Chapter Outline:

CHAPTER 2: EXISTING CONDITIONS

2.0 Overview

In order to increase Carrboro's bronze level Bicycle Friendly Community (BFC) rating, it is important to understand how Carrboro has achieved this accomplishment and the deficiencies that currently keep the Town from a higher ranking. Also, to propose a comprehensive engineering, education, encouragement, and enforcement approach, it is critical to examine the existing environment, demographics, and ongoing programs for bicyclists. The area's geographic and demographic characteristics significantly affect the everyday transportation decisions made by bicyclists, pedestrians, and motorists.

A comprehensive research approach was implemented consisting of intensive research, analysis, fieldwork, Geographic Information Systems (GIS) analysis, existing plan review, and Steering Committee meetings. The result of this effort is the foundation for the recommendations found later in this Plan. The findings are presented below.

2.1 History of Bicycling

Carrboro has a very extensive history of bicycle planning and facility development, unique in comparison to other North Carolina communities. Early efforts were very progressive for the State and have led to the extensive system of bicycle facilities found today. The existing physical network of bicycle lanes and off-road paths is a significant reason Carrboro was recognized nationally as a BFC.

A local bicycle advocacy group, the Carrboro Cyclists, formed in 1974 to lobby for roadway improvements. The Carrboro Bikeways Project Plan, the first bicycle plan in the Town's history, was created in 1980. This Plan addressed the needs of bicycle commuters, school children, university students, utilitarian cyclists, and recreational cyclists. This bicycle group was the first in North Carolina to specifically advocate for bicycling needs. The first bicycle lane was built in 1980 on Jones Ferry Rd..

Throughout the 1980s and 1990s, the Town of Carrboro was very active in developing policies for bicycle facility development, education, and safer operation. Bicycle lanes and paths were installed as a result of Town funding (its bonding authority), NCDOT funding, and through development requirements. The Town amended its street standards to include bicycle lanes on all collector roads with its very progressive 1989 Bicycle and Sidewalk Policies.

Today, the community is still one that is bicycle friendly, advocating for bicycle safety. On any given day, bicyclists can be seen on many roadways in Carrboro. Key gaps in the bicycle network, which will be described on the next few pages, tend to be relics of difficult design solutions due to environmental and right-of-way constraints. One of the goals of this Bicycle Plan is to continue what was started back in the 1970s: expanding the bicycle network, programs, and policies to make Carrboro even more bicycle friendly.



Fig. 2-1 - 2-3. From left: A cyclist makes use of the bicycle lane on Jones Ferry Rd.; shared road signage on Estes Dr.; and bicycle lanes on Main St.

2.2 Current Bicycle Conditions

Current bicycling conditions in Carrboro reflect the Town's hard work and progress over the last 30 years. Most of the arterial streets have some sort of bicycle facility, with many having bicycle lanes. With 12.8 miles of bike lanes, 4.1 miles of paved shoulders, and over 5 miles of off-road bikeways, Carrboro boasts one of the most extensive networks of bicycle facilities in the state (See Map 2.1). Still, there is room for improvement in terms of connectivity, safety, and accessibility. Roadway data was observed, collected and examined to determine opportunities and constraints for proposed bicycle facilities and results are shown in Table 2-1 on page 2-4 and 2-5. For a thorough examination of Carrboro's existing level of bicycle friendliness, see Table 2-5 on page 2-17 of this chapter.

Friendliness

Carrboro ranks among the top communities in the nation for bicycle friendliness. This is due in large part to the number and quality of bicycle facilities present in the Town. In fact, the League of American Bicyclists cited Carrboro's bike facility engineering as one of the community's major strengths. The overall bicycle friendliness generated by the well-designed facilities is evidenced by a steady increase in bicycle activity that has occurred on numerous facilities located throughout the town. A mobility report containing data collected between 2003 and 2005 shows over 10% increase in bicycle facility usage in downtown Carrboro during that time period[1]. Based on an online comment form that was established at the start of this planning effort, 70% of respondents reported having a bike path, greenway trail, or bike lane within a half mile of their home, and over 93% of those reported using those facilities regularly. It is apparent from these results that Carrboro has done a fair job of making its facilities accessible and enjoyable. More detailed results of the online comment form can be found in Appendix B: Public Input.

1 *Carrboro's 2005 Mobility Report Card*, by LSA Associates, Inc. January 2006.

Bicycles on Buses

Chapel Hill Transit bus routes traverse Carrboro along major roadways including Greensboro St., Smith Level Rd., Hillsborough Rd., Old Fayetteville Rd., Main St., NC 54 bypass, Davie Rd., and Weaver St., reaching such destinations as Downtown Carrboro, McDougle School, and Carrboro High School. Buses are equipped with bicycle racks on the front. Buses provide free, regular service across Carrboro and Chapel Hill throughout the year providing bicyclists the opportunity to "trip-chain," using multiple modes of transporation to reach their destination.

Deficiencies

While most of the arterial roads in Carrboro have bicycle lanes or wide shoulders, there are certain road corridors and intersections where deficiencies exist that present problems to both recreational and commuter riders alike. As automobile traffic has increased alongside bicycle ridership, safety issues have arisen in areas due to conflicts between the two user groups. According to data gathered during this planning process, bicyclists in the Carrboro community cite lack of bicycle facilities, gaps in bicycle facilities, narrow roads, and high automobile speeds as the top four major impediments to bicycling. The majority of survey and workshop respondents in Carrboro (77%) find the bicycling conditions in the Carrboro area to be "fair," indicating

Fig. 2-4. Although the crosswalk makes this road more user friendly, a bicyclist's comfort level is questionable on Greensboro St.

Fig. 2-5. The bike path at the PTA thift shop approaches an intersection that provides little if no facilities to safely cross on a bicycle.

the need for further improvements. Listed below are some examples of often-cited deficiencies as well as how to improve them.

On-road Bicycle Facilities

According to the public comment form responses, the top three roadway corridors in need of improvements are **Estes Dr., South Greensboro St., and Old NC 86**. All three of these corridors present dangers to bicyclists who must ride with heavy, often high-speed auto traffic. Estes Dr., for example, is dangerous because the wide shoulders do not continue the full length of the road to N. Greensboro St., forcing bicyclists heading towards Carrboro to merge into the stream of traffic on a narrow and steep section of the roadway.

The corridors along Main St. E., E. Weaver St., and North Greensboro St., in the central business district of downtown, also lack bicycle facilities. The high levels of automobile traffic and numerous intersections on these streets make them especially hazardous for bicyclists traveling within Carrboro as well as between Carrboro and Chapel Hill.

Connectivity to Off-Road Paths

There are also gaps between on-road facilities and off-road facilities that present safety and accessibility concerns for bicyclists. The Libba Cotten bike path provides a safe off-road route to Chapel Hill and the University, but in order to reach it from points to the west, bicyclists must negotiate at least one major intersection without bicycle facilities of any kind. Similarly, the PTA bike path offers bicyclists route which bypasses the Main/Greensboro and Main/Weaver/Roberson intersections; however, bicyclists from the north must use W. Main St. (a segment without any bicycle facilities) to get to the path. Additionally, the PTA bike path leads the bicyclists to the Carr/Greensboro intersection that can be difficult to cross.

The Roberson Place bike path offers a safe route from southern Carrboro to the Libba Cotten bike path, but is not well known to many bicyclists and lacks adequate signage at both the entry and exit points. The Frances Shetley bike path provides a nice shortcut from Carrboro Elementary to Greensboro St., but deposits bicyclists directly into a dangerous intersection with no safe way of accessing Estes Dr.. These are all examples of well-designed bicycle facilities that are made less effective by gaps in facilities surrounding them. Carrboro should continue to collaborate with the Town of Chapel Hill to identify popular destinations and ensure that there are adequate bicycle facilities connecting these destinations. With over 40% of bicyclist respondents in Carrboro feeling most comfortable on off-road paths or clearly designated bike lanes, it is important that these users be able to navigate their way between such facilities with ease and comfort.

Traffic Conditions

Although over 46% of bicyclist respondents in Carrboro report being comfortable riding on the road with automobiles in all situations, heavy and high-speed traffic are nonetheless cited by many bicyclists as presenting major impediments to bicycling. South Greensboro St. at Smith Level Rd. is especially dangerous, and motorists are often heading to or from Highway 54, and thus are generally traveling at higher speeds than desirable for bicyclists shar-

(continued on page 2-6)

Fig. 2-6. Downtown corridors have high levels of bicycle use, but lack facilities.

	Carrboro Bicycle Plan Roadway Inventory					
Sheet	**Roadway Segment**	**From**	**To**	**Width**	**# Traffic Lanes**	**Configuration**
1A	**Old 86**	Hickory Forest	Hogan Hills	21'	2	Undivided
1B	**Old 86**	Hogan Hills	Dairyland/Homestead	21.5'	2	Undivided
2A	**Dairyland**	86	Union Grove	21.5'	2	Undivided
2B	**86**	Dairyland	Farmstead	21.5'	2	Undivided
3A	**86**	Farmstead	Strowd	21'	2	Undivided
3B	**86 (Old Fayetteville)**	Strowd	54	21'	2	Undivided
4A	**86 (Old Fayetteville)**	54	Jones Ferry	30'	2	Undivided
4B	**Jones Ferry**	Old Greensboro	Old Fayetteville	21.5'	2	Undivided
5A	**Jones Ferry**	Old Fayetteville	Davie	75'	6	Divided/Median
5B						
6A	**Berry Hill**	Jones Ferry	West Brook	34'	2	Undivided
6B	**Smith Level RD**	Rock Haven	15-501	23'	2	Undivided
7A	**Smith Level RD**	Rock Haven	NC 54	?	2	Undivided
7B	**Eubanks**	86	Rogers	20.5'	2	Undivided
8A	**Rogers**	Eubanks	Homestead	20'	2	Undivided
8B	**Homestead**	Rogers	Old 86	25'	2	Undivided
9A	**Estes**	MLK	Greensboro	30'	2	Undivided
9B	**James**				2	Undivided
10A	**W. Main**	NC 54	Hillsborough	36'	2	Undivided
10B	**Hillsborough**	Main	Greensboro	34'	2	Undivided
11A	**Greensboro**	Hillsborough		36'	2	Undivided
11B	**W Main**	Hillsborough	Jones Ferry	44'	4	Undivided
12A	**S Greensboro**	Main	NC 54	21'	2	Undivided
12B	**Weaver**	Main	Greensboro	30'	2	Undivided
13A	**Fidelity**	Main	Davie	36'	2	Undivided
13B	**Poplar**	NC 54	Davie	34'	2	Undivided
14A	**Pathway**	Cates Farm		34'	2	Undivided
14B	**East Main**	Weaver	Rosemary	46'	4	Undivided

Table 2-1. Roadway Inventory based on field work examinations done by the Consultant.

Roadway Segment	Speed Limit	Shoulder Score[1]	Prelim. Rec.[2]	Req'd for Imp.[3]	Preliminary Field Recommendations and Notes
Old 86	45	3	PS	EW	future park (Twin Creek); elementary school, rural, but growing
Old 86	45	3	PS	EW	expanding Hogan Hills Road
Dairyland	45	2	PS	EW	generally flat shoulder in areas; slopes extreme in some spots
86	45	2	PS	EW	high priority area. Farmstead toward 54-shoulder begins
86	35	CBS	None	None	McDougle Elementary - existing bicycle lane
86 (Old Fayetteville)	35	2	BL	EW	
86 (Old Fayetteville)	35	2	BL	EW	opportunity for bike lane-wide shoudler from 54 to just past Lacock; SW present one side
Jones Ferry	45	3	PS	EW	Bike Route #2, bridges (2); narrow and needs expansion
Jones Ferry	35	CBS	BL		overpass (54)
Berry Hill	25	CBS	BL	EW	New connections to University Lake/Old Fayetteville, new neighborhood-Park and Ride past University Lake
Smith Level RD	45	2	PS	EW	Speed goes from 35-45-40
Smith Level RD	35	2	PS/BL	EW	Bridge/overpass @ 54/School
Eubanks	45	1	PS	EW	Construction happening at school (road widening)- north side has a bit of ditch
Rogers	40	2	PS	EW	Property along road. Parts are good.
Homestead	45	3	PS/BL	EW	Shoulders need maintenance. Needs further evaluaton-numerous new developments
Estes	35	3	PS/BL	EW	Bottleneck toward Greensboro-shoulder ends on one side just before trailhead, fill in ditches-
James	25	2	SR		Traffic calming/ residential
W. Main		CBS	BL	None	Bike lanes
Hillsborough	35	??	None	None	Bike lanes
Greensboro		CBS	None	None	
W Main		CBS	BL	Req'd for Imp.3	Bike lanes
S Greensboro	35	3	PS/BL	EW	
Weaver	25	CBS	BL	EW	Long term restripe, make wider bike lanes
Fidelity	25	CBS	BL	Req'd for Imp.2	Bike striping (shoulder)
Poplar	20	CBS	None	None	Bike lanes (marked)
Pathway	25	CBS	None	None	Bike lanes- residential setting
East Main		CBS	BL		

**Estimate Only*

[1]1 = clear space of 10-12' free of obstructions, grade similar to roadway; 2 = somewhat buildable, narrower, more frequent obstructions, steeper grade; 3 = severe slopes, ditches, trees, unbuildable without major construction effort; CBS = curb both sides; CN = curb north side; CE = curb east side; CS = curb south side; CW = curb west side

[2]SR = shared/signed roadway; WOL = wide outside lane; PS = paved shoulder; BL = bicycle lane; SP = side path; SH = sharrow

[3]These actions are required for all preliminary recommended changes: N = none; RO = restripe only; RR = restripe with road diet; EW = expand total road width

Top Six Locations of Repeated Bicycle Crashes

Site	Number of Crashes
Main Street and Lloyd Street	12
Main Street and Rosemary Street	6
Weaver Street and Roberson Street	5
Weaver Street and N Greensboro Street	5
Jones Ferry Road and NC 54	5
Main Street and Jones Ferry Road	4

Table 2-2. Top six locations of repeated bicycle crashes in Carrboro.

ing the roadway. In addition, S. Greensboro St. is narrow and lacks paved shoulder space. Similarly, Old NC 86 is narrow and has posted speed limits of 40-45 miles per hour with an absence of traffic signals or major intersections. Intersections such as Estes Dr. and N. Greensboro St.; N. Greensboro St. and Weaver St.; and N. Greensboro St. and Main St. experience heavy traffic volumes throughout the day and especially at peak hours, presenting great difficulties for bicyclists attempting to navigate their way safely.

Over half of Carrboro bicyclist respondents claim that increased enforcement of laws applying to motorists would encourage them to bike more often. When asked about typical motorist behavior in the Carrboro area in the public comment form, over half of respondents believe that motorists pass too closely and/or drive too fast. While increased enforcement of speeding laws would undoubtedly help, there also need to be improved bicycle facilities including shared roadway signs and, where possible, bike lanes.

2.3 Crash Data

As presented in Chapter 1, one of the goals of this plan is to increase the safety of bicycle activity in the Carrboro area. To assess the current level of safety for bicycle activity, information about bicycle crashes was gathered for the Town of Carrboro (data from NCDOT Traffic Safety Unit). Bicycle crash reports were analyzed and mapped for a 17-year period, 1990-2006 (See Map 2.2). Key findings about bicycle crashes in Carrboro are listed below. It should be noted that not all bicycle crashes were reported.

- There were a total of 88 bicycle crashes reported in Carrboro between 1990 and 2006.

- There was an average of roughly 6 bicycle crashes reported in the Town of Carrboro each year.

- There were no bicyclist fatalities during the time period. However, 12 bicycle crashes resulted in a disabling injury, and an additional 47 crashes resulted in some other type of evident injury.

- 75% of bicycle crashes occurred during the day (6am-6pm). 25% of crashes occurred during the evening and overnight hours (6pm-6am).

In general, bicycle crashes were concentrated in downtown corridors with high levels of both automobile and bicycle traffic. Many of the crashes occurred at intersections where there are no bicycle facilities, or where bicycle facilities end. Many of these intersections and corridors have also been listed by Carrboro citizens as areas of concern. Therefore, many of the bicycle facility improvements listed in the recommendations chapter are for these roadway corridors and intersections.

The top six locations of repeated bicycle crashes are shown in Table 2-2 above. The top corridor for bicycle crashes is clearly Main St. between Rosemary St. and Jones Ferry Rd., with the number of crashes at the intersection with Lloyd St. being particularly high relative to the rest of Carrboro. The Jones

Fig. 2-7. A bicyclist attempts to navigate himself safely through the intersection of Main St. and S. Greensboro St.

Ferry Rd. corridor from Main St. to NC 54 is another area that has seen repeated crashes, in particular near the entrance to NC 54. The third corridor where there have been high numbers of crashes is the N. Greensboro St. corridor from Weaver St. to Estes Dr.

2.4 Bicycle Conditions at Destinations

A successful bicycle plan relies on an integrated set of connections between major nodes and destinations. However, in order for these connections to function properly, the destinations need to include programs and facilities that encourage and accommodate bicycle use. The American League of Bicyclists considers parking and employer ordinances that provide showers and changing facilities as critical for creating a bicycle-friendly community.

Major destinations were examined in Carrboro to determine both the strengths and weaknesses of these areas. Facilities examined included bicycle parking, storage facilities, and showers. Other amenities such as water fountains, bike maps, and roadway conditions were also examined and are discussed here.

Carrboro has a large number of bicycle facilities connecting many of the destinations examined below. Many of the more popular destination areas, such as Carr Mill Mall and downtown, have bicycle parking racks. However, other destinations have a noticeable lack of bicycle facilities, including Carrboro Plaza, Harris Teeter, and the Willow Creek shopping center. Also, the elementary, middle, and high schools located in Carrboro offer bicycle parking racks, but use could be improved with some added facilities and programs. Overall, there are more options in terms of accessibility and parking for bicyclists in Carrboro than in other North Carolina localities, but there are a number of things that could be done by the Town as well as employers and other entities to encourage more people to travel to the Town's numerous destinations by bicycle. For example, none of the destinations have sheltered racks, and there are no bicycle route maps available at any of the locations. Making foldable bicycle maps available is not only a great way to educate people about the location of bicycle facilities and convenient travel routes, but also a medium for promoting programs meant to encourage bicycle use.

The following destinations, or trip attractors, are discussed in more detail below and displayed in Map 2.3.

Carr Mill Mall

Carr Mill Mall lies at the heart of Downtown Carrboro, with Weaver Street Market acting as the focal point for many citizens' daily activities. The north side of Carr Mill Mall has about 20 bike parking spaces, however only about 8 spaces that allow locking. This area experiences very high bicyclist use. Currently there are no employee shower facilities of any kind at this destination, and storage lockers are provided on an employer-by-employer basis.

Weaver Street Market

Weaver Street Market has bicycle racks to accommodate the large number of bicyclists who visit on a daily basis. The east side of Weaver Street Market has bike racks capable of accommodating approximately 40 bicycles at a time, with the west side having approximately 24 parking spaces.

Figs. 2-8 & 2-9. The parking lot of Carr Mill Mall (left); and Weaver Street Market (right); two of the most popular places in Carrboro to bicycle to.

Harris Teeter
Harris Teeter is located adjacent to Carr Mill Mall. This grocery store was observed as having some of the busiest activity at all times of the day. Considering the high use of this destination, the existing bicycle parking facilities are inadequate for both employees and customers. There are approximately 16 bicycle parking spaces, only 7 of which allow locking. The bike racks should be improved to allow all bikes to be locked and to accommodate more bicycles overall. There are water fountains located inside near the store's restrooms; however, there is no signage alerting bicyclists to their presence. According to one manager, there are no showers or locker facilities of any kind for employees wishing to commute by bicycle.

Downtown Shopping
Downtown Carrboro offers a number of shopping opportunities for both visitors and residents alike. Many of the shops and other businesses located Downtown have bicycle facilities of some kind, but overall, downtown Carrboro could be more bicycle friendly with some targeted improvements. In total, there are over 80 bicycle parking spaces on either side of Greensboro St. between Roberson St. and Main St. Main St., the major downtown thoroughfare, does not have an adequate number of bicycle racks. Armadillo Grill, located on the corner of Main St. and Roberson St. features one small bike rack, while the Arts Center development includes 12 bicycle parking spaces. There are also no water fountains outside of popular destinations or sheltered parking for any of the bicycle facilities.

Arts Center/Cat's Cradle
The Arts Center, located off Main St., is another major destination in Carrboro. Interestingly, there are only 12 bicycle parking spaces available. Currently, the site is planned for redevelopment, and should incorporate bicycle facility improvements.

Carrboro Plaza/Food Lion
Carrboro Plaza is located near the intersection of Main St. and NC 54, and sees mostly automobile traffic due to its overall lack of bicycle facilities and relative inaccessibility. There are 12 bicycle parking spaces located at the rear end of the Plaza (south entrance). There is also a 6-space bike rack located at the Credit Union.

Wilson Park
There is one bike rack located at Wilson Park with room for about 7-9 bikes. There is also a water fountain on site; however, it is currently not operational. Bicycle lanes begin along Greensboro St. north of the park entrance, although there are no bicycle lanes running south from the park. The entrance to Wilson Park can be dangerous for bicyclists exiting southbound, because there is no crossing facility.

Anderson Park
There are two bike racks at Anderson Park that provide a total of 24 bicycle parking spaces.

MLK Park
According to the new CIP (2009/2010 - 2014/2015) MLK Park is scheduled for Phase One development in 2011-2012. The park is located off Hillsborough Rd., north of Greensboro St., and will include a community playground, play fields, a bird sanctuary

Fig. 2-10 & 2-11. Wilson Park (left), is a popular destination however in need of increased bicycle parking; and bicycle-friendly Carrboro Elementary (right).

and public gardens. The space is currently open to the public and houses a community garden and open play field. MLK Park's proximity to neighborhoods and its location off Hillsborough Rd. make it a primary destination for bicycling, and facilities should be made available during development.

Carrboro Elementary School

Carrboro Elementary School is a bicycle friendly school in Carrboro. While there could be more covered bicycle parking (there are only spaces for approximately 16 bicycles), the overall accessibility is superior to any of the other schools examined. Hillsborough Rd., which serves as the main roadway for accessing the school, has bicycle lanes on both sides. Also, the school has access to a greenway that runs adjacent to the school grounds and connects to Greensboro St. These features, combined with the quiet residential streets surrounding the school, make it no wonder that children and parents can often be seen riding bicycles to school on weekday mornings.

Carrboro High School

Carrboro High School is located on Smith Level Rd. and Rock Haven Rd., and incorporates a number of bicycle facilities, including bicycle lanes on roadways leading up to the school and signage, as well as over 40 bicycle parking spaces. While the destination itself is very bike friendly, Smith Level Rd. is in need of bicycle facility improvements, as is discussed further in Chapter 3: Bicycle Network Plan. At the time of the study, it is unknown whether the school has programs in place meant to encourage students to bike to school.

McDougle Schools

McDougle Middle School and McDougle Elementary School are located on Old Fayetteville Rd. near the western edge of Carrboro off NC 54. Old Fayetteville Rd. has bicycle lanes leading to-and-from the schools and the campus has a path from Quail Roost Rd. to the track. The Middle School has approximately 40 bicycle parking spaces, while the Elementary School has approximately 22 spaces. At the time of the study it is unknown whether the schools have programs in place meant to encourage students to bike to school.

Frank Porter Graham Elementary School

Frank Porter Graham Elementary is located at the intersection of Smith Level Rd. and NC 54, and as such, encounters a heavy amount of traffic near the school entrance during peak hours. Unfortunately, there are no bicycle lanes leading up to the school, making it unlikely that students will risk traveling to school by bike. However, there is a bicycle rack located at the school, with spaces for approximately 12 bicycles. As with the other schools in Carrboro, making improvements to on-campus bicycle facilities will help, but the greatest improvements will come from making improvements to the roadways leading to and from the school. Proposed greenway planning efforts are underway for the Morgan Creek corridor, scheduled to begin in 2009. At the time of the study, it is unknown whether the school has programs in place meant to encourage students to bike to school.

Fig. 2-12. Town Commons, location of the Carrboro Farmers' Market, is a spectacle of residents and visitors on bikes.

Chapel Hill High School, Smith Middle School, and Seawell Elementary

This trio of schools is located in the Town of Chapel Hill, just across the Carrboro boundary line. This large property adjoins Carolina North Forest. This is a significant destination with three schools ranging from elementary to high school located next to one another. While unpaved trails lead to this site from the Carolina North Forest area, roadways leading to the school have no bicycle facilities. Homestead Rd. offers a stretch of existing bicycle lane nearby but Seawell School Rd. and Chapel Hill High School Rd. lack bicycle facilities. There are bicycle parking racks on campus. At the time of the study, it is unknown whether the school has programs in place meant to encourage students to bike to school.

Town Hall/Town Commons

The Carrboro Farmers' Market, currently held at the Town Commons, is in operation year-round, but is especially busy during the fall, spring, and summer. There are close to 28 spaces for bicycles. Often times during the market, people will leave their bikes unlocked leaning against either a rack or sign, and there does not seem to be a demand for more security due to the presence of people at all times. There is only one bicycle rack with spaces for two bikes at the entrance to Town Hall, which should be increased if employees are to be encouraged to commute by bicycle. The intersection at the street leading to the Farmer's Market/Town Hall can be tricky to navigate on a bike.

Willow Creek Shopping and Office Center

The Willow Creek center is located on Jones Ferry Rd. immediately south of the NC 54 overpass, and serves as a shopping center for many people living in the southern part of Carrboro. Neither the commercial center nor the office center has bicycle racks of any kind. There are also no bicycle facilities leading up to this destination. This makes it very unlikely that people will travel to this destination by bicycle, though there were some bicyclists observed who were using staircase railings and other unofficial structures for locking their bicycles.

University Lake Park N' Ride

The Park N' Ride is located on Berryhill Rd. near University Lake serves as the public transportation hub for many Carrboro citizens. It has approximately 12 bicycle parking spaces, but no other bicycle facilities of any kind. Given the large number of residences located in close proximity to this destination, making changes in ancillary features such as increased bicycle parking, water fountains, and storage lockers could improve the number of people bicycling to the stop instead of driving.

Fig. 2-13. University Lake Park N' Ride is in need of ample bicycle parking.

Fig. 2-14. A commuter cyclist on Cameron Ave. in Chapel Hill. Chapel Hill is a major regional connector for Carrboro.

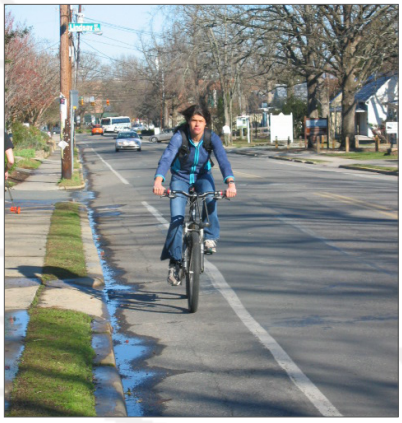


Fig. 2-15. The bicycle lanes on Main St. are good facilities; however, efforts should be made to provide facilities that extend to the intersection with Jones Ferry Rd.

2.5 Current Bicycle Use

With the relatively large number of bicycle facilities Carrboro has to offer, it is no wonder that many residents bike to destinations such as the nearby college, grocery stores, parks, and neighbors' homes. What may come as a surprise is that there are near equal numbers of recreational and utilitarian bicyclists. Approximately 36% of bicyclists in Carrboro bike regularly on-road for fitness or recreation, and approximately 34% of bicyclists report bicycling regularly for short, utilitarian trips. While 30% of bicyclists questioned responded that they regularly commute by bicycle, census data on the entire population shows lower numbers for the population as a whole. Census data provides information regarding the means of transportation to work and an important starting point to understanding current use.

Carrboro Mode Share Statistics

Regarding commuting patterns, the mean travel time to work for Carrboro residents is about 19 minutes, four minutes lower than the State average. While a number of people live and work in Carrboro/Chapel Hill, there are a number of commuters to Research Triangle Park, Durham, and Raleigh. Here is how Carrboro residents get to work:

Means of Transportation to Work, Carrboro, NC (2000)

Workers over age of 16, 2000 Census: 10,066 (100%)

Drove alone	6,640	(66.0%)
Carpooled	1,174	(11.7%)
Bus or trolley bus	915	(9.0%)
Taxi	0	(0%)
Motorcycle	13	(0.1%)
Bicycle	**520**	**(5.2%)**
Walked	**396**	**(3.9%)**
Other means	31	(0.3%)
Worked at home	377	(3.7%)

Source: U.S. Census Bureau, Census 2000 Summary File 3, Table P30 Means of Transportation to Work.

There is a significant difference between the number of people bicycling/walking to work as compared to driving to work. This is very typical across the United States (refer to Table 2-3). At 5.2%, Carrboro has the second highest percentage of bicycle commuters in the state (Ocracoke, at 5.9%, has the highest percentage). It is far more common throughout the State of North Carolina and the country to have more pedestrian commuters than bicycle commuters within each community. Carrboro is an exception showing that residents are comfortable riding a bicycle to their work destination.

A bicycle mode share of 5.2% is a significant number but still a small percentage compared to automobile

Fig. 2-16. A woman boards the local transit bus on Old Fayetteville Rd.

Fig. 2-17 & 2-18. A commuter cyclist (left) and recreational cyclists (right) in Carrboro.

commuters. But, consider the fact that this percentage only represents bicycle commuting. According to the comment forms tabulated as part of this planning process, 30% of bicyclists regularly commute by bicycle, 36% of bicyclists bicycle regularly for fitness or recreation along with 34% bicycling regularly for short, utilitarian trips (in addition to those who bicycle to work). Therefore, the number of bicycle commuters reported by the Census Bureau for Carrboro (520) only represents a portion of the bicycling population which also includes children and those who may not own a vehicle.

Table 2-3 below shows how Carrboro stacks up locally, statewide, and nationally in terms of bicycle commuting.

When compared to cities and towns that represent model bicycling communities, the Town of Carrboro still appears to have plenty of room for improvement. Still, the Town is leading the way in North Carolina. Chapel Hill, as an adjoining municipality, also ranks in the Top 10 in the State in bicycle percentage mode share.

Percentages for Bicycle Commuting (2000): Comparison of National, Statewide, and Local Examples

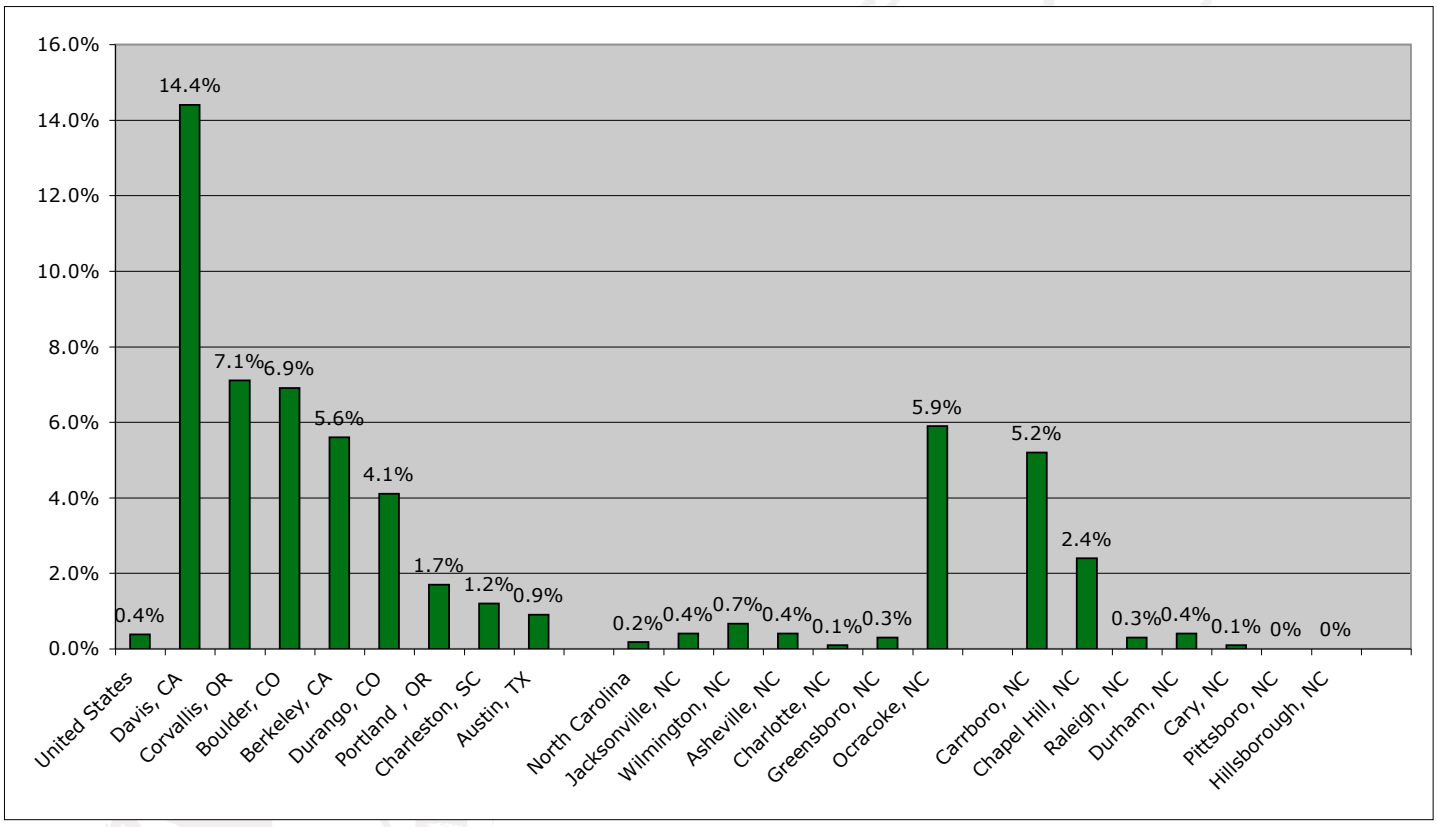


Table 2-3. Source: U.S. Census Bureau, Census 2000 Summary File 3, Table P30 Means of Transportation to Work.

Fig. 2-19. A commuter bicyclist in Downtown Carrboro.

2.6 Current Demand

A variety of demand models are often used to quantify usage of existing bicycle facilities and to estimate the potential usage of new facilities. The purpose of these models is to provide an overview of the demand and benefits for bicycling in Carrboro. As with all models, the results presented show a range of accuracy that can vary based on a number of assumptions and the available data. The models used for this study incorporated information from existing publications as well as data from the U.S. Census. All data assumptions and sources are noted in the tables following each section of the analysis. The Carrboro bicycle demand model consisted of several variables, including commuting patterns of working adults and predicted patterns for area students. For modeling purposes, the study area included all residents within the Town of Carrboro in 2000. Commuter trips from the rural areas of the county were not counted in the model due to the travel distances involved and the limits of available data. The information was ultimately aggregated to estimate the total existing demand for bicycle facilities in the town.

Table 2-4 identifies the variables used in the model. Data regarding the existing labor force (including number of workers and percentage of bicycle commuters) was obtained from the 2000 Census. The 2000 Census was also used to estimate the number of children within the study area. This figure was combined with data from National Safe Routes to School surveys to estimate the proportion of children riding bicycles to and from school. College students constituted a third variable in the model due to the presence of the University of North Carolina in Chapel Hill. Data from the Federal Highway Administration regarding bicycle mode share in university communities was used to estimate the number of students bicycling to and from campus. Finally, data regarding non-commute trips was obtained from the 2001 National Household Transportation Survey to estimate bicycle trips not associated with traveling to and from school or work. Table 2-4 summarizes estimated existing daily bicycle one way trips in Carrboro. The table indicates that around 18,000 bicycle trips are made on a daily basis. The model also shows that non-commuting trips comprise the vast majority of existing bicycle demand.

Table 2-4. ***Current Demand Model for One-Way Bicycle Trips in Carrboro*** *(to be used as a model estimate only).*

Variable	*Figure*	*Calculations*
Employed Adults, 16 yrs and older		
a. Study area population[1]	16,782	
b. Employed persons[2]	10,066	
c. Bicycle commute percentage	5.2%	(b*c)
d. Bicycle commuters	520	
School Children		
e. Population, ages 6-14[3]	1,928	
f. Estimated school bicycle commute share[4]	2%	
g. School bicycle commuters	39	(e*f)
College Students		
h. Full-time college students[5]	27,500	
i. Bicycle commute percentage[6]	10%	
j. College bicycle commuters[7]	1,375	[(h*i)/2]
Work and School Commute Trips Subtotal		
k. Daily commuters subtotal	1,934	(d+g+j)
l. Daily commute trips subtotal	3,868	(k*2)
Other Utilitarian and Discretionary Trips		
m. Ratio of "Other" trips in relation to commute trips[8]	3.7	Ratio
n. Estimated non-commute trips	14,311	(l*m)
Total Estimated Bicycle Trips in Study Area per Day	**18,179**	**(l+n)**

Notes:
Census data collected from 2000 U.S. Census for Carrboro.
(1) 2000 U.S. Census, STF3, P1.
(2) 2000 U.S. Census, STF3, P30.
(3) 2000 U.S. Census, STF3, P8.
(4) Estimated share of school children who commute by bicycle, as of 2000 (source: National Safe Routes to School Surveys, 2003).
(5) Full-time enrollment (source: University of North Carolina-Chapel Hill).
(6) Review of bicycle commute share in 7 university communities (source: National Bicycling & Walking Study, FHWA, Case Study #1, 1995).
(7) Assumes half of college bicycle commuters ride through Carrboro city limits.
(8) 27% of all trips are commute trips (source: National Household Transportation Survey, 2001).

2.7 Demographics

To demonstrate local needs, it is critical to understand demographic patterns and composition. The U.S. Census Bureau provides data that helps us understand those patterns, as it pertains to bicycling or the potential need for bicycling improvements. In general, the population of Carrboro has increased very little since 2000, but has the potential for growth with new development and to feel the effects of growth in neighboring Chapel Hill. Considering more specific items such as population density, median family income, vehicle ownership, and bicycle mode share in a geographic context provides additional criteria for considering the facility and prgrammatic recommendations as described in the next few chapters of this Plan.

Map 2.4 shows population density throughout the Carrboro and Chapel Hill area. Due to development decisions in the past, the Town is relatively compact, with most major destinations reachable by most of the population in a one-mile radius.

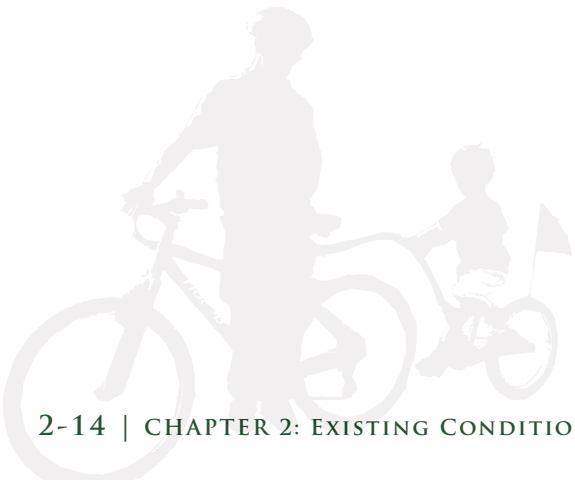


Fig. 2-20. More educational programs will need to reach out to specific user groups, such as these Latino children who are not wearing helmets.

More important to examine are conditions within each household. These census maps may express a strong need for bicycling infrastructure and programming. For example, the median family income map (Map 2.5) displays areas in which households may not own enough vehicles to provide for necessary trips and may feel a strong impact from rising gas prices. It is critical to provide bicycle connections to these areas creating viable means of transportation for bicyclists.

Even more specific, Map 2.6 presents those block group areas in which persons may not own a motor vehicle. Very high percentages can be found throughout the entire study area with the highest percentages found in and around downtown Carrboro and Chapel Hill. This pattern can be explained by both economics but also by more progressive decision-making by some Carrboro citizens to not own a vehicle and to walk or bicycle instead. Map 2.7 presents the percentage of people bicycling to work by block group. Again, the block groups that are found within the core Carrboro area have higher bicycle mode share. This is likely because of the reasonable distances between people's homes and their employers.

A bicycle-friendly community is one that provides facilities and programming for everyone. In many cases, underrepresented minority groups may live in the lower-income areas in which car ownership is not as high and bicycling is more of a necessity as displayed in the maps. Latino groups often face difficulties because of a language barrier. According to the League of American Bicyclists, it is critical to reach out with educational, encouragement, and enforcement programming to all groups in the community. When striving to become more bicycle-friendly, the Town of Carrboro will need to be proactive in involving everyone, including these communities.

2.8 Land Use Patterns

Carrboro has worked since the 1970s to promote compact land use. Carrboro is quite compact with 85% of the population living within two miles of Downtown. These development patterns make bicycling a realistic means of travel to destinations within town. The land use map can be seen in Map 2.8.

By maintaining an urban services boundary, Carrboro has discouraged development in the rural areas directly west of the Town, and has been able to increase density, ensure provision of adequate public facilities, and in general maintain a size that is friendly for bicyclists and pedestrians, as well as public transportation. However, development is occuring on the town's fringe, expanding growth away from Downtown. Bicycle facilities have been slow to expand to newly developed areas, and certain developments require crossing major intersections to access downtown and other commercial centers. In order for residents to have an adequate number of transportation options, the lack of bicycle facilities in these areas should be addressed.

Development in outlying areas is not the only land use pattern that raises concern over bicycle facilities. With numerous future developments already approved for the downtown area, including the Roberson Square mixed use development, the Alberta

Fig. 2-21. A bicyclist making a left-hand turn on the Libba Cotten Bikeway.

Fig. 2-22. Carrboro proudly displays its designation status on Estes Dr.

mixed use, and 300 E. Main project, all of which will likely contribute to increasing auto traffic, steps must be taken early to ensure bicycle facilities are not overlooked. As the populations of both Carrboro and Chapel Hill continue to grow, it is critical to treat transportation and land use issues as codependent, not mutually exclusive.

The Town of Carrboro, with an urban services boundary approach and strong bicycle facility policy, has helped its status as a BFC. There are still land use, development, and policy ordinances that can be enhanced to make Carrboro even more bicycle-friendly. For example, the Town does not have a bicycle parking ordinance that provides requirements to commercial, multi-use, and multi-family developments. A number of revisions and updates are detailed in Chapter 5 with policy recommendations.

2.9 Bicycle-Friendly Community Summary

The existing conditions analysis supports Carrboro's bicycle friendly designation but also makes clear that there are many opportunities for the Town to continue along it's path towards more comprehensively integrating bicycling as a key mode of transportation. There are needs for engineering, education, encouragement, enforcement, and evaluation improvements in the Town. The requirements of the American League of Bicyclists in its designation of communities represent a comprehensive, exhaustive list that makes a community bicycle-friendly. For the Town of Carrboro to rise to a Platinum-level designation in the future, it will need to continue its excellent tradition but also expand upon what it has done, especially involving all items in the list. This Plan provides a guide for the Town to follow in order to achieve its goal of Platinum level.

The table on page 2-17 was developed from the American League of Bicyclists BFC community application question list. The table displays what Carrboro has already achieved in its existing conditions. Later in Chapter 6: Implementation, a similar table will be displayed that addresses items that Carrboro can do to improve its bicycle friendliness.

The five E's are communicated throughout this document in multiple chapters, with their respective solutions outlined in the following sections:

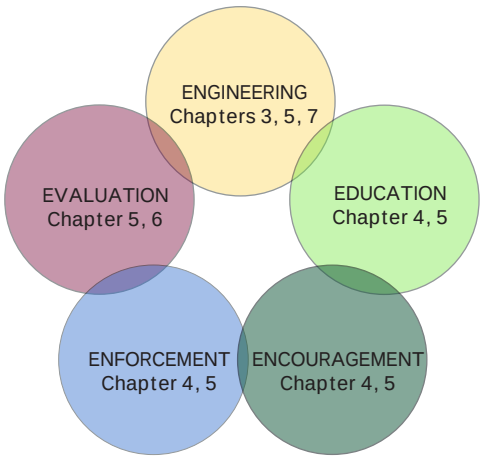
Engineering Solutions: Chapter 3: Bicycle Network, Chapter 5: Bicycle Policies & Chapter 7: Design Guidelines

Education Solutions: Chapter 4: Program Recommendations & Chapter 5: Bicycle Policies

Encouragement Solutions: Chapter 4: Program Recommendations & Chapter 5: Bicycle Policies

Enforcement Solutions: Chapter 4: Program Recommendations & Chapter 5: Bicycle Policies

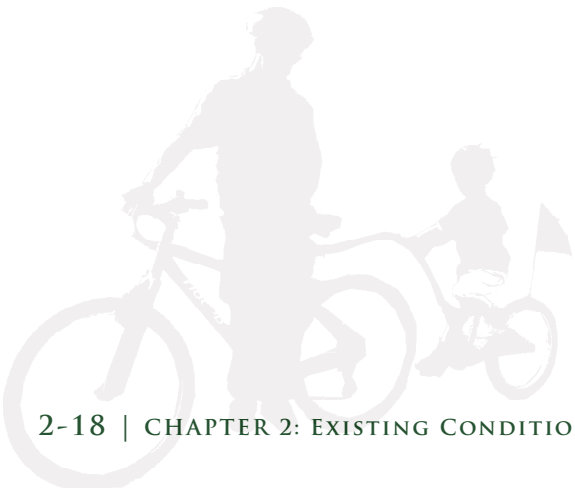
Evaluation Solutions: Chapter 5: Bicycle Policies & Chapter 6: Implementation



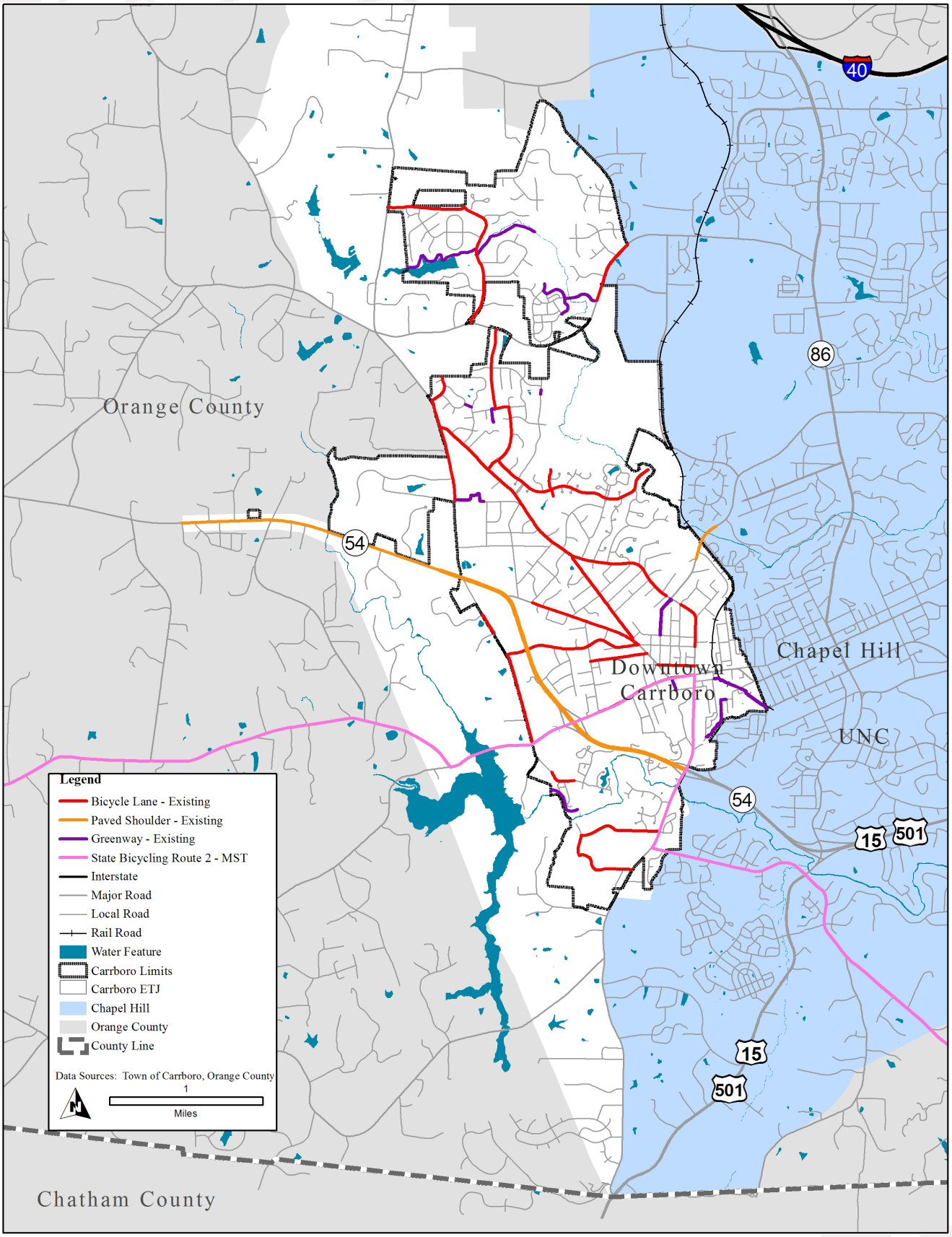
		EXISTING CONDITIONS	
	DETAILED BFC* AUDIT	CARRBORO'S EXISTING CONDITIONS	CURRENT LEVEL OF ACCOMPLISHMENT (Good/Fair/Poor)
ENGINEERING	NEW ROAD CONSTRUCTION	Bike Lane requirement on all collector roads-as street standards	Good
	TOWN STAFF TRAINING PROGRAMS	Last program was SRTS in 2005 sponsored by NCDOT	Poor
	BRIDGES	6 of 7 bridges have bicycle facilities; State ordinance	Good
	BIKE PARKING	Carrboro's Land Use Ordinance provides for a reduction in the required amount of (1) auto parking spaces if bicycle parking is provided	Fair
	BIKE RACKS/STORAGE UNITS	At most major destinations	Fair
	TRANSIT SERVICE AND BIKES	Chapel Hill Transit offers bike racks	Fair
	BIKE FACILITY MILEAGE	56 miles of bike lanes	Good
	ARTERIAL STREETS	53% have lanes or shoulders	Good
	BIKE ROUTES	3 miles	Fair
	MAINTENANCE PROGRAMS	The Town regularly sweeps bike lanes, prohibitions on parking in bike lanes are enforced, signs and pavement reg. Inspected; NCDOT and the Town include restriping of bike lanes in their routine maintenance as well as bike lane clearing. No maintenance rec'd in CIP	Good
	INTERSECTIONS	N/A	Poor
	PAVED BIKE TRAILS	4 miles of off-road bikeways	Fair
	MOUNTAIN BIKING	Healthy off-road trails budget	Fair
	BICYCLIST OPEN SPACE	N/A	Poor
	EMPLOYER BIKE ORDINANCE	N/A	Poor
	RECREATIONAL FACILITIES	Most occur in Orange County	Fair
EDUCATION	MOTORIST EDUCATION	STR signage	Poor
	ADULT BICYCLE EDUCATION	Driver license training and exam, brochures from FHWA; The ReCYCLEry, a non-profit organization that helps to educate bicyclists on maintenance and repair	Fair
	BICYCLE SAFETY PROGRAM FOR CHILDREN	"Basics of Bicycling" course for fourth and fifth graders developed by NCDOT B+PT. 5 out of 5 schools participate	Fair
	PUBLIC BICYCLE SAFETY	Brochures rom FHWA in english and spanish	Fair
	BICYCLE AMBASSADOR PROGRAM	N/A	Poor
	LEAGUE CYCLING INSTRUCTORS	3 individuals within 35 miles	Good
	ROUTINE LOCAL SAFETY EDUCATION	Chapter 6 of the ND Driver's Handbook	Fair
ENCOURAGEMENT	NATIONAL BIKE MONTH	Posters and flyers are posted, targeted emails	Fair
	BIKE TO WORK DAY	Posters and flyers are posted, targeted emails	Fair
	ANNUAL COMMUNITY BIKE TOUR	Rural Heritage Tour (Bikefest), Cycle North Carolina	Fair
	BIKE CLUBS	Carolina Tarwheels	Good
	SPECIALTY BIKE SHOPS	2 in Carrboro	Good
	BIKING CENTERS	N/A	Poor
	MTB TRAIL PATROL	N/A	Poor
	BICYCLE RENTAL	The BUB program, bicycle rentals at local bike specialty shops	Good
	SRTS PROGRAM FOR BICYCLING	Carrboro Elementary; awarded a SRTS Action Plan Grant for 3 schools (2 elementary and 1 middle) in 2008	Good
	YOUTH RECREATION + INTERVENTION	N/A	Poor
	BIKE MAPS	Online map - needs graphic improvement	Poor
	MTB TRAILS	N/A	Poor
	OTHER EFFORTS	The Town cosponsors Senior Games which includes cycling events; BUB hubs (a bike share program)	Fair
ENFORCEMENT	LOCAL POLICE INPUT	Police Department monitors the newspaper as well as speaking with the general public, bicycle advocacy groups, and local biking enthusiasts; Liason to the Bicycle Plan steering committee is an unofficial bicycle liason	Fair
	POLICE OFFICER TRAFFIC TRAINING	All police officers receive Law Enforcement Training	Good
	TARGETED ENFORCEMENT	Used to encourage all aspects of safe driving	Poor
	PUBLIC SAFETY EMPLOYEES ON BIKES	The option is available to use bikes as routine patrol (currently understaffed)	Fair
	MANDATORY HELMET LAW	16 and under required to use helmet	Fair
	MANDATORY SIDEPATH LAW	State Law, not enforced	Poor
EVALUATION + PLANNING	NUMBER OF BIKE TRIPS	Mobility Report Card was prepeared in 2003 and 2005 with 12-hour monitoring	Good
	CYCLIST/MOTORIST FATALITIES in past 5 years	0	--
	CYCLIST/MOTORIST CRASHES in past 5 years	25	--
	CRASH REDUCTION PROGRAMS	HSRC study should be addressing	Fair
	PUBLIC COMMENTS SYSTEM FOR OFFICIALS	CBTP, Transportation Advisory Board, Board of Aldermen floor requests	Fair
	COMPREHENSIVE BICYCLE PLAN	2008-2009 Bicycle Plan (ongoing)	Good
	TRAILS MP FOR MTB	N/A	Poor
	BICYCLE NETWORK + FUTURE DEVELOPMENT	All new projects with collector roads must include bike lanes; any new projects improving an arterial or collector must include bike lanes	Good
	PRIORITIZATION IMPROVEMENTS	2008-2009 Bicycle Plan (ongoing)	Fair
	BICYCLING IMPROVEMENTS	2008-2009 Bicycle Plan (ongoing)	Fair
	WHY A BFC	N/A	--
	TOP THREE IMPROVEMENT PROJECTS	CONTINUE TO IMPLEMENT Bicycle Policy and Greenways Plan; Continue to work to educate motorists, more adult education, SRTS prgrams, Bike to Work Day/Month	--
	*BFC=Bike Friendly Community		

Table 2-5. Carrboro's existing Bicycle Friendly Community level of accomplishment.

2.10 Existing Conditions Maps

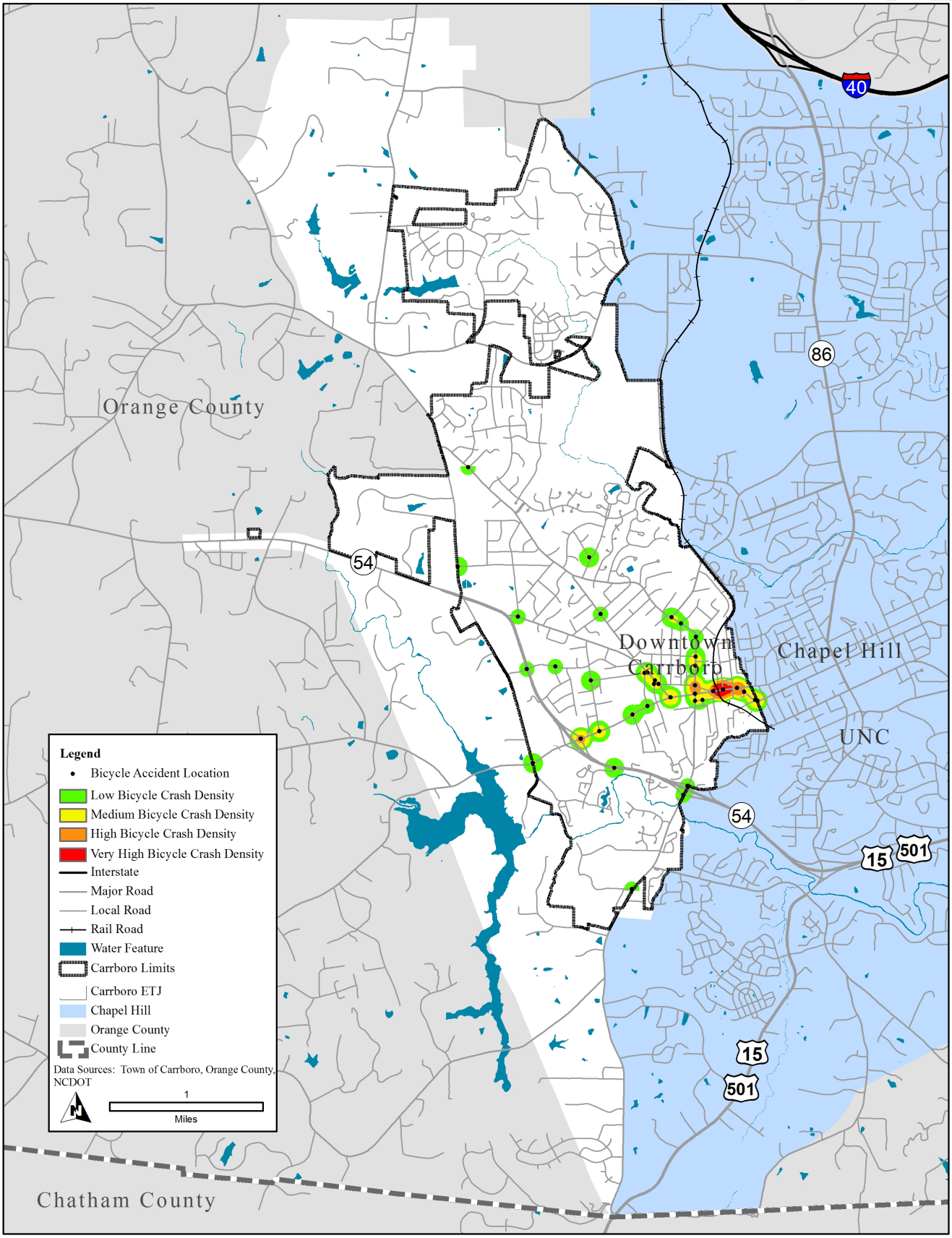


MAP 2.1: EXISTING BICYCLE NETWORK



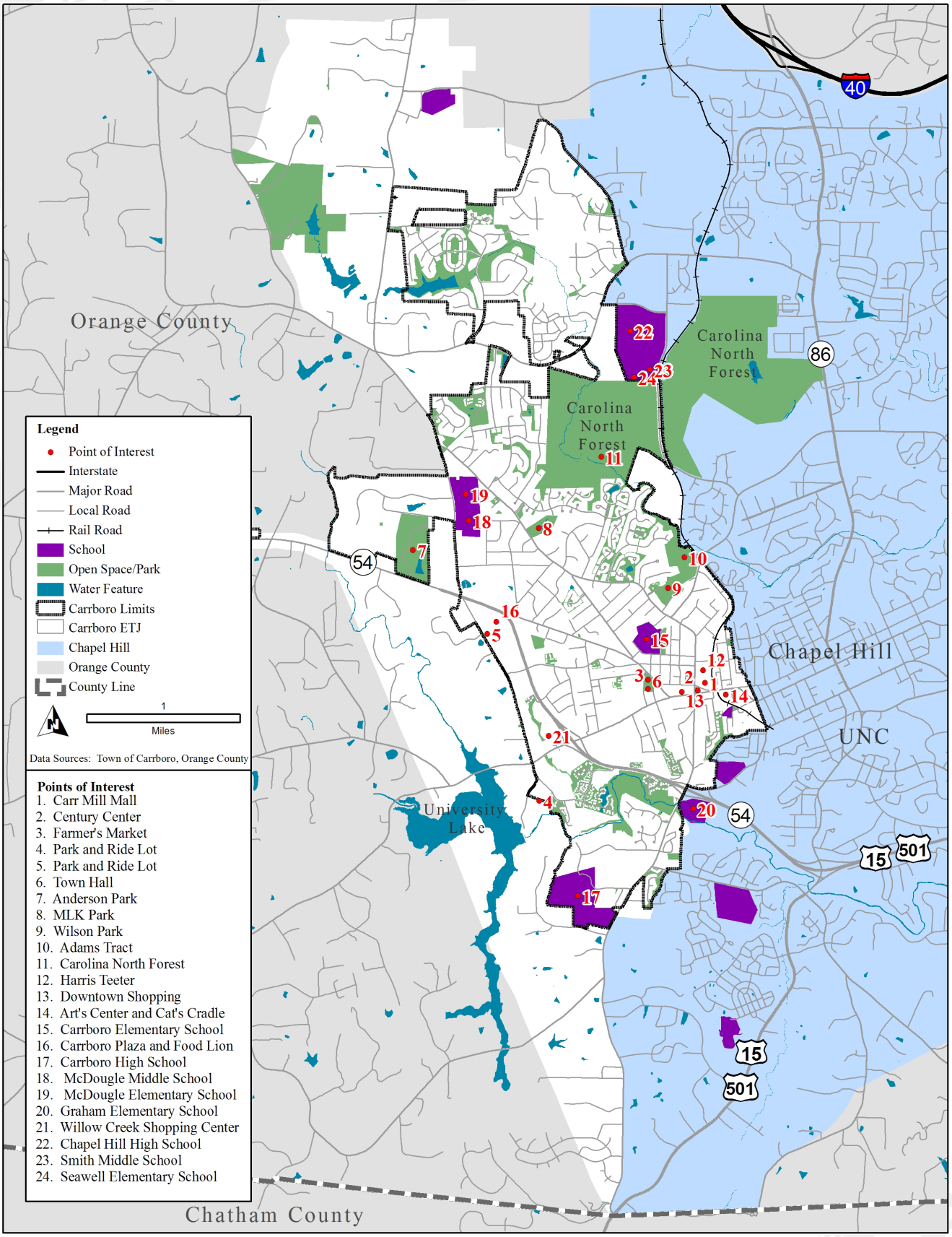
There are a significant amount of bicycle facilities in the Carrboro city limits, but gaps are still present. Bicycle lanes (in red) were identified in fieldwork. Paved shoulders (in orange) connect Carrboro to neighboring Chapel Hill and greater Orange County. NC Bicycling Route 2 (Mountains to Sea Route) runs east-west through the center of Carrboro.

Map 2.2: Bicycle Crash Density



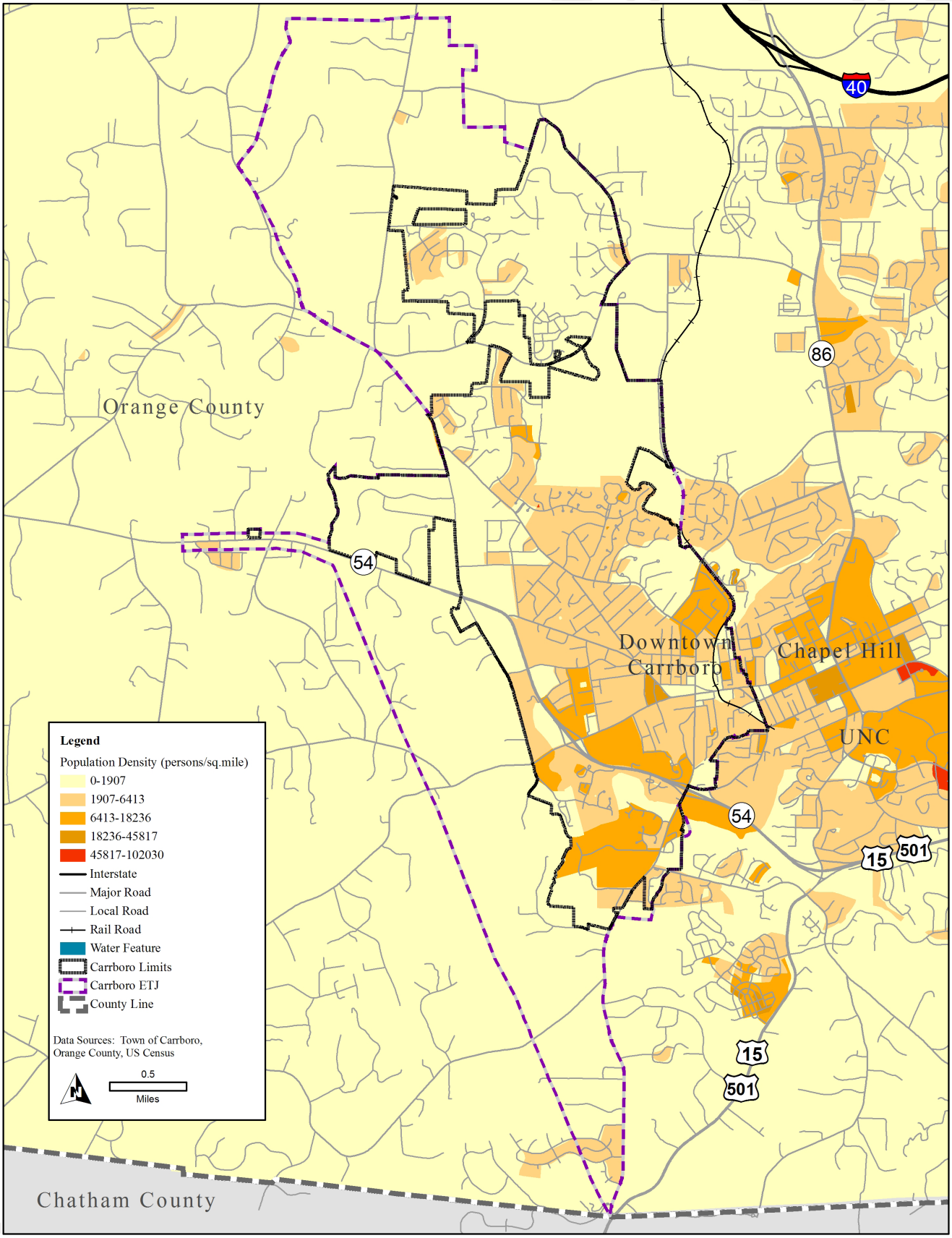
Recorded crash data shows that the majority of incidents have occurred along East Main St. and Greensboro St. Other roadways with crashes include Jones Ferry Rd. and NC 54. These crash sites are often at intersections, the places where bicyclist and motorist interaction is greatest. For top locations of crashes, see Table 2-2 on page 2-6.

MAP 2.3: PLACES OF INTEREST IN CARRBORO



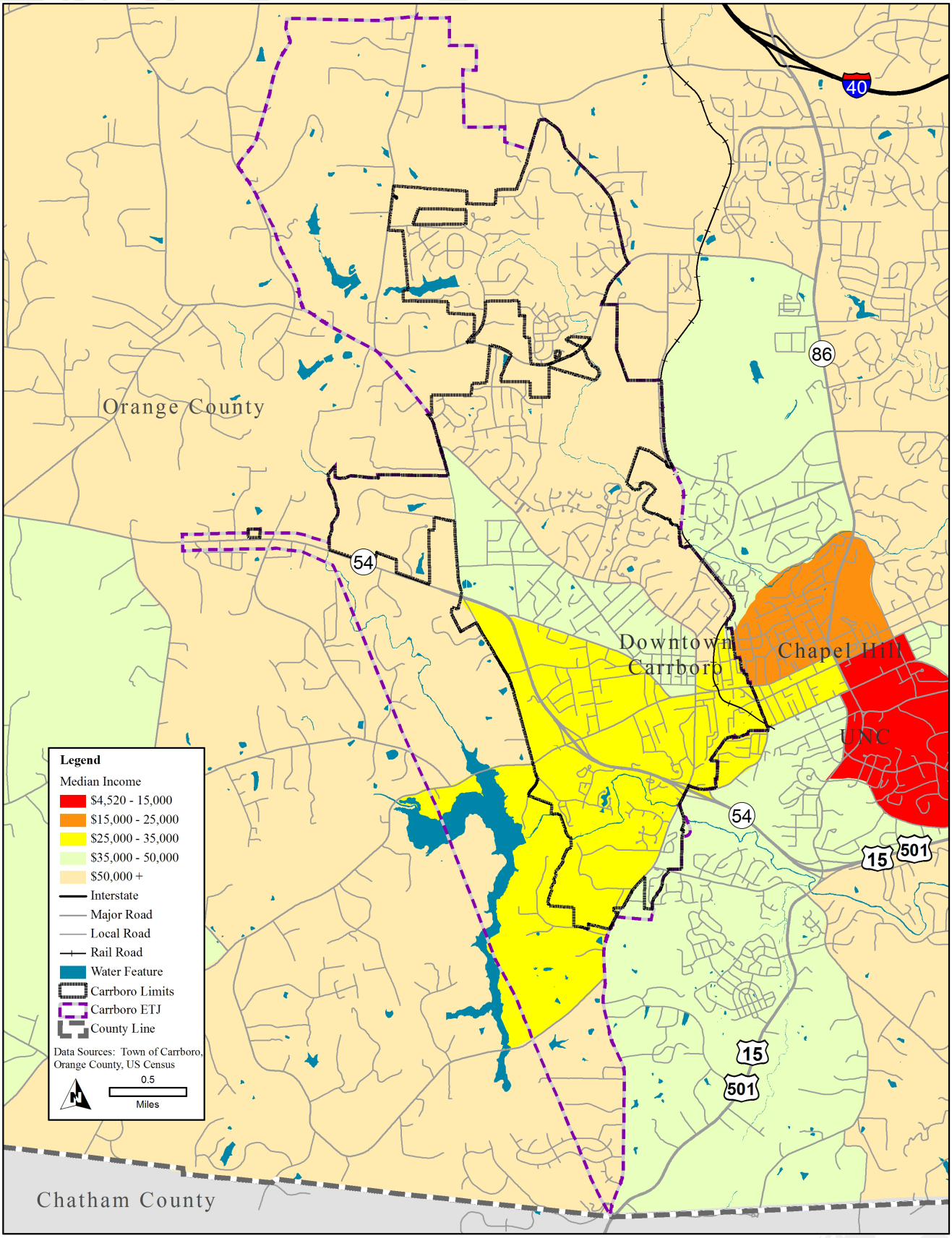
Destinations are numerous throughout Carrboro. Popular places of interest include Carr Mill Mall, the Farmers' Market, and the Century Center, which all offer bicycle parking or other facilities that accommodate bicyclists.

Map 2.4: Population Density



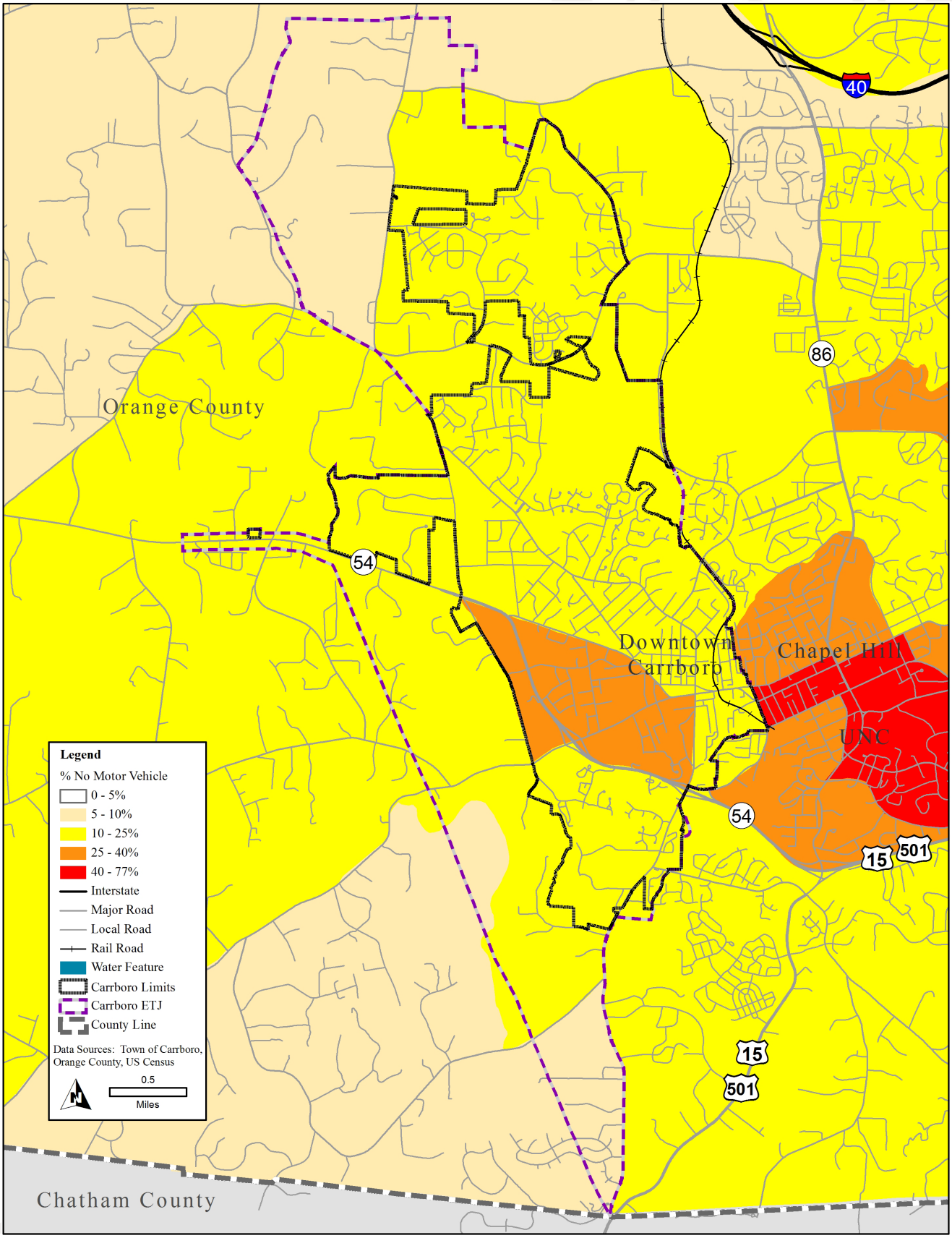
Population density provides a snapshot of the distribution of Carrboro area residents.

MAP 2.5: MEDIAN FAMILY INCOME



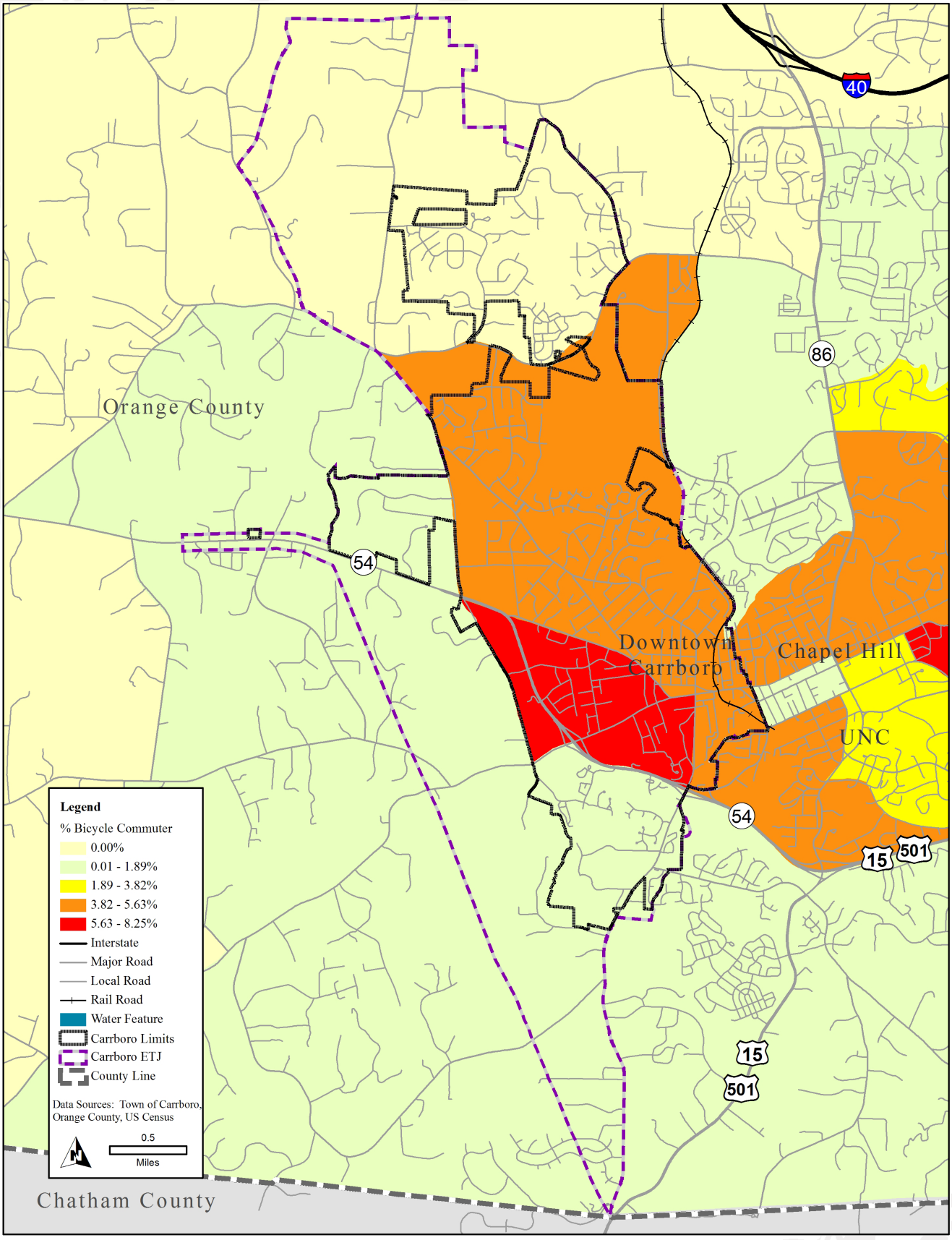
The 2000 census data for median family income is portrayed here at the block group level. Some of these areas may display more need with lower car ownership, and higher gas prices.

Map 2.6: Percentage of Workers without Vehicles



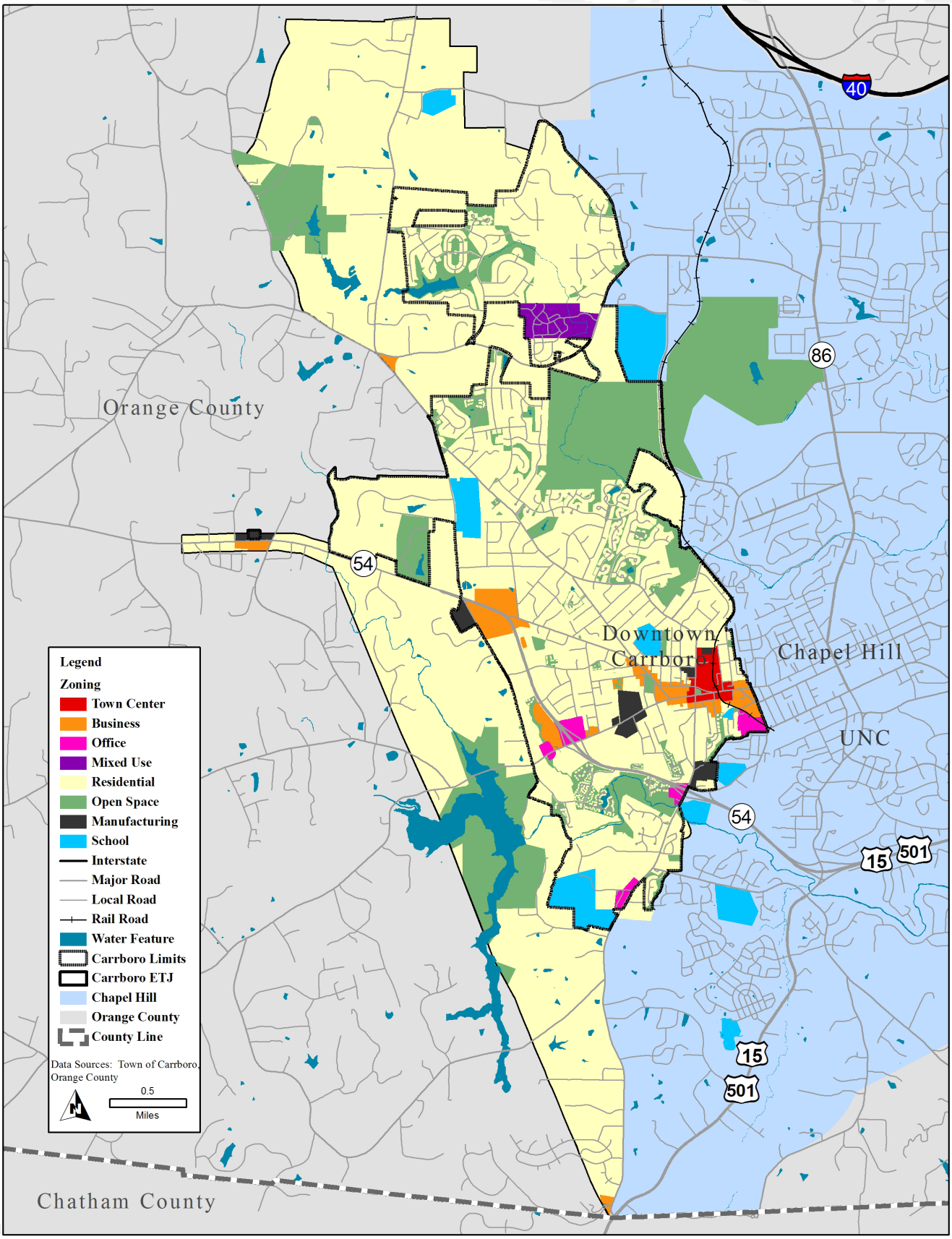
This 2000 census data displays block groups in which automobile ownership is lower, indicating possible need for bicycling facilities

Map 2.7: Percentage of Workers Commuting by Bicycle



The 2000 census data is portrayed here at the block group level. Overall, Carrboro has a high mode share percentage of bicycle commuters. Areas displaying the highest percentages are concentrated in the downtown area.

Map 2.8: Land Use



One goal of the network recommendations will be to connect these different land uses.