Town of Carrboro

Comprehensive Bicycle Transportation Plan

ADOPTED BY THE BOARD OF ALDERMEN
MARCH 24, 2009

Prepared for:
The Town of Carrboro, North Carolina
Prepared by:
GREENWAYS INC.
planning & design for open space, parks, trails, & alternative transportation

Division of Bicycle & Pedestrian Transportation

Town of Carrboro

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Prepared For:
The Town of Carrboro
301 W. Main Street
Carrboro, North Carolina 27510

Prepared By:
Greenways Incorporated

January 2009

Acknowledgements

Town of Carrboro

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EXECUTIVE SUMMARY

Vision and Goals

The Town of Carrboro is recognized regionally for its strong sense of community, cultural diversity, and proactive citizen involvement. A large part of Carrboro's community and identity is its bicycle friendliness. In 2001, Carrboro was recognized as the first community in the State of North Carolina to be a Bicycle Friendly Community. The Town was awarded a bronze-level designation from the League of American Bicyclists.

To further distinguish itself as a national model for bicycle-friendly communities, Carrboro applied for, and received, an NCDOT Bicycle and Pedestrian Planning Grant for the development of a comprehensive bicycle transportation plan. Through this Plan, Carrboro is making a commitment to improving bicycle facilities and programs within the Town. These efforts would continue to improve citizens' quality of life, reduce auto dependency, and increase community connections. In January 2008, the Town commissioned Greenways Incorporated to prepare a Comprehensive Bicycle Transportation Plan with the following vision:

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

Research and design was performed in close collaboration with the Carrboro Planning Department and a specially appointed project Steering Committee. In addition, public input was obtained through workshops, a comment form of interests and needs, and a thorough review of existing plans, each of which included previous public input. The resulting Plan has a series of recommendations: a proposed Bicycle Network of on- and off-road facilities that safely accommodate varying levels of bicyclists traveling for transportation, recreation, and health, and detailed policies and programs that will help the Town implement this Plan. Specifically, the goals of this Plan are:

1. To have bicycling as a viable transportation alternative throughout the Town and for all trip purposes.
2. A continuing process for reviewing, updating, and implementing bicycle-related policies.
3. A robust comprehensive bicycle program that incorporates engineering, education, encouragement, enforcement and evaluation programs.
4. A safe and accessible network of bicycle facilities.

The Town of Carrboro recognizes the importance of accommodating bicycle travel as a viable transportation mode and to create safe, convenient and efficient transportation opportunities for residents and visitors that choose to bicycle throughout the community. This Plan provides a comprehensive approach toward identifying existing and future bicycle needs and deficiencies, a route network to address those deficiencies, a method to examine optimal design and policy improvements, and implementation strategies for the development of quality bicycle facilities and programs. If executed, it will make Carrboro a candidate for platinum-level designation as a Bicycle Friendly Community with the League of American Bicyclists.



Existing Conditions Analysis

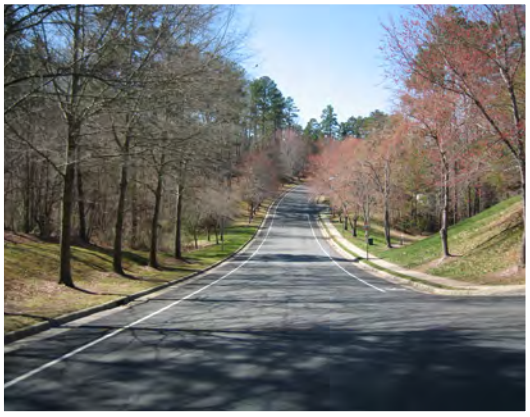
Background
The consultant team conducted an in-depth analysis and evaluation of current conditions for bicycling, including current bicycle conditions, crash data, bicycle facilities at destinations, bicycle use and demand, demographics, and land use.

Use of GIS
Geographic Information Systems (GIS) data were collected by the consultant from the Town of Carrboro, including bicycle crash data from the NCDOT Traffic Safety Unit and the 2000 Census. The existing bicycle network was supplemented with crash data mapping and analysis, trip attractors, population density, income levels, transportation data, and land use to provide a comprehensive map and tool for developing the recommended bicycle network.

Fieldwork
Fieldwork was a critical element of existing conditions analysis. Gaps in the existing bicycle system, possible off-road greenway corridors, and intersections were examined and inventoried. A digital photo inventory was collected for locations throughout Carrboro. Fieldwork allowed for the direct experience of being a cyclist in the town.

Public Input
Significant public input was gathered from multiple efforts throughout the planning process, which helped shape the outcome of a majority of the recommendations in this Plan. Public input was solicited via two public workshops, public outreach, and paper and online comment forms. Approximately 100 people provided input at the two workshops through direct conversation with the consultant and Town staff, map markups, and comment forms. 396 citizens completed either the paper or online comment form, which contained 32 questions relating to bicycling and demographics.

Needs Analysis
The need and demand for a more accessible, safe and functional bicycle system throughout Carrboro continues to grow. Although Carrboro is nationally-recognized for its bicycle friendliness, citizens have expressed concern about cyclist safety and a desire for more and better facilities. This was clearly articulated by the residents who attended the public workshops, and was even more evident in the additional feedback gathered through public comment forms. In addition, Carrboro's high quality of life and commitment to compact land use will continue to draw newcomers wanting to enjoy a less car-centric lifestyle. As such, it is expected that bicycle travel will continue to increase, making cyclist accommodation and protection paramount in the future. These needs can be met with a comprehensive system of on-road and off-road bicycle facilities along with the programs, policies, and funding to support the recommendations in this plan.



Existing Plans
Numerous plans, guidelines, ordinances, and strategies have addressed issues related to bicycle planning in Carrboro, such as transportations, development, and land use. These were examined and integrated into the development of this Plan.

Bicycle Network Recommendations

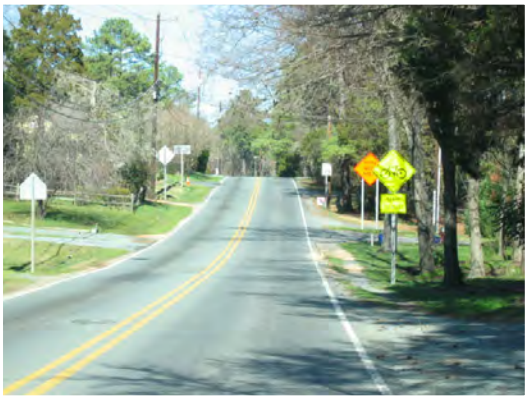
This Plan recommends the implementation of an additional 54 miles of bicycle facilities, including paved shoulders, bicycle lanes, sharrows, sidepaths, intersection improvements and off-road trails. These facilities are recommended in phases, and are prioritized for implementation. Recommended improvements 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.

In order to prioritize bicycle network projects, the Steering Committee developed a prioritization matrix based on the following criteria, from most valued to least valued:

- Top 1-5 public requested
- Top 6-10 public requested
- Direct access to/from a school
- Direct access to/from an existing greenway
- Connections to Downtown
- Direct access to/from an existing (or funded) bicycle facility
- Direct access to/from higher density residential areas
- Top 11-20 public requested
- Elementary & middle school proximity
- High school proximity
- Parks/rec/playground proximity
- Regional connection and/or highway crossing
- Integrates with bus route network
- Direct access to/from future development
- Direct access to/from a proposed greenway
- Direct access to commercially zoned areas
- Direct access to mixed use areas
- Route with a reported accident

PHOTO RENDERINGS

ON-ROAD FACILITIES



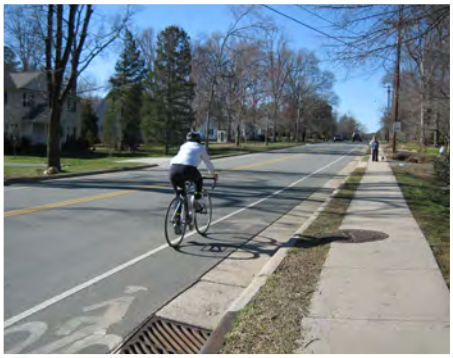
Although 12.8 centerline miles of on-road bicycle facilities exist currently throughout Carrboro, gaps between corridors create a lack of connectivity between destinations. An additional 12.2 miles of corridor facilities, such as bicycle lanes along Estes Dr. (shown above), could close gaps and accommodate bicyclists.

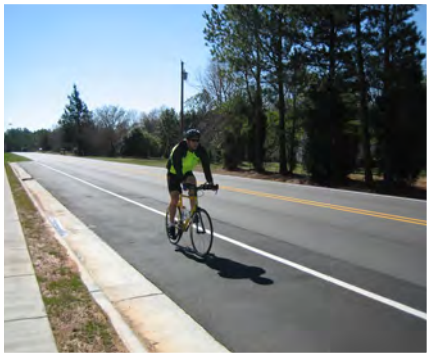
INTERSECTIONS

Intersections throughout Carrboro were inventoried to determine if treatments were needed to improve legibility and safety. High-visibility ladder-style crosswalk markings, bike boxes, and colored bicycle lanes, as shown above at the intersection of Main St. and Jones Ferry Rd., all contribute to a more visible crossing environment for cyclists and motorists.

GREENWAYS

Greenways in this Plan refer to off-road, multi-use paved pathways for both recreation and transportation. The greatest opportunities for these in Carrboro are the future Bolin and Morgan Creek Greenways. The renderings above illustrate how the existing sewer easement can be used to provide an alternative bicycling experience to Wilson Park and N. Greensboro Rd.





The top 10 priority corridor improvements identified by the matrix are described in the table below:

TOP 10 PRIORITY CORRIDOR SEGMENTS

Corridor	From	To	Interim Treatment[1]	Cost
Smith Level Rd.*	NC 54	Rock Haven Rd.	Paved shoulders on both sides	$456,000
Estes Dr.*	N. Greensboro St.	Town limits	Wilson Park Greenway	$175,000
Homestead Rd.*	High School Rd.	Stratford Dr.	Enforcement/Share the Road signage (2)	$400
S. Greensboro St.*	Weaver St.	NC 54	Alternate routing on Old Pittsboro Rd./ Signage (4)	$1,000
Old Fayetteville Rd.*	Hillsborough Rd.	NC 54	Enforcement/Share the Road signage (2)	$400
Smith Level Rd.*	Rock Haven Rd.	Damascus Church Rd.	Enforcement/Share the Road signage (2)	$400
Old NC 86*	Homestead Rd.	Hillsborough Rd.	Enforcement/Share the Road signage (2)	$400
Shelton St.**	N. Greensboro St.	Hillsborough Rd.	Sharrow (20)	$1,300
N. Greensboro St.*	Estes Dr.	Shelton St.	Maintenance/repaint existing lanes & symbols	$2,080
N. Greensboro St.*	Shelton St.	Weaver St.	Sharrow (8)	$520

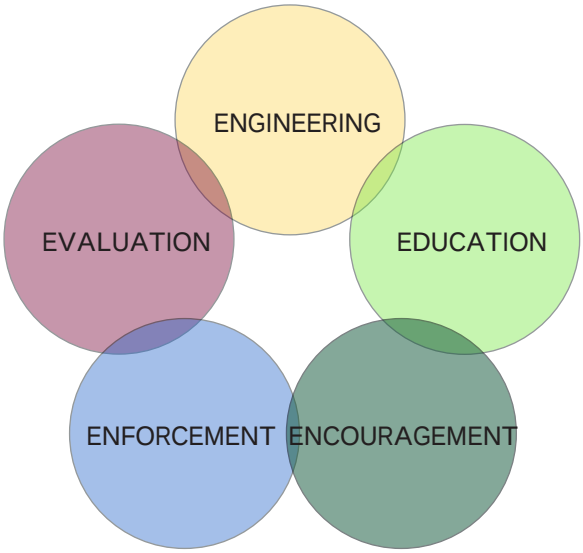
**Roadway owned by NCDOT* ***Roadway owned by Town of Carrboro*

[1] *Long-term treatments can be found in Chapter 3: Bicycle Network Plan*



Because intersections are critical locations in terms of bicyclist safety, this Plan identifies key intersections in need of specific improvements. The majority of these locations are multi-lane roadways with high-volume traffic and corridors that connect multiple uses and large populations. As a response to citizen-reported preference for off-road facilities as primary bicycle routes, the Plan also identifies two greenway corridors- Bolin Creek Greenway and Morgan Creek Greenway- as important connections within the Town of Carrboro.

Lastly, this Plan encourages the Town of Carrboro to maximize its efforts and link bicycle facilities to neighboring and regional destinations. It is recommended that the Town of Carrboro coordinate its Bicycle Network with those of the Town of Chapel Hill, UNC-Chapel Hill, and Orange and Durham Counties to create long distance connections for alternative transportation and recreation. Specific regional routes for which to consider connections include NCDOT's State Bicycle Route #2, the future Morgan and Bolin Creek Greenways, the American Tobacco Trail in Durham County, and ultimately the East Coast Greenway.



Program and Policy Recommendations

Achieving the goals of the Carrboro Bicycle Transportation Plan will require more than the installation of recommended bicycle facilities. A comprehensive approach that promotes and encourages proper use and enjoyment of the system will not only help meet mode-share goals, but will also help meet the needs of all types of bicyclists that cannot be met through facility construction alone.

Programs

The programs recommended by the Plan address education, encouragement, and enforcement. The Town should work closely with local volunteers and community organizations to implement events and activities, research new program ideas, and improve upon existing programs. Primary among these efforts is the development of a citizens' Bicycle Advocacy Group to champion the recommendations and implementation of the Plan. This advisory group would meet quarterly and would be a beneficial resource for promoting bicycle safety, providing feedback on opportunities and obstacles within the bicycle network, and assisting in the coordination of events and outreach campaigns. The Bicycle Advocacy Group would function as a separate, non-Town entity; however, it would be critical for the group to coordinate and collaborate with the Carrboro Transportation Advisory Board and the Greenways Commission to ensure proper communication and integration of efforts.

Specific program recommendations may be found in the tables at the end of this Executive Summary.

Policies

Developing a comprehensive, safe, accessible, connected bicycle network will require strong policies to ensure proper development. This planning document supercedes the 1989 Bicycle Policy. New policies enhancing the old policy include additional bicycle facility options, enhanced programming, and a bicycle parking ordinance. These changes will help the Town of Carrboro meet the needs of bicyclists through plan implementation.

Specific policy recommendations may be found in the tables at the end of this Executive Summary; short-term policy recommendations are listed below:

- Update the 1989 Bicycle Policy with this plan
- Expand the bicycle parking ordinance for new development

Implementation

An implementation plan is required to best realize the facilities, programs, and policies recommended in this Plan. Such a plan should include a monitoring and evaluation process to ensure that the programs and policies are effecting the desired results. The key actions in the implementation of this Plan are as follows:

- Implement the priority bicycle network projects identified by this plan.
- Create the necessary governance capability and administration capability to oversee plan implementation and facility maintenance.
- Secure the funding necessary to immediately begin the short-term phase work and maintenance operations, and start working on a strategy to fund the physical, policy and program modifications over a 5-10 year period.
- Produce a user-friendly Carrboro Bicycle Map that shows existing facilities as well as recommended cycling transportations routes.
- Start educating and building awareness by holding a public event to announce the adoption of the bicycle plan and some of the upcoming projects.
- Coordinate the policy recommendations in this plan with future Land Use Ordinance updates.
- Ensure that bicycle planning is integrated with other transportation, land use, economic development, and environmental planning efforts in the community.
- Begin signage program to include wayfinding and route signage to bicycle routes.
- Begin short-term, high-priority projects as described in the Five E's tables on the following pages.

Design Guidelines

Bicycle facility guidelines that adhere to national standards were provided in this Plan. The treatments and guidelines put forward are important because they represent the minimum standards for creating a bicycle-friendly, safe, accessible community.

Recommendations Tables

ENGINEERING				
Detailed BFC* Audit	**Key Recommendations**	**Detailed Description**	**Responsible Agency(s)**	**Phase**
New Road Construction	Utilize new bicycle policy (in Chapter 5) to consider additional bicycle facility treatments.	Chapter 5	Town of Carrboro	Short-term
Town Staff Training Programs	Create in-reach training sessions for Town engineers and planners.	Chapter 4	Town of Carrboro	Long-term
	Partner with Orange County, Town of Chapel Hill, and NCDOT representatives for training programs.	Chapter 4	Town of Carrboro	Long-term
Bridges	Ensure bicycle facilities are part of new and reconstructed bridge design.	Chapters 5, 6, & 7	Town of Carrboro; NCDOT	Long-term
Bike Parking	Expand bicycle parking ordinance (as described in Chapter 5). Add additional bicycle parking as described in Chapter 3.	Chapter 3 & 5	Town of Carrboro	Short-term
Bike Racks/ Storage Units	Upgrade at some destinations as described in Chapter 3.	Chapter 3	Town of Carrboro	Medium-term
Transit Service & Bikes	Continue to ensure bicyclists are accommodated in future transit services.	Chapter 6 & 7	Town of Carrboro, Chapel Hill Transit (CHT)	Long-term
Bike Facility Mileage	Begin implementing bicycle network recommendations to lengthen system.	Chapter 3	Town of Carrboro; NCDOT	Short-term
Arterial Streets	Begin implementing bicycle network recommendations in this Plan and utlilize new bicycle policy in Chapter 5.	Chapters 3, 5, & 7	Town of Carrboro; NCDOT	Short-term
Bike Routes	Begin implementing bicycle route and signage recommendations in this Plan.	Chapters 3, 6, & 7	Town of Carrboro; NCDOT	Medium-term
Maintenance Programs	Create a bicyclist-request response system for maintenance needs.	Chapter 6	Town of Carrboro; NCDOT	Medium-term
	Continue routine and remedial maintenance tasks and consider expansion of tasks.	Chapter 6	Town of Carrboro; NCDOT	Short-term
Intersections	Begin implementing bicycle intersection recommendations in this Plan.	Chapters 3 & 7	Town of Carrboro; NCDOT	Medium-term

(Table continued on next page)

*BFC=Bicycle Friendly Community

ENGINEERING, CONTINUED				
Detailed BFC* Audit	**Key Recommendations**	**Detailed Description**	**Responsible Agency(s)**	**Phase**
	(Continued from previous page)			
Paved Bike Trails	Begin expanding paved trails as recommended in Plan and prioritized by Greenways Commission.	Chapters 3, 6, & 7	Town of Carrboro	Short-term
Mountain Biking	Improve signage and mapping.	Chapter 4	Town of Carrboro	Long-term
Bicyclist Open Space	Improve signage and mapping.	Chapter 4	Town of Carrboro	Long-term
Employer Bike Ordinance	*See Encouragement Table*	Chapters 4 & 5	Town of Carrboro	Short-term
Recreational Facilities	Begin implementing bicycle network recommendations in this Plan (rural paved shoulders, route signage, etc.).	Chapter 3, 6 & 7	Town of Carrboro, Orange County; NCDOT	Short-term
*BFC=Bicycle Friendly Community				

EDUCATION

Detailed BFC* Audit	Key Recommendations	Detailed Description	Responsible Agency(s)	Phase
Motorist Education	Develop brochures, newspaper articles, and newsletters.	Chapter 4	Town of Carrboro†	Medium-term
	Review traffic calming public education program to ensure that it targets motorists, pedestrians, and bicyclists.	Chapter 4	Town of Carrboro	Medium-term
	Enhance enforcement of unsafe behavior.	Chapter 4	Town of Carrboro	Medium-term
Adult Bicycle Education	Launch traffic calming program to target motorists, pedestrians, and bicyclists.	Chapter 4	Town of Carrboro	Medium-term
	Conduct brown-bag events, lecture series, and clinics for adults.	Chapter 4	Town of Carrboro†	Short-term
	Enhance enforcement of unsafe behavior.	Chapter 4	Town of Carrboro	Medium-term
Safety Programs for Children	Continue "Basics of Bicycling" course.	Chapter 4	CHCCS	Short-term
	Launch traffic calming program to target youth motorists, pedestrians, and bicyclists.	Chapter 4	Town of Carrboro	Medium-term
	Enhance enforcement of unsafe behavior.	Chapter 4	Town of Carrboro	Medium-term
	Develop programs such as earn-a-bike programs, bicycle rodeos, and summer camps.	Chapter 4	Town of Carrboro†	Medium-term
	Organize bicycle rides as part of Carrboro Day.	Chapter 4	Town of Carrboro†	Short-term
Public Safety	Develop bicycle safety materials, newsletters, and brochures.	Chapter 4	Town of Carrboro†	Medium-term
	Develop educational bicycle map.	Chapter 4	Town of Carrboro	Short-term
Routine Local Safety Education	Produce education messages in distributions and media.	Chapter 4	Town of Carrboro	Medium-term
Internal Education**	Create in-reach events such as brown bags and training sessions for Town departments.	Chapter 4	Town of Carrboro	Medium-term
	Develop training sessions for local-law enforcement.	Chapter 4	Town of Carrboro	Medium-term
Bicycle Ambassador Program	Begin ambassador program formed of Advocacy Group members and citizens.	Chapter 4	†	Short-term
	Make ambassadors visible through educational and encouragement programs and events.	Chapter 4	†	Short-term
League Cycling Instructors	Increase number of League Cycling Instructors in area.	Chapter 4	†	Short-term

*BFC=Bicycle Friendly Community **Item not part of BFC application, but added for the Town of Carrboro †Possible role for Citizens' Bicycle Advisory Group

ENCOURAGEMENT				
Detailed BFC* Audit	**Key Recommendations**	**Detailed Description**	**Responsible Agency(s)**	**Phase**
Employer Programs**	Employers should provide incentives for employees for commuting by bicycle.	Chapter 4	Town of Carrboro†	Short-term
	Town should provide information to employers for programs.	Chapter 4	Town of Carrboro†	Short-term
School Programs (Safe Routes to School)	Apply for additional Safe Routes to School funding for planning and implementation.	Chapter 4	Town of Carrboro	Medium-term
	Complete implementation of current action planning efforts.	Chapter 4	Town of Carrboro	Medium-term
	Develop after-school programs, summer camps, and family rides.	Chapter 4	Town of Carrboro†	Medium-term
Youth Recreation Intervention**	Develop bicycle rodeos, summer bicycle camps, and events/camps that require bicycles.	Chapter 4	Town of Carrboro†	Medium-term
	Continue "Basics of Bicycling" course.	Chapter 4	CHCCS	Short-term
Awareness Days				
National Bike Month	Promote the month and create additional activities.	Chapter 4	Town of Carrboro†	Short-term
Bike to Work Day	Promote the day and create additional activities, especially for commuters.	Chapter 4	Town of Carrboro†	Short-term
Annual Bike Tour	Host own bicycle riding tours/races.	Chapter 4	Town of Carrboro	Long-term
League Cycling Instructors	Increase number of League Cycling Instructors in area.	Chapter 4	†	Short-term
Bicyclist Breakfast**	Establish monthly bicyclist breakfast to build support and camaraderie.	Chapter 4	Town of Carrboro†	Medium-term
Other Days**	Promote bicycling at other annual days.	Chapter 4	Town of Carrboro†	Medium-term
Facilities to Promote Other Causes**	Utilize greenways and bicycle facilities to host events for causes.	Chapter 4	Town of Carrboro†	Medium-term

(Table continued on next page)

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ENCOURAGEMENT, CONTINUED

Detailed BFC* Audit	Key Recommendations	Detailed Description	Responsible Agency(s)	Phase
	(Continued from previous page)			
Bicycle Promotion Within Local Organizations				
Bike Clubs	Expand clubs such as Carolina Tarwheels to reach less experienced bicyclists.	Chapter 4	Town of Carrboro†	Medium-term
Specialty Bike Shops	Bicycle shops should remain involved in Plan implementation and events.	Chapter 4	Town of Carrboro†	Short-term
Bicycle Rental & Upkeep	Further Town support of Blue Urban Bikes (BUB) and ReCYCLEry programs.	Chapter 4	Town of Carrboro†	Short-term
	Establish Town Hall as BUB hub.	Chapter 4	Town of Carrboro†	Short-term
Bike Maps	Improve town-wide online maps with routing, facilities, and bicycle education information.	Chapters 4 & 6	Town of Carrboro†	Short-term
	Create foldable town-wide bicycle map with routing, facilities, and bicycle education information.	Chapters 4 & 6	Town of Carrboro†	Short-term
	Update current Bicycle Map.	Chapters 4 & 6	Town of Carrboro†	Medium-term
MTB Trails Maps	Develop online and hardcopy mountain bicycle trail maps.	Chapter 4	Town of Carrboro	Long-term
Adopt-a-Trail**	Promote and support local volunteer groups and agencies to maintain greenways.	Chapter 4	Town of Carrboro†	Short-term
Revenue Generating Programs**	Consider events that require fees and/or donations that would increase revenue for bicycle facilities.	Chapter 4	Town of Carrboro†	Long-term
Other Efforts**	Provide annual reports to community that update on bicycling improvements.	Chapter 4	Town of Carrboro†	Short-term
	Promote and advertise new programs and events.	Chapter 4	Town of Carrboro†	Short-term
	Reach out to Spanish-speaking population with education and encouragement programs.	Chapter 4	Town of Carrboro†	Medium-term
	Research and consider other encouragement methods.	Chapter 4	†	Long-term

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ENFORCEMENT				
Detailed BFC* Audit	**Key Recommendations**	**Detailed Description**	**Responsible Agency(s)**	**Phase**
Targeted Motorist Enforcement	Enforce illegal motorist actions related to bicycle safety.	Chapter 4	Town of Carrboro	Medium-term
	Develop traffic calming programs to educate and enforce.	Chapter 4	Town of Carrboro	Medium-term
Targeted Bicyclist Enforcement	Enforce illegal bicyclist actions related to bicycle safety.	Chapter 4	Town of Carrboro	Medium-term
	Target enforcement at sites of newly introduced bicycle facilities.	Chapter 4	Town of Carrboro†	Medium-term
	Create Volunteer trail patrol positions which can monitor incidences and report trail violations.	Chapter 4	Town of Carrboro†	Medium-term
Local Police Input	Include Police Department representative to report to Town.	Chapters 4 & 6	Town of Carrboro†	Short-term
Police Officer Traffic Training	Create new training sessions, especially with new facility implementation.	Chapter 4	Town of Carrboro	Long-term
	Have police officers participate in bicycle-related workshops and certification workshops.	Chapter 4	Town of Carrboro	Long-term
Bicycle Patrol	Create bicycle patrol positions.	Chapter 4	Town of Carrboro	Long-term
School Crossing Guards**	Continue school crossing guard program and consider expanding when need arrives.	Chapter 4	Town of Carrboro	Short-term
Mandatory Helmet Law	Consider helmet law for all ages.	Chapter 4	Town of Carrboro	Medium-term

*BFC=Bicycle Friendly Community ** Item not part of BFC application, but added for the Town of Carrboro †Possible role for Citizens' Bicycle Advisory Group

EVALUATION AND PLANNING				
Detailed BFC* Audit	**Key Recommendations**	**Detailed Description**	**Responsible Agency(s)**	**Phase**
Overall Mode Share and Number of Bike Trips	Utilize 2010 Census Data to determine new mode share.	Chapter 6	Town of Carrboro	Medium-term
	Continue to conduct and update bicycle counts as part of Mobility Report Card.	Chapter 6	Town of Carrboro	Short-term
Safety (Cyclist/Motorist Fatalities in Past 5 Years)	Keep these incidences tallied and part of database.	Chapter 6	Town of Carrboro	Short-term
Safety (Cyclist/Motorist Crashes in Past 5 Years)	Keep these incidences tallied and part of database.	Chapter 6	Town of Carrboro	Short-term
Crash Reduction Programs	Research crashes and initiatiate crash reduction programs.	Chapter 6	Town of Carrboro†	Medium-term
Bicycle Facility Improvements	Measure new facilities as constructed and report on facility quality.	Chapter 6	Town of Carrboro	Medium-term
Implement and Update Prioritization Improvements	Implement priority projects as identified in this Bicycle Plan. Update Top 10 priority list each year.	Chapters 3 & 6; App. A	Town of Carrboro	Short-term
	Address new requests and safety issues that may arise.	Chapter 6	Town of Carrboro	Medium-term
Program Successes	Measure program participation, education/enforcement efforts, and evaluate success.	Chapter 6	Town of Carrboro	Medium-term

(Table continued on next page)

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EVALUATION AND PLANNING, CONTINUED				
Detailed BFC* Audit	**Key Recommendations**	**Detailed Description**	**Responsible Agency(s)**	**Phase**
	(Continued from previous page)			
Policy for Bicycle & Network Future Development	Update policies with this Plan.	Chapters 5 & 6	Town of Carrboro	Short-term
	Reguarly review and update bicycle-related policies.	Chapter 6	Town of Carrboro	Medium-term
Public Comments System for Officials	Create a bicyclist-request response system for maintenance needs and other requests and concerns.	Chapter 6	Town of Carrboro†	Medium-term
	Encourage citizens to attend Bicycle Advocacy Group meetings.	Chapter 4	Town of Carrboro†	Short-term
Greenways Master Plan	Develop Design Plans for Morgan Creek and Bolin Creek greenway trails.	Chapter 6	Town of Carrboro; Greenways Commission	Short-term
	On-going review and revision (as necessary) of the greenway sections of the Recreation and Parks Master Plan	Chapter 6	Town of Carrboro; Greenways Commission	Medium-term
Comprehensive Bicycle Plan	Make updates when necessary.	Chapter 6	Town of Carrboro	Short-term
	Completely update Plan within 5-10 years.	Chapter 6	Town of Carrboro	Long-term
*BFC=Bicycle Friendly Community †Possible role for Citizens' Bicycle Advisory Group				

Chapter Outline:

CHAPTER 1: INTRODUCTION

1.0 Vision

The Town of Carrboro is known for its bicycle-friendliness. On any given day, hundreds of residents ride a bicycle to work and school, to run errands, to socialize, or for fitness. Carrboro is a culturally diverse and progressive community recognized for its strong local identity. Such proactive citizen involvement has led to a great deal of support for the establishment of bicycling among Carrboro's residents and elected officials, with millions of dollars dedicated to the establishment of bicycle lanes, off-road bikeways, and wide shoulders.

In 2001, Carrboro became the first town in the state of North Carolina to be recognized as a Bicycle Friendly Community. In 2004, the American League of Bicyclists recognized Carrboro with a bronze-level designation. Carrboro has the opportunity to further distinguish itself as a national model for bicycle-friendly communities by making visionary improvements to bicycle facilities and programs within the town that would continue to improve quality of life, reduce auto dependency, and increase community connections.

This plan envisions a connected system of on- and off-road facilities that accommodate varying levels of bicyclists, and which provides an accessible, safe, and convenient option of bicycling for transportation, recreation, and health. Integral to the plan are recommended policies and programs that complement the facility recommendations and which underscore the comprehensive approach of the plan. While the plan is structured within the framework of achieving a Platinum level designation through the League of American Bicyclists Bicycle Friendly Community program, it is the collection of facilities, policies and programs that this designation symbolizes, which the Town is seeking to achieve. The plan is structured within the foundation of achieving a Platinum designation level through the League of American Bicyclists Bicycle Friendly Communities program.

The Carrboro Bicycle Transportation Plan was created with the vision:

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

Fig. 1-1. Members of the steering committee meet with the project consultant.

Fig. 1-2. A Bike to Work Day poster encourages alternative transportation.

1.1 Project Background and Purpose

In 2007, the Town of Carrboro received a bicycle planning grant from the NCDOT Bicycle and Pedestrian Planning Grant Initiative. In January of 2008, the Town of Carrboro commissioned Greenways Incorporated to prepare a Comprehensive Bicycle Transportation Plan for the area bound by the Town of Carrboro planning jurisdiction. After months of fieldwork, research and public input, a preliminary draft network was completed and presented to the public for review in July of 2008. Greenways Incorporated then produced a revised Bicycle Network and finalized the elements of the Plan, as defined within this document.

The Carrboro Planning Department and a specially appointed project Steering Committee worked closely with Greenways Incorporated to ensure significant levels of public input. Citizens from throughout the community were selected for the committee for their dedication to improving the Town and for their knowledge of various bicycling issues including recreation, health, engineering, education, city processes, industry and business, law enforcement, environmental sustainability, and transportation. The mechanism of public input included public workshops and presentations, a survey of bicycle interests and needs, and a thorough review of existing plans, each of which included previous public input.

The Town of Carrboro wants to create safe, convenient and efficient transportation opportunities for residents and visitors that choose to bicycle throughout the community. The Town recognizes the importance of accommodating bicycle travel as a viable transportation mode. The purpose of this plan is to provide a comprehensive approach toward identifying existing and future bicycle needs and deficiencies, present a route network to address those deficiencies, examine optimal program and policy improvements, and identify implementation strategies for the development of quality bicycle facilities and programs. Recommendations are built within the framework of achieving the vision of a Platinum-level bicycle friendly community.

1.2 Measurable Goals

The following goals and objectives were generated from Steering Committee members and the general public and are listed below. While the Town of Carrboro must lead this effort, overall success will also require continued, active participation and encouragement from local residents and community organizations.

GOAL 1 –To have bicycling as a viable transportation alternative throughout the Town and for all trip purposes.

OBJECTIVE 1 – Increase connectivity of on- and off-street bicycle facilities to provide access to all destinations in Carrboro, including community hubs, such as schools, transit stops, parks, civic spaces, commercial and residential areas.

OBJECTIVE 2 - Increase connectivity of the bicycle network with surrounding communities.

Fig. 1-3. Bicycle lanes along Pathway Dr.

Fig. 1-4. One of several Steering Committee meetings at Town Hall.

OBJECTIVE 3 - Fully integrate the bicycle and greenway networks.

OBJECTIVE 4 – Fill in network gaps identified through the bicycle transportation plan.

OBJECTIVE 5 – Increase Carrboro's mode share of bicycling for all trip purposes.

OBJECTIVE 6 – Implement and/or support transportation demand management programs.

GOAL 2 – A continuing process for reviewing, updating, and implementing bicycle-related policies.

OBJECTIVE 1 - Regularly review and update bicycle–related policies.

OBJECTIVE 2 - Increase bicycle facilities and ancillary features in newly annexed areas.

OBJECTIVE 3 - Require bicycle facilities and ancillary features in future developments.

OBJECTIVE 4 – Monitor bicycle plan implementation progress on a schedule that allows identification and funding of new projects, as appropriate for the CIP, annual budget and other funding opportunities.

GOAL 3 – A robust bicycle program that incorporates engineering, education, encouragement, enforcement and evaluation programs.

OBJECTIVE 1 - Increase enforcement of traffic rules that apply to bicycling for motorists and bicyclists.

OBJECTIVE 2 - Actively promote Bike to Work Day and other bicycle commuting incentive programs to reach the community workforce.

OBJECTIVE 3 - Refine motorist and bicyclist education outreach about the laws of the road and bicycle safety.

OBJECTIVE 4 – Develop, distribute, and maintain current bicycle facilities maps.

OBJECTIVE 5 - Seek varied resources for maintenance and expansion of plan and bicycle network.

OBJECTIVE 6 – Implement a Safe Routes to School program in all elementary and middle schools, and develop programs for high school students.

OBJECTIVE 7 - Reduce the number of crashes involving bicycles, both single vehicle crashes and crashes involving motor vehicles and bicyclists.

OBJECTIVE 8 - Initiate community endeavors such as bike exchanges, "public" bikes, the ReCYCLEry, and additional Blue Urban Bikes bike-share hubs around town.

Fig. 1-5. A preferred route for a bicyclist riding to Carr Mill Mall or Weaver Street Market from Main St. is through the parking lot.

OBJECTIVE 9 - Create a defined community response and participation system that allows for comments on bicycle planning, implementation, and maintenance concerns.

GOAL 4 – A safe and accessible network of bicycle facilities.

OBJECTIVE 1 - Improve existing high-use "bottle-neck" bicycling areas so that they are safe, efficient, and convenient for all users.

OBJECTIVE 2 - Improve intersection crossings that safely and comfortably accommodate bicyclists of all levels.

OBJECTIVE 3 - Design bicycle facilities and ancillary features to ensure clear communication with cyclists of all ages and experience levels, including Carrboro residents and visitors alike.

1.3 Plan Framework

A combination of enforcement, engineering, education and encouragement strategies should be used to achieve long-term results as described in this Plan. As described previously, this Plan is structured within the framework of achieving the vision of a Platinum-level bicycle friendly community. The main chapters of this plan describe current conditions of the Carrboro area, a recommended bicycle network, programs to make bicycling more viable and integral to daily life, implementation strategies and next steps for completing a network of bicycle facilities, and design guidelines for making the community more bicycle friendly.

Because success in achieving the Platinum-level designation will require achievements in all of the 5 E's (**Engineering**, **Education**, **Encouragement**, **Enforcement**, and **Evaluation**), these are addressed throughout the elements of the Plan. Each chapter, as it applies to the 5 E's, will contain the graphic shown on the right as a guide to which "E" is covered in that chapter. If a specific "E" is not described in the section, that circle will be grayed out.

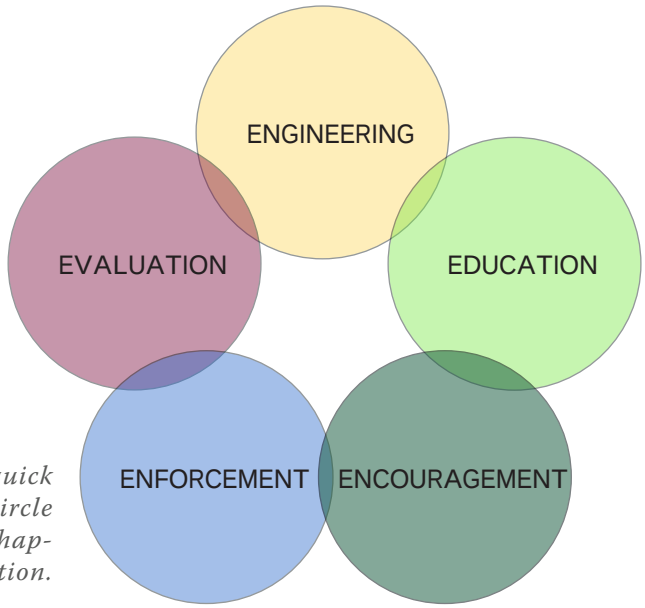


Fig. 1-6. This graphic was developed to provide a quick reference to those using this Plan. Each colored circle and its corresponding "E" will appear in different chapters of this Plan at the start of each section.

Fig. 1-7, 1-8. Members of the Steering Committee and project consultants gathered to bicycle and discuss some of the key project corridors in Carrboro.

The Plan is divided into the following components:

An ***Introduction*** that presents the overview, purpose and scope, vision, and guiding principles of this Plan along with the benefits of a bike friendly community (Chapter 1).

An assessment of ***Existing Conditions*** that summarizes existing bicycle conditions, demand, demographics, land use, and trip attractors (Chapter 2). A table, based on the Bicycle-Friendly Community application, features what Carrboro has achieved with its existing conditions and where improvements can still be made (which become the basis for the recommendations throughout the rest of the Plan).

A recommended ***Bicycle Network*** that puts forward recommended facilities (bicycle lanes, sharrows, shoulders, greenways, routes, etc.). Engineering solutions, required to improve bicycle-friendly community status, are specifically defined (Chapter 3).

Program Recommendations for education, encouragement, and enforcement of the bicycle network (Chapter 4).

Bicycle Policies that help address items in development to make Carrboro more bicycle-friendly (Chapter 5).

Implementation recommendations that outline specific steps for achieving the plan's key elements including phasing and prioritization of the Bicycle Network. The fifth E (evaluation) is discussed in this chapter (Chapter 6). The overall table, containing all 5 E's and established in Chapter 2, is expanded to include detailed recommendations and action steps for the Town of Carrboro to achieve its vision of a Platinum-level community.

Design Guidelines to guide the Town of Carrboro in current facility design and standards (Chapter 7). Engineering design solutions, related to improving the bicycle-friendly community status, are described here as well.

Appendices that provide a summary of prioritization matrices, public input, funding recommendations, applicable federal and state policies, the values of bicycling, existing planning efforts, and a glossary of terms.

Fig. 1-9. Members of the Steering Committee working on priority bikeway corridors.

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]	Prelimina y 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

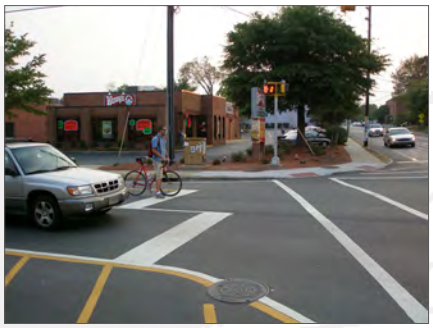


Fig. 2-7. A bicyclist attempts to navigate himself safely through the intersection of Main St. and S. Greensboro St.

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.

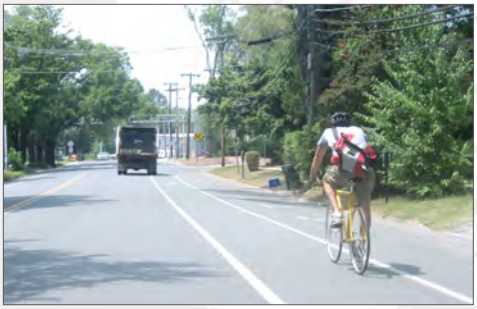


Fig. 2-14. A commuter cyclist on Cameron Ave. in Chapel Hill. Chapel Hill is a major regional connector for Carrboro.

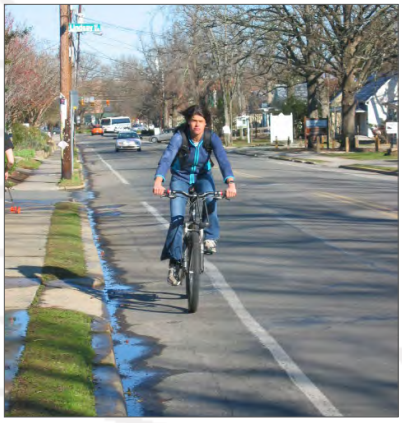


Fig. 2-15. The bicycle lanes on Main St. are good facilities; however, efforts should be made to provide facilities that extend to the intersection with Jones Ferry Rd.

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.

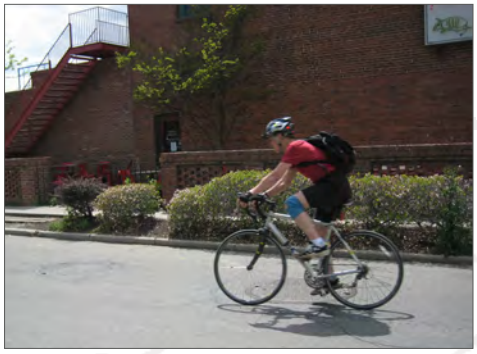


Fig. 2-17 & 2-18. A commuter cyclist (left) and recreational cyclists (right) in Carrboro.

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

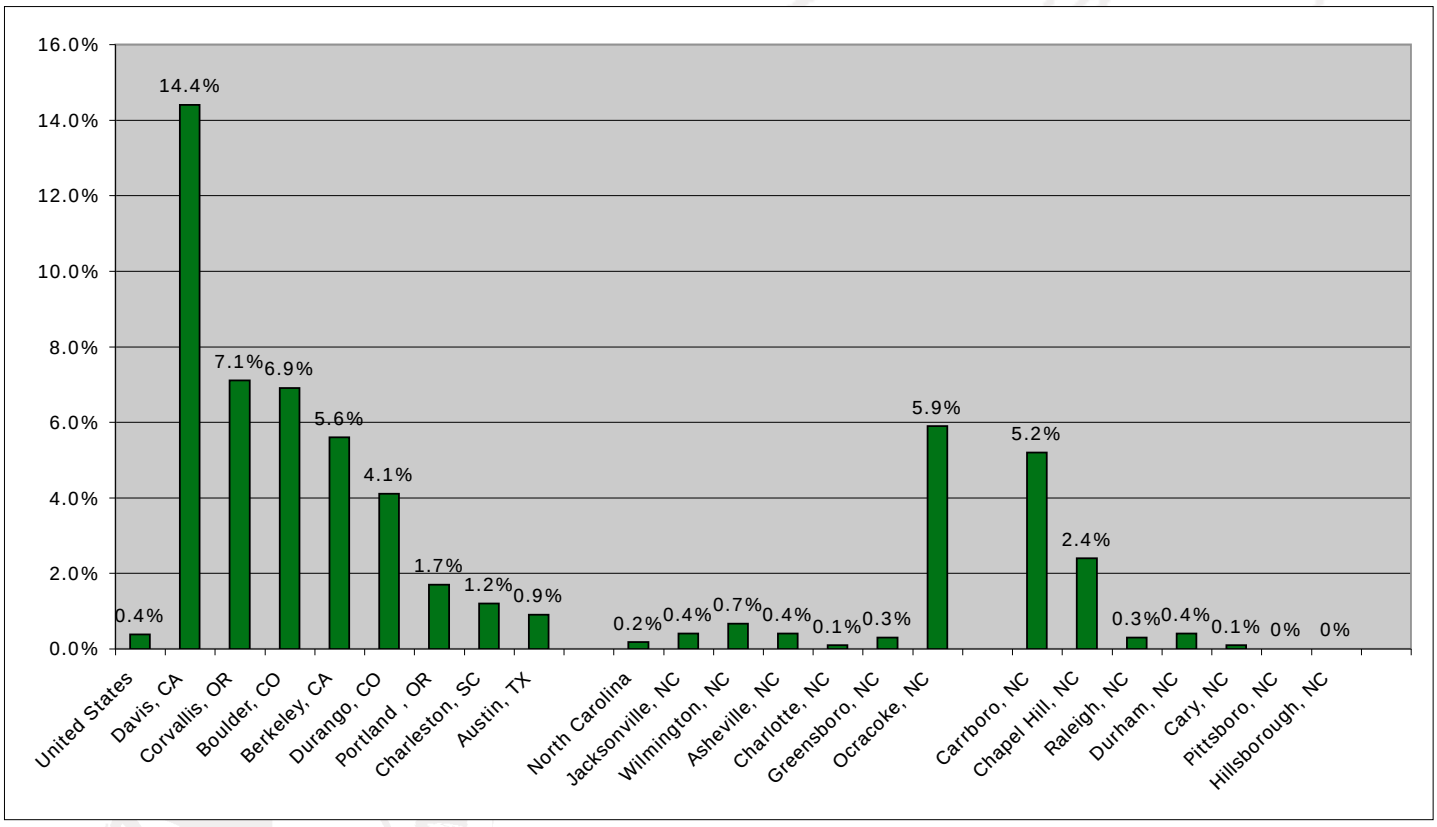


Table 2-3. Source: U.S. Census Bureau, Census 2000 Summary File 3, Table P30 Means of Transportation to Work.

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.

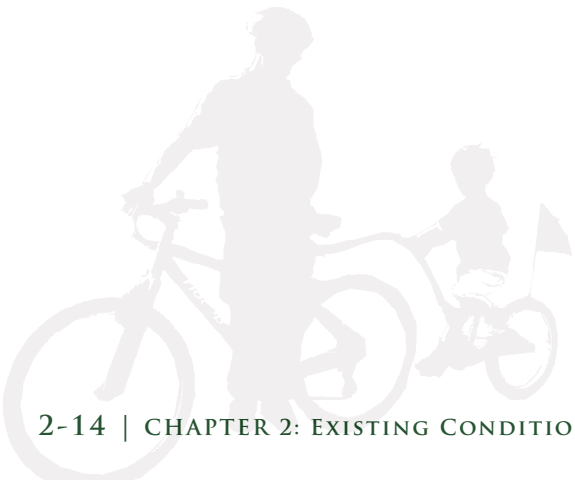


Fig. 2-20. More educational programs will need to reach out to specific user groups, such as these Latino children who are not wearing helmets.

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

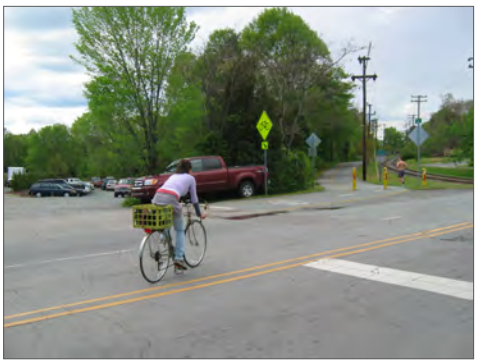


Fig. 2-21. A bicyclist making a left-hand turn on the Libba Cotten Bikeway.

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:

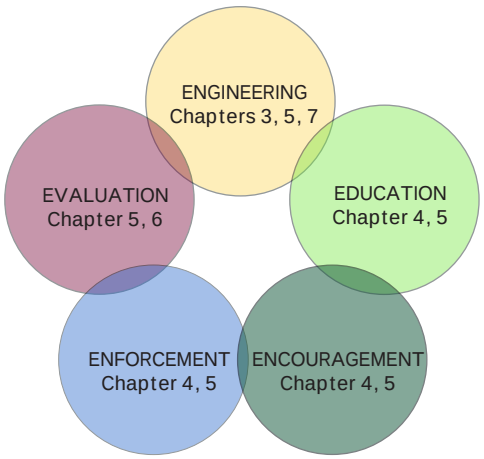
Engineering Solutions: Chapter 3: Bicycle Network, Chapter 5: Bicycle Policies & Chapter 7: Design Guidelines

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

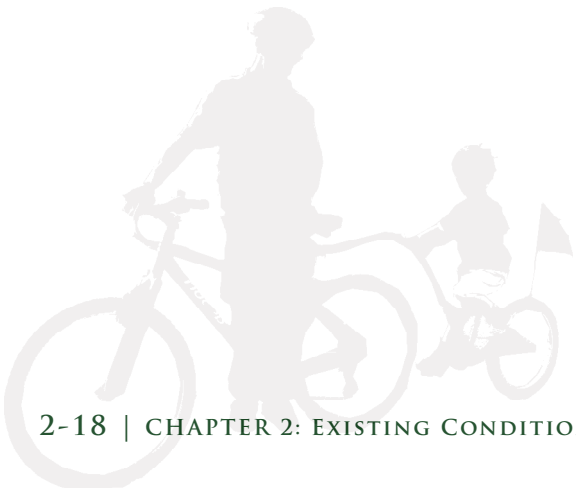
Evaluation Solutions: Chapter 5: Bicycle Policies & Chapter 6: Implementation



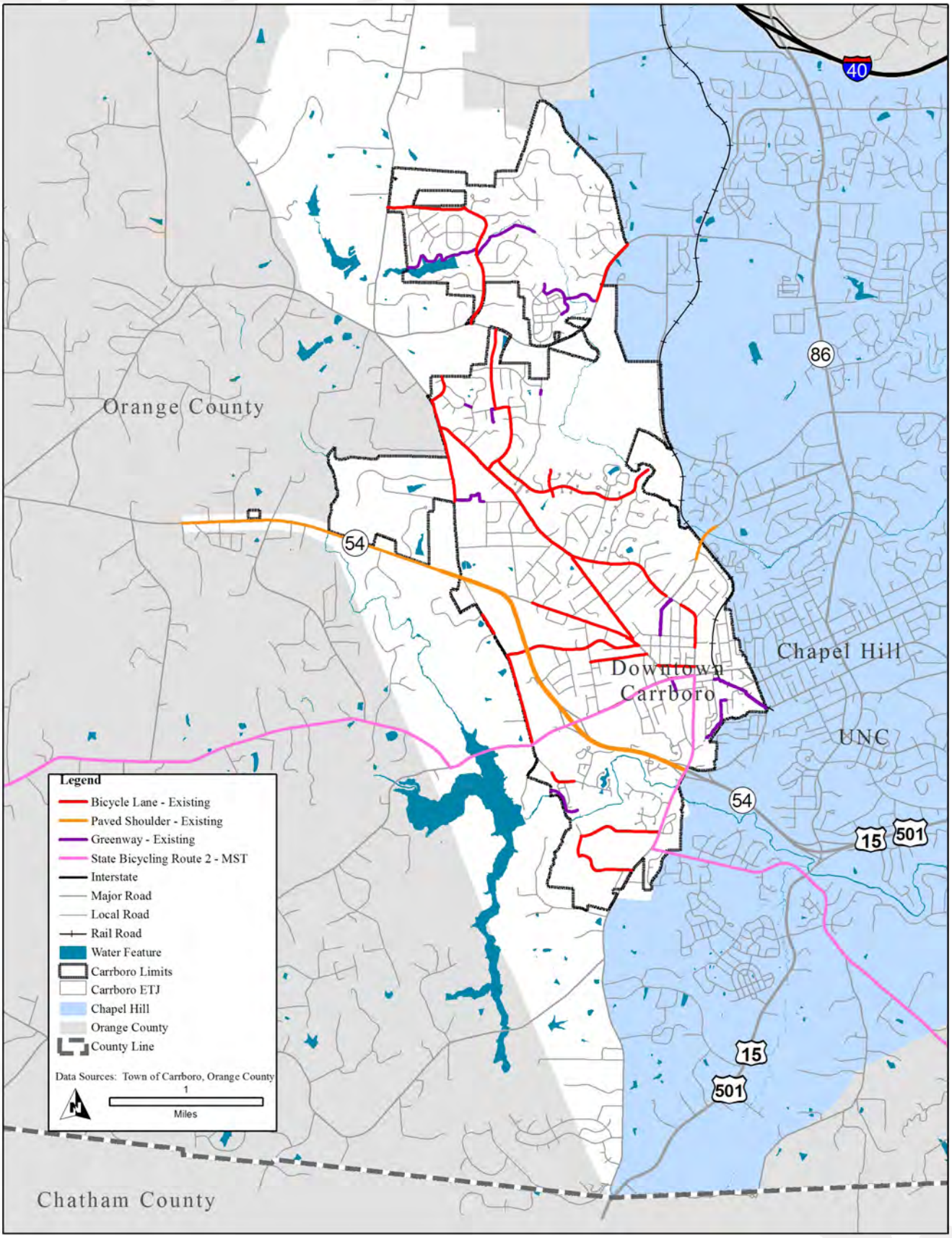
		EXISTING CONDITIONS	
	DETAILED BFC* AUDIT	CARRBORO'S EXISTING CONDITIONS	CURRENT LEVEL OF ACCOMPLISHMENT (Good/Fair/Poor)
ENGINEERING	NEW ROAD CONSTRUCTION	Bike Lane requirement on all collector roads-as street standards	Good
	TOWN STAFF TRAINING PROGRAMS	Last program was SRTS in 2005 sponsored by NCDOT	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

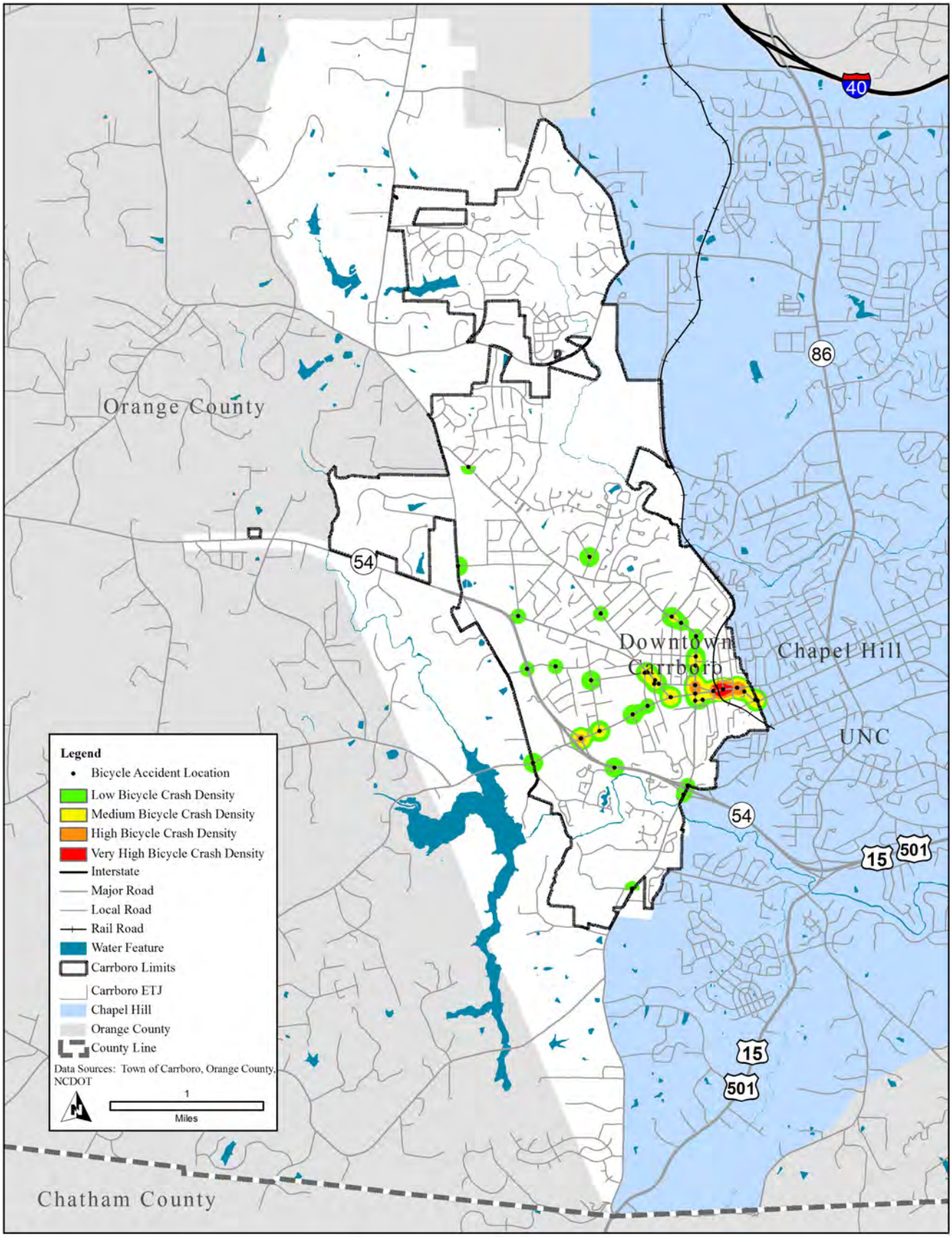


MAP 2.1: EXISTING BICYCLE NETWORK



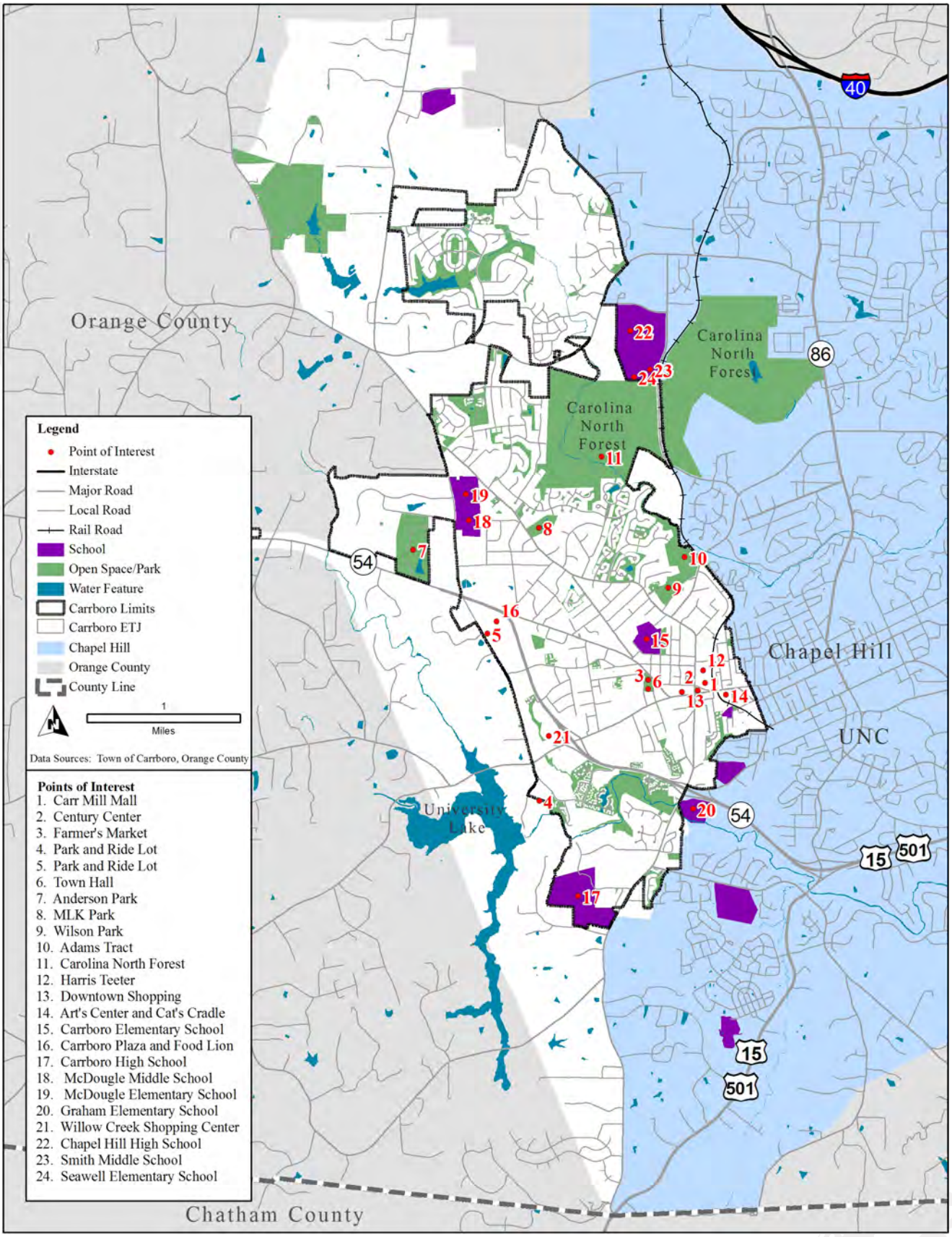
There are a significant amount of bicycle facilities in the Carrboro city limits, but gaps are still present. Bicycle lanes (in red) were identified in fieldwork. Paved shoulders (in orange) connect Carrboro to neighboring Chapel Hill and greater Orange County. NC Bicycling Route 2 (Mountains to Sea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

Map 2.2: Bicycle Crash Density



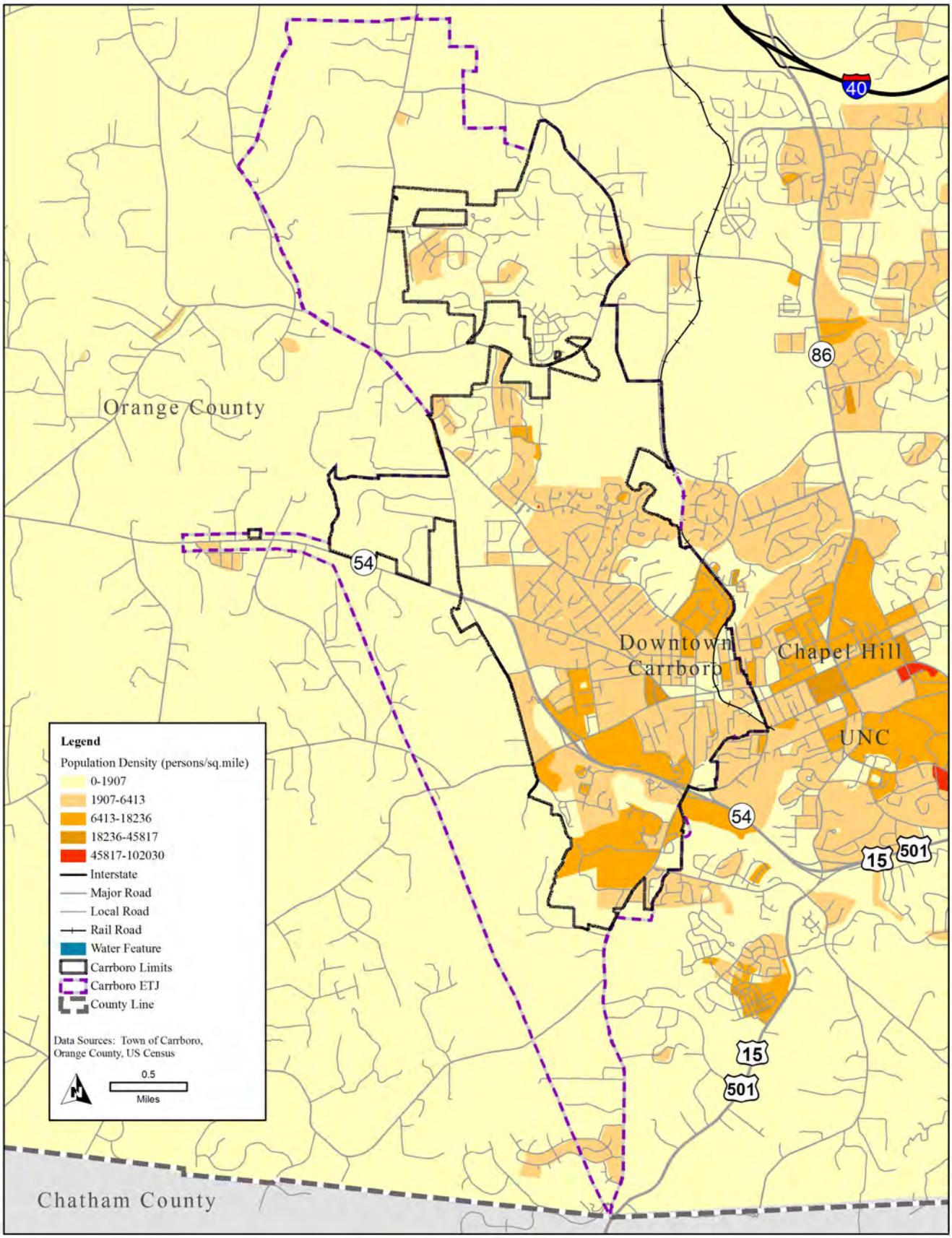
Recorded crash data shows that the majority of incidents have occurred along East Main St. and Greensboro St. Other roadways with crashes include Jones Ferry Rd. and NC 54. These crash sites are often at intersections, the places where bicyclist and motorist interaction is greatest. For top locations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

Map 2.3: Places of Interest In Carrboro



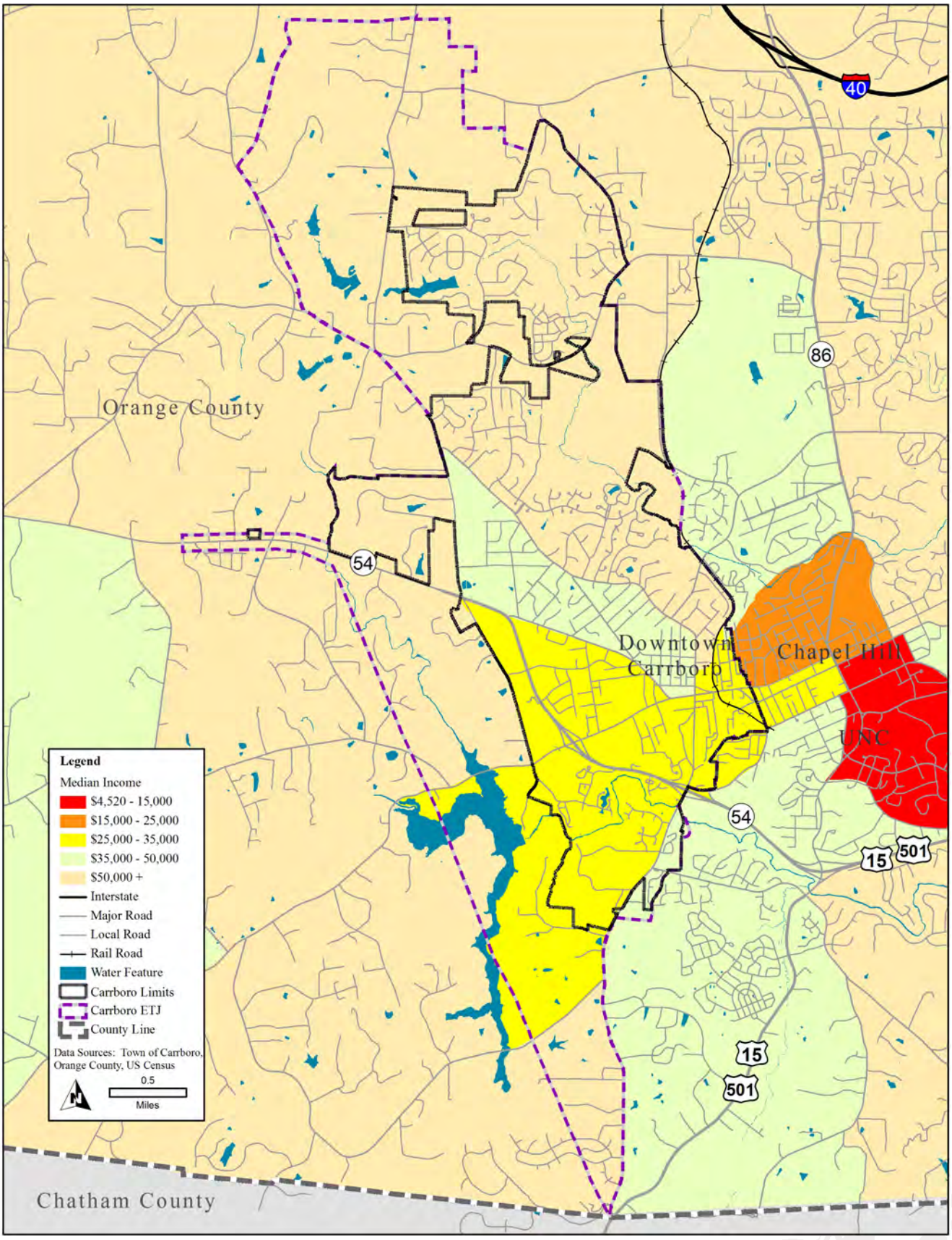
Destinations are numerous throughout Carrboro. Popular places of interest include Carr Mill Mall, the Farmers' Market, and the Century Center, which all offer bicycle parking or other facilities that accommodate bicyclists.

Map 2.4: Population Density



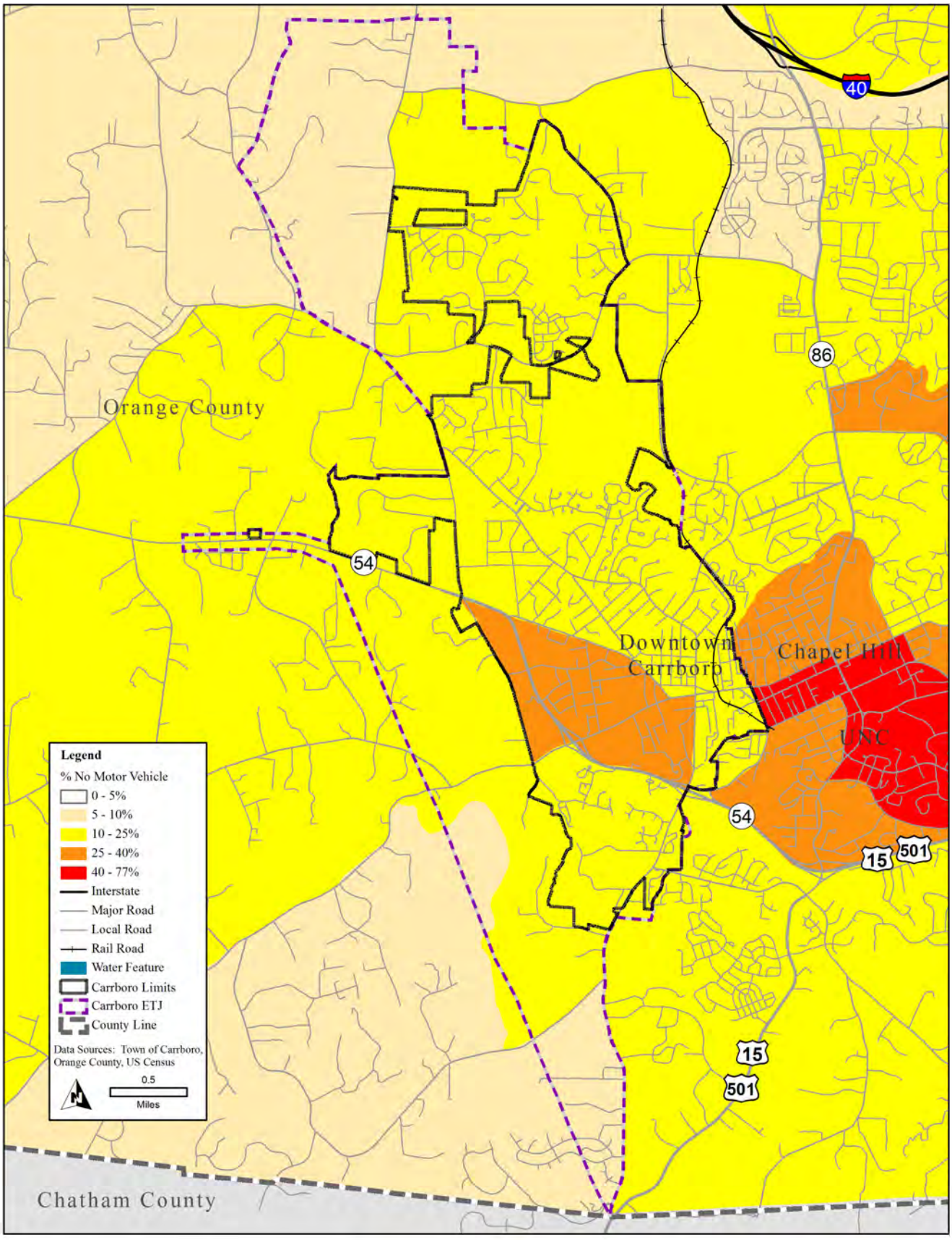
Population density provides a snapshot of the distribution of Carrboro area residents.

Map 2.5: Median Family Income



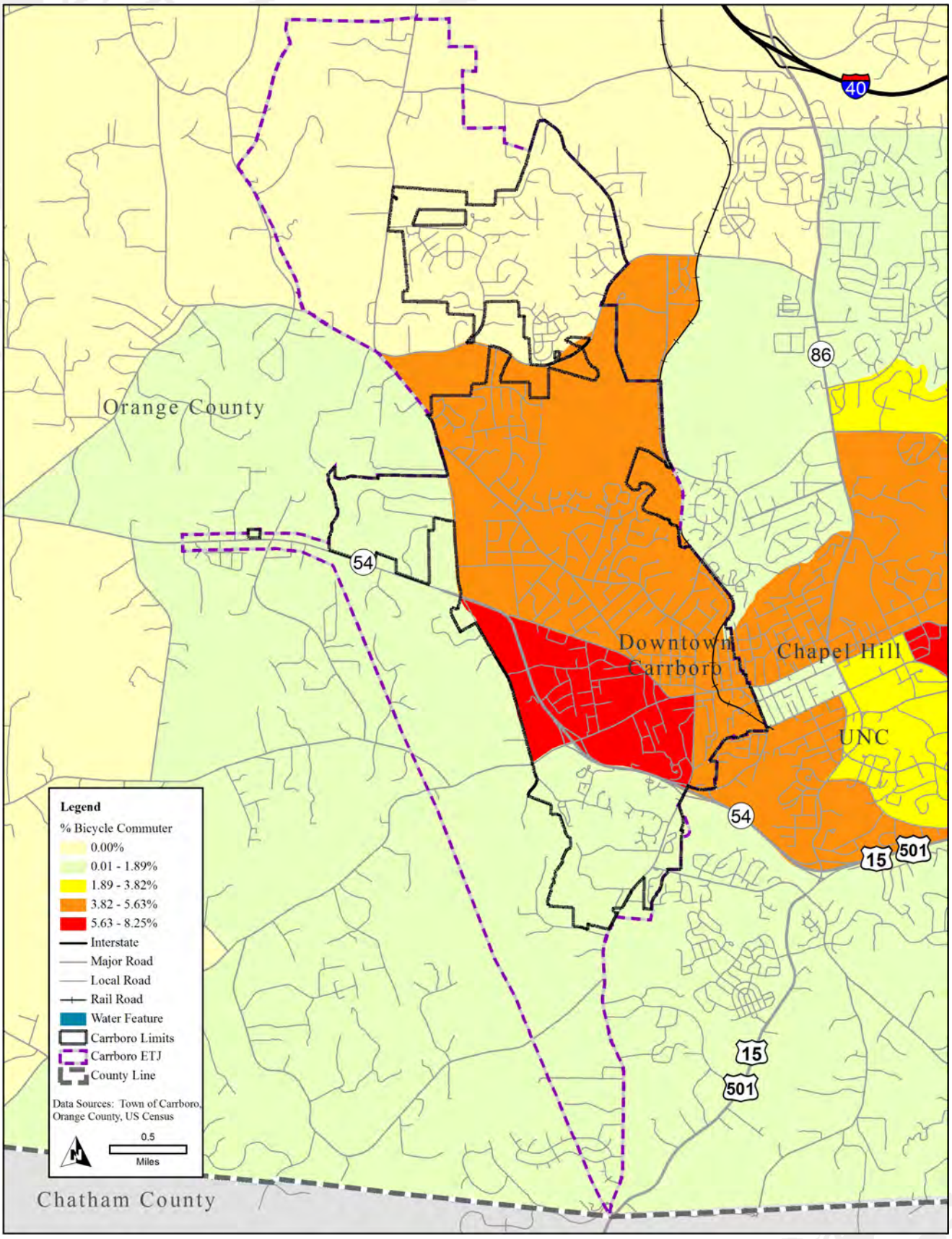
The 2000 census data for median family income is portrayed here at the block group level. Some of these areas may display more need with lower car ownership, and higher gas prices.

Map 2.6: Percentage of Workers without Vehicles



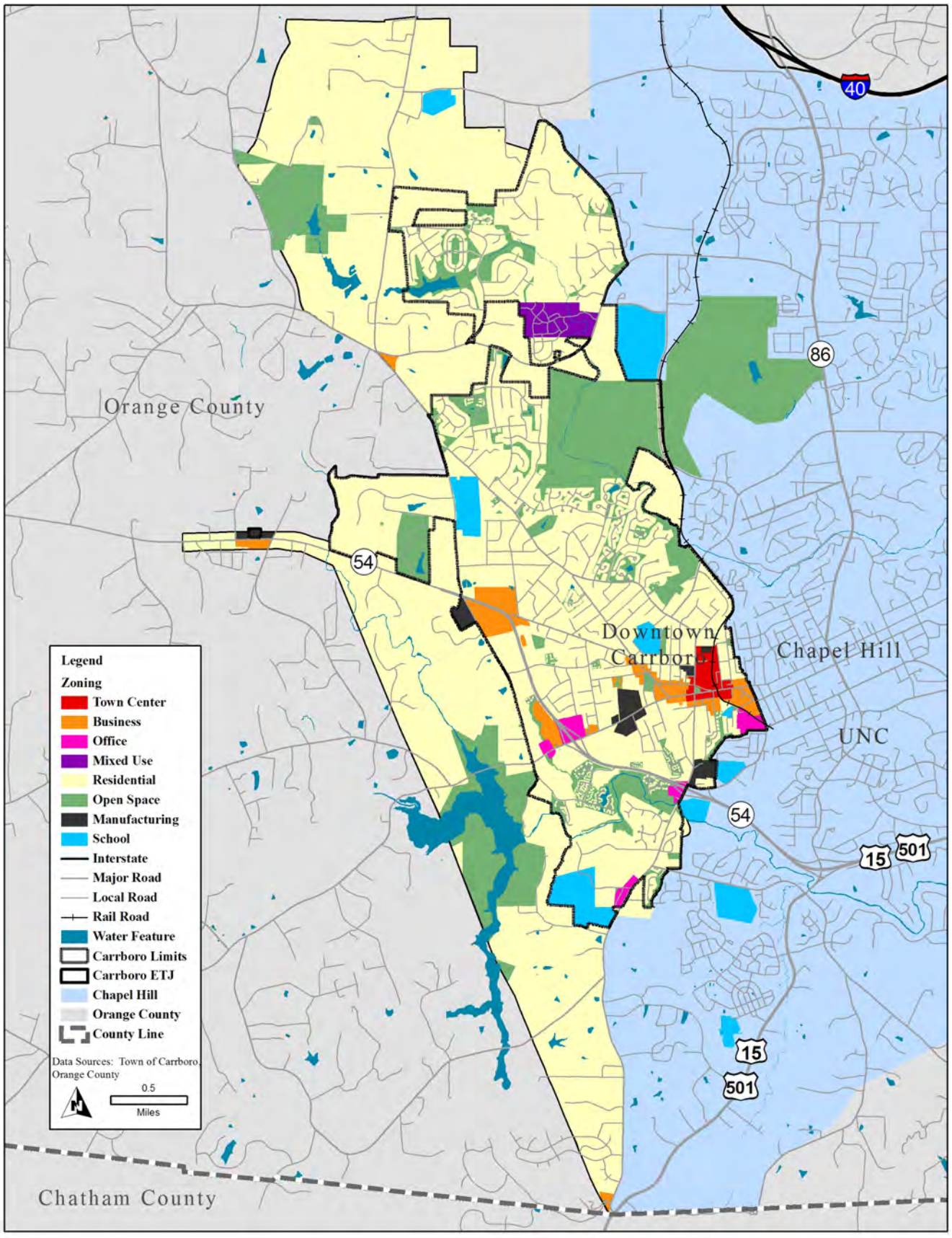
This 2000 census data displays block groups in which automobile ownership is lower, indicating possible need for bicycling facilities

Map 2.7: Percentage of Workers Commuting by Bicycle

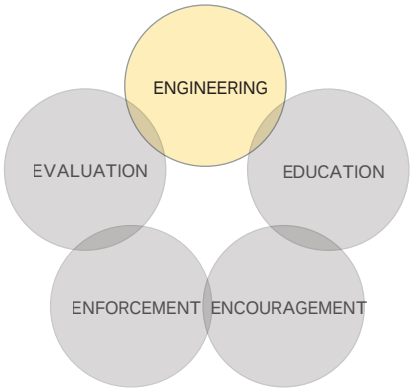


The 2000 census data is portrayed here at the block group level. Overall, Carrboro has a high mode share percentage of bicycle commuters. Areas displaying the highest percentages are concentrated in the downtown area.

Map 2.8: Land Use



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



Chapter Outline:

CHAPTER 3: BICYCLE NETWORK PLAN

3.0 Overview

The Town of Carrboro's Bicycle Network Plan was created through a process involving past planning efforts, public input, field analysis, and technical review by a steering committee. This chapter details the recommended bicycle facilities that make up the Network Plan, including bicycle corridors, greenway corridors, and recommended intersection improvements. These facilities, in conjunction with the other 4 E's, seek to fulfill the goals of this Plan, creating a safe, accessible and comprehensive bicycle network. While Carrboro achieved a Bronze-level designation because of its existing facilities, there are still key gaps that were discussed in Chapter 2.

3.1 Bicycle Network Methodology

Input from the public was critical in developing the Network Plan. Previous planning efforts (such as the 2030 Long Range Transportation Plan) involved their own levels of public input which provided useful information, and have in turn influenced the Network Plan. Public input was also gathered specifically for this Comprehensive Bicycle Transportation Plan, and included: five public input maps gathered from two public meetings; guidance from the steering committee; and nearly 400 public comment forms that each provided specific route preferences and recommendations for improvement. For a complete review of the public input process, please see Appendix B. This appendix includes results from the Public Opinion Surveys and Public Workshops.

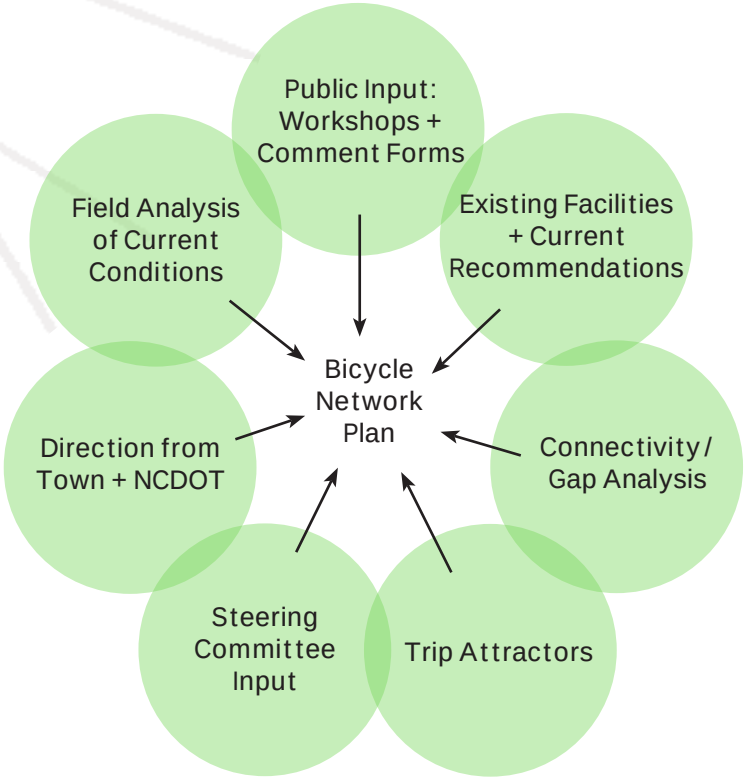


Fig. 3-1. This diagram illustrates the many inputs and levels of analyses used to design the Bicycle Network.



Figs. 3-2. From left: Type "A", "B", and "C" cyclists.

3.2 User Types

Accommodating bicycles begins with the understanding that bicyclists vary greatly in age, skill, and needs. There is no one design or bicycle facility that will suit all types of users; however, the network can be planned such that the benefits of each corridor will be maximized according to user-type, extent of use, and level of accessibility. Bicyclists' skill levels are rated in three distinct categories[1]:

- *"A" or Expert Cyclists* - These cyclists use their bicycles for transportation purposes. They are confident in their ability to both control their vehicle and ride in a variety of conditions, including alongside motor vehicles. They are comfortable using high-speed roads that don't provide a special accomodation for bicycles.
- *"B" or Casual Cyclists* - These cyclists use their bicycles for recreation and transportation purposes. They will ride within the roadway environment, but generally avoid high speed, heavily-trafficked roads. They prefer quiet, less-traveled residential streets and shared-use paths that are separate from the road environment.
- *"C" or Inexperienced Cyclists* - Many of these cyclists are children and therefore, are either novice or inexperienced riders who have neither an understanding of traffic laws and regulations, nor a good grasp of how to control their bicycle. They often depend on their bicycle as a form of transportation - to friends' homes, school, and recreation venues. They are most comfortable on shared-use, off-road paths. Within the roadway environment, they often use sidewalks for their travel.

Specific bicycle facilities are recommended with the purpose of encouraging all users, including the most inexperienced bicyclist type (Type "C"), to use the facility. Different roadway environments will necessitate certain facilities, just as certain facilities will accommodate particular user-types. In general, casual or inexperienced bicyclists will likely favor facilities that provide extra operating space or are separate from the roadway, such as bicycle lanes, sidepaths, or greenway trails (see Section 3.3-Facility Types for more information). In situations where roadway space is constrained, facilities that serve the most experienced level of cyclists should be considered as a minimum solution.

1 From Planning and Urban Design Standards by the APA. Hoboken, New Jersey: John Wiley and Sons, 2006.

Fig. 3-3. Weaver St. is a candidate for a sharrow/shared roadway facility.

Fig. 3-4. Sharrow facilities are already being locally implemented within the county, as seen here on Martin Luther King Jr. Blvd. in Chapel Hill.

3.3 Facility Types

Linear Network

The proposed Bicycle Network for Carrboro consists of signed/shared roadways, paved shoulders, bicycle lanes, sharrows, sidepaths, and greenway corridors. Together, these proposed facilities are intended to be incorporated into the existing bicycle network and roadways (or developed within existing rights-of-way) to create a safe and connected bicycle network for all cyclists throughout the Carrboro.

The proposed bicycle network shown on page 3-39 represents the ideal network. Getting from existing conditions to this ideal will take time and resources. Chapter 6: Implementation provides guidance on the phasing of facilities. However, network segments should be developed whenever there is an opportunity (such as through development dedications, roadway resurfacing projects, etc.), regardless of the order in the recommended phases.

Five main types of bicycle facilities have been identified for Carrboro and are outlined on the following pages. Please refer to the design guidelines in Chapter 7 for detailed information regarding proper placement and facility treatments. Also included in Chapter 7 are guidelines for other important bicycle facilities, such as bicycle racks, signage, recommendations for bicycle-friendly intersections, etc.

The complete recommended network of bicycle facilities and off-road greenways can be found on Map 3.2. Each segment can be found in the prioritization matrix found in Appendix A.

Sharrow Marking

An innovative solution for incorporating and implementing bicycle facilities in Carrboro is to use a relatively new facility called the sharrow. A sharrow is placed on a roadway that is too narrow to incorporate a striped bicycle lane. Sharrows are designated by a bicycle and arrow symbol painted on the roadway, alerting motorists that cyclists frequent this route. Additionally, it illustrates to bicyclists the proper direction for bicycle travel on the roadway and encourages rules of the road to be followed. This Plan recommends 11.3 miles of sharrows in Carrboro. More details on placement and use of sharrows is explained in Chapter 7 - Design Guidelines.

Cities such as Denver, CO; San Francisco, CA; and Portland, OR; have been using sharrows for some time now. Los Angeles recently conducted a survey to identify and evaluate roads suitable for placing sharrows: http://www.labikecoalition.org/surveys/lacbcsharrowssurvey.html. Although the final update of the MUTCD is still being finalized, the FHWA has approved the sharrow as a legitimate bicycle facility. It is recommended that Carrboro initiate a pilot project by implementing sharrows on local city-owned roads to demonstrate to NCDOT the validity and usefulness of this facility.

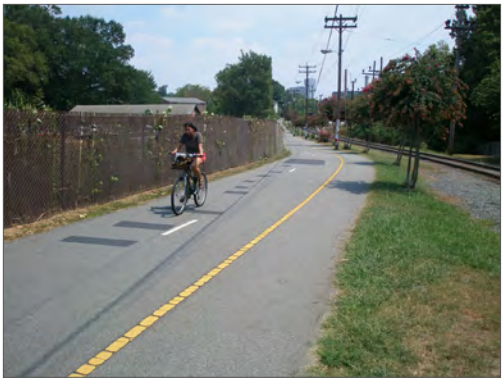


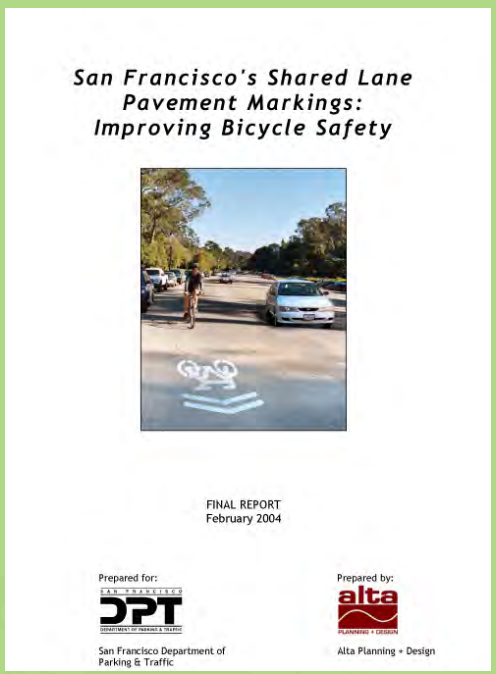
Fig. 3-5. The Libba Cotten Bike Path.

Fig. 3-6. Weaver St. is an excellent candidate for a sharrow facility as a short-term solution.

Case Study: Sharrows - San Francisco, CA

In 2004, the City of San Francisco Department of Parking and Traffic undertook a study of the effectiveness of shared lane pavement markings (or "sharrows"). It was called San Francisco's Shared Lane Pavement Markings: Improving Bicycle Safety. The sharrow markings were of two-kinds, either with arrow or chevron markings indicating the proper direction a bicyclist should be going. The study sought to determine the markings' effectiveness in 1) improving the position of both motorists and bicyclists on roadways without bicycle lanes, 2) reducing aggressive motorist behavior, and 3) encouraging correct bicyclist riding behavior. Through surveys and videotape analysis, the study concluded that the stencil markings significantly improved both motorists' and cyclists' positions in the roadway in relationship to each other and to parked cars, significantly reduced the number of sidewalk riders, and significantly reduced the number of wrong-way riders. As a result of the study, the California Traffic Control Device Committee formally approved the shared lane marking for use throughout the state (the marking will be official across the United States in the 2009 MUTCD). The study does not recommend that shared lane markings be used as a substitute for bicycle lanes where they are a feasible option. The study goes on to briefly discuss pavement markings in other communities including Chicago, Denver, and Portland.

For the full report, see http://www.sfmta.com/cms/uploadedfiles/dpt/bike/Bike_Plan/Shared%20Lane%20Marking%20Full%20Report-052404.pdf



Paved Shoulders

Paved shoulders are most often used by cyclists in more rural environments, although they are not confined to any particular type of environment. Paved shoulders are the part of a roadway which is contiguous to the regularly traveled portion of the roadway, and is on the same level as the roadway. Shoulders should be provided on both sides of the road. 6.3 miles of paved shoulders are recommended for this Plan. NCDOT requires a minimum width of four-feet to safely accomodate bicycles. See Chapter 7: Design Guidelines for details.

Bicycle Lanes

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 should always be located on both sides of the road (except one-way streets), and carry bicyclists in the same direction as adjacent motor vehicle traffic. This Plan recommends 12.2 additional miles of bicycle lanes. The minimum width for a bicycle lane is four feet; five- and six-foot bike lanes are typical for collector and arterial roads. See Chapter 7: Design Guidelines for details.

Greenway Corridors

Greenway corridors, for the purposes of this study, are off-road, multi-use facilities that provide an excellent source for alternative transportation and recreation. Greenway corridors can also serve an envi-

ronmental purpose, to protect forests and enhance water quality. Greenway corridors can be constructed of different surfacing materials depending upon the projected usage and surrounding landscape, but for the purposes of bicycle facilities, they should be constructed of concrete or asphalt. These corridors typically take advantage of linear stream corridors, easements, and other tracts of open space. Examples of different types of greenways can be seen in Chapter 7: Design Guidelines. Greenway trails in Carrboro should be integrated with and serve as an off-road extension of the on-road bicycle and pedestrian network. Numerous greenway opportunities were identified throughout Carrboro, via consultant fieldwork, public input, and other local and regional planning efforts, and as a result, more than 19 miles of greenway are recommended. When designated for bicycle use, a greenway trail should be at least 10-feet wide and be constructed of concrete or asphalt. Proposed greenway corridors are illustrated on Map 3.2.

Sidepaths

This type of path is similar to a multi-use path or greenway trail, but it is constructed within a roadway corridor right-of-way, physically separated from motorized vehicular traffic. Side paths should be a minimum of ten feet wide with preferred widths of 12-feet or greater. They are most appropriate in corridors with few driveways and intersections. Bicycle routes where side paths are recommended should also have adequate on-road bicycle facilities (such as paved shoulders or bicycle lanes) wherever possible. This Plan recommends 4.7 miles of sidepaths. See Chapter 7: Design Guidelines for details.

Ancillary Treatments

In addition to the above facilities, a number of other important bicycle treatments can improve safety throughout the bicycle network. A full listing and description of these facilities and treatments can be found in Chapter 7: Design Guidelines. A summary of three major treatments is provided below.

Bicycle Parking: This refers not only to bicycle racks, but also covered bicycle parking. The design guidelines describe which types of racks should be used, and which types to avoid.

Driveway Access Management: This refers to reducing the size and frequency of driveways for motor vehicles crossing sidewalks and bicycle routes to adjacent parking lots and property. For the overall safety of bicyclists and pedestrians, closing and/or rerouting driveways to side streets could prove to be more effective than the development of any single facility type.

Traffic Calming: This refers to a range of measures that reduce the impact of vehicular traffic on residents, pedestrians and cyclists - most commonly on residential streets, but also now on commercial streets.

Fig. 3-7. Greensboro and Main St. intersection.

3.4 Priority Bicycle Corridors

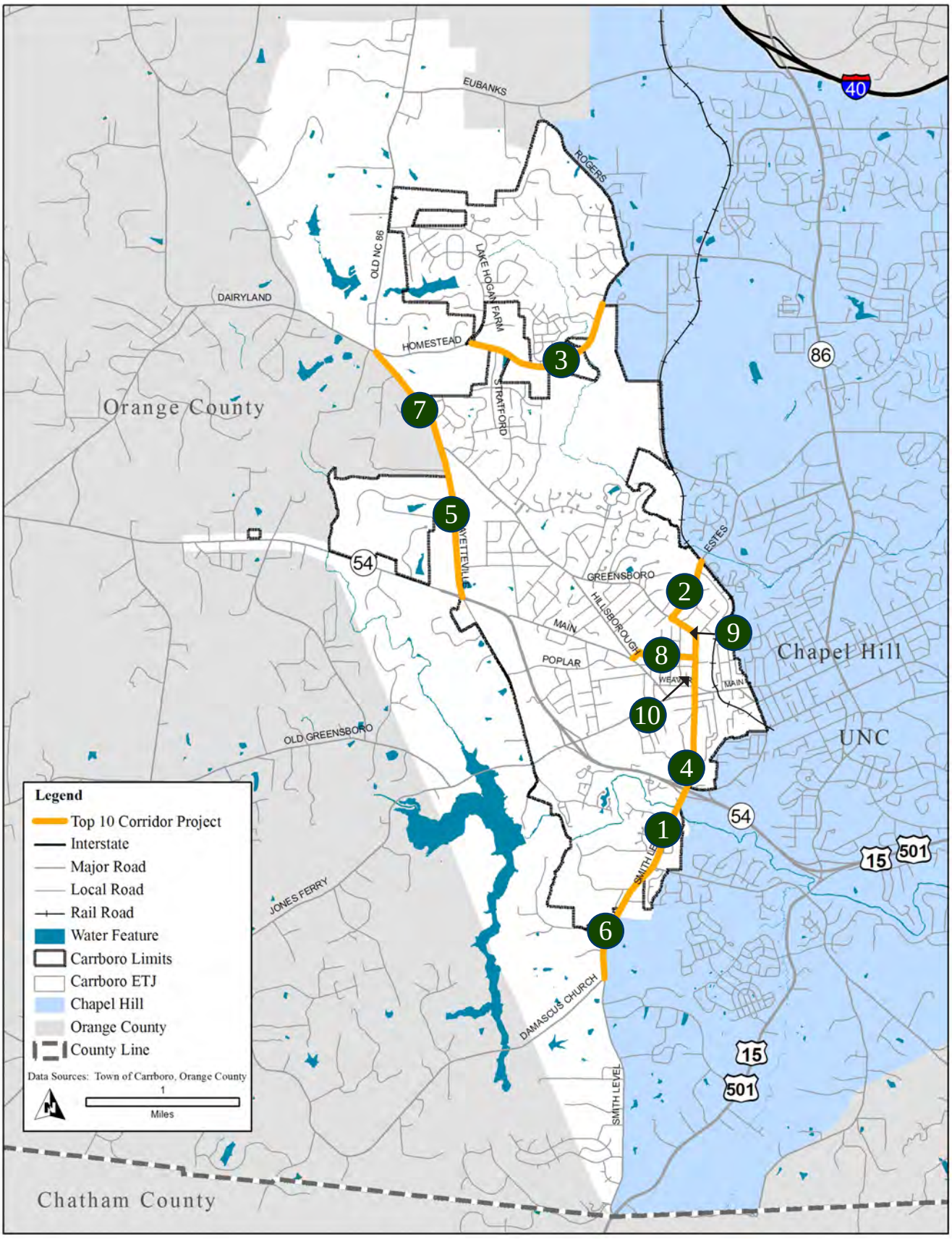
This section provides detailed bicycle recommendations for important roadway corridors and intersections within those corridors. The prioritization process and matrix, described in Appendix A: Prioritization and Cost Estimates, defines the Top 10 network corridor segment priorities for the Town of Carrboro. For each of the Top 10 roadway corridors, recommended solutions, interim treatments, and cut sheets are provided with details of the sections.

The locations of the following higher priority corridor segment recommendations are shown on Map 3.1. The map numbers reference the prioritized list of recommendations presented in this section. The Bike Facility Recommendations Table (see pages 3-28 – 3-29) illustrates Top 10 priority projects as well as overall recommendations, segment length, and construction type. Maps 3.2 and 3.3 at the conclusion of this chapter present the specific recommended facilities, including greenways, as an overall network.

The bicycle network is intended to provide a guide for the community that can respond to changing conditions and community priorities. It is important to note that these recommendations are based on current knowledge, conditions, and projects, and are intended to be updated on an ongoing basis. As the area continues to change and grow, with modification of transportation corridors and development, new priorities may arise.

Design guidelines in Chapter 7 contain specific standards for the following recommended bicycle facility types.

MAP 3.1: BICYCLE CORRIDOR MAP



The bicycle corridor map shows locations of Top 10 priority projects, as indicated by public input and Bicycle Plan steering committee members.

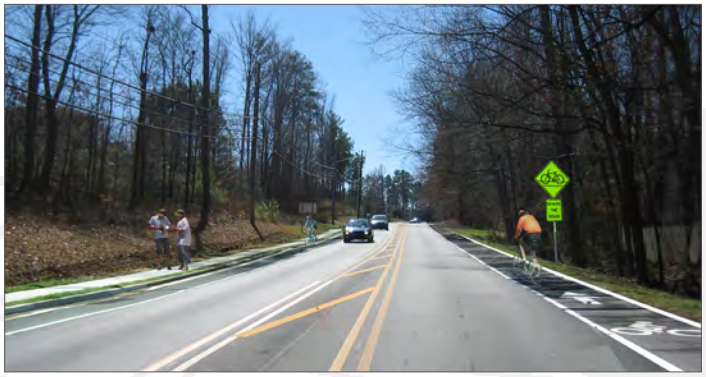


Fig. 3-8. Smith Level Rd. would benefit greatly from bicycle lanes and increased signage.

Priority Roadway Corridors for Bicycle Improvements

1. Smith Level Road: from NC-54 to Rock Haven Rd.
(U-2803 TIP project to widen to multiple lanes, install sidewalks and bicycles lanes)

Importance

- Key gap in bicycle network (Not adequate space for bicyclists, especially along relatively steep hill of Smith Level Rd.)
- Very high priority among public participants
- Connectivity of multi-family and single family residential to Carrboro High School and Downtown

Recommended Solution

Work with NCDOT on the STIP project, U2803, to construct bicycle lanes along both sides of Smith Level Rd. to address issue of uphill biking especially (will require expansion of roadway width).

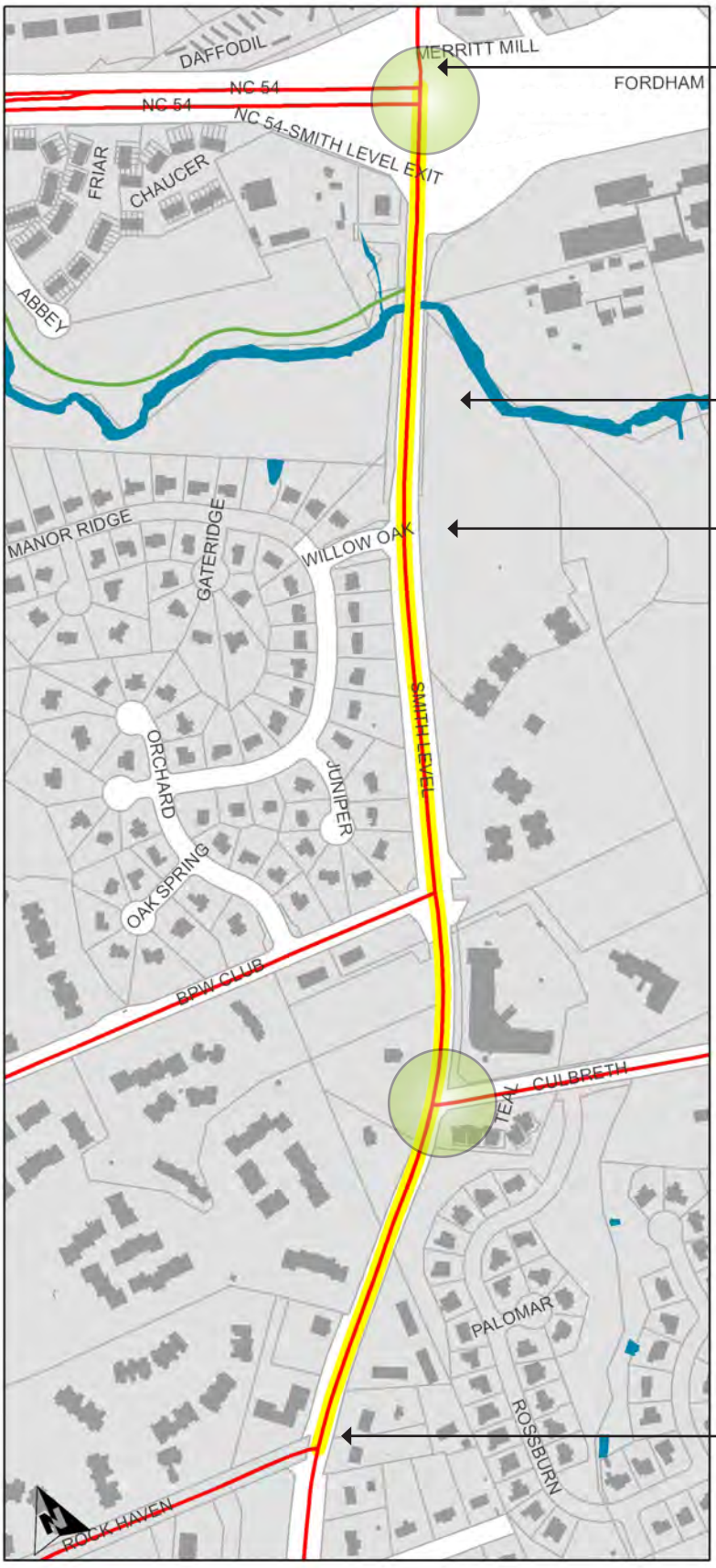
Interim Treatments

Increase enforcement, especially during peak bicycle travel times. Work with NCDOT to construct paved shoulder on both sides of Smith Level Rd. between Public Works Dr. and to uphill portion of Rock Haven Rd.

Intersection Improvements:

- Smith Level Rd. and Culbreth Rd.
  - Paint bicycle box* to connect to future bicycle lanes
  - Install bicycle loop indicators
- Smith Level Rd. and NC-54
  - Provide colored bicycle lanes* to clearly designate the bicyclist's space

**Construction projects considered to be innovative; will require state and federal approval for permission to experiment with these types of treatments*



Project: 1

Smith Level Road

Boundaries:

NC 54
Rock Haven Road

Facility:

Bicycle Lanes
Colored Bicycle Lanes at intersections
Paved Shoulders as interim

Project Type:

Roadway Widening
Paint

Function:

Bicycle Commuter Route
School-Residential Connector

Trip Generators:

Carrboro High School
Frank Porter Graham Elementary
Future Morgan Creek Greenway

Corridor Ownership:

NCDOT

Recommendation
- Stripe Colored Bicycle Lanes* across NC 54 access ramps and intersection

Recommendation
-Expand Road Width to enable bicycle lanes

Interim Treatment
- Expand roadway to construct paved shoulder on both sides from Rock Haven to Public Works Drive

Intersection Improvement Project (see facing page for description)

Priority Project

Existing/Proposed Connecting Bicycle Facility

Existing/Proposed Connecting Greenway/Bikeway

Fig. 3-9. Improvements to the intersection of Estes Rd. and N. Greensboro St. include improved bicycle lanes, a bike box, and ladder-style crosswalks.

2. Estes Drive: From N. Greensboro St. to town limits
(U-2909, EB 5021 TIP project)

Importance

- Key gap in bicycle network
- High priority among participants

Recommended Solution

Extend wide shoulders along Estes Dr. to N. Greensboro St. and stripe as bicycle lanes

Interim Treatment

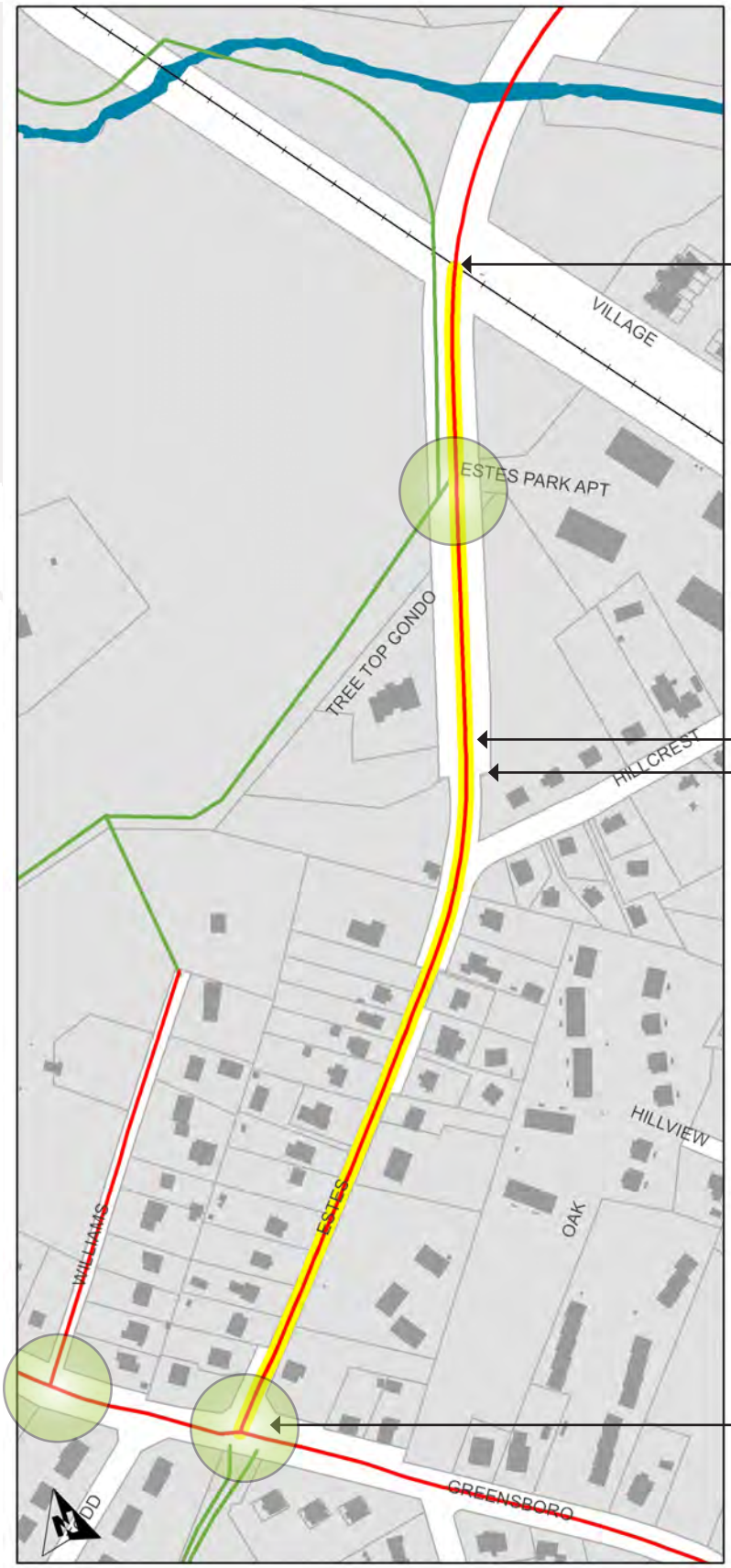
- Construct paved multi-use path along sewer corridor extending from Adam's Tract on northwest side of Estes Dr. to Wilson Park, ultimately to Greensboro St. at Williams St.

Intersection Improvements:

- Estes Dr. and North Greensboro St.
  - Reallocate lanes to properly install westbound bicycle lane to extend to intersection
  - Paint bicycle boxes*
  - Install bicycle loop detectors
- Estes Dr. and proposed multi-use path
  - Further analysis is warranted; work with future Bolin Creek Greenway plan
  - Work with NCDOT to install a cross-alert mid-block bicycle and pedestrian crossing to Estes Park Apartment complex
- Williams St. and Greensboro St. (entrance to Wilson Park)
  - Work with NCDOT to provide crossing facilities

**Construction projects considered to be innovative; will require state and federal approval for permission to experiment with these types of treatments*

Fig. 3-10. Estes Dr. photo rendering showing recommended solution of bicycle lanes on both sides of the roadway.



Project: 2

Estes Drive

Boundaries:

N. Greensboro Street
Carrboro Town Limits

Facility:

Bicycle Lanes
Greenway Trail

Project Type:

Roadway widening for bicycle lanes
Greenway Construction

Function:

Bicycle Commuter Route
Residential Connector

Trip Generators:

Frances Shetley Greenway
Adam's Tract Park
Wilson Park
Future Carolina North Campus

Corridor Ownership:

NCDOT

Recommendation
- Work with Chapel Hill to upgrade wide shoulders to striped bicycle lanes
- Create a "bicycle gateway" to Carrboro through signage

Recommendation
- Expand Road Width
- Stripe Bicycle Lanes

Interim Treatment
- Construct greenway from Estes Drive to Wilson Park along sewer line
(see photo rendering below)

Intersection Improvement Project
(see facing page for description)

Priority Project

Existing/Proposed Connecting Bicycle Facility

Existing/Proposed Connecting Greenway/Bikeway

3. Homestead Road: from High School to Lake Hogan Farms

Importance

- Connects multiple residential areas
- Connectivity for recreational bicyclists to Orange County bicycling roadways
- High priority among public participants
- Fills gaps in between developing areas that are slotted for long-term construction

Recommended Solution

Construct bicycle lanes along entire stretch (will require expanding roadway width). Also develop a multi-use sidepath as a facility for bicyclists more comfortable in the off-road environment, such as Type B or C cyclists.

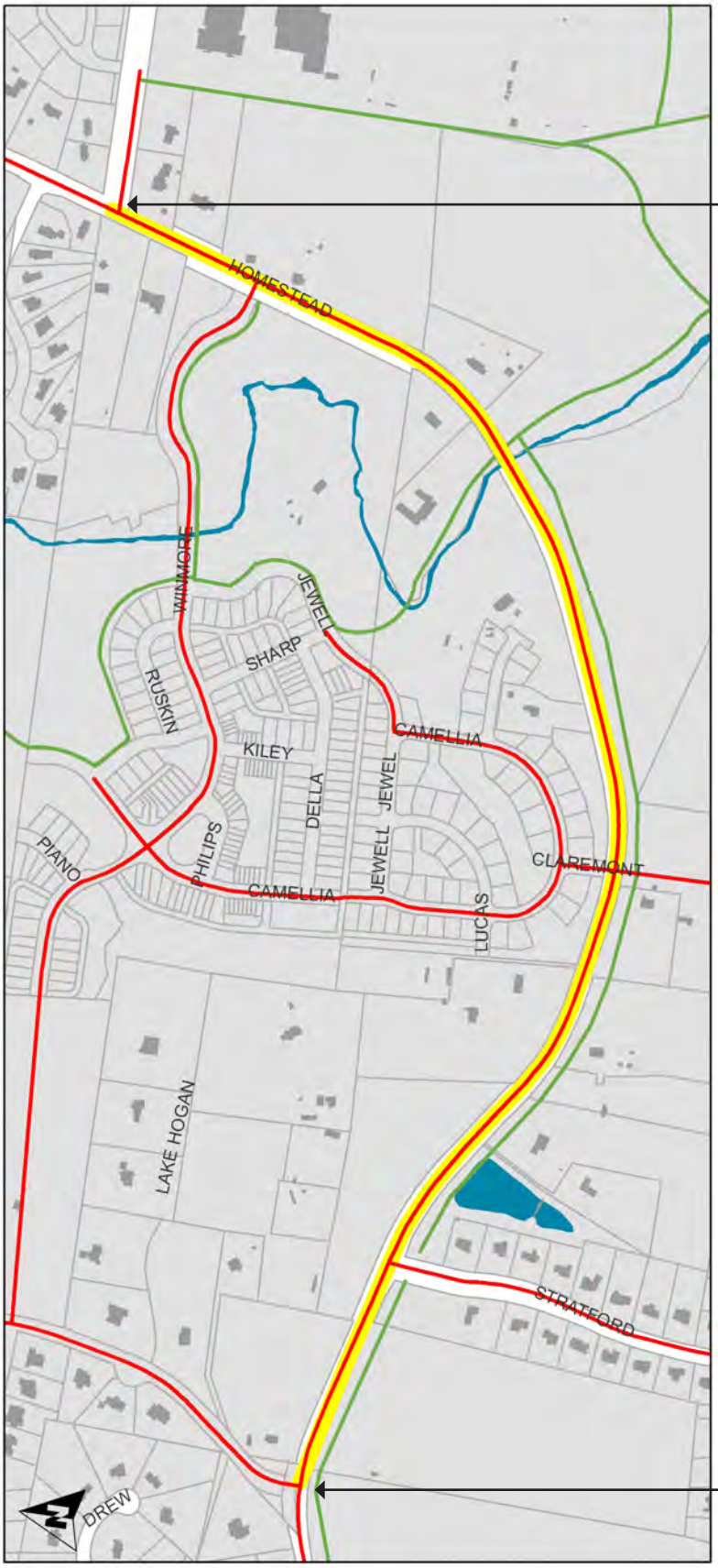
Interim Treatment

Install "Share the Road" signage, lower motor vehicle speed limit and increase enforcement.

Intersection Improvements:

- Old NC 86 and Homestead Rd.
  - Install bicycle loop detectors

Fig. 3-11. Bicyclists on Homestead Road will benefit greatly with the installation of bicycle lanes for its entire stretch, and possibly a sidepath for Type B and C bicyclists.



Project: 3
Homestead Road

Boundaries:
- High School Road
- Lake Hogan Farms

Facility:
- Bicycle Lanes (Filling Gaps)

Project Type:
- Roadway widening

Function:
- Bicycle Commuter Route
- School-Residential Connector

Trip Generators:
- Chapel Hill High School
- Connection to Chapel Hill
- Future Bolin Creek Greenway

Corridor Ownership:
- NCDOT

Recommendation
- Road Widening for Bike Lanes
- Stripe Bicycle Lanes (fill gaps)

Interim Treatment
- Increase Enforcement
- Lower Speed Limit
- Share the Road Signs

Intersection Improvement Project
(see facing page for description)

Priority Project

Existing/Proposed Connecting Bicycle Facility

Existing/Proposed Connecting Greenway/Bikeway

Fig. 3-12. Site lines make S. Greensboro St. unwelcoming and unsafe for bicyclists. Bike lanes, crossing signals, and increased signage will greatly improve the quality of this corridor.

4. South Greensboro Street/Old Pittsboro Road: from NC-54 to Weaver St.

Importance

- Key gap in bicycle network (not adequate paved shoulder space for bicyclists on steep uphill from NC 54 to Main St.)
- Very high priority among public participants

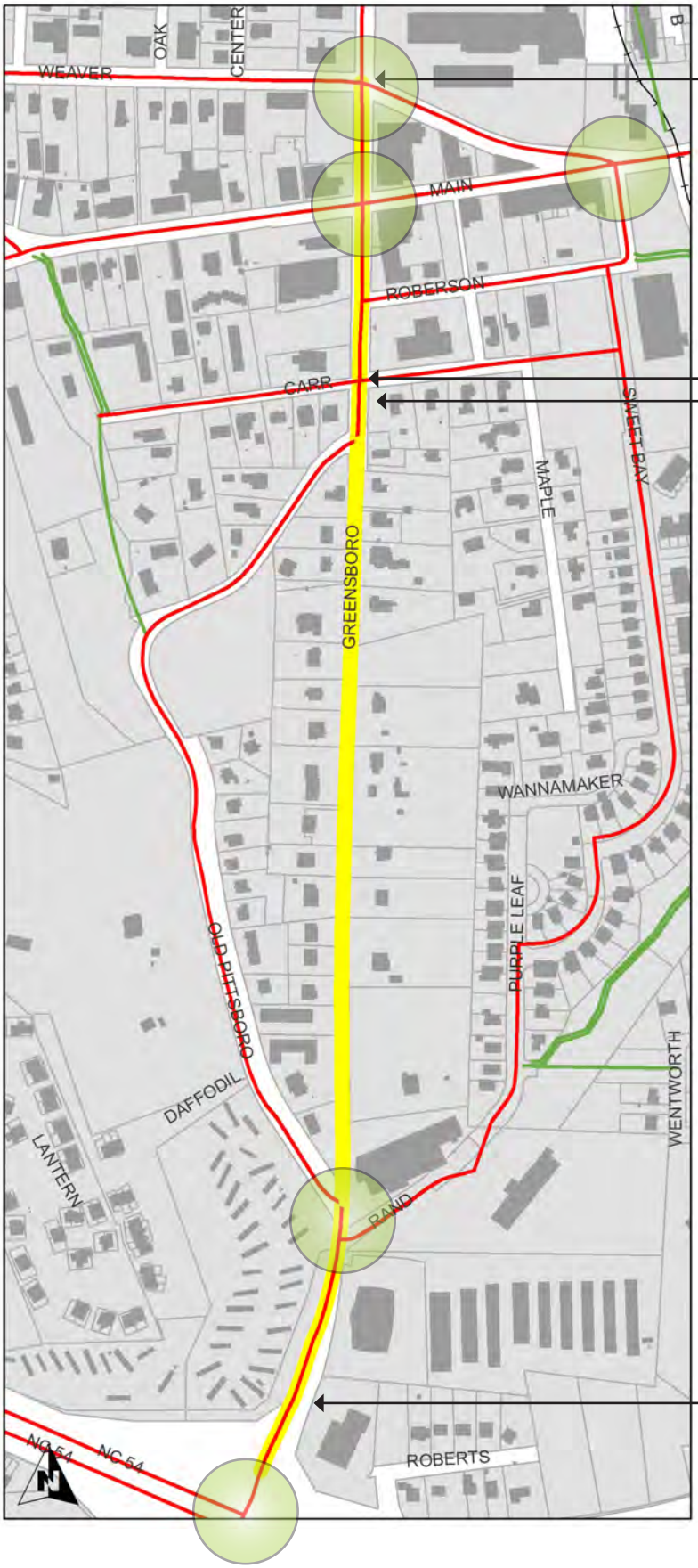
Recommended Solution

Provide sharrows from Weaver St. to Old Pittsboro Rd. Route bicyclists down Old Pittsboro Rd. and up Roberson Greenway with signage and sharrows. Bicycle lanes should be provided on S. Greensboro south from Old Pittsboro Rd. Current TIP project would place sidewalk on one side of S. Greensboro St.

Intersection Improvements:

- South Greensboro and NC 54
  - Restripe roadway and construct colored bicycle lanes* across on and off ramps.
- Main St., Weaver St. and Roberson St.
  - Paint bicycle boxes* on eastbound lane on Weaver St. at Main St.
  - Install bicycle signal loop detectors in bicycle box.
  - Paint colored bicycle lanes* on the westbound Weaver St. lane across the intersection.
- S. Greensboro St. and Old Pittsboro Rd.
  - -Add short segment of sidepath along Greensboro St. southward from Old Pittsboro Rd. to allow for perpendicular crossing to Roberson Greenway
  - Consider installing High intensity Activated crossWalk (HAWK) signal* or other crossing signal due to high volume of bicycle and pedestrians crossing at non-signalized intersection.
  - -Add highly-visible marked ladder crosswalks

**Construction projects considered to be innovative; will require state and federal approval for permission to experiment with these types of treatments*



Project: 4

S. Greensboro Street

Boundaries:

NC 54
Weaver Street

Facilites:

Bicycle Lanes
Sharrow
Crossing Improvement
Bicycle Box

Project Type:

Roadway widening/Paint

Function:

Bicycle Commuter Route
Commercial-Residential Connector

Trip Generators:

Roberson Street Greenway
Carrboro Century Center

Corridor Ownership:

NCDOT

Recommendation
- Paint Sharrow Symbols
- Possible Chance to Stripe 60' or so of Bicycle Lane approaching Main Street
- Paint Bicycle Box at Main Street on northbound lane of S. Greensboro Street

Recommendation
- Improve Crossing at Old Pittsboro Street and Rand Road
-Route Cyclists Up/Down Old Pittsboro Street or Roberson Greenway
-Install signage

Intersection Improvement Project (see facing page for description)

Priority Project

Existing/Proposed Connecting Bicycle Facility

Existing/Proposed Connecting Greenway/Bikeway

5. Old Fayetteville Road: from McDougle Campus to NC-54
(STIP Project U-3100B to provide bicycle, pedestrian and transit accomodations)

Importance

- Connects multiple gaps along Old Fayetteville Rd. between existing sections of bicycle lanes
- Connectivity for residential areas and McDougle middle and elementary schools
- High priority among public participants

Recommended Solution

Complete bicycle lanes along Old Fayetteville, filling current gaps.

Intersection Improvements:

- Old Fayetteville and NC-54
  - Install bicycle signal loop indicators
  - Install bicycle crossing signage on NC-54

- Strowd Lane and McDougle Middle School
  - Install crosswalk
  - Install HAWK signal*
  - Install median refuge island and curb cuts at both ends of sidewalk

**Construction projects considered to be innovative; will require state and federal approval for permission to experiment with these types of treatments*

Fig. 3-13. Old Fayetteville Rd. serves as a valuable connector for residents and McDougle schools. Bicycle lanes would fill current gaps in the bicycle network.

Project: 5

Old Fayetteville Road

Boundaries:
NC 54
McDougle Campus

Facility:
Bicycle Lanes (fill gaps)

Project Type:
Roadway widening

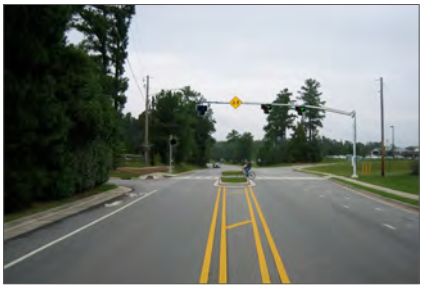
Function:
Bicycle Commuter Route
School-Residential Connector
Recreational Cyclist Route

Trip Generators:
McDougle Elem./Middle Schools
Anderson Park
Carrboro Plaza

Corridor Ownership:
NCDOT

Recommendation
- Maintain Existing Bicycle Lanes

Recommendation
- Improve Crossing
(see photo rendering below)



Recommendation
- Expand Road Width
- Stripe Bicycle Lanes

Interim Treatment
- Increase Enforcement during school beginning and ending hours

Intersection Improvement Project
(see facing page for description)

Priority Project

Existing/Proposed Connecting Bicycle Facility

Existing/Proposed Connecting Greenway/Bikeway

6. Smith Level Road: from Rock Haven Rd. to Damascus Church Rd.

Importance

- Connects rural residential areas to Carrboro High School
- Connectivity for recreational bicyclists existing town to rural Orange County
- Fills in gaps between Town and rapidly growing parts of northern Chatham County

Recommended Solution

Construct paved shoulders along the entire stretch (will require expanding roadway width).

Interim Treatment

Install Share the Road Signage, lower motor vehicle speed limit and increase enforcement.

Fig. 3-14. Views of Smith Level Rd. heading in- and out of town.

Project: 6

Smith Level Road

Boundaries:
Rock Haven Road
Damascus Church Road

Facility:
Wide Shoulders

Project Type:
Roadway widening

Function:
Bicycle Commuter Route
School-Residential Connector

Trip Generators:
Carrboro High School
Regional Connector to Points South

Corridor Ownership:
NCDOT

Recommendation
- Expand Road Width
- Pave Shoulders

Interim Treatment
- Increase enforcement during peak bicycle usage times
- Install signage

Priority Project

Existing/Proposed Connecting Bicycle Facility

Existing/Proposed Connecting Greenway/Bikeway

7. Old NC 86: from Hillsborough Rd. to Homestead Rd.

Importance

- Key gap in bicycle network (Not adequate paved shoulder space for recreational and commuter bicyclists to popular Orange County recreational bicycle riding)
- Very high priority among public participants

Recommended Solution

Extend bicycle facility northward to Homestead Rd./Dairyland Rd. as a bicycle lane. If funding and available lands allow, create a multi-use sidepath providing a facility for bicyclists less comfortable in the roadway environment, such as Type B and C cyclists.

Interim Treatment

Lower posted motor vehicle speed limit on corridor and increase enforcement, especially during weekend mornings and afternoon weekdays (peak bicycle travel times).

Intersection Improvements:

- Old NC 86 and Homestead Rd.
  - Install bicycle loop detectors
  - Install bicycle crossing signage
- Hillsborough Rd. and Old NC 86
  - Install bicycle loop detectors
  - Install bicycle crossing signage

Fig. 3-15. Old 86 with a sidepath and bicycle lanes to Hillsborough Rd. The multiple options for facilities will appeal to various types of users.

Project: 7

Old NC 86

Boundaries:
- Homestead Road
- Hillsborough Road

Facility:
- Bicycle Lanes
- Sidepath

Project Type:
- Roadway widening
- Sidepath construction

Function:
- Bicycle Commuter Route
- Regional Connector
- Recreational Cyclist Route

Trip Generators:
- Existing Bicycle Lanes
- Morris Grove Elementary

Corridor Ownership:
- NCDOT

Recommendation
- Expand Road Width
- Construct Bicycle Lanes
- Construct Sidepath (Alternative)

Interim Treatment
- Increase enforcement during peak bicycle usage times (weekends, mornings and evenings)

Recommendation
- Maintain Existing Bicycle Lanes
- Construct Sidepath

Intersection Improvement Project (see facing page for description)

Priority Project

Existing/Proposed Connecting Bicycle Facility

Existing/Proposed Connecting Greenway/Bikeway

8. Shelton Street: from N. Greensboro St. to Hillsborough Rd.

Importance

- Neighborhood connector that links to Carrboro Elementary
- Neighborhood connector that links to Frances Lloyd Shetley Greenway

Recommended Solution

Install sharrows and signage to direct cyclists to local destinations and provide connections between existing bicycle lanes on Hillsborough and N. Greensboro.

Intersection Improvements:

- North Greensboro St. and Shelton St.
  - Move 30 mph speed limit sign north of Shelton St. intersection
  - Consider installing (HAWK)* signal due to high volume of bicycle and pedestrians crossing at non-signalized intersection.

**Construction projects considered to be innovative; will require state and federal approval for permission to experiment with these types of treatments*

Fig. 3-16. Shelton St. is an important connector linking Carrboro Elementary to surrounding neighborhoods.

Project: 8

Shelton Street

Boundaries:
N. Greensboro Street
Hillsborough Road

Facility:
Shared Road

Project Type:
Signage

Function:
Bicycle Commuter Route
School-Residential Connector

Trip Generators:
Carrboro Elementary School
Frances Shetley Greenway
Neighboring Commercial Areas

Corridor Ownership:
Town of Carrboro

Recommendation
- Bicycle Route Signage

Recommendation
- Bicycle Route Signage

Recommendation
- Bicycle Route Signage

Intersection Improvement Project
(see facing page for description)

Priority Project

Existing/Proposed Connecting Bicycle Facility

Existing/Proposed Connecting Greenway/Bikeway

9. North Greensboro Street: from Estes Dr. to Shelton St.

Importance

- Existing major bicycle network artery
- Connectivity to residential areas to and from Downtown
- Connectivity for recreational bicyclists exiting town for rural Orange County

Recommended Solution

Improve crossing at N. Greensboro and Estes by re-striping traffic lanes to accommodate a proper bicycle lane, restriping crosswalks and installing a bicycle box (See Figure 3-17). Maintain existing bicycle lanes by restriping and sweeping regularly.

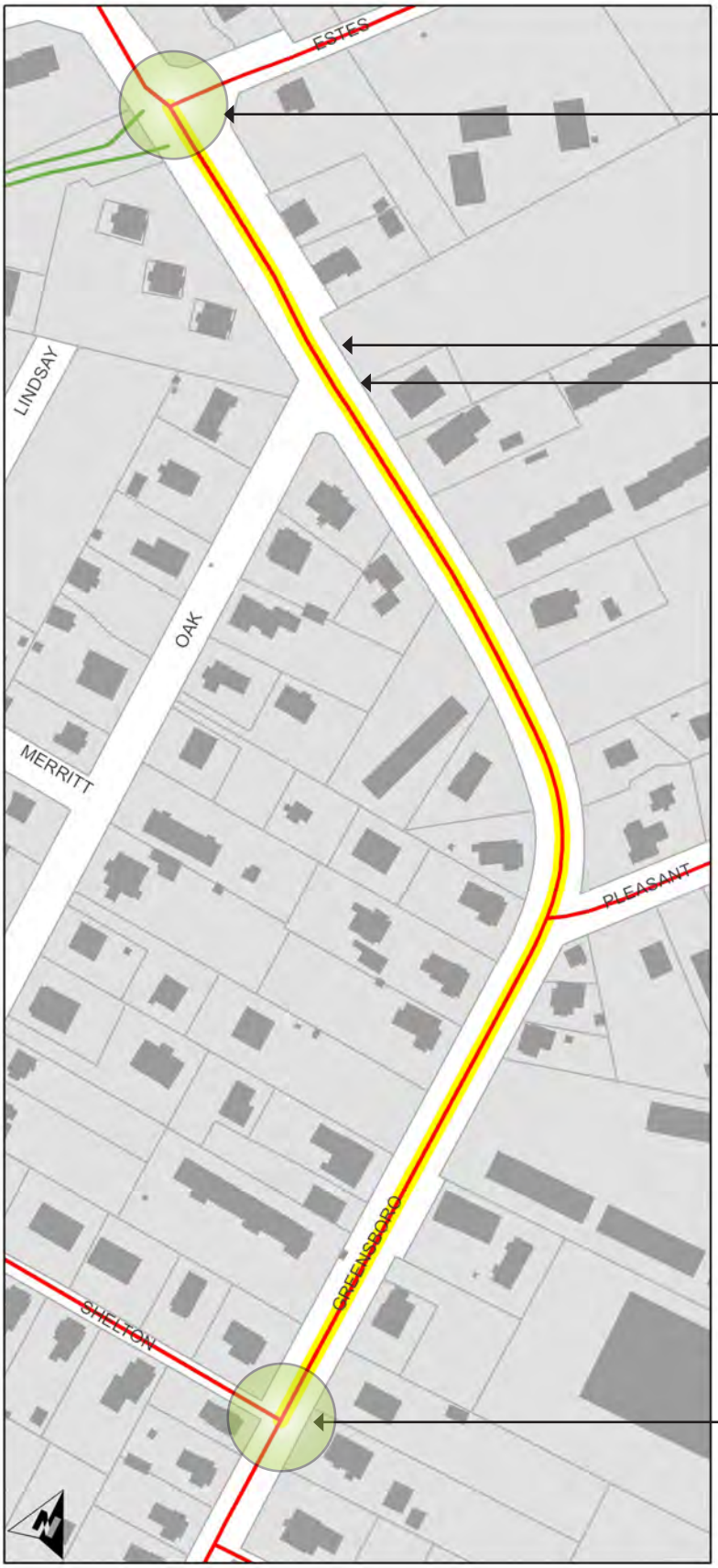
Intersection Improvements:

- Estes Dr. and North Greensboro St.
  - Reallocate lanes to properly install westbound bicycle lane to extend through intersection (see Figure 3-17)
  - Paint bicycle boxes*
  - Install bicycle loop detectors

- North Greensboro St. and Shelton St.
  - Move 30 mph speed limit sign north of Shelton St. intersection
  - Consider installing (HAWK) signal* due to high volume of bicycle and pedestrians crossing at non-signalized intersection.

**Construction projects considered to be innovative; will require state and federal approval for permission to experiment with these types of treatments*

Fig. 3-17. Improvements at the intersection of Estes Dr. and N. Greensboro St. could include restriping ladder-style crosswalks, painting bicycle boxes, and installing eastbound bike lanes.



Project: 9

N. Greensboro Street

Boundaries:
- Estes Drive
- Shelton Street

Facility:
- Improve Estes Intersection
- Repaint Existing Bicycle Lanes
- Sweep Bicycle lane Regularly

Project Type:
- Restriping and Maintenance

Function:
- Bicycle Commuter Route
- Recreation Cyclist Connector

Trip Generators:
- Wilson Park
- Frances Shetley Greenway
- Downtown

Corridor Ownership:
- NCDOT

Recommendation
- Improve Intersection

Recommendation
- Maintain Existing Bicycle Lanes
- Repaint Lines
- Repaint Symbols
- Consider Flexible Bollards along bicycle lane on southbound lane on curve near Pleasant Lane

Intersection Improvement Project (see facing page for description)

Priority Project

Existing/Proposed Connecting Bicycle Facility

Existing/Proposed Connecting Greenway/Bikeway

10. North Greensboro Street: from Shelton St. to Weaver St.

Importance

- Key gap in bicycle network (Bicycle lanes extend north from Shelton St. on N. Greensboro St. but end coming into the downtown area in front of Harris Teeter)
- Very high priority among public participants

Recommended Solution

Extend bicycle facility southward to Main St. as a bicycle lane (expansion of roadway will be required as narrow roadway width is currently a constraint).

Interim Treatment

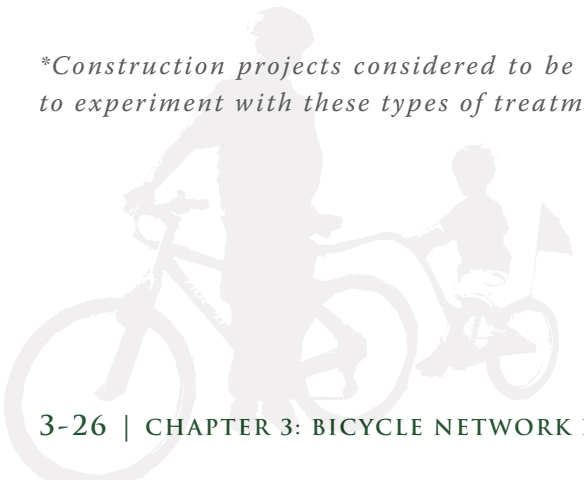
Extend bicycle facility southward to Main St. as a sharrow facility.

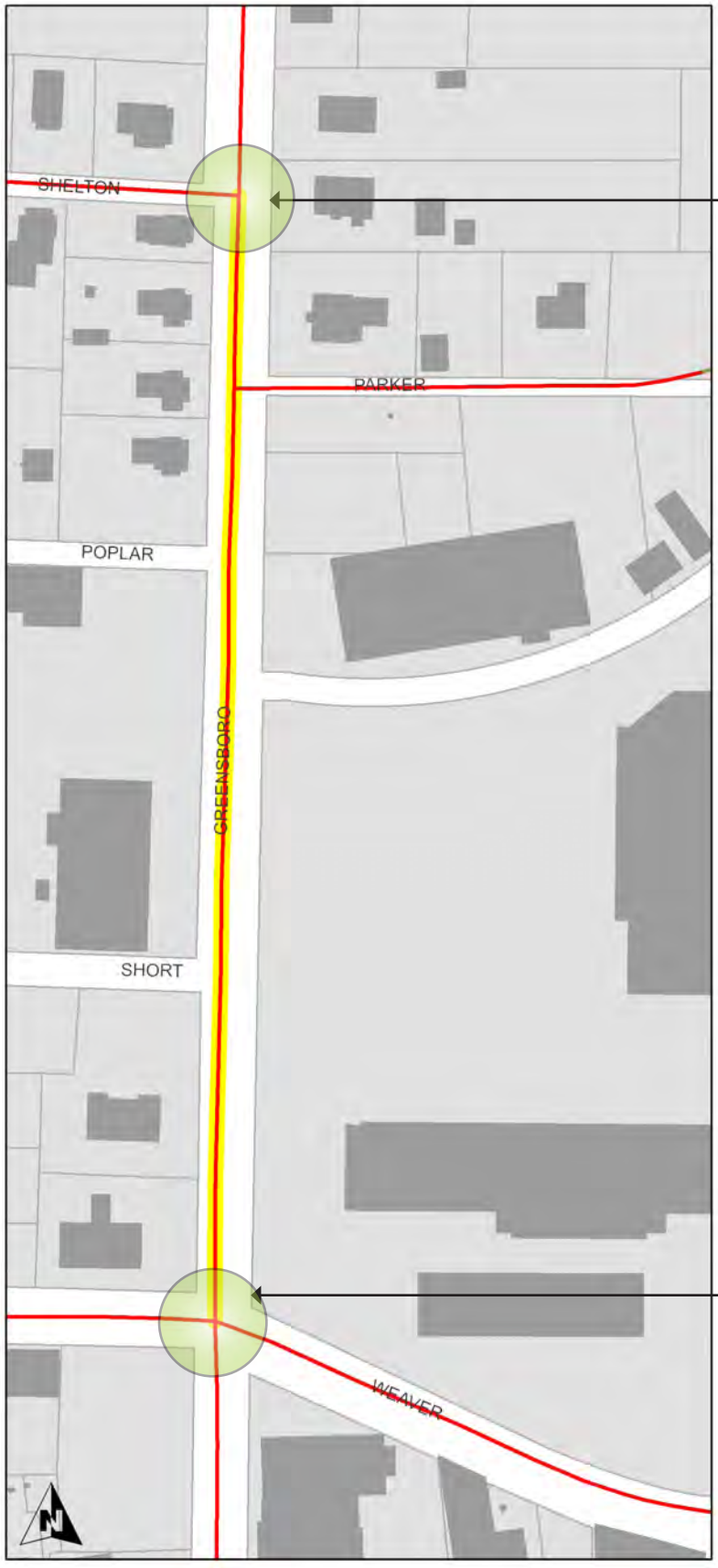
Intersection Improvements:

- North Greensboro St. and Shelton St.
  - Move 30 mph speed limit sign north of Shelton St. intersection
  - Consider installing (HAWK) signal* due to high volume of bicycle and pedestrians crossing at non-signalized intersection.

- North Greensboro and Weaver St.
  - Paint bicycle box* on westbound and eastbound sections of Weaver St. connecting to future bicycle lanes.
  - Widen eastbound road slightly to continue bicycle lane to connect to bicycle box* on eastbound lane of Weaver St.
  - Install bicycle signal loop detectors in bicycle boxes*

**Construction projects considered to be innovative; will require state and federal approval for permission to experiment with these types of treatments*





Project: 10

N. Greensboro Street

Boundaries:
- Shelton Street
- Weaver Street

Facility:
- Sharrow
- Bicycle Lanes

Project Type:
- Paint/Road widening

Function:
- Bicycle Commuter Route
- Commercial-Residential Connector

Trip Generators:
- Downtown
- Carrboro Century Center
- Existing Bicycle Lanes to the north

Corridor Ownership:
- NCDOT

Recommendation
- Paint Sharrow Marking
- Move 30mph speed limit sign north of Shelton Street.

Intersection Improvement Project (see facing page for description)

Priority Project

Existing/Proposed Connecting Bicycle Facility

Existing/Proposed Connecting Greenway/Bikeway

Bike Facility Recommendations Table

Rank	Bicycle Routes	From	To	Miles	Feet	Recommendation (Long Term)	Cost Estimate (Long Term)
1	**Smith Level**	NC 54	Rock Haven	0 76	4,008	Bicycle Lanes	$456,000
2	**Estes**	Greensboro	Town Limits	0 42	2,233	Bicycle Lanes	$186,000
3	**Homestead**	High School	Lake Hogan Farms	0 94	7,630	Bicycle Lanes	$564,000
4	**S. Greensboro**	Weaver	NC 54	0 68	3,609	(See short-term solution)	$408,000
5	**Old Fayetteville**	Hillsborough	NC 54	1 00	5,280	Bicycle Lanes	$600,000
6	**Smith Level**	Rock Haven	Damascus Church	0 63	3,306	Bicycle Lanes	$378,000
7	**Old 86**	Homestead	Hillsborough	0 72	3,793	Paved Shoulders	$342,000
8	**Shelton**	N Greensboro	Hillsborough	0 5	2,640	Sharrow	$1,300
9	**N. Greensboro**	Estes	Shelton	0 33	1,733	Maintenance	$2,080
10	**N. Greensboro**	Shelton	Weaver	0 19	994	Sharrow	$520
11	**Main St**	Rosemary	Greensboro	0 28	1,450	Bicycle Lanes	N/A
12	**Poplar**	N Greensboro	Main	0 36	1,925	Sharrow	N/A
13	**N. Greensboro**	Hillsborough	Estes	0 75	3,952	Existing Bicycle Lanes	N/A
14	**Main St**	Greensboro	Jones Ferry	0 16	840	Existing Bicycle Lanes	N/A
15	**Weaver**	E Main	W Main	0 36	1,885	Bicycle Lanes	N/A
16	**Jones Ferry**	Main	Davie	0 52	2,726	Existing Bicycle Lanes	N/A
17	**Main St**	Jones Ferry	Hillsborough	0 35	1,862	Bicycle Lanes	N/A
18	**Jones Ferry**	NC 54	Old Fayeteville	0 30	1,590	Bicycle Lanes	N/A
19	**Old Fayetteville**	NC 54	Jones Ferry	1 18	6,200	Bicycle Lanes	N/A
20	**NC 54**	Jones Ferry	Old Fayetteville	1 25	6,615	Existing Paved Shoulders	N/A
21	**NC 54**	Smith Level	Jones Ferry	0 82	4,323	Existing Paved Shoulders	N/A
22	**Old 86**	Eubanks	Homestead	1 72	9,100	Paved Shoulders	N/A
23	**Elm**	Weaver	Shelton	0 19	1,115	Sharrow	N/A
24	**Jones Ferry**	Davie	NC 54	18	967	Sharrow	N/A
25	**Stratford**	Homestead	Autumn	0 52	2,750	Existing Bicycle Lanes	N/A
26	**Main St**	Hillsborough	NC 54	0 87	4,607	Existing Bicycle Lanes	N/A
27	**Hillsborough**	Old Fayetteville	N Greensboro	1 25	6,623	Existing Bicycle Lanes	N/A
28	**James**	Hillsborough	Main	0 64	3,387	Sharrow	N/A
29	**Jones Ferry**	Old Fayetteville	Old Greensboro	0 57	3,000	Paved Shoulders	N/A
30	**Hillsborough**	N Greensboro	Main	0 68	3,592	Existing Bicycle Lanes	N/A
31	**Quail Roost**	Hillsborough	Lisa	0 24	1,256	Sharrow	N/A
32	**Davie**	Main	Jones Ferry	0 60	3,155	Bicycle Lanes	N/A
33	**Homestead**	Rogers	High School	0 32	1,712	Bicycle Lanes	N/A
34	**Seawell School**	Homestead	Estes	1 91	10,070	Bicycle Lanes	N/A
35	**Rogers**	Eubanks	Homestead	1 22	6,432	Bicycle Lanes	N/A
36	**NC 54**	Old Fayetteville	Town Limits	1 90	10,057	Existing Paved Shoulders	N/A
37	**Main St**	Merritt Mill	Rosemary	0 15	773	Sharrow	N/A
38	**Homestead**	Lake Hogan Farm	Old 86	0 80	4,213	Bicycle Lanes	N/A
39	**Lake Hogan Farm**	Homestead	Hogan Hills	0 87	4,604	Existing Bicycle Lanes	N/A
40	**Pine**	Greensboro	Hillsborough	0 32	1,700	Sharrow	N/A
41	**Hogan Hills**	Old 86	Lake Hogan Farms	0 50	2,652	Existing Bicycle Lanes	N/A
42	**Smith Level**	Damascus Church	15-501	1 60	8,560	Paved Shoulders	N/A
43	**Eubanks**	Town Limits	Old 86	0 90	4,770	Bicycle Lanes	N/A
44	**Old 86**	Town Limits	Eubanks	0 50	2,600	Paved Shoulders	N/A

*** Phase 1 = Top 10 projects, all other simple paint projects; Phase 2 = all road diet and restripe projects; Maintenance = existing facilities that need to be swept/ potholes that need repaving, etc; Opportunity Based = projects outside the Top 10 that require new construction and will occur if and when roadway is widened**

Table 3-1. This list represents the majority of the recommended network of bicycle facilities in Carrboro. Shorter, residential segments are left out of this list. Note: Costs do not include intersection improvements.

Construction Type (Long Term)	Short Term Solution	Cost Estimate (Short Term)	Phase*	Carrboro/NCDOT Road
New Construction	Paved Shoulder on South Side	$456,000	Phase 1	NCDOT
New Construction	Wilson Park Greenway	$175,000	Phase 1	NCDOT
New Construction	Enforcement/Share the Road Signage (2)	$400	Phase 1	NCDOT
(See short-term solution)	Alternate Routing on Old Pittsboro/Signage (4)	$1,000	Phase 1	NCDOT
New Construction	Enforcement/Share the Road Signage (2)	$400	Phase 1	NCDOT
New Construction	Enforcement/Share the Road Signage (2)	$400	Phase 1	NCDOT
New Construction	Enforcement/Share the Road Signage (2)	$400	Phase 1	NCDOT
Paint	Sharrow (20)	$1,300	Phase 1	Carrboro
Maintenance	Maintenance/Repaint Existing Lanes & Symbols	$2,080	Phase 1	NCDOT
Paint	Sharrow (8)	$520	Phase 1	NCDOT
New Construction	N/A	N/A	Opportunity Based	NCDOT
Paint	N/A	N/A	Phase 1	Carrboro
Maintenance	N/A	N/A	Maintenance	NCDOT
Maintenance	N/A	N/A	Maintenance	NCDOT
Road Diet/Restripe	N/A	N/A	Phase 2	Carrboro
Maintenance	N/A	N/A	Maintenance	NCDOT
Road Diet	N/A	N/A	Phase 2	NCDOT
Restripe	N/A	N/A	Phase 2	NCDOT
New Construction	N/A	N/A	Opportunity Based	NCDOT
Maintenance	N/A	N/A	Maintenance	NCDOT
Maintenance	N/A	N/A	Maintenance	NCDOT
New Construction	N/A	N/A	Opportunity Based	NCDOT
Paint	N/A	N/A	Phase 1	Carrboro
Paint	N/A	N/A	Phase 1	NCDOT
Maintenance	N/A	N/A	Maintenance	Carrboro
Maintenance	N/A	N/A	Maintenance	NCDOT
Maintenance	N/A	N/A	Maintenance	NCDOT
Paint	N/A	N/A	Phase 1	Carrboro
New Construction	N/A	N/A	Opportunity Based	NCDOT
Maintenance	N/A	N/A	Maintenance	NCDOT
Paint	N/A	N/A	Phase 1	Carrboro
New Construction	N/A	N/A	Phase 2	Carrboro
New Construction	N/A	N/A	Opportunity Based	NCDOT
New Construction	N/A	N/A	Opportunity Based	NCDOT
New Construction	N/A	N/A	Opportunity Based	NCDOT
Maintenance	N/A	N/A	Opportunity Based	NCDOT
Paint	N/A	N/A	Phase 1	NCDOT
New Construction	N/A	N/A	Opportunity Based	NCDOT
Maintenance	N/A	N/A	Maintenance	Carrboro
Paint	N/A	N/A	Phase 1	Carrboro
Maintenance	N/A	N/A	Maintenance	Carrboro
New Construction	N/A	N/A	Opportunity Based	NCDOT
New Construction	N/A	N/A	Opportunity Based	NCDOT
New Construction	N/A	N/A	Opportunity Based	NCDOT

*** Phase 1 = Top 10 projects, all other simple paint projects; Phase 2 = all road diet and restripe projects; Maintenance = existing facilities that need to be swept/potholes that need repaving, etc; Opportunity Based = projects outside the Top 10 that require new construction and will occur if and when roadway is widened**

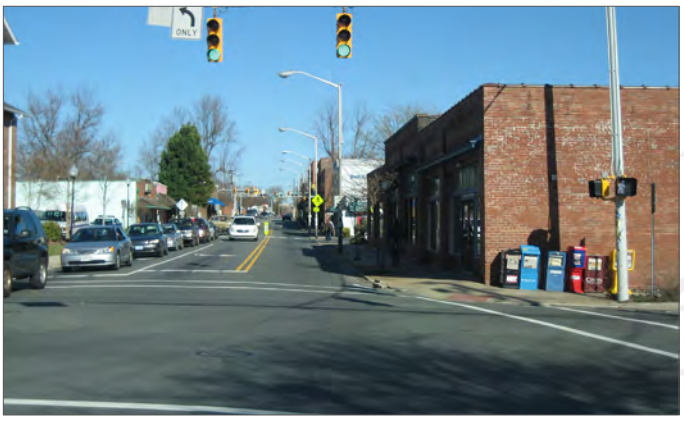


Fig. 3-18. If E. Main St. cannot be widened, a sharrow can serve as a comparable bicycle facility.

3.5 Other Important Corridors

Five other corridors (and intersections within these corridors) are described here because of their importance in overall connectivity to key destinations and because they fell just outside the Top 10 in the prioritization process.

East Main Street: from Chapel Hill town limits to Weaver St.

Importance

- Key roadway connection between Chapel Hill and Carrboro (No designated facility currently)
- High automobile and bicycle traffic volumes
- High priority among public participants

Recommended Solution

Extend bicycle facility from Cameron Blvd. (Chapel Hill) to Carrboro town limits as a bicycle lane, with major roadway reconfiguration and traffic calming.

Interim Solution

Enforce speed limits. Place clear signage indicating the need to "Share the Road." Install sharrow pavement markings on E. Main St.

Intersection Improvements:

- E. Main St. and Rosemary St.
  - Remove one westbound lane of Rosemary St. and stripe bicycle lanes on both sides of Rosemary St. to Chapel Hill limits.

- Main St. and Lloyd St.
  - -Install bicycle loop detectors
  - -Install "No Turn on Red" signs from Lloyd St.
  - -Make marked crosswalks more highly visible (ladder painted)
  - -Paint bicycle boxes*

**Construction projects considered to be innovative; will require state and federal approval for permission to experiment with these types of treatments*

Fig. 3-19. Main St. is busy with vehicles and bicyclists on a day-to-day basis. The introduction of a sharrow provides a short -term solution to areas with no facilities.

Fig. 3-20. Weaver St. is a key gap in the bicycle network and recommended bicycle facilities include bike lanes or sharrow markings.

Weaver Street: from W. Main St. to E. Main St.

Importance

- Key gap in bicycle network (Not a separated space for bicyclists currently)
- Very high priority among public participants
- In the middle of Downtown with high volume of bicyclists
- Dangerous condition of bicyclists passing by cars due to the tight width of the travel lane and parking stalls when approaching intersections

Recommended Solution

Bicycle lane along stretch to provide separated space for bicyclists. This will require removing on-street parking and/or roadway reconfiguration. Installation of a bicycle box* at both ends.

Interim Treatment

Place sharrow markings along Weaver St. This would more clearly designate the appropriate location for bicyclists to share the roadway. Traffic often moves slowly through this corridor because of traffic lights, allowing bicyclists to easily keep up with the speed of traffic.

Intersection Improvements:

- Weaver St. and N. Greensboro St.
  - Paint bicycle box* on westbound and eastbound sections of Weaver St. connecting to future bicycle lanes.
  - Widen eastbound road slightly to continue bicycle lane to connect to bicycle box* on eastbound lane of Weaver St.
  - Install bicycle signal loop detectors in bicycle boxes

- Weaver St. and West Main St.
  - Install bicycle signal loop detectors
  - Paint bicycle box* on northbound and eastbound lanes of W. Main St. once recommended road diet is completed (see page 3-33).
  - Consider colored bicycle box* and bicycle loop indicator in front of service station on westbound lane of Weaver St.

**Construction projects considered to be innovative; will require state and federal approval for permission to experiment with these types of treatments*

Old NC 86: from Homestead Rd. to Hillsborough Rd.

Importance

- Increases connectivity for recreational bicyclists to Orange County bicycling roadways
- High priority among public participants
- Connect to the Morris Grove Elementary School on Eubanks along Old NC 86 north of Lake Hogan Farms

Recommended Solution

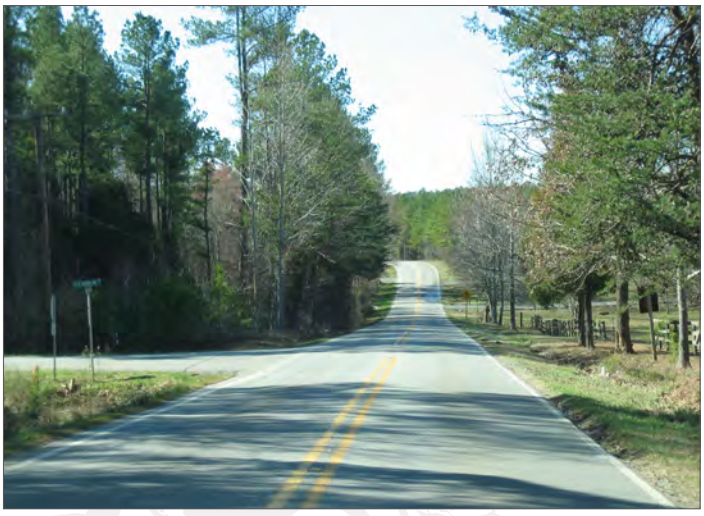
Develop paved shoulder bicycle facility along Old NC 86. Depending on cooperation from landowners and right-of-way issues, develop a multi-use side-path as a facility for bicyclists more comfortable in the off-road environment. This will also provide acccess to Morris Grove Elementary.

Interim Treatment

Lower motor vehicle speed limit and increase enforcement, especially during peak bicycle travel times. Install "Share the Road" signage.

Intersection Improvements:

- Old NC 86 and Homestead Rd.
  - Install bicycle loop detectors
  - Install bicycle crossing signage



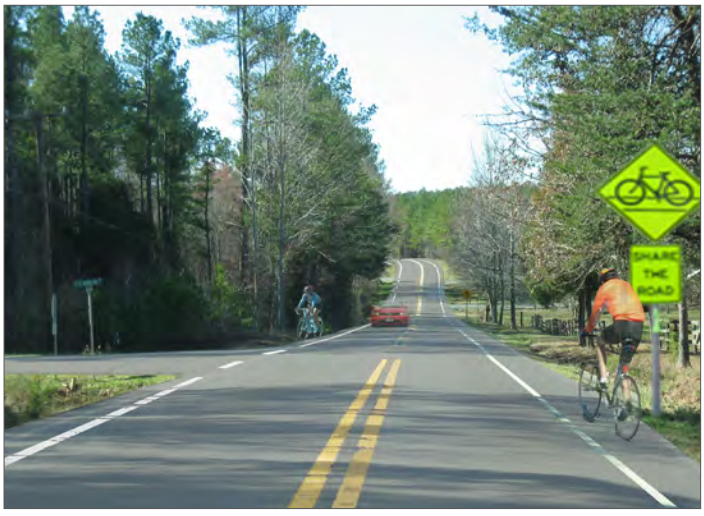


Fig. 3-21. Old NC 86 is a road frequented by recreational bicyclists and conditions would vastly improve with short-term solutions such as "Share The Road" signage, and ultimately paved shoulders.

Fig. 3-22. W. Main St.'s proposed facilities include a road diet and bicycle lanes on both sides.

West Main Street: from Jones Ferry Rd. to Hillsborough Rd.

Importance

- Very high priority among public participants
- Important connection between Downtown area, Farmers Market, and residential areas
- Critical gap between existing bicycle facilities

Recommended Solution

Stripe bicycle lanes along this stretch of Main St. with the implementation of a road diet, converting existing four lanes to two travel lanes, a central turn lane, and striped bicycle lanes on both sides of the roadway.

Intersection Improvements:

- Main St. and Jones Ferry Rd.
  - Widen entrance to PTA bike path and paint directional arrows for turn lane (see photo rendering below)
  - Stripe and paint bicycle boxes* on Jones Ferry Rd.
  - Stripe and paint bicycle boxes* on Main St.
  - Paint colored bicycle lanes* connecting PTA bike path to future bicycle lanes on W. Main St.

**Construction projects considered to be innovative; will require state and federal approval for permission to experiment with these types of treatments*

Fig. 3-23. The PTA bike path and Main St./Jones Ferry Rd. intersection is very much in need of improvement. Constructing a turn lane on the bike path would discourage bicyclists from using the sidewalk along Main St.

Jones Ferry Road: from Davie Rd. to Old Greensboro Hwy.

Importance

- Connections of multiple land uses
- Connectivity for areas south and west of the Town to the Downtown and existing bicycle lanes along Jones Ferry Rd. near Downtown
- High priority among public participants
- Connection under main highway

Recommended Solution

Develop bicycle lane from Davie Rd. to Old Fayetteville Rd. Consider colored bicycle lanes* through NC-54 Bypass intersection creating a clear, designated space for bicyclists. From Old Fayetteville Rd. westward, develop paved shoulders until Old Greensboro Hwy. When and if University Lake's bridge is replaced, adequate bicycle accomodations such as striped bicycle lanes on the bridge will need to be provided.

Interim Treatment

Increase enforcement, especially during peak bicycle travel times. Install "Share the Road" signage.

Intersection Improvements:

- Jones Ferry Rd. and NC-54
  - Restripe roadway and paint colored bicycle lanes* across on- and off ramps.
  - Install bicycle crossing signage on off-ramps

**Construction projects considered to be innovative; will require state and federal approval for permission to experiment with these types of treatments*

Fig. 3-24. Jones Ferry Rd. improvements could include wide shoulders over the bridge if and when the bridge is replaced.

Fig. 3-25. Main St. and Weaver St. (left) and Weaver St. and Greensboro St. (right) can be improved with bicycle boxes and colored bike lanes.

Other Intersections of Importance

Merritt Mill Road and Cameron Avenue

- Coordinate with Chapel Hill on reconfiguration of pavement markings
- Remove existing crosswalks and stripe colored bicycle lane* coming from Chapel Hill bicycle lane to line up with the Libba Cotten Bike Path ahead of vehicle stop bar.
- Remove 5-foot section of multi-use path at apex of existing crosswalks
- Realign southern crosswalk to the south along motor vehicle stop bar
- Encourage eastbound cyclists exiting the Libba Cotten Bike Path to enter the left turn lane and flow with motor vehicle traffic via special signage

Poplar Street and NC-54

- Install bicycle loop detectors on both sides of NC-54
- Install bicycle crossing signage on NC-54

S. Greensboro Street and NC-54

- Restripe roadway and paint colored bicycle lanes* across on- and off ramps
- Install bicycle crossing signage on NC-54 off-ramps

Barnes Street to future Morgan Creek Greenway

- Construct bicycle and pedestrian bridge over NC 54
- Provide directional signage from Jones Ferry Rd. to Morgan Creek Greenway

**Construction projects considered to be innovative; will require state and federal approval for permission to experiment with these types of treatments*

3.6 Off-Road Bicycle Facilities (Greenways)

Off-road trails provide a more unique, comfortable experience for all levels of bicyclists and can also serve a transportation and recreation purpose. Public participants in this planning process often preferred off-road greenways as their primary bicycle routing. Two greenway corridors are particularly important for the Town of Carrboro. These include the Bolin Creek Greenway (part of which exists in the Town of Chapel Hill), and the Morgan Creek Greenway. Both the Bolin Creek Greenway and Morgan Creek Greenway were in the preliminary planning phase during the time of this planning process.

Bolin Creek Greenway (EL-4994 TIP project) – This would serve as the major paved north/south spine of the greenway system. This greenway could connect multiple residential areas, Morris Grove Elementary School, Chapel Hill High School on Eubanks Rd. south to Wilson Park. This greenway has the potential to tie into bicycle facilities on Estes Dr., as well as future phasing of Chapel Hill greenways. The Town should consider an effective trail surface for both transportation and environmental sensitivity.

Morgan Creek Greenway (EL-4828 TIP project) – This would serve as the major paved east/west spine of the greenway system, providing excellent transportation and recreation opportunities. The greenway would provide connections to the Town of Chapel Hill, Frank Porter Graham Elementary, multi-family residential areas, University Lake, the Chapel Hill Tennis Club and Jones Ferry Rd.

3.7 Ancillary Facilities

Parking

Based on an examination of existing bicycle parking conditions in Carrboro, the following locations either need bicycle parking, expanded bicycle parking or improved bicycle parking:

- Carr Mill Mall/Harris Teeter
- Willow Creek Shopping Plaza
- Weaver Street Market
- Town Hall
- Farmers' Market
- Century Center
- Carrboro Plaza
- Downtown
- Cat's Cradle/Arts Center Area
- University Lake Park and Ride
- Transit Stops

For more information on bicycle rack systems and options, see Chapter 7: Design Guidelines: "Ancillary Features" of this Plan.

Improvements to Existing Facilities

Consultant fieldwork included analysis of the existing bicycle network and a general evaluation of roadway conditions. The following road segments either contain bicycle facilities that need improvement or possess dangerous conditions for cyclists:

- Restripe Fidelity St. bicycle lanes to 6-feet and paint bicycle lane symbol
- Improve pavement conditions and expand width of existing bicycle lanes on Weaver St. between Main St. and North Greensboro St.
- Standardize bicycle lane symbol townwide to nationally accepted symbol
- Restripe existing bicycle lanes on Jones Ferry Rd. near Davie
- Restripe portions of bicycle lanes on inside curve of North Greensboro Rd. near Pleasant Drive
- Improve Drainage grates on Jones Ferry Rd.
- Improve Drainage grates on Hillsborough Rd.
- Improve railroad crossing on North Greensboro St. in front of Harris Teeter
- Improve railroad crossing on East Main St.
- Attend to dangerous drainage grate on the east side of the railroad tracks on Main St.

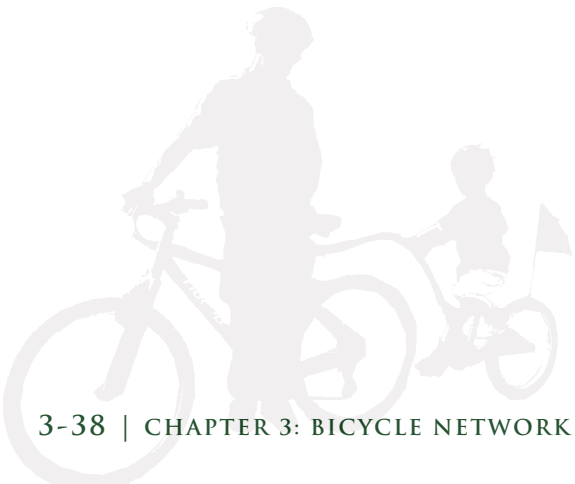
3.8 Regional Connectivity

The Town of Carrboro should look beyond its town limits and link bicycle facilities to neighboring and regional destinations. It is recommended that the Town of Carrboro coordinate efforts with surrounding communities: the Town of Chapel Hill, UNC-Chapel Hill, Orange County, Chatham County and Durham County to create long distance connections for alternative transportation and recreation.

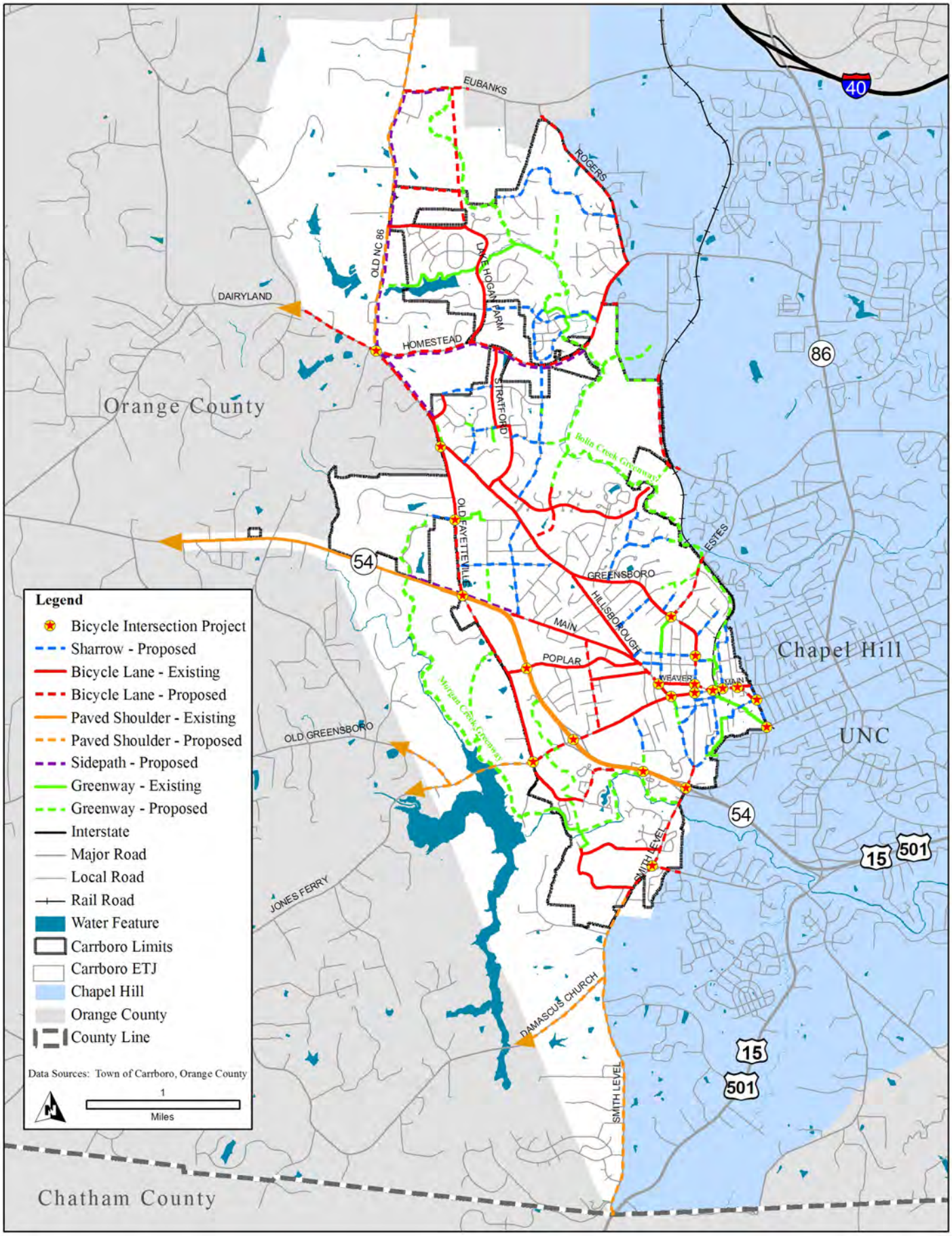
Existing regional bicycle connection efforts include the imminent construction of bicycle facilities along Old Chapel Hill/Old Durham Rd.. While these facilities lie in Chapel Hill and Durham, they are accessible via bicycle routes that connect Chapel Hill to Carrboro. Additionally, NCDOT State Bike Route #2(http://www.ncdot.org/transit/bicycle/maps/maps_highways.html) already connects to Carrboro via Jones Ferry Rd., Main St., S. Greensboro Rd., and Smith Level Rd.

Regional greenway corridors such as the Bolin Creek Greenway and Morgan Creek Greenway will encourage and draw users from all over the Triangle into the area, boosting tourism and interest in trail expansion. Long-range efforts should be made to connect Carrboro to the American Tobacco Trail in Durham County via the Morgan Creek Greenway, Meadowmont Greenways in Chapel Hill, and along the Barbee Chapel Rd./Stagecoach Rd. corridor in Durham. This relationship could connect Carrboro

not only to surrounding communities but would tie the town into the East Coast Greenway, which is a 2000+ mile existing and planned trail that extends from Calais, MN; to Key West, FL, of which the American Tobacco Trail is an existing segment. Additionally, Carrboro should work with Chapel Hill and Hillsborough, Orange County and Chatham County on developing regional bicycle and greenway connections to the rapidly developing areas of northern Chatham County and Pittsboro.

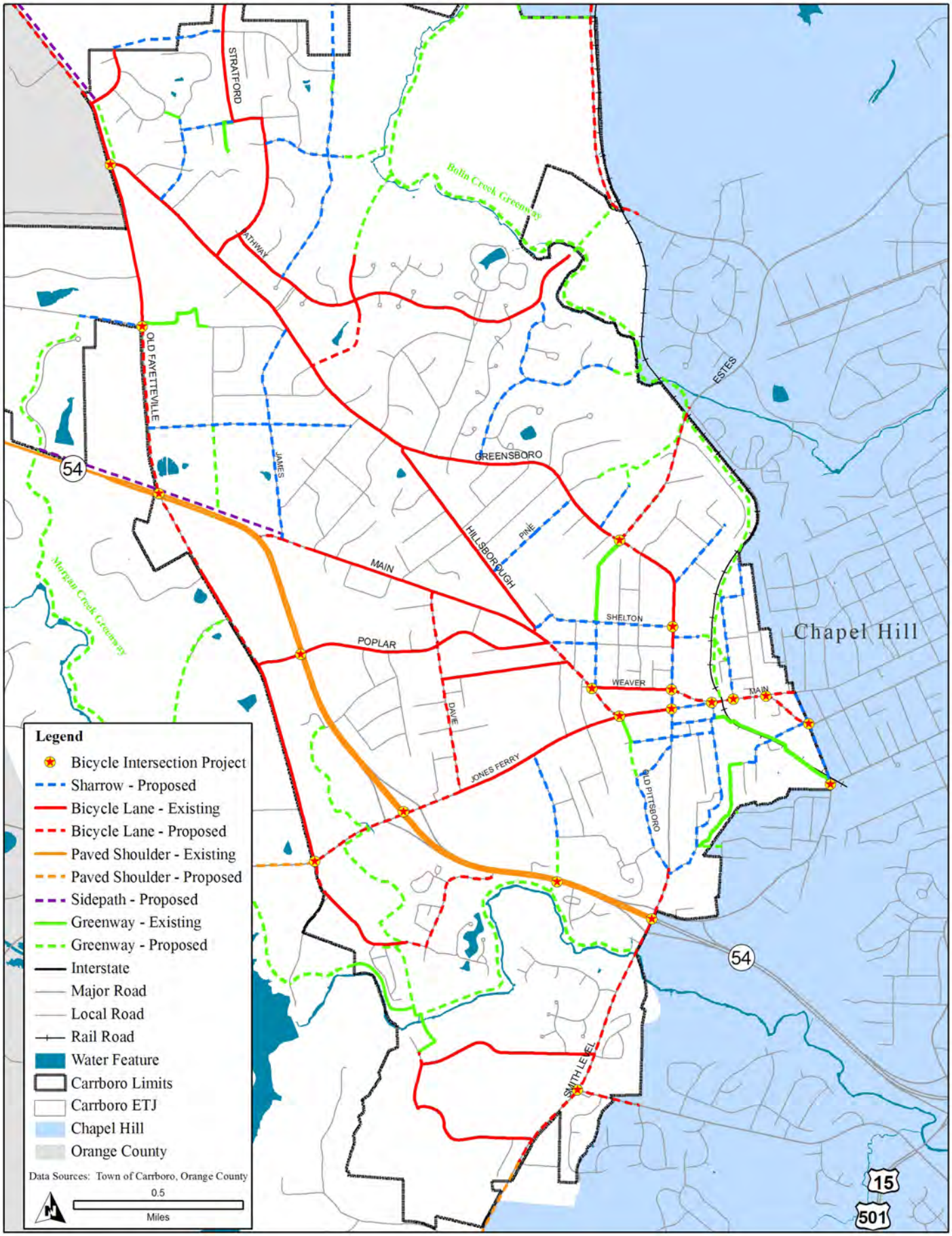


MAP 3.2: BICYCLE NETWORK MAP

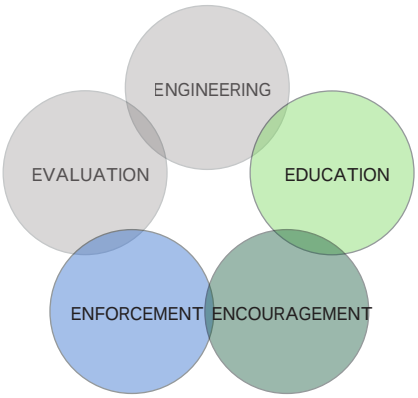


The overall proposed bicycle network for Carrboro. Note: greenway alignments are conceptual and further studies should be conducted to determine alignment.

Map 3.3: Enlarged Bicycle Network Map



The proposed bicycle network for Carrboro zoomed into the downtown area. Note: greenway alignments are conceptual and further studies should be conducted to determine alignment.



Chapter Outline:

CHAPTER 4: PROGRAM RECOMMENDATIONS

4.0 Overview

Reaching the goals of the Carrboro Bicycle Transportation Plan will require a comprehensive approach that goes beyond the installation of recommended bicycle facilities. Meeting mode-share goals, for example, requires programs to encourage proper use and enjoyment of the system. This chapter outlines recommended programs for the Town of Carrboro to meet the needs of bicyclists that cannot be met through facility construction alone.

4.1 Program Recommendations

Bicycle-related programs listed in this chapter are provided to demonstrate the variety of opportunities available for promoting bicycling and active lifestyles in Carrboro. The Town should work closely with local volunteers and community organizations to implement events and activities, research new program ideas, and improve upon existing programs. Program recommendations come in the form of three E's: education, encouragement, and enforcement. All three E's are important in establishing a higher ranking as a bicycle-friendly community. The most important programming effort is the development of a Bicycle Advocacy Group described below.

Bicycle Advocacy Group

A Citizens Bicycle Advocacy Group, established by citizens of Carrboro, should be formed to champion the recommendations and implementation of this Plan. During public workshops for this planning process, a number of residents expressed interest in forming this group. This advisory group would not be Town-supported but key Town staff should be involved. The group would be a beneficial resource for promoting bicycle safety, providing feedback on opportunities and obstacles within the bicycle network, and assisting in the coordination of events and outreach campaigns. The group would meet quarterly to encourage and evaluate the progress of overall plan implementation. For example, the group could initiate a bicycle ambassador program to encourage more bicycling in the community, help seek grants to implement facilities and programs recommended in the plan, and evaluate the progress of the overall implementation.

The Town of Carrboro is fortunate to already have the establishment of a Greenways Commission and a Transportation Advisory Board. Greenway and transportation planning plays an important role in the bicycle network in terms of design and implementation because these types of facilities promote bicycling and safety. These two committees can meet to help to push the efforts of maintaining bicycling as a priority within Carrboro. The Citizens Bicycle Advocacy Group should work closely with these groups to ensure proper communication and integration of efforts.

Case Study: Bicycle Advocacy Group

The San Francisco Bicycle Coalition (SFBC) is one of the oldest bicycle advocacy groups in the country, founded in 1970, to work for a more bicycle-friendly city. Today, nearly 10,000 members are working towards more safe, efficient, and green ways to move around the city. Successes resulting from SFBC efforts include 201 miles of bicycle lanes and paths, bicycle access on mass transit, and bicycle access on the Golden Gate Bridge. The SFBC provides free urban cycling classes, distributes hundreds of free bike lights and helmets to cyclists in underserved communities, hosts dozens of events including Family Bicycling Day, and provides free, valet bike barking to major events including San Francisco Giants baseball games. The SFBC partners with a number of agencies including mass transit groups, the Police Department, YMCA, San Francisco Department of the Environment, and other community groups.

In order to achieve these successes, the SFBC employs a number of efforts. To work for a citywide, connected bicycle network, the coalition works on bike network campaigns in districts throughout the City. It utilizes the volunteer efforts of hundreds of people for education and encouragement events. More recently, the SFBC developed a 2008-2012 Strategic Plan with visions, goals, strategies, and success measurements. Over half the funding for the SFBC comes from members and donors. Benefits, events, and grants provide an additional 25% of the group's funding. The majority of expenditures go to programs.

For more information, visit http://www.sfbike.org/

SAN FRANCISCO BICYCLE COALITION

4.2 Education

Public Education

Educating adults and children about proper bicyclist and motorist behavior is critical for creating a safe, bicycle-friendly community. A number of educational techniques and materials are available and should be pursued by the Town of Carrboro. Educational materials can focus on safe behaviors, rules, and responsibilities. Information may include important bicycle laws, bulleted keys for safe bicycle travel, safe motor vehicle operation around bicycles, and general facility rules and regulations. This safety information is often available for download from national pedestrian advocacy organizations, such as the Pedestrian and Bicycle Information Center website, www.pedbikeinfo.org. Information can be distributed through brochures, newsletters, newspapers, bumper stickers, and other print media. It can also be posted on municipal websites and shown on local cable access television. Local events such as earn-a-bike programs, bicycle rodeos, and summer camps can be organized by the Town and can be utilized to distribute information using a booth to display related print media. Brown-bag events and clinics are excellent means to provide adult education. Such events can be an opportunity to distribute new bicycle maps. A representative from the proposed Citizens' Bicycle Advocacy Group could volunteer at events to answer questions related to bicycling in Carrboro.

- ***Motorist Education*** - Revise the Town's traffic calming program to target all forms of transportation. Brochures, newspaper articles and newsletters, may be utilized as part of the traffic-calming initiative. Enhanced, educational enforcement of unsafe behavior will help as well.
- ***Adult Education*** - Conduct brown-bag events and clinics for adults and distribute safety materials and bicycle maps. Bicycle shops and clubs should be involved in education. Enhanced, educational enforcement of unsafe behavior will help as well.

- ***Safety Programs for Children*** - Currently, the schools in the Town of Carrboro provide the NCDOT "Basics of Bicycling" course for fourth and fifth graders. In addition, the Town should launch programs that target all bicyclists and conduct earn-a-bike programs, bicycle rodeos, and summer camps. Bicycle shops and clubs should be involved in education. Enhanced, educational enforcement of unsafe behavior will help as well.
- ***Public Safety*** - Develop bicycle safety materials, brochures, newsletters, and bicycle maps for distribution at schools, places of work, and events. Bicycle maps should provide educational and safety information. These materials should be available on the Town's website as well.
- ***Routine Local Safety Education*** - Seek opportunities to distribute and communicate bicycle safety education messages. Include routine bicycle safety education messages in quarterly Town newsletters, water bills, or other distributions.

Internal Education

'Internal' education refers to the training of all people who are involved in the actual implementation of the Bicycle Transportation Plan. Internal training should be sponsored by the Town of Carrboro, and is essential to institutionalizing bicycle issues into the everyday operations of public works, planning, and parks & recreation departments. In addition to relevant Town staff, members of the local planning commission, NCDOT Division 7 staff, and county staff should also be included in training sessions whenever possible. This training should cover all aspects of the transportation and development process, including planning, design, development review, construction, and maintenance. This type of 'inreach' can be in the form of brown bag lunches, professional certification programs and special sessions or conferences. Even simple meetings to go over the Bicycle Plan and communicate its strategies and objectives can prove useful for staff and newly elected officials that may not have otherwise learned about the plan. Bicycle planning and design issues are complex, and state-of-the-art research and guidelines continue to evolve. Therefore, training sessions need to be updated and repeated on a regular basis.

Local law enforcement should be trained in accurate reporting of bicycle crashes involving automobiles. In many communities, police do not always adequately understand the rights of bicyclists. Proper interpretation of individual circumstances and events is critical for proper enforcement and respect between motorists and bicyclists. Special training sessions should be instituted and occur annually for new employees within the Police Department that focus on laws relating to bicycle travel.

Bicycle Ambassador Program

The proposed Bicycle Advocacy Group should begin this program as one of their early initiatives. Bicycle ambassadors are an important part of outreach to promote bicycle safety and awareness. Ambassador programs around the country promote safety for all road users, bicyclists, motorists, and pedes-

Fig. 4-1. An after-work event is held at a local cafe in Durham, NC, for the Bike to Work Week event.

Fig. 4-2. A child displays a right-turn-signal during a summer Bike Camp event in Portland, OR.

trians. Members of the Bicycle Advocacy Group may volunteer to be ambassadors as well as recruit community members to be ambassadors. The ambassadors program would host programs, demonstrations, and events at events, summer camps, and schools. One of the more popular programs in the country is Mayor Daley's Bicycling Ambassadors in Chicago (http://www.bicyclingambassadors.org/) where the group includes adult and junior ambassadors, hosts a number of educational events, and sports their own T-shirts. Local bicycle shops and groups in Carrboro should be involved such as the ReCYCLEry.

League Cycling Instructors (LCI)
The LCI certification is acquired by everyday people who are trained by seminar. Having certified teachers for Bicycle Education is a great way to help bicyclists in the Town of Carrboro. Instructors may teach youth and adults. Currently, the Town of Carrboro has 3 LCI instructors within a 35-mile radius. The newly-formed Bicycle Advocacy Group should pursue additional LCI-certified residents.

Education Resources
One section of the *Pedestrian and Bicycle Information Center* website provides important messages for a range of different audiences that can be part of an educational campaign or program. It also offers links for finding more information related to bicycling education: http://www.bicyclinginfo.org/education/

The League of American Bicyclists has been working for better cycling in America since 1880. They do this by promoting bicycling, educating cyclists and motorists, and advocating on behalf of cyclists on Capitol Hill and with state legislators across the United States. This web page has information on some of their programs: http://www.bikeleague.org/programs/index.php

The mission of the *National Center for Bicycling & Walking (NCBW)* is to help create bicycle-friendly and walkable communities across North America by encouraging and supporting the efforts of individuals, organizations, and agencies. This section of the website provides information on the workshops they offer for the general public as well as for training professionals: http://www.bikewalk.org/workshops.php

The role of the *Active Living Resource Center (ALRC)* website is to provide resources and tools to help make walking and bicycling part of your community's healthy lifestyle. This page of the website contains educational information related to bicycling: http://www.activelivingresources.org/bikingandwalking.php

NCDOT Division of Bicycle and Pedestrian Transportation provides significant information related to bicycle programming: http://www.ncdot.org/transit/bicycle/safety/safety_programs.html. Also, they list print material that is available for download: http://www.ncdot.org/transit/bicycle/safety/safety_materials.html#posters

Fig. 4-3. The ReCYCLEry in Carrboro could begin organizing group rides and furthering encouragement activities in the community.

Safe Communities is a project of the National Highway Traffic Safety Administration (NHTSA). Nine agencies within the U.S. Department of Transportation are working together to promote and implement a safer national transportation system by combining the best injury prevention practices into the Safe Communities approach to serve as a model throughout the nation: http://www.nhtsa.dot.gov/safecommunities

Safe Kids Worldwide is a global network of organizations whose mission is to prevent accidental childhood injury, a leading killer of children 14 and under. More than 450 coalitions in 15 countries bring together health and safety experts, educators, corporations, foundations, governments and volunteers to educate and protect families. Visit their website to receive information about programs, involving media events, device distribution and hands-on educational activities for kids and their families: http://www.usa.safekids.org/

Rules of the Road for Grandchildren: Safety Tips is an information website for grandparenting. If you are a grandparent, you can play an important role in teaching your grandchildren the "rules of the road." AARP: http://www.aarp.org/confacts/grandparents/rulesroad.html

Eat Smart, Move More is a statewide movement that promotes increased opportunities for healthy eating and physical activity wherever people live, learn, earn, play and pray: http://www.eatsmartmovemorenc.com/

American Trails supports local, regional, and long-distance greenways and trails, whether in backcountry, rural, or urban areas. This page of the website contains studies and reports that can be referenced in educational materials related to trails and greenways: http://www.americantrails.org/resources/

Worldcarfree.net is a clearinghouse of information from around the world on how to revitalize towns and cities and create a sustainable future. In addition to serving the carfree movement, Worldcarfree.net offers resources for architects, planners, teachers/professors, students, decision-makers and engaged citizens: http://www.worldcarfree.net/

Fig. 4-4. Businesses across the Triangle sponsor the SmartCommute challenge and other commuter clubs.

4.3 Encouragement

Employer Programs

To encourage bicycling and walking to work, employers can provide programs and incentives. When bicycling is encouraged, the employer benefits from improved employee health and morale along with an enhanced community perception when protecting the environment and being active in the community. Promotions could include a Bike to Work Day or a morning Pit-Stop where employees can receive free refreshments. Employers can provide educational workshops, bicycle parking options, and employee incentives. Incentives may include prize drawings, t-shirts, free tune-ups at a local bicycle shop, and bicycle maps.

School Programs

Many programs, such as Safe Routes to School, exist to aid communities in developing safer bicycle and pedestrian facilities around schools. Programs can be adopted by parents or the schools to provide initiatives for walking or biking. Information is available to encourage group travel, prevent bicycle- and pedestrian-related injuries, and sponsor commuter-related events. Carrboro can develop and implement action plans for all schools to participate in these programs and later apply for funding. The Safe Routes to School program also provides implementation and construction funding for facilities near schools.

After-school programs, summer bike camps, and Family Fun Rides can be created to provide a supportive environment for children to learn how to ride a bike comfortably and safely with friends, learn how to repair and maintain a bicycle, and tour their city and its destinations.

Case Study: Adult Bicycle Encouragement

The City of Portland, Oregon's Office of Transportation developed Downtown Smart Trips, a program that encourages bicycle commuting and provides incentives to workers, employers, and residents in Portland's downtown area. The program provides information to employers encouraging bicycle commuting options including improved health and productivity reduced demand for parking spaces, attracting employees, and providing tax breaks. The program also provides assistance to employers such as consultations, workshops, and presentations. Free information, maps, and gifts are provided to employers and individuals who request it. Those who complete pledge forms to increase commute trips by bike, transit, walking, and carpool are entered into prize drawings and encouraged to enter challenges. The overall SmartTrips program for the City of Portland extends outside of Downtown and is funded at $570,000 per year.

For more information, visit http://www.portlandonline.com/TRANSPORTATION/index.cfm?c=43820

DOWNTOWN SMART TRIPS

Case Study: Safe Routes to School Program - Davis, CA

The City of Davis, CA, has a very active Safe Routes to Schools program. All schools are involved in the Safe Routes to Schools program. The City's Bicycle/Pedestrian Coordinator created Suggested Safe Routes to School maps for local elementary schools that highlight key transportation infrastructure in each school boundary area. The City updates these maps on an annual basis, highlighting key safety. These routes take advantage of signalized crossings and adult crossing guards. In order to ensure the maps are as helpful as possible to all parties, the City staff has conducted a comprehensive survey about travel to school to gather more information.

Another Davis, CA, Safe Routes to School initiative involves an annual report prepared by engineering and public works staff. Working with the local bicycle and safety advocacy groups and City staff, this process ensures that specific school, bicycle, and pedestrian safety issues are addressed when roadway improvement projects are scheduled near a specific school.

Youth Recreation and Intervention

Encouraging and educating the Town's youth is critical to ensure bicycle usage in future generations. A number of methods may be considered for youth bicyclists. Classroom training, already occurring in the Town of Carrboro, brings the concept of bicycling into the minds of youth. Additional methods such as bicycle rodeos, summer bicycle camps, family fun rides, and after-school programs should be pursued by the Town.

Case Study: Youth Bicycle Encouragement

The City of Davis, CA, utilizes its recreational events and camps to encourage youth bicycling. The City created summer camp programs involving bicycle education. The Parks and Community Services Department has established a number of summer camps that incorporate bicycles as a required mode of transportation to some locations and activities. The soccer league also encourages children and their parents to bicycle to their games.
For more information, visit http://www.city.davis.ca.us/pcs/download/

Awareness Days/Events

A specific day of the year can be devoted to a theme to raise awareness and celebrate issues relating to that theme. A greenway and its amenities can serve as a venue for events that will put the greenway on display for the community. Major holidays, such as July 4th, and popular local events such as the town's Carrboro Day serve as excellent opportunities to distribute bicycling information. The following are examples of other national events that the Town of Carrboro can use to improve usage of bicycle facilities:

Fig. 4-5. Bicycle patrol officers in TX.

National Bike Month
May is National Bike Month and is an important annual event to promote and encourage bicycling. The entire month provides a chance for people to consciously promote the many ways bicycling is a fun, recreational, and useful way to get around. Bicycling to work is one of the main goals that is encouraged and promoted. Many events are clustered around a week in mid-May which is Bike-to-Work Week and typically a Friday of that week which is Bike-to-Work Day. The Town of Carrboro posts flyers and posters and sends targeted emails. This would also be an opportunity to promote the Bicycle Advocacy Group, host an Ambassador and/or bicycle event, provide educational materials and bicycle maps, and give prizes. For other ideas, visit: http://www.bikeleague.org/programs/bikemonth/pdf/50_things_for_bike_month.pdf.

Bike to Work Day
Bike to Work Day is an annual event held on the third Friday of May across the United States that promotes the bicycle as an option for commuting to work. Leading up to Bike to Work Day, national, regional, and local bicycle advocacy groups encourage people to try bicycle commuting as a healthy and safe alternative to driving by providing route information and tips for new bicycle commuters. On Bike to Work Day, these groups often organize bicycle-related events, and in some areas, pit stops along bicycle routes with snacks. The Town of Carrboro, with help from the newly-formed Bicycle Advocacy Group, should work to make this a more significant event, adding such things as a breakfast event and prizes for bicycle commuters.

Bike to Work Day was originated by the League of American Bicyclists in 1956 and is a part of Bike-to-Work Week, which is in turn part of National Bike Month. The week and month should also be promoted and celebrated by the Town of Carrboro. For more information visit:http://www.bikeleague.org/programs/bikemonth/

Annual Bike Tours
Currently, two tours occur in or around Carrboro: Rural Heritage Tour and Cycle North Carolina. The Rural Heritage Tour (Bikefest) offers several choices of distances up to 100 miles and includes routes through Orange County, into the rural areas surrounding Carrboro. The Cycle North Carolina tours vary year to year but often come through the Triangle. The Town of Carrboro should host its own bicycle tours that utilize existing bicycle lanes and rural roadways surrounding the Town. This event would provide an opportunity to promote and publicize bicycling in a number of ways. The Town should consider multiple annual bicycle events that could include races such as Criteriums and Century rides along with family rides, social rides, and interpretive rides. Events could happen in correspondence with National Bike Month or holidays.

Bicyclist Breakfast
Breakfast events are an excellent means of encouragement through camaraderie and community building. The City of Durham, NC, bicycling community has held these events on weekday mornings each month as part of bicycle commuting.

International Car-Free Day (September 22)
Designate one day a year for people to walk to work to help advance programs, promote active living, and raise awareness for environmental issues. Car-Free Day can be at the end of an entire week or month of alternative transportation promotional activities, including fitness expos, transit-use incentives, walking and jogging group activities, running and bicycling races and rides, etc. For more information visit: http://www.worldcarfree.net/wcfd/

"Strive Not to Drive Day"
This event example, from the Town of Black Mountain, North Carolina, is an annual event to celebrate and promote the Town's pedestrian achievements for the year throughout their region. Awards for pedestrian commuters, as well as booths, contests, and other events are organized through their local MPO Bicycle and Pedestrian Task Force and the Land-of-Sky Regional Council. A similar event could be held in Carrboro to focus on bicycling issues, as the Bicycle Transportation Plan is implemented.

National Trails Day
This event is held every year in June. Other events, competitions, races, and tours can be held simultaneously to promote trail use within Carrboro. For example, in Greensboro, North Carolina, the Parks and Recreation Trails Division sponsors events for National Trails Day, and it has become a huge event for the entire city. For more information visit: http://www.americanhiking.org/NTD.aspx

Earth Day
Earth Day is April 22nd every year and offers an opportunity to focus on helping the environment. Efforts can be made to encourage people to help the environment by bicycling to destinations and staying out of their automobiles. This provides an excellent opportunity to educate people of all ages in Carrboro. For more information visit: http://www.earthday.net/

Use Facilities to Promote Other Causes
Greenways could be used for events that promote other causes, such as health awareness. Not only does the event raise money/publicity for a specific cause, but it encourages and promotes healthy living and an active lifestyle, while raising awareness for bicycling activities. Non-profit organizations such as the American Cancer Society, American Heart Association, and the Red Cross sponsor events such as the Tour de Cure, a series of cycling events held in more than 80 cities nationwide to benefit the American Diabetes Association.

Bicycle Activities/Promotion within Local Organizations (Bicycle Clubs, Bike Shops, and Bike Rentals)
The Town of Carrboro has numerous organizations that could be utilized to promote bicycling activities (e.g., the local bicycle stores, the ReCYCLEry, local cycling groups, local schools/PTAs, neighborhood groups, homeowners associations, etc.). Education, enforcement, and encouragement programs can be advertised and discussed in local organization newsletters, seminars, and meetings. Such organizations could even organize and cross-promote their own group rides, trail clean-ups, distribute new bicycling maps, and broadcast information about new programs in the community as well as other activities listed in this section. Carrboro can

Fig. 4-6. The ReCYCLEry was started by local citizens and could be expanded with the help of the Town.

Fig. 4-7. The Clean Machine, located off Main Street, should have an active role in programming.

partner with such local organizations or bike shops to expand the free bikes program that will appeal to tourists or those who do not own a bicycle. Efforts should also be made to reach out to the Spanish-speaking population to encourage bicycling and educate about facility use.

Expand BUB (Rental) and ReCYCLEry Programs
The Blue Urban Bikes (BUB) and ReCYCLEry programs were started by, and continue to be run by, local citizens and provide great resources to encourage and educate bicyclists. BUB is a community bicycle loan program that provides bicycle checkout stations throughout Chapel Hill and Carrboro, offering inexpensive yearly memberships and 24-hour free bicycle rental periods. The ReCYCLEry offers a short class on how to maintain and repair their bicycles. The Town of Carrboro should help expand these two programs, increasing the bicycles and resources available. One first step is making Town Hall a BUB hub.

Cycling Clubs/Bicycle-Commuting Groups
Neighborhoods, local groups, or businesses could promote cycling clubs for local residents or employees to meet at a designated area and exercise on certain days before or after work (or even to work), during lunch breaks, or anytime that works for the group. This informal group could be advertised on local bulletin or information boards. These clubs could be specialized to attract different interest groups. For example, in the Durham's Research Triangle Park, several work places (Such as RTI International) have organized their own riding groups to promote cycling and active, healthy lifestyles.

The Town of Carrboro area already features the Carolina Tarwheels Bicycle Club along with an active bicycling community that has additional organized weekly rides. The Carolina Tarwheels is a group of bicycle enthusiasts who organize social rides in Orange, Durham, Wake, Alamance, and Chatham counties. The group meets in Carrboro on Wednesday and Saturday mornings. The Saturday morning ride begins at Wilson Park. These groups should be encouraged and supported by the Bicycle Advocacy Group. The clubs could be expanded to reach out to less experienced cyclists and provide advocacy and workshops in addition to their group rides.

Specialty Shops
The Town of Carrboro is fortunate to have The Clean Machine, a specialty bicycle shop located in downtown. The Clean Machine should be involved with programming efforts of the Town of Carrboro and the Bicycle Advocacy Group. The shop should be involved in events, conduct promotions, and provide event prizes.

Bicycle Maps
Town-wide bicycle maps, in both online and foldable hardcopy formats, encourage use by detailing existing bicycle facilities, routes, and destinations. Bicycle maps also provide an opportunity for bicycle education and safety information. Bicycle map distribution at events and bicycle shops will encourage more bicycling and inform new and current residents of the great facilities the Town of Carrboro features. This map should be developed during implementation of this Plan and be updated regularly.

Orange County Bike Map
The Orange County Bike Map, which will be published in early 2009, will include facilities within Carrboro.

Carrboro Bikeways Map
This map was developed by the Town of Carrboro, and highlights the locations of existing and planned bike lanes and bike paths. This map should be updated with future planned bicycle facilities within the town. Maps are available at Town Hall.

Mountain Bike Trail Maps
Mountain bike trail maps should also be provided for sites where mountain biking is appropriate and accepted. These maps should be provided both online and as foldable hard copies. The maps should also provide recommended routing from surrounding areas to the mountain bike trails to encourage a complete bicycle trip.

Adopt-A-Trail
Local clubs and organizations provide great volunteer services for maintaining and patrolling trails. This idea could be extended to follow tour routes or specified streets/sidewalks. A sign to recognize the club or organization could be posted as an incentive to sustain high quality volunteer service. The Boy Scouts of America serve as a good model for participation in this type of program.

Revenue-Generating Programs
The Town of Carrboro should be proactive in increasing revenue from programs and events that can help fund the building, management, and maintenance of future facilities. Fees could be increased in events annually or biannually to increase revenue. Specific program and event ideas that are being used to generate revenue across the country include:

- Races/triathlons (fees and/or donations)
- Concessions
- Educational/Nature/Historic tours (fees and/or donations)
- Fund-raisers including dinners/galas
- Moonlight bike rides and walks (fees and/or donations)
- Greenway parade (fees and/or donations)
- Concerts (fees and/or donations)
- Art events along greenway (fees and/or do nations)
- Events coincident with other local events such as fairs, festivals, historic/folk events, etc.
- Media events and ribbon-cuttings for new trails and bicycle facilities (donations)

Other Efforts
A number of other encouragement efforts may be undertaken by the Town of Carrboro. These include but are not limited to:

- Provide annual reports to the community that update bicycle improvements
- Promote and advertise new programs and events
- Reach out to the Spanish-speaking population to encourage safe bicycling

Encouragement Resources

Safe Routes to School is a national program with $612 million dedicated from Congress from 2005 to 2009. Local Safe Routes to School programs are sustained by parents, community leaders, and citizens to improve the health and well-being of children by enabling and encouraging them to walk and bicycle to school. Recently, the state of North Carolina has started the NC Safe Routes to School Program based off of the national program. The state has $15 million over the next 5 years for infrastructure improvements within 2 miles of schools. This funding can also be used towards the development of school related programs to improve safety and walkability initiatives. The state requires the completion of a competitive application to apply for funding and a workshop at the school to determine what improvements are needed: http://www.saferoutesinfo.org and http://www.ncdot.org/transit/bicycle/saferoutes/SafeRoutes.html

BikeIowa provides a good resource, the "Employer's Bike to Work Guide," providing ideas for encouraging bicycle commuting: http://www.bikeiowa.com/asp/bike/EmployerGuide.asp

This web page from the *League of American Bicyclists* has information on encouraging bicycle commuting: http://www.bikeleague.org/resources/better/commuters.php

Bikes Belong is sponsored by the U.S. bicycle industry with the goal of putting more people on bicycles more often. From helping create safe places to ride to promoting bicycling, they carefully select projects and partnerships that have the capacity to make a difference. Their work concentrates on four main areas: federal policy and funding, national partnerships, community grants, and promoting bicycling. In addition, they operate the Bikes Belong Foundation to focus on kids and bicycle safety: http://www.bikesbelong.org/

The Thunderhead Alliance is a national coalition of advocacy organizations working to promote bicycling and walking. There are a number of organizations working at the state and local levels to educate and encourage communities to walk and bike: http://www.thunderheadalliance.org/site/index.php/site/index

4.4 Enforcement

Enforcement of proper bicycle, pedestrian, and motorist behavior and interaction is critical for the safety of Carrboro. As more residents choose bicycling as an option, interactions will continue to increase. Enforcement can occur in a number of ways but should mostly include an educational component. The Carrboro Police Department along with the recommended Ambassador Program can carry out the enforcement/education.

Targeted Motorist Enforcement

Based on crash data analysis and observed patterns of behavior, law enforcement can use targeted enforcement to focus on key issues such as motorist speeding, improper passing, parking in bicycle lanes, etc. These issues should be targeted and enforced consistently. The goal is for bicyclists and motorists to recognize and respect each other's rights on the roadway. Carrboro should set up speed enforcement in areas that are highly trafficked by bicycles,

such as rural roads and the downtown area. Other measures, such as traffic calming programs, can strengthen and protect neighborhoods or other local streets by improving the quality of life in these areas. When traffic problems become a daily occurrence, the sense of community and personal well-being are threatened.

Traffic Calming Programs - Davis, CA

The City of Davis, CA, launched Street Smarts with the goal of establishing a public-private traffic safety effort to educate drivers, pedestrians, and bicyclists on issues related to traffic safety. The program is led by the City of Davis Public Works Department but partners include the Chamber of Commerce, Farmers Market, School District, Police Department, UC Davis, and other agencies. Street Smarts has developed a number of strategies including public service announcement videos, advertisements, events, school activities, and a Pace Car. The Street Smarts program has made school areas a priority and has installed bright banners near schools urging drivers to "Keep Our Kids Safe, Slow Down," placed speed boards near schools to alert drivers how fast they are going, and stepped up enforcement. The program specifically addresses the proper use of helmets, hand signals, and the importance of obeying traffic laws for bicyclists. Although the campaign was launched with City funding, the program requires community support and donations in order to achieve its public education goals. The program runs both educational video and poster contests for the general public.

For more information, visit http://www.city.davis.ca.us/streetsmarts/.

Targeted Bicyclist Enforcement

In many cases observations made by local bicyclists can be used to identify specific areas of conflict (see online public comment form results in Appendix B: Public Input). To encourage the proper use of bicycle facilities this Plan recommends that a group, such as the Bicycle Advisory Group or the Bicycle Ambassadors, work with the Carrboro Police Department to develop a volunteer patrol team. Together, they could identify the role of the patrol team and how they would report back to the Police Department. Another task would be to work with the Police Department to identify the best way for citizens to report incidents to the police and how to best publicize this information to the bicycling community.

Additionally, unsafe cycling (e.g., riding on the wrong side of the street, riding without lights at night, or children riding without helmets) should be addressed by local law enforcement through warnings and educational methods, with an understanding that there may be a learning curve for new or inexperienced cyclists. Again, the goal is for bicyclists and motorists to recognize and respect each other's rights on the roadway.

Furthermore, targeted enforcement should occur at sites of new bicycle facilities including bicycle lanes and new intersection facilities such as bicycle boxes when they are implemented. This will help bicyclists who will likely be unfamiliar with some of the new bicycle roadway treatments.

Local Police Input

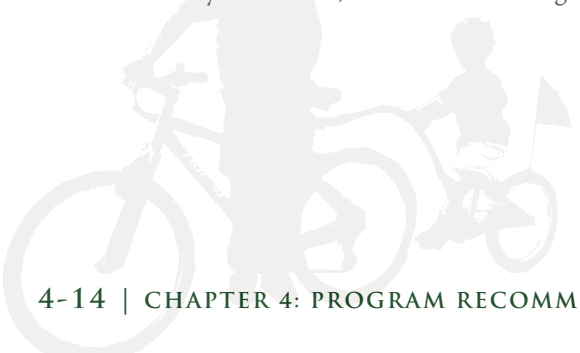
A member of the Carrboro Police Department should serve as the point person for the proposed Bicycle Advocacy Group and assist the group with understanding bicycle laws. Likewise, the Bicycle Advocacy Group could help the police department understand bicycling issues of concern to citizens, that may not be directly expressed to the department.

Police Officer Training
Internally, Carrboro should create new training sessions and programs for police officers that focus on enforcement, crashes, and bicycle laws. When new facilities are implemented, workshops or certification programs should be launched that educate officers about motorist and bicyclist laws. Training programs are held year-round at locations across the country in which officers can receive certificates.

Bicycle Patrol
As resources allow, the Town of Carrboro should consider creating bicycle patrol positions within the department. In many locations bicycle patrol units have proven to be a cost-effective, efficient and meaningful supplement to traditional police patrol units. As a first step, the Police Department could assess how and where a bicycle patrol unit could be implemented in Carrboro.

School Crossing Guards
Chapel Hill-Carrboro City Schools (CHCCS) currently hires and pays school crossing guards. As traffic continues to increase on North Carolina's streets and highways, concern has grown for the safety of children as they walk or bike to and from school. At the same time, health agencies, alarmed at the increase in obesity and inactivity among children, are encouraging parents and communities to get their children walking and biking to school. In response, the Division of Bicycle and Pedestrian Transportation funded a study on school zone safety and decided to establish a consistent training program for law enforcement officers responsible for school crossing guards. According to the office of the North Carolina Attorney General, school crossing guards may be considered traffic control officers when proper training is provided as specified in GS 20-114.1. At the request of the school system, the Carrboro police department provides limited training for new crossing guards accepting this position.

Mandatory Helmet Law
The Town of Carrboro should consider enacting a mandatory helmet law for residents of all ages. The National Highway Traffic Safety Administration (NHTSA) supports the enactment of bicycle helmet usage laws by states and municipalities. This is due to studies that show bicycle helmets provide protection (Example: Helmets are 85 to 88% effective in mitigating head and brain injuries). Over 20 states, including North Carolina, have laws requiring helmet usage for persons under age 16. A number of communities throughout the country have made helmet usage mandatory for all ages especially in the states of Missouri and Washington. In North Carolina, the towns of Black Mountain and Boone require helmets for all ages. For more information, visit http://helmets.org/mandator.htm and http://www.bikeleague.org/media/facts/pdf/BicycleHelmetUseLaws.pdf
As an enforcement/education measure, a partnership between the Town of Carrboro, local shops and groups, and the Bicycle Advocacy Group could distribute prizes to children seen wearing a helmet. Enforcement should not be heavy handed but rather an opportunity to educate and encourage helmet usage.



Case Study: Bicycle Helmets Program

The Bicycle Helmet Initiative Trust (BHIT) in Berkshire, England, is a charity aimed to ensure young cyclists are well equipped to take part in bicycling, considered a healthy and environmentally-friendly form of transportation. Their main objective is to increase helmet wearing among children. The BHIT believes that bicycle helmets saves lives and their focus is children from all walks of life (including lower income populations and socially-challenged individuals). The Trust works with road safety officers, teachers, parents, police, and health professionals. Strategies have included education and helmet giveaways. Posters and leaflets have been prepared in multiple languages and made available to schools, youth groups, and parents. The Trust also started a community-based reinforcement strategy called Helmet Watch. Community police officers and health professionals distribute prizes and entries in a grand drawing to children who are seen on their bicycles wearing a helmet. This type of initiative could be a public-private partnership between the Town of Carrboro and local groups such as the reCYCLEry, bicycle shops, the newly formed bicycle advocacy group, or other local companies, charities, or non-profits.

For more information, visit http://www.bhit.org/

Enforcement Resources

Town of Carrboro Police Department, non-emergency phone number: 919-918-7397
http://www.ci.carrboro.nc.us/pd/default.htm

The *National Highway Traffic Safety Administration (NHTSA)* awarded a grant to MassBike to develop a national program to educate police departments about laws relating to bicyclists. The program is intended to be taught by law enforcement officers to law enforcement officers as a stand-alone resource. The link contains downloads for presentations, videos, and other resources that are useful for police officers and everyday cyclists alike: http://www.massbike.org/police/

This webpage of the *Pedestrian and Bicycle Information Center* has a wealth of resources regarding enforcement issues, ranging from training for local law enforcement to procedures for handling violators, to enforcement example case studies: http://www.bicyclinginfo.org/enforcement/

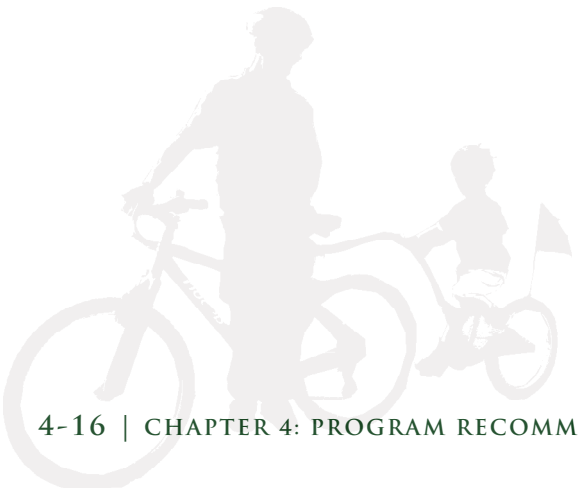
NCDOT School Crossing Guard Program
http://www.ncdot.org/transit/bicycle/safety/programs_initiatives/crossing.html

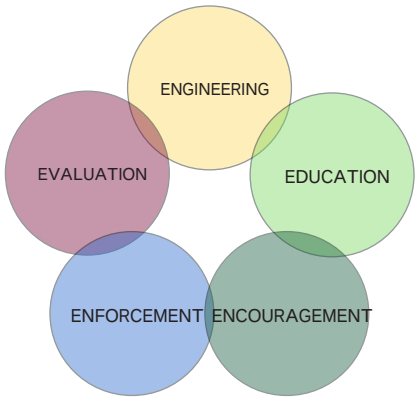
NCDOT's A Guide to North Carolina Bicycle and Pedestrian Laws. For an online resource guide on laws related to pedestrian and bicycle safety (provided by the National Highway Traffic Safety Administration), visit:
http://www.nhtsa.dot.gov/people/injury/pedbimot/bike/resourceguide/index.html

http://www.ncdot.org/transit/bicycle/laws/laws_bikelaws.html

http://www.ncdot.org/transit/bicycle/laws/resources/BikePedLawsGuidebook-Part-1.pdf

The International Police Mountain Bike Association (IPMBA) is a non-profit educational organization providing resources, networking opportunities, and the best, most complete training for public safety bicyclists: http://www.ipmba.org/





Chapter Outline:

CHAPTER 5: BICYCLE POLICIES

5.0 Overview

Developing a comprehensive, safe, accessible, connected bicycle network will require strong policies to ensure proper development. Proper facilities ranging from sharrows to bicycle parking will encourage bicycle use. This chapter outlines recommended policies, and in some cases, policy changes for the Town of Carrboro to meet the needs of bicyclists through implementation and development.

5.1 Policy Recommendations

The following sections outline updated bicycle-related policies for the Town of Carrboro and address one of this Plan's goals to review, update, and implement new bicycle policies regularly. The Town of Carrboro Planning staff, Town of Carrboro Public Works staff, and NCDOT Division 7 staff should be familiar with both the current and recommended bicycle policies to ensure the full suite of policy tools are used and enforced.

See Appendix D: Relevant Federal and State Policies for complete versions of additional, supportive existing state and federal policies.

5.2 Local Policy Documents

Existing land development and roadway design policies have a significant effect on bicycle transportation and recreation in Carrboro. Carrboro's existing planning documents and policies are clear in their encouragement of bicycle transportation. These policies are established in the Town of Carrboro's Bicycle and Sidewalk Policy, Land Use Ordinance, Vision 2020 Plan, and the Carrboro Development Guide. Specific policy additions and revisions to these documents are described in the following sections. Key policy recommendations are:

Updates to the 1989 Bicycle Policy

- Expansion of bicycle lane requirements to include other treatment options such as sharrows to mirror those described in Chapter 3: Bicycle Network Plan
- Addition of implementation policies that address items such programs, policy, signage, and maintenance

Land Use Ordinance Recommendations

- Development and implementation of bicycle parking standards and requirements.

Carrboro Vision 2020 Recommendations

- Mandatory development of bicycle facilities, including greenways, as recommended in Plan
- Connectivity through cul-de-sacs

5.2.1 Updates to the 1989 Bicycle Policy

As referenced in Appendix F: Existing Planning Efforts, the 1989 Bicycle and Sidewalk Policy has effectively guided Carrboro with respect to developing a network of bicycle facilities throughout the Town. As a result of efforts to include planning for bicycle travel in many new developments and street improvements, Carrboro now has a bikeway system that is among the best in the State of North Carolina. The Town's relatively flat topography, its proximity to the University of North Carolina at Chapel Hill, the density of its layout, and its temperate climate make it an ideal setting for bicycle transportation. The significant percentage of trips by bicycle in Carrboro confirms this. The Town recognizes the need to further encourage bicycle use for both transpor-

tation and recreation. Bicycle use conserves energy, reduces air and noise pollution, reduces pavement wear on town roads, improves personal fitness, relieves automobile congestion and parking problems, and creates greater community interaction.

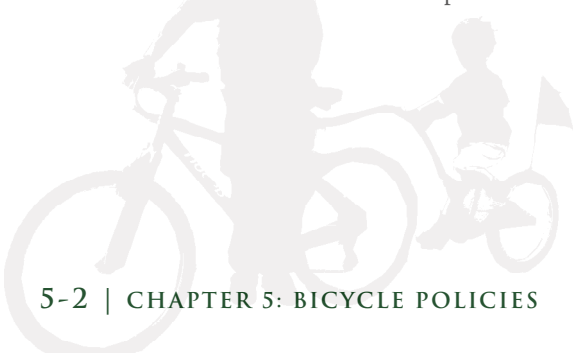
In adopting this Comprehensive Bicycle Transportation Plan, the Town builds on its successes in bicycle planning by focusing on: (1) the consistent application of the latest engineering principals in constructing bicycle facilities, (2) the enforcement of existing traffic laws for both bicyclists and motorists, (3) the introduction of public education and encouragement programs to promote effective cycling as an alternative to motorized transportation, and (4) the application of evaluation methodologies to continually assess the progress towards meeting the goals, as outlined in Chapter 6: Implementation.

Guiding Policies
The Town's guiding principles regarding the Bicycle Policy are two-fold:

- Assure safe and convenient bicycle access to all areas of the Town.
- Promote bicycles as a viable and attractive means of transportation.

Implementation Policies

- Provide bicycle facilities along all collector and arterial streets.
- Develop top priority bicycle facilities as prioritized in this Bicycle Plan.
- Expand facility type options to mirror those described in Chapter 3 of this plan.
- Consider bicycle-operating characteristics and improve bicycle facility visibility in existing and future-designed intersections, greenway crossings, and traffic control systems.
- Improve and maintain education, enforcement, and encouragement programs as defined by this plan to promote bicycle use and safety.
- Develop and implement bicycle parking standards and requirements.
- Require compliance with bikeway policies and standards for new development including bikeways. Ensure interconnection of new facilities with the existing bikeway system.
- Continue to develop a greenway system as a multi-functional facility that provides and improves recreation, transportation, community-building, education, maintenance access, stream protection, and habitat improvement opportunities.
- Continue regular maintenance programs (sweeping and bicycle lane re-striping) but also create a cyclist-request response system in which anyone can report maintenance needs.
- Create bicycle route signage that is directional and informational in nature. Signage should correlate to a new Bicycle Map and direct bicyclists to key destinations around town.
- Continue to develop bicycle and pedestrian facilities and fill gaps in existing facilities in and around schools.
- Provide incentives for developers and



employers to install shower facilities and locker rooms and encourage employers to develop programs and provide incentives to employees who bicycle to work.

- Uphold law enforcement regulations for bicycles as instituted within the Carrboro Town Code as referenced in Article VIII, Sections 6-34 through 6-40.1.
- Accommodate bicyclists on roadway bridges, underpasses, and interchanges and on any other roadways that are impacted by a bridge, underpass, or interchange project (except on roadways where they are prohibited by law). All new bridges should be constructed with bicycle lanes and wide sidewalks.

Requirements for Existing Streets

Priority will be given to construction of bicycle lanes or sharrows on all existing arterial and collector streets, along with other recommended facilities indicated on the Recommended Bicycle Network Map in Chapter 3 of the Carrboro Bicycle Transportation Plan. Sharrows may be considered as an option, especially if 1) roadway width does not allow for bicycle lanes, 2) speed limits are reduced, and 3) on-street parking exists. An off-road bicycle path may be built in place of on-road facilities if it is determined that bicycle travel would be better served by a separate facility.

To adequately serve the residents or patrons of a new development, existing roads shall be widened to accommodate bicycle lanes along the frontage to allow the development to connect to the existing bicycle network. In the case where the appropriate bicycle facility cannot be provided on the designated street because of severe environmental, topographical, or right-of-way constraints, the Town should explore safe and convenient access for bicycles on parallel streets.

Requirements for New Arterial and Collector Streets

Bicycle lanes or wide travel lanes shall be required to be constructed on all new arterial and collector streets, as classified in Section 15-210(b), and Section 15-216 of the Carrboro Land Use Ordinance. Bicycle facilities shall be required according to the 2008 Comprehensive Bicycle Transportation Plan Recommended Bicycle Network Map found in this plan.

In the case where the appropriate bicycle facility cannot be provided on the designated street because of severe environmental, topographical, or right-of-way constraints, safe and convenient access for bicycles on parallel streets will be explored.

Requirements for Intersections

Appropriate bicycle facilities at existing and future intersections, as defined in Chapter 3 of this Plan, shall be implemented to create more hospitable and clearly designated crossings. These intersection characteristics shall be considered in the design process of future intersections.

Programs

Education, encouragement, and enforcement programs as defined in Chapter 4 of the 2008 Comprehensive Bicycle Transportation Plan shall be implemented to promote bicycle use and safety.

The Town of Carrboro should facilitate the mandatory helmet law to aid in bicycling safety, as well more thoroughly examining bicycle riding on sidewalks to determine the need for a policy.

Greenways and Sidepaths
Off-road multi-use paths (greenways) and sidepaths shall be required, according to the Recommended Comprehensive Bicycle Network Map in Chapter 3 of this plan, with new development.

Driveway Access Management
Driveway entrance curb cuts should be reduced where possible to limit crossings of pathways.

5.2.2 Land Use Ordinance Recommendations

Article XVIII. Parking
Currently, the Town of Carrboro allows for a substitution of one car parking spaces if the developer provides at least 5 bicycle parking spaces. The language for this allowance, with a recommended update, in boldface type, is as follows:

Section 15-291 Number of Parking Spaces Required.
(d) With respect to any parking lot that is required to be paved (see Section 15-296): **(AMENDED 9/13/83)**

(1) The number of parking spaces may be reduced by one space per 5 secure bicycle parking spaces that are (a) provided by the developer, and (b) that are conveninently located near a building entrance.

Requirements for bicycle parking may also be met by:
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.

Further ordinances regarding bicycle parking are recommended as amendments to this Article as follows:

(h) Bicycle parking shall be provided by all non-residential, multi-family, recreation and industrial uses as set forth in the Table of Bicycle Parking Standards.

Design Standards for Bicycle Parking
A. Bicycle parking may be located in any parking area or in other locations that are easily accessible, clearly visible from the entrance it serves, and do not impede pedestrian or motorized vehicle movement into or around the site. Parking should be sheltered when possible. Designating space for bicycle parking within buildings is an option to consider when feasible.

B. When a percentage of the required motorized vehicle spaces are provided in a structure, an equal percentage of the required bicycle spaces shall be located inside that structure, unless other accessible, covered bicycle parking is located elsewhere on the site.

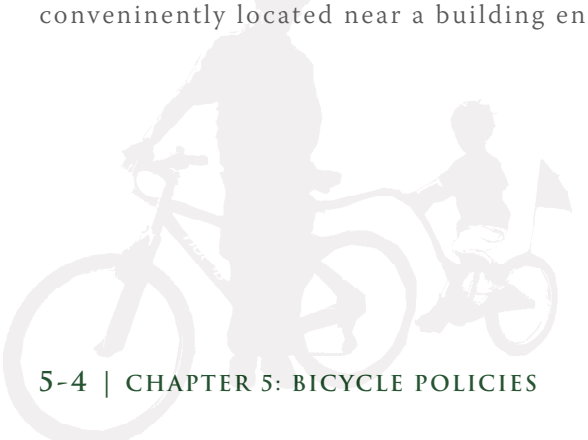


TABLE OF BICYCLE PARKING STANDARDS		
Use #	**Use Description**	**Minimum Bicycle Parking Requirement**
1.3	Multi-family res.	1 to 2 spaces per unit
2.1, 2.2, 2.3	Retail	1 space per 10 presumptively required auto spaces, with a minimum of 5 spaces
3.1, 3.2	Office	1 space per 10 presumptively required auto spaces, with a minimum of 5 spaces
5.1	Schools	1 space per 15 students plus 1 space per 10 employees
6.2	Recreation	1 space per 4 presumptively required auto spaces
8.1, 8.2	Restaurant	1 space per 10 presumptively required auto spaces, with a minimum of 5 spaces
10.1	Storage and pkg.	1 space per 10 auto spaces
34.1	Hotel/Motel	1 space per 5 rooms, up to 50 rooms; 1 space per 10 rooms above 50 rooms

C. Where bicycle parking facilities are not clearly visible to approaching cyclists, signs shall be posted to direct cyclists to the facilities.

D. Facilities shall provide at least a 30 inch clearance from the centerline of each adjacent bicycle rack/support structure and at least 24 inches from walls or other obstructions.

E. An aisle or other space shall be provided for bicycles to enter and leave the facility. The aisle shall have a width of at least four feet to the front or the rear of a standard six-foot bicycle parked in the facility.

F. Each bicycle parking space shall be sufficient to accommodate a bicycle at least six feet in length and two feet wide. Overhead clearance shall be at least seven feet.

G. Bicycle parking spaces shall be clearly marked as such and shall be separated from motorized vehicle parking by some form of physical barrier designed to protect a bicycle from being hit by a motorized vehicle.

H. Each bicycle parking space shall be provided with some form of stable frame permanently anchored to a foundation to which a bicycle frame and both wheels may be conveniently secured using either a chain and padlock or a U-lock. The frame shall support a bicycle in a stable position without damage to frame, wheels, or components. The rack known as an "inverted U-rack" is the preferred type.

I. Bicycle racks should be designed and constructed according to Design Guidelines of the Carrboro Bicycle Plan.

J. Wayfinding signage should be provided that guides bicyclists to bicycle parking locations.

5.2.3 Carrboro Vision 2020 Recommendations

The Vision 2020 Plan is a policy document that guides the Town of Carrboro in the planning of its future. Policy statements are listed by category. Statements pertaining to bicycle transportation are listed below. Recommendations for additional recommendations of policy statements are also provided.

1.2 Art and Culture

1.2.9.1 Policy Statement Recommendation: [The Town should support the concept of art in the landscape in Town open space and along greenways to encourage trail use.]

4.3 Bicycle and pedestrian traffic

4.31 The Town should fully implement its bicycle and pedestrian network plan, **[including the 2008 Bicycle Transportation Plan.]** This Plan should identify links needed now as well as links that will be needed by 2020.

4.32 The Town should establish connections with bicycle and pedestrian ways in other jurisdictions.

4.33 The maintenance of these paths and ways should continue to be a high priority.

4.3.4 Policy Statement Recommendation: [The Town should update all pertinent documents and ordinances with policy recommendations stated in the 2008 Bicycle Transportation Plan.]

4.4 Established Roads

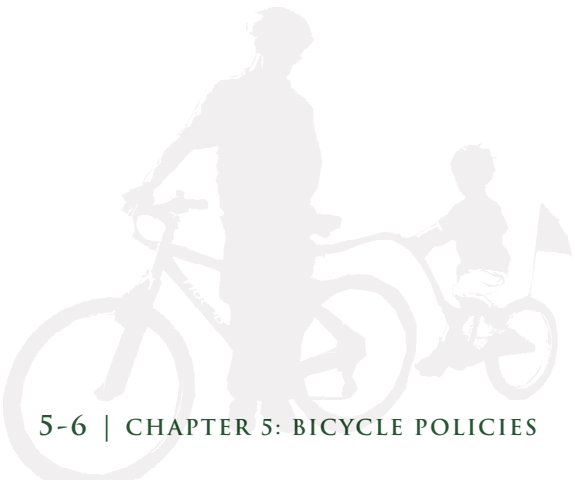
4.41 As a general policy, established roads should be widened to accommodate bike lanes and sidewalks, but not to provide additional lanes for automobiles.

4.5 New Development

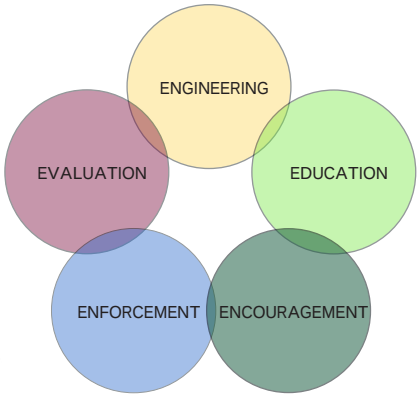
4.51 The Town should continue to require developers to install sidewalks and bicycle paths in new developments.

4.52 New developments should bear the costs of upgrading connector and arterial facilities in the areas adjacent to their properties to the extent appropriate, including upgrades to serve pedestrians and bicycles, given the added load to the infrastructure and anticipated use of facilities.

Recommended Addition:
[New developments should provide bicycle and pedestrian access through cul-de-sacs and neighborhoods to connect adjacent subdivisions and land uses.]



Chapter Outline:



CHAPTER 6: IMPLEMENTATION

6.0 Overview

The text and action steps table in this chapter describe how the Town of Carrboro can turn the vision of becoming a Platinum-level bicycle-friendly community into a reality. The detailed recommendations of the previous three chapters focused on physical bicycle improvements (engineering solutions) along with program and policy recommendations (education, encouragement, and enforcement solutions). This chapter ties all of those recommendations together, and adds the fifth "E": Evaluation. Key recommendations, based on Carrboro's existing conditions, are summarized in Tables 6-1 - 6-5 (see pages 6-4 through 6-11). The tables are based on the American League of Bicyclists Bicycle Friendly Community (BFC) framework, as described in Chapter 2.

6.1 Opportunities and Strategies

Improving bicycle transportation and bicycle-friendly community status in the Town of Carrboro will build on previous efforts to build bicycle facilities and multi-use off-road paths or greenways. Three main opportunities available to the Town of Carrboro are: 1) taking advantage of the Town's relative small size and land use patterns that have placed many residents within bicycling distance of activities and destinations; 2) improving bicycle programming to educate and encourage more users; and 3) building on the already high bicycle mode-share of over 5% experienced in Carrboro currently. Improvements for bicycling should become a primary, rather than secondary, strategy for improving transportation for thousands of residents.

6.2 Adopting this Plan

Before any other action takes place, the Town of Carrboro should adopt this Plan. This should be considered the first step in implementation. Through adoption of this document as the Town's official bicycle plan, the community will be better able to shape transportation decisions so that they fit with the goals of this plan. The Town, County and NCDOT also will more appropriately shape future land development so that the resulting built form achieves the goals and vision of this plan. Most importantly, adoption is key to securing funding from NCDOT and other state and federal agencies in support of implementing the recommendations of this plan.

6.3 Key Steps in Implementation

The nine strategic action steps listed below encompass a mixture of broad and specific early strategies that the Town of Carrboro should undertake. These steps will continue momentum from the planning process and kick-off the implementation process.

1) **Implement priority bicycle network projects in accordance with the recommendations of this plan**. Specifically, these recommendations are broken into bicycle network, intersection, and multi-use path or greenway improvements. The priority cutsheets are found in Chapter 3: Bicycle Network Plan.

2) **Create the necessary governance capability and administration capability** to oversee the implementation of this plan and the proper maintenance of the facilities that are developed. This includes the creation of a Bicycle Advocacy Group, formed of volunteers from this Plan's Steering Com-

Fig. 6-1. Greenway in the Roberson Place neighborhood.

mittee and other members of the public who have shown interest. Additionally, it is recommended that a Bicycle, Pedestrian and Trails Coordinator be hired by the Town of Carrboro to oversee the day-to-day implementation of this plan along with other duties. A description of this position is described in Section 5.4.

3) **Secure the funding necessary to immediately begin the short-term phase work**, and start working on a funding strategy that will allow the community to incrementally complete many of the suggested physical, policy and program modifications over a 5-10 year period. The Town should have a budget line item for bicycle improvements in order to implement the top priority facility and program recommendations. Funding sources are provided in Appendix C: Funding.

4) **Produce a user-friendly Carrboro Bicycle Map** that shows the existing bicycle lanes and multi-use paths, along with the recommended cycling routes throughout the community that serve a transportation purpose. This map would be available online and as a foldable hard copy version with bicycle safety and education information.

Case Study: Implementation/Dedicated Funding
(largely taken from http://www.walkinginfo.org/funding/sources-government.cfm)

There are many examples of local communities creating revenue streams to improve conditions for bicycling and walking. Three common approaches include: special bond issues, dedications of a portion of local sales taxes or a voter-approved sales tax increase, and use of the annual capital improvement budgets of Public Works and/or Parks agencies.
Some examples follow:

• The City of Albuquerque, New Mexico, and Bernalillo County, have 5 percent of street bond funds set aside which go to trails and bikeways. For the City, this has amounted to approximately $1.2 million every two years. City voters last year passed a 1/4 cent gross receipts tax for transportation which includes approximately $1 million per year for the next ten years for trail development. Many on-street facilities are developed as a part of other road projects.

• Pinellas County, Florida, built much of the Pinellas Trail system with a portion of a one cent sales tax increase voted for by county residents.

• Seattle, Washington, approved a nine year levy (property tax) in the fall of 2006 that provides five million dollars a year for pedestrian and bicycle projects.

• Denver, Colorado, invested $5 million in its emerging trail network with a bond issue, which also funded the city's bike planner for a number of years.

• Eagle County, Colorado, (which includes Vail) voters passed a transportation tax that earmarks 10 percent for trails, about $300,000 a year.

• In Colorado Springs, Colorado, 20 percent of the new open space sales tax is designated for trail acquisition and development - about $5–6 million per year.

• The City of Portland, Oregon, provides dedicated funding for bicycle facility and programming through its Capital Improvement Plan. Set asides for bicycle funding include: $150,000-$250,000 per year for Safe Routes to School; $150,000 each year for general bicycle improvements; often millions of dollars for specific bicycle projects each year that have been identified by the Bicycle Plan, City staff, or advocacy group.

• The Town of Cary dedicates $20,000 each year for marking one mile of bicycle lanes per year, enhancing the motorist and bicyclist biking safety education campaign, installing bicycle racks, and updating the Town's bikeways map to accurately reflect changes to the Town's road network.

5) **Start the process of education and awareness building** by holding a public event to announce the adoption of the bicycle plan and some of the upcoming projects.

6) **Coordinate the policy recommendations** in this plan with future Land Use Ordinance updates.

7) **Coordinate with Town of Chapel Hill and Orange County** to develop connected bicycle networks across administrative boundaries.

8) **Ensure that bicycle planning is integrated with other transportation planning efforts** in the community as well as long-range and current land use planning, economic development planning, and environmental planning. Communicate regularly with local NCDOT Division 7 to ensure future roadway projects incorporate bicycle recommendations of this Plan.

9) **Begin a signage program** to include wayfinding and route signage to bicycle routes.

10) **Begin short-term, high-priority projects** as described in the following Five E's tables.

Tables 6-1 - 6-5 on the following pages list the detailed recommendations, reference locations of recommendation descriptions in this Plan, and provide phasing. Short-term refers to projects within 0-2 years. Medium-term refers to 3-5 years and long-term refers to 6+ years. The recommendations in the tables were generated from the Steering Committee, general public, consultant efforts, and from Portland, OR, and Davis, CA (both Platinum designation-level BFC communities) case studies.

ENGINEERING				
Detailed BFC* Audit	**Key Recommendations**	**Detailed Description**	**Responsible Agency(s)**	**Phase**
New Road Construction	Utilize new bicycle policy (in Chapter 5) to consider additional bicycle facility treatments.	Chapter 5	Town of Carrboro	Short-term
Town Staff Training Programs	Create in-reach training sessions for Town engineers and planners.	Chapter 4	Town of Carrboro	Long-term
	Partner with Orange County, Town of Chapel Hill, and NCDOT representatives for training programs.	Chapter 4	Town of Carrboro	Long-term
Bridges	Ensure bicycle facilities are part of new and reconstructed bridge design.	Chapters 5, 6, & 7	Town of Carrboro; NCDOT	Long-term
Bike Parking	Expand bicycle parking ordinance (as described in Chapter 5). Add additional bicycle parking as described in Chapter 3.	Chapter 3 & 5	Town of Carrboro	Short-term
Bike Racks/ Storage Units	Upgrade at some destinations as described in Chapter 3.	Chapter 3	Town of Carrboro	Medium-term
Transit Service & Bikes	Continue to ensure bicyclists are accommodated in future transit services.	Chapter 6 & 7	Town of Carrboro, Chapel Hill Transit (CHT)	Long-term
Bike Facility Mileage	Begin implementing bicycle network recommendations to lengthen system.	Chapter 3	Town of Carrboro; NCDOT	Short-term
Arterial Streets	Begin implementing bicycle network recommendations in this Plan and utlilize new bicycle policy in Chapter 5.	Chapters 3, 5, & 7	Town of Carrboro; NCDOT	Short-term
Bike Routes	Begin implementing bicycle route and signage recommendations in this Plan.	Chapters 3, 6, & 7	Town of Carrboro; NCDOT	Medium-term
Maintenance Programs	Create a bicyclist-request response system for maintenance needs.	Chapter 6	Town of Carrboro; NCDOT	Medium-term
	Continue routine and remedial maintenance tasks and consider expansion of tasks.	Chapter 6	Town of Carrboro; NCDOT	Short-term
Intersections	Begin implementing bicycle intersection recommendations in this Plan.	Chapters 3 & 7	Town of Carrboro; NCDOT	Medium-term

(Table continued on next page)

*BFC=Bicycle Friendly Community

*Table 6-1. Illustrates the **Engineering** components of the Plan.*

ENGINEERING, CONTINUED				
Detailed BFC* Audit	**Key Recommendations**	**Detailed Description**	**Responsible Agency(s)**	**Phase**
	(Continued from previous page)			
Paved Bike Trails	Begin expanding paved trails as recommended in Plan and prioritized by Greenways Commission.	Chapters 3, 6, & 7	Town of Carrboro	Short-term
Mountain Biking	Improve signage and mapping.	Chapter 4	Town of Carrboro	Long-term
Bicyclist Open Space	Improve signage and mapping.	Chapter 4	Town of Carrboro	Long-term
Employer Bike Ordinance	*See Encouragement Table*	Chapters 4 & 5	Town of Carrboro	Short-term
Recreational Facilities	Begin implementing bicycle network recommendations in this Plan (rural paved shoulders, route signage, etc.).	Chapter 3, 6 & 7	Town of Carrboro, Orange County; NCDOT	Short-term
				*BFC=Bicycle Friendly Community

*Table 6-1 (cont'd). Illustrates the **Engineering** components of the Plan.*

EDUCATION				
Detailed BFC* Audit	**Key Recommendations**	**Detailed Description**	**Responsible Agency(s)**	**Phase**
Motorist Education	Develop brochures, newspaper articles, and newsletters.	Chapter 4	Town of Carrboro†	Medium-term
	Review traffic calming public education program to ensure that it targets motorists, pedestrians, and bicyclists.	Chapter 4	Town of Carrboro	Medium-term
	Enhance enforcement of unsafe behavior.	Chapter 4	Town of Carrboro	Medium-term
Adult Bicycle Education	Launch traffic calming program to target motorists, pedestrians, and bicyclists.	Chapter 4	Town of Carrboro	Medium-term
	Conduct brown-bag events, lecture series, and clinics for adults.	Chapter 4	Town of Carrboro†	Short-term
	Enhance enforcement of unsafe behavior.	Chapter 4	Town of Carrboro	Medium-term
Safety Programs for Children	Continue "Basics of Bicycling" course.	Chapter 4	CHCCS	Short-term
	Launch traffic calming program to target youth motorists, pedestrians, and bicyclists.	Chapter 4	Town of Carrboro	Medium-term
	Enhance enforcement of unsafe behavior.	Chapter 4	Town of Carrboro	Medium-term
	Develop programs such as earn-a-bike programs, bicycle rodeos, and summer camps.	Chapter 4	Town of Carrboro†	Medium-term
	Organize bicycle rides as part of Carrboro Day.	Chapter 4	Town of Carrboro†	Short-term
Public Safety	Develop bicycle safety materials, newsletters, and brochures.	Chapter 4	Town of Carrboro†	Medium-term
	Develop educational bicycle map.	Chapter 4	Town of Carrboro	Short-term
Routine Local Safety Education	Produce education messages in distributions and media.	Chapter 4	Town of Carrboro	Medium-term
Internal Education**	Create in-reach events such as brown bags and training sessions for Town departments.	Chapter 4	Town of Carrboro	Medium-term
	Develop training sessions for local-law enforcement.	Chapter 4	Town of Carrboro	Medium-term
Bicycle Ambassador Program	Begin ambassador program formed of Advocacy Group members and citizens.	Chapter 4	†	Short-term
	Make ambassadors visible through educational and encouragement programs and events.	Chapter 4	†	Short-term
League Cycling Instructors	Increase number of League Cycling Instructors in area.	Chapter 4	†	Short-term

*BFC=Bicycle Friendly Community **Item not part of BFC application, but added for the Town of Carrboro †Possible role for Citizens' Bicycle Advisory Group

*Table 6-2. Illustrates the **Education** components of the Plan.*

ENCOURAGEMENT				
Detailed BFC* Audit	**Key Recommendations**	**Detailed Description**	**Responsible Agency(s)**	**Phase**
Employer Programs**	Employers should provide incentives for employees for commuting by bicycle.	Chapter 4	Town of Carrboro†	Short-term
	Town should provide information to employers for programs.	Chapter 4	Town of Carrboro†	Short-term
School Programs (Safe Routes to School)	Apply for additional Safe Routes to School funding for planning and implementation.	Chapter 4	Town of Carrboro	Medium-term
	Complete implementation of current action planning efforts.	Chapter 4	Town of Carrboro	Medium-term
	Develop after-school programs, summer camps, and family rides.	Chapter 4	Town of Carrboro†	Medium-term
Youth Recreation Intervention**	Develop bicycle rodeos, summer bicycle camps, and events/camps that require bicycles.	Chapter 4	Town of Carrboro†	Medium-term
	Continue "Basics of Bicycling" course.	Chapter 4	CHCCS	Short-term
Awareness Days				
National Bike Month	Promote the month and create additional activities.	Chapter 4	Town of Carrboro†	Short-term
Bike to Work Day	Promote the day and create additional activities, especially for commuters.	Chapter 4	Town of Carrboro†	Short-term
Annual Bike Tour	Host own bicycle riding tours/races.	Chapter 4	Town of Carrboro	Long-term
League Cycling Instructors	Increase number of League Cycling Instructors in area.	Chapter 4	†	Short-term
Bicyclist Breakfast**	Establish monthly bicyclist breakfast to build support and camaraderie.	Chapter 4	Town of Carrboro†	Medium-term
Other Days**	Promote bicycling at other annual days.	Chapter 4	Town of Carrboro†	Medium-term
Facilities to Promote Other Causes**	Utilize greenways and bicycle facilities to host events for causes.	Chapter 4	Town of Carrboro†	Medium-term

(Table continued on next page)

*BFC=Bicycle Friendly Community ** Item not part of BFC application, but added for the Town of Carrboro †Possible role for Citizens' Bicycle Advisory Group

*Table 6-3. Illustrates the **Encouragement** components of the Plan.*

ENCOURAGEMENT, CONTINUED				
Detailed BFC* Audit	**Key Recommendations**	**Detailed Description**	**Responsible Agency(s)**	**Phase**
	(Continued from previous page)			
Bicycle Promotion Within Local Organizations				
Bike Clubs	Expand clubs such as Carolina Tarwheels to reach less experienced bicyclists.	Chapter 4	Town of Carrboro†	Medium-term
Specialty Bike Shops	Bicycle shops should remain involved in Plan implementation and events.	Chapter 4	Town of Carrboro†	Short-term
Bicycle Rental & Upkeep	Further Town support of Blue Urban Bikes (BUB) and ReCYCLEry programs.	Chapter 4	Town of Carrboro†	Short-term
	Establish Town Hall as BUB hub.	Chapter 4	Town of Carrboro†	Short-term
Bike Maps	Improve town-wide online maps with routing, facilities, and bicycle education information.	Chapters 4 & 6	Town of Carrboro†	Short-term
	Create foldable town-wide bicycle map with routing, facilities, and bicycle education information.	Chapters 4 & 6	Town of Carrboro†	Short-term
	Update current Bicycle Map.	Chapters 4 & 6	Town of Carrboro†	Medium-term
MTB Trails Maps	Develop online and hardcopy mountain bicycle trail maps.	Chapter 4	Town of Carrboro	Long-term
Adopt-a-Trail**	Promote and support local volunteer groups and agencies to maintain greenways.	Chapter 4	Town of Carrboro†	Short-term
Revenue Generating Programs**	Consider events that require fees and/or donations that would increase revenue for bicycle facilities.	Chapter 4	Town of Carrboro†	Long-term
Other Efforts**	Provide annual reports to community that update on bicycling improvements.	Chapter 4	Town of Carrboro†	Short-term
	Promote and advertise new programs and events.	Chapter 4	Town of Carrboro†	Short-term
	Reach out to Spanish-speaking population with education and encouragement programs.	Chapter 4	Town of Carrboro†	Medium-term
	Research and consider other encouragement methods.	Chapter 4	†	Long-term

*BFC=Bicycle Friendly Community **Item not part of BFC application, but added for the Town of Carrboro †Possible role for Citizens' Bicycle Advisory Group

*Table 6-3 (cont'd). Illustrates the **Encouragement** components of the Plan.*

ENFORCEMENT				
Detailed BFC* Audit	**Key Recommendations**	**Detailed Description**	**Responsible Agency(s)**	**Phase**
Targeted Motorist Enforcement	Enforce illegal motorist actions related to bicycle safety.	Chapter 4	Town of Carrboro	Medium-term
	Develop traffic calming programs to educate and enforce.	Chapter 4	Town of Carrboro	Medium-term
Targeted Bicyclist Enforcement	Enforce illegal bicyclist actions related to bicycle safety.	Chapter 4	Town of Carrboro	Medium-term
	Target enforcement at sites of newly introduced bicycle facilities.	Chapter 4	Town of Carrboro†	Medium-term
	Create Volunteer trail patrol positions which can monitor incidences and report trail violations.	Chapter 4	Town of Carrboro†	Medium-term
Local Police Input	Include Police Department representative to report to Town.	Chapters 4 & 6	Town of Carrboro†	Short-term
Police Officer Traffic Training	Create new training sessions, especially with new facility implementation.	Chapter 4	Town of Carrboro	Long-term
	Have police officers participate in bicycle-related workshops and certification workshops.	Chapter 4	Town of Carrboro	Long-term
Bicycle Patrol	Create bicycle patrol positions.	Chapter 4	Town of Carrboro	Long-term
School Crossing Guards**	Continue school crossing guard program and consider expanding when need arrives.	Chapter 4	Town of Carrboro	Short-term
Mandatory Helmet Law	Consider helmet law for all ages.	Chapter 4	Town of Carrboro	Medium-term

*BFC=Bicycle Friendly Community ** Item not part of BFC application, but added for the Town of Carrboro †Possible role for Citizens' Bicycle Advisory Group

*Table 6-4. Illustrates the **Enforcement** components of the Plan.*

EVALUATION AND PLANNING				
Detailed BFC* Audit	**Key Recommendations**	**Detailed Description**	**Responsible Agency(s)**	**Phase**
Overall Mode Share and Number of Bike Trips	Utilize 2010 Census Data to determine new mode share.	Chapter 6	Town of Carrboro	Medium-term
	Continue to conduct and update bicycle counts as part of Mobility Report Card.	Chapter 6	Town of Carrboro	Short-term
Safety (Cyclist/Motorist Fatalities in Past 5 Years)	Keep these incidences tallied and part of database.	Chapter 6	Town of Carrboro	Short-term
Safety (Cyclist/Motorist Crashes in Past 5 Years)	Keep these incidences tallied and part of database.	Chapter 6	Town of Carrboro	Short-term
Crash Reduction Programs	Research crashes and initiatiate crash reduction programs.	Chapter 6	Town of Carrboro†	Medium-term
Bicycle Facility Improvements	Measure new facilities as constructed and report on facility quality.	Chapter 6	Town of Carrboro	Medium-term
Implement and Update Prioritization Improvements	Implement priority projects as identified in this Bicycle Plan. Update Top 10 priority list each year.	Chapters 3 & 6; App. A	Town of Carrboro	Short-term
	Address new requests and safety issues that may arise.	Chapter 6	Town of Carrboro	Medium-term
Program Successes	Measure program participation, education/enforcement efforts, and evaluate success.	Chapter 6	Town of Carrboro	Medium-term

(Table continued on next page)

*BFC=Bicycle Friendly Community

*Table 6-5. Illustrates the **Evaluation and Monitoring** components of the Plan.*

EVALUATION AND PLANNING, CONTINUED				
Detailed BFC* Audit	**Key Recommendations**	**Detailed Description**	**Responsible Agency(s)**	**Phase**
	(Continued from previous page)			
Policy for Bicycle & Network Future Development	Update policies with this Plan.	Chapters 5 & 6	Town of Carrboro	Short-term
	Reguarly review and update bicycle-related policies.	Chapter 6	Town of Carrboro	Medium-term
Public Comments System for Officials	Create a bicyclist-request response system for maintenance needs and other requests and concerns.	Chapter 6	Town of Carrboro†	Medium-term
	Encourage citizens to attend Bicycle Advocacy Group meetings.	Chapter 4	Town of Carrboro†	Short-term
Greenways Master Plan	Develop Design Plans for Morgan Creek and Bolin Creek greenway trails.	Chapter 6	Town of Carrboro; Greenways Commission	Short-term
	On-going review and revision (as necessary) of the greenway sections of the Recreation and Parks Master Plan	Chapter 6	Town of Carrboro; Greenways Commission	Medium-term
Comprehensive Bicycle Plan	Make updates when necessary.	Chapter 6	Town of Carrboro	Short-term
	Completely update Plan within 5-10 years.	Chapter 6	Town of Carrboro	Long-term
*BFC=Bicycle Friendly Community †Possible role for Citizens' Bicycle Advisory Group				

*Table 6-5 (cont'd). Illustrates the **Evaluation and Monitoring** components of the Plan.*

Fig. 6-2. The new Rose Walk neighborhood has installed bike lanes and enforcement signage.

6.4 Staffing Recommendations

Bicycle, Pedestrian and Trails Planner
The Town of Carrboro should create and fund the position of Bicycle, Pedestrian and Trails Planner to handle the day-to-day implementation of recommended policies, programs and activities described within this plan. Other responsibilities could include updating the sidewalk policy document, taking on transportation demand management (TDM) planning, and working with the Greenways Commission. This position could initially be part time in nature but may become full time as dictated by workload. The Planner could lead efforts to apply for funding, oversee planning, mapping, design and development of bicycle, pedestrian and trail projects. The Planner should assist with programming, public outreach, and policy development. This new position is necessary given the existing responsibilities of the Town Planning staff and the additional responsibilities that would come with implementing this Plan, as well as the other duties as described above. The Planner should report to the Town of Carrboro Planning Administrator.

6.5 Evaluation, Monitoring, and Planning

The Town of Carrboro should establish an official evaluation and monitoring program. The fifth "E," Evaluation, will allow the Town of Carrboro to monitor the implementation of this Plan and the performance of bicycle facilities and programs. Evaluation can be used to determine if the goals of this Plan are being met and to assure that resources are directed towards efforts that show the greatest likelihood of success. It can also identify needed adjustments to the program underway. Evaluating the network systems and programming in place will help the Town determine when to make adjustments.
Performance measures should benchmark progress toward achieving the goals and objectives of this plan. Some goals and objectives can be measured in a more subjective manner while others can be measured quantitatively. When establishing performance measures, the Town should consider utilizing data that can be collected cost effectively and reported at regular intervals, such as in a performance measures report that is published annually or bi-annually. A number of performance measures are already quantitatively tallied as part of the Mobility Report Cards. These analyses and reports should continue regularly in the future. These performance measures should also be stated in an official report, prepared by the Bicycle, Pedestrian and Trails Coordinator, and filed with the Town, within one to three years after this Plan is officially adopted by the local government. The performance measures should address the following aspects of bicycle facility development.

1) Overall Mode Share and Bicycle Trips - With the updated 2010 census, calculate the new bicyclist mode-share numbers for the Town of Carrboro. As in previous years and as part of the Mobility Report Card, conduct bicycle counts at specific targeted facilities. The number of bicycle trips daily is estimated in Chapter 2 of this Bicycle Plan. This table should be updated when new data becomes available.

Goal and Objectives Measured:

GOAL 1 –*To have bicycling as a viable transportation alternative throughout the Town and for all trip purposes.*
OBJECTIVE – Increase Carrboro's mode share of bicycling for all trip purposes.

Fig. 6-3. Construction of a new bridge in Rose Walk has included bike lanes.

2) Safety (Crashes and Fatalities) – Measure the number of bicycle and pedestrian crashes on an annual basis. Keep fatality and injury incidences tallied and mapped. With a focus and research on crash incidences, the Bicycle Advocacy Group should initiate crash reduction programs.

Goal and Objectives Measured:

GOAL 3 - *A robust bicycle program that incorporates engineering, education, encouragement, enforcement and evaluation programs.*
OBJECTIVE - Reduce the number of crashes involving bicycles, both single vehicle crashes and crashes involving motor vehicles and bicyclists.

3) Bicycle Facility Improvements – Measure how many facilities are constructed, in accordance with the recommendations of this Plan. Also report on the quality of these facilities. Also examine new facility types and their effectiveness (intersection improvements and sharrows).

Goals and Objectives Measured:

GOAL 1 - *To have bicycling as a viable transportation alternative throughout the Town and for all trip purposes.*
OBJECTIVE 1 – Increase connectivity of on-street and off-street bicycle facilities to provide access to all destinations in Carrboro, including community hubs such as schools, transit stops, parks, civic spaces, and commercial and residential areas.
OBJECTIVE 2 - Increase connectivity of the bicycle network with surrounding communities.
OBJECTIVE 3 - Fully integrate the bicycle and greenway networks.
OBJECTIVE 4 – Fill in network gaps identified through the bicycle transportation plan.

GOAL 4 - *A safe and accessible network of bicycle facilities.*
OBJECTIVE 1- Improve existing high-use "bottle-neck" bicycling areas so that they are safe, efficient, and convenient for all users.
OBJECTIVE 2 - Improve intersection crossings that safely and comfortably accommodate bicyclists of all levels.
OBJECTIVE 3 - Design bicycle facilities and ancillary features to ensure clear communication with cyclists of all ages and experience levels, including Carrboro residents and visitors alike.

4) Implement and Update Prioritization Improvements - Implementation facilities in accordance with priorities put forth in this Bicycle Plan. Address new requests, safety issues, and upcoming roadway reconstruction projects that may arise during implementation of this Plan.

Goals and Objectives Measured:

GOAL 1 –*To have bicycling as a viable transportation alternative throughout the Town and for all trip purposes.*
OBJECTIVE 1 – Increase connectivity of on-street and off-street bicycle facilities to provide access to all destinations in Carrboro, including community hubs such

as schools, transit stops, parks, civic spaces, commercial and residential areas.
OBJECTIVE 2 – Fill in network gaps identified through the bicycle transportation plan.

GOAL 2 – *A continuing process for reviewing, updating, and implementing bicycle-related policies.*
OBJECTIVE – Monitor bicycle plan implementation progress on a schedule that allows identification and funding of new projects, as appropriate for the CIP, annual budget and other funding opportunities.

GOAL 4 – *A safe and accessible network of bicycle facilities.*
OBJECTIVE - Improve existing high-use "bottle-neck" bicycling areas so that they are safe, efficient, and convenient for all users.

5) Program Successes – Work with local law enforcement and advocacy groups to measure the number of people that participate in education programs and the number that are stopped for violations of motor vehicle and bicycle laws. Evaluate success and interest in new education and encouragement programs.

Goals and Objectives Measured:

GOAL 3 – *A robust bicycle program that incorporates engineering, education, encouragement, enforcement and evaluation programs.*
OBJECTIVE 1 - Increase enforcement of traffic rules that apply to bicycling fo motorists and bicyclists.
OBJECTIVE 2 - Actively promote Bike to Work Day and other bicycle commuting incentive programs to reach the community workforce.
OBJECTIVE 3 - Refine motorist and bicyclist education outreach about the laws of the road and bicycle safety.
OBJECTIVE 4 – Develop, distribute, and maintain current bicycle facilities maps.
OBJECTIVE 5 – Implement a Safe Routes to School program in all elementary and middle schools, and develop programs for high school students.
OBJECTIVE 6 - Initiate community endeavors such as bike exchanges, "public" bikes, the ReCYCLEry, and additional Blue Urban Bikes bike-share hubs around town.

6) Policy for Bicycle Network and Future Development - Regularly review and update bicycle-related policies. Implement policies recommended in this Bicycle Plan.

Goal and Objectives Measured:

GOAL 2 – *A continuing process for reviewing, updating, and implementing bicycle-related policies.*
OBJECTIVE 1 - Regularly review and update bicycle–related policies.
OBJECTIVE 2 - Increase bicycle facilities and ancillary features in newly annexed areas.
OBJECTIVE 3 - Require bicycle facilities and ancillary features in future developments.

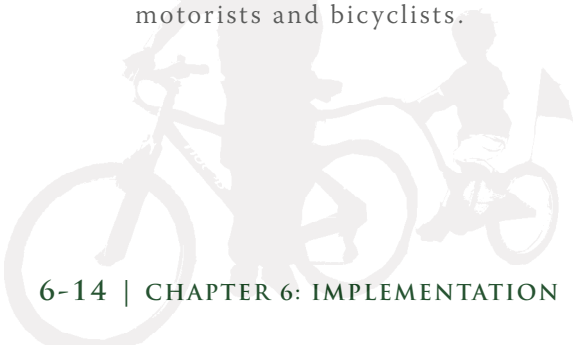


Fig. 6-4. The bike lanes on Pathway Dr. should be clear at all times of mulch piles, debris, and litter.

OBJECTIVE 4 – Monitor bicycle plan implementation progress on a schedule that allows identification and funding of new projects, as appropriate for the CIP, annual budget and other funding opportunities.

7) Institutionalization – Measure the total budget spent by local governments on bicycle projects and programs along with grant accomplishments.

Goals and Objectives Measured:

GOAL 2 – *A continuing process for reviewing, updating, and implementing bicycle-related policies.*
OBJECTIVE – Monitor bicycle plan implementation progress on a schedule that allows identification and funding of new projects, as appropriate for the CIP, annual budget and other funding opportunities.

GOAL 3 – *A robust bicycle program that incorporates engineering, education, encouragement, enforcement and evaluation programs.*
OBJECTIVE - Seek varied resources for maintenance and expansion of plan and bicycle network.

8) Public Comments System - Create means in which residents can submit ideas and concerns along with maintenance requests. Also encourage residents to attend meetings of the Bicycle Advocacy Group.

GOAL 3 – *A robust bicycle program that incorporates engineering, education, encouragement, enforcement and evaluation programs.*
OBJECTIVE - Create a defined community response and participation system that allows for comments on bicycle planning, implementation, and maintenance concerns.

In addition to an evaluation and monitoring process, planning should continue in the near future as well with the following items:

Greenways Master Plan
Work with developers and the Greenways Commission to implement the greenway system as outlined in the Recreation and Parks Master Plan.

Updates to this Bicycle Plan
This Bicycle Plan should be updated when necessary and completely updated within the next 5-10 years. It will be the responsibility of the Bicycle, Pedestrian, and Trails Coordinator, in cooperation with the Bicycle Advocacy Group, to evaluate and monitor the implementation of this Plan. The Town should use the evaluation and review process to evolve and adapt as needed. Land use, transportation, development, the economy, and the overall landscape will continue to change as Carrboro changes. Also, new opportunities or input from an on-going monitoring and evaluation process may emerge, leading to the need to adapt and update the recommendations of this Plan.

6.6 Physical Project Priorities

The entire Carrboro Bicycle Network is described in Chapter 3. However, the system will be developed incrementally. Development will occur piece by piece, in a coordinated effort between the Town,surrounding municipalities, and NCDOT. The

Corridor	From	To	Facilities	Cost
Smith Level Rd.	NC 54	Culbreth Rd.	Bicycle Lanes	$330,000
Estes Dr.	N. Greensboro St.	Town limits	Bicycle Lanes	$186,000
Homestead Rd.	High School Rd.	Stratford Dr.	Bicycle Lanes	$564,000
S. Greensboro St.	Weaver St.	NC 54	Bicycle Lanes	$408,000
Old Fayetteville Rd.	Hillsborough Rd.	NC 54	Bicycle Lanes	$600,000
Smith Level Rd.	Rock Haven Rd.	Damascus Church Rd.	Bicycle Lanes	$378,000
Old NC 86	Homestead Rd.	Hillsborough Rd.	Paved Shoulders	$342,000
Shelton St.	N. Greensboro St,	Hillsborough Rd.	Signed Route	$500
N. Greensboro St.	Estes Dr.	Shelton St.	Maintenance	$2,080
N. Greensboro St.	Shelton St.	Weaver St.	Sharrow	$520

Table 6-6. Top ten bicycle corridor recommendations.

top 10 bicycle corridor recommendations are shown in Table 6-6.

6.7 Methods for Developing Facilities

This section describes types of transportation facility construction and maintenance projects that can be used to create new bicycle facilities. Note that roadway re-construction projects offer excellent opportunities to incorporate facility improvements for bicyclists. It is much more cost-effective to provide a bicycle facility when these road projects are implemented than to initiate the improvement as a "retrofit."

In order to take advantage of upcoming opportunities to incorporate bicycle and pedestrian facilities into routine transportation projects, the Town should continue to track the NCDOT repaving schedules, and other lists of projects. As the long-range transportation plan is updated in future years, bicycle and pedestrian improvements should be included in all programmed projects. The recommended network in Chapter 3 is accompanied by segmented corridors and intersections presenting the recommended method for developing each facility. These methods and additional methods are described below.

6.7.1 Re-striping and Pavement Markings

When room allows, the simplest type of restriping project is the addition of bicycle lanes, edgelines, or shoulder stripes to streets without making any other changes to the roadway. Bicycle lanes, edgelines and shoulder stripes can also be added by narrowing the existing travel lanes or removing one or more travel lanes. In some locations where the existing lanes are 12- or 13-feet wide, it may be possible to narrow them to 10 feet. This requires changing the configuration of the roadway during a resurfacing project.

6.7.2 Removing Parking

Some neighborhood collector roadways are wide enough to stripe with bike lanes, but they are used by residents for on-street parking, especially in the evening. In locations like this, removing parking is likely to create considerable controversy and is not recommended unless there is no other solution (unless the parking is never used). In the rare case that removing parking is being considered, the parking should not be removed unless there is a great deal of public support for the bike lanes on that particular roadway, and a full public involvement process with adjacent residents and businesses is undertaken prior to removing parking.

If it is not practical to add a bike lane, edgelines and shared lane markings may be considered. On roads where the outside lane and parking area combined are more than 17 feet wide, 10-foot-wide travel lanes can be striped with an edgeline, leaving the rest of the space on either side for parking. The stripe would help slow motor vehicles and provide extra comfort for bicyclists, especially during the daytime when fewer cars would be parked along the curb. On roads with outside lane and parking areas that are narrower than 17 feet wide, shared lane markings can be provided every 100 to 200 meters on the right side of the motor vehicle travel lane to increase the visibility of the bike route.

6.7.3 Repaving

Repaving projects provide a clean slate for revis-

ing pavement markings. When a road is repaved, the roadway should be restriped to create narrower lanes and provide space for bike lanes and shoulders whenever possible. In addition, if the space on the sides of the roadway has a relatively level grade and few obstructions, the total pavement width can be widened to include paved shoulders. Not all repaved roadways, however, will be candidates for bike facilities such as restriping.

6.7.4 Roadway Construction and Reconstruction

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

6.7.5 Bridge Replacement

All new or replacement bridges should accommodate bicycles with on-road facilities on both sides of the bridge.

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

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

On urban and suburban bridge projects, NCDOT recommends a minimum of 4-foot bridge shoulder to be provided on bridge replacements. Greater widths on local roads should be a minimum of 5.5-feet wide if traffic volumes are projected to be less than 15,000 vehicles per day. If traffic volumes are projected to be 15,000 or more vehicles per day, the shoulders should be at least 6.5-feet wide. Provide bicycle safe railings that are 54" high.

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

6.7.6 Retrofit Roadways with New Bicycle Facilities

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

In some places, it may be relatively easy to add extra pavement for shoulders, but others may require removing trees, moving landscaping or fences, or re-

grading ditches or hills. Retrofitting roadways with sidepaths creates similar challenges. Improvements in these locations are typically recommended in the long-term.

6.7.7 Signage and Wayfinding Projects

Signage along specific routes or in an entire community can be updated to make it easier for people to find destinations. Bicycle route signs are one example of these wayfinding signs, and they can be installed along routes independently of other signage projects or as a part of a more comprehensive wayfinding improvement project.

6.8 Maintenance

Creation of a successful Bicycle Network will involve more than facility improvements. The long-term success of the bicycle network will also depend on how the Town builds facility maintenance and long-term facility planning into its existing maintenance and planning practices. The subsections below detail these critical policy areas. More detailed policy examinations and language update recommendations are discussed in Chapter 5.

6.8.1 Maintenance

Regular maintenance of the community's bicycle facilities will be essential to maintain the safety of the facilities and their overall usability. To facilitate the practice of regular maintenance, the Town should integrate bicycle facility maintenance into the maintenance routines. Currently, the Town of Carrboro does have a regular sweeping program and bicycle lane re-striping is part of the Town's and NCDOT's routine maintenance. To further enhance maintenance activities, the Town of Carrboro should create a cyclist-request response system in which anyone can report maintenance needs. For more information on maintenance routines, please see Chapter 7: Design Guidelines.

Types of maintenance required include:

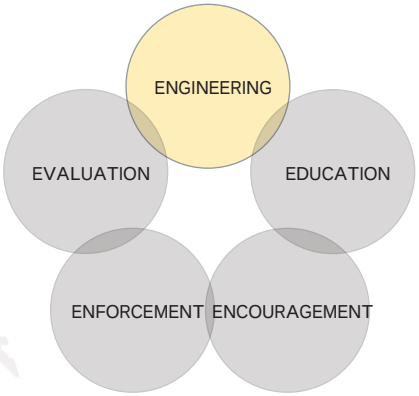
- Regular inspection
- Repair of pavement
- Re-striping of lanes/remarking of pavement
- Replacement or repair of route signs due to damage caused by vandalism or general wear
- Removal of debris from roadway shoulders, bike lanes, and shared-use paths (including trash and vegetation)
- Replacement and repair of bicycle parking and storage facilities
- Citizen-response system allowing residents to report maintenance needs with active response
- Installation and replacement with bicycle friendly drainage grates

Off-road bicycle routes may require the attention of separate agencies and should be regularly maintained as well. Key maintenance types required for multi-use paved paths include:

- Sweeping and debris removal
- Vegetation trimming and mowing
- Invasive species control
- Replacing asphalt or concrete as needed
- Re-striping pavement lines
- Replacing and repairing bicycle parking and storage facilities

Volunteers may assist the Town of Carrboro in maintenance as well. Adopt-a-trail programs could be further developed with local civic groups, scouts, schools, and businesses taking responsibility for the general upkeep of both off-road paths and on-road bicycle paths. Traditionally, these programs have focused on off-road trails but could be expanded to on-road facilities as well. Adopt-a-trail programs should include credit signage and written agreements with the adopting group.

Chapter Outline:



CHAPTER 7: DESIGN GUIDELINES

7.0 Design Principles

These recommended guidelines have been tailored to meet the specific facility development needs of Carrboro's bicycle network. It is the intent of this plan to originate from and adhere to national design standards as defined by the American Association of State Highway Transportation Officials (AASHTO), the Americans with Disabilities Act (ADA), the Federal Highway Administration (FHWA), the Manual on Uniform Traffic Control Devices (MUTCD), and the NCDOT. Should the national standards be revised in the future and result in discrepancies with this chapter, the national standards should prevail for all design decisions. For example, the 2009 update to MUTCD provides new guidance. This chapter utilizes some of these 2009 updates, including the use of the sharrow facility. In order for Carrboro to move forward with the objective of achieving a higher Bicycle Friendly Community designation level, the design and implementation of high quality bicycle and greenway facilities is of utmost importance.

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

The following are key principles for these design guidelines:

1. Carrboro will have both a thorough network of off-road trails and a complete network of on-street bicycling facilities. These two systems will be interconnected to make it possible for all destinations in Carrboro to be accessible by bicycle.

2. All roads in Carrboro are legal for the use of bicyclists (except those roads designated as limited access facilities which prohibit bicyclists). This means that most streets have bicycle facilities, and will be designed and maintained accordingly.

3. Bicyclists have a range of skill levels, from Type "B"/"C" inexperienced/ recreational bicyclists (especially children and seniors) to Type "A" experienced cyclists (adults who are capable of sharing the road with motor vehicles). These groups are not always exclusive – some elite-level athletes still like to ride on shared-use paths with their families, and recreational bicyclists will sometimes use their bicycles for utilitarian travel.

4. At a minimum, facilities will be designed for the use of Type "B" cyclists, with a goal of providing for Type "C" cyclists to the greatest extent possible. In areas where specific needs have been identified (for example, near schools) the needs of appropriate types of bicyclists will be accommodated.

5. Design guidelines are intended to be flexible and can be applied with professional judgment by designers. Specific national and state guidelines are identified in this document, as well as design treatments that may exceed these guidelines.

Fig. 7-1. A bicyclist utilizing Jones Ferry Rd. facilities.

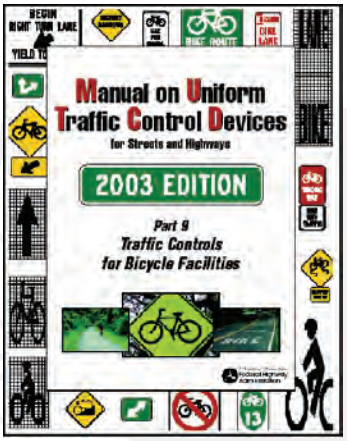


Fig. 7-2. Manual on Uniform Traffic Control Devices (MUTCD)

7.1 National and State Guidelines

The following is a list of references and sources utilized to develop design guidelines for Carrboro's Comprehensive Bicycle Transportation Plan. Many of these documents are available online and are a wealth of information and resources available to the public.

Federal Guidelines:

AASHTO Guide
Guide for the Development of Bicycle Facilities, 1999.
American Association of State Highway and Transportation Officials, Washington, DC.
www.transportation.org

AASHTO Green Book
Policy on Geometric Design of Streets and Highways, 2001.
American Association of State Highway and Transportation Officials, Washington, DC.
www.transportation.org

NCDOT
The North Carolina Bicycle Facilities Planning and Design Guidelines, 1994
NCDOT Division of Bicycle and Pedestrian Transportation
http://www.ncdot.org/transit/bicycle/projects/resources/projects_facilitydesign.html

MUTCD
Manual on Uniform Traffic Control Devices, 2003. Federal Highway Administration, Washington, DC.
http://mutcd.fhwa.dot.gov

State Guidelines:

PBIC / APBP
Bicycle Facility Selection: A Comparison of Approaches
Michael King, for the Pedestrian and Bicycle Information Center
Highway Safety Research Center, University of North Carolina – Chapel Hill, August 2002
http://www.bicyclinginfo.org/pdf/bikeguide.pdf

Bike Lane Design Guide (City of Chicago)
http://www.bicyclinginfo.org/pdf/bike_lane.pdf

Bicycle Parking Design Guidelines
http://www.bicyclinginfo.org/pdf/bikepark.pdf

San Francisco's Shared Lane Pavement Markings: Improving Bicycle Safety:
http://www.bicycle.sfgov.org

Local Guidelines:

Downtown Carrboro: New Vision (Downtown Visioning Charrette Report (2001)
http://www.ci.carrboro.nc.us/pzi/PDFs/ToCFinalVision.pdf

Carrboro Vision 2020 (2000)
http://www.ci.carrboro.nc.us/PZI/PDFs/Vision2020.pdf

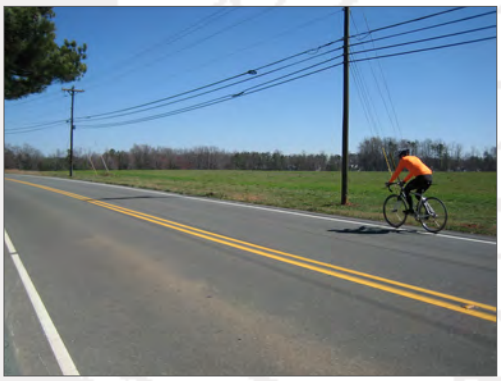


Fig. 7-3. Examples of a paved shoulder facility.

7.2 Linear Bicycle Facilities - On Road

Paved Shoulder

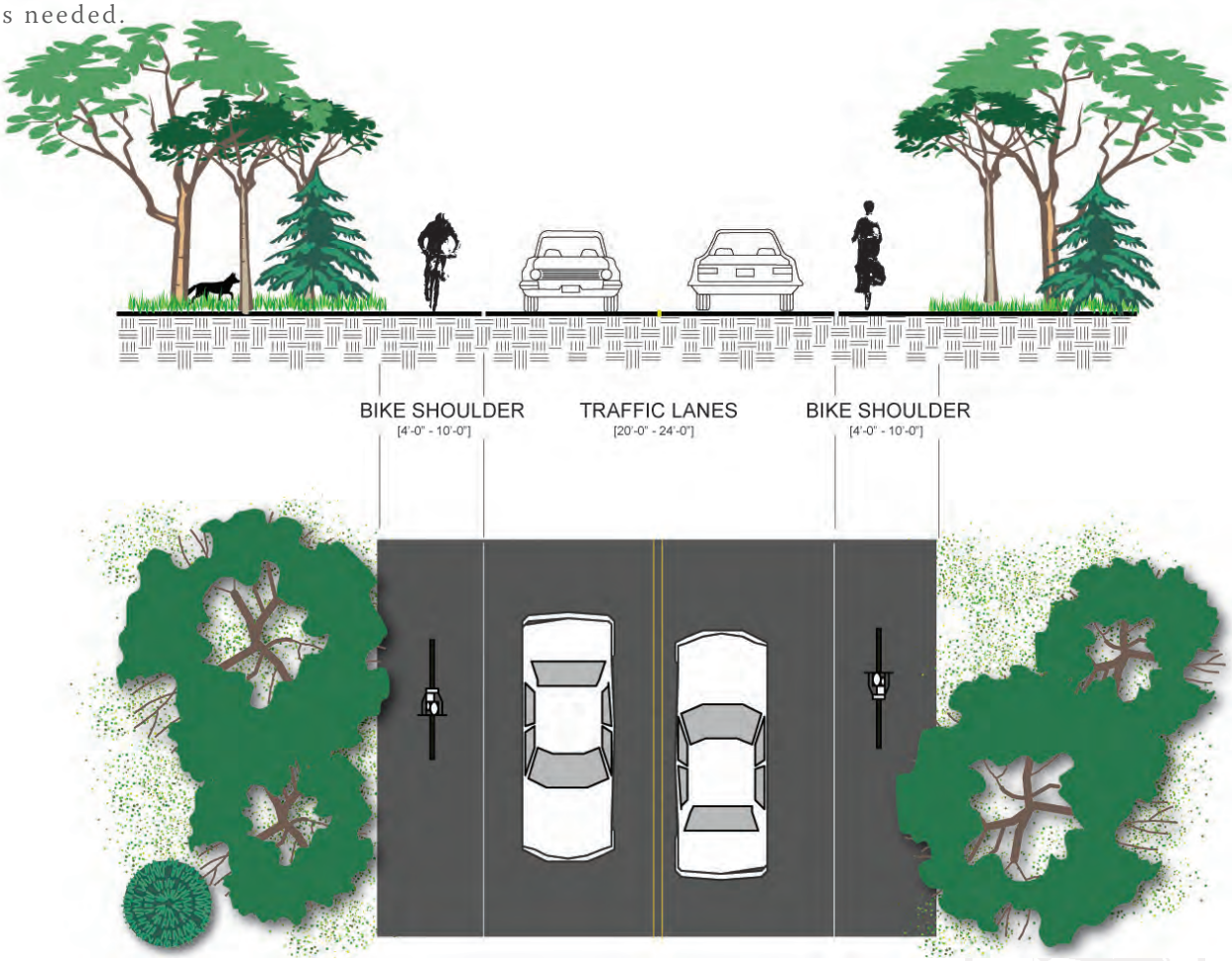
- For skilled bicyclists (Type "A" cyclists) who are capable of sharing the road with motor vehicles.
- Commonly located in more rural areas without curb and gutter
- Provide smooth pavement, free of debris.
- Provide shared road signage.
- Rumble strips hould be avoided, but if used, then a paved shoulder of wider width is needed.
- 4-foot width is recommended, but for speeds higher than 40 MPH and high ADT, a shoulder width of more than 4-feet is recommended.

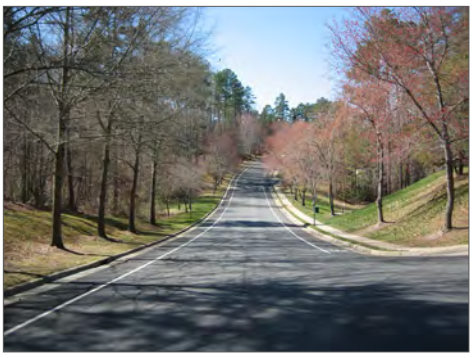
Several roadways in Carrboro with **existing** paved shoulder facilities:

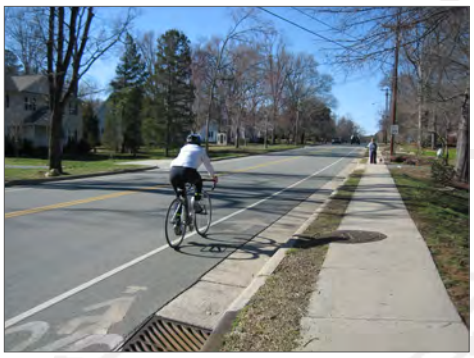
- NC 54
- Estes Dr.

Several roadways in Carrboro with **proposed** paved shoulders:

- Jones Ferry Rd.
- Old Greensboro Rd.
- Smith Level Rd.







Figs. 7-4 — 7-5. Two examples of existing bicycle lanes in Carrboro.

Bicycle Lane

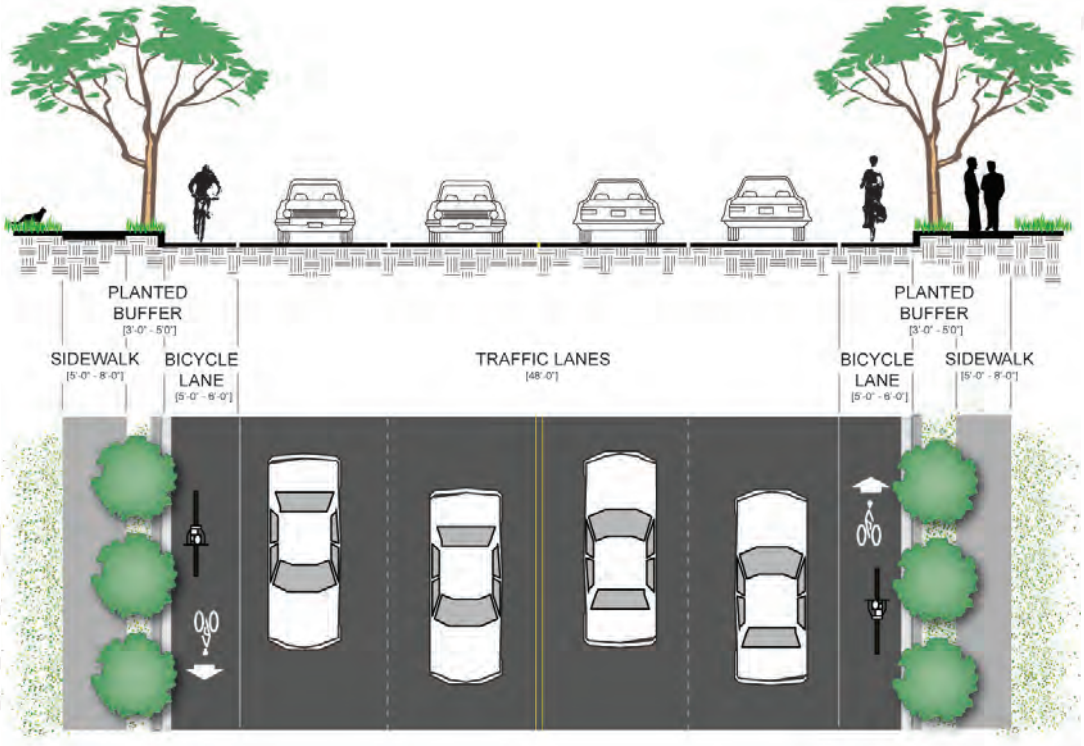
- Should be used on roadways with 3,000 or more ADT.
- For Type "A", "B" cyclists who are capable of sharing the road with motorists
- Recommended width of 6-feet. NCDOT recommends 4-feet from edge of curb (when no gutter pan is present); and 6-feet from edge of curb when gutter pan is present.
- Roadway paving should be at same grade as gutter pan. Ensure that there is no lip between bicycle lane paving and gutter pan paving.
- Not suitable where there are a high number of commercial driveways
- Suitable for 2-lane facilities and 4-lane divided facilities
- Roadway paving should be at same grade as gutter pan. Ensure that there is no lip between bicycle lane paving and gutter pan paving.

Several roadways in Carrboro with **existing** bicycle lanes:

- Hillsborough St.
- N. Greensboro St.
- Main St.
- Jones Ferry Rd.

Several roadways in Carrboro with **proposed** bicycle lanes:

- Davie St.
- Old Fayetteville Rd.
- Seawell School Rd.
- Weaver St.



Typical Pavement Markings for Bicycle Lanes

The Manual on Uniform Traffic Control Devices (MUTCD) provides guidance for lane delineation, intersection treatments, and general application of pavement wording and symbols for on-road bicycle facilities and off-road bike paths (http://mutcd.fhwa.dot.gov/pdfs/millennium/12.18.00/9.pdf). In addition to those presented in the MUTCD, the experimental pavement markings shown below may be considered.

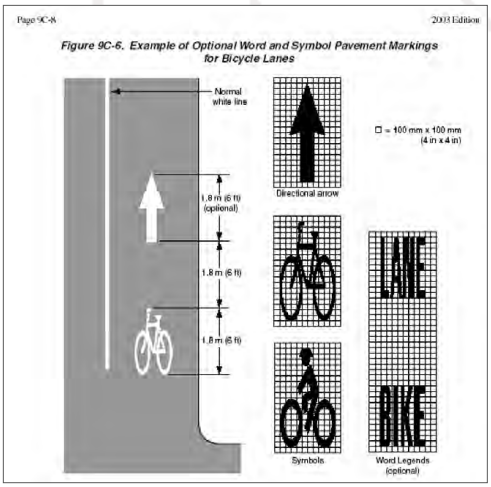


Fig. 7-6. Typical pavement markings for bicycle lanes from the MUTCD.

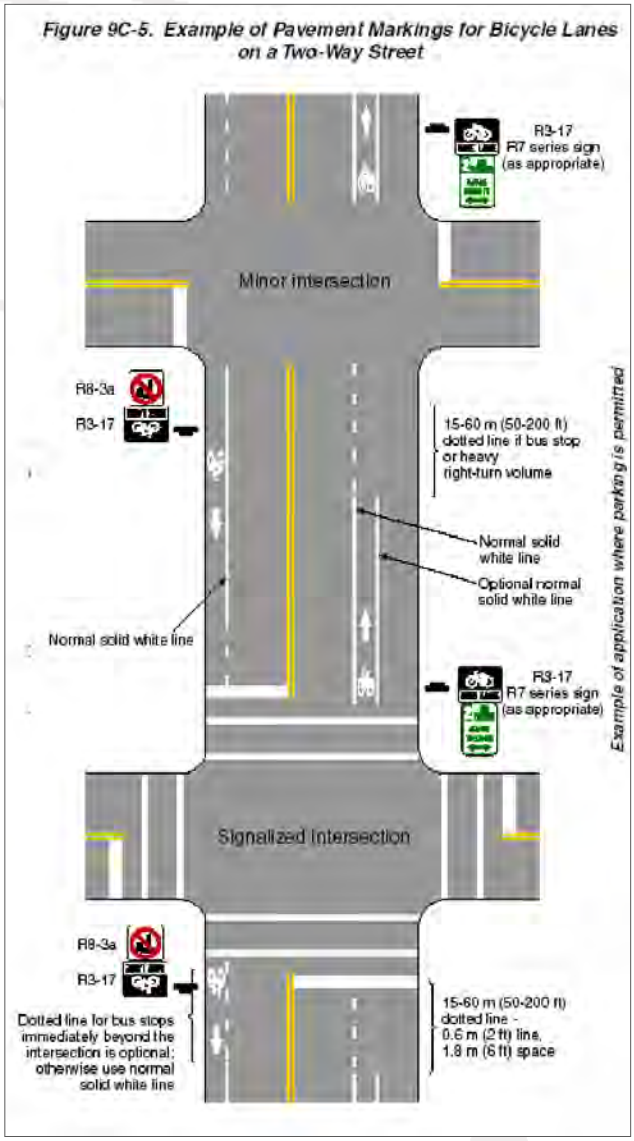


Fig. 7-7. MUTCD examples of optional word and markings within bicycle lanes.

Figs. 7-8. Two examples of sharrow marking.

Fig. 7-9. The city of San Francisco has developed these educational flyers for their installed sharrow markings.

Sharrow Marking

Some U.S. cities have created a bicycle shared lane arrow (or "sharrow" stencil) for use on designated on-road bicycle facilities where lanes are too narrow for striping designated bike lanes. Sharrow markings are recommended for Type "A" and "B" bicyclists who are comfortable sharing the road with motorists. The stencil can serve a number of purposes, such as making motorists aware of bicycles potentially traveling in their lane, showing bicyclists the appropriate direction of travel, and, with proper placement, reminding bicyclists to bike further from parked cars to prevent "dooring" collisions.

Denver, CO, and San Francisco, CA, have effectively used this treatment for several years. Other cities, such as Portland, OR; Los Angeles, CA; Gainesville, GA; Cambridge, MA; Oakland, CA; and foreign cities such as Paris, Brisbane, Zurich, and Buenos Aires have begun to utilize this new treatment as well.

The "sharrow" treatment was recently included in the future 2009 update of the MUTCD. This update has yet to be finalized, and according to the MUTCD website, the final version is anticipated during 2009.

- Sharrow marking is appropriate where speed limit does not exceed 35 MPH.
- Sharrow marking should be placed immediately after an intersection and at intervals not greater than 250 feet thereafter.
- Sharrow marking can be used with-or without on-street parking.

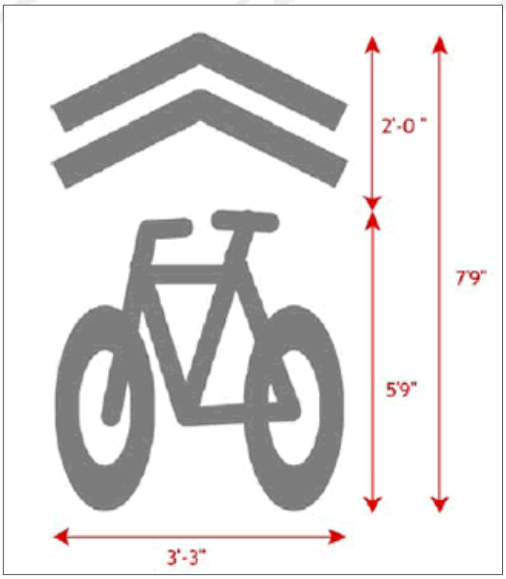


Fig. 7-10. Sharrow Stencil Dimensions

Roadways in/near Carrboro with **existing** sharrows:

- MLK Blvd. between Estes Dr. and Rosemary St.

Several roadways in Carrboro for **proposed** sharrows:

- Old Pittsboro Rd.
- Shelton St.
- Main St.
- Merritt Mill Rd.
- Colfax Rd.
- Roberson St.

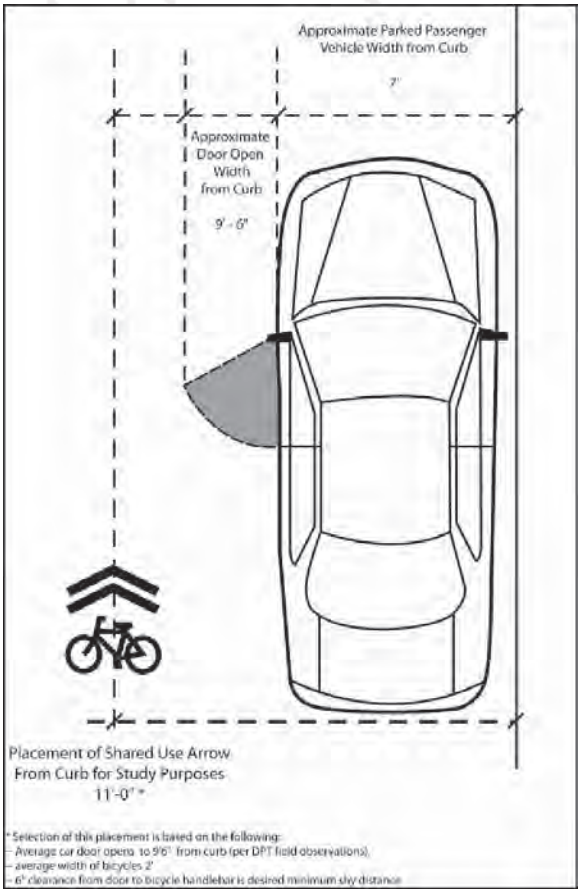


Fig. 7-11. Sharrow Placement Dimensions

Fig. 7-12 — 7-13. Examples of a sidepath in Durham, NC (left); and Sand City, CA (right).

7.3 Linear Bicycle Facilities - Off Road

Sidepath

- Accomodates all types of bicyclists
- This type of trail works best in corridors where there are limited driveway/ intersection crossings and more desirable destinations along one side of the roadway, or where no roadway space is available to provide bike lanes.
- The trail should be at least 10 feet wide (preferably 12 feet) with a 3-5-foot (preferably 6-foot) vegetated buffer where possible.
- A well-designed transition (at-grade crossing or appropriate signage) where the sidepath ends at the roadway or intersection is recommended so that the bicyclist can be safely directed into the correct flow of traffic.

Several roadways in Carrboro with **proposed** sidepaths:

- Old NC 86
- Dairyland Rd. (at end of Homestead Rd.)
- NC 54 from James St. to Anderson Park along Eubanks Rd.

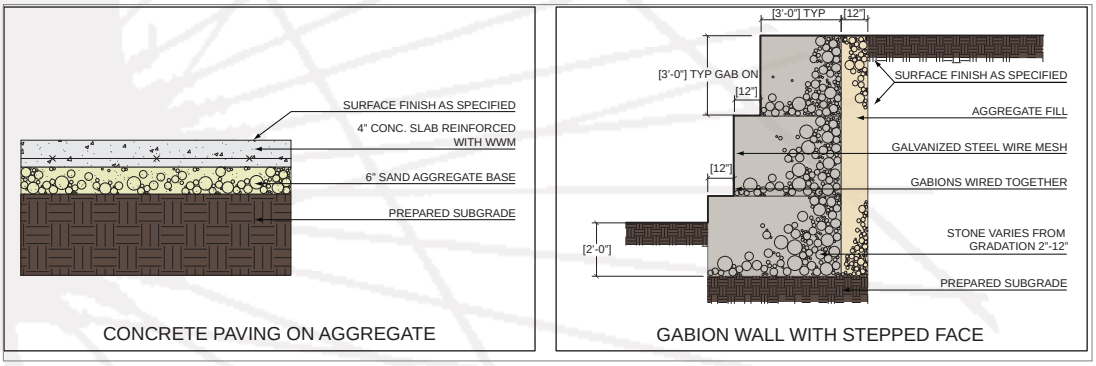


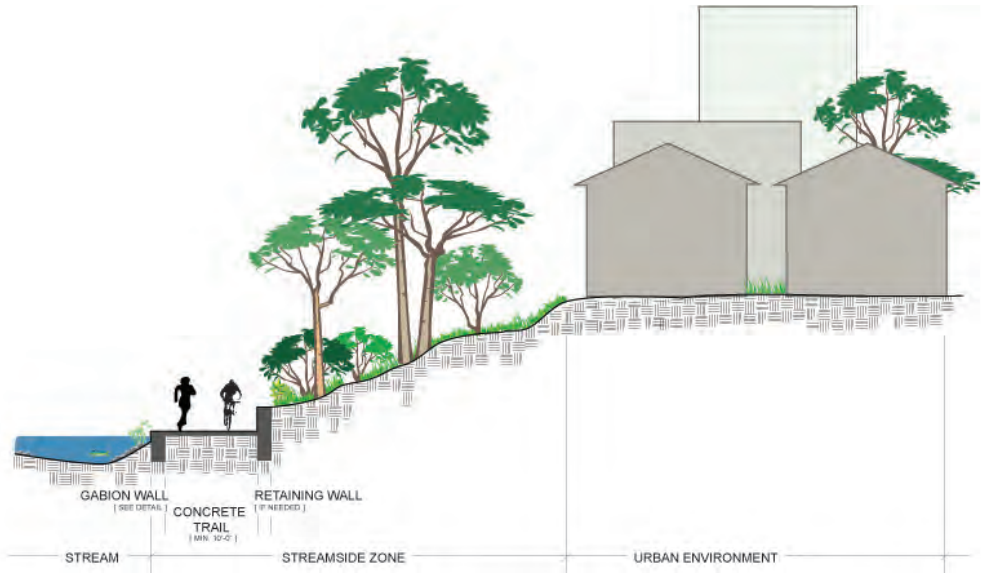
Fig. 7-14. Examples of stable construction elements.

Greenway Trails

The following pages focus on design guidelines for greenways. Greenways accomodate all levels of bicyclists but are the most comfortable for Type "C" cyclists, namely children.

Creekside Trail (Urban Areas Only)

- Located only in urban areas, where right-of-way constraints and channelized streams restrict trail development to the floodway.
- Typically positioned directly adjacent to the stream channel and are therefore subject to frequent flooding.
- Parking areas near urban creeks can also be retrofitted to accommodate this type of trail.
- When box culverts are built along creeks on planned trail routes, they should be designed to meet with this trail type, and should have sufficient space for trail users.
- Require hard paved surfaces of concrete to withstand high-velocity stream flows. May consider permeable paving treatments in more environmentally-sensitive areas.
- Retaining walls or other structural elements may also be required for stable construction and to protect the trail from erosion and flood damage.
- The installation of railings, benches, signage, and trash receptacles, that could obstruct flow during storm events, should be carefully considered.
- The use of retaining walls and seat walls is one way in which non-obtrusive amenities can be included.
- Special consideration should be given to the mitigation of impacts from trail construction on the natural environment.
- Minimum 10-foot width for multi-use trails.



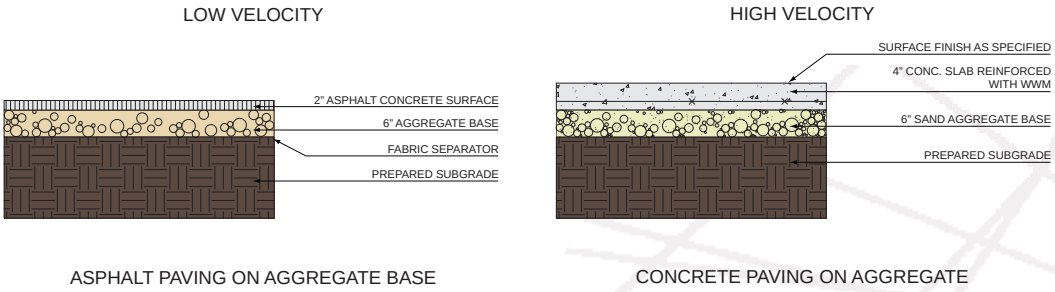


Fig. 7-15. Typical trail foundation details.

Floodway Trail (Limited Areas)

- Typically positioned within the floodway, but not directly adjacent to streams; some vegetative buffer between the stream and trail should be left intact.
- Subject to infrequent, periodic flooding.
- Require paved surfaces of either asphalt or concrete depending on frequency of flooding and expected velocity of flow. May consider permeable paving treatments in more environmentally-sensitive areas.
- Proper trail foundation (see Figure 7-15) will increase the longevity of the trail.
- No soft shoulder should be constructed due to flood considerations.
- All elements of the trail, including the trail tread, railings, benches, and trash receptacles, will be periodically flooded; design and materials should be carefully selected and sited accordingly.
- Special consideration should be given to the mitigation of impacts from trail construction on the natural environment.
- Minimum 10-foot width for multi-use trails.

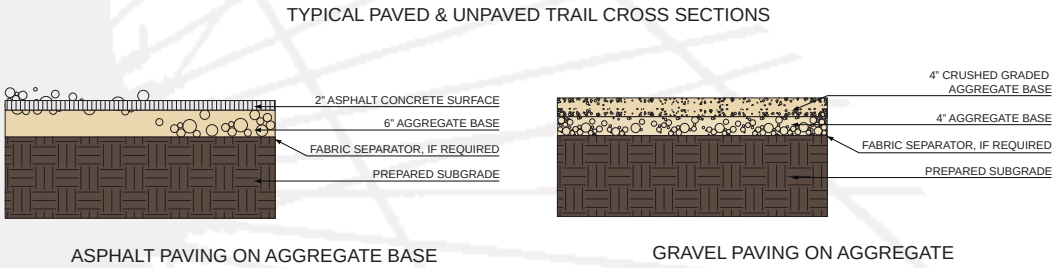
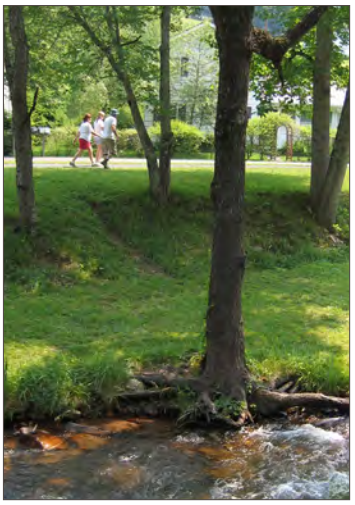


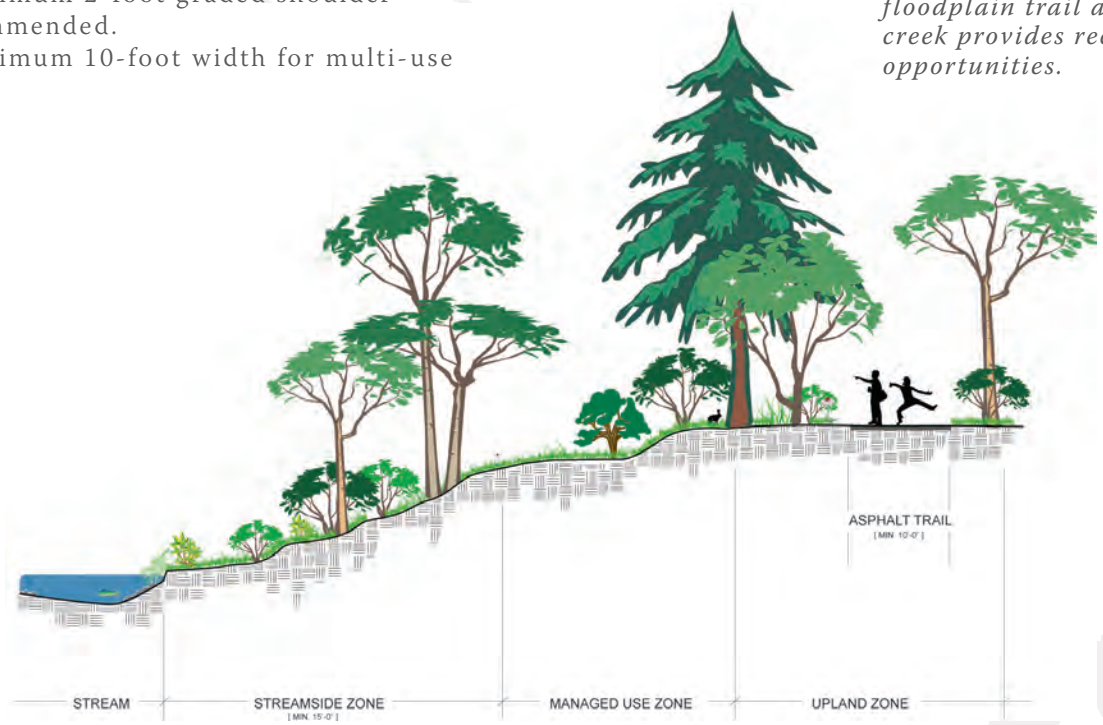
Fig. 7-16. Typical trail cross sections



Floodplain Trail

- Typically positioned outside the floodway, within the floodplain; significant vegetative buffer between the stream and trail should be left intact.
- Subject to occasional flooding, during large storm events.
- Paved asphalt recommended, though an aggregate stone surface may be adequate in some locations. May consider permeable paving treatments in more environmentally sensitive areas.
- Proper trail foundation (see Figure 7-16) will increase the longevity of the trail.
- Minimum 2-foot graded shoulder recommended.
- Minimum 10-foot width for multi-use trails.

Fig. 7-17 — 7-18. A floodplain trail along a creek provides recreational opportunities.



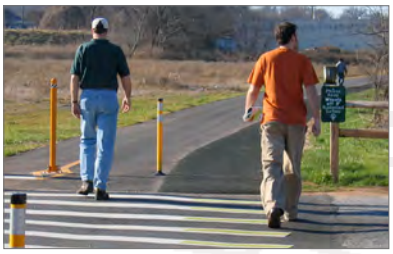
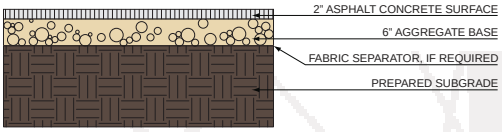


Fig. 7-19 — 7-20. Multi-use trails support all types of cyclists. Trails shown above are in Durham, NC.



ASPHALT PAVING ON AGGREGATE BASE

Fig. 7-21. Typical paved trail cross section.

Multi-use Trail

- Minimum 10-foot width
- Proper trail foundation (see Figure 7-21) will increase the longevity of the trail.
- Paved asphalt recommended, May consider permeable paving treatments in more environmentally sensitive areas.
- A 2-foot-wide gravel strip may be installed along the trail for an alternate surface and to help reduce crumbling of trail edges.
- A minimum of 8 feet of vertical clearance

Trail Underpass

Trail underpasses typically utilize existing overhead roadway bridges adjacent to steams or culverts under the roadway that are large enough to accommodate trail users.

- Vertical clearance of the underpass should be at least 10-feet.
- Width of the underpass must be at least 12-feet
- Proper drainage must be established to avoid pooling of stormwater.
- Lighting is recommended for safety

Trail Overpass

Bridges are used for above-grade crossings and should be designed with specific structural engineering and safety considerations. If crossing an interstate highway, specific and stringent standards will apply.

- Safety should be the primary consideration in bridge/overpass design.
- Specific design and construction specifications will vary for each bridge and can be determined only after all site-specific criteria are known.
- Always consult a structural engineer before completing bridge design plans, before making alterations or additions to an existing bridge, and prior to installing a new bridge.
- A 'signature' bridge should be considered in areas of high visibility, such as over major roadways. While often more expensive, a more artistic overpass will draw more attention to the trail system in general, and could serve as a regional landmark.
- For shared-use facilities, a minimum width of 14-feet is recommended.
- Trail overpasses are prohibitively expensive and should only be placed in areas of substantial need.

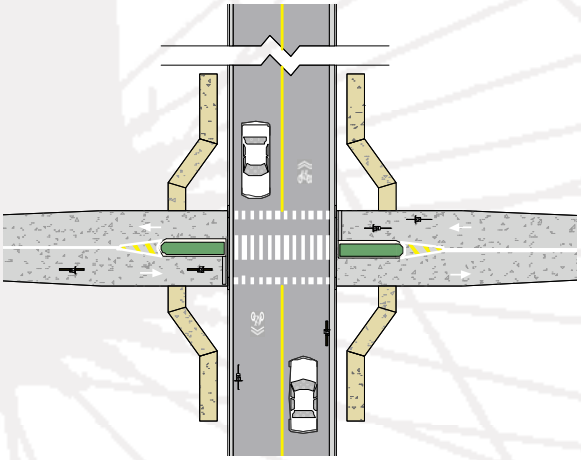


Fig. 7-22. Detail (left) and photo (above) showing Midblock Crossing with Shared Use Path.

7.4 Bicycle Friendly Intersections & Traffic Calming

Intersections represent one of the primary collision points for bicyclists. Generally, the larger the intersection, the more difficult it is for bicyclists to cross. On-coming vehicles from multiple directions and increased turning movements sometimes may make it difficult for motorists to see non-motorized travelers.

Most intersections in Carrboro do not provide a designated place for bicyclists. Bike lanes and pavement markings often end before intersections, causing confusion for bicyclists. Loop and other traffic signal detectors, such as video, often do not detect bicycles. Bicyclists wanting to make a left turn can face quite a challenge. Bicyclists must either choose to behave like motorists by crossing travel lanes and seeking refuge in a left-turn lane, or they may act as pedestrians and dismount their bikes, push the pedestrian walk button located on the sidewalk, and then cross the street in the crosswalk. In some situations bicyclists traveling straight may have difficulty maneuvering from the far right lane, across a right turn lane, to a through lane of travel. Furthermore, motorists often do not know which bicyclist movement to expect. The following pages provide treatments for these conditions.

Bike Trail & Roadway Intersections

- Include appropriate signage warning trail user of upcoming conditions.
- Either a median refuge island or crosswalk should connect the trail entrance to the roadway.
- Typically bollards may be used at the entrance of trails where passage of motor vehicles is prohibited and bicycles is permitted.
- The crossing should be a safe enough distance from neighboring intersections to not interefere with traffic flow.
- A roadway with flat topography is desirable to increase motorist visibility of the path crossing.
- In addition to signage, motorists and trail users can also be warned of the trail crossing with changes in pavement texture, flashing beacons, raised crossings, and striping.
- A refuge is most particularly needed in conditions exhibiting high volumes/speeds, where trail usage is significant, and/or where the primary user group crossing the roadway requires additional time.
- The crossing should occur as close to perpendicular (90 degrees) to the roadway as possible.
- It may be desirable to bring the path crossing up to a nearby signalized crossing is situations with high speeds/ADT and design and/or physical constraints.
- Signalized crossings may be necessary on trails with significant usage when intersecting with demanding roadways, but MUTCD warrants must be met for the installation of a signalized crossing.

Median Refuge Islands

Median refuge islands are barriers in the center portion of a street or roadway. When used in conjunction with mid-block or intersection crossings, they can be used as a crossing island to provide a place of refuge for bicyclists. They also provide opportunities for landscaping that in turn can help to slow traffic. Locations in Carrboro where crossing frequency is significant (such as Fayetteville Rd. at McDougle schools) and traffic volumes are not high are good candidates for a median refuge island.

- A center turn lane can be converted into a raised or lowered median thus increasing motorist safety.
- Median crossings should be at least 6-feet wide

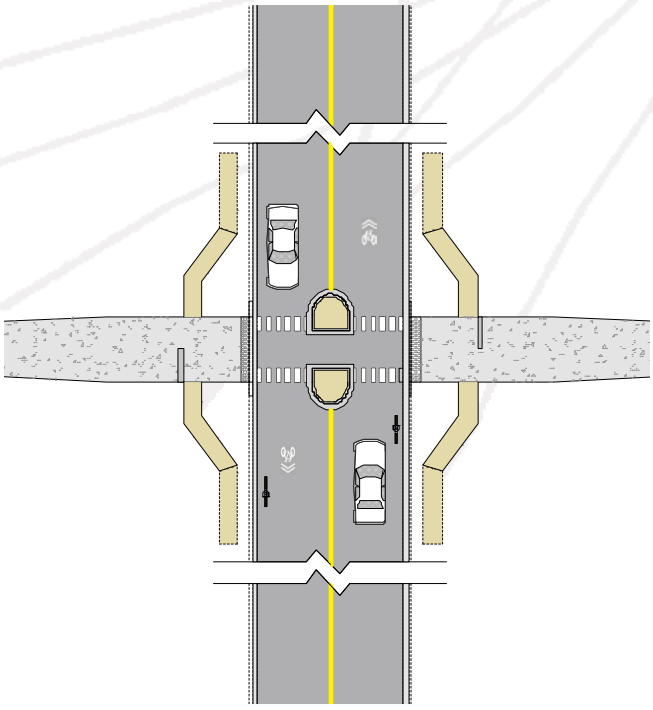


Fig. 7-23. Detail and photo showing Median Refuge with Shared Use Path and Sidewalks.

Fig. 7-24 — 7-25. Bollards can be used as a single (left) or in groups of three (far left) as seen here on several trails in Carrboro.

Bollards

Bollards are structures used to restrict access or improve security at the intersection of a roadway and a trail. While many bollards provide aesthetic benefits, typically, bollards are used to protect pedestrians and bicyclists from vehicles. Bollards are available in a variety of sizes, colors, materials, and finish options. Rubber is used to manufacturer flexible bollards, while plastic bollards are made of composite or recycled materials.

- Make bollards well marked and visible both day and night to bicyclists by using reflectors.
- Stationary bollards provide a constant barrier while retractable bollards permit authorized entry for emergency vehicles or maintenance
- Must be at least 3-feet tall, and at least 10-feet from the intersection
- Can be installed as a group or single; when using more than one bollard provide a 5-foot spacing to permit passage of bicycle trailers and tricycles
- Always use one or three bollards, never two, which can channel users to the center of the trail causing possible head-on collisions

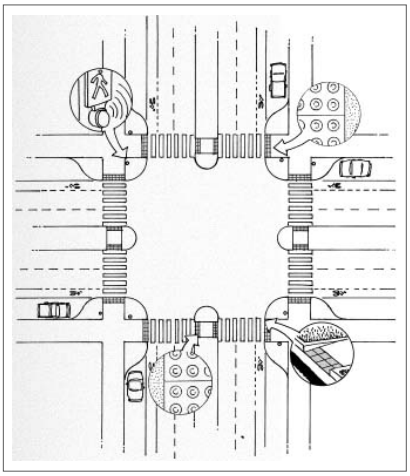


Fig. 7-26. FHWA diagram showing a well-designed intersection for bicyclist safety.

Fig. 7-27. A ladder-style crosswalk provides the most visibility for both the bicyclist and the motorist.

Marked Crosswalks

A marked crosswalk designates a pedestrian and bicyclist right-of-way across a street. It is often installed at controlled intersections or at key locations along the street (e.g., mid-block crossings) and in this Plan are prescribed for areas where bicycle corridor intersections occur. Marked crosswalks are important at intersections where bicyclists should dismount their bicycle and cross the roadway using the crosswalk. The use of crosswalks within the bicycle network is successful when used in conjunction with other traffic-calming devices to fully recognize low traffic speeds and enhance bicyclists' safety. A well-designed traffic calming location is not effective if bicyclists are using other unmodified and potentially dangerous locations to cross the street.

Marked crosswalks may be used under the following conditions: 1) At locations with stop signs or traffic signals, 2) At non-signalized street crossing locations in designated school zones, and 3) At non-signalized locations where engineering judgment dictates that the use of specifically designated crosswalks are desirable.

An engineering study may need to be performed to determine the appropriate width of a crosswalk at a given location, however marked crosswalks should not be less than six feet in width. In downtown areas or other locations of high pedestrian traffic, a width of ten feet or greater should be considered.

Guidelines:

- Should not be installed in an uncontrolled environment where speeds exceed 40 mph.
- Crosswalks alone may not be enough and should be used in conjunction with other measures to improve crossing safety, particularly on roads with average daily traffic (ADT) above 10,000.
- Width of marked crosswalk should be at least six feet wide; ideally ten feet or wider in Downtown areas.
- Curb ramps and other sloped areas should be fully contained within the markings.
- Crosswalk markings should extend the full length of the crossings.
- Crosswalk markings should be white per MUTCD.
- Ladder' patterns are recommended for intersection improvements in Carrboro for aesthetic and visibility purposes. Lines should be one to two feet wide and spaced one to five feet apart.

Fig. 7-28. Tucson, AZ, was the first to use the HAWK signal. (Photo courtesy of Tucson Department of Transportation)

*HAWK Signals**

High-intensity **A**ctivated cross**W**al**K** signals (or, HAWK signals) were developed by the City of Tucson, Arizona, as a means to increase pedestrian and bicyclist safety at crossings. HAWK signals are applied to intersections or mid-block crossings with low vehicular volumes where bicyclists and/or pedestrians have difficulty obtaining adequate gaps in major street traffic to safely cross the street. The signal features two overhead-mounted signal faces for each major street approach, with each face having two side-by-side circular red lenses above a circular yellow lens. These signal faces will rest in a dark condition until a bicyclist and/or pedestrian activates a control sequence. After flashing yellow and/or steady yellow change intervals, the red lenses will first display steady red, followed by a simultaneous (rather than wig-wag) flashing red display. The bicyclist then follows standard crossing signals with a countdown crossing signal and "do not cross" signal.

Tucson, AZ, has had much success with the installation of HAWK signals. According to the Safe Routes to School guide, the device substantially improves motorist stopping behavior, and the City has asked FHWA for approval in including the signal in the Manual for Uniform Traffic Control Devices (MUTCD). Portland, OR, is also experimenting with HAWK signals. The city has requested experimentation approval with the FHWA for the installation of these signals.

Carrboro should pilot the installation of several HAWK signals in areas where mid-block crossings or particularly sensitive crossing areas occur, such as S. Greensboro St. at the Harris Teeter, or Old Fayetteville Rd. in front of McDougle Schools.
For more information on the installation and design guidelines for HAWK signals, refer to Tucson's DOT website below:

http://www.dot.ci.tucson.az.us/traffic3/tspedestrian.php

**Considered to be innovative by the FHWA and NC-DOT; projects implementing this facility will require state and federal approval for permission to experiment with these types of treatments.*

Fig. 7-29. Signage can help instruct bicyclists on how to use the detector loop.

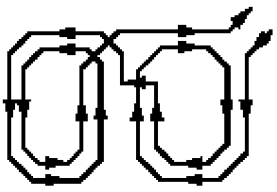
Bicycle-Activated Detector Loop

Changing how intersections operate can help make them more "friendly" to bicyclists. Improved traffic signal timing for bicyclists, bicycle-activated loop detectors, and camera detection make it easier and safer for cyclists to cross intersections. Bicycle-activated loop detectors are installed within the roadway to allow the weight of a bicycle to trigger a change in the traffic signal. This allows the cyclist to stay within the lane of travel and avoid maneuvering to the side of the road to trigger a push button, which ultimately provides extra green time before the light turns yellow to make it through the light. Current and future loops that are sensitive enough to detect bicycles should have pavement markings to instruct cyclists on how to trip them.

Loop detectors are important at cross streets, left-turn-only lanes and other travel lanes where cyclists may become stuck, unable to get a green light. Lane markings or signage that show cyclists where to position their bicycle maximize the capability of the sensor.

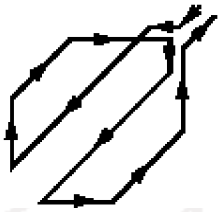
Quadruple Loop

- Detects most strongly in center
- Sharp cut-off sensitivity
- Used in bike lanes



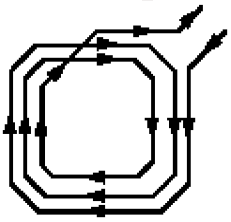
Diagonal Quadruple Loop

- Sensitive over whole area
- Sharp cut-off sensitivity
- Used in shared lanes



Standard Loop

- Detects most strongly over wires
- Gradual cut-off
- Used for advanced detection



From: Implementing Bicycle Improvements at the Local Level, FHWA, 1998, p. 70.

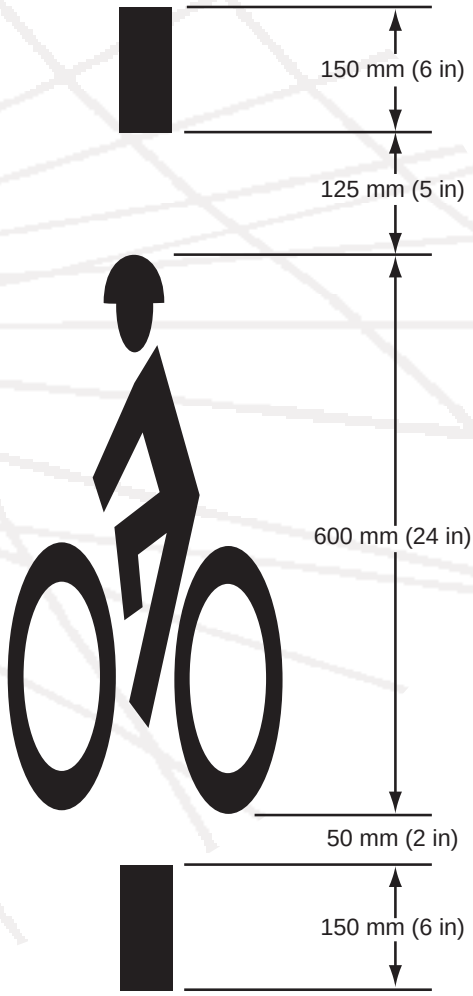


Fig. 7-30 — 7-31. Use pavement marking (top) to aid bicyclists in locating loop detectors at intersections (bottom).

Fig. 7-32 — 7-33. The PTA Bike Path intersection with Main St. and Jones Ferry Rd. could be a candidate for a bike signal (far left). A bicycle traffic signal used to bring bicycles leaving the UC-Davis campus back into the road network (left).

Bicycle-Specific Traffic Control Signals

A bicycle signal is an electrically powered traffic control device that may only be used in combination with an existing traffic signal. Bicycle signals direct bicyclists to take specific actions and may be used to address an identified safety or operational problem involving bicycles. A separate signal phase for bicycle movement will be used. Alternative means of handling conflicts between bicycles and motor vehicles shall be considered first. When bicycle traffic is controlled, green, yellow, or red bicycle symbols are used to direct bicycle movement at a signalized intersection. Bicycle signals shall only be used at locations that meet Department of Transportation Bicycle Signal Warrants. A bicycle signal may be considered for use only when the volume and collision, or volume and geometric warrants have been met:

1. *Volume.* When W = B x V and W > 50,000 and B >50.
   Where:
   W is the volume warrant.
   B is the number of bicycles at the peak hour entering the intersection.
   V is the number of vehicles at the peak hour entering the intersection.
   B and V shall use the same peak hour.

2. Collisions of types susceptible to correction by a bicycle signal have occurred over a 12-month period and the responsible public works official determines that a bicycle signal will reduce the number of collisions.

3. *Geometric.*
   (a) Where a separate bicycle/multi-use path intersects a roadway.
   (b) At other locations to facilitate a bicycle movement that is not permitted for a motor vehicle.

From: MUTCD 2003 and MUTCD 2003 California Supplement (May 20, 2004), Sections 4C.103 & 4D.104 - http://www/dot.ca.gov/hq/traffopps/signtech/mutcdsupp/

Fig. 7-34. Bicycle traffic signals.

Fig. 7-35. Bike box in England filled in with color to emphasize allocation of space to bicycle traffic.

Fig. 7-36. Bicycle box in Portland, OR.

*Bike Box/Advance Stop Line**

A bike box is a relatively simple innovation to improve turning movements for bicyclists without requiring cyclists to merge into traffic to reach the turn lane or use crosswalks as a pedestrian. The bike box is formed by pulling the stop line for vehicles back from the intersection, and adding a stop line for bicyclists immediately behind the crosswalk. When a traffic signal is red, bicyclists can move into this "box" ahead of the cars to make themselves more visible, or to move into a more comfortable position to make a turn. Bike boxes have been used in Cambridge, MA; Eugene, OR; Portland, OR; and European cities.

Potential Applications:

- At intersections with a high volume of bicycles and motor vehicles
- Where there are frequent turning conflict and/or intersections with a high percentage of turning movements by both bicyclists and motorists
- At intersections with no right turn on red (RTOR)
- At intersections with high bicycle crash rates
- On roads with bicycle lanes
- Can be combined with a bicycle signal (optional)
- Can be combined with a bicycle signal (optional)

Considerations:

- Bike boxes are not currently included in the MUTCD but there are provisions for jurisdictions to request permission to experiment with innovative treatments (and thus, with successful application, future inclusion of bike boxes in the MUTCD could occur).
- If a signal turns green as a cyclist is approaching an intersection, they should not use the bike box.
- Motorists will need to be educated to not encroach into the bike box.

**Considered to be innovative by the FHWA and NC-DOT; projects implementing this facility will require state and federal approval for permission to experiment with these types of treatments.*

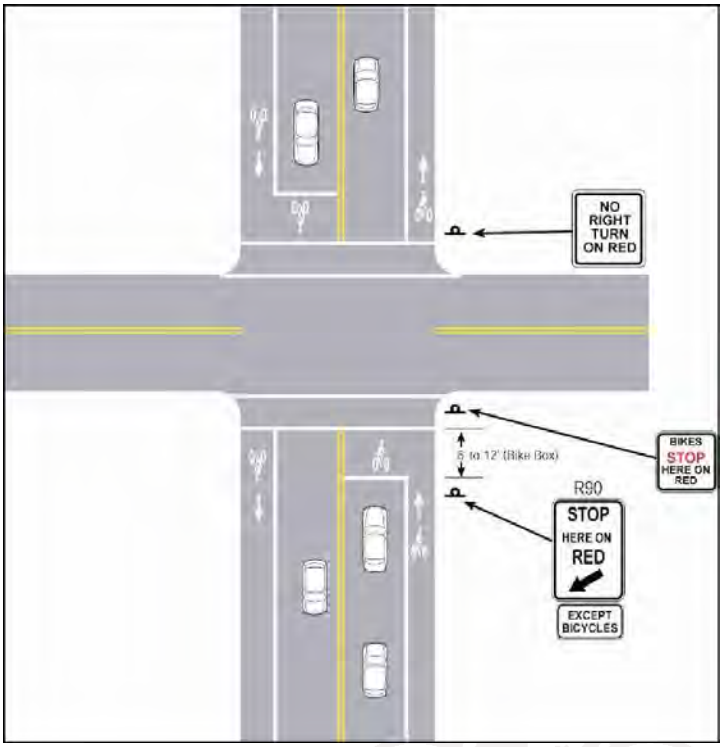


Fig. 7-38. Plan view of appropriate bicycle box configuration.

Fig. 7-37. Bicycle box being used in Portland, OR.

Bicycle Lane Development through Travel Lane Narrowing (Road Diet)

One means of developing bicycle lanes is through restriping or travel lane narrowing. In laying out the bicycle network facility recommendations and methods, it was determined that 10-foot travel lanes were acceptable in order to fit bicycle lanes into the existing roadway environment. For example, an existing five lane cross section with 12-foot lanes (Total roadway width of 60-feet) could be altered to 10-foot lanes with 5-foot bicycle lanes (Total roadway width of 60-feet). This methodology used in developing recommendations is supported by research in both automobile traffic safety and bicycle level of service improvements.

Current AASHTO literature, research, and precedent examples support the notion of reducing 12-foot travel lanes to 10-foot lanes. The 2004 AASHTO Green Book states that travel lanes between 10- and 12-feet are adequate for urban collectors and urban arterials.[1] "On interrupted-flow operating conditions at low speeds (45 mph or less), narrow lane widths are normally adequate and have some advantages." At the 2007 TRB Annual Meeting, a research paper using advanced statistical analysis, supported the AASHTO Green Book in providing flexibility for use of lane widths narrower than 12-feet on urban and suburban arterials. The paper indicates there is no difference in safety on streets with lanes ranging from 10-to 12-feet. "The research found no general indication that the use of lanes narrower than 12-feet on urban and suburban arterials increases crash frequencies. This finding suggests that geometric design policies should provide substantial flexibility for use of lane widths narrower than 12-feet." The research paper goes on to say "There are situations in which use of narrower lanes may provide benefits in traffic operations, pedestrian safety, and/or reduced interference with surrounding development, and may provide space for geometric features that enhance safety such as medians or turn lanes. The analysis results indicate narrow lanes can generally be used to obtain these benefits without compromising safety." and "Use of narrower lanes in appropriate locations can provide other benefits to users and the surrounding community including shorter pedestrian crossing distances and space for additional through lanes, auxiliary and turning lanes, bicycle lanes, buffer areas between travel lanes and sidewalks, and placement of roadside hardware."[2]

Precedent examples also show the large number of communities around the United States that have narrowed travel lanes to enable the development of bicycle lanes. The Missoula Institute for Sustainable Transportation accumulated a list of these communities by asking members of the Association of Pedestrian and Bicycle Professionals. The webpage titled "Accommodating Bike Lanes in Constrained Rights-of-Way (http://www.strans.org/travellanessurvey.htm) lists the community, their methods, and contact information. Cities such as Arlington, VA; Cincinnati, OH; Charlotte, NC; Houston, TX; and Portland, OR have regularly narrowed travel lanes to 10-feet or even commonly

1 American Association of State Highway and Transportation Officials, A Policy on Geometric Design of Highways and Streets, Washington, DC 2004.

2 Relationship of Lane Width to Safety for Urban and Suburban Arterials, Ingrid B. Potts, Harwood, D., Richard, K, TRB 2007 Annual Meeting

use them in new roadway development. Arlington, VA has been installing bicycle lanes on streets when they are repaved and have a number of streets with 10-foot lanes and bicycle lanes that have been functioning well without operational issues and complaints. Cincinnati, OH uses a policy that 10-foot lanes on collections and arterials are always permitted. New installations of 10-foot lanes with bicycle lanes require a speed limit of 35 mph or under. By restriping 12-foot lanes to 10-feet, the City of Houston, TX has converted 30 miles of arterial streets.

Lane narrowing and the addition of bicycle lanes will require further analysis beyond this planning effort. Changing the roadway design may also require a reduction in speed limit and consideration of traffic calming designs such as median islands. For roadways with higher speed limits and traffic volumes, wider bicycle lanes may be warranted. Further analysis of bicycle lane restriping projects is warranted to determine appropriateness of lane narrowing, bicycle lane widths, and speed limits that impact both motorists and bicyclists.

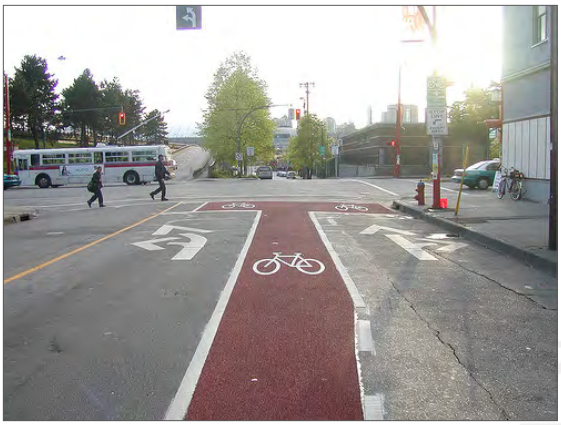


Fig. 7-39 — 7-40. Colored bike lanes in Vancouver, B.C. (left) and New York City (right).

*Colored Bike Lanes**

European countries as well as the City of Portland, OR, and Brooklyn, NY, have experimented with blue and green bike lanes and supportive signing with favorable results. Studies after implementation showed more motorists slowing or stopping at the blue lanes and more motorists using their turn signals near the colored lanes.

- Green is the recommended color (some cities that have used blue are changing to green, since blue is associated with handicapped facilities).
- Jurisdictions must obtain federal approval before experiementing with colored bicycle lanes.

**Considered to be innovative by the FHWA and NC-DOT; projects implementing this facility will require state and federal approval for permission to experiment with these types of treatments.*

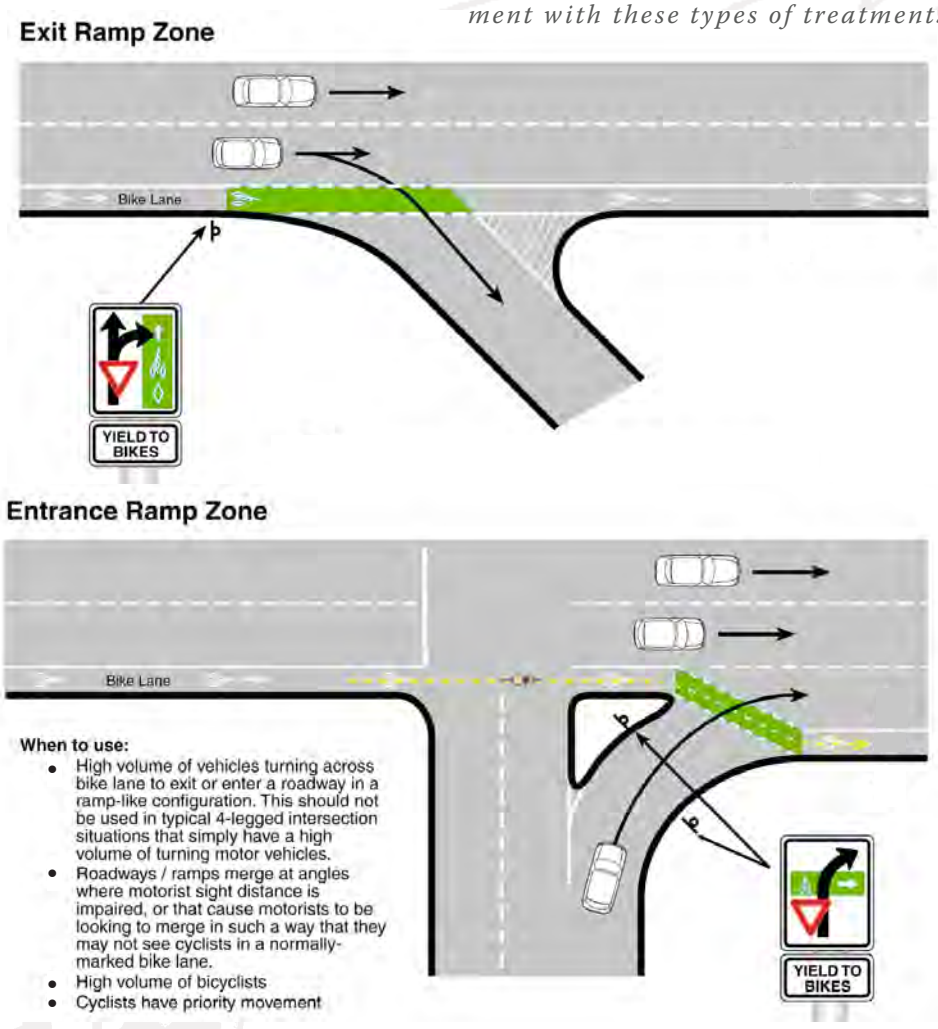


Fig. 7-41. Colored bicycle lane treatment through conflict area.

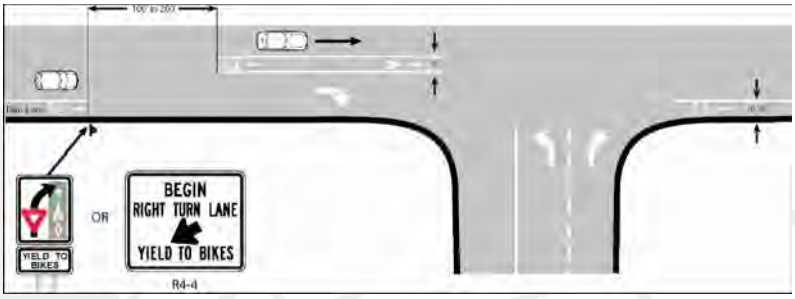


Fig. 7-42. Bicycle lane adjacent to a right turn only lane.

Typical Right Turn-Bicycle Lane Configurations

Common bicyclist/motorist collisions occur within the blind spot of the motorist. When turning right, motorists forget to yield to bicycles or do not see them approaching. (Note: the following diagrams are from Caltrans, thus there is a discrepancy with what is recommended in this Plan regarding bike lane widths. Use the diagrams for conceptual purposes only.)

- Bike Lane Through 'Right Turn Island' Intersections (Fig. 7-43)
- Shared Travel Lane Through 'Right Turn Island' Intersection (Fig. 7-43)
- Bicycle Lane Adjacent to a 'Right Turn Only' Lane (Fig. 7-42 & 7-45)
- Bicycle Lane through a freeway ramp (Fig. 7-44 & 7-46)

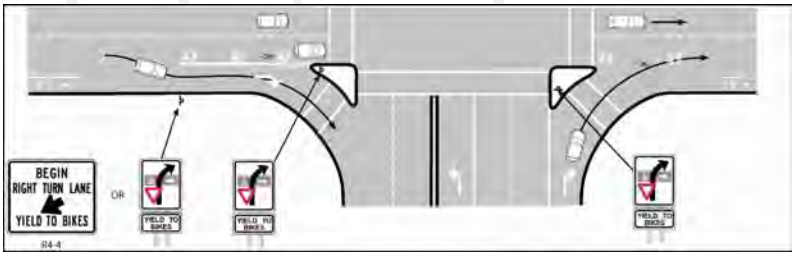


Fig. 7-43. Shared travel lane through right turn island intersection with exclusive right turn lanes.

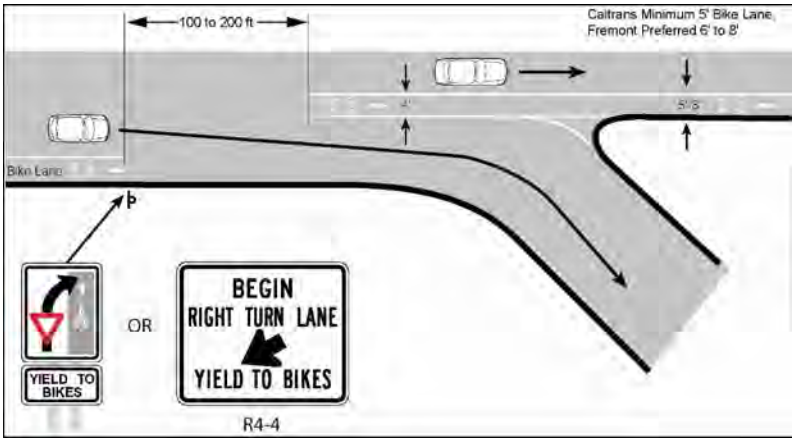


Fig. 7-44. Bicycle lane through a freeway ramp.

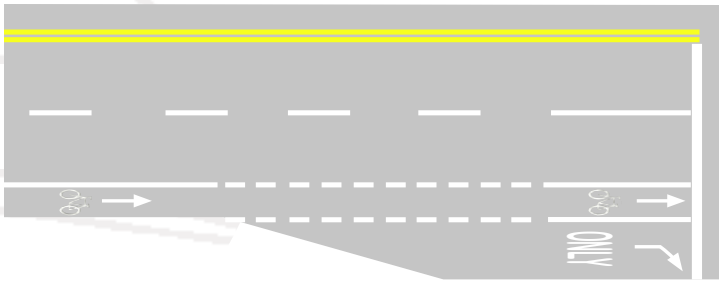


Fig. 7-45. Bicycle Lane Adjacent to a 'Right Turn Only' Lane

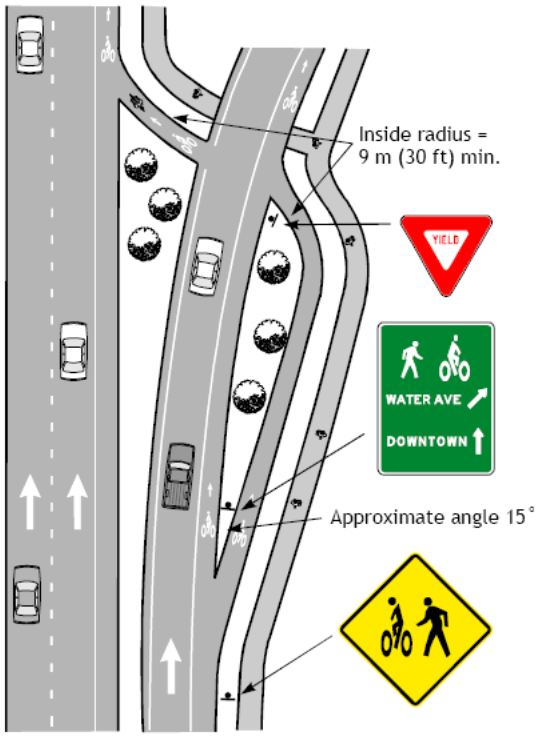


Fig. 7-46. Bicycle Lane Configuration at Exit Ramp (from the Oregon Bicycle and Pedestrian Plan)

Fig. 7-47 — 7-49. Some national examples of high-quality wayfinding include those in Centre City Philadelphia (far left), the City of Greenville, SC (center/left), and Grand Forks Greeway, ND (left).

7.5 Bicycle Signage

A comprehensive system of signage ensures that information is provided regarding the safe and appropriate use of all facilities, both on-road and on greenways. The bicycle network should be signed seamlessly with other alternative transportation routes, such as bicycle routes from neighboring jurisdictions, trails, historic and/or cultural walking tours, and wherever possible, local transit systems.

Signage includes post- or pole-mounted signs or kiosks. Signage is further divided into information signs, directional/wayfinding signs, regulatory signs and warning signs. Trail signage should conform to the (2009) *Manual on Uniform Traffic Control Devices* and the *American Association of State Highway Transportation Official Guide for the Development of Bicycle Facilities*. Bicycle signage should also be coordinated with the Town of Carrboro's current signage standards.

Directional Signage

Implementing a well-planned and attractive system of signing can greatly enhance bikeway facilities by signaling their presence and location to both motorists and existing or potential bicycle users. Effective directional signage can encourage more bicycling by leading people to town bike paths, or bike routes and by creating a safe and efficient transportation option for local residents and visitors.

The signage examples in Figure 7-50 show a number of different signs and markings, both on poles and on the roadway, that the City of Portland, OR has adopted for their new bicycle signage program. The signs have been approved by the Oregon DOT, and will be installed throughout Portland in the near future. Wayfinding signs such as these improve the clarity of travel direction while illustrating that destinations are only a short ride away. The signs shown are provided only as a point of reference for the purposes of these guidelines only.

Conventional bicycle route signage examples, shown in Figure 7-51, help bicyclists find the most comfortable route through town via bicycle. Roadways with bicycle route signage generally have less traffic, more negotiable terrain, and are safe to travel on by bike. Signed bike routes are usually available on local bicycle maps to help the bicyclist plan his or her route accordingly. Bicycle route signage should be repeated at regular intervals so that bicyclists entering from side streets will have an opportunity to realize the presence of the route.

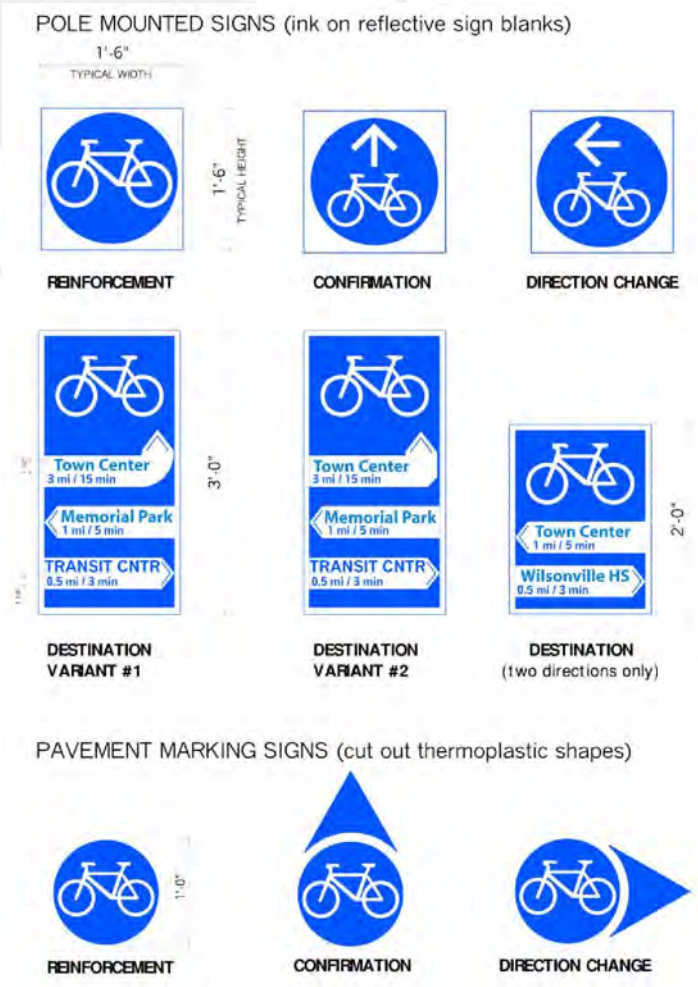


Fig. 7-50. Innovative On-Road Facilities Signage used in Portland, OR which could be used experimentally in Carrboro.

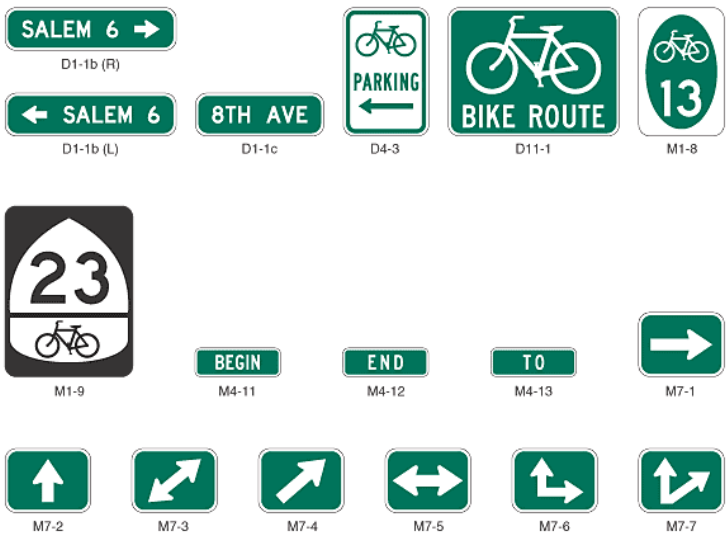


Fig. 7-51. Bicycle Route Guide signs which are approved by NCDOT.

Fig. 7-52. Existing bicycle regulatory signage as well as traffic calming signage in Carrboro.

Regulatory/Warning Signage

Regulatory and warning bicycle signage should conform to the Manual on Uniform Traffic Control Devices (MUTCD). The examples shown in Figure 7-53 are regulatory signs for bicycle (their labels are sign reference numbers for the MUTCD).

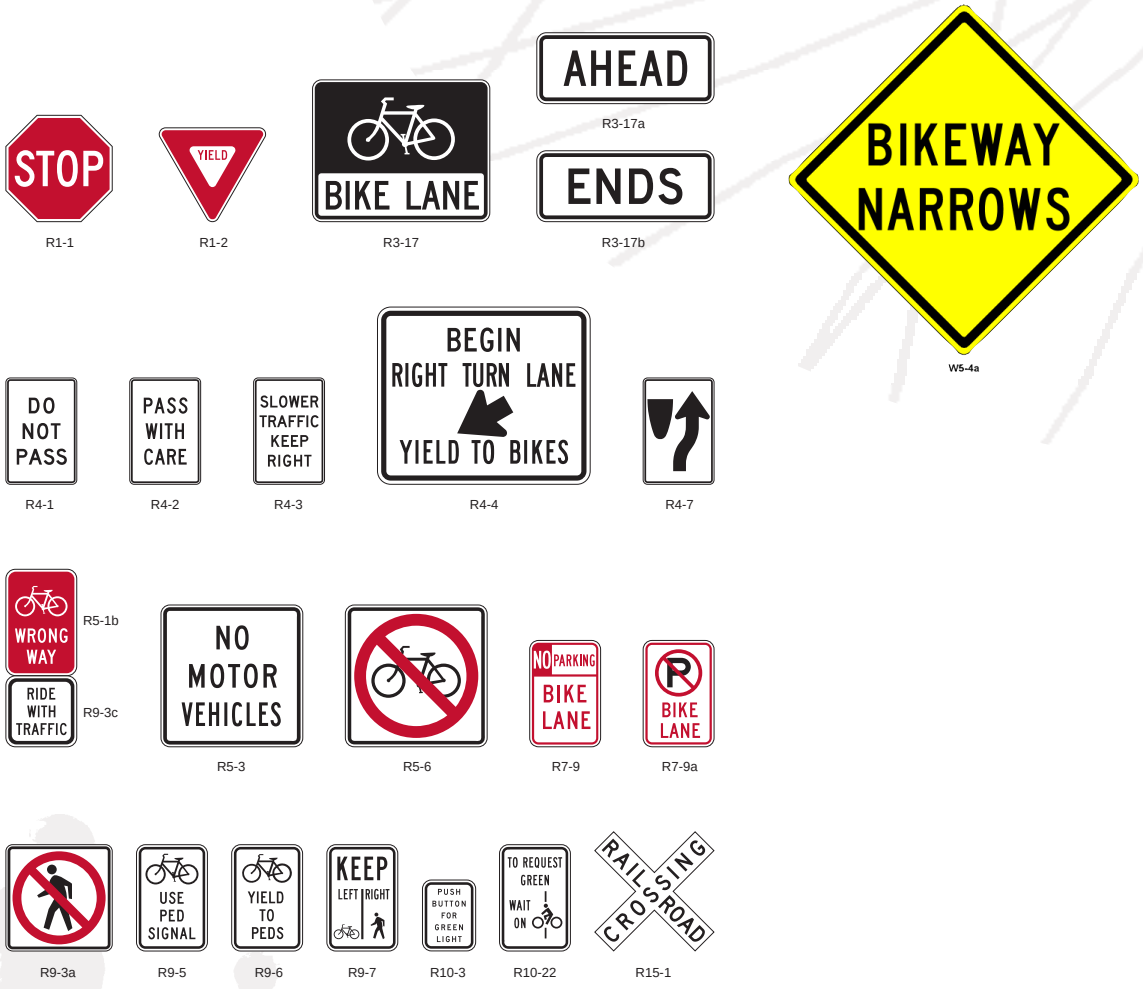


Fig. 7-53. Bicycle signage options from the MUTCD.

Fig. 7-54. Share the Road signs remind motorists that bicyclists have the right to ride on the roadway.

Fig. 7-55. The "Bikes Allowed Use of Full Lane" sign is currently used on an experimental basis in cities such as San Francisco, CA.

Special Purpose Signage

The "Share the Road" sign Fig. 7-54, is designed to advise motorists that bicyclists are allowed to share and have the right to cycle on narrow roadways with motor vehicles. For more on the "Share the Road Initiative" go to: http://ncdot.org/transit/bicycle/safety/programs_initiatives/share.html

Innovative signage is often developed to increase bicycle awareness and improve visibility (such as "Bikes Allowed Use of Full Lane", (Fig. 7-55). Special purpose signs to be installed on public roadways in North Carolina must be approved by NCDOT's Traffic Control Devices Committee and/or the Town of Carrboro. New designs can be utilized on an experimental basis with NCDOT approval.

Where bicycle facilities terminate or the roadway narrows and cannot accomodate bicycle facilities, signage should be used in Carrboro to remind motorists and bicyclists to resume sharing a travel lane. This type of sign is currently being used in the Town of Chapel Hill (Fig. 7-56).

Fig. 7-56. Where bicycle facilties end, as seen on MLK Blvd. in Chapel Hill, the above signage could be used to remind bicyclists and motorists to resume sharing the travel lane.

Fig. 7-57. Bicycle parking wayfinding signage will inform the bicyclist about where facilities exist.

Fig. 7-58. An example of a covered bicycle parking facility.

7.6 Ancillary Features

Bicycle Parking

As more bikeways are constructed and bicycle usage grows, the need for bike parking will climb. Long-term bicycle parking at bus stops and work sites, as well as short-term parking at shopping centers and similar sites, can support bicycling. In addition to providing the venue for parking, bicycle parking wayfinding signage will help provide direction to the facilities. Bicyclists have a significant need for secure long-term parking because bicycles parked for longer periods are more exposed to weather and theft, although adequate long-term parking rarely meets demand.

When choosing bike racks, there are a number of things to keep in mind:

- The rack element (part of the rack that supports the bike) should keep the bike upright by supporting the frame in two places allowing one or both wheels to be secured.
- Install racks so there is enough room between adjacent parked bicycles. If it becomes too difficult for a bicyclist to easily lock their bicycle, they may park it elsewhere and the bicycle capacity is lowered. A row of inverted "U"racks should be installed with 15 inches minimum between racks.
- The inverted "U" shaped bicycle racks are preferential for short term parking due to their efficient use of space, ease of use and security, while bicycle lockers provide a safe and secure option for long term bicycle parking (Figure 7-61).
- Empty racks should not pose a tripping hazard for visually impaired pedestrians. Position racks out of the walkway's clear zone.
- When possible, racks should be in a covered area protected from the elements. Long-term parking should always be protected (Figure 7-58).
- For safety and visibility, provide lighting in bicycle parking areas through overhead or bollard lighting fixtures.

For more information on bicycle parking facilities please visit:

http://www.apbp.org/pdfsanddocs/Resources/Bicycle%20Parking%20Guidelines.pdf

http://www.ibike.org/engineering/parking.htm

Fig. 7-59. Bicycle parking in downtown Carrboro.

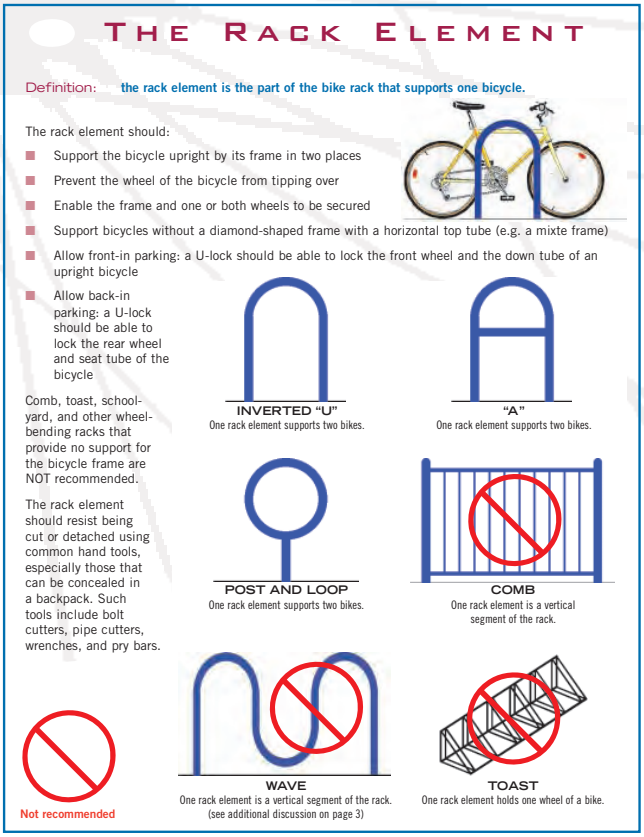


Fig. 7-60. Recommended bicycle parking facilities, Source: APBP. (www.apbp.org)

Bicycle Storage

Bicycle lockers are a crucial component of the bicycle system. They offer safe and secure storage at transit centers and destinations. Parking rates are reasonable at about 3-5 cents per hour. Bicycle lockers are designed to be secure and flexible so that the individual bikes with panniers, computers, lights, etc. can be left on the bike. Some designs of bike lockers can be stacked so there is twice the parking density. Good protection from the weather is another benefit. Bike lockers tend to be used most for long term bicycle commuter parking in area without a lot of continuous oversight. Carrboro's future mixed-use developments (which may include residential use) would benefit from these types of storage facilities.

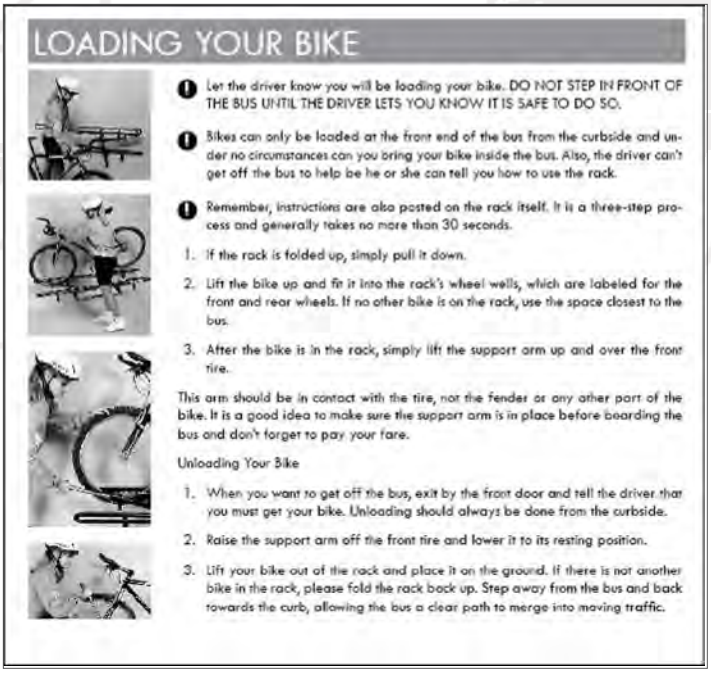
Fig. 7-61. Bicycle locker facility and pay stations offer long-term parking.

Fig. 7-62. Chapel Hill Transit, serving parts of Carrboro, provides racks on the front of their buses.

Fig. 7-63. Examples of integrating bicycle facilities with transit modes.

Bicycle Facilities on Buses

Integrating bicycle facilities with transit modes allows bicyclists to greatly expand their range of travel or "trip chain". Integration of facilities with transit modes allows cyclists to use their bicycles on one or both ends of their daily commute, allowing greater flexibility. Figure 7-63 shows examples of commuter bus services with customized facilities allowing for simple and secure storage of bicycles without hindering or impeding other passengers. Chapel Hill Transit buses, serving parts of Carrboro, provide racks on the front and should maintain or expand this service to bicyclists.



LOADING YOUR BIKE

- Let the driver know you will be loading your bike. DO NOT STEP IN FRONT OF THE BUS UNTIL THE DRIVER LETS YOU KNOW IT IS SAFE TO DO SO.
- Bikes can only be loaded at the front end of the bus from the curbside and under no circumstances can you bring your bike inside the bus. Also, the driver can't get off the bus to help be he or she can tell you how to use the rack.
- Remember, instructions are also posted on the rack itself. It is a three-step process and generally takes no more than 30 seconds.

1. If the rack is folded up, simply pull it down.
2. Lift the bike up and fit it into the rack's wheel wells, which are labeled for the front and rear wheels. If no other bike is on the rack, use the space closest to the bus.
3. After the bike is in the rack, simply lift the support arm up and over the front tire.

This arm should be in contact with the tire, not the fender or any other part of the bike. It is a good idea to make sure the support arm is in place before boarding the bus and don't forget to pay your fare.

Unloading Your Bike

1. When you want to get off the bus, exit by the front door and tell the driver that you must get your bike. Unloading should always be done from the curbside.
2. Raise the support arm off the front tire and lower it to its resting position.
3. Lift your bike out of the rack and place it on the ground. If there is not another bike in the rack, please fold the rack back up. Step away from the bus and back towards the curb, allowing the bus a clear path to merge into moving traffic.

Fig. 7-65. Instructions on how to load a bicycle onto a bus equipped with a bicycle rack, developed for a bicycle user map by Fremont, CA.

Affordable and Accessible Bicycle Maintenance

This bicycle repair stand shown in Figure 7-64 is a fixture within the Cambridge, UK, town marketplace. The Carrboro equivalent would be at the farmers' market which is a center for activity, easily accessible by foot or bicycle. Local bike shops in Carrboro could provide similar services. The presence of smaller-scale operations that primarily provide maintenance and repair functions within semi-permanent structures like the tent and tarp shown below allowing for a lower cost operation, thereby passing on savings to the customer in terms of lower repair and maintenance costs.

Fig 7-64. A bicycle maintenance stands in the UK.

Fig. 7-66. Bicycle-friendly drainage grate.

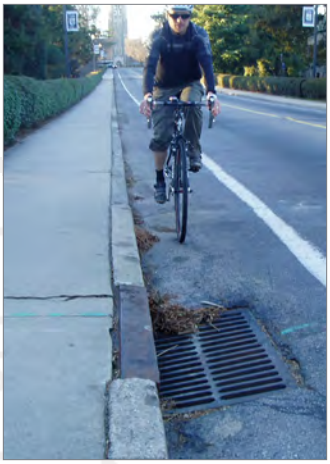


Fig. 7-67. Dangerous drainage grate condition; this example is dangerous due to the surrounding paving condition (when the road was resurfaced the drainage grate remained at the same height).

Bicycle-Friendly Drainage Grates

Drainage grates usually occupy portions of roadways, such as bicycle lanes, where bicycles frequently travel. Often drainage grates are poorly maintained or are of a design that can damage a bicycle wheel or in severe circumstances, cause a bicyclist to crash. Improper drainage grates create an unfriendly obstacle a cyclist must navigate around, often forcing entrance into a motor vehicle lane in severe cases. Bicycle-friendly drainage grates should be installed in all new roadway projects and problem grates should be identified and replaced.

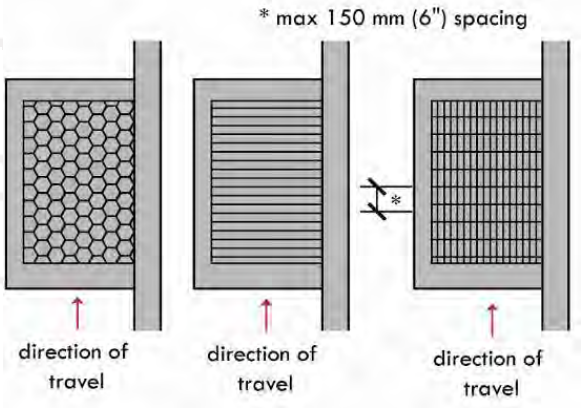


Fig. 7-69. Bicycle Friendly Drainage Grate Designs.

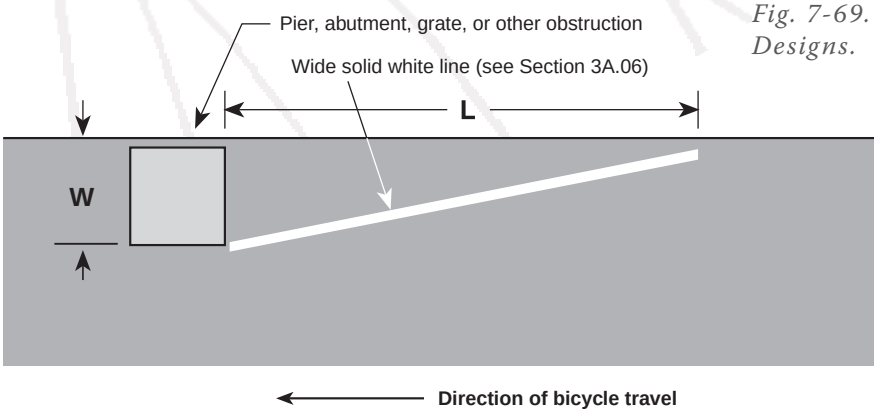


Fig. 7-68. MUTCD example of obstruction pavement marking; if dangerous drainage grates (or other obstructions) are not to be fixed in the short term, then this pavement marking should direct cyclists away from the obstruction.

Fig. 7-70. Bicycle-friendly drainage grate in Carrboro.

Bicycle Facilities at Rail Road Crossing

Railroad crossings are particularly hazard to those who rely on wheeled devices for m ity (railroad crossings have flangeway gaps that passage of the wheels o , but also have the potential to catch hee ir casters and bicycle tires). In addition l r ties that are not embedded in the travel fac reate a tripping hazard. Recommendation

- Make the Crossing Level: Raise approaches to the tracks and the area between the tracks to the level of the top of the rail.

Fig. 7-71. Installing a rubber surface rather than asphalt around railroad flangeways reduces changes in level and other maintenance problems.

- Bikes Should Cross RR at Right Angle

- When bikeways or roadways cross railroad tracks at grade, the roadway should ideally be at a right angle to the rails. When the angle of the roadway to the rails is increasingly severe, the approach recommended by Caltrans (Highway Design Manual, Section 1003.6) and AASHTO (Guide for the Development of Bicycle Facilities, 1999, p.60) is to widen the approach roadway shoulder or bicycle facility, allowing bicycles to cross the tracks at a right angle without veering into the path of passing motor vehicle traffic.

- Use Multiple Forms of Warning: Provide railroad crossing information in multiple formats, including signs, flashing lights, and audible sounds.

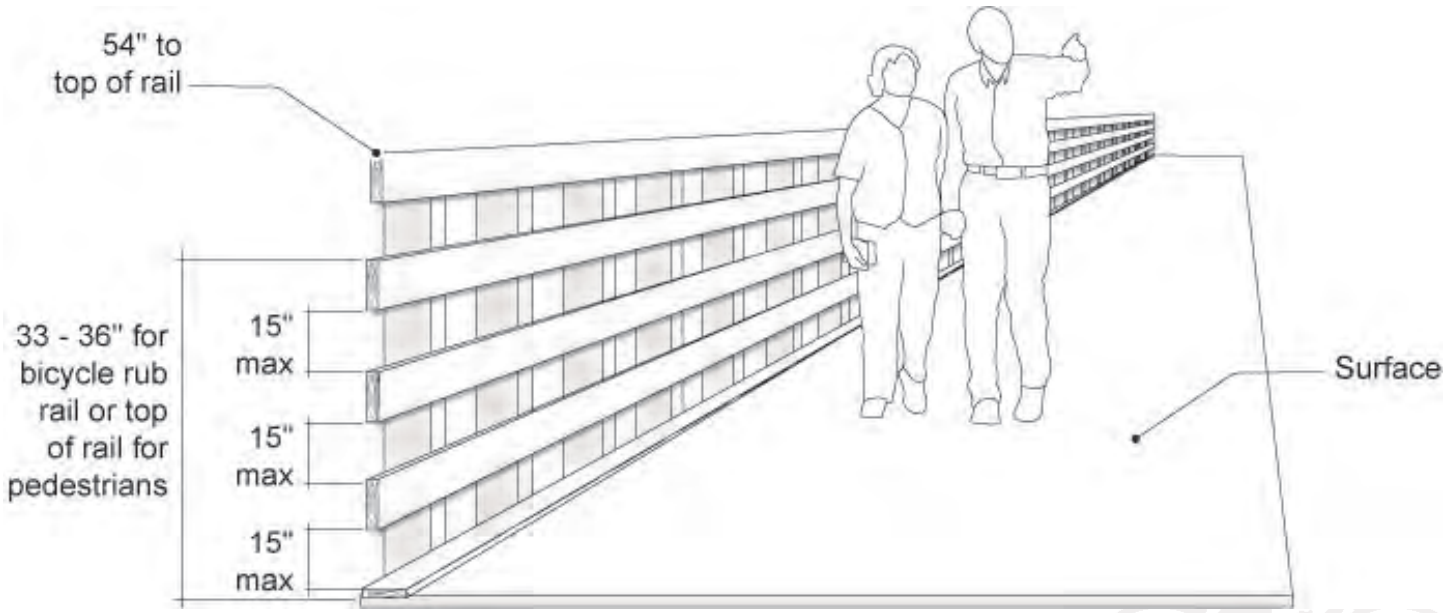
- Clear Debris Regularly: Perform regular maintenance to clear debris from shoulder areas at railroad crossings.

- Fill Flangeway with Rubberized Material or Concrete Slab: Normal use of rail facilities causes buckling of paved-and-timbered rail crossings. Pavement buckling can be reduced or eliminated by filling the flangeway with rubberized material, concrete slab, or other treatments. A beneficial effect of this is a decrease in long-term maintenance costs.

Railings

Railings are important features on bridges, some boardwalks, or in areas where there may be a hazardous drop-off.

- At a minimum, railings should consist of a vertical top, bottom, and middle rail. Picket-style fencing should be avoided as it presents a safety hazard for bicyclists
- A pedestrian railing should be 42-inches above the surface.
- A bicyclist railing should be 54-inches above the surface.
- The middle railing functions as a "rub rail" for bicyclists and should be located 33-and 36-inches above the surface.
- Local, state, and/or federal regulations and building codes should be consulted to determine when it is appropriate to install a railing.



Bicycle Facility Maintenance

The regular maintenance of on-road bicycle facilities and off road bike trails is critical to their overall functionality and safety for users. A cyclist who must swerve in order to miss a pothole or debris risks getting hit by passing automobiles. Several comments were received from the public regarding the maintenance of facilities during the planning process.

Below is a collection of comments received regarding bicycle-related maintenance issues in Carrboro. For more public input comments, see Appendix B: Public Input.

- "Sweep the bike lanes and shoulders more frequently, especially on Homestead Rd.; gravel and debris get pushed into the paved shoulder."

- "Improve potholes and road surface conditions on sides of road, especially near Carr Mill Mall and on Main St. near the BP station."

- "Railroad crossing at Main St. has deep ruts next to tracks."

- "Manholes, grates, and other utilities need a smoother surface transition within the bicycle facility."

Fig. 7-72 — 7-73. Repaving and restriping so that bike lanes are smooth and visible will make facilities more comfortable for bicyclists as indicated in the top photo; manholes and drainage grates should be properly located within the bikeway to avoid swerving bicyclists, bicycle accidents, or negligence of the facilities.

Fig. 7-74. This example of a well designed utility condition in the roadway (taken in Carrboro), provides a curb cut for the manhole cover so that it does not interfere with the bicycle right-of-way.

Bicycle Facility Maintenance (continued)

Bicycle facilities provided within the roadway right-of-way should be maintained by either NCDOT or the Town of Carrboro Public Works Department. A Carrboro staff member should be designated as the main contact for the maintenance of bicycle facilities in the roadway right-of-way. This staff member should coordinate with the appropriate departments to set up a free maintenance hotline and conduct maintenance activities in the field. Funding for an ongoing maintenance program should be included in the Town's operating budget.

Note that the schedule shown on Table 7-1 is intended to provide general guidance for routine and remedial maintenance activities. The frequency of bicycle facility maintenance within the roadway right-of-way will vary. Maintenance needs will depend upon many factors, including pavement surface type, the use of paint or thermoplastic for markings, and traffic volumes. The Town of Carrboro Public Works Department and NCDOT should make immediate repairs to any on-road bicycle facilities that are damaged or have hazardous conditions.

Maintenance of Bicycle Facilities within the Roadway Rights-of-Way

Task	Frequency	Comments
Regular inspection	2 times per year	Includes all on-road bikeways, identify needed repairs of pavement signs, markings, etc
Shoulder and bike lane sweeping	2 times per year	All roadways with bicycle facilities
Shoulder and bike lane repairs	As needed	Repair of road surface, including potholes, cracks, or other problems on bicycle facilities
Median island and curb extension repairs	As needed	Repair of curb and gutters, removal of debris
Shoulder and bike lane resurfacing	During regular roadway repaving	Ensure that pavement width is maintained or increased during repaving projects
Debris removal from shoulders	As needed	Remove debris from roadway shoulders and bike lanes such as limbs, silt, and broken glass
Signs and markings	As needed	Repair or replace pedestrian and bicycle warning signs, bicycle route signs, crosswalk markings, bicycle lane markings, and any other similar facilities identified during inspections
Vegetation control	During regular roadway maintenance	Mow grass and trim limbs and shrubs 2 feet back from sidewalk edge
Litter removal	6 times per year	Could be done with volunteers

Table 7-1. Bicycle facility maintenance chart presents tasks and necessary frequency of tasks.

Appendix Outline:

APPENDIX A: PRIORITIZATION AND COST ESTIMATES

A.0 Overview

The prioritization process began by making a list of all the roadways in the study area for which bicycle recommendations were made. The roadways were then broken down into segments at logical points, such as major intersections. Most segments are under a mile long.

The total list of segments consists of 44 recommended improvements for bicycle facilities. Long term solutions and interim treatments for the top 10 priority bicycle corridors are detailed in Chapter 3: Bicycle Network Plan. The criteria used to rank each segment is custom designed for Carrboro, based on public input, Steering Committee input, and data collected pertaining to Carrboro's existing conditions. Furthermore, the criteria were weighted according to standards used throughout North Carolina, and modified to reflect input from Carrboro's online public survey results.

A.1 Prioritization Tables

The following chart contains the prioritization table for bicycle segments. While these rankings represent where there is need, bicycle facilities should be built when opportunity arises, regardless of their ranking here.

PRIORITIZATION TABLE

	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
11	**Main St**	Rosemary	Greensboro
12	**Poplar**	N Greensboro	Main
13	**N. Greensboro**	Hillsborough	Estes
14	**Main St**	Greensboro	Jones Ferry
15	**Weaver**	E Main	W Main
16	**Jones Ferry**	Main	Davie
17	**Main St**	Jones Ferry	Hillsborough
18	**Jones Ferry**	NC 54	Old Fayeteville
19	**Old Fayetteville**	NC 54	Jones Ferry
20	**NC 54**	Jones Ferry	Old Fayetteville
21	**NC 54**	Smith Level	Jones Ferry
22	**Old 86**	Eubanks	Homestead
23	**Elm**	Weaver	Shelton
24	**Jones Ferry**	Davie	NC 54
25	**Stratford**	Homestead	Hillsborough
26	**Main St**	Hillsborough	NC 54
27	**Hillsborough**	Old Fayetteville	N Greensboro
28	**James**	Hillsborough	Main
29	**Jones Ferry**	Old Fayetteville	Old Greensboro
30	**Hillsborough**	N Greensboro	Main
31	**Quail Roost**	Hillsborough	Lisa
32	**Davie**	Main	Jones Ferry
33	**Homestead**	Rogers	High School
34	**Seawell School**	Homestead	Estes
35	**Rogers**	Eubanks	Homestead
36	**NC 54**	Old Fayetteville	Town Limits
37	**Main St**	Merritt Mill	Rosemary
38	**Homestead**	Lake Hogan Farm	Old 86
39	**Lake Hogan Farm**	Homestead	Hogan Hills
40	**Pine**	Greensboro	Hillsborough
41	**Hogan Hills**	Old 86	Lake Hogan Farm
42	**Smith Level**	Damascus Church	15-501
43	**Eubanks**	Town Limits	Old 86
44	**Old 86**	Town Limits	Eubanks

Table A-1. This list represents the majority of the recommended network of bicycle facilities in Carrboro. Shorter, residential segments are left out of this list.

Top 1-5 Public Requested	Top 6-10 Public Requested	Direct Access to/from a School	Direct Access to/from an Existing Greenway	Connections to Downtown or Central Business Zoning	Direct Access to/from an existing (or funded) bicycle facility	Direct Access to/from higher density residential areas	Top 11-20 Public Requested	Elementary & Middle School Proximity	High School Proximity	Parks/Rec/Playground Proximity	Regional connection and/or highway crossing	Integrates with bus route network	Direct access to/from future development	Direct Access to/from a proposed greenway	Direct Access to commercially zoned areas	Direct Access to mixed use areas	Route with a Reported Accident	Totals
5	4	4	4	4	4	4	3	3	3	3	3	3	3	3	3	2	1	59
5	0	4	0	0	4	4	0	3	0	3	3	3	0	3	3	0	1	36
5	0	0	4	0	4	4	0	3	0	3	0	3	0	3	0	0	1	30
0	4	4	4	0	4	0	0	3	0	3	0	3	0	3	0	2	0	30
5	0	0	0	4	0	4	0	3	0	3	3	3	0	0	3	0	1	29
0	0	4	4	0	4	0	3	0	0	3	3	3	0	0	3	0	1	28
0	0	4	0	0	4	0	3	0	3	3	0	3	0	3	3	0	1	27
5	0	0	0	0	4	0	0	3	0	3	0	3	3	3	3	0	0	27
0	0	4	4	4	4	4	0	0	0	3	0	3	0	0	0	0	1	27
0	0	0	4	4	4	4	0	3	0	3	0	3	0	0	0	0	1	26
0	4	0	0	4	4	4	0	3	0	3	0	3	0	0	0	0	1	26
5	0	0	0	4	4	0	0	0	0	3	0	3	3	0	3	0	1	26
0	0	0	0	4	4	4	0	4	0	3	0	3	0	0	3	0	1	26
0	0	0	4	0	4	4	0	3	0	3	0	3	3	0	0	0	1	25
0	0	0	4	4	4	0	3	0	0	3	0	3	0	0	3	0	1	25
0	4	0	0	4	4	0	0	3	0	3	0	3	0	0	3	0	1	25
0	0	0	4	0	4	4	3	0	0	3	0	3	0	0	3	0	1	25
0	0	0	4	0	4	0	3	3	0	3	0	3	0	0	3	0	1	24
0	0	0	0	0	4	4	0	0	0	3	3	3	0	3	3	0	1	24
0	0	0	0	0	4	4	0	0	0	3	3	3	0	3	3	0	1	24
0	0	0	0	0	4	4	0	0	0	3	3	3	0	3	3	0	1	24
0	0	0	0	0	0	4	0	3	0	3	3	3	0	3	3	0	1	23
0	0	0	0	0	4	0	3	3	0	3	0	0	3	3	3	0	0	22
0	0	4	4	0	4	0	0	0	0	3	0	3	0	0	3	0	1	22
0	0	0	0	0	4	4	3	0	0	0	3	3	0	0	3	0	1	21
0	0	0	4	0	4	4	0	3	0	3	0	3	0	0	0	0	0	21
0	0	0	0	0	4	0	0	3	0	3	3	3	0	0	3	0	1	20
0	0	0	0	0	4	0	0	3	0	3	0	3	3	3	0	0	1	20
0	0	0	0	0	4	0	0	3	0	3	3	3	0	0	3	0	1	20
0	0	0	0	0	4	4	0	0	0	3	0	3	0	3	0	0	1	18
0	0	4	0	0	4	0	0	0	0	3	0	3	0	0	3	0	1	18
0	0	4	4	0	4	0	0	0	0	3	0	3	0	0	0	0	0	18
0	0	0	0	0	4	4	0	0	0	3	0	3	0	0	3	0	1	18
0	0	4	0	0	4	0	3	0	0	3	0	3	0	0	0	0	0	17
0	0	4	0	0	4	0	0	0	0	3	0	3	0	3	0	0	0	17
0	0	0	0	0	4	0	0	0	3	3	0	3	0	0	3	0	0	16
0	0	0	0	0	0	0	0	0	0	3	3	3	0	3	3	0	0	15
0	0	0	0	4	0	0	0	3	0	0	0	3	0	0	3	0	1	14
0	4	0	0	0	4	0	0	0	0	3	0	0	0	0	3	0	0	14
0	0	0	4	0	4	0	0	0	0	3	0	0	0	3	0	0	0	14
0	0	0	0	0	4	0	0	3	0	3	0	3	0	0	0	0	0	13
0	0	0	0	0	4	0	0	0	0	3	0	0	0	3	0	0	0	10
0	0	0	0	0	0	0	3	0	0	0	3	0	0	0	3	0	0	9
0	0	4	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	7
0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3

* "Points of Interest" include Shopping Centers, Employment Centers, Recreation Centers, Downtown, Base Entrances, etc.

** "Higher-Demand" determined by overlay of Low Income Areas and Low Car Ownership Areas, according to the U S Census Bureau

*** "Bus route Network" includes corridors with main bus routes

Bicycle Cost Estimating Template (For Planning Purposes Only)[1,2,3]			
Item	**Description**	**Unit**	**Unit Cost**
On-Road Bicycle Facilities			
1.0	Install bicycle route signs	Per sign	$250
1.01	Install bicycle lanes (on existing pavement or during repaving)	Linear foot per single line	Paint: $0.20 Thermo: $0.60
1.02	Restripe roadway for wide outside lanes	Linear foot per single line	Paint: $0.20 Thermo: $0.60
1.03	Remove existing 4" paint or road stripe marking	Linear foot per single line	
1.04	Install shared lane markings (on existing pavement or during repaving)	EA	Paint: $40 Thermo: $65
1.05	Construct wide outside lanes (additional lane pavement added during roadway construction)	Linear mile	$300,000
1.06	Construct four-foot paved shoulder (additional lane pavement added during roadway construction)	Linear mile	$600,000
1.07	Construct four-foot bicycle lanes (additional lane pavement added during roadway construction)	Linear mile	$600,000
1.08	Bicycle Route Signage (Standard vs. High Visibility)	EA	Standard: $150 High-Visibility: $200
Bicycle Parking and Bus Facilities			
1.09	Bike Rack	One rack	$150-$300
1.10	Bus rack on bus (purchase and install)	One rack	$570
Shared-Use Pedestrian and Bicycle Facilities			
1.11	Construct 10-foot shared-use path	Linear foot Linear mile	$133 $700,000
1.12	Construct 10-foot crushed stone walkway	Linear foot Linear mile	$15-$25 $80,000-$106,000
1.13	Construct 6- to 8-foot wooden or recycled synthetic material boardwalk	Linear foot Linear mile	$200-$250 $1,000,000-$1,300,000

1 All items listed include installation costs.
2 All items reflect 2008 pricing.
3 Cost for paths includes clearing, grubbing and grading. Geotextile cost or other major costs, including utility relocation, are not included in multi-use path or sidepath estimates. Multi-use paths and sidepaths are asphalt, with 2" asphalt and 6" aggregate base course.

Bicycle Cost Estimating Template (For Planning Purposes Only)[1,2,3]			
Item	**Description**	**Unit**	**Unit Cost**
Intersection Treatment Facilities			
1.15	Crosswalk Striping (Standard and High Visibility	Linear foot	Standard: Thermo =$2.40 Paint = $1.60 High Visibility: Thermo = $4.80 Paint = $1.60
1.16	Bicycle Loop Detector	EA	$1,500
1.17	HAWK signal/bike signal	EA	$40,000
1.18	Bicycle Box (colored pavement)	Square Foot	$9

1 All items listed include installation costs.
2 All items reflect 2008 pricing.
3 Cost for paths includes clearing, grubbing and grading. Geotextile cost or other major costs, including utility relocation, are not included in multi-use path or sidepath estimates. Multi-use paths and sidepaths are asphalt, with 2" asphalt and 6" aggregate base course.

Sources:
Guidelines for Analysis of Investments in Bicycle Facilities By Kevin J. Krizek, United States Federal Highway Administration, National Research Council (U.S.). Transportation Research Board, National

The Albemarle Pedestrian Plan

NCDOT Bicycle and Pedestrian Division

Fig. B-1. Carrboro citizens discuss bicycle network gaps at the first public meeting.

Appendix Outline:

APPENDIX B: PUBLIC INPUT

B.0 Overview

Significant public input was gathered from multiple efforts throughout the planning process, which helped shape the outcome of a majority of the recommendations in this Plan. Public input was solicited via two official public workshops, paper opinion forms, and an online interactive version of the opinion form. A project website and two newsletters were developed by the Consultant to keep Carrboro residents updated on the planning process. A Steering Committee, composed of Carrboro employees and residents, was created to guide and foster the development of this Plan. The variety and depth of public input sought to ensure that a range of citizens from all areas of Carrboro were expressed and represented.

B.1 Project Website

A project website was developed and updated throughout the planning process providing information and updates to the Steering Committee and public. The project website link was distributed whenever possible to listserves and people who attended the public workshops. Important dates for Committee meetings and public meetings were provided on the website. Other items included committee meeting minutes, a link to the online comment form, and the project newsletters.

B.2 Public Workshops

Two public workshops and a third, informational input session were conducted during the planning process, each drawing significant comment, suggestion, support and awareness for the project. Newsletters were created and distributed at each Public Workshop, to keep the public abreast of the planning process. Copies of these newsletters can be found later in this appendix.

The initial public workshop was held in April 2008 and introduced the project to the public. A series of poster boards outlined the planning process, project timeline, and announced opportunities for public input. Additionally, base maps of the Carrboro area were provided to gather input on desired bicycling routes, problem areas, areas of opportunity and existing bicycle facility identification. Approximately 65 people attended the workshop and provided input. Many citizens expressed interest in forming a Bicycle Advocacy Group following the completion of the Plan.

Although not a formal wokshop, an informational table was set up at Weaver Street Market, a busy, well-traversed market area in central Carrboro to help with public outreach for the Plan. Project information, base maps, and comment forms were available to the public to provide comments. A shortened comment form was developed with the most pertinent questions to allow for easier completion by the public.

The second public workshop was held in July 2008. Preliminary network maps were presented at Town Hall and people were solicited for comments. Approximately 50 people provided input through map markups, direct conversation with client and consultant, and the shortened comment forms.

B.3 Public Opinion Form

An online comment form was created for the Carrboro Bicycle Transportation Plan. The consultant worked with the Town of Carrboro and the Steering Committee to prepare questions and tabulate the results of this survey that received 396 online and paper responses. The online survey link was available on the project website, newsletters, distributed to numerous local email listserves, and publicized at each of the public workshops. The survey contained 32 questions related to bicycling and demographics. A shortened form was developed for the final public workshop to expedite the answer time for the respondents.

A variety of respondents completed the survey including a wide range of age groups and user groups. In general, most respondents were bicyclists who supported the concept of a more bikeable community. People wanted to bike to a number of locations including greenways/trails, parks, and shopping. The leading factor that discouraged respondents from biking were gaps in bicycle facilities, heavy traffic, and narrow roads.

Fig. B-2, B-3. A citizen discusses how to improve facilities in Carrboro for her daughter (left), the second public workshop attendees look over proposed bicycle network maps (right).

B.3 Public Opinion Form Results

(see pages B-3 through B-17 for raw data)

Carrboro Comprehensive Bicycle Transportation Plan

1. How important to you is improving bicycling conditions in the Carrboro community? (select one)

	Response Percent	Response Count
Very important	**87.6%**	312
Somewhat important	11.2%	40
Not important	1.1%	4
answered question		**356**
skipped question		**40**

2. How do you rate present bicycling conditions in the Carrboro area? (select one)

	Response Percent	Response Count
Excellent	13.8%	49
Fair	**75.7%**	268
Poor	10.5%	37
answered question		**354**
skipped question		**42**

Fig. B-4, B-5. A group discusses areas of improvement on the overall maps (right); residents read educational posters on display at the second public workshop (far right).

3. What bicycling destinations would you most like to get to? (choose three)

	Response Percent	Response Count
University	57.6%	227
Elementary, Middle, or High Schools	27.2%	107
Grocery stores	57.9%	228
Places of work	44.2%	174
Restaurants	40.9%	161
Public Transportation	22.8%	90
Other Shopping (retail stores)	31.0%	122
Parks	37.6%	148
Entertainment	25.4%	100
Trails and greenways	**58.4%**	230
I DON'T BICYCLE.	1.0%	4
Other specific location (please specify)	15.0%	59
	answered question	**394**
	skipped question	**2**

For questions 4, 5, and 6 see pages 17, 18 and 19 of this chapter.

7. How long have you been bicycle riding?

	Response Percent	Response Count
Do not bicycle	2.7%	8
1-2 years	6.0%	18
2-5 years	8.3%	25
5-10 years	14.0%	42
10-20 years	20.3%	61
20+ years	**48.8%**	147
	answered question	**301**
	skipped question	**95**

8. How frequently do you bicycle? (select one)

	Response Percent	Response Count
never	6.5%	22
few times per month	25.2%	86
few times per week	31.1%	106
5+ times per week	**37.2%**	127
	answered question	**341**
	skipped question	**55**

9. Which statement best describes your comfort level on a bicycle.

	Response Percent	Response Count
I am comfortable bicycling on the road with automobiles in all situations, including heavy traffic.	**44.9%**	151
I am most comfortable on off-road paths or in a clearly designated bicycle lane.	43.5%	146
I don't feel comfortable sharing any roadway with cars and prefer off-road paths or very low-traffic residential roads.	11.6%	39
	answered question	**336**
	skipped question	**60**

10. How many people are in your household?

	Response Percent	Response Count
1	14.3%	43
2	**42.0%**	126
3	13.7%	41
4	22.3%	67
5+	7.7%	23
	answered question	**300**
	skipped question	**96**

11. How many bicycles do you have in your household? (select one)

	Response Percent	Response Count
0	1.3%	4
1	12.7%	38
2	24.7%	74
3	17.0%	51
4	14.3%	43
5+	**30.0%**	90
	answered question	**300**
	skipped question	**96**

12. How many automobiles are at your household?

	Response Percent	Response Count
0	3.7%	11
1	30.0%	90
2	**52.0%**	156
3	11.0%	33
4	3.0%	9
5+	0.3%	1
	answered question	**300**
	skipped question	**96**

13. Which terms most describe your current level of bicycling activity? (choose all that apply)		Response Percent	Response Count
Do not bicycle		5.1%	15
Bicycle occasionally for short, utilitarian trips (1-5 times per month)		25.0%	74
Bicycle regularly for short, utilitarian trips (1-5 times per week)		35.5%	105
Bicycle occasionally on-road for fitness or recreation (1-5 times per month)		**35.8%**	106
Bicycle regularly on-road for fitness or recreation (1-5 times per week)		33.4%	99
Occasionally commute by bicycle (3-5 days a week)		18.9%	56
Regularly commute by bicycle (3-5 days a week)		32.8%	97
Occasionally mountain bicycle (1-2 times per month)		14.5%	43
Regularly mountain bicycle (1-2 times per week)		7.8%	23
	answered question		**296**
	skipped question		**100**

14. Should public funds be used to improve bicycle transportation options? (yes/no)		Response Percent	Response Count
Yes		**98.4%**	314
No		1.6%	5
	answered question		**319**
	skipped question		**77**

15. Which types of funds should be used to improve bicycle transportation options? (please check all that apply)

	Response Percent	Response Count
Existing local taxes	80.6%	237
New local taxes	41.2%	121
State and federal grants	85.0%	250
NCDOT maintenance funds	**91.8%**	270
Other (please specify)	18.0%	53
	answered question	**294**
	skipped question	**102**

16. Is there a bicycle path, greenway trail, or bicycle lane within a half mile of your home? (yes/no)

	Response Percent	Response Count
Yes	**69.2%**	207
No	30.8%	92
	answered question	**299**
	skipped question	**97**

17. Do you ride on the bicycle path, greenway trail, or bicycle lane near your home? (yes/no)

	Response Percent	Response Count
Yes	**92.2%**	189
No	7.8%	16
	answered question	**205**
	skipped question	**191**

18. If there was a bicycle path, greenway trail, or bicycle lane within a half mile of your home, would you ride on it? (yes/no)

	Response Percent	Response Count
Yes	**97.9%**	282
No	2.1%	6
answered question		**288**
skipped question		**108**

19. Which of the following factors prevent you from bicycling or from bicycling more often? (rank order Top 3, with 1 being the worst circumstance)

	1	2	3	Rating Average	Response Count
Lack of bicycle facilities (such as bike lanes, wide travel lanes, paved shoulders, greenway trails, etc.)	**62.5% (125)**	15.5% (31)	22.0% (44)	1.60	200
Gaps in bicycle facilities	23.2% (23)	**55.6% (55)**	21.2% (21)	1.98	99
Narrow roads	28.7% (35)	**45.9% (56)**	25.4% (31)	1.97	122
Other travel modes are safer or more comfortable	30.0% (12)	30.0% (12)	**40.0% (16)**	2.10	40
Pavement quality	6.3% (1)	25.0% (4)	**68.8% (11)**	2.63	16
Crossing busy roads	13.8% (8)	**48.3% (28)**	37.9% (22)	2.24	58
Hills	27.3% (6)	**36.4% (8)**	**36.4% (8)**	2.09	22
Loose gravel/debris	22.2% (4)	33.3% (6)	**44.4% (8)**	2.22	18
Yard waste in bicycle lane	23.1% (3)	**53.8% (7)**	23.1% (3)	2.00	13
Drainage grates	12.5% (1)	0.0% (0)	**87.5% (7)**	2.75	8
Poor lighting (along routes/trails or at roadway crossings)	35.7% (5)	**57.1% (8)**	7.1% (1)	1.71	14
Personal safety (from crime)	22.2% (2)	33.3% (3)	**44.4% (4)**	2.22	9
Physical ability	30.0% (3)	**50.0% (5)**	20.0% (2)	1.90	10
Travel time and/or distance	**37.7% (26)**	30.4% (21)	31.9% (22)	1.94	69
Heavy traffic	22.2% (20)	35.6% (32)	**42.2% (38)**	2.20	90

20. Which of the following changes would encourage you to bike more often? (rank order Top 3, with 1 being the highest priority)					
	1	**2**	**3**	**Rating Average**	**Response Count**
More programs and events for new cyclists	6.3% (2)	21.9% (7)	**71.9% (23)**	2.66	32
Better education on bicycle safety	14.3% (4)	39.3% (11)	**46.4% (13)**	2.32	28
More bike parking (such as bike racks or lockers at schools, parks, shopping areas, offices, etc.)	11.9% (13)	**47.7% (52)**	40.4% (44)	2.28	109
More bike racks on buses	18.6% (8)	**51.2% (22)**	30.2% (13)	2.12	43
More bicycle facilities (such as bike lanes, wide travel lanes, paved shoulders, greenway trails, etc.)	**80.3% (224)**	14.3% (40)	5.4% (15)	1.25	279
Increased enforcement of laws applying to motorists	26.8% (41)	**47.1% (72)**	26.1% (40)	1.99	153
Increased enforcement of laws applying to bicyclists	8.9% (4)	31.1% (14)	**60.0% (27)**	2.51	45
Greater availability of showers/changing facilities	19.7% (12)	**50.8% (31)**	29.5% (18)	2.10	61
A foldable map of bicycle routes	10.3% (9)	40.2% (35)	**49.4% (43)**	2.39	87
OTHER	16.7% (6)	30.6% (11)	**52.8% (19)**	2.36	36
NOTHING	**46.2% (6)**	15.4% (2)	38.5% (5)	1.92	13
			answered question		**331**
			skipped question		**65**

21. Please rate the importance of each of the following transportation improvements in the Carrboro area. (rank in order, with 1 being the highest priority)

	#1	#2	#3	4	Rating Average	Response Count
Automobile/roadway improvements	16.2% (41)	7.5% (19)	16.2% (41)	**60.1% (152)**	3.20	253
Bicycle improvements	**49.8% (140)**	33.5% (94)	13.9% (39)	2.8% (8)	1.70	281
Pedestrian improvements	12.6% (34)	**42.4% (114)**	36.4% (98)	8.6% (23)	2.41	269
Public Transportation improvements	27.9% (74)	21.1% (56)	**37.0% (98)**	14.0% (37)	2.37	265
				answered question		**289**
				skipped question		**107**

22. How often do you take your bike on a Chapel Hill Transit bus?

	Response Percent	Response Count
Never	**66.8%**	195
A few times per year	21.6%	63
A few times per month	7.9%	23
A few times per week	3.4%	10
Five or more times per week	0.3%	1
	answered question	**292**
	skipped question	**104**

23. How often do you take your bike on a Triangle Transit Authority (TTA) bus?

	Response Percent	Response Count
Never	**86.6%**	253
A few times per year	8.9%	26
A few times per month	2.4%	7
A few times per week	0.7%	2
Five or more times per week	1.4%	4
answered question		**292**
skipped question		**104**

24. Which aspect of biking is most appealing to you? (choose three)

	Response Percent	Response Count
Increased health and fitness	**83.6%**	244
Money saved on fuel	38.7%	113
More time outdoors	47.9%	140
Faster commute	12.3%	36
Easier to find convenient parking	25.0%	73
Fewer traffic jams	9.2%	27
Reducing the amount of time spent in a car	28.4%	83
Less negative impact on the environment/preserving the environment	67.5%	197
I DO NOT BICYCLE.	1.4%	4
Other (please specify)	6.8%	20
answered question		**292**
skipped question		**104**

25. How do you feel drivers in your area typically behave around bicyclists? (Please check all that apply)

	Response Percent	Response Count
Courteous, yield, and give bicyclists space	**53.9%**	178
Drive too fast	50.6%	167
Pass bicyclists too closely	53.0%	175
Tolerate bicyclists not following rules of the road	29.7%	98
Harass bicyclists	19.4%	64
Fail to yield to bicyclists crossing a street	23.3%	77
Other (please specify)	14.5%	48
	answered question	**330**
	skipped question	**66**

26. How do you feel bicyclists in your area typically behave? (Please check all that apply)

	Response Percent	Response Count
Courteous, obeying all traffic laws	43.8%	139
Cycle in the roadway the opposing direction as vehicles	20.8%	66
Fail to comply with traffic laws	**53.3%**	169
Ride too slowly	2.5%	8
Are young and/or inexperienced	9.1%	29
Multiple cyclists ride abreast in the same travel lane	41.0%	130
Behave rudely	7.9%	25
Don't signal turns or stops	42.3%	134
Ride on sidewalks	41.3%	131
Ride at night without lights	35.6%	113

28. What is your gender?		Response Percent	Response Count
Male		48.5%	159
Female		**51.5%**	169
	answered question		**328**
	skipped question		**68**

29. What is your age?		Response Percent	Response Count
0-9		0.0%	0
10-19		0.9%	3
20-29		20.9%	69
30-39		**29.7%**	98
40-49		23.9%	79
50-59		17.9%	59
60 and older		6.7%	22
	answered question		**330**
	skipped question		**66**

30. Are you a student? (yes/no)			
		Response Percent	Response Count
Yes		16.7%	55
No		**83.3%**	274
	answered question		**329**
	skipped question		**67**

31. Where do you live? (select one)			
		Response Percent	Response Count
Carrboro		**69.2%**	227
Chapel Hill		18.9%	62
Orange County, outside Carrboro Town limits		8.5%	28
Hillsborough		1.2%	4
Durham		2.1%	7
	Other (please specify)		12
	answered question		**328**
	skipped question		**68**

32. Have you visited a community that you feel has an exemplary bicycle transportation system? Which community was it? Please explain your experience and what aspects of the community would transfer well to improving conditions in Carrboro.		
		Response Count
		157
	answered question	**157**
	skipped question	**239**

B.3 Public Opinion Form Results, cont'd.

A number of comment form questions were open ended and included space for full responses. The tables on pages B-16 through B-20 were generated from answers to Question #4 and 5 and show intersections and corridors in Carrboro that posed a concern to residents.

Question #27 on page B-20 presents a summary of respondents' zip codes. Open-ended questions #6 and #32 are presented in Section B.6 at the end of the appendix.

4. What do you think are the top three roadway intersections (in Carrboro Town limits) most needing bicycling improvements? (Example response: Smith Street & 1st Avenue)

Intersection	Citations
Estes Dr. & Greensboro St.	98
Estes Dr. & Hillcrest Ave.	2
Eubanks Rd. & Rogers Rd.	2
Greensboro St. & Carr St.	2
Greensboro St. & Harris Teeter	3
Greensboro St. & Hillsborough St.	2
Greensboro St. & Main St.	55
Greensboro St. & Roberson St.	11
Greensboro St. & Weaver St.	92
Highway 54 & Jones Ferry Rd.	28
Highway 54 & Smith Level Rd.	24
Homestead Rd. & Old NC 86	11
Homestead Rd. & Rogers Rd.	3
Main St. & Franklin St./Merritt Mill Rd.	5
Main St. & Hillsborough St	4
Main St. & Jones Ferry Rd.	6
Main St. & Lloyd St.	3
Main St. & Poplar Ave.	3
Old Fayetteville Rd. & Jones Ferry Rd.	7
Rosemary St. & Main St.	26
Smith Level Rd. & 15-501	4
Smith Level Rd. & Culbreth Rd.	3
Weaver St. & E. Main St.	67
Weaver St. & W. Main St.	17

(Table continued on following page)

4. (cont'd) What do you think are the top three roadway intersections (in Carrboro Town limits) most needing bicycling improvements? (Example response: Smith Street & 1st Avenue)

Intersection	Citations
(Continued from previous page)	
Estes Dr. & railroad tracks	1
Eubanks Rd. & Old NC 86	2
Greensboro St. & "backstreet" that leads to the bike lane	1
Greensboro St. & Morningside Dr.	1
Greensboro St. & Oak St.	1
Greensboro St. & Old Fayetteville Rd.	1
Greensboro St. & Open Eye Cafe	2
Greensboro St. & Poplar Ave.	2
Highway 54 & Anderson Park	1
Highway 54 & Carrboro Plaza	1
Hillsborough St. & Cates Farm Rd.	1
Homestead Rd. & Claremont Greenway	1
Homestead Rd. & Rogers Rd.	1
Main St. & Fidelity St.	2
Main St. & High St.	1
Merritt Mill Rd. & Cotton Bike Path	1
Rogers Rd. & Meadow Run Ct.	1
Rogers Rd. & Tallyho Trl.	1
Smith Level Rd. & Rock Haven Rd.	2
(Table continued on following page)	

4(a). What do you think are the top three roadway intersections (outside Carrboro Town limits) most needing bicycling improvements? (Example response: Cameron Ave. and Merritt Mill Rd.)

Intersection	Citations
(Continued from previous page)	
Cameron Ave. & Merritt Mill Rd. (Chapel Hill)	7
Dairyland Rd. & Union Grove Church Rd. (Orange County)	1
Estes Dr. & Franklin St. (Chapel Hill)	3
Estes Dr. & MLK Blvd. (Chapel Hill)	1
Estes Dr. & Sewell School Rd. (Chapel Hill)	3
Franklin St. & Columbia St. (Chapel Hill)	3
High School Rd. & Sewell School Rd. (Chapel Hill)	1
Homestead Rd. & High School Rd. (Chapel Hill)	3
Homestead Rd. & MLK Blvd. (Chapel Hill)	1
Homestead Rd. & Sewell School Rd. (Chapel Hill)	2
Rosemary St. & Columbia St. (Chapel Hill)	1
Smith Level Rd. & Dogwood Acres Dr. (Chapel Hill)	1
Smith Level Rd. & Graham Elementary School (Chapel Hill)	1

5. What do you think are the top three roadway corridors (in Carrboro Town limits) most needing bicycling improvements? (Example response: Road Corridor #1: Eubanks, Starting At: Old 86, Ending At: Rogers)

Corridor	Citations
Carrboro High School	1
Culbreth Rd.	2
Estes Dr.	163
Eubanks Rd.	5
Old Fayetteville Rd.	8
Fox Meadow and Lake Hogan Farms subdivisions	1
Greensboro St.	101
High St.	1
Highway 54	12
Old Hillsborough Rd.	4
Homestead Rd.	42
Jones Ferry Rd.	15
Libba Cotton Bikeway	1
Main St.	51
Merrit Mill Rd.	2
Old Fayetteville Rd.	20
Old Hillsborough Rd.	1
Old NC 86	53
Poplar Ave.	1
Rock Haven Rd.	1
Rogers Rd.	8
Seawell School Rd.	14
Smith Level Rd.	52
Tallyho Trl.	1
Weaver St.	1

5(a). What do you think are the top three roadway corridors (outside Carrboro Town limits) most needing bicycling improvements? (Example response: Road Corridor #1: Franklin St., Starting At: Cameron Blvd., Ending At: Main St.)

Corridor	Citations
15-501 (Chapel Hill)	1
Cobble Ridge Dr. (Chapel Hill)	1
Dairyland Rd. (Orange County)	3
Dogwood Acres Rd. (Chapel Hill)	1
Franklin St. (Chapel Hill)	3
MLK Blvd. (Chapel Hill)	2
Rosemary St. (Chapel Hill)	1
Umstead Rd. (Chapel Hill)	47
Weaver Dairy Rd. (Chapel Hill)	1

27. What is your zip code?

Zip Code	Respondents
27510	157
27516	127
27514	13
27517	11
Other	16

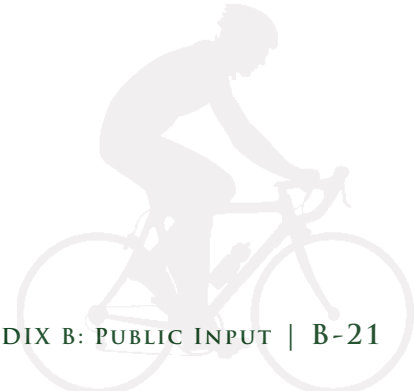
B.4 Public Workshop Comments

Public Meeting 1

The following lists of comments were taken directly from the handwritten comments on the Public Comment Maps from the first public meeting, which was held in April 2008.

NOTE: To prevent censorship, all comments were taken directly from the hard copy forms. Therefore, typographical and grammatical errors occuring within public comments were not edited.

Location	Comment
Outer Carrboro	Construct bike facilities from on Old 86 from Homestead toHickory Forest
Outer Carrboro	Bike facilities needed on Dairyland from Old 86 to Union Grove Church
Outer Carrboro	Bke lanes needed on Old 86 from Farmhouse Rd to Dairyland Rd
Outer Carrboro	Bke lanes needed on Old 86 from Farmhouse Rd to Dairyland Rd
Outer Carrboro	Bke lanes needed on Old 86 from Farmhouse Rd to Dairyland Rd
Outer Carrboro	Bke lanes needed on Old 86 from Farmhouse Rd to Dairyland Rd
Outer Carrboro	Bke lanes needed on Old 86 from Farmhouse Rd to Dairyland Rd
Outer Carrboro	Bike lanes needed on Homestead from Lake Hogan Farm Rd to Strattford Rd
Outer Carrboro	Connect future Elementary on Eubanks Rd to neighborhoods south via sewer corridor
Outer Carrboro	Connect future Elementary on Eubanks Rd to neighborhoods south via sewer corridor
Outer Carrboro	Connect future Elementary on Eubanks Rd to neighborhoods south via sewer corridor
Outer Carrboro	Connect Lake Hogan Farms to Brace Rd via greenway
Outer Carrboro	Connect Reynard to Claymoor via greenway trail through UNC property
Outer Carrboro	Connect Hogan Farms to Winmore
Outer Carrboro	Connect Winmore to Pathway Dr along Bolin Creek
Citywide	Important to protect Bolin Creek
Outer Carrboro	Keep it natural (Carolina North Forest)
Outer Carrboro	Need for greenway bridge over Bolin Creek near Tripp Farm Rd
Outer Carrboro	Ensure bicycle connectivity to Carolina North
Outer Carrboro	Improve bike facilities for increased traffic on Estes Dr in future
Citywide	Greenways are safety issue too
Outer Carrboro	Provide connection along Strowd Rd from Anderson Park to McDougle
Outer Carrboro	Old 86 is the main cyclist route out of town
Outer Carrboro	Fill gaps between existing bike facilities on Old Fayetteville
Outer Carrboro	Improve access between Quail Roost Rd and McDougle
Central Carrboro	Erosion is an issue/ improved management practices in Adams Track
Citywide	More bike parking needed
Citywide	Improve bike connections to Chapel Hill, specifically Franklin, Airport, and Estes
Citywide	Davis, CA excellent model for Carrboro
Citywide	Madison, WI a good model
Outer Carrboro	Bike facilities needed on Estes Dr toward Capel Hill
Outer Carrboro	Improve lighting on Estes Dr



Location	Comment
Central Carrboro	Enforcement of auto speed in downtown proper
Citywide	Make bike triggers more accessible at lights
Citywide	Provide facilities separate from main roadways
Central Carrboro	Improve triangle from cradle, weaver st, and open eye
Citywide	Davis, CA very similar town to Carrboro
Outer Carrboro	Fix Estes Dr
Citywide	Greenways don't connect to downtown-have to drive to get there
Outer Carrboro	Need bridge over Morgan Cr between Rosewalk and BPW Club Rd
Outer Carrboro	Bike facilities need on Smith Level Rd from 54 to 15/501
Outer Carrboro	Bike facilities need on Smith Level Rd from 54 to 15/501
Outer Carrboro	Bike facilities need on Smith Level Rd from 54 to 15/501
Outer Carrboro	Fill gaps between Poplar and 54 on Old Fayettevile Rd
Outer Carrboro	Culbreth Rd is a state bicycle route
Outer Carrboro	Connect future Morgan Creek greenway to both sides of Smith Level Rd
Outer Carrboro	Construct bike facilities on Seawell School Rd
Outer Carrboro	Construct bike facilities on Seawell School Rd
Outer Carrboro	Construct bike facilities on Seawell School Rd

Location	Comment
Outer Carrboro	Construct consistent bike facility on Estes from Greensboro to Town Limits
Outer Carrboro	Construct consistent bike facility on Estes from Greensboro to Town Limits
Outer Carrboro	Construct consistent bike facility on Estes from Greensboro to Town Limits
Outer Carrboro	Construct consistent bike facility on Estes from Greensboro to Town Limits
Outer Carrboro	Construct consistent bike facility on Estes from Greensboro to Town Limits
Outer Carrboro	Construct consistent bike facility on Estes from Greensboro to Town Limits
Outer Carrboro	Construct consistent bike facility on Estes from Greensboro to Town Limits
Outer Carrboro	Construct a greenway from Wilson Park to Estes along sewer corridor
Central Carrboro	Fix potholes on Main St
Central Carrboro	Bike facilities needed on Old Pittsboro Rd
Central Carrboro	Improve bike facilities in Downtown area
Central Carrboro	Improve bike facilities in Downtown area
Central Carrboro	Improve bike facilities in Downtown area
Central Carrboro	Improve bike facilities in Downtown area
Central Carrboro	Improve bike facilities in Downtown area
Central Carrboro	Extend bike lanes on Jones Ferry from Alabama to Old Fayetteville
Outer Carrboro	Need bike shoulders on Dairyland Rd from Old 86 to Union Grove
Outer Carrboro	Need wide shoulders on Old 86 from Hillsborough to Dairyland

Location	Comment
Outer Carrboro	Need wide shoulders on Old 86 from Hillsborough to Dairyland
Outer Carrboro	Need wide shoulders on Old 86 from Hillsborough to Dairyland
Outer Carrboro	Need wide shoulders on Old 86 from Hillsborough to Dairyland
Outer Carrboro	Need wide shoulders on Old 86 from Hillsborough to Dairyland
Outer Carrboro	Construct bike lanes on Smith Level Rd from Highway 54 to Carrboro High School
Outer Carrboro	Construct bike lanes on Smith Level Rd from Highway 54 to Carrboro High School
Outer Carrboro	Construct bike lanes on Smith Level Rd from Highway 54 to Carrboro High School
Outer Carrboro	Construct greenway loop trail around University Lake
Outer Carrboro	Construct bike lanes on Jones Ferry Rd from Davie to Old Greensboro
Outer Carrboro	Construct bike lanes on Jones Ferry Rd from Davie to Old Greensboro
Outer Carrboro	Construct bike lanes on Jones Ferry Rd from Davie to Old Greensboro
Outer Carrboro	Construct Morgan Creek greenway from Smith Level Rd to University Lake
Outer Carrboro	Connect Morgan Creek greenway to Carrboro High School
Outer Carrboro	Connect Morgan Cr greenway to Rosewalk Neighborhood

Location	Comment
Outer Carrboro	Improve Hwy 54 crossing at Jones Ferry
Outer Carrboro	Improve Hwy 54 crossing at Jones Ferry
Outer Carrboro	Improve Hwy 54 crossing at Smith Level
Outer Carrboro	Improve Hwy 54 crossing at Smith Level
Outer Carrboro	Improve Hwy 54 crossing at Smith Level
Outer Carrboro	Install bike signage on Hwy 54 alerting drivers to cyclists
Citywide	Educate drivers that cyclists are vehicles
Citywide	Educate cyclists
Citywide	Improve safety on greenway trails- lighting and security
Citywide	Clean bike lanes regularly
Citywide	Cars expect bikes everywhere in Carrboro
Citywide	Provide gateway signage to Carrboro- "slow down"
Outer Carrboro	Construct bike facilities on both sides of Old Fayetteville Rd
Outer Carrboro	Connect Anderson Park to McDougle via Stroud
Outer Carrboro	Construct bike facilities on Old 86 between 54 and McDougle Middle School
Outer Carrboro	Fill gaps on Old Fayetteville between 54 and Poplar
Outer Carrboro	Fill gaps on Old Fayetteville between 54 and Poplar
Outer Carrboro	Improve bike access to Carrboro Plaza
Central Carrboro	Bike lanes and traffic calming needed on Davie Rd from Jones Ferry to Main St
Central Carrboro	Bike facilities needed on Carol

Location	Comment
Central Carrboro	Bike facility needed on James St
Central Carrboro	Bike facility needed on Lorraine
Central Carrboro	Connect Tripp Farm to Hillsborough via greenway in MLK park
Central Carrboro	Pave greenway connection from Hannah St to Bolin Creek greenway
Central Carrboro	Connect Wislon Park to Estes via paved greenway along sewer corridor
Central Carrboro	Provide trail connection between Phipps and Bel Arbor
Central Carrboro	Bike lanes needed on Estes Dr from N. Greensboro to train tracks
Central Carrboro	Bike lanes needed on Estes Dr from N. Greensboro to train tracks
Central Carrboro	Construct paved greenway along Bolin Creek sewer corridor
Citywide	Signage: Carrboro is full of bikes
Central Carrboro	Improve S Greensboro between 54 and Main St
Central Carrboro	Improve S Greensboro between 54 and Main St
Central Carrboro	Improve S Greensboro between 54 and Main St
Central Carrboro	Improve S Greensboro between 54 and Main St
Central Carrboro	Construct bike facilities on N Greensboro between Main and Poplar
Central Carrboro	Construct bike facilities on N Greensboro between Main and Poplar
Central Carrboro	Construct bike facilities on N Greensboro between Main and Poplar

Location	Comment
Central Carrboro	Construct bike facilities on N Greensboro between Main and Poplar
Central Carrboro	Construct bike facilities on Main St between Jones Ferry and Poplar
Central Carrboro	Construct bike facilities on Main St between Jones Ferry and Poplar
Central Carrboro	Construct bike facilities on Main St between Jones Ferry and Poplar
Central Carrboro	Improve greenway connection between S Greensboro and Purple Leaf
Central Carrboro	Connect Sweet Bay Greenway to Libba Cotton greenway
Central Carrboro	Close Weaver St on Sundays as bicycle/pedestrian mall
Central Carrboro	Improve intersections: Main and Greensboro, Greensboro and Weaver, Jones Ferry and Davie, Estes and N. Greensboro, Greensboro and Roberson
Central Carrboro	Make connection between Jones Ferry and 54 (and Walden) on Barnes
Central Carrboro	Connect West Brook to Jones Ferry through Carolina Apts.
Outer Carrboro	Construct Bike facilities on Old 86 between Dairyland and Farmhouse
Outer Carrboro	Construct bike facilities on Old 86 between 54 and McDougle Middle School
Outer Carrboro	Construct bike facilities on Old 86 between 54 and McDougle Middle School
Outer Carrboro	Fill gaps on Old Fayetteville between 54 and Poplar

Location	Comment
Outer Carrboro	Fill gaps on Old Fayetteville between 54 and Poplar
Outer Carrboro	Connect Anderson Park to McDougle via Strowd
Outer Carrboro	Construct bike facilities on Carol
Outer Carrboro	Construct bike facilities on James
Central Carrboro	Connect Wislon Park to Estes via paved greenway along sewer corridor
Central Carrboro	Construct bike lanes on Estes from Train tracks to N. Greensboro
Central Carrboro	Construct bike lanes on Estes from Train tracks to N. Greensboro
Central Carrboro	Intersection improvements needed on: Main and NC 54, Main and Poplar, Main and Weaver, Greensboro and Carr, Merrit Mill and Cameron (*3), Estes and Estes Park Apt Rd
Central Carrboro	Intersection improvement needed at Roberson, Main , and Weaver
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Central Carrboro	Intersection improvement needed at Roberson, Main , and Weaver
Central Carrboro	Make Old Pittsboro one way, with half being a bike route

Location	Comment
Central Carrboro	Bike facilities need on Main St from Merrit Mill to Weaver St
Central Carrboro	Bike facilities need on Main St from Merrit Mill to Weaver St
Central Carrboro	Bike facilities need on Main St from Merrit Mill to Weaver St
Central Carrboro	Bike facilities need on Main St from Merrit Mill to Weaver St
Central Carrboro	Bike facilities needed on Main St from Roberson to Greensboro
Central Carrboro	Bike facilities needed on Greensboro from Roberson to Main St
Central Carrboro	Bike facilities needed on Greensboro from Roberson to Main St
Central Carrboro	Bike facilities needed on Weaver St from Roberson to N. Greensboro
Central Carrboro	Bike facilities needed on Weaver St from Roberson to N. Greensboro
Central Carrboro	Bike facilities needed on N. Greensboro from Poplar to Main St
Central Carrboro	Bike facilities needed on N. Greensboro from Poplar to Main St
Central Carrboro	Bike facilities needed on Main St from Poplar to Jones Ferry
Central Carrboro	Close Weaver St to automobiles from Roberson to Greensboro
Central Carrboro	Construct bike path behind Harris Teeter
Citywide	Increase bike/bus interface with respect to parking and carrying capacity
Citywide	Educate motorists
Citywide	Educate motorists

Location	Comment
Citywide	Educate cyclists
Citywide	Look at Swedish bicycle facilities
Central Carrboro	Move the 30 MPH sign on N greensboro after the pedestrian crosswalk (going North)- this will make bike turning on Shelton St easier
Central Carrboro	Construct bike to bus transit stop at the corner of Weaver and N. Greensboro

Public Meeting 2

The following lists of comments were taken directly from the handwritten comments on the Public Comment Maps from the first public meeting, which was held in July 2008.

NOTE: To prevent censorship, all comments were taken directly from the hard copy forms. Therefore, typographical and grammatical errors occuring within public comments were not edited.

Location	Comment
Central Carrboro	Estes and N. Greensboro intersection not safe
Central Carrboro	Estes and N. Greensboro is a tough intersection/route
Central Carrboro	Estes from N. Greensboro to Hillcrest is extremely dangerous
Central Carrboro	Provide sharrows on Cheek St
Central Carrboro	Need a safe connection between Carrboro Elementary and Wilson Park
Central Carrboro	Need a safe connection between Pine St and Thomas
Central Carrboro	Bike facilities on Pleasant could act as an Estes Bypass
Central Carrboro	Bike box needed on Roberson to make left turn onto Main/Weaver safe
Central Carrboro	Bike boxes needed at intersection of Greensboro and Main
Central Carrboro	Prioritize intersection at Old Fayetteville and Jones Ferry- make safer using signals, crossings
Citywide	Prioritize intersections in general- make safer using signals, crossings
Central Carrboro	Have Morgan Creek Greenway travel on south side of oxbow bend to provide better access to soccer field
Citywide	Bicycle/paid facilities through use
Citywide	Install "Water for Cyclists" signs
Outer Carrboro	Install greenway/multi-use path from Eubanks to Albert
Citywide	Increase bike enforcement

Location	Comment
Citywide	Increase bike enforcement- bike lanes are dangerous for strollers
Citywide	More east/west connectors
Outer Carrboro	Connect Brace St to proposed greenway via small "stub"
Outer Carrboro	Brace connection needs bridge cleared from Fox Meadow to LHF
Outer Carrboro	Easement ends at Brace St?
Outer Carrboro	Connect development NE of Lake Hogan to proposed greenway from both sides
Outer Carrboro	Proposed greenway that crosses Homestead should be installed on south side of creek
Outer Carrboro	Connect Bolin Creek greenway to Seawell Elementary via greenway on power line road through Carolina North Forest
Outer Carrboro	Provide connection between Seawell Elementary and proposed greenway via link just above Carolina North border
Outer Carrboro	Bridge needed at northern terminus of greenway section connecting Bolin Creek greenway to Tripp Farm Rd- UNC bidding bridge
Outer Carrboro	Connect potential power line greenway in Caolina North Forest to Carolina North development via bikeway
Outer Carrboro	Southern portion of residential runway to be dedicated bikeway- look into LA's Plans
Outer Carrboro	Connect potential Carolina North link to southern end of Seawell School Rd via trails on either side of RR tracks

Location	Comment
Outer Carrboro	Proposed greenway linking Pathway to Seawell School Rd might not be feasible due to private property issues
Outer Carrboro	Perennial streams exist along eastern side of rr tracks
Central Carrboro	Longer crossings at Estes & Greensboro- 20 seconds minimum
Central Carrboro	Longer crossings Main St intersections- 20 seconds minimum
Central Carrboro	Proposed bike lanes on Estes leading to N greensboro are a good idea
Central Carrboro	Main @ Weaver St Market- trim trees, provide overhead clearance for access
Central Carrboro	Weaver St needs maintenance, cleaning, widening
Central Carrboro	Weaver St needs maintenance, cleaning, widening
Central Carrboro	Weaver St needs maintenance, cleaning, widening
Central Carrboro	PTA Thrift Shop- BAD curb cut
Citywide	Need improvements for people with disabilities
Central Carrboro	General improvements needed along S. Greensboro/ Smith Level
Citywide	More programs/routine presentations needed- for helemet fittings, maintenance,etc.
Outer Carrboro	Provide greenway connecting Carrboro High School to Brandywine St

B.6 Open-Ended Public Comments
(Taken from Question #6 on the Public Comment Form)
NOTE: To prevent censorship, all comments were taken directly from the comment form. Therefore, typographical and grammatical errors occuring within public comments were not edited for this section.

What other bicycle related improvements do you consider priorities?

More paved bicycle paths through the woods and away from cars.

More dedicated bike paths that would be suitable for children. Even bike lanes on major roads are often not suitable for children to ride. Still too much traffic.

RR crossings hazardous for bikes Bike lanes and trails end abruptly Driver education

"I personally live in Chapel Hill and find Carrboro's plans wonderful, but where is Chapel Hill on this issue? Absent? Everyone in Chapel Hill should be able to freely bike on designated bike lanes/trails to UNC the largest employer in the area from their homes in town. I thought I had moved to an ecoconscious area? Biking to stores, restaurants, etc would also be wonderful. Thank you."

Improve parking situation--especially as scooter demand increases. One scooter can hog a lot of bike rack space.

Connections to greenways and to Chapel Hill - and easy way to get across town
"road shoulder conditions. If these are riddled with potholes or debris, then cyclists can't use them"

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Connections to greenways and to Chapel Hill - and easy way to get across town
"road shoulder conditions. If these are riddled with potholes or debris, then cyclists can't use them"

"The worst biking stretch in town is the corridor in front of KFC/Milltown/Cat's Cradle, in both directions. It would greatly help if there were some sort of bike path from N. Greensboro (near Southern States?) around Carr Mill and connecting to Lloyd Street/Broad Street or Sunset. If you are coming from N. Greensboro but going to , it doesn't make sense to deal with the Carr Mill/Weaver/Main traffic and go through multiple lights and turns to get to the bike path, only to have to deal with more lights and left turns to get back over to Rosemary. I would love to stay completely North of Main Street at all times. Lots of people ride on the sidewalk here (often in the wrong direction), just to dodge traffic. Clearly this is a hazard to pedestrians and Milltown/KFC customers, etc. Weaver Street in from of the WSM lawn is too narrow and bikes have to hop on the sidewalk when cars are backed up. This really ought to be a one-way road (towards Town Hall).... or the parking in front of Spotted Dog should be removed in lieu of two one-way bike lanes. Estes Drive is great on the Chapel Hill side, but the part in Carrboro near N. Greensboro is really scary, with no shoulder."

"Many cyclists travel into the country using Jones Ferry Road. I commute by bicycle on this road too. If there is anything that can be done to improve the extentions like this, it would really be helpful. Carrboro is generally very good but my trip on Jones Ferry is an adventure."

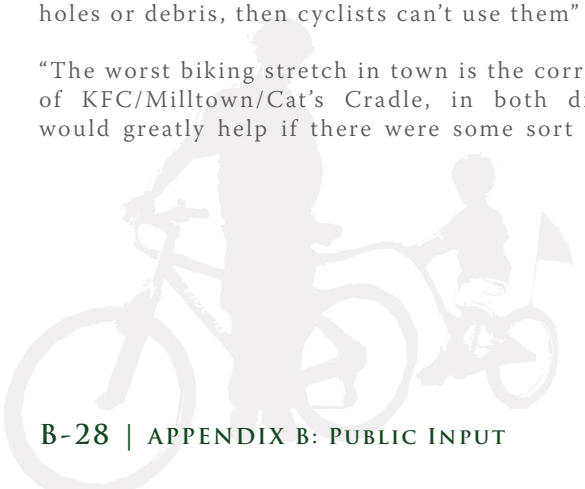
Bicyclist need to understand that it is absolutely dangerous for them to ride side-by-side and inconsiderate to drivers

slow down cars on N. Greensboro St.

"Connecting planned Morgan Creek Greenway to Carrboro and Chapel Hill in a safe manner (i.e., getting us over or under 54 safely)"
"Bike lanes or sharrows downtown. Also, biker- activated traffic signals at major intersections."

more bike racks on buses. More bike racks around town.

"Mainly, there needs to be clear biking paths all the way



through. It is quite useless to have part of a stretch of road have bike paths, if you cannot bike all the way."
Gravel off the bike lanes but better than bike lanes are separate bike paths -- cars and bikes are better off not sharing the road.
More Bicycle and Pedestrian Paths More Bikeways Wide Shoulders

More bicycle paths to parks and nature would be great.

"Bicycle lanes are needed everywhere, bicyclists have become a real hazard."
"Bicyclists SHOULD be REQUIRED to observe ALL traffic rules & regs when they attempt to ""share the road"" with motor vehicles. This includes: no passing on the right, observing all signal lights, no passing on the white line while traffic is stopped, etc. Carrboro police need to be instructed to enforce all traffic regulations and write tickets to bicyclists, if necessary. Pedestrians and motorists are expected to obey the law; bicyclists should be also!"

putting a multi-purpose lane on smith level road

Education on two sides: 1. Bicycle education on how to ride safely - with helmets 2. Driver Education: how to share the road with a bike

"more bike parking, less on-street car parking"

"Long term, turn Weaver Street into a pedestrian mall between Greensboro and Main Street (in front of Carr Mill) with an identified bike path (yellow brick road?) crossing the mall from Greensboro to the existing bike path at the RR tracks. Route existing Weaver Street traffic to Main Street."

"i actually think Carrboro is in good shape, vis a vis biking. Easier to bike here than anywhere else I have ever lived!"
Finding alternative routes that make bicycling faster or more convenient than cars (like a shortcut over the railroad tracks behind Harris Teeter that would connect bikers from Estes straight over to East Main Street and Rosemary
better education for drivers of how to co-exist with bicyclists
Pedestrian related amenities for public transit riders such as bus stop shelters with protection from the weather plus maps and transit routes and schedules.

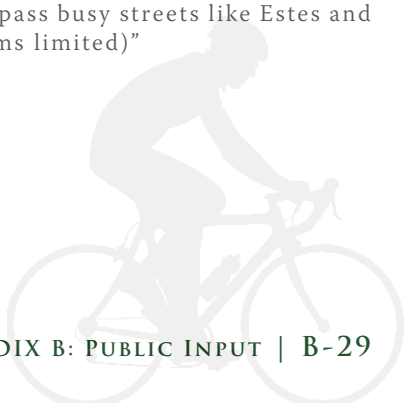
"connecting the existing paths so that you don't end up right in the middle of downtown with nowhere to go. specifically, connecting the path along the railway line with the path along weaver st on the other side of weaver st market. The biggest problem is the lack of regional connections between cities and towns, such as biking to Durham, UNC campus, etc. Regional connections should be the top priority, especially with Durham and RTP."
The Carrboro bikepath (connecting to Cameron Street) feels unsafe at night. Improving lighting on the path may help.

More bike racks

Cleaning debris out of the bike lanes.

"trails and greenways, and cycle lanes on roadways"
The roads I listed in 5 may fall within Chapel Hill--but roads can't start and stop solely within Carrboro. I would like to be able to bike from Ironwoods into Carrboro but do not feel safe doing so because of the stretches listed above

"require cyclists to have headlights and rear lights at night (not just reflectors), helmet law for cyclists of all ages, enforce traffic laws for cyclists, motorists, and pedestrians (too many cars running bikes off the road, too many bikes on the wrong side of the road/running lights, etc), more bike paths (esp. to bypass busy streets like Estes and Greensboro, but space seems limited)"



Additional stoplight bicycle sensors.

bike transportation education opportunities
Bolin & Morgan Creek Greenways

Education/ awareness/ confidence!

Better rules for bicyclists. It looks bad when a rider flies through a stop light/ stop sign.

Finish bike lane on Estes near Greensboro St.

Activation of traffic lights by bikes

Greenways and trails that connect to surrounding towns!

Access to northern area of town

Unifying the laws and setting a strong standard for bike accomodation.

Ensuring safe biking to schools

"Separated bike lanes (ie- a lane f major roads, separated by native plantings, with pedestrian and bike paths)"

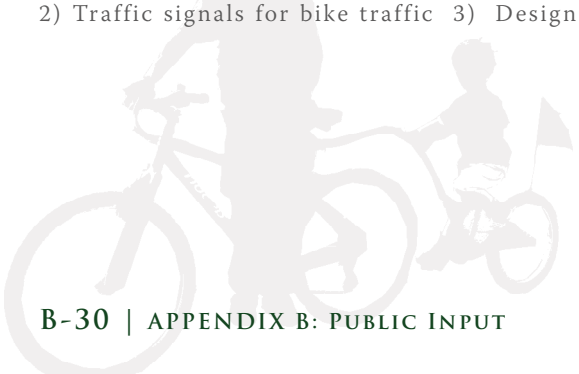
"1)Super high priority- designated bike trails for commuting that are separate from vehicles- so children and families with children can do routine commutes safely, away from traffic. For adults, designated commuting routes separate from traffic are safer for them as well, and protect their exercising lungs from carbon monoxide, mercury, and other exhaust poisons. I also shop by bike and don't feel safe in a bike lane next to heavy traffic with 30 to 60 pounds of groceries in my baskets- under these conditions, I carefully use the sidewalks. Elder people also need designated, off-road bicycle paths if they are to bike for routine commuting (shopping. drug store, etc.) 2) Traffic signals for bike traffic 3) Designate some low traffic residential streets as bike and pedestrian access only, except for residents who live on that street- eg: Poplar St & Lindsay or Oak in the block of old Carrboro next to downtown- make existing 2-way vehicle streets- one lane dedicated to pedestrians and bikes w/ vegetated safety strips b/t the two lanes and w/ one lane as one way for vehicles."

"keeping current bike lanes clean, northern ""bypass"" behind Harris-Teeter to Chapel Hill line (would help with corridor #2 problem above)"

"Connecting bicycle lanes to major lanes such as a separate trail corridor for RTP traffic. Also, what if we followed Charleston's pattern and elected a bicycle manager to oversee the production, implementation, and maintanence of bicycle greenways?"

Public awareness of rights and responsibilities of both drivers and cyclists
"More education for drivers that cyclists have a right to share the road. I would like to see a county-wide and/or a statewide education campaign given the number of cyclists that have been hit lately. Ads should be on radio, TV, billboards (where possible), Internet, YouTube, etc."
Adding bicycle boxes to let bikes collect in front of stopped traffic at intersections. Cars should have last right of way.
"I've been nudged by a car twice in the last couple of months at Weaver St. & N. Greensboro -- traveling west on Weaver St, the bike lane ends, and both times a car approached from behind and passed me, then attempted to move over to the right in order to continue straight through the intersection, even though I was right there."
It would be nice to have a trail connecting Chapel Hill to Carrboro

"More general bike only trails, like Libba Cotten, etc"
The bike path from Roberson to Merrit Mill Rd. is always littered with shards of glass! It would be nice if there was



a way to keep it swept up. Or maybe put trash/recycle bins at a few intervals along the path?

Smoother sides of road on Weaver Street and Greensboro near Car Mill Mall (lots of potholes and bumps where we need to ride).

Mainly bike lanes that provide safety for cyclists in town who are using bicycles as alternative transportation.

The triangular intersection near WSM entrance is dangerous. I avoid it. More yield to bikers on right turn signs. Closing Weaver Street to vehicles would be great.

There needs to be a bicycle trail. I have almost had accidents because of bikers especailly making a right hand turn. They alos do not use the same rules as autos ie they go through lights and take the whole lane. I am surprised there are not more accidents. They need a path to the University!!
Traffic calming. Greensboro from Estes to Main St. is becoming a drag strip. Speed tables from around Cedar Court to the Century Center would make that area much more bike friendly.

"If Carrboro is a bike friendly community, I think the entire town should have bike lanes."

"The scariest thing about biking pretty much anywhere in the US is that cars aren't looking for me, often don't yield to me appropriately, and aren't sure how closely to pass me. Some public education about how to share the road with bikes could be useful."

"bike racks, bike lane in every intersection cause its annoying when it ends. a public information sign/s about hand signals and which sides of the road to ride on. teach free bike saftey class and get a free bike light or helmet"

"1) improve condition of road surface in some places: for example on Main St in front of the BP station, there are potholes on the side of the road. Avoiding potholes is dangerous because it requires moving to the left and thus potentially in the way of cars arriving behind 2) some bike lanes are too narrow: for instance, going downhill on West Poplar Avenue (coming from W. Main St), the bike path narrows down and becomes very narrow. It is particularly difficult to stay on it if there are any stones one needs to avoid 3) more bike parking in the area downtown"

"Auto Driver education regarding sharing the road, passing cycles on narrow roads and passing then quickly slowing and turning right."
more bike racks

Kids should have a safe way (stop light & cross walks) to ride from Southern Village & Cobble Ridge to Carrboro High. Busing these kids is silly.

"I'm not sure if this counts as ""other"" but you can see that I think safe biking options are needed between neighborhoods such as Heritage Hills and the middle school, high school, and the new park."

"Carrboro needs travel demand management downtown. There are too many cars downtown which makes it intimidating to bikee downtown. The Town should adopt policies that reduce the appeal of driving downtown (such as more stringent parking policies) and increase attractiveness of traveling by other modes. Also, there are not enough bike racks downtown, especially at Weaver St. market. Many bike racks should be upgraded to ones that meet the standards of the League of American Bicyclists, as many are not usable with U-Locks. On Weaver St, if the 5 parking spots across from the Beehive, Spotted Dog, etc were removed, there would be enough room in the lane for bicyclists to pass motorists on the right: as it is, it is quite difficult to do and I often am blocked. Also, it would be great to have ""bike boxes"" in front of intersections so bikes have a place to wait in front of cars. Also,

the intersection of W Main and W Weaver is frustrating (both as a bicyclist and a car).. the light is way too long even when there is no traffic, and there is no loop detection for cyclists. I often bike through this intersection on a red light."

bike lanes

"Increase the visibility of and usage of the Blue Urban Bike program. No one knows about it, but it could be a wonderful community asset."

"maintenance of bike lanes (keep free from rubbish, glass, leaves, etc); bike boxes at intersections; continuity with facilities in Chapel Hill"
Smith Level coming into town

Additional greenways/bike paths separate from roadways

it would be nice to have path avoiding town between and Estes Dr. and the bike path between Carrboro and the university. maybe something along the railroad tracks.

greenways between schools and parks

Access to the new Elementary #10 to allow out childern to walk/right to school
unsure - want more trails in parks

Lower the hill @ Eubanks for both car and bike safety. This is going to be very treacherous (or I should say more) once the new school opens.

A bikeway linking N.Greensboro to Roberson (existing bike path to campus)following RR tracks behind Carr Mill.

From Lake Hogan Farms to new Morris Grove Elementary and connections between neighborhoods in N. Carrboro

"Connection to Chapel Hill via Greenways should be the absolute highest priority. That way, more people will actually ride their bikes to work!"

"Bike lanes on major roads out of town. There is a very large cycling community and the recreational cyclists need safer roads to get into and out of town. Old 86 is busy and dangerous, Eubanks and Homestead are also getting busier."

"Regular cleaning of bike lanes (glass, rocks, and nails)"

"I would like to see lighted bike racks. Parking lots get lights for safety, but bike racks are dark. Scary to walk to in dark, also hard to see combination lock."

Fix traffic light at Culbreth and Smith Level to have ability to trip light

Education

The bike lanes across from McDougal Middle School are nice but frequently filled with debris making it impossible to ride in them. Don't forget the periodic maintenance.

Need bicycle lanes like in every developed country. It is unsafe to ride with the family at the moment.

"Every single road in the crowded downtown area should have striped bike lanes, as these are heavily used by bikers, yet when NO provisions are given, it makes for a very dangerous situation."

bike lane/trail along railroad tracks on the north side of town

"Clean current bike lanes once per month (I see the same rocks and pieces of glass for months at a time which forces me to ride on the street (includes Hw 54, Hillsborough Rd...))."

police should NOT allow baby strollers in the bike lanes; this is dangerous for everyone- especially the babies in the strollers

Connecting Carrboro & its bike paths to whatever bicycle planning is underway for Carolina North.

Real bike lines on major arterial roads. Safer-feeling access to downtown Carrboro by bike for youth/young families.

Bicycle racks at bus stops and local businesses

"At grade RR crossing on Main St. going east (with old Archer Graphics building to right) has deep ruts next to tracks. Try to keep the Libba Cotten trail (I realize that the lease is up with UNC) and improve it - get rid of obsolete RR tracks, make entrance ramp on Roberson less steep, remove stop sign for bikes on Brewer Ln and have cars stop at that intersection. Consider feasibility of bike lights at traffic signals to make bike trips faster."

"1. Covered bicycle parking areas, velo park, near local businesses and public transportation hubs. 2. Close Weaver Street from East Main (at Spotted Dog)to N Greensboro to motorized vehicles."
Rogers Road to Homestead Park -- please work with town of Chapel Hill

"bike lanes are great, but separate bike paths are much better"

"1. signs! a. share the road b. yield to bicycle when turning right 2. bike lanes are sufficient (and often impractical in high traffic areas) 3. paint main lane of road with ""bicycle and car lane"". I believe Denver and Boulder have done this to some success. Key is to get cars and bikes to share road rather than marginalize bikes."

"Old 86, Hillsborough to Calvander"

Bike lanes need to be kept clean; police need to enforce laws against aggressive motorist behavior toward cyclists; bicycle racks are needed throughout the downtown

"more ""Share the Road"" signs bike rentals ride-your-bike-to-work day[s]"

"Bike lanes to the new elementary school, Morris Grove."

keeping bike lanes free of debris

better utilization of utility right of way areas should be utilized to the fullest extent. The more that both bicycles and pedestrians can be separated from traffic the better for all parties involved. safety is my major concern here. The reason that I do not commute by bicycle is because of the lack of safe corridors where I do not have to contend with traffic.

More greenways

Enforced laws against anybody except cyclists in bike lanes...

bike lanes or road shoulders

it's critically important that the bike trail not be shut down by UNC in the North development.

"Please clean/sweep the existing bike lanes more frequently - the are the collection area for broken glass, accident debris, leaves, road kill! Thanks for doing this assessment!"

Greenways

safe railroad crossings

"bicycle signs indicating bicycle trails, bicycle lanes"

"Maintenance of the existing bike paths (i.e., the one from Carrboro to Merrit Mill Rd has many raised bumps that are pain to ride on"

"Safe, convenient access to shopping plazas. Bicycle awareness/lanes maybe? in parking lots. Regular street cleaning of bicycle lanes (gravel tends to collect there)."

"Weaver Dairy Rd in front of Timberlyne, going toward ECCHS."

"Having safe lanes for bicyclists, not having to fight cars for a lane throughout downtown."

Completion of the Bolin Creek Greenway as a bikable alternative to roads

more education and/or enforcement of proper/lawful rules at intersections. bikes should adhere to same rules as other wheeled vehicles.

More and better bikeways that are not just shoulders on major roadways. A bikeway/greenway connecting Carrboro High to other areas/neighborhood without having to ride on Smith Level.

"get the cyclist off the middle of the road, they block the flow of traffic and put every one in danger. They invaruably neglect to uuse the bike lanes"

laying a multipurpose asphalt slab from 15-501 north to the new carrboro high school and then having a greenway that will connect into town from there
- increase number of bicycle racks - more effective curb parking on bicycle lanes

more bike lanes everywhere

"A bike path all along Smith Level, from 15/501 to Carrboro High School"

More extensive bicycle lanes; Repair damages asphalt/pavement in existing bike lanes and shoulders

"greenway north through martin luther king park, tripps farm rd to homestead rd"

Bike lanes on main corridors where there are now none.

Bike parking Roundabouts

Reduce speed limit and traffic on Smith Level Road. Enforce speed limit on Smith Level Road.

restricting biking on sidewalks

There are a LOT of big potholes right now...W. Main between Fidelity & Weaver (in front of Town Hall) has gotten particularly bad!

Need to connect to Chapel Hill Trails through Boling Creek!

"When speed bumps are installed in neighborhoods, they shouldn't extend into the bike lane. At Calvander intersection (outside town limits), bikes cannot trip the traffic light and have to run it or wait for a car"

"Anywhere that the road isn't wide enough to pass a bicycle, especially when the visibility isn't great either. Intersections aren't too bad except that they're very busy."

N Greensboro and Smith Level Rd!!!!!!!!!!!!!!!

railroad crossings not well maintained

"Better racks at the Bank of America parking lot, More racks at Weaver St. or across the street at Century Cen-

ter."

W Main St between Jones Ferry and Highway 54 (Carrboro Plaza) - no lane for bicyclists!
"bike lanes everywhere! Also the Carrboro end of Estes Drive Also, work with Chapel Hill and Orange County"

extending bike right-of-way all the way south on Smith Level Road

"Streets don't even have to have dedicated bike lanes, but just a wider shoulders"

Getting a path between Fox MEadow and Lake Hogan Farms

"Consistency and predictability of bike lanes (don't strand bicyclists in the middle of intersections, for example); Bike detection loops at intersections, Better enforcement of bicyclists rights AND responsibilities when using public roads."

There is no width nfor bikes.. Very Dangerous!!!!

bike lanes that provide safe access to the entire town.

"Car driver education regarding the rights of cyclists (with ""Bikes Belong"" type signage)."

"Improve Jones Ferry Road to Old Greensboro Road, and Old Greensboro road to Hatch Road. These areas are extremely dangerous, have a lot of bike traffic, and are in the Extraterritorial Zone for Carrboro. In other words, Carrboro tells the residents what they can and cannot do with their land but provides not service to them. This is an improtant service that can be provided."
would love a bicycle path down the railroad from e main to este dr and open space area across road

"Downtown is not as easy to navigate on bike as it ought to be. I see dangerous interactions between cars, bikes & peds all the time on Weaver in front of Carr Mill. Instead of widening Weaver, why not just close this block and make it pedestrian mall? Send traffic down Main St."

Keeping bike lanes clear of debris and other blockages

"Safety demands wider lanes for faster traffic. Your insistence on ""town limits"" results in unsafe backward roads: they narrow where speed limits increase and widen where unnecessary."

"Educating cyclists about road laws. As a cyclist and a driver, I am horrified by the number of cyclists who routinely run red lights, ride on the left side of the road, or weave around stopped traffic to make a turn (often against the light)."

Greenways

"Clearly, Chapel Hill has a great deal to learn from carrboro (and from any other progressive town) in terms of pedestrian friendly development"

"Signs--something to educate drivers that we have a right to be there. Also, maybe some way to educate new ""road"" bikers about how to follow the rules/be safe? The posters you had at the event were great. I think drivers would be less angry if they didnt see bikes passing on the right or doing other illegal things. Some bikers probably don't care, but I know when I started riding, I wanted to do it right, but i often didn't know the right thing to do in a situation. I felt silly using hand signals until i saw other bikers doing it. Now i feel like i know what i'm doing, but it took years."

bike lanes and paved greenways

I am more interested in improved bike lanes on roads with speed limits above 25mph than in modifications to intersections. I appreciate the bike lane added to Estes Dr. Ext.

Bike paths & greenways everywhere

Bike paths over bike lanes...driver education on bicycling.

clear bike routes from communities to UNC bike paths separate from road public restrooms

"bike lanes, fixed pot holes/grates in existing bike lanes."

Bike lanes need to be continuous and connect to other bike lanes. Too many paths that go nowhere. Bike lanes *separated* from roadways will be required to get more commuters on their bikes. The average commuter doesn't want to ride right next to cars. A single curb divider between roadway and bikeway would be a *HUGE* comfort zone for bike commuters and greatly increase cycling in town.

"Improving cyclist safety with bicycle lanes, overpasses, and underpasses in areas of high traffic. Signs and signals to improve bicycle awareness. Continuity for existing bike ways. Separation of roadway and bikeway wherever possible."

More Mountain biking trails.

"Making safer bicycle routes - including bike routes that are separate from the road (widen the sidewalks like they do in Denmark/Sweden and make them for bikers+peds), bike boxes for safe left turns by bikers (see Portland), and changing the culture so that bikers respect drivers and drivers respect bicyclists right to the road and right-of-way"

If you want more people to bike and less to drive bike racks must be plentiful and right where people want to shop/eat/etc. Not around back jammed next to a dumpster.

"We need to improve bike-to-bus options for Carrboro residents. As long as we're going to keep one of our most

important downtown street corners as public parking and a tree (Weaver/Greensboro adjacent to Phydeax) we should take away 2-3 parking spaces and build covered, single-inverted U bicycle racks with lighting. Carrboro residents could then easily bike to the part of town with the best Chapel Hill Transit service and have a place to store their bikes, even on bad weather days. Even better, get TTA to run service from this location to RTP and Durham from Carrboro during rush hour, like the Chapel hill-Raleigh express."

Clean out the debris from the bike lanes at least twice a week.

"wider roads, not locked in bike lanes"

sweeping the shoulders... its not conducive to have 'bike lanes' if debris and obstacles are in the way

"There should be access from the Morgan Creek Trail to BOTH sides of Greensboro St.. The proposed Morgan Creek Trail will go under Smith Level Rd just south of NC-54. There will be a trail entrance/exit onto Smith Level/Greensboro at that point--which is good because Smith Level/Greensboro serves important destinations including Carrboro High School to the south and Weaver Street and Farmer's Market to the north. Current plans call for trail access from the west side (southbound lane) only. This is wrong. Smith Level is five lanes wide and inexperienced cyclists will be encouraged to travel north on the wrong side of the road unless a trail exit on the east side is also provided. The grade on the east side is not steep--in fact you can already see a makeshift path worn by pedestrians in the grass there. Pedestrians, and to some extent mountain-bikers, will go where they want and will create their own path if the town fails to provide one."

"I have research that documents how marked bicycle lanes can actually have a detrimental effect on safety since it trains motorists to ""ignore"" bicycles in a certain zone and increases right/left turns into them and make cyclists ride in dirty parts of the street. Simply making the streets wide is according to this research better. Please give this your considerations even though it goes against current beliefs."

Find ways for bicyclists (and pedestrians) to cross Hwy 54. Critical to work with Orange Co. and Chapel Hill to extend facilities beyond Carrboro town limits

Better road signs and maps--I am new to the area and it is hard to figure out where one bikeway ends and how it connects to another one.

Downtown needs to be much more bicycle friendly.

"Bike facilities along NC 54, especially the entrance/exit ramps"

"bike trails not part of the road, so there is less danger of being side-swiped by cars!!!"

More bike parking available at local businesses. More education for motorists for how to interact with bikes on the road.
setting/installing trippers to recognize bicycles

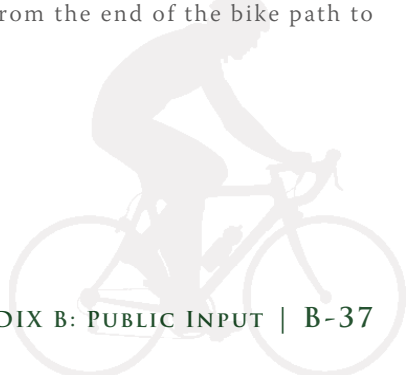
finish the bike lane on estes

"Awareness, More ""Share the Road"" signs, Teaching people bicycle-car etiquette/road rules"

Bikeway from at least Homestead/Old 86 to Hillsborough St./Greensboro St (near McDougle M. School)

It would be nice to have more bike racks in the downtown area (near the restaurant row on Main).

"There needs to be a better way to get through/around the downtown/CarrMill Mall from the end of the bike path to



Chapel. An extension of the bike path to N. Greensboro St. around the rear parking lot of the CarrMill Mall would be great, as would improved bike lanes on Main St/Weaver St."

more bike paths

Teach bikers to ride in the bike lane. Doubling up (and tripling and so forth) during peak hours of traffic is abusive and irritating. This happens a lot. They should have common sense consideration.

On Weaver St in front of the Century Center it would be helpful to remove the parking and modify the curb position a bit so that bike lanes could be added in both directions. I hate the way the bike lanes just end before intersections where the space is taken up by turn lanes. It seems that the cyclists are suppose to disappear. Even if there isn't room for a full width bike lane maybe a narrower bike lane could be indicated so the car drivers won't forget that there are cyclists on the right side of the road.

more bike racks at retail like open eye café

"putting a bike lane on all main roads, preferably on both sides!"

"keep road debris off bike paths; swerving to avoid debris, manhole covers, holes, etc, can force me out into the auto lanes"

There needs to be an equal commitment on the part of Chapel Hill. This is a single/continuous urban area.

Trails to get out of town that are OFF the roadway (or right next to it). A connected system where you can bike from trail to trail on Bike LANES that are safe for children and adults. Bike lanes on ALL busy roads.

"Continuous bike lanes, keeping shoulders and bike lanes clear from debris, taking care of potholes and other road problems on the shoulder and bike lanes"

pave the railroad!!!

relieving downtown congestion so bikers don't have to sit there breathing in exhaust.

Do more off-road hook-ups between neighborhoods. Purchase or claim right-of-way when nesessary from homeowners and apartment complexes.

Often the bike paths are full of debris; I would appreciate more street cleaning!

Creation of more bike lanes and continuation of present bile lanes to form a continuous network rather than a disjointed system.
Connection of all existing facilities. Direct and safe access to all schools.

Taken from Question #32 of the Public Comment Form
NOTE: To prevent censorship, all comments were taken directly from the input forms. Therefore, typographical and grammatical errors occuring within public comments were not edited.

Have you visited a community that you feel has an exemplary bicycle transportation system? Which community was it? Please explain your experience and what aspects of the community would transfer well to improving conditions in Carrboro.

Open Ended Question #32	
Europe locations	20
Carrboro, NC	15
Portland, OR	14
Boulder, CO	10
Davis, CA	10
Madison, WI	8
Seattle, WA	7
Washington DC	4

"Washington, DC. LOVED Rock Creek park and the fact that you could ride quite long distances on bike paths without getting into traffic much at all."

"Madison, Wisconsin"

Hilton Head

"Beijing! I have no idea how it could translate to carrboro, but having entire car lanes devoted to (and filled with) cyclists, and having people on almost every block who could repair bikes was an amazing experience."

"In much of Europe I have seen public covered bike parking, hard bike lanes (separate from roadway and sidewalks) and huge rider usage. I was in Denmark and Germany in July 2008 and it made me realize how far we have to go. Much of Europe is connected by paved bike lanes between towns and cities as well and people from all over the world fly to Europe to tour on bikes. It is much more likely people will ride if there are safe routes that connect to destinations of interest and of need."

I lived for 4 years in the Twin Cities and was really impressed by how easily I could get around by bike. I think it's really important to have well publicized bike routes and easy routes that let you get around freeways.

"Lived in Seattle for 10 years. They have an extensive bike system/trail and several major roads w/ dedicated bike lanes. However, my biggest issue is making bike transportation safer for families w/ children."

"Palo Alto had a bicycle friendly atmosphere. They had big bicycle lanes, and bicycle paths along the side of roads like a sidewalk. Also traffic lights seemed subordinate to pedestrian needs; it seemed like if you pressed the button for a walk sign it came almost immediately."

"Carrboro is absolutely wonderful. However, to protect bicyclists and encourage the sport , we really need to do more."

I have lived in DC and I enjoyed access to numerous paved bike paths that served both commuters and those who enjoyed biking for recreation and fitness.

"No. I hear Madison, WI is excellent. Carrboro's pretty good, I think, but needs to continue to improve: especially, slow down cars on N. Greensboro St. and widen Estes."

"Boulder, CO- There are bike lanes nearly everywhere-busy intersections and downtown streets still feel pretty comfortable for average bicyclists to ride on. In Carrboro, the outlying and arterial streets are pretty comfortable, but once you get downtown it feels dangerous and is often stressful to navigate one's way."

"Denver, Colorado. We lived there for several years. Bike routes along residential streets with little automobile traffic connect to separate bike paths all of which connect to higher traffic roads with bike lanes. Washington DC is also a good bike commuting town in most cases."

"florence, italy. cars are basically banned from the historic center, and they have to pay for a parking permit. otherwise, pedestrians and bicyclists are welcome everywhere. this is typical of most european countries."

"Peachtree City, Ga. and Reston, VA. Both had extensive greenways that encourage cycling to destinations without having to go on a road."

"Phoenix. Its roads were (when I was there, 1985-9) * very wide. I do NOT believe in transportation segregation, e.g. ""bike lanes,"" unless they go everywhere anyone might need to go. Even then, bike lanes are problematic, e.g. for left turns. Rather I advocate wide lanes, esp wide outside lanes. * generally free of on-street car park-

ing. * crowned. Crowning of pavement (i.e. increasing the height of pavement at the the midline of the roadway relative to its outer edges) promotes shedding and prevents pooling of water (and the associated degradation of the roadway due to freeze-thaw cycling). Also better weather (unfortunately non-transferrable :-)"

"London. Lots of bike lanes and crazy driving but it all seems to work. They'll turn about any spare space into a bike lane, and that's a good thing. Cheers"

"Seattle, Vancouver, Portland, Madison, etc. Wide shoulders, bike lanes everywhere, etc. Generally though I think biking in Carrboro is pretty great."
"Santa Barbara has developed an off road network of bicycle paths that allows bikers to easily get to important locations without having to travel in the same lanes as roads, making it more accessible to those who are afraid of riding in traffic."

"Portland, Oregon has a shared roadway system that makes a statement to the effect that alternatives to the automobile are legitimate and of equal importance. I have also cycled in Cape Town, Tokyo and three other cities in Japan, Eugene, Santa Cruz and Monterrey, Santa Monica, Lawrence KS, Washington DC, NYC, Pasadena CA, Palm Springs, and in numerous other towns and cities and I can say that conditions locally are by far the worst. This is mainly due to common attitudes held by NC motorists and their unsafe driving habits."
"Honestly, Carrboro probably has the best bicycle transportation system I've seen, considering the size of the community (but there's always room for improvement). Madison, WI may be the only community I've seen that can compete. They benefit from a large student population, a strong bicycling culture, and dense development, which is not necessarily transferable to Carrboro."

"Berkeley, CA has an excellent, well-connected bike path system with clear maps of routes. Seattle, WA has an excellent system of bike paths near the water to go longer distances."
"Carrboro is the only community I've lived in where I feel safe riding a bike on a regular basis, and where there are enough facilities to do so."

This area has the best bicycle facilities of any I have seen.

"Minneapolis -- in terms of a connected greenway system, it is amazing. On-road lanes are wide and well marked and actually get you places you need to go!"

Carrboro is an example for most other communities!

"I rode through Boulder ,Co once and I was impressed with their bike lanes in traffic."

"I think that Carrboro has an opportunity to become a regional example for bicycle transportation, if it can capitalize on the good steps it has already made."

"Corallis Oregon- lots of bike lanes on roadways, cyclists can trip traffic lights."

"Reston, VA- bike trails throughout town"

"Flat, small towns without major traffic corridors running through them!"

"No- but seeing info on Copenhagen it looks pretty amazing- ""bike roads"" etc."

Any community with separated bike lanes from traffic- I'm an advocate of separating cars and bikes.

Madison

"Pittsburgh had lots of cars, but plenty of lanes and the cars were all going 25 mph."

"Boulder, CO."

"Key West, FL- flat, lots of rental bikes, tolerant motorists."

"Davis, CA: anywhere I wanted to commute, there were safe routes with a great degree of removal from vehicles. Many children and elders commuted and did errands by bike. Traffic signals at major intersections had a bicycle segment."

"Davis, CA,Boulder, CO- bike facilities, bike culture that translate to better motorist behavior around them- this isn't to say that Carrboro is bad, there's just always room for improvement."

"Carrboro has been the best thus far followed by Sacramento, CA."

"Davidson, NC. Good facilities on main roads (though they could use more); but, most destinations reachable by alternate, less-traveled routes. Town also has access to all community facilities (recreation, grocery store, retail, employment) via this formal/informal bike network."

"I recently read an article on Charleston about their decision to become a premier bicycle community, and I thought it was brilliant- Carrboro is too congested with autos, and plenty people are walking and bicycling. Let's encourage the whole community to bicycle: it saves energy, finances, improves health, gets people outdoors. What if we really focused on bicycling as a means of transportation? Create more greenways, decrease traffic congestion. Much potential."

"Portland, Oregon. It's like heaven for cyclists (except for the rain). 1% of their road budget goes to bicycle infrastructure. Cyclists represent 1% of commuter traffic nationwide, so a minimum of 1% of the road budget seems fair. However, if you figure in the savings to townships with higher bicycle ridership, a higher percentage of the budget to encourage more cycling would be wise."

"Most European cities are good about cyclists, especially in the Netherlands."

"Actually, Carrboro is one of the better ones. And we can become even more of a model."

"I think that Carrboro is the best that I have ever seen... we have got to get the east end of Chapel Hill up to par... I am terrified of riding on Estes, Airport and E. Franklin after boundary street!"

"Have you ever been to Boulder, CO? I like CB bikelanes, but Boulder blows us out the water! I was VERY impressed. European-esque, very friendly for cyclists, pedestrian, joggers. Boulder went the distance."

"Amesterdam, The Netherlands"

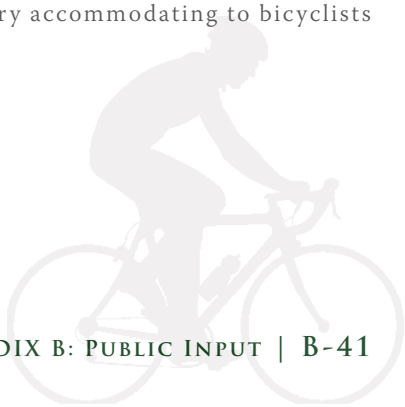
"Portland, Or and Denver Colorado. Both have extensive bike paths that residents use to commute, use as public transportation, and use for errands and shopping. Very accessible and convenient."

Carrboro is pretty good... Madison Wi. is a great biking town. San Fran also had some great biking areas.

many streets are too busy for anyone on a bicycle to be safe. They need a path of thei own. It is much too dangerous. Often they swerve and scare me.

"Portland, Oregon. Bike lanes everywhere, lots of racks and hooks on public transportation. Full time bike advocate in City Hall."

"portland, OR. They are very accommodating to bicyclists with plenty of bike lanes."



"Portland, Oregon. Bike lanes on every road. great public transportation."

"I'm actually in Rotterdam, Netherlands at the moment, and my bike is my primary means of transport (public transport second). Drivers here are used to bikes, so I don't feel as nervous biking here. Also, on the really busy roads, they have bike lanes that are separated from the road by a concrete curb or sometimes raised up like riding on a sidewalk, but this is designated for bikes and a walkway is yet farther off the road. I love biking in those lanes because there's no chance of being brushed by a car and there are no cars parked along the side to have to skim by and watch for someone getting in or out of one. Cars that are turning have to yield to a bike going straight in those lanes. There are also bike racks outside almost every place of business."

"boulder, Co"

"Although improvements would be a good thing (they always are), I feel that facilities in Carrboro are already above average."

"The Netherlands, where I lived for three years, views bikes as an important mode of transportation and designs for them in every aspect of transportation plans. One can truly ride a bike to get anywhere in the country. I rode to work nearly every day because it was safe, inexpensive and healthy."

san francisco. bike friendly. lots of bike lanes.

"Yes, Portland, OR. Extensive system of bike paths. Cycling is an integral element of city/community life. Motorists much more knowlegable of the law as regards cyclists."

"Upsalla, Sweden"

"A good cycling community elimates narrow & dangerous roads (E.g., Smith Level) and provides kids a safe route to bike to high school."

"Madison, Wisconsin, where I grew up has an *excellent* bicycle transportation system. When I was in high school, I would bike to the UW campus from my home for summertime classes. It was about 2.5 miles and was completely safe with bike paths and bike lanes and bike-friendly drivers. Now I live here and my kids will not be able to bike safely the same distance to Carrboro HS. Does that make sense?!"

"I haven't been there but I am very familiar with the bike facilities in Portland and Davis, which I know are exemplary. Also, i wanted to add to the previous 2 questions: my answers were in direct conflict because I know some cars and some cyclists who obey rules and are courteous and others who don't. Also, as a regular cyclist I often don't obey all the traffic rules because there are not the proper facilities in place. For example, sometimes at Weaver St when it is full of cars stopped, I will pass cars on the left, or on the sidewalk to get to the front of the light. If there was enough room to pass in a bike lane, then i wouldn't break the rules, but as it is, I will not be a ""sucker"" who waits an extra long time, when the whole point of a bicycle is that it is so much smaller than it does not cause congestion the way a car does."

n/a

"Boulder CO., interconnected bike lanes, drivers and cyclists aware of proper auto/bike interactions, laws and right of ways."

"Bremen, Germany. They have sidewalks everywhere, with parallel paths separate from the road for bicycles. Here, when riding with children on busy roads we take the sidewalk because to do otherwise would feel unsafe. Also,

while the separate paved bike path in Carrboro starting by the rescue squad is nice; from a potential crime standpoint I would not feel comfortable sending my kids down it alone, or even my wife, especially at night -- something along lighted public roads would have more visibility and feel more safe from the personal safety standpoint. I do like the bike lanes on North Greensboro!"

"Davis, California - has a complete system with bicycle lanes on EVERY street and markings at EVERY intersection directing bicycles to the safest locations; also has slow, calm traffic that respects cyclists. There is the will from citizens in Carrboro and Chapel Hill to do this as well, and paint for bike lanes (with a little maintenance) is not that expensive."

"Palo Alto, California and surrounding area. Wide bike paths along road make it safe."

"I have not, I like much of what I've seen in Carrboro related to cycling but the big thing is getting the riders in / out of town safely. Old 86 is simply too dangerous @ this stage and the inclusion of Winmore will make this worse."

"I lived in the Netherlands and there is a totally COMPREHENSIVE/CONNECTED system of bike lanes, traffic signals for bikes etc. The biggest difference is the safety there for CHILDREN on bikes. My husband and I bike a lot but there are barriers (traffic, lack of bike lanes in places etc.) to biking more places with our elementary age kids."

"Madison, Wisconsin. Many more paths for bicycles, connecting all major parts of the city. But more importantly, the routes into and out of town are FAR BETTER than here. What the Carrboro planners don't realize is that a great deal of traffic in town is due to people who live nearby but out of town. The roads beyond town limits are HORRIBLE for regular cycling. You will not get any of those folks onto bikes until road improvements are made out of town (e.g. Jones Ferry, Dairyland, etc). In Madison, Wisconsin, there are multiple rail-trail paths that go from town to surrounding communities. Plus, their rural roads are wider and less crowded."

"I think Carrboro has done as good a job as I have seen, in the US. Changing the views of drivers and cyclists as transportation alternatives but equals is a big step in the right direction."

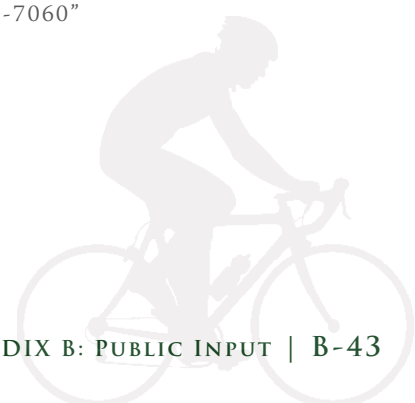
Montgomery County - http://www.cctrail.org/

"I have done a bike tour in Vermont and found the roads to be very accommodating to cyclists. Most roads are paved with a very wide shoulder, even remote areas. Of course, Vermont (in general) does not have the population density that we have."

"Portland, OR -- excellent community support for bicycles. The people and government have integrate biking into everyday life. The light rail has sections for bikes, there are lanes, and bike parking."

"The Netherlands, Germany, France, Italy. Need driver education -- many assume that roads are for cars only. There are lots of motorists harassments of cyclists. You need just one mistake to end up in the hospital. We desperately need bicycle lanes everywhere. There should be no gaps in bicycle lanes. I bike with three young kids (4,6,8 y.o.) and it is a nightmare very often."

"Every community in the Netherlands! Nearly every street is a ""complete street"" with full amenities for both pedestrians and bikers. Such a complete street policy can be pursued here, too - many US communities are adopting it. Please check out: www.completestreets.org (I am interested in helping to pursue this some day - when kids get a bit older. Cara Crisler 265-7060"



Sonoma CA. Very slow speed limits that were actually followed for roads in town or leading into town. I also believe the whole downtown square in Sonoma would transfer well to improving conditions in growth areas of Carrboro and NSA.

Michigan in general has a wonderful bike trail system. Ottawa and Allegan Counties have off road bike trails go for 100's of miles. I have very fond memories of biking on vacations for miles and miles- we would stop places to eat and shop.

"Minneapolis, Minnesota. I lived in St. Paul, MN, for four years going to college, just across the Mississippi River from Minneapolis. I've never experienced a more bike-friendly city, and I've visited Portland, Madison, etc. Minneapolis's bike network is centered around the Midtown Greenway, a rails-to-trails bike path that traverses the entire city east and west. One of the best of its merits is that it is well-connected. To the east, the greenway connects with the Mississippi River bike path and St. Paul. To the west, it connects with suburban bike paths, urban lake trails, and downtown. These are all *off-road*, which is so important because it allows bicyclists to cover long distances quickly and have an enjoyable ride relatively free of the worry and annoyance of automobiles. The trails are conducive to both recreation cycling and bike commuting, are well landscaped in many areas, have plenty of signs and information, and connect with multiple important destinations. Supporting this off-road trail network is a strong network of bike lanes on a well-connected street grid with plenty of bicycle parking (good bike racks, too, not the old comb-like ones). There is a strong bike culture in the Twin Cities, and good support and collaboration between the public sector and nonprofits/businesses. This is why despite the frigid weather in the winter the Twin Cities have higher cycling mode shares than cities in much more moderate climates. I would strongly encourage you to look at Minneapolis as a best practice."

"I don't have experience in a city that has a better bicycle transportation system than Carrboro. Carrboro (and Chapel Hill) could definitely make improvements, but Carrboro (and Chapel Hill) residents need to appreciate the opportunity to cycle safely--to commute or for recreation--and act responsibly on the bike."

This is a different topic but there wasn't space to put it anywhere -- need bike racks on the shared ride feeder vans

"Washington, D.C. area They have many well maintained, long greenways for bicycles to travel many miles to typical areas of living and work without crossing many roads."

seattle has some great bike paths that get you where you want to go
Carrboro really is one of the best around. Keep it up!

"I lived in the Pasadena area. It wasn't perfect, but roads were simply wider."

"Portland (OR), Seattle (WA). Bicycles are respected as a mode of transportation; ample facilities (lanes, racks on buses, rental bikes). I do not understand why a progressive community like Carrboro continues to be so intolerant of cyclists and cycling."

"I believe Cary is heading in the right direction, but the cities really need to look into using the access available through utility right of ways. These are the best place for both walkers and bikers - for drivers too."

"Munich, Germany...very strict enforcement of bicycle laws and many many people ride bikes. I would definitely bike more if lanes were provided and I could feel safer about biking from my house."

"Bike lanes or wide road shoulders would benefit both cyclists and pedestrians, since there are not always side-

walks. Please build them!"

"Ashland, Oregon - traffic calming, dedicated trails Flagstaff, Az - dedicated trail system"

"Lund, Sweden, had lots of designated bike travel paths all over town and the outskirts. This meant that most people used bikes for commuting from home to work/school. Stockholm is also excellent. In the US, Ann Arbor had nice paths and bike lanes all over town, which provided space for cars and bikes to safely coexist."

"Portland Oregon - more bike lanes, bikes share with public transportation"
"Throughout Europe! Especially Dutch, Swiss, and some German cities Bike lanes and wide pedestrian roads are merged on busy, high car-dense roads so bikes aren't in way - bikes have own turn signals, turn lanes & right of way at busy intersections."

"Eugene, Oregon. Great greenways, bike lanes, public awareness. Would love to see Recyclery/Clean Machine combine and expand to something like center for Appropriate Transit http://www.catoregon.org/, and it's various spinoffs like Pedalers Express"

"Haarlem, The Netherlands: Obviously a community that uses bikes more than here, but I was amazed on their system and equal treatment of bikers to cars."

This community has the best bicycle facilities I've ever seen. Unfortunately I think the rest of the Triangle area - not Carrboro itself - needs the most help.

Seattle has a 15 mile bicycle trail running through the North end of the city. Having a continous trail from Carrboro through Chapel Hill that connects all of the major shopping areas (no gaps like downtown Carrboro) would greatly increase the practicality of using a bike instead of a car for all citizens that ride bikes.

"Davis, California"

"florence, italy closes the center of town to cars. if you live there and want to park your car, you have to pay for a parking permit. cycling is encouraged in europe...maybe that's why we're all so heavy. maybe we could take some of the gas tax and use it toward bike lanes...."

no

"Amsterdam, Berlin, Portland, OR...all have well marked and continuous bike trails and paths. In some cases there are even separate bike traffic signals. Motorists are also more aware of cycles on the road."

"Portland, Oregon. Lots of bike lanes, room for bikes on city transportation, dedicated bike lanes, encourage bike as mode of transportation"

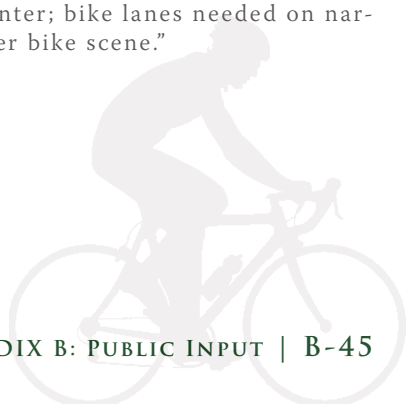
Cameron Street between Merrit Mill and UNC. Nice bike lanes.

Davis!

"Boulder, Co. has really wide shoulders, even out of town. I find in-town Carrboro to be relatively bike friendly, but get to the outskirts and beyond and despite the large number of cyclists there are no facilities."

"I have not, but in general, a wider shoulder would make a huge difference in allowing me to bicycle (or walk) to public transportation and/or work."
I have to say that the Carrboro/Chapel Hill bicycle amenities are the best I have seen. I am trying to get these extended further out. Thanks for your work!

"Madison, Wisconsin. Excellent bike paths in all directions outward from city center; bike lanes needed on narrow roads; strong commuter bike scene."



"I grew up in Denver/Aurora, which has a much more extensive bicycle network that weaves throughout the suburbs. While they have dedicated bike lanes, they also have a large bike path system along canals/greenways to physically separate bicyclists from heavy commuter traffic. This allows bicyclists to feel safer while riding."

"Davis, California in 1992. They had bikeways, bike/pedestrian bridges and tunnels. I would love to see our area become more ""share the road"" friendly. Frankly, I'm not coordinated enough to be fearless on the prettiest places to bike around here!"

"Charlotte has a highly underrated bicycle transportation network. (also, why should it be a problem that cyclists ride 2 abreast, especially if they take up less road width than one person in a car???)"

"Cary has a much more bike friendly greenway/bike trail system. Portland, Oregon and Irvine, CA"

"In Connecticut, because of snow removal needs, roads are built with a 3 foot paved shoulder that is ideal for cyclists...and universal, throughout the state."

"amsterdam, netherlands: most everyone has the experience of riding a bicycle on the road so they are more courteous to others riding a bicycle whether in their vehicle or on another bike. motorist and law makers here need to ride their bike to experience the situation first hand. also, paris has a nice community bike rental system so everyone can rent a bike cheaply and use it even if they don't have their own."

"davis, ca. great parking, great lanes, though things fell apart downtown there too."

"I've definitely dealt with worse than Carrboro, but I do find Durham has more of an active community and discussion of biking issues than CH/Carrboro. One thing that didn't fit in this survey: I find the current bike conditions fine for commuting and fitness biking. But I'm diehard. Where improved facilities and conditions would make a big difference is things like riding with my family to the farmer's market and the Carr Mill. Or running to the grocery store for an errand. And so, making downtown much more friendly to bicyclists of all ages and skills seems extremely important to me."

"Seattle was better, wider and multi lane roads gave cyclists space. Bike lanes not needed, just 12-14' lanes. Hard to share 10 lane with fast traffic here (I commuted Smith Level to Carrboro 4 yrs, annual fatality near current HS for 3 of those yrs. Hi speed narrow hiway discourages cyclists and kills car drivers. Most schools inaccessible except by car)"

Linked greenway/trail system. People are more likely to use a bike for utility if they also use it for recreation.

"Davis, CA. I think improving cycling and pedestrian facilities should be a top priority in all city planning and in all permit considerations where appropriate."

"I enjoyed biking in DC. There were long bike paths that did not interact with roads at all; with a little planning, I could avoid the bad intersections. Drivers were VERY courteous, except for the taxis, it felt much safer than Chapel Hill when the students are there. Seattle was good too--again lots of bike paths that you could use to get all over the city, and they felt safe to be on at night. Seattle seemed to like bikes, too. Same as in san francisco--bikes are an accepted part of life, it seems, so motorists dont get angry. It's just another vehicle that you are waiting behind, same as if it were a car. The bikes behaving safely helps SO MUCH. madison WI brings the front of a bus to their farmers' market, and a bike, so you can practice putting a bike on and off. (It tooks me years to be brave enough to try this for real!)

indianapolis had a long bike path, but it kept crossing roads--it didnt seem that safe to me. I think it is much easier if they can be kept separate. and bike paths that go to convenient places would divert much of the bike traffic off the roads. intertown bike paths would be great, too--like the rail trails. but that's not in carrboro :)"

"Most places are worse than Carrboro, but with overpopulation and sprawl, things are not going to get any better for non-car options unless we just make cars more inconvenient and bikes and public transit more convenient. Otherwise, bicycling will continue to be dangerous, and few novice cyclists will take the leap to bike commuting."

"Main Roads in Cecil County (and perhaps other counties in the eastern shore area) of Maryland have wide (8'?) paved ""shoulder"" lanes possibly as much for agricultural equipment as bicycles, but they are great for bicycling!"

"Seattle, WA. Extensive network of bike paths, not lanes. Gained the sense that bikers and saving the environment was very important to the city...almost more so than driving...by having such great bike paths, people did not have an excuse not to bike or walk."

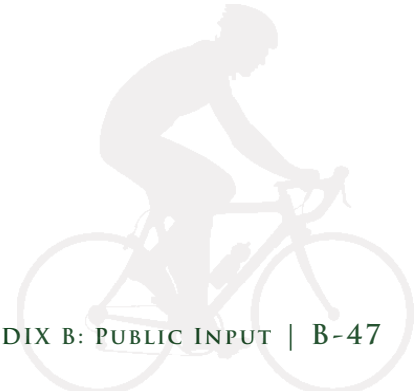
"Madison, WI http://www.cityofmadison.com/trafficEngineering/bicyclingMaps.cfm Davis, CA http://www.city.davis.ca.us/bicycles/maps.cfm The Town of Carrboro needs to make cycling friendly for the commuter if they want to encourage less driving. Safety, safety, safety. Dedicated bike paths, separated bike lanes, lanes free of debris, public restrooms near bike paths, safe passage over/under major thoroughfares and through major intersections."

"Davis, California. They have bike lanes everywhere, ample bike parking, motorists respect bicycles and give them the right of way."

"I moved to Carrboro from Davis, CA last year. Davis was the most bicycle-friendly city I have ever lived in. The entire town was criss-crossed by a network of paved off-road bike paths, and most roads had wide bike lanes. The entire population of Davis commuted to the university by bicycle, skateboard, and rollerblade, and it was safe to do so. Bike-only overpasses or underpasses crossed major highways like highway 80. Carrboro has the potential in that the population *wants* it to be bike friendly, but the infrastructure is missing. There are several only a few dedicated bike paths - mostly in Chapel Hill - and they go nowhere and connect to nothing. Great for running or walking the dog, but useless for commuting. Carrboro has some roads with bike lanes - but many of the bike lanes end before the road does. Examples are Estes, Old Fayetteville, and Jones Ferry. What's the point of a bike lane that ends? People who don't feel comfortable riding in traffic will never bike commute unless they feel safe doing so the entire route. The best options are off-road dedicated bike paths, although those are not always feasible. The next best option is bike lanes with a curb divider from traffic. This keeps those idiots who aren't paying attention from drifting into the bike lane and killing cyclists, which happens too often around the country. These don't take extra space – just a few more dollars for the curb. Towns like Madison, WI, have this arrangement on their major roads. Of course, in a real world, many of us would be happy with just nice wide bike lanes that make a network of routes that connect from the outskirts of town to major destinations such as the Weaver St area and UNC."

"Davis, CA is an excellent model of a small town with a great sense of community, and fous on green/sustainable living. Carrboro reminds me of Davis, with great potential for improving cyclist safety and access. Davis incorporated a comprehensive network of greenways with over and underpasses for major roadway crossings."

Salt Lake CityDesign of roads incorporates bike lanes for long mileage rides.



"YES! Lund, Sweden and Copenhagen, Denmark had FANTASTIC facilities. Every road and intersection had a clear and designated space for bicyclists; bikers were given right of way over drivers (ex. when bike routes crossed car routes, the bike route was level while the cars had to go over the ""curb"" of the bike route); I loved that the bike lanes were primarily set aside from car traffic (all sidewalks were widened to include half the space for bikers - this felt to safe even children could ride), but the merging back into traffic for turning purposes was always very clearly marked. In Lund, there are more bikes than people, and biking is a ""normal"" way to commute, so tolerated that it is safe to bike anywhere because cars are used to it. Also, downtown Lund and many parts of Copenhagen have large pedestrian- and bike-only roads (converted from car-only roads in the 60s and 70s) which are pleasant both for peds and bikers; they also boosted the local businesses."

"Yes, it was Vancouver. I feel that Carrboro is a leader in having far more ped/cyclist in the mainstream population. But I feel that rule breakers- cyclists and drivers- sour the experience for others. Too many places have bike lanes that simply end and leave all in an unsafe situation. We can have more education but at some point there alspo has to be rule enforcement. I want to ride, but am largely afraid to do so."

None that I can think of.

"Portland, oregon has these terrific bike boxes that let bikes move to the front of traffic light queues. If we are really serious about fighting climate change, we need to start doing stuff like this, putting lower-emissions mobility first instead of cars. See here: http://bikeportland.org/2008/03/10/bike-box-billboards-bus-ads-debut/ and here: http://carfreeusa.blogspot.com/2008/03/st-paddys-bike-box-in-portland.html"

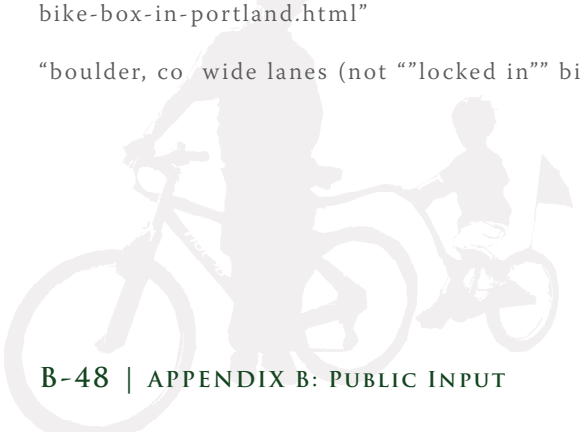
"boulder, co wide lanes (not ""locked in"" bike lanes that lead to drivers ignoring cyclists til it's too late at interesections), recreational paths, education for motorists and cyclists alike (DMV & Local laws)."
"I think the same rules should apply to the road- for cyclists and cars. If cars understand that bikes are allowed to be on the road, they might respect bikes more. separate rules are not equal and create a division of perspective that is harmful to cyclists on the road."

"Spain & Germany--bikes on trains. Germany--serious enforcement of traffic laws for cyclists AND motorists. Shanghai--bike facilities connecting cities, not just inside cities."

"Non-related note: I am a former Seattle city bike commuter and so things like riding in traffic no longer bother me, but for my wife and others I understand how that is a concern. I like to be able to safely travel in a high speed manner which is why I use roads when they are the shortest path. In the Lake Union area of Seattle and at the Pike Place market there is a wide street concept that takes you gradually from pure pedestrian activity to through traffic in an incremental fashion. For some of the busiest places this can be a counterintuitive way to deal with a problem, but I believe this type of integration keeps people more alert and has been proven in other areas. Separation breeds complacency."

"I used to live in Madison Wisconsin where they have made great efforts to include bicycles in their transportation plan. It's not been easy there either, but they have managed some trans-city bicycle routes which assist with commuting. They also have bike lanes in downtown busy roads and lots of bike parking on campus. The bikes are obvious and drivers somewhat used to seeing them, which helps"

I have always enjoyed the rails to trails bike paths and areas that have decent bike route maps.



Lived in Davis California. Had a lot of the same problems with downtown biking. Had a lot more greenways within neighborhoods linking to downtown.

DC has done a lot recently to encourage bike commuting and integrate biking with public transit.

Seattle has a pretty good one.

this is the best i have ever had

"Boulder, CO - extensive use of bike lanes, including at intersections. Good general pedestrian and bicycle awareness and pride in having bicycle-friendly infrastructure and community."

"Seattle, Washington has tons of bike lanes all over the city. The bike lanes are clear bike lanes, not traffic shoulders. They are generally wide and there are no gaps from one point to another. Also, people in Seattle are very respectable to bikers and pedestrians."

"Berlin, Germany. Berlin has bike lanes on all major streets, many of which are clearly divided from the road, and painted red (ie not just separated by a thin white line from the street). I think a more uniform system of bike lanes/sidewalks would be the most important thing that could be done in Carrboro. This would encourage bikers, pedestrians, and cars to stay in their prespective place on the road, and make expectations for each more consistetn at each intersection, crossing, etc. Berlin also has a better culture of awareness about bicyclists and their needs than Carrboro: it is simply more expected that bicyclists will be using the roads. Better, more consistent markings, and more awareness about bikers would be the easiest aspects fo this system to transfer to Carrboro."

Boulder CO

Overall Oregon is fairly bicycle friendly. there are bike lanes in places like Eugene and Portland. There is a bike map for the whole state that indicates which roads are better or worse for cycling. the main problem with Carrboro is that it was not very well laid out to begin with. There is really only one through street east to west (Main) and one going north to south (Greensboro/Hillsboro)unless you go further out to get to Estes or Homestead or the bypass. This puts so much traffic on a few roads. If only Cameron extended into Carrboro and the street east of the RR tracks connected to Estes. There's just not a grid of through streets.

"Recently visited Portland, OR. The cycling culture there is very strong and seems to get lots of support from the city. Portland is much larger but some aspects of support could transfer. There were excellent sources of information about bike routes and commuting and I believe there are some annual 'bike only' events on certain roadways."

portland separates walk/jog lanes from bike lane -- which is crucial to the safety of both -- but forcing bikers into the street with cars is less safe than bike lanes on wide sidewalks.

"YES! Fort Collins Colorado. They have wide bike lanes on most well-travelled roads. When possible, they use bike lanes on parallel roads that aren't as busy. They have an excellent trail system that meets up with the bike lanes and leads to rides in the countryside. They have tons of bike parking - - EVERYONE there bikes. And our climate here is much easier to bike in than there. We just need to make the environmental change for safer roadways and paths."

"Boulder Colorado. This was 15 years ago and even then Boulder had comprehensive bike facilities, bike lanes on all major roads and specific bike paths that connected different parts of the city."

Town of Carrboro
Bicycle Transportation Plan

The Carrboro Bicycle Transportation Plan is nearing its completion and we need your input! Some of the major goals are providing safe, integrated, connected bicycling facilities to serve destinations in and around Carrboro. Improvements can include the installation of on-road bicycle lanes, increasing rider/driver awareness and education as well as safer intersection crossings.

Do you want to bicycle more in Carrboro? Couldn't make it to the last workshop? Drop by while visiting the farmer's market and review proposed bicycle network maps, comment on the Plan's recommendations, and make suggestions for improvements.

Come help shape the future of your community!

PUBLIC WORKSHOP

JULY 23, 2008 5:00-7:30
CARRBORO TOWN HALL
NEXT TO WED. FARMER'S MARKET

The purpose of this public workshop is to gather members of the community to exchange information regarding the future Comprehensive Bicycle Plan for the Town of Carrboro. This meeting will be informal in nature, so please feel free to drop by at any time between 5:00 and 7:30 to listen, learn, or share ideas! Visit ***www.greenways.com/pages/CarrboroBicycle/html*** *for more details.*

TOWN OF CARRBORO • NORTH CAROLINA

GREENWAYS INC.

Fig. B-6 & B-7. Workshop flyers were prepared in English (left) and Spanish (right).

TALLER PÚBLICO

El Plan de Bicicleta de Carrboro

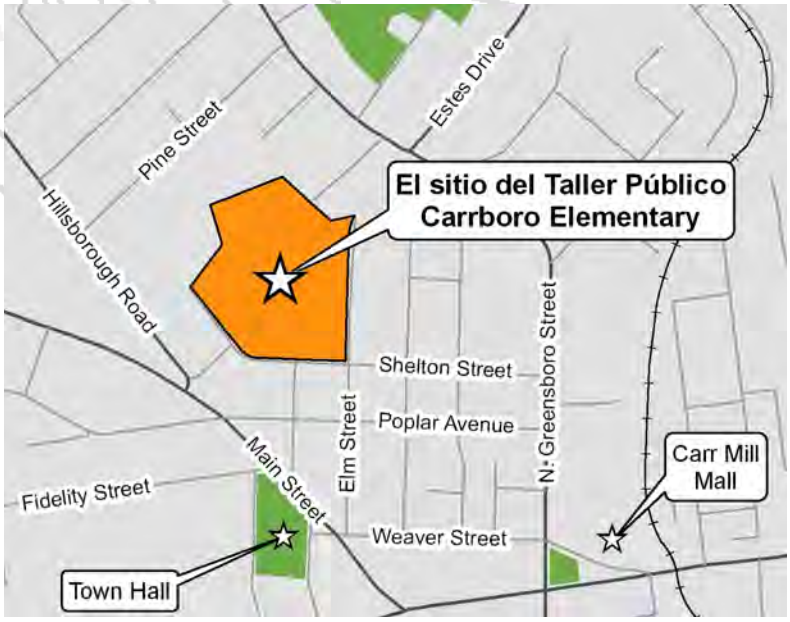
El departamento de planificación ahora está preparando un Plan de Bicicleta y se necesita su ayuda. Una de las metas principales es provenir facilidades seguras e integradas para el pueblo de Carrboro. Las reformas pueden incluir la instalación de más líneas de tráfico para bicicletas, la educación de los conductores, y también la aumentación de seguridad en las bocacalles.

¿Adónde prefiere montar en bicicleta en Carrboro?
¿Piensa que hay calles que requieren atención oficial?
¿Qué tipos de facilidades bicicletas prefiere?

¡TODOS SON BIENVENIDOS—ES EL FUTURO DE SU COMUNIDAD!

10 de abril, 2008 4:30-7:30

CARRBORO ELEMENTARY - Cafetería



Este taller público es una oportunidad de reunir miembros de la comunidad y discutir el futuro del Plan de Bicicleta. La reunión será informal y se puede asistir a cualquier hora entre las 4:30 y las 7:30. Para más detalles, busque el sitio www.greenways.com/pages/CarrboroBicycle/html.

Para más información: Adena Messinger, planificador de transportación
amessinger@ci.carrboro.nc.us

CARRBORO BICYCLE TRANSPORTATION PLAN

A bicycle commuter in Carrboro's downtown

IMPROVING BICYCLING IN CARRBORO

In January of 2008, Town staff, local residents, and the project consultants met to begin work on the Town of Carrboro Bicycle Transportation Plan.

The Bicycle Transportation Plan is part of a statewide matching grants program from NCDOT that is designed to support local communities in their efforts to plan for bicycle improvements. The project consultant, Greenways Inc. (GWI), has successfully completed several such plans with other communities in North Carolina, and has worked in over 150 towns, cities and regions in 35 states to create more liveable communities.

The Bicycle Transportation Plan Steering Committee was selected for their useful expertise and interest in related fields. At the project kick-off meeting in January 2008, participants voiced that connectivity and education were the biggest priorities. Improving and creating connections from residential areas and new development into Downtown as well as local community hubs through a series of loops were one of several ideas. Existing corridors such as Main Street and Greensboro, among others will be examined as future opportunities for bicycling facilities. The Town staff identified major roads and intersections which posed a concern for cyclist safety and require improvements.

Bike parking along Open Eye Cafe

PROJECT NEWSLETTER

PUBLIC PARTICIPATION

More specific goals will be established as public input is gathered, and as the steering committee contributes further to the development of this plan.

There are several ways for you to help shape the future of Carrboro in terms of bicycling and connectivity. High levels of public participation will make this plan more effective for implementation and more relevant for the particular needs of local residents:

1. **Public Input Workshop.**
April 10, 2008, 4:30-7:30 PM at Carrboro Elementary (400 Shelton Street, Carrboro, NC). Stop by to learn more about the Bicycle Plan and talk directly with Steering Committee members and project consultants. Maps will be provided for writing comments, identifying places you would like to get to by bike, and ideas for future opportunities. Please come share your ideas!

The Libba Cotten Bikeway

PROJECT NEWSLETTER #1 APRIL 2008 TOWN OF CARRBORO, NC

Fig. B-8 & B-9. Project newsletters were generated during the planning process for spring (left) and summer (right).

CARRBORO BICYCLE TRANSPORTATION PLAN

HOW TO STAY INVOLVED

PROJECT NEWSLETTER

1. The July 2008 Public Workshop.
July 23, 2008, 5:00-7:30 PM in front of Town Hall (310 W. Main St. Carrboro, NC), next to the Wednesday farmer's market. This will be an opportunity to review the core elements of the Draft Bicycle Transportation Plan, and to comment on the Plan's recommendations.

2. **Support the Adoption of the Final Plan**. In winter of 2008, the Final Plan will be ready for adoption by the Town of Carrboro. It is critical that the Plan be officially adopted in order for its recommendations to be carried out. Adoption of the Plan will send a clear message to outside agencies that the Town of Carrboro has a well thought-out and planned set of bicycle improvements, making them more likely to fund and implement projects. Be sure to write a letter of support to the Board of Aldermen, or show up to support the Plan when it goes before the Board of Aldermen this winter.

3. **Contact a Steering Committee Member.** If you are unable to provide direct input through the upcoming workshop, please contact Adena Messinger, Transportation Planner. See Project Contact Info (at right). She can either answer your questions or direct you to a Steering Committee Member who can.

PROJECT CONTACT INFO

For more information, please contact:
Adena Messinger
Transportation Planner
Town of Carrboro
301 W. Main Street
Carrboro, NC 27510
919-918-7329
amessinger@townofcarrboro.org

GREENWAYS INC.

Appendix Outline:

APPENDIX C: FUNDING

C.0 Overview

The purpose of this appendix is to define and describe possible funding sources that could be used to support the planning, design and development of bicycle improvements.

Implementing the recommendations of this plan will require a strong level of local support and commitment through a variety of local funding mechanisms. Perhaps most important is the addition of bicycle and greenway recommendations from this Plan into the Town's Transportation Improvement Program (TIP). These improvements should become a high priority and be supported through the TIP and local bonds.

For the past two decades, a variety of funding has been used throughout North Carolina to support the planning, design and construction of urban and rural bicycle and greenway projects. The largest single source of funding for these projects has come from the Surface Transportation Act, first the Intermodal Surface Transportation Efficiency Act (ISTEA) in the early to mid 1990s; then its successor, Transportation Equity Act for the Twenty-First Century (TEA-21) through the early part of 2002; and now the Safe, Accountable, Flexible and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). The North Carolina Department of Transportation manages and distributes the majority of federal funds that are derived from the Act to support the development of bicycle/trail development.

The majority of federal funding is distributed to states in the form of block grants and is then distributed throughout a given state for specific projects. State funding programs in North Carolina also support the creation of greenways. North Carolina has developed a broad array of funding sources that address land acquisition, green infrastructure development, and trail facility development.

This appendix is organized by first addressing high priority and state sources of funding, then separate federal and local government funding sources. It is by no means an exhaustive list as there may be many additional funding sources available that should be researched and pursued as well.

C.1 High Priority Funding Options

While there are a number of funding sources provided in the following pages, these sources should be the highest priority in order to achieve successful implementation. It is critical for local government to not delay applying for funding given the competitiveness and changing, finite availabilities of most sources. Details about the following sources are found later in this appendix.

- Local Capital Improvements Program (CIP)
- Local Bond
- Local Fees
- State Transportation Improvement Program (TIP)
- State Powell Bill Funds
- State Safe Routes to School Program
- State Parks and Recreation Trust Fund (PARTF)
- State Health and Wellness Trust Fund (HWTF)
- Private Sources

C.2 State Funding Sources

The most direct source of public-sector funding for the Town of Carrboro will come from state agencies in North Carolina. Generally, these funds are made available to local governments based on grant-in-aid formulas. The single most important key to obtaining state grant funding is for local governments to have adopted plans for greenway, open space, bicycle, pedestrian or trail systems prior to making an application for funding. Unfortunately, there is no direct correlation between any of the programs listed and a constant stream of funding for bicycle projects and all projects are funded on the basis of grant applications. There is no specific set aside amount that is allocated for bicycle development within a given program. Funding is based solely on need and the need has to be expressed and submitted in the form of a grant application. Finally, all of these programs are geared to address needs across the entire state, so all of the programs are competitive and must allocate funding with the needs of the entire state in mind.

The *Powell Bill Program* is an annual state allocation to municipalities for use in street system maintenance and construction activities. There is considerable local control over Powell Bill Funds (it is not a grant application process). In the past, the State allocated a considerable portion of these revenues for construction purposes. However, budgetary constraints since 2001 have led to a shift of new Powell Bill funds to cover maintenance and operations activities. Both the Powell Bill reserves and the 2000 Transportation Bond funds are limited funding sources that will eventually be depleted.

In North Carolina, the *Department of Transportation, Division of Bicycle and Pedestrian Transportation (DBPT)* has been the single largest source of funding for bicycle and greenway projects, including non-construction projects such as brochures, maps, and public safety information for more than a decade. DBPT offers several programs in support of bicycle facility development. The following information is from NCDOT's interactive web site (www.ncdot.org). Contact the NCDOT, Division of Bicycle and Pedestrian Transportation at (919) 807-2804 for more information.

North Carolina programs are listed below. A good starting website with links to many of the state programs is http://www.enr.state.nc.us/html/tax_credits.html.

Funding Opportunities Through NCDOT:

Bicycle and Pedestrian Independent Projects Funded Through the Transportation Improvement Program (TIP):

In North Carolina, the *Department of Transportation, Division of Bicycle and Pedestrian Transportation* (DBPT) manages the Transportation Improvement Program (TIP) selection process for bicycle projects. Projects programmed into the TIP by the DBPT are independent projects – those which are not related to a scheduled highway project. Incidental projects – those related to a scheduled highway project – are handled through other funding sources described in this section.

DBPT has an annual budget of $6 million. Eighty percent of these funds are from Surface Transporta-

tion Program-Enhancement funds, while the State Highway Trust provides the remaining 20 percent of the funding.

A total of $5.3 million dollars of TIP funding is available for funding various bicycle-independent projects, including the construction of multi-use trails, the striping of bicycle lanes, and the construction of paved shoulders, among other facilities. Prospective applicants are encouraged to contact the DBPT regarding funding assistance for bicycle projects. For a detailed description of the TIP project selection process, visit: http://www.ncdot.org/transit/bicycle/funding/funding_TIP.html. Another $500,000 of the division's funding is available for miscellaneous projects.

Incidental Projects – Bicycle accommodations such as bike lanes, widened paved shoulders, and bicycle-safe bridge design are frequently included as incidental features of highway projects. In addition, bicycle-safe drainage grates are a standard feature of all highway construction. Most bicycle safety accommodations built by NCDOT are included as part of scheduled highway improvement projects funded with a combination of National Highway System funds and State Highway Trust Funds.

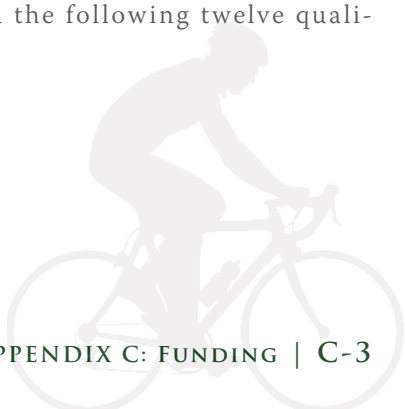
Governor's Highway Safety Program (GHSP) – The mission of the GHSP is to promote highway safety awareness and reduce the number of traffic crashes in the state of North Carolina through the planning and execution of safety programs. GHSP funding is provided through an annual program, upon approval of specific project requests. Amounts of GHSP funds vary from year to year, according to the specific amounts requested. Communities may apply for a GHSP grant to be used as seed money to start a program to enhance highway safety. Once a grant is awarded, funding is provided on a reimbursement basis. Evidence of reductions in crashes, injuries, and fatalities is required. For information on applying for GHSP funding, visit: www.ncdot.org/programs/ghsp/.

Funding Available Through North Carolina Metropolitan Planning Organizations (MPOs)

MPOs in North Carolina which are located in air quality nonattainment or maintenance areas have the authority to program Congestion Mitigation Air Quality (CMAQ) funds. CMAQ funding is intended for projects that reduce transportation related emissions. Some NC MPOs have chosen to use the CMAQ funding for bicycle projects. Local governments in air quality nonattainment or maintenance area should contact their MPO for information on CMAQ funding opportunities for bicycle facilities.

Transportation Enhancement Call for Projects, EU, NCDOT

The Enhancement Unit administers a portion of the enhancement funding set-aside through the Call for Projects process. In North Carolina the Enhancement Program is a federally funded cost reimbursement program with a focus upon improving the transportation experience in and through local North Carolina communities either culturally, aesthetically, or environmentally. The program seeks to encourage diverse modes of travel, increase benefits to communities and to encourage citizen involvement. This is accomplished through the following twelve qualifying activities:



1. Bicycle and Pedestrian Facilities
2. Bicycle and Pedestrian Safety
3. Acquisition of Scenic Easements, Scenic or Historic Sites
4. Scenic or Historic Highway Programs (including tourist or welcome centers)
5. Landscaping and other Scenic Beautification
6. Historic Preservation
7. Rehabilitation of Historic Transportation Facilities
8. Preservation of Abandoned Rail Corridors
9. Control of Outdoor Advertising
10. Archaeological Planning and Research
11. Environmental Mitigation
12. Transportation Museums

Funds are allocated based on an equity formula approved by the Board of Transportation. The formula is applied at the county level and aggregated to the regional level. Available fund amount varies. In previous Calls, the funds available ranged from $10 million to $22 million.

The Call process takes place on even numbered years or as specified by the Secretary of Transportation. For more information, visit: www.ncdot.org/financial/fiscal/Enhancement/

Safe Routes to School Program, managed by NCDOT, DBPT

The NCDOT Safe Routes to School Program is a federally funded program that was initiated by the passing of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) in 2005, which establishes a national SRTS program to distribute funding and institutional support to implement SRTS programs in states and communities across the country. SRTS programs facilitate the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity of schools. The Division of Bicycle and Pedestrian Transportation at NCDOT is charged with disseminating SRTS funding.

The state of North Carolina has been allocated $15 million in Safe Routes to School funding for fiscal years 2005 through 2009 for infrastructure or non-infrastructure projects. All proposed projects must relate to increasing walking or biking to and from an elementary or middle school. An example of a non-infrastructure project is an education or encouragement program to improve rates of walking and biking to school. An example of an infrastructure project is construction of sidewalks around a school. Infrastructure improvements under this program must be made within 2 miles of an elementary or middle school. The state requires the completion of a competitive application to apply for funding. For more information, visit www.ncdot.org/programs/safeRoutes/ or contact DBPT/NCDOT, (919) 807-0774.

State Funding Opportunities Outside of NCDOT:

The North Carolina Conservation Tax Credit (managed by NCDENR)

This program, managed by the North Carolina Department of Environment and Natural Resources, provides an incentive (in the form of an income tax credit) for landowners that donate interests in real property for conservation purposes. Property donations can be fee simple or in the form of conservation easements or bargain sale. The goal of this program is to manage stormwater, protect water supply watersheds, retain working farms and forests, and set-aside greenways for ecological communities, public trails, and wildlife corridors. For more information, visit: www.enr.state.nc.us/conservationtaxcredit/.

Land and Water Conservation Fund (LWCF)

The *Land and Water Conservation Fund* (LWCF) program is a reimbursable, 50/50 matching grants program to states for conservation and recreation purposes, and through the states to local governments to address "close to home" outdoor recreation needs. LWCF grants can be used by communities to build a trail within one park site, if the local government has fee-simple title to the park site. Grants for a maximum of $250,000 in LWCF assistance are awarded yearly to county governments, incorporated municipalities, public authorities and federally recognized Indian tribes. The local match may be provided with in-kind services or cash. The program's funding comes primarily from offshore oil and gas drilling receipts, with an authorized expenditure of $900 million each year. However, Congress generally appropriates only a small fraction of this amount.

The *Land and Water Conservation Fund* (LWCF) has historically been a primary funding source of the US Department of the Interior for outdoor recreation development and land acquisition by local governments and state agencies. In North Carolina, the program is administered by the Department of Environment and Natural Resources. Since 1965, the LWCF program has built a permanent park legacy for present and future generations. In North Carolina alone, the LWCF program has provided more than $63 million in matching grants to protect land and support more than 800 state and local park projects. More than 37,000 acres have been acquired with LWCF assistance to establish a park legacy in our state. For more information, visit: http://ils.unc.edu/parkproject/lwcf/home1.html

NC Adopt-A-Trail Grant Program

This program, operated by the Trails Section of the NC Division of State Parks, offers annual grants to local governments to build, renovate, maintain, sign and map and create brochures for pedestrian trails. Grants are generally capped at about $5,000 per project and do not require a match. A total of $108,000 in Adopt-A-Trail money is awarded annually to government agencies. Applications are due during the month of February. For more information, visit : http://ils.unc.edu/parkproject/trails/grant.html.

Recreational Trails Program

The Recreational Trails Program (RTP) is a grant program funded by Congress with money from the federal gas taxes paid on fuel used by off-highway vehicles. This program's intent is to meet the trail and trail-related recreational needs identified by the Statewide Comprehensive Outdoor Recreation Plan.

Grant applicants must be able contribute 20% of the project cost with cash or in-kind contributions. The program is managed by the State Trails Program, which is a section of the N.C. Division of Parks and Recreation. The grant application is available and instruction handbook is available through the State Trails Program website at: http://ils.unc.edu/parkproject/trails/home.html. Applications are due during the month of February. For more information, call (919) 715-8699.

North Carolina Parks and Recreation Trust Fund (PARTF)

The fund was established in 1994 by the North Carolina General Assembly and is administered by the Parks and Recreation Authority. Through this program, several million dollars each year are available to local governments to fund the acquisition, development and renovation of recreational areas. Applicable projects require a 50/50 match from the local government. Grants for a maximum of $500,000 are awarded yearly to county governments or incorporated municipalities. The fund is fueled by money from the state's portion of the real estate deed transfer tax for property sold in North Carolina.

The trust fund is allocated three ways:

- 65 percent to the state parks through the N.C. Division of Parks and Recreation.
- 30 percent as dollar-for dollar matching grants to local governments for park and recreation purposes.
- 5 percent for the Coastal and Estuarine Water Access Program.

For information on how to apply, visit: www.partf.net/learn.html

Clean Water Management Trust Fund (CWMTF)

This fund was established in 1996 and has become one of the largest sources of money in North Carolina for land and water protection. At the end of each fiscal year, 6.5% of the unreserved credit balance in North Carolina's General Fund, or a minimum of $30 million, is placed in the CWMTF. The revenue of this fund is allocated as grants to local governments, state agencies and conservation nonprofits to help finance projects that specifically address water pollution problems. CWMTF funds may be used to establish a network of riparian buffers and greenways for environmental, educational, and recreational benefits. The fund has provided funding for land acquisition of numerous greenway projects featuring trails, both paved and unpaved. For a history of awarded grants in North Carolina and more information about this fund and applications, visit: www.cwmtf.net/.

Natural Heritage Trust Fund (NHTF)

This trust fund, managed by the NC Natural Heritage Program, has contributed millions of dollars to support the conservation of North Carolina's most significant natural areas and cultural heritage sites. The NHTF is used to acquire and protect land that has significant habitat value. Some large wetland areas may also qualify, depending on their biological integrity and characteristics. Only certain state agencies are eligible to apply for this fund, including the Department of Environment and Natural Resources, the Wildlife Resources Commission, the Department of Cultural Resources and the Department of Agriculture and Consumer Services. As such, municipalities must work with State level partners to access this fund. Additional information

is available from the NC Natural Heritage Program. For more information and grant application information, visit: www.ncnhtf.org/.

North Carolina Conservation Tax Credit Program

North Carolina has a unique incentive program to assist land-owners to protect the environment and the quality of life. A credit is allowed against individual and corporate income taxes when real property is donated for conservation purposes. Interests in property that promote specific public benefits may be donated to a qualified recipient. Such conservation donations qualify for a substantial tax credit. For more information, visit: www.enr.state.nc.us/conservationtaxcredit/.

Urban and Community Forestry Assistance Program

This program offers small grants that can be used to plant urban trees, establish a community arboretum, or other programs that promote tree canopy in urban areas. The program operates as a cooperative partnership between the NC Division of Forest Resources and the USDA Forest Service, Southern Region. To qualify for this program, a community must pledge to develop a street-tree inventory, a municipal tree ordinance, a tree commission, and an urban forestry-management plan. All of these can be funded through the program. For more information, contact the NC Division of Forest Resources. For more information and a grant application, contact the NC Division of Forest Resources and/or visit: http://www.dfr.state.nc.us/urban/urban_grantprogram.htm.

Ecosystem Enhancement Program

Developed in 2003 as a new mechanism to facilitate improved mitigation projects for NC highways, this program offers funding for restoration projects and for protection projects that serve to enhance water quality and wildlife habitat in NC. Information on the program is available by contacting the Natural Heritage Program in the NC Department of Environment and Natural Resources (NCDENR). For more information, visit: www.nceep.net/pages/partners.html or call 919-715-0476.

Conservation Reserve Enhancement Program (CREP)

This program is a joint effort of the North Carolina Division of Soil and Water Conservation, the NC Clean Water Management Trust Fund, the Ecosystem Enhancement Program (EEP), and the Farm Service Agency - United States Department of Agriculture (USDA) to address water quality problems of the Neuse, Tar-Pamlico and Chowan river basins as well as the Jordan Lake watershed area.

CREP is a voluntary program that seeks to protect land along watercourses that is currently in agricultural production. The objectives of the program include installing 100,000 acres of forested riparian buffers, grassed filter strips and wetlands; reducing the impacts of sediment and nutrients within the targeted area; and providing substantial ecological benefits for many wildlife species that are declining in part as a result of habitat loss. Program funding will combine the Federal Conservation Reserve Program (CRP) funding with State funding from the Clean Water Management Trust Fund, Agriculture Cost Share Program, and North Carolina Wetlands Restoration Program.

The program is managed by the NC Division of Soil and Water Conservation. For more information, visit www.enr.state.nc.us/dswc/pages/crep.html

Agriculture Cost Share Program
Established in 1984, this program assists farmers with the cost of installing best management practices (BMPs) that benefit water quality. The program covers as much as 75 percent of the costs to implement BMPs. The NC Division of Soil and Water Conservation within the NC Department of Environment and Natural Resources administers this program through local Soil and Water Conservation Districts (SWCD). For more information, visit: www.enr.state.nc.us/DSWC/pages/agcostshareprogram.html or call 919-733-2302.

Water Resources Development Grant Program
The NC Division of Water Resources offers cost-sharing grants to local governments on projects related to water resources. Of the seven project application categories available, the category which relates to the establishment of greenways is "Land Acquisition and Facility Development for Water-Based Recreation Projects." Applicants may apply for funding for a greenway as long as the greenway is in close proximity to a water body. For more information, see: www.ncwater.org/Financial Assistance or call 919-733-4064.

Small Cities Community Development Block Grants
State level funds are allocated through the NC Department of Commerce, Division of Community Assistance to be used to promote economic development and to serve low-income and moderate-income neighborhoods. Greenways that are part of a community's economic development plans may qualify for assistance under this program. Recreational areas that serve to improve the quality of life in lower income areas may also qualify. Approximately $50 million is available statewide to fund a variety of projects. For more information, visit www.hud.gov/offices/cpd/communitydevelopment/programs/stateadmin/ or call 919-733-2853.

North Carolina Health and Wellness Trust Fund
The *NC Health and Wellness Trust Fund* was created by the General Assembly as one of 3 entities to invest North Carolina's portion of the Tobacco Master Settlement Agreement. HWTF receives one-fourth of the state's tobacco settlement funds, which are paid in annual installments over a 25-year period.

Fit Together, a partnership of the NC Health and Wellness Trust Fund (HWTF) and Blue Cross and Blue Shield of North Carolina (BCBSNC) announces the establishment of *Fit Community*, a designation and grant program that recognizes and rewards North Carolina communities' efforts to support physical activity and healthy eating initiatives, as well as tobacco-free school environments. *Fit Community* is one component of the jointly sponsored *Fit Together* initiative, a statewide prevention campaign designed to raise awareness about obesity and to equip individuals, families and communities with the tools they need to address this important issue.

All North Carolina municipalities and counties are eligible to apply for a *Fit Community* designation, which will be awarded to those that have excelled in supporting the following:

- physical activity in the community, schools, and workplaces
- healthy eating in the community, schools, and workplaces
- tobacco use prevention efforts in schools

Designations will be valid for two years, and designated communities may have the opportunity to reapply for subsequent two-year extensions. The benefits of being a *Fit Community* include:

- heightened statewide attention that can help bolster local community development and/or economic investment initiatives (highway signage and a plaque for the Mayor's or County Commission Chair's office will be provided)
- reinvigoration of a community's sense of civic pride (each *Fit Community* will serve as a model for other communities that are trying to achieve similar goals)
- use of the *Fit Community* designation logo for promotional and communication purposes. The application for *Fit Community* designation is available on the Fit Together Web site:

www.FitTogetherNC.org/FitCommunity.aspx.

Fit Community grants are designed to support innovative strategies that help a community meet its goal to becoming a *Fit Community*. Eight to nine, two-year grants of up to $30,000 annually will be awarded to applicants that have a demonstrated need, proven capacity, and opportunity for positive change in addressing physical activity and/or healthy eating.For more information, visit: www.healthwellnc.com/

Eat Smart, Move More NC Community Grants
The Eat Smart, Move More (ESMM) NC Community Grants program provides funding to local communities to implement strategies that advance the goals and objectives of the ESMM NC Plan. These goals include increasing physical activity opportunities and increasing the number of citizens who get the recommended amount of physical activity. Administered by the Physical Activity and Nutrition branch of the Division of Public Health, the program awards $10,000 - 20,000 to local communities each year. Interested applicants must submit a letter of intent in late June and an application in mid-July. For more information, visit: http://www.eatsmartmovemorenc.com/funding/index.html.

The North Carolina Division of Forest Resources
Urban and Community Forestry Grant can provide funding for a variety of projects that will help toward planning and establishing street trees as well as trees for urban open space. See: http://www.dfr.state.nc.us/urban/urban_ideas.htm

C.3 Funding Allocated by Federal Agencies

Wetlands Reserve Program
This federal funding source is a voluntary program offering technical and financial assistance to landowners who want to restore and protect wetland areas for water quality and wildlife habitat. The US Department of Agriculture's Natural Resource Con-

servation Service (USDA-NRCS) administers the program and provides direct payments to private landowners who agree to place sensitive wetlands under permanent easements. This program can be used to fund the protection of open space and greenways within riparian corridors. For more information, visit: http://www.nrcs.usda.gov/PROGRAMS/wrp/.

The Community Development Block Grant (HUD-CDBG)

The U.S. Department of Housing and Urban Development (HUD) offers financial grants to communities for neighborhood revitalization, economic development, and improvements to community facilities and services, especially in low and moderate income areas. Several communities have used HUD funds to develop greenways, including the Boulding Branch Greenway in High Point, North Carolina. Grants from this program range from $50,000 to $200,000 and are either made to municipalities or non-profits. There is no formal application process. For more information, visit: www.hud.gov/offices/cpd/communitydevelopment/programs/.

USDA Rural Business Enterprise Grants

Public and private nonprofit groups in communities with populations under 50,000 are eligible to apply for grant assistance to help their local small business environment. $1 million is available for North Carolina on an annual basis and may be used for sidewalk and other community facilities. For more information from the local USDA Service Center, visit: http://www.rurdev.usda.gov/rbs/busp/rbeg.htm

Rivers Trails and Conservation Assistance Program (RTCA)

The Rivers, Trails, and Conservation Assistance Program, also known as the *Rivers & Trails Program or RTCA*, is the community assistance arm of the National Park Service. RTCA staff provide technical assistance to community groups and local, State, and federal government agencies so they can conserve rivers, preserve open space, and develop trails and greenways. The RTCA program implements the natural resource conservation and outdoor recreation mission of the National Park Service in communities across America.

Although the program does not provide funding for projects, it does provide valuable on-the-ground technical assistance, from strategic consultation and partnership development to serving as liaison with other government agencies. Communities must apply for assistance. For more information, visit: www.nps.gov/ncrc/programs/rtca/ or call Chris Abbett, Program Leader, at 404-562-3175 ext. 522.

Public Lands Highways Discretionary Fund (PLHDF)

The Federal Highway Administration administers discretionary funding for projects that will reduce congestion and improve air quality. The FHWA issues a call for projects to disseminate this funding. The FHWA estimates that the PLHD funding for the 2007 call will be $85 million. In the past, Congress has earmarked a portion of the total available funding for projects. For information on how to apply, visit: http://www.fhwa.dot.gov/discretionary/

C.4 Local Funding Sources

Municipalities often plan for the funding of pedestrian facilities or improvements through development of Capital Improvement Programs (CIP). In Raleigh, for example, the greenways system has been developed over many years through a dedicated source of annual funding that has ranged from $100,000 to $500,000, administered through the Recreation and Parks Department. CIPs should include all types of capital improvements (water, sewer, buildings, streets, etc.) versus programs for single purposes. This allows municipal decision-makers to balance all capital needs. Typical capital funding mechanisms include the following: capital reserve fund, capital protection ordinances, municipal service district, tax increment financing, taxes, fees, and bonds. Each of these categories are described below.

Capital Reserve Fund

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

Capital Project Ordinances

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

Municipal Service District

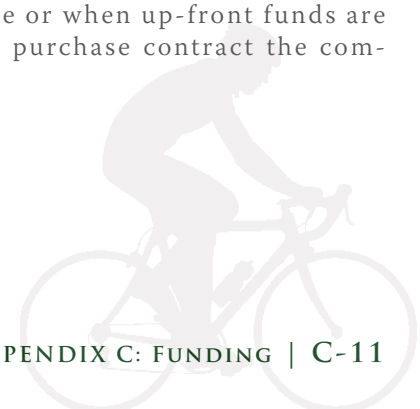
Municipalities have statutory authority to establish municipal service districts, to levy a property tax in the district additional to the citywide property tax, and to use the proceeds to provide services in the district. Downtown revitalization projects are one of the eligible uses of service districts.

Tax Increment Financing

Tax increment financing is a tool to use future gains in taxes to finance the current improvements that will create those gains. When a public project, such as the construction of a greenway, is carried out, there is an increase in the value of surrounding real estate. Oftentimes, new investment in the area follows such a project. This increase sit value and investment creates more taxable property, which increases tax revenues. These increased revenues can be referred to as the "tax increment." Tax Increment Financing dedicates that increased revenue to finance debt issued to pay for the project. TIF is designed to channel funding toward improvements in distressed or underdeveloped areas where development would not otherwise occur. TIF creates funding for public projects that may otherwise be unaffordable to localities. The large majority of states have enabling legislation for tax increment financing.

Installment Purchase Financing

As an alternative to debt financing of capital improvements, communities can execute installment/lease purchase contracts for improvements. This type of financing is typically used for relatively small projects that the seller or a financial institution is willing to finance or when up-front funds are unavailable. In a lease purchase contract the com-



munity leases the property or improvement from the seller or financial institution. The lease is paid in installments that include principal, interest, and associated costs. Upon completion of the lease period, the community owns the property or improvement. While lease purchase contracts are similar to a bond, this arrangement allows the community to acquire the property or improvement without issuing debt. These instruments, however, are more costly than issuing debt.

Taxes

Many communities have raised money through self-imposed increases in taxes and bonds. For example, Pinellas County residents in Florida voted to adopt a one-cent sales tax increase, which provided an additional $5 million for the development of the overwhelmingly popular Pinellas Trail. Sales taxes have also been used in Allegheny County, Pennsylvania, and in Boulder, Colorado to fund open space projects. A gas tax is another method used by some municipalities to fund public improvements. A number of taxes provide direct or indirect funding for the operations of local governments. Some of them are:

Sales Tax

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

Property Tax

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

Excise Taxes

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

Occupancy Tax

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

Fees

Three fee options that have been used by local governments to assist in funding pedestrian and bicycle facilities are listed here:

Stormwater Utility Fees
Greenway sections may be purchased with stormwater fees, if the property in question is used to mitigate floodwater or filter pollutants.

Stormwater charges are typically based on an estimate of the amount of impervious surface on a user's property. Impervious surfaces (such as rooftops and paved areas) increase both the amount and rate of stormwater runoff compared to natural conditions. Such surfaces cause runoff that directly or indirectly discharge into public storm drainage facilities and creates a need for stormwater management services. Thus, users with more impervious surface are charged more for stormwater service than users with less impervious surface. The rates, fees, and charges collected for stormwater management services may not exceed the costs incurred to provide these services. The costs that may be recovered through the stormwater rates, fees, and charges includes any costs necessary to assure that all aspects of stormwater quality and quantity are managed in accordance with federal and state laws, regulations, and rules.

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

Impact Fees
Developers can be required to provide greenway impact fees through local enabling legislation. Impact fees, which are also known as capital contributions, facilities fees, or system development charges, are typically collected from developers or property owners at the time of building permit issuance to pay for capital improvements that provide capacity to serve new growth. The intent of these fees is to avoid burdening existing customers with the costs of providing capacity to serve new growth ("growth pays its own way"). Greenway impact fees are designed to reflect the costs incurred to provide sufficient capacity in the system to meet the additional needs of a growing community. These charges are set in a fee schedule applied uniformly to all new development. Communities that institute impact fees must develop a sound financial model that enables policy makers to justify fee levels for different user groups, and to ensure that revenues generated meet (but do not exceed) the needs of development. Factors used to determine an appropriate impact fee amount can include: lot size, number of occupants, and types of subdivision improvements. If Carrboro is interested in pursuing open space impact fees, it will require enabling legislation to authorize the collection of the fees.

Exactions
Exactions are similar to impact fees in that they provide facilities to growing communities. The difference is that through exactions it can be established

that it is the responsibility of the developer to build the greenway or pedestrian facility that crosses through the property, or adjacent to the property being developed.

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

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

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

General Obligation Bonds
Cities, counties, and service districts generally are able to issue general obligation (G.O.) bonds that are secured by the full faith and credit of the entity. In this case, the local government issuing the bonds pledges to raise its property taxes, or use any other sources of revenue, to generate sufficient revenues to make the debt service payments on the bonds. A general obligation pledge is stronger than a revenue pledge, and thus may carry a lower interest rate than a revenue bond. Frequently, when local governments issue G.O. bonds for public enterprise improvements, the public enterprise will make the debt service payments on the G.O. bonds with revenues generated through the public entity's rates and charges. However, if those rate revenues are insufficient to make the debt payment, the local government is obligated to raise taxes or use other sources of revenue to make the payments. G.O. bonds distribute the costs of land acquisition and greenway development and make funds available for immediate purchases and projects. Voter approval is required.

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

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

C.5 Other Local Options

Facility Maintenance Districts
Facility Maintenance Districts (FMDs) can be created to pay for the costs of on-going maintenance of public facilities and landscaping within the areas of the Town where improvements have been concentrated and where their benefits most directly benefit business and institutional property owners. An FMD is needed in order to assure a sustainable maintenance program. Fees may be based upon the length of lot frontage along streets where improvements have been installed, or upon other factors such as the size of the parcel. The program supported by the FMD should include regular maintenance of streetscape of off road trail improvements. The municipality can initiate public outreach efforts to merchants, the Chamber of Commerce, and property owners. In these meetings, Town staff will discuss the proposed apportionment and allocation methodology and will explore implementation strategies.

The municipality can manage maintenance responsibilities either through its own staff or through private contractors.

Partnerships
Another method of funding facilities is to partner with public agencies and private companies and organizations. Partnerships engender a spirit of cooperation, civic pride and community participation. The key to the involvement of private partners is to make a compelling argument for their participation. Very specific routes that make critical connections to place of business would be targeted for private partners' monetary support following a successful master planning effort. Potential partners include major employers which are located along or accessible to pedestrian facilities such as multi-use paths or greenways. Name recognition for corporate partnerships would be accomplished through signage trail heads or interpretive signage along greenway systems. Utilities often make good partners and many trails now share corridors with them. Money raised from providing an easement to utilities can help defray the costs of maintenance. It is important to have a lawyer review the legal agreement and verify ownership of the subsurface, surface or air rights in order to enter into an agreement.

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

Volunteer Work
It is expected that many citizens will be excited about the development of a greenway corridor. Individual volunteers from the community can be brought together with groups of volunteers form church groups, civic groups, scout troops and environmental groups to work on greenway development on special community work days. Volunteers can also be used for fund-raising, maintenance, and programming needs.

C.6 Private Foundations and Organizations

Many communities have solicited greenway funding assistance from private foundations and other conservation-minded benefactors. Below are a few examples of private funding opportunities available in North Carolina.

Land for Tomorrow Campaign
Land for Tomorrow is a diverse partnership of businesses, conservationists, farmers, environmental groups, health professionals and community groups committed to securing support from the public and General Assembly for protecting land, water and historic places. The campaign is asking the North Carolina General Assembly to support issuance of a bond for $200 million a year for five years to preserve and protect its special land and water resources. *Land for Tomorrow* will enable North Carolina to reach a goal of ensuring that working farms and forests; sanctuaries for wildlife; land bordering streams, parks and greenways; land that helps strengthen communities and promotes job growth; historic downtowns and neighborhoods; and more, will be there to enhance the quality of life for generations to come. For more information, visit http://www.landfortomorrow.org/

The Trust for Public Land
Land conservation is central to the mission of the *Trust for Public Land* (TPL). Founded in 1972, the TPL is the only national nonprofit working exclusively to protect land for human enjoyment and well being. TPL helps conserve land for recreation and spiritual nourishment and to improve the health and quality of life of American communities. TPL's legal and real estate specialists work with landowners, government agencies, and community groups to:

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

The following are TPL's Conservation Services:

- Conservation Vision: TPL helps agencies and communities define conservation priorities, identify lands to be protected, and plan networks of conserved land that meet public need.
- Conservation Finance: TPL helps agencies and communities identify and raise funds for conservation from federal, state, local, and philanthropic sources.
- Conservation Transactions: TPL helps structure, negotiate, and complete land transactions that create parks, playgrounds, and protected natural areas.
- Research & Education: TPL acquires and shares knowledge of conservation issues and techniques to improve the practice of conservation and promote its public benefits.

Since 1972, TPL has worked with willing landowners, community groups, and national, state, and local agencies to complete more than 3,000 land conservation projects in 46 states, protecting more than 2 million acres. Since 1994, TPL has helped states and communities craft and pass over 330 ballot measures, generating almost $25 billion in new conservation-related funding. For more information, visit http://www.tpl.org/.

Z. Smith Reynolds Foundation

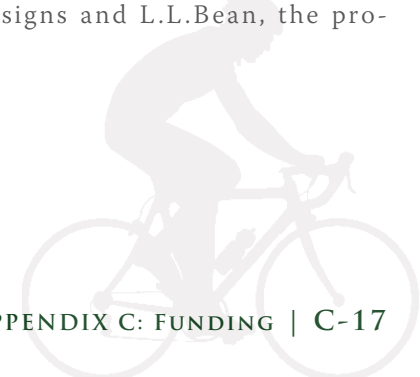
This Winston-Salem based Foundation has been assisting the environmental projects of local governments and non-profits in North Carolina for many years. The foundation has two grant cycles per year and generally does not fund land acquisition. However, the foundation may be able to support municipalities in other areas of greenways development. More information is available at www.zsr.org.

North Carolina Community Foundation

The *North Carolina Community Foundation*, established in 1988, is a statewide foundation seeking gifts from individuals, corporations, and other foundations to build endowments and ensure financial security for nonprofit organizations and institutions throughout the state. Based in Raleigh, North Carolina, the foundation also manages a number of community affiliates throughout North Carolina that make grants in the areas of human services, education, health, arts, religion, civic affairs, and the conservation and preservation of historical, cultural, and environmental resources. In addition, the foundation manages various scholarship programs statewide. Web site: http://nccommunityfoundation.org/

National Trails Fund

In 1998, the American Hiking Society created the *National Trails Fund*, the only privately supported national grants program providing funding to grassroots organizations working toward establishing, protecting and maintaining foot trails in America. Each year, 73 million people enjoy foot trails, yet many of our favorite trails need major repairs due to a $200 million in badly needed maintenance. National Trails Fund grants give local organizations the resources they need to secure access, volunteers, tools and materials to protect America's cherished public trails. For 2005, American Hiking distributed over $40,000 in grants thanks to the generous support of Cascade Designs and L.L.Bean, the pro-



gram's Charter Sponsors. To date, American Hiking has granted more than $240,000 to 56 different trail projects across the U.S. for land acquisition, constituency building campaigns, and traditional trail work projects. Awards range from $500 to $10,000 per project.

What types of projects will American Hiking Society consider? Securing trail lands, including acquisition of trails and trail corridors, and the costs associated with acquiring conservation easements. Building and maintaining trails which will result in visible and substantial ease of access, improved hiker safety, and/or avoidance of environmental damage. Constituency building surrounding specific trail projects - including volunteer recruitment and support. Web site: www.americanhiking.org/alliance/fund.html.

Annual Azalea Celebration

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

Appendix Outline:

APPENDIX D: RELEVANT FEDERAL AND STATE POLICIES

D.0 Overview

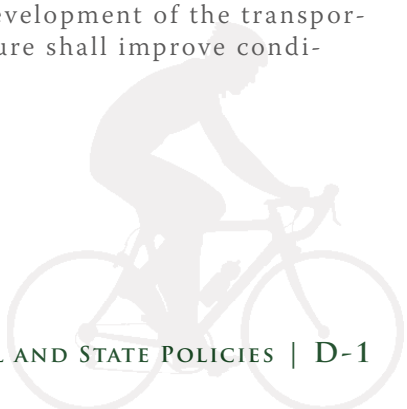
A number of federal and state bicycle and pedestrian policies have been developed in recent years. This appendix covers a number of these policies that are intended to better integrate bicycling and walking into transportation infrastructure.

D.1 Bicycle and Pedestrian Policy

United States Department of Transportation (US DOT)

A United States Department of Transportation (US DOT) policy statement regarding the integration of bicycling and walking into transportation infrastructure recommends that, "bicycling and walking facilities will be incorporated into all transportation projects" unless exceptional circumstances exist. The Policy Statement was drafted by the U.S. Department of Transportation in response to Section 1202 (b) of the Transportation Equity Act for the 21st Century (TEA-21) with the input and assistance of public agencies, professional associations and advocacy groups. USDOT hopes that public agencies, professional associations, advocacy groups, and others adopt this approach as a way of committing themselves to integrating bicycling and walking into the transportation mainstream. The full statement reads as follows, with some minor adjustments for applicability in Carrboro (note: some parts, like #3, are pedestrian-focused):

1. Bicycle and pedestrian ways shall be established in new construction and reconstruction projects in all urbanized areas unless one or more of three conditions are met:
   - Bicyclists and pedestrians are prohibited by law from using the roadway. In this instance, a greater effort may be necessary to accommodate bicyclists and pedestrians elsewhere within the right of way or within the same transportation corridor.
   - The cost of establishing bikeways or walkways would be excessively disproportionate to the need or probable use. Excessively disproportionate is defined as exceeding twenty percent of the cost of the larger transportation project.
   - Where sparsity of population or other factors indicate an absence of need. For example, on low volume, low speed residential streets, or streets with severe topographic or natural resource constraints.
2. In rural areas, paved shoulders should be included in all new construction and reconstruction projects on roadways used by more than 1,000 vehicles per day. Paved shoulders have safety and operational advantages for all road users in addition to providing a place for bicyclists and pedestrians to operate. Rumble strips are not recommended where shoulders are used by bicyclists unless there is a minimum clear path of four feet in which a bicycle may safely operate.
3. Sidewalks, shared use paths, street crossings (including over- and undercrossings), pedestrian signals, signs, street furniture, transit stops and facilities, and all connecting pathways shall be designed, constructed, operated and maintained so that all pedestrians, including people with disabilities, can travel safely and independently.
4. The design and development of the transportation infrastructure shall improve condi-



tions for bicycling and walking through the following additional steps:

- *Planning projects for the long-term.* Transportation facilities are long-term investments that remain in place for many years. The design and construction of new facilities that meet the criteria in item 1) above should anticipate likely future demand for bicycling and walking facilities and not preclude the provision of future improvements. For example, a bridge that is likely to remain in place for 50 years, might be built with sufficient width for safe bicycle and pedestrian use in anticipation that facilities will be available at either end of the bridge even if that is not currently the case.
- *Addressing the need for bicyclists and pedestrians to cross corridors as well as travel along them.* Even where bicyclists and pedestrians may not commonly use a particular travel corridor that is being improved or constructed, they will likely need to be able to cross that corridor safely and conveniently. Therefore, the design of intersections and interchanges shall accommodate bicyclists and pedestrians in a manner that is safe, accessible and convenient.
- *Getting exceptions approved at a senior level.* Exceptions for the non-inclusion of bikeways and walkways shall be approved by a senior manager and be documented with supporting data that indicates the basis for the decision.
- *Designing facilities to the best currently available standards and guidelines.* The design of facilities for bicyclists and pedestrians should follow design guidelines and standards that are commonly used, such as the AASHTO Guide for the Development of Bicycle Facilities, AASHTO's A Policy on Geometric Design of Highways and Streets, and the ITE Recommended Practice "Design and Safety of Pedestrian Facilities. (Many of these guidelines are summarized in Chapter 4: Bicycle Facility Standards)

(Retrieved from http://www.fhwa.dot.gov/environment/bikeped/design.htm on 5/6/2008)

D.2 FHWA Memorandum on Mainstreaming Bicycle and Pedestrian Projects

(See pages 3-5)

U.S. Department of Transportation
Federal Highway Administration

Memorandum

Subject: ACTION: Transmittal of Guidance on Bicycle and Pedestrian Provisions of the Federal-aid Program

Date: February 24, 1999

From: Kenneth R. Wykle
Federal Highway Administrator

In reply, refer to: HEPH-30

To:
Division Administrators
Federal Lands Highway Division Engineers

This memorandum transmits the Federal Highway Administration's (FHWA) Guidance on the Bicycle and Pedestrian Provisions of the Federal-aid Program and reaffirms our strong commitment to improving conditions for bicycling and walking. The nonmotorized modes are an integral part of the mission of FHWA and a critical element of the local, regional, and national transportation system. Bicycle and pedestrian projects and programs are eligible for but not guaranteed funding from almost all of the major Federal-aid funding programs. We expect every transportation agency to make accommodation for bicycling and walking a routine part of their planning, design, construction, operations and maintenance activities.

The Transportation Equity Act for the 21st Century (TEA-21) continues the call for the mainstreaming of bicycle and pedestrian projects into the planning, design, and operation of our Nation's transportation system. Under the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), Federal spending on bicycle and pedestrian improvements increased from $4 million annually to an average of $160 million annually. Nevertheless, the level of commitment to addressing the needs of bicyclists and pedestrians varies greatly from State to State.

The attached guidance explains how bicycle and pedestrian improvements can be routinely included in federally funded transportation projects and programs. I would ask each division office to pass along this guidance to the State DOT and to meet with them to discuss ways of expediting the implementation of bicycle and pedestrian projects. With the guidance as a basis for action, States can then decide the most appropriate ways of mainstreaming the inclusion of bicycle and pedestrian projects and programs.

Bicycling and walking contribute to many of the goals for our transportation system we have at FHWA and at the State and local levels. Increasing bicycling and walking offers the potential for cleaner air, healthier people, reduced congestion, more liveable communities, and more efficient use of precious road space and resources. That is why funds in programs such as Congestion Mitigation and Air Quality Improvement, Transportation Enhancements, and the National Highway System, are eligible to be used for bicycling and

walking improvements that will encourage use of the two modes.

We also have a responsibility to improve the safety of bicycling and walking as the two modes represent more than 14 percent of the 41,000 traffic fatalities the nation endures each year. Pedestrian and bicycle safety is one of FHWA's top priorities and this is reflected in our 1999 Safety Action Plan. As the attached guidance details, TEA-21 has opened up the Hazard Elimination Program to a broader array of bicycle, pedestrian, and traffic calming projects that will improve dangerous locations. The legislation also continues funding for critical safety education and enforcement activities under the leadership of the National Highway Traffic Safety Administration. If we are successful in improving the real and perceived safety of bicyclists and pedestrians, we will also increase use.

You will see from the attached guidance that the Federal-aid Program, as amended by TEA-21, offers an extraordinary range of opportunities to improve conditions for bicycling and walking. Initiatives such as the Transportation and Community and System Preservation Pilot Program and the Access to Jobs program offer exciting new avenues to explore.

Bicycling and walking ought to be accommodated, as an element of good planning, design, and operation, in all new transportation projects unless there are substantial safety or cost reasons for not doing so. Later this year (1999), FHWA will issue design guidance language on approaches to accommodating bicycling and pedestrian travel that will, with the cooperation of AASHTO, ITE, and other interested parties, spell out ways to build bicycle and pedestrian facilities into the fabric of our transportation infrastructure from the outset. We can no longer afford to treat the two modes as an afterthought or luxury.

The TEA-21 makes a great deal possible. However, in the area of bicycling and walking in particular, we must work hard to ensure good intentions and fine policies translate quickly and directly into better conditions for bicycling and walking. While FHWA has limited ability to mandate specific outcomes, I am committed to ensuring that we provide national leadership in three critical areas.

- The FHWA will encourage the development and implementation of bicycle and pedestrian plans as part of the overall transportation planning process. Every statewide and metropolitan transportation plan should address bicycling and walking as an integral part of the overall system, either through the development of a separate bicycle and pedestrian element or by incorporating bicycling and walking provisions throughout the plan. Further, I am instructing each FHWA division office to closely monitor the progress of projects from the long-range transportation plans to the STIPs and TIPs. In the coming months, FHWA will disseminate exemplary projects, programs, and plans, and we will conduct evaluations in selected States and MPOs to determine the effectiveness of the planning process.
- The FHWA will promote the availability and use of the full range of streamlining mechanisms to increase project delivery. The tools are in place for States and local government agencies to speed up the delivery of bicycle and pedestrian projects - it makes no sense to treat installation of a bicycle rack or curb cut the same way we treat a new Interstate highway project - and our division offices must take a lead in promoting and administering these procedures.
- The FHWA will help coordinate the efforts of Federal, State, metropolitan, and other relevant agencies to improve conditions for bicycling and walking. Once again, our division offices must ensure that those involved in implementing bicycle and pedestrian projects at the State and local level are given maximum opportunity to get their job done, unimpeded by regulations and red tape from the Federal level. I am asking each of our division offices to facilitate a dialogue among each State's bicycle and pedestrian coordinator, Transportation Enhancements program manager, Recreational Trails Program administrator, and their local and FHWA counterparts to identify and remove obstacles to the implementation of bicycle and pedestrian projects and programs.

In less than a decade, bicycling and walking have gone from being described by my predecessor Tom Larson as "the forgotten modes" to becoming a serious part of our national transportation system. The growing acceptance of bicycling and walking as modes to be included as part of the transportation mainstream started with passage of ISTEA in 1991 and was given a considerable boost by the Congressionally-mandated National Bicycling and Walking Study. That study, released in 1994, challenges the U.S. Department of Transportation to double the percentage of trips made by foot and bicycle while simultaneously reducing fatalities and injuries suffered by these modes by 10 percent - and we remain committed to achieving these goals.

The impetus of ISTEA and the National Bicycling and Walking Study is clearly reinforced by the bicycle and pedestrian provisions of the TEA-21. The legislation confirms the vital role bicycling and walking must play in creating a balanced, accessible, and safe transportation system for all Americans.

FHWA Guidance (1999) - Bicycle and Pedestrian Provisions of Federal Transportation Legislation

To provide Feedback, Suggestions, or Comments for this page contact Gabe Rousseau at gabe.rousseau@dot.gov.

D.3 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
BOARD OF TRANSPORTATION RESOLUTION: BICYCLING & WALKING IN NORTH CAROLINA, A CRITICAL PART OF THE TRANSPORTATION SYSTEM

(Adopted by the Board of Transportation on September 8, 2000)

The North Carolina Board of Transportation strongly reaffirms its commitment to improving conditions for bicycling and walking, and recognizes nonmotorized modes of transportation as critical elements of the local, regional, and national transportation system.

WHEREAS, increasing bicycling and walking offers the potential for cleaner air, healthier people, reduced congestion, more liveable communities, and more efficient use of road space and resources; and

WHEREAS, crashes involving bicyclists and pedestrians represent more than 14 percent of the nation's traffic fatalities; and

WHEREAS, the Federal Highway Administration (FHWA) in its policy statement "Guidance on the Bicycle and Pedestrian Provisions of the Federal-Aid Program" urges states to include bicycle and pedestrian accommodations in its programmed highway projects; and

WHEREAS, bicycle and pedestrian projects and programs are eligible for funding from almost all of the major Federal-aid funding programs; and

WHEREAS, the Transportation Equity Act for the 21st Century (TEA-21) calls for the mainstreaming of bicycle and pedestrian projects into the planning, design and operation of our Nation's transportation system;

NOW, THEREFORE, BE IT RESOLVED, the North Carolina Board of Transportation concurs that bicycling and walking accommodations shall be a routine part of the North Carolina Department of Transportation's planning, design, construction, and operations activities and supports the Department's study and consideration of methods of improving the inclusion of these modes into the everyday operations of North Carolina's transportation system; and

BE IT FURTHER RESOLVED, North Carolina cities and towns are encouraged to make bicycling and pedestrian improvements an integral part of their transportation planning and programming.

D.4 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
ADMINISTRATIVE ACTION TO INCLUDE LOCAL ADOPTED GREENWAYS PLANS IN THE NCDOT HIGHWAY PLANNING PROCESS

ADOPTED JANUARY, 1994

In 1994 the NCDOT adopted administrative guidelines to consider greenways and greenway crossings

during the highway planning process. This policy was incorporated so that critical corridors which have been adopted by localities for future greenways will not be severed by highway construction. Following are the text for the Greenway Policy and Guidelines for implementing it.

In concurrence with the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and the Board of Transportation's Bicycle Policy of 1978 (updated in 1991) and Pedestrian Policy of 1993, the North Carolina Department of Transportation recognizes the importance of incorporating local greenways plans into its planning process for the development and improvement of highways throughout North Carolina.

NCDOT Responsibilities: The Department will incorporate locally adopted plans for greenways into the ongoing planning processes within the Statewide Planning (thoroughfare plans) and the Planning and Environmental (project plans) Branches of the Division of Highways. This incorporation of greenway plans will be consistent throughout the department. Consideration will be given to including the greenway access as a part of the highway improvement.

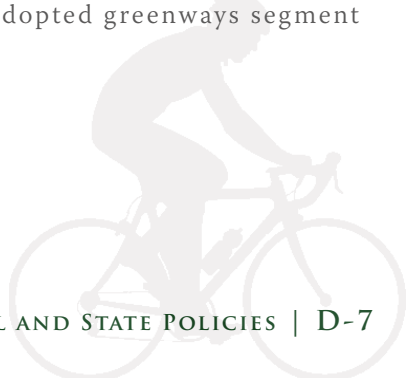
Where possible, within the policies of the Department, within the guidelines set forth in provisions for greenway crossings, or other greenway elements, will be made as a part of the highway project or undertaken as an allowable local expenditure.

Local Responsibilities: Localities must show the same commitment to building their adopted greenway plans as they are requesting when they ask the state to commit to providing for a certain segment of that plan. It is the responsibility of each locality to notify the Department of greenway planning activity and adopted greenway plans and to update the Department with all adopted additions and changes in existing plans.

It is also the responsibility of each locality to consider the adopted transportation plan in their greenways planning and include its adopted greenways planning activities within their local transportation planning process. Localities should place in priority their greenways construction activities and justify the transportation nature of each greenway segment. When there are several planned greenway crossings of a proposed highway improvement, the locality must provide justification of each and place the list of crossings in priority order. Where crossings are planned, transportation rights of way should be designated or acquired separately to avoid jeopardizing the future transportation improvements.

GUIDELINES FOR NCDOT TO COMPLY WITH ADMINISTRATIVE DECISION TO INCORPORATE LOCAL GREENWAYS INTO HIGHWAY PLANNING PROCESS

- Thoroughfare plans will address the existence of greenways planning activity, which has been submitted by local areas. Documentation of mutually agreed upon interface points between the thoroughfare plan and a greenway plan will be kept, and this information will become a part of project files.
- Project Planning Reports will address the existence of locally adopted greenways segment



plans, which may affect the corridor being planned for a highway improvement. It is, however, the responsibility of the locality to notify the Department of the adopted greenways plans (or changes to its previous plans) through its current local transportation plan, as well as its implementation programs.

- Where local greenways plans have not been formally adopted or certain portions of the greenways plans have not been adopted, the Department may note this greenway planning activity but is not required to incorporate this information into its planning reports.
- Where the locality has included adopted greenways plans as a part of its local transportation plan and a segment (or segments) of these greenways fall within the corridor of new highway construction or a highway improvement project, the feasibility study and/or project planning report for this highway improvement will consider the effects of the proposed highway improvement upon the greenway in the same manner as it considers other planning characteristics of the project corridor, such as archeological features or land use.
- Where the locality has justified the transportation versus the leisure use importance of a greenway segment and there is no greenway alternative of equal importance nearby, the project planning report will suggest inclusion of the greenway crossing, or appropriate greenway element, as an incidental part of the highway expenditure.
- Where the locality has not justified the transportation importance of a greenway segment, the greenway crossing, or appropriate greenway element, may be included as a part of the highway improvement plan if the local government covers the cost.
- A locality may add any appropriate/acceptable greenway crossing or greenway element at their own expense to any highway improvement project as long as it meets the design standards of the NCDOT.
- The NCDOT will consider funding for greenway crossings, and other appropriate greenway elements only if the localities guarantee the construction of and/or connection with other greenway segments. This guarantee should be in the form of inclusion in the local capital improvements program or NCDOT/ municipal agreement. If the state pays for the construction of a greenway incidental to a highway improvement and the locality either removes the connecting greenway segments from its adopted greenways plans or decides not to construct its agreed upon greenway segment, the locality will reimburse the state for the cost of the greenway incidental feature. These details will be handled through a municipal agreement.
- Locality must accept maintenanceresponsibilities for state-built greenways, or portions thereof. Details will be handled through a municipal agreement.

D.5 NCDOT Bicycle Policy

General

Pursuant to the Bicycle and Bikeways Act of 1974, the Board of Transportation finds that bicycling is a bonafide highway purpose subject to the same

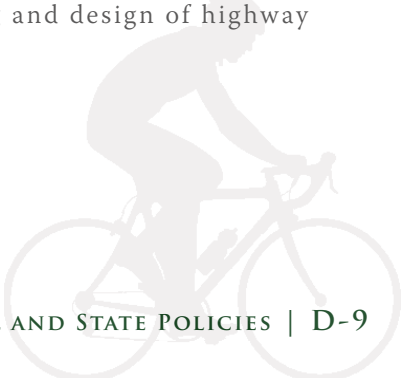
rights and responsibilities and eligible for the same considerations as other highway purposes, as elaborated below.

1. The Board of Transportation endorses the concept that bicycle transportation is an integral part of the comprehensive transportation system in North Carolina.
2. The Board of Transportation endorses the concept of providing bicycle transportation facilities within the rights-of-way of highways deemed appropriated by the Board.
3. The Board of Transportation will adopt Design Guidelines for Bicycle Facilities. These guidelines will include criteria for selecting cost-effective and safety-effective bicycle facility types and a procedure for prioritizing bicycle facility improvements.
4. Bicycle compatibility shall be a goal for state highways, except on fully controlled access highways where bicycles are prohibited, in order to provide reasonably safe bicycle use.
5. All bicycle transportation facilities approved by the Board of Transportation shall conform with the adopted "Design Guidelines for Bicycle Facilities" on statefunded projects, and also with guidelines published by the American Association of State Highway and Transportation Officials (AASHTO) on federal aid projects.

Planning and Design

It is the policy of the Board of Transportation that bicycle facility planning be included in the state thoroughfare and project planning process.

1. The intent to include planning for bicycle facilities within new highway construction and improvement projects is to be noted in the Transportation Improvement Program.
2. During the thoroughfare planning process, bicycle usage shall be presumed to exist along certain corridors (e.g., between residential developments, schools, businesses and recreational areas). Within the project planning process, each project shall have a documented finding with regard to existing or future bicycling needs. In order to use available funds efficiently, each finding shall include measures of cost-effectiveness and safety effectiveness of any proposed bicycle facility.
3. If bicycle usage is shown likely to be significant, and it is not prohibited, and there are positive cost-effective and safety-effective findings; then, plans for and designs of highway construction projects along new corridors, and for improvement projects along existing highways, shall include provisions for bicycle facilities (e.g., bike routes, bike lanes, bike paths, paved shoulders, wide outside lanes, bike trails) and secondary bicycle facilities (traffic control, parking, information devices, etc.).
4. Federally funded new bridges, grade separated interchanges, tunnels, and viaducts, and their improvements, shall be designed to provide safe access to bicycles, pursuant to the policies of the Federal Highway Administration.
5. Barriers to existing bicycling shall be avoided in the planning and design of highway



projects.

6. Although separate bicycle facilities (e.g., bike paths, bike trails) are useful under some conditions and can have great value for exclusively recreational purposes, incorporation of on road bicycle facilities (e.g., bicycle lanes, paved shoulders) in highway projects are preferred for safety reasons over separate bicycle facilities parallel to major roadways. Secondary complementary bicycle facilities (e.g., traffic control, parking, information devices, etc.) should be designed to be within highway rights-of-way.
7. Technical assistance shall be provided in the planning and design of alternative transportation uses, including bicycling, for abandoned railroad rights-of way. This assistance would be pursuant to the National Trails Act Amendment of 1983, and the resultant national Rails to Trails program, as will the Railway Revitalization Act of 1975.
8. Wherever appropriate, bicycle facilities shall be integrated into the study, planning, design, and implementation of state funded transportation projects involving air, rail, and marine transportation, and public parking facilities.
9. The development of new and improved bicycle control and information signs is encouraged for the increased safety of all highway users.
10. The development of bicycle demonstration projects which foster innovations in planning, design, construction, and maintenance is encouraged.
11. Paved shoulders shall be encouraged as appropriate along highways for the safety of all highway users, and should be designed to accommodate bicycle traffic.
12. Environmental Documents/Planning Studies for transportation projects shall evaluate the potential use of the facility by bicyclists and determine whether special bicycle facility design is appropriate.
13. Local input and advice shall be sought, to the degree practicable, during the planning stage and in advance of the final design of roadway improvements to ensure appropriate consideration of bicycling needs, if significant.
14. On highways where bicycle facilities exist, (bike paths, bike lanes, bike routes, paved shoulders, wide curb lanes, etc.), new highway improvements shall be planned and implemented to maintain the level of existing safety for bicyclists.
15. Any new or improved highway project designed and constructed within a public use transportation corridor with private funding shall include the same bicycle facility considerations as if the project had been funded with public funds. In private transportation projects (including parking facilities), where state funding or Department approval is not involved, the same guidelines and standards for providing bicycle facilities should be encouraged.

Construction

It is the policy of the Board of Transportation that all state and federally funded highway projects incorporating bicycle facility improvements shall be constructed in accordance with approved state and

federal guidelines and standards.

1. Bicycle facilities shall be constructed, and bicycle compatibility shall be provided for, in accordance with adopted Design Guidelines for Bicycle Facilities and with guidelines of the American Association of State Highway and Transportation Officials.
2. Rumble strips (raised traffic bars), asphalt concrete dikes, reflectors, and other such surface alterations, where installed, shall be placed in a manner as not to present hazards to bicyclists where bicycle use exists or is likely to exist. Rumble strips shall not be extended across shoulder or other areas intended for bicycle travel.
3. During restriping operations, motor vehicle traffic lanes may be narrowed to allow for wider curb lanes.

Maintenance

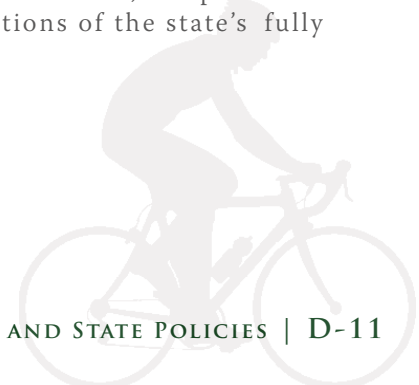
It is the policy of the Board of Transportation that the state highway system, including state-funded bicycle facilities, shall be maintained in a manner conducive to bicycle safety.

1. State and federally funded and built bicycle facilities within the state right-of-way are to be maintained to the same degree as the state highway system.
2. In the maintenance, repair, and resurfacing of highways, bridges, and other transportation facilities, and in the installation of utilities or other structures, nothing shall be done to diminish existing bicycle compatibility.
3. Rough road surfaces which are acceptable to motor vehicle traffic may be unsuitable for bicycle traffic, and special consideration may be necessary for highways with significant bicycle usage.
4. For any state-funded bicycle project not constructed on state right-of-way, maintenance agreement stating that maintenance shall be the total responsibility of the local government sponsor shall be negotiated between the Department and the local government sponsor.
5. Pot-holes, edge erosion, debris, etc., are special problems for bicyclists, and their elimination should be a part of each Division's maintenance program. On identified bicycle facilities, the bike lanes and paths should be routinely swept and cleared of grass intrusion, undertaken within the discretion and capabilities of Division forces.

Operations

It is the policy of the Board of Transportation that operations and activities on the state highway system and bicycle facilities shall be conducted in a manner conducive to bicycle safety.

1. A bicyclist has the right to travel at a speed less than that of the normal motor vehicle traffic. In exercising this right, the bicyclist shall also be responsible to drive his/her vehicle safely, with due consideration to the rights of the other motor vehicle operators and bicyclists and in compliance with the motor vehicle laws of North Carolina.
2. 2. On a case by case basis, the paved shoulders of those portions of the state's fully



controlled access highways may be studied and considered as an exception for usage by bicyclists where adjacent highways do not exist or are more dangerous for bicycling. Pursuant to federal highway policy, usage by bicyclists must receive prior approval by the Board of Transportation for each specific segment for which such usage is deemed appropriate, and those segments shall be appropriately signed for that usage.

3. State, county, and local law enforcement agencies are encouraged to provide specific training for law enforcement personnel with regard to bicycling.
4. The use of approved safety helmets by all bicyclists is encouraged.

Education

It is the policy of the Board of Transportation that education of both motorists and bicyclists, regarding the rights and responsibilities of bicycle riders, shall be an integral part of the Department's Bicycle Program.

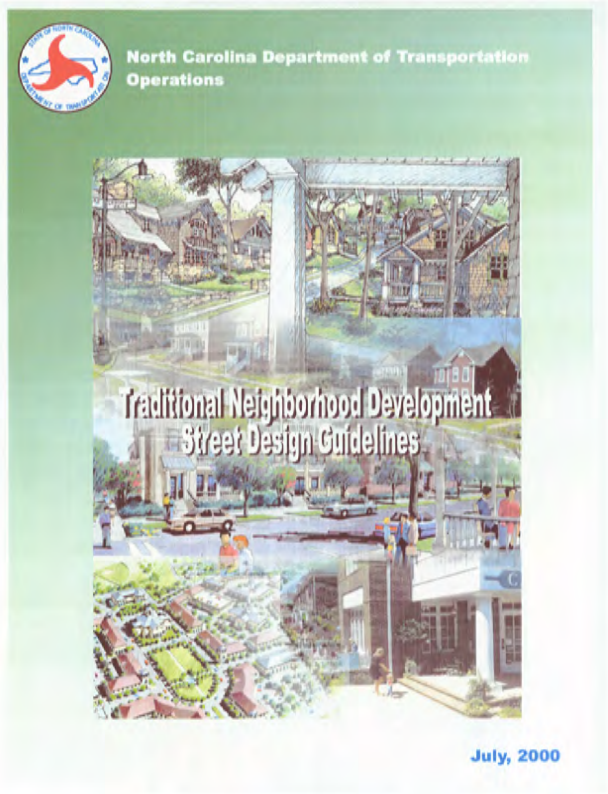
School systems are encouraged to conduct bicycle safety education programs as a part of and in addition to the driver's education program, to the maximum extent practicable, and in conjunction with safety efforts through the Governor's Highway Safety Program. The Division of Motor Vehicles is also urged to include bicycle safety and user information in its motor vehicle safety publications.

Parking

It is the policy of the Board of Transportation that secure and adequate bicycle parking facilities shall be provided wherever practicable and warranted in the design and construction of all state-funded buildings, parks, and recreational facilities.

D.6 NCDOT Traditional Neighborhood Development Street Design Guidelines

NCDOT's Traditional Neighborhood Development Street Design Guidlines are available for proposed TND developments and permits localities and developers to design certain roadways according to the TND guidelines rather than the conventional subdivision street standards. The guidelines recognize that in TND developments, mixed uses are encouraged and pedestrians and bicyclists are accomodated on multi-mode/shared streets.



Appendix Outline:

Appendix E: Values of Bicycle Transportation

E.0 The Value of Bicycle Transportation

Given the extensive commitment of time and resources needed to fulfill the goals of this plan, it is also important to assess the immense value of bicycle transportation.

Scores of studies from experts in the fields of public health, urban planning, urban ecology, real estate, transportation, sociology, and economics have supported such claims and affirm the substantial value of supporting bicycling as it relates to active living and alternative transportation. Communities across the United States and throughout the world are implementing strategies for serving the bicycle needs of their residents, and have been doing so for many years. They do this because of their obligations to promote health, safety and welfare, and also because of the growing awareness of the many benefits of bicycling.

E.1 Increased Health and Physical Activity

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

The CDC determined that creating and improving places to be active could result in a 25 percent increase in the number of people who exercise at least three times a week[2]. This is significant considering that for people who are inactive, even small increases in physical activity can bring measurable health benefits. Enhancing a safe and reliable bicycle network in Carrboro will positively impact the health of local residents. The Rails-to-Trails Conservancy puts it simply: "Individuals must choose to exercise, but communities can make that choice easier[3]."

E.2 Economic Benefits

Bicycling is an affordable form of transportation. According to the Pedestrian and Bicycle Information Center (PBIC), of Chapel Hill, NC, the cost of operating a bicycle for a year is approximately $120, compared to $7,800 for operating a car over the same time period[4]. Bicycling becomes even more attractive from an economic standpoint when the rising price of oil (and decreasing availability) is factored into the equation. Since 2000, oil prices have more than quadrupled. As of summer 2008, gasoline prices have topped $4 a gallon and are generally forecast to continue to increase[5]. The rising cost of fuel reinforces the idea that local communities should be built to accommodate people-powered transportation, such as walking and biking. Carrboro's current compact land development patterns, combined with new strategies for improving bicycle transportation, could facilitate a substantial local reduction in auto- and oil-dependency.

From a real estate standpoint, consider the positive impact of trails and greenways, which are essential components of a complete bicycle network. Accord-

ing to a 2002 survey of recent homebuyers by the National Association of Home Realtors and the National Association of Home Builders, trails ranked as the second most important community amenity out of a list of 18 choices[6]. Additionally, the study found that 'trail availability' outranked 16 other options including security, ball fields, golf courses, parks, and access to shopping or business centers. Findings from the American Planning Association (How Cities Use Parks for Economic Development, 2002), the Rails-to-Trails Conservancy (Economic Benefits of Trails and Greenways, 2005), and the Trust for Public Land (Economic Benefits of Parks and Open Space, 1999) further substantiate the positive connection between trails and property values across the country.

Finally, from a tourism perspective, cyclists can add real value to local economies. For example, in the Outer Banks, NC, bicycling is estimated to have an annual economic impact of $60 million; 1,407 jobs are supported by the 40,800 visitors for whom bicycling was an important reason for choosing to vacation in the area. The annual return on bicycle facility development in the Outer Banks is approximately nine times higher than the initial investment[7]. Similarly, Damascus, VA, the self-proclaimed 'Friendliest Trail Town', features 34-miles of trail where approximately $2.5 million is spent annually related to recreation visits. Of this amount, non-local visitors spend about $1.2 million directly into the economies of Washington and Grayson counties[8]. While these examples feature beach and mountain destinations, the Town of Carrboro also has key advantages, such as a popular downtown, events at UNC-Chapel Hill, and the proximity of a large population of potential riders/tourists. In fact, local tourism also experiences a boost from area cyclists, many of whom ride in Carrboro and spend time and money in downtown.

E.3 Environmental Improvements

As demonstrated by the Southern Resource Center of the Federal Highway Administration, when get out of their cars and onto their bicycles, they reduce measurable volumes of pollutants[9]. Other environmental impacts include a reduction in overall neighborhood noise levels and improvements in local water quality as fewer automobile-related discharges wind up in the local rivers, streams, and lakes.

Trails and greenways are also part of any bicycle network, conveying unique environmental benefits. Greenways protect and link fragmented habitat and provide opportunities for protecting plant and animal species. Aside from connecting places without the use of air-polluting automobiles, trails and greenways also reduce air pollution by protecting large areas of plants that create oxygen and filter air pollutants such as ozone, sulfur dioxide, carbon monoxide and airborne particles of heavy metal. Finally, greenways improve water quality by creating a natural buffer zone that protects streams, rivers and lakes, preventing soil erosion and filtering pollution caused by agricultural and road runoff.

E.4 Transportation Benefits

In 2001, the National Household Travel Survey found that roughly 40% of all trips taken by car are less than 2 miles. By taking these short trips on a bicycle, rather than in a car, citizens can substantially

impact local traffic and congestion. Additionally, many people do not have access to a vehicle or are not able to drive. According to the National Household Travel Survey (NHTS), one in 12 U.S. households does not own an automobile and approximately 12 percent of persons 15 or older do not drive[10]. An improved bicycle network provides greater and safer mobility for these residents.

Traffic congestion is often a major problem in fast growing areas, such as Orange County. Congestion reduces mobility, increases auto-operating costs, adds to air pollution, and causes stress. Bicycle users can help alleviate overall congestion because each cyclist is one less car on the road. Incidentally, cyclists take up significantly less space on the road (see images at left). While some may argue over the degree to which overall congestion is alleviated by cyclists, one aspect of the argument is particularly difficult to challenge: for the individuals who choose to ride a bike rather than drive, the negative impacts of congestion (stress, operating costs, and sometimes even mobility) are greatly reduced.

E.5 Quality of Life

Many factors go into determining quality of life for the citizens of a community: the local education system, prevalence of quality employment opportunities, and affordability of housing are all items that are commonly cited. Increasingly though, citizens claim that access to alternative means of transportation and access to quality recreational opportunities such as parks, trails, greenways, and bicycle routes, are important factors for them in determining their overall pleasure within their community. Communities with such amenities can attract new businesses, industries, and in turn, new residents. Furthermore, quality of life is positively impacted by bicycling through the increased social connections that take place by residents being active, talking to one another and spending more time outdoors and in their communities.

According to the Brookings Institution, the number of older Americans is expected to double over the next 25 years[11]. All but the most fortunate seniors will confront an array of medical and other constraints on their mobility even as they continue to seek both an active community life, and the ability to age in place. Trails built as part of the bicycle transportation network generally do not allow for motor vehicles. However, they do accommodate motorized wheelchairs, which is an important asset for the growing number of senior citizens who deserve access to independent mobility.

Children under 16 are another important subset of our society who deserve access to safe mobility and a higher quality of life. According to the U.S. Environmental Protection Agency, fewer children walk or bike to school than did so a generation ago. In 1969, 48 percent of students walked or biked to school, but by 2001, less than 16 percent of students between 5 and 15 walked or biked to or from school[12].

According to the National Center for Safe Routes to School, "Walking or biking to school gives children time for physical activity and a sense of responsibility and independence; allows them to enjoy being outside; and provides them with time to socialize with their parents and friends and to get to know their neighborhoods[13]." In a 2004 CDC survey, 1,588

adults answered questions about barriers to walking to school for their youngest child aged 5 to 18 years[14]. The main reasons cited by parents included distance to school, at 62%, and traffic-related danger, at 30%. Strategic additions to Carrboro's trail system could shorten the distance from homes to schools, and overall bicycle improvements can improve the safety of our roadways.

E.6 Quantifiable Benefits for Carrboro

Non-motorized transportation can serve recreational purposes, improve mobility, and improve health. The "BikeCost" model, made available by the National Pedestrian and Bicycle Information Center (http://www.bicyclinginfo.org/bikecost), quantifies these benefits. Though focused primarily on bicycling, the model provides a starting point for identifying the potential cost savings of improving Carrboro's non-motorized transportation system.

Several modeling assumptions should be discussed. First, the BikeCost model is project-specific, requiring specific information regarding project type, facility length and year of construction. Because this study focuses on a larger study area, several variables were used. The model was based on the addition of 5 miles of proposed new on-street bicycle lanes. The expected "mid year" of construction for the new system was assumed to be 2011. The model also required other inputs obtainable from the 2000 U.S. Census, including bicycle commute mode share, average population density, and average household size.

Based on the variables described above, the BikeCost model estimated annual recreational, mobility and health benefits. The benefits were quantified based on a combination of research from previous studies as well as other factors (identified in the footnotes in the table below).

The table below summarizes the estimated benefits of enhancing the bicycle lane network in Carrboro by five miles. Except for mobility benefits, the model outputs represent aggregate benefits of a potential future system of bicycle lanes. Potential annual recreational benefits range from a low estimate of about $3 million to a high estimate of over $31 million. Annual health benefits range from about $178,000 to about $1.2 million. Mobility benefits were estimated on a per-trip, daily and annual basis. The roughly $3.60 per-trip benefit of bicycle lanes could translate to an annual benefit of nearly $2 million. Decreased auto usage could also generate monetary benefits. As most of the study area is generally urban in character, the enhanced bikeway network could generate over $169,000 in annual savings from reduced vehicle trips.

ESTIMATED AGGREGATE ANNUAL BENEFITS OF AN ENHANCED BICYCLE NETWORK

Annual Benefits

	Low Estimate	Mid Estimate	High Estimate
Recreation	$3,057,159	$19,769,628	$31,590,643
	Per Trip	Daily	Annually
Mobility-Bicycle Lane	$3.60	$7,904	$1,857,540
	Low Estimate	Mid Estimate	High Estimate
Health	$178,683	$764,764	$1,179,310
	Urban	Suburban	Rural
Decreased Auto Use	$169,596	$104,367	$13,046

Source: *Benefit-Cost Analysis of Bicycle Facilities* ("Bike-Cost") Model, Pedestrian and Bicycle Information Center.
(1) Recreational benefit estimated at $10 per hour (based on previous studies). Assumes one hour of recreation per adult. $10 value multiplied by the number of new cyclists minus the number of new commuters. This value multiplied by 365 days to estimate annual benefit.
(2) Assumes an hourly time value of $12. This value multiplied by 15.38 minutes (the amount of extra time bicycle commuters are willing to spend to travel on a bicycle lane without adjacent on-street parking). Per-trip benefit then multiplied by the daily number of existing and induced commuters. This value then doubled to account for round-trips, to reach daily mobility benefit. Daily benefit then multiplied by 50 weeks per year and 5 days per week.
(3) Based on a network of 118 additional miles of off-street trails.
(4) Based on a network of 236 additional miles of on-street bicycle lanes.
(5) Annual per-capita cost savings from physical activity of $128 based on previous studies. This value then multiplied by total number of new cyclists.

Footnotes

1. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. (1996). *Physical Activity and Health: A Report of the Surgeon General.*

2. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. (2002). *Guide to Community Preventive Services.*

3. Rails-to-Trails Conservancy. (2006) *Health and Wellness Benefits.*

4. Pedestrian and Bicycle Information Center. (2008). *Economic Benefits: Money Facts*. Retrieved 8/8/2008 from www.bicyclinginfo.org/why/benefits_economic.cfm

5. King, Neil. *The Wall Street Journal: Another Peek at the Plateau.* (2/27/08): In February 2008, the Wall Street Journal quoted industry experts, stating, "supply constraints could push the price of oil to $150 a barrel by 2010".

6. National Association of Realtors and National Association of Home Builders. (2002). *Consumer's Survey on Smart Choices for Home Buyers.*

7. NCDOT and ITRE. (2006). *Bikeways to Prosperity: Assessing the Economic Impact of Bicycle Facilities.*

8. Virginia Department of Conservation. (2004). *The Virginia Creeper Trail: An Assessment of User Demographics, Preferences, and Economics.*

9. Federal Highway Administration, Southern Resource Center. (1999). *Off-Mode Air Quality Analysis: A Compendium of Practice. To calculate air quality benefits of bicycling, first calculate the Daily VMT reduction.* VMT Reduction = PD * Area * L * BMS, where PD = Population density, persons/mile; Area = Project length * 1 mile radius, mile; L = Round trip length, one-half of the project length times 2 daily trips, miles; BMS = Bike mode share, %. Last, calculate the Daily Emission reductions for a pollutant. Ed = EFx * VMT Reduction, where Ed = Daily Emissions, grams/day; EFx = Emission factor for pollutant x, grams/mile; VMT = vehicle mile/day.

10. U.S. Department of Transportation (DOT), Bureau of Transportation Statistics (BTS) and the Federal Highway Administration (FHWA). (2002). National Household Travel Survey.

11. Brookings Institution. 2003. *The Mobility Needs of Older Americans: Implications for Transportation Reauthorization.*

12. US EPA. (2003). *Travel and Environmental Implications of School Siting.*

13. National Center for Safe Routes to School. (2006). *National Center for Safe Routes to School Talking Points.*

14. Centers for Disease Control and Prevention. *The Importance of Regular Physical Activity for Children.* Accessed 9/16/05 at http://www.cdc.gov/nccdphp/dnpa/kidswalk/health_benefits.htm.

Appendix Outline:

Appendix F: EXISTING PLANNING EFFORTS

F.0 Overview

Numerous plans, guidelines, and strategies have covered issues related to bicycle planning in Carrboro and the surrounding region. They have addressed alternative transportation, greenways and trails, land use, and facility design standards on municipal, county, regional, state, and private levels. All of these documents represent important efforts, provide valuable insight and background, and have influenced the development of this plan.

The current plans are reviewed and summarized below only as they relate to bicycle planning in Carrboro. For further information on each plan, please consult the reviewed document in its entirety.

F.1 Local Plans

Carrboro Vision 2020 (2000)

This is a policy-making document informed by citizen input to craft future policies that reflect the visions and will of the community. It is divided into several components including programming, development, economic development, transportation, environmental protection, and housing. The town wants to maintain its character and protect its natural environment.

Key policies affecting this bicycle planning effort are pulled directly from the document below.

1.1 Recreation and Parks

1.11 The town should encourage and support the development of greenways and parklands dedicated to public use along streams and easements. There should be a network of connected greenways throughout the town. These greenways should serve as nature trails, biking and walking trails, wildlife corridors. All should protect our natural environment.

1.14 The town should practice and encourage ecologically sound and sustainable maintenance of open space, including parks and greenways.

4.3 Bicycle and pedestrian traffic

4.31 The town should fully implement its bicycle and pedestrian network plan. This plan should identify links needed now as well as links that will be needed by 2020.
4.32 The town should establish connections with bicycle and pedestrian ways in other juristictions.
4.33 The maintenance of these paths and ways should continue to be a high priority.

4.4 Established Roads

4.41 As a general policy, established roads should be widened to accommodate bike lanes and sidewalks, but not to provide additional lanes for automobiles.

4.5 New Development

4.51 The town should continue to require developers to install sidewalks and bicycle paths in new developments.
4.52 New developments should bear the costs of upgrading connector and arterial facilities in the areas adjacent to their pro-

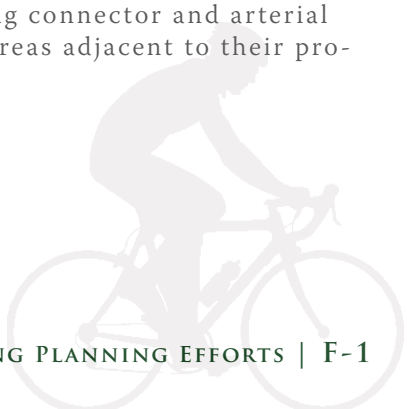


Fig. F-1. Key policies are documented in the Carrboro Vision 2020 plan.

perties to the extent appropriate, including upgrades to serve pedestrians and bicycles, given the added load to the infrastructure and anticipated use of facilities.

5.30 Open Space, Greenways, and Natural Areas

5.31 Carrboro should work to preserve open space and greenways through all available means, such as direct purchase, conservation easements, donations, and federal and state grants.

5.32 The town should map a connected series of greenways that are large enough to serve as wildlife corridors.

Town of Carrboro Residential Traffic Management Plan for Speed and Traffic Control (Revised 2006)

One of the goals of traffic calming measures is to provide alternative transportation modes in order to reduce automobile traffic. In determining areas to install traffic calming measures, bicycle volume is a measurement that is taken into account. Points are given for every 10 cyclists on roads with and without bicycle lanes.

Facilitated Small Area Plan for Carrboro's Northern Study Area (1998)

This document provides planning and goals for future land use within Carrboro's northern growth area. This area begins at Carrboro's town limits to the south and extends north to Carrboro's joint planning jurisdiction line to the north. At this stage, the area is fairly rural and undeveloped with some established neighborhoods.

One of the goals is to address the provision of adequate transportation routes including bicycle, pedestrian, and mass transit. The plan states that Carrboro's bicycle and pedestrian system should be extended into the Study area, especially where higher density development occurs. The plan further recommends that all new development be designed for easy bicycle and pedestrian access with bicycle paths when possible. It is a goal to acquire land and provide off-road bikeways when possible.

A list of possible funding and revenue sources to finance the recommendations of this Plan are provided. General obligation bonds are an option and had been used previously with the 1978 $1.5 million recreation bond referendum for the development of the Community Park and segments of the bikeway system.

Carrboro Downtown Design Guidelines

The majority of this document addresses planning issues from an urban design standpoint, but there is some mention of Carrboro bicycle facilities needing improvement. First, it is mentioned as essential to provide a continuous, connected bicycle network through Town. In order to reduce the conflict that already exists between automobiles, bikes and pedestrians, the plan suggests clearly identifying bicycle networks for the user in addition to providing a system complete with no gaps. The plans goes on to address the need for bicycle traffic to be encouraged on the downtown streets by providing separate lane systems and bicycle racks at points where bicyclists change modes of transportation. "Bicycle racks need to be located close to all centers of business, public buildings, places of public assembly, bus stops and so on. They should be located near major entrances and marked for easy visibility."

The design guidelines recommend that the existing system be modified and expanded to achieve separation from pedestrian facilities, clear demarcation, the furthest route possible and a relationship to downtown buildings, which include bike racks near the main entrances.

Recreation and Parks Comprehensive Master Plan Update (2006)

The purpose of this Plan is to evaluate existing recreational facilities and guide the Town in meeting the community's future recreational needs. An inventory of facilities and programs was developed along with recommendations and funding guidance. A thorough public input process occurred. Public response indicated that the most popular recreational activities were walking, biking, swimming, hiking, and running/jogging (in that order). Since four out of the five top responses involved activities that take place on bike paths, trails, and greenways, these are a high priority for the Carrboro community.

Some of the top goals of this Plan include the acquisition and construction of greenway trail and bike path facilities. Focus areas include Bolin Creek (extending from Martin Luther King Jr Road to Estes Drive Extension, then to Homestead Road) and Morgan Creek (from Culbreth Road/Highway 15-501 to Smith Level Road at Frank Porter Graham School.) Also emphasized is the desire to link greenway trail development in Chapel Hill and the future construction of the Twin Creeks Park and Educational Campus and Carolina North projects. Another goal presented is connectivity to regional systems such as the American Tobacco Trail and Chatham County.

In addition to greenway development, an emphasis was placed on programming to promote and educate residents on the benefits, health, and safety of walking and bicycling. Programming should reach all user groups, including Latino populations.

A significant portion of this Master Plan update discusses the types of greenways, acquisition strategies, and design guidelines for greenways. It is recommended that the Carrboro greenway system be composed of six types:

Type 1: No Facility Development (Natural state green corridors for conservation purpose)
Type 2: Low Impact/Limited Development (Natural trail surface 4-6 feet wide)
Type 3: Multi-use Unpaved Trail Development (Compacted crushed stone, minimum of 8 feet wide)
Type 4: Multi-use Paved Trail Development (Asphalt or concrete, minimum of 10 feet wide)
Type 5: On-road Facilities (Sidewalks at 5-foot minimum and bike lanes at 4 feet minimum)
Type 6: Mountain Bike Facilities (Off-road unpaved corridor for mountain biking, minimum 6 feet wide)

1989 Town of Carrboro Bicycle and Sidewalk Policies

This plan identifies two major objectives in the interest of the bicycle facilities:

- Increase safety of bicycle riders in town by creating a series of separate facilities
    1. Complete separation of motor traffic from bicycle traffic
    2. Designated bikelanes on major streets such as Weaver Street, Jones Ferry Rd., Greensboro St., Main St. and Hillsborough Rd.
    3. Shared roadways on less traveled residential streets
- Access to major destination points
    1. Connect existing bicycle system with major community facilities such as schools, Town Hall, and the Downtown, including the University
    2. The system should expand to connect high density areas. An example of such an area is the apartment communities on Smith Level Road and BPW Road.
    3. Lower density developments should be connected with the existing system.

Taken directly from the text, policy requirements for bicycle facilities include:

EXISTING STREETS

Consideration will be given to construction of bicycle lanes on all existing arterial and collector streets. An off-road bicycle path may be built in place of on-road facilities if it is determined that bicycle travel would be better served by a separate facility.

To adequately serve the residents or patrons of a new development, existing roads shall be widened to accommodate bicycle lanes along the frontage to allow the development to connect to the existing bicycle network.

NEW ARTERIAL AND COLLECTOR STREETS

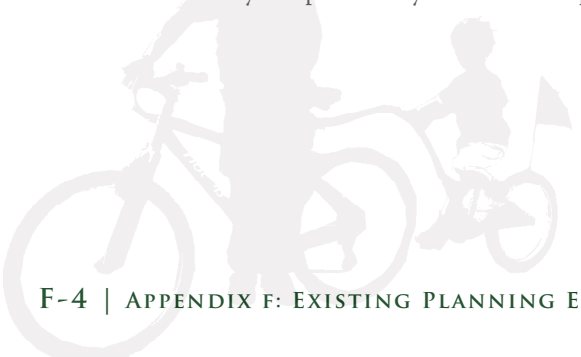
Bicycle lanes shall be required to be constructed on all new arterial and collector streets, as classified in Section 15-210(b) of the Carrboro Land Use Ordinance.

As motor vehicle traffic and speeds on sub-collectors, local and minor streets are low, and combining motor vehicle and bicycle traffic would not create a safety hazard on these streets, no on-road bicycle lanes will be required.

CONSTRUCTION STANDARDS

The following presumptive standards shall apply unless modifies in a particular case by the permit issuing authority in light of environmental or other public welfare considerations.

1. On road bikelanes shall be constructed to the same standards as the motor vehicle portion of the pavement. Most bikelanes in Carrboro are five (5) feet in width.
2. Off-road facilities shall be constructed according to standards in AASHTO Guide for Development of New Bicycle Facilities.



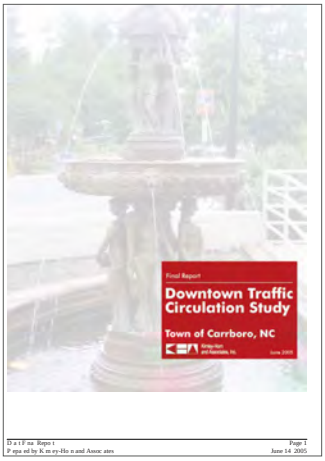


Fig. F-2. An overall report on existing downtown features.

The plan goes on to list the location, length and status of existing and proposed facilities for the town of Carrboro.

F.2 Local Studies

Downtown Carrboro: New Vision (Downtown Visioning Charrette Report (2001)
This report summarizes the public workshop process and outcomes of a downtown community visioning process. The citizens of Carrboro identified their top values which included diversity, inclusiveness, friendliness, a sense of community, green space, and walkable communities. Regarding downtown development, bicycle lanes, increased public space, and connections between residential and commercial areas were listed as priorities.

Recommendations included a number of bicycle facility improvements including promotion of bicycling to reduce congestion along with bicycle racks and signage that are designed to enhance the downtown identiy. Pedestrian facility improvement recommendations included crosswalks, maintained sidewalks, bulb-outs, and pedestrian-scale lighting. A number of planning and policy recommendations were provided which mostly focused on the provision of sidewalks of adequate width and buffer between the roadway.

Recommendations were developed for downtown streets. A number of traffic calming facilities and roundabouts were recommended. Specific to bicycle, recommendations included:

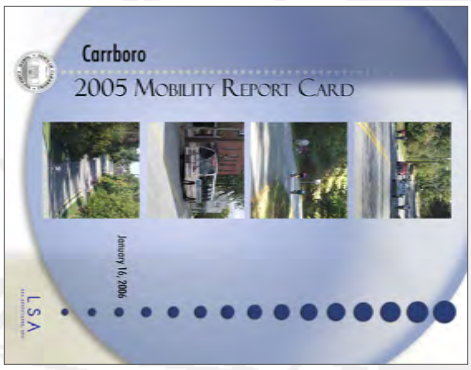
- West Weaver Street: Street reconstruction should include bicycle lanes with high visibility crossings and refuge islands.
- Main Street: Traffic calming should be installed with bicycle racks along both sides.

2005 Downtown Traffic Circulation Study
Drafted by Kimley-Horn and Associates, this plan serves as an overall report on existing downtown features with a focus on transportation and circulation patterns. Current conditions as well as improvement areas are outlined in the extensive Implementation and Phasing Section of the Plan and range from repaving and restriping options on local downtown corridors, street extensions and bicycle/pedestrian improvements, to Main Street redesign and traffic calming measures. The plan addresses current bicycle conditions as well as crash reports and identifies the Town's major objectives and community goals to improve bicycle circulation and safety standards. The plan builds on previous Design Guidelines and downtown visionary charrettes, and significant data collected from local citizens of Carrboro. It includes a number of goals and objectives that address bicycle networks.

Bicycle facility improvements that are recommended include:

- Restripe all intersections to continue bicycle lanes through the intersection to enhance conditions for bicyclists to mix with vehicular traffic.
- Continuous bicycle lanes would be provided throughout the study area on

Fig. F-3. The 2005 Mobility Report Card assesses bicycle facilities.



Main Street, Weaver Street, Jones Ferry Road, and a route defined as Carr Street, Maple Street, Roberson Street, Libba Cotton bike path, Railroad Street, and Brewer Lane

- Retain a contractor to complete a design/build project that will install bicycle detection capabilities at all signalized intersections throughout Carrboro (Consider using video image and tracking system to detect and process bicyclists at selected intersections; an example of such a system is provided with the California Department of Transportation).
- As streets are repaved in downtown Carrboro, consideration should be given to restriping them with 11-foot travel lanes and 5-foot bicycle lanes (for state roads) or 10-foot travel lanes on town roads, if feasible.
- Bicycle route signs should be posted on streets that provide interconnectivity between bicycle lanes and shared-use paths radiating from downtown.
- Greensboro Street corridor: Turn stormwater grates to the bicycle-friendly position and resurface to remove ruts and rough edges between grates and surrounding concrete.
- Free space on Main Street and Weaver Street to provide interconnected bicycle lanes
- Promote bicycling and install signs and bicycle racks

2005 Mobility Report Card

This plan documents existing vehicle circulation and transportation modes in the Town of Carrboro and specifically in the Bicycle Facilities section, examines patterns of improvement, types of facilities, and bicycle activity. Existing bicycle networks are closely inventoried and mapped over the course of two years with the results presented in different figures and charts throughout the document. Because Carrboro's existing bicycle network is already somewhat extensive, there is little improvement in the course of the years; however the plan concludes that there are still opportunities to "fill in missing gaps and further enhance the bicycle system."

Bicycle activity data was collected and measured to determine peak hours of activity, locations of activity, and volume of bicyclists. The data revealed that the highest level of bicycling does occur in the downtown area, where facilities were determined to be the most complete. Other bicycle paths in the downtown area such as the Libba Cotten Bikeway and the Francis Shetley Bikepath were described as having a very high volume of activity with some of the highest counts in Carrboro being taken on the Libba Cotton Bikeway during a 12-hour period.

The 2005 Mobility Report Card concludes the document by pointing out that mobility is highest in downtown Carrboro. Also noted in the findings and conclusions section was bicycle use and its fluctuations. The two main corridors (Main Street from Davie Road to Hillsborough Road and Hillsborough Road from Greensboro Street to Main Street) were used 7 percent of the time by bicyclists, while other locations ranged in use from 4 percent to 2.5 percent.

2003 Mobility Report Card
Measurement of miles of bicycle routes, paths and lanes using existing facilities through GIS is used as the objective of this inventory. The 2003 Mobility Report Card document clearly served as a benchmark for the 2005 Mobility report card. In 2003, there were approximately 34 miles of various types of bicycle facilities in Carrboro. This data includes actual bicycle lanes, bicycle paths, shoulders, and wide lanes. Carrboro had 71 percent bicycle lanes within city limits in 2003, with only 5 percent bicycle paths and 24 percent wide shoulders.

Both the 2003 and the 2005 Mobility Report Card do little to make suggestions as to the overall improvement of existing and/or future bicycle facilities. Based on the findings and conclusions from both of these Report Cards, it seems apparent that downtown facilities are successful but other areas of the city need more connectivity. The bicyclists are out using what is existing, but a network of safe, extensive lanes and paths will attribute to the ultimate success of Carrboro's alternative mobility.

Active Projects Report for October 2007
This document serves as a summary of current development projects in Carrboro. Project type, address, status and description are listed. GWI will use this information to determine necessary outreach bicycle facilities to serve these areas by locating approved projects on GIS maps.

F.3 Regional Plans

2030 Long Range Transportation Plan (2005, DCHC MPO)
The Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHCMPO) has set a goal to create a "pedestrian and bicycle system that provides alternative transportation, allows greater access to public transit, and supports recreational opportunities." Furthermore, the MPO strives towards the development of "a safe, accessible and convenient network of regional bike and pedestrian routes." On a regional level, the Transportation Advisory Committee adopted a policy of inclusion for pedestrian and bicycle projects in all roadway improvement projects. In addition to facility improvements, the MPO created recommendations for education, enforcement, and encouragement (to provide incentive to get more people biking and walking).

For the Town of Carrboro, the Plan recommends a total of 22 projects (17 miles) at an estimated cost of $4.8 million. The MPO's recommended bicycle projects have been taken into account during the development of this Plan. The projects are:

BICYCLE LANES:

- BPW Club Rd. - Tar Hill Dr. to Rock Haven Rd.
- Dairyland Rd. - Old NC 86 to Union Grove Church Rd
- Davie Rd. - W. Main St. to Jones Ferry Rd.
- Farm House/Tramore Connector
- Jones Ferry Rd. - Old Greensboro Rd. to Hwy 54
- N. Lake Hogan Farm Ext. - Lake Hogan Farm Rd. to Eubanks Rd.

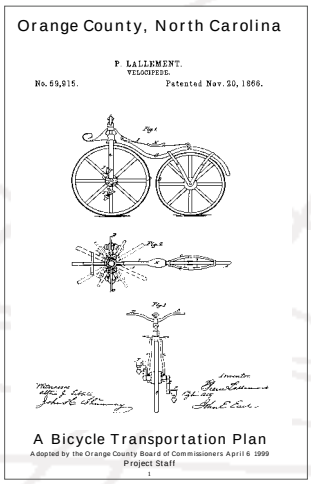


Fig. F-4. The Orange County Bike Plan examines bicycle strategies county-wide.

- Old Fayetteville Rd. - Jones Ferry Rd. to Strowd Lane
- Old Greensboro Rd. - Jones Ferry Rd. to Sturbridge Lane
- Old NC 86 - Farm House Dr. to Eubanks Rd.
- Quail Roost Dr. - Hillsborough Rd. to McDougle School
- S. Lake Hogan Farm Rd. - Tramore Rd. to Homestead Rd.
- Seawell School Connector - Lake Hogan Farm Rd. to Seawell School Rd.
- Smith Level Rd. - NC 54 Bypass to Ray Rd.
- Strowd Lane - Old Fayeteville Rd. to Anderson Community Park
- Tripp Farm Rd. - Hillsborough Rd. to Fair Oaks

MULTI-USE PATHS

- Bolin Creek Greenway Trail. Estes Dr. to Old NC 86.
- Morgan Creek Greenway Trail. Smith Level Rd. to University Lake
- Pathway Dr. - Cates Farm Rd. to Seawell School Rd.
- Robeson Place Bikepath - Eugene St. to Rand Rd.
- Tripp Farm Rd.- Fairoaks to Seawell School Rd.

Joint Planning Agreement (Orange County - Town of Chapel Hill - Town of Carrboro) (Amended 2003)

This planning agreement, while making no specific mention of bicycle transportation, establishes the environment for coordinated and comprehensive planning in the Joint Planning Area of the three entities. For long term bicycle connectivity, it will be critical for Chapel Hill, Carrboro, and Orange County to work together on bicycle facility development.

Orange County Bicycle Transportation Plan 1999

This extensive bicycle plan addresses facilities on a more expansive scale, including the towns of Carrboro, Chapel Hill, and the City of Durham. The plan's introductory goals include providing rural areas with routes that access urban areas within and adjacent to Orange County as well as addressing current facilities by providing increased connectivity between these urban areas.

The plan has outlined goals and objectives for achieving successful bicycle facilities:

1. *Construct bicycle facilities in Orange County that will make cycling for transportation purposes safer, more convenient, and more efficient.*
   - Widen travel lanes to 12 feet and provide paved shoulders
   - Change state and regional bicycle transportation policies and programs
   - Dedicate funding for better surfacing, maintenance, and signage
   - Establish a Bicycle Advisory Committee at the local and regional levels
   - Provide intersection improvements and treatments including bicycle pavement markings and "bicycle sensitive" traffic signal actuators

2. Increase safety on Orange County bicycle transportation routes.

- Provide education for adults and children bicyclists and drivers
- Improve cycling routes by providing route mapping
- Target illegal cyclist and motorist behavior and enforce rights regarding NC law
- Provide accurate accident reporting
- Assess implementation with performance measures (measures being annual number of miles of road lanes widened to 12 feet and number of miles of 4 foot shoulders constructed; also the number of persons attending the cyclist skills and traffic education courses

Specific construction schedules for 4' paved shoulders on all Orange County primary priority bicycle routes were:

- NC 86 from Chapel Hill to Hillsborough and Old NC 10 from Hillsborough to Durham (Primary Route 1 and 1/2 of Primary Route 2) - by 2005
- Remainder of Primary Route 2 (West 10 from Hillsborough to Mebane) - by 2010
- NC Route 2, Primary Route 3 (Old Greensboro Road from Chapel Hill to Alamance County) - by 2015
- Primary Routes 4, 5, 6 (Erwin Road, Whitfield Road, and Old NC 86) - by 2020
- Primary Routes 7 and 8 (Jones Ferry Road and Mt. Carmel Church Road) - by 2025

Specific strategies to improve bicycle facilities and programs included:

- Dedicating funding for bicycle facilities
- Provide greater emphasis and funding for surface quality and debris removal
- Provide end-of-trip facilities (racks and lockers)
- Insure adequate right-of-way is dedicated along bicycle routes to provide for 4' paved shoulders
- Stricter enforcement for cyclists and motorists
- Teach Effective Cycling Course in schools
- Develop incentives for major employers to promote cycle commuting

Finally, Orange County bicycle commuters were estimated. UNC-Chapel Hill indicated that approximately 3,396 persons commuted by bicycle each day during the academic year (3.7% of employees and 16.5% of total students).

Transportation Improvement Program (2009-2015): Independent Projects

A document published every year by the NCDOT, several bicycle projects are slated for Orange County. These projects include:

- Countywide: Bicycle route mapping and signing (IN PROGRESS)
- Carrboro: Robeson Place Bike path: Rand Road to Wesley Street. Construct Bicycle Path (UNDER CONSTRUCTION)
- Chapel Hill: Seawell School Road bicycle improvements, Homestead Road to Estes Drive (CONSTRUCTION)

DCHC MPO Regional Priority List for Bicycle and Pedestrian (Division 7 - Orange County)

A top priority project list exists for bicycle and pedestrian improvements specifically. The ones pertinent to this effort include:

- Old Fayetteville Road (McDougle School to NC 54) - Bicycle and pedestrian improvements
- Homestead Road (NC 86 to High School Road) - Bicycle lanes and sidewalks
- Estes Extension (S. Greensboro Street to Carrboro Town limits) - Multi-use path from Williams Street to Estes Drive. Add bicycle lanes, sidewalks to both sides of the road. Project connects to wide shoulders on Estes Drive
- Southern Railway Greenway (Estes Drive to Seawell School Road)
- Old NC 86 (Hillsborough to Homestead) - Bicycle and pedestrian improvements
- BPW Club Road/Westbrook Drive Greenway
- Old NC 86 (Eubanks to I-40) - Bicycle lanes
- Old NC 86 (Homestead to Eubanks - Bicycle and pedestrian improvements
- Eubanks (Old NC 86 to Rogers) - Bicycle and pedestrian improvements

Appendix Outline:

APPENDIX G: GLOSSARY

G.0 Overview

The material in this glossary is largely taken from the International Pedestrian Lexicon available online at: http://user.itl.net/~wordcraf/lexicon.html#a. Other definitions came from a variety of other sources.

G.1 Glossary of Terms

AASHTO – American Association of State Highway and Transportation Officials; a nonprofit, nonpartisan association representing highway and transportation departments of all transportation modes in the 50 states, the District of Columbia and Puerto Rico.

"A" Cyclist – a term generally used to describe experienced or advanced bicyclists that are comfortable in all cycling environments, even busy roadways that lack bicycle facilities. "A" cyclists will typically bicycle in any condition, whether hospitable or not.

ADA – Americans with Disabilities Act of 1991; The Act gives civil rights protections to individuals with disabilities including equal opportunities in public accommodations, employment, transportation, state and local government services, and telecommunications.

Advance Stop Lines – applies to a stop line placed prior to a crosswalk or bicycle box, to either prevent motor vehicle encroachment, or to improve visibility. It plays an important safety role, especially in multi-lane roads.

Alternative Transportation Network – a connected system for travel using transportation other than private cars, such as walking bicycling, rollerblading, carpooling and transit.

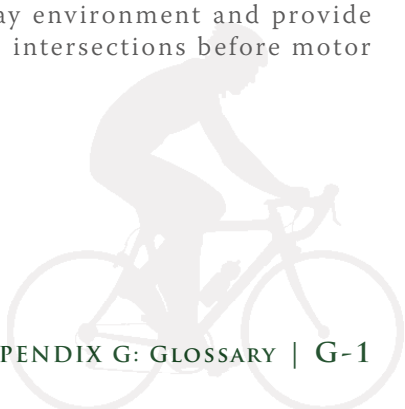
Arterial Connections – interconnected corridors designed to accommodate a large volume of through traffic.

"B" Cyclist – a term generally used to describe intermediate level cyclists, who bicycle for reasons ranging from recreation and fitness riding to commuting. "B" cyclists typically prefer on-street bicycle facilities, such as bicycle lanes and paved shoulders.

Bicycle – Every vehicle propelled solely by human power upon which any person may ride, having two tandem wheels, except scooters and similar devices. The term "bicycle" in this document also includes three- and four-wheeled human-powered vehicles, but not tricycles for children.

Bicycle Activated Detector Loop – sensors installed in the roadway at intersections that trigger a change in a traffic signal. They allow cyclists to remain in the travel lane and avoid maneuvering to the side of the road to trigger a push button.

Bicycle Box – a box painted on a roadway at an intersection that allows bicyclists to move to the front of the line in traffic. Generally a bicycle lane allows cyclists to pass stopped motor vehicle traffic and enter the bicycle box. The bicycle box is located between the intersection and front of the motor vehicle stop line. Bicycle boxes increase awareness of cyclists in the roadway environment and provide the opportunity to cross intersections before motor vehicles.



Bicycle Facilities – a general term denoting improvements and provisions made by public agencies to accommodate or encourage bicycling. Examples include, but are not limited to bicycle parking/storage facilities, shared roadways not specifically designated for bicycle use, bicycle lanes, paved shoulders, and sidepaths.

Bicycle Friendly Community – a program established by the League of American Bicyclists that recognizes and awards municipalities who encourage bicycling and make significant strides in creating a bicycle-friendly environment.

Bicycle Lane – a portion of a roadway that has been designated by striping, signing, and pavement markings for the preferential or exclusive use of bicyclists. AASHTO requires that bike lanes provide five feet of space between the travel lane and parking, curb face, or other roadway barrier. Four-foot bike lanes are acceptable for roadways without curb and gutter.

Bikeway – a generic term for any road, street, path, or way which in some manner is specifically designated for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.

Bridge Culvert – a sewer or drain crossing used for the transference of surface water from a bridge.

Buffer Zone – an area of land specifically designed to separate one zoning use from another.

Bulb-out – extended pavement to narrow roadway, or pinch thoroughfare, or provide space for bus stop, bench, etc. Commonly used as a traffic calming measure.

"C" Cyclist – a term generally used to describe a beginner, juvenile, or elderly cyclists who are not comfortable bicycling in an environment with significant motor vehicle traffic. Typically "C" cyclists prefer to cycle on shared-use paths, greenways, and calm neighborhood streets.

Collector Streets – a public road designed to flow traffic from small neighborhood streets and connect to larger thoroughfares.

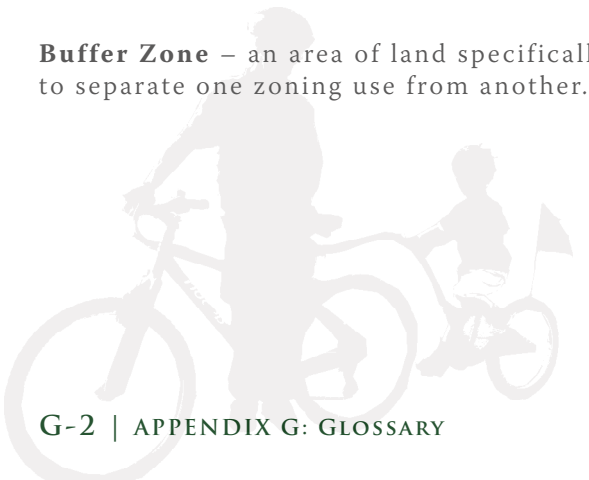
Concurrent Signal Timing – motorists running parallel to a crosswalk are allowed to turn into and through the crosswalk (left or right) after yielding to bicyclists or pedestrians.

Condemnation – the taking of private property for public use, with adequate compensation to the owner, under the right of eminent domain.

Connectivity – the logical and physical interconnection of functionally related points so that people can move among them.

Contra Flow Bicycle Lane – a striped bicycle lane that goes against the flow of motor vehicle traffic and is separated by a double yellow line.

Conservation Easement – a transfer of usage rights which creates a legally enforceable land preservation agreement between a landowner and a municipality



or a qualified land protection organization (often called a "land trust"), for the purposes of conservation. It restricts real estate development, commercial and industrial uses, and certain other activities on a property to a mutually agreed upon level.

Corridor – a spatial link between two or more significant locations.

Crosswalk – a designated point on a road at which some means are employed to assist bicyclists and pedestrians who wish to cross a roadway or intersections. They are designed to keep bicyclists and pedestrians together where they can be seen by motorists, and where they can cross most safely with the flow of vehicular traffic.

Curb Cut – interruption of the curb, as for a driveway.

Curb Extension – a section of sidewalk at an intersection or mid-block crossing that reduces the crossing width for bicyclists and pedestrians and is intended to slow the speed of traffic and increase driver awareness.

Curb Ramp – a ramp leading smoothly down from a sidewalk, greenway, or multi-use path to an intersecting street, rather than abruptly ending with a curb.

Driveway Apron – the section of a driveway between a sidewalk or greenway and the curb.

Eminent Domain – the acquisition of property by the government which is deemed to be necessary for the completion of a public project from an owner that is unwilling to negotiate a price for its sale.

EPA – Environmental Protection Agency.

Fee Simple Purchase – an outright purchase of the land by a municipality.

FHWA – Federal Highway Administration.

Fitness Trail – a pathway upon which users jog or walk from station to station to perform various exercise tasks.

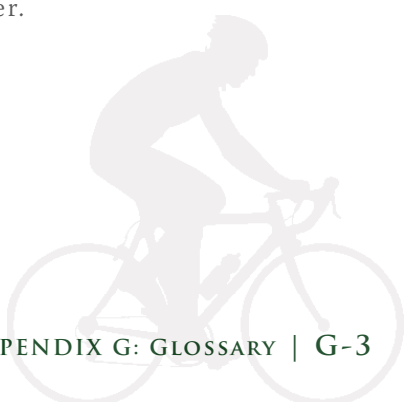
Greenway – a linear open space; a corridor composed of natural vegetation. Greenways can be used to create connected networks of open space that include traditional parks and natural areas. Greenways provide and off-street component to the bicycle network.

High Volume Artery – an important transportation corridor that is used by large traffic levels.

Hydrologic Resources – stream and sewer corridors and buffer zones that can be used to facilitate the building of greenways.

Incentive Zoning – a system by which zoning incentives are provided to developers on the condition that specific physical, social, or cultural benefits are provided to the community.

Intersection – an area where two or more pathways or roadways join together.



ISTEA – Intermodal Surface Transportation Efficiency Act of 1991.

Islands of Vegetation – a landscaping feature that is planted with flora chosen for the ability to remove pollution and toxins. These spaces manage stormwater runoff from impervious surfaces; the water is slowed down, preventing erosion and allowing water to be absorbed into the ground.

Leaseback - the process of selling a property and also entering into a lease to continue using that property.

Linear Stream Corridor - generally consists of the stream channel, floodplain, and transitional upland fringe aligned linearly.

Median - a median is a barrier, constructed of concrete, asphalt, or landscaping, that separates two directions of traffic.

Median Refuge Island - island in the median, that offers a stopping or halfway point for a pedestrian

Mixed Use Area – a term used to describe a specific area that possesses a combination of different land use types, such as residential, commercial, and recreation.

Mode Share - a term used to describe percentage splits in transportation options.

MST – Mountains-to-Sea Trail: a 900+ mile trail corridor that traverses the state of North Carolina from the Smoky Mountains to the Outer Banks.

MUTCD – Manual of Uniform Traffic Control Devices: National standards guidebook on signage and pavement marking for roadways.

Municipal Boundary – the limit of municipal jurisdiction.

Nature Trail - a marked trail designed to lead people through a natural environment, which highlights and protects resources.

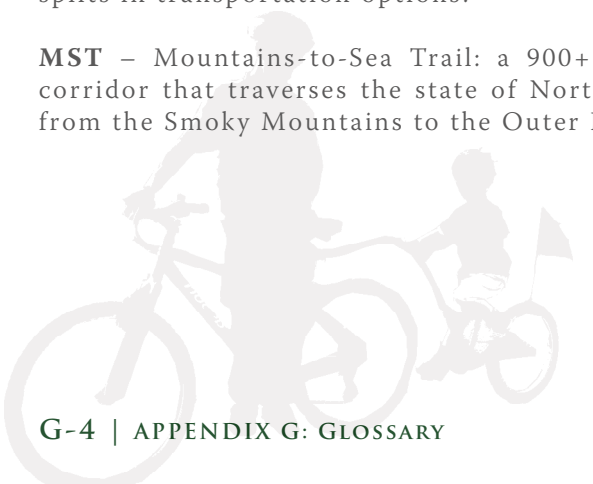
NCDOT – North Carolina Department of Transportation.

Negotiated Dedications - a local government may ask a landowner to enter into negotiations for certain parcels of land that are deemed beneficial to the protection and preservation of specific parcel of land.

Off-road Trail – paths or trails in areas not served by the street system, such as parks and greenbelt corridors. Off-street paths are intended to serve both recreational uses and other trips, and may accommodate other non-motorized travel modes, such as bicycles in addition to walking.

On-road Bicycle Facility – any bicycle facility that is constructed or marked on a roadway, such as a shared roadway, signed route, wide outside lane, bicycle lane, or paved shoulder.

Open Space - empty or vacant land which is set aside for public or private use and will not be developed. The space may be used for passive or active recreation, or may be reserved to protect or buffer natural areas.



Overlay Zone - a zone or district created by the local legislature for the purpose of conserving natural resources or promoting certain types of development. Overlay zones are imposed over existing zoning districts and contain provisions that are applicable in addition to those contained in the zoning law.

Pedestrian - a person on foot or a person on roller skates, roller blades, child's tricycle, non-motorized wheelchair, skateboard, or other non-powered vehicles (excluding bicycles).

Planned Unit Development (PUD) - a project or subdivision that includes common property that is owned and maintained by a homeowners' association for the benefit and use of the individual PUD unit owners.

Pocket Park - a small area accessible to the general public that is often of primarily environmental, rather than recreational, importance; they can be urban, suburban or rural and often feature as part of urban regeneration plans in inner-city areas to provide areas where wildlife can establish a foothold.

Preservation Easement – a voluntary legal agreement that protects historic, archaeological, or cultural resources on a property. The easement provides assurance to the property owner that intrinsic values will be preserved through subsequent ownership. In addition, the owner may obtain substantial tax benefits.

Public Access Easement – a voluntary legal agreement which grants a municipality a perpetual right-of-way and easement for public access and public benefit.

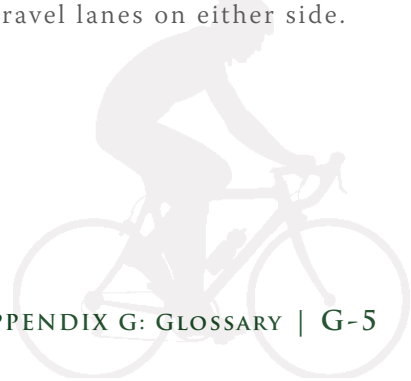
Quality of Life - a measure of the standard of living which considers non-financial factors such as health, functional status and social opportunities that are influenced by disease, injury, treatment or social and political policy.

Regional Bikeway Network- a system of high-quality bicycle facilities, including shared use paths that are a minimum of 10 feet, paved shoulders that are four feet or wider, and bike lanes (see acceptable widths under the definition for bike lanes). In constrained situations, wide curb lanes, with a minimum of 14 feet usable width, can also be used to accommodate bicyclists.

Retrofit - the redesign and reconstruction of an existing facility or subsystem to incorporate new technology, to meet new requirements, or to otherwise provide performance not foreseen in the original design.

Right Turn Cut-off - the channel created in larger intersection by a very long turning radius and the construction of a pedestrian island, to which the pedestrian must cross before being in the formal intersection that is controlled by lights. The right-turn cut-off allows continuous right turns at fairly high speeds without stopping.

Road Diet – reconfiguring or reducing the number of motorized vehicle lanes to provide room to integrate a bicycle facility into a roadway. Commonly used on 4 lane roads with moderate motorized traffic volumes. Generally roadways are reconfigured to include a center turn lane, two 5-foot bicycle lanes and two motor vehicle travel lanes on either side.



Roundabout – traffic-calming device at which traffic streams circularly around a central island after first yielding to the circulating traffic.

ROW (Right of Way) - an easement held by the local jurisdiction over land owned by the adjacent property owners that allows the jurisdiction to exercise control over the surface and above and below the ground of the right-of-way; usually designated for passage.

RTOR – Right turn on red.

Safe Routes to School (SRTS) – a federal program that provides funding to encourage and facilitate the planning and implementation of bicycle and pedestrian projects near schools.

SAFETEA - Safe, Accountable, Flexible and Efficient Transportation Equity Act of 2003.

SAFETEA-LU - Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users.

Sharrow – painted roadway marking that alerts motorists that bicyclists are present and frequently use the roadway. Traditionally used in slower, low volume roadways with wide curb lanes, such as neighborhood routes. Successfully pioneered and used by San Francisco and Denver.

Shoulder - The portion of the roadway contiguous with the traveled way for the accommodation of stopped vehicles, for emergency use, and for lateral support of sub-base, base, and surface courses. Paved shoulders can be used for bicycle travel as well.

Shared Roadway – A roadway that is open to both bicycle and motor vehicle travel. This may be an existing roadway, street with wide curb lanes of 14-feet to 15-feet, or road with paved shoulders. Generally lower speed roadways that are located in residential or compact urban environments.

Shared Use Path (Multi Use Path/Sidepath) - A bikeway physically separated from motorized vehicular traffic by an open space or barrier and located either within the highway right-of-way (often termed "parallel shared use path") or within an independent right-of-way. Shared use paths may also be used by pedestrians, skaters, wheelchair users, joggers, and other non-motorized users. In some cases shared use paths also accommodate equestrians.

Sidewalk - an improved facility intended to provide for pedestrian movement; usually, but not always, located in the public right-of-way adjacent to a roadway. Typically constructed of concrete, but can be made with asphalt, bricks, stone, wood, and other materials.

Signed Shared Roadway (Signed Bike Route) – A shared roadway that has been designated by signing as a preferred route for bicycle use with either a "Share the Road" or "Bike Route" sign.

Thoroughfare - a public road from one place to another, designed for high traffic volumes and essential connections.

TND (Traditional Neighborhood Development) - an area of land developed in a planned fashion for a compatible mixture of residential units for various

income levels and nonresidential commercial and workplace uses, with a high priority placed on access to open spaces.

Traffic Calming - a range of measures that reduce the impact of vehicular traffic on residents, pedestrians and cyclists - most commonly on residential streets, but also now on commercial streets.

Trip Attractor - a location which, because of what it contains, generates itself as a destination for people.

UDO – Universal Development Ordinance; Document outlining ordinances for development and construction in a given area.

Village Center - an area in a community where people naturally congregate.

Wide Outside Lane – roadway with additional unmarked space in the outermost lane that allows motorized vehicles to pass cyclists without changing lanes.