

Comprehensive Bicycle Plan



A plan to connect
Haywood County
to the places and
people we love....

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Haywood County Comprehensive Bicycle Plan

The Haywood County Comprehensive Bicycle Plan was adopted by the Haywood County Board of Commissioners on November 7, 2011.

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Chapter 1: Introduction

What is a Comprehensive Bicycle Plan?

A community that aspires to grow awareness of bicycling and create a bicycling culture must first take steps to identify what makes that community special and what attributes can be improved to facilitate more people taking to their bicycles. The pursuit of a countywide Comprehensive Bicycle Plan for Haywood County that encompasses all of its incorporated municipalities and rural communities is a critical first step.

The conceptual framework of any planning effort—land use, economic development, housing, transportation or otherwise—includes a summary of present-day conditions and a long-range vision for how the community can address the unique characteristics of a specialized plan. Being comprehensive entails a full-scale examination, to the degree that time and resources will allow, to incorporate the needs of citizens, government agencies and key stakeholders within an integrated examination of various projects, programs and policies that should be pursued to foster a bicycle friendly community.

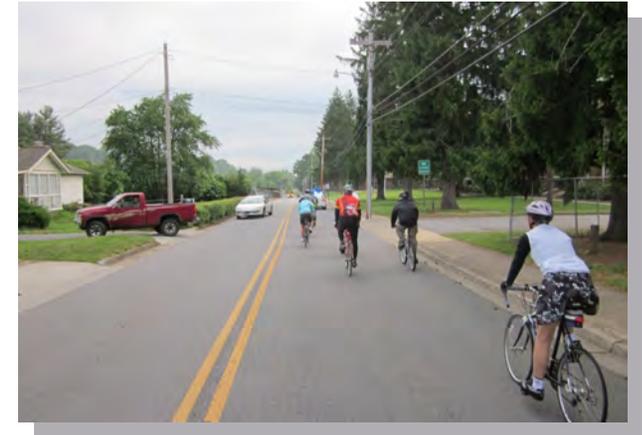
In both urban and rural areas of the United States a large proportion of trips are shorter than two miles in length, which means bicycling as a transportation mode can provide options for individuals and families and help contribute to a reduction in traffic congestion and reliance on fossil fuels. Bicycling also offers a more flexible and convenient mode of travel

for those who can make work trips or run errands on a bike instead of using an automobile. Even if these trips are not altogether taken during the course of one’s daily activities, the prospects of increased physical fitness and overall public health are also an attractive outcome of a more bicycle friendly community.

According to the American Association of State Highway Transportation Officials (AASHTO) 2010 publication on bicycle facility design, “Planning for existing and potential bicycle use should be integrated into and coordinated with the overall transportation planning process.” Further, AASHTO acknowledges that the benefits recognized of more traditionally auto-oriented solutions to transportation can also provide communities with opportunities “to enhance the safety and convenience of bicycle travel.”

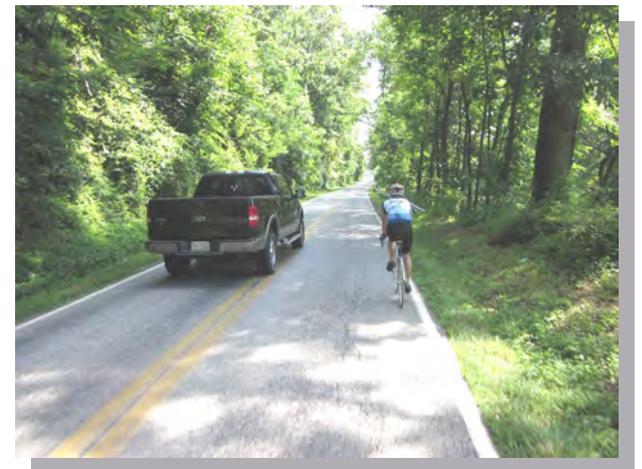
Comprehensive Bicycle Planning in North Carolina has historically been steered by the State’s Department of Transportation, which was one of the first DOTs to establish a dedicated Division of Bicycle & Pedestrian Transportation. North Carolina is also blessed with a high number of dedicated state bicycle routes that connect the Mountains, Piedmont, and Coastal Plain.

What makes the Haywood County Comprehensive Bicycle Plan unique is that it encompasses all geographic areas of Haywood County, not just individ-



Roads in Haywood County range from low-speed, low-volume neighborhood streets (above) to narrow, curving mountain roads. Formulating a countywide bicycle plan that addresses this variety requires input from stakeholders, including planners, advocates, law enforcement, municipal management, elected officials, business and residents.

Photo Credit: Don Kostelec





Members of BicycleHaywoodNC have organized several outreach efforts to interact with residents of Haywood County and inform community organizations and elected officials about the importance of promoting a bicycle culture.

Photo Credit: Don Kostelec

ual municipalities or unincorporated areas. This endeavor is rare in North Carolina as communities have typically relied on the NCDOT's Bicycle & Pedestrian Planning Grant program for funding, which does not allow for such planning in unincorporated areas. This limitation motivated BicycleHaywoodNC—a local advocacy group for bicycling—to pursue contributions from a broad base of supporters to fund the Plan.

BicycleHaywoodNC

BicycleHaywoodNC is an advocacy council organized in 2009 to address the concerns of community members in Haywood County who had witnessed rapid growth since the mid-1990s as the mountains of Western North Carolina became more of a destination for retirees, second home buyers, and families moving to the area. Haywood County grew by 9.2% from 2000 to 2010, representing an increase of more than 5,000 residents in a decade that also brought about an economic downturn during its last three years.

Such rapid growth creates a variety of conflicts among transportation modes and interests as pressures mount on state and local agencies to improve traffic conditions as the needs of bicyclists and pedestrians are sometimes overlooked when new neighborhoods or shopping centers are approved. Historically the needs of bicyclists have been a secondary consideration across the United States but have received more attention in the past 10 years due to changes in policies at the federal level and

increases in bicycling as a recreational and commuting activity.

These influences helped to organize BicycleHaywoodNC through the shared dreams, goals, and concerns for Haywood County and the surrounding areas. The goal of BicycleHaywoodNC is to “address town and county leaders as partners in the growth of the local area and to be sure that cycling and the needs of cyclists are at the forefront of the local planning boards.” The council has also tasked its leadership and members with working as partners to ensure the interests of cyclists are met through various programs related to safety and education, as well as raising community awareness and promoting sound policy at local, regional, state and national levels. A key aspect of this advocacy council role is being affiliated with the League of American Bicyclists—a national organization that promotes bicycling through a variety of advocacy efforts, including their Bicycle Friendly America Program.

The membership of BicycleHaywoodNC includes key stakeholders in the community, including business owners, physicians, law enforcement, town and city planners, counselors, mothers, fathers, financial consultants, non-profit consultants, long distance cyclists, fitness cyclists, and retirees. In 2012, BicycleHaywoodNC will become a chapter of the Blue Ridge Bicycle Club

As a result, BicycleHaywoodNC has a multidisciplinary platform, recognizing that establishing a bicycle-friendly community can:



- ◆ Offer an important, low-cost alternative form of transportation that must be provided in order to break the nation's dependence on foreign oil;
- ◆ Return citizens of Haywood County to improved physical and mental health;
- ◆ Be a powerful economic engine to support local tourism;
- ◆ Safeguard bicyclists of all ages and abilities; and
- ◆ Present an outstanding recruitment tool for bringing young vibrant families to the area for careers.

Organizing & Funding the Plan

BicycleHaywoodNC pursued various funding sources to accomplish and adopt the Haywood County Comprehensive Bicycle Plan. A primary funding source of the plan is the French Broad River Metropolitan Planning Organization (FBRMPO), which is a federally-designated entity for the region tasked with developing long-range multi-modal transportation plans. All metropolitan areas in the United States with a population greater than 50,000 are required to have a Metropolitan Planning Organization. Much of Haywood County, including all of its municipalities, are within the boundary of the FBRMPO, which also has transportation planning responsibilities for Buncombe County and Henderson County. FBRMPO, through its technical committees consisting of planners, engineers and elected officials recognized a need to fund 80% of the plan.

BicycleHaywoodNC then pursued other non-

government entities to fund the remaining 20%. These contributors include:

- ◆ Community Foundation of Western North Carolina;
- ◆ Blue Ridge Bicycle Club;
- ◆ Mast General Store; and
- ◆ Local individuals.

Additional support was provided for the plan through Haywood County, who administered the plan and associated grants, as well as municipal staff members who helped develop ideas for the plan. The communities of Haywood County, Haywood County Recreation Department and Recreation Advisory Board, as well as Healthy Haywood, the Haywood County Economic Development Commission, and the Haywood Advancement Foundation, expressed written support for the plan and provided input at various stages. And more than 170 individuals took time to complete the survey conducted as part of the Plan.

Understanding Bicycle Users

Bicycle and pedestrian professionals recognize several common elements in creating comprehensive plans for non-motorized travel. This stems from the experience of the users of bicycle and pedestrian systems, which differs greatly from the experience of motorists. The operator of a car, truck or motorcycle experiences the transportation system and communities through which he or she travels



Bicyclists vary greatly in terms of age and abilities. Therefore, a comprehensive bicycle plan must examine the unique needs of those users and recognize that bicyclists experience their community at a different scale than motorists.

Photo Credit: Paul Casper

Experienced / Confident Riders	Casual / Less Confident Riders
<ul style="list-style-type: none"> ◆ Most are comfortable riding with vehicles on streets, and are able to negotiate streets like a motor vehicle, including use of the full width of a narrow travel lane when appropriate and using left-turn lanes. 	<ul style="list-style-type: none"> ◆ Prefer shared-use paths, bike boulevards, or bike lanes along low-volume, low-speed streets.
<ul style="list-style-type: none"> ◆ While comfortable on most streets, some prefer on-street bike lanes, paved shoulders or shared-use paths (greenways) when available. 	<ul style="list-style-type: none"> ◆ May have difficulty gauging traffic and may be unfamiliar with rules of the road as they pertain to bicycles; may walk bike across intersections.
<ul style="list-style-type: none"> ◆ Prefer a more direct route. 	<ul style="list-style-type: none"> ◆ May use less direct route to avoid primary streets with heavy traffic volumes.
<ul style="list-style-type: none"> ◆ Avoid riding on sidewalks. Ride with the flow of traffic on streets. 	<ul style="list-style-type: none"> ◆ If no on-street facility is available, may ride on sidewalks even though it is not necessarily safer than the street. Should always ride with flow of traffic.
<ul style="list-style-type: none"> ◆ May ride at speeds of up to 20 mph on flat ground, up to 45 mph on steep descents. 	<ul style="list-style-type: none"> ◆ May ride at speeds around 8 to 12 mph.
<ul style="list-style-type: none"> ◆ May cycle longer distances. 	<ul style="list-style-type: none"> ◆ Cycle shorter distances; 2 to 5 miles is a typical trip distance.

Exhibit 1-1: Experienced / Confident Riders vs. Casual / Less Confident Riders

Source: AASHTO

at rates of speed higher than 25 mph. Even the most ardent bicyclists rarely travel at an average speed greater than 25 mph and most utilitarian cyclists move at speeds of 12 mph or less. The rate of speed for pedestrians is measured in feet per second instead of miles per hour.

The bicycle operator or pedestrian sees things at a different scale. The world moves slower and elements of the transportation system that may go unnoticed by motorists can be discouraging at best to the bicyclist or pedestrian; deadly at worst.

Even among experienced bicycle users there exists great variation in the skill and comfort level of the bicyclists and this impacts designers of transportation systems and how they should consider the various user types when determining the best-fit solution to accommodating bicycle traffic. AASHTO attempted to organize users into two key categories, which are summarized below and outlined further in Exhibit 1-1.

Experienced and Confident bicyclists are those who are comfortable riding on almost any type of bicycle facility. These include utilitarian and recreational riders of many ages with a high level of confidence when riding on busy streets and navigating their way through traffic. These riders may prefer routes that lead them along low-speed, low-volume residential streets or greenways; or they seek alternative routes if they are more preferred than the most direct route to reach their destination. According to



AASHTO, experienced bicyclists include commuters, long-distance road bicyclists, racers, and those who regularly participate in rides organized by bicycle clubs.

Casual and Less Confident bicyclists include a majority of the population and a wider range of people than those that listed above. They may ride frequently for a variety of reasons and enjoy bicycling occasionally. They prefer more favorable conditions for bicyclists such as greenways, other paths or low-volume, low-speed streets. This group also includes bicyclists who ride for recreation or with children. Population groups who are most dependent on bicycling as a mode of transportation are included in this category. AASHTO notes “in order for this group to regularly choose bicycling as a mode of transportation, a physical network of visible, convenient and well-designed bicycle facilities is needed.”

AASHTO has also outlined common characteristics for recreational and utilitarian trips to help designers, lawmakers and others understand the difference related to user types. These are outlined in Exhibit 1-2.

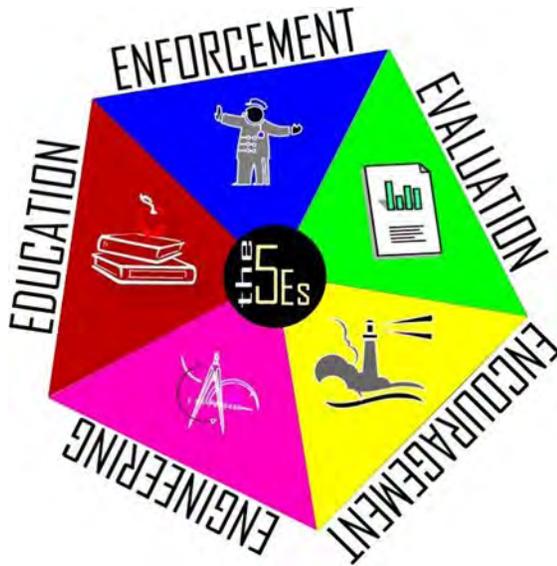
The age of the user also has a major influence on how projects, programs and policies should be developed. This is particularly important for Haywood County, as nearly 21% of its population was identified as being 65 years old or older in the 2010 Census (North Carolina’s overall population of persons 65 years old or older is 12.7%).

Recreational Trips	Utilitarian Trips
◆ Directness of route not as important as visual interest, shade, and protection from wind.	◆ Directness of route and connected, continuous facilities more important than visual interest, etc.
◆ Loop trips may be preferred to backtracking; start and end points are often the same.	◆ Trips generally travel from residential areas to schools, shopping or work areas and back.
◆ Trips may range from under a mile to more than 50 miles.	◆ Trips are generally 1 to 5 miles in length.
◆ Short-term bicycle parking is needed at recreational sites, parks, trailheads and other recreational activity centers.	◆ Short-term and long-term bicycle parking is needed at stores, transit stations / stops, schools and workplaces.
◆ Varied topography may be desired, depending on the fitness and skill level of the bicyclists.	◆ Flat topography is desired.
◆ May be riding in a group.	◆ Often ride alone.
◆ May drive with their bicycles to the starting point of a ride.	◆ Use bicycle as primary transportation mode for the trip; may transfer to public transit; may or may not have access to a car for the trip.
◆ Typically occur on the weekend or on weekdays before morning commute hours or after evening commute hours.	◆ Some trips occur during morning and evening commute hours (to school and/or work), but bicycle commute trips may occur at any hour of the day.

Exhibit 1-2: Recreational Trips vs. Utilitarian Trips
Source: AASHTO



The 5 E's of a Comprehensive Bicycle Plan



Seniors generally require different accommodations and rely on different cognitive and perceptual abilities to operate a bicycle. They travel at a slower pace and are less able to overcome hilly terrain, either through physical means or mental determination. The reaction time of seniors is also slower than adults as is their judgment of speed and distance of approach vehicles.

Children are similar to seniors in their physical abilities and are further limited by the degree to which their parents will allow them to ride a bicycle and where they are allowed to ride. Haywood County's percentage of children under 18 years old (20.0%) is lower than the state of North Carolina (24.3%), however parents and health organizations are promoting bicycling as a way to help combat childhood obesity and related health problems.

Children have greater difficulty understanding the level of danger posed by the roadway system and other motorists and do not have the on-road knowledge of how to operate a vehicle.

Fortunately, Haywood County features several efforts to encourage children to cycle safety. All fourth graders in Haywood County Schools learn to ride a bicycle as part of the physical education curriculum. In May of each year, the Western North Carolina Vietnam Veterans of America and Haywood County Recreation and Parks conduct a bicycle rodeo for children at the park located on Glance Street in Clyde. More than 20 children participated

in the 2011 event and many parents stayed to learn how to teach their children proper riding skills. A proposed BMX park in Waynesville may provide additional cycling options for young riders.

5 E's of a Comprehensive Bicycle Plan

A recognition of the variety of bicycle users and the facilities they desire has led the bicycle and pedestrian planning profession, along with the League of American Bicyclists, to endorse an approach to developing a bicycling culture that is inclusive of the "5 E's"—Engineering, Education, Encouragement, Enforcement, and Evaluation. In being considered for designation as a Bicycle Friendly Community (BFC), the League of American Bicyclists state "a community must demonstrate achievements in each of the five categories in order to be considered for an award" and "communities with more significant achievements in these areas receive superior awards."

It is therefore incumbent on any community desirous of becoming a BFC that the 5 E's become an integral component of their initiatives and a related bicycle plan is well-served to incorporate these 5 E's, which are defined by the League as:

Engineering represents what has been built in the community to promote cycling, inclusive of developing recommendations through a bicycle plan. Specific elements of the built environment include how bicyclists are considered in street design and construction as well as along greenway corridors. The existence of bicycle parking and the overall connec-

tivity of the bicycle facilities network are also factors.

Education is also a critical component of a bicycle friendly community as the users of the system—bicyclists, motorists, pedestrians and others—should be well-informed of local and state laws pertaining to bicycling and share the road in a manner that is safe for everyone. Various outreach programs and informational materials should be developed by a community to address all ages and all types of users.

Encouragement is inclusive of how a community promotes and encourages bicycling through bicycle clubs, organized rides and events, Bike to Work activities, promotional materials, maps of all types of routes and trails, and Safe Routes to Schools programs. The development of off-road facilities such as velodromes, BMX tracks and mountain bike trails are also an element of encouragement.

Enforcement relates primarily to the knowledge base of the law enforcement community and its willingness to enforce bicycle-related laws. Enforcement programs include targeted efforts to encourage motorists and bicyclists to safely share the road. The existence of bicycle-related safety laws at the state and local level are also critical, as is inclusion of appropriate regulatory signagery along roadways.

Evaluation is the method by which a community understands and tracks the progress of its various projects, programs and policies to measure how well it is performing. Many communities track the performance of the bicycle system and progress of the bi-

cycling community by examining usage of the bicycle system through regular counts, analyzing crash rates to look for trends, tallying how many children participate in bicycle rodeos or how many adults participate in training modules.

The Haywood County Comprehensive Bicycle Plan addresses each of these components in chapters identified by each subject area, with Education and Encouragement combined into one chapter due to their mutually supportive outcomes.

Further, the Plan incorporates two additional “E’s” to reflect the context of Haywood County and the goals of BicycleHaywoodNC: Environment and Economics.

Environment: Western North Carolina owes much of its success and continued attraction to its unique setting. The southern Appalachian Mountains have always been an environmentally-sensitive area due to the region’s rivers and streams that have carved its valleys, its forests and proximity to the Great Smoky Mountains National Park.

The protection of environmental assets has the potential to greatly impact the region’s ability to fully incorporate bicycle-related infrastructure and these influences should be understood by citizens, stakeholders and elected officials. Simply, it may not be feasible to widen some roads to include bicycle lanes or shoulders. While the area’s high peaks and narrow valleys create ideal scenery, they also pose design challenges for cycling infrastructure.



The environmental features of Haywood County attract residents and visitors to its natural areas, streams and greenways. These same environmental features constrain the transportation system and can make it difficult to achieve optimal design for on-street facilities and multi-use trails.

Photo Credit: Don Kostelec



Therefore the community should prioritize key connections to these and other corridors to accommodate bicyclists in the best possible way. The constraints brought about by the natural setting of the area should also be outlined in future Bicycle Friendly Community applications so the League of American Bicyclists fully comprehends the constraints of the area.

It also means that BicycleHaywoodNC should seek other methods to promote bicycling, a role that the group has embraced in its two years of existence by pursuing grants for new bicycles for children's education and presenting its ideas to various community organizations.

The presence of three scenic byways in Haywood County also create's opportunities for additional funding, as the addition of bicycle lanes or shoulders to scenic byways is an allowed expenditure under most scenic byway funding programs.

Economics: These same environmental constraints are also the region's greatest attractor. Bicycling is proven to have a measurable economic impact in rural, urban and natural settings and Haywood County is poised to maximize the economic potential of bicycling to the region and promote economic development as a reason for the County, Towns and NCDOT to include bicycle facilities as an integral piece of the transportation and education systems. The economic impacts of bicycling

are outlined in greater detail in Chapter 9

The annual Blue Ridge Breakaway—an organized bicycling event that includes routes ranging from 24 miles to 105 miles—attracts riders from across the United States and Canada. For the 2011 event, the organizers of the Haywood County Comprehensive Bicycle Plan developed a questionnaire to determine how long visitors stay in Haywood County for this event and how much they typically spend.

The information obtained from the survey's 22 respondents indicated 86% stayed overnight for the Breakaway and the average stay in the area was 4.3 days. The average travel party size was 3.3 persons, with 2.3 of those taking part in the event. It is recommended that this survey be conducted each year with the event to gather responses for more detailed analysis.

Chapter 2: Becoming a Bicycle Friendly Community

Vision for the Plan

Visioning is a technique whereby a community or group determines what it wants to become, in a broad context. BicycleHaywoodNC has stated that they want to become an officially-designated Bicycle Friendly Community (BFC). What does that mean?

Creating a vision draws from where the community, its residents, its businesses and various stakeholders are now—existing conditions—and where it wants to go—future directions. A shared community vision can provide clarity to a planning process, and having a vision generally makes it easier to implement planning initiatives. The goals and objectives associated with a vision help the community gauge its progress toward achieving that vision and may help determine when the vision needs to be revisited.

In the context of a bicycle plan, the vision helps formulate and ultimately direct strategies that develop a bicycling culture. BicycleHaywoodNC created a mission statement upon its formation in 2009 to reflect the perspective of its members and what it wants to accomplish for Haywood County and its residents in becoming a BFC. That mission statement is:

"Dedicated to enhancing cycling through advocacy and addressing improved health and wellness, com-

munity growth, and reduction in dependence upon foreign oil."

This mission statement also formed the vision of BicycleHaywoodNC and what propelled the group to organize the Haywood County Comprehensive Bicycle Plan. Rather than re-tooling this mission statement for purposes of the Plan, the statement was endorsed as the vision for the plan. At the May 2011 steering committee meeting of the Haywood

"Dedicated to enhancing cycling through advocacy and addressing improved health care, community growth, and reduction in dependence upon foreign oil."

County Comprehensive Bicycle Plan, the attendees were asked to reflect on that mission statement to help identify specific ways in which BicycleHaywoodNC could fulfill that mission/vision.

The May 2011 issue of *Southern Living* magazine included a feature called "Joy Rides", which profiled popular bicycling-based efforts in cities across the South. It included a culinary tour in New Orleans and similarly themed efforts in Atlanta and Charlotte. It also described how Greenville, SC has developed a world-class 13.5-mile greenway trail and how a bicycle-specific tour is organized in Austin, TX. Mountain bike trails in Birmingham, AL, and at the DuPont State Forest near Brevard, NC, were also profiled.

This article was presented and attendees asked to imagine the scenarios by which the magazine could profile the bicycling culture of Haywood County in



Members of BicycleHaywoodNC and county staff identified several goals and objectives to promote bicycling throughout the area, including more outreach and programs for children.

Photo Credit: Cecil Yount

a future edition. Participants brainstormed vision components, organized these components by categorical relationships, named each categorical group, and lastly reflected about the results. The group was asked a focus question that formed the basis of their answers:

How should Haywood County and its communities develop and promote a bicycling culture that enhances cycling through addressing improved health and wellness, community growth, and reduction in dependence upon foreign oil? Things that...

- ◆ Accommodate all types of cyclists;
- ◆ Enhance the environment;
- ◆ Promote livability;
- ◆ Reflect the context of Haywood County;
- ◆ Engage residents of all ages; and
- ◆ Encourage economic development.

The resultant Haywood County Comprehensive Bicycle Plan vision consists of five component parts or goals shown at right. While not specifically outlined, the set of goals and objectives sets forth the planning effort in the context of the 5 E's.

This is the collective vision for how bicycling in Haywood County and its communities will be viewed, perhaps in 20 years, perhaps over a longer span of time – but always, the community should be moving towards implementation of this vision through these goals and objectives.

GOAL #1	<p>Build Bicycle Infrastructure & Other Improvements: <i>Engineering-based infrastructure for bicycle routes and parking.</i></p>
	<ul style="list-style-type: none"> ◆ Prioritize bikeways that connect destinations such as downtown areas, schools, neighborhoods, lodging and parks.
	<ul style="list-style-type: none"> ◆ Create a county “backbone” loop (called the Haywood Hub in this Plan) as a priority route to connect the population center of the county between Waynesville and Canton.
	<ul style="list-style-type: none"> ◆ Designate and improve “pocket areas” in existing communities that can serve as learn-to-ride areas.
	<ul style="list-style-type: none"> ◆ Construct bicycle lanes along major arterial roadways and greenways along major rivers and streams.
	<ul style="list-style-type: none"> ◆ Provide safe space via shoulders or other treatments when bicycle lanes are not feasible or practical.
	<ul style="list-style-type: none"> ◆ Install signage and other bicycle-friendly markings to delineate bicycle routes.
	<ul style="list-style-type: none"> ◆ Erect bicycle parking in downtown areas and at other major attractors and destinations.

GOAL #2	<p>Develop Support Facilities & Programs: <i>Help attract bicyclists to the community & connect bicyclists to facilities.</i></p>
	<ul style="list-style-type: none"> ◆ Identify and develop a location for a cycling sports complex that could include a velodrome, BMX track and mountain bike trails.
	<ul style="list-style-type: none"> ◆ Develop and enhance mountain bike trails in natural settings such as the Rough Creek Watershed area.
	<ul style="list-style-type: none"> ◆ Organize a multi-stage road race in Haywood County and surrounding counties.
	<ul style="list-style-type: none"> ◆ Develop natural trails above Lake Logan and near other water features.
	<ul style="list-style-type: none"> ◆ Encourage a bicycle rental program through a public facility or bicycle shop.
	<ul style="list-style-type: none"> ◆ Conduct non-race competitions such as “Biggest Loser: Cyclist”.



GOAL #3

Increase Educational Opportunities:

BicycleHaywoodNC and its partners can provide hands-on outreach to users of all age groups and abilities.

- ◆ Conduct how-to sessions for beginner or returning bicyclists.
- ◆ Identify potential for bicycle rodeos and other teaching of school-age children.
- ◆ Organize parents/kids rides.
- ◆ Integrate bicycle-based education into drivers' education curricula.
- ◆ Reach out to employers to promote policies and facilities for bicycle commuters.
- ◆ Build on "Bike to Work" Month/Day to establish monthly Bike to Work rides.
- ◆ Focus on older or senior bicyclists through a "Silver Wheels" program.

GOAL #4

Provide Information to Residents & Visitors:

Promote bicycling through a variety of media & educational and outreach programs.

- ◆ Design an interactive map (online) of bicycle-friendly locations.
- ◆ Print road and mountain bike maps of routes and trails.
- ◆ Organize a "Share the Road" public service campaign to raise awareness of bicyclists.
- ◆ Develop specialized guided routes of the communities, such as a Cycling Café, coffee shops tour, Haywood County history, or artists gallery route.
- ◆ Promote fitness through coordinated education and guided rides.



GOAL #5

Support Policy Change & Economic Development:

Identifies methods for stakeholders, advocates, businesses and municipalities to promote bicycling.

- ◆ Foster inter-governmental collaboration to standardize bicycle-related policies at the municipal, county and state level.
- ◆ Compile information on the economic impact of bicycling, such as a survey of visitors.
- ◆ Ensure that bicycling-related opportunities are not lost to other counties or regions.
- ◆ Seek a ban on texting while driving at the municipal or state level.
- ◆ Pursue easements or other dedication of land for greenways and other bicycle-related facilities.
- ◆ Develop animal control ordinances to help protect bicyclists.





GOLD:

- ◆ Jackson / Teton County, Wyoming; and
- ◆ Tucson / East Pima Region, Arizona.

SILVER:

- ◆ Wood River Valley, Idaho (Sun Valley area).

BRONZE:

- ◆ Indianapolis / Marion County, Indiana;
- ◆ Lexington / Fayette County, Kentucky; and
- ◆ Ada County, Idaho.

Exhibit 2-1: Countywide or Regional Bicycle Friendly Communities

*Source: League of American Bicyclists
Photo Credit: Ada County Highway District*

Characteristics of a Bicycle Friendly Community

Each year the League of American Bicyclists considers applications from communities across the United States for designation as a Bicycle Friendly Community (BFC). The League examines the progress of a community through the lens of the 5 E's noted in the Introduction of the Haywood County Comprehensive Bicycle Plan.

The term of the BFC designation is three years for successful applicants and the categories attained by communities, which range from cities and counties to regions, are Honorable Mention, Bronze, Silver, Gold and Platinum.



North Carolina has nine (9) areas carrying the Bicycle Friendly Community designation, including eight (8) Bronze level communities and one (1) Silver level community (Carrboro). As a state, North Carolina ranks 38 out of 50 for Bicycle Friendly State status, so there is clearly work to be done on a statewide and communitywide basis to improve these standings.

The League has also organized bicycle friendly designation programs for businesses and universities as part of their Bicycle Friendly America campaign. As of July 2011, Liberty Bicycles in Asheville and the National Institute of Environmental Health Sciences in the Research Triangle Park are the only two Bicycle Friendly Businesses in North Carolina.

UNC Greensboro and UNC Wilmington are the only two Bicycle Friendly Universities in the state.

While the League of American Bicyclists does not have a specific designation for counties, there are several regional or countywide designations, showing the League is willing to consider geographic areas beyond town limits. Countywide or regional BFCs are shown in Exhibit 2-1. Further, there are several small communities with BFC designations that are similar to communities within Haywood County, including those in mountainous or natural settings and those that attract tourists, vacationers and retirees. These include those listed in Exhibit 2-2.

The purpose in listing those communities with similarities to Haywood County is to identify peer communities to inquire about the types of investments and programs they have put in place to achieve these designations. This listing can also showcase to local elected officials, businesses and others that it does not take a large population base to achieve BFC status.

When considering BFC applications, the League of American Bicyclists tracks communities at certain levels to gauge how much of a bicycling culture exists within a community. The League applies certain criteria to assess BFC status. Below is information obtained from the League of American Bicyclists related to what they considered in their 2010 review of community applications.



No Award. The community does not yet exhibit the characteristics of a bicycle friendly community described in the award levels outlined below. A community must demonstrate significant achievements in each of the five categories in order to be considered for an award.

Honorable Mention. Communities that do not yet exhibit the characteristics of a BFC may be recognized with an honorable mention designation because:

- a) The community recently implemented significant improvements for bicycling but sufficient time has not yet passed for this to develop characteristics of a BFC.
- b) The community has a remarkable project or program, but the impact or influence of this has yet to extend throughout the community.

Examples of honorable mention characteristics for the various categories include:

- ◆ Engineering: Community recently instituted a policy to engineer streets with the consideration of bicyclists and/or is beginning to develop a trail network. Facilities conform to the currently recognized safety standards.
- ◆ Education: Community holds some type of bicycle safety event.
- ◆ Encouragement: Mayor proclaims Bike Month or local club opens events to the public.
- ◆ Enforcement: Officers are familiar with laws relating to bicyclists.

- ◆ Evaluation & Planning: The community is familiar with and responsive to the needs of cyclists. Bicycle mode share is at least an average level for U.S. communities.

Bronze. Communities exhibit a strong commitment to cycling that is still in its beginning stages. There is certainly “room to grow” but notable steps are being made in the right direction.

- ◆ Engineering: Community recently implemented a policy to engineer streets with the consideration of bicyclists and/or is beginning to develop a trail network. Facilities conform to the currently recognized safety standards.
- ◆ Education: Community holds bicycle safety events, provides opportunities for bicycle education.
- ◆ Encouragement: Community hosts a Bike to Work Day or community ride.
- ◆ Enforcement: Officers are familiar with laws relating to bicyclists.
- ◆ Evaluation & Planning: The community is familiar with and responsive to the needs of cyclists. A bicycle master plan or chapter in another document has been developed and approved. Bicycle mode share is above average for U.S. communities

Silver. Silver level communities are particularly strong in 2 or 3 of the 5 parts of the application.

- ◆ Engineering: Community has made a significant investment and is on its way to an integrated network. Facilities conform to the cur-



SILVER:

- ◆ Breckenridge, CO (pop. 3,500);
- ◆ Durango, CO (16,000);
- ◆ Sisters, OR (2,000);
- ◆ Steamboat Springs, CO (9,800)
- ◆ Wood River Valley, ID (12,500)

BRONZE:

- ◆ Arcata, CA (16,600);
- ◆ Brunswick, ME (21,800);
- ◆ Calistoga, CA (5,300);
- ◆ Carbondale, CO (5,200);
- ◆ Franklin, PA (7,200);
- ◆ Houghton, MI (8,200);
- ◆ Sanibel, FL (6,100);
- ◆ Sedona, AZ (10,200);
- ◆ Sitka, AK (8,900);
- ◆ Sonoma, CA (9,100);
- ◆ Tybee Island, GA (3,700); and
- ◆ Vail, CO (4,800).

Exhibit 2-2: Bicycle Friendly Communities with Characteristics Similar to Haywood County

Source: League of American Bicyclists





Davis, California was the United States' first Platinum Level Bicycle Friendly Community. For decades, the city has fostered a bicycle culture by theming the town for bicycles, such as in the city's official logo (top picture) and making investments in urban and rural settings (bottom picture).

Photo Credit: Don Kostelec

- ♦ Education: Educational materials are published and distributed, children receive in-class instruction on bike safety, classes are available for adults.
- ♦ Encouragement: Community celebrates cycling through a number of events. There is significant involvement in other encouragement efforts as well, such as publishing a map, working on Safe Routes to School, etc.
- ♦ Enforcement: Officers are knowledgeable concerning laws relating to bicyclists.
- ♦ Evaluation & Planning: Community has a bicycle master plan. Bicycle mode share is well above average for US cities.

Gold. Gold level communities are impressive in virtually all aspects of their application.

- ♦ Engineering: Community has an integrated network for bicycling. There is ample bike parking. The community has well-designed streets and off-street facilities. Engineering standards exceed currently recognized safety standards.
- ♦ Education: Children receive on-bike training. Classes are available for adults and there is a Safe Routes to School program in place.
- ♦ Encouragement: There are a variety of community events and incentive programs.
- ♦ Enforcement: Officers have received specific training on the relationship between bicycling and law enforcement.

- ♦ Evaluation & Planning: Community has a well-developed and mostly implemented bicycle master plan. Percentage of bike trips significantly exceeds the U.S. average and specific targets are set to increase that percentage.

Platinum. A Platinum level designation is one given to truly exemplar communities for bicyclists. This community is consistently referred to as an example of how to “do it right” in virtually all aspects of cycling. There is a strong community program as well as local advocacy groups and clubs supporting cycling. The community has an impressive bicycle mode share.

- ♦ Engineering: The community's master plan is referred to by others across the country. Community maintains its own design standards that reflect the state of the practice.
- ♦ Education: Safe Routes to School and Bike Ed programs reaching significant numbers of people.
- ♦ Encouragement: A variety of community events, commuter programs and incentive programs.
- ♦ Enforcement: Officers are well versed in laws pertaining to bicyclists, and use targeted enforcement relating to motorists and cyclists.
- ♦ Evaluation & Planning: Community uses Multi-Modal Level of Service standards (bicycle, pedestrian, vehicle and transit) to plan transportation improvements or similar level of

sophistication and integration of bicycling.

More information on the League and the BFC program can be accessed at:

<http://www.bikeleague.org>

Complete Streets

The adoption of the Haywood County Comprehensive Bicycle Plan comes at an opportune time in North Carolina as the Department of Transportation (NCDOT) is embarking on a new business model for consideration of the needs of bicyclists, pedestrians and transit users in addition to motorists as the agency designs new streets and retrofits old streets.

NCDOT's Board adopted a "Complete Streets" policy in 2009 to acknowledge the changing paradigm for how the agency considers the needs of all users in the design of its street system. A Complete Street can be defined as one that is designed to provide for the safe movement of all users of all abilities at all times. This does not mean that all streets are required or should have bicycle and pedestrian facilities. For many residential streets, most bicyclists of any age or ability is able to operate in the street without the need for dedicated space or bicycle lanes.

Further, incorporating Complete Streets elements in the built environment is challenging as buildings constructed in downtown areas and along other

corridors create limited opportunities for optimal facilities, particularly in a retrofit situation. This is especially difficult in the mountains where many corridors are also constrained by topography and other natural features.

However, these constraints should be defined only as influences to the design of a Complete Street and not reasons to eliminate bicycle and pedestrian facilities from projects. The real challenges lie in how NCDOT and its partners consider trade-offs between vehicle usage and bicycle, pedestrian and transit usage to achieve a "best fit" solution for a street.

The League of American Bicyclists requests that Bicycle Friendly Communities adopt a Complete Streets Ordinance as a show of commitment to multi-modal transportation solutions.

The process of designing a Complete Street must consider the existing and future likelihood of the types of bicyclists who will use a particular street. For example, a road may exist in a rural setting but if that road connects schools, parks or recreation centers to a greenway or each other, then certain accommodations should be made when compared to a road in a rural setting that may only connect to other streets and provides access for low-density residential neighborhoods or farms.

Another challenge for advocates of bicycle facilities is that bike lanes are oftentimes seen as the most "disposable" component of a street that is being



“Transportation, quality of life, and economic development are all undeniably connected through well-planned, well-designed, and context-sensitive transportation solutions. To NCDOT the designations ‘well-planned’, ‘well-designed’ and ‘context-sensitive’ imply that transportation is an integral part of a comprehensive network that safely supports the needs of the communities and the traveling public that are served.”

- NCDOT Complete Streets
Policy Statement (2009)



Shoulders along NC 209 (Crabtree Road) in north Haywood County are an example of Complete Streets cross sections developed by NCDOT that depict this Rural Road as having a paved shoulder that constitutes the Bicycle Zone in this land use context.

Photo Credit: Don Kostelec

designed. This stems from varying levels of support from bicyclists as it relates to dedicated lanes and a lack of understanding by project designers of what type of facility is most suitable to support the types of bicyclists using that street.

Exhibit 2-4 on the pages 20 and 21 was modified from AASHTO publications to illustrate the various types of bicycle facilities and associated characteristics of those facilities that should be considered in Complete Streets implementation.

NCDOT has a tendency to default to an option known as a Wide Outside Lane, typically 14-feet wide, to allow space for a bicyclist and a motorist to share the lane, especially when a motor vehicle is passing a bicycle. Many road cyclists feel comfortable when riding in this wide outside lane, however widespread use of this design option can discourage new riders from trying to ride on the road as they do not feel they have space in which to operate.

Dedicated bike lanes offer another set of opportunities and challenges. Bike lanes clearly let the motorists know that bicyclists belong on the road, but some motorists react negatively when they see a bicycle operating outside of that lane due to either debris in the bicycle lane or the need to change lanes to make a turn or avoid another obstacle such as a parked vehicle.

The clearing of debris from bike lanes and shoulders creates on-road conflicts when bicyclists have to

operate in the travel lane to avoid debris. Conflicts also arise between government agencies that are tasked with maintaining the road and may have budget, labor and/or equipment limitations that prevent timely clearing of debris.

NCDOT's Complete Streets policies and design guidelines were still under development when the Haywood County Comprehensive Bicycle Plan was adopted. At that time, NCDOT had progressed to the point of developing its Preliminary Complete Streets Planning & Design Guideline Framework for review by agencies, citizens and stakeholders (a copy of the document is included in the Appendix CD of this Plan).

The primary component of this framework document is the set of street cross-sections (Exhibit 2-3) that form the basis for design and implementation of Complete Streets and represent a new direction for NCDOT.

It will be imperative for groups like BicycleHaywoodNC to work with Haywood County and its towns, as well as NCDOT's Division 14, to ensure the proper needs of bicyclists are considered when the design of projects commences. It is also important to recognize that there are some projects in Haywood County and elsewhere in the region that were already designed or under design at the time this document was developed. These projects may not fully reflect the features shown in the Framework document.

Further, Complete Streets policies and documents do not fully consider how the transportation system interfaces with land use and the design of adjacent buildings, commercial centers and neighborhoods. A street’s design could include narrow travel lanes to keep traffic moving slowly, properly sized bicycle lanes, beautifully landscaped medians, and wide, detached sidewalks. If adjacent land uses and the design of those land uses are not also conducive to travel by bicyclists or pedestrians, then the investment in that street may result in less usage. For this reason, it is important for Haywood County, its towns, BicycleHaywoodNC and its residents to recognize that other policy changes need to occur at the local level to fully complete the streets, where appropriate, necessary and prioritized; and ultimately ensure the safe use of them by all users of all abilities at all times.

More information on NCDOT’s Complete Streets program can be accessed at:

<http://nccompletestreets.org/>

Exhibit 2-3: Sample Cross Section from NCDOT’s Preliminary Complete Streets Planning and Design Guideline Framework
Source: North Carolina Department of Transportation

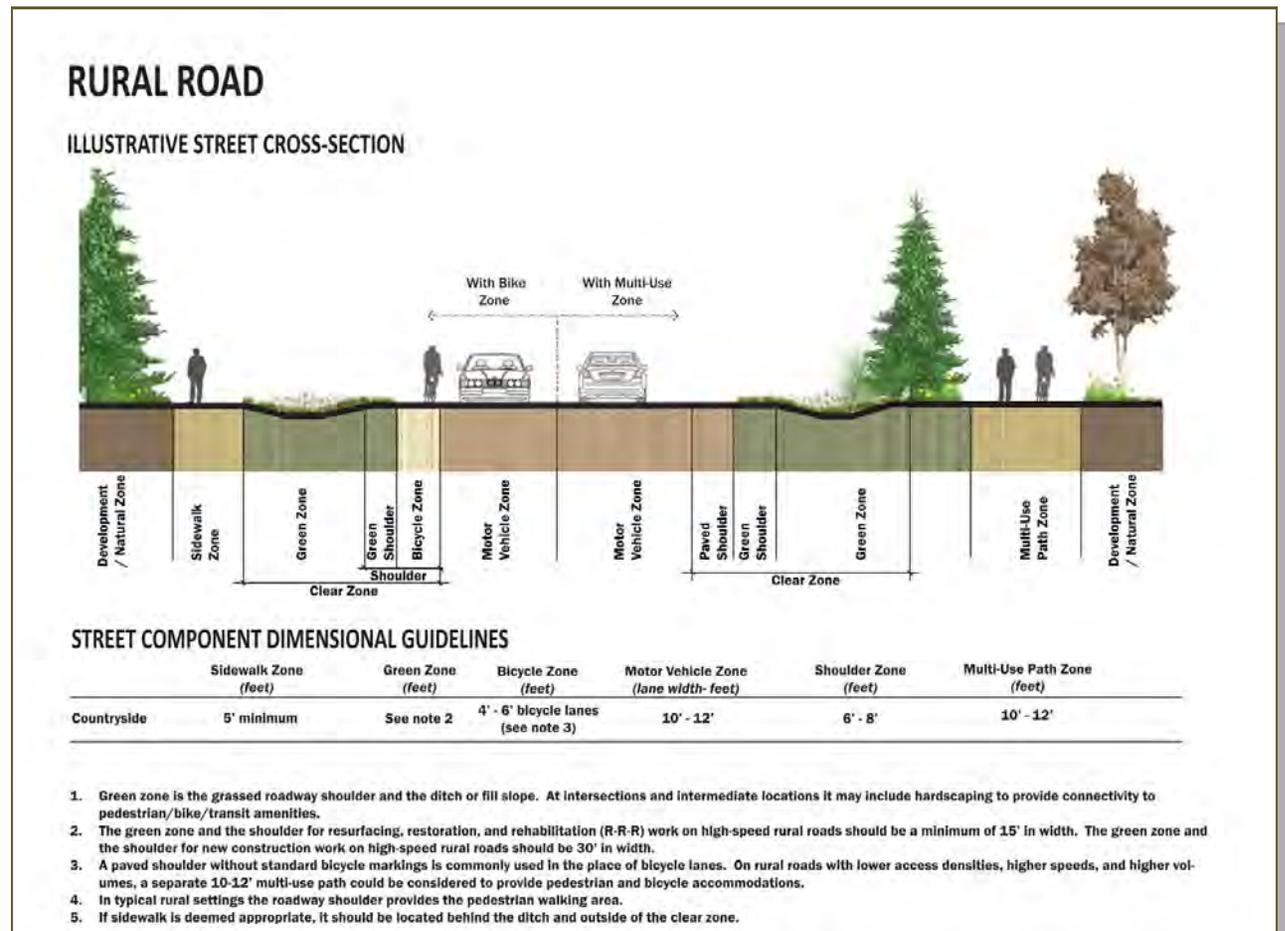


Exhibit 2-4: General Classifications for Different Bikeway Types

Source: AASHTO

Type of Bikeway	Best Use	Motor Vehicle Design Speed	Intended use / Traffic Volume	Other considerations
 <p>Paved Shoulder</p>	Rural highways that connect towns and other major attractors.	Variable. Typical posted rural highway speeds (40-55 mph)	Rural roadways; inter-city highways. Variable traffic volumes.	Provides more shoulder width for roadway stability. Width dependent on adjacent motor vehicle traffic (i.e. wider shoulder on higher-speed roads).
 <p>Shared Roadways—No Special Provisions</p>	Minor roads with low speeds / volumes, where bicycles can share the road with no special provisions.	Speed differential between motorists and bicyclists is typically 15 mph or less. Speeds limits less than 30 mph.	Neighborhood or local streets. Generally less than 1,000 vehicles per day.	Can provide alternative to busier streets. On a grid network, may be circuitous or discontinuous.
 <p>Shared Lanes—Wide Outside Lanes</p>	Major roads where bike lanes are not selected due to space constraints or other limitations.	Variable. Use as the speed differential between bicyclists and motorists increases. Generally any road where the design speed is more than 25 mph.	Arterials and collectors intended for major motor vehicle traffic movements. General more than 3,000 vehicles per day.	Explore opportunities to provide parallel facilities for less confident bicyclists.



Exhibit 2-4: General Classifications for Different Bikeway Types (continued)

Source: AASHTO

Photo Credit: Don Kostelec / Bethany Schilleman

Type of Bikeway	Best Use	Motor Vehicle Design Speed	Intended use / Traffic Volume	Other considerations
 <p>Shared Lane—Shared Lane Markings</p>	Space constrained roads with narrow travel lanes, or road segments where bicycle lanes are not selected due to space. Also known as “sharrows”.	Variable. Use where speed limit is 35 mph or less.	Collector or minor arterials. Variable. Useful where there is high turnover in on-street parking to prevent “dooring” crashes.	May be used in conjunction with wide outside lanes. Where on-street parking is present, ensure markings placement reduces conflict with opening car doors.
 <p>Bike Lanes</p>	Major roads that provide direct, convenient, quick access to major lane uses. Also can be used on collector roads and busy urban streets with slow speeds.	Generally, any road where the design speed is more than 25 mph.	Arterials and collectors intended for major motor vehicle traffic movements. Variable traffic volumes. Speed differential is generally a more important factor than volume.	Where on-street parking is present, ensure bike lane placement reduces conflict with opening car doors. Analyze intersections to reduce bicycle / motorized vehicle conflict.
 <p>Shared-Use / Multi-Use Path</p>	Linear greenways or along waterways, highways, active or abandoned rail lines, or utility rights-of-way. May be a short connection between two cul-de-sacs.	No vehicular traffic. Bicyclists should be encouraged to travel at speeds lower than 12 mph to avoid conflicts with other users.	Provides a separated path for non-motorized users. Advanced riders may still prefer on-street facilities. Traffic Volume: N/A	Analyze intersections to anticipate and mitigate conflict points between path and roadway users. Design path with all users in mind and width to accommodate expected usage.



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Chapter 3: The Haywood County Context

In Wilma Dykeman’s book, *The French Broad*, she chronicles the story of how wheat-grinding millstones were imported from France and set up in the Town of Clyde in the 1870s. “Bringing those great stones over the rocky and precipitous mountain roads of that decade must have been a man-sized undertaking.” While pavement and construction techniques have improved over the past 140 years, the precipitous nature of the roadways throughout Haywood County continues to inspire—and challenge—bicyclists of either gender.

It is the context of the transportation system in Western North Carolina that also forms the backbone of the region’s bicycle routes and greatly impacts the experience of the most seasoned and novice cyclists. As noted in the Introduction, the environment of Haywood County has a major impact on tourism and long-term sustainability of the region. The travel routes in the area can be traced to ancient eras when the network of streams and rivers carved valleys throughout the southern Appalachian Mountains. Thus transportation in Western North Carolina has always been difficult, as the far-traveling Frederick Law Olmstead noted in the late 1800s that the stage roads in Western North Carolina were “as bad as anything, under the name of road, can be conceived to be.” Some bicyclists have joked during development of the Comprehensive Bicycle Plan that some roads have not progressed since that era.

Narrow mountain passages and streets wedged between creeks and hillsides create narrow corridors that may not have high traffic volumes but present barriers and opportunities for bicyclists. The scenic vistas and rolling terrain in some areas lead to other areas of more extreme terrain, limited sight distance, and a lack of suitable clearance space to allow vehicles and bicyclists to share the road side by side.

Roadways are narrow in Haywood County today in part because the NC Legislature decreed in the mid-1850’s that most roads built in Western North Carolina should not be more than 12 feet wide where side-cutting (cut slopes) was needed and just 8 feet wide in instances where rock blasting was necessary. Convenience was sacrificed at the expense of cost where road building was concerned. While the ribbon pavement roads in place today are seldom 12 feet wide, many are not more than 18 or 20 feet wide because of these policies. As a result, there are no bike lanes in Haywood County today and few roads have shoulders to accommodate bicyclists.

Despite this, bicyclists flock to Western North Carolina to ride the Blue Ridge Parkway, experience mountain vistas, and wheel down single track mountain bike trails that rank among the best in the United States. This influence, fed by a strong tourism-based economy, creates a context within Haywood County that should help natural-



Scenic vistas that have been in place for centuries, such as the one shown above on Wagon Gap Road, have drawn people to Western North Carolina and Haywood County.

Photo Credit: Asheville Citizen-Times



While vehicles, businesses and technologies have changed, streets such as Main Street in downtown Waynesville maintain the same look and feel as they had almost 80 years ago.

ly promote a stronger bicycling culture in the future and provide tangible economic, social and health benefits to bicycling investments, especially where features of the natural environment can be overcome.

Community Profiles

The towns and rural communities in Haywood County are as diverse as the landscape that has both connected and isolated them throughout their respective histories. The county seat, Waynesville, remains both the population and cultural hub of Haywood County while Canton is a major employment center not only for the County but for Western North Carolina with the presence of Evergreen Packaging (formerly Champion). The Town of Maggie Valley is a popular tourism destination in the Southern Appalachians and has seen a transformation into a retirement and second home destination. The Town of Clyde is nestled along the Pigeon River between Waynesville and Canton and is well-suited to become a bicycling hub for Haywood County due to its central location, the number of suitable bicycle routes that emanate from the Town, and its proximity to Haywood Community College

Other unincorporated communities also play a vital role in Haywood County's prosperity and national draw. Most prominent of those is Lake Junaluska, a conference and retreat center as well as a private residential community that serves as a gathering

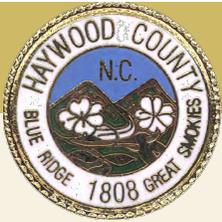
place for Methodists. It is also a recreational attractor for Haywood County as visitors and residents enjoy strolling the walkways around the lake. Another prominent rural community is Bethel, a rural farming community in southern Haywood County that enjoys quick access to the Blue Ridge Parkway and other recreational opportunities in the Pisgah National Forest.

Many other rural communities are scattered throughout Haywood County and have two-lane rural roadways that are a delight for bicyclists who enjoy low-speed and low-volume roadways that parallel creeks and streams while traversing rolling farm land.

During the course of the Haywood County Comprehensive Bicycle Plan, representatives of BicycleHaywoodNC and the Plan's consultant team met with key staff of each of the four incorporated towns and Lake Junaluska as these communities represent the majority of the population of the County. Meetings were also held with Haywood County's management team and other staff members to gather input on the bicycle-related needs of unincorporated areas.

The following pages contain snapshots of each town and Lake Junaluska to outline bicycling-related features and opportunities identified during the community meetings and field analysis.





Haywood County

Population: 59,036
 Pop. Growth (2000-2010): 9.3%
 Land Area: 553 Sq Mi.



Context: Haywood County has diverse landscape ranging from rolling hills with forests and farmland to steep terrain and high mountainous areas. The Blue Ridge Parkway follows much of the southern boundary of the County.

Influences: A majority of the population of Haywood County resides in the urbanized area defined as the incorporated towns and unincorporated areas between Maggie Valley, Waynesville, Lake Junaluska, Clyde and Canton. Other communities such as Jonathan Creek, Bethel, Iron Duff and the Ratcliff Cove Road corridor have notable population clusters. Connecting these communities and major destinations within them should be the primary focus of bicycle facilities investment.

Bicycling: The state-designated and US highways form the backbone of the transportation system in Haywood County and link bicyclists to numerous two-lane, low-volume routes and loops throughout the rural areas. These routes and loops provide for some of the most scenic bicycle riding in North Carolina and will not likely require large-scale improvements. Adding shoulders or wide outside lanes to major corridors connecting to these routes, as well as greenways, should be a priority.



Town of Waynesville

Population: 10,144
 Pop. Growth (2000-2009): 9.8%
 Land Area: 7.8 Sq. Mi.



Context: Waynesville is the County seat, the largest town in Haywood County and a tourism and cultural hub. Several roads converge on Waynesville and it has several traditional neighborhoods, including Hazelwood, a very bicycle-friendly area.

Influences: Waynesville provides the majority of commercial and shopping destinations for the area. Waynesville’s Main Street and nearby areas are one of the most vibrant small town downtowns in North Carolina and offer walkable destinations within a few blocks of one another. The Frog Level Historic District and Hazelwood also offer unique downtown shopping environments and great potential for bicycle-friendly nodes. There are several traditional neighborhoods in Waynesville as well as golf communities on its periphery.

Bicycling: Major corridors such as US 276 and US 23 Business create barriers for bicycling but there are alternative routes on parallel two-lane streets throughout town and other routes connect to scenic loops. The US 276—Russ Avenue corridor has large-scale commercial development and is planned for improvements that include bicycle lanes. The Town is planning a BMX park as part of the master plan for the Recreation Center. Downtown Waynesville is an ideal location for bicycle racks.





Town of Canton

Population: 4,029
 Pop. Growth (2000-2009): 1.7%
 Land Area: 3.8 Sq. Mi.



Context: Canton is Haywood County's second largest town and the hub of employment with Evergreen Packaging (historically called Champion), which is the county's largest industry. It is also home to the historic Colonial Theatre.

Influences: Canton has witnessed a re-birth of its downtown in recent years as the town has emerged as a bedroom community for Asheville and re-investment has led to renovation of the Colonial Theatre and Imperial Hotel. Haywood County's second largest community is also the location of the county's largest private employer—Evergreen Packaging—which employs more than 1,200.

Bicycling: The renovation of the Colonial Theatre was partially funded through a transportation-related grant that stipulated the theatre would be opened to bicyclists for restrooms and water breaks. It also includes covered bicycle parking. The Rough Creek watershed is owned by the Town of Canton and has more than 10 miles of walking, running and mountain bike trails. Canton provides a gateway for bicyclists traveling recreational routes to and from Buncombe County and the Blue Ridge Parkway. Some residents expressed concern over a ban on bikes in the Recreation Park.



Town of Maggie Valley

Population: 1,602
 Pop. Growth (2000-2009): 163.9%
 Land Area: 1.6 Sq. Mi.



Context: Residents and visitors to Maggie Valley enjoy quick access to the Great Smoky Mountains National Park and Blue Ridge Parkway. The town is a primary tourism destination for Western North Carolina.

Influences: Maggie Valley is one of Western North Carolina's primary tourist destinations and has remained so, even after the closure of the Ghost Town amusement park in 2007, due to the town's proximity to the Qualla Boundary and Cataloochee Ski Area. The Town is situated along a five-mile stretch of US 19—Soco Road, which is the only thoroughfare that connects the town to other communities.

Bicycling: The geographic constraints of Maggie Valley make it difficult to access via bicycle from other towns and communities within Haywood County. Some recreational bicyclists use Soco Road as a connection to the Blue Ridge Parkway. Maggie Valley has seen an increase in families using bicycles to get from campgrounds and residential areas to the commercial strip along Soco Road, but much of this takes place on the sidewalks. New parks are planned at either end of Moody Farm Road, which parallels Soco Road for two miles and has new sidewalks.



Town of Clyde

Population: 1,401
 Pop. Growth (2000-2009): 5.8%
 Land Area: 0.8 Sq. Mi.



Context: Clyde is the cross-roads of Haywood County, located almost equidistant between Waynesville and Canton. The Pigeon River defines this close knit bedroom community that experienced devastating floods in 2004.

Influences: Clyde has historically been defined by the shape of its town limits, which is almost a perfect circle centered on the downtown district. The Town of Clyde is bisected by Carolina Boulevard (US 19 / 23), which connects to Waynesville and Canton. Haywood Community College and Haywood Regional Medical Center are located just west of Clyde, as is Tuscola High School.

Bicycling: Clyde has the potential to become the bicycling hub of Haywood County. Parcels purchased after the flood of 2004 along Glance Street are planned to be a county park and have pad sites and pathways ideal for conducting bicycle rodeos for children. Further, several key recreational routes converge in Clyde, including Old Clyde Road, Thickety Road, Hyder Mountain Road, and Main Street / Poison Cove Road. The presence of small parks in Clyde with restrooms and water fountains, as well as parking, are a benefit to bicyclists.



Lake Junaluska

Population: 2,675 (2000)
 Pop. Growth (2000-2010): N/A
 Land Area: 1,200 acres

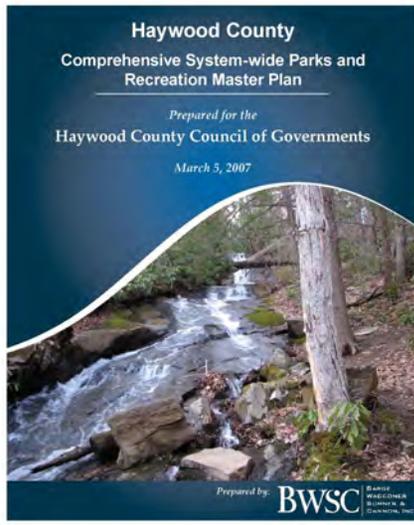


Context: Lake Junaluska is an unincorporated community, conference center and retreat affiliated with the United Methodist Church. There are more than 800 residences, 700 hotel rooms and several meeting spaces on the grounds.

Influences: Lake Junaluska is a private community founded in 1913 and serves more than 150,000 people each year through its various programs, events and retreats. Rental cottages, hotel rooms and apartments also make Lake Junaluska a vacation destination. The streets within the community are privately owned with the exception of County Road. A ring road around the lake is a popular scenic destination with the mountains as a backdrop.

Bicycling: Lake Junaluska is a popular recreation destination for Haywood County as residents and visitors flock to the walking trail around the lake. Bicyclists also enjoy riding the low-speed and low-volume streets. Residents of Lake Junaluska express concerns over bicyclists, particularly as it relates to their use of the pedestrian-only bridge and perceived conflicts during high volume times at the Assembly. Roads within the Lake Junaluska community will likely remain shared use due to space.





“Any future roadway construction project in the County should include provisions to accommodate pedestrian and bicycle travel. This network should connect existing and future park and recreation facilities and greenways. Bike racks ... should be installed at all publicly owned facilities across the County.”

- Haywood County Comprehensive Recreation Plan (2007)

Planning History

While there are no bicycle-specific plans for municipalities within Haywood County or its unincorporated areas, there are several related plans that have impacts to the existing and future bicycle system. The plans listed below have been reviewed and summarized based on their relevance to the Comprehensive Bicycle Plan.

It is important for BicycleHaywoodNC and other bicycle-related stakeholders to track the progress of these plans and the projects identified within them for opportunities to provide input on the design and connectivity of the projects. Of particular note, the projects identified in the 2035 Regional Long-Range Transportation Plan suggests several million dollars in corridor improvements and bicycle/greenway facilities.

Haywood County Comprehensive Recreation Plan. The 2007 Comprehensive Recreation Plan was developed as a countywide joint effort to encompass all of Haywood County, including its four municipalities, recognizing that collaborative efforts to develop a system of parks, recreation and greenway facilities would be necessary to fully achieve the goals of the plan and address the needs expressed by citizens during the course of the Plan.

The Plan identifies various types of park and recreation facilities managed by various entities, including eight (8) facilities owned by Haywood County,

which include agricultural buildings and activity centers; six (6) parks and recreation sites in Waynesville along with one (1) greenway; six (6) existing or planned parks in Canton and one (1) pedestrian-only greenway trail; one (1) existing and one (1) planned park in Clyde; and five (5) recreational sites in Maggie Valley.

There are more than 170 acres dedicated to these facilities and sites. The plan also identified more than 50 private parks, recreation and amusement sites within the County. Fifteen (15) school sites were also identified as having some type of recreational facility.

Of most relevance to the Comprehensive Bicycle Plan is the location of these public and private facilities and the degree to which they are or can be connected via a system of on-street bicycle routes, trails and greenways, or private trails constructed by development in the future. Through a questionnaire the Plan identified a desire among Haywood County residents to have more linear parks or greenways along streets, rivers and streams. From this, greenways were a top priority identified for the County with 80% of respondents to the questionnaire expressing strong support for greenways. The Plan identifies a four-mile greenway between Canton and Clyde along the Pigeon River as a top priority.

Specific bicycle recommendations included strong language related to the pursuit of Complete Streets.

Recommendation #4: Bicycle Lanes notes “Any future roadway construction project in the County should include provisions to accommodate pedestrian and bicycle travel. This network should connect existing and future park and recreation facilities and greenways. Bike racks (sheltered ones at schools and other high potential use areas) should be installed at all publicly owned facilities across the County.”

Russ Avenue Corridor Study. This study was adopted in 2010 and includes detailed traffic analysis to determine methods by which Russ Avenue (US 276) from the Great Smoky Mountains Expressway (US 23/74) to Walnut Street near downtown Waynesville can accommodate future growth along the corridor and influences from growth elsewhere in Haywood County. The 0.8-mile section is the most heavily travelled roadway in Waynesville with up to 23,000 vehicles per day. The corridor has no bicycle facilities.

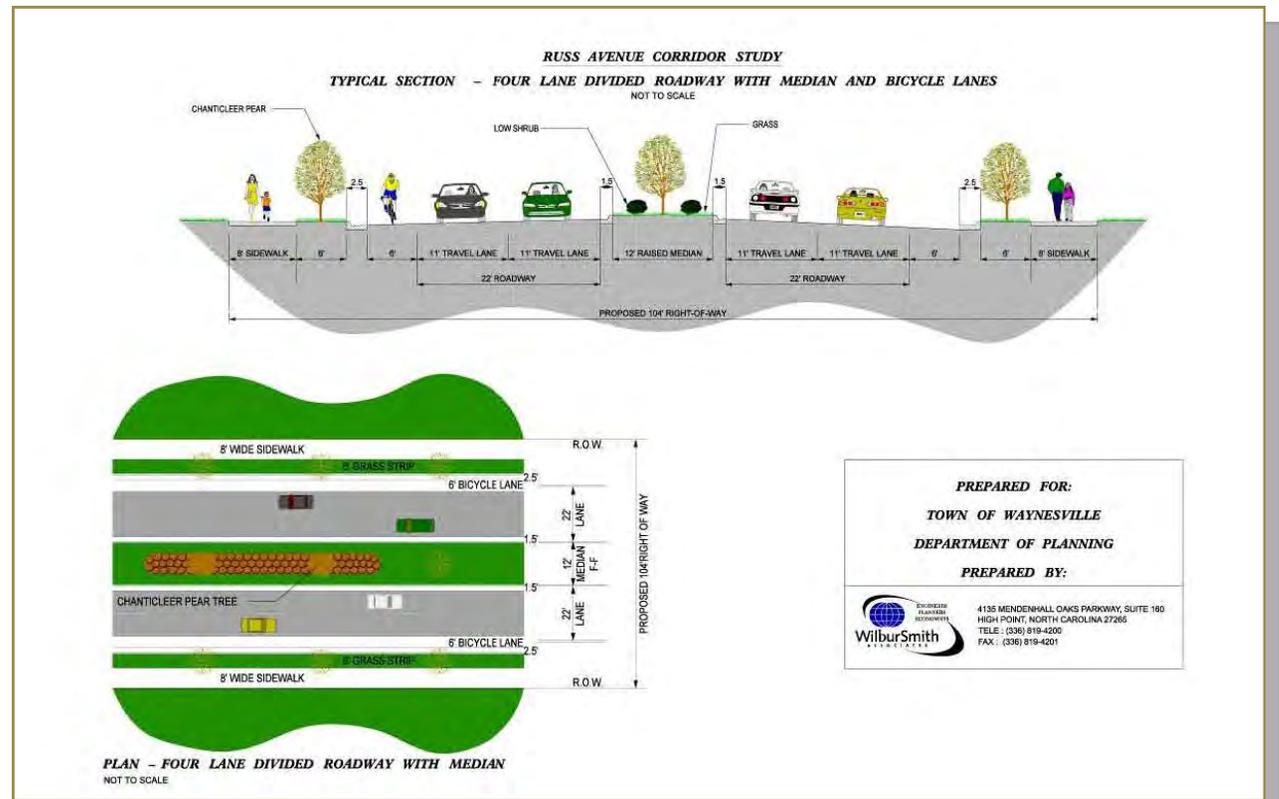
The recommendations of the study include the addition of 6-foot bicycle lanes on both sides of Russ Avenue along with 11-foot travel lanes and a sidewalk separated by a 6-foot buffer (Exhibit 3-1). The importance of this route for bicycling lies in its connectivity to major retail areas of Waynesville along with limited parallel options along lower volume roads. The study analyzed intersecting streets but did not include any specific recommendations for bicycle facilities as part of those intersection improvements.

Waynesville Comprehensive Pedestrian Plan.

The primary bicycle-related component of the Town of Waynesville Pedestrian Plan (2010) is the documentation and recommendation of two greenway corridors. The most prominent greenway feature identified in the plan is along Richland Creek from Russ Avenue (US 276) to Hyatt Creek Road, connecting to the existing greenway along Richland Creek. This was proposed for long-range implementation.

Exhibit 3-1: Cross Section Identified for Russ Avenue, including 6-Foot Bicycle Lanes

Source: Russ Avenue Corridor Study





Trails Identified in the Land of Sky Regional Council Regional Trails Plan

- ◆ Pigeon River from Clyde to Canton, including an extension along the Pigeon River from Clyde to the confluence with Richland Creek near NC 209 and a connection to Lake Junaluska;
- ◆ Richland Creek from Balsam through Waynesville to Lake Junaluska.
- ◆ Jonathan Creek north of the US 276 / US 19 intersection to the proposed site of a County park;
- ◆ Raccoon Creek greenway similar to what is identified in the Waynesville Pedestrian Plan;
- ◆ Connection to Maggie Valley from the Blue Ridge Parkway along US 19;
- ◆ Beaverdam Creek to the Rough Creek Watershed trails; and
- ◆ Pigeon River – East Fork connecting to trails in the Pisgah National Forest.

Exhibit 3-2: Trails Identified in the Land of Sky Regional Council Regional Trails Plan

Shorter greenway connectivity projects are proposed from Russ Avenue toward the east side of Waynesville parallel to the Creek and Howell Mill Road to connect to the existing County greenway that crosses under US 23/74 and connects to US 19 near Lake Junaluska.

A greenway is also planned for long-term implementation along Raccoon Creek from the confluence of Richland Creek and Raccoon Creek to US 276 (Pigeon Road), running parallel to Raccoon Creek and Ratcliff Cove Road.

Other greenway components of the pedestrian plan include providing a wayfinding system and greenway access signage along the greenway and acquiring ownership interests in floodway properties along corridors designated for greenways.

The Pedestrian Plan also recommends the Town require developers to construct greenway connections and encourage multi-use pathways along one side of the road in areas of steep terrain.

Land of Sky Regional Council Regional Trails Plan. The Regional Trails Plans (2008) is a broad-based examination of the potential for a variety of trails in the five-county region consisting of Buncombe, Haywood, Henderson, Madison and Transylvania Counties. The primary output of the effort is a regional trails plan map and big picture recommendations, including language that encourages NCDOT to include trails, sidewalks, and bicycle lanes as a component of new projects or retrofits.

Trail-related recommendations include on-street and off-street sidewalk and greenways in parts of Haywood County as well as recommendations for local and regional trails. These trails are listed in Exhibit 3-2

French Broad River MPO Comprehensive Transportation Plan. The bicycle element of the Comprehensive Transportation Plan (CTP) covers the urbanized areas of Haywood County, roughly defined as the Waynesville to Canton corridor and the US 276 / US 19 corridor to Maggie Valley.

The CTP (2007) is intended to be a long-range (greater than 20 years) evaluation of which corridors in Haywood County are in need of some type of multi-modal transportation improvement. The formation of the maps and recommendations stems from community input and technical analysis that is intended to be refined further in other planning efforts by the MPO, NCDOT and municipalities.

All North Carolina and US highways designated in the Haywood County urbanized area are designated for “Needs Improvement” on the CTP Bicycle Map. Local streets designed as “Needs Improvement” include:

- ◆ North Lakeshore Drive, Lake Junaluska;
- ◆ Old Clyde Rd between Waynesville and Canton
- ◆ Howell Mill Road in Waynesville;
- ◆ Ratcliff Cove Rd & Raccoon Rd in Waynesville;
- ◆ Ninevah / Country Club Dr / Crymes Cove Rd



- to US 276 in Waynesville;
- ◆ Plott Creek Rd, Will Hyatt Rd, and Sulphur Springs Rd in Waynesville;
- ◆ Brown Ave through the Hazelwood community in Waynesville;
- ◆ Old Balsam Rd in Waynesville and unincorporated Haywood County;
- ◆ Champion Drive in Canton; and
- ◆ North Main Street in Canton.

The CTP Bicycle Maps include the greenways studied further in the County Comprehensive Recreation Plan and Waynesville Pedestrian Plan.

French Broad River MPO 2035 Long-Range Transportation Plan. The 2035 Long-Range Transportation Plan (LRTP) in effect for Haywood County includes a significant element related to pedestrian and bicycle transportation, including several references to policy initiatives at the state and federal level. It was adopted in 2010. Chapter 3 focuses on pedestrian and bicycle usage and crash statistics throughout Buncombe, Haywood and Henderson Counties and references to various funding programs.

Project-related components of the LRTP include a streamlined list of corridors stemming from the Comprehensive Transportation Plan. Chapter 15 provides a detailed listing of specific bicycle projects as well as several projects that include bicycle facilities. The major projects are listed in Exhibit 3-3.



**Major Projects & Bicycle-Specific Projects
Identified in the FBRMPO 2035 Long-Range Transportation Plan**

Tier I Projects: 2011-2015

- ◆ Howell Mill Road upgrade, which includes wide lanes for shared use
- ◆ US 19 in Maggie Valley to restripe to provide wider outside lane with shared lane markings or bike lane

Tier II Projects: 2016-2025

- ◆ Richland Creek Greenway in Waynesville
- ◆ NC 209 widening from US 19/23/74 to Old Clyde Road
- ◆ Russ Ave. Corridor Plan Implementation
- ◆ US 23-Business from Hyatt Creek Rd to Ninevah Rd (currently under study)
- ◆ \$1.0 million for regionwide projects to include bicycle-related signage, shared lane markings and striping of bicycle lanes
- ◆ \$7.0 million for regionwide bicycle and pedestrian elements of highway projects
- ◆ \$1.8 million for regionwide spot infrastructure improvements to provide bicycle and pedestrian access to transit

Tier III Projects: 2026-2035

- ◆ US 19/23 widening to four lanes from Candler to Canton
- ◆ US 276 (Pigeon Road) for six miles from US 23 Business in downtown Waynesville to NC 215
- ◆ Dellwood Road upgrade from Miller Street to Russ Avenue (US 276)
- ◆ NC 215 improvements from Pigeon Street in Canton to US 276
- ◆ Streetscape improvements along US 19/23 through Clyde
- ◆ \$10.0 million for implementation of municipal / county bicycle, pedestrian and greenway plans
- ◆ \$6.5 million for repaving and widening of rural roads to accommodate bicyclists and pedestrians
- ◆ \$1.0 million for bicycle-related signage, sharrows and bicycle lanes

Exhibit 3-3: Major Projects & Bicycle-Specific Projects Identified in the FBRMPO 2035 Long-Range Transportation Plan.





Members of BicycleHaywoodNC identified corridors and hot spots throughout Haywood County where they felt there was a high likelihood of a bicyclist being involved in a crash. These results were then used for “Hot Spot” analysis detailed later in the Plan.

Photo Credit: Don Kostelec

Crash Data

Analysis of bicycle crashes in Haywood County is summarized utilizing data compiled by NCDOT and maintained by the Highway Safety Research Council at the University of North Carolina. Crash data for areas such as Haywood County can be misleading when compared to data elsewhere in the state, particularly for urbanized areas and the state’s largest population centers.

Data on total crashes compiled between 1997 and 2007 for North Carolina’s 100 counties indicates Haywood County ranks 71st while nearby Buncombe County ranks 13th and Jackson County is 90th. However, these published rankings are not normalized by population or bicycle usage rates to gather a true determination of the magnitude of bicycle crashes in the County or within individual towns.

From 1997 through 2008 (the latest date range available) there were 21 bicycle-related crashes reported in Haywood County, including: 12 in rural areas; seven (7) in Waynesville; one (1) in Canton; and one (1) in Clyde. Only one (1) of these crashes did not result in an injury to the cyclist. In comparison, there were 86 crashes involving pedestrians in Haywood County during the same time period.

In the period from 2004 to 2008 there was a rate of 0.34 crashes per 10,000 people in Haywood County, equaling roughly two (2) crashes per year. In

that same period, the state’s largest urban areas had rates between 0.7 and 2.5.

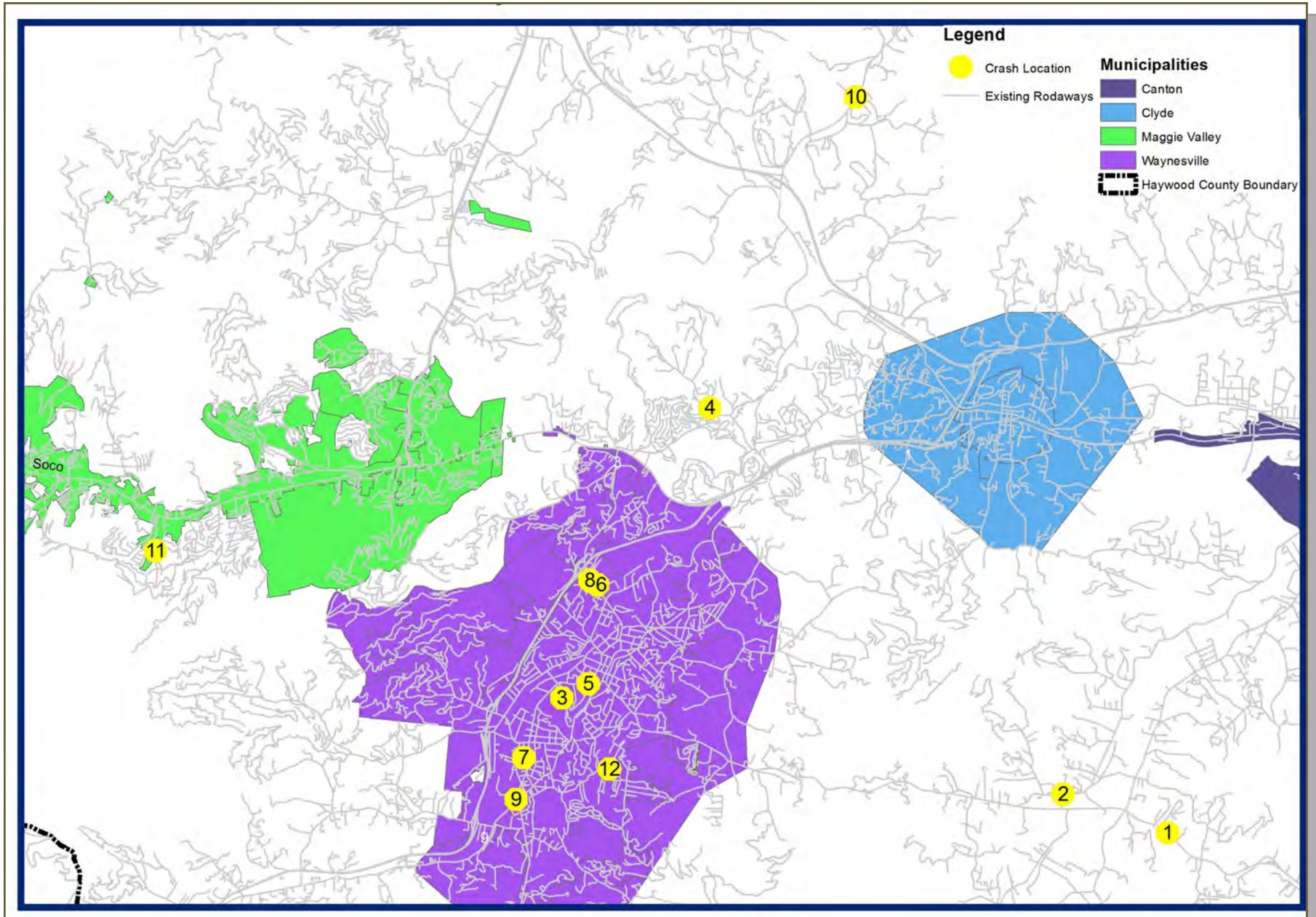
Even though the figures for Haywood County do not represent a level that carries any statistical significance, understanding the nature of crash data and the location of these crashes is important in assessing best fit design principles as well as education, enforcement and encouragement programs.

For example, the data seem to indicate children are the most vulnerable group and the considerations for Education components of this Plan reflect the unique needs of children so they can learn to ride safer on the streets.

Exhibit 3-4 indicates the location-specific information for the bicycle crashes, as compiled by NCDOT. Please note these are locations that were identified in the incident reports filed by law enforcement and do not reflect address-specific locations.

It is important to note that not all crashes are reported, and neither are incidents involving bicyclists and motorists such as minor assaults and incidents of harassment. Methods for addressing these types of issues are summarized in the Enforcement chapter.

Exhibit 3-4: Haywood County Bicycle Crash Locations; 1997-2009.



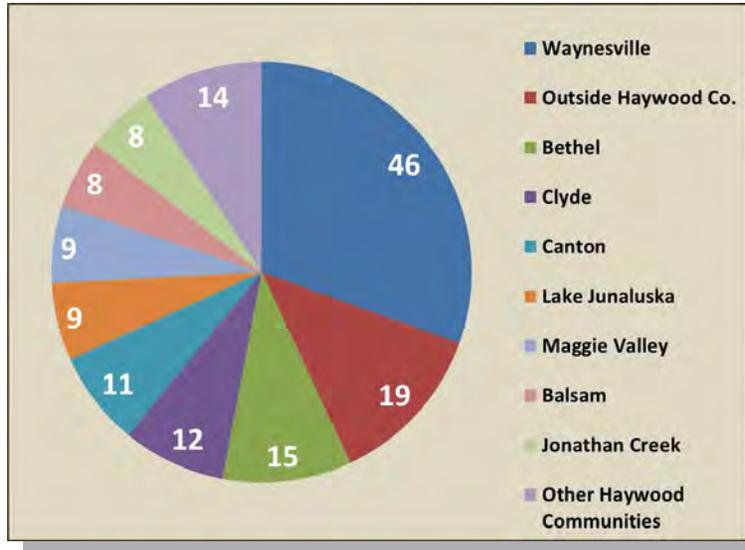


Exhibit 3-5: Geographic Distribution of Survey Respondents

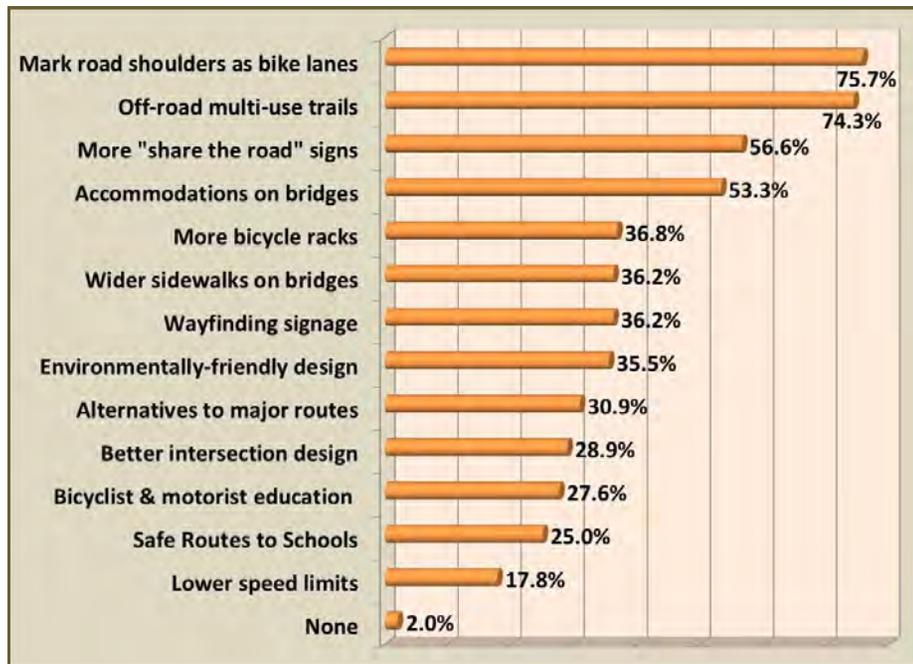


Exhibit 3-6: Preferred Improvements, by percentage of respondents, to Roadways and Other Facilities to Accommodate Bicyclists

Public & Stakeholder Outreach

The public involvement features of the Haywood County Comprehensive Bicycle Plan consisted of six strategies to reach the most diverse populations and user group as possible given time and resource limitations. These strategies were:

- ◆ **Survey:** Online and hard copy completed by 170 individuals;
- ◆ **Festivals:** Distributing information about the Plan and BicycleHaywoodNC at four community events, one in each town;
- ◆ **Municipal Meetings:** Community-specific meetings with town staff, as well as Lake Junaluska, to gather bicycle-specific ideas, summarized in the Community Profiles;
- ◆ **Community Conversations:** BicycleHaywoodNC representatives introduced the plan to the Bethel Community Organizations and several civic / service clubs;
- ◆ **Blue Ridge Breakaway:** Economic survey of users, one-on-one conversations, and table with Plan information on the day of the event;
- ◆ **Articles & Blog:** Cecil Yount's columns in the *Mountaineer* and *GR&SMOKIESZEKE* blog.
- ◆ **Public Open House:** October 2011 public forum held at the Colonial Theatre in Canton to present the findings of the Plan prior to adoption by the Board of County Commissioners.

Community Bicycling Survey. A key component in understanding attitudes and opinions about bicycling in Haywood County was the survey developed

for the Comprehensive Bicycle Plan. The survey was developed to gain an idea of major themes related to bicycling, such as:

- ◆ How often and where do you ride?
- ◆ What type of improvements do you want to see for bicyclists?
- ◆ What routes are in the best shape / worst shape for bicycling? And
- ◆ Do you wear a helmet when you ride?

This type of survey is not intended to be a scientific analysis to develop distinct statistically summaries, rather it was meant to help inform and confirm the findings of the Plan. The survey was distributed in both online and hard copy formats through various media, including bicycling articles in local newspapers, the Blue Ridge Bicycle Club and other newsletters, the BicycleHaywoodNC web site, municipal and county websites, and promotion at community events and festivals.

Survey responses were collected from May 1, 2011 to August 31, 2011 with 170 respondents completing the survey, exceeding the goal of 150 responses established early in the planning process. Exhibit 3-5 shows the geographic distribution of respondents.

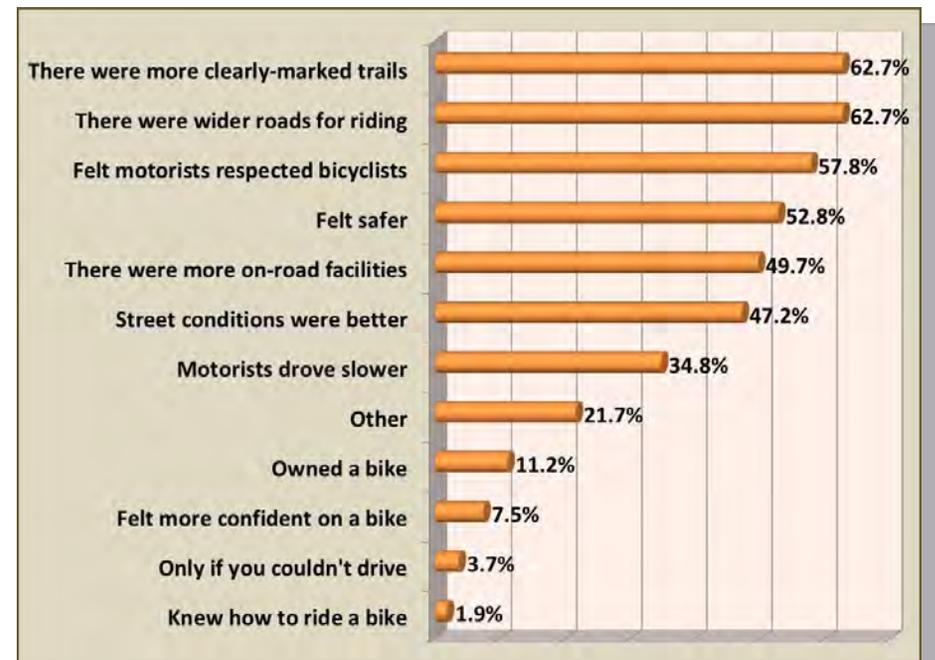
Exhibits 3-6 and 3-7 represent key findings of the survey that helped identify themes for recommendations contained throughout the Plan. A full summary of the survey results is located in the Appendix and a summary of helmet usage statistics is contained in

the chapter on Enforcement.

In general, the survey indicated:

- ◆ Not owning a bike and feeling unsafe on the roads as primary reasons why people do not ride a bike more often;
- ◆ Most trips are taken for recreational purposes, for exercise, and for mountain biking;
- ◆ Weekends are the preferred riding time; 17.5% of respondents commute to work by bicycle;
- ◆ Bicyclists prefer to ride around their neighborhood and on greenways / multi-use trails;
- ◆ More than 30 respondents said they felt safe and comfortable riding on roads such as Main

Exhibit 3-7: Responses to the Question: "What would encourage to ride your bike more often?"



- Street in Waynesville and Canton, NC 215 to the Blue Ridge Parkway, and NC 209
- ◆ 50 respondents felt no roads in Haywood County were comfortable for bicycling;
- ◆ More than 70 respondents indicated Main Street in Waynesville and Canton and US 276 – Pigeon Road as places where they would most like to see improvements; and
- ◆ More than 77% of respondents said they wore a helmet when riding their bicycles.

The survey results are consistent with similar outreach efforts conducted in other small towns and rural communities. The interests of bicyclists typi-

cally fit into two distinct groups: cyclists who are comfortable in most riding situations and riders who feel safe only on very low speed and low volume streets. The characteristics of these two groups are profiled in Chapter 1.

In total, 61.3% of the respondents are male; 38.7% are female; and the age group with the highest percentage of responses was 50 to 69 years of age representing 47.4%. More than 35% of responses were from persons age 30 to 49.

Demographic Profile

Basic outcomes from the 2010 Census were available while the Haywood County Comprehensive Bicycle Plan was being developed. The results of the Census indicate the County grew by 9.3% from 2000 to 2010, a rate lower than the North Carolina average of 18.5%. As previously noted, the proportion of persons age 65 years and over in Haywood County is 20.7%, a rate higher than the state of North Carolina (12.7%).

Other salient demographic data obtained for Haywood County was obtained through the American Community Survey (ACS), which is managed by the US Census Bureau and is a more detailed examination of various community characteristics. The ACS is conducted every year with the current data for Haywood County collected in the 2005-2009 ACS. Below are some key summary statistics for Haywood County that can have an impact on bicycling.

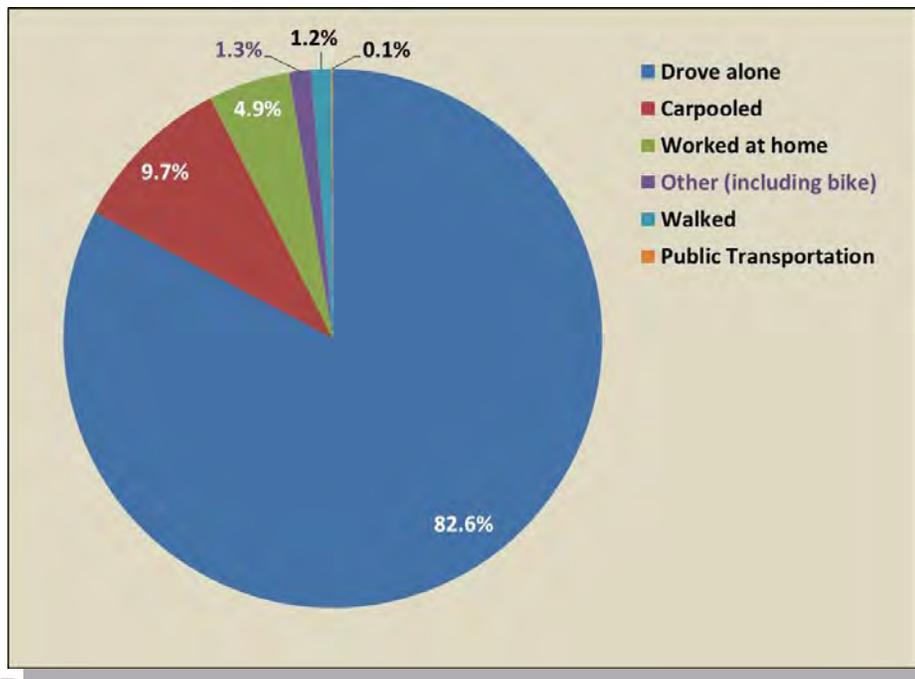


Exhibit 3-8: Commute Trip by Mode of Travel for Haywood County Residents
Source: US Census Bureau—American Community Survey



Eighty-three percent (83%) of Haywood County workers drove to work alone in 2005-2009. Of that, 10% carpooled, less than 0.5% took public transportation, and 3% used other means such as walking and bicycling (Exhibit 3-8). The mode that includes bicycling is 1.8% of commuters. North Carolina’s bike commute rate was 0.2% of commuters, a rate similar to Georgia but lower than South Carolina and Virginia (0.3% each).

The remaining 5% of Haywood County were telecommuters (worked at home). Among those who commuted to work, it took them on average 21.8 minutes to get to work, an average lower than the state of North Carolina at 24.0 minutes. The US average is 25.1 minutes.

Major Bicycling Destinations

Blue Ridge Parkway. The Parkway is designated as part of North Carolina Bicycle Route 2 – Mountains to Sea as it follows the southern boundary of Haywood County. The Blue Ridge Breakaway’s 105-mile Hawk Route follows the Parkway through southern Haywood County, with cyclists accessing the road at US 215—Lake Logan Road and traveling to its intersection with US 19—Soco Road near Maggie Valley.

The design of the Blue Ridge Parkway is the same from mile marker No. 1 to No. 469 and that design is federally-protected through various designations. This limits the ability and willingness of the National Park Service to consider improvements to the roadway

cross section that would accommodate bicycle lanes, shoulders, or added space on descents. The Parkway also has several tunnels in North Carolina that require bicyclists to ride with front and rear lights.

Bicycle access to the Parkway in Haywood County is provided via several thoroughfares. The Great Smoky Mountains Expressway has shoulders between Hyatt Creek Road (Exit 98) and the access point near Balsam, as well as connections to Old Balsam Road. Other connections are along two-lane segments of US 276 (Cruso Road), NC 215 (Lake Logan Road, and US 19 (Soco Road).

Biking on off-road trails adjacent to the Parkway within National Forest or National Park service land is prohibited unless specially-designated for bicycle use.

Rough Creek Watershed Trails. The area north of Canton known as the Rough Creek Watershed provides municipal water supply for the Town of Canton. The 830-acre preserve has more than 10 miles of designated trails that are becoming a popular mountain biking destination.

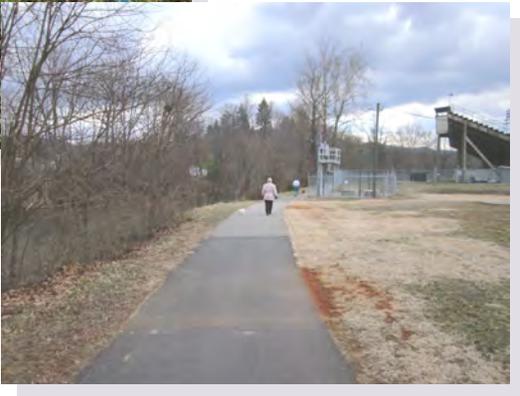
There are three distinct trails within the Rough Creek Watershed that create loops to one another. They are the Road Bed Trail, Cherry Cove Trail and Turkey Run Trail. Much of the trail system has grades suitable for children or novice



The Blue Ridge Parkway is designated as part of North Carolina Bicycle Route 2—Mountains to Sea. It is a popular regional destination for recreational cyclists and is part of the Blue Ridge Breakaway’s 105-mile Hawk Route.

Photo Credit: Don Kostelec





Canton's Recreation Park includes a walking trail where bicyclists are discouraged from using it. The Town is interested in further discussion on how to best resolve these user conflicts to provide a place where children and those just learning to ride a bike can safely ride.

Photo Credit: Don Kostelec

mountain bikers. Input gathered as part of the Haywood County Comprehensive Bicycle Plan indicates a desire to connect the Rough Creek Watershed Trails to the Town of Canton via on-street bicycle improvements.

Waynesville Recreation Center. The complex and greenway along Richland Creek offers a safe environment for children to learn to bicycle and a place for families to ride. Plans call for the recreation center to add a BMX bicycling area as part of new development plans for the facility.

Given the role the Center plays for recreation and bicycling, connecting on-road and off-road routes are identified in this Plan. BicycleHaywoodNC can support these plans by developing or supporting skills and safety training for BMX park users that also addresses other riding skills.

Canton Recreation Park. Canton's has a large recreation park located approximately 1/4-mile south of downtown along the Pigeon River. The linear park stretches along a 1/2-mile section of along the west bank of the river and includes: a swimming pool; baseball fields; basketball courts; a picnic area; tennis courts; and the town's football stadium.

The park also features a trail along the river that is designated for walking only. Bicyclists are discouraged from using the trail, which as led to discussions among citizens and town leaders about how

to effectively work with parents and children who would like to have a place to ride in Canton.

On trails where there are many walkers and bicyclists, a fear among walkers and other users is the speed and behavior of bicyclists, young and old. Oftentimes these fears are over-emphasized in development and enforcement of rules and ordinances.

BicycleHaywoodNC and Haywood County are well-positioned to work with the Town of Canton to develop solutions so that children and bicyclists just learning to ride can have a safe, in-town area to ride and not create conflicts with other user groups.

Chapter 4: Engineering—Best Practices

Why should we have best practice standards for bicycling?

The national practice of providing for bicyclists is fragmented, but is largely dominated by guidance released from the American Association of State Highway and Transportation Officials (AASHTO) and the Institute of Transportation Engineers (ITE).

North Carolina Department of Transportation (NCDOT) has developed standards for new and improved roadways, and is often in the process of creating updates to those standards, like the new “Complete Streets” guidelines.

Other sources of information include individual municipalities and advocacy organizations. With all of this reference material it would be reasonable to ask why Haywood County would need to develop its own best practice standards. The following provide some rationale for creating a one-source compendium for best practices for cycling-related facilities, design and operations—all focused on the user, for which basic dimensions are illustrated in Exhibit 4-1.

No single source has all of the information we need. All of the current state and national resources contain valuable information, but they do not all contain the same information. In fact, there is no one single source for bicycling design and program practices that includes information about on-street facilities; off-street (trail) facilities; programs like bicycle rodeos; best practices for helmet or bicycle selection; and intersection (crossing) treatments.

Current guidance is not specific to Haywood County. Haywood County is largely rural with sharp changes in terrain as well as weather patterns. Given these conditions, the practice of bicycling in Haywood County may indicate the need for guidance on everything from proper attire to special considerations relevant to snow removal. Complicating matters further is that accurate guidance on cycling facility design and programs is not “set in stone;” that is, the guidance for “best practice” varies by authoring agency or individual. In other words, there is no one “best” type of facility, and the proper choice of a bicycle facility has to consider traffic volumes, speeds, roadway design, grade, land uses, and other factors.

Therefore, it is imperative that bicycling interests in Haywood County continue to work with agencies such as NCDOT and the French Broad River MPO to identify the best-fit facilities as funding and design of new projects materialize. It is also crucial for bicyclists in Haywood County to track emergent research and recommendations related to bicycle facilities, as the level of analysis conducted on the effectiveness and safety of various bicycle facilities is only now being thoroughly examined by researchers and academics now that communities have begun more large-scale investments in bicycle facilities. The increase in users over the past decade is another reason why new research could result in more immediate changes to design standards as

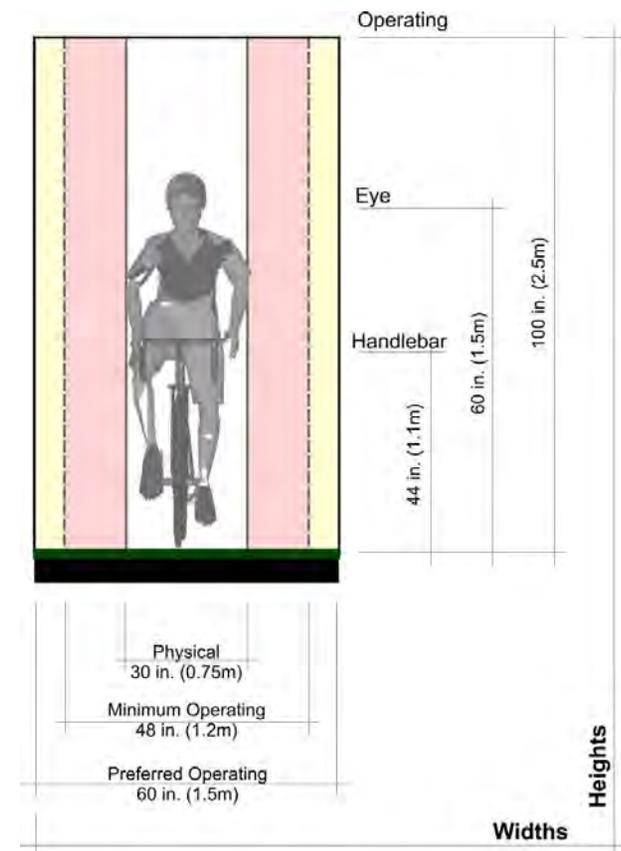


Exhibit 4-1: Horizontal and vertical space requirements of the bicyclist in travel.

Source: AASHTO

more bicyclists provide researchers with a larger data set to evaluate.

Formats and content are not consistent. The goal of this guidance document is to put the most relevant information into the hands of cyclists, planners, engineers, and decision-makers responsible for assembling a bicycling transportation system. Exhibit 4-2 highlights AASHTO research on typical speed and other travel characteristics of bicyclists, indicating that the system has to include a number of elements to be comprehensive and account for various user types.

Exhibit 4-2: Performance Criteria for Different Bicyclists
Source: AASHTO

Bicyclist Type	Feature	Value
Typical Upright Adult Bicyclist	Speed, paved level terrain	8-15 mph
	Speed, downhill	20-30 plus mph
	Speed, uphill	5-12 mph
	Perception reaction time	1.0-2.5 seconds
	Acceleration rate	1.5-5.0 feet per second
	Deceleration rate on dry level pavement	8.0-10.0 feet per second
	Deceleration rate for wet conditions	2.0-5.0 feet per second
Recumbent bicyclist	Speed, level terrain	11-18 mph
	Acceleration rate	3.0-6.0 feet per second
	Deceleration rate	10.0-13.0 feet per second

- ◆ **Along the Street.** Identifying the indications that suggest when bicycle lanes, wide lanes, sharrow markings, and striped shoulders are the most appropriate treatment for a given type of on-road facility.
- ◆ **Greenways & Trails.** Greenway and trail design is largely accomplished through the practice of engineers and architects through a design process that reflects, among other things, grade, land use, drainage, permit requirements, and environmental protection.
- ◆ **Parking & Driveways.** Parking for cyclists is often overlooked, as are the transitions into driveways for businesses. Providing guidance on bicycle parking and driveway design could help reduce or lessen conflict points.
- ◆ **Intersections.** Noting the right way to transition bicycle treatment on the approach to intersections, markings to trigger signalization changes, and what happens when greenways cross streets are important design factors as well.
- ◆ **Programs.** Educating youth riders, choosing appropriate attire and equipment, and creating opportunities to encourage more cycling is a critical part of a complete bicycling guidance document. This element is addressed in the Education & Encouragement chapter.

This guidance should be updated and appended as time goes by, but serves as the starting point for every cycling endeavor in a community.



Design Values for Bicycle Facilities

The design treatments summarized in this section reflect common design practices and, where noted, also reflect the *North Carolina Bicycle Facilities Planning and Design Guidelines (1994)*, which are the most comprehensive publication by NCDOT on the design of bicycle facilities and should be used as reference when discussing potential improvements with NCDOT and other jurisdictions.

There are several types of bicycles (Exhibit 4-3) and all should be considered for the space they require when designing facilities to proper dimensions. Exhibits 4-4 and 4-5 characterize design values for the most common bicycle facilities.

Bicycle Lanes. Bicycle lanes should always be one-way, and are set off from the rest of the roadway with signage, pavement markings, and edge striping. The presence of on-street parking (see Across the Street section) and turn lanes alters the design of bike lanes, which are typically used in urban and sub-urban settings. Bicycle lane widths are designed between 4-feet in width and 6-feet in width based on a variety of factors, outlined below:

- ◆ A width of 4-feet is the minimum standard and is most suited for streets with low speeds (typically 35 mph or less) and low volumes of motorist traffic.
- ◆ A 4-foot bicycle lane can also be used next to a gutter pan that is at least 1-foot wide, thus giving the bicyclists 5-feet of “clearance” space to

Exhibit 4-3: Common dimensions for various types of bicycles.
Source: AASHTO

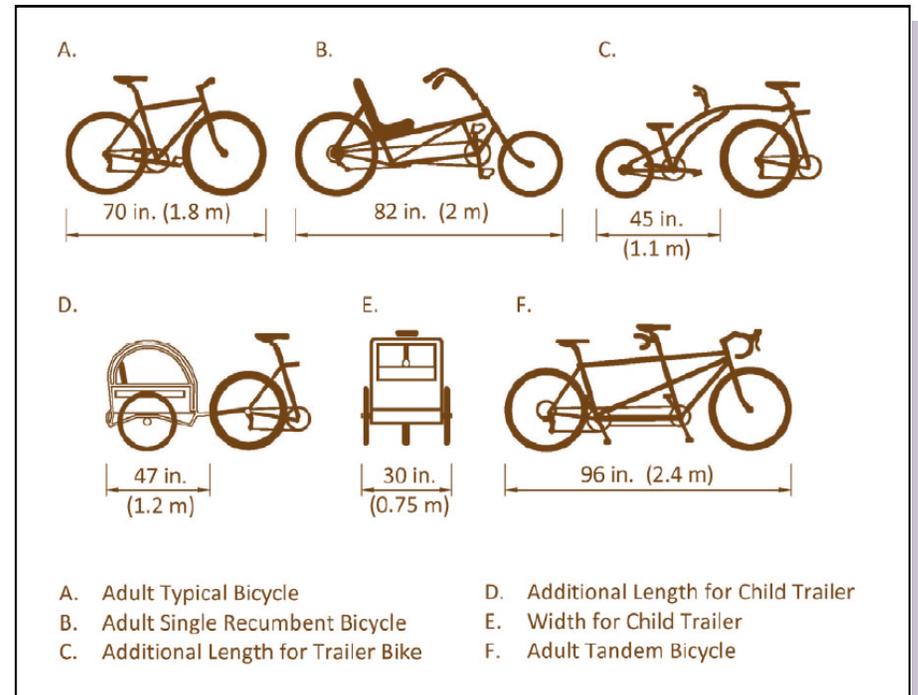


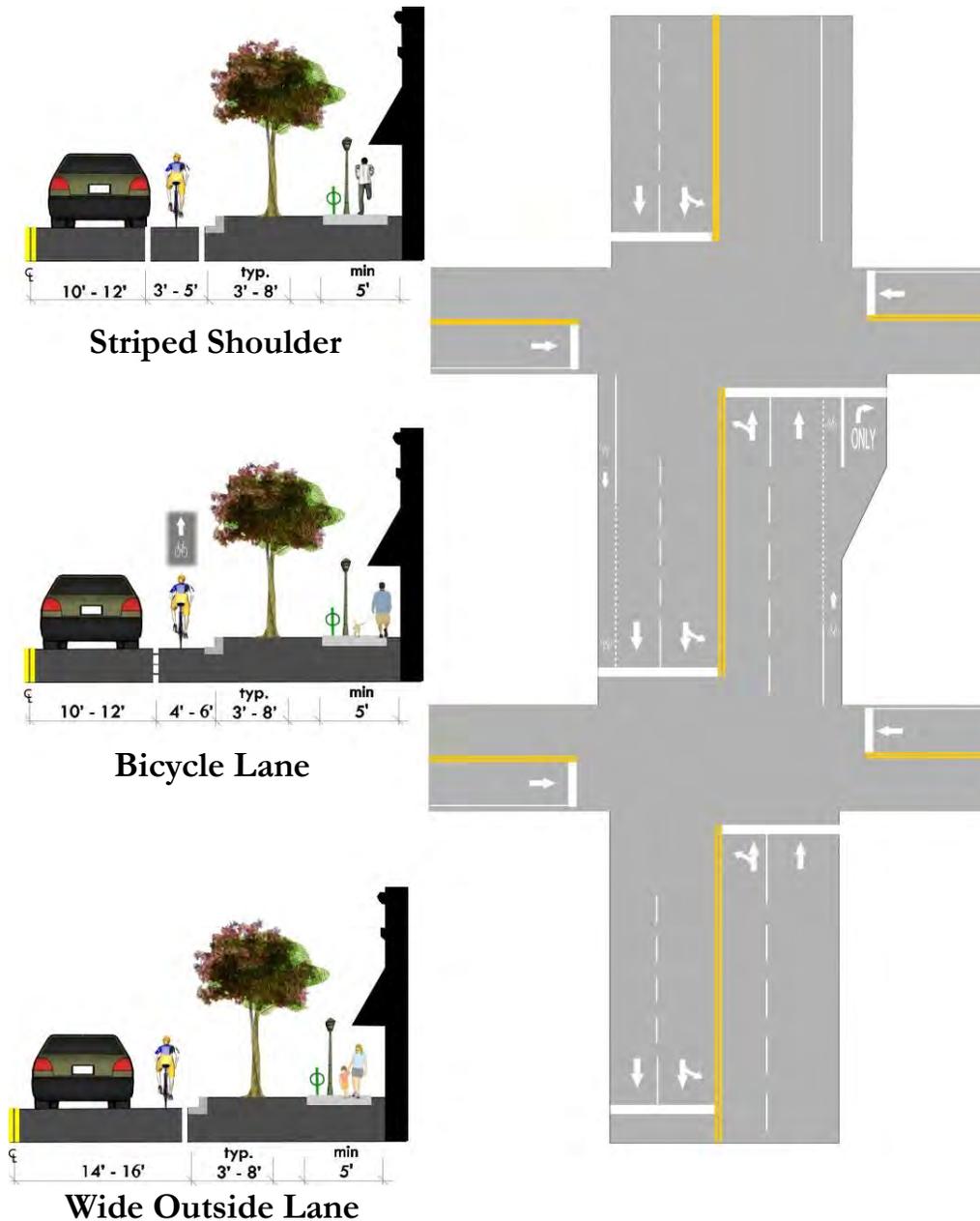
Exhibit 4-4: Width Considerations for Bicycle Facility Types

Source: AASHTO

Facility	Minimum Width	Preferred Width*	Maximum Width	Edge Stripe	Driveway Density
Striped Shoulder	3'	5'	N/A	4"	Moderate
Wide Curb Lane	14'	15'	15'	N/A	Moderate
Bicycle Lane	4'	5'	6'	4"	Low
Greenway	8'	10'	14' (typ.)	4"	None/Very Low



Exhibit 4-5: Common Design Treatments for Bicycle Facilities at Intersections



avoid hazards. *The gutter pan should not be considered part of the bicycle lane width.*

- ◆ A width of 5-feet is the typical bicycle lane treatment, with or without a gutter pan.
- ◆ A width of 6-feet is used on higher speed urban facilities to create greater distance between the bicyclist and motorist. The speed of motorists should allow for “air sweeping” of debris on the bicycle lanes, which does not occur on wide bicycle lanes on lower speed streets.
- ◆ 6-foot wide lanes are also used when adjacent to on-street parking, which allows the bicyclists to operate within the lane but outside of the door zone of parked cars.

Striped Shoulder. This is a common treatment on rural roadways, especially where vehicle speeds are high (in excess of 45 mph). Striped shoulders are one-way carriers of bicycle traffic that also yield benefits for other transportation needs: to motorists as recovery areas; to pavement management and preservation; drainage and stormwater management; and to pedestrians in rural areas who would otherwise have to walk on grass shoulders.

An important, but often overlooked, aspect of designing and constructing shoulders that are intended to also be used by bicyclists is the relationships between the width of the shoulder and the speed of adjacent traffic. This is crucial to note in areas around Haywood County where most of the numbered highways have posted speed limits of 45 mph or greater.



NCDOT guidelines for bicycle facilities state:

If it is intended that bicyclists ride on shoulders, the paved surface must be at least 4 feet in width. If motor vehicle speeds exceed 35 mph; if the percentage of trucks, buses and recreation vehicles is high; or if static obstructions exist at the right side, then additional width is desirable.

Therefore, the width of most shoulders should be at least 5 feet for posted speeds greater than 35 mph; and 6 feet width is most desirable at posted speeds of 55 mph or greater.

Exhibit 4-6 indicates the typical spacing on the roadway to avoid conflicts with opening doors from parked cars when using sharrow markings. The graphic at bottom shows the minimum (48") operating width for a cyclist as well as the preferred operating width (60").

Climbing Lanes. Climbing lanes may be warranted on uphill grades where the stability of the bicyclist is threatened, such as in complicated on-street parking conditions in downtown areas; sustained, steep grades of 7% or greater; and where the road may be too narrow to accommodate bicycle lanes on both sides of the street. Climbing lanes should be a minimum of 4-feet wide to be designated as a bicycle facility.

During the course of the Haywood County Comprehensive Bicycle Plan, several participants noted the desire for any type of shoulder on the uphill sections of local roadways. Where adequate width is not

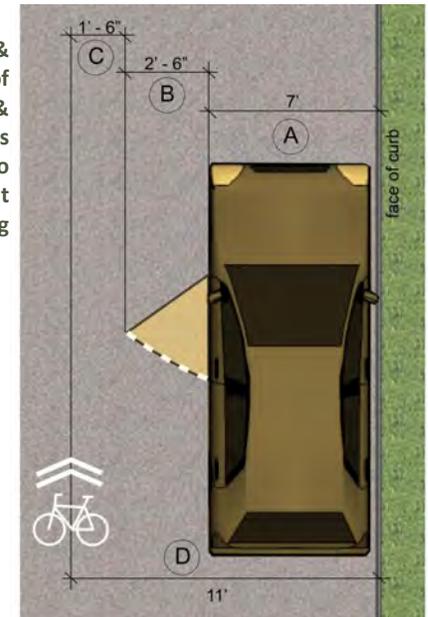
achievable for 4-foot climbing lanes, a narrower shoulder could be considered to provide this space for bicyclists, however it should not be designated as a bicycle lane.

Wide Outside (Curb) Lane. Wide outside lanes (typically 14' in North Carolina) allow cyclists to share the roadway with automobiles while providing passing room and better turning operations for cars and trucks. Wide outside lanes are also one-way facilities, and are used in a variety of urban and rural settings.

Advocates for having bicyclists and motorists share the road tend to prefer these treatments, but they are generally more suitable for the most ardent bicyclists who don't mind sharing that space. These use of wide outside lanes has become a default position for NCDOT at the expense of less-experienced bicyclists who are less inclined to travel by bicycle without a dedicated facility. Whereas bicycle lanes on urban streets oftentimes lead to narrower travel lanes for motorists, thus resulting in a lower speeds and traffic calming, the use of wide outside lanes has the opposite effect for motorists and can create higher operating speeds which can be detrimental to bicycle travel.

While some higher speed and higher volume routes may not be suitable for less-experienced bicyclists even with a bicycle lane, the use of wide outside lanes should not become the default solution when a corridor has major attractors for bicycle traffic such as greenway connections, schools, parks, downtown

Exhibit 4-6: Use & Dimensions of Sharrows & Bicycle Lanes Adjacent to On-Street Parking



A=Distance from Driver Side Door to Face of Curb
B=Door Swing Distance
C=Distance from Open Door to Centerline of Sharrow Pavement Marking
D=Distance from Face of Curb to Centerline of Sharrow Pavement Marking
E=Minimum Bicycle Operating Width (48")
F=Preferred Bicycle Operating Width (60")

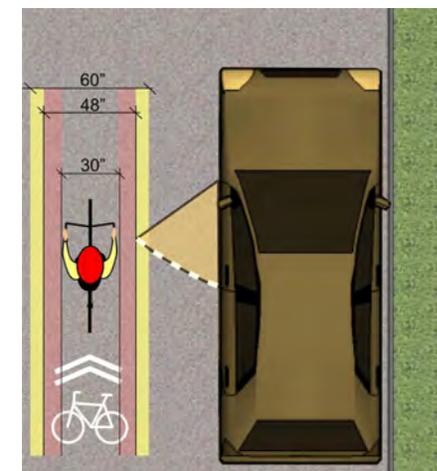
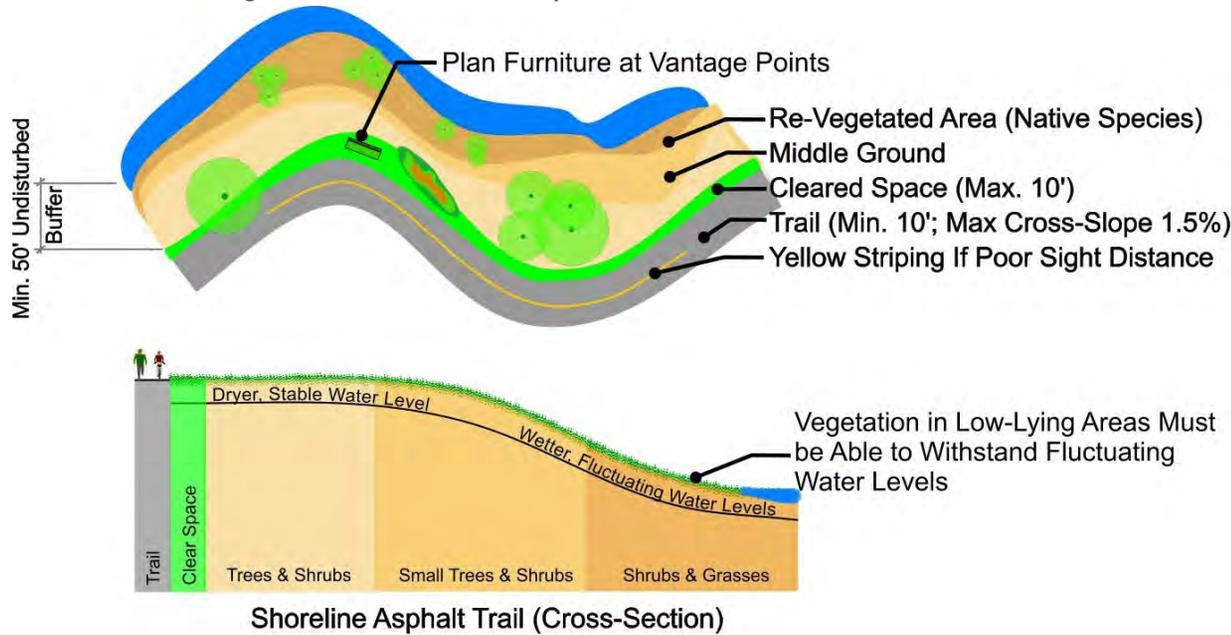


Exhibit 4-7: Design Considerations for Greenway Trails



Shoreline Asphalt Trail (Cross-Section)



shopping areas, neighborhoods, and other community gathering spaces.

Shared Lane Markings or Sharrows. These treatments are an emergent facility type and were adopted in 2009 as part of the Manual on Uniform Traffic Control Devices (MUTCD). The use of sharrows varies greatly by the community implementing them, but is commonly applied in the following circumstances:

- ◆ Guide the bicyclist on a shared urban street to avoid conflict with opening doors from parked cars;
- ◆ Designate an urban street as a shared space;
- ◆ Indicate the presence of a bicycle route in a section of a corridor that is too constrained for bicycle lanes or is a gap in existing bicycle lanes; and
- ◆ Designating connection between greenway segments where pedestrians are using sidewalks and bicyclists are required to use the street.

Greenway and Trail Considerations

From the bicyclist perspective. Greenways and multi-use trails create places where bicyclists of all ages and abilities should be able to comfortably ride their bicycle. However, there are various other users of these facilities that can easily complicate the function of the greenway or trail and create unanticipated safety hazards. While on the road, the bicyclist is subject to interaction with motorized vehicles and a speed differential that makes the bicyclists the slow-

est user of the road (e.g. a bicyclist traveling at 12 to 15 mph and a motorist traveling at 35 to 55 mph).

On a greenway, the status of the bicyclists is more similar to that of the motorist on the road as the speed differential between pedestrians and bicyclists (e.g. a walking speed of 2 to 3 miles per hour) can be intimidating to some users. This is why the greenways and trails oftentimes cater to the design specifications of pedestrians.

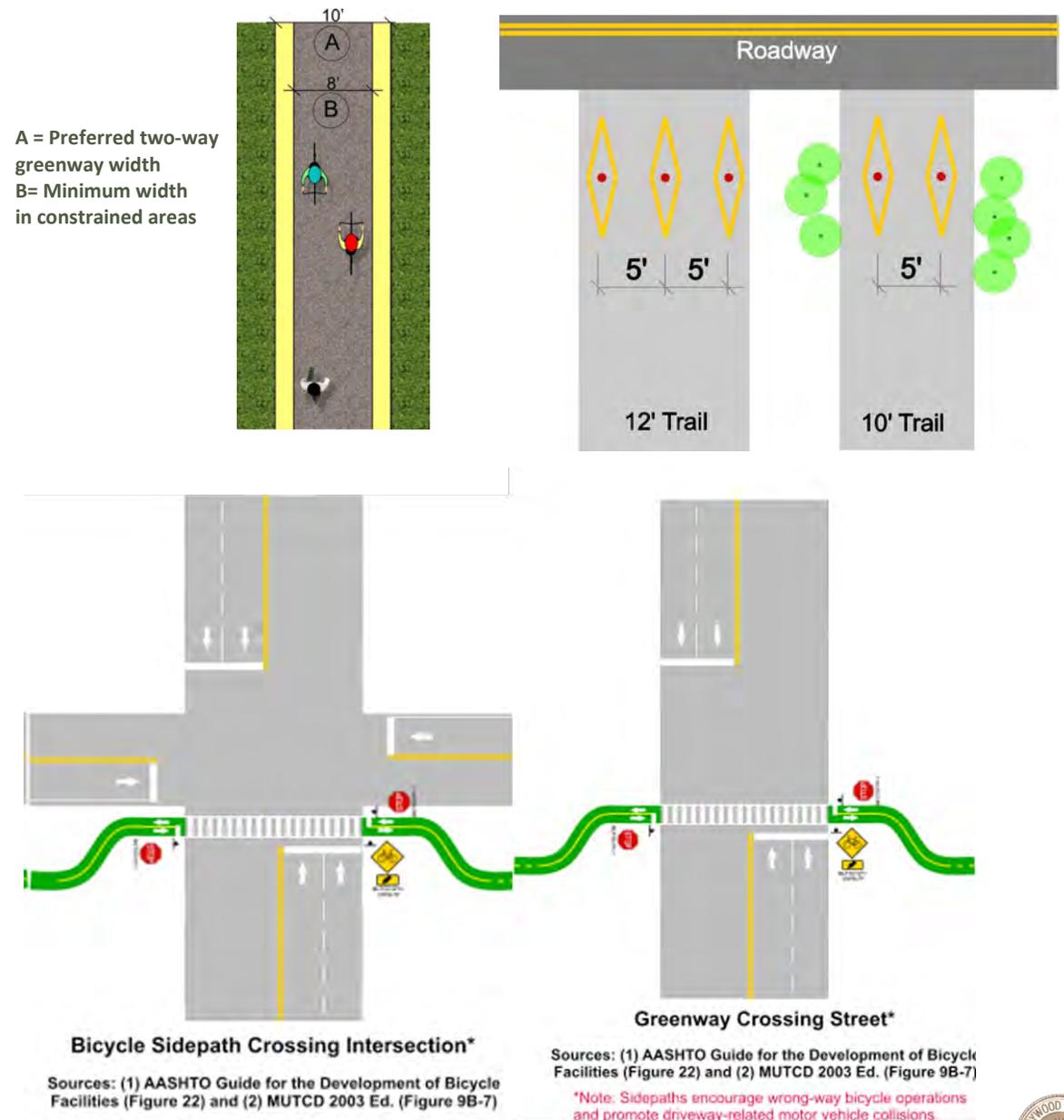
By including directional pavement markings, appropriate signage (especially at intersections), and considering grade, cross-slope (superelevation), and horizontal curvature, the designer can readily accommodate cyclists moving at 10 mph, a typical maximum for greenways (Exhibits 4-7 and 4-8). Most important is to remember that pedestrians, dog-walkers, children, skateboarders, and bicyclists of all skill levels and speeds are sharing the space on a greenway.

Greenway design guidelines & accessibility.

These design standards are intended to serve multi-use traffic along greenway segments and are in compliance with the Americans with Disabilities Act guidelines for public rights-of-way to accommodate users of all abilities.

- ◆ Two-way path width: 10 feet minimum;
- ◆ Two-way path width (preferred or heavy traffic): 12 or more feet;
- ◆ Right-of-way constraints: an 8’ width can be adequate in rare instances for two-way paths for

Exhibit 4-8: Design Parameters for Greenway Trails and Intersections with Roadways





Above: This greenway trail intersection with a cross street allows for adequate width for multi-use travel—minimum 10-feet to meet ADA requirements along with use of detectable warning surfaces.

Photo Credit: Don Kostelec

Below: The stairway accessing the Chicago downtown bike station have grooves alongside the steps to allow bicyclist to easily roll their bike up the stairs.



very short distances;

- ◆ Lateral clearance from edge of path to cleared area: 2 feet minimum;
- ◆ Side-grading each side of path: 3' - 5' at max. slope of 6:1;
- ◆ Separation from adjacent roadway: 5' min.; preferably 10'; and
- ◆ Recommended barrier height when there is inadequate separation from roadway: 42" min.

Intersection crossings of greenways should also adhere to a 10 feet minimum width for both crosswalks and curb ramps (aka wheelchair ramps) as the 10-foot minimum is intended to accommodate multi-use travel and the crosswalk and ramps are extensions of that multi-use pathway.

Currently, NCDOT does not have standard drawings specifically for greenway crossings of public streets, which results in these crossings being treated as a sidewalk crossing, thus not meeting width requirements established through the Americans with Disabilities Act guidelines. It is recommended that Haywood County work with the towns and other stakeholders to develop a design standard for these greenway crossing to ensure proper accessibility requirements are met. The top image at left shows a greenway street crossing that is in compliance with ADA standards for public rights-of-way.

It has become a common response by communities to designate sidewalks as a greenway in constrained areas where constructing a multi-use trail is not feasible or recent investments did not allow for a mini-

imum 8-foot wide pathway (10-foot recommended). This practice can create a facility that is not in compliance with ADA and may expose the local jurisdiction to legal claims related to this design.

Any facility that does not meet the width requirements, but is labeled as a greenway or multi-use trail is in a state of non-compliance with ADA. Some communities have used the combination of sidewalks and bike lanes / shared lane markings to remedy this by directing bicycle traffic away from the sidewalk. Another remedy to this constrained scenario is signage and requirements for bicyclists to dismount in these areas and walk the bike to the nearest point where the pathway meets the width requirements.

Parking and Transition Areas

From the bicyclist perspective. Parking lots and driveway entrances/exits are surprisingly hazardous for bicyclists. Novice cyclists will often “cut through” parking areas to avoid perceived hazards on the road, and engage in bad practices such as cutting across parking aisles. Driveway entrances sometimes have channelized islands that allow motorists to make high-speed turns into a parking lot that can pose hazards for both cyclists and pedestrians.

Navigating stairs. Stairs are a frequent fact of life in Haywood County due to terrain, and accommodating cyclists can be accomplished by “grooving” the stairway, as shown in the bottom left image on

page 46. The cyclist “walks” the bicycle up the stairs with the wheels resting in the 2” groove.

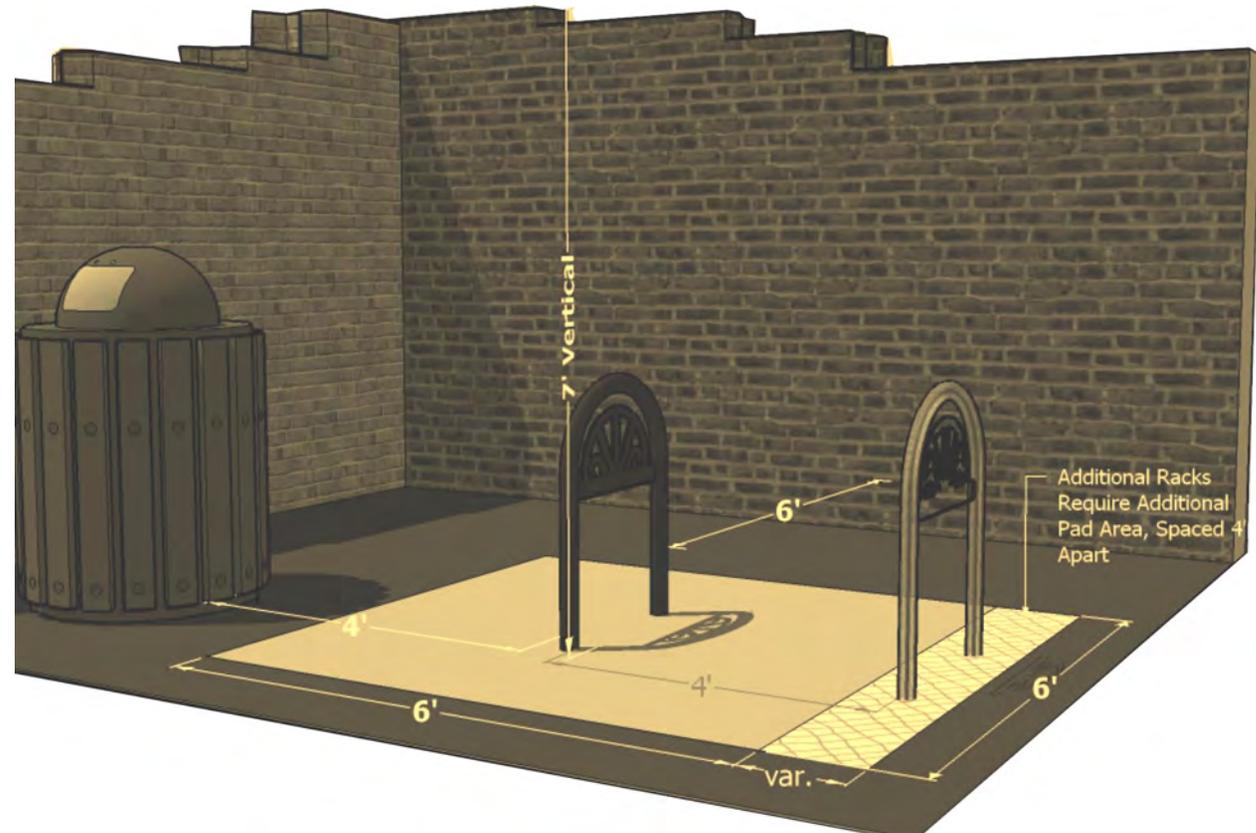
Bicycle parking. Bicycle parking racks can almost literally come in any shape or style you can imagine, thanks to some vendors catering to special markets for event centers, universities (with specific mascots), municipal icons, and artists.

However, the basic rack styles are still a variant of the “post-and-loop” design like those shown in Exhibit 4-9 (green at top). These styles are easily recognizable as usable bicycle racks instead of works of art and help prevent two bicycles rubbing up against each other.

In contrast, the popular “wave” rack style at far right generally only supports the bicycle at one point, as does the comb rack (second from right), often seen at public schools. Regardless of the specific style, a thick (10”) concrete base should be constructed for each bicycle parking station.

Note also that bicycle parking areas should have minimum 6’ horizontal clearances on all sides to ensure that each rack can be used properly, and at least a 7’ vertical clearance (see graphic at bottom). A shorter horizontal clearance (minimum: 4’) may be used behind the rack - note that bicycles are to park parallel to the rack, not “through” them for post-and-loop designs.

Exhibit 4-9: Design Considerations & Dimensions for Bicycle Parking



Considerations for Intersection and Crossing Treatments

From the bicyclist perspective. Anyplace where two streets, a street and a driveway, a trail and a railroad track, or a street and a trail meet is an intersection. Intersections may have traffic signals, STOP signs or no traffic signal control at all.

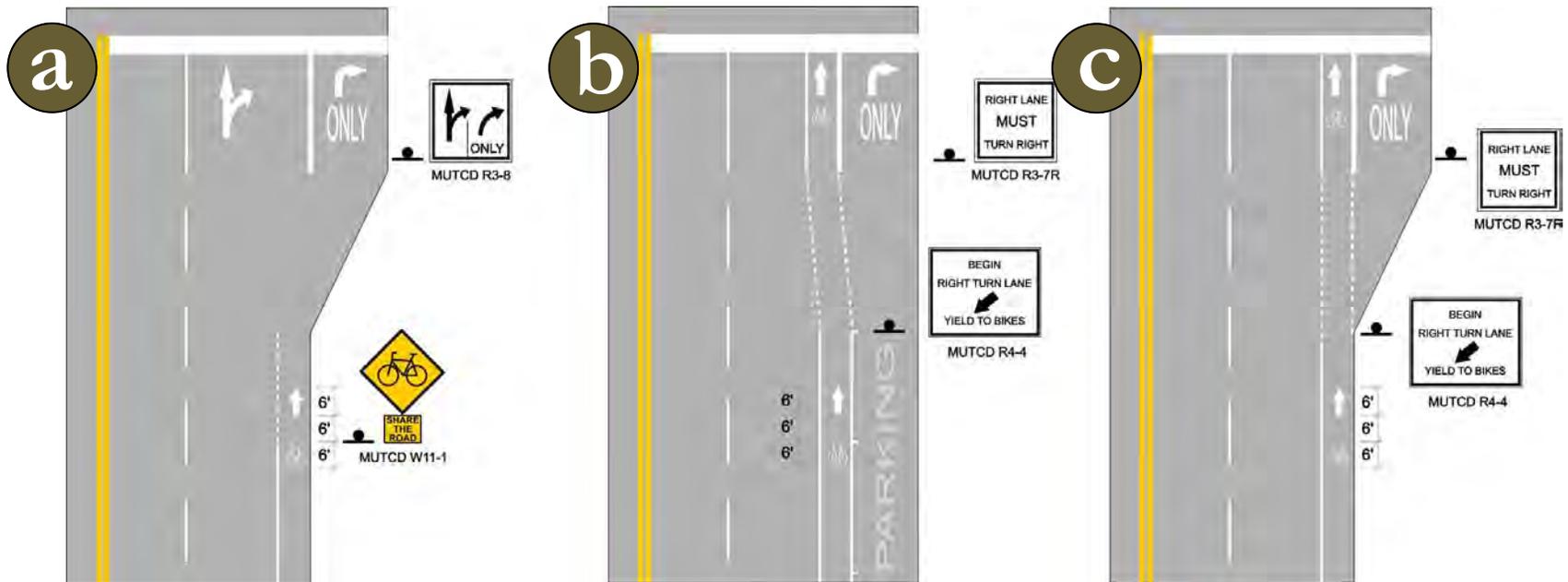
Intersections with ramps for limited access highways are special cases but can still be designed to be bicycle-friendly. Problems occur when a traffic signal is not sufficiently sensitive to detect cyclists; greenway crossings are poorly signed for either the cyclist or motorists; or large intersections are poorly designed with little thought of how cyclists can safely

ly make turning movements.

Bicycle lane transitions at intersections. Creating transition opportunities for on-road bicycle facilities as they approach an intersection can be challenging. The bicyclist is frequently asked to merge back into traffic (Exhibit 4-10a) but with a number of intersections in close proximity that exercise can be daunting, especially for a relatively inexperienced bicyclist. Exhibits 4-10b and 4-10c illustrate how to carry a bicycle lane through the intersection, with and without on-street parking. This approach may be better where there are expected to be fewer right- or left-turns by cyclists.

Position markings. The traditional detectors used

Figures 4-10: Typical Intersection Treatments for Bicycle Lanes



at intersections can be fairly insensitive to bicycles, particularly those that have little ferrous metals (e.g., carbon frame bikes). A position indicator indicates the optimal position for a cyclist to place her bicycle to get a “read” from the detector (Exhibit 4-11).

Crossing Railroad Tracks

Most railroad tracks and on-road bicycle paths will cross at a near-90 degree angle. Bicycles crossing tracks at a less than 45 degree angle should consider the treatment shown in Exhibit 4-12, which calls for a realignment of the bicycle path to create a more perpendicular approach angle.

Some communities have begun using shared-lane markings (sharrows) to indicate to bicyclists the most suitable way to cross a railroad track that is within an urban street where improvements such as those shows in Exhibit 4-12 are not feasible.

Using Traffic Calming Wisely

Many cities conduct and implement traffic calming studies each year to analyze and recommend treatments to slow vehicles and discourage high “cut-through” traffic volumes of cars and trucks. Although a complete treatment of traffic calming principles and guidance is beyond the scope of this document, there are a number of principals that should be emphasized during the evaluation, design, and implementation of traffic calming treatments.

Municipal and county positions on traffic calming should be clear and strictly adhered to in order to

Exhibit 4-11: Loop Detector Placement, Signage & Pavement Markings for Bicycles

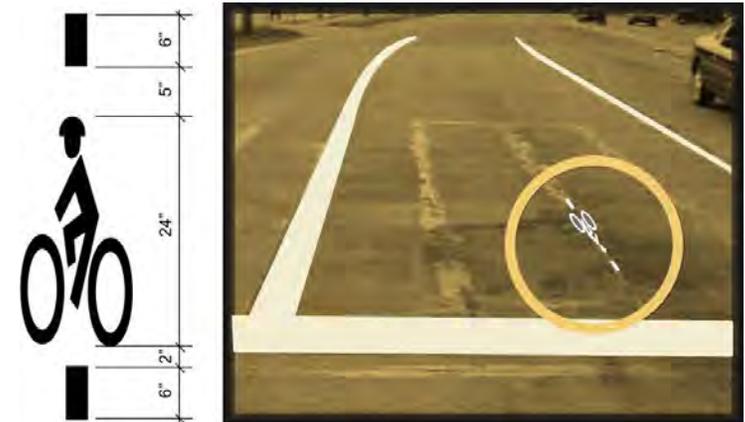
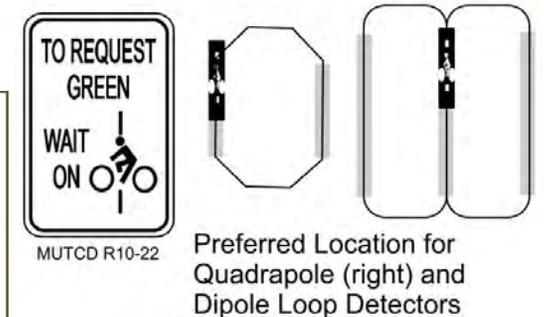
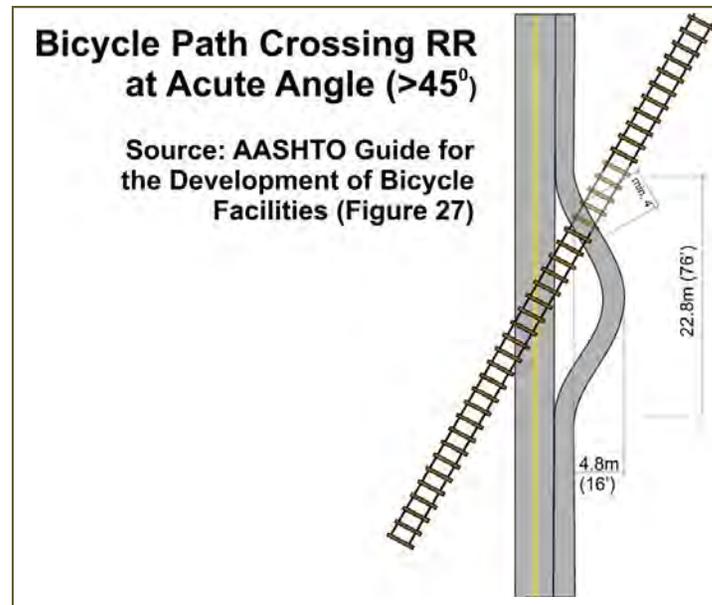


Exhibit 4-12: Sample Treatment for Bicycle Lane or Shoulder Crossing of a Railroad Track





These speed humps are designed to allow both emergency vehicles and bicyclists to travel through them without impeding their speed (gap highlighted in blue).

Photo Credit: Don Kostelec

prevent disregard for standards or traffic calming signs, signals, roadway design elements, speed limits, and other features.

The installation of some traffic calming devices, if inappropriately designed, can impede the safe movement of bicyclists, mobility-impaired pedestrians, emergency response vehicles, and some vehicle types such as combination truck-trailers or motorcycles. Neighborhoods where traffic calming measures are being considered should be consulted and be in near-total agreement on the planning and location of any traffic calming devices.

The shortcomings of the most common and visible traffic calming devices, such as speed humps, street closures, and unwarranted stop controls at intersections, need to be carefully documented and considered during the planning and design process. These may include diversion of traffic to other locations, consideration of emergency vehicle response times, noise level increases, community inconveniences, claims of vehicular damage, disregard of devices in the longer-term, and even speed increases in localized areas.

Sited and designed properly, traffic calming can successfully enhance bicyclist and pedestrian environments. Factors such as the presence of on-street parking, traffic and truck volumes, and drainage returns may strongly influence the appropriateness, effectiveness, location and design of traffic calming devices. Exhibit 4-13 illustrates the effects of vari-

ous traffic calming techniques on different user groups.

Drainage Grates & Utility Covers

Drainage grates can pose a serious hazard for bicyclists, particularly on older streets where the design and placement of drainage grates did not consider the potential use of bicyclists. Grates with openings that are parallel to the curb cause the wheels on bicycles (particularly those with narrow tires) to fall into the grates and result in a crash.

On new construction projects, grates should be placed only within the gutter pan of the street with grate openings that are perpendicular to the curb and direction of travel. On older streets, the jurisdiction in control of that street should be requested to retrofit the grates with new grates with openings that are perpendicular to the curb. Another retrofit treatment is the welding of straps across the grate perpendicular to the direction of travel, which narrows the opening of the grate to prevent the bicycle wheel from falling into the opening.

Grates and utility covers (“manholes”) create different problems for bicyclists as roadways sink or are resurfaced. Grates and utility covers should be flush with the roadway and should be replaced or reconfigured when NCDOT or a municipality resurfaces a street so they remain flush with the pavement.

Utility covers can pose problems on greenways as many of them are constructed along sewer easements. As with roadways, the utility covers should be

Exhibit 4-13: Traffic Calming Treatments & Potential for Poor Design to Influence Different User Groups (B = bicyclists; P = pedestrians; MI = Mobility Impaired; VI = Visually Impaired)

Device/Treatment	Description	B	P	MI	VI
Curb extensions “pinch points”	Curb extensions, planters, or centerline traffic islands that narrow traffic lanes to control traffic and reduce pedestrian crossing distances. Also called “chokers.”	●	•	●	●
Speed tables, raised crosswalks	Ramped surface above roadway, 2 – 3 inches high, 10 – 20 feet long.	●		●	•
Mini-circles	Small traffic circles at intersections.	•	•	•	•
Median island	Raised island in the road center (median) narrows lanes and provides pedestrian with a safe place to stop.			●	•
Channelization islands	A raised island that forces traffic in a particular direction, such as right-turn-only.	•	●	●	●
Tighter corner radii	The radius of street corners affects traffic turning speeds. A tighter radius forces drivers to reduce speed. It is particularly helpful for intersections with numerous pedestrians.	•			
Speed humps	Curved, 2 – 3 inches high, 10 – 20 feet long hump.	●		•	
Rumble Strips	Low bumps across road that make noise when driven over.	●			•
Chicanes	Curb bulges or planters (usually 3) on alternating sides, forcing motorists to slow down.	●			
Roundabouts	Medium to large circles at intersections (Kittelson, 2000).	•	●	●	●
Pavement treatments	Special pavement textures (textured concrete or asphalt) and markings to designate special areas.	●		●	●
Bike lanes	Marking bike lanes narrows traffic lanes.	•			
“Road diets”	Reducing the number and width of traffic lanes, particularly on arterials.	●			
Horizontal shifts	Lane centerline that curves or shifts.	●			•
2-lanes narrow to 1-lane	Curb bulge or center island narrows two-lane road down to one lane, forcing traffic for each direction to take turns.	•			
Semi-diverters, partial closures	Restrict entry/exit to/from neighborhood. Limit traffic flow at intersections.	•			
Street closures	Closing off streets to through vehicle traffic at intersections or mid-block	•			
Stop signs	Additional stop signs, such as 4-way-stop intersections.	•	•	•	•
“Neotraditional” street design	Streets with narrower lanes, shorter blocks, T-intersections, and other design features to control traffic speed and volumes.	•		•	
Perceptual Design Features	Patterns painted or stamped into road surfaces and other perceptual design features that encourage drivers to reduce their speeds.				●
Street Trees	Planting trees along a street to create a sense of enclosure and improve the pedestrian environment.			•	
Woonerf	Streets with mixed vehicle and pedestrian traffic, where motorists are required to drive at very low speeds.	•	●	●	•
Speed Reductions	Traffic speed reduction programs. Increased enforcement of speeding violations.				

● = Potentially Serious Impact ● = Moderate Impact • = Light Impact <blank> = No impact





Above: Utility access points, as shown above on the Virginia Creeper Trail, can be highlighted with paint when creating a flush transition to a trail is difficult due to existing design features.

Photo Credit: Don Kostelec

Below: Rumble strips along US 27 in south Georgia allow space for bicyclists to operate along the shoulder. Georgia also recommends gaps in the rumble strips at regular intervals.



flush with the trail surface and, where possible, outside of the travelway.

Rumble Strips

The addition of rumble strips along highways causes great concern among bicyclists due to the way in which these rumble strips are placed on the shoulders of high speed roadways. The shoulders are the only suitable area for bicyclists to travel due to the speed differential.

To account for the needs of bicyclists, rumble strips should be placed as close to the edge line or fog line of the highway to maximize the space available for the bicyclist along the highway. Design standards for most four-lane highways leave enough room along the shoulder (typically 5-foot or greater) for the bicyclists to operate outside the area of the rumble strips.

A local best practice for placement of rumble strips is along US 23 / 74 in Jackson County where the rumble strips were placed as close as possible to the travel lane along NC Bicycle Route 2.

Another consideration in the design of rumble strips to properly accommodate bicyclists is the placement of regular gaps in the rumble strips to allow the bicyclists to emerge from the shoulder to make a turn or maneuver away from debris on the shoulder.

Georgia's DOT has a policy for gaps in rumble strips that allows for 28-feet of continuous rumble

strips followed by a gap of 12-feet in between continuous rumble strips. These are recommended for highways with speed limits greater than 50 mph. Some states reduce the width of the rumble strip in areas where the shoulder width is less than 6-feet. NCDOT's Division 14 is using a 60-foot cycle, with 48-feet of rumble strips followed by a 12-foot gap.

Chip Seals

Highway agencies are utilizing the application of seal-coats or chip seals to roadways as cost-effective preventive maintenance. The application of chip seals (small pieces of gravel laid over existing pavement and then sealed to the road with binding materials) can create discomfort for bicyclists, both during construction and after application.

Agencies can modify their chipseal applications to better accommodate bicyclists by:

- ◆ Using smaller chips (smaller than 3/8-inch);
- ◆ Conducting an extra roll of the chips after application;
- ◆ Not applying chipseals to shoulders; and
- ◆ Providing advance warning of chipseal applications during construction.

Park-n-Pedal Lots

A new concept in promoting bicycling is the idea of designating parking lots, similar to park-and-ride lots used for transit and carpooling, whereby bicyclists can access via car to then make the remainder of their trip via bicycle. These "Park-n-Pedal" lots are

an encouragement technique that recognizes rural and suburban areas lack continuity in the bicycle transportation system or commute or travel distances are too great for many bicyclists to consider for regular use. They can also help attract weekend or touring riders from other areas who need a safe place to park while riding.

For example, a resident of Canton who works in Waynesville, or vice versa, may not be able to ride along roadways that he or she would consider conducive to bicycle travel. However, the designation of a Park-n-Pedal lot in Clyde or near Lake Junaluska reduces the travel distance and travel time of the trip while still allowing for the bicyclist to have some level of physical activity.

This section on Park-n-Pedal lots is included in the engineering chapter because it will likely require partnerships with NCDOT, municipalities, parks departments, churches or other stakeholders. It is likely that most Park-n-Pedal locations can be placed within existing parks or developments. To fully designate and promote these lots for this use, it is advisable that a municipal entity—either the County or a town—pursue use and indemnification agreements if the owner of the lot is another government agency or private development.

Ideally, a Park-n-Pedal lot should be placed at a distance of approximately 3 to 5 miles from major destinations or employment centers, with special signage (example shown at right). These locations are on the

edge of towns or communities and allow access to major destinations via lower volume, low speed roads or in combination with existing greenways. Some potential locations for Park-n-Pedal lots identified during the course of the Plan are:

- ◆ Walmart shopping center in Waynesville or near Ingles on Brown Avenue for bicyclists to travel to downtown Waynesville via Hazelwood (2.5 miles).
- ◆ Greenway access lot near US 19—Dellwood Road and South Lakeshore Drive allows use of the greenway to cross US 23/74 and access Waynesville via US 19 Business or Howell Mill Road and the greenway (4.0 miles).
- ◆ Park along Glance Street in downtown Clyde allows bicyclists to commute westbound via Old Clyde Road, Lee Road and Jones Cove Road to Haywood Community College or MedWest Haywood Regional Medical Center. (2 miles). This lot serves a 5-mile commute to downtown Canton via Old Clyde Road.
- ◆ Bethel Baptist Church or the Middle School area, which serves a 6-mile commute to Canton via NC 215 - Old River Road.
- ◆ Old Dellwood Methodist Church near the intersection of US19-Dellwood Road and US276 -Jonathan Creek Road provides a starting point for commutes to Maggie Valley (4 miles) or Lake Junaluska (3.5 miles).



Park-n-Pedal lots are designated areas in outlying locations or near commercial development for bicyclists to park and then travel by bike to their work or destination. Those shown in these images are near the Boise River and five miles from downtown Boise, Idaho.

Photo Credit: Don Kostelec

Resources for Design Guidance

American Trails	www.americantrails.org
America Walks	www.americawalks.org
Beneficial Designs	www.beneficialdesigns.com
Bicycle Federation of America	www.bikefed.org
Center for Watershed Protection	www.cwp.org
American Greenways Program	www.conservationfund.org
Green Infrastructure	www.greeninfrastructure.net
International Mountain Bike Association	www.imba.com
National Center for Bicycling & Walking	www.bikewalk.org
National Clearinghouse on Greenways & Trails	www.trailsandgreenways.org
National Trail Training Partnership	www.nttp.net
Pedestrian and Bicycle Information Center	www.walkinginfo.org
Rails-to-Trails Conservancy	www.railtrails.org
Safe Routes to School National Partnership	www.saferoutespartnership.org
Smart Growth America	www.smartgrowthamerica.org
Surface Transportation Policy Project	http://transact.org
Tread Lightly, Inc.	www.treadlightly.org
Trust for Public Land	www.tpl.org
In North Carolina.	
NCDOT Division of Bicycle & Pedestrian Transp.	www.ncdot.org/bikeped
NC Coalition for Bicycle Driving	www.humantransport.org/bicycledriving
NC Safe Routes to School	www.saferoutespartnership.org
NC Complete Streets	www.nccompletestreets.org

Implementation & More Information

It is impossible to address every possible design scenario within the context of a bicycle plan. Fortunately for bicyclists, several agencies and interest groups have published design guidance on bicycle facilities with detailed drawings and tables to explain the nuances of facility design.

Various resources were used to develop this chapter along with the professional perspective of the consultant team. AASHTO's *Guide for the Planning, Design and Operation of Bicycle Facilities* is included in the appendix CD of this plan and should be used for reference along with the *North Carolina Bicycle Facilities Planning and Design Guidelines*. Where there are conflicts in the information, the most recently published guidance should be used.

Due to these potential conflicts in guidance and the number of publications, it is advisable to become familiar with the most recent guidance and know when to reference it. Within NCDOT and municipal engineering departments, the knowledge-base and understanding of these various documents can vary greatly as designers have other duties beyond bicycle facility design. Street design, stormwater management, utility design, bridges, and sidewalks all have similar publications from many sources and one person or one department simply cannot be expected to know of or be familiar with all of them.



Chapter 5: Engineering—Cool Corridors & Hot Spots

Citizens, stakeholders, municipalities and members of BicycleHaywoodNC have provided input as part of the Haywood County Comprehensive Bicycle Plan to identify intersections "Hot Spots" and "Cool Corridors" routes that should be targeted for improvements. These findings were developed as part of the planning process and should be refined as projects are designed and constructed.

Cool Corridors

Cool Corridors represent routes where bicyclists travel for commuting, recreation or other purposes. Eleven (11) routes or combinations of routes have been detailed on the following pages and constitute those routes that will require the greatest investment of time and resources to implement.

Other primary routes not included in these project capsules are routes where few infrastructure needs were identified, therefore these corridors are recommended for installation of signage such as Share the Roads signs, bicycle route designation and wayfinding.

Numerous corridors have been identified through French Broad River MPO and NCDOT for other infrastructure investments and are referenced in these recommendations. Oftentimes, the corridor analyses conducted by NCDOT and municipalities will not provide sufficient detail as to the reason and justification for inclusion of bicycle-related facilities on these corridors. The capsules for these projects

outline the influences that contribute to the need for bicycle facilities in hopes that they can be used by BicycleHaywoodNC, Haywood County and towns to better substantiate the investments when working with NCDOT and other agencies.

As corridor studies are conducted in the future, it will be critical to use the Bicycle Plan as the foundation for the discussion with NCDOT and others to help advocate for inclusion of bicycle facilities. A benefit for Haywood County is the nature of the corridor recommendations, as many routes are shown for the addition of shoulders in rural areas with the potential to have these shoulders designated as bicycle lanes.

The recommendations for shoulders on US or State Highways is a goal of NCDOT to bring these roads up to current design standards. Shoulders provide a recovery area outside of the travel lanes for motorists and help with the overall pavement condition of the corridor as they can prevent deterioration of travel lanes. It is important to understand the need for a program of regular maintenance to prevent debris and foliage from overwhelming the shoulders for use of them by bicyclists.

Other Routes

Following the pages dedicated to specific corridor improvements are corridor maps of other routes in Haywood County with recommended improve-



The engineering recommendations included in this chapter for Cool Corridors and Hot Spots were generated following input from BicycleHaywoodNC members, the survey and public input. Project team members rode more than 300 miles of area routes and conducted in-the-field measurements to formulate these recommendations.

Photo Credit: Don Kostelec

The Haywood Hub concept

The concept of a Haywood Hub route was identified early in the planning process as the Vision and Goals exercise prioritized the need for a central route that connects the population centers of Haywood County. The Hub route requires various improvements to streets and greenway through different land use contexts, which are identified on the facing page. The route was also identified through the Health Impact Assessment.



Brown Avenue in the
Hazelwood community



Broad Street through
Downtown Clyde



Greenway near the Recreation
Center in Waynesville



S. Lakeshore Drive
at Lake Junaluska

ments. Three general types of bicycle route improvements have been identified for on-street facilities.

Urban Shared Route. Routes are recommended for shared use of travel lanes with vehicles with shared lane markings ("sharrows") and/or "Share the Road" signs. These routes generally have constraints due to the built environment or topography that limit the potential for bicycle lanes or shoulders.

Shoulder, Bike Lane. These routes are typically along major arterials in the rural and urban areas, including the US and State Highways. The addition of shoulders in the non-curbed sections can provide space for bicyclists to operate. On more popular routes or in urban areas, a bicycle lane could be accommodated. The Blue Ridge Parkway is a popular route but federal regulations and designations associated with the Parkway limit the feasibility of adding shoulders, bicycle lanes, or climbing lanes to the existing route. Therefore, it is shown as a "Rural Shared Lane" route.

Rural Shared Lane. Routes in this category are generally low volume and low speed routes in the rural areas of Haywood County. Many are located adjacent to rivers and streams and have other constraints such as topography. The low-volume, low-speed nature of these routes make them an area that can be enjoyed by recreational bicyclists without additional width or other accommodations. Routes may be designated as a bicycle route and have "Share the Road" signage.

Corridor Recommendations

Cost estimates are planning level and may change dramatically due to right-of-way availability and actual design. Estimates with a (*) reflect FBRMPO estimates for full corridor improvements identified in the 2035 Long-Range Transportation Plan.

Haywood Hub: A Central Route for Haywood County Communities

Short-term & Long-term investment
Estimated Cost: \$3 - 7 million

Context: The Haywood Hub traverses the Towns of Waynesville, Clyde and Canton, as well as the Lake Junaluska community, to create a central route that serves the majority of the population of Haywood County.

Influences:

- Hazelwood Elementary School
- Hazelwood Community
- Waynesville Middle School
- Central Elementary School
- Downtown Waynesville
- Richland Creek
- Railroad tracks
- Frog Level Historic District
- Waynesville Recreation Center & Greenway
- Dutch Fisher Park & Vance St Park
- Junaluska Elementary School
- Lake Junaluska Walking Trail
- Tuscola High School
- Haywood Community College
- Haywood Regional Medical Center
- Clyde Elementary School
- Downtown Clyde & Parks
- Downtown Canton
- Canton Middle School & Recreation Park

Recommendations:

- **US 23 Business / S. Main Street:** Construct bicycle lanes as part of corridor improvements
- **Brown Avenue:** Road diet to three lanes plus bike lanes from South Main Street to Belle Meade Drive. Install Share the Road signs and / or shared lane markings from Belle Meade Drive to Richland Street.
- **Richland Street, Commerce Street & Boundary Street:** From Brown Avenue to Shackleford Street install Share the Road signs and / or shared lane markings through Frog Level Historic District (alternate route: US 276 to Walnut Street).
- **Vance Street Park / Waynesville Recreation Center:** Upgrade unpaved sections of greenway to paved sections. Connect greenway along Richland Creek or via Howell Mill Road to Industrial Park via Old Asheville Hwy.
- **Greenway to Lake Junaluska:** Upgrade, where feasible, to paved greenway, and construct improvements at US 19—Dellwood to facilitate crossing to Lake Junaluska and South Lakeshore Drive.
- **South Lakeshore Drive to NC 209—Crabtree Road:** Work with Lake Junaluska to gain approval for pavement markings, including shared lane markings or specialized signage.
- **NC 209—Crabtree Road:** Complete shoulders to Old Clyde Road.
- **Old Clyde Road/Broad St.:** Install shoulders for 7 miles from NC 209 to NC 215 in Canton. Re-stripe through downtown Clyde for travel lanes and bike lanes. Until then, sharrows or Share the Road signage should be installed.



Complete Streets: Several NCDOT Complete Streets Cross Sections could apply to this corridor due to diversity of land uses along it. The most applicable are the Rural Road and Rural Village Main Street cross sections (see Appendix).



Corridor Recommendations

Cost estimates are planning level and may change dramatically due to right-of-way availability and actual design. Estimates with a (*) reflect FBRMPO estimates for full corridor improvements identified in the 2035 Long-Range Transportation Plan.

NC 209—Crabtree Road / Rush Fork Road

Short-term investment

Estimated Cost: \$1.4 million

Context: The corridor connects Lake Junaluska to northern Haywood County and Madison County. The predominant land use is rural residential and agricultural with some commercial.

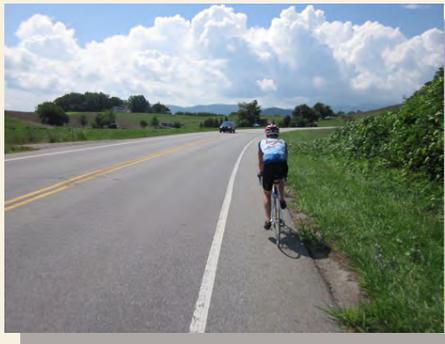
Influences:

- Lake Junaluska
- Haywood County Fairgrounds
- Connections to popular recreational routes
- Riverbend Elementary School
- I-40 interchange

Recommendations: Add five-foot wide shoulders where possible along both sides of NC 209 from I-40 to Betsys Gap Road. Install climbing lanes on constrained sections. Consider specialized bike lane markings through intersections with I-40 interchange off-ramps. Designate as state bicycle route.



Length: 7.1 miles



Sections of NC 209 south of I-40 already have paved shoulders of a width suitable for bicycle travel. This project recommends continuing this treatment to Betsys Gap Road, with climbing lanes in constrained areas.



US 276—Jonathan Creek Road

Short-term investment

Estimated Cost: \$1.1 million

Context: Route is a high-speed four-lane thoroughfare with rural residential and commercial land uses. US 276 connects I-40 at Exit 20 to Maggie Valley and the US 19 corridor.

Influences:

- Jonathan Valley Elementary School
- Future Haywood County Park
- Only road connection to popular recreational routes along Fines Creek Road and Coleman Mountain Road.

Recommendations: Add six-foot wide shoulders from I-40 to US 19 intersection. If rumble strips are installed, follow guidelines outlined in this Plan. Designate as state bicycle route.



Length: 5.5 miles



Potential improvements to US 276 include the addition of shoulders, similar to these on NC 107 near Cullowhee. The marking of these future shoulders as a bicycle lane is an option for US 276.



Corridor Recommendations

Cost estimates are planning level and may change dramatically due to right-of-way availability and actual design. Estimates with a (*) reflect FBRMPO estimates for full corridor improvements identified in the 2035 Long-Range Transportation Plan.

US 276—Pigeon Road / Cruso Road

Short-/Long-term investment

Estimated Cost: \$1 - 47 million *

Context: Route is a two-lane route through rolling terrain from Waynesville to Bethel, with a mix of residential, commercial, and agricultural uses. From Bethel, US 276 winds its way to the Blue Ridge Parkway.

Influences:

- Downtown Waynesville
- Bethel Community & Schools
- Blue Ridge Parkway connection
- Connections to other recreational routes
- Campgrounds

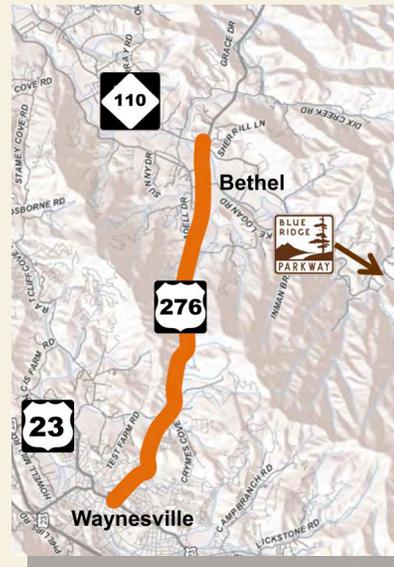
Recommendations: *Short-term*—add share the road signs & climbing shoulders where possible between Waynesville & Bethel. *Long-term*—FBRMPO long-range plan identifies 6-mile \$47 million project from Waynesville to NC 215.



Length: 6.5 - 13.5 miles



US 276—Pigeon Road was consistently mentioned as one of the corridors that presents the most challenges for bicyclists in terms of feeling safe next to high-speed traffic on a narrow two-lane road.



US 276—Russ Avenue

Short-term investment

Estimated Cost: \$22+ million *

Context: The Russ Avenue corridor study recommended bicycle lanes from US 23/74 to downtown Waynesville for this commercial corridor. Cross street improvements were not evaluated for bicycle facilities.

Influences:

- Connectivity between Maggie Valley & Waynesville
- Commercial land uses along Russ Avenue
- Local street connections to greenway & parks
- Need for various Complete Streets components identified in corridor study

Recommendations: *Short-term*—FBRMPO Long-Range plan identifies 2016-2025 as timeframe for corridor study implementation (\$22 million). *Long-term*—Conduct similar study from US 23/74 to US 276 / US 19—Dellwood Road.



Length: 5.9 miles



A corridor study for US 276—Russ Avenue identified several improvements, including the addition of bicycle lanes, a completed network of sidewalks, landscaped medians and local street / parking area connectivity.



Corridor Recommendations

Cost estimates are planning level and may change dramatically due to right-of-way availability and actual design. Estimates with a (*) reflect FBRMPO estimates for full corridor improvements identified in the 2035 Long-Range Transportation Plan.

NC 215—Old River Road / Penland Street

Short-/Long-term investment

Estimated Cost: \$12 million *

Context: The route is parallel to the Pigeon River and NC 110 but is a more suitable route to connect downtown Canton to Bethel and US 276. Land uses transition from neighborhoods in Canton to agriculture along the River.

Influences:

- Downtown Canton & Canton Recreation Park
- Canton Middle School & Pisgah High School
- Connections to Stamey Cove Road & Bethel
- Bethel Middle & Elementary Schools
- Blue Ridge Parkway connection

Recommendations: Add shoulders where possible from bridge near Recreation Park to Bethel and designate as bicycle lanes. Corridor improvements shown in FBRMPO long-range plan. Shared lane markings may be used in constrained areas. Install shared lane markings from Main Street in Canton to the Pigeon River bridge.



Length: 6.0 miles



Sections of NC 215 between Canton and Bethel are narrow but have lower volumes of traffic than NC 110. The corridor has scenic value as it parallels the Pigeon River and passes numerous farms.



US 19—Soco Road

Short-term investment

Estimated Cost: \$200,000 *

Context: US 19 flows through the heart of Maggie Valley's commercial district and is a popular route to connect to the Blue Ridge Parkway. Roadway includes four lanes and a center turn lane, along with sidewalks.

Influences:

- Maggie Valley commercial core
- Festival Grounds & Parks
- Blue Ridge Parkway connection
- Connections to other recreational routes
- Campgrounds & many tourists

Recommendations: Re-stripe existing cross-section from US 276—Russ Ave. to old Ghost Town entry to have 10-foot travel lanes as shown in NCDOT Complete Streets: Rural Boulevard with 4-foot bicycle lanes (not counting gutter pan).



Length: 7.1 miles



US 19—Soco Road is identified by the French Broad River MPO as a project for evaluation of a re-striping project to add bicycle lanes. Trucks are discouraged from using this route, which is constrained between Maggie Valley and Cherokee.



Corridor Recommendations

Cost estimates are planning level and may change dramatically due to right-of-way availability and actual design. Estimates with a (*) reflect FBRMPO estimates for full corridor improvements identified in the 2035 Long-Range Transportation Plan.

US 23 Business: S. Main Street—Waynesville

Short-/Long-term investment

Estimated Cost: \$21 million *

Context: Route is under study for section between Ninevah Road and US 23/74 interchange. The corridor consists of neighborhoods and commercial uses from downtown Waynesville to shopping centers at US 23/74.

Influences:

- Downtown Waynesville & Hazelwood
- West Waynesville shopping district
- Connections to recreational routes, Haywood Hub & Blue Ridge Parkway (State Bicycle Route 2)
- Railroad tracks & Allens Creek.

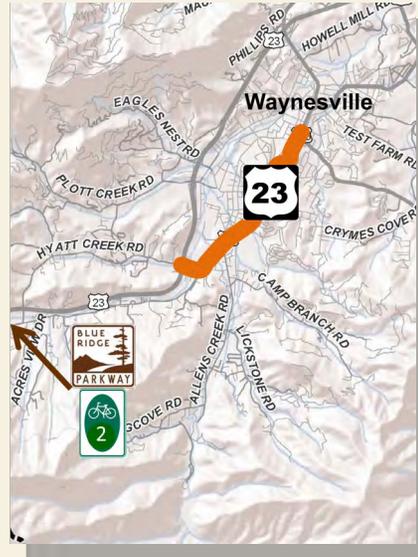
Recommendations: *Short-term*—Add Share the Road signs & designate as bicycle route. *Long-term*—Install bicycle lanes consistent with NCDOT Complete Streets cross section for Urban/Suburban Main Street (Urban/Suburban Avenue if 4 lanes).



Length: 2.2 miles



US 23 Business—S. Main Street is under analysis for potential improvements from Ninevah Road to the US 23/74 interchange, which is a busy street with numerous commercial driveways and turning conflicts.



Newfound St-Rd / Bridge St / Beaverdam Rd

Long-term investment

Estimated Cost: \$1.1 million

Context: Route transitions from historic neighborhoods in Canton to a rural route connecting to Buncombe County. Beaverdam Road provides access to mountain bike trails within the Rough Creek Watershed.

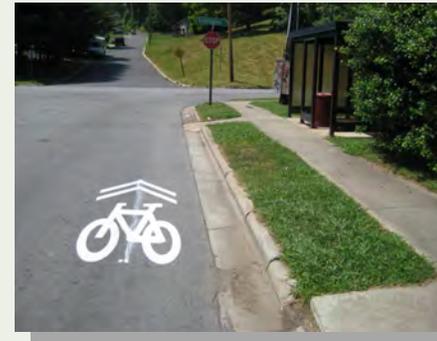
Influences:

- Downtown Canton & neighborhoods
- Rough Creek Watershed trails
- Recreational route connections to Buncombe County



Length: 8.1 miles

Recommendations: Designate as shared route in Canton town limits with shared lane markings. Add shoulders where feasible from town limits to Buncombe County line. Designate Beaverdam Road as bicycle route.



Shared lane markings are a new addition to the MUTCD and can be used on neighborhood streets to connect bicycle routes where pavement or right-of-way width does not allow for bicycle lanes, as on Newfound Street & Bridge Street in Canton.



Corridor Recommendations

Cost estimates are planning level and may change dramatically due to right-of-way availability and actual design. Estimates with a (*) reflect FBRMPO estimates for full corridor improvements identified in the 2035 Long-Range Transportation Plan.

Panther Creek, Fines Creek, Iron Duff & Coleman Mtn Rds

Short-term investment

Estimated Cost: \$100,000

Context: The popular recreational routes provide some of the most bicycle-friendly rural roads in Haywood County as they pass through rural residential and agricultural uses and connect to NC 209 and US 276, and other routes.

Influences:

- Popular loop routes for recreational cyclists
- Pigeon River and numerous creeks & streams
- Rolling hills and scenic vistas
- Connections to Madison County / Betsys Gap Rd
- Riverside Drive, Hyder Mountain Road, & Upper Crabtree Road have direct or nearby connections.

Recommendations: Designate as bicycle routes and install Share the Road signage along with wayfinding signs at intersections to connect bicyclists to other routes.



Length: 17.0 miles



Scenic vistas and low traffic volumes along these routes provide for spectacular bicycle-riding conditions even though the roads are narrow. These routes connect to other popular recreational routes and create a vast network of bicycling options in north Haywood County.



Raccoon Road / Ratcliff Cove Road

Long-term investment

Estimated Cost: \$1.2 million

Context: These recreational routes provide an alternate route around Waynesville and connect to US 276, US 23 Business, Poison Cove Rd. and Stamey Cove Rd. Land uses are rural residential, light commercial and agriculture.

Influences:

- Local street connections to downtown Waynesville and neighborhoods.
- Connections to other recreational routes.
- Right-of-way availability.
- Alternate route to US 276 / US 23 Business

Recommendations: Add four-foot shoulders where possible along each route and designate as bicycle lanes if width is available. Shared lane marking may be used in constrained areas. Designate as a bicycle route.

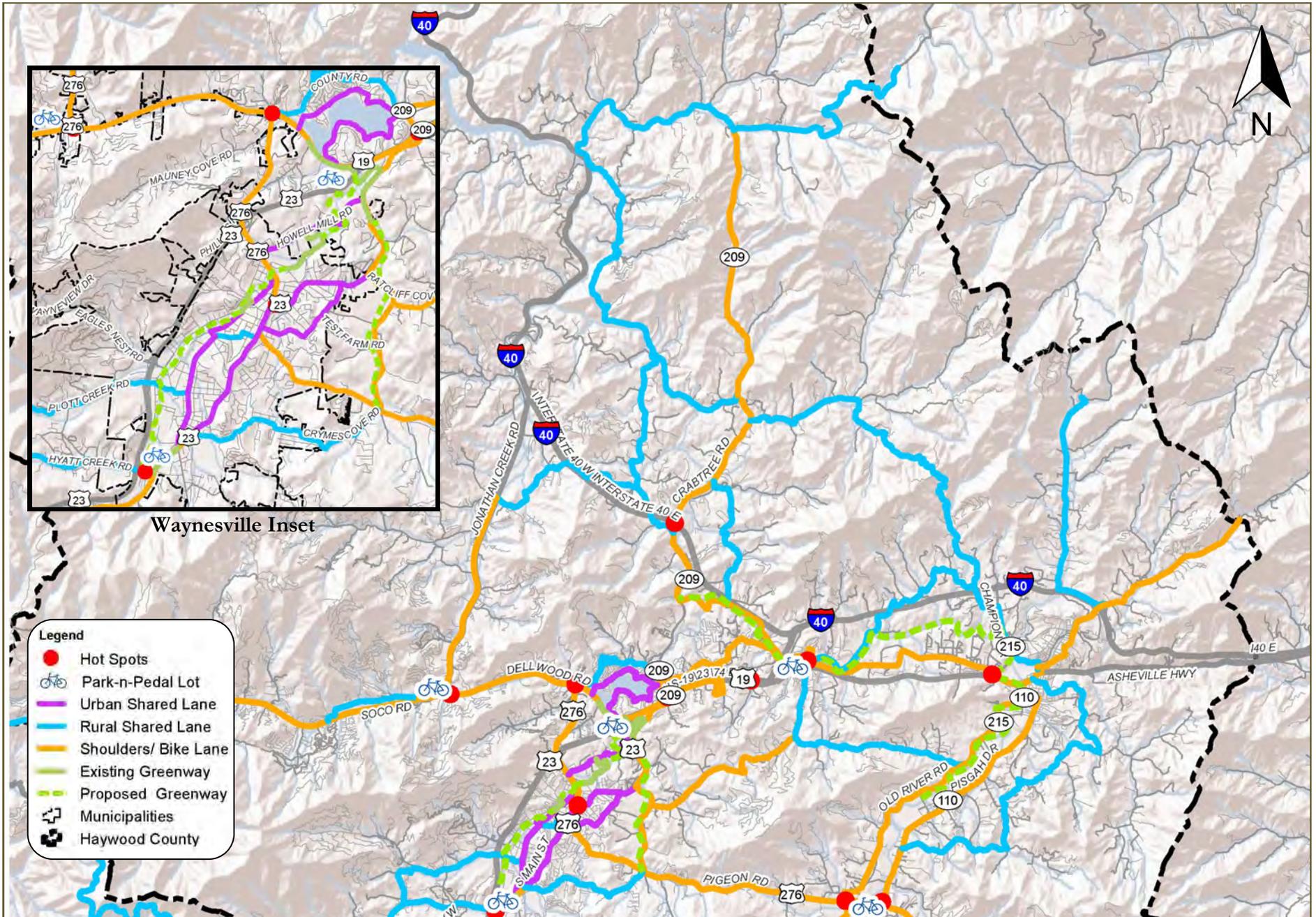


Length: 5.9 miles



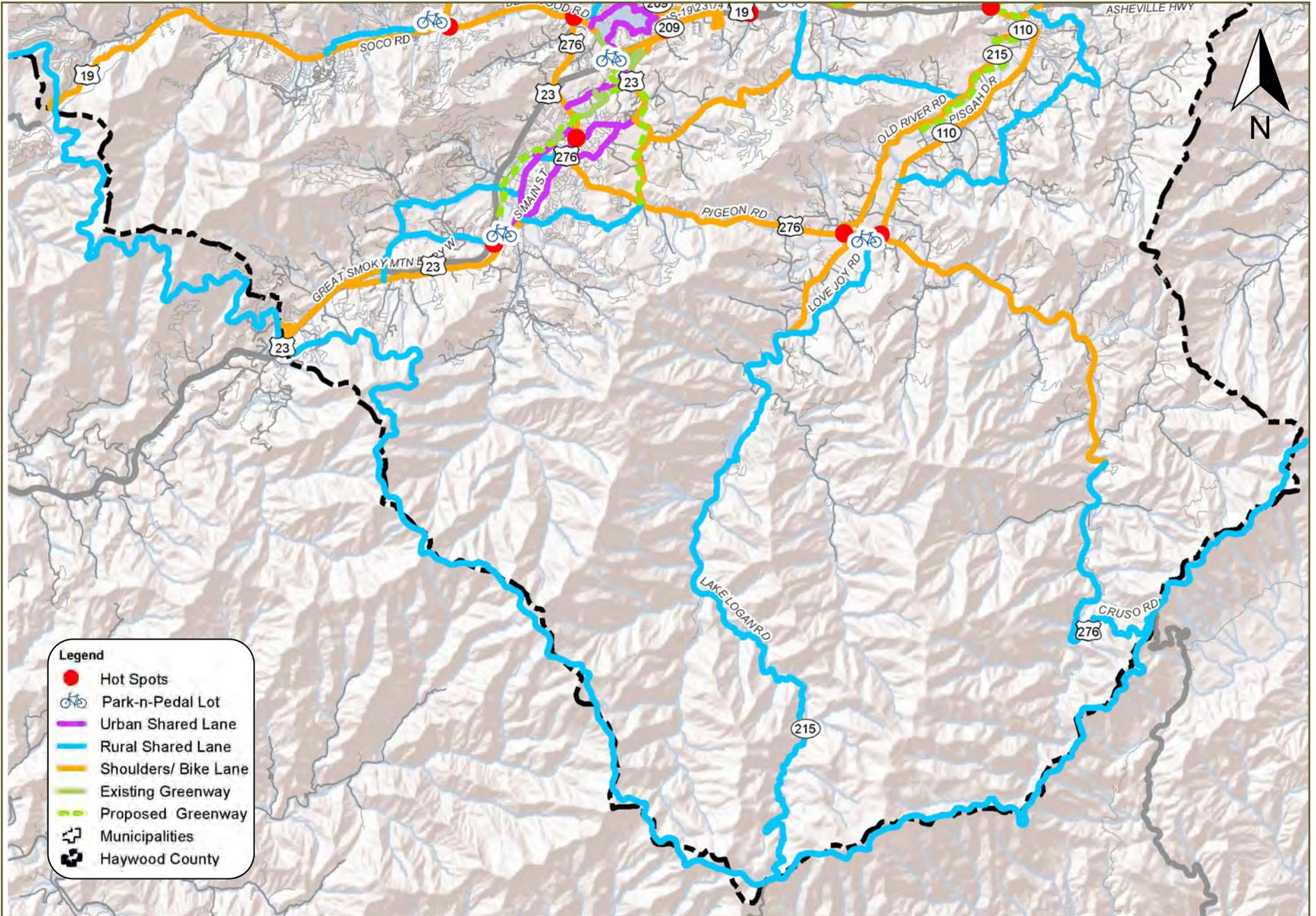
NCDOT has added shoulders designated as bicycle lanes to NC 107 between Cullowhee and the Caney Fork community in Jackson County. Similar investments along Raccoon Road and Ratcliff Cove Road are desirable but right-of-way constraints could limit implementation.





Route Recommendations: Northern Haywood County





Route Recommendations: Southern Haywood County



Hot Spots

Ten (10) locations were identified as intersections where bicyclists may find it uncomfortable to navigate during normal traffic conditions. Hot Spot locations in Haywood County are situated at the intersections of US and State Highways and have significant constraints related to the existing configuration of the intersection and features of the built environment (e.g. adjacent design of properties and driveways) that make them difficult to be addressed as standalone bicycle projects.

Some Hot Spots have been included as part of transportation corridor improvements identified in the French Broad River MPO 2035 Long-Range Transportation Plan. Given the complexity of many of these intersections, it is imperative that needs of bicyclists are represented as these projects and corridors studies move from a planning phase to a project development phase.

The needs of the bicyclist at these intersections is different than the needs of motorists and even pedestrians, as motor vehicle traffic merging from intersecting streets is oftentimes doing so in a free-running or yield situation where the rate of speed of a bicyclist may not be within the field of vision of the motorist making this maneuver. These intersections also pose a notable barrier to people who are just starting to ride their bicycles on the roads and can be perceived as more intimidating than roadway segments.

To date, NCDOT’s Complete Streets documents do not address intersection design but they will include some cross sections for intersections once complete. BicycleHaywoodNC, the County, and towns, along with the MPO and RPO, should track the progress of the intersection design features of the Complete Street guidance to apply solutions at these hot spot locations.

The exhibits on the following pages contain profile information of the hot spots and potential short- and long-term improvements. Hot Spots that are within identified projects in the MPO’s Long-Range Plan have been noted.

Estimating costs for these is difficult at a planning-level analysis, as right-of-way constraints, presence of structures near the intersection, driveways, and other variables can greatly impact feasibility. Therefore, the recommendations included in this section should be considered when beginning the project development process or at a time when NCDOT’s Division 14 office is considering operational improvements.

If redevelopment occurs on one or all corners of these intersections, BicycleHaywoodNC and other stakeholders should work with County, towns, and NCDOT to require dedication of additional right-of-way or inclusion of these improvements as part of the development review and approval process.

1. Jones Cove Road & Hospital Drive



Context: Horizontal and vertical curvature, combined with the proximity of the US 23/74 underpass are concerns for bicyclists at this intersection. The route parallels Old Clyde Road and serves activity generators along Hospital Drive. Land uses are primarily institutional.

Influences:

- Haywood Community College
- Haywood Regional Medical Center
- Tuscola High School
- US 23/74 Expressway

Recommendations: Increase visibility of the presence of bicyclists by installing Share the Road and wayfinding signs identifying access to Haywood Community College, MedWest Haywood and Tuscola High School.



Hot Spot Recommendations

2. Broad Street & Charles Street



Context: The intersection is in the heart of downtown Clyde and Charles Street is the only river crossing for the town and nearby communities. Visibility is the primary concern for bicyclists who connect to various recreational routes at this intersection.

Influences:

- Downtown Clyde & Parks
- Central Haywood High School
- Connections to recreational routes
- Along Haywood Hub route
- Utility poles

Recommendations: Re-stripe Broad Street for bicycle lanes as identified in the corridor recommendations. Increase visibility of the presence of bicyclists with Share the Road and wayfinding signs related to access to bicycle routes. Pursue funding to move utility poles out of the sight triangle.

3. US 276 (Russ Ave) & US 19 (Dellwood)

Context: The intersection is one of the busiest in Haywood County and has a free-running right turn lane from eastbound US 19 to southbound US 276. Land uses are commercial on all corners.

Influences:

- Routes to Maggie Valley and Jonathan Creek
- Lake Junaluska
- Connectivity to Waynesville
- Dayton Drive and County Road provide parallel connectivity to Waynesville and Junaluska

Recommendations: Improvements included in re-striping of US 19—Dellwood project extension to this location. Evaluate full-scale intersection improvements with future corridor study along Russ Avenue, as recommended under Corridors. Short-term improvements could include Share the Road signage and wayfinding.



4. NC 215—Blackwell Drive & Old Clyde Road



Context: The intersection is a gateway to Canton at the eastern end of the Haywood Hub route. From the eastern leg of the intersection, there are potential sight distance issues with southbound traffic on NC 215 in combination with the proximity of the railroad crossing and NC 215 & US 19/23 intersection.

Influences:

- Evergreen Packaging
- Downtown Canton
- Railroad tracks
- Connections to recreational routes such as Thickety Road, NC 215 to Bethel and Newfound Road.

Recommendations: Consider width for bike lanes across railroad tracks and up to intersection of NC 215 & US 19/23. Install bicycle route signage on Old Clyde Road.

Hot Spot Recommendations

5. US 23/74 & NC 209 Interchange



Context: The interchange is confusing for both motorists and bicyclists, which creates a potentially dangerous situation for all users. The interchange is surrounded by commercial land uses.

Influences:

- Haywood Community College
- Haywood Regional Medical Center
- Tuscola High School
- US 23/74 expressway
- Lake Junaluska
- Shopping centers

Recommendations: Improve visibility for bicyclists, install bicycle lanes and eliminate merging conflicts as part of NCDOT project R-4047 to widen NC 209 from the interchange to Old Clyde Road.

6. I-40 & NC 209 Interchange

Context: The NC 209—Crabtree Road route is a primary connection to recreational routes in northern Haywood County. Much of the corridor already has shoulders, including sections near the interchange.

Influences:

- Lake Junaluska
- Haywood County Fairgrounds
- Connections to popular recreational routes
- Riverbend Elementary School

Recommendations: Stripe shoulders near interchange as bicycle lanes and continue them through the on/off ramps and on the bridge. Install advanced warning signs on ramps to alert to potential for bicycle traffic traveling on NC 209.



7. US 276—Pigeon Road at NC 110 & Poindexter / Lake Logan Road



Context: Several recreational bicycle routes criss-cross at or near this segment / intersections and vehicular volumes are high for a rural context. The proximity of the Pigeon River on the west side of the US 276 / NC 110 intersection is a constraint for large-scale intersection improvements.

Influences:

- Bethel Community, stores & schools
- Blue Ridge Parkway connection
- Connections to other recreational routes
- Campgrounds

Recommendations: Shoulders (potentially marked as bike lanes) are recommended for US 276 in this area. The designation of nearby routes as bicycle routes, along with Share the Road signage can increase visibility. Future intersection improvements should include additional width for bicyclists, either via shoulders or lanes. Install bicycle marking on loop detectors at US 276 / NC 110.



Hot Spot Recommendations

8. US 19—Soco Road & US 276—Jonathan Creek Road



Context: The intersection is a busy connector between US highways and US 276 is a link to I-40. The confluence of truck, vehicular and motorcycle traffic make this intersection a barrier for most bicyclists.

Influences:

- Maggie Valley
- Jonathan Valley Elementary School
- Future Haywood County Park
- Only road connection to popular recreational routes along Fines Creek Road and Coleman Mountain Road.

Recommendations: Include intersection improvements on US 19—Soco Road / Dellwood with re-stripping project. Shoulders are recommended for US 276 but may require full-scale intersection improvements. Improvements could be made to free-running right turn lanes to increase visibility for bicyclists.

9. US 23/74 & Hyatt Creek Road Interchange

Context: The interchange is part of the link between South Main Street and the Hyatt Creek Road route, which links to the Blue Ridge Parkway (State Bike Route 2) via US 23/74 at its intersection with Plott Creek Road. The Walmart shopping center is located in the southeast quadrant of the intersection.

Influences:

- West Waynesville shopping district
- Interchange & roundabout
- Planned greenway along Richland Creek
- Blue Ridge Parkway / Plott Creek routes

Recommendations: The South Main Street study will address corridor to this interchange. The roundabout is well-suited for bicycle travel. Consider bicycle lanes on Hyatt Creek Road in commercial areas north and south of the interchange.



10. US 276—Walnut Street & US 23 Business—North Main Street



Context: The intersection is a gateway to downtown Waynesville with several streets connecting to recreational bicycle routes and the nearby greenway and parks. The intersection is built-out from a land use perspective and has topographical constraints that make full-scale improvements difficult.

Influences:

- Downtown Waynesville
- Russ Avenue shopping district.
- Greenway, Vance Street Park & Waynesville Recreation Center

Recommendations: Install shared lane markings on intersection approaches and consider climbing lane on westbound leg of US 19 Business. Alternate routes in the area may also be designated and signed as bicycle routes along with wayfinding signs to draw bicyclists away from the intersection to lower volume streets.

Chapter 6: Education & Encouragement

Education

The type of educational programs that should be offered to residents and visitors of Haywood County vary greatly by the intended audience, notably the age and abilities of the bicyclist. No matter what improvements are made to the roadways, if bicyclists and motorists are not adhering to the rules of the road, crashes will occur and the bicyclist will fair worse due to their lack of the protective shield that motorists have. Therefore, it is extremely important to have ongoing training programs for children and adults. It is also important to support efforts such as Waynesville's proposal for a BMX park so children have places to ride and learn.

Reaching out to adults helps build behavior patterns that can translate to children becoming more aware of bicycling. Teaching children also helps to develop safer drivers in the future and can serve as a motivating influence on parents.

The recommendations developed in this chapter have been organized by the various user types based on age groups rather than on detailing of specific educational programs, for which there are a variety of online sources.

Organizations such as the NCDOT Bicycle Program, League of American Bicyclists, Safe Routes to Schools Coalition, National Highway Traffic Safety Administration (NHTSA) and several state-level bicycle advocacy organizations have online

materials and videos that can be distributed to students as well as parents. It is important to have parents reinforcing the material with correct information. The pamphlet "What Every Parent Should Know" is one important tool to be given to parents. The Video "Kids Eye View" which comes from the League of American Bicyclists video on Safety Tips can be shown at PTA or other parent meetings.

Young Children. It is important that the any educational program takes into consideration the cognitive ability of children as young children are unable to determine the speed of a vehicle. Children below the age of eight operate their bicycles on sidewalks or on low volume streets, therefore their actions are most similar to those of pedestrians. They do not understand how to determine when or where it is safe to cross the roadway and they are so small that motorists may not see them until it is too late.

Children younger than 3rd grade age are best-served learning to always dismount from their bike and hold hands with an adult to cross the road. The most common crashes involving young children occur because they dart out into the roadway without looking. This usually happens because they are concentrating on an object they have an interest in, such as a dog. Children of this age may not think they are entering a roadway and don't sense or understand the dangers.



The Western North Carolina Vietnam Veterans of America conduct a bicycle rodeo each year at the park along Glance Street in Canton. In 2011, more than 20 kids participated in the rodeo, which taught basic riding skills for young children and more advance maneuvering for older children.

Photo Credit: Cecil Yount

Bicycle Rodeos

Bicycle Rodeos have become more popular among community organizations and law enforcement agencies to promote safe cycling habits at an early age. The annual bicycle rodeo in Clyde, led by the Vietnam Veterans of America and Haywood County Recreation & Parks, can be replicated across Haywood County or offered at the Park along Glance Street as a type of centralized location for schools groups and others to congregate. Aligning the interests of BicycleHaywoodNC and the Vietnam Veterans has the potential to create a unique partnership, along with support from other groups such as Healthy Haywood, to promote a bicycling culture.

There are several models for bicycle rodeos posted on various web sites. The 2011 rodeo in Clyde was organized with the Vietnam Veterans of America to incorporate education modules consistent with a bicycle rodeo curriculum being piloted by the League of American Bicyclists. The prospects of a League-sanctioned rodeo means League Cycling Instructors can oversee the event, which also means they are covered by the League's insurance.



Primary Bicycle Rodeo Modules

- ◆ Bicycle and helmet fitting, maintenance check
- ◆ Riding in a straight line
- ◆ Stopping and signaling
- ◆ Right / left turns and signaling
- ◆ Scanning for motorists and other vehicles
- ◆ Bicycle maneuvering and balance (a figure-8)
- ◆ Street riding skills, including:
 - Sidewalk riding and walking a bike
 - Driveway exit and entrance
 - Scanning, signaling and stopping
 - Turning
 - Hazard avoidance, including drainage grates and railroad crossings
 - Interacting with other traffic

Learning to come to the edge of the roadway, then stop and look about before entering the road is a very important lesson. Young children need to learn where to safely bike and walk along a road as well as how to share the sidewalk with others.

When dealing with bike skills the target should be on awareness that driveways are where cars travel. They need to stop and look both ways for cars entering and exiting the drive before proceeding.

Recommendation: Educational methods to target children of this age group should include:

- ◆ Joint parent/child programs to teach proper skills;
- ◆ Instructional videos, such as *Willie Whistle*, which is available from the National Highway Traffic Safety Administration (NHTSA);
- ◆ Participation in Safe Routes to Schools programs such as bicycle trains and walking school buses;
- ◆ Coloring books designed specifically for bicycle education of young riders; and
- ◆ How-to booklets on proper bicycling sizing and learning to ride on two wheels.

Third Grade through Fifth Grade Children. By the time children are in third, fourth, or fifth grade, their cognitive skills have developed to where they can begin to determine when it is safe to dismount their bicycle and cross the street without holding an adult's hand. This age group still needs to be reminded about looking both ways as there is still a tenden-

cy to dart into the roadway. This occurs because they assume that it is safe to enter the street because the first person in the group made it through. They forget to look for themselves.

Children of this age who are self-taught or have spent most of their time riding in their driveway or on residential streets are more likely to ride facing traffic; either because their parents told them to do so or they confuse the walking against traffic rule with the bicycle rules that specific riding with the flow of traffic. Parents and children falsely believe if they see the cars eye-to-eye they can get out of the way to avoid a crash, however, the motorist has no time to wait until it is clear to pass them and must react more quickly.

This is the key message for children of this age as they can now begin to judge speed and understand dangers before they occur. Their hearing is more defined and they can start making judgment as to the proper way to maneuver on the street.

Therefore, this is the age where they should be learning hand signals, bike handling skills such as starting and stopping under control and making turns. Children at this age can be perfecting their balance and avoiding hazards. Riding a bike on a quiet road with a parent is acceptable and a parent may want to begin talking with this child about what they are doing and observing while driving to

begin the understanding of cause and affect and how traffic rules are applied.

Recommendation: Educational methods to target children of this age group should include:

- ◆ Riding skills as currently taught as part of the 4th grade curriculum in Haywood County Schools
- ◆ Bicycle rodeos such as the annual Veterans of the Vietnam War event in Clyde;
- ◆ More advanced videos, such as “Ride Smart: It’s Time to Start”, available through NHTSA; and
- ◆ Participation in Safe Routes to Schools programs such as Bicycle Trains and Walking School Buses .

Middle School Age Children. By the time a child has reached middle school age the parent should be taking advantage when driving with the kids in the car and talk about what they are doing while driving, what they see as problems that could occur on the road and what decisions they are making. This provides children with a foundation for understanding the rules of the road, share the road concepts and how to handle various situations.

Children are great observers of their parent’s behavior. This age is when kids begin to think about doing things on their own; they crave independence and are willing to travel anywhere and everywhere they can on their bicycle. With that, they need good



Once children reach an age where they are in third, fourth or fifth grade, they have the physical and cognitive abilities to learn more advanced bicycle riding skills, such as proper signaling techniques and more complex maneuvering around a figure-8, as shown above from the Clyde Bicycle Rodeo.

Photo Credit: Cecil Yount



BicycleHaywoodNC offers a Thursday night novice ride to help adults become more comfortable riding their bicycles. Participants have included brand new riders and those who have not cycled in many years. These rides can offer a low-stress experience for riders who may have some trepidation about riding their bicycle on the roads or have not ridden a bicycle since they were children.

Photo Credit: Cecil Yount

judgment and the experience to understand how their behavior and what they do will affect what happens on the road. This is also when kids become more courageous about riding at night or at dusk, which necessitates lights, reflectors, and reflective clothing for safety.

They need experiences in a safe environment to practice their skills and to perfect them as they build upon skills learned at the elementary school level and increased cognitive abilities to make judgments about potentially hazardous situations. Specific on-road skills such as signaling before turns and rear gazing before turning while practicing on a simulated streetscape, along with opportunities to interact with other types of traffic, will give them more experience so they can be safe. It will also prepare them for being good drivers who know how to interact safely on the street.

Recommendation: At this stage, specific educational opportunities should include:

- ◆ Full-length bicycle rodeos;
- ◆ Reading and writing assignments related to bicycle safety;
- ◆ Poster contests;
- ◆ Use of more advanced instructional videos such as “Bike Safe. Bike Smart.”;
- ◆ Traffic Skills 101 courses with adults or parents for more advanced or experienced riders; and
- ◆ After school riding clubs.

Adults. Once children have progressed beyond middle school age, they can be included in many adult-specific educational and outreach modules. Most adult bicyclists have not had any training in appropriate riding behaviors, even though most have had driver’s education training and possess a driver’s license.

Providing training for adults is important because their fears often keep them from trying to use a bicycle for transportation or recreation. The most common behaviors for adults are riding too close to the road edge, not being predictable, or not letting others know their intentions. Some adults still adhere to the “ride against traffic” dictum from their childhood. They may also be riding on sidewalks or not watching where they are going when operating in mixed traffic or along a greenway.

The most direct method of adult education is the Traffic Skills 101 course developed by the League of American Bicyclists. The course, along with associated Traffic Skills 201 and Commuter Skills courses, are taught by certified League Cycling Instructors to give adults the skills and confidence needed to ride comfortably in traffic.

Offering these classes should be part of any total education program. Courses typically last six hours and include classroom discussion, parking lot skills and a short ride on the road. Discussions include how the rules of the road apply to bicyclists, how and where to ride in specific traffic situations, how

to be predictable and skill practice in avoiding collisions. There is also a video developed by the League of American Bicyclists for adults and it is available through the League or a NHTSA video “Bicycle Safety Tips for Adults.”

Recommendation: Other adult-specific educational programs should include:

- ◆ Organized rides for novice riders, such as the BicycleHaywoodNC Thursday Night Ride;
- ◆ Integration of bicycle-related questions on driver’s license exams;
- ◆ Take-home handouts to children who participate in bicycle rodeos or other programs;
- ◆ Parent-specific outreach while their children are participating in bicycle rodeos;
- ◆ “Silver Wheels” programs to encourage seniors to ride their bicycles;
- ◆ Educational outreach with law enforcement officials;
- ◆ Outreach at community events such as downtown or music festivals; and
- ◆ Promotion of safe riding skills through materials distributed as part of organized rides or special event rides, such as the Blue Ridge Breakaway.

Motorists. It is almost impossible to change the behaviors of motor vehicle drivers once they have been behind the wheel for a few years. Even in the most advanced bicycling cultures in the United States, there is still a challenge posed to bicyclists by motorists who feel that they own the roadway.

The increased use of mobile phones for purposes other than making phone calls has created a new set of problems for bicyclists. North Carolina banned texting while driving in 2009 but it remains a problem and a concern for bicyclists.

The most influential way to have an impact is to reach new drivers through driver’s education classes. The present driver’s education programs do not spend much time on bicycle and pedestrian safety or how to maneuver a car with other roadway users. Many of the driver education teachers in North Carolina are under contract through an independent company and not the Department of Education or Department of Transportation.

Past efforts in Buncombe County to further incorporate bicycle-related education into driver’s license programs found them open to volunteers teaching awareness of safe driving around bicyclists and pedestrians but the practice is still not widespread.

The curriculum used in Buncombe County was developed by The League of Illinois Bicyclists and includes a video, test and teacher materials to get started. This curriculum can be downloaded from their web site, www.bikelib.org/safety-education/motorists/driver-education. Getting volunteers and training them does take commitment.

Involvement from the law enforcement community can also contribute to advanced education of motorists and bicyclists. Involving law enforce-



Targeted motorist outreach efforts can be developed outside the realm of a driver’s education curriculum in the absence of participation from these programs. Public service advertisements from Tacoma, Washington reinforce driver’s education ideas in a poster and print ad format.

Source: Drive Nice, Tacoma.

Avoidance Maneuvers

QUICK STOP 1

Bells are 10' apart and spaced 4 ft, 2 ft, 4 ft apart along the chute.

Each student should make at least three passes, one using just the back brake, one using both brakes and one with both brakes and a weight shift.

Instruct students to begin stopping brakes when the front wheel reaches the first set of markers. Emphasize that this is not a contest.

Have students come to a complete stop, off the pedals with one foot flat on the ground.

Instructor stands in a position to support the students when they come to a stop. Assistant stands on the other side.

For more advanced riders, instruct them to begin stopping when you give a signal while they are somewhere within the chute.

ROCK DODGE 2

We teach this maneuver by turning left first and then back to the right a little more. If done properly the front wheel should pass to the left of the bell and the rear wheel will pass to the right.

Remind students that they will not loose points if the back wheel hits the "rock". Turn a 1/2 turn to bell inside out to make the "rock". Mark spots with cones for easy repositioning.

Instructor stands in a position to see the front wheel. Assistant stands where they can replace the "rock" easily. Have extra rocks in hand.

Start with bells 10 inches apart and reduce the width if riders are "clustering" around the rock instead of dodging.

INSTANT TURN 4

Point out to students that this is the space that they would have if they were creating a wide lane or riding in a bus lane. Have them begin the counter-lean between the second and third set of bells.

Most riders fail by straightening up before they have completed the turn. Aggressive riders may jerk the wheel back too sharply and slip up over the handlebars. The maximum bells spaced for this drill appears to be about 15 mph.

This bell should be moved 8 inches right and down to create a perceived curve instead of a right angle.

Create this layout so the entrance is flat or uphill and the exit is usually down or down. If riders perceive a "hill" they will abort the turn.

Remind the riders of 4 things:

1. No straddles
2. Outside foot down
3. Shoulders leaned to the inside
4. Look up and long at the end

An optional layout for more experienced riders is to create a "T" and point left or right as riders enter the beginning of the chute.

AVOIDANCE WEAVE 3

Start with 5 bells on a straight line 10 feet apart. Place the other bells 10 inches to the side.

Remind students that the first three passes will be between the bells which means that the first only have to move the width of a bell.

The second set of three passes will require moving outside of the bells which means 3 feet sideways for every 10 feet along the layout.

Instructor stands in a position to give encouragement and remind riders to look up, turn early and lean their bicycle.

This is a fun exercise and most students will want to continue on so make sure you maintain your time stopping.

League Cycling Instructors are taught methods to educate bicyclists of all abilities on various riding skills. These avoidance maneuvers are taught as part of the Traffic Skills 101 course to help participants learn how to minimize the likelihood that they will be involved in a crash.

Source: League of American Bicyclists

ment officers in Traffic Skills 101 courses to review applicable traffic laws and teach participants of nuances in North Carolina laws can be more effective than an instructor simply reciting state code.

League Cycling Instructors (LCI). The cycling community in Haywood County, via BicycleHaywoodNC, should begin development of a bicycle education program for children and adults that is similar to programs already in place in nearby Buncombe County. For example, there are 10 individuals in Buncombe County certified by the League to teach bicycle training courses. Having individuals with this certification gives a community many advantages, the first being a first-rate curriculum from the League of American Bicyclists that has been tested across the United States and provides materials that are age appropriate.

Another important component of this certification is insurance coverage provided to LCIs through the League. Participants in traffic skills classes and parents whose children are taking part in a bicycle rodeo are concerned about safety during the event and organizers are concerned about liability.

The Blue Ridge Bicycle Club, which is aligned with BicycleHaywoodNC, also has insurance through the League to cover the individuals involved in various programs. In today's litigious society, having certified instructors to oversee or teach leads to a good program and peace of mind.

Documentation. Documenting the work in this area will help improve programming, justify future funding and assist in grant applications, and provide a barometer by which progress is made in creating a bicycling culture in Haywood County. Simply documenting the number of children and adults engaged in these educational programs also provides government staff and elected officials with justification for continued support throughout the community.

It is also important to develop pre- and post-tests when conducting classes in the public schools to help gauge student retention and improve the program. Test questions need to be the same to determine what has been learned as well as asking what the children remember from the class. It is also important to document how many children and what age children are involved with educational programs. This information is also essential when applying for Bicycle Friendly Community status through the League of American Bicyclists.

Silver Wheels: Encouraging Cycling among Older Adults



Photo Credit: Streetfilms.org

Haywood County has a higher percentage of older adults than the rest of North Carolina as the area has long been a destination for retirees and second home buyers. During the visioning exercise for the Plan, the steering committee identified the need for special outreach programs designed to help older adults feel more comfortable on a bicycle and riding on the road and greenways.

First and foremost, older adults should be aware of their basic health conditions, as well as the acuity of their sight and hearing. Basic actions undertaken by younger cyclists, such as turning your head to scan for cars, can be much more difficult for a senior citizen.

Cycling is shown to be good for a person's joints and puts less stress on hips, knees and ankles than running. It can also be beneficial for those who suffer from arthritis in knees or hips. It can also build muscle mass in the legs, which is difficult for seniors whose only exercise is walking.

Those with any type of neck injury or stiffness in their back that prevents should be discouraged from riding. Balance is also a critical component to operating a bicycle. People with mobility impairments that prevent them from operating a motor vehicle should also be discouraged from riding.

Older adults should start any bicycling regimen slowly to get acclimated to the feel of the bicycle and get into bicycling shape. Seniors will be most comfortable in a low-speed, low-volume roadway setting, along a greenway trail or in a park. While making utilitarian trips is a noble endeavor, the focus should first be on exercise in an environment that is not intimidating.

Technological advances in recumbent bicycles and three-wheeled bicycles have created more options for seniors to exercise and become mobile on a bike. Portland, Oregon offers a "three-wheeled" bicycle class aimed at senior citizens. And organizing a "bike buddy" program helps look after a senior who is learning to ride or has some type of physical restriction.



BicycleHaywoodNC organized the County's first-ever Bike to Work ride as part of National Bike to Work Day in May 2011. The ride included police escorts and bicycle-mounted patrol from West Waynesville to Downtown Waynesville.

Photo Credit: Don Kostelec

Encouragement

Developing encouragement programs to complement educational efforts and engineering investments helps promote usage of the system and makes people feel safer when they decide to try bicycling. Making it easy and fun to ride for transportation can increase bicycle mode share. BicycleHaywoodNC has already established a track record for encouragement activities, most notably the Thursday Night Rides during the summer months. The rides are intended to introduce new or returning bicyclists to the experience of riding on the roads and on greenways. This helps them get a feel for what it is like to share the road with motorists and ride in a low-pressure situation.

In May 2011, BicycleHaywoodNC also organized the County's first ever Bike to Work ride to commemorate national Bike to Work Day. More than a dozen riders enjoyed the commute from west Waynesville to downtown Waynesville, which included bike patrol and police escorts along the route.

Building upon these encouragement programs is critical to building awareness of bicycling. Encouragement efforts can also provide a highly visible outreach mechanism to showcase the accomplishments of Towns, the County and BicycleHaywoodNC as they pursue more long-range facilities investments.

This section outlines some major encouragement

programs and recommendations. Note that many recommendations also include a pedestrian element as many programs are designed to promote active living through bicycling and walking.

Safe Routes to School. In 1969 about half of all students walked or bicycled to school. Today, however, more than half of all children arrive at school in private automobiles and only 15 percent of school trips are made by walking or bicycling.

Designed to address these dramatic statistics, the Safe Routes to School Program was organized to create and promote safe walking and bicycling in order to improve safety near schools, promote active lifestyles, and reduce pollution and congestion caused by school traffic during arrival and departure times. The first Safe Routes to School program debuted in Europe in the 1970s and the first program in the United States began in the Bronx, New York in 1997. Less than 15 years later, the Safe Routes to School Program has become both a federally-funded and grassroots national movement.

A Safe Routes to School (SRTS) program is a school-based effort that involves young students, teachers, law enforcement officers and parents in the development of school safety and encouragement initiatives such as Walk to School Day, bicycle trains, Walking Wednesdays, pedestrian safety assemblies and bicycle rodeos. SRTS funding is also available for various facility investments and other activities.

These programs can help engage children in safe walking behaviors and encourage more bicycling and healthier lifestyles. Common steps to creating a successful program are to kick-off with an event on International Walk-to-School Day, then subsequently work with PTA members, teachers and students to identify needs and program ideas while incorporating encouragement measures and education into the school curriculum for students to learn safe walking and bicycling skills and the benefits of an active lifestyle.

Funds are available through the North Carolina Department of Transportation for planning and infrastructure work intended to encourage safe walking and bicycling to elementary and middle schools. Development of a SRTS Action Plan could help with program development and in making key physical improvements within the vicinity of local schools. SRTS workshops are also available through NCDOT to aid in the development of a SRTS Action Plans and are an opportunity to bring together school administrators, faculty, staff, and representatives from related agencies such as health departments, law enforcement, engineering, and city planning to discuss local issues and solutions.

Resources and information are available at www.saferoutesinfo.org.

NCDOT funding applications and information on local resources are available at: www.ncdot.gov/bikeped/

Recommendation: A Safe Routes to School program is a recurring activity and will require support from Town and County Staff, school administration, parents and faculty; however, the benefits will continue with children into adulthood. Town and County staff, along with BicycleHaywoodNC volunteers and Haywood County Schools administration, should encourage and support the establishment of a Safe Routes to School program at either a system-wide or individual school level.

A starting point would be schools that are already located in areas that can easily be accessed on foot or by bicycle. In addition, when new schools are planned and constructed, Haywood County Schools representatives should work with Town and County staff to plan for and design safe walking and cycling routes to new schools.

BicycleHaywoodNC, Haywood County or Healthy Haywood should considering having a representative trained as a Safe Routes to School coordinator. Training sessions occur at least twice per year and are led by the national center.

Themed Rides. The concept of organizing themed rides can be a fun experience and add to the comfort factor of riding bicycles. An idea generated through the visioning phase of the Haywood County Comprehensive Bicycle Plan was to organize some type of bicycle-based culinary tour. This could be organized in cooperation with restaurants



Helping parents identify safe routes for their children to ride to school is part of a Safe Routes to School program. Other efforts such as Bicycle Trains and conducting Bicycle Rodeos introduce children and parents to the concept of getting to school via a mode other than the automobile.

Photo Credit: Cecil Yount



New federal guidelines have formalized the design of bicycle wayfinding signs for on-street application. The signs shown above from Chicago identify key destinations and major bicycle routes.

Photo Credit: Don Kostelec

throughout a Town who offer bite size samples of their food in exchange for a small promotional fee.

Similar rides to coffee shops or other unique destinations could be incorporated into the ride. Holding group rides where participants dress in costumes or that is held to celebrate special days such as St. Patrick's Day or Halloween can develop group camaraderie and encourage riders to enjoy the spirit of riding. Given the history of the area, a special ride devoted to touring and learning about places of historical significance would be another option.

Recommendation: Launch themed rides on a seasonal basis (excluding winter). It is important that these rides are not fast, as the emphasis should be on having fun and having people join in the fun. These rides also represent a time to share experiences with people of all ages and abilities. Children and older adults can be included as the length of the ride is not the emphasis. Encourage safe riding habits and use experienced riders to remind others of the rules.

Bicycle Wayfinding Systems and Route Maps.

More and more communities are using pedestrian and bicycle wayfinding systems to provide visitors and residents with directional and distance information to major landmarks, parks and other local attractions. Given Haywood County's tourism attractions, cultural destinations and parks, a similar system would be very useful. Several cool corridors

and hot spots identify wayfinding as a potential components of these projects.

Depending on the distances between attractions, it is advisable to combine bicycle and pedestrian wayfinding systems, recognizing that some bicycle-based destinations may only be accessed from on-street routes and may then have to be combined with auto-oriented wayfinding.

Bicycle and pedestrian wayfinding signs should be at a height of at least 7 feet, with a font and orientation appropriate for viewing by those traveling at the speed of a pedestrian or bicyclist. Distance information should be provided in blocks or miles and kiosks with a map can be useful for visitors. Such a system could incorporate local themes, allowing area artists an opportunity to design sign templates. Opportunities for private-public partnerships exist, such as working with area retailers or B&B's along the route to sponsor signage and/or complementary brochures in exchange for a mention in the guide.

Recommendation: Develop a system of wayfinding signs to direct bicyclists and pedestrians to major landmarks, parks, greenway trails, and other public attractions in the County and Towns. Develop a map and brochure for visitors and residents to use in navigating the area by bike or on foot. Bicycle and pedestrian safety information could be included, as well as information on local cultural sites, landmarks and businesses.

Healthy Living Initiative. One of the major characteristics of a bicycle-friendly community is to have a body of citizens, municipal staff and elected leaders who are engaged in and educated about the economic, health, and general quality of life benefits of a bicycle-friendly community.

Additionally, educational activities could be held at a Town Hall or Recreation Center, such as presentations on pedestrian- and bicycle-friendliness to learn about the projects, programs, and policies that can encourage a more bicycle- and pedestrian-friendly city. Several organizations, such as the National Center for Bicycling and Walking (www.bikewalk.org), Walkable Communities, Inc., and the Complete the Streets initiative (www.completestreets.org), provide resources such as speakers, handouts, guides, and publications which can be used for the education and encouragement component of the event. Local businesses might be asked to encourage employee participation in workplace walking clubs and events, along with the promotion of a local walking route and corresponding map (see below).

This program could also be promoted in local schools, health centers and at City/County events. A “Fitness Challenge” event and/or regular senior cycling/walking program could also be incorporated.

Recommendation: In order to facilitate this, it is recommended that Haywood County build upon efforts already underway via groups such as Healthy

Haywood to expand outreach activities to be more specific to bicycling. Several of the encouragement initiatives outlined in this section could be candidates for incorporation within a healthy living initiative.

Bike to Work Day or Strive Not to Drive. Bike month is each May and National Bike to Work Day is usually held the 3rd Friday of May. The League of American Bicyclists has a packet to assist in starting a bike to work event in your town. This can be accessed through their web site www.bikeleague.org. Efforts in the Asheville areas have led to an expanded Bike to Work Day and weeklong Strive Not to Drive campaign.

Encouragement programs vary from contests, awards like the Golden Sneaker (for walkers), Golden Spoke (for cyclists) and Golden Wheel (for carpoolers and bus riders). Programming usually includes breakfast stations with free coffee and treats on the specific day and education classes to give people more confidence to try a new travel mode that day. Some communities have awards for the most creative commute and most decorated bicycle.

Recommendation: Continue to expand the 2011 events in Waynesville to each community and conduct rides at other times of the year.



Safe Routes to School events are oftentimes a combination of Education and Encouragement as they offer an opportunity to interact with parents and children to encourage safe use of bicycles.



Bicycle corrals have become a standard fixture at downtown events in Asheville. Corrals are an encouragement technique that can help promote local advocacy efforts.

Photo Credit: Asheville on Bikes

Other Encouragement Activities

Bike and Walk to School Days. October is International Walk & Bike to School Month. The premise of this program is to encourage children to walk and bike to school as a way to increase physical activity, help children develop an understanding of their environment and to become more healthy and independent. When it is safe to walk and bike to school this is an encouragement program; when it is not already safe it is important to hold a safety workshop and audit with a variety of community leaders, school officials and parents to develop an understanding of the needs, concerns, challenges and opportunities to make it safe.

NCDOT has a Safe Routes to School coordinator and trained workshop professionals that can assist with these workshops. The encouragement programs for the children once the facilities are in and around the school usually involve contests and prizes and can include award punch cards kids carry on their backpacks that are punched each time they walk or bike to school. Once their card is filled they are eligible for a prize. These programs develop enthusiasm and encouragement for the kids and they want to participate.

Valet parking through bike corrals at community festivals is a way to develop secure parking, education about your programs, and provide a way to get feedback from the general public. It also adds a

fun element to the festival. Besides providing the service, you definitely want to use this opportunity to educate the public about your programs and collect email addresses. Make colorful posters and have them laminated for durability. It is also important to document how many bikes are parking each time this service is provided and how many volunteers have worked, including their hours. All this information can be used to document effectiveness. Groups such as BicycleHaywoodNC can also ask for in-kind donations.

Documentation. An important component of any of these programs is documenting how many people are served through them. Tallying comments as to why people participate, what works and what doesn't are all important to expand bicycle-related encouragement programs. Knowing how groups and individuals achieve their goals helps understand the community from a bicycling perspective and can help groups like BicycleHaywood NC determine how effective it has been. Documentation also helps with future funding pursuits as many communities do not document their progress.

Chapter 7: Enforcement

A community desirous of a bicycle-friendly community designation can sometimes struggle to effectively address enforcement that applies to both motorists and bicyclists observing and practicing the rules of the road. This can be even more challenging for a countywide effort as there typically several municipal or countywide departments responsible for law or traffic enforcement.

Capturing the interest of the Sheriff's Department and municipal Police Departments can be a difficult task as their day-to-day responsibilities are so multi-faceted that focusing on bicycle-related enforcement efforts, particularly those not involving specific crashes, is difficult given department priorities, budgetary limitations and personnel constraints.

This should not become a deterrent to bicyclists or advocacy groups as there are several other methods of effectively addressing enforcement, including directed efforts with local law enforcement agencies.

Law Enforcement Support

Creating partnerships with local law enforcement agencies should start with building upon existing relationships in Haywood County. During the course of the Bicycle Plan, three notable efforts showcased how a community can engage local law enforcement to build a better understanding of interests among those concerned with bicyclist safety.

- ◆ The May 2011 Bicycle Rodeo in Clyde was supported by the Town of Clyde Police Department

and Town of Waynesville Police Department. The police departments provided bicycles, helmets, traffic cones and other supplies to conduct the rodeo.

- ◆ The Bike-to-Work Day event, also in May 2011, was supported by the Town of Waynesville Police Department, which provided bicycle-mounted patrol officers riding along with the group as well as a police escorts throughout the ride and at major intersections.
- ◆ Representatives of the Bicycle Plan consulting team, BicycleHaywoodNC and Haywood County met with other county officials, including the Sheriff's Department to exchange ideas about the plan and specifically discuss enforcement methods.

This type of involvement with enforcement entities should not stop with adoption of the Plan, but rather should be encouraged annually through continuance of these events and identification of new partnerships. One such partnership should be the inclusion of an officer to teach the specific module of bicycle rodeos or the League of American Bicyclists Traffic Skills 101 course (identified in the Education & Encouragement chapter) related to traffic laws. A recommendation in the Evaluation & Implementation chapter of this Plan suggests the training of League Cycling Instructors, which could include a local law enforcement officer who is also a bicyclist.



Waynesville Police provided bicycle-mounted patrols and escorts along the route for the 2011 Bike-to-Work Day event organized by BicycleHaywoodNC.

Photo Credit: Don Kostelec

Exhibit 7-1: Common signs for bicyclists identified in the Manual on Uniform Traffic Control Devices (MUTCD), 2009
Alpha-numeric titles in parentheses denote MUTCD reference number.

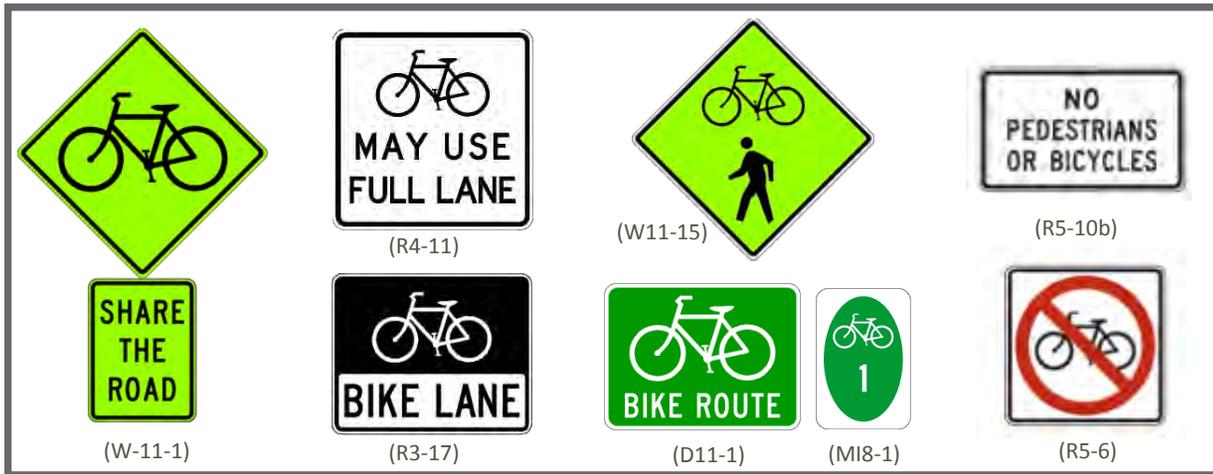


Exhibit 7-2: Special signs help highlight the presence of bicyclists.

LEFT: Special route signage for bikeways in Phoenix, Arizona.

CENTER: Signs installed during construction for bicyclists in Boise, Idaho.

RIGHT: Special “Shared Route” imagery signs in with Share the Road signs in Moncton, New Brunswick, Canada.

Photo Credit: Don Kostelec



Other methods to engage the law enforcement include:

- ◆ Conduct training on the laws that affect bicycling and help law enforcement officials understand them from the perspective of the bicyclist.
- ◆ Encourage your local law enforcement trainers to take the class on bicycle laws so they can in turn train the rest of the department officers.
- ◆ Work with your local departments explaining the importance in having all officers trained in this area.
- ◆ Encourage the use of bike patrol officers for the greenways and parks in the community and then future bike lanes.
- ◆ Request a police liaison for advisory groups so it is well-known who should be contacted.

Signage

While partnerships are pursued with law enforcement agencies, BicycleHaywoodNC, Haywood County and municipalities can work with NCDOT and others to provide an effective enforcement component—signage in the public and private realm.

The most common method of signage-related enforcement is traffic signs along key corridors that promote good behavior by motorists and bicyclists. There are several types of signage that can be installed along roads and streets to highlight the presence of bicyclists or the designation of a bicy-

cle route. Most signs for this type of enforcement are contained in the Manual on Uniform Traffic Control Devices (MUTCD), which is a document developed at the Federal level to ensure consistent implementation of traffic control devices (such as signage) across the United States. NCDOT relies on this publication, updated in 2009, as a guide for their implementation methods. Signs included in MUTCD for bicycle-related enforcement are shown in Exhibit 7-1.

Signage does not have to be constrained to that identified in MUTCD, as many communities have recognized that these signs are intended to be universal and utilitarian. Therefore, some communities supplement these signs with other specialized signs. Exhibit 7-2 shows three such efforts—the designation of the Sonoran Bikeway in Phoenix, Arizona; construction signs in Boise, Idaho; and the use of special Shared Route signs to supplement Share the Road signs in Moncton, New Brunswick, Canada. Each of these signs showcases the presence of other users along the street and serves as a more artistic enforcement method in combination with regulatory signs.

Helmet Use

In North Carolina, children under the age of 16 are required to wear a helmet when riding a bicycle. This requirement is not a focus of most law enforcement efforts and many families simply do not have access to or cannot afford a helmet to comply with this law. Adults should also be strongly encouraged to wear a

helmet whenever riding, even if it's only in a park or along a greenway.

The Bicycle Plan survey indicated helmet usage greater than 77%, which is a strong figure but is likely skewed toward those who were likely to respond to survey and those where outreach regarding this survey was conducted through events that would draw regular bicyclists to take the survey. Of the 23% that said they do not wear a helmet when riding a bicycle, 60% noted they did not own a helmet (Exhibit 7-3).

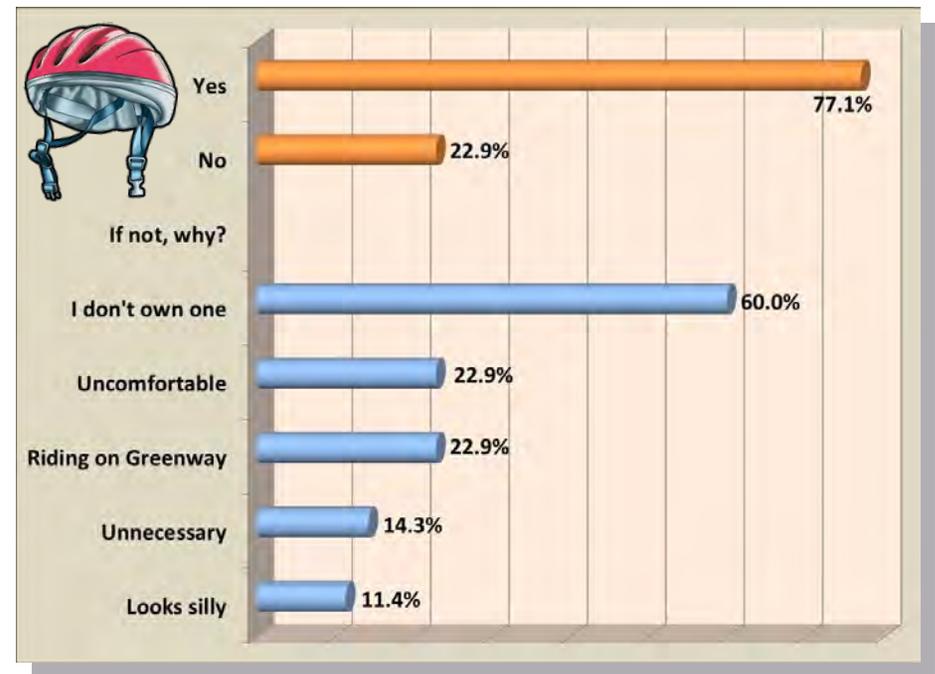


Exhibit 7-3: Do you wear a helmet? If not, why?
Helmet use statistics from the Haywood County Comprehensive Bicycle Plan survey



Cooperative methods to report and track bicyclist / motorists engagements are being developed by BicycleHaywoodNC and local law enforcement to correctly respond to these incidents.

Photo Credit: Don Kostelec

The enforcement of helmet laws can be conducted through passive enforcement campaigns and educational forums such as bicycle rodeos and Traffic Skills 101 courses. BicycleHaywoodNC requires a helmet for those participating its Thursday night Novice Rides. Along with its partners, municipal governments and law enforcement agencies, BicycleHaywoodNC can pursue grants to purchase helmets as giveaways for both children and adults.

Reporting Mechanisms

The methods of reporting crashes or incidents related to bicycling is not as evolved as methods for reporting vehicular crashes and not a focal point of law enforcement agencies simply because most areas do not have high volumes of these incidents to change existing reporting methods.

While a crash between a motorist and a bicyclist is oftentimes reported through official forms and legal requirements in North Carolina, the raw statistics generated from these reporting mechanisms do not effectively provide the context for what it means to be a bicyclist in Haywood County.

During development of the Bicycle Plan, representatives of BicycleHaywoodNC crafted a method for reporting bicycle-related incidents that does not always necessitate direct interaction with local law enforcement at the time of the incident.

The exhibit on the facing page outlines a tiered model for reporting of incidents that accomplishes several things:

- ◆ Provides a medium for bicyclists to report incidents;
- ◆ Allows for tracking of non-crash incidents that do not necessitate reporting to local law enforcement;
- ◆ Identifies a role by which BicycleHaywoodNC can contribute to positive enforcement of bicycle laws; and
- ◆ Generates local data for use in conversations and initiatives with law enforcement agencies.

Once the Bicycle Plan is adopted, BicycleHaywoodNC should further pursue use of this tiered system with buy-in from local law enforcement and bicyclists and then develop the on-line tools to allow for individuals to report these incidents and advertise the availability of the on-line tool.

Traffic Enforcement

Many communities rely on a traffic enforcement unit of the local police or Sheriff's department to conduct periodic ticketing and speed enforcement efforts on problem streets. Speeding, failure to yield to young bicyclists or pedestrians in a crosswalk, and rolling stops are often targets of traffic enforcement.

Because of the expense involved and staffing resources needed to conduct traffic enforcement, it is often used as a follow-up activity to educational and encouragement efforts, and/or as a last result for addressing a problem location or issue. Other, ef-

Enforcement: Suggested Reporting Mechanism for All Level of Bicycle & Motorist Engagements

To accomplish this goal of working with the law enforcement community, the following is proposed as a set of protocols to gather data regarding cyclist / motorist engagements:

- A tiered reporting system that leads to a county wide data gathering function that can be used for targeted education of:
 - ◊ Local citizens if and when “hot spots” are identified through data,
 - ◊ Sharing of data with local law enforcement so as to sensitize both parties to “hot spots” and ask for targeted enforcement in the identified areas and/or through increased presence in the local area of law enforcement.
- Development of a ranking system understood by both cyclists and law enforcement officials to reduce unnecessary reporting to an already overburdened law enforcement system but one which can highlight a serious infraction/incident that has led to injury or death.
- An ongoing system of communication between cyclists and law enforcement officials that fosters healthy relationships and respect between the parties and maintains a solutions-oriented focus.
- Development and implementation of a signed Memorandum of Agreement between local law enforcement agencies and BicycleHaywoodNC that specifies roles and responsibilities of each party in keeping roads safe for all users.

LEVEL 4: Incident in which a cyclist is harassed by motorists by following too closely, “buzzing” (passing within the State mandated 2’ limit), throwing objects at a cyclist that do not make contact AND the cyclist CANNOT gather sufficient information to lead to identification but may get general information. For LEVEL 4, the cyclist is not forced from the road and does not lose control of his/her bike due to the behavior of the motorists.

Reporting procedure. Reported to BicycleHaywoodNC via on-line form. Data is aggregated and maintained to develop a database for public education and spot enforcement . No report is made to law enforcement directly by the cyclist and 911 is NOT called.

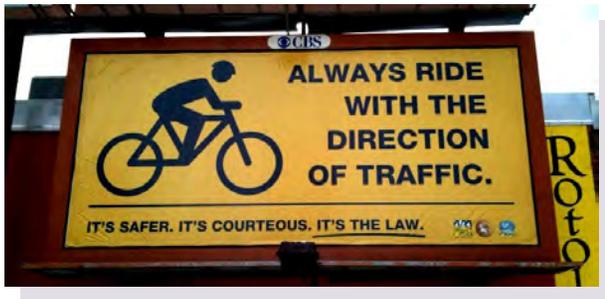
LEVEL 3: – Similar to Level 4 *EXCEPT* an article thrown at the cyclist hits its intended mark but does not cause injury. Items such as soft foods or drinks in paper-type containers would be examples of items. The cyclist is not injured, does not lose control of the bike, and is unable to gather sufficient data to lead to identification of the perpetrator. Some identifying data is available.

Reporting procedure. Information is reported via BicycleHaywoodNC on-line form. Data is aggregated and maintained to develop to be used for public education and spot enforcement. No report is made to local law enforcement directly by the cyclist and 911 is *NOT* called.

LEVEL 2: Level of harassment results in loss of control by the cyclist and leads to minor injury and/or damage to the bicycle, but no loss of consciousness occurs and no life threatening injuries are sustained. Partial or no identifying information is gathered by the cyclist or observers. Due to the nature of the injury and the degree of hostility, law enforcement is contacted directly via 911 and an *ASSAULT* report is filed. If possible, observers are asked to stay on-site to be interviewed by law enforcement. Law enforcement dispatches officers to the scene and treat the case as an assault. At a later date, information is submitted to via on-line form.

LEVEL 1: Level of harassment results in significant and life threatening injury. An immediate call is made to 911 requesting medical assistance. The report of assault is made. As in a level 3 , observers are encouraged to stay for interview by law enforcement. Law Enforcement treats the incident as they would any other violent assault and commences with an investigation geared toward leading to arrest and prosecution. At a later date, the information is submitted to BicycleHaywoodNC via the on-line form. Representatives of BicycleHaywoodNC and local law enforcement agencies may conduct a walk-through of the location to determine if there are other factors (i.e. the design of facilities, a blind curve, or foliage that obstructs the sight distance) to then work with Town or DOT officials to remedy if something of this nature is identified.





Promoting proper and legal behavior by bicyclists can be accomplished via public service announcements (above) or through regulatory signage (below).

Photo Credit: Don Kostelec



fective passive enforcement options include active speed monitor signs and speed trailers.

Suggesting broad-reaching traffic enforcement efforts would be difficult for law enforcement agencies to process and adequately devote resources.

They simply can't cover every geographic area of a town or county with their resources, which is why groups like BicycleHaywoodNC should identify areas of the county where they receive the most complaints or data suggests there may be issues in the interaction of vehicular traffic and bicyclist traffic.

In identifying problem areas, it is much easier for law enforcement officials to focus traffic stings or install speed monitors in those locations.

Public Service Announcements

Government agencies and non-profits have tapped into grant and other Federal funding to develop public service campaigns aimed at enforcement through public service announcements (PSAs). These PSAs can range from television and radio advertisements, to promotional materials, to billboards and other signage.

The development of a PSA should include involvement of several agencies, including local law enforcement, the state highway patrol, local government and bicycling organizations to ensure the proper message is articulated and is not in conflict with other local or state laws.

Pace Car Program

A pace car program is a participatory program for citizens to pledge to act as "pace cars" that obey signed speed limits at all times on Haywood County roads and town streets. The purpose of a pace car program is to provide for safe streets where bicyclists and pedestrians of all ages feel comfortable using the streets. This is particularly important in areas where children bike or walk to school.

Pace car participants self-enforce the local speed limit by committing to always driving at or below local speed limits, and typically display their participation in the program with a bumper sticker and/or window stickers. In addition to self-enforcement, pace car participants help to set a normative speed in their community and set examples for courteous, law-abiding traffic behavior in neighborhoods.

BicycleHaywoodNC can engage town Public Works, Planning and Police departments along with the Haywood County Sheriff's Department to implement and promote a pace car program. Promotional efforts should focus on benefits of lower traffic speeds--most importantly child and adult bicyclists and pedestrian safety.

Awareness of Contributory Negligence Laws

North Carolina is one of only a few states with a contributory negligence law that can greatly impact the bicyclist's ability to receive compensation in the event of crash where the motorist is seen as at fault.

Other states may require contribution, such as if the accident is 20% your fault as a cyclist then you only get 80% of the judgment, otherwise known as comparative fault.

North Carolina's contributory negligence laws stipulate that if, for example, a lady gets in the way of two dogs fighting she is partially responsible for her injuries. This means that she may be awarded no compensation for her injuries whatsoever, regardless of the role that the owners of the dogs may have had in the incident. Attempts have been made to convert North Carolina's contributory negligence law to comparative negligence, but without success.

This approach to legal remedy has far-reaching consequences for bicyclists in North Carolina. A bicyclist struck by a drunken driver would have a much lower chance of receiving compensation for his or her injuries under the state's pure Contributory Negligence law.

Although juries do tend to award zero negligence in cases where the plaintiff's role was slight in order to avoid this decision and provide some compensation, lawyers will frequently turn down tort liability cases where they believe that a protracted legal battle will provide no compensation to them or their clients.

Opponents of legislation to change the law cite increases in automobile insurance costs and a less favorable business climate that would endanger job growth. However, while South Carolina's change of their contributory negligence law was succeeded by a

38% increase in automobile insurance rates, critics have charged that other reasons are responsible for the increase, and there are no definitive studies documenting how dropping pure contributory negligence would impact the economy. North Carolina's insurance and other business interests typically block changes to the law when they appear in the state legislature, most recently one in 2011 (HB 813, which passed the House but has not passed in the Senate).

The effect of this law generates some compelling personal stories that have to be weighed against an uncertain impact on economic situations:

- ◆ An insurance company denies the claim of a man that was struck and dragged down an Interstate while changing his tire beside the road.
- ◆ A cyclist is hit from a behind by a speeding van and suffers eight months of recuperation from a broken pelvis and other injuries; a police report very favorable to the driver did not support the cyclist attempting to receive payment to cover her medical costs.
- ◆ A bus strikes a cyclist while making a right turn; fortunately, the cyclist was able to prove that, under the "last clear chance" provision of the law in DC, that the preponderance of evidence was against the bus driver.

One of the issues that this law potentially raises is the perception that riding in the street is disproportionately dangerous; cyclists are simply "asking for



Bicyclists should be aware of North Carolina laws related to contributory negligence so they are prepared to respond to incidents where they might be in a crash and found to be partially at fault for that crash. These situations could arise due to a motorist claim of the bicyclist not following posted signs (above), wrong-way riding or failing to stop at a stop sign or traffic signal.

Photo Credit: J. Scott Lane

it" when they ride as they should – with traffic and obeying all the laws.

Until a time when North Carolina's laws are changed, it is vital for bicyclists to work with and educate law enforcement officials on the perspective of the bicyclist and what it means to be a bicyclist in Haywood County.



To effectively address enforcement of various bicyclist-related laws as well as basic motorist and bicyclist behavior, several agencies and individuals must be engaged in the conversation and be a part of the solution. This image was taken during the Blue Ridge Breakaway where highway agency staff placed a variable message sign to alert motorists to the presence of bicyclists. This situation could have been improved by not placing the sign on the shoulder where the bicyclists were riding during the event.

Photo Credit: George Ivey

Chapter 8: Health Assessment

A method of evaluation known as a Health Impact Assessment (HIA) was conducted as part of the Haywood County Comprehensive Bicycle Plan. The HIA was the first ever conducted in North Carolina for a non-motorized transportation plan and was used to bring a new perspective to the planning process and gather input from non-traditional stakeholders. The HIA conducted is what is known as a Rapid HIA and extensive document and data review, a half-day workshop with area health professionals, and an assessment of the Plan's recommendations. This chapter is a summary of the HIA process and the full HIA document is included in the Appendix.

The impacts of the Haywood County Comprehensive Bicycle Plan are generally positive in its potential impacts on community health. Due in part to the holistic approach of the Plan, implementation of the plan will mean that virtually all members of the community are aware of bicycling. Between the increased level of awareness and education, the specific roadway facilities and the numerous segments of the population who will be able to access both, the Plan should give citizens a level of bicycle understanding along with a strong chance of improving numerous elements of community health.

Health in Haywood County

Data from the region was compiled to help gauge historic and current county health conditions, understand demographically where likely hot spots of poor health reside, and to determine how the Plan

could influence the goals and objectives of area organizations to improve bicycling in Haywood County. Most of the information was gathered from the *Haywood County, State of Health Report*, released by the Haywood County Health Department in December 2010. Some key elements of this document and other data are shown below.

Leading Causes of Death. Between the years 2005-2009 in Haywood County, the leading causes of death were Diseases of the Heart, Cancer, and Ischemic Heart issues. Many of the top killers have to do with cardiovascular conditions, which in many cases can be limited or even prevented with improved diet and regular exercise.

Heart Disease. As the leading cause of death in Haywood County, heart disease rates have improved since 1994. With regular exercise and activity, heart disease can be limited if not prevented. One suggestion given as a preventative measure is to get 30 continuous minutes of cardio vascular exercise per day.

Obesity. Obesity increases risk for several health conditions such as cancer, hypertension, Type 2 diabetes, various heart issues, stroke and others. In Haywood County, 29% of the adult population (over 20 years of age) is classified as obese. With a population of nearly 60,000, this equates to roughly 20,000 citizens with Body Mass Index (BMI) of 30 or greater. According to a recent University of Wisconsin Population Health Institute, which evaluated



Children who grow up with in a bicycling culture will grow into adults who thrive in that culture and thus reduce the occurrence of various type of health ailments.

Photo Credit: Cecil Yount



Analyzing the expected outcomes of the Plan through the lens of health can create a different perspective on how we view the built environment and put our communities on the trail to better well-being.

Photo Credit: Don Kostelec

all counties in the United States, this is similar to average for North Carolina and slightly above the national average.

Asthma. Air quality and asthma are considered by most health professionals to be directly related and deterioration of air quality can be attributed to agriculture, manufacturing, industry and the transportation sector. Haywood County has a 15% higher hospital discharge rate of asthma compared to North Carolina and has regional haze issues according to the Division of Air Quality at the NC Department of Environment and Natural Resources.

Baseline Demographic Conditions, Existing Conditions

A significant indicator of public health can be demographic data as compiled through the Census. Data such as population, income levels, employment, and housing occupancy usually correlates with access to healthcare, safety, and mental stresses. These datasets from the 2010 Census were used for the assessment at the Census Tract level (Exhibit 8-1 on page 92). By evaluating these four measures (population, income, housing occupancy, and employment) we can identify places facing difficult conditions based Census data:

- ◆ Clyde (decreases of 8% household income, 6% housing occupancy, and 5.8% employment)
- ◆ South Waynesville (the lowest household income \$28,668 with a decrease of 8% in housing occupancy)

Those parts of the community with the highest economic and health indicators are:

- ◆ West Waynesville (highest household income \$53,750 with 98.2% employment)
- ◆ Lake Junaluska (household income \$44,007 with the highest employment rate, 98.4%)
- ◆ Southeast Waynesville (household income \$49,485 and an increase in employment rate of 5.3%)

This data was used to help determine pockets of need within Haywood County as it relates to health. Additional data were provided by Healthy Haywood in the form of BMI measurements from area elementary schools and overlaid with the corresponding Census Tract. Due to the sensitivity of such information, this report will not show the data but the HIA did utilize the information. When each school was mapped and layered with Census data, the links between these demographics factors and BMI rates were consistent with the three communities showing difficult conditions.

These communities showed higher than average BMI calculations when compared with other schools in the County. The South Waynesville, Northeast Canton and Clyde Census Tracts all had combined overweight and obese BMI ratings higher than 42% of total students. Assuming that children are typically outcomes of conditions, these statistics can generally be transferable to the adult populations and therefore reinforce where pockets of cardiovascular disease, obesity, and other risks may reside.

HIA Workshop

Many area health experts were either interviewed independently or included in a half day workshop for the HIA, which generated numerous ideas and future coordination opportunities. Those attending represented municipal government interests, the French Broad River MPO, Healthy Haywood, Haywood County Social Services, North Carolina Division of Air Quality and the MedWest hospital system. Many health afflictions and leading causes of death were discussed as well as mental health issues, economic health due to the direct relationship between access to health care, healthy food and family health.

Attendees shared their thoughts on the following health indicators and potential impacts stemming from implementation of the Plan.

Heart Disease. If a significant and comprehensive effort was implemented including infrastructure investments, rider/driver education, promotional outreach, and improved public/private coordination for plans and policy, cardiovascular disease rates should decline over time correlating with increases in riders, cardiovascular exercise and reductions of vehicle trips. Group members also identified the relationship between particulate matter and heart disease.

Obesity. Increased riding amongst all demographics will increase calorie expenditures and therefore lower obesity measures among bicyclists. Similar to heart disease, if a robust and comprehensive ap-

proach is utilized, over time obesity statistics county-wide should improve or at least maintain assuming increases in the remaining sedentary portions of the population. If all elements of the Plan are successful, obesity rates amongst children should gradually improve, especially when combined with changes to diet and increased general activity, which is the focus of health and school officials in the area.

Asthma. Several connections were identified regarding air quality, asthma and the Plan, notably that among youth hospital admittance records, 30% of cases were due to asthma. The group noted there should be careful consideration of placement of facilities as they relate to major vehicle routes. This concern was raised in reference to studies indicating higher asthma rates caused by exposure to particulate matter within 1,000 feet of major vehicular routes. A positive side-effect for households of better asthma rates was thought to be the economic impacts from fewer missed school days. Lastly, concern was voiced on alerting people to poor air quality days especially for those with respiratory problems.

Mental Health. Implementation of the Plan should include reinforcing the interaction with nature and the social interaction possible for bicyclists of all cohorts. This can be possible with signage, social outreach and education messaging. Positive outcomes may be possible by improving self esteem from improved health measures, lowering of stress through physical/natural connections, improving family relationships by sharing common experiences and fos-



Participants from a variety of health-related and governmental organizations participated in a June 2011 workshop as part of the Health Impact Assessment conducted for the Haywood County Comprehensive Bicycle Plan.

Photo Credit: Don Kostelec

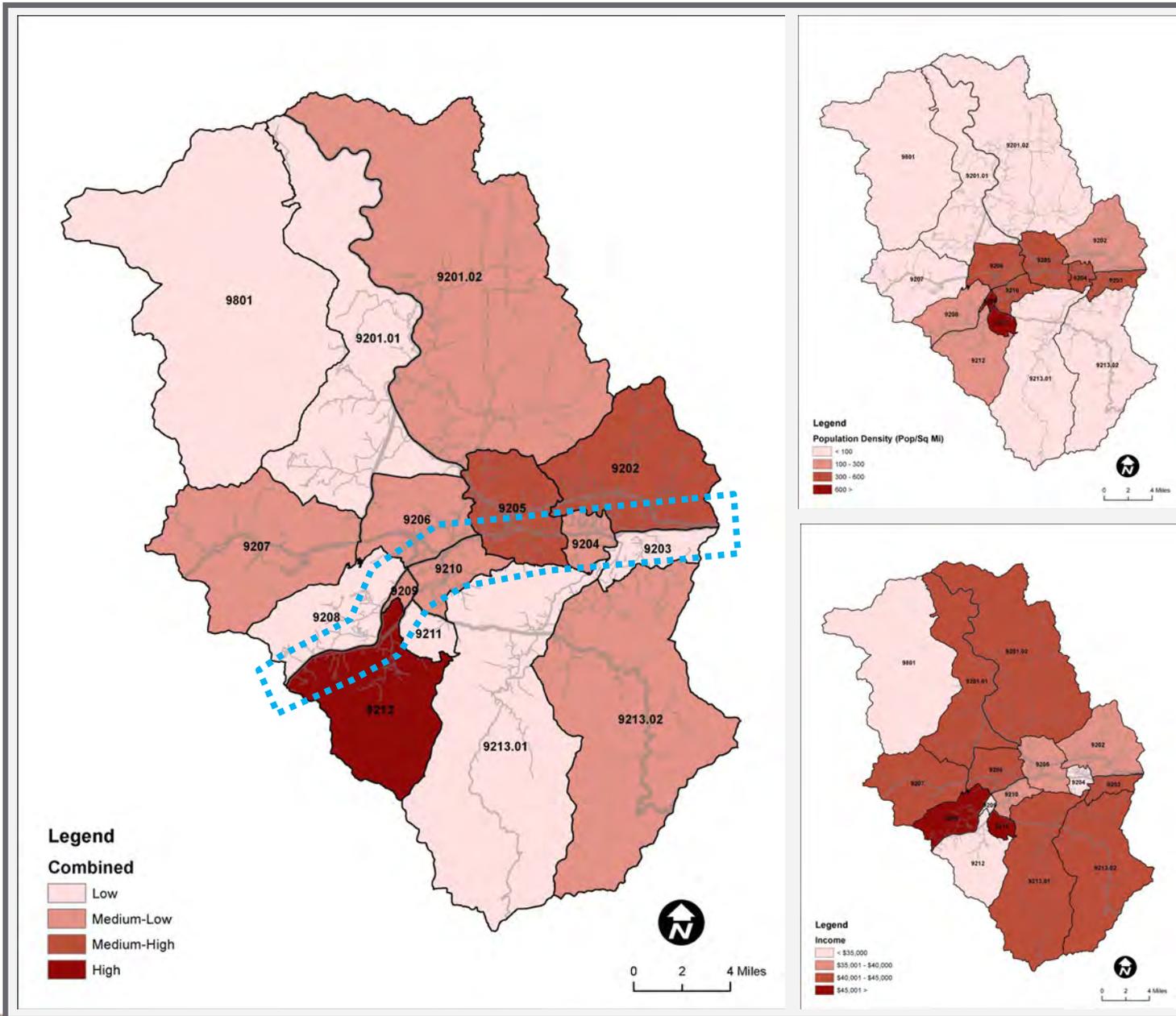


Exhibit 8-1: Combined Census demographics (left) for both population density (top) and income (bottom)

Analysis revealed the area surrounding the US 19 Corridor (buffered in blue) that connect Waynesville, Clyde and Canton had a strong correlation in these demographics to the schools containing the highest Body Mass Index (BMI) rates.

The Haywood Hub route (located within the blue buffer) is intended, in part, to address these demographics and health concerns.



tering a sense of community and environmental stewardship.

One warning from the group was made cautioning the potential for increased “road rage” due to the potential for more cyclist/motorist confrontation. It was thought that due to lack of experience when driving near cyclists, there exists potential for frustration leading to aggressive driving behavior.

General Habits. Attendees concluded that increased ridership amongst Haywood youth would be likely through education and encouragement campaigns and the gradual placement of bicycle facilities. This would ultimately make in-roads on the adult population and impact lifestyles trends.

A psychological effect was noted stemming from an increased number of utilitarian trips. The thought was that with increased purposeful bicycle trips, the reduced notion of riding for exercise would occur. If people are riding to get somewhere, they won’t be thinking about the fact that they are in fact participating in physical activity. Both points emphasize that by changing viewpoints, habits could be built and numerous benefits similar to those detailed in previous sections could be possible.

Economic Health. The group concluded that increased access to bike facilities leading to increased riding could appeal to those either considering a health club membership or provide an option for free exercise if they are not able to afford member-

ship. Also, by cycling and improving general health, a possibility of reducing reliance on medication is possible thus saving individuals and households the cost. This impact was thought to have the greatest potential for older and overweight segments of the population. Additional impacts on potential reduced vehicle costs were identified such as gasoline, maintenance, and insurance costs as well.

Physical & Perceived Barriers

Numerous barriers were identified during the preliminary discussion including some of both a physical and social nature and will help mold the final bike plan, list of recommended projects, and both the educational and encouragement campaigns to be included as well.

Safety: The concerns with safety have to do with traffic and roadway safety such as vehicle conflicts, narrow roadways and a lack of driver awareness for cyclists as well as safe riding skills.

- ◆ **Plan Impacts:** Bike facility design and placement, lighting recommendations, signage, education reinforcement for both cyclist and driver.

Convenience: Another barrier identified was that of facility convenience. The noted convenience included proximity of facilities to residential, park and school areas as well as convenience of riding on those roads viewed as being most ripe for increased riding.



The presence of loose dogs along a route can become a barrier that dissuades people from riding a bicycle, particularly in rural areas.

Photo Credit: Don Kostelec



Walking trails like the one shown above in Maggie Valley can contribute to overall physical and mental health for residents and serve as an ideal locations for children to learn to ride their bicycles when on-street facilities are not available.

Photo Credit: Don Kostelec

- ◆ *Plan Impacts:* Bike facility placement for maximum population impact, bike rack placement near high use areas, and bike education.

Dog Control: Loose or intimidating dogs were identified by participants as a barrier to increased and safe riding as well as an overall deterrent especially to the youth of the community.

- ◆ *Plan Impacts:* Education and awareness campaigns, enforcement of county / city leash laws.

Perceptions: The issue of un-related safety influences such as sex offenders registration lists was viewed as an obstacle more for parents influencing where and when their children are allowed to ride their bicycle.

- ◆ *Plan Impacts:* Bike route placement, add-on to youth bike education, distribution of County bike route maps.

Communication: Due to occasional air quality degradation events, communication with the public ensuring that riding is done in a safer manner was viewed as a possible barrier that could detract from the health goals of local agencies. Specifically, difficulties getting word out to more isolated portions of the community were brought out in the meeting.

- ◆ *Plan Impacts:* Signage, add-on to general bike education, additional social media and website communication.

Economic: A concern was raised specifically related to the current economic climate. Due to a reduction of jobs, many area workers who could be po-

tential bike commuters have to seek work in nearby Counties which increases distance and thus decreases the likelihood of commuting by bike.

- ◆ *Plan Impacts:* Bike facility placement, promotion of park-n-pedal facilities.

Population Segments Most Impacted

Cycling in Haywood County is infrequent and challenging due to topography, narrow roads, and driver behavior. When asked what portions of the county residents would be most impacted by the proposed bicycle plan facilities, participants felt seniors, vacationers, kids and families would benefit most. Commuters were thought to be minimally impacted due to their general knowledge of roadway riding and experience. Therefore, the recommendation of the committee was to ensure that bicycle facilities were designed to accommodate more novice riders similar to the proposed Haywood Hub. Safety features such as additional pavement, signage, and stripping are critical to provide a more comfortable feel for identified users.

The potential health impacts from increased riding within these segments of the population vary greatly among age groups. Riding amongst seniors will strengthen lung capacity, lower risk of cardiovascular disease, and stimulate brain activity and maintain balance. Youth will benefit from building lifelong habits, improving classroom focus, reduced Asthma rates and prevention of both obesity and Type II diabetes. Families as a whole may not only see simi-

Health Priority #5 Coordinated Loop System

A priority amongst those interviewed was the establishment of a series of loops throughout the County. The final Plan does consider this and has recommended several loops using shoulders and designated roadway space. Additional recommendations are to improve visibility through signage, paint schemes, and driver awareness through multiple education campaigns. One note, key to roadway safety for both riders and drivers is facility design. It will be imperative for both the cities and NCDOT to ensure appropriate and proven designs are utilized. The loops should provide connected and safer places for both recreational and utilitarian riders to cycle thus increasing activity for all user types.

Health Priority #1 South Waynesville

As can be viewed from the inset, the Plan recommendations include numerous facility types in and around the South Waynesville area. With such a concentration of facilities in place, over time through education, encouragement and use, health measures in this pocket should slowly improve. Especially possible are the BMI measures of local school children in the coming years.

Health Priority #3 NE Canton

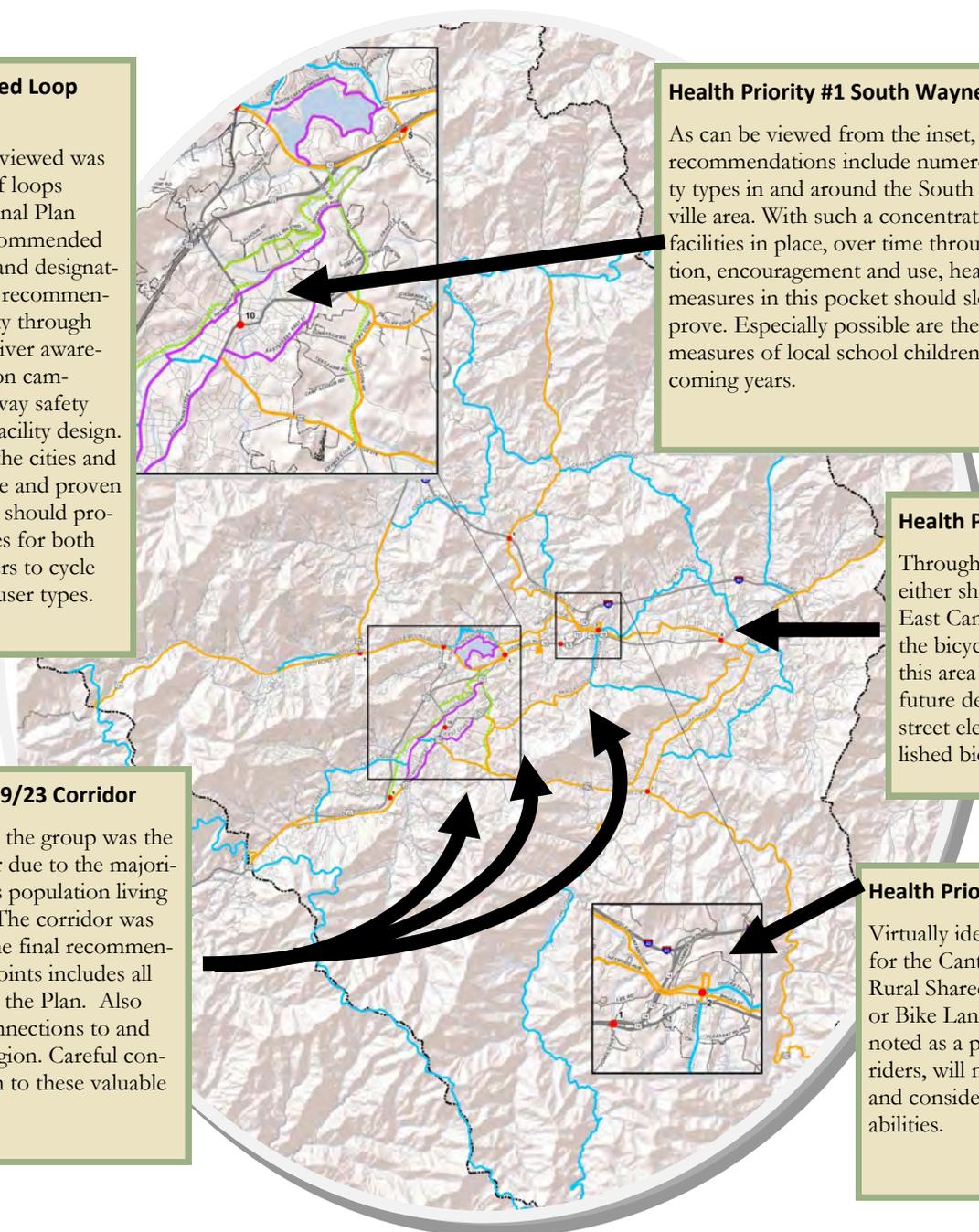
Through a series of rural shared lanes and either shoulders or bike lanes, the North East Canton area will see improvements to the bicycling environment. Essential to this area is the Hot Spot identification and future design for city streets. The future street elements need to be based in established bicycle facility design practice.

Health Priority #4 US 19/23 Corridor

A priority mentioned by the group was the Highway 19/23 corridor due to the majority of Haywood County's population living within close proximity. The corridor was very clearly a focus of the final recommendations and at various points includes all facility types included in the Plan. Also worth noting are the connections to and from the spine of the region. Careful consideration was also given to these valuable links.

Health Priority #2 Clyde

Virtually identical to the recommendations for the Canton area, Clyde will also include Rural Shared Lanes and either Shoulders or Bike Lanes. Again, the downtown area noted as a potential challenge for most riders, will need to be designed with care and considerations of all user types and abilities.





Continuous communication and outreach to potentially vulnerable populations was cited as a point of focus among participants in the HIA workshop. Setting up bicycle information booths, like the one shown above at Maggie Valley's Red, White and Boom festival can inform families about the positive health impacts from bicycling.

Photo Credit: Don Kostelec

lar health benefits but also could realize improved family bonds, lower household transportation costs, reduce overall health care costs, and in some cases reduce risk of domestic violence and/or child abuse.

Community Impacts

The next phase of the HIA discussion focused on identifying who and where potential impacts could be most realized and where the plan should focus to make the most significant difference from a health perspective. Using the various demographics, area concerns, and talking through general recommendations typically found in bicycle plans, the group was led through a series of questions aimed at identifying segments of the population or geographic hot spots within the county

Geographic Focus of Plan. The group largely felt that the most significant impact on public health would be realized if the plan focused on integration early along the US 19/23 corridor (identified as the Haywood Hub route in the Engineering Recommendations). Improvements for bicyclists along this corridor could impact nearly two-thirds of the County's population. The stretch between the west and east portions of the corridor span approximately 13 miles and include approximately 39,000 people of the 59,000 countywide total.

Additional support for the Haywood Hub includes establishment of economic urban centers, maximizing convenience to more concentrated pockets of

residents, the possibility of gaining a greater mode share of utilitarian trips for access to the local jobs, educational and retail possibilities, and the highest number of K-12 school sites which could foster an environment of generational cyclist increases.

Geographic Concerns

Topography. Haywood County topography is a major concern for both safe riding and for focusing resources. Safety considerations should be maximized when designing facilities in areas of limited sight lines for both drivers and riders in areas of substantial vertical grades. County topography was cited as a barrier to increase riding due to riding difficulty and safety hazards.

Haywood Hub. Due to the rural nature of the County outside the central business district, it was believed by the panelists that recreational opportunities would be the most promising if a county bicycle loop was established. The loop would include a series of rural roadways in need of particular safety consideration due to the higher probability of younger less experienced and overall novice riders. The establishment of a loop was viewed as helpful for promoting family rides, recreational rides by tourists, seniors and some commuters. The Haywood Hub was developed to serve as the mainline of this loop.



Chapter 9: Economic Impacts of Bicycling

There are important benefits that bicycling brings to a municipality or county, especially when cycling is part of a larger economic development strategy.

This chapter describes areas of positive economic impact from bicycle investments, and summarizes the strategies that communities should develop to maximize their return on investments in bicycle infrastructure and programs. Finally, some key statistics are provided that will allow the estimation of the impact of trails on the local economy. Throughout, real-world success stories are used to illustrate economic gains and programs.

In nearly every economic impact study, the results can be heavily influenced by the choice of externalities that are included or excluded from the impact model. "Externalities" refers here to economic factors that are not related to the cost of producing a good or service, or to the cost of a consumer purchasing the good or service. For example, the value to air quality/emissions, mental health, physical health, and adjacent property values are difficult to measure over time and therefore are easy to overlook or overestimate, depending on the preferences of the analyst.

For now, it's enough to recognize variations in local economic conditions and analysis methods when setting out to compare direct and indirect trail benefits.

Benefit Categories

Various categories of expenditure are commonly recognized in economic impact analyses of cycling on a community. The ones that follow are fairly commonplace and, with the exception of the indirect category, are benefits that few would argue, although the magnitude of the effect is more open to debate and analysis.

Cycling Event Expenditures. Registration fees for charity events and races are significant revenue sources, and are usually in the range of \$25 to \$75 per cyclist. The Blue Ridge Breakaway attracted more than 400 participants in 2011 for the one-day event with registration fees between \$29 and \$54.

In North Carolina, similar events can attract thousands of cyclists, such as the New Bern-based BikeMS ride that drew more than 4,500 cyclists to the city across two days, netting approximately \$115,000 in registration fees alone. These longer events often provide indirect revenues for massages, kiosk-capable food/beverage vendors, and entertainers.

Expenditures by Ride and Race Participants.

Cyclists from out-of-town will usually want to spend the night to prepare for a longer ride, and will certainly do so for multiple-day events. They also purchase repair-related equipment at local bike shops and food/entertainment as well as lodging.



Participants in the 2011 Blue Ridge Breakaway represented 15 states and territories, as well as a group of 12 riders from Ontario, Canada (above) who were in the region for a cycling-based vacation.

Photo Credit: Don Kostelec



The 2011 Blue Ridge Breakaway grew to more than 400 participants in only its second year, representing the potential for expansion to a two-day event and even greater positive economic impact for Haywood County.

Photo Credit: Cecil Yount

A notable component of the BikeMS ride is that it is a two-day event with early morning start times. From an economic perspective—whether intentional or not—the two-day nature of the ride along with the early start time virtually guarantees participants stay at least two nights in nearby hotels and campgrounds, thus creating an even greater impact on the local economy. As the Blue Ridge Breakaway grows, the Haywood County Chamber of Commerce and its partners should explore what it would take to make this a two-day event.

Bicycle Tourism and Tourist Expenditures.

Outside of race and charity events, people will orient their vacation selections toward places that offer quality cycling environments. One study of 6,000 people conducted by the State of Colorado noted that 10% of those surveyed had taken a bicycle-related vacation within the State in the preceding year, spending \$360 per person. The same study indicated that out-of-state bicycle-oriented vacationers spent an average of \$950 per trip.

A similar study conducted by NCDOT for the northern Outer Banks stated that cycling accounted for 1,400 full-time equivalent (FTE) jobs annually and \$60 million in revenues. Forty-three percent (43%) of people surveyed in that study cited cycling as a major factor in their decision to vacation in the Outer Banks.

Bicycle Specialty Retailers. The market for higher-end road and mountain bikes has been growing for

nearly a decade. These shops often custom-fit bicycle frames to their clientele, who typically pay in the range of \$1,500 to \$4,000 per bicycle, although some bicycles can easily fetch twice that amount. Accessory expenditures made at the time of sale of the bicycle purchase or subsequently often amount to a greater proportion of sales than the original bicycle purchase.

Helmets (\$40-\$60), shoes (\$150), clip-in or clipless pedals (\$200), lights (\$30-\$100), water bottle cages, bicycle attire, pannier bags or satchels, and equipment upgrades (a pair of ultralight wheels may cost \$1,000 or more) as well as maintenance/repair visits provide an ongoing source of revenues for bike shop owners. A small shop may employ 3 - 8 people full- and part-time employees. One study in Colorado stated that 755 jobs were based on supplying goods and services to Colorado-based cyclists on bicycle-related vacations in that state, generating/earning \$10 million in annual income.

Indirect Benefits. This category of impact encompasses health effects of increased trail use/walking, improved mental benefits of exercising, reductions in vehicular emissions for trips that replace an automobile with a non-motorized mode of travel, new or expanded business opportunities that key on trail users and their needs, and the impacts to adjacent property values.

While most studies that set out to find beneficial indirect impacts do find them, the areas (e.g., Port-

land, OR) that have embraced bike/pedestrian modes as part of an overall economic - if not cultural - development strategy have realized truly measurable benefits in terms of mode share, for example. There is also strong potential to evaluate reduced dependence on fossil fuels and less impact on transportation infrastructure.

Exhibit 9-1 illustrates some of the relationships, or connectivity, between bicycling expenditures and other factors such as job creation and tax revenues. The complexities of the relationships are understated, particularly when long-term, indirect effects are accrued to the total benefit profile of a project. Even relatively small categories of expenditures can add up: the Colorado study mentioned earlier noted that 22,000 riders contributed to race and registration fees of \$1.2 million in 1999.

Economic Outcomes

A 2001 survey of the Heritage Trail, Pennsylvania users (2001) indicated that 64% of the trail users lived inside the county, and that 15% of the users lived more than one county away. Of those surveyed, 78% stated that cycling was their primary use of the trail. Just over 50% spent more than two hours on the trail, and 27% or 32% of the users stated that their use of the trail had influenced their decision to purchase bicycles or bicycle supplies, respectively. Bottled water, candy, snacks, lunch at a trailside restaurant, and seeing a movie were cited as expenditure categories while actually using the trail.

We should expect typical values like those shown in Exhibit 9-2 for various cyclist categories of expenditures shown in the studies mentioned previously.

Monetizing the non-expenditure side of indirect and induced benefits of cycling activity is particularly challenging. Note that many studies use a popular input-output model called IMPLAN to calculate indirect and induced effects. The IMPLAN model is also attractive because it com-

Exhibit 9-2: Typical Expenditures from Various Types of Bicyclists.

Source: Nelson Institute for Environmental Studies Center for Sustainability and the Global Environment.

Activity	Resident Expenditures / Day	Non-Resident Expenditures / Day
Roadway	\$40	\$54
Trails	\$8 - 18	\$34
Single-Day Events	\$76	\$76
Multi-Day Tours	\$81	\$81

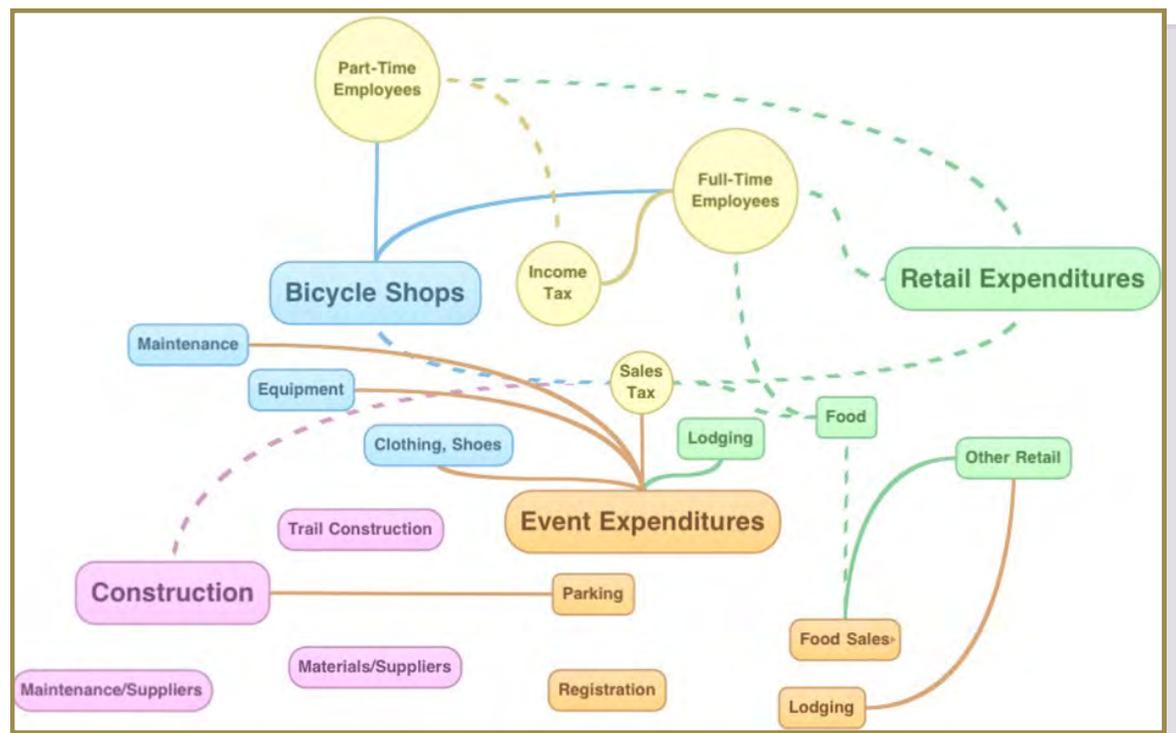
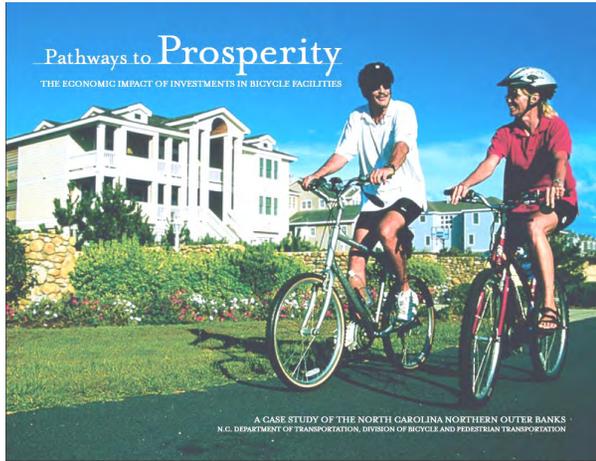


Exhibit 9-1: Connections Between Economic Impact Areas of Bicycling





A study conducted by NCDOT and NC State University on the impacts of bicycling investments on the Outer Banks identified a \$60 million benefit for the region on an annual basis stemming from the region's investment in bicycling facilities.

putes these values at the county level, and because it also calculates the total person-years of jobs created by the activity.

Some indirect effects may be impossible to reliably monetize due to a lack of data. Health-related impacts of additional cycling, reduction in fuel consumption/energy costs, job access, and other effects can still be reported anecdotally, such as those listed in the 2004 report conducted by the North Carolina Department of Transportation on the economic effects of cycling in the Outer Banks region of North Carolina.

Even though a user survey was conducted for this study, some facts were not extrapolated into money. For example, the reported number of people influenced to stay an extra day or to return due to the quality of bicycle facilities was not broken out discretely from the \$60 million benefit estimated for the region from bicycling.

This same study suggested that for every \$1 million spent on bicycling, 31.1 jobs were created. Perhaps more importantly, the range of economic impact from bicycling – between \$15 million and \$149 million – provides a good example of how the output of even a study utilizing direct survey data can spread over a wide range of possible outcomes.

Of course, there are also costs associated with constructing and maintaining bicycle trails. The initial cost of design, right-of-way acquisition, and construction is a one-time lump sum; the ongoing cost

of maintenance is an additional cost comprising direct labor, fringe benefits, and equipment. The calculation of a benefit-cost ratio (BCR) or payback period (e.g., the number of years that it takes to “pay back” to the taxpayers the cost of the facility) are common metrics.

Fortunately, capturing costs is typically an easier task than calculating the benefits, since data is readily available on government expenditures through contracting, capital improvement programs, and Comprehensive Annual Financial Reports.

The Blue Ridge Breakaway as a Barometer of Economic Impact

The 2011 event, held on August 20, was only the second year of organizing the ride that attracts riders from across the southeast, primarily from western North Carolina, eastern Tennessee, and upstate South Carolina. From an anecdotal perspective, those involved with the Breakaway have felt the event positively impacts the local economy. Based on raw numbers, the 2011 event drew more than 400 riders with more than 90% of them residing outside Haywood County (Exhibit 9-3).

In an effort to begin to quantify the impacts of this event, a brief survey was developed and circulated to registrants via email both before and after the event. Given the limitations in available time and distribution channels, the survey did not achieve a high response rate (only 22 people completed the online survey) and thus did not yield adequate information

to make statistically-relevant conclusions.

Some of the key responses to the survey did indicate some aspects of how people visit and view the event:

- ◆ Respondents were from North Carolina, South Carolina, Georgia, Tennessee, Florida, Kentucky and Maryland;
- ◆ 86% of respondents said they planned to stay overnight for the Breakaway;
- ◆ The average travel party size was 3.3 persons, with 2.3 persons per party participating in the Breakaway;
- ◆ The average stay in the area was reported as 4.3 days;
- ◆ Average responses for rating bicycling in Haywood County based on the Breakaway were favorable; and
- ◆ Respondents noted they spent between \$30 per day and \$400 per day on accommodations.

Recommendation: The Chamber of Commerce and BicycleHaywoodNC should continue to promote this survey (or a similar survey) each year in order to gather multiple years of data and achieve a higher response rate. Working with entities such as the Public Policy Institute at Western Carolina University may be a low-cost way to achieve this and gain statistical acceptance of the ultimate results.

Maximizing Economic Benefits

A number of recommendations can help to improve the return on investment (ROI) from bicycling pro-

grams and projects. Supporting facilities with educational and encouragement programs helps to ensure that the economic benefits cited previously come to fruition, for example a trail or mountain biking destination that no one knows about will generate little interest, particularly outside the immediate community.

To effectively evaluate the economic benefits of bicycling in Haywood County will require numerous partners over a few years to capture data that is statistically significant. Partners in this effort should include:

- ◆ Chamber of Commerce;
- ◆ Tourism Development Authority;
- ◆ Downtown Associations;
- ◆ County / Municipal Planning & Recreation Departments;
- ◆ North Carolina DOT;
- ◆ French Broad River MPO & Land of Sky RPO;
- ◆ BicycleHaywoodNC;
- ◆ Local businesses; and
- ◆ Civic clubs & neighborhood groups.

Recommended programs for consideration should include:

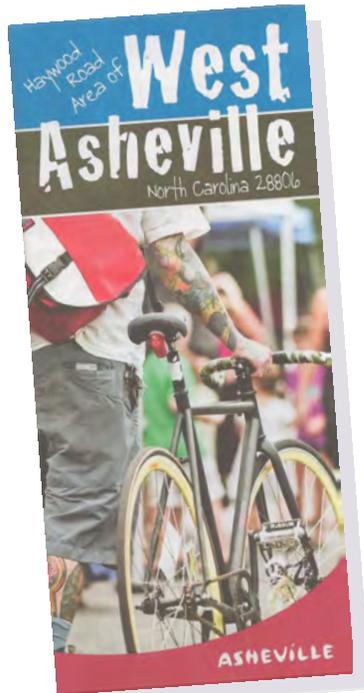
1. Ensure existing marketing materials incorporate bicycling. Many agencies, including the Chamber of Commerce and Tourism Development Authority, develop marketing brochures, websites, and videos and then distribute them to various markets. Having representative local cycling con-

Place of Residence	Total
North Carolina	178
<i>Haywood County</i>	<i>28</i>
<i>Other Western NC</i>	<i>91</i>
<i>Outside Western NC</i>	<i>59</i>
South Carolina	44
Tennessee	33
Georgia	33
Florida	14
Canada	12
Virginia	2
Kentucky	2
New Jersey	2
Ohio	2
Maryland	2
Guam	1
Texas	1
Hawaii	1
Indiana	1

Exhibit 9-3: 2011 Blue Ridge Breakaway Participants by Place of Residence.

Source: Haywood County Chamber of Commerce
NOTE: These figures do not yet include day of event registrations.





This brochure for businesses along the Haywood Road corridor of West Asheville contains imagery that helps promote the area as a bicycling destination.

tent included in these brochures is a low-cost way of making sure that the cycling “brand” is included in the overall marketing scheme for the region. An example of providing good content from a non-trail site is found at the Asheville Chamber of Commerce website, which devotes a page on bicycling and links to a long list of cue sheet for routes around Asheville.

2. Don’t forget bicycle parking. Adding bicycle racks in front of businesses and at recreation facilities allows business owners to tout their “bicycle-friendliness” as well as to send a message to cyclists that they are welcome to return – and to spend a few dollars on the trip at local retailers.

3. To market the benefits of cycling you have to know what they are. As already explained, the acquisition of data for cycling is critical, not only for determining the benefits but also for marketing the activity. The NCDOT “Pathways to Prosperity” document is an excellent example of a study summary that is both beautiful and easy to read while imparting key statistics. Hence, having BicycleHaywoodNC and the Chamber of Commerce conducting annual surveys, or making sure that bicycle questions are included in the economic surveys conducted by business groups or local governments, is crucial. Over time, charting the increase in cycling activity and expenditures can provide key information to prioritize facilities and programs.

4. Focus on connecting to complementary land uses. Since off-road bicycle trails typically connect destinations along a stream bank, residential uses predominate. Using trail heads to reach businesses and commercial centers as well as parks and schools greatly increases the transportation utility of the facility. When siting a new trail, considering how the adjacent land uses could support cyclists and trail users – or how redeveloped property could support them – is important.

5. Create trail and route maps. The most useful dedicated resource for cyclists is a map plus cue sheet that explains the route and its hazards, destinations, and scenic resources. Creating these maps that can be easily downloaded and printed from the Internet is an important consideration when considering formatting. Also, make sure that each map includes information about where to go for more information.

6. Get national recognition. As noted previously in this document, the League of American Bicyclists (LAB) Bicycle Friendly Community status can help a community get “on the radar” for outside visitors. Getting businesses on the LAB list of bicycle-friendly businesses is also an excellent way of touting an area’s bicycle-friendliness as well.

Chapter 10: Evaluation & Implementation

Completion of the Haywood County Comprehensive Pedestrian Plan is only one step in creating a bicycle-friendly community. The implementation of the Plan will require a coordinated effort amongst County and Town officials, leaders, and citizen volunteers as well as follow-up plans and studies on more specific improvements. This chapter provides a series of actions steps for moving forward with the recommendations of the Plan, as well as potential funding sources and partners for proposed projects.

The implementation strategies of the Bicycle Plan are closely aligned with areas the state of North Carolina identified for Bicycle and Pedestrian Safety Strategies through a series of summits in early 2011 (The reports from this effort are included in the Appendix). The major action initiatives identified through those summits to help guide NCDOT and other state agencies through the next decade were:

- ◆ Fully implement Complete Streets;
- ◆ Address multi-modal funding;
- ◆ Retrofit existing facilities;
- ◆ Require more from all road users;
- ◆ Increase public awareness through education;
- ◆ Connect transportation and land use; and
- ◆ Improve law and strengthen enforcement.

Each of these themes are addressed to some degree within the Haywood County Comprehensive Bicycle Plan. This can help stakeholders within Haywood County articulate to local, regional and state leaders that the implementation of this Plan is consistent

with what has been identified at the state level.

10 Action Steps

Completing the 10 action steps illustrated on pages 104 and 105 helps guide development of the proposed bicycling network and creates a supportive program and policy environment for a bicycle-friendly Haywood County. These steps will be crucial in moving forward with the overall recommendations of the Comprehensive Bicycle Plan.

Measuring Performance

Transportation-based projects, programs and policies are some of the most measurable aspects of the built environment in that an organization or municipality can track the progress of investments and policy changes. Given the economic uncertainty in many communities and within funding sources, non-profits, cities, MPOs and DOTs are finding value in tracking the performance of a variety of actions. For groups like BicycleHaywoodNC and communities like Haywood County, methods of tracking the performance of projects, programs and policies can not only lead to easy material to include in a Bicycle-Friendly Community application, but communities that show measurable progress in the implementation of their plans can also find themselves in a more strategic position to receive funding from grants or other pursuits.

Performance should not be confused with prioritization, as performance is measured as a *change over a period of time*, not a ranking of strategies. Perfor-



The grant awarded to BicycleHaywoodNC to purchase 14 new bicycles for Haywood County Schools is an example of the type of contributions that should be tallied as part of an annual performance report to track implementation of the Bicycle Plan.

Photo Credit: Paul Casper

10 Action Steps for Implementation

1 Adopt the Plan

This is the first stage of implementation. The Plan should be forwarded to regional and state decision-makers, such as the RPO, MPO and NCDOT Division office, for inclusion in a regional planning and development processes. Each town in Haywood County should also receive a copy for consideration when local plans or ordinances are updated.

Partners: County, Towns, MPO/RPO, NCDOT

5 Emphasize Complete Streets

Haywood County now has a Bicycle Plan that incorporates NCDOT's Complete Streets policy and design guidance, which bolsters the case for bicycle-related improvements on area roadways. To strengthen this position, the county and towns, MPO and RPO should adopt in-depth Complete Streets policies to complement NCDOT's efforts.

Partners: BicycleHaywoodNC, NCDOT, County, Towns, MPO/RPO

2 Meet regularly with stakeholders & organizations

The planning effort engaged citizens and organizations in visioning, goal-setting and identification of projects, programs, and policies. Some communities may take more convincing that a bicycle-friendly future is beneficial. Keeping citizens and organizations engaged in regular conversation about implementation is vital. The meetings and conversations, particularly with NCDOT Division 14, often lead to identification of mutual interests and projects or funding sources.

Partners: BicycleHaywoodNC, NCDOT, County, Towns, MPO/RPO



4 Adopt policy changes to the Bicycle Plan

Proposed ordinance changes will be crucial to balancing the public/private burden of implementing this Bicycle Plan. Local planning staff is in the best position to inform BicycleHaywoodNC on the proper methods to pursue these changes as each town can have a difference process.

Partners: County, Towns, MPO/RPO

3 Pursue best practices, Cool Corridor & Hot Spot investments

The county is in an opportunistic position to work with NCDOT on shoulder / bike lane projects on many state and US highways. These improvements can develop from long-range projects or from annual operating and maintenance expenditures identified by NCDOT Division 14.

Partners: BicycleHaywoodNC, NCDOT, County, Towns, MPO/RPO, Health Haywood, Chamber of Commerce, TDA





6 Be involved in complementary planning efforts

Incorporate the recommendations of the Bicycle Plan into future and existing plans developed and updated at the local, regional and statewide level. For instance, the recommendations of the Haywood County Comprehensive Bicycle Plan should be incorporated into the regional bicycle plan for Western North Carolina being developed by the Land of Sky Regional Council and French Broad River MPO.

Partners: BicycleHaywoodNC, NCDOT, County, Towns, MPO/RPO

10 Be unique. Think big.

This Plan contains many firsts for the region and state in regards to: a county-wide bicycle plan in a rural and mountain environment, its application of Complete Streets, a new model of incident reporting for law enforcement, and the health impact assessment. These components should position Haywood County at the top of the list when it comes to funding for bicycling investments and recognizing the area as a leader in this field.

Everyone.

7 Develop supportive education, encouragement & enforcement programs

Bicycle facilities alone will not lead to a bicycle-friendly community. A variety of program recommendations are highlighted in this plan to be to promote a bicycling culture. Ideally, programs and policy priorities should be implemented alongside infrastructure improvements, but the community should recognize that programs such as installing signage or wayfinding can occur several years before major infrastructure projects.

Partners: BicycleHaywoodNC, County, Towns, Haywood County Schools, Healthy Haywood, Haywood Community College, Sheriff's Department



8 Measure performance

This chapter identifies methods by which BicycleHaywoodNC, Haywood County and others can track the performance in implementation of the Plan, which can help justify funding pursuits and strengthen the ability of the community to gain funding from various sources.

Partners: BicycleHaywoodNC, County, MPO/RPO

9 Complete the Bicycle Friendly Community application

In the year following adoption of the Plan, the community should complete and submit a BFC application to the League of American Bicyclists. The application requires input from variety of data sources, many of which are included in this Plan. Even if the community does not receive BFC status on its first attempt, the feedback from the League and potential for Honorable Mention status can inspire local leaders to implement other Plan recommendations. Several BFC applications from other communities are included the Plan's Appendix for reference.

Partners: BicycleHaywoodNC, County, Towns





The Haywood County Comprehensive Bicycle Plan has identified new partnership opportunities from organizations with various public and private sector interests related to bicycling, education, economic development and healthy living.

mance for bicycling and related endeavors can fall into many categories, each of which is in turn measured by some criterion.

Recommendation: Track performance on an annual basis and promote this performance through an annual report and presentation to municipalities and other organizations. Exhibit 10-1 (page 112) depicts several performance areas that BicycleHaywoodNC could consider to measure and document performance of itself, NCDOT's investments in the county, and outreach efforts.

Recognizing progress toward becoming a bicycle-friendly community can be shown in several program and outreach areas while Haywood County works toward more long-term implementation projects (e.g. new bicycle lanes or shoulders).

Partnership Opportunities

Many of the education, encouragement and enforcement programs will be carried out by partnerships between Town departments, local nonprofit and civic organizations, business owners, developers and others. Creating strong partners in the county-wide effort to improve safety and increase bicycling awareness will help spread the word and awareness of the importance of bicycling in the community, as well as lead to programs that can withstand the test of time.

Potential partners for implementation of the Haywood County Comprehensive Bicycle Plan include:

- ◆ Blue Ridge Bicycle Club
- ◆ Downtown Waynesville Association
- ◆ French Broad River MPO / Land of Sky RPO
- ◆ Haywood Community College
- ◆ Haywood County Chamber of Commerce
- ◆ Haywood County Department of Social Services
- ◆ Haywood County Historic Farmer's Market
- ◆ Haywood County Schools
- ◆ Haywood County Sheriff's Department
- ◆ Haywood County Tourism Development Authority
- ◆ Haywood Regional Medical Center
- ◆ Healthy Haywood
- ◆ North Carolina Department of Commerce;
- ◆ Service Clubs, such as Rotary, Kiwanis, and Lion's Club
- ◆ SORBA (Southern Off-Road Bicycle Assn.)
- ◆ Town Police Departments
- ◆ Trips for Kids WNC
- ◆ Veterans groups

Funding

Bicycle facilities are constructed – and therefore funded – through a number of avenues and there are even more funding sources to pursue for programmatic implementation measures. Funding is generally divided into five categories of sources: local, state, federal, non-profit and private funding. The following section describe some of the more prominent sources in each category that Haywood County, BicycleHaywoodNC and other stakeholders could tap

into the Bicycle Plan. The Appendix contains detailed information on many of these sources and a simple internet search can yield more information as well as application deadlines or changes in the availability of these sources.

Local Funding. Currently, Haywood County and its Towns do not have an annual budget line item specifically for bicycle improvements, due to in part to the role NCDOT plays on many of the roadways in the region that are in the most need for bicycle-related improvements. In the future, the County and its municipal partners may wish to consider creating a specific annual budget item to set aside funds for improving bicycle facilities, especially for improvements such as signage and wayfinding.

A specific budget item is the most direct way to ensure that funding for bicycle facilities is available, but sometimes a municipality's budget may be too limited to finance this work. Bicycle facilities can also be built through “incidental” projects, by ensuring that bicycle-related features (e.g. bicycle racks or shoulders along the street frontage of a property) are constructed with any new projects or improvements, such as parks and recreation facilities, libraries, schools, and new roads. In addition, future private development should be reviewed for adequate bicycle access, connections and parking.

Municipalities often plan for the funding of bicycle facilities or improvements through development of Capital Improvement Programs (CIP). Typical capi-

tal funding mechanisms include the following: capital reserve fund, capital protection ordinances, municipal service district, tax increment financing, taxes, fees, and bonds.

State Transportation Funding. The North Carolina Department of Transportation (NCDOT) is the single largest source of funding available to Haywood County for bicycle facilities. The adoption of North Carolina's Complete Streets policy and development of related design criteria have great potential to capitalize on state funding sources to improve conditions for bicyclists.

Throughout the Complete Streets effort, NCDOT has consistently referenced past DOT and General Assembly actions aimed at support bicycle infrastructure, including the Bicycle and Bikeway Act of 1974—passed by the General Assembly—which authorized NCDOT “to spend any federal, state, local or private funds available to the Department and designated for the accomplishment” of fulfilling the duties laid out through the Act. The Act states that bicycle facilities “are a bona fide highway purpose, subject to the same rights and responsibilities, and eligible for the same considerations as other highway purposes and functions.”

It is important to track changes or adjustments in these programs through the French Broad River MPO and Land of Sky RPO as funding allocations and programs are in flux on a regular basis and partially driven by the status of the Federal govern-



Non-traditional funding sources for projects such as a bicycle wayfinding system can be pursued through partnerships with tourism-based organizations or local businesses who stand to benefit from increase visibility of area destinations.

Photo Credit: Don Kostelec



Creating expectations for future funding and bicycle facilities can help create momentum for funding and document a need for the community, such as this signage for a planned greenway in downtown Greensboro, NC.

Photo Credit: Don Kostelec

ment's transportation funding acts that are intended to be updated every six years (the current Act—SAFETEA-LU—expired in September 2009 and is still in negotiation by the US Congress).

State Transportation Improvement Program (STIP)

– The STIP is the overall document outlining funding programs and projects for study, design, and construction of major transportation facilities in the state. The MPO and RPO has input for project identification and adoption of the STIP.

Strategic Planning Office for Transportation (SPOT)

– In 2009, NCDOT embarked on a new process to identify and prioritize all types of projects managed through the STIP. Every two years, MPOs, RPOs, Division offices, and other NCDOT departments can submit projects for prioritization through SPOT.

Transportation Enhancement Program – The Enhancement program is part of the federal Surface Transportation Program funding allocation contained in the transportation bills a focus of improving the transportation experience in and through communities either culturally, aesthetically or environmentally. Bicycle facilities and other expenditures for bicyclists' safety, and greenway construction are all eligible under the Enhancement program. Currently, NCDOT is not actively seeking projects for this program and it is subject to change once Congress adopts a new transportation bill.

Spot Improvement Program – The NCDOT Division of Bicycle and Pedestrian Transportation (DBPT) budgets \$500,000/year for “spot” safety improvements (not related to SPOT) throughout the State. These improvements include items such as signing, grate replacement, bike rack installations, hazard remediation at skewed railroad crossings, and other small-scale improvements.

Small Construction Funds – Small Urban Funds are available for small improvement projects in urban areas. Each NCDOT Highway Division (Division 14 for Haywood County) has \$500,000 in small construction funds available annually. Although not commonly used for bicycle facilities, local requests for small bicycle projects can be directed to the NCDOT Highway Division office for funding through this source.

Powell Bill Funds – Annually, state street-aid (Powell Bill) allocations are made to incorporated municipalities which establish their eligibility and qualify as provided by statute. This program is a state grant to municipalities for the purposes of maintaining, repairing, constructing, reconstructing or widening of local streets that are the responsibility of the municipalities or for planning, construction, and maintenance of bikeways or sidewalks along public streets and highways.

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 North Carolina through the planning and execution of safety programs. GHSP funding is provided through an annual program, upon approval of specific project requests and evidence of reductions in crashes, injuries, and fatalities is required.

Safe Routes to School Program – NCDOT’s Safe Routes to School Program is a federally-funded program that was initiated by the passing of SAFETEA-LU. 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.

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.

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.

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. PARTF funds are allocated through the North Carolina Trails Program to help fund beach accesses, state trail systems, and local trail construction efforts.

North Carolina Health and Wellness Trust Fund - The NC Health and Wellness Trust Fund was created by the General Assembly as one of three entities to invest North Carolina’s portion of the Tobacco Master Settlement Agreement. Fit Together, a partnership of the NC Health and Wellness Trust Fund (HWTF) and Blue Cross and Blue Shield of North Carolina (BCBSNC) established the Fit Community designation and grant program to recognize and rewards North Carolina communities’ efforts to support physical activity and healthy eating initiatives, as well as tobacco-free school environments.

Non-Profit / Private Funding
Another method of funding bicycle systems and greenway trails is to partner with public agencies, private companies and/or not-for-profit organizations. Most private funding sources offer limited grants and public-private partnerships engender a spirit of cooperation, civic pride and community participation.



The Safe Routes to Schools and Transportation Enhancement programs are administered by NCDOT and are potential funding sources for implementation of the Haywood County Comprehensive Bicycle Plan.



Volunteers were a critical component of the public outreach and messaging efforts to develop the Haywood County Comprehensive Bicycle Plan. They will continue to be important for implementation of the Plan.

Photo Credit: Don Kostelec

The key to the involvement of non-profit and private partners is to make a compelling argument for their participation. Major employers and developers could be identified and provided with a “Benefits of Cycling” handout for themselves and their employees. 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 bicycle routes or greenways. Name recognition for corporate partnerships could be accomplished through trailhead signage 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 legal counsel review the agreement and verify ownership of the subsurface, surface or air rights in order to enter into an agreement.

Volunteer Work. It is expected that many citizens will be excited about the development of a community bicycle system and this is already evident in the energy level of those involved with BicycleHaywoodNC. Individual volunteers from the community can be brought together with groups of volunteers from church groups, civic groups, scout troops and environmental groups to work on bicycle route and greenway development on special community work days. Volunteers can also be used

for fund-raising, maintenance, and programming needs.

Other Planning Efforts

Implementation of the Plan to become a bicycle-friendly community will require other planning efforts to fully realize the goals and objectives identified in the plan. The initiatives outlined below will help refine the findings of the Bicycle Plan and allow for more specific exploration of these topics in the context of specific corridors, neighborhoods and greenway corridors.

Complete Streets / Complete Community Policies for the County and Towns. The adoption of a Complete Streets policy is a question on the Bicycle-Friendly Community application. NCDOT has adopted a Complete Streets policy, but this should not be considered sufficient for implementation by the County and Towns as new projects come online, developments are considered and improved, and parks and other public facilities are constructed. The adoption of Complete Streets policies at the local government level should go beyond design standards like those in the NCDOT Complete Streets guidance and should consider how subdivision, zoning, stormwater management and other ordinances consider the needs of all mode of travel.

Streets should not be deemed “complete” unless the design of the land uses adjacent to those streets is also complete in its consideration of bicycle and pedestrian modes, as it does little to promote use of

non-motorized modes to have a bicycle lane or a sidewalk if those users cannot safely reach the front door of a store or business, and park their bicycle, once they leave the street environment. The County and Towns should also pursue policies and design guidance for non-DOT streets and greenways that help connect complete streets to a variety of land use types.

Corridor-Level Bicycle & Pedestrian Safety Audits. Each corridor identified in the Plan contains various features that can greatly impact the ability to fully realize the recommended improvements. There will be tradeoffs within what is feasible due to competing interests for space within the built environment. Studies conducted for transportation improvements to corridors are oftentimes focused as a traffic engineering exercise, which can overlook many of the influences on pedestrian and bicycle travel. Including a bicycle and pedestrian safety audit in the context of these studies helps designers, DOT representatives and town officials understand these unique needs and can influence the design process.

Regional Economic Impact Analysis of Bicycling. The Bicycle Plan includes a limited assessment of the economic impacts of bicycling, however, a full-scale analysis similar to the Outer Banks study referenced in Chapter 9 is needed for Haywood County as part of what could become an analysis for Western North Carolina. After completion of the regional bicycle plan, the region should embark on a study to define the economic impacts of

bicycling on the region and engaged the various chambers of commerce and tourism development authorities, along with partners such as colleges and universities.

Safe Routes to Schools Action Plan. Communities that have fared best in capitalizing on available Safe Routes to Schools funding have done so through first organizing an action plan for schools that clearly identifies roles and responsibilities for the county, towns, schools districts, organizations and citizens. The needs of both bicyclists and pedestrians and the ability of each mode to safely access a school need to be defined so that the users who are most in need are addressed first. It is also important for the school districts to understand how site design and school placement impacts the ability of students to bike or walk to school. Each of these factors can be addressed in the Action Plan.

Countywide Greenways Master Plan. Greenways and trails have the potential to link communities and bicycle routes through a variety of facility types and necessitate a different set of programs and policies. Studies such as the Waynesville Pedestrian Plan and Land of Sky Regional Trails Plan have included ideas related to greenways and trails, but the same comprehensive analysis conducted as part of the Bicycle Plan should also be conducted for greenways, with an emphasis on regional partnerships given the geography of Haywood County.



Conducting regular in-the-field evaluation, such as Bicycle & Pedestrian Safety Audits, can lead to information exchange among design professionals, planners and citizens.

Photo Credit: Don Kostelec

Exhibit 10-1: Recommended Performance Measures

Performance Measure	Frequency (Every 1 or 2 years)	Performance Measure	Frequency (Every 1 or 2 years)
Engineering		Education	
• Jurisdictions with Complete Streets Ordinances	Ongoing	• Children Taught through Haywood Schools	1
• Percentage of Bicycle Facilities Addressed from Plan	2	• Bicycle Rodeos / Participation	1
• Miles of Designated Routes	2	• Adults in Traffic Skills 101 courses	1
• Miles of Shoulders / Lanes	2	• Students participating in Driver's Ed module	1
• Miles of Multi-Use Trails / Greenways	2		
• Miles of Mountain Bike Trails	2	Evaluation	
• Number of Intersections Improved for Bicyclists	2	• Bicycle Counts, Park-n-Pedal Usage	2
• Number of Bicycle Racks	2	• Members of BicycleHaywoodNC	1
• Park-n-Pedal Lots	2	• Total Volunteer Hours	1
• Signage Added along Routes	2	• Economic Impact Survey	1 to 2
Encouragement		• BMI Rates at Haywood Schools	1
• Participants in Bike to Work Ride	1	• Meetings with Town Officials	1 to 2
• Participants in Thursday Night Novice Rides	1	• Funding allocated to Bicycle-related Expenditures	1 to 2
• Participants in Blue Ridge Breakaway & Other Events	1	• Corridor Design Audits for Cycling	2
• Participants in Themed Rides	1	• Interaction with Municipal, Corridor & Regional Plans	Ongoing
• Schools with Safe Routes to Schools Programs	1	• Persons Attending BicycleHaywoodNC Events	1
• Safe Routes to Schools Events	1	• Number of Presentation to Civic Groups, Others	1
• Number of Bicycle Route Maps Distributed	1	• Number of Bicycle-related Grants Applied For	1
Enforcement		• Number of Website Views	1
• Number of Crashes (by level / total)	2	• Participation in seminars, webinars and other training	1
• Meetings with Law Enforcement	1		
• Public Service Announcements	1		



Glossary of Bicycle Facility Terms

As developed by AASHTO (America Association of State Highway Transportation Officials)

BICYCLE - A pedal-powered vehicle upon which the human operator sits. The term “bicycle” for includes three and four-wheeled human-powered vehicles, but not tricycles for children.

BICYCLE FACILITIES - A general term denoting improvements and provisions to accommodate or encourage bicycling, including parking and storage facilities, and shared roadways.

BICYCLE LANE or BIKE LANE - A portion of a roadway which has been designated by pavement markings and, if used, signs, for the preferential or exclusive use of bicyclists.

BICYCLE LEVEL OF SERVICE (BLOS) – A model used to estimate bicyclists’ average perception of the quality of service of a section of roadway between two intersections.

BICYCLE LOCKER or BIKE LOCKER – A secure, lockable container used for long-term individual bicycle storage.

BICYCLE PATH or BIKE PATH – A pathway that is exclusively used by bicyclists, where a separate, parallel path is provided for pedestrians and other wheeled users. Most pathways are shared between bicyclists and other users: see Shared Use Path.

BICYCLE RACK or BIKE RACK - A stationary fixture to which a bicycle can be securely attached.

BICYCLE ROUTE– A roadway or bikeway designated by the jurisdiction having authority, either with a unique route designation or with BIKE

ROUTE signs, along which bicycle guide signs may provide directional and distance information. Signs that provide directional, distance, and destination information for cyclists do not necessarily establish a bicycle route.

BICYCLE NETWORK - A system of bikeways designated by the jurisdiction having authority. This system may include bike lanes, bicycle routes, shared use paths, and other identifiable bicycle facilities.

BIKEWAY - A generic term for any road, street, path or way which in some manner is specifically designated for bicycle travel.

HIGHWAY - A general term denoting a public way for purposes of vehicular travel, including the entire area within the right-of-way.

RIGHT-OF-WAY - A general term denoting land, property or interest therein, usually in a strip, acquired for or devoted to transportation purposes.

RIGHT OF WAY (ASSIGNMENT) - The right of one vehicle or pedestrian to proceed in a lawful manner in preference to another vehicle or pedestrian.

ROADWAY - The portion of the highway, including shoulders, intended for vehicular use.

RECUMBENT BICYCLE - A bicycle with pedals at roughly the same level as the seat where the

operator is seated in a reclined position with their back supported.

RUMBLE STRIPS - A textured or grooved pavement treatment designed to create noise and vibration to alert motorists of a hazard.

SHARED LANE - A lane of a traveled way that is open to bicycle travel and vehicular use.

SHARED LANE MARKING - A pavement marking symbol that indicates an appropriate bicycle positioning in a shared lane.

SHARED ROADWAY - A roadway that is open to both bicycle and motor vehicle travel. This may be an existing roadway, a street with wide curb lanes, or a road with paved shoulders.

SHARED USE PATH - A bikeway physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way 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.

SHOULDER - The portion of the roadway contiguous with the traveled way, for accommodation of stopped vehicles, emergency use and lateral support of sub-base, base and surface courses, often used by cyclists where paved.

SIDEPATH - A shared use path located immediately adjacent and parallel to a roadway.

Appendix

The CD affixed to the back cover of this report contains various documents used in development of the Haywood County Comprehensive Bicycle Plan. The Appendix CD contains these folders:



1. **Bicycling & Economic Development:**

- Various articles on the economic impacts of bicycle facilities.

2. **Bicycle Friendly Community Applications**

- Applications from Charlotte and Raleigh, NC; Edina and Minneapolis, MN; and Ada County Highway District, Idaho.

3. **NCDOT Documents**

- North Carolina Bicycle Facilities Planning & Design Guidelines (1994)
- NCDOT Complete Streets Guidelines (2011)
- Bicycle & Pedestrian Safety Strategies in NC: Statewide Input & Priorities (Report & Appendices; 2011)

4. **AASHTO Documents**

- AASHTO Guide for the Development of Bicycle Facilities (1999)
- DRAFT AASHTO Guide for the Planning, Design and Operations of Bicycle Facilities (2010)

5. **Survey**

- Bicycle Plan Survey Detailed Results
- Haywood County Comprehensive Bicycle Plan Survey

6. **Health Impact Assessment Document**

- The full report of the Health Impact Assessment conducted as part of the Plan

7. **Maps**

- Route and Bicycle Suitability maps in 11 x 17 format and ANSI E Plot format.

8. **Images & Pictures**

- Various images obtained through the Plan
- JPEG images of various Exhibits in the Plan

9. **Other Documents**

- Letters of support and other miscellaneous documents relating to the Plan