City of Asheville, NC

Comprehensive Bicycle Plan

April 2, 2008

FINAL

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Executive Summary

The Comprehensive Bicycle Plan is a coordinated and strategic effort to develop a safe, accessible and comfortable network of bicycle facilities throughout Asheville, North Carolina.

This Plan builds on existing assets in the City, including a vibrant and engaged bicycle community, diverse range of bicyclists, existing bicycle facilities and an emerging greenway network. It attempts to address challenges that bicyclists face, such as access, connectivity and safety. It strives to improve bicycle conditions on all roads, including large commercial arterial roads, while also addressing issues such education and awareness, driver behavior and maintenance of bicycle facilities.

The planning process for this Plan included extensive public participation, including two public meetings, an online questionnaire and a Steering Committee comprised of local stakeholders. Community input serves as the foundation for the goals and recommendations in this Plan.

Participants provide feedback at the March 8, 2007 Public Meeting
Photo Credit: Toole Design Group

The primary goal of this Plan is to provide transportation alternatives and to enhance quality of life by creating continuous linear bicycle connections, providing bicycle facilities for the full range of users, and increasing safety and mobility of bicyclists in Asheville. Additional goals are outlined below.

- Prioritize improvements based on current usage and functional connectivity
- Better utilize the existing pavement width by retrofitting existing facilities
- Coordinate City, County, and private-sector efforts
- Conduct educational, encouragement and enforcement efforts throughout the City to promote the benefits of bicycling, bicycle safety, the proper use of bicycle facilities and rules for sharing the road
- Pursue bicycle-friendly policies and maintenance procedures to continuously improve bicycling in the City

Figure ES-1: Proposed Bicycle Route Network

Proposed Bicycle Route Network

Bike lanes: 43 miles
Climbing lanes: 17 miles
Shared lane markings: 21 miles
Shared roadways: 64 miles
Striped shoulders: 21 miles
Striped shoulders (plus a range of additional improvements): 15 miles

<u>The Proposed Bicycle Network and Action Maps</u>

Implementation of this Plan will establish a 181-mile network of bicycle facilities. The make-up of the proposed bicycle route network is detailed in Figure ES-1. The long range vision for the bicycle network is shown on the Bicycle Network Map in Figure ES-2 on page 6 and as Figure 19 on page 54. The network

is composed of locations where specific improvements have either already been made or are proposed in the future.

In order to create the bicycle route network, a range of actions will be required depending on the facility that is being created and the character of the existing road. Improvements may be as simple as adding pavement markings or signage, or they may require narrowing or eliminating existing travel lanes or expanding the pavement width. The actions required to create the bicycle route network are detailed on the Bicycle Action Map in Figures ES-3 on page 7 and Figure 20 on page 55. Many of the roads depicted on the bicycle network and action maps are maintained by the State of North Carolina. The proposed recommendations on these roads will require state approval.

Note that the Bicycle Network Map and Bicycle Action Map in this Plan have been reduced in size so that they may be included in this document. The full size versions of these maps are available on the City of Asheville's website at http://www.ashevillenc.gov.

Short-Term Recommendations

This Plan recommends the construction of a physical network of bicycle facilities, as well as a variety of programs and policies that are needed to achieve the goals identified above. A complete list of recommendations is provided in Chapters 5 and 6. Below is a summary of the short, medium and long-term recommendations of the Plan. These actions should be implemented within the first five years after the Plan is adopted. They will help build momentum for implementing the medium and longer-term recommendations in the Plan.

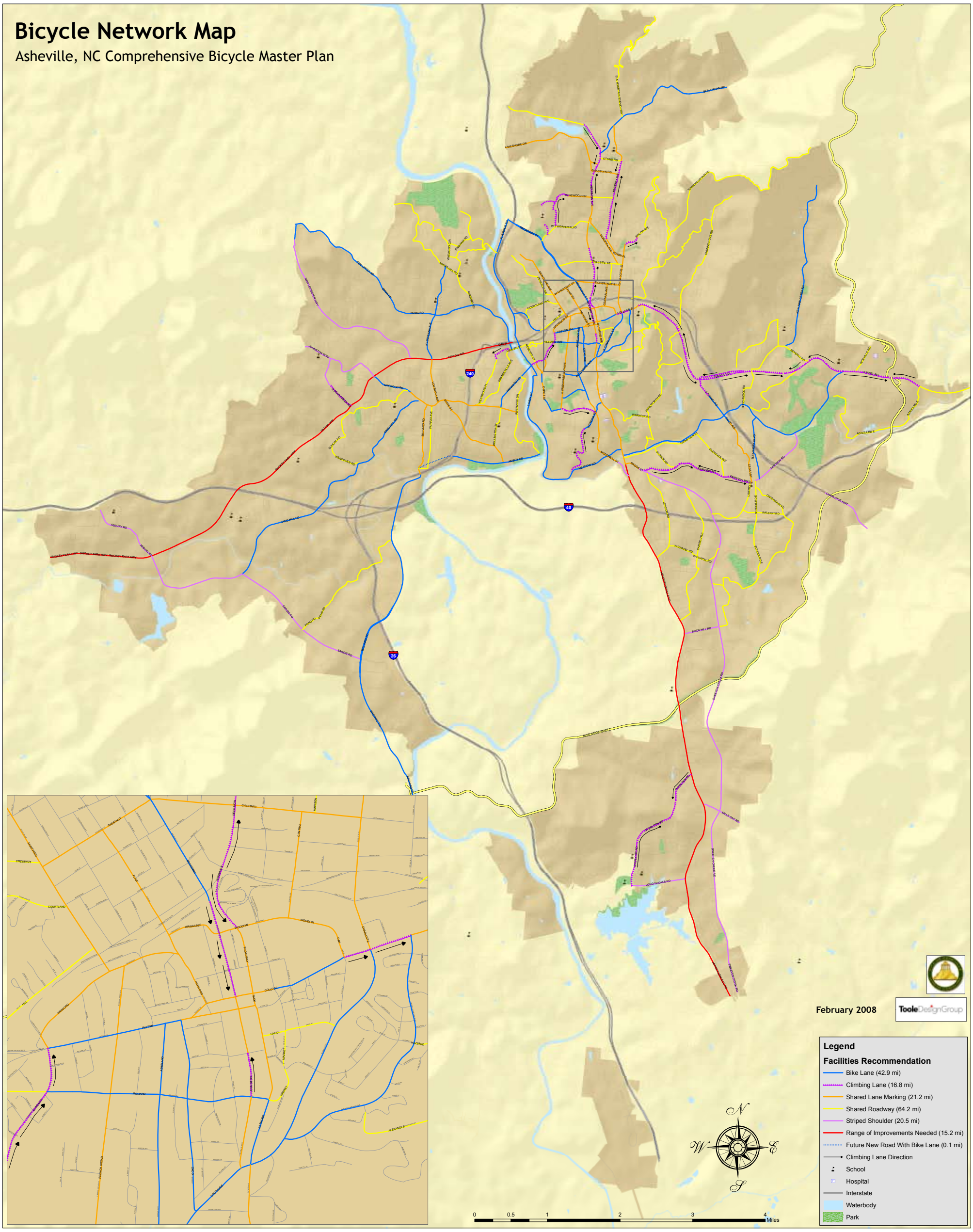
Short-Term Bicycle Facilities and Operational Improvements

- Provide bicycle lanes on the following streets:
  - Asheland Avenue
  - Broadway (north of I-240)
  - Coxe Avenue
  - Haywood Road (from Riverside Drive to Beverly Road West)
  - Hilliard Avenue
  - South Charlotte Street
  - Southside Avenue

- Provide shared lane pavement markings (described in Chapter 4) on Charlotte Street north of I-240 to encourage bicycling and build public awareness. Haywood Road in Downtown West Asheville may also be an appropriate location for shared lane markings in the near term. Recommended locations for shared lane markings in the short-term are included below.
  - Charlotte Street (north of I-240)
  - Haywood Road (in downtown West Asheville)
  - Chestnut Street
  - Montford Avenue
  - South French Broad Avenue

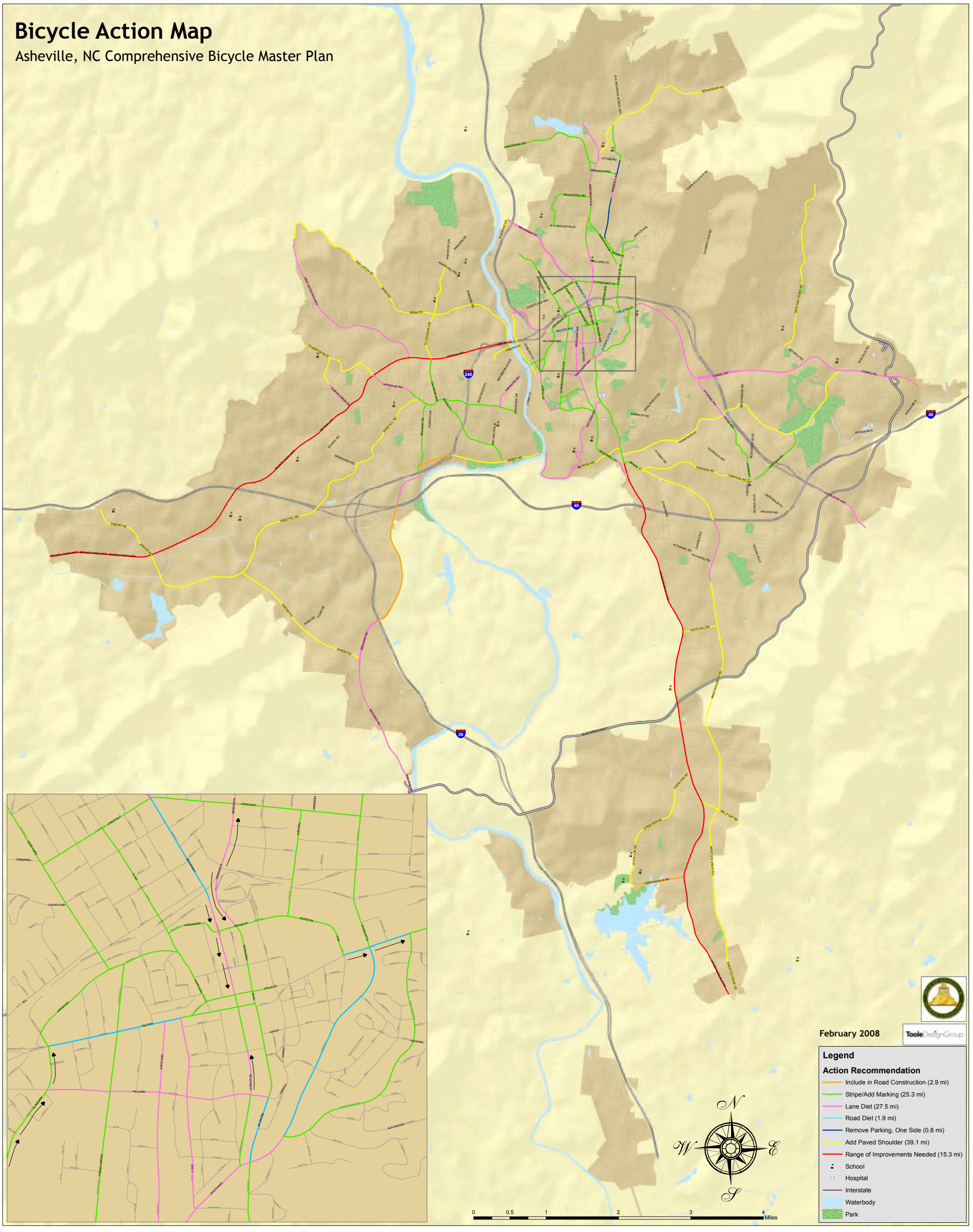
Participants provide feedback at the March 8, 2007 Public Meeting Photo Credit: Toole Design Group

Figure ES-2: Bicycle Network Map



The Bicycle Network Map is the long range vision for a safe, accessible and comfortable network of bicycle facilities throughout Asheville. The proposed bicycle network includes a variety of facility improvements that respond to the many different issues faced by bicyclists. Among on-road bikeways, there are a variety of different design treatments that are proposed, which are described in Chapter 4 of this Plan. The network is meant to provide options for the full range of users, including families, commuters and recreational riders. The full size version of this map is available on the City of Asheville's website at http://www.ashevillenc.gov.

Figure ES-3: Bicycle Action Map



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- Conduct a pilot lane diet (narrowing automobile travel lanes to create enough space within the existing road width to provide bicycle facilities) project in Asheville to gain public awareness and analyze outcomes for both bicyclists and automobiles. Sections of Broadway north of Chestnut Street may be a good initial candidate for a lane diet.

- Develop plans and designs for pursuing a road diet (creating space for bicycle facilities by eliminating an automobile travel lane) on Broadway from Chestnut Street to Cherry Street, in order to provide bicycle lanes within the existing pavement width. This will need to be balanced with the City's plans for on-street parking.

- Provide a climbing lane on Clingman Avenue on the east side of the Riverlink Bridge and on Lexington Avenue in Downtown Asheville.

- Improve safety conditions for bicyclists crossing the railroad tracks on Riverside Drive.

- Develop a maintenance plan, including a web-based maintenance request form, to ensure that existing and future bicycle facilities are well-maintained.

- Review the design of ongoing transportation improvements on Brevard Road and the Riverlink Bridge to make the projects consistent with the bicycle systems plan if possible.

- Clarify whether bicycle access is provided on all "No Outlet" signs in Asheville, for example by adding "Except for Bikes" below the sign where bicycle access is provided.

- A greenway connection at Onteora Road should be explored as an alternative way for bicyclist to access US 74A to Fairview.

- The City should improve bicycle accommodations on bridges (as well as on their approaches and access ramps) as they serve as critical links in the bicycle network in Asheville. In the short-term, bicycle access should be enhanced using signage, pavement markings, maintenance and through other spot improvements. Additionally, the City should ensure that upcoming projects on bridges in the City do not preclude the provision of bicycle facilities in the future.

- The City should continue to support current and future greenway trail development efforts as greenways have the potential to provide connections between destinations and between on-road bicycle facilities. Opportunities to enhance the relationship between greenways and on-road bicycle facilities should be pursued. The City should continue to look for ways that the on-road bicycle network can fill gaps in the greenway network and how the greenway network can provide alternative connections to uncomfortable roads. By encouraging the relationship between the on-road bicycle network and the emerging greenway system, the City can ensure that both types of facilities compliment each other. The City should ensure that locations where a greenway intersects with a road are designed with careful attention focused on the safety of trail users crossing the road. For additional guidance on road crossings, the publications listed on page 31 of this Plan should be consulted.

- The City should continue to implement the short-term greenway facilities recommended in the City's Greenway Master Plan. In 2008, the City will be updating its Parks and Recreation Master Plan. This effort will include an update to the Greenway Master Plan.

Identifying connections between the bicycle and greenway networks should be an important element of this planning effort.

- The City should pursue increased bicycle connections as a part of the I-26 Connector project, for example by establishing a more direct connection between Downtown and West Asheville via the Smoky Park Bridge.

Short-Term Programs and Policies

- Incorporate the recommendations from this Plan into the French Broad River Metropolitan Planning Organization's (MPO) Comprehensive Transportation Plan.

- The City should consider budgeting annual "set aside" funds to implement the recommendations in this Plan.

- The City should consider re-establishing a bicycle coordinator or similar position to support efforts underway at the MPO level. This staff member would provide additional resources to support bicycle planning activities and could assist in organizing meetings, facilitating communication among the City, NCDOT, MPO and other stakeholders and prepare regular briefings to the City Council and other interested parties on accomplishments and activities.

- Develop an institutional framework for ongoing collaboration and communication between the City of Asheville, the NCDOT Division 13 Office, the Division of Bicycle and Pedestrian Transportation and other relevant NCDOT units, and the public. Develop a mechanism to ensure that bicycle issues are addressed as a part of all ongoing coordination between the City and NCDOT, particularly during repaving projects.

- Undertake a detailed analysis of Asheville's policies, funding mechanisms and maintenance policies looking for opportunities to better provide for bicycle needs.

- Pursue opportunities to encourage and/or require private sector developers to provide the bicycle facilities recommended in this Plan, especially in cul-de-sac development.

- Develop standard designs for bicycle-friendly intersections and bicycle parking.

- Establish clear maintenance responsibilities and continue to involve the public in identifying maintenance needs. Continue to utilize volunteers to assist with some maintenance tasks.

- Repave roadways with poor pavement conditions that provide critical connections in the bicycle network and continue to replace drainage grates with drain openings parallel to the direction of travel with bicycle-friendly grates.

- Expand and promote bicycle education and encouragement efforts in Asheville through partnerships with community organizations. These efforts should include awareness campaigns focusing on the new bicycle facilities that are being provided.

- Continue to support Asheville Transit's "Bike on Bus" program that allows bicyclists to bring their bicycles on board buses in order to use them when they disembark at their destination. This program should be expanded as it enhances the viability of both transportation modes. Options for expanding and improving the program include installing high-capacity bicycle racks on buses (ie: racks that can hold up to four bicycles on the front of buses) and increasing bus service frequency especially where bicycle-on-bus service is in high demand. The City should also advertise the service more to students and residents.

- Build on its existing Safe Routes to School (SRTS) program. By expanding its efforts to work with the Asheville Public Schools, public health organizations, parent associations, and local walking and bicycling advocacy groups, the City can further develop safe bicycle routes to Asheville schools. For example, the City should work with local schools to increase participation in International Walk and Bicycle to School Day to increase awareness of bicycling as a fun and healthy transportation choice that can reduce automobile congestion and pollution near schools.

- Work with the University of North Carolina-Asheville, Asheville-Buncombe Technical Community College, and other local schools to identify, evaluate and prioritize the most cost effective strategies to support bicycling to and from campus. These schools generate a substantial number of vehicle trips and many of their students live in close proximity. This captive student population presents an enormous opportunity to reduce congestion and increase student health by replacing vehicle trips with bicycling trips. A "corridors-to-campus" initiative focused on improving bicycle connections between the University of North Carolina-Asheville campus and surrounding areas would be a good initial project.

- Support Employer Incentive Programs to encourage bicycle commuting by providing information about economic benefits, health benefits, and potential commuting routes to employers and employees. The Bicycle Commuter Guide, prepared by the Asheville Bicycle and Pedestrian Task Force and the City of Asheville Transportation Demand Management Program (TDM) with assistance from NCDOT, is a good resource for information on this topic. The Bicycle Commuter Guide is available online at http://www.fbrmpo.org/uploads/NC_Bicycle_Commute_Guide.pdf.

- Update the existing Asheville Bicycle Map to show residents and visitors preferred routes for bicycling. This map should provide information about connections between the on-road bicycle network and the emerging greenway network, as well as educational material about the purpose and proper use of new bicycle facilities, and also about other resources such as bicycle parking and contact information for local bicycle organizations.

- The City should work with the Police Department to increase enforcement of bicyclist and motorist behavior to reduce bicycle and motor vehicle crashes.

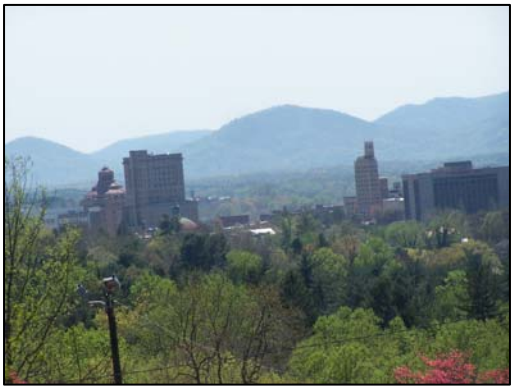
Medium-Term Recommendations

There are a number of recommended projects and programs that are very important for improving bicycle conditions in Asheville, but are likely to take longer to implement than the short-term initiatives. These projects and programs are classified as medium-term recommendations. Though these recommendations are designed for a 10-year timeframe,

Asheville should take advantage of opportunities that arise to implement the projects and programs sooner. Specific medium-term projects and programs are listed below.

- Provide bicycle lanes in the following locations:
  - Biltmore Avenue (US 25)
  - College Street
  - Lyman Street
  - Martin Luther King, Jr. Drive
  - McDowell Street
  - Patton Avenue
  - Riverside Drive
  - Sand Hill Road
  - Southside Avenue
  - South Tunnel Road
  - Swannanoa River Road
  - Tunnel Road

- Provide shared lane markings in the following locations:
  - Biltmore Avenue (US 25)
  - Brevard Road
  - Brook Street (US 25A)
  - Central Avenue
  - College Street
  - Edwin Place
  - Gracelyn Road
  - Kimberly Avenue
  - Lakeshore Drive
  - McDowell Street
  - Merrimon Avenue (US 25)
  - Murdock Avenue
  - Patton Avenue (downtown)



Downtown Asheville
Photo Credit: Toole Design Group

- Provide climbing lanes in the following locations:
  - College Street
  - Kimberly Avenue
  - Merrimon Avenue
  - South Tunnel Road
  - Tunnel Road

- Provide striped/paved shoulders in the following locations:
  - US 74A to Fairview
  - Hendersonville Road (US 25)
  - New Leicester Highway (NC 63)
  - Patton Avenue (US 19/23)
  - Sardis Road (NC 112)
  - Sweeten Creek Road (US 25A)

- Provide a safer facility for bicyclists to cross the I-240 entrance ramp when traveling east on Tunnel Road.

- Consider bicycle-related signage outside of the tunnel on Tunnel Road.

- Improve conditions for bicyclists on bridges in Asheville.
- Supplement the existing signed bicycle route system as the bicycle facilities recommended in this Plan are provided.
- The City should consider changing the orientation of on-street parking on College Street downtown to reverse-in angled parking to reduce potential car/bicycle conflicts in the existing bicycle lane. This should be considered in the medium-term or whenever re-striping is necessary.

Medium-Term Programs and Policies

- The City should expand its program to install bicycle racks on public property adjacent to commercial buildings, multi-family dwellings and schools.
- Improve bicycle access to bus stops and stations to make the transition between transportation modes as seamless as possible.
- Bicycle route information should be integrated into transit route maps and signs.
- Roadways should be designed so that bicycles and buses co-exist safely and efficiently.
- When the City of Asheville Comprehensive Plan is updated, the recommendations from this Plan should be incorporated.

Long-Term Recommendations

Long-term recommendations include providing shoulders on many higher-volume rural roadways and constructing much of the greenway trail system. While these recommendations may be included in the long-term category, there may be opportunities for implementing them sooner. For example, bicycle facilities could be included as a part of a new roadway project added to the Transportation Improvement Program (TIP) or a new bicycle program could be provided by applying to a new grant funding source. The City should take advantage of these opportunities for implementation. Upcoming transportation projects represent one of the most important considerations in implementing the recommendations of this Plan. All resurfacing, repaving and improvement projects should be evaluated to determine whether it is possible to provide the bicycle facility recommendations included in this Plan as part of the planned project.

General Bicycle Facility Costs

General (order of magnitude) cost estimates for the main components of this Plan are provided in Chapter 7. The costs shown are an approximation of the total cost of implementation. In many cases, on-road bicycle facilities can be created by narrowing or removing travel lanes in corridors where motor vehicle usage is below projected capacity. Often, these facilities can be added for a minimal cost as a part of a roadway repaving or reconstruction project. If the City is undertaking a roadway improvement project as part of its normal maintenance program, it may be advantageous to provide a bicycle facility identified in this Plan during that effort. In this case, the City would improve bicycling conditions sooner and save the additional costs of retrofitting in the future. The City should take advantage of implementation opportunities as they become available.

Plan Outline

This Plan envisions a continuous network of bicycle facilities, which increases access, safety and mobility of bicyclists in Asheville. Chapter 2 outlines current conditions for bicyclists in Asheville, including existing facilities, unique assets and challenges to bicycling in the City. Chapter 3 presents the planning context for this Plan, detailing policies and plans that have been developed at the national, state, regional, and local levels, which provide support for improving bicycle transportation in Asheville. Chapter 4 presents general design guidelines to ensure the provision of high-quality bicycle facilities in Asheville.

Chapter 5 provides a proposed bicycle network plan, which creates a connected and accessible network of bicycle facilities throughout Asheville, as well as recommended actions to create this network. Chapter 6 provides additional recommendations for bicycle improvements, such as ancillary facilities and programs to support bicycling. Chapter 7 provides an implementation plan to guide the realization of the proposed network.

Downtown Asheville
Photo Credit: Toole Design Group

Conclusion

The Comprehensive Bicycle Plan is a coordinated and strategic effort to develop a comfortable, safe and accessible network of bicycle facilities throughout the City of Asheville. This Plan encourages the provision of bicycle facilities for the full range of bicyclists and so current and future greenway trail development efforts are strongly supported. Opportunities to enhance the relationship between greenways and on-road bicycle facilities should be pursued.

The City should also provide support facilities to make bicycling efficient and convenient to all Asheville residents. In order for bicycling to be a fully viable form of transportation, other programs and facilities are needed to complement the bicycle network. This includes educational, encouragement and enforcement opportunities for bicyclists and the general public, better connections between bicycles and transit and adequate bicycle parking at all destinations. A critical step in providing convenient and safe options for bicycle transportation lies in having a strategic plan that is supported by design guidelines, ordinances and other regulations necessary to steer community design and roadway construction. The policies recommended in this Plan will help integrate accommodations for bicycle transportation into everyday activities in Asheville.

By building on significant local assets and pursuing ongoing collaborative efforts amongst all stakeholders, including citizens, the City of Asheville, NCDOT Division Office, Division of Bicycle and Pedestrian Transportation, French Broad River MPO, and the Transportation Planning Branch, Asheville can over time develop a network of bicycle facilities that is functional and connected. This network will provide the option of bicycling as a practical and convenient mode of transportation and recreation for the full range of bicyclists in Asheville.

Chapter 1: Introduction

The Comprehensive Bicycle Plan is a coordinated and strategic effort to develop a comfortable, safe and accessible network of bicycle facilities throughout Asheville. This Plan strives to build on existing assets in the City, including a vibrant and engaged bicycle community, diverse range of bicycle riders, and the emerging greenway network. It also attempts to address challenges that bicyclists face, such as access, connectivity and safety. It strives to improve the experience of bicyclists on all roads, while also addressing issues such education and awareness, driver behavior and maintenance of bicycle facilities.

Existing Sign in Asheville
Photo Credit: Toole Design Group

The primary goals of this Plan are to provide transportation choice, create continuous linear connections of bicycle facilities, provide bicycle facilities for the full range of users and increase safety and mobility of bicyclists in Asheville. Additional goals are outlined below.

- Prioritize improvements based on current usage and functional connectivity
- Better utilize the existing pavement width by retrofitting existing facilities
- Coordinate City, County, and private-sector efforts
- Conduct educational, encouragement and enforcement efforts throughout the City to promote the benefits of bicycling, bicycle safety, the proper use of bicycle facilities, and rules for sharing the road
- Pursue bicycle-friendly policies and maintenance procedures to continuously improve bicycling in the City

Why is Bicycle Planning Important in Asheville?

Bicycling is an important part of Asheville's transportation system for many reasons:

- Providing bicycle facilities can improve safety and reduce conflicts with motor vehicles. Unsafe behaviors from both motorists and bicyclists increase the chances of injuries on roadways. Because bicyclists' needs have historically been underserved, the current transportation system does not function well for bicyclists and precipitates conflicts between motorists and bicyclists. In cities that have effectively accommodated bicyclists, these conflicts tend to dissipate.

- Bicycle facilities and programs provide residents with transportation choice and the City has made a commitment that people should have more than one way to get around. The public has consistently expressed a need for facilities for bicycling and

has expressed a latent demand to travel more by bicycle. This demand was evidenced by a large turnout at the public meetings and by more than eight hundred responses to the online questionnaire. Bicycling is a valid mode of transportation that needs to be accommodated.

- It is important for the City of Asheville to have a bicycle plan to inform the Comprehensive Transportation Plan, the City of Asheville Comprehensive Plan and other important planning documents.

- Bicycle planning also highlights opportunities to develop partnerships to implement programs and to make improvements to the existing system through better communication within and between municipal, regional and state agencies.

- Many of Asheville's residents currently use bicycles for transportation. Bicycle facilities are needed to create important connections between regional activity centers, population centers, shopping areas, parks, tourist attractions and other cultural resources in the area.

Benefits of Bicycle Transportation

- Many people in the region need an alternative mode of travel. Bicycling is an affordable mode of transportation, requiring only a fraction of the cost of owning and operating a motor vehicle. The American Automobile Association estimates that the average American spends nearly $8,000 per year to own and operate an automobile, while bicyclists typically spend less than $200 per year.[1]

- Bicycling instead of driving a car can help to improve the environment by reducing greenhouse gases that contribute to global warming, and reducing the amount of pollution in our air and water.

- As a vehicle, the bicycle is very efficient in its use of public space. For example, there is space for approximately 10 to 12 bicycle parking spaces in one automobile parking space.[2]

- Bicycling provides an opportunity for routine physical activity – which is increasingly important given the sedentary lifestyles of many Asheville residents. Recent health studies have shown up to a 50% reduction in Type 2 diabetes among people who engage in moderate physical activity – such as bicycling to work - on a regular basis.[3]

[1] American Automobile Association, Your Driving Costs (2007 study of driving costs) http://www.aaanewsroom.net
[2] Pedestrian and Bicycle Information Center, "Bicycle Parking: Costs," Available online: www.bicyclinginfo.org/de/park_costs.cfm.
[3] Journal of the American Medical Association, October 1999, based on a study by the Harvard School of Public Health.

The Planning Process

Background Data Collection and Field Analysis:

Background information was gathered for this Plan from previous plans and studies, existing GIS data and maps, and from local government staff. Existing GIS data were provided, including the locations of roadways, railroads, rivers and streams, major subdivisions, schools, parks, and municipal boundaries. Field work was conducted throughout Asheville to document existing conditions for bicycling and to identify opportunities to improve conditions for bicyclists. Information on variables such as the number of lanes, lane and road width, speed limit and the presence of parking, bike lanes, sidewalks and paved shoulders was recorded in the field analysis.

Public Open Houses and Meetings

A public open house was held on March 8, 2007 from 4:00pm-7:00pm and was attended by more than one-hundred people. The open house was conducted in an open "drop in" format and participants were encouraged to gather around large maps to provide feedback and opinions and participate in discussion in a smaller group setting.

Information was recorded on the maps and comment sheets. In addition to the large format maps, informational boards and a slideshow of photographs from Asheville and around the country was provided. A flier announcing the online questionnaire was also distributed at the meeting. Information on Asheville's bicycle-related opportunities, challenges, destinations and problem areas was gathered from participants. In addition, participants provided detailed information on specific locations in need of improvement.

Participants provide feedback at the March 8, 2007 Public Meeting
Photo Credit: Toole Design Group

A second public meeting was held on July 26, 2007 from 6:30pm to 9:00pm and attended by more than seventy-five people. Draft bicycle network and action maps were available for review prior to a formal presentation, which outlined the project process, facility types and recommendations for facilities, programs and policies to improve bicycling in Asheville. After the presentation, participants were provided with the opportunity to ask questions and provide comments on the material presented.

Steering Committee

The first Steering Committee meeting was held on February 6, 2007. At this meeting, information was provided on NCDOT's role and purpose in supporting the project. In addition, information was provided on the consultant team and the scope, schedule and goals for the project. At the meeting, the Steering Committee was also provided with the opportunity to discuss their primary goals for the project. At the second Steering Committee meeting on July

26, 2006, draft recommendations were provided and feedback was gathered and subsequently incorporated into this Plan.

Online Questionnaire

An online questionnaire was developed to supplement information gathered at the public meetings. The questionnaire was developed in the spring of 2007 with input from the City of Asheville, NCDOT and the Steering Committee. The questionnaire was distributed electronically by the Steering Committee. It was publicized on various email listservs and fliers were circulated at the public meeting. The questionnaire was available online from March 5, 2007 through April 2, 2007. Over 830 responses were received. There was a fairly even response (geographic, range of experience, gender, etc.) to the questionnaire. Key highlights of the questionnaire are described in Chapter 2 and a memorandum detailing the full results of the questionnaire is included as appendix 1.

Conclusion

This chapter introduced the goals and the purpose of this Plan. It also presented the planning, analysis and public outreach process. The following chapter outlines existing conditions for bicycling in Asheville.

Chapter 2: Evaluating Current Conditions

This Chapter outlines existing conditions for bicycling in Asheville. It describes the City's existing bicycle facilities, destinations and unique assets. In addition, it outlines critical barriers and challenges to bicycling. This information was gathered at the public meetings, from the online questionnaire and through field analysis.

Existing Greenway Trail in Asheville
Photo Credit: Toole Design Group

Existing Facilities

There are many neighborhood roads in Asheville that are comfortable for bicycling in their present condition. There are bicycle lanes on selected roads in the City; however, these facilities are disconnected. Maintenance is also a concern with existing bicycle facilities. For example, debris is not cleared frequently enough from existing bicycle lanes, which can make it difficult to ride in them. The Blue Ridge Bicycle Club has been assisting the City with the cleaning of the bicycle lanes on Riverside Drive.

Asheville includes many different types of roads, some are comfortable for bicycling and others are not. Working with local bicyclists, City staff and other stakeholders, NCDOT's Division of Bicycle and Pedestrian Transportation produced the Asheville and Buncombe County Bicycle Transportation Map to provide information on the suitability of riding a bicycle on different roads in the area. The map is meant to help bicyclists choose where to ride, based on their own level of bicycling ability and traffic handling skills. Demanding climbs are highlighted, as are parks and other major destinations and points of interest, safety information and riding tips and regulations for bicycling on the Blue Ridge Parkway. The 10 locally signed neighborhood bike routes in Asheville are also highlighted. The map is available on NCDOT's Division of Bicycle and Pedestrian Transportation website at http://www.ncdot.org/transit/bicycle/maps/maps_urban.html.

Bicycle racks and "Share the Road" signs are distributed throughout the City; however, the availability of bicycle parking is a concern in many locations. As noted, there are ten signed bicycle routes, which are generally located in residential neighborhoods and on rural roads that are comfortable for bicycling. These signed routes serve primarily a recreational function. There is no bicycle-related signage intended to serve more of a functional purpose, for example directing bicyclists to a good alternate route between Downtown and West Asheville.

In addition to the facilities described above, there are shared use paths on WT Weaver Boulevard, Amboy Road and Broadway. Numerous additional trails are planned, as outlined in the City's Greenway Master Plan, which is available on the City of Asheville Parks and Recreation Department's website at http://www.ashevillenc.gov/departments/parks_rec. There are also multi-use and mountain bike trails in local and regional parks, for example at the North Carolina Arboretum and Bent Creek. Finally, there are bicycle racing facilities such

as the Asheville Velodrome, which is an asset for bicycle racers and fitness riders. Existing facilities are outlined in Table 1 below.

Table 1: Existing Bicycle Facilities in Asheville

Facility	Location
Bike lanes	Lyman Street/Riverside Drive, College Street (Downtown), Bleachery Road (Near Wal-Mart)
Bike racks	Throughout the city (Primarily Downtown)
"Share the Road" signs	Throughout the city
Signed bike routes	Emerald Necklace, Beverly Hills/Azalea, Sunset Drive, Sandhill, Oakley, Montford, Kenilworth, Beaver Lake, Caribou/Shiloh, and Riverview
Shared use paths	Glen's Creek, Reed Creek, etc.
Multi-use and mountain bike trails in local and regional parks	North Carolina Arboretum, Bent Creek, and others
Carrier Park (including the Asheville Velodrome)	Amboy Road

Key Destinations

The online questionnaire supplemented information gathered at the first public meeting regarding key destinations for bicycling in Asheville. According to participants, schools, parks, hospitals and retail destinations are places that people need to access by bicycle. Numerous participants cited schools such as Asheville High School, UNC-Asheville and Asheville-Buncombe Technical Community College as important destinations. Parks and recreational facilities such as Richmond Hill Park, Carrier Park, Bent Creek, the North Carolina Arboretum and Lake Lure were mentioned, as were health facilities such as Mission Hospital. In addition, retail destinations such as the Asheville Mall, Earth Fare, Greenlife, Ingles and Westgate Shopping Center were highlighted as important destinations for bicycling. Downtown was mentioned frequently, as was the Blue Ridge Parkway. A goal of this Plan is to enhance bicycle access to these key destinations.

Unique Assets

The City of Asheville has many unique assets that can serve as the foundation in its efforts to become a more bicycle-friendly community. There is a great amount of interest in bicycling issues among citizens of Asheville. This was demonstrated by the participation of more than 175 attendees at the two public meetings held for this Plan and more than 830 responses to the online questionnaire. There are many bicycle shops in town and grassroots bicycle advocacy and education efforts are currently underway, such as "Asheville on Bikes," commuter classes, and a standing Asheville Area Bicycle and Pedestrian Task Force.

Participants provide feedback at the March 8, 2007 Public Meeting. Photo Credit: Toole Design Group

Asheville has a complete range of bicycle riders. There are families, children, and beginning riders that utilize the multi-use trails as part of the emerging greenway network, on residential streets, and on trails at the Bent Creek Recreation Area. There are commuters that live in one part of the City and bicycle to and from work or school every day. These range from residents who live in South Asheville and ride downtown, to students who live in North Asheville and ride to the UNC-Asheville campus.

There is also a spectrum of recreational bicyclists ranging from those who ride on the weekends to those who ride every day after work. These riders enjoy the area's topography and appealing destinations in the city and the region such as the Blue Ridge Parkway, Richmond Hill Park, Lake Lure, Bat Cave, and Bent Creek. There are also advanced and professional riders that train in Asheville, ride at the Velodrome on Swannanoa River Road and race to the top of Buzzards Rock (a 5-mile, 2,000 foot climb).

Participants provide feedback at the March 8, 2007 Public Meeting
Photo Credit: Toole Design Group

Challenges

Through public meetings, the online questionnaire and field analysis, critical issues and problem areas have also been identified. Many people are concerned about the discontinuity of the existing bicycle network. Facilities may exist in certain locations, but there are many gaps in the network and existing facilities are not maintained adequately. Suburban commercial arterial roads with high traffic volumes and speeds are also a challenge for bicyclists, especially because of the key function that they serve within the transportation network.

Figure 1: Critical Issues and Concerns

Critical Issues and Concerns

- Access and connectivity
- Lack of adequate bicycle facilities
- Driver behavior
- Safety
- Road width (narrow roads)
- Traffic
- Large arterial roads
- Dangerous intersections and roads
- Lack of shoulders
- Disconnected areas and key destinations
- Problematic bicycle and car interactions
- Maintenance practices

Bicycle and automobile interactions were mentioned as a frequent concern, as were concerns about driver behavior. Safety was the most critical concern that people expressed most frequently in public meetings and on the online questionnaire. Critical issues and concerns, revealed at public meetings and by the online questionnaire, are listed in Figure 1.

Barriers to bicycle access and mobility in Asheville

Participants in the first public meeting identified several barriers and challenges to bicycling in Asheville. Current practices and facilities, safety, connections and road limitations were identified as barriers to

bicycling in Asheville. Planning for future development and education and awareness were also identified as key challenges to improving conditions for bicyclists. These barriers and challenges are described in detail below.

Current Facilities and Practices

- The existing road network includes inhospitable roads with heavy traffic volumes, high speeds and few bicycle facilities.
- Key areas of town and important destinations are not well-connected.
- Large suburban arterial roads are problematic; however, they provide critical connections throughout town, so bicyclists still must use them.
- Many of the roads in Asheville lack shoulders so there is inadequate separation between motor vehicles and bicyclists, particularly on roads with higher speeds and volumes.
- There are functional concerns with some of the existing bicycle facilities, for example in certain locations automobiles back out of angled parking spaces directly into the bicycle travel lane.
- Maintenance practices are a concern, for example some bike lanes are littered with debris. Additionally, broken glass is often not cleared from the bicycle travel way in the tunnel on Tunnel Road.
- Motor vehicle speeds on many roads do not adequately account for the comfort and safety of bicyclists sharing the road space.
- Road width is a concern for many bicyclists in Asheville. Certain roads are too wide and others are to narrow for comfortable bicycle travel.

Safety

- There are particularly dangerous intersections in the city where traffic volume, turning movements, and limited directional information present serious concerns for bicyclists.
- Certain bridges are difficult for bicyclists.
- Bicycle access to local schools was noted as a safety issue.

Connections

- Many popular destinations such as Richmond Hill Park and Bent Creek are difficult to access by bicycle.
- Connections between different areas of town are in many cases difficult and unsafe. For example, there are limited options for traveling between South Asheville and Downtown.

Road Limitations

- Many roads currently have high volumes of traffic, which will impact the City's ability to pursue bicycle-friendly changes to the roadway design.
- In many cases, topography makes widening roads difficult or prohibitively expensive.
- NCDOT does not own the right-of-way on all of its roads in Asheville so pursuing widening projects could require time-consuming and expensive property acquisition.

Planning for Future Development

- There is significant residential development occurring in Asheville. This development will likely increase motor vehicle traffic.

- It will be important for the City to ensure that these developments provide internal bicycle connectivity, as well as bicycle connectivity to surrounding areas.
- Much of the new development is occurring along certain roads such as Beaverdam Road and New Haw Creek Road that lack bicycle facilities. Topographical and other constraints will make it difficult to provide facilities on these roads.
- There are plans for significant road improvement projects in Asheville, for example on Brevard Road, Long Shoals Road and as part of the I-26 Connector project. These projects offer the opportunity to provide additional bicycle facilities; however, it will be a challenge to ensure that they are ultimately included.
- Developing systems and policies that ensure that bike facilities are seriously considered on all widening or repaving roads will be a vitally important challenge.
- Opportunities to educate the development community regarding the value of providing bicycle facilities may be helpful.

Education and Awareness

- Bicyclist education was mentioned as an important challenge. This could include educational opportunities focusing on children, commuting, roadway rules and responsibilities, and strategies for safe interactions with motor vehicles.
- Education of the full range of stakeholders was also mentioned, including children, police, City and county employees, etc.

Key Findings from the Online Questionnaire

As noted, the online questionnaire supplemented information gathered at the public meetings and during field analysis. The questionnaire was available online for around one month and more than 830 people responded. When asked which specific locations in Asheville need improvements, respondents frequently cited high volume and high speed roads such as Merrimon Avenue. A memorandum with the full results on the questionnaire is included in the appendix. Key findings from the online questionnaire are included in Figure 2 below.

Figure 2: Key Findings from the Online Questionnaire

Key Findings from the Online Questionnaire

- Lack of adequate bicycle facilities, driver behavior, safety, narrow roads, traffic, access and connectivity were cited most frequently in response to a question about the most critical issues that people face while bicycling in Asheville.
- Key destinations cited by respondents as needing bicycle-related improvements included Downtown Asheville, Merrimon Avenue, Biltmore Village, UNC-Asheville, and West Asheville. Additionally, respondents frequently listed schools, grocery stores, and parks as areas in need of improvement.
- In response to questions about specific locations that need improvements so that bicycling is safer and more convenient, respondents cited the high volume and high speed roads in Asheville most frequently.
- Respondents tend to ride fairly short distances for transportation trips – over half of respondents said that their utilitarian trips are less than five miles in length.
- When asked what one thing would do the most to encourage bicycling, respondents clearly cited the need for better bicycle accommodations on streets and trails.
- It was clear from the responses that safety is a critical issue for Asheville's bicyclists, and with good reason: 25% of respondents have experienced a crash while bicycling in Asheville.

As noted above, safety is a critical concern for bicyclists in Asheville. It was cited frequently at the public meetings and on the online questionnaire. Table 2 below shows the number of bicycle crashes in Asheville, according to NCDOT's Division of Bicycle and Pedestrian Transportation Bicycle Crash Data Online Database. Note that the table below includes only bicycle-motor vehicle crashes reported to the North Carolina Division of Motor Vehicles by investigating officers for the years 1997-2005. Falls or other events involving only bicyclists that might be documented in medical databases are not included.

Table 2: Asheville Bicycle Crash Data - Injury Table

Injury	1997	1998	1999	2000	2001	2002	2003	2004	2005	Totals
Killed	0	0	0	0	0	0	0	0	0	0
Disabling Injury	3	2	2	1	0	0	2	1	1	10
Evident Injury	9	7	7	9	5	4	10	13	10	64
Possible Injury	8	1	3	2	3	0	4	3	4	24
No Injury	1	0	0	0	0	1	0	0	1	3
Unknown	0	0	0	0	0	1	0	0	0	1
Totals	**21**	**10**	**12**	**12**	**8**	**6**	**16**	**17**	**16**	**102**

Source: NCDOT Division of Bicycle and Pedestrian Transportation, Bicycle Crash Data Online Database at
http://www.pedbikeinfo.org/pbcat/city1_bike.cfm?CITY=Asheville&CNTY=Buncombe

Conclusion

The City of Asheville has a mix of opportunities and challenges to bicycling. Progress to improve future connectivity will depend on the City's ability to overcome the barriers identified in this chapter, as well as to capitalize on its existing facilities, assets and unique strengths. The following chapters provide recommendations for achieving the City's goals for improving bicycling in Asheville.

Greenway Trail Under Construction
Photo Credit: City of Asheville

Chapter 3: Existing Plans, Programs, and Policies

TEA-21 impacts the provision of bicycle facilities
Photo Credit: Toole Design Group

Policies and plans have been developed at the national, state, regional, and local levels that provide support for improving bicycle transportation in Asheville. The first part of this section describes federal policies and programs such as the Transportation Equity Act for the 21st Century (TEA-21), which impact the provision of bicycle facilities. The second part describes state plans, programs and laws regarding bicycling. The third section describes regional plans, and the final section describes local plans, programs and policies.

Taken together, these national, state, regional and local plans and policies create the context for planning efforts for the Asheville Comprehensive Bicycle Plan. Below is a description of the plans and policies that are most relevant to this Plan.

Federal Policies

Federal transportation policies (through the Intermodal Surface Transportation Efficiency Act of 1990 as well as subsequent transportation bills, including the most recent legislation passed in 2005: The Transportation Equity Act – A Legacy for Users) strongly support the inclusion of pedestrian and bicycle facilities in transportation projects, and have supplied a consistent source of funding for these activities for the past fifteen years.

Highlights from Section 1202 of the 1998 federal law, the Transportation Equity Act for the 21st Century (TEA-21) are included in Figure 3 below.

Figure 3: Selections from the Transportation Equity Act for the 21st Century (TEA-21)

"Bicyclists and pedestrians shall be given due consideration in the comprehensive transportation plans developed by each metropolitan planning organization and State." (Section 1202(a));

"Bicycle transportation facilities and pedestrian walkways shall be considered, where appropriate, in conjunction with all new construction and reconstruction and transportation facilities, except where bicycle and pedestrian use are not permitted." (Section1202(a)); and

"Transportation plans and projects shall provide due consideration for safety and contiguous routes for bicyclists and pedestrians." (Section 1202(a))

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

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

Policy Guidance

TEA-21 directed the Federal Highway Administration to draft policy guidance that would better define the level of accommodation that was required. In 1999, the Federal Highway Administrator issued the following guidance with regard to pedestrian and bicycle accommodations:

"While these sections stop short of requiring specific bicycle and pedestrian accommodation in every transportation project, Congress clearly intends for bicyclists and pedestrians to have safe, convenient access to the transportation system and sees every transportation improvement as an opportunity to enhance the safety and convenience of the two modes. "Due consideration" of bicycle and pedestrian needs should include, at a minimum, a presumption that bicyclists and pedestrians will be accommodated in the design of new and improved transportation facilities. In the planning, design, and operation of transportation facilities, bicyclists and pedestrians should be included as a matter of routine, and the decision to not accommodate them should be the exception rather than the rule. There must be exceptional circumstances for denying bicycle and pedestrian access either by prohibition or by designing highways that are incompatible with safe, convenient walking and bicycling."

Figure 4 below includes text from FHWA's Design Guidance issued in 2000 (entitled Accommodating Bicycle and Pedestrian Travel: A Recommended Approach).

Figure 4: FHWA's Design Guidance

FHWA's Design Guidance

Bicycle and pedestrian ways shall be established in new construction and reconstruction projects in all urbanized areas unless one or more of three conditions are met:

- bicyclists and pedestrians are prohibited by law from using the roadway. In this instance, a greater effort may be necessary to accommodate bicyclists and pedestrians elsewhere within the right of way or within the same transportation corridor.
- the cost of establishing bikeways or walkways would be excessively disproportionate to the need or probable use. Excessively disproportionate is defined as exceeding twenty percent of the cost of the larger transportation project.
- where sparsity of population or other factors indicate an absence of need. For example, the Portland Pedestrian Guide requires "all construction of new public streets" to include sidewalk improvements on both sides, unless the street is a cul-de-sac with four or fewer dwellings or the street has severe topographic or natural resource constraints.

In rural areas, paved shoulders should be included in all new construction and reconstruction projects on roadways used by more than 1,000 vehicles per day, as in States such as Wisconsin. Paved shoulders have safety and operational advantages for all road users in addition to providing a place for bicyclists and pedestrians to operate.

In addition to the Federal support for bicycle planning efforts, there is significant support at the State level, as described below.

State of North Carolina Plans, Programs and Policies

The State of North Carolina has numerous plans, programs and policies that support bicycling. Several of the most important bicycle planning documents are listed below.

- Bicycling and Walking in North Carolina: A Long-Range Transportation Plan
- Charting a New Direction for NCDOT: North Carolina's Long-Range Statewide Multi-Modal Transportation Plan
- 2007-2013 State Transportation Improvement Program (TIP)

The State of North Carolina has numerous programs and initiatives that support bicycling throughout the State. Theses programs are listed below.

- Division of Bicycle and Pedestrian Transportation
- Bicycle and Pedestrian Transportation Improvement Program
- Safe Routes to School Program
- Bicycle and Pedestrian Planning Grant Initiative
- Bikes on Public Transportation
- North Carolina Bicycle Committee

Figure 5: State of North Carolina Laws

State of North Carolina Laws

- Bicycle helmets (Note that adults are not required by law to wear helmets.)
- Bicycle lights
- Requirements for riding on the right
- Impaired driving
- Reckless operation
- Signs and signals
- One-way streets
- Signaling and turning
- Yielding right-of-way to pedestrians
- Passing another vehicle
- Being passed
- Crashes
- "Good Samaritan" law

State of North Carolina laws significantly impact bicycling in Asheville. State laws regulate a range of safety issues such as the use of bicycle helmets and lights, as well as operational issues such as where to ride on the road and how to pass and be passed while riding a bicycle. A list of areas that state law covers is included in Figure 5.

More specific information on State laws pertaining to bicycling can be found at the Division of Bicycle and Pedestrian Transportation's website at http://www.ncdot.org/transit/bicycle.

The State of North Carolina has many important policies that support bicycling and impact bicycle-related activities in localities. The most important policies are noted below.

- 1974 Bicycle and Bikeway Act
  http://www.ncdot.org/transit/bicycle/laws/laws_bikewayact.html
- NCDOT Bicycle Policies
  http://www.ncdot.org/transit/bicycle/laws/laws_bikepolicy.html
- Board of Transportation Resolution on Mainstreaming
  http://www.ncdot.org/transit/bicycle/laws/laws_resolution.html
- Greenway administrative guidelines
  http://www.ncdot.org/transit/bicycle/laws/laws_greenway_admin.html

Regional Plans and Programs

The planning context for this project is influenced by regional plans and programs as well. The City is located within the French Broad River Metropolitan Planning Organization (MPO), which is the transportation planning agency serving the urbanized areas of Buncombe County, Haywood County, and Henderson County, North Carolina. The MPO works with the North Carolina Department of Transportation (NCDOT) to plan improvements to the transportation system in the area. It is responsible for developing long range transportation plans, and setting local priorities for transportation improvements. Transportation planning covers all modes of transportation including highways, public transit, and bicycle and pedestrian facilities. The MPO's most significant planning documents relating to bicycle planning are listed below.

- 2007 Comprehensive Transportation Plan (CTP): The CTP is a planning process undertaken by NCDOT to create a series of maps that present a vision for the future transportation system. The CTP was updated in fall 2007 and was informed by recommendations in this Plan. The updated CTP is available on the French Broad River MPO's website at http://www.fbrmpo.org. All future updates to the CTP should continue to incorporate the recommendations in this Plan.
- Transportation 2030: The Long-Range Multi-Modal Plan for Buncombe, Haywood, and Henderson Counties. One of the primary policy objectives in the Plan is to "increase the supply of pedestrian and bicycle facilities."
- 2007-2013 French Broad River MPO TIP: The MPO TIP includes bicycle and pedestrian improvement projects. The TIP process is described in Chapter 7 of this Plan.
- 2007 Draft Priority Needs List (Priorities in the TIP): The Priority Needs List includes bicycle facilities.
- 2004 Congestion Management System Report (CMS): The CMS report notes that providing bicycle facilities is a valuable regional congestion mitigation strategy.

Local Plans, Programs and Policies

Local plans, programs and policies have a significant impact on bicycling in Asheville. The most important planning document in the City is the Asheville 2025 Plan. The Comprehensive Plan is the guiding policy document for the City, outlining a vision for the future and providing the framework for policy and decisions. Additional local plans which impact bicycling in Asheville are listed in Table 3 below.

Table 3: Selected Local and Regional Planning Documents

Title	Coordinating Agency	Year
Asheville Center City Plan	Developed as part of the City's comprehensive plan process	2003
Transportation Options of Western North Carolina: A Regional Plan for Mobility	Buncombe County	2001
Asheville Greenways Master Plan	City of Asheville	1998
Asheville MPO Pedestrian and Bicycle Thoroughfare Plan	French Broad River MPO	1999
River Redevelopment Plan	River District Design Committee	2005

Asheville Neighborhood Plans	WestEnd/Clingman Avenue, Haywood Road Corridor, Charlotte Street, and Broadway Corridor	Varies
City of Asheville Pedestrian Plan (Update to the 1999 Pedestrian Thoroughfare Plan)	City of Asheville and the French Broad River MPO	2005
City of Asheville Smart Growth Policy	City of Asheville	2000
Downtown Streetscape Plan	Unknown	Unknown
Wilma Dykeman Riverway Plan	Prepared by RiverLink	2003
Historic District Plans	Biltmore Village, Montford, etc.	Varies

A selection of important bicycle-related statements from the Comprehensive Plan is included in Figure 6 below.

Figure 6: Quotations from the City of Asheville's 2025 Plan

City of Asheville's 2025 Plan

- Providing transportation options where transit, bicycles, and walking join the automobile in getting us around our neighborhoods and business centers
- Strongly encourage improvements that make Asheville a premier walking and biking community, including the use of evaluative and regulatory tools and capital improvements.
- Implementation of various projects from the City's Bicycle and Pedestrian Plan should be implemented on a priority basis as funding allows.
- Where possible, multimodal transportation interconnectivity between neighborhoods and to destination areas such as parks and neighborhood shopping locations should be encouraged.
- These problems require a balanced approach--adding a new focus on development patterns, transportation demand management, transit, bicycling, and walking to road building will maximize our potential for long-term success.
- Vision: The City of Asheville will have a network of bicycle and pedestrian routes which are safe and provide reasonable transportation choice for its residents as outlined in the Asheville Greenway Master Plan and the City's Bicycle and Pedestrian Plan.
  Bicycle and pedestrian travel will be encouraged with the continued construction of pedestrian and bicycle facilities, including sidewalks, curb extensions, bicycle lanes, and bicycle parking racks. Land use is an integral component of transportation need and modal choice. Mixed use, densification, nodal development, and proximity are key concepts creating land use that encourage bicycle and pedestrian travel.
- Preferred street design cross-sections should provide provisions for bike lanes and sidewalks and should also extend beyond the right-of way to address items such as building setbacks, parking location, and scale and size of buildings.
  A few basic assumptions should be in place for improving urbanizing transportation corridors. First, unless the facility is a limited access highway, it should be assumed that there will be adjacent development. Second, all developed corridors and urbanizing environments have a need for safe and attractive pedestrian facilities and consideration of bicycle transportation.
- Goal X. The City should assure that as land is developed or redeveloped, provision is made for access by various means of transportation.
- Goal II. Develop a system of sidewalks, greenways and bicycle facilities that will make Asheville a more walkable and more livable city.

In addition to the Plans outlined above, there are numerous programs that encourage and support bicycling in Asheville. These include programs that are provided by the government, as well as programs that are community-based efforts. A selection of government-based and community-based bicycle programs are listed below.

Government-based programs

- City of Asheville Engineering and Transportation Department
- Other City departments such as the Planning Department and the Department of Parks and Recreation
- Asheville Greenway Commission
- Asheville Transit "Bike on Bus" Program
- Asheville Transportation Demand Management (TDM) Program

Community-based programs/resources

- Asheville on Bikes
- Asheville Area Bicycle and Pedestrian Task Force
- Ongoing bicycle commuter classes
- Great Asheville-Buncombe Cleanup
- Strive Not to Drive (annual event)
- Bicycle clubs
- Bicycle Alliance of North Carolina
- Local bike shops
- Locally-based professional teams
- List-serves

Local policies also impact bicycling in Asheville. For example, the City's Zoning Regulations require developers to provide bicycle parking facilities. Sections of the Zoning Regulations that impact bicycling are outlined in Table 4 below.

Table 4: Bicycle-Related Elements in the City of Asheville Zoning Regulations

Section and Title	**Zoning Text**
Sec. 7-8-24. Neighborhood Corridor District, (f) *Development standards.* (9) *Parking/loading standards, c.*	Uses in the Neighborhood Corridor District are permitted a 50 percent reduction in the minimum number of parking spaces required by section 7-11-1 of this chapter provided that a walking amenity and bike racks are provided (walking amenities may include but are not limited to public courtyards, drinking water fountains, benches, shade structures, pocket green spaces and public access restrooms).

ARTICLE XI. DEVELOPMENT AND DESIGN STANDARDS, Sec. 7-11-1. Parking, loading, and access standards, (3) *Bicycle parking.*	Bicycle parking shall be provided for all uses except single-family and two-family dwellings. The minimum number of bicycle parking spaces required shall be equal to five percent of the total number of automobile parking spaces in the lot. Bicycle parking facilities shall include standard bike racks or other secured, lockable facilities.
Sec. 3-9. Public nuisance. (7)	Maintaining an animal that habitually or repeatedly chases, snaps at, attacks or barks at pedestrians, joggers, animals walked on a leash, bicycles or other vehicles;
ARTICLE VIII. RAILROADS, Sec. 19-279. Maintenance of tracks and crossings.	All railroad companies maintaining tracks in, along or across any of the streets of the city shall at all times keep such tracks and a space immediately outside of each rail and next thereto 24 inches wide in good condition and shall maintain their rails level with the surface of the street and in such condition with reference thereto as to render the crossing of the rails by pedestrians and vehicles easy, convenient and safe. (Code 1965, § 23-3)

Conclusion

Policies and plans at the national, state, regional, and local level provide support and provide context for improving bicycle transportation in Asheville. To the extent possible, this Plan incorporates the goals and strategies outlined in the plans described above. This Plan strives to encourage bicycling in Asheville by improving access, mobility and safety of bicyclists. In doing so, it provides a critical element of the Smart Growth vision outlined in the Asheville 2025 Comprehensive Plan.

Downtown Asheville
Photo Credit: Toole Design Group

Chapter 4: Facility Standards and Guidelines

A goal of the Comprehensive Bicycle Plan is to provide functional, safe and accessible multi-modal connections throughout Asheville. It is critical that facilities and design solutions are chosen that are appropriate for the user and existing space. This chapter provides guidance on design solutions for situations that currently exist or that are likely to develop in Asheville.

The following publications should be referenced for greater detail on the design of bicycle facilities.

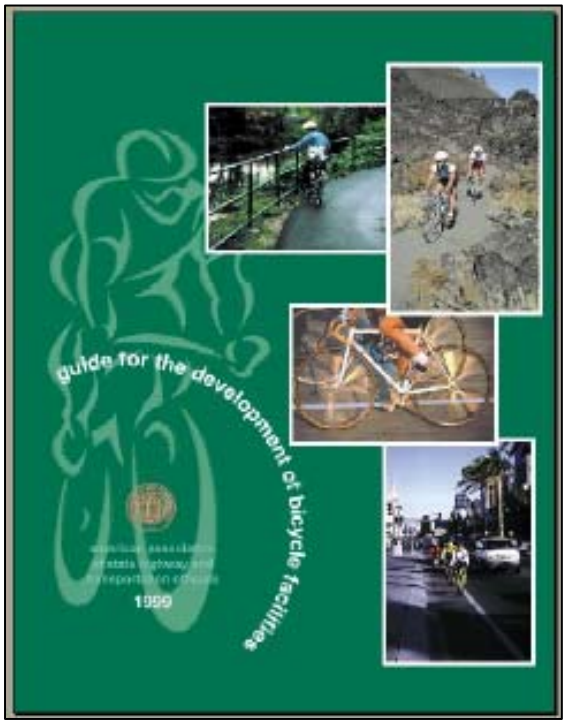
- Guide to the Development of Bicycle Facilities. The American Association of State Highway Transportation Officials (AASHTO), Updated in 1999. Available from AASHTO at www.aashto.org/bookstore/abs.html.

- Manual on Uniform Traffic Control Devices (MUTCD). Published by the U. S. Department of Transportation, Washington, DC, 2001. The manual is available at http://mutcd.fhwa.dot.gov.

- Americans with Disabilities Act Accessibility Guidelines. U.S. Department of Justice, United States Access Board. Guidelines are available at http://www.access-board.gov/adaag/html/adaag.htm

- Designing Sidewalks and Trails for Access: Part Two - Best Practices Design Guide. Published by U.S. Department of Transportation, Washington, DC, 2001

- International Building Code. Published by International Code Council (ICC), 2006.



AASHTO Guide to the Development of Bicycle Facilities
Photo Credit: AASHTO

- North Carolina Bicycle Facilities Planning and Design Guidelines. Published by the State of North Carolina Department of Transportation, 1994.

All pedestrian and bicycle facilities should be designed to meet State and Federal design guidance and standards, as defined by the American Association of State Highway Transportation Officials (AASHTO), the Americans with Disabilities Act, and the Manual on Uniform Traffic Control Devices (MUTCD). If the national standards are revised in the future, the new national standards should be followed.

On-Street Bicycle Facilities

On-street bicycle facilities can include a range of design treatments such as bicycle lanes, striped shoulders and shared lane markings. The goal of on-street facilities is to improve bicycling conditions on roadways while providing a visible reminder that motorists should share the road with bicyclists. On busy streets, an important purpose of these facilities is to provide lateral separation between bicyclists and motor vehicles and to encourage proper behavior among bicyclists and motorists. For these reasons, on-street facilities are recommended for roads in Asheville with higher traffic volumes.

Factors that impact safety and comfort for on-street facilities are noted below.

- Amount of lateral separation between bicycles and motor vehicles (more space is needed when traffic speeds increase)
- Motor vehicle traffic volumes on the roadway
- Speed of the traffic on the roadway
- Percent of heavy vehicles on the roadway
- Presence of on-street parking
- Pavement surface condition

Shared Roadways: Shared roadways are streets and roads where bicyclists can be served by sharing the travel lanes with motor vehicles. Usually, these are streets with low traffic volumes and/or low speeds, which do not need special bicycle accommodations in order to be bicycle-friendly. There are many low-volume local and rural roadways in Asheville that are excellent for bicycling in their current condition and need no further improvement to be bicycle compatible.

Signed-Shared Roadways: A signed-shared roadway is a shared roadway, which has been designated by signing as a preferred route for bicycle use. Bike route signs can be posted on key routes between major destinations in Asheville to indicate to bicyclists that particular advantages exist to using these routes compared with alternative routes. Bicycle route signs should only be posted on roadways where conditions are favorable.

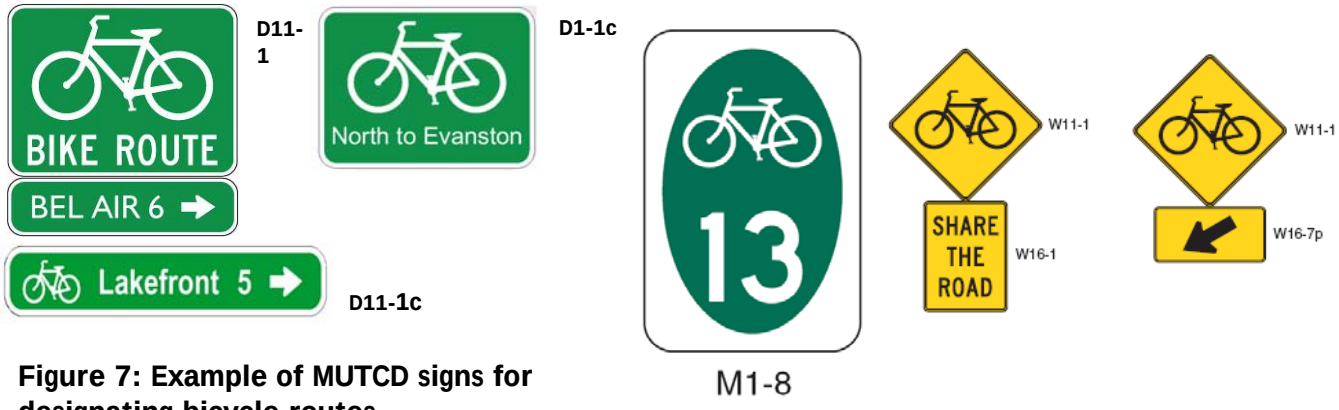


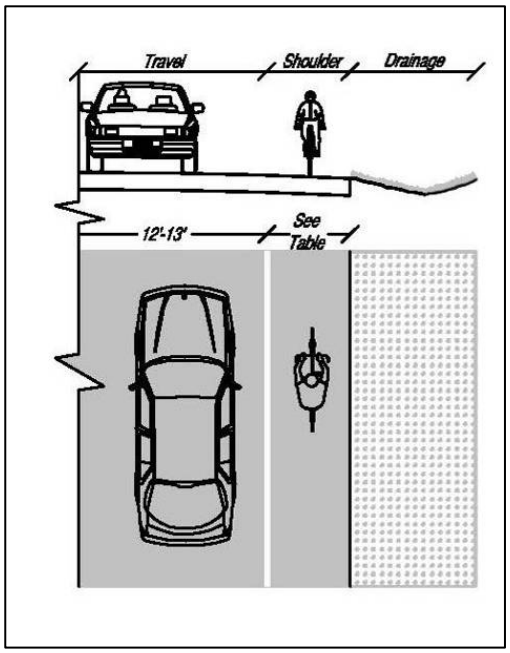
Figure 7: Example of MUTCD signs for designating bicycle routes

"Share the Road" signs can be posted on roads that bicyclists use regularly. These signs can increase motorists' awareness of the presence of bicyclists, especially in areas where bicyclists may not be expected or where many drivers are tourists. A new fluorescent

yellow/green color has been approved in the *Manual on Uniform Traffic Control Devices* and can be used on these signs. Signs should be used judiciously, as too many signs can cause visual clutter and lead to non-compliance. Note that the Share the Road sign is a warning and should not be used for directional signing of a bicycle route. This sign; however, may be used along a designated route where traffic volumes are higher (usually a short section of route) or at an approach to a narrow bridge. For additional information, see page 93 of the North Carolina Bicycle Facilities Planning and Design Guidelines.

Striped/Paved Shoulders: Striped/paved shoulders are another treatment that can be considered for roads in Asheville with higher traffic volumes and speeds. These facilities increase the comfort of bicyclists by providing greater lateral separation between automobiles and bicycles. The width of the shoulder can vary, but at least four feet is preferred (see the chart below for recommended widths). NCDOT guidelines require a 4 foot minimum width to be a designated facility and provide guidance on when that should be exceeded. It is important to note that at intersections, additional symbols and arrows may be needed to provide direction to bicyclists and reduce potential conflicts between bicyclists and turning cars. Shoulders are typically installed in non-curb and gutter sections.

Figure 8: Striped/Paved Shoulders



Bicycle Shoulder Width Table		
AADT (< 6% HV)	**Travel Lane**	**Bicycle Treatment**
0-1,500	10'-12'	Shared Lane
1,501-2,000	11'	4' Shoulder
2,001-3,000	11'	4' Shoulder
3,001-6,000	12'	4' Shoulder
6,001-13,500	12'	5' Shoulder
≥ 13,501	12'	6' Shoulder

Source: Toole Design Group

Shoulder on roadway with no parking, ≤ 55mph

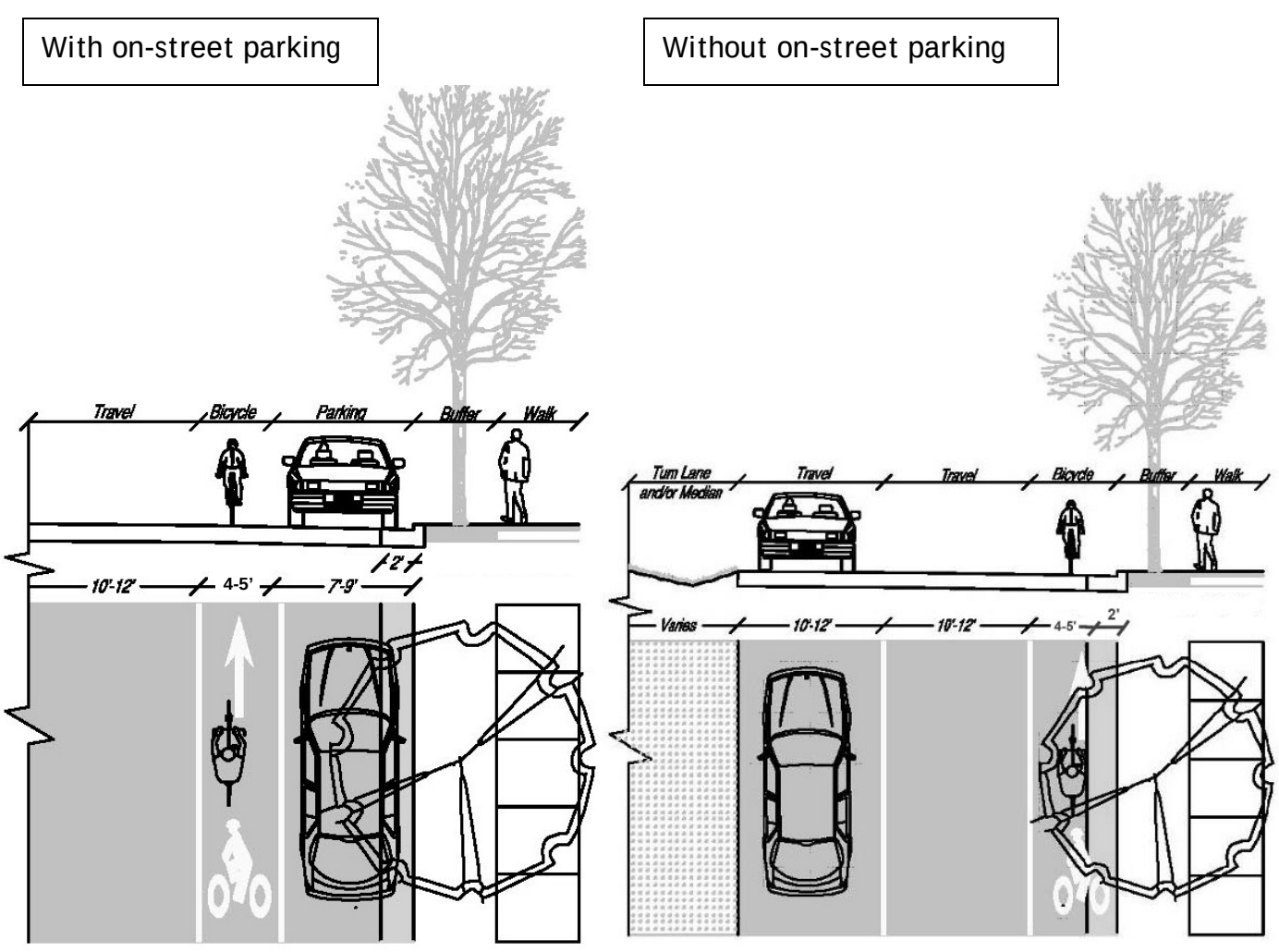
Bicycle Lanes: Bicycle lanes are portions of the roadway that have been designated for the preferential or exclusive use of bicyclists through striping, signage and other pavement markings. On two-way streets, bike lanes should be provided on both sides of the road so that bicyclists can ride in the same direction as adjacent motor vehicle traffic. Bike lanes should be at least four feet wide on roadways with open shoulders and five feet wide on roadways with curb and gutter. Five foot bicycle lanes are typical, but wider lanes (i.e. 6') are often used on roadways with high motor vehicle traffic volumes. Bicyclists still have the right to use the travel lanes on streets with bicycle lanes. Note that North Carolina guidelines for bicycle

lanes do not include the width of the gutter pan as part of the four or five foot bike lane width. The standard width is a minimum of 4 feet, not including the gutter pan. Where the asphalt goes all the way to the curb (as a result of repaving projects) the minimum width is 6 feet.

Bicycle lanes can provide the following benefits:

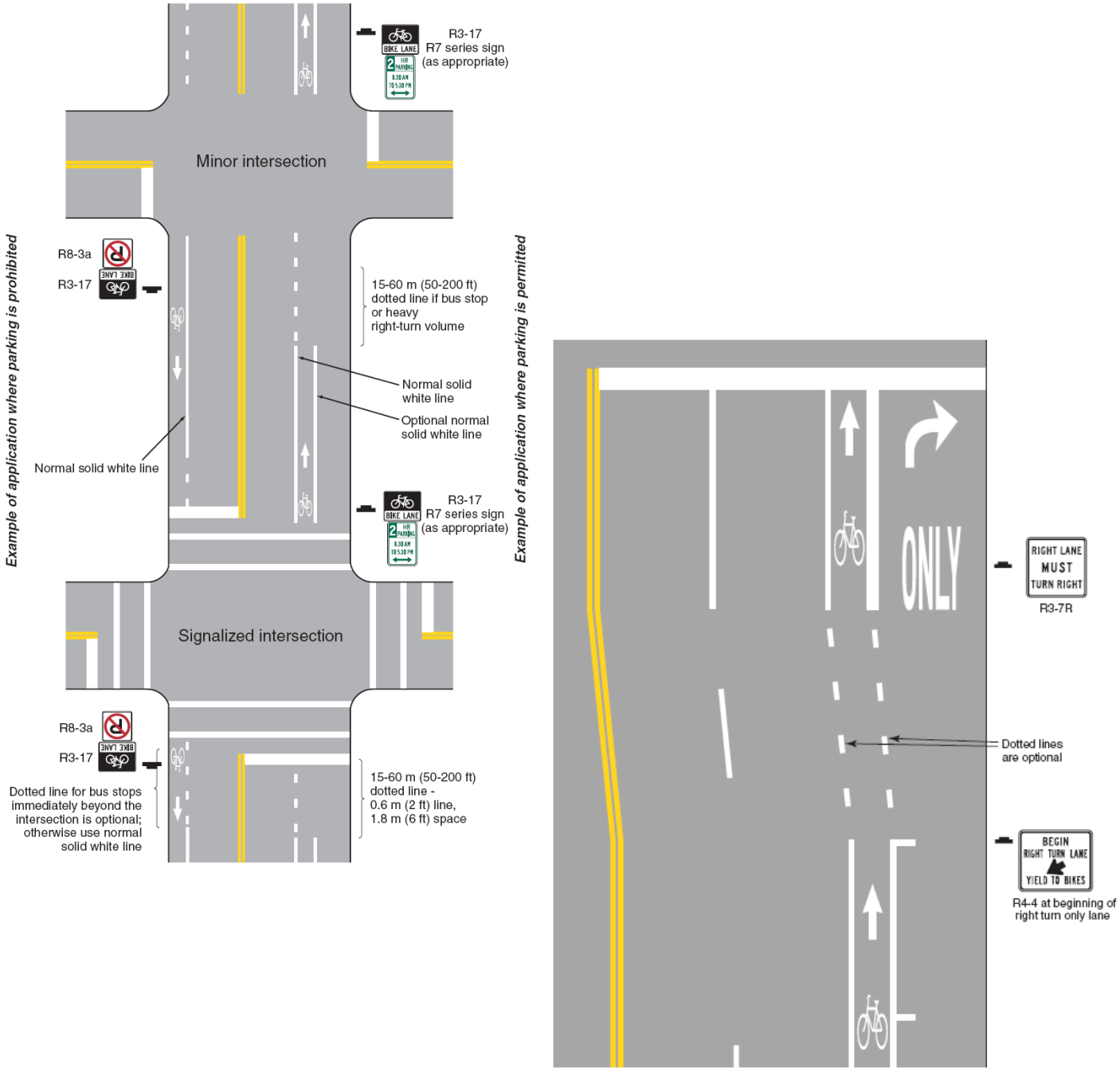
- Increase the comfort of bicyclists and motorists on roadways
- Increase the amount of lateral separation between motor vehicles and bicycles
- Indicate the appropriate location to ride on the roadway with respect to moving traffic and parked cars, both at mid-block locations and approaching intersections
- Increase the capacity of roadways that carry mixed bicycle and motor vehicle traffic
- Increase predictability of bicyclist and motorist movements
- Increase drivers' awareness of bicyclists while driving and when opening doors from an on-street parking space

Figure 9: Bicycle lanes with and without on-street parking



Source: Toole Design Group

Figure 10: Examples of Pavement Markings for Bicycle Lanes on a Two-Way Street and Bicycle Lane Treatments at Parking Lanes into a Right Turn Only Lane



Source: Manual of Uniform Traffic Control Devices for Street and Highways, 2003 Edition

According to the Manual of Uniform Traffic Control Devices, bike lanes provide the following benefits:

- Longitudinal pavement markings should be used to define bicycle lanes.
- Pavement markings designate that portion of the roadway for preferential use by bicyclists.
- Markings inform all road users of the restricted nature of the bicycle lane.

Bicycle Lane Pavement Markings
The Manual on Uniform Traffic Control Devices (MUTCD) establishes standards and guidance on the use of pavement markings (symbol and pavement marking arrow) to designate bicycle lanes, and should be referenced in addition to the guidance provided below.

The bicycle lane symbol should be a white, thermoplastic preformed pavement marking. The symbol should generally be placed in the center of the bicycle lane and should be accompanied by a pavement marking arrow.

Bicycle lane pavement markings should only be used in conjunction with a solid and/or dashed white stripe that delineates the bicycle lane from the motor vehicle travel lane. The bicycle lane striping should be a minimum of five inches in width to delineate the bicycle lane from the motor vehicle travel lane per the MUTCD. An optional five inch wide stripe may delineate the bicycle lane from a parking lane. The MUTCD offers the following additional guidance on making and signing bike lanes:

- If used, the bicycle lane symbol marking shall be placed immediately after an intersection and at other locations as needed.
- The bicycle lane symbol marking shall be white.
- If the bicycle lane symbol marking is used in conjunction with other word or symbol messages, it shall precede them.
- A through bicycle lane shall not be positioned to the right of a right turn only lane.
- When the right through lane is dropped to become a right turn only lane, the bicycle lane markings should stop at least 100 feet before the beginning of the right turn lane. Through bicycle lane markings should resume to the left of the right turn only lane. Dashed lines should be provided for the transition to the left of the right turn lane.
- An optional through-right turn lane next to a right turn only lane should not be used where there is a through bicycle lane. If a capacity analysis indicates the need for an optional through-right turn lane, the bicycle lane should be discontinued at the intersection approach.
- Posts or raised pavement markers should not be used to separate bicycle lanes from adjacent travel lanes.

For additional information, see the MUTCD referenced at the beginning of this chapter.

Bicycle Lane Signs
The MUTCD also establishes standards and guidance on the use of signs to designate bicycle lanes, and should be referenced in addition to the guidance provided below. The following discussion highlights signs that can be used in conjunction with bicycle lanes.

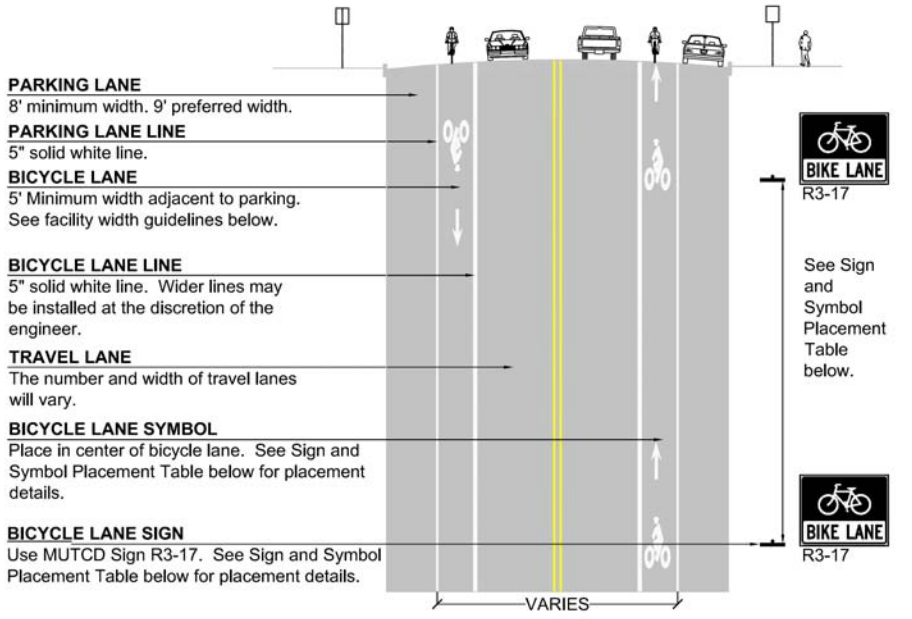
The use of the bike lane sign should be used only in conjunction with marked bicycle lanes, and should be placed at periodic intervals along the bicycle lanes. Bicycle lane signs need not

be adjacent to every symbol to avoid overuse of the signs. Preference should be given to placing signs at locations where there are sight distance problems, where the bicycle lane is unexpected, where there is a history of motorists utilizing the bicycle lane for driving, and/or parking. For additional information, see the MUTCD referenced at the beginning of this chapter.

Bike Lanes Next to Parking

The marking of bike lanes on closed section roadways with parallel parking should vary depending upon a number of factors including parking turnover, vehicular volumes, road width, lane width, and pavement condition. In general, it is recommended that parking lanes be a minimum width of 8 feet adjacent to a 5 foot bicycle lane. Parking should be prohibited in the bicycle lane. Additional information on the striping of bicycle lanes next to on-street parking is included in Figure 11.

Figure 11: Bike Lane Striping Next to On-Street Parking



FACILITY WIDTH GUIDELINES

OPERATING SPEED	VOLUME RANGE	BICYCLE LANE WIDTH
≤35 MPH	<10,000 ADT	5 FEET
36-45 MPH	10,000-20,000 ADT	5-6 FEET
>45 MPH	>20,000 ADT	6 FEET

SIGN AND SYMBOL PLACEMENT

	SIGN SPACING	SYMBOL SPACING
RURAL	1-3 MILES	0.5-1 MILES
SUBURBAN	0.5-1 MILES	0.1-0.5 MILES
URBAN*	VARIES[1]	2-4 PER BLOCK

* In urban areas, the use of bike lane signs should be kept to a minimum. Generally a sign may be utilized at the beginning and end of a bike lane.

DESIGN OF BIKE LANES ON CLOSED SECTION ROADWAYS WITH PARKING:

- In areas where parking violations frequently occur, the use of the R7-9 NO PARKING/BIKE LANE sign may be used in place of the NO PARKING sign (R7-1 or similar).

Source: Toole Design Group

Shared Lane Markings: Shared lane markings are pavement markings placed along selected roads that alert automobile drivers to the presence of bicyclists and encourage bicyclists to ride outside of the "door zone" of parked cars. They reduce wrong-way bicycling and tend to increase the distance between bicyclists and passing cars. Shared lane markings are generally used where there is not enough space for bicycle lanes. They should not be used on roadways with a speed limit above 35 miles per hour. Marking should be placed immediately after an intersection and spaced at intervals not greater than 250 feet thereafter. Shared lane markings are expected to be adopted into the Manual on Uniform Traffic Control Devices (MUTCD) in 2009.

Shared lane markings have the following benefits:

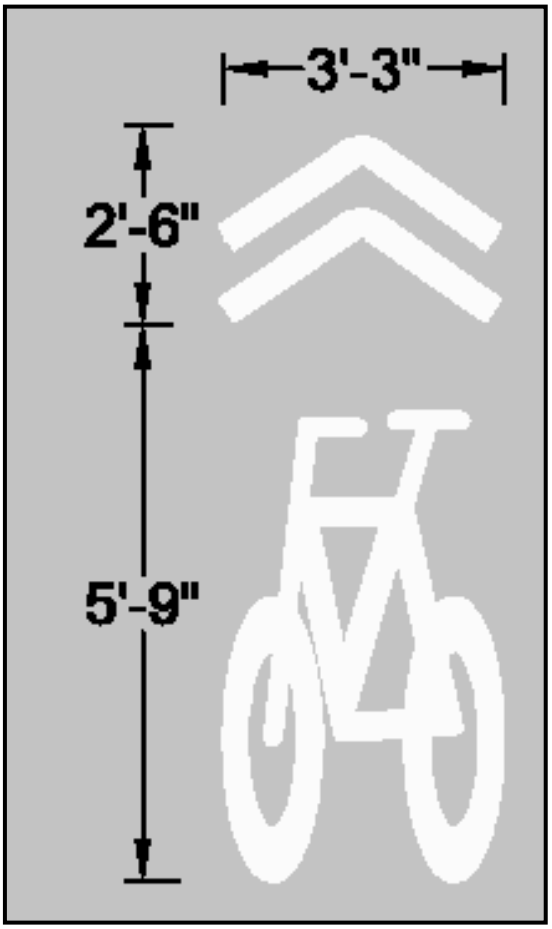
- Provide a visible cue to bicyclists and motorists that bicycles are expected and welcomed on the roadway
- Indicate the most appropriate location to ride on the roadway with respect to moving traffic and parked cars
- Can be used on roadways where there is not enough space for standard width bicycle lanes
- Connect gaps between other bicycle facilities, such as a narrow section of roadway between road segments with bicycle lanes

The shared lane pavement marking should be placed:

- A minimum of 11 feet from the face of the curb when used adjacent to a parking lane;
- A minimum of 4 feet from the face of curb or roadway edge when not used adjacent to a parking lane; and
- Immediately following intersections and spaced at intervals up to 250-foot thereafter;

The shared lane pavement marking should not be placed in bicycle lanes. The shared lane pavement marking should not be placed on roadways with speed limits posted above 35 mph.

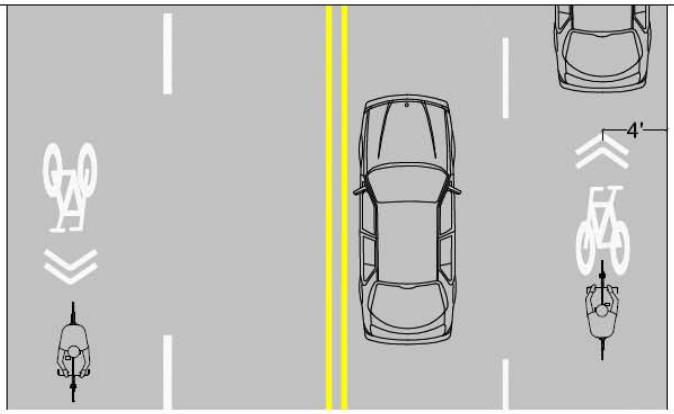
Figure 12: Shared Lane Markings



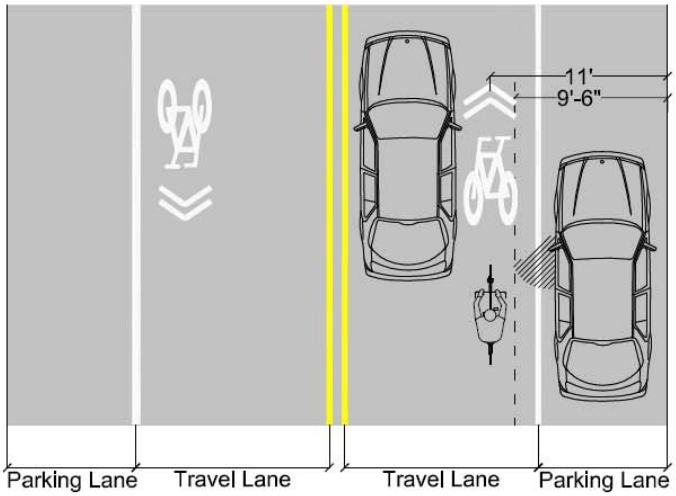
Shared lane marking on constrained roadway with parking and speed limit ≤ 35 mph. Source: Maryland SHA Bicycle and Pedestrian Design Guidelines

Figure 13: Example Shared Lane Marking Placement

SYMBOL PLACEMENT - NO PARKING:



SYMBOL PLACEMENT - PARKING:



SUITABLE LOCATIONS FOR SHARED LANE MARKING:

- Symbols may be used on roadways that are too narrow for bicycle lanes.
- Symbols may be used on narrow roadways to connect disconnected bicycle facilities such as bicycle lanes, designated routes, and shared use paths.
- Symbols should only be used on roadways with posted speeds less than 35 mph.

DESIGN OF SHARED LANE MARKINGS:

- Symbols shall be placed after each intersection. Symbols shall be placed no closer than every 250' thereafter.
- If used on roadways with on-street parking, symbols shall be placed so that their centers are a minimum of 11' from the adjacent curb face.
- Symbols placed in a shared lane without parking shall be placed so that their centers are a minimum of 4' from the adjacent curbface.
- Do not place symbols on lane lines.

Source: Maryland SHA Bicycle and Pedestrian Design Guidelines

Climbing Lanes: Climbing lanes are a hybrid bicycle facility that includes a five-foot bicycle lane on one side of the roadway (typically in the uphill direction) and a shared lane marking on the other side of the roadway. This allows slower-moving, uphill bicyclists to have a designated bicycle lane space and allows motor vehicles to pass more easily. It also allows faster-moving, downhill bicyclists to have a shared-lane marking, which alerts motorists to expect faster-moving bicyclists in the travel lane, further from parked cars. The bicycle lane and shared lane markings also indicate the proper direction for bicyclists to travel on either side of the street. This type of facility is particularly applicable in Asheville because of its topography and because it can be used on streets where there is not enough space for standard width bicycle lanes on both sides.

Climbing lanes include a five-foot bicycle lane on one side of the roadway and a shared lane marking on the other side of the roadway.

Road Diet: There are streets in Asheville where space for bicycle lanes or other on-road bicycle facilities could be provided by removing existing travel lanes. This travel lane rechannelization, or road diet, often involves converting an existing four-lane roadway to a two-lane roadway with a center-turn lane. This allows bicycle facilities to be installed as well as raised median islands or a crossing island. This treatment reduces bicycle and pedestrian crossing distance and exposure to vehicular traffic, and has been shown to improve motor vehicle flow and reduce rear-end and left-turning crashes when used in appropriate locations.

Removing travel lanes may or may not require tradeoffs between travel modes within a roadway corridor. An engineering and policy analysis must be conducted to evaluate the impact of removing travel lanes on all modes.

This includes considering factors such as:

- Pedestrian crossing opportunities and safety
- Transit capacity and performance (additional transit operational analysis is needed for UVTN corridors)
- Bicycle network connectivity
- Peak-hour motor vehicle capacity
- Access to adjacent businesses
- Opportunity to reduce crashes of all types
- Opportunity to reduce vehicle travel speeds, thereby reducing injury severity to pedestrians and bicyclists involved in collisions
- Roadway substructure (if part of the roadway that was formerly a median or streetcar lane is reconfigured to carry heavy trucks, there may be additional maintenance costs)

Lane Diet: There are many streets in Asheville that could potentially accommodate bicycle facilities within the existing road width if the travel lanes were narrower. In these locations, narrowing the automobile travel lanes would create enough space within the existing road width to provide bicycle facilities without eliminating a travel lane. An example of how this can occur is included in Figure 18 on page 53.

Bicycles on Bridges

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

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

The NC Bridge Policy has three relevant sections as listed below and can be found at http://www.ncdot.org/doh/preconstruct/altern/value/manuals/bpe2000.doc. The Division of Bicycle and Pedestrian Transportation staff review all bridge projects and make recommendations for wide shoulders, sidewalks and bicycle-safe railings according to potential usage by bicyclists (and pedestrians).

Bikeways

When a bikeway is required, the bridge shall be designed in accordance with AASHTO standard bicycle accommodations and North Carolina Bicycle Facilities Planning and Design Guidelines to give safe access to bicycles where feasible. A minimum handrail height of 54" is required where bicyclists will be riding next to the handrail.

Sidewalks

Sidewalks shall be included on new bridges with curb and gutter approach roadways that are without control of access; in some cases, only one side may warrant a sidewalk. Sidewalks should not be included on controlled access facilities. A determination on providing sidewalks on one or both sides of new bridges will be made during the planning process according to the NCDOT Pedestrian Policy Guidelines. When a sidewalk is justified, it shall be a minimum of 5'-6" wide. A minimum handrail height of 42" is required.

Bridges within Urban Area Boundaries

Urban Area Boundaries represent the outer limit of potential urban growth over the planning period – generally 20 to 25 years – and include more than enough land to accommodate anticipated growth. The full approach curbed width is to be provided for bridges with existing urban – type roadway sections (curb and gutter). On urban – type roadways without control of access ADA acceptable sidewalks shall be provided on new bridges. Sidewalks will be provided on structures for non-control of access facilities crossing control of access facilities. Sidewalks shall be provided on one or both sides in accordance with the project Environmental Planning Document. If future roadway widening is anticipated, additional bridge width should be considered to accommodate the planned curbed width.

Bridges within the Federal-aid urban boundaries with rural-type roadway sections (shoulder approaches) may warrant special consideration. To allow for future placement of ADA acceptable sidewalks, sufficient bridge deck width should be considered on new bridges in order to accommodate the placement of sidewalks. As part of the planning process, the functional classification will be reviewed to determine if its planning designation is applicable

for the facility over the 20-year design period. In some cases, a new classification may be established for design purposes and approved in the Environmental Planning Document. Design exceptions would be required for any design elements that do not meet the

Additional information is included below.

Bridges on Controlled Access Freeways

Bridge replacement projects on controlled access freeways where bicyclists are prohibited by law will generally *not* include facilities to accommodate bicyclists. In cases, however, where a bridge replacement project on a controlled access freeway impacts a non-controlled access roadway (i.e. a new overpass over an arterial roadway), the project should include the necessary access for bicycles on the non-limited access roadway, including such elements as: paved shoulders and bicycle crossing improvements to associated ramps and intersections.

Urban/Suburban Bridges (Closed Section)

The NCDOT Roadway Design Manual notes that a minimum handrail height of 54" is required where bicyclists will be riding next to the handrail.

Locations with Shared Use Pathways

For bridges that have an existing or proposed shared use path approaching one side, the bridge should be constructed with a shared use path on that side, separated from traffic by a concrete barrier. Use of the concrete barrier requires a crash cushion, or should otherwise be designed so that it does not pose a hazard to errant vehicles. Note that if a shared use path is only on the bridge and does not continue on the roadway for any distance, this would make bicyclists ride against traffic.

The pathway should be a minimum of 12' wide. The barrier between the pathway and the shoulder should be a uni-directional concrete barrier with a height of 42" from the surface of the pathway. The railing on the other side of the pathway is not required to be crashworthy. This railing should be constructed to a height of 54" from the surface of the pathway. It is important to also consider the shy distance that bicyclists utilize when walking along vertical objects, such as a barrier. This distance is usually assumed to be 2 feet from the edge of a persons arm to the edge of the vertical object.

Rural Roads (Open Section)

The following guidelines apply to bridge replacement projects on rural roadways with open sections. Shoulder tapers should be considered along roadways without continuous paved shoulders to transition bicyclists onto the bridge shoulder. Roadway shoulder improvements associated with bridge replacement projects should include 4' wide (minimum) paved shoulders for bicycle use. Pedestrians who occasionally use rural bridges will share the shoulder space with bicycles – sidewalks generally are not required on rural bridges. However, on bridge replacement projects that are near points of community development such as schools, shopping centers, local businesses, tourism attractions, or other land uses that result in pedestrian concentrations along the highway, a curb and sidewalk cross section should be used in conjunction with 4' paved shoulders on each side of the road to accommodate bicyclists.

Bridge Retrofit Projects

Bridges can be retrofitted to better accommodate bicyclists. There are a variety of ways of accomplishing this:

1) Reducing the width and/or number of travel lanes to create more space for bicycles. For example, a narrow sidewalk can be widened to provide for a more comfortable pedestrian environment, while maintaining adequate shoulder width for bicycling.

2) Adding a new bicycle structure to the existing bridge structure. In some cases, bridge footers may have been constructed in anticipation of a future roadway widening, or it may otherwise be possible to add an additional structure for bicyclists. Bridge retrofit solutions require detailed structural analysis to determine if the bridge can accommodate the additional weight of new facilities without compromising its structural integrity. Note that adding a structure on only one side could potentially create safety concerns as bicyclists could end up on the road against (or facing) traffic.

Bridge policy in the North Carolina Roadway Design Manual

Additional sections of NCDOT's bridge policy, excerpted from the North Carolina Roadway Design Manual, are included below. The full document can be found on NCDOT's website at: http://www.ncdot.org/doh/preconstruct/altern/value/manuals/RDM2001/part1/chapter6/pt1ch6.pdf.

Bridge Deck Railing

All bridge railings shall conform to current AASHTO criteria and shall have been successfully crash-tested in accordance with FHWA guidelines. Generally bridges with no sidewalks or no anticipated sidewalks should have a Jersey barrier rail. When a sidewalk or designated bikeway is justified, appropriate railings shall be used.

Curb and Gutter

The clear width for new bridges on streets with curb and gutter approaches shall be the same as the curb to curb approach width except where bikeways are carried across the structure; in such instances, AASHTO standard bicycle safety accommodations should be provided.

The 2' gutter widths shown in this policy are based upon the use of the standard 2'-6" curb and gutter. If other curb and gutter widths are used, bridge widths will be adjusted accordingly.

Deck Widths and Horizontal Clearances

Two primary elements of any bridge are the deck width on the bridge and the horizontal clearance between piers underneath the bridge. For determining these dimensions, the functional classification of highway facilities described in this chapter shall be used.

A study will be made to determine the deck width on any bridge having a high unit cost.

A cost analysis will be made by Structure Design to determine pier necessity and location. The factors included in this analysis are construction cost, maintenance cost, accident cost,

future widening potential, for both the mainline and road underneath it, and continuity of section. Consideration should be given to allow sufficient lateral offset for placement of a future greenway, sidewalk, or rail trail where the project Environmental Planning Document has justified the need for additional lateral offset. Structure Design will coordinate with Roadway Design as necessary.

A study will be made at each interchange to insure that adequate sight distance is available. Special attention should be given to the bridge rail design, offset, and the crest vertical curve on the structure so that traffic turning from the ramp has adequate sight distance. See Chapter 8-7 (Required Sight Distance at Terminals of Ramps) of the Roadway Design Manual for required sight distance.

When a ditch section is carried under a bridge, coordination will be necessary in the selection of horizontal openings and roadway typical sections so that piers are not placed in the ditch bottom, but preferably 2' minimum behind the ditch.

Greenway Facilities

Shared Use Paths

This report provides some basic information on the appropriate design of shared use paths (also termed "greenways" or "multi-use trails"). The designer should also consult with the 1999 AASHTO *Guide for the Development of Bicycle Facilities* and the *Manual on Uniform Traffic Control Devices* (MUTCD) for further information on many other aspects of pathway design, such as horizontal and vertical alignment, the proper design of pathway structures, intersection design and other pertinent topics. It is essential to refer to these resources, as they provide further guidance and standards that are needed in order to ensure proper pathway design.

Shared-use paths serve a wide variety of users, including pedestrians, bicyclists, people with disabilities, and in-line skaters. Shared use paths should be designed with the volumes, various speeds and space requirements of different user groups in mind. According to the 1999 AASHTO *Guide for the Development of Bicycle Facilities*, shared use paths should be a minimum of 10 feet wide with 2 foot-wide shoulders. This will enable the path to operate as a two way facility. In areas with high volumes of trail users, 12-14 foot widths are recommended.

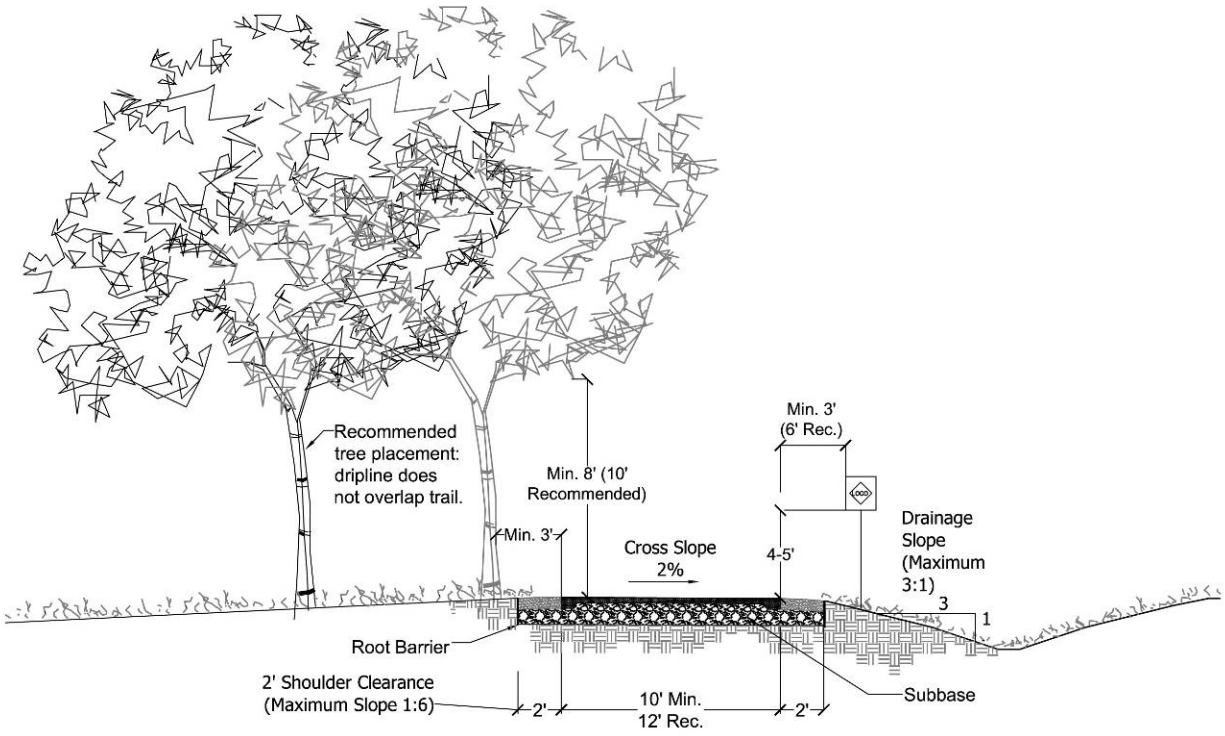
In extremely constrained conditions, pathway width can be reduced to 8', however this is generally only appropriate for short sections of trails, and according to the 1999 AAHSTO Guide, the following conditions should prevail: "(1) bicycle traffic is expected to be low, even on peak days or during peak hours, (2) pedestrian use of the facility is not expected to be more than occasional, (3) there will be good horizontal and vertical alignment providing safe and frequent passing opportunities, and (4) during normal maintenance activities the path will not be subjected to maintenance vehicle loading conditions that would cause pavement edge damage." The MUTCD provides further guidance on the appropriate types and sizes of warning signs that can be used for narrow pinchpoints on pathways, as well as other pathway conditions that require warning signs.

Pathway users generally co-exist on multi-use trails without requiring separate lanes for pedestrian versus bicycle traffic. For trails with high volumes of pedestrians, however, it can

sometimes be helpful to provide a center line stripe to minimize conflicts, particularly around curves in the trail alignment, or areas where sight distances are short.

Soft surface hiking, mountain biking, and equestrian trails that are not constructed with a paved surface are generally regarded as recreational trails. Since these trails are not intended for transportation use, they may be narrower, and are not required to follow the design guidelines described in this section.

Figure 14: Typical shared-use path cross-section



Shared Use Path Cross Section

Surface Types

Asphalt or concrete are the preferred surface types for multi-use trails. In some circumstances it may be appropriate to construct the path with a soft surface. Soft surface trails are generally not recommended in areas prone to flooding or where steep grades would cause the erosion of the trail surface. The surface should be designed to withstand loads transferred by the heaviest maintenance vehicle intended to travel along the pathway. The trail surface should be designed with appropriately compacted sub-grade, and the correct sub-base and pavement thickness in order to accommodate maintenance and emergency vehicles that will access the trail. Due to the wide variation in soil types and drainage conditions, the pavement structure and subsurface drainage should be designed to the specific conditions of each trail project.

Accessibility

Multi-use trails should comply with the provisions set forth in the Americans with Disabilities Act Accessibility Guidelines (ADAAG). Universal design principles should also be applied to all connections to the multi-use trail including parking lots, neighborhood connectors, adjoining roadways, and adjoining facilities (rest stops, buildings, restrooms, etc.)

Cross slopes on shared use paths should not exceed 2%. Running grades should be kept to minimum to provide for maximum accessibility. Every effort should be made to ensure running grades are kept within ADA guidelines on shared use paths. In limited circumstances where achieving these grades would be prohibitively expensive or would denigrate a unique natural environment, exceptions can be made to running grade requirements. Making such an exception does not eliminate the responsibility to meet ADA guidelines on all other aspects of trail design.

The following steps should be taken to mitigate steeper grades in these situations:

- Provide flat landings with benches to enable trail users to stop and rest if necessary
- Provide hand rails on the sides of the trail
- Widen the trail to allow more space for slower users
- Provide an alternative accessible route and use signage to direct people with physical disabilities to the route

Steep downgrades are not recommended at roadway intersection approaches. Every effort should be made to keep intersection approaches at or below a 5% slope in order to reduce the possibility of a bicyclist or other wheeled user losing control and crashing into the intersection.

Shoulders

Two-foot wide graded shoulders should be provided along the entire length of the path unless right of way is constrained. The shoulders should typically be of some soft material to serve walkers and runners who prefer soft surfaces.

Example of driveway conflict on a sidepath
Photo Credit: Toole Design Group

Shared Use Paths Adjacent to Roadways

Shared Use Paths adjacent to roadways, also known as sidepaths or wide sidewalks, can provide a more comfortable place for novice bicyclists and other people who are not comfortable riding on the road with traffic. However, shared use paths adjacent to roadways are most appropriate in corridors with few driveways and intersections. This is because these locations present a safety problem due to conflicts between turning motorists and bicyclists. The photo above demonstrates such a conflict: the motorist in the driveway is looking to the left for breaks in traffic and does not see the bicyclist approaching from his right.

For the reasons described above, shared use paths adjacent to roadways should not be designated by signs or markings as bicycle facilities, and care should be taken in providing them as a facility intended to serve the needs of bicyclists. Along roadways with few driveways or intersections, shared use paths may be provided, however on-road bicycle facilities should also be provided as an alternative.

Greenway Signage, Trailheads and Other Trail Amenities

There are several excellent sources for information on greenway signage, trailheads, and other trail amenities. For more information, refer to the following publications:

- *Greenways: A Guide to Planning, Design and Development*. Published by Island Press, 1993. Authors: Charles A. Flink and Robert Searns. www.greenways.com

- *Trails for the Twenty-First Century*. Published by Island Press, 2001. Authors: Charles A. Flink, Robert Searns, and Kristine Olka. www.greenways.com

Other Facilities and Treatments

Bicycle Racks and Bicycle Lockers

Bicycle parking can be provided in the form of bike racks or bike lockers. Secure bicycle parking located close to building entrances and transit entry points can make bicycling more attractive. It also reduces the risk of bicycle damage or theft. Bike rack design and site location are discussed in detail in the Bicycle Parking Guidelines, developed by the Association of Pedestrian and Bicycle Professionals (available on the resources page at http://www.apbp.org).

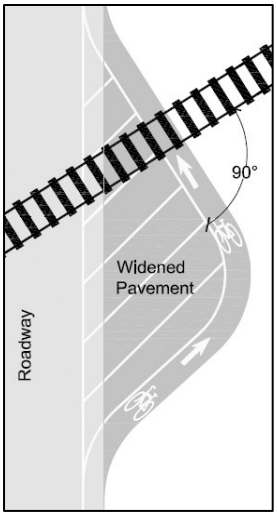
Bicycle lockers
Photo Credit: Toole Design Group

Bike lockers provide added protection from theft and weather. Bike parking is important at destinations such as town centers, historic sites, transit stations and park-and-ride lots. It is also important to provide bike parking near business entrances and at employment centers.

Figure 15: Suggested Bicycle Parking Designs

Source: Toole Design Group

Railroad Crossings



Under certain circumstances, railroad tracks crossing the road can present a dangerous condition for bicyclists. At diagonal at-grade crossings, the gap next to the rail can trap the front wheel of a bicycle causing the bicyclist to crash. To prevent this from happening, the bicycle lane or shoulder should be designed to enable the bicyclist to approach the track at an angle closer to 90 degrees (but not less than 60 degrees) without having to swerve into motor vehicle travel lanes.

Figure 16: Recommended Design Treatment at Diagonal Railroad Crossings.

Skewed Railroad Crossing in Madison, Wisconsin. Photo Credit: Toole Design Group

Figure 17: Bicycle-safe drainage grates approved by NCDOT

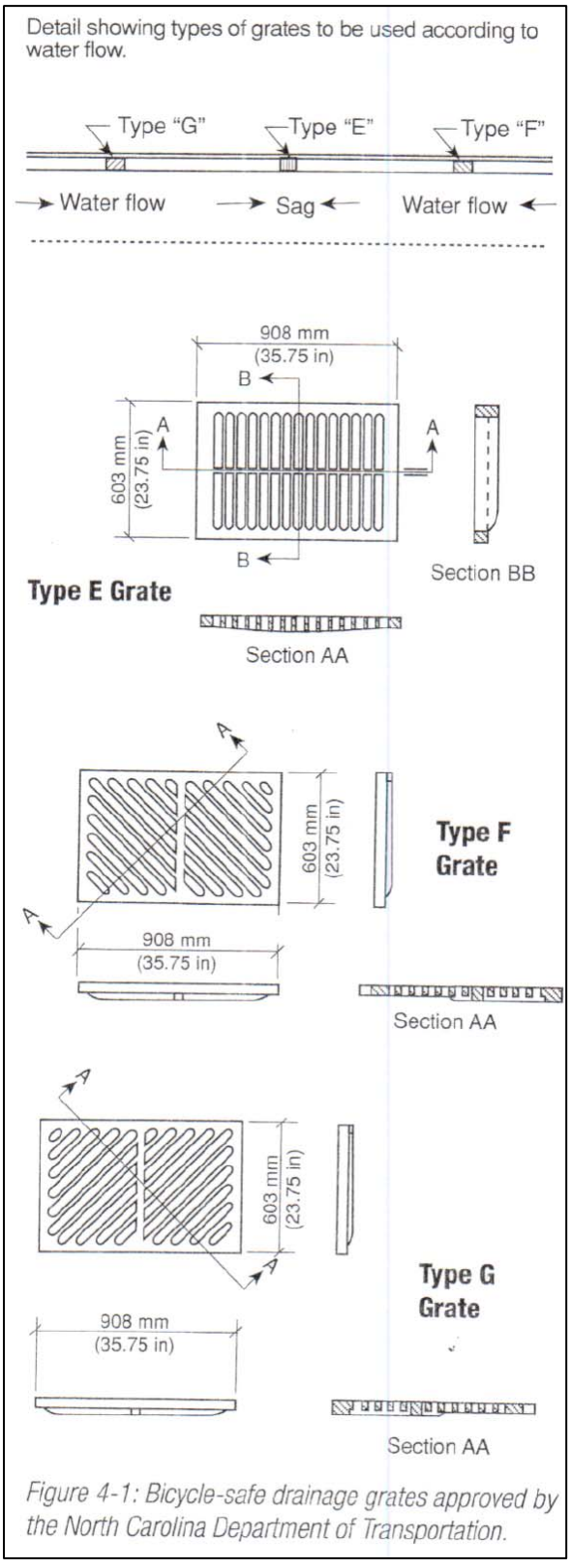


Figure 4-1: Bicycle-safe drainage grates approved by the North Carolina Department of Transportation.

Source: North Carolina Bicycle Facilities Planning and Design Guidelines

Source: MUTCD

The width and the dimensions of the widened area discussed above will be dependent upon the skew of the railroad tracks relative to the bicyclist crossing point. It is important that the bicyclist is given sufficient space on the approach and the departure of the crossing to safely transition back to the travel way. An example of this widening treatment is shown in Figure 16.

In locations where a retrofit may not be feasible or where the retrofit may not occur for a period of time, the *Manual on Uniform Traffic Control Devices* (MUTCD) includes the W10-12 warning sign which should be used to warn bicyclists of skewed railroad crossings. A filled or rubberized flangeway can also help to reduce, but not eliminate, the risk of a trapped wheel. See above for an example of this sign.

Bicycle Safe Drainage Grates

Storm grates pose a hazard for bicyclists when the openings are parallel to the bicyclists' direction of travel. Bicycle tires can get caught between the bars of these grates, and cause bicyclists to crash. Unsafe drainage grates should be replaced with grates that are consistent with NCDOT's standard grate design. Figure 17 includes additional detail about bicycle-safe drainage grates that are approved by NCDOT. Additional information is available on the Division of Bicycle and Pedestrian Transportation's website at http://www.ncdot.org/transit/bicycle.

Bicycle Detection and Signal Timing at Intersections

At signalized intersections where bicycle traffic exists or is anticipated (i.e. if it is designated in a local plan as an existing or proposed bicycle facility) consideration should be given to bicyclists in the timing of the traffic signal, and in the method of detecting the presence of bicyclists.

Loop detectors should be designed to respond to the presence of bicyclists. A number of bicycle sensitive loop detector configurations are available and should be provided at intersections that serve bicyclists (see ITE's *Manual of Traffic Detector Design* for more information). For traffic signals where bicyclists are having difficulty being detected, a temporary solution is to mark the spot along the loop where a bicyclist should stand in order to trip the signal.

Visibility-limited signal faces should be positioned so that bicyclists can see the signal indication. If they cannot, then separate signal faces should be provided for bicyclists. The needs of bicyclists should also be considered during signal timing. The greatest risk to bicyclists traveling through intersections is during the clearance interval and during actuated phases during periods of low traffic flow. Signals should be designed to provide an adequate clearance interval for bicyclists who enter the intersection at the end of the green phase. The 1999 AASHTO *Guide for the Development of Bicycle Facilities* provides guidance on how to determine the clearance interval needed to accommodate bicyclists.

Signals should also be designed to provide a total crossing time long enough to accommodate bicyclists starting up on a new green phase. When an intersection approach receives a green signal, the bicyclist needs enough time to react, accelerate, and cross the intersection. The AASHTO Guide provides guidance on determining the amount of time needed for this movement.

Conclusion

This chapter provided information on bicycle facility and design solutions. The following chapter provides recommendations aimed at creating an interconnected network of bicycle facilities throughout Asheville.

Chapter 5: Bicycle System Plan

The recommendations in this section are aimed at creating an interconnected network of bicycle facilities in Asheville. As noted in Chapter 3, these recommendations are supported by the Asheville 2025 Comprehensive Plan, the French Broad River MPO Comprehensive Transportation Plan, and by numerous other local, regional, state and federal plans and policies. A fundamental goal of this Plan is to provide a bicycle network that is comfortable, safe and connected.

Participants provide feedback at the March 8, 2007 Public Meeting. Photo Credit: Toole Design Group

A Network to Meet the Needs of Different Types of Bicyclists

The proposed bicycle network includes a variety of facility improvements that respond to the many different issues faced by bicyclists. Among on-road bikeways, there are a variety of different design treatments that are proposed, depending on the existing road width, topography and traffic volumes and speeds. The facilities are described below. The network is meant to provide options for the full range of users, including families, commuters and recreational riders. The network map is included as Figure 19 on page 54.

There are important reasons for providing a mix of bicycle facility types:

- Depending on individual bicyclist's level of experience, some types of bikeways are preferred over others. New bicyclists may prefer off-road multi-use trails and quiet neighborhood streets while more experienced bicyclists may prefer on-road bicycle facilities such as bike lanes or shared lanes.
- Asheville is a built environment with a limited number of corridors that can accommodate multi-use trails. Bicyclists need access to the roadway system in order to create a bicycle network that provides connections between important destinations.
- Different types of bicycle facilities are appropriate in different situations, depending on surrounding land-use characteristics, available right-of-way space, traffic volume, traffic speed and composition, on-street parking, roadway grade, etc.

For these reasons, the bicycle network is composed of a variety of different facility types that will appeal to bicyclists with varying levels of experience.

Bicycle Network Map

Implementation of this Plan will establish a 181-mile network of bicycle facilities. This network is shown on the Bicycle Network Map on page 54. The network is composed of locations where specific improvements have either already been made or are proposed in the future. Except for shared roadways, segments will have some type of visible cue (i.e. bike lane, striped shoulder, bike route sign, pavement marking, etc.) to indicate that special

accommodations have been made for bicyclists. While the network will provide primary routes for bicycling, it is important to note that, by law, bicyclists are permitted to use *all* roadways (except limited access freeways or where bicycles are otherwise prohibited). Therefore, the network will serve as a core system of major routes that can be used to access all parts of the City. Greenways will also contribute to the creation of a connected bicycle network.

The make-up of the proposed bicycle route network is detailed below.

Bike lanes: 43 miles
Climbing lanes: 17 miles
Shared lane markings: 21 miles
Shared roadways: 64 miles
Striped shoulders: 21 miles
Striped shoulders (plus a range of additional improvements): 15 miles

Total network: 181 miles

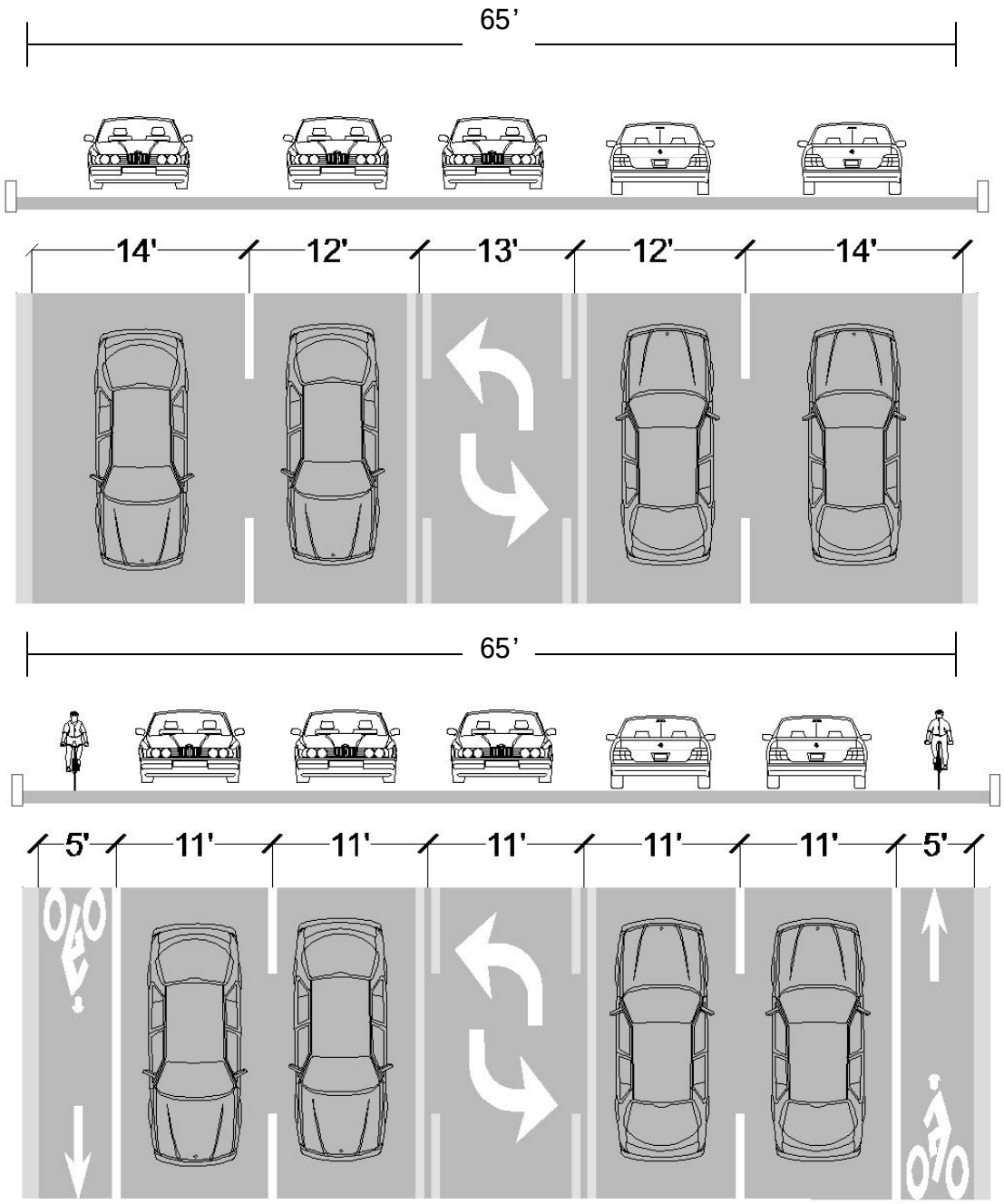
Bicycle Action Map

In order to create the bicycle route network, a range of actions will be required depending on the facility that is being created and the character of the existing road. Improvements may be as simple as adding pavement markings or signage, or they may require narrowing or eliminating existing travel lanes or expanding the pavement width. The difficulty in creating the facility is considered in the prioritization strategy outlined in Chapter 7. The actions required to create the bicycle route network are detailed on the Bicycle Action Map as Figure 20 on page 55 and on the Bicycle Action Map details on the following pages. The City should begin to implement the actions outlined below on City-maintained roads. On State-maintained roads, the City should work in collaboration with NCDOT to improve bicycling conditions as the proposed recommendations on these roads will require state approval.

Bicycle facilities will be built in Asheville through the following types of actions:

- Include in road construction (locations where bicycle facilities can be provided as part of planned transportation improvement projects).
- Stripe/add marking (locations where facilities can be added by simply adding pavement markings).
- Road diet (locations where facilities can be added by eliminating an automobile travel lane).
- Remove parking (locations where facilities can be added by eliminating on-street parking). Note that this recommendation is used only sparingly and would require extensive public outreach.
- Add paved shoulder (locations where the road would need to be widened to create space for a bicycle facility).
- Range of improvements needed (Locations where a range of improvements are needed to make bicycling more comfortable).
- Lane diet (Locations where narrowing automobile travel lanes would create enough space within the existing road width to provide bicycle facilities). An example of how this can occur is included below in Figure 18.

Figure 18: Sample Lane Diet

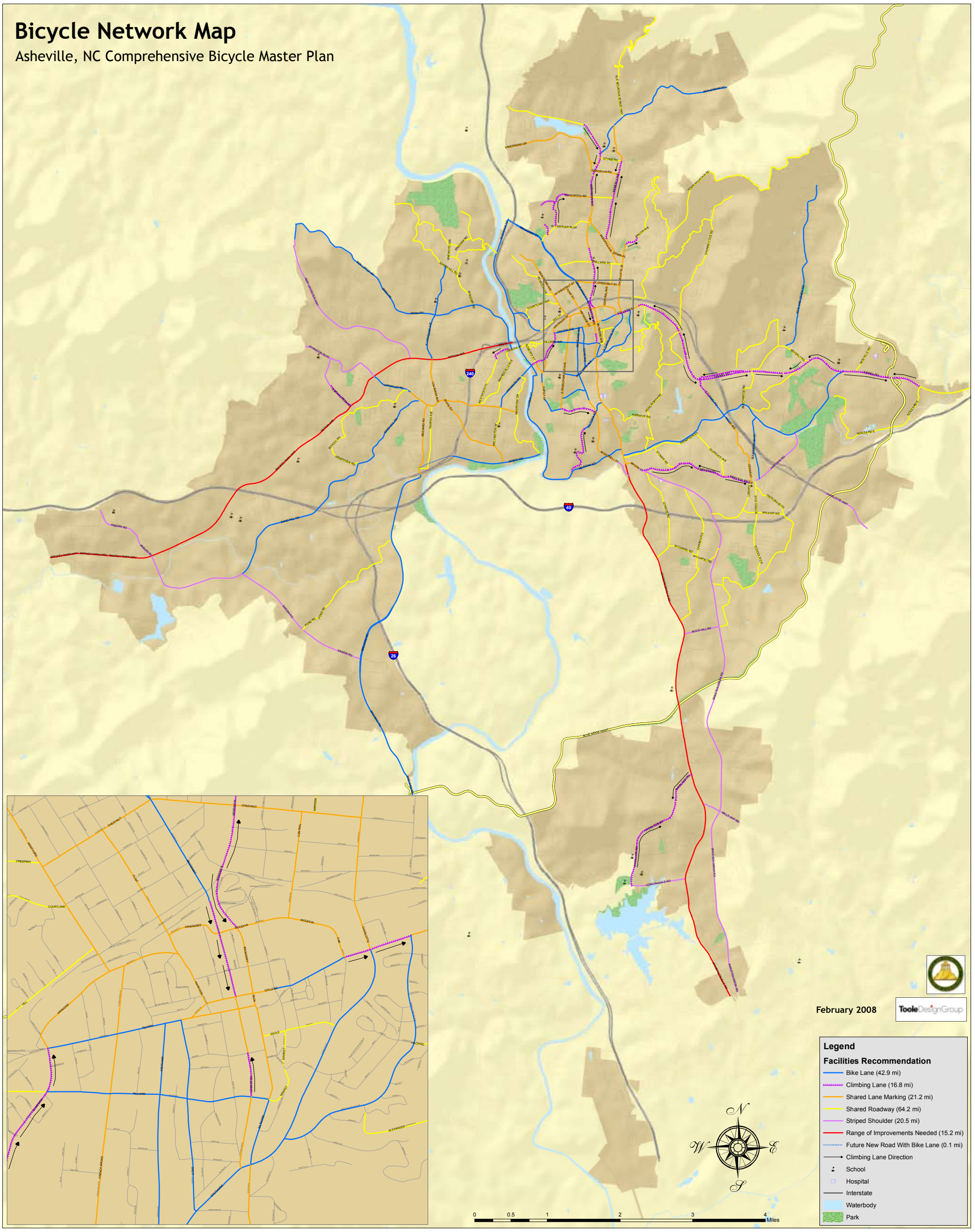


Source: Toole Design Group

Bicycle Network and Actions Map Details

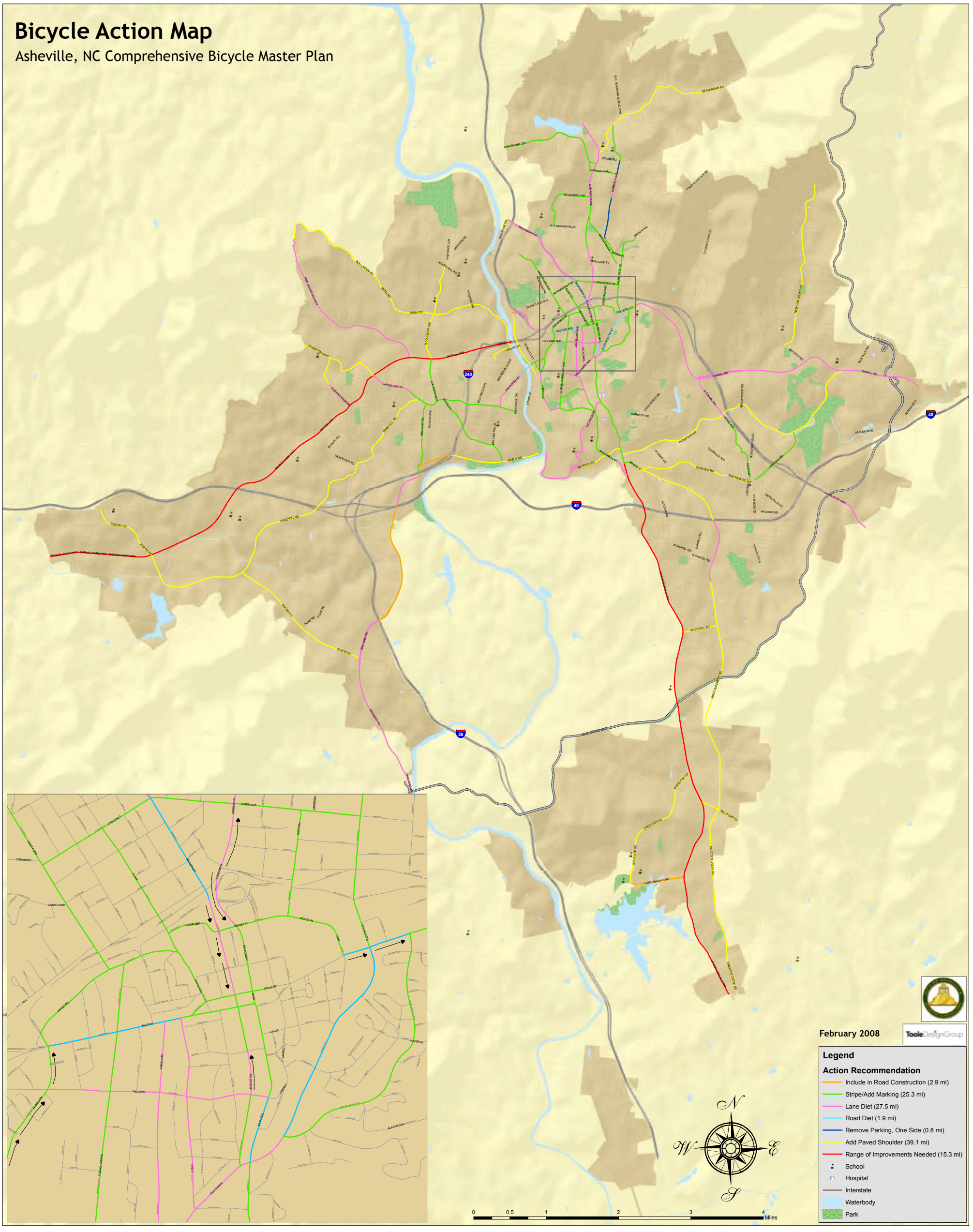
The Bicycle Network Map represents the vision for a connected network of bicycle facilities throughout Asheville and the Bicycle Action Map details the action that would be required on each individual segment of road, to create the proposed bicycle network. Detailed sections of the Bicycle Network and Action Maps are provided for Downtown Asheville and the north, south, east and west areas of the City, beginning on page 56, to reinforce the vital connection between the information on the two maps.

Figure 19: Bicycle Network Map



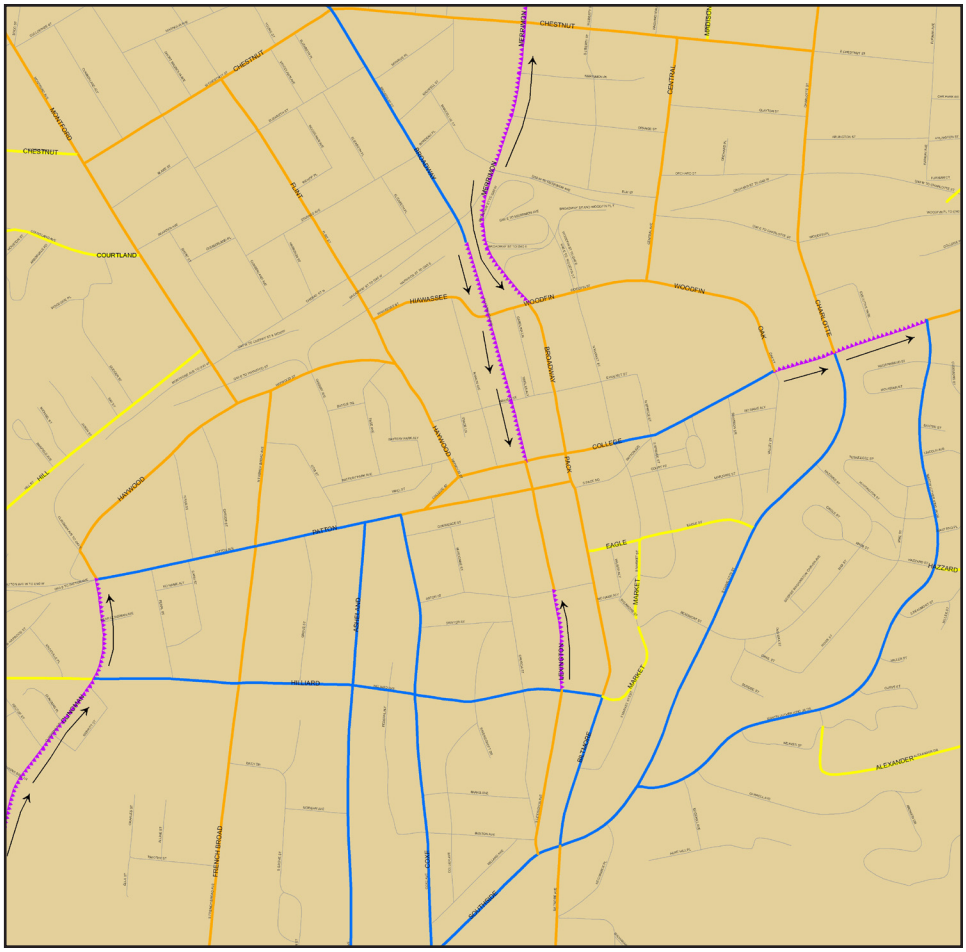
The Bicycle Network Map is the long range vision for a safe, accessible and comfortable network of bicycle facilities throughout Asheville. The proposed bicycle network includes a variety of facility improvements that respond to the many different issues faced by bicyclists. Among on-road bikeways, there are a variety of different design treatments that are proposed, which are described in Chapter 4 of this Plan. The network is meant to provide options for the full range of users, including families, commuters and recreational riders. The full size version of this map is available on the City of Asheville's website at http://www.ashevillenc.gov.

Figure 20: Bicycle Action Map



In order to create the bicycle route network, a range of actions will be required depending on the facility that is being created and the character of the existing road. Improvements may be as simple as adding pavement markings or signage, or they may require narrowing or eliminating existing travel lanes or expanding the pavement width. The actions required to create the bicycle route network are detailed on the Bicycle Action Map. The full size version of this map is available on the City of Asheville's website at http://www.ashevillenc.gov.

Figure 21: Network and Action Map Details, Downtown Asheville

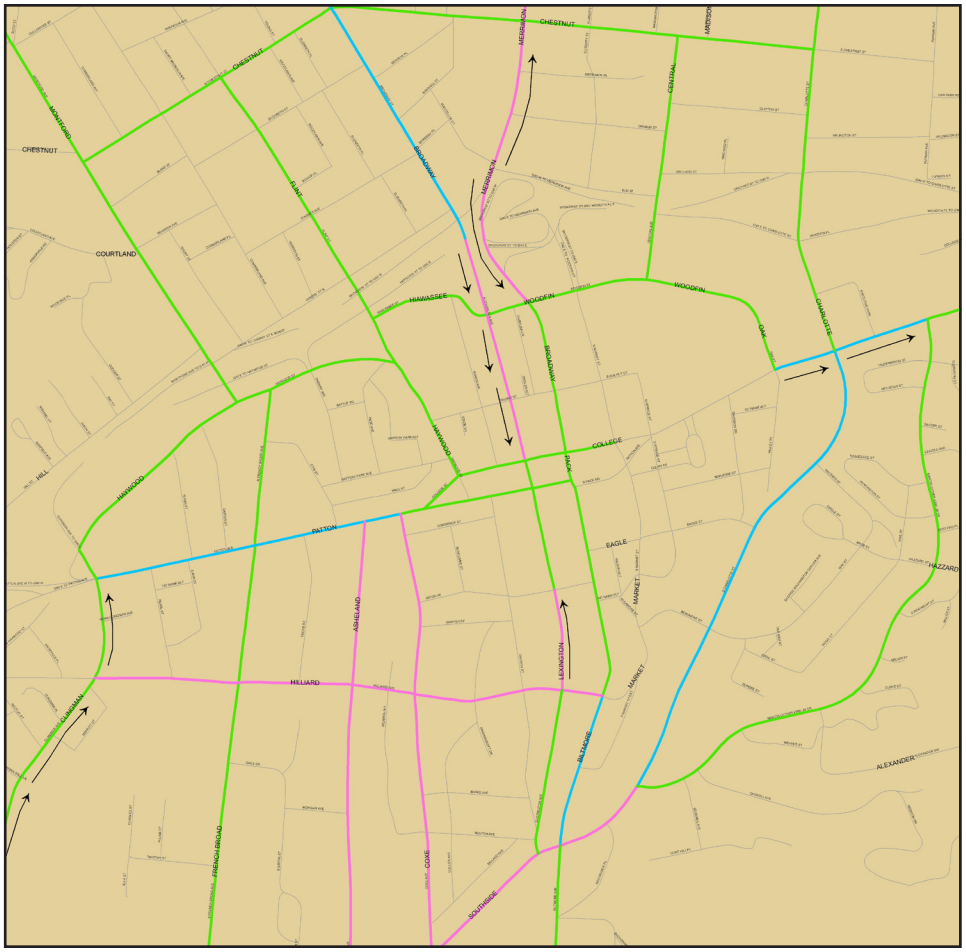


Bicycle Network Map Detail
Downtown Asheville

Legend

Facilities Recommendation

- Bike Lane (42.9 mi)
- Climbing Lane (16.8 mi)
- Shared Lane Marking (21.2 mi)
- Shared Roadway (64.2 mi)
- Striped Shoulder (20.5 mi)
- Range of Improvements Needed (15.2 mi)
- Future New Road With Bike Lane (0.1 mi)
- Climbing Lane Direction
- School
- Hospital
- Interstate
- Waterbody
- Park



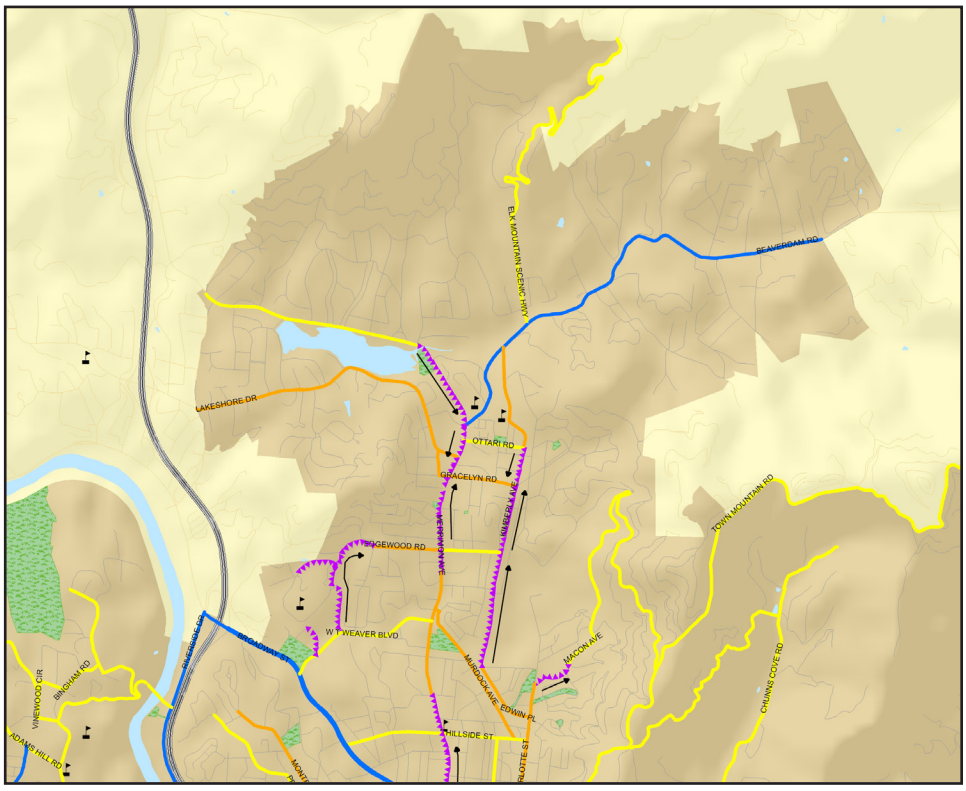
Bicycle Action Map Detail
Downtown Asheville

Legend

Action Recommendation

- Include in Road Construction (2.9 mi)
- Stripe/Add Marking (25.3 mi)
- Lane Diet (27.5 mi)
- Road Diet (1.9 mi)
- Remove Parking, One Side (0.8 mi)
- Add Paved Shoulder (39.1 mi)
- Range of Improvements Needed (15.3 mi)
- School
- Hospital
- Interstate
- Waterbody
- Park

Figure 22: Network and Action Map Details, North Asheville

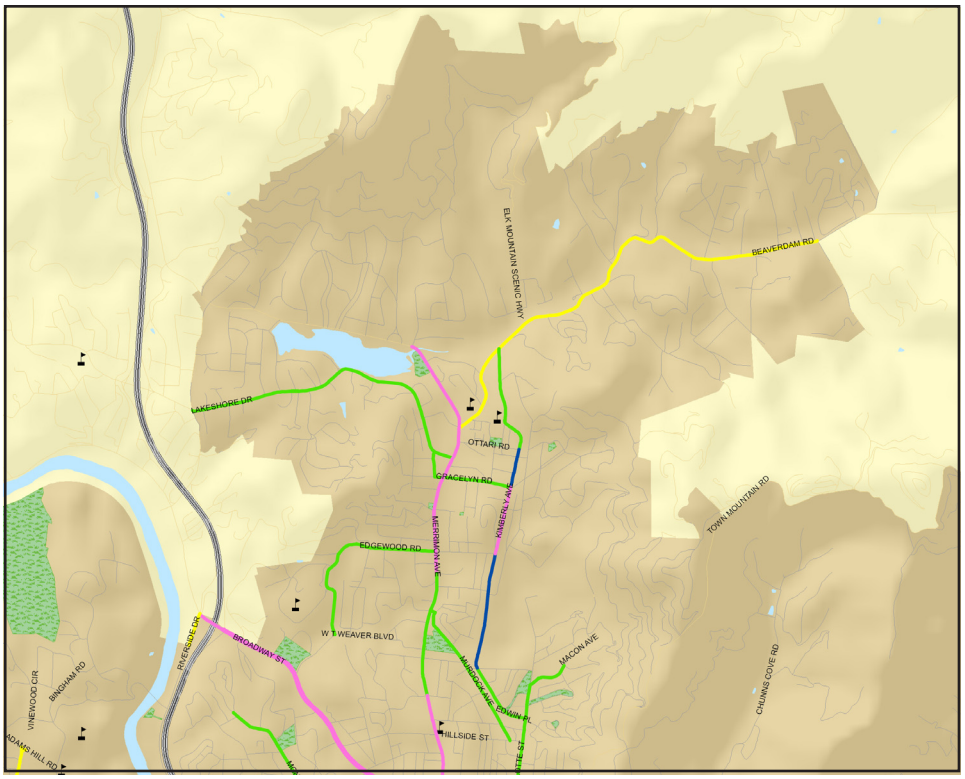


Bicycle Network Map Detail
North Asheville

Legend

Facilities Recommendation

- Bike Lane (42.9 mi)
- Climbing Lane (16.8 mi)
- Shared Lane Marking (21.2 mi)
- Shared Roadway (64.2 mi)
- Striped Shoulder (20.5 mi)
- Range of Improvements Needed (15.2 mi)
- Future New Road With Bike Lane (0.1 mi)
- Climbing Lane Direction
- School
- Hospital
- Interstate
- Waterbody
- Park



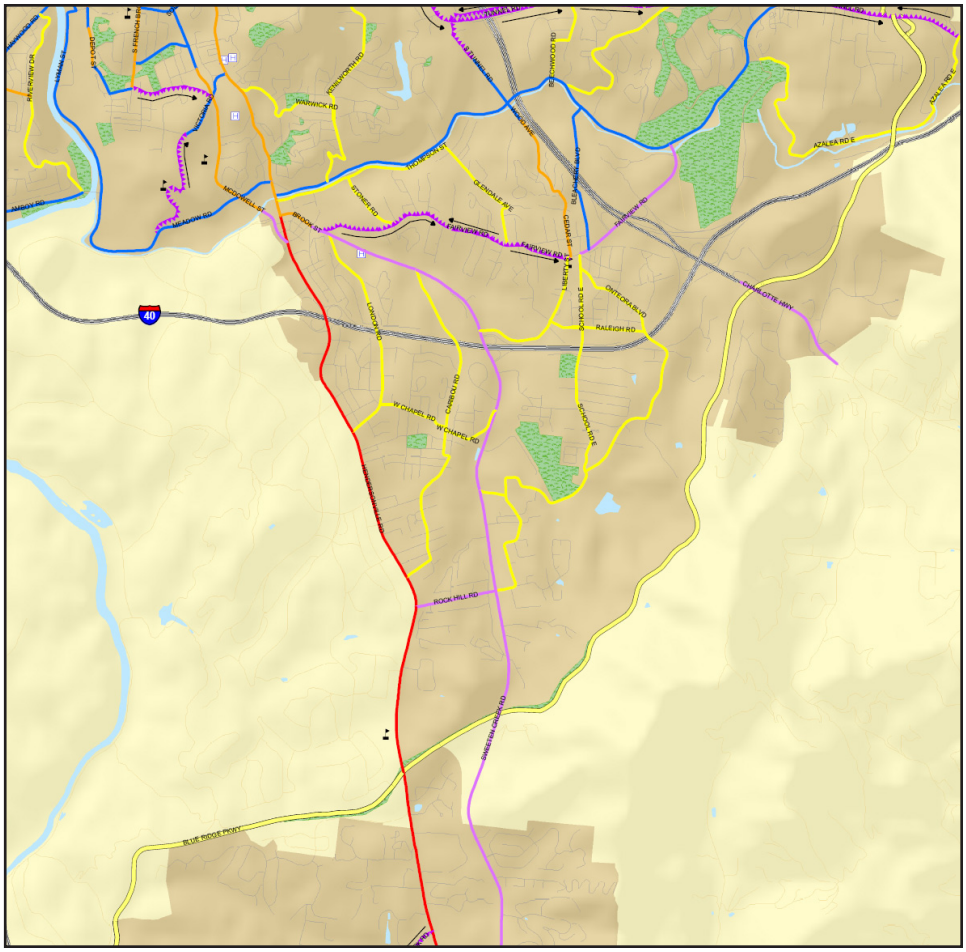
Bicycle Action Map Detail
North Asheville

Legend

Action Recommendation

- Include in Road Construction (2.9 mi)
- Stripe/Add Marking (25.3 mi)
- Lane Diet (27.5 mi)
- Road Diet (1.9 mi)
- Remove Parking, One Side (0.8 mi)
- Add Paved Shoulder (39.1 mi)
- Range of Improvements Needed (15.3 mi)
- School
- Hospital
- Interstate
- Waterbody
- Park

Figure 23: Network and Action Map Details, South Asheville

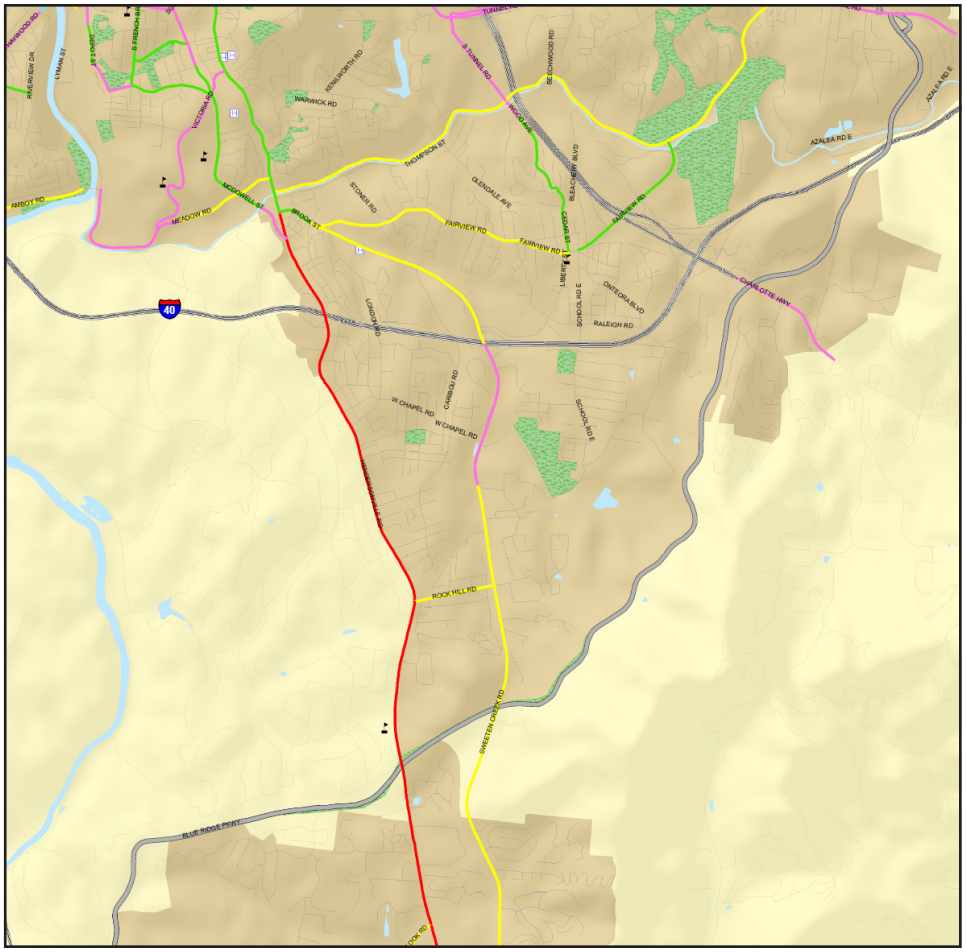


Bicycle Network Map Detail
South Asheville

Legend

Facilities Recommendation

- Bike Lane (42.9 mi)
- Climbing Lane (16.8 mi)
- Shared Lane Marking (21.2 mi)
- Shared Roadway (64.2 mi)
- Striped Shoulder (20.5 mi)
- Range of Improvements Needed (15.2 mi)
- Future New Road With Bike Lane (0.1 mi)
- Climbing Lane Direction
- School
- Hospital
- Interstate
- Waterbody
- Park



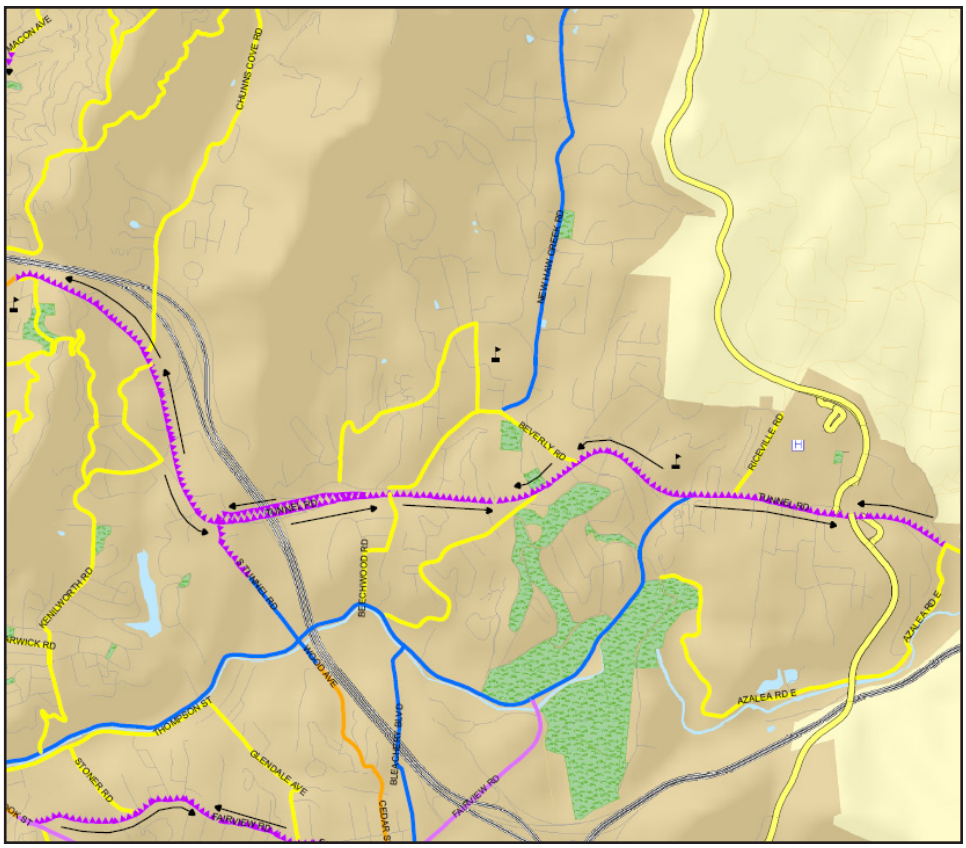
Bicycle Action Map Detail
South Asheville

Legend

Action Recommendation

- Include in Road Construction (2.9 mi)
- Stripe/Add Marking (25.3 mi)
- Lane Diet (27.5 mi)
- Road Diet (1.9 mi)
- Remove Parking, One Side (0.8 mi)
- Add Paved Shoulder (39.1 mi)
- Range of Improvements Needed (15.3 mi)
- School
- Hospital
- Interstate
- Waterbody
- Park

Figure 24: Network and Action Map Details, East Asheville

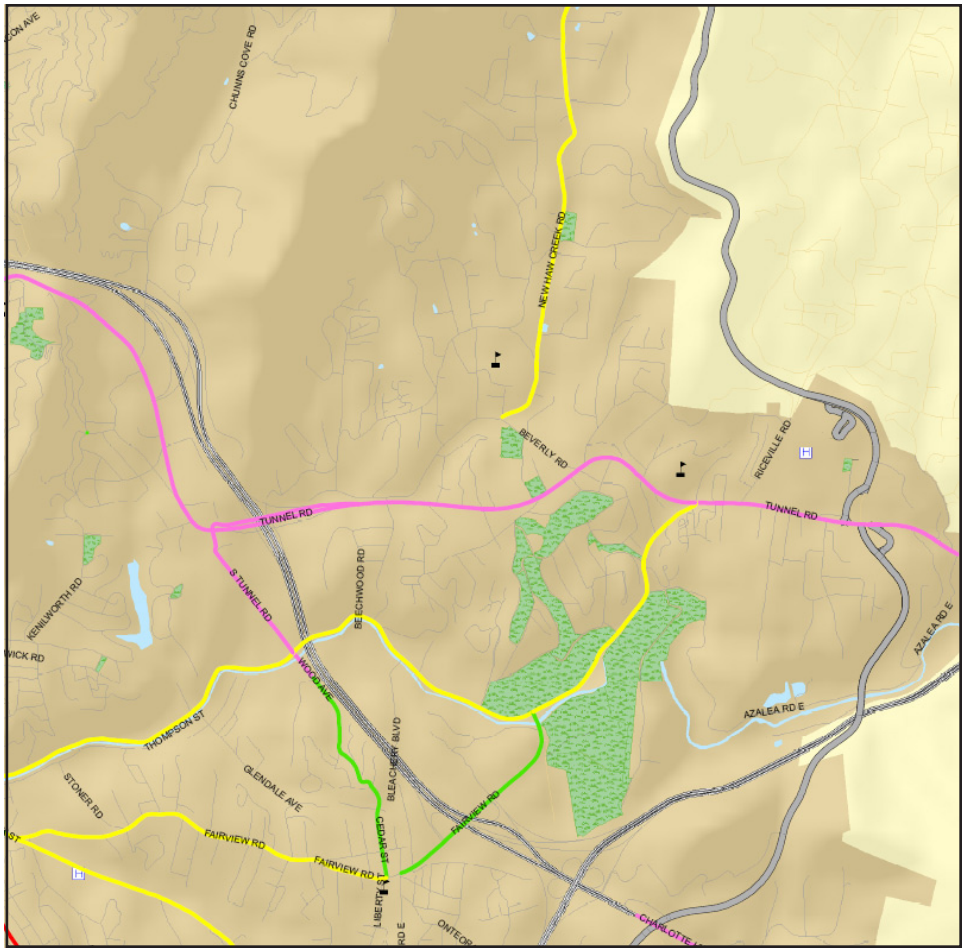


Bicycle Network Map Detail
East Asheville

Legend

Facilities Recommendation

- Bike Lane (42.9 mi)
- Climbing Lane (16.8 mi)
- Shared Lane Marking (21.2 mi)
- Shared Roadway (64.2 mi)
- Striped Shoulder (20.5 mi)
- Range of Improvements Needed (15.2 mi)
- Future New Road With Bike Lane (0.1 mi)
- Climbing Lane Direction
- School
- Hospital
- Interstate
- Waterbody
- Park



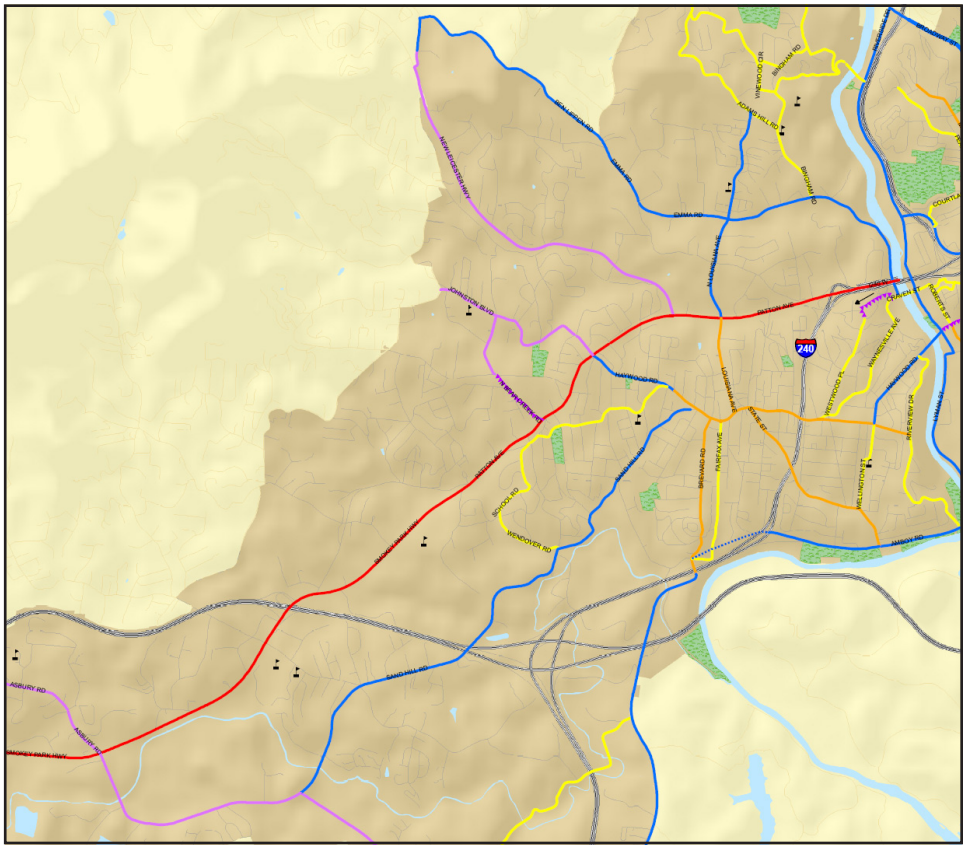
Bicycle Action Map Detail
East Asheville

Legend

Action Recommendation

- Include in Road Construction (2.9 mi)
- Stripe/Add Marking (25.3 mi)
- Lane Diet (27.5 mi)
- Road Diet (1.9 mi)
- Remove Parking, One Side (0.8 mi)
- Add Paved Shoulder (39.1 mi)
- Range of Improvements Needed (15.3 mi)
- School
- Hospital
- Interstate
- Waterbody
- Park

Figure 25: Network and Action Map Details, West Asheville

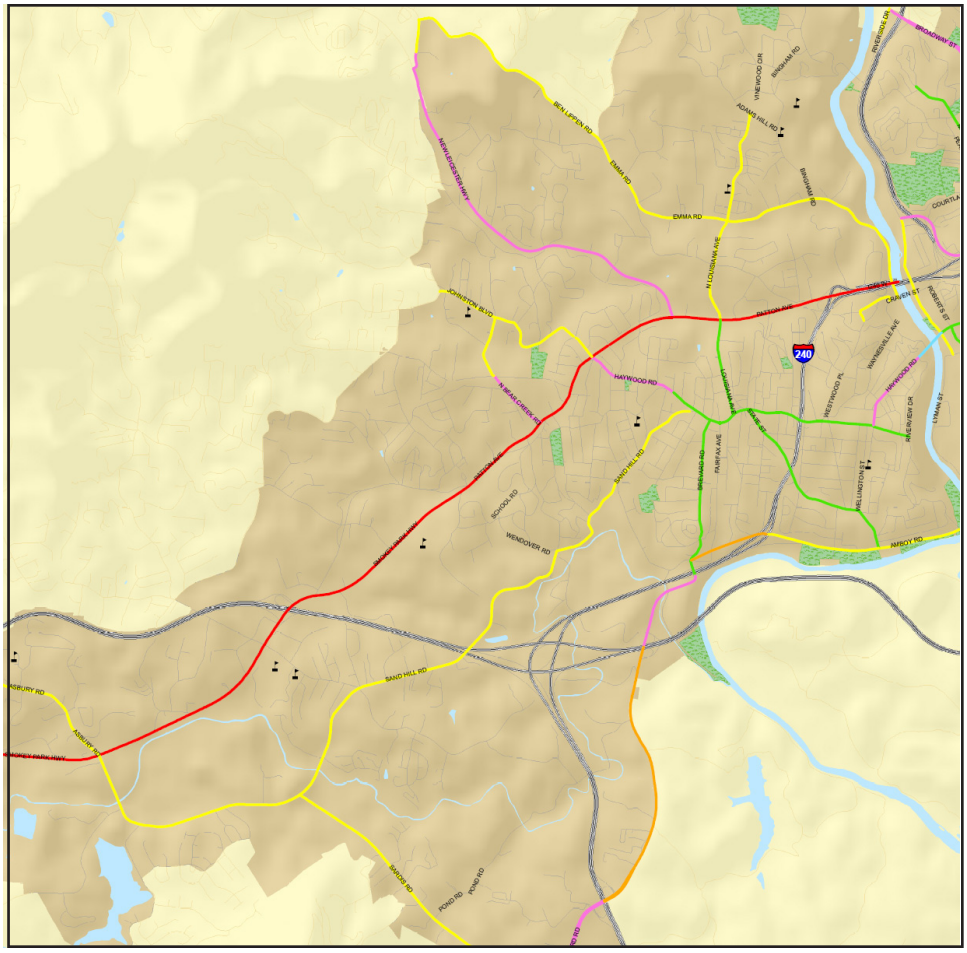


Bicycle Network Map Detail
West Asheville

Legend

Facilities Recommendation

- Bike Lane (42.9 mi)
- Climbing Lane (16.8 mi)
- Shared Lane Marking (21.2 mi)
- Shared Roadway (64.2 mi)
- Striped Shoulder (20.5 mi)
- Range of Improvements Needed (15.2 mi)
- Future New Road With Bike Lane (0.1 mi)
- Climbing Lane Direction
- School
- Hospital
- Interstate
- Waterbody
- Park



Bicycle Action Map Detail
West Asheville

Legend

Action Recommendation

- Include in Road Construction (2.9 mi)
- Stripe/Add Marking (25.3 mi)
- Lane Diet (27.5 mi)
- Road Diet (1.9 mi)
- Remove Parking, One Side (0.8 mi)
- Add Paved Shoulder (39.1 mi)
- Range of Improvements Needed (15.3 mi)
- School
- Hospital
- Interstate
- Waterbody
- Park

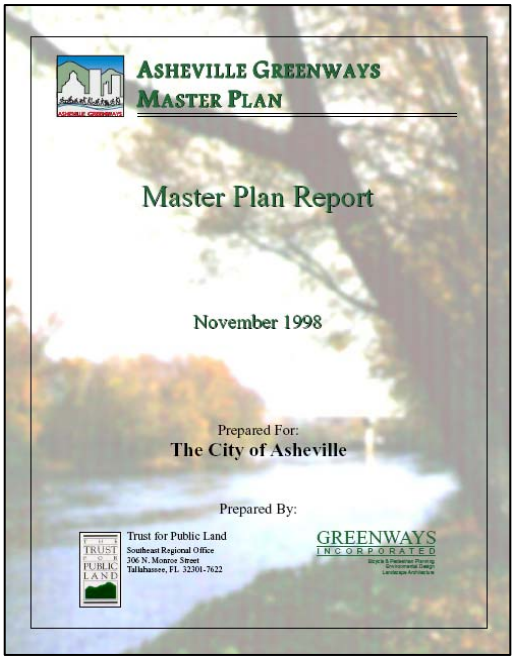
Further Evaluation of Bicycle Facility Recommendations

The projects that are recommended in this chapter will require additional evaluation during the implementation process to determine if there are other factors that may either help or hinder their development. Additional corridor-level traffic analysis will be needed in some cases to determine the optimum design for specific locations. Neighborhood involvement will also be an important part of the implementation process. Some locations shown on the map may be determined, after more detailed analysis, to require different or more costly improvements and therefore may become longer-term projects. However, for every project, the first assumption should be that the bicycle facilities shown in the Comprehensive Bicycle Plan will be implemented.

Shared-Use Paths and On-Road Bicycle Facilities

The shared-use path (also termed "greenways" and "trails") network in Asheville is an important resource for the community. They serve a transportation purpose when they connect to destinations. Shared-use paths provide a recreational opportunity for those on foot and bicycles. Shared-use paths can be an appealing option for bicyclists because they offer the opportunity to ride on separate dedicated paths, away from traffic. For this reason, they can serve as an alternate route to a busy road, which can be especially appealing for young and less experienced bicyclists. They can also encourage people to try bicycling for the first time.

This Plan encourages the provision of bicycle facilities for the full range of bicyclists. While this Plan focuses on the on-road bicycle network, it fully supports current and future greenway trail development efforts because greenways have the potential to provide connections between destinations and between on-road bicycle facilities. Opportunities to enhance the relationship between greenways and on-road bicycle facilities should be pursued. Additional information on the emerging greenway network can be found in the City of Asheville Greenway Master Plan available on the City of Asheville's website at http://www.ashevillenc.gov/departments/parks_rec.



Asheville Greenway Master Plan
Source: City of Asheville

In 2008 the City will be updating its Parks and Recreation Master Plan. This effort will include an update to the Greenway Master Plan. Identifying connections between the bicycle and greenway networks should be an important element of this planning effort. The Asheville Greenway Master Plan map is included as Figure 32 on page 89. In addition, the Asheville Greenway Commission's project scoring and ranking summary of greenway projects is included in the appendix of this Plan.

As noted, the on-road bicycle network can fill gaps in the greenway network and the greenway network can provide alternative connections to uncomfortable roads. For example, a greenway trail facility connecting from Onteora Road could potentially provide bicyclists

with a connection to on-road facilities on US 74A to Fairview without having to navigate the interstate ramp. Greenway trails could also provide functional connections to on-road bicycle facilities around the University of North Carolina-Asheville campus. A potential greenway trail along Beaverdam Road could serve as an alternate route on a road that is unlikely to be widened because of physical constraints. In doing so, the greenway network and on-road facilities will compliment each other, making both types of facilities more functional. It is critical that locations where a greenway intersects with a road be designed with careful attention focused on the safety of trail users crossing the road. For additional guidance on road crossings, the publications listed on page 31 of this Plan should be consulted.

It should be noted; however, that the presence of a greenway trail does not eliminate the need for on-road bicycle facilities. Asheville is largely a built environment and roads often provide the most direct connection between destinations and different areas of the City. This is particularly important for people who are bicycling for transportation purposes. On-road bicycling also offers the opportunity to travel longer distances at higher speeds than a multi-use trail, especially when the volume of trail users is high. For these and other reasons, some bicyclists prefer to bicycle on roads instead of separate dedicated facilities and as has been noted, this Plan strives to provide facilities for the full range of users. The section below outlines the recommended locations and facility types included in the Bicycle Network Map. For detail on the project limits for each road outlined below, see the Bicycle Network Map, shown on page 54 of this Plan. The full size version of this map is available on the City of Asheville's website at http://www.ashevillenc.gov.

Proposed Bicycle Facilities

Action 1.1: Provide bicycle facilities on designated streets.

Bicycle Lanes
A bike lane is a portion of the roadway that has been designated by striping, signing and/or pavement markings for the preferential or exclusive use of bicyclists. Bike lanes are always located on both sides of the road (except one way streets), and carry bicyclists in the same direction as adjacent motor vehicle traffic. Bike lanes will be an important addition to many roads in Asheville, particularly on roads that provide functional connections between key destinations and different areas of town. Bike lanes can either be provided in the existing pavement width or by adding pavement width. This can be done as a separate stand alone project or as part of larger road improvement or repaving projects.

Examples of the types of roads where bicycle lanes are recommended are included below.

- Amboy Road
- Asheland Avenue
- Beaverdam Road
- Biltmore Avenue (US 25)
- Brevard Road
- Broadway
- Choctaw Street
- College Street
- Coxe Avenue
- Depot Street

- Emma Road
- Haywood Road
- Hilliard Avenue
- Louisiana Avenue
- Lyman Street
- Martin Luther King Jr. Drive
- McDowell Street
- Meadow Road
- New Haw Creek Road
- Riverside Drive
- Sand Hill Road
- South Charlotte Street
- Southside Avenue
- South Tunnel Road
- Swannanoa River Road
- Tunnel Road
- Victoria Road

Bicycle Lane (Cambridge, MA)
Source: Toole Design Group

Shared Roadways

Shared roadways are streets and roads where bicyclists can be served by sharing the travel lanes with motor vehicles. Usually, these are streets with low traffic volumes and/or low motor vehicle speeds, which do not need additional width in order to be bicycle-friendly. Examples of the types of roads that are recommended as shared roadways are included below.

- Adams Hill Road
- Alexander Drive
- Azalea Road
- Beechwood Road
- Beverly Road
- Bingham Road
- Blue Ridge Parkway
- Caribou Road
- Chunns Cove Road
- College Street
- Courtland Avenue
- Fairfax Avenue
- Glendale Avenue
- Hill Street
- Hillside Street
- Kenilworth Road
- Liberty Street (Oakley)
- London Road
- Macon Avenue
- Merrimon Avenue (US 25)
- Onteora Boulevard
- Pond Road
- Raleigh Road
- Riverview Drive

Shared Roadway (Asheville, NC)
Source: Toole Design Group

- Thompson Street
- Town Mountain Road
- School Road
- Vinewood Circle
- Wellington Street
- Wendover Road
- West Chapel Road
- Westwood Road
- W.T. Weaver Boulevard

Shared Lane Markings

Motor vehicle/bicycle sharing of the travel space can be emphasized by using special shared roadway pavement markings called shared lane markings (sometimes referred to as "sharrows"). Shared lane markings have been recommended for inclusion in the 2009 Manual on Uniform Traffic Control Devises (MUTCD) by the NCUTCD Bicycle Subcommittee. Shared lane markings can be helpful on multi-lane streets where there is insufficient space to add bicycle lanes and traffic volumes and/or motor vehicle speeds are at medium levels. Shared lane markings are not recommended on roadways with posted speeds over 35 miles per hour. In some cases they may be used on two-lane roadways as well. The shared lane marking also assists with wayfinding and can be used in conjunction with signs to delineate preferred bicycle routes. Examples of the types of roads where shared lane markings are recommended are included below.

- Biltmore Avenue (US 25)
- Brevard Road
- Broadway (US 25)
- Brook Street (US 25A)
- Cedar Street
- Central Street
- Charlotte Street
- Chestnut Street
- College Street
- Depot Street
- Edgewood Road (north)
- Edwin Place
- Flint Street
- French Broad Avenue
- Gracelyn Road
- Haywood Street
- Hiawassee Street
- Kimberly Avenue
- Lakeshore Drive
- Lexington Avenue
- Lodge Street (US 25A)
- Louisiana Avenue
- McDowell Street
- Merrimon Avenue (US 25)
- Montford Avenue

Shared Lane Markings (San Francisco, CA)
Source: Toole Design Group

- Murdock Avenue
- Oak Street
- Roberts Street
- State Street
- Patton Avenue
- Wood Avenue
- Woodfin Street

Climbing Lanes

A bicycle lane on one side of the road (climbing lane) and a shared lane marking on the other side, can provide additional space for riders climbing a hill while providing shared roadway notification to cars and bicyclists coming down the hill. Asheville has many roads where the topography and the existing pavement width make a climbing lane the preferred facility type. Examples of the types of roads where climbing lanes are recommended are included below.

- Clingman Avenue
- College Street
- Fairview Road (Oakley)
- Kimberly Avenue
- Lexington Avenue
- Livingston Street
- Merrimon Avenue
- Overlook Road
- South Tunnel Road
- Tunnel Road
- Victoria Road
- W.T. Weaver Boulevard

Climbing Lane (Seattle, WA)
Source: Toole Design Group

Striped Shoulders

Striped/paved shoulders can provide bicyclists with extra riding space to increase their comfort when traveling adjacent to motor vehicle traffic. The desired width of striped shoulders to accommodate bicyclists is 4 feet, or wider on higher volume roads. Examples of the types of roads where striped shoulders are recommended are included below.

- Asbury Road (Enka)
- Bear Creek Road
- US 74A to Fairview
- Fairview Road in Oakley (US 74A)
- Johnston Boulevard
- Long Shoals Road (NC 146)
- Hendersonville Road (US 25) *
- Mills Gap Road
- New Leicester Highway (NC 63)
- Patton Avenue (US 19/23) *
- Rock Hill Road
- Sand Hill Road
- Sardis Road (NC 112)
- Sweeten Creek Road (US 25A)

Striped Shoulder (Asheville, NC)
Source: Toole Design Group

* Note: Striped shoulders are the recommended bicycle facility on Patton Avenue and Hendersonville Road. As on many suburban commercial roads and especially on these two particular roads, additional improvements are needed in order for them to be a comfortable place to ride a bicycle. These improvements could include additional shoulder width for bicycle use (up to 7'), access management strategies and wide sidewalks. Because Patton Avenue and Hendersonville Road were considered to be unique, they are identified separately on the network and actions maps as needing a range of facilities and action improvements.

Greenway Trails

While this Plan focuses on the on-road bicycle network, it fully supports current and future greenway trail development efforts. Greenways have the potential to provide connections and therefore opportunities to enhance the relationship between greenways and on-road bicycle facilities should be pursued. Detailed information on the emerging greenway network can be found in the City of Asheville Greenway Master Plan available on the City of Asheville Parks and Recreation Department's website. A map from the Greenway Master Plan is included as Figure 32 in this Plan. In addition, the Asheville Greenway Commission's project scoring and ranking summary of greenway projects is included in the appendix of this Plan.

Bridges

Bridges also provide important connections in the bicycle route network in Asheville. Applicable sections of NCDOT's bridge policy, excerpted from the North Carolina Roadway Design Manual, are included in the Facility Standards and Guidelines chapter of this Plan. The full document can be found on NCDOT's website at: http://www.ncdot.org/doh/preconstruct/altern/value/manuals/RDM2001/part1/chapter6/pt1ch6.pdf. Additional information on bridges in Asheville is included as Action 1.6 in the following chapter.

Conclusion

This chapter presented a connected network of bicycle facilities throughout Asheville and details on the actions that would be required on each individual segment of road to create the proposed bicycle network. The following chapter presents additional recommendations for improving bicycle access and connectivity.

Chapter 6: Recommendations

This chapter presents general recommendations for improving bicycle access and connectivity in Asheville, as well as recommendations for ancillary facilities and policies to further encourage bicycling in the City.

Arterial street in Asheville
Source: Toole Design Group

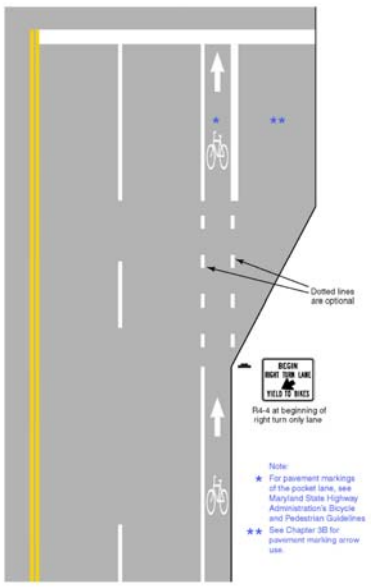
1. General Recommendations

Action 1.1: Improve conditions on arterial streets.
Arterial roads such as Tunnel Road, Merrimon Avenue, and Biltmore Avenue offer direct routes to workplaces, shopping areas, schools and other destinations in Asheville. A lack of bicycle accommodations on the city's arterial street system discourages people from making trips by bicycle and makes conditions less comfortable for bicyclists who ride there now. The existing pavement width of many of these roads is sufficient to provide striped/paved shoulders without eliminating automobile travel lanes. This can be accomplished by reducing the width of lanes and adding the captured space to the side of the road, as shown in Figure 18. A striped/paved shoulder will make arterial roads more comfortable by increasing the lateral distance between bicyclists and motor vehicles.

These roads will still have heavy traffic, high speeds and many driveways and therefore may not be suitable for all riders. Recognizing this, these striped/paved shoulders should not be marked as bicycle lanes in some areas (see map).

Action 1.2: Provide better guidance through complex intersections.
There are many intersections in Asheville that are currently difficult and uncomfortable for bicyclists to use, in part because little or no guidance is provided for bicyclists. Signs and striping at intersections should be carefully selected to raise awareness of merging movements and ensure the proper position at stop lines, especially in light of the fact that research has found that over 70% of bicyclist crashes occur at roadway and driveway intersections. Figure 26 provides additional information about intersection striping.

Figure 26: Intersection striping



Source: Maryland SHA Bicycle and Pedestrian Design Guidelines

Additional improvements could include treatments such as traffic signals, median islands and curb extensions combined with signs, and/or pavement markings. Signal timing and detection that accommodates bicycles should also be utilized. The AASHTO Bike Guide provides guidance on both timing and bicycle detection strategies.

Action 1.3: Provide better connections and access to points outside of Asheville.
There are many destinations outside of Asheville that people would like to access by bicycle, including Lake Lure and Bat Cave. Many participants at the public meeting and on the online questionnaire mentioned appealing regional destinations as one of Asheville's key bicycle-related assets. Therefore, providing better connections to regional destinations is a critical goal of this Plan. Specific regional connections that should be enhanced are described below.

- Finding a safe and convenient way to access US 74A to Fairview by bicycle is important because it provides the most convenient access to locations such as Bat Cave. Bicyclists currently cannot get to US 74A to Fairview from the City without going through the I-240 / I-40 freeway interchange. An alternative route that avoids the interstate ramp should be explored. A greenway connecting off of Onteora Road should be explored as a potential alternative way to access US 74A to Fairview.

Blue Ridge Parkway in Asheville
Source: Toole Design Group

- Providing enhanced connections to the Blue Ridge Parkway, for example from Azalea Road, would be beneficial to bicyclists in Asheville. The Blue Ridge Parkway is, in itself, a bicycle destination. It also provides access to key regional destinations such as Pisgah National Forest and the North Carolina Arboretum.

Action 1.4: Incorporate greenway trails into the bicycle network.
Guided by the Asheville Greenway Master Plan, available on the City of Asheville Parks and Recreation Department's website at http://www.ashevillenc.gov/departments/parks_rec, the City has developed greenway trails near WT Weaver Boulevard, Amboy Road and Broadway. These shared-use paths provide transportation connections and recreational opportunities. This Plan strives to incorporate existing and planned greenway trails into the overall bicycle network. The trails supplement the bicycle network by providing users of different skill levels with off-road bicycling options; however, it should be noted that the presence of greenway trails does not eliminate the need to provide on-road bicycle facilities. An example of a location where a new greenway trail could potentially provide an alternative to the on-road bicycle network is a multi-use trail following along Beaverdam Road, which would provide bicyclists with an important route into and out of the City, as an alternative to riding on Beaverdam Road. A second example of a potentially important off-road connection is a proposed multi-use trail from Hominy Creek to Amboy Road.

Action 1.5: Make key operational improvements to complete connections in the bicycle network.

There are many locations where improvements are recommended to enhance connectivity in the bicycle network. The following is a list of general operational improvements that are recommended.

Bicycle Access is provided on Crayton Road
Source: Toole Design Group

- *Consider changing the direction of automobile parking on College Street downtown where the existing bike lane is located.* The City should consider requiring automobiles to back into the parking spots on College Street downtown where the existing bicycle lane is located. This could potentially reduce the instances of cars pulling in front of and cutting off bicycles traveling in the bicycle lane. This option may be preferable; however, this shift would require additional discussion and education.

- *When there is somewhere for a bicyclist to go, supplement "Dead End" and "Do Not Enter" signs, as appropriate, to indicate that bicycle access is allowed.* Add the words "Except Bicycles" (or some other indication that bicycle access is permitted) to "Dead End" and "Do Not Enter" signs that only apply to motor vehicles. One example of this is the "No Outlet" sign on Crayton Road upon leaving Sweeten Creek Road.

- *Adjust the timing of traffic signals to accommodate bicyclists.* Traffic signal timing should consider all modes including bicycling. Therefore, all traffic signals should facilitate safe bicycle crossings. This includes providing a minimum green time and a minimum yellow time to ensure that bicyclists are able to clear intersections, per the AASHTO *Guide for the Development of Bicycle Facilities* (1999 or latest edition). It is important to ensure that adjusted signal timing for bicycle crossings also facilitates safe pedestrian crossings. In addition, the City should ensure that actuated traffic signals are sensitive to the presence of a bicyclist, for example by using a loop detector configuration that is sensitive to bicycles, providing an accessible push button and using a newer technology such as infrared or video sensors that can tell the difference between bicycles and motor vehicles. This can help improve bicycle detection at actuated signalized intersections and make it possible to detect bicyclists at pedestrian crosswalk signals.

Left turn lane for bicycles
Source: Michael Moule

- *Provide bicycle turn pockets at key intersections.* Left-turn pockets allow bicyclists to wait in a designated space for a gap in traffic before turning left. These pockets are particularly beneficial on roadways with relatively high traffic volumes and significant bicycle turning volumes.

Locations with raised medians provide good opportunities to add these left turn lanes. Left turn pockets can also be useful where greenway trails intersect roadways at mid-block locations.

Action 1.6: Improve bicycle accommodations on bridges.
Bicycle accommodations on bridges (as well as on their approaches and access ramps) should be improved. In the short-term, bicycle access should be enhanced using signage, pavement markings, maintenance and through other spot improvements. All bridge improvement projects should maintain or enhance bicycle access. In the long-term, bridges should be replaced with new facilities or retrofitted with facilities that provide full bicycle access. Any place where there is a bridge or culvert on a minor road should provide bicycle access.

Bridges are critical links in the bicycle network in Asheville. For example, the Craven Street Bridge provides an important connection in the bicycle network. Bicycle access should be enhanced and maintained on these bridges. It is particularly important that future bridge projects accommodate bicyclists. For example, a planned lane reduction project on the Riverlink Bridge should not preclude the provision of bicycle facilities, as it serves as an important connection in the bicycle network. The Smoky Park Bridge does not currently provide bicycle access. Improvements to the bridge as part of the I-26 Connector project should provide bicycle access. Additional information on the design of bridges to accommodate bicycles can be found in Chapter 4 of this Plan.

Action 1.7: Improve the quality and frequency of bicycle facility maintenance.
Bicycle facility maintenance should be improved by establishing clear maintenance responsibilities and continuing to involve the public in identifying maintenance needs. The Blue Ridge Bicycle Club has been assisting the City with cleaning the bicycle lanes on Riverside Drive. The City should continue to utilize volunteers to assist with some maintenance tasks, especially given Asheville's engaged bicycle community. These actions will improve the efficiency and quality of bicycle facility maintenance in the City. Specific maintenance-related recommendations are described below.

- *Encourage bicycle organizations and other community groups to assist with minor maintenance activities.* The City should continue to work with the bicycle community in Asheville, including bicycle organizations, community groups, civic organizations, and businesses to further develop its "adopt-a-bikeway" program. This will help improve bicycle facility safety and reduce maintenance costs.

- *Continue to respond to citizen complaints and maintenance requests.* The City should develop a web-based program to identify maintenance problems in the bicycle network. This program should identify issues that need immediate attention, as well as recurring problems at specific locations. A maintenance program should also assist with setting major maintenance priorities. The maintenance program should have a web-based component to share timely information and encourage active and ongoing public participation.

Specific maintenance problems that should be addressed in the short-term are listed below.

- In many locations, there is gravel in the bicycle travelway caused by driveways without paved aprons. The City should regularly clear bicycle travelways of gravel. It

should continue to require and enforce its existing regulation requiring driveway aprons to be paved 10 feet back from the road.

- Debris in the tunnel on Tunnel Road is problematic, especially given the limited space that is available to bicyclists. This road and elevated walkway should be swept on a regular basis to ensure safe and comfortable bicycle access in the tunnel.

Funding for the maintenance of bicycle facilities should be budgeted as a separate activity from regular mantenance. Specific maintenance tasks are included below.

- Sweeping trails, bicycle lanes and paved shoulders regularly to remove debris;
- Repairing trail and roadway surfaces and sidewalks to ensure a continuous facility and smooth surface that is free of cracks, potholes, bumps and other physical problems;
- Careful repair of utility cuts to prevent rough surfaces for bicyclists;
- Cutting back vegetation such as shrubbery, tree limbs and intrusive tree roots to prevent encroachment;
- Maintenance of bicycle signs, striping, and markings, especially replacement of signs that are damaged by vehicle crashes and other incidents;
- Maintenance of drainage facilities including catch basins and drainage grates;
- Signal maintenance.

Maintenance Website and Hotline

Once a regular schedule for bicycle facility maintenance is established, a website and phone hotline should be established to allow residents to report maintenance problems and request spot repairs. The City website should include a "Bicycle Facility Maintenance Action Request Form" and the City should establish a Bicycle Maintenance Hotline to give citizens an easy means of reporting maintenance concerns on bikeways.

Sample bicycle route signage Source: Toole Design Group

Maintenance Manager

The City should identify a lead staff person as a Maintenance Manager to organize and keep track of both regular and remedial inspection and maintenance of the bicycle network. This staff person would be responsible for coordinating with maintenance crews and volunteer groups for tasks with which they can assist. The maintenance manager would be responsible for addressing maintenance issues that are raised by residents through the City website or Hotline.

Action 1.8: Supplement existing signed bicycle route system.

There are currently ten signed bicycle routes in Asheville, which are identified on the NCDOT Bicycle Transportation Map. These routes are located on roads with generally favorable conditions for bicyclists and are used primarily for recreational purposes. Additional signage should be provided along preferred bicycle routes, focused on providing directional information to destinations. For example signs could be provided to direct bicyclists to destinations like Downtown, Richmond Hill Park, and the Asheville Velodrome and Black Mountain Park via Azalea Road.

Existing bicycle route signage. Source: Toole Design Group

Appropriate sign design and placement is critical to the success of a signage program. Signs should be catalogued and replaced if missing or damaged. It is particularly important to address safety concerns in locations where signed bike routes cross busy roadways.

Action 1.9: Fix spot problems on existing city streets and bikeways.
Making spot improvements of specific existing on-road bicycle facilities should be given high priority. Spot improvements, such as addressing potholes, removing surface irregularities and filling seams between concrete pavement sections should be made on an as-needed basis. Public feedback is critical for identifying these issues (See Action 1.7). Existing spot improvements that should be considered are described below.

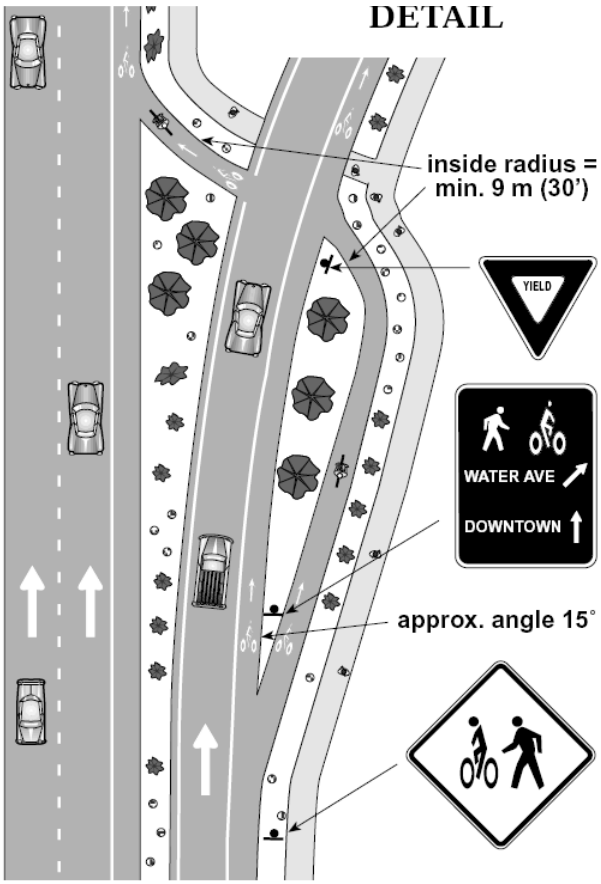
- *Continue to remove drainage grates with drain openings parallel to the direction of travel.* Drainage grates can potentially pose a similar hazard as railroad tracks if the openings are parallel to the bicyclist's direction of travel. To avoid this, only grates with openings perpendicular to the travel lane should be used. Problematic drainage grates should continue to be replaced, as needed, as part of ongoing repair and maintenance efforts. They should also be replaced when streets are repaved and bicycle facilities are added.

Action 1.10: Provide a safer facility for bicyclists to cross the I-240 entrance ramp when traveling east on Tunnel Road.
There are currently two right diverging lanes for motor vehicles turning off of Tunnel Road onto the I-240 entrance ramp. This creates a particularly challenging environment for bicyclists traveling east on Tunnel Road, as they must merge over two lanes of exiting traffic. The City and NCDOT should explore options for improving this situation.

For example, one of the lanes could be eliminated. This could allow for the additional pavement to be used to create enough space to realign the bicycle travelway so that it crosses the exiting travel lane at or close to a ninety degree angle.

Another solution would be to remove a travel lane prior to the signal at Haw Creek Road, and place the bike lane to the left of a right turn only lane that develops immediately after the intersection. Figure 27 provides additional information about alternative entrance ramp design.

Figure 27: Alternative entrance ramp design



Source: State of Oregon Department of Transportation

Tunnel Road in Asheville
Source: Toole Design Group

Action 1.11: Consider bicycle-related signage outside of the tunnel on Tunnel Road.
The City should consider adding bicycle-related signage outside of the tunnel on Tunnel Road to alert motor vehicle drivers to the presence of bicyclists in the tunnel. The signage would make clear that, by law, bicyclists are allowed to travel in the roadway. For example, the State of Oregon uses a sign outside of tunnels that may be applicable in Asheville. Before entering the tunnel, a bicyclist pushes a button, which activates a flashing light on the tunnel entrance beneath a sign that says "Bicyclist in Tunnel When Flashing."

Action 1.12: Make physical improvements to improve railroad crossings.
Roadways should be designed to allow bicyclists to cross railroad lines perpendicular to the rails (or as close to perpendicular as possible). This may require adding pavement to the roadway shoulder area, modifying striping and markings, and posting warning signs.

Flange fillers are another possible treatment to improve safety on rail lines that are still in place but no longer active. Top priorities for railroad crossing improvements should be along multi-purpose trails and signed bicycle routes, but all roadways should be designed to provide bicyclists with safe rail crossing opportunities.

The railroad crossing on Riverside Drive was mentioned frequently at the public meeting as a particularly dangerous obstacle for bicyclists. The online questionnaire further reinforced this observation, as many people cited the railroad crossing as a location where they have crashed on their bicycle. For additional information on the design of railroad crossings, see Chapter 4 of this Plan.

Physical Improvements to Improve Railroad Crossing
Source: Toole Design Group

2. Ancillary Facility Recommendations

The City should provide support facilities to make bicycling efficient and convenient to all Asheville residents. In order for bicycling to be a fully viable form of transportation, other programs and facilities are needed to complement the bicycle network. This includes educational opportunities for bicyclists and the general public, better connections between bicycles and transit and adequate bicycle parking at all destinations. Recommendations for support facilities are included below.

Action 2.1: Improve bicycle access to bus stops and stations.
The new bicycle facilities that will be developed as a part of the bicycle network will help improve the ability of bicyclists to connect to transit throughout the City. To complement this effort, coordination will be needed between the City and local and regional transit agencies. Improved bicycle access and route information should make the transition between modes as seamless as possible. Bicycle route information should be integrated into transit route maps and signs and roadways should be designed so that bicycles and buses co-exist safely and efficiently.

Action 2.2: Accommodate more bicycles on transit vehicles.
Asheville Transit currently has a "Bike on Bus" program that allows bicyclists to bring their bicycles on board buses in order to use them when they disembark at their destination. This program should be expanded as it enhances the viability of both transportation modes. Options for expanding and improving the program include installing high-capacity bicycle racks on buses (ie: racks that can hold up to four bicycles on the front of buses) and increasing bus service frequency especially where bicycle-on-bus service is in high demand. The City should also advertise the service more to students and residents. For additional information on the integration of bicycles and transit, see the TCRP Synthesis 62: Integration of Bicycles and Transit report, available at http://www.tooledesign.com/toolkit.html.

The City should also facilitate safe and efficient bicycle loading onto transit vehicles in Downtown Asheville, for example by providing training on how to use the facility to the general public as well as to bus drivers. The City should also count and report bicycle-on-transit ridership to track growth and make adjustments in scheduling based on need.

Action 2.3: Increase the availability of bicycle parking throughout the city.
Secure bicycle parking located in close proximity to building entrances and transit entry points is essential in order to accommodate bicycling. Secure parking makes bicycling more convenient and helps to reduce the risk of bicycle damage and/or theft.

The City should expand its existing program to install bicycle racks on public property adjacent to commercial buildings, multi-family dwellings and schools. In addition, when new buildings are constructed or properties undergo major changes, bicycle

Existing Bicycle Parking in Asheville
Source: Toole Design Group

racks should continue to be included as a condition of development. It will be important for the City and transit agencies to maintain bicycle racks and lockers and use enforcement to deter misuse of these facilities. Abandoned bikes and locks can make existing racks unusable. Bicycle parking improvements should also be provided at bus stations. Additional strategies to increase the availability of bicycle parking in Asheville are provided below.

- Strengthen regulations to require more bicycle racks and lockers as a part of new developments (as referenced in Action 3.2 on the following page).
- Provide or require covered longer-term bicycle parking in locations where people are likely to leave their bicycles for a longer period of time (i.e. campus housing, transit stations, employment center, etc.)
- Provide incentives and/or requirements for operators of private parking facilities to add secure, high-quality bike parking.
- Increase the amount of bicycle parking provided at public parks, schools, community centers, and libraries as needed.
- Provide sufficient space for bicycle storage at transit stations and at heavily-used bus stops.

3. Policies

The most efficient way to improve conditions for bicycling in Asheville is to incorporate bicycle-friendly policies into community design from the outset. It is much more expensive to retrofit bicycle facilities into communities that were originally designed only for automobile access. Therefore "complete streets" principles should guide roadway design considerations. Complete streets are those that are designed for all users – people who drive automobiles, people who use public transportation, people who bicycle, people with disabilities, and people who travel on foot.

A critical step in providing convenient and safe options for bicycle transportation lies in having a strategic plan that is supported by design guidelines, ordinances and other regulations necessary to steer community design and roadway construction. The policies recommended in this Plan will help integrate accommodations for bicycle transportation into everyday activities in Asheville.

Action 3.1: Develop and institutionalize a mechanism for ongoing communication and collaboration regarding bicycle planning efforts between the City of Asheville, NCDOT Division Office, Division of Bicycle and Pedestrian Transportation and the Transportation Planning Branch.

In order to effectively implement this Plan, the City of Asheville, NCDOT Division Office, Division of Bicycle and Pedestrian Transportation and the Transportation Planning Branch and other stakeholders should develop an institutional framework to ensure that bicycle facilities are considered as a part of all transportation projects. Bicycle considerations should be incorporated into all City efforts, including road repaving and improvement projects, changes to the zoning ordinances and all planning efforts. The Division of Bicycle and Pedestrian Transportation should continue to review planning and design document for all highway and bridge design projects and make recommendations on bicycle accommodations. Bicycle planning efforts should also be coordinated with the Transportation Planning Branch, especially as related to the Comprehensive Transportation Plan (CTP). In addition, bicycle

issues should be considered as a part of all road improvement and repaving projects undertaken by the NCDOT Division Office.

The City, the Division of Bicycle and Pedestrian Transportation and the NCDOT Division Office should build on current coordination and communication efforts regarding their respective road improvement projects and plans. Bicycle considerations should be included as an agenda item at all coordination meetings between the City and the NCDOT Division Office. The City and Division Office should develop mechanisms to share information about upcoming road improvements, which refers back to this Plan as a guide. Additional design efforts will be needed as specific roads are identified.

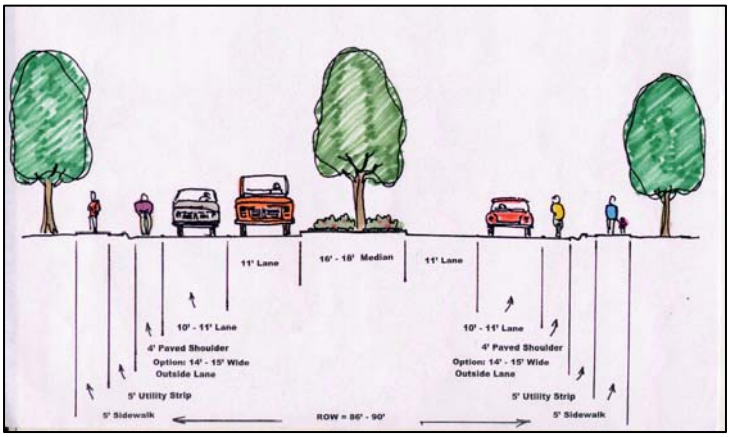
The City and the NCDOT Division Office should develop mechanisms to ensure that bicycle facility designs can be developed, approved and incorporated within the timeframe available. Because this timeframe can be limited, especially for basic resurfacing projects, it is essential that design staff is available on short-notice. Clear channels of communication between the City, State and public should be established to ensure this coordination occurs because repaving projects represent one of the best opportunities to provide bicycle facilities.

Action 3.2: Conduct a review of the existing Zoning Ordinance to highlight areas where requirements could be changed or added to improve bicycle facilities.

As demonstrated in Table 4, the City of Asheville's Zoning Ordinance requires the provision of bicycle facilities; however, improvements should be considered. For example, the City currently requires developers to provide bicycle parking for all uses except single and two-family dwellings. The minimum number for parking spaces required is five percent of the total number of motor vehicle parking spaces provided in a parking lot. The City should consider tying the required number of bike parking spaces to the type of land use. It should also specify acceptable types of bike rack design, address bike parking in garages, and require the provision of showers and lockers in major employment centers.

The City should also explore additional opportunities to require the provision of bicycle facilities and accommodations outlined in this Plan and require that developers demonstrate both internal and external bicycle connectivity, for example by providing bicycle lanes within their developments that connect to existing bicycle lanes on nearby streets.

Figure 28: Gateway Cross Section



Gateway Cross Section. Source: City of Asheville

Action 3.3: Develop a long-term vision for wide arterial roads in Asheville.

The City should develop a long-term vision for what large arterial roads in Asheville will look like in the future. Currently, many of the arterial roads have a five-lane cross section (two travel lanes in each direction and a continuous center turn lane). There are many locations where a continuous center turn lane is not necessary. At these points, the City may wish to

recapture the center turn lane and replace it with a landscaped center median. In the process, it may be possible to free up enough road width to provide bike lanes or striped shoulders.

The City has explored alternative design concepts for roadways in Asheville. For example, the Gateway Cross Section shown as Figure 28 above is included in the Transportation Master Plan. This concept should be updated and incorporated in relevant local and regional planning documents.

Action 3.4: Ensure that bicycle facilities are included as part of all planned roadway improvement projects.
The City, the French Broad River MPO and NCDOT have projects underway or planned that have the potential to significantly contribute to the bicycle route network. Bicycle facilities should be added to these projects where possible. Current and upcoming projects that should include bicycle accommodations include the following:

- Patton Avenue and the new I-26 Connector
- Planned new connection between Amboy Road and Brevard Road (as part of the I-26 Connector project)
- Brevard Road (expansion of the road between the two interstates is currently underway)
- Long Shoals Road
- Grove Park Inn traffic calming and other improvements

In addition, the City should work with the MPO to include bicycle-related projects as priorities in the Transportation Improvement Program (TIP) process. Additional information on this process is provided in Chapter 7 and on the Division of Bicycle and Pedestrian Transportation website at http://www.ncdot.org/transit/bicycle/funding.

Action 3.5: When the City of Asheville Comprehensive Plan and the French Broad River MPO Comprehensive Transportation Plan are updated, the recommendations from this Plan should be incorporated.
When updates to the City of Asheville's Comprehensive Plan and the French Broad River MPO's Comprehensive Transportation Plan are undertaken, the recommendations of this Plan should be incorporated. Because these Plans are important policy documents, it is critical that they include this Plan's vision for a convenient, accessible and connected bicycle network. The CTP was updated in fall 2007 and was informed by recommendations in this Plan. The updated CTP is available on the French Broad River MPO's website at http://www.fbrmpo.org. All future updates to the CTP should continue to incorporate the recommendations in this Plan.

Bicycle Safety Training
Source: Toole Design Group

4. Education, Enforcement and Encouragement Recommendations

The bicycle network is designed to provide safe, convenient access for bicyclists throughout Asheville. Like facilities for other transportation modes, this network of bicycle facilities must be used appropriately to be effective. Therefore, it is not acceptable for bicyclists or motorists to disregard traffic rules. Breaking these laws

puts bicyclists and other roadway users at risk and is inconsistent with the City's overarching goal of increasing safety. Efforts must be made to encourage, among motorists and bicyclists alike, a culture of respect and shared usage that welcomes new riders to Asheville's roads.

Bicycle education, enforcement and encouragement programs have been an important part of the bicycling experience in Asheville for many years. Programs have been implemented by various organizations and agencies in order to improve bicycle safety and encourage more people to ride bicycles. For example, bicycle commuter classes currently being offered in Asheville are one of many community-based initiatives to encourage bicycling.

As the bicycle network is built and more people are encouraged to ride, new programs will be needed to educate bicyclists and motorists about how to co-exist safely in the roadway environment. Drivers should be taught to treat bicyclists as legitimate users of the road and operate safely around bicyclists. Unsafe behavior by either bicyclists or drivers should be targeted through education and enforcement efforts. The actions listed below are recommended in an effort to provide a range of programs to promote bicycling as a fun, healthy form of transportation in the city.

Action 4.1: Promote bicycle education and encouragement in Asheville through partnerships with community organizations.
The City should work with a team of organizations to offer bicycle education and encouragement programs in Asheville. While bicycle safety issues are important, these programs must also focus on pedestrian safety, including pedestrian interactions with bicyclists and motor vehicle drivers. These programs can be offered at community centers, libraries, schools, community festivals, and other public venues. For programs that target children, youth specific curricula and age-appropriate language should be used to explain concepts and safety issues. Potential activities to promote bicycling in Asheville are described below.

Bicycle Website
The City should further develop its website to encourage more bicycle activity in Asheville. The website should include maps of on-and off-road bicycling facilities, recommended bicycle touring routes that provide access to historic and cultural sites and public water access points. Information should also be provided on bicycle and driver safety tips. It should include resources such as bicycle shops, bicycle clubs, a calendar of events with information about organized rides and links to other websites with information about bicycling, and related health issues. The City's website should link to the Division of Bicycle and Pedestrian Transportation's website at http://www.ncdot.org/transit/bicycle for information on events, maps, laws, safety tips, etc.

Bicycling Rodeos
The City should work with the Police Department and other local organizations to organize bicycling rodeos. Rodeos are an opportunity for City staff, police, and other leaders to teach safe bicycling behaviors and give children hands-on experience to improve their bicycling skills. The rodeo site can be set up with mock streets, intersections, and houses/stores for the walking course and cones, stop signs, and play vehicles for a bicycle course. These rodeos should be offered several times each year, and could be coordinated with other City events.

Bicycle Safety Education Curriculum
The City should work with local schools to implement a bicycle safety education curriculum in elementary and middle schools. There are a number of existing sources for funding and assistance in integrating bicycle safety education into schools. The curriculum should cover topics such as bicycle safety and laws and can include helmet promotions and other activities.

Bicycle Safety Materials
The City should develop and distribute bicycle safety materials. Potential materials include safety tips on the City's website, brochures, handouts, and public safety messages. These materials can be provided at local businesses, schools, and public buildings. Information should be targeted at bicyclists as well as drivers. Important safety topics that should be discussed include:

- Laws
- Rules of the road
- Road crossing safety
- Proper location and direction for bicycling on the roadway
- Bicyclist visibility to drivers at night
- Yielding to bicyclists at road crossings and giving bicyclists enough space when riding on the roadway
- The relationship between vehicle speeds and the severity of bicycle injuries

Asheville Bicycle Maps and Brochures
The City should work with the Asheville Convention and Visitors Bureau to develop maps and brochures to show residents and visitors preferred routes for bicycling. These materials should provide information about the benefits of non-motorized transportation and physical activity, bicycle safety tips, bicycling rules, bicycle parking, and information about local bicycling organizations.

Brochures about individual bicycle routes, greenway trails and mountain bike trails should be developed. These brochures should show the bicycle routes in significant detail, including written directions (e.g., cue sheet). They should also include information about historic sites, restaurants, shops and other attractions along or close to the route. This type of brochure would be an excellent resource for residents and visitors.

These maps and brochures should be distributed through a wide variety of outlets, including:

- Visitors centers
- Bicycle shops
- Libraries
- Gyms/YMCAs
- Schools
- Online
- Other organizations, such as bicycle clubs, businesses, and realtors

Educational Campaign on the Benefits of Bicycling
Many people are aware of the environmental benefits of bicycling instead of driving an automobile; however, they may not fully realize the health benefits that bicycling provides. An educational campaign could encourage the development of bikeways and trails as a way to promote physical activity and wellness for people of all ages in Asheville. The initiative should

emphasize the links between bicycling and weight loss, disease prevention, lower health care costs, and longer lives for all members of the community. Targeted audiences for this outreach effort should include:

- Community-based health improvement partnerships
- Hospitals
- Schools

Specific projects can be targeted based on local needs and ideas, however a key component of each project should be a community outreach and promotion effort that highlights the health benefits of bicycling and gives practical advice about where to bicycle in the community.

Employee Bicycle Commuting Incentive Programs
The City should encourage bicycle commuting by providing information about economic benefits, health benefits, and potential commuting routes to employers and employees. The Bicycle Commuter Guide, prepared by the Asheville Bicycle and Pedestrian Task Force and the City of Asheville Transportation Demand Management Program (TDM), with assistance from NCDOT, is a good resource for information on this topic. The Bicycle Commuter Guide is available online at http://www.fbrmpo.org/uploads/NC_Bicycle_Commute_Guide.pdf.

Public agencies can be model employers by considering the following actions:

- Offering monetary incentives for employees who bicycle to work
- Providing showers and lockers for employees
- Working with local bicycling groups to provide "bicycle mentors" to demonstrate to employees who have always driven to work how it may be possible to bicycle to work
- Continuing to support "Guaranteed Ride Home" programs for people who do not bring a car to work but need a car in case of emergencies or inclement weather. Asheville's TDM Program currently offers a Guaranteed Ride Home.
- Encouraging employees who live in locations that are safe and convenient for bicycling to work to participate in Bike-to-Work Day and Strive Not to Drive events.

Action 4.2: Educate Asheville transportation system users about new bicycle facility types.
The City should provide residents with information about the purpose of new bicycle facility treatments (e.g., bicycle lanes, shared lane markings, etc.) and safe behaviors for using these facilities.

- Develop web pages and disseminate information about each treatment.
- Install temporary orange warning flags, flashing lights, or cones at locations where new facilities are installed, where appropriate.
- Increase police patrols for a period of time as roadway users adjust their behavior after a new facility is installed.

Bicycle Safety Training
Source: Toole Design Group

Action 4.3: Increase enforcement of bicyclist and motorist behavior to reduce bicycle and motor vehicle crashes.
The City should work with the Police Department to develop an enforcement program to reduce bicycle and motor vehicle

crashes. This should take a balanced approach to improving behaviors of both bicyclists and motorists. Motorist behaviors that should be targeted include:

- Turning left and right in front of bicyclists
- Passing too close to bicyclists
- Speeding and rolling through stop signs or disobeying traffic signals
- Parking in bicycle lanes and opening doors of parked vehicles in front of bicyclists
- Harassment or assault of bicyclists

For additional information on bicycle laws of North Carolina, visit the Division of Bicycle and Pedestrian Transportation's website at http://www.ncdot.org/transit/bicycle.

Bicyclist behaviors that should be targeted include:

- Ignoring traffic control (particularly traffic signals)
- Riding the wrong way on a street
- Riding with no lights at night
- Riding without helmets (only for children)
- Riding recklessly near pedestrians on sidewalks

Bicyclist safety is a shared responsibility between all roadway users. Enforcement priorities should be established through a collaborative process. Additional enforcement programs are described below.

Bicycle Education for Law Enforcement Officers

The Police Department should offer educational training to officers about bicyclist rights and responsibilities as well as aggressive motor vehicle behavior toward bicyclists. For example, the Maryland Office of Highway Safety organizes safety training events for officers to raise awareness about rights, rules, and appropriate responses to incidents involving conflicts between motor vehicles, bicycles and pedestrians. The Federal Highway Administration offers a DVD titled "Enhancing Bicycle Safety: Law Enforcements Role" that is an excellent training tool. It is available for free from FHWA.

Police Bicycle Patrols

The City and the Police Department may wish to apply for grants and other resources to reestablish its bicycle patrol. Police Bicycle Patrols establish visibility of law enforcement as well as bicycling in general. This also helps involve law enforcement more extensively in bicycling issues. Bicycle squad members could work with the City and other local organizations to provide bike safety education through youth groups and schools, as well as simply talking with residents on their beats. Professional law enforcement can also be supplemented with volunteer and community-based patrols. This approach can also be used on multi-use trails and along biking routes to school.

Safe Routes to School Activity
Source: Toole Design Group

Action 4.4: Obtain funding for bicycle education and enforcement programs.

The City should work with local organizations to pursue additional funding for bicycle safety education and enforcement programs. By providing support to grants and other funding applications, the City can help organizations that conduct education and

enforcement to increase their resources and reach more Asheville residents. Sources could include the Governor's Highway Safety Program and the Safe Routes to School program discussed below.

Action 4.5: Expand the Safe Routes to Schools program to encourage children to walk and bicycle to school.
The City should build on its existing Safe Routes to School (SRTS) program. While the program is managed by NCDOT, the City should participate in this federal state program as much possible. By expanding its efforts to work with the Asheville Public Schools, public health organizations, parent associations, and local walking and bicycling advocacy groups, the City can further develop safe bicycle routes to Asheville schools. These routes should be improved in conjunction with the implementation of this Plan and the Asheville Pedestrian Master Plan. Bicycle facilities included within this Plan that are within a 2-mile radius of schools should be considered for potential SRTS funding.

The City should work with local schools to increase participation in International Walk and Bicycle to School Day (held each year in October). Walk and Bicycle to School days have been instituted at many schools throughout the country over the past decade. They increase awareness of bicycling and walking as fun, healthy transportation choices that can reduce automobile congestion and pollution near schools.

Additional examples of bicycle-related programs that could be offered are listed in Figure 29 below.

Figure 29: Bicycle Related Programs

Bicycle-Related Programs

- Bicycle commuter classes (currently being offered in Asheville)
- Helmet promotions
- University-base programs
- Bicycle "ambassadors" in all parts of Asheville who can provide helmets and bicycle lights, assist with bicycle maintenance, and remind bicyclists about laws and safe behaviors (similar to Chicago's Bicycle Ambassador Program)
- Media outreach to promote bicycling and increase awareness of bicycle safety, including billboards, direct mail, television and radio advertisements, etc.
- A "Share the Road" campaign to increase safe travel behavior and respect between all types of roadway users
- Community rides in all parts of Asheville that are comfortable for less-experienced bicyclists
- Outreach to lower-income and minority populations that are typically under-represented in the Asheville bicycle community
- "Drive with Care" campaign targeted to improve motorist behavior around bicyclists
- Work with businesses to develop programs that encourage their employees and customers to bicycle

Asheville has a strong and vibrant bicycle community, which is an important resource in its efforts to become a more bicycle-friendly city. The City should fully utilize this important

asset, while also collaborating with other constituencies in the area. Additionally, the City should facilitate and encourage the efforts of local bicycle shops to lead bicycle education and encouragement activities.

Action 4.6: Consider developing a corridors-to-campus initiative focused on the University of North Carolina Asheville, Asheville-Buncombe Technical Community College and other local campuses.

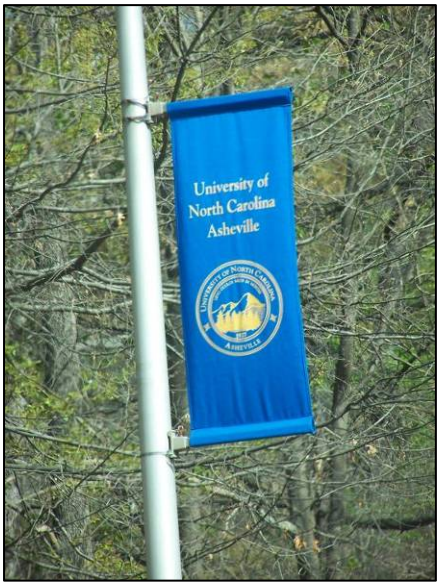


Photo Credit: Toole Design Credit

The City should work with the University of North Carolina-Asheville, Asheville-Buncombe Technical Community College, and other local schools to identify, evaluate and prioritize the most cost effective strategies to support bicycling to and from campus. These schools generate a substantial number of vehicle trips and many of their students live in close proximity. This captive student population presents an enormous opportunity to reduce congestion and increase student health by replacing vehicle trips with bicycling trips.

Working with administrative officials, the City should launch a corridors-to-campus initiative designed to identify, evaluate and prioritize the most cost effective strategies to support walking and bicycling. As an example, the University of Florida, in cooperation with the City of Gainesville, conducted such an effort in 1998 as part of an overall mobility management effort. The study entailed intercept questionnaires and ranking of routes from surrounding neighborhoods and apartment complexes that would benefit from specific bicycle and pedestrian improvements. The results were programmed into the MPO's Transportation Improvement Program as well as University capital investment and program budgets.

Conclusion

This chapter provided general recommendations for improving bicycle access and connectivity in Asheville. The following chapter outlines a strategy for how these recommendations can be achieved over the next 25 years

Chapter 7: Implementing the Plan

This chapter describes how the recommendations for improving bicycle conditions in Asheville outlined in the previous chapters will be achieved over the next 25 years. The first section of this chapter discusses factors that should be considered in implementing recommendations and in prioritizing projects. The second section breaks the phasing of recommendations into short, medium, and long-term categories. The third part of the chapter describes facility development strategies, outlining general bicycle facility costs and potential funding sources for the Plan.

Asheville, NC
Photo Credit: Toole Design Group

Upcoming transportation projects represent one of the most important considerations in implementing the recommendations of this Plan. All resurfacing, repaving and improvement projects should be evaluated to determine whether it is possible to provide the bicycle facility recommendations included in this Plan as part of a planned project. This will be accomplished by mainstreaming bicycle needs into all City departments and processes. The City and the NCDOT Division Office currently coordinate regarding their respective repaving schedules. Bicycle considerations should be included as part of this coordination process. Coordination with the MPO in prioritizing projects in the region and incorporating bicycle projects into the TIP process will be critical in implementing the recommendations in this Plan, as will ongoing coordination with the Division of Bicycle and Pedestrian Transportation and the Transportation Planning Branch.

Considerations

There are several factors that should be considered in pursuing the implementation of the recommendations in this Plan. These factors were taken into consideration in the prioritization of the recommendations to the extent possible.

- Safety is an important consideration in prioritizing bicycle improvement projects in Asheville. Improvements that enhance the safety of bicyclists in Asheville should be initiated in the short-term.

- Maintenance is a critical consideration in evaluating how recommendations for specific roads in Asheville can be implemented. Whether the City or the State maintains a road will determine who is responsible for creating and maintaining any potential bicycle facility. It will determine how a project is funded, as well as the process for road improvements.

- In addition to maintenance of the road, ownership of the right-of-way is a critical consideration in implementing the recommendations of this Plan. If the City or State owns the right-of-way, it will be easier to pursue improvements such as widening the road or paving the shoulder. If the right-of way is not owned, it will likely take more time (to negotiate agreements with individuals) and money to create the facility.

- The relative importance of a proposed bicycle facility within the transportation network should be evaluated in prioritizing potential projects. Roads that provide important connections to and between key destinations should be prioritized, as should roads that contribute to a linear network of bicycle facilities that allows users to get around Asheville safely and comfortably. Major corridors, especially ones that provide important north/south and east/west connections should be developed in the early phases of implementation. Additionally, roads that currently have a high volume of bicyclists should be prioritized as they obviously serve a significant role for bicyclists.

- The cost of providing bicycle facilities and programs should also be considered in the implementation of this Plan. Projects that can be completed quickly and at moderate cost should be pursued first. Projects that will require more significant investments should be planned for in the near-term so that it will be possible to implement them in the medium-term. The cost of providing facilities depends on whether they are developed as stand alone projects, or whether they are included as part of other improvement projects. When completed as part of a road improvement project, a bicycle facility can in some instances be provided at little or no additional cost. In other cases, a bicycle improvement can be provided as an incidental cost to a larger project.

Project and Program Phasing

The City's bicycle projects and programs will be developed over the next 25 years. Phasing of the Plan recommendations is discussed below. Specific short-term recommendations are listed. These are the first actions that should be taken to begin implementing this Plan.

Short-Term Recommendations (0 to 5 years)

Several of the project and program recommendations should be implemented soon after this Plan is adopted (within 5 years). These short-term projects will improve bicycle conditions in specific areas, creating early successes. These short-term projects, programs, and policies will build momentum for the other recommendations of the plan. Short-term recommendations are included below.

Short-Term Bicycle Facilities and Operational Improvements

- Provide bicycle lanes in the locations listed in Figure 30 below:

Figure 30: Short-Term Priority Locations for Bicycle Lanes

Short-Term Priority Locations for Bicycle Lanes

- Asheland Avenue
- Broadway (north of I-240)
- Coxe Avenue
- Haywood Road (from Riverside Drive to Beverly Road West)
- Hilliard Avenue
- South Charlotte Street
- Southside Avenue

- Provide shared lane pavement markings (described in Chapter 4) on Charlotte Street to encourage bicycling and build public awareness. Haywood Road in Downtown West Asheville may also be an appropriate location for shared lane markings in the near term. Recommended locations for shared lane markings in the short-term are listed in Figure 31 below.

Figure 31: Short-Term Priority Locations for Shared Lane Markings

Short-Term Priority Locations for Shared Lane Markings

- Charlotte Street (north of I-240)
- Haywood Road (in downtown West Asheville)
- Chestnut Street
- Montford Avenue
- South French Broad Avenue

- Conduct a pilot lane diet (narrowing automobile travel lanes to create enough space within the existing road width to provide bicycle facilities) project in Asheville to gain public awareness and analyze outcomes for both bicyclists and automobiles. Sections of Broadway north of Chestnut Street may be a good initial candidate for a lane diet.

- Develop plans and designs for pursuing a road diet (creating space for bicycle facilities by eliminating an automobile travel lane) on Broadway from Chestnut Street to Cherry Street, in order to provide bicycle lanes within the existing pavement width.

- Provide a climbing lane on Clingman Avenue on the east side of the Riverlink Bridge and on Lexington Avenue in Downtown Asheville.

- Improve safety conditions for bicyclists crossing the railroad tracks on Riverside Drive.

- Develop a maintenance plan, including a web-based maintenance request form, to ensure that existing and future bicycle facilities are well-maintained.

- Review the design of ongoing transportation improvements on Brevard Road and the Riverside Bridge to make the projects consistent with the bicycle network in this Plan if possible.

- Clarify whether bicycle access is provided on all "No Outlet" signs in Asheville, for example by adding "Except for Bikes" below the sign where bicycle access is provided.

- A greenway connection at Onteora Road should be explored as an alternative way for bicyclist to access US 74A to Fairview.

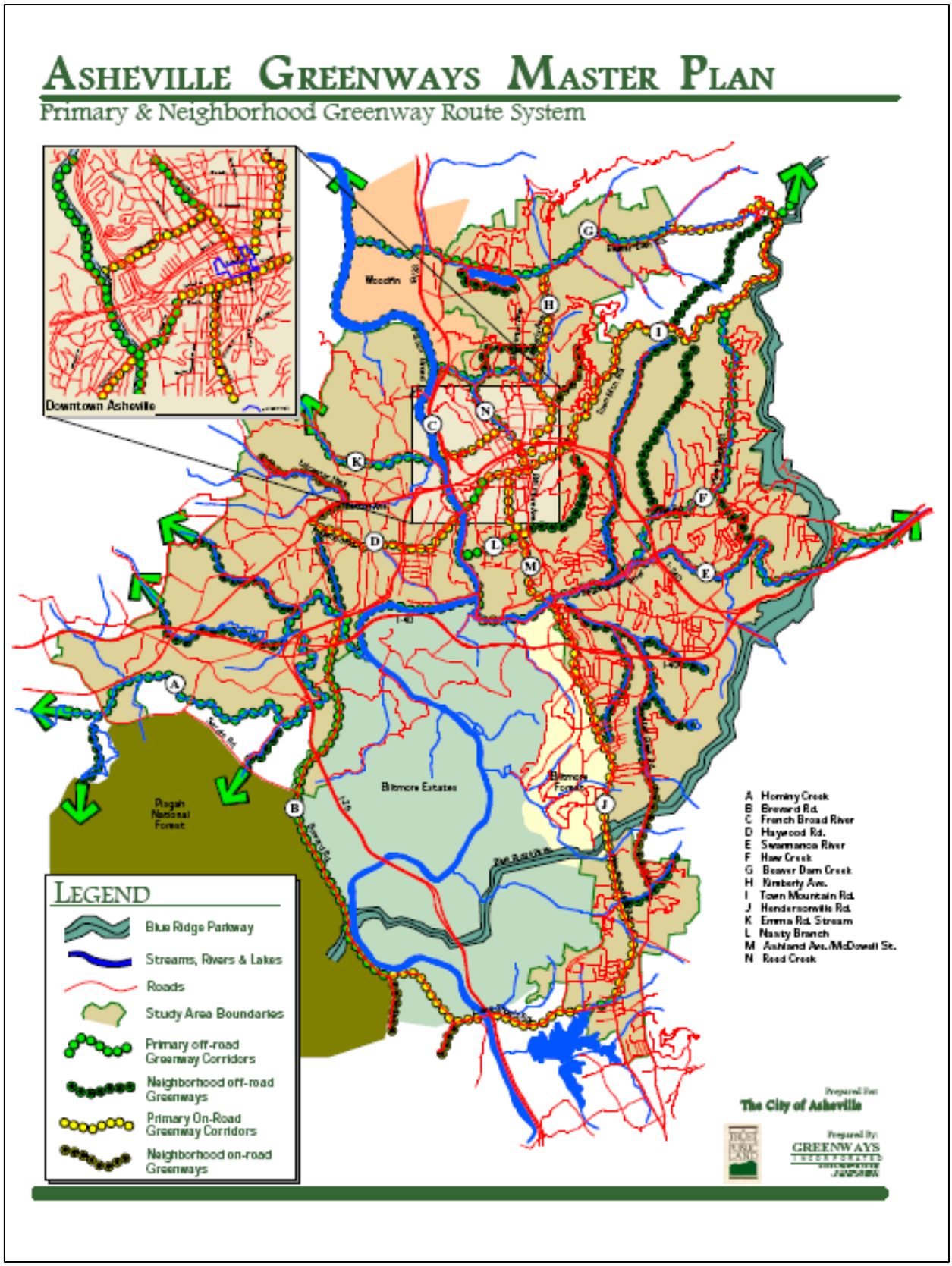
- The City should pursue opportunities to improve bicycle accommodations on bridges (as well as on their approaches and access ramps) as they serve as critical links in the bicycle network. In the short-term, bicycle access should be enhanced using signage, pavement markings, maintenance and through other spot improvements. Additionally, the City should ensure that upcoming projects on bridges in the City do not preclude the provision of bicycle facilities in the future.

- The City should continue to support current and future greenway trail development efforts as greenways have the potential to provide connections between destinations and between on-road bicycle facilities. Opportunities to enhance the relationship between greenways and on-road bicycle facilities should be pursued. The City should continue to look for opportunities for how the on-road bicycle network can fill gaps in the greenway network and how the greenway network can provide alternative connections to uncomfortable roads. By encouraging the relationship between the on-road bicycle network and the emerging greenway system, the City can ensure that both types of facilities compliment each other. The City should ensure that locations where a greenway intersects with a road are designed with careful attention focused on the safety of trail users crossing the road. For additional guidance on road crossings, the publications listed on page 31 of this Plan should be consulted.

- The City should continue to implement the short-term greenway facilities recommended in the City's Greenway Master Plan. Coordinating the City's bicycle and greenway planning efforts will ensure that mutually beneficial opportunities, for example areas where on-road bicycle facilities connect greenways or where greenways provide an alternate route to a difficult road, are identified.

  In 2008 the City will be updating its Parks and Recreation Master Plan. This effort will include an update to the Greenway Master Plan. Identifying connections between the bicycle and greenway networks should be an important element of this planning effort. The Asheville Greenway Master Plan map is included as Figure 32 on the following page. To further encourage coordinated implementation of the bicycle and greenway plans, the Asheville Greenway Commission's project scoring and ranking summary of greenway projects is included in the appendix of this Plan.

Figure 32: Asheville Greenway Master Plan Map



Short-Term Programs and Policies

- Incorporate the recommendations from this Plan into the French Broad River MPO's Comprehensive Transportation Plan.

- The City should consider budgeting dedicated "set aside" funds to implement the recommendations in this Plan.

- The City should consider re-establishing a bicycle coordinator or similar position to support efforts underway at the MPO level. This staff member would provide additional resources to support bicycle planning activities and could assist in organizing meetings, facilitating communication among the City, NCDOT, MPO and other stakeholders and could also prepare regular briefings to the City Council and other interested parties on accomplishments and activities.

- Develop an institutional framework for ongoing collaboration and communication between the City of Asheville, the NCDOT 13 Division Office, the Division of Bicycle and Pedestrian Transportation and other relevant NCDOT units, and the public. Develop a mechanism to ensure that bicycle issues are addressed as a part of all ongoing coordination between the City and NCDOT, particularly during repaving projects.

- Undertake a detailed analysis of Asheville's policies, funding mechanisms and maintenance policies looking for opportunities to better provide for bicycle needs.

- Pursue opportunities to encourage and/or require private sector developers to provide the bicycle facilities recommended in this Plan, especially in cul-de-sac development.

- Develop standard designs for bicycle-friendly intersections, bicycle parking and bicycle lockers.

- Establish clear maintenance responsibilities and continue to involve the public in identifying maintenance needs. Opportunities to continue to utilize volunteers to assist with some maintenance tasks should be pursued.

- Repave roadways with poor pavement conditions that provide critical connections in the bicycle network and continue to replace drainage grates with drain openings parallel to the direction of travel with bicycle-friendly grates.

- Expand efforts to promote bicycle education and encouragement in Asheville through partnerships with community organizations. These efforts should include educational and awareness campaigns focused on the new bicycle facilities that are being provided.

- The City should continue to support Asheville Transit's "Bike on Bus" program that allows bicyclists to bring their bicycles on board buses in order to use them when they disembark at their destination. This program should be expanded as it enhances the viability of both transportation modes. Options for expanding and improving the program include installing high-capacity bicycle racks on buses (ie: racks that can hold up to four bicycles on the front of buses) and increasing bus service frequency especially where bicycle-on-bus service is in high demand. The City should also advertise the service more to students and

residents. For additional information on the integration of bicycles and transit, see the TCRP Synthesis 62: Integration of Bicycles and Transit report, available at http://www.tooledesign.com/toolkit.html.

- As noted in Action 4.5, the City should build on its existing Safe Routes to School (SRTS) program. By expanding its efforts to work with the Asheville Public Schools, public health organizations, parent associations, and local walking and bicycling advocacy groups, the City can further develop safe bicycle routes to Asheville schools. For example, the City should work with local schools to increase participation in International Walk and Bicycle to School Day to increase awareness of bicycling as a fun and healthy transportation choice that can reduce automobile congestion and pollution near schools.

- The City should work with the University of North Carolina-Asheville, Asheville-Buncombe Technical Community College, and other local schools to identify, evaluate and prioritize the most cost effective strategies to support bicycling to and from campus. These schools generate a substantial number of vehicle trips and many of their students live in close proximity. This captive student population presents an enormous opportunity to reduce congestion and increase student health by replacing vehicle trips with bicycling trips. A "corridors-to-campus" initiative focused on improving bicycle connections between the University of North Carolina-Asheville campus and surrounding areas would be a good initial project.

- The City should support Employer Incentive Programs to encourage bicycle commuting by providing information about economic benefits, health benefits, and potential commuting routes to employers and employees. The Bicycle Commuter Guide, prepared by the Asheville Bicycle and Pedestrian Task Force and the City of Asheville Transportation Demand Management Program (TDM) with assistance from NCDOT, is a good resource for information on this topic. The Bicycle Commuter Guide is available online at http://www.fbrmpo.org/uploads/NC_Bicycle_Commute_Guide.pdf. Examples of such programs are included in Action 4.1 in the previous chapter.

- The City should update the existing Asheville Bicycle Map to show residents and visitors preferred routes for bicycling. This map should provide information about connections between the on-road bicycle network and the emerging greenway network, as well as educational material about the purpose and proper use of new bicycle facilities, and also about other resources such as bicycle parking and contact information for local bicycle organizations.

- The City should work with the Police Department to increase enforcement of bicyclist and motorist behavior to reduce bicycle and motor vehicle crashes.

Medium-Term Recommendations (0 to 10 years)

There are a number of recommended projects and programs that are very important for improving bicycle conditions in Asheville, but are likely to take longer to implement than the short-term initiatives. These projects and programs are classified as medium-term recommendations. Though these recommendations are designed for a 10-year timeframe, Asheville should take advantage of opportunities that arise to implement the projects and programs sooner. Specific medium-term projects and programs are listed below.

- Provide bicycle lanes and shared lane markings in the locations listed in Figures 33 and 34 below.

Figures 33 and 34: Medium-Term Priority Locations for Bicycle Lanes and Shared Lane Markings

Medium-Term Priority Locations for Bicycle Lanes

- Biltmore Avenue (US 25)
- College Street
- Lyman Street
- Martin Luther King Avenue
- McDowell Street
- Patton Avenue
- Riverside Drive
- Sand Hill Road
- Southside Avenue
- South Tunnel Road
- Swannanoa River Road
- Tunnel Road

Medium-Term Priority Locations for Shared Lane Markings

- Biltmore Avenue (US 25)
- Brevard Road
- Brook Street (US 25A)
- Central Avenue
- College Street
- Edwin Place
- Gracelyn Road
- Kimberly Avenue
- Lakeshore Drive
- McDowell Street
- Merrimon Avenue (US 25)
- Murdock Avenue
- Patton Avenue (downtown)

- Provide climbing lanes in the locations listed in Figure 35 below.

Figure 35: Medium-Term Priority Locations for Climbing Lanes

Medium-Term Priority Locations for Climbing Lanes

- College Street
- Kimberly Avenue
- Merrimon Avenue
- South Tunnel Road
- Tunnel Road

- Provide striped/paved shoulders in the locations in Figure 36 below.

Figure 36: Medium-Term Priority Locations for Striped/Paved Shoulders

Medium-Term Priority Locations for Striped/Paved Shoulders

- US 74A to Fairview
- Hendersonville Road (US 25)
- New Leicester Highway (NC 63)
- Patton Avenue (US 19/23)
- Sardis Road (NC 112)
- Sweeten Creek Road (US 25A)

- Provide a safer facility for bicyclists to cross the I-240 entrance ramp when traveling east on Tunnel Road.

- Consider bicycle-related signage outside of the tunnel on Tunnel Road.

- Improve conditions for bicyclists on bridges in Asheville.

- Supplement the existing signed bicycle route system as the bicycle facilities recommended in this Plan are provided.

- Continue to implement the medium-term greenway facilities recommended in the City's Greenway Master Plan.

- The City should consider changing the orientation of on-street parking on College Street downtown to reverse-in angled parking to reduce potential car/bicycle conflicts in the existing bicycle lane. This should be considered in the medium-term or whenever re-striping is necessary.

Medium-Term Programs and Policies

- The City should expand its program to install bicycle racks on public property adjacent to commercial buildings, multi-family dwellings and schools.

- Improve bicycle access to bus stops and stations to make the transition between modes as seamless as possible.

- Bicycle route information should be integrated into transit route maps and signs.

- Roadways should be designed so that bicycles and buses co-exist safely and efficiently.

- When the City of Asheville Comprehensive Plan is updated, the recommendations from this Plan should be incorporated.

Long-Term Recommendations (0 to 25 years)

Long-term recommendations include providing shoulders on many higher-volume rural roadways and constructing much of the greenway trail system. While these recommendations may be included in the long-term category, there may be opportunities for implementing them sooner. For example, bicycle facilities could be included as a part of a new roadway project added to the Transportation Improvement Program or a new bicycle program could be provided by applying to a new grant funding source. The City should take advantage of these opportunities for implementation.

As has been noted, upcoming transportation projects represent one of the most important considerations in implementing the recommendations of this Plan. All resurfacing, repaving and improvement projects should be evaluated to determine whether it is possible to provide the bicycle facility recommendations included in this Plan as part of the planned project.

Facility Development Strategies

This section describes several strategies that the City of Asheville can use to develop the bicycle facilities recommended in this Plan. It is essential for the City to implement the most cost-effective strategies in order to have the greatest impact with a finite amount of resources available for bicycle transportation.

Roadway construction and re-construction projects offer excellent opportunities to incorporate facility improvements for non-motorized modes. It is much more cost-effective to provide bicycle facilities along with these projects than to initiate the improvements later as "retrofit" projects. Figure 37 includes several types of roadway projects that can incorporate bicycle facilities.

Figure 37: Types of Roadway Projects that can Incorporate Bicycle Facilities

Types of roadway projects that can incorporate bicycle facilities

- New roadway construction
- Roadway reconstruction
- Restriping
- Repaving
- Replacing roadway bridges
- Retrofitting roadways with new pedestrian and bicycle facilities
- Signage and wayfinding projects

As noted, upcoming transportation projects represent one of the most important considerations in implementing the recommendations of this Plan. All resurfacing, repaving and improvement projects should be evaluated to determine whether it is possible to provide the bicycle facility recommendations included in this Plan as part of a planned project. This is true for the full range of projects, from large scale projects such as the I-26 Connector to basic repaving and resurfacing projects undertaken by the NCDOT Division Office and the City of Asheville. This will be accomplished by mainstreaming bicycle needs into all City departments and processes.

Incorporating bicycle facility projects into planned projects is a more efficient means of creating facilities than retrofitting roads or pursuing bicycle projects as stand-alone projects. The City and the NCDOT Division Office currently coordinate regarding their respective repaving schedules. Bicycle considerations should be included as part of this coordination process. Bicycle issues, and specifically the implementation of this Plan, should be included on the agenda of all coordination meetings between the City and the NCDOT Division Office. As noted, coordination with the MPO in prioritizing projects in the region and incorporating bicycle projects into the TIP process will be critical in implementing the recommendations in this Plan. Coordination with the Division of Bicycle and Pedestrian Transportation and the Transportation Planning Branch, especially as related to the Comprehensive Transportation Plan, will also be critical.

General Bicycle Facility Costs

General (order of magnitude) cost estimates for the main components of this Plan are provided in tables 5 through 7 on the following page.

The costs shown in this Plan are an approximation of the total cost of implementation. In many cases, on-road bicycle facilities can be created by narrowing or removing travel lanes in corridors where motor vehicle capacity is not at projected levels. Often, these facilities can be added for a minimal cost as a part of a roadway repaving or reconstruction project.

If the City is undertaking a roadway improvement project as part of its normal maintenance program, it may be advantageous to provide a bicycle facility identified in this Plan during that effort. In this case, the City would improve bicycling conditions sooner and save the additional costs of retrofitting in the future. The City should take advantage of implementation opportunities as they become available. Additional information on the generalized cost estimates in the tables that follow is provided below.

- The costs in this spreadsheet are generalized estimates, based on 2007 project costs.
- The estimates are made for long-range planning purposes, not for specific project designs.
- These estimates do not include costs for right-of-way acquisition, planning, design, labor, maintenance of traffic during construction, mobilization, and future maintenance.
- These estimates do not include costs for drainage, erosion and sediment control, and grading, where applicable.
- Actual unit costs will vary based on project location, project limits, project scope (combination with other projects).

Table 5: On-Road Bicycle Facilities

FACILITY	ACTION	UNIT	UNIT COST
Install bicycle route signs	Add/install signs to bicycle route	Linear mile (roadway centerline)	$1,500
Install bicycle lanes (on existing pavement or during repaving)	Stripe bicycle lane on both sides of roadway.	Linear mile (roadway centerline)	$13,834.00
Remove existing markings (lane removal or lane width reduction) and install bicycle lanes	Eradicate existing markings (4 lines) and install bicycle lanes on both sides of roadway.	Linear mile (roadway centerline)	$47,626.00
Install climbing lanes (on existing pavement or during repaving)	Stripe bicycle lane on one side of roadway and install shared lane markings on other side of the roadway.	Linear mile (roadway centerline)	$11,141.00
Remove existing markings (lane removal or lane width reduction) and install climbing lanes.	Eradicate existing markings (4 lines) and install bicycle lane on one side of the raodway and shared lane markings on the other side of the roadway	Linear mile (roadway centerline)	$44,933.00
Install shared lane markings (on existing pavement or during repaving)	Install shared lane markings	Linear mile (roadway centerline)	$8,448
Construct wide outside lanes	Additional lane pavement added during roadway construction	Linear mile (roadway centerline)	$287,584

Table 6: Bicycle Parking Facilities

FACILITY	ACTION	UNIT	UNIT COST
Bicycle rack (Purchase and install)	Purchase and install a bicycle rack	One rack	$700
Bicycle locker (Purchase and install)	Purchase and install a bicycle locker	One locker	$2,000

Table 7: Shared-Use Pedestrian and Bicycle Facilities

FACILITY	ACTION	UNIT	UNIT COST
Construct shared-use path (10' wide)	Construct asphalt base and surface course	Linear mile (one shared-use path)	$706,273
Construct sidepath or widen existing sidewalk for ped/bike use	Construct sidepath	Linear mile (one sidepath)	$706,273

Funding

Funding is essential for implementing the recommendations of this Plan. New bicycle facilities, programs, and maintenance activities will need to be funded through various sources. Because of this, it will be important for the City to establish dedicated funding to provide the facilities included in this Plan. Additional funding should also be provided to use

as matching funds for federal, state, and other grants. These funds can be generated through public/private partnerships, through the proffer system, and through the capital budget if necessary. The City should look to partner with regional governments and adjacent jurisdictions to develop funding sources. Additional funding opportunities from the public and private sectors should also be explored.

The NCDOT Division of Bicycle and Pedestrian Transportation is an excellent resource for information regarding funding opportunities for bicycle transportation projects in Asheville. The information below is included on DPBT's website at http://www.ncdot.org/transit/bicycle/default.html.

Introduction — Funding

The North Carolina General Assembly enacted legislation (G.S. 136-71.12 Funds) that authorizes the North Carolina Department of Transportation (NCDOT) to spend any federal, state, local, or private funds available to the Department and designated for the accomplishment of Article 4A, Bicycle and Bikeway Act of 1974. In addition the 2005 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) requires the Department to set aside federal funds from eligible categories for the construction of bicycle and pedestrian transportation facilities"

Funds for bicycle and pedestrian projects come from several different sources that are described in this section; however, allocation of those funds depends on the type of project/program and other criteria. The information provided in this section is intended to present a basic overview of the process.

Funding Sources for Pedestrian and Bicycle Needs

Federal Aid Construction Funds – Several categories of federal aid construction funds — National Highway System (NHS) and Surface Transportation Program (STP) — or Congestion Mitigation and Air Quality (CMAQ) funds provide for the construction of pedestrian and bicycle transportation facilities. The primary source of funding for bicycle and pedestrian projects is STP Enhancement Funding.

State Construction Funds – State roadway construction funds (not including the Highway Trust Fund for Urban Loops and Interchanges) may be used for the construction of sidewalks and bicycle accommodations that are a part of roadway improvement projects.

Governor's Highway Safety Program (GHSP) – GHSP funding is provided through an annual program, upon approval of specific project requests, to undertake a variety of pedestrian and bicycle safety initiatives. Amounts of GHSP funds vary from year to year, according to the specific amounts requested.

Information on funding categories for bicycle projects (ie: independent and incidental) and information on the Transportation Improvement Program (TIP) process are also included on the NCDOT Pedestrian and Bicycle Program's website. The TIP process is described briefly below.

Transportation Improvement Program Process

Planning, design and construction of transportation projects in North Carolina is done through the Transportation Improvement Program (TIP). The TIP process is the mechanism for local areas, such as Asheville, to present transportation requests to state government. Bicycle improvements can be included in the TIP as part of the construction of a highway project or as an independent project. The Division of Bicycle and Pedestrian Transportation creates a four-year schedule of projects drawing from the following sources:

- The prioritized Local Transportation Improvement Program (LTIP) list produced by the MPOs, which is derived from separate lists produced by communities comprising the MPO.
- Project requests that are made at the biennial TIP meetings or through written requests within 30 days of the meetings from the state's small urban areas, counties, public and private entities, and citizens.
- Internal DBPT assessment of statewide bicycle and pedestrian project needs.

All project requests are classified as independent or incidental (those built as part of a highway or bridge improvement) projects. Independent project requests are evaluated using project selection criteria. A prioritized list of projects is presented to the North Carolina Bicycle Committee, which reviews the list, makes revisions and recommendations, and adopts a four-year schedule of projects. The adopted schedule is sent to the North Carolina Board of Transportation for approval and inclusion in the state's TIP.

The steps for including a project in the TIP, as provided on the Division of Bicycle and Pedestrian Transportation's website at http://www.ncdot.org/transit/bicycle/funding/funding_TIP.html, are included below.

Steps in the Process

1. *Recognizing a need for a bicycle improvement project. Somewhere in a local area there may be unsafe or difficult riding conditions for bicyclists that highlight a need for bicycle transportation improvements. Such improvements may be an on-road improvement such as wide paved shoulders, an off-road bike path, bicycle parking, or printed materials such as maps or safety brochures.*
2. *The need is presented to the North Carolina Department of Transportation. If it is a citizen or private group such as a local bicycle club, there are several ways to present the need to transportation officials. First, a citizen or local club may present their request to appropriate local government officials—aldermen, town council members, county commissioners, local planning boards, Transportation Advisory Committees, or other group appropriate to that local area. These agencies may or may not choose to include the request in their transportation improvement plan to be presented to NC Department of Transportation at the biennial Transportation Improvement Program (TIP) meeting.*

   If an official of an agency desires to make a request at a division TIP meeting but is unable to attend on the date of the meeting, a written request may be submitted within 30 days of the scheduled TIP meeting. The request should be addressed to the Secretary of the North Carolina Department of Transportation. All requests will receive the same degree of consideration.

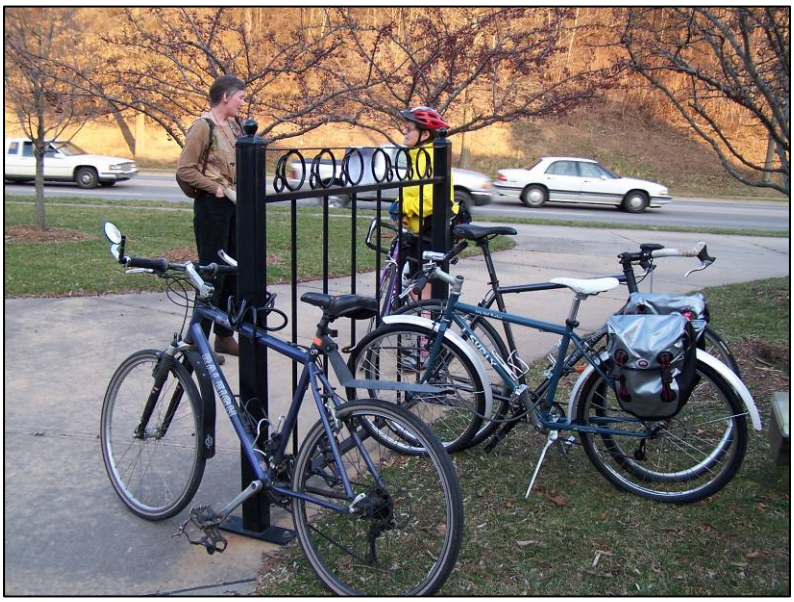
3. *All bicycle requests are documented. Following the public TIP meetings, requests for bicycle transportation improvement projects will be organized and documented by the NCDOT Division of Bicycle and Pedestrian Transportation.*
4. *Some bicycle improvement projects are selected for construction. The Division of Bicycle and Pedestrian Transportation first evaluates and prioritizes all requests; then a summary of the project requests is presented to the NCDOT Bicycle Committee for its review. The Committee then forwards recommendations on the scheduling of some of the requested projects to the North Carolina Board of Transportation, which makes the final decision on projects to be included in the Transportation Improvement Program. Inclusion in the TIP Plan does not in any way guarantee that a requested project will be implemented. Rather, it means that the project will receive further study and will be implemented if feasible.*
5. *Projects listed in the TIP fall into two categories. Bicycle and pedestrian projects that can be incorporated into a planned and scheduled highway improvement are categorized as incidental projects. The bicycle or pedestrian element will be considered during the planning and design phases of the total project. Incidental projects are built with a combination of state and federal funds in the same manner as the larger highway project is constructed. Projects not incorporated into a planned and scheduled highway improvement are categorized as independent projects. These projects are constructed using 80% federal and 20% state money.*
6. *Finally, some TIP projects are implemented. In the case of a scheduled incidental bicycle improvement, inclusion in the TIP means that the project will be considered in conjunction with the planning and environmental studies for the given highway project. If the bicycle component is judged to be feasible, it will be scheduled for construction.*
   Following inclusion in the TIP, each independent project will undergo a detailed planning study that includes the evaluation of the feasibility of the project as well as the actual project cost. Upon completion and acceptance by the NCDOT, the planning study will be submitted to the North Carolina Board of Transportation for final approval and funding. A project must successfully pass through each of these levels in order to be implemented. During any of the above phases of project development, it may be necessary to alter or eliminate a proposed improvement due to regulatory or design constraints or because of unanticipated costs.
7. *TIP bicycle projects may take many forms. A number of bicycle improvement projects involve construction of on-road or off-road facilities: wide paved shoulders (4-ft. minimum width); specially striped lanes for bicycles (minimum 4-foot width); wide outside lanes (14-ft. minimum width) which permit a safer mix of bicycles and motor vehicles); greenway-type bicycle paths; railroad crossing improvements for bicycle safety; and the addition of bicycle-safe bridge railings. The Projects section of this website provides more information.*

   However, not all eligible bicycle improvements require a construction project. The following are examples of other acceptable projects: signing bicycle routes; producing maps and safety brochures for cyclists in local areas; replacing unsafe drainage grates; making spot improvements such as paving potholes or hazard marking of dangerous roadway features; and providing bicycle safety education materials for local areas.

Chapter 8: Conclusion

The recommendations included in this Plan form the basis for the creation of a comfortable, safe and accessible network of bicycle facilities throughout Asheville.

This network will provide the option of bicycling as a practical mode of transportation. This Plan is meant to serve as a "working document" to guide transportation planning decisions made over time and to support the multi-modal transportation goals outlined in Asheville's 2025 Comprehensive Plan and the French Broad River MPO's Comprehensive Transportation Plan.



Existing Bicycle Parking Rack in Asheville
Photo Credit: City of Asheville

Appendix A:

Online Questionnaire Results Memorandum

MEMO

City of Asheville Comprehensive Bicycle Master Plan
Online Questionnaire Results
May 4, 2007

The City of Asheville and the North Carolina Department of Transportation (NCDOT) are developing a Comprehensive Bicycle Master Plan to improve bicycle mobility and safety in Asheville. An online questionnaire was developed to supplement information gathered at a public meeting and from a local Steering Committee. The survey was developed in the spring of 2007 with input from the City of Asheville, NCDOT and the Steering Committee.

The questionnaire was distributed electronically by the Steering Committee. It was publicized on various email listservs and fliers were circulated at the public meeting. The questionnaire was available online from May 5, 2007 through April 2, 2007. Over 830 responses were received. There was a fairly even response (geographic, range of experience, gender, etc.) to the questionnaire.

Key highlights of the questionnaire responses are shown below:

- In response to a question about critical issues that people face while bicycling in Asheville, the most frequently cited concerns included:
    - Lack of adequate bicycle facilities
    - Driver behavior
    - Safety
    - Narrow roads
    - Traffic
    - Access and connectivity

- Key destinations cited by respondents as needing bicycle-related improvements included Downtown Asheville, Merrimon Avenue, Biltmore Village, UNC-Asheville, and West Asheville. Additionally, respondents frequently listed schools, grocery stores, and parks as areas in need of improvement.

- In response to questions about specific locations that need improvements so that bicycling is safer and more convenient, respondents cited the high volume and high speed roads in Asheville most frequently.

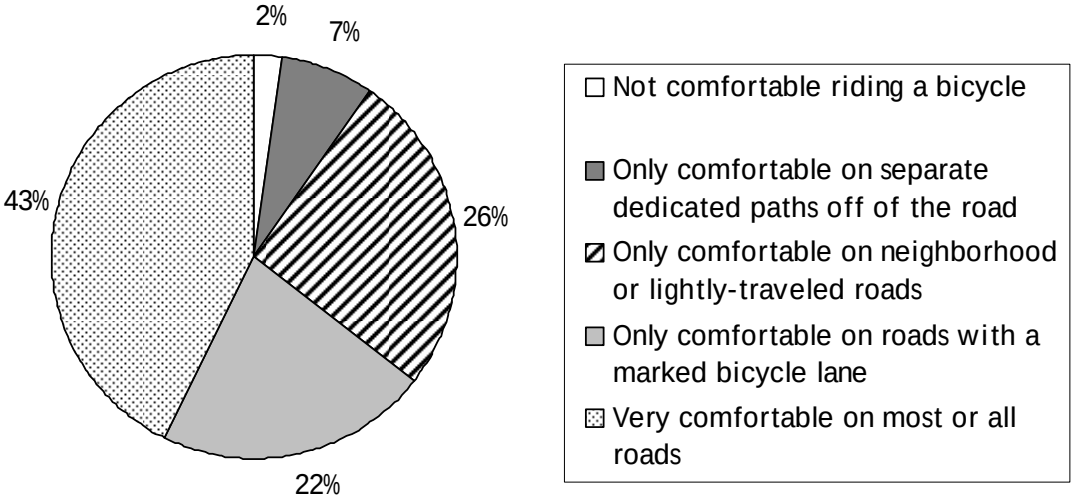
- Asheville's bicyclists tend to ride fairly short distances for transportation trips – over half of respondents said that their utilitarian trips are less than five miles in length.

- When asked what one thing would do the most to encourage bicycling, respondents clearly cited the need for better bicycle accommodations on streets and trails.

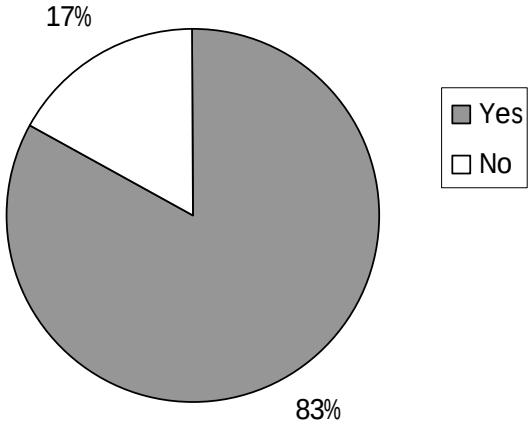
- It was clear from the responses that safety is a critical issue for Asheville's bicyclists, and with good reason: 25% of respondents had experienced a crash while bicycling in Asheville.

The online questionnaire was used to broaden the reach of public input; however, it is important to note that this questionnaire is self-selected and the results are not statistically significant. Summary tables and charts illustrating the results of the questionnaire are included on the following pages.

How would you describe your own comfort level with riding a bicycle?



Do you bike in Asheville?

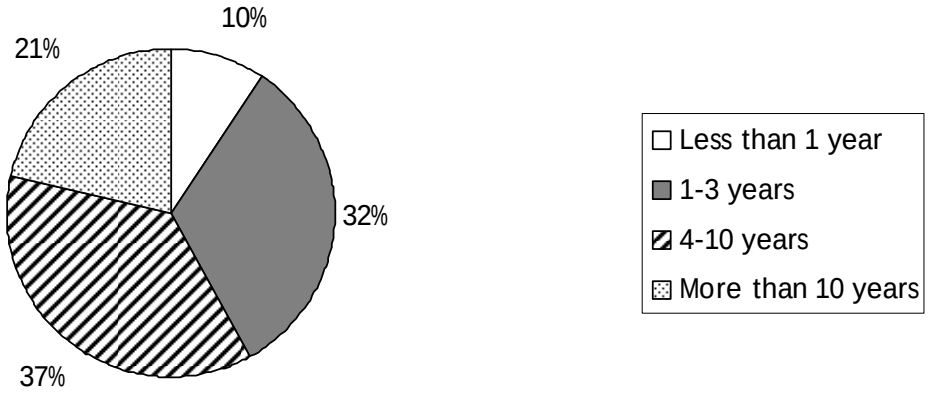


If you bike in Asheville and/or the surrounding areas please tell us why and how often?

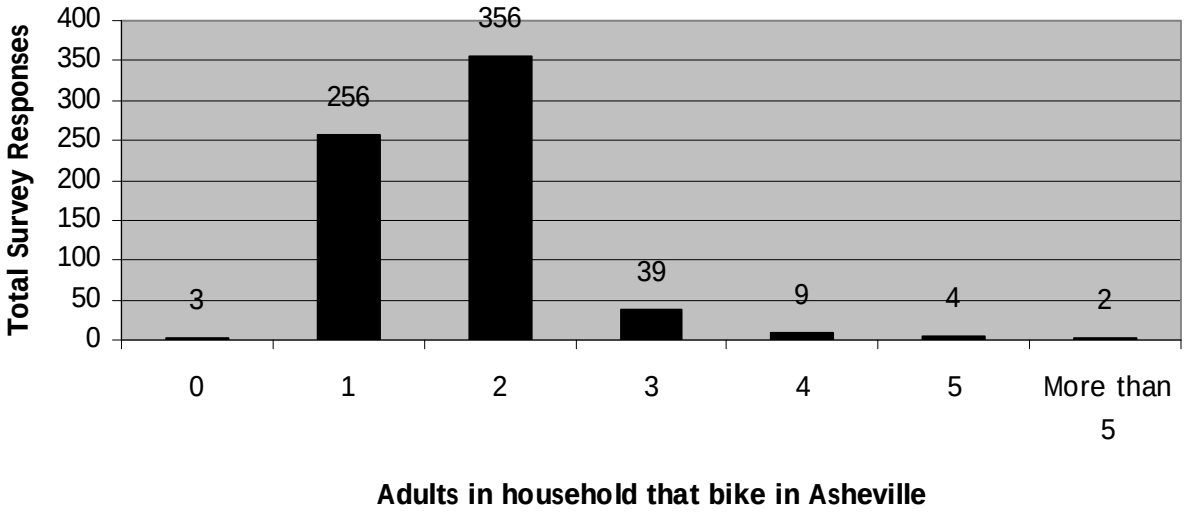
	5 or more times a week	One to four times a week	Once or twice a month	Rarely if ever
Exercise or recreational activity (including mountain biking)	14% (93)	**59% (388)**	23% (149)	4% (27)
Commute to work	12% (59)	28% (141)	20% (97)	**40% (199)**
Commute to school	7% (21)	10% (31)	7% (21)	**77% (248)**
Personal business or errands	12% (61)	**37% (191)**	27% (140)	24% (127)

Note: The number in parenthesis indicates the total number of survey responses received in each category.

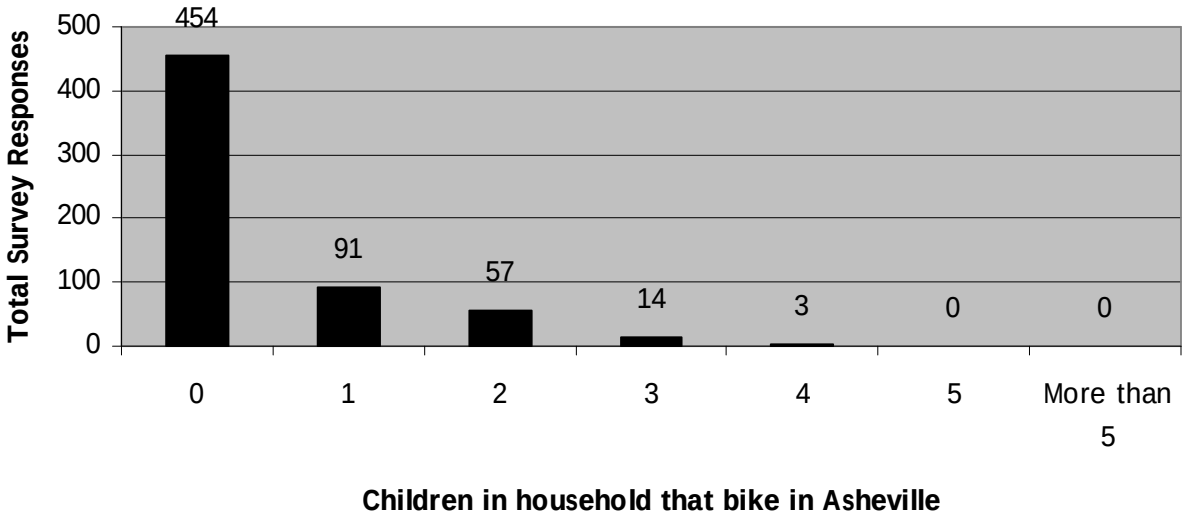
How long have you been biking in Asheville?



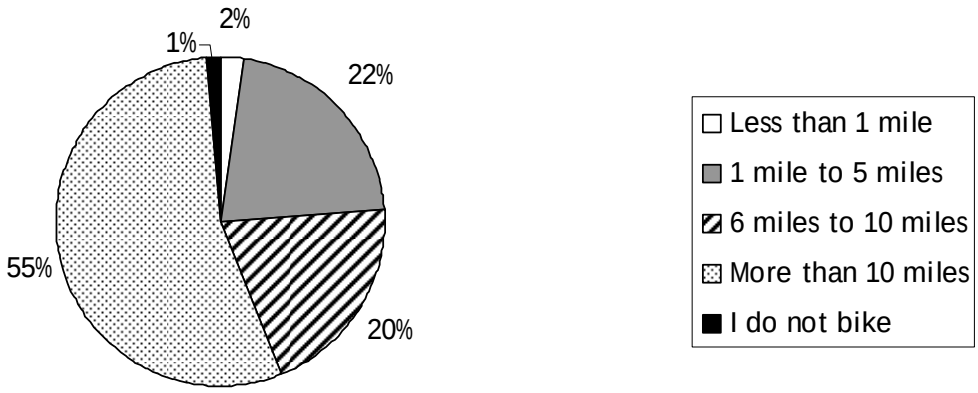
How many adults in your household bike in Asheville?



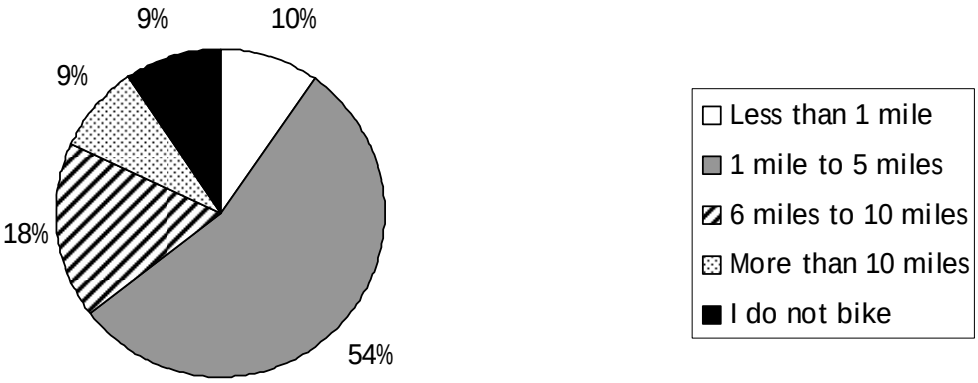
How many children in your household bike in Asheville?



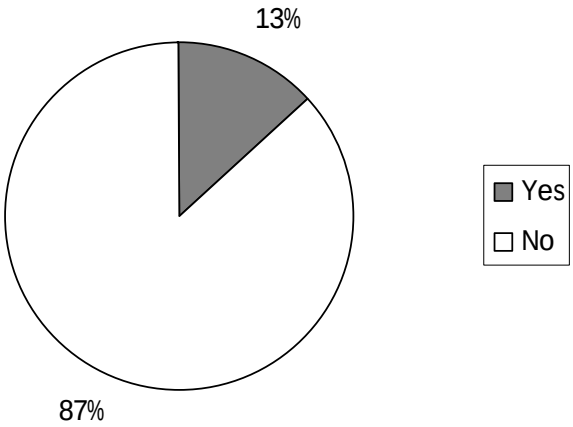
How far is your typical exercise or recreational bicycle trip?



How far is your typical practical (commute, personal business, errands, etc.) bicycle trip?



Is bicycling your primary means of transportation?



What is the MOST critical issue that people face while bicycling in Asheville?

The most critical issues cited in the survey were:

- Lack of adequate bicycle facilities
- Driver behavior
- Safety
- Narrow roads
- Traffic
- Access and connectivity

Note: On the online survey this question was an open response, allowing participants to enter information rather than choose from a selected list. The responses received were grouped into categories and the above list represents the categories with the highest number of responses.

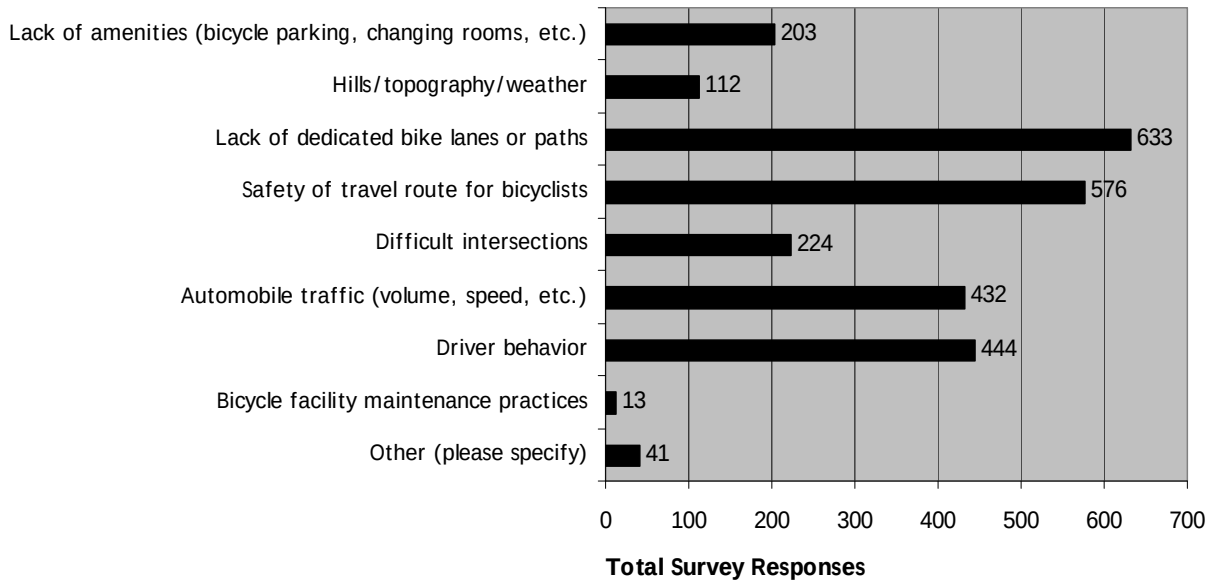
Which ONE of the following do you think would do the MOST to encourage bicycling in Asheville?

	Total Responses	Percent
Conduct safety outreach and education	28	3.6
Enforce laws applying to motorists	24	3.0
Enforce laws applying to bicyclists	11	1.4
Create a map or list of routes appropriate/safe for bicycling	26	3.3
Build more bicycle lanes	372	47.2
Build more bicycle paths	172	21.8
Build more bicycle accommodations (racks, storage, etc.)	5	0.6
Provide better connections between key destinations	120	15.2
Nothing	1	0.1
Don't know	9	1.1
Other (please specify)	20	2.5

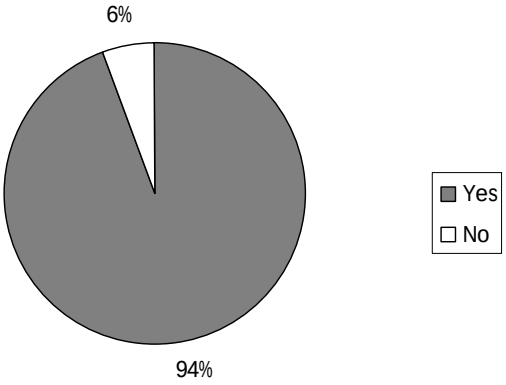
How would bicycling improvements (bicycle lanes, racks, route maps, etc.) MOST benefit Asheville?

	Total Responses	Percent
By improving the safety of people who ride	288	36.8
By promoting a healthy lifestyle	127	16.2
By increasing bicycle commuting	246	31.5
By drawing more bicyclists to the area, enhancing tourism	41	5.2
Bicycle improvements would not benefit my community	8	1.0
Other (please specify)	72	9.2

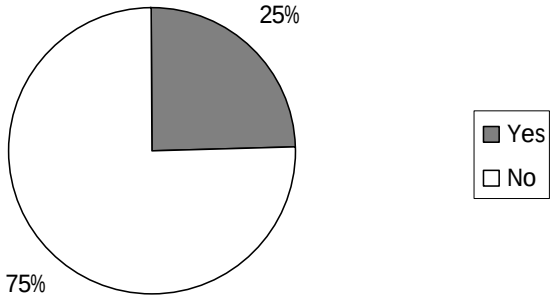
What are the most important barriers to bicycling in Asheville?



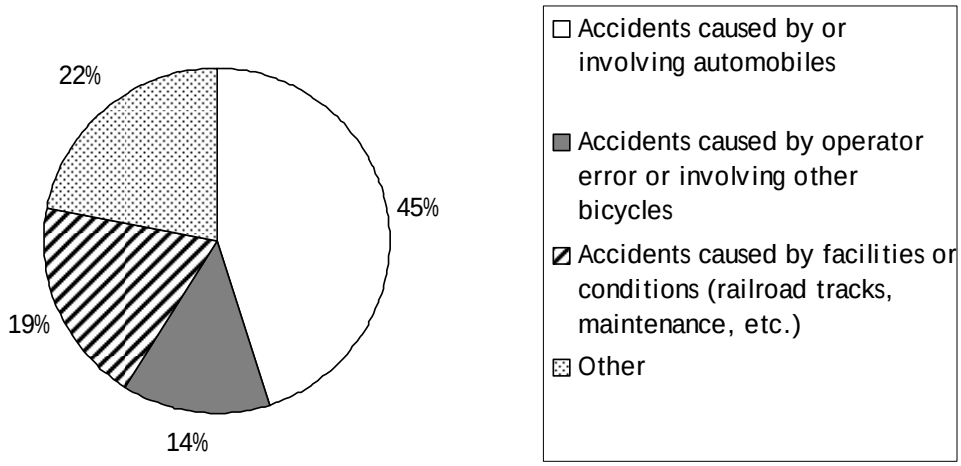
If better bicycle facilities and accommodations (bicycle lanes, wider shoulders, separate bicycle paths, bicycle racks, route maps, etc.) were available would you bike more often?



Have you ever experienced a crash while bicycling in Asheville?



If you have experienced a crash, where and what were the circumstances?



Note: On the online survey this question was an open response, allowing participants to enter information rather than choose from a selected list. The responses received were grouped into four categories. The chart above shows the percentage of total responses in each of these categories.

On which streets/roads do you bike most often?

The five roads cited most often were:

1. Haywood Road
2. Swannanoa River Road
3. Merrimon Avenue
4. Biltmore Avenue
5. Blue Ridge Parkway

Please list any SPECIFIC DESTINATIONS in Asheville (name of a school, park, shopping center, intersections, etc.) that need improvements to provide safer and more comfortable access by bicycle.

The five destinations cited most often were:

1. Downtown Asheville
2. Destinations around Merrimon Avenue
3. Biltmore Village
4. UNC-Asheville Campus
5. West Asheville

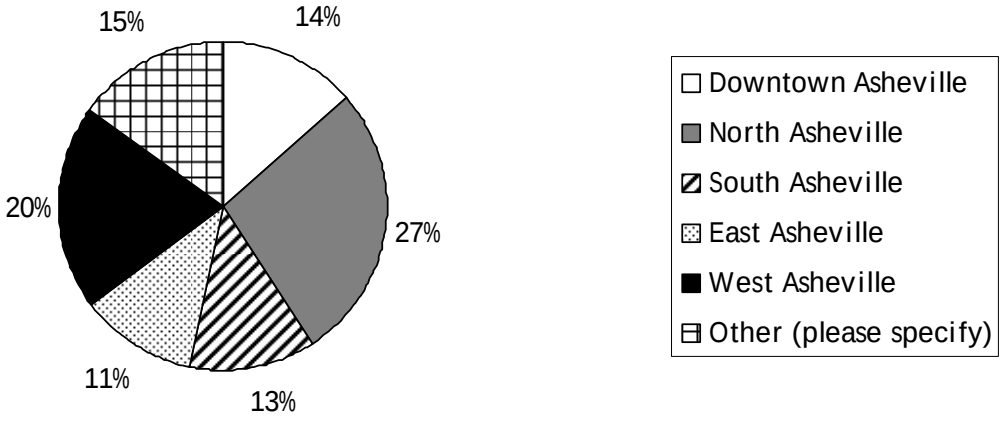
Schools such as Asheville High School and Asheville-Buncombe Technical Community College (A-B Tech), grocery stores such as Earth Fare, Greenlife, and Ingles, shopping centers such as Asheville Mall and Westgate Shopping Center, and parks such as Carrier Park were also cited frequently as specific destinations that need improvements to provide safer and more comfortable access by bicycle.

Which SPECIFIC STREETS need improvements so that bicycling is safer and more convenient?

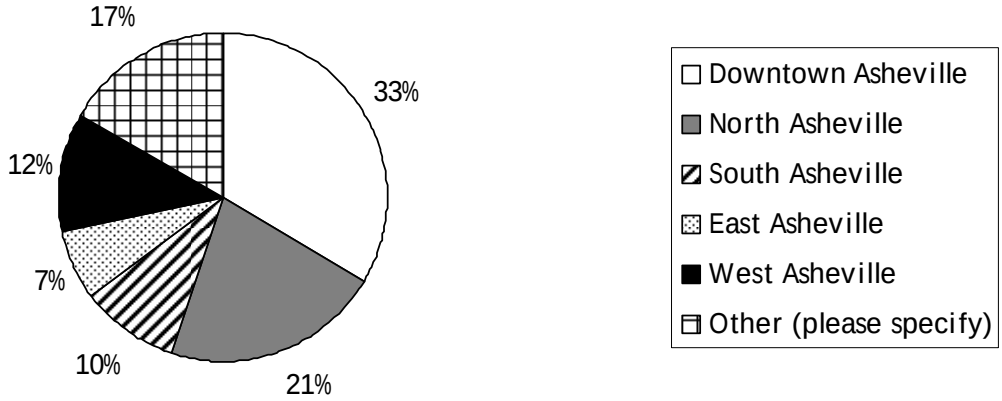
The five roads cited most often were:

1. Merrimon Avenue
2. Biltmore Avenue
3. Patton Avenue
4. Tunnel Road
5. Hendersonville Road

Where do you live?



Where do you bike to most often?



Age (Optional)

Age Range	Total Responses	Percent
0-16	1	0.1
16-21	9	1.2
22-35	288	38.2
36-50	288	38.2
51-65	150	19.9
65 and over	18	2.4

Gender (Optional)

Gender	Total Responses	Percent
Male	436	58.3
Female	312	41.7

Appendix B:

Asheville Greenway Commission's Project Scoring and Ranking Summary

Asheville Greenways Ranking
Scoring Analysis

	Ashland Ave.1	Ashland Ave.2	Azalea Pk.	Beaverdam Rd.	Brevard Rd.1	Brevard Rd.2	Chestnut St.	Clingman Forest	FB Riv. 1	FB Riv. 2	FB Riv. 3	Glenn Ck.	Haw Ck.	Haywood Rd.	Hendersonville Rd.	Hominy Ck.1	Hominy Ck.2	Montford	Nasty Brch.	Reed Ck.	Reed Ck. Ext.	Rhodo Ck.	Richmond Hill	Swann. Riv. 1	Swann. Riv. 2	Sweeten Ck.
Community Benefit Criteria:																										
Proposed greenway provides safe connections for alternative transportation to schools, work, places of worship, parks, public amenities, etc. that would help to reduce auto use.	4	4	0	3	3	3	3	3	3	1	4	3	3	4	3	2	3	3	2	4	3	3	0	3	3	3
Is a segment that would promote connectivity - would be a primary link to another greenway segment, expand neighborhood connectivity, extend an existing greenway, or would be a main greenway segment.	2	3	2	2	2	2	3	2	4	4	4	4	1	3	2	4	3	3	2	4	4	2	0	4	4	1
The greenway would be highly visible to the public promoting use and safety, awareness, and programming opportunities to build funding opportunities for greenways.	3	3	2	2	3	3	2	1	4	2	4	2	2	2	2	2	1	1	3	3	3	2	2	3	3	3
Proximity to natural features or a stream corridor with the potential to improve water quality, to mitigate flooding, environmental interpretation, improve wildlife habitat, or otherwise advance environmental conservation.	0	1	3	2	1	0	0	4	2	4	4	2	3	0	0	4	4	2	3	3	2	3	3	4	3	1
The greenway would be in an aesthetically pleasing location which has scenery, interesting resources, forest/pastures etc. It is in a corridor with historic significance that has the potential for cultural interpretation/signage.	1	2	4	2	2	0	1	3	3	4	3	2	2	2	1	3	3	3	2	3	2	2	4	3	2	1
Potential to promote economic development through infill and redevelopment opportunities.	2	3	1	1	1	1	0	3	3	2	1	1	0	1	2	2	1	1	3	3	2	2	1	3	3	1
Affordability Criteria:																										
Relative cost of acquisition	3	1	4	2	2	2	2	2	1	3	3	2	0	2	2	2	1	1	3	3	3	2	4	1	1	1
Relative cost of development	3	2	3	3	3	3	3	2	2	3	3	3	1	3	3	2	2	1	3	3	3	2	4	1	1	1
Is a project that would attract support of partners and/or sufficient public and private funds for implementation.	2	3	2	3	3	2	2	3	2	3	3	2	3	3	3	2	2	3	3	3	3	3	3	3	3	2
The property is owned, controlled, or available publicly, or utilizes existing/proposed infrastructure (e.g., DOT Right-of-Way).	2	2	4	3	2	2	3	2	1	4	4	2	3	2	3	1	1	1	3	4	3	3	4	2	1	2

Asheville Greenways Commission

Project Scoring and Ranking Summary - General

Abbreviation	Greenway Description	Score	Rank
FB Riv. 3	French Broad River (Dog Park to Haywood Rd.)	46.50	1
Reed Ck.	Reed Creek (Weaver Blvd. to downtown)	45.00	2
FB Riv. 2	French Broad River (Amboy Road to Hominy Creek)	40.25	3
Swann. Riv. 1	Swannanoa River (Azalea Park to Riverbend)	39.25	4
Reed Ck. Ext.	Reed Creek Extension to French Broad River	37.75	5
Nasty Brch.	Nasty Branch	35.00	6
FB Riv. 1	French Broad River (Webb Park north to Broadway area; work with NCDOT Re: I-26 Connector Area)	35.00	6
Swann. Riv. 2	Swannanoa River (Riverbend to French Broad River)	34.75	8
Hominy Ck.1	Hominy Creek (From French Broad River to Rhododendron Creek)	34.00	9
Clingman Forest	Clingman Forest	33.75	10
Rhodo Ck.	Rhododendron Creek	32.75	11
Ashland Ave.2	Ashland Ave/McDowell St. – off-road (bus terminal to A-B Tech to McDowell & Short Michigan)	32.75	11
Glenn Ck.	Glenn Creek Extension to Kimberly Ave	32.00	13
Azalea Pk.	Azalea Park Greenway	31.25	14
Hominy Ck.2	Hominy Creek (Rhododendron to the west)	30.50	15
Beaverdam Rd.	Beaverdam Road (Merrimon to Elk Mountain)	30.50	15
Richmond Hill	Richmond Hill (internal trail system)	29.00	17
Montford	Montford neighborhood connector from the new Chamber to Riverside Drive	28.75	18
Haywood Rd.	Haywood Road (including link with Clingman Forest)	28.75	18
Brevard Rd.1	Brevard Road (Hominy Creek Greenway to I-26)	28.50	20
Ashland Ave.1	Ashland Ave/McDowell St. – on-road (Patton Ave to Swannanoa River)	28.00	21
Haw Ck.	Haw Creek (including link to Swannanoa)	26.50	22
Hendersonville Rd.	Hendersonville Road	26.50	22
Chestnut St.	Chestnut St. to French Broad River (on-road)	25.50	24
Brevard Rd.2	Brevard Road (I-26 to the Blue Ridge Parkway)	23.50	25
Sweeten Ck.	Sweeten Creek	22.25	26

Asheville Greenways Commission

Project Scoring and Ranking Summary - Community Benefits (without regard to Affordability)

Abbreviation	Greenway Description	Score	Rank
FB Riv. 3	French Broad River (Dog Park to Haywood Rd.)	33.00	1
Swann. Riv. 1	Swannanoa River (Azalea Park to Riverbend)	31.75	2
Reed Ck.	Reed Creek (Weaver Blvd. to downtown)	31.50	3
FB Riv. 1	French Broad River (Webb Park north to Broadway area; work with NCDOT Re: I-26 Connector Area)	29.25	4
Swann. Riv. 2	Swannanoa River (Riverbend to French Broad River)	28.75	5
Hominy Ck.1	Hominy Creek (From French Broad River to Rhododendron Creek)	27.50	6
FB Riv. 2	French Broad River (Amboy Road to Hominy Creek)	26.75	7
Reed Ck. Ext.	Reed Creek Extension to French Broad River	25.75	8
Clingman Forest	Clingman Forest	24.75	9
Hominy Ck.2	Hominy Creek (Rhododendron to the west)	24.75	9
Ashland Ave.2	Ashland Ave/McDowell St. – off-road (bus terminal to A-B Tech to McDowell & Short Michigan)	24.50	11
Glenn Ck.	Glenn Creek Extension to Kimberly Ave	23.25	12
Nasty Brch.	Nasty Branch	23.00	13
Montford	Montford neighborhood connector from the new Chamber to Riverside Drive	22.75	14
Rhodo Ck.	Rhododendron Creek	22.25	15
Beaverdam Rd.	Beaverdam Road (Merrimon to Elk Mountain)	19.25	16
Haywood Rd.	Haywood Road (including link with Clingman Forest)	19.00	17
Brevard Rd.1	Brevard Road (Hominy Creek Greenway to I-26)	18.75	18
Ashland Ave.1	Ashland Ave/McDowell St. – on-road (Patton Ave to Swannanoa River)	18.50	19
Haw Ck.	Haw Creek (including link to Swannanoa)	18.25	20
Azalea Pk.	Azalea Park Greenway	18.00	21
Sweeten Ck.	Sweeten Creek	15.75	22
Hendersonville Rd.	Hendersonville Road	15.25	23
Chestnut St.	Chestnut St. to French Broad River (on-road)	15.25	23
Brevard Rd.2	Brevard Road (I-26 to the Blue Ridge Parkway)	14.75	25
Richmond Hill	Richmond Hill (internal trail system)	14.00	26

Asheville Greenways Commission

Project Scoring and Ranking Summary - Affordability Only

Abbreviation	Greenway Description	Score	Rank
Richmond Hill	Richmond Hill (internal trail system)	15.00	1
FB Riv. 3	French Broad River (Dog Park to Haywood Rd.)	13.50	2
Reed Ck.	Reed Creek (Weaver Blvd. to downtown)	13.50	2
FB Riv. 2	French Broad River (Amboy Road to Hominy Creek)	13.50	2
Azalea Pk.	Azalea Park Greenway	13.25	5
Nasty Brch.	Nasty Branch	12.00	6
Reed Ck. Ext.	Reed Creek Extension to French Broad River	12.00	6
Beaverdam Rd.	Beaverdam Road (Merrimon to Elk Mountain)	11.25	8
Hendersonville Rd.	Hendersonville Road	11.25	8
Rhodo Ck.	Rhododendron Creek	10.50	10
Chestnut St.	Chestnut St. to French Broad River (on-road)	10.25	11
Haywood Rd.	Haywood Road (including link with Clingman Forest)	9.75	12
Brevard Rd.1	Brevard Road (Hominy Creek Greenway to I-26)	9.75	12
Ashland Ave.1	Ashland Ave/McDowell St. – on-road (Patton Ave to Swannanoa River)	9.50	14
Clingman Forest	Clingman Forest	9.00	15
Glenn Ck.	Glenn Creek Extension to Kimberly Ave	8.75	16
Brevard Rd.2	Brevard Road (I-26 to the Blue Ridge Parkway)	8.75	16
Haw Ck.	Haw Creek (including link to Swannanoa)	8.25	18
Ashland Ave.2	Ashland Ave/McDowell St. – off-road (bus terminal to A-B Tech to McDowell & Short Michigan)	8.25	18
Swann. Riv. 1	Swannanoa River (Azalea Park to Riverbend)	7.50	20
Sweeten Ck.	Sweeten Creek	6.50	21
Hominy Ck.1	Hominy Creek (From French Broad River to Rhododendron Creek)	6.50	21
Swann. Riv. 2	Swannanoa River (Riverbend to French Broad River)	6.00	23
Montford	Montford neighborhood connector from the new Chamber to Riverside Drive	6.00	23
Hominy Ck.2	Hominy Creek (Rhododendron to the west)	5.75	25
FB Riv. 1	French Broad River (Webb Park north to Broadway area; work with NCDOT Re: I-26 Connector Area)	5.75	25

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Off-Road Project Scoring and Ranking Summary

Abbreviation	Greenway Description	Score	Rank
FB Riv. 3	French Broad River (Dog Park to Haywood Rd.)	46.50	1
Reed Ck.	Reed Creek (Weaver Blvd. to downtown)	45.00	2
FB Riv. 2	French Broad River (Amboy Road to Hominy Creek)	40.25	3
Swann. Riv. 1	Swannanoa River (Azalea Park to Riverbend)	39.25	4
Reed Ck. Ext.	Reed Creek Extension to French Broad River	37.75	5
Nasty Brch.	Nasty Branch	35.00	6
FB Riv. 1	French Broad River (Webb Park north to Broadway area; work with NCDOT Re: I-26 Connector Area)	35.00	6
Swann. Riv. 2	Swannanoa River (Riverbend to French Broad River)	34.75	8
Hominy Ck.1	Hominy Creek (From French Broad River to Rhododendron Creek)	34.00	9
Clingman Forest	Clingman Forest	33.75	10
Rhodo Ck.	Rhododendron Creek	32.75	11
Ashland Ave.2	Ashland Ave/McDowell St. – off-road (bus terminal to A-B Tech to McDowell & Short Michigan)	32.75	11
Glenn Ck.	Glenn Creek Extension to Kimberly Ave	32.00	13
Azalea Pk.	Azalea Park Greenway	31.25	14
Hominy Ck.2	Hominy Creek (Rhododendron to the west)	30.50	15
Beaverdam Rd.	Beaverdam Road (Merrimon to Elk Mountain)	30.50	15
Richmond Hill	Richmond Hill (internal trail system)	29.00	17
Montford	Montford neighborhood connector from the new Chamber to Riverside Drive	28.75	18
Haw Ck.	Haw Creek (including link to Swannanoa)	26.50	19
Brevard Rd.2	Brevard Road (I-26 to the Blue Ridge Parkway)	23.50	20
Sweeten Ck.	Sweeten Creek	22.25	21

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On-Road Project Scoring and Ranking Summary

Abbreviation	Greenway Description	Score	Rank
Haywood Rd.	Haywood Road (including link with Clingman Forest)	28.75	1
Brevard Rd.1	Brevard Road (Hominy Creek Greenway to I-26)	28.50	2
Ashland Ave.1	Ashland Ave/McDowell St. – on-road (Patton Ave to Swannanoa River)	28.00	3
Hendersonville Rd.	Hendersonville Road	26.50	4
Chestnut St.	Chestnut St. to French Broad River (on-road)	25.50	5