



Bicycle Master Plan

City of Belmont, North Carolina

MAY 2013

PREPARED BY:
Alta / Greenways



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Division of
Bicycle &
Pedestrian
Transportation



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CITY OF BELMONT MAYOR AND COUNCIL

Richard Boyce, Mayor
Charlie Flowers, Council Member
Charlie Martin, Council Member
Martha Stowe, Council Member
Ron Foulk, Council Member
Bill Toole, Council Member

PUBLIC PARTICIPANTS

Thank you to the many Belmont leaders and citizens who participated in this planning process through comment forms, interviews and meetings. Thanks also to the many individuals of the press and those engaged in social media throughout the process.

BICYCLE PLAN STEERING COMMITTEE

Bill Reames, Duke Energy
Bill Toole, City of Belmont Council Member
Douglas Huffstetler, City of Belmont Police Officer
Elson Baldwin, City of Belmont Planning Director
Emory Cox, Belmont Citizen
Ian Archibald, Gaston Area Cyclists
Jerry Hatton, City of Belmont Engineer
Larry Gilmer, Belmont Citizen
Loren Packard, Belmont Planning & Zoning Board
Mike Hawley, Belmont Citizen
Paul Bruchone, Jr., Belmont Citizen
Sallie Stevenson, City of Belmont Parks & Recreation Director

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

John Vine-Hodge, Division of Bicycle and Pedestrian Transportation (DBPT)
Mark Stafford, Division (12) Operations Engineer
Samuel Nichols, Division (12) Traffic Engineer

PROJECT CONSULTANTS

Andrea Garland, Alta/Greenways
Chris Pay, Alta/Greenways
Jason Reyes, Alta/Greenways
Jean Crowther, Alta/Greenways
Jeff Olson, Alta/Greenways
John Cock, Alta/Greenways



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- 1.2 BACKGROUND
- 1.3 PLANNING PROCESS
- 1.4 VISION AND GOALS
- 1.5 FIVE E's of BICYCLE PLANNING
- 1.6 BENEFITS of BICYCLE FRIENDLINESS

1.1 PLAN OVERVIEW

In 2011, the North Carolina Department of Transportation (NCDOT) Bicycle and Pedestrian Planning Grant Initiative awarded the City of Belmont a matching grant. The purpose of the grant is to encourage municipalities to develop comprehensive bicycle plans and pedestrian plans. This program has assisted more than 100 North Carolina communities and is administered through NCDOT's Division of Bicycle and Pedestrian Transportation (DBPT).

The Bicycle and Pedestrian Planning Grant Initiative funded a *City of Belmont Pedestrian Transportation Plan* in 2009. The current grant is funding this Plan, a Comprehensive Bicycle Master Plan for the City of Belmont. The Belmont Comprehensive Bicycle Master Plan combines past planning efforts with new research and analysis, and includes a full public input process. A proposed on- and off-street bikeway network is included in this Plan, as well as recommended policies and programs to encourage more bicycling activity and to promote safe bicycling and driving practices. These combined elements establish a complete, up-to-date framework for moving forward with improvements to the bicycling environment of Belmont.

1.2 BACKGROUND

Originally settled in the 1750s and incorporated as a town in 1895, the City of Belmont has grown significantly since its historic beginnings. Located in the Piedmont region of North Carolina, Belmont is nestled between two rivers: the Catawba River and its tributary, the South Fork Catawba River. The city's topography offers rolling hills, as well as more gentle slopes near the shores of the rivers.

Belmont is just over five miles due west of the Charlotte-Douglas International Airport and less than 15 miles from downtown Charlotte, NC. Interstate 85 passes through the northern portion of Belmont's city limits and Highway 74 (also Highway 29) provides a parallel east-west connection between Charlotte and Belmont.

Through progressive city planning and efforts to revitalize downtown Belmont, while still retaining its historic character, the city has retained a high quality of life for its residents. Chapter 2 of the Plan provides for more information about the City of Belmont, including the principal opportunities and constraints for bicycling throughout the community.

With its political support for quality of life and healthy lifestyles; supportive existing street infrastructure and planning policies; planned greenways and parks; attractive downtown and other tourist destinations, strong bicycling community and college population, and proximity to great biking venues and routes (including the Whitewater Center and the Rock Hill Velodrome, the Carolina Thread Trail, and quiet rural roads), **Belmont is poised to be one of the premier bicycling destination communities in the state and region**, joining the ranks of other regional Bicycle Friendly Communities (BFCs) including Davidson, Rock Hill, and Charlotte.

1.3 PLANNING PROCESS

City of Belmont staff and the Project Steering Committee guided the development of the Comprehensive Bicycle Master Plan. The committee is made up of citizen advocates and representatives from multiple stakeholder organizations and local groups, including the NCDOT and Belmont Planning Commission, among others (listed in the Acknowledgements section of this plan). The Steering Committee met several times throughout the process and provided guidance on the overall vision, facility recommendations, programs, policies, and draft plan development.

1.3.1 Data Collection and Analysis

City staff, the Project Steering Committee, and stakeholders provided baseline information about the existing conditions of Belmont. Through aerial photography, geographic information systems (GIS) data, and on-the-ground field investigation, the project consultants identified opportunities and constraints for bicycle facility development. Field research also included examining portions of proposed trails, verifying certain road widths, studying lane configurations, and preparing a photographic inventory. A review of planning documents, polices, and existing bicycling programs supplemented the analysis of the physical environment.

1.3.2 Public Involvement

Outreach to the citizens and visitors of Belmont included two public workshops, an online and hard-copy citizen comment form, presence



The project consultants identified opportunities and constraints for bicycle facility development.





Outreach to the citizens and visitors of Belmont included two public workshops

at booths at local events, and a dedicated project website. Four Project Steering Committee meetings provided additional information about public concerns and preferences. Interested citizens and stakeholders signed-up to receive a quarterly newsletter providing updates about development of the Comprehensive Bicycle Master Plan and other notifications.

1.3.3 PLAN DEVELOPMENT

The draft plan reflects input from the public, the Project Steering Committee, City staff, NCDOT staff, and the existing conditions analysis. The City of Belmont and NCDOT reviewed and commented on the initial draft, which was revised and presented to the Project Steering Committee. With the recommendation of the Project Steering Committee, City staff and project consultants presented the draft plan to City Council.

1.4 VISION AND GOALS

The Project Steering Committee of the Belmont Comprehensive Bicycle Master Plan met for the first of four meetings in May 2012. The group discussed overarching goals for the Plan, identified opportunities for improving conditions for bicyclists in Belmont, and described desired outcomes of the Plan. Individual statements from the committee were combined into the following overall vision statement for this plan:

Belmont’s Bicycle Plan Vision Statement:

“The Belmont Comprehensive Bicycle Master Plan envisions a **connected network of on- and off-street bikeways** that provide **safe and convenient access** between neighborhoods, schools, and downtown for all types of bicyclists. The Plan expands **Belmont’s reputation as a destination for bicycling** and recreation, as a community that considerately shares its roadways, **and as a healthy place to live.**”



Specific goals for the outcome of this plan include:

- Create a community network of on- and off-street bikeways designed for all types of bicyclists;
- Improve bicycling access along major corridors;
- Capitalize on the scenic beauty of the Belmont area, while providing safe and well-defined bicycling routes;
- Create a safe way for people to bicycle from Belmont to neighboring communities;
- Create safe bicycling routes between neighborhoods and schools and neighborhoods and downtown;
- Educate both bicyclists and motorists as to the rules of the road and etiquette related to bicycling;
- Pursue cost effective strategies for infrastructure improvements.

1.5 FIVE E'S OF BICYCLE PLANNING

Research has shown that a comprehensive approach to bicycle-friendliness is more effective than a singular approach that addresses only one issue, such as tackling only infrastructure or bicyclist education.¹ Recognizing this, the national Bicycle Friendly Community program, administered by the League of American Bicyclists, recommends a multi-faceted approach based on the following five E's: Engineering, Education, Encouragement, Enforcement, and Evaluation. This Plan has been developed using the Five E's approach as a means of providing action steps in each arena that the community can take towards becoming more bicycle-friendly. The Bicycle Friendly Community program is discussed in more detail in Chapter 2, as a useful framework for Belmont's bicycle friendly initiatives.

The five E's are described below. For the purposes of this Plan, a sixth 'E', Equity, is considered an integral component of each of the five E's. 'Equity' takes into account the distribution of impacts (benefits and costs) of bicycling programs, policies, and infrastructure improvements, and whether that distribution is appropriate.

¹ Pucher, J. Dill, J. and Handy, S. (2010). Infrastructure, programs, and policies to increase bicycling: An international review. *Preventative Medicine*, 50. S106-S125; Krizek, K., Forsyth, A., and Baum, L. (2009). *Walking and cycling international literature review*. Melbourne, Victoria: Department of Transport.



Engineering

Designing, engineering, operating, and maintaining quality roadways and bicycle facilities is a critical element in producing a bicycle-friendly environment. Safe and connected infrastructure for bicyclists is one crucial piece of a comprehensive approach to increasing bicycling activity. This category may include adding new bicycle specific infrastructure, improvements to street crossings, traffic calming, trail design, traffic management, school zones, or other related strategies.

Education

Providing bicycle educational opportunities is critical for bicycle safety. Education should span all age groups and include motorists as well as cyclists. The focus of an educational campaign can range from information about the rights and responsibilities of road users to tips for safe behavior; from awareness of the communitywide benefits of bicycling to technical trainings for municipality staff.

Encouragement

Encouragement programs are critical for promoting and increasing bicycling. These programs should address all ages and user groups from school children, to working adults, to the elderly and also address recreation and transportation users. The goal of encouragement programs is to increase the amount of bicycling that occurs in a community. Programs can range from work-place commuter incentives to “Bike to School Day” at an elementary school; and from bicycle-friendly route maps to a bicycle co-op.

Enforcement

Enforcement is critical to ensure that motorists and bicyclists are obeying common laws. It serves as a means to educate and protect all users. The goal of enforcement is for bicyclists and motorists to recognize and respect each other’s rights on the roadway. In many cases, officers and citizens do not fully understand state and local laws for motorists and bicyclists, making targeted education an important component of every enforcement effort.

Evaluation

Evaluation methods can include quarterly meetings, the development of an annual performance report, update of bicycle infrastructure databases, bicycle counts, assessment of new facilities, and plan updates. The City of Belmont will monitor implementation of this Plan on a regular basis and establish policies that ensure long-term investment in the bike-



Providing bicycle educational opportunities is critical for bicycle safety. Education should span all age groups and include motorists as well as cyclists.



Encouragement programs, like Bike to School Day, are critical for promoting and increasing bicycling.



way network. Monitoring progress of implementation will facilitate continued momentum and provide opportunities for updates and changes to process if necessary. Additionally, the city will adopt policies that promote investment in and improvements to the bicycling and walking environment in accordance with the recommendations of this Plan.

1.6 BENEFITS OF BICYCLE FRIENDLINESS

A bicycle-friendly Belmont will help to improve the health and fitness of residents, transportation options, the local economy, and environmental conditions while contributing to a greater sense of community – and fun!. Scores of studies from the fields of public health, urban planning, urban ecology, real estate, transportation, and economics consistently affirm the value of supporting bicycling as it relates to these issues. Small towns, big cities, and entire regions across the United States and throughout the world are implementing strategies for creating bicycle-friendly communities, and have been doing so for many years. They do this because of their obligations to promote health, safety and welfare, and also because of the growing awareness of the many benefits of bicycling.

1.6.1 Increased Health and Physical Activity

A growing number of studies show that the design of our communities and the built environment—including neighborhoods, towns, transportation systems, parks, trails and other public recreational facilities—affects people’s ability to reach the recommended daily 30 minutes of moderately intense physical activity (60 minutes for youth). According to the Centers for Disease Control and Prevention (CDC), “physical inactivity causes numerous physical and mental health problems, is responsible for an estimated 200,000 deaths per year, and contributes to the obesity epidemic.”² The increased rate of disease associated with inactivity reduces quality of life for individuals and increases medical costs for families, companies, and local governments.

Belmont is representative of the health challenges facing the Gaston County community. According to the CDC Behavioral Risk Factors Surveillance System, **more than one in four of Gaston County adult residents (26.2 percent) is obese and nearly a third of the adult population is physically inactive (28.2 percent).**³



Improving active spaces has been shown to increase physical activity within a community.

2 U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. (1996). Physical Activity and Health: A Report of the Surgeon General.

3 Centers for Disease Control. (2009). *Behavioral Risk Factors Surveillance System (BRFSS)*. Retrieved from http://apps.nccd.cdc.gov/DDT_STRS2/CountyPrevalenceData.aspx?mode=OBS, (accessed July 2012).



The CDC has determined that creating and improving places to be active could result in a 25 percent increase in the number of people who exercise at least three times a week.⁴ This is significant considering that for people who are inactive, even small increases in physical activity can bring measurable health benefits. Establishing a safe and reliable bicycle network in Belmont will positively impact the health of local residents. The Rails-to-Trails Conservancy puts it simply: “Individuals must choose to exercise, but communities can make that choice easier.”⁵



Substituting walking or bicycling for some of our daily trips relieves congestion, benefiting all road users.

1.6.2 Transportation Choices

A National Household Travel Survey found that roughly 40% of all trips taken by car are less than two miles.⁶ By replacing short car trips with bicycle trips, residents have a significant positive impact on local traffic and congestion. Traffic congestion reduces mobility, increases auto-operating costs, adds to air pollution, and causes stress in drivers. Substituting bicycling for some of these trips relieves the congestion, benefiting all road users. In addition, an improved bicycle network provides greater and safer mobility for residents who do not have access to a motor vehicle.

Nearly five percent of Belmont households do not have access to a vehicle and over 30 percent have access to only one. American demographics show that typically around 30% of a community’s population do not or cannot drive or own a car due to age (under 16), physical or mental disabilities or old age, and/or income. Bicycling for transportation is an important option for these populations, especially those with more than one working family member. Belmont residents are already taking advantage of the transportation benefits of bicycling. **The city’s bicycle mode share of 1.7 percent is higher than the mode share of many designated Bicycle Friendly Communities.**

1.6.3 Economic Development

The economic benefits of bicycling are being realized in cities throughout the country and the Southeast. From mountain biking destinations to cyclist touring routes, from bike shop businesses to premier special events, bicycling can have a significant impact on a local economy. Greenville, SC has seen a dramatic increase in the number of bike shops that exist and in bike shop sales in the last five years. In a 2011 survey, nearly every shop owner identified the city’s Bicycle Friendly Community initiative to be a leading contributor to that growth.⁷ The Augusta, GA

4 U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. (2002). Guide to Community Preventive Services.
 5 Rails-to-Trails Conservancy. (2006) Health and Wellness Benefits.
 6 U.S. Department of Transportation (DOT), Bureau of Transportation Statistics (BTS) and the Federal Highway Administration (FHWA). (2002). National Household Travel Survey.
 7 City of Greenville Bicycle Master Plan, 2011.



area estimates the economic impact of cycling-related sporting events in just the last three years (2009-2011) to total \$15.5 million. As one example, the region hosted the 2010 International Mountain Bike Association (IMBA) Summit in 2010, which brought nearly \$0.5 million in local spending.⁸

Beyond bicycle shops, bicycle rentals, and major cycling events, there are others ways that communities are benefiting economically from investments in bicycling.

1.6.3.1 Bicycle Tourism

Investments in the bicycling environment can lead to increases in bicycling tourism. In the Outer Banks, NC, bicycling is estimated to have a positive annual economic impact of \$60 million; 1,407 jobs are supported by the 40,800 visitors for whom bicycling was an important reason for choosing to vacation in the area. The annual return on bicycle facility development in the Outer Banks is approximately nine times higher than the initial investment.⁹

Even though there are substantial differences between the City of Belmont and the Outer Banks (such as beach access and available lodging), Belmont could still achieve positive economic gains proportional to its own attractions and its own future investments in communitywide bicycle facilities. The quality of bicycling in the Outer Banks region positively impacts vacationers' planning—it is not all about the beaches:

- 12% of vacationers report staying three to four days longer to bicycle
- 43% of vacationers report that bicycling is an important factor in their decision to come to the area
- 53% of vacationers report that bicycling will strongly influence their decision to return to the area in the future¹⁰

In terms of tourism, Belmont has the benefit of its proximity to Charlotte, NC, Lake Wylie, and Charlotte Douglas International Airport, existing or soon-to-be built portions of the Carolina Thread Trail, the Whitewiter Center, the new Rock Hill Velodrome, Daniel Stowe Botanical Garden, and scenic, low-volume rural roads that are already popular with existing cyclists from around the region. **As Belmont expands its attractive network of trails, bikeways, and bicycle routes, the city will win over some bicycle-related tourism from other regions, and attract new tourists as an easily accessible bicycling destination.**

8 Phone interview with the Augusta Sports Council, 2011.

9 NCDOT and ITRE. (2006). *Bikeways to Prosperity: Assessing the Economic Impact of Bicycle Facilities*.

10 Ibid.



1.6.3.2 Real Estate Values

From a real estate standpoint, consider the positive impact of trails and greenways, which are essential components of a complete bicycle network. **According to a 2002 survey of homebuyers** by the National Association of Home Realtors and the National Association of Home Builders, **trails ranked as the second most important community amenity** out of a list of 18 choices.¹¹ Additionally, the study found that ‘trail availability’ outranked 16 other options including security, ball fields, golf courses, parks, and access to shopping or business centers. Findings from the American Planning Association (*How Cities Use Parks for Economic Development, 2002*), the Rails-to-Trails Conservancy (*Economic Benefits of Trails and Greenways, 2005*), and CEO’s for Cities (*Walking the Walk: How Walkability Raises Home Values in U.S. Cities, 2009*) further substantiate the positive connection between trails and property values across the country.

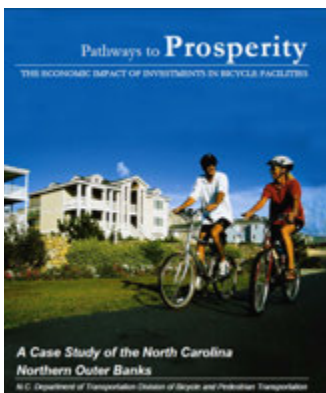


Above: Apex, NC: A residential development added \$5,000 to the price of 40 homes adjacent to the greenway – and those homes were still the first to sell. (Rails to Trails Conservancy, 2005)

1.6.3.3 Household Savings

Bicycling is an affordable form of transportation, recreation, and exercise. According to the Pedestrian and Bicycle Information Center (PBIC), within the UNC Highway Safety Research Center in Chapel Hill, NC, the cost of operating a bicycle for a year is approximately \$120, compared to \$7,800 for operating a car over the same time period.¹² The average annual cost of a gym membership is about \$500 to \$775.¹³

Bicycling for transportation becomes even more attractive from an individual’s standpoint when the unstable price of gas is factored into the equation (e.g., in May 2011, gasoline prices were \$4 a gallon).¹⁴ Whether bicycling for transportation, fun, or exercise, bicyclists who are physically active on a regular basis can avoid costly medical expenses in the long run, and can avoid the cost of gym memberships in the short run.



Above: Download “Pathways to Prosperity” www.ncdot.gov/bikeped/researchreports

1.6.4 Environmental Improvements

As demonstrated by the Southern Resource Center of the Federal Highway Administration, when people get out of their cars and onto their bicycles, they reduce measurable volumes of pollutants.¹⁵ Other environmental impacts include a reduction in overall neighborhood noise levels and improvements in local water quality as fewer automobile-related discharges wind up in the local rivers, streams, and lakes. Trails and gre-

11 National Association of Realtors and National Association of Home Builders. (2002). Consumer’s Survey on Smart Choices for Home Buyers.

12 Pedestrian and Bicycle Information Center. (2010). Economic Benefits: Money Facts. Retrieved 1/20/2010 from www.bicyclinginfo.org/why/benefits_economic.cfm

13 Grant, Kelli. (January 6, 2010). *Wall Street Journal*. Six ways to cut the cost of a gym membership. Retrieved from <http://online.wsj.com/article/SB10001424052748703436504574640651941267992.html>, (accessed July 2012).

14 Kearney, Helen. (5/8/11). Reuters: U.S. gas prices hit \$4 a gallon, but may retreat.

15 Federal Highway Administration, Southern Resource Center. (1999). Off-Mode Air Quality Analysis: A Compendium of Practice.



enways are also part of an attractive bicycle network, conveying unique environmental benefits. Greenways protect and link fragmented habitat and provide opportunities for protecting plant and animal species. Trails and greenways connect places without the use of emission-producing vehicles, while also reducing air pollution by protecting large areas of plants that create oxygen and filter pollutants such as ozone, sulfur dioxide, carbon monoxide and airborne particles of heavy metal. Finally, greenway corridors can improve water quality by creating a natural buffer zone that protects streams, rivers and lakes, preventing soil erosion and filtering pollution caused by agricultural and road runoff.

1.6.5 Quality of Life

Many factors go into determining quality of life for the citizens of a community: the local education system, prevalence of quality employment opportunities, and affordability of housing are all items that are commonly cited. Increasingly though, citizens claim that access to alternative means of transportation and access to quality recreational opportunities such as parks, trails, greenways, and bicycle routes, are important factors for them in determining their overall pleasure within their community. **Communities with bikeway and trail amenities can attract new businesses, industries, and in turn, new residents.** Furthermore, quality of life is positively impacted by bicycling through the increased social connections that take place by residents being active, talking to one another and spending more time outdoors and in their communities.

According to the Brookings Institution, the number of older Americans is expected to double over the next 25 years.¹⁶ All but the most fortunate seniors will confront an array of medical and other constraints on their mobility even as they continue to seek both an active community life, and the ability to age in place. **Off-road trails built as part of the bicycle transportation network** generally do not allow for motor vehicles; however, they **do accommodate motorized wheelchairs, which is an important asset for the growing number of senior citizens who deserve access to independent mobility.** For those seniors who remain very ambulatory, off-road trails provide an excellent and safe opportunity for exercise and fitness.

Children under 16 are another important subset of our society who deserve access to safe mobility and a higher quality of life. According to the U.S. Environmental Protection Agency, fewer children walk or bike to school than did so a generation ago. In 1969, 48 percent of students walked or biked to school, but by 2001, less than 16 percent of students walked or biked to or from school.¹⁷

¹⁶ Brookings Institution. 2003. The Mobility Needs of Older Americans: Implications for Transportation Reauthorization.

¹⁷ US EPA. (2003). Travel and Environmental Implications of School Siting.

For those seniors who remain ambulatory, off-road trails provide an excellent and safe opportunity for exercise and fitness.



(Image Credit: Portland, OR Parks and Recreation)



According to the National Center for Safe Routes to School, “Walking or biking to school gives children time for physical activity and a sense of responsibility and independence; allows them to enjoy being outside; and provides them with time to socialize with their parents and friends and to get to know their neighborhoods.”¹⁸ In a 2004 CDC survey, 1,588 adults answered questions about barriers to walking to school for their youngest child aged 5 to 18 years.¹⁹ The main reasons cited by parents included distance to school, at 62%, and traffic-related danger, at 30%. A network of bikeways in Belmont could reduce the travel distance from homes to schools, and overall bicycle improvements can improve the safety of our roadways. The availability of a good bicycle network has become a hallmark of a community with a high quality of life – one of the reasons that they are almost always included in new planned communities.



18 National Center for Safe Routes to School. (2006). National Center for Safe Routes to School Talking Points.

19 Centers for Disease Control and Prevention. The Importance of Regular Physical Activity for Children. Accessed 9/16/05 at http://www.cdc.gov/nccdphp/dnpa/kidswalk/health_benefits.htm

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EXISTING CONDITIONS

CHAPTER OUTLINE:

- 2.1 OVERVIEW
- 2.2 BICYCLE FRIENDLY COMMUNITY ASSESSMENT
- 2.3 DATA INVENTORY
- 2.4 FIELD INVESTIGATION
- 2.5 EXISTING RESOURCES AND PROGRAMS
- 2.6 PUBLIC OUTREACH
- 2.7 PLANNING AND POLICY REVIEW
- 2.8 CONCLUSION

2.1 OVERVIEW

This chapter provides an overview of the major components of the bicycling environment of the City of Belmont. The assessment of existing conditions is based on information collected primarily by gathering existing regional geographic information systems (GIS) data, conducting field work, requesting local information from the City of Belmont, internet research, and soliciting public input. The existing conditions analysis includes the following six elements: Bicycle Friendly Community assessment; Data inventory; Field investigation; Existing resources and programs; Public input; and Planning and policy review.

The chapter concludes with an overview of key findings regarding strengths and challenges of the bicycling environment in Belmont.

An understanding of population demographics provides context for the current conditions of Belmont. Since 2000, Belmont’s population has grown by nearly 16 percent. Residents aged 25 to 44 make up the largest age group, though the city has a nearly equivalent number of residents aged 18 and under and aged 45 to 64. The percentage of Belmont’s population considered seniors (65 and over) has decreased since 2000, while the percentage of residents aged 18 to 24 has grown.¹ American Community Survey (2007-2011 5-year Estimates) reports that the primary means of transportation to work for commuters in Belmont are as follows:

- 0.4% public transportation
- 3.8% walking
- 1.7% other means , including bicycling

Of the nearly 4,000 occupied housing units in Belmont, 5.2 percent do not have access to a vehicle and 37.4 percent have access to only one vehicle.² This data suggests that more than 40 percent of Belmont households have limited mobility options.



¹ Source: U.S. Census 2010
² Source: American Community Survey 2007-2011 5-year Estimates

2.2 BICYCLE FRIENDLY COMMUNITY ASSESSMENT

2.2.1 OVERVIEW OF BICYCLE FRIENDLY COMMUNITY DESIGNATION

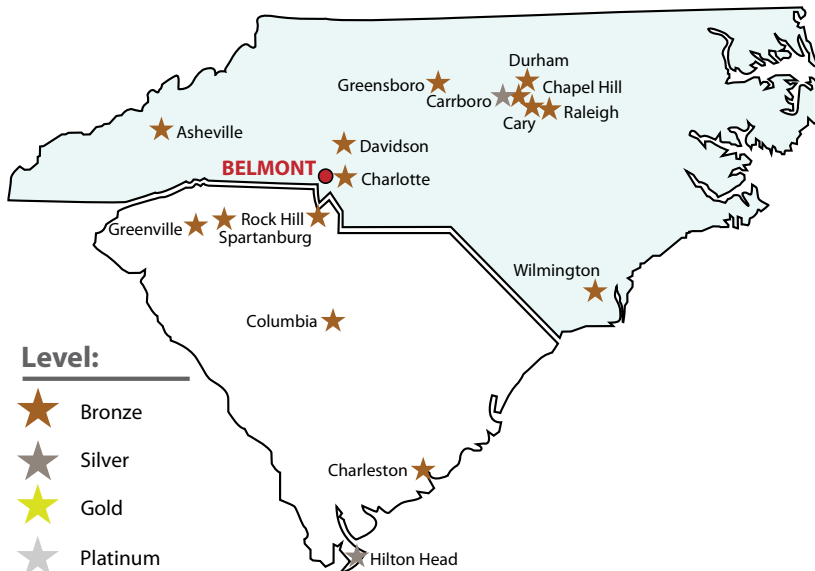
The Bicycle Friendly Community (BFC) program is a national initiative intended to encourage cities and towns across the country to improve the bicycling environment in their community and to recognize communities who are successfully doing this. The program provides communities with invaluable resources related to bicycle planning and also generate positive media attention at the national and local level for communities who earn a designation.

The BFC program is administered by the League of American Bicyclists, a national bicycling advocacy organization based in Washington, D.C. As of early 2012, the League has received 490 applications and awarded 190 communities with “bicycle-friendly” status since the program began. Table 2-1 lists BFC designated communities in North and South Carolina.

Table 2-1. Designated communities in the Carolinas as of Fall 2012

Level	South Carolina	North Carolina
Bronze	Charleston, Columbia, Greenville, Spartanburg, Rock Hill	Asheville, Cary, Chapel Hill, Charlotte , Davidson, Durham, Greensboro, Raleigh, Wilmington
Silver	Hilton Head	Carrboro
Gold	None	None
Platinum	None	None

BICYCLE FRIENDLY COMMUNITIES OF THE CAROLINAS



The BFC program uses the five “E’s” of bicycle and pedestrian planning as the framework for identifying successful biking communities. As described in Chapter 1, the five “E’s” are: Engineering, Education, Encouragement, Enforcement, and Evaluation. A city, town or county must complete a detailed questionnaire developed by the League of American Bicyclists in order to apply for recognition. Four levels of award designation are possible: Bronze, Silver, Gold, and Platinum. An Honorable Mention category is offered, as well.

There are two opportunities to apply for a designation each year. Applications are due in February for the spring awards and in July for the fall awards.

2.2.2 ACHIEVING BICYCLE FRIENDLY COMMUNITY DESIGNATION

A BFC is described as a community that “welcomes cyclists by providing safe accommodation for cycling and encouraging people to bike for transportation and recreation.”¹ In order to achieve Bronze level status as a BFC, a community is expected to show a strong commitment to bicycling, even if that commitment is in its early stages. Bronze communities have “room to grow” and show potential for more successes in bicycle friendliness, but important steps in the right direction are already being taken.

The League of American Bicyclists offers the following summary of characteristics that can be found in a Bronze level BFC:

- **Engineering** Community recently implemented a policy to engineer streets with the consideration of bicyclists and/or is beginning to develop a trail network. Facilities conform to the currently recognized safety standards.
- **Education** Community holds bicycle safety events, provides opportunities for bicycle education.
- **Encouragement** Community hosts a Bike to Work Day or community ride.
- **Enforcement** Officers are familiar with laws relating to bicyclists.
- **Evaluation & Planning** The community is familiar with and responsive to the needs of cyclists. A bicycle master plan or chapter in another document has been developed and approved. Bicycle mode share is above average for U.S. communities.²

To achieve a designation level higher than Bronze, significant advances within each of the five E’s must occur. An honorable mention may be awarded to a community that shows its potential to fit the characterization



1 Source: <http://www.bikeleague.org/programs/bicyclefriendlyamerica/communities/bfcabout.php>
 2 Source: League of American Bicyclists, *Scoring Guidelines for Local Reviewers*, 2010.

of a Bronze community in the near future. In particular, a community that has not yet had time to realize the full impact of important recent successes would be a likely candidate for an honorable mention award. While there is no clear benchmark that identifies communities within the four levels of BFC designation, *Table 2-2* outlines the average bicycle mode share found among designated BFCs around the country. Notably, **the City of Belmont has a bicycling mode share of 1.7 percent³, which is higher than the average mode share of bronze level Bicycle Friendly Communities, and has strong potential to achieve at least Bronze level status in a relatively short time frame.**

Table 2-2. Average bicycle mode share among designated Bicycle Friendly Communities⁴

BFC Award Level	Average Bicycle Mode Share
Platinum	9.71%
Gold	5.20%
Silver	2.82%
Bronze	1.10%

2.2.3 BIKE FRIENDLY COMMUNITY SCORECARD

By design, the process of filling-out the detailed questionnaires is an educational tool for communities seeking a national designation. Communities not only learn the variety of programmatic, policy, and infrastructure initiatives that contribute to becoming bicycle- and walk-friendly, but also learn the areas in which the community excels or needs improvement. *Table 2-3* offers an overview benchmarking report for the City of Belmont based on key elements of the Bicycle Friendly Community designation criteria. Though the scorecard is not a complete reflection of the criteria weighted within the Bicycle Friendly Community application, it is a practical tool for identifying key areas in need of improvement in the City of Belmont’s bicycling environment.

Table 2-3. Assessment of Belmont as a Bicycle Friendly Community

Bike Friendly Community Scorecard	Yes	No
Engineering		
Does your community have a comprehensive, connected and well-maintained bicycling network? (Comment: <i>Not yet, but plans are in place for a system of connected greenways and this plan will put forth a plan for a comprehensive system of on- and off-road bicycling facilities.</i>)	0	1
Is bike parking readily available throughout the community? (Comment: <i>Not yet, but bike parking is required with new development and there are some bike parking racks at some destinations.</i>)	0	1

3 Source: 2006-2010 American Community Survey, Five-Year Estimates
 4 Source: League of American Bicyclists, staff report.



Bike Friendly Community Scorecard	Yes	No
Is there a Complete Streets ordinance or another policy that mandates the accommodation of cyclists on all road projects? (Comment: NCDOT has a Complete Streets policy and a draft Complete Streets design guide. The City also has complete streets development standards and recommended street design typologies.)	1	0
Is bike parking readily available throughout the community? (Comment: Not yet, but bike parking is required with new development and there are some bike parking racks at some destinations.)	0	1
Is there a Complete Streets ordinance or another policy that mandates the accommodations fo cyclists on all road projects? (Comment: NCDOT has a Complete Streets policy and a draft Complete Streets design guide. The City also has complete streets development standards and recommended street design typologies.)	0	1
ENGINEERING TOTAL	1 / 3	
Education		
Is there a community-wide Safe routes to School program that includes bicycling education? (Comment: The City has just completed a SRTS plan, which will include infrastructure and education improvements.)	1	0
Are there bicycling education courses available for adults in the community? (Comment: There are a number of certified League of American Bicyclists-certified cycling instructors in the Charlotte area.)	0	1
Does your community educate motorists and cyclists on their rights and responsibilities as road users?	0	1
EDUCATION SCORE TOTAL	1 / 3	
Encouragement		
Does your community have an up-to-date bicycle map?	0	1
Does the community celebrate bicycling during national Bike month with community rides, Bike to Work Day or media outreach?	0	1
Is there an active bicycle advocacy group in the community? (Comment: Two major cycling events are planned in Belmont in Fall 2012 and Spring 2013 to coincide with an existing local festival and a regional criterium series during National Bike Month.)	1	0
Is there an active bicycle advocacy group in the community? (Comment: The Gaston Cycling Club engages in advocacy for cycling of all types in the area.)	1	0
ENCOURAGEMENT SCORE TOTAL	2 / 4	
Enforcement		
Do law enforcement officers receive training on the rights and responsibilities of all road users?	0	1
Does your community have law enforcement or other public safety officers on bikes?	1	0
Do local ordinances treat bicyclists equitably?	1	0
ENFORCEMENT SCORE TOTAL	2 / 3	



Bike Friendly Community Scorecard	Yes	No
Evaluation and Planning		
Is there a specific plan or program to reduce cyclist/motor vehicle crashes?	0	1
Does your community have a current comprehensive bicycle plan? (Comment: A plan is underway as part of this process and will be complete in early 2013.)	1	0
Is there a Bicycle advisory Committee that meets regularly? (Comment: The City has established a steering committee as part of the Bicycle Master Plan effort. Perhaps this could be the basis of an on-going City advisory group.)	0	1
Does your community have a bicycle program manager?	0	1
EVALUATION AND PLANNING TOTAL	1 / 5	
BICYCLE FRIENDLY TOTAL	7 / 18	

Score 0-8: Based on the criteria of the Bicycle Friendly Community program, this score indicates that Belmont has some improvements to make before becoming a designated Bicycle Friendly Community. However, the momentum and the pieces are in place for Belmont to become a Bicycle Friendly Community in a relatively short time frame by addressing some of the key factors above.

Communities scoring 9 or higher are considered likely candidates for Bicycle Friendly Community status.

2.3 DATA INVENTORY

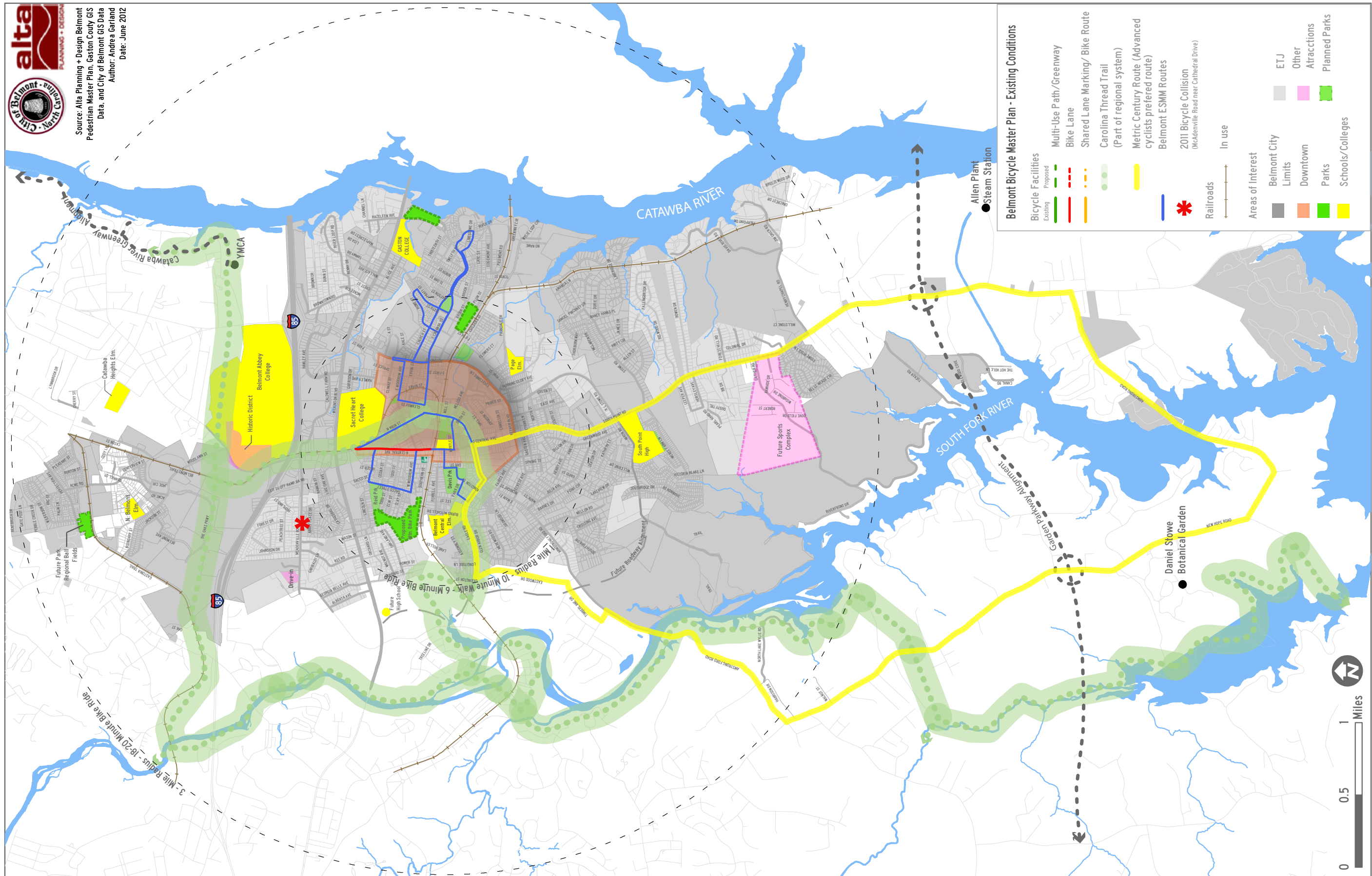
The City of Belmont provided data related to the bicycling environment of the community. The data related to the following broad categories of existing conditions:

- Transportation (such as streets, traffic volumes, and traffic signal locations)
- Land use and ownership (such as parcel boundaries, and zoning designations)
- Points of interest (such as schools, parks, and retail centers)
- Physical geography (such as wetlands and topography)
- Administrative and jurisdictional boundaries (such as city borders)

A review of all relevant plans or planning documents related to bicycle activity in the region supplemented the data inventory. A summary of that review is provided in Section 2.7. Figure 2-1 depicts the existing bicycling conditions in the City of Belmont, including previously recommended bikeway and trail facilities. The only recorded bicycle collision that occurred between 2009-2011 is shown on the map.



Figure 2-1. Existing conditions and previously recommended facilities for bicycling in the City of Belmont



2.4 FIELD INVESTIGATION

The project team identified priority corridors and locations for field review throughout the City of Belmont. Field work allows for roadway characteristics that may present opportunities or constraints for bicycle facilities, such as pavement width, shoulders, right of way, and intersections, to be inventoried and mapped. Areas targeted for field investigation are corridors and locations with:

- key connectors between neighborhoods and retail and office destinations,
- areas of high bicycle collisions,
- and primary corridors for accessing destinations, such as commercial land uses, transit centers, parks, trails, and schools or colleges.

At the project kick-off meeting, the steering committee identified key corridors and locations for field review. The committee identified connectivity between neighborhoods and to downtown as priorities for a future bikeway network.

Table 2-4 provides an inventory of roadways examined through field investigation.

Table 2- 4. Key corridors examined through field investigation

Road	From**	To	Appx. Lane Widths (Ft)	Total Width	Predominant Configuration*	Curb & Gutter (Y/N/Some)	ROW Observations	AADT	Existing Facilities/Notes	Destinations	Speed Limit
5th St -5th St Exn	Catawba St	Vine St	n/a	20-24'	2LU	Some	No sidewalk or drainage observed	n/a	Includes at-grade railroad crossing	Neighborhoods, office, light industrial	25
6th St	Catawba St	Andrew Jackson Highway	10-12'	24'	2LU	Yes	Sidewalk on one side for majority	n/a	Speed bump	New residential	25
Acme Rd	Perfection Ave	Woodlawn Ave	12'	24'	2LU	None	No sidewalk or drainage observed	1800	No paved shoulder; At-grade railroad crossing	Residential Area	35
Acme Rd	City limits north	Perfection Ave	12'	24'	2LU	None	No sidewalk or drainage observed	1800	No paved shoulder; At-grade railroad crossing	Residential Area	35
Andrew Jackson Hwy (Hwy 74)	N Main St	City limits east	14'	98'	6LT	Curb, Drainage grates, No gutter pan	No sidewalk or drainage ditches	15,000-17,001	Very wide crossing distances; Concrete median does not allow bicycle access	Commercial, office and light industrial; Gaston College	50
Andrew Jackson Hwy (Hwy 74)	N Main St	City limits west	14'	84'+14' concrete median	6LT	Some	Sewer ROW, southside, near N Main Street	17000-18000	Very wide crossing distances; Concrete median does not allow bicycle access	Commercial, industrial, and some residential	50
Armstrong Ford Rd	Eastwood Dr	Julia Ave	13'	26'	2LU	Some curb with gutter pan	Sidewalks on one side of roadway for short section	7700	Very short section of 4' paved	Neighborhoods	35
Cason St	Cherry St	Woodlawn Ave	12'-15'	24'-30'	2LU	Some curb, No gutter pan	No sidewalk or drainage observed; Powerline easement on west side of road	1000	Connects to vacant large tract; Parallel to abandoned railline	Neighborhoods	35
Central Ave	Lincoln St	Myrtle St	12-13'	24-26'	2LU	Curb, No gutter pan	Sidewalk on the west side of the roadway (no buffer)	9300-9800	Approximately 3' striped shoulder on both sides of roadway with no markings or signage calms traffic and provides minimal space for bicyclists	Belmont Middle School	25-35
Clearwater Lake Rd	Perfection Ave	Cason St	12'	24'	2LU	None	No sidewalk or drainage observed	1600	No paved shoulder	Residential Area	35
E Catawba St	N Main St	Church St	15'	30-32'	2LU	Curb, No gutter pan	Sidewalk on the south side of the road (no buffer) until Park Street; Sidewalk on both sides from Park Street to 6th Street	2900-3300	Parallel parking is available on both sides of the road between 3rd and 6th Streets	Downtown and other streetfront retail; the Catawba Mills multi-family housing	35



*LU = Vehicle Travel Lanes Undivided; LT = Vehicle Travel Lanes with Turn Lane

E Catawba St	Church St	Highway 74	12-15'	24-30'	2LU	Some	Sidewalk on the south side of the road until Old State Highway 7)	3600	No paved shoulder	Neighborhoods; Neighborhood pocket park; Future Riverfront Park	35
E. Woodrow Ave	Main St	Spruce St	n/a	24-28'	2LU	Curb, No gutter pan	Sidewalk on one side of road	n/a	Low-volume, low-speed east-west connection; Light commercial and single family residential neighborhoods	Neighborhoods; Downtown	25
Eagle Rd	Assembly St	S. Main St	11-12'	22-24'	2LU	None	Sidewalks on one or both sides of the roadway and, on the north side, offer a wide grassy buffer; Powerline easement on south side of road	3700	Parallel parking provided on one side of the road near S. Main Street	Belmont Central Elementary	35, with School Speed Zone
Eagle Rd	Lakewood Rd	Assembly St	11-12'	22-24'	2LU; 2LT	Some	Sidewalks exist until Eastwood Drive on the north side of the roadway (with buffer); Powerline easement on south side of road	3700	Some traffic calming treatments provided near new development; No paved shoulder west of new development; Provides an important connection across the railroad tracks (the only crossing west of S. Main).	Belmont Central Elementary	35, with School Speed Zone
Eastwood Dr	Eagle Dr	Armstrong Ford Rd	13'	26'	2LU	None	20' either side	n/a	Provides a direct link between a proposed sidepath along Eagle Road and a proposed greenway along an easement that extends due south of the intersection of Eastwood Drive and Armstrong Ford Road	Proposed Greenway Connection	35
Gerogia Belle Ave - Hubbard St	Peach Orchard Rd	Power St	12'	24'	2LU	None	No sidewalks; Powerline easement (side of road varies)	n/a	No paved shoulder	Future high school site; Low-density residential areas and light commercial	35
Hawley Ave	Highway 74	Park St	n/a	20-24'	2LU	Yes	Sidewalks on both sides with landscaped buffer	n/a	Commercial circulation road with restricted access at Park Street (traffic diversion)	Wal-Mart and other commercial retail	25
Julia Ave	Armstrong Ford Rd	Willerene St	10-11'	20-22'	2LU	None	No sidewalk or drainage observed	n/a	Quiet, low-volume residential street	Neighborhoods	25
Keener Blvd	E Catawba St	S Point Rd	12'	48-60'	4LT	Yes	Sidewalk on both sides for the majority of the section; Powerline easement on south side of road to railroad overpass	14000-15000	Moderate traffic volumes and relatively high speeds with very limited pedestrian crossing facilities	Residential and commercial	45
Lincoln St	Sacco St	Central Ave	n/a	20'	2LU	Curb, No gutter pan	No sidewalk or drainage observed; Powerline easement on south side of road	550	Quiet, low-volume residential street	Neighborhoods and churches	25
Main St - Belmont Mt. Holly Rd	Highway 74	Woodlawn St	12'	Varies	4LT; 2LU	Some	Sidewalk on west side of road south of Interstate 85; No sidewalk or drainage observed north of Interstate 85	20000	Includes Interstate 85 overpass; Future Belmont Rail Trail will serve as sidepath	Belmont Abbey College; YMCA; Commercial corridor	45



McAdenville Rd	Belmont Mt Holly Rd	Peach Orchard Rd	12'	24'	2LT, 2LU	None until Interstate 85 interchange near N Main Street	No sidewalks except a short segment near N Main Street; Powerline easement on south side of road	4200-5700	No paved shoulder	Commercial shopping near N. Main Street Intersection	45
McLeod Ave	S Main St	Keener Blvd	12'		2LU	Some	New sidewalks (with buffer) on both sides near Keener Blvd; No sidewalks west of Hawthorne Street	n/a	Curb bulb outs with parallel parking on both sides for a short segment adjacent to new residential development	New Residential Development	25
Myrtle St	Central Ave	S Main St	n/a	30-34'	2LU	Curb, No gutter pan	Sidewalks on both sides of the road	n/a	This is a low-volume, low-speed east-west connection with a mix of multi-family and single-family housing and institutional uses, including Belmont Middle School.	Belmont Middle School and South Main Cycles	25
N. Main St	City Hall	Highway 74	12'	Varies	2LU; 4LT	Yes	Sidewalk on one side of roadway (no buffer) for the majority of the section; Sidewalks on both sides near City Hall	4000-15000	Parallel Parking on downtown portion; Approximately 4-6' striped shoulder on one or both side of the road with no markings or signage calms traffic and provides space for bicyclists	Downtown, municipal buildings, and commercial areas	20
Nixon Rd	End of Nixon Rd	South Point Road	12'	24'	2LU	None	No sidewalks (except a few very short segments); Powerline easement on north side of road	3400	No paved shoulder	Public park; Current high school; Connects to a proposed greenway that connects to the Catawba River	25
Oakland Ave - Mason St	Power St	Highway 74	n/a	20'	2LU	None	No sidewalks	n/a	No access across Highway 74 due to concrete median; No paved shoulder	Future greenway south of Power Street	25
Park St	Hawley Ave	Highway 74	12'	48'	4LU; 4LT	Curb, No gutter pan	No sidewalks	24000	No paved shoulder	Future Highway 74 sidepaths; Commercial areas including Walmart	45
Park St	Highway 74	E Catawba St	11-12'	44-48'	4LU; 4LT	Yes	Sidewalks on both sides of the road	16000	Important north-south thoroughfare	Mixture of residential single family homes, commercial, and light industrial land uses	45
Parkdale Dr	Vine St	Keener Blvd	12'	24'	2LU	None	No sidewalks or drainage observed	n/a	No paved shoulder; Safe Routes to School Action Plans recommend reducing the speed to 20 mph and installing a sidewalk on one side of Parkdale and establishing a signalized crossing at Keener Blvd.	J.B. Page Primary School; Neighborhoods	25
Peach Orchard Rd	McAdenville Rd	Georgia Belle Ave	12'	24'	2LU	None	No sidewalks or drainage observed; Powerline easement on north/west side of road	n/a	No paved shoulder	Low-density residential and industrial	35
Perfection Ave	Acme Rd	Clearwater Lake Rd	12'	24' + TL	2LU; 2LT	None	No sidewalks or drainage observed; Powerline easement on north side of road	5100	No paved shoulder	Residential and industrial	35



Power St	Oakland Ave	End	n/a	14'	2LU	None	No sidewalks or drainage observed	n/a	Quiet, low-volume residential street	Connects to Proposed CTT along power line easement	
RL Stowe Rd	Keener Blvd	South Point Rd	12'	24'	2LU	None	No sidewalks or drainage observed; Powerline easement on east side of road	7900	No paved shoulder; Steep topography	Current high school, proposed greenway; Relatively dense residential development	45
S Main St	City Hall	N. Central Ave	13'	Varies	2LU; 2LT	Yes	Sidewalks on both sides of the road	5100	Parallel parking on one or both sides of the street for the majority of the segment; Some curb bulb-outs and traffic calming treatments applied	Downtown	20
S Main St	Eagle Rd	N. Central Ave	13'	24-26'	2LU	Yes	Sidewalk on north side of road	9200		Neighborhoods and churches	35
Sacco Street	Woodrow Ave	Lincoln St	n/a	24'	2LU	Yes	No sidewalks	n/a	Quiet, low-volume residential street	Reid Park with walking track	25
South Point Rd	North St	RL Stowe Rd	12'	24'	2LU	None	Sidewalk on east side of road with wide grassy buffer and drainage ditch; Powerline easement on east side of road for portions of this section	8500	No paved shoulder	Neighborhoods; Current high school	35
South Point - Central Ave	S Main St	North St	15'	30'	2LU	Yes	Sidewalks on one or both sides of road (with some buffer)	9700		Belmont Middle School; Neighborhoods	35
Vine St	5th St Exn	Parkdale Dr	n/a	20-22'	2LU	None	Sidewalk on one side of road (with buffer)	n/a	Low-volume street with moderate speeds	Neighborhoods; J.B. Page Primary School	35
W. Woodrow Ave	Sacco St	Main St	n/a	24-28'	2LU	Curb, No gutter pan	Sidewalk on one side of road	n/a	Quiet, low-volume residential street; Primarily single family residences, some commercial/light industrial	Neighborhoods; Future mountain biking park	25
Willerene Rd	Julia Ave	Nixon Rd	n/a	24-26'	2LU	None	No sidewalks	n/a	Steep topography; No paved shoulder	Neighborhoods; Current high school	25
Woodlawn Ave	Abandoned rail line 30 yards west of Cason Street	Belmont-Mt Holly Rd	13'	26'	2LU	None	No sidewalks or drainage observed	8900	No paved shoulder; Pavement widens west of the abandoned rail line; Largely undeveloped; Industrial with low-density residential	North Belmont Elementary School; Belmont-Abbey College	35
Woodlawn Ave	City limits west	Abandoned rail line 30 yards west of Cason St	13-14' /20-25'	Varies	2LU	Curb, No gutter pan	Sidewalk on one side of road west of Acme Road	6200	No paved shoulder	North Belmont Elementary School	25



2.5 EXISTING RESOURCES AND PROGRAMS

A number of initiatives are already in place at the state, regional and local level to promote bicycling in Belmont. The program priorities range from transportation to youth sport development, from healthcare to injury prevention. The Bicycle Master Plan recognizes these efforts as part of the existing bicycling environment of Belmont.

In addition to the items described below, several new programs and events are planned for the spring of 2013. These planned activities are discussed in more detail in the program recommendations section of this Plan (Chapter 4).

2.5.1 Be Active North Carolina

Be Active North Carolina, Inc. is the statewide initiative committed to empowering North Carolinians to live healthy, physically active lives. Education and encouragement are key strategies in fulfilling the mission of Be Active. The nonprofit organization works to establish policies that make physical activity and good health convenient and accessible for all North Carolina residents.

URL: <http://www.beactivenc.org/>

2.5.2 Carolina Youth Mountain Bike League

The Carolina Youth Mountain Bike League (CYMBL) is a program of Blue Ridge Adventures and Falling Creek Camp that provides opportunities for youth to participate in competitive mountain bike races throughout the Carolinas. The CYMBL mission is to promote mountain biking as a lifelong sport, model sportsmanship for student racers and promote healthy lifestyles.

URL: <http://www.cymbbl.org/default.html>

2.5.3 Carolina Thread Trail

The Carolina Thread Trail is a nonprofit organization focused on the planning and development of a 15-county regional trail network. The organization operates under the leadership of the Catawba Lands Conservancy. A Gaston County committee exists to support development of the trail network within Gaston County.

URL: <http://www.carolinathreadtrail.org/local-connections/gaston-county-nc/>



2.5.4 Connect Gaston

Connect Gaston is a nonprofit organization focused on trail and greenway promotion and development in the Gaston County area. In October 2009, Connect Gaston was awarded a \$74,484 grant from the Catawba Lands Conservancy for greenway expansion along the South Fork River.

URL: <http://www.ncdot.gov/programs/safety/>

2.5.5 Eat Smart Move More NC

Eat Smart Move More NC is a statewide coalition that promotes increase opportunities for healthy eating and physical activity in North Carolina. The group provides resources for local communities related to best practices and health statistics, as well as funding opportunities. The City of Belmont has

URL: <http://www.eatsmartmovemorenc.com/index.html>

2.5.6 Gaston County Cyclists & Gaston County Road Runners

Gaston County Cyclists serve as a local recreational cycling and running club. The group organizes four major state rides each year, as well as several private club rides. The club has also assisted state and county officials in developing bike routes in Gaston County and placing Share the Road signs within the City of Gastonia.

URL: <http://gastoncountycyclists.com/>

2.5.7 Gaston County Healthcare Commission

The Gaston County Healthcare Commission (GCHC) is dedicated to improving the health status of citizens of Gaston County. The commission relies on a network of organizations and people engaged in “health care access, funding, distribution of resources and allocation of those resources.” The GCHC project groups potentially relevant to bicycling initiatives in Belmont include: the Fitness and Nutrition Council, Safe Kids of Gaston County, and Workplace Wellness.

URL: <http://www.healthygaston.org/>

2.5.8 North Carolina Active Transportation Alliance

The North Carolina Active Transportation Alliance (NCATA) is a membership-based advocacy organization promoting active transportation opportunities throughout the state of North Carolina. Information related to statewide policy, biking and walking transportation programs in NC cities, and biking and walking events is posted on their website.

URL: <https://sites.google.com/site/ncactive/>



2.5.9 North Carolina Department of Transportation (NCDOT)

The official website of NCDOT provides numerous resources for traveling by bicycle. Links to bicycle club websites, links to bicycle shops, tips for bicycling and announcements for special events are all included on the site. Information about both road and mountain biking is provided, as well as state, regional and local route maps.

URL: <http://www.ncdot.gov/bikeped/bicycle/>

2.5.10 Safe Kids Gaston County

Safe Kids of Gaston County is a program of the Gaston County Healthcare Commission and serves as the local coalition of the international Safe Kids organization. The organization is dedicated to the prevention of childhood injury and offers bicycle safety rodeos. The local program has a direct link to the bicycle and helmet safety resources provided by the national coalition.

URL: <http://www.healthygaston.org/project-groups/15-safe-kids-of-gaston-county.html?layout=blog>

2.5.11 Safe Routes to School Programs

2.5.11.1 Safe Routes to School North Carolina

Safe Routes to School Programs (SRTS) provide funding for school based programs which encourage bicycling and walking to school. This typically involves examining conditions around public schools and providing programs to improve bicycle/pedestrian safety, accessibility and use. Managed by the North Carolina Department of Transportation (NCDOT), Transportation Mobility and Safety Division, SRTS is the source for federal SRTS funding amounts, SRTS applications and guidelines, and state SRTS program information.

North Carolina's SRTS funding from FY2005-2011 totaled \$25,981,930, and funding requests typically range from \$100,000 to \$300,000. The NCDOT also seeks requests for SRTS Highway Division Fund projects on a rolling basis, which provides for infrastructure projects through its SRTS Division Fund program. Each Division has been allocated up to \$430,000 of SRTS funds for eligible infrastructure improvement projects along or intersecting with state-maintained roads. Projects must be within two miles of a school serving grades K-8. These funds are primarily intended for small safety improvements, as project requests can range from \$10,000 to \$100,000.

The City of Belmont is already a partner in the North Carolina Safe Routes to School program. Page Primary, Belmont Central Elementary, and Belmont Middle Schools completed SRTS action plans.

URL: <http://www.ncdot.gov/programs/safety/>



2.5.11.2 Fit Community Grant

The City of Belmont received a two-year \$60,000 Fit Community grant focused on promoting active travel to school at Belmont Central Elementary School and Belmont Middle School. The grant funded construction of a new sidewalk through Davis Park, as well as intersection safety improvements, allowing students to walk through the park to school.

2.6 PUBLIC OUTREACH

Public outreach is essential to developing a citywide bicycle plan that addresses the needs of community members. This section provides an analysis of public input acquired through two public workshops, a public comment form, booths at community events, and the project website to identify issues and priorities related to bicycling in the City of Belmont. The Plan is also informed by input garnered through stakeholder interviews, such as with City staff, NCDOT staff, the local bicycle shop, and the Project Steering Committee.

2.6.1 Types of Bicyclists and Cycling

Respondents to the City of Belmont public comment form overwhelmingly **prefer to bike within a bicycle lane, off-road path, or on quiet residential streets** (80 percent). The respondents frequency of bicycling varied significantly with roughly one-third biking a few times per month, one-third biking a few times per week and nearly 20 percent biking a few times per year. About six percent of respondents do not bike at all.

Eighty two percent of participants in the public comment form live and/or work in the City of Belmont. The remainder of respondents includes 16 percent who have an interest in Belmont’s bicycling environment as visitors to the city.

The **majority of respondents find the bicycling environment in Belmont to be unsafe**. Nearly all respondents (92 percent) indicated they would bicycle more if safety were improved in Belmont (Figure 2-2). The public generally identifies the bicycling environment as less safe for daily travel needs than for recreational trips. Roughly 52 percent of respondents identified the bicycling for transportation as “somewhat” or “very” dangerous, while about 43 percent did so for recreation.

By the Numbers:

101

Survey Respondents

57%

Aged 30 to 49

28%

Aged 50 or older

47%

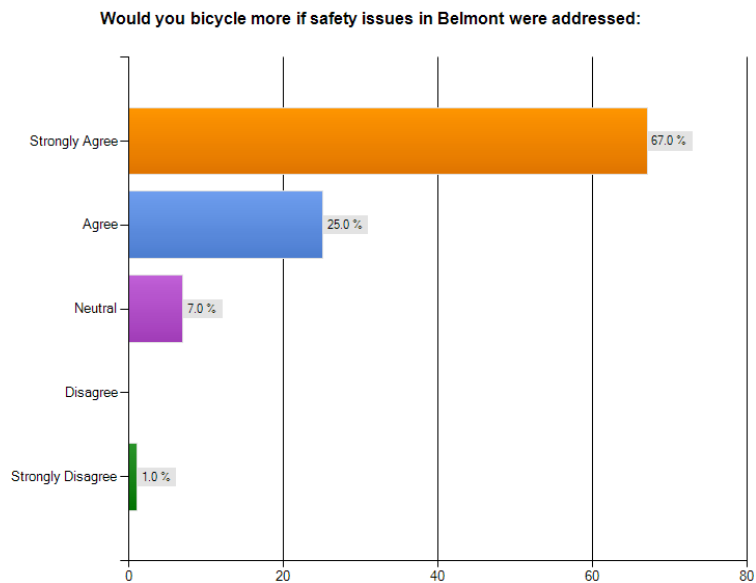
Female

64

Would Like to Volunteer



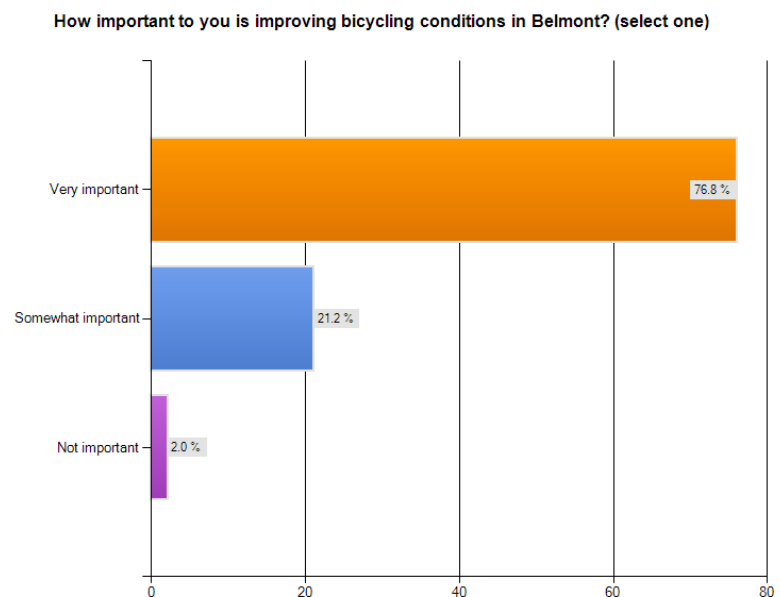
Figure 2-2. Public comments related to frequency of bicycling safety in Belmont



2.6.2 Bicycling Investments

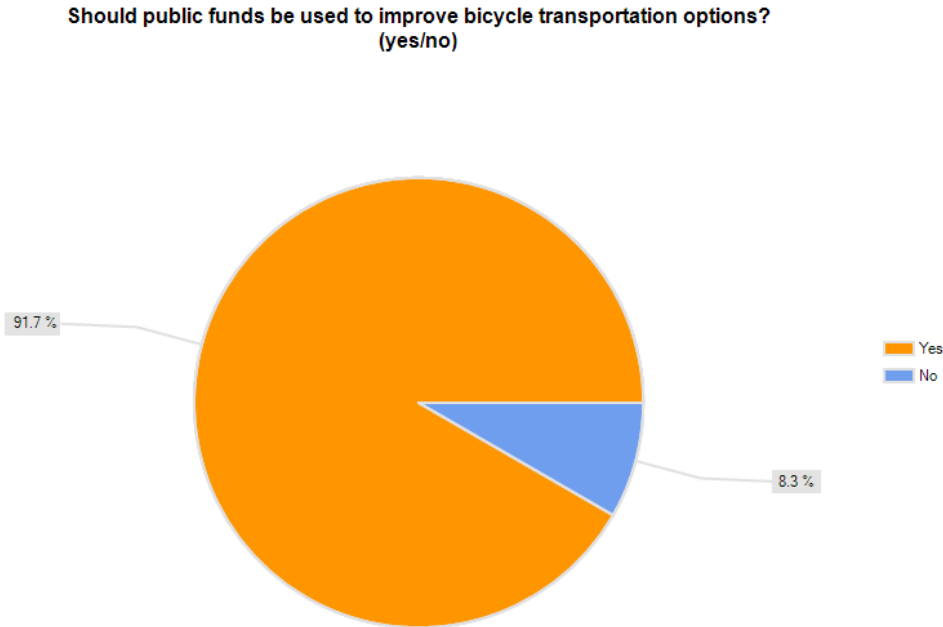
Notably, while six percent of respondents do not bicycle, only two percent identified improvements to the bicycling environment in Belmont as “not important.” More than **three-quarters of respondents consider bicycling improvements to be “very important” for Belmont** (Figure 2-3)

Figure 2-3. Public comments about the importance of bicycling conditions in Belmont



Additionally, **92 percent of respondents believe public funds should be used to improve bicycle transportation options** (Figure 2-4). A majority of respondents suggest using state and federal grants (88 percent) NCDOT maintenance funds (77 percent), and existing local taxes (72 percent).

Figure 2-4. Public comments regarding the use of public funds for bicycle transportation improvements



2.6.3 Bicycling Preferences

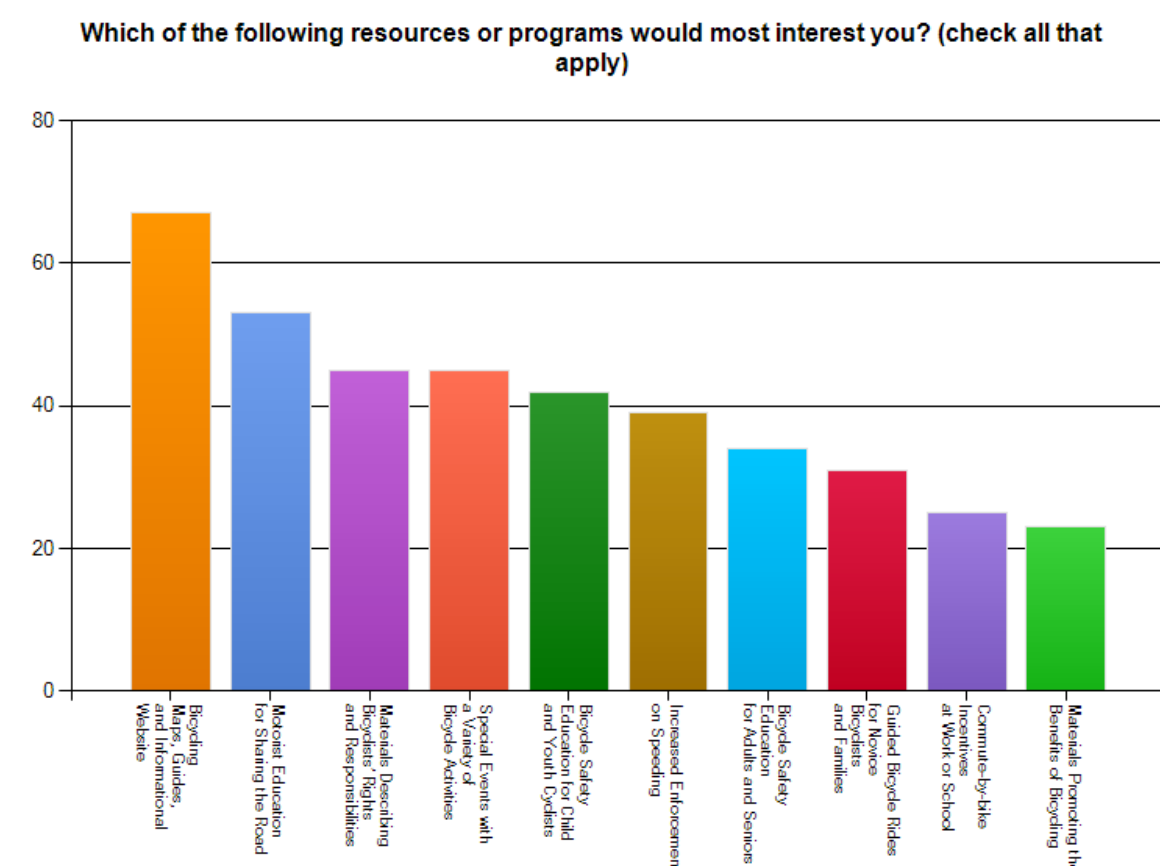
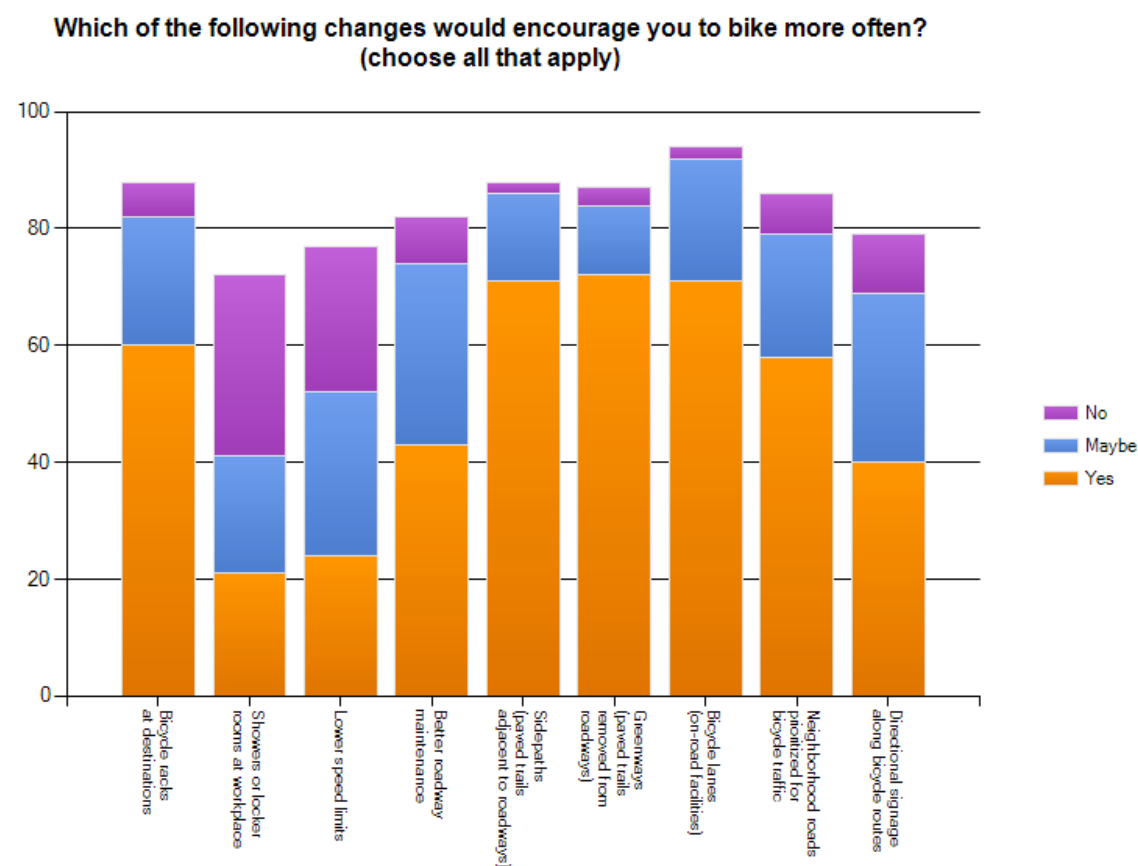
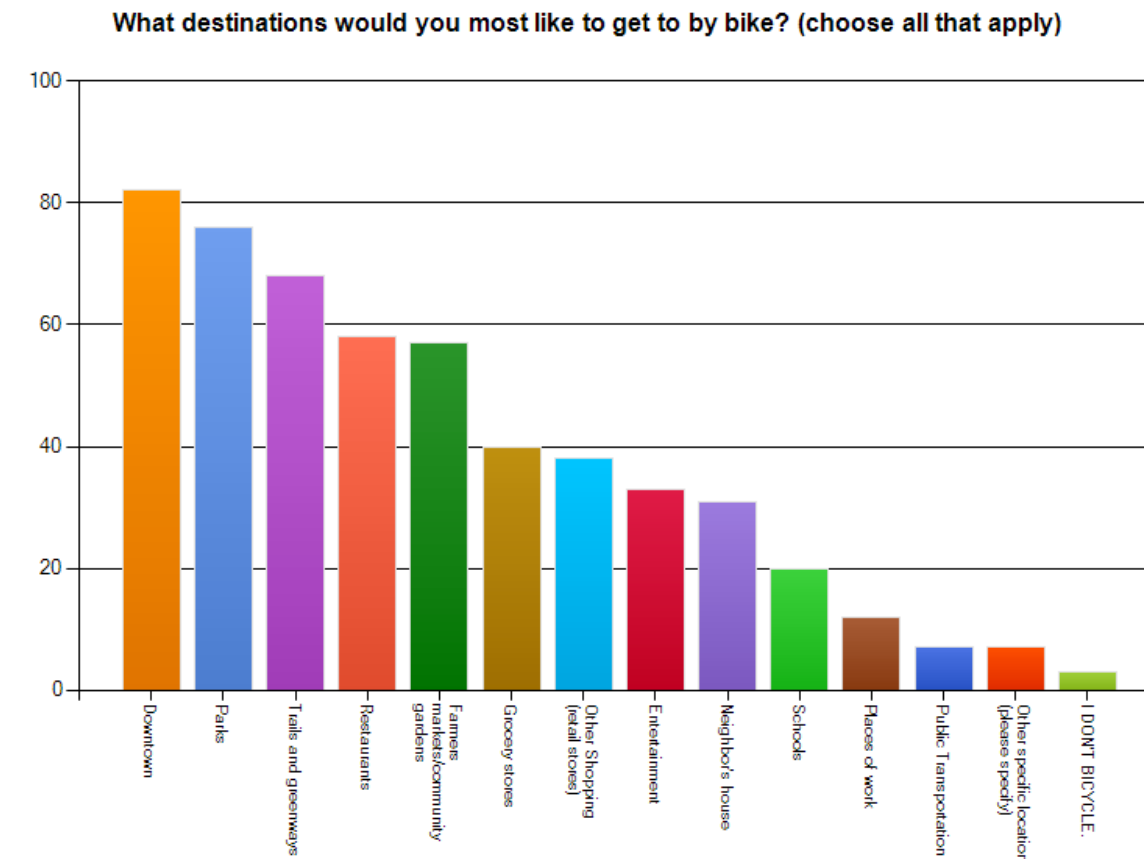
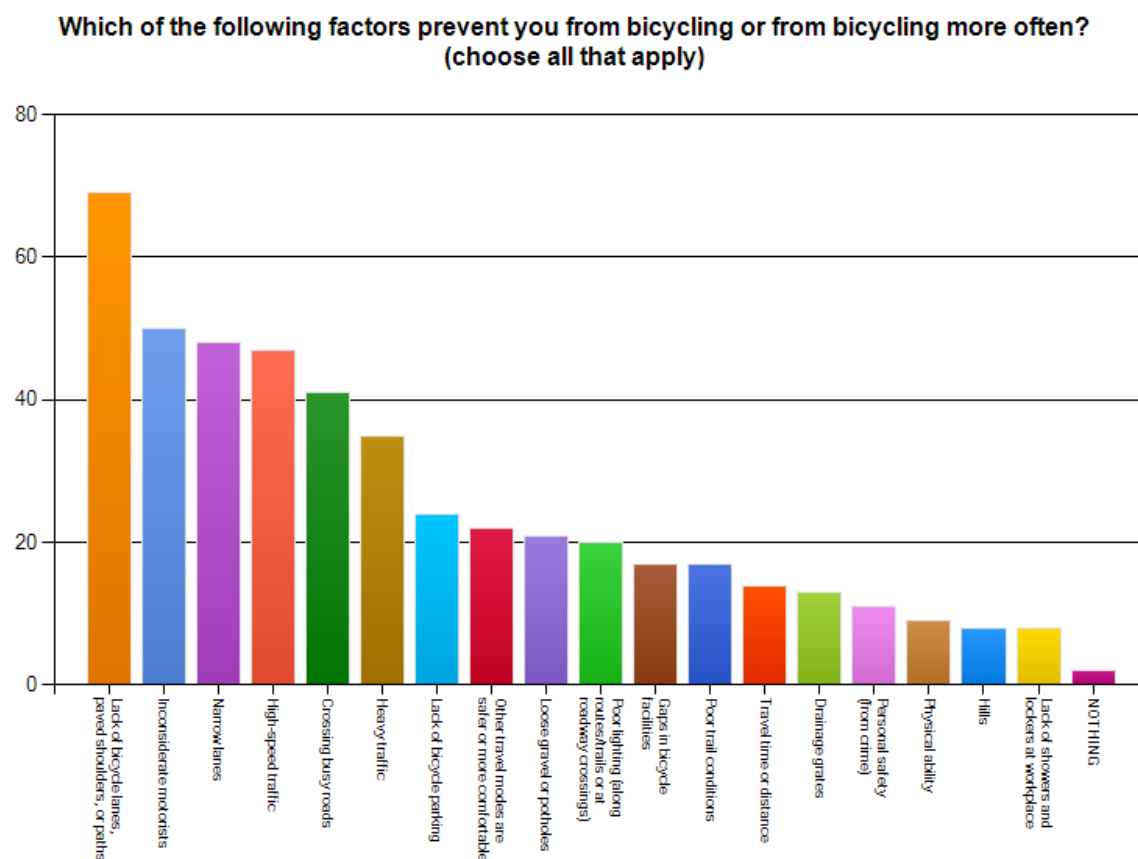
Graphs shown in Figure 2-5 identify existing issues related to bicycling in Belmont and preferences for targeted improvements. **Respondents identified a lack of bicycle facilities, narrow roads, inconsiderate motorists and traffic hazards** (heavy traffic volume, crossing busy roads, etc) as primary concerns. Development of **sidepaths, greenways, and designated bicycle lanes are the most popular approaches** to improving the bicycling environment.

Bicyclists in Belmont are **most interested in accessing downtown, retail, and parks and recreation facilities** by bike. The most popular destinations for bicyclists are downtown, restaurants, parks, trails and greenways, and farmers markets, community gardens, or similar attractions.

Respondents also identified preferences for education and encouragement programs in Belmont. The **top four choices are bicycling maps and guides, motorist education** about safely sharing the road, special events with bicycling activities, and adult bicyclist education.



Figure 2-5. Public comments related to bicycling preferences in Belmont

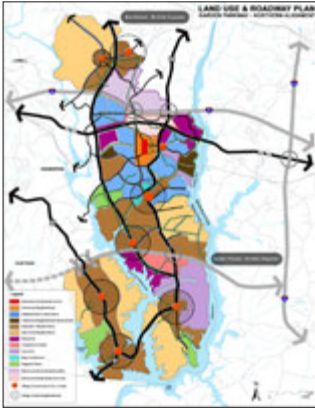


2.6.4 Public Workshops

The public involvement process involved one public workshop during the needs assessment phase of Plan development (May 2012) and one public workshop during the recommendations phase of the Plan (September 2012). Residents of Belmont provided comments related to the current conditions of bicycling in Belmont, their vision for improving the bicycling environment, and key opportunities and challenges for achieving that vision. Approximately 20 individuals attended the first public meeting, while more than 30 attended the second meeting. The comments received during the workshops are summarized as follows:

- Interconnecting parks is a City priority
- Key destinations include:
 - Goat Island
 - Planned mountain bike park at Reid Park
 - Nearby municipalities
 - Downtown Belmont
 - Neighborhoods
 - YMCA
- Family friend bicycle routes are needed
- Regional routes (connections outside of the city limits) are important
- Heavy bicycle and pedestrian traffic exists on South Point Road
- Difficult crossings are located at:
 - The Norfolk railroad and Central Avenue (existing overpass) and at multiple points east of Central Avenue
 - Highway 74 and Mason Street and at multiple points east of N. Main Street
 - Interstate 85 and N. Main Street/Belmont-Mt Holly Road
 - Interstate 85 and Park Street
- Gaps in the roadway network exist between subdivisions on the east side of the city of Belmont (such as between Amanda Lane and Ewing Drive, or between the residences attached to Betwood Drive and those along Stowe Road, for example); closing the gaps would benefit the development of a connected bike route network.
- Existing programs include a metric century ride and an annual ride organized by the First Baptist Church
- Encouragement program ideas include:





The City's Comprehensive Land Use Plan calls for complete streets as well as greenways and trails.

- Downtown criterium
- Mountain bike races
- "Open Streets" events
- Promote Belmont as a biking destination
- Engage the college campuses in this effort

2.7 PLANNING AND POLICY REVIEW

The bicycling environment in the City of Belmont is impacted by existing codes, ordinances, and long-range planning efforts. This section provides a summary of bicycle planning-related efforts, as well as bicycling-related elements of the city's Land Development Code and Municipal Code of Ordinances. Where quotations are used, the code is referenced verbatim.

The plans and documents reviewed are listed in Table 2-5. Appendix A provides the full review of planning documents.

Table 2-5. The background document review included an assessment of bicycle-related planning documents.

Plan	Agency	Year
Safe Routes to School Action Plans (J.B. Page Primary School, Belmont Central Elementary School, and Belmont Middle School)	City of Belmont, NC-DOT, and School District	2011
Gaston County Carolina Thread Trail Master Plan for Gaston County Communities (2009)	Gaston County	2009
Comprehensive Land Use and Transportation Plan (2007)	City of Belmont	2007
Gaston County Parks & Recreation Master Plan	Gaston County	2007
Long Range Transportation Plan 2030 (2005)	Gaston Urban Area mpo	2005
Belmont Parks & Recreation Master Plan (2003)	City of Belmont	2003
Comprehensive Plan (2002)	Gaston County	2002

2.7.1 Summary of Recent Bicycle Planning Efforts

2010-2012

The City completed study of the Belmont Rail Trail project that would connect downtown Belmont with Belmont Abbey College and North Belmont. In this same time frame, the City began its NCDOT-funded Bicycle Master Plan. The City also completed a Safe Routes to School Study.

2007-2009

A recipient of a Carolina Thread Trail planning grant, Gaston County ad-



opted the *Carolina Thread Trail Master Plan for Gaston County Communities* in 2009. The City of Belmont was part of the Carolina Thread Trail Steering Committee that supervised the planning process. The Carolina Thread Trail Master Plan includes 265 miles of existing and potential trails in Gaston County, and several miles of trails in Belmont, to create a comprehensive trail network across Gaston County.

The City also completed its *Pedestrian Transportation Plan* in 2009, which included recommendations for various greenway projects.

2007

The Belmont City Council adopted the City's first *Comprehensive Land Use and Transportation Plan*, which calls for mixed-use and pedestrian-scaled developments, complete streets, as well as greenways and trails, to connect various parts of the city to one another.

2003

The *Belmont Parks and Recreation Master Plan* recommended greenways, urban bikeways, and linear parks to be added to Belmont, but also recommended that a more detailed Greenway Master Plan be conducted.

2002

The *Gaston County Comprehensive Plan* recommended a countywide greenway system that includes Belmont.

2001

The City and the Gaston UAMPO sponsored a Walkable Communities Workshop in Belmont, which included recommendations for creating more walkable and bikeable streets.

2.7.2 Summary of Local Ordinances

2.7.2.1 City of Belmont Land Development Code

The City of Belmont adopted the land development code in July 2003 and has updated the document since then. This code supports the City's *Comprehensive Land Use Plan* by encouraging the development of a network of sidewalks and bicycle lanes that provide an attractive and safe mode of travel for pedestrians and cyclists. The City of Belmont was one of the first communities to adopt a New Urbanist zoning ordinance that stresses the importance of walkable, bikeable, and sustainable communities. Below are some excerpts from the land development code related to bicycle-friendly development:



8.1 General Street Design Principles

"This Code **encourages the development of a network of interconnecting streets** that work to disperse traffic while connecting and integrating neighborhoods with the existing urban fabric of the City. Equally as important, the Code **encourages the development of a network of sidewalks and bicycle lanes** that provide an attractive and safe mode of travel for pedestrians and cyclists."

"It is the intent of this ordinance to build streets that are integral components of community design...In an effort to protect this investment, the City views streets as the most important public space and therefore has developed a set of principles which **provide adequate facilities for all types of traffic, including motorists, pedestrians, bicyclists, and transit users, and including of all levels of ability**, such as those in wheelchairs, the elderly and the young."

"Streets shall interconnect within a development and with adjoining development. Cul-de-sacs are permitted only where topographic conditions and/or exterior lot line configurations offer no practical alternatives for connection or through traffic. Street stubs should be provided with development adjacent to open land to provide for future connections. Streets shall be planned with due regard to the designated corridors shown on the Thoroughfare Plan."

8.5 General Greenway Design Principles

"When a greenway is part of a development, the following standards apply:

- Greenways shall be planned following the designated circulation system shown on the Comprehensive Plan map, the Parks and Recreation Master Plan, and the City of Belmont Pedestrian Transportation Plan.
- Greenways shall connect to new development wherever possible. Greenway stubs should be provided when development is adjacent to open land scheduled for greenway construction to provide for future connections. Stubs must extend to the neighboring property line.
- Greenways should be designed to fit the contours of the land and should minimize removal of significant trees.
- All greenways shall be constructed in accordance with the design



and construction standards in this code and the City of Belmont Pedestrian Transportation Plan and shall be maintained for public access whether by easement or by public dedication.”

9.2 (5) General Parking Requirements (Bicycle Parking)

“All non-residential development with more than 36 parking spaces, recreation facilities, and multi-family residential buildings where no garages are provided shall include an area for parking bicycles. This area may be a designated parking space within the parking lot near the building or an area outside the parking lot adjacent to the building. The bike parking area must include a bike rack. **The Downtown District is exempt from these requirements.**”

10 Curbs and Drainage

“All drainage grates must be made safe for bicyclists.”

16 (H) Development Plan Requirements

“Incorporate bike paths, sidewalks, pedestrian paths, greenways, and other pedestrian facilities to connect with similar planned or existing local or regional facilities as shown on official plans and maps of the city of Belmont, the Belmont Pedestrian Transportation Plan, neighboring municipalities, or Gaston County. Designs shall encourage pedestrian and bicycle use by being spatially defined by buildings, trees, and lighting, and by discouraging high-speed traffic.”

2.7.2.2 City of Belmont Municipal Code of Ordinances

Chapter 73 of the City’s Municipal Code of Ordinances provides safety regulations related to “Bicycles, Coasters, and Roller Skates.” Notably, the Chapter includes a requirement for bicycle lights at night; prohibits clinging to motor vehicles, riding on handlebars, and biking on sidewalks anywhere in the City.

2.7.3 Key Findings

Evaluation of the city’s existing planning documents and local ordinances indicates that Belmont could benefit from strengthening several key areas of policy. This concerns, in particular, the areas of bicycle parking standards, through-access for bicyclists at intersections, and bicycle facility design guidelines. Policy recommendations to address these opportunities are provided in Chapter 3.



2.8 CONCLUSION

Examining the conditions of the existing bicycle infrastructure and the nature of existing policies, programs and planning documents is a critical first step prior to proposing a comprehensive bicycle network. In terms of infrastructure, the area's geographic characteristics, existing roadway configurations, and existing bicycle facilities significantly affect bicycle transportation and the everyday decisions by bicyclists and motorists. Non-infrastructure elements, such as education and encouragement for bicyclists and motorists and local policies, also affect bicycling activity and daily transportation decisions. This section offers key findings of the bicycling environment in Belmont.

Figure 2-6 summarizes key opportunities and constraints of the existing infrastructure for bicyclists in Belmont.

2.8.1 Strengths of existing Bicycle Conditions

2.8.1.1 Infrastructure

Abandoned rail lines: Abandoned railroad tracks provide a linear right of way suitable for developing rails-to-trail greenways. The City of Belmont has plans to develop a trail in the former Piedmont and Northern Railroad Line that extends from Woodlawn Street to downtown Belmont.

Traffic calming: The City of Belmont has implemented traffic calming measures on portions of several key corridors, such as Main Street, Central Avenue, and Church Street. Successful traffic calming can create a safe and inviting roadway for bicyclists.

Neighborhood grid network: Streets within the traditional neighborhoods of Belmont are on a good grid system for all transportation modes and many have low automobile speeds.

Roadway/lane widths: Some roadways in the City are wide enough to offer bicycle lanes or other bicycle facilities without the need to add additional pavement width.

Low-volume roads: Belmont has numerous residential areas with low traffic volumes and low traffic speeds. This includes traditional neighborhoods near the city center as well as less dense residential areas in the northern portion of the City of Belmont.

2.8.1.2 Non-Infrastructure

The City of Belmont is a well-planned community. The bicycling environment benefits from:

- The proposed Carolina Thread Trail alignment and the organizational support of the Carolina Thread Trail nonprofit



entity

- Traditional Neighborhood Design ordinances that incentivize bikeable and walkable development and account for bicyclists within street and parking development regulations
- An active cycling club serving the Gaston County area and health-focused nonprofits at the local and state level
- A well-supported Safe Routes to School program
- Political support for bicycling, trails, and healthy community amenities
- Proximity to regional cycling destinations (e.g., the Whitewater Center and regional bike routes)





Roadway/lane widths



Abandoned rail lines



Neighborhood grid, Low volume roads



Traffic calming



2.8.2 Deficiencies of Existing Bicycle Conditions

2.8.2.1 Infrastructure

Lack of signage: Limited to no signage is available to direct bicyclists along preferred bicycling routes.

Driveway access management: A number of driveway aprons in Belmont are excessively wide without clear direction for ingress and egress. This presents a hazard to bicyclists by increasing the number of potential conflict points and making bicyclist and motorist interactions less predictable. The parking lots on both sides of East Woodrow Avenue as it approaches N Main Street are prime examples. While the Land Development Code addresses this design standard, an incentive for retrofitting existing driveways is needed.

Connectivity issues: There is a lack of connectivity between existing bicycle friendly roads and destinations. Additionally, many residential developments do not offer a connected street grid within the development or bicycle/pedestrian connections between adjacent developments.

Major Arterial: Highway 74 is a wide, high-volume arterial with high speeds and little shoulder. The roadway provides access to commercial, retail, and office destinations. It does not offer a safe place for bicyclists traveling on it or crossing it, which limits both east-west and north-south access for Belmont bicyclists.

Narrow roadways and lanes: There are many roadways throughout the region that are too narrow for bicyclists to travel safely on them. These roads have little or no shoulder and have relatively high vehicle travel speeds which pose multiple hazards for bicyclists. South Point Road and Central Avenue are examples.

Major barriers with limited route alternatives: Belmont has four significant pinch points for bicyclists. Currently, bicyclists have a single, generally unsafe option for traversing these major barriers and no reasonable alternative routes:

- a) Crossing Interstate 85, north of downtown Belmont - Belmont-Mount Holly Road and Park Street (Beatty Drive), which have no shoulder, are the only roads in Belmont City limits providing access across Interstate 85. Notably, the proposed Belmont Rail Trail alignment addresses this challenge at Belmont-Mount Holly Road.
- b) Crossing the Catawba River, east of downtown Belmont - The Highway 74 bridge, which has no shoulder, is the only road providing access across the Catawba River.
- c) South Point Road, south of downtown Belmont - South Point Road,



which has no shoulder, is the only road extending south out of the city limits meaning that no parallel bicycle route alternatives exist.

- d) Norfolk Southern Rail Line, west of downtown Belmont – On the City’s west side, the only opportunities to cross the railroad tracks are at North Central Avenue and Lakewood Road, the latter of which is not within city limits. As a result, safe access to Belmont Central Elementary School and the surrounding neighborhood is severely limited.

2.8.2.2 Non-Infrastructure

The City of Belmont has made important investments toward planning a future trail and multi-use path network. However, the current bicycling environment is challenged by:

- A public perception that bicycling is unsafe and motorists are inconsiderate to bicyclists
- A lack of ordinances encouraging or requiring bicycling access at intersections
- A lack of clear standards for bicycle parking facilities and on-street bikeway design
- Limited existing bicycle-related education, enforcement, and encouragement resources and programs at the local level (rather than county, regional, or state)





Connectivity issues



Major arterial



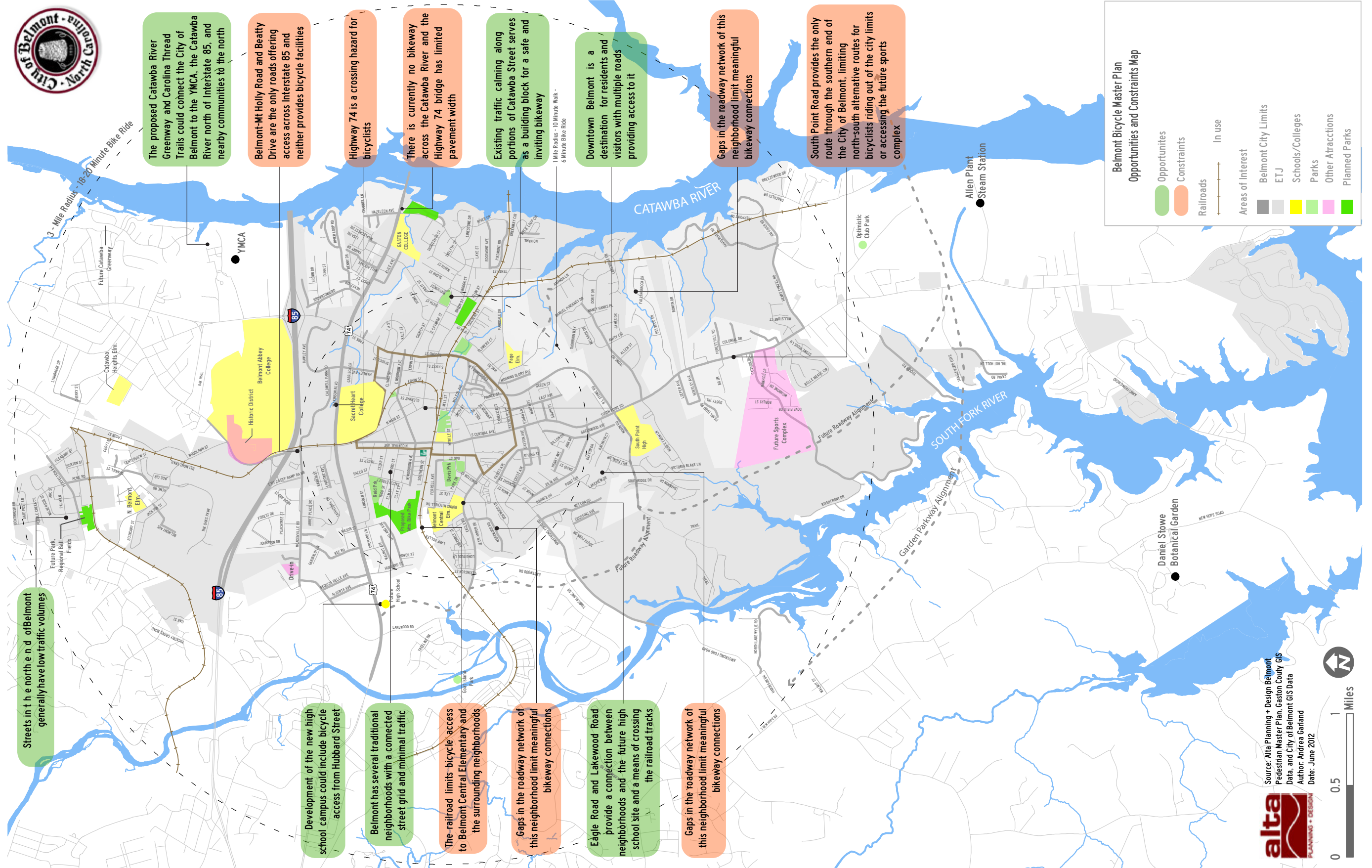
Narrow roadways and lanes



Major barriers, Limited route alternatives



Figure 2-6. Key opportunities and constraints of the City of Belmont's bicycling environment



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CHAPTER OUTLINE:

3.1 OVERVIEW

3.2 RECOMMENDED BICYCLE FACILITIES

3.3 RECOMMENDED BIKEWAY NETWORK

3.1 OVERVIEW

This chapter presents proposed bikeways and bicycle support facilities identified through input from the community, the Plan Advisory Committee, and the needs analysis. The proposed improvements are intended to make bicycling more comfortable and accessible for bicyclist of all skill levels and trip purposes. Bicyclists have the same rights and responsibilities as motorists and are allowed to ride on all roads in Belmont. Modifications to roadways in Belmont, as well as the addition of off-street pathways, will make bicycling a safer and more viable form of transportation.

3.2 RECOMMENDED BICYCLE FACILITIES

The bikeway recommendations of this Plan include over 50 miles of new on-street bikeways (including bike lanes, bike routes and shared lane markings) to increase Belmont’s bicycle network connectivity and to create a comprehensive, safe, and logical network. This mileage is in addition to over 36 miles of proposed off-street greenway trails, which includes existing recommendations from the City’s Pedestrian Transportation Plan and additional mileage proposed through the Bicycle Master Plan process. At full build out of the proposed bikeways, Belmont will have nearly 90 bikeway miles, improving connections from residential neighborhoods to attractors such as retail, transit, and jobs.

Figure 3-1 shows the existing and proposed bikeway network and Table 3-1 through Table 3-7 list the bikeways by type and mileage. The proposed bikeways were developed with consideration for roadway widths, traffic volumes and speeds, and connections to destinations. Brief descriptions of seven types of bicycle facilities recommended in Belmont are provided below. For a comprehensive guide to bicycle facilities, see Chapter 6: Design Guidelines.



Bicycle Boulevards/Neighborhood Bicycle Routes Rather than a specific bicycle facility type, these routes contain combinations of facilities, if any. This Plan recommends several signed routes that connect destinations in areas where no special bicycle facilities are needed (due to lower traffic speeds and volumes). In areas where traffic calming is needed and/or preferred by local residents, facilities such as speed humps that allow bicycle access or mini traffic circles can be added to the bicycle boulevard.

Shared Lane Markings (Sharrows) Shared lane markings, or “sharrows,” are placed in a linear pattern along a corridor, typically every 100-250 feet and after intersections. They make motorists more aware of the potential presence of cyclists; direct cyclists to ride in the proper direction; and remind cyclists to ride further from parked cars to avoid ‘dooring’ collisions.

Paved Shoulders Paved shoulders are the part of a roadway which is contiguous and on the same level as the regularly traveled portion of the roadway. There is no minimum width for paved shoulders; however a width of at least four feet is preferred. Ideally, paved shoulders should be included in the construction of new roadways and/or the upgrade of existing roadways, especially where there is a need to more safely accommodate bicycles. In this plan, paved shoulders should also be implemented as the short-term solution during resurfacing in all locations where bike lanes are recommended in Figure 3-1 before curb and gutter is added.

Bicycle Lanes A bicycle lane is a portion of the roadway that has been designated by striping, signing, and pavement markings for the preferential and exclusive use of bicyclists. The minimum width for a bicycle lane is four feet; five- and six-foot bicycle lanes are typical for collector and arterial roads. Bicycle lanes can be striped on existing roadways, sometimes with modifications to travel lane widths and configuration. There are some opportunities for bicycle lanes in Belmont in the short term. As a general practice, any local arterial or collector that is widened should incorporate bicycle lanes with speed limit reduction considerations.

Cycle Tracks A cycle track is an exclusive bike facility that combines the user experience of a separated path with the on-street infrastructure of a conventional bike lane. A cycle track is physically separated from motor traffic and distinct from the sidewalk.

Sidepaths Multi-use trails located within the roadway corridor right-of-way, or adjacent to roads, are called ‘side paths’. Side paths are most appropriate in corridors with few driveways and intersections and should be at least 10’ wide. Bicycle routes where side paths are recommended should also have adequate on-road bicycle facilities (such as paved

Design Guidelines for Each Bicycle Facility Type:

Bicycle Boulevards
Page 105 & 107

Shared Lane Markings
Page 106

Paved Shoulders -
Page 109

Bicycle Lanes
Page 110 - 112

Cycle Tracks
Page 113

Sidepaths
Page 135

Multi-use Trails
Page 131-134



shoulders or bicycle lanes) wherever possible. Many times, sidepaths are used in place of a sidewalk and can be used by bicyclists and pedestrians.

Multi-Use Trails/Greenways Multi-use trails are completely separated from motorized vehicular traffic and are constructed in their own corridor, often within parks, open spaces, or alongside utility corridors. Multi-use paths include bicycle paths, rail-trails or other facilities built for bicycle and pedestrian traffic.

3.3 RECOMMENDED BIKEWAY NETWORK

The recommended bicycle network (Figure 3-1) represents a connected system that will allow transportation and recreation-based bicycle travel throughout Belmont. The recommended network is composed of numerous types of on-street and off-street bicycle facilities that serve to connect people and neighborhoods to local destinations. Individual segments of the overall network would be built in phases (along with related programs and policies), which is the subject of Chapter 5: Implementation. Table 3-1 lists the seven types of bicycle facilities and the mileage of those facility types within the recommended bicycle network for Belmont.

Table 3-1. Proposed mileage of recommended bicycle facility types for Belmont.

Bikeway Facility Type	Recommended Mileage
Bicycle Boulevard/Neighborhood Route	14.85
Shared Lane Marking	1.55
Bicycle Lane	13.73
Paved Shoulder	10.9
Cycle Track	4.4
Sidepath	7.2
Greenway	36.6
Total Recommended Network Mileage	89.23



3.3.1 Bicycle Boulevards/Neighborhood Routes

Table 3-2. Recommended bicycle boulevards for Belmont

Road	From	To	Length (Ft) (Rounded)	Length (Mi) (Rounded)
5th St -5th St Exn	Catawba Street	Vine Street	1346	0.25
6th Street	Catawba Street	Andrew Jackson Highway	3095	0.59
Cason Street	Cherry Street	Woodlawn Ave	4678	0.89
Clearwater Lake Road	Perfection Ave	Cason Street	3517	0.67
E. Woodrow Ave	Main Street	Spruce Street	2039	0.39
Julia Ave	Armstrong Ford	Willerene	3503	0.66
Lincoln Street	Sacco Street	Central Ave	1250	0.24
Mason Street	Barnes Street	Highway 74	481	0.09
North Street	S Central Avenue	RI Stowe Road	1255	0.24
Parkdale Drive	Vine Street	End of Road (Proposed Greenway)	5938	1.12
River Loop Road	Browntown Road	Browntown Road	4774	0.9
South Fork Drive	S Main Street	Point Crossing	2885	0.55
Spruce Street	Hawley Avenue	E Woodrow Avenue	437	0.08
Tenth Street	E Catawba Street	Parkdale Drive	1694	0.32
Belmont Avenue	Woodlawn Street	Cud-de-Sac	1513	0.29
Hazelen Avenue	Catawba Greenway	Andrew Jackson Hwy	2105	0.4
Morning Glory Ave	Ewing Drive	Proposed Greenway	1213	0.23
School Street	Acme Road	Woodlawn Street	1600	0.3
Total Recommended Bicycle Boulevard Mileage				14.85



3.3.2 Shared Lane Marking

Table 3-3. Recommended shared lane markings for Belmont

Road	From	To	Length (Ft) (Rounded)	Length (Mi) (Rounded)
Central Ave	N Main St	S Main St	4291	0.81
McLeod Ave	S Main St	Keener Blvd	2036	0.39
N. Main Street	Woodrow Ave	Myrtle St	1873	0.35
Total Recommended Shared Lane Marking Mileage				1.55

3.3.3 Paved Shoulders

Table 3-4. Recommended paved shoulders for Belmont

Road	From	To	Presence of Curb/Gutter	Length (Ft) (Rounded)	Length (Mi) (Rounded)
Acme Rd/ Pebble Creek Dr	City limits north	Perfection Ave	None	874	0.17
McAdenville	Belmont Mt Holly Rd	Peach Orchard Rd	None (except near I-85 in- terchange)	4835	0.92
Nixon Rd	End of Nixon Rd	South Point Rd	None	7298	1.38
Peach Orchard	McAdenville	Georgia Belle	None (except near I-85 in- terchange)	4835	0.92
Perfection Ave	Acme Rd	Clearwater Lake Rd	None	3600	0.68
Woodlawn Ave	City limits west	School St	None	3589	0.68
Perfection Ave	Acme Rd	City Limits West	Some	3454	0.65
New Hope Rd	Armstrong Ford Rd	Armstrong Rd	None	18944	3.5
Total Recommended Paved Shoulder Mileage					10.09



3.3.4 Bicycle Lanes

Table 3-5. Recommended bicycle lanes for Belmont

Road	From	To	Length (Ft) (Rounded)	Length (Mi) (Rounded)	Implementation Type	Implementation Strategy
Armstrong Ford Rd	Eagle Rd	South Point Rd	12538	2.0	Add Pavement	Construct 4 ft wide paved shoulder on both sides of roadway, as part of road reconstruction with curb/gutter and sidewalks added.
E Catawba St	N Main St	Church St	4575	0.87	Lane Narrowing	Restripe travel lanes to 10 ft width. Use shared-lane markings (rather than bike lane stripe) where parallel parking is provided.
E Catawba St	Church St	Highway 74	4438	0.84	Add Pavement	Construct 4 ft wide paved shoulder on both sides of roadway and add pavement markings and signage.
Ewing Dr	Keener Blvd	Amanda Ln	4029	0.76	Add Pavement	Construct 4 ft wide paved shoulder on both sides of roadway, as part of road construction/reconstruction with curb/gutter and sidewalks added (a portion of this segment includes planned construction of a new road connecting Ewing Drive and Amanda Lane).
Georgia Belle Ave - Hubbard St	Peach Orchard Rd	Power Street	3502	0.66	Add Pavement	Construct 4 ft wide paved shoulder on both sides of roadway, as part of road reconstruction with curb/gutter and sidewalks added.
Hawley Ave	Highway 74	Park St	3673	0.7	Lane Reconfiguration	Study the feasibility of converting this segment to a single travel lane each direction with dedicated left turn lanes; Use shared-lane marking if needed in short narrow segments.
Keener Blvd	E Catawba St	S Point Rd	4721	0.89	Lane Reconfiguration	Study the feasibility of converting this segment to two travel lanes with center turn lane.
N Main St	Interstate 85	Highway 74	1731	0.33	Add Pavement	As part of road widening, add pavement, markings, and signage for a striped bike lane on each side of the roadway.
N. Main St	Highway 74	Woodrow Ave	2784	0.53	Lane Reconfiguration	Use the existing pavement width to create a striped bike lane.
Samuel Pinckney Dr/ Amanda Ln	Stowe Rd	End of Road	2321	0.44	Add Pavement	Construct 4 ft wide paved shoulder on both sides of roadway, as part of road reconstruction with curb/gutter and sidewalks added.
S Main St	Myrtle St	N. Central Ave	1256	0.24	Lane Narrowing	Use the existing pavement width to create a striped bike lane.
S Main St	Eagle Rd	N. Central Ave	1337	0.25	Add Pavement	Construct 4 ft wide paved shoulder on both sides of roadway, as part of road reconstruction with curb/gutter and sidewalks added.
South Point Road	North St	RL Stowe Rd	2972	0.56	Add Pavement	Construct 4 ft wide paved shoulder on both sides of roadway and add pavement markings and signage.
South Point - Central Ave	S Main St	North St	2496	0.47	Lane Narrowing	Use the existing pavement width to create a striped bike lane.

Table 3-5. Recommended bicycle lanes for Belmont (Continued)

South Point Rd	RL Stowe Rd	Lower Armstrong Rd	17788	3.37	Add Pavement	Construct 4 ft wide paved shoulder on both sides of roadway and add pavement markings and signage.
Stowe Rd	South Point Rd	Samuel Pinckney Dr	4283	0.81	Add Pavement	Construct 4 ft wide paved shoulder on both sides of roadway, as part of road reconstruction with curb/gutter and sidewalks added.
Woodlawn Ave	Cason St	Belmont-Mt Holly Road	1565	0.3	Add Pavement	Construct 4 ft wide paved shoulder on both sides of roadway; Add pavement markings and signage
Woodlawn Ave	School St	Cason Street	2485	0.47	Lane Narrowing/Add Pavement	Use the existing pavement width to create a striped bike lane from Cason Street to Acme Street; Add pavement where needed from Acme Street to School Street
Total Recommended Bicycle Lane Mileage				13.73		



3.3.5 Cycle Tracks

Table 3-6. Recommended cycle tracks for Belmont

Road	From	To	Length (Ft) (Rounded)	Length (Mi) (Rounded)
Andrew Jackson Highway (Hwy 74)	N Main St	City limits east	9765	1.85
Andrew Jackson Highway (Hwy 74)	Albert Ave	N Main Street	5239	0.99
Andrew Jackson Highway (Hwy 74)	City limits west	Albert Ave	3732	0.71
Park Street	Browntown Road	Highway 74	1323	0.25
Park Street	Highway 74	E Catawba St	3125	0.59
Total Recommended Cycle Track Mileage				4.4

3.3.6 Sidepaths

The 7.2 miles of proposed sidepaths are listed in Table 3-7 below. The proposed sidepath along Eagle Road is a long-term strategy that can occur with development and/or scheduled road widening/reconstruction. It is the preferred facility type for this corridor. Applying shared-lane markings is an appropriate short-term alternative given current traffic volumes and posted speed limits, however, shared-lane markings should not be used as a replacement for the long-term recommended facility. Similarly, a paved shoulder can serve as an appropriate short-term strategy for Eastwood Drive, however the proposed sidepath is the recommended facility type.

Table 3-7. Recommended sidepaths for Belmont

Road	From	To	Length (Ft) (Rounded)	Length (Mi) (Rounded)
Eagle Road	Assembly Street	S. Main Street	1691	0.32
Eagle Road	Lakewood Road	Assembly Street	4102	0.78
Eastwood Drive	Eagle Drive	Armstrong Ford	3766	0.71
Main Street - Belmont Mt. Holly Road	Highway 74	Woodlawn St	5302	1
RL Stowe	Keener Blvd	South Point Road	5070	0.96
New Road Alignment	Andrew Jackson Hwy	Nixon Rd	11802	2.24
South Point Road	RL Stowe Road	Proposed Greenway	6207	1.18
Total Recommended Sidepath Mileage				7.2



3.3.7 Greenways/Multi-use Paths

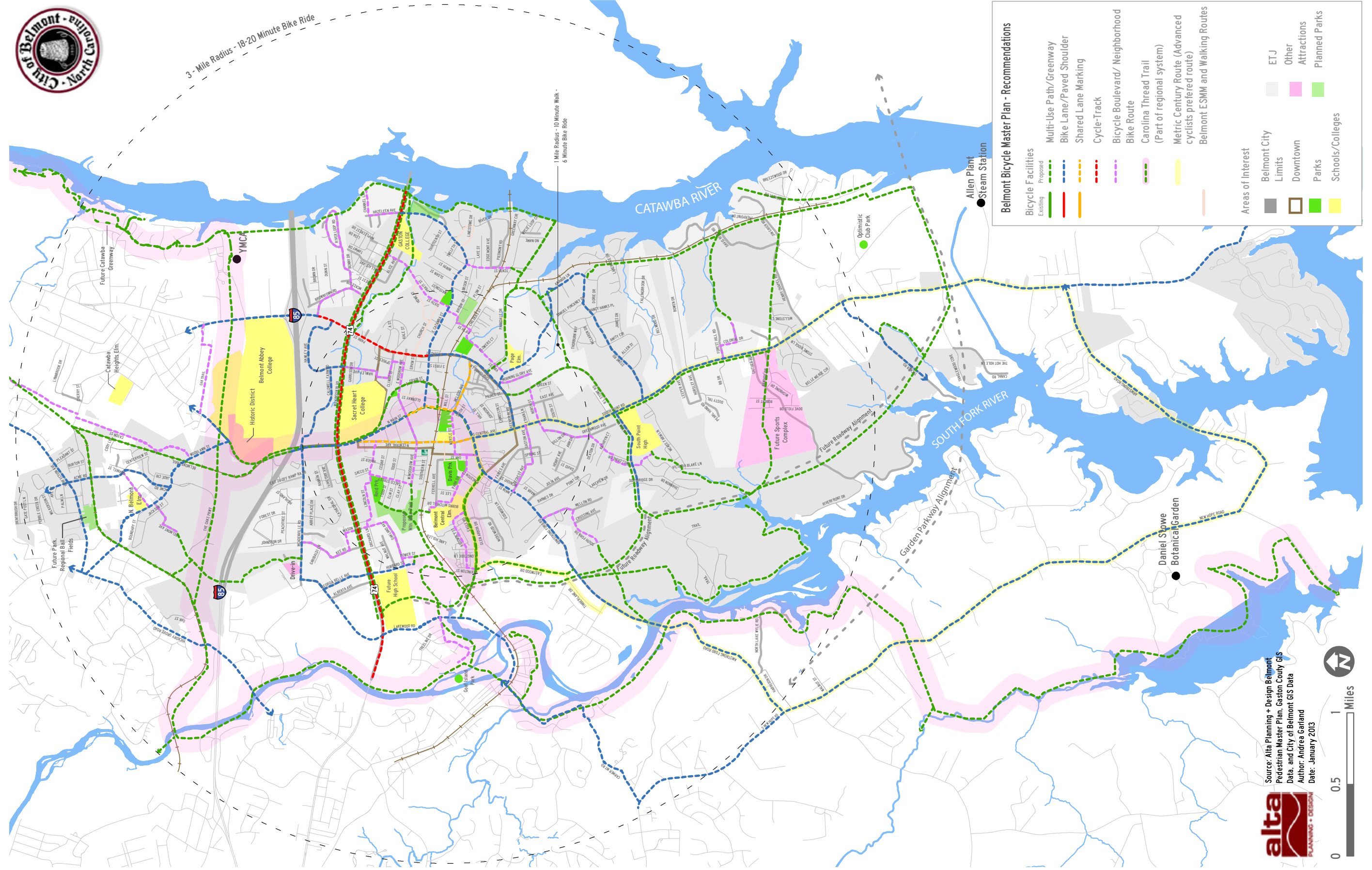
This Plan recommends a total of 36.09 miles of off-street greenways. The proposed greenway network includes segments of the regional Carolina Thread Trail, as well as trail alignments recommended in the City of Belmont's Pedestrian Plan. The greenways are identified in Table 3-8 and Figure 3-2. Additional information is included in the Pedestrian Plan.

Table 3-8. Greenway/ Multi-use Path Recommendations

Map ID	From	To	Length (Ft) (Rounded)	Length (Mi) (Rounded)
1	Pinhook Loop	River Front Trail	26606	5.04
2	Gastonia Trail	Wilkinson Blvd	10270	1.95
3	Hickory Grove Road	The Oaks Parkway	2501	0.47
4	Belmont Avenue	McAdenville Road	5690	1.08
5	Proposed Carolina Thread Trail	Parkdale Drive	13561	2.57
6	Peach Orchard Road	Catawba River Front	17020	3.22
7	Peach Orchard Road	Catwba River Front	16946	3.21
8	Park Street	E Catawba Street	6167	1.17
9	N Central Avenue	S Main Street	4839	0.92
10	Tood Street	W Woodrow Avenue	3155	0.60
11	Hubbard Street	Ferrell Avenue	2429	0.46
12	Keener Blvd	Exsisting Shared Use Path	11417	2.16
13	Armstrong Ford Road	Riverfront Drive	13318	2.52
14	South Point Fork	Armstrong Road	3419	0.65
15	Samuel Pinckney Drive	Catwba River (near Boat Club Rd)	12436	2.36
16	Timber Ridge Road	Davis River Road	3736	0.71
17	Clark Hill Drive	Oakcrest Drive	15493	2.93
18	Nixon Road	Catawba River (Near Boat Club Rd)	18987	3.60
19	Tucker Road	Proposed Greenway (Along future Nixon Rd Ext.	2499	0.47
Total Mileage				36.09



Figure 3-2 Greenway/Multi-use Path Corridors



3.3.8 Corridor Design Recommendations

Several roadways in Belmont present a potential opportunity for lane re-configuration (commonly referred to as a “road diet”) and inclusion of a bicycle lane or cycletrack. Through conducting a traffic study of each corridor, Belmont will determine the traffic implications of reallocating space within the existing pavement width. Road diets typically involve reducing the number of travel lanes (from a four-lane road to a two-lane road with center turn lane, for example). Road diets provide traffic calming and safety benefits, while also allowing adequate space for bicycle lanes. A report by the Federal Highway Administration documents lower pedestrian crash risk when crossing two- or three-lane roads, as compared to roads with four or more lanes.¹ Additionally, a reduction in travel lanes does not necessarily result in a reduction in motor vehicle traffic volumes and in some cases leads to an increase in ADT (East Boulevard in Charlotte, NC, as one example). Research shows that roadways with an ADT under 18,000 are prime candidates for road diets. A recent FHWA study of road diet streets in California, Iowa, and Washington found that increased congestion might occur for streets over 20,000 ADT.

As shown on Figure 3-3, the corridors identified for further study are:

- Hawley Avenue (from Highway 74 to Park Street)
- Keener Boulevard – Park Street (from S. Central Avenue to Interstate-85/City limits)
- N. Main Street (from Highway 74 to Catawba Street)
- Highway 74 (from the western city limits to the eastern city limits)

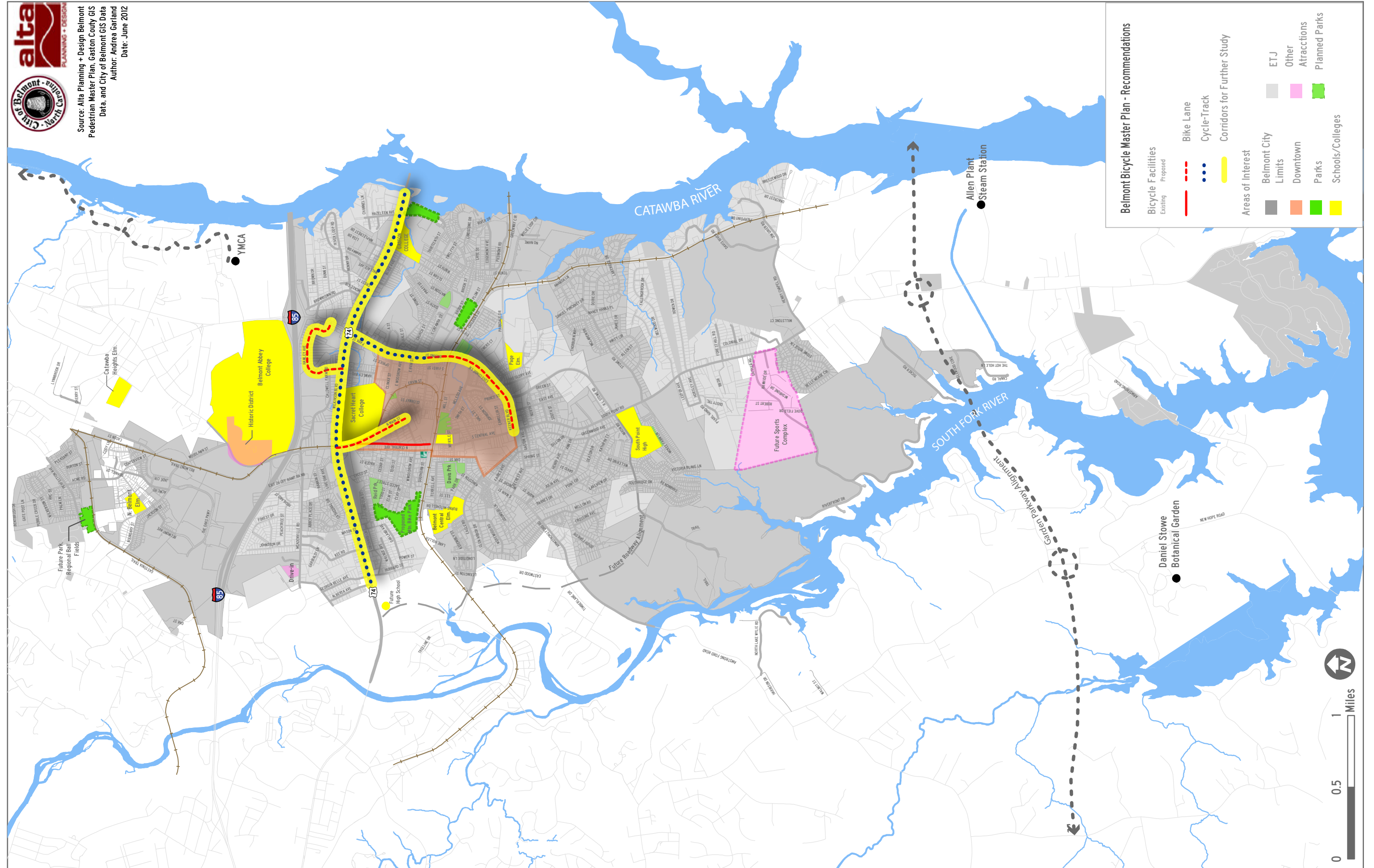
These corridors provide connections to many primary local and regional destinations and provide critical north-south and east-west connectivity. These corridors were also named as priority locations for bicycling improvements by participants in the public input process of this plan. The traffic studies will examine the feasibility of actions such as removing a center turn lane (Hawley Avenue), removing outside travel lanes (Highway 74), or exchanging outside travel lanes for a center turn lane (Keener Boulevard). In the event that lane reconfiguration along the existing roadway corridor is deemed infeasible, bicycling improvements along these important corridors must still be addressed. The alternative solutions will involve higher-cost (and longer-term) construction strategies to add pavement width for on-street facilities.

Highway 74 (Andrew Jackson Highway/Wilkinson Boulevard) is of particular importance due to its relatively high-volume traffic, high speeds, concentrations of commercial, office, and institutional destinations, and regional connectivity. The City has already begun a planning and design

¹ Federal Highway Administration: *Safety Effects of Marked vs Unmarked Crosswalks at Uncontrolled Locations*.



Figure 3-3. Corridors recommended for further study



Source: Alta Planning + Design Belmont Pedestrian Master Plan, Gaston County GIS Data, and City of Belmont GIS Data
 Author: Andrea Garland
 Date: June 2012

effort for the corridor. This Plan recommends that the study examine the impact of removing the outside travel lane in each direction on the entire length of the corridor. With removal of the outside lanes, the City could install a buffered bicycle lane or cycle track facility within the existing pavement width. Inclusion of a buffered bicycle lane or cycle track would provide a short-term opportunity for improving bicyclist access, while the longer-term process of establishing multi-use paths on both sides of the highway as development occurs is underway.

Figures Figure 3-4 and Figure 3-5 depict the potential opportunity to include a cycle track on Highway 74 with 'before' and 'after' images.

Figure 3-4. Highway 74 current conditions



Figure 3-5. Potential opportunity to include one-way cycle tracks on each side of Highway 74.



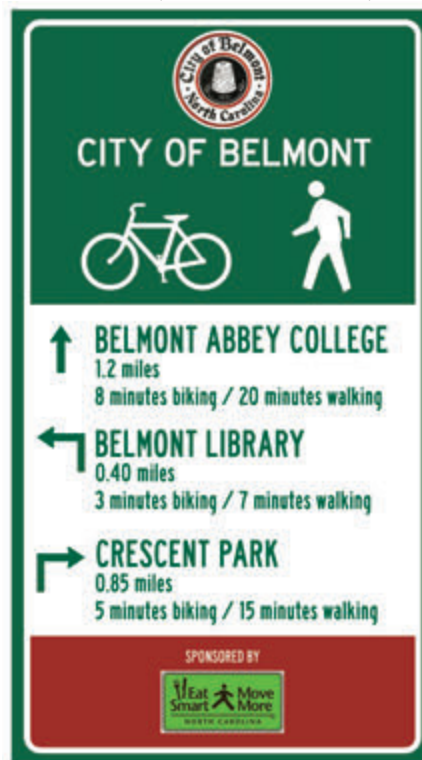
3.3.9 Wayfinding Signage

Wayfinding signs direct bicyclists along the bicycle network and to community destinations. These signs may also include “distance to” information, which displays mileage and/or travel time to community destinations. This Plan recommends installation of custom City of Belmont wayfinding signs at decision points and confirmation signs that display destinations and mileage.

- **Decision signs** (Figure 3-6) mark the junction of two or more bike-ways. Decision signs are comprised of a Bicycle Route Guide Sign and a Destination Supplemental Sign. Decision signs are located on the near-side of intersections. They include destinations and their associated directional arrows, but not distances.
- **Confirmation signs** confirm that a cyclist is on a designated bike-way. Confirmation signs are located mid-block or on the far-side of intersections. Confirmation signs may include destinations and their associated distances, but not directional arrows.

Wayfinding signs may follow MUTCD standards, which use additional plaques that display destinations and mileage. The City would mount these plaques under existing bike route and lane signs. Alternatively, the City may decide to design guide signs that exhibit a unique symbol of Belmont. Signage on NCDOT roads must adhere to MUTCD and AASHTO standards. Further guidance for development and implementation of wayfinding signage is provided in Chapter 6: Design Guidelines.

Figure 3-6. Customized City of Belmont route wayfinding signage



3.3.10 Bicycle Parking

Beyond the bicycle network, increasing bicycle parking is an area-wide priority. Bicycle parking should be expanded as the bikeway network is expanded. This Plan recommends three priority action steps to achieve this and to ensure a wide network of bicycling parking locations that will serve the broad population of bicyclists.

- Adopt local policies to ensure long-term investment in bicycle parking throughout the region. Specific bicycle parking policies are described in Chapter 4: Program and Policy Recommendations.
- Ensure that bicycle parking is provided at all publicly owned buildings and facilities. This includes all public schools, civic buildings (such as libraries), government offices, recreation facilities, and others.
- Partner with local landowners to prioritize bicycle parking at destinations for bicyclists, such as those cited in the public outreach process.

Figure 3-7. In Belmont, bicycle parking should be expanded as the bikeway network is expanded.





PROGRAMS & POLICIES

CHAPTER OUTLINE:

- 4.1 OVERVIEW
- 4.2 RECOMMENDED PROGRAMS
- 4.3 ENCOURAGEMENT
- 4.4 EDUCATION AND ENFORCEMENT
- 4.5 EVALUATION
- 4.6 RECOMMENDED POLICIES

4.1 OVERVIEW

Of the Five Es of bicycle planning, four are related to programs: encouragement, education, enforcement and evaluation. Bicycle-related policies affect all Five Es and serve as evaluation and planning tools for institutionalizing the principals of bicycle friendliness. Programs will complement engineering improvements such as bike lanes, routes, and greenways by giving Belmont residents the tools they need to safely and confidently use the bikeway network.

All of the Five Es work together to enhance the bicycling experience in Greenville. The following section presents recommended programs and policies to support the vision and goals of this Plan. The recommendations can be undertaken by local or regional agencies and community organizations, in addition to the City of Belmont.

Program concepts were developed by the technical team and were based on:

- knowledge about existing programs in the city, region, and state;
- the Vision and Goals of this Plan;
- stated community needs and concerns (as communicated through stakeholder interviews, the citizen comment form, public meetings, and the Project Steering Committee);
- and the consultant team's knowledge about national model programs and best practices.

Additionally, this memorandum is intended to assist the City in their efforts to reach the status of a nationally designated Bicycle-Friendly Community. For each program, we have provided information about the program purpose, a description of the basic approach and, wherever possible, links to model programs and useful resources.

4.2 RECOMMENDED PROGRAMS

The City of Belmont and its partners, including NCDOT and local, region-



al, and state organizations identified in Chapter 2 of this Plan, will work collaboratively to develop the following programs.

4.3 ENCOURAGEMENT

4.3.1 Bike Month Activities

Cities and towns across the country participate in National Bike Month annually, during May. The League of American Bicyclists (LAB) hosts a website for event organizers. The website contains information on nationwide and local events, an organizing handbook, and promotional materials. The kick-off meeting of this Plan was held in May 2012 as an inaugural Bike Month event for Belmont and plans for Bike Month 2013 in Belmont are already underway. Belmont currently will host a criterium in downtown and family bike rides as part of Bike Month 2013. These events are well-suited for the Belmont community and are recommended strategies for encouragement

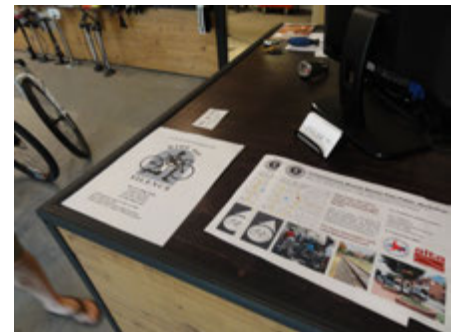
It is recommended that the City of Belmont host National Bike Month events and activities annually, with the support of local bicycling groups and shops. Events and activities for Bike Month may change from year to year, and the total number of activities should increase each year as the bicycling community in Belmont grows. Additional Bike Month activities may include:

- Bike to Work Day events: morning-commute energizer stations with food, encouragement, information, and sponsored goodies for participants; rally or celebration with raffles, food, and vendors.
- A group ride with the mayor.
- Discounts at local businesses for bicycle commuters.
- Short, themed community bicycle rides (six miles or less), such as a park tour, restaurant tour, or steeple chase (church tour).
- Participation in the national Ride of Silence bike ride to bring awareness to cyclist safety
- Mountain biking skills clinic.
- Celebrating the opening of, or hosting an event at, the new mountain bike park in west Belmont.
- Adult Bicycle Commuter Course or Youth Bike Rodeo taught by nationally certified League Cycling Instructors

Program Resources:

- National Bike Month: <http://www.bikeleague.org/programs/bike-month/>

Figure 4.1. The kick-off meeting of this Plan was held in May 2012 as an inaugural Bike Month event for Belmont.



- Greenville, SC Bike Month events: <http://www.greenvillesc.gov/ParksRec/trails/bikemonth.aspx>
- Atlanta, GA Bike Month events: <http://www.atlantabike.org/May>

4.3.2 Competitive Cycling Event

Belmont currently has plans to host a criterium in downtown as part of Bike Month 2013. The criterium will be one race within a series of races across the Southeast known as USA Crits SpeedWeek. The criterium has significant political and community support and is a recommended strategy for encouraging bicycling in Belmont. As a Bike Month activity, criteriums, in particular, can generate substantial media attention and sponsorship funding. Belmont should capitalize on that attention by promoting other Bike Month events and activities along with the criterium. Additionally, incorporating activities for non-competitive cyclists (of all ages) into the criterium will serve as a tool for promoting bicycling as a fun, daily activity for Belmont residents, rather than focusing exclusively on the fast-paced, racing side of cycling. Examples of non-competitive activities include:

- Half-time biking activity on the race course, such as a teen or adult “slow-bike” race or a children’s race
- Youth bicycle safety rodeo occurring before and/or during the races at a nearby, visible location
- An adult bicycle giveaway and/or child helmet giveaway
- A bicycle “expo” hosted by the local bicycle shop
- Free bicycle “tune-ups” by volunteers bicycle mechanics or the local bicycle shop
- Bicycle valet (supervised bicycle parking) provided at the event
- Organized (leisurely) bicycle rides to the event from various neighborhoods or meeting spots

Program resources:

- Spartanburg Regional Classic - <http://www.biketownspartanburg.org/>
- Bike Bakersfield Downtown Criterium - <http://www.bikebakersfield.org/images/flyers/critflyer.pdf>
- Cigar City Brewing Criterium & Street Festival - <http://tampacrit.com/>
- Slow Bicycle Race “Rules” - <http://www.slowbicyclerovement.org/2009/06/slow-bicycle-race-rules-apparently.html>



4.3.3 Safe Routes to School Committee

As referenced earlier, most Belmont schools already participate in a Safe Routes to School Program. Page Primary School, Belmont Central Elementary School, and Belmont Middle School completed Safe Routes to School action plans. A major next step in developing a communitywide approach to this program is to establish a Safe Routes to School Advisory Committee. The committee will serve as a collaborative group representing multiple schools and neighborhoods and focused on leveraging volunteer time and resources. It will be a joint City/school district committee that includes appointed parents, teachers, student representatives, administrators, police, active bicyclists, and engineering department staff. The group can set benchmarks for tracking progress of implementation of the action plans and measure trends in walking and bicycling to school through tools such as bicycle and pedestrian counts or student and parent surveys. The committee will focus on encouraging bicycling and walking to school, but will also contribute towards the other “Es” of engineering, education, enforcement, and evaluation.

Coordinating with the regional NCDOT Safe Routes to School Coordinator will leverage resources useful in developing plans for implementation of this program. Contacts for the City of Belmont include: Ed Johnson, NCDOT Safe Routes to School Coordinator, 919-707-2604 erjohnson2@ncdot.gov and Terry Lansdell, State Advocacy Organizer for Safe Routes to School National Partnership, 704-332-1796, terry@saferoutespartnership.org

Program Resources:

- National Safe Routes to School Partnership: <http://www.saferoutespartnership.org/>
- National Center for Safe Routes to School: <http://www.saferoutesinfo.org/>
- SC Safe Routes to School Resource Center: <http://scsaferoutes.org/>
- Sample Safe Routes to School Encouragement Program (SC): <http://active-living.org/Walking--Wheeling-Wednesday.html>
- Sample Safe Routes to School Travel Plan (GA): <http://www.saferoutesga.org/content/completed-travel-plans>

4.3.4 Open Street Events

Open street events have many names: Sunday Parkways, Ciclovias, Summer Streets, and Sunday Streets. The events are periodic street “openings” (i.e., “open” to users besides just cars; usually on Sundays) that cre-

Figure 4.2. Most Belmont schools already participate in a Safe Routes to School program.



ate a temporary park that is open to the public for walking, bicycling, dancing, hula hooping, roller-skating, etc. They have been very successful internationally and are rapidly becoming popular in the United States. Open street events promote health by creating a safe and attractive space for physical activity and social contact, and are cost-effective compared to the cost of building new parks for the same purpose. Events can be weekly events or one-time occasions, and are generally very popular and well attended.

This Plan recommends that the City of Belmont and local partner groups such as Safe Kids Gaston County and Gaston County Cyclists and Gaston County Road Runners, consider hosting open street events annually. The City may choose a two-block section of street, with the intention of growing the spatial coverage of the event over time.

Program Resources:

- Atlanta Streets Alive: <http://www.atlantabike.org/atlantastreet-salive>
- Vancouver LiveStreets: <http://www.livestreets.ca/>
- San Francisco Sunday Streets: <http://sundaystreetsf.com/>
- Oakland's Oaklavia <http://oaklavia.org/media>
- Portland Sunday Parkways: <http://portlandsundayparkways.org/>

4.2.5 Positive Media Campaign

The term “cyclist” can generate negative stereotypes among members of the public who do not bicycle or do not know someone who does. A media campaign that shows a wide range of ordinary residents using their bicycles for a variety of purposes will help break down those stereotypes and raise awareness of bicycling and geniality towards people who ride bicycles. One excellent example is the “I Ride” campaign from the Community Cycling Center in Portland, Oregon. They have created well-photographed posters showing people in a wide variety of ages, races, body types, and with a wide variety of bicycle types, and each person has been invited to complete the sentence “I ride _____.” The images are being distributed as bus stop and bus bench ads, as well as online.

In the City of Belmont, the “I ride” slogan may be considered, or another equally humanizing slogan could be created. Donated media placement should be sought for print media and other public installations (such as benches, billboards, or other locations). A good photographer should be engaged and a well-known community member or local business owner could be invited to be one of the first faces of a media campaign. Other people may be invited to participate because they demonstrate that



women, families, or older residents ride bicycles in the community.

Program Resource:

- Portland “I Ride” Campaign - <http://www.communitycyclingcenter.org/index.php/introducing-the-i-ride-bicycling-campaign/>

9.2.6. Bicycling Route Maps & Guides

One of the most effective ways of encouraging people to bicycle is through the use of maps and guides that show enjoyable routes and destinations for bicycling. One or more maps should be developed for the City of Belmont to show the location of existing safe and enjoyable biking routes. Maps should be posted online (in print-ready format) and printed in bulk as needed. The City of Belmont should actively distribute the material to residents and visitors and promote the online version, as well. The information should also be updated on a regular basis as new facilities are implemented (every five years or less for the printed version; every six months or less for the online version). The map should highlight destinations and amenities such as Belmont Abbey College, parks, and community centers. A nominal fee for restaurants, shops, and other commercial destinations to be included on the map can assist in covering program costs.

The proposed network of Bicycle Boulevards/Neighborhood Bicycle Routes provided in this Plan offers a blueprint for developing a map of preferred, family-friendly bicycling routes. The City of Belmont can follow the model provided by the existing Eat Smart Move More NC Walking Routes, which are signed throughout the downtown area. Local recreational cyclists and Safe Routes to School participants may be able to assist as volunteers for mapping the bicycling routes. The Montcross Area Chamber of Commerce and other visitor programs should assist in promoting the routes.

Program Resources:

- Charleston (SC) Route Book: <http://coastalcyclists.org/maps/routebooksample.pdf> (sample route)
- Spartanburg (SC) Walking and Biking Route Maps: <http://www.active-living.org/Maps.html>

Figure 4.3. This Plan recommends that the City of Belmont establish a variety of outreach strategies for educating motorists and bicyclists about safely sharing the road.



4.4 EDUCATION AND ENFORCEMENT

4.4.1.1 Campaign for Rights and Responsibilities of Motorists and Bicyclists

A joint educational campaign targeting both motorists and bicyclists creates a shared sense of responsibility among both roadway users, rather than singling out one user group. A joint campaign focuses on the rights and responsibilities of both bicyclists and motorists in sharing the road. Information may include important bicycle laws, bulleted tips for safe bicycle travel, helmet safety information, keys to safe motor vehicle operation around bicyclists, and general facility rules and regulations.

Educational materials are often available for download from national bicycle advocacy organizations, such as the Pedestrian and Bicycle Information Center website, www.pedbikeinfo.org. Several examples of safety materials have already been developed for motorists as well. An example of a motorist guide is the Triangle Motorist Guide to Bicycle Safety Brochure which is available for download on the CAMPO website: http://www.camponc.us/BPSG/BPSG_Home.htm. The North Carolina Driver's Handbook has an entire section devoted to bicycles, bicyclists' rights and responsibilities, and how motorists should behave.

This Plan recommends that the City of Belmont establish a variety of outreach strategies for educating motorists and bicyclists about safely sharing the road. Campaign activities can include informational brown-bag lunches and distributing materials at local events, such as the Garibaldi Fest during National Bike Month (May). Other forms of outreach such as print advertisements, billboards, postcards, 'earned' media, and PSAs should be employed for the campaign to reach a broad audience.

Program Resource:

- See Share Be Aware (Wilmington NC) - <http://www.seeshare-beaware.com/>
- StreetSmart (Washington DC) - <http://www.mwcog.org/streetsmart/about.asp>

4.4.1.2 Youth Bicycle Safety Education Classes

Typical school-based bicycle education programs educate students about the rules of the road, proper use of bicycle equipment, biking skills, street crossing skills, and the benefits of biking. Education programs can be part of a Safe Routes to School program and should be an objective of the Safe Routes to School Committee (see above). Youth Bicycle Rodeos held during Bike Month (see above) will complement the annual youth bicycle safety education classes held as part of the Safe



Routes to School program.

Program Resource:

- League of American Bicyclists - <http://www.bikeleague.org/programs/education/courses.php#kids1>
- Bicycle Transportation Alliance – Portland, OR: <http://www.bta4bikes.org/resources/educational.php>

4.4.1.3 Family Biking Classes

As a complement to the family-oriented bicycle ride that Belmont is organizing for May of 2013, this Plan recommends hosting events and activities focused on bicycling education for families. Family Biking Classes are great tools for educating and encouraging families to ride bicycles. The activities provide an avenue for families to understand the differences between bicycling ability levels based on age, learn opportunities for families to safety bike together, and provide parents with the tools they need to build bicycling confidence in their children and to serve as role models for bicycle safety and handling. Education trainings and encouragement events can include:

- “Freedom from Training Wheels” course
- Classes on how to carry children by bicycle
- Safety checks and instruction
- Basic bike maintenance classes
- Bicycle rodeos
- Bicycle parades around parks and schools

A family cycling class is organized through the Community Cycling Center in Portland, Oregon. They teach urban riding and bicycle maintenance over five weekly sessions. They work with families to help them achieve the goals of improving fitness, reducing pollution, and having more fun.

The San Francisco Bike Coalition organizes a “Freedom From Training Wheels” event. Families meet at a park and attempt to teach their children to ride their bicycles without training wheels. The fun and encouraging atmosphere helps bring confidence to children learning to ride on two wheels.

Program Resources:

- Mayor’s Family Bike Day (Baton Rouge, LA) - <http://brgov.com/dept/mayor/bikeday.htm>



- Family Bicycling Series (Minneapolis, MN) - <http://www.ci.minneapolis.mn.us/bicycles/WCMS1P-088472>
- San Francisco Bike Coalition (San Francisco, CA) - <http://www.sfbike.org/?familybiking>

4.4.2 Police Training Program

Police training courses provide police officers with safety education related to the rights and responsibilities of bicyclists, pedestrians, and motorists. The training will explain such matters as: common errors in reporting a bicycle collision; laws related to a motorist passing a bicyclist; etc. This Plan recommends that the City of Belmont contact BikeLaw.com to determine if any upcoming police trainings are scheduled within the state. Identify available trainers within the region (BikeLaw.com staff, League Cycling Instructors, or others) who could lead a police training course. Engage local police agencies in the task of determining training agenda, schedule, and trainers.

Program Resource:

- Bike Law: <http://www.bikelaw.com/>

4.5 EVALUATION

4.5.1 Bicycle Staff Position

The City of Belmont should designate a staff member to “wear the hat” of local bicycle coordinator. While at this point in time the bicycle coordinator position does not need to be a full-time dedicated staff position, this Plan recommends that the City assign an existing staff member to now dedicate some specified level of time (10-15%) to bicycle issues. The tasks of this staff member would include coordination with NCDOT and regional transportation planners at the Gaston UAMPO regarding infrastructure improvements for bicyclists. This staff member would also serve as liaison to the permanent bicycle advisory committee (see below) and to community members and organizations assisting in the development of a more bicycle friendly community.

4.5.2 Permanent Bicycle Advisory Committee

Many cities have an official Bicycle Advisory Committee made of citizen volunteers, appointed by City Council, to advise the city on bicycling issues. An advisory committee establishes the area’s commitment to making bicycling and walking safer and more desirable, and has the potential to assist Belmont in getting funding for bicycle projects. Establishing a committee is also desirable for pursuing a Bicycle Friendly Community designation for the city.



The Bicycle Advisory Committee (BAC) should be composed of no more than 15 representatives, and no less than five. Representative bicycling stakeholder groups can include: road bicyclists, greenway cyclists, and mountain bicyclists. The Project Steering Committee already established for the purposes of this Plan provides an existing group of knowledgeable and interested stakeholders who could serve on a permanent Bicycle Advisory Committee.

The charges of the BAC should include some or all of the following:

- Review and provide citizen input on capital project planning and design as it affects bicycling (e.g., corridor plans, street improvement projects, signing or signal projects, and parking facilities)
- Review and comment on changes to zoning, development code, comprehensive plans, and other long-term planning and policy documents
- Participate in the development, implementation, and evaluation of updates to the Bicycle Master Plan and bikeway facility standards
- Provide a formal liaison between local government, staff, and the public
- Develop and monitor goals and indices related to bicycling in the jurisdiction
- Promote bicycling, including bicycle safety and education

Because BAC members are volunteers, it is essential to have strong staffing supporting the committee in order for it to be successful. An agency staff person should be formally assigned to the BAC and should take charge of managing the application process, managing agendas and minutes, scheduling meetings, bringing agency issues to the BAC, and reporting back to the agency and governing body about the BAC's recommendations and findings. As stated, the committee should be appointed by City Council and officially chartered as a commission of the council. The City of Beaver Creek, Ohio provides a useful example of a successful council-appointed BAC (<http://ci.beavercreek.oh.us/boards-commissions/bikeway-advisory/>).



4.6 RECOMENDED POLICIES

Policy recommendations of the Belmont Bicycle Master Plan are based on a review and assessment of existing codes, ordinances, and land use regulations for the City of Belmont (see Chapter 2: Existing Conditions). The full review of planning and policy documents is provided in Appendix A.

While many elements of the City of Belmont’s policies are supportive of bicycle and pedestrian friendly development, it is evident that the City could significantly strengthen several areas of policy regarding complete streets, bicycle parking standards, and general references to bicyclist conduct and safety. The following provides recommended “next steps” for improving the bicycle- friendliness of local policies.

4.6.1 Complete Streets Policy

A Complete Street is a roadway that, in addition to general purpose vehicular travel lanes, includes items such as sidewalks, bike lanes or shoulders, bus lanes, transit stops, crosswalks, median refuges, curb bulbouts, appropriate landscaping, and other features that add to the usability and livability of the street as determined by context. By the end of 2011, legislation on the subject had been passed in 25 states, including North Carolina, and 300 other jurisdictions throughout the country, and the list continues to grow.

This Plan recommends that the City of Belmont adopt a Complete Streets Policy. Reviewing and revising current design guidelines to effectively implement Complete Streets is also a critical step. In addition to adopting an overarching Complete Streets Policy, the City of Belmont should also adopt the street design guidelines provided in Chapter 6 of this Plan.

According to the National Complete Streets Coalition (www.completestreets.org), an ideal Policy should include the following elements:

- Includes a vision for how and why the community wants to complete its streets
- Specifies that ‘all users’ includes pedestrians, bicyclists and transit passengers of all ages and abilities, as well as trucks, buses and automobiles.
- Applies to both new and retrofit projects, including design, planning, maintenance, and operations, for the entire right of way.
- Makes any exceptions specific and sets a clear procedure that requires high-level approval of exceptions.
- Encourages street connectivity and aims to create a comprehensive, integrated, connected network for all modes.

Figure 4.4. A lack of bicycle parking standards generally results in bicycle parking that is limited in its functionality, difficult to find, impractical to use, or lacking in other ways.



- Is adoptable by all agencies to cover all roads.
- Directs the use of the latest and best design criteria and guidelines while recognizing the need for flexibility in balancing user needs.
- Directs that complete streets solutions will complement the context of the community.

The City can use the resources associated with the National Complete Streets Coalition (they have sample policies from around the country to draw upon) to develop and tailor a Policy consistent with the community's context and goals. The Policy itself need not be cumbersome in its language; however, the real "teeth" associated with the Policy is the subsequent development of design guidelines such as typical cross sections that can be applied in varied contexts throughout each of the member jurisdictions, as articulated in the next recommendation.

Policy Resource: <http://www.completestreets.org/changing-policy/policy-elements/>

4.6.2 Update Bicycle Parking Ordinance

At present, bicycle parking within the City of Belmont is extremely limited. While the City does have a codified bicycle parking requirement (City of Belmont Land Development Code 9.2(5)), the code exempts the downtown district from complying with the bicycle parking requirements and does not include bicycle parking standards.

This Plan recommends revising the existing bicycle parking requirements to include specific guidance for downtown businesses and bicycle parking standards. When new construction occurs or when a new business occupies an existing space or a major renovation to an existing space occurs, a downtown business could be required to provide bicycle parking spaces based on either the building square footage or building occupancy.

The City should also adopt the bicycle parking standards included in Chapter 6: Design Guidelines of this Plan as required standards for installations of bicycle parking. A lack of bicycle parking standards generally results in bicycle parking that is limited in its functionality, difficult to find, impractical to use, or lacking in other ways. Ensuring best practices in the provision of bicycle parking will enable more trips to be made by bicycle.

Policy Resource: http://c.ymcdn.com/sites/www.apbp.org/resource/resmgr/publications/bicycle_parking_guidelines.pdf



4.6.3 Update Bicycle Operation Ordinances

The local ordinances in Belmont relating to operation of a bicycle are outdated. The City should update its laws related to bicycling to improve conditions for bicycling in Belmont. As the laws are updated, law enforcement personnel should be trained to enforce the new provisions as part of the Police Training Program recommended in this chapter. The updated ordinance could include provisions such as:

- Specifying that bicyclists may “share the road” (riding in the right-most lane of the cyclists’ direction of travel)
- Specifying that bicyclists may “take the lane” (when conditions warrant)
- Specifying that bicyclists may ride two-abreast
- Requiring a three-foot minimum passing distance when motorists pass a bicyclist
- Specifying that children may bicycle on sidewalks, or permitting other circumstances for bicycling on sidewalks outside of the central business district

Any updates to the local ordinances should remain in accordance with statewide bicycle laws (see here: <http://www.ncdot.gov/bikeped/lawspolicies/>).

Policy Resources:

- Sioux Falls SD Bicycle Ordinance Update: <http://www.siouxfalls.org/planning-building/planning/transportation/highlights/bicycle-planning/on-st-bike-ord-updates.aspx>
- Fort Wayne IN Bicycle Ordinance Update: <http://www.cityoffortwayne.org/latest-news/2289-proposed-changes-make-city-even-more-bike-friendly.html>
- Memphis TN Bicycle Ordinance Update: http://www.cityofmemphis.org/pdf_forms/ordinances/5352_operationofbicycles.pdf

4.6.4 Establish Driveway Access Management Guidelines

Driveway Access Management involves the management and reduction of the size and number of necessary driveway entrances. This practice creates a safer bicycling and walking environment by reducing crossings (or conflict points), improving the predictability of motorist movements, and ensuring a continuous pedestrian zone. Planning policy should discourage excessively wide or frequent driveways, while incentivizing shared parking with consolidated driveways.

This Plan recommends that the City of Belmont consider repositioning driveways that unnecessarily impair bicyclist safety and accessibility. A



high frequency of driveways and parking lot curb-cuts present repeated hazards to cyclists as the automobile crosses the cyclists' path of travel. Additionally, unnecessarily long or wide curb-cuts result in an undefined pedestrian space and a lack of visual clues for motorists as to the potential presence of pedestrians.

In the near-term, the City of Belmont should work with property owners and NCDOT to improve existing driveway closures. The NC DOT Policy on Street and Driveway Access to North Carolina Highways Manual states that "adjacent property owners are encouraged to construct a shared driveway by written mutual agreement to serve both properties. Joint Access provides improved internal circulation and parking capabilities, as well as reduces conflict."¹

For long-term impact, the City should provide design standards for parking lots, curb cuts, and driveways that are pedestrian and bicycle orientated. As one example, the City of Davis, CA, set forth driveway requirements across sidewalks with the specific aim of improving walking conditions and safety. The requirements include maximum width (12 feet), location (not within four feet of any crosswalk), number per parcel of land (one, with some exceptions), and minimum distance between driveways on one property (24 feet)². Neighboring Charlotte, NC addressed driveway access management within its Urban Street Design Guidelines.

Policy Resources:

- Transportation Research Board Access Management Committee: <http://www.accessmanagement.info/resources.html>
- Charlotte NC Urban Street Design Guidelines (Chapter 4: Segments): <http://charmec.org/city/charlotte/transportation/plansprojects/pages/urban%20street%20design%20guidelines.aspx>

¹ NCDOT. (July 2003). Policy on Street and Driveway Access to North Carolina Highways, p 40.

² Davis, Calif., Municipal Code § 35.05.0. Available at: <http://cityofdavis.org/cmo/city-code/printsection.cfm?chapter=35§ion=05>.





CHAPTER OUTLINE:

5.1 INTRODUCTION

5.2 PRIORITIES

5.3 IMPLEMENTATION AGENCIES AND GROUPS

5.4 PERFORMANCE MEASURES (EVALUATION AND MONITORING)

5.5 BICYCLE FACILITY DEVELOPMENT METHODS

5.1 INTRODUCTION

Implementing the recommendations of this Plan is essential to improving Belmont's bicycle friendliness in both the short- and long-term. Together, infrastructure and non-infrastructure recommendations address all of the five E's of bicycle planning (Engineering, Education, Encouragement, Enforcement, and Evaluation) and are equally crucial to realizing the vision of this Plan. This chapter outlines action steps for developing the bicycle network and implementing bicycle policies and programs including implementation priorities, staffing partners in implementation, facility development methods, project prioritization, and a programmatic timeline.

5.2 PRIORITIES

5.2.1 Adopt this Plan

Through adoption, this Plan becomes an official planning document of the City. Adoption shows that the City of Belmont has undergone a successful, supported planning process. The City can then use this document to apply implementation funding through NCDOT and other sources. The City staff, elected and appointed officials should be made aware of this Plan and support bicycle-related projects and policies. Finally, this Plan's recommendations should be integrated into existing and future City of Belmont policy and planning documents.

5.2.2 Begin Building Projects

Project Steering Committee input, public input, existing plans, connectivity, and other factors were used to develop the recommended bicycle network (see Chapter 3). These projects should be implemented using a combination of grants, local funding, private and non-profit sector support and state funding, and should be constructed in coordination with local development and state transportation projects (see Funding Appendix C and refer to section 5.5 Bicycle Facility Development Methods).



5.2.3 Improve and Enforce Bicycle-Related Regulations

Regulations and development standards should be enforced to ensure that future development provides for bicycle facilities in approved development plans. Bicycle policy recommendations are provided in Chapter 4 of this Plan. For state roadways (which comprise much of Belmont's recommended bicycle network) see the "Complete Streets" policy that was adopted by NCDOT in 2009 and Complete Street Guidelines that were developed by NCDOT in 2012.. The policy directs the Department to consider and incorporate all modes of transportation when building new projects or making improvements to existing infrastructure. Under the policy, the Department will collaborate with cities, towns and communities during the planning and design phases of projects. Together, they will decide how to provide the transportation options needed to serve the community and complement the context of the area. More information about the Complete Streets Policy, as well as other state and federal policies that are applicable to implementation of Belmont's bicycle network, is included below:

- Complete Streets Policy – <http://www.completestreetsnc.org/> and http://www.bytrain.org/fra/general/ncdot_streets_policy.pdf
- NCDOT Bicycle Policy Guidelines http://www.ncdot.gov/bikeped/download/bikeped_laws_Bicycle_Policy.pdf
- NCDOT Greenway Policy http://www.ncdot.gov/_templates/download/external.html?pdf=http%3A//www.ncdot.gov/bikeped/download/bikeped_laws_Greenway_Admin_Action.pdf
- NCDOT Board of Transportation Resolution for Bicycling and Walking - http://www.ncdot.gov/bikeped/download/bikeped_laws_BOT_Mainstreaming_Resolution.pdf
- TND Guidelines - <http://ntl.bts.gov/lib/22000/22600/22616/tnd.pdf>
- Bridge Policy – <https://connect.ncdot.gov/projects/Roadway/RoadwayDesignAdministrativeDocuments/Bridge%20Policy.pdf>
- United States Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations (March 2010) - http://www.fhwa.dot.gov/environment/bikeped/policy_accom.htm
- FHWA Policy for Mainstreaming Nonmotorized Transportation (FHWA Guidance – Bicycling and Pedestrian Provision of Federal Transportation Legislation) - <http://www.fhwa.dot.gov/environment/bikeped/bp-guid.htm>



5.2.4 Take Advantage Of All Opportunities

Some of the most cost-effective opportunities to provide bicycle facilities are routine roadway construction, reconstruction, and repaving projects. A new commercial development or a roadway widening project, for instance, would provide an opportunity to add shoulder width or paint shared lane markings as part of an existing effort, potentially saving costs. One role of the Permanent Bicycle Advisory Committee and the designated Bicycle Staff Position recommended in Chapter 4 is to stay aware of upcoming roadway construction, reconstruction, and repaving projects and commercial development projects and identify opportunities for bicycle facility development. This requires ongoing communication with NCDOT and local developers.

5.2.5 Seek Multiple Funding Sources And Facility Development Options

Multiple approaches should be taken to support bicycle facility development and programming. It is important to secure the funding necessary to undertake short-term projects but also to develop a long term funding strategy to allow continued development of the overall system. A variety of local, state, and federal options and sources exist and should be pursued. These funding options are described in Appendix C of this Plan. Other methods of bicycle facility development that are efficient and cost-effective are described later in this chapter.

5.2.6 Develop Bicycle Encouragement and Education Programs

It is important that implementation of bicycling programs occur in conjunction with implementation of bicycling infrastructure improvements. Belmont can consider hosting public events and media outreach in conjunction with announcements for new bikeway and trail projects. Refer to Chapter 4 of this Plan for a comprehensive list of program ideas.

5.2.7 Ensure Planning Efforts Are Integrated Regionally

Combining resources and efforts for bicycle planning and trail planning with surrounding municipalities, regional entities, and stakeholders is beneficial to all parties involved. Regional, long-distance trails often spark the most excitement, use, and tourism. The City should continue to coordinate with Gaston County and neighboring municipalities on regional bicycle route and trail initiatives, including the Carolina Thread Trail and similar efforts. It is important to remain aware of with other municipal, county, state, and NCDOT efforts to ensure the City takes advantage of funding opportunities and support.

After adoption by the City, the City should ensure that this document



is recognized and utilized by regional transportation planning agencies, such as NCDOT Division 12 and the Gaston Urban Area MPO. The plan's recommendations should be programmed into the official work schedule and planning of these organizations.

5.2.8 Become Designated as a Bicycle Friendly Community

This Bicycle Plan will help to transform Belmont into a "Bicycle Friendly Community" (BFC). As described in Chapter 2, the Bicycle Friendly Community Campaign is an awards program that recognizes municipalities that actively support bicycling. The development and implementation of this Plan is an essential first step in becoming a Bicycle Friendly Community. Having a citizen's board officially dedicated to these issues, such as the Permanent Bicycle Advisory Committee recommended in Chapter 4, also helps tremendously. Belmont should make progress in accomplishing the goals of this Plan, and then apply for BFC status.

5.3 IMPLEMENTATION AGENCIES AND GROUPS

5.3.1 City Of Belmont

The City's Planning Director, Public Works Director, Engineer, and City Manager are responsible for leading the implementation of this plan. The City will continue to spearhead initiatives to manifest tangible results based on the recommendations of this plan.

5.3.2 North Carolina Department Of Transportation

NCDOT Division 12 maintains most of the major roadways in Belmont. Recommendations for bicycle facilities on NCDOT roads will have to be carried out through a coordinated effort between the City of Belmont and NCDOT Division 12. Some technical assistance can be provided through NCDOT's Division of Bicycle and Pedestrian Transportation (the City should be proactive in seeking such assistance, and should refer NCDOT back to this plan whenever possible).

5.3.3 Police Department

The Belmont Police Department plays a vital role in bicycle safety. All local police officers should be knowledgeable about North Carolina's bicycle laws to promote positive interactions between bicyclists and motorists. Local law enforcement should be familiar with *The Guide to North Carolina Bicycle and Pedestrian Laws*, written by the NCDOT Division of Bicycle and Pedestrian Transportation. The Police Department should continue to specifically target any known areas of bicycle use and motor vehicle speeding, such as along South Point Road.



5.3.4 Volunteers

Services from volunteers, students, local non-profits, and seniors, or donations of material and equipment provided in-kind are particularly beneficial for trail development and program implementation. Such contributions may offset construction and maintenance costs of trails. Formalized maintenance agreements, such as adopt-a-trail/greenway or adopt-a-highway can be used to provide a regulated service agreement with volunteers. Other efforts and projects can be coordinated with senior class projects, scout projects, interested organizations, clubs or a neighborhood's community service to provide for many of the program ideas outlined in Chapter 4 of this Plan. Advantages of utilizing volunteers include reduced or donated planning and construction costs, community pride and personal connections to the City's trail and bikeway networks.

5.4 PERFORMANCE MEASURES (EVALUATION AND MONITORING)

The City of Belmont should establish performance measures to benchmark progress towards implementing this plan. These performance measures should be stated in an official report within two years after the Plan is adopted. Establishing, tracking, and documenting progress is a task the Permanent Bicycle Advisory Committee can lead with support from staff, particularly the Bicycle Staff Position (see Chapter 4). Performance measures could address the following aspects of bicycle transportation and recreation in Belmont:

- **Safety:** Measures of bicycle crashes and injuries or speeding in the City.
- **Facilities and Usage:** Measures of how many bicycle facilities have been funded and constructed since the Plan's adoption and the numbers of people using the facilities.
- **Maintenance:** Measures of existing bicycle facility deficiency or maintenance needs.
- **Education, Encouragement and Enforcement:** Measures of the number of people who have participated in part of a bicycle program since the Plan's adoption.

5.5 BICYCLE FACILITY DEVELOPMENT METHODS

This section describes various construction methods for the proposed bicycle facilities outlined in Chapter 3. Note that many types of transportation facility construction and maintenance projects can be used to create new bicycle facilities. It is much more cost-effective to provide bicycle facilities during roadway construction and re-construction projects than



to initiate the improvements later as “retrofit” projects.

To take advantage of upcoming opportunities and to incorporate bicycle facilities into routine transportation and utility projects, the City should keep track of NCDOT’s projects and any other local transportation improvements. While doing this, staff should be aware of the different procedures for state and local roads and interstates.

5.5.1 NCDOT Transportation Improvement Program (TIP)

The Transportation Improvement Program (TIP) is an ongoing program at NCDOT which includes a process asking localities to present their transportation needs to state government. Bicycle facility and safety needs are an important part of this process. Every other year, a series of TIP meetings are scheduled around the state. Following the conclusion of these meetings, all requests are evaluated. Bicycle transportation improvement requests, which meet project selection criteria, are then scheduled into a four-year program as part of the state’s long-term transportation program.

There are two types of projects in the TIP: incidental and independent. Incidental projects are those that can be incorporated into a scheduled roadway improvement project. Independent are those that can stand-alone such as a greenway, not related to a particular roadway.

The City of Belmont, guided by the priority projects within this Plan, should present bicycle projects along State roads to the MPO and State. Local requests for small bicycle projects, such as shared lane markings or signage, can be directed to the MPO or the local NCDOT Division 12 office. Further information, including the criteria evaluated can be found at: <http://www.ncdot.gov/bikeped/funding/process/>

5.5.2 Local Roadway Construction And Reconstruction

Bicyclists should be accommodated when a new road is constructed or an existing road is reconstructed. All new roads with moderate to heavy motor vehicle traffic (typically, above 3,000 motor vehicles per day) should have bicycle facilities and safe intersections for cyclists. The City of Belmont should take advantage of any upcoming construction projects, including roadway projects outlined in local comprehensive and transportation plans.

5.5.3 Residential And Commercial Development

Construction of bicycle facilities that corresponds with site construction is more cost-effective than retro-fitting, and should be required during development. In commercial development, emphasis should also be focused on bicycle parking and safe bicycle access into, within, and



through large parking lots and along new roadways.. This ensures the future growth of the bicycle network and the development of safe communities.

5.5.4 Retrofit Roadways With New Bicycle Facilities

It may be necessary to add new facilities before a roadway is scheduled to be reconstructed, especially on roadways that are not expected to be modified or improved in the foreseeable future. In some places, it may be relatively easy to add facilities to fill gaps, but other segments may require removing trees, relocating landscaping or fences, re-grading ditches or cut and fill sections.

Section 3.3.4 of this Plan identifies implementation strategies for developing bicycle lane and paved shoulder facilities. Retrofits identified as either a “lane reconfiguration” or “lane narrowing” utilize the existing pavement width of a roadway. A lane reconfiguration, also known as a “road diet,” involves reallocating space by removing a vehicle travel lane(s) and adding on-road bicycle facilities or side paths. These are generally recommended in situations where the motor vehicular traffic count can be safely and efficiently accommodated with a reduced number of travel lanes. Further study may be necessary to ensure that motor vehicular capacity and level-of-service needs are balanced with bicycle level of service needs.

Bicycle lanes developed through lane narrowing are generally cost-effective and require little to no construction or reconstruction of the roadway. In laying out the bicycle network facility recommendations and methods, it is assumed that travel lanes as narrow as 10 feet may be acceptable in many of Belmont’s urban roadway corridors order to fit bicycle lanes into the existing roadway environment, while also maintaining a safe vehicular environment. (See the NCDOT Complete Street Guidelines for further information on lane widths.) For example, an existing two lane cross section with 15’ lanes (Total roadway width of 30’) could be altered to 10’ lanes with 5’ bicycle lanes (Total roadway width of 30’). This methodology used in developing recommendations is supported by research in both automobile traffic safety and bicycle level of service improvements.

Current AASHTO literature, research, and precedent examples support the notion of reducing 12’ travel lanes to 10’ lanes. The 2004 AASHTO Green Book states that travel lanes between 10 and 12 feet are adequate for urban collectors and urban arterials.¹ “On interrupted- flow operating conditions at low speeds (45 mph or less) narrow lane widths are normally adequate and have some advantages.” At the 2007 TRB Annual Meeting, a research paper using advanced statistical analysis supported the AASHTO Green Book in providing flexibility for use of lane widths narrower

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



than 12 feet on urban and suburban arterials. The paper indicates there is no difference in safety on streets with lanes ranging from 10 to 12 feet. “The research found no general indication that the use of lanes narrower than 12 feet on urban and suburban arterials increases crash frequencies. This finding suggests that geometric design policies should provide substantial flexibility for use of lane widths narrower than 12 feet.” The research paper goes on to say “There are situations in which use of narrower lanes may provide benefits in traffic operations, pedestrian safety, and/or reduced interference with surrounding development, and may provide space for geometric features that enhance safety such as medians or turn lanes. The analysis results indicate narrow lanes can generally be used to obtain these benefits without compromising safety” and “Use of narrower lanes in appropriate locations can provide other benefits to users and the surrounding community including shorter pedestrian crossing distances and space for additional through lanes, auxiliary and turning lanes, bicycle lanes, buffer areas between travel lanes and sidewalks, and placement of roadside hardware.”²

Precedent examples also show the large number of communities around the United States that have narrowed travel lanes to enable the development of bicycle lanes. The Missoula Institute for Sustainable Transportation accumulated a list of these communities by asking members of the Association of Pedestrian and Bicycle Professionals. The webpage titled “Accommodating Bike Lanes in Constrained Rights-of-Way (<http://www.strans.org/travellanessurvey.htm>) lists the community, their methods, and contact information. Cities such as Arlington, VA, Cincinnati, OH, Charlotte, NC, Houston, TX, and Portland, OR have regularly narrowed travel lanes to 10’ or even commonly use them in new roadway development. Arlington, VA has been installing bicycle lanes on streets when they are repaved and have a number of streets with 10’ lanes and bicycle lanes that have been functioning well without operational issues and complaints. Cincinnati, OH uses a policy that 10 foot lanes on collections and arterials are always permitted.

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

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



5.5.5 Existing City Easements

The City may have several existing easements offering an opportunity for greenway facilities. Sewer easements are very commonly used for this purpose; offering cleared and graded corridors that easily accommodate trails. This approach avoids some of the difficulties associated with acquiring land, and it utilizes the City's existing resources.

5.5.6 Greenway Acquisition and Development

Since not all greenways can be built on existing City easements, land acquisition is an important component of greenway development. It will be necessary to work with landowners and future development projects. The rail trail being developed along an abandoned rail corridor owned by NCDOT is an example of the City of Belmont successfully negotiating easement acquisition. For more on this topic please refer to the City of Belmont's Pedestrian Transportation Plan.

5.6 PLANNING-LEVEL COST ESTIMATES

The following per-costs can be used to develop planning-level budget estimates for individual projects:

- Bicycle Boulevard/Neighborhood Bicycle Route
 - \$400/Wayfinding Signage
 - \$300/Regulatory Signage
 - \$275/Pavement Marking
 - Beyond signage and pavement markings, a bicycle boulevard may include additional features such as speed humps (\$2,000), curb ramp improvements (\$2,500), curb extensions (\$5,000), and traffic diverters (\$8,000).
 - Typical facility costs range from \$40,000 to \$114,000 per mile, depending on the additional features included.
- Shared-Lane Markings
 - \$300/Shared Lane Sign
 - \$275/Sharrow Marking
 - Typically placed after intersections and about every 250 feet between intersections.
- Bicycle Lanes
 - \$0.70/LF for single thermoplastic white lines (\$0.07/LF for painted lines)
 - \$300/Bicycle Lane Sign



- \$275/Bicycle Lane Marking
- Typically placed after major intersections and incrementally between intersections, based on engineering judgment. If roadway width needs to be added to create the bicycle lanes, add shoulder costs below.
- Paved Shoulders
 - \$75/LF for adding paved shoulders to an existing roadway
- Cycle Track
 - \$350-\$450/LF for typical cycle track created within existing roadway right-of-way
 - This cost does not include pavement resurfacing costs
- Multi-Use Path/Greenway
 - \$55/LF for typical 10-foot wide paved multi-use trails
 - Typical facilities are estimated to cost \$600,000 to \$1,000,000 per mile.

Budget estimates are based on project examples from communities in North Carolina and South Carolina within the last two years. Project specific cost estimates are included in section 5.8 of this Chapter.

5.7 PROJECT PRIORITIZATION

This section identifies the high priority projects recommended in the Plan. The Project Steering Committee identified criteria for evaluating priority projects. Priority projects are listed in the table below and described in the project cut sheets of this chapter. Criteria used to determine the priority projects are:

- Near-term feasibility, such as facilities implemented through lane narrowing within the existing pavement width or roadways slated for resurfacing
- Connections to existing trails, including the Carolina Thread Trail
- Connections to local destinations, such as downtown and parks
- Connections to regional destinations, such as Gastonia and other nearby municipalities
- Existing bicycle demand, as evidenced through the public involvement process of this Plan

In consideration of these criteria, **all recommended bicycle boulevard/neighborhood routes are priority projects of this Plan.** Bicycle boulevards are relatively easy to implement in that they use existing roads and pavement width and incur minimal associated costs. Additionally, a



bicycle boulevard network serves as an encouragement tool for spurring increased bicycling activity among cyclists of all abilities and ages. By prioritizing bicycle boulevard development as an initial step in Plan implementation, Belmont will broaden the base of public support for bicycle friendly efforts.

Several larger projects offer near-term potential for implementation and reflect community priorities. These projects are considered priorities of this Plan, as well:



The Belmont Rail-Trail is a signature project that will provide a key north-south bikeway corridor.



A bikeway along Keener Boulevard/Park Street will link multiple residential and commercial areas.

- *Belmont Rail-Trail:* The City of Belmont has undertaken planning and design work for the Belmont Rail-Trail. This signature project will provide a key north-south corridor for Belmont residents and visitors. The value of the rail-trail is magnified by the bicycle and pedestrian access it provides across Interstate 85.
- *Highway 74 (Wilkinson Boulevard):* The City of Belmont is completing a corridor study for Highway 74. This key east-west connection has regional significance while also providing links to local destinations and residential areas. Efforts to develop a continuous sidepath along Highway 74 should continue, while opportunities for providing on-street facilities through lane reconfiguration are advanced, as well.
- *Keener Boulevard/Park Street:* Keener Boulevard/Park Street links numerous residential and commercial areas of Belmont. The corridor also serves as a gateway to the city from Interstate 85. The City of Belmont should commission a corridor study of Keener Boulevard/Park Street to determine the feasibility of removing travel lanes and providing on-street bicycle facilities. At minimum, crossing improvements along the corridor are necessary to improve bicycle and pedestrian safety and access.
- *Abbey Creek Greenway:* Greenway development will encourage bicycling activity among a broad range of ages and ability levels. The proposed greenway extending east-west along Abbey Creek behind Gaston College is a priority project. The corridor follows the path of the creek behind Gaston College, running parallel to Highway 74 and ending at the planned riverfront park along the Catawba River. The trail will be a transportation and recreation corridor and ultimately provide access to the proposed greenway along the shores of the Catawba River. This project is detailed in the Belmont Pedestrian Plan.

Based on research, analysis and public input in the preparation of this Plan, the entire proposed bikeway network has evidenced merit. All remaining proposed projects not listed within this section play an important role in completing the vision of the bikeway network and should be considered mid- to long-term projects.

The priority projects are listed below and correspond to the following project cut sheets, (section 5.8).



ID	Corridor	From	To	Facility Type
1	Armstrong Ford Road	Eagle Road	City Limits West	Bicycle Lane
2	Catawba Street	N Main Street	Church Street	Bicycle Lane
	Catawba Street	Church Street	Highway 74	Bicycle Lane
3	Central Avenue	N Main Street	S Main Street	Shared Lane Marking
4	N Main Street	Highway 74	Woodrow Avenue	Bicycle Lane
	N Main Street	Woodrow Avenue	Myrtle Avenue	Shared Lane Marking
5	S Main Street	Myrtle Avenue	N Central Avenue	Bicycle lane
	S Main Street	N Central Avenue	Eagle Road	Bicycle Lane
6	South Point - Central Avenue	S Main Street	North Street	Bicycle Lane
	South Point Road	North Street	RL Stowe Road	Bicycle Lane
	South Point Road	RL Stowe Road	City Limits South	Paved Shoulder
7	Woodlawn Avenue	Belmont-Mt Holly Road	Cason Street	Bicycle Lane
	Woodlawn Avenue	Cason Street	School Street	Bicycle Lane

5.8 PROJECT CUT SHEETS

The following pages offer detailed information for bicycle facility recommendations on roadways and potential trail corridors in Belmont. The cut sheets provide City staff, NCDOT staff, and related transportation agencies with a clear picture of the near-term projects within this Plan's recommendations.



PROJECT 1: Armstrong Ford Road

Boundaries:

Eagle Road
City Limits West

Length: 2 miles

Facility Type: Bicycle Lane

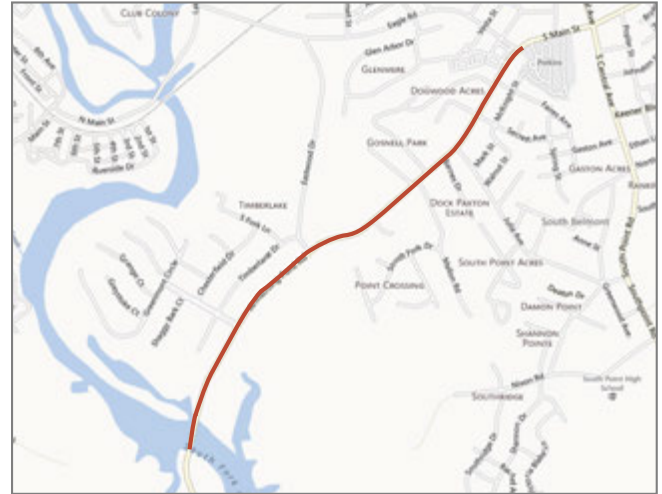
Implementation Type: Add Pavement

Cost Estimate: \$1,084,000

Implementation Strategy: Construct 4 ft wide paved shoulder on both sides of roadway, as part of road reconstruction with curb/gutter and sidewalks added.

Characteristics: Armstrong Ford Road is already a popular route for recreational cyclists, yet provides no space for bicyclists. The importance of this segment for bicycle and pedestrian access is magnified by the South Fork River. Though the river is a natural asset to Belmont, it also serves as a barrier to regional access. Providing a safe route across the South Fork River will improve regional mobility. The primary trip attractors and generators along this route include several residential subdivisions and several proposed trail alignments, including the Carolina Thread Trail.

Challenges: Some homes along Armstrong Ford Road have limited setback. Developing a bicycle facility by adding pavement incurs construction costs.



PROJECT 2: Catawba Street

Boundaries:

N Main Street
Highway 74

Length: 1.71 miles

Facility Type: Bicycle Lane

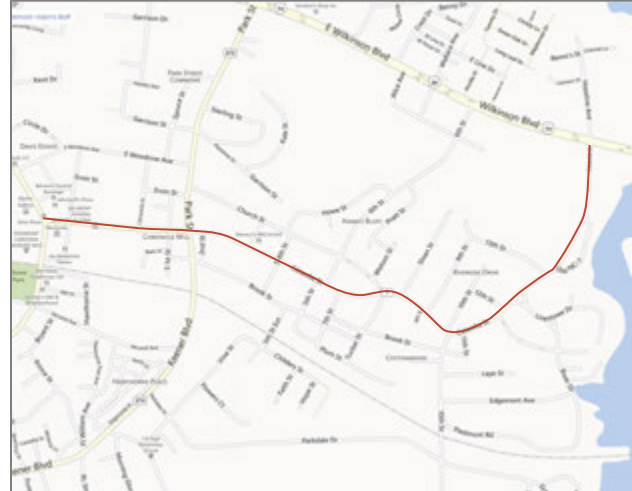
Implementation Type: Lane Narrowing/Add Pavement

Cost Estimate: \$561,000

Implementation Strategy: From N Main Street to Church Street, restripe travel lanes to 10 ft width and use shared-lane markings (rather than bike lane stripe) where parallel parking is provided. Construct 4 ft wide paved shoulder on both sides of roadway as part of road reconstruction from Church Street to Highway 74.

Characteristics: Catawba Street provides an important east-west corridor for bicycle mobility. Priority destinations along the corridor include a planned river front park, a local baseball field, Gaston College, and downtown. Numerous neighborhoods border Catawba Street or have access to Catawba through low-volume, low-speed residential roads.

Challenges: Parallel parking is available at limited spots along the western end of Catawba Street. Bike lane development will require the use of shared-lane markings where parallel parking exists or a public involvement process to identify opportunities for reallocating parking space elsewhere for the benefit of a continuous bike lane facility. Some homes along Catawba Street, east of Church Street, have limited setback. Though developing a bicycle facility by adding pavement incurs construction costs, Catawba Street is already slated for repaving, which may present cost-efficiencies in implementation.



PROJECT 3: Central Avenue

Boundaries

N Main Street

S Main Street

Length: 0.81 miles

Facility Type: Shared Lane Marking

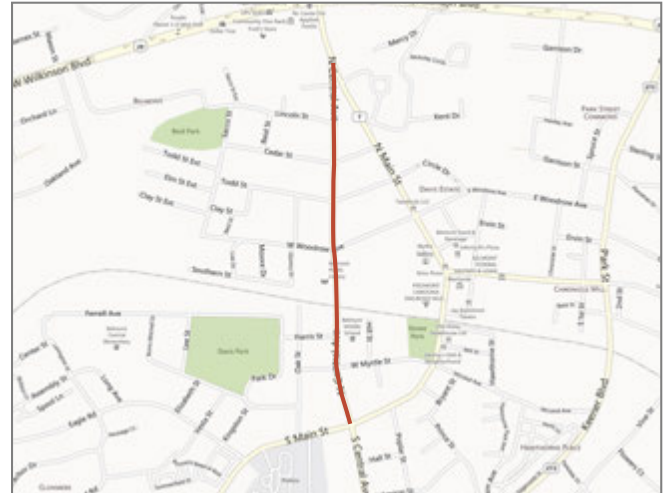
Implementation Type: Add pavement marking and signage

Cost Estimate: \$16,000

Implementation Strategy: N/a

Characteristics: Central Avenue connects several neighborhoods to one another. Bicycle and pedestrian access to Belmont Central Elementary School and to Reid Park is also provided by Central Avenue. Other routes to safely access these important destinations are limited due to the active rail line that transects Belmont's city center. Central Avenue offers an overpass at the railroad. The road has moderate traffic, which adds to the value of creating a safe, visible bikeway along this corridor.

Challenges: The road has limited right of way and limited pavement width. Combined with moderate traffic volumes and a speed limit at 35 mph or less, this situation is appropriate for the use of shared lane markings. Attention must be given to storm grates along the corridor to ensure that the shared lane markings are positioned in appropriately and direct bicyclists to travel outside of the grate.



PROJECT 4: North Main Street

Boundaries:

Highway 74

Myrtle Street

Length: 0.88

Facility Type: Bicycle Lane/Shared Lane Marking

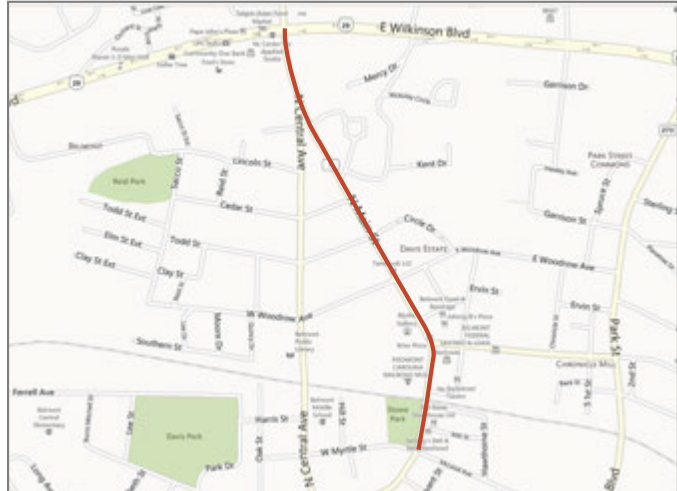
Implementation Type: Lane Narrowing

Cost Estimate: \$71,000

Implementation Strategy: Use the existing pavement width to create a striped bike lane from Highway 74 to Woodrow Avenue. South of Woodrow Avenue, add shared lane pavement markings and signage.

Characteristics: N Main Street is Belmont's signature corridor. The street serves as a gateway from Interstate 85 to downtown. This corridor is a priority project given its regional connectivity, access to neighborhoods, and priority destinations, such as restaurants, shopping, and other downtown attractions. The corridor is also within the Carolina Thread Trail alignment.

Challenges: The pavement width and lane configurations along this section of North Main Street vary. The density of development, types of land uses, and incidence of parallel parking also vary. Shared-lane markings are an appropriate application where parallel parking will remain between E. Woodrow Avenue and Myrtle Street. A lane reconfiguration (or "road diet") is required north of N. Central Avenue. Bicycle facility design innovations, such as a combined bike lane/turn lane, may be needed as part of the lane reconfiguration (see Design Guidelines, page 117).



PROJECT 5: South Main Street

Boundaries

Myrtle Street

Eagle Road

Length: 0.49

Facility Type: Bicycle lane

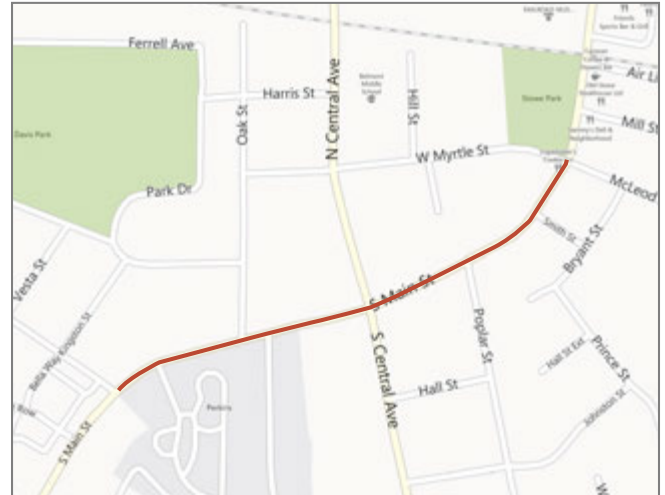
Implementation Type: Lane Narrowing/Add Pavement

Cost Estimate: \$333,000

Implementation Strategy: From Myrtle Avenue to Central Avenue, use the existing pavement width to create a striped bike lane. South of Myrtle Avenue, construct 4 ft wide paved shoulder on both sides of roadway, as part of road reconstruction with curb/gutter and sidewalks added.

Characteristics: Extending from N Main Street, S Main Street also serves as a signature corridor, connecting Belmont residents to one another and to downtown. The density of homes, institutions, and commercial destinations along this segment provide a context appropriate for a curb and gutter street with safe, comfortable bicycle lanes. This section of S Main Street is also within the alignment of the Carolina Thread Trail.

Challenges: The gutter pan is currently paved along this portion of South Main Street. Should this change, the pavement width available for a bicycle lane will be limited. In that instance, a shared-lane marking west of Central Avenue is an appropriate alternative. West of Central Avenue, some homes and businesses have limited setbacks. Developing a bicycle facility by adding pavement incurs construction costs.



PROJECT 6: South Point Road - South Central Avenue

Boundaries:

S Main Street

City Limits South

Length: 2.49

Facility Type: Bicycle Lane/Paved Shoulders

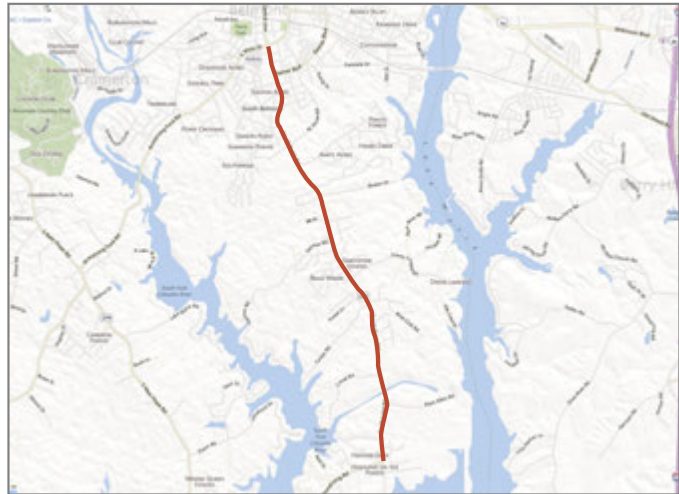
Implementation Type: Lane Narrowing/Add Pavement

Cost Estimate: \$1,152,000

Implementation Strategy: From S Main Street to North Street, use the existing pavement width to create a striped bike lane. South of North Street, construct 4 ft wide paved shoulder on both sides of roadway and add pavement markings and signage, creating a striped bicycle lane to RL Stowe Road and a paved shoulder south of RL Stowe Road.

Characteristics: South Point Road is an important north-south corridor for bicycling access. The roadway provides regional connectivity not available through alternate routes. South Point Road already evidences bicycling and pedestrian demand and was identified as a community priority through the public involvement process of this Plan.

Challenges: Developing a bicycle facility by adding pavement incurs construction costs.



PROJECT 7: Woodlawn Avenue

Boundaries

Belmont-Mt Holly Road

School Street

Length: 0.77

Facility Type: Bicycle lane

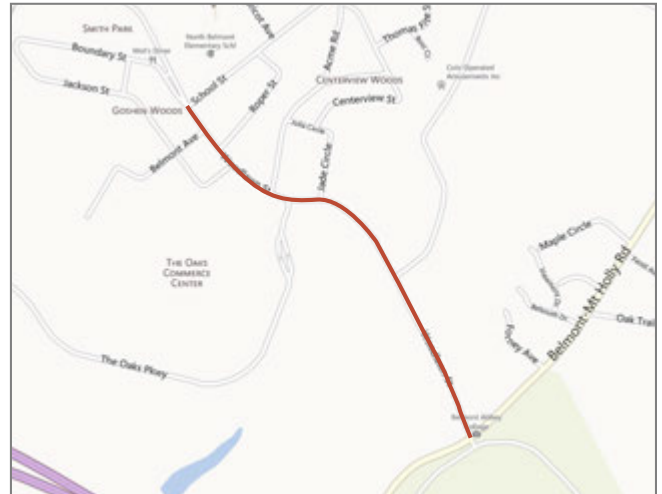
Implementation Type: Lane Narrowing/Add Pavement

Cost Estimate: \$304,000

Implementation Strategy: From Belmont-Mt Holly Road to Cason Street, construct 4 ft wide paved shoulder on both sides of roadway, and add pavement markings and signage. West of Cason Street, use the existing pavement width to create a striped bike lane to Acme Street and add pavement, where needed (widths vary), from Acme Street to School Street.

Characteristics: Woodlawn Avenue is a key corridor for creating access between the residential communities north of Interstate 85 and the Belmont community south of Interstate 85. Bicycle lanes on Woodlawn Avenue will connect residents to North Belmont Elementary School, the planned Belmont Rail-Trail (which links to downtown), and Belmont Abbey College.

Challenges: Developing a bicycle facility by adding pavement incurs construction costs.



5.9 PROGRAM & POLICY IMPLEMENTATION

The Belmont Bicycle Plan’s program and policy recommendations are designed for implementation within three years of adoption of the Plan. While the vast majority of infrastructure and policy recommendations fall within the exclusive jurisdiction of the City of Belmont and its governing authority, many program recommendations can, and should, fall under the banner of outside agencies, private sector partners, and nonprofit organizations (see Section 2.5 Existing Resources and Programs for a list of partners).

5.9.1 Policy Development

Following the establishment of a Permanent Bicycle Advisory Committee, the committee should work with City of Belmont staff to prioritize and advance the policy recommendations of the Plan. This Plan recommends allowing three to five months for policy research, development, stakeholder input, and formal adoption. While prioritization of policies is driven by local political will, the table below provides a guide for moving forward with policy adoption:

Strategy	Target Adoption Timeframe
Adopt Complete Streets Policy	Fall 2013
Update Bicycle Operations Ordinances	Spring 2014
Update Bicycle Parking Ordinance	Fall 2014
Establish Driveway Access Management Guidelines	Spring 2015

5.9.2 Program Development

A collaborative approach to implementing and sustaining bicycling programs contributes to the broader vision of fostering a strong bicycle advocacy community and bicycle culture. Additionally, the minimal expense associated with most programs offers the unique opportunity for multiple, varied sectors of the community to contribute to the larger bicycle friendly community campaign.

For each of non-infrastructure recommendation of the Plan, the table below outlines the timeline for implementation and the frequency of the program’s occurrence. The final column in the table provides a relative cost scale for implementing the program based on experiences in other communities.



Strategy	Timeline for Commencement	Duration	Cost Range
Bike Month Activities	May 2013	Month of May; Occurring Annually (4 months planning)	\$-\$
Competitive Cycling Event	May 2013	Month of May; Occurring Annually (6 months planning)	\$\$\$
Bicycle Staff Position	March 2013	Ongoing	\$
Permanent Bicycle Committee	April 2013	Ongoing	\$
Open Street Events	September 2013	Monthly during Fall; Occurring Annually (2 months planning)	\$
Positive Media Campaign	April 2014	1-2 months; Every Two Years (3 months planning)	\$
Family Biking Classes	May 2014	Occurring Annually (2 months planning)	\$
Safe Routes to School Committee	August 2014	Ongoing	\$
Police Training Program	January 2015	Every Three Years	\$\$\$
Campaign for Rights and Responsibilities of Motorists and Bicyclists	April 2015	1-2 months; Every Two Years (3 months planning)	\$
Youth Bicycle Safety Education Classes	May 2015	Every Two Years (2 months planning)	\$
Bicycling Route Maps and Guides	August 2015	Ongoing(Update Hard Copy Materials Every Three Years)	\$



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CHAPTER OUTLINE:

- OVERVIEW
- DESIGN NEEDS OF BICYCLISTS
- BICYCLE FACILITY SELECTION GUIDELINES
- SHARED ROADWAYS
- SEPARATED BIKEWAYS
- SEPARATED BIKEWAYS AT INTERSECTIONS
- BIKEWAY SIGNING
- RETROFITTING EXISTING STREETS TO ADD BIKEWAYS
- GREENWAYS AND OFF-STREET FACILITIES
- BIKEWAY SUPPORT AND MAINTENANCE
- STANDARDS COMPLIANCE

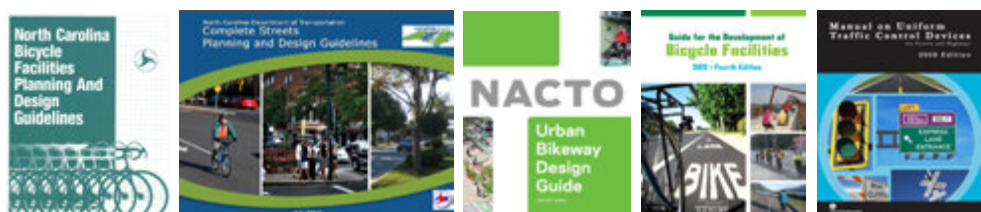
OVERVIEW

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

- The Federal Highway Administration’s **Manual on Uniform Traffic Control Devices (MUTCD)** is the primary source for guidance on lane striping requirements, signal warrants, and recommended signage and pavement markings.
- American Association of State Highway and Transportation Officials (AASHTO) **Guide for the Development of Bicycle Facilities**, updated in June 2012 provides guidance on dimensions, use, and layout of specific bicycle facilities.
- The National Association of City Transportation Officials’ (NACTO) 2012 **Urban Bikeway Design Guide** is the newest publication of nationally recognized bikeway design standards, and offers guidance on the current state of the practice designs. Most NACTO treatments are compatible within AASHTO/MUTCD guidance, though some NACTO endorsed designs may not be permitted on state roads at this time.
- North Carolina focused guidance in 2012 **Complete Streets Planning and Design Guidelines** also offers preferred design details and considerations for bikeway design.
- Meeting the requirements of the Americans with Disabilities Act (ADA) is an important part of any bicycle facility project. The United States Access Board’s proposed **Public Rights-of-Way Accessibility Guidelines (PROWAG)** and the **2010 ADA Standards for Accessible Design**(2010 Standards) contain standards and guidance for the construction of accessible facilities.

Should the national standards be revised in the future and result in discrepancies with this chapter, the national standards should prevail for all design decisions. A qualified engineer or landscape architect should be consulted for the most up to date and accurate cost estimates.

Nationally recognized bikeway standards such as NACTO, AASHTO, the MUTCD, along with guidance from the state of North Carolina have all informed the content of this chapter.



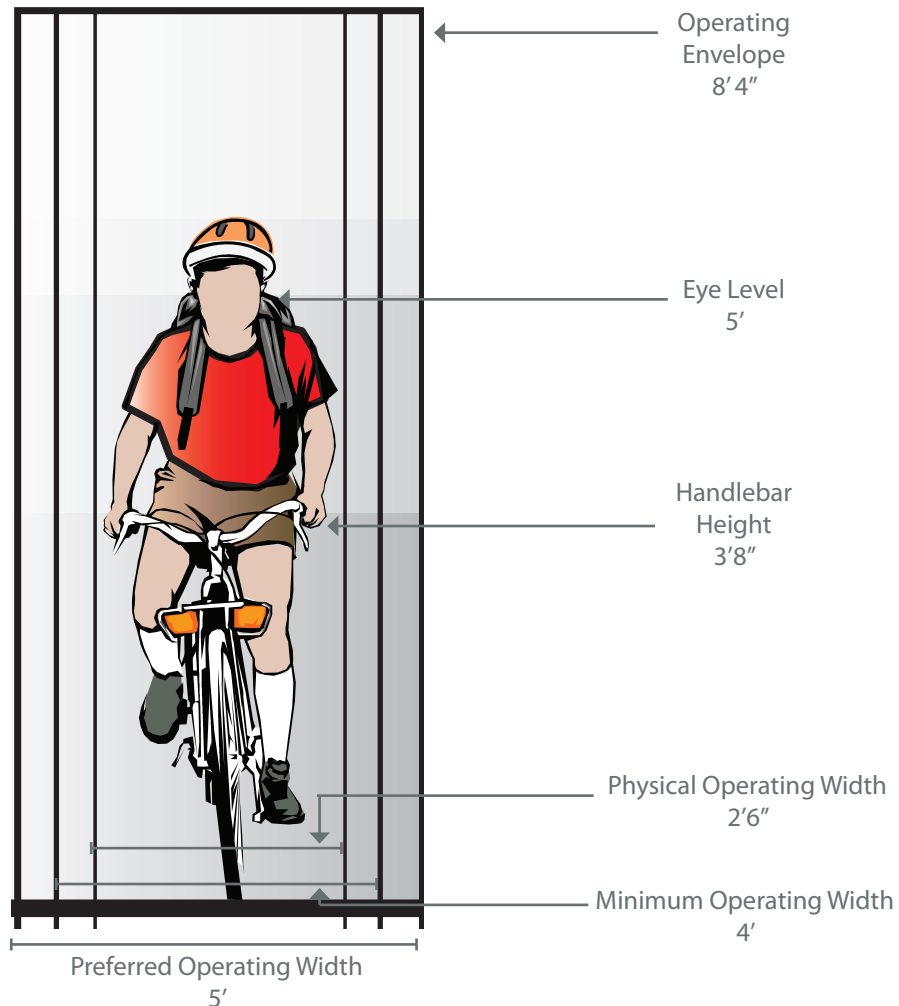
DESIGN NEEDS OF BICYCLISTS

The purpose of this section is to provide the facility designer with an understanding of how bicyclists operate and how their bicycle influences that operation. Bicyclists, by nature, are much more affected by poor facility design, construction and maintenance practices than motor vehicle drivers. Bicyclists lack the protection from the elements and roadway hazards provided by an automobile's structure and safety features. By understanding the unique characteristics and needs of bicyclists, a facility designer can provide quality facilities and minimize user risk.

Bicycle as a Design Vehicle

Similar to motor vehicles, bicyclists and their bicycles exist in a variety of sizes and configurations. These variations occur in the types of vehicle (such as a conventional bicycle, a recumbent bicycle or a tricycle), and behavioral characteristics (such as the comfort level of the bicyclist). The design of a bikeway should consider reasonably expected bicycle types on the facility and utilize the appropriate dimensions.

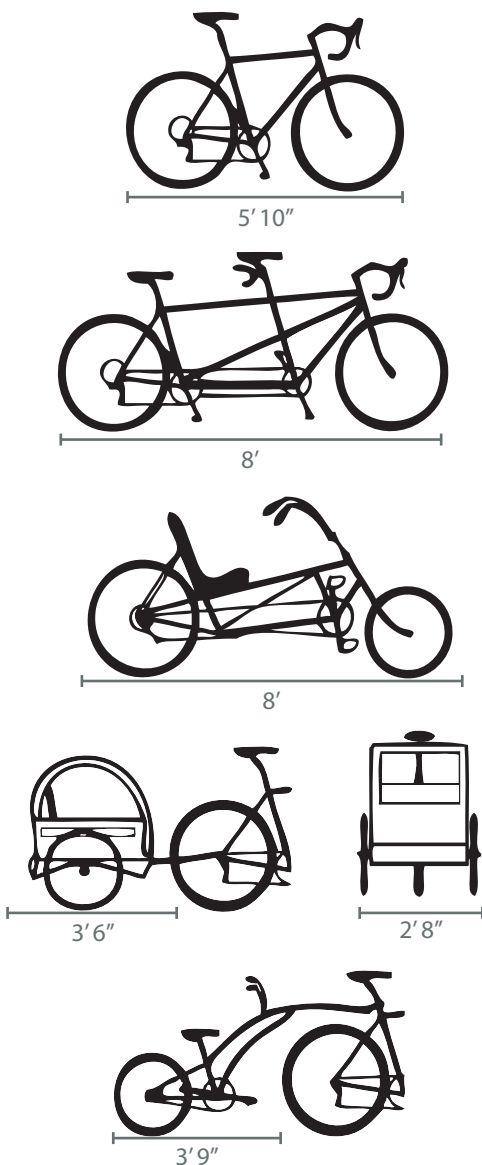
The figure below illustrates the operating space and physical dimensions of a typical adult bicyclist, which are the basis for typical facility design. Bicyclists require clear space to operate within a facility. This is why the minimum operating width is greater than the physical dimensions of the bicyclist. Bicyclists prefer five feet or more operating width, although four feet may be minimally acceptable.



Standard Bicycle Rider Dimensions

Source: AASHTO Guide for the Development of Bicycle Facilities, 3rd Edition

In addition to the design dimensions of a typical bicycle, there are many other commonly used pedal-driven cycles and accessories to consider when planning and designing bicycle facilities. The most common types include tandem bicycles, recumbent bicycles, and trailer accessories. The figure and table below summarize the typical dimensions for bicycle types.



Bicycle as Design Vehicle - Typical Dimensions

Source: AASHTO Guide for the Development of Bicycle Facilities, 3rd Edition *AASHTO does not provide typical dimensions for tricycles.

Design Speed Expectations

The expected speed that different types of bicyclists can maintain under various conditions also influences the design of facilities such as multi-use paths. The table to the right provides typical bicyclist speeds for a variety of conditions.

Bicycle as Design Vehicle - Typical Dimensions

Bicycle Type	Feature	Typical Dimensions
Upright Adult Bicyclist	Physical width	2 ft 6 in
	Operating width (Minimum)	4 ft
	Operating width (Preferred)	5 ft
	Physical length	5 ft 10 in
	Physical height of handlebars	3 ft 8 in
	Operating height	8 ft 4 in
	Eye height	5 ft
	Vertical clearance to obstructions (tunnel height, lighting, etc)	10 ft
Recumbent Bicyclist	Approximate center of gravity	2 ft 9 in - 3 ft 4 in
	Physical length	8 ft
Tandem Bicyclist	Eye height	3 ft 10 in
	Physical length	8 ft
Bicyclist with child trailer	Physical length	10 ft
	Physical width	2 ft 8 in

Bicycle as Design Vehicle - Design Speed Expectations

Bicycle Type	Feature	Typical Speed
Upright Adult Bicyclist	Paved level surfacing	15 mph
	Crossing Intersections	10 mph
	Downhill	30 mph
	Uphill	5 -12 mph
Recumbent Bicyclist	Paved level surfacing	18 mph

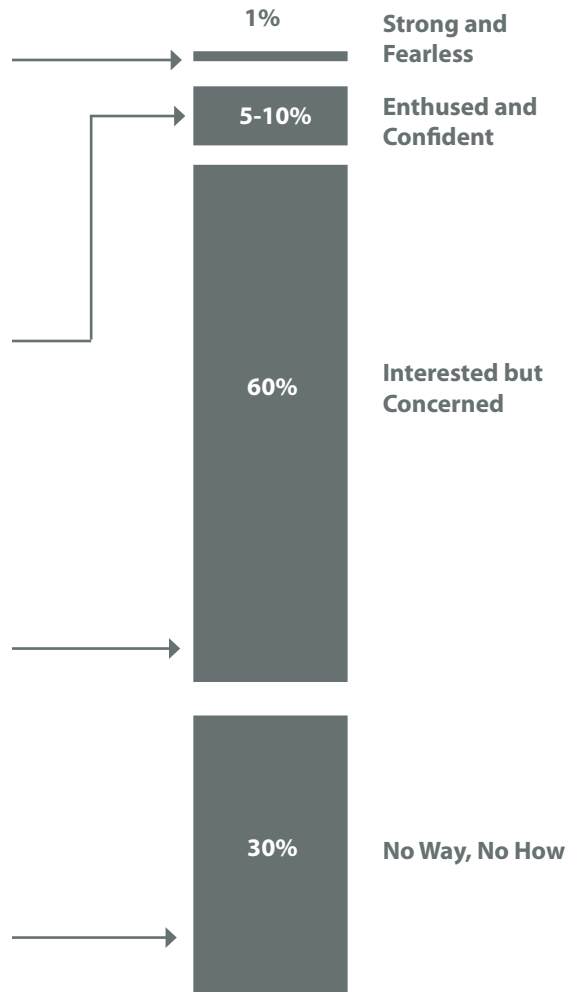
*Tandem bicycles and bicyclists with trailers have typical speeds equal to or less than upright adult bicyclists.

Types of Bicyclists

It is important to consider bicyclists of all skill levels when creating a non-motorized plan or project. Bicyclist skill level greatly influences expected speeds and behavior, both in separated bikeways and on shared roadways. Bicycle infrastructure should accommodate as many user types as possible, with decisions for separate or parallel facilities based on providing a comfortable experience for the greatest number of people.

The bicycle planning and engineering professions currently use several systems to classify the population, which can assist in understanding the characteristics and infrastructure preferences of different bicyclists. The most conventional framework classifies the “design cyclist” as *Advanced, Basic, or Child*¹. A more detailed understanding of the US population as a whole is illustrated in the figure below. Developed by planners in Portland, OR² and supported by data collected nationally since 2005, this classification provides the following alternative categories to address varying attitudes towards bicycling in the US:

- **Strong and Fearless** (approximately 1% of population) – Characterized by bicyclists that will typically ride anywhere regardless of roadway conditions or weather. These bicyclists can ride faster than other user types, prefer direct routes and will typically choose roadway connections -- even if shared with vehicles -- over separate bicycle facilities such as multi-use paths.
- **Enthusied and Confident** (5-10% of population) - This user group encompasses bicyclists who are fairly comfortable riding on all types of bikeways but usually choose low traffic streets or multi-use paths when available. These bicyclists may deviate from a more direct route in favor of a preferred facility type. This group includes all kinds of bicyclists such as commuters, recreationalists, racers and utilitarian bicyclists.
- **Interested but Concerned** (approximately 60% of population) – This user type comprises the bulk of the cycling population and represents bicyclists who typically only ride a bicycle on low traffic streets or multi-use trails under favorable weather conditions. These bicyclists perceive significant barriers to their increased use of cycling, specifically traffic and other safety issues. These people may become “Enthusied & Confident” with encouragement, education and experience.
- **No Way, No How** (approximately 30% of population) – Persons in this category are not bicyclists, and perceive severe safety issues with riding in traffic. Some people in this group may eventually become more regular cyclists with time and education. A significant portion of these people will not ride a bicycle under any circumstances.



Typical Distribution of Bicyclist Types

1 *Selecting Roadway Design Treatments to Accommodate Bicycles. (1994). Publication No. FHWA-RD-92-073*
 2 *Four Types of Cyclists. (2009). Roger Geller, City of Portland Bureau of Transportation. <http://www.portlandonline.com/transportation/index.cfm?&a=237507>*

BICYCLE FACILITY SELECTION GUIDELINES

This section summarizes the bicycle facility selection typology developed for the City of Belmont. The specific facility type that should be provided depends on the surrounding environment (e.g. auto speed and volume, topography, and adjacent land use) and expected bicyclist needs (e.g. bicyclists commuting on a highway versus students riding to school on residential streets).

Facility Selection Guidelines

There are no ‘hard and fast’ rules for determining the most appropriate type of bicycle facility for a particular location – roadway speeds, volumes, right-of-way width, presence of parking, adjacent land uses, and expected bicycle user types are all critical elements of this decision. Studies find that the most significant factors influencing bicycle use are motor vehicle traffic volumes and speeds. Additionally, most bicyclists prefer facilities separated from motor vehicle traffic or located on local roads with low motor vehicle traffic speeds and volumes. Because off-street pathways are physically separated from the roadway, they are perceived as safe and attractive routes for bicyclists who prefer to avoid motor vehicle traffic. Consistent use of treatments and application of bikeway facilities allow users to anticipate whether they would feel comfortable riding on a particular facility, and plan their trips accordingly. This section provides guidance on various factors that affect the type of facilities that should be provided.



This section includes:

- Facility Classification
- Facility Continua

FACILITY CLASSIFICATION

Description

Consistent with bicycle facility classifications throughout the nation, these Bicycle Facility Design Guidelines identify the following classes of facilities by degree of separation from motor vehicle traffic.

Shared Roadways are bikeways where bicyclists and cars operate within the same travel lane, either side by side or in single file depending on roadway configuration. The most basic type of bikeway is a signed shared roadway. This facility provides continuity with other bicycle facilities (usually bike lanes), or designates preferred routes through high-demand corridors.



Shared Roadways may also be designated by pavement markings, signage and other treatments including directional signage, traffic diverters, chicanes, chokers and /or other traffic calming devices to reduce vehicle speeds or volumes. Shared-lane markings are included in this class of treatments.



Separated Bikeways, such as bike lanes, use signage and striping to delineate the right-of-way assigned to bicyclists and motorists. Bike lanes encourage predictable movements by both bicyclists and motorists. Paved Shoulders are also included in this classification.



Cycle Tracks are exclusive bike facilities that combine the user experience of a separated path with the on-street infrastructure of conventional bike lanes.



Multi-use Paths are facilities separated from roadways for use by bicyclists and pedestrians. Greenways and sidepaths are included in this classification.



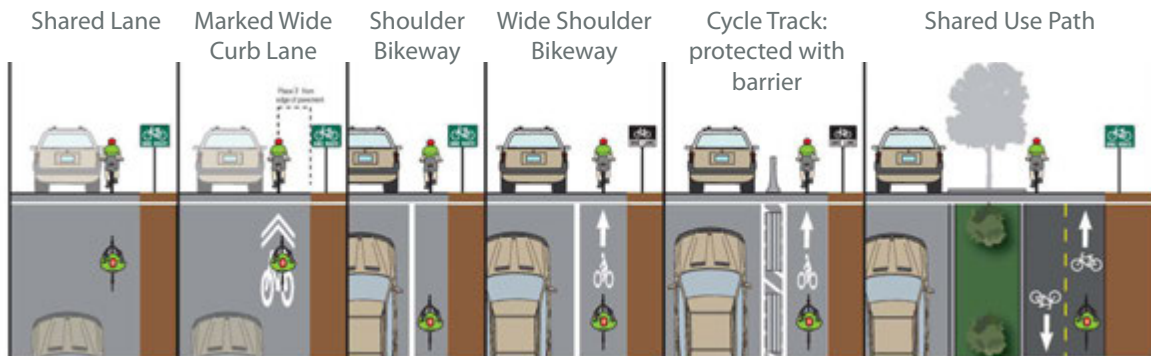
FACILITY CONTINUA

The following continua illustrate the range of bicycle facilities applicable to various roadway environments, based on the roadway type and desired degree of separation. Engineering judgment, traffic studies, previous municipal planning efforts, community input and local context should be used to refine criteria when developing bicycle facility recommendations for a particular street. In some corridors, it may be desirable to construct facilities to a higher level of treatment than those recommended in relevant planning documents in order to enhance user safety and comfort. In other cases, existing and/or future motor vehicle speeds and volumes may not justify the recommended level of separation, and a less intensive treatment may be acceptable.

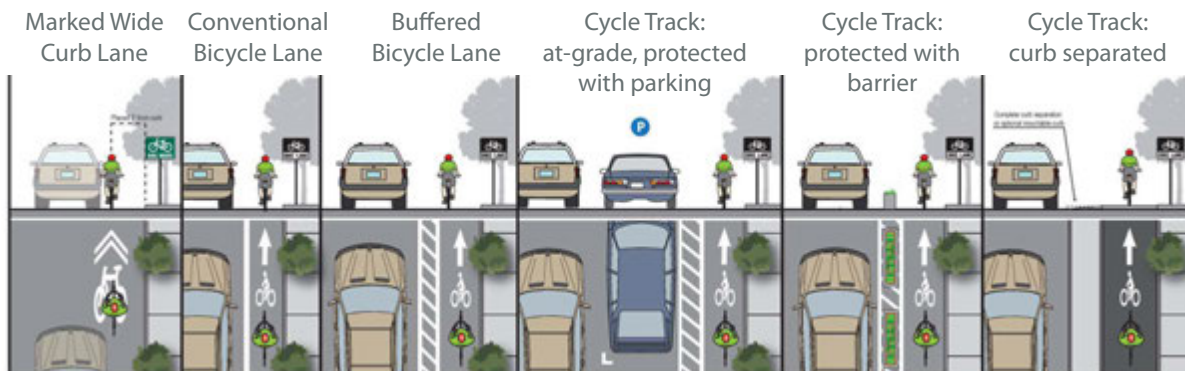
Least Protected

Most Protected

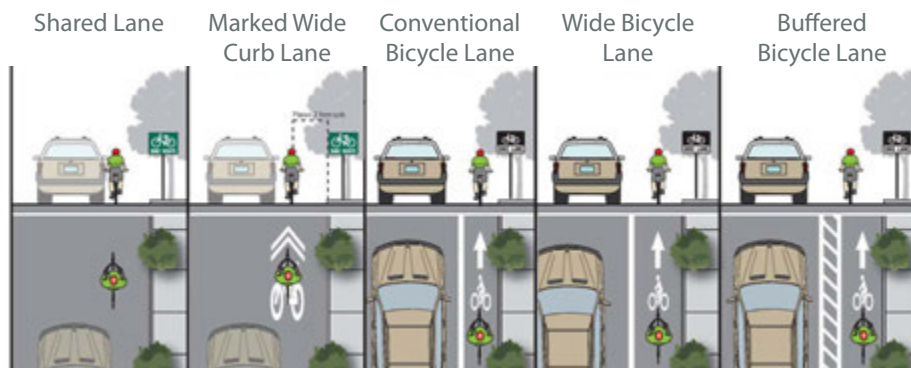
Arterial/Highway Bikeway Continuum (without curb and gutter)



Arterial/Highway Bikeway Continuum (with curb and gutter)



Collector Bikeway Continuum



SHARED ROADWAYS

On shared roadways, bicyclists and motor vehicles use the same roadway space. These facilities are typically used on roads with low speeds and traffic volumes, however they can be used on higher volume roads with wide outside lanes or shoulders. A motor vehicle driver will usually have to cross over into the adjacent travel lane to pass a bicyclist, unless a wide outside lane or shoulder is provided.

Shared roadways employ a large variety of treatments from simple signage and shared lane markings to more complex treatments including directional signage, traffic diverters, chicanes, chokers, and/or other traffic calming devices to reduce vehicle speeds or volumes.



Signed Shared Roadway



Marked Shared Roadway



Bicycle Boulevard

This section includes:

- Signed Shared Roadway
- Marked Shared Roadway
- Bicycle Boulevard

SIGNED SHARED ROADWAY

Guidance

Lane width varies depending on roadway configuration.

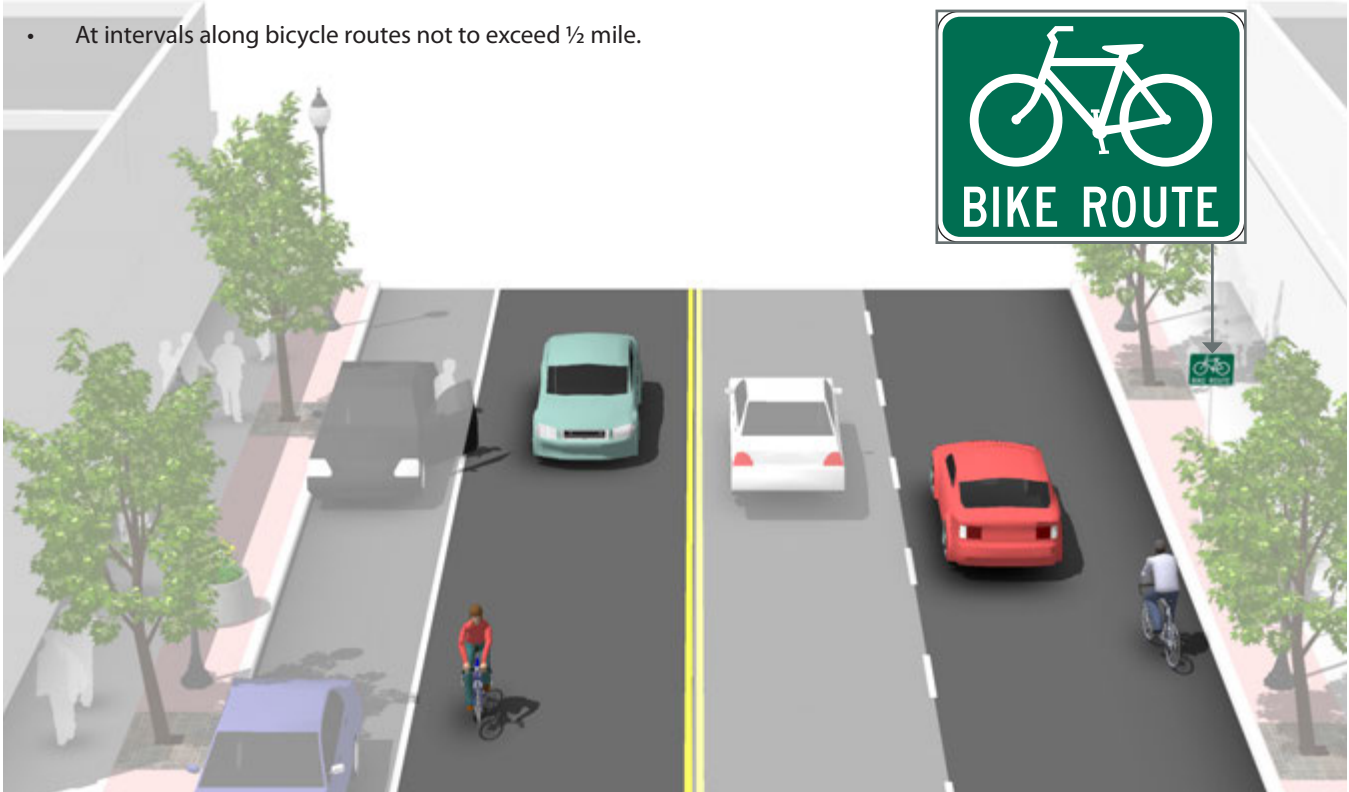
Bicycle Route signage (D11-1) should be applied at intervals frequent enough to keep bicyclists informed of changes in route direction and to remind motorists of the presence of bicyclists. Commonly, this includes placement at:

- Beginning or end of Bicycle Route.
- At major changes in direction or at intersections with other bicycle routes.
- At intervals along bicycle routes not to exceed ½ mile.

Description

Signed Shared Roadways are facilities shared with motor vehicles. They are typically used on roads with low speeds and traffic volumes, however can be used on higher volume roads with wide outside lanes or shoulders. A motor vehicle driver will usually have to cross over into the adjacent travel lane to pass a bicyclist, unless a wide outside lane or shoulder is provided.

MUTCD D11-1



Discussion

Signed Shared Roadways serve either to provide continuity with other bicycle facilities (usually bike lanes) or to designate preferred routes through high-demand corridors.

This configuration differs from a **Bicycle Boulevard** due to a lack of traffic calming, wayfinding, pavement markings and other enhancements designed to provide a higher level of comfort for a broad spectrum of users.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
 FHWA. (2009). Manual on Uniform Traffic Control Devices.
 NCDOT. (2012). Complete Streets Planning and Design Guidelines.

Materials and Maintenance

Maintenance needs for bicycle wayfinding signs are similar to other signs, and will need periodic replacement due to wear.

MARKED SHARED ROADWAY

Guidance

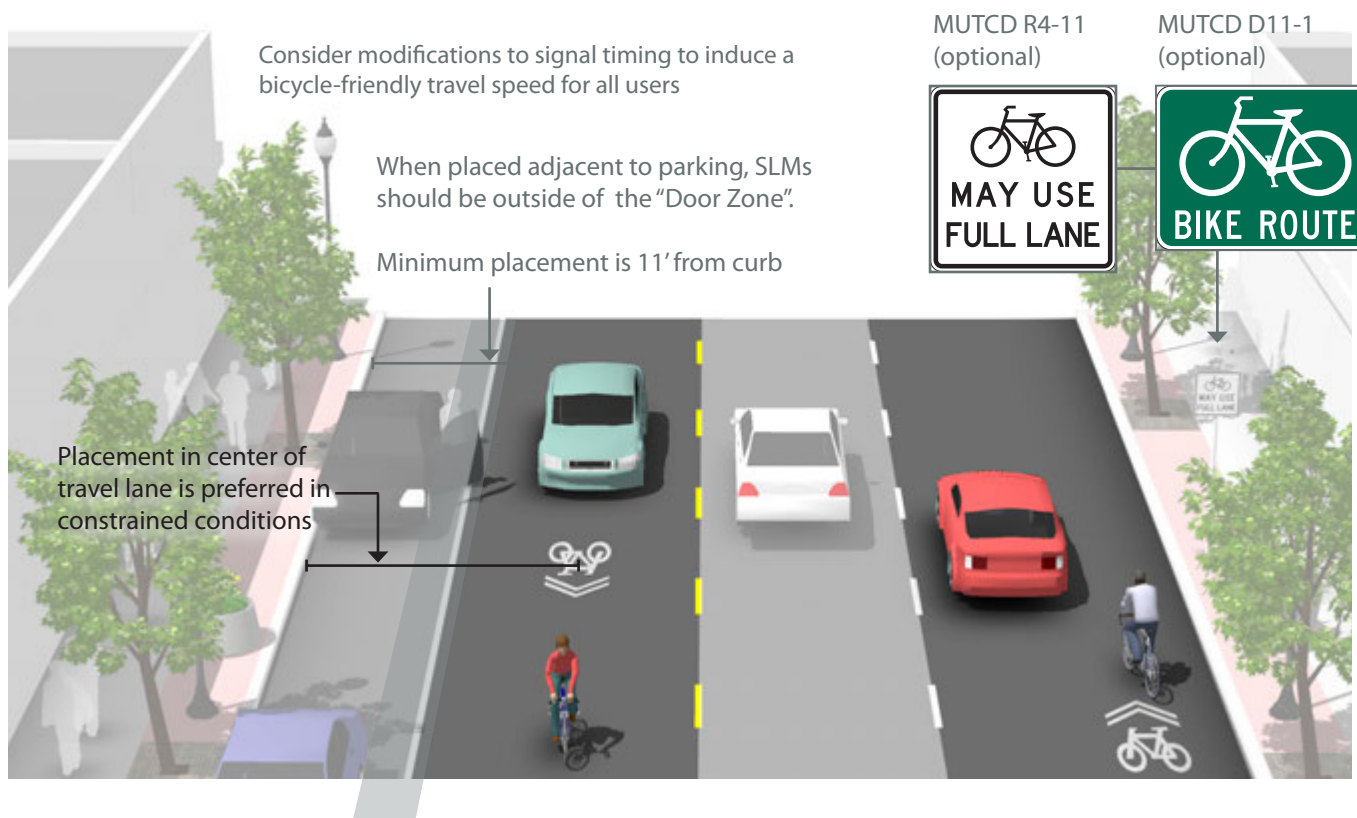
- Marked shared roadways have a 35 mph maximum speed limit.
- In constrained conditions, preferred placement is in the center of the travel lane to minimize wear and promote single file travel.
- Minimum placement of SLM marking centerline is 11 feet from edge of curb where on-street parking is present, 4 feet from edge of curb with no parking. If parking lane is wider than 7.5 feet, the SLM should be moved further out accordingly.

Description

A marked shared roadway is a general purpose travel lane marked with shared lane markings (SLM) used to encourage bicycle travel and proper positioning within the lane.

In constrained conditions, the SLMs are placed in the middle of the lane to discourage unsafe passing by motor vehicles. On a wide outside lane, the SLMs can be used to promote bicycle travel to the right of motor vehicles.

In all conditions, SLMs should be placed outside of the door zone of parked cars.



Discussion

Bike Lanes should be considered on roadways with outside travel lanes wider than 15 feet, or where other lane narrowing or removal strategies may provide adequate road space. SLMs shall not be used on shoulders, in designated **Bike Lanes**, or to designate **Bicycle Detection** at signalized intersections. (MUTCD 9C.07)

This configuration differs from a **Bicycle Boulevard** due to a lack of traffic calming, wayfinding, and other enhancements designed to provide a higher level of comfort for a broad spectrum of users.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
 FHWA. (2009). Manual on Uniform Traffic Control Devices.
 NACTO. (2012). Urban Bikeway Design Guide.
 NCDOT. (2012). Complete Streets Planning and Design Guidelines.

Materials and Maintenance

Placing SLMs between vehicle tire tracks will increase the life of the markings and minimize the long-term cost of the treatment.

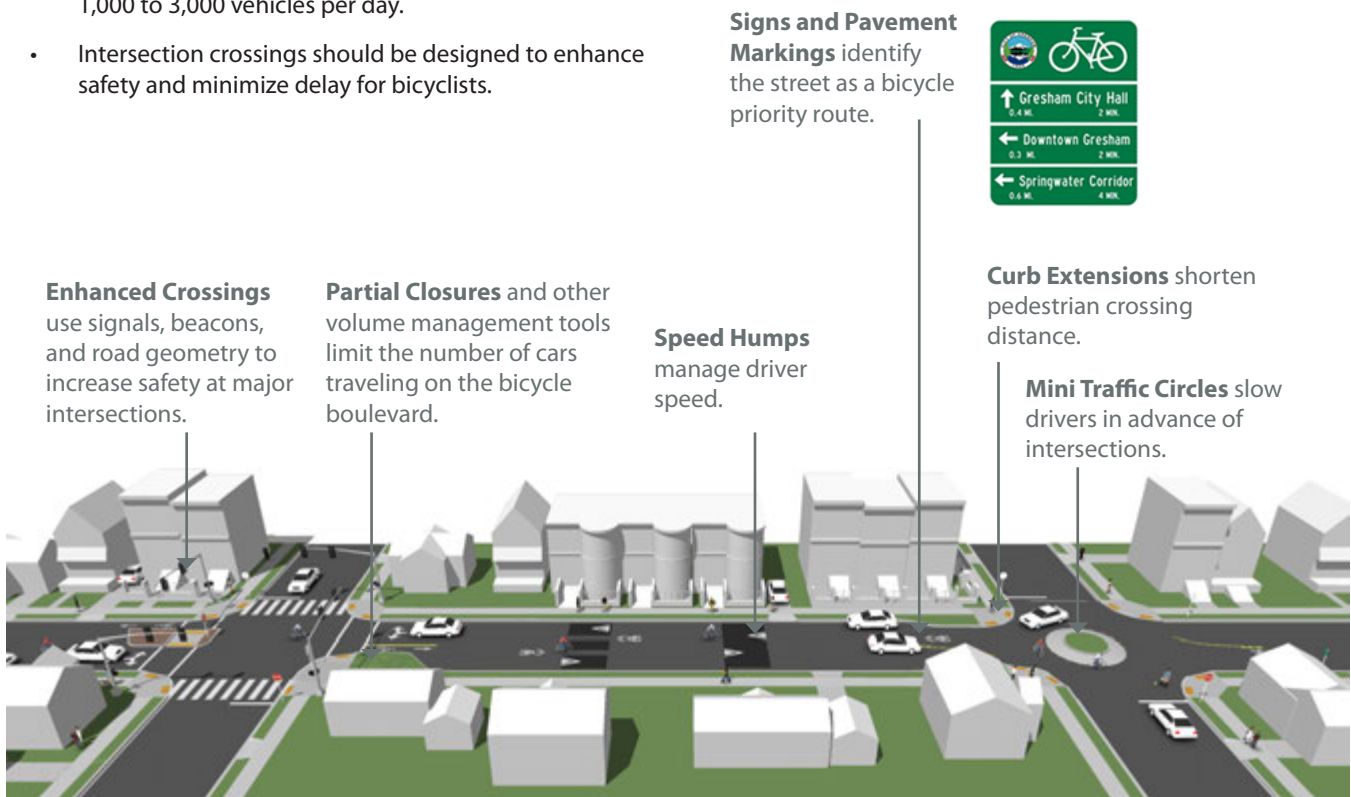
BICYCLE BOULEVARD

Guidance

- Signs and pavement markings are the minimum treatments necessary to designate a street as a bicycle boulevard.
- Bicycle boulevards should have a maximum posted speed of 25 mph. Use traffic calming to maintain an 85th percentile speed below 22 mph.
- Implement volume control treatments based on the context of the bicycle boulevard, using engineering judgment. Target motor vehicle volumes range from 1,000 to 3,000 vehicles per day.
- Intersection crossings should be designed to enhance safety and minimize delay for bicyclists.

Description

Bicycle boulevards are a special class of shared roadways designed for a broad spectrum of bicyclists. They are low-volume, low-speed local streets modified to enhance bicyclist comfort by using treatments such as signage, pavement markings, traffic calming and/or traffic reduction, and intersection modifications. These treatments allow through movements of bicyclists while discouraging similar through-trips by non-local motorized traffic.



Signs and Pavement Markings identify the street as a bicycle priority route.



Enhanced Crossings use signals, beacons, and road geometry to increase safety at major intersections.

Partial Closures and other volume management tools limit the number of cars traveling on the bicycle boulevard.

Speed Humps manage driver speed.

Curb Extensions shorten pedestrian crossing distance.

Mini Traffic Circles slow drivers in advance of intersections.

Discussion

Bicycle boulevard retrofits to local streets are typically located on streets without existing signalized accommodation at crossings of collector and arterial roadways. Without treatments for bicyclists, these intersections can become major barriers along the bicycle boulevard and compromise safety.

Traffic calming can deter motorists from driving on a street. Anticipate and monitor vehicle volumes on adjacent streets to determine whether traffic calming results in inappropriate volumes. Traffic calming can be implemented on a trial basis.

Additional References and Guidelines

- Alta Planning + Design and IBPI. (2009). Bicycle Boulevard Planning and Design Handbook.
- BikeSafe. (No Date). Bicycle countermeasure selection system.
- Ewing, Reid. (1999). Traffic Calming: State of the Practice.
- Ewing, Reid and Brown, Steven. (2009). U.S. Traffic Calming Manual.

Materials and Maintenance

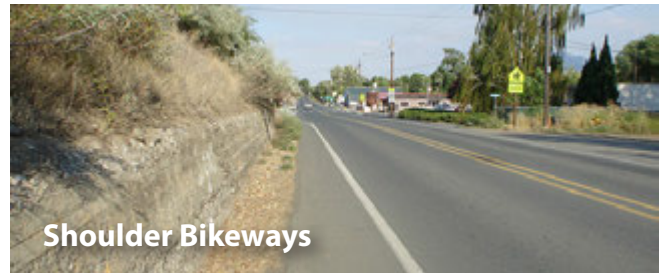
Vegetation should be regularly trimmed to maintain visibility and attractiveness.

SEPARATED BIKEWAYS

Designated exclusively for bicycle travel, separated bikeways are segregated from vehicle travel lanes by striping, and can include pavement stencils and other treatments. Separated bikeways are most appropriate on arterial and collector streets where higher traffic volumes and speeds warrant greater separation.

Separated bikeways can increase safety and promote proper riding by:

- Defining road space for bicyclists and motorists, reducing the possibility that motorists will stray into the bicyclists' path.
- Discouraging bicyclists from riding on the sidewalk.
- Reducing the incidence of wrong way riding.
- Reminding motorists that bicyclists have a right to the road.



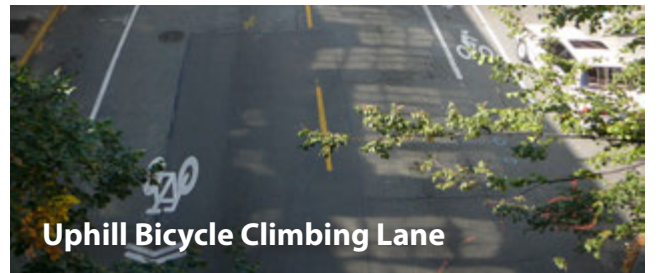
Shoulder Bikeways



Bicycle Lanes



Buffered Bike Lanes



Uphill Bicycle Climbing Lane



Cycle Tracks

This section includes:

- Shoulder Bikeways
- Bicycle Lanes
- Buffered Bike Lanes
- Uphill Bicycle Climbing Lane
- Cycle Tracks

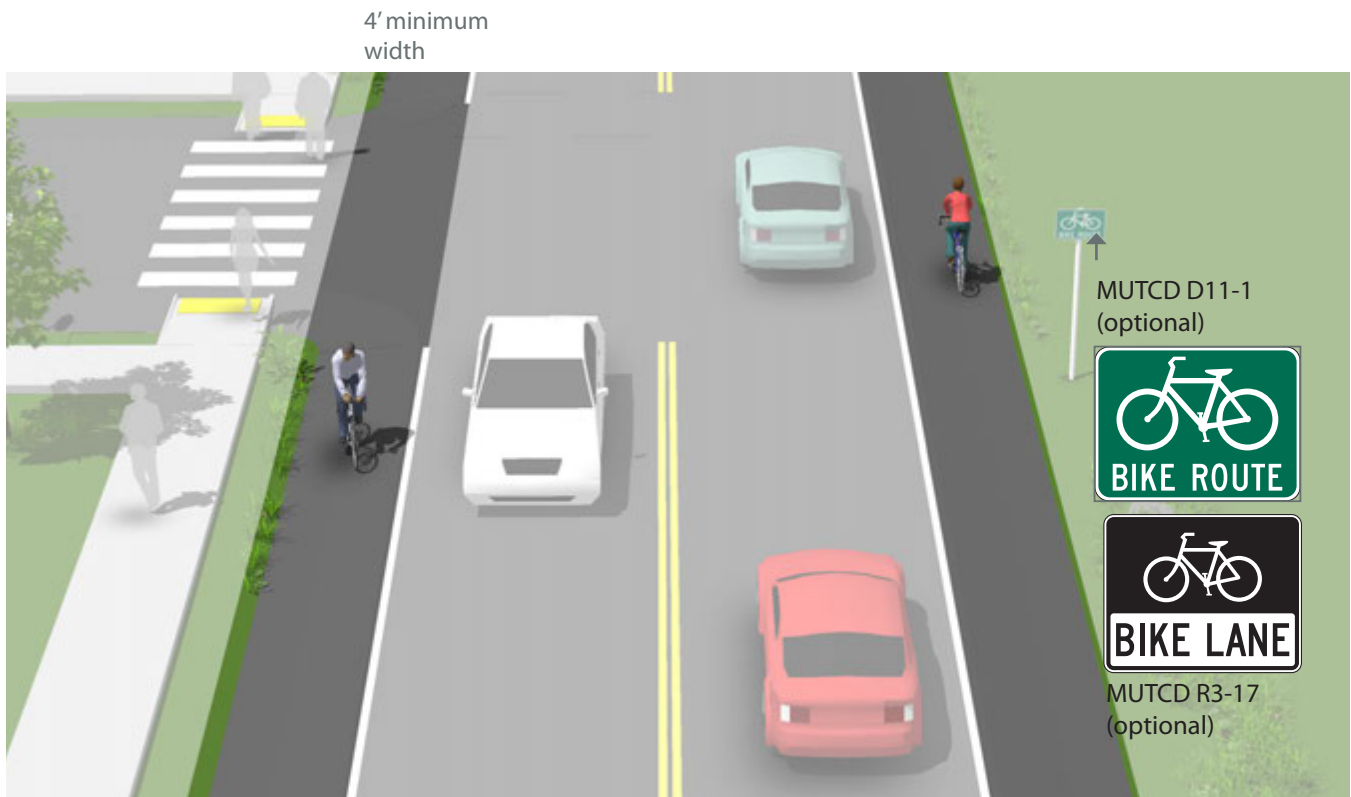
SHOULDER BIKEWAYS

Guidance

- 4 foot minimum width. Greater widths preferred.
- If it is not possible to meet minimum bicycle lane dimensions, a reduced width paved shoulder can still improve conditions for bicyclists on constrained roadways. In these situations, a minimum of 3 feet of operating space should be provided.
- If rumble strips are present, the paved shoulder should provide 4 feet of unobstructed space for bicyclists.

Description

Typically found in less-dense areas, shoulder bikeways are paved roadways with striped shoulders (4'+) wide enough for bicycle travel. Shoulder bikeways often, but not always, include signage alerting motorists to expect bicycle travel along the roadway. Shoulder bikeways should be considered a temporary treatment, with full bike lanes planned for construction when the roadway is widened or completed with curb and gutter. This type of treatment is not typical in urban areas and should only be used where constraints exist.



Discussion

A wide outside lane may be sufficient accommodation for bicyclists on streets with insufficient width for bike lanes but which do have space available to provide a wider (14'-16') outside travel lane. Consider configuring as a **marked shared roadway** in these locations.

Where feasible, **roadway widening** should be performed with pavement resurfacing jobs.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
 FHWA. (2009). Manual on Uniform Traffic Control Devices.
 NCDOT. (2012). Complete Streets Planning and Design Guidelines.

Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Shoulder bikeways should be cleared of snow through routine snow removal operations.

BICYCLE LANES

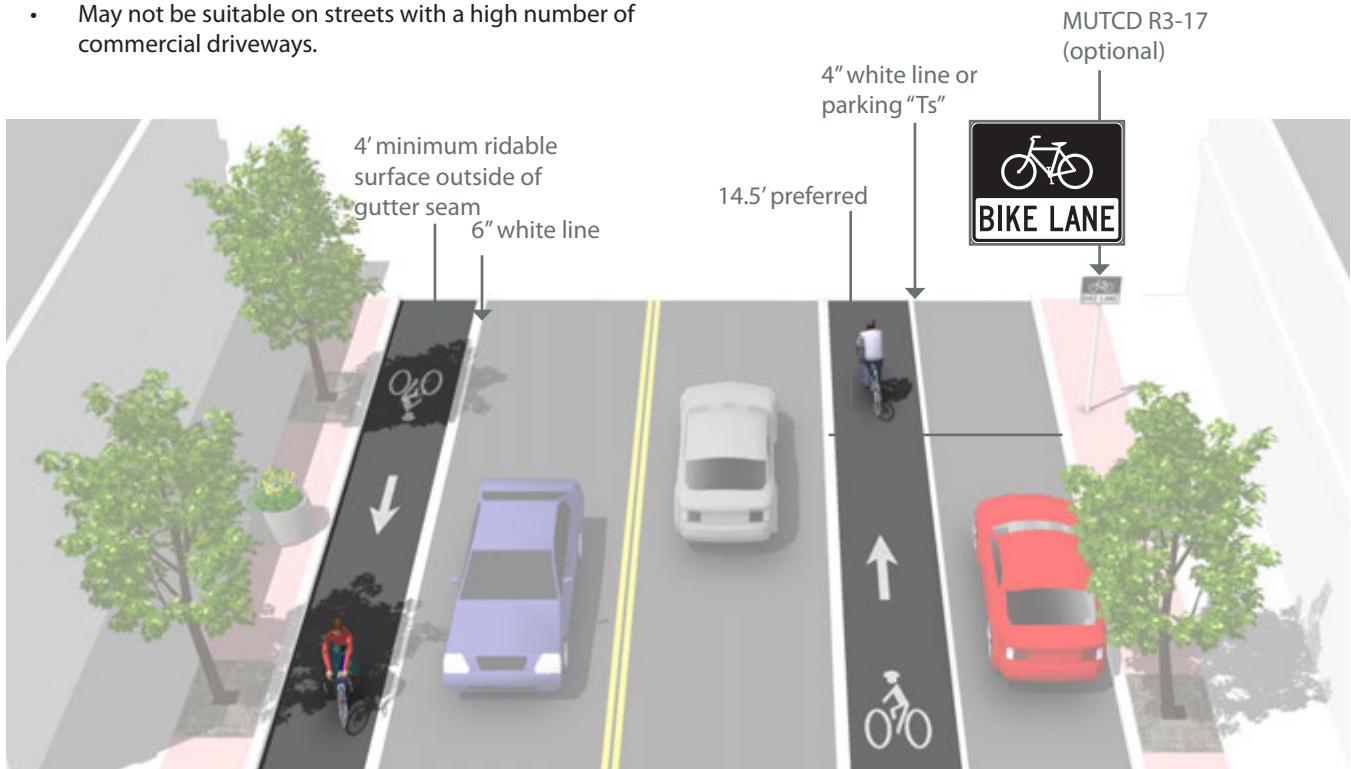
Guidance

- 4 foot minimum when no curb and gutter is present.
- 5 foot minimum when adjacent to curb and gutter or 3 feet more than the gutter pan width if the gutter pan is wider than 2 feet.
- 14.5 foot preferred from curb face to edge of bike lane. (12 foot minimum).
- 7 foot maximum width for use adjacent to arterials with high travel speeds. Greater widths may encourage motor vehicle use of bike lane.
- May not be suitable on streets with a high number of commercial driveways.

Description

Bike lanes designate an exclusive space for bicyclists through the use of pavement markings and signage. The bike lane is located adjacent to motor vehicle travel lanes and is used in the same direction as motor vehicle traffic. Bike lanes are typically on the right side of the street, between the adjacent travel lane and curb, road edge or parking lane.

Many bicyclists, particularly less experienced riders, are more comfortable riding on a busy street if it has a striped and signed bikeway than if they are expected to share a lane with vehicles.



Discussion

Wider bicycle lanes are desirable in certain situations such as on higher speed arterials (45 mph+) where use of a wider bicycle lane would increase separation between passing vehicles and bicyclists. Appropriate signing and stenciling is important with wide bicycle lanes to ensure motorists do not mistake the lane for a vehicle lane or parking lane. Consider **Buffered Bicycle Lanes** when further separation is desired.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
 FHWA. (2009). Manual on Uniform Traffic Control Devices.
 NACTO. (2012). Urban Bikeway Design Guide.
 NCDOT. (2000). Traditional Neighborhood Development (TND) Guidelines.
 NCDOT. (2012). Complete Streets Planning and Design Guidelines.

Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Bicycle lanes should be cleared of snow through routine snow removal operations.

BUFFERED BIKE LANES

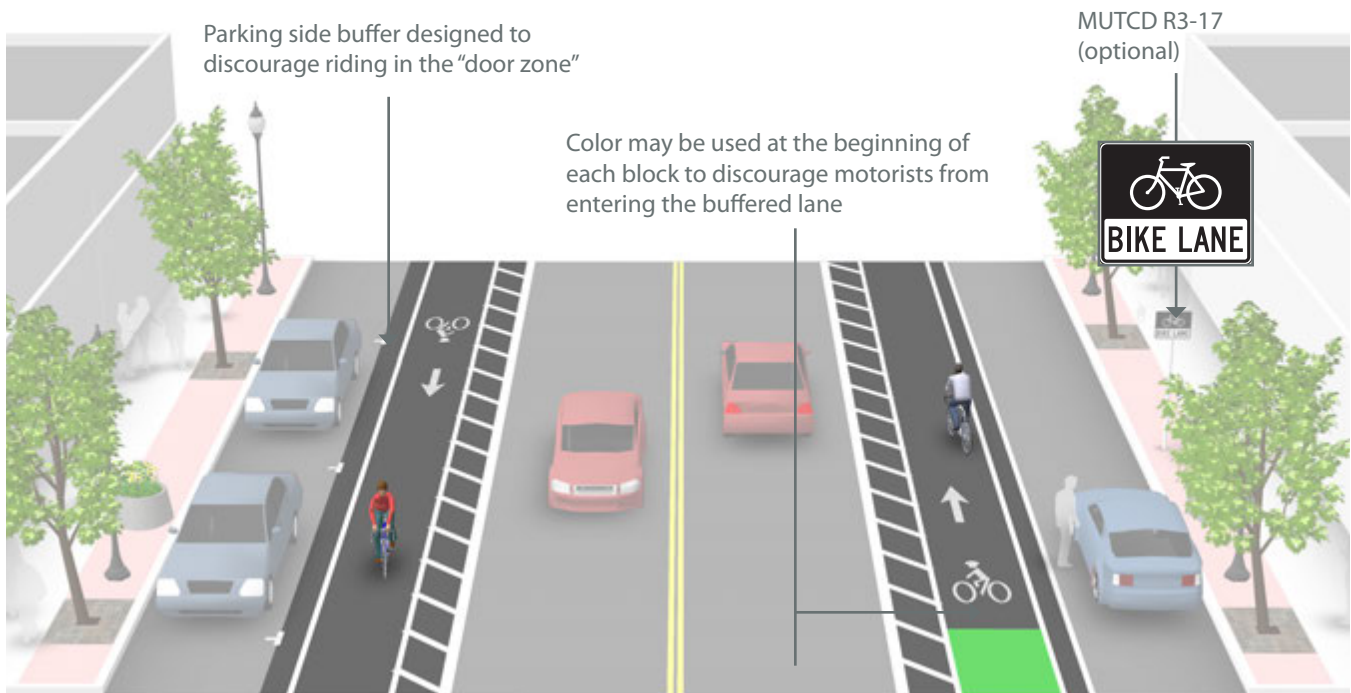
Guidance

- Where bicyclist volumes are high or where bicyclist speed differentials are significant, the desired bicycle travel area width is 7 feet.
- Buffers should be at least 2 feet wide. If 3 feet or wider, mark with diagonal or chevron hatching. For clarity at driveways or minor street crossings, consider a dotted line for the inside buffer boundary where cars are expected to cross.

Description

Buffered bike lanes are conventional bicycle lanes paired with a designated buffer space, separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane. Buffered bike lanes are allowed as per MUTCD guidelines for buffered preferential lanes (section 3D-01).

Buffered bike lanes are designed to increase the space between the bike lane and the travel lane or parked cars. This treatment is appropriate for bike lanes on roadways with high motor vehicle traffic volumes and speed, adjacent to parking lanes, or a high volume of truck or oversized vehicle traffic.



Discussion

Frequency of right turns by motor vehicles at major intersections should determine whether continuous or truncated buffer striping should be used approaching the intersection. Commonly configured as a buffer between the bicycle lane and motor vehicle travel lane, a parking side buffer may also be provided to help bicyclists avoid the 'door zone' of parked cars.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
 FHWA. (2009). Manual on Uniform Traffic Control Devices. (3D-01)
 NACTO. (2012). Urban Bikeway Design Guide.

Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Bicycle lanes should be cleared of snow through routine snow removal operations.

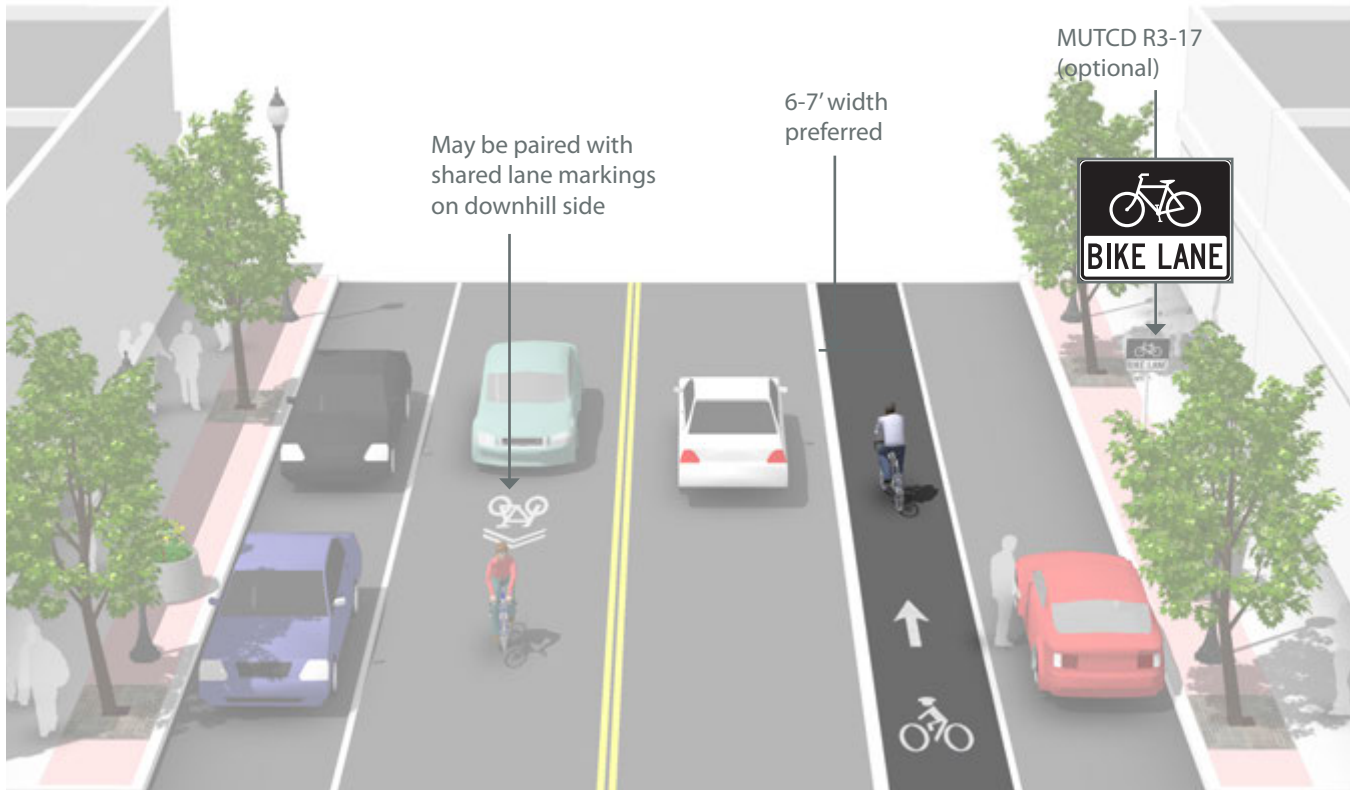
UPHILL BICYCLE CLIMBING LANE

Guidance

- Uphill bike lanes should be 6-7 feet wide (wider lanes are preferred because extra maneuvering room on steep grades can benefit bicyclists).
- Can be combined with **Shared Lane Markings** for downhill bicyclists who can more closely match prevailing traffic speeds.

Description

Uphill bike lanes (also known as “climbing lanes”) enable motorists to safely pass slower-speed bicyclists, thereby improving conditions for both travel modes.



Discussion

This treatment is typically found on retrofit projects as newly constructed roads should provide adequate space for bicycle lanes in both directions of travel. Accommodating an uphill bicycle lane often includes delineating on-street parking (if provided), narrowing travel lanes and/or shifting the centerline if necessary.

Additional References and Guidelines

NACTO. (2012). Urban Bikeway Design Guide.
AASHTO. (2012). Guide for the Development of Bicycle Facilities.
FHWA. (2009). Manual on Uniform Traffic Control Devices.
NCDOT. (2004). Bicycle Facilities Planning and Design Guidelines.

Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Bicycle lanes should be cleared of snow through routine snow removal operations.

CYCLE TRACKS

Guidance

Cycle tracks should ideally be placed along streets with long blocks and few driveways or mid-block access points for motor vehicles.

One-Way Cycle Tracks

- 7 foot recommended minimum to allow passing. 5 foot minimum width in constrained locations.

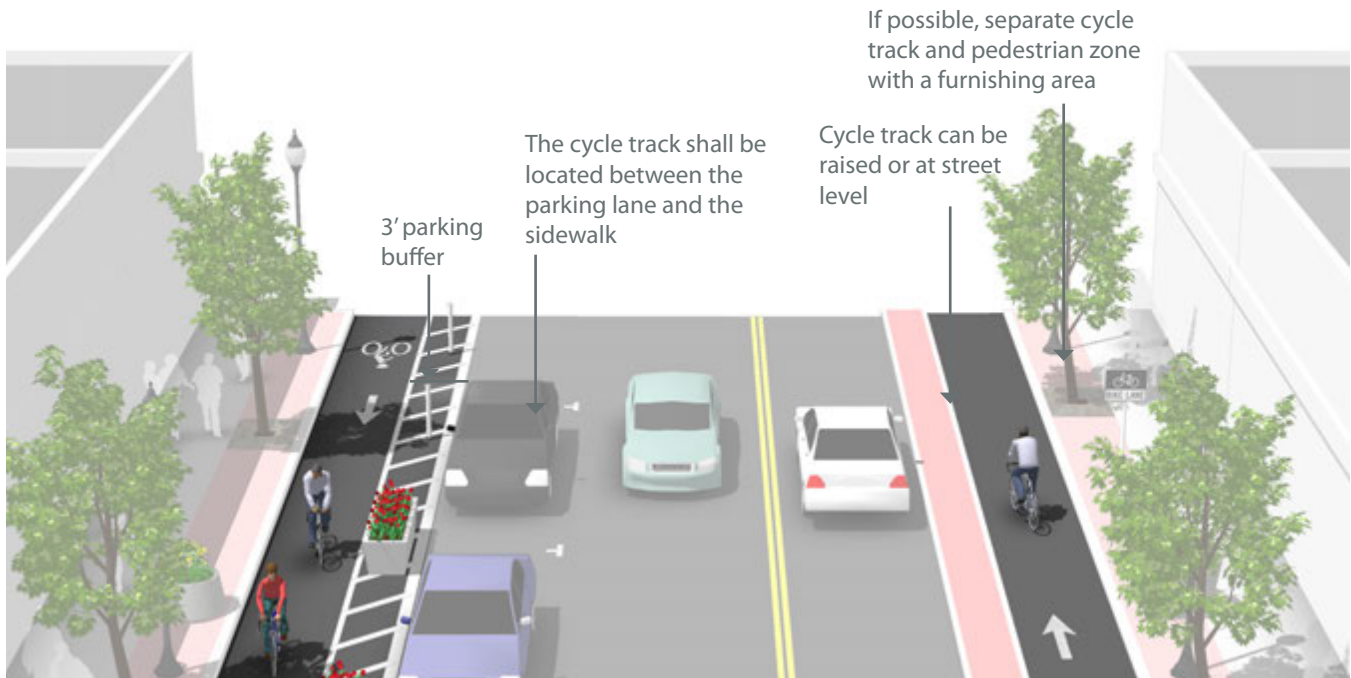
Two-Way Cycle Tracks

- Cycle tracks located on one-way streets have fewer potential conflict areas than those on two-way streets.
- 12 foot recommended minimum for two-way facility. 8 foot minimum in constrained locations

Description

A cycle track is an exclusive bike facility that combines the user experience of a separated path with the on-street infrastructure of a conventional bike lane. A cycle track is physically separated from motor traffic and distinct from the sidewalk. Cycle tracks have different forms but all share common elements—they provide space that is intended to be exclusively or primarily used by bicycles, and are separated from motor vehicle travel lanes, parking lanes, and sidewalks.

Raised cycle tracks may be at the level of the adjacent sidewalk or set at an intermediate level between the roadway and sidewalk to separate the cycle track from the pedestrian area.



Discussion

Special consideration should be given at transit stops to manage bicycle and pedestrian interactions. Driveways and minor street crossings are unique challenges to cycle track design. Parking should be prohibited within 30 feet of the intersection to improve visibility. Color, yield markings and “Yield to Bikes” signage should be used to identify the conflict area and make it clear that the cycle track has priority over entering and exiting traffic. If configured as a raised cycle track, the crossing should be raised so that the sidewalk and cycle track maintain their elevation through the crossing.

Additional References and Guidelines

NACTO. (2012). Urban Bikeway Design Guide.

Materials and Maintenance

In cities with winter climates, barrier separated and raised cycle tracks may require special equipment for snow removal.

SEPARATED BIKEWAYS AT INTERSECTIONS

Intersections are junctions at which different modes of transportation meet and facilities overlap. An intersection facilitates the interchange between bicyclists, motorists, pedestrians and other modes in order to advance traffic flow in a safe and efficient manner. Designs for intersections with bicycle facilities should reduce conflict between bicyclists (and other vulnerable road users) and vehicles by heightening the level of visibility, denoting clear right-of-way and facilitating eye contact and awareness with other modes. Intersection treatments can improve both queuing and merging maneuvers for bicyclists, and are often coordinated with timed or specialized signals.

The configuration of a safe intersection for bicyclists may include elements such as color, signage, medians, signal detection and pavement markings. Intersection design should take into consideration existing and anticipated bicyclist, pedestrian and motorist movements. In all cases, the degree of mixing or separation between bicyclists and other modes is intended to reduce the risk of crashes and increase bicyclist comfort. The level of treatment required for bicyclists at an intersection will depend on the bicycle facility type used, whether bicycle facilities are intersecting, and the adjacent street function and land use.



Bike Lanes at Right Turn Only Lanes



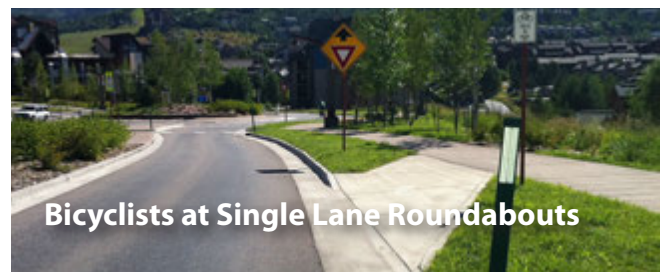
Colored Bike Lanes in Conflict Areas



Combined Bike Lane/Turn Lane



Intersection Crossing Markings



Bicyclists at Single Lane Roundabouts

This section includes:

- Bike Lanes at Right Turn Only Lanes
- Colored Bike Lanes in Conflict Areas
- Combined Bike Lane/Turn Lane
- Intersection Crossing Markings
- Bicycles at Single Lane Roundabouts

BIKE LANES AT RIGHT TURN ONLY LANES

Description

The appropriate treatment at right-turn lanes is to place the bike lane between the right-turn lane and the right-most through lane or, where right-of-way is insufficient, to use a **shared bike lane/turn lane**.

The design (right) illustrates a bike lane pocket, with signage indicating that motorists should yield to bicyclists through the conflict area.

Guidance

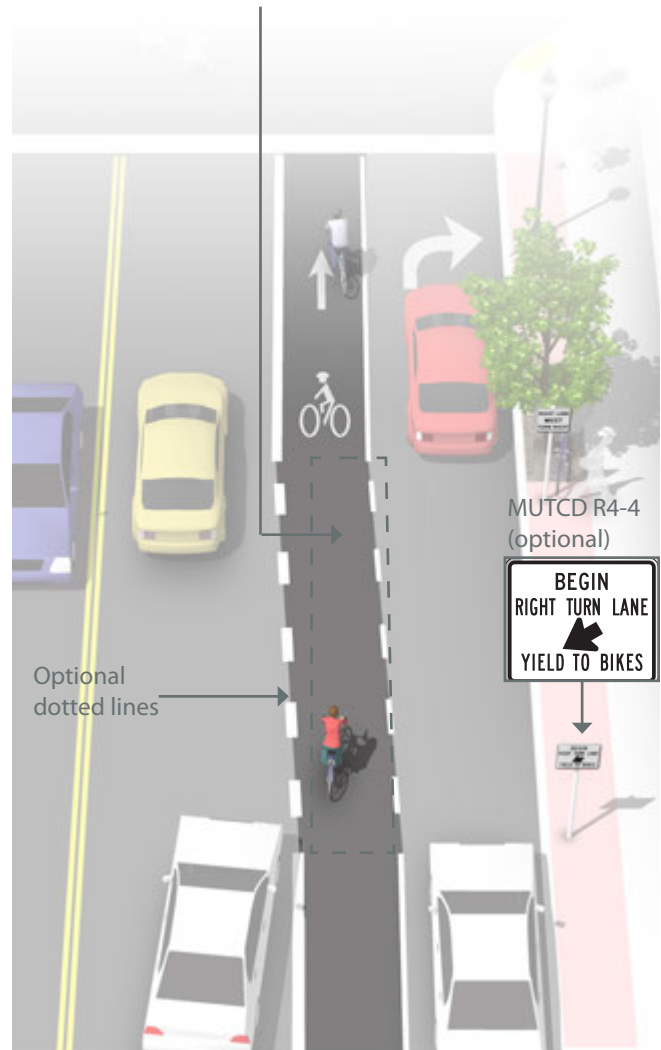
At auxiliary right turn only lanes (add lane):

- Continue existing bike lane width; standard width of 5 to 6 feet or 4 feet in constrained locations.
- Use signage to indicate that motorists should yield to bicyclists through the conflict area.
- Consider using **colored conflict areas** to promote visibility of the mixing zone.

Where a through lane becomes a right turn only lane:

- Do not define a dotted line merging path for bicyclists.
- Drop the bicycle lane in advance of the merge area.
- Use shared lane markings to indicate shared use of the lane in the merging zone.

Colored pavement may be used in the weaving area to increase visibility and awareness of potential conflict



Discussion

For other potential approaches to providing accommodations for bicyclists at intersections with turn lanes, please see **shared bike lane/turn lane, bicycle signals, and colored bike facilities**.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
 FHWA. (2009). Manual on Uniform Traffic Control Devices.
 NACTO. (2012). Urban Bikeway Design Guide.

Materials and Maintenance

Because the effectiveness of markings depends entirely on their visibility, maintaining markings should be a high priority.

COLORED BIKE LANES IN CONFLICT AREAS

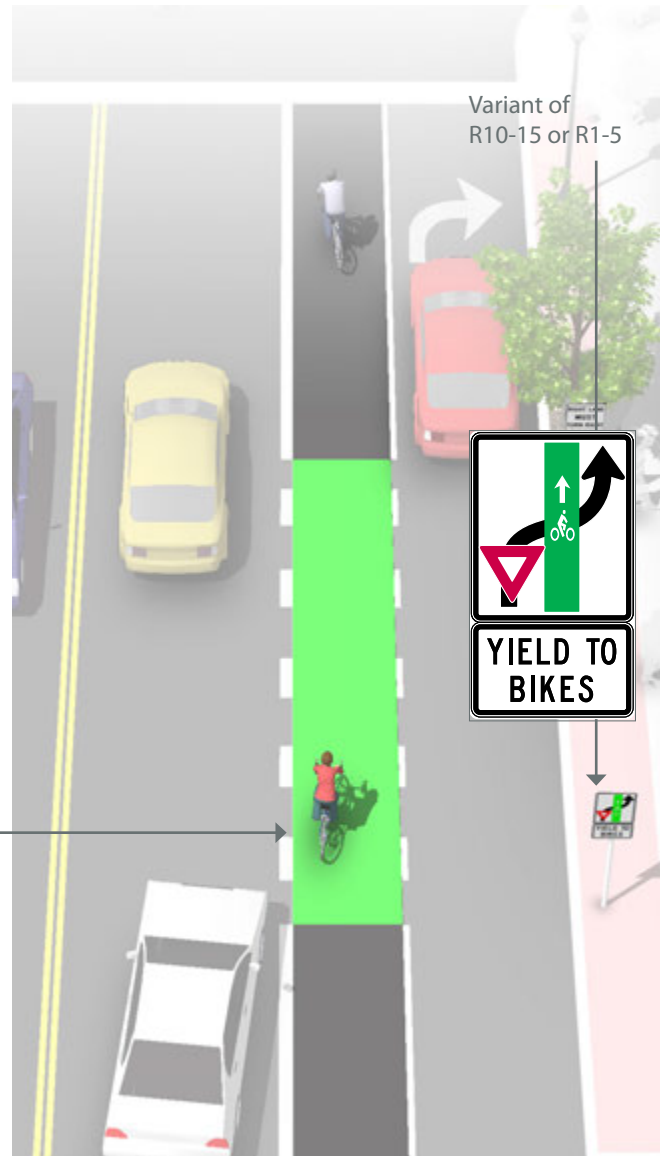
Description

Colored pavement within a bicycle lane increases the visibility of the facility and reinforces priority of bicyclists in conflict areas.

Guidance

- Green colored pavement was given interim approval by the Federal Highways Administration in March 2011. See interim approval for specific color standards.
- The colored surface should be skid resistant and retro-reflective.
- A “Yield to Bikes” sign should be used at intersections or driveway crossings to reinforce that bicyclists have the right-of-way in colored bike lane areas.

Normal white dotted edge lines should define colored space



Discussion

Evaluations performed in Portland, OR, St. Petersburg, FL and Austin, TX found that significantly more motorists yielded to bicyclists and slowed or stopped before entering the conflict area after the application of the colored pavement when compared with an uncolored treatment.

Additional References and Guidelines

FHWA. (2011). Interim Approval (IA-14) has been granted. Requests to use green colored pavement need to comply with the provisions of Paragraphs 14 through 22 of Section 1A.10
NACTO. (2012). Urban Bikeway Design Guide.

Materials and Maintenance

Because the effectiveness of markings depends entirely on their visibility, maintaining markings should be a high priority.

COMBINED BIKE LANE / TURN LANE

Description

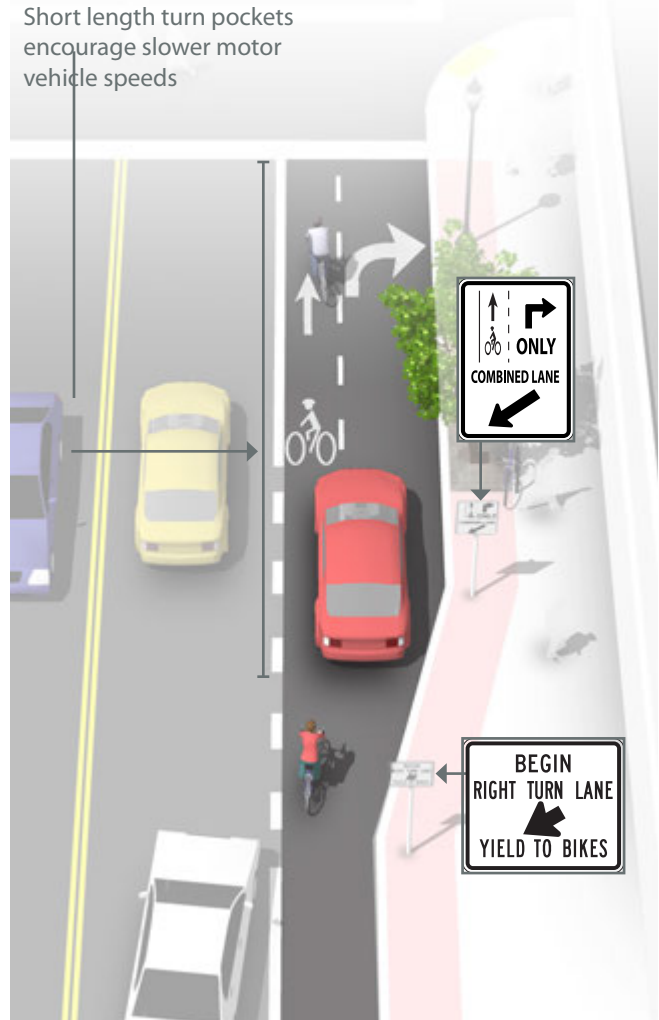
The combined bicycle/right turn lane places a standard-width bike lane on the left side of a dedicated right turn lane. A dotted line delineates the space for bicyclists and motorists within the shared lane. This treatment includes signage advising motorists and bicyclists of proper positioning within the lane.

This treatment is recommended at intersections lacking sufficient space to accommodate both a standard **through bike lane** and right turn lane.

Guidance

- Maximum shared turn lane width is 13 feet; narrower is preferable.
- Bike Lane pocket should have a minimum width of 4 feet with 5 feet preferred.
- A dotted 4 inch line and bicycle lane marking should be used to clarify bicyclist positioning within the combined lane, without excluding cars from the suggested bicycle area.
- A “Right Turn Only” sign with an “Except Bicycles” plaque may be needed to make it legal for through bicyclists to use a right turn lane.

Short length turn pockets encourage slower motor vehicle speeds



Discussion

Case studies cited by the Pedestrian and Bicycle Information Center indicate that this treatment works best on streets with lower posted speeds (30 MPH or less) and with lower traffic volumes (10,000 ADT or less). May not be appropriate for high-speed arterials or intersections with long right turn lanes. May not be appropriate for intersections with large percentages of right-turning heavy vehicles.

Additional References and Guidelines

NACTO. (2012). Urban Bikeway Design Guide. This treatment is currently slated for inclusion in the next edition of the AASHTO Guide for the Development of Bicycle Facilities

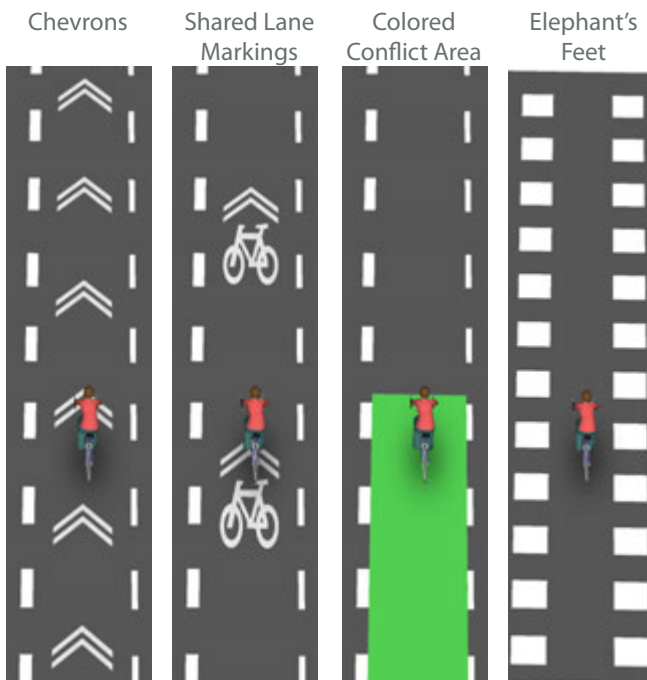
Materials and Maintenance

Locate markings out of tire tread to minimize wear. Because the effectiveness of markings depends on their visibility, maintaining markings should be a high priority.

INTERSECTION CROSSING MARKINGS

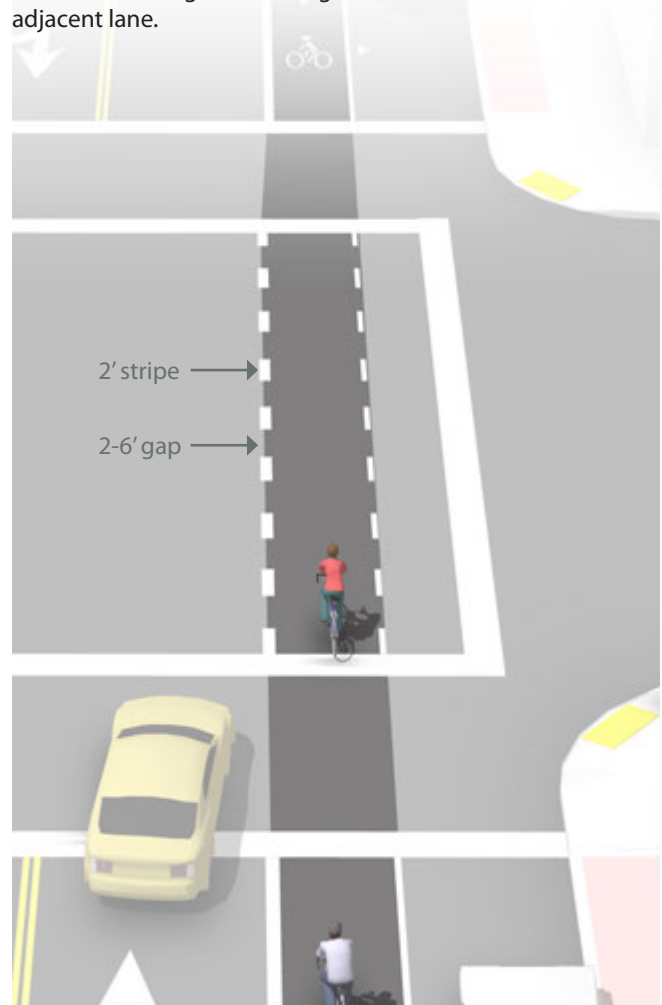
Guidance

- See MUTCD Section 3B.08: “dotted line extensions”
- Crossing striping shall be at least six inches wide when adjacent to motor vehicle travel lanes. Dotted lines should be two-foot lines spaced two to six feet apart.
- Chevrons, shared lane markings, or **colored bike lanes in conflict areas** may be used to increase visibility within conflict areas or across entire intersections. Elephant’s Feet markings are common in Canada, and in use in Chicago, IL.



Description

Bicycle pavement markings through intersections indicate the intended path of bicyclists through an intersection or across a driveway or ramp. They guide bicyclists on a safe and direct path through the intersection and provide a clear boundary between the paths of through bicyclists and either through or crossing motor vehicles in the adjacent lane.



Discussion

Additional markings such as chevrons, shared lane markings, or **colored bike lanes in conflict areas** are strategies currently in use in the United States and Canada. Cities considering the implementation of markings through intersections should standardize future designs to avoid confusion.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
 FHWA. (2009). Manual on Uniform Traffic Control Devices. (3A.06)
 NACTO. (2012). Urban Bikeway Design Guide.

Materials and Maintenance

Because the effectiveness of marked crossings depends entirely on their visibility, maintaining marked crossings should be a high priority.

BICYCLISTS AT SINGLE LANE ROUNDABOUTS

Guidelines

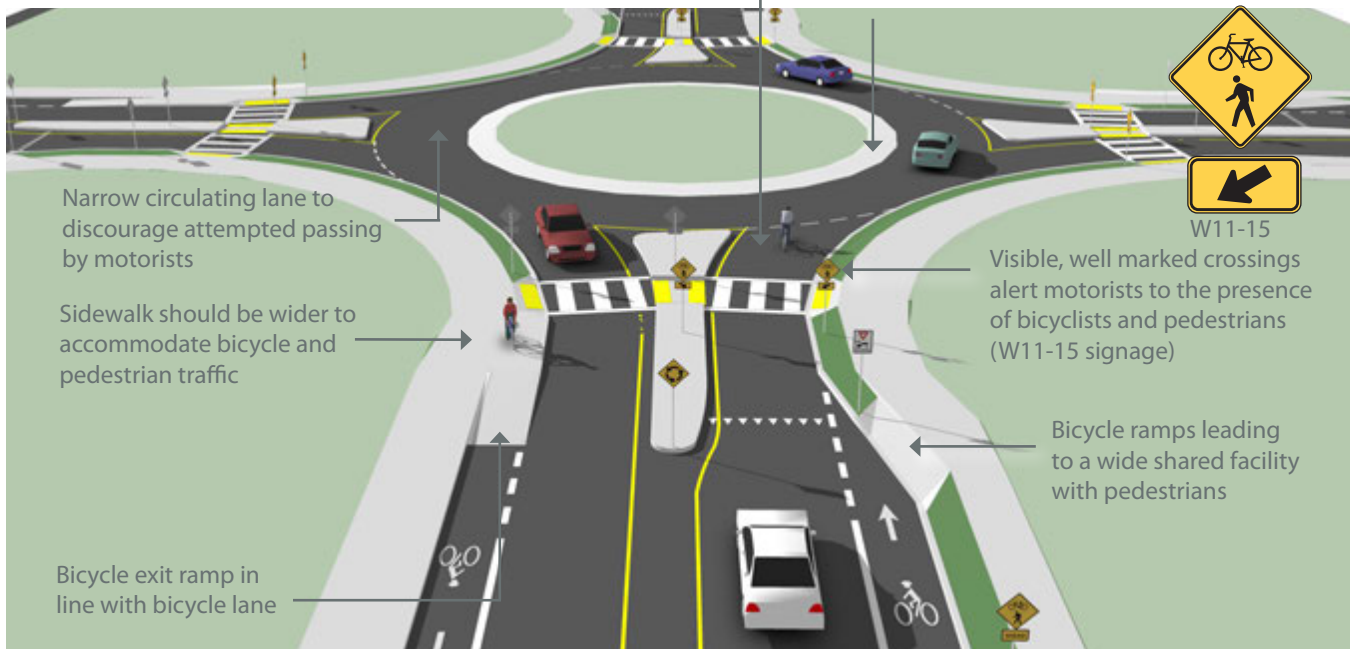
- 25 mph maximum circulating design speed.
- Design approaches/exits to the lowest speeds possible.
- Encourage bicyclists navigating the roundabout like motor vehicles to “take the lane.”
- Maximize yielding rate of motorists to pedestrians and bicyclists at crosswalks.
- Provide separated facilities for bicyclists who prefer not to navigate the roundabout on the roadway.

Description

In single lane roundabouts it is important to indicate to motorists, bicyclists and pedestrians the right-of-way rules and correct way for them to circulate, using appropriately designed signage, pavement markings, and geometric design elements.

Crossings set back at least one car length from the entrance of the roundabout

Truck apron can provide adequate clearance for longer vehicles



Discussion

Research indicates that while single-lane roundabouts may benefit bicyclists and pedestrians by slowing traffic, multi-lane roundabouts may present greater challenges and significantly increase safety problems for these users.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
 FHWA. (2000). Roundabouts: An Informational Guide
 FHWA. (2010). Roundabouts: An Informational Guide, Second Edition. NCHRP 672

Materials and Maintenance

Signage and striping require routine maintenance.

BIKEWAY SIGNING

The ability to navigate through a city is informed by landmarks, natural features and other visual cues. Signs throughout the city should indicate to bicyclists:

- Direction of travel
- Location of destinations
- Travel time/distance to those destinations

These signs will increase users' comfort and accessibility to the bicycle systems.

Signage can serve both wayfinding and safety purposes including:

- Helping to familiarize users with the bicycle network
- Helping users identify the best routes to destinations
- Helping to address misperceptions about time and distance
- Helping overcome a "barrier to entry" for people who are not frequent bicyclists (e.g., "interested but concerned" bicyclists)

A community-wide bicycle wayfinding signage plan would identify:

- Sign locations
- Sign type – what information should be included and design features
- Destinations to be highlighted on each sign – key destinations for bicyclists
- Approximate distance and travel time to each destination

Bicycle wayfinding signs also visually cue motorists that they are driving along a bicycle route and should use caution. Signs are typically placed at key locations leading to and along bicycle routes, including the intersection of multiple routes. Too many road signs tend to clutter the right-of-way, and it is recommended that these signs be posted at a level most visible to bicyclists rather than per vehicle signage standards.

This section includes:

- Wayfinding Sign Types
- Wayfinding Sign Placement
- Regulatory Signs
- Warning Signs



Wayfinding Sign Types



Wayfinding Sign Placement



Regulatory Signs



Warning Signs

WAYFINDING SIGN TYPES

Description

A bicycle wayfinding system consists of comprehensive signing and/or pavement markings to guide bicyclists to their destinations along preferred bicycle routes. There are three general types of wayfinding signs:

Confirmation Signs

- Indicate to bicyclists that they are on a designated bikeway. Make motorists aware of the bicycle route.
- Can include destinations and distance/time. Do not include arrows.

Turn Signs

- Indicate where a bikeway turns from one street onto another street. Can be used with pavement markings.
- Include destinations and arrows.

Decisions Signs

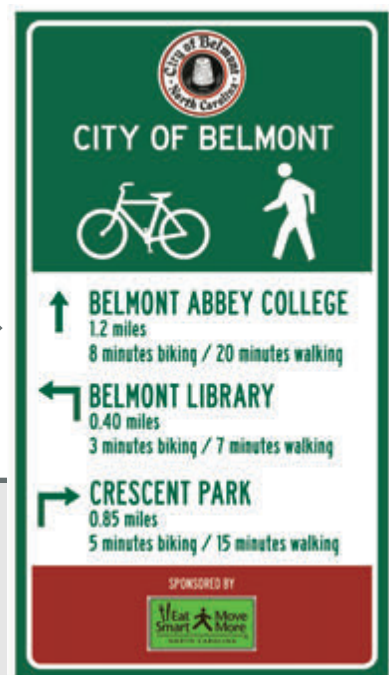
- Mark the junction of two or more bikeways.
- Inform bicyclists of the designated bike route to access key destinations.
- Destinations and arrows, distances and travel times are optional but recommended.

Numbered Routes

The MUTCD offers a standard design for numbered bicycle routes (M1-8). A customized design incorporating localized logo, photo or text is also available (M1-8a).

Alternative Designs

A customized alternative design may be used to include pedestrian-oriented travel times, local city logos, and sponsorship branding.



Discussion

There is no standard color for bicycle wayfinding signage. Section 1A.12 of the MUTCD establishes the general meaning for signage colors. Green is the color used for directional guidance and is the most common color of bicycle wayfinding signage in the US, including those in the MUTCD.

Additional References and Guidelines

- AASHTO. (2012). Guide for the Development of Bicycle Facilities.
- FHWA. (2009). Manual on Uniform Traffic Control Devices.
- NACTO. (2012). Urban Bikeway Design Guide.
- NCDOT. (2012). Complete Streets Planning and Design Guidelines.

Materials and Maintenance

Maintenance needs for bicycle wayfinding signs are similar to other signs and will need periodic replacement due to wear.

WAYFINDING SIGN PLACEMENT

Guidance

Signs are typically placed at decision points along bicycle routes – typically at the intersection of two or more bikeways and at other key locations leading to and along bicycle routes.

Decisions Signs

Near-side of intersections in advance of a junction with another bicycle route.

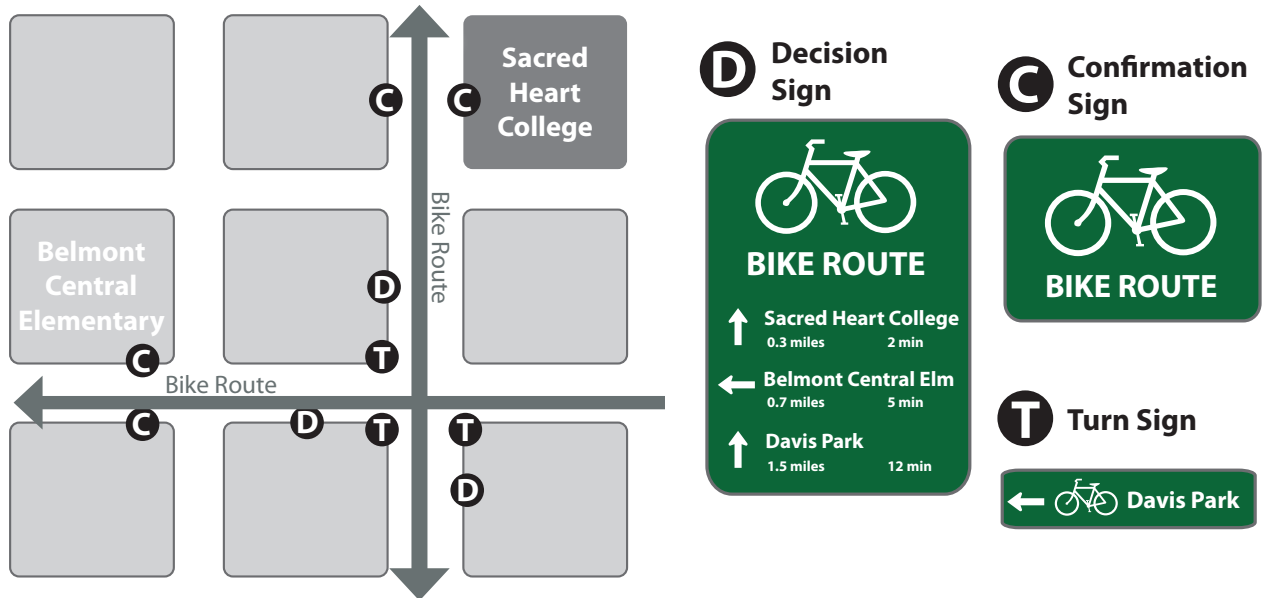
Along a route to indicate a nearby destination.

Confirmation Signs

Every ¼ to ½ mile on off-street facilities and every 2 to 3 blocks along on-street bicycle facilities, unless another type of sign is used (e.g., within 150 ft of a turn or decision sign). Should be placed soon after turns to confirm destination(s). Pavement markings can also act as confirmation that a bicyclist is on a preferred route.

Turn Signs

Near-side of intersections where bike routes turn (e.g., where the street ceases to be a bicycle route or does not go through). Pavement markings can also indicate the need to turn to the bicyclist.



Discussion

It can be useful to classify a list of destinations for inclusion on the signs based on their relative importance to users throughout the area. A particular destination's ranking in the hierarchy can be used to determine the physical distance from which the locations are signed. For example, primary destinations (such as the downtown area) may be included on signage up to five miles away. Secondary destinations (such as a transit station) may be included on signage up to two miles away. Tertiary destinations (such as a park) may be included on signage up to one mile away.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
 FHWA. (2009). Manual on Uniform Traffic Control Devices.
 NACTO. (2012). Urban Bikeway Design Guide.

Materials and Maintenance

Maintenance needs for bicycle wayfinding signs are similar to other signs and will need periodic replacement due to wear.

REGULATORY SIGNS

Guidance

- Small-sized signs or plaques may be used for bicycle-only traffic applications, such as along shared use paths.
- See the MUTCD 9B for a detailed list of regulatory sign application and guidance.

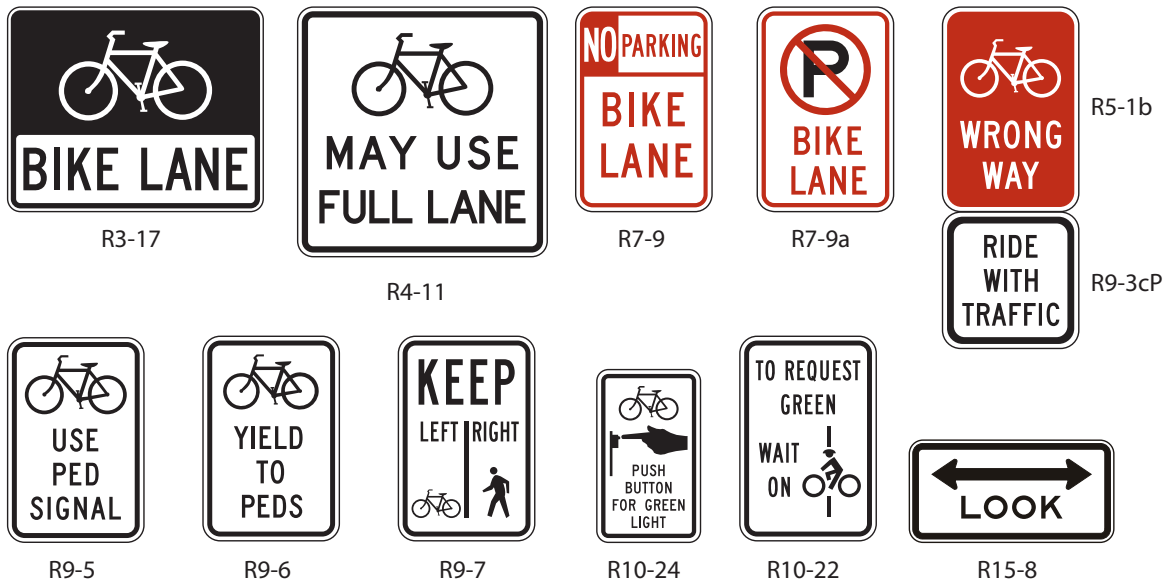
Description

Regulatory signs give a direction that must be obeyed, and apply to intersection control, speed, vehicle movement and parking. They are usually rectangular or square with a white background and black, white or colored letters.

Regulatory signs with a red background are reserved for STOP, YIELD, DO NOT ENTER or WRONG WAY messages.

Red text indicates a restricted parking conditions, and a circle with a line through it means the activity shown is not allowed.

Common Bicycle Oriented Regulatory Signs:



Discussion

Signs for the exclusive use of bicyclists should be located so that other road users are not confused by them.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
 FHWA. (2009). Manual on Uniform Traffic Control Devices.

Materials and Maintenance

Maintenance needs for bicycle regulatory signs are similar to other signs and will need periodic replacement due to wear.

WARNING SIGNS

Guidance

- Small-sized signs or plaques may be used for bicycle-only traffic applications, such as along shared use paths.
- See the MUTCD 9B for a detailed list of regulatory sign application and guidance.
- Fieldwork and engineering judgment are necessary to fine-tune the placement of signs.

Description

Warning signs call attention to unexpected conditions on or adjacent to a street, and to situations that might not be readily apparent to road users. Warning signs alert users to conditions that might call for a reduction of speed or an action in the interest of safety and efficient traffic operations.

They are usually diamond-shaped or square with a retro-reflective yellow or fluorescent yellow-green background with black letters.



Share the Road Sign

The sign serves to make motorists aware that bicyclists might be on the road, and that they have a legal right to use the roadway.

- The SHARE THE ROAD plaque (W16-P) shall not be used alone, and must be mounted below a W11-1 vehicular traffic warning sign.
- It is typically placed along roadways with high levels of bicycle usage but relatively hazardous conditions for bicyclists.
- The sign should not be used to designate a preferred bicycle route, but may be used along short sections of designated routes where traffic volumes are higher than desirable.

Additional Bicycle-Oriented Warning Signs:



Bicycle Crossing Assembly:



Additional warning are available to call attention to unexpected conditions for people riding bicycles, such as ar steep grades, rail crossings, and slippery conditions.

A Bicycle Crossing Assembly using W11-1 and W16-7P arrow plaque may be used at the location of a bikeway crossing to warn other road users.

Discussion

Installation of “Share the Road” signs is an ongoing process. Each new route system that is developed is assessed for “Share the Road” signing needs. Periodic field inspections of existing routes should identify areas where changing traffic conditions may warrant additional “Share the Road” signs.

The mixing of standard yellow and fluorescent yellow-green backgrounds within a zone or area should be avoided.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
 FHWA. (2009). Manual on Uniform Traffic Control Devices.
 North Carolina Department of Transportation Division of Bicycle and Pedestrian Transportation.

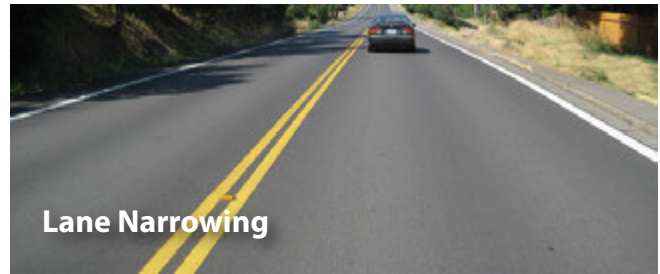
Materials and Maintenance

Maintenance needs for bicycle warning signs are similar to other signs and will need periodic replacement due to wear.

RETROFITTING EXISTING STREETS TO ADD BIKEWAYS

Most major streets are characterized by conditions (e.g., high vehicle speeds and/or volumes) for which dedicated bike lanes are the most appropriate facility to accommodate safe and comfortable riding. Although opportunities to add bike lanes through roadway widening may exist in some locations, many major streets have physical and other constraints that would require street retrofit measures within existing curb-to-curb widths. As a result, much of the guidance provided in this section focuses on effectively reallocating existing street width through striping modifications to accommodate dedicated bike lanes.

Although largely intended for major streets, these measures may be appropriate for any roadway where bike lanes would be the best accommodation for bicyclists.



This section includes:

- Roadway Widening
- Lane Narrowing
- Lane Reconfiguration
- Parking Reduction

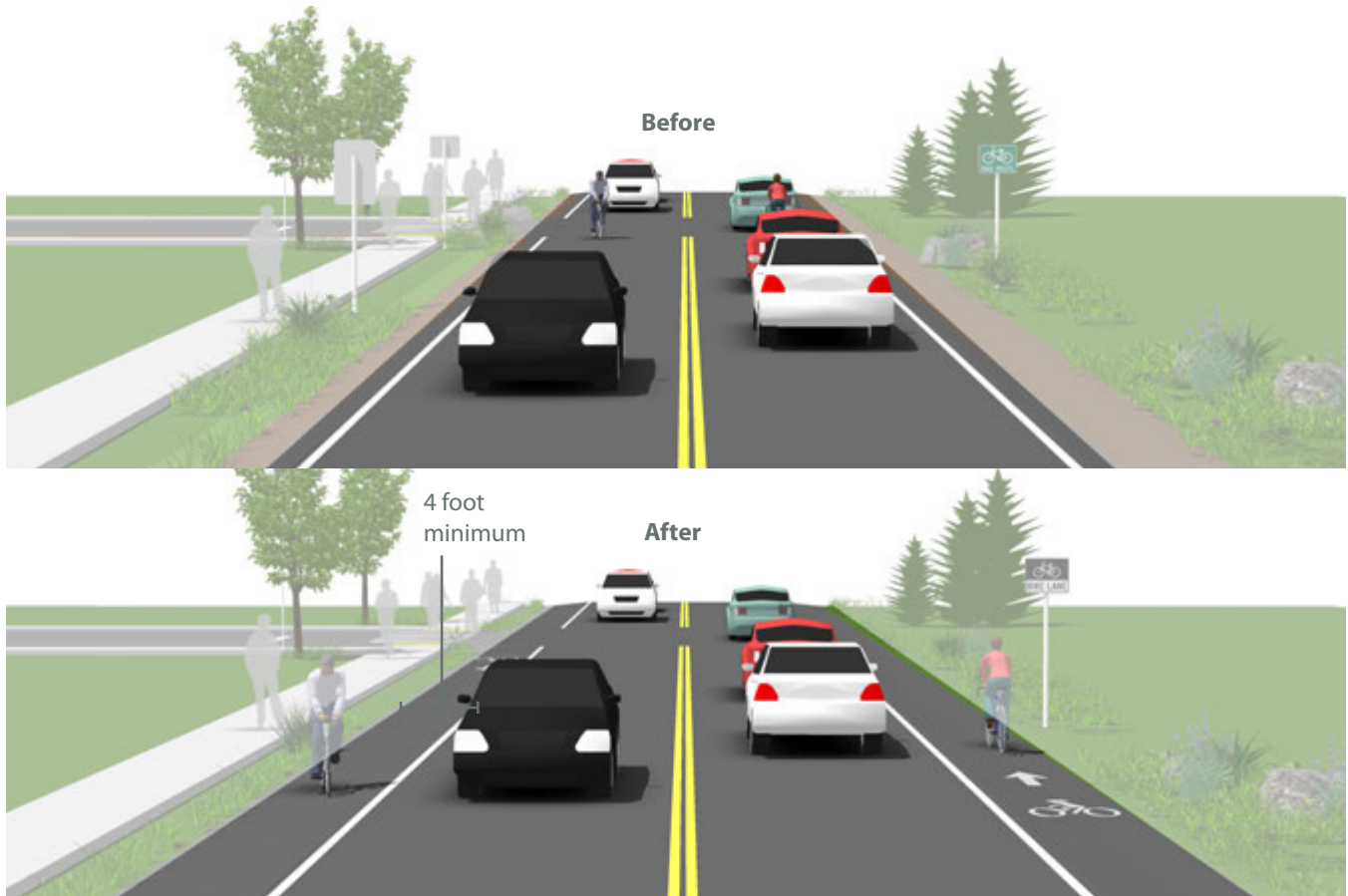
ROADWAY WIDENING

Guidance

- Guidance on **bicycle lanes** applies to this treatment.
- 4 foot minimum width when no curb and gutter is present.
- 6 foot width preferred.

Description

Bike lanes can be accommodated on streets with excess right-of-way through shoulder widening. Although roadway widening incurs higher expenses compared with re-striping projects, bike lanes can be added to streets currently lacking curbs, gutters and sidewalks without the high costs of major infrastructure reconstruction.



Discussion

Roadway widening is most appropriate on roads lacking curbs, gutters and sidewalks.

If it is not possible to meet minimum bicycle lane dimensions, a reduced width paved shoulder can still improve conditions for bicyclists on constrained roadways. In these situations, a minimum of 3 feet of operating space should be provided.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

Materials and Maintenance

The extended bicycle area should not contain any rough joints where bicyclists ride. Saw or grind a clean cut at the edge of the travel lane, or feather with a fine mix in a non-ridable area of the roadway.

LANE NARROWING

Guidance

Vehicle lane width:

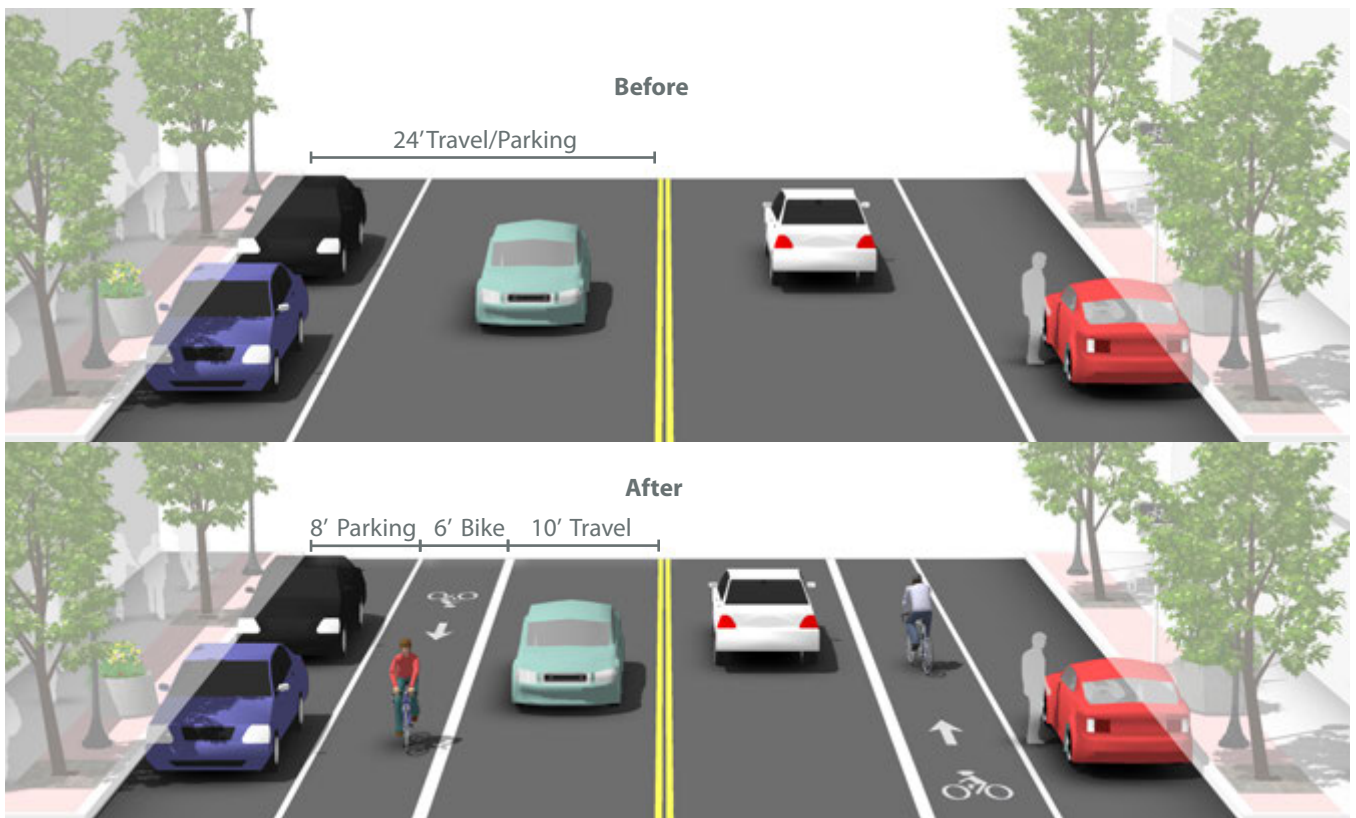
- Before: 10-15 feet
- After: 10-11 feet

Bicycle lane width:

- Guidance on **Bicycle Lanes** applies to this treatment.
-

Description

Lane narrowing utilizes roadway space that exceeds minimum standards to provide the needed space for bike lanes. Many roadways have existing travel lanes that are wider than those prescribed in local and national roadway design standards, or which are not marked. Most standards allow for the use of 11 foot and sometimes 10 foot wide travel lanes to create space for bike lanes.



Discussion

Special consideration should be given to the amount of heavy vehicle traffic and horizontal curvature before the decision is made to narrow travel lanes. Center turn lanes can also be narrowed in some situations to free up pavement space for bike lanes.

AASHTO supports reduced width lanes in *A Policy on Geometric Design of Highways and Streets*: “On interrupted-flow operation conditions at low speeds (45 mph or less), narrow lane widths are normally adequate and have some advantages.”

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
 AASHTO. (2004). A Policy on Geometric Design of Highways and Streets.

Materials and Maintenance

Repair rough or uneven pavement surface. Use bicycle compatible drainage grates. Raise or lower existing grates and utility covers so they are flush with the pavement.

LANE RECONFIGURATION

Guidance

Vehicle lane width:

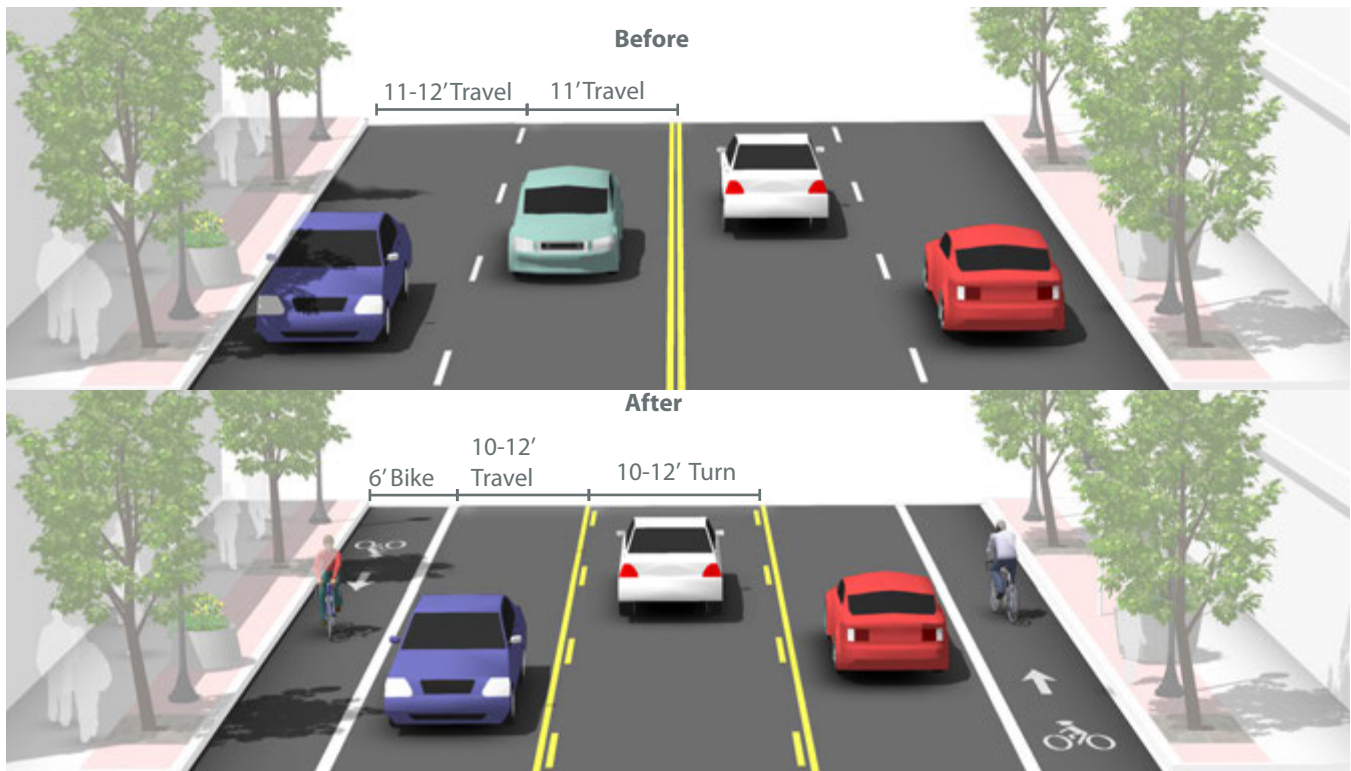
- Width depends on project. No narrowing may be needed if a lane is removed.

Bicycle lane width:

- Guidance on **Bicycle Lanes** applies to this treatment.

Description

The removal of a single travel lane will generally provide sufficient space for bike lanes on both sides of a street. Streets with excess vehicle capacity provide opportunities for bike lane retrofit projects.



Discussion

Depending on a street's existing configuration, traffic operations, user needs and safety concerns, various lane reduction configurations may apply. For instance, a four-lane street (with two travel lanes in each direction) could be modified to provide one travel lane in each direction, a center turn lane, and bike lanes. Prior to implementing this measure, a traffic analysis should identify potential impacts.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
 FHWA. (2010). Evaluation of Lane Reduction "Road Diet" Measures on Crashes. Publication Number: FHWA-HRT-10-053
 NCDOT. (2012). Complete Streets Planning and Design Guidelines.

Materials and Maintenance

Repair rough or uneven pavement surface. Use bicycle compatible drainage grates. Raise or lower existing grates and utility covers so they are flush with the pavement.

PARKING REDUCTION

Guidance

Vehicle lane width:

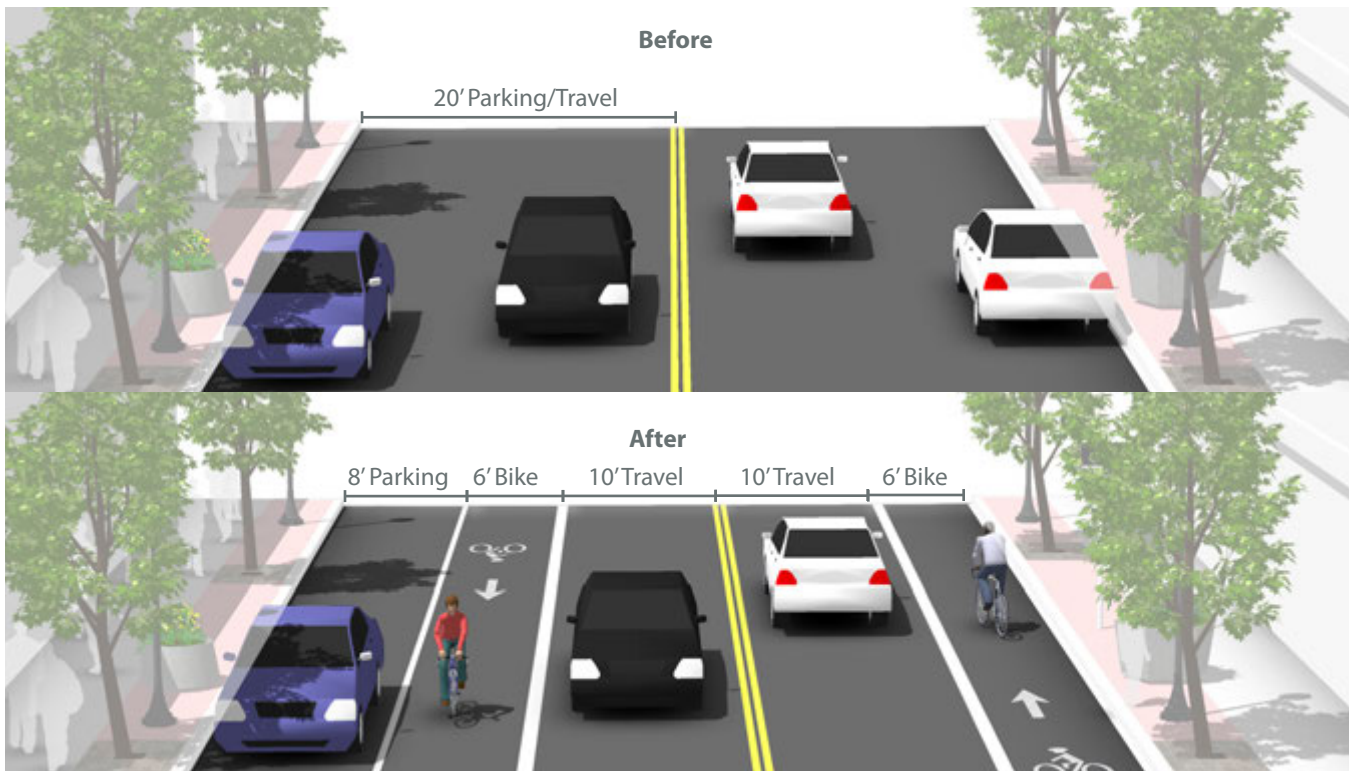
- Parking lane width depends on project. No travel lane narrowing may be required depending on the width of the parking lanes.

Bicycle lane width:

- Guidance on **Bicycle Lanes** applies to this treatment.

Description

Bike lanes can replace one or more on-street parking lanes on streets where excess parking exists and/or the importance of bike lanes outweighs parking needs. For example, parking may be needed on only one side of a street. Eliminating or reducing on-street parking also improves sight distance for bicyclists in bike lanes and for motorists on approaching side streets and driveways.



Discussion

Removing or reducing on-street parking to install bike lanes requires comprehensive outreach to the affected businesses and residents. Prior to reallocating on-street parking for other uses, a parking study should be performed to gauge demand and to evaluate impacts to people with disabilities.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
 AASHTO. (2004). A Policy on Geometric Design of Highways and Streets.

Materials and Maintenance

Repair rough or uneven pavement surface. Use bicycle compatible drainage grates. Raise or lower existing grates and utility covers so they are flush with the pavement

GREENWAYS AND OFF-STREET FACILITIES

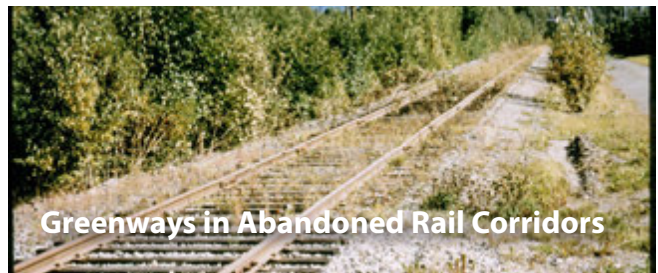
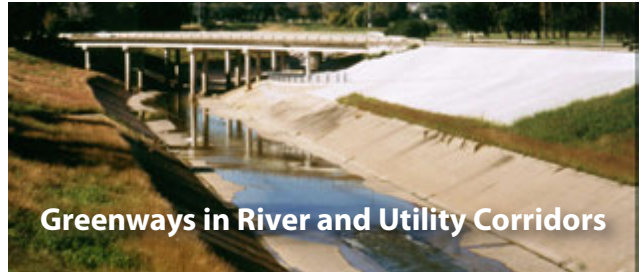
A greenway (also known as a multi-use path) allows for two-way, off-street bicycle use and also may be used by pedestrians, skaters, wheelchair users, joggers and other non-motorized users. These facilities are frequently found in parks, along rivers, beaches, and in greenbelts or utility corridors where there are few conflicts with motorized vehicles. Path facilities can also include amenities such as lighting, signage, and fencing (where appropriate).

Key features of greenways include:

- Frequent access points from the local road network.
- Directional signs to direct users to and from the path.
- A limited number of at-grade crossings with streets or driveways.
- Terminating the path where it is easily accessible to and from the street system.
- Separate treads for pedestrians and bicyclists when heavy use is expected.

This Section Includes:

- General Design Practices
- Trails in River and Utility Corridors
- Trails in Abandoned Rail Corridors
- Local Neighborhood Accessways
- Multi-Use Paths along Roadways



GENERAL DESIGN PRACTICES

Description

Shared use paths can provide a desirable facility, particularly for recreation, and users of all skill levels preferring separation from traffic. Bicycle paths should generally provide directional travel opportunities not provided by existing roadways.

Guidance

Width

- 8 feet is the minimum allowed for a two-way bicycle path and is only recommended for low traffic situations.
- 10 feet is recommended in most situations and will be adequate for moderate to heavy use.
- 12 feet is recommended for heavy use situations with high concentrations of multiple users. A separate track (5' minimum) can be provided for pedestrian use.

Lateral Clearance

- A 2 foot or greater shoulder on both sides of the path should be provided. An additional foot of lateral clearance (total of 3') is required by the MUTCD for the installation of signage or other furnishings.

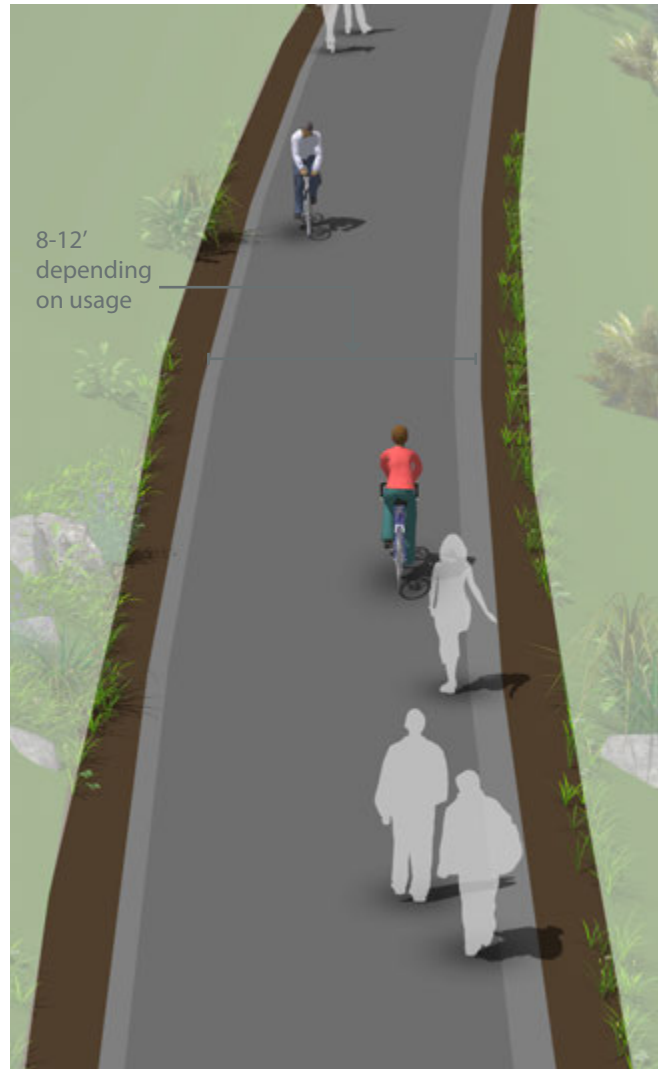
Overhead Clearance

- Clearance to overhead obstructions should be 8 feet minimum, with 10 feet recommended.

Striping

- When striping is required, use a 4 inch dashed yellow centerline stripe with 4 inch solid white edge lines.
- Solid centerlines can be provided on tight or blind corners, and on the approaches to roadway crossings.

Terminate the path where it is easily accessible to and from the street system, preferably at a controlled intersection or at the beginning of a dead-end street.



Discussion

The AASHTO Guide for the Development of Bicycle Facilities generally recommends against the development of **shared use paths along roadways**. Also known as “sidepaths”, these facilities create a situation where a portion of the bicycle traffic rides against the normal flow of motor vehicle traffic and can result in wrong-way riding when either entering or exiting the path.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
 FHWA. (2009). Manual on Uniform Traffic Control Devices.
 Flink, C. (1993). Greenways: A Guide To Planning Design And Development.
 NCDOT. (2012). Complete Streets Planning and Design Guidelines.

Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

GREENWAYS IN RIVER AND UTILITY CORRIDORS

Guidance

Greenways in utility corridors should meet or exceed **general design practices**. If additional width allows, wider paths, and landscaping are desirable.

Access Points

Any access point to the path should be well-defined with appropriate signage designating the pathway as a bicycle facility and prohibiting motor vehicles.

Path Closure

Public access to the greenway may be prohibited during the following events:

- Canal/flood control channel or other utility maintenance activities
- Inclement weather or the prediction of storm conditions

Description

Utility and waterway corridors often offer excellent greenway development and bikeway gap closure opportunities. Utility corridors typically include powerline and sewer corridors, while waterway corridors include canals, drainage ditches, rivers, and beaches. These corridors offer excellent transportation and recreation opportunities for bicyclists of all ages and skills.



Discussion

Similar to railroads, public access to flood control channels or canals is undesirable by all parties. Hazardous materials, deep water or swift current, steep, slippery slopes, and debris all constitute risks for public access. Appropriate fencing may be required to keep path users within the designated travel way. Creative design of fencing is encouraged to make the path facility feel welcoming to the user.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
FHWA. (2009). Manual on Uniform Traffic Control Devices.
Flink, C. (1993). Greenways: A Guide To Planning Design And Development.

Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

GREENWAYS IN ABANDONED RAIL CORRIDORS

Guidance

Greenways in abandoned rail corridors should meet or exceed **general design practices**. If additional width allows, wider paths, and landscaping are desirable.

In full conversions of abandoned rail corridors, the sub-base, superstructure, drainage, bridges, and crossings are already established. Design becomes a matter of working with the existing infrastructure to meet the needs of a rail-trail.

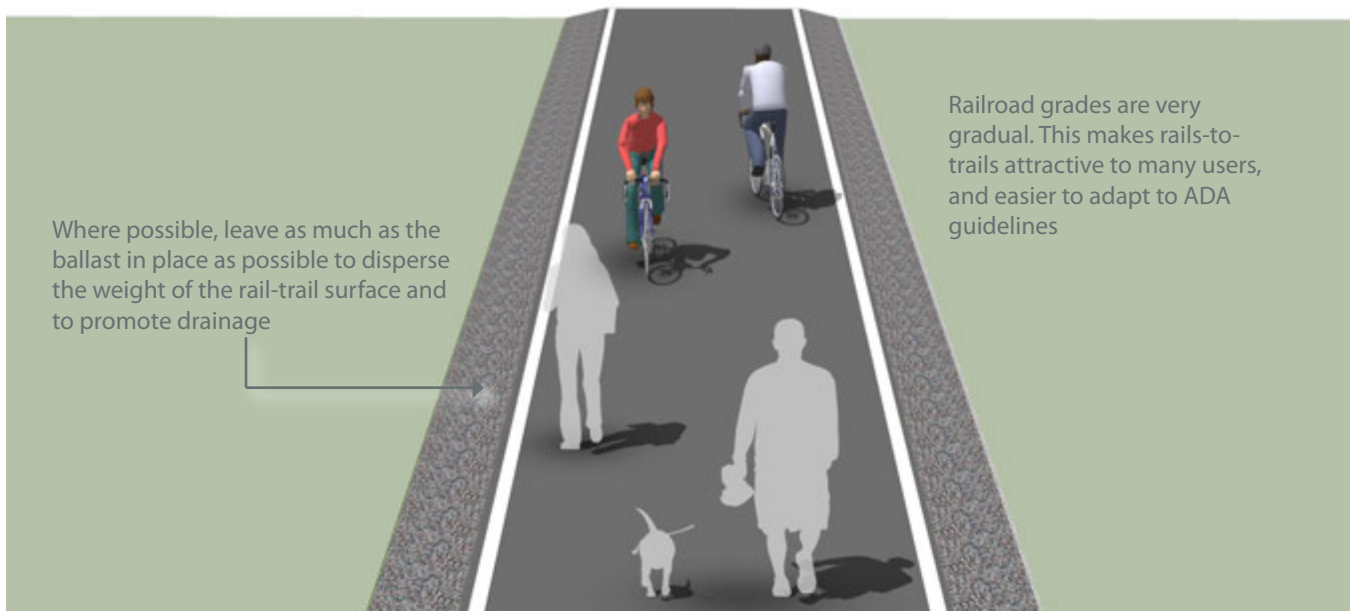
If converting a rail bed adjacent to an active rail line, see **Greenways in Existing Active Rail Corridors**.

Description

Commonly referred to as Rails-to-Trails or Rail-Trails, these projects convert vacated rail corridors into off-street paths. Rail corridors offer several advantages, including relatively direct routes between major destinations and generally flat terrain.

In some cases, rail owners may rail-bank their corridors as an alternative to a complete abandonment of the line, thus preserving the rail corridor for possible future use.

The railroad may form an agreement with any person, public or private, who would like to use the banked rail line as a trail or linear park until it is again needed for rail use. Municipalities should acquire abandoned rail rights-of-way whenever possible to preserve the opportunity for trail development.



Discussion

It is often impractical and costly to add material to existing railroad bed fill slopes. This results in trails that meet minimum path widths, but often lack preferred shoulder and lateral clearance widths.

Rail-to-trails can involve many challenges including the acquisition of the right of way, cleanup and removal of toxic substances, and rehabilitation of tunnels, trestles and culverts. A structural engineer should evaluate existing railroad bridges for structural integrity to ensure they are capable of carrying the appropriate design loads.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
 FHWA. (2009). Manual on Uniform Traffic Control Devices.
 Flink, C. (1993). Greenways: A Guide To Planning Design And Development.

Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

LOCAL NEIGHBORHOOD ACCESSWAYS

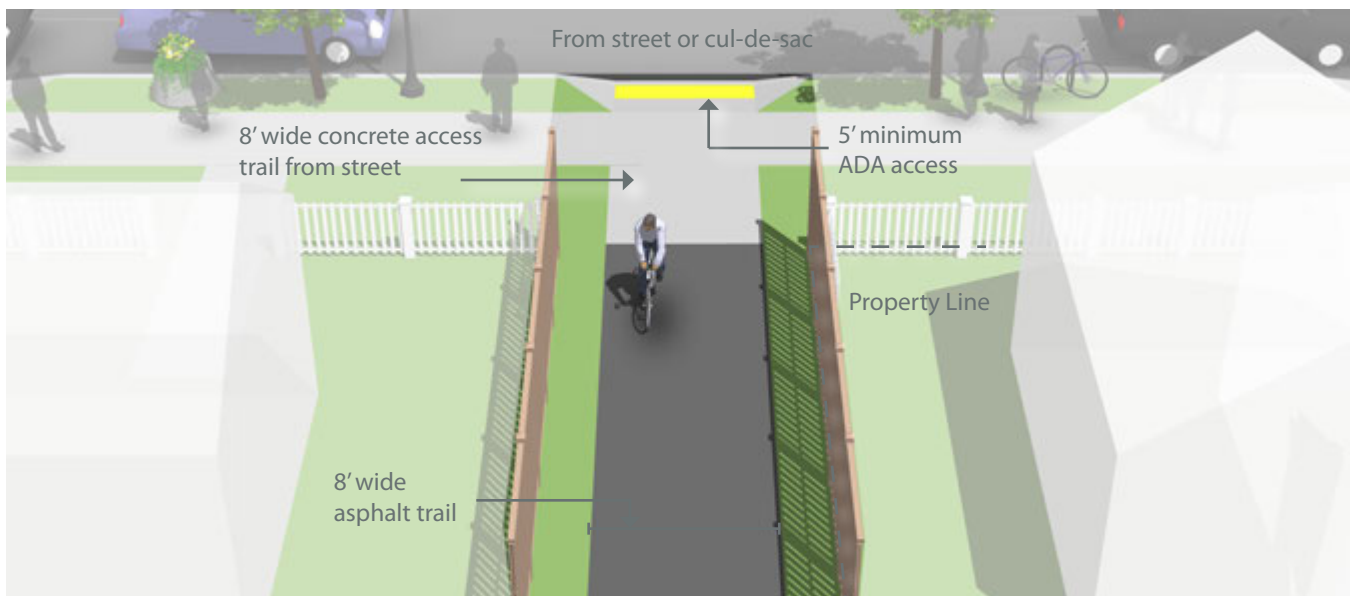
Guidance

- Neighborhood accessways should remain open to the public.
- Trail pavement shall be at least 8' wide to accommodate emergency and maintenance vehicles, meet ADA requirements and be considered suitable for multi-use.
- Trail widths should be designed to be less than 8' wide only when necessary to protect large mature native trees over 18" in caliper, wetlands or other ecologically sensitive areas.
- Access trails should slightly meander whenever possible.

Description

Neighborhood accessways provide residential areas with direct bicycle and pedestrian access to parks, trails, greenspaces, and other recreational areas. They most often serve as small trail connections to and from the larger trail network, typically having their own rights-of-way and easements.

Additionally, these smaller trails can be used to provide bicycle and pedestrian connections between dead-end streets, cul-de-sacs, and access to nearby destinations not provided by the street network.



Discussion

Neighborhood accessways should be designed into new subdivisions at every opportunity and should be required by City/County subdivision regulations.

For existing subdivisions, Neighborhood and homeowner association groups are encouraged to identify locations where such connects would be desirable. Nearby residents and adjacent property owners should be invited to provide landscape design input.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
 FHWA. (2009). Manual on Uniform Traffic Control Devices.
 FHWA. (2006). Federal Highway Administration University Course on Bicycle and Pedestrian Transportation. Lesson 19: Greenways and Shared Use Paths.

Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

MULTI-USE PATHS ALONG ROADWAYS

Description

A multi-use path allows for two-way, off-street bicycle use and also may be used by pedestrians, skaters, wheelchair users, joggers and other non-motorized users. These facilities are frequently found in parks, along rivers, beaches, and in greenbelts or utility corridors where there are few conflicts with motorized vehicles.

Guidance

- 8 feet is the minimum allowed for a two-way bicycle path and is only recommended for low traffic situations.
- 10 feet is recommended in most situations and will be adequate for moderate to heavy use.
- 12 feet is recommended for heavy use situations with high concentrations of multiple users such as joggers, bicyclists, rollerbladers and pedestrians. A separate track (5' minimum) can be provided for pedestrian use.

Driveways and Intersections

The AASHTO Guide for the Development of Bicycle Facilities generally recommends against the development of multi-use paths directly adjacent to roadways, primarily due to safety and operational concerns at driveways and intersections. Key strategies to mitigate this concern include:

- Reduce the density of driveways and simplify movements through access management.
- Keep approaches to intersections and major driveways clear of obstructions.
- Pay special attention to the entrance/exit of the path as bicyclists may continue to travel on the wrong side of the street.



Discussion

When designing a bikeway network, the presence of a nearby or parallel path should not be used as a reason to not provide adequate shoulder or bicycle lane width on the roadway, as the on-street bicycle facility will generally be superior to the "sidepath" for experienced bicyclists and those who are cycling for transportation purposes.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
 NACTO. (2012). Urban Bikeway Design Guide. See entry on Raised Cycle Tracks.
 NCDOT. (2012). Complete Streets Planning and Design Guidelines.

Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

PATH/ROADWAY CROSSINGS

At-grade roadway crossings can create potential conflicts between path users and motorists, however, well-designed crossings can mitigate many operational issues and provide a higher degree of safety and comfort for path users. Path facilities that cater to bicyclists can require additional considerations due to the higher travel speed of bicyclists versus pedestrians.

Consideration must be given to adequate warning distance based on vehicle speeds and line of sight, with the visibility of any signs absolutely critical. Directing the active attention of motorists to roadway signs may require additional alerting devices such as a flashing beacon, roadway striping or changes in pavement texture. Signing for path users may include a standard "STOP" or "YIELD" sign and pavement markings, possibly combined with other features such as bollards or a bend in the pathway to slow bicyclists. Care must be taken not to place too many signs at crossings lest they begin to lose their visual impact.

A number of striping patterns have emerged over the years to delineate path crossings. A median stripe on the path approach will help to organize and warn path users. Crosswalk striping is typically a matter of local and State preference, and may be accompanied by pavement treatments to help warn and slow motorists. In areas where motorists do not typically yield to crosswalk users, additional measures may be required to increase compliance.

Bikeway/Railroad Crossings

Crossings of railroad tracks by greenways or other bikeways on a diagonal can cause steering difficulties for bicyclists. The likelihood of a fall is kept to a minimum where the bikeway crosses the tracks at 90 degrees. Crossing angles should be widened and realigned to create a 60 degree crossing or better (90 degrees preferred). It may be helpful to post a W10-12 warning sign at these locations.



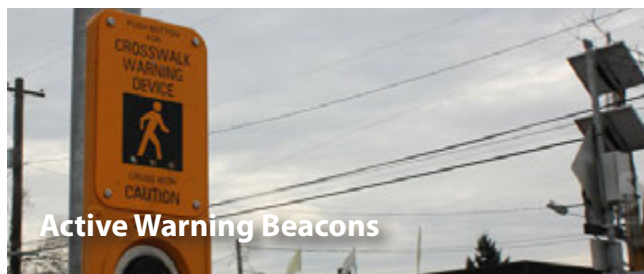
W10-12

This section includes:

- Marked/Unsignalized Crossings
- Active Warning Beacons
- Signalized/Controlled Crossings
- Undercrossings
- Overcrossings



Marked/Unsignalized Crossings



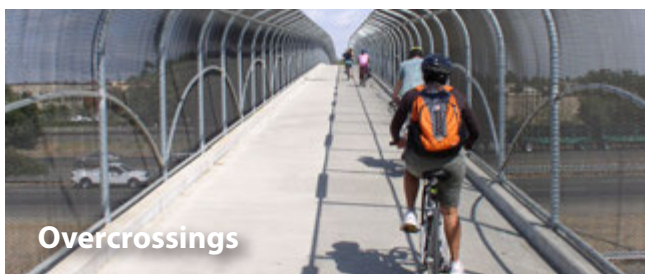
Active Warning Beacons



Signalized/Controlled Crossings



Undercrossings



Overcrossings

MARKED/UNSIGNALIZED CROSSINGS

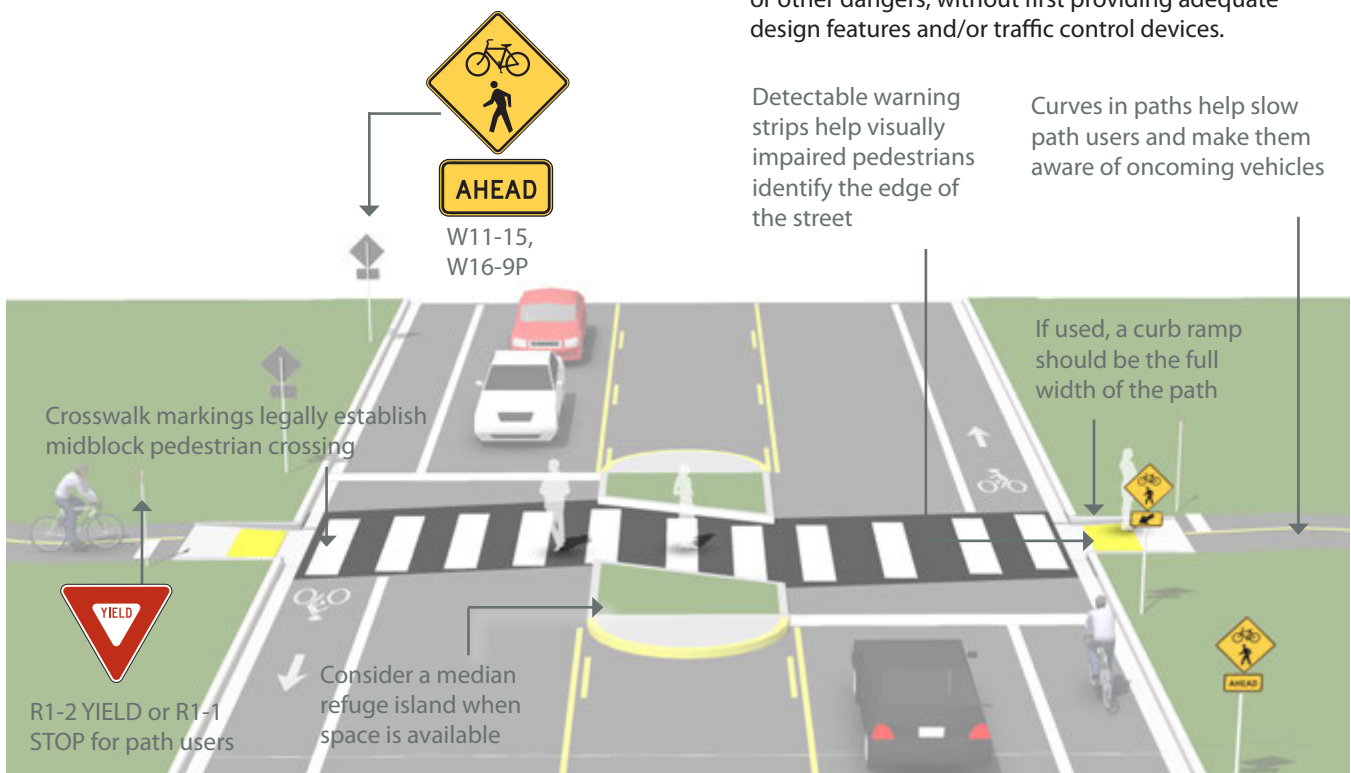
Description

A marked/unsignalized crossing typically consists of a marked crossing area, signage and other markings to slow or stop traffic. The approach to designing crossings at mid-block locations depends on an evaluation of vehicular traffic, line of sight, pathway traffic, use patterns, vehicle speed, road type, road width, and other safety issues such as proximity to major attractions.

When space is available, using a median refuge island can improve user safety by providing pedestrians and bicyclists space to perform the safe crossing of one side of the street at a time.

Guidance

- Refer to the FHWA report, “Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations” for specific volume and speed ranges where a marked crosswalk alone may be sufficient.
- Where the speed limit exceeds 40 miles per hour, marked crosswalks alone should not be used at unsignalized locations.
- Crosswalks should not be installed at locations that could present an increased risk to pedestrians, such as where there is poor sight distance, complex or confusing designs, a substantial volume of heavy trucks, or other dangers, without first providing adequate design features and/or traffic control devices.



Discussion

Crosswalks alone will not make crossings safer, nor will crosswalks necessarily result in more vehicles stopping for pedestrians. Whether or not marked crosswalks are installed, it is important to consider other pedestrian facility enhancements (e.g. raised median, traffic signal, roadway narrowing, enhanced overhead lighting, traffic-calming measures, curb extensions, etc.) as needed to improve the safety of the crossing. These are general recommendations; good engineering judgment should be used in individual cases for deciding which treatment to use.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
 FHWA. (2009). Manual on Uniform Traffic Control Devices.

Materials and Maintenance

Locate markings out of wheel tread when possible to minimize wear and maintenance costs.

ACTIVE WARNING BEACONS

Description

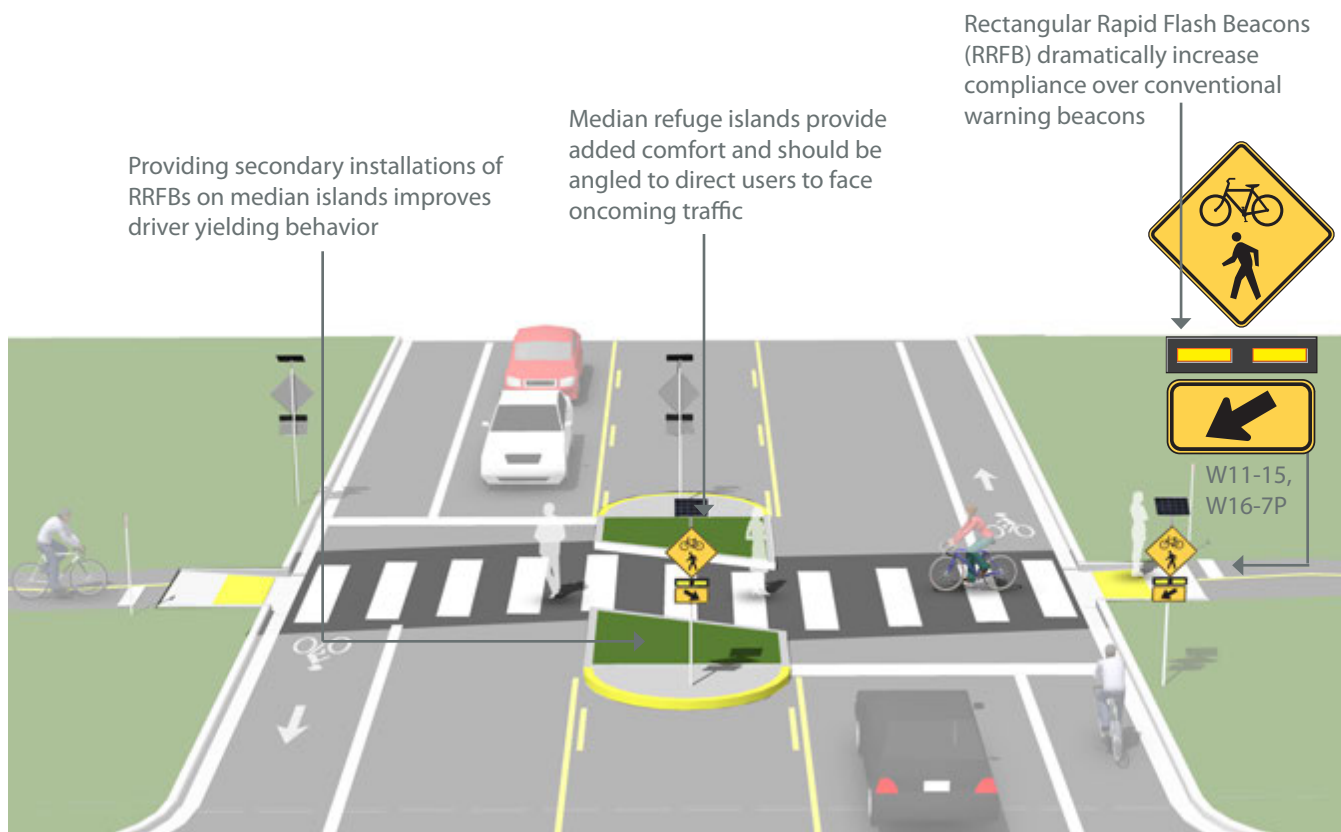
Enhanced marked crossings are unsignalized crossings with additional treatments designed to increase motor vehicle yielding compliance on multi-lane or high volume roadways.

These enhancements include pathway user or sensor actuated warning beacons, Rectangular Rapid Flash Beacons (RRFB) shown below, or in-roadway warning lights.

Guidance

Guidance for **Marked/Unsignalized Crossings** applies.

- Warning beacons shall not be used at crosswalks controlled by YIELD signs, STOP signs, or traffic control signals.
- Warning beacons shall initiate operation based on user actuation and shall cease operation at a predetermined time after the user actuation or, with passive detection, after the user clears the crosswalk.



Discussion

Rectangular rapid flash beacons show the most increased compliance of all the warning beacon enhancement options.

A study of the effectiveness of going from a no-beacon arrangement to a two-beacon RRFB installation increased yielding from 18 percent to 81 percent. A four-beacon arrangement raised compliance to 88%. Additional studies of long term installations show little to no decrease in yielding behavior over time.

Additional References and Guidelines

NACTO. (2012). Urban Bikeway Design Guide.
 FHWA. (2009). Manual on Uniform Traffic Control Devices.
 FHWA. (2008). MUTCD - Interim Approval for Optional Use of Rectangular Rapid Flashing Beacons (IA-11)

Materials and Maintenance

Locate markings out of wheel tread when possible to minimize wear and maintenance costs. Signing and striping need to be maintained to help users understand any unfamiliar traffic control.

SIGNALIZED/CONTROLLED CROSSINGS

Description

Signalized crossings provide the most protection for crossing path users through the use of a red-signal indication to stop conflicting motor vehicle traffic. The two types of path signalization are full traffic signal control and hybrid signals.

A full traffic signal installation treats the path crossing as a conventional 4-way intersection and provides standard red-yellow-green traffic signal heads for all legs of the intersection.

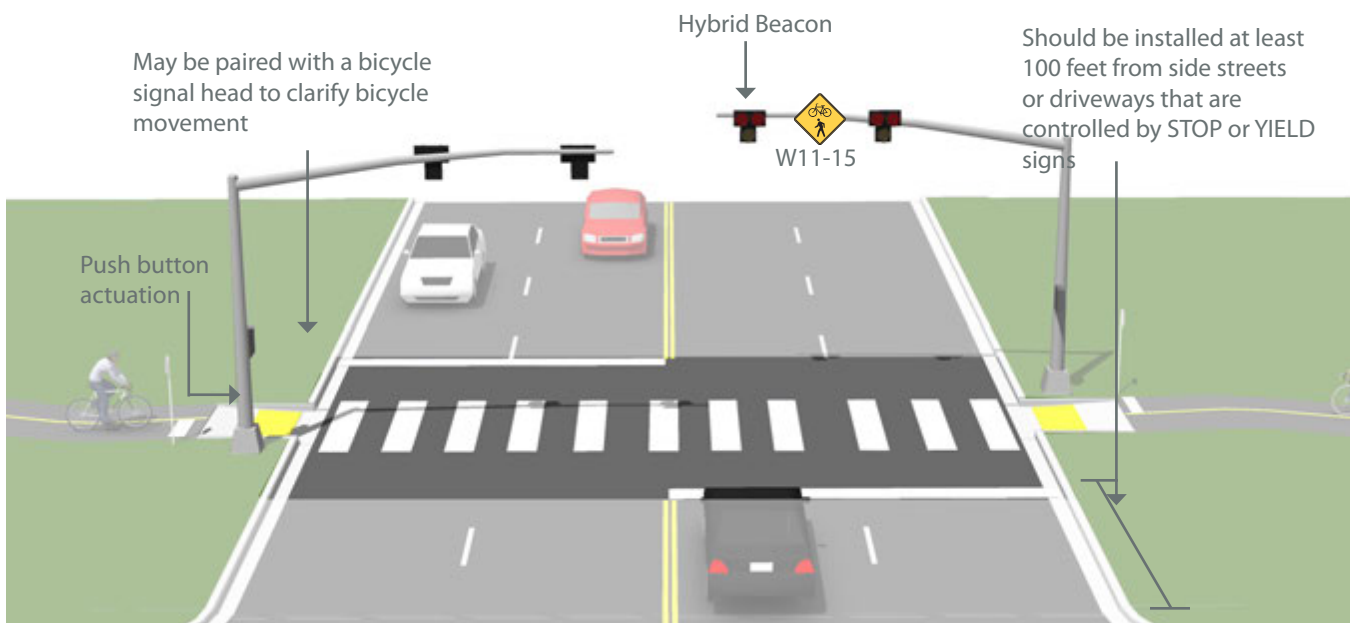
Hybrid beacon installation (shown below) faces only cross motor vehicle traffic, stays dark when inactive, and uses a unique 'wig-wag' signal phase to indicate activation. Vehicles have the option to proceed after stopping during the final flashing red phase, which can reduce motor vehicle delay when compared to a full signal installation.

Guidance

Hybrid beacons (illustrated here) may be installed without meeting traffic signal control warrants if roadway speed and volumes are excessive for comfortable path crossings.

Full traffic signal installations must meet MUTCD pedestrian, school or modified warrants. Additional guidance for signalized crossings:

- Located more than 300 feet from an existing signalized intersection
- Roadway travel speeds of 40 MPH and above
- Roadway ADT exceeds 15,000 vehicles



Discussion

Shared-use path signals are normally activated by push buttons but may also be triggered by embedded loop, infrared, microwave or video detectors. The maximum delay for activation of the signal should be two minutes, with minimum crossing times determined by the width of the street.

Each crossing, regardless of traffic speed or volume, requires additional review by a registered engineer to identify sight lines, potential impacts on traffic progression, timing with adjacent signals, capacity and safety.

Additional References and Guidelines

FHWA. (2009). Manual on Uniform Traffic Control Devices.
 NACTO. (2012). Urban Bikeway Design Guide.

Materials and Maintenance

Hybrid beacons are subject to the same maintenance needs and requirements as standard traffic signals. Signage and striping need to be maintained to help users understand any unfamiliar traffic control.

UNDERCROSSINGS

Description

Bicycle/pedestrian undercrossings provide critical non-motorized system links by joining areas separated by barriers such as railroads and highway corridors. In most cases, these structures are built in response to user demand for safe crossings where they previously did not exist.

Grade-separated crossings are advisable where existing bicycle/pedestrian crossings do not exist, where ADT exceeds 25,000 vehicles and where 85th percentile speeds exceed 45 miles per hour.

Guidance

- 14 foot minimum width, greater widths preferred for lengths over 60 feet.
- 10 foot minimum height.
- The undercrossing should have a centerline stripe even if the rest of the path does not have one.
- Lighting should be considered during the design process for any undercrossing with high anticipated use or in culverts and tunnels.



Discussion

Safety is a major concern with undercrossings. Shared-use path users may be temporarily out of sight from public view and may experience poor visibility themselves. To mitigate safety concerns, an undercrossing should be designed to be spacious, well-lit, equipped with emergency cell phones at each end and completely visible for its entire length from end to end.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
AASHTO. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities.

Materials and Maintenance

14 foot width allows for maintenance vehicle access.

Potential problems include conflicts with utilities, drainage, flood control and vandalism.

OVERCROSSINGS

Description

Bicycle/pedestrian overcrossings provide critical non-motorized system links by joining areas separated by barriers such as deep canyons, waterways or major transportation corridors. In most cases, these structures are built in response to user demand for safe crossings where they previously did not exist.

Grade-separated crossings may be needed where existing bicycle/pedestrian crossings do not exist, where ADT exceeds 25,000 vehicles, and where 85th percentile speeds exceed 45 miles per hour.

Overcrossings require a minimum of 17 feet of vertical clearance to the roadway below versus a minimum elevation differential of around 12 feet for an undercrossing. This results in potentially greater elevation differences and much longer ramps for bicycles and pedestrians to negotiate.

Guidance

8 foot minimum width, 14 feet preferred. If overcrossing has any scenic vistas additional width should be provided to allow for stopping. A separate 5 foot pedestrian area may be provided for facilities with high bicycle and pedestrian use.

10 foot headroom on overcrossing; clearance below will vary depending on feature being crossed.

Roadway:	17 feet
Freeway:	18.5 feet
Heavy Rail Line:	23 feet

The overcrossing should have a centerline stripe even if the rest of the path does not have one.



Discussion

Overcrossings for bicycles and pedestrians typically fall under the Americans with Disabilities Act (ADA), which strictly limits ramp slopes to 5% (1:20) with landings at 400 foot intervals, or 8.33% (1:12) with landings every 30 feet.

Overcrossings pose potential concerns about visual impact and functional appeal, as well as space requirements necessary to meet ADA guidelines for slope.

Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
 AASHTO. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities.

Materials and Maintenance

Potential issues with vandalism.

Overcrossings can be more difficult to clear of snow than undercrossings.

BIKEWAY SUPPORT AND MAINTENANCE

Bicycle Parking

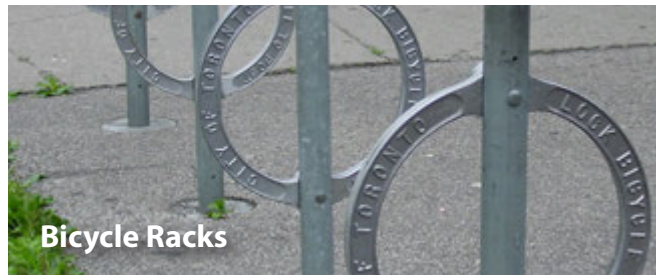
Bicyclists expect a safe, convenient place to secure their bicycle when they reach their destination. This may be short-term parking of 2 hours or less, or long-term parking for employees, students, residents, and commuters.

Maintenance

Regular bicycle facility maintenance includes sweeping, maintaining a smooth roadway, ensuring that the gutter-to-pavement transition remains relatively flat, and installing bicycle-friendly drainage grates. Pavement overlays are a good opportunity to improve bicycle facilities.

This Section Includes:

- Bicycle Racks
- Bicycle Detection and Actuation
- Drainage Grates
- Sweeping
- Pavement Overlays
- Gutter to Pavement Transitions



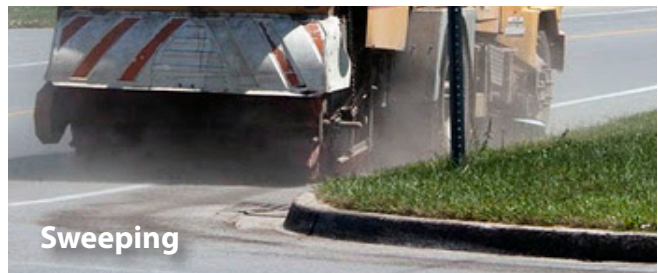
Bicycle Racks



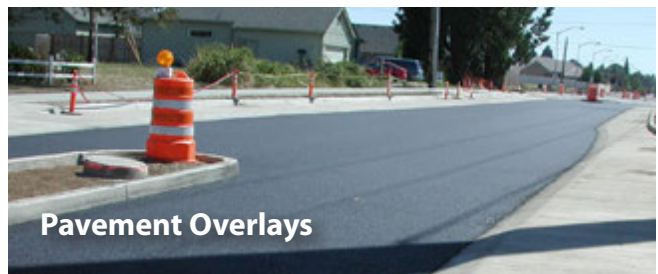
Bicycle Detection and Actuation



Drainage Grates



Sweeping



Pavement Overlays



Gutter to Pavement Transition

BICYCLE RACKS

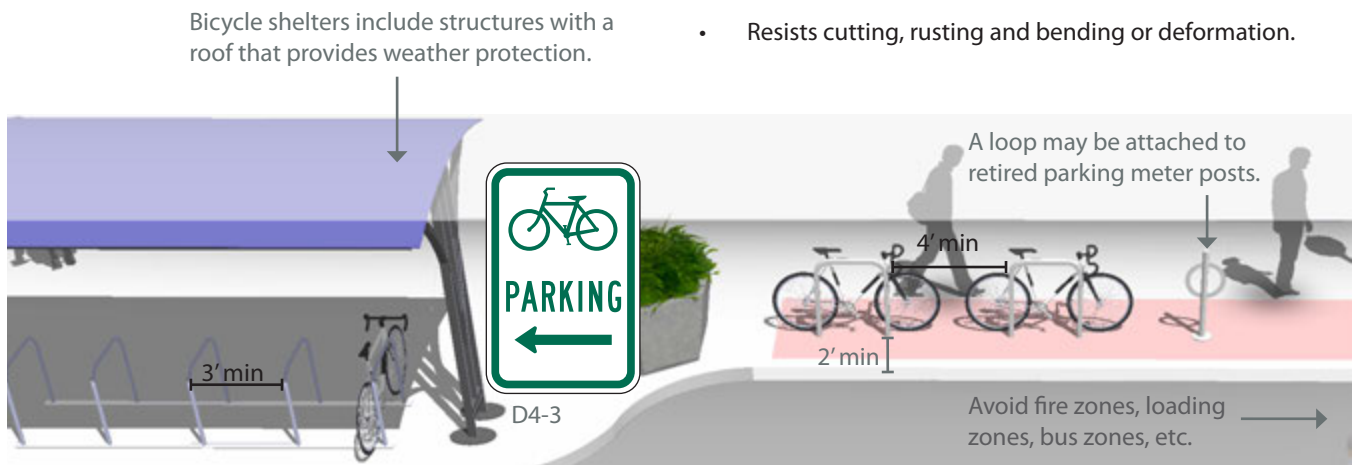
Guidance

- 2' minimum from the curb face to avoid 'dooring.'
- Close to destinations; 50' maximum distance from main building entrance.
- Minimum clear distance of 6' should be provided between the bicycle rack and the property line.
- Locate racks in areas that cyclists are most likely to travel.

Description

Short-term bicycle parking is meant to accommodate visitors, customers, and others expected to depart within two hours. It should have an approved standard rack, appropriate location and placement, and weather protection. Racks should:

- Support the bicycle in at least two places, preventing it from falling over.
- Allow locking of the frame and one or both wheels with a U-lock.
- Is securely anchored to ground.
- Resists cutting, rusting and bending or deformation.



BICYCLE DETECTION AND ACTUATION

Description

Push Button Actuation

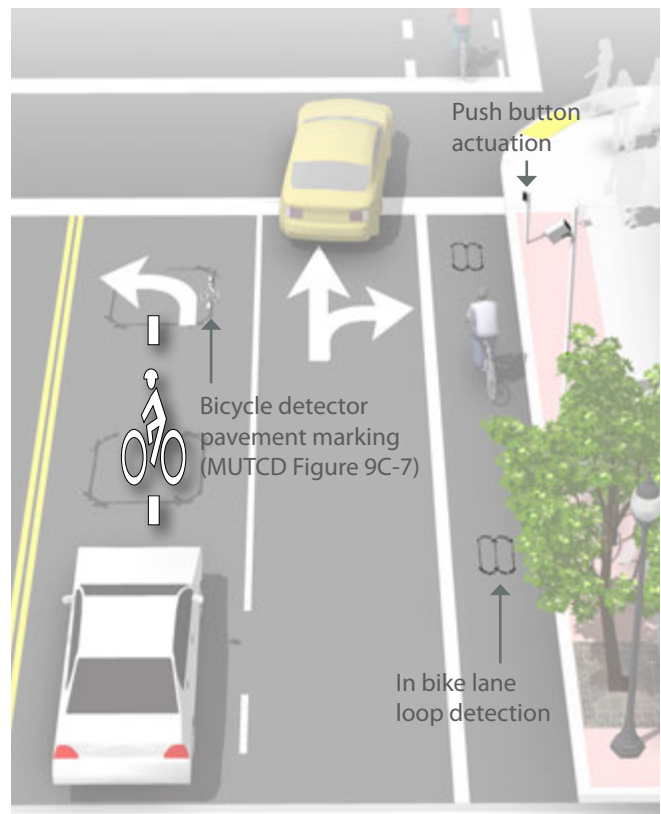
User-activated button mounted on a pole facing the street.

Loop Detectors

Bicycle-activated loop detectors are installed within the roadway to allow the presence of a bicycle to trigger a change in the traffic signal. This allows the bicyclist to stay within the lane of travel without having to maneuver to the side of the road to trigger a push button.

Loops that are sensitive enough to detect bicycles should be supplemented with pavement markings to instruct bicyclists how to trip them.

Bicycle loops and other detection mechanisms can also provide bicyclists with an extended green time before the light turns yellow so that bicyclists of all abilities can reach the far side of the intersection.



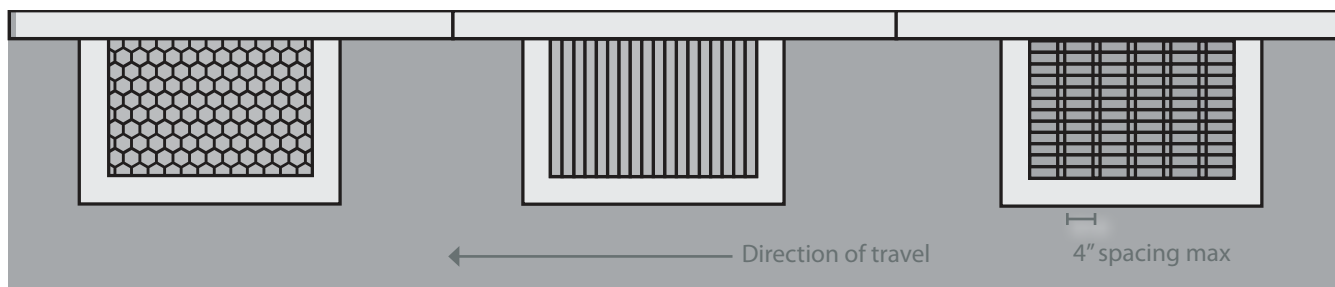
DRAINAGE GRATES

Guidance

- Require all new drainage grates be bicycle-friendly, including grates that have horizontal slats on them so that bicycle tires and assistive devices do not fall through the vertical slats.
- Create a program to inventory all existing drainage grates, and replace hazardous grates as necessary – temporary modifications such as installing rebar horizontally across the grate should not be an acceptable alternative to replacement.

Description

Drainage grates are typically located in the gutter area near the curb of a roadway. Drainage grates typically have slots through which water drains into the municipal storm sewer system. Many older grates were designed with linear parallel bars spread wide enough for a tire to become caught so that if a bicyclist were to ride on them, the front tire could become caught in the slot. This would cause the bicyclist to tumble over the handlebars and sustain potentially serious injuries.



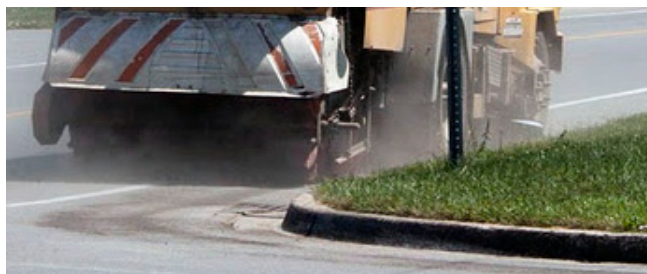
SWEEPING

Guidance

- Establish a seasonal sweeping schedule that prioritizes roadways with major bicycle routes.
- Sweep walkways and bikeways whenever there is an accumulation of debris on the facility.
- In curbed sections, sweepers should pick up debris; on open shoulders, debris can be swept onto gravel shoulders.
- Pave gravel driveway approaches to minimize loose gravel on paved roadway shoulders.
- Perform additional sweeping in the Spring to remove debris from the Winter.
- Perform additional sweeping in the Fall in areas where leaves accumulate .

Description

Bicyclists often avoid shoulders and bike lanes filled with gravel, broken glass and other debris; they will ride in the roadway to avoid these hazards, potentially causing conflicts with motorists. Debris from the roadway should not be swept onto sidewalks (pedestrians need a clean walking surface), nor should debris be swept from the sidewalk onto the roadway. A regularly scheduled inspection and maintenance program helps ensure that roadway debris is regularly picked up or swept.



PAVEMENT OVERLAYS

Guidance

- Extend the overlay over the entire roadway surface to avoid leaving an abrupt edge.
- If the shoulder or bike lane pavement is of good quality, it may be appropriate to end the overlay at the shoulder or bike lane stripe provided no abrupt ridge remains.
- Ensure that inlet grates, manhole and valve covers are within ¼ inch of the finished pavement surface and are made or treated with slip resistant materials.
- Pave gravel driveways to property lines to prevent gravel from being tracked onto shoulders or bike lanes.
- Paving over gutter pans is not a recommended practice due to potential break-up of overlaid asphalt.. If this is done, consistent maintenance is necessary to maintain a smooth surface.

Description

Pavement overlays represent good opportunities to improve conditions for bicyclists if done carefully. A ridge should not be left in the area where bicyclists ride (this occurs where an overlay extends part-way into a shoulder bikeway or bike lane). Overlay projects also offer opportunities to widen a roadway, or to re-stripe a roadway with bike lanes.



GUTTER TO PAVEMENT TRANSITION

Guidance

- Ensure that gutter-to-pavement transitions have no more than a ¼" vertical transition.
- Examine pavement transitions during every roadway project for new construction, maintenance activities, and construction project activities that occur in streets.
- Inspect the pavement 2 to 4 months after trenching construction activities are completed to ensure that excessive settlement has not occurred.
- Provide at least 3 feet of pavement outside of the gutter seam.

Description

On streets with concrete curbs and gutters, 1 to 2 feet of the curbside area is typically devoted to the gutter pan, where water collects and drains into catch basins. On many streets, the bikeway is situated near the transition between the gutter pan and the pavement edge. This transition can be susceptible to erosion, creating potholes and a rough surface for travel.

The pavement on many streets is not flush with the gutter, creating a vertical transition between these segments. This area can buckle over time, creating a hazardous condition for bicyclists.



STANDARDS COMPLIANCE

Some of these treatments covered by these guidelines are not directly referenced in the current versions of the AASHTO Guide or the MUTCD, although many of the elements of these treatments are found within these documents. An “X” marking in the following table identifies the inclusion of a particular treatment within the national and state design guides. A “-” marking indicates a treatment may not be specifically mentioned, but is compliant assuming MUTCD compliant signs and markings are used.

In all cases, engineering judgment is recommended to ensure that the application makes sense for the context of each treatment, given the many complexities of urban streets.



	Manual of Uniform Traffic Control Devices (2009)	Guide for the Development of Bicycle Facilities (2012)	Urban Bikeway Design Guide (2012)*	NCDOT Complete Streets and Bicycle Facility Guidelines **
Signed Shared Roadway	X	X		X
Marked Shared Roadway	X	X	X	X
Bicycle Boulevard		X	X	
Shoulder Bikeway	X	X		X
Bicycle Lane	X	X	X	X
Buffered Bike Lane	-	X	X	
Uphill Bicycle Climbing Lane	-	X	X	
Cycle Tracks	-	Called "one-way sidepath"	X	
Bike Lanes at Right Turn Only Lanes	X	X	X	X
Colored Bike Lanes in Conflict Areas	Interim Approval Granted	X	X	
Combined Bike Lane/Turn Lane	-		X	
Intersection Crossing Markings	X	X	X	
Bicyclists at Single Lane Roundabouts	-	X		
Wayfinding Sign Types	X	X	X	X
Wayfinding Sign Placement	X	X	X	X
Greenways	X	X		X
Shared Use Paths along Roadways	X	Discouraged		X

* Most NACTO treatments are compatible within AASHTO/MUTCD guidance, though some NACTO endorsed designs may not be permitted on state roads at this time.

** This column includes both the 1994 North Carolina Bicycle Facilities Planning and Design Guidelines and the 2012 North Carolina Department of Transportation Complete Streets Planning and Design Guidelines.



CHAPTER OUTLINE:

SUMMARY OF EXISTING
PLANNING EFFORTS

CITY AND LOCAL PLANNING
EFFORTS

SUMMARY OF EXISTING PLANNING EFFORTS

REGIONAL AND COUNTY PLANNING EFFORTS

**GASTON MPO LONG RANGE TRANSPORTATION PLAN 2030
(2005)**

The Gaston Urban Area Metropolitan Planning Organization’s *2030 Long Range Transportation Plan* supports bicycle transportation by establishing the following goals and objectives:

“Develop a transportation system that integrates pedestrian and bicycle modes of transportation with motor vehicle transportation and encourages the use of walking and bicycling as alternative modes.

- Increase the design sensitivity of specific transportation projects to the needs of pedestrians and bicyclists.
- Assist the development of pedestrian and bikeway systems for both recreation and transportation purposes.
- Improve the transportation system to accommodate pedestrian and bicycle access along roadways through design and facility standards.
- Increase pedestrian and bicycle safety through public awareness programs.
- Provide linkages for pedestrian and/or bicyclists between neighborhoods, employment centers, services, cultural facilities, schools, parks, and businesses.” (Chapter 2.3.5)

The *2030 Long Range Transportation Plan* identifies some bicycle routes and bike parking: “Making transportation corridors truly multi-modal is a priority for the Gaston MPO. The best if not the only way to reduce automobile trips is to make other modes more viable. In an effort to



educate the citizens of Gaston County about roads most appropriate for bicycling, the Gaston MPO has worked with the NCDOT Bicycle and Pedestrian Division to create a map of recommended bicycle routes in the urban area. The goal was to identify and sign routes on streets that would be safe for the average rider, while providing a connection between popular local attractions...MPO staff continues to work with the NCDOT Bicycle and Pedestrian Division to mark these routes with signage...To further make the transportation network safe for bicyclists, it has been the policy of MPO staff to encourage NCDOT engineers to design roads with lanes wide enough to accommodate bicyclists...[T]he MPO also has recently hired a contractor to install 24 bike racks throughout Gaston County...Bike racks will enhance public use for bicycles by providing safe lockable racks to ensure safety for bicycles." (Chapter 4.2.3) A map of the identified bike routes is included as **Figure X**. One of the bike routes is located in Belmont along Eagle Road, S. Main Street, and Catawba Street (NC 7).

Chapter 6 of the *2030 Transportation Plan* identified several road projects in the Belmont area in the unmet needs list that should integrate bicycle facilities when planned and constructed. They are listed below:

- Belmont/Mt.Holly Loop (South Point &Western Segment). New alignment project: four-lane divided facility from South Point Road (NC 273) to the proposed Gastonia - Mt. Holly Connector.
- Wilkinson Blvd. (US 29/74) Catawba River Bridge. Road widening and bridge replacement project: widen existing four-lane bridge to six-lanes, and widen existing four-lane cross section to six-lanes from Catawba Street (NC 7) to the east bank of the Catawba River.
- NC 273 (South Point Road). Road widening project: widen existing two-lane road to a four-lane divided facility from Nixon Road (SR 2534) to Lower Armstrong Road (NC 273).

LONG RANGE TRANSPORTATION PLAN 2035 DRAFT UPDATE (2011)

The Gaston Urban Area Metropolitan Planning Area Long Range Transportation Plan 2035 Draft Update includes the aforementioned projects and priorities.

CAROLINA THREAD TRAIL MASTER PLAN FOR GASTON COUNTY COMMUNITIES (2009)

Adopted in 2009, the Carolina Thread Trail Master Plan for Gaston County Communities in 2009 identifies several miles of trails in Belmont.



With an eye for “readiness,” the steering committee suggested Gaston County communities work on completing segments of trail where there is broad support and access to land. With the understanding that more research is needed into feasibility and that circumstances can change, the committee suggested the following opportunities that are relevant to Belmont:

First priority segments:

- From Cramerton to Downtown Belmont near Highway 7

Secondary priority segments:

- From Belmont running north to Belmont Abbey College to connect to the Mount Holly Greenway

Other identified Carolina Thread Trail routes that directly affect the City of Belmont include a trail north of Belmont Abbey College, connecting to the Catawba River, and bike routes along Eagle Road and South Main Street. Other connection opportunities identified in the document include bike routes along Highway 273, and Canal Road/Tanglewood Cove.

Gaston County Parks and Recreation Master Plan (2007)

Proposals and Recommendations

Linear Parks (aka “greenways”):

- “The existing natural resources in the county provide an ideal opportunity for the development of a Linear Park System. Linear parks are linear in shape and often link parks, other recreational facilities and open space. They are often located along creeks and rivers and are typically developed with trails for walking, hiking and biking. With the advent of the Carolina Thread Trail, whose purpose is to weave communities of the Charlotte region together through greenways and linear parks, now is the time for Gaston County to assume a leading role in the planning, coordination and development of a linear park/greenway system that connects parks, schools and neighborhoods.
- Prepare a detailed master linear park/greenway plan with the participation of a representative group of county and municipal planners; trail advocates; and elected officials.
- Coordinate the planning and development of linear parks with state and local governments and the private sector. As recommended in the 2002 *Gaston County Comprehensive Planning Program*, the county’s “green assets”: Crowders Mountain State



Park, the Stowe Botanical Garden and the Mountain Island Educational State Forest, should be connected through a pedestrian/bicycle trail system.”

CITY AND LOCAL PLANNING EFFORTS

BELMONT PARKS AND RECREATION FACILITIES COMPREHENSIVE MASTER PLAN 2003-2013

The Belmont Parks and Recreation Master Plan, completed in 2003, recommended that the City complete the following bicycle-related facilities to meet current recreation needs: 9 miles of urban bikeways and 3.1 miles of trails. The plan recommended that by 2013 the City would need to add an additional 2.5 miles of trails and 6 miles of urban bikeways. The plan also recommended that the City complete a greenway master plan.

BELMONT COMPREHENSIVE LAND USE PLAN (2007)

The City of Belmont adopted the land use plan on August 7, 2007. The plan provides relevant recommendations for bicycle planning efforts. The citizens of Belmont responded in public meetings and survey that greenways are highly important to the future growth of the city.

Below are excerpts from the Comprehensive Land Use Plan that demonstrate the commitment that the City of Belmont has already made towards accommodating cyclists:

“Traffic planning should emphasize slower driving speeds that respect pedestrians, children playing, and the residential character of the neighborhood. Convenient connections to other parts of Belmont should be given careful consideration, especially for pedestrians and bicycles.”
(Section 4 C)

“The streets within the neighborhood should form a connected network. This provides a variety of itineraries and disperses traffic congestion. They should also be relatively narrow and shaded by rows of trees. This slows down the traffic, creating a comfortable environment for pedestrians and bicyclists.”

(Section 4 D)



“From a safety perspective, probably the most important aspect of connectivity relates to bicycle and pedestrian facilities . . . With little or limited connectivity to other areas of town, there is a missed opportunity for more trips being made without the need for a vehicle. . .” (Section 4.2.2)

“Accommodation of pedestrians and bicycles is incorporated into the street typologies.” (Section 4.2.6) [THESE ARE WORTH REFERENCING IN DESIGN GUIDELINES OR EXISTING CONDITIONS; PROVIDES SPECIFIC RECOMMENDATIONS FOR CERTAIN ROADWAYS and ROADWAY TYPES]

“The Land Use Plan includes an interconnected system of greenway trails throughout much of Belmont, using a combination of creeks, Duke Energy electric transmission line easements or rights-of-way, and NCDOT inactive railroad rights-of-way.... This system links neighborhoods together, and provides access to Lake Wylie and the South Fork of the Catawba River, where waterfront parks can be developed. The greenway system also links, wherever possible, to the Downtown Commercial and Civic Center, Village Commercial and Civic Centers, and schools.” (Section 4.3.3) [SEE FIGURE 31 in COMP PLAN; WORTH REFERENCING IN BIKE PLAN DOC]

BELMONT LAND DEVELOPMENT CODE

The City of Belmont adopted the land development code in July 2003 and has updated the document since then. This code supports the Comprehensive Land use Plan by encouraging the development of a network of sidewalks and bicycle lanes that provide an attractive and safe mode of travel for pedestrians and cyclists. The City of Belmont was one of the first communities to adopt a New Urbanist zoning ordinance that stresses the importance of walkable, bikeable, and sustainable communities. Below are some excerpts from the land development code related to bicycle-friendly development:

8.1 General Street Design Principles

“This Code encourages the development of a network of interconnecting streets that work to disperse traffic while connecting and integrating neighborhoods with the existing urban fabric of the City. Equally as



important, **the Code encourages the development of a network of sidewalks and bicycle lanes** that provide an attractive and safe mode of travel for pedestrians and cyclists.”

“It is the intent of this ordinance to build streets that are integral components of community design...In an effort to protect this investment, the City views streets as the most important public space and therefore has developed a set of **principles which provide adequate facilities for all types of traffic, including motorists, pedestrians, bicyclists**, and transit users, and including of all levels of ability, such as those in wheelchairs, the elderly and the young.”

“Streets shall interconnect within a development and with adjoining development. Cul-de-sacs are permitted only where topographic conditions and/or exterior lot line configurations offer no practical alternatives for connection or through traffic. Street stubs should be provided with development adjacent to open land to provide for future connections. Streets shall be planned with due regard to the designated corridors shown on the Thoroughfare Plan.”

8.5 General Greenway Design Principles

“When a greenway is part of a development, the following standards apply:

- Greenways shall be planned following the designated circulation system shown on the *Comprehensive Plan* map, the *Parks and Recreation Master Plan*, and the *City of Belmont Pedestrian Transportation Plan*.
- Greenways shall connect to new development wherever possible. Greenway stubs should be provided when development is adjacent to open land scheduled for greenway construction to provide for future connections. Stubs must extend to the neighboring property line.



- Greenways should be designed to fit the contours of the land and should minimize removal of significant trees.
- All greenways shall be constructed in accordance with the design and construction standards in this code and the *City of Belmont Pedestrian Transportation Plan* and shall be maintained for public access whether by easement or by public dedication."

9.2 (5) General Parking Requirements (Bicycle Parking)

"All non-residential development with more than 36 parking spaces, recreation facilities, and multi-family residential buildings where no garages are provided shall include an **area for parking bicycles**. This area may be a designated parking space within the parking lot near the building or an area outside the parking lot adjacent to the building. **The bike parking area must include a bike rack. The Downtown District is exempt from these requirements.**"

16 (H) Development Plan Requirements

"Incorporate bike paths, sidewalks, pedestrian paths, greenways, and other pedestrian facilities to connect with similar planned or existing local or regional facilities as shown on official plans and maps of the city of Belmont, the *Belmont Pedestrian Transportation Plan*, neighboring municipalities, or Gaston County. Designs shall encourage pedestrian and bicycle use by being spatially defined by buildings, trees, and lighting, and by discouraging high-speed traffic."

CITY OF BELMONT MUNICIPAL CODE OF ORDINANCES:

Chapter 73 of the City's Municipal Code of Ordinances provides safety regulations related to "Bicycles, Coasters, and Roller Skates." Notably, the Chapter includes a requirement for bicycle lights at night; prohibits clinging to motor vehicles, riding on handlebars, and biking on sidewalks anywhere in the City.



PEDESTRIAN TRANSPORTATION PLAN FOR THE CITY OF BELMONT, NORTH CAROLINA (2009)

The Belmont Pedestrian Plan recommends several 'Project Package's: a 'Project Package' is a set of recommended facilities or facility improvements that are logically grouped together for purposes of prioritization, funding and implementation. The recommended project packages that are relevant to the bicycle master plan are as follows:

Project Package #1: Carolina Thread Trail Corridor Improvements

Location: This corridor follows Main Street from Belmont Abbey College in the north to Belmont city limits on Eagle Street to the south and west.

Description: Projects primarily consist of intersection improvements, but also includes sections of new sidewalk and a potential widening of the walkway over the I-85 bridge.

- Includes a trail that runs parallel to the existing rail road tracks on the east side of Main St.

Project Package #2: Abbey Creek Greenway

Location: This proposed trail would run along the creek just south of Wilkinson Blvd, from Park Street to Catawba Street.

Description: This is multi-use trail development project that will consist of just over one mile of 10-ft wide paved trail.

Project Package #5: Wilkinson Pedestrian Improvements

Location: Wilkinson Blvd, from city limits to the east and west.

Description: This project consists of sidepaths along both sides of Wilkinson Blvd., including several new crosswalks.

SAFE ROUTES TO SCHOOL ACTION PLAN FOR BELMONT, NORTH CAROLINA (2011)



In 2011, The City of Belmont and NCDOT undertook an action plan to identify infrastructure and policy recommendations to improve safe, non-motorized access to the City's elementary schools. The policy and infrastructure recommendations focused largely on pedestrian improvements. However, some pedestrian improvements (such as sidewalks, which can effectively be used for bicycling by younger school age children biking slowly, and speed limit reductions) also have benefits for local bicycling.

SRTS Action Plan Recommendations

Location-Specific Engineering Recommendations

J.B. Page Primary School

Ewing Drive from Charles Street south:

- Include a sidewalk on the east side of Ewing Street (south of Charles Street), as part of the development build out, as recommended in the 2009 *Pedestrian Transportation Plan*.

Vine Street from Ewing Drive to Flowers Court:

- Upgrade sidewalk to conform to ADA standards.

Vine Street from Flowers Court to Childers Street

- Construct sidewalk east to Childers Street.

Keener Boulevard near Scone Lane

- If a signalized pedestrian crossing is established at Keener Boulevard/Parkdale Drive intersection, consider establishing a pedestrian opening in the brick wall along Edgecombe Lane to provide access to Keener Boulevard.

Parkdale Drive from Keener Boulevard to Vine Street

- Consider reducing the speed limit to 20 mph along this segment (increase to 35 mph southeast of Vine Street).
- Install a sidewalk along the west side of Parkdale Drive, especially if a signalized crossing is established at Parkdale and Keener.



Belmont Central Elementary School

Eagle Road from Merewood Road to Assembly Street

- Convert asphalt path to 5-foot-wide concrete sidewalk with vegetated buffer.

Eagle Road from Assembly Street to Kingston Street

- Construct sidewalk where missing along south side of Eagle Road, as recommended in the 2009 *Pedestrian Transportation Plan*.

Park Drive from Lee Street to Elizabeth Street

- Install sidewalk.

Park Drive from Kingston Street to Harris Street

- Calm traffic by narrowing travel lanes with striped shoulders where space allows and there are no conflicts with striped parking spaces.

Burns Mitchell Drive

- Construct sidewalks on both sides of street.

Lee Street

- Construct sidewalks on both sides of the street.

Ferrell Avenue

- Construct sidewalk on at least one side of the street (recommend south side).

Belmont Middle School

No relevant recommendations

Other Recommendations

- Consider reducing the posted speed limits and incorporating other traffic calming measures on Keener Boulevard, Eagle Road, and Central Avenue to improve pedestrian, [bicycle], and driver safety.
- The City of Belmont should consider adopting an ordinance allowing children to ride on the sidewalk.
- The bicycle parking facilities at Belmont Central Elementary School



and Belmont Middle School should be upgraded and expanded. Inverted U racks are recommended.

- The plan also includes several bicycle-related program or policy recommendations such as: a bicycle rodeo/bicycle education; bicycling and walking maps; and a city-wide “pace car” program.



BELMONT RAIL TRAIL FEASIBILITY STUDY (2012)

The City of Belmont is working to convert the inactive railroad line that runs from downtown Belmont north to Belmont Abbey College and on to Woodlawn Avenue into a pedestrian trail. This trail would provide a safe and convenient bicycle and pedestrian connection between downtown, the [Sisters of Mercy](#), [Belmont Abbey College](#), and North Belmont. It is also a part of the [Carolina Thread Trail](#) adopted route for Gaston County and was a recommendation in the City’s *Pedestrian Transportation Plan*.

In 2012, the City completed a feasibility study on the project that was funded by a grant by the Carolina Thread Trail. The study was conducted by LandDesign and HDR and was facilitated by a steering committee consisting of representatives from Belmont Abbey, Sisters of Mercy, local residents, city staff, NCDOT, and Carolina Thread Trail staff. The study included the feedback we received during several public meetings and from interviews with stakeholders.

NCDOT and the City have agreed on the location of the trail, which will be on the east side of the railroad tracks for most of the corridor from Belmont Abbey to downtown. NCDOT has surveyed the corridor and hopes to begin designing the trail in June 2012.



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APPENDIX D



PUBLIC COMMENT FORM for the BELMONT BICYCLE PLAN

1. Which statement best describes your comfort level on a bicycle? (circle one)

I am comfortable bicycling on the road with automobiles in most traffic situations, regardless of bicycle facilities.

I am most comfortable in a clearly designated bicycle lane or on off-road paths.

I don't feel comfortable sharing any roadway with cars and prefer off-road paths or very low-traffic residential roads.

2. How frequently do you bicycle? (circle one)

*never | few times per year | few times per month
few times per week | 5+ times per week*

3. Which aspect of biking is most appealing to you? (circle all that apply)

Increased health and fitness

More time outdoors

Easier to find convenient parking

Reducing the amount of time spent in a car

Less negative impact on the environment/preserving the environment

I do not bicycle

Other: _____

Money saved on fuel

Faster commute

Fewer traffic jams

4. Do you feel, in general, bicycling for daily needs (commuting to work/school, errands, etc.) in Belmont is:

Very Safe

Somewhat Safe

Neutral

Somewhat Dangerous

Very Dangerous

5. Do you feel, in general, bicycling for recreation in Belmont is:

Very Safe

Somewhat Safe

Neutral

Somewhat Dangerous

Very Dangerous

6. How important to you is improving bicycling conditions in Belmont? (circle one)

Very important | Somewhat important | Not important

7. Would you bicycle more if safety issues in Belmont were addressed?

Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree



8. What destinations would you most like to get to by bike? (circle all that apply)

- Neighbor's house* *Downtown*
- Schools* *Grocery stores*
- Places of work* *Restaurants*
- Public transportation* *Other shopping (retail stores)*
- Parks* *Entertainment*
- Trails and greenways* *Farmers markets/gardens*
- I don't bicycle* *Other: _____*

9. Which of the following changes would encourage you to bike more often?

(Yes | Maybe | No)

- _____ *Bicycle racks at destinations*
- _____ *Showers or locker rooms at workplace*
- _____ *Lower speed limits*
- _____ *Better roadway maintenance*
- _____ *Sidepaths (paved trails adjacent to roadways)*
- _____ *Greenways (paved trails removed from roadways)*
- _____ *Bicycle lanes (on-street facilities)*
- _____ *Neighborhood roads prioritized for bicycle traffic*
- _____ *Directional signage along bicycle routes*
- _____ *Other: _____*

10. Which of the following resources or programs would most interest you? (circle all that apply)

- Bicycle Safety Education for Adults and Seniors*
- Bicycle Safety Education for Child and Youth Cyclists*
- Materials Describing Bicyclists' Rights and Responsibilities*
- Materials Promoting the Benefits of Bicycling*
- Motorist Education for Sharing the Road*
- Bicycling Maps, Guides, and Informational Website*
- Guided Bicycle Rides for Novice Bicyclists and Families*
- Special Events with a Variety of Bicycle Activities*
- Increased Enforcement on Speeding*
- Commute-by-bike Incentives at Work or School*

11. Which of the following factors prevent you from bicycling or from bicycling more often? (circle all that apply)

- Lack of bicycle lanes, paved shoulders, or paths*
- Gaps in bicycle facilities*
- Narrow lanes*
- Poor trail conditions*
- Other travel modes are safer or more comfortable*
- Crossing busy roads*
- Hills*
- Loose gravel or potholes*
- Drainage grates*
- Poor lighting (along routes/trails or at roadway crossings)*
- Personal safety (from crime)*
- Physical ability*
- Travel time or distance*
- Heavy traffic*
- High-speed traffic*
- Inconsiderate motorists*
- Lack of bicycle parking*
- Lack of showers and lockers at workplace*
- Nothing*
- Other: _____*

12. What do you think are the top three roadway corridors (in Belmont most needing bicycling improvements?)

- Road Corridor #1: _____
- Road Corridor #2: _____
- Road Corridor #3: _____

13. What do you think are the top three roadway intersections (in Belmont) most needing bicycling improvements? (Example response: Smith Street & 1st Avenue)

- Intersection #1: _____
- _____
- Intersection #2: _____
- _____
- Intersection #3: _____
- _____



14. What other bicycle related improvements do you consider priorities?

15. Should public funds be used to improve bicycle transportation options?

Yes | No

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

Existing local taxes | New local taxes
State and federal grants | NCDOT maintenance funds
 Other: _____

17. If you had \$100 to spend on bicycle facility improvements, how would you spend it? You can spend it on one thing or spread it around. (Be sure your total equals \$100 and do not include the "\$" sign.)

Bike lanes (on-road facilities) _____

Sidepaths (parallel to road facilities) _____

Greenways (off-road paved trails) _____

Other bicycle related improvements _____

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

Courteous, yield, and give bicyclists space
Drive too fast
Pass bicyclists too closely
Tolerate bicyclists not following rules of the road
Harass bicyclists
Fail to yield to bicyclists crossing a street
 Other: _____

19. How do you feel bicyclists in your area typically behave? (Please circle all that apply)

Courteous, obeying all traffic laws
Cycle in the roadway the opposing direction as vehicles
Fail to comply with traffic laws
Ride too slowly
Are young and/or inexperienced
Multiple cyclists ride abreast in the same travel lane
Behave rudely
Don't signal turns or stops
Ride on sidewalks
Ride at night without lights
 Other: _____

20. Do you live or work in the City of Belmont? (circle one)

Live | Work | Both | Neither, but I visit | Neither

21. What is your gender? Male | Female

22. What is your age?

0-9 10-19 20-29 30-39
40-49 50-59 60 and older

23. Would you consider volunteering for a bike program?

Yes | No

24. To stay informed about the plan, provide your email address:

Project Contact: Elson Baldwin, City of Belmont, 701-901-2065, ebaldwin@cityofbelmont.org



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CHAPTER OUTLINE:

OVERVIEW

FEDERAL FUNDING SOURCES

STATE FUNDING SOURCES

LOCAL FUNDING SOURCES

PRIVATE SECTOR

OVERVIEW

The following section outlines potential sources of funding for bike-way projects in Belmont, NC. Federal, state, local, and private sources of funding are identified. The following descriptions are intended to provide an overview of available options and do not represent a comprehensive list. Funding sources can be used for a variety of activities, including: planning, design, implementation and maintenance. It should be noted that this section reflects the funding available at the time of writing. The funding amounts, fund cycles, and even the programs themselves are susceptible to change without notice. As described in Chapter 5: Implementation, it is likely that many bicycle facilities will be built as part of future roadway restriping, widening, and reconstruction projects in which the direct funding necessary may be minimized.

FEDERAL FUNDING SOURCES

Federal funding is typically directed through State agencies to local governments either in the form of grants or direct appropriations, independent from State budgets. Federal funding typically requires a local match of 20%, although there are sometimes exceptions, such as the recent American Recovery and Reinvestment Act stimulus funds, which did not require a match.

The following is a list of possible Federal funding sources that could be used to support construction of many pedestrian and bicycle improvements. Most of these are competitive, and involve the completion of extensive applications with clear documentation of the project need, costs, and benefits. However, it should be noted that the FHWA encourages the construction of pedestrian and bicycle facilities as an incidental element of larger ongoing projects. Examples include providing paved shoulders on new and reconstructed roads, or building sidewalks, on-street bikeways, trails and marked crosswalks as part of new highways.

6.2.1 Moving Ahead for Progress in the Twenty-First Century (MAP-21)

The largest source of federal funding for bicycle and pedestrian is the US DOT's Federal-Aid Highway Program, which Congress has reauthorized



roughly every six years since the passage of the Federal-Aid Road Act of 1916. The latest act, Moving Ahead for Progress in the Twenty-First Century (MAP-21) was enacted in July 2012 as Public Law 112-141. The Act replaces the Safe, Accountable, Flexible, Efficient Transportation Equity Act – a Legacy for Users (SAFETEA-LU), which was valid from August 2005 - June 2012.

MAP-21 authorizes funding for federal surface transportation programs including highways and transit for the 27 month period between July 2012 and September 2014. It is not possible to guarantee the continued availability of any listed MAP-21 programs, or to predict their future funding levels or policy guidance. Nevertheless, many of these programs have been included in some form since the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991, and thus may continue to provide capital for active transportation projects and programs.

In North Carolina, federal monies are administered through the North Carolina Department of Transportation (NCDOT) and metropolitan planning organizations (MPOs). Most, but not all, of these programs are oriented toward transportation versus recreation, with an emphasis on reducing auto trips and providing inter-modal connections. Federal funding is intended for capital improvements and safety and education programs, and projects must relate to the surface transportation system.

There are a number of programs identified within MAP-21 that are applicable to bicycle and pedestrian projects. These programs are discussed below.

More information: <http://www.fhwa.dot.gov/map21/summaryinfo.cfm>

4.2.1.1 Transportation Alternatives

Transportation Alternatives (TA) is a new funding source under MAP-21 that consolidates three formerly separate programs under SAFETEA-LU: Transportation Enhancements (TE), Safe Routes to School (SR2S), and the Recreational Trails Program (RTP). These funds may be used for a variety of pedestrian, bicycle, and streetscape projects including sidewalks, bikeways, multi-use paths, and rail-trails. TA funds may also be used for selected education and encouragement programming such as Safe Routes to School, despite the fact that TA does not provide a guaranteed set-aside for this activity as SAFETEA-LU did. Unless the Governor of a given state chooses to opt out of Recreational Trails Program funds, dedicated funds for recreational trails continue to be provided as a subset of TA. MAP-21 provides \$85 million nationally for the RTP.

Complete eligibilities for TA include:



- 1 *Transportation Alternatives as defined by Section 1103 (a) (29).* This category includes the construction, planning, and design of a range of bicycle and pedestrian infrastructure including “on-road and off-road trail facilities for pedestrians, bicyclists, and other non-motorized forms of transportation, including sidewalks, bicycle infrastructure, pedestrian and bicycle signals, traffic calming techniques, lighting and other safety-related infrastructure, and transportation projects to achieve compliance with the Americans with Disabilities Act of 1990.” Infrastructure projects and systems that provide “Safe Routes for Non-Drivers” is a new eligible activity. For the complete list of eligible activities, visit:

http://www.fhwa.dot.gov/environment/transportation_enhancements/legislation/map21.cfm

- 2 *Recreational Trails.* TA funds may be used to develop and maintain recreational trails and trail-related facilities for both non-motorized and motorized recreational trail uses. Examples of trail uses include hiking, bicycling, in-line skating, equestrian use, and other non-motorized and motorized uses. These funds are available for both paved and unpaved trails, but may not be used to improve roads for general passenger vehicle use or to provide shoulders or sidewalks along roads.

Recreational Trails Program funds may be used for:

- Maintenance and restoration of existing trails
- Purchase and lease of trail construction and maintenance equipment
- Construction of new trails, including unpaved trails
- Acquisition or easements of property for trails
- State administrative costs related to this program (limited to seven percent of a State’s funds)
- Operation of educational programs to promote safety and environmental protection related to trails (limited to five percent of a State’s funds)

North Carolina’s dedicated annual RTP funds are \$1,506,344 for fiscal year 2012. Note that under MAP-21 governors may choose to opt out of a portion or all of



this “dedicated” RTP funding. If North Carolina’s governor chooses to opt out, these funds still must remain in the TA funding total.

- 3 *Safe Routes to School*. The purpose of the Safe Routes to Schools eligibility is to promote safe, healthy alternatives to riding the bus or being driven to school. All projects must be within two miles of primary or middle schools (K-8).

Eligible projects may include:

- *Engineering improvements*. These physical improvements are designed to reduce potential bicycle and pedestrian conflicts with motor vehicles. Physical improvements may also reduce motor vehicle traffic volumes around schools, establish safer and more accessible crossings, or construct walkways, trails or bikeways. Eligible improvements include sidewalk improvements, traffic calming/speed reduction, pedestrian and bicycle crossing improvements, on-street bicycle facilities, off-street bicycle and pedestrian facilities, and secure bicycle parking facilities.
- *Education and Encouragement Efforts*. These programs are designed to teach children safe bicycling and walking skills while educating them about the health benefits, and environmental impacts. Projects and programs may include creation, distribution and implementation of educational materials; safety based field trips; interactive bicycle/pedestrian safety video games; and promotional events and activities (e.g., assemblies, bicycle rodeos, walking school buses).
- *Enforcement Efforts*. These programs aim to ensure that traffic laws near schools are obeyed. Law enforcement activities apply to cyclists, pedestrians and motor vehicles alike. Projects may include development of a crossing guard program, enforcement equipment, photo enforcement, and pedestrian sting operations.

- 4 *Planning, designing, or constructing roadways within the*



right-of-way of former Interstate routes or divided highways. At the time of writing, detailed guidance from the Federal Highway Administration on this new eligible activity was not available.

Average annual funds available through TA over the life of MAP-21 equal \$814 million nationally, which is based on a 2% set-aside of total MAP-21 allocations. Projected obligations for North Carolina total \$46,346.809 for fiscal year(s) 2013-2014. Note that state DOT's may elect to transfer up to 50% of TA funds to other highway programs, so the amount listed above represents the maximum potential funding.

50% of TA funds for the Gaston County region are automatically allocated directly to the Gaston MPO based on population. The MPO distributes funds to local communities through a competitive grant program. Remaining TA funds (those monies not re-directed to other highway programs) are disbursed through a separate competitive grant program administered by NCDOT. Local governments, school districts, tribal governments, and public lands agencies are permitted to compete for these funds.

4.2.1.2 Surface Transportation Program

The Surface Transportation Program (STP) provides states with flexible funds which may be used for a variety of highway, road, bridge, and transit projects. A wide variety of bicycle and pedestrian improvements are eligible, including on-street bicycle facilities, off-street trails, sidewalks, crosswalks, bicycle and pedestrian signals, parking, and other ancillary facilities. Modification of sidewalks to comply with the requirements of the Americans with Disabilities Act (ADA) is also an eligible activity. Unlike most highway projects, STP-funded bicycle and pedestrian facilities may be located on local and collector roads which are not part of the Federal-aid Highway System. 50% of each state's STP funds are suballocated geographically by population; the remaining 50% may be spent in any area of the state.

4.2.1.3 Highway Safety Improvement Program

MAP-21 doubles the amount of funding available through the Highway Safety Improvement Program (HSIP) relative to SAFETEA-LU. HSIP provides \$2.4 billion nationally for projects and programs that help communities achieve significant reductions in traffic fatalities and serious injuries on all public roads, bikeways, and walkways. MAP-21 preserves the Railway-Highway Crossings Program within HSIP but discontinues the High-Risk Rural roads set-aside unless safety statistics demonstrate that fatalities are increasing on these roads. Bicycle and pedestrian



safety improvements, enforcement activities, traffic calming projects, and crossing treatments for non-motorized users in school zones are eligible for these funds. NCDOT estimates that they will receive an average of \$65 million annually for this program through the lifetime of MAP-21.

4.2.1.4 Congestion Mitigation/Air Quality Program

The Congestion Mitigation/Air Quality Improvement Program (CMAQ) provides funding for projects and programs in air quality non-attainment and maintenance areas for ozone, carbon monoxide, and particulate matter which reduce transportation related emissions. States with no nonattainment areas may use their CMAQ funds for any CMAQ or STP eligible project. These federal dollars can be used to build bicycle and pedestrian facilities that reduce travel by automobile. Purely recreational facilities generally are not eligible.

4.2.1.5 New Freedom Initiative

MAP-21 continues a formula grant program that provides capital and operating costs to provide transportation services and facility improvements that exceed those required by the Americans with Disabilities Act. Examples of pedestrian/accessibility projects funded in other communities through the New Freedom Initiative include installing Accessible Pedestrian Signals (APS), enhancing transit stops to improve accessibility, and establishing a mobility coordinator position.

More information: <http://www.hhs.gov/newfreedom/>

4.2.1.6 Pilot Transit-Oriented Development Planning

MAP-21 establishes a new pilot program to promote planning for Transit-Oriented Development. At the time of writing the details of this program are not fully clear, although the bill text states that the Secretary of Transportation may make grants available for the planning of projects that seek to “facilitate multimodal connectivity and accessibility,” and “increase access to transit hubs for pedestrian and bicycle traffic.”

4.2.2 Partnership for Sustainable Communities

Founded in 2009, the Partnership for Sustainable Communities is a joint project of the Environmental Protection Agency (EPA), the U.S. Department of Housing and Urban Development (HUD), and the U.S. Department of Transportation (USDOT). The partnership aims to “improve access to affordable housing, more transportation options, and lower transportation costs while protecting the environment in communities nationwide.” The Partnership is based on five Livability Principles, one



of which explicitly addresses the need for bicycle and pedestrian infrastructure (“Provide more transportation choices: Develop safe, reliable, and economical transportation choices to decrease household transportation costs, reduce our nation’s dependence on foreign oil, improve air quality, reduce greenhouse gas emissions, and promote public health”).

The Partnership is not a formal agency with a regular annual grant program. Nevertheless, it is an important effort that has already led to some new grant opportunities (including both TIGER I and TIGER II grants). The City of Belmont should track Partnership communications and be prepared to respond proactively to announcements of new grant programs. Initiatives that speak to multiple livability goals (such as partnerships with Transit agencies or affordable housing groups) are more likely to score well than initiatives that are narrowly limited in scope to bicycle and pedestrian efforts.

More information: <http://www.epa.gov/smartgrowth/partnership/>

4.2.3 Community Development Block Grants

The Community Development Block Grants (CDBG) program provides money for streetscape revitalization, which may be largely comprised of pedestrian improvements. Federal CDBG grantees may “use Community Development Block Grants funds for activities that include (but are not limited to): acquiring real property; reconstructing or rehabilitating housing and other property; building public facilities and improvements, such as streets, sidewalks, community and senior citizen centers and recreational facilities; paying for planning and administrative expenses, such as costs related to developing a consolidated plan and managing Community Development Block Grants funds; provide public services for youths, seniors, or the disabled; and initiatives such as neighborhood watch programs.”

More information: http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs

4.2.4 Land and Water Conservation Fund

The Land and Water Conservation Fund (LWCF) provides grants for planning and acquiring outdoor recreation areas and facilities, including trails. Funds can be used for right-of-way acquisition and construction. The program is administered by the Department of Environment and Natural Resources as a grant program for states and local governments. Maximum annual grant awards for county governments, incorporated municipalities, public authorities, and federally recognized Indian tribes are \$250,000. The local match may be provided with in-kind services or cash.

More info: http://www.ncparks.gov/About/grants/lwcf_main.php



4.2.5 Rivers, Trails, and Conservation Assistance Program

The Rivers, Trails, and Conservation Assistance Program (RTCA) is a National Parks Service (NPS) program providing technical assistance via direct NPS staff involvement to establish and restore greenways, rivers, trails, watersheds and open space. The RTCA program provides only for planning assistance—there are no implementation monies available. Projects are prioritized for assistance based on criteria including conserving significant community resources, fostering cooperation between agencies, serving a large number of users, encouraging public involvement in planning and implementation, and focusing on lasting accomplishments. This program may benefit trail development in Belmont indirectly through technical assistance, particularly for community organizations, but should not be considered a future capital funding source.

More info: <http://www.nps.gov/pwro/rtca/who-we-are.htm>

STATE FUNDING SOURCES

NCDOT Bicycle and Pedestrian Project: Funds for bicycle and pedestrian projects come from several different sources. Allocation of funds depends on the type of project/program and other criteria. Projects can include independent and incidental projects.

NCDOT's primary current funding structure:

- NCDOT annually sets aside \$6 million for the construction of bicycle and pedestrian improvements that are independent of scheduled highway projects in communities throughout the state. Types of projects include shared-use paths, wide-paved shoulders, bike lanes, and sidewalks. These independent projects are funded through the Strategic Prioritization/State Transportation Improvement Program (STIP) process.
- The strategic prioritization process serves as the primary input source for the STIP. Metropolitan Planning Organizations, (MPOs), Rural Planning Organizations (RPOs), NCDOT Divisions, and the Division of Bicycle and Pedestrian Transportation (DBPT) as well as other units at NCDOT may submit projects through the prioritization process. For bike and pedestrian projects, the DBPT utilizes a project prioritization methodology with defined criteria to rank all bike/pedestrian projects. This process occurs every two years. Priority projects are included in the developmental STIP (years 6 to 10) and the 10-year Program & Resource Plan.
- Bicycle and pedestrian accommodations such as bike lanes, widened paved shoulders, sidewalks and bicycle-safe bridge design are



frequently funded as incidental features of highway projects. Most pedestrian safety accommodations built by NCDOT are included as part of scheduled highway improvement projects funded with a combination of federal and state roadway construction funds or with a local fund match.

4.3.1 NC Department of Environment – Recreational Trails and Adopt-A-Trail Grants

The State Trails Program is a section of the N.C. Division of Parks and Recreation. The program originated in 1973 with the North Carolina Trails System Act and is dedicated to helping citizens, organizations and agencies plan, develop and manage all types of trails ranging from greenways and trails for hiking, biking and horseback riding to river trails and off-highway vehicle trails. The Recreation Trails Program awards grants up to \$75,000 per project. The Adopt-A-Trail Program awards grants up to \$5,000 per project.

4.3.2 Powell Bill Funds

Annually, State street-aid (Powell Bill) allocations are made to incorporated municipalities which establish their eligibility and qualify as provided by G.S. 136-41.1 through 136-41.4. Powell Bill funds shall be expended only for the purposes of maintaining, repairing, constructing, reconstructing or widening of local streets that are the responsibility of the municipalities or for planning, construction, and maintenance of bikeways or sidewalks along public streets and highways.

4.3.3 N.C. Parks and Recreation Trust Fund (PARTF)

The Parks and Recreation Trust Fund (PARTF) provide dollar-for-dollar matching grants to local governments for parks and recreational projects to serve the general public. Counties, incorporated municipalities and public authorities, as defined by G.S. 159-7, are eligible applicants.

A local government can request a maximum of \$500,000 with each application. An applicant must match the grant dollar-for-dollar, 50% of the total cost of the project, and may contribute more than 50%. The appraised value of land to be donated to the applicant can be used as part of the match. The value of in-kind services, such as volunteer work, cannot be used as part of the match.

More info: http://www.ncparks.gov/About/grants/partf_main.php

4.3.4 Safe Routes to School Program

Safe Routes to School (SRTS) is a program that enables and encourages children to walk and bike to school. The program helps make walking and bicycling to school a safe and more appealing method of



transportation for children. SRTS facilitates the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity of schools. The North Carolina Safe Routes to School Program is supported by federal funds through SAFETEA-LU and MAP-21 legislation.

Different types of reimbursable funding opportunities are available through this program which include; Action Plans or School Travel Plans, Non-Infrastructure Program funding, Infrastructure Program funding, and Highway Division Funds. Please note that all SRTS projects “shall be treated as projects on a Federal-aid system under chapter 1 of title 23, United States Code.” Although no local match is required and all SRTS projects are 100% federally funded, agencies are encouraged to leverage other funding sources that may be available to them, including grant awards, local, state, or other federal funding. SRTS funds can be used for any school public or private, K-8, in a municipality or in the county jurisdiction.

The following provides information about the program.

- **Action Plans or School Travel Plans:** These are plans to improve pedestrian and bicycle safety within a two-mile radius of schools that are grades K-8. The Action Plans provide a framework for identifying projects, programs and activities that will make walking and bicycling to school safer and more appealing.
- **Non-Infrastructure Funds:** are used for pedestrian and bicycle education, encouragement, evaluation and enforcement. These grants are good for developing programs that inspire children to walk and bike to school.
- **Infrastructure Funds:** are funds that are awarded for the planning, design, and construction of pedestrian and bicycling facilities within a 2-mile radius of a school. Funding requests typically range from \$100,000 to \$300,000 per project. Types of projects may include sidewalk improvements, crossing improvements, on-street bike and pedestrian improvements, bike parking, traffic calming, and traffic separation devices among others. An adopted Comprehensive Transportation Plan or other type of pedestrian and bicycle plan that identifies needed infrastructure improvements is helpful in obtaining these grants.
- **Highway Division Funds:** are funds that are allocated by each of NCDOT’s 14 Highway Divisions and the SRTS office to fund infrastructure projects on state-maintained roadways. The projects must be within 2-miles of a school serving grades K-8 to be eligible. The funding amounts can be used to improve conditions for walking and biking to school.



Contact info:

Ed Johnson, ASLA, RLA
 SRTS Coordinator
 NCDOT, Division of Bicycle and Pedestrian Transportation
 1552 Mail Service Center
 Raleigh, NC 27699-1552
 Email: erjohnson2@ncdot.gov
 919.707.2604

LOCAL FUNDING SOURCES

Local funding sources that would support bike facility project construction will most likely be limited but should be explored.

4.4.1 Local Area Metropolitan Planning Organization

The Gaston Metropolitan Planning Organization (GMPO) manages the transportation planning process required by Federal law. The GMPO plans for the area's surface transportation needs, including highways, transit, bicycle, and pedestrian facilities. There are two subcommittees of the MPO: the Technical Advisory Committee and the Technical Coordinating Committee. An important part of the transportation planning process is to identify transportation needs and to explore feasible alternatives to meet those needs. Plans and programs are often conducted in partnership with the NC Department of Transportation to identify needs and projects to enhance Belmont's transportation infrastructure.

It is suggested that the City of Belmont work closely with GMPO on getting these projects listed on the TIP since this may be the primary source of funding for the project. Typically, projects on this list require a 20% local match.

4.4.2 City of Belmont Capital Improvement programming and Reserve Funds

The City of Belmont may have funding available to support some elements of construction or repair. It will be important to meet with City Council representatives and the City Manager to judge the availability of this funding.

Other local funding options

- Bonds/Loans
- Taxes
- Impact fees
- Exactions
- Tax increment financing



- Partnerships

PRIVATE SECTOR

Many communities have solicited greenway funding assistance from private foundations and other conservation-minded benefactors. Below are several examples of private funding opportunities available.

4.5.1 Land for Tomorrow Campaign

Land for Tomorrow is a diverse partnership of businesses, conservationists, farmers, environmental groups, health professionals and community groups committed to securing support from the public and General Assembly for protecting land, water and historic places. The campaign is asking the North Carolina General Assembly to support issuance of a bond for \$200 million a year for five years to preserve and protect its special land and water resources. Land for Tomorrow will enable North Carolina to reach a goal of ensuring that working farms and forests; sanctuaries for wildlife; land bordering streams, parks and greenways; land that helps strengthen communities and promotes job growth; historic downtowns and neighborhoods; and more, will be there to enhance the quality of life for generations to come.

More info: <http://www.landfortomorrow.org/>

4.5.2 The Robert Wood Johnson Foundation

The Robert Wood Johnson Foundation was established as a national philanthropy in 1972 and today it is the largest U.S. foundation devoted to improving the health and health care of all Americans. Grant making is concentrated in four areas:

- To assure that all Americans have access to basic health care at a reasonable cost
- To improve care and support for people with chronic health conditions
- To promote healthy communities and lifestyles
- To reduce the personal, social and economic harm caused by substance abuse: tobacco, alcohol, and illicit drugs

For more specific information about what types of projects are funded and how to apply, visit

www.rwjf.org/applications/.



4.5.3 North Carolina Community Foundation

The North Carolina Community Foundation, established in 1988, is a statewide foundation seeking gifts from individuals, corporations, and other foundations to build endowments and ensure financial security for nonprofit organizations and institutions throughout the state. Based in Raleigh, North Carolina, the foundation also manages a number of community affiliates throughout North Carolina, that make grants in the areas of human services, education, health, arts, religion, civic affairs, and the conservation and preservation of historical, cultural, and environmental resources. The foundation also manages various scholarship programs statewide.

More info: <http://nccommunityfoundation.org/>

4.5.4 Z. Smith Reynolds Foundation

This Winston-Salem-based Foundation has been assisting the environmental projects of local governments and non-profits in North Carolina for many years. They have two grant cycles per year and generally do not fund land acquisition. However, they may be able to offer support in other areas of open space and greenways development.

More info: www.zsr.org

4.5.5 Bank of America Charitable Foundation, Inc.

The Bank of America Charitable Foundation is one of the largest in the nation. The primary grants program is called Neighborhood Excellence, which seeks to identify critical issues in local communities. Another program that applies to greenways is the Community Development Programs, and specifically the Program Related Investments. This program targets low and moderate income communities and serves to encourage entrepreneurial business development.

More info: www.bankofamerica.com/foundation

4.5.6 Duke Energy Foundation

Funded by Duke Energy shareholders, this non-profit organization makes charitable grants to selected non-profits or governmental subdivisions. Each annual grant must have:

- An internal Duke Energy business “sponsor”
- A clear business reason for making the contribution

The grant program has three focus areas: Environment and Energy Efficiency, Economic Development, and Community Vitality. Related to this project, the Foundation would support programs that support conservation, training and research around environmental and energy



efficiency initiatives.

More info: <http://www.duke-energy.com/community/foundation.asp>

4.5.7 National Trails Fund

American Hiking Society created the National Trails Fund in 1998, the only privately supported national grants program providing funding to grassroots organizations working toward establishing, protecting and maintaining foot trails in America. 73 million people enjoy foot trails annually, yet many of our favorite trails need major repairs due to a \$200 million backlog of badly needed maintenance. National Trails Fund grants help give local organizations the resources they need to secure access, volunteers, tools and materials to protect America's cherished public trails. To date, American Hiking has granted more than \$240,000 to 56 different trail projects across the U.S. for land acquisition, constituency building campaigns, and traditional trail work projects. Awards range from \$500 to \$10,000 per project.

Projects the American Hiking Society will consider include:

- Securing trail lands, including acquisition of trails and trail corridors, and the costs associated with acquiring conservation easements.
- Building and maintaining trails which will result in visible and substantial ease of access, improved hiker safety, and/or avoidance of environmental damage.
- Constituency building surrounding specific trail projects - including volunteer recruitment and support.

More info: www.americanhiking.org/alliance/fund.html.

4.5.8 The Conservation Alliance

The Conservation Alliance is a non-profit organization of outdoor businesses whose collective annual membership dues support grassroots citizen-action groups and their efforts to protect wild and natural areas. One hundred percent of its member companies' dues go directly to diverse, local community groups across the nation - groups like Southern Utah Wilderness Alliance, Alliance for the Wild Rockies, The Greater Yellowstone Coalition, the South Yuba River Citizens' League, RESTORE: The North Woods and the Sinkyone Wilderness Council (a Native American-owned/operated wilderness park). For these groups, who seek to protect the last great wild lands and waterways from resource extraction and commercial development, the Alliance's grants are substantial in size (about \$35,000 each), and have often made the difference between success and defeat. Since its inception in 1989, The Conservation Alliance has contributed \$4,775,059 to grassroots environmental groups



across the nation, and its member companies are proud of the results: To date the groups funded have saved over 34 million acres of wild lands and 14 dams have been either prevented or removed—all through grassroots community efforts.

The Conservation Alliance is a unique funding source for grassroots environmental groups. It is the only environmental grant maker whose funds come from a potent yet largely untapped constituency for protection of ecosystems - the non-motorized outdoor recreation industry and its customers. This industry has great incentive to protect the places in which people use the clothing, hiking boots, tents and backpacks it sells. The industry is also uniquely positioned to educate outdoor enthusiasts about threats to wild places, and engage them to take action. Finally, when it comes to decision-makers - especially those in the Forest Service, National Park Service, and Bureau of Land Management, this industry has clout - an important tool that small advocacy groups can wield.

The Conservation Alliance Funding Criteria: The Project should be focused primarily on direct citizen action to protect and enhance our natural resources for recreation. We're not looking for mainstream education or scientific research projects, but rather for active campaigns. All projects should be quantifiable, with specific goals, objectives and action plans and should include a measure for evaluating success. The project should have a good chance for closure or significant measurable results over a fairly short term (one to two years). Funding emphasis may not be on general operating expenses or staff payroll.

More info: <http://www.conservationalliance.com/>

4.5.9 National Fish and Wildlife Foundation (NFWF)

The National Fish and Wildlife Foundation (NFWF) is a private, nonprofit, tax-exempt organization chartered by Congress in 1984. The National Fish and Wildlife Foundation sustains, restores, and enhances the Nation's fish, wildlife, plants and habitats. Through leadership conservation investments with public and private partners, the Foundation is dedicated to achieving maximum conservation impact by developing and applying best practices and innovative methods for measurable outcomes.

The Foundation awards matching grants under its Keystone Initiatives to achieve measurable outcomes in the conservation of fish, wildlife, plants and the habitats on which they depend. Awards are made on a competitive basis to eligible grant recipients, including federal, tribal, state, and local governments, educational institutions, and non-profit conservation organizations. Project proposals are received on a year-round, revolving basis with two decision cycles per year. Grants gener-



ally range from \$50,000-\$300,000 and typically require a minimum 2:1 non-federal match.

Funding priorities include bird, fish, marine/coastal, and wildlife and habitat conservation. Other projects that are considered include controlling invasive species, enhancing delivery of ecosystem services in agricultural systems, minimizing the impact on wildlife of emerging energy sources, and developing future conservation leaders and professionals.

More info: <http://www.nfwf.org/AM/Template.cfm?Section=Grants>

4.5.10 The Trust for Public Land

Land conservation is central to the mission of the Trust for Public Land (TPL). Founded in 1972, the Trust for Public Land is the only national nonprofit working exclusively to protect land for human enjoyment and well being. TPL helps conserve land for recreation and spiritual nourishment and to improve the health and quality of life of American communities. TPL's legal and real estate specialists work with landowners, government agencies, and community groups to:

- Create urban parks, gardens, greenways, and riverways
- Build livable communities by setting aside open space in the path of growth
- Conserve land for watershed protection, scenic beauty, and close-to home recreation safeguard the character of communities by preserving historic landmarks and landscapes.

The following are TPL's Conservation Services:

- Conservation Vision: TPL helps agencies and communities define conservation priorities, identify lands to be protected, and plan networks of conserved land that meet public need.
- Conservation Finance: TPL helps agencies and communities identify and raise funds for conservation from federal, state, local, and philanthropic sources.
- Conservation Transactions: TPL helps structure, negotiate, and complete land transactions that create parks, playgrounds, and protected natural areas.
- Research and Education: TPL acquires and shares knowledge of conservation issues and techniques to improve the practice of conservation and promote its public benefits.

Since 1972, TPL has worked with willing landowners, community



groups, and national, state, and local agencies to complete more than 3,000 land conservation projects in 46 states, protecting more than 2 million acres. Since 1994, TPL has helped states and communities craft and pass over 330 ballot measures, generating almost \$25 billion in new conservation-related funding.

More info: www.tpl.org/

4.5.11 BlueCross BlueShield of North Carolina Foundation (BCBS)

Blue Cross Blue Shield (BCBS) focuses on programs that use an outcome approach to improve the health and well-being of residents. The Health of Vulnerable Populations grants program focuses on improving health outcomes for at-risk populations. The Healthy Active Communities grant concentrates on increased physical activity and healthy eating habits. Eligible grant applicants must be located in North Carolina, be able to provide recent tax forms and, depending on the size of the nonprofit, provide an audit.

BlueCross BlueShield of NC Foundation

P.O Box 2291

Durham, NC 27702

919-765-7347

More info: <http://www.bcbsncfoundation.org/>

4.5.12 Local Trail Sponsors

A sponsorship program for trail amenities allows smaller donations to be received from both individuals and businesses. Cash donations could be placed into a trust fund to be accessed for certain construction or acquisition projects associated with the greenways and open space system. Some recognition of the donors is appropriate and can be accomplished through the placement of a plaque, the naming of a trail segment, and/or special recognition at an opening ceremony. Types of gifts other than cash could include donations of services, equipment, labor, or reduced costs for supplies.

4.5.13 Volunteer Work

It is expected that many citizens will be excited about the development of a greenway corridor. Individual volunteers from the community can be brought together with groups of volunteers from church groups, civic groups, scout troops and environmental groups to work on greenway development on special community workdays. Volunteers can also be used for fund-raising, maintenance, and programming needs.

