North Augusta

South Carolina's Riverfront

City of North Augusta

Greeneway, Pedestrian and Bicycle Master Plan

May 2011
Adopted April 16, 2012

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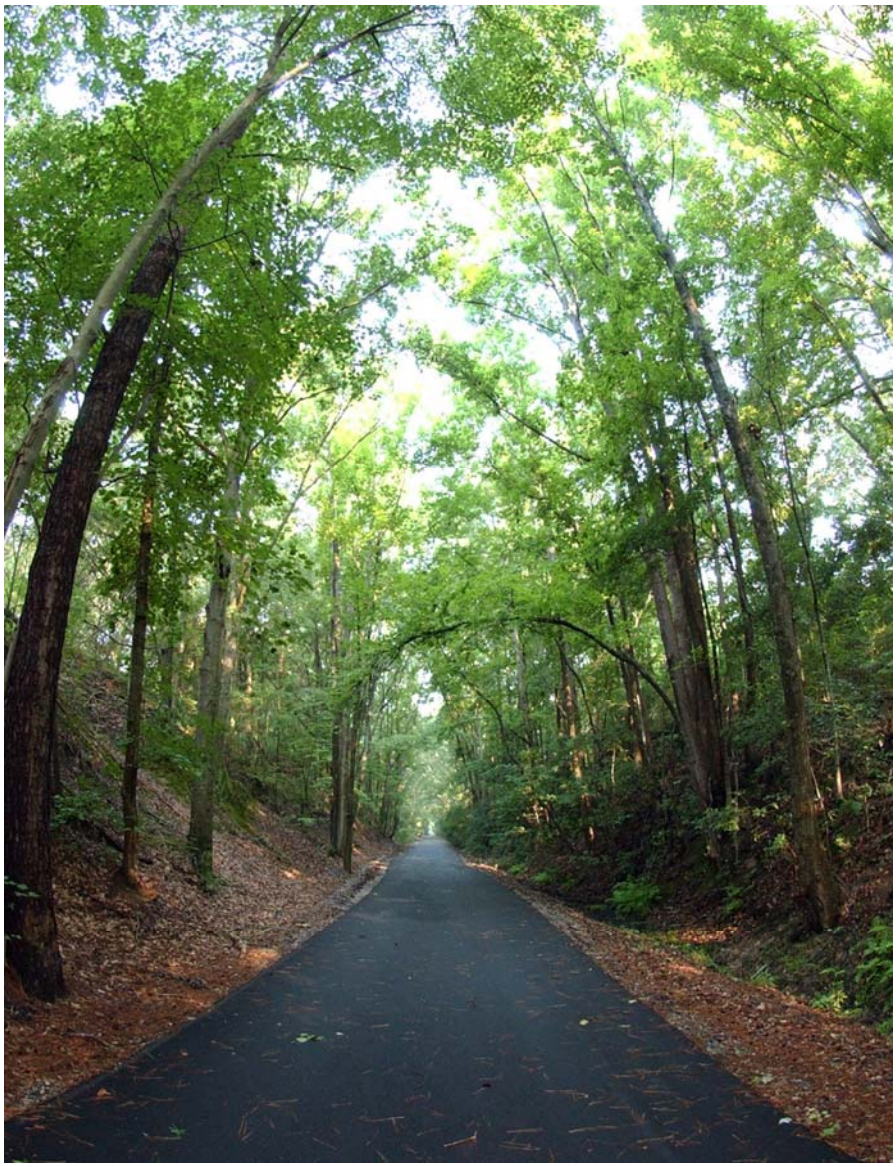

alta PLANNING + DESIGN

North Augusta South Carolina's Riverfront

ENGINEERS PLANNERS ECONOMISTS WilburSmith ASSOCIATES

Acknowledgments

The City of North Augusta acknowledges the efforts of the numerous City officials and residents who participated in the development of the North Augusta Greeneway, Pedestrian and Bicycle Master Plan. Their creativity, energy and commitment to the future of North Augusta were the driving force behind this planning effort. In addition, the following citizens, city staff and other agency and organization members significantly contributed to the development of this Plan.

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Chapter 1 – Introduction

1.1 INTRODUCTION

The North Augusta Greeneway, Pedestrian and Bicycle Master Plan was undertaken in 2010 and 2011 to update and consolidate previous plans and policies related to the pedestrian and bicycle network in North Augusta. Alta Planning + Design of Davidson, NC, a firm that specializes in bicycle and trail planning and design, was retained to assist with the planning process. A majority of the planning occurred in the spring and summer of 2010. Final drafting and mapping extended into 2011.

Implementation of the Plan will help the City enhance safety, access and mobility through the periodic improvement to the community's on-street and off-street Greeneway/bikeway network. The Plan elements, when implemented, will provide an interconnected network of Greeneway trails and bicycle routes throughout the City and will serve residents across the spectrum of age, economic status, physical ability, neighborhood location and daily activity. Improved mobility for pedestrians and bicyclists will offer North Augusta's residents, employees and visitors new opportunities to connect work, play, shopping and exercise.

The North Augusta Greeneway is a public access multi-purpose trail, currently 13 miles in length and initially developed as a "Rails-to-Trails" project on an unused Norfolk Southern railroad right of way. Its unique name stems from Mayor Thomas Greene, who served the City of North Augusta from 1985 to 1997 and was instrumental in the trail's creation. The current Greeneway network includes a number of extensions and connections to public facilities and neighborhoods. It also includes a five mile section parallel to the recently completed Palmetto Parkway (I-520).

The existing Greeneway provides recreation and commuting opportunities for North Augusta's residents.

The residents of North Augusta and the region who utilize the Greeneway speak highly of the City's trail system. The reality, however, is that, while the Greeneway provides excellent recreation opportunities, it does not provide direct access to many desirable destinations in the community. Therefore, it is not functioning near its potential capacity. Pedestrian and bicycle connectivity that creates a more walkable community will provide for alternative means of transportation and reduce dependency on automobiles. Improved connectivity will provide a circulation system that is more functional and safer. City objectives for the Greeneway, Pedestrian and Bicycle Master Plan are continued expansion of the trail with additional connections to neighborhoods, parks, schools, the new Palmetto Parkway segment, and ultimately into Aiken County, the City of Aiken and Richmond and Columbia Counties in Georgia.

This Plan proposes improvement projects that will create a comprehensive system of on-street and off-street bicycle and pedestrian improvements, including Greeneway trails, multi-purpose trails, bike lanes and bike routes.

1.2 PLAN ORGANIZATION

Chapter 1: The **Introduction** provides an overview of the Plan.

Chapter 2: The **Existing Conditions** description provides a background of the Greeneway Plan's relationship to other planning efforts.

Chapter 3: The **Recommended Network** contains an overview of the proposed system of on-street and off-street facilities.

Chapter 4: The **Implementation** discussion provides an overview of project prioritization policies, recommended project priorities, planning-level unit cost estimates and cost estimates for individual projects.

Appendices: The **Appendices** at the end of the Plan include design guidelines based on local, state and national best practices for various bikeway and off-street facility types and potential funding sources.

1.3 DEFINITIONS

When discussing both existing facilities and proposed facilities, it is useful to have a consistent glossary of terms. The following list explains the types of off-street facilities and on-street bikeways that are considered throughout this Plan. (See Appendix A, Design Guidelines, for a more detailed description of the various types of facilities and amenities.)

1.3.1 Greeneways

Greeneway trails are off-street multi-use facilities that have exclusive right of way and that provide access across the City and connections to the larger regional network. The Greeneway is a shared-use trail system which accommodates pedestrians, joggers, runners, fast-moving cyclists, recreational bicyclists, in-line skaters and walkers with baby strollers. It is a citywide network that originated on the former Norfolk Southern Railroad right of way and has been expanded through a number of extensions. The mainline Greeneway is generally flatter and wider than other elements of the system. The Greeneway is frequently used by cyclists riding long distances. The mainline of the Greeneway includes both the original sections along the former Norfolk Southern Railroad alignment and major Greeneway "extensions" like the Palmetto Parkway section and the loop along the Savannah River in Hammond's Ferry. For the purposes of this Plan, the terms trail, shared-use trail, shared-use path and Greeneway are considered interchangeable.

1.3.2 Greeneway Extensions

Greeneway extensions are new and additional segments of the mainline Greeneway system. They can also be major tributaries to the mainline Greeneway trail that connect substantial pedestrian and bicycle traffic generators to the Greeneway or provide access to scenic areas and major destinations. Some Greeneway extensions tie existing neighborhoods and parks that include their own internal pedestrian circulation systems to the mainline system.

1.3.3 Greeneway Connectors

Connectors are narrower shared-use or pedestrian only segments that provide local access to a larger Greeneway trail or a key destination, usually by linking a Greeneway to sidewalks or the circulation system in a destination which could include a residential neighborhood, a shopping center, a park, a civic building or a place of employment. Greeneway connectors are shorter and generally narrower segments of trail. Connector trails serve commuters and recreational trips by providing access to other Greeneway trails, bikeways and sidewalks.

1.3.4 Side Paths (Side Trails)

Side paths or side trails are off-street two way trails on one side of the road and located within the road right of way. These “side paths” serve both bicyclists and pedestrians and are wider than a standard sidewalk. They are also used by in-line skaters and runners. Shared-use paths are preferred by novice and casual bicyclists because they are separated from vehicular traffic. However, conflicts with other users can occur. Side paths provide commuter routes between residential areas, employment centers and retail areas. They are used for both pedestrians and recreational bicycle riders to access the regional trail network. The high frequency of street and driveway crossings limits fast and continuous riding. Side paths require specific design improvements at intersecting roadway crossings to ensure that pedestrians and bicycle riders can safely cross the road. Safety concerns include increasing cyclist visibility, limiting vehicle right turning movements at the trail crossing, and ensuring that cyclists come to a stop when cars are present and then proceed through the intersection with caution.

1.3.5 Sidewalks

Sidewalks are paths for pedestrians adjacent to a street and within the street right of way. Adult bicyclists are generally not permitted to use sidewalks.

1.3.6 Soft Surface Trails

Soft surface trails are off-street trails that are not improved with asphalt or concrete paving. A soft surface trail is designed for pedestrian and trail bike use, may be steeper and narrower than a Greeneway on some segments and is generally not ADA compliant.

1.3.7 Bike Lanes

A bike lane is a separate lane within the right of way and travel way of a road designated exclusively for bicycles. Bike lanes are used on collector and arterial roads with higher traffic volumes and are most often located between the vehicle traffic lane and the curb or shoulder. They are separated from the vehicle lanes by a solid stripe and include bike lane markings on the pavement. Bicycle traffic moves in the same direction as vehicular traffic. Bike lanes safely accommodate bicycle travel by providing separated space on-street in corridors with current or anticipated high traffic volumes. They provide direct connections to Greeneway trails, commercial corridors and other key destinations.

1.3.8 Shared Roadways, Bicycle Routes and Bicycle Boulevards

Shared roadways are on-street bicycle facilities that are intended to prioritize safe and convenient bicycle travel on streets that do not have space for bike lanes. Bike routes are most often indicated by signs and sometimes by shared lane arrows (sharrows). A bicycle route or boulevard is located on a shared road that does not include a designated bicycle lane. Bicycles and motor vehicles share the same lane and pavement. Bike boulevards and bike routes are appropriate for lower volume roads and streets where potential conflicts between bicycles and motor vehicles are reduced. Speed limits are generally less than thirty-five miles per hour, road widths are narrower, and on-street parking is usually allowed on both sides. Traffic calming measures, including speed tables, curb extensions and roundabouts, may be included in the street design. Sometimes shared lane markings, “sharrows”, are applied to the pavement. A sharrow is a bike symbol with two chevron markings above it that indicate that the lane is shared with bicycles. It does not designate a bike lane.

1.4 PUBLIC INVOLVEMENT

The North Augusta Greeneway, Pedestrian and Bicycle Master Plan is an update of plans previously completed by the City and the ARTS Metropolitan Planning Organization (MPO) for the region. Considerable public involvement was included in the development of the ARTS regional bicycle and pedestrian plan in 2003. Additional public and stakeholder input contributed to the development of the Greeneway, Pedestrian and Bicycle Master Plan recommendations. The public involvement element included two mechanisms to achieve local input.

1.4.1 Plan Advisory Committee

The Plan advisory committee included members of the City’s staff representing various departments, including Planning and Economic Development, Parks & Recreation, Engineering and Administration. The City-appointed Plan Advisory Committee provided oversight in the Plan’s development and information on the existing Greeneway and bicycle network, contributed ideas for system improvements, and assisted in getting the word out about the plan effort to the broader community. The consultant team met with the Advisory Committee throughout the plan development for direction on recommendations and to determine local priorities.

1.4.2 Design Workshop

In March 2010, City staff and Alta Planning + Design held a workshop to gather feedback on the Plan. Attendees included members of the City Council, Planning Commission, and Parks and Recreation Advisory Commission who were asked to identify and prioritize potential future extensions of the Greeneway; connections to existing and planned schools, parks, neighborhoods, shopping areas, public facilities and other significant destinations; connections that will integrate the new Palmetto Parkway Greeneway segment into the network; multi-use trails, bike lanes, and sidewalks that could provide connections to the Greeneway; the location of possible Greeneway access parking areas; and Greeneway crossings at existing and proposed collector and arterial roadways that will require special treatments including speed tables, tunnels or bridges.

Chapter 2 – Existing Conditions

This chapter describes the current Greeneway and bikeway network in North Augusta and provides an inventory and assessment of existing Greeneway and bicycle facilities. The chapter also outlines key planning efforts that the Greeneway, Pedestrian and Bicycle Master Plan should leverage for implementation.

2.1 EXISTING OFF-STREET GREENEWAYS AND TRAILS

Also known as shared-use paths, Greeneways are used by various nonmotorized users, including pedestrians, cyclists, in-line skaters and runners. Shared-use paths are typically paved (asphalt or concrete) but may also consist of an unpaved smooth surface as long as it meets ADA standards.

As described in Chapter 1, the types of off-street facilities that can accommodate bicycle travel include Greeneway trails, side paths and connectors. The following section describes these off-street facilities in greater detail and the Greeneway, Pedestrian and Bicycle Master Plan Map shows the existing and potential off-street Greeneways and trails in North Augusta.

2.1.1 Greeneway

The mainline of the Greeneway trail is located along the former railroad right of way from Georgia Avenue to Interstate 20. Other Greeneway trails in North Augusta exist along the Palmetto Parkway, on Walnut Lane, on Riverside Boulevard and in Hammond's Ferry. A portion of the Palmetto Parkway Greeneway trail is located in Aiken County. Across the Savannah River in Augusta, the Riverwalk esplanade extends from the 5th Street Bridge downtown to 13th Street, along Bartram Trail to the Augusta Canal Towpath and to the canal head gates in Columbia County.

2.1.2 Greeneway Extensions

Greeneway extensions include the Hammond's Ferry Riverfront loop, the Riverside Boulevard/Waterworks Park segment, Walnut Lane, and the Knox Avenue side path. Both Greeneway extensions and Greeneway connectors will utilize drainage ways (including the Boeckh Ravine system) and open space either unsuitable or unavailable for development. The Georgia Power and South Carolina Electric & Gas power line easements that extend through the City parallel to the river are appropriate locations for Greeneway extensions. Open space and detention areas within neighborhoods are appropriate for the development of Greeneway connectors. Over the last several years, the Planning Commission and City Council have emphasized the need for sidewalk and Greeneway connector construction in all new developments, both residential and commercial. Sidewalks and Greeneway connections are being required in those projects. Significant examples include The Village at Riverview, Bergen Village townhouse developments and Woodstone on Bergen Road. The Shoppes at North Augusta and River Commons are two commercial examples.

2.1.3 Side Paths (Side Trails)

Several shared-use side paths in North Augusta are directly adjacent to roadways and within the street right of way. The portion of the Riverside Boulevard Greeneway Extension from East Buena Vista Avenue to the bridge across the creek can be considered a side trail. The side trail on Knox Avenue from Martintown Road to Georgia Avenue and on Walnut Lane from the western city limit to Bentley Drive are two additional examples. The Walnut Lane Greeneway will be extended to US 25 and then

south on the south side of US 25 to Northridge Plaza (Food Lion) shopping center as part of the US 25/Walnut Lane intersection improvement project.

2.1.4 Connectors

Connectors in North Augusta include those connecting from Bolin Road to the Greeneway, from the Riverview Park Trail to The Village at Riverview subdivision, and from Walnut Park in Walnut Grove to the Greeneway on Walnut Lane.

2.1.5 Sidewalks

A relatively extensive network of sidewalks is present within the older areas of the City, but there are very few in newer neighborhoods and commercial centers. Sidewalks are located along some sections of arterial and collector roads, but do not complete a network that pedestrians can utilize. Sidewalks are noticeably absent in the vicinity of public schools

2.2 EXISTING ON-STREET BIKEWAYS

On-street bikeways are roadway treatments accommodating bicycle travel. Accommodations can take the form of bicycle route designation and signage, bicycle lane or shoulder striping. AASHTO's Guide for the Development of Bicycle Facilities (1999), which is referenced by the South Carolina Department of Transportation (SCDOT) as the basis for bicycle design guidelines on State roadways, defines several types of "bikeways". The definitions in Chapter 1 are consistent with the SCDOT definitions. North Augusta currently has no designated on-street facilities for bicyclists. The Greeneway, Pedestrian and Bicycle Master Plan Map shows potential and proposed on-street bicycle and pedestrian facilities in North Augusta.

2.3 RELATIONSHIP WITH EXISTING PLANS

Background plans and studies relevant to the Greeneway, Pedestrian and Bicycle Master Plan were reviewed for existing and proposed goals, policies and projects that would influence or potentially impact the development of bicycle and pedestrian projects in North Augusta.

The following plans were reviewed for existing or proposed bicycle, pedestrian and Greeneway related content:

- The North Augusta Riverfront Redevelopment District Master Plan (1996)
- North Augusta Greeneway Plan (2002)
- North Augusta Community Needs Assessment (2003)
- Parks and Recreation Facilities Master Plan (2003)
- ARTS Regional Bicycle and Pedestrian Plan (2003)
- Comprehensive Plan Citizen Survey (2005)
- City of North Augusta Comprehensive Plan (2005)

Projects that were proposed in the documents listed above and have not yet been implemented were added to the project lists and map in the Greeneway, Pedestrian and Bicycle Master Plan. Additionally, the following information from each plan document is relevant to the implementation of the projects recommended in this Plan.

2.3.1 The North Augusta Riverfront Redevelopment District Master Plan (1996)

This plan identified a multi-use trail adjacent to the river as an opportunity to provide public access to the river and connections between neighborhoods. The study also

proposed a Greeneway network, including dedicated bike and pedestrian routes and bikeway tours that follow new and existing streets. The study identifies regional connections from South Carolina to Georgia across the Savannah River, including a connection to the canal bikeway system on or under the Georgia Avenue Bridge. Another connection identified is the former rail bridge between Hamburg and Augusta near the Fifth Street Bridge. Several of the segments identified in the Riverfront Redevelopment District Master Plan have been implemented.

2.3.2 North Augusta Greeneway Plan (2002)

In 1988, North Augusta purchased the right of way of an abandoned rail line for the development of an eight mile long multi-use trail. The Greeneway provides multimodal connectivity between neighborhoods, recreational centers, and other activity centers. Funding has been provided by grants from the South Carolina Department of Parks, Recreation and Tourism, South Carolina Department of Transportation, and South Carolina Department of Health and Environmental Control. The initial Greeneway Master Plan was developed by city staff in 2002.

2.3.3 North Augusta Community Needs Assessment (2003)

The North Augusta Community Needs Assessment was undertaken in conjunction with the 2003 Parks and Recreation Facilities Master Plan and presents the results of a survey that asked questions regarding residents' bicycling and walking priorities. The top four park or facility types that respondents report using most often are:

- Walking/biking trails/parks (Greeneway Park).
- Riverview Park Activities Center.
- Playgrounds for children.
- Access to bodies of water, rivers and creeks.

While many people use Greeneway trails, respondents also primarily desired additional facilities. The top four park or facility types needed most in North Augusta were:

- Walking and biking trails or parks (such as Greeneway Park).
- Recreation/activity center such as Riverview Park Activities Center.
- Playgrounds for children.
- Access to bodies of water, rivers and creeks.

The top three improvements to existing parks and facilities that respondent households are most willing to support with tax dollars:

- Continue northern Greeneway expansion.
- Increase visibility of law enforcement in parks.
- Add swimming pools.
- Create walking, jogging and biking trails.
- Add lighting to facilities.

2.3.4 Parks and Recreation Facilities Master Plan (2003)

The Parks and Recreation Facilities Master Plan was adopted by the City Council in 2003. Final Proposal and Recommendations related to the Greeneway were listed under the heading "Greenway/Bikeway" and included:

- Develop approximately six to eight miles of new Greeneway and six to eight miles of bikeway trails.
- Expand the width of the Greeneway Trail.

- Make more connections with schools and other public use areas (all parks should be connected via the Greeneway).
- Develop paths along the river for viewing and interacting with the water.

2.3.5 ARTS Regional Bicycle and Pedestrian Plan (2003)

The 2003 ARTS Bicycle and Pedestrian Plan outlined a network of routes throughout the region to improve the bicycle and pedestrian system funded under the Federal Transportation Enhancement Program. The North Augusta routes included in the ARTS Plan were based on and essentially the same as those contained in the 2002 North Augusta Greeneway Plan. Several of the projects listed in the ARTS Plan have since been constructed. The facilities recommended in this Plan will provide connections to the network planned in 2003. The ARTS Bicycle and Pedestrian Plan is scheduled to be updated in 2011. The projects recommended in 2003 and this Plan will be included in the 2011 ARTS Bicycle and Pedestrian Plan.

2.3.6 Comprehensive Plan Citizen Survey (2005)

Research undertaken in conjunction with the preparation of the Comprehensive Plan included a mail survey of North Augusta residents. The survey asked two multi-part questions related to walkability of the community and the desirability of being able to walk to destinations. A surprising number of the respondents, more than a third in most cases, were capable of walking to a variety of destinations from their current residence. Parks and the Greeneway were identified as the most readily located. When asked how important walking to one of seven listed destinations would be if moving to a new house, the numbers were similarly high. Parks and the Greeneway were also at the top of the list of desired destinations within walking distance. Two thirds of the respondents said that it was very important or somewhat important. A third question asked if the City should require bike paths and trails in new developments. Two thirds responded in the positive.

2.3.7 City of North Augusta Comprehensive Plan (2005)

Text from the City's Comprehensive Plan that is relevant to the recommendations and implementation of this Plan is excerpted here.

2.3.7.1 Greeneway – Greeneway extensions are major tributaries to the main Greeneway Trail. Extensions will be developed to tie substantial pedestrian and bicycle traffic generators to the Greeneway. Many of the Greeneway extensions will tie existing neighborhoods and parks that include their own internal pedestrian circulation systems to the citywide system. Greeneway connectors are shorter and generally narrower segments of trail that tie existing neighborhoods to the Greeneway Trail. Both Greeneway extensions and Greeneway connectors will utilize drainage ways including the Boeckh Ravine system.

2.3.7.2 Sidewalks – A relatively extensive network of sidewalks is present within the older areas of the City, but there are very few in newer neighborhoods and commercial centers. Sidewalks are located along some sections of arterial and collector roads, but do not complete a network that pedestrians can utilize. Sidewalks are noticeably absent in the vicinity of public schools.

2.3.7.3 Goals, Objectives, Policies and Strategies – The following goals, objectives, policies and strategies from the City's 2005 Comprehensive Plan are relevant to the implementation of the Greeneway Master Plan.

a. Consider development regulations that require all new residential and commercial developments to install sidewalks and Greeneway extensions and connectors and to provide for adequate internal vehicular and pedestrian circulation, and external vehicular and pedestrian connectivity to adjacent developments, subdivisions and the Greeneway. (5.14.9)

b. Implement the citywide Greeneway bicycle and pedestrian master circulation plan that includes the primary Greeneway system, Greeneway extensions and connectors, multi-purpose trails adjacent to arterial highways, sidewalks and share-the-road bicycle lanes. The plan will emphasize and prioritize connections to parks, schools, commercial areas, churches and other public facilities and is designed to ultimately connect every neighborhood and commercial area in the City. (5.14.10)

c. Continue the program of retrofitting existing streets to provide a citywide sidewalk network where reasonable, economically feasible and regular use will occur. (5.14.12)

d. Evaluate "downsizing" or narrowing existing streets, including some collectors and arterials, to calm traffic and make them more pedestrian friendly where road and lane width is not necessary to carry current and projected traffic volumes. (5.14.20)

e. Cooperate with Augusta-Richmond County, Columbia County, Aiken County and the Augusta Canal Authority to provide interstate connections between the North Augusta Greeneway system, Augusta Riverwalk, the Augusta Canal Bikeway system and the Columbia County Bikeway system. (5.14.22)

f. Modify the subdivision and street design and construction standards to include minimum standards for street widths, block lengths, cul-de-sac lengths, street connectivity, trees, Greeneway and other pedestrian connections, sidewalks (a minimum of 5 feet wide) and driveways. (6.13.9)

g. Develop design standards and regulations for sidewalks and streets to ensure safety and mobility for pedestrians and bicycles. (9.13.12)

2.3.7.4 Greeneway Projects

Chapter 6, Community Facilities and Services, of the 2005 Comprehensive Plan includes lists of capital projects broken down by type and potential funding source. The Greeneway and trail related projects listed in the Comprehensive Plan are summarized in Table 1. Project numbers 1 through 7 are included in the list of long range unfunded projects in the 2005 Comprehensive Plan. Project 8 is essentially complete. Land acquisition under Project 9 is underway.

TABLE 1 2005 COMPREHENSIVE PLAN GREENEWAY PROJECTS

	Project	Cost Estimate	Potential Funding Source
1	Greeneway Connectors	$300,000	Federal/State Transportation & Trails Grants
2	Watershed Parks (development including Greeneway extensions and connectors)	$500,000	Federal/State Transportation & Trails Grants
3	Greeneway Park Extension (Pisgah to North of I-20)	$350,000	Federal/State Transportation & Trails Grants
4	Greeneway Park Extension (River Club to US 1)	$200,000	Federal/State Transportation & Trails Grants
5	Greeneway Park Extension (US 1 to Palmetto Parkway)	$500,000	Federal/State Transportation & Trails Grants
6	Greeneway Park Extension (Palmetto Parkway to River)	$100,000	Federal/State Transportation & Trails Grants
7	Savannah River Pedestrian bridges (Location to TBD)	$3,500,000	Federal/State Transportation Grants
8	Greeneway: Riverfront Extension/Park (part)	$1,500,000	Sales Tax Round 1
9	Parks, Greeneway & Open Space Land Purchase/Development	$3,140,000	Sales Tax Round 2

2.4 PROJECT IMPLEMENTATION

2.4.1 History

The right of way for the initial phase of the Greeneway extended approximately 3.1 miles along the former Norfolk Southern Railroad right of way from Georgia Avenue to Martintown Road. The second phase, 1.6 miles, continued along the old railroad bed from Martintown Road to Pisgah Road. A parking lot and trailhead were also constructed at the Pisgah Road terminus. The third phase consisted of a pedestrian bridge across Martintown Road connecting the first and second phases. An isolated section, approximately 0.75 miles, on the north side of Walnut Lane was constructed adjacent to the Butler's Mill, Andrews Branch and Walnut Grove subdivisions. A number of connectors from subdivisions to the Greeneway have been constructed. The subdivisions include Green Forest, Knollwood and Walnut Grove. Other subdivisions have dedicated right of way for connectors which will be developed when a Greeneway Extension is developed in the vicinity to complete the connection.

- **North Augusta Greeneway Riverfront Extension, Phases I and II –** The Riverfront Extension extends the Greeneway between the initial mainline Greeneway alignment near Crystal Lake Drive, along and across Crystal Lake, through the Hammond's Ferry development including a one mile segment along the Savannah River and reconnects with the Greeneway side trail on Riverside Boulevard near the Railroad Avenue traffic circle. Fiscal year 2003 Trails funding of $178,000 was earmarked for Phase I. Phase II was completed with $224,000 in fiscal year 2004 with Trails funding and a portion of the tax increment funds allocated to the Riverfront/Central Core Redevelopment Fund. A portion of the section adjacent to the Georgia Avenue Bridge and along the riverfront was constructed as a temporary alignment and may be relocated in conjunction with the development of Riverfront Park and the Riverfront Center commercial area of Hammond's Ferry.

- **Pisgah to Bergen Greeneway Extension –** An extension of the Greeneway from its terminus at Pisgah Road another 0.85 miles under I-20 to Bergen Road is under construction. The project includes a trailhead parking area adjacent to Bergen Road. The alignment of the extension, previously outside the city limits, follows the old railroad right of way that had been sold to adjacent property owners. The City acquired the old right of way and some additional property up to Bergen Road between 2007 and 2010. The project is funded with SCDOT Enhancement Funds, $200,000; SCPRT Trails Funds, $100,000; North Augusta Capital Projects Funds, $89,375; and North Augusta General Funds, $117,012. It is scheduled to open in 2011.

- **Bergen to Woodstone Greeneway Extension –** A continuation of the Pisgah to Bergen extension will extend an additional 0.48 miles through the Village at Bergen and into the Woodstone subdivision and will be the next segment of the Greeneway to be constructed. The Bergen to Woodstone Extension will follow the old railroad right of way north through the Village at Bergen then turn to the west into the Woodstone development. The right of way through the Village at Bergen is owned by the City. The Greeneway right of way in Woodstone will be donated by the developer. An SCDOT Enhancement grant application for $195,771 was requested from SCDOT in January 2011. A matching amount of $48,943 is budgeted in the North Augusta Capital Projects Fund.

- **Woodstone Extension –** The next planned phase of the main line of the Greeneway will continue through the Woodstone subdivision. Ultimately, through a series of extensions, the Greeneway will extend through Bergen West and Woodstone to Martintown Road in the vicinity of Gregory Lake Road. An application for SCPRT Trails funding will be submitted this year for the continuation through Woodstone.

The trail systems in Augusta-Richmond and Columbia Counties, Georgia have also been implemented in phases in recent years. In the future, the North Augusta Greeneway system will connect to both systems in Georgia and potentially systems in Aiken and Edgefield Counties in South Carolina creating an interconnected system of between fifty and one hundred miles.

- **Augusta Canal Multi-Use Trail, Phases I and II –** The Augusta Canal towpath is located in Richmond and Columbia Counties Georgia west of the Savannah River and connects to the North Augusta Greeneway system via the Georgia Avenue/13th Street Bridge.

- **The New Bartram Trail –** Bartram Trail is a multi-use trail connecting the Augusta Riverwalk in downtown Augusta to the Augusta Canal. It will include a new section of multi-use trail between Lake Olmstead and Grace Street in the Augusta Harrisburg neighborhood.

2.4.2 Sales Tax Funded Future Projects

The referendum on Round 3 of the Aiken County Capital Projects Sales Tax was passed in November 2010. The ballot included funding for Greeneway related projects by both the City and Aiken County. Collections under Round 3 of the sales tax will commence when the total collection of Round 2 sales tax proceeds have been reached. It is

currently anticipated that Round 3 collections will start in early 2013 and run for seven years.

2.4.2.1 City of North Augusta Funding

The City of North Augusta included *"$1,475,000 for Greeneway expansion, extension, connectors and roadway crossing improvements"* in the project list for Round 3 of the Aiken County Capital Projects Sales Tax. These funds can be applied to any Greeneway related project in the City including side trails that may be associated with SCDOT road widening projects.

2.4.2.2 Aiken County Funding

Aiken County included *"$13,000,000 for jointly funded projects with the City of Aiken and North Augusta including roads, utilities, parking and other infrastructure related to the development of the new county office complex; Hitchcock Parkway; University Parkway; Powderhouse Connector Road; Martintown/Knobcone intersection improvements; Palmetto Parkway."* These funds might be combined with City funds and applied to parking and trailhead development, directional signage and amenities, including benches, trail distance and directional signs, and pavement markings associated with the Palmetto Parkway Greeneway segment. Additionally, County allocated sales tax funds could be used in conjunction with the Martintown/Knobcone intersection improvements for related pedestrian amenities, including side trails, Greeneway extensions, pedestrian crossing signals and others.

Chapter 3 – Recommended Network

North Augusta has the potential to transform itself into a community where walking and bicycling for transportation and recreation are even more popular activities than they are currently. This chapter summarizes the recommended Greeneway and bicycle network, a comprehensive system of Greeneways and bikeways connecting key destinations and surrounding areas. City staff, elected officials, stakeholder groups, consultants and North Augusta residents worked together to develop this recommended system. The network recommendations build upon current and past planning efforts.

The Greeneway, Pedestrian and Bicycle Master Plan Map depicts existing and potential off-street bicycle and pedestrian facilities and proposed on-street bicycle facilities. The facility segments shown are based on the types of bikeways and off-street shared facilities described in Chapters 1 and 2. A summary of the total length of each type of facility proposed is provided in Table 2, Recommended Overall Greeneway and Bikeway System. The alignments of many of the proposed segments are not specific at this time. Final alignments may be longer or shorter depending on circumstances at the time more detailed planning and design is initiated.

The proposed bridge shown in Table 2 is the Five Notch Road bridge over I-20 that will require replacement (or widening if possible) as part of the Five Notch Road widening project. The Greeneway, Pedestrian and Bicycle Master Plan Map also shows three potential bridges across the Savannah River at The Rapids, 5th Street/US 1 and Palmetto Parkway. Those bridges will require interstate cooperation and have not been included in the calculations or cost estimates included in this plan. A side trail crossing of the Savannah River on the Georgia Avenue/13th Street Bridge is included as a side trail. The Plan Map also shows a tunnel under the Palmetto Parkway connecting the undeveloped Springs property to the undeveloped Kellogg property. The tunnel connection may be developed in conjunction with either or cooperatively with the development of the properties. The cost of the tunnel is not included in this Plan.

Additionally, the four projects currently funded or under construction listed in Table 3, the ten off-street Greenway priority projects listed in Table 4 and the ten on-street priority projects listed in Table 5 are all identified on the map with their respective project numbers.

TABLE 2 RECOMMENDED OVERALL GREENEWAY AND BIKEWAY SYSTEM

Facility Type	Estimated Length in Miles
Proposed Greeneway	**19.23**
Proposed Side Path	**23.98**
Proposed Soft Surface Trail	**5.85**
Proposed Trails by Developer	**13.1**
Proposed Connector	**2.37**
Proposed Bridge	**0.10**
Proposed Bike Lane	**12.13**
Proposed Bicycle Route	**19.35**
Total	**96.11**

Chapter 4 – Implementation

4.1 RECOMMENDED GREENEWAYS AND BIKEWAYS

The North Augusta Greeneway, Pedestrian and Bicycle Master Plan will allow North Augusta to refocus and prioritize implementation efforts where they will provide the greatest community benefit. This chapter describes the methodology used for identifying and prioritizing North Augusta's bikeway and Greeneway projects. The methodology was applied to projects identified in the plan to produce an initial list of recommendations. The Project Team evaluated many project ideas originating from previous local and regional planning efforts, the Steering Committee, City Council, Planning Commission, Parks and Recreation Advisory Commission, City staff, and others.

The Plan recommends a comprehensive network of off-street Greeneways and trails and on-street sidewalks and bikeways. The proposed facilities for North Augusta cross jurisdictional boundaries between the City of North Augusta and Aiken County. At some time in the future it is expected that the Greeneway will extend into Edgefield County. Table 2 estimates the total number of miles, by individual facility type, that are located or proposed to be ultimately developed pursuant to this Plan. As the Plan is implemented and additional segments are identified, they should be incorporated into the Plan. Additionally, as the City grows and as segments into Edgefield County are anticipated, the Plan should be amended.

4.2 IMPLEMENTATION RESOURCES

Successfully completing Greeneway related projects and programs is considerably more likely if resources can be leveraged from a combination of local, state, federal and private sources. North Augusta has done an exemplary job of combining funding sources to develop the Greeneway system that exists today. A major portion of the right of way for the main line of the Greeneway is former railroad right of way purchased by the City. Federal Trails program funding has also been used. Segments of Greeneway side trails are located within existing street rights of way. Additionally, significant portions of the right of way for Greeneway extensions and connectors (both existing and those reserved for future construction) have been donated by private property owners and subdivision developers. Property donated by developers was either a portion of required open space or specifically set aside for the Greeneway.

Funding for the construction of Greeneway segments has also been provided by a variety of sources. The City's Capital Projects Funds, Riverfront/Central Core Redevelopment Fund and General Fund have been utilized. The Aiken County Capital Projects Sales Tax, originally passed in 2000 and reauthorized twice since, has been a major source of funding. The Federal Transportation Enhancement and Recreational Trails grant programs administered by the South Carolina Department of Transportation (SCDOT) and the South Carolina Department of Parks, Recreation and Tourism (SCPRT), respectively, have also provided a generous and steady source of construction funding. (See Appendix B, Funding Sources, for additional information.) Intergovernmental transfers for Greeneway right of way and construction should continue to be aggressively pursued as long as such funding is available. SCDOT is currently developing policies to allow local governments to utilize Surface Transportation Program funds, in the past allocated almost exclusively for road widening, new road construction and intersection improvement projects, for greenway, bicycle, pedestrian, complete streets and road diet projects. A 20% local match will likely be required but the

amount of Federal funds available for Greeneway related projects is expected to increase.

4.3 IMPLEMENTATION STRATEGY

Greeneway development has and should continue to be financed with a variety of sources of both right of way and construction funding. As described above, land developments, both residential and commercial, should be expected to participate in the development of the Greenway by contributing rights of way and, where appropriate, constructing the trail necessary to implement this Plan. It is unlikely that any significant amount of additional railroad right of way will become available for expansions of the Greeneway system. However, powerline easements may be an appropriate location for new Greeneway extensions, connectors and soft surface trails. Easements within segments of the combined Georgia Power and South Carolina Electric and Gas easement that parallels the Savannah River from Riverview Park north into Edgefield County have already been acquired in portions of The Rapids and Savannah Barony. The previously identified federal and state sources of funding can be pursued for construction financing.

The state road system is another significant source for both Greeneway system right of way and construction, primarily for side trails and sidewalks. As roads projects are planned for capacity improvements or beautification or both, the City can influence the design process to include side trails and sidewalks. That has been accomplished on Knox Avenue and will be included in the construction of the Walnut Lane/US 25 intersection improvements on both Walnut Lane and US 25. The preliminary scope of the Five Notch Road widening and the US 1 improvements include side trails. The accommodation of pedestrian and bicycle transportation in the construction of highway improvements is allowed and encouraged by the US Department of Transportation. In the case of new roads, road widenings and road beautification projects, all or a substantial majority of the cost of the bicycle and pedestrian elements can be funded by the state and federal governments.

Because the Greeneway is intended to be an interconnected system, it will include segments and links that are on the road network and some that are isolated and off of the roadway system. The pastoral character of the North Augusta Greeneway is one of its most appreciated features. A majority of the original alignment is constructed through wooded areas and away from vehicular traffic. As a result, unless a user lives adjacent to the Greeneway, access is limited to a few locations where a connector has been provided or the trail crosses a road or goes through a park. Accordingly, parking areas have been provided at trailheads, usually at a road crossing. The system envisioned in this plan is intended to be accessible to walkers and bikers from anywhere in the City without the need to drive to a trailhead to get on the Greeneway. While additional trailheads are proposed, especially near the Palmetto Parkway, sidewalks, bike lanes and bike routes can provide the connections for pedestrians and bikers from almost any area of the City. Sidewalks, bikeways and share the road bike routes are almost always less expensive to construct than off road trails and, if direct connections to the Greeneway are provided, will reduce the demand for parking spaces. Sidewalks, bike lanes and bike routes that provide the connections should be included in all Greeneway construction projects to optimize accessibility and reduce overall costs.

4.4 FRIENDS OF THE GREENEWAY

It is recommended that the City support the creation of a "Friends of the Greeneway" organization which could tap the social and monetary capital in North Augusta and the region to support the improvement, expansion and utilization of the Greeneway system. The Friends group could initiate and coordinate events activities on the Greeneway, raise funds for special improvements and treatments on Greeneway trails, and pursue opportunities to implement some of the projects proposed in this Plan. Ultimately, the group could promote the utilization of the Greeneway, serve as an unofficial advisory group, and assist in ensuring that new trails and Greeneway segments are successful when implemented.

The Friends group could designate and organize events that improve the Greeneway network, including tree plantings, cleanup activities, trail monitoring, bridge building, invasive plant removal, etc. The group could work with other civic organizations and local businesses to get in-kind donations for cleaning up the corridor (e.g., a local hauling service could donate a truck to haul away debris or a local nursery could donate native plants for enhancement activities). They could also work with local artists and designers as well as students to develop user maps and signs, interpretive illustrations, and functional artwork for the corridor.

The group could also perform fundraising activities for trail enhancements. Examples of trail enhancements include interpretive signs along creeks and at historic sites, directional signage, benches and rest areas, and others. Additionally, the "Friends of the Greeneway" group could be responsible for assisting the City with grant writing efforts to secure federal and state funding for various phases of development. The group could also coordinate with the Greeneway Trust organization created by North Augusta 2000 and currently administered by a local board and the Community Foundation for the CSRA.

4.5 PROJECT PRIORITIZATION AND RANKING

The proposed Greeneway and bicycle projects identified in this plan or subsequently identified should be prioritized to establish their relative importance and to guide funding allocations for system improvements. Prioritization criteria can be used to lay out the best possible future pedestrian and bicycle network by identifying the features of the network most important to North Augusta residents and to rank projects against each other to establish their relative importance. Projects could be ranked based on how well they accomplish the following seven objectives.

The project:

1. Provides connectivity to existing and planned neighborhoods, destinations and generators to ensure that parks, civic facilities, shopping areas, employment centers, churches and community centers are linked to neighborhoods.
2. Provides internal connectivity within the Greeneways system to ensure that multiple routes are available to and from the various trail corridors.
3. Improves connectivity to regional destinations and generators to ensure that North Augusta capitalizes on tourism opportunities and contributes to the regional system.
4. Leverages available state, federal and private funding to the extent possible.
5. Utilizes donated right of way or available SCDOT right of way.

6. Can be constructed in conjunction with another project (SCDOT road paving or widening, subdivision development, park development, etc.) at little or no cost to the City.
7. Utilizes citizen support through a "Friends of the Greeneway" or other community organization.

4.6 PRIORITY PROJECTS

4.6.1 Funded Projects

The projects listed in Table 3 are projects that are already funded and under construction or pending implementation, or for which grant funds have already been approved.

- **Project 1 –** The Pisgah to Bergen Greeneway Extension is funded with a combination of sources, is under construction and is expected to be completed and open to the public in 2011.
- **Project 2 –** The Greeneway pedestrian/bicycle intersection signal at the Pisgah Road crossing is funded in conjunction with the Pisgah to Bergen Greeneway Extension and is designed to provide a safe crossing of Pisgah Road.
- **Project 3 –** The US 25 Greeneway Side Trail will extend from the current eastern terminus of the Walnut Lane Greeneway at Walnut Grove to US 25, through a realigned and reconstructed Walnut Lane/US 25 intersection and run south on the west side of US 25 to Northridge Plaza (Food Lion Center). The project is funded in conjunction with the City/SCDOT funded US 25/Walnut Lane intersection realignment and improvement project.
- **Project 4 –** The Bergen to Woodstone Greeneway Extension will continue north from Bergen Road through Bergen Village along the former railroad right of way and then turn north and extend into the Woodstone neighborhood. A pedestrian/bicycle intersection signal at the Bergen Road crossing is included in the project.

TABLE 3 FUNDED GREENEWAY IMPROVEMENT PROJECTS

Project No.	Project Title and Type	Route	From	To	Length (mi.)
1	Pisgah to Bergen Greeneway Extension	Former railroad right of way	Pisgah Road	Bergen Road	0.86
2	Greeneway Intersection Signal	Greeneway	Pisgah Road	NA	NA
3	US 25 Greeneway Side Trail	Walnut Lane/US 25	Walnut Grove	Northridge Plaza	0.40
4	Bergen to Woodstone Greeneway Extension	Former railroad right of way through Bergen Village	Bergen Road	Wetland at Rippling Creek Lane in Woodstone	0.48

4.6.2 Priority Off-Street Projects

The projects listed in Table 4 were evaluated by the project prioritization and ranking criteria listed in Section 4.5. The ten projects are the recommended priorities for Greeneway extensions, connectors, side trails, trailheads and parking areas. With the exception of the parking projects (numbers 7, 8 and 9) final alignments for these projects have been preliminarily established through the planned dedication of right of way in planned developments or shared right of way on SCDOT roads.

- **Project 5 –** The Woodstone Greeneway Extension will continue from the termination of Project 4. An application for SCPRT Trails funds has been submitted for the construction.
- **Project 6 –** The Bergen West and Wando Woodlands Greeneway Extension will continue from where Project 5 terminates and extend all the way to Martintown Road. This project may require development in phases depending on the availability of construction funding and the schedule of development in the Bergen West and Wando Woodlands planned developments.
- **Projects 7, 8 and 9 –** Trailhead access points and parking areas for users of the Palmetto Parkway Greeneway will be necessary. The new five mile segment is not yet connected with the existing Greeneway system. However, use has been increasing and the availability of parking is limited. Off-street parking will be necessary to achieve reasonable utilization of the segment. When the Palmetto Parkway Greeneway segment is ultimately connected to the balance of the system, the parking areas will serve users from Belvedere, the areas north of I-20 and Horse Creek Valley. Aiken County included funds for improvements associated with the Palmetto Parkway in Round 3 of the Capital Projects Sales Tax. Those funds should be pursued for these projects.
- **Project 10 –** Amenities including bollards, pavement marking and signage on the Palmetto Greeneway segments should be added where not included as part of the initial construction. The amenities should be included at the time of implementation of the trailhead and parking projects. County and City sales tax receipts could also be available for these expenses.
- **Projects 11, 12, 13 and 14 –** The widening of Five Notch Road is a priority for the City to accommodate increasing commuter traffic during peak periods. A side trail along the extent of Five Notch Road from Georgia Avenue to Northview Park will contribute significantly to the overall connection of the system. It is likely that, due to the cost, the road widening project will be constructed in phases. The Greeneway projects are ranked in the estimated phasing of the road construction project. Funding will be primarily provided by SCDOT, however, the City has earmarked sales tax receipts for a portion of the road cost in order to accelerate the project.

TABLE 4 PRIORITY OFF-STREET PROJECTS

Project No.	Project Title and Type	Route	From	To	Length (mi.)
5	Woodstone Greeneway Extension	Through Woodstone to Bergen West	Wetland at Rippling Creek Lane in Woodstone	Adjacent Line Bars Road	0.30
6	Bergen West and Wando Woodlands Greeneway Extension	Through Bergen West and Wando Woodlands to Martintown Road	A point adjacent Line Bars Road	Martintown Road	1.80
7	Trailhead & Parking	Palmetto Parkway	Belvedere-Clearwater Road	NA	NA
8	Trailhead & Parking	Palmetto Parkway	Ascauga Lake Road	NA	NA
9	Trailhead & Parking	Palmetto Parkway	Atomic Road	NA	NA
10	Greeneway Amenities (Bollards, Pavement Marking, Signage, etc.)	Palmetto Parkway	Ascauga Lake Road	Atomic Road	NA

11	Greeneway Side Trail	Five Notch Road	Georgia Avenue	Pisgah Road	1.20
12	Greeneway Side Trail	Five Notch Road	Pisgah Road	Austin Graybill Road	1.30
13	Greeneway Side Trail	Five Notch Road	Austin Graybill Road	Northview Park	2.10
14	Greeneway Side Trail	Five Notch Road	I-20 Bridge	NA	0.10

4.6.3 Priority On-Street Projects

The projects listed in Table 5 were evaluated by the project prioritization and ranking criteria listed in Section 4.5. The ten projects are the recommended priorities for on-street bicycle facilities.

- **Projects 15, 16, 17 and 18 –** The four projects listed will improve the connections between neighborhoods on Martintown Road with the downtown and the connection between the downtown and Riverview Park. Bike lanes require the designation of a separate lane in each direction for bicycle travel, special pavement markings and signage. The four streets have adequate roadway width to accommodate the addition of the bicycle lanes. All four bike lanes are on streets that include curb and gutter through most or all of the affected segments. Restriping the center median areas and lane markings will be necessary on Martintown Road. The bike lanes on West and Carolina Avenues will be located between on-street parking and the travel lanes which could have the added benefit of traffic calming.
- **Projects 19 through 24 –** Bike routes require little more than signage and, in some cases, pavement markings. Pavement width is critical for bike routes. On some road sections that do not include curb and gutter, the addition of asphalt paving on shoulders will be necessary if the pavement is not wide enough to safely accommodate bicycles. **Project 19** is located on a route that is currently used by a significant number of serious bicyclists from the region because it provides a ready connection between Martintown Road and both I-520 and US 1. Verifying adequate pavement width and installing signage will be necessary. **Projects 20 through 23** will improve access to Riverview Park and **Project 24** will facilitate travel between Martintown Road and the Greeneway at Pisgah Road.

TABLE 5 PRIORITY ON-STREET PROJECTS

Project No.	Project Type	Route	From	To	Length (mi.)
15	Bike Lane	Martintown Road	Georgia Avenue	I-20 Exit 1	3.0 mi.
16	Bike Lane	West Avenue	Martintown Road	Jackson Avenue	0.8 mi.
17	Bike Lane	Carolina Avenue	Martintown Road	Jackson Avenue	0.7 mi.
18	Bike Lane	West Buena Vista Avenue	West Avenue	Riverview Park	0.9 mi.
19	Bike Route	Whitlaws Road, Womrath Road, Old Aiken Road	Knox Avenue	I-520 Greeneway	1.7 mi.
20	Bike Route	Bunting Drive	Martintown Road	Georgia Avenue	1.2 mi.

21	Bike Route	Woodlawn Avenue,	Carolina Avenue	Amherst Drive	1.3 mi.
22	Bike Route	Amherst Drive, Bunting Drive	Woodlawn Avenue	Martintown Road	0.40 mi.
23	Bike Route	Fairwood Avenue	Woodlawn Avenue	West Avenue	0.50 mi.
24	Bike Route	Knobcone Avenue	Martintown Road	Pisgah Road	1.30 mi.

4.7 COST OF CONSTRUCTION ESTIMATES

4.7.1 General

The planning level estimate of the total implementation cost of the North Augusta Greeneway, Pedestrian and Bicycle Master Plan is approximately $101.4 million, as shown in Table 6. As explained in Section 4.2, there are numerous sources available for funding the right of way and implementation of bicycle and pedestrian projects. The available sources can provide a substantial majority of the funding required if actively pursued. The cost estimates described in this section are liberal and calculated high to account for variations in terrain, grading and surface treatment and the degree of road crossings, signage and other enhancements that may be required. Inflation has not been calculated and the estimates are in 2010 dollars. Land acquisition costs are not included in these estimates.

4.7.2 Methodology

All costs are fully-burdened and include: construction engineering and administration (20%), mobilization (15%), architect and engineering (A and E) fees (20%), and contingency (40%). Cost estimates are based on recent actual costs incurred by projects throughout the region. Final costs may be higher or lower based on costs of labor and materials at the time of construction. Costs for each facility type include basic pavement markings and signage, are based on number of amenities required per mile, and divided to arrive at an estimate per foot cost (two-way) for each facility type. Assumptions and estimates are provided in Appendix A.

4.7.3 Cost Summary

Recommended projects within the City's jurisdiction and adjacent areas of Aiken and Edgefield Counties add up to $101.4 million if the plan is fully implemented. Table 6 summarizes the total costs of implementing the North Augusta Greeneway, Pedestrian and Bicycle Master Plan broken down by project type.

TABLE 6 SUMMARY OF PRELIMINARY TOTAL COST ESTIMATES BY PROJECT TYPE

Project Type	Estimated Total Cost
Greeneway Trails	$10,086,000
Side Trails (Paths)	$12,536,000
Soft Surface Trails	$300,000
Trails by Developers	$874,000
Greeneway Connectors	$22,239,000
Bridges/Tunnels	$50,699,000
Bike Lanes	$2,791,000
Bicycle Routes	$1,873,000
Total	**$101,398,000**

4.7.4 Unit Costs

The cost of Greeneway and bikeway facility development varies significantly by project type. Some variations in cost difference between facilities are partially explained by the level of physical separation intrinsic to each facility type. For example, the addition of shared lane marking to an existing roadway (bike lane) requires few changes to the existing roadway but provides no exclusive space for bicycle use. This can be compared to the development of a multi-use path (side trail) that provides a greater level of separation from the roadway, but at a greater cost. Tables 7 through 11 detail unit cost estimates for different types of bicycle and pedestrian facilities including Greeneway extensions, Greeneway connectors, bicycle lanes, bicycle routes and trail amenities.

4.7.4.1 Multi-Use Greeneway – Table 7 depicts the fully-burdened average cost estimates for a typical asphalt twelve foot wide multi-use Greeneway trail. The estimate does not include land acquisition costs. (The amounts shown are planning level estimates in 2010 dollars with no inflation calculated and no land acquisition cost included.)

TABLE 7 COST ESTIMATES FOR PLANNED GREENEWAY EXTENSIONS

Item Description	Unit	Quantity	Unit Cost	Total Cost	Notes
Selective Site Demolition	LF	5,280	$0.66	$3,432	Assume minor removals
Clearing and Grubbing	Acre	5,280	$3.73	$19,694	25 ft. Corridor
Soil Stripping/Stockpiling	CY	5,280	$1.75	$9,240	27 ft. Corridor, 12 in. Deep
Fine Grading	SY	15,840	$1.08	$17,107	27 ft. Corridor
Finish Grading	SY	15,840	$0.20	$3,168	27 ft. Corridor
Erosion Controls	LF	10,560	$1.25	$13,200	Both sides, Length of project
Sedimentation Controls	LF	100	$7.15	$5,016	Hay bales
Aggregate Base Courses	SY	9,387	$5.25	$30,782	16 ft. Wide base course 2 ft. Shoulders / 12 ft. Tread, ¾ in. Stone Base, 3 in. Deep
Asphalt Paving Wearing Course 4 in. thick	SY	7040	$15.00	$105,600	16 ft. Wide base course, 2 ft. Shoulders / 12 ft. Tread
Mechanical Seeding	SY	5280	$0.50	$2,640	9 ft. Corridor
Estimated Greeneway Construction Cost per Mile				**$522,703**	
Estimated Greeneway Construction Cost per LF:				**$99**	

4.7.4.2 Connectors – Connector trails have similar cost inputs as Greeneways, but are generally not as wide and require less landscaping and seeding. Table 8 provides unit cost estimates for connector trails. (The amounts shown are planning level estimates in 2010 dollars with no inflation calculated and no land acquisition cost included.)

TABLE 8 COST ESTIMATES FOR PLANNED CONNECTORS

Item Description	Unit	Quantity	Unit Cost	Total Cost	Notes
Selective Site Demolition	LF	5,280	$0.66	$3,432	Assume minor removals
Clearing and Grubbing	Acre	1,320	$3.73	$9,847	18 ft. Corridor
Soil Stripping and Stockpiling	CY	1,320	$1.75	$4,620	13 ft. Corridor, 12 in. Deep
Fine Grading	SY	3,960	$1.08	$8,553	13 ft. Corridor
Finish Grading	SY	3,960	$0.20	$1,584	13 ft. Corridor
Erosion Controls	LF	10,560	$1.25	$13,200	Both sides, Length of project
Sedimentation Controls	LF	100	$7.15	$5,016	Hay bales
Aggregate Base Course	SY	7,040	$5.25	$23,087	12 ft. Wide base course 2 ft. shoulders / 12 ft. Tread, ¾ in. Stone Base, 3 in. Deep
Asphalt Paving Wearing Course 4 in. thick	SY	528,000	$15.00	$79,200	12 ft. wide base course, 1 ft. Shoulders / 10 ft. Tread
Estimated Connector Cost per Mile:				**$369,936**	
Estimated Connector Construction Cost per LF:				**$70**	

4.7.4.3 Bike Lanes – Table 9 depicts the unit cost estimates of providing bike lanes in both directions by re-striping an existing segment of roadway. (The amounts shown are planning level estimates in 2010 dollars with no inflation calculated.)

TABLE 9 COST ESTIMATES FOR BIKE LANES (ROADWAY RESTRIPING)

Item Description	Unit	Quantity	Unit Cost	Total Cost	Notes
Striping Removal	LF	10,560	$2.93	$30,888	Assumes 2 lanes
Re-striping	LF	21,120	$8.78	$185,328	2 lanes w/ bike lanes
Pavement markings	EA	53	$97.50	$5,168	Every 100'
Signage	EA	18	$487.50	$8,775	Every 300'
Estimated Bike Lane Cost per Mile:				**$230,159**	
Estimated Construction Cost per LF:				**$44**	

4.7.4.4 Bike Routes (or Bicycle Boulevards) – Table 10 depicts the fully-burdened cost of establishing a bike route or bicycle boulevard on an existing roadway. The cost estimate includes an allowance for standard traffic calming measures and intersection treatments to ensure that bicyclists can travel safely and comfortably along the facility. (The amounts shown are planning level estimates in 2010 dollars with no inflation calculated.)

TABLE 10 COST ESTIMATES FOR BIKE ROUTES (BICYCLE BOULEVARDS)

Item Description	Unit	Quantity	Unit Cost	Total	Notes
Level 1: Signage	EA	18	$487.50	$8,775	Every 600' each direction
Level 2: Pavement Marking	EA	52	$97.50	$5,070	Every 200' each direction
Level 3: Intersection Treatments					
Turn stop signs	EA	4	$585.00	$2,340	4 per mile
Bike signal actuation	EA	2	$1,950.00	$3,900	2 per mile
Level 4: Traffic Calming					
Traffic circles	EA	1	$39,000.00	$39,000	1 per mile
Level 5: Traffic Diversion					
Diverter	EA	1	$15,600.00	$15,600	1 per mile
Estimated Bicycle Route Cost per Mile:				**$74,685**	
Estimated Construction Cost per LF:				**$14**	

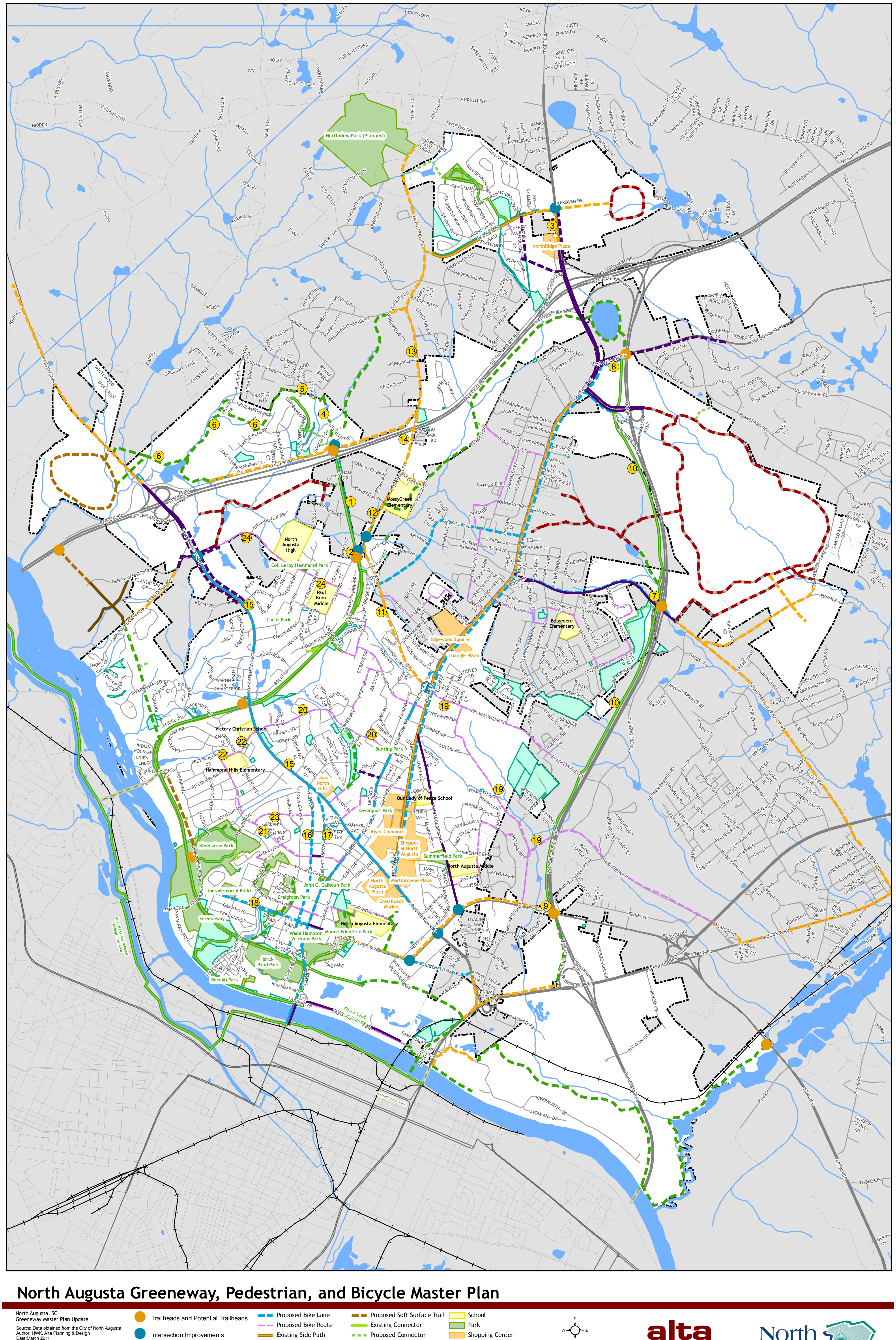
4.7.4.5 Additional Cost Elements – In addition to standard corridor treatments for different types of bikeways, additional elements may be required. For example, a signal detector may be added along a bicycle boulevard or bike lane at an intersection. The total costs for each item are fully-burdened and include: construction engineering and administration (20%), mobilization (15%), A and E fees (20%), and contingency (40%). Estimates for additional elements are provided in Table 11. (The amounts shown are planning level estimates in 2010 dollars with no inflation calculated.)

TABLE 11 COST ESTIMATES FOR ADDITIONAL ELEMENTS

Item Description	Unit	Unit Cost	Total Cost
Bike Box	EA	$5,000	$9,750
Signal Detectors	EA	$2,500	$4,875
Advanced Stop Line (ASL)	EA	$225	$439
Refuge island	EA	$5,000	$9,750
Intersection	EA	$21,797	$42,504
Signalized intersection	EA	$327,845	$639,298
High Visibility CW	EA	$7,465	$14,557
Mid block crossing	EA	$169,502	$330,529
Colored Bike Lane Markings	SF	$22	$44
Bicycle/Pedestrian Bridge	LF	$150	$293
Natural Surface Trail	Mile	$26,400	$51,480

4.8 INDIVIDUAL PROJECT COST ESTIMATES

Planning level cost estimates for individual off-street and on-street projects in the North Augusta Greeneway System as anticipated in this Plan can be calculated using the 2010 unit cost estimates provided in Section 4.7. Order of magnitude estimates can be generated from the unit estimates for several years and are appropriate for municipal budgeting and grant applications. However, the various unit costs should be reevaluated from time to time to keep them current with the area market.



North Augusta Greeneway, Pedestrian, and Bicycle Master Plan

North Augusta, SC
Greeneway Master Plan Update

Source: Data obtained from the City of North Augusta
Author: HWK, Alta Planning & Design
Date:March 2011
Revised: March 2011 - KBW City of North Augusta

- Trailheads and Potential Trailheads
- Intersection Improvements
- Proposed Grade Separated Crossing
- Project Number
- Existing Sidewalks
- Proposed Sidewalks
- Proposed Bike Lane
- Proposed Bike Route
- Existing Side Path
- Proposed Side Path
- Existing Greenway
- Proposed Greenway
- Trails by Developer
- Existing Soft Surface Trail
- Proposed Soft Surface Trail
- Existing Connector
- Proposed Connector
- Existing Bridge
- Proposed Bridge
- Railroad
- School
- Park
- Shopping Center
- City Owned Parcels
- Water
- City Limits

0 1,750 3,500 Ft
1 inch = 3,500 feet

alta PLANNING + DESIGN

North Augusta
South Carolina's Riverfront

Appendix A – Design Guidelines

The City of North Augusta is working to implement on-street and off-street projects to encourage walking and cycling, improve safety and accessibility, and enhance the quality of the bikeway network so that these activities become integral parts of daily life. While North Augusta is growing, it has a substantial built urban environment. Many future projects will involve retrofitting existing streets and intersections. When looking to implement on-street bikeways or additional Greeneway extensions, most standard design manuals offer limited solutions.

These design guidelines are intended to provide greater detail and a more exhaustive range of design options than standard design manuals for pedestrian and bicycle treatments. These design concepts are based on the American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities, and the Manual of Uniform Traffic Control Devices (MUTCD) 2009, Part 9 – Traffic Controls for Bicycle Facilities. These guidelines use the documents as a baseline for minimum conditions, and are intended to find creative solutions to a wide range of pedestrian and bicycle facility types. These treatments draw upon creative solutions in use in other states as well as European cities. These designs should undergo additional engineering before being applied to specific projects in North Augusta. Strong design guidelines will allow the City to improve the quality of the bicycle network by applying the highest standard of pedestrian and bicycle safety, comfort and convenience.

The following are key principles for bicycle and trail guidelines:

- **The walking and bicycling environments should be safe.** Sidewalks, pathways, crossings and bicycle routes should be designed and built to be free of hazards and to minimize conflicts with external factors such as noise, vehicular traffic and protruding architectural elements.
- **The pedestrian and bicycle network should be accessible.** Sidewalks, pathways and crosswalks should ensure the mobility of all users by accommodating the needs of people regardless of age or ability. Bicyclists have a range of skill levels. Facilities should be designed for the use of experienced cyclists, with a goal of providing for inexperienced and recreational bicyclists (especially children and seniors) to the greatest extent possible. In areas where specific needs have been identified (for example, near schools) the needs of appropriate types of bicyclists should be accommodated.
- **The pedestrian and bicycle network should connect to places people want to go.** The pedestrian and bicycle network should provide continuous direct routes and convenient connections between destinations, including homes, schools, shopping areas, public services, recreational opportunities and transit.
- **The walking and bicycling environment should be clear and easy to use.** Sidewalks, pathways and crossings should be designed so people, including those with or without mobility and sensory impairments, can easily find a direct route to a destination and delays are minimized. All roads in the City of North Augusta are legal for the use of bicyclists (except those roads designated as limited access facilities which prohibit bicyclists). This means that most streets are bicycle facilities, and should be designed, marked and maintained accordingly.
- **The walking and bicycling environment should provide good places.** Good design should integrate with, and support the development of, complementary uses and should encourage preservation and construction of art, landscaping and other items which add value to public ways. These components might include open spaces

such as plazas, courtyards and squares, and amenities including street furniture, banners, art, plantings and special paving, which, along with historical elements and cultural references, should promote a sense of place. Public activities should be encouraged and commercial activities such as dining, vending and advertising may be permitted when they do not interfere with safety and accessibility. A complete network of on-street bicycling facilities should connect seamlessly to the existing and proposed off-street pathways to complete recreational and commuting routes around the City.

- **Design guidelines are intended to be flexible and can be applied with professional judgment by designers.** Specific national and state guidelines are identified in this document, as well as design treatments that may exceed these guidelines. It is recognized that statutory and regulatory guidance may change. For this reason among others, it is noted that the guidance and recommendations in this document are meant to complement the other resources considered during the design process.

National and State Guidelines / Best Practices

The following is a list of references and sources utilized to develop the design guidelines. Many of these documents are available online and offer a wealth of information and resources available to the public.

Federal Guidelines

- AASHTO. (1999). *Guide for the Development of Bicycle Facilities.*
- AASHTO. (2001). *Policy on Geometric Design of Streets and Highways.*
- Federal Highway Administration. (2009). *Manual on Uniform Traffic Control Devices.* (*/mutcd.fhwa.dot.gov)*

Best Practices Documents

- *Bicycle Parking Design Guidelines*. (*www.bicyclinginfo.org/pdf/bikepark.pdf*)
- *City of Chicago Bike Lane Design Guide*. (*www.bicyclinginfo.org/pdf/bike_lane.pdf)*
- FHWA Report HRT-04-100. *Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations. (www.tfhrc.gov/safety/pubs/04100)*
- FHWA. (2001). *Designing Sidewalks and Trails for Access. (www.fhwa.dot.gov/environment/sidewalk2/contents.htm)*
- King, Michael. (2002). *Bicycle Facility Selection: A Comparison of Approaches.* Highway Safety Research Center, University of North Carolina – Chapel Hill (*www.bicyclinginfo.org/pdf/bikeguide.pdf*)
- North Carolina Department of Transportation Division of Bicycle and Pedestrian Transportation. (1994). *North Carolina Bicycle Facilities Planning and Design Guidelines.* (*www.ncdot.org/transit/bicycle/projects/resources/projects_facilitydesign.html)*
- Oregon Department of Transportation. (1995). *Oregon Bicycle and Pedestrian Plan. (www.oregon.gov/ODOT/HWY/BIKEPED/docs/ or_bicycle_ped_plan.pdf*)
- Rosales, Jennifer. (2006). *Road Diet Handbook: Setting Trends for Livable Streets*.
- South Carolina Department of Transportation. (2000). *Road Design Plan Preparation Guide. (www.dot.state.sc.us/doing/planprep.shtml*)
- South Carolina Department of Transportation Engineering Directive Memorandum. (2003). *Considerations for Bicycle Facilities. (www.pccsc.net/pdfs/Engineering%20Directive%20Memorandum%2022.pdf)*
- Wisconsin Department of Transportation. (2004). *Wisconsin Bicycle Facility Design Handbook.* (www.dot.wisconsin.gov/projects/bike.htm)

A.1 SHARED-USE PATHS (TRAILS)

Design Summary

Shared-use paths (primarily the Greeneway system in North Augusta) can provide a desirable facility particularly for novice riders, recreational trips and cyclists of all skill levels preferring separation from traffic. Shared-use paths generally provide new or alternative travel opportunities.

Shared-use paths, also referred to as "trails" and "multi-use paths", are often viewed as recreational facilities, but they are also important corridors for utilitarian trips.

Discussion

Shared-use trails serve bicyclists and pedestrians and provide additional width over a standard sidewalk. Facilities may be constructed adjacent to roads, through parks or along linear corridors such as active or abandoned railroad lines or waterways.

Shared-use paths in North Augusta can be categorized as Greeneways, side trails and connectors.

- A Greeneway is a facility that has an exclusive right of way.
- A side trail is a two-way trail on one side of the road that is located within the road right of way.
- A connector is a shorter connection, usually between a residential area and a larger trail, park or a segment of the main Greeneway.

Basic design elements remain the same for all types of shared-use paths, although additional considerations should be noted for side paths.

Additional Guidance

Elements that enhance shared-use path design include:

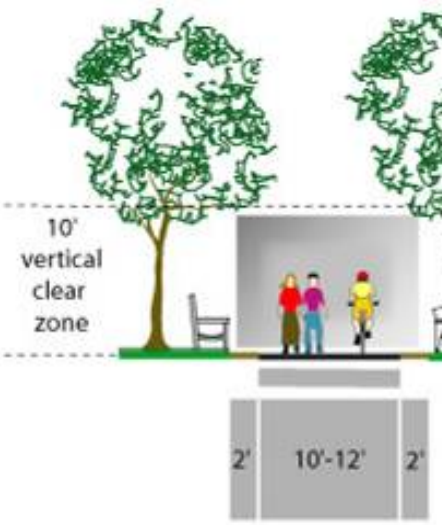
- Providing frequent access points (trailheads, connectors) from the local road network. If access points are spaced too far apart, users will have to travel out of direction to enter or exit the trail, which will discourage use.
- Placing directional signs to direct users to and from the path.
- Building to a standard high enough to allow heavy maintenance equipment to use the path without causing it to deteriorate.
- Limiting the number of at-grade crossings with streets or driveways.
- Terminating the trail 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. If poorly designed, the point where the path joins the street system can put pedestrians and cyclists in a position where motor vehicle drivers do not expect them.
- Identifying and addressing potential safety and security issues up front.
- Whenever possible, and especially where heavy use can be expected, separate bicycle and pedestrian ways should be provided to reduce conflicts.
- Providing accessible parking space(s).

A.1.1 Greeneway Design

Design Summary

Width

- 10’ is the minimum allowed for a two-way shared-use path and is only recommended for low traffic situations.
- 12’ is recommended in most situations.
- 12’ or greater is recommended for heavy use situations with high concentrations of multiple users such as joggers, bicyclists, in-line skaters and pedestrians.



Recommended shared-use path design

Lateral Clearance

- A 2’ or greater shoulder on both sides.

Overhead Clearance

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

Grade

Based on AASHTO guidelines, the running slope, or grade, on a shared-use path should be kept to a minimum. Grades greater than 5% are undesirable and where necessary should be denoted with appropriate warning signage. Where terrain dictates, the following grade lengths are recommended:

- < 5% (< 1:20) any length
- 5-6% for up to 800 feet
- 7% for up to 400 feet
- 8% for up to 300 feet
- 9% for up to 200 feet
- 10% for up to 100 feet
- 11+% for up to 50 feet

The Cedar Lake Regional Trail in Minneapolis has sufficient width to accommodate a variety of users.

Separation from Roadway

- Where a shared-use path must be adjacent to a roadway, a five foot minimum buffer should separate the path from the edge of the roadway, or a physical barrier of sufficient height should be installed.

Discussion

Asphalt is the most common surface for shared-use paths. However, the material composition and construction methods used can substantially affect the longevity of the pathway. Thicker asphalt sections and a well-prepared subgrade will reduce deformation over time and reduce long-term maintenance costs.

The use of concrete surfacing for paths has proven to be the most suitable for long-term use. Using modern construction practices, concrete provides a smooth ride with low maintenance costs. Concrete paths can be placed with a slip-form paver. The surface must be cross-broomed. Crack-control joints should be saw cut, not troweled. Concrete paths cost more to build than asphalt paths but do not as readily become brittle, cracked and rough with age, or deformed by roots.

Shared-use path surfacing materials affect which types of users can benefit from the facility.

Shared-use paths should be designed with sufficient surfacing structural depth for the subgrade soil type to support maintenance and emergency vehicles. Where the path must be constructed over a very poor subgrade (wet and/or poor material), treatment of the subgrade with lime, cement or geotextile fabric should be considered.

These standards are described in additional detail in:

- U.S. Access Board. *Public Rights-of-Way Accessibility Guidelines*. (PROWAG)
- FHWA. *Designing Sidewalks and Trails for Access*

A.1.2 Side Trails (Paths)

Design Summary

The AASHTO *Guide for the Development of Bicycle Facilities* generally recommends against the development of shared-use trails directly adjacent to roadways.

Regardless of the type, paths constructed next to the road must have some type of vertical (e.g., curb or barrier) or horizontal (e.g., landscaped strip) buffer separating the path area from adjacent vehicle travel lanes.

Discussion

Side paths 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 where cyclists enter or leave the path. This can create an unsafe situation where motorists entering or crossing the roadway do not notice bicyclists coming from their right, as they are not expecting traffic from that direction. Stopped cross-street motor vehicle traffic or vehicles exiting side streets or driveways may frequently block path crossings. Bicyclists coming from the left may also be unnoticed, particularly if sight distances are poor.

Additional Guidance

Additional concerns about shared-use trails directly adjacent to roadways (with minimal separation) –

- When the path ends, cyclists riding against traffic tend to continue to travel on the wrong side of the street, as do cyclists making their way to the path. Wrong-way bicycle travel is a major cause of vehicle/bicycle crashes.
- At intersections, motorists crossing the trail often do not notice bicyclists approaching from certain directions, especially where sight distances are poor.

- Bicyclists on the path are required to stop/yield at cross-streets or driveways, unless posted.
- Stopped vehicles on a cross-street or driveway may block the trail.
- Because of the closeness of vehicle traffic to opposing bicycle traffic, barriers are often necessary to separate motorists from cyclists. These barriers serve as obstructions, complicate facility maintenance and waste available right of way.
- Trails directly adjacent to high-volume roadways diminish users' experience by placing them in an uncomfortable environment. This could lead to a path's underutilization.

Mitigation measures for several of these issues are discussed in the following pages. Intersection treatments for side paths should be designed with care, to minimize conflicts between trail users and motor vehicles.

Example of a substandard side path in Molalla, Oregon.

As bicyclists gain experience and realize some of the advantages of riding on the roadway, some riders stop using trails adjacent to roadways. Bicyclists may also tend to prefer the roadway as pedestrian traffic on the shared-use path increases due to its location next to an urban roadway. When designing a bikeway network, the presence of a nearby or parallel trail should not be used as a reason to not provide adequate shoulder or bike lane width on the roadway, as the on-street bicycle facility will generally be superior to the side path for experienced cyclists and those who are cycling for transportation purposes. Bike lanes should be provided as an alternate (more transportation-oriented) facility whenever possible.

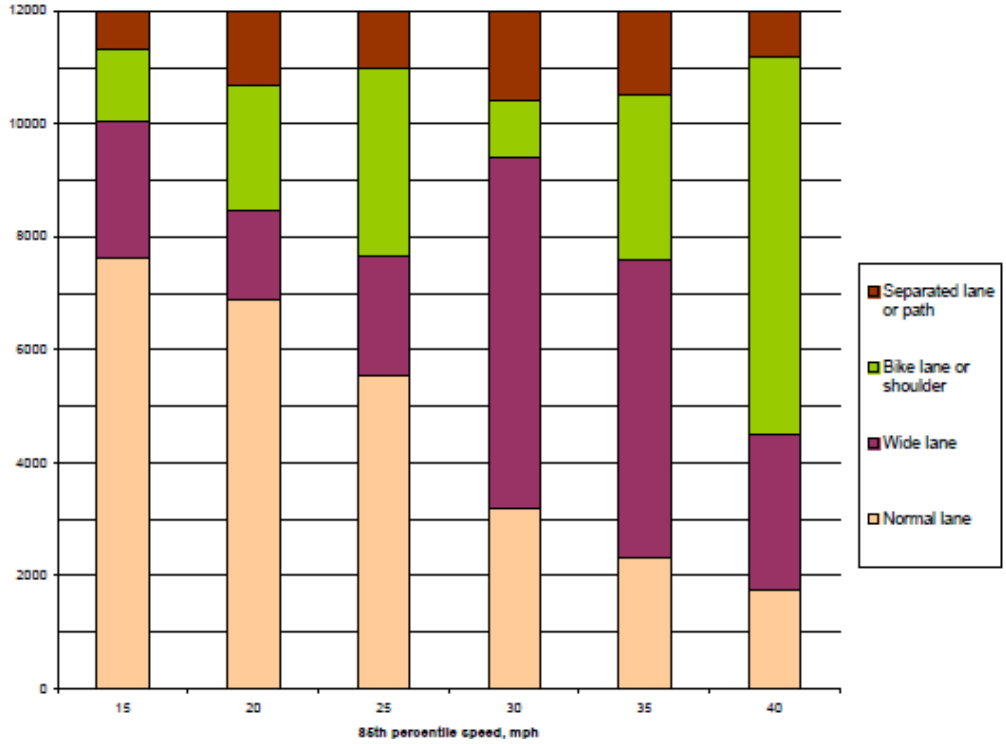
Shared-use trails may be considered along roadways under the following conditions –

- The path will generally be separated from all motor vehicle traffic.
- Bicycle and pedestrian use is anticipated to be high.
- To provide continuity with an existing Greeneway through a roadway corridor.
- The trail can be terminated at each end onto streets with good bicycle and pedestrian facilities, or onto another well-designed path.
- There is adequate access to local cross-streets and other facilities along the route.
- Any needed grade separation structures do not add substantial out-of-direction travel.
- The total cost of providing the proposed trail is proportionate to the need.

Table A-1 clarifies the process of determining the appropriateness of a treatment based on traffic volume and 85 percentile speeds, which more accurately reflects a cyclists' experience of a roadway. While North America tends to have a higher threshold for the implementation of separated lanes of trails, Table A-1 indicates the worldwide standards.

Where a side trail is adjacent to an arterial or collector street, a bicycle lane should be added to the roadway section to accommodate faster and more experienced cyclists. A bicycle route designation is generally adequate on local streets. Signage and pavement markings as necessary should be added to differentiate the appropriate use and users of the side trail and the bike lane or bike route.

Table A-1 Worldwide Speed Volume Chart



Source: King, Michael (2002). Bicycle Facility Selection: A Comparison of Approaches. Pedestrian and Bicycle Information Center and Highway Research Center, University of North Carolina-Chapel Hill.

A.1.2.1 Sidewalks as Shared-Use Paths – Utilizing a sidewalk as a shared-use trail is unsatisfactory because sidewalks are designed for pedestrian speeds and maneuverability and are not safe for higher bicycle speeds. Conflicts are common between pedestrians traveling at low speeds (e.g., exiting stores, parked cars, etc.) and bicyclists, as are conflicts with fixed objects (e.g., utility poles, mailboxes, and parked cars extending into the sidewalk from a driveway). Walkers, joggers, skateboarders and in-line skaters can (and often do) change their speed and direction almost instantaneously, leaving bicyclists insufficient reaction time to avoid collisions.

Similarly, pedestrians often have difficulty predicting the direction an oncoming cyclist will take. At intersections, motorists are often not looking for bicyclists (who are traveling at higher speeds than pedestrians) entering a crosswalk area, particularly when motorists are making a turn. Sight distance is often impaired by buildings, walls, fences and shrubs along sidewalks, especially at driveways. In addition, bicyclists and pedestrians often prefer to ride or walk side-by-side when traveling in pairs. Sidewalks are typically too narrow to enable this to occur without serious conflict between users.

It should also be noted that developing extremely wide sidewalks does not necessarily add to the safety of sidewalk bicycle travel. Wide sidewalks might encourage higher speed bicycle use and can increase the potential for conflicts with motorists at intersections, as well as pedestrians with fixed objects.

A.1.3 Connectors

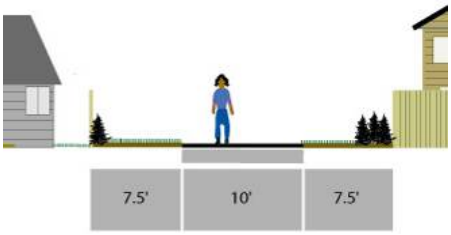
Design Summary

Connectors provide direct routes between residential areas, retail and office areas, institutional facilities, industrial parks, transit streets, neighborhood activity centers and transit oriented developments.

Width

The appropriate width of a connector depends on the predicted usage.

- 12' right of way with a centered 8' wide paved surface and two 2' planter strips is appropriate for a heavily used connector.
- 8' is the minimum width generally recommended.
- Narrower widths can be acceptable in less-heavily trafficked physically-constrained areas. If such a shared-use path is long, bulb-outs should be provided to allow pedestrians to pass each other.



Preferred accessway design

Discussion

Connectors are necessary where routes for pedestrians and bicyclists are not otherwise provided by the street system, particularly in neighborhoods with a disconnected street grid that requires both out-of-direction travel and walking or biking on a major street. Also known as accessways, connectors should be considered when "desire lines" or informal, unauthorized and unmaintained paths have been created. These routes are intended to provide safe, direct and convenient connections to reduce out-of-direction travel and make walking and bicycling easier.


This accessway connects two cul-de-sac streets, improving connectivity for bicyclist and pedestrians.

The design of connectors varies according to the functional classification of the facility as well as the expected user group. Safety for bicyclists and pedestrians on these routes is paramount, as they often intersect busy roadways, are located in residential areas without regular surveillance and can be quite dark.

Additional Guidance

Surface

Pervious surface materials such as pervious concrete and interlocking pavers are ideal for connectors, as they reduce rainwater runoff into neighboring yards. If the connector is built to accommodate all users, including pedestrians with disabilities, bicyclists, strollers, and in-line skaters, it should not exceed a five percent slope. Cross-slope should not exceed two percent. Where connectors connect to sidewalks, ramps to the curb at each side should be provided.

Fencing

As a general policy, fencing should be reviewed on case-by-case basis. If credible evidence suggests that trespassing and crime issues on a specific property result from a connector, then installation of fencing should be considered. There are numerous fencing types that can be considered. Solid fencing that does not allow any visual access to the shared-use path should be discouraged. Fencing that allows a balance between the need for privacy, while simultaneously allowing informal surveillance of the connector should be encouraged. If fencing is requested purely for privacy reasons, vegetative buffers should be considered.

A.1.4 Trail Surfacing

Design Summary

Pervious surface materials such as pervious concrete and interlocking pavers are ideal for trails, as they reduce rainwater runoff into neighboring yards. If the trail is built to accommodate all users, it should not exceed a 5% slope.

A.1.4.1 Concrete/Permeable Concrete – The use of concrete surfacing for paths has proven to be the most suitable for long-term use. Using modern construction practices, concrete provides a smooth surface with low maintenance costs that is suitable for all users. Runners may prefer to use the softer surface along the sides of the trail.

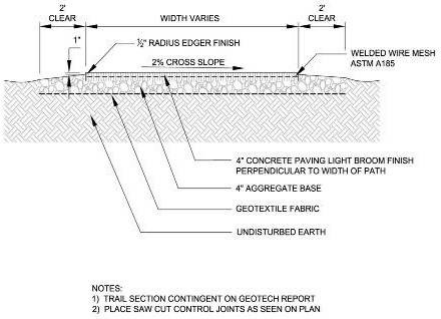
Concrete Trail Surface

Concrete paths cost more to build than asphalt paths, yet they do not become brittle, cracked and rough with age, or deformed by roots and weeds as with asphalt.

Permeable concrete lasts for approximately 15 years and requires a sweep and pressure wash four times per year. Permeable concrete allows water to absorb through the trail surface, thereby decreasing run-off and improving drainage alongside the trail.

Table A-2 Costs for Concrete Trails

Element	Unit Price	Unit
Clear & Grub	$0.15	SF
4" Aggregate base	$0.60	SF
4" Concrete	$5.95	SF
4” Permeable Concrete	$7.50	SF
Excavation for Trail	$10.00	CY
Geotextile Fabric	$0.20	SF



Concrete Trail Cross-Section

Note: The “clear” shoulders shown on the cross-section should be kept empty of buildings or fences; however, low-lying vegetation or bioswale plantings are encouraged in these areas.

A.1.4.2 Asphalt/Permeable Asphalt –

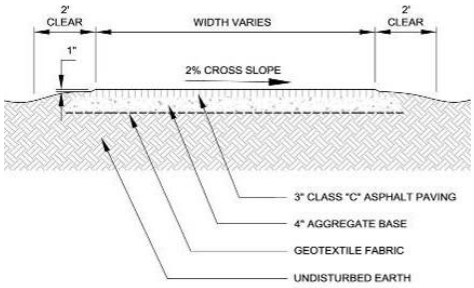
Asphalt is the most common surface treatment for multi-use paths. The material composition and construction methods used can significantly affect the longevity of the pathway. Thicker asphalt sections and a well-prepared subgrade will reduce deformation over time and reduce long-term maintenance costs. Asphalt is suitable for a wide variety of trail users.

Asphalt Trail

Pervious asphalt allows rain to seep through the surface, reducing runoff. Trails that are along bodies of water or that may have flooding problems should consider using this surface.

Table A-3 Costs for Asphalt Trails

Element	Unit Price	Unit
Clear & Grub	$0.15	SF
Site Grading	$10.00	CY
6” Aggregate Base	$1.00	SF
Asphalt Paving (non-permeable)	$ 3.45	SF
Permeable Asphalt Paving	$4.40	SF



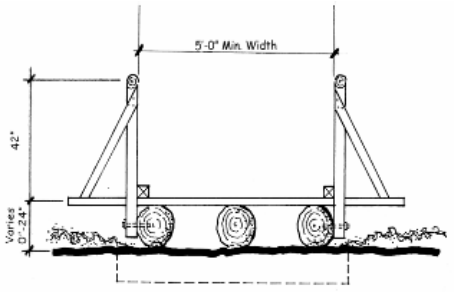
Asphalt Trail Cross-Section

A.1.4.3 Boardwalk –

While expensive, boardwalks are appropriate in environmentally sensitive trail locations. They can provide direct access through sensitive wet areas and across small waterways. Construction options include piers, foundation material and decking.

Helical Piers

Helical piers are auger-like anchors that can be screwed into the soil with little disruption to the ecosystem environment. Helical piers are particularly effective where soft soils are over ten feet deep and can be applied using handheld equipment in the field. Large piers can be applied using small automated machinery. Costs for this type of system are based on soil type and number of piers.



Boardwalk Concept Cross-Section

A.1.4.4 Trail Surfacing Options Analysis – The surfacing material of a path contributes to the overall feel of the trail and affects which users can comfortably utilize the trail. Whether or not a trail is paved can encourage or deter neighborhood support for the trail. A paved trail may be considered to be an invitation for outsiders to pass through a community and there may be safety or aesthetic concerns about an unpaved trail. In arriving at a recommended trail surface, several key criteria should be considered.

Surfacing Option Considerations

- **Initial Capital Cost** – Trail surface costs vary dramatically and dollars to build trails are scarce. Construction costs include excavation, sub-base preparation, aggregate base placement and application of the selected trail surface. Costs can vary from a low of around $2.00/sf for a bark mulch trail, up to $12-$13/sf for a rubberized surface.
- **Maintenance and Long Term Durability** – The anticipated life of a trail surface can vary from a single year (bark surface in a moist climate) to 25+ years (concrete). In addition, each trail surface has varying maintenance needs that will require regular to sporadic inspections and follow up depending on the material. Some surface repairs can be made with volunteer effort (bark surface trail), while others (concrete surface) will require skilled craftsmen to perform the repair.
- **Existing Soil and Environmental Conditions** – Soil conditions are predetermined and play a critical role in surfacing selection. In addition, when considering the use of a permeable concrete or asphalt surface, the success rate of these surfaces is directly correlated to the permeability of the soil and climatic conditions. The lower the permeability and moisture, the greater risk of failure.
- **Anticipated Use/Functionality** – Who are the anticipated users of the trail? Will the trail surface need to accommodate equestrians, wheelchairs, maintenance vehicles, bicycles, etc.? Does the trail provide critical access to a popular destination for many users or is it a local access route to a community park? Multiple use trails attempt to meet the needs of all anticipated trail users. This may not be feasible with a single trail surface. Considering the shoulder area as a usable surface, it is possible to provide enough width to accommodate use by those preferring a softer material. Each surface also has varying degrees of roughness and therefore accommodates varying users. In-line skates, for example, cannot be used on a chip seal surface or most permeable concrete surfaces due to the coarseness of the finished surface.
- **Funding Source** – The funding source for the trail may dictate the trail surface characteristics. If the trail project utilizes federal funds and is being administered through SCDOT, the selected trail surface will need to be reviewed and approved by SCDOT.
- **Susceptibility to Vandalism** – Trail surfaces are not usually thought of as being susceptible to vandalism, but the characteristics of the varying surfaces do lend themselves to a variety of vandalism including movement of materials such as gravel or bark, graffiti on hard surfaces, arson (wood and rubber surfaces) and deformation.
- **Aesthetics** – Each trail surface has varying aesthetic characteristics that should fit with the overall design concept desired for the project and for the neighborhood in which the trail is located.

TABLE A-4 Surfacing Options Matrix

Product	Description/Installation	Dura-bility	Maintenance[(1)]	Perme-able	Uses	ADA	Availa-bility	Vandalism Potential	Cost / SF
Crusher Fines/ Gravel	Prepare subbase, place geotextile, 6" aggregate base, place 2" depth ½" minus over base, roll and compact	2-5 years	Sweep to fill voids from dislodged fines	Yes	Ped, bicycle	No	High	Moved, deformation	$4.88
Filbert Shells	Prepare subbase, place geotextile fabric, 4" aggregate base, then 3" layer of filbert shells	7-10 years	Rake regularly. Re-top every 5 years	Yes	Ped	No	Medium	Moved	$2.85
Wood Mulch	Prepare subbase, place geotextile, 4" aggregate base, place 3" layer of wood mulch, rake and shape, apply second 3" layer after initial compaction and settlement	1-3 years	Top dress annually	Yes	Ped	No	High	Moved, deformation, arson	$2.65
Wood Planer Shavings	Prepare subbase, place geotextile, 4" aggregate base, place 3" layer of wood planers shavings, add additional 3" layer after initial compaction	2-3 years	Add 2"-3" of new material annually	Yes	Ped	No	High	Moved, deformation, arson	$3.25
Concrete	Prepared subbase, place geotextile, 6" aggregate. base, Portland cement, aggregate, sand, water, 4" depth section	25 years	Inspect for uplift & settlement, repair as needed	No	Ped, bicycle, in-line skates, wheelchair	Yes	High	Graffiti	$9.00
Permeable Concrete	Prepared subbase, place geotextile, 12" depth aggregate base, Portland cement, coarse aggregate, water, 5" depth section	15 years	Vacuum sweep & pressure wash 4x/year	Yes	Ped, bicycle, in-line skates, wheelchair	Yes	Medium	Graffiti	$11.65
Asphalt	Prepared subbase, place geotextile, 6" aggregate base, emulsion, aggregate	10 years	Pothole patching	No	Ped, bicycle, in-line skates, wheelchair	Yes	High	Graffiti	$5.25
Permeable Asphalt	Prepared subbase, place geotextile, 12" depth aggregate base, emulsion and coarse aggregate 2" depth section	8 years	Vacuum sweep & pressure wash 4x/ year, patch pot holes as needed	Yes	Ped, Bicycle, in-line skates, wheelchair	Yes	Medium	Graffiti	$6.75

(1) The cost of maintaining each trail surface is incorporated into the overall cost per square foot for the surface.

A.1.5 Edge Treatments

A.1.5.1 Fencing – Fencing is a means of assuring safety for both trail users and neighboring residents by preventing unwanted access onto or off of the trail. Significant lengths of the trail corridors are frequently surrounded on both sides by residential properties. However, fencing both sides of the trail right of way can result in a "tunnel" effect with the perception of being trapped, resulting in a detrimental effect on the trail user experience. The narrow width of many corridors in the area compounds this tunnel effect. Additionally, fencing could literally have the opposite effect of enhancing public safety by inhibiting community surveillance of the trail.

Post and Wire Fence

As a general policy, fencing requests should be reviewed on case-by-case bases. If credible evidence exists that trespassing and crime issues on a specific property are a result of the development of the trail, then installation of fencing should be considered. There are numerous fencing types that can be considered. Solid fencing that does not allow any visual access to the trail should be discouraged. Fencing that allows a balance between the need for privacy, while simultaneously allowing informal surveillance of the trail, should be encouraged. If fencing is requested purely for privacy reasons, vegetative buffers should be considered.

Wooden Safety Fence

A.1.5.2 Dense Vegetation – Dense vegetation can be used to define the trail corridor and increase privacy, particularly in locations with preexisting plants. The major expense of this option is maintenance and upkeep, which includes watering and trimming vegetation periodically to maintain adequate path clearance.

A.1.5.3 Open Boundary – In locations without significant vegetation, it is an option to maintain an open boundary around the trail. Users will tend to walk through an open area, so this option is not practical for areas where privacy or trespassing is a concern of landowners.

Metal Fencing

A.1.6 Trail/Roadway Crossings

Design Summary

At-grade trail/roadway crossings generally will fit into one of five basic categories –

- Type 1 – Marked/Unsignalized;
- Type 1+ – Marked/Enhanced
- Type 2 – Route Users to Existing Signalized Intersection
- Type 3 – Signalized/Controlled
- Type 4 – Grade-Separated Crossings

Discussion

While at-grade crossings create a potentially high level of conflict between path users and motorists, well-designed crossings have not historically posed a safety problem for path users. This is evidenced by the thousands of successful trails around the United States with at-grade crossings. In most cases, at-grade path crossings can be properly designed to a reasonable degree of safety and can meet existing traffic and safety standards.

Evaluation of trail crossings involves analysis of vehicular and anticipated path user traffic patterns, including vehicle speeds, traffic volumes (average daily traffic and peak hour traffic), street width, sight distance and path user profile (age distribution, destinations served). Crossing features for all roadways include warning signs both for vehicles and path users. The type, location and other criteria are identified in the AASHTO's *Guide for the Development of Bicycle Facilities* and the MUTCD.

An offset crossing forces pedestrians to turn and face the traffic they are about to cross.

Consideration must be given for adequate warning distance based on vehicle speeds and line of sight, with visibility of any signing absolutely critical. Catching the attention of motorists jaded to roadway signs may require additional alerting devices such as a flashing light, roadway striping or changes in pavement texture. Signing for path users must include a standard "STOP" sign and pavement marking, sometimes combined with other features such as bollards or a kink in the pathway to slow bicyclists. Care must be taken not to place too many signs at crossings lest they begin to lose their 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. The actual crosswalk striping is a matter of local and state preference, and may be accompanied by pavement treatments to help warn and slow motorists. The effectiveness of crosswalk striping is highly related to local customs and regulations. In areas where motorists do not typically defer to pedestrians in crosswalks, additional measures may be required. The following section identifies several path/roadway crossing treatments that should be considered for North Augusta's Greeneway system.

The proposed intersection approach that follows is based on established standards, published technical reports, and experiences from cities around the country. In particular, the recommendations in this report are based on experiences in cities like Portland, OR, Seattle, WA, Tucson, AZ, and Sacramento, CA, among others.

Table A-5 Summary of Trail/Roadway At-Grade Crossing Recommendations

Roadway Type	Vehicle ADT □ 9,000			Vehicle ADT > 9,000 to 12,000			Vehicle ADT > 12,000 to 15,000			Vehicle ADT > 15,000		
	Speed Limit [1]											
	30 mph	35 mph	40 mph	30 mph	35 mph	40 mph	30 mph	35 mph	40 mph	30 mph	35 mph	40 mph
2 Lanes	1[3]	1	1/1+[4]	1	1	1/1+	1	1	1+/3[5]	1	1/1+	1+/3
3 Lanes	1	1	1□1+	1	1/1+	1/1+	1/1+	1/1+	1+/3	1/1+	1+/3	1+/3
Multi-Lane (4 +) w/ raised median[2]	1	1	1/1+	1	1/1+	1+/3	1/1+	1/1+	1+/3	1+/3	1+/3	1+/3
Multi-Lane (4 +) w/o raised median	1	1/1+	1+/3	1/1+	1/1+	1+/3	1+/3	1+/3	1+/3	1+/3	1+/3	1+/3

Source: U.S. Department of Transportation Federal Highway Administration Study. *Safety Effects of Marked and Unmarked Crosswalks at Uncontrolled Locations (2002).*

[1] Where the speed limit exceeds 40 mph, marked crosswalks alone should not be used at unsignalized locations.
[2] The raised median or crossing island must be at least 4 ft (1.2 m) wide and 6 ft (1.8 m) long to adequately serve as a refuge area for pedestrians in accordance with MUTCD and AASHTO guidelines. A two-way center turn lane is not considered a median.
[3] 1 = Type 1 Crossings. Ladder-style crosswalks with appropriate signage should be used.
[4] 1/1+ = With the higher volumes and speeds, enhanced treatments should be used, including marked ladder style crosswalks, median refuge, flashing beacons and/or in-pavement flashers. Ensure there are sufficient gaps through signal timing as well as sight distance.
[5] 1+/3 = Carefully analyze signal warrants using a combination of Warrant 2 or 5 (depending on school presence) and EAU factoring. Make sure to project pathway usage based on future potential demand. Consider Pelican, Puffin or Hawk signals in lieu of full signals. For those intersections not meeting warrants or where engineering judgment or cost recommends against signalization, implement Type 1/1+ enhanced crosswalk markings with marked ladder style crosswalks, median refuge, flashing beacons and/or in-pavement flashers. Ensure there are sufficient gaps through signal timing as well as sight distance.

General Notes – 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. Adding crosswalks alone **will not** make crossings safer, nor will they 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), 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.**

For each trail/roadway crossing, an engineering study is needed to determine the proper location. For each engineering study, a site review may be sufficient at some locations, while a more in-depth study of pedestrian volume, vehicle speed, site distance, vehicle mix, etc., may be needed at other sites.

A.1.6.1 Type 1 and 1+ – Marked/Unsignalized and Marked/Enhanced Crossings

A Type 1 crossing consists of a crosswalk, signage, and often no other devices to slow or stop traffic. The approach to designing crossings at mid-block locations depends on an evaluation of vehicular traffic, line of sight, path traffic, use patterns, vehicle speed, road type and width, and other safety issues such as proximity to schools.

If well-designed, crossings of multi-lane higher volume arterials over 15,000 ADT may be unsignalized with features such as a combination of some or all of the following: excellent sight distance, sufficient crossing gaps (more than 60 per hour), median refuges, and/or active warning devices like flashing beacons or in-pavement flashers. These are referred to as "Type 1 Enhanced" (Type 1+). Such crossings are not appropriate, however, if a significant number of schoolchildren use the path. Furthermore, both existing and potential future path usage volume should be taken into consideration.

Type 1 Crossing

Discussion

On two-lane residential and collector roads below 15,000 ADT with average vehicle speeds of 35 MPH or less, crosswalks and warning signs ("Path Xing") should be provided to warn motorists, and stop signs and slowing techniques (bollards/geometry) should be used on the path approach. Curves in paths that orient the path user toward oncoming traffic are helpful in slowing path users and making them aware of oncoming vehicles. Care should be taken to keep vegetation and other obstacles out of the sight line for motorists and path users. Engineering judgment should be used to determine the appropriate level of traffic control and design.

On roadways with low to moderate traffic volumes (<12,000 ADT) and a need to control traffic speeds, a raised crosswalk may be the most appropriate crossing design to improve pedestrian visibility and safety. These crosswalks are raised 75 millimeters above the roadway pavement (similar to speed humps) to an elevation that matches the adjacent sidewalk. The top of the crosswalk is flat and typically made of asphalt, patterned concrete or brick pavers. Brick or unit pavers should be discouraged because of potential problems related to pedestrians, bicycles and ADA requirements for a continuous and smooth vibration-free surface. Detectable warning strips are needed at the sidewalk/street boundary so that visually impaired pedestrians can identify the edge of the street.

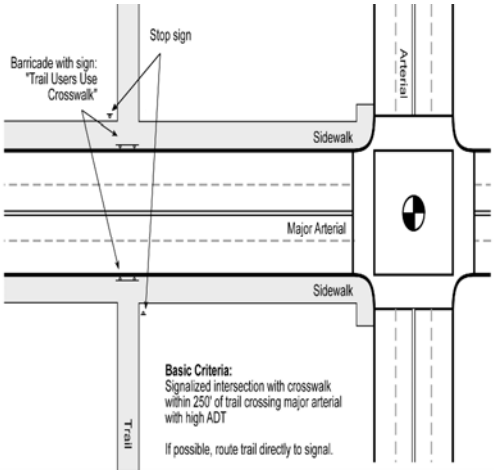
The following thresholds recommend where unsignalized crossings may be acceptable:

a. Maximum traffic volumes –
   - ≤9,000-12,000 Average Daily Traffic (ADT) volumes.
   - Up to 15,000 ADT on two-lane roads, preferably with a median.
   - Up to 12,000 ADT on four-lane roads with median.

b. Maximum travel speed – 35 MPH

c. Minimum line of sight –
   - 25 MPH zone – 155 feet
   - 35 MPH zone – 250 feet
   - 45 MPH zone – 360 feet

A.1.6.2 Type 2 – Route Users to Existing Signalized Intersection – Crossings within 250 feet of an existing signalized intersection with crosswalks are typically diverted to the signalized intersection for safety purposes. For this option to be effective, barriers and signing may be needed to direct shared-use path users to the signalized crossings.



A.1.6.3 Type 3 – Signalized/Controlled Crossings – New signalized crossings may be recommended for crossings that meet pedestrian, school or modified warrants, are located more than 250 feet from an existing signalized intersection, and where 85th percentile travel speeds are 40 MPH and above and/or ADT exceeds 15,000 vehicles. 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.

Type 3 Crossing

Shared-use path signals are normally activated by push buttons, but also may be triggered by motion detectors. The maximum delay for activation of the signal should be two minutes, with minimum crossing times determined by the width of the street. The signals may rest on flashing yellow or green for motorists when not activated, and should be supplemented by standard advanced warning signs. Various types of pedestrian signals exist and can be used at Type 3 crossings.

A.1.6.4 Type 4 – Grade-Separated Crossings – Grade-separated crossings may be needed where existing bicycle/pedestrian crossings do not exist, where ADT exceeds 25,000 vehicles, and 85th percentile speeds exceed 45 MPH. Safety is a major concern with both overcrossings and undercrossings. In both cases, shared-use path users may be temporarily out of sight from public view and may have poor visibility themselves. Undercrossings, like parking garages, have the reputation of being places where crimes occur. Most crime on shared-use paths, however, appears to have more in common with the general crime rate of the community and the overall usage of the shared-use path than any specific design feature**.**

Type 4 Grade-Separated Undercrossing

Design and operation measures are available which can address shared-use path user concerns. For example, an undercrossing can be designed to be spacious, well-lit, equipped with emergency phones at each end and completely visible for its entire length prior to entering. Other potential problems with undercrossings include conflicts with utilities, drainage, flood control and maintenance requirements. Overcrossings pose potential concerns about visual impact and functional appeal, as well as space requirements necessary to meet ADA guidelines for slope.

Type 4 Grade-Separated Overcrossing

A.1.7 Path Signage

Design Summary

Three types of signage appropriate for shared-use path use –

- Wayfinding (below left)
- Regulatory (below right)
- Warning (traffic signage)

Discussion

Directional signing may be useful for pathway users and motorists alike. For motorists, a sign reading "Path Xing" along with a North Augusta logo helps both warn and promote use of the path itself. For path users, directional signs and street names at crossings help direct people to their destinations. The directional signing should impart a unique theme so path users know which path they are following and where it goes. The theme can be conveyed in a variety of ways, e.g., engraved stone, medallions, bollards and mile markers.

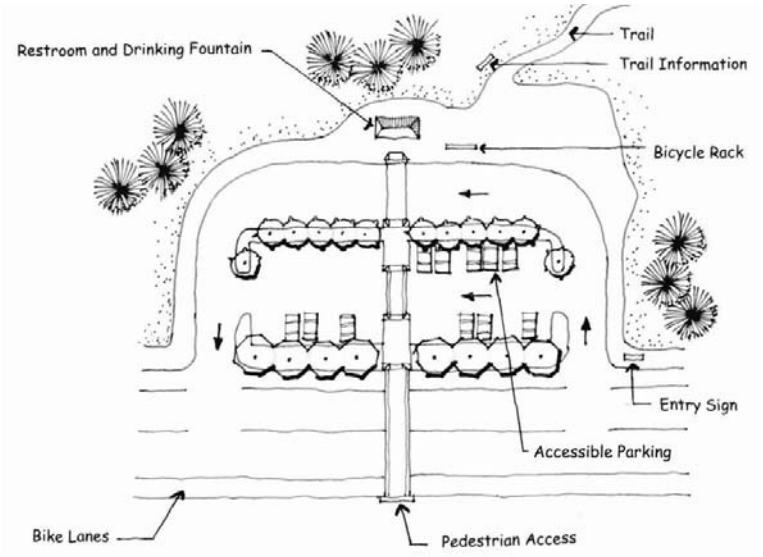
Wayfinding Sign

Regulatory Sign

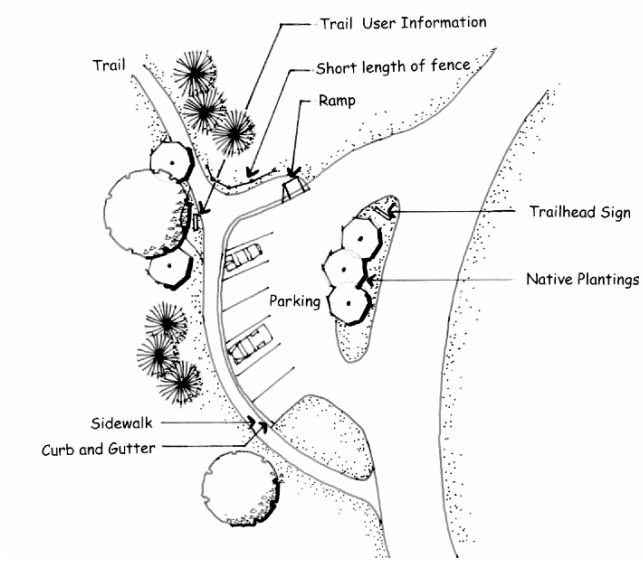
A.1.8 Trailheads

Good access to a path system is a key element for its success. Trailheads (formalized parking areas) serve the local and regional population arriving to the path system by car, transit, bicycle or other modes. Trailheads include amenities like parking for vehicles and bicycles, restrooms (at major trailheads) and posted maps. A central information installation helps users find their way and acknowledge the rules of the path. They also provide interpretive education about plant and animal life, ecosystems and history.

A.1.8.1 Major Trailhead –



A.1.8.2 Trailhead with Small Parking Area –



Trailheads with a small parking area should include bicycle parking and accessible parking that meets ADA standards to design, height and placement.

A.1.9 Greeneway Amenities

As a network of linear open spaces winding their way through urban development, the Greeneway has become a model for restoration and respect for the natural environment. A design theme that reflects the community values and contributes to building a "sense of place" will add to that model.

Context Sensitive Design is the practice of integrating local culture and heritage into infrastructure projects. For the Greeneway system, there are a number of unique themes, icons and details that will make the trails inviting and unique, particularly related to the natural features in the City. The following examples of context sensitive design solutions can make a trail system more inviting to the user.

Interpretive signage

A.1.9.1 Interpretive Signs and Maps – Interpretive installations and signs can enhance the users' experience by providing information about the history of North Augusta and the surrounding area. Installations can also discuss local ecology, environmental concerns and other educational information. The historic sign panels along the Savannah River and the environmental information available in Brick Pond Park are examples.

Informational kiosks with maps can provide information for someone to use the network with little introduction, which is particularly beneficial in areas with high out-of-area visitation rates.

A.1.9.2 Water Fountains and Bicycle Parking – Water fountains provide water for people (and pets, in some cases) and bicycle racks allow recreational users to safely park their bikes if they wish to stop along the way, particularly at parks and other desirable destinations.

Benches and pedestrian lighting

A.1.9.3 Pedestrian-Scaled Lighting and Furniture – Pedestrian-scale lighting improves safety and enables the facility to be used yearround. It also enhances the aesthetic of the pathway. Lighting fixtures should be consistent with other light fixtures in the City, possibly emulating a historic theme. Minimizing glare, not lighting the night sky, and protecting the light from vandalism are the three main issues trail lighting design should consider.

Providing benches at key rest areas and viewpoints encourages people of all ages to use the pathway by ensuring that they have a place to rest along the way. Benches can be simple (e.g., wood slates) or more ornate (e.g., stone, wrought iron, concrete).

A.1.9.4 Art Installations – Local artists can be commissioned to provide art for the pathway system, making it uniquely distinct. Many pathway art installations are functional as well as aesthetic, as they may provide places to sit and play on.

A.1.9.5 Landscaping – Landscape features, including street trees or trees along paths, can enhance the visual environment and improve the path user experience. Trees can also provide shade from heat and also provide protection from rain.

A.1.9.6 Restrooms – Restrooms, while frequently expensive to construct and maintain, benefit path users, especially in more remote areas where other facilities do not exist. Accessible restrooms can be sited at major trailheads or at other strategic locations along the Greeneway.

Bollards

A.1.9.7 Bollards – Bollards are posts that can be used to block vehicle access to the path and that can provide information such as mile markings, wayfinding for key destinations or small area maps.

Where used, bollards should be high-visibility with reflective tape or paint, and should not be low enough to be unnoticed. Cyclists using the shared-use path can bump into a bollard, particularly in low light conditions. Bollards should be placed in the middle of the path, with sufficient space for Greeneway users of all abilities, using a variety of mobility devices, to pass. They can create bottlenecks with path users at intersections, and should be used with caution.

Restrooms

Art installations

Landscaping

Bicycle parking and water fountain

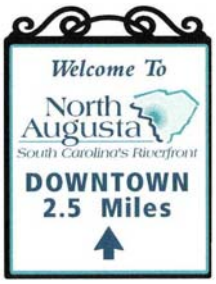
Figure A-1 Site Furnishings





Benches

Wayfinding



Bike Parking


Solar Lighting







Drinking Fountain

A.1.10 Trail Safety and Security

Design Summary

Various design and programmatic measures can be taken to address safety issues on a shared-use trail. This section summarizes key safety issues and strategies for minimizing impacts.

Discussion

Privacy of adjacent property owners

- Encourage the use of neighborhood friendly fencing and also planting of landscape buffers.
- Clearly mark path access points.
- Post path rules that encourage respect for private property.

Surveillance from nearby buildings and pedestrian-scale lighting can increase shared-use trail safety.

Unwanted vehicle access on the path

- Utilize landscaping to define the corridor edge and path, including earth berms or boulders.
- Use bollards at intersections (Section A.1.9.7).
- Pass a "motorized vehicle prohibited" ordinance and sign the path.
- Create a Path Watch Program and encourage citizens to photograph and report illegal vehicle use of the corridor.
- Lay the shared-use path out with curves that allow bike-ped passage, but are uncomfortably tight for automobile passage.

Litter and dumping

- Post rules encouraging "pack-it-out" practices.
- Place garbage receptacles at trailheads.
- Install strategically-placed lighting, utilizing light shields to minimize unwanted light in adjacent homes.
- Manage vegetation to allow visual surveillance of the path from adjacent properties and form roadway/path intersections.
- Encourage local residents to report incidents as soon as they occur.

Trespassing

- Clearly distinguish public path right of way from private property through the use of vegetative buffers and the use of good neighbor type fencing.
- Post rules encouraging respect for property.

Local on-street parking

- Designate residential streets as parking for local residents only to discourage user parking.
- Place "no outlet" and "no parking" signs prior to path access points.

Crime

- Manage vegetation to ensure visibility from adjacent streets and residences.

- Select shrubs that grow below 3 ft in height and trees that branch out greater than 6 feet in height.
- Place lights strategically and as necessary.
- Place benches and other amenities at locations with good visual surveillance and high activity.
- Provide mileage markers every one quarter (¼) mile and clear directional signage for orientation.
- Create a "Greeneway Watch Program" involving local residents.
- Practice proactive law enforcement. Utilize the corridor for bicycle or mounted patrol training.

Vandalism

- Select benches, bollards, signage and other site amenities that are durable, low maintenance and vandal resistant.
- Respond rapidly through removal or replacement.
- Keep a photo record of all vandalism and turn over to local law enforcement.
- Encourage local residents to report vandalism.
- Create a Trail Watch Program; maintain good surveillance of the corridor.
- Involve neighbors in trail projects to build a sense of ownership.
- Place amenities in well used and visible areas.

A.1.10.1 Community Involvement with Safety on the Path

Design Summary

Creating a safe path environment goes beyond design and law enforcement and should involve the entire community. The most effective and most visible deterrent to illegal activity on North Augusta's Greeneway system will be the presence of legitimate path users. Getting as many "eyes on the Greeneway" as possible is a key deterrent to undesirable activity.

Discussion

Provide good access to the trail

Access options range from providing conveniently located trailheads along the Greeneway to encouraging the construction of connectors or sidewalks to accommodate access from private developments adjacent to the system. Access points should be inviting and signed so as to welcome the public onto the path.

"Share the Path" and other community programs raise awareness of safety and other shared-use trail issues.

Good visibility from adjacent neighbors

Neighbors adjacent to the Greeneway can potentially provide 24-hour surveillance of the path and can become North Augusta's biggest ally. Though some screening and setback of the trail is needed for privacy of adjacent neighbors, complete blocking out of the trail from neighborhood view should be discouraged to improve the potential of neighbors' "eyes on the Greeneway" and avoid a tunnel effect on the trail.

High level of maintenance

A well-maintained trail sends a message that the community cares about the public space. This message alone will discourage undesirable activity on the Greeneway.

Programmed events

Community events on the Greeneway will help increase public awareness and thereby attract more people to use the system. Neighbors and residents can help organize numerous public events path which will increase support for the Greeneway. Events might include a daylong trail clean up or a series of short interpretive walks led by long time residents, city staff or a naturalist.

Community projects

Nearby businesses, community institutions and residential neighbors often see the benefit of their involvement in the path development and maintenance. Businesses and developers may view the Greeneway as an integral part of their site planning and be willing to take on some level of responsibility for trail maintenance. Creation of an Adopt-the-Greeneway program should be explored to capitalize on this opportunity and build civic pride.

Greeneway Watch Program

Partnering with local and county law enforcement, a Greeneway watch program would provide an opportunity for local residents to become actively involved in crime prevention along North Augusta's Greeneway system. Similar to Neighborhood Watch programs, residents are brought together to get to know their neighbors, and are educated on how to recognize and report suspicious activity.

A.1.11 Universal Access/ADA Considerations

Design Summary

All public facilities must be built to meet the requirement of the *Americans with Disabilities Act* (ADA), where possible. The Act was established to prohibit discrimination on the basis of disability by public accommodations and requires places of public accommodation and commercial facilities to be designed, constructed and altered in compliance with accessibility standards established by ADA.

ADA design standards establish criteria to support universal access. All paths and ramps are to be designed with the least possible slope. The maximum slope allowed by ADA design standard for a walkway in new construction is 1:12 or 8.33% of grade. When designing for maximum slope, landings are needed every 30 inches of vertical rise along with handrails. Paths must have a continuous clear width of 5 feet so that two wheelchairs can pass each other. To provide extra traction, decking should be perpendicular to the walking direction. Standard code requirements state, where the walkway/boardwalk will be 30" or more from the ground plain, guardrails will be added to the design. In areas 30" or lower, curbing stops will be constructed to edge the walkway.

Constructing trails outdoors may have limitations that make meeting ADA standards difficult and sometimes prohibitive. Prohibitive impacts include harm to significant cultural or natural resources, a significant change in the intended purpose of the trail, requirements of construction methods that are against federal, state or local regulations, or presence of terrain characteristics that prevent compliance. See the following Table A-6 which provides guidelines for developing accessible trails.

If the slope where a trail is proposed exceeds 5%, constructing the trail with switchbacks or over a more gradual distance can ameliorate this problem. However, in certain situations, it is impossible to build a trail to the slope standards. Additionally, trail connectors will often have soft surfaces, which are not conducive to wheelchair travel. In these situations, alternative routes that include sidewalks are acceptable accommodations.

Simple details to be considered in the planning and design process can greatly enhance accessibility to and within the planned system. Breaks in long grades, consideration of the user's eye level, minimizing grades at drainage crossings, providing areas to get off the trail, and appropriately designed seating walls are examples of simple accessible improvements. Consultation with the physically challenged on specific design issues prior to the planning and design of trails or trailhead facilities can be very beneficial and is encouraged for every accessible project.

Table A-6 ADA Trail Development Guidelines

Item	Recommended Treatment	Purpose
Trail surface	Hard surface such as asphalt, concrete, wood, compacted gravel	Provide a smooth surface for wheelchairs
Trail gradient	Maximum of 5%	Greater than 5% is too strenuous
Trail cross slope	2% maximum	Provide positive trail drainage, but avoid excessive gravitational to side of trail
Trail width	5' Minimum	Accommodate a wide variety of users
Trail amenities, drinking fountains, ped. actuation	Place no higher than 4' off ground	Provide access within reach of wheelchair users
Detectable pavement changes at curb ramp	Place at top of ramp before entering roadways	Provide visual cues for visually impaired
Trailhead signage	Accessibility information (e.g. trail gradient/ profile, distances, tread conditions, location of drinking fountains and rest stops)	User convenience and safety

Sources: http://www.usdoj.gov/crt/ada/stdspdf.htm and http://www.access-board.gov/adaag/html/adaag.htm#4.8

A.1.12 Environmental Considerations

A.1.12.1 Design Summary – Environmental constraints should be considered before choosing construction materials. Often trails and boardwalks are constructed to minimize impacts to sensitive ecosystems such as wetlands. Material considerations in these areas should mitigate potential long term impacts to the resource. Steps to consider taking include –

- **Identify and map water resources within 200 feet of the trail system.** Accurately locating wetlands, streams and riparian areas relative to the trail is an important element of the trail planning. The location of these potential "receiving resources" for trail drainage and associated sediments will affect decisions about placement of trail drainage structures, maneuvering of maintenance equipment, season of work, interception and infiltration of trail drainage, and disposal of earth materials generated during maintenance activities.
- **Minimize crossings of streams and wetlands.** Minimize channel crossings and changes to natural drainage patterns.

- **Minimize trail drainage to streams and wetlands.** Minimize the hydrologic connectivity of trails with streams, wetlands and other water resources.
- **Keep heavy equipment off wet trails.** Avoid operating heavy equipment on trails when they are wet. Use alternate routes for heavy equipment when trails are wet.
- **Provide crossing structures where needed**. Where trails traverse wet areas, structures should be provided to avoid trail widening and damage at "go around" spots. Crossing structures also help protect water quality, wetlands and riparian areas.
- **Establish vegetative buffers between trails, streams and wetlands.** Retain a buffer between trails and water resources by establishing riparian and streamside management zones (RSMZs), within which trail influences such as drainage, disturbance and trail width are minimized.

In reviewing environmental considerations, permitting will play an important role regarding what can or cannot be accomplished on site. A few over-arching principles can provide some guidelines for master planning and, hopefully, steer many project elements away from the lengthy and expensive environmental assessment process.

- **Utilize disturbed areas.** Utilize existing disturbed areas and clearings for trails and parking facilities, to the extent that such use does not detract from the area's scenic quality.
- **Establish vegetative buffers for non-conforming uses.** Industrial and commercial uses adjacent to trails should be screened by means of fully planted native vegetative buffers at least 25 feet wide.
- **Establish riparian and streamside management setbacks (RSMS).** Vegetative disturbances such as thinning, pruning and felling to improve canopy openings should be allowed as necessary to maintain existing trails in RSMSs. However, no heavy equipment should operate outside the trail clearing limits here. Stormwater discharges from roads and trails to the RSMS should be minimized to the maximum extent possible. Stormwater discharges that cannot be avoided should be designed for maximum treatment, sedimentation, infiltration and level-spreading before entering the RSMS.
- **Avoid wet areas** unless special construction techniques are used.

A.1.13 Maintenance

A.1.13.1 Design Summary – Trail management and maintenance are important factors in trail success. The psychological effects of good maintenance can be a highly effective deterrent to vandalism and littering. Maintaining surfacing, vegetation and signage improves trail safety and aesthetic quality. Which parties are responsible for trail maintenance should be clear, as should specific and regular maintenance tasks.

A.1.13.2 Maintenance Responsibilities

City Staff

The City should establish maintenance standards and ensure that any maintenance partners are aware of and will adhere to such standards. The following list represents the major management tasks for trails –

- Monitor security/safety of the trail system through routine inspections.
- Oversee maintenance and rehabilitation efforts.
- Establish consistency in the trail user regulations with nearby agencies.
- Manage and respond to issues and incidents throughout the trail system.
- Coordinate routine law enforcement needs.

- Assist in coordination of art in public places programming.
- Act as the local trail system spokesperson with the public and elected officials, and respond to the issues and concerns raised by trail users.
- Develop and manage an emergency response system in coordination with local fire and police departments.

Community Members

Active and informed community members are a wonderful resource for the trail system. Interested citizens should be connected with volunteer opportunities. Additionally, community members can be encouraged to form "Friends Of" groups and take pride and a sense of ownership in their local trails.

Property Management

Non-trail use needs arise such as utility installations, private driveway access and roadways that will impact the trail system. A separate set of policies and procedures that outline the details of property management for the planned system should be developed and implemented in order to protect the quality of the user's experience.

Encroachments

Given the public nature of the Greeneway, private encroachments should be carefully evaluated. Resolving encroachment issues early to minimize their impact on future trails should be a priority.

Utilities / Shared Usage

Compatible utility and shared usage agreements may be of benefit to both the Greeneway and the requesting utility. For example, underground fiber optic cables will not interrupt use of the trail while providing an annual rental fee for maintenance of the trail. Utilities should not be granted exclusive use of the right of way but would be expected to share use with other compatible and even competing utilities. It is strongly recommended that a utility corridor be defined and conduits running the length of the corridor be installed as each phase of paved trail is built. This will minimize construction and design impacts to the trail as future utilities are installed. Undergrounding of utilities is encouraged whenever feasible.

A.1.13.3 Maintenance Tasks

Paved Surface Maintenance

Cracks, ruts and water damage will need to be repaired periodically. In addition, vegetation control will be necessary on a regular basis. Where drainage problems exist along the trails, ditches and drainage structures will need to be kept clear of debris to prevent washouts. Bioswales should be considered in these locations to improve drainage. Checks for erosion along the trails should be made monthly during the wet season and immediately after any storm that brings flooding to the local area.

The trail surface should be kept free of debris, especially broken glass and other sharp objects, loose gravel, leaves and stray branches. Trail surfaces should be swept periodically.

Soft Surface Maintenance

Soft surface trails are often used in environmentally sensitive areas, and care must be taken that the trail surfacing material does not spill outside the established width of the trail itself.

Compacted gravel and crusher fines trails need to be swept periodically to ensure that the trail material is not spilling over and to fill in voids along the trail from dislodged gravel and fines.

Bark mulch trails need to be top dressed annually, with particular care paid to the established width of the trail to ensure that a trail does not grow wider with the new application of the trail material.

Signage

Signage will be replaced along the trail on an as needed basis. A bimonthly check on the status of signage should be performed with follow up as necessary.

Fencing

As the need arises, fencing should be evaluated on a case-by-case basis. Property lines should be clearly surveyed and field marked in a way that is useful for maintenance staff.

Vegetation and Pest Management

In general, visibility between plantings at trailside should be maintained so as to avoid creating the feeling of an enclosed space. This will also give trail users good, clear views of their surroundings, which enhances the aesthetic experience. Understory vegetation along trail corridors should not be allowed to grow higher than 36 inches. Trees species selection and placement should be made that minimizes vegetative litter on the trail and root uplifting of pavement. Vertical clearance along the trail should be periodically checked and any overhanging branches over the trail should be pruned to a minimum vertical clearance of 10 feet.

The trail system moves through a variety of landscape settings. Some basic measures should be taken to best protect the trail investment. Wherever possible, weed control should be accomplished by mechanical means. This is especially true along drainage ways crossing the trail. Innovative weed control methods such as grazing and steaming should be explored. Use of chemical sprays should be limited to use only on those plants that are harmful to the public.

Litter and Illegal Dumping

Litter along the trail corridors should be removed by staff or volunteer effort. Litter receptacles should be placed at access points such as trailheads. Litter should be picked up once a week and after any special events held on the trail.

Illegal dumping should be controlled by vehicle barriers, regulatory signage and fines as much as possible. When it does occur, it should be quickly removed in order to prevent further dumping. Neighborhood volunteers, friends groups, alternative community service crews and inmate labor could be used in addition to maintenance staff.

A.2. BIKE LANES

Design Summary

Designated exclusively for bicycle travel, bike lanes are separated from vehicle travel lanes with striping and also include pavement stencils. Bike lanes are most appropriate on arterial and collector streets where higher traffic volumes and speeds warrant greater separation. According to SCDOT design guidelines, "a bike lane provides for more predictable movements by the motorist and bicyclist. Bike lanes should be one-way facilities and carry bike traffic in the same direction as adjacent motor vehicle traffic." SCDOT requires bike lanes to be at least four feet from the edge of the gutter pan to the stripe.

Bike lanes with signage on a popular community and recreational route in California.

Table A-7 Recommended Bike Lane Widths

Type of Bike Lane	Recommended Width (Min-Max)
Adjacent to on-street parallel parking	6' (4'-7')
Adjacent to on-street diagonal parking	6' (5'-7')
Without on-street parking, no gutter	6' (4'-7')
Without on-street parking, curb & gutter	6' (5'-8')

Discussion

Most commuter bicyclists would argue that bike lanes are the safest and most functional facilities for bicycle transportation. Bicyclists have stated their preference for marked on-street bike lanes in numerous national surveys. Many bicyclists, particularly less experienced riders, are more comfortable riding on a busy street if it has a striped and signed bike lane. This Plan will serve to encourage new riders, and providing marked facilities such as bike lanes is one way of helping to persuade residents to try bicycling.

Bike lane pavement markings in Portland, Oregon provide character to the roadway.

If properly designed, bike lanes can increase safety and promote proper riding. Bike lanes help define road space for bicyclists and motorists, reduce the chance that motorists will stray into the cyclists' path, discourage bicyclists from riding on the sidewalk, and remind motorists that cyclists have a right to the road. One key consideration in designing bike lanes in an urban setting is to ensure that bike lanes and adjacent parking lanes have sufficient width so that cyclists have enough room to avoid a suddenly opened vehicle door.

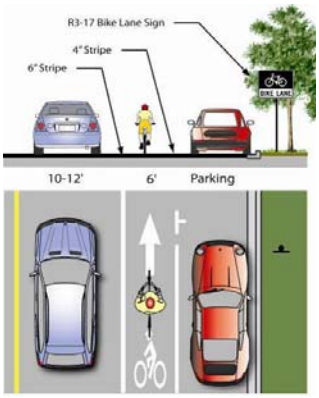
Additional Guidance

The AASHTO *Guide for the Development of Bicycle Facilities* notes that "longitudinal pavement markings should be used to define bicycle lanes." The guideline states that "if used, the bicycle lane symbol marking shall be placed immediately after an intersection

and other locations as needed. The bicycle lane symbol marking shall be white. If the word or symbol pavement markings are used, 'Bicycle Lane' signs shall also be used."

A.2.1 Bike Lane Configurations

A.2.1.1 Bike Lane Adjacent to On-Street Parking



Minimum Design

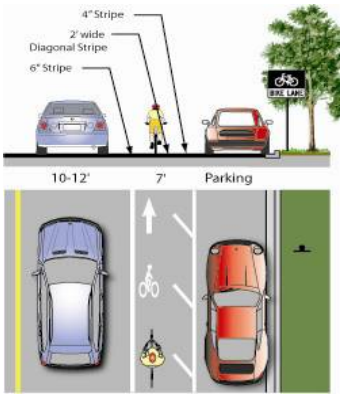
Design Summary

Bike Lane Width

- 6' recommended when parking stalls are marked.
- 4' minimum in constrained locations.
- 5' acceptable if parking not marked.
- 7' maximum (may encourage vehicle loading in bike lane).

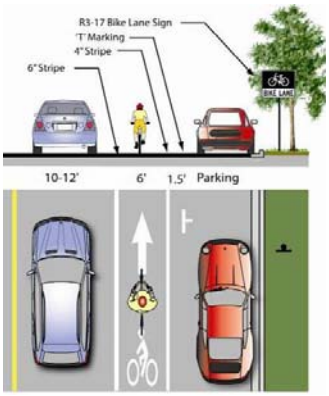
Discussion

Bike lanes adjacent to on-street parallel parking are common in the United States and can be dangerous for bicyclists if not designed properly. Crashes caused by a suddenly opened vehicle door are a common hazard for bicyclists using this type of facility. Wide bike lanes may encourage the cyclist to ride farther to the right (door zone) to maximize distance from passing traffic. Wide bike lanes may also cause confusion with unloading vehicles in busy areas where parking is typically full. Some alternatives include –



Maximum Width

- Installing parking "T"s and smaller bike lane stencils placed to the left (see graphic top right).
- Using diagonal stripes to encourage cyclists to ride on the left side of the bike lane (shown right; this treatment is not standard and should be studied before use).
- Provide a buffer zone (preferred design shown lower right). Bicyclists traveling in the center of the bike lane will be less likely to encounter open car doors. Motorists have space to stand outside the bike lane when loading and unloading.



Preferred Design, if space is available

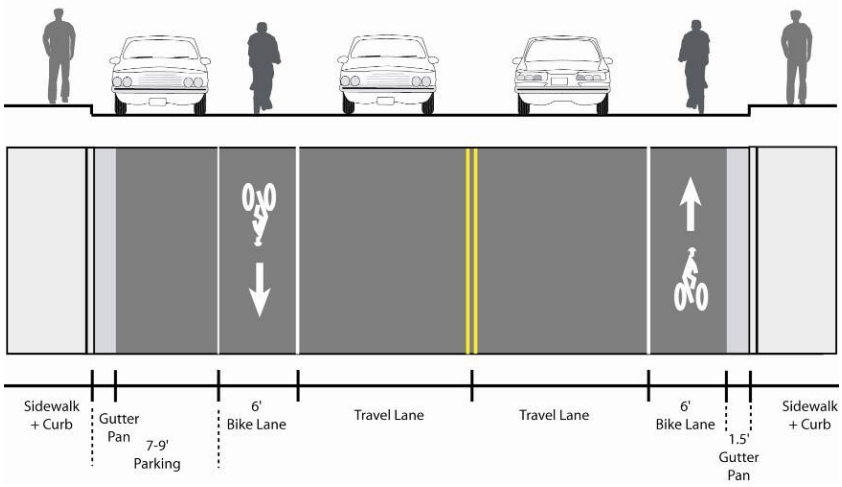
Note – While AASHTO allows 5' bike lanes and recommends 6', the SCDOT design guidelines recommends a minimum bike lane width of 4' (exclusive of gutter pan) on urban sections with curb and gutter. SCDOT also recommends that "where the percentage of trucks, buses, and recreational vehicles are greater than five percent of the ADT, consideration should be given to providing a minimum six (6) feet of width." (Source: South Carolina Department of Transportation Engineering Directive Memorandum 22).

From AASHTO *Guide for the Development of Bicycle Facilities* –

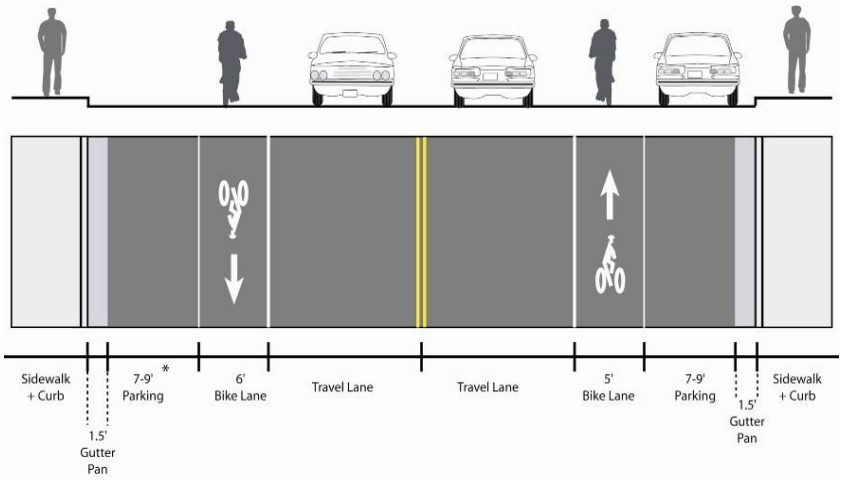
- "If parking is permitted, the bike lane should be placed between the parking area and the travel lane and have a minimum width of 5'. Where parking is permitted but a parking stripe or stalls are not utilized, the shared area should be a minimum of 11' without a curb face and adjacent to a curb face. If the parking volume is substantial or turnover is high, an additional 1'- 2' of width is desirable."

This bike lane provides parking "T"s to minimize the risk of "dooring".

Recommended Designs



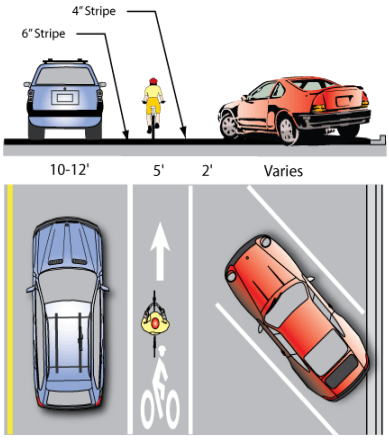
Two lane cross-section with parking on both sides, inclusive of gutter pan.



Two lane cross-section with parking on one side.
Bike lane on nonparking side can be four feet wide in constrained locations.

A.2.1.2 Bike Lane Adjacent to On-Street Diagonal Parking

Design Summary



Recommended Design

Bike Lane Width

- 5' minimum.
- White 4" stripe separates bike lane from parking bays.
- Parking bays are sufficiently long to accommodate most vehicles (vehicles do not block bike lane).

Discussion

In areas with high parking demand such as urban commercial areas, diagonal parking can be used to increase parking supply. Conventional "head-in" diagonal parking is not recommended in conjunction with high levels of bicycle traffic or with the provision of bike lanes as drivers backing out of conventional diagonal parking spaces have poor visibility of approaching bicyclists.


"Back in" diagonal parking is safer for cyclists than "head in" parking due to visibility.

The use of "back-in diagonal parking" or "reverse angled parking" is recommended over head-in diagonal parking. This design addresses issues with diagonal parking and bicycle travel by improving sight distance between drivers and bicyclists and has other benefits to vehicles: loading and unloading of the trunk occurs at the curb rather than in the street; passengers (including children) are directed by open doors towards the curb; and there is no door conflict with bicyclists. While there may be a learning curve for some drivers, using back-in diagonal parking is typically an easier maneuver than conventional parallel parking.

This treatment is slated for inclusion in the 2010 AASHTO *Guide for the Development of Bicycle Facilities,* currently under review.

A.2.1.3 Bike Lane Without On-Street Parking

Design Summary

Bike Lane Width –

- 4' minimum when no curb & gutter is present.
- 5' minimum when adjacent to curb and gutter (3' more than the gutter pan width if the gutter pan is wider than 2').

Recommended Width – 6' where right of way allows.

Maximum Width – 8' adjacent to arterials with 45 mph+.

Recommended Design

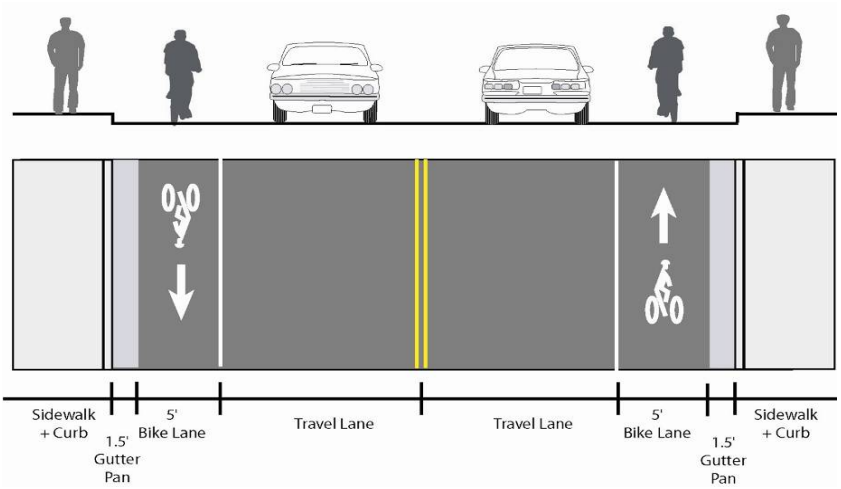
Discussion

Wider bike lanes are desirable in certain circumstances such as on higher speed arterials (45 mph+) where a wider bike lane can increase separation between passing vehicles and cyclists.

Wide bike lanes are also appropriate in areas with high bicycle use. A bike lane width of 6 to 8 feet makes it possible for bicyclists to ride side-by-side or pass each other without leaving the bike lane, increasing the capacity of the lane. Appropriate signing and stenciling is important with wide bike lanes to ensure motorists do not mistake the lane for a vehicle lane or parking lane.

SCDOT recommends a minimum of 6' bike lanes on streets where motor vehicle speeds exceed 50 mph.

Recommended Design



Two lane cross-section with no parking.
Bike lanes may be 4 feet wide in constrained circumstances.

A.2.2 Bike Lanes at Intersections

A.2.2.1 Bicycle Detection at Intersections

Design Summary

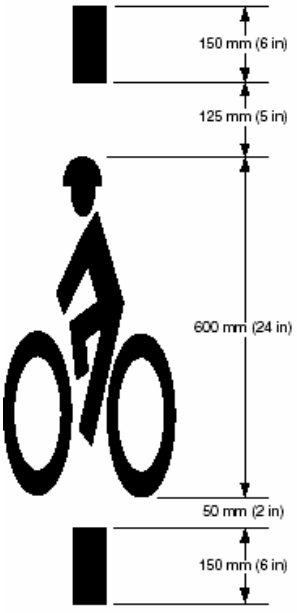
Bicycle detection facilitates bicycle movement at intersections. Several types of detection exist, including loop detection, cameras and RTMS.

Discussion

Changing how intersections operate also can help make them more bicyclist "friendly." Improved signal timings for bicyclists, bicycle-activated loop detectors and camera detection make it easier and safer for cyclists to cross.

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 cyclist to stay within the lane of travel and avoid maneuvering to the side of the road to trigger a push button.



Recommended Design

Most demand-actuated signals in North Augusta currently use loop detectors, which can be attuned to be sensitive enough to detect any type of metal, including steel and aluminum. Current and future loops that are sensitive enough to detect bicycles should have pavement markings to instruct cyclists how to trip them, as well as signage.

Example of a bicycle actuator marking.

Detection Cameras

Video detection cameras can also be used to determine when a vehicle is waiting for a signal. These systems use digital image processing to detect a change in the image at the location. Cameras can detect bicycles, although cyclists should wait in the center of the lane, where an automobile would usually wait, in order to be detected. Video camera system costs range from $20,000 to $25,000 per intersection.

Detection cameras are currently used for cyclists in the City of San Luis Obispo, CA, where the system has proven to detect pedestrians as well.

Instructional Signal

Remote Traffic Microwave Sensor Detection (RTMS)

RTMS is a system developed in China which uses frequency modulated continuous wave radio signals to detect objects in the roadway. This method is marked with a time code which gives information on how far away the object is. The RTMS system is unaffected by temperature and lighting, which can affect standard detection cameras.

Bicycle loops and other detection mechanisms can provide cyclists extra green time before the light turns yellow, so that cyclists of all abilities can make it through the light.

Additional technical detail is available online –

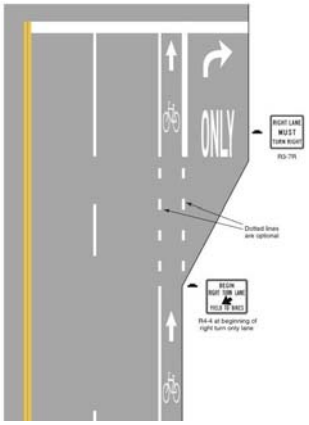
- Use of loop detectors – w*ww.humantransport.org/bicycledriving/library/signals/detection.htm*
- ITE Guidance for Bicycle – Sensitive Detection and Counters – *http://www.ite.org/councils/Bike-Report-Ch4.pdf*

A.2.2.2 Bike Lanes With Right Turn Pockets

Design Summary

Bike Lane Width

- Continue existing bike lane width; standard width of 5’ to 6’, or 4’ in constrained locations.



Recommended Design

Discussion

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 drop the bike lane entirely approaching the right turn lane. The design (right) illustrates a bike lane pocket, with

signage indicating that motorists should yield to bicyclists through the conflict area. While the dashed lines in this area are currently an optional treatment, it is recommended that they be an integral part of any intersection with this treatment in North Augusta.

Dropping the bike lane is not recommended, and should only be done when a bike lane cannot be accommodated at the intersection.

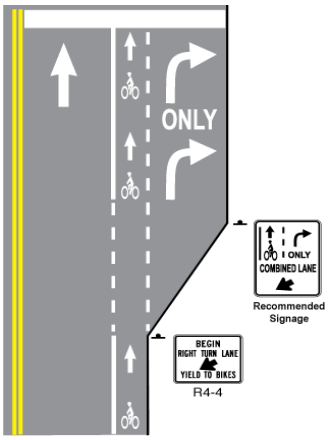
Continuing a bike lane straight while providing a right turn pocket reduces bicycle/motor vehicle conflicts.

A.2.2.3 Shared Bicycle/Right Turn Lane

Design Summary

Width

- Shared turn lane – min. 12' width.
- Bike Lane pocket – min. 4'-5' preferred.



Recommended Design

Discussion

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

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

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).

Advantages of the shared bicycle/right turn lane

- Aids in correct positioning of cyclists at intersections with a dedicated right turn lane without adequate space for a dedicated bike lane.
- Encourages motorists to yield to bicyclists when using the right turn lane.
- Reduces motor vehicle speed within the right turn lane.

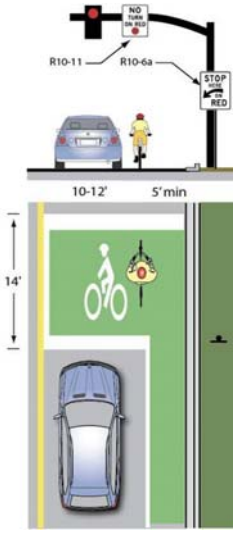
Shared bike right turn lanes require signage as well as pavement markings.

Disadvantages/potential hazards

- 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.

This treatment is slated for inclusion in the 2010 AASHTO *Guide for the Development of Bicycle Facilities*, currently under review. It has been previously implemented in the Cities of San Francisco, CA and Eugene, OR.

A.2.2.4 Bike Box



Recommended Design

Design Summary

Bike Box Dimensions

- 14' deep to allow for bicycle positioning.

Signage

- Appropriate signage as recommended by the MUTCD applies. Signage should be present to prohibit "right turn on red" and to indicate where the motorist must stop.

Discussion

A bike box is generally a right angle extension of a bike lane at the head of a signalized intersection. The bike box allows bicyclists to move to the front of the traffic queue on a red light and proceed first when that signal turns green. Motor vehicles must stop behind the white stop line at the rear of the bike box.

Bike boxes can be combined with dashed lines through the intersection for green light situations to remind right-turning motorists to be aware of bicyclists traveling straight. Bike boxes can be installed with striping only or with colored treatments to increase visibility.

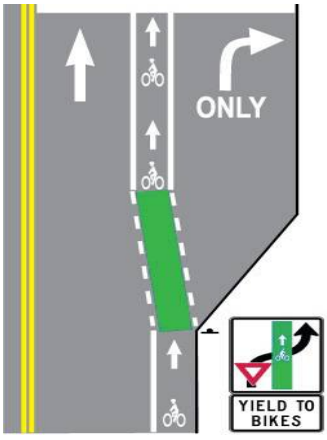
Bike boxes should be located at signalized intersections only, and right turns on red should be prohibited. On roadways with one travel lane in each direction, the bike box also facilitates left turning movements for cyclists.

Bike boxes have been installed at several intersections in Portland, Oregon where right-turning motorists conflict with through bicyclists.

A.2.3 Colored Bike Lanes in Conflict Areas

Discussion

Cyclists are especially vulnerable at locations where the volume of conflicting vehicle traffic is high and where the vehicle/bicycle conflict area is long. Some cities are using colored bike lanes to guide cyclists through major vehicle/bicycle conflict points. These conflict areas are locations where motorists and cyclists must cross each other's path, e.g., at intersections or merge areas. Colored bike lanes typically extend through the entire bicycle/vehicle conflict zone, e.g., through the entire intersection, or through the transition zone where motorists cross a bike lane to enter a dedicated right turn lane.



Recommended Design

Guidance

Although colored bike lanes are not an official standard at this time, they continue to be successfully used in cities, including Portland, OR, Philadelphia, PA, Cambridge, MA, Toronto, Ontario, Vancouver, BC and Tempe, AZ. This treatment typically includes

signage alerting motorists of vehicle/bicycle conflict points. Portland's *Blue Bike Lane* report found that significantly more motorists yielded to bicyclists and slowed or stopped before entering the conflict area after the application of the colored pavement.

Color Considerations

There are three colors commonly used in bike lanes: blue, green and red. All help the bike lane stand out in conflict areas. Green is the color recommended for use in North Augusta.

Portland, Oregon implemented blue bike lanes and has since changed to green.

Advantages of colored bike lanes at conflict points

- Draws attention to conflict areas.
- Increases motorist yielding behavior.
- Emphasizes expectation of bicyclists on the road.

Disadvantages / potential hazards

- Not currently an adopted standard marking in the U.S.
- Interim FHWA approval granted for optional use of green colored pavement for bike lanes, 2011.

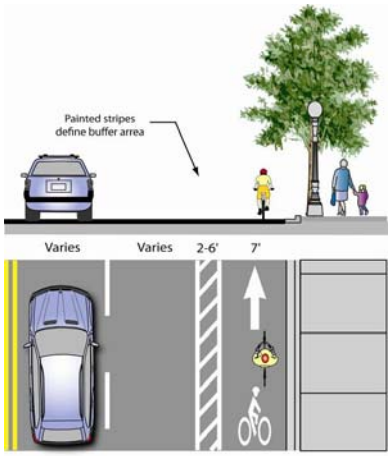
Sources: Federal Highway Administration Policy Memorandum. *Interim Approval for Optional Use of Green Colored Pavement for Bike Lanes (IA-14),* April 15, 2011.

Portland Office of Transportation. (1999) *Portland's Blue Bike Lanes: Improved Safety through Enhanced Visibility.*

Discussion

Bike lanes on high volume or high speed roadways can be dangerous or uncomfortable for cyclists as automobiles pass or are parked too close to bicyclists. Buffered bike lanes are designed to increase the space between the bike lanes and the travel lane or parked cars.

This treatment is appropriate on bike lanes with high automobile traffic volumes and speed, bike lanes adjacent to parked cars, and bike lanes with a high volume of truck or oversized vehicle traffic. Frequency of right turns by motor vehicles at major intersections should determine whether continuous or truncated buffer striping should be used approaching the intersection.



Recommended Design

Guidance

Guidelines for buffer width vary –

- 2.6 feet/80 cm (London and Brussels).
- 1.6-2.5 feet/50-75 cm (CROW Guide).
- 6 feet (Portland, OR).

Advantages of buffered bike lanes

- Provides cushion of space to mitigate friction with motor vehicles on streets with narrow bike lanes.
- Provides space for cyclists to pass one another without encroaching into the travel lane.
- Provides space for cyclists to avoid potential obstacles in the bike lanes, including drainage inlets, manholes, trash cans or debris.
- Parking side buffer provides cyclists with space to avoid the "door zone" of parked cars.
- Provides motorists greater shy distances from cyclists in the bike lane.

Seattle uses buffered bike lanes to protect cyclists from fast moving traffic. Source: seattle.gov/transportation/bikesmart.htm

Disadvantages / Potential hazards

- Requires additional roadway space.
- Requires additional maintenance for the buffer striping.
- Frequency of parking turnover should be considered prior to installing buffered bike lanes.

This treatment is not currently present in any state or federal design standards.

- The City of Portland, OR included this treatment in the Bikeway Design Best Practices for the 2030 Bicycle Master Plan.
- Buffered bike lanes are currently used in Brussels & Bruges, Belgium; Budapest, Hungary; London, UK; Seattle, WA; San Francisco, CA; New York, NY; and Portland, OR.

A.2.5 Retrofitting Existing Streets with Bike Lanes

Design Summary

This section describes several strategies for retrofitting bike lanes to existing streets. Treatments include roadway widening, lane narrowing, lane reconfiguration and parking reduction. Although largely intended for major streets, these measures may be appropriate on some lower order streets where bike lanes would best accommodate cyclists.

Discussion

Most major streets in North Augusta are characterized by conditions (e.g., high vehicle speeds and/or volumes) for which dedicated bike lanes are appropriate to accommodate safe and comfortable riding. Although opportunities to add bike lanes through roadway widening may exist in some locations, most major streets in North Augusta pose physical and other constraints requiring street retrofit measures within existing curb-to-curb widths. As a result, many of the recommended measures effectively reallocate existing street width through striping modifications to accommodate dedicated bike lanes.

A.2.5.1 Roadway Widening

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

Design Summary

Bike Lane Width

- 6’ preferred.
- 4’ minimum (see bike lane guidance).

Discussion

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

As a long term measure, the City of North Augusta should find opportunities to add bike lanes to other major streets where they are needed. Opportunities include adding bike lanes as streets and bridges are widened for additional auto capacity or as property development necessitates street reconstruction.

Guidance for this treatment comes from the AASHTO *Guide for the Development of Bicycle Facilities.*

A.2.5.2 Lane Narrowing (Road Diet 1)

Design Summary

Vehicle Lane Widths

- Before – 12 to 15 feet.
- After – 10 to 11 feet.

Bike Lane Width

- See bike lane design guidance.

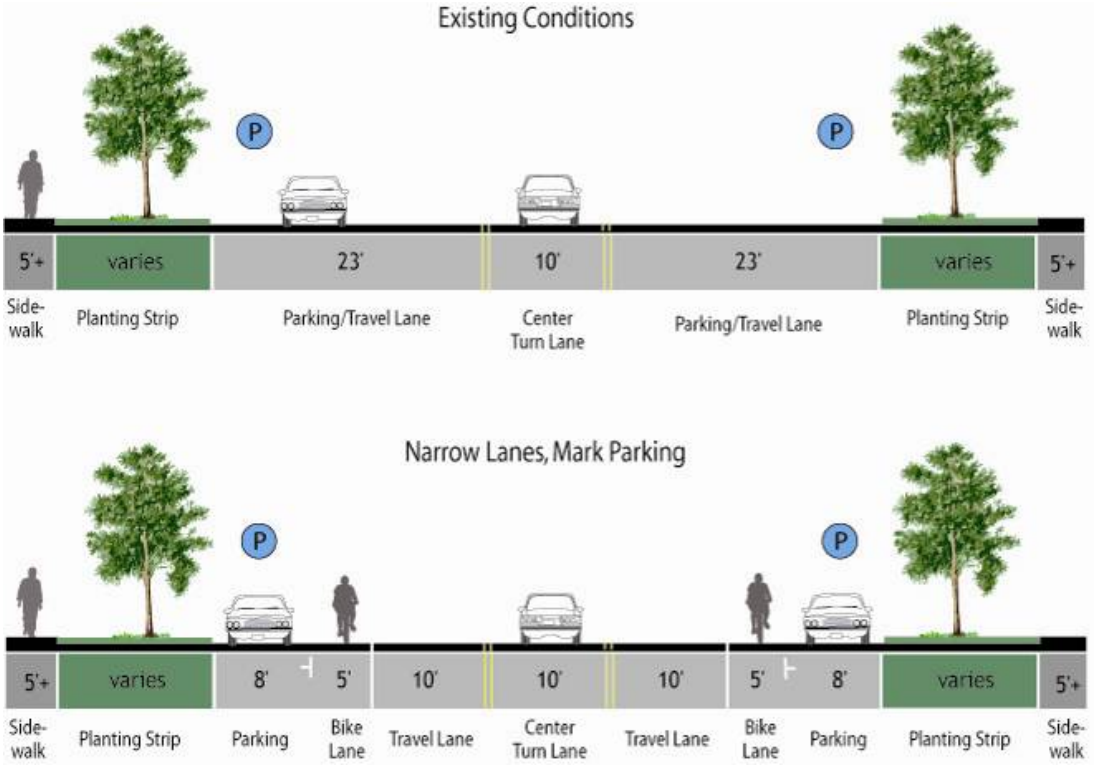
This street previously had 13 foot lanes which were narrowed to accommodate bike lanes without removing a lane.

Discussion

Also called a “road diet”, lane narrowing utilizes roadway space that exceeds minimum standards to create the needed space to provide bike lanes. Many North Augusta roadways have existing 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.

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 space for bike lanes.

Illustrative Example



Example of vehicle travel lane narrowing to accommodate bike lanes

A.2.5.3 Lane Reconfiguration (Road Diet 2)

This road was re-striped to convert four vehicle travel lanes into three travel lanes with bike lanes.

Design Summary

Vehicle Lane Widths

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

Bike Lane Width

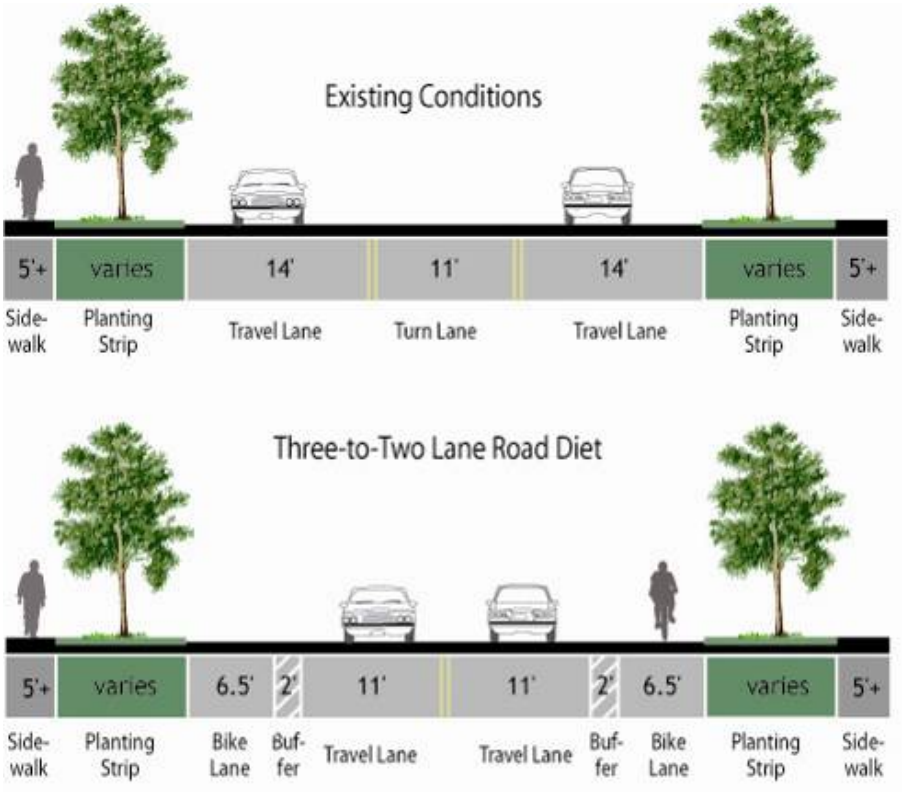
- See bike lane design guidance.

Discussion

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

This treatment is slated for inclusion in the 2010 AASHTO *Guide for the Development of Bicycle Facilities*, currently under review.

Illustrative Example

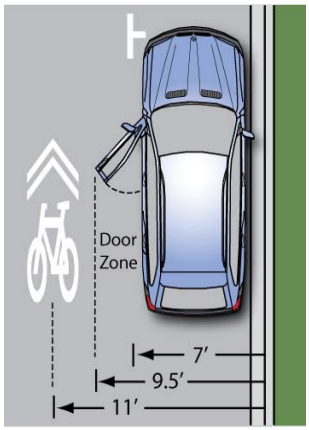


Example of vehicle travel lane reconfiguration to accommodate bike lanes.

A.3. SHARED LANE MARKINGS

Design Summary

Shared lane markings (also known as "sharrows") are high visibility pavement markings that help position bicyclists within the travel lane. These markings are often used on streets where dedicated bike lanes are desirable but are not possible due to physical or other constraints. Sharrows are placed strategically in the travel lane to alert motorists of bicycle traffic, while also encouraging cyclists to ride at an appropriate distance from the "door zone" of adjacent parked cars. Placed in a linear pattern along a corridor (typically every 100-200 feet), sharrows also encourage cyclists to ride in a straight line so their movements are predictable to motorists. These pavement markings have been successfully used in many communities throughout the U.S. Shared lane markings made of thermoplastic tend to last longer than painted ones.



Shared lane marking placement guidance for streets with on-street parking.

<u>Door Zone Width</u>

The width of the door zone is generally assumed to be 2.5 feet from the edge of the parking lane.

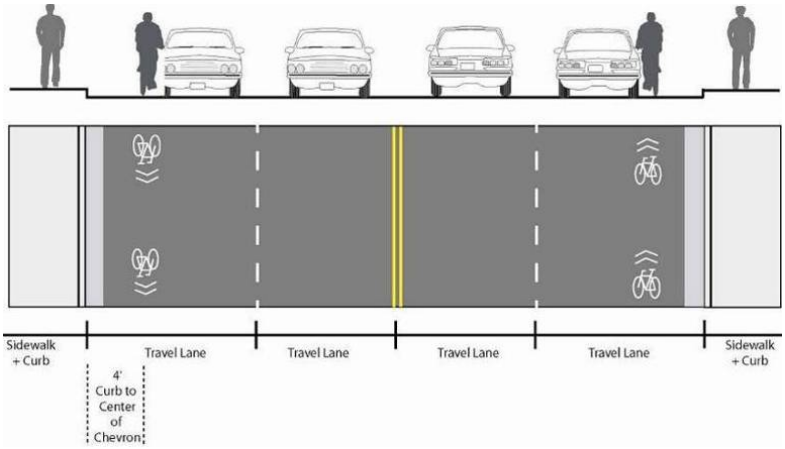
Recommended Placement

- At 11' from face of curb (or shoulder edge) on streets with on-street parking.
- At 4' from face of curb (or shoulder edge) on streets without on-street parking.

Shared lane markings can be used on minor and major roadways.

Discussion

The 2009 MUTCD language notes that shared lane markings should not be placed on roadways with a speed limit over 35 MPH, and that, when used, the marking should be placed immediately after an intersection and spaced at intervals no greater than 250 feet thereafter. Placing shared lane markings between vehicle tire tracks will increase the life of the markings.



Recommended Shared Lane Markings

A.4. BICYCLE ROUTES/BIKE BOULEVARDS

Design Summary

Preferred bicycle routes, or bicycle boulevards, are low-volume streets where motorists and bicyclists share the same space. Treatments for bicycle boulevards include different application levels based on the level of physical intensity, from least physically intensive treatments that could be implemented at relatively low cost. Identifying appropriate application levels for individual bicycle boulevard corridors provides a starting point for selecting appropriate site-specific improvements.

Bicycle boulevards are low-speed streets that provide a comfortable and pleasant experience for cyclists.

SCDOT recommends shared roadways, "to accommodate bicycles through urban areas that are not considered high bicycle-demand corridors or where other constraints do not allow the development of a bike lane/paved shoulder".

Discussion

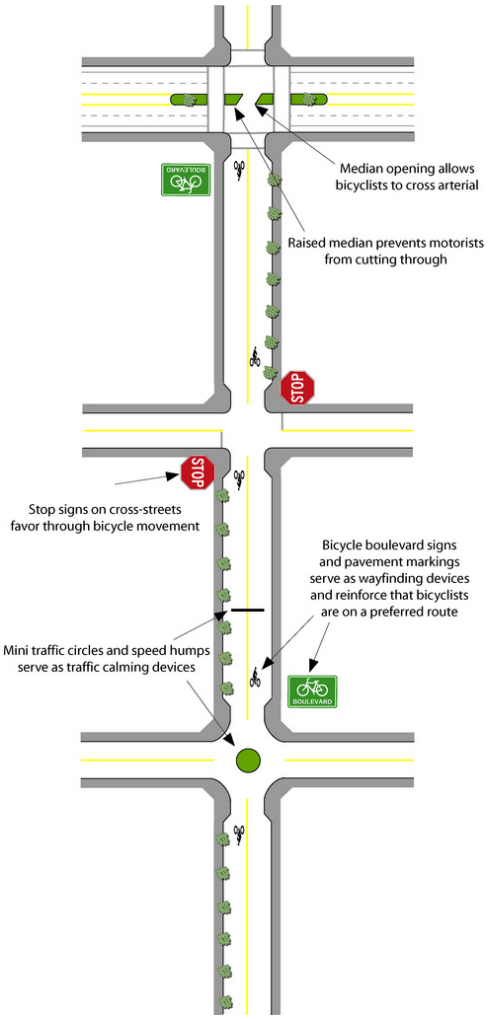
Traffic calming and other treatments along the corridor reduce vehicle speeds so that motorists and bicyclists generally travel at the same speed, creating a safer and more-comfortable environment for all users. Bicycle boulevards incorporate treatments to facilitate safe and convenient crossings where the route crosses a major street. They work best in well-connected street grids where riders can follow reasonably direct and logical routes and when higher order parallel streets exist to serve through vehicle traffic.

Additional Guidance

Bicycle boulevards serve a variety of purposes –

- **Parallel major streets lacking dedicated bicycle facilities –** Higher order streets typically include major bicyclist destinations (e.g., commercial and employment areas, and other activity centers). However, these corridors often lack bike lanes or other dedicated facilities, thereby creating an uncomfortable, unattractive and potentially unsafe riding environment. Bicycle boulevards serve as parallel facilities allowing cyclists to avoid major streets for longer trip segments.
- **Parallel major streets with bicycle facilities that are uncomfortable for some users –** Some users may not feel comfortable using bike lanes on major streets for various reasons, including high traffic volumes and vehicle speeds, conflicts with motorists entering and leaving driveways, and/or conflicts with buses occupying the bike lane while loading and unloading passengers. Children and less experienced riders might find these environments especially challenging. Utilizing lower order streets, bicycle boulevards provide alternate routes for bicyclists. It should be noted that bike lanes on major streets provide important access to key land uses, and the major street network often provides the most direct routes between major destinations. Bike routes should complement a bike lane network and not serve as a substitute.
- **Ease of implementation on most local streets –** Bicycle boulevards incorporate cost-effective and less physically intrusive treatments than bike lanes. Most streets could be provided relatively inexpensive treatments like new signage, pavement markings, striping and signal improvements to facilitate bicyclists' mobility and safety. Other treatments include curb extensions, medians and other features that can be implemented at reasonable cost and are compatible with emergency vehicle accessibility.
- **Benefits beyond an improved bicycling environment –** Residents living on bicycle boulevards benefit from reduced vehicle speeds and through traffic, creating a safer and more-attractive environment. Pedestrians and other users can also benefit from boulevard treatments (e.g., by improving the crossing environment where boulevards meet major streets).

  Bicycle boulevards can employ a variety of treatments including signage, traffic calming and pavement stencils. The level of treatment provided at a specific location depends on several factors.



Sample Bicycle Boulevard/Bike Route Treatments

A.4.1 Bicycle Boulevard Signs

Signage is a cost-effective yet highly visible treatment that can improve the riding environment on a bicycle boulevard/bike route network.

Wayfinding signs help bicyclists stay on designated bicycle routes.

Wayfinding Signs

Wayfinding signs are typically placed at key locations leading to and along bicycle boulevards, including where multiple routes intersect and at key bicyclist "decision points." Wayfinding signs displaying destinations, distances and riding time can dispel common misperceptions about time and distance while increasing users' comfort and accessibility to the boulevard network.

Wayfinding signs also visually cue motorists that they are driving along a bicycle route and should correspondingly use caution. Note that too many signs tend to clutter the right of way, and it is recommended that these signs be posted at a level most visible to bicyclists and pedestrians, rather than at vehicle signage standards.

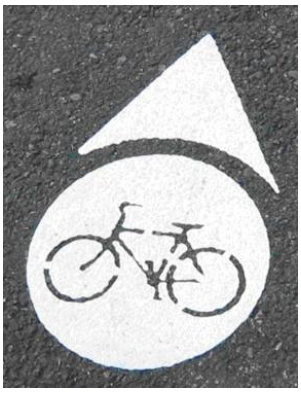
Warning Signs

Warning signs advising motorists to "share the road" and "watch for bicyclists" may also improve bicycling conditions on shared streets. These signs are especially useful near major bicycle trip generators such as schools, parks and other activity centers. Warning signs should also be placed on major streets approaching bicycle boulevards to alert motorists of bicyclist crossings.

A.4.2 Bicycle Boulevard Pavement Markings

On-Street Parking Delineation

Delineating on-street parking spaces with paint or other materials clearly indicates where a vehicle should be parked, and can discourage motorists from parking their vehicles too far into the adjacent travel lane. This helps cyclists by maintaining a wide enough space to safely share a travel lane with moving vehicles while minimizing the need to swerve farther into the travel lane to maneuver around parked cars. In addition to benefiting cyclists, delineated parking spaces also promote the efficient use of on-street parking by maximizing the number of spaces in high demand areas.



Bicycle boulevard directional marker

Directional Pavement Markings

Directional pavement markings reinforce to bicyclists that they are on a designated route. Markings can take a variety of forms, such as small bicycle symbols placed every 600-800 feet along a linear corridor, as currently used on Portland, Oregon's boulevard network.

When a bike route follows several streets (with multiple turns at intersections), additional markings accompanied by directional arrows are provided to guide cyclists through turns and other complex routing areas. Directional pavement markings also visually cue motorists that they are traveling along a bicycle route and should exercise caution.

A.4.3 Bicycle Boulevard Intersection Treatments

Intersection traffic controls favoring through bicycle movement on the boulevard facilitate continuous and convenient bicycle travel. Intersection treatments also provide convenient and safe crossings where boulevards intersect major roads.

Stop Sign on Cross-Street

The installation of a stop sign on cross streets along the bicycle boulevard maximizes through bicycle momentum and forces motorists crossing the facility to stop and proceed when safe. This treatment should be used judiciously. It can be combined with traffic calming efforts to prevent excessive vehicle speeds on the bicycle boulevard.

Roundabout

Roundabouts reduce through-bicycle and cross-vehicle conflicts and add overall traffic calming in all directions. Typically, roundabouts (right) are implemented where the bicycle boulevard intersects a local street where ADT is less than 2,000. Signage and striping treatments should be implemented based on expected traffic volumes.

Roundabouts require that both bicyclists and motorist slow down and watch for conflicts.

Curb Bulb-Outs (Curb Extensions) and High-Visibility Crosswalks

This treatment is appropriate near activity centers that may generate large amounts of pedestrian activity such as schools or commercial areas. The bulb-outs should only extend across the parking lane and should not obstruct bicyclists' path of travel or the travel lane.

Curb bulb-outs can be a good location for pedestrian amenities and street trees.

Bicycle Left-Turn Lane or Pocket

Bicycle left-turn lanes or pockets allow the crossing to be completed in two phases. A bicyclist on the boulevard could execute a right hand turn onto the cross-street, and then wait to cross in a protected space. The bike turn pockets should be at least 5' wide, with a total of 11' for both turn pockets and center striping. Because of the restriction on vehicle left turning movements, where the treatment includes curbs, it acts as traffic diversion.

This bike-only left turn pocket guides cyclists along a popular bike route.

Medians/Refuge Islands

At uncontrolled intersections on major streets, a bicycle crossing island can be provided to allow cyclists to cross one direction of traffic at a time when gaps in traffic allow. The bicycle crossing island should be at least 8' wide (measured perpendicular to the centerline of the major road) to be used as the bike refuge area. Narrower medians can accommodate bikes if the holding area is at an acute angle to the major roadway, which allows stopped cyclists to face oncoming motorists.

Half-Signals

Where vehicles on the major street do not tend to stop for pedestrians and cyclists waiting to cross, "half signals" can be installed to improve the crossing environment. Half signals include pedestrian and bicycle activation buttons and may also include bicycle loop detectors on the approach. Many of these models have been used successfully for years overseas, and their use in the U.S. has increased over the last decade.

Bike signals facilitate crossings of bicycle boulevards and major roads.

A.4.4 Traffic Calming

Traffic calming treatments on bicycle boulevards improve the bicycling environment by reducing vehicle speeds to the point where they generally match cyclists' operating speeds, enabling motorists and cyclists to safely co-exist on the same facility.

Chicanes

Chicanes are a series of raised or delineated curb extensions on alternating sides of a street forming an S-shaped curb, which reduce vehicle speeds through narrowed travel lanes. Chicanes can also be achieved by establishing on-street parking on alternate sides of the street. These treatments are most effective on streets with narrower cross-sections.

Chicanes reduce bicyclist and motorist speeds on local streets.

Speed Humps

Speed humps are rounded raised areas of the pavement requiring approaching motor vehicles to reduce speed. These devices also discourage through vehicle travel on a street when a parallel route exists.

Speed humps should not be so steep that they may cause a bicyclist to lose control of the bicycle or be distracted from traffic. In some cases, a gap could be provided, whereby a bicyclist could continue on the level roadway surface, while vehicles would slow down to cross the barrier.

Speed humps also reduce speeds.

A.4.5 Traffic Diversion

Traffic diversion treatments maintain through bicycle travel on a street while physically restricting through vehicle traffic. These treatments direct through vehicle traffic onto parallel higher order streets while accommodating bicyclists and local vehicle traffic on the bicycle boulevard. Traffic diversion is most effective when higher order streets can sufficiently accommodate the diverted traffic associated with these treatments.

Similar to choker entrances, traffic diverters are raised features directing vehicle traffic off the bicycle boulevard while permitting through travel.

Diverters require automobile traffic to turn while allowing through bicycle travel.

Choker Entrances

Choker entrances are intersection curb extensions or raised islands allowing full bicycle passage while restricting vehicle access to and from a bicycle boulevard. When they approach a choker entrance at a cross-street, motorists on the bicycle boulevard must turn onto the cross-street while cyclists may continue forward. These devices can be designed to permit some vehicle turning movements from a cross-street onto the bicycle boulevard while restricting other movements.

Choker entrances can be used to minimize vehicle turns onto a boulevard.

A.5. BICYCLE PARKING

Design Summary

Bicycle parking can be broadly defined as either short term or long term parking –

- **Short term parking –** Parking meant to accommodate visitors, customers, messengers and others expected to depart within two hours. Requires approved standard rack, appropriate location and placement, and weather protection.
- **Long term parking –** Parking meant to accommodate employees, students, residents, commuters and others expected to park more than two hours. This parking is to be provided in a secure, weather protected manner and location.

A.5.1 Short Term Parking

Short term bicycle parking facilities include racks which permit the locking of the bicycle frame and at least one wheel to the rack and support the bicycle in a stable position without damage to wheels, frame or components. Short term bicycle parking is currently provided at no charge at various locations in North Augusta. Such facilities should continue to be free, as they provide minimal security but encourage cycling and promote proper bicycle parking.

Standard bicycle rack

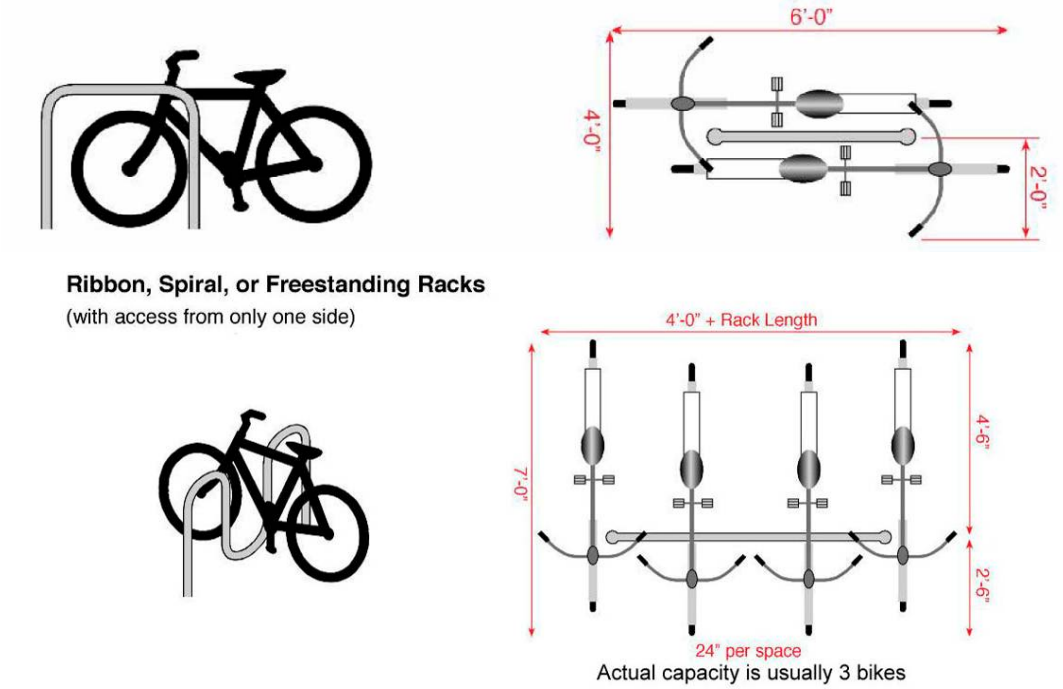


Table A-8 Bicycle Rack Placement Guidelines

Design Issue	Recommended Guidance
Minimum Rack Height	To increase visibility to pedestrians, racks should have a minimum height of 33 inches or be indicated or cordoned off by visible markers.
Signing	Where bicycle parking areas are not clearly visible to approaching cyclists, signs at least 12 inches square should direct them to the facility. The sign should include the name, phone number and location of the person in charge of the facility, where applicable.
Lighting	Lighting of not less than one foot-candle illumination at ground level should be provided in all bicycle parking areas.
Frequency of Racks on Streets	In popular retail areas, two or more racks should be installed on each side of each block. This does not eliminate the inclusion of requests from the public which do not fall in these areas. Areas officially designated or used as bicycle routes may warrant the consideration of more racks.

Design Issue	Recommended Guidance
Location and Access	Access to facilities should be convenient. Where access is by sidewalk or walkway, ADA-compliant curb ramps should be provided where appropriate. Parking facilities intended for employees should be located near the employee entrance, and those for customers or visitors near main public entrances. (Convenience should be balanced against the need for security if the employee entrance is not in a well traveled area). Bicycle parking should be clustered in lots not to exceed 16 spaces each. Large expanses of bicycle parking make it easier for thieves to be undetected.
Locations within Buildings	Provide bike racks within 50 feet of the entrance. Where a security guard is present, provide racks behind or within view of a security guard. The location should be outside the normal flow of pedestrian traffic.
Locations near Transit Stops	To prevent bicyclists from locking bikes to bus stop poles, which can create access problems for transit users, particularly those who are disabled, racks should be placed in close proximity to transit stops where there is a demand for short term bike parking.
Locations within a Campus Type Setting	Racks are useful in a campus type setting at locations where the user is likely to spend less than two hours, such as classroom buildings. Racks should be located near the entrance to each building. Where racks are clustered in a single location, they should be surrounded by a fence and watched by an attendant. The attendant can often share this duty with other duties to reduce or eliminate the cost of labor being applied to bike parking duties. A cheaper alternative to an attendant may be to site the fenced bicycle compound in a highly visible location on the campus. For long term parking needs of employees and students, attendant parking and/or bike lockers are recommended
Retrofit Program	In established locations, such as schools, employment centers and shopping centers, the City should conduct bicycle audits to assess bicycle parking availability and access, and add additional bicycle racks where necessary.

A.5.1.1 On-Street Parking

Where the placement of racks on sidewalks is not possible (due to narrow sidewalk width, sidewalk obstructions, etc.), bicycle parking can be provided in the street where on-street vehicle parking is allowed. Racks can be clustered in a parking space, or they can be located on sidewalk curb extensions where adequate sight distance exists. Installing bicycle parking directly in a car parking space incurs only the cost of the racks and bollards or other protective devices.

On-street bicycle parking may be installed at intersection corners or at midblock locations.

A curb extension is more expensive to install, and can be prohibitively expensive if substantial drainage and/or utility work is necessary. Costs may be less if the curb extension is installed as part of a larger street improvement project. While on-street bicycle parking may take space away from automobile parking, it is possible to mitigate auto parking loss by creating auto parking spaces through driveway consolidation, moving fire hydrants, or otherwise permitting auto parking where it is currently prohibited. Options for combining bicycle and motorcycle parking also exist.

A.5.2 Long Term Parking

Long term bicycle parking facilities are intended to provide secure long term bicycle storage. Long term facilities protect the entire bicycle, its components and accessories against theft and against inclement weather, including snow and wind-driven rain.

Examples include lockers, check in facilities, monitored parking, restricted access parking and personal storage.

Long term parking facilities are more expensive to provide than short term facilities, but are also significantly more secure. Although many bicycle commuters would be willing to pay a nominal fee to guarantee the safety of their bicycle, long term bicycle parking should be free wherever automobile parking is free. Potential locations for long term bicycle parking include transit stations, large employers and institutions where people use their bikes for commuting and not consistently throughout the day.

A.5.2.1 Bike Lockers

Bicycle lockers provide space to store a few accessories or rain gear in addition to containing the bicycle. Some lockers allow access to two users; a partition separating the two bicycles can help ensure users feel their bike is secure. Lockers can also be stacked, reducing the footprint of the area, although that makes them more difficult to use.

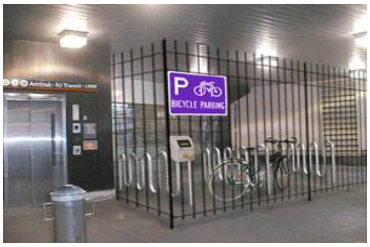
Bike lockers at a transit station

New federal security requirements mandating that locker contents be visible have highlighted a tradeoff between security and perceived safety. Though these measures are designed to increase station security, bicyclists will perceive the contents of their locker to be less safe if they are visible and will be more reluctant to use them.

Traditionally, bicycle lockers have been available on a signup basis, whereby cyclists are given a key or a code to access a particular locker. Computerized on demand systems allow users to check for available lockers or sign up online. Models from eLocker and CycleSafe allow keyless access to the locker with the use of a SmartCard or cell phone. Lockers available for one time use have the advantage of serving multiple users a week. Monthly rentals, by contrast, ensure renters that their locker will always be available.

A.5.2.2 Racks Inside a Cage or Room

A higher security variation on basic racks is a bike cage that restricts access to bicyclists. The cage can be fitted with a gate and an electronic passcard access to provide unsupervised parking.



Bike cage in Penn Station

Parking inside an enclosed room is more secure, but also more expensive than cages. The downside of both is that bicyclists must have a key or know a code prior to using the parking facilities, which is a barrier to incidental use. A cage of 18.5 feet by 18 feet can accommodate up to 20 bicycles and uses the space of approximately two automobile parking spots.

A.6. BIKEWAY MAINTENANCE

A.6.1 Street Construction and Repair

Safety of all roadway users should be considered during road construction and repair. Wherever bicycles are allowed, measures should be taken to provide for the continuity of a bicyclist's trip through a work zone area. Only in rare cases should pedestrians and bicyclists be detoured to another street when travel vehicle lanes remain open. The following actions are recommended –

- Bicyclists should not be led into conflicts with work site vehicles, equipment, moving vehicles, open trenches or temporary construction signage.
- Efforts should be made to recreate a bike lane (if one exists) to the left of the construction zone.
- Where there is insufficient space to provide a bike lane adjacent to the construction zone, a standard width travel lane should be considered. If steel plating is used, special care should be taken to ensure that bicyclists can traverse the plates safely.
- Contractors performing work for North Augusta should be made aware of the needs of bicyclists and be properly trained in how to safely route bicyclists through or around work zones.

Signage

Construction signage should be placed in a location that does not obstruct the path of bicyclists or pedestrians, including bike lanes, wide curb lanes or sidewalks. In areas where there are grades, signs may be placed at the street side edge of sidewalks so as not to encroach onto a bike lane. Detour and closure signage related to bicycle travel may be included on all bikeways where construction activities occur. Signage should also be provided on all other roadways.

Open Trenches

Plates to cover trenches tend to not be flush with pavement and have a 1" to 2" vertical transition on the edges. This can puncture a hole in a bicycle tire and cause a cyclist to lose control. Bicyclists often are left on their own to merge with vehicles in the adjacent travel lane.

A.6.2 Bikeway Maintenance – Regular 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. The following recommendations provide a menu of options for North Augusta to consider as it augments and enhances its maintenance regimen. Many of the recommendations listed below are already part of North Augusta's regular maintenance activities.

Table A-9 Recommended Bikeway Maintenance Activities

Maintenance Activity	Frequency
Inspections	Semiannual – March and September
Pavement sweeping/blowing	Weekly or as needed
Pavement sealing	2 to 5 years or as needed
Pothole repair	1 week to 1 month after report
Pavement markings replacement	1 to 3 years or as needed
Signage replacement	3 to 5 years or as needed
Major damage response (washouts, fallen trees, flooding)	As soon as possible

Appendix B – Funding Sources

Construction of the Greeneway has been funded by grants from the South Carolina Department of Parks, Recreation and Tourism, South Carolina Department of Transportation and the South Carolina Department of Health and Environmental Control. Other funding sources include the Aiken County Capital Projects Sales Tax and the North Augusta Capital Projects Fund.

Acquiring funding for projects and programs is considerably more likely if it can be leveraged with a combination of local, state, federal and private sources. This section identifies potential major funding sources available for bicycle and pedestrian projects and programs as well as their associated need and criteria.

B.1 TRADITIONAL LOCAL TRANSPORTATION FUNDING SOURCES

B.1.1 General Fund

The General Fund is often used to pay for maintenance expenses and limited capital improvement projects. Projects identified for reconstruction or repavement as part of the Capital Improvements list could also implement recommendations for bicycle or pedestrian improvements in order to reduce additional costs.

B.1.2 Local Improvement Districts (LIDs)

Local Improvement Districts (LIDs) are most often used by cities to construct localized projects such as streets, sidewalks or bikeways. Through the LID process, the costs of local improvements are generally spread out among a group of property owners within a specified area. The cost can be allocated based on property frontage or other methods such as traffic trip generation. Based on South Carolina's Municipal Improvements Act of 1999, LIDs can include a Municipal Improvement District (MID), a County Public Works Improvement District (CPWID) or a Residential Improvement District (RID).

Several cities have successfully used LID funds to make improvements on residential streets and for large scale arterial projects. LIDs formed to finance commercial street development can be "full cost," in which the property assessments are entirely borne by the property owners.

B.1.3 Business Improvement Area or District (BIA or BID)

Pedestrian and bicycle improvements can often be included as part of larger efforts aimed at business improvement and retail district beautification. Business Improvement Areas collect levies on businesses in order to fund area wide improvements that benefit businesses and improve access for customers. These districts may include provisions for pedestrian and bicycle improvements, including as wider sidewalks, landscaping and ADA compliance.

B.2 FEDERAL FUNDING SOURCES

Federal funding is primarily distributed through several different programs established by the Federal Transportation Act. The latest federal transportation act, The Safe, Accountable, Flexible, Efficient Transportation Equity Act – a Legacy for Users (SAFETEA-LU) was enacted in August 2005, as Public Law 109-59. SAFETEA-LU authorized the Federal surface transportation programs for highways, highway safety

and transit for the 5-year period 2005-2009. This legislation was recently extended through September 30, 2011.

In South Carolina, Federal funding is administered through state (SCDOT) and regional planning agencies. Most, but not all, of these funding 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.

B.2.1 SAFETEA-LU

There are a number of programs identified within SAFETEA-LU that provide for the funding of bicycle projects. The specific types of eligible projects and required funding match by the local jurisdiction are discussed further below.

B.2.1.1 National Highway System (NHS) – This program funds improvements to rural and urban roads that are part of the National Highway System (NHS), including the interstate system. Bicycle facilities within NHS corridors are eligible activities for NHS funds.

B.2.1.2 Surface Transportation Program (STP) – The Surface Transportation Program (STP) provides states with flexible funds which may be used for a wide variety of projects on any Federal aid highway including the National Highway System, bridges on any public road and transit facilities.

Eligible bicycle improvements include on-street facilities, off-road shared-use side paths, sidewalks, crosswalks, bicycle and pedestrian signals, parking, and other ancillary facilities. SAFETEA-LU also specifically clarifies that the modification of sidewalks to comply with the requirements of the Americans with Disabilities Act is an eligible activity. As an exception to the general rule described above, some STP funded bicycle facilities may be located on local and collector roads which are not part of the Federal aid highway system. In addition, bicycle related nonconstruction projects, such as maps, coordinator positions and encouragement programs, are eligible for STP funds.

B.2.1.3 Transportation Enhancements (TE)[1] – Administered by SCDOT, the Enhancement program is funded by a set-aside of STP funds. Projects must serve a transportation need. These funds can be used to build a variety of pedestrian, bicycle, streetscape and other improvements that enhance the cultural, aesthetic or environmental value of transportation systems.

SCDOT's Transportation Enhancement Program can be used for a feasibility study for a Greeneway; however, the Greeneway must serve as primarily a transportation facility, rather than a recreational one. The requirement is an 80/20 match and must be pursued by a government entity. The required match can be in-kind. Applications are submitted through the Metropolitan Planning Organization (MPO). The MPO serving North Augusta is the Augusta Regional Transportation Study (ARTS). The project selection cycle is ongoing.

B.2.1.4 Highway Safety Improvement Program – This program funds projects designed to achieve significant reductions in traffic fatalities and serious injuries on all public roads, bikeways and walkways. This program includes the Railway-Highway

[1]The National Transportation Enhancements Clearinghouse has prepared a useful technical brief: *Financing and Funding for Trails* that cites over thirty federal and national funding sources that could be used to help fund bicycling and walking facilities and/or programs, especially trails.

Crossings Program and the High Risk Rural Roads Program. This program replaces the Hazard Elimination Program from TEA-21.

B.2.1.5 Railway-Highway Crossing Program (RHC) – Administered by SCDOT, this program is funded by a set-aside of STP funds and is designated for improvements to highway rail grade crossings to eliminate safety hazards. Eligible projects include installation of new crossing protection devices, passive crossing protection devices, upgrades of existing signal devices, railroad crossing closures and pedestrian crossing improvements. Funding for this program comes out of Highway Safety Improvement Program funds.

B.2.1.6 Recreational Trails Program (RTP)[2] – The Recreational Trails Program of SAFETEA-LU provides funds to states to develop and maintain recreational trails and trail related facilities for both nonmotorized and motorized recreational trail uses. Examples of trail uses include hiking, bicycling, in-line skating, equestrian use and other nonmotorized 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).

The South Carolina Recreational Trails Program is a Federal aid assistance program administered by the South Carolina Department of Parks, Recreation and Tourism (SCPRT). SCPRT coordinates an annual grant cycle requiring an 80/20 match (match can be in-kind). The program is for motorized and nonmotorized recreational use. Applicants must submit a letter of intent in order to be eligible to apply for a grant. Applications are due in March and awarded in July of each year. The minimum grant amount is $10,000 with a maximum amount of $100,000. Applicants can be municipal, state or federal government, or for profit or nonprofit organizations. South Carolina's Parks, Recreation and Tourism grants must be used for construction (no more than 5% for planning or engineering).

B.2.1.7 Safe Routes to School (SR2S)[3] – The purpose of the Safe Routes to Schools program is to provide children a safe, healthy alternative to riding the bus or being driven to school. The SR2S grants were established to address pedestrian and bicycle mobility and safety near schools. The State Department of Transportation is responsible for administration of SR2S funding. Application for these funds is open to any public agency. Agencies providing a funding match will be given preference.

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[2] Information about the program, and links to information about the application process can be found online at: *http://www.rco.wa.gov/rcfb/grants/nrtp.htm*

[3] More information about the Safe Routes to School Program may be found online at: *http://www.scdot.org/community/saferoutes.shtml*

Eligible projects may include three elements –

1. **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.
2. **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).
3. **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.

South Carolina's SR2S funding program has provided up to $200,000 per school for infrastructure and noninfrastructure improvement programs. Ninety percent of the funding must be used for infrastructure. Because the grants are competitive and statewide funding limited, only one school in a given municipality is likely to receive funding. All projects must be within two miles of a primary or middle school (K-8). Project proposals are due in early May.

B.2.2 Congestion Mitigation/Air Quality Program (CMAQ)

The Congestion Mitigation/Air Quality Improvement Program provides funding for projects and programs in air quality nonattainment and maintenance areas for ozone, carbon monoxide and particulate matter which reduce transportation related emissions. When projects are included in an MPO Transportation Conformity Plan, these federal funds can be used to build bicycle and pedestrian facilities that reduce travel by automobile. Recreational facilities generally are not funded. The ARTS area has not yet been determined to be in nonattainment for air quality. However, the potential for a nonattainment designation due to ozone levels within the next few years is substantial.

B.2.3 Community Development Block Grants (CDBG)

The Community Development Block Grant program provides money for streetscape revitalization, which may be largely comprised of pedestrian improvements. Federal CDBG recipients may use funds for the following activities: "…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." North Augusta is eligible as a small city in the discretionary program administered by the South Carolina Department of Commerce.

B.2.4 Rivers, Trails and Conservation Assistance Program (RTCA)

The Rivers, Trails and Conservation Assistance program is a National Parks Service program which provides technical assistance, via direct 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 upon criteria that include 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.

B.2.5 Land and Water Conservation Fund (LWCF)

The Land and Water Conservation Fund is a federally funded program that provides grants for planning and acquiring outdoor recreation areas and facilities, including trails. It is administered by the South Carolina Department of Parks, Recreation and Tourism. Funds can be used for ROW acquisition and construction.

B.2.6 Transportation, Community and System Preservation Program (TCSP)

The Transportation, Community and System Preservation Program provides federal funding for transit oriented development, traffic calming, and other projects that improve the efficiency of the transportation system, reduce the impact on the environment and provide efficient access to jobs, services and trade centers. The program is intended to provide communities with the resources to explore the integration of their transportation system with community preservation and environmental activities. The Transportation, Community and System Preservation Program is administered by SCDOT and the Federal Highway Administration (FHWA). It requires a 20 percent match. The Center Street project was funded in part with TCSP program funds.

B.3 STATE FUNDING SOURCES

B.3.1 South Carolina Department of Transportation – Capital Projects

The South Carolina Department of Transportation would like to work closely with the City of North Augusta in including bicycle and pedestrian improvements as part of major projects. The two organizations will continue to cooperate on an ongoing basis to identify opportunities for implementation of the Greeneway Master Plan.

B.3.2 South Carolina Department of Transportation – Maintenance Program

The South Carolina Department of Transportation carries out a number of road resurfacing maintenance projects annually. There may be opportunities for road restriping to be completed as part of regular roadway maintenance. This will require coordination between the City, the SCDOT District Traffic Engineer and the local maintenance office to ensure that the pavement marking design is safe for cyclists and drivers.

B.3.3 Statewide Transportation Improvement Program (STIP)

The Statewide Transportation Improvement Program is SCDOT's short term capital improvement program, providing project funding and scheduling information for the Department and South Carolina's metropolitan planning organizations (MPOs). The program provides guidance for the next six years and is updated every three years. The STIP includes projects approved by each MPO and regional Council of Governments (COG). The South Carolina Department of Transportation Commission, as well as the

Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) approve the STIP.

In developing the STIP, SCDOT must verify that the identified projects comply with existing transportation and comprehensive plans and SAFETEA-LU planning requirements. The STIP must fulfill Federal planning requirements for a staged, multi-year, statewide intermodal program of transportation projects. Specific transportation projects are prioritized based on Federal planning requirements and the different State plans.[4]

B.3.4 South Carolina Transportation Infrastructure Bank (SCTIB)

The South Carolina Transportation Infrastructure Bank is a statewide revolving loan fund designed in 1997 to assist major transportation projects in excess of $100 million in value. The SCTIB has since approved more than $4.5 billion in financial assistance and is arguably the largest and most active State Infrastructure Bank in the country.[5] The Greeneway Trail on Interstate 520 was funded primarily through the SCTIB.

B.4 NONTRADITIONAL GRANT FUNDING SOURCES

B.4.1 American Greenways Program

Administered by The Conservation Fund, the American Greenways Program provides funding for the planning and design of greenways. Applications for funds can be made by local, regional or statewide nonprofit organizations and public agencies. The maximum award is $2,500, but most range from $500 to $1,500. American Greenways Program monies may be used to fund unpaved trail development.

B.4.2 Bikes Belong Grant Program

The Bikes Belong Coalition of bicycle suppliers and retailers has awarded $1.2 million and leveraged an additional $470 million since its inception in 1999. The program funds corridor improvements, mountain bike trails, BMX parks, trails and park access. It is funded by the Bikes Belong Employee Pro Purchase Program.

B.4.3 Robert Wood Johnson Foundation Grants (RWJ)

Robert Wood Johnson Foundation Grants are awarded to promote healthy communities and lifestyles. Most grants are awarded through calls for proposals for the seven program areas of the RWJ Foundation. The Berkeley-Charleston-Dorchester Council of Governments was recently awarded a RWJ Foundation grant to complete a regional bicycle and pedestrian action plan.

B.5 POTENTIAL LOCAL FUNDING SOURCES

B.5.1 Local Bond Measures

The City could issue bonds to fund bicycle and/or pedestrian improvements. This would spread the cost of the improvements over the life of the bonds. Certain types of bonds would require voter approval. The debt would have to be retired, so funding for repayment on the bond and the interest would be required.

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[4] Additional information is available at: *http://www.scdot.org/inside/stip.shtml*

[5] Additional information is available at:
http://www.chiplimehouse.net/whisper/graphics/60565Connector%20Fall%202007%2012.pdf

A bond issued in Denver, Colorado funded $5 million for trail development and also funded the City's bike planner for several years. The City of Albuquerque, New Mexico and Bernalillo County have a 5 percent set aside of street bond funds for trails and bikeways. This has amounted to approximately $1.2 million for the City every two years

B.5.2 Tax Increment Financing (TIF)

Tax Increment Financing is a tool to use future gains in taxes to finance the current improvements that will create those gains. When a public project (e.g., shared use trail) is constructed, surrounding property values generally increase and encourage surrounding development or redevelopment. The increased tax revenues are then dedicated to support the debt created by the original public improvement project.

B.5.3 Street User/Street Utility Fees

The City could administer street user fees through residents' monthly water or other utility bills. The revenue generated by the street user fee is used for operations and maintenance of the street system. Priorities are established by the Public Works department. Revenue from this fund could be used to maintain on-street bicycle and pedestrian facilities, including routine sweeping of bicycle lanes and other designated bicycle routes. Additionally, this type of fee may free up more general fund money for off-street projects. Implementation of street user fees may require a public vote.

B.5.4 Sales Taxes

Bicycle and pedestrian projects can be funded by a portion of local sales tax revenue or from a voter approved sales tax increase. The City of Colorado Springs implemented a TOPS tax (Trails, Open Space and Parks) to administer the ordinance passed by voters in April of 1997. The sales tax, $1/10^{th}$ of one percent, generates about $6 million annually for trails, open space and parks.

B.5.5 Property Tax Levy

Seattle, Washington is receiving $5 million a year for nine years for bicycle and pedestrian projects as a result of a levy (property tax) approved by voters in 2006.

B.5.6 Bike Tax

The City of Colorado Springs has a $4.00 per bike tax to provide funding for bikeway improvements. The tax generates nearly $100,000 annually and has been used for both on- and off-street projects. It is used primarily to provide a local match for other grants such as the Colorado State Trails Program and, in some jurisdictions, SAFETEA-LU grants. A bike tax is an annual fee. Implementation may require a public vote.

B.5.7 Developer Impact Fees

Another potential local source of funding is developer impact fees, typically tied to trip generation rates and traffic impacts produced by a proposed project. A developer may reduce the number of trips (and hence impacts and cost) by paying for on-site and off-site bikeway improvements that will encourage residents to bicycle rather than drive. Establishing a clear nexus or connection between the impact fee and the project's impacts is critical in justifying the amount of the fee and location of projects.

B.5.8 Latecomer Fees

Latecomer fees are a mechanism which allows local governments in some states to recover pro rata costs of a duly authorized public improvement from future developers which receive benefit from the public improvement.

B.6 PRIVATE SECTOR FUNDING SOURCES

B.6.1 Adopt a Bikeway, Sidewalk or Trail Program

A challenge grant program with local businesses may be a good source of local funding, where corporations "adopt" a bikeway, sidewalk or trail and help develop or maintain the facility. Foundation grants, volunteer work, and donations of in-kind services, equipment, labor or materials are other sources of support that can play a supporting role in gathering resources to design and build new bicycle and pedestrian facilities.

Residents and other community members are excellent resources for garnering support and enthusiasm for a bicycle and pedestrian facility, and the City should work with volunteers to substantially reduce implementation and maintenance costs. Local schools, community groups or a group of dedicated neighbors may use the project as a goal for the year. Work parties can be formed to help clear the right of way for a new trail or maintain existing facilities where needed. A local construction company could donate or discount services. Other opportunities for implementation will appear over time, such as grants and private funds. The City should look to its residents for additional funding ideas to expedite completion of the bicycle and pedestrian system.

B.6.2 Local Businesses[6]

There is increasing corporate and business involvement in trail and conservation projects. Employers recognize that creating places to bike and walk is one way to build community and attract a quality work force. Bicycling and outdoor recreation businesses often support local projects and programs. Some examples include:

- In Evansville, Indiana, a boardwalk is being built with corporate donations from Indiana Power and Light Co. and the Wal-Mart Foundation.
- In Greenville, SC, the Greenville Hospital System contributed $1 million over 10 years for promotional and educational activities related to the Swamp Rabbit Trail.
- In Arizona, trail directional and interpretive signs are being provided by the Salt River Project, a local utility. Other corporate sponsors of the Arizona Trail are the Hughes Missile Systems, BHP Cooper, and Pace American, Inc.
- Recreational Equipment, Inc. has long been a financial supporter of local trail and conservation projects.
- The Kodak Company now supports the American Greenways Awards program of The Conservation Fund, which was started in partnership with the DuPont Company. This annual awards program provides grants of up to $2,500 to local greenway projects for any activities related to greenway advocacy, planning, design or development.

B.6.3 Land Trusts

Many environmental land trust organizations have raised funds to purchase land where trails are built, especially rail-trails. The Aiken Land Conservancy (ALC) has been active

[6]Information from the Trails and Greenways Clearinghouse at the Rails-to-Trails Conservancy: *www.railstotrails.org*

in land conservation in Aiken County since 1991. Currently, ALC manages over 548 acres of local lands that are owned by the Conservancy. Additionally, the Nature Conservancy of South Carolina acts as a land trust and has partnered on public trails in the past, such as the Blue Wall Passage of the Palmetto Trail in upcountry South Carolina.

B.6.4 Community Fundraising and Creative Partnerships

Community fundraising and creative partnerships are plentiful. A common approach is to find creative ways to break a large project into small pieces that can be "purchased" by the public. Some examples:

- In Ashtabula, Ohio, the local trail organization raised one-third of the money needed to buy the land for a trail by forming a "300 Club". Three hundred acres were needed for the trail and the goal was finding 300 individuals to each finance one acre. The land price was $400 an acre. Just over 100 people purchased an honorary acre, raising over $40,000.
- Jackson County, Oregon held a "Yard Sale". The Bear Creek Greenway Foundation sold symbolic "yards" of the trail and placed donor's names on permanent markers that are located at each trailhead. At $40 a yard, private cash donations were raised to help match the $690,000 Transportation Enhancements program award for the 18-mile Bear Creek trail linking Medford, Talent, Phoenix and Ashland.
- Selling bricks for local sidewalk projects, especially those in historic areas or on downtown Main Streets, is increasingly common. Donor names are engraved in each brick, and a tremendous amount of publicity and community support is purchased along with basic construction materials. Portland, Oregon's downtown Pioneer Square is a good example of such a project.
- In Colorado Springs, the Rock Island Rail-Trail is partly funded by the Rustic Hills Improvement Association, a group of local homeowners living adjacent to the trail. Also, ten miles of the trail was cleared of railroad ties by a local Boy Scout troop.
- A pivotal 40-acre section of the Ice Age Trail between the cities of Madison and Verona, Wisconsin was acquired with the help of the Madison Area Youth Soccer Association. The soccer association agreed to a fifty year lease of 30 acres of the parcel for a soccer complex, providing a substantial part of the $600,000 acquisition price.

B.6.5 Foundations

A wide range of foundations have provided funding for bicycling and walking. A few national and large regional foundations have supported the national organizations involved in pedestrian and bicycle policy advocacy. However it is usually regional and local foundations that get involved in funding particular bicycle, pedestrian or trail projects. These same foundations may also fund statewide and local advocacy efforts as well. The best way to find such foundations is through the research and information services provided by the nationwide Foundation Center. The Center maintains a store of information including the guidelines, past funding records and application procedures for most foundations.

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