Greenwood, SC
Pedestrian & Bicycle Master Plan

alta
PLANNING + DESIGN

Acknowledgements

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The project team would like to recognize and express appreciation for the myriad of individuals who participated in the development of this Plan. Special thanks to **Greenwood City/County Planning Department and the Greenwood Family YMCA** for their contribution to the Plan and for their commitment to making Greenwood an active community where bicycling and walking are safe, healthy, fun, and normal daily activities.

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1 Project Purpose

1.1 Overview

In 2003, The Greenwood Partnership Alliance (GPA) announced the Greenwood City Center Master Plan to serve as a catalyst for the economic and cultural revitalization of the downtown center. The City and County of Greenwood have reaped many benefits from the implementation of the City Center Master Plan, streetscape improvements on Main Street, pedestrian improvements, and comprehensive branding and wayfinding signage effort that have taken place in the last 12 years. These improvements have collectively brought substantial new investment, interest, and vibrancy to the community. Community leaders have recognized the incredible impact that these efforts have had to date, and are committed to continuing Greenwood's advancement as a top-tier small city.

The *Greenwood Pedestrian and Bicycle Master Plan* combines past planning efforts with new research and analysis as a means **to further enhance the health and well-being of the city's citizens, as well as enhance the community's attractiveness to prospective businesses, employees, and visitors.** The primary objective of this Plan is to **propose a long-term on- and off-street bikeway, walkway, and trail network.** These combined elements establish a complete, up-to-date framework for moving forward with improvements to Greenwood City and County's active transportation and recreation environment.

1.2 Planning Process

The development of the *Greenwood Pedestrian and Bicycle Master Plan* was guided by the City and County of Greenwood, a Stakeholder Advisory Committee consisting of members representing various stakeholder groups throughout the community, and public input. Eat Smart Move More Greenwood County established a Stakeholder Advisory Committee of representatives crucial to walkway, bikeway, and trail implementation in Greenwood, including South Carolina Department of Health and Environmental Control (DHEC), South Carolina Department of Transportation (SCDOT), university staff, neighborhood representatives, the nonprofit and advocacy community, and City and County staff, to help guide the development of the Plan.

1.2.1 Data Collection and Analysis

Eat Smart Move More Greenwood County and its partners, along with Greenwood County and City, and stakeholders provided baseline information about the existing conditions of Greenwood. Through aerial photography, geographic information systems (GIS) data, and on-the-ground field investigation, the project consultants identified opportunities and constraints for bicycle, pedestrian, and greenway facility development. Field research also included examining potential trail corridors, examining roadway conditions for the potential inclusion of sidewalks or on-street bikeways, and preparing a photographic inventory of opportunities and constraints in the community. A review of planning documents, polices, bicycle and pedestrian access to outlets for healthy foods, and existing cultural and recreational programs supplemented the analysis of the physical environment.

1.2.2 Public Involvement

Public outreach to engage the citizens and visitors of Greenwood consisted of two public workshops and a citizen comment form. The initial public meeting sought information regarding existing conditions and needs, while the second public meeting sought feedback on the draft recommendations and priorities of the Plan. Through these engagement opportunities, the Greenwood community shared their needs and aspirations for walking and bicycling, and provided the input necessary to develop a plan that represents the desires of the community. Summary highlights from the public outreach phase of the Plan are detailed in subchapter 2.4, *Community Identified Needs.* Two Stakeholder Advisory Committee meetings also provided useful information about public concerns and preferences. The project consultants revised the Plan based on feedback received during public involvement to revise the Pedestrian and Bicycle Master Plan.

1.2.3 Plan Development

The recommendations of the draft Plan reflect input from the public, the Stakeholder Advisory Committee, County and City staff, past planning efforts, and the existing conditions analysis. The Stakeholder Advisory Committee reviewed and commented on the initial draft, which was also made available for public review. The project consultants revised the Plan based on feedback received as well as national best practices for pedestrian and bicycle planning in communities of similar size and conditions. The final Plan was presented to local elected officials of Greenwood County and its municipalities.

1.3 The Five E's Approach to Pedestrian and Bicycle Planning

Research has shown that a **comprehensive approach to improving conditions for walking and bicycling is more effective than a singular approach that would address infrastructure issues only.**[1] Recognizing this, the national Bicycle Friendly Community program, administered by the League of American Bicyclists, and the Walk Friendly Community program, administered by the National Center for Walking and Bicycling, recommend a multi-faceted approach based on the following five 'E's: Engineering, Education, Encouragement, Enforcement, and Evaluation. For the purposes of this Plan, a sixth 'E', Equity, is included in order to fulfill the goals and vision of this Plan. While this Plan focuses on "Engineering" recommendations, the project team recognizes the value of programmatic and policy efforts of the City, County, and local nonprofit and community partners that are already occurring and that will be implemented moving forward.

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

1.3.1 Engineering

Designing, engineering, operating, and maintaining quality pedestrian and bicycle facilities is a critical component in creating a pedestrian-friendly and bicycle-friendly community. This category includes projects that address and impact the built environment, such as adding new bicycle and pedestrian specific infrastructure, improvements to street crossings, traffic calming, trail design, traffic management, school zones, or other related strategies.

1.3.2 Education

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

1.3.3 Encouragement

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

1.3.4 Enforcement

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

1.3.5 Evaluation

Evaluation methods can include quarterly meetings, the development of an annual performance report, update of bicycle and pedestrian infrastructure databases, pedestrian and bicycle counts, assessment of new facilities, and plan updates. Monitoring implementation of this Plan on a regular basis and establishing policies that ensure long-term investment in the bikeway and walkway network are critical to effective evaluation. Monitoring progress of implementation will facilitate continued momentum and provide opportunities for updates and changes to process if necessary.

1.3.6 Equity

Equity in transportation planning refers to the distribution of impacts (benefits and costs) and whether that distribution is considered appropriate. Transportation planning decisions have significant and diverse equity impacts. Equity in bicycle and pedestrian planning decisions should reflect community needs and values. Communities may choose to give special attention to variances in age, income, ability, gender, or other characteristics.

2 Existing Conditions

2.1 Overview

This chapter analyzes the key walking and bicycling characteristics of the City of Greenwood that relate to the community's walking and bicycling environment. The analysis is based on:

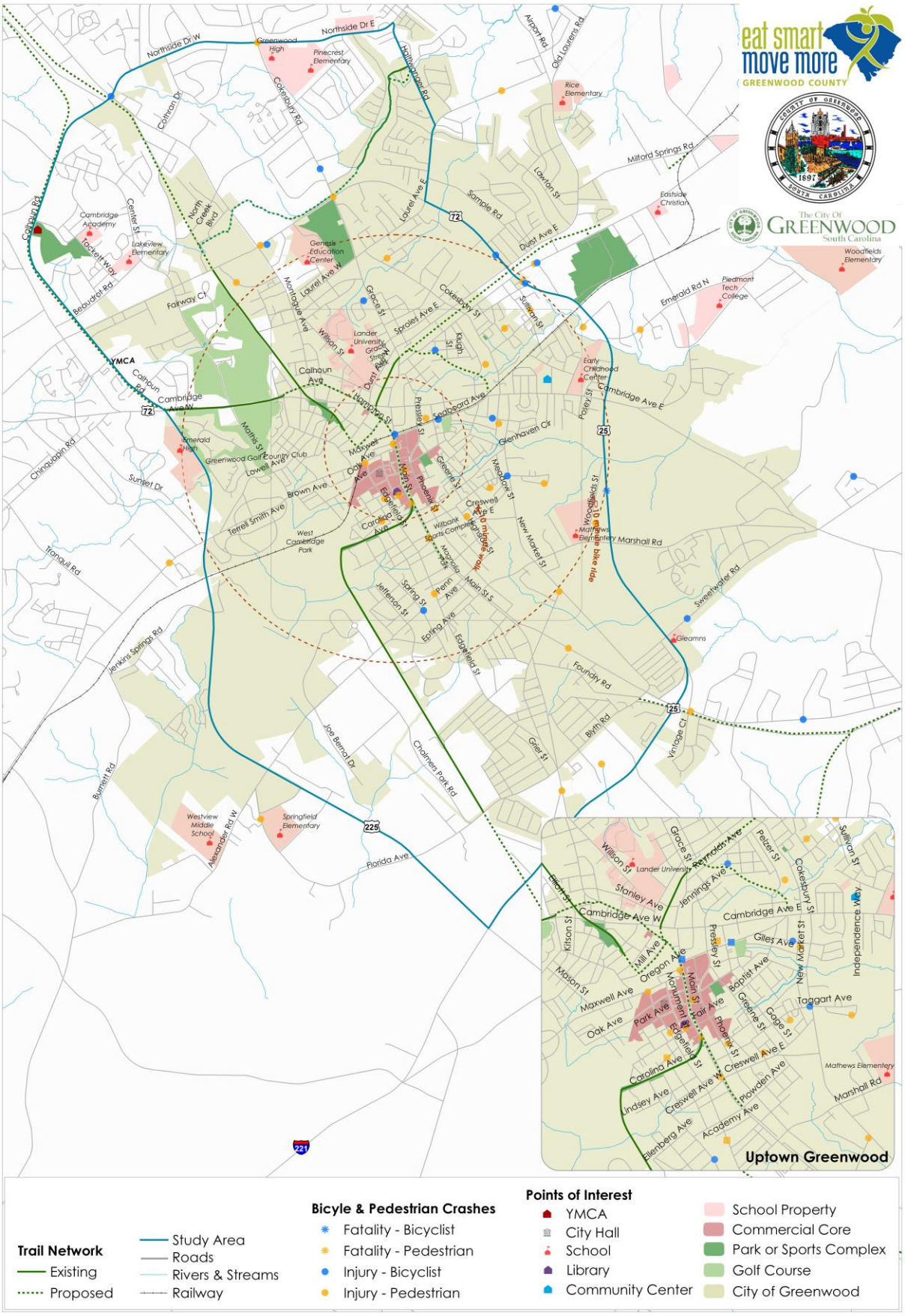
- a review of existing planning documents,
- existing GIS data provided by the City and its partners,
- pedestrian and bicycle collision data from the last three (3) years,
- field review of the project study area,
- and input received from the stakeholder advisory committee, city and county staff, and the general public.

2.2 Data Collection and Base Map

The Eat Smart Move More Greenwood County coalition, City of Greenwood staff, Greenwood County staff, and stakeholder advisory committee were engaged early in the planning process to gather baseline information, personal perspective on existing conditions in Greenwood, and the desired outcomes of this planning effort. In addition, the project team utilized the U.S. Census Bureau's American Community Survey for information on the demographics of Travelers Rest and the South Carolina Department of Public Safety's database of pedestrian and bicyclist collisions in the last three years. Through this information combined with aerial photography, geographic information systems (GIS) data, and on-the-ground field investigation, Alta evaluated existing transportation data and identified opportunities and constraints for pedestrian and bicycle facility development.

A review of the planning documents and policies supplemented the analysis of the physical environment. Specifically, the planning team surveyed the Greenwood Comprehensive Plan, Greenwood Parks & Recreation Master Plan, and the City of Greenwood Zoning Ordinance as they relate to future walkway and bikeway development. Previously proposed bikeway, walkway, and greenway improvements are reflected in the base map.

The general public was solicited to gather input and raise public awareness of the planning effort. Outreach to the citizens of Greenwood was conducted through a citizen comment form and a public open house forum. Information collected from the public regarding points of interests, destinations, and existing facilities are also reflected in the base map.



City of Greenwood, South Carolina - Pedestrian and Bicycle Master Plan

Existing Conditions

2.3 Opportunities and Constraints

2.3.1 Overview

The City of Greenwood has the foundation and momentum to become a community where walking and bicycling are normal transportation and recreation choices, and are accessible by individuals of all abilities, in all areas of the City. Greenwood has a **relatively mild climate and flat terrain throughout the City, several miles of existing trails, and an existing dense, walkable town center**.

However, as indicated during the public outreach, fieldwork, and feedback from the steering committee, walking and bicycling in Greenwood is not without challenges. **There are several safety concerns, barriers, and gaps in network connectivity that must be addressed** in order to reach the goals identified for this Plan. The following sections discuss the current walking and bicycle network, the many opportunities that exist as starting points for improvement, and the constraints that the City must address to become a more pedestrian and bicycle-friendly City.

2.3.2 Opportunities

While Greenwood currently lacks many on-road bicycle facilities, there are numerous assets and opportunities throughout the community that provide a strong base for facilitating a safe, accessible, and convenient bicycle network. Though Greenwood has a substantial network of existing sidewalks in the city center and in its traditional neighborhoods, gaps in pedestrian infrastructure and a lack of pedestrian intersection improvements limit overall connectivity and pedestrian safety and comfort.

Transportation in Greenwood is facilitated via a **fairly well-connected street network**, especially surrounding the Uptown area. Greenwood grew somewhat organically due to the addition of new mill communities over time, and there was an apparent effort among mill developers to connect into the existing street network. Lander University is situated just north of Uptown, which equates to a **large population of existing and potential walkers and bicyclists within the most walkable and bikeable area of Greenwood**. There are also a number of parks, trails, and informal recreation areas located throughout the community. Many of these parks like West Cambridge Park and the Grace Street Park (currently in development) are close to surrounding residential areas.

There have been recent and successful efforts to attract more residents and visitors into the Uptown area. **Recent streetscape and public space improvements** surrounding Maxwell Avenue have contributed to attracting new businesses and development such as the Mill House and new residential condominiums. **A new farmers market** is also in development on Maxwell Avenue near the railroad tracks. In addition, **a consistent schedule of outside, public events in Uptown**, such as the South Carolina Festival of Flowers, draw thousands of people into the area each year.

Key opportunities of the existing transportation network include:

- Many of the older neighborhoods around Greenwood have **well-connected, existing sidewalk networks.**

- The area around the downtown core offers good **street connectivity** which provides alternate routes for pedestrians or bicyclists wanting to travel off of heavily trafficked streets.
- Some of the roadways in Greenwood have **more roadway width than their traffic volumes warrant**. This available roadway provides an opportunity to reutilize the space for pedestrian facilities, bicycle facilities, and/or placemaking measures.
- There are **many existing trail segments** in Greenwood as well as opportunities for future trail extensions and connections.
- **Neighborhood streets** with lower traffic volumes (like Phoenix Street) that run parallel to high volume, high speed roads (like Main Street) offer suitable alternative routes for bicycling.
- **The development of new parks** like Grace Street Park **and commercial properties** such as the Clemson Genetics Center present an opportunity to implement bicycle and pedestrian projects as a component of already programmed efforts.
- The **relatively flat terrain** in Greenwood **and large number of shade trees** provide comfortable walking and riding conditions across most of the City.
- The many utility corridors and stream beds offer many **great opportunities for new trails, or connecting segments of existing trails.**

Photo Inventory of Opportunities

This section provides a photo inventory of the City of Greenwood's existing conditions opportunities for pedestrians, bicyclists, and trail users.

OPPORTUNITY Downtown Greenwood is in many regards already friendly for walkers and bicyclists. Low-speed and low-volume roadways, a human-scaled streetscape environment, low-speed traffic, and well-marked intersections all make this an enjoyable place to walk and bike.

OPPORTUNITY The Heritage Trail is a popular recreation asset for pedestrians and bicyclists. Tying this trail into surrounding developments and/or other bicycle/pedestrian connections would greatly increase the access to this trail. Also, the public expressed a great desire for better maintenance and lighting along existing trails in Greenwood.

OPPORTUNITY There are several streets throughout the core of Greenwood that could offer comfortable, low-volume, parallel connections to Main St for bicyclists and pedestrians. Wayfinding signage and shared-lane markings could indicate that these are preferred routes for bicyclists.

OPPORTUNITY The area around the Lander campus is, in general, friendly for walking and bicycling. This solid foundation could be improved by providing better walking and bicycle access across Calhoun Ave. (Business 25), connecting to the Cambridge and Grace Street Trails, and providing a bicycle connection to Uptown.

OPPORTUNITY Several corridors throughout Greenwood could be reconfigured using existing roadway space to provide dedicated space for bicyclists. Center St. by Lakeview Elementary is a prime example of this.

2.3.3 Constraints

Greenwood also has several physical barriers that are currently discouraging walking and bicycling. Many local roadways are designed for automobile use only. Travelling by foot or by bicycle in the city often requires crossing **intersections with complex and intimidating traffic patterns**. The **railroads that traverse the city also disconnect the roadway network** in certain areas, making continuous travel difficult for pedestrians and bicyclists. Navigating these barriers is difficult and they act as major detractors to walking and bicycling in the region.

Additionally, **on the periphery** of the City limits, **development is less dense, the roadway network is less connected, and most vehicular traffic is concentrated on several large, high-speed roadways**. Walking and bicycling is more difficult in these areas of town.

Key constraints of the existing walking and bicycling system and roadway network include:

- **As one moves away from the City center, street network connectivity and development density decreases.** This makes walking and bicycling more difficult as pedestrians and bicyclists are forced onto major roadways and must travel longer distances to reach their destinations. Strategic improvements in street network connectivity and policies affecting new development can help to improve this.
- At many intersections, **crosswalks are not present** at all legs of the intersection **or pedestrian signals are not present**. This not only makes intersections less safe for pedestrians, but discourages pedestrian travel, as it requires an uncomfortable amount of time to get across intersections.
- While sidewalk connectivity is good in the core of Greenwood, **sidewalk connectivity breaks down as one moves away from the City center.** Continuous sidewalks are needed along all major roadways to facilitate pedestrian connectivity to key destinations.

- **Sidewalk maintenance and ADA compliance** is an issue along many existing sidewalks. These issues pose a barrier for people with mobility issues. In addition, ADA non-compliance can be a liability for the City.
- **Existing trails in Greenwood are disconnected** from one another and **the surface quality and perceived safety of trails prevents many potential users** from utilizing them.
- **On-street separated bike facilities are limited**. These are important as they create a more comfortable environment for bicyclists of multiple ages and abilities along corridors that offer direct connections to important destinations.
- **Surface condition and debris** on some roadways make it difficult for bicyclists, who are more susceptible to poor maintenance conditions.
- **End-of-trip facilities, such as short and long-term bicycle parking, are limited**. Bicyclists need designated, secure parking at their destinations. More bicycle parking in the Uptown area, at parks, at Lander University, primary schools, and retail destinations would support more bicycling for transportation.
- **Major roads with high posted speeds and traffic volumes** are especially uncomfortable for bicyclists. Roads such as Main Street, Highway 72, Calhoun Road, and Reynolds Ave. have many driveway cuts and a lack of dedicated bicycle facilities that make it impractical and uncomfortable to bike these corridors. These barriers restrict bicyclists' access to the many shopping centers, services, and attractions that are located along these roads.

Photo Inventory of Constraints

This section provides a photo inventory of the City of Greenwood's existing conditions constraints for pedestrians, bicyclists, and trail users.

CONSTRAINT The issue of trail maintenance and perceived safety was one of the most frequent comments during the public meetings. Following Crime Prevention Through Environmental Design (CPTED) guidelines and maintaining better lighting, trail upkeep, and sightlines could increase both safety and perceived safety of existing trails, leading to increased trail use.

CONSTRAINT The project team observed sidewalk bicycle riding in Greenwood. While this is not preferable for adults from a safety standpoint, this is an indicator that residents feel more comfortable bicycling on sidewalks due to the lack of dedicated spaces for bicycling along most Greenwood roadways. Bicyclists would likely be comfortable riding on the roadway if a comfortable space and education are provided.

CONSTRAINT Intersections at large roadways are a barrier for pedestrians and bicyclists. Ensuring that intersections are more human-scaled and human-oriented will encourage more people to walk and bike. Median refuges, pedestrian and bicycle-oriented signals and actuation, and high-visibility pavement markings are some potential treatments that make intersections more accessible.

CONSTRAINT As pedestrians move away from the City center, sidewalks become more disconnected. Filling in sidewalk gaps along major roadways will encourage walking and increase accessibility for school children and citizens with mobility issues

2.4 Community Identified Needs

The public outreach process included three major components:

- Input from stakeholder advisory committee
- Public Open House
- Citizen Comment Form

The results of each effort to gain public input are described in the following sections.

2.4.1 Citizen Comment Form

The *City of Greenwood Pedestrian and Bicycle Master Plan* comment form was available from April 15th to April 24th, 2015. The comment form was distributed locally by City staff and advisory committee members and was available at the public workshop. A total of 43 responses were received. The full comment form is provided in Appendix A of this Plan and a summary of the results are discussed below.

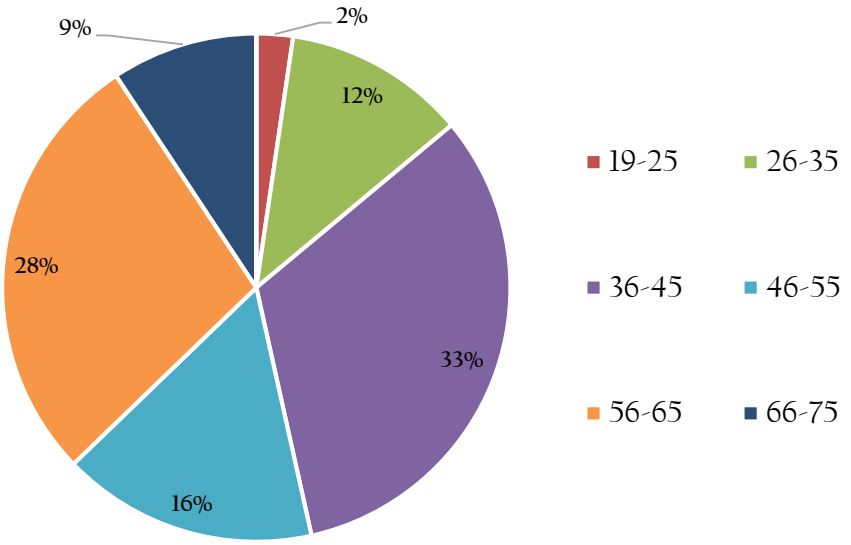
Respondent Characteristics

The age of survey respondents are shown below in Figure 2-1. Participants that took part in the survey were:

- Predominantly middle-aged, ranging from 36 to 65 years old.
- Over 90 percent live in the City or County of Greenwood.
- 44 percent work in the City of Greenwood.
- 42 percent work in Greenwood County.

When compared to 2010 U.S. Census data for Greenwood, the survey population slightly over-represents the age group of 36 to 65 year olds and slightly under-represents the population that is 18 and under or 76 and older.[2]

Figure 2-1: Age of Survey Respondents

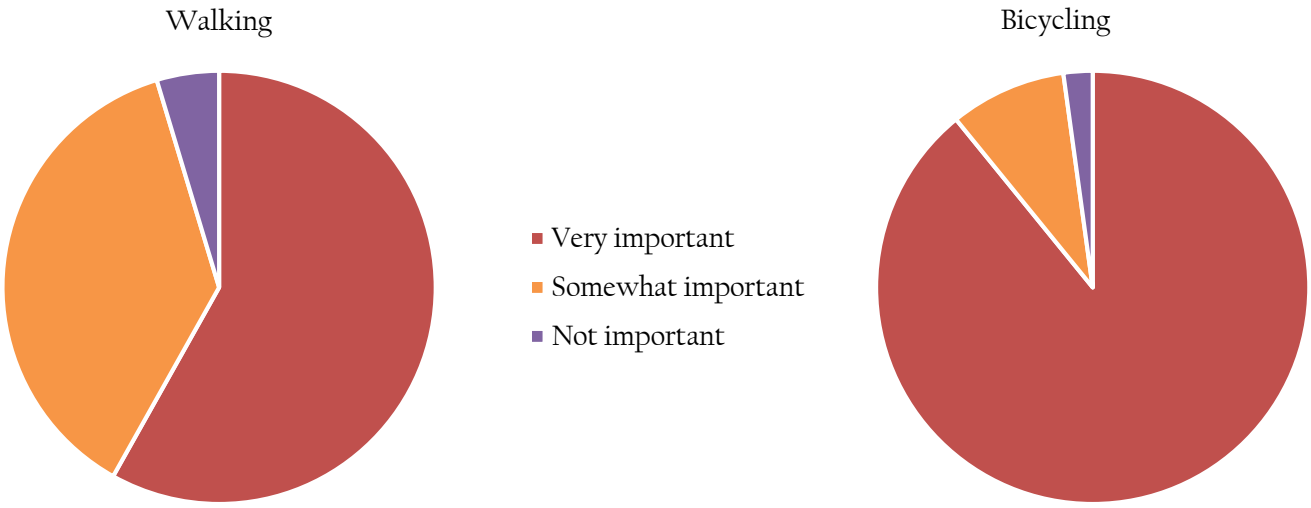


Importance of Improving Walking and Bicycling Conditions

Survey participants were asked to evaluate how important improving walking and bicycling conditions in Greenwood are. Almost sixty percent of respondents considered improving walking conditions in Greenwood a very important priority. Thirty-seven percent of respondents considered improving walking conditions still a somewhat important priority for Greenwood. Nearly ninety percent of respondents considered improving bicycling conditions in Greenwood a very important priority. Figure 2-2 details the exact breakdown of respondents' evaluation.

[2] U.S. Census Bureau, 2010 Census. http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF

Figure 2-2: Importance of Improving Walking and Bicycling Conditions in Greenwood



Identified Issues and Roads Targeted for Improvements

Respondents identified roads that do not feel safe as their top reason for not walking and the top reason for not bicycling. Other top concerns that prevent walking and bicycling more often were "trails and greenways that do not feel safe" and "lack of bicycle parking at destinations."

Respondents identified the following roads in need of safety improvements for walking:

- Maxwell Avenue
- Haltiwanger Road
- Northside Road
- Highway 10
- Highway 72
- South Main Street
- Montague Avenue
- Edgefield Street
- Grace Street
- Laurel Avenue
- Cokesbury Street

Desired Walking and Bicycling Destinations

Residents of the City of Greenwood are interested in accessing many local destinations by bike or by foot. Figure 2-3 displays destination suggestions for cyclists and pedestrians based on survey responses. The size of the font reflects the number of times the respondents of the survey mentioned each destination. **The grocery store, parks, uptown, and downtown ranked highest**. This interest in biking or walking to the grocery store, in particular, suggests a potential for increased bicycling and walking commuting, not simply recreational walking and biking. Apart from local destinations, residents also emphasized a need to connect to nearby towns, particularly Ninety-Six.

Figure 2-3: Respondents' preferred destinations for biking and walking

2.4.2 Public Open House

The project team hosted a public meeting on April 16th, 2015 inviting residents and visitors to express their walking and bicycling infrastructure preferences through interactive posters, and to envision the walking and bicycling future of the City of Greenwood. During this evening open house forum at the YMCA of Greenwood, over 50 citizens attended to learn about the Plan and share ideas. Attendees viewed base maps of the project study area and a series of posters discussing the project scope, types of bicycle and pedestrian infrastructure improvements, program ideas, and low-cost strategies for creating new bikeways.

Bicycling and Walking Infrastructure Preferences

The meeting attendees were invited to select their top four preferences for walking and bicycling infrastructure they would most like to see in Greenwood. Development of **shared-use paths along roadways ranked first for preferred walking facilities and second for preferred bicycling facilities.** Only bicycle lanes and buffered bicycle lanes outranked shared-use paths as the most popular facility to improve Greenwood's bicycling environment. Figure 2-4 and Figure 2-5 below show a comprehensive tally of the public's preference for types of walking and cycling infrastructure.

Figure 2-4: Preferred walking facilities

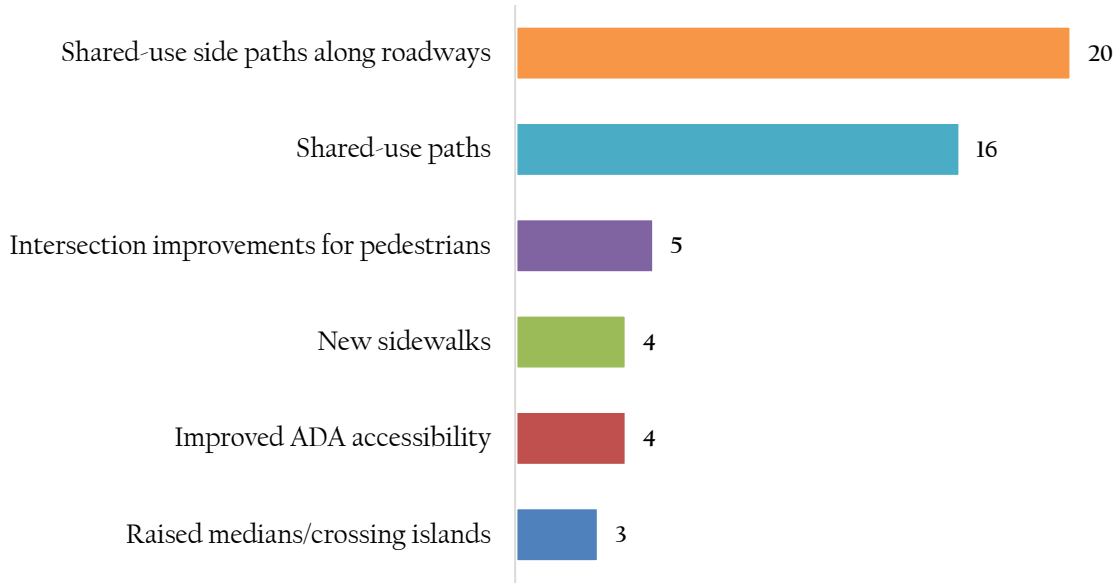
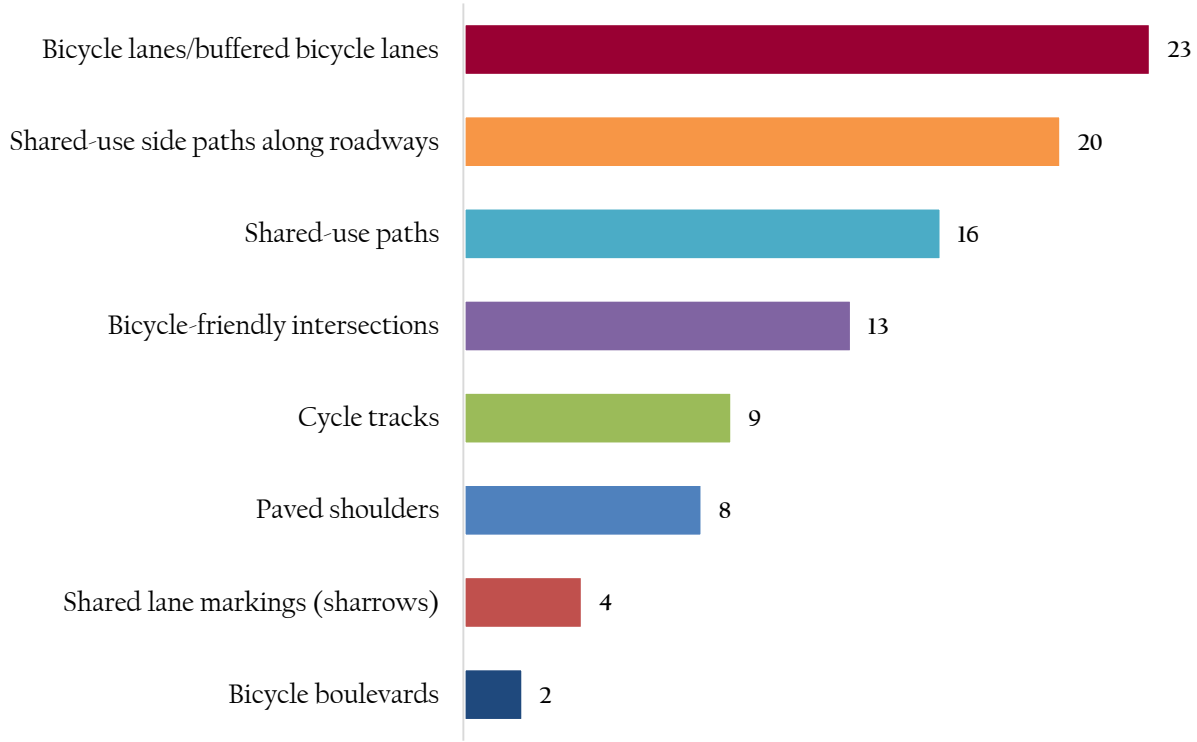


Figure 2-5: Preferred bicycling facilities



Bicycling and Walking Visioning

Meeting participants were also encouraged to write key phrases relating to their vision for the city. Key themes that recurred in the participants' input included:

- safe lanes for cyclists
- paved, lighted shared-use path traversing and encircling Greenwood
- wellness-based tourism
- increased connectivity between neighborhoods and between existing paths
- decreased dependence on cars
- more bike racks, particularly at shopping destinations
- safer commutes, including for school-aged children
- more neighborhood sidewalks

The public meeting also allowed attendees an opportunity to pinpoint specific walking and bicycling infrastructure improvements on maps. The **need for sidewalk infrastructure** was identified in the area encompassed by Deadfall Road West, Northside Drive West, Route 178/25, and Newcastle Road. Another area identified as lacking sidewalks was along Durst Avenue from Grace Street to Cokesbury Street.

Residents also identified several **priority routes in need of improvement for walking**:

- Grace Street from Reynolds Avenue to Route 178/25
- Laurel Avenue West from Grace Street to Wilson Street
- Wilson Street and Landers Avenue from Laurel Avenue West to Cambridge Avenue West
- Mathis Street North from Highway 72 to Maxwell Avenue
- The triangle formed by Lowell Avenue, Mathis Street North, and Maxwell Avenue
- Oak Avenue from Main Street to Mathis Street South.

In terms of **new bicycling infrastructure**, residents expressed a desire for dedicated bike lanes on Main Street and Main Street South extending from Oak Avenue to Route 25, as well as on Cambridge Avenue West from Route 72 to the existing trail network between Kitson Street and Charles Street.

Other ideas for Greenwood include:

- enhance and encourage use on the existing Heritage Trail
- offer an educational component for motorists as part of the Plan
- enforce leash laws as dogs run after cyclists

Additional comments noted on the map were that **Emerald Road needs safety improvements for biking**, and that **Florida Avenue is too narrow to accommodate both cyclists and pedestrians**. One prevailing vision from Greenwood residents was the **need to connect the city to nearby Hodges or State Road 96 with a paved trail**.

3 Proposed Improvements

3.1 Overview

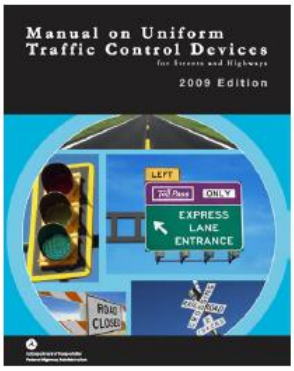
The following section presents a comprehensive long-term vision for a Greenwood pedestrian and bicycle network. These recommendations are intended to reflect the needs for pedestrians and bicyclists of all ages and abilities, whether it is a child walking to school, a wheelchair-bound individual fulfilling their daily needs, an employee bicycling to their job, a family out for a leisurely bike ride, or a recreational cyclist taking long-distance ride across the county. Recommendations are representative of the project vision, goals and objectives, community needs discovered in the existing conditions analysis and stakeholder input.

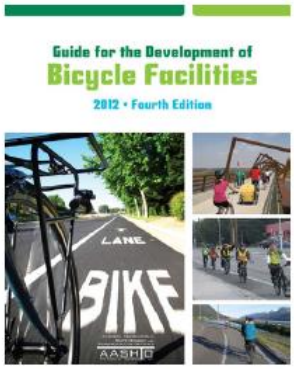
3.2 Pedestrian and Bicycle Facilities Types

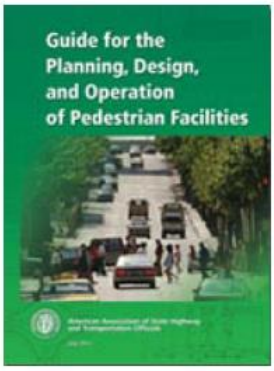
3.2.1 Bicycle and Pedestrian Design Resources

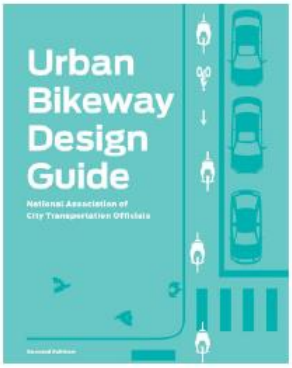
There are a number of state and national design resources that provide more detailed information on the design of the facilities recommended in this Plan. An overview of these is presented below:

- ***Manual on Uniform Traffic Control Devices*** **(MUTCD):** defines the standards used by road managers nationwide to install and maintain traffic control devices on all public streets, highways, bikeways, and private roads open to public traffic. The MUTCD is the primary source for guidance on lane striping requirements, signal warrants, and recommended signage and pavement markings. To clarify guidance on bicycle facilities, FHWA has set up the following website as a resource: *http://www.fhwa.dot.gov/environment/bikeped/mutcd_bike.htm*
- **American Association of State Highway and Transportation Officials (AASHTO)** ***Guide for the Development of Bicycle Facilities***, updated in June 2012 provides guidance on dimensions, use, and layout of specific bicycle facilities. The standards and guidelines presented by AASHTO provide basic information, such as minimum sidewalk widths, bicycle lane dimensions, detailed striping requirements and recommended signage and pavement markings.
- **The National Association of City Transportation Officials' (NACTO) 2012** ***Urban Bikeway Design Guide*** is the newest publication of nationally recognized bicycle-specific design guidelines, and offers guidance on the current state of the practice designs. The NACTO Urban Bikeway Design Guide is based on current practices in the best cycling cities in the world. The intent of the guide is to offer substantive guidance for cities seeking to improve bicycle transportation in places where competing demands for the use of the right of way present unique challenges. All of the NACTO Urban Bikeway Design Guide treatments are in use in many cities around the US and internationally.
- **The 2004 AASHTO** ***Guide for the Planning, Design and Operation of Pedestrian Facilities*** provides comprehensive guidance on planning and designing for people on foot.

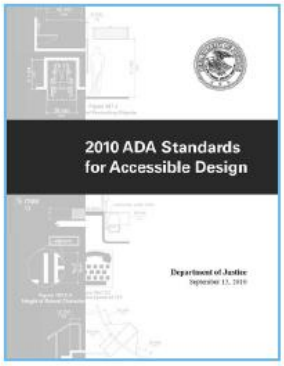


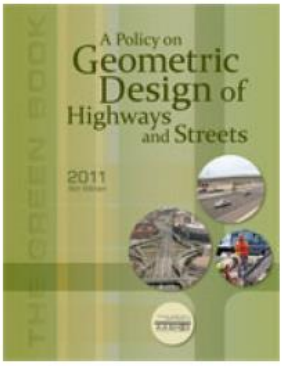




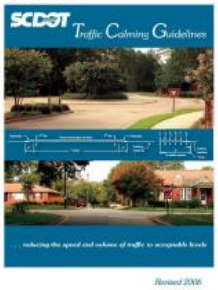


- **The United States Access Board's proposed *Public Rights-of-Way Accessibility Guide*lines (PROWAG) and the 2010 ADA Standards for Accessible Design (2010 Standards)** contain standards and guidance for the construction of accessible facilities. This includes requirements for sidewalk curb ramps, slope requirements, and pedestrian railings along stairs. Meeting the requirements of the Americans with Disabilities Act (ADA) is an important part of any bicycle and pedestrian facility project.
- **The 2011 *AASHTO: A Policy on Geometric Design of Highways and Streets*** commonly referred to as the "Green Book," contains the current design research and practices for highway and street geometric design.





- **The South Carolina Department of Transportation has published a variety of additional resources for designing bicycle and pedestrian facilities.** These include the SCDOT Highway Design Manual, SCDOT Traffic Calming Design Guidelines, SCDOT Traffic Signal Design Guidelines and SCDOT Access and Roadside Management Standards. In recent years, SCDOT has also issued several Traffic Engineering Guidelines and Engineering Directive Memorandums for such treatments as pedestrian hybrid beacons, shared lane markings, rumble strips and other complete streets treatments.



3.2.2 Design for Pedestrians

The transportation network should accommodate pedestrians with a variety of needs, abilities, and possible impairments. Age is one major factor that affects pedestrians' physical characteristics, walking speed, and environmental perception. Children have low eye height and walk at slower speeds than adults. They also perceive the environment differently at various stages of their cognitive development. Older adults walk more slowly and may require assistive devices for walking stability, sight, and hearing.

The *Manual of Uniform Traffic Control Devices* (MUTCD) recommends a normal walking speed of three and a half feet per second when calculating the pedestrian clearance interval at traffic signals. Typical walking speeds can drop to three feet per second in areas with older populations and persons with mobility impairments. While the type and degree of mobility impairment varies greatly across the population, the transportation system should accommodate these users to the greatest reasonable extent.

Sidewalks

Sidewalks are the most fundamental element of the walking network, as they provide an area for pedestrian travel that is separated from vehicle traffic. **Sidewalks should be provided on both sides of major roadways and on at least one side of collectors and minor arterials or residential streets with at least 3 dwelling units per acre.** Sidewalks are typically constructed of concrete and are separated from the roadway by a curb and gutter and preferably a landscaped planting strip area. Sidewalks are a common application in both urban and suburban environments. Attributes of well-designed sidewalks include the following:

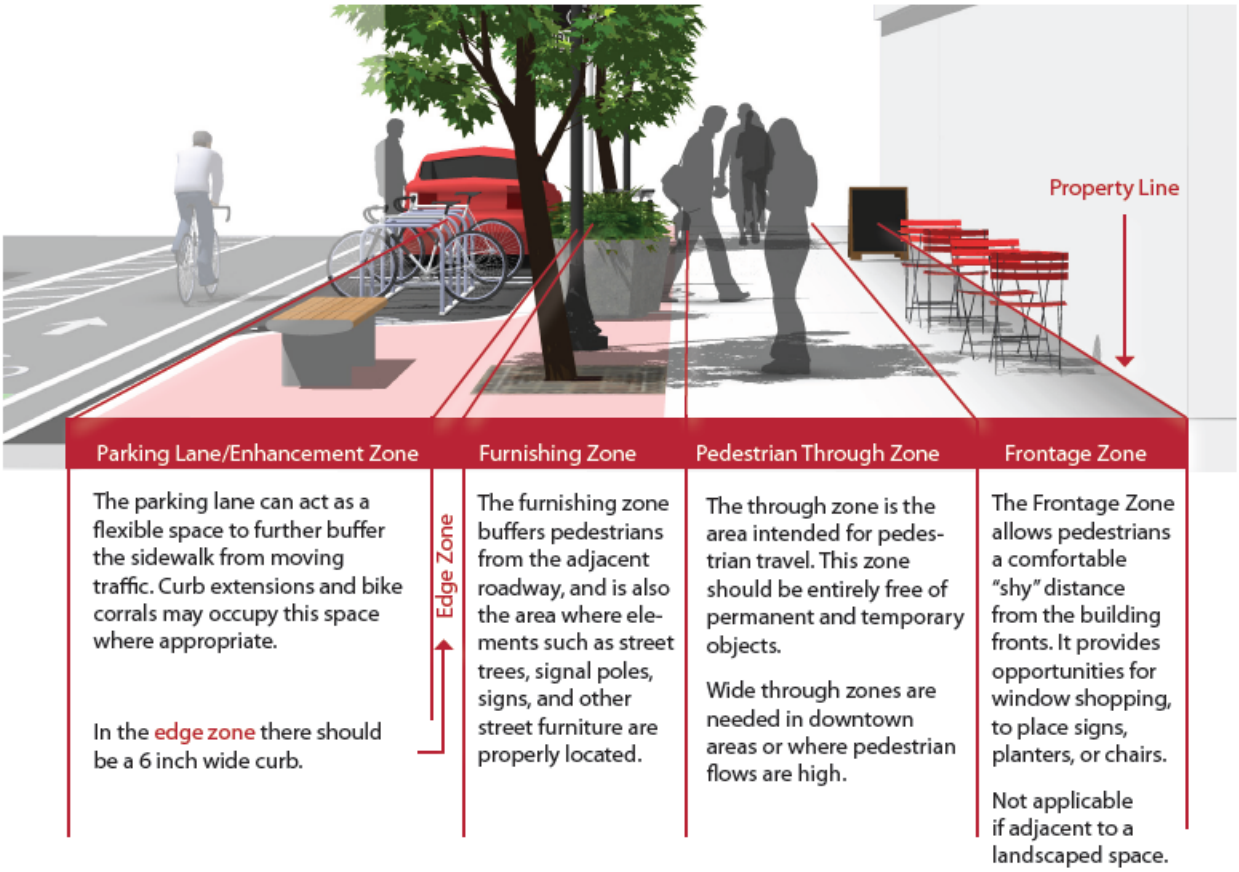
- **Accessibility:** A network of sidewalks should be accessible to all users. Roadway crossing distances and distances between crossings should be minimized to accommodate and encourage pedestrian travel.
- **Adequate width:** Two people should be able to walk side-by-side. Different walking speeds should be possible. In areas of intense pedestrian use, sidewalks should accommodate the high volume of walkers.

- **Safety:** Design features of the sidewalk should allow pedestrians to have a sense of security and predictability. Sidewalk users should not feel they are at risk due to the presence of adjacent traffic.
- **Continuity:** Walking routes should be obvious and should not require pedestrians to travel out of their way unnecessarily.
- **Lighting:** Good lighting is an important aspect of visibility, safety, and accessibility.
- **Landscaping:** Plantings and street trees contribute to the overall psychological and comfort of sidewalk users, and should be designed in a manner that contribute to the safety of people and provide shade.
- **Drainage:** Sidewalks and curb ramps should be designed so that standing water is minimized.
- **Social space:** There should be places for standing, visiting, and sitting. The sidewalk area should be a place where adults and children can safely participate in public life.
- **Quality of place:** Sidewalks should contribute to the character of neighborhoods and business districts.

Sidewalk Zones

The sidewalk area can be broken down into four distinct zones as seen in the figure below. The concept of sidewalk zones should be strictly followed for a sidewalk to function properly and provide safe passage for all users. This is especially important for users with visual or physical impairments to be able to effectively navigate the corridor.

Other considerations such as sidewalk obstructions, driveways, width and access through construction areas are important to consider as well. The following figure includes important considerations for sidewalk design.



Street Classification	Parking Lane/Enhancement Zone	Furnishing/Green Zone	Pedestrian Through Zone	Frontage Zone	Total Sidewalk Area
Local Streets	7 feet	4-8 feet	5-6 feet	N/A	9-12 feet
Commercial Areas	8-10 feet	6-8 feet	6-12 feet	2-8 feet	14-28 feet
Arterials and Collectors	8-10 feet	6-8 feet	4-12 feet	2-4 feet	12-24 feet
Notes			Six feet enables two pedestrians (including wheelchair users) to walk side-by-side, or to pass each other comfortably		Total sidewalk area excludes parking area

Intersections

Intersections are also an important piece of the pedestrian realm. Attributes of pedestrian-friendly intersection design include:

- **Clear Space:** Corners should be clear of obstructions. They should also have enough room for curb ramps, for transit stops where appropriate, and for street conversations where pedestrians might congregate.
- **Visibility:** It is critical that pedestrians on the corner have a good view of vehicle travel lanes and that motorists in the travel lanes can easily see waiting pedestrians.
- **Legibility:** Symbols, markings, and signs used at corners should clearly indicate what actions the pedestrian should take.
- **Accessibility:** All corner features, such as curb ramps, landings, call buttons, signs, symbols, markings, and textures, should meet accessibility standards and follow universal design principles.
- **Separation from Traffic:** Corner design and construction should be effective in discouraging turning vehicles from driving over the pedestrian area. Crossing distances should be minimized.
- **Lighting:** Good lighting is an important aspect of visibility, legibility, and accessibility.

These attributes will vary with context but should be considered in all design processes. For example, more remote intersections may have limited or no signing. However, legibility regarding appropriate pedestrian movements should still be taken into account during design.

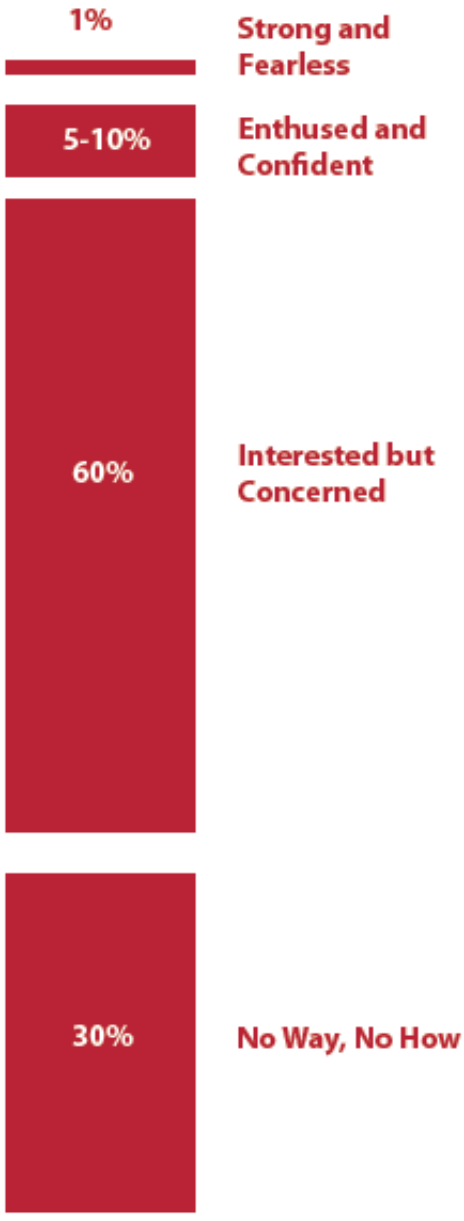
3.2.3 Design for Bicyclists

Bicyclists, by nature, are much more affected by poor facility design, construction and maintenance practices than motor vehicle drivers. Bicyclists lack the protection from the elements and roadway hazards provided by an automobile's structure and safety features. By understanding the unique characteristics and needs of bicyclists, a facility designer can provide quality facilities and minimize user risk.

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

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

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



Typical Distribution of Bicyclist Types

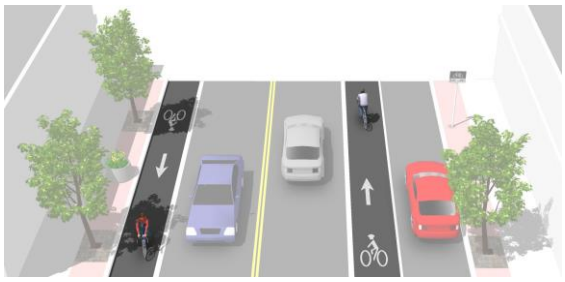
- **Strong and Fearless (approximately 1% of population)** – Characterized by bicyclists that will typically ride anywhere regardless of roadway conditions or weather. These bicyclists can ride faster than other user types, prefer direct routes and will typically choose roadway connections - even if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

Bicycle Facility Types

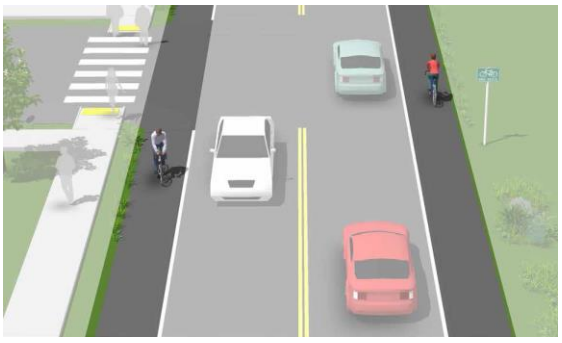
Consistent with bicycle facility classifications throughout the nation, the facility types presented in the figures below identify classes of facilities by degree of separation from motor vehicle traffic. In general, the wider the roadway, the higher the traffic volume, and the greater the traffic speed, the more separation is necessary to provide safe and comfortable riding conditions for bicyclists. This Plan recommends the following facility types for implementation in Greenwood:

- **Bicycle Boulevards** are enhanced bike routes on local street networks. They are minimally designated by pavement markings and bicycle wayfinding signage. Traffic calming devices to reduce vehicle speeds and volumes while maintaining bicycle access such as traffic diverters, chicanes and chokers may also be used in conjunction with bicycle boulevards.

- **Bike Lanes** use striping and optionally signage to delineate the right-of-way assigned to bicyclists and motorists. Bike lanes encourage predictable movements by both bicyclists and motorists.



- **Paved Shoulders** Typically found in more rural areas, shoulder bikeways are paved roadways with striped shoulders (4'+) wide enough for bicycle travel. Shoulder bikeways often, but not always, include signage alerting motorists to expect bicycle travel along the roadway. In rural areas shoulders also provide an area for pedestrian travel where traffic volumes or development may not warrant sidewalks or sidepaths.



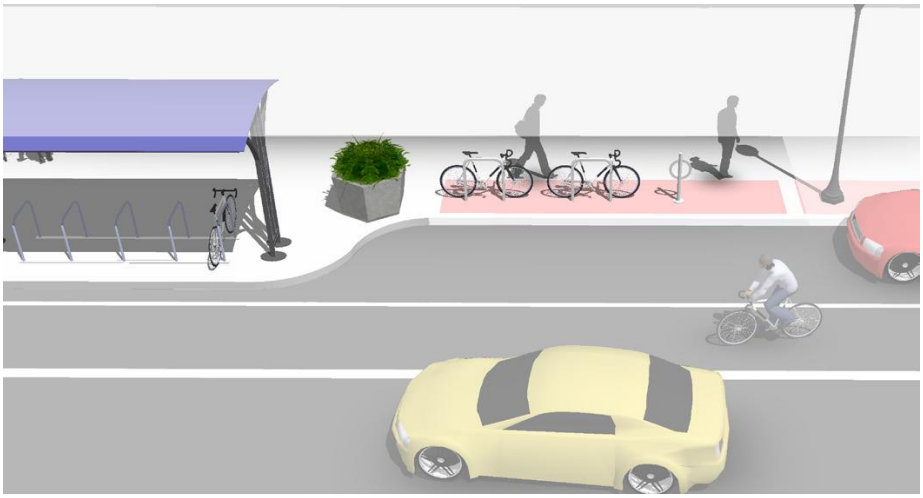
- **Buffered bike lanes** are conventional bicycle lanes paired with a designated buffer space, separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane. Buffered bike lanes are designed to increase the space between the bike lane and the travel lane and/or parked cars.

- **Cycle Tracks** are exclusive bike facilities that combine the user experience of a separated path with the on-street infrastructure of conventional bike lanes. These are also referred to as protected bicycle lanes. Cycle tracks are either raised or at street level and use a variety of elements for physical protection from passing traffic.

- **Shared Use Paths** are facilities separated from roadways for use by bicyclists and pedestrians. Sidepaths usually refer to shared use paths immediately adjacent to the roadway. Greenways refer to shared-use paths that don't necessarily follow a roadway alignment. Greenways typically follow other features such as railroads, utility lines, or streams.

Bicycle Parking

Bicyclists expect a safe, convenient place to secure their bicycle when they reach their destination. This may be short-term parking of two hours or less, or long-term parking for employees, students, residents, and commuters. In order to encourage bicycling in Williamston, plentiful, convenient and attractive bicycle parking must be provided. While specific bicycle parking locations are not identified in this planning effort, ample bicycle parking should be provided at popular bicycling destinations such as parks, schools, retail areas and other gathering places. The town could better insure this by including bicycle parking as part of their requirements for new development. Best practice guidelines for bicycle parking policy and the design and planning of bicycle parking can be found in the ABPB Bike Parking Guidelines: http://www.apbp.org/?page=publications



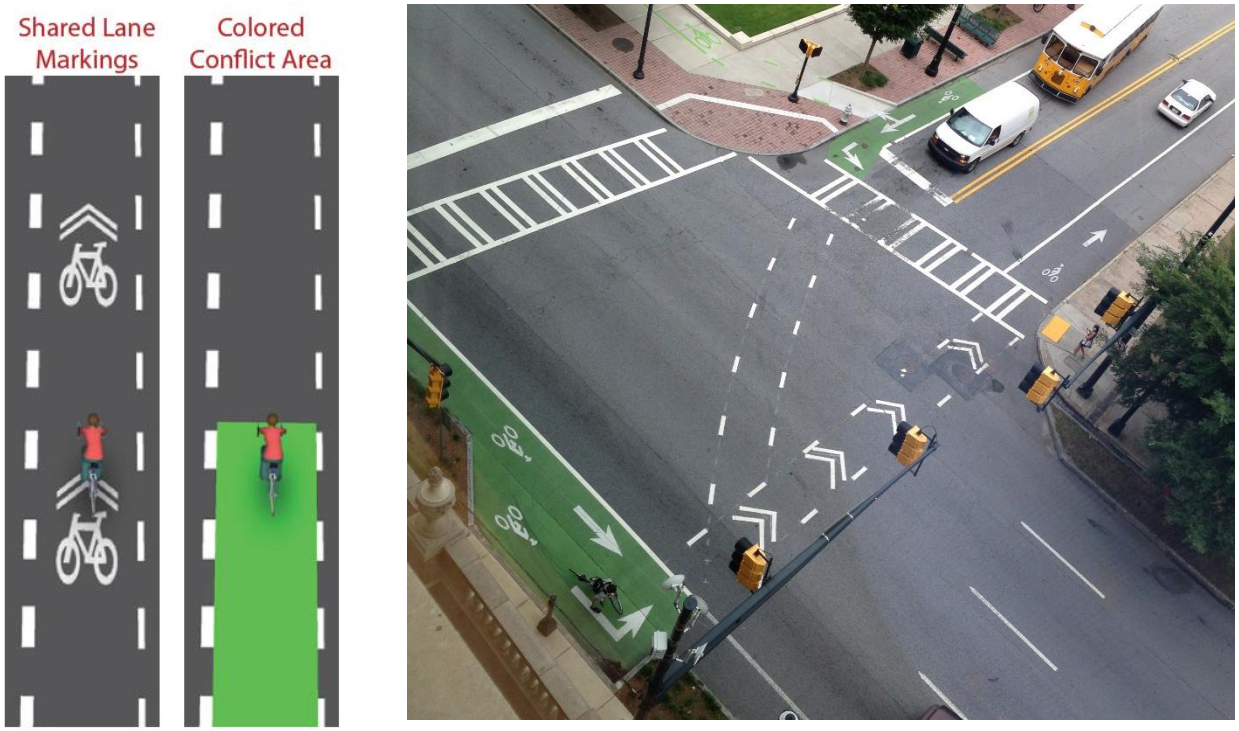
Intersections

Intersections are also an important piece of the bicycle realm and they can either be facilitators of or barriers to bicycle transportation. If a potential bicyclist knows that they have to cross an uncomfortable intersection to get to their destination, they will be less apt to choose to bicycle there even if there are safe and comfortable on-street bicycle facilities along the route. The following considerations should be made when addressing the specific intersections recommended for improvement:

- **Visibility:** It is critical that bicyclists have a good view of vehicle travel lanes and that motorists in the travel lanes can easily see bicyclists. Roadways should be designed to intersect at a 90 degree angle as much as possible to improve visibility.
- **Legibility:** Symbols, markings, and signs used at corners should clearly indicate what actions the bicyclist should take through the intersection. Pavement markings should also heighten driver's awareness of potential conflicts with bicyclists or pedestrians.
- **Speed:** Intersections where regular bicycle or pedestrian traffic is expected should be designed to minimize the speed of vehicles driving or turning through the intersection. This can be accomplished through improvements such as curb extensions, turning radii reductions, and pavement markings.

- **Separation from Traffic:** Intersection designs should strive to segregate bicycle and vehicular traffic as much as possible. Designs that allow bicyclists to locate at the front of the intersection when traffic is stopped are preferred.
- **Lighting:** Good lighting is an important aspect of visibility, legibility, and accessibility.

These attributes will vary with context but should be considered in all design processes. For example, more remote intersections may have limited or no signing. However, legibility regarding appropriate bicycle movements should still be taken into account during design.



Examples of different pavement markings and signals for bicyclists at intersections (Photo: W. Peachtree St., Atlanta)

3.3 Summary of Proposed Improvements

The network recommendations of this Plan depict the **long-range vision** for walking and bicycling in Greenwood utilizing recognized best practices for non-motorized transportation planning from around the southeast and the country. **Later sections of this Plan identify initial implementation priorities and action steps** to ensure that the first projects to be implemented as a part of this network have the largest impact on bicycling and walking safety and comfort with the lowest impact and investment.

Within and surrounding the City limits, the long-range bicycling and walking vision recommends:

Proposed mileage of recommended bicycle facility types for Greenwood. This table lists the types of bikeway and walkway facilities and the mileage of those facility types within the recommended bikeway, walkway, and greenway network.

Bikeway, Walkway, and Greenway Facility Type	Recommended Mileage	Existing Mileage
Sidewalks	10.3	*
Bicycle Boulevards	25.3	0
Bike Lanes or Paved Shoulders	7.0	0.2
Buffered Bike Lanes	1.9	0
Cycle Tracks	11.9	0
Greenways or Shared-Use Paths	24.1	7.6
Total Network Mileage	80.5	7.8*

*A complete inventory of existing sidewalks is not available.

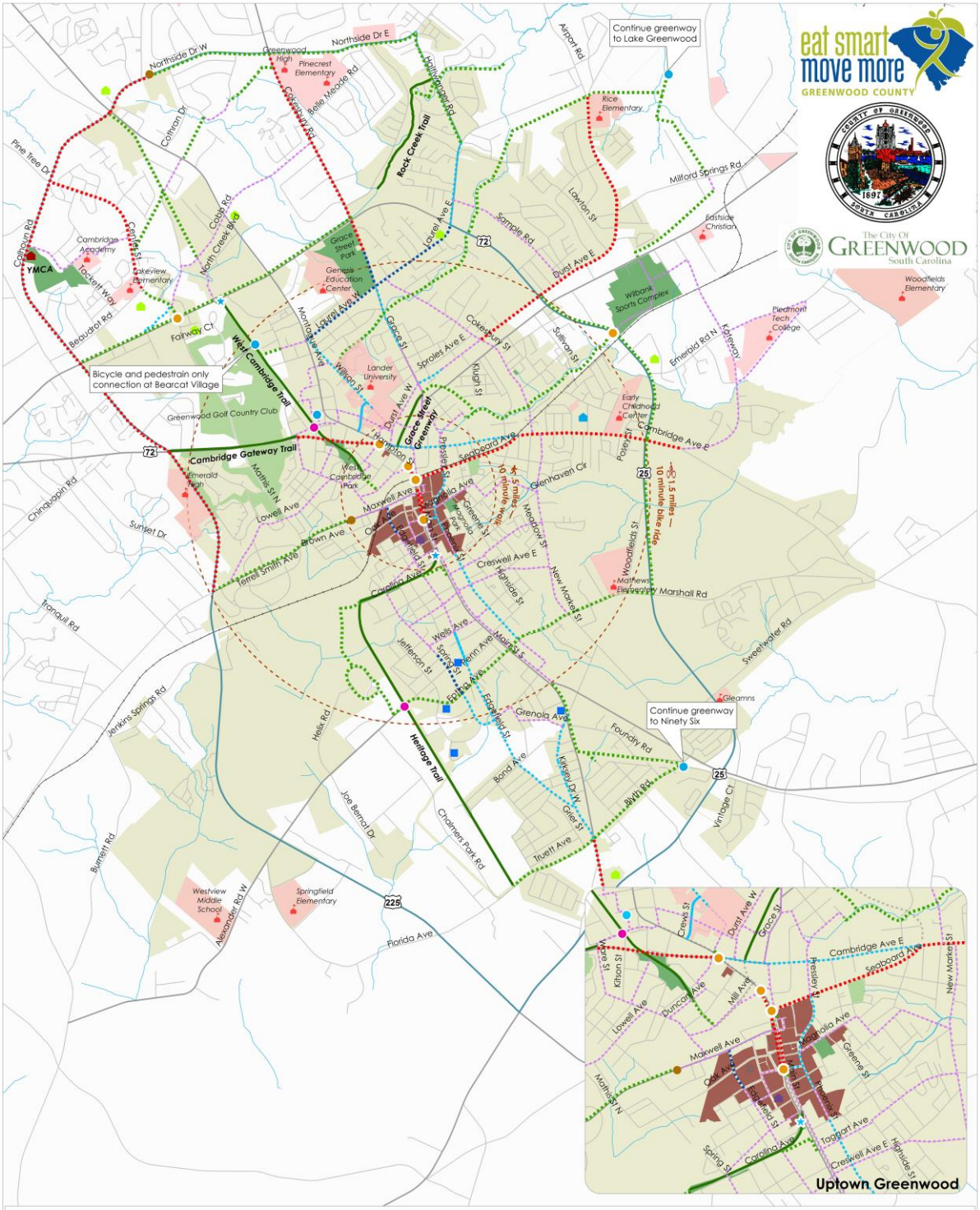
3.4 Recommendation Maps

The following maps detail recommendations for creating a complete, inclusive walking and cycling network for the City of Greenwood. The final recommendations are a culmination of responding to public and stakeholder input, capitalizing on existing opportunities, overcoming existing constraints, and enhancing the long-term vision of Greenwood's active transportation and recreation environment.

The pedestrian recommendations map identifies street segments in need of new sidewalks, street segments in need of improvements to existing sidewalks, and street segments in need of sidewalks on both sides of the roadway in order to complete gaps in the sidewalk network. The map also identifies recommended trail connections where pedestrians can access existing off-street trail systems from on-street sidewalk infrastructure. Six intersections were also identified as in need of improvements to make connections safer for both pedestrians and bicyclists.

The bikeway recommendations map incorporates the same intersection improvements and trail connections, and also identifies existing bicycling infrastructure, previously proposed bicycling infrastructure, and types of recommended bicycling infrastructure.

Refer to **Appendix A** for complete tables of project recommendations and larger versions of the pedestrian recommendations and bikeway recommendations maps.



City of Greenwood, South Carolina - Pedestrian and Bicycle Master Plan

Bikeway Recommendations

alta PLANNING + DESIGN

Source: Alta Planning + Design
Pedestrian and Bicycle Master Plan
Data: City of Greenwood & SC DNR
Author: Aileen Daney
Date: June 2015

0 1 2 Miles

4 Implementation Strategy

Even among cities most committed to improving bicycling conditions, realizing a long-term community-wide vision for bicycling infrastructure improvements can take decades. This is why a thoughtful implementation plan is a must for ensuring that the most impactful and cost-effective projects are prioritized first.

This Implementation Plan identifies the top 4 priority projects from the project recommendations and provides cost estimates for these improvements. Expanded priority project descriptions provide more detail on these top recommendations including photosimulations to help convey what some of these improvements might look like.

4.1 Cost Estimates

Cost estimates for projects were generated from a variety of sources including national datasets such as the 2013 Costs for Pedestrian and Bicyclist Infrastructure Improvements, Conducted by the University of North Carolina, average costs for buffered bikeways and cycle tracks in the 2040 Hennepin County Transportation Plan, and recent, regional implementation experience. While these costs represent averages for pedestrian and bicycle projects in 2014 dollars, note that individual project costs can vary widely based on a number of conditions including, but not limited to:

- Facility design (width, frequency of material placement, demolition)
- Temporary traffic control requirements
- Environmental requirements
- Utility relocation
- Required right of way acquisition
- Contractor experience and material availability
- Project length or grouping (projects of longer length are typically less expensive than short projects)

Cost estimates and assumptions are presented in the following table. Project costs will vary due to conditions such as physical constraints, rights-of-way purchase, frequency of pavement markings, intersection design, etc. These costs do not include additional considerations such as project design or contingency costs.

Facility Type	Cost Estimate	Assumptions
Bicycle Boulevards and Bicycle Routes	$45,000 per mile	Includes signage and pavement markings only
Bike Lanes	$75,000 per mile	Pavement Restriping Costs Only
Buffered Bike Lanes	$130,000 per mile	Pavement Restriping Costs Only
Cycle Tracks	$160,000 per mile	Pavement Restriping Costs Only
Greenway or Sidepath	$600,000 per mile	10' asphalt path and no ROW purchase required.
Intersection Improvements	$50,000 - $100,000	$50,000 for pavement markings only. $100,000 for pavement marking and signal improvements.
Sidewalks with Curb Construction	$350 per linear foot	No ROW purchase required; includes the installation of storm sewers.

4.2 Priority Projects

The projects listed in this section represent the highest priority recommendations. These projects were selected as initial priorities for implementation due to the following characteristics:

- **Community Input:** areas in need of improvement frequently mentioned during the public outreach process
- **Connection to important community destinations:** those that link residents and neighborhoods to parks, grocery stores, schools, and downtown.
- **Connectivity:** projects that fill network gaps, and provide continuous connections across the City
- **Estimated Demand:** projects that meet current needs and reflect potential needs induced by future development
- **Population Distribution:** areas that reach and benefit the greatest number of residents
- **Project Feasibility**: projects that would not require right of way acquisition or major reconstruction and already have adequate widths to accommodate bicycling infrastructure
- **Safety:** projects that address known safety issues – such as locations with high instances of non-motorized user crashes

The City and its implementation partners such as SCDOT should continuously look for opportunities to incorporate any of the recommended improvements into already programmed maintenance activities such as roadway resurfacing or reconstruction. Close coordination with roadway implementing agencies will lead to substantial cost and time savings in Plan implementation. The top 4 priority projects are listed in the table below:

Greenwood Top 4 Priority Projects

No.	Corridor	From	To	Fac. Type	Miles	Cost Est.	Notes
1.	Lander University to Uptown	Ped route: Wilson Street Bike route: Durst Ave W.	Main St. N.	Intersection improvements, bicycle lanes, bike boulevard	.76 mi ped route 0.89 mi bike route	Ped route: $200,000 Bike route: $44,000	Restripe Cambridge Ave lanes for bike lanes
2.	Edgefield Corridor	Sidewalk: Washington Ave. Bike route: Carolina Ave.	Sidewalk: Epting Ave. Bike route: W Kirksey Dr.	Sidewalk, bike lane, bike boulevard	1 mi sidewalk on both sides 1.8 mile bike route	Sidewalk: $1,848,000 Bike route: $126,000	Paint sharrow pavement markings
3.	Uptown Area	Edgefield St.	Duncan Ave.	Greenway, intersection improvements, buffered bike lane, bike boulevard, shared-lane marking	1 mi trail connection route	$144,000	Redesign intersections. Restripe Edgefield St for buffered bike lane
4.	Center Street	Beaudrot Road	Calhoun Road	Two-way cycle track	1 mi	$160,000	Restripe existing roadway for cycle tracks
					Total	$2,522,000	

Lander University to Uptown

BIKE LANE BEST PRACTICE

EXISTING

Mileage and Cost Summary: .89 mile bike route - $44,000; .76 mile ped route - $200,000.

Project Highlights: Connects Lander University students to Uptown.

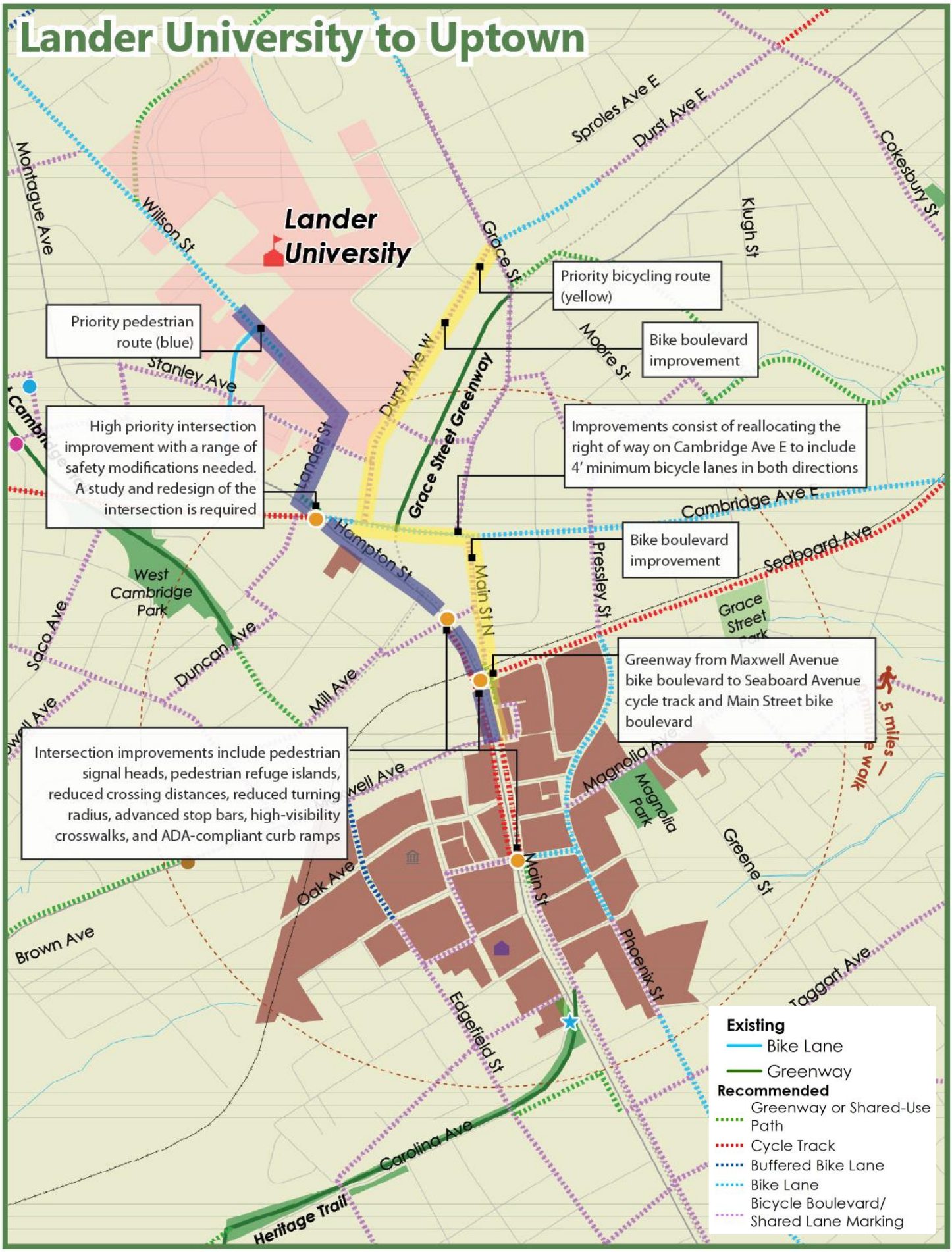
Crash History: 1 pedestrian and 1 pedacycle crash resulting in injury.

Key Issues: Lack of bicycling infrastructure and pedestrian infrastructure at intersections.

Proposed Improvements: Shared-lane markings, bicycle boulevards, bike lanes, intersection upgrades.

Implementation Strategy: Pedestrian and bicycling infrastructure provisions should occur concurrently. Near-term priority cycling route should extend from Durst Ave. to Cambridge Ave. to Main St. Near-term prioirty pedestrian route should extend from Wilson St. to Lander St. to Hampton St. Long term, there should be a network of sidewalks and cycling infrastructure options to move pedestrians and bicyclists between the University and Uptown.

Cambridge Avenue Improvements


Lander University to Uptown
Lander University
Priority pedestrian route (blue)
Priority bicycling route (yellow)
Bike boulevard improvement
High priority intersection improvement with a range of safety modifications needed. A study and redesign of the intersection is required
Improvements consist of reallocating the right of way on Cambridge Ave E to include 4' minimum bicycle lanes in both directions
Bike boulevard improvement
Greenway from Maxwell Avenue bike boulevard to Seaboard Avenue cycle track and Main Street bike boulevard
Intersection improvements include pedestrian signal heads, pedestrian refuge islands, reduced crossing distances, reduced turning radius, advanced stop bars, high-visibility crosswalks, and ADA-compliant curb ramps
Grace Street Greenway
Heritage Trail
Existing
Bike Lane
Greenway
Recommended
Greenway or Shared-Use Path
Cycle Track
Buffered Bike Lane
Bike Lane
Bicycle Boulevard/ Shared Lane Marking

Edgefield Corridor: Sidewalk

Mileage and Cost Summary: 1.8 mile bike route - $126,000; 1 mile sidewalk - $1,848,000.

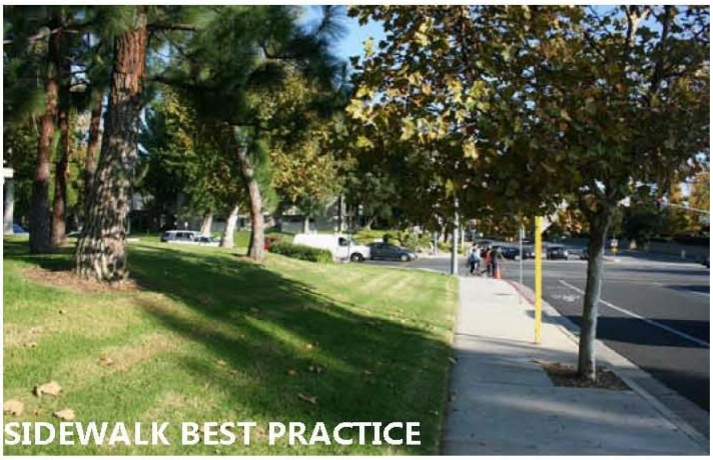
Crash History: 3 pedestrian crashes resulting in injury.

Project Highlights: Provides access to Heritage Trail, the hospital and nearby social services, and the proposed greenway to Ninety Six.

Key Issues: Sidewalk gaps on both sides of the roadway. Lack of bicycling infrastructure.

Proposed Improvements: Sidewalks, and various bicycle improvements including bike lanes, buffered bike lanes, and bike boulevards.

Implementation Strategy: Completing a sidewalk network is a near-term priority for the corridor. Buffered bike lanes between Park Ave. and Maxwell Ave. should have parking on one side. Improvements should be coupled with streetscape improvements such as landscaping and bicycle wayfinding signage.



SIDEWALK BEST PRACTICE

EXISTING

Edgefield Street Improvements

Uptown Area: Trail Improvements & Connections

Mileage and Cost Summary: 1 mile trail connection route - $144,000.

Crash History: 1 pedestrian fatality at Carolina Avenue and Main Street.

Project Highlights: Creates a seamless bicycle and pedestrian connection between trail systems, effectively linking with Uptown Greenwood.

Key Issues: Connectivity, maintenance, lighting, and safety upgrades.

Proposed Improvements: Wayfinding, ADA improvements, pedestrian-scale lighting, paved trail with runnning shoulders, landscaping, and greenway extensions.

Implementation Strategy: Trail improvements consist of paving the trail surface, including a paved running shoulder which should improve drainage, and formalizing trailheads and access points with landscaping and wayfinding signs. Adding lighting, particularly under overpasses, and public art would increase safety and add to the trail's appeal. Extending the greenway to Gregor Mendel Circle is a long-term plan for increasing trail connectivity.

EXISTING


EXISTING

Examples of Best Practices in Trail Design


ADA compliant curb ramp


Paved Trail

Wayfinding


Runner's shoulder

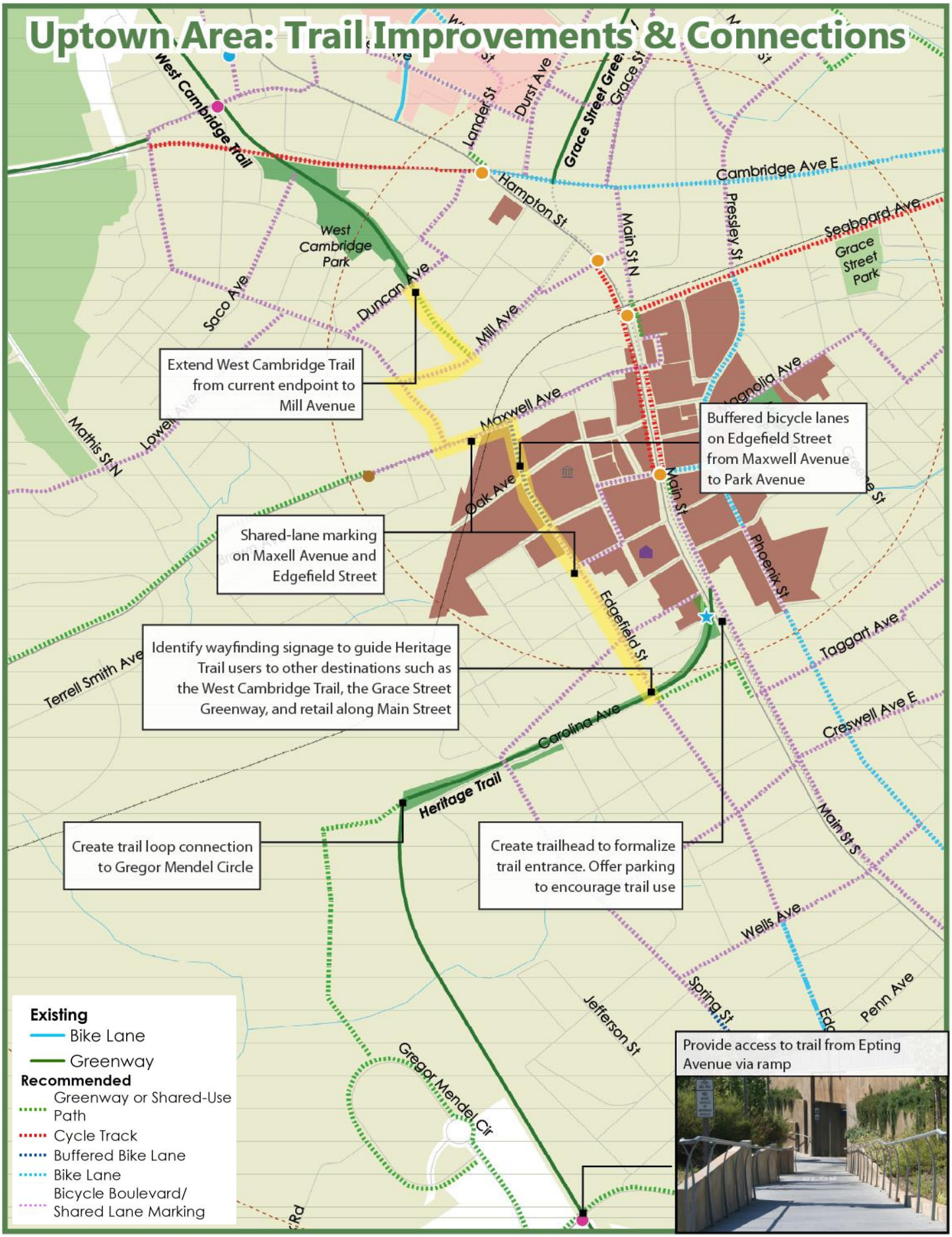

Pedestrian-scale lighting

Uptown Area: Trail Improvements & Connections

Heritage Trail at Edgefield Street and Carolina Avenue

West Cambridge Trail connection with West Cambridge Park

Uptown Area: Trail Improvements & Connections



Center Street: Two-way Cycle Track

Mileage and Cost Summary: 1 mile - $160,000.

Crash History: None reported.

Project Highlights: North/south connection and links to five roads with proposed bicycle infrastructure. Links to Lakevaiew Elementary.

Key Issue: Lack of bicycling infrastructure connection to Lakeview Elementary.

Proposed Improvements: Two-way cycle track.

Implementation Strategy: Use existing wide shoulder space for two-way cycle track that extends from the proposed cycle track on Calhoun Road to Beaudrot Road. Use green paint, orange bollards, and dashed buffer lines at intersections to indicate turning conflict zones.

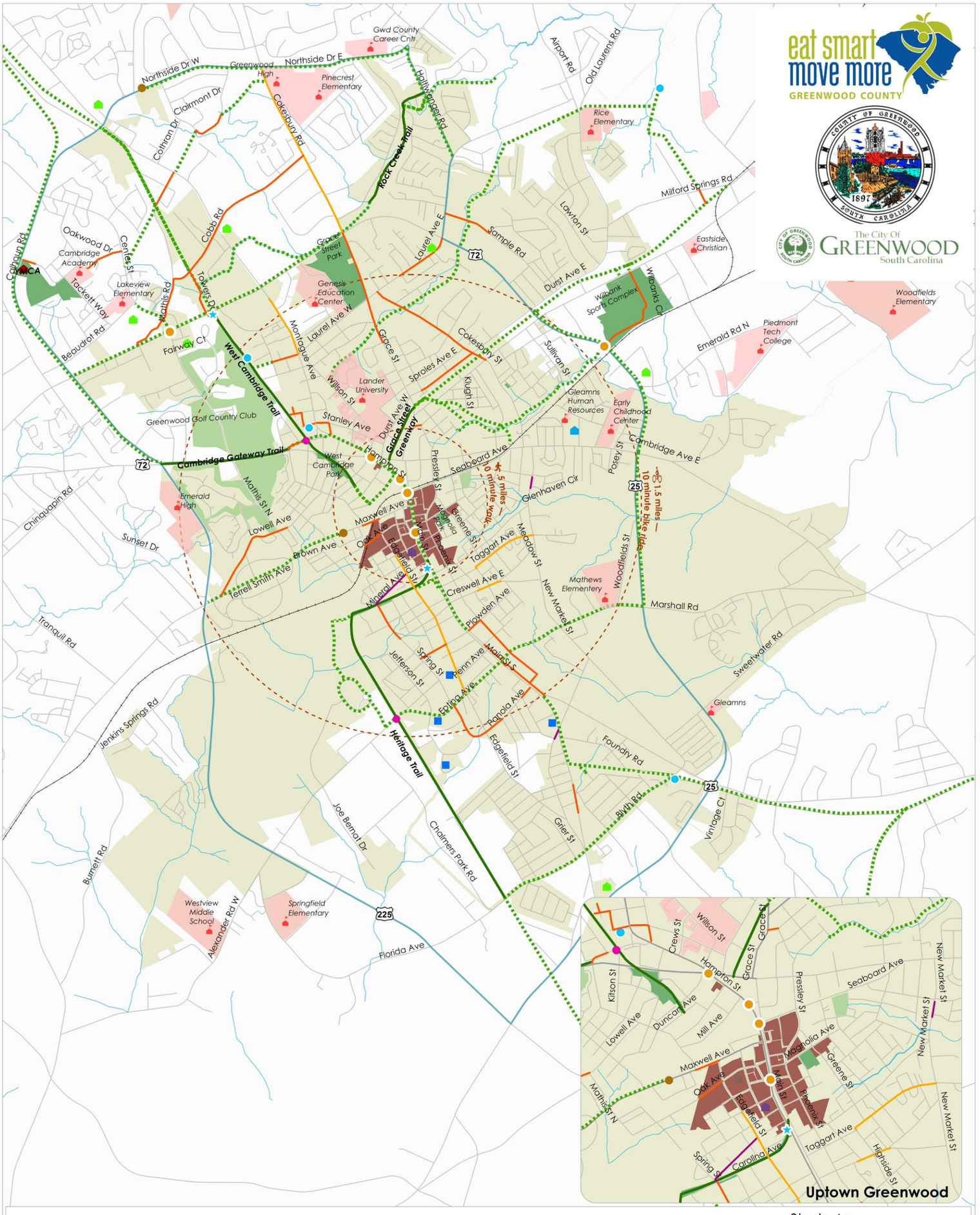
TWO-WAY CYCLE TRACK BEST EXAMPLE

EXISTING

Center Street Proposed Improvements

APPENDIX A

MASTER PLAN MAPS & TABLES



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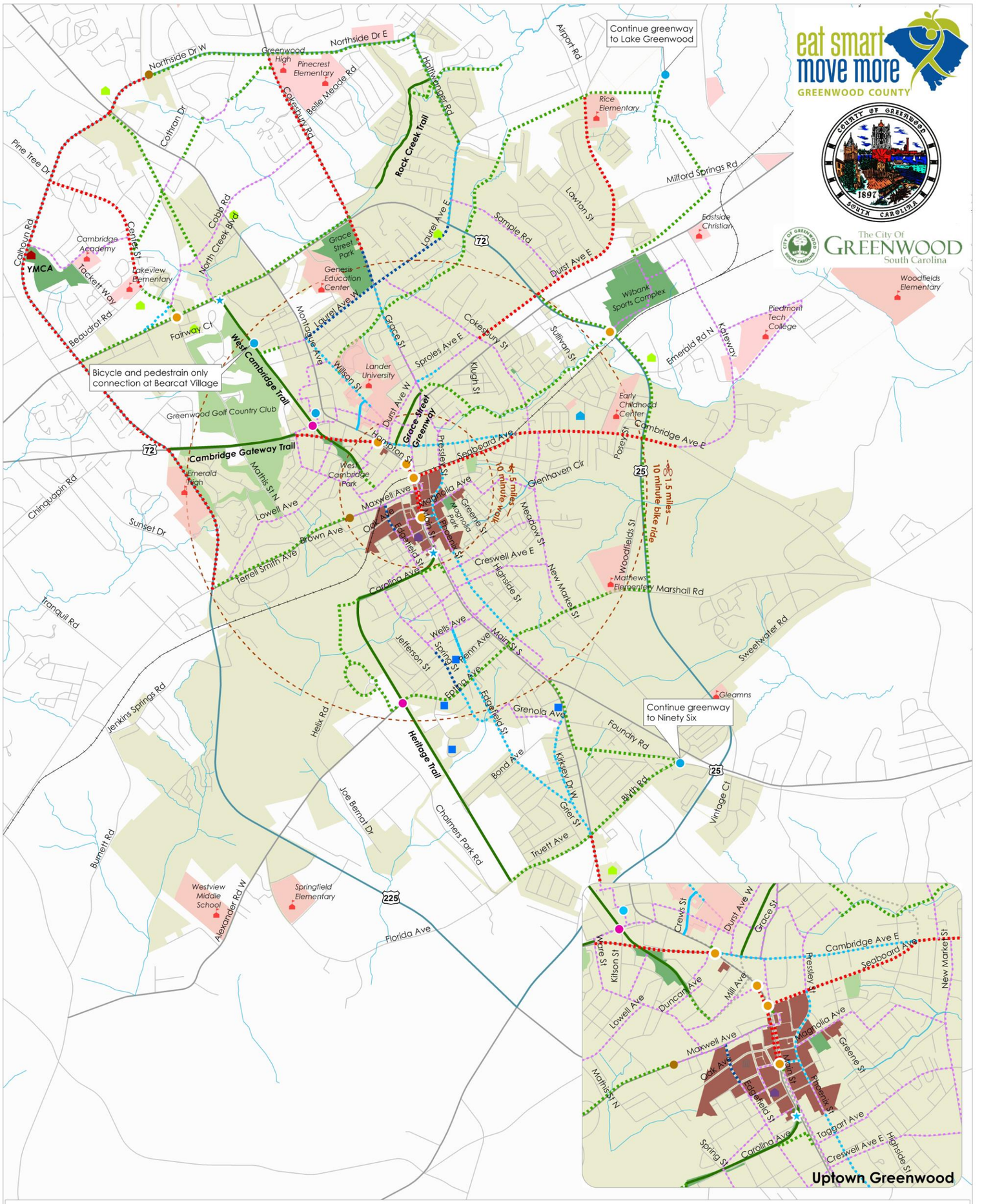

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Date: June 2015

0 1 2 Miles

Table A-1: Sidewalk Recommendations

Object ID	Corridor	Beginning	End	Facility Type	Length in Miles	Both Sides of Roadway	Within City Limits	SCDOT Ownership
1	Calhoun Ave, Ware St	Cambridge Ave W	Elliott St	Sidewalk Infill	0.09	No	Yes	Yes
25	Clairmont Dr	Yorke Dr	Stratford Rd	Sidewalk Connection	0.23	No	No	Yes
26	Cobb Rd	Cokesbury Rd	Mathis Rd	Install Sidewalks	1.21	No	No	Yes
24	Cokesbury Rd	Northside Dr E	BYP 72 NW	Complete Gaps in Sidewalk	1.19	Yes	No	Yes
15	Cokesbury St	Laurel Ave W	Reynolds Ave	Install Sidewalk	0.83	No	Yes	Yes
38	Cothran Ave	Grace St	Lites St	Sidewalk Infill	0.05	No	Yes	Yes
12	Creswell Ave E	Brannon St	Sunnyside St	Complete Gaps in Sidewalk	0.16	Yes	Yes	Yes
37	Diane Ct	Milford Springs Rd	Diane Ct	Sidewalk Connection	0.10	No	No	No
14	Durst Ave E	Cokesbury St	Hazelwood Ct	Install Sidewalk	0.41	No	Yes	Yes
31	Eastman St	Calhoun Rd	Bitmore St	Sidewalk Infill Connection	0.08	No	No	Yes
8	Edgefield St	Washington Ave	Epting Ave	Complete Gaps in Sidewalk	1.01	Yes	Yes	Yes
22	Grace St	72 BYP NW	Edgewood Ave	Install Sidewalk	0.77	No	Yes	Yes
17	Highland Park Dr	Stanley Ave	Montague Ave	Install Sidewalk	0.07	No	Yes	Yes
3	Kirksey Dr W	Main St S	Grenola Ave	Improve Sidewalks	0.06	No	Yes	Yes
2	Laurel Ave E	72 BYP NE	Harper St	Sidewalk Infill	0.38	No	Yes	Yes
21	Laurel Ave W	Montague Ave	Coleman Dr	Install Sidewalk	0.18	No	Yes	Yes
33	Lowell Ave	Lake St	Maxwell Ave	Sidewalk Connection	0.66	No	Yes	Yes
9	Main St S	Epting Ave	Main St S	Sidewalk Connection	0.35	No	Yes	Yes
10	Main St S	Alexander Ave E	Marshall Rd	Sidewalk Connection	0.15	No	Yes	Yes
35	Main St S	Morgan Ave	Brissie Ave	Sidewalk Infill	0.18	No	Yes	Yes
27	Mathis Rd	72 BYP NW	Center St	Install Sidewalks	0.25	No	No	Yes

Object ID	Corridor	Beginning	End	Facility Type	Length in Miles	Both Sides of Roadway	Within City Limits	SCDOT Ownership
28	Mathis Rd	Cobb Rd	Center St	Install Sidewalks	0.27	No	No	Yes
30	Mathis Rd	Montague Ave Ext	Old Greenwood Rd	Install Sidewalks	0.24	No	No	No
40	Maxwell Ave	Kitson St	Edgefield St	Sidewalk Infill	0.12	No	Yes	Yes
20	McGhee Ave	McGhee Ave	Jeff May Complex	Install Sidewalk	0.04	No	Yes	No
19	McGhee Ave, Karen Way, Stanley Ave	Montague Ave	McGhee Ave	Install Sidewalk	0.23	No	Yes	Yes
7	Mineral Ave	Edgefield St	Spring St	Improve Sidewalks	0.28	No	Yes	Yes
39	Montague Ave	72 BYP NW	Laurel Ave W	Complete Gaps in Sidewalk	0.41	Yes	Yes	Yes
42	New Market St	Chipley Ave	Glenhaven Cir	Improve Sidewalk	0.07	No	Yes	Yes
41	Oak Ave	Edgefield St	Strong St	Sidewalk Infill	0.13	No	Yes	Yes
32	Oakwood Dr	Center St	Eastman St	Sidewalk Connection	0.25	No	No	No
4	Panola Ave	Main St S	First St	Sidewalk Connection	0.08	No	Yes	Yes
11	Phoenix St	Plowden Ave	Main St S	Sidewalk Connection	0.59	No	Yes	Yes
36	Plowden Ave	Phoenix St	Main St S	Sidewalk Connection	0.10	No	Yes	Yes
16	Sample Rd	Laurel Ave E	Lupo Dr	Infill Sidewalk	0.32	No	Yes	Yes
6	Spring St	Mineral Ave	Creswell Ave W	Sidewalk Connection	0.27	No	Yes	Yes
5	Spring St, Panola Ave	Epting Ave	Fourth St	Sidewalk Connection	0.47	No	Yes	Yes
18	Stanley Ave	Montague Ave	Highland Park Dr	Install Sidewalk	0.08	No	Yes	Yes
13	Taggart Ave	New Market St	Marshall St	Complete Gaps in Sidewalk	0.45	Yes	Yes	Yes
29	Towers Dr	Cobb Rd	72 BYP NW	Sidewalk Connection	0.30	No	Yes	Yes
34	Wells Ave	Spring St	Edgefield St	Sidewalk Infill	0.19	No	Yes	Yes
23	Wilbanks Cir	Hwy 72/221 E	25 BYP NE	Install Sidewalk	0.64	No	No	Yes

Table A-2: Bike Facility Recommendations

Object ID	Corridor	Beginning	End	Facility Type	Length in Miles	Within City Limits	SCDOT Ownership
66	225 BYP S	Cambridge Ave W	Maxwell Ave	Cycle Tracks	1.00	Yes	Yes
60	25 BYP NE	Durst Ave E	Cambridge Ave E	Shared-use Path	1.33	Yes	Yes
51	72 BYP NW	Calhoun Rd	Grace St	Shared-use Path	1.99	Yes	Yes
65	Alezander Ave, Epting Ave	Liner Dr	Main St S	Shraed-use Path	0.91	Yes	Yes
54	Blyth Ave	Lites St	Blyth Ave	Bike Boulevard	0.22	Yes	Yes
13	Blyth Rd	Main St S	Foundry Rd	Sidepath or Sidewalk	0.75	Yes	Yes
43	Calhoun Ave	Ware St	Highland Park Dr	Bicycle Boulevard	0.13	Yes	Yes
97	Calhoun Ave	Lander St	Cambridge Ave W	Bike Path connecting Andrews Ave to Lander St.	0.04	Yes	Yes
67	Calhoun Rd	Montague Ave Ext	Hwy 72 W	Cycle Tracks	2.77	No	Yes
47	Cambridge Ave	Calhoun Ave	Oakland St	Bike Lanes	0.90	Yes	Yes
22	Cambridge Ave E	Oakland St	Kateway	Cycle Tracks	1.06	Yes	Yes
45	Cambridge Ave W	Ware St	Calhoun Ave	Two-way Cycle Track - North Side of Roadway	0.54	Yes	Yes
48	Center St	Beaudrot Rd	72 BYP NW	Shared-use Path	0.29	Yes	Yes
49	Center St	Calhoun Rd	Beaudrot Rd	Cycle Track	1.01	No	Yes
83	Clairmont Dr	Clairmont Dr	Clairmont Dr	Bicycle Boulevard	0.23	No	Yes
77	Cobb Rd	Montague Ave Ext	Cokesbury Rd	Bicycle Boulevard	1.08	No	Yes
7	Cokesbury Rd, Grace St	Northside Dr E	Laurel Ave	Cycle Tracks	1.43	No	Yes
34	Cokesbury St	Laurel Ave E	Cambridge Ave E	Bicycle Boulevard	1.47	Yes	Yes
74	Connector	Oakhaven Ct	Sumpter Ct	Realign Circular Ave.	0.04	Yes	No
8	Cothran Ave, Lites St, Pressley St	Grace St	Seaboard Ave	Bike Boulevard	0.44	Yes	Yes
102	Court Ave	Main St	Phoenix St	Bike Lane	0.09	Yes	Yes

Object ID	Corridor	Beginning	End	Facility Type	Length in Miles	Within City Limits	SCDOT Ownership
103	Court Ave, Monument St, Washington Ave	Main St	Edgefield St	Shared Lane Markings	0.28	Yes	Yes
73	Creswell Ave	Spring St	New Market St	Bicycle Boulevard	1.02	Yes	Yes
93	Diane Ct	Milford Springs Rd	Diane Ct	Bicycle Boulevard	0.10	No	No
46	Duncan Ave, Andrews Ave	Kitson St	Cambridge Ave W	Bike Boulevard	0.39	Yes	No
107	Durst Ave	Cambridge Ave	Stanley Ave	Bicycle Boulevard	0.09	Yes	Yes
28	Durst Ave E	Grace St	Woodland St	Bike Lanes	0.17	Yes	Yes
29	Durst Ave E	Woodland St	Cokesbury St	Bike Boulevards	0.32	Yes	Yes
30	Durst Ave E	Cokesbury St	Old Laurens Rd	Cycle Tracks	2.06	Yes	Yes
40	Durst Ave W	Grace St	Blake St	Bicycle Boulevard	0.29	Yes	Yes
50	Eastman St, Oakwood Dr	Calhoun Rd	Center St	Bicycle Boulevard	0.82	No	Yes
17	Edgefield St	Wells Ave	Kirksey Dr W	Bike Lanes	1.65	Yes	Yes
18	Edgefield St	Park Ave	Wells Ave	Bike Boulevard	0.75	Yes	Yes
19	Edgefield St	Maxwell Ave	Park Ave	Buffered Bike Lanes - Parking One Side	0.18	Yes	Yes
111	Emerald Rd S	Kateway	Emerald Rd N	Share Lane Markings	1.28	No	Yes
15	Florida Ave	Main St S	Chalmers Park Rd	Sidewalk or Sidepath	0.61	Yes	Yes
11	Foundry Rd, Main St S	Orange Ave	Ninety Six	Potential Greenway	1.16	Yes	Yes
25	Grace St	Grace Ter	Cambridge Ave	Bike Boulevard	0.71	Yes	Yes
26	Grace St	Woodcrest St	Laurel Ave E	Buffered Bike Lanes	0.23	Yes	Yes
27	Grace St	Laurel Ave W	Grace Ter	Bike Lanes	0.42	Yes	Yes
53	Greenway/Sidepath	Blyth Ave	72 BYP NE	Greenway	1.22	Yes	No
112	Greenway/Sidepath, 35 BYP 25	Cambridge Ave E	Marshall Rd	Shared-use Path	1.17	Yes	Yes

Object ID	Corridor	Beginning	End	Facility Type	Length in Miles	Within City Limits	SCDOT Ownership
70	Greenway/Sidepath	Haltiwanger Rd	end	Shared-use Path	0.53	No	No
75	Greenway/Sidepath	Edgefield St	Main St	Create greenway spur along future Genetics Research Blvd that connects to Taggart Ave. Bicycle Boulevard	0.21	Yes	No
80	Greenway/Sidepath	Grace St	Blyth Ave	Shared-use Path	0.42	Yes	No
87	Greenway/Sidepath	Mathis Rd	Center St	Shraed-use Path	0.45	No	No
88	Greenway/Sidepath	Cokesbury Rd	Clairmont Dr	Shared-use Path	0.38	No	No
89	Greenway/Sidepath	Wilbanks Cir	Diane Ct	Shared-use Path	0.69	No	No
90	Greenway/Sidepath	Milford Springs	Lake Greenwood	Shared-use Path	0.84	No	No
91	Greenway/Sidepath	Willson St	72 BYP NE	Shared-use Path	1.31	Yes	No
92	Greenway/Sidepath	72 BYP NE	Lake Greenwood	Shared-use Path	1.78	No	No
94	Greenway/Sidepath	Laurel Ave W	end	Greenway Connection	0.13	No	No
95	Greenway/Sidepath	Towers Dr	Cross Creek Connector	Trail Spur Connection	0.03	Yes	No
108	Greenway/Sidepath	Gregor Mendel Cir	Carolina Ave	Greenway Connection	0.54	Yes	No
109	Greenway/Sidepath	Haltiwanger Rd	Rockcreek Blvd	Greenway Connection	0.21	Yes	No
85	Greenway/Sidepath, Cothran Dr	Montague Ave Ext	Clairmont Dr	Shared-use Path	0.30	No	No
64	Gregor Mendel Cir, Liner Dr	Alexander RD W	Alexander Rd W	Shared-use Path	0.82	Yes	No
59	Haltiwanger Rd	Northside Dr E	Laurel Rd E	Shared-use Path	0.77	Yes	Yes
110	Kateway	Cambridge Ave E	Wikibanks Sports Complex	Shared Lane Markings	1.72	No	Yes
14	Kentycky Ct	Kentucky Ave	Main St S	Spur Trail	0.08	Yes	Yes
16	Kirksey Dr W	Blyth Rd	Main St S	Bike Lanes	0.86	Yes	Yes
24	Kitson St, Maxwell Ave, Waller Ave	Duncan Ave	Main St	Shared Lane Markings	0.69	Yes	Yes

Object ID	Corridor	Beginning	End	Facility Type	Length in Miles	Within City Limits	SCDOT Ownership
96	Lander St	Calhoun Ave	Stanley Ave	Bicycle Boulevard	0.08	Yes	No
4	Laurel Ave	72 BYP NE	Montague Ave	Buffered Bike Lanes	1.21	Yes	Yes
5	Laurel Ave	Montaque Ave	Coleman Dr	Bicycle Boulevard	0.18	Yes	Yes
58	Laurel Ave E	72 BYP NE	Haltiwanger Rd	Bike Lanes	0.54	Yes	Yes
52	Lowell Ave	Maxwell Ave	Kitson St	Shared Lane Markings	1.00	Yes	Yes
72	Magnolia Ave, James St, Baptist Ave, Gilliam Ave	Phoenix St	New Market St	Bicycle Boulevard	0.81	Yes	Yes
9	Main St	Cambrdge Ave E	Hampton St	Shared Lane Marking	0.18	Yes	Yes
10	Main St	Seaboard Ave	Main St N	Sidepath	0.05	Yes	Yes
98	Main St	Marshall Rd	end of greenway	Greenway Connection	0.06	Yes	Yes
99	Main St	Seaboard Ave	Waller Ave	Sidepath	0.04	Yes	Yes
100	Main St	Beaudrot Ave	Court Ave W	One-way Cycle Track (reallocate parking - turn parallel)	0.36	Yes	Yes
101	Main St	Waller Ave	Court Ave E	One-way Cycle Track (reallocate parking - turn parallel)	0.18	Yes	Yes
105	Main St	Court Ave	Harvey Ave	Sidepath	0.04	Yes	Yes
69	Main St S	Washington Ave	Marshall Rd	Bike Boulevard	0.97	Yes	Yes
79	Main St S	Marshall Rd	Phoenix St	Bicycle Boulevard	0.19	Yes	Yes
114	Main St S	Florida Ave	25 BYP SE	Cycle Track	.39	No	Yes
68	Marshall Rd	Main St S	Sidney Dr	Shared-use Path	0.76	Yes	Yes
78	Mathis Rd	72 BYP NW	Center St	Bike Lanes	0.26	No	No
84	Mathis Rd	Montague Ave Ext	Old Greenwood Rd	Bicycle Boulevard	0.24	No	No
62	Maxwell Ave	Kitson St	Fortune St	Shared Lane Markings	0.13	Yes	Yes

Object ID	Corridor	Beginning	End	Facility Type	Length in Miles	Within City Limits	SCDOT Ownership
63	Maxwell Ave	Fortune St	225 BYP S	Shared-use Path	0.99	Yes	Yes
44	McGhee Ave, Grayton Ave, Felder Ave	McGhee Ave	Willson St	Bicycle Boulevard	0.39	Yes	No
31	Mill Ave	Kitson St	Main St N	Shared Lane Marking	0.43	Yes	Yes
76	Mthis Rd, Cobb Rd	Center St	Towers Dr	Bicycle Boulevard	0.39	No	No
33	New Market St	Cambridge Ave E	Marshall Rd	Bicycle Boulevard	1.22	Yes	Yes
56	Northside Dr	Newcastle Rd	Haltiwanger Rd	Shared-use Path	1.77	No	Yes
57	Northside Dr W	Montague Ave Ext	Newcastle Rd	Cycle Track	0.36	No	Yes
36	Old Greenwood Rd, Montague Ave Ext	Calhoun Rd	Cobb Rd	Greenway	1.09	Yes	No
86	Panola Ave, Fourth St, Grenola Ave, First St	Edgefield St	Kirksey Dr W	Bicycle Boulevard	0.54	Yes	Yes
2	Phoenix St	Fair Ave	Milwee Ave	Bike Boulevards	0.16	Yes	Yes
3	Phoenix St	Milwee Ave	Marshall Rd	Bike Lanes	0.70	Yes	Yes
12	Phoenix St, Main St S	Marshall Rd	Main St S	Bike Boulevard	0.43	Yes	Yes
1	Phoenix St, Pressley St	Seaboard Ave	Fair Ave	Bike Lanes	0.44	Yes	Yes
106	Saco Ave	Kitson St	end Saco Ave	Bicycle Boulevard	0.21	Yes	No
61	Sample Rd	Laurel Ave E	Durst Ave E	Bike Boulevard	0.89	Yes	Yes
21	Seaboard Ave	Main St S	Cambridge Ave E	Cycle Tracks	0.71	Yes	Yes
23	Sidepath/Greenway	Duncan Ave	Mill Ave	Extend Trail	0.15	Yes	No
81	Spring St	Epting Ave	Edgefield St	Bike Lanes	0.32	Yes	No
82	Spring St	Lamar Ave	Epting Ave	Buffered Bike Lanes	0.31	Yes	Yes
104	Spring St	Creswell Ave	Elizabeth Ave	Shared Lane Markings	0.26	Yes	Yes
71	Spring St, Mineral Ave	Main St S	Creswell Ave W	Bicycle Boulevard	0.70	Yes	Yes

Object ID	Corridor	Beginning	End	Facility Type	Length in Miles	Within City Limits	SCDOT Ownership
38	Stanley Ave, Durst Ave W, Blake St	Highland Pack Dr	Grace St	Bicycle Boulevard	0.65	Yes	Yes
32	Taggart Ave	Main St S	New Market St	Bicycle Boulevard	0.72	Yes	Yes
35	Towers Dr	Cobb Rd	72 BYP NW	Bicycle Boulevard	0.30	Yes	No
42	Ware St, Calhoun Ave, Karen Way, McGhee Ave	Cambridge Ave W	end McGhee Ave	Bicycle Boulevard	0.45	Yes	Yes
41	Ware St, Kitson St	Cambridge Ave W	Duncan Ave	Bicycle Boulevard	0.51	Yes	Yes
20	Wells Ave, Plowden Ave	Spring St	Phoenix St	Bike Boulevard	0.47	Yes	Yes
55	Wilbanks Cir	Hwy 72/221 E	25 BYP NE	Bike Boulevard	0.64	No	No
39	Willson St	Laurel Ave W	Crews St	6' Bike Lanes	0.61	Yes	Yes
37	Willson St, Lander St	Stanley Ave	Crews St	Bicycle Boulevard - Contraflow Bike Lane	0.16	Yes	No