



Memorandum

TO: All Members of the CMCOG **Transportation Subcommittee**

FROM: Sam Davis, Chairman

DATE: January 4, 2018

SUBJECT: **Next Meeting: January 11, 2018**

Please be advised that the business of the CMCOG Transportation Subcommittee will be conducted on **Thursday, January 11th, at 12:00 p.m.** in the CMCOG Conference Room. Enclosed, please find an agenda and support materials for your review.

Please note that a light lunch will be available beginning at 11:45 a.m. so that we can begin promptly at 12:00 noon.

Please be advised that in order for the Subcommittee to conduct business, a quorum of three (3) out of the six (6) local governments or appointed members must be present. Delays in conducting business may result in delays to the flow of funding to CMCOG for carrying out transportation planning activities, so please don't forget to mark your calendars.

If you have any questions or need any additional information, please do not hesitate to contact Reginald Simmons of the CMCOG staff. Reginald can be reached at 803-744-5133 or by email at rsimmons@centralmidlands.org. Thank you for your time, dedication, and service as I look forward to seeing each of you on **January 11th**.

Enclosures

AGENDA

TRANSPORTATION SUBCOMMITTEE

THURSDAY, JANUARY 11, 2018

12:00 PM TO 1:00 PM

CMCOG CONFERENCE ROOM

1. Welcome, Introductions, and Call to Order..... Sam Davis

2. Invocation.....Open

3. Determination of a Quorum Entire Group

ACTION → 4. Approval of the November 30th Meeting MinutesEntire Group (Enclosure 1)

ACTION → 5. Approval of the Regional Freight Mobility Plan R. Simmons
The Central Midlands Council of Government (CMCOG) Regional Freight Mobility Plan was developed based on guidance provided by the federal transportation bill, Fixing America’s Surface Transportation (FAST) Act. This places the CMCOG in a competitive position to pursue funding and grants provided by the FAST Act and other freight-related federal and state funding opportunities. The CMCOG Regional Freight Study provides an assessment of the current freight infrastructure within the CMCOG and Columbia Area Transportation Study (COATS) MPO study area, and identifies specific projects and policies designed to support current and future freight movement. Staff will present the draft final document for review and approval. (Enclosure 2)

ACTION → 6. Approval of the West Metro Bike and Pedestrian Master Plan R. Simmons
The West Metro Bike and Pedestrian Master Plan identifies a clear strategy for near- and long-term active transportation projects within the municipalities of Cayce, West Columbia, and Springdale. These projects will advance a safer, more connected network of bicycle and pedestrian infrastructure. The recommended network connects key destinations to encourage active transportation throughout the three communities and surrounding jurisdictions. The development of the Plan focused on safety, connectivity, and accessibility for residents throughout the West Metro region. Staff will present the draft final document for review and approval. (Enclosure 3)

7. Project UpdatesJ. Necker
SCDOT is currently managing various highway, intersection, interstate, and bridge projects throughout our planning region. SCDOT will provide the latest status updates.

8. Old/New BusinessSam Davis

9. Public Comments..... Open

10. Adjourn Sam Davis

MEETING SUMMARY

Transportation Subcommittee

November 30, 2017

<u>Organization</u>	<u>Members Present</u>	<u>Others Attending</u>
City of Columbia:	Sam Davis	
Lexington County:	Todd Cullum	
Kershaw County:	Russ VanPatten	
Calhoun County	John Nelson	
Richland County	Joyce Dickerson Paul Livingston	
University of South Carolina:	Derrick Huggins	
Wendel:		Charles Badger Ronald Reekes
Richland County Penny:		Robert Pratt
SCDOT:		Tevia Brown Jim Frierson Kenny Larimore Diane Lackey Jennifer Necker
CMCOG Staff:		Reginald Simmons Roland Bart Guillermo Espinosa Jessica Foster

1. Welcome, Introductions, and call to order

Sam Davis welcomed everyone and called the meeting to order at 12:02 p.m.

2. Invocation

Joyce Dickerson gave the invocation.

3. Determination of a Quorum

It was determined that a quorum was present

4. Approval of the November 9, 2017 Meeting Minutes

A motion was made by Joyce Dickerson to approve the minutes of November 9, 2017. The motion was second by Todd Cullum. All were in favor and the minutes were approved.

5. Regional Intermodal Transportation Center Feasibility Study

Reginald Simmons requested a recommendation of approval to adopt the Regional Intermodal Transportation Center Feasibility Study. In September of 2016, the Central Midlands Council of Governments (CMCOG) initiated a study to examine the opportunities that a Regional Intermodal Transportation Center located in or around downtown Columbia would bring to the Central Midlands area. The purpose of this study was to look at what an Intermodal Transportation Center might include, how it might serve various modes of transportation, how it might impact development, and where it might be located. Through an analysis of over 22 identified sites, 4 sites were identified as having the best potential to serve as a regional transportation center. The study revealed that the preferred location included the existing transfer facility that is located at the corner of Sumter Street and Laurel Street and extended along the back half of that block to Blanding Street. The estimated cost to build a transit only facility at this location is \$14 million.

There was a brief discussion.

At this time a motion was made by Derrick Huggins to adopt the Regional Intermodal Transportation Feasibility Study. The motion was seconded by Todd Cullum. The majority were in favor and the motion was approved.

6. TIP Amendment – South Main Street Streetscape Project

Reginald Simmons requested a recommendation of approval to amend the 2016 – 2022 TIP to add \$2.4 million in guideshare funds for the South Main Street Streetscape Project. CMCOG in partnership with the University of South Carolina, City of Columbia, South Carolina Department of Transportation and the Comet will develop and implement the South Main Street Streetscape Project. This project consists of streetscape improvements along 4 blocks from the intersection of Pendleton Street to Blossom Street. Currently the roadway consists four (4) lanes (2 lanes in each direction with dedicated turn lanes at each intersection and parallel parking on both sides of the street. The scope of this project will consist of

reducing the number of lanes to one (1) in each direction, implementing complete street improvements and enhanced connectivity to bus stops on Pendleton, College, Greene, and Sumter Streets. Through a collaborative effort, a financial plan involving funding from SCDOT, USC, Richland County and a repurposed earmark has a total estimated amount of \$5 million. Staff has requested to add \$2.4 million in guideshare funding to this project. This request replaces any FTA funds that were associated with this project to bring the project under one federal agency.

There was a brief discussion.

At this time a motion was made by Todd Cullum to amend the 2016 – 2022 TIP to add \$2.4 million in guideshare funds for the South Main Street Streetscape Project. The motion was seconded by Paul Livingston. All were in favor and the motion was unanimously approved.

7. TIP Amendment – Columbia Avenue Widening Project.

Reginald Simmons requested a recommendation of approval to amend the 2016 – 2022 TIP to add a \$45.7 million financial plan for the Columbia Avenue Widening Project. Columbia Avenue serves as the primary access to I-26 for residents of Chapin and the residential areas south of Chapin and along Lake Murray. The Project Corridor also provides access to Chapin High School, as well as businesses and residences located along Columbia Avenue. The purpose of the project is to improve traffic congestion along the Columbia Avenue corridor between I-26 and U.S. Highway 76 (Chapin Road).

The project team developed and analyzed 31 Mainline Build Alternatives in and around the Town of Chapin, and three Interchange Build Alternatives, to identify a Preferred Alternative that would minimize impacts while achieving the project’s purpose and need. The Mainline Build Alternatives included improvements to existing roadways, new location roadways, and combinations of existing and new location roadways. The Interchange Build Alternatives evaluated for the project included a Dual Roundabout Interchange, a Partial Cloverleaf Interchange, and a Diverging Diamond Interchange.

The Preferred Alternative would include the construction of a 1.3-mile, three-lane, new location roadway to serve as an alternative route through the Town of Chapin. The Preferred Alternative would replace the existing I-26 interchange at Columbia Avenue with a new diverging diamond interchange.

Mead and Hunt has recently completed the cost estimate for this project. In total, they estimate the cost of the project to be approximately \$45.7 million. In order to continue the development of this project, CMCOG recommended the following financial plan for approval:

FY 2016	FY 2017	FY 2018	FY 2019	FY 2021	FY 2022	FY 2023	FY 2024
1,000	2,000	5,000	5,000	8,175	8,175	8,175	8,175

At this time a motion was made by Todd Cullum to amend the 2016 – 2022 TIP to add the \$45.7 million financial plan for the Columbia Avenue Widening Project. The motion was seconded by Derrick Huggins. All were in favor and the motion was unanimously approved.

8. Old/New Business

There were none.

9. Public Comments

There were none.

10. Adjourn

The meeting was adjourned at 12:50 p.m.



Memorandum

TO: All Members of the CMCOG **Transportation Subcommittee**

FROM: Reginald Simmons, Deputy Executive Director/Transportation Director

DATE: January 11, 2018

SUBJECT: **Regional Freight Mobility Plan**

REQUESTED ACTION

The Central Midlands Council of Governments' staff requests a recommendation of approval to adopt the Regional Freight Mobility Plan. Please be advised that the remaining sections of this plan are available on the CMCOG website (www.centralmidlands.org).

PROGRAM DESCRIPTION

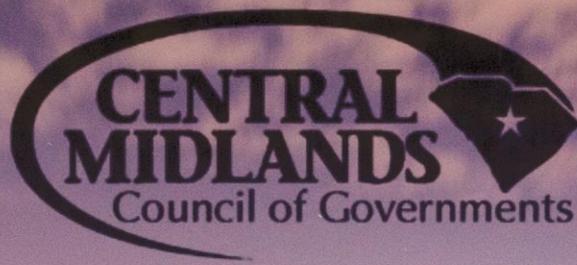
The Central Midlands Council of Government (CMCOG) Regional Freight Mobility Plan was developed based on guidance provided by the federal transportation bill, Fixing America's Surface Transportation (FAST) Act. This places the CMCOG in a competitive position to pursue funding and grants provided by the FAST Act and other freight-related federal and state funding opportunities. In addition to the Fast Act, the Regional Freight Study was developed to align with the following regional-and state-level planning documents:

- 2040 Columbia Area Transportation Study (COATS) Long Range Transportation Plan
- Columbia Regional Motor Freight Transportation Plan, December 2008
- South Carolina Department of Transportation (SCDOT) 2040 Statewide Multimodal Transportation Plan
- SCDOT 2040 Statewide Freight Plan

The CMCOG Regional Freight Study provides an assessment of the current freight infrastructure within the CMCOG and Columbia Area Transportation Study (COATS) MPO study area, and identifies specific projects and policies designed to support current and future freight movement. This investigation of the CMCOG freight system needs and issues, combined with identifying projects targeted to improve the system allows the CMCOG to pursue funding opportunities at the federal, state, and local levels. Funding for transportation projects has been increased through the FAST Act at the federal level with efforts also underway to incorporate freight priorities into the South Carolina statewide project prioritization process under ACT 114. The FAST Act authorizes \$3.5 billion for the formula program nationally and South Carolina's apportionment totals \$107.2 million (\$21.4 million annual average) through FY2020 for improvements on the Primary Highway Freight System (PHFS).

ATTACHMENT

Draft Final CMCOG Regional Freight Mobility Plan



CENTRAL MIDLANDS REGIONAL FREIGHT MOBILITY PLAN



DRAFT

NOVEMBER
2017

www.CentralMidlandsFreightMobility.org

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APPENDIX B - Economic Impacts of Freight Mobility in the Midlands Executive Brochure

APPENDIX C – Land Use, Facility and Regulatory Freight Analysis Technical Memorandum

APPENDIX D – Regional Freight Mobility Best Practices Technical Memorandum

APPENDIX E – Freight Performance Measures Technical Memorandum

APPENDIX F – Priority Freight Projects and Policies Technical Memorandum

APPENDIX G – A summary of Public Information and Stakeholder Outreach

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Acronyms

ATRI - American Transportation Research Institute

CMCOG - Central Midlands Council of Government's

CFR - Code of Federal Regulations

COATS - Columbia Area Transportation Study

CAE - Columbia Metropolitan Airport

CAV - connected and automated/autonomous vehicle

CTIP - County Transportation Improvement Program

FHWA - Federal Highway Administration

FAST Act - Fixing America's Surface Transportation (FAST) Act

FTZ - Foreign Trade Zone

Hazmat - hazardous materials

ICTF - Intermodal Container Transfer Facility

NPMRDS - National Performance Measure Research Data Set

NS - Norfolk Southern

PHFS- Primary Highway Freight System

SCDOT - South Carolina Departments of Transportation SCDOT

SCPA - South Carolina Ports Authority

STIP - Statewide Transportation Improvement Program

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1. Introduction

1.1 PURPOSE

The Central Midlands Council of Government (CMCOG) Regional Freight Mobility Plan was developed based on guidance provided by the federal transportation bill, Fixing America's Surface Transportation (FAST) Act. This places the CMCOG in a competitive position to pursue funding and grants provided by the FAST Act and other freight-related federal and state funding opportunities. In addition to the Fast Act, the Regional Freight Study was developed to align with the following regional-and state-level planning documents:

- Columbia Area Transportation Study (COATS) Long Range Transportation Plan: 2015 Update
- Columbia Regional Motor Freight Transportation Plan, December 2008
- South Carolina Department of Transportation (SCDOT) 2040 Statewide Multimodal Transportation Plan
- SCDOT 2040 Statewide Freight Plan

The CMCOG Regional Freight Study provides an assessment of the current freight infrastructure within the CMCOG and Columbia Area Transportation Study (COATS) MPO study area, and identifies specific projects and policies designed to support current and future freight movement. This investigation of the CMCOG freight system needs and issues, combined with identifying projects targeted to improve the system allows the CMCOG to pursue funding opportunities at the federal, state, and local levels. Funding for transportation projects has been increased through the FAST Act at the federal level with efforts also underway to incorporate freight priorities into the South Carolina statewide project prioritization process under ACT 114. The FAST Act authorizes \$3.5 billion for the formula program nationally and South Carolina's apportionment totals \$107.2 million (\$21.4 million annual average) through FY2020 for improvements on the Primary Highway Freight System (PHFS).

1.2 PROCESS

The Regional Freight Mobility Plan followed a proven process of plan development consisting of major project tasks and deliverables combined with continuous efforts of public involvement. The major project deliverables consisted of Technical Memoranda and presentations given to the Technical Committee. The technical memoranda were developed to provide a comprehensive assessment and analysis of the issues and needs impacting freight in the study area. These deliverables were also provided to the public via a project website and the technical memoranda comprise the appendices of this plan. Major project tasks with their accompanying deliverables include:

1. An Existing conditions analysis that laid the groundwork for understanding the "Freight Condition" of the midlands region. This analysis included conducting an inventory of existing freight infrastructure, trends, regional freight flows and economic impacts.

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INTRODUCTION

Deliverables: Existing Conditions Technical Memorandum and Economic Impacts of Freight Mobility in the Midlands Executive Brochure

2. An analysis of the local land use priorities and policies relating to freight dependent land uses accompanied by an analysis of the freight infrastructure conditions serving the identified freight land uses. This combined analysis forms the basis for planning a freight infrastructure network that can allow for continued and increased growth in the freight economy. This task included detailed analysis of the freight network including truck parking facilities, freight bottlenecks, congestion, pavement condition and safety and crash data.

Deliverable: Land Use, Infrastructure and Regulatory Freight Analysis Technical Memorandum

3. A review of national freight mobility trends and best practices. This review investigated and summarized applicable best practices in technology trends and applications, safety and security and opportunities for public/private partnerships with potential application in the midlands region. This included a peer review of several similarly sized peer freight planning efforts.

Deliverable: Best Practices in Freight Planning Technical Memorandum

4. The development of regional freight performance measures in accordance with FAST ACT and South Carolina Act 114. Freight performance measures are used to gauge how the transportation system is operating and how projects can improve this performance. The performance measures are designed to be consistent with federal and state guidance ensuring consistency of efforts and freight funding eligibility.

Deliverable: Freight Performance Measures Technical Memorandum

5. The final task built upon the previous efforts in developing a prioritized list of regional needs. This task developed prioritization filters for project prioritization, researched existing projects supportive of freight, identified new projects and developed policies designed to support freight movements in the region. These projects and policies are presented as actionable items CMOG and project partners may advance and implement.

Deliverable: Priority Freight Projects and Policies Technical Memorandum

The technical memoranda, economic brochure and a public outreach summary are provided as appendices to the plan as follows:

- APPENDIX A – Existing Conditions Technical Memorandum
- APPENDIX B - Economic Impacts of Freight Mobility in the Midlands Executive Brochure
- APPENDIX C – Land Use, Facility and Regulatory Freight Analysis Technical Memorandum
- APPENDIX D – Regional Freight Mobility Best Practices Technical Memorandum
- APPENDIX E – Freight Performance Measures Technical Memorandum
- APPENDIX F – Priority Freight Projects and Policies Technical Memorandum
- APPENDIX G – A summary of Public Information and Stakeholder Outreach

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1.3 PUBLIC OUTREACH

The Central Midlands Regional Freight Mobility Plan followed the SCDOT's 2040 Multimodal Transportation Plan and occurred at the same time as both the Carolina Crossroads Environmental Impact Study process and the Columbia Corridor Management Plan. Because each of these planning efforts shared common stakeholders, the Central Midlands Freight Mobility Plan chose to focus its outreach efforts on building upon these stakeholder interactions to complete a comprehensive understanding of regional public opinion on freight issues. Stakeholder comments and priorities from these efforts as well as the input from thirteen other plans and studies were reviewed for relevant comments for this study. Input was also received through interviews with planning directors of the outlying counties within the study area, and 69 responses to an online survey. Information was shared with the public about the survey through a project website www.CentralMidlandsFreightMobility.org, a project Webinar, an initial Freight Mobility Council lunch, a glossy 11 x 17 folded Freight Movement and Economic Impact Report, as well as an Existing Conditions Memo and a Land Use, Infrastructure and Regulatory Analysis.

The CMCOG Technical Advisory Committee was utilized as the Coordinating Committee with study team attendance at five of their 2017 meetings. The study team's presence at their regularly scheduled meetings enabled Technical Advisory Committee members the opportunity to oversee the overall technical elements of the Freight Plan. They reviewed and commented upon the Freight Plan's technical memos, recommendations, and implementation. The Technical Advisory Committee consisted of representatives from the regions city and county planning staff, the regional transit provider, the South Carolina Departments of Transportation (SCDOT), and the Federal Highway Administration (FHWA).

The feedback gathered from the CMCOG Technical Advisory Committee meetings, the webinar, and online survey guided and helped refine the Freight Mobility Plan. Stakeholder feedback included input on goals, objectives, and performance measures; identification and confirmation of freight needs, issues, and bottlenecks; and prioritizing recommendations. Stakeholder feedback coupled with data analysis ensures the Freight Mobility Plan meets the needs of the region to improve freight mobility. Greater details on the public outreach efforts and the resulting information provided through those efforts can be found in Appendix H: A Summary of Public Information and Stakeholder Outreach.

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2. Freight Infrastructure System and Existing Conditions

This section describes conditions on the existing freight network of the Central Midlands Region, including key freight highways, railroads, and airports handling cargo. It also discusses regional freight generators (e.g., large shippers and industrial parks) as well as freight-intensive land uses and zoning designations that may impact regional freight operations as well as their impacts on the community. This section also describes current and future freight flows in the four-county region in terms of tons, value, mode, and direction (to, from, within, and through). Finally, it provides estimates of the economic impact of goods movement in the Central Midlands, including employment, economic output, and tax revenue.

2.1 RECENT PLANNING EFFORTS IN THE REGION

While the Central Midlands Freight Mobility Plan is the first regional freight study in the state of South Carolina, it is not the first time the region has discussed freight movements, nor is it the only study underway in this region. This effort has received funding prioritization from SCDOT, sales tax funding in Richland County and has at least two other regional planning efforts underway – Carolina Crossroads and the I-20/I-26/I-77 Corridor Analysis and two local planning efforts gathering input – The Cayce, West Columbia & Springdale Bike and Pedestrian Master Plan and Imagine Mill District: Whaley, Olympia, Granby.

To build upon the previous studies and the comments received through those efforts, the CMCOG Freight Mobility Plan team conducted public information and outreach in two phases.

The first phase was a review of the previous planning efforts and what has been said about freight mobility prior to this study. During this phase, the study team collected available public comments and relevant recommendations from other planning exercises in the region. In total, seventeen different studies were reviewed and multiple interviews were conducted. The review of these planning efforts examined their public outreach efforts to understand which stakeholders were engaged, how they were engaged, and where their recommendations intersected with freight mobility. The results of this review can be found in Appendix H: A Summary of Public Information and Stakeholder Outreach.

Key Findings of this effort include:

- Freight mobility needs champions to assure its needs are considered in land planning discussions.
- Freight mobility is an economic development issue not just for the through traffic across the state but also to support local and even district wide development.
- Communities with freight access must build relationships with the freight community.
- Coordination can avoid freight mobility conflicts.

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- Regional issues are best handled working together across multiple jurisdictions and industries.

2.2 REGIONAL FREIGHT SYSTEM IDENTIFICATION AND CONDITION

This section provides an overview of the freight infrastructure and relative condition of that transportation infrastructure. This inventory and overview serves as a baseline for additional analysis in the identification of needed improvements to best plan for the safe and efficient mobility of freight through the Central Midlands region.

2.2.1 INLAND PORTS AND INTERMODAL CONTAINER TRANSFER FACILITY

The South Carolina Ports Authority (SCPA) opened a rail-served container terminal at Greer in 2013 to provide overnight service between the Port of Charleston and shippers in the rapidly developing I-85 corridor. The service is largely centered around current and projected logistical needs of the BMW factory in Greer, which receives inputs and ships finished automobiles via rail. The SCPA provided \$23.5 million for the project, with the Norfolk Southern (NS) Railroad contributing an additional \$7.5 million. This route passes directly through Columbia. Although this may be creating additional trains through the CMOG region, it is also removing truck traffic that would otherwise be using I-26.

In March 2017, the SCPA broke ground on a new inland port in Dillon. This new facility is expected to open in early 2018 and will provide additional intermodal rail capacity to support cargo flows between the Port of Charleston and markets in the Carolinas, Northeast, and Midwest. It will be built in the Carolinas I-95 Mega Site, which is a 1,920-acre industrial park located at Exit 190 off I-95 in Dillon. This adjacency to I-95 provides quick access to a critical trade artery for the entire US East Coast. The Mega Site is within 160 miles of the Port of Charleston, 89 miles of the Port of Georgetown, and 85 miles of the Port of Wilmington, NC. Overnight rail service to and from Charleston will be provided by CSX. SCPA expects the new inland port to handle about 45,000 containers per year initially.¹

In addition to the inland ports, Palmetto Railways plans to construct a new intermodal container transfer facility, the Naval Base Intermodal Facility (NBIF) on a 118-acre site at the former Charleston Naval Complex. This new facility will provide better intermodal connectivity between the Port of Charleston and the state and national rail networks. It will include dual access by both NS and CSX, offering shippers maximum flexibility and lower transportation rates. The NBIF is expected to open in 2018 and will increase the Port's intermodal capacity by 50 percent.

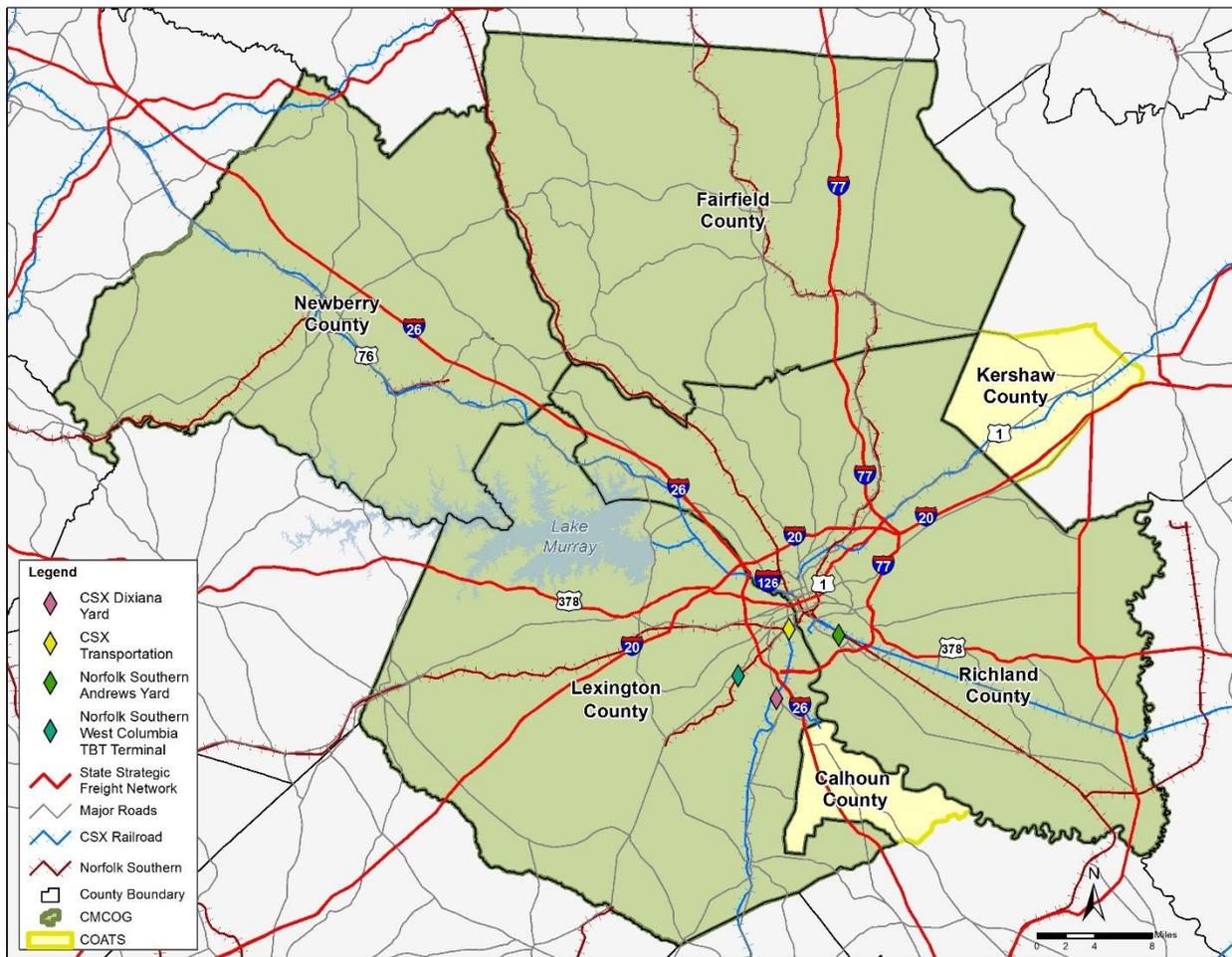
2.2.2 ROADWAYS

Figure 2.1 shows portions of the SCDOT Statewide Strategic Freight Network roads in the Central Midlands area. They include all the Interstates as well as US 1, US 378, and US 601. These facilities carry some of the highest truck volumes in the region since they serve not only local markets in the Midlands but also statewide and national freight traffic. I-20 links the area to Atlanta and major markets on the Eastern Seaboard via I-95, while I-26 is a key route for freight going to and from the Port of Charleston. I-77 links the Midlands to Charlotte. US 378 provides linkages to smaller cities around the Midlands such as Sumter and Saluda.

¹ <http://www.scpa.com/news/sc-ports-breaks-ground-inland-port-dillon/>

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Figure 2.1: SCDOT Statewide Strategic Freight Network Roads and Railroads in the CMCOG Region



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2.2.3 HAZARDOUS MATERIALS SHIPMENTS BY TRUCK

The movement of hazardous materials (hazmat) is a key concern in the Central Midlands region based on public comments received. For example, tanker trucks transport significant volumes of gasoline and diesel fuel to and through the region. There is a pipeline terminal in North Augusta where tanker trucks load and then distribute fuel throughout the state. These shipments typically stay on the Interstates, except for final miles of shipment which often require movement on local arterials.

The Savannah River Site nuclear facility in Barnwell and Fort Jackson in Richland County both generate hazmat shipments. Flammable and corrosive materials are stored at the Savannah River Site while Fort Jackson requires shipments of arms and munitions. Nukem Nuclear Technologies, which specializes in radioactive waste management, operates a nuclear shipment and maintenance facility in Lexington County. Specific roads and routings of these loads are considered security sensitive, but they sometimes must move through residential areas or other conflicting land uses.

South Carolina does not impose any specific route restrictions on hazmat loads, so there is currently no designated hazmat route network statewide or in the Central Midlands region.

2.2.4 TRUCK PARKING

In the Central Midlands, truck parking is mostly provided by private truck stops, although there is a public parking area with truck spaces on I-20 near Calks Ferry Road in Lexington. A preliminary inventory of parking facilities based on satellite imagery was completed for this study. In total, 16 truck parking facilities were identified within the study area along I-20 and I-26. There are facilities located on I-77, but were located outside the study area. As expected these facilities are located on the primary through truck routes in the area. This preliminary count identified nearly 1,000 truck parking spaces in the area. It is unclear from Google Earth whether the public parking area on I-20 includes spaces specifically for trucks or if it is designed for passenger cars but usable by trucks if spaces are available. The inventory of truck parking facilities formed the basis for conducting the truck parking capacity analysis in section 3.2.1.6 of this plan.

2.2.5 RAIL

As shown previously in Figure 2.1 SCDOT Statewide Strategic Freight Network Roads and Railroads in the CMCOG Region, the Central Midlands region is served by two Class I railroads, CSX Corporation and NS. Combined, they operate about 260 miles of track in the area. Columbia is a crossroads for key lines owned by both railroads. NS lines connect the CMCOG region with Charlotte to the north and Atlanta, Savannah, and Macon, GA to the south and west. NS also operates regular service between Greer and the Port of Charleston which passes through the Central Midlands. CSX lines in the region connect to Savannah, Charleston, Spartanburg, and Raleigh-Durham, NC.

NS operates 132 miles of rail in the Central Midlands region. It owns two rail yards in the area, the West Columbia Thoroughbred Bulk Transfer terminal and the Andrews Yard. CSX operates 128 miles of railroad in the CMCOG area. More than three quarters of the rail freight by weight and by value in the Central Midlands is simply moving through the region, with no origin or destination in the area. This means that although this traffic is not directly associated with economic activity in the Central Midlands, it creates regional impacts including traffic delays at grade crossings and potential safety concerns (a large share of this through freight consists of chemical products, some of which may be hazardous).

2.2.6 AVIATION

Columbia Metropolitan Airport (CAE) is the primary commercial airport serving the Central Midlands region. It is located in Lexington County about five miles southwest of Columbia. The airport offers two runways supported by taxiways that provide access to the terminal as well as cargo aprons and associated facilities.



Foreign Trade Zone (FTZ) 127 is located within the airport on a 108-acre tract of land. FTZs allow business tenants to bring intermediate foreign and domestic goods into the airport complex without formal customs entry. These goods are then assembled, manufactured, or otherwise processed. Since the FTZ is considered outside US Customs territory, no duties are required for goods that are exported from the zone. Duties are only assessed on goods that leave the FTZ for domestic consumption.

CAE is also one of six UPS regional cargo hubs. The UPS southeastern regional hub is located on the southeast side of the airport complex adjacent to the east cargo apron. It includes a 281,000-square

foot sorting facility capable of sorting 41,000 packages per hour and a 35-acre ramp with 14 aircraft parking spaces. The facility primarily serves destinations in the southeast (Alabama, Florida, Georgia, Tennessee, and the Carolinas) but also serves California, Hawaii, and Nevada. UPS averages about 10 flights per day at Columbia Metropolitan.²

2.3 REGIONAL FREIGHT FLOWS

Millions of tons and billions of dollars of freight annually traverses the CMCOG transportation infrastructure, including finished goods and intermediate materials. While some of the freight originates and/or terminates in the CMCOG region, the majority passes through.

2.3.1 REGIONAL SUMMARY

To understand Central Midlands freight movements, the IHS Transearch[®] freight database was used. The database provides various dimensions to help identify important movements including:

- **Volume** – Tons, Dollar Value, and Units (Truckloads and Rail Carloads)
- **Mode** – Truck, Rail, and Air
- **Direction** – Outbound, Inbound, Intra-Regional, and Through
- **Commodity** – 700+ Commodities aggregated into 40 groups

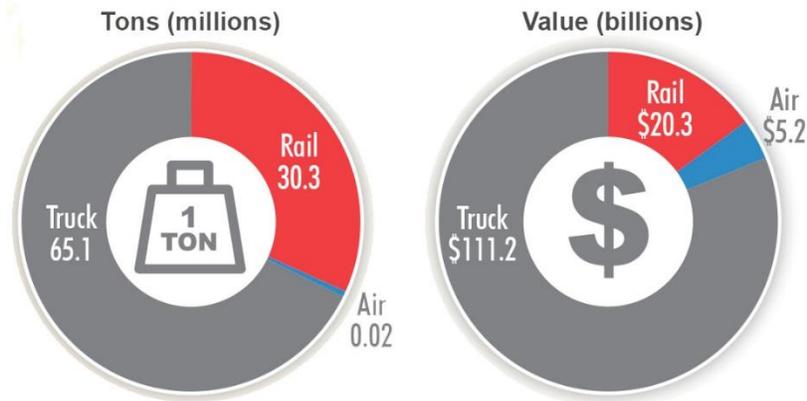
2.3.1.1 How Much Freight Moves Across the Central Midlands?

95.5 million tons of freight moved across the Central Midlands transportation network in 2011, valued at over \$145.7 billion, for an average value per ton of \$1,526.

- **Truck** – 65.1 million tons in 4.9 million laden units, valued at \$111.2 billion, for an average value per ton of \$1,708.
- **Rail** – 30.3 million tons in 442,340 carload units, valued at \$29.3 billion, for an average value per ton of \$964.
- **Air** – 19,460 tons valued at \$5.2 billion, with a very high average value per ton of \$268,349.

² UPS Air Operations Facts, retrieved April 26, 2017 from <https://pressroom.ups.com/pressroom/ContentDetailsViewer.page?ConceptType=FactSheets&id=1426321563773-779>.

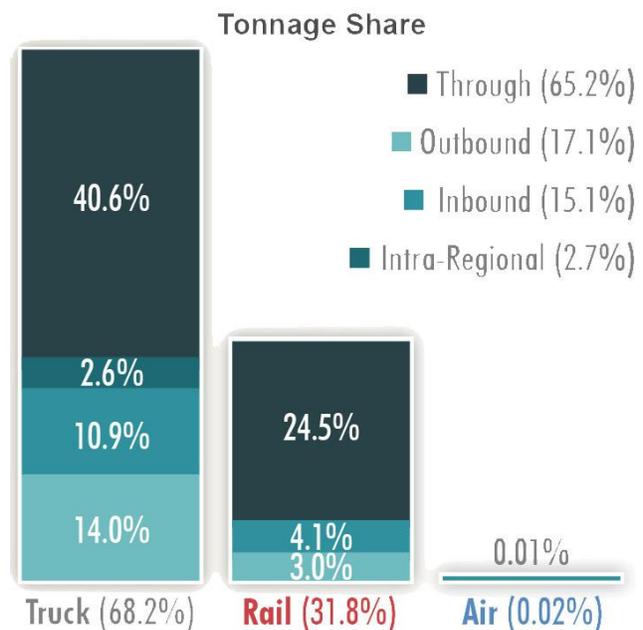
Freight Across the Midlands



2.3.1.2 Where Does the Freight Come From and Go To?

Freight infrastructure connects other regions and states.

- **Through** – 62.2 million tons comprise 65.2% of all directional movements valued at \$104.1 billion (71.4%), which illustrates the bridge-role played by the regional highway and rail network.
- **Outbound** – 16.3 million tons (17.1%) valued at \$21.8 billion (14.9%); most (82.2%) moves via truck, the remaining mostly via rail (17.7%).
- **Inbound** – 14.4 million tons (15.1%), valued at \$19.3 billion (13.2%); most moves via trucks (72.5%).
- **Intra-Regional** – Intra-Regional comprises 2.6 million tons (2.7%) valued \$582 million (0.4%).

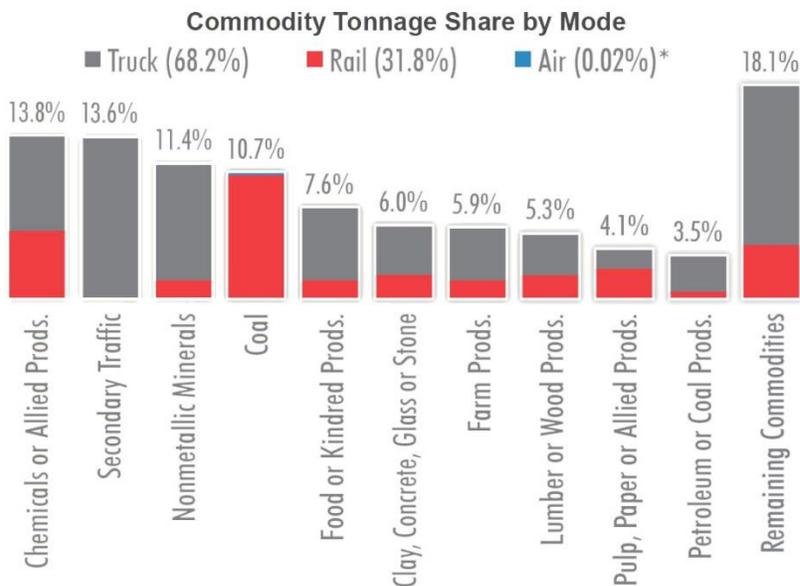


2.3.1.3 What Kind of Goods Move Across the Region?

The top four commodities comprise half of total tonnage, while truck units are led by shipping containers.

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- Chemicals or Allied Products** – 13.2 million tons move mostly by truck (59.1%), with the remainder by rail (40.9%). Most (68.7%) moves through the Central Midlands region.



- Secondary Traffic** – 13.0 million tons of distribution and intermodal deliveries (from railroads, airports, and warehouses). Most (72.2%) moves through the Central Midlands region.
- Nonmetallic Minerals** – 10.9 million tons (11.4%), but only 0.1% of value - reflects local quarry mining operations.
- Coal** – 10.2 million tons, low value, via rail (99.0%) through the Central Midlands region.
- Shipping Containers** – Empty containers comprise no tonnage or value, but 34.6% of all laden trucks.
- Remaining Commodities** – Led by farm, lumber, and earthen (clay, concrete, glass, stone) products.

2.4 ECONOMIC IMPACTS

Central Midlands freight-related economic impacts emanate from freight carriers (service providers), and from shippers/receivers (trade users) who depend on freight transport. Such impacts are estimated via the Implan[®] economic model based on movement values from the IHS Transearch[®] database. Impacts are calculated by transport mode (truck, rail, and air), activity (carriers and shippers/receivers), type (direct, indirect, induced, and aggregate total), and measure (employment, income, value added, output, and tax revenue) for year 2011.

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FREIGHT INFRASTRUCTURE SYSTEM AND EXISTING CONDITIONS

2.4.1 HOW DOES FREIGHT IMPACT THE REGION AND THE STATE?

Of the total \$145.7 billion in freight movements across the Central Midlands region in 2011, only 18% are produced and/or used by Central Midlands shippers/receivers. The other 82% reflects through movements, empty containers, secondary traffic, etc., which generate little if any trade user impact to the region beyond freight carrier services. However, over half of such through movements are produced and/or consumed by other South Carolina regions.

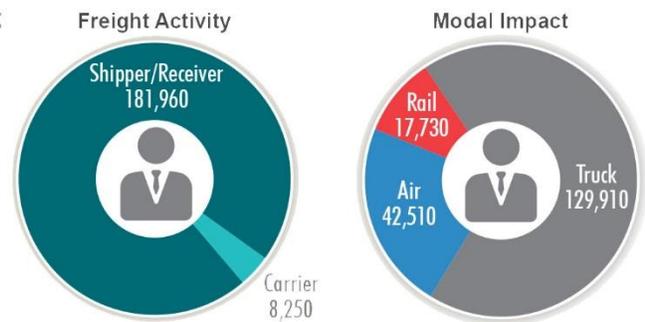


2.4.2 WHAT FREIGHT ACTIVITY SUPPORTS THE MOST JOBS?

Freight carriers account for only 4% (8,250) of employment impacts; the big impacts reflect shippers/receivers (trade users), who comprise 96% (181,960) of the employment impacts.

2.4.3 WHICH MODE SUPPORTS THE MOST JOBS?

Most of the employment impacts supported by freight are attributed to the economic activity facilitated by truck movements followed by air freight and then rail. Air freight has a larger modal impact than rail because of the much higher values associated with the goods moved.



2.4.4 ECONOMIC IMPACT RESULTS

Impacts are summarized for each transport mode (truck, rail, and air) by activity (service providers, trade users, and a combined total), type (direct, indirect, induced, and an economic total), and measure (employment, income, value added, output, and tax revenue) for year 2011 to provide a comprehensive perspective on how freight in CMCOG impacts the economy. Summary-level impacts from all freight-related activity (both service providers and trade users combined) by mode and measure/type are presented in Table 2.1.

Direct – Accounting for both the freight service providers and the trade facilitated by such providers, the direct economic impact to the CMCOG region amounted to 106,220 jobs in 2011, earning \$5.4 billion by producing \$8.0 billion in value-added (gross regional product, or GRP), which equates to \$21.8 billion in output (the sales value of goods/services) taxed to yield \$537 million to local, state, and federal coffers.

Total – Incorporating multiplier impacts (indirect and induced) associated with direct freight activity translates into an additional 83,960 jobs earning \$3.5 billion, by producing \$6.6 billion in GRP. In total, the direct and multiplier impacts related to freight activity amounts to 190,150 jobs in 2011, earning \$9.0 billion by producing \$14.6 billion in GRP, equating to \$33.5 billion in output, taxed to yield \$1.1 billion to local, state, and federal coffers.

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Table 2.1: Total Freight Activity-Related Impacts by Mode and Economic Measure/Type

Measure/Type	Truck	Rail	Air	Total
Employment*				
Direct	74,000	8,490	23,730	106,220
Indirect	29,410	4,980	8,610	43,000
Induced	26,500	4,260	10,160	40,920
Total	129,910	17,730	42,510	190,150
Income**				
Direct	\$3,458	\$519	\$1,435	\$5,412
Indirect	\$1,346	\$251	\$446	\$2,044
Induced	\$975	\$157	\$374	\$1,506
Total	\$5,780	\$927	\$2,255	\$8,962
Value Added**				
Direct	\$5,367	\$900	\$1,721	\$7,988
Indirect	\$2,370	\$449	\$770	\$3,588
Induced	\$1,936	\$311	\$743	\$2,991
Total	\$9,673	\$1,660	\$3,234	\$14,567
Output**				
Direct	\$14,427	\$2,732	\$4,671	\$21,831
Indirect	\$4,441	\$855	\$1,378	\$6,674
Induced	\$3,249	\$522	\$1,247	\$5,017
Total	\$22,117	\$4,109	\$7,296	\$33,522
Tax Revenue**				
Direct	\$392	\$90	\$54	\$537
Indirect	\$210	\$44	\$62	\$316
Induced	\$187	\$30	\$72	\$289
Total	\$790	\$165	\$188	\$1,142

* employment rounded to nearest ten jobs, totals may not sum due to rounding

**in millions of 2013 dollars

Source: CDM Smith based on TRANSEARCH® and IMPLAN®

Accounting for both the service providers (carriers) and trade users (shippers/receivers), the direct impacts associated with CMCOG-related freight amount to between 16.3% (value-added) and 27.7% (output) of the regional economy, per Table 2.2. Accounting for supplier-related impacts (indirect) and the income re-circulation impacts (induced), the total economic impacts pertaining to all freight-related activity in CMCOG amounts to between 29.8% (value-added) and 42.6% (employment) of the regional economy. Such estimates demonstrate the extent to which the CMCOG economy is reliant on the transportation infrastructure network.

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Table 2.2: Total Freight Activity-Related Impacts, Percent of Economy

Measure/Type	Truck	Rail	Air	Total
Employment*				
Direct	16.6%	1.9%	5.3%	23.8%
Indirect	6.6%	1.1%	1.9%	9.6%
Induced	5.9%	1.0%	2.3%	9.2%
Total	29.1%	4.0%	9.5%	42.6%
Income**				
Direct	15.9%	2.4%	6.6%	25.0%
Indirect	6.2%	1.2%	2.1%	9.4%
Induced	4.5%	0.7%	1.7%	6.9%
Total	26.7%	4.3%	10.4%	41.3%
Value Added**				
Direct	11.0%	1.8%	3.5%	16.3%
Indirect	4.8%	0.9%	1.6%	7.3%
Induced	4.0%	0.6%	1.5%	6.1%
Total	19.8%	3.4%	6.6%	29.8%
Output**				
Direct	18.3%	3.5%	5.9%	27.7%
Indirect	5.6%	1.1%	1.8%	8.5%
Induced	4.1%	0.7%	1.6%	6.4%
Total	28.1%	5.2%	9.3%	42.6%
Tax Revenue**				
Direct	14.6%	3.3%	2.0%	19.9%
Indirect	7.8%	1.7%	2.3%	11.7%
Induced	7.0%	1.1%	2.7%	10.7%
Total	29.3%	6.1%	7.0%	42.4%

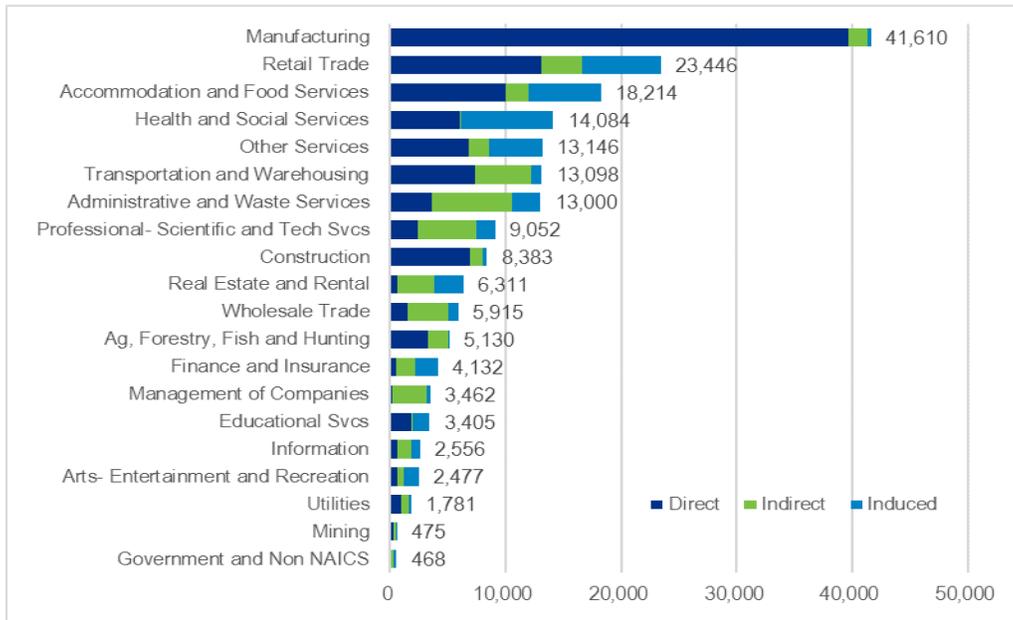
Source: CDM Smith based on TRANSEARCH® and IMPLAN®

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Industry Impacts – Impacts are distributed across various industries, including freight service industries (modal carriers) and all the other industries dependent on physical goods-movement (i.e., trade). Employment impacts by industry and impact type are presented graphically in Figure 2.2.³

Combining all freight modes total employment impacts (direct plus multiplier) amount to 190,050, of which more than half (51.2%) are concentrated within the top four industries of *Manufacturing; Retail Trade; Accommodation and Food Services; and Health and Social Services*. All but *Health and Social Services* employment impacts are mostly related to freight (*Manufacturing* with an especially large direct proportion), whereas the impacts to *Health and Social Services* are mostly induced (re-spending of the extra income).

Figure 2.2: Total Freight Activity-Related Employment by Industry



Source: CDM Smith based on TRANSEARCH® and IMPLAN®

A freight job supports other jobs. A direct freight job (carriers, shippers/receivers) in the Central Midlands supports indirect jobs associated with supplies and materials, as well as induced jobs from the respending of direct and induced income. Combined, these activities result in broad impacts across many industries including: manufacturing, retail trade, accommodation & food services, and health & social services, as well as transportation and warehousing.

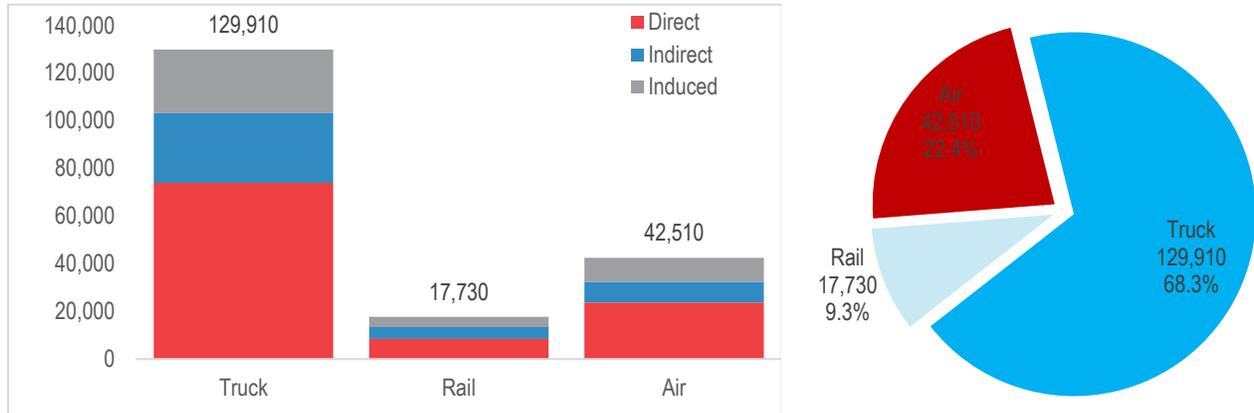
2.4.4.1 Modal Impacts

Figure 2.3 summarizes employment impacts by mode and impact type. The largest impacts are attributable to truck (68.3%), followed by air freight (22.4%), then rail (9.3%). Such modal impacts are mostly a function of the associated economically-relevant trade values facilitated by the respective modes.

³ Based on North American Industry Classification System (NAICS) two-digit industries (20).

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Figure 2.3: Total Freight Activity-Related Employment by Mode



Source: CDM Smith based on TRANSEARCH® and IMPLAN®

The impacts by mode and five categories of economic impacts are shown in Figure 2.4.

- **Trucking** – Constitutes the largest modal impacts with 129,910 total employees in the CMCOG region associated directly with the trucking industry (4,060) or users (69,940), or with the associated multiplier effects (55,910). Over 93% of the modal impacts (depending on measure/type) are trade-related.
- **Air** – Exhibits the second largest economic impact to the CMCOG region, with 42,510 associated jobs. A vast majority of the airborne freight impacts (99.7%) are attributable to the users shipping and receiving mostly high value/weight cargo.
- **Rail** – Comprises the smallest relative-modal impacts, with 17,730 total employees: 240 directly employed in freight rail, 8,260 directly use freight rail carrier services to trade goods, and multiplier impacts include another 9,240.

Figure 2.4: Economic Impacts by Mode

Modal	Employment	Income*	GRP*	Output*	Taxes*
	129,910	\$5,780	\$9,673	\$22,117	\$790
	17,730	\$927	\$1,660	\$4,109	\$165
	42,510	\$2,255	\$3,234	\$7,296	\$188
TOTAL	190,150	\$8,962	\$14,567	\$33,522	\$1,142

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This economic analysis of CMCOG freight quantifies freight's contribution to the economy, and contextualizes the interaction of traded-goods between people, businesses, and institutions. The analysis highlights the fact that user-related impacts (i.e., manufacturing facilities) far surpass the impacts associated with freight provision (i.e., truckers). This demonstrates how efficient transportation infrastructure is an enabler for the success of key regional industries. Manufacturers, distribution centers, retailers, and other important industries in the CMCOG region all depend on having an efficient multimodal transportation network. Additionally, although air freight maintains a relatively low profile compared to rail, the value of air freight shipped/received by CMCOG users generates significantly greater impacts than rail.

By going beyond freight tonnage analysis and by excluding economically-irrelevant movements (i.e. through the CMCOG region), these CMCOG-region impact findings provide another useful perspective when considering future regional transportation infrastructure development.

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3. Analysis of the Central Midlands Freight Needs

3.1 FREIGHT RELATED LOCAL LAND USE POLICIES AND AREAS OF PLANNED GROWTH

3.1.1 COMPREHENSIVE PLAN POLICIES

Local land use decisions have a significant impact on freight mobility. The current and future land uses and allowed activities will ultimately guide the location and type of freight entering and leaving the Central Midlands region. To understand the land use policies impacting freight movement within the Central Midlands region, a review of local government land use plans has been conducted. The review was used to determine where growth is expected to occur and identify areas with freight mobility constraints. The guiding document analysis included approved comprehensive plans and zoning ordinances. These guidance documents were studied to identify areas which allowed freight-related uses and any additional policy guidance which supported the development and location of these activities. For the purposes of this review, freight activities can include manufacturing, industrial, storage, agriculture, airports, rail, mining, and timber among others. Several municipalities had several supportive freight land use policies outlined in their comprehensive plans and zoning ordinances, examples of their policies are discussed below and in Table 3.1.

Fairfield County, for instance, allows industrial development to locate in areas away from community environments. This is because the Town of Winnsboro has agreed to extend sewer and water service to areas of the county better suited for industrial development, such as south of Winnsboro on US 321 and SC 34 to the interstate and the county's industrial parks. The county also has a policy promoting the development of planned industrial parks and discouraging non-agriculture related industry in rural or natural resource areas. Fairfield County also encourages making rail sites available for industrial development.

The Town of Pelion has established several freight land use policies. One such policy states that zoning regulations should prevent future mines from locating within town limits. The town's comprehensive plan also recommends that efforts to annex any new industrial park should be undertaken. The town has recommended guidelines for freight uses. For future growth and development, the town wants to encourage commercial and light industrial manufacturing along specified corridors. They town also discusses that land needs to be set aside for future development of these commercial and industrial uses and that these uses should be concentrated on the fringe of town in industrial parks or in designated areas.

Richland County has multiple freight-supportive policies. An example of one is an economic goal, which aims to diversify the economic base by attracting manufacturing and industry, a proposed strategy for this goal is to ensure there is a sufficient inventory of available land for economic development. Another strategy they propose, is the promotion of the county as a transportation

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crossroads for highways and rail service. Richland County has also established a penny sales tax referendum, named the Richland Penny, which works to create a variety of transportation improvement projects. The program works to fund multiple types of transportation improvements, including road widenings, intersection improvements, greenways, resurfacing, and more.

In the City of Columbia’s Land Use Plan, it states that the city will pursue industrial, transportation, and utility centers and recognizes the importance of maintaining land for their inclusion is crucial. This entails ensuring that encroachment from residential development in land designated for industrial, transportation, and utility development types should be avoided. The plan also acknowledges that these uses will generate significant freight traffic on local roads that are designed to accommodate large turning radius and heavy use.

Table 3.1 demonstrates a few of the general policies outlined in some of the municipalities comprehensive plans.

Table 3.1: Freight Policy Examples

Municipality	Freight Policy Theme	Policy References
Fairfield County	Airport Protection Districts; Industrial development away from community environments; Compatible land use between freight uses and adjacent land; Promotion of planned industrial parks; Protection of agricultural areas; Reserving land for future industrial development; Set aside land for rail construction	Fairfield County Land Management Ordinance: P.4; Fairfield County Comprehensive Plan: Existing Land Use, P. 123; Industrial Policies 1 & 4, P.133; Economic Development Goal, P.158; Land Use Goal, P.159, EG-2 Action 5, P.116
Town of Pelion	Industrial development away from community environments; Encourage industrial development; Compatible land use between freight uses and adjacent land; Promotion of planned industrial parks; Protection of agricultural areas; Reserving land for future industrial development	Town of Pelion Comprehensive Plan: Natural Resource Element P.49; Growth & Development Goals, P.72; Economic Development Considerations, P.35; Economic Goals, P.77; Land Use Objective 6, P.74; Light Manufacturing Zoning Policy, P.86
Richland County	Airport Protection Districts; Compatible land use between freight uses and adjacent land; Reserving land for future industrial development; Road widening/improvements; Promotion of transportation crossroads	Richland County Zoning Ordinance: Ch. 26, Article V, Sec. 26-104; Ch. 26, Article V, Sec. 26-111 Richland County Comprehensive Plan: Economic Development Strategy 4.1, P.74; Richland County Transportation Improvement Program (CTIP)
City of Columbia	Airport Protection Districts, Compatible land use between freight uses and adjacent land	City of Columbia Zoning Ordinance: Ch. 17, Article III, Division 8, Sec. 17-249; Plan Columbia Land Use Plan: Industrial, Transportation, and Utility Centers, P.39

Municipalities have high level land use policies dictating general freight land use guidelines. In some cases, specific locations are identified in these plans that state where exactly freight land uses are being promoted or anticipated to develop. These specific types of areas and the importance of identifying a freight network in concert with land use decisions is established in the following sections.

3.1.2 PROPOSED CENTRAL MIDLANDS REGIONAL FREIGHT NETWORK

The Fixing America’s Surface Transportation Act (FAST Act) directs the U.S. Department of Transportation (USDOT) to establish and maintain a national freight network to assist states in strategically guiding resources that improve network performance for freight movement on roadways of the nation’s freight transportation system. To meet the requirements of the FAST Act, the Central

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Midlands Regional Freight Study proposes the Central Midlands Regional Freight Network. The network comprises highways within the Central Midlands region. Identifying this network is crucial to support the efficient movement of freight within the region. Figure 3.1 illustrates the proposed Central Midlands Freight Network.

The Central Midlands Regional Freight Network will be used to:

- Support South Carolina Department of Transportation (SCDOT) with identifying critical freight corridors in the Central Midlands study area for the statewide freight network;
- Inform the Central Midlands COG, local governments, and SCDOT of the corridors that need attention to maintain the efficient and safe movement of goods;
- Assist the Central Midlands COG, local governments, and SCDOT in decision-making regarding recommendations from transportation projects to policy and operational changes that impact regional freight mobility; and,
- Help identify recommendations in the Central Midlands Regional Freight Mobility Plan and beyond.

The following sections define the purpose and process of establishing a tiered Central Midlands Regional Freight Network.

3.1.2.1 Tier 1 Roadways

The Central Midlands Freight Network Tier 1 Roadways includes I-26, which passes north to south through Lexington, Calhoun, Richland, and Newberry counties. Tier 1 also includes I-20, which passes east to west through Lexington, Richland, and Kershaw counties. In addition, I-77 is a Tier 1 route, passing north to south through Fairfield, Richland, and Lexington counties. Tier 1 is also comprised of US 378 in Lexington and Richland counties, a small part of US 1 in Richland County, and US 601 in Calhoun County. There are 262 miles on the Tier 1 Roadway in the Central Midlands Freight Network.

3.1.2.2 Tier 2 Roadways

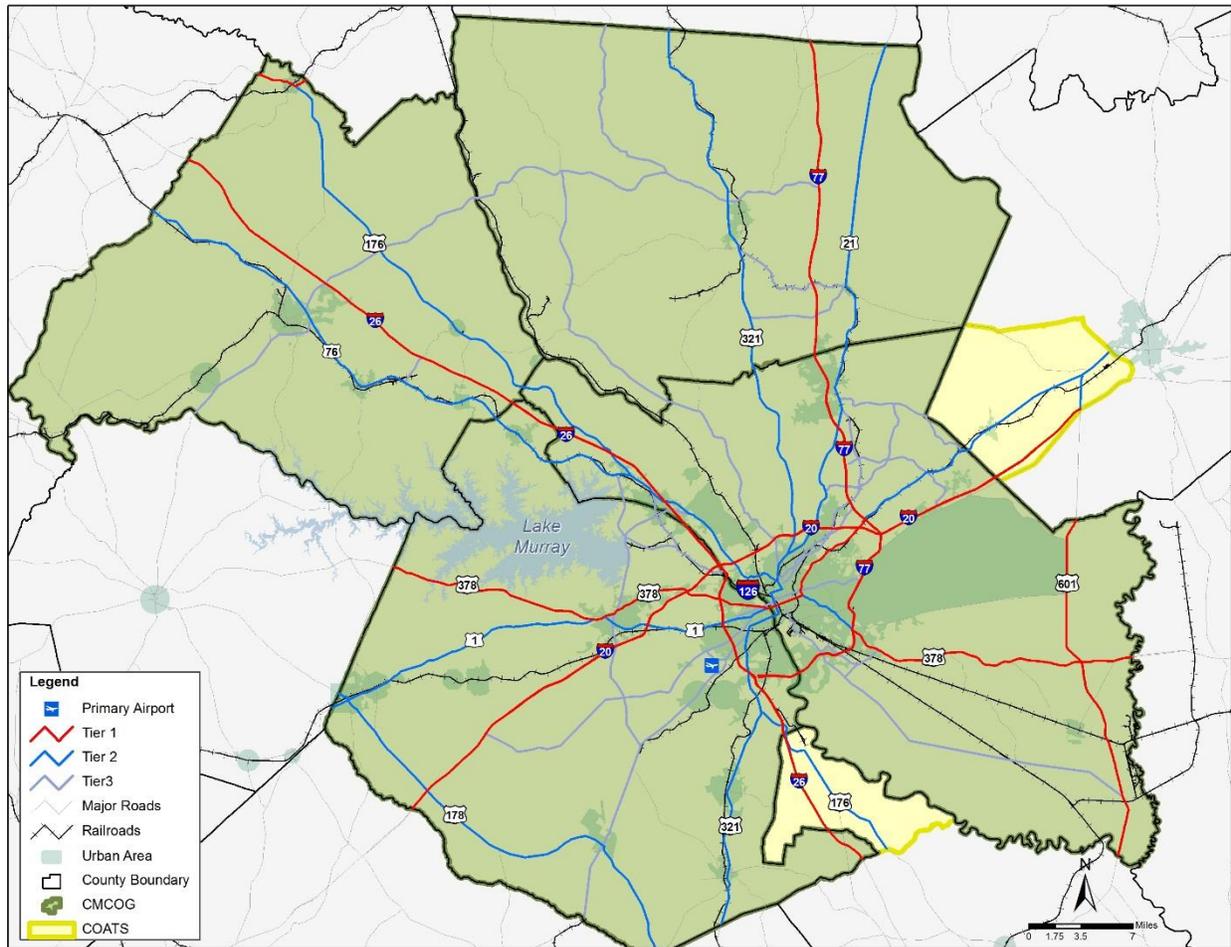
The Central Midlands Freight Network Tier 2 Roadways are the U.S. highways located within the Central Midlands region. This includes U.S. 176 in Newberry, Richland, Lexington, and Calhoun counties, 76 in Newberry and Richland counties, 321 in Fairfield, Richland, and Lexington counties, 21 in Fairfield and Richland counties, and 1 in Lexington, Richland, and Kershaw counties. The Tier 2 Roadways total to 257 miles.

3.1.2.3 Tier 3 Roadways

The Central Midlands Freight Network Tier 3 Roadways are comprised of state and local roads that connect to freight land use clusters within the Central Midlands region. The Tier 3 Roadways consist of 297 miles and serve as the last-mile connectors between the established Tier 1 and 2 roadways. These roadways may have limited data tracking condition, performance, utilization, and operating characteristics of the roadways compared to Tier 1 and 2. Coordination between the Central Midlands COG, local municipalities, and the freight community will be important to evaluate the performance of Tier 3 roadways.

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Figure 3.1: Proposed Central Midlands Freight Network



3.1.3 FREIGHT LAND USE GENERATORS

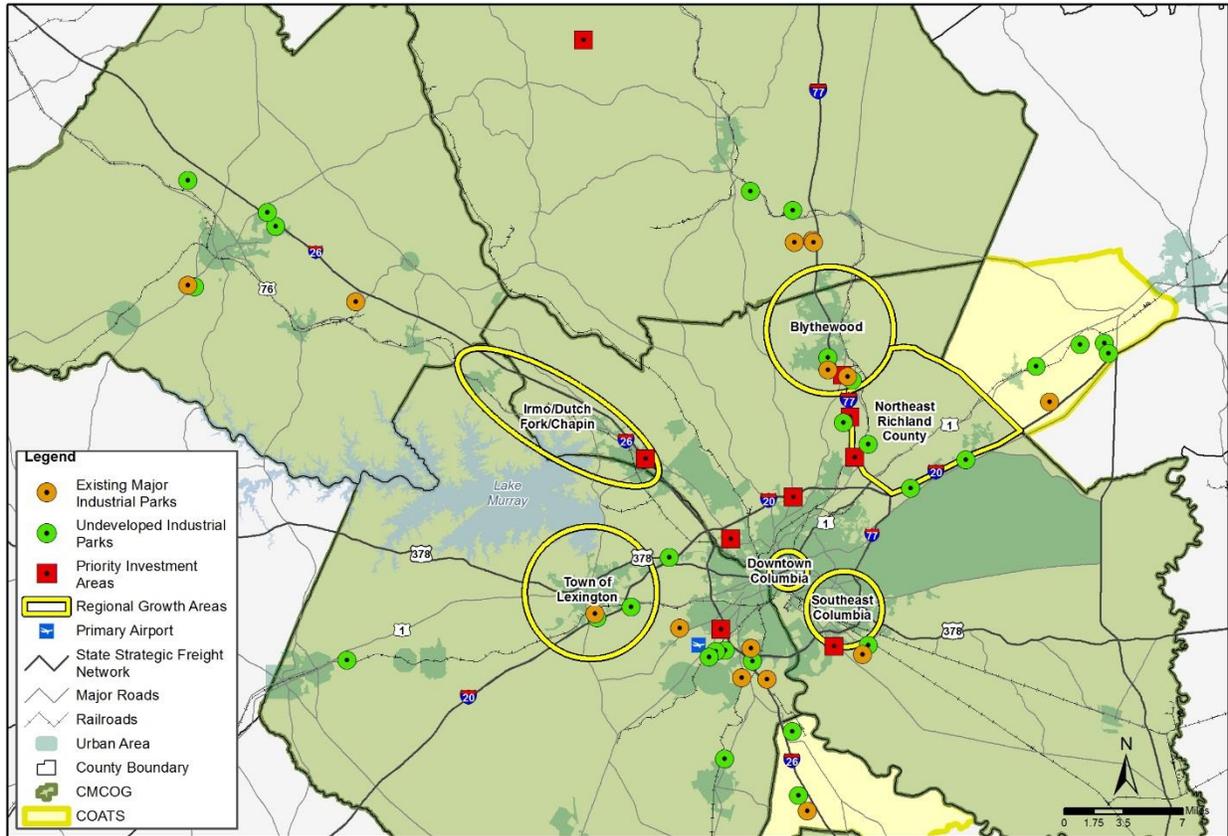
Local governments dictate freight land uses in their comprehensive plans, zoning ordinances, and long-range transportation plans. These documents state where freight uses are located and their preferred future locations as well. Freight land uses incorporate a variety of activities, such as industrial uses, agriculture, warehousing, mining, and more.

Four types of freight land use generators were identified from the local comprehensive plans, zoning ordinances, and long-range transportation plans. (Figure 3.2) The first freight land use generator is existing industrial parks. These are industrial parks that have existing tenants. The locations of these parks were found in the local comprehensive plans and from centralsc.org⁴. The second freight land use generator is undeveloped (or future) industrial parks. These industrial parks were identified in the local comprehensive plans and from centralsc.org. The undeveloped industrial parks are parks that have designated land for industrial uses but do not have existing tenants. The third freight land use generator is priority investment areas. Priority investment areas are those locations identified in local comprehensive plans designated specifically for freight or industrial land uses. The fourth freight land use generator is the regional growth areas. The regional growth areas were identified in the 2040 COATS

⁴ <https://centralsc.org/>

Long Range Transportation Plan. These are areas that have or anticipated to experience significant population growth. The regional growth areas are not specifically freight related, but with additional growth comes the need for additional goods movement to meet the needs of the population.

Figure 3.2: Freight Land Use Generators



3.2 ANALYSIS OF FREIGHT INFRASTRUCTURE CAPACITY

3.2.1 HIGHWAY

As covered in the freight flow and freight land use analysis, freight is generated within the CMCOG study area, while impacting local traffic by passing through the study area traveling to other markets. This section describes the impact operational and physical deterrents that may negatively impact the movement of freight within the study area.

3.2.1.1 Bottlenecks

Highway and street congestion and bottlenecks – both in the CMCOG region and throughout South Carolina – are a major concern for freight carriers and shippers in the state as well as government agencies. Freight bottlenecks contribute to cargo delays, higher fuel consumption, increased emissions, and increased transportation costs both within the Central Midlands and elsewhere. They therefore impact not only area traffic conditions and quality of life, but also regional economic competitiveness.

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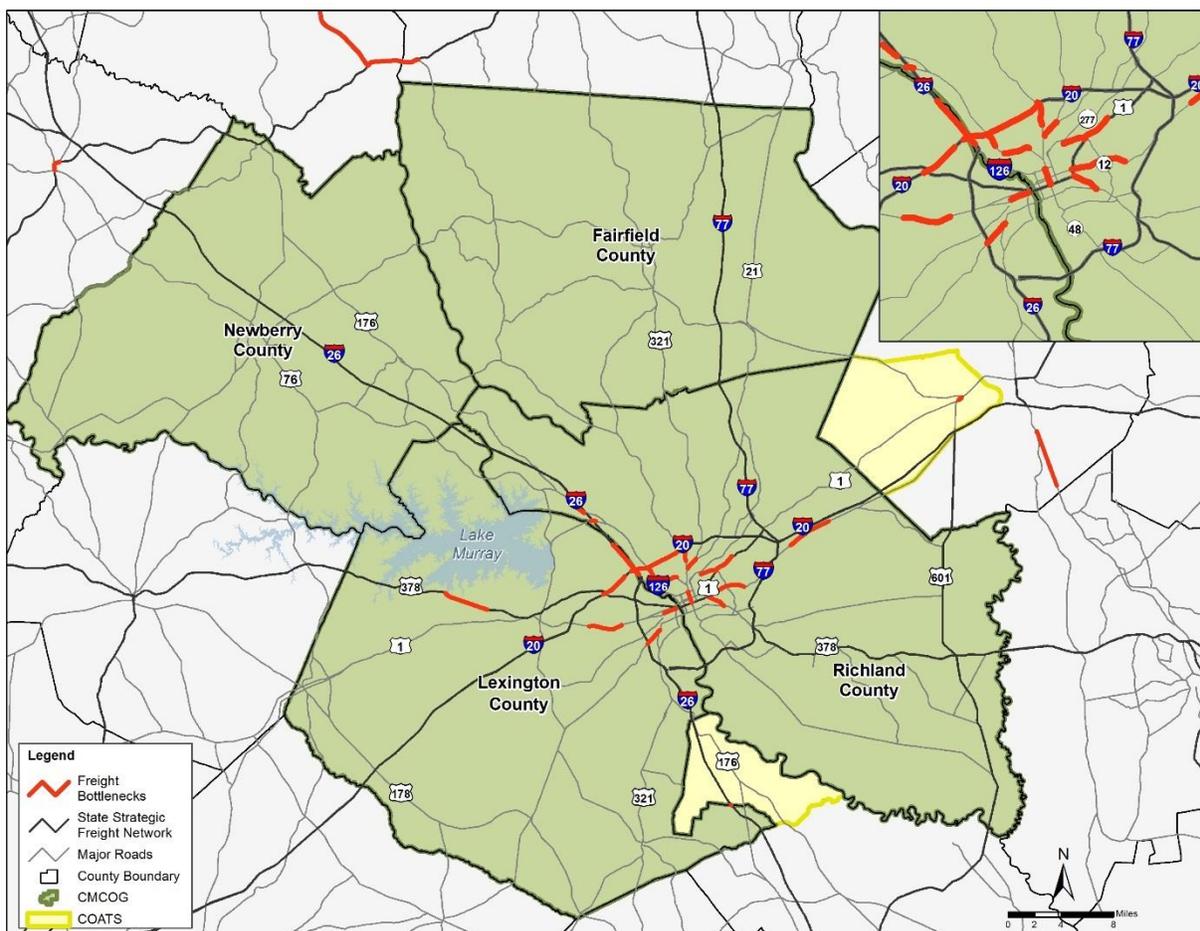
ANALYSIS OF THE CENTRAL MIDLANDS FREIGHT NEEDS

Freight bottlenecks also result in poor travel time reliability for shippers, which can be crippling to their productivity and delivery of goods in a timely manner, resulting in poor business performance.

Freight bottlenecks in the Central Midlands were identified using the Federal Highway Administration’s (FHWA) National Performance Measure Research Data Set (NPMRDS) vehicle probe data. The NPMRDS is a national data set of average travel times for use in analyzing highway system performance. The data provided is actual observed measurement of travel times. No estimates or historical data substitutions of missing data are included. The data is provided to DOTs and MPOs on a monthly basis. The data used in this analysis were for October 2015 (peak shipping season) and June 2016 (peak tourism season) and comprised nearly 27 million records for South Carolina.

Truck bottlenecks were identified using a three-step process (for more information on this process, see Appendix A). The results of this analysis are illustrated in Figure 3.2. As the map shows, trucks encounter bottlenecks in many known problem areas around the region including “Carolina Crossroads” (the I-20/I-26 interchange), I-26 to the north of Columbia, and I-20 through the north side of the city. I-20 from US 378 to roughly Bush River Road is another truck bottleneck, perhaps because it is serving pass-through traffic as well as trucks going to and from the Two Notch Road/Industrial Drive corridor (around Exit 55) where several manufacturers such as Michelin Tire and International Paper are located. Several of these truck bottlenecks are on the South Carolina Strategic Freight Network, but many others are not.

Figure 3.3: Freight Roadway Bottlenecks



3.2.1.2 Future 2040 Congestion

Volume/Capacity (V/C) ratio was used to illustrate potential future congestion for the CMCOG network. V/C ratios are a measure of traffic volumes as they compare to the capacities of roadway segments. The measure provides a view of mobility and quality of travel for users of each roadway segment.

Capacities for roadway segments were developed using the SCDOT statewide travel demand model. For freight analysis the daily model is used as freight traffic does not follow the typical AM and PM peak commuting patterns. Traffic volumes used for this measure include 2016 traffic counts from SCDOT counters and 2040 traffic counts forecasted from the 2016 counts using a compound annual growth rate obtained from 2010 to 2016 counts.

As shown in Figure 3.3, most of the roadways within the CMCOG region are operating below capacity. However, there are a few that are beginning to operate near or at capacity while a few segments are operating over capacity. Several of these segments have been previously identified as congested roadways and bottlenecks during the NPMRDS analysis. It is also important to note that many of the segments reaching or are operating over capacity include interstate and non-interstate roadways. The interstate corridors segments which run the potential of becoming congested in the future include

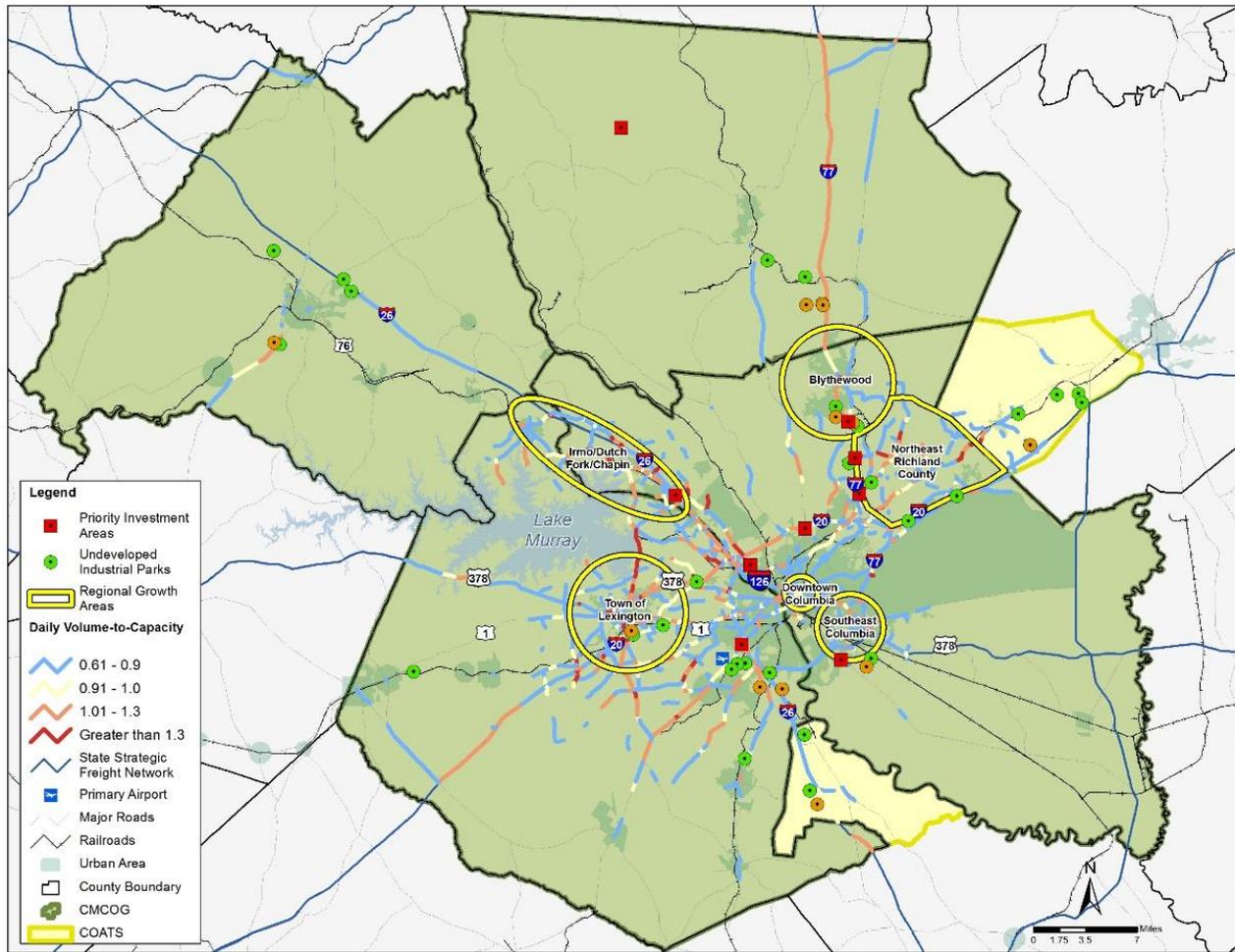
- I-20 in western Lexington County;
- I-20 near the I-26 interchange;
- I-20 in Northeast Richland County;
- I-26 at major interchanges north of I-20 to Broad River Road (US 176); and,
- I-77 in Blythewood area and Fairfield County.

The non-interstate corridor segments projected to contain future congestion include:

- N Lake Drive (SR 6) and Lake Murray Boulevard (SR 60) in Lexington County;
- Platt Springs Road (SR 602), Edmund Highway (SR 302), and Fish Hatchery Road, all south of the Columbia Metropolitan Airport; and,
- Two Notch Road (US 1), HardScrabble Road, and Clemson Road in Northeast Richland County.

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Figure 3.4: Future 2040 Volume-to-Capacity (AADT)



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3.2.1.3 Low Clearance Bridges

There are five bridges on I-26 in the Central Midlands region that have vertical clearance of less than 15 feet. These bridges do not pose a problem for truck loads that do not exceed South Carolina’s legal height limit, which is 13 feet 6 inches. However, they may create issues for oversized loads moving on these facilities.

Table 3.2: Bridge Vertical Clearance Limitations

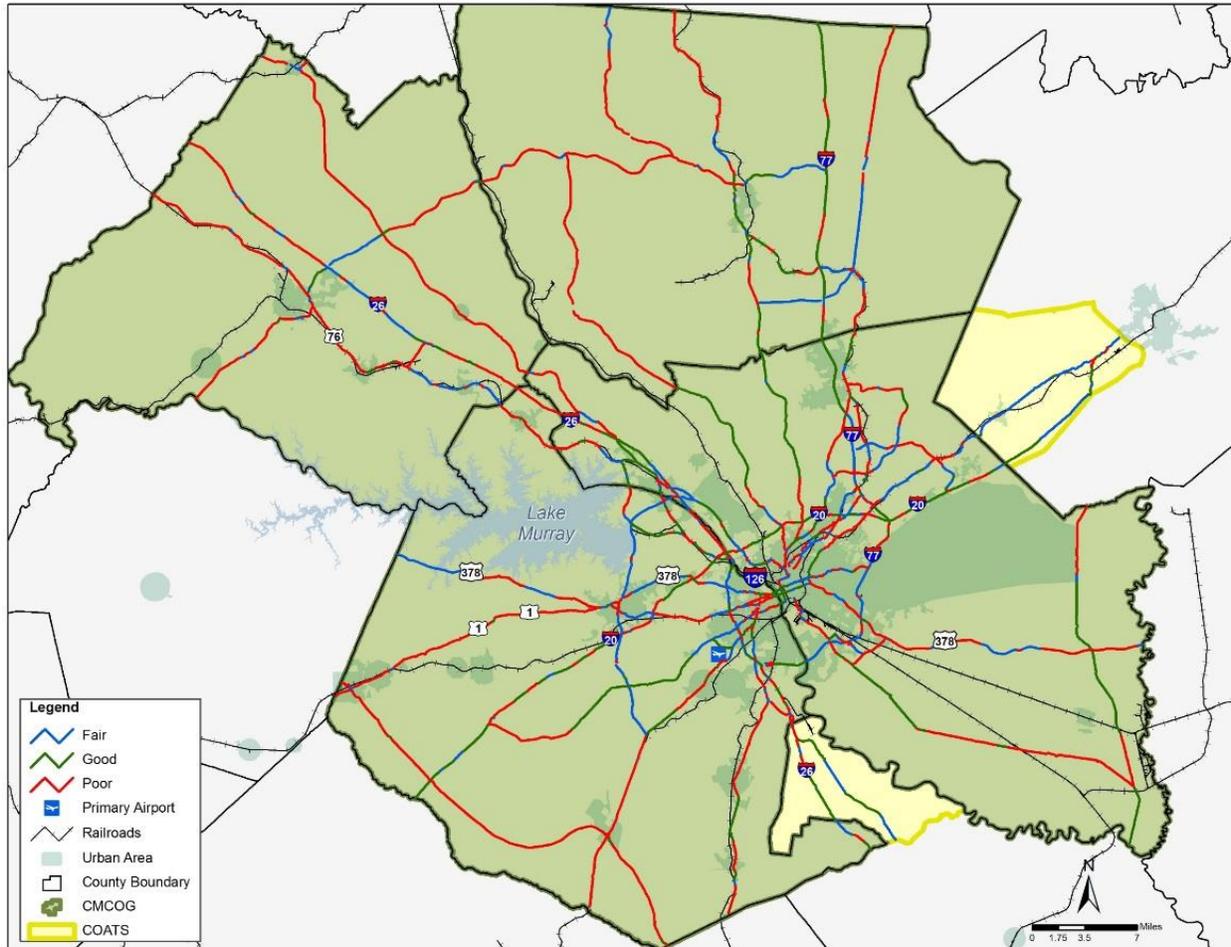
Roadway	Bridge Road Name	Height	Direction	County
I-26	Old Dunbar Rd	14’4”	Northbound	Lexington
I-26	Shady Grove Rd	14’11”	Both	Richland
I-26	Bachman Chapel Rd	14’5”	Northbound	Newberry
I-26	SC 121	14’7”	Northbound	Newberry
I-26	Jalapa Rd	14’8”	Both	Newberry

SCDOT has initiated bridge raising or replacement projects for the bridges identified below to raise the vertical clearance.

3.2.1.4 Pavement Condition

Pavement condition is an important factor in the safe and efficient movement of freight. Roadways in poor condition can lead to traffic congestion and can increase wear and tear on vehicles and damage cargo. ATRI (American Transportation Research Institute) estimates that in 2015, congestion-related cost the trucking industry \$63.5 billion. ATRI ranked transportation infrastructure ninth out of ten in the Industry Concern Index.

Figure 3.5: Pavement Condition on Proposed Freight Network Roadways



3.2.1.5 Safety and Areas of High Crash Volume

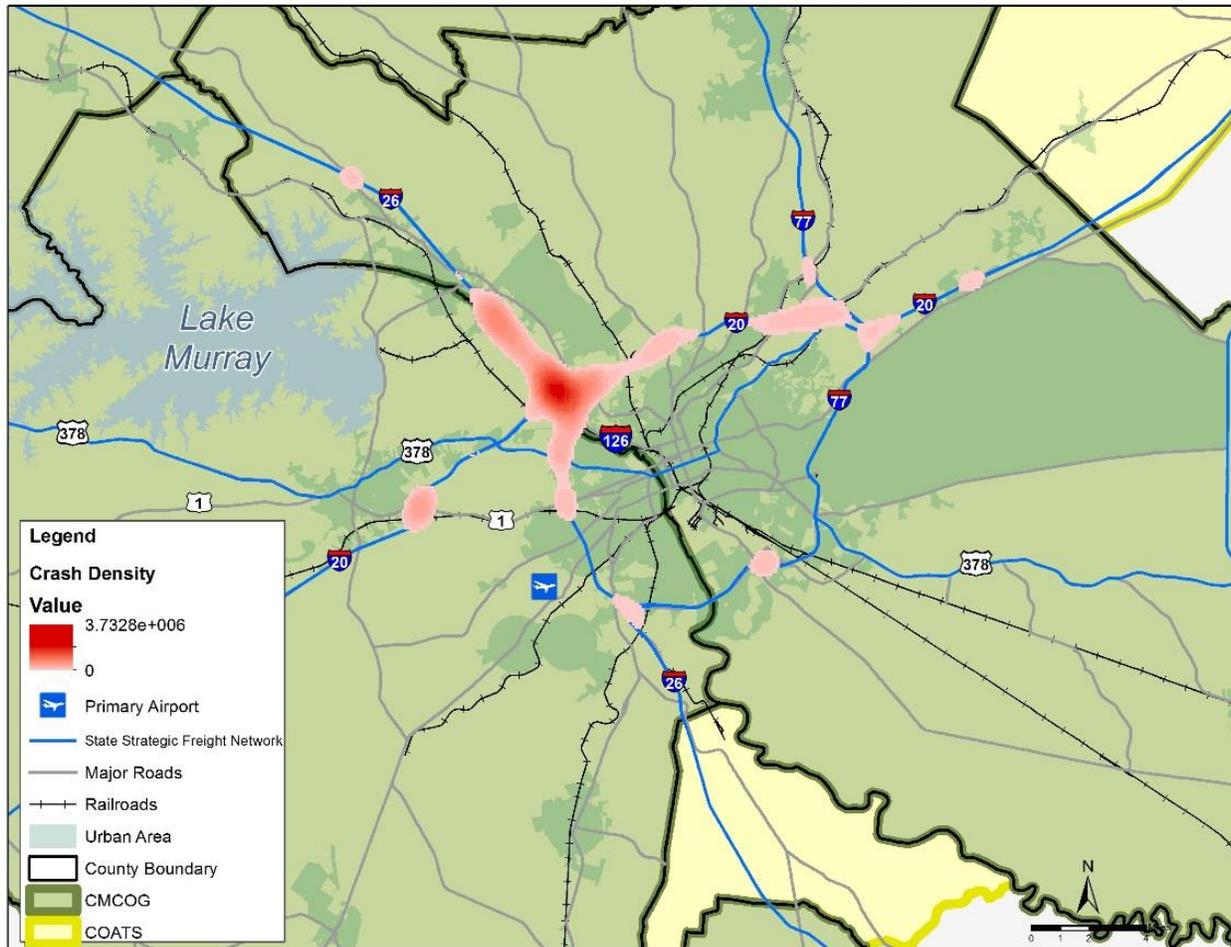
Figure 3.6 shows the crash density of the state strategic freight network. The map shows that there is a significantly higher density of crashes centered around the I-26, I-126, and I-20 interchange. SCDOT has made this intersection the number one interstate priority in South Carolina with the Carolina Crossroads I-20/26/126 Corridor Project. The project is intended to improve local and freight mobility, safety while simultaneously reducing existing traffic congestion⁵.

Another area with a high crash density is the I-77, US 1, and SC 277 interchange. The crash density data represents the location of accidents from 2012 to 2015.

⁵ <http://www.scdotcarolinacrossroads.com/#home>

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Figure 3.6: Crash Density on Strategic Freight Network



3.2.1.6 Truck Parking

To promote safety and help prevent truck-involved accidents caused by drowsy driving, truck drivers are subject to hours of service rules found in the Code of Federal Regulations (CFR).⁶ These rules govern how long drivers may remain on duty without rest and the required length of the rest periods. However, truck drivers are not always able to find suitable parking when required by the schedule. This frequently forces them to choose between parking illegally or risking an hours of service violation, if they continue driving until they find a parking facility. Drivers often find parking in non-designated areas, but this can raise safety concerns for the driver. In 2009, truck driver Jason Rivenburg was robbed and murdered after parking at an abandoned gas station in South Carolina. In response, Congress passed “Jason’s Law” in 2012. Jason’s Law prioritized USDOT funding to provide commercial truck parking areas and required the USDOT to conduct a survey of truck parking availability by state. In response to these concerns a truck parking inventory and utilization study was conducted as part of this plan development effort.

In total, 16 truck parking facilities were identified within the study area along I-20 and I-26. There are facilities located on I-77, but were located outside the study area. In addition to private truck parking facilities, public rest areas, welcome centers, and visitor centers were also considered. Desktop analysis

⁶ Hours of Service of Drivers, 49 CFR §395.3 (2017).

conducted through <http://www.scdot.org/getting/restareamap.aspx> did not identify any facilities within the study area. The results of the analysis identified three types of truck parking facilities, those facilities with designated parking spaces and those with no designated parking spaces or a combination of the two. This distinction is important to understand for counting available parking spaces and calculating utilization.

The demand for truck parking facilities is determined by calculating the current utilization of the facilities. The rate of utilization is obtained by dividing the number of trucks parked at the facility divided by the number of available parking spaces at the facility. Within the study area, utilization ranged from 0% to 100% with five facilities reporting 94% and greater as shown in Figure 3.7. It should be noted that the facilities with 0% utilization were so identified because they have no designated parking spaces rather than from having zero trucks parked at the facilities.

Figure 3.7: Utilization of Truck Parking Facilities Surveyed

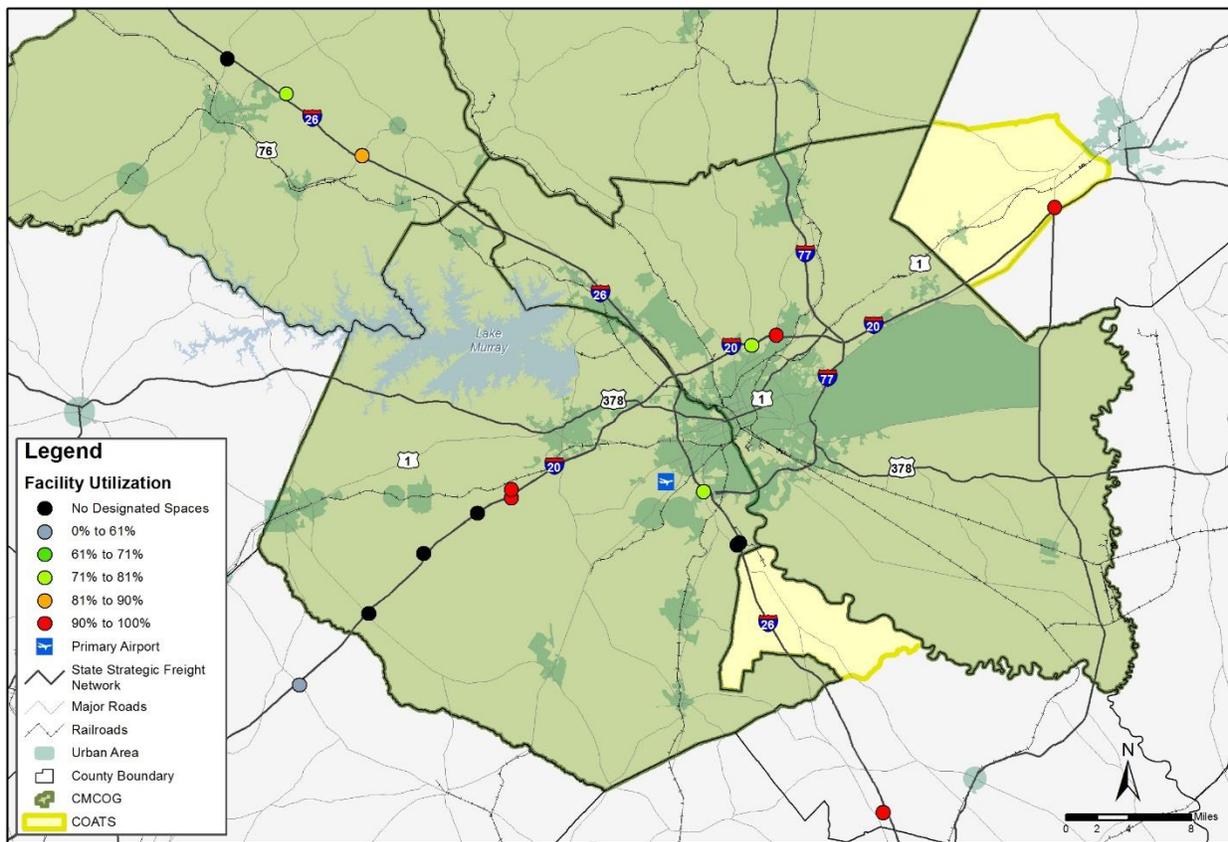


Table 3.3 includes the truck parking facility inventory list, the type of facility based on parking space infrastructure, and associated capacities. For those facilities with no designated truck parking spaces, all but one reported trucks parked at these facilities. The lowest number parked was four trucks while the highest number was 32. For those facilities with designated truck parking spaces, a significant number of trucks are not parked in designated parking spaces. The number of trucks not parked in designated parking spaces ranged from 1 to 18. Two facilities, Pit Stop #15 and Pilot Travel Center #346, were originally calculated to be 100% utilized during the survey time. Both facilities have overflow lots. Pit Stop #15 has 9 designated truck parking spaces, but had 19 trucks parked there during the survey. Pilot

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Travel Center #346 has 37 designated truck parking spaces, but 50 trucks were reported using the facility.

The use of non-designated parking areas associated with the truck parking facilities identified within the inventory suggest there is current demand for more adequate parking facilities for truck drivers. Many of these facilities have had to improvise to cater to demand. While beneficial in attempting to meet current demand, these overflow and improvised parking facilities have potential negative issues including truck driver safety. This situation is anticipated to worsen over time due to hours of service regulations and forecasts of increased truck traffic within the CMCOG region.

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Table 3.3: Total Freight Activity-Related Impacts, Percent of Economy

Facility Name	Location	Facility Parking Area Layout	Potential Capacity Range ¹	Designated Spaces	Trucks Parked in Spaces	Total Trucks Parked
Pilot/WilcoHess #0933	I-26 (Exit 139)	Designated Spots with Overflow Lot	25-84	24	23	28
Pitt Stop #36	I-26 (Exit 119)	No Designated Spots	25-84	N/A	0	6
Pilot Travel Center #338	I-26 (Exit 115)	Designated Spots Only	85+	84	68	69
Pilot/WilcoHess #4580	I-26 (Exit 82)	Designated Spots with Overflow Lot	85+	60	54	72
Love's Travel Spot #396	I-26 (Exit 76)	Designated Spots Only	85+	95	74	79
Corner Market #44	I-26 (Exit 72)	No Designated Spots	25-84	N/A	0	4
Circle K	I-20 (Exit 33)	Designated Spots with Overflow Lot	85+	54	33	40
Hill View Truck Stop	I-20 (Exit 39)	No Designated Spots	85+	N/A	0	22
Truck Stop 44	I-20 (Exit 44)	No Designated Spots	25-84	N/A	0	32
Love's Travel Spot #424	I-20 (Exit 51)	Designated Spots Only	85+	83	78	91
Pitt Stop #15	I-20 (Exit 51)	Designated Spots with Overflow Lot	25-84	9	9	19
Flying J Travel Plaza	I-20 (Exit 70)	Designated Spots Only	85+	167	120	128
TA Columbia #262	I-20 (Exit 71)	Designated Spots with Overflow Lot	85+	69	65	75
Pilot Travel Center #346	I-20 (Exit 92)	Designated Spots with Overflow Lot	25-84	37	37	50
Public Parking on I-20	I-20 ²	No Designated Spots	Unknown	N/A	0	0
Circle K (BP)	I-26 (Exit 119)	No Designated Spots	5-24	N/A	0	5

¹ As identified from the 2017 National Truck Stop Directory.

² This public parking space is located west of Lexington, South Carolina.

3.2.2 RAILWAYS

The Central Midlands region is served by two Class I railroads, CSX Corporation and Norfolk Southern. Combined, they operate 260 miles of track in the area. Columbia is a crossroads for key lines owned by both railroads. Norfolk Southern lines connect the Central Midlands region with Charlotte to the north and Atlanta, Savannah, and Macon, GA to the south and west. Norfolk Southern also operates regular service between Greer and the Port of Charleston which passes through the region. CSX lines connect to Savannah, Charleston, Spartanburg, and Raleigh-Durham, NC.

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Rail needs in the region and state mostly focus on line capacity, grade crossings, bottleneck issues, and industrial development. Since there is no dedicated source of rail infrastructure funding in South Carolina, CSX and Norfolk Southern have historically self-funded most rail improvement projects in the Central Midlands and elsewhere in the state. The railroads each prioritize and develop projects based on their own internal business requirements. For example, CSX classifies each of their lines into one of three categories (core, strategic, and non-strategic) for needs identification and prioritization. However, the railroad does apply for federal grant programs for eligible projects.

In 2009, conducted a feasibility study regarding the Assembly Street railroad corridor consolidation project which further details the purpose and need for removing Assembly Street's at-grade rail crossings. Norfolk Southern has expressed interest in the Assembly Street Corridor project, but as noted above this project has not advanced due to funding constraints. Both railroads could potentially benefit from the project, however implementation would rely on identifying and securing adequate funding, and on establishing an equitable cost share between the various public sector agencies and the two railroads. Table 3.4 shows the crossings in the CMCOG region that are slated for improvements in FY 2017. All three are scheduled to receive an upgrade from crossbucks to standard flashing light signals with gates. The CMCOG 2040 Long Range Transportation Plan proposed a new railroad bridge over Assembly Street near Whaley Street which would eliminate five more grade crossings and reduce wait times and congestion during morning and evening commutes.

Table 3.4: SCDOT FY 2017 Rail Grade Crossing Projects in the CMCOG Region

Crossing Number	County	Railroad	Roadway	Current Protection	Scheduled Upgrades
843292C	Richland	CSX	S-2889 (Candi Lane)	Crossbucks	Flashing light signals with gates
715922T	Fairfield	NS	Macedonia Church Road	Crossbucks	Flashing light signals with gates
715962R	Fairfield	NS	Fairfield	Crossbucks	Flashing light signals with gates

3.2.3 AVIATION

Columbia Metropolitan Airport (CAE) is the primary commercial airport serving the Central Midlands region. It is located in Lexington County about five miles southwest of Columbia. The airport offers two runways supported by taxiways that provide access to the terminal as well as cargo aprons and associated facilities.

The last Master Plan completed by CAE called for a 40,000-square yard cargo apron expansion and the construction of a new 30,750-square foot air cargo building adjacent to one of the existing air cargo facilities to the west of the main terminal.⁷

One constraint affecting air freight operations is the lack of a direct limited access connector road linking the airport to I-26. The existing John N. Hardee Expressway provides a four-lane link between SC 302 and SC 602 north of the airport, but it was not extended all the way to I-26 due to funding constraints. The proposed Phase II project would complete the link from SC 302 to I-26, thus providing a direct link freeway between the airport and industrial and commercial areas in Cayce and around the I-26/I-77 interchange, including the Saxe Gotha Industrial Park and the Amazon.com distribution center. The

⁷ Columbia Metropolitan Airport, *Airport Master Plan Update Chapter 1 Executive Summary*, available at <https://columbiaairport.com/wp-content/uploads/2016/02/CAE-Master-Plan-Summary.pdf>.

current SCDOT STIP includes \$3 million for this project.⁸ However, this is not enough to complete the entire project. The total cost to complete the project was estimated at nearly \$85 million in 2009.⁹

3.3 RESULTS OF PUBLIC OUTREACH SURVEY

To supplement empirical data about the transportation system, public input was sought during the planning effort. A web-based survey was conducted in October and November using SuveyGizmo® to solicit public feedback. The survey included questions designed to understand the public's interactions with the freight mobility community and the priority needs for the community. A total of sixty-seven responses were received. The vast majority of survey respondents, 71.6% came from Richland County, which could be because the City of Columbia posted the survey link on their website. Lexington County had 16 respondents or 23.9%. One person surveyed was from Newberry County and two respondents did not live in the Central Midlands Region.

More than half of those surveyed live within ¼ mile from a major road/highway, airport, or rail line. Just over a third noted their home receives more than three packages a week and 19.4% of survey respondents noted they work in the transportation and logistics industry. Only 7.2% of those surveyed said their business depends upon freight mobility to distribute their material or products, but 20.9% indicated that their business depends upon freight mobility to deliver materials or products.

Community interactions with road, capacity or room for the movement of freight along interstate routes, and geometrics, or design for roadways were recognized as the top three key issues for the movement of freight through the Central Midlands region by more than 43.3% of all survey respondents. Community interaction with rail was a top issue for 26.9% of respondents.

When asked about safety concerns, conflicts between local traffic and through traffic (68.7%) and railroad crossings (59.7) stood out above other issues. Roads with steep grades, tight turning radius, or low bridge clearance were seen as a top three priority by just over a quarter of all respondents (26.9%) while emissions from highway was a priority by just over a fifth of all respondents (20.9%). First mile, last mile issues for trucks (access at pick up or drop off points) were seen as a top issue by 20.9% of survey respondents. Lack of truck parking, lack of delivery zones, spills from trucks, spills from railcars, noise from railroad, and clear signage and wayfinding were considered to be one of the top three priorities by 10.4% to 17.9% of respondents.

Ninety-two and a half percent of all respondents believed the I-26/I-20/I-126 Intersection also known as Malfunction Junction or Carolina Crossroads should be the biggest priority bottleneck. I-26 North of Columbia was seen as a priority by 4.5% of those surveyed and only three percent designated I-20 through the North side of Columbia as the top priority.

While there was less consensus when respondents were asked about which practices would be the most impactful to enhance the movement of freight within the Central Midlands region with none of the choices recognized by more than 50% of respondents, the top three responses were both development related. Encouraging development along freight network corridors as opposed to developing where

⁸ <http://www.dot.state.sc.us/inside/stip.aspx>.

⁹ Central Midlands Council of Governments, *TIGER Discretionary Grant Application for the Completion of the John N. Hardee Expressway*, September 11, 2009, available at <http://www.centralmidlands.org/tiger/John%20N.%20Hardee%20Tiger%20Grant%20Application%20Final.o.pdf>.

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freight networks do not currently exist was considered to be impactful by 41.8% of respondents, encouraging re-use and infill of land parcels which have been used for freight or industrial uses in the past was seen as impactful by 35.8% of respondents, and streamlining project planning, review, and permitting and work to improve coordination between public and private sectors was seen as impactful by 32.8% of respondents. Completing rail crossing improvements which may include or result in quiet zones were seen as impactful by 31.3% of respondents, and 26.9% of respondents recommended the use of Intelligent Transportation Systems to provide updated travel information for rail lines and roadways.

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4. Regional Freight Needs Projects and Policies

4.1 DEVELOPMENT OF NEEDS BASED ON FREIGHT LAND USE AND INFRASTRUCTURE ANALYSIS

4.1.1 ROADWAY PERFORMANCE MEASURES

The FAST Act promotes the development of freight plans to better understand and improve the condition and performance of the regional freight network. The FAST Act encourages states to identify freight projects that may qualify for an increased level of federal funding participation. The development of performance measures for the Central Midlands Freight Mobility Plan can be used to identify and prioritize projects in the region, providing guidance to implement goals, objectives, and performance measures into the project identification, prioritization and programming process of their own municipalities.

It is crucial that performance measures are developed based on other CMCOG and SCDOT plans in addition to national policies that already exist or are in development. To align the goals and outcome of the Central Midlands Freight Mobility Plan, it is recommended that the performance measures be consistent with those called for in the SCDOT Statewide Freight Plan.

The Central Midlands Freight Mobility Plan goals align with the goals, objectives, and performance measures discussed in the FAST Act, SCDOT Statewide Freight Plan, SCDOT Statewide Rail Plan, and the Columbia Area Transportation Study Metropolitan Planning Organization 2040 Long Range Transportation Plan (COATS 2040 LRTP).

The purpose of developing and implementing performance measures for Central Midlands is to provide a means of assessing how the transportation system and/or the agency is functioning. Performance measures better inform decision-making and establish accountability for efficient and effective program implementation.

To remain consistent with the SCDOT Statewide Freight Plan and the COATS LRTP, the Central Midlands Freight Mobility Plan proposes performance measures that align with the goals, outcomes, and performance measures of the state and MPO plans. The Central Midlands Freight Mobility Plan Performance Measures were developed in accordance with Federal and SCDOT performance measures. Table 4.1 lists the performance measures of the Central Midlands Freight Mobility Plan Freight Performance Measures.

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Table 4.1: Central Midlands Freight Mobility Plan Performance Measures

CMCOG Goals	Proposed Performance Measures	Potential Source of Data
Mobility & System Reliability	Reduction of Strategic Freight Network mileage that at less than a LOS E for urban areas and LOS C for rural areas	COATS Travel Demand Model Output, SCDOT
	Average or weighted buffer index or travel time index on priority corridors	INRIX, SCDOT
	Miles of Strategic Freight Network above acceptable congestion levels	INRIX, SCDOT, Point-in-Time data
Safety	Number of large trucks reported in accidents (fatal, non-fatal, injury reported, hazardous materials)	SCDOT
	Percent of substandard roadway improved	MPO data
	Number and rate of fatalities (rate= # of fatalities per 100 million vehicle miles traveled)	SCDOT
	Number and rate of serious injuries (rate= # of serious injuries per 100 million vehicle miles traveled)	SCDOT
Infrastructure Condition	Number of Miles of Interstate and NHS rated at "good" or higher condition	SCDOT
	Reduction in the percentage of remaining state highway miles (non-interstate/strategic corridors) moving from a "fair" to a "very poor" rating while maintaining or increasing the % of miles rated as "good"	SCDOT
	Percent of deficient bridge deck area	SCDOT, NBIS ¹⁰
	Percent of state-maintained road miles in "good" condition	SCDOT
	Percent of state-maintained bridges in satisfactory condition	SCDOT, NBIS
Economic & Community Vitality	Truck travel time index on the freight corridor network; Annual hours of truck delay; Freight Reliability	SCDOT
	Travel Time Reliability index	INRIX, SCDOT
Environmental	MPO Air Quality Design Values	MPO data
	Annual hours of delay on principal arterials	INRIX, SCDOT

4.1.1.1 Project Prioritization Filters

Prioritization filters have been developed to provide a framework for developing a prioritized list of freight projects. The existing COATS LRTP prioritization filters form the base with additional freight filters proposed. These prioritization filters are consistent with Act 114 and the FAST Act. In addition to a prioritized ranking of projects, the proposed freight projects will be divided into three groups:

- Short term- intersection improvements, signalization, studies etc.
- Mid-term- widenings, larger intersections
- Long term- new construction, major interchange improvements

An additional freight filter has been developed to help prioritize freight projects in the region within the COATS project prioritization process for new projects. The freight prioritization filter provides an additional point for projects located on the State and proposed regional freight networks. All of the roadway projects provided in this plan would qualify for this addition freight prioritization criteria.

4.1.2 EXISTING PROJECTS AND PLANS BENEFICIAL TO IDENTIFIED FREIGHT NEEDS

In developing the CMCOG Regional Freight Mobility Plan, several regional and state transportation plans and studies were identified and incorporated into the regional freight planning process. From these

¹⁰ National Bridge Inspection Standards (NBIS)

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plans and studies, projects located on the CMCOG regional freight network, were targeted for inclusion in the CMCOG Regional Freight Mobility Plan. These plans and studies which were referenced for the regional freight study include:

- Columbia Area Transportation Study (COATS) – Moving the Midlands 2040 Long Range Transportation Plan;
- South Carolina Statewide Freight Plan;
- South Carolina Statewide Rail Plan;
- CMCOG Regional Motor Freight Study;
- SCDOT Assembly Street Railroad Corridor Consolidation Project; and,
- Columbia Metropolitan Airport Master Plan.

4.1.2.1 Road Widening Projects

Table 4.2 lists the existing road widening projects identified in both the 2040 COATS LRTP and 2035 Rural LRTPs. The road widening projects are categorized by cost constrained and aspirational. Cost constrained projects are those that have some sort of committed funding for construction. Aspirational projects are identified as projects that would improve efficiency but do not have designated funding. Road widening projects are classified long-term projects.

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REGIONAL FREIGHT NEEDS PROJECTS AND POLICIES

Table 4.2 Road Widening Projects

Route Name	Limits	Type of Project	Cost Estimate	Score	Source
SC 302 Edmunds Hwy (B)	Hartley Quarter Rd S-245 to Fish Hatchery Rd S-73	Cost Constrained	\$15,811,429	82.66	RLRTP
Two Notch Rd US 1 Pontiac	Steven Campbell Rd S-407 to Spears Creek Church Rd S-53	Cost Constrained	\$18,988,909	80.899	L RTP
W Main St Lexington US 1	Columbia Ave to N Lake Dr SC 6	Cost Constrained	\$51,123,986	70.175	L RTP
SC 302 Edmunds Hwy (A)	Cedar Creek Rd S-45 to Hartley Quarter Rd S-245	Cost Constrained	\$46,184,083	69.76	RLRTP
Edmund Highway SC 302	S. Lake Dr SC 6 to SC 6	Cost Constrained	\$64,189,005	69.51	L RTP
Hard Scrabble Rd S-83	Farrow Rd SC 255/I-77 to Clemson Rd S-52	Cost Constrained	\$94,214,204	67.602	L RTP
S Lake Dr South	Platt Springs Rd SC 602 to Boiling Springs Rd S-279	Cost Constrained	\$159,458,148	64.935	L RTP
US 1 Augusta Hwy (C)	W Hampton Rd S-31 to Peach Festival Rd S-24	Cost Constrained	\$69,864,457	64.54	RLRTP
Hard Scrabble Road S-83	Clemson Rd S-52 to Lake Carolina	Cost Constrained	\$192,567,016	63.426	L RTP
Edmund Hwy SC 302	Princeton Rd S-1287 to S. Lake Dr SC 6	Cost Constrained	\$219,566,296	61.58	L RTP
Jefferson Davis Hwy US 1	Steven Campbell Rd S-407 to Sessions Rd S-47	Cost Constrained	\$258,230,770	58.687	L RTP
US 1 Augusta Hwy (B)	Breezy Hill Rd S-955 to W Hampton Rd S-31	Aspirational	\$83,763,807	58.66	RLRTP
Broad River Rd US 76/176	Dutch Fork Rd US 76 to Woodrow St S-27	Cost Constrained	\$274,599,672	58.517	L RTP
US 1 Augusta Hwy (A)	Leesburg Rd SC 23 to Breezy Hill Rd S-955	Aspirational	\$89,720,671	55.97	RLRTP
Clemson Rd S-52	Quality Ct to Sparkleberry Crossing	Cost Constrained	\$320,413,781	54.59	L RTP
Broad River Rd US 76/176	Woodrow St to I-26 Interchange	Cost Constrained	\$329,162,677	53.949	L RTP
Edmund Hwy SC 302 south	S Lake Dr (SC 6) to Old Charleston Rd S-625	Cost Constrained	\$369,426,412	52.381	L RTP
Bush River Rd S-273	Seawright Rd S-1002 to Woodlands Dr	Cost Constrained	\$396,237,543	50.427	L RTP
Chapin Rd/Dutch Fork Rd	Sid Bickley Rd S-715, Lexington Co. to Three Dog Rd	Cost Constrained	\$419,466,837	50.233	L RTP
US 321 Savannah Hwy	Burton Gunter Rd S-102 to East Fifth St SC 692	Aspirational	\$113,768,752	46.88	RLRTP
Pineview Rd SC 769	Bluff Rd SC 48 to Garners Ferry Rd US 76	Aspirational	\$797,478,685		L RTP
Dutch Fork Rd US 76	Twin Gates Rd S-1151 to Three Dog Rd S-1403	Aspirational	\$469,524,331		L RTP
Wilson Rd US 21	I-77 to Blythewood Rd S-59	Aspirational	\$688,118,650		L RTP
Winnsboro Rd US 321	Koon Store Rd S-61 to Blythewood Rd S-2200	Aspirational	\$1,467,465,465		L RTP
S Lake Dr I-20	Industrial Dr S-626 to US 1 Main St	Aspirational	\$513,910,822		L RTP
Farrow Rd SC 555	N Pines Rd S-1437 to Hard Scrabble Rd	Aspirational	\$498,751,799		L RTP
Jefferson Davis Hwy US 1 east	Sessions Rd S-101 to W. Dunbar Rd S-72	Aspirational	\$551,644,793		L RTP
Hardscrabble Rd North	Langford Rd to Summit Pkwy	Aspirational	\$1,182,222,380		L RTP
Platt Springs Rd west S-34/63	White Knoll HS past SC 6 to Boiling Springs Rd S-279	Aspirational	\$1,548,511,759		L RTP
US 378	Old Lexington Rd S-157 to Beulah Church Rd	Aspirational	\$1,058,815,109		L RTP
Bush River Rd S-107	N Lake Dr SC 6 to St. Andrews Rd	Aspirational	\$1,113,776,780		L RTP
Wilson Blvd US 21 north	Raines Rd S-2126 to Langford Rd S-54	Aspirational	\$1,344,029,539		L RTP
Broad River Rd US 176 north	I-26 to Chapin Rd S-39	Aspirational	\$1,391,516,422		L RTP
Broad River Rd US 176 north	Chapin Rd S-39 to north of Jake Eargle Rd S-592	Aspirational	\$1,840,244,435		L RTP
Wilson Blvd US 21 south	Fulmer Rd S-1352 to south of Pisgah Church Rd S-34	Aspirational	\$1,676,962,489		L RTP
Chapin Rd US 76	Murray Lindler Rd S-82 to Sid Bickley Rd S-715	Aspirational	\$1,773,130,628		L RTP

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4.1.2.2 New Right-of-Way Projects

Table 4.3 identifies the proposed new right-of-way projects in the Central Midlands region. The 2040 COATS LRTP states that right-of-way projects should be evaluated using feasibility studies prior to being added to the financially constrained project list. New right-of-way projects are long-term projects.

Table 4.3: Right-of-Way Projects

Route Name	Limits	Cost Estimate	Score	Source
Southern Connector	From Amick's Ferry Rd to Columbia Ave	\$22,525,019	78.3	LRTP
Airport Connector	From SC 302 to Interstate 26	\$111,557,268	75	LRTP
Rabbit Run	From Trotter Rd to Garner Ferry Point	\$125,468,557	68.5	LRTP
Shop Rd Extension	From Pinewood Rd to Garners Ferry Rd	\$204,529,612	66.9	LRTP

4.1.2.3 Intersection Improvement Projects

Table 4.4 lists the intersection improvement projects in the Central Midlands region. Projects listed in the COATS LRTP and Rural LRTP are aspirational. The COATS LRTP states that the intersection improvement program has over \$17 million over the next 30 years available for intersection improvement projects. Intersection improvement projects are mid-term projects.

Table 4.4: Intersection Improvement Projects

Major Road	Minor Road	Type of Project	New Score	Source
Augusta Hwy US 1	St David Ch Rd S-386/S-230	Aspirational	79.835	LRTP
US 76 Wilson Rd	SC 219 Main St	Aspirational	75.4	RLRTP
Sunset Blvd US 378	Fairlane Dr S-1209	Aspirational	73.519	LRTP
Broad River Rd US 176	Piney Woods Rd S-674	Aspirational	63.967	LRTP
US 76 Wilson Rd	Winnsboro Rd (south intersection)	Aspirational	62.798	RLRTP
US 76 Wilson Rd	Winnsboro Rd (north intersection)	Aspirational	61.856	RLRTP
Broad River Rd US 176	Riverhill Cir S-213	Aspirational	59.967	LRTP
Broad River Rd US 176	Shivers Rd S-2233	Aspirational	53.967	LRTP
US 321	Recycle Center	Aspirational	51.619	LRTP
Lake Murray Blvd SC 60	Columbiana Dr	Aspirational	49.008	LRTP
SC 23 Church St	US 178/SC 391 N Pine St	Aspirational	45.191	RLRTP
US 321	SC 34	Aspirational	40.251	RLRTP
SC 34 Winnsboro Rd	S-44 Mt. Bethel Garmany Rd	Aspirational	38.743	RLRTP
Platt Springs Rd S-34	Cannon Trail Rd S-1790	Aspirational	38.513	LRTP
SC 34 Winnsboro Rd	S-462/S-505	Aspirational	37.368	RLRTP
Main St US 1	Pine St S-109	Aspirational	32.438	LRTP
SC 34 Boundary St	SC 121 Kendall Rd	Aspirational	31.585	RLRTP
US 76	S-41 Mt Pilgrim Church Rd	Aspirational	30.911	RLRTP
Broad River Rd US 176	Sid Sites S-1150-Hopewell Ch Rd S-24	Aspirational	29.902	LRTP
SC 34 BP Bob Lake Blvd	S-68 Glenn St	Aspirational	29.165	RLRTP
SC 34 BP Bob Lake Blvd	SC 395 Nance Rd	Aspirational	27.135	RLRTP
US 601 McCords Ferry Rd	SC 263 VanBoklen Rd	Aspirational	26.958	RLRTP
US 76 Main St in Little Mountain	S-20 Wheeland Rd	Aspirational	26.632	RLRTP
US 321	S-30 Peach Rd	Aspirational	26.383	RLRTP
SC 34 BP Bob Lake Blvd	S-90 Boundary St	Aspirational	24.04	RLRTP
US 601 McCords Ferry Rd	SC 48 Bluff Rd	Aspirational	24.016	RLRTP
S-233	S- @Industrial Park near Peach Rd	Aspirational	23.754	RLRTP

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REGIONAL FREIGHT NEEDS PROJECTS AND POLICIES

Major Road	Minor Road	Type of Project	New Score	Source
SC 34 (In Ridgeway)	US 21	Aspirational	23.575	RLRTP
SC 215	SC 34	Aspirational	19.648	RLRTP
SC 48 Bluff Rd	S-2558 RR crossing @ Sidetrack Ln/St. Marks St.	Aspirational	19.045	RLRTP
US 176	S-97 New Hope Rd	Aspirational	17.951	RLRTP
Garners Ferry Rd US 76/378	Hazelwood Rd S-88	Aspirational		L RTP
Garners Ferry Rd US 76/378	Old Woodlands Rd S-1100	Aspirational		L RTP
N Main St US 21/321	Monticello Rd SC 215	Aspirational		L RTP
N Main St US 21	Miller Ave S-531	Aspirational		L RTP
S Lake Dr SC 6	Edmund Hwy SC 302	Aspirational		L RTP
Broad River Rd US 176	Piney Grove Rd S-1280	Aspirational		L RTP
Hardscrabble Rd S-83	Lee Rd S1050	Aspirational		L RTP
Farrow Rd SC 555	Cushman Rd S-907	Aspirational		L RTP
Two Notch Rd US 1	Beltline Blvd SC 16	Aspirational		L RTP
Gervais St US 1	Harden St S-10	Aspirational		L RTP
Lake Murray Blvd SC 60	Broad River Rd US 176	Aspirational		L RTP
Gervais St US 1	Millwood Ave US 76/378	Aspirational		L RTP
Laurel St S-337	Huger St US 21	Aspirational		L RTP
Old Bush River Rd S 107	Wescot Rd S-174	Aspirational		L RTP
Columbia Ave US 378	Reed Ave S-638-W Butler St S-131	Aspirational		L RTP
Columbia Ave US 378	Old Chapin Rd S-52-W Main St US 1	Aspirational		L RTP
Columbia Ave US 378	Park Rd S-127	Aspirational		L RTP
Lake Murray Blvd SC 60	Kinley Rd S-670-Partridge Dr S-670	Aspirational		L RTP
N Main St US 21	Fairfield Rd US 321-Clarendon St	Aspirational		L RTP
Bluff Rd SC 48	Bluff Industrial Blvd	Aspirational		L RTP
Broad River Rd US 76/176	Elliott Richardson Rd S-3950- Min	Aspirational		L RTP
US 321	State Pond Rd S-1697	Aspirational		L RTP
Platt Springs Rd S-34	Kyzer Rd S-1848 - McLee Rd S-1910	Aspirational		L RTP
Sunset Blvd US 378	Mineral Springs Rd S-106	Aspirational		L RTP
Augusta Hwy US 1	Wattling Rd S-71	Aspirational		L RTP
Farrow Rd SC 555	N Brickyard Rd S-1274	Aspirational		L RTP
Clemson Rd S-52	Earth Rd	Aspirational		L RTP
US 378	St Peters Rd S-204-Charter Oak Rd S-204	Aspirational		L RTP
Garners Ferry Rd US 76/378	Leesburg Rd SC 262	Aspirational		L RTP
Garners Ferry Rd US 76/378	I-77	Aspirational		L RTP
Garners Ferry Rd US 76/378	Horrel Hill Rd S-86	Aspirational		L RTP
Shop Rd Ext SC 768	Pineview Rd SC 768	Aspirational		L RTP
Shop Rd Ext SC 768	Atlas Rd S-50	Aspirational		L RTP
Shop Rd Ext SC 768	S Beltline Blvd S-48	Aspirational		L RTP
Bluff Rd SC 48	S Beltline Blvd S-49	Aspirational		L RTP
Columbia Ave S-48	Chapin Rd US 76/Amick Ferry Rd S-51	Aspirational		L RTP
Broad River Rd US 176	Freshley Mill Rd S-234	Aspirational		L RTP
Broad River Rd US 176	Shady Grove Rd S-612	Aspirational		L RTP
Broad River Rd US 176	Dutch Fork Rd US 76	Aspirational		L RTP
Broad River Rd US 176	Royal Tower Rd S-1862	Aspirational		L RTP
St Andrews Rd S-36	Lake Murray Blvd SC 60	Aspirational		L RTP
St Andrews Rd S-36	Harbison Blvd S-757	Aspirational		L RTP
Wilson Blvd US 21	Hardscrabble Rd S-83	Aspirational		L RTP

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Major Road	Minor Road	Type of Project	New Score	Source
Two Notch Rd US 1	Sparkleberry Ln S-2033	Aspirational		L RTP
Main St US 1	Church St S-47	Aspirational		L RTP
Kelly Mill Rd S-955	Bookman Rd S-53	Aspirational		L RTP
Main St US 1	Green Hill Rd S-756	Aspirational		L RTP
Jefferson Davis Hwy US 1	Blaney Rd S-551	Aspirational		L RTP
Highway Ch Rd S-102	Fort Jackson Rd SC 12 (Percival Rd)	Aspirational		L RTP
I-26	Koon Rd S-58 Exit 101	Aspirational		L RTP
Two Notch Rd US 1	Parklane Rd /Decker Blvd S-151	Aspirational		L RTP
I-20	Broad River Rd US 176 Exit 65	Aspirational		L RTP
Assembly St Ph 1		Aspirational		L RTP
Assembly St Ph II		Aspirational		L RTP
US 1	Watts Hill Rd	Aspirational		L RTP
Bud Keefe Rd	Hardscrabble Rd S-83	Aspirational		L RTP
Wilson Blvd US 21	Pisgah Church Rd	Aspirational		L RTP
S. Lake Dr SC 6	Nazareth Rd S-243	Aspirational		L RTP
S. Lake Dr SC 6	Community Dr S-648	Aspirational		L RTP
Old Orangeburg Rd S-244	Platt Springs Rd SC 602	Aspirational		L RTP
Bethany Church Rd	S. Lake Dr SC 6	Aspirational		L RTP
Platts Spring Rd SC 602	Emanuel Church Rd S-168	Aspirational		L RTP

4.1.2.4 Air Cargo Improvement Projects

Table 4.5 lists the aviation improvement projects in the Central Midlands region. The projects were identified to support air cargo expansion at the Columbia Metropolitan Airport. Projects listed originated out of the Aviation System Plan. Air cargo improvement projects are considered long-term projects.

Table 4.5: Air Cargo Improvement Projects

Project	Facility	Description
Cargo Apron Expansion	Air Cargo Building Adjacent to Existing Facilities West of Main Terminal	40,000 sq yd Cargo Apron Expansion
New Air Cargo Building	New Air Cargo Building	30,750 sq ft Air Cargo Building

4.1.2.5 Rail Improvement Projects

The Central Midlands region is served by two Class I railroads, CSX Corporation and Norfolk Southern. Rail needs in the region and state mostly focus on line capacity, grade crossings, bottleneck issues, and industrial development. Table 4.6 lists the rail improvement projects in the Central Midlands region. The projects listed in Table 10 are at-grade rail crossing improvements that were programmed for 2017. The Assembly Street Corridor Study is on-going and will provide a series of improvements that will be included in the CMCOG Freight Study. Rail grade projects are considered to be long-term projects.

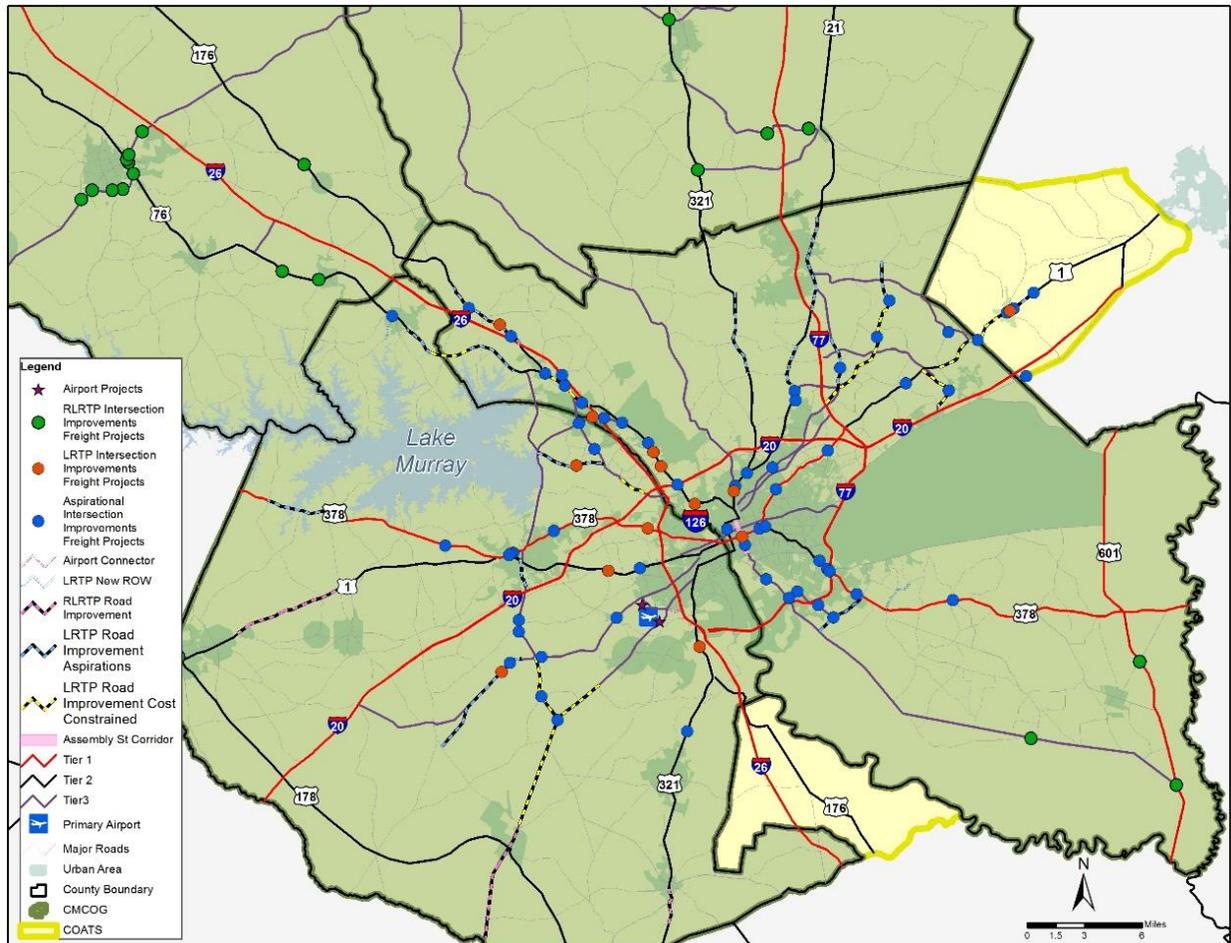
Table 4.6: Rail Improvement Projects

Crossing Number	County	Railroad	Roadway	Improvement Type
843292C	Richland	CSX	S-2889 (Candi Lane)	Rail Grade Crossing
715922T	Fairfield	NS	Macedonia Church Road	Rail Grade Crossing
715962R	Fairfield	NS	Fairfield	Rail Grade Crossing

4.1.2.6 Mapped Projects

Figure 4.1 illustrates the projects that would improve identified freight land use generators and the proposed freight network.

Figure 4.1: Projects on the Proposed Freight Network



In addition to existing transportation plans/studies, the CMOG region has three strategic efforts which impact the movement of freight in the region – Carolina Crossroads, Assembly Street Railroad Corridor Consolidation Project, and the Columbia Airport Foreign Trade Zone. Each of these efforts is summarized to provide an understanding of the impact each effort will have on the region’s freight community.

4.1.2.7 Carolina Crossroads

SCDOT has made the Carolina Crossroads I-20/26/126 Corridor Project the number one interstate priority in South Carolina. This major interstate junction project is intended to improve local and freight mobility, safety while simultaneously reducing existing traffic congestion in one of the most congested roadways in the Southeast. Construction for this megaproject is anticipated to start in 2019.

4.1.2.8 Assembly Street Railroad Corridor Consolidation Project

The Assembly Street railroad crossing is a major rail bottleneck that blocks vehicle traffic on Assembly Street traveling through downtown Columbia. The Assembly Street Corridor Study is examining opportunities to reduce the number of at-grade crossings and helped catalyze redevelopment in the

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downtown core, many problematic grade crossings remain, particularly along Assembly Street which is the focus of a renewed effort to improve rail operations downtown.

4.1.2.9 Columbia Airport Foreign Trade Zone

The Columbia Metropolitan Airport Foreign Trade Zone (FTZ) is a 108-acre area of land located within the Columbia Metropolitan Airport. The FTZ offers incentives to companies, reducing tariff payments for trade brought into the United States through the FTZ. Projects that will directly impact and support the FTZ include air cargo projects at the airport and roadway projects which provide improved mobility between Columbia Metropolitan Airport air cargo facilities and the interstate.

4.1.3 POTENTIAL NEW PROJECTS

4.1.3.1 Previous Plans

The 2008 Columbia Area Transportation Study (COATS) Regional Motor Freight Study identified freight deficiencies and potential projects to address them. They are listed below in Table 4.6:

Table 4.6: 2008 COATS Regional Motor Freight Study Proposed Projects

Type	Facility
Intersection/Junction Improvements	SC 34 and Winnsboro Rd
	I-20, I-126, and I-20 junction
	Killian Rd and Farrow Rd
	SC 34 at US 76
	SC 555 at Westmore Dr
	US 21 at Pisgah Church Rd
	US 1 at US 178
Lane widenings	I-20 at Exit 68/Windhill Rd
Shoulder widenings	SC 34 at miles 28 and 30
	SC 34
Signage/signal timing improvements	SC 601
	US 1/378 to I-20
	US 601 from Leesburg Rd to Bluff Rd
	SC 34
Rail grade crossing improvements	US 321
	US 601 at Whaley St
Variable message signage	US 601 at Assembly St
	US 321 from Winnsboro to downtown Columbia
Roadway improvements/widenings	I-26 from Spartanburg to Columbia
	Old Dunbar Rd
	Bluff Rd
Roadway connections	Killian Rd to Farrow Rd

4.1.3.2 Proposed Projects

As a part of the public outreach process, members of the public were asked to identify areas where they experience bottlenecks and would like to see improvements. The projects listed in the tables below represent areas that do not currently have an existing LRTP, RL RTP, or SCDOT project programmed.

Table 4.7: Public Comment Intersection Improvement Projects

Major Rd	Minor Rd	County	Time Frame
Huger St	Elmwood St	Richland	Mid-term
I-77	SC 277	Richland	Mid-term

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Table 4.8: Public Comment Rail Crossing Improvement Projects

Crossing Number	County	Railroad	Position	Cost Estimate	Time Frame	Comment
715869J- Greene St	Richland	NS	At grade	\$20,000	Short term	Level out grade

Comments from the survey generally identified Assembly St at-grade rail crossings as a bottleneck source. The Assembly Street Railroad Corridor Consolidation Project is evaluating opportunities for reducing the number of at-grade crossings to spur redevelopment downtown and alleviate congestion.

Table 4.9: Entrances/Exits to Interstates

Major	Minor Rd	County	Comment	Cost Estimate	Time Frame
I-26	US 1	Lexington	Study to evaluate entrances/exits to Interstate	\$50,000	Short term
I-20	US 1 (Lexington)	Lexington	Study to evaluate entrances/exits to Interstate	\$50,000	Short term

Table 4.10: Additional Projects

Area	Project	County	Comment
Downtown Columbia	Traffic Signal Synchronization	Richland	Traffic management system of Downtown Columbia
Central Midlands Region	Truck Parking Safety Study	All	Detailed regional truck parking safety study

4.1.4 PROPOSED POLICIES

In conjunction with the freight infrastructure improvement recommendations, the freight policy recommendations will provide guidance in the maintenance and investment of the freight infrastructure and movement of freight and goods within the CMCOG study area. In order to ensure this efficient movement of freight and goods, any freight project should be recognized and given a higher priority due to its benefits to the economy and the continued investment of technological and innovative improvement in the regional freight transportation system. Aligning with the CMCOG Goals, a series of freight policy recommendations and actions are listed below.

Freight Advisory Committee

- Continue and build upon the efforts begun during this plan development to establish a freight advisory committee comprised of public and private freight stakeholders of the Central Midlands region to identify freight issues.

Mobility and System Reliability

- Facilitate multijurisdictional, multimodal collaboration and solutions.
- Improve coordination between public and private sectors to identify regional freight issues and solutions.
- Develop and implement policies and projects that address regional freight issues.
- Improve the day-to-day operation of the CMCOG freight truck network by retiming traffic signals, applying access management techniques, applying ITS solutions, removing

operational deficiencies, and improving response time and management of traffic disrupting events like work zones, crashes, and special events.

- Partner with SCDOT on its connected and automated/autonomous vehicle (CAV) pilot initiative.
- Coordinate and support SCDOT and the City of Columbia in improving the Assembly Street/Huger Street railroad crossings.

Safety

- Increase efficiency of existing truck parking facilities.
- Coordinate with SCDOT to identify new truck parking facilities.
- Identify and improve unsafe roadway and operational characteristics.
- Coordinate with SCDOT and railroad partners to improve safety at existing at-grade railroad crossings traveling through Downtown Columbia.
- Infrastructure Condition
- Develop freight facilities in clusters to improve last and first mile needs, intersection or interchange ramp improvements.
- Support development, maintenance, and communication of improved wayfinding system to improve access to local industrial parks along SCDOT freight truck network.
- Coordinate with private sector fleets to identify freight issues and solutions on the regional freight network.

Economic and Community Vitality

- Coordinate with county and city planners to promote sustainable land use strategies to accommodate freight in the region.
- Develop design guidelines for designated bike/pedestrian facilities along shared corridors on the CMCOG truck freight network.
- Coordinate with freight partners to identify opportunities for industrial parks and intermodal terminal yards in the CMCOG study area.
- Improve annual hours of truck delay on CMCOG freight truck network.
- Coordinate with the South Carolina Ports Authority (SCPA) and Richland-Lexington Airport District-Columbia Metropolitan Airport to identify opportunities for the South Carolina Foreign Trade Zone (FTZ) 127 in the Midlands region.
- Work with SCPA and Columbia Metropolitan Airport to identify and implement intermodal projects that will improve the freight network within the FTZ 127 area.

Environmental

- Develop freight facilities in clusters to reduce environmental and community impacts.
- Identify assets along CMCOG freight truck network vulnerable to flooding and develop adaptive strategies to address or mitigate current and future weaknesses.
- Coordinated with regional partners to mitigate freight-related development in environmentally sensitive areas.

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5. Implementation and Next Steps

In the CMCOG region, the movement of freight is a major economic component of the economy. This Regional Freight Study effort was conducted to tie together the various freight planning efforts conducted in the midlands region in recent years. The plan will serve as a guide for project partners and stakeholders to address future regional freight processes, policies and investments. The following section provides a few of the next steps that the CMCOG can take to implement the recommendations of this plan and improve the regional freight system:

- Use the guidance of the CMCOG Freight Goals and Objectives for making decisions which impact the CMCOG freight system.
- Utilize the CMCOG Freight Performance Measures to track the performance of the CMCOG freight system and identify where the region's greatest freight needs are required.
- Work with local communities to target locations on or in close proximity to the CMCOG freight system for future freight-related developments.
- Maintain visibility and participate as appropriate to issues impacting freight movement in the region such as the assembly street rail study and others as they arise.
- Continuing the communication initiated during the CMCOG Regional Freight Study between public and private sectors involved in the movement of freight within the CMCOG study area, the CMCOG staff will take the leadership in targeting the frequency of FAC meetings. This continued dialogue about the impacts and needs of the local freight community will keep freight at the forefront of discussions within the CMCOG communities.
- Integrate the CMCOG projects into the next planning updates for the following local and state plans:
 - CMCOG Regional Transportation Plan;
 - CMCOG Transportation Improvement Plan (TIP);
 - South Carolina Statewide Strategic Transportation Plan; and,
 - South Carolina Statewide Freight and Logistics Plan.

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Memorandum

TO: All Members of the CMCOG Transportation Subcommittee

FROM: Reginald Simmons, Deputy Executive Director/Transportation Director

DATE: January 11, 2018

SUBJECT: West Metro Bike and Pedestrian Master Plan and Bike Share Plan

REQUESTED ACTION

The Central Midlands Council of Governments' staff requests a recommendation of approval to adopt the West Metro Bike and Pedestrian Master Plan and Bike Share Plan. Please be advised that this plan is available on the CMCOG website (www.centralmidlands.org).

PROGRAM DESCRIPTION

The West Metro area, comprised of the communities of Cayce, West Columbia, and Springdale, has established itself as a vibrant and dynamic location within the Central Midlands region of South Carolina. The proximity of these municipalities to one another and Columbia, provides opportunities for reaching destinations on foot and by bike. Combine this with a diverse mix of outdoor and recreational amenities, including the Three Rivers Greenway, and the West Metro area is quickly becoming an active living destination. Building on that growing reputation and positioning for the future, the Central Midlands Council of Governments (CMCOG), in cooperation with the City of Cayce, City of West Columbia, and Town of Springdale, has completed the West Metro Bike and Pedestrian Master Plan. The West Metro Bike and Pedestrian Master Plan identifies a clear strategy for near- and long-term active transportation projects within the municipalities of Cayce, West Columbia, and Springdale. These projects will advance a safer, more connected network of bicycle and pedestrian infrastructure. The recommended network connects key destinations to encourage active transportation throughout the three communities and surrounding jurisdictions. The development of the Plan focused on safety, connectivity, and accessibility for residents throughout the West Metro region. Recommendations build upon the previous and ongoing work from all three communities. Additionally, public input was essential to the planning process and crucial to developing a regional network that will attract more users and connect those users to desirable destinations.

The West Metro study area consists of three adjacent municipalities: Cayce, West Columbia, and Springdale. The entirety of the study area is within the Metropolitan Planning Organization boundary of the Columbia Area Transportation Study, which is housed within CMCOG. Most of the study area is within Lexington County, except for a portion of the City of Cayce that is in Richland County on the east side of the Congaree River. Figure 1.1-1 shows the West Metro study area along with major roadways, transit routes/stops, existing bike facilities, existing greenways, and previously proposed greenways. Staff will present this study for review and approval.

ATTACHMENT

Draft Final West Metro Bike and Pedestrian Master Plan and Bike Share Plan



WEST METRO

BIKE AND PEDESTRIAN MASTER PLAN

DECEMBER 2017

ACKNOWLEDGMENTS

West Metro Bike and Pedestrian Master Plan

December 2017

Central Midlands Council of Governments

Reginald Simmons, Director of Transportation

City of Cayce

Rachelle Moody, Special Projects/Grants Manager

Carroll Williamson, AICP, Planning and Development Director

City of West Columbia

Tara Greenwood, Director of Grants and Special Projects

Wayne Shuler, AICP, Director of Planning and Zoning

Town of Springdale

John Rabon, Special Projects Coordinator

Consultant Team

Toole Design Group

Ernie Boughman, AICP, Regional Director

Jared Draper, AICP, Project Planner

Blake Loudermilk, PE, Senior Engineer

Chris Lambka, PLA, Landscape Architect

Rachael Thompson Panik, Planner

The LandPlan Group South

Charles Howell, RLA, Principal

The Boudreaux Group

Irene Dumas Tyson, AICP, Director of Planning

Wendel

Ronald Reekes, Project Manager

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INTRODUCTION

1. INTRODUCTION

The West Metro area, comprised of the communities of Cayce, West Columbia, and Springdale, has established itself as a vibrant and dynamic location within the Central Midlands region of South Carolina. The proximity of these municipalities to one another and Columbia, provides opportunities for reaching destinations on foot and by bike. Combine this with a diverse mix of outdoor and recreational amenities, including the Three Rivers Greenway, and the West Metro area is quickly becoming an active living destination. Building on that growing reputation and positioning for the future, the Central Midlands Council of Governments (CMCOG), in cooperation with the City of Cayce, City of West Columbia, and Town of Springdale, has completed the West Metro Bike and Pedestrian Master Plan.

The West Metro Bike and Pedestrian Master Plan identifies a clear strategy for near- and long-term active transportation projects within the municipalities of Cayce, West Columbia, and Springdale. These projects will advance a safer, more connected network of bicycle and pedestrian infrastructure. The recommended network connects key destinations to encourage active transportation throughout the three communities and surrounding jurisdictions.

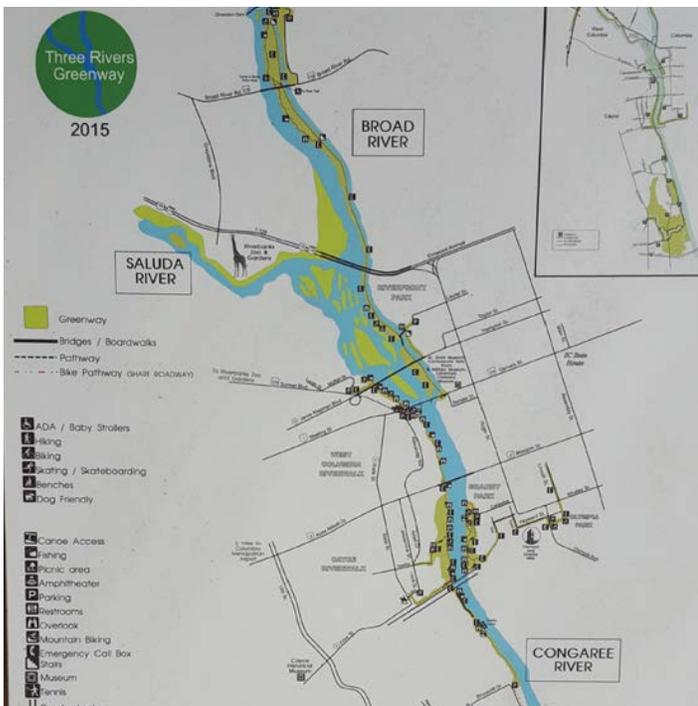
The development of the Plan focused on safety, connectivity, and accessibility for residents throughout the West Metro region. Recommendations build upon the

previous and ongoing work from all three communities. Additionally, public input was essential to the planning process and crucial to developing a regional network that will attract more users and connect those users to desirable destinations.

The West Metro study area consists of three adjacent municipalities: Cayce, West Columbia, and Springdale. The entirety of the study area is within the Metropolitan Planning Organization boundary of the Columbia Area Transportation Study, which is housed within CMCOG. Most of the study area is within Lexington County, except for a portion of the City of Cayce that is in Richland County on the east side of the Congaree River. Figure 1.1-1 shows the West Metro study area along with major roadways, transit routes/stops, existing bike facilities, existing greenways, and previously proposed greenways.

The West Metro Bike and Pedestrian Master Plan took a comprehensive approach to bicycle and pedestrian infrastructure, route connectivity, accessibility, and policies and programs. Through the implementation of this plan, the West Metro area will become a region where:

- A 43-mile, low-stress network of bicycle and pedestrian facilities exists;
- Amenities, destinations, and neighborhoods are accessible through multiple modes of transportation;
- All ages, abilities, genders, and income levels are comfortable walking and biking throughout the area;
- Bicycle ridership will increase annually;
- Residents are regularly engaged about walking and biking in the West Metro area through programming and events;
- Future development embraces a walking and biking culture;
- Active transportation planning efforts are led by an advisory committee made up of stakeholders from all three communities;
- School-age children can safely walk and bike to schools within the West Metro area; and
- Transit can be accessed safely and conveniently by walking or biking.



Existing trail system

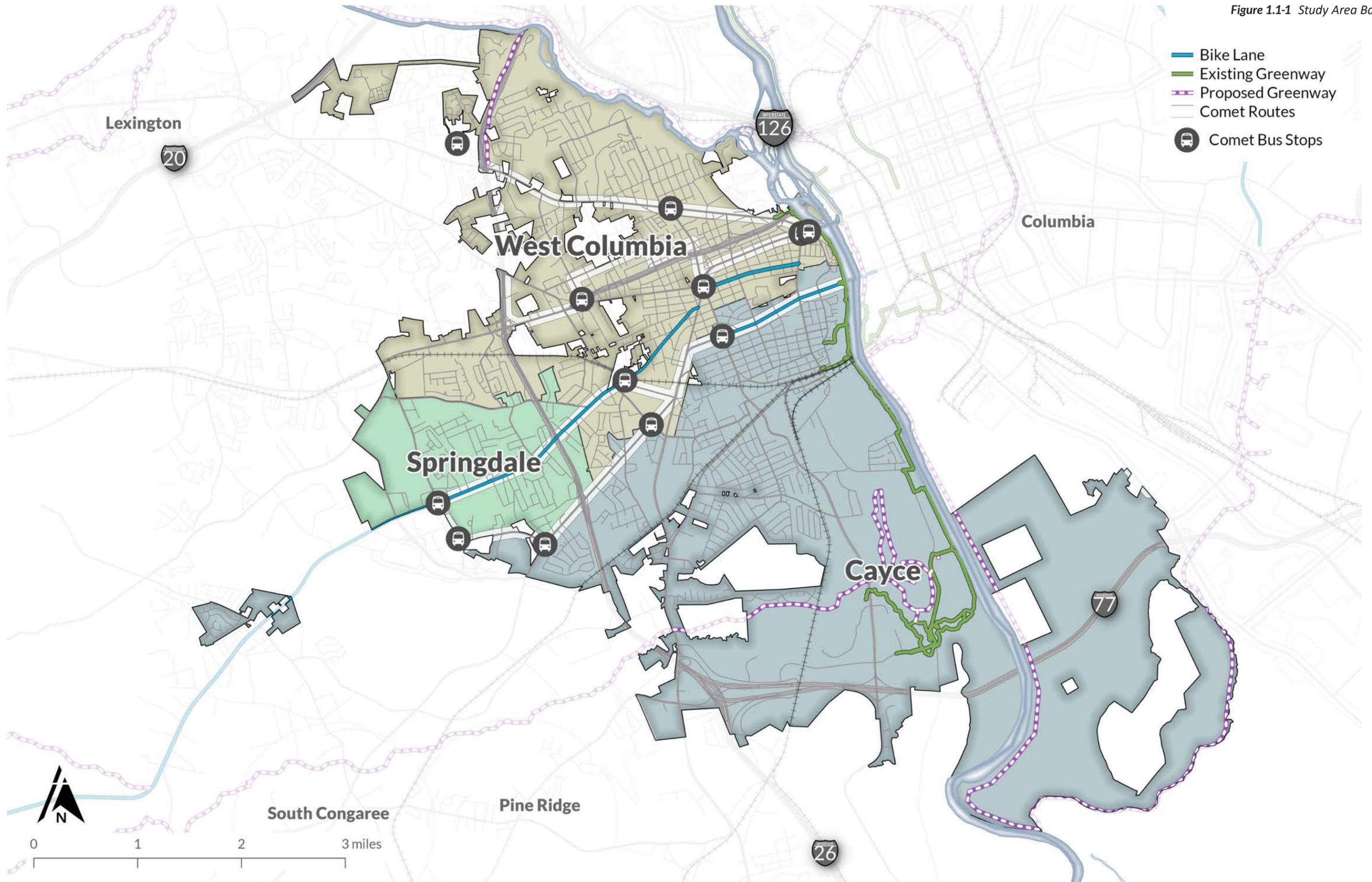
1.1 Goals and Objectives

To guide the planning process, goals and objectives were developed based upon input from the municipal staff of Cayce, West Columbia, and Springdale, stakeholder comments, and public input. Key themes of previous planning documents (see Section 1.2) were also considered in order to ensure that goals and objectives aligned with community initiatives and vision. The goals and objectives presented in Table 1.1-1 set the stage for recommendations, including how projects are prioritized and phased for implementation.

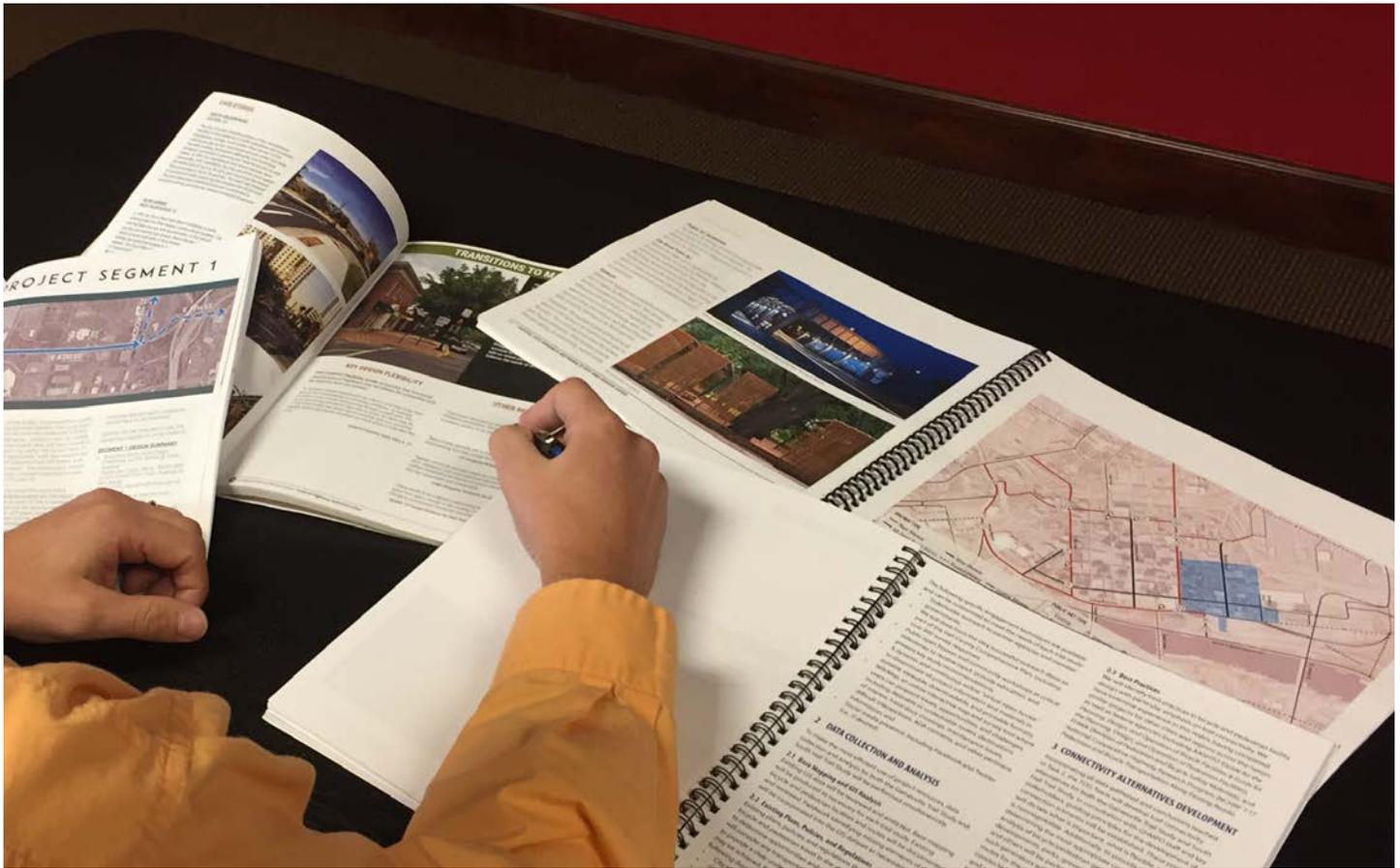
Table 1.1-1 Goals and Objectives

Goal	Objectives
Connectivity Complete a connected and accessible network of low-stress bike and pedestrian facilities.	<ul style="list-style-type: none"> • Build and maintain bike and pedestrian facilities that form a continuous, comfortable network with seamless connections to transit, schools, parks, neighborhoods, and other community destinations. • Provide on-street and adjacent-to-street bike and pedestrian connections to existing and planned greenway access locations.
Safety Improve safety for all modes of transportation	<ul style="list-style-type: none"> • Identify key intersections for safety improvements for cyclists and pedestrians. • Increase separation for cyclists and pedestrians from vehicular travel lanes along corridors with speed limits greater than 35 miles per hour (mph). • Enforce existing laws, including laws that pertain to vehicular speeds and driver behavior (e.g., distracted driving), yielding of right-of-way, and pedestrian and bicyclist behavior.
Increase Users Provide a comfortable network that encourages biking and walking by users of all ages and abilities.	<ul style="list-style-type: none"> • Attract new users by creating a comfortable and connected regional network for biking and walking. • Implement a program for counting cyclists and pedestrians, specifically before and after new infrastructure is constructed. • Host open streets events to showcase new bike and pedestrian facility types and educate the community on benefits.
Community-wide Access Provide equitable access to bike and pedestrian facilities and cultivate an environment of respect for all modes of transportation.	<ul style="list-style-type: none"> • Create a West Metro Bicycle and Pedestrian Advisory Committee (BPAC) to be a champion for bike and pedestrian infrastructure in the West Metro area. • Implement comfortable bike and pedestrian facilities to ensure access is provided in all parts of the West Metro region. • Implement pilot programs and initiatives that promote education for all modes of transportation about the rules of the road and respect for all users.

Figure 1.1-1 Study Area Basemap



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1.2 Existing Plans, Policies, and Programs Review

To contextualize the West Metro Bike and Pedestrian Master Plan, the project team conducted a review of prior planning efforts and local government regulations pertaining to biking and walking in the study area. The detailed review is included in Appendix A. Key themes were identified from the plan review and are presented below. Table 1.2-1 provides a summary of which plans reflect each theme.

Prior Planning Key Themes

- Active Transportation Connectivity: Connecting planned and existing bike lanes, trails, and paths to create a cohesive network that can be utilized for transportation and recreation
- Gateways: Creating attractive and multimodal entrances to downtown areas
- Beautification and Place: Encouraging a sense of “place” within the three communities by updating landscaping and streetscaping that attracts visitors and new residents
- Redevelop and Revitalize: Using economic tools, beautification, and multimodal travel to reinvigorate existing communities
- Safety: Creating active transportation facilities that are safe for all ages and abilities
- Transit Linkages: Coordinating transit and active transportation planning so that convenient and effective linkages are accessible to the three communities

Table 1.2-1 Prior Planning Key Themes

Existing Plan	Active Transportation Connectivity	Gateways	Beautification & Place	Redevelop & Revitalize	Safety	Transit Linkages
Springdale Master Plan Charrette	X	x	x	x		
Moving the Midlands: 2040 Long Range Transportation Plan	x				x	x
Knox Abbott Drive Master Plan		x	x		x	
Springdale Comprehensive Plan	x		x	x	x	
West Columbia Gateway Overlay District Redevelopment Plan	x	x	x	x	x	
City of West Columbia Comprehensive Plan			x		x	x
West Columbia Beautification Plan	x		x			
Central Midlands Bicycle and Pedestrian Regional Pathways Plan	x				x	
Cayce Comprehensive Plan Overview	x			x		x
Cayce Master Plan Charrette	x		x	x		
CMCOG Model Policy Guidelines	x				x	

1.3 Public Participation Summary

Listening to the public’s thoughts on biking and walking in the West Metro area was crucial in forming the recommended network, building the project’s momentum, and attracting new users once the Plan is implemented. Engagement occurred in a variety of ways, encouraging a broad cross-section of the public and key stakeholders to participate, ensuring that the West Metro Bike and Pedestrian Master Plan will comprehensively address citizens’ needs and remove barriers that impact network recommendations. Detailed documentation of each engagement effort is included in Appendix B, but key methods and emerging themes are summarized here.

Steering Committee

A project steering committee was formed to guide the overall process and development of the Plan. The steering committee was comprised of key staff from Cayce, West Columbia, and Springdale, along with CMCOG representatives. The steering committee met at key project milestones, during which feedback was solicited on other public participation efforts, study methods, and draft network recommendations.

Pop-Up Events

Informing the public about the planning process was a critical step in gaining valuable feedback to help shape the Plan that will guide improvements within the bike and pedestrian environment throughout the West Metro area. To reach a diverse and large number of the public within all three communities, the Project Team used informal “pop-up” events to distribute informational materials, promote the planning process, and receive valuable feedback. A pop-up style strategy engages the community at events that are already well-attended. Postcards with project information and the link to the online interactive Wikimap were distributed at all pop-up events. On April 8, 2017, the Project Team conducted pop-up events at the following community gatherings to solicit input and discuss opportunities to enhance biking and walking in the West Metro area:

- Easter in Springdale
- Cayce Festival of the Arts
- Rhythm on the River in West Columbia



A pop-up event was held at West Columbia’s Rhythm on the River

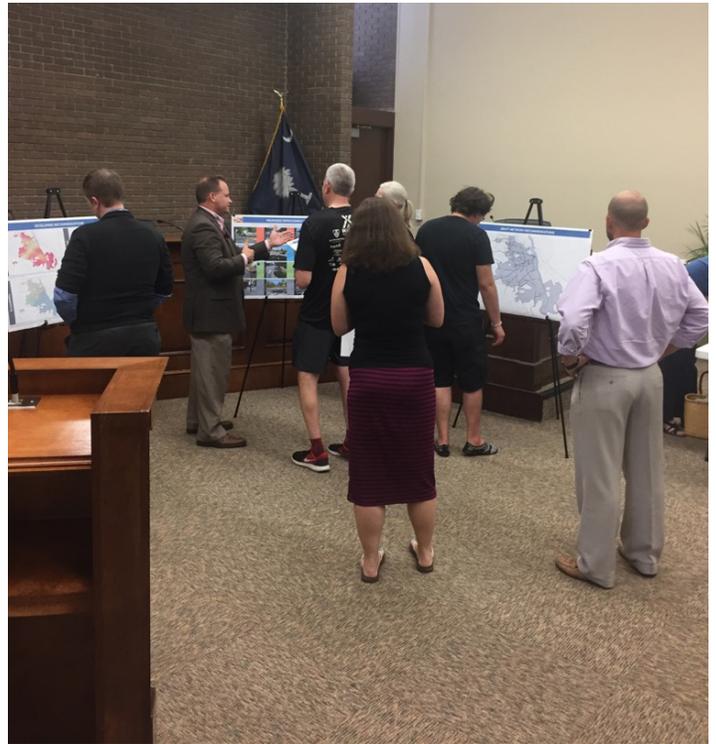
All three events provided interactive activities, allowing the public to provide input in a quick, streamlined manner. These activities asked participants about barriers to walking and biking in the West Metro area. Over 26% of participants said that “lack of safe bicycle and pedestrian facilities” is what prevented them from biking or walking more often, and 30% stated that “dangerous intersections” were the greatest deterrent. A more detailed description of each event can be found in Appendix B.



Festival of the Arts in Cayce

Council Outreach

On May 2, 2017, the Project Team presented an overview of the planning process and provided a project update for the West Metro Bike and Pedestrian Master Plan to elected officials of all three communities. These presentations were conducted concurrently by the Project Team, along with providing the opportunity for feedback through interactive activities that asked participants their preference for the type of bike and pedestrian infrastructure they would like to see implemented within each community. Based upon feedback from all three communities, 25% of participants would like to see shared-use paths as a facility type for bikes and pedestrians within the West Metro area. Median refuges received 21% of the responses, which emphasized the need for safe pedestrian crossings within the region.



Project update meeting for Council

Wikimap

An online interactive map, or WikiMap, was created to collect public input about existing bike and pedestrian conditions, barriers to walking and biking, unsafe intersections, key destinations, desirable walking and biking routes, and potential locations of future bike share stations. The map was opened for input in April 2017, coinciding with the pop-up events in each community, and closed mid-June. The WikiMap was promoted to the community through a variety of means, including links from websites, postcards distributed during pop-up events, and during Council presentations. WikiMap input was integrated into the broader public input and helped to develop draft recommendations.

A total of 94 people participated in the WikiMap, contributing 97 individual comments. The participants of the Wikimap provided key information for developing the draft recommendations along with demographic information of each participant. Figures 1.3-1 to 1.3-4 present key information collected through this online engagement tool.

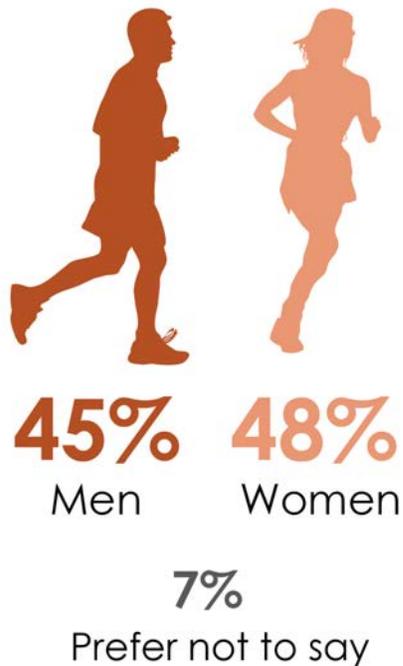


Figure 1.3-1 Wikimap Participants Gender

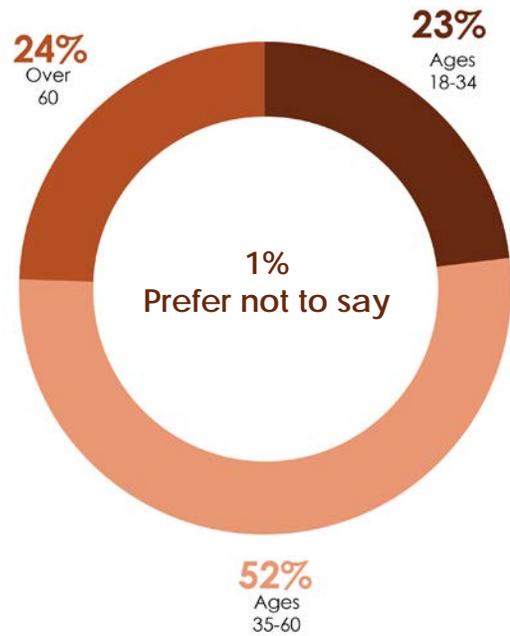


Figure 1.3-2 Wikimap Participants Age

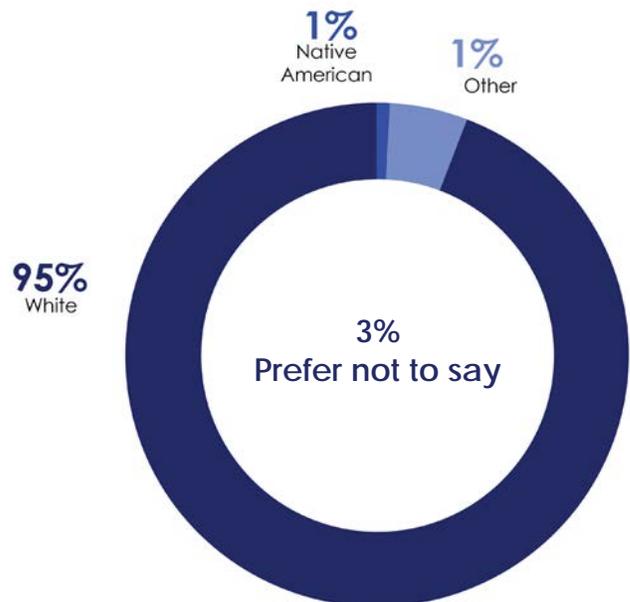


Figure 1.3-3 Wikimap Participants Demographics

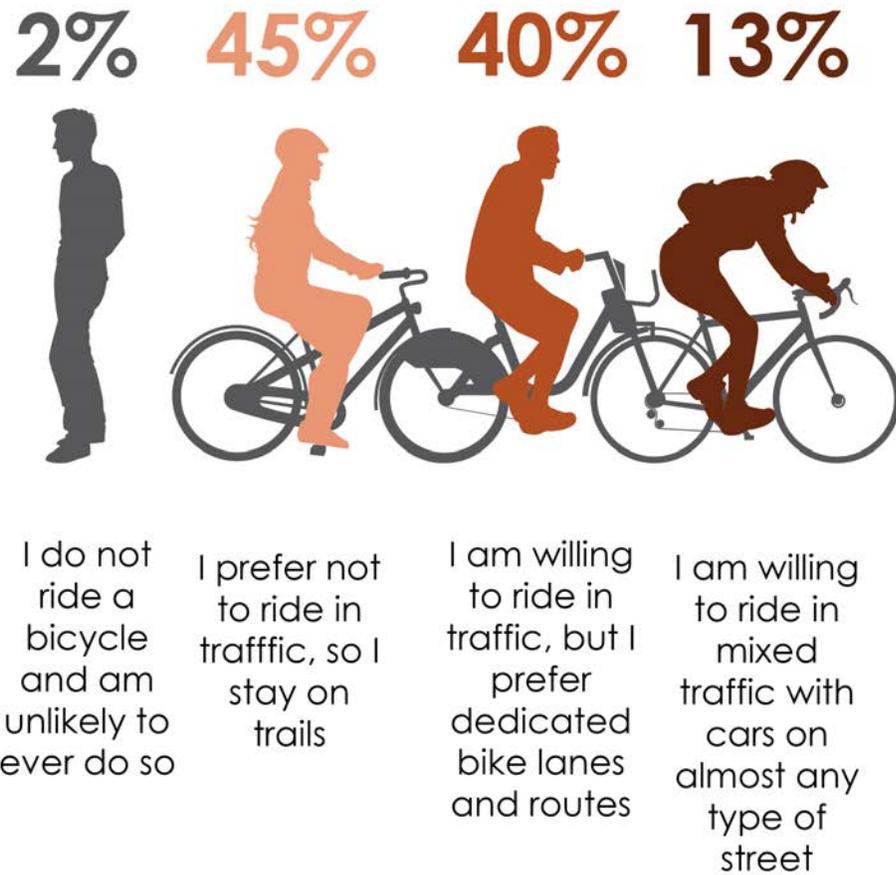


Figure 1.3-4 Wikimap Types of Cyclists

Stakeholder Engagement

The project team conducted interviews with various stakeholders throughout the planning process. Conversations with stakeholders allowed community members to provide insight that may be missed during the standard public meeting process. There were 26 stakeholders from a variety of organizations that provided

feedback for the West Metro Bike and Pedestrian Master Plan. Participants were asked to describe current conditions, major opportunities and barriers, desired outcomes and actions, and key destinations to connect with respect to bicycling and walking in the study area. Repeated topic areas are presented below.

STAKEHOLDER INTERVIEW HIGHLIGHTS		
<p>Current Condition</p> <ul style="list-style-type: none"> High speed limits make cyclists feel unsafe Poor maintenance for existing on-street bike lanes <p>Opportunities</p> <ul style="list-style-type: none"> Increase tourism and economic benefits Overall improvement for connectivity Community health benefit 	<p>Barriers</p> <ul style="list-style-type: none"> Education for drivers and cyclists Distracted driving Lack of maintenance High speed limits and traffic volumes <p>Desired Outcomes</p> <ul style="list-style-type: none"> Paths to key destinations (parks, schools, businesses) Well-defined bike routes Connectivity throughout West Metro 	<p>Desired Actions</p> <ul style="list-style-type: none"> Develop a vision for a bike and pedestrian network Enforce existing laws Signage for safety and wayfinding Improve comfort for all users <p>Destinations to Connect</p> <ul style="list-style-type: none"> Riverwalk/Timmerman Trail 12th Street



NETWORK DEVELOPMENT

2. NETWORK DEVELOPMENT

Based on national research, approximately 51% people might use a bike more often if the appropriate infrastructure was implemented. This group of potential users is categorized as the “Interested but Concerned,” as presented in Figure 2.0-1 below.

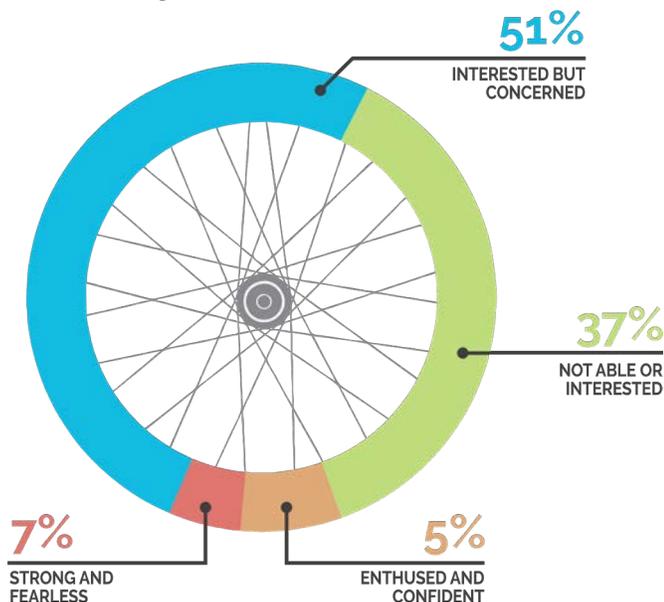


Figure 2.0-1 Bicyclist User Types (Source: Dill & McNeil, 2015)

Balancing input received from the public, stakeholders, and the steering committee with technical analyses was critical to crafting a network of improvements to attract the “Interested but Concerned” within the region. The following sections present the technical approach used to

develop the overall draft network.

2.1 Demand Analysis

The purpose of the demand analysis is to highlight places within Cayce, West Columbia, and Springdale that are either: 1) currently hubs for bicycle and pedestrian activity; or 2) may be hubs of activity in the future. These places create demand for high quality infrastructure to support existing users and attract users in the future. Places that are already “hotspots” of active transportation can serve as nodes of a network of bicycle and pedestrian infrastructure. The activity centers in the West Metro area were used to inform and prioritize network recommendations.

Process and Outcomes

The demand analysis created for the West Metro study area identifies existing and potential demand for bicycle and pedestrian activity. The demand analysis map, or heatmap, presented in Figure 2.1-1 illustrates these locations by considering multiple weighted demand criteria, including but not limited to existing active transportation infrastructure, the locations of schools and parks, and a variety of zoning categories; these criteria are presented in Table 2.1-1. Each criteria and its weight was chosen based on its likelihood to generate biking and/or walking trips. Together, these inputs provide a picture of locations where bike and pedestrian infrastructure will most likely be successful.

Table 2.1-1 Demand Criteria

Input	Weight	Rationale
Comet Routes/Stops	7	Transit ridership generates demand for bike and pedestrian facilities
Existing/Future Schools	20	Students may be frequent users of active transportation to commute to school if safe facilities are provided
Existing Active Transportation Infrastructure	25	Existing infrastructure indicates a certain level of bike and pedestrian activity currently exists
Parks	15	Parks are existing locations of pedestrian activity and destinations for bicyclists and pedestrians
Commercial Properties	3	Commercial zoning districts are often destinations for bike and pedestrian trips
High Density Residential Development (Multi-family)	10	Dense residential zoning districts likely provide a safe and comfortable biking and walking environment
Critical Corridors	20	<ul style="list-style-type: none"> • Knox Abbott Drive • State Street • Platt Springs Road • Meeting Street • Sunset Boulevard • 12th Street • Airport Boulevard • US 1

2.2 Level of Comfort Analysis

Bicyclists have varying levels of tolerance for the stress created by volume, speed, and proximity of adjacent traffic. Their tolerance may vary by time of day or trip purpose, and it may change over time and with bicycling experience. To quantify a cyclist's comfort, a Level of Comfort (LOC) analysis was performed for the West Metro area. The LOC analysis is based on a concept developed in the Mineta Report that assigns a score to a given segment of street or bicycle infrastructure based on its characteristics, such as the level of separation from traffic, road speeds, traffic volumes, and safe crossings on major roadways.

This analysis was customized for the West Metro area, and it is intended to inform the West Metro Bike and Pedestrian Master Plan as a baseline understanding of existing roadway comfort. As noted in the goals, the network should be planned to serve the "Interested but Concerned" rider. The LOC analysis informs the type of infrastructure improvements needed to improve rider comfort to attract these riders.

While it may not reflect the experience of every individual bicyclist, the LOC ratings reflect a "worst case scenario" so that the assigned LOC score is a conservative estimate, which is appropriate for infrastructure's long-term nature.

Process and Outcomes

The overall LOC map presented in Figure 2.2-1 illustrates all five of the LOC scores for the West Metro study area. Additionally, the analysis extends beyond the study area limits because it is important to understand the LOC of streets entering and exiting the study area to provide a clear and accurate depiction of the existing conditions for regional bikeability.

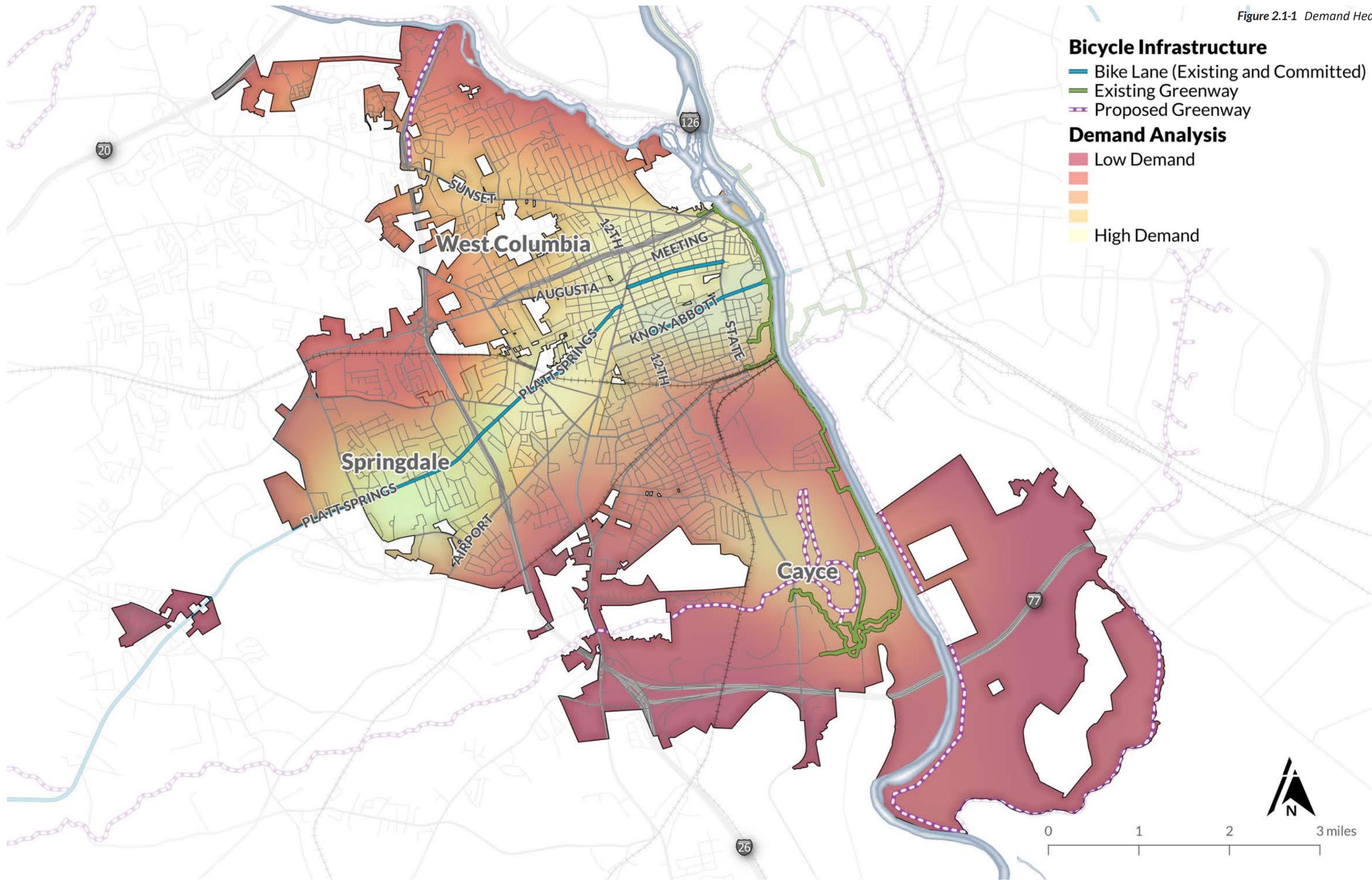
LOW-STRESS ISLANDS

During planning and implementation, it is important to determine where "low-stress islands" exist. Low-stress islands are created when streets within a neighborhood are connected, but there is no way to reach an adjacent neighborhood without crossing a high stress street (LTS 3 and 4 streets). These islands detract from overall connectivity and cohesion within the West Metro area. Crossings at key locations should be identified and prioritized for improvement.



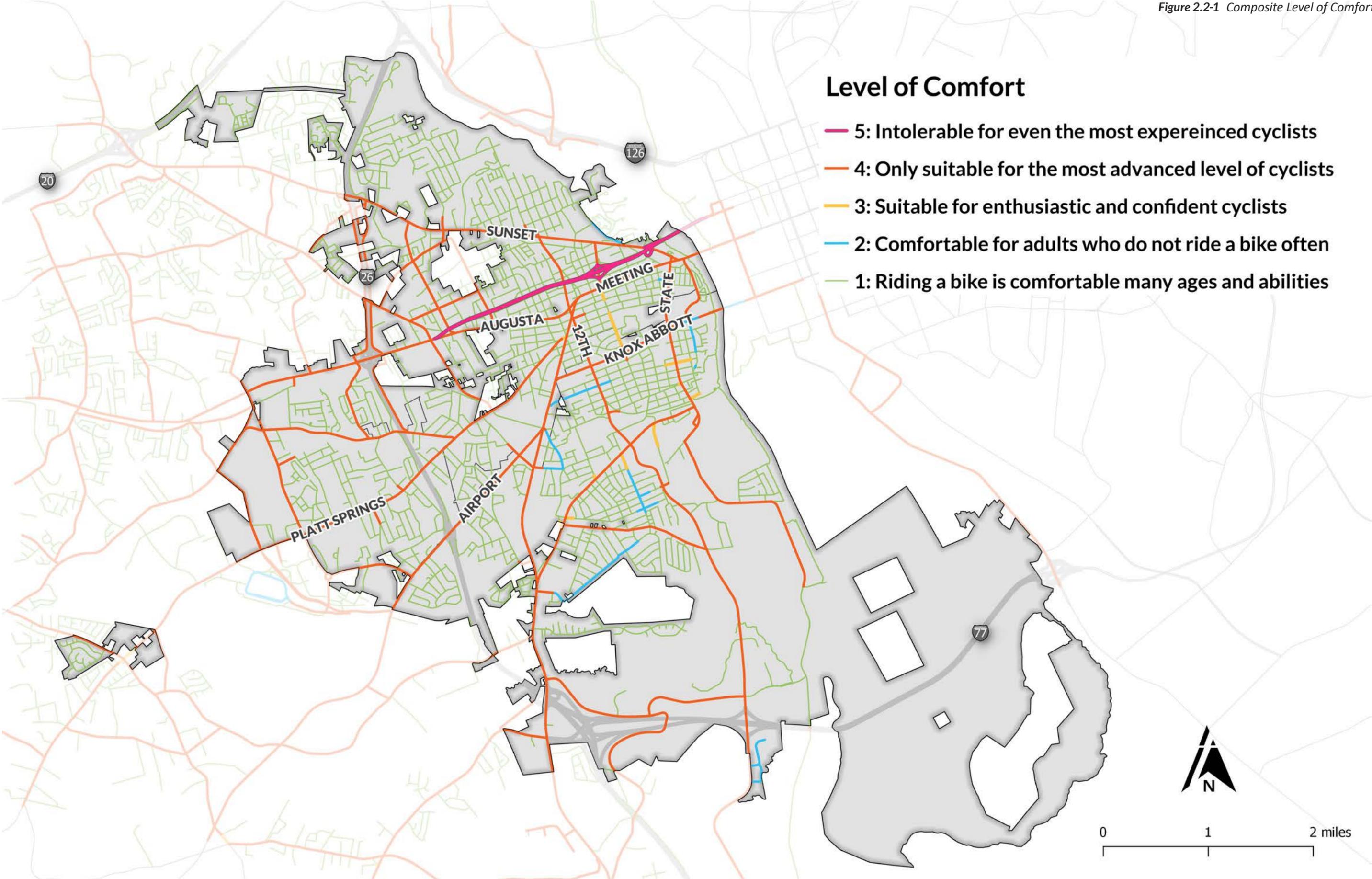
Existing bike lane adjacent to street with high volumes and high speeds

Figure 2.1-1 Demand Heatmap



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Figure 2.2-1 Composite Level of Comfort Map



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The following pages illustrate each LOC score separately along with a short description and examples of streets that fall into each respective scoring category. An exhaustive list of all the factors considered in the LOC analysis is included in Appendix C.

LOC 1 is assigned to areas where riding a bike is comfortable for a wide range of ages and abilities. Off-street bike facilities, such as multiuse paths, trails, and greenways, are included in this category. Roads within this category are characterized by slower speeds (<35 mph), lower Annual Average Daily Traffic (AADT), and one or two adjacent travel lanes.

Representative LOC 1 Facilities:

- Three Rivers Greenway
- Neighborhood streets



Three Rivers Greenway is an example of a LOC 1 facility

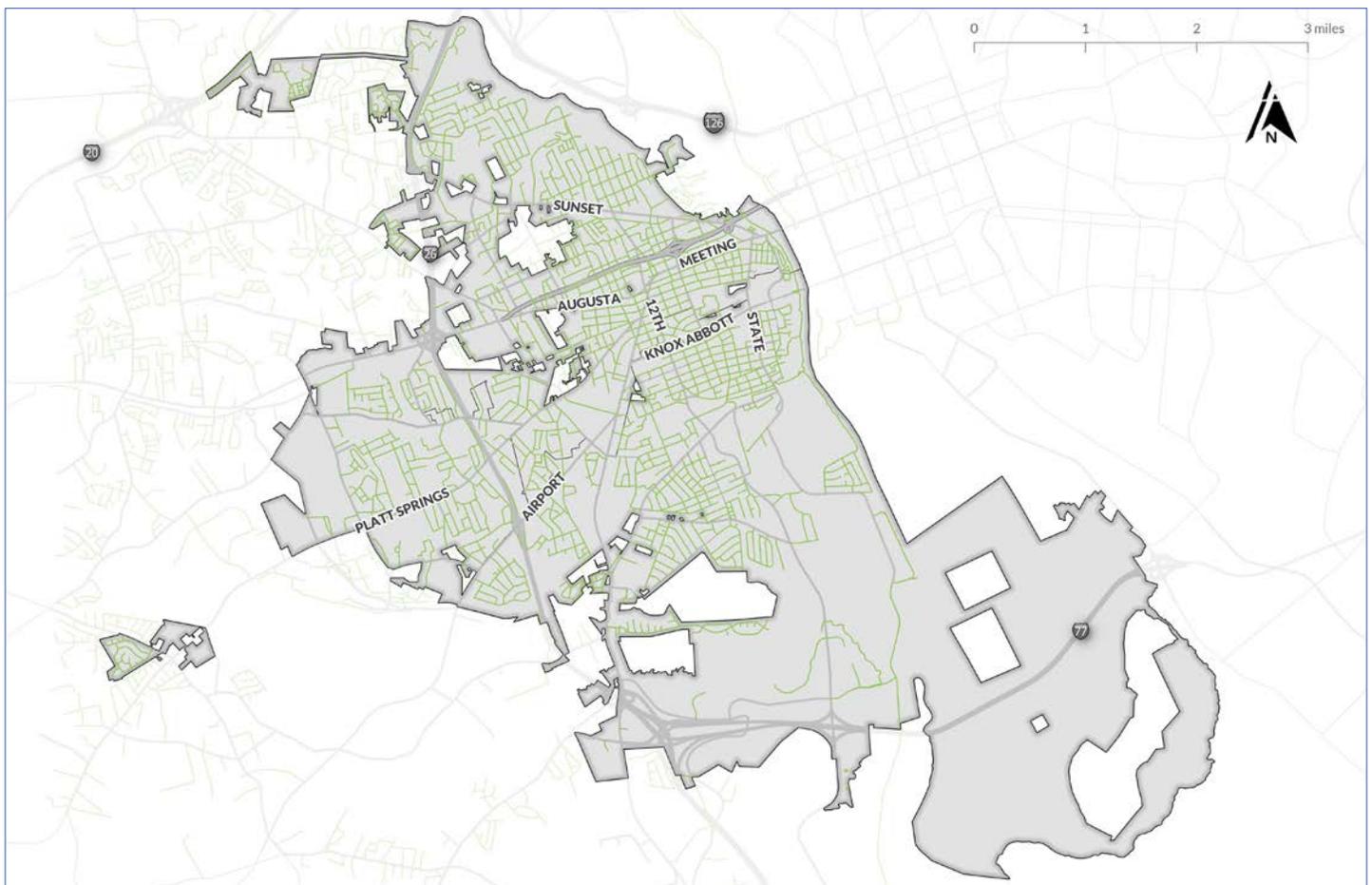


Figure 2.2-2 LOC 1 Facilities

LOC 2 is assigned to roads that may be comfortable for adults that don't ride a bike often. Roads within this category are characterized by designated bike lanes, moderate speeds (30-45 mph), one or more adjacent travel lanes, and moderate traffic volumes (2,000-4,000 vehicles daily).

Representative LOC 2 Facilities:

- North Eden Drive
- Julius Felder Street
- Axtell Drive



Slow speeds and wide travel lanes provide a more comfortable bike and pedestrian environment



Figure 2.2-3 LOC 2 Facilities

LOC 3 is assigned to areas well suited for enthusiastic cyclists that are confident in their abilities and comfortable riding in mixed traffic. Roads within this category are characterized by designated bike lanes, moderately high speeds (35-45 mph), one or more adjacent travel lanes, and higher traffic volumes (4,000-8,000 vehicles daily). Within the West Metro area, there are very few examples of streets with a current LOC 3 score, and, in all cases, they are short segments providing little connectivity.

Representative LOC 3 Facilities:

- 9th Street
- Foreman Street
- Lafayette Avenue



Streets with increase speeds and a lack of bike facilities decrease comfort for bike users

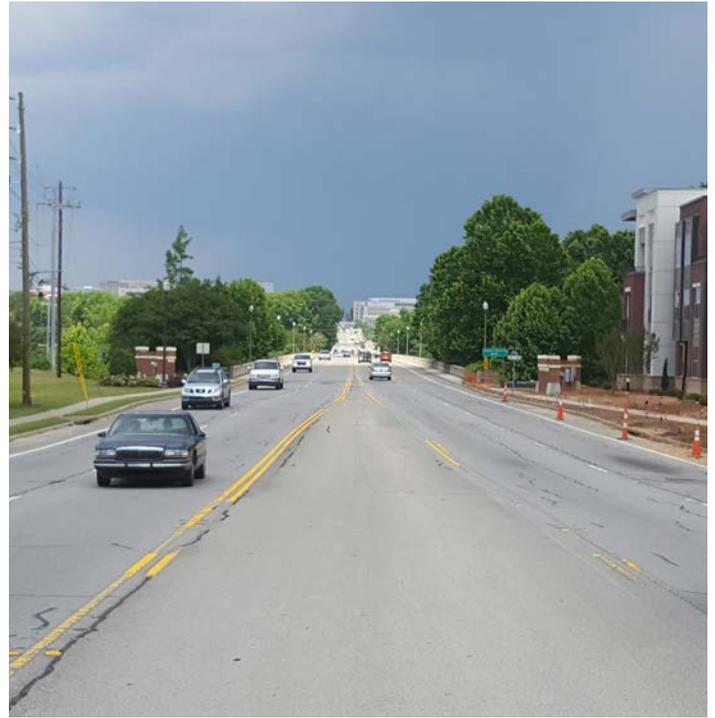


Figure 2.2-4 LOC 3 Facilities

LOC 4 are streets that are not comfortable for bicycle travel and may only be suitable for the most advanced level of cyclist, the strong and fearless, in rare circumstances. Roads within this category are characterized by high speeds, one or more adjacent travel lanes, and high traffic volumes (>8,000 vehicles daily).

Representative LOC 4 Facilities:

- Knox Abbott Drive
- Sunset Boulevard
- Platt Springs Road



Multiple travel lanes and high speeds create uncomfortable conditions for bikes and pedestrians



Figure 2.2-5 LOC 4 Facilities

LOC 5 is a category that is intolerable for even the most experienced adult cyclists. Roads within this category are characterized by very high speeds (55+ mph), multiple adjacent travel lanes, and limited access.

Representative LOC 5 Facilities:

- Jarvis Klapman Boulevard



High speeds and volumes along Jarvis Klapman Boulevard create dangerous conditions for cyclists



Figure 2.2-6 LOC 5 Facilities

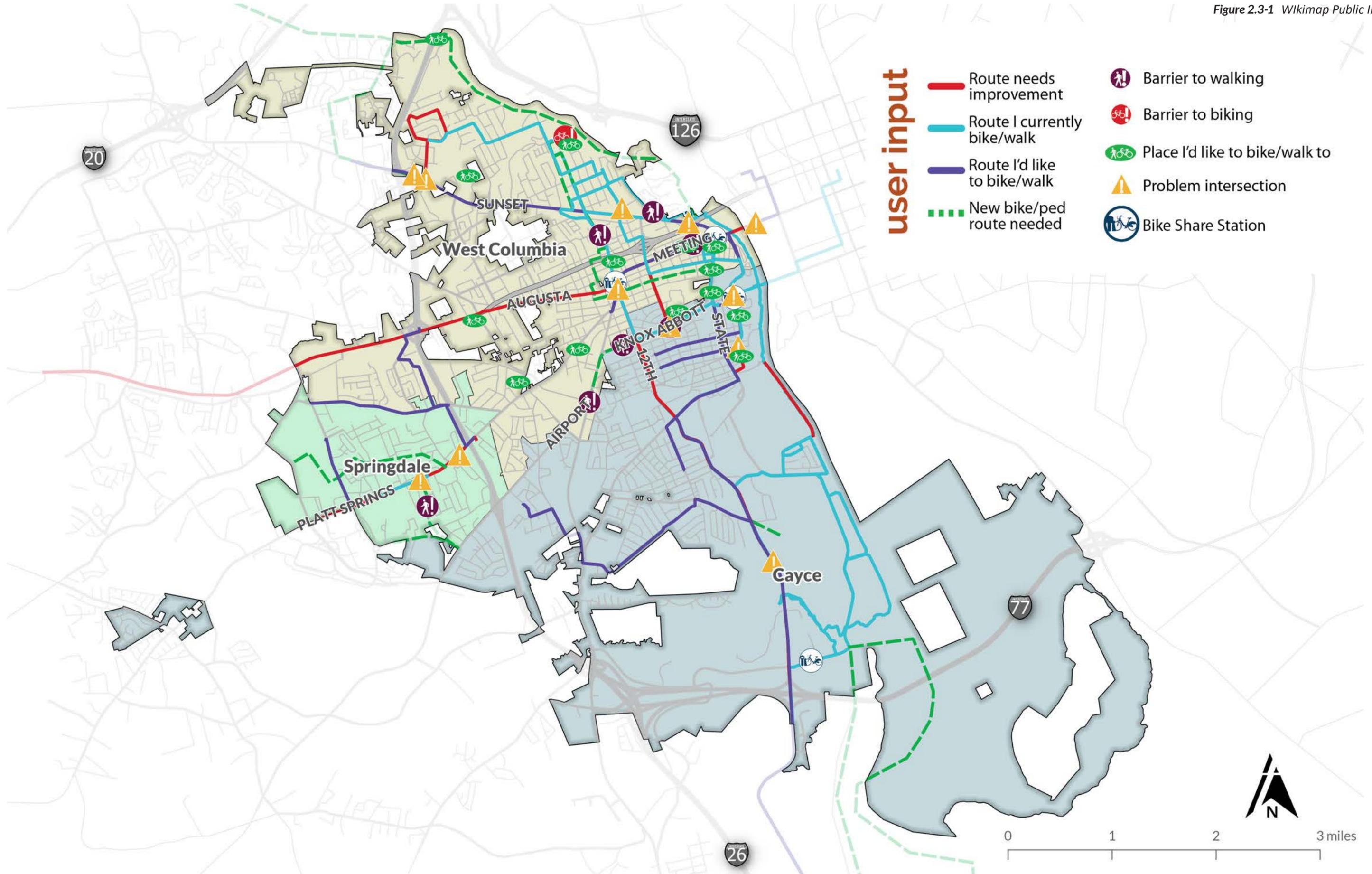
2.3 Public Input

Results from the Wikimap were included in the analysis to identify key destinations, barriers to biking and walking, and intersection and roads in need of improvement. Public comments were used as another layer of analysis when developing draft recommendations.

The results of the Wikimap along with other public input was used comparatively with the LOC and demand analyses. The proposed network considered the key destinations that users desired to access by biking or walking in order to recommend a facilities that would increase safety and connectivity for all existing and potential users. Additionally, barriers and problem intersections identified by the public were reviewed for targeted improvements as part of the overall network, as well as a key consideration for prioritization of projects.

Although a majority of comments received were within the municipal boundaries of Cayce, West Columbia, and Springdale, there were several public comments for connectivity outside of the study area. These comments were reviewed and incorporated into the proposed network where applicable regional connections were necessary.

Figure 2.3-1 Wikimap Public Input



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2.4 Accessibility Grid

To ensure that the proposed network connected destinations across the entire West Metro area, the Project Team used an “accessibility grid” as another factor for selecting roads for improvement. The grid consisted of multiple one square-mile blocks covering the study area. The proposed network was designed so that each square-mile block that contained identified amenities (e.g., schools, parks, destinations identified in the Wikimap results, etc.) had roughly one north-south connection and one east-west connection.

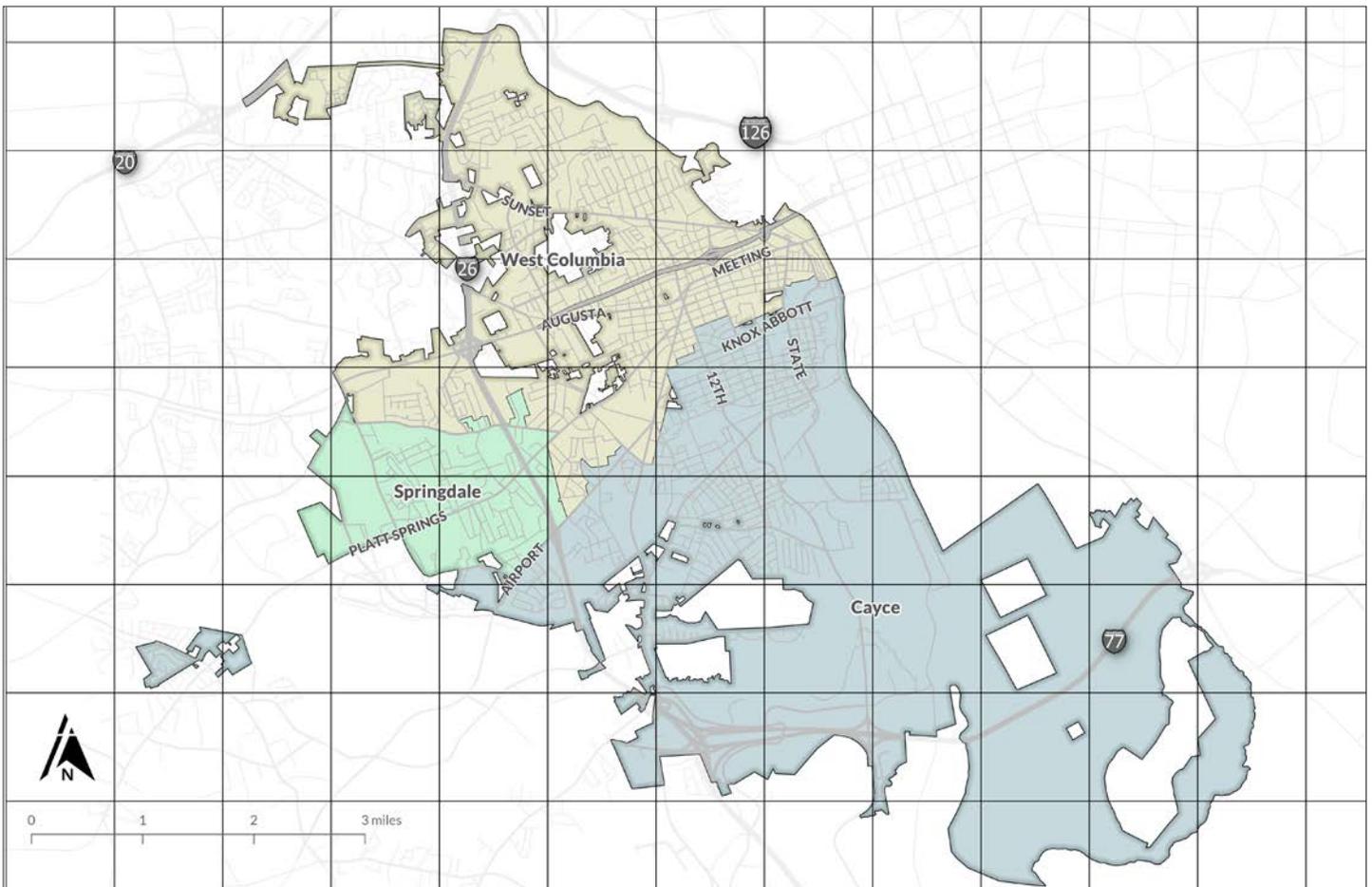


Figure 2.4-1 Accessibility Grid





RECOMMENDATIONS

3. RECOMMENDATIONS

Based on previous planning, public input received, and analysis performed as part of network development, recommendations for the proposed network were drafted and refined. Recommendations included here are comprised of the proposed network itself and facility toolboxes to guide the design of recommended facilities.



The proposed network has been crafted to increase comfort for all ages and abilities

3.1 Proposed Network

This section presents a brief review of the network development process, but the focus is the presentation of a bicycle and pedestrian facility network for implementation. This network strategically utilizes existing streets that provide the most connectivity to create a complete network accessible to people of all abilities throughout Cayce, West Columbia, and Springdale. The overarching strategy of the West Metro Bike and Pedestrian Master Plan is to create a network where the “Interested but Concerned” rider is the design standard.

The development of a successful bicycle and pedestrian network is the most important step that the West Metro area can take to become bicycle and pedestrian friendly. Providing a low-stress network that is connected, safety-focused, convenient, and comfortable will help the municipalities achieve the goals set forth in this plan. The

following bullets explain how each of the Plan goals guided network design.

- **Connectivity:** Network recommendations create continuous routes throughout the West Metro area, connecting neighborhoods to one another and to major destinations such as schools, trails, commercial districts and downtown.
- **Safety:** Recommendations are provided to address the most typical safety issues and to prioritize improvements along priority corridors and intersections. Recognizable bike routes will alert drivers to be more conscious of bicycle traffic on the street.
- **Increase Users:** Providing a complete, low-stress network that includes a range of facility types will enable more people to use a bicycle for more of their trips. Additionally, the lower the stress is for bicyclists, the lower the stress will be for pedestrians as well.
- **Community-wide Access:** Network recommendations cover the entire geography of the West Metro area, ensuring residents of all types, including families with children, in all neighborhoods are served by the low-stress network. Streets that are more active with bicyclists and pedestrians can also promote the personal interactions that form the foundation for neighborhood livability and vitality.

As previously discussed, the proposed network was developed through an iterative process of existing conditions analysis, field work, public and stakeholder interview and discussion, level of comfort assessment, and demand analysis. Using these inputs, a draft network was developed and reviewed by the public and agency stakeholders. Their input was incorporated into the final recommended network.

Increasing bicycle ridership is best done by creating a low stress network of facilities so that those who may not feel comfortable riding in stressful traffic conditions can confidently use the active transportation network. With this in mind, the proposed routes have been paired with one or more types of recommended facility improvements that would provide a rider the experience of LOC 1 or LOC 2. The proposed bicycle and pedestrian network is presented graphically in Figure 3.1-1. In addition to route improvements, key intersection improvements are also included. All recommended facilities are further outlined in Section 4 of the Plan, where prioritization, cost, and phasing are articulated.

3.2 Facility Toolboxes

Network development should follow the design guidance presented in the “Bicycle Facility Toolbox” and the “Pedestrian Facility Toolbox” presented in this section. While the network outlines a framework for facility location decisions, these guidelines provide facility recommendations for each recommendation based on its existing level of comfort. These guides should be used as starting points for integrating new facilities into existing roadways, and they should be consulted throughout the design process.

The following facility toolboxes and spot improvement actions are recommended to build the proposed active transportation network. While this summary should not be used as a design standard, it can be helpful in making general design recommendations for each part of the proposed network. Application of the guidance provided in this document requires the use of engineering judgment. Useful design guidelines to help inform design decisions include:

- American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities
- AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities

- Federal Highway Administration (FHWA) Guide for Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts
- South Carolina Department of Transportation (SCDOT) Engineering Directive Memorandum No. 22: Considerations for Bicycle Facilities
- Manual on Uniform Traffic Control Devices (MUTCD)
- National Association of City Transportation Officials (NACTO) Urban Street Design Guide and Urban Bikeway Design Guide

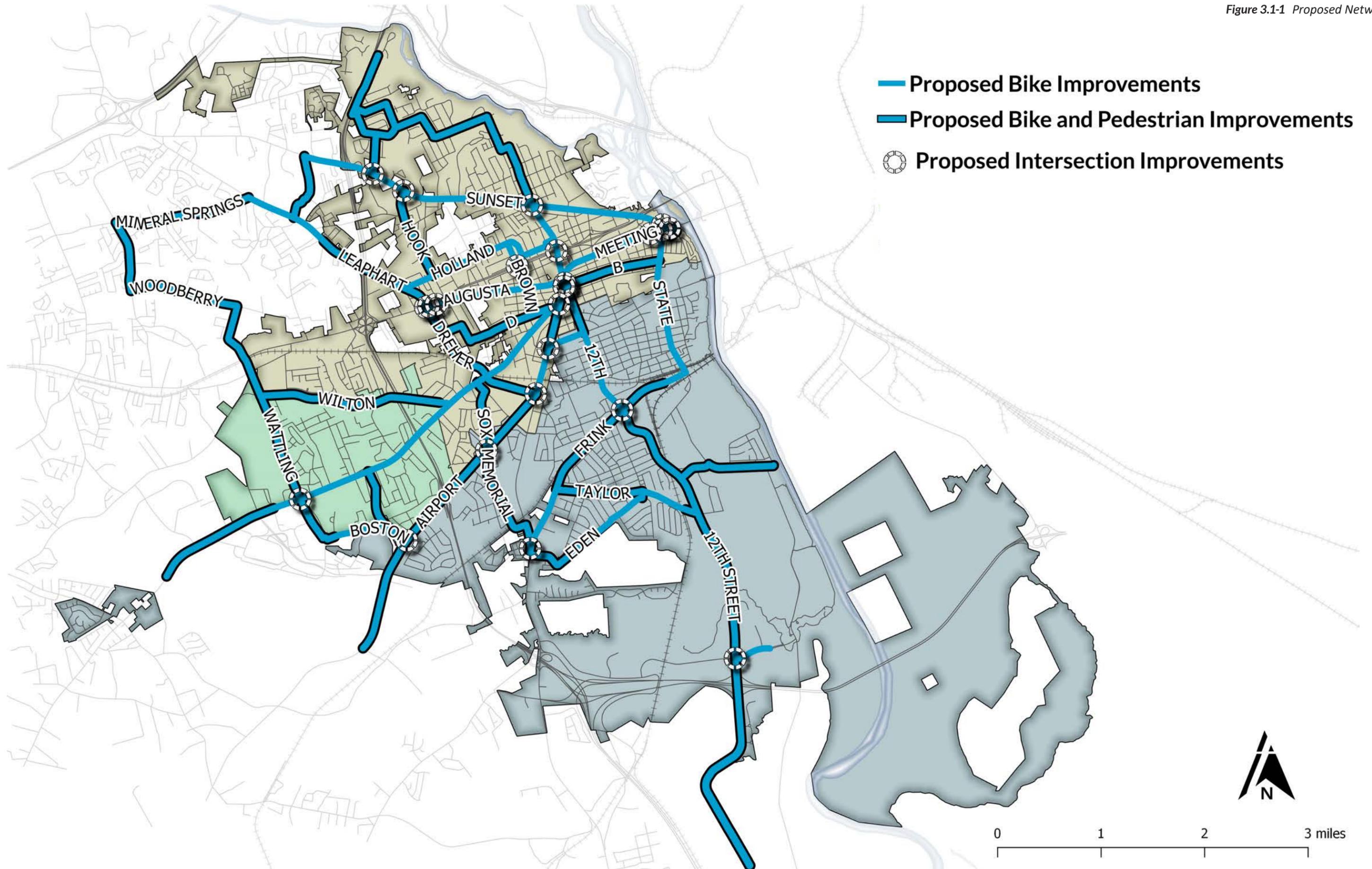
ART AS TRAFFIC CALMING

Art is a fun, community-engaging way to slow traffic down around bicycle and pedestrian crossings. Brightly colored patterns that pay homage to their context will draw drivers’ attention towards crossing pedestrians and cyclists. While art does not always substitute for traditional markings, it can simultaneously beautify and calm traffic on lower stress streets.



Decatur, Georgia uses artistic crosswalks to draw attention to pedestrians and express community vitality

Figure 3.1-1 Proposed Network



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Bicycle Facility Toolbox

There are several different bicycle facility types that can be used to implement the proposed bicycle improvements. The facility types described below should be applied in the West Metro area using best practice standards described here as referenced from detailed design guidelines, including as those developed by the AASHTO, FHWA, SCDOT, and NACTO. The facilities are shown from greater to lesser level of separation from motor vehicle traffic, and each facility type corresponds to a specific context and rider comfort level.

Shared-Use Paths and Sidepaths

Both shared-use paths and sidepaths provide opportunities for cyclists who are not comfortable riding in or beside mixed traffic to use the active transportation system. A shared-use path or trail allows for multiple user types—cyclists, runners, walkers, etc.—to use the same facility at the same time. They can be located along a road right-of-way or in an independent right-of-way, such as a greenway, along a utility corridor, or an abandoned railroad corridor. An existing example of a shared-use path is the Three Rivers Greenway. A shared-use path can have one- or two-way traffic. For two-way traffic, shared-use paths should be 12 feet wide to allow for passing opportunities, allowing different skill/ability levels to comfortably use the path. In constrained areas, the path can narrow to a minimum of 8 feet, but this is not recommended for extended portions.



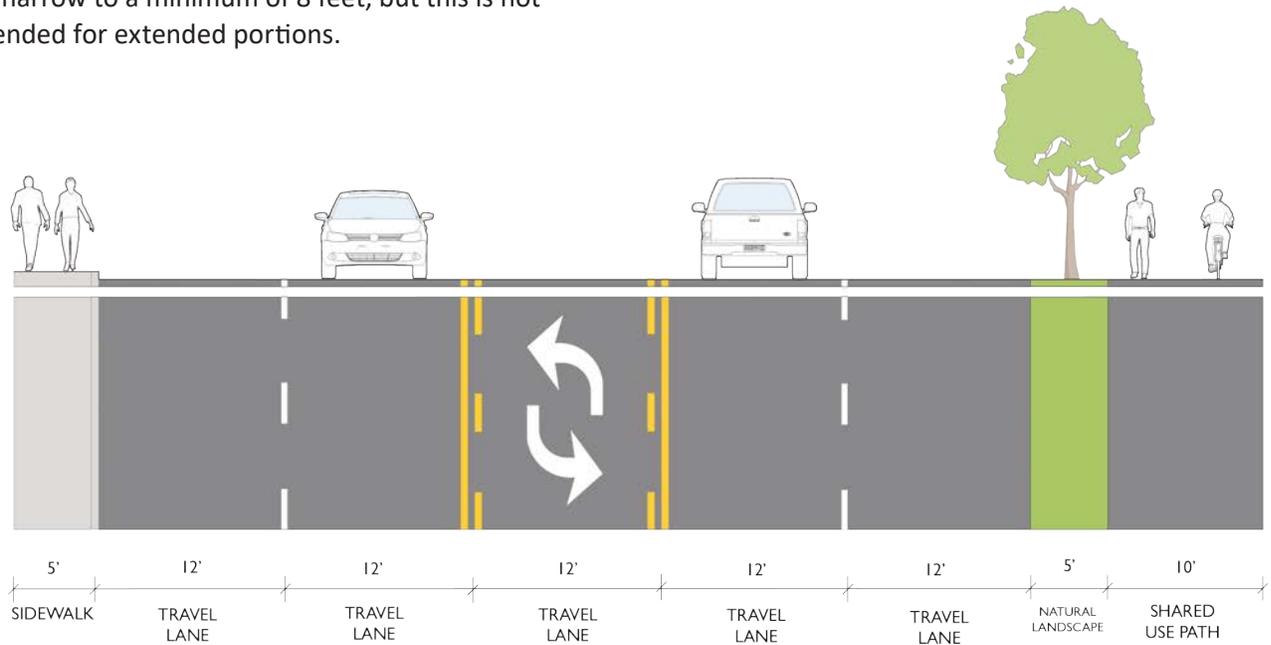
Sidepath parallel to existing street

Sidepaths are bi-directional paved routes for bicyclists, pedestrians, and other non-motorized uses. Sidepaths are often located parallel to existing streets within the right-of-way, particularly those that are of higher speed and volume. Due to the proximity to the road, sidepaths may not be appropriate where there are lots of driveways/side street access. All access point crossings must be carefully designed to ensure safety.

Appropriate Context for Shared-use Paths: Parks, greenways, abandoned railroad corridors

Appropriate Context for Sidepaths: Arterials

Comfort Level: LOC 1



SHARED USE PATH + SIDEWALK
3+ TRAVEL LANES

Example cross section for shared-use path

Separated Bike Lanes

Separated bike lanes are bicycle facilities that are physically separated from both the street and sidewalk. A key reason for providing separated bike lanes at intersections is to reduce the number of conflict points between bicyclists and motorists at intersections. On roadways with traditional bike lanes or shared lanes, bicyclists often must merge with motor vehicles that are traveling at a greater speed. These maneuvers are uncomfortable for most bicyclists due to their vulnerability in traffic.

In contrast, separated bike lanes at intersections reduce bicyclists' exposure by reducing multiple merging and crossing movements to a single predictable crossing point. Vertical separation can provide physical separation from motor vehicles using curbs, planters, or on-street parking. The separation increases the comfort, thereby reducing the traffic stress. Separated bike lanes can be one-directional on each side of the street, or bi-directional on one side of the street.

Designs of protected bike lanes will generally fall into the following two categories:

Flexible Post Protected: This bike lane is street level, and provides physical separation from vehicular travel lanes with vertical flexible delineators. This may be considered an interim treatment, as it is significantly cheaper, and easier to implement than a curb-protected bike lane. This design can lead to an increase in roadway debris within the protected bike lane as debris from the roadway can easily



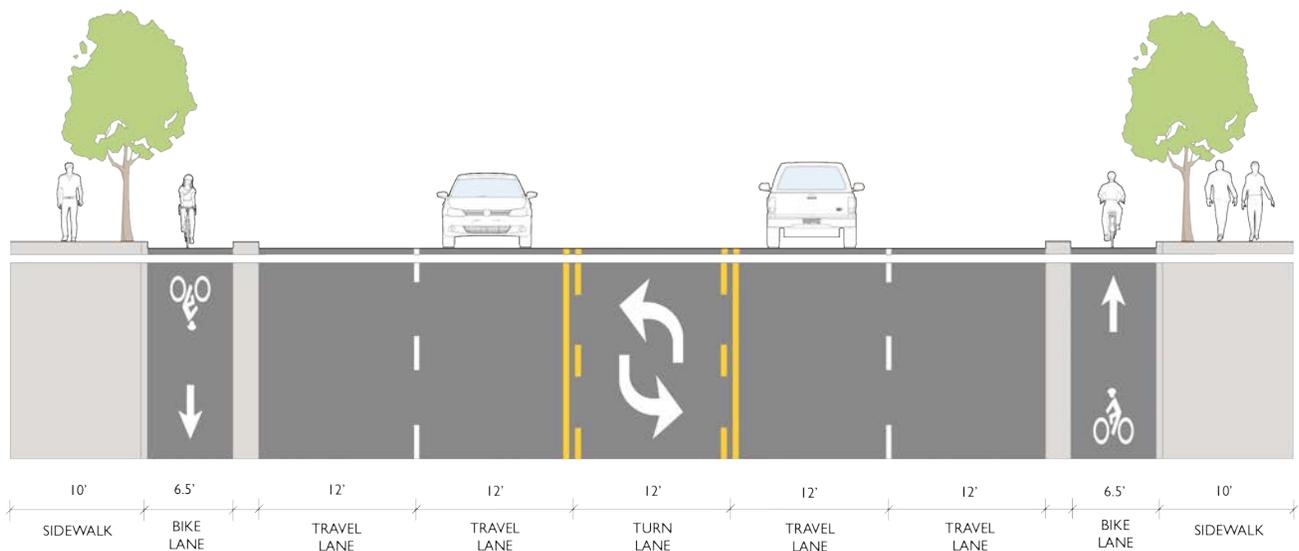
Separated bike lane intersection improvements

deposit within the buffer and bike lane area. The flexible delineators may require repair or replacement if struck by vehicles. On streets with parking, parking will be located between the bike lane and travel lane increasing the level of protection and comfort.

Curb Protected: This bike lane may be street level or sidewalk level. It provides physical separation from parallel vehicle travel lanes with vertical curbing. If the bike lane is street level, the barrier will form narrow medians between the vehicle travel lanes and the bike lane. The curbing can reduce the spread of debris from the roadway and offers more protection than flexible delineators. On streets with parking, parking will be located between the bike lane and travel lane.

Appropriate Context: Collector streets, arterials

Comfort Level: LOC 2



SEPARATED BIKE LANE
3+ TRAVEL LANES

Example cross section for separated bike lanes

Buffered Bike Lanes

Buffered bike lanes add a painted hatched buffer area to the bike lane on the side adjacent to vehicular travel lanes. This increased separation provides a more comfortable riding environment, and the hatched area reinforces the message that the wider lanes are not for parking or car travel. Narrower travel lanes may reduce speeds.

The buffer typically creates sufficient space for bicyclists to operate side-by-side if desired, or to pass slower moving bicyclists without having to encroach on adjacent travel lanes. Additional design considerations include:

- Widths of buffered bicycle lanes are the same as those for bicycle lanes without buffers.
- The minimum width for the buffer area is 2 feet. There is no maximum.
- Consider placing the buffer next to the parking lane where there is high parking turnover.
- Consider placing the buffer next to the travel lane where speeds are 35 mph or greater or when traffic volume exceeds 8,000 vehicles per day.

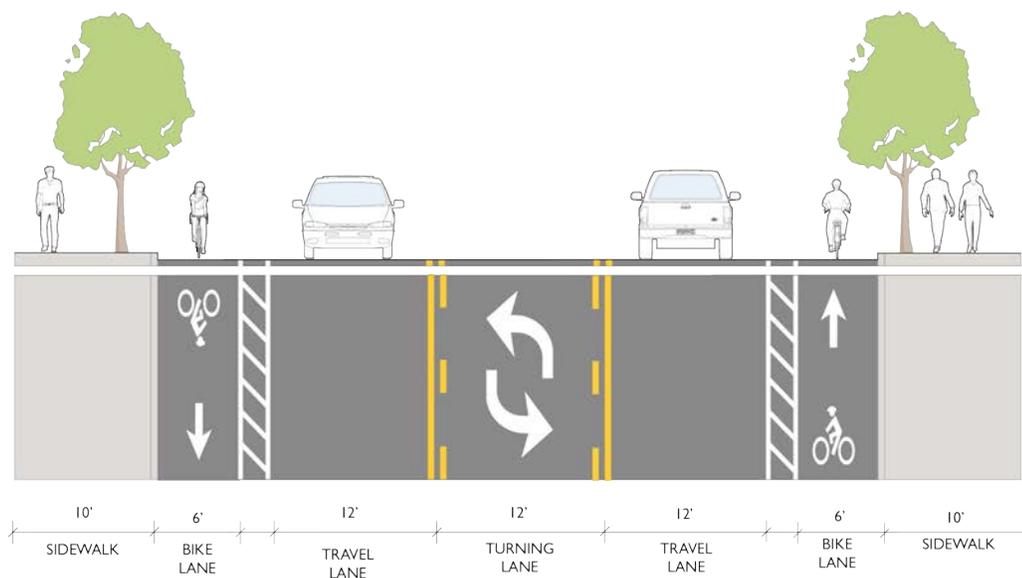


Buffered bike lanes can use paint to increase separation

- The space between cross-hatching is flexible, but typically varies between 5 and 40 feet. Wider spacing is best in locations with no on-street parking and higher speed roadways. More frequent spacing may be desired in areas with on-street parking.

Appropriate Context: Local streets, collector streets

Comfort Level: LOC 2



BUFFERED BIKE LANE

Example cross section for buffered bike lanes

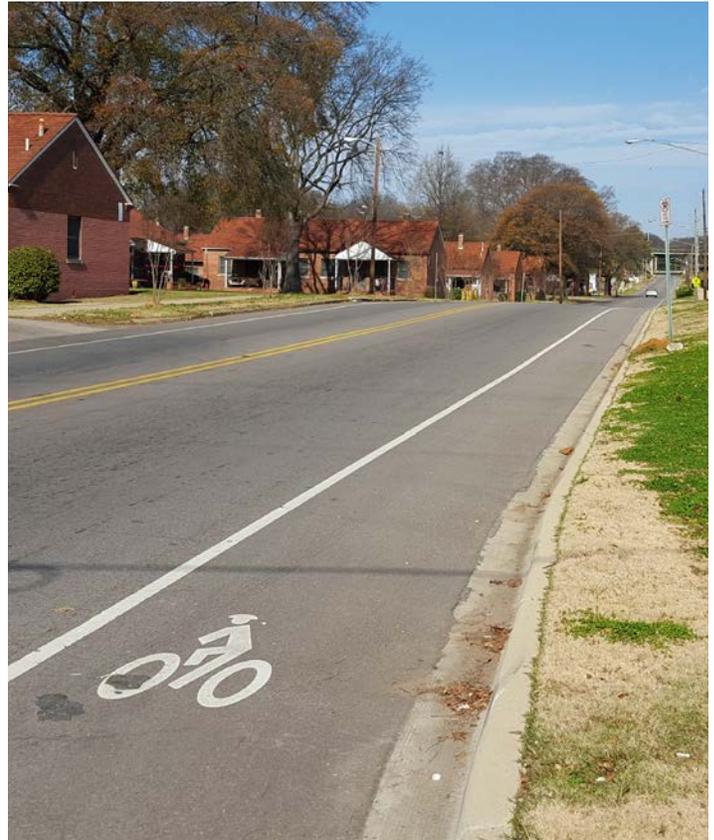
Bike Lanes

A bike lane designates a portion of a street for the exclusive use of bicycles. Bike lanes are one-way, on-road bike facilities that provide a dedicated lane of travel for bicycling. Bike lanes are often marked with pavement markings and, at conflict points, may be colored for higher visibility. Existing examples of bike lanes are Platt Springs Road and Knox Abbott Drive.

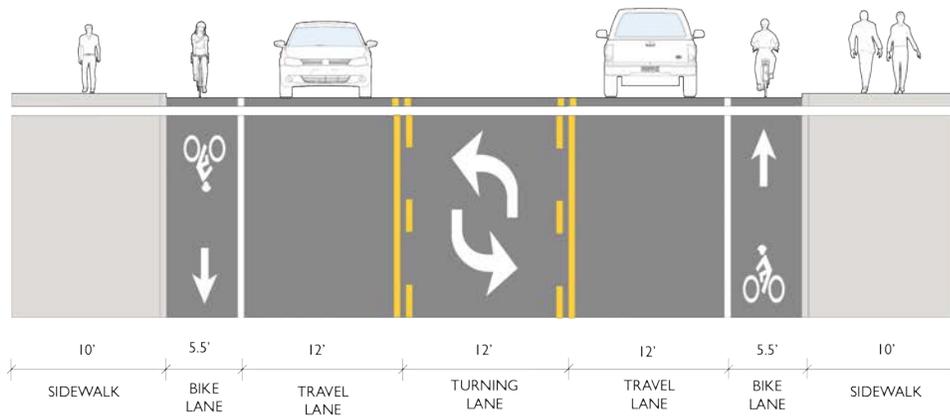
Bike lanes must be 5 feet wide at a minimum, with a 6-inch solid white line separating bicycle travel from vehicular travel. When more space is available, bike lane widths should be expanded to promote rider safety and comfort. Any stormwater controls (e.g., gutter pans, drainage grates, etc.) should be flush with the pavement surface as to avoid conflicts or accidents. Bike lanes should be marked with MUTCD appropriate arrows and bicycles, and “bike lane” signs can optionally be added to designate the cyclists’ exclusive space. These facilities function best when connected to a network of other facilities, and when the bicycle lane continues through the intersection.

Appropriate Context: Local streets, collector streets

Comfort Level: LOC 3-4



Bike lanes can increase connectivity through striping, signage, and pavement markings



BIKE LANES + SIDEWALKS

Example cross section for bike lanes

Pedestrian Facility Toolbox

The main facilities that can be used to implement the proposed pedestrian improvements are sidewalks and sidepaths/shared-use paths (i.e., described in the previous section). Sidewalks should be applied in the West Metro area using best practice standards described here; more detailed design guidance can be found in guidelines published by AASHTO, FHWA, and NACTO.

Sidewalks

Sidewalks provide connectivity for pedestrians to safely use active transportation for traveling to work, school, or other trips, and for recreation/exercise. To meet Americans with Disabilities Act (ADA) standards (i.e., more information at follows), sidewalks must have 4 feet clear, but should be a minimum of 5 feet wide preferably, or, if the sidewalk is directly beside traffic, 6-8 feet wide. When possible, sidewalks should be widened to allow for street trees and other plantings for beautification and a buffer between pedestrians and traffic.

Sidewalk designs can vary by context. In suburban or residential areas, they can be narrower “ribbon” sidewalks, with equal width allotted to planting buffers or street trees when possible.

In urban or neighborhood settings, sidewalks should be planned or designed in terms of three zones:

- **Frontage zone:** The frontage zone is the space allotted as an extension of the building for businesses along a corridor. As a part of a wider sidewalk, the frontage zone can be used for extra café-style seating, planter boxes, and/or “sandwich board signs.”

- **Through zone:** This zone is the travel lane for pedestrians. This should be at least 5 feet wide, or in busier, commercial areas, 8 feet wide.
- **Buffer/planting zone:** The buffer and planting zone acts as another level of separation between pedestrians and other types of traffic. Street trees or other landscaping, as well as street seating, lighting, or even artwork can be used to enhance the pedestrian experience on the street.

ADA Compliance

All sidewalks in the active transportation network should meet design standards as defined by ADA so that all abilities can safely and comfortably use the pedestrian facilities. This is a crucial component of an equitable, community-oriented network. While ADA places many requirements on the public right-of-way, and the Proposed Right-of-Way Accessibility Guidelines should always be consulted, several key elements to consider include:

- Curb ramps should be present at each crossing direction at intersections and at each curb cut along the network. The ramps should align with the painted crosswalks, and they should be wide enough for those in wheelchairs to comfortably maneuver (usually 4 feet).
- Tactile warning surfaces should be placed on the ramps entrance to the roadway for users with visual impairments.
- Sidewalks should be free of hazards, such as uneven, cracked, or broken pavement.



A robust network of sidewalks is essential to pedestrian access and safety

Mid-block Improvements

A goal of the West Metro Bike and Pedestrian Master Plan is to create a safe, multi-jurisdictional network for all types of users. While this can only be accomplished through implementing a complete network of bicycle and pedestrian facilities, safety issues can be addressed in part through improving high-stress spot locations.

Mid-block crossing treatments provide a safe way for pedestrians and bicyclists to cross a road in places where they are not served by existing infrastructure and where there is not an intersection of two or more roads. These treatments could be implemented where there are destinations and/or parking on both sides of the street and there is a notable distance between intersections. These crossing treatments provide safe ways for users to cross over the street without being unprotected or walking longer distances to cross at an intersection. Locations for mid-block crossings can be identified where there are significant “desire lines”—cyclists or pedestrians creating their own paths as opposed to using sidewalks, bike lanes, or crosswalks. These locations are often around transit stops, schools, office buildings, and parks.

Mid-block crossings can be supported with several different treatments, including:

Pedestrian Hybrid Beacons (a.k.a: HAWK Signal - High Intensity Activated Crosswalk)

This signal allows pedestrians and bicyclists to stop traffic to cross high-volume arterial streets. The signal allows traffic to stop and go while pedestrians and bicyclists may still be in the street by flashing red (i.e., motorists must remain stopped if the pedestrian or bicyclist is on their half of the roadway). The signal may be used in lieu of a full signal as well as at locations which do not meet traffic signal warrants where it is necessary to provide assistance to cross a high-volume arterial. Pushbuttons should stop traffic within 30 seconds, and be placed in convenient locations for bicyclist and/or pedestrian actuation (i.e., which can be identified by “desire lines”). These crossings should abide by ADA standards and fit within the local design context. Passive signal activation, such as video or infrared may also be considered.



HAWK Signals increase safety for pedestrians and may be used for high volume crossings locations

Rectangular Rapid Flashing Beacons

Rectangular rapid flashing beacons (RRFB) can be installed at mid-block crossings to assist pedestrians and bicyclists in crossing the street. Rectangular rapid flashing beacons have proven to be effective devices at uncontrolled intersections for increasing motorist yielding rates and reducing pedestrian-vehicle crashes at crosswalk locations. The rapid flashing beacon device consists of a pair of rectangular, yellow LED beacons, which can be pushbutton or passive detection activated and should be placed on both sides of the street. If a median exists at the crossing location across a multi-lane street, a third and fourth beacon may be placed in the median, which, studies show, significantly increases motorist yield rates.



High visibility crossing are useful for mid-block trail crossing as well as downtown environments

Beautification and Materials

Adding street trees and plantings around and/or in the crossing can improve its visibility and be visually appealing. The crossing can also be highlighted by using different materials and/or by raising the crossings. Regardless of the material used, the crossing should always be striped to ensure that vehicles can see it in all lighting conditions.

High Visibility

Removing visual impairments for drivers approaching the crossing can make it safer for cars and pedestrians —a process often called “daylighting.” This can be accomplished by restricting parking spaces near the crossing or by adding a curb extension at both ends of the crossing.



Unique materials for the crosswalk can add to the sense of place along with designating a location for crossing

Intersection Improvements

The following sections provide guidance for improving safety at intersections. In many cases, intersections are the most vulnerable point for cyclists and pedestrians. One way to ensure safe, comfortable bicycle and pedestrian facilities is to provide safe crossings at major street intersections.

At many intersections, signal improvements, geometric changes, and improved or additional pavement markings may be sufficient to provide comfortable crossings. These treatments may include bicycle/pedestrian signal detection, crosswalks, curb extensions, and curb radius reductions, among others. Specific examples of bicycle and pedestrian improvements are discussed below.

General Considerations

The best intersection designs are those that are context sensitive in their material use, increase visibility of cyclists and pedestrians, and provide accessible crossings for all types of users. Design challenges with many intersections include:

- Discontinuous bicycle facilities or sidewalks that drop before the intersection (e.g. bike lane striping that does not continue all the way to the stop bar) and are not carried through to the other side, thereby causing greater confusion and stress for bicyclists and other road users;
- Signalized crossings that do not adequately detect bicyclists and pedestrians, or that require bicyclists to wait long periods of time to cross; and
- Incomplete or faded striping may not clearly indicate where cyclists and pedestrians should cross or where other road users should stop.



Intersection improvements can improve functionality and safety for all modes of transportation

Pedestrian Improvements at Intersections

Crosswalks: Improved or Additional Striping or Beautification Materials

Crosswalk striping identifies the pedestrian's direct path across an intersection for both the pedestrian and other road users. Faded or missing striping may cause the pedestrian's right-of-way at an intersection to be ambiguous, especially when other road striping, such as stop bars, are also faded or missing.

Crosswalks should be at least 8 feet wide, and the borders of the crosswalk should be set off with reflective white paint or thermoplastic. They should be separated from bicyclists' crossings. In addition, crosswalks can also be used to pull urban design elements from the surroundings into the intersections. For example, pavers that match materials used in the surrounding buildings (with additional white stripes on the outside of the pavement for increased visibility) can be used as a crosswalk treatment.

Median Crossing Islands

Median crossing islands can serve as a refuge for pedestrians and bicyclists when crossing a street at intersections. These treatments are typically installed at locations where a left-turn lane is not necessary or where a left-turn movement can be prohibited and redirected to another intersection as part of a neighborhood traffic management plan.

CONTEXT SENSITIVITY

Intersections should be designed in a way that is appropriate to their context. They also provide opportunity to pay homage to elements that make the West Metro Area unique. By using local materials and mimicking building facades and styles, intersection improvements can add invaluable aesthetic as well as safety.

The median may extend across the intersecting roadway if restricted motor vehicle access is desired. When the crossing is unsignalized, this treatment would typically include other engineering interventions, such as an advanced yield line or rectangular rapid flash beacon. Where bicycle circulation is needed, these medians should be designed or retrofitted to include openings for bicyclists to pass through.

Curb Extensions

Curb extensions are a section of sidewalk extending into the roadway at an intersection or midblock crossing that reduces the crossing width for pedestrians and increases their visibility, and may help reduce traffic speeds. Curb extensions shorten bicyclist and pedestrian exposure time in traffic and increase the visibility of non-motorized users at roadway crossings. By narrowing the curb-to-curb width of a roadway, curb extensions may also help reduce motor vehicle speeds and improve bicyclist and pedestrian safety. Curb extensions are appropriate only for locations that have full-time, on-street parking. Some design considerations include:

- No wider than parking lane
- Curb radius can be tightened to slow right-turning vehicles
- Curb bulbs can provide additional space for curb ramp construction if there is limited right-of-way



Curb extensions can also be used as a streetscape feature

Bicycle Improvements at Intersections

Bike Lane Extensions through Crossings

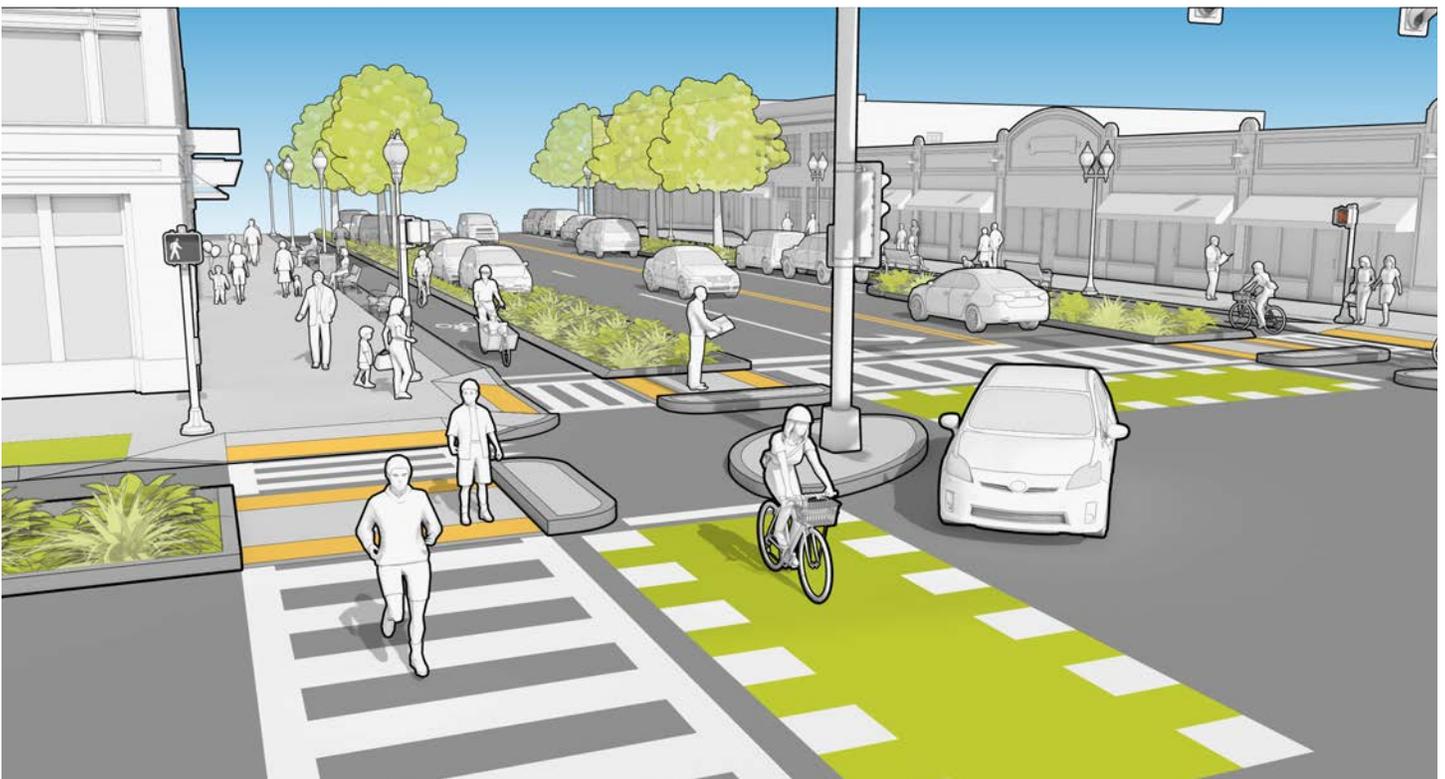
Bicycle lane extensions delineate a clearly defined and direct bicycle crossing through an intersection or driveway. The additional pavement markings provide a clear boundary between the paths of through bicyclists and either through or crossing motor vehicles in the adjacent lane. Within intersections, these are often parallel with pedestrian crosswalks. At two-way protected bike lane crossings, a dashed centerline should be used within the crossing to separate the two directions of bicycle traffic.

They may include bicycle lane markings and be highlighted with green colored pavement. The use of contrasting green color is used primarily to highlight areas with a potential for bicycle-vehicle conflicts, such as bicycle lane extensions through crossings where bicyclists are susceptible to conflicting left or right turning traffic. If a pair of dotted lines is used to extend a bicycle lane across an intersection or driveway, or a ramp, green colored pavement should be installed in the same dotted pattern as the white edge lines.

Protected Bike Lane Intersection Design

The design of intersections with separated bicycle infrastructure should ensure visibility between approaching and departing motorists, bicyclists and pedestrians. All users should have visual indicators that clearly identify right-of-way priority and expected yielding behavior. The following strategies can be used to accomplish this at intersections with protected bike lanes:

- Clearly indicate right-of-way priority: Signs and markings should reinforce correct yielding behaviors.
- Provide yielding geometry: Intersection geometry should not require users to turn their head more than 90 degrees to see a potential conflict.
- Reduce speeds: Slowing speeds at conflict points reduce conflicts between all users and the severity of injuries in the event a crash occurs. Speed reduction is achieved primarily through horizontal and vertical deflection.



Conceptual protected intersection design (Source: MassDOT Separated Bike Lane Planning and Design Guide, 2015)

Wayfinding

Wayfinding throughout the active transportation network can improve the viability of the network by guiding bicyclists and pedestrians to their desired destinations. Through directional or destination-based signing and marking, the West Metro area can clarify network junctions or connections that are not obvious, particularly to new riders or those unfamiliar with an area.

Wayfinding signage should have a consistent theme throughout the system, but individual municipalities can nuance the theme to fit local context and desires. This will require coordination among Cayce, West Columbia, and Springdale.



Wayfinding signage to existing trails or major destinations

Transit

Transit stops were used as a factor in the Demand Analysis, and they ultimately influenced the route choices of the proposed network. This was done to encourage truly multimodal transportation throughout the West Metro area. Seamless connections between walking, biking, and transit effectively extends the coverage of transit and allows more mobility options for existing users. Creating these “first- and last-mile connections” will also help to increase transit ridership throughout the West Metro area.

As a design consideration, it is important that transit stops interface conveniently and safely with the transportation infrastructure. At transit stops along protected bicycle lanes, special consideration should be given to manage bicyclist, pedestrian and transit operator interactions. The bike lane should be located behind the transit stop, and a 6-foot minimum width median should be provided for pedestrians to access the transit vehicle.

Wayfinding should also include clear information about how the active transportation network interacts with transit routes. Public signage, including maps and route times, should be included at bus stops.



Innovative bike facilities integrated with transit stops





IMPLEMENTATION

4. IMPLEMENTATION

The previous sections presented the planning process that led to the development of the active transportation network for the West Metro Bike and Pedestrian Master Plan. While that process was essential to developing the recommended network, realization of individual projects from those recommendations is critical to advancing Cayce, West Columbia, and Springdale as communities where walking and biking are modes of choice. This requires that a connected, safe, and comfortable network of low-stress facilities be implemented. To that end, this section provides:

- Summary of the project prioritization process and methodology;
- Overview of the project rankings;
- Review of cost estimating methodology;
- Defining of project phases to establish implementation periods;
- Short-term capital improvement projects by municipality; and
- Early action projects.

4.1 Project Prioritization

The West Metro Bike and Pedestrian Master Plan includes over 100 linear projects and 24 intersection improvement locations. With so many projects to implement, it could be overwhelming to determine what is most important and which projects should be given priority. Therefore, it is essential to gain some understanding of which projects will provide the most benefit and how projects relate to one another from an implementation perspective. To facilitate this process, a prioritization methodology was developed to score projects comparatively.

A number of variables were used to “score” each recommended project. The variables utilized were both quantitative and qualitative in nature to provide a balance to project prioritization. While it was desirable for scoring to reflect objective merits such as access, safety, and connectivity, it was also important for more subjective considerations to be weighed like probability of use and degree of barrier to the network. The prioritization methodology is presented in Table 4.1-1.



Implementing safe bicycle and pedestrian infrastructure is key to advancing active travel in the West Metro area

4.2 Project Rankings

Bicycle Improvements

Based on the prioritization methodology presented in Section 4.1, four project lists were developed. The first is a ranking of over 40 linear bicycle infrastructure capital construction recommendations; these projects include bike lanes, buffered bike lanes, and physically separated facilities (i.e., separated bike lanes, sidepaths, and shared-use pathways/greenways). Figure 4.2 1 graphically depicts the geographic location of the ranked bicycle projects. A summary of bicycle infrastructure projects is presented in Table 4.2-1, and the complete ranking of projects is included in Appendix D.

Table 4.2-1 Bicycle Facilities by Type

Facility Type	No. of Projects	Miles
Bike Lane	4	2.3
Buffered Bike Lane	23	23.1
Physically Separated Facility	15	21.5
TOTAL	42	46.9



Paving shoulders on slower speed roads can create a more comfortable experience for cyclists



The Three Rivers Greenway is a key connection for biking and walking

Table 4.1-1 Prioritization Methodology

Variables	Scoring	Notes
QUANTITATIVE VARIABLES		
Max Score: 74		
Access to key destinations (miles to destination)		
Max Score: 12		
0-0.25 mile	3 per category	3 points given for proximity to each category (existing/future school, park, commercial development, multi-family residential development)
Access to transit (miles to destination)		
Max Score: 5		
0-0.5 mile from transit stop	5	
0.5-1 mile from transit stop	3	
Level of Effort to Implement		
Max Score: 10		
Low	10	
Medium	6	
High	2	
Safety		
Max Score: 12		
Speed Limit	5	Project on or adjacent to a road which has a posted speed limit 45 mph or greater
	3	Project on or adjacent to a road which has a posted speed limit 35-40 mph
Separated Facility	7	Project that is separated or protected from a road with a speed limit 35 mph or greater (i.e., greenway, cycle track, buffered bike lane)
Connectivity		
Max Score: 10		
Connects to an existing facility	10	No points for connecting to a "loop" greenway
Connects to a planned facility	5	
Critical Corridor		
Max Score: 13		
Within a critical corridor	10	Proposed improvement is within/along a critical corridor: Knox Abbott Drive State Street Platt Springs Road Meeting Street Sunset Boulevard 12th Street Airport Boulevard US 1 (State Street to Jarvis Klapman Boulevard)
Crosses or "feeds" into a critical corridor	5	Proposed improvements that intersect one of the critical corridors listed above
Route is on the National Highway System (NHS) Network	3	
Existing Riding Conditions		
Max Score: 12		
Terrible for all bicyclists	12	Existing Level of Comfort Score 4
Uncomfortable for most bicyclists	8	Existing Level of Comfort Score 3
Slightly uncomfortable for some bicyclists	4	
QUALITATIVE VARIABLES		
Max Score: 26		
Network Barrier		
Max Score: 16		
Severe barrier	16	
Significant barrier	10	
Difficult barrier	8	
Minor barrier	4	
Probability of Use		
Max Score: 10		
High probability of use	10	High frequency of public comments on the desired need for bike/pedestrian infrastructure
Medium probability of use	8	Medium frequency of public comments on the desired need for bike/pedestrian infrastructure
Low to medium probability of use	4	Low frequency of public comments on the desired need for bike/pedestrian infrastructure

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Pedestrian Improvements

The second list provides a ranking of over 70 pedestrian infrastructure capital improvement projects; this includes new sidewalks, elimination of sidewalk gaps, widening of existing sidewalks, and incidental intersection improvements along pedestrian routes. Figure 4.2-2 graphically depicts the geographic location of the ranked pedestrian projects. A summary of pedestrian infrastructure projects is presented in Table 4.2-2, and the complete ranking of projects is included in Appendix D.

Table 4.2-2 Pedestrian Facilities by Type

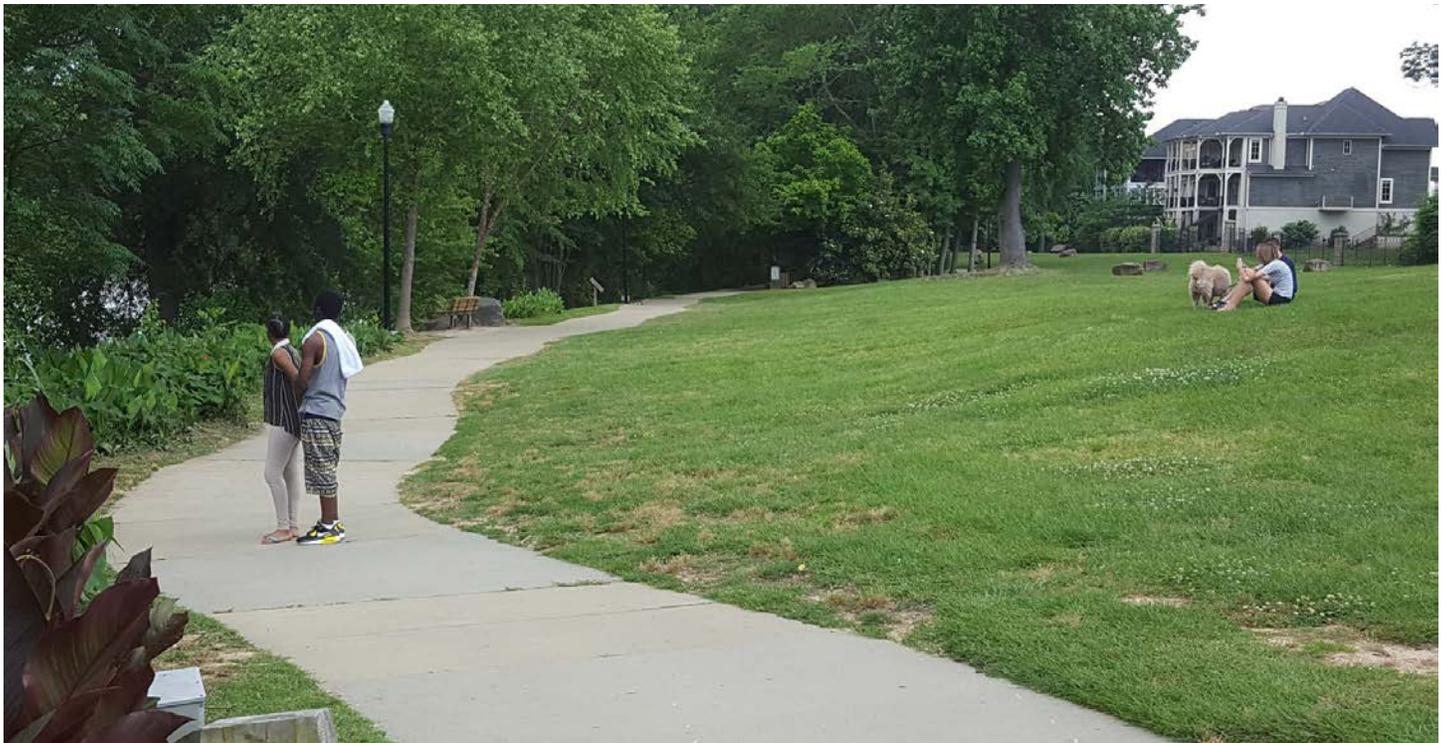
Facility Type	No. of Projects	Miles
Add Sidewalks, Improve Intersections	42	54.8
Eliminate Sidewalk Gaps, Improve Intersections	10	25.8
Improve/widen Sidewalks, Improve Intersections	2	4.8
Improve Intersections	17	16.3
TOTAL	71	101.7

Intersection Improvements

The third list focuses on intersection improvements to benefit both walking and biking. It ranks 24 critical intersections within the West Metro area that require improvements to facilitate a low-stress network. Figure 4.2-3 graphically depicts the geographic location of ranked intersection projects. The complete listing of intersection projects is included in Appendix D.

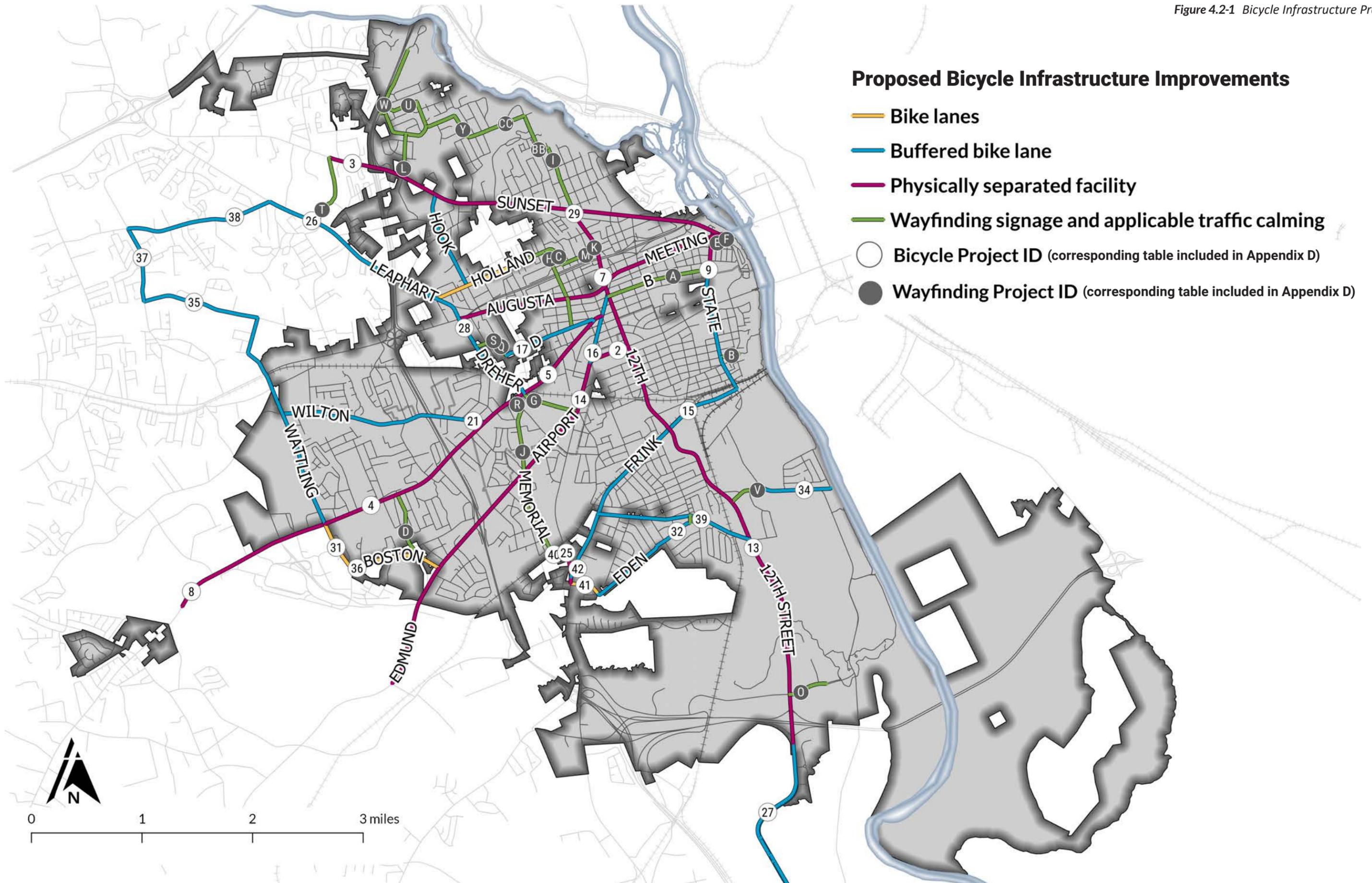


The stamped crosswalk at 12th Street in West Columbia clearly identifies pedestrians' place on the street



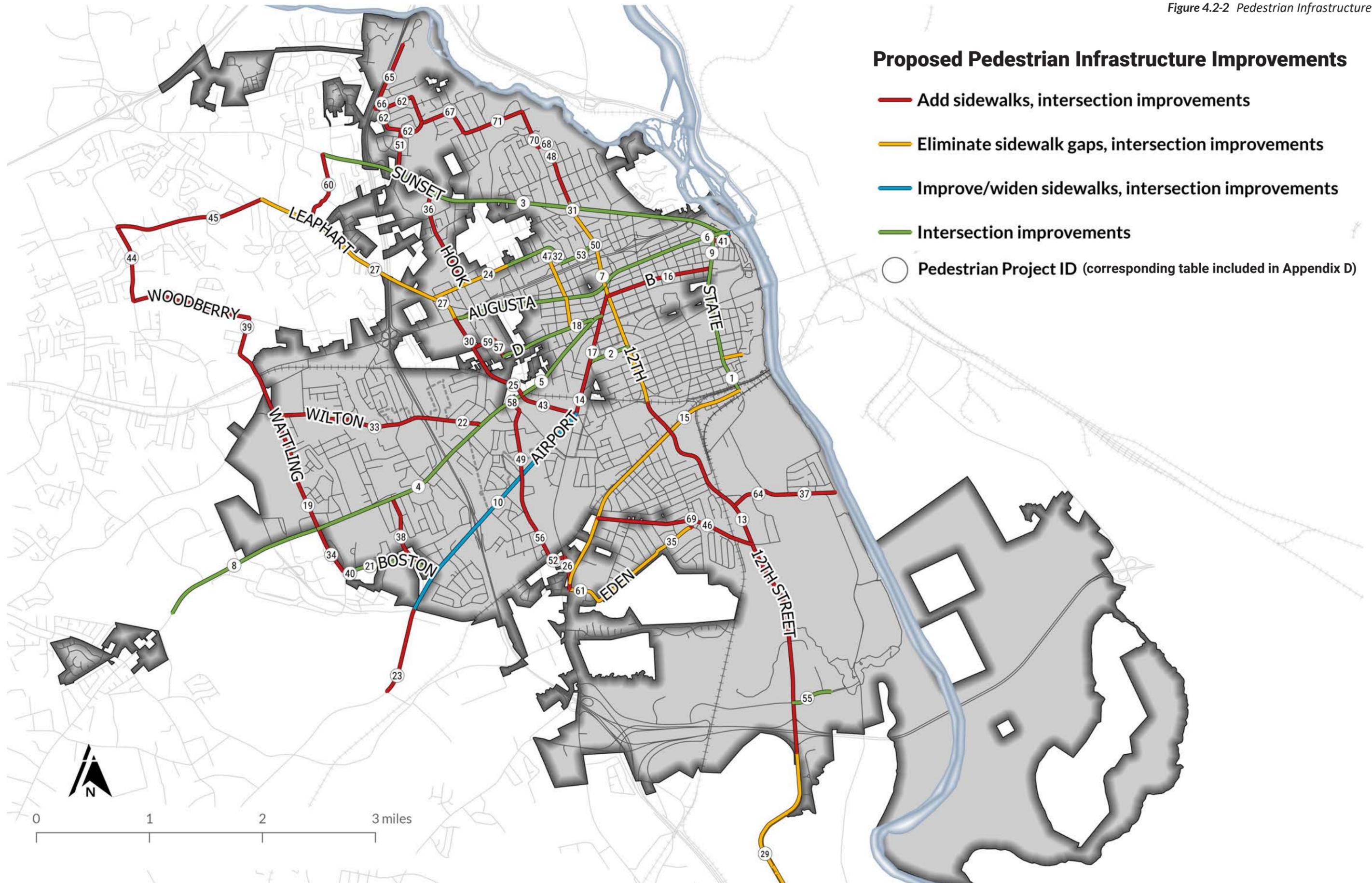
The Three Rivers Greenway provides pedestrians their own space for recreation and exercise

Figure 4.2-1 Bicycle Infrastructure Projects



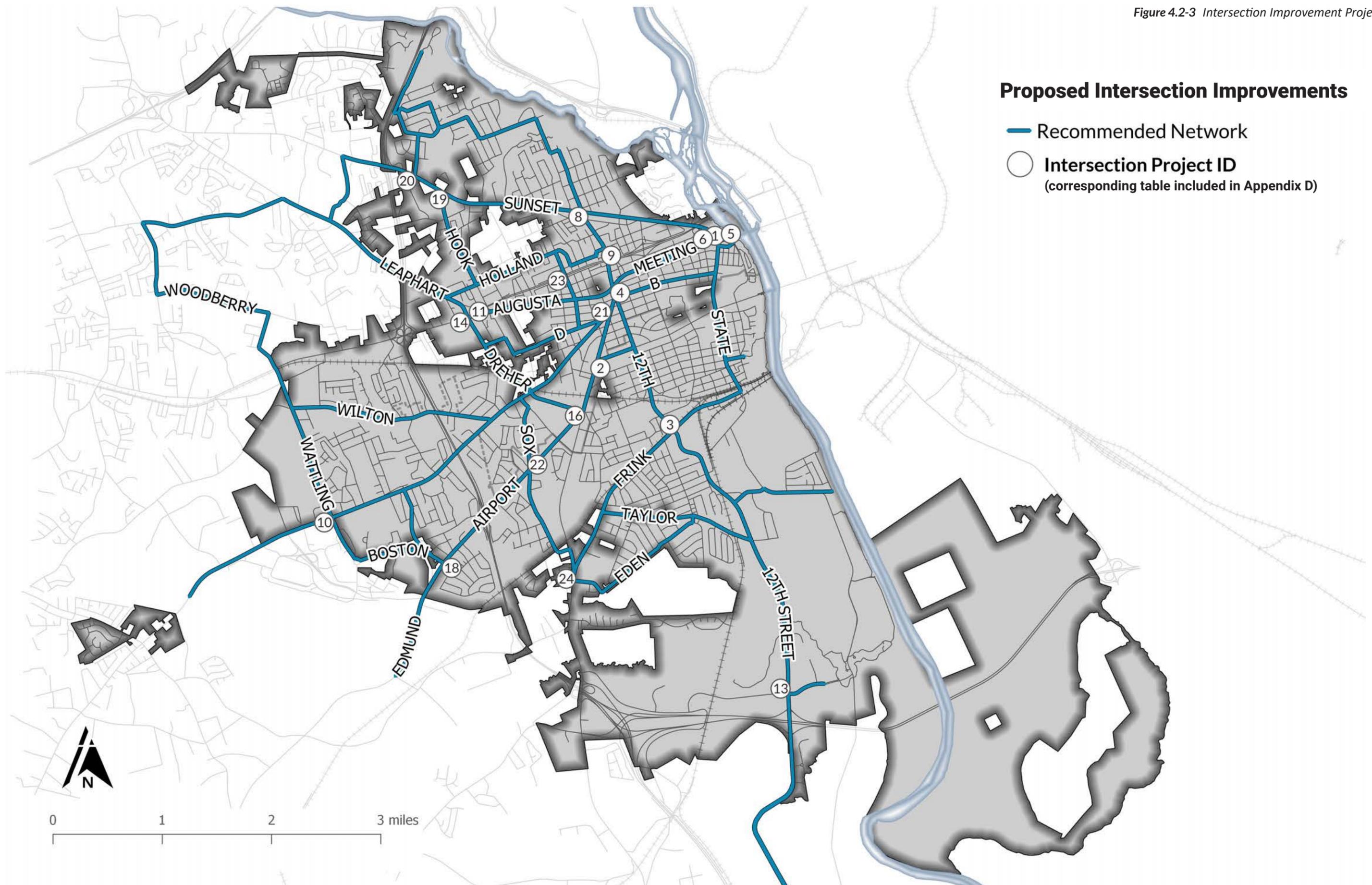
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Figure 4.2-2 Pedestrian Infrastructure Projects



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Figure 4.2-3 Intersection Improvement Projects



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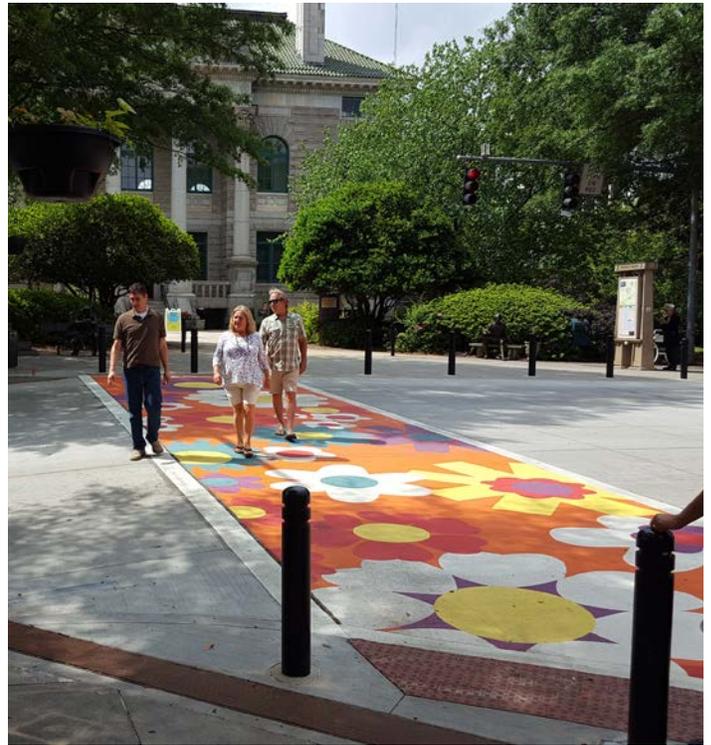
Wayfinding, Signage, and Traffic Calming Improvements

Finally, the fourth list includes all wayfinding, signage, and traffic calming projects; these projects were not ranked, as they require a much lower level of funding and should be programmed on an annual, systematic basis. Wayfinding, signage, and traffic calming projects are included graphically as part of the bicycle infrastructure projects in Figure 4.2-1. The complete listing of wayfinding, signage, and traffic calming projects is included in Appendix D.

As a summary, Table 4.2-3 presents combined totals for all project types.

Table 4.2-3 Combined Totals by Project Type

Project Type	No. of Projects	Miles
Bike Projects	42	46.9
Pedestrian Projects	71	101.7
Intersection Projects	24	-
Wayfinding/ Signage/Calming	29	12
TOTAL	166	160.6



Art used as infrastructure can be both a wayfinding measure and a form of traffic calming



Wayfinding signage creates an identity for bike and pedestrian connections

4.3 Project Costs

Order-of-magnitude opinion of probable costs by linear foot were generated for each facility type and applied to each recommended project based on its total linear feet. Linear foot costs were developed by identifying pay items and establishing rough quantities. Unit costs are based on 2017 dollars and were assigned based on historical cost data from SCDOT and other sources. Please note that the estimates do not include any costs for engineering analysis and design, easement or right-of-way acquisition, or the cost for ongoing maintenance. Also, note that rough costs have been assigned to some general categories such as utility relocations, however these costs can vary widely depending on the exact details and nature of the work. A 30% contingency has been included. The estimates are intended to be general and used for planning purposes. Construction costs will vary based on the ultimate project scope (i.e., potential combination or segmentation of projects) and economic conditions at the time of construction. Table 4.3-1 presents linear foot costs by facility type.

Because of the large geographic area being studied and scope constraints of the Plan, the West Metro Bike and Pedestrian Master Plan considered implementation at a planning level of detail. As quantified above, many aspects of implementation are not currently known, such as right-of-way, ability to accomplish projects within existing pavement, and exact extent of construction limits. Additionally, because flexibility of facility type has been programmed into the Plan to allow local jurisdictions to be agile in implementation, many projects may have more than one right solution to realize their completion. For example, a “physically separated facility” could be implemented as a separated bike lane, sidepath, or shared-use pathway/greenway, all of which have different construction costs. Therefore, a low and a high cost have been included for each recommended project. Over \$215 million of projects are included in the Plan; Table 4.3-2 provides a summary of cost by project type. Individual project costs are presented in Appendix D as part of project rankings.

Table 4.3-1 Linear Foot Costs by Facility Type

Facility Type	Cost per Linear Foot*
Bike Lane (restripe/lane diet/road diet)	\$32.00
Bike Lane (widen road, closed section)	\$662.00
Bike Lane (widen road, open section)	\$353.00
Buffered Bike Lane (widen road, open section)	\$536.00
Buffered Bike Lane (restripe/lane diet/road diet)	\$40.00
Sidepath (concrete)	\$202.00
Sidepath (asphalt)	\$112.00
Shared-use Pathway/Greenway (concrete)	\$301.00
Shared-use Pathway/Greenway (asphalt)	\$134.00
Separated Bike Lane (curb protected)	\$632.00
Sidewalk (open section)	\$218.00
Sidewalk (closed section)	\$266.00
Improve Existing Sidewalks (eliminate gaps, widen)	\$87.00
Incidental Intersection Improvements	\$60.00
Wayfinding/Signage	\$30.00
Traffic Calming	\$50.00

*Costs are for implementing the facility on both sides of the street.

Table 4.3-2 Summary of Cost by Project Type

Project Type	No. of Projects	Miles	Low Cost	High Cost
Bike Projects	42	46.9	\$17,953,000	\$144,977,000
Pedestrian Projects	71	101.7	\$47,856,000	\$65,655,000
Intersection Projects	24	-	\$1,519,000	\$1,519,000
Wayfinding/Signage/Calming	29	12.0	\$1,907,000	\$3,178,000
TOTAL	166	160.6	\$69,235,000	\$215,328,000

4.4 Project Phasing

Breakpoints were established to categorize projects by three implementation phases:

- Short-Term (2-5 years)
- Mid-Term (5-10 years)
- Long-Term (10+ years)

Although the above implementation phases have been established, these designations are for planning purposes only; improvements should be implemented logically and as opportunities arise. For example, if circumstances provide an opportunity to complete a Mid-Term project two years after the Plan is adopted, the improvement should be made, regardless of its designation as “Mid Term.” Use of common sense and good judgment must prevail. If a project in the Short-Term period is heavily reliant on a Mid-Term project to be successful (e.g., completing a connection), then it may make sense to hold off on the Short-Term project until resources are available to implement it along with the related Mid-Term project. Similarly, should one of the municipalities learn that a street is to be resurfaced, then that is the time to put a new striping pattern (e.g., bike lanes) in place, regardless of the timing of the recommendation based on its implementation phase.



Projects can be phased in over time with new development and construction

Capital Cost Breakdown

A breakdown of capital cost by phase is presented in Table 4.4-1. In years 2-5 \$7.5 million to \$36.0 million is needed. Mid-Term projects account for nearly \$21 million to \$65 million, but have the benefit of more time for planning, securing funding, and building public and political support in the 5-10 year period. Long-Term projects total over \$39 million to nearly \$111 million.

Table 4.4-1 Summary of Cost by Implementation Phase

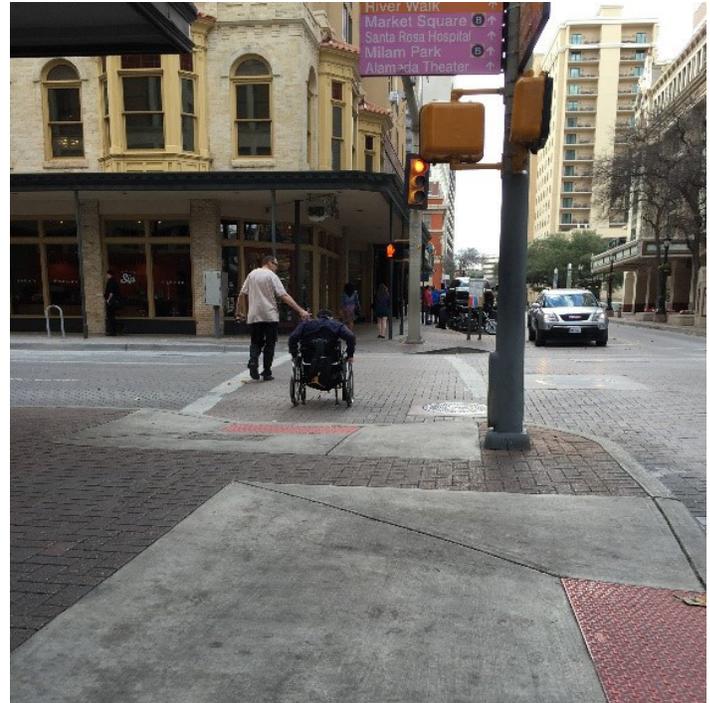
Phase	No. of Projects	Miles	Low Cost	High Cost
Short-Term (2-5 years)	22	19.8	\$7,457,000	\$36,040,000
Mid-Term (5-10 years)	35	43.0	\$20,695,000	\$65,144,000
Long-Term (10+ years)	80	85.8	\$39,176,000	\$110,966,000
Wayfinding/Signage/Calming	29	12.0	\$1,907,000	\$3,178,000`
TOTAL	166	160.6	\$69,235,000	\$215,328,000

4.5 Capital Improvements by Municipality

While the West Metro Bike and Pedestrian Master Plan is a regional plan, it is important to provide each municipality with an understanding of key projects that are within their jurisdiction in the Short-Term period (2-5 years) and costs associated with those projects; this will allow for individual municipalities to plan for implementation within their respective capital improvement budgets and grant cycles. Short-term projects are taken from the overall rankings presented in Appendix D, but have been prioritized by each municipality based on local goals and objectives. The following sections present capital improvements by municipality in the 2-5 year period.

Cayce Short-Term Capital Improvements

Table 4.5-1 presents Short-Term bicycle, pedestrian, and intersection projects within the City of Cayce. In addition to the capital improvement projects presented below, there are six wayfinding, signage, and calming projects within the City of Cayce, with a total cost that ranges from \$372,000 to \$619,000.



Updating intersections to be ADA compliant as a part of capital improvements ensures accessibility for all ages and abilities

Table 4.5-1 City of Cayce Short-Term Projects

Local Priority	Location	Recommendation	Low Cost	High Cost
Bicycle Projects			\$466,000	\$4,405,000
1	State Street	Buffered Bike Lane	\$229,000	\$3,065,000
2	Knox Abbott Drive	Physically Separated Facility	\$237,000	\$1,340,000
Pedestrian Projects			\$236,000	\$470,000
1	State Street	Incidental Intersection Improvements along Pedestrian Route	\$172,000	\$343,000
2	Knox Abbott Drive	Incidental Intersection Improvements along Pedestrian Route	\$64,000	\$127,000
Intersection Projects			\$26,000	\$26,000
1	12th Street at Frink Street	High visibility crosswalks, curb ramps	\$26,000	\$26,000
SHORT-TERM TOTAL			\$728,000	\$4,901,000

West Columbia Short-Term Capital Improvements

Table 4.5-2 presents Short-Term bicycle, pedestrian, and intersection projects within the City of West Columbia. In addition to the capital improvement projects presented below, there are 23 wayfinding, signage, and calming projects within the City of West Columbia, with a total cost that ranges from \$1,516,000 to \$2,526,000.

Table 4.5-2 City of West Columbia Short-Term Projects

Local Priority	Location	Recommendation	Low Cost	High Cost
Bicycle Projects			\$3,932,000	\$22,188,000
1	Meeting Street	Physically Separated Facility	\$730,000	\$4,121,000
2	Sunset Boulevard	Physically Separated Facility	\$2,213,000	\$12,486,000
3	Platt Springs Road*	Physically Separated Facility	\$989,000	\$5,581,000
Pedestrian Projects			\$1,054,000	\$2,106,000
1	Meeting Street	Incidental Intersection Improvements along Pedestrian Route	\$196,000	\$391,000
2	Sunset Boulevard	Incidental Intersection Improvements along Pedestrian Route	\$593,000	\$1,185,000
3	Platt Springs Road*	Incidental Intersection Improvements along Pedestrian Route	\$265,000	\$530,000
Intersection Projects			\$397,000	\$397,000
1	State Street at Meeting Street	High visibility crosswalks, curb ramps	\$26,000	\$26,000
2	Knox Abbot Drive at Charleston Highway	Curb Extensions	\$67,000	\$67,000
3	12th Street at B Avenue	High visibility crosswalks, curb extensions	\$78,000	\$78,000
4	Meeting Street at Sunset Boulevard	High visibility crosswalks, curb extensions	\$78,000	\$78,000
5	Meeting Street	Mid-block crossing with RRFP	\$56,000	\$56,000
6	State Street at Sunset Boulevard	Restripe Crosswalks	\$4,000	\$4,000
7	12th Street at Sunset Boulevard	Curb extensions	\$67,000	\$67,000
8	12 Street at Jarvis Klapman Boulevard	Priority pavement makrings for bikes and pedestrians across Jarvis Klapman and slip lanes	\$21,000	\$21,000
SHORT-TERM TOTAL			\$5,383,000	\$24,691,000

* Shared project with the Town of Springdale

Springdale Short-Term Capital Improvements

Table 4.5-3 presents Short-Term bicycle, pedestrian, and intersection projects within the Town of Springdale. In addition to the capital improvement projects presented below, there is one wayfinding, signage, and calming project within the Town of Springdale, with a total cost that ranges from \$111,000 to \$185,000.

Table 4.5-3 Town of Springdale Short-Term Projects

Local Priority	Location	Recommendation	Low Cost	High Cost
Bicycle Projects			\$2,028,000	\$11,442,000
1	Platt Springs Road	Physically Separated Facility	\$1,039,000	\$5,861,000
2	Platt Springs Road*	Physically Separated Facility	\$989,000	\$5,581,000
Pedestrian Projects			\$543,000	\$1,086,000
1	Platt Springs Road	Incidental Intersection Improvements along Pedestrian Route	\$278,000	\$556,000
2	Platt Springs Road*	Incidental Intersection Improvements along Pedestrian Route	\$265,000	\$530,000
Intersection Projects			\$29,000	\$29,000
1	Platt Springs Road at Watling Road	Restripe corsswalks, median refuge	\$29,000	\$29,000
SHORT-TERM TOTAL			\$2,600,000	\$12,557,000

4.6 Early Action Projects

To generate momentum for implementation of projects recommended in the West Metro Bike and Pedestrian Plan, Early Action Projects are presented in Appendix E. Each page provides a “cut sheet” of an Early Action Project that can be implemented in the near-term. Three bicycle projects and three pedestrian projects are included for each municipality. The cut sheets provide a short description of the improvement, associated graphic, and cost estimate.



Implementing safe routes for cyclists and pedestrians generates momentum for more cycling and walking in communities

