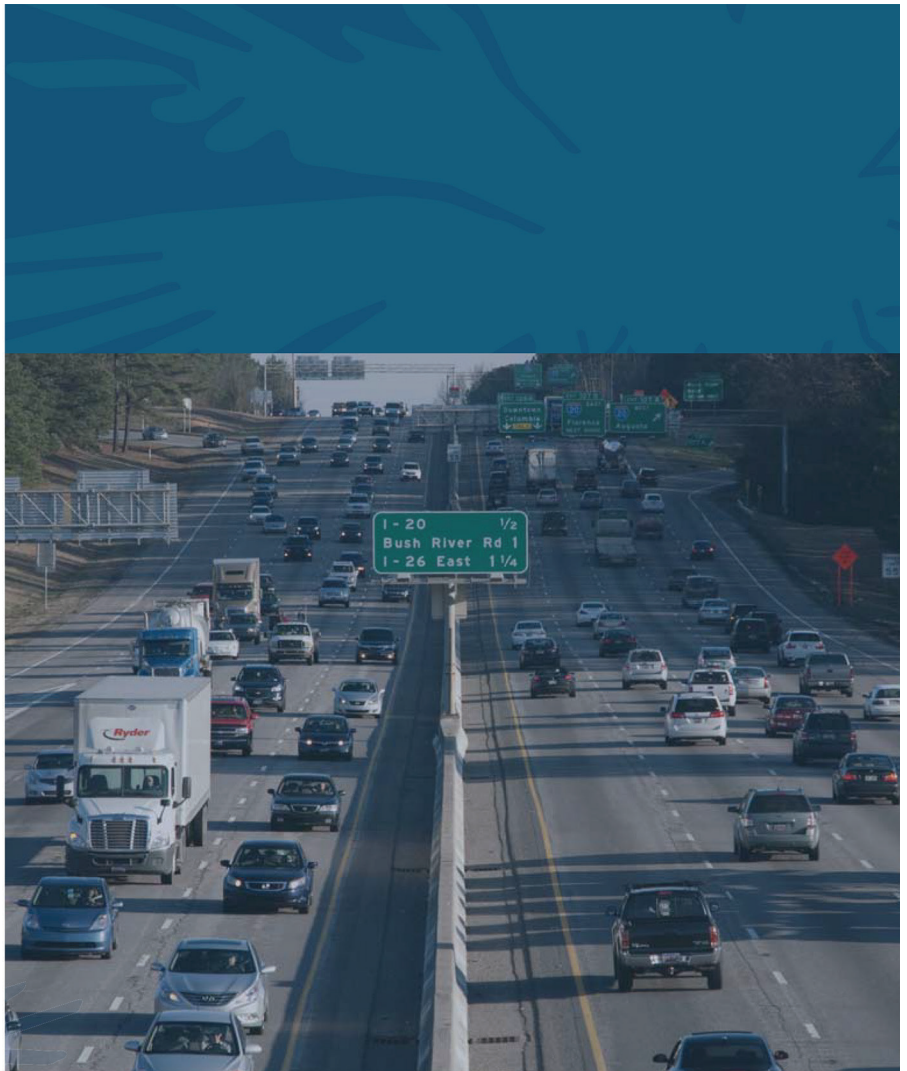


Appendix A—Purpose and Need Report



Purpose and Need Report

*Carolina Crossroads
I-20/26/126 Corridor Improvement Project
Lexington and Richland Counties, South Carolina*

DEIS July 23, 2018



Purpose and Need Report

Carolina Crossroads

I-20/26/126 Corridor Improvement Project

Lexington and Richland Counties, South Carolina

DEIS July 23, 2018

Prepared for
South Carolina Department of Transportation,
and the Federal Highway Administration

Prepared by



Purpose and Need Report

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Purpose and Need Report

1 Introduction

The South Carolina Department of Transportation (SCDOT), in consultation with the Federal Highway Administration (FHWA), is studying alternatives to improve mobility and enhance traffic operations within the I-20/26/126 corridor in Columbia, South Carolina. This Purpose and Need report for the proposed Carolina Crossroads I-20/26/126 Corridor Improvement Project (Carolina Crossroads) was prepared according to the provisions of the National Environmental Policy Act (NEPA) and corresponding regulations and guidelines of the Federal Highway Administration (FHWA), the lead federal agency (23 Code of Federal Regulations [CFR] PART 771 and 40 CFR PART 1500–1508). This document also conforms to the requirements of SCDOT, the project sponsor and lead state agency.

FHWA and SCDOT have joint responsibility for developing transportation infrastructure in South Carolina. As the lead agencies, FHWA and SCDOT are responsible for the Environmental Impact Statement (EIS) being prepared for the Carolina Crossroads project.

Section 6002 of the Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA-LU), as amended by Section 1304 of Fixing America's Surface Transportation Act (FAST), requires lead agencies to identify and involve cooperating and participating agencies, develop coordination plans, provide opportunities for the public and agencies to be involved in defining the purpose and need statement and determining the range of alternatives, and collaborate with cooperating and participating agencies to determine methodologies and the level of detail for analyzing alternatives. Lead agencies must also provide oversight with regard to managing the NEPA process and resolving issues.

Table 1.1 lists the cooperating and participating agencies for the Carolina Crossroads EIS.

Who are the lead agencies for the Carolina Crossroads Project?

The Federal Highway Administration (FHWA) is the lead federal agency, and the South Carolina Department of Transportation (SCDOT) is the project sponsor and lead state agency.

What are cooperating and participating agencies?

A cooperating agency is any agency, other than a lead agency, that has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposed project or project alternative (40 CFR §1508.5).

A participating agency is a federal, state, tribal, regional, or local government agency that might have an interest in the project.

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Table 1.1 Cooperating and Participating Agencies for the Carolina Crossroads EIS*

Agency or local government	Type of agency involvement
Federal Agencies	
U.S. Army Corps of Engineers	Cooperating
U.S. Environmental Protection Agency	Participating
U.S. Fish and Wildlife Service	Participating
State Agencies	
South Carolina Department of Archives and History	Participating
South Carolina Department of Health & Environmental Control	Participating
South Carolina Department of Natural Resources	Participating
South Carolina Department of Public Safety	Participating
Local Governments or Agencies	
Central Midlands Council of Governments	Participating
Central Midlands Regional Transit Authority	Participating
Richland County	Participating
Lexington County	Participating

*Other agencies invited to be Participating but declined include United Keetoowah Band of Cherokee Indians. The project team will continue to consult with this agency as requested and where applicable.

Input from local communities, stakeholders, and agencies, coupled with field research and traffic analysis, has helped SCDOT and FHWA develop the purpose and need of the proposed Carolina Crossroads project. The purpose and need explains why a project is necessary and what it should achieve. Most importantly, it serves as the criteria for determining and evaluating the range of project alternatives, and ultimately selecting the preferred alternative for the project.

The U.S. Army Corps of Engineers (USACE) will utilize the overall project purpose for permit applications in order to evaluate “practicable” alternatives that may have impacts on wetlands and waters of the U.S. under the Clean Water Act. When considering USACE’s purpose and need for issuing a permit, USACE looks to the need for and purpose of the project in terms of benefits to society based on public interest factors. See Section 1.9.

2 What are the project limits and how were they selected?

The I-20/26/126 corridor is located in an urbanized area associated with the Columbia, South Carolina metropolitan area. Specifically, the corridor is located within the city limits of Lexington, Columbia, and West Columbia in both Richland and Lexington counties. Land use within the project area is comprised primarily of commercial development, residential development, industrial development, and sparse undeveloped forestland. Land use directly adjacent to the existing project corridor is primarily comprised of commercial development, roadway and utility rights-of-way (R/Ws), and sparse undeveloped forestland in the vicinity of the Saluda and Broad Rivers.

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The boundaries of the study area, shown in Figure 2.1, are generally:

- I-20 from the Saluda River crossing to the Broad River crossing
- I-26 from Broad River Road to US 378
- I-126 from I-26 to Colonial Life Boulevard

A traffic impact study was completed in 2010 to better understand the issues in the corridor that were contributing to congestion and safety concerns. Field observations, historical and real-time traffic conditions, crash data, and lane utilization data collected during that study were the primary factors in determining the project limits, also known as logical termini.

An approximate 500-foot buffer was established along the project limits to define the study area, which formed the initial basis of examining existing conditions.

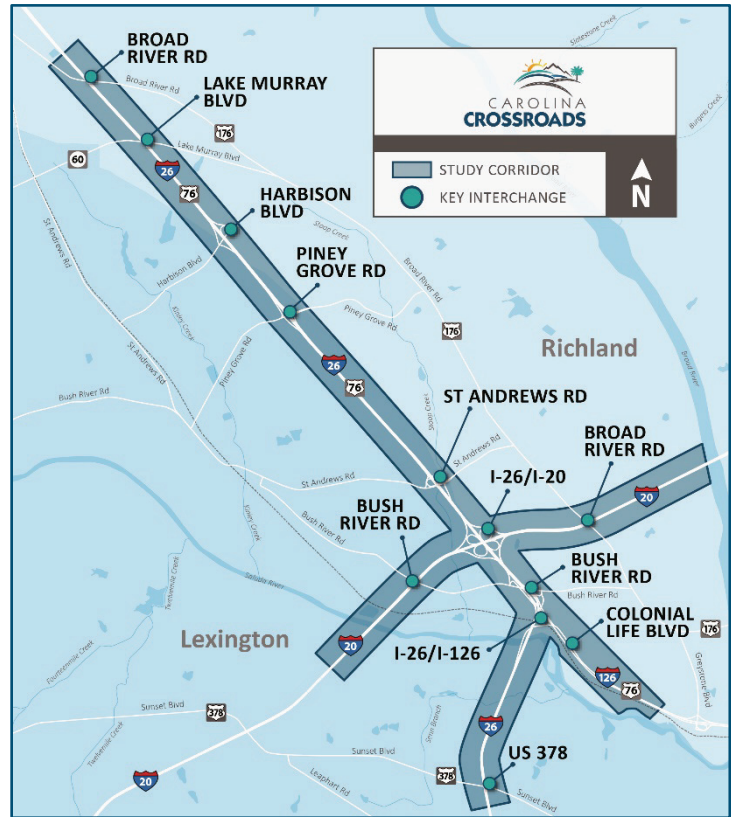


Figure 2.1 Study area limits

3 What is the history of the I-20/26/126 corridor?

Construction of I-26 began in the Columbia area in 1957, and the first section opened in 1960. One year later I-126 opened, and the first segment of I-20 followed five years later in 1966. Over the years, many improvements have been made to the I-20/26/126 corridor, including widening and the addition of interchanges to accommodate several decades of growth and development. Figure 3.1 provides a timeline of the history of the corridor.

What are logical termini?

Logical termini are the project limits, which are defined as the rational end points for transportation improvement and for environmental review. Points of major traffic generation and congestion are common termini.

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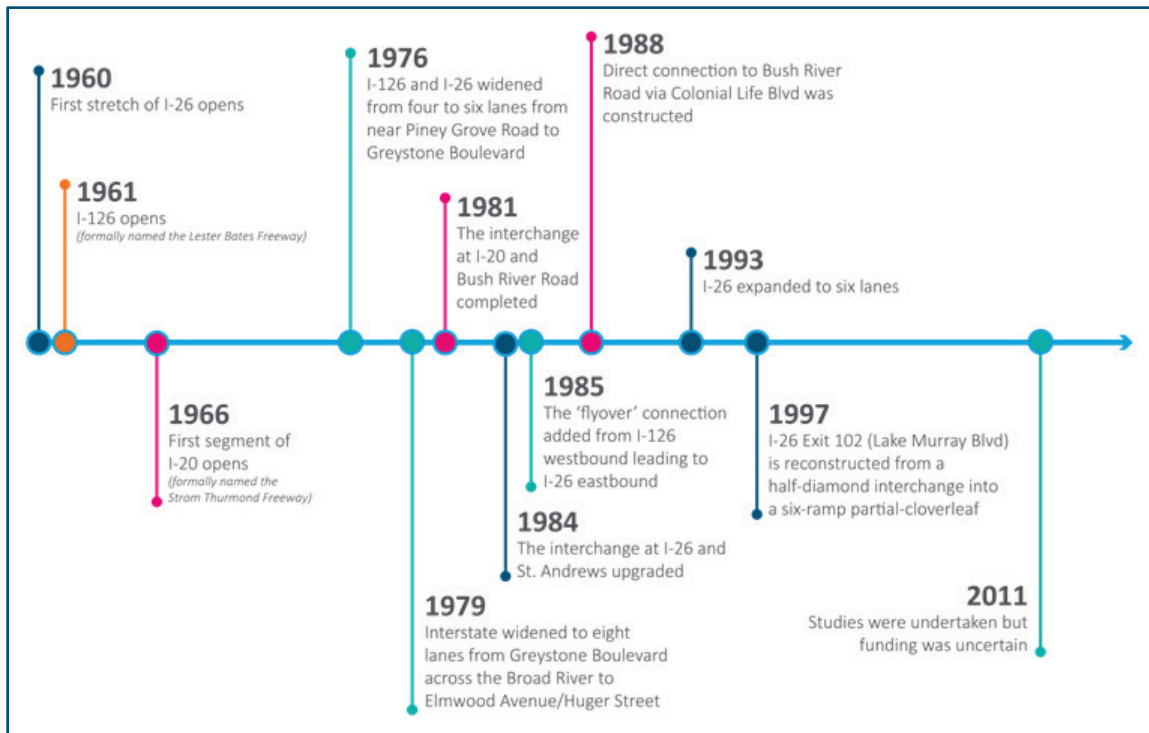


Figure 3.1 History of the I-20/26/126 corridor

3.1 Transportation Planning Background

3.1.1 LONG-RANGE INTERSTATE PLAN

In the mid-2000's SCDOT developed the 2030 Interstate Plan. This was done in response to South Carolina Act 114, passed in 2007, which made changes to the South Carolina Code of Laws and required SCDOT to implement new regulations describing its project selection process. To that end, the 2030 Interstate Plan was developed which addressed the interstate maintenance and capacity needs and identified future priority projects in a cost-constrained 20-year plan. It was approved by the SCDOT Commission in 2008 and included interstate maintenance items such as resurfacing, drainage, signage, guardrail replacements, etc.; as well as needed capacity projects such as reconstruction of existing interchanges, the addition of travel lanes, and alternative transportation options. In addition, the plan identified "mega projects", which were large-scale projects whose estimated construction costs were expected to exceed \$400 million. Because of the limits of the project and regional importance, one of the identified "mega projects" in the 2030 Interstate Plan was the I-26 corridor in Lexington and Richland counties. It was determined that as funding became available, the Statewide Transportation Improvement Program (STIP) would be amended to include projects identified in the long range plan. In 2009, the I-20/26/126 corridor was identified in the STIP as an interstate upgrade project with \$10.5 million allocated for engineering and implementation of selected strategies.

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3.1.2 TRAFFIC IMPACT STUDY FOR THE I-26/I-126 CORRIDOR

After the I-20/26/126 corridor was identified in the 2030 Interstate Plan and subsequently the STIP, SCDOT determined that establishing a long-term strategy for the corridor would be necessary. To do that, SCDOT needed to better understand the issues in the corridor that were contributing to the on-going congestion and safety concerns. Therefore, SCDOT completed a traffic impact study (TIS) for the corridor (SCDOT, 2010). The intent of the TIS was to assess existing and future traffic volumes and congestion in the corridor and to develop a plan of action to address the specific issues. The study consisted of an 8.5-mile segment of I-26, which included the system-to-system interchanges at I-20/26 and at I-26/126; a three-mile segment of I-126; and a two-mile segment of I-20. These limits generally correspond to those of the proposed Carolina Crossroads project.

SCDOT conducted field observations, collected traffic data, and reviewed crash statistics, historical and real-time traffic conditions, and lane utilization data. SCDOT also analyzed level of service (LOS) along the corridor, assessed average travel times and speeds, and performed capacity and safety analyses, including a close look at weaves and conflict points. From that, the TIS identified 39 strategies that could potentially address the existing and future congestion needs of the corridor. These strategies fell into four categories consisting of travel demand management, modal options, traffic operations, and capacity improvements. The suggested strategies including potential phasing options are as follows:

Phase 1:

- Develop an express lane for westbound I-26 from westbound I-126 to past the St. Andrews Road interchange with I-26.
- Extend the eastbound I-26 entrance ramp from Bush River Road to just before the eastbound entrance ramp from westbound I-126.
- Mark the inside barrier lane on eastbound I-26 with a solid white line to create an express lane for eastbound I-26 traffic.

Phase 2:

- Provide an eight-lane section on I-26 from St. Andrews Road to Lake Murray Boulevard.
- Provide fourteen-foot wide shoulders designed to carry traffic when needed during peak demands.

Phase 3:

- Improve the St. Andrews Road interchange with I-26.
- Improve the Broad River Road interchange with I-26.
- Improve the Bush River Road interchange with I-26.

Phase 4:

- Develop a collector-distributor system for I-20 in conjunction with the improvement of Broad River Road interchange with I-20.
- Develop a collector-distributor system on I-26 with improvements to the loop ramps.
- Grade-separate the westbound I-20 traffic from the westbound I-26 traffic exiting at St. Andrews Road.

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Phase 5:

- Develop a true system-to-system interchange at I-20 and I-26.

In-between phase improvements that could be made:

- Implement counter flow lanes on I-26 from St. Andrews Road interchange to the I-126/Colonial Life Boulevard interchange.
- Implement a reverse flow diamond design for the St. Andrews Road interchange.
- Implement a true traffic management center to regulate speed and flow through interactive intelligent transportation systems (ITS).

It was recommended in the TIS, that some portion of the \$10.5 million identified in the STIP be utilized to implement Phase 1 improvements. However, future funding beyond that was uncertain. Additionally, to implement Phase 1 improvements and other future improvements, environmental reviews under NEPA would need to be completed, as would the opportunity for public involvement. Therefore, SCDOT in cooperation with FHWA, is preparing an Environmental Impact Statement (EIS) in accordance with NEPA to promote informed decision making in the development of a solution to the issues faced in the I-20/26/126 corridor. This includes a thorough alternatives analysis, environmental impact analysis, a mitigation strategy analysis for potential impacts, agency coordination, and robust public involvement. Additionally, the project has since been identified as the state's number one interstate priority project and is included in the State's STIP as an interstate upgrade project with \$10.0 million of State Infrastructure Bank (SCTIB) funding allocated for engineering and the development of the EIS. The SCDOT is funding the proposed project through construction using a blended funding approach that combines Federal-Aid Interstate Upgrade program funds and General Obligation Highway bond revenues.

3.1.3 REGIONAL TRANSPORTATION PLANNING

3.1.3.1 Midlands Tomorrow: 2035 Long Range Transportation Plan

The Midlands Tomorrow: 2035 Long Range Transportation Plan is the regional transportation plan for the Columbia metropolitan area, developed by the Columbia Area Transportation Study (COATS). The long range transportation plan (LRTP) looks 30 years into the future to assess the transportation needs for the region. Building on previous plans and including public outreach, the LRTP takes into account population trends and economic development trends to assess bicycle/pedestrian, transit, highway, congestion, freight, and safety needs. The LRTP is meant to serve as a guide for the investment of financial resources (local, state, and federal)

A component of the LRTP development was a transportation survey distributed throughout the Midlands as a way to determine how and where people traveled within the region. The survey revealed that approximately 97 percent or those responding travel by car and that the greatest travel problem is travel time. The most important travel issue was congestion and maintaining and improving existing roads is where respondents felt they would most support financial expenditure. Additionally, issues/improvements that respondents wanted to

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see addressed in the future included sidewalks in subdivisions, an I-26 Bypass, more transit options, and more travel choices, among others.

Relative to the interstate system within the Midlands, the LRTP acknowledges that the interstates are critical components for emergency evacuation, tourist traffic, motor freight carriers, and commuter traffic, and that portions of I-20 and I-26 within the Columbia area are among the most congested in South Carolina. The following improvements within the Carolina Crossroads project corridor are identified in the LRTP in order to maintain an acceptable level of service:

- Interchange improvements on I-26 at I-20 and I-126
- Widening of I-26 from I-126 to US 321

The 2035 LRTP also includes a freight movement component. In 2006, an estimated 228 billion tons of commodities moved into, out of, within, and through the Midlands region. Of the total volume, an estimated 92 percent moves by truck, and the total volume of freight moving through the region is expected to increase 42 percent by 2030. To that end, a primary objective of the LRTP is to prepare a regional truck route plan. The Carolina Crossroads project corridor was identified as a Tier 1 truck route. Tier 1 routes are those that experience high truck volumes as compared to other routes in the region. Tier 1 routes should be able to accommodate all commercial freight vehicles, providing adequate lane widths, shoulders, clear site lines, bridge/overpass clearances, and regional connections.

3.1.3.2 Moving the Midlands: 2040 Long Range Transportation Plan

The 2040 LRTP serves as an update to the 2035 LRTP described in the previous section. It addresses many of the same transportation challenges as the 2035 LRTP, and expands its scope beyond roadway capacity to also consider investment in transit, bicycle/pedestrian, and preservation of the existing transportation system. It also considers performance-based planning to support project selection and programming decisions.

As with the 2035 LRTP, the 2040 LRTP notes that the interstate system is critical to South Carolina's emergency evacuation, tourist traffic, increasing reliance on motor freight carriers, and to the growth and international freight movements through the Port of Charleston. The 2040 LRTP specifically lists the Carolina Crossroads project as a needed improvement in order to maintain an acceptable level of service on the interstate network.

3.1.3.3 COATS 2015 Congestion Management Plan

The COATS 2015 Congestion Management Plan (CMP) provides information on the performance of the transportation system within the Columbia metropolitan area, and provides strategy recommendations to manage congestion and enhance mobility and safety (COATS, 2015). The primary focus of the CMP is roadways that are functionally classified as primary arterials, minor arterials, major collectors, and minor collectors. The main function of the CMP was development of a toolbox of mitigation strategies that could be applied to congested corridors and intersections.

Interstates were not included in the CMP since performance monitoring, analysis, and congestion mitigation are programmed and implemented by SCDOT. However, some of the CMP-focused roadways do intersect with

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interstate corridors, including the Carolina Crossroads project corridor. These roadways include Broad River Road, Lake Murray Boulevard, Harbison Boulevard, Piney Grove Road, St. Andrews Road, and Sunset Boulevard which all have interchanges at I-26; Bush River Road and Broad River Road, which have interchanges at I-20; and Bush River Road and Colonial Life Boulevard, which have interchanges at I-126. Given that the CMP has regional objectives for congestion management and is integrated with the LRTP, STIP, and corridor studies, the following information is important to the Purpose and Need of the proposed Carolina Crossroads project in that it further supports the need for improved mobility and enhanced operations:

- Lake Murray Boulevard: strategies for congestion management along Lake Murray Boulevard include the addition of commuter oriented transit service, park-and-ride facilities, transportation demand management, signal coordination, and access management.
- Harbison Boulevard: The Broad River Road/Harbison Boulevard corridor has been identified as a high capacity transit route. The CMP focuses on enhanced transit service in the Broad River Road/Harbison Boulevard corridor.
- Broad River Road: Strategies for congestion management include land use policies, transportation demand management, transit service enhancement, arterial lanes, and interchange improvements, among others.
- Bush River Road: Strategies for congestion management include transit park-and-ride facilities, transit service enhancement, transportation demand management, pedestrian improvements, and signal coordination.

3.1.3.4 South Carolina Multimodal Transportation Plan – Interstate Plan

The South Carolina Interstate Plan documents existing and projected conditions on the South Carolina interstate network. It was developed to help guide decision makers in transportation investment decisions, including prioritizing improvements that would best support statewide visions and goals for safety and efficiency and was approved by the SCDOT Commission in December 2014 (SCDOT, 2014). The plan provides information on congested areas and bottlenecks where more in-depth studies are needed to identify investments that would improve the interstate network.

Segments of the Carolina Crossroads corridor study area are included in the Interstate Plan. The Interstate Plan notes that AM peak hour congestion primarily occurs in the eastbound direction of I-26 occur from SC 60/Lake Murray Boulevard to I-20, where I-26 operates at LOS E conditions. During the PM peak hour, congestion primarily occurs in the westbound direction where I-26 westbound operates at LOS F or LOS E conditions from I-126 to Piney Grove Road. The I-20 interchange at I-26 was also identified as a primary bottleneck point during the AM peak hour, with the I-20 and St. Andrews Road interchanges at I-26 being the primary bottleneck points during the PM peak hour. The congestion analysis revealed that the primary congestion point along I-126 is located between Saluda River Road and I-26, where I-126 westbound operates at LOS E conditions during the PM peak hour. Specifically, the I-26 interchange is the primary bottleneck along I-126 westbound during the PM peak hour.

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Based on projected future (2040) conditions, decreases in LOS are expected in the Columbia area. It should be noted that projected future (2040) conditions, includes existing plus committed (E+C) highway projects, and therefore, under no-build scenarios for those projects, decreases in LOS would be exacerbated. There are five corridors that are projected to be among the most congested in the state, all within the Carolina Crossroads project study area. They include:

- SC 60/Lake Murray Boulevard (Exit 102) to Piney Grove Road (Exit 104);
- Harbison Boulevard (Exit 103);
- Piney Grove Road (Exit 104) to I-20 (Exit 107);
- St. Andrews Road (Exit 106) to I-20 (Exit 107); and
- I-20 (Exit 107) to I-126/US 76.

At the conclusion of the Interstate Plan analysis, it was recommended that an Interstate Corridor Study be conducted for the interstate corridors that were identified as the most congested in the state if previous studies on traffic operations had not been conducted. The I-26 corridor had been evaluated under the I-26/I-20/I-126 TIS, which provides a more-detailed assessment of existing and future traffic congestion.

3.1.3.5 HOV/HOT Feasibility Study

SCDOT conducted a feasibility study that evaluated the possibility of adding new high-occupancy vehicle (HOV) or high-occupancy toll (HOT) lanes on five major interstate corridors in South Carolina. The five corridors identified were interstate facilities:

- with sufficient length to incorporate HOV or HOT lanes;
- that serve a dense activity center;
- that are heavily used by commuters; and,
- that experience congestion regularly.

The study included the I-26/I-126, I-20, and I-26 corridors in Columbia which meet the aforementioned criteria, and considered existing and future traffic congestion, physical constraints, and user benefits and costs. After assessing these parameters for all five corridors, the I-26 corridor in Charleston was the only corridor recommended for further study as it provided the greatest opportunity for implementation. While congestion does exist currently and is projected to exist in the future (2040) along I-26 and I-20 in Columbia, congestion levels were not deemed high enough to support the use of HOV or HOT lanes. Additionally, physical constraints, including three bridges along I-26 and eight bridges along I-20 that would have to be reconstructed, along with substandard features, further impacted the feasibility of adding HOV or HOT lanes to the I-26 and I-20 corridors in Columbia. The I-26/126 corridor showed high congestion levels both in present and future scenarios. All of the existing bridges would be adequate, but some interchanges, particularly those with loop ramps would require realignment. Since the I-26/126 corridor was part of a TIS that recommended an express lane for consideration, no further study was recommended for the corridor.

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3.1.3.6 Richland County Comprehensive Plan

There are eleven priority investment areas that have been identified in the Richland County Comprehensive Plan (Richland County, 2015). Priority investment areas are ones in which the county has determined that public investments should be focused on and where private investment will be encouraged. Two of the priority investment areas are located along I-26 within the proposed Carolina Crossroads project. These include a neighborhood activity center in the area of the I-26/Broad River Road interchange and both a neighborhood activity center and a larger community activity center in the area of the I-26/I-20 and I-26/I-126 interchanges. The Richland County Comprehensive Plan highlights traffic congestion occurring in the county (present and future) and notes the need to address this congestion and promote a more complete and sustainable transportation system. The comprehensive plan therefore integrates several transportation-related goals including coordinating with SCDOT to improve overall traffic conditions; strengthening long-term transportation planning; expanding transportation choices; supporting public transit service improvements and expanding accessibility for County residents; and linking land use planning and sustainable transportation. Specific to coordinating with SCDOT, county strategies include partnering with SCDOT to explore transportation demand management techniques such as HOV lanes; establishing a traffic count program to supplement SCDOT's program; and coordinating with SCDOT on traffic management plans for proposed developments.

4 What is the purpose of the project?

The primary purpose of a project is the “driver” of the project. It reflects the fundamental reason why the project is being pursued. The secondary purpose (or other desirable outcome) is an additional purpose(s) that is desirable, but not the core purpose of the project. The primary purpose of the proposed Carolina Crossroads project is to implement a transportation solution(s) that would improve mobility and enhance traffic operations by reducing existing traffic congestion within the I-20/26/126 corridor while accommodating future traffic needs. The secondary purposes of the proposed Carolina Crossroads project are to enhance safety throughout the corridor, improve freight mobility, and improve system linkages, while minimizing community and environmental impacts.

The primary purpose of the proposed Carolina Crossroads project is to implement a transportation solution(s) that would improve mobility and enhance traffic operations within the I-20/26/126 corridor.

As noted, the I-20/26/126 corridor is listed as one of South Carolina's most congested interstate corridors. The corridor is a major hub for the Midlands' commuters as well as travelers and commerce, serving as a main route in and out of Columbia. It serves a number of important functions locally including regional access to downtown Columbia, adjacent employment areas and neighborhoods, and regional activity centers. With its location central in the state, the I-20/26/126 corridor also serves as a primary thoroughfare for travelers going to the coast and mountains for recreation and tourism. Additionally, I-26 in particular also serves as a major cargo route between Lowcountry ports and Upstate manufacturers. I-26 is further elevated in importance by its direct

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connection with I-20 which connects South Carolina with the rest of the southern states; I-85 which connects Alabama to Virginia; I-77 which connects South Carolina to the Midwest and north; and I-95 which runs from Florida to Maine.

5 Why is this project needed?

5.1 Outdated Infrastructure

As an interstate corridor initially developed in the 1950s and 1960s and improved during the 1970s and 1980s, the I-20/26/126 corridor does not meet current vehicular traffic demands. It experiences heavy traffic congestion due to increases in vehicular traffic, vehicle weaving, interchange spacing, and above average accident rates, and access ramps to and from each interstate consistently become congested. Finding an up-to-date solution has become a statewide priority. The need for this project is a result of the following, detailed further in the sections that follow:

- Population and employment growth trends
- Decreased mobility and increased traffic congestion in the AM and PM peak-period travel period (inadequate roadway capacity)
- Increased user delay and lost productivity
- Inadequate system linkages
- Safety concerns

Vehicle Weaving: when vehicles merge and diverge, sometimes making multiple lane changes, in close proximity when entering or exiting the interstate. This is common at interchange locations where multiple corridors intersect, such as at the I-26/I-20/Bush River Road interchange.

5.2 Growth trends

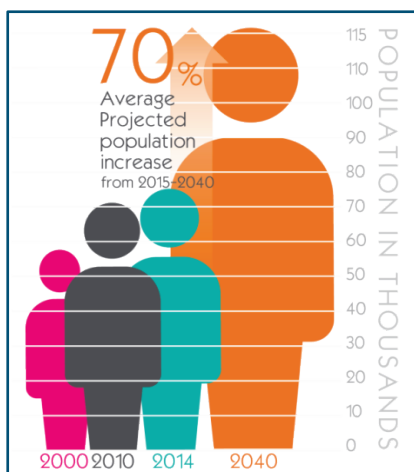


Figure 5.1 Regional population growth

South Carolina as a whole is growing, as is the Columbia metropolitan area. Many areas within the proposed Carolina Crossroads project corridor have experienced rapid growth since the development of I-26 and subsequent development of I-20 and I-126. For example, the I-26/Harbison Boulevard interchange has become a major regional retail center, housing a large shopping mall, other popular retail venues, restaurants, and hotels. Projections show that this trend will continue through the foreseeable future.

5.2.1 POPULATION GROWTH AND HOUSEHOLD GROWTH

Regional trends showed that from 2000 to 2010 the population of the metropolitan area of Lexington, Richland, Newberry and Fairfield

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Counties grew from 596,253 to 708,359 (18.8%) and is projected to increase by another 64% to a population of 1,164,000 by 2040. Of these four counties, Lexington and Richland, which includes the study area, are expected to show the largest percentage of growth at 81.6% and 61.1% respectively (CMCOG 2012), an average of approximately 70%. These numbers outpace the growth of South Carolina which showed a 15.3% growth between 2000 and 2010 (US Census 2011).

In addition to population growth, South Carolina has also experienced a growth in households. Table 5.1 shows the trends from the last two US Census reports at a state, county, and city level.

Table 5.1 Household Growth

Census year	South Carolina	Lexington County	Richland County	Columbia
2010	180,1181	102,733	145,194	52,471
2000	153,3854	83,240	120,101	42,245

Source: US Census Bureau American FactFinder

5.2.2 EMPLOYMENT GROWTH

In the last year, employment in South Carolina increased by 62,548 jobs with the labor force growing by 46,700 individuals. This represented a 3.25% increase, with the Columbia Metropolitan Statistical Area having the largest increase, from 375,200 jobs in September 2014 to 384,900 jobs in September 2015 (DEW 2015). Table 5.2 shows the projected employment growth in the Columbia MSA (which includes Lexington, Richland, and Fairfield counties, along with adjoining Calhoun, Kershaw and Saluda counties) from 2012 to 2022.

Table 5.2 Projected Employment, Columbia MSA

Area	2012 estimated employment	2022 projected employment	Employment change	Total percent change
Columbia MSA	337,201	377,000	39,799	11.80%
South Carolina	1,983,585	2,212,392	228,807	11.50%

Source: SC Works online services

5.3 Decreased Mobility and Increased Traffic Congestion

5.3.1 TRAVEL PATTERNS

The Carolina Crossroads project team evaluated traveler origin-destination information. That is, where travelers started and where they were going. The project team did this by using Bluetooth technology to evaluate the direction of travel in the study area. The most important period to examine for trip modeling is the period of the morning (7:30 AM – 9:00 AM) and evening (4:00 PM – 6:30 PM) work commutes, since these tend to be the most congested travel times of the day. The data shows that during the morning and evening commute, traffic is highly directional, with approximately 65 percent of the traffic heading southbound on I-26 during the morning and 60 percent heading northbound on I-26 in the afternoon. High volumes of traffic enter southbound I-26 during the morning peak hour (8:00 AM), with about 2,000 vehicles per hour entering from the St. Andrews

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Road interchange (Exit 106). The Broad River Road interchange (Exit 101) adds approximately 1,200 vehicles per hour, while the Lake Murray Boulevard (Exit 102), Harbison Boulevard (Exit 103), and Piney Grove Road (Exit 104) interchanges add 850, 650, and 950 vehicles per hour, respectively. Over the course of seven days, approximately 40 percent of the traffic within the I-20/26/126 corridor passes-through, meaning it starts and ends outside of the study corridor limits. Table 5.3 illustrates the origin-destination travel patterns within the I-20/26/126 study corridor for a week.

Table 5.3 Origin-Destination Travel Patterns within the I-20/26/126 Corridor

Origin-destination	Total traffic	Percentage
External – external	42,429	39.8%
External – internal	29,023	27.1%
Internal – external	26,093	24.3%
Internal – internal	9,430	8.8%
Total	107,175	100%

Other notable travel patterns include Saturday traffic on I-26. Specifically, Saturday traffic has a longer peak period (11:00AM to 6:00PM) with generally even directional distribution; and between 11:00AM and 4:00PM, Saturday traffic is higher than those same times during the week. Additionally, at the Harbison Boulevard interchange (Exit 103), the morning and afternoon peak hours fall outside of the usual commuting periods. This is likely due to the concentration of retail development along Harbison Boulevard.

5.3.2 UNACCEPTABLE LEVEL OF SERVICE

Level of service (LOS) is a method of measuring the vehicle-carrying capacity of a street or freeway. When the capacity of a road is exceeded, the result is congestion, delay, and a poor level of service. LOS is represented by a letter “grade” ranging from A for excellent conditions – that is, traffic is light and free-flowing – to F for failure conditions – that is,

extremely congested, gridlock traffic. LOS B through LOS E describe progressively worse traffic conditions. Typically, in urban areas, such as Columbia, LOS E and F are considered to be unacceptable operating conditions and LOS D and above are generally considered acceptable.

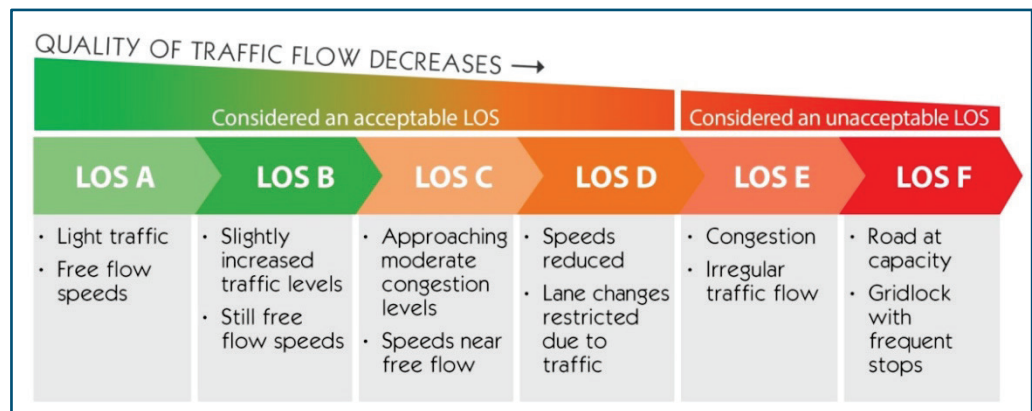


Figure 5.2 Definition of level of service

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Travel demand models show that certain segments within the I-26 corridor operate near or over capacity (Figure 5.3). By 2040, the congestion on these roads is expected to increase, and the projected increase in traffic is likely to exacerbate this.

Segment	Eastbound	Westbound
Exit 101 to Exit 102 Broad River Rd to Lake Murray Blvd	Under Capacity	Under Capacity
Exit 102 to Exit 103 Lake Murray Blvd to Harbison Blvd	Near Capacity	Near Capacity
Exit 103 to Exit 104 Harbison Blvd to Piney Grove Rd	Near Capacity	Near Capacity
Exit 104 to Exit 106 Piney Grove Rd to St. Andrews Rd	Over Capacity	Near Capacity
Exit 106 to Exit 107 St. Andrews Rd to I-20	Over Capacity	Over Capacity
Exit 107 to Exit 108 I-20 to Bush River Rd	Over Capacity	Over Capacity
Exit 108 to Exit 110 Bush River Rd to US 378	Near Capacity	Under Capacity

Figure 5.3 Existing level of service, I-26

5.4 Freight Movement

With access to major ocean port terminals, inland port terminals, railroad lines, airports, and highways, a substantial amount of freight moves through South Carolina. It is estimated that over 375 million tons of freight moved across South Carolina in 2011 (SCDOT, 2014), 80 percent of which was moved by truck. I-26 and I-20 are both major trucking corridors, with several freight shipping centers such as BMW, Continental, Michelin, Bridgestone, and Fort Jackson. I-26 in particular also serves as a major cargo route between Lowcountry ports and Upstate manufacturers. I-26 is further elevated in importance by its direct connection with I-20, which connects South Carolina to the rest of the southern states; I-85, which connects Alabama to Virginia; I-77 which connects Columbia, South Carolina to the Midwest; and I-95, which runs from Florida to Maine.

5.5 Inadequate Interconnection of Transportation Modes

5.5.1 PEDESTRIAN AND BICYCLE FACILITIES

Pedestrian and bicycle facilities do not exist directly along the Carolina Crossroads corridor, as pedestrian traffic and the use of non-motorized vehicles are prohibited on the interstates due to safety concerns. Currently there are no continuous north-south or east-west pedestrian/bicycle facilities through the study area, but there is popular support for expanding bicycle and pedestrian facilities in the Columbia metropolitan area. The City of Columbia and the Central Midlands Council of Governments (CMCOG) have initiated a Pedestrian and Bicycle Master Plan and Bike Share Plan called Walk Bike Columbia. It is currently in the planning phase and upon completion the City of Columbia anticipates having a national designation as a Bicycle Friendly Community, and could be the first Walk Friendly Community in South Carolina (Walk Bike Columbia). Recommendations from the Walk Bike Columbia report show that Broad River Road is given the highest priority score for sidewalk necessity and that there should be appropriate crossings of I-26 at St. Andrews Road. The report also indicates a need for signalized bicycle and pedestrian signals at crossings of Harbison Boulevard and I-26, St. Andrews Road and I-26, Bush River Road and I-20, and Broad River Road and I-20 (Walk Bike Columbia).

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5.5.2 TRANSIT INFRASTRUCTURE AND ACCESS

Public and mass transit options are growing in interest in the Midlands region. The primary transit provider is the Central Midlands Regional Transit Authority (CMRTA), known as the Comet. The CMRTA provides fixed route bus service in Richland County and portions of Lexington County. CMRTA routes do not travel directly within the I-20/26/126 corridor, but they do parallel and/or cross it via major arterials such Broad River Road, Piney Grove Road and others. CMRTA is currently in the process of developing a plan for a more connected and accessible transit system, including development of high frequency service along high capacity corridors and limited stop express routes, as well as restructuring of service to lower density routes such as neighborhoods. Park-and-ride express routes are also being considered which would utilize the region's interstate highway network to service major employment sites and events. The Northwest (I-26) Express and East (I-20) Richland Express routes are among the park-and-ride express routes to be evaluated by CMRTA.

5.6 Safety Concerns

The frequency and severity of crashes is valuable information in assessing the safety of an interstate. The SCDOT Safety Office keeps records of crashes and provided crash data information for three years, from January 1, 2012 to December 31, 2014 for the mainline interstate sections and on/off ramps within the study area. The locations of the crashes were coded by the time and date of the collisions, and included the accident location, as well as information concerning the manner of collision, severity, lighting condition, pavement surface conditions, and other information. In the project corridor, I-26 experiences more traffic crashes than the state average. There were a total of 2,370 accidents reported along I-26 from January 1, 2012 to December 31, 2014. These were split nearly evenly in the eastbound and westbound directions, with 1,171 and 1,199 accidents, respectively. These crashes occur most frequently at interchange locations and most often during the AM and PM peak and in the early afternoon. Fifty percent of all accidents within the study area occurred between the I-26/Piney Grove Road interchange and the I-26/I-126 system-to-system interchange, which also includes the system-to-system interchange at I-20/I-26. The most frequent collisions were rear-end collisions (over 60 percent) with same direction sideswipe accidents and "no collision with motor vehicle" accidents making up 18 and 17 percent of the total collisions, respectively. In addition to safety concerns, crashes often cause unavoidable congestion, and when they occur during the AM and PM peak, they worsen the congestion that already exists from travel demand during those time periods.

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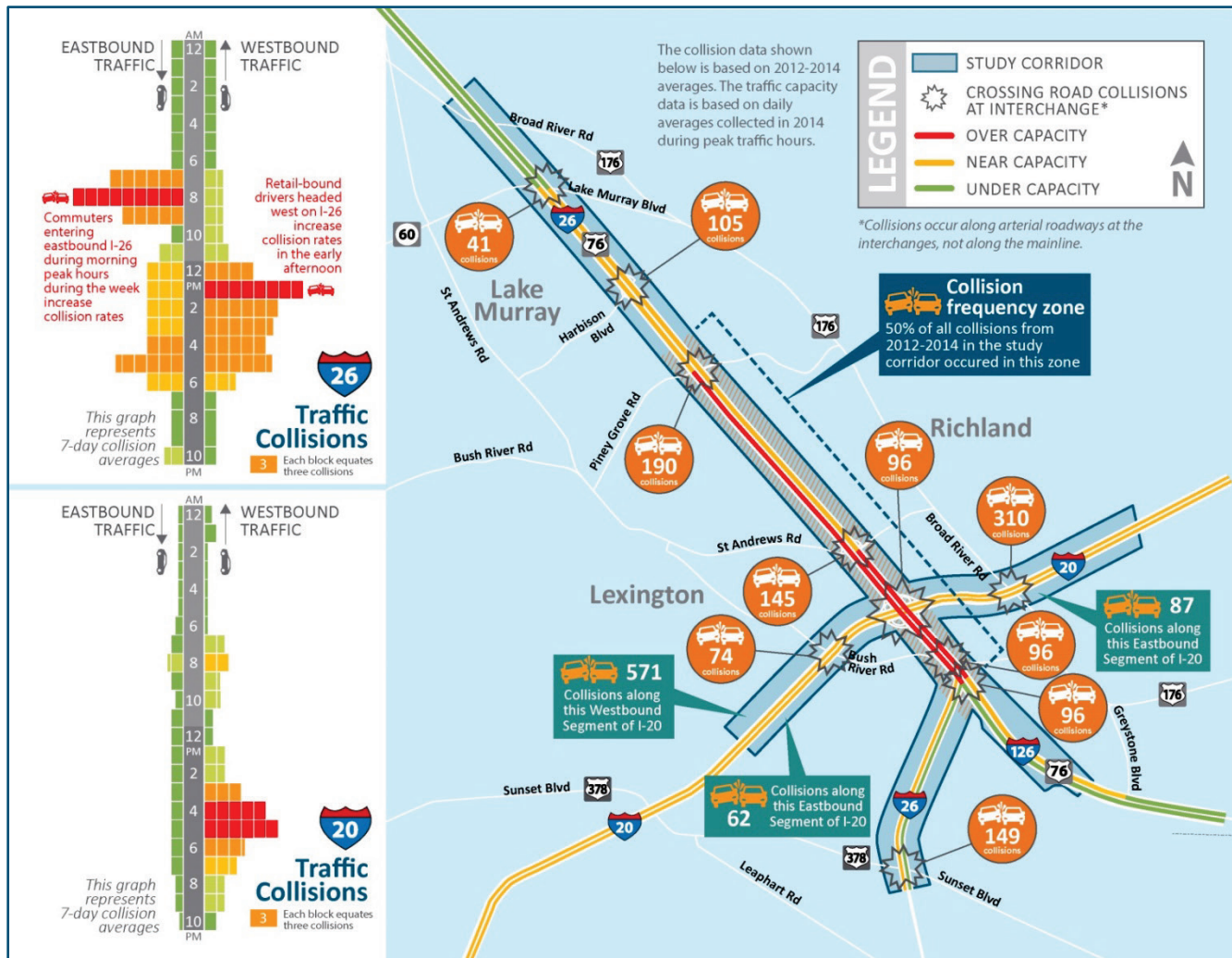


Figure 5.4 Corridor collision summary, I-20/26/126

5.6.1 INCREASE IN CRASH RATES AND FATALITY RATES

To identify where crashes were more frequent, the project team collected crash data from the SCDOT Office of Traffic Engineering for roadway segments within the study area. In the project corridor, I-26 experiences more traffic crashes than the state average. There were a total of 2,370 accidents reported along I-26 from January 1, 2012 to December 31, 2014 (Figure 5.4). These were split nearly evenly in the eastbound (1,171 accidents) and westbound (1,199 accidents) directions. The most frequent collisions were rear-end collisions (over 60 percent) with same direction sideswipe accidents and “no collision with motor vehicle” accidents making up 18 and 17 percent of the total collisions, respectively. High crash rates are attributed to extended periods of congestion throughout the corridor and abrupt driving maneuvers due to the multiple weaving movements at and adjacent to the system interchange at I-20. A comparison of crash rates at the Carolina Crossroads site with similar interchanges between I-26 and I-526 in Charleston County and I-85 and I-385 in Greenville County is summarized in Table 5.4.

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Table 4.4 Total Crash Rates and FSI Crash Rates Comparison

Location	Total crash rate (per 1MVT)	Fatal/severe injury crash rate (per 1MVT)
Statewide; urban interstates (2015)	1.431	0.016
I-26/I-20/I-126 (Carolina Crossroads)*	2.863	
I-20 MP 60.895 – 67.0*	1.913	0.022
I-126 MP 0.0 – 2.1*	0.766	0.033
I-26 MP 99.0 – 109.70*	2.441	0.018
I-26/I-526 (Charleston County)*	1.748	
I-85/I-385 (Greenville County)*	2.690	

Source: SCDOT Office of Traffic Engineering

*Crash rates are aggregated over 5 years (2012-2016); crash rates are at the referenced interchanges and do not include freeway approaches. Upgrades at these interchanges are currently in process or under development and screening.

MP – milepost

MVMT – million vehicle miles traveled

The total crash rate at the I-26/I-20/I-126 study area is twice as high as the statewide average for Urban Interstates. The study area includes the I-20/26/126 interchange and several miles of freeway sections on I-26, I-20, and I-126 approaching the interchange. On the I-20 and I-26 segments of the study areas, the crash rates exceed the statewide average for total crashes. All segments of this interchange exceed the average for FSI (Fatal and Severe Injury) crashes. Additionally, the I-20/26/126 study area crash rate is higher than both comparable freeway-to-freeway interchanges. Much of this crash risk is attributed to the complex weaving maneuvers that take place within a relatively short section of freeway.

A crash hotspot analysis⁸ revealed that there are several hotspot crash locations on the three freeway sections in proximity to the I-20/26/126 interchange. This analysis identified several safety considerations which would mitigate the high crash risk throughout this interchange. Those considerations include:

- Reducing or eliminating the multiple weaving segments on I-26 southbound in proximity to the off- and on-ramps to I-20, and on I-26 northbound between the I-126/I-26 ramp merge and Exit 103 at Harbison Boulevard;
- Improving northbound I-126 between the I-20 ramp diverge and the I-26 merge, where considerable traffic weaves occur between all three freeways;
- Reducing or eliminating the weaving segments on I-20 between Exit 64 (I-26) and Exit 63 (Bush River Road);
- Separating system-to-system traffic flow, especially from I-20 westbound to I-26 northbound;
- Lengthening merge sections; and,
- Improving interchange ramp termini at arterial and collector roads to reduce crash risk through geometric modifications

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6 How is the purpose and need used to evaluate alternatives?

The primary purpose of the project – to implement a transportation solution(s) that would improve mobility and enhance traffic operations by reducing existing traffic congestion with the I-20/26/126 corridor – will be used as criteria to screen or eliminate alternatives that are not reasonable or practicable. In other words, if an alternative does not achieve the project’s primary purpose, it will be eliminated from further consideration. The team will then use the secondary purposes to further compare alternatives.

First, a range of alternatives will be developed that will include an initial list of alternatives which are general in nature. Examples include:

- Making changes to the existing highway transportation corridor including I-20/26/126 and/or existing arterial streets such as Broad River Road and St. Andrews Road.
- Establishing a new transportation corridor, identified by the public as a “northern connector” or “northern arterial”.
- Increased travel demand management (TDM) strategies and/or add new TDM strategies such as managed lanes.
- Increased existing transportation system management (TSM) strategies or add new TSM strategies such as intersection and signal improvements, signage and lighting, and measures to correct weaving movements.
- Additional mass transit within the study area such as light rail, commuter rail, Bus Rapid Transit (BRT)
- No-Build alternative.

The initial range of alternatives was evaluated against the purpose and need under Level 1A screening including qualitative traffic metrics followed by Level 1B screening. Criteria established for metrics in Level 1A screening were essential to meeting the project purpose and need, therefore if an alternative was unable to meet them, it was considered “fatally flawed”. Those alternatives that passed Level 1A screening were moved to Level 1B screening for more detailed traffic analysis to evaluate LOS, travel time, delay and v/c. Alternatives that advanced to Level 2 screening were evaluated against environmental constraints; construction feasibility, cost, and secondary need components including the ability to improve safety, improve freight mobility,

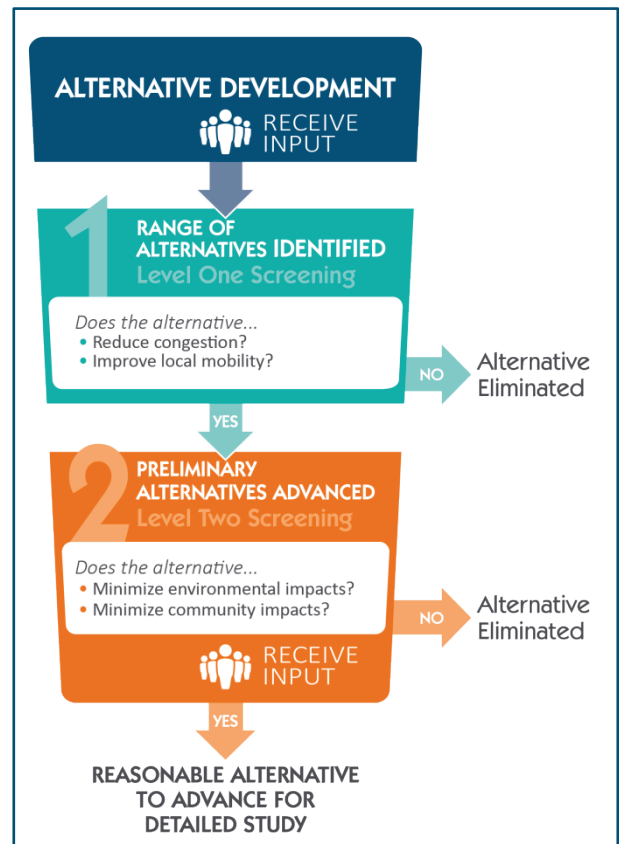


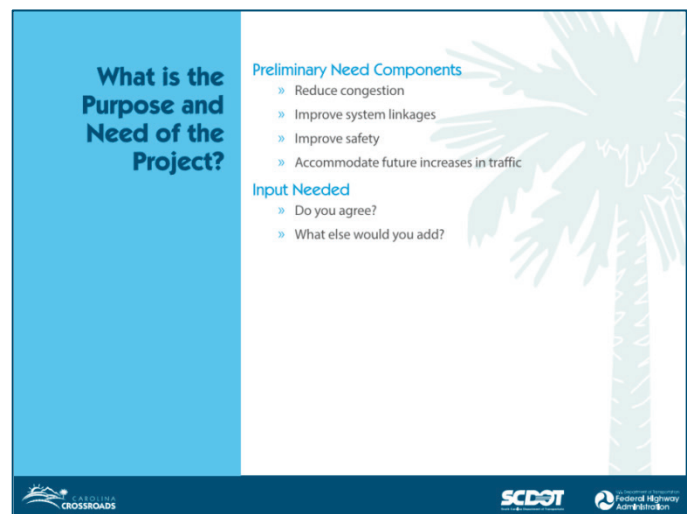
Figure 6.1 Alternatives development process

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improve system linkages, while minimizing community and environmental impacts. Those alternatives that advanced through Level 2 screening became Reasonable Alternatives which were evaluated in detail in this DEIS under Level 3 screening with the ultimate goal of determining a Recommended Preferred Alternative that would meet the purpose and need of the proposed project. Figure 6.1 illustrates the alternatives development and screening process under the purpose and need.

7 How were the public and agencies involved in developing the project's purpose and need?

The development of project's purpose and need incorporated input from the public and various other sources during the EIS scoping process. Numerous commenters said that roads in the study area are congested and were supportive of roadway improvements to alleviate the congestion. An initial community kickoff meeting was held on May 12, 2015 to introduce the project to the public. General comments were requested and resulted in 158 comments received, covering a variety of topics including alternatives development, cost, environmental impacts, and agency and public involvement. On September 10, 2015, a public scoping meeting was held. During the public scoping meeting (both in-person and on-line), participants were asked to provide feedback on the purpose and need of the project. Sixty-three comments were received, and feedback received included:



- Safety as a primary purpose and need
- Accommodating future traffic and population of the region
- Commuting patterns
- Evacuation routes
- Address noise impacts
- Accommodating increased economic traffic from the Upstate

FHWA and SCDOT published a draft of the project purpose and need document for review by the cooperating and participating agencies, and subsequently for review by the public. Members of the public and agencies were encouraged to provide comments by e-mail, the project website, and U.S. mail within a 30-day time period.

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7.1 United States Army Corps of Engineers (USACE) Determination of Purpose and Need

USACE is responsible for ensuring compliance with Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, as well as NEPA. Under Section 404(b)(1) of the Clean Water Act, the Environmental Protection Agency, in conjunction with USACE, developed “Guidelines” to ensure compliance with Section 404 of the Clean Water Act when evaluating permit applications.¹ No discharge of dredged or fill material shall be permitted if there is a “practicable” alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem. USACE considers an alternative “practicable” if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purpose (40 CFR §230.10(a)(2)). When reviewing the proposed project, USACE must evaluate each alternative, always considering whether each of the alternatives really meets the project’s overall purpose.

7.1.1 WHAT IS THE RESPONSIBILITY OF USACE TO REVIEW THE STATEMENT OF NEED?

USACE has general policies that guide the review of Department of the Army permits.² One such policy is the public interest review. The concept of public and private need for the proposed project is important to the balancing process of USACE’s public interest review. 33 CFR §320.4(a)(2) states that part of the public interest review in the evaluation of every application is to consider the relative extent of the public and private need for the proposed structure or work. A public sector applicant’s project is presumed to address some public need and USACE can defer to a state or other government entity’s decision to spend public money. However, regulations indicate that USACE should make an independent review of the public need for a project from the perspective of the overall public interest. This independent review is relevant to USACE’s permit decision. USACE will question the public need for a project if the proposed project appears to be unduly speculative. In the public interest review, USACE has the responsibility to balance public interest need or benefits against public interest detriments. The decision of whether to authorize the proposed project and the conditions under which it will be allowed are determined by the outcome of the general balancing process.

8 Conclusion

The I-20/26/126 corridor is listed as one of South Carolina’s most congested interstate corridors. The corridor has become a major hub for the Midlands’ commuters as well as travelers and commerce, serving as a main route in and out of Columbia. It serves a number of important functions locally including regional access to downtown Columbia, adjacent employment areas and neighborhoods, and regional activity centers. With its location central in the state, the I-20/26/126 corridor also serves as a primary thoroughfare for travelers going to the coast and mountains for recreation and tourism. I-26 in particular also serves as a major cargo route between Lowcountry ports and Upstate manufacturers. Its direct connection with I-20 and other major

¹ 40 CFR 230. https://www.epa.gov/sites/production/files/2015-03/documents/cwa_section404b1_guidelines_40cfr230_july2010.pdf

² 33 CFR 320. <https://www.gpo.gov/fdsys/pkg/CFR-2012-title33-vol3/pdf/CFR-2012-title33-vol3-part320.pdf>

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interstates also makes I-26 a particularly important travel and commerce corridor for the state of South Carolina.

As an interstate corridor initially developed in the 1950s and 1960s and improved during the 1970s and 1980s, the I-20/26/126 corridor does not meet current vehicular traffic demands. Traffic models show that the corridor operates at unacceptable LOS currently. It experiences heavy traffic congestion due to increases in vehicular traffic, vehicle weaving, and above average accident rates (I-26 experiences more traffic crashes than the state average), and access ramps to and from each interstate consistently become congested. Finding an up-to-date solution has become a statewide priority. The need for this project is a result of:

- Population and employment growth in the Midlands
- Decreased mobility and increased traffic congestion in the AM and PM peak-period travel period (inadequate roadway capacity)
- Increased user delay and lost productivity
- Inadequate interconnection of transportation modes
- Safety concerns

The primary purpose of the proposed Carolina Crossroads project is to implement a transportation solution(s) that would improve mobility and enhance traffic operations by reducing existing traffic congestion within the I-20/26/126 corridor while accommodating future traffic needs. The secondary purposes of the proposed Carolina Crossroads project are to enhance safety throughout the corridor and improve freight mobility, while minimizing environmental impacts.

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9 References

- Central-Midlands Council of Governments (CMCOG). 2012. "2010-2040 Population Projections for the Central Midlands Region." Accessed 11/12/2015. http://www.columbiasc.net/depts/city-council/docs/old_downloads/12_4_2012_Agenda_Items/2010-2040_Population.pdf
- Columbia Area Transportation Study (COATS) Metropolitan Planning Organization. 2015. "2015 Congestion Management Plan."
- COATS. 2008. "Midlands Tomorrow, 2035 Long Range Transportation Plan." Adopted December 18, 2008; Amended February 26, 2009; April 23, 2009; June 25, 2009; October 22, 2009; December 10, 2009.
- Federal Highway Administration (FHWA), "I-26 Economic Development Report." Accessed December 29, 2015. http://www.fhwa.dot.gov/planning/economic_development/assistance/i26sc.cfm.
- South Carolina Department of Employment and Workforce (SCDEW). 2015. "South Carolina's Employment Situation September 2015." Accessed 11/12/2015. http://dew.sc.gov/documents/lmi-monthly-trends/September_2015.pdf
- South Carolina Department of Transportation (SCDOT). 2010. "SCDOT HOV/HOT Lane Feasibility Study." Prepared by Davis & Floyd, in association with Stantec.
- SCDOT. 2014. "South Carolina Multimodal Transportation Plan – Interstate Plan." Prepared by Stantec, in association with CDM Smith.
- SCDOT. 2014. "South Carolina Multimodal Transportation Plan – South Carolina Statewide Freight Plan." Prepared by Stantec in association with CDM Smith.
- SCDOT. 2010. Traffic Impact Study for the I-26/I-126 Corridor in Columbia South Carolina." Prepared by SCDOT Planning Office.
- US Census Bureau. 2011. "Population Distribution and Change: 2000 to 2010." Accessed 11/12/2015. <https://www.census.gov/prod/cen2010/briefs/c2010br-01.pdf>
- US Census Bureau. 2015. "American FactFinder." Accessed 11/13/2015. <http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>
- South Carolina Multimodal Transportation Plan. 2014. "Regional Transit & Coordination Plan Central Midlands Region." Accessed 11/12/2015. http://www.dot.state.sc.us/Multimodal/pdf/SC_MTP_Regional_Transit_Plan_CentralMidlands_FINAL.pdf
- SC Works. "Online Services Community Profiles". Accessed 11/12/2015. <http://lmi.dew.sc.gov/lmi%20site/CommunityProfiles.html>
- Walk Bike Columbia. 2015. "Recommendations: Programs and Policy". Accessed 11/13/2015. http://www.walkbikecolumbia.org/uploads/1/9/4/6/19463751/150324_wbcolumbiafinal_recs_lrlr.pdf