Introduction

GPATS

This chapter examines the existing transportation network and establishes a foundation upon which to determine the improvements necessary given current growth and development patterns. The chapter begins with an overview of the connection between transportation and land use before profiling the existing highway network and discussing corridor operations and traffic congestion. The chapter closes with the results of detailed crash analysis and potential countermeasures for high occurrence crash locations.

Transportation and Land Use

An efficient transportation system connects neighborhoods and activity centers via a network of streets, paths, and trails that are safe and supportive of pedestrians, bicyclists, transit patrons, cars, and trucks. Such a system offers choice for short and long trips and promotes convenient movement of people and goods.

Equally important to the relationship between activity centers and the transportation network that links them is the choice provided to transportation users within the center. While all streets are not created the same, every street contributes to the form of the neighborhood, city, and region. Narrow two-lane streets with on-street parking and safe pedestrian crossings lead to visibly different land uses and building forms when compared with those presented by high-speed, multi-lane divided highways. Both types of streets are needed in most cities and regions, prompting the local officials to determine the frequency and location of each type. As the region continues to grow, continuous evaluations of the transportation impacts of land use decisions as well as the land use impacts of transportation decisions is imperative.

Neighborhoods and activity centers often depend on a few corridors to link homes with jobs, schools, restaurants, stores, and other destinations. The mix of these origins and destinations has a dramatic effect on the choice provided to users as well as the character of the community. The success of corridors within and between activity centers often leans of the intended function of the street. The challenge we now face is balancing the mobility needs of an



area with competing priorities. In the past, traffic mobility overshadowed other priorities of a street, such as the promotion of other modes and the relationship use and urban design. For a diverse region such as the GPATS area, the balance access, connectivity, and safety with social and environmental stewardship forces innovative solutions. (Table 3.1 summarizes three general categories of activity that exist in the GPATS area.)

	Table 3.1 – Activity Centers
Center Type	Characteristics
Regional Activity Center <u>Local Example</u> Downtown Greenville Woodruff Road at I-385 (Greenville Mall area) Haywood Mall area	 Large-scale, tran Core areas contare supported b Accessed by inttransportation (Served by muni Higher resident Balance betwee
Community Activity Center Local Example University Center (SC 291 at Laurens Road) Cherrydale (SC 291 at Poinsett Highway) Fairview Road (Simpsonville) Butler Road (Mauldin) Pelham Road west of I-85 Greenville Tech Campus SC 153 at SC 81 (Powdersville) Augusta Street from SC 20 (Grove Road) to Faris Ro	 Include a comb and social uses Core areas cont serving the day- as well as the gr Accessed by pri Served by muni Medium density Residential/nor
Neighborhood Activity Center Local Example Department Example	Largely resident for the neighboMixture of low

- Downtown Fountain Inn, Simpsonville, Greer, Travelers Rest, Liberty, Pickens, Easley
- West Greenville SC 124 (Pendleton Street) at Traction Street
- East North Street at Overbook Road
- Brushy Creek Road at Old Spartanburg Road

- street access



Chapter 3

Highway Element – Existing

to land	
of	
3	
centers	

ansit supportive center of employee-intensive land uses
ntain large-scale and high intensity urban land uses that by and serve communities within the region
tterstates/freeways, principal arterials, and public (preferably regional transit)
nicipal water and sewer
itial densities
en residential/non-residential land use
bination of retail, personal services, civic, educational, s that serve needs of surrounding neighborhoods
tain medium-scale development that is focused on y-to-day needs and activities of the core area occupants, greater needs of the surrounding neighborhoods
rincipal arterials and public transportation
nicipal water and sewer
ty residential areas
on-residential land use mix is approximately 60/40
ntial with a mixed-use core that serves as a focal point

orhood and provides retail and service needs

and medium density residential areas

Accessed by principal and minor arterials with integrated collector

Transit service is provided or desired

Linking transportation and land use is a necessary first step. Coordinating transportation and land use can reduce capital and operating costs for the transportation system, protect social and environmental resources, and ensure consistent economic growth. In addition to balancing the urban and rural divide, the benefits of connecting land use and transportation include:

- Convenient and attractive access between work, services, and residences while reducing dependency on automobiles and the area's major thoroughfares
- Attractive, economically sound places serviced by an efficient and diverse transportation system

Existing Highway Network

Several cities and towns as well as unincorporated areas of Greenville and Pickens County make up the GPATS area. Cities and towns within the GPATS area include Easley, Fountain Inn, Greenville, Greer, Liberty, Mauldin, Pickens, Simpsonville, and Travelers Rest. These cities and the unincorporated areas outside their limits provide a variety of residential, employment, and leisure options for citizens and visitors, and each area contributes its unique character to the larger region. The existing roadway infrastructure provides critical links within and to these places throughout the state and nation.

Regional Access

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Regional access in the GPATS area was greatly enhanced by the National Interstate and Highway Defense Act in 1956 and now acts as a major reason the regional businesses continue to locate or expand in the area. Today, I-85 which stretches from Atlanta, Georgia to Richmond, Virginia — crosses the area from northeast to southwest.

The more recent openings of I-385 and I-185 created additional connections to the regional and national roadway network. I-385, an interstate spur, connects the eastern edge of downtown Greenville south to I-85 and I-26. Although outside the GPATS boundary, I-26 is an important roadway for the region because it offers an uninterrupted connection north to I-81 in Tennessee and south to Columbia and Charleston. I-185 exists as a half-circle that connects the southwest corner of downtown with I-385.

In addition to these interstate facilities, several US highways and state roads provide relatively efficient travel between the region's cities and towns and connect with the region's interstate highways.

Functional Classification

Grouping roadways into functional classification groups helps policy makers, planners, engineers, and citizens communicate the existing conditions and future needs of the transportation system. The classification of streets in terms of design and operational characteristics of the movement of vehicles also provides a general notion of the type of traffic each street is intended to serve.

Distinguishing an arterial from a local street requires consideration of access and mobility. As shown in the figure to the right, arterials provide the most mobility and least access compared to collectors and locals. Classifying the roadway network in the GPATS area required an evaluation of each street's role within the transportation system. **Figures 3.1A to 3.1D** illustrate the functional classification for streets in the GPATS region. Functional classifications for roadways as defined in *A Policy on Geometric Design of Highways and Streets* (American Association of State Highway and Transportation Officials, 2004) are summarized below.

Arterials

Arterials provide high mobility, operate at higher speeds (45 mph and above), provide significant roadway capacity, have a great degree of access control, and serve longer distance travel. While most arterials connect to one another or to collector streets, few arterials connect to local streets. Arterials can be subdivided into expressways and freeways, principal arterials, and minor arterials.

Freeways and Interstates

Freeways and interstates provide the most mobility and restrict access to interchanges. As a result, these facilities give preference to longer distance travel and support regional mobility. Roadway improvement and maintenance on these facilities are funded by the state. I-85, I-185, I-385, and US 276 are classified as freeways or interstates.



I-85 north of Laurens Road



Regional Access – I-385





Principal Arterials

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Principal arterials serve major activity centers and higher traffic volumes by having tightly controlled access and few driveways. These facilities serve moderate to longer distance travel and typically connect minor arterials and collector streets to freeways and other higher type roadway facilities. The state typically funds roadway improvements and maintenance on principal arterials. Principal arterials within the GPATS area include:

- Laurens Road (Greenville)
- Wade Hampton Boulevard (Greer)
- Main Street (Mauldin)
- **Minor Arterials**
- Minor arterials also provide mobility but compared to principal arterials have more closely spaced intersections and driveways. The design and posted speeds also are lower (35 to 45 mph). As a result, these roadways usually support trips of moderate length. Minor arterials typically connect to other arterials and collectors. Because of the higher level of access provided to adjacent parcels and lower posted speeds, minor arterials usually have lower traffic volumes. The state typically maintains these facilities, although improvements can be the responsibility of local governments.

Most minor arterials in the GPATS area are two-lane roads with little or no paved shoulders and left-turn lanes at intersections and major driveways. Some of the intersections may be signalized, and the roadways may include sidewalks and on-street parking. Local examples of minor arterials include:

- Gulliver Street (Fountain Inn)
- Woodruff Road (Greenville)
- Arlington Road (Greer)
- Poinsett Highway (Travelers Rest)
- Anderson Drive (Liberty)

Butler Road (Mauldin)

• US Highway 25 (Travelers Rest)

Calhoun Memorial Highway (Liberty)

Dacusville Highway (Easley)

- Main Street (Simpsonville)
- Olive Street (Easley)
- Ann Street (Pickens)

Collectors

Collectors provide the most balance between access and mobility. Compared to arterials, these streets usually operate at lower speeds (less than 35 mph) and serve shorter distance travel. Collectors connect with major and minor arterials, other collectors, and local streets. The main purpose of collectors is to gather traffic from neighborhoods and distribute it onto the system of arterials. The cross section typically includes two lanes with exclusive left-turn lanes at major intersections. The state rarely constructs and funds collectors. Instead, the burden usually falls to local governments and private developers. Examples of collectors in the GPATS area include:

- Quillen Avenue (Fountain Inn)
- Salters Road (Greenville)
- Brushy Creek Road (Greer)
- Miller Road (Mauldin)
- West Curtis Street (Simpsonville)

Locals

Compared to arterials and collectors, locals provide the most access and least mobility. These facilities usually connect to collectors and other locals. Because of the low posted speeds (25 to 35 mph) and high level of access to adjacent parcels, locals serve short distance travel. Most streets in the GPATS area are locals, including:

- Hellams Street (Fountain Inn)
- Parkins Lake Road (Greenville)
- Jones Avenue (Greer)
- Hyde Circle (Mauldin)
- College Street (Simpsonville)

West Road (Travelers Rest)

Hillcrest Drive (Easley)

Summit Drive (Liberty)

Reece Mill Road (Pickens)

- Washington Avenue (Easley)
- Blue Ridge Drive (Liberty)
- Baker Street (Pickens)



Tubbs Mountain Road (Travelers Rest)





Arterial – US 123 (Calhoun Memorial Highway)



Collector – Woods Lake Road



Local – Residential









Corridor Operations

The roadways that make up the GPATS highway system operate at varying degrees of efficiency. Corridor operation can be described in terms of the number of vehicles that travel a given segment on an average day. Traffic congestion along a corridor can also be calculated by dividing the traffic volume by the roadways capacity. Figures 3.2A to 3.2D illustrate 2005 average daily traffic (ADT) volumes on roadways within the GPATS area and congested corridors as determined by volume-to-capacity ratio. The following sections briefly describe some of the information presented in the maps.

Traffic Volumes

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Traffic volumes represent the number of vehicles that travel a given segment on an average day. As shown in Figures 3.2A to 3.2D, several corridors displayed noticeably high ADTs. In particular, the interstate highways in the region have the highest volumes with as many as 107,600 vehicles traveling on I-85 north of the interchange with I-385. At this interchange, more than 85,000 vehicles per day travel on I-385.

Principal arterials with high traffic volumes include White Horse Road near I-85 (18,600 vehicles), Old Buncombe Road (US 25) between Greenville and Travelers Rest (22,100), Wade Hampton Boulevard (US 29) between Greenville and Greer (31,800), and Calhoun Memorial Highway (US 123) between Easley and Greenville (36,800).

Minor arterials with high traffic volumes include West Butler Road in west Mauldin (26,600), Haywood Road north of Greenville (27,400), and Gentry Memorial Highway south of Pickens (18,700). Collectors and locals are designed and located to carry fewer vehicles.



Haywood Road

Woodruff Road

Traffic Congestion

While traffic volumes provide a glimpse of how a corridor is operating, such a measure makes it difficult to compare corridors of differing functional classifications throughout the region. A better measurement of corridor operations for the sake of comparison is calculated using volume-to-capacity (V/C) ratios. V/C ratios divide the actual volume of traffic carried by a roadway by the theoretical capacity of the roadway to produce a universal measurement.

The following V/C categories are displayed in Figures 3.2A to 3.2D:

- Approaching Capacity (V/C = 0.8 to 1.0) A roadway with a V/C less than 0.8typically operates efficiently. As the V/C nears 1.0, the roadway becomes more congested. A roadway approaching capacity may operate efficiently during nonpeak hours but be congested during morning and evening peak travel periods.
- At Capacity (V/C = 1.0 to 1.2) Roadways operating at capacity or slightly above capacity are heavily congested during peak periods and moderately congested during non-peak periods. A change in capacity due to incidents greatly impacts the travel flow on corridors operating within this V/C range.
- Over Capacity (V/C > 1.2) The roadways in this category represent the most congested corridors in the GPATS area. These roadways are congested during non-peak hours and most likely operate in stop-and-go gridlock conditions during the morning and evening peak travel periods.

It is impossible for a community or region to build its way out of congestion. As the GPATS region continues to grow, adding capacity alone to the existing roadway network will do little to improve or even maintain existing congestion levels.

As can be expected, the worst congestion in the GPATS area occurs along the freeways and arterials in the Greenville area. However, the congestion displayed in Figures 3.2A and 3.2B does not account for the recent widening of I-385 to six lanes from Harrison Bridge to US 276 in Simpsonville. Current congested segments of this interstate include the 4-lane section between Bridges Road in Mauldin and the I-85 interchange north of the US 276 interchange. Other non-freeway congested corridors in Greenville include Woodruff Road east of I-85 (classified as an urban minor arterial). Near the interchange with I-385, the Woodruff Road V/C ratio is as high as 1.64.

Existing congested corridors are more widespread in the surrounding municipalities and unincorporated areas of the GPATS region. East of Easley, Calhoun Memorial Highway (US 123) is at capacity and the congestion on North Main Street (US 276) exiting Mauldin to the north gets progressively worse as it nears I-85.















Traffic Safety and Crash History

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A thorough examination of crash history and traffic patterns helps identify key locations where traffic safety improvements would be beneficial. Improving the safety for motorists and other users of the transportation network has widespread impacts not only on the transportation system but also on the community. Improved safety reduces a variety of costs associated with crashes, including medical care, emergency services, victim work loss, employer cost, traffic delay, property damage, and overall quality of life in the community.

A traditional approach to determine location for safety countermeasures involves a thorough study of the number of crashes and associated crash rate for a given location. The analysis for the *GPATS Long-Range Transportation Plan* built on this approach by factoring in other key components such as traffic volumes, severity of crashes (fatalities and injuries), and facility type. The inclusion of these components allowed for the establishment of a priority ranking system to earmark funds in the most efficient, cost-effective manner.

Table 3.2 details the worst-case crash intersection locations considered for safety improvements in the GPATS study area. Additional causation and countermeasures follow for these priority locations. The crashes represented in the table occurred between 2003 and 2005. Each location was analyzed and given a weighted score for influential factors. The sum of these weighted scores was used to determine the overall safety ranking of the intersection. A higher score represents those intersections where implementing countermeasures would be most cost-effective.

In general, several factors such as intersection design, access considerations, and traffic congestion contribute to a location's high crash frequency. Not surprisingly, many locations with a high frequency of crashes also have problems with traffic congestion. Likewise, driveway access close to an intersection can contribute to crash frequency by introducing conflict points near the intersection.

Priority Locations

Despite the availability of general crash type information, the cause of individual crashes was not available. Therefore, the following causational factors and potential countermeasures resulted from a preliminary review of each intersection's crash history and subsequent field investigation. Prior to implementing specific measures to address traffic safety concerns at these intersections, a more in-depth study of crash circumstances should be completed. **Figure 3.3** illustrates the location of the high occurrence crash intersections.



	Table 3.2 - High Occurrence Crash Intersection Rankings												
(2003 - 2005)													
				Vehicles						Injuries per			
Rank	County	Rt 1	Rt 2	Entering	Score	Crashes	Score	Fatalities	Score	Crash	Score	MEV Rate**	Score
1	Greenville	White Horse Road (US 25)	Anderson Road (SC 81)	47700	7	102	9	0	0	0.265	1	5.859	10
2	Greenville	Poinsett Highway (US 276)	Blue Ridge Road (SC 253)	67400	10	68	7	0	0	0.235	1	2.764	4
3	Greenville	White Horse Road (US 25)	Blue Ridge Road (SC 253)	45700	5	91	8	0	0	0.231	1	5.455	10
4	Greenville	Wade Hampton Boulevard (US 29)	Edwards Mill Road (S-335)	42700	3	85	8	0	0	0.353	2	5.454	10
5	Greenville	Wade Hampton Boulevard (US 29)	Main Street (SC 14) Greer	44200	4	63	6	0	0	0.381	2	3.905	9
6	Pickens	Calhoun Memorial Highway (US 123)	Main Street (SC 93) Easley	51800	8	55	5	0	0	0.291	1	2.909	5
7	Greenville	Main Street (US 276) Mauldin	Butler Road (S-107)	47500	7	50	4	0	0	0.300	2	2.884	4
8	Greenville	Pelham Street/SC 14	N.E. Main Street (SC 417) Simpsonville	33900	1	47	4	0	0	0.191	1	3.798	8
9	Greenville	Easley Bridge Road (US 123)	Washington Avenue (S-149)	35000	1	37	3	0	0	0.324	2	2.896	5
10	Greenville	Haywood Road (S-273)	Woods Crossing Road (S-510)	34800	1	0	-	0	0	-	-	0.000	1

* MEV Rate = (Total crashes*1,000,000)/(AADT*365 days per year*3 year analysis period); reported as crashes per million vehicles entering





US 25 (White Horse Road) and SC 81 (Anderson Road)

GPATS

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US 25 (White Horse Road) and SC 81 (Anderson Road) intersect southwest of Greenville. Approaching the signalized intersection, US 25 runs north to south as a seven-lane road. SC 81 runs east to west as a five-lane road. On average, 47,700 vehicles per day enter this intersection. A total of 102 crashes occurred during the 3-year analysis period, resulting in 27 injuries (0.265 injuries per crash).

Every intersection approach has a left-turn lane, and the eastbound and westbound approaches have right-turn lane channels with small concrete islands and yield signs. All left turns have protected/permitted left-turn phases. Carolina High School and Academy is located west of the intersection.

Based on visual observation during the field work, potential causes for crashes at this location include:

- SC 81 intersects White Horse Road at an angle, and the crest of a vertical curve is located on SC 81 west of the intersection. This geometry may affect westbound left turns.
- Pedestrians observed in the field had trouble crossing due to the left turns, channelized islands, and lack of pedestrian signals.
- Permitted left turns opposing three through lanes often experience more left turn crashes than the average of all turns.
- Street name markers are small and post-mounted, and some route markers are missing.
- SC 81 left-turn lanes do not have turn arrow pavement markings.

Based on these visual observations and the prevailing crash pattern at the intersection, the following potential countermeasures are recommended at this location:

- Convert left-turn phases to protected/prohibited if justified by crash reports
- Replace route markers and upgrade street name signs to large signs mounted overhead
- Check clearance intervals
- Install pedestrian signals
- Install turn arrow pavement markings



US 25 Southbound



SC 81 Westbound







US 276 (Poinsett Highway) and SC 253 (Blue Ridge Highway/State Park Road)

GPATS

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US 276 (Poinsett Highway) and SC 253 (Blue Ridge Highway/State Park Road) intersect north of the City of Greenville. At the signalized intersection, US 276 runs north to south as a five-lane road. Blue Ridge Highway is a four-lane highway west of the intersection and a seven-lane highway to the east. On average, 67,400 vehicles per day enter this intersection. A total of 68 crashes occurred during the 3-year analysis period, resulting in 16 injuries (0.235 injuries per crash).

All intersection approaches have left-turn lanes with dual left-turn lanes provided for southbound and westbound approaches. The westbound approach also has dual rightturn lanes, and the northbound approach has a channelized right-turn lane. All approaches have protected/prohibited left-turn phases. Right turn on red is prohibited for vehicles in the westbound dual right-turn lanes.

Based on visual observation during the field work, potential causes for crashes at this location include:

- The crest of a vertical curve exists several hundred feet north of the intersection on Poinsett and may intensify rear end collision potential.
- North of the intersection, Poinsett transitions from a five-lane arterial serving scattered commercial uses to a limited access facility. This transition from a higherspeed facility may result in higher approach speeds southbound which further contribute to rear end collision potential.
- Although most left turns into the corner businesses are prohibited, turns into and out of Checkers, Master's Mark Cleaners, Eckerd Pharmacy, and Stax are still a factor in the operations at the intersection.
- The signalized intersection of Blue Ridge/Parker Road is located just a few hundred feet to the west of the intersection, and the intersection of Pleasantburg/State Park Road is located about 1,000 feet to the east.
- Some route markers are missing and street name signs are small and post-mounted.

Based on these visual observations and the prevailing crash pattern at the intersection, the following potential countermeasures are recommended at this location:

- Coordinate adjacent traffic signals
- Review southbound approach sight distance and clearance intervals
- Replace route markers and upgrade street name signs to large signs mounted overhead



US 276 Northbound



SC 253 Westbound







GPATS

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US 25 (White Horse Road) and SC 253 (Blue Ridge Highway)

US 25 (White Horse Road) and SC 253 (Blue Ridge Highway) intersect west of Greenville. Approaching the signalized intersection, US 25 runs north to south as a seven-lane road. SC 253 runs east to west as a five-lane road east of the intersection and a two-lane road to the west. On average, 33,900 vehicles per day enter this intersection. A total of 91 crashes occurred during the 3-year analysis period, resulting in 21 injuries (0.231 injuries per crash).

Every intersection approach has a left-turn lane, with dual left turns on the southbound and westbound approaches. The northbound, southbound, and eastbound approaches also have right-turn lanes with a raised island northbound and a painted island southbound. All left turns have protected/prohibited phasing. Pedestrian accommodations are present.

Based on visual observation during the field work, potential causes for crashes at this location include:

- The northbound left-turn phase is a lagging phase.
- Beyond the intersection westbound, the outside lane of SC 253 drops.
- Street name markers are small and post-mounted.

Based on these visual observations and the prevailing crash pattern at the intersection, the following potential countermeasures are recommended at this location:

- Upgrade street name signs to large signs mounted overhead
- Check clearance intervals and examine operation of lagging left
- Adjust location of westbound lane drop



US 25 Northbound



SC 253 Westbound





GPATS

A 1 50

US 29 (Wade Hampton Boulevard) and Edwards Mill Road (S-335)

US 29 (Wade Hampton Boulevard) and Edwards Mill Road (S-335) intersect between the Cities of Greenville and Greer. At the signalized intersection, US 29 runs east to west as a seven-lane road. SR 335 runs north to south as a two-lane road. On average, 42,700 vehicles per day enter this intersection. A total of 85 crashes occurred during the 3-year analysis period, resulting in 30 injuries (0.352 injuries per crash).

Each intersection approach has a left-turn lane with protected/permitted left-turn phases. CSX Railroad and Norfolk-Southern Railroad cross Edwards Road approximately 300 and 500 feet south of the intersection, respectively.

Based on visual observation during the field work, potential causes for crashes at this location include:

- A short sag vertical curve is located on Edwards Mill Road between Wade Hampton and the CSX Railroad crossing, which may affect sight distance for southbound left turns.
- The southwest corner turn radius is substandard, and little shoulder exists between the edge of pavement and a deep ditch on the western side of Edwards Mill south of the intersection.
- High trip generators on corners CVS, the gas station, and BB&T influence operations at the intersection.
- Some route markers are missing, and street name signs are small and post-mounted.
- Although pedestrian signals are present on all corners, no crosswalks are provided at the intersection. Sidewalks only exist on one side of one leg of the intersection.
- Permitted left turns opposing three through lanes often experience more left turn crashes than average.

Based on these visual observations and the prevailing crash pattern at the intersection, the following potential countermeasures are recommended at this location:

- Reconstruct northbound approach to treat sag vertical curve and improve turn lane storage
- Convert left-turn phases to protected/prohibited if justified by accident reports
- Replace route markers and upgrade street name signs to large signs mounted overhead
- Upgrade pedestrian facilities



US 29 Westbound







US 29 (Wade Hampton Boulevard and SC 14 (N Main Street/N Main Street Ext)

GPATS

US 29 (Wade Hampton Boulevard) and SC 14 (N Main Street/N Main Street Ext) intersect in Greer. Approaching the signalized intersection, US 29 runs east to west as a seven-lane road. SC 14 runs north to south as a four-lane road near the intersection. On average, 44,200 vehicles per day enter this intersection. A total of 63 crashes occurred during the 3-year analysis period, resulting in 24 injuries (0.381 injuries per crash) and no fatalities.

All intersection approaches have left-turn lanes, which have protected/permitted leftturn phases. Pedestrian signals, crosswalks, and sidewalks are present. Route markers and large overhead street name signs also are present.

Based on visual observation during the field work, potential causes for crashes at this location include:

- The intersection is located on a relatively flat section of Wade Hampton Boulevard between the crests of two vertical curves, which may affect left turn sight distance. This problem is compounded because permitted left turns opposing three through lanes often experience more left turn crashes than average.
- This intersection is the primary access from US 29 for several high generators such as schools and destinations in downtown Greer.
- No turn arrow pavements markings are provided in the left-turn lanes on SC 14.

Based on these visual observations and the prevailing crash pattern at the intersection, the following potential countermeasures are recommended at this location:

- Convert left-turn phases to protected/prohibited where supported by crash reports
- Check clearance intervals
- Install turn arrow pavement markings



US 29 Northbound



SC 14 Eastbound

Signage





GPATS

A 1 00

US 123 (Calhoun Memorial Highway) and SC 93 (Main Street)

US 123 (Calhoun Memorial Highway) and SC 93 (Main Street) intersect west of downtown Easley. Approaching the signalized T-intersection, US 123 is a divided/fivelane road and SC 93 is a five-lane road. On average, 51,800 vehicles per day enter this intersection. A total of 55 crashes occurred during the 3-year analysis period, resulting in 16 injuries (0.291 injuries per crash).

From the west, two lanes approach the intersection. Motorists in the left lane continue on US 123, while motorists in the right lane have the option to continue on US 123 or veer right onto SC 93. For both SC 93 approaches, two left-turn lanes and a channelized right-turn lane is provided. The wide landscaped median on US 123 requires vehicles on the southbound approach to cross two US 123 through lanes and the median before entering US 123 eastbound. Thus, the southbound motorist encounters two sets of signals. The aerial photo on this page shows the intersection.

Based on visual observation during the field work, potential causes for crashes at this location include:

- The combination of the median landscaping and the crest of the median cross slope limit the sight distance for motorists turning from SC 93 onto US 23.
- The combination of limited sight distance and high speed of approaching vehicles may be an issue for approaching vehicles turning right onto SC 93 without signal control. The "veer" from US 123 to SC 93 does not require a decrease in speed and is separated from the southbound lanes by a large landscaped island.
- The signalized intersection of US 123/Powdersville Road is located only a few hundred feet to the east.
- No street name markers are located at the intersection.

Based on these visual observations and the prevailing crash pattern at the intersection, the following potential countermeasures are recommended at this location:

- Improve sight lines with small changes in landscaping to improve sight distances
- Reconstruct eastbound veer to SC 93 and southbound channelized right to create turn lanes rather than yield situations
- Install street name markers



US 123 Northbound

SC 93 Westbound



US 123 and SC 93





US 276 (Main Street) and S-107 (Butler Road)

GPATS

US 276 (Main Street) and S-107 (Butler Road) intersect in downtown Mauldin. At the signalized intersection, Main Street runs north to south as a five-lane road. Butler Avenue is a five-lane highway west of the intersection and a three-lane highway to the east. On average, 47,500 vehicles per day enter this intersection. A total of 50 crashes occurred during the 3-year analysis period, resulting in 15 injuries (0.300 injuries per crash).

Every intersection approach has a left-turn lane, and dual left turns are provided northbound. A right-turn lane also is provided for eastbound traffic. Left-turn phases are protected/permitted for eastbound and westbound traffic and are protected/prohibited for northbound and southbound traffic.

Based on visual observation during the field work, potential causes for crashes at this location include:

- The outside lanes end just beyond the intersection on both the eastbound and northbound approaches.
- Rear end collisions likely occur more frequently in the eastbound right-turn lane due to a high turning volumes and the frequency of right turn on red movements.
- Some crosswalks and curb ramps are awkwardly located.
- Heavy traffic volumes for eastbound left turns often result in traffic queues blocking through lanes. Motorists make unsafe turns during green phase.
- High trip generators on the corners Eckerd/City Hall, Walgreens, BP, and Blockbuster — influence operations.
- Some route markers are missing, and street name signs although mounted overhead — are small.

Based on these visual observations and the prevailing crash pattern at the intersection, the following potential countermeasures are recommended at this location:

- Restripe the eastbound approach to provide dual lefts and only one through lane
- Relocate lane drop northbound
- Replace route markers and increase size of street name signs
- Conduct study to determine feasibility of eastbound right turn on red restriction
- Revise pedestrian accommodations



US 276 Northbound



Butler Road Southbound





SC 14/Pelham Street and SC 417 (NE Main Street)

GPATS

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SC 14/Pelham Street and SC 417 (NE Main Street) intersect between Mauldin and Simpsonville. Approaching the intersection, SC 417 runs north to south as a five-lane road. SC 14 lies east of the intersection as a three-lane road, while Pelham Road lies to west of the intersection as a two-lane road. On average, 33,900 vehicles per day enter this intersection. A total of 47 crashes occurred during the 3-year analysis period, resulting in 9 injuries (0.191 injuries per crash).

The northbound and southbound approaches have left-turn lanes, and the eastbound approach has a left-turn lane and a right-turn lane. The eastbound approach has only one lane, which flares at the intersection to form a short, unmarked right-turn lane. All left turns have protected/permitted turn phases except for eastbound traffic where the left turn is permitted only. The railroad crosses Pelham Road west of the intersection, and the intersection has railroad pre-empt signal phasing.

Based on visual observation during the field work, potential causes for crashes at this location include:

- Just beyond the intersection for eastbound motorist, two through lanes are provided. However, one of these lanes becomes a right-turn lane at Stokes Road.
- The railroad crossing is close to the intersection.
- No crosswalks or pedestrian signals are provided at the intersection, and sidewalks are intermittent.
- Sunoco and BP gas stations on the eastern corners influence operations at the intersection.
- West of the intersection, curb cuts are not defined, and a tire store and a packaging company likely serve trucks. The eastbound approach has no left-turn lane.
- Street name markers are small and post-mounted.

Based on these visual observations and the prevailing crash pattern at the intersection, the following potential countermeasures are recommended at this location:

- Reconstruct eastbound approach to provide a left-turn lane aligned with westbound left, provide left-turn storage, and define pavement edges and driveways.
- Improve pedestrian accommodations.
- Provide large, overhead street name markers.



Pelham Street Eastbound facing SC 14



SC 417 Southbound





US 123 (Easley Bridge Road) and S-149 (Washington Avenue)

US 123 (Easley Bridge Road) and S-149 (Washington Avenue) intersect in south of downtown Easley just east of the US 123 and US 25 (White Horse Road) interchange. Approaching the signalized intersection, both US 123, which runs east to west, and S-149, which runs north to south, are four-lane facilities. On average, 35,000 vehicles per day enter this intersection. A total of 37 crashes occurred during the 3-year analysis period, resulting in 12 injuries (0.324 injuries per crash).

All intersection approaches have left-turn lanes. The northbound left from Washington Avenue to westbound Easley Bridge Road has protected/permitted phasing.

Based on visual observation during the field work, potential causes for crashes at this location include:

- No pedestrian signals are located at the intersection, and curb ramps are missing, substandard, or misaligned with crosswalks.
- A grouping of bollards on the southwest corner appears to protect a sign, which indicates the radius is insufficient.
- As the first signalized intersection for several miles eastbound on US 123, approach speeds may be high and rear end collisions more prevalent. In addition, collisions between eastbound through traffic and westbound vehicles turning left may be more prevalent due to the difficulty for westbound motorists turning left to judge the speed of opposing eastbound vehicles.
- A Chevron station and two restaurants on the western corners are high trip generators.
- No arrows are painted in the turn lanes, and street name markers are small and post-mounted.

Based on these visual observations and the prevailing crash pattern at the intersection, the following potential countermeasures are recommended at this location:

- Consider left-turn phase westbound
- Check clearance intervals

GPATS

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- Upgrade pedestrian facilities
- Reconstruct southwest corner
- Install turn arrow pavement markings and upgrade street name markers to large, overhead signs



US 123 Eastbound



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S-149 Southbound





Southwest Corner

S-273 (Haywood Road) and S-510 (Woods Lake Road/Woods Crossing Road)

Long Range Transportation Plan

GPATS

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S-273 (Haywood Road) and S-510 (Woods Lake Road/Woods Crossing Road) intersect adjacent to Haywood Mall just south of I-395. At the signalized intersection, Haywood Road runs north to south as a five-lane road. Woods Crossing Road lies east of the intersection as a three- and four-lane road, while Woods Lake Road lies west of the intersection as a two-lane road. On average, 34,800 vehicles per day enter this intersection. A total of 14 crashes occurred during the 3-year analysis period, resulting in 9 injuries (0.643 injuries per crash).

Based on visual observation during the field work, potential causes for crashes at this location include:

- The westbound lane drop requires merging maneuvers close to the intersection.
- A worn radius in the northwest corner indicates an inadequate turning radius.
- No pedestrian signals, crosswalks, or sidewalks are provided at the intersection.
- Left turns are permitted into three banks and a Burger King located on the corners. A driveway for the mall is located close to the intersection on the westbound approach.
- Street name markers are large and overhead but only show one east/west street name per north/south approach.
- When exiting the BB&T (northwest corner) onto Woods Lake Road, the sight distance to the left is blocked by a retaining wall on the bank site.

Based on these visual observations and the prevailing crash pattern at the intersection, the following potential countermeasures are recommended at this location:

- Upgrade pedestrian facilities
- Relocate westbound lane drop
- Install additional overhead street name markers for change in street name
- Work with BB&T to improve sight distance at Woods Lake Road
- Work with Haywood Mall on relocation/reconfiguration of Woods Crossing Road driveway



S-273 Northbound



Northwest Corner

S-510 Westbound



