



SC 20/S-201 Augusta Street

Road Safety Audit

Greenville, South Carolina

Prepared for:

City of Greenville

Prepared by:

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Project Number: 171002440

November 2021



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1.0 INTRODUCTION

1.1 BACKGROUND

Effective transportation management plans often consider the six “E”s:

- Evaluation – Review and analysis of crash data and information from surveys, walking audits, and other research to determine strategies for improving safety
- Engineering – Design of physical infrastructure to improve safety
- Enforcement – Engagement of law enforcement to patrol problem locations and increase community awareness of safety issues
- Education – Methods to teach motorists and pedestrians about their responsibilities and traffic rules
- Encouragement – Strategies that develop awareness and build enthusiasm for alternative forms of travel including walking, cycling, micro-mobility vehicles, and transit.
- Equity – Consideration for the diverse needs of all roadway users

This Road Safety Audit covers the first “E”, Evaluation. The RSA process identifies safety issues through an intensive and collaborative forum and uses brainstorming and local knowledge to enhance analysis findings in developing a range of improvement ideas. This RSA provides specific recommendations for Engineering, but also recognizes Enforcement, Education, Encouragement and Equity needs. A multi-disciplinary team performed the RSA, bringing a variety of perspectives to the study. Detailed crash data from the most recent five years along with extensive analyses was used to identify high crash patterns and/or rates throughout the study area to share with the study team.

1.2 PROJECT OVERVIEW

The City of Greenville has identified the section of Augusta Street (SC 20/S-201) between US 29 (S Church Street/Mills Avenue) and S-107 (Mauldin Road) as a corridor of concern for both vehicular and non-motorized users, i.e. bicyclists and pedestrians.

Over a five-year period, from 2016-2020, 1,177 total crashes (1,165 vehicular, 4 bicycle, and 8 pedestrian) have been reported along the study area, at a rate of approximately 236 crashes per year. An additional collision, a pedestrian fatality, occurred in 2021. This pedestrian fatality was added to the data set collected between 2016-2020. Of the 1,178 crashes, 360 resulted in injuries and 1 resulted in fatality (0 vehicular, 1 pedestrian, and 0 bicycle). The number and severity of these crashes warranted a closer evaluation for potential safety improvements for drivers, bicyclists, and pedestrians.

1.3 ROAD SAFETY ASSESSMENT MULTIDISCIPLINARY TEAM

A multidisciplinary team was formed to evaluate safety needs and identify the recommended improvements. The team consisted of engineers, law enforcement, and local municipality representatives. The team conducted field visits on August 31st and September 1st, 2021. The members of the RSA team were as follows:

Clint Link - City of Greenville

Jason Cisson – SCDOT D3

Nick DePalma - City of Greenville

Ben Olson – SCDOT D3

Valerie Holmes - City of Greenville

Brandon Wilson – SCDOT D3

Shannon Lavrin - City of Greenville

Keith Brockington - GPATS

Allen Reid - City of Greenville

Mike Yearout – City of Greenville Police Department

Courtney Powell – City of Greenville

Mark Holbrooks – City of Greenville Police Department

Calin Owens – City of Greenville

Edward Kinney – City of Greenville

Lee Hunt – City of Greenville Police Department

Hannah Slyce – City of Greenville

Mary McGowan – Bike/Walk Greenville

Kayleigh Sullivan – City of Greenville/Greenlink

Frank Mansbach – Bike/Walk Greenville

Drew Smith – City of Greenville

David Beaty - Stantec

Asangwua Ikein - Greenville County

Brett Harrelson - Stantec

Brian Horton – Greenville Fire Department

Josh Mitchell – Stantec

Jamie Benton – Greenville County School District

David Filiatreau – Stantec

Joey Riddle - SCDOT

Stuart Day – Stantec

Emily Thomas - SCDOT

Rob Robinson - Urban Design Associates

Eugene Taylor – SCDOT

1.4 REPORT OBJECTIVES

The purpose of this Road Safety Assessment is to evaluate safety issues and other areas of concern along Augusta Street (SC20/S-201) between Church Street and Mauldin Road including the intersections located along the route. The study identifies opportunities for improving bicycle, pedestrian and vehicular safety.

The assessment has three (3) basic components:

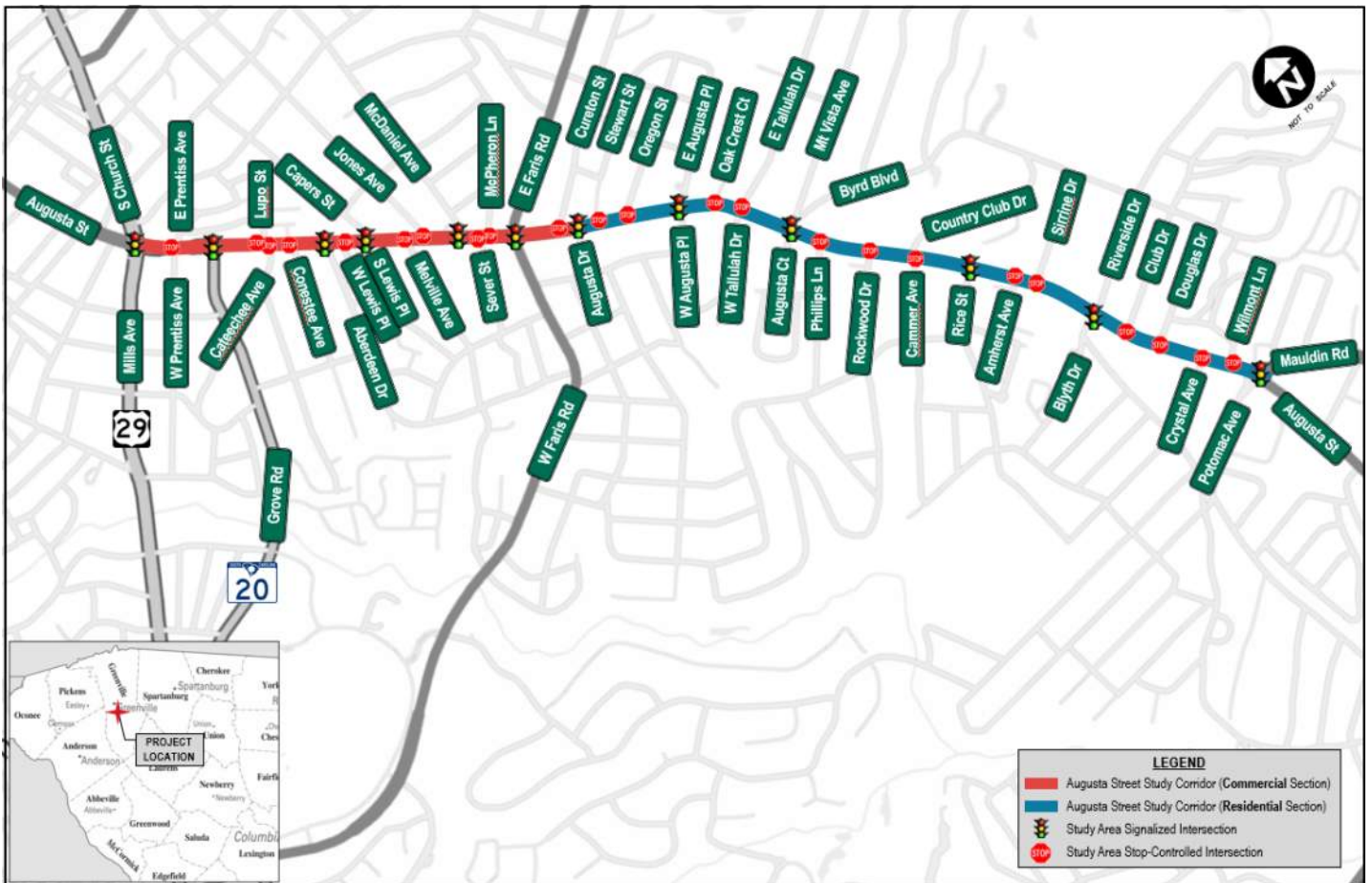
1. Pre-assessment
 - a. Analyze crash data – Crash data over a five-year period were analyzed, with results based on different crash types and trends depicted through various charts, tables and spreadsheets.
 - b. Speed Study - Conduct speed study of the corridor at 2 different locations to gauge average and 85th percentile speeds during non-rush hour traffic.
 - c. The audit team reviews location characteristics and crash analysis
2. Field meeting/Site visit
 - a. Study team gathers to review/discuss crash details and share local knowledge of existing issues and concerns.
 - b. Study team walks the corridor to examine conditions along the corridor.
3. Post-assessment – The study team gathers to share findings and develop a list of issues and potential strategies.

2.0 EXISTING CONDITIONS

2.1 PROJECT LOCATION

The project study area of Augusta Street (SC 20/S-201) begins at the intersection of Church Street/Mills Avenue in the northern end and extends southward to Mauldin Road. These limits are shown below in **Figure 1**. Augusta Street has active bicycle, pedestrian, vehicular, and transit traffic. It serves residential, office, institutional, and retail properties.

Figure 1 - Project Study Area



2.2 EXISTING ROADWAYS

Augusta Street is a four-lane minor arterial roadway that serves residential, industrial, office and retail traffic. From the intersection with S Church Street/Mills Avenue, Augusta Street is signed as SC 20. After the intersection with Grove Road, the route designation changes to S-23-201. The posted speed limit from the north end is 30 mph and increases to 35 mph towards the south end, beyond the Augusta Street & Rice Street intersection. There are existing traffic signals at the intersections of S Church Street/Mills Avenue, Grove Road, Aberdeen Drive, Capers Street/S Lewis Plaza, McDaniel Avenue, Faris Road, Augusta Drive, Augusta Place, Byrd Boulevard/Augusta Court, Rice Street, Riverside Drive/Old Augusta Road, and Mauldin Road/Potomac Avenue. Sidewalk exists on both sides of the roadway, throughout the study area. Signalized pedestrian crossings exist at each signalized intersection. The 2019 AADTs are 19,300 Vehicles Per Day (VPD) between S Church Street/Mills Avenue and Faris Road and 22,600 VPD between the Faris Road and Potomac Avenue/Mauldin Road.

Key intersections include:

- **S Church Street** is a four-lane principal arterial in the west end of the study area. The posted speed limit is 35 mph and 2019 AADT was 26,300 VPD.
- **Mills Avenue** is a four-lane principal arterial towards the west end of the study area. The posted speed limit is 40 mph and the 2019 AADT was 22,300 VPD.
- **Faris Road** is a four-lane minor arterial at the center of the study area. The posted speed limit is 35 mph and 2019 AADT was 16,200 VPD.
- **Potomac Avenue** is a two-lane major collector towards the east end of the study area. The 2019 AADT was 5,600 VPD.
- **Mauldin Road** is a four-lane minor arterial in the east end of the study area. The posted speed limit is 35 mph and 2019 AADT was 29,400 VPD.

2.3 CRASH DATA

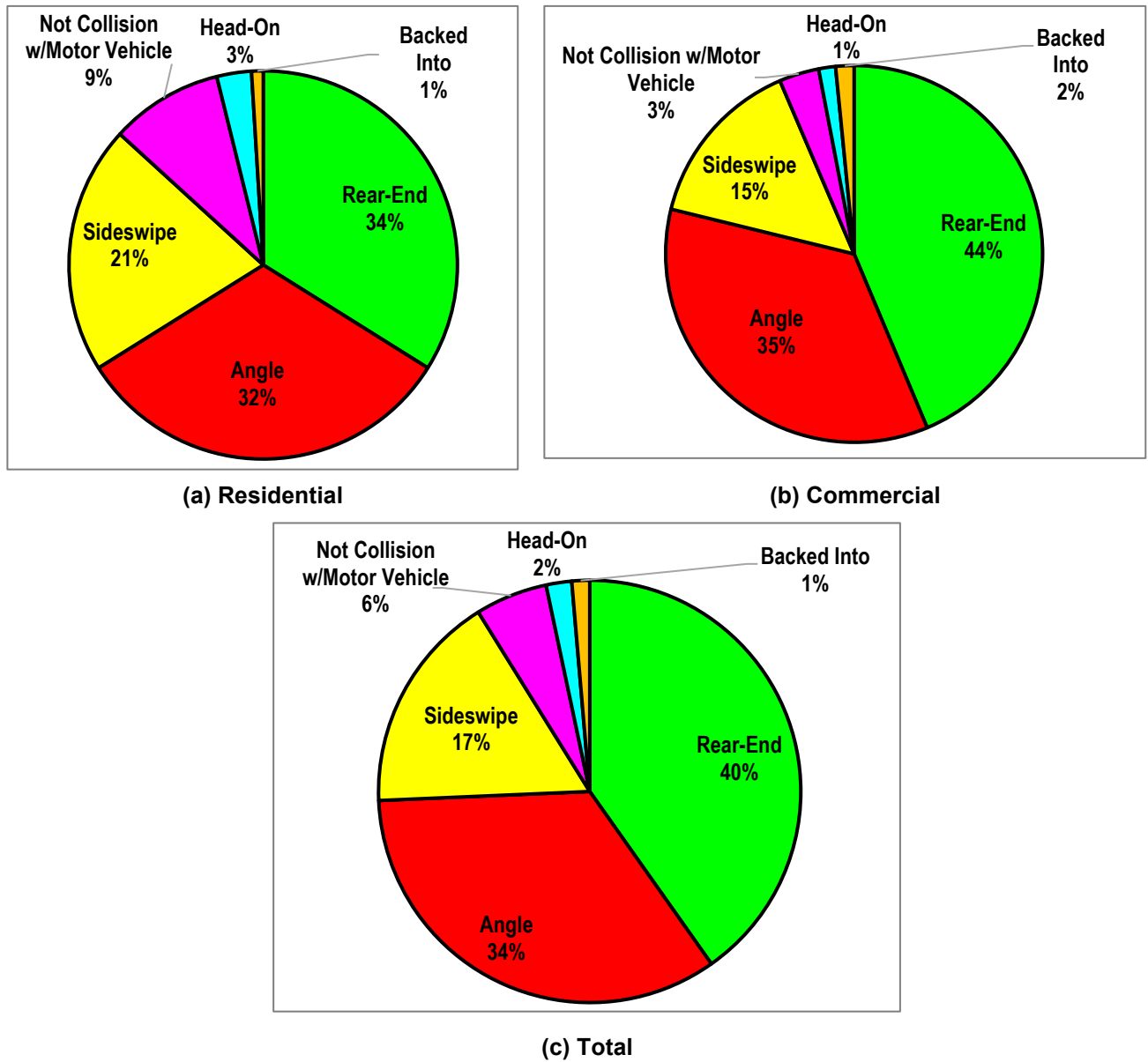
Crash data for the study corridor was provided by SCDOT for a five-year period between January 2016 and December 2020. An additional fatal collision occurred outside of the five-year period described above. This collision was an impetus for the RSA and as such, has been included in the crash statistics. The crash data supplied by SCDOT was grouped into commercial and residential sections (from north to south), and then reviewed to identify trends in collision types and locations. Additional bike and pedestrian collision data were collected via the City of Greenville. In total, there were 1,178 crashes reported along the study corridor.

For the purposes of this RSA the section between the intersection of Augusta Street & S Church Street/Mills Avenue and Augusta Street & E/W Augusta Place is identified as commercial section. The section between the intersection of Augusta Street & E/W Augusta Place and Augusta Street & Mauldin Road/Potomac Avenue is identified as residential section. However, it is noted that both residences and commercial businesses are interspersed throughout the corridor. The crash data is presented in the following sections for each of the two identified sections (residential and commercial) as well as for the whole study corridor. See summaries of the crash data in the figures on the following pages, as well as in tabular form in **Appendix A**.

2.3.1 Crashes by Type

The crash data was categorized by type of crashes. **Figure 2** (a) presents different types of crashes for the residential section (from Augusta Place to Mauldin Road), (b) presents types of crashes for the commercial section (from S Church Street/Mills Avenue to Augusta Place) while (c) shows different types of crashes for the whole study corridor. It can be observed from these figures that the rear-end, angle and sideswipe crashes are the predominant crashes in both sections.

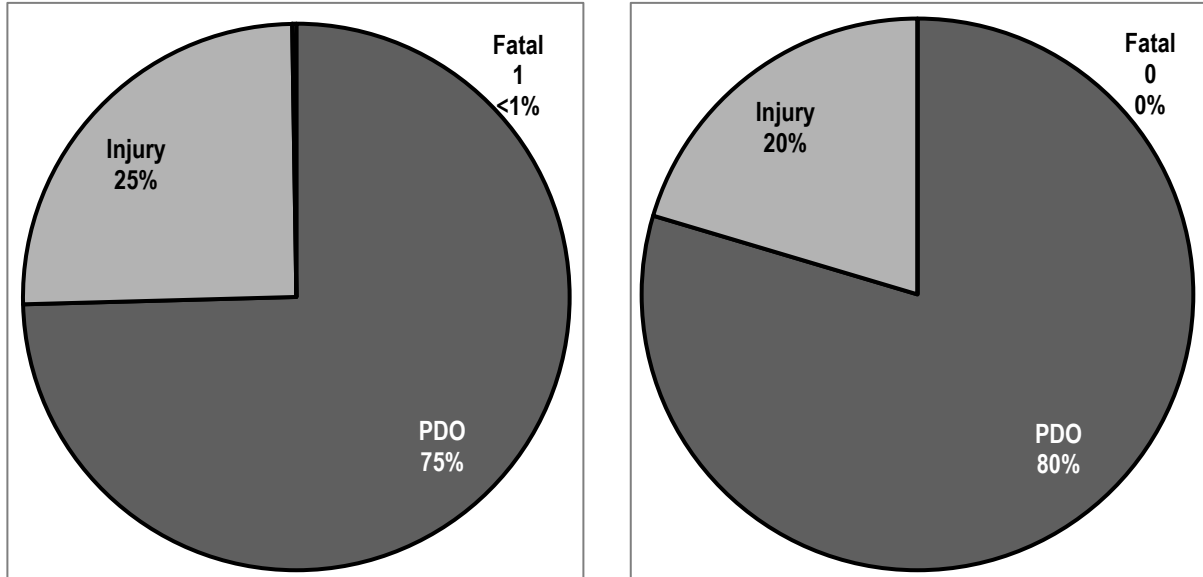
Figure 2 - Crashes by Type (2016-2020)



2.3.2 Crashes by Severity

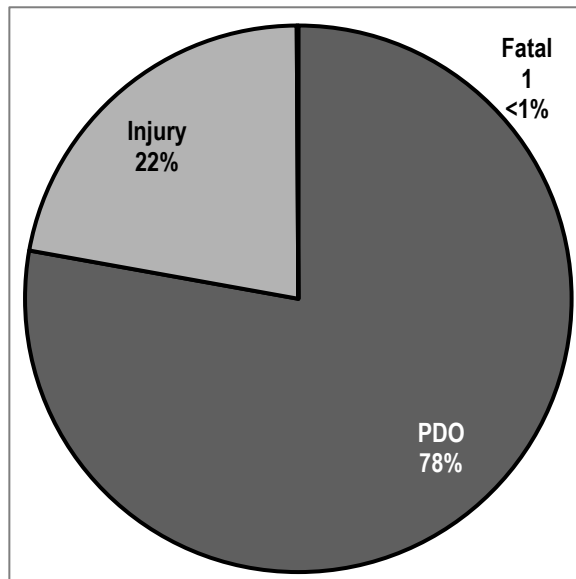
Crash data presented in **Figure 3** indicates crashes categorized by severity. Crash severity is broken down into three different types, property damage only (PDO), injury, and fatal.

Figure 3 - Crashes by Severity (2016-2020)



(a) Residential

(b) Commercial

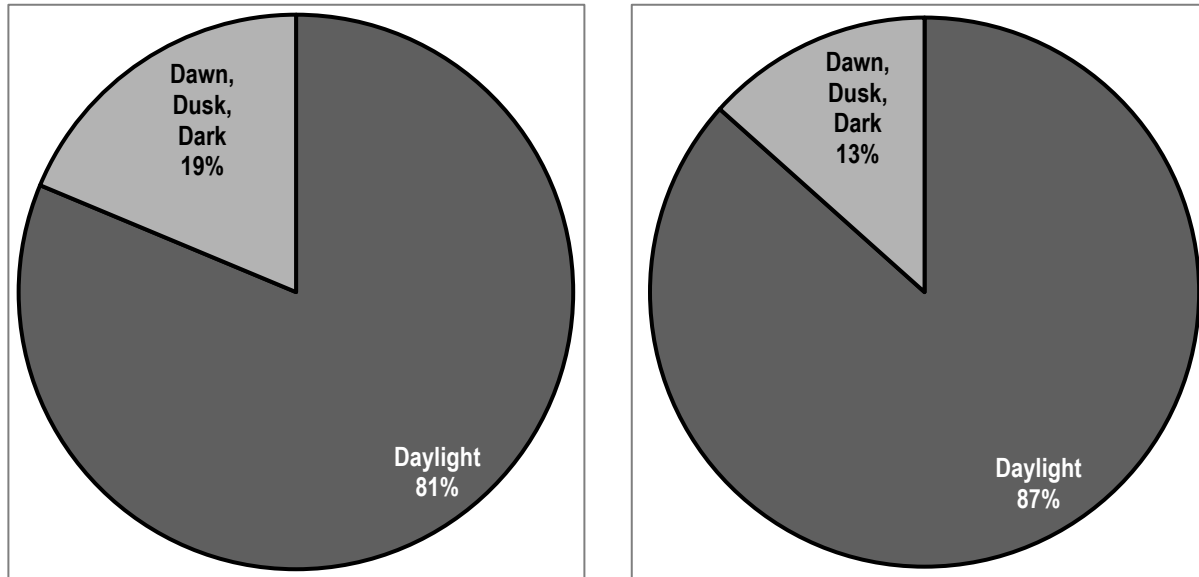


(c) Total

2.3.3 Crashes by Light Condition

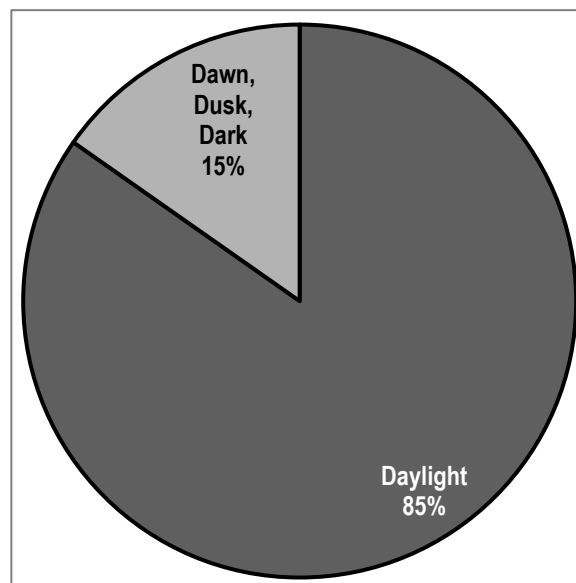
Crash data presented in **Figure 4** separates crashes out by light conditions. The rates below roughly correspond to typical light condition crash patterns experienced in other parts of South Carolina.

Figure 4 - Crashes by Light Condition (2016-2020)



(a) Residential

(b) Commercial

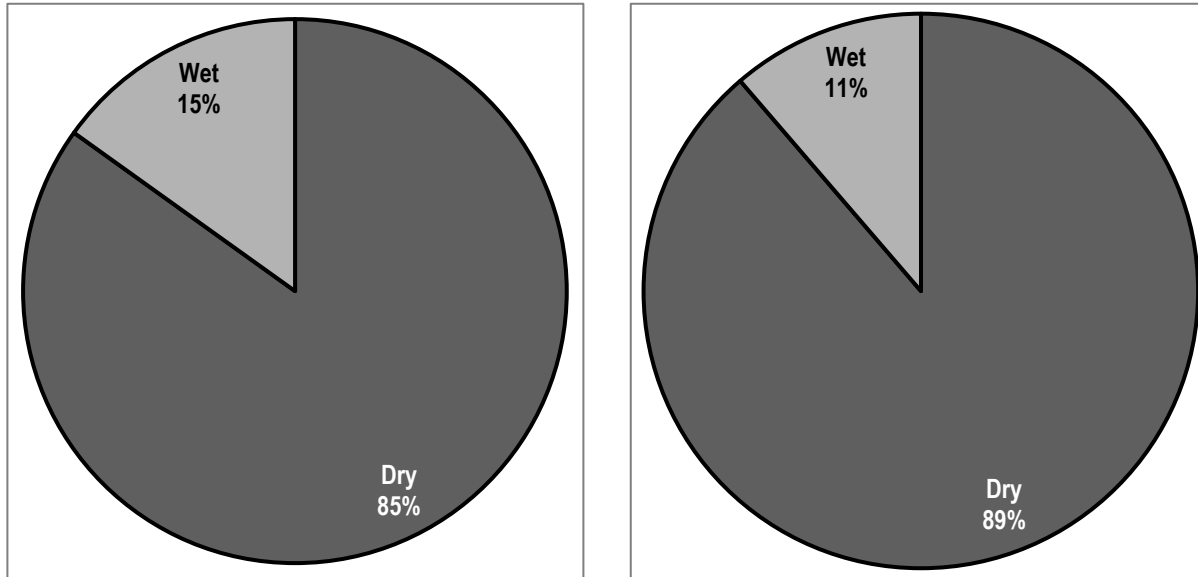


(c) Total

2.3.4 Crashes by Pavement Condition

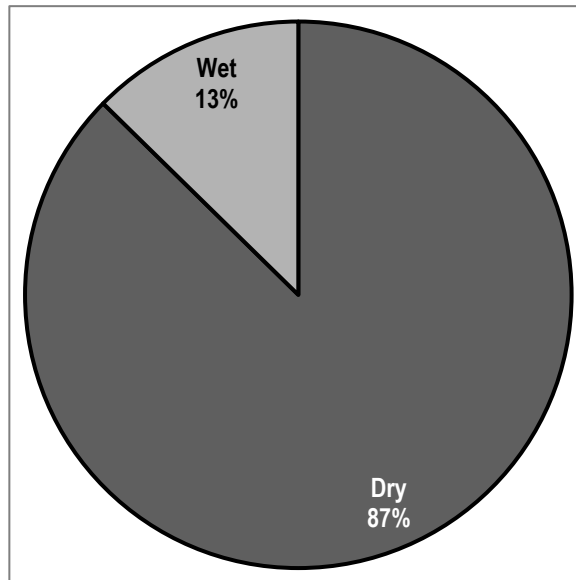
Crash data in **Figure 5** indicates the pavement condition. This statistic is potentially important as wet pavement has a lower coefficient of friction and as such, may result in an increased number of collisions. The results from the collision analysis indicates no significant change when comparing the residential to commercial sections or when compared to roadways with similar characteristics in South Carolina.

Figure 5 - Crashes by Pavement Condition (2016-2020)



(a) Residential

(b) Commercial



(c) Total

2.3.5 Probable Cause

The statistic displayed below in **Figure 6-8** indicates the manner in which the collision was most likely caused. The most common causes along the August Street corridor are similar to other roadways throughout the state. For each figure, the top ten, known probable causes are shown (causes such as “unknown”, “other improper action”, etc. are not shown as they do not provide definitive information about the probable cause of the collision).

Figure 6 - Probable Cause (2016-2020)

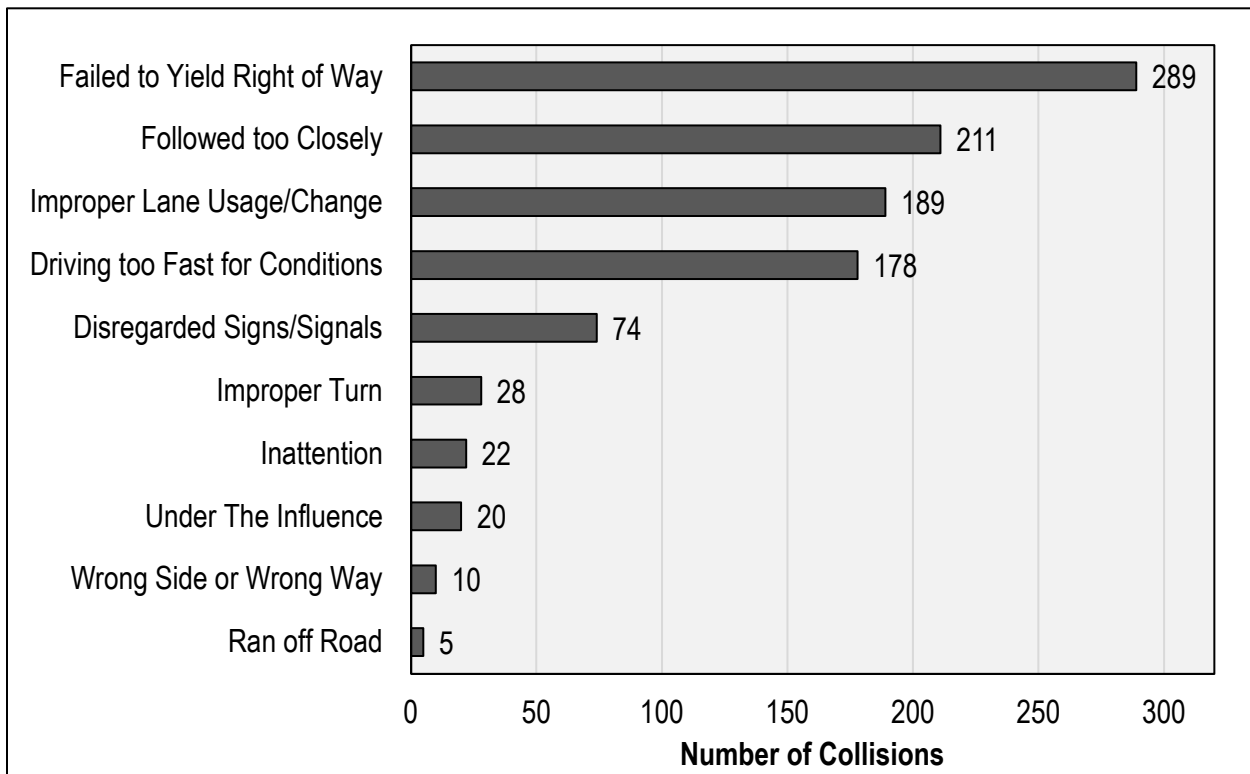


Figure 7 - Probable Cause - Commercial Section (2016-2020)

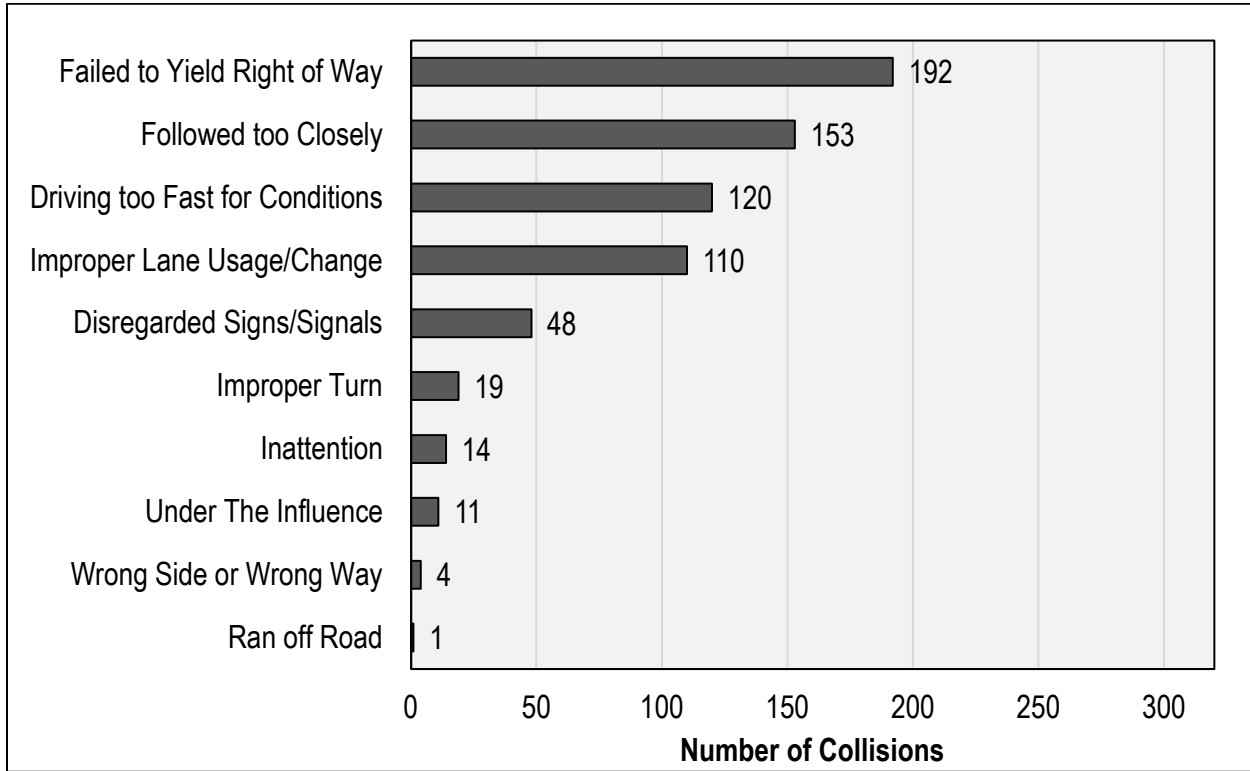
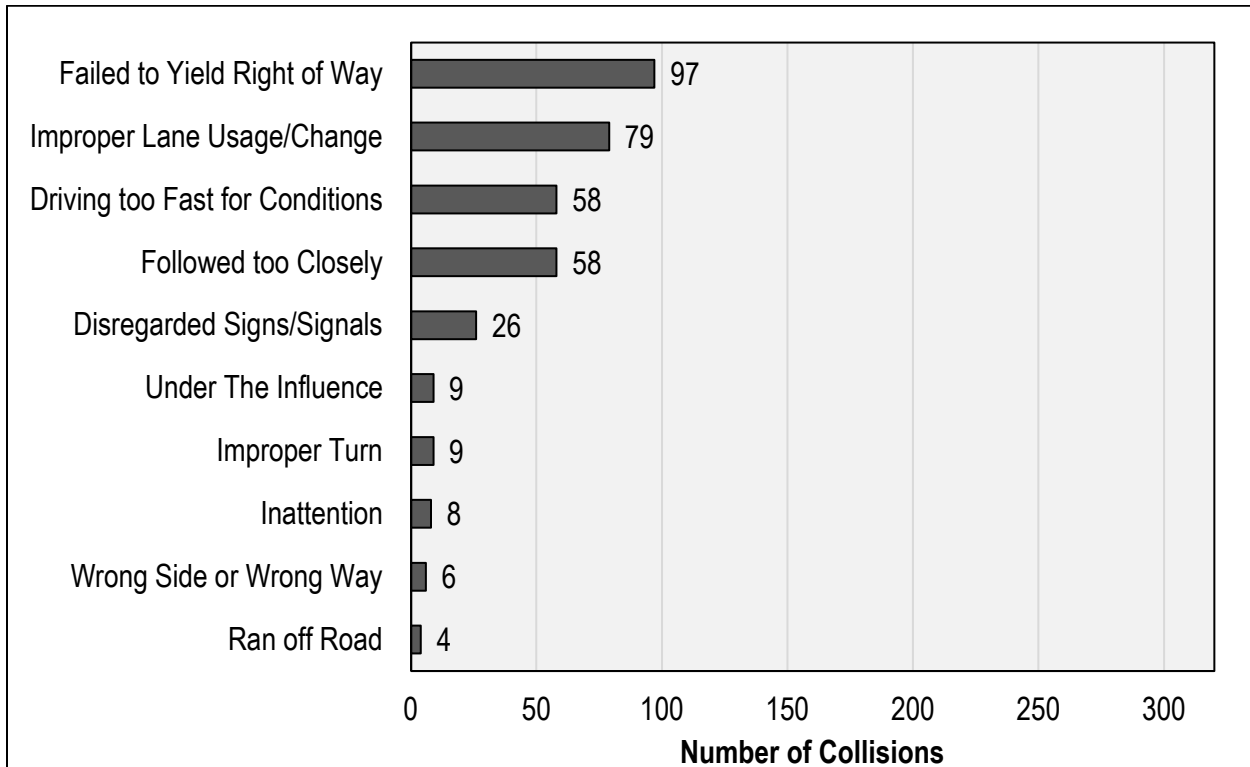


Figure 8 - Probable Cause - Residential Section (2016-2020)



2.3.6 First Harmful Event

The first harmful event statistics indicates the cause of the collision. As shown in **Figures 9-11** the first harmful event is most often the result of a vehicle vs vehicle crash, which is coded as motor vehicle in transport or motor vehicle stopped on the police report form. For each figure, the top ten events are shown.

Figure 9 - First Harmful Event – Combined (2016-2020)

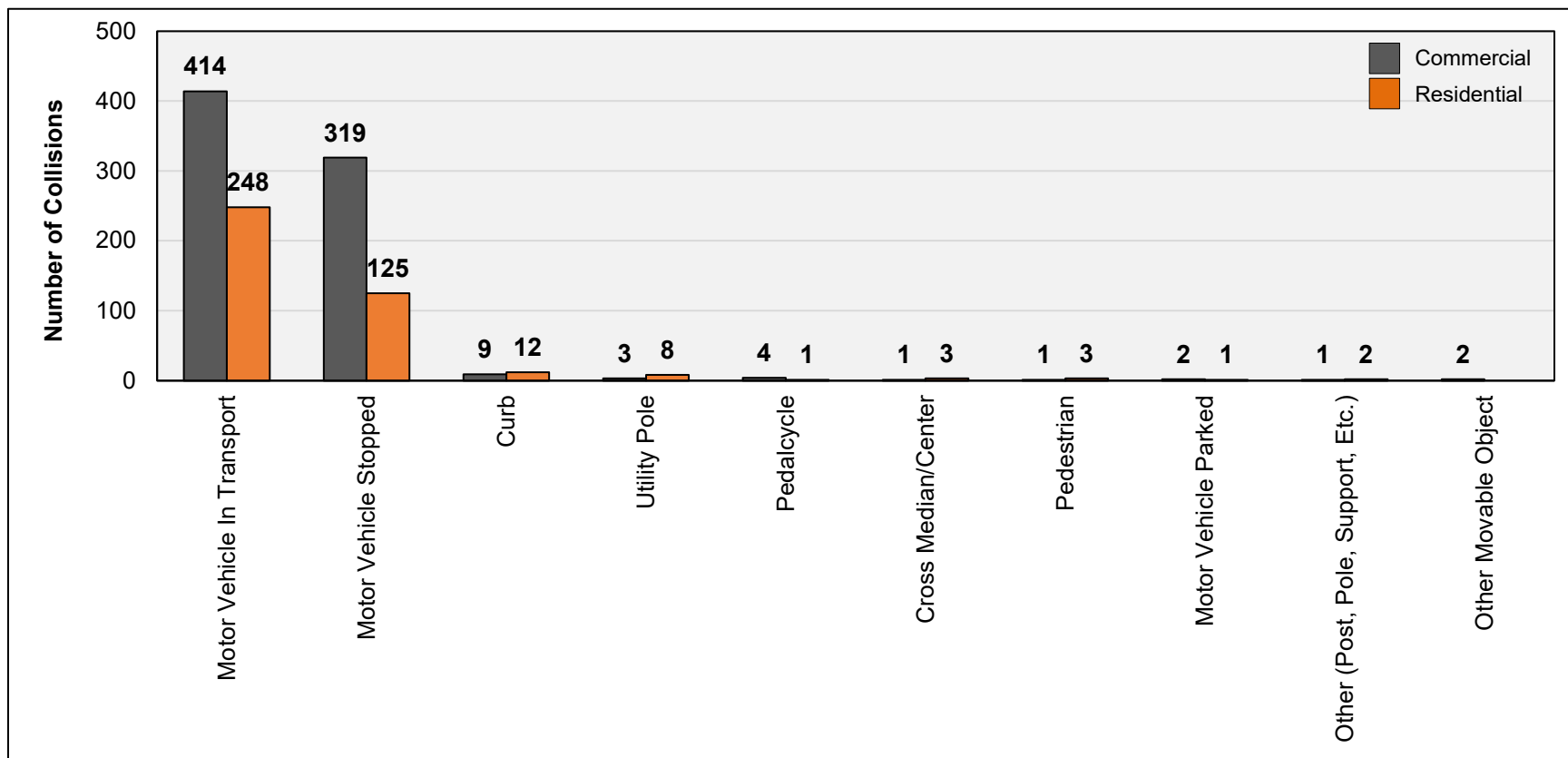


Figure 10 - First Harmful Event - Commercial (2016-2020)

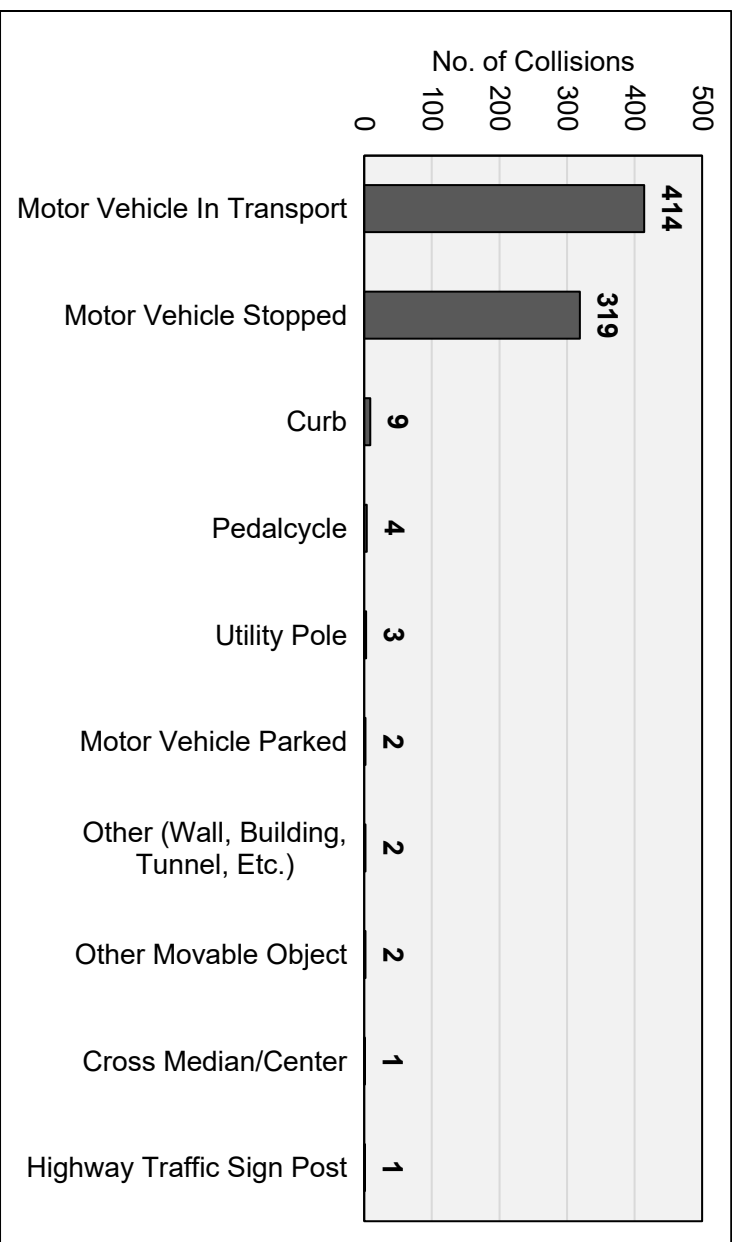
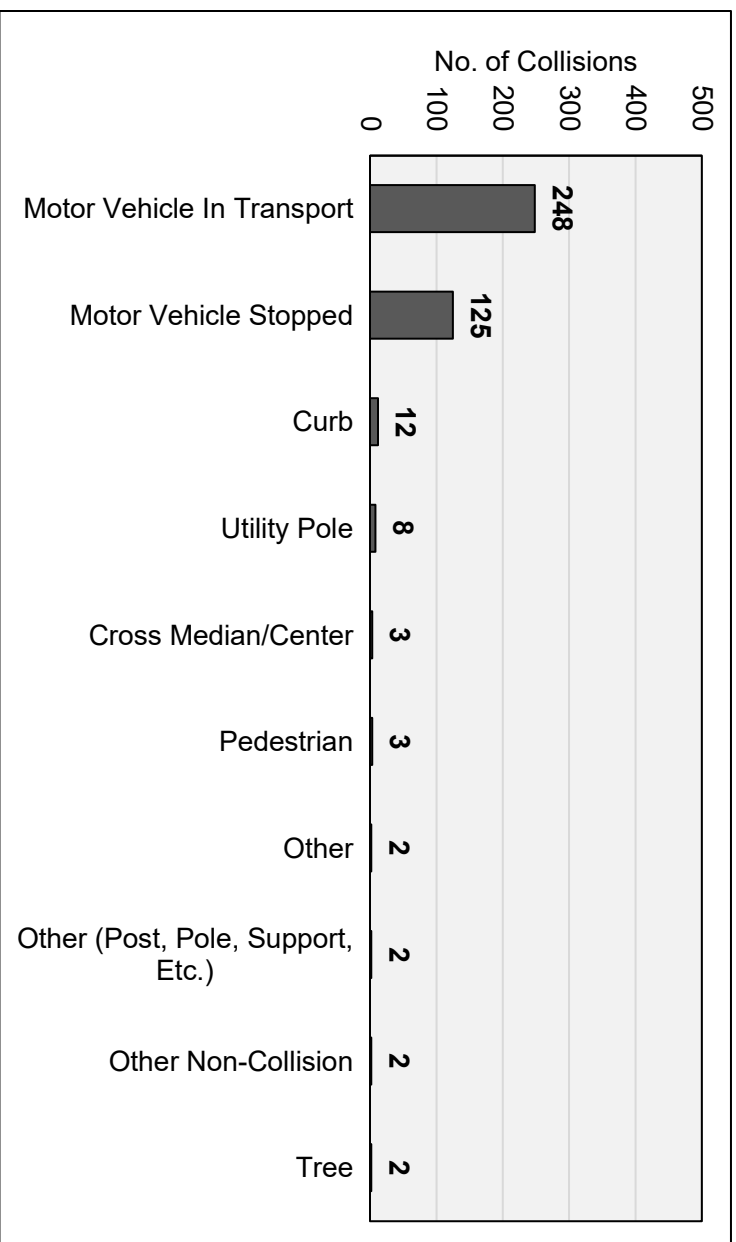


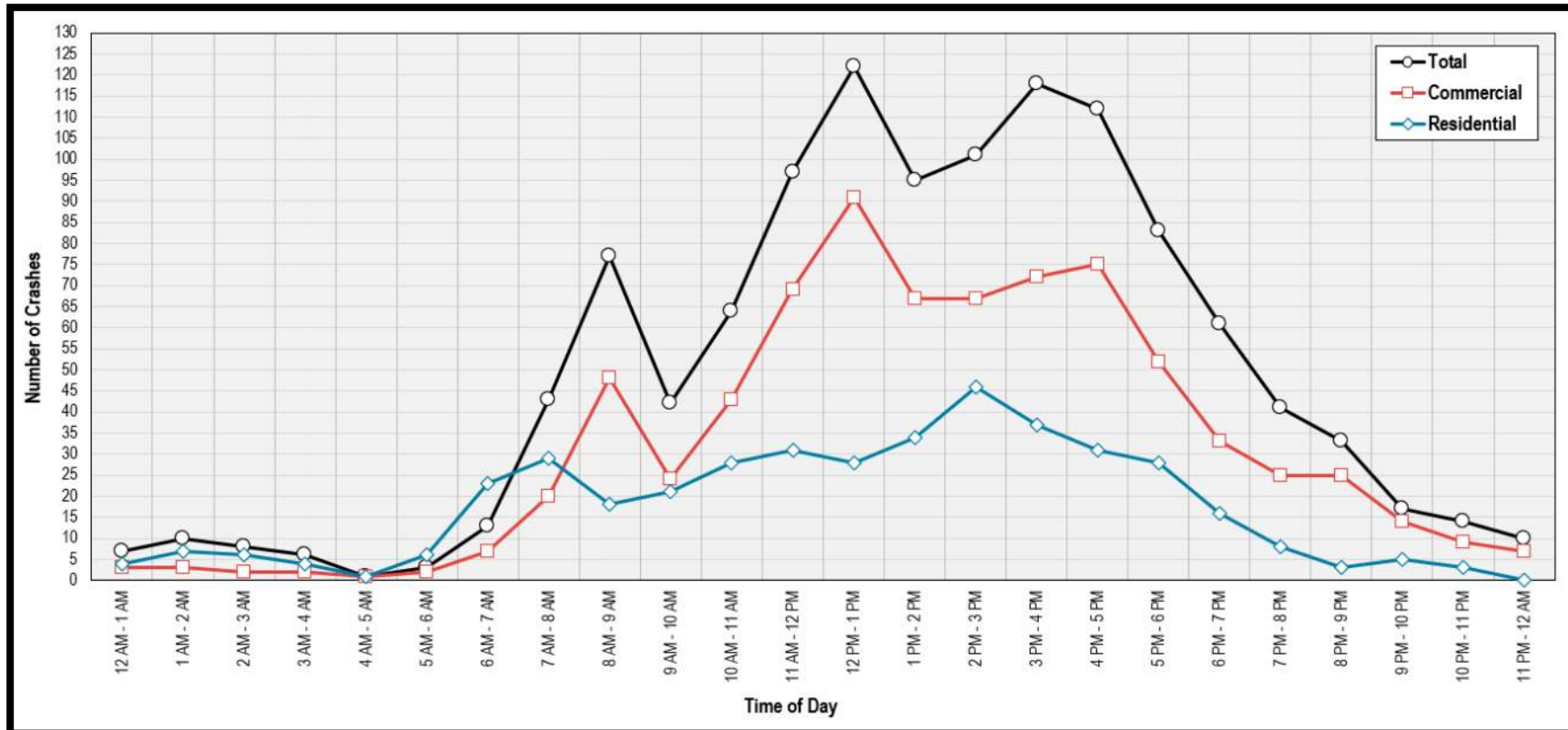
Figure 11 - First Harmful Event - Residential (2016-2020)



2.3.7 Crashes by Time of Day

Figure 12 below shows crash data by time of day and indicates a peak collision time period between Noon and 4PM which is counter to what is typically seen. Most often, as a result of an increase in traffic congestions, crashes will peak in the PM peak hour. One possible reason for this difference may be the type of roadway user groups who access Augusta Street in the AM and PM peak compared with the lunch and school release hour. There are many curb cuts along the corridor and these access points are more likely to be utilized by lunch and school release traffic than commuter traffic in the afternoon, who are more likely to pass through the corridor without entering or exiting the roadway.

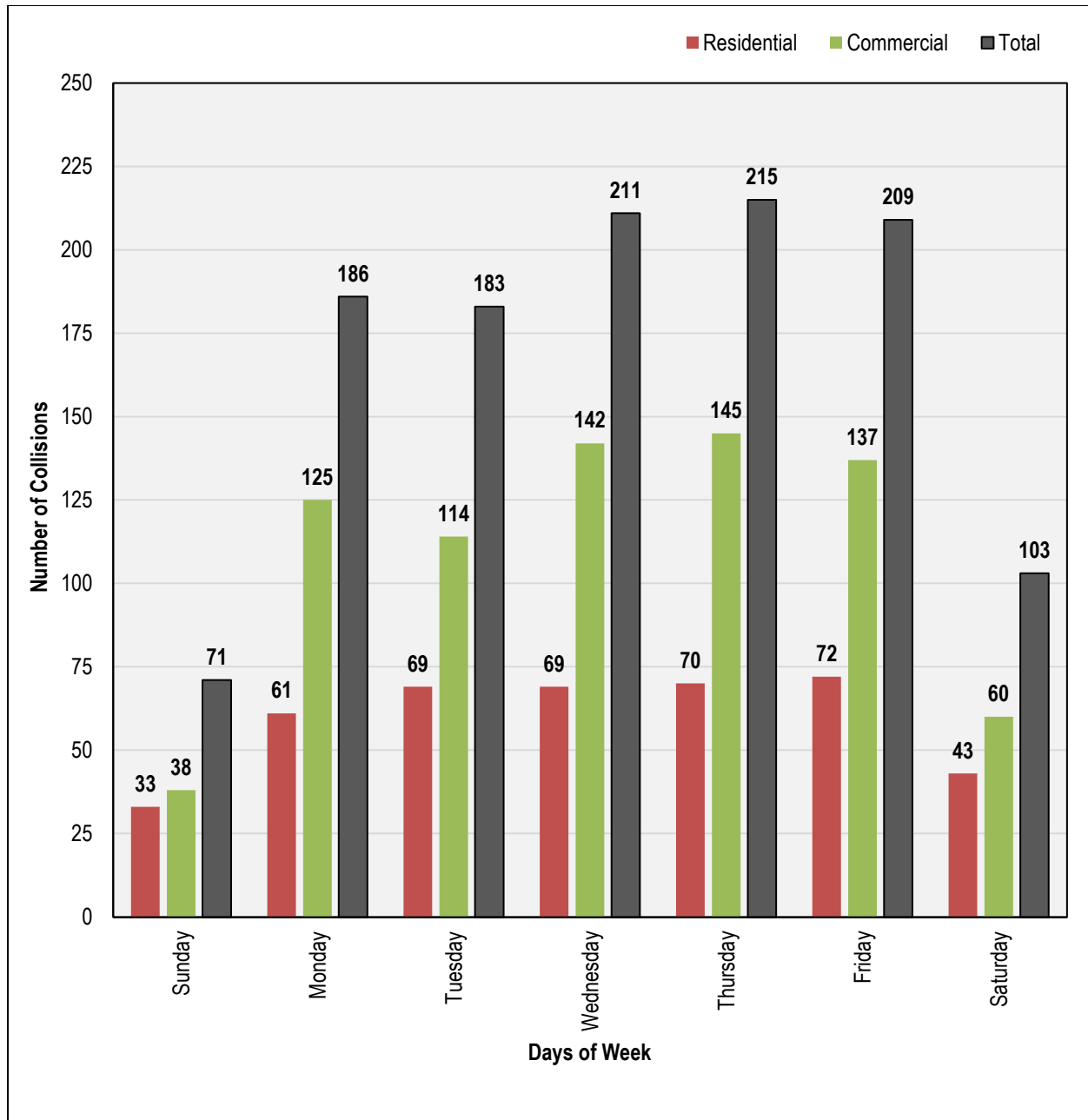
Figure 12 - Crashes by Time of Day (2016-2020)



2.3.8 Crashes by Day of the Week

Figure 13 below shows crash data by day of the week indicates, as is typical, a majority of collisions occur during the weekdays. While most roadways experience fewer collisions on the weekend, the drop of 50% for the weekend compared with the weekday peaks is larger than what is typically experienced. This large drop in collision may indicate that the Augusta Street corridor has a greater share of commuter traffic than other roadways with similar characteristics.

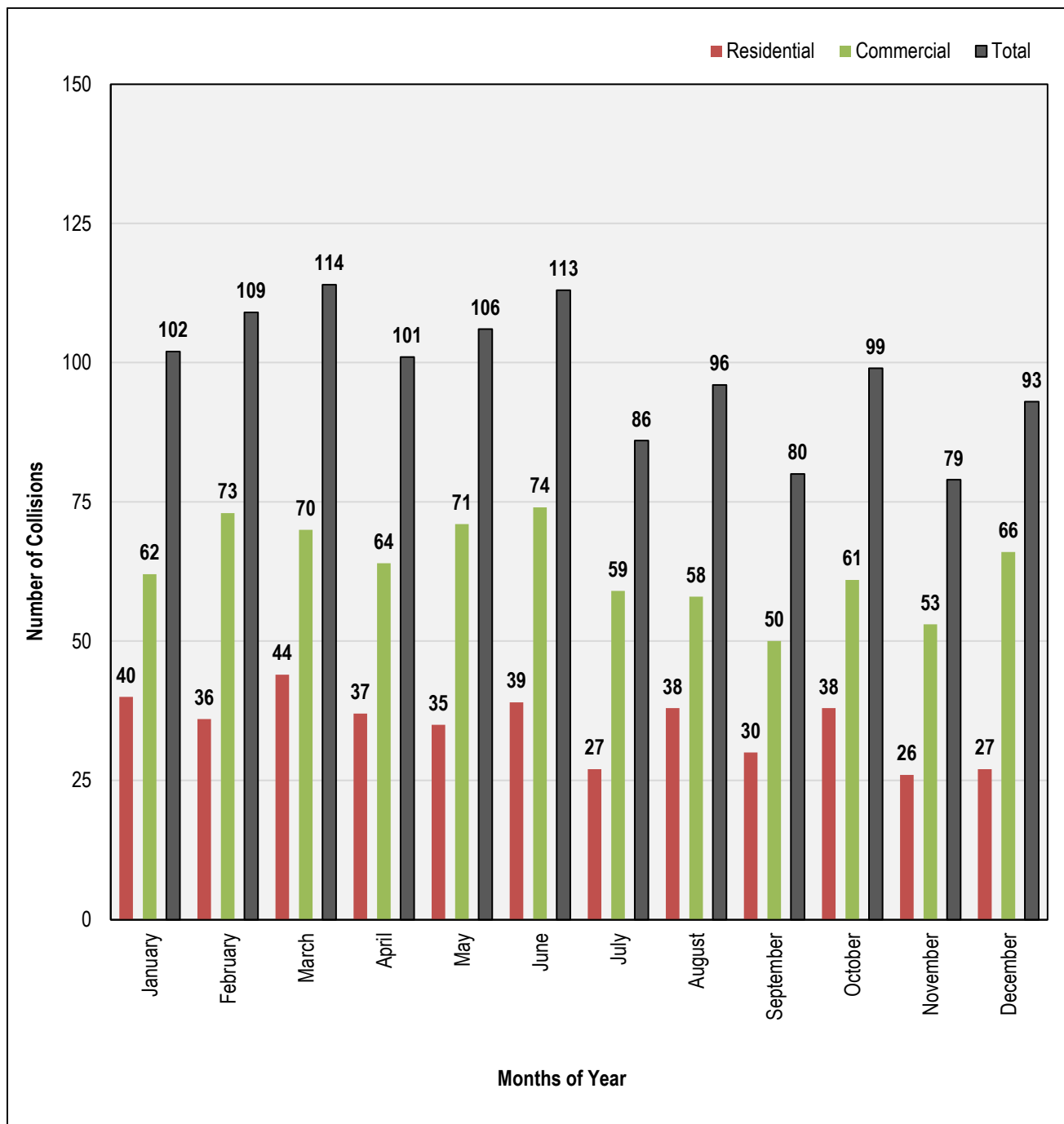
Figure 13 - Crashes by Day of the Week (2016-2020)



2.3.9 Crashes by Month of Year

Figure 14 below illustrates crash data by months of the year and indicates that the fewest collisions occur in the fall of each year. This is counter to typical crash patterns experienced on roadways similar characteristics to Augusta Street.

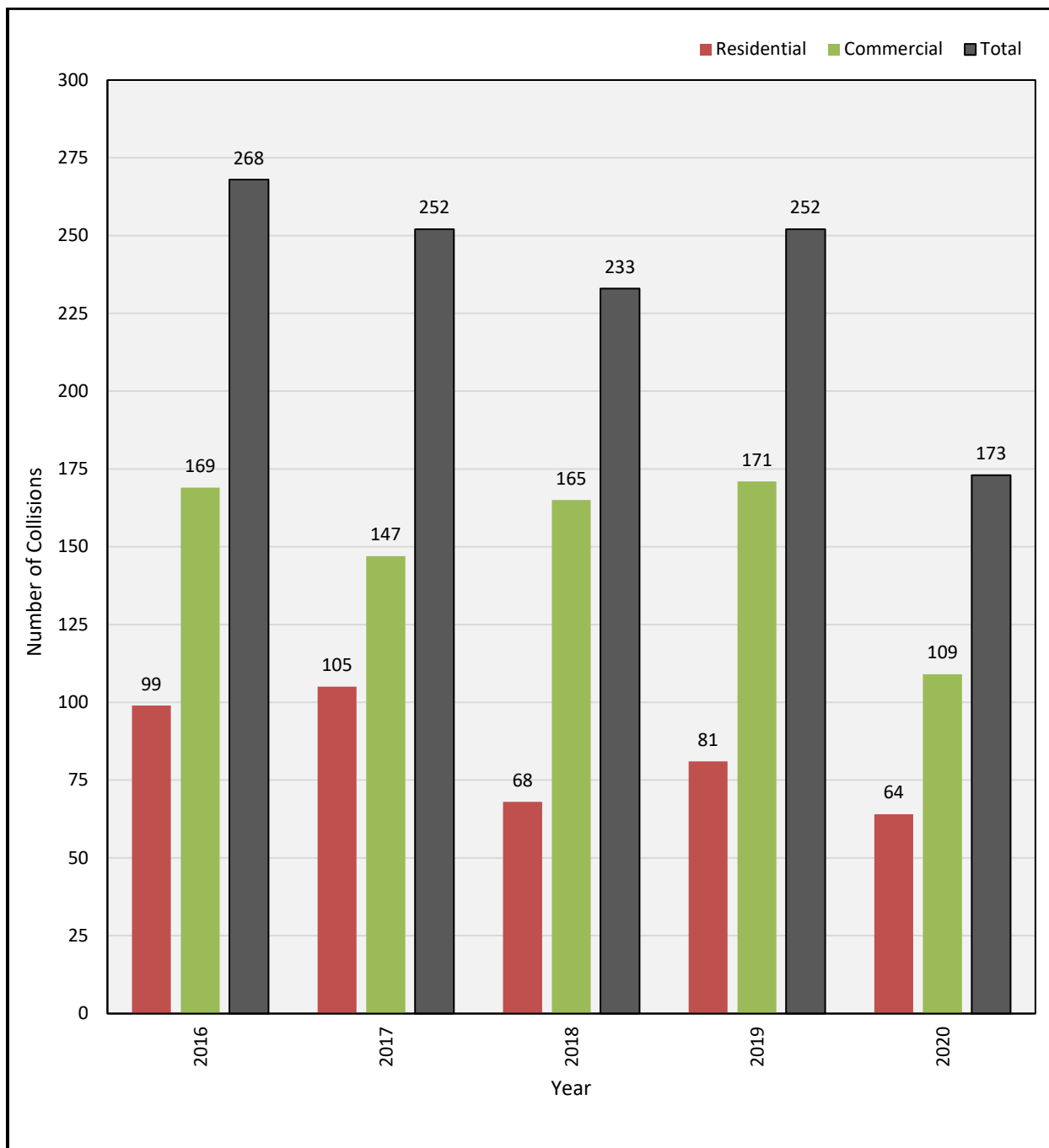
Figure 14 - Crashes by Month of Year (2016-2020)



2.3.10 Crashes by Year

As shown in **Figure 15** below, the crash data from the last five years do not vary more than 15%, with the one exception of 2020. It is assumed that 2020 experienced significantly fewer crashes as a result of the COVID-19 pandemic.

Figure 15 - Crashes by Year (2016-2020)



2.3.11 Transit Related Crashes

Augusta Street is among the most popular transit corridors in the Greenville, South Carolina area. Because transit often makes frequent stops, identifying patterns among transit crashes may help identify potential mitigation strategies. Illustrated in **Figures 16 and 17** below, are the number of transit crashes by year and type. The predominate crash type is a sideswipe, typically as a result of a passenger vehicle striking a sideview mirror. An effective mitigation strategy for sideswipe crashes could be the introduction of a road diet to create a dedicated TWLTL which would reduce traffic to only one lane of travel in each direction. A road diet may also create the opportunity for additional space for potential dedicated transit stops outside the travel lane.

Figure 16 - Transit Related Crashes by Year (2018-2021)

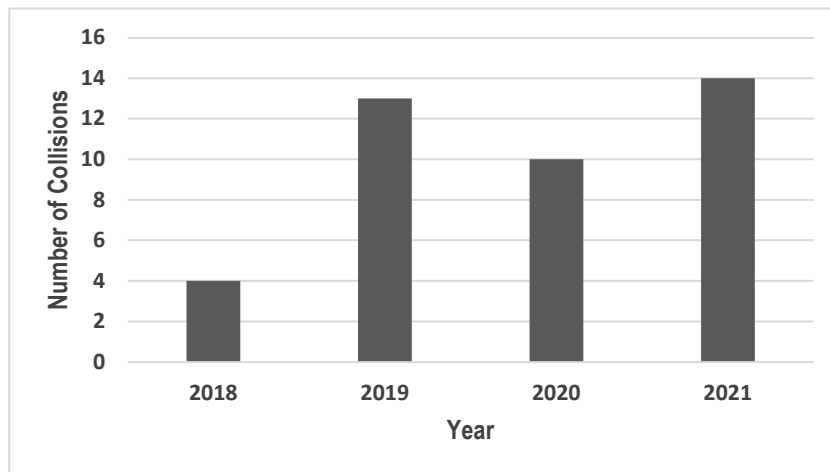
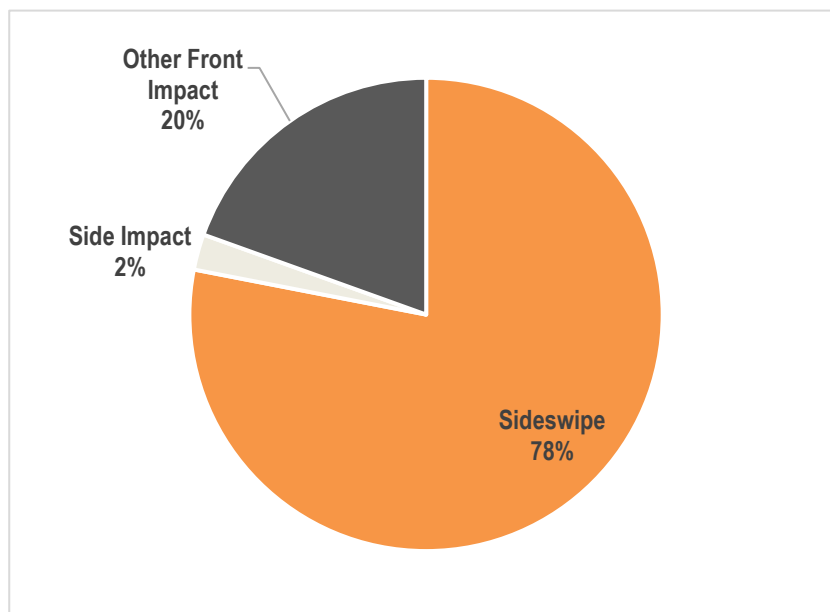


Figure 17 - Transit Related Crashes by Type (2018-2021)



3.0 SPEED STUDY

A speed study was conducted at two locations along the project corridor. As shown in **Figure 18** below, Location #1 readings were taken on Augusta Street between Cateechee Avenue and Conestee Avenue. Location #2 readings were taken between Rockwood Drive and Phillips Lane. The speed limits varied from 30 MPH at Location 1 (commercial area) to 35 MPH at Location 2 (residential area). Results of the speed study are shown in **Table 1** below.

Figure 18 - Augusta Street Speed Study Locations



Table 1 - Augusta Street Speed Limits & Study Results

Location	1	2
Time	3:00 – 3:30 PM	2:00 – 2:30 PM
Sample Size	200 (100 NB, 100 SB)	200 (100 NB, 100 SB)
Limit (mph)	30	35
Average (mph)	35.6	36.5
Standard Deviation (mph)	5.5	4.0
85th percentile (mph)	41	40

Results of the speed study indicate that, while the commercial sector of the corridor has a lower speed limit of 30 mph, average speeds and 85th percentile speeds are essentially unchanged when compared with the residential sector. The 85th percentile speed is a metric often used to determine the appropriate driving speed and/or speed limit and is defined as speed at or below which 85 percent of all vehicles are observed to travel under free-flowing conditions at a particular point. The result of the speed study indicates that, although the roadway cross-section differs through the corridor, travel speeds do not significantly vary between sectors.

4.0 OTHER IMPROVEMENTS AND STUDIES

- **South Downtown Connectivity Study**

This study is projected to be completed in December of 2021. Urban Design Associates has completed a review of the area and made proposals to improve connectivity to the downtown area. The project limits for this study includes the Augusta Street and S Church Street/Mills Avenue intersection and as such, some recommendations from that study may coincide with recommendations made by this RSA document. Improvements are being studied by an engineering consultant to infer how traffic patterns and characteristics may be altered as a result of implementing a particular improvement.

- **Augusta Street Bike Boulevard**

The City of Greenville has designated a bike boulevard adjacent to Augusta Street designed to discourage cyclists from using Augusta Street due to the narrow typical section and numerous intersections and driveways. Portions of this corridor have been identified but the final roadway environment will rely on additional funding to complete the project as initially envisioned.

- **Augusta Street Area Bike Network**

Outlined in the GPATS project list, this project is slated to enter the planning and feasibility stage in 2022 with the goal of providing better transportation options to those living and visiting the Greenville, SC area.

- **SCDOT Signal Retiming Project**

SCDOT and the City of Greenville are currently reviewing existing signal timing along the project corridor. This project will consist of developing new signal timing plans to be put in effect throughout the weekday and portions of the weekend. The yellow and red clearance intervals as well as the pedestrian walk intervals will be reviewed as part of this project.

- **SCDOT Augusta Street Pavement Markings Project**

SCDOT has reviewed existing pavement markings along Augusta Street and has plans to apply enhanced crosswalk markings at each signalized intersection. This project is anticipated to be completed by December 2021.

- **Greenlink Transit Development Plan (TDP)**

The Greenlink TDP included a recommendation for prioritizing the expansion of coverage area through the introduction of new routes as well as the expansion of existing routes. Additional recommendations included the reduction of transit headway for the Augusta Street corridor and an increase in transit funding.

5.0 EXISTING ROADWAY SAFETY FEATURES

The following were identified as positive measures and features that are already in place within the study area that enhance road user safety:

- Continuous sidewalks: Sidewalks exist along the full length of Augusta Street on both sides. A majority of sidewalk within the corridor also includes a grass buffer which provides space between the pedestrians and vehicular traffic.
- Most intersections have ADA ramps with tactile mats.
- Most side streets in the commercial area have marked crosswalks.
- Traffic signal timing is in the process of being updated.
- Existing bus stops are marked and are regularly used.
- Signalized intersections have pedestrian signal heads for all existing pedestrian movements.
- SCDOT has recently erected new roadway signs.
- All existing signal heads have backplates.
- Re-developed parcels have improved sidewalks (8') with grass buffers.
- Two existing speed feedback signs are in place.
- SCDOT is currently working on a signal retiming project.
- SCDOT is currently working on a project which will add high-visibility crosswalks to all signalized intersections from Mauldin Road to S Church Street/Mills Avenue. Contractor has been procured. Estimated completion Fall 2021.

6.0 RECOMMENDATIONS

Recommendations for improving safety along Augusta Street are provided under two categories:

1. Improvements to be applied along the corridor
2. Intersection specific improvements

6.1 CORRIDOR IMPROVEMENTS

This section provides findings and recommendations for improvements to be applied along the Augusta Street corridor.

ACCESS MANAGEMENT

FINDINGS:

From 2016 – 2020, Augusta Street experienced 401 right angle and 198 sideswipe crashes. Many of these collisions are related to ingress and egress of the numerous driveways located throughout the corridor. In fact, many commercial parcels have more than one access point, with several locations having a curb cut present along the entire property. Because of the abundance of driveways along the corridor, there is increased opportunity for conflict between entering and exiting vehicles.



Augusta Street Commercial Section

The issue of access management is currently being mitigated by the City of Greenville Planning and Zoning process as multiple, unnecessary access points are no longer allowed after a property undergoes redevelopment. While this process is likely to continue promoting access management along the corridor, it should be considered a passive solution as it does not apply to a parcel unless it is undergoing redevelopment.



Augusta Street Residential Section

IMPROVEMENTS:

Consider implementing access management practices throughout the corridor such as consolidating driveways where feasible and/or installing physical barrier such as a concrete or landscaped median to restrict access to right in /right out.

Typical crash reduction of 25% for installing raised or landscaped median. – CMF ID: 2219

ROADWAY RECONFIGURATION

FINDINGS:

The road width on the Augusta Street Corridor varies from 38'-50' wide with dedicated left turn lanes present only at the intersections with Mauldin Road, Faris Road, McDaniel Avenue, and S Church Street/Mills Avenue. In the residential section there are a total of four travel lanes (2 SB, 2 NB) with no dedicated left turn lanes. Because of the roadway characteristics there are unusually high incidences of sideswipe collisions along the entirety of the corridor.

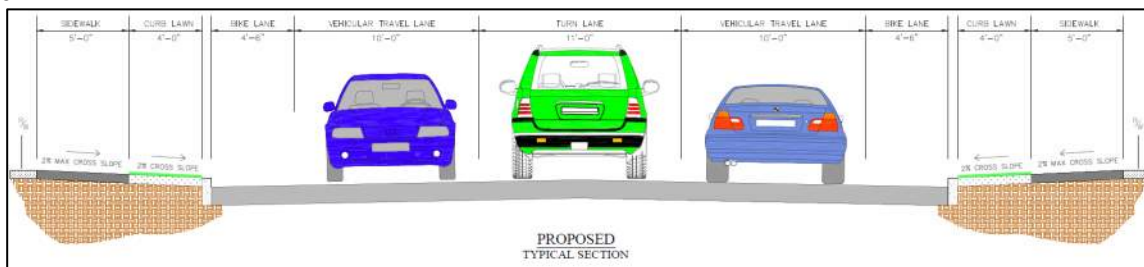
IMPROVEMENTS:

For the residential section consider a road diet to reduce the total number of lanes from four to three. The final cross-section would have one travel lane for each direction, with a two-way left-turn lane (TWLTL) in the middle. This configuration would allow more space for vehicular traffic, helping to reduce speeds through the natural metering of traffic. Pedestrians would have a larger buffer area between the traveled way and the sidewalk, increasing safety and comfort. The installation of a road diet could also create room to allow for the development of a designated bike lane. In fact, the buffer area, coupled with the designated bike lane would further enhance the safety and comfort of public transit riders, who travel as both pedestrians and cyclists along this corridor. A road diet can be a low-cost safety solution when planned in conjunction with a simple pavement overlay, and the reconfiguration can be accomplished at no additional cost.

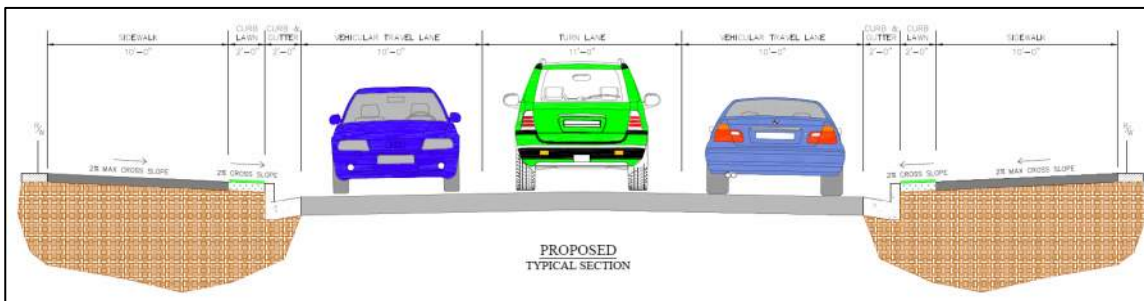
To possibly accelerate the implementation of a road diet, consideration could be given to utilizing a phased development approach. Phase 1 could be implemented in the short term through a thin overlay of the section and the installation of new pavement markings to create a center turn lane. Phase 2 could be considered long term and include the relocation of utilities underground, relocation of the curb, new drainage structures, and the addition of a separated multi-use path and/or sidewalks.

Below is a potential road diet sketch of each phase:

Phase 1:



Phase 2:

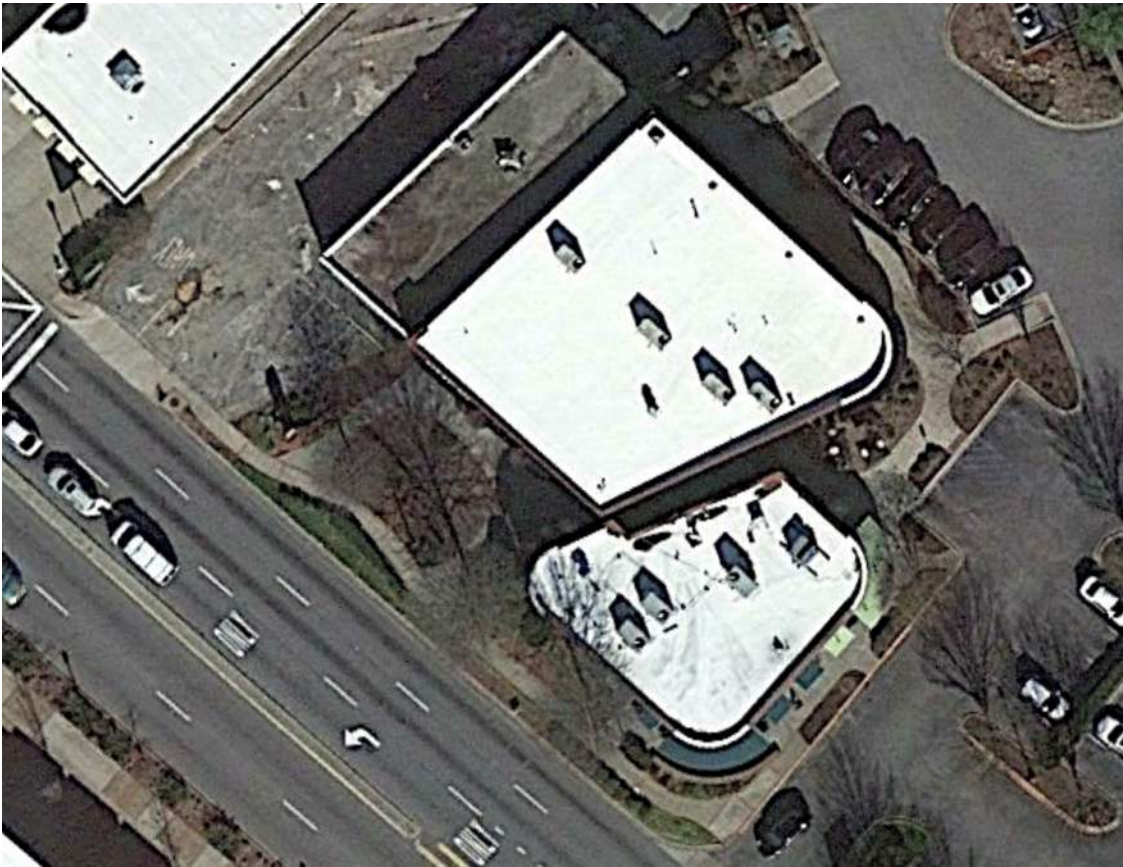


For the commercial section consider locations where a TWLTL or median could be instituted to reduce potential conflicts caused by multiple access points and allow for the development of a dedicated left turn lane. These scenarios should undergo a capacity analysis to gauge the overall impacts to traffic patterns.

Typical crash reduction for a 4 lane to 3 lane roadway conversion is 20 - 50%.¹

BICYCLE & PEDESTRIAN ACCOMMODATIONS**FINDINGS:**

Augusta Street has active pedestrian traffic and sidewalk present along both sides of the street for the entirety of the corridor. Along the residential section, a 2–3-foot grass buffer is present, giving some additional lateral offset to the travel lane. Due to the conversion of the gutter pan into the standard roadway surface, vehicular traffic is generally less than 5 feet from pedestrian facility, which may cause unease with some pedestrians. Each of the 12 signalized intersections contain at least one marked crosswalk to cross Augusta Street. Riverside Drive/Old Augusta Road currently utilizes a Leading Pedestrian Interval (LPI) for pedestrian walk movement as intersection experiences high pedestrian volumes during school hours. As part of the City of Greenville's planning and zoning process, all newly re-developed parcels contain improvement lateral offset and sidewalks.



Redeveloped Parcel

IMPROVEMENTS:

While pedestrian facilities are present, some improvement may be made to increase pedestrian safety and accessibility.

- During field review, it was noted that some pedestrian crossings seem to have inadequate flashing don't walk (FDW) times. It is recommended to review Pedestrian Clearance Interval for all pedestrian crossings to ensure enough crossing time when walking 3.5 ft/second.
- To enhance pedestrian safety, consider implementing Leading Pedestrian Intervals (LPIs) for the signalized pedestrian crossings. LPIs give pedestrians the opportunity to enter a signalized intersection 3–7 seconds before vehicles are given green indications. With this head start, pedestrians can better establish their presence in the crosswalk before vehicles begin entering the intersection. A traffic analysis study is needed to verify LPIs will not materially affect congestion and delays.

Typical pedestrian crash reduction of 10-15% for installation of LPIs.²



Signalized Crosswalk at Augusta Court

- While all crossings have a dedicated pedestrian signal head, many only have one pedestrian button on each corner and it is unclear as to which pedestrian movement the button will call. Additionally, some pedestrian pedestals do not meet MUTCD or ADA standards for placement. Consider updating locations of pedestrian signal pedestals to have a lateral offset from the marked crosswalk of no more than 10' to ensure ADA compliance.
- Consider updating pedestrian signal heads, push buttons and signs to newest standards recommended by MUTCD and SCDOT.

Typical crash reduction factor of 5 - 10% for the installation of a pedestrian countdown timer. – CMF ID: 10364

BICYCLE & PEDESTRIAN ACCOMMODATIONS

FINDINGS:

Crosswalk markings are missing for side street crosswalks in the residential section of the Augusta Street Corridor.



Missing crosswalk at County Club Drive.

IMPROVEMENTS:

Consider adding ladder-style crosswalks at each of the side street approaches and signalized intersections.

Typical pedestrian crash reduction of up to 50% for installation of high visibility crosswalks³

Note: Ladder-style crosswalks are currently planned for installation through an SCDOT contract. Expected completion date: Fall 2021.

PAVEMENT MARKINGS

FINDINGS:

Pavement markings and raised pavement markers (RPM) in several sections are worn out.



Existing pavement markings worn out

IMPROVEMENTS:

Consider upgrading pavement markings and RPMs throughout the corridor, including travel lanes, arrows, and outer faces of some concrete medians.

Typical crash reduction of 5% for installation of new pavement markings and RPMs.

ROADWAY

FINDINGS:

At several locations there are wood or concrete poles erected which may no longer serve a purpose.



Obsolete Concrete Pole

IMPROVEMENTS:

Consider removal of concrete or wood poles that may no longer serve a purpose. Consider engaging with the local utility companies to ensure any redundant or obsolete utility poles are removed as well.

ROADWAY

FINDINGS:

The field review and speed study completed as part of this RSA indicates that average speeds for the Augusta Street corridor are consistently higher than the speed limit.

IMPROVEMENTS:

Consider the installation of a roundabout in the residential section. A roundabout would be beneficial by providing a means for traffic calming and a safe location for U-turns. When combined with a raised or landscaped median, a roundabout could also serve as a U-turn option to access driveways and side streets that have been converted to right in / right out. A capacity analysis should be completed prior to consideration.

MAINTENANCE

FINDINGS:

Sections of the sidewalk have sediment buildup and overgrown vegetation.



Overgrown Vegetation near Blythe Drive

IMPROVEMENTS:

Trim overgrown vegetation and remove sediment buildup on sidewalks.

FINDINGS:

At several locations, sidewalks have experienced heave, either due to the root systems of an adjacent tree, drainage issues, or other environmental causes.



Uneven Concrete Sidewalk

IMPROVEMENTS:

Recommend completing a field review of sidewalks along the Augusta Street corridor to determine portions of sidewalks that may be out of compliance.

DRAINAGE**FINDINGS:**

During heavy rains, it was observed that the roadway drainage infrastructure quickly became overwhelmed and standing water was present along much of the corridor.



Catch Basin Blocked with Silt

IMPROVEMENTS:

Recommend all inlets and drainage basins be evaluated to determine existing obstructions and deficiencies with storm sewer system. Vacuuming of silt and removal of blockages should improve conditions in the short term. An increase of water runoff has likely occurred over the past several decades due to commercial growth and increase of impervious surfaces. Consider reviewing existing capacity of storm water infrastructure to determine if additional drainage structures should be placed along the corridor.

TRANSIT ACCOMODATIONS**FINDINGS:**

Transit stops are present and used but no pedestrian or bicycle accommodations currently exist. Transit vehicles must stop in traffic to load and unload passengers.



Bus stop without accommodations

IMPROVEMENTS:

Consider installing bike racks, benches, and/or refuges where appropriate. Consider bringing bus stops into ADA-compliance as well as installing benches, shelters, or refuges where possible. Consider stop locations where a bus turnout may be appropriate.

TRAFFIC SIGNALS & SIGNING

FINDINGS:

All signalized intersections contain signal heads with backplates, but they have not been outfitted with the reflectorized strips.



Existing Faris Road signal heads without retroreflective backplates.

IMPROVEMENTS:

Consider installing reflective backplates to improve signal head visibility.
Typical total crash reduction of 15% for installing reflective backplates.⁴

FINDINGS:

The Protected-Permitted and Permissive left turns on the corridor could benefit from Flashing Yellow Arrow upgrades.

IMPROVEMENTS:

Install Flashing Yellow Arrow signal heads at the protected-permitted and permissive left-turns of the following signalized intersections: S Church Street/Mills Avenue and Faris Road.
Typical left turn crash reduction of 10% for installation of flashing yellow arrows.

FINDINGS:

Upon review of the extracted traffic signal timing data received prior to RSA field review it was noted that some vehicle clearance intervals are shorter than expected. Typically, the yellow change interval is calculated based upon approach speed to ensure a vehicle has the appropriate amount of time to come to a stop and the red clearance interval is calculated based upon the amount of time necessary to clear the intersection prior to the start of green indication of a conflicting phase. Crash analysis has identified red-light running as one of the leading causes of crashes at many of the signalized intersections.

IMPROVEMENTS:

Review yellow and red clearance intervals for all intersections along the corridor.
Note: A signal retiming project is underway, and it is expected that these intervals will be reviewed as part of that contract.

TRAFFIC SIGNALS & SIGNING**FINDINGS:**

Adequate signing is present along the corridor, some of which has been recently updated by SCDOT. Some existing signing does not meet the required height clearance for an urban setting of 7' between the ground and bottom of sign.

IMPROVEMENTS:

Recommend adjusting signs to meet the MUTCD requirements.

EDUCATION AND OUTREACH**FINDINGS:**

The Augusta Street corridor is utilized by many different mode types, all of which need the appropriate engineering solutions to improve safety and comfort. Additional effort should be taken to educate the public on proper driving habits.

IMPROVEMENTS:

Education and outreach programs for bicycles and pedestrians are designed to alert roadway users on the importance of safe travel practices, educate them on safe practices, and encourage active transportation modes for a healthy lifestyle. Typically, these programs are local initiatives, led by a combination of local governments, schools, and community groups. Various municipalities across the US have developed and implemented their own education and outreach programs. Among the typical elements that may be appropriate for this corridor area include:

- Public Awareness Campaigns – Intermittent educational / advertising programs that notify the public on the program's initiatives and importance. They can be delivered through local media such as radio, television, billboards, and transit vehicle ads, as well as non-media methods such as classroom programs and partnering with community events. Targeting specific age and ethnic groups has demonstrated effective results for some programs. Targeted campaigns have helped pedestrians understand how to interpret traffic signals, how to be more visible at night, how to be more aware of turning vehicles at intersections, and how to travel defensively through techniques like making eye contact with a driver. For drivers, these campaigns often focus on yielding to pedestrians and expanding awareness of bicycling and crosswalk laws.
- Public Service Announcements (PSAs) – Social media, radio, and/or television are used to promote safe cycling, walking, and driving behaviors.
- Promotional Items – Tote bags, T-shirts, magnets, coffee cup sleeves, or other items with printed logos and content can be distributed to the public.
- Partnerships – Government organizations, schools, non-profits, universities, businesses groups, and community groups combine efforts to interact with the public.
- Community Events – Safety education can be included at public events like festivals, school events, and health fairs.
- Skills Practice – Lectures, videos, and/or on-street simulations for college students, school children, and older adults.
- How-To Guides – Printed brochures or internet content.
- Budgeting – Many program components require funding. Social media and volunteer efforts can be very cost effective.

ENFORCEMENT

FINDING:

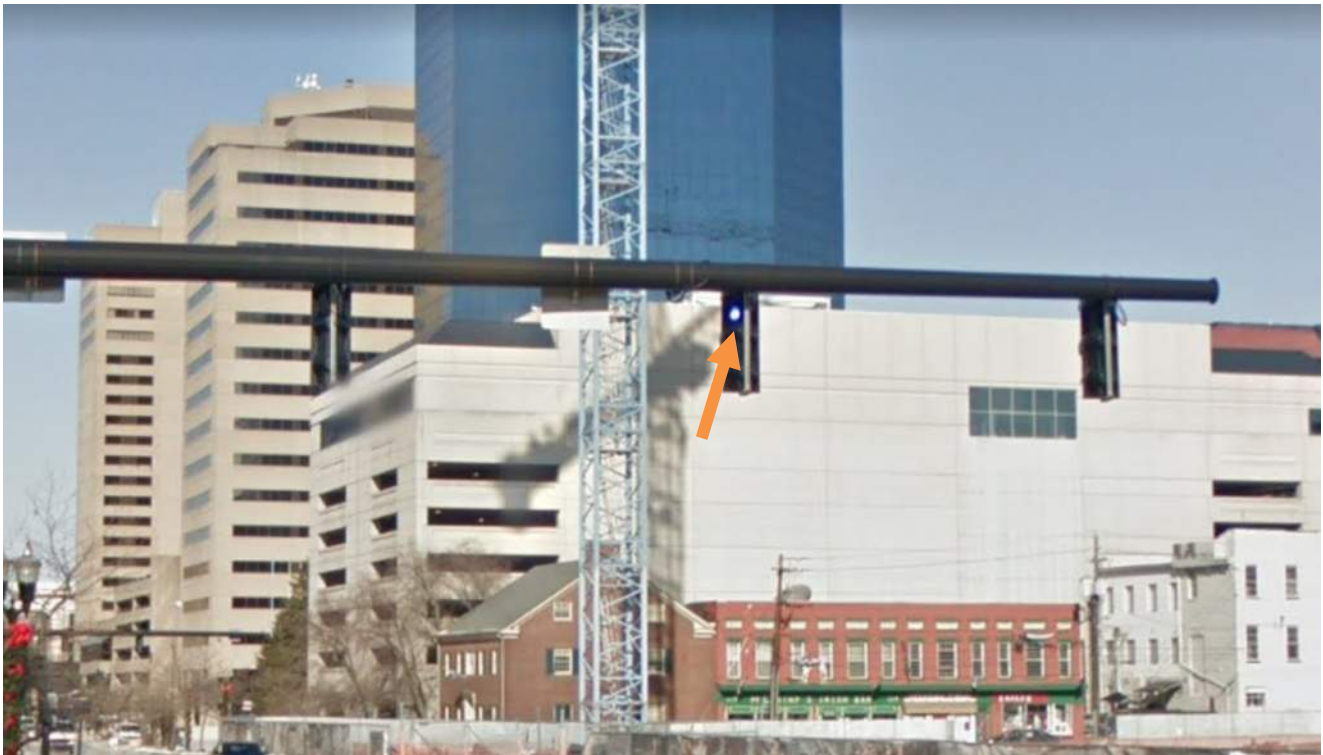
39% of vehicular crashes were caused by Driving Too Fast, Improper Crossing, DUI, or Disregard for Signs and running red lights. Each of these above can potentially be mitigated with targeted enforcement.

IMPROVEMENTS:

While design improvements can provide safer means to cross the roadway, enforcement is needed regardless to change these behaviors. Increased enforcement can play a critical role in the reduction of fatal and serious injury crashes along the corridor.

FINDING:

Red light running accounts for roughly 8% of all collisions at signalized intersections on the Augusta Street corridor. Identifying red light running offenders can sometimes be difficult as officers must physically see both the signal indication change to red, and the vehicle disobey the indication.



Red-light Indicator Light (RLIL)

IMPROVEMENTS:

To aide police officers in identify red light running instances, specialized traffic signals that have a small blue light mounted to the back of the signal housing. The red-light indicator light is wired directly with the red signal indication which results in the blue light illuminating simultaneously. This blue light allows an officer to station themselves at a downstream location so that they may abide by state law while also avoiding potential conflicts when pursuing a red-light running vehicle through an intersection.

This solution is planned for implementation on US 176 in Goose Creek, SC. Other locations in the southeast utilizing this signal feature are Orange County and Seminole County, Florida.

6.2 INTERSECTION SPECIFIC IMPROVEMENTS

The following sections contain findings and recommendations for improvements at individual intersections along the Augusta Street corridor.

S Church Street/Mills Avenue

Findings:

- Sideswipe crashes occurring along Augusta Street near this intersection could be the result of the abrupt turn path of the double left turns entering Augusta Street from S Church Street.
- Walk and Flashing Don't Walk intervals seems short.
- Pavement Markings are worn out at intersection and approach to intersections.

Improvements:

- Consider set back of stop bar and concrete median along Augusta Street to improve turn radii for the double left movement.
- Review pedestrian Walk and FDW intervals.
- Improve pavement markings.
- Consider installing "Yield to Peds in Crosswalk" sign for northbound Augusta Street onto S Church Street to avoid pedestrian conflicts at intersection.
- Consider widening northbound Augusta Street approach to allow for exclusive right turn lane.
- Consider adding trailblazing guide signs at intersection to encourage accessing Greenville Memorial Hospital via Mills Avenue rather than Faris Road.

Grove Road

Findings:

- Right turning traffic may sometimes conflict with pedestrians.
- Adjacent parcels have multiple access points.
- Northbound traffic attempting to make left turn onto Grove Street impedes traffic and causes weaving issue due to lack of dedicated left turn lane.
- Lack of dedicated left turn lane from Augusta Street onto Grove Road.

Improvements

- Consider adding crosswalk to southern side of intersection.
- Consider installing "Yield to Peds in Crosswalk" sign to avoid pedestrian conflicts at intersection.
- Consider northbound inside lane drop to make exclusive turn lane.
- Consider closing redundant access point on Augusta Street to reduce conflicts.
- Consider adding left turn at intersection through lane reduction or road widening. Reducing or widening roadway may be determined through additional capacity analysis.

Cateechee Avenue

Findings:

- Adjacent parcels have multiple access points and/or extended curb cuts.
- Landscaped area near intersection may reduce sight distance for traffic entering Augusta Street.

Improvements:

- Consider closing or shortening existing curb cut along corner parcels.
- Trees adjacent to antique store causing potential sight distance issues. Consider trimming.

Aberdeen Drive

Findings:

- Corner parcel under redevelopment.
- Pedestrian signal button in inaccessible location. This pedestal is slated to be moved as part of redevelopment of adjacent parcel.
- Lack of dedicated left turn lane from Augusta Street onto Aberdeen Drive.

Improvements:

- Consider adding crosswalk to southern side of intersection.
- Consider closing one of two access points along corner parcel.
- Consider adding left turn at intersection through lane reduction or road widening. Reducing or widening roadway may be determined through additional capacity analysis.

West Lewis Plaza

Findings:

- Lack of dedicated left turn lane from Augusta Street onto West Lewis Plaza has resulted in higher than typical incidence of sideswipe collisions.
- Consider adding left turn at intersection through lane reduction or road widening. Reducing or widening roadway may be determined through additional capacity analysis.

Capers Street

Findings:

- No striping on northbound pedestrian movement.
- Only one pedestrian push button on each corner. Difficult to tell if that button applies to either movement or just crossing main street.
- RSA group was approached by citizen who requested audible pedestrian signal at the intersection.
- Due to medians on the side street, intersection is very wide resulting in long clearance distances for northbound left turns.
- No dedicated left turns are present at this intersection impeded through traffic and causing weaving issues, which may increase instances of sideswipe.
- Some pedestrian signal heads located greater than the MUTCD specified maximum 10' offset.
- Lack of dedicated left turn lane from Augusta Street onto Capers Street has resulted in higher than typical incidence of sideswipe collisions.

Improvements:

- Consider geometric improvements to facilitate turning movements from mainline into shopping center.
- Based upon local request, consider audible countdown pedestrian signal heads at this intersection.
- Relocate stop bar on southbound approach to lessen crossing distances.
- Consider eliminating medians on the side streets to reduce intersection width and clearance intervals.
- Add striping to northbound crosswalks.
- Add new pedestrian pedestal poles to achieve ADA compliance for crosswalks across mainline.
- Consider adding left turn at intersection through lane reduction or road widening. Reducing or widening roadway may be determined through additional capacity analysis.

Melville Avenue

Findings:

- No northbound left turn lane present.

Improvements:

- Consider adding left turn lane to northbound Augusta Street onto Melville Avenue.

Sevier Street/McPherson Lane

Findings:

- Side streets located within 200' of signalized intersections to the north and south. With additional access points for commercial properties. Lots of ingress and egress points throughout this area.

Improvements:

- Consider restricting side street approaches to Right-in/Right-Out.

Jones Street/McDaniel Avenue

Findings:

- Sight Distance issue from side streets with vegetation and skew angle impact sight distance.

Improvements:

- Consider trimming vegetation.

Faris Road

Findings:

- Former fire station located on southeast corner. As result of this fire station stop bar and detection is setback from fire station entrance.
- Considerable number of right turning traffic from East and West Faris Road.

Improvements:

- Consider adding right turn overlap on eastbound Faris Road to southbound Augusta Street.
- Consider relocating existing detection loops and “Don’t Block the Box” striping and stop bar in conjunction with redevelopment of adjacent firehouse.

Cureton Street

Findings:

- Heavy usage of commercial entrances and exits causing increased conflict between Augusta traffic.
- Dedicated left turn lane onto Cureton Street but fast-food store on opposite side of street likely generates higher number of left turners.

Improvements:

- Consider relocating bank sign, which may be limiting sight distance.
- Consider implementing access management strategies to reduce the number of conflicts caused by vehicles entering and exiting traffic from adjacent commercial properties.
- Consider removing medians as necessary and create TWLTL to allow left turners into both Cureton Street and fast-food restaurant.

Byrd Boulevard

Findings:

- Pedestrian crossing located on the southside of intersection is located greater than the minimum 10’ offset from the pedestrian signal head.
- Westbound Byrd Boulevard approach crossing is very wide, resulting in long pedestrian walk times given the nature of the approach road.
- Southbound approach signal heads are obscured by overhanging trees.

Improvements:

- Recommend trimming tree overhang to reduce obstruction of traffic signal heads.
- Move pedestrian signal head to align with crosswalk.
- Consider relocating curb lines to narrow westbound approach.

Rockwood Drive & East/West Tallulah Drive

Findings:

- Privacy Fence creating sight distance issues at intersection.

Improvements:

- Work with property owner in NW quadrant of the intersection to improve the intersection sight distance.
- Consider amending code of ordinances to require greater roadway offset for future privacy fence applications and/or reduce maximum allowable height of front yard privacy fences along roadway right-of-way.

Cammer Avenue/Country Club Drive

Findings:

- Side street approach roads to Augusta Street are offset.

Improvements:

- Consider roundabout.
- Consider restricting left-turns from side street.

Rice Street

Findings:

- Marked pedestrian crossing only present for three of the four approaches.
- Traffic signal control cabinet blocks/partially blocks sidewalk.

Improvements:

- Add markings to all crossings.
- Relocate traffic signal control cabinet to back of sidewalk.

Riverside Drive/Old Augusta Road

Findings:

- Tight entrance radius present at intersection.
- Multiple access points at adjacent commercial properties.

Improvements:

- Consider moving back stop bar or lengthening radius.
- Close redundant access point at convenient store adjacent to intersection.

Crystal Avenue

Findings:

- Roadway built upon steep vertical curve. Vegetation and vertical curve issue create potential sight distance problem. Approach traffic may feel like they need to pull closer to Augusta Street than typically necessary.

Improvements:

- Considering adding edge line to better indicate proximity to sidewalk and improve sight distance issue.
- Consider trimming vegetation.

Mauldin Road

Findings:

- Striping for dual right turn lanes from Mauldin Road to Augusta Street makes it difficult for drivers to determine the correct way to merge.
- Trees are present at each of the refuge areas in the intersections. These trees cause obstruction of the pedestrian signal heads, making it difficult to determine if pedestrian has right-of-way.
- Pedestrian walk times seem shorter than typical for the crossing distance.

Improvements:

- Consider restriping intersection and merge area to better delineate correct traffic patterns
- Consider relocating the pedestrian signal heads into refuge islands.
- Consider leading pedestrian interval.
- Complete review of Walk and Flashing Don't Walk (FDW) times.

7.0 PRIORITIZATION

The percentages for crash reductions used in our tables are based on national research of engineering studies that used crash data to quantify the safety effect of the corresponding countermeasure. The reduction factor applies to all crash types unless otherwise noted in the table. This report also recognizes some improvements have intangible benefits beyond crash reductions. For example, improvements to bicycle and pedestrian facilities can provide a level of comfort for its users. They can also lead to increased usage, providing public convenience, health, and/or economic benefits from the improved transportation system.

In this section, each suggested improvement is listed with its cost and associated crash reduction factor (CRF) when available and are grouped into potential short term and long-term categories. These categories are for planning purposes only and can be subject to change based on funding and other factors.

SHORT TERM		
IMPROVEMENT	COST	CRF
Phase 1 Road Diet in Residential Section - pavement overlay with new markings (sketch on page 25).	TBD	Up to 50%
Consider closing redundant access points and curb cuts. Shorten longer curb cuts. (Assume 12 Closures)	\$100,000	25%
Install ladder-style crosswalks to side street approaches. (Approx. 16 approaches)	\$12,500	Up to 50% (Ped Crashes)
Install ladder-style crosswalks at each of the 12 signalized intersections.	\$45,000	Up to 50% (Ped Crashes)
Update storm water system (20 new inlets, 1000' of new storm water pipe)	\$250,000	N/A
Implement leading Pedestrian Intervals (LPs) (up to 12 signals)	\$15,000	10-15% (Ped Crashes)
Upgrade pavement markings and raised pavement markers.	\$85,000	5%
Remove obsolete wood and concrete poles along corridor (Assumes 4 poles removed)	\$25,000	N/A
Maintenance- Clean sidewalks and ramps of sediment build-up, and overgrown vegetation.	\$10,000	N/A
Level and correct existing sidewalks to reduce trip hazards and attain ADA compliance.	\$75,000	N/A
Clean Storm Inlets and Basins (Assumes 4000' of pipe cleanout)	\$20,000	N/A
Install retroreflective backplates to improve signal head visibility. (Approx. 12 intersections) – To be completed by City of Greenville	\$5,000	15%
Install RLIL at intersections (one signal head mainline approach, 24 total)	\$20,000	N/A

AUGUSTA STREET ROAD SAFETY AUDIT

OCTOBER 2021

Upgrade to countdown pedestrian signals (Approx. 12 intersections). Install new pedestal poles and countdown signals. (7 new or improved crossings)	\$125,000	5-10% (Ped Crashes)
Install Flashing Yellow Arrow signal heads (Approx. 3 approaches).	\$5,000	10% (LT Crashes)
Review Red and Yellow Clearance Intervals (Ongoing contract)	N/A	8%
Church Street – Remove median islands on side street approaches, cut back median nose for Augusta Street. Repave and restripe intersection	\$85,000	N/A
Church Street – Add “No Right Turn On Red” Signage.	\$1,000	N/A
Church Street – Add dedicated Right Turn Lane from NB Augusta Street to Church Street	\$250,000	14%
Church Street – Add guide signage to Hospital.	\$2,000	N/A
Grove Road – Add “Yield to Ped in Crosswalk” Signage.	\$1,000	N/A
Aberdeen Drive – Relocate Pedestrian Pedestal (to be completed as part of parcel redevelopment).	N/A	N/A
Cateechee Avenue – Close or shorten curb cuts at corner parcels	\$12,000	N/A
Cateechee Street – Trim Trees at corner parcel to improve sight distance.	\$2,500	N/A
Capers Street – Install Audible Countdown Pedestrian Buttons	\$6,000	N/A
Capers Street – Relocate Stop Bar on Southbound approach to reduce intersection width	\$1,000	N/A
Capers Street – Add new pedestrian poles to achieve ADA compliance.	\$5,500	N/A
Capers Street – Remove existing median islands on side streets to reduce intersection width.	\$40,000	N/A
Melville Avenue – Add left turn lane to Northbound Augusta Street onto Melville Avenue	\$10,000	33%
Sevier Street – Restrict to right-in/right-out	\$10,000	45%
McPherson Lane – Restrict to right-in/right-out	\$10,000	45%
Jones Street – Trim Vegetation to improve sight distance.	\$2,500	N/A
McDaniel Avenue – Trim Vegetation to improve sight distance.	\$2,500	N/A
Faris Road – Add right turn overlap on eastbound Farris to southbound Augusta Street	\$3,000	N/A
Faris Road – Remove and replace existing detection, remove “Don’t Block the Box” striping, and move stop bar closer to intersection.	\$15,000	N/A

AUGUSTA STREET ROAD SAFETY AUDIT

OCTOBER 2021

Cureton Street – Consider Bank sign relocation to improve sight distance	N/A	N/A
Byrd Boulevard – Trim Vegetation to reduce obstruction of traffic signal heads.	\$2,500	N/A
Rockwood Drive & East/West Tallulah Drive – Privacy fences obstructing sight distance. Relocate fence.	N/A	N/A
Riverside Drive/Old Augusta Road – Close redundant access point at adjacent convenient store.	\$8,000	25%
Riverside Drive/Old Augusta Road – Widen radius to reduce constricted turning movement.	\$15,000	N/A
Crystal Avenue – Add dashed edge lines through intersection to convey Augusta Street edge of traveled way.	\$1000	N/A
Mauldin Road – Advance Delineation and Overhead Lane designation Signs for Mauldin Road approach to Augusta Street	\$5,000	N/A
Mauldin Road – Relocate existing pedestrian signal heads to refuge islands.	\$20,000	N/A
Subtotal	\$1,303,000	
Contingency (30%)	\$391,000	
Total	\$1,694,000	
LONG TERM		
IMPROVEMENT	COST	CRF
Phase 2 Road Diet in Residential Section – Update curb and gutter, installing new drainage structures and sidewalk corners to match elevations. Includes installing 10' shared-use path. (sketch on page 25).	\$7,000,000	Up to 50%
Consider Road Diet in Commercial Section. (Install median, northbound inside lane drops/turn lanes, upgrade storm water infrastructure)	\$3,500,000	Up to 50%
Consider phased improvements to include restriping to provide a road diet, inclusion of roundabouts at select locations, and major roadway improvements to provide offset multiuse path(s). Costs will vary considerably dependent on approach selected.		
Subtotal	\$10,500,000	
Contingency (30%)	\$3,150,000	
Total	\$13,650,000	

8.0 REFERENCES

1. *Road Diet FAQ*, FHWA, https://safety.fhwa.dot.gov/road_diets/resources/pdf/fhwasa17021.pdf, 10/20/2021
2. *Safety Evaluation of Leading Pedestrian Intervals on Pedestrian Safety*, FHWA, <https://www.fhwa.dot.gov/publications/research/safety/18060/18060.pdf>, 10/20/2021
3. *Crosswalk Visibility Enhancements*, FHWA, https://safety.fhwa.dot.gov/ped_bike/step/docs/TechSheet_VizEnhancemt_508compliant.pdf, 10/20/2021
4. *Backplates with Retroreflective Borders*, FHWA, <https://safety.fhwa.dot.gov/provencountermeasures/blackplate/>, 10/20/2021

Appendix A **RSA AGENDA / ATTENDEE LIST**

Greenville S-201 Augusta Street Road Safety Audit

Location: City Hall Conf Room, Project Site

Aug. 31 – Sept. 1, 2021

Anticipated Attendees:

City of Greenville

- Clint Link
- Nick De Palma
- Shannon Lavrin
- Courtney Powell
- Valerie Holmes
- Allen Reid
- Beth Brotherton
- Kayleigh Sullivan
- Calin Owens
- Kris Kurijiaka
- Drew Smith
- Ben Carol
- Edward Kinney

City of Greenville-Police

- Mike Yearout

City of Greenville-Fire

- Brian Horton

Bike/Walk Greenville

- Mary Reid
- Frank Mansbach

EMS Representative

Greenville County Schools

- Jamie Benton
- Phillip Davie

Stantec

- David Beaty
- Brett Harrelson
- David Filiatreau
- Josh Mitchell

UDA

- Rob Robinson

GPATS

- Keith Brockington

Greenville County

- Kurt Walters

SCDOT District Three

- Brandon Wilson

- Ben Olson

- Craig Nelson

SCDOT HQ Safety

- Emily Thomas
- Joey Riddle
- Gene Taylor

Purpose:

The purpose of this meeting is to discuss the collision patterns along Augusta St. between Church St and Mauldin Rd., gather input from all participants, and field evaluate the corridor for safety improvements.

Goal:

The goal is to establish a clear understanding of the safety issues present on the corridor and develop potential countermeasures for improving safety. Following a two-day meeting, Stantec will develop a safety assessment report that identifies recommended improvements.

Schedule:

Day 1

10:00 Discuss objectives, summarize data collected, and discuss intended outcomes. (Office)

1:30 Conduct site visit and discuss deficiencies and potential solutions. (Field)

Day 2

8:00 Conduct site visit and discuss deficiencies and potential solutions (Field)

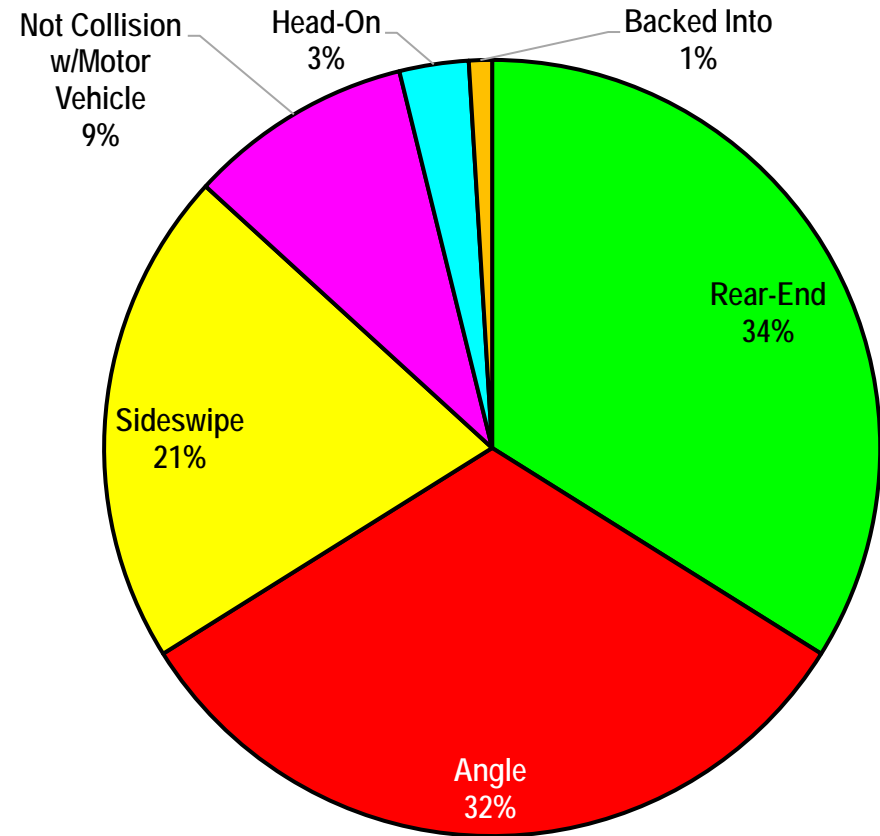
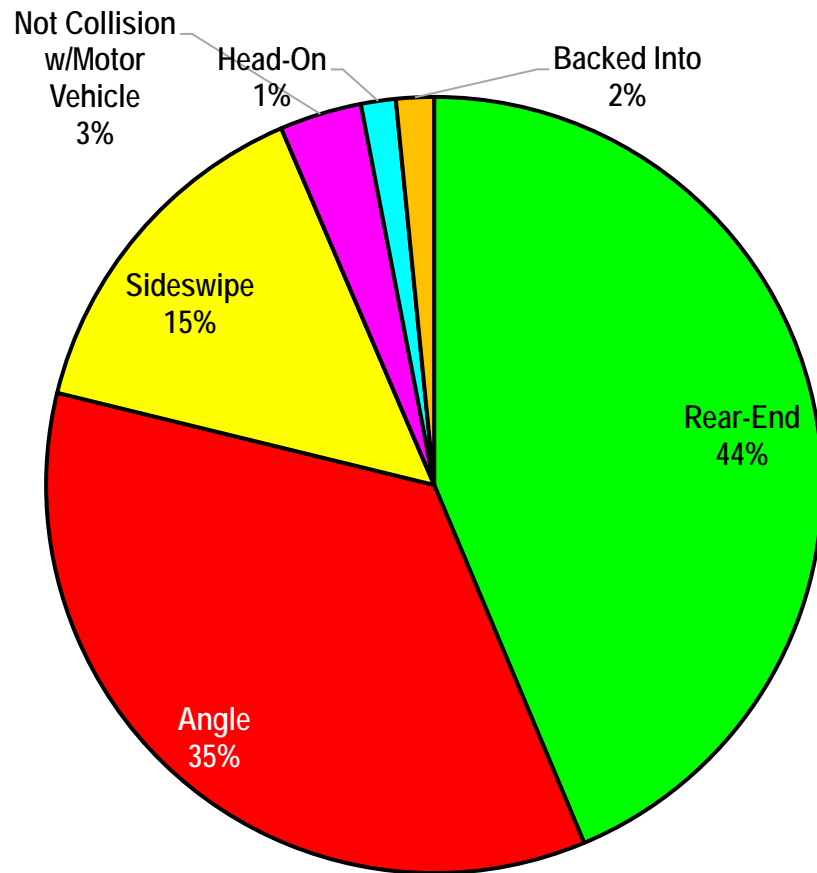
10:00 Discuss safety improvements to be included in the RSA report. (Office)

Appendix B **CORRIDOR CRASH SUMMARY**

CRASHES BY: TYPE

Commercial Section

Residential Section



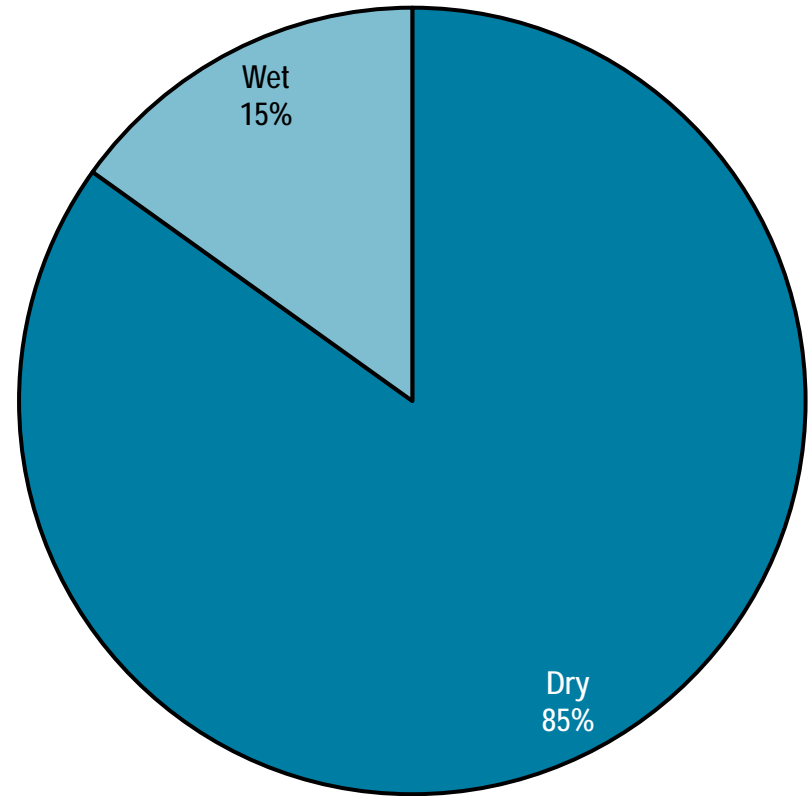
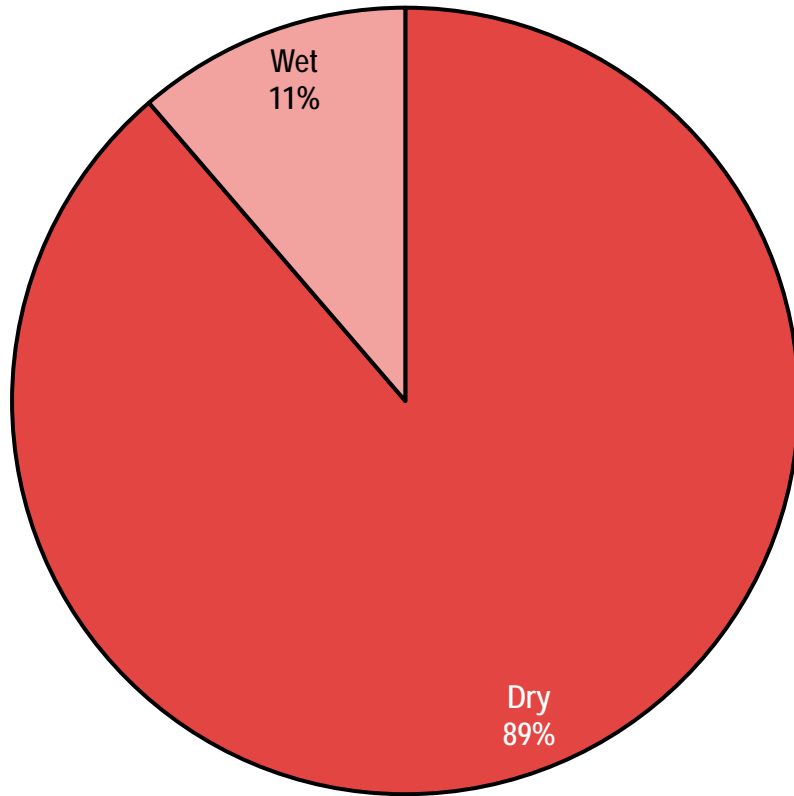
Commercial Section: S. Church Street/Mills Avenue – E/W Augusta Place | 71.77 Crashes/Tenth Mile

Residential Section: E/W Augusta Place – Mauldin Road | 36.75 Crashes/Tenth Mile

CRASHES BY: PAVEMENT CONDITION

Commercial Section

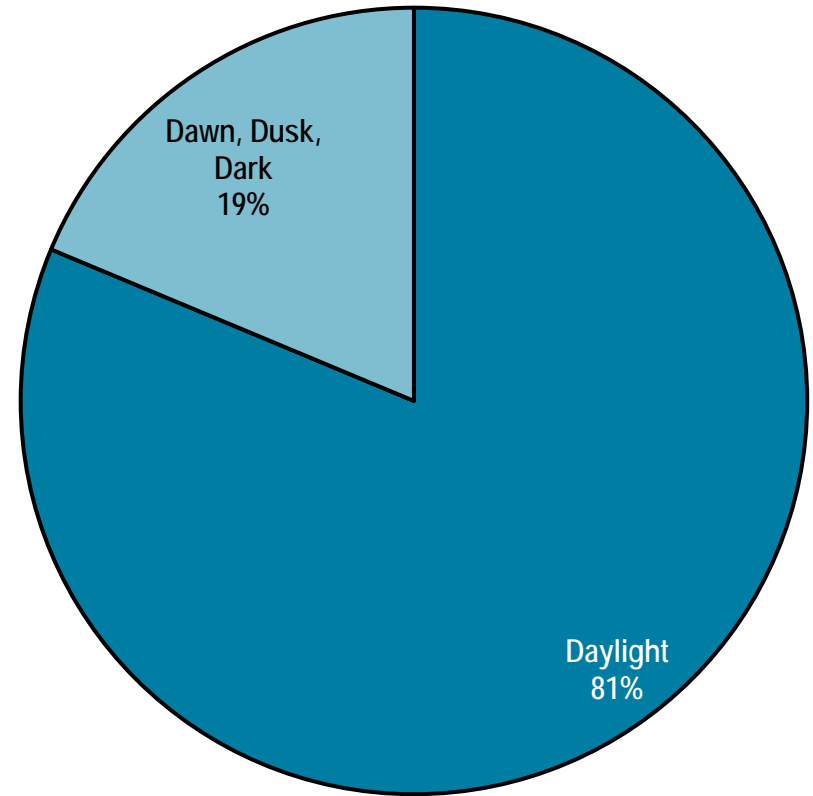
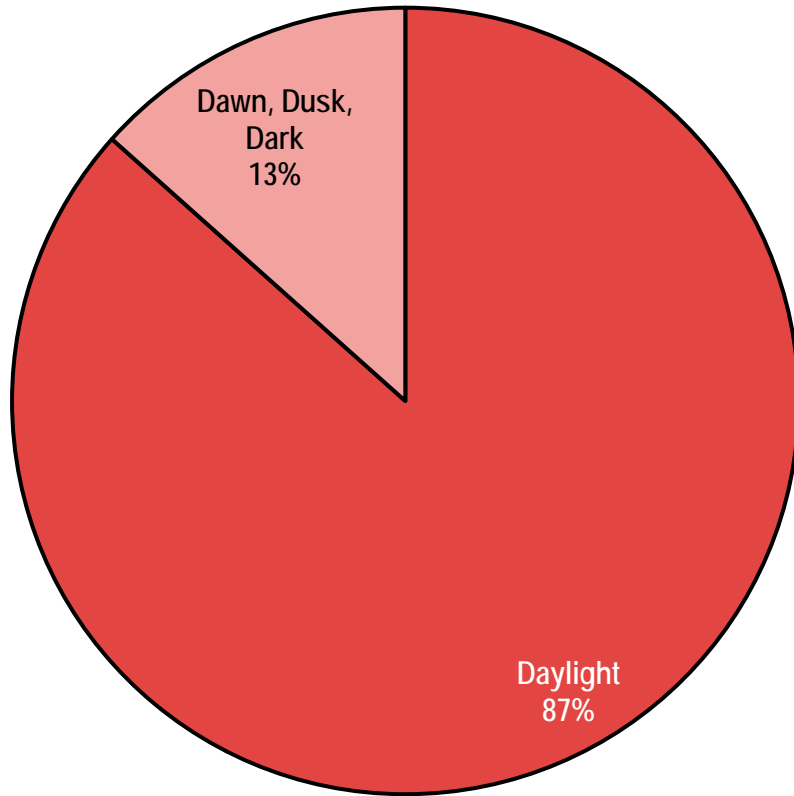
Residential Section



CRASHES BY: LIGHT CONDITION

Commercial Section

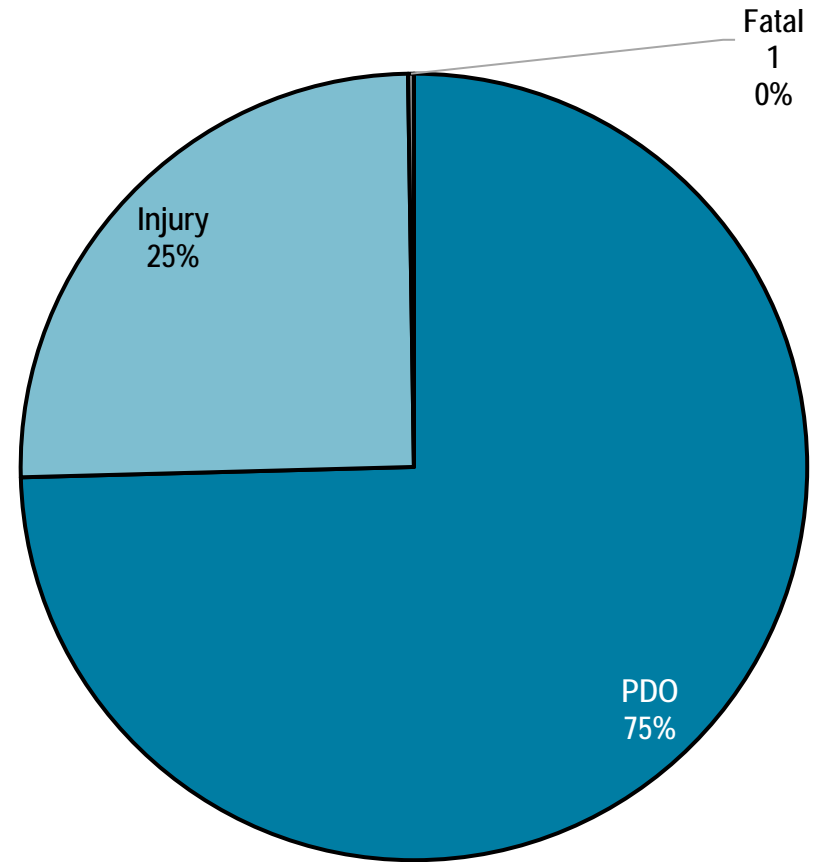
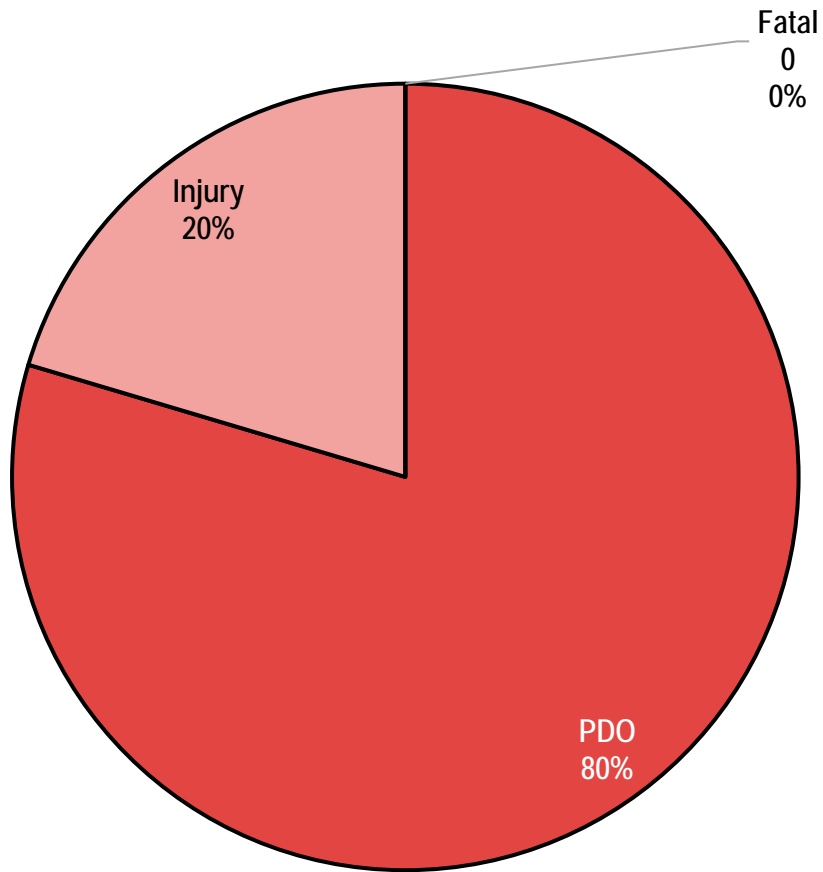
Residential Section



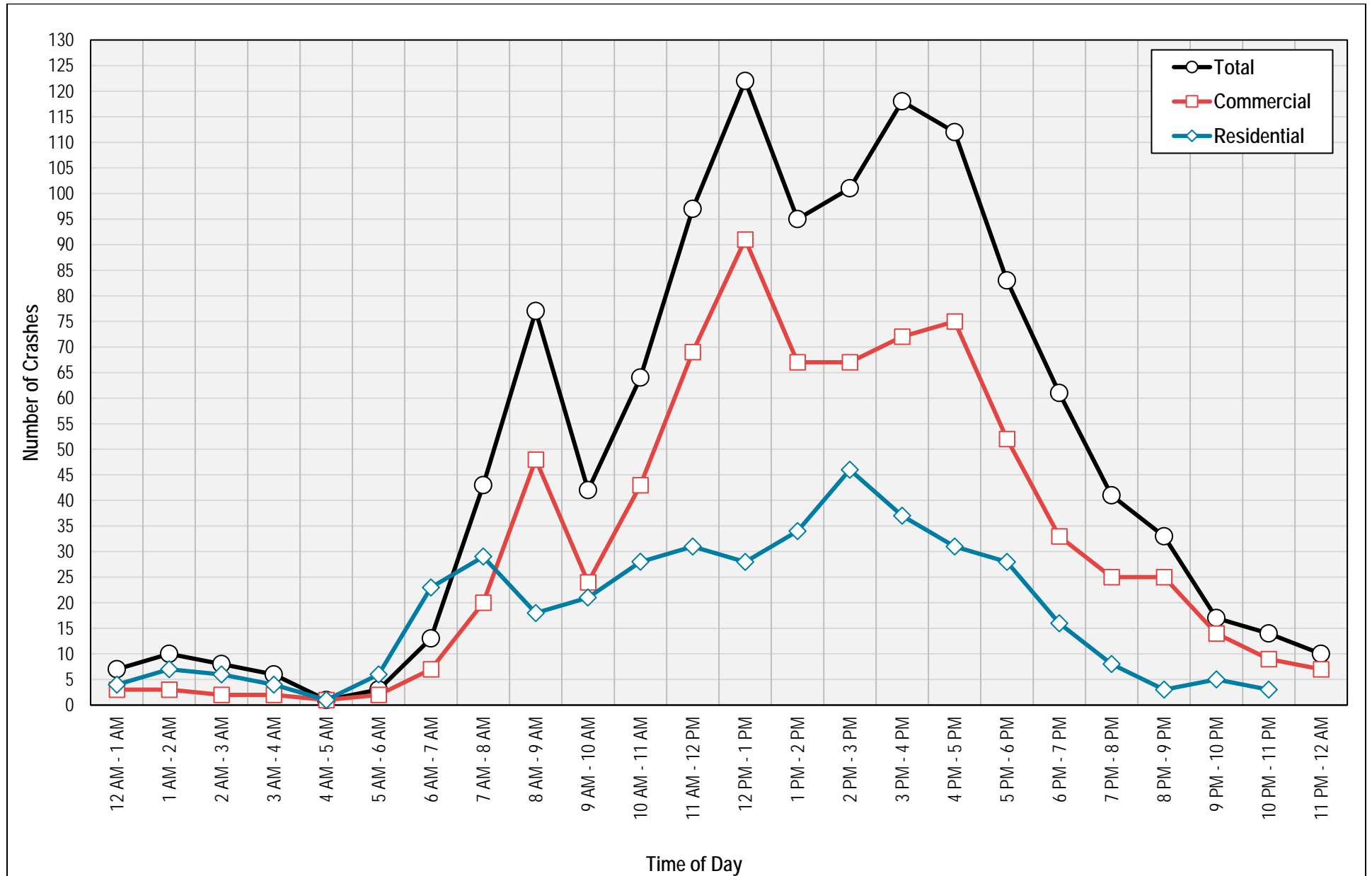
CRASHES BY: SEVERITY

Commercial Section

Residential Section

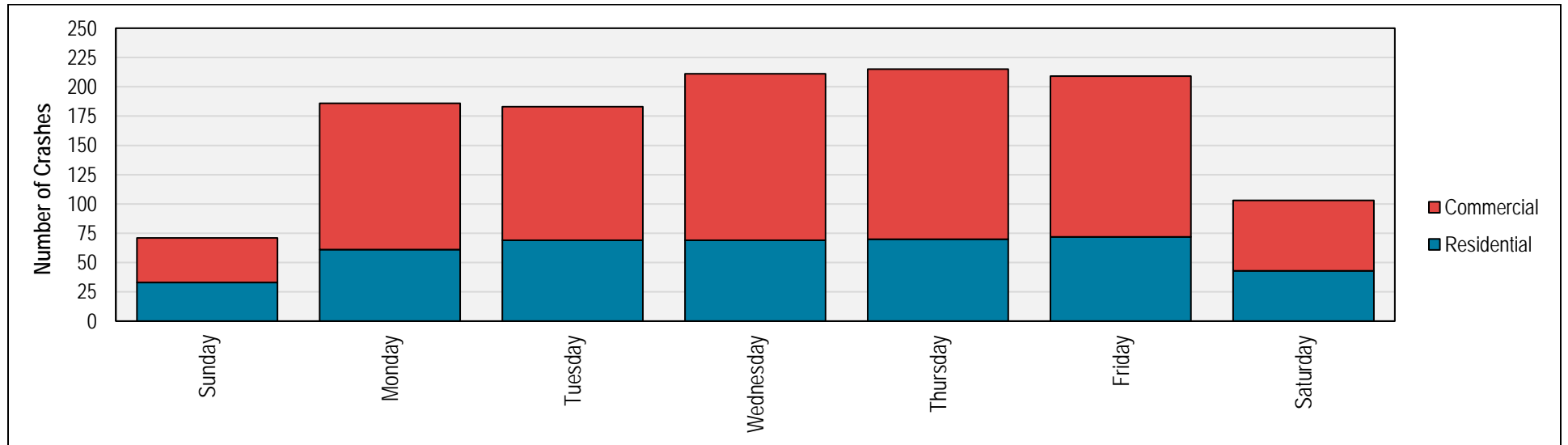


CRASHES BY: TIME OF DAY

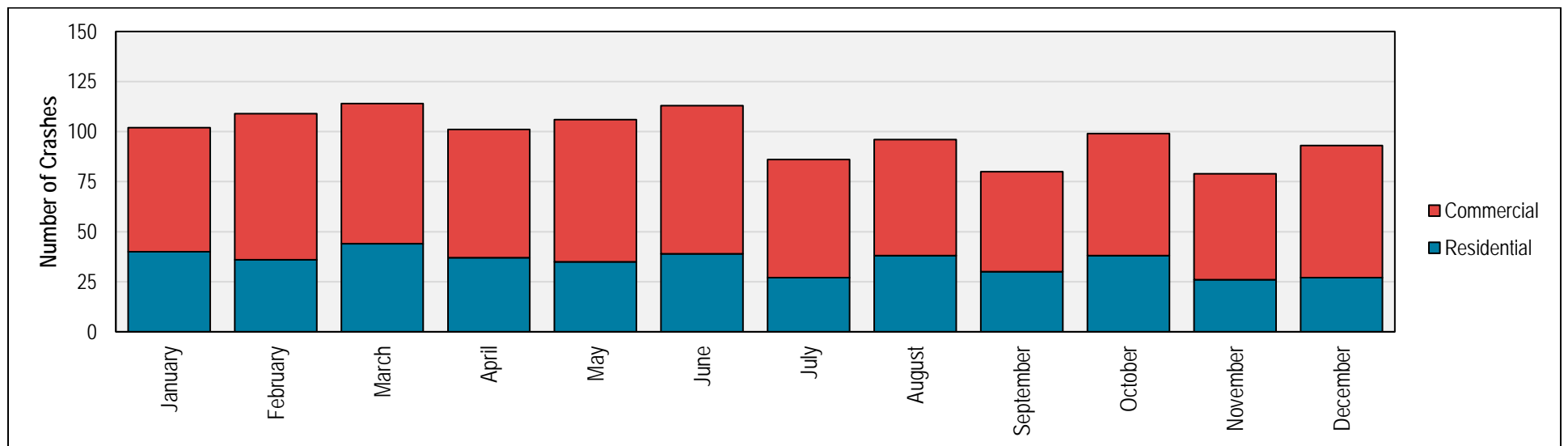


CRASHES BY: DAY OF WEEK & MONTH OF YEAR

By Day of Week



By Month of Year



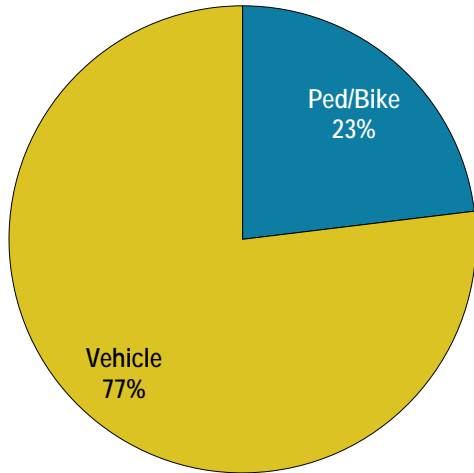
Appendix C **BIKE / PED CRASH SUMMARY**

PEDESTRIAN CRASH DIAGRAM

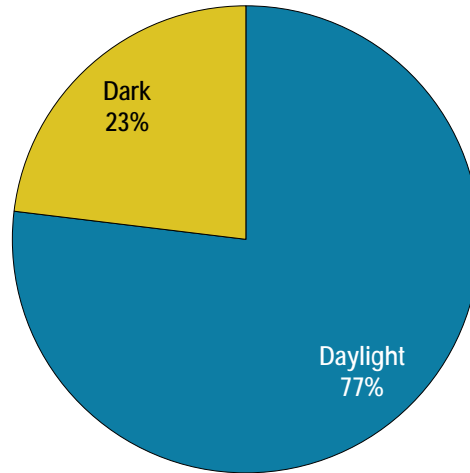


PEDESTRIAN CRASH STATISTICS

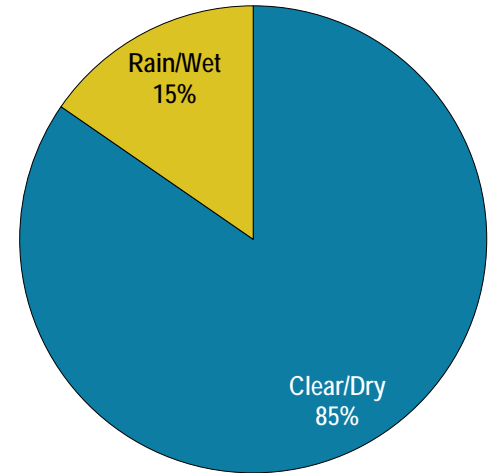
Contributed to Collision



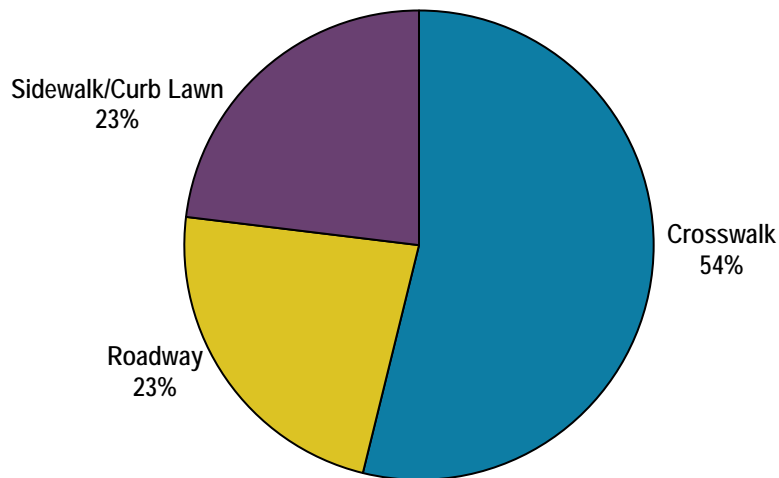
Light Condition



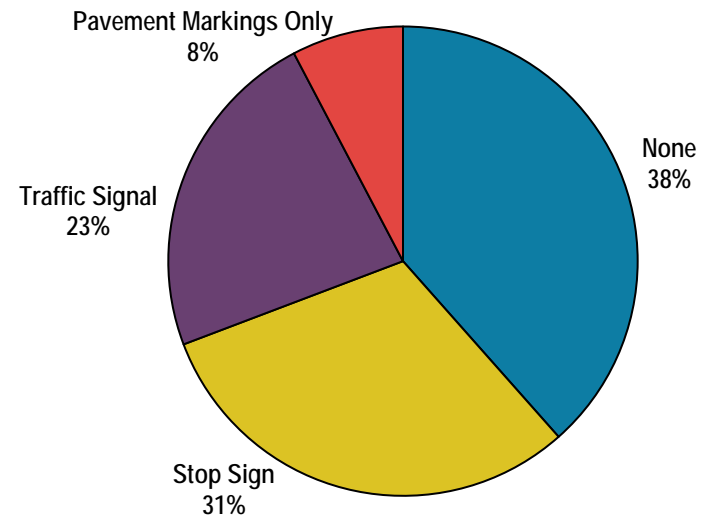
Pavement Condition



Location of Collision

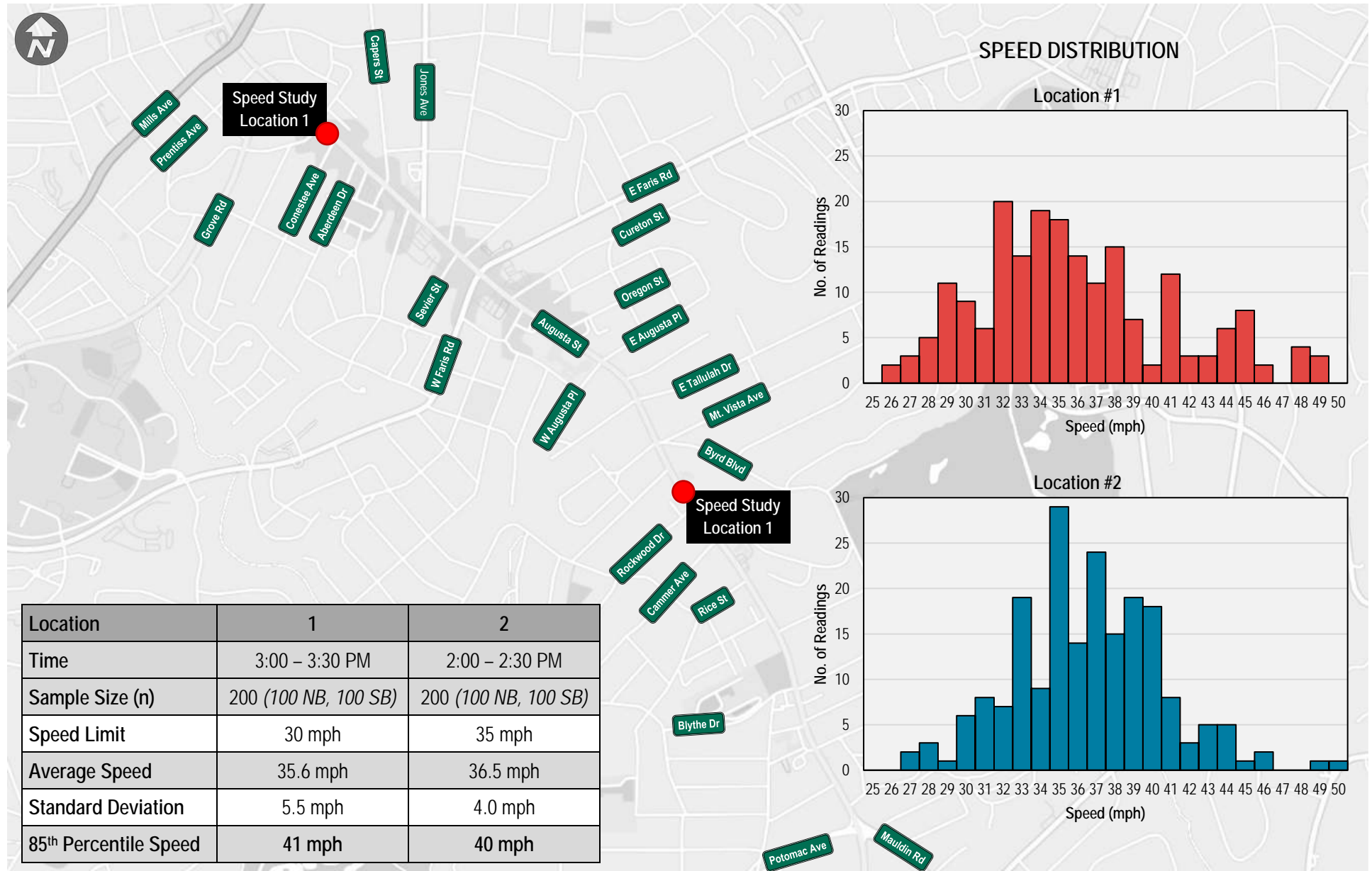


Traffic Control



Appendix D **SPEED STUDY DATA**

AUGUSTA STREET SPEED STUDY




Appendix E INTERSECTION CRASH EXHIBITS

INTERSECTION CRASH EXHIBITS: Mills Avenue/S. Church Street




- Frequent rear-end collisions with majority of them reported to follow too closely due to heavy congestion on all four approaches at the intersection.
- Frequent angle collisions reported with majority of left-turning vehicle from Mills Avenue to Augusta Street failing to yield right of way to the through traffic from S Church Street.
- Frequent eastbound sideswipes due to improper lane change maneuver.


 Rear End – 79

 Angle – 34

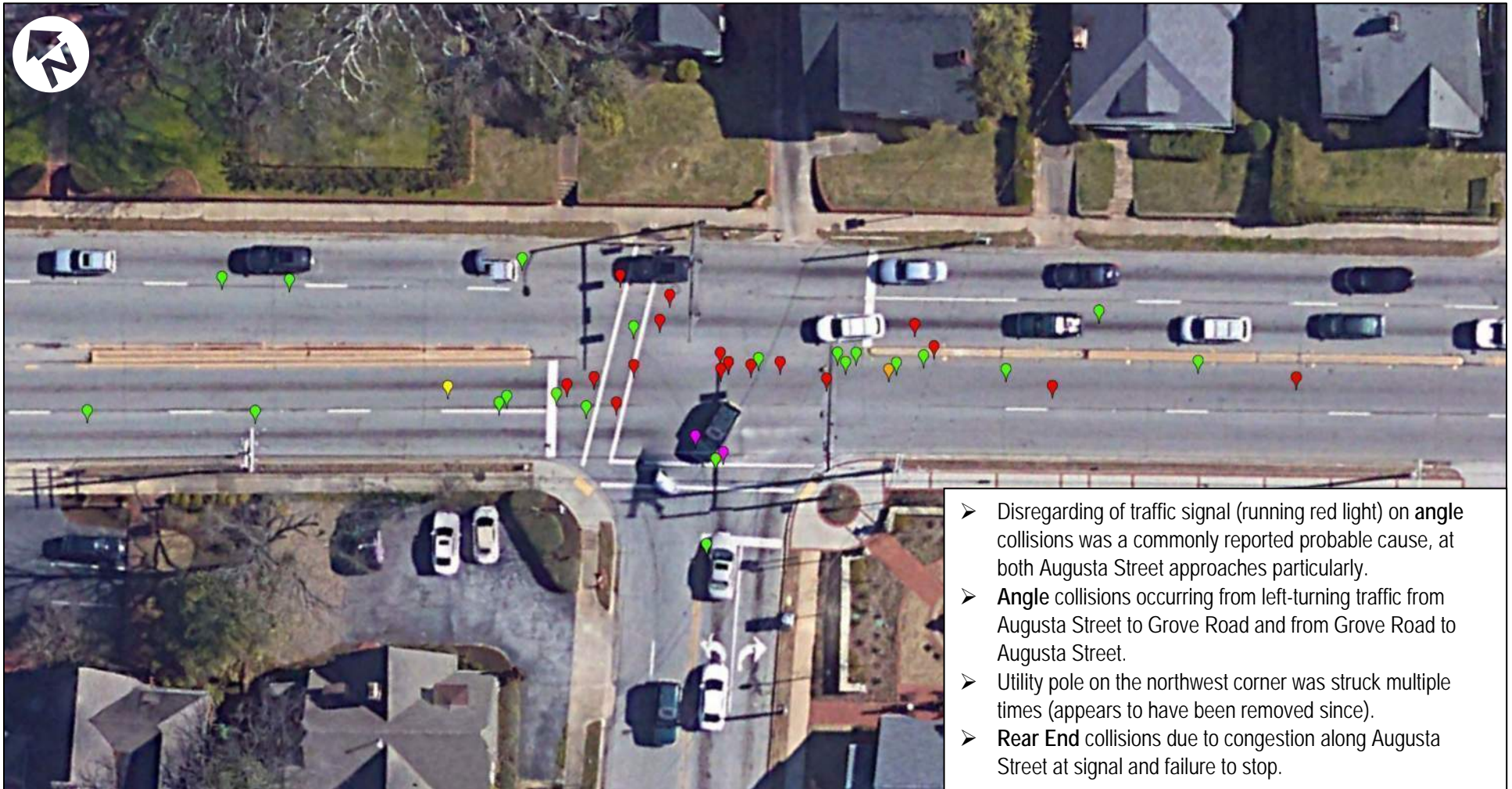
 Sideswipe – 21


 No Collision W/ Motor Vehicle – 6

 Head On – 2

 Backed Into – 4

INTERSECTION CRASH EXHIBITS: Grove Road




 Rear End – 21

 Angle – 19

 Sideswipe – 1

 No Collision W/ Motor Vehicle – 2

 Head On – 0

 Backed Into – 1

INTERSECTION CRASH EXHIBITS: Aberdeen Drive





 Rear End – 14

 Angle – 15

 Sideswipe – 3


 No Collision W/ Motor Vehicle – 0

 Head On – 0

 Backed Into – 1

INTERSECTION CRASH EXHIBITS: Capers Street/S. Lewis Plaza





 Rear End – 12

 Angle – 24

 Sideswipe – 16

 No Collision W/ Motor Vehicle – 1


 Head On – 2

 Backed Into – 0

INTERSECTION CRASH EXHIBITS: McDaniel Avenue




- Disregarding of traffic signal (running red light) on **angle** collisions was a commonly reported probable cause, at both Augusta Street approaches particularly.
- **Angle** collisions occurring from left-turning traffic from Augusta Street to McDaniel Avenue and from McDaniel Avenue to Augusta Street.
- Frequent **rear-end** collisions with majority of them reported to follow too closely or driving too fast for the conditions along Augusta Street.


 Rear End – 23

 Angle – 29

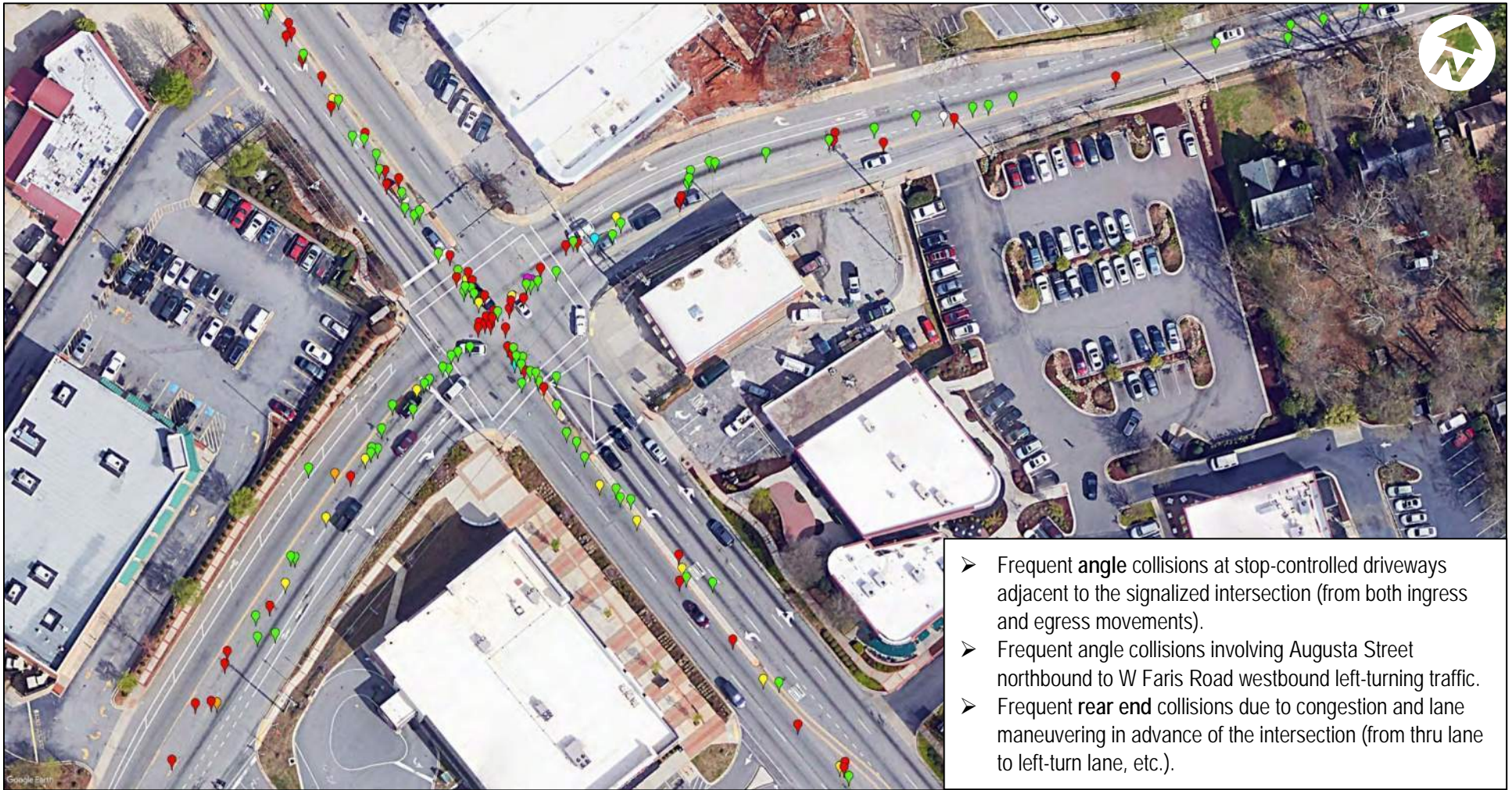
 Sideswipe – 3


 No Collision W/ Motor Vehicle – 2

 Head On – 1

 Backed Into – 1

INTERSECTION CRASH EXHIBITS: E/W Faris Road





 Rear End – 92

 Angle – 58

 Sideswipe – 13


 No Collision W/ Motor Vehicle – 3

 Head On – 3


 Backed Into – 5

INTERSECTION CRASH EXHIBITS: Augusta Drive (including Cureton Street)





 Rear End – 26

 Angle – 21

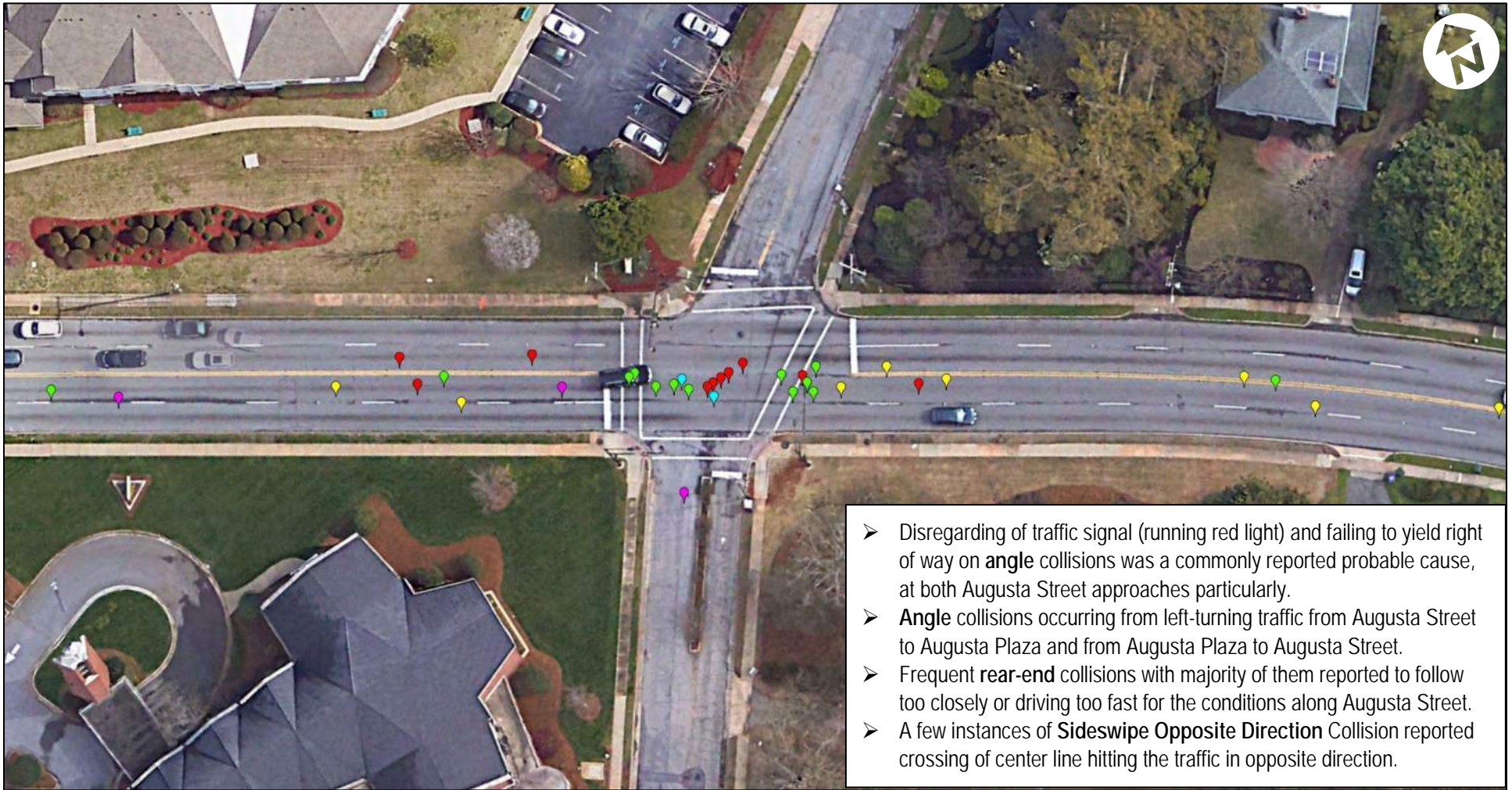
 Sideswipe – 8


 No Collision W/ Motor Vehicle – 2

 Head On – 1


 Backed Into – 0

INTERSECTION CRASH EXHIBITS: E/W Augusta Place





 Rear End – 13

 Angle – 11

 Sideswipe – 8

 No Collision W/ Motor Vehicle – 3

 Head On – 2

 Backed Into – 0

INTERSECTION CRASH EXHIBITS: Augusta Court/Byrd Blvd/Mount Vista Avenue




 Rear End – 13

 Angle – 17

 Sideswipe – 11

 No Collision W/ Motor Vehicle – 5


 Head On – 0

 Backed Into – 3

INTERSECTION CRASH EXHIBITS: Rice Street





- Disregarding of traffic signal (running red light) on **angle** collisions was a commonly reported probable cause, at southbound Augusta Street particularly.
- Frequent **rear-end** collisions with majority of them reported to follow too closely or driving too fast for the conditions along Augusta Street.
- Frequent northbound and southbound **sideswipes** due to improper lane change maneuver along Augusta Street.

 Rear End - 8

 Angle - 7

 Sideswipe - 2


 No Collision W/ Motor Vehicle - 1

 Head On - 0

 Backed Into - 0

INTERSECTION CRASH EXHIBITS: Old Augusta Road/Blythe Dr/Riverside Drive




 Rear End - 17

 Angle - 24

 Sideswipe - 20

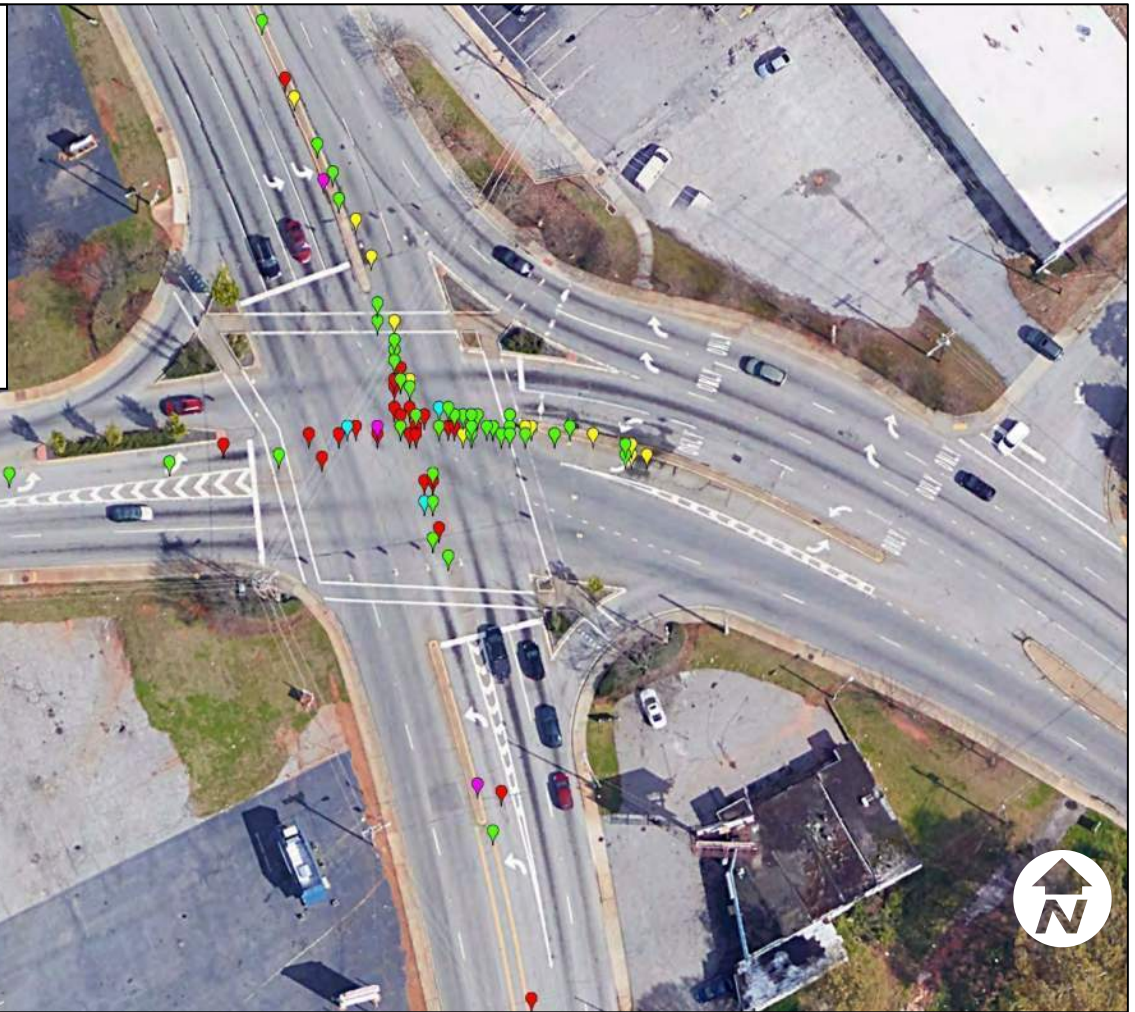
 No Collision W/ Motor Vehicle - 4


 Head On - 2

 Backed Into - 0

INTERSECTION CRASH EXHIBITS: Mauldin Road/Potomac Avenue

- Disregarding of traffic signal (running red light) or failing to yield right of way on **angle** collisions was a commonly reported probable cause, by left-turning traffic from all four approaches (especially northbound approach).
- Frequent **rear-end** collisions with majority of them reported to follow too closely due to congestion along Augusta Street and Mauldin Road.
- Frequent northbound and southbound **sideswipes** due to improper lane change maneuver along Augusta Street and right-turning traffic from Mauldin Road to Augusta Street.




 Rear End - 48

 Angle - 36

 Sideswipe - 18

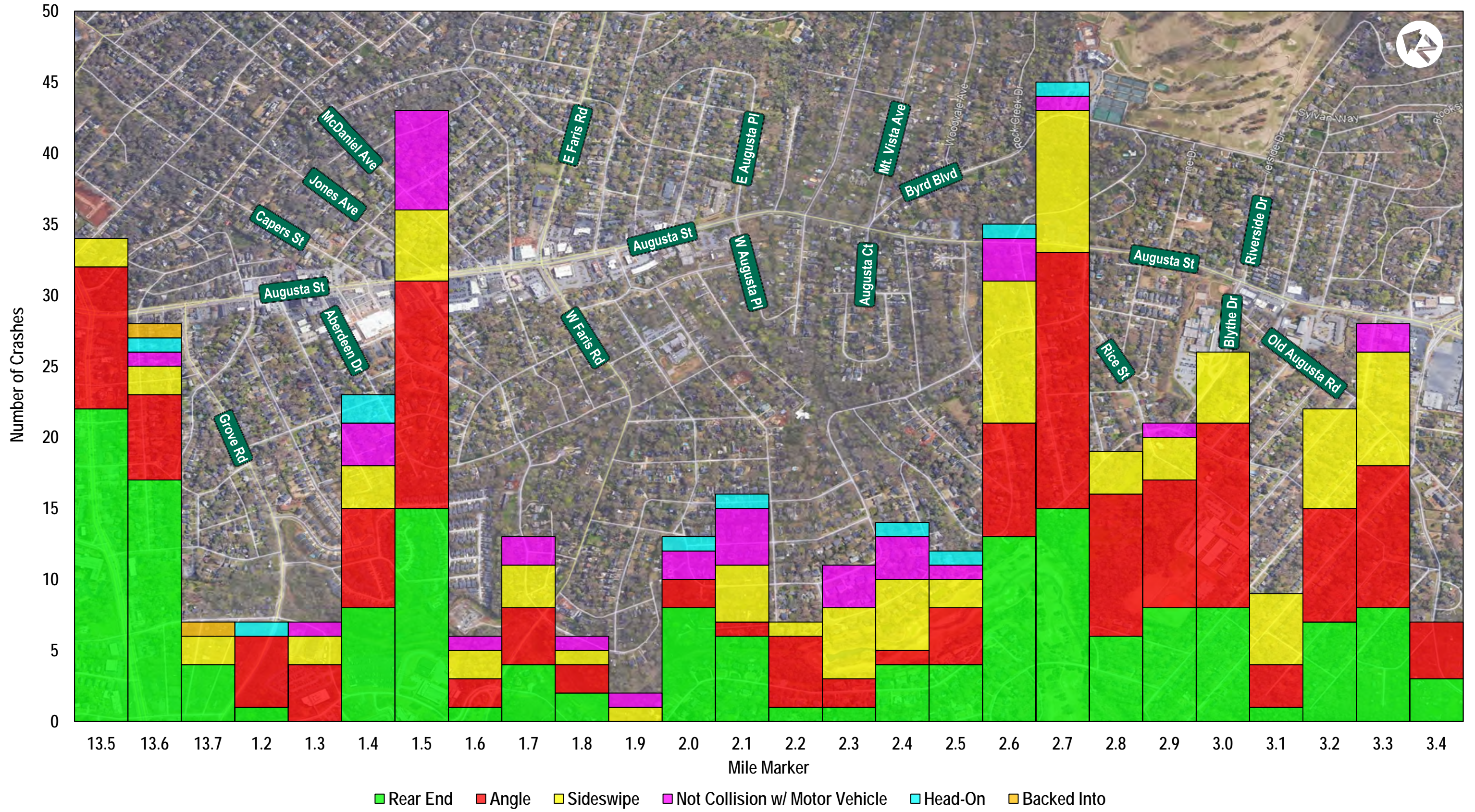
 No Collision W/ Motor Vehicle - 4

 Head On - 3

 Backed Into - 1

Appendix F **SEGMENT CRASH SUMMARY**

CORRIDOR (NOT CODED TO SIGNALIZED INTERSECTIONS) CRASH DATA: By Tenth Mile Segments



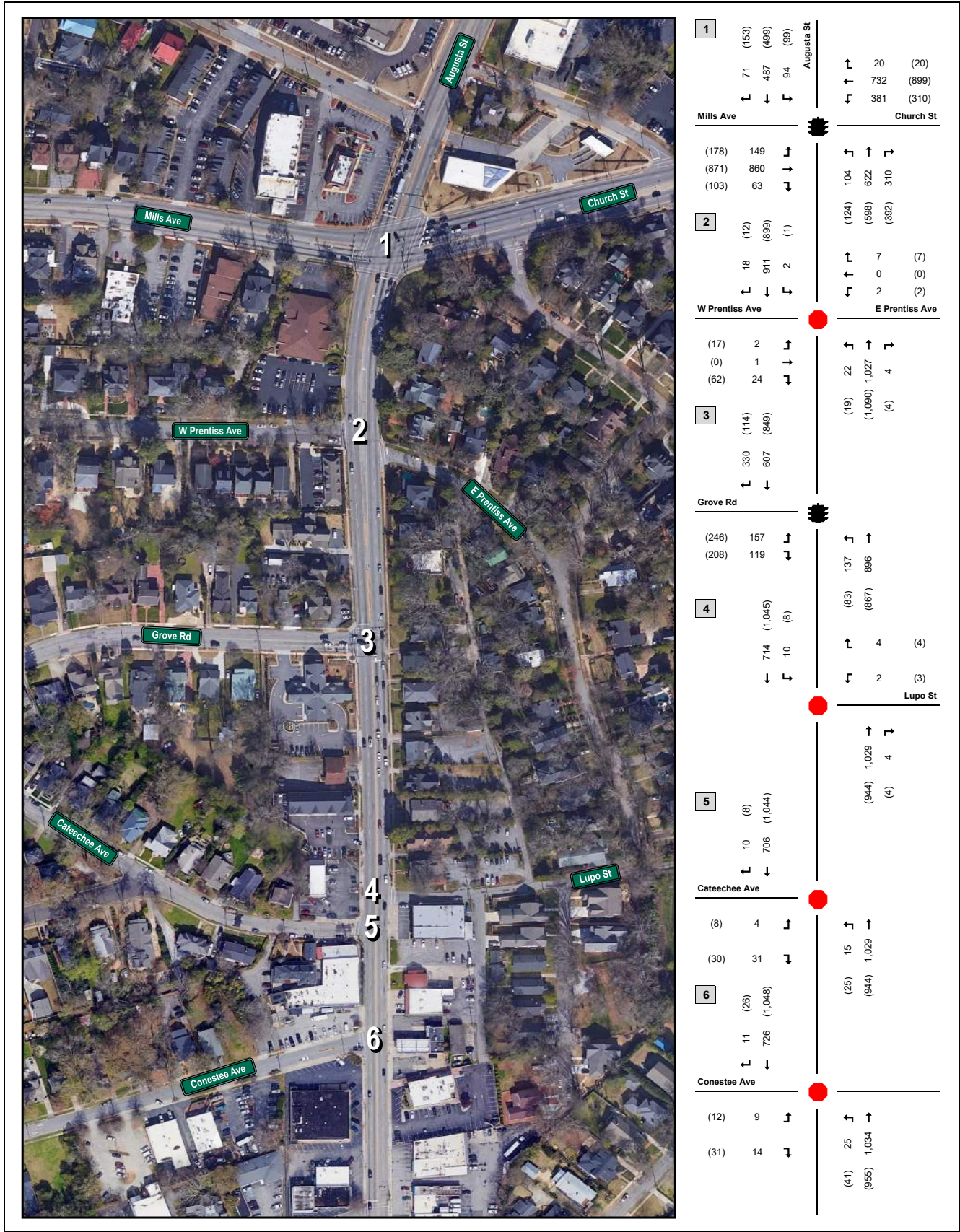
Appendix G **TRAFFIC COUNT DATA**



2021 Existing Traffic Volumes (Sheet 1 of 7)
(Commercial Section)



Traffic Volumes Legend			
000 - AM Peak Hour Volumes	(000) - PM Peak Hour Volumes	TWSC	SIGNAL





2021 Existing Traffic Volumes (Sheet 2 of 7)
(Commercial Section)



Traffic Volumes Legend			
000 - AM Peak Hour Volumes	(000) - PM Peak Hour Volumes	● TWSC	SIGNAL



Segment	AM Peak Hour Volumes	PM Peak Hour Volumes	Notes
7	22	714	Augusta St
Aberdeen Dr	(79) 54	(0) 0	(67) 43
8	18	736	W Lewis Plaza
9	18	714	S Lewis Plaza
10	6	768	Melville Ave
11	19	772	Augusta St
12	2	731	McDaniel Ave



2021 Existing Traffic Volumes (Sheet 3 of 7)
(Commercial Section)



Traffic Volumes Legend			
000 - AM Peak Hour Volumes	● TWSC	🚦 SIGNAL	
(000) - PM Peak Hour Volumes			



Location	AM Peak Hour Volumes	PM Peak Hour Volumes	Notes
13 - Augusta St (North of Business Dr)	9	883	9 (35) (1,197)
13 - Business Dr	4	7	4 (9) (19)
14 - Augusta St (Between Business Dr and McPherson Ln)	3	18	3 (20) (1,195)
14 - McPherson Ln	4	889	4 (11) (37)
15 - Augusta St (Between McPherson Ln and E Faris Rd)	79	704	79 (215) (1,320)
15 - E Faris Rd	111	366	111 (110) (348)
15 - W Faris Rd	117	230	117 (110) (233)



2021 Existing Traffic Volumes (Sheet 4 of 7)
(Residential Section)



Traffic Volumes Legend			
000 - AM Peak Hour Volumes	(000) - PM Peak Hour Volumes	● TWSC	SIGNAL



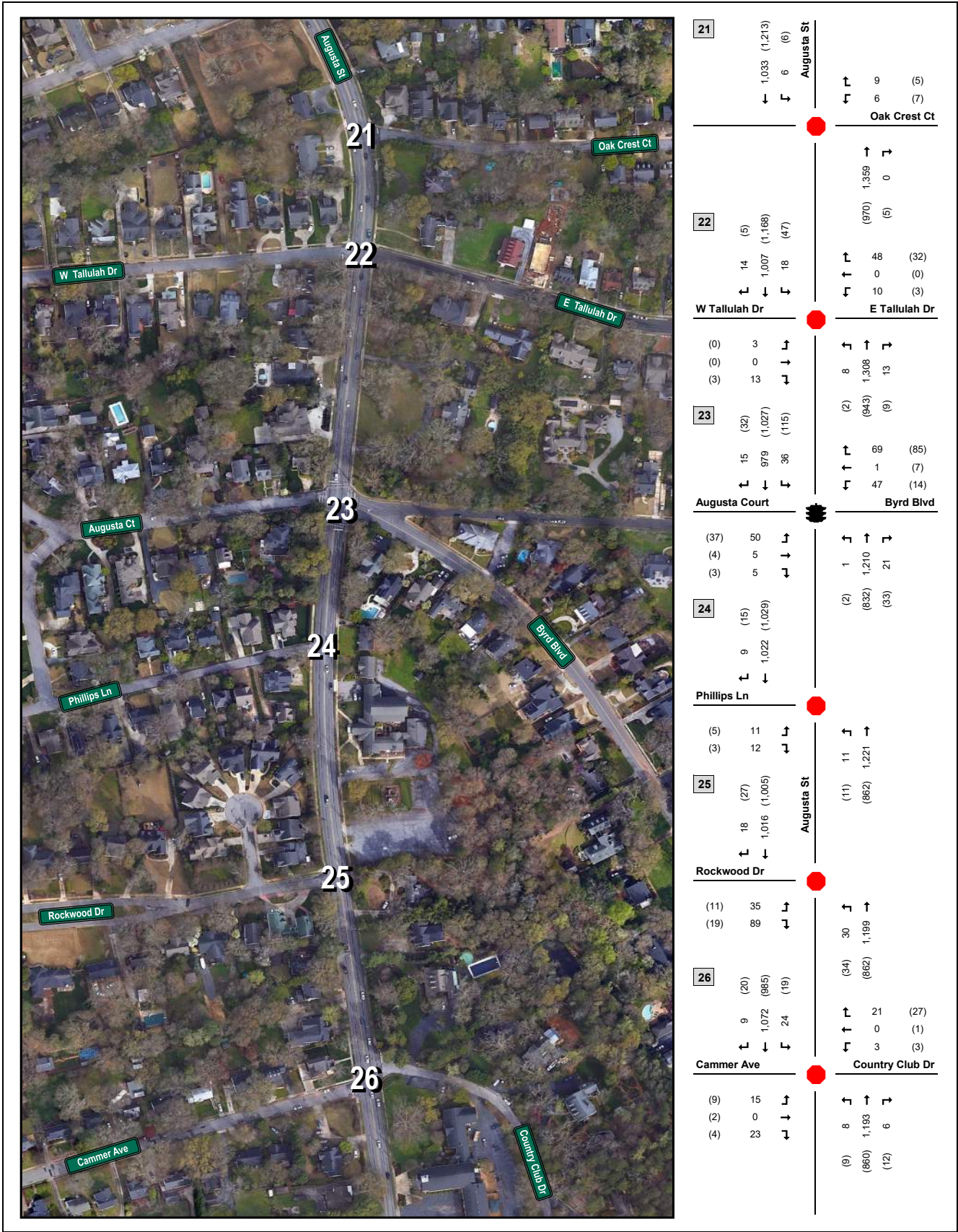
15	(127)	(903)	(169)	Augusta St	↑ 122 (215)	↓ 366 (348)	↔ 111 (110)
	79	704	118		W Faris Rd	↔	E Faris Rd
	(138)	117	↔		↔	↔	↔
16	(357)	326	↔	Augusta St	↔	↔	↔
	(233)	230	↔		↔	↔	↔
	(3)	(1,201)	(42)		↔	↔	↔
17	0	999	46	Augusta St	↔	↔	↔
	↔	↔	↔		↔	↔	↔
	(3)	15	↔		↔	↔	↔
18	(0)	2	↔	Augusta St	↔	↔	↔
	(23)	35	↔		↔	↔	↔
	(66)	(1,169)	(4)		↔	↔	↔
19	66	982	2	Augusta St	↔	↔	↔
	↔	↔	↔		↔	↔	↔
	(81)	135	↔		↔	↔	↔
20	(3)	2	↔	Augusta St	↔	↔	↔
	(28)	47	↔		↔	↔	↔
	(40)	(1,178)	(4)		↔	↔	↔
15	11	1,024	11	Augusta St	↔	↔	↔
	↔	↔	↔		↔	↔	↔
	(3)	3	↔		↔	↔	↔
16	(0)	0	↔	Augusta St	↔	↔	↔
	(16)	6	↔		↔	↔	↔
	(12)	(998)	(1)		↔	↔	↔
17	1,000	30	(25)	Augusta St	↔	↔	↔
	↔	↔	↔		↔	↔	↔
	(14)	18	↔		↔	↔	↔
18	(2)	2	↔	Augusta St	↔	↔	↔
	(17)	54	↔		↔	↔	↔
	(9)	(954)	(12)		↔	↔	↔
19	49	965	6	Augusta St	↔	↔	↔
	↔	↔	↔		↔	↔	↔
	(14)	18	↔		↔	↔	↔
20	(2)	2	↔	Augusta St	↔	↔	↔
	(17)	54	↔		↔	↔	↔
	(9)	(954)	(12)		↔	↔	↔



2021 Existing Traffic Volumes (Sheet 5 of 7)
(Residential Section)



Traffic Volumes Legend			
000 - AM Peak Hour Volumes	(000) - PM Peak Hour Volumes	● TWSC	🚦 SIGNAL





2021 Existing Traffic Volumes (Sheet 6 of 7)
(Residential Section)



Traffic Volumes Legend			
000 - AM Peak Hour Volumes	(000) - PM Peak Hour Volumes	● TWSC	SIGNAL



Station	AM Peak Hour Volumes	PM Peak Hour Volumes	Notes
27	141	(973)	Augusta St
Rice St	(30) 133	(16) 17	Signal
28	9	(980)	Augusta St
Amherst Ave	(9) 2	(5) 20	TWSC
29	973	(978) (7)	Augusta St
Sistine Dr	12 (9)	8 (4)	TWSC
30	174	(89) (908) (6)	Augusta St
Blythe Dr	(80) 114	(12) 8	Signal
Riverside Dr	(17) 11	(13) 59	TWSC
31	5	(5) (954) (10)	Augusta St
Club Dr	12 (4)	0 (1)	TWSC
32	1	(4) (948) (14)	Augusta St
Douglas Dr	(1) 8	(0) 0	TWSC



2021 Existing Traffic Volumes (Sheet 7 of 7)
(Residential Section)



Traffic Volumes Legend			
000 - AM Peak Hour Volumes	● TWSC	🚦 SIGNAL	
(000) - PM Peak Hour Volumes			



Section	Street	Direction	AM Peak Hour Volume	PM Peak Hour Volume
33	Augusta St	Northbound	3	(4)
		Southbound	865	(959)
33	Crystal Ave	Northbound	3	(5)
		Southbound	20	(19)
		Eastbound	16	(16)
		Westbound	1,080	(830)
34	Augusta St	Northbound	8	(8)
		Southbound	877	(954)
		Eastbound	9	(15)
		Westbound	17	(17)
34	Wilmont Ln	Northbound	14	(14)
		Southbound	1,087	(645)
		Eastbound	778	(612)
		Westbound	148	(238)
35	Augusta St	Northbound	17	(36)
		Southbound	292	(382)
		Eastbound	25	(44)
		Westbound	585	(553)
35	Potomac Ave	Northbound	21	(35)
		Southbound	236	(201)
		Eastbound	35	(32)
		Westbound	302	(219)
35	Mauldin Road	Northbound	18	(18)
		Southbound	18	(42)
		Eastbound	18	(18)
		Westbound	18	(42)