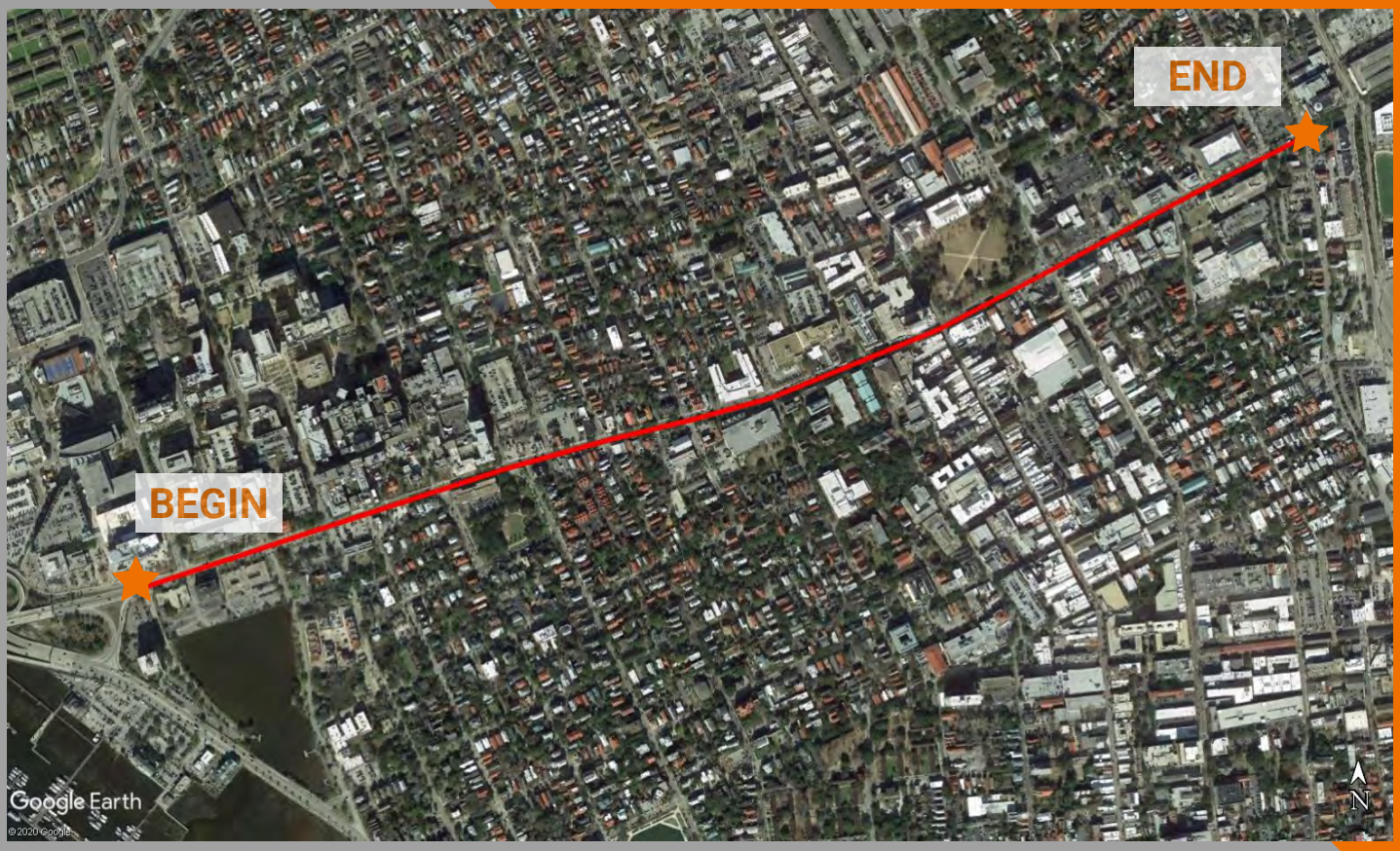
CALHOUN STREET

Bicycle and Pedestrian Road Safety Audit

Charleston, SC



JULY 2020

South Carolina Department of Transportation

Stantec

S-404 Calhoun Street

Bicycle and Pedestrian Road Safety Audit

Charleston, South Carolina

Prepared for:

South Carolina Department of Transportation (SCDOT)

Prepared by:

Stantec Consulting Services Inc.

Project Number: 171002156

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LIST OF APPENDICES

1.0 INTRODUCTION

1.1 Background

Effective bicycle and pedestrian programs often consider the six “Es”:

- 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 cycling and walking
- Equity – Consideration for the diverse needs of all roadway users

This Bicycle and Pedestrian 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 six 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

In 2018, SCDOT identified S-404 (Calhoun Street), as a high crash corridor involving non-motorized users, i.e. bicyclists and pedestrians. The corridor was #4 in the statewide ranking of SCDOT’s non-motorized safety project list, which was based on the total number of bike / pedestrian crashes per mile. Between 2013 and 2018, there were 40 crashes along S-107 involving bicycles and pedestrians. Of these 40 crashes, 36 resulted in injuries and one resulted in a fatality. 14 crashes involved bicycles, while the remaining 26 involved pedestrians.

The study area is a 1.48-mile section of Calhoun Street, which begins at 4th Street and extends eastward to US 52/East Bay Street. Over the six-year period, 754 crashes have been reported along the study area, at a rate of approximately 126 crashes per year. Of the 754 crashes, 156 resulted in injuries and 2 resulted in fatalities. The number and severity of these crashes warranted a closer evaluation for potential safety improvements for drivers, bicyclists and pedestrians.

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. A multi-disciplinary team performed the road safety audit, bringing a variety of perspectives to the study. Detailed crash data from the most recent six years, along with extensive analysis, was used to identify high crash patterns and/or rates throughout the study area to share with the study team.

1.3 Road Safety Assessment Interdisciplinary 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 March 2 and 3, 2020. The members of the RSA team were as follows:

- Shawn Salley – SCDOT
- Robert Amick – SCDOT
- Josh Johnson – SCDOT
- Adam Payne – SCDOT
- Sarah Cox – BCDCOG
- Belen Vitello – BCDCOG
- Michael Mathis – City of Charleston
- Keith Benjamin – City of Charleston
- Morgan Gundlach – City of Charleston
- Troy Mitchell - City of Charleston
- Robert Somerville – City of Charleston
- Kristy McFadden - Charleston PD
- Katie Zimmerman – Charleston Moves
- Savannah Brennan – Charleston Moves
- Regina Creech – MUSC
- Kathy Papadimitriou – Ronald McDonald House
- Dennis Frazier – Charleston Medical District
- Mark Berry – College of Charleston
- Bret Gillis – Stantec Consulting Services
- Chris Cook – Stantec Consulting Services
- Stuart Day – Stantec Consulting Services
- Nabarjun Vashisth – Stantec Consulting Services

1.4 Report Objectives

The purpose of this Road Safety Assessment is to evaluate safety issues and other areas of concern along S-404 between Line Street and Broad Street, including the intersections located along the route. The study identifies opportunities for improving bicycle, pedestrian and vehicular safety.

The assessment has three basic components:

- Pre-assessment
    - Analyze crash data – Crash data over a six-year period were analyzed, with results based on different crash types and trends depicted through various charts, tables and spreadsheets.
    - Speed Study - Conduct speed study of the corridor at 3 different locations to gauge average and 85th percentile speeds during non-rush hour traffic.
    - The audit team reviews location characteristics and crash analysis
- Field meeting/Site visit
    - Study team gathers to review/discuss crash details and share local knowledge of existing issues and concerns.
    - Study team walks the corridor to examine conditions along the corridor.
- 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 begins at the intersection of 4th Street and extends eastward to US 52/East Bay Street. These limits are shown below in Figure 2.1. S-404 has active bicycle, pedestrian, vehicular, and transit traffic. It serves residential, office and retail properties, with several attractions for both tourists and local residents. In addition to numerous shops and restaurants, some popular destinations along this corridor include Roper Hospital, MUSC, Marion Square, Charleston County Public Library and Charleston Farmer's Market. The College of Charleston is also nearby, adding to nonvehicular and vehicular traffic when school is in session.

Figure 2.1- Project Study Area

2.2 EXISTING ROADWAYS

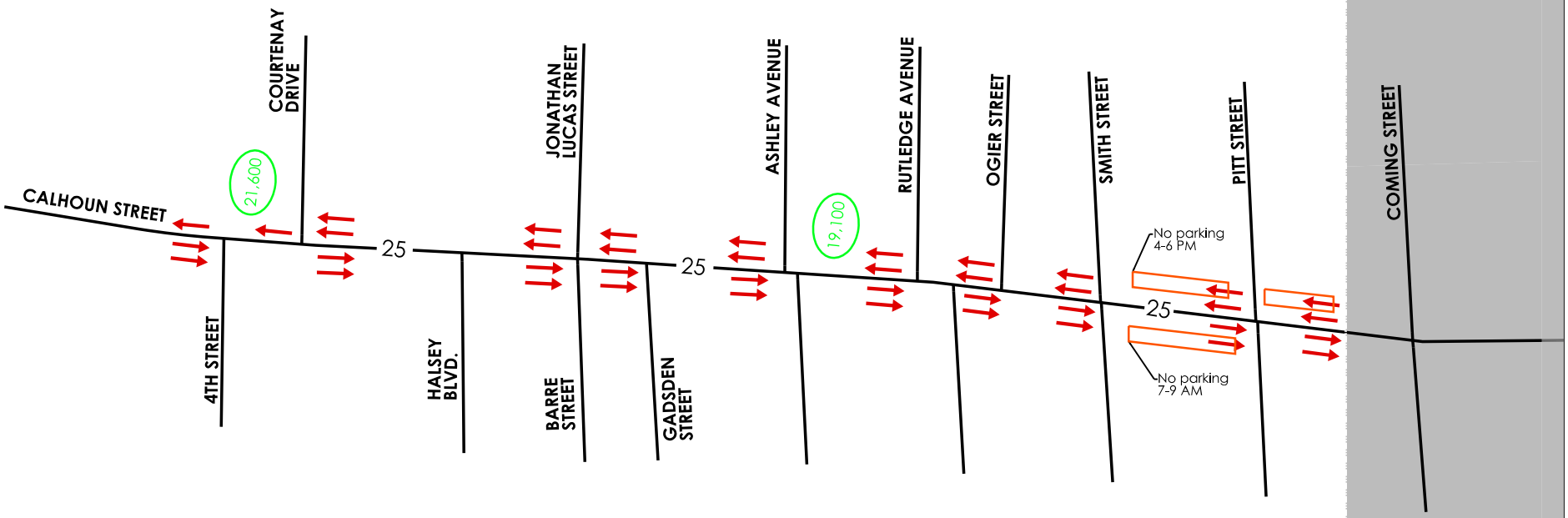
Calhoun St. is a four-lane principal arterial roadway that serves residential and commercial traffic. Both eastbound and westbound Calhoun St. have two lanes. However, the outside lanes in both directions are used for parking in segments. Through lanes, on-street parking, posted speeds, and 2019 ADT counts are mapped on the following pages. There are existing traffic signals at the intersections of Courtenay Dr., Barre St./Jonathan Lucas St., Ashley Ave., Rutledge Ave., Smith St., Coming St., Saint Philip St., King St., Meeting St., Elizabeth St., and US 52/East Bay St. Sidewalk exists on both sides of the roadway, throughout

the study area. Signalized pedestrian crossings along this corridor exist at most of the signalized intersections in the study area. There are existing pedestrian crossings with flashing beacons at Gadsden Street and Alexander Street.

Key intersections include:

- ***Ashley Ave.*** is a two-lane minor arterial in the west end of the study area. The posted speed limit is 25 mph and 2019 AADT was 6,300 vehicles per day (vpd).
- ***Coming St.*** is a two-lane major collector towards the east end of the study area. The posted speed limit is 25 mph and 2019 AADT was 2,900 vpd.
- ***Saint Philip St.*** is a two-lane major collector towards the east end of the study area. The posted speed limit is 25 mph and 2019 AADT was 4,000 vpd.
- ***King St.*** is a two-lane principal arterial towards the end of the study area. South of Calhoun St., King St. is a one-way road for southbound traffic only. The posted speed limit is 25 mph and 2019 AADT was 9,300 vpd.
- ***Meeting St.*** is a four-lane principal arterial towards the end of the study area. The posted speed limit is 25 mph and 2019 AADT was 18,200 vpd.
- ***US 52/East Bay St.*** is a four-lane minor arterial (north of Calhoun St.) and a principal arterial (south of Calhoun St.) at the end of the study area. The posted speed limit is 25 mph and 2019 AADT was 24,100 vpd.

CALHOUN STREET
TRAFFIC FEATURES



LEGEND

— 25 — SPEED LIMIT ON SECTION (MPH)

EXISTING THROUGH LANES

EXISTING STREET PARKING

10,000 2019 AADT (VEHICLES PER DAY)

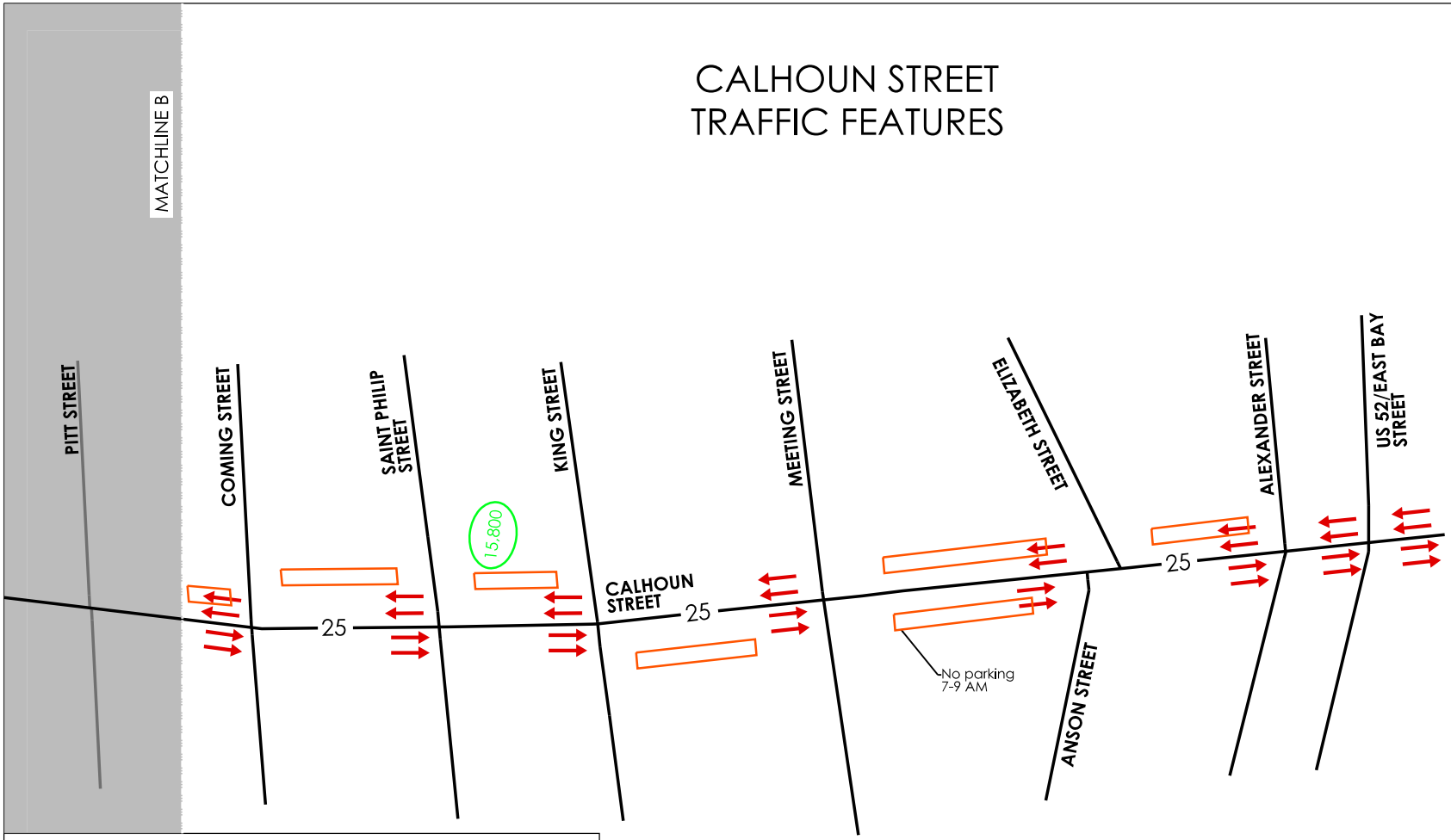
SCALE IN FEET

0 500 1000 2000

SHEET 1

N

CALHOUN STREET
TRAFFIC FEATURES



LEGEND

— 25 — SPEED LIMIT ON SECTION (MPH)

EXISTING THROUGH LANES

EXISTING STREET PARKING

10,000 2019 AADT (VEHICLES PER DAY)

SCALE IN FEET

0 500 1000 2000

SHEET 2

N

2.3 CRASH DATA

Crash data for the study corridor was provided by SCDOT for a six-year period between January 2013 and December 2018. The crash data supplied by SCDOT was grouped into street blocks (from west to east), and then reviewed to identify trends in collision types and locations that experienced a high crash frequency. In total, there were 754 reported crashes along the entire route.

See summaries of the crash data in Figures 2.3.1-2.3.16 below, as well as in tabular form in Appendix A.

Note that the 2013-2018 time frames used in this section and Appendices A and B are different from the 2012-2018 time frames used in Appendix C - Crash Diagrams - Specific Intersections and Appendix D - Bicycle and Pedestrian Crash Diagram. Appendix C uses a 1-1-2016 to 3-31-2019 time frame, while Appendix D uses a 1-1-12 to 3-31-2018 time frame.

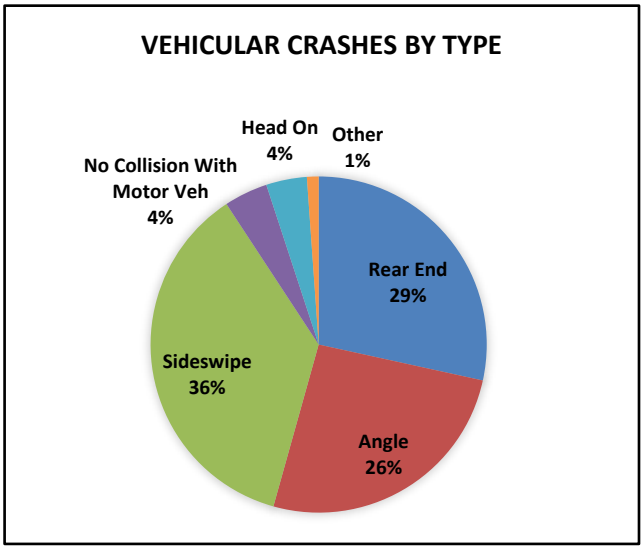


Figure 2.3.1- S-404 Crashes by Type

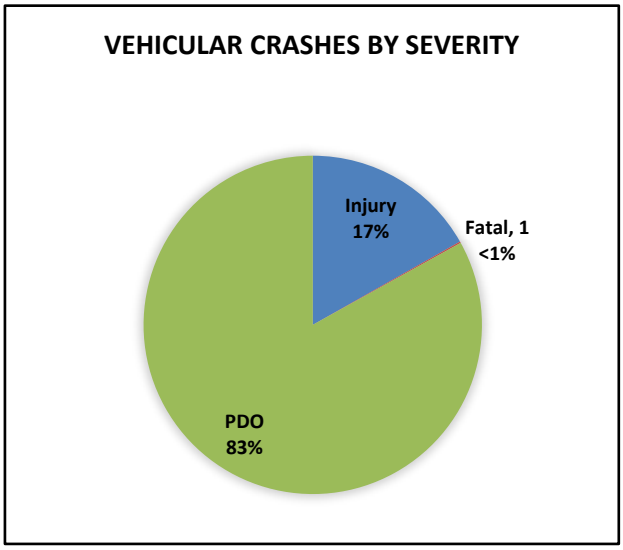


Figure 2.3.2 - S-404 Crashes by Severity

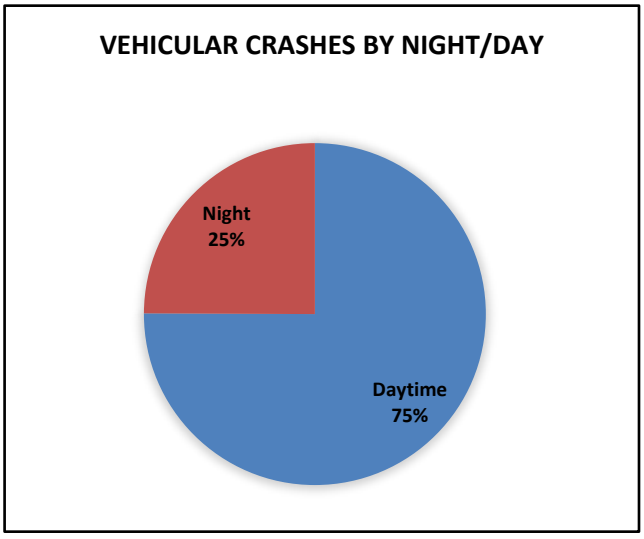


Figure 2.3.3 - S-404 Crashes by Day/Night

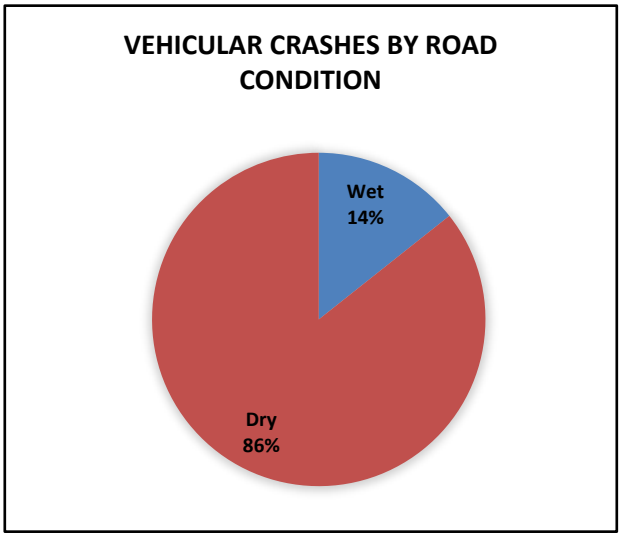


Figure 2.3.4 - S-404 Crashes by Road Condition

As seen in Figure 2.3.1, sideswipe crashes are the most common type, at 36% of all vehicular crashes. Crashes designated as no collision with motor vehicle are typically collisions with a fixed object. Figure 2.3.2 depicts vehicular crashes by severity along the study area, which shows 17% of all crashes resulted in injuries. Around 83% of the crashes were reported to be property damage only (PDO). Two fatal crashes were reported over the entire period. One fatal vehicular crash occurred between Halsey Blvd. and Gadsden Street, which was reported as a head-on crash. DUI was listed as the probable cause. One fatal pedestrian crash occurred at the Calhoun St. and Rutledge Ave. intersection. The contributing factor reported was DUI.

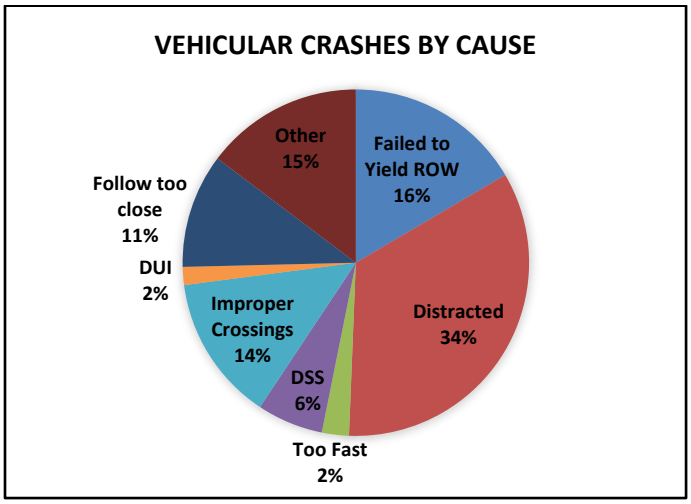


Figure 2.3.5 - S-404 Crashes by Cause

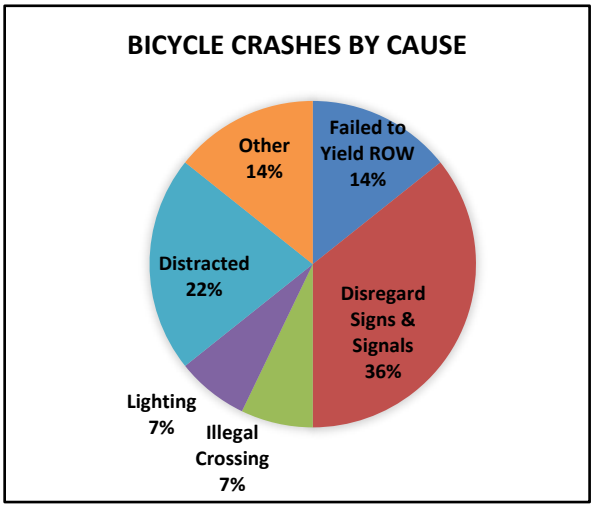


Figure 2.3.6 - S-404 Bicycle Crashes by Cause

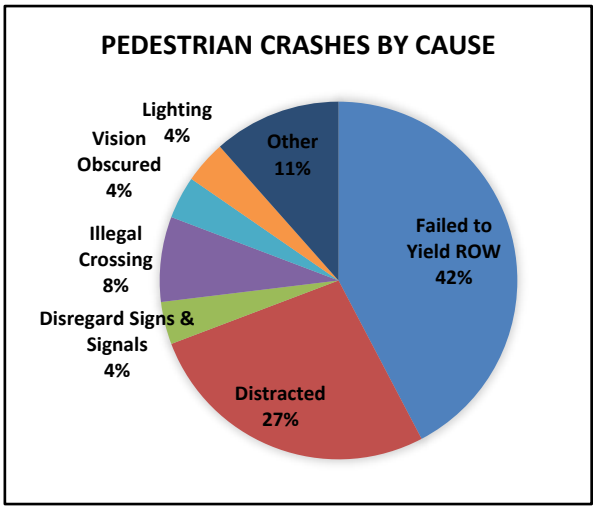


Figure 2.3.7 - S-404 Pedestrian Crashes by Cause

Figures 2.3.6 and 2.3.7 depict bicycle and pedestrian crashes by probable cause, respectively along the study area. Most of the crashes are caused by either a failure to yield right of way, distraction, or a disregard for signs and signals.

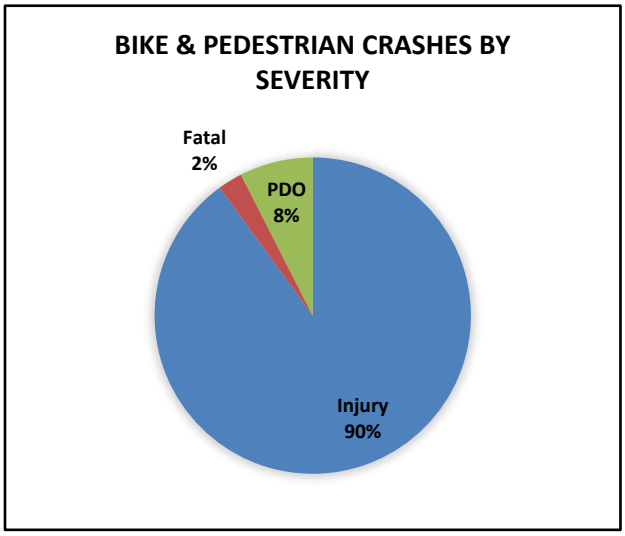


Figure 2.3.8 - S-404 Bicycle and Pedestrian Crashes by Severity

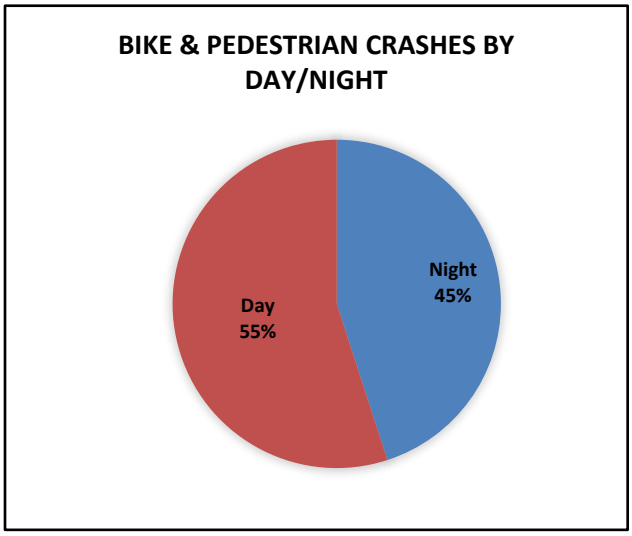


Figure 2.3.9 - S-404 Bicycle and Pedestrian Crashes by Day/Night

Figures 2.3.8 and 2.3.9 depict bicycle and pedestrian crashes by severity and day/night, respectively along the study area. 36 of the 40 crashes resulted in injuries and one pedestrian crash resulted in a fatality. 45% of the bicycle and pedestrian crashes occurred at night.

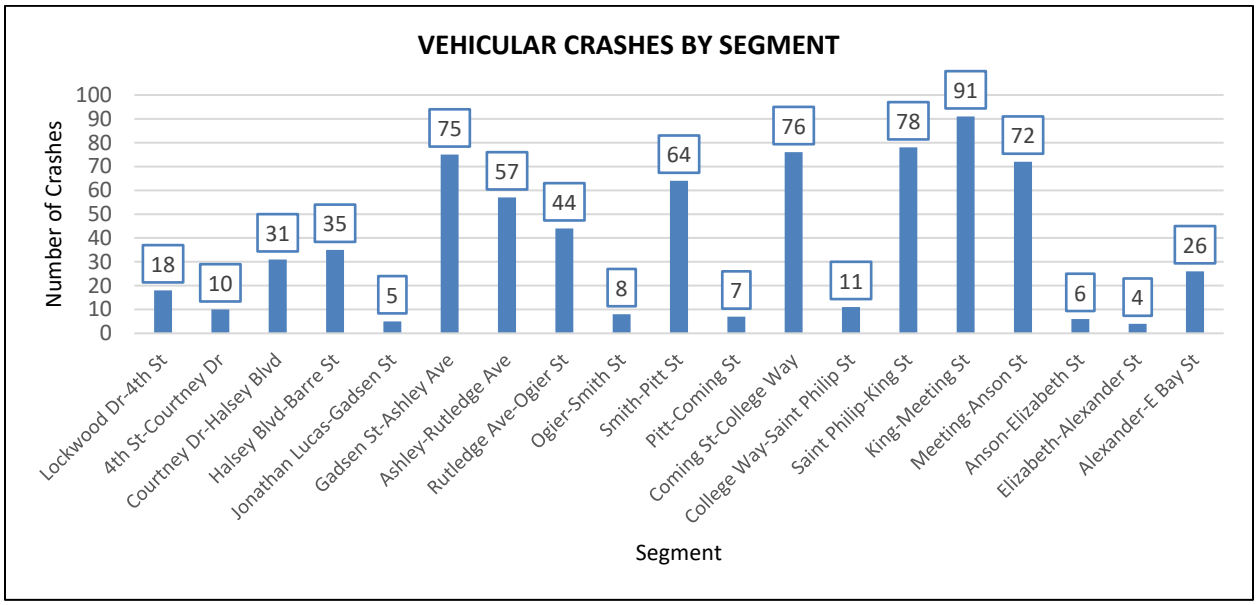


Figure 2.3.10- S-404 Vehicular Crashes by Segment

Figure 2.3.10 shows that King Street to Meeting Street had the highest number of crashes overall, followed by Saint Philip Street to King Street.

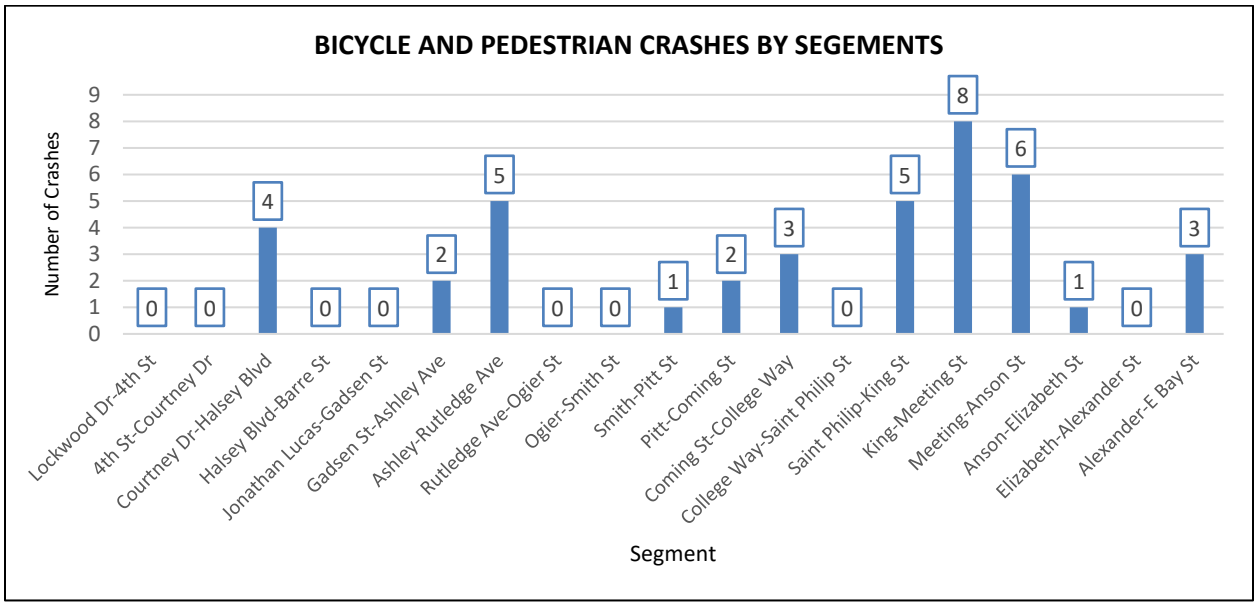


Figure 2.3.11- S-404 Bicycle and Pedestrians Crashes by Segment

As seen from Figure 2.3.11, bicycle and pedestrian crashes occur along the length of the study corridor.

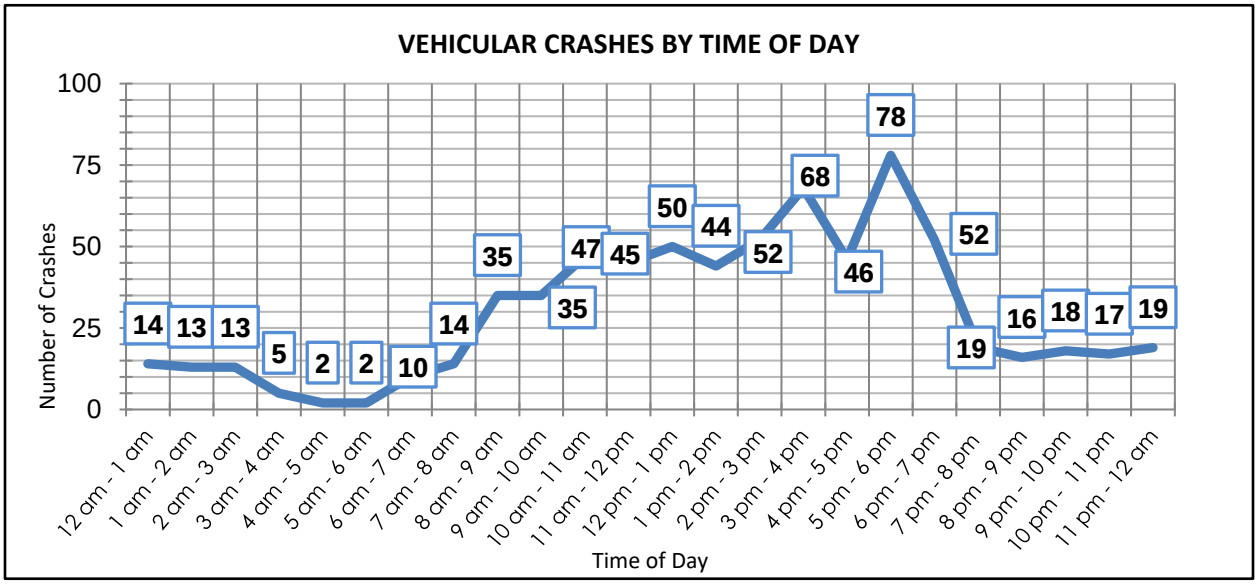


Figure 2.3.12 - S-404 Crashes by Time of Day

As seen in Figure 2.3.12, the majority of the crashes occur between 7:00 AM and 8:00 PM, but night-time crashes continue until 4:00 AM. Figure 2.3.13 below shows that bicycle and pedestrian crashes occur throughout the day.

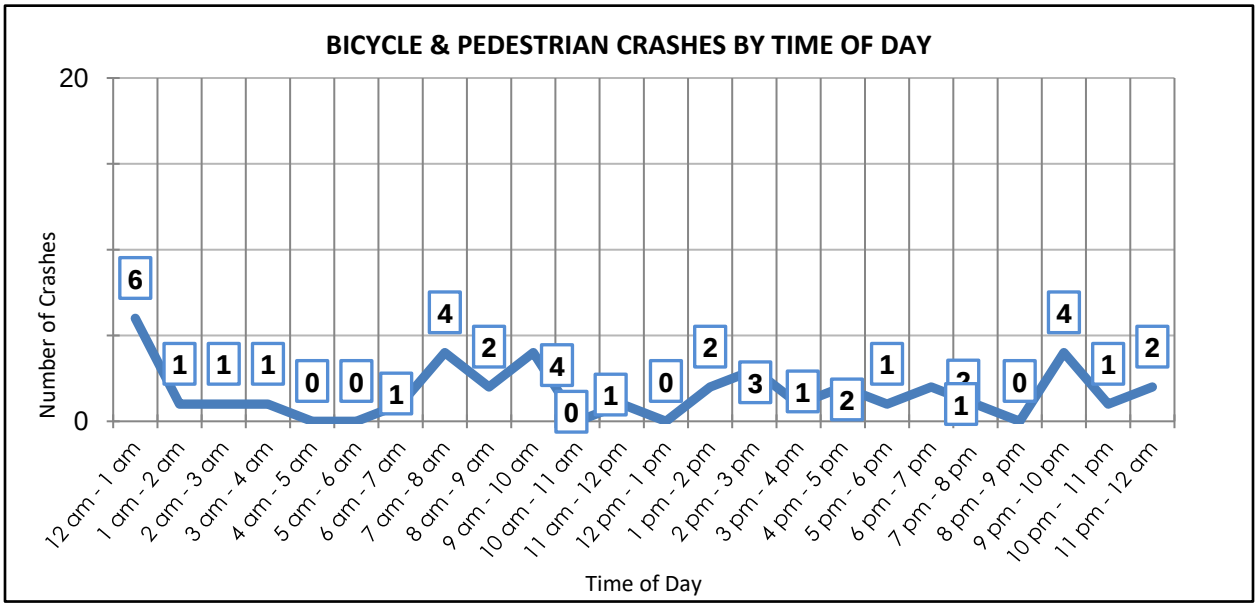


Figure 2.4.13- S-404 Bicycle & Pedestrian Crashes by Time of Day

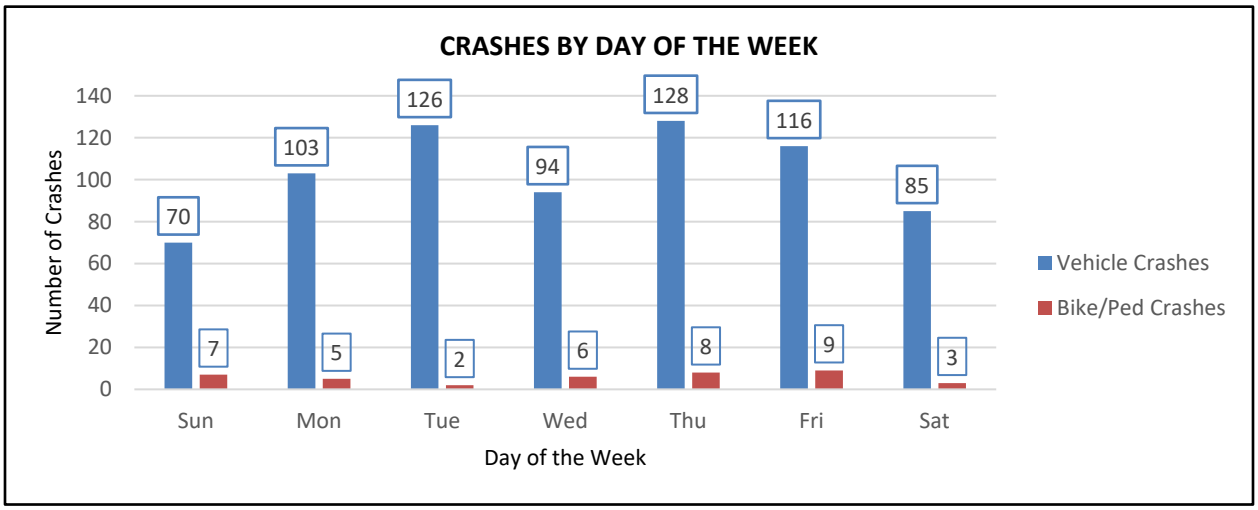


Figure 2.3.14 - S-404 Crashes by Day of the Week

As seen in Figure 2.3.14, crashes are generally spread throughout the week. Vehicular crashes decrease during weekends.

Crashes by month are depicted in Figure 2.3.15 below. Crashes are highest from April to June.

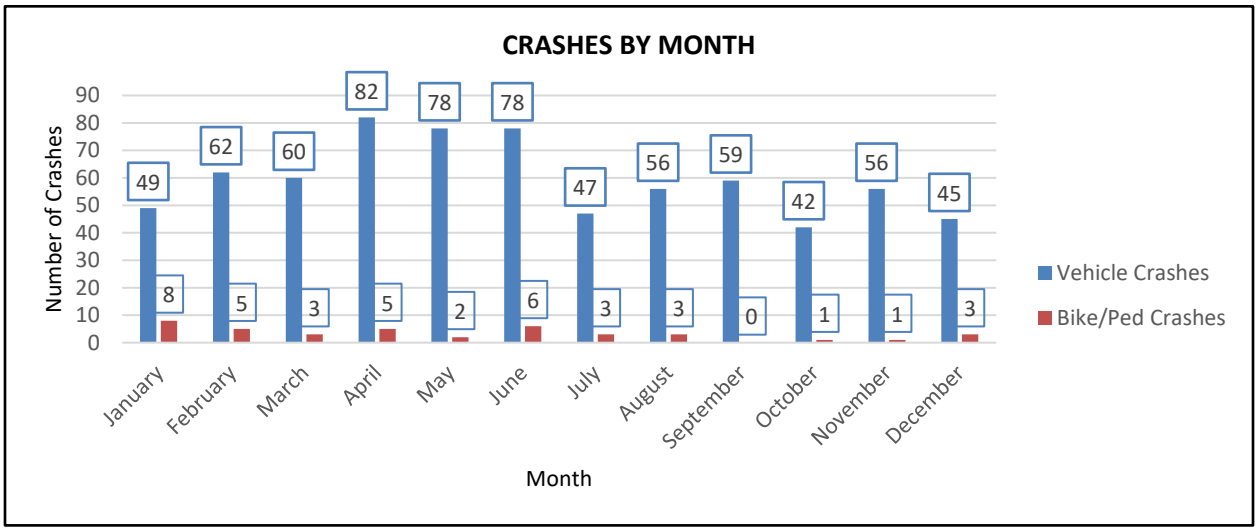


Figure 2.3.15 - S-404 Crashes by Month

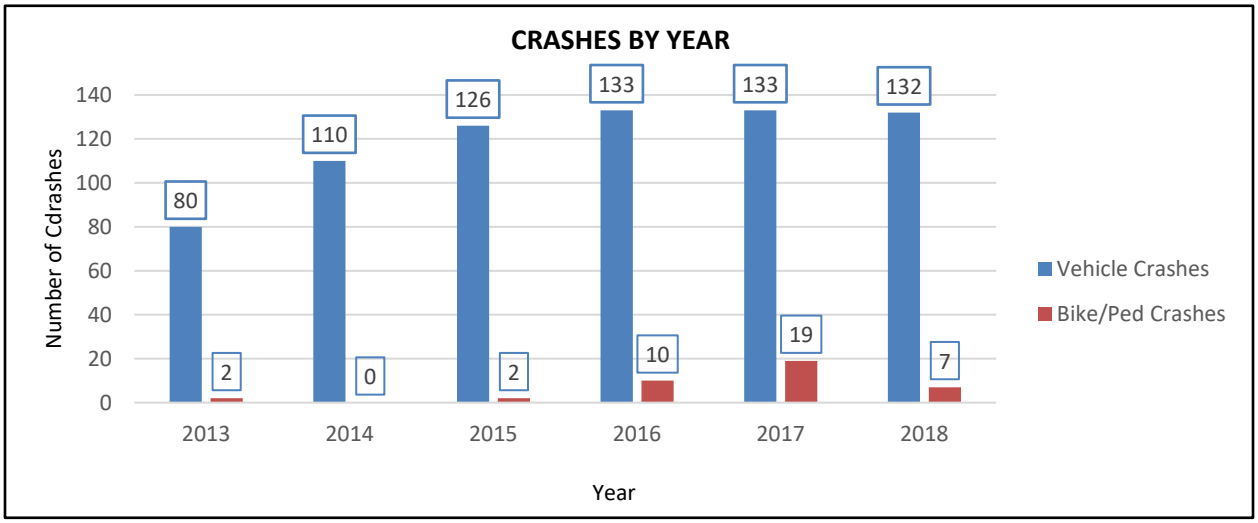


Figure 2.3.16 - S-404 Crashes by Year

Figure 2.3.16 shows a general increase in crashes over time.

2.4 SPEED STUDY

A speed study at 3 different locations along the corridor was conducted to gauge normal speed variations during non-rush hours. As seen from Figure 2.4.1 and Table 2.1, average and 85th percentile speeds are just below the posted speed limit. The posted speed limit is 25 mph along the entire study area, with a 20 mph school speed limit between Meeting Street and Elizabeth Street.

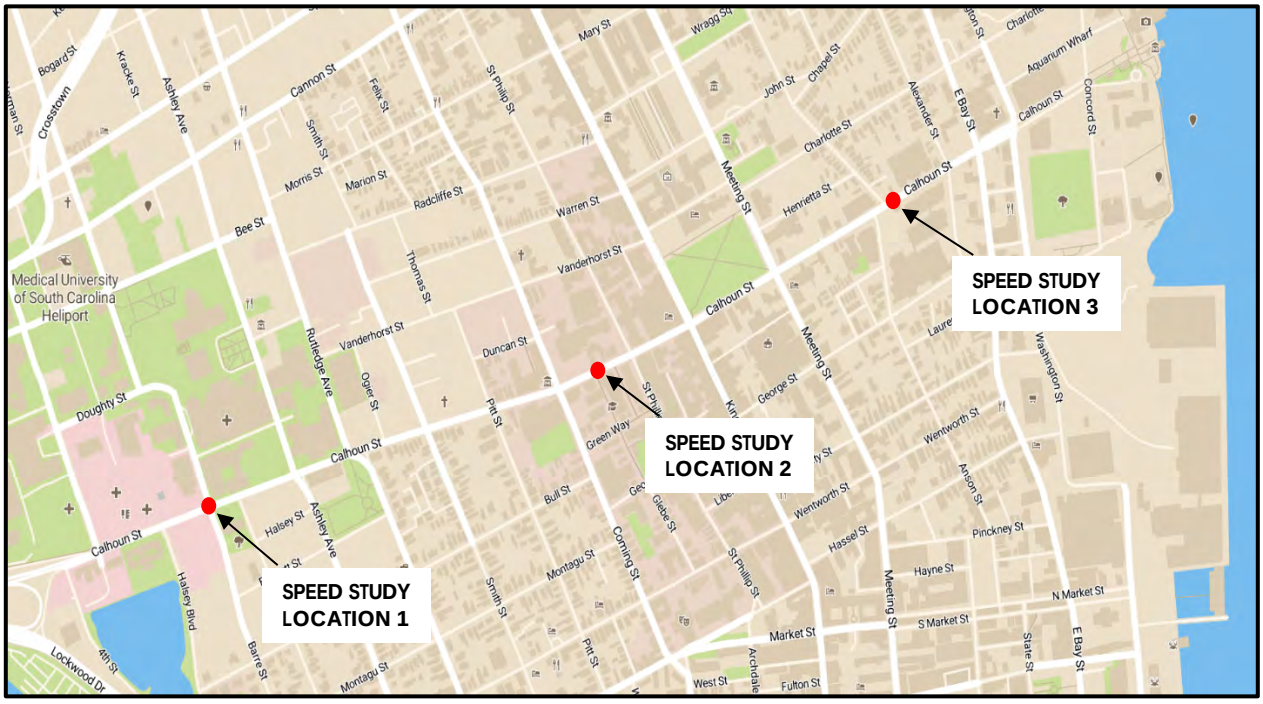


Figure 2.4.1- S-404 Speed Study Locations

Location	1	2	3
Time	10:45 to 11:00am	11:05 to 11:20am	11:25 to 11:40am
Limit (mph)	25	25	25
Average (mph)	21	22	22
85th percentile (mph)	23	24	24

Table 2.1 – S-404 Speed Limits & Study Results

Results of the speed study show mid-day 85th percentile speeds close to the posted speed limits. This aligns with Figures 2.3.5 to 2.3.7, which shows only 2% of vehicular crashes and none of the bicycle or pedestrian crashes were caused by “driving too fast for conditions”.

2.5 OTHER IMPROVEMENTS AND STUDIES

Lowcountry Rapid Transit (LCRT) Project

BCDCOG's LCRT project is planned for the peninsula. One of the alternative alignments under consideration routes the project along S-404 Calhoun Street from Courtenay Drive to Meeting Street. This alternate maintains the four existing lanes on S-404.

Holy Spokes

The Charleston bike share system, Holy Spokes, was launched in May 2017. The closest hub near Calhoun Street is located on College Way. There are six bike hubs throughout the medical district, with three within a block of Calhoun Street.

People Pedal Plan

The City's People Pedal Plan provides recommendations for bicycle and pedestrian improvements throughout the peninsula (Figure 2.5.1). It recommends converting S-404 Calhoun Street to have two through lanes, a two-way left-turn lane, and a cycle track with buffer. The plan shows 85th percentile speeds that are close to those listed in this study.

Charleston Comprehensive Parking Study

Published in January 2019, the study provided a comprehensive analysis and set of recommendations for the city's parking system.

Calhoun Street-East/Cooper River Waterfront Plan

The Calhoun Street-East/Cooper River Waterfront Plan was adopted in February 2010. It included Calhoun Street from Coming Street to its terminus at Concord Street. Its transportation goals for both US 52/East Bay Street and Calhoun Street were to maintain current vehicular capacity, improve problem intersections for pedestrians, and provide bicycle paths and lanes wherever possible. The report did not elaborate on specific details.

Charleston County Calhoun Street/Courtenay Drive Project

This Charleston County project is currently under design. It will widen S-404 Calhoun Street from near the Ashley River Bridge/James Island Connector eastward to Jonathan Lucas Street/Barre Street to include:

- Dedicated left turn lanes on Calhoun Street
- Maintain two through lanes in each direction
- Add an eastbound right turn lane at the Courtenay Drive intersection
- Add a southbound right turn lane on Courtenay Drive.

College of Charleston Bicycle and Pedestrian Counts

The College of Charleston (CofC) conducted a bicycle and pedestrian count study for the intersection of Saint Philip St./Calhoun St. in July 2018 and October 2018. For July 2018, peak hour counts showed the following:

- 10 am to 12 pm (weekday) – 74 bicyclists and 515 pedestrians
- 5 pm to 7 pm (weekday) – 56 bicyclists and 649 pedestrians
- 12 pm to 2 pm (Saturday) – 69 bicyclists and 828 pedestrians

For October 2018, peak hour counts showed the following:

- 10 am to 12 pm (weekday) – 192 bicyclists and 3522 pedestrians
- 5 pm to 7 pm (weekday) – 159 bicyclists and 2336 pedestrians
- 12 pm to 2 pm (Saturday) – 100 bicyclists and 1937 pedestrians

Bicycle and pedestrian counts were also performed for the intersection of Coming St./Calhoun St. on October 26,2019 and October 30, 2019. Peak hour counts showed the following:

- 2 pm to 4 pm (weekday) – 64 bicyclists and 571 pedestrians
- 4 pm to 6 pm (Saturday) – 128 bicyclists and 1569 pedestrians

Charleston Moves Close Calls Database

Charleston Moves provided a copy of their incident reports for the RSA corridors. For Calhoun Street, they include incidents such as:

- Drivers turning during a green signal, but in front of pedestrians.
- Driver angst toward bicyclists, apparently from lack of understanding legal allowances for bicyclists.
- Near misses from drivers running red lights.

Medical District Master Plan

In December 2015, the City of Charleston approved a Memorandum of Understanding to redevelop the downtown medical district in Charleston. The plan transforms the campuses of the Medical University of South Carolina, Roper Hospital, and the Ralph H. Johnson VA Medical Center into a healthy space for the benefit of patients and the entire community. It also converts Doughty Street into a pedestrian mall and adds an additional parking garage.

Figure 2.5.1- People Pedal Plan

2.6 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 within the corridor are continuous and provide a generally comfortable walking environment on both sides.
- Vehicular speed along the corridor is largely controlled.
- Sight triangles: Intersection sight distance was not obstructed by signs or other obstacles for most of the intersection approaches.
- Crosswalks are present at most intersections, including ladder-style crosswalks in some intersections
- Pavement markings: The roadway markings and existing pedestrian crosswalks were in generally good condition.
- Sidewalks at intersections have ramps.
- Existing bus stops were well marked and appear to be heavily used
- Most traffic signals have pedestrian signals
- Portions of S-404 has lighting.
- S-46 Rutledge Ave. approach was recently upgraded with pedestrian signal equipment

3.0 RECOMMENDATIONS

Recommendations for improving safety along S-404 are provided under two categories:

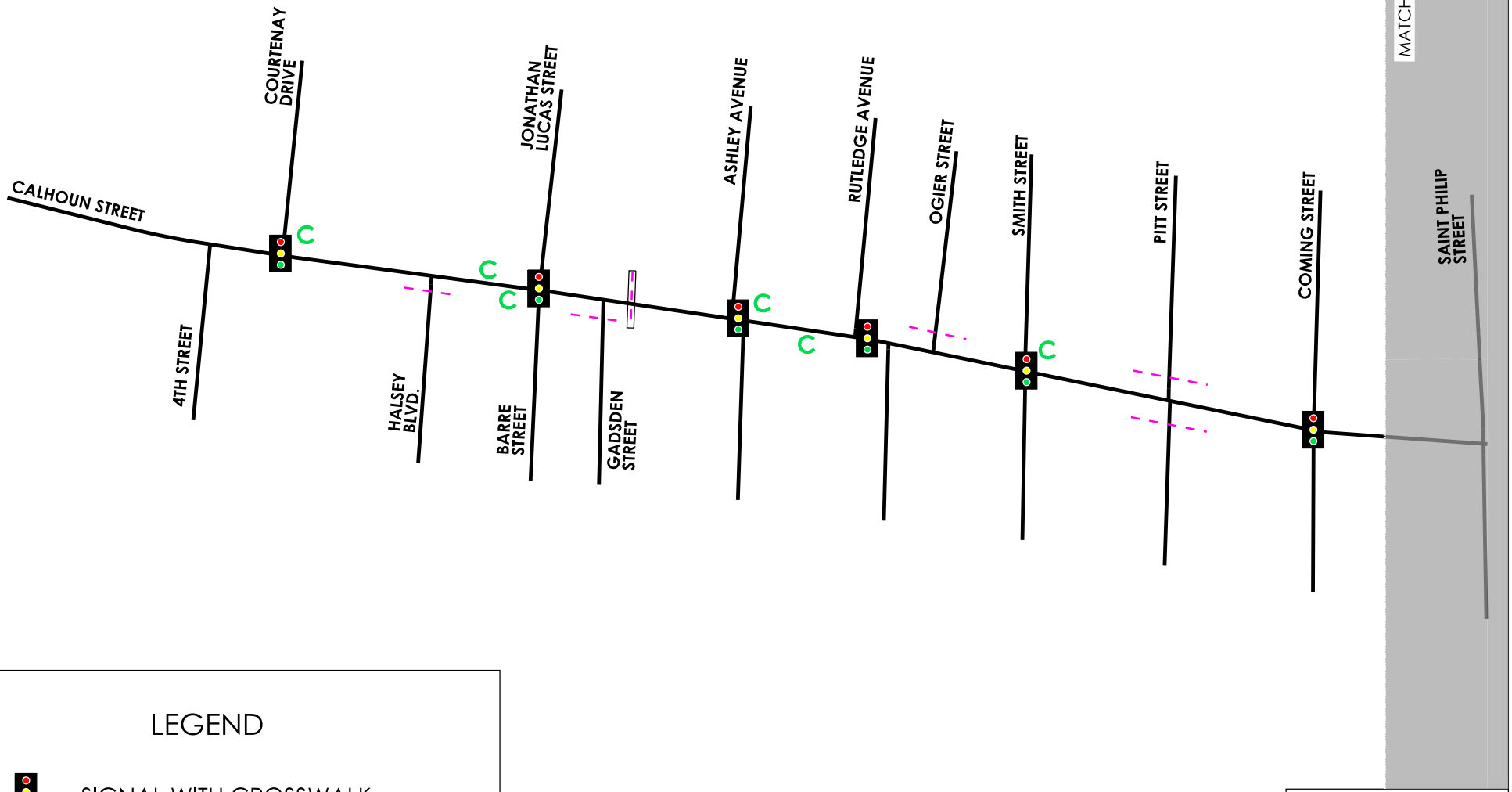
1. Improvements to be applied along the corridor
2. Intersection specific improvements

3.1 CORRIDOR IMPROVEMENTS

This section provides findings and recommendations for improvements to be applied along the S-404 corridor.

BICYCLE & PEDESTRIAN ACCOMMODATIONS
This study recognizes the need to provide safe pedestrian crossings that reflect pedestrian routing demand. Efforts are made to provide direct crossing routes as feasible. The exhibits on the following page show existing pedestrian crossings for S-404. The exhibits show each side street approach already has a stop-controlled crosswalk with the lone exception of 4th Street. That crosswalk is listed for improvement in this report. They also show generally good access for crossing S-404. Each of the 11 traffic signals have crosswalks across S-404. All but one of them, the Rutledge Street intersection, have crosswalks on both the western and eastern approaches. Two additional locations have uncontrolled crosswalks across S-404. Average spacing between the S-404 crossings is 600 feet. From 2013 to 2018, 36 of the 40 bicycle and pedestrian crashes occurred at intersections. Therefore, this report focuses largely on improving bicycle and pedestrian safety at the intersections.

CALHOUN STREET
EXISTING PEDESTRIAN CROSSINGS



LEGEND

- SIGNAL WITH CROSSWALK
- STOP-CONTROLLED CROSSWALK
- UNCONTROLLED CROSSWALK
- C CARTA BUS STOP

SCALE IN FEET

0 500 1000 2000

SHEET 1

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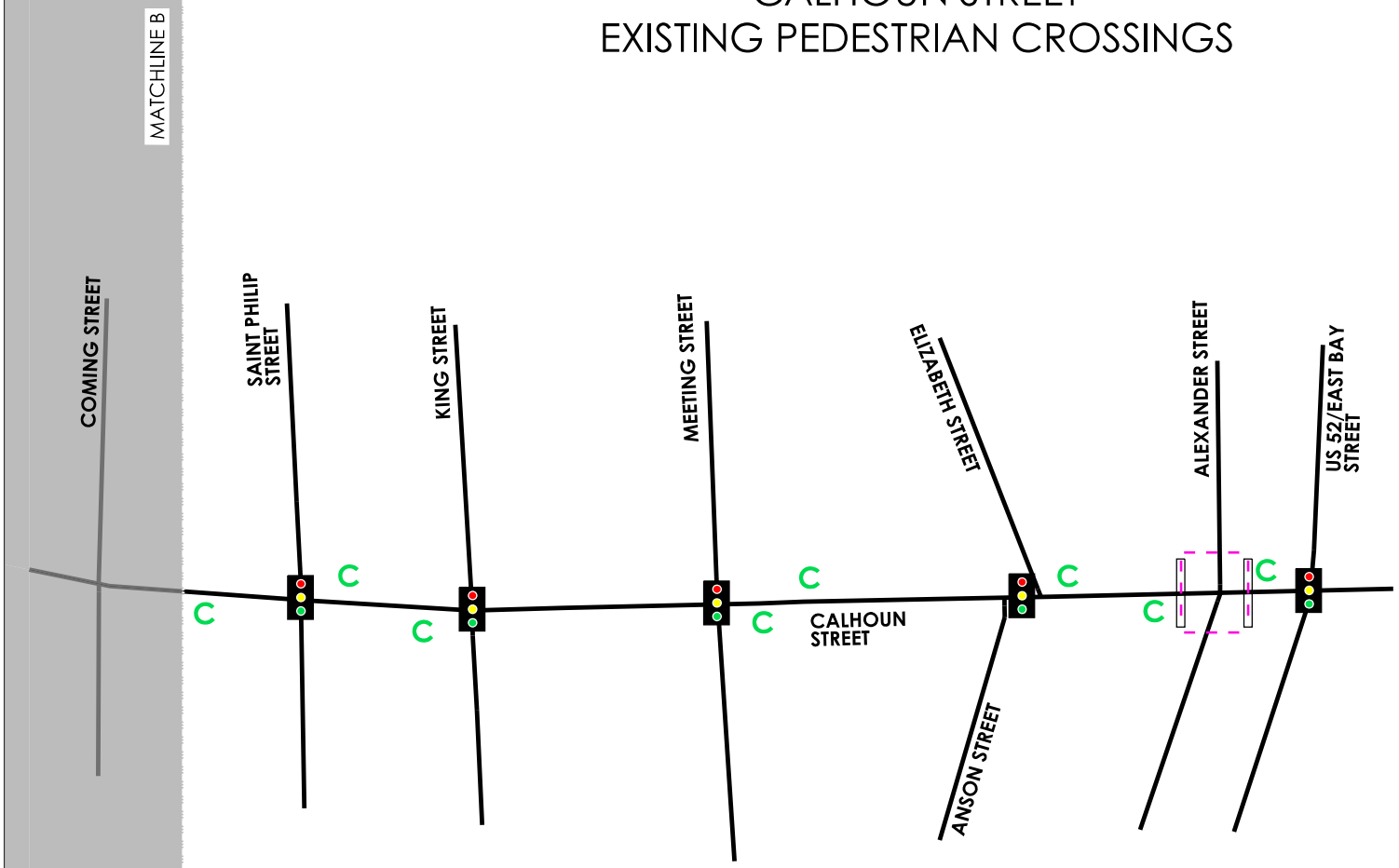
CALHOUN STREET
EXISTING PEDESTRIAN CROSSINGS



LEGEND

- SIGNAL WITH CROSSWALK
- STOP-CONTROLLED CROSSWALK
- UNCONTROLLED CROSSWALK
- C — CARTA BUS STOP

SCALE IN FEET

0 500 1000 2000

SHEET 2

N

BICYCLE & PEDESTRIAN ACCOMMODATIONS

FINDINGS:
Crosswalks are missing across some stop-controlled side streets approaches and signalized intersection approaches.

Missing crosswalk at 4th St.

IMPROVEMENTS:
Consider adding ladder-style crosswalks to the side street approaches that don't have them (or decorative stamped asphalt crosswalks) already (Approximately 1 approach). Also, reconstruct ADA ramps or relocate crosswalks that don't align, where feasible.
Typical pedestrian crash reduction of 50% for installation of crosswalks

FINDINGS:
Pedestrian activity is high at the intersections of Meeting Street, King Street, Coming Street, and Saint Philip Street.

Heavy pedestrian activity at Saint Philip Street intersection

IMPROVEMENTS:
To enhance pedestrian safety, consider adding an all pedestrian signal phase at the above four intersections. A more comprehensive evaluation of signal timing plans would be needed prior to implementation. S-404 traffic signals are part of the overall downtown signal system.

FINDINGS:
Pedestrians crossing the signalized intersections are dependent on right turning vehicles yielding to them. Also, more visible crosswalks could help alert drivers of their presence.

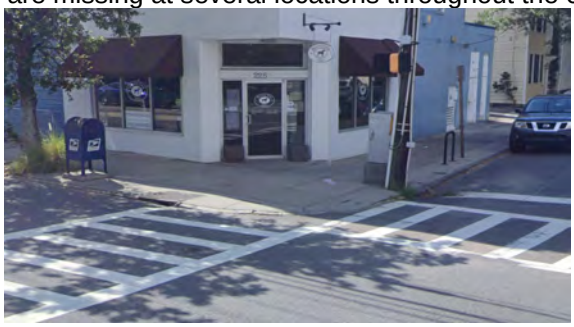
IMPROVEMENTS:
To enhance pedestrian safety, consider implementing Leading Pedestrian Intervals (LPIs) for the signalized pedestrian crossings. LPIs give pedestrians the opportunity to enter a signalized intersection 4–7 seconds before vehicles are given green indications. With this head start, pedestrians 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.

The following intersections do not have pedestrian pushbuttons. Incorporation of LPI would typically include them to avoid unnecessary delays: Courtenay Drive, Jonathan Lucas/Barre Street, Ashley Avenue, Rutledge Avenue, Coming Street, Saint Philip Street, King Street, and Meeting Street.
Typical pedestrian crash reduction of 59% for installation of LPIs.

BICYCLE & PEDESTRIAN ACCOMMODATIONS

FINDINGS:

Detectable warning surfaces are missing at several locations throughout the corridor.



Sidewalk without detectable warning surface at Smith St.

IMPROVEMENTS:

Consider adding detectable warning surfaces on ADA ramps at the signalized intersections and unsignalized side street crossings (Approximately 13 ramps). Also, reconstruct ADA ramps or relocate crosswalks that don't align, where feasible.

FINDINGS:

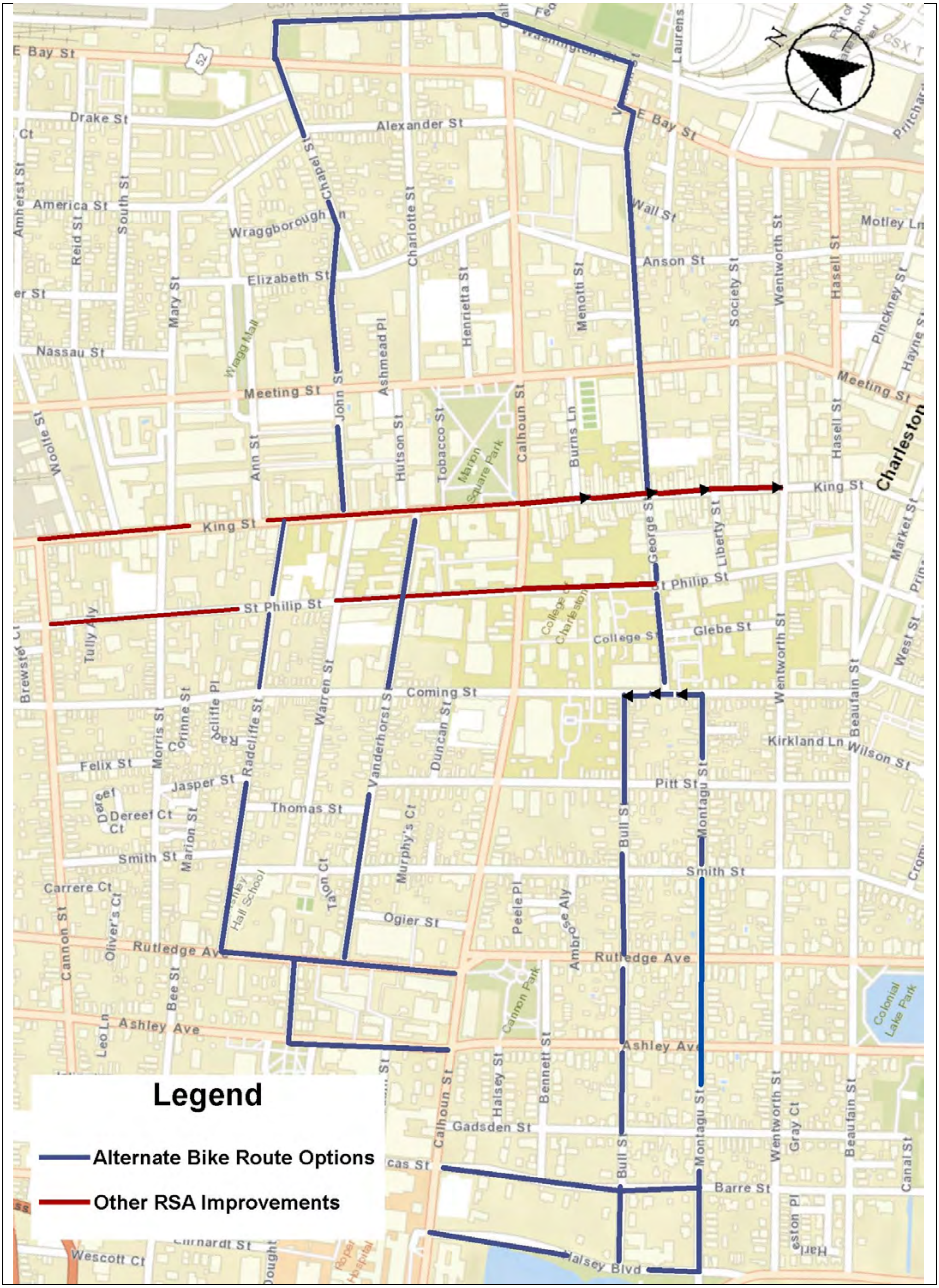
Bicyclists routinely use S-404, but it has no designated bicycle facilities. In the 6-year period from 2013-2018, 14 bicycle crashes occurred.

IMPROVEMENTS:

Two options are considered:

1. Convert S-404 to have one through lane in each direction, a Two-Way Left-Turn Lane, and dedicated bicycle lanes. Parking would need to be removed along the corridor. Detailed capacity analysis would be needed to determine impacts on traffic congestion. Adequate space would not be available to include dedicated right turn lanes, further increasing the congestion.
2. Maintain the existing four through lanes on S-404. If the LCRT alternate along S-404 is selected, it will occupy all four existing lanes on S-404 and make this the default option. Recognizing that the high traffic volumes on S-404 are not conducive to shared use lanes, consider alternate routing strategies that accommodate bicyclists on safer routes with much lower traffic volumes. Provide bicycle accommodations on those routes, encouraging their use. The LCRT routing and station locations have not been finalized, but it may include a transit station on S-404. If so, this report recognizes the need for pedestrian and bicycle connections to the station. The exhibit below shows potential routes, with recommendations from the City's People Pedal Plan in mind:

Note: The two options mentioned above are excluded from the cost estimates.
Prohibition of on-street parking provides a typical crash reduction of 20% to 30% of all crash types.
A national study suggests adding a dedicated bicycle lane can provide a crash reduction of 20% to 25% of all vehicle vs bicycle crashes.


Legend
Alternate Bike Route Options
Other RSA Improvements
N
E Bay St
Drake St
Alexander St
Chapel St
Wraggborough Ln
Charlotte St
America St
Amherst St
Reid St
South St
Elizabeth St
Mary St
Henrietta St
Menotti St
Anson St
Society St
Wentworth St
Hasell St
Motley Ln
Wall St
Laurens
Pinckney St
Hayne St
Nassau St
Wragg Mall
Meeting St
John St
Ashmead Pl
Hutson St
Tobacco St
Marion Square Park
Calhoun St
Burns Ln
King St
Charleston
Market St
Woolfe St
Ann St
George St
Liberty St
St Philip St
Tully Aly
Brewster Ct
College of Charleston
College St
Glebe St
Coming St
Warren St
Vanderhorst St
Duncan St
Radcliffe St
Corinne St
Morris St
Felix St
Jasper St
Thomas St
Dereef Ct
Marion St
Smith St
Carrere Ct
Kirkland Ln
Wilson St
Pitt St
Bull St
Montagu St
Beaufain St
West St
Murphy's Ct
Talon Ct
Ogier St
Peele Pl
Ambrose Aly
Ashley Hall School
Rutledge Ave
Cannon St
Oliver's Ct
Bee St
Cannon Park
Colonial Lake Park
Ashley Ave
Leo Ln
Halsey St
Bennett St
Gadsden St
Gray Ct
Canal St
Barre St
Halsey Blvd
Wescott Ct
Roper Hospital

TRAFFIC OPERATIONS

FINDINGS:
Because of turn lanes, loading zones, and lane restrictions by time of day, S-404 Calhoun Street drivers are weaving back and forth between lanes. This creates confusion for drivers, reduces capacity, and distracts the drivers' attention away from bicyclists and pedestrians.

IMPROVEMENTS:
Two scenarios are considered:

1. If the LCRT alternate along S-404 is selected, it will address these issues with reversible lanes and removal of parking.
2. If the LCRT alternate along S-404 is not selected, reversible lanes and parking removal would resolve the lane shift issues. This option could be considered.

PAVEMENT MARKINGS AND SIGNING

FINDINGS:
Pavement marking and RPM markings in several sections are worn out.

Existing pavement markings worn out

IMPROVEMENTS:
Consider upgrading pavement markings and RPM throughout the corridor, including travel lane and crosswalks.
Typical crash reduction of 5% for installation of RPMs.

SIDEWALKS

FINDINGS:

From Halsey Blvd. to Ashley Ave. along S-404, sidewalk accommodations are obstructed by trees, vegetation, and a retaining wall. They also have uneven sections. This section is traveled by medical patients with limited mobility.

Sidewalk between Halsey Blvd. and Barre Street

IMPROVEMENTS:

From Halsey Blvd. to Barre Street, consider removing the retaining wall and re-grading the landscaped area to slope down towards the sidewalk. Use this to both widen the sidewalk and remove the vertical barrier at its edge. If adequate sidewalk cannot be otherwise obtained, consider removing Palmetto trees. For the remainder of this section from Barre Street to Ashley Avenue, repair uneven sidewalk sections and clear vegetation as needed.

FINDINGS:

The eastbound CARTA bus stop between Halsey Boulevard and Barre Street gets crowded with transit riders waiting on the sidewalk.

IMPROVEMENTS:

Consider relocating the eastbound CARTA bus stop to the parking lot offered by Ronald McDonald House, to offer more space for people waiting for the bus and prevent transit riders from blocking the entire sidewalk.

MAINTENANCE

FINDINGS:

Some sidewalk and pedestrian ramps need repairs.

Sidewalk at Rutledge Ave. intersection needs to be repaired

IMPROVEMENTS:

Consider repairing sidewalks and ramps.

MAINTENANCE

FINDINGS:
Tree limbs along the corridor, and vegetation that has grown over sidewalks block visibility of drivers and obstruct view of traffic signs and signals.

IMPROVEMENTS:
Consider pruning trees and vegetation for better visibility.

FINDINGS:
Some sidewalk and pedestrian ramps have debris and sediment accumulated.

Existing sidewalk between 4th Street and Halsey Blvd.

IMPROVEMENTS:
Consider cleaning sidewalks and ramps.

DRAINAGE

FINDINGS:
Storm drain inlets are in the roadway, some of which do not accommodate bicycle tires. This required bicyclists to maneuver around them.

Existing storm drain inlets on the travel lane.

IMPROVEMENTS:
Consider replacing these grates with bicycle friendly grates. (Approximately 25 grates)

TRAFFIC SIGNALS AND SIGNING

FINDINGS:
The following signalized intersections lack retroreflective backplates: Barre St., Ashley Ave., Rutledge Ave., Smith St., Coming St., Saint Philip St., Meeting St., Anson St., and Elizabeth St.

Existing Smith St. signal heads without retroreflective backplates.

IMPROVEMENTS:
Consider installing retroreflective backplates to improve signal head visibility.
Typical total crash reduction of 15%.

FINDINGS:
The following intersection approaches appear to have 8" signal heads, which are no longer MUTCD compliant:

- Barre Street/Jonathan Lucas Street
- Ashley Avenue
- Rutledge Avenue
- Smith Street
- Coming Street
- Saint Philip Street
- Meeting Street
- Elizabeth Street

IMPROVEMENTS:
Evaluate the viability of replacing each approach with 12" signal heads as per MUTCD requirements. Data on utility attachment heights and vertical clearances will be needed, as well as coordination with Dominion Energy and telecom providers.
According to an FHWA report, installing 12" signal heads can reduce right angle crashes by 47% and all crashes by 10%.

STREET LIGHTING

FINDINGS:
25% of vehicular and 45% of bicycle/pedestrian crashes occurred at night. Roadway lighting along S-404 could help reduce night time crashes.

IMPROVEMENTS:
Consider adding and upgrading street lighting along the corridor. SCDOT requires illumination uniformity along a given roadway. This is needed to avoid blind spots and safety issues being created. It is particularly important for older drivers. The same street trees that provide canopy shade and enhance aesthetics make street illumination difficult. Both high-level and low-level street lighting could be required. Construction costs can be determined through a lighting study.
Typical crash reduction of 20% for night time crashes with installation of street lighting.

EDUCATION AND OUTREACH

FINDINGS:

Several of the bicycle and pedestrian crashes list “Disregard Signals or Signs” or “Illegal Crossing” as the contributing factor. These crashes and possibly others result in part because of cyclists and pedestrians crossing either at undesignated locations or at undesignated times (when pedestrian signal head doesn’t display the “Walk” signal). Likewise, other crashes appear to result from drivers failing to yield to cyclists and pedestrians. Improvements in behavior of all users are needed.

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:

Crash data involving bicyclists and pedestrians show that most crashes were caused by some form of improper maneuver by drivers, pedestrians, or bicyclists (Failed to Yield Right of Way, Disregard Signs and Signals, Distracted, or Illegal Crossings). Each of these above can potentially be mitigated with targeted enforcement.

IMPROVEMENTS:

While design improvements can provide safer infrastructure, enforcement is still beneficial to change these behaviors. Increased enforcement can play a critical role in the reduction of crashes along the corridor. Proactive steps will be taken to ensure enforcement does not disproportionately affect minority and low-income communities.

3.2 INTERSECTION SPECIFIC IMPROVEMENTS

The following sections contain findings and recommendations for improvements at individual intersections.

S-404 and 4th Street

Findings:

- There is no crosswalk present at this side street approach.
- There are no detectable warning surfaces at both the sidewalk approaches.

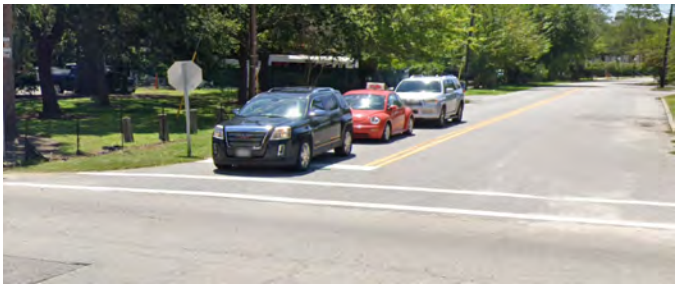
Improvements:

- Add a ladder-style crosswalk at this side street approach.
- Add detectable warning surfaces to each of the two 4th Street ADA ramps.

S-404 and Halsey Boulevard

Findings:

- The existing crosswalk is not ladder-style and is worn out at this side street approach.



- Pedestrians have been observed to cross S-404 midblock between Courtenay Drive and Halsey Blvd., rather than using the signalized crosswalks at Courtenay Drive. The CARTA bus stop is only 130 feet from the crosswalk.

Improvements:

- Consider upgrading this side street approach with a ladder-style crosswalk.
- With four through lanes and no room for a pedestrian refuge median, a new midblock crosswalk does not appear feasible. The Charleston County project will widen this section of S-404, making it less attractive to cross midblock. It will improve the Courtenay Drive intersection with a pedestrian refuge island, improving pedestrian crossings where they are supposed to occur. Sidewalk improvements for this (listed elsewhere) may also help.

S-404 and Gadsden Street

Findings:

- The existing S-404 crosswalk is deficient. Its existing beacons flash constantly, reducing their effectiveness. The northern end of the crosswalk doesn't connect to the sidewalk, but is blocked by a palmetto tree instead.

- Patients and visitors have difficulties routing to their appropriate medical facility.

Improvements:

- Ideally, an RRFB crosswalk across four lanes of traffic would include a refuge island. Impacts from widening S-404 to accommodate the median refuge island appear to be too extensive to make this option feasible. Therefore, remove the crosswalk and direct pedestrians to cross at nearby Barre Street instead. It appears pedestrian using this crosswalk are already passing either the Jonathan Lucas Street / Barre Street intersection or the Ashley Avenue intersection. The pedestrians could cross more safely at those signalized crosswalks instead.
- Consider installation of Medical District wayfinding between 4th Street and Ashley Avenue for safe pedestrian routing.

S-404 and Ashley Avenue

Findings:

- There are no pedestrian signal heads for the southern and eastern crosswalks. Also, the pedestrian signal head at the northeast corner is not working.
- There are no countdowns at the existing pedestrian signal heads in this intersection.

Improvements:

- Upgrade the intersection with countdown pedestrian signal heads. For the southeastern corner, remove the hatched island, shift the right turn lane inward, and increase the sidewalk width to accommodate a pedestrian pedestal pole.

Typical bicycle and pedestrian crash reduction of 70% for installation of pedestrian signal heads.

S-404 and Rutledge Avenue

Findings:

- There are no ADA ramps and detectable warning surfaces at the northwest and northeast corners of this intersection.
- Ramps don't align with the existing crosswalks.
- There are no pavement markings to guide left turning vehicles in this intersection.
- The sidewalk at the northwest corner of the intersection is damaged.
- There is an existing gas station at the northeast corner of the intersection

Improvements:

- Construct ADA ramps and detectable surfaces at the northeast and northwest corners of this intersection.
- Reconstruct ramps to align with the existing crosswalks.
- Install left-turn skip lines to better guide left turning vehicles in this intersection.
- Repair broken section of sidewalk in the northwest corner of the intersection.
- Consider closing the western most driveway of the gas station along S-404. Add ladder-style crosswalk to complete the intersection and connect the Rutledge Avenue raised island, including two new ADA ramps. Relocate the S-404 stopbar back to accommodate the new crosswalk.

S-404 and Smith Street

Findings:

- There are no ADA ramps and detectable warning surfaces at the northwest and southwest corners of this intersection.
- The ramp at the northeast corner is covered with debris.
- Crosswalks appear to be worn out,

Improvements:

- Add ADA ramps and detectable surfaces at the northwest and southwest corners of this intersection.
- Clean ramp at the northeast corner
- Upgrade crosswalks.
- Consider constructing a curb extension at the northwest corner of the intersection to shorten the pedestrian crossing.

S-404 and Pitt Street

Findings:

- There is no detectable warning surface in the southwest corner of this intersection.

Improvements:

- Add a detectable warning surface at the southwest corner of this intersection.

S-404 and Coming Street

Findings:

- There are no detectable warning surfaces in the northwest, southwest and southeast corners of this intersection.
- Eastbound pedestrians are receiving the walk signal late.
- This intersection experiences significant delays in the afternoon peak.
- The southeast corner of the intersection has two storm drains that were not elevated when the roadway was resurfaced.
- ADA ramp at the southeast corner is small and steep compared to the other corners.

Improvements:

- Add detectable warning surfaces in the northwest, southwest and southeast corners of this intersection.
- City of Charleston will address the problem with the eastbound pedestrian walk signal.
- A traffic signal timing study is needed to improve operations along the corridor.
- Consider expanding pedestrian waiting space onto private property.
- Consider elevating the two storm drains at the southeast corner of the intersection.
- Consider widening the ramp at the southeast corner to include a shallower slope.

S-404 and Saint Philip Street

Findings:

- There is no detectable warning surface at the southeast corner of the intersection.
- The ADA ramp at the southwest corner of the intersection do not align with the crosswalk at the western approach.

Improvements:

- Add a detectable warning surface at the southeast corner.
- Consider reconstructing the ramp at the southwest corner or relocating the crosswalk at the western approach, to make them align, where feasible.
- Consider creating more pedestrian space on all adjacent private parcels, and explore opportunities to reduce/remove landscape, knee walls, etc. to allow hardscape space for pedestrian queueing

S-404 and King Street

Findings:

- There are no detectable warning surfaces at all four corners of this intersection.
- White lines are missing along the edges of the brick crosswalks.
- The loading zone at the northwest corner of S-404 creates a merging issue for through traffic as the loading is not wide enough to accommodate a large box truck.

Improvements:

- Add detectable warning surfaces at this intersection.
- Add white thermoplastic lines along both edges of the crosswalks in this intersection. These lines should be placed far enough away from the crosswalk granite bands to preserve their character.
- Remove the loading zones at the northwest corner of the intersection and the one on the eastern side past the intersection.

S-404 and Meeting Street

Findings:

- The ADA ramps and detectable warning surfaces at the northeast and southwest corners appear to be damaged and full of debris.
- The northwestern corner is susceptible to flooding during heavy rains.
- Pedestrians have been observed to cross S-404 midblock between Meeting Street and Anson Street, both of which have signalized crosswalks. A CARTA bus stop is located 130 feet from the Meeting Street crosswalk.
- The northbound left turn lane queues back into through lane.
- There is space for two cars to park outside the Marriott Hotel. However, it is not marked.

Improvements:

- Repair and clean the ADA ramps and detectable surfaces at the northeast and southwest corners of the intersection.
- Evaluate ramp adjustments at the northwestern corner of the intersection to prevent flooding.
- With four through lanes and no room for a pedestrian refuge median, a new midblock crosswalk is not feasible at this location. However, the Meeting Street intersection is listed to be considered for a pedestrian scramble phase to better accommodate and encourage pedestrian crossings there.
- Restripe northbound left turn lane to extend its storage.
- Add pavement markings to clearly indicate the two-car parking spaces outside the Marriott Hotel.

S-404 and Anson Street

Findings:

- There is no detectable warning surface in the southeast corner of this intersection.
- The ADA ramp at the southeast corner does not align with the crosswalk.
- Traffic signal heads for Anson Street are partially blocked by the Oak tree planted immediately underneath.
- Pedestrians have been observed to cross S-404 between its crosswalks at Anson Street and Elizabeth Street instead of using the actual crosswalks.

Improvements:

- Add a detectable warning surface in the southeast corner of this intersection.
- Reconstruct the ramp at the southeast corner of the intersection to align with the crosswalk.
- This tree will be a continuous maintenance issue. Repeated trimmings will distort its appearance. Remove this tree.
- The existing S-404 crosswalks at this intersection are easily accessible for pedestrians. Installing a new crosswalk in the middle of the intersection is not advisable. Consider adding signage directing pedestrians to cross at the designated crosswalks.
- Remove the eastbound pedestal mounted signal head on the right side of Calhoun Street eastbound to avoid appearance of an additional stop being required.

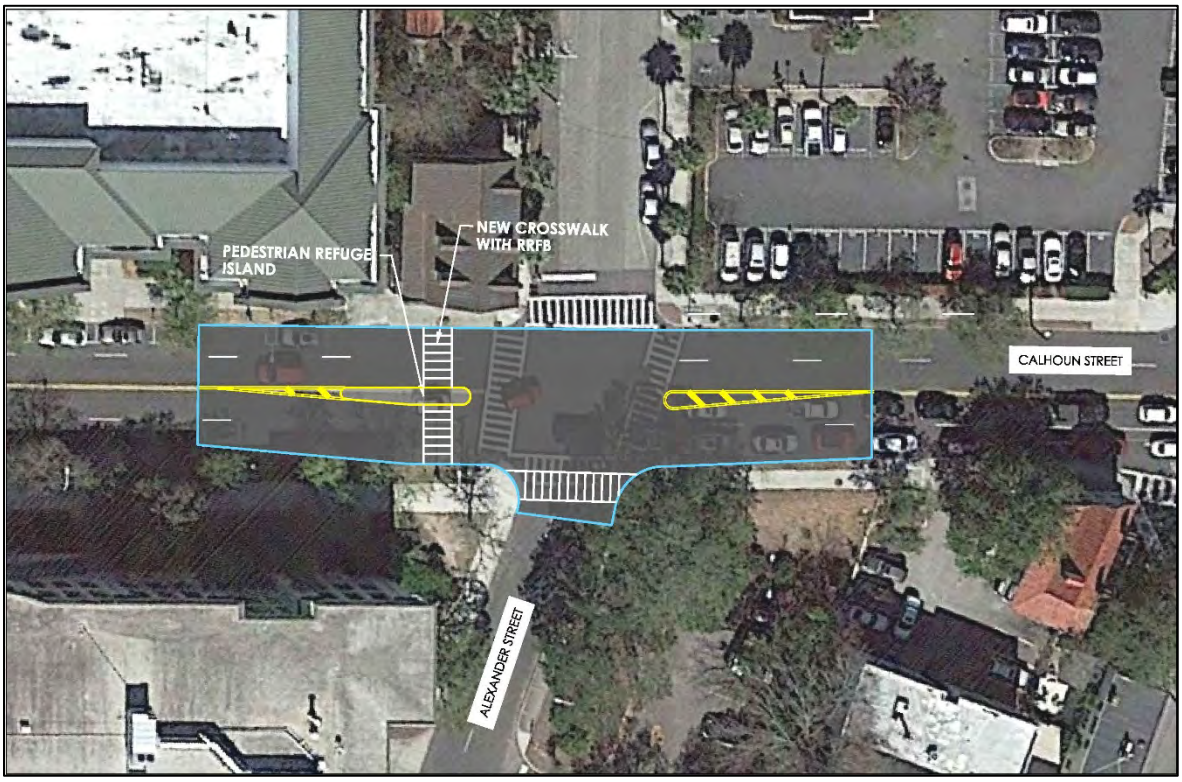
S-404 and Alexander Street

Findings:

- There are no ADA ramps present at the southwest corner of the intersection.
- The S-404 crosswalks have beacons that flash constantly, reducing their effectiveness. They are also long, requiring pedestrians to cross four lanes at once.

Improvements:

- Consider upgrading the intersection to have one S-404 crosswalk with pedestrian pushbutton activated Rectangular Rapid Flashing Beacon (RRFB) as shown in the conceptual sketch below. Widen S-404 as shown to provide the pedestrian refuge island.



Alexander Street Concept Sketch

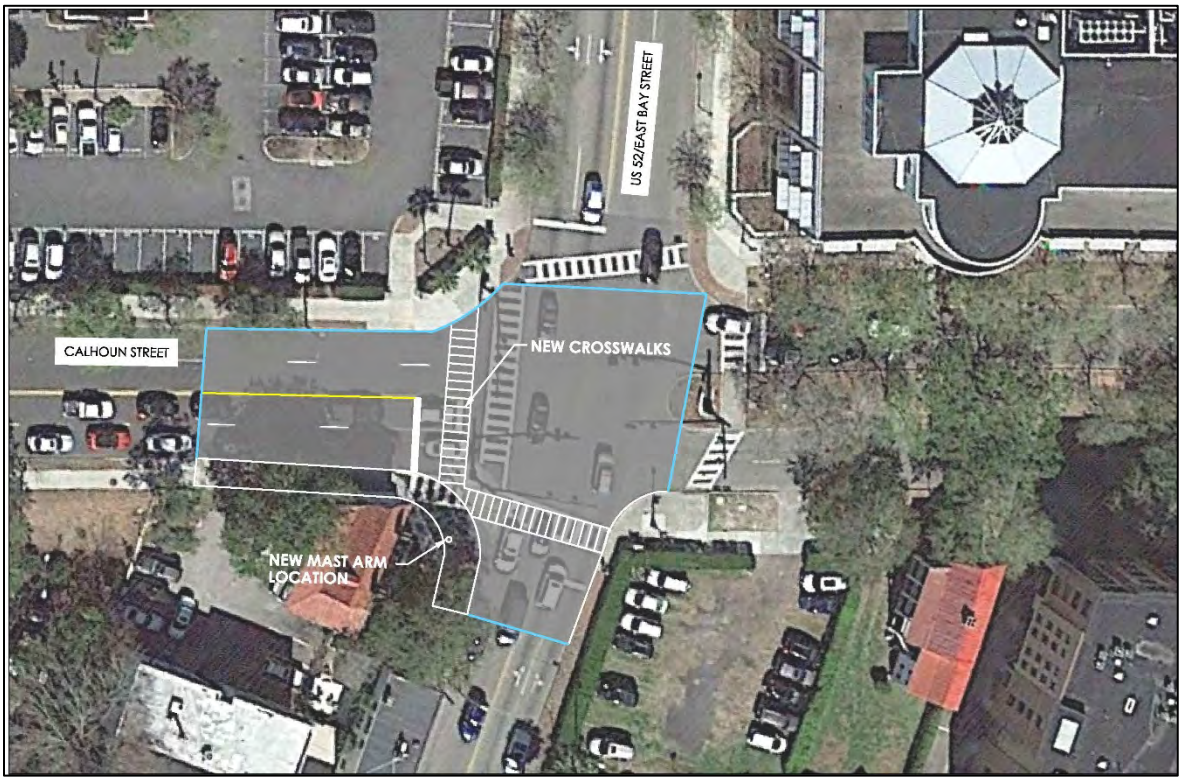
S-404 and US 52/East Bay Street

Findings:

- The southwestern intersection corner is tight for pedestrians and its island is ineffective.
- The City has received citizen requests about backups for the northbound US 52 left turn lane. This movement has a shared left-through lane with a five-section signal head for protected-permitted operation and a queue loop to detect backups.

Improvements:

- Consider removing the island and widening the outer sidewalk to improve traffic and pedestrian operations. Relocate the mast arm, crosswalks, and stopbar as shown in the conceptual sketch below.
- As referenced elsewhere, consider signal timing updates for the corridor. This left turn movement would be evaluated under that effort.



US 52/East Bay Street Concept Sketch

4.0 SUMMARY OF CONSTRUCTION COSTS

Probable construction costs for the recommended improvements are provided below. Note these costs do not include preliminary engineering, right of way, utility relocation or CE&I costs.

CORRIDOR RECOMMENDATIONS (SECTION 3.1)	
IMPROVEMENT	COST
Add crosswalks to side street approaches. (Approx. 1 approach)	$750
Consider adding an all pedestrian signal phase. (Approx. 4 intersections)	$100,000
Consider implementing Leading Pedestrian Intervals (LPIs), and add pedestrian pushbuttons (Approx. 8 signals)	$88,000
Add detectable warning surfaces to ADA ramps at signalized and unsignalized side street crossings. (Approx. 13 ramps)	$4,800
Alternate routing strategies to accommodate bicyclists on safer routes and add bicycle facilities	TBD
Reversible lanes and on-street parking removal.	TBD
Upgrade pavement markings and raised pavement markers. (Includes some crosswalks)	$55,000
Remove retaining wall and re-grade landscaped area between Halsey Blvd. and Ashley Ave. to widen sidewalk and remove the vertical barrier.	$95,000
Consider relocating the eastbound CARTA bus stop to the parking lot offered by Ronald McDonald House.	$50,000
Maintenance- Repair damaged sidewalks and ramps.	$50,000
Maintenance- Clean sidewalks and ramps with debris, trim overgrown vegetation and trees.	N/A
Replace existing drop inlet grates to bicycle friendly grates. (Approx. 25 grates)	$20,000
Install retroreflective backplates to improve signal head visibility. Note: Utility pole availability must be coordinated with Dominion Energy. (Approx. 9 intersections)	$14,500
Replace 8” signal heads with 12” signal heads, as per MUTCD. Note: Utility pole availability must be coordinated with Dominion Energy. (Approx. 8 intersections)	$146,000
Construct raised median, with a pedestrian refuge at the Alexander Street intersection (Eastbound).	$50,000
Consider installing uniform street lighting.	TBD
Subtotal	$674,050
Contingency (30%)	$202,215
INTERSECTION SPECIFIC IMPROVEMENTS (SECTION 3.2)	
IMPROVEMENT	COST
4th St. - Improvements included in section 3.1).	N/A
Halsey Blvd. – Charleston County widening project, including sidewalk improvements (other improvements included in section 3.1).	N/A
Gadsden St. – Remove existing deficient crosswalk and redirect pedestrians. Consider installation of Medical District wayfinding between 4th Street and Ashley Avenue.	$5,000
Ashley Ave. - Install countdown pedestrian signal heads, and increase sidewalk width at the southeast corner to accommodate a pedestrian pedestal pole.	$25,000
Rutledge Ave. – Reconstruct ramps to align with crosswalks, install left-turn skip lines, and repair sidewalk in the northwest corner. Consider closing the west most driveway of the gas station, add ladder-style crosswalk and relocate stopbar (other improvements included in section 3.1).	$44,000
Smith St. – Consider a curb extension at the northwest corner of the intersection (other improvements included in section 3.1).	$5,000
Pitt St. - Improvements included in section 3.1.	N/A

Coming St. – Perform a traffic signal timing study to improve operations. Consider expanding pedestrian waiting space onto private property. Elevate the two storm drains at the southeast corner. Widen the ramp at the southeast corner to include a shallower slope (other improvements included in section 3.1).	$40,000
Saint Philip St. – Reconstruct ramps to align with crosswalk or relocate crosswalk at the southwest corner, implement a pedestrian scramble phase at this intersection. Create more pedestrian space on all adjacent private parcels (other improvements included in section 3.1).	$60,000
King St. – Add white thermoplastic lines along both edges of the crosswalks. Remove the two loading zones (other improvements included in section 3.1).	$3,000
Meeting St. – Improvements included in section 3.1.	N/A
Anson St. – Reconstruct ramp at the southeast corner, remove tree blocking traffic signals, and add pedestrian crossing signs. Remove signal head (other improvements included in section 3.1).	$7,000
Alexander St. – Widen S-404 to include a pedestrian refuge island and install an RRFB (other improvements included in section 3.1).	$120,000
US 52/East Bay St. – Remove island at the southwest corner, widen sidewalk and relocate the mast arm, crosswalk and the stop-bar. Perform a left-turn movement study.	$45,000
Subtotal	$354,000
Contingency (30%)	$106,200
Total (Sections 3.1-3.2)	**$1,336,465**

The summary of construction costs above excludes the following two recommendations, which are part of the Bicycle and Pedestrian Accommodations in Section 3.1:

- Alternate routing strategies to accommodate bicyclists on safer routes and add bicycle facilities
- Reversible lanes and on-street parking removal.

Construction costs for these items will vary depending on how they are implemented.

Right of way acquisition costs are excluded from the construction costs.

5.0 PRIORITIZATION

Appendix E shows the annualized cost and benefit for each improvement, as applicable. Costs are based on conceptual construction costs only. Costs are annualized based on the following life cycle of improvements:

- Thermoplastic pavement markings – 5 years
- Roadway signs – 10 years
- Other items – 20 years

Benefits are based on the estimated savings from potential crash reductions. The predictions for crash reductions used in the analysis are based on national research of engineering studies that used crash data to quantify the safety effect of the corresponding countermeasure. Application of the crash modification factors to this particular corridor is somewhat subjective, so the computed benefits should only be considered as generally applicable. 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 evaluated based on its cost, ease of construction, impacts, benefit-cost (B/C) ratio, and how it relates to other improvements. Based on these evaluations, improvements 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. The B/C ratios are calculated for each improvement individually. So, cumulative benefits from performing all the recommended improvements may be less than what is shown.

SHORT TERM		
IMPROVEMENT	**COST**	**B/C**
Add crosswalks to side street approaches. (Approx. 1 approach)	$750	<1
Consider adding an all pedestrian signal phase. (Approx. 4 intersections)	$100,000	28.54
Consider implementing Leading Pedestrian Intervals (LPIs), and add pedestrian pushbuttons (Approx. 8 signals)	$88,000	87.64
Add detectable warning surfaces to ADA ramps at signalized and unsignalized side street crossings. (Approx. 13 ramps)	$4,800	N/A
Upgrade pavement markings and raised pavement markers. (Includes some crosswalks)	$55,000	17.30
Remove retaining wall and re-grade landscaped area between Halsey Blvd. and Ashley Ave. to widen sidewalk and remove the vertical barrier.	$95,000	N/A
Consider relocating the eastbound CARTA bus stop to the parking lot offered by Ronald McDonald House.	$50,000	
Maintenance- Repair damaged sidewalks and ramps.	$50,000	N/A
Maintenance- Clean sidewalks and ramps with debris, trim overgrown vegetation and trees.	N/A	N/A
Replace existing drop inlet grates to bicycle friendly grates. (Approx. 25 grates)	$20,000	N/A

Install retroreflective backplates to improve signal head visibility. Note: Utility pole availability must be coordinated with Dominion Energy. (Approx. 9 intersections)	$14,500	>100
Replace 8” signal heads with 12” signal heads, as per MUTCD. Note: Utility pole availability must be coordinated with Dominion Energy. (Approx. 8 intersections)	$146,000	33.50
Construct raised median, with a pedestrian refuge at the Alexander Street intersection (Eastbound).	$50,000	N/A
4th St. - Improvements included in section 3.1).	N/A	N/A
Halsey Blvd. – Charleston County widening project, including sidewalk improvements (other improvements included in section 3.1).	N/A	N/A
Gadsden St. – Remove existing deficient crosswalk and redirect pedestrians. Consider installation of Medical District wayfinding between 4th Street and Ashley Avenue.	$5,000	N/A
Ashley Ave. - Install countdown pedestrian signal heads, and increase sidewalk width at the southeast corner to accommodate a pedestrian pedestal pole.	$25,000	71.35
Rutledge Ave. – Reconstruct ramps to align with crosswalks, install left-turn skip lines, and repair sidewalk in the northwest corner. Consider closing the west most driveway of the gas station, add ladder-style crosswalk and relocate stopbar (other improvements included in section 3.1).	$44,000	<1
Smith St. – Consider a curb extension at the northwest corner of the intersection (other improvements included in section 3.1).	$5,000	N/A
Pitt St. - Improvements included in section 3.1.	N/A	N/A
Coming St. – Perform a traffic signal timing study to improve operations. Consider expanding pedestrian waiting space onto private property. Elevate the two storm drains at the southeast corner. Widen the ramp at the southeast corner to include a shallower slope (other improvements included in section 3.1).	$40,000	>100
Saint Philip St. – Reconstruct ramps to align with crosswalk or relocate crosswalk at the southwest corner, implement a pedestrian scramble phase at this intersection. Create more pedestrian space on all adjacent private parcels (other improvements included in section 3.1).	$60,000	N/A
King St. – Add white thermoplastic lines along both edges of the crosswalks. Remove the two loading zones (other improvements included in section 3.1).	$3,000	>100
Meeting St. – Improvements included in section 3.1.	N/A	N/A
Anson St. – Reconstruct ramp at the southeast corner, remove tree blocking traffic signals, and add pedestrian crossing signs. Remove signal head (other improvements included in section 3.1).	$7,000	N/A
Alexander St. – Widen S-404 to include a pedestrian refuge island and install an RRFB (other improvements included in section 3.1).	$120,000	3.86
US 52/East Bay St. – Remove island at the southwest corner, widen sidewalk and relocate the mast arm, crosswalk, and the stop-bar. Perform a left-turn movement study.	$45,000	<1
Subtotal	$1,028,050	
Contingency (30%)	$308,415	
Total	**$1,336,465**	

Long Term Recommendations:

The table above excludes the following three recommendations:

- Alternate routing strategies to accommodate bicyclists on safer routes and add bicycle facilities
- Reversible lanes and on-street parking removal.
- Install uniform street lighting.

Appendix A CRASH TYPES AND YEARLY TRENDS

TABLE A
CALHOUN ST CRASH SUMMARY
CRASH TYPES AND YEARLY TRENDS

Segment	Crashes in Section	# of Injury Crashes	# of Fatal Crashes	# of Rear End Crashes	# of Angle Crashes	# of Sideswipe Crashes	# of No Collision W/Motor Vehicle	# of Wet Road Crashes	# of Dry Road Crashes	# of Bicycle Crashes	# of Pedestrian Crashes	# of DUI Crashes	# of Distracted Crashes	# of Day Crashes	# of Night Crashes	# of Crashes in 2013	# of Crashes in 2014	# of Crashes in 2015	# of Crashes in 2016	# of Crashes in 2017	# of Crashes in 2018
LOCKWOOD DR - 4TH ST	18	4	0	9	1	2	6	7	11	0	0	0	5	15	3	0	5	4	5	2	2
4TH ST - COURTNEY DR	10	2	0	4	2	3	0	1	9	0	0	0	0	8	2	0	0	2	1	5	2
COURTNEY DR - HALSEY BLVD	35	9	0	11	10	7	4	5	30	0	4	0	11	27	8	4	2	5	9	11	4
HALSEY BLVD - BARRE ST	35	7	1	14	10	6	2	5	30	0	0	1	14	27	8	3	5	7	6	6	8
JONATHAN LUCAS - GADSDEN ST	5	0	0	1	1	2	0	0	5	0	0	0	4	5	0	0	0	1	0	1	3
GADSDEN ST - ASHLEY AVE	77	23	0	28	19	24	4	9	68	1	1	4	27	54	23	7	16	13	15	15	11
ASHLEY AVE - RUTLEDGE AVE	62	17	0	16	20	15	8	7	55	2	3	2	12	46	16	3	7	6	18	16	12
RUTLEDGE AVE - OGIER ST	44	6	0	13	17	9	1	7	37	0	0	0	18	30	14	9	8	10	10	4	3
OGIER - SMITH ST	8	1	0	3	4	1	0	3	5	0	0	0	4	8	0	1	1	0	1	1	4
SMITH - PITT ST	65	14	0	23	20	16	3	7	57	0	1	0	20	52	13	5	10	12	15	13	10
PITT - COMING ST	9	2	0	4	0	5	0	1	8	0	0	0	1	8	1	0	1	0	3	2	3
COMING ST - COLLEGE WAY	79	17	0	19	16	32	5	9	69	1	2	2	24	48	31	6	11	13	17	15	17
COLLEGE WAY - SAINT PHILIP ST	11	0	0	0	1	9	0	0	11	0	0	0	10	8	3	1	0	0	0	0	10
SAINT PHILIP - KING ST	82	12	0	13	16	44	7	13	69	3	2	2	25	57	25	17	14	11	10	20	10
KING - MEETING ST	99	20	0	16	21	48	6	22	77	3	5	0	26	73	26	17	16	18	11	21	16
MEETING - ANSON ST	78	16	0	17	21	30	7	11	67	2	4	0	26	59	19	7	9	16	18	14	14
ANSON - ELIZABETH ST	7	0	0	3	2	2	0	1	6	1	0	0	4	7	0	0	0	4	1	2	0
ELIZABETH - ALEXANDER ST	4	0	0	3	0	1	0	0	4	0	0	1	2	4	0	0	0	0	0	1	3
ALEXANDER - E BAY ST	26	7	0	7	9	5	4	3	23	2	1	0	9	22	4	2	5	6	3	3	7
Grand Total	**754**	**157**	**1**	**204**	**190**	**261**	**57**	**111**	**641**	**15**	**23**	**12**	**242**	**558**	**196**	**82**	**110**	**128**	**143**	**152**	**139**
% of Total		**20.82%**	**0.13%**	**27.06%**	**25.20%**	**34.62%**	**7.56%**	**14.72%**	**85.01%**	**1.99%**	**3.05%**	**1.59%**	**32.10%**	**74.01%**	**25.99%**	**10.88%**	**14.59%**	**16.98%**	**18.97%**	**20.16%**	**18.44%**

TABLE A.1
CALHOUN ST CRASH SUMMARY
CRASH TYPES AND YEARLY TRENDS

SHEET #	Segment	CRASHES	ANGLE	SIDESWIPE	REAR-END	OTHER	BIKE	PED	WET	DRY	INJURY	FATAL	PDO
1	LOCKWOOD DR - 4TH ST	18	1	2	9	6	0	0	7	11	4	0	14
	4TH ST - COURTNEY DR	10	2	3	4	1	0	0	1	9	2	0	8
2	COURTNEY DR - HALSEY BLVD	35	10	7	11	7	0	4	5	30	9	0	26
	HALSEY BLVD - BARRE ST	35	10	6	14	5	0	0	5	30	7	1	27
3	JONATHAN LUCAS - GADSDEN ST	5	1	2	1	1	0	0	0	5	0	0	5
	GADSDEN ST - ASHLEY AVE	77	19	24	28	6	1	1	9	68	23	0	54
4	ASHLEY AVE - RUTLEDGE AVE	62	20	15	16	11	2	3	7	55	17	0	45
	RUTLEDGE AVE - OGIER ST	44	17	9	13	5	0	0	7	37	6	0	38
5	OGIER - SMITH ST	8	4	1	3	0	0	0	3	5	1	0	7
	SMITH - PITT ST	65	20	16	23	6	0	1	7	57	14	0	51
6	PITT - COMING ST	9	0	5	4	0	0	0	1	8	2	0	7
7	COMING ST - COLLEGE WAY	79	16	32	19	12	1	2	9	69	17	0	62
	COLLEGE WAY - SAINT PHILIP ST	11	1	9	0	1	0	0	0	11	0	0	11
8	SAINT PHILIP - KING ST	82	16	44	13	9	3	2	13	69	12	0	70
9	KING - MEETING ST	99	21	48	16	14	3	5	22	77	20	0	79
10	MEETING - ANSON ST	78	21	30	17	10	2	4	11	67	16	0	62
	ANSON - ELIZABETH ST	7	2	2	3	0	1	0	1	6	0	0	7
11	ELIZABETH - ALEXANDER ST	4	0	1	3	0	0	0	0	4	0	0	4
	ALEXANDER - E BAY ST	26	9	5	7	5	2	1	3	23	7	0	19
	TOTAL	**754**	**190**	**261**	**204**	**99**	**15**	**23**	**111**	**641**	**157**	**1**	**596**

TABLE B
CALHOUN ST CRASH SUMMARY
MONTHLY AND DAILY TRENDS

Segment	Crashes in Section	# of Crashes in Jan	# of Crashes in Feb	# of Crashes in Mar	# of Crashes in Apr	# of Crashes in May	# of Crashes in Jun	# of Crashes in Jul	# of Crashes in Aug	# of Crashes in Sep	# of Crashes in Oct	# of Crashes in Nov	# of Crashes in Dec	# of Crashes on Sun	# of Crashes on Mon	# of Crashes on Tue	# of Crashes on Wed	# of Crashes on Thu	# of Crashes on Fri	# of Crashes on Sat
LOCKWOOD DR - 4TH ST	18	2	2	2	2	1	3	0	0	1	0	3	2	3	3	3	1	6	2	0
4TH ST - COURTNEY DR	10	2	1	1	1	1	1	0	0	2	0	1	0	1	2	2	0	2	3	0
COURTNEY DR - HALSEY BLVD	35	2	2	3	4	4	5	1	4	2	3	1	4	0	3	6	9	6	9	2
HALSEY BLVD - BARRE ST	35	4	4	4	1	2	4	1	4	4	1	4	2	1	7	5	6	6	5	5
JONATHAN LUCAS - GADSDEN ST	5	0	1	0	2	0	0	0	1	0	0	1	0	1	2	1	0	1	0	0
GADSDEN ST - ASHLEY AVE	77	5	5	10	8	6	9	6	4	6	3	10	5	7	7	17	8	14	14	10
ASHLEY AVE - RUTLEDGE AVE	62	4	5	5	7	8	2	9	5	5	5	4	3	5	9	9	8	13	8	10
RUTLEDGE AVE - OGIER ST	44	1	6	3	6	7	3	1	4	5	4	2	2	1	6	13	3	8	9	4
OGIER - SMITH ST	8	0	0	2	2	1	1	0	1	1	0	0	0	1	1	1	2	2	1	0
SMITH - PITT ST	65	3	3	5	11	6	10	5	5	4	6	5	2	8	8	11	9	16	6	7
PITT - COMING ST	9	0	2	0	3	2	2	0	0	0	0	0	0	1	0	2	1	2	1	2
COMING ST - COLLEGE WAY	79	8	9	9	9	8	9	4	4	8	2	5	4	10	12	9	11	7	16	14
COLLEGE WAY - SAINT PHILIP ST	11	0	3	0	1	2	1	1	3	0	0	0	0	0	2	2	3	0	1	3
SAINT PHILIP - KING ST	82	10	7	7	9	14	4	9	2	7	3	6	4	9	12	16	12	13	14	6
KING - MEETING ST	99	5	12	7	10	6	15	6	9	3	10	9	7	16	16	15	8	14	16	14
MEETING - ANSON ST	78	7	4	5	7	8	10	5	7	8	4	5	8	11	10	9	9	17	11	11
ANSON - ELIZABETH ST	7	0	0	0	1	0	2	1	1	0	0	0	2	0	0	2	3	1	1	0
ELIZABETH - ALEXANDER ST	4	0	1	0	0	0	0	0	0	2	1	0	0	0	1	1	1	0	1	0
ALEXANDER - E BAY ST	26	4	0	0	3	4	3	1	5	1	1	1	3	2	7	4	2	4	7	0
Grand Total	**754**	**57**	**67**	**63**	**87**	**80**	**84**	**50**	**59**	**59**	**43**	**57**	**48**	**77**	**108**	**128**	**96**	**132**	**125**	**88**
% of Total		**7.56%**	**8.89%**	**8.36%**	**11.54%**	**10.61%**	**11.14%**	**6.63%**	**7.82%**	**7.82%**	**5.70%**	**7.56%**	**6.37%**	**10.21%**	**14.32%**	**16.98%**	**12.73%**	**17.51%**	**16.58%**	**11.67%**

TABLE C
CALHOUN ST CRASH SUMMARY
HOURLY TRENDS

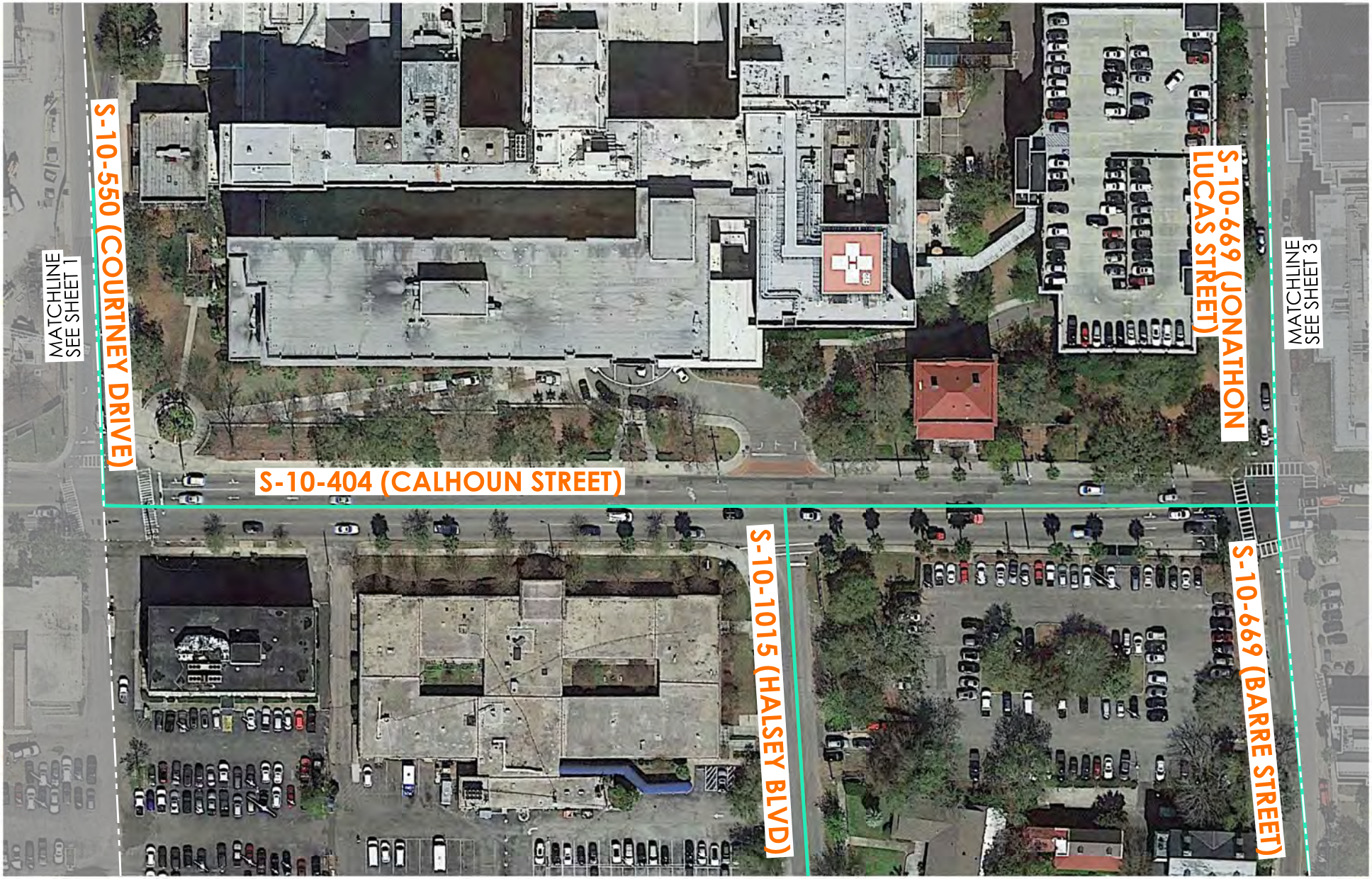
Segment	Crashes in Section	# Crashes 12am-1am	# Crashes 1am-2am	# Crashes 2am-3am	# Crashes 3am-4am	# Crashes 4am-5am	# Crashes 5am-6am	# Crashes 6am-7am	# Crashes 7am-8am	# Crashes 8am-9am	# Crashes 9am-10am	# Crashes 10am-11am	# Crashes 11am-12pm
LOCKWOOD DR - 4TH ST	18	0	0	1	0	0	0	0	0	2	1	2	0
4TH ST - COURTNEY DR	10	0	0	0	0	0	0	1	0	0	2	1	2
COURTNEY DR - HALSEY BLVD	35	1	0	1	0	0	0	0	2	4	5	2	2
HALSEY BLVD - BARRE ST	35	0	0	0	0	0	0	1	1	1	0	0	4
JONATHAN LUCAS - GADSDEN ST	5	0	0	0	0	0	0	1	0	0	0	0	0
GADSDEN ST - ASHLEY AVE	77	2	1	1	1	1	0	1	3	3	4	2	2
ASHLEY AVE - RUTLEDGE AVE	62	1	1	2	1	0	1	1	4	3	2	6	2
RUTLEDGE AVE - OGIER ST	44	2	0	2	0	0	0	0	1	1	1	4	5
OGIER - SMITH ST	8	0	0	0	0	0	0	0	0	0	0	4	1
SMITH - PITT ST	65	1	1	0	1	0	0	2	2	1	6	4	1
PITT - COMING ST	9	0	1	0	0	0	0	0	0	1	0	2	0
COMING ST - COLLEGE WAY	79	2	3	4	1	0	0	1	2	4	2	3	3
COLLEGE WAY - SAINT PHILIP ST	11	0	0	0	0	0	0	0	0	0	1	2	0
SAINT PHILIP - KING ST	82	5	2	0	0	1	0	1	0	6	4	3	8
KING - MEETING ST	99	2	4	2	0	0	1	0	0	5	2	6	6
MEETING - ANSON ST	78	3	1	1	2	0	0	2	2	3	4	6	4
ANSON - ELIZABETH ST	7	0	0	0	0	0	0	0	0	0	1	0	2
ELIZABETH - ALEXANDER ST	4	0	0	0	0	0	0	0	1	0	2	0	0
ALEXANDER - E BAY ST	26	1	0	0	0	0	0	0	0	3	2	0	4
Grand Total	**754**	**20**	**14**	**14**	**6**	**2**	**2**	**11**	**18**	**37**	**39**	**47**	**46**
% of Total		**2.65%**	**1.86%**	**1.86%**	**0.80%**	**0.27%**	**0.27%**	**1.46%**	**2.39%**	**4.91%**	**5.17%**	**6.23%**	**6.10%**

TABLE C
CALHOUN ST CRASH SUMMARY
HOURLY TRENDS

Segment	Crashes in Section	# Crashes 12pm-1pm	# Crashes 1pm-2pm	# Crashes 2pm-3pm	# Crashes 3pm-4pm	# Crashes 4pm-5pm	# Crashes 5pm-6pm	# Crashes 6pm-7pm	# Crashes 7pm-8pm	# Crashes 8pm-9pm	# Crashes 9pm-10pm	# Crashes 10pm-11pm	# Crashes 11pm-12am
LOCKWOOD DR - 4TH ST	18	2	1	3	2	0	1	2	0	1	0	0	0
4TH ST - COURTNEY DR	10	0	1	0	0	0	2	0	0	0	1	0	0
COURTNEY DR - HALSEY BLVD	35	2	1	2	3	1	1	2	1	2	2	1	0
HALSEY BLVD - BARRE ST	35	1	1	0	10	3	7	3	0	0	1	0	2
JONATHAN LUCAS - GADSDEN ST	5	0	0	1	2	1	0	0	0	0	0	0	0
GADSDEN ST - ASHLEY AVE	77	5	4	5	6	7	9	5	3	2	5	3	2
ASHLEY AVE - RUTLEDGE AVE	62	7	1	3	4	6	7	4	2	1	0	0	3
RUTLEDGE AVE - OGIER ST	44	1	2	4	3	4	6	4	0	1	1	1	0
OGIER - SMITH ST	8	1	1	0	1	0	0	0	0	0	0	0	0
SMITH - PITT ST	65	3	5	7	12	1	10	3	1	1	1	1	1
PITT - COMING ST	9	2	1	0	1	0	1	0	0	0	0	0	0
COMING ST - COLLEGE WAY	79	3	4	3	2	5	9	12	3	2	4	3	4
COLLEGE WAY - SAINT PHILIP ST	11	0	0	0	1	1	3	2	0	0	0	0	1
SAINT PHILIP - KING ST	82	4	7	4	8	5	6	4	5	1	1	5	2
KING - MEETING ST	99	7	13	11	3	7	6	9	4	3	5	0	2
MEETING - ANSON ST	78	9	3	11	6	5	5	3	1	2	1	3	1
ANSON - ELIZABETH ST	7	1	1	1	1	0	0	0	0	0	0	0	0
ELIZABETH - ALEXANDER ST	4	0	0	0	0	1	0	0	0	0	0	0	0
ALEXANDER - E BAY ST	26	2	0	0	4	1	6	1	0	0	0	1	1
Grand Total	**754**	**50**	**46**	**55**	**69**	**48**	**79**	**54**	**20**	**16**	**22**	**18**	**19**
% of Total		**6.63%**	**6.10%**	**7.29%**	**9.15%**	**6.37%**	**10.48%**	**7.16%**	**2.65%**	**2.12%**	**2.92%**	**2.39%**	**2.52%**

Appendix B AERIAL CRASH EXHIBITS

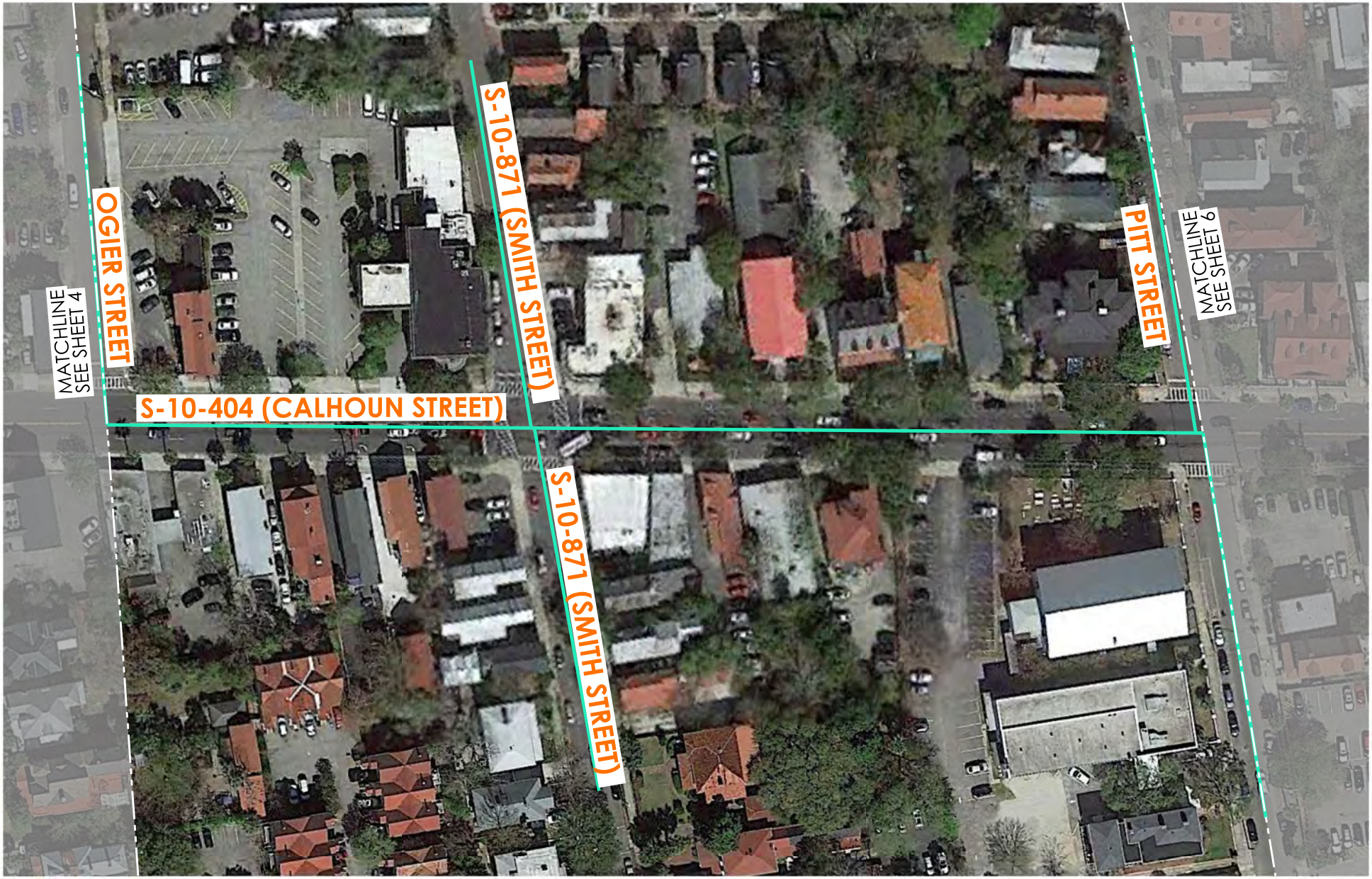
CRASH TYPE		BICYCLE AND PEDESTRIAN	ROAD CONDITIONS	SEVERITY		
ANGLE CRASH: 3	SIDESWIPE CRASH: 5	BICYCLE: 3	WET: 8	PDO: 22	N	CALHOUN ST SAFETY IMPROVEMENTS BLOCK: LOCKWOOD DR - COURTNEY DR SCALE: 1"=100' SHEET 1 OF 11
REAR END CRASH: 13	OTHER CRASH: 7	PEDESTRIANS: 3	DRY: 20	INJURY: 6 FATAL: 0		



CRASH TYPE		BICYCLE AND PEDESTRIAN	ROAD CONDITIONS	SEVERITY		
ANGLE CRASH: 20	SIDESWIPE CRASH: 13	BICYCLE: 0	WET: 10	PDO: 53	N	CALHOUN ST SAFETY IMPROVEMENTS
REAR END CRASH: 25	OTHER CRASH: 12	PEDESTRIANS: 4	DRY: 60	INJURY: 16		BLOCK: COURTNEY DR - JONATHAN LUCAS ST
				FATAL: 1		SCALE: 1"=100'
						SHEET 2 OF 11

CRASH TYPE		BICYCLE AND PEDESTRIAN	ROAD CONDITIONS	SEVERITY		
ANGLE CRASH: 20	SIDESWIPE CRASH: 26	BICYCLE: 1	WET: 9	PDO: 59	N	CALHOUN ST SAFETY IMPROVEMENTS
REAR END CRASH: 29	OTHER CRASH: 7	PEDESTRIANS: 1	DRY: 73	INJURY: 23 FATAL: 0		BLOCK: JONATHAN LUCAS ST - ASHLEY AVE
						SCALE: 1"=100'
						SHEET 3 OF 11

CRASH TYPE		BICYCLE AND PEDESTRIAN	ROAD CONDITIONS	SEVERITY		
ANGLE CRASH: 37	SIDESWIPE CRASH: 24	BICYCLE: 2	WET: 14	PDO: 83	N	CALHOUN ST SAFETY IMPROVEMENTS
REAR END CRASH: 29	OTHER CRASH: 16	PEDESTRIANS: 3	DRY: 92	INJURY: 23		BLOCK: ASHLEY AVE - OGIER ST
				FATAL: 0		SCALE: 1"=100'
						SHEET 4 OF 11



CRASH TYPE		BICYCLE AND PEDESTRIAN	ROAD CONDITIONS	SEVERITY		
ANGLE CRASH: 24	SIDESWIPE CRASH: 17	BICYCLE: 0	WET: 10	PDO: 58	N	CALHOUN ST SAFETY IMPROVEMENTS BLOCK: OGIER - PITT ST
REAR END CRASH: 26	OTHER CRASH: 6	PEDESTRIANS: 1	DRY: 62	INJURY: 15 FATAL: 0		SCALE: 1"=100' SHEET 5 OF 11

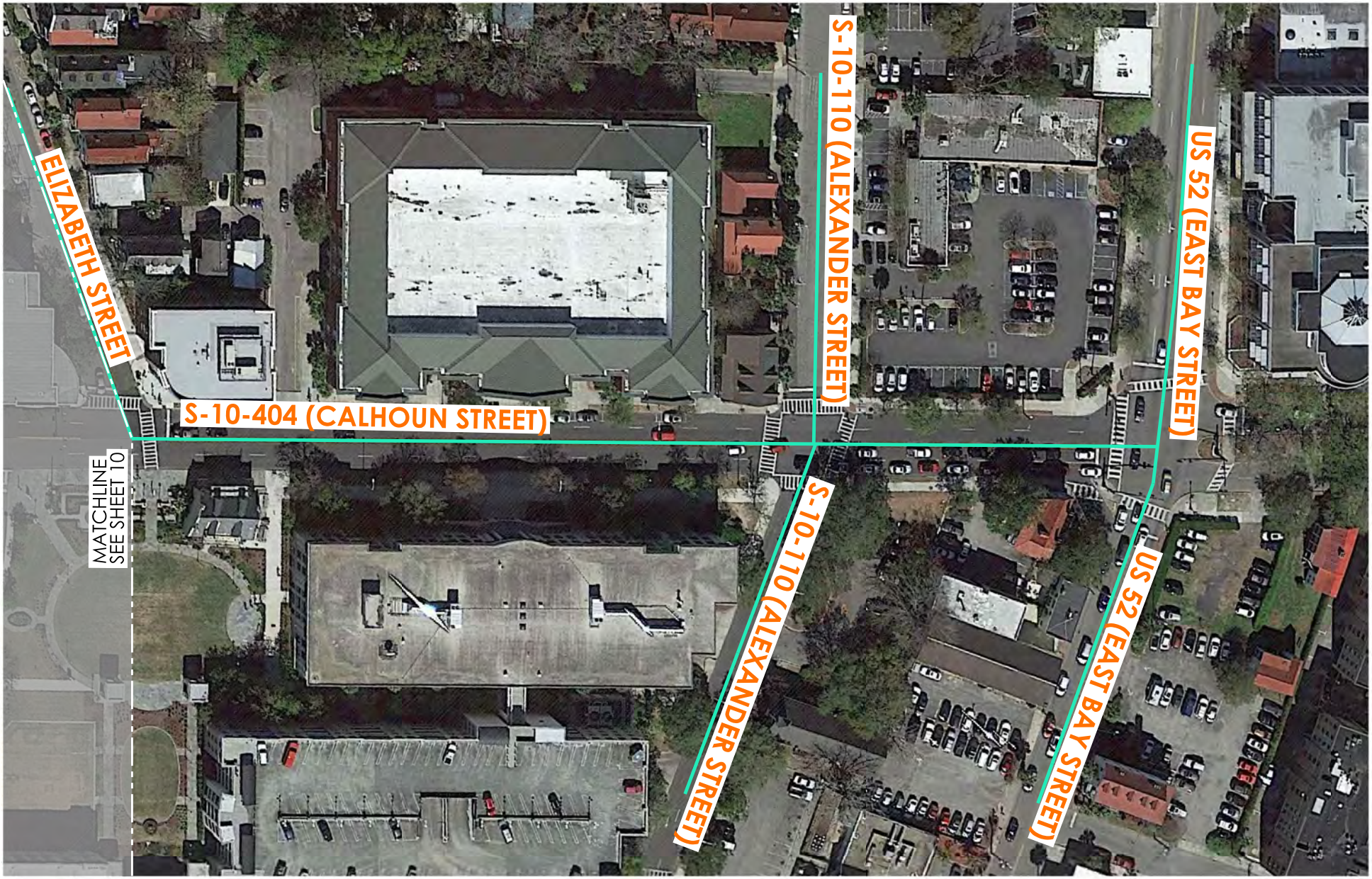
CRASH TYPE		BICYCLE AND PEDESTRIAN	ROAD CONDITIONS	SEVERITY		
ANGLE CRASH: 0	SIDESWIPE CRASH: 5	BICYCLE: 0	WET: 1	PDO: 7	N	CALHOUN ST SAFETY IMPROVEMENTS BLOCK: PITT - COMING ST
REAR END CRASH: 4	OTHER CRASH: 0	PEDESTRIANS: 0	DRY: 8	INJURY: 2 FATAL: 0		SCALE: 1"=100' SHEET 6 OF 11

CRASH TYPE		BICYCLE AND PEDESTRIAN	ROAD CONDITIONS	SEVERITY		
ANGLE CRASH: 17	SIDESWIPE CRASH: 41	BICYCLE: 1	WET: 9	PDO: 73	N	CALHOUN ST SAFETY IMPROVEMENTS
REAR END CRASH: 19	OTHER CRASH: 13	PEDESTRIANS: 2	DRY: 80	INJURY: 17		BLOCK: COMING ST - SAINT PHILIP ST
				FATAL: 0		SCALE: 1"=100'
						SHEET 7 OF 11

CRASH TYPE		BICYCLE AND PEDESTRIAN	ROAD CONDITIONS	SEVERITY		
ANGLE CRASH: 16	SIDESWIPE CRASH: 44	BICYCLE: 3	WET: 13	PDO: 70	N	CALHOUN ST SAFETY IMPROVEMENTS BLOCK: SAINT PHILIP ST - KING ST
REAR END CRASH: 13	OTHER CRASH: 9	PEDESTRIANS: 2	DRY: 69	INJURY: 12 FATAL: 0		SCALE: 1"=100' SHEET 8 OF 11

CRASH TYPE		BICYCLE AND PEDESTRIAN	ROAD CONDITIONS	SEVERITY		
ANGLE CRASH: 21	SIDESWIPE CRASH: 48	BICYCLE: 3	WET: 22	PDO: 79	N	CALHOUN ST SAFETY IMPROVEMENTS
REAR END CRASH: 16	OTHER CRASH: 14	PEDESTRIANS: 5	DRY: 77	INJURY: 20		BLOCK: KING - MEETING ST
				FATAL: 0		SCALE: 1"=100'
						SHEET 9 OF 11

CRASH TYPE		BICYCLE AND PEDESTRIAN	ROAD CONDITIONS	SEVERITY		
ANGLE CRASH: 23	SIDESWIPE CRASH: 32	BICYCLE: 3	WET: 12	PDO: 69	N	CALHOUN ST SAFETY IMPROVEMENTS BLOCK: MEETING - ELIZABETH ST
REAR END CRASH: 20	OTHER CRASH: 10	PEDESTRIANS: 4	DRY: 73	INJURY: 16 FATAL: 0		SCALE: 1"=100' SHEET 10 OF 11



CRASH TYPE		BICYCLE AND PEDESTRIAN	ROAD CONDITIONS	SEVERITY		
ANGLE CRASH: 9	SIDESWIPE CRASH: 6	BICYCLE: 2	WET: 3	PDO: 23	N	CALHOUN ST SAFETY IMPROVEMENTS
REAR END CRASH: 10	OTHER CRASH: 5	PEDESTRIANS: 1	DRY: 27	INJURY: 7		BLOCK: ELIZABETH - E BAY ST
				FATAL: 0		SCALE: 1"=100'
						SHEET 11 OF 11

Appendix C CRASH DIAGRAMS- SPECIFIC INTERSECTIONS

YR	2016	2017	2018	2019	Total
RA	3	7	2	0	12
RE	4	1	2	0	7
SS	0	2	0	0	2
HO	0	0	0	0	0
OC	0	0	0	0	0
HA	0	0	0	0	0
OTH	1	2	2	0	5
Total	8	12	6	0	26

NIght - 6
Day - 20

Wet - 4
Dry - 22

Total = 26
AADT = 27050
Years = 3.75
01/01/16 - 09/30/19
CR = 0.702
SI = 1.134

PDO - 18
Inj. 1 - 7
Inj. 2 - 1
Inj. 3 - 0
Fatal - 0

SCDOT South Carolina Department of Transportation

TRAFFIC ENGINEERING
DIVISION
COLUMBIA,S.C.

TRAFFIC SAFETY PROGRAM

SUBJECT TITLE: Collision Diagram

SPECIFIC LOCATION: S-404 & S-550

CITY	COUNTY		
Charleston	Charleston		
DRAWN BY	DATE	SCALE	PAGE
REW	02/27/19	None	1 of 1

LEGEND

DSS - Disregarded Sign or Signal
Inatt - Inattention
DTFFC - Driving Too Fast for Conditions
FYRW - Failure to Yield Right of Way
ROR - Ran off Road
FTC - Followed Too Closely
AOV - Aggressive Operation of Vehicle
SAO - Swerving to Avoid Object
DUI - Under the Influence
Imp LC - Improper Lane Change

RA = Right Angle
RE = Rear End
SS = Side Swipe
HO = Head On
OC = Out of Control
HA = Hit Animal
OTH = Other

09/26/17, 15:20, Day, Dry, FYRW, Inj. 0

07/19/16, 15:45, Day, Dry, Imp Lane Usage, Inj. 0

S-669 (Barrie St.)

S-404 (Cahoun St.)
AADT: 21600

01/28/16, 17:40, Day, Wet, FTC, Inj. 0
05/16/16, 15:23, Day, Dry, Work Zone, Inj. 0
08/01/16, 09:03, Day, Dry, FTC, Inj. 0
11/21/16, 11:15, Day, Dry, Inatt, Inj. 0
08/10/18, 16:39, Day, Dry, Inatt, Inj. 0
09/05/18, 13:55, Day, Dry, FTC / Inatt, Inj. 0

01/17/18, 11:48, Day, Dry, FYRW, Inj. 0
07/23/19, 08:28, Day, Dry, DSS, Inj. 1

05/08/17, 12:56, Day, Dry, FTC, Inj. 0
02/22/18, 18:15, Day, Dry, Inatt, Inj. 0
03/08/18, 15:15, Day, Dry, DTFFC / Inatt, Inj. 1

03/06/19, 15:35, Day, Dry, Imp Turn, Inj. 0
04/26/19, 16:20, Day, Dry, FYRW, Inj. 1

07/15/19, 16:55, Day, Wet, FYRW, Inj. 0
08/29/19, 14:40, Day, Dry, DSS, Inj. 0

S-404 (Cahoun St.)
AADT: 21600

S-1015 (Halsey Blvd.)
AADT: 700

S-669 (Barrie St.)

YR	2016	2017	2018	2019	Total
RA	1	1	1	5	8
RE	4	1	4	0	9
SS	0	0	0	0	0
HO	0	0	0	0	0
OC	0	0	0	0	0
HA	0	0	0	0	0
OTH	0	0	0	0	0
Total	5	2	5	5	17

NIght - 0
Day - 17

Wet - 2
Dry - 15

Total = 17
AADT = 21950
Years = 3.75
01/01/16 - 09/30/19
CR = 0.566
SI = 0.766

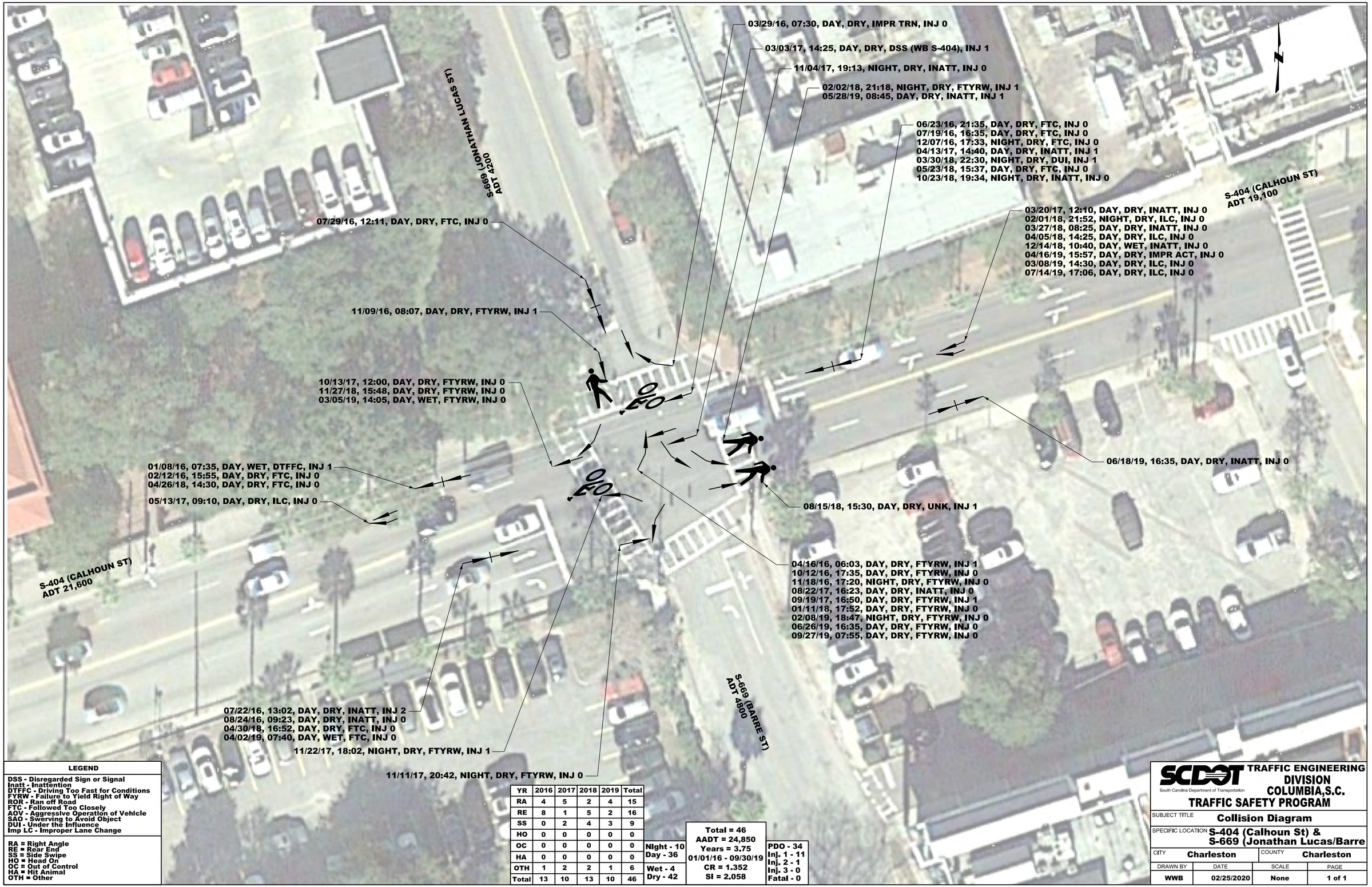
PDO - 14
Inj. 1 - 3
Inj. 2 - 0
Inj. 3 - 0
Fatal - 0

SCDOT South Carolina Department of Transportation

TRAFFIC ENGINEERING DIVISION
COLUMBIA,S.C.

TRAFFIC SAFETY PROGRAM

SUBJECT TITLE			
Collision Diagram			
SPECIFIC LOCATION			
S-404 & S-1015			
CITY	Charleston	COUNTY	Charleston
DRAWN BY	DATE	SCALE	PAGE
REW	02/26/19	None	1 of 1



LEGEND
DSS - Disregarded Sign or Signal Inatt - Inattention DTFFC - Driving Too Fast for Conditions FYRW - Failure to Yield Right of Way ROR - Ran off Road FTC - Followed Too Closely AOV - Aggressive Operation of Vehicle SAO - Swerving to Avoid Object DUI - Under the Influence Imp LC - Improper Lane Change
RA = Right Angle RE = Rear End SS = Side Swipe HO = Head On OC = Out of Control HA = Hit Animal OTH = Other

YR	2016	2017	2018	2019	Total
RA	4	5	2	4	15
RE	8	1	5	2	16
SS	0	2	4	3	9
HO	0	0	0	0	0
OC	0	0	0	0	0
HA	0	0	0	0	0
OTH	1	2	2	1	6
Total	13	10	13	10	46

Night - 10
Day - 36

Wet - 4
Dry - 42

Total = 46
AADT = 24,850
Years = 3.75
01/01/16 - 09/30/19
CR = 1.352
SI = 2.058

PDO - 34
Inj. 1 - 11
Inj. 2 - 1
Inj. 3 - 0
Fatal - 0

SCDOT
South Carolina Department of Transportation

TRAFFIC ENGINEERING DIVISION COLUMBIA,S.C.

TRAFFIC SAFETY PROGRAM

SUBJECT TITLE: **Collision Diagram**

SPECIFIC LOCATION: **S-404 (Calhoun St) & S-669 (Jonathan Lucas/Barre**

CITY	COUNTY
Charleston	Charleston

DRAWN BY	DATE	SCALE	PAGE
WWB	02/25/2020	None	1 of 1

LEGEND

DSS - Disregarded Sign or Signal
Inatt - Inattention
DTFFC - Driving Too Fast for Conditions
FYRW - Failure to Yield Right of Way
ROR - Ran off Road
FTC - Followed Too Closely
AOV - Aggressive Operation of Vehicle
SAO - Swerving to Avoid Object
DUI - Under the Influence
Imp LC - Improper Lane Change

RA = Right Angle
RE = Rear End
SS = Side Swipe
HO = Head On
OC = Out of Control
HA = Hit Animal
OTH = Other

S-103 (Ashley St.)
AADT: 6300

S-404 (Calhoun St.)
AADT: 19100

07/30/16, 17:15, Day, Dry, DSS, Inj. 0
01/06/19, 15:50, Day, Dry, DSS / AOV, Inj. 0

02/09/16, 09:00, Day, Dry, Imp Lane Usage, Inj. 0
04/01/17, 16:20, Day, Dry, Imp Lane Usage, Inj. 0
04/01/17, 19:10, Night, Dry, Imp Lane Usage, Inj. 0
07/13/18, 16:40, Day, Dry, Over-correcting, Inj. 0

07/01/16, 19:59, Day, Wet, FYRW, Inj. 1
09/19/17, 15:10, Day, Dry, FYRW, Inj. 0
10/10/17, 16:40, Day, Dry, FYRW, Inj. 0
11/11/17, 00:21, Night, Dry, Lights / Bicycle, Inj. 2

04/11/17, 13:01, Day, Dry, Imp Turn, Inj. 0, RA

03/03/16, 23:35, Night, Wet, DUI / DFTTC, Inj. 0
04/27/18, 18:15, Day, Dry, FTC, Inj. 0
05/06/18, 14:50, Day, Dry, Inatt, Inj. 0
11/01/18, 12:55, Day, Dry, FTC, Inj. 0
09/12/19, 17:00, Day, Dry, FTC, Inj. 0

07/22/19, 05:32, Day, Dry, Inatt, Inj. 0

10/24/16, 20:10, Night, Dry, Inatt, Inj. 0

03/05/16, 11:05, Day, Dry, Vision Obscured, Inj. 1

01/28/16, 07:40, Day, Dry, Inatt, Inj. 1

01/11/16, 17:55, Day, Dry, DUI, Inj. 0

10/20/17, 10:02, Day, Dry, Wrong Side of Road, Inj. 0

07/19/17, 12:55, Day, Dry, Inatt, Inj. 1
08/31/17, 16:30, Day, Dry, DSS(WB), Inj. 3
03/30/18, 11:58, Day, Wet, FYRW, Inj. 1

01/11/18, 07:45, Day, Wet, FYRW, Inj. 1

05/07/17, 11:08, Day, Dry, DSS(WB), Inj. 0
09/25/18, 10:25, Day, Dry, DSS(WB), Inj. 0

10/01/16, 12:28, Day, Dry, DSS(EB), Inj. 1
02/04/16, 05:54, Night, Dry, DSS, Inj. 0
12/05/16, 00:00, Day, Dry, DSS, Inj. 0
03/07/18, 12:30, Day, Dry, DSS(NB), Inj. 1

03/23/16, 18:00, Day, Dry, Inatt, Inj. 0
09/08/18, 12:30, Day, Dry, Imp Lane Usage, Inj. 0
12/11/18, 13:36, Day, Dry, Inatt, Inj. 0

05/29/17, 08:46, Day, Dry, Inatt, Inj. 0
08/02/18, 23:33, Night, Wet, Inatt, Inj. 0

07/11/16, 16:28, Day, Dry, Inatt, Inj. 1
07/18/16, 08:00, Day, Dry, FYRW / Imp. Turn, Inj. 0

11/30/18, 23:00, Night, Dry, FYRW / AOV, Inj. 1

11/27/16, 01:33, Night, Dry, DUI / DSS, Inj. 0
05/16/17, 06:57, Day, Dry, DSS / (EB) / FYRW, Inj. 1

YR	2016	2017	2018	2019	Total
RA	7	6	6	2	21
RE	2	1	4	1	8
SS	1	3	1	0	5
HO	0	0	0	0	0
OC	1	0	0	0	1
HA	0	0	0	0	0
OTH	4	2	1	0	0
Total	15	12	12	3	42

NIght - 8
Day - 34

Wet - 5
Dry - 37

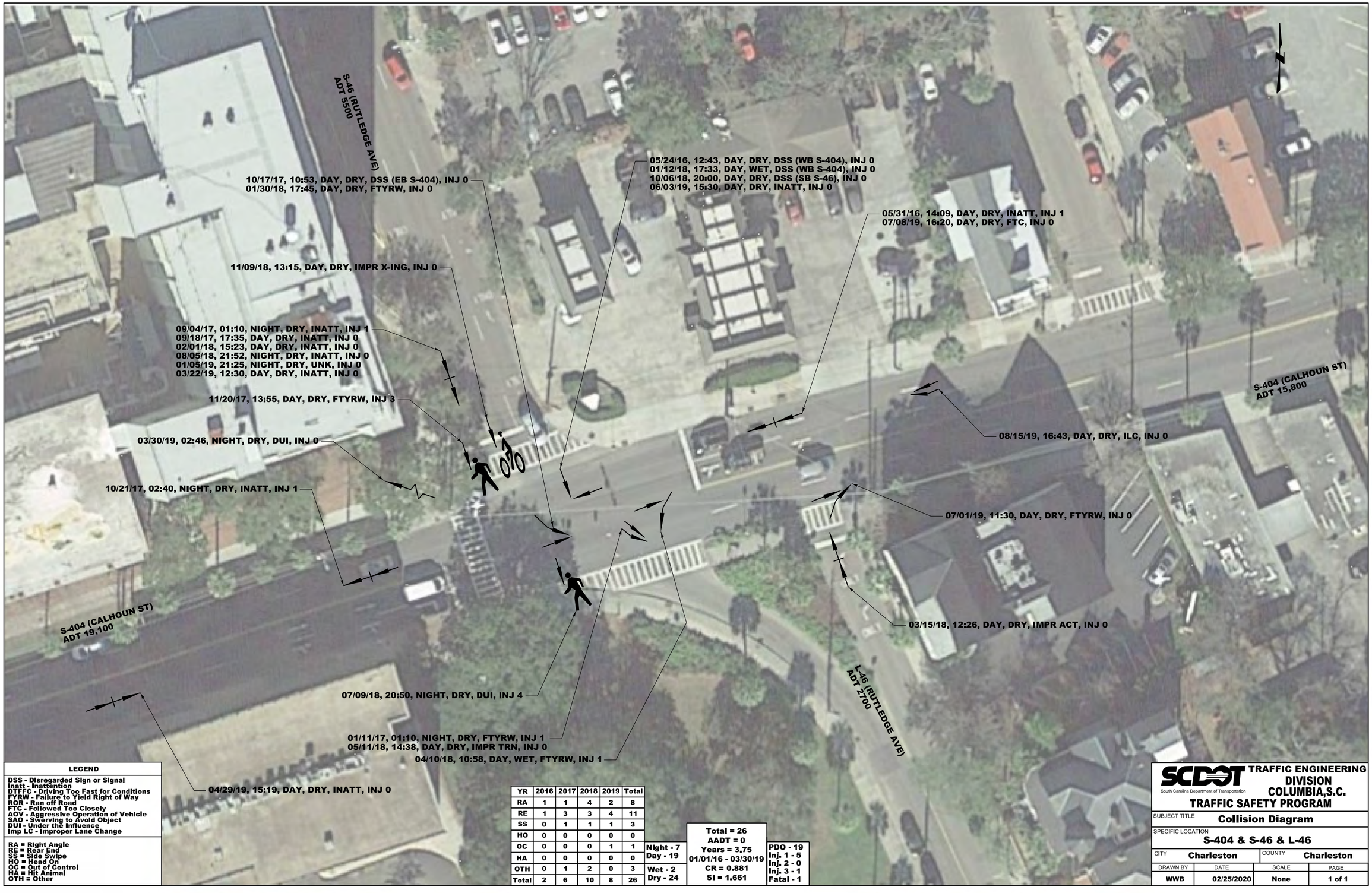
Total = 42
AADT = 25400
Years = 3.75
01/01/16 - 09/30/19
CR = 1.208
SI = 1.956

PDO - 29
Inj. 1 - 11
Inj. 2 - 1
Inj. 3 - 1
Fatal - 0

SCDOT South Carolina Department of Transportation
TRAFFIC ENGINEERING DIVISION COLUMBIA,S.C.
TRAFFIC SAFETY PROGRAM

SUBJECT TITLE: Collision Diagram
SPECIFIC LOCATION: S-404 & S-103
CITY: Charleston | COUNTY: Charleston

DRAWN BY	DATE	SCALE	PAGE
REW	02/25/19	None	1 of 1



LEGEND

DSS - Disregarded Sign or Signal
Inatt - Inattention
DTFFC - Driving Too Fast for Conditions
FYRW - Failure to Yield Right of Way
ROR - Ran off Road
FTC - Followed Too Closely
AOV - Aggressive Operation of Vehicle
SAO - Swerving to Avoid Object
DUI - Under the Influence
Imp LC - Improper Lane Change

RA = Right Angle
RE = Rear End
SS = Side Swipe
HO = Head On
OC = Out of Control
HA = Hit Animal
OTH = Other

YR	2016	2017	2018	2019	Total
RA	1	1	4	2	8
RE	1	3	3	4	11
SS	0	1	1	1	3
HO	0	0	0	0	0
OC	0	0	0	1	1
HA	0	0	0	0	0
OTH	0	1	2	0	3
Total	2	6	10	8	26

Night - 7
Day - 19

Wet - 2
Dry - 24

Total = 26
AADT = 0
Years = 3.75
01/01/16 - 03/30/19
CR = 0.881
SI = 1.661

PDO - 19
Inj. 1 - 5
Inj. 2 - 0
Inj. 3 - 1
Fatal - 1

SCDOT South Carolina Department of Transportation

TRAFFIC ENGINEERING DIVISION COLUMBIA,S.C.

TRAFFIC SAFETY PROGRAM

SUBJECT TITLE: **Collision Diagram**

SPECIFIC LOCATION: **S-404 & S-46 & L-46**

CITY	COUNTY
Charleston	Charleston

DRAWN BY	DATE	SCALE	PAGE
WWB	02/25/2020	None	1 of 1

LEGEND

DSS - Disregarded Sign or Signal
Inatt - Inattention
DTFFC - Driving Too Fast for Conditions
FYRW - Failure to Yield Right of Way
ROR - Ran off Road
FTC - Followed Too Closely
AOV - Aggressive Operation of Vehicle
SAO - Swerving to Avoid Object
DUI - Under the Influence
Imp LC - Improper Lane Change

RA = Right Angle
RE = Rear End
SS = Side Swipe
HO = Head On
OC = Out of Control
HA = Hit Animal
OTH = Other

YR	2016	2017	2018	2019	Total
RA	6	2	1	0	9
RE	2	3	6	1	12
SS	1	3	2	2	8
HO	0	0	0	0	0
OC	0	0	0	0	0
HA	0	0	0	0	0
OTH	0	0	1	0	1
Total	9	8	10	3	30

NIght - 5
Day - 25

Wet - 0
Dry - 30

Total = 30
AADT = 16,125
Years = 3.75
01/01/16 - 09/30/19
CR = 1.359
SI = 1.812

PDO - 25
Inj. 1 - 1
Inj. 2 - 4
Inj. 3 - 0
Fatal - 0

SCDOT South Carolina Department of Transportation

TRAFFIC ENGINEERING DIVISION COLUMBIA,S.C.

TRAFFIC SAFETY PROGRAM

SUBJECT TITLE	**Collision Diagram**
SPECIFIC LOCATION	**S-404 (CALHOUN ST) & S-871 (SMITH ST)**
CITY **Charleston**	COUNTY **Charleston**

DRAWN BY	DATE	SCALE	PAGE
WWB	02/26/2020	None	1 of 1

LEGEND

DSS - Disregarded Sign or Signal
Inatt - Inattention
DTFFC - Driving Too Fast for Conditions
FYRW - Failure to Yield Right of Way
ROR - Ran off Road
FTC - Followed Too Closely
AOV - Aggressive Operation of Vehicle
SAO - Swerving to Avoid Object
DUI - Under the Influence
Imp LC - Improper Lane Change

RA = Right Angle
RE = Rear End
SS = Side Swipe
HO = Head On
OC = Out of Control
HA = Hit Animal
OTH = Other

(Pitt St.)

S-404 (Calhoun St.)
AADT: 15800

09/26/16, 16:05, Day, Wet, FYRW, Inj. 0

01/17/19, 21:29, Night, Wet, FTC, Inj. 0

09/24/18, 13:00, Day, Dry, AOV, Inj. 0

10/17/18, 18:19, Day, Dry, FYRW, Inj. 2

07/31/16, 15:40, Day, Dry, Inatt, Inj. 0
06/29/17, 09:40, Day, Dry, Inatt, Inj. 0
12/26/17, 14:15, Day, Dry, FYRW, Inj. 0

11/17/16, 14:50, Day, Dry, AOV, Inj. 0

04/18/17, 13:10, Day, Dry, DTFFC, Inj. 0
02/23/19, 16:40, Day, Dry, FTC, Inj. 1

02/24/16, 17:50, Day, Dry, FYRW, Inj. 0
06/02/16, 14:20, Day, Dry, Inatt, Inj. 0
01/17/19, 21:16, Night, Wet, Inatt, Inj. 2

09/27/18, 13:15, Day, Dry, FTC, Inj. 0

02/21/18, 09:00, Day, Dry, Inatt, Inj. 0

01/17/19, 17:35, Night, Dry, Inatt, Inj. 2

10/27/17, 18:59, Day, Dry, Inatt, Inj. 1

08/06/16, 15:05, Day, Dry, FYRW, Inj. 0
03/19/17, 10:55, Day, Dry, FYRW, Inj. 0

S-404 (Calhoun St.)
AADT: 15800

(Pitt St.)

YR	2016	2017	2018	2019	Total
RA	4	2	2	2	10
RE	0	1	2	2	5
SS	2	2	0	0	4
HO	0	0	0	0	0
OC	0	0	0	0	0
HA	0	0	0	0	0
OTH	0	0	0	0	0
Total	6	5	4	4	19

Night - 3
Day - 16

Wet - 3
Dry - 16

Total = 19
AADT = 15800
Years = 3.75
01/01/16 - 09/30/19
CR = 0.879
SI = 1.248

PDO - 15
Inj. 1 - 1
Inj. 2 - 3
Inj. 3 - 0
Fatal - 0

SCDOT
South Carolina Department of Transportation

TRAFFIC ENGINEERING
DIVISION
COLUMBIA,S.C.

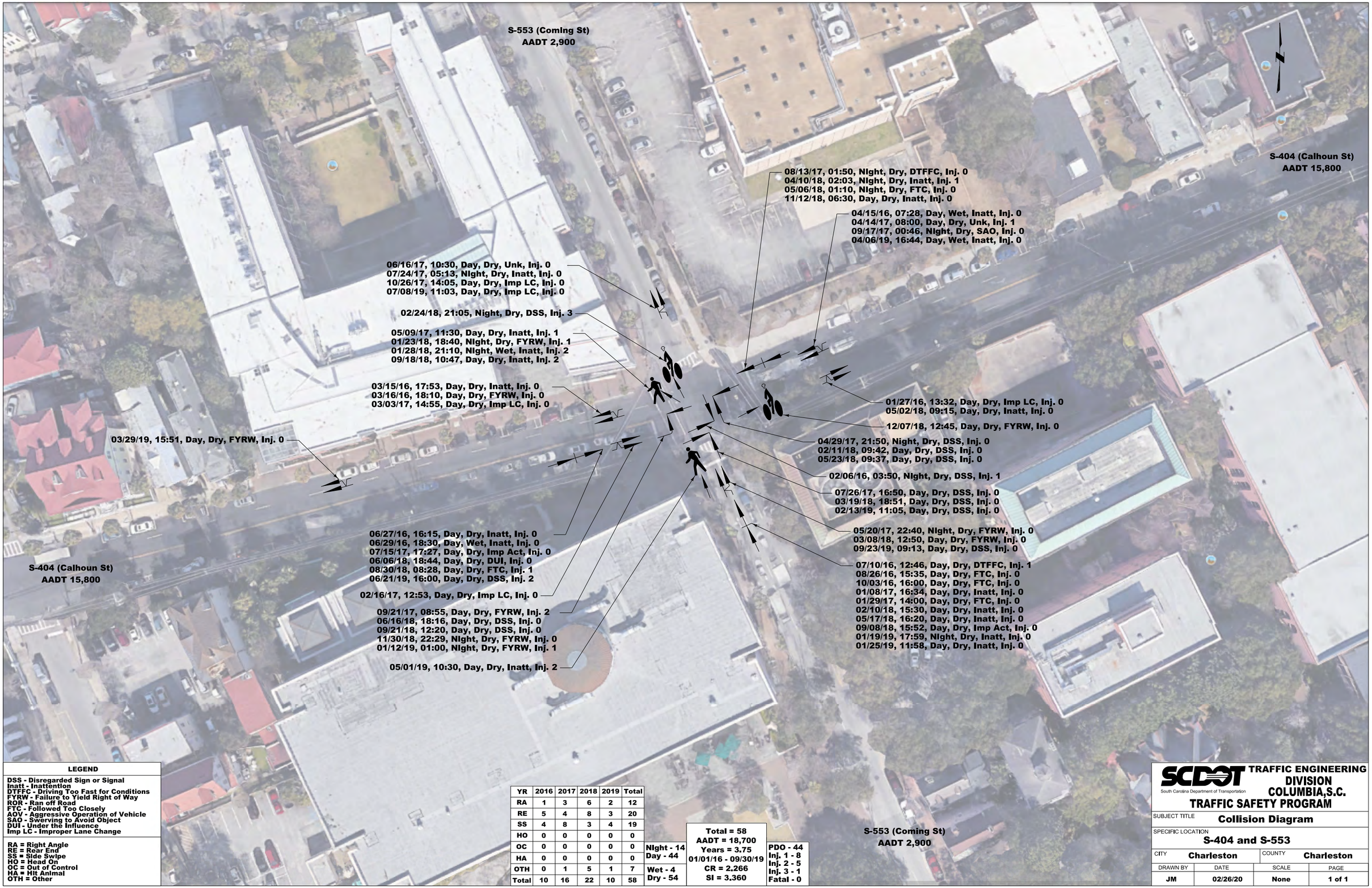
TRAFFIC SAFETY PROGRAM

SUBJECT TITLE: Collision Diagram

SPECIFIC LOCATION: S-404 & (Pitt St.)

CITY	COUNTY
Charleston	Charleston

DRAWN BY	DATE	SCALE	PAGE
REW	02/24/19	None	1 of 1



LEGEND

DSS - Disregarded Sign or Signal
Inatt - Inattention
DTFFC - Driving Too Fast for Conditions
FYRW - Failure to Yield Right of Way
ROR - Ran off Road
FTC - Followed Too Closely
AOV - Aggressive Operation of Vehicle
SAO - Swerving to Avoid Object
DUI - Under the Influence
Imp LC - Improper Lane Change

RA = Right Angle
RE = Rear End
SS = Side Swipe
HO = Head On
OC = Out of Control
HA = Hit Animal
OTH = Other

YR	2016	2017	2018	2019	Total
RA	1	3	6	2	12
RE	5	4	8	3	20
SS	4	8	3	4	19
HO	0	0	0	0	0
OC	0	0	0	0	0
HA	0	0	0	0	0
OTH	0	1	5	1	7
Total	10	16	22	10	58

Night - 14
Day - 44

Wet - 4
Dry - 54

Total = 58
AADT = 18,700
Years = 3.75
01/01/16 - 09/30/19
CR = 2.266
SI = 3.360

PDO - 44
Inj. 1 - 8
Inj. 2 - 5
Inj. 3 - 1
Fatal - 0

SCDOT South Carolina Department of Transportation

TRAFFIC ENGINEERING DIVISION COLUMBIA,S.C.

TRAFFIC SAFETY PROGRAM

SUBJECT TITLE: **Collision Diagram**

SPECIFIC LOCATION: **S-404 and S-553**

CITY	COUNTY
Charleston	Charleston

DRAWN BY	DATE	SCALE	PAGE
JM	02/26/20	None	1 of 1

LEGEND

DSS - Disregarded Sign or Signal
Inatt - Inattention
DTFFC - Driving Too Fast for Conditions
FYRW - Failure to Yield Right of Way
ROR - Ran off Road
FTC - Followed Too Closely
AOV - Aggressive Operation of Vehicle
SAO - Swerving to Avoid Object
DUI - Under the Influence
Imp LC - Improper Lane Change

RA = Right Angle
RE = Rear End
SS = Side Swipe
HO = Head On
OC = Out of Control
HA = Hit Animal
OTH = Other

YR	2016	2017	2018	2019	Total
RA	1	1	1	0	3
RE	2	4	1	0	7
SS	2	6	6	0	14
HO	0	0	0	0	0
OC	0	0	0	0	0
HA	0	0	0	0	0
OTH	3	4	0	0	7
Total	8	15	8	0	31

Night - 7
Day - 24

Wet - 6
Dry - 25

Total = 31
AADT = 24,550
Years = 3.25
01/01/16 - 03/31/19
CR = 1.064
SI = 1.683

PDO - 22
Inj. 1 - 6
Inj. 2 - 2
Inj. 3 - 1
Fatal - 0

SCDOT South Carolina Department of Transportation

TRAFFIC ENGINEERING DIVISION COLUMBIA,S.C.

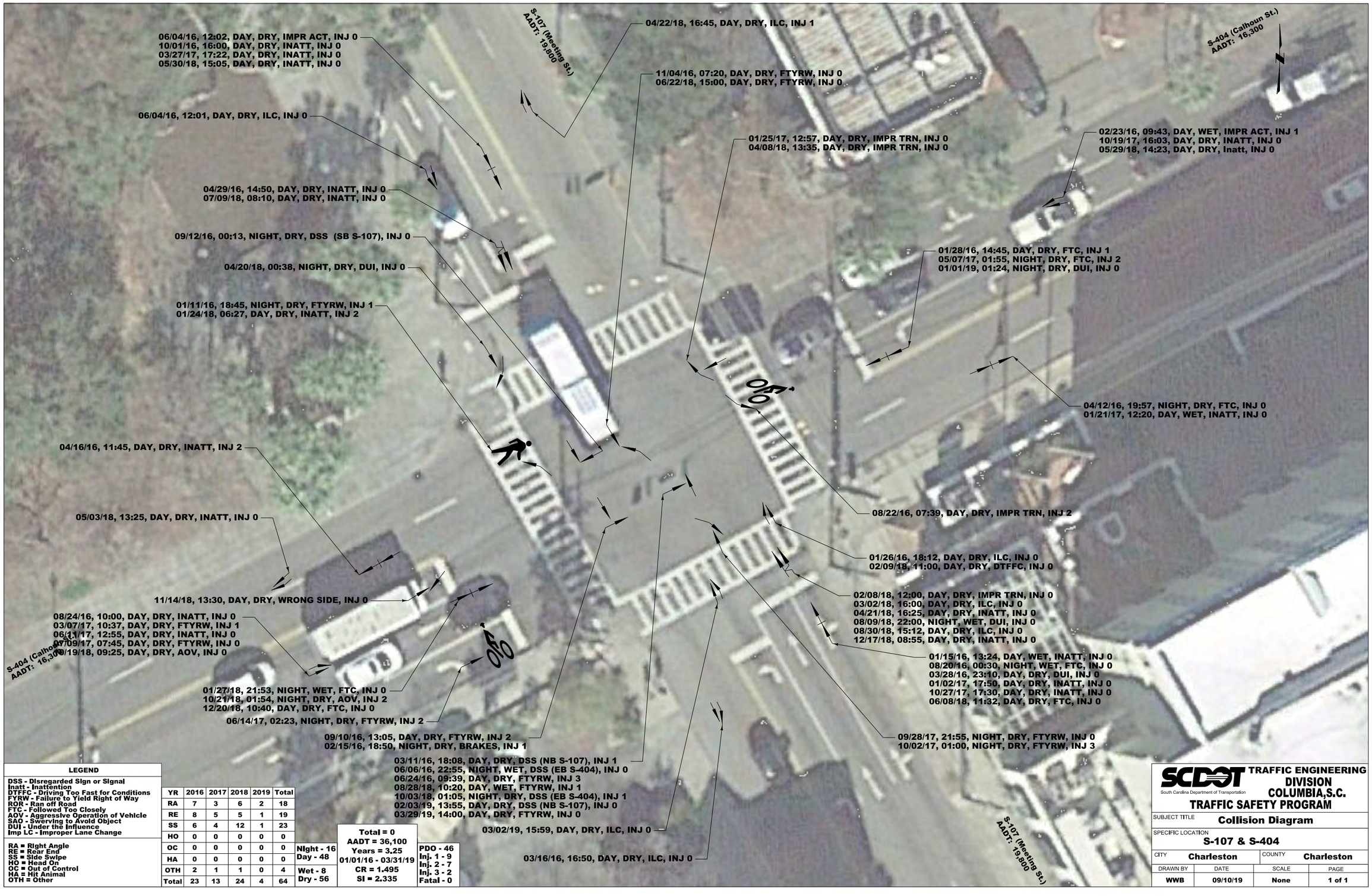
TRAFFIC SAFETY PROGRAM

SUBJECT TITLE: **Collision Diagram**

SPECIFIC LOCATION: **S-104 & S-404**

CITY: **Charleston** COUNTY: **Charleston**

DRAWN BY	DATE	SCALE	PAGE
WWB	09/05/19	None	1 of 1



LEGEND

DSS - Disregarded Sign or Signal
Inatt - Inattention
DTFFC - Driving Too Fast for Conditions
FYRW - Failure to Yield Right of Way
ROR - Ran off Road
FTC - Followed Too Closely
AOV - Aggressive Operation of Vehicle
SAO - Swerving to Avoid Object
DUI - Under the Influence
Imp LC - Improper Lane Change

RA = Right Angle
RE = Rear End
SS = Side Swipe
HO = Head On
OC = Out of Control
HA = Hit Animal
OTH = Other

YR	2016	2017	2018	2019	Total
RA	7	3	6	2	18
RE	8	5	5	1	19
SS	6	4	12	1	23
HO	0	0	0	0	0
OC	0	0	0	0	0
HA	0	0	0	0	0
OTH	2	1	1	0	4
Total	23	13	24	4	64

NIght - 16
Day - 48

Wet - 8
Dry - 56

Total = 0
AADT = 36,100
Years = 3.25
01/01/16 - 03/31/19
CR = 1.495
SI = 2.335

PDO - 46
Inj. 1 - 9
Inj. 2 - 7
Inj. 3 - 2
Fatal - 0

SCDOT
South Carolina Department of Transportation

TRAFFIC ENGINEERING DIVISION COLUMBIA,S.C.

TRAFFIC SAFETY PROGRAM

SUBJECT TITLE: **Collision Diagram**

SPECIFIC LOCATION: **S-107 & S-404**

CITY	COUNTY
Charleston	Charleston

DRAWN BY	DATE	SCALE	PAGE
WWB	09/10/19	None	1 of 1

LEGEND

DSS - Disregarded Sign or Signal
Inatt - Inattention
DTFFC - Driving Too Fast for Conditions
FYRW - Failure to Yield Right of Way
ROR - Ran off Road
FTC - Followed Too Closely
AOV - Aggressive Operation of Vehicle
SAO - Swerving to Avoid Object
DUI - Under the Influence
Imp LC - Improper Lane Change

RA = Right Angle
RE = Rear End
SS = Side Swipe
HO = Head On
OC = Out of Control
HA = Hit Animal
OTH = Other

YR	2012	2013	2014	2015	2016	2017	2018	Total
RA	0	0	0	0	0	0	0	0
RE	0	0	0	0	0	0	0	0
SS	0	0	0	0	0	0	0	0
HO	0	0	0	0	0	0	0	0
OC	0	0	0	0	0	0	0	0
HA	0	0	0	0	0	0	0	0
OTH	9	2	0	2	10	19	7	49
Total	9	2	0	2	10	19	7	49

Night - 20
Day - 29

Wet - 9
Dry - 40

Total = 49
Years = 6.25
01/01/12 - 03/31/18

PDO - 3
Inj. 1 - 26
Inj. 2 - 17
Inj. 3 - 3
Fatal - 0

SCDOT South Carolina Department of Transportation

TRAFFIC ENGINEERING DIVISION COLUMBIA,S.C.

TRAFFIC SAFETY PROGRAM

SUBJECT TITLE: **Collision Diagram**

SPECIFIC LOCATION: **S-404 MPT 0.0 - 1.48**

CITY	COUNTY		
Charleston	Charleston		
DRAWN BY	DATE	SCALE	PAGE
JCB	09/21/18	None	1 of 8

LEGEND

DSS - Disregarded Sign or Signal
Inatt - Inattention
DTFFC - Driving Too Fast for Conditions
FYRW - Failure to Yield Right of Way
ROR - Ran off Road
FTC - Followed Too Closely
AOV - Aggressive Operation of Vehicle
SAO - Swerving to Avoid Object
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RA = Right Angle
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SCDOT South Carolina Department of Transportation

TRAFFIC ENGINEERING DIVISION COLUMBIA,S.C.

TRAFFIC SAFETY PROGRAM

SUBJECT TITLE: **Collision Diagram**			
SPECIFIC LOCATION: **S-404 MPT 0.0 - 1.48**			
CITY: **Charleston**		COUNTY: **Charleston**	
DRAWN BY	DATE	SCALE	PAGE
JCB	**09/21/18**	**None**	**2 of 8**

Appendix D CRASH DIAGRAMS- BICYCLE AND PEDESTRIANS

LEGEND
DSS - Disregarded Sign or Signal Inatt - Inattention DTFFC - Driving Too Fast for Conditions FYRW - Failure to Yield Right of Way ROR - Ran off Road FTC - Followed Too Closely AOV - Aggressive Operation of Vehicle SAO - Swerving to Avoid Object DUI - Under the Influence Imp LC - Improper Lane Change
RA = Right Angle RE = Rear End SS = Side Swipe HO = Head On OC = Out of Control HA = Hit Animal OTH = Other

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TRAFFIC ENGINEERING DIVISION COLUMBIA,S.C.

TRAFFIC SAFETY PROGRAM

SUBJECT TITLE			
Collision Diagram			
SPECIFIC LOCATION			
S-404 MPT 0.0 - 1.48			
CITY **Charleston**		COUNTY **Charleston**	
DRAWN BY	DATE	SCALE	PAGE
JCB	**09/21/18**	**None**	**3 of 8**

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SUBJECT TITLE: **Collision Diagram**			
SPECIFIC LOCATION: **S-404 MPT 0.0 - 1.48**			
CITY: **Charleston**		COUNTY: **Charleston**	
DRAWN BY	DATE	SCALE	PAGE
JCB	09/21/18	None	4 of 8

LEGEND

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SUBJECT TITLE	**Collision Diagram**
SPECIFIC LOCATION	**S-404 MPT 0.0 - 1.48**
CITY **Charleston**	COUNTY **Charleston**

DRAWN BY	DATE	SCALE	PAGE
JCB	**09/21/18**	**None**	**5 of 8**

LEGEND

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TRAFFIC SAFETY PROGRAM

SUBJECT TITLE	**Collision Diagram**
SPECIFIC LOCATION	**S-404 MPT 0.0 - 1.48**
CITY **Charleston**	COUNTY **Charleston**

DRAWN BY	DATE	SCALE	PAGE
JCB	09/21/18	None	6 of 8

LEGEND
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TRAFFIC SAFETY PROGRAM

SUBJECT TITLE			
Collision Diagram			
SPECIFIC LOCATION			
S-404 MPT 0.0 - 1.48			
CITY **Charleston**		COUNTY **Charleston**	
DRAWN BY	DATE	SCALE	PAGE
JCB	**09/21/18**	**None**	**7 of 8**

LEGEND

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DRAWN BY	DATE	SCALE	PAGE
JCB	09/21/18	None	8 of 8

Appendix E BENEFIT-COST ANALYSIS

Benefit / Cost Analysis Summary Table

S-404 - Calhoun Street

Corridor Improvements				
	Annual Cost	Annual Benefit	Net Benefit	B/C
Add crosswalks to side street approaches. (Approx. 1 approach)	$201	$0	-$201	< 1
Add an all pedestrian signal phase (Approx. 4 intersections)	$7,202	$205,568	$198,366	28.54
Implement leading Pedestrian Intervals (LPIs) with ped push buttons (Approx. 8 signals)	$6,338	$555,447	$549,109	87.64
(Approx. 13 ramps)	$346		N/A	N/A
Alternate routing strategies to accommodate bicyclists on safer routes and add bicycle facilities	N/A		N/A	N/A
Reversible lanes and on-street parking removal	N/A		N/A	N/A
Upgrade pavement markings and raised pavement markers (Includes crosswalks).	$14,729	$254,868	$240,139	17.30
Widen sidewalk and remove vertical barrier between Halsey Blvd. and Ashley Ave.	$6,842		N/A	N/A
Repair damaged sidewalks and ramps	$3,601		N/A	N/A
Clean sidewalks and ramps with debris, trim overgrown vegetation and trees	N/A		N/A	N/A
Replace existing drop inlet grates to bicycle friendly grates. (Approx. 25 grates)	$1,440		N/A	N/A
Install retroreflective backplates to improve signal head visibility. (Approx. 9 locations)	$1,991	$531,285	$529,294	>100
Replace 8” signal heads with 12” signal heads, as per MUTCD. (Approx. 7 intersections)	$10,515	$352,230	$341,715	33.50
Construct raised median with a pedestrian refuge at Alexander St.	$3,601			
Install uniform streetlighting to enhance pedestrian safety	TBD			

Intersection Specific Improvements				
	Annual Cost	Annual Benefit	Net Benefit	B/C
Gadsden St. – Remove existing deficient crosswalk and redirect pedestrians. Add wayfinding signs for medical district	$360	N/A	N/A	N/A
Ashley Ave. - Install countdown pedestrian signal heads, and increase sidewalk width at the southeast corner to accommodate a pedestrian pedestal pole.	$1,801	$128,464	$126,664	71.35
Rutledge Ave. – Reconstruct ramps to align with crosswalks, install left-turn skip lines and repair s/w in NW corner. Consider closing the west most driveway of the gas station, add ladder-style crosswalk and relocate stopbar	$11,783	$0	$0	< 1
Smith St. - Consider curb extension @ NW corner	$1,071	N/A	N/A	N/A
Coming St. – Perform a traffic signal timing study to improve operations. Expand ped waiting area. Elevate storm drains at SE corner. Widen ramp at SE corner.	$2,881	N/A	N/A	>100
St. Philip St. - Reconstruct ramps to align w crosswalk. Create additional pedestrian storage space. Add ped scramble phase.	$4,321	N/A	N/A	N/A
King St. – Add white thermoplastic lines along both edges of the crosswalks	$803	N/A	N/A	N/A
Anson St. – Reconstruct ramp at the southeast corner, remove tree blocking traffic signals, and add pedestrian crossing signs	$1,875	N/A	N/A	N/A
Alexander St. – Widen S-404 to include a pedestrian refuge island and install an RRFB	$8,642	$33,389	$32,585	3.86
US 52/East Bay St. – Remove island at the southwest corner, widen sidewalk and relocate the mast arm, crosswalk and the stop-bar.	$3,241	$0	$0	< 1