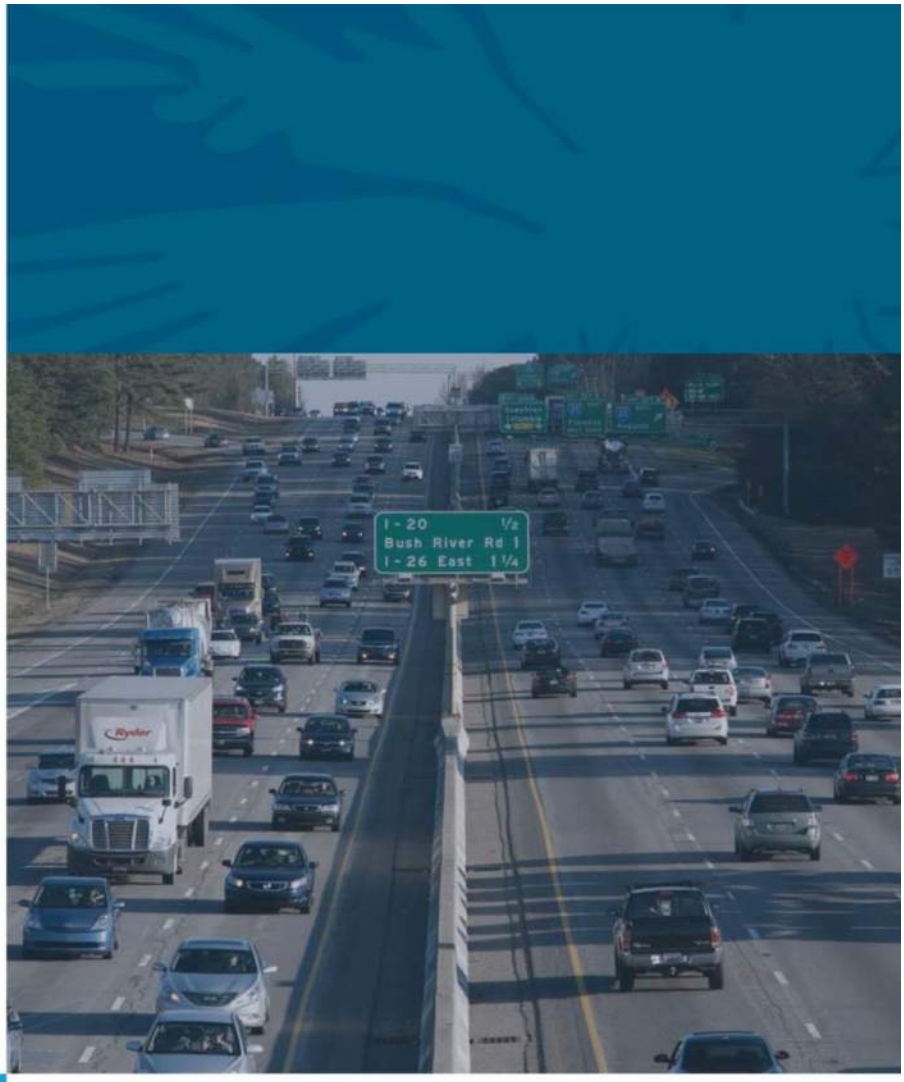
Appendix D—Alternatives Traffic Analysis Technical Memo

Part 1

CAROLINA CROSSROADS

I-20/26/126 Corridor Project



Alternatives Traffic Analysis Addendum

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

Addendum April 25, 2019

SCDOT South Carolina Department of Transportation

U.S. Department of Transportation Federal Highway Administration

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

CAROLINA CROSSROADS

Alternatives Traffic Analysis Technical Memo Addendum

Carolina Crossroads

I-20/26/126 Corridor Improvement Project

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Addendum April 25, 2019

Prepared for
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Prepared by

STV 100 Years

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 22070 ROBERT J. DUBNICKA

4-25-2019

SOUTH CAROLINA STV INCORPORATED NO. C03318 CERTIFICATE OF AUTHORIZATION

SCDOT U.S. Department of Transportation Federal Highway Administration

1 Microsimulation Model Calibration

This addendum addresses the calibration statistics summarized in **Table 4-2** of the original Alternatives Traffic Analysis Technical Memo, dated July 23, 2018. The specific calibration result being addressed is that of having at least 85 percent of the total number of links with more than 2,700 vehicles per hour (vph) having a model flow within 400 vph of the observed flow. The original **Table 4-2** is shown below with the specific row in question highlighted.

Table 4-2: Traffic Flow Calibration Statistics

Hourly Flows - Model v. Observed	Target	AM Peak Hour		PM Peak Hour	
		Total Links	% of Cases	Total Links	% of Cases
Individual Link Flows					
Within 15% for 700 veh/h < flow < 2700 veh/h	> 85% of cases	30	87%	27	85%
Within 100 veh/h for flows < 700 veh/h	> 85% of cases	56	86%	57	72%
Within 400 veh/h for flows > 2700 veh/h	> 85% of cases	32	88%	34	74%
Average Link Flows Criteria Compliance	> 85% of cases	118	86%	118	75%
Sum of All Links					
Sum of Link Flows	Within 5% of sum of all link counts		211,167		213,909
Sum of Counts			208,140		223,305
% Difference [abs(flow - count)/count]			1.45%		4.21%
Links with GEH statistic < 5	> 85% of cases	118	100%	112	95%

As shown in the highlighted row in **Table 4-2**, 74 percent of the links with more than 2,700 vehicles per hour for model flows were within 400 vph of the observed volumes, which is below the target of 85 percent.

In the AM and PM peak hour models, there are a number of interstate links with volumes that exceed 2,700 vph. Some of the links have volumes that exceed 4,000 and 6,000 vph.

Using a fixed value of 400 vph as a calibration threshold on these higher volume links is equivalent to using a "within 10%" difference between the model volumes and the observed flow for a link with a 4,000 vph flow. For a link with 6,000 or more vehicles per hour, the 400 vph calibration threshold allows for a maximum "within 6.7%" difference to meet the calibration threshold. Therefore, it can be concluded that being within 400 vph of these higher observed volumes is too stringent a calibration requirement for these higher volume links.

Since the links with volumes between 700 and 2,700 vph were evaluated using a calibration threshold of "Within 15%", this same "Within 15%" threshold was also applied to the links with flows greater than 2,700 vph. This was done to determine if the percentage of links with volumes above 2,700 vph meeting the "within 15%" threshold would increase above the calibration target of 85%.

A revised table, **Table 4-2R** was prepared to summarize the results the change for individual link flows being within 400 vph to "Within 15%" has on meeting the 85 percent target threshold of network links. This table also stratifies the results for the links with volumes on the mainline, above 2,700 vph and by separating the ">2,700 vph" category into three separate sub-categories (2,700 - 4,000 vph, 4000 – 6,000 vph, and > 6,000 vph).

Table 4-2R: Traffic Flow Calibration Statistics

Hourly Flows - Model v. Observed	Target	AM Peak Hour		PM Peak Hour	
		Total Links	% of Cases	Total Links	% of Cases
Individual Link Flows					
Within 100 veh/h for flows < 700 veh/h	> 85% of cases	56	86%	57	72%
Within 15% for 700 veh/h < flow < 2700 veh/h	> 85% of cases	30	87%	27	85%
Within 15% for flows > 2700 veh/h	> 85% of cases	32	100%	34	94%
Within 15% for flows along mainline		38	100%	38	95%
Within 15% for 2700 veh/h < flow < 4000 veh/h	> 85% of cases	10	100%	12	92%
Within 15% for 4000 veh/h < flow < 6000 veh/h	> 85% of cases	20	100%	17	94%
Within 15% for flows > 6000 veh/h	> 85% of cases	2	100%	5	100%
Average Link Flows Criteria Compliance	> 85% of cases	118	90%	118	81%
Sum of All Links					
Sum of Link Flows	Within 5% of sum of all link counts		211,167		213,909
Sum of Counts			208,140		223,305
% Difference [abs(flow - count)/count]			1.45%		4.21%
Links with GEH statistic < 5	> 85% of cases	118	100%	112	95%

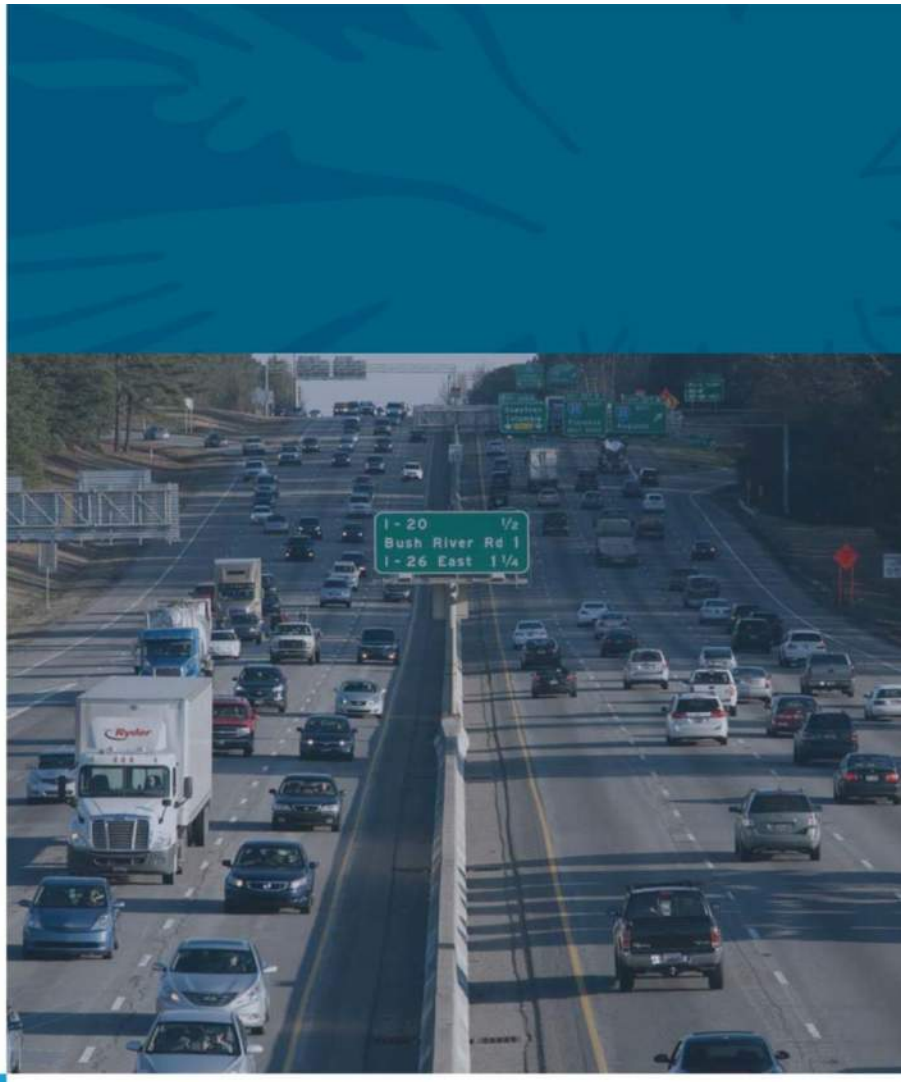
With the calibration criteria for links with more than 2,700 vph revised from 400 vph to 15% of the link volume, the following calibration results are obtained:

- The percentage of links within 15% for flow above 2,700 vph: 100% AM Peak, 94% PM Peak
- The percentage of mainline freeway links within 15%: 100% AM Peak, 95% PM Peak
- Within 15% for links with flows between 2,700 and 4,000 vph: 100% AM Peak, 92% PM Peak
- Within 15 % for links with flows between 4,000 and 6,000 vph: 100% AM Peak, 94% PM Peak
- Within 15% for links with flows greater than 6,000 vph: 100% AM Peak, 100% PM Peak

In conclusion, changing the calibration criteria for links over 2,700 vph from the fixed value variance of 400 vph to the typical 15% variance results in 94% of links meeting the calibration criteria (compared to 74% of links with flows exceeding 2,700 vph meeting the fixed 400 vph variance criterion).

CAROLINA CROSSROADS

I-20/26/126 Corridor Project



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1 Introduction

1.1 Project Description

STV, in cooperation with HDR and Mead & Hunt (the project team), has been contracted by the South Carolina Department of Transportation (SCDOT) to provide engineering services necessary for the preparation of an Environmental Impact Statement (EIS), right of way plans, and final construction plans for roadways and bridges for the proposed Carolina Crossroads I-20/26/126 Corridor Project.

The proposed project is a transportation corridor improvement project located in Lexington and Richland counties. To date, the project area has been defined as a mainline corridor including I-20 from the Saluda River to the Broad River (approximately four miles), I-26 from Broad River Road to US-378 (approximately nine miles), and I-126 from I-26 to Colonial Life Boulevard (approximately one mile. **Figure 1.1** illustrates the extent of the Carolina Crossroads study area.

Figure 1-1 - Carolina Crossroads Study Area

The I-20/26/126 corridor is a vital link in South Carolina, serving residents, commuters, travelers, and commerce. Due to nearby residential and commercial development, proximity to downtown Columbia, traffic volumes, and the overall geometric layout, including 12 interchange points, the I-20/26/126 corridor has become one of the most congested interstate sections in South Carolina. The purpose of the proposed project is to address this congestion and enhance safety throughout the corridor.

1.2 Purpose of Representative Alternative Traffic Analysis

The traffic analysis of the Representative Alternatives (RA) consisted of an iterative process involving the development of traffic projections incorporating previously collected data, screening of interchange Accessory Options (AO) that led to the development of the individual RA, evaluating microsimulation networks of individual RA concepts that included microsimulation model calibration, review of areas of congestion within

each alternative, and preparation of measures of effectiveness to facilitate the comparison of individual RA. As areas of congestion and improvements in conceptual design of the RA were addressed, the microsimulation networks were modified to incorporate improvements to the original RA concept. Detailed information regarding the alternatives development and screening process is contained in the *Alternatives Development and Screening Report.*

Travel demand modeling was also performed for those RA that included major new alignment segments between I-26 and I-20 as an alternative to maintaining the existing I-20/I-26 system interchange.

1.3 Coordination of Alternative Traffic Analysis

The traffic analysis of the RA included coordination among the other activities taking place internal to the Carolina Crossroads project, as well as coordination with other SCDOT projects.

As mentioned previously, the traffic analysis of the RA included interaction with the development of the conceptual roadway design of each RA. In addition to the interactive RA development, the Alternative Traffic Analysis was also coordinated with internal project activities, such as the preparation of planning documents and the development of noise and air quality assessments.

Coordination with other major SCDOT planning projects in the Columbia area was also a necessity. These projects included the *I-26 Widening from Mile Marker 85 to Mile Marker 101*, and the *I-20/26/77 Corridor Management Plan* planning study.

The *I-26 Widening from Mile Marker 85 to Mile Marker 101* project is evaluating the proposed widening of I-26 from approximately 1.6 miles west of SC 202 (Exit 85) to the west end of the Carolina Crossroads project at Exit 101. The project includes traffic analysis, conceptual roadway design, and planning document preparation.

The I-20/26/77 Corridor Management Plan encompasses approximately 100 miles of interstate routes on I-20, I-26, I-77, I-126 and SC 277 in and around the Columbia area. This planning study was to identify evaluate the feasibility of strategies to provide congestion relief and improved capacity on the interstate routes. Since the Carolina Crossroads study area is a subset of the larger regional freeway network under study as part of I-20/26/77 Corridor Management Plan, it was desirable to share traffic data and coordinate on elements of the network microsimulation. The sharing of information between the two projects was intended to achieve the consistent use and application of microsimulation model networks, traffic data and analysis techniques, and trip tables used in dynamic traffic assignment in the overlapping portions of the study area.

This report summarizes the procedures and methodologies used in preparing the traffic analysis used to compare the ten RA. The ten RA consisted of nine potential build conditions (RA1 – RA9) and a no-build alternative (RA10).

2 Traffic Projections

Traffic projections were developed to provide estimates of 2040 traffic volumes used in the development and assessment of each of the ten RA.

2.1 Development of Traffic Projections

Two methods were used to develop traffic projections that were applied to elements of the RA development and to the microsimulation of each RA. The first method involved the use of historic traffic data to estimate system-wide annual growth rates to be applied against existing traffic. The second method involved the use of origin-destination data collected as part of the Carolina Crossroads data collection and developed into regional trip tables used in the microsimulation model. This second method will be discussed in **Section 4 Microsimulation Traffic Modeling**.

Previously collected existing traffic volume data were used as the basis for the development of the future traffic projections used in the preliminary screening of interchange AO and for high level assessment of freeway ramps, and in the microsimulation model network.

2.1.1 EXISTING TRAFFIC VOLUMES

Extensive traffic data collection was performed as part of the Carolina Crossroads project. The data collection effort is summarized in a separate technical report *Traffic Data Collection, Carolina Crossroads*. Data that was collected included vehicle classification/volume counts at the I-20/I-26 and I-26/I-126 system interchanges, ramp termini turning movement counts, data from mainline Automatic Traffic Recorders (ATR), and regional and ramp-to-ramp origin-destination information.

Project Team members met in an Alternatives Workshop held in March 2016 to discuss potential interchange and network improvement options. During this workshop, it was apparent that the original turning movement traffic data collection was insufficient to cover the extent of turning movement counts needed to evaluate the improvement option concepts. It was decided to extend the turning movement count coverage to include certain intersections adjacent to the ramp termini intersections where the original turning movement counts were collected. Collecting data at these adjacent intersections allowed for the investigation of interchange AO to extend beyond the footprint of the ramp termini. The data collection also allowed accurate traffic volumes to be used in preparing the arterial interchange and the overall network microsimulation models.

The turning movement count data was collected by SCDOT. The list of the locations of the additional turning movement counts and the turning movement count data are contained in **Appendix A**. The original ramp termini turning count data is contained in Appendix E of the *Traffic Data Collection, Carolina Crossroads* report.

A review of the combined turning movement count and system interchange counts indicated that the system-wide morning peak hour was 7:30 to 8:30 AM and the system-wide afternoon peak hour was 4:45 to 5:45 PM. At the system ramps, the morning peak hour was found to be between 7:00 and 8:00 AM, while the afternoon peak was found to be 4:00 to 5:00 PM.

Mainline volume data derived from the ATR were combined with the system ramp volumes and the turning movement ramp peak hour volumes to develop existing balanced traffic volumes for the study area. Selection of the mainline volumes was based on directional volumes during the morning (7:00 AM to 10:00 AM) and afternoon (4:00 PM to 6:00 PM) peak periods for weekdays (Tuesday, Wednesday, and Thursday). Mainline

estimated peak hour volumes on I-26 and I-126 were derived from ATR data obtained from station P-0021, which is located on I-126 between the Greystone Boulevard interchange and the bridge over Broad River, and station P-0095, which is located on I-26 between the Lake Murray Boulevard interchange (Exit 102) and the Harbison Boulevard interchange (Exit 103). Mainline estimated peak hour volumes on I-20 were derived from ATR data obtained from station P-0126, which is located on I-20 at milepost 66.3 near the bridge over the Broad River, and station P-0086 on I-20 between the Bush River Road interchange (Exit 63) and the US 378 interchange (Exit 61). The locations of the ATR stations are shown in **Figure 2-1**.

The entire collected ATR data, generally covering the period between January 1, 2014 and January 31, 2015, was used to determine the directional freeway volumes by balancing freeway segment volumes selected at an ATR station through the network by adding and subtracting ramp volumes entering and exiting the freeways via service interchange ramps. This was done individually for each direction of I-26/I-126 and I-20 for each peak hour to provide a conservative estimate of freeway traffic volumes for use in the preliminary development of alternatives. Starting with a 10th highest hourly volume, and after accounting for on- and off-ramp volumes between the count stations, the resulting volume was compared against the hourly volumes at the count station at the opposite end of the network. When starting with a 10th highest hourly volume at station P-0021, the resulting volume on the segment containing station P-0095 was reviewed. Similarly, starting with a 10th highest volume at station P-0095, the resulting volumes on the segment containing station P-0021 was reviewed. A similar approach was taken for both directions of I-20 between stations P-0126 and P-0086.

For example, as shown in **Table 2.1**, the following freeway volumes from the P-0095 and P-0021 stations were compared for westbound I-26/I-126 during the weekday morning peak period:

- The 10th highest westbound volume at station P-0095 (2,586 vehicles per hour) results in a volume of 1,771 vehicles per hour at station P-0021. This volume (1,771 vehicles per hour) is equivalent to the 163rd highest westbound hourly volume observed at station P-0021.
- The westbound volume (2,411 vehicles per hour) associated with the 10th highest two-way volume (7,521 vehicles per hour) at station P-0095, results in a volume of 1,596 vehicles per hour at station P-0021. The 2,411 vehicles per hour volume at station P-0095 is the 166th highest hourly westbound volume at that station, while the 1,596 vehicles per hour volume at station P-0021 is equivalent to the 285th highest hourly westbound volume.
- The 10th highest westbound volume at station P-0021 (2,023 vehicles per hour) results in a volume of 2,838 vehicles per hour at station P-0095. This volume exceeds the highest observed morning westbound volume (2,647 vehicles per hour) at station P-0095 by 191 vehicles per hour.
- The westbound volume (1,973 vehicles per hour) associated with the 10th highest two-way volume (7,340 vehicles per hour) at station P-0021, results in a volume of 2,788 vehicles per hour at station P-0095. The 1,973 vehicles per hour volume at station P-0021 is the 25th highest hourly westbound volume at that station, while the 2,788 vehicles per hour at station P-0095 is 141 vehicles more than the highest observed morning westbound volume (2,647 vehicles per hour) at station P-0095.

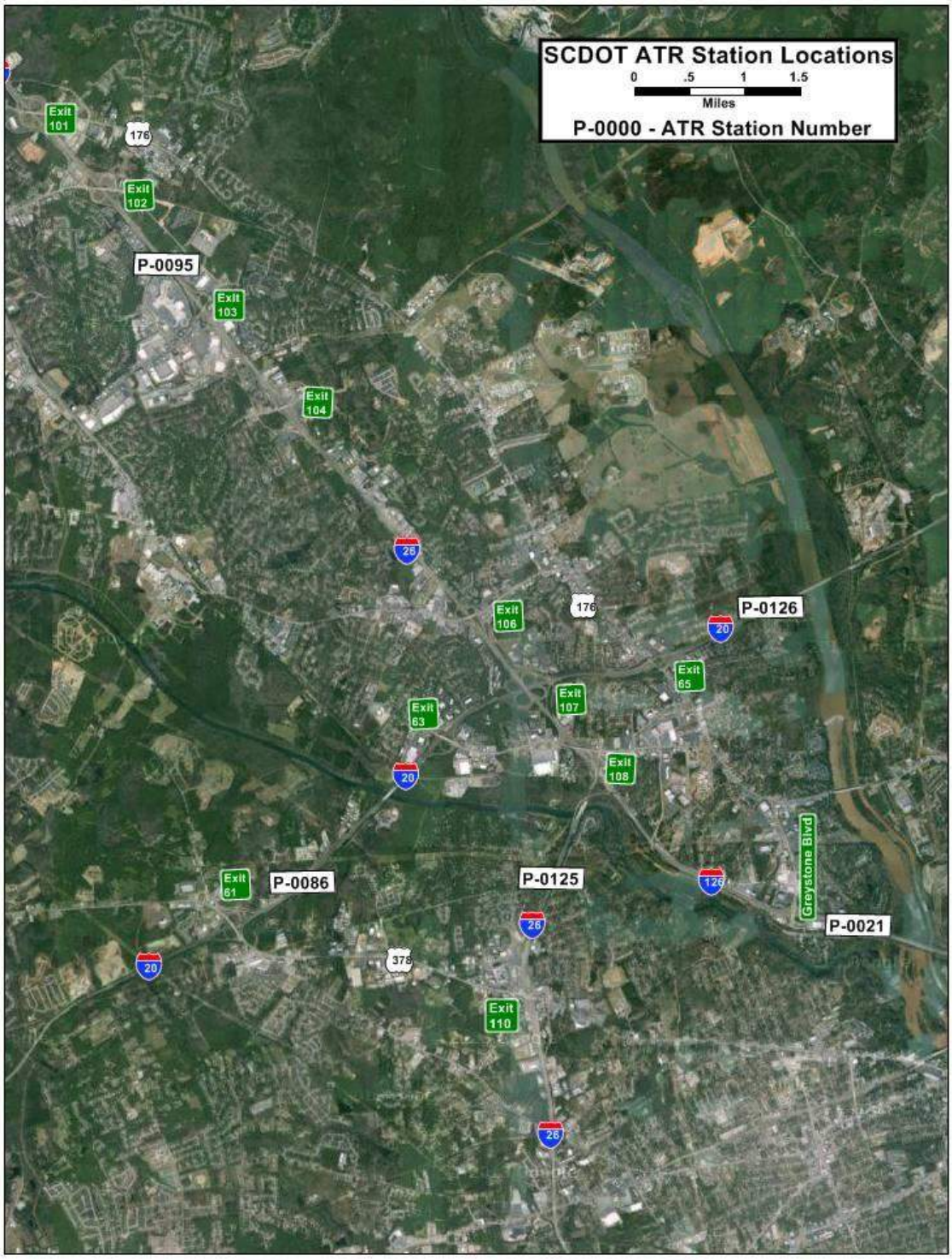


Figure 2-1: SCDOT ATR Station Location

Table 2.1 - I-26/I-126 Westbound AM ATR Station Volume Comparison

I-26/I-126 Westbound - AM Peak Hour											
ATR Station	Volume	# Highest Hour	10th Highest Hour Date/Time	ATR Station	Volume	# Highest Hour	P-0095 # Highest Hourly Volume	Starting Volume P-0095	Δ Ramp Volume P-0021 P-0095	Ending Volume P-0021	P-0021 # Highest Hourly Volume
P-0095	2,647	1st		P-0021	2,238	1st					
WB	2,586	10	06/05/2014	WB	1,679	229	10	2,586	815	*1,771*	*163*
EB	4,243	165	8	EB	4,894	193	*65*	*2,494*	815	1,679	229
Total	6,829	144	THU	Total	6,573	207					
WB	2,411	166	02/25/2014	WB	1,704	203	166	2,411	815	*1,596*	*285*
EB	5,110	6	8	EB	5,152	78	*34*	*2,519*	815	1,704	203
Total	7,521	10	TUE	Total	6,856	129					
WB	2,230	277	05/06/2014	WB	2,023	10	*> 1st*	*2,838*	815	2,023	10
EB	4,254	164	9	EB	5,149	80	277	2,230	815	*1,415*	*312*
Total	6,484	206	TUE	Total	7,172	49					
WB	2,402	178	03/25/2014	WB	1,973	25	*> 1st*	*2,788*	815	1,973	25
EB	4,134	189	9	EB	5,367	20	178	2,402	815	*1,587*	*287*
Total	6,536	197	TUE	Total	7,340	10					

0,000 - Volume from ATR Station Data *>1st* - calculated volume is higher than highest recorded weekday ATR volume

0,0000 - Volume calculated using Δ ramp volumes

Using this methodology, the following volumes were selected at their respective count stations and used to estimate mainline segment volumes along their respective routes in each direction during the morning and afternoon peak periods. In some instances, the observed volume at the upstream station was chosen, resulting in a more conservative volume estimated at the downstream station. In other instances, a more conservative volume could be estimated at the upstream station by selecting the observed volume at the downstream ATR station.

Eastbound I-26/I-126

AM Peak

Station P-0095's 10th highest eastbound AM peak period volume (5,056 vehicles per hour recorded from 8:00 to 9:00 AM on Thursday, May 29, 2014) results in an estimated downstream eastbound volume of 6,267 vehicles per hour at station P-0021; this estimated volume exceeds the highest observed weekday AM eastbound peak period volume at station P-0021 (5,612 vehicles per hour) by 655 vehicles per hour. **Table 2.2** summarizes the I-26/I-126 eastbound AM peak hour ATR count station volume comparison.

PM Peak

Station P-0021's 10th highest two-way PM peak period volume (7,919 vehicles per hour recorded from 6:00 to 7:00 PM on Thursday, March 27, 2014) with a westbound volume of 3,069 vehicles per hour (9th highest observed PM eastbound peak period volume at station P-0021) results in an estimated upstream eastbound volume of 4,034 vehicles per hour at station P-0095; this estimated volume exceeds the

highest observed weekday PM eastbound peak period volume at station P-0095 (3,974 vehicles per hour) by sixty vehicles per hour. **Table 2.3** summarizes the I-26/I-126 eastbound PM peak hour ATR count station volume comparison.

Table 2.2 - I-26/I-126 Eastbound AM ATR Station Volume Comparison

I-26/I-126 Eastbound - AM Peak Hour											
ATR Station	Volume	# Highest Hour	10th Highest Hour	ATR Station	Volume	# Highest Hour	P-0095 # Highest Hourly	Starting Volume P-0095	Δ Ramp Volume P-0021	Ending Volume P-0021	P-0021 # Highest Hourly
P-0095	5,275	1st		P-0021	5,612	1st					
WB	2,591	8	05/29/2014	WB	1,700	206	10	5,056	1211	*6,267*	*> 1st*
EB	5,056	10	8	EB	4,851	209	*288*	*3,640*	1211	4,851	209
Total	7,647	2	THU	Total	6,551	214					
WB	2,411	166	02/25/2014	WB	1,704	203	6	5,110	1211	*6,321*	*> 1st*
EB	5,110	6	8	EB	5,152	78	*231*	*3,941*	1211	5,152	78
Total	7,521	10	TUE	Total	6,856	129					
WB	2,388	188	09/25/2014	WB	1,874	108	*170*	*4,225*	1211	5,436	10
EB	3,435	297	9	EB	5,436	10	297	3,435	1211	*4,646*	*262*
Total	5,823	293	THU	Total	7,310	14					
WB	2,402	178	03/25/2014	WB	1,973	25	*186*	*4,156*	1211	5,367	20
EB	4,134	189	9	EB	5,367	20	189	4,134	1211	*5,345*	*24*
Total	6,536	197	TUE	Total	7,340	10					

0,000 - Volume from ATR Station Data *>1st* - calculated volume is higher than highest recorded weekday ATR volume

0,0000 - Volume calculated using Δ ramp volumes

Table 2.3 - I-26/I-126 Eastbound PM ATR Station Volume Comparison

I-26/I-126 Eastbound - PM Peak Hour											
ATR Station	Volume	# Highest Hour	10th Highest Hour	ATR Station	Volume	# Highest Hour	P-0095 # Highest Hourly	Starting Volume P-0095	Δ Ramp Volume P-0021	Ending Volume P-0021	P-0021 # Highest Hourly
P-0095	3,974	1st		P-0021	3,580	1st					
WB	4,684	117	05/08/2014	WB	4,770	147	10	3,770	-965	*2,805*	*40*
EB	3,770	10	18	EB	2,903	25	*3*	*3,868*	-965	2,903	25
Total	8,454	22	THU	Total	7,673	48					
WB	4,939	8	05/01/2014	WB	4,929	54	27	3,633	-965	*2,668*	*481*
EB	3,633	27	18	EB	2,675	81	*26*	*3,640*	-965	2,675	81
Total	8,572	10	THU	Total	7,604	73					
WB	4,716	101	12/04/2014	WB	4,773	146	*> 1st*	*4,011*	-965	3,046	10
EB	3,743	11	18	EB	3,046	10	11	3,743	-965	*2,778*	*48*
Total	8,459	21	THU	Total	7,819	15					
WB	5,008	4	03/27/2014	WB	4,850	91	*> 1st*	*4,034*	-965	3,069	9
EB	3,534	53	18	EB	3,069	9	53	3,534	-965	*2,569*	*132*
Total	8,542	12	THU	Total	7,919	10					

0,000 - Volume from ATR Station Data *>1st* - calculated volume is higher than highest recorded weekday ATR volume

0,0000 - Volume calculated using Δ ramp volumes

Westbound I-26/I-126

AM Peak

Station P0021's 10th highest westbound AM peak period volume (2,023 vehicles per hour recorded from 9:00 to 10:00 AM on Tuesday, May 6, 2014) results in an estimated downstream westbound volume of 2,838 vehicles per hour at station P-0095; this estimated volume exceeds the highest observed weekday AM westbound peak period volume at station P-0095 (2,647 vehicles per hour) by 191 vehicles per hour. **Table 2.1** (shown previously) summarizes the I-26/I-126 westbound AM peak hour ATR count station volume comparison.

PM Peak

Station P-0021's 10th highest westbound PM Peak period volume (5,062 vehicles per hour recorded from 6:00 to 7:00 PM on Wednesday, February 19, 2014) results in an estimated downstream westbound volume of 5,416 vehicles per hour at station P-0095; this estimated volume exceeds the highest observed weekday PM westbound peak period volume at station P-0095 (5,054 vehicles per hour) by 362 vehicles per hour. **Table 2.4** summarizes the I-26/I-126 westbound PM peak hour ATR count station volume comparison.

Table 2.4 - I-26/I-126 Westbound PM ATR Station Volume Comparison

I-26/I-126 Westbound - PM Peak Hour											
ATR Station	Volume	# Highest Hour	10th Highest Hour	ATR Station	Volume	# Highest Hour	P-0095 # Highest Hourly	Starting Volume P-0095	Δ Ramp Volume P-0021	Ending Volume P-0021	P-0021 # Highest Hourly
P-0095	5,054	1st		P-0021	5,198	1st					
WB	4,931	10	04/29/2014	WB	4,736	176	9	4,931	354	*4,577*	*256*
EB	3,205	187	18	EB	2,533	151	*> 1st*	*5,090*	354	4,736	176
Total	8,136	89	TUE	Total	7,269	161					
WB	4,939	8	05/01/2014	WB	4,929	54	8	4,939	354	*4,585*	*255*
EB	3,633	27	18	EB	2,675	81	*> 1st*	*5,283*	354	4,929	54
Total	8,572	10	THU	Total	7,604	73					
WB	4,842	25	02/19/2014	WB	5,062	10	*> 1st*	*5,416*	354	5,062	10
EB	3,506	64	18	EB	2,930	21	25	4,842	354	*4,488*	*289*
Total	8,348	41	WED	Total	7,992	6					
WB	5,008	4	03/27/2014	WB	4,850	91	*> 1st*	*5,204*	354	4,850	91
EB	3,534	53	18	EB	3,069	9	4	5,008	354	*4,654*	*222*
Total	8,542	12	THU	Total	7,919	10					

0,000 - Volume from ATR Station Data

>1st - calculated volume is higher than highest recorded weekday ATR volume

0,0000 - Volume calculated using Δ ramp volumes

Eastbound I-20

AM Peak

Station P-0086's 10th highest two-way peak period volume (7,419 vehicles per hour recorded from 8:00 to 9:00 AM on Tuesday, May 27, 2014) with an eastbound volume of 5,145 vehicles per hour (second highest observed AM eastbound peak period volume at station P-0086) results in an estimated downstream eastbound volume of 5,404 vehicles per hour at station P-0126; this estimated volume exceeds the highest observed weekday AM eastbound peak period volume at station P-0126 (5,280 vehicles per hour) by 124 vehicles per hour. **Table 2.5** summarizes the I-20 eastbound AM peak hour ATR count station volume comparison.

Table 2.5 - I-20 Eastbound AM ATR Station Volume Comparison

I-20 Eastbound - AM Peak Hour											
ATR Station	Volume	# Highest Hour	10th Highest Hour	ATR Station	Volume	# Highest Hour	P-0095 # Highest Hourly	Starting Volume P-0095	Δ Ramp Volume P-0021	Ending Volume P-0021	P-0021 # Highest Hourly
P-0086	5,194	1st		P-0126	5,280	1st					
WB	2,244	105	02/20/2014	WB	4,625	9	10	5,021	259	*5,280*	*1*
EB	5,021	10	8	EB	5,219	4	*22*	*4,960*	259	5,219	4
Total	7,265	24	THU	Total	9,844	2					
WB	2,274	80	05/27/2014	WB	4,285	62	2	5,145	259	*5,404*	*> 1st*
EB	5,145	2	8	EB	5,280	1	*10*	*5,021*	259	5,280	1
Total	7,419	10	TUE	Total	9,565	14					
WB	2,823	2	04/09/2014	WB	4,497	27	*35*	*4,915*	259	5,174	10
EB	4,835	71	8	EB	5,174	10	71	4,835	259	*5,094*	*30*
Total	7,658	2	WED	Total	9,671	4					
WB	2,174	187	03/25/2014	WB	4,512	22	*75*	*4,820*	259	5,079	38
EB	4,951	25	8	EB	5,079	38	25	4,951	259	*5,210*	*4*
Total	7,125	71	TUE	Total	9,591	10					

0,000 - Volume from ATR Station Data

0,0000 - Volume calculated using Δ ramp volumes

>1st - calculated volume is higher than highest recorded weekday ATR volume

PM Peak

Station P-0086's 10th highest eastbound peak period volume (3,245 vehicles per hour recorded from 6:00 to 7:00 PM on Thursday, May 22, 2014) results in an estimated downstream eastbound volume of 4,654 vehicles per hour at station P-0126; this estimated volume would be ranked as the 4th highest weekday PM eastbound peak period volume among the observed volumes at station P-0126. **Table 2.6** summarizes the I-20 eastbound PM peak hour ATR count station volume comparison.

Table 2.6 - I-20 Eastbound PM ATR Station Volume Comparison

I-20 Eastbound - PM Peak Hour											
ATR Station	Volume	# Highest Hour	10th Highest Hour	ATR Station	Volume	# Highest Hour	P-0095 # Highest Hourly	Starting Volume P-0095	Δ Ramp Volume P-0021	Ending Volume P-0021	P-0021 # Highest Hourly
P-0086	3,619	1st		P-0126	4,863	1st					
WB	3,986	231	05/22/2014	WB	4,529	288	10	3,245	1409	*4,654*	*4*
EB	3,245	10	18	EB	4,573	11	*23*	*3,164*	1409	4,573	11
Total	7,231	89	THU	Total	9,102	177					
WB	4,612	18	01/29/2015	WB	5,068	107	36	3,117	1409	*4,526*	*290*
EB	3,117	36	18	EB	4,460	28	*59*	*3,051*	1409	4,460	28
Total	7,729	10	THU	Total	9,528	48					
WB	3,639	300	11/26/2014	WB	4,117	337	*20*	*3,183*	1409	4,592	10
EB	3,165	23	18	EB	4,592	10	23	3,165	1409	*4,574*	*10*
Total	6,804	199	WED	Total	8,709	267					
WB	4,591	22	11/05/2014	WB	5,379	17	*46*	*3,095*	1409	4,504	17
EB	3,175	22	18	EB	4,504	17	22	3,175	1409	*4,584*	*10*
Total	7,766	7	WED	Total	9,883	10					

0,000 - Volume from ATR Station Data *>1st* - calculated volume is higher than highest recorded weekday ATR volume

0,0000 - Volume calculated using Δ ramp volumes

Westbound I-20

AM Peak

Station P-0126's 10th highest westbound peak period volume (4,622 vehicles per hour recorded from 8:00 to 9:00 AM on Wednesday, March 19, 2014) results in an estimated downstream westbound volume of 2,519 vehicles per hour at station P-0086; this estimated volume would be ranked as the 8th highest weekday AM westbound peak period volume among the observed volumes at station P-0086. **Table 2.7** summarizes the I-20 westbound AM peak hour ATR count station volume comparison.

PM Peak

Station P-0126's 10th highest westbound peak period volume (5,490 vehicles per hour recorded from 6:00 to 7:00 PM on Thursday, March 13, 2014) results in an estimated downstream westbound volume of 4,684 vehicles per hour at station P-0086; this estimated volume would be ranked as the 3rd highest weekday PM westbound peak period volume among the observed volumes at station P-0086. **Table 2.8** summarizes the I-20 westbound PM peak hour ATR count station volume comparison.

While some of the estimates exceed the observed highest directional hourly volume recorded at the ATR, this was considered acceptable and reasonable for their general use as a starting point for evaluating the potential number of lanes needed along mainline segments.

Table 2.7 - I-20 Westbound AM ATR Station Volume Comparison

I-20 Westbound - AM Peak Hour											
ATR Station	Volume	# Highest Hour	10th Highest Hour	ATR Station	Volume	# Highest Hour	P-0086 # Highest Hourly	Starting Volume P-0086	Δ Ramp Volume P-0126	Ending Volume P-0126	P-0126 # Highest Hourly
P-0086	2,865	1st		P-0126	4,804	1st					
WB	2,494	10	05/22/2014	WB	4,315	54	10	2,494	-2103	*4,597*	*13*
EB	4,829	72	8	EB	4,984	72	*131*	*2,212*	-2103	4,315	54
Total	7,323	19	THU	Total	9,299	50					
WB	2,274	80	05/27/2014	WB	4,285	62	80	2,274	-2103	*4,377*	*38*
EB	5,145	2	8	EB	5,280	1	*173*	*2,182*	-2103	4,285	62
Total	7,419	10	TUE	Total	9,565	14					
WB	2,190	160	03/19/2014	WB	4,622	10	*8*	*2,519*	-2103	4,622	10
EB	4,587	140	8	EB	4,764	131	160	2,190	-2103	*4,293*	*58*
Total	6,777	134	WED	Total	9,386	37					
WB	2,174	187	03/25/2014	WB	4,512	22	*14*	*2,409*	-2103	4,512	22
EB	4,951	25	8	EB	5,079	38	187	2,174	-2103	*4,277*	*64*
Total	7,125	71	TUE	Total	9,591	10					

0,000 - Volume from ATR Station Data

>1st - calculated volume is higher than highest recorded weekday ATR volume

0,0000 - Volume calculated using Δ ramp volumes

Table 2.8 - I-20 Westbound PM ATR Station Volume Comparison

I-20 Westbound - PM Peak Hour											
ATR Station	Volume	# Highest Hour	10th Highest Hour	ATR Station	Volume	# Highest Hour	P-0086 # Highest Hourly	Starting Volume P-0086	Δ Ramp Volume P-0126	Ending Volume P-0126	P-0126 # Highest Hourly
P-0086	4,729	1st		P-0126	5,912	1st					
WB	4,653	10	09/18/2014	WB	5,164	60	10	4,653	-806	*5,459*	*13*
EB	3,060	54	18	EB	4,342	69	*81*	*4,358*	-806	5,164	60
Total	7,713	12	THU	Total	9,506	54					
WB	4,612	18	01/29/2015	WB	5,068	107	18	4,612	-806	*5,418*	*14*
EB	3,117	36	18	EB	4,460	28	*111*	*4,262*	-806	5,068	107
Total	7,729	10	THU	Total	9,528	48					
WB	4,632	13	03/13/2014	WB	5,490	10	*3*	*4,684*	-806	5,490	10
EB	3,010	75	18	EB	4,471	24	13	4,632	-806	*5,438*	*14*
Total	7,642	21	THU	Total	9,961	7					
WB	4,591	22	11/05/2014	WB	5,379	17	*25*	*4,573*	-806	5,379	17
EB	3,175	22	18	EB	4,504	17	22	4,591	-806	*5,397*	*15*
Total	7,766	7	WED	Total	9,883	10					

0,000 - Volume from ATR Station Data

>1st - calculated volume is higher than highest recorded weekday ATR volume

0,0000 - Volume calculated using Δ ramp volumes

The existing peak hour volumes along the interstate and at the interchanges, including turning movement counts at the ramp terminal intersections, are contained in **Appendix B.**

2.1.2 2040 TRAFFIC VOLUMES

The first traffic projection method used to estimate 2040 traffic volumes was based on changes to historic annual average daily traffic (AADT) volumes obtained from SCDOT and from growth forecasts in the South Carolina Statewide Model (SCSWM). The historic AADT for the multiple study area freeway segments and interchange arterial segments were assessed, as were the differences in SCSWM link volume forecasts in the existing and future E+C model network within the study area. From this assessment, a general annual growth rate of 1.0 percent was established and used to factor existing peak hour volumes to create 2040 peak hour volume estimates for use in the capacity screening.

The second method involved modifying and using trip tables developed as part of the I-20/26/77 Corridor Management Plan. These trip tables were developed by the travel demand modeling consultants working on the I-20/26/77 Corridor Management Plan and were initially derived from SCSWM trip tables. From the SCSWM existing and future network daily trip tables, morning and afternoon peak hour subarea trip tables were prepared. A general annual growth rate of 0.7 percent was derived from those trip tables. The trip tables were used in the microsimulation of alternatives and will be discussed in **Section 4 Microsimulation Traffic Modeling**.

Projected traffic volumes were developed using the existing peak hour volumes along the mainline interstate and at the interchanges and applying a general uniform annual growth rate to those volumes to estimate 2040 morning and afternoon peak hour traffic. For the traffic volume projections used in the capacity screening, a one percent annual growth rate was used to estimate 2040 peak hour traffic volumes. The 2040 peak hour traffic volumes were applied in the generalized interstate/interchange capacity screenings used to develop the individual RA from a range of prospective Accessory Options (AO) at each interchange. The estimated 2040 volumes along the interstate and at the interchanges, including turning movement counts at the ramp terminal intersections, are contained in **Appendix C**.

The differences in the growth rates result from the different methodologies used to estimate the rates. For the capacity screening, historic and projected trends in more general average annual daily volumes were used to develop the 1.0 percent growth rate. For the microsimulation models, the 0.7 percent growth rate is an overall average rate within the study area derived from the peak hour trip tables, which in turn were based on the zonal trip generation estimates from the SCSWM socio-economic/land use assumptions and traffic zone origin-destination estimates.

The trip tables used in the microsimulations would reflect changes in peak hour trip generation arising from forecast changes in SCSWM zonal socio-economic inputs, such as population and employment, as well as changes in the distribution of trips between zones. As a result, some zones may be estimated to experience traffic growth at a slightly higher rate, while traffic in other zones may be estimated to grow at a lower rate. The peak hour trip tables are better suited for microsimulation analyses of peak hour conditions that incorporate the dynamic assignment of traffic through the existing, future no-build, and future improvement alternative study area networks.

While the growth rates differ, they are appropriate for their individual applications, and should not produce significantly different results. Assuming application of the growth rates over a 25 year period (such as between 2015 and 2040), the 1.0 percent annual growth rate would produce a compounded growth factor of 1.28, while a 0.7 percent annual rate would produce a factor of 1.19. Applied to the same base year volume, the overall difference between the resulting volumes estimated using these rates is approximately 7.5 percent. This is within generally observed weekday, weekly, and monthly variations typically encountered with peak hour volumes.

3 Capacity Screening

Capacity screenings were performed for existing and 2040 no-build traffic conditions and for a range of multiple 2040 AOs at each interchange. The capacity screening was intended to be a quick, sketch planning level assessment of the potential operation of elements at each of the study area interchanges. The elements assessed included adjacent freeway segments, interchange arterials, and interstate ramps.

The sketch planning assessments were performed by evaluating existing and estimated future traffic volumes using capacity "rules of thumb" for the various facilities to estimate the operational level of service (LOS). Two primary sources were used for the "rules of thumb" for the various facility types: the Florida Department of Transportation's (FDOT) **2012 Generalized Service Volume Tables**[1] (2012 GSVT) and chapter seven of the Massachusetts Department of Transportation's (MassDOT) 2006 **Project Development & Design Guide**[2].

3.1 Capacity Screening Threshold Volumes

The FDOT 2012 Generalized Service Volume Tables contain nine tables for planning level assessments of various roadway facilities, including freeways and signalized state arterials, located in urbanized areas, areas transitioning into urbanized areas (or areas outside of urbanized areas with a population exceeding 5,000 people), and rural undeveloped areas and cities (or developed areas with a population less than 5,000 people). LOS thresholds are provided for facilities within those area types based on annual average daily volumes, peak hour two-way volumes, and peak hour directional volumes. Since the available data provides for the directional assessment of freeway segments and for signalized state arterials, and since the study area can be considered an urbanized area, *Table 7 – Generalized Peak Hour Directional Volumes for Florida's Urbanized Areas* (2012 GSVT:Table 7) was used in the sketch planning assessments for those facilities. A copy of this table is contained in **Appendix D**.

Chapter seven, section seven of the MassDOT Design Guide includes information on the geometric design of interchange ramps. Section 7.7.2 of the Design Guide refers to ramp capacity and includes *Exhibit 7-27 – Approximate Service Volumes for Signal-lane Ramps* (MassDOT Exhibit 7-27) that outlines LOS criteria for ramps

[1] http://www.fdot.gov/planning/systems/programs/sm/los/pdfs/fdot%202012%20generalized%20service%20volume%20tables.pdf

[2] http://www.massdot.state.ma.us/Portals/8/docs/designGuide/CH_7_a.pdf

based on the ramp design speed. MassDOT Exhibit 7-27 was used as the basis for the sketch planning assessments for interchange ramps. A copy of Section 7.7.2 from the Design Guide is contained in **Appendix D**.

3.1.1 FREEWAY CAPACITY SCREENING THRESHOLD VOLUMES

Table 3.1 summarizes the Freeway LOS criteria derived from the 2012 GSVT:Table 7. The volume values in the columns represent the upper limit for that LOS for the given number of lanes. For example, a two lane freeway segment with a directional peak hour volume less than 2,200 vehicles per hour would be classified as operating at a potential LOS B. With a directional peak hour volume of 4,000 vehicles per hour, the two lane freeway segment would be classified as operating at a potential LOS E. For a directional peak hour volume at or above 4,020 vehicles per hour, the two lane freeway segment would be classified as operating at a potential LOS F.

Table 3.1 Freeway LOS Volume Thresholds

	Freeway LOS			
Lanes	**B**	**C**	**D**	**E**
2	2,200	3,020	3,720	4,020
3	3,300	4,580	5,580	6,200
4	4,400	6,080	7,420	8,400
5	5,500	7,680	9,320	10,580
6	7,560	10,220	12,080	12,780

Source: Table 7 – Generalized Peak Hour Directional Volumes for Florida's Urbanized Areas

As previously discussed, directional volumes were estimated on all the freeway segments approaching or between service interchanges located along I-20, I-26, and I-126. Consequently, individual freeway segments were evaluated using these criteria.

3.1.2 ARTERIAL CAPACITY SCREENING THRESHOLD VOLUMES

Table 3.2 summarizes the LOS criteria derived from the 2012 GSVT:Table 7 for State Signalized Arterials. The volume values again represent the upper limit for that LOS for a given number of lanes. Additionally, the State Signalized Arterials are separated into classes I, II, and III on the basis of the ratio of the number of signalized intersections per mile of arterial roadway.

Class I arterials (which average less than two signals per mile) have a *maximum* LOS D volume threshold. Depicted in **Table 3.2** with three asterisks ("***"), volumes above this threshold would result in the possible LOS for a State Signalized Arterial to be considered as LOS F. If volumes exceed the LOS D threshold volume, the intersections along the arterial, which primarily control actual arterial LOS, are considered as having reached capacity, which in turn causes the arterial operation to operate at LOS F.

Similarly, Class II arterials (which average between two and 4½ signals per mile) and Class III arterials, which average more than 4½ signal per mile, have a *minimum* potential LOS of LOS C. Depicted in **Table 3.2** with two asterisks ("**"), arterial volumes up to the LOS C threshold volumes are considered to result in the arterial operating at a potential LOS C.

Table 3.2 – Arterial LOS Volume Thresholds

State Signalized Arterials					
Class I	**Lanes**	**B**	**C**	**D**	**E**
0 - 1.99 signals/mile	1	510	820	880	***
	2	1,560	1,890	1,960	***
	3	2,400	2,860	2,940	***
	4	3,240	3,830	3,970	***
Class II	1	**	560	810	860
2 - 4.5 signals/mile	2	**	1,330	1,770	1,870
	3	**	2,080	2,680	2,830
	4	**	2,830	3,590	3,780
Class III/IV	1	**	270	630	790
>4.5 signals per mile	2	**	670	1,500	1,700
	3	**	1,050	2,330	2,570
	4	**	1,440	3,170	3,450

Source: Table 7 – Generalized Peak Hour Directional Volumes for Florida's Urbanized Areas

Since the turning movement count data obtained at the ramp terminal intersections can be separated into peak hour directional volumes on each arterial, these planning LOS criteria were used to evaluate the arterials at the service interchanges. The arterial class was determined based on the existing number of signals along the arterial in the area of the service interchange and the total distance between the signals.

3.1.3 RAMP CAPACITY SCREENING THRESHOLD VOLUMES

Table 3.3 summarizes the LOS criteria derived from MassDOT Exhibit 7-27. The volume values used in the table were taken from the 45-50 miles per hour ramp design speed column. While MassDOT Exhibit 7-27 is for single lane ramps, a footnote to the Exhibit advises to multiply the thresholds by 1.8 to obtain service volumes for two lane ramps. The values shown in **Table 3.3** for two lane ramps were calculated based on this guidance. Additionally, loop ramp volumes thresholds were not explicitly listed in MassDOT Exhibit 7-27, but were derived based on the text of section 7.7.2, which states that *"The capacity of a loop ramp is about 1,250 pcph"*[3] (where pcph is passenger cars per hour). The loop ramp volume thresholds were calculated by dividing the single lane ramp LOS threshold volume by the single lane ramp LOS E threshold volume and multiplying it by 1,250.

Table 3.3 - Ramp LOS Volume Thresholds

Ramp LOS (45-50 mph)				
Lanes	**B**	**C**	**D**	**E**
1	1,000	1,250	1,325	1,650
2	1,800	2,250	2,385	2,970
Loop Ramp	758	947	1,004	1,250

[3] 2006 Design Guide, page 7-52

The service interchange ramp volumes, derived from peak hour turning movement counts, and the system ramp volumes, derived from vehicle classification counts, were used with these volume thresholds to evaluate the potential LOS on the ramps.

3.1.4 LOS SCREENING PROCESS

While the freeway, state signalized arterial and ramp volume threshold tables permit specific LOS classifications, the output of the screening process was to identify a facility as operating *under*, *near*, and *over* capacity. To be considered *under capacity*, facility volumes had to fall in the LOS B, LOS C, or LOS D threshold ranges. To be considered *near capacity*, facility volumes had to fall in the LOS E threshold range. To be considered *over capacity*, facility volumes had to fall in the LOS F threshold range.

3.2 Existing/No-Build Capacity Screening

The existing and 2040 no-build traffic conditions were assessed to establish the general baseline condition of the existing network's freeway segments, state signalized arterials, and ramps using the previously established LOS volume thresholds and classifying the operation on the individual facilities as under, near, or over capacity.

To facilitate summarizing the information, interchanges are described based their individual exit numbers. Street names will be omitted. Interchanges located on I-26 are numbered between 101 and 110. Interchanges located on I-20 are numbered between 63 and 65. For reference, the interchange numbers used in the screening are as follows:

- Exit 101 (Broad River Road)
- Exit 102 (Lake Murray Boulevard)
- Exit 103 (Harbison Boulevard)
- Exit 104 (Piney Grove Road)
- Exit 106 (St Andrews Road)
- Exit 107/64 (I-20/I-26 System Interchange)
- Exit 108 (Bush River Road)
- Exit 108B (I-20/I-126 System Interchange)
- Exit 110 (Sunset Boulevard/US 378)
- Exit 63 (Bush River Road)
- Exit 65 (Broad River Road)

The individual exit capacity screening inputs and results are contained in **Appendix E**.

3.2.1 CAPACITY SCREENING – EXISTING CONDITIONS

The existing volumes for the freeway segments, arterials, and ramps were used to complete the screening for existing conditions. The results of the screening are summarized in **Table 3.4**.

The results for the freeway segments shown at each exit were derived from the inbound freeway segment volume at the interchange and are based on the volume thresholds shown in **Table 3.1**. For example, the results for the eastbound freeway segment are based on the volume approaching Exit 103 from Exit 102, while the results for the westbound freeway segment are based on the volume approaching Exit 103 from Exit 104. At Exit 108B, the results for the eastbound freeway segment are based on the eastbound volume between the eastbound off-ramp to Exit 108 and the eastbound on-ramp from Exit 108; while the results for the westbound freeway segment are based on the volume approaching from Exit 110.

The results for the arterials at each exit were derived using the highest volume approaching either of the ramp intersections at each interchange and the volume thresholds shown in **Table 3.2**. There are no arterial facilities located at the system ramp interchanges at Exits 107/64 and 108B; therefore, no screening results are provided for arterials at those exits.

The results for the ramps follow a general pattern applicable at each interchange except at Exit 108B. For off- and on-ramps, the results were based on the volume thresholds for one or two lane ramps as shown in **Table 3.3**, while the loop ramp results were based on the loop ramp threshold volumes. Where ramps of a particular type are not present at an interchange, no results are provided.

At Exit 108B, there are a mix of ramps and freeway segments that do not fall under the general pattern.

The segments, shown in **Figure 3.1**, are summarized are as follows:

- EB/SB Off – the two lane eastbound freeway segment of I-26 east before the merge of the eastbound on-ramp from Exit 108; this segment was evaluated using freeway segment criteria and not ramp criteria
- EB/SB Loop On – the single lane flyover ramp from westbound I-126 to eastbound I-26; this segment was evaluated using ramp criteria
- EB/SB Loop Off – the three lane eastbound freeway segment that becomes I-126 eastbound; this segment was evaluated using freeway segment criteria and not ramp criteria
- WB/NB Off – the two lane westbound flyover ramp from westbound I-26 that continues as westbound I-26 at the merge with westbound I-126 segments/ramps; this segment was evaluated using ramp criteria
- WB/NB Loop On – the two lane westbound freeway segment from westbound I-126 that merges to the left of the westbound I-26 flyover ramps; this segment was evaluated using freeway segment criteria
- WB/NB Loop Off – the single lane ramp from westbound I-126 that leads to the I-20 ramps at the system interchange (without the westbound on-ramp traffic from Exit 108); this segment was evaluated using ramp criteria
- WB/NB On – the single lane ramp from westbound I-26 to eastbound I-126; this segment was evaluated using ramp criteria.

Figure 3-1 - Exit 108B Ramp Descriptions in Table 3.4

Table 3.4 Existing Condition Screening Summary

Exit #	Peak Hour	Existing Conditions											
		Freeway Segment		Arterial		EB/SB Ramps				WB/NB Ramps			
		EB (SB)	WB (NB)	EB (SB)	WB (NB)	EB/SB Off	EB/SB Loop On	EB/SB Loop Off	EB/SB On	WB/NB Off	WB/NB Loop On	WB/NB Loop Off	WB/NB On
101	AM	Under	Under	Under	Under	Under	-	Under	Under	Under	-	Under	Under
	PM	Under	Under	Under	Under	Under	-	Under	Under	Under	-	Under	Under
102	AM	Under	Under	Under	Under	Under	-	Under	Under	Under	-	Under	Under
	PM	Under	Under	Under	Near	Under	-	Under	Under	Under	-	Under	Under
103	AM	Under	Under	Under	Under	Under	-	-	Under	Under	-	Under	Under
	PM	Under	Near	Under	Under	Under	-	-	Under	Under	-	Under	Under
104	AM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
	PM	Under	Near	Under	Under	Under	-	-	Under	Under	-	-	Under
106	AM	Over	Under	Under	Under	Under	Under	-	Under	Under	-	Under	Under
	PM	Under	Under	Under	Under	Under	Under	-	Under	Under	-	Under	Under
107/64	AM	Under	Under	-	-	Under	Under	Over	Under	Under	Under	Under	Under
	PM	Under	Under	-	-	Under	Under	Near	Under	Under	Under	Near	Near
108	AM	Under	Under	Under	Under	Under	Under	-	-	Under	Under	-	-
	PM	Under	Under	Under	Over	Under	Under	-	-	Under	Under	-	-
108B	AM	Near	Under	-	-	Under	Under	Under	-	Under	Near	Under	Under
	PM	Under	Under	-	-	Under	Under	Under	-	Near	Over	Under	Under
110	AM	Under	Under	Over	Over	Under	-	-	Under	Under	-	-	Under
	PM	Under	Under	Over	Over	Under	-	-	Under	Under	-	-	Under
63	AM	Under	Under	Under	Under	Under	Under	-	Under	Under	-	-	Under
	PM	Under	Under	Under	Near	Under	Under	-	Under	Under	-	-	Under
65	AM	Under	Under	Over	Under	Under	-	-	Under	Under	-	-	Under
	PM	Under	Under	Near	Near	Under	-	-	Under	Under	-	-	Under

The screening shows that the eastbound segment approaching Exit 106 is currently operating over capacity during the morning peak hour. The arterial segments at Exit 110 (Sunset Boulevard) are over capacity during both peak hours, while the southbound approach at Exit 65 (Broad River Road) and the westbound approach at Exit 108 (Bush River Road) are over capacity in the morning and afternoon peak hours respectively. Two ramps are currently over capacity: the loop off-ramp from eastbound I-26 to eastbound I-20 at Exit 107 in the morning peak hour, and the two lane freeway segment from westbound I-126 (analyzed as a freeway segment) in the afternoon peak hour.

3.2.2 2040 NO-BUILD CAPACITY SCREENING

The existing volumes for the freeway segments, arterials, and ramps were increased using a one percent annual growth rate to estimate 2040 volumes. These volumes were then used to complete the screening for 2040 No-Build conditions. The results of the screening are summarized in **Table 3.5**.

As would be expected with continued growth in traffic and no increase in roadway capacity, the 2040 No-Build capacity screening has more freeway segments, arterials and ramps that are projected to be over capacity.

3.3 Preliminary Interchange Alternatives Capacity Screening

Preliminary alternatives were developed for each of the interchanges throughout the study area. The concepts were designated as “Accessory Options” and numbered. They are referenced as AO1, AO2, AO3, etc.

The capacity of the individual AO were screened similar to the existing and 2040 no-build capacity screenings. In addition to the capacity screenings, the AO were also analyzed using Synchro/SimTraffic software and, where roundabouts were included in the AO concept, with SIDRA software to further assess intersection operations, identify the need for additional capacity and turn lanes to be incorporated into the AO.

Where possible, the FHWA’s Capacity Analysis for Planning of Junctions (CAP-X) Excel-based spreadsheet was used to assess proposed interchange configurations. CAP-X allows for a planning-level assessment and comparison of a range of conventional and innovation intersection, roundabout and interchange configurations. For interchanges, CAP-X assesses diamond, partial cloverleaf (with diagonally opposite loop ramps in two quadrants), displaced left turn, double crossover diamond (diverging diamond), and single point interchanges. Volumes, truck percentages, and growth rates are input, along with number of turn lanes at ramp intersections. Using these inputs, CAP-X calculates volume-capacity (v/c) ratios for portions of the interchange and an overall v/c, and compares and ranks the results. These comparisons were also included in the preliminary alternative capacity screening.

To facilitate the capacity screening and review of intersection operations and in keeping with the general nature of the assessments, Synchro template files were used to evaluate most of the consistently common interchange AO. The use of template files eliminated the need to devote substantial effort to develop multiple, often complex, individual interchange models at each interchange location. At each interchange where template files were used, the volumes were modified to correspond with traffic volumes at the individual interchange.

Table 3.5 2040 No-Build Condition Screening Summary

Exit #	Peak Hour	2040 No-Build Conditions											
		Freeway Segment		Arterial		EB/SB Ramps				WB/NB Ramps			
		EB (SB)	WB (NB)	EB (SB)	WB (NB)	EB/SB Off	EB/SB Loop On	EB/SB Loop Off	EB/SB On	WB/NB Off	WB/NB Loop On	WB/NB Loop Off	WB/NB On
101	AM	Near	Under	Under	Under	Under	-	Under	Under	Under	-	Under	Under
	PM	Under	Over	Under	Over	Under	-	Under	Under	Under	-	Under	Under
102	AM	Over	Under	Over	Under	Under	-	Under	Under	Under	-	Under	Under
	PM	Under	Over	Near	Over	Under	-	Under	Under	Under	-	Under	Under
103	AM	Over	Under	Under	Under	Under	-	-	Under	-	-	Under	Under
	PM	Under	Over	Over	Over	Under	-	-	Under	-	-	Near	Under
104	AM	Over	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
	PM	Near	Over	Under	Over	Under	-	-	Under	Under	-	-	Under
106	AM	Over	Under	Under	Under	Under	Near	-	Near	Under	-	Under	Under
	PM	Over	Under	Under	Under	Under	Near	-	Under	Under	-	Under	Under
107/64	AM	Over	Under	-	-	Under	Near	Over	Over	Under	Under	Under	Near
	PM	Under	Under	-	-	Under	Under	Over	Under	Under	Under	Over	Over
108	AM	Over	Under	Over	Under	Under	Under	-	-	Under	Under	-	-
	PM	Under	Under	Under	Over	Under	Under	-	-	Under	Under	-	-
108B	AM	Over	Under	-	-	Over	Under	Over	Under	Over	Over	Under	Under
	PM	Under	Under	-	-	Under	Under	Under	Under	Over	Over	Over	Under
110	AM	Under	Under	Over	Over	Under	-	-	Under	Under	-	-	Under
	PM	Under	Under	Over	Over	Under	-	-	Under	Under	-	-	Under
63	AM	Over	Under	Over	Under	Under	Under	-	Under	Under	-	-	Under
	PM	Under	Under	Near	Over	Under	Under	-	Under	Under	-	-	Under
65	AM	Near	Near	Over	Under	Under	-	-	Under	Under	-	-	Under
	PM	Under	Over	Over	Over	Under	-	-	Under	Under	-	-	Under

While the template files did not replicate the exact footprint, alignment and orientation of individual interchanges, it was easy to adjust the template file geometry to match the AO design concepts. Overall, using the template files where appropriate allowed for a fast assessment of the AO consistent with the planning sketch level capacity assessment methodology. Template files were generally used in evaluating Diverging Diamond Interchanges (DDI) and Single Point Urban Interchanges (SPUI).

For AO that were too complex to use the template files, the AO were more precisely modeled using Synchro/SimTraffic to facilitate the assessment. In some cases, such as where Tight Urban Diamond Interchanges (TUDI) were evaluated, a single detailed TUDI model was developed for one interchange and re-used at other interchanges.

The use of template files or the re-use of an interchange model for multiple interchanges was not possible for each AO. Several AO were too complex to be screened using either the general capacity assessment methodology, the Synchro/SimTraffic template files, or re-used interchange models. For the complex AO, a detailed Synchro/SimTraffic was used to more accurately model the AO.

Several of the alternatives incorporated roundabouts at either the ramp intersections or at intersections adjacent to the interchanges. In these cases, SIDRA was used to evaluate the roundabout operation.

CAP-X was also used to evaluate each service interchange, though not every AO could be evaluated in CAP-X.

The following sections list the various AO options and assessment methods at each interchange to identify AO that would be incorporated into system-wide Representative Alternatives. Information from these assessments was incorporated into the level 1A screening of options discussed in Section 4.4 of the *Alternatives Development and Screening Report*.

3.3.1 AO1 – AO5 (EXIT 65)

The following are a list of the AO developed and screened for Exit 65.

- AO1 – Diverging Diamond Interchange (Synchro Template)
- AO2 – Roundabout Interchange (SIDRA)
- AO3 – Single Point Urban Interchange (Synchro Template)
- AO4 – Stacked Diamond Interchange (detailed Synchro model)
- AO5 – Offset/Displaced Left Interchange (detailed Synchro model)

Note: The use of CAP-X was applicable for comparing AO1, AO3, and AO5.

Existing traffic operations at Exit 65 are complicated by:

- High left turn volumes onto eastbound I-20 during both peak hours (existing peak hour traffic is over 700 vehicles in the morning and 500 vehicles in the afternoon)
- High left turn volumes from the westbound off-ramp during both peak hours (existing peak hour traffic is approximately 500 vehicles in the morning and nearly 400 vehicles in the afternoon)

- Extremely high right turn volumes from the westbound off-ramp to Broad River Road during both peak hours (existing peak hour traffic is over 700 vehicles in the morning, and nearly 1000 vehicles in the afternoon)
- High directional through volumes on Broad River Road crossing the interchange during both peak hours
- Limited opportunity to provide additional through lanes through the interchange area without widening the Broad River Road approaches to the interchange from their current five lane cross-section
- Closely spaced adjacent signals (Briargate Circle is located approximately 550 feet north of the westbound ramp signal; Longcreek Drive is located approximately 860 feet south of the eastbound ramp signal) and multiple businesses with driveways located between the ramp intersections and the adjacent signalized intersections.
- The westbound off-ramp was widened in 2005 to mitigate the queuing of the heavy traffic volumes on the ramp from backing up into mainline I-20. It is desirable to avoid re-introducing extensive ramp queuing in the proposed AO concepts.

3.3.1.1 Exit 65 AO1 – Diverging Diamond Interchange

The proposed diverging diamond interchange (DDI) maintained two through lanes in each direction on Broad River Road through the interchange area. The eastbound off-ramp consisted of a single lane exiting I-26 and provided a separate left turn and separate right turn lane at Broad River Road. The eastbound on-ramp included a single left turn and single right turn lane from Broad River Road, creating a two lane on-ramp that merged into a single lane. The westbound off ramp included four turn lanes at Broad River Road: dual left turn and dual right turn lanes. The westbound on-ramp included a single left turn lane and single right turn lane from Broad River Road, creating a two lane on-ramp that merged into a single lane. The initial AO1 concept evaluated is shown in **Figure 3-2**.

The capacity screening incorporated the use of the Synchro Template file for a DDI. The analysis indicated AO1 was undersized as proposed. Under 2040 traffic volumes, the westbound ramp intersections operates near capacity during the morning peak hour, and over capacity during the afternoon peak hour. The eastbound ramp intersection operates under capacity.

At a minimum, dual left turn lanes are required to accommodate the high volume of left turn traffic to and from eastbound I-20. At least two right turn lanes are needed to accommodate the extremely high right turn traffic from the westbound off-ramp; three right turn lanes would be preferable but would require downstream widening of Broad River Road to provide three northbound lanes. At least three through lanes would be needed at the crossovers for traffic entering the interchange, making the crossing over I-20 at least six lanes wide. Traffic signals would be required at the intersections of the left and right turn lanes exiting from the off-ramps In addition to the crossover intersections. AO1 was not selected to be incorporated into the representative alternatives.

3.3.1.2 Exit 65 AO2 – Roundabout Interchange

The proposed roundabout interchange incorporated two-lane roundabouts in place of traffic signals at the ramp intersections with Broad River Road. Two lanes in each direction were maintained on Broad River Road through the interchange area. The eastbound and westbound off-ramps approach to the roundabouts would provide

two lanes, and the on-ramp approaches departing from the roundabouts would provide one lane. The initial AO2 concept evaluated is shown in **Figure 3-3**.

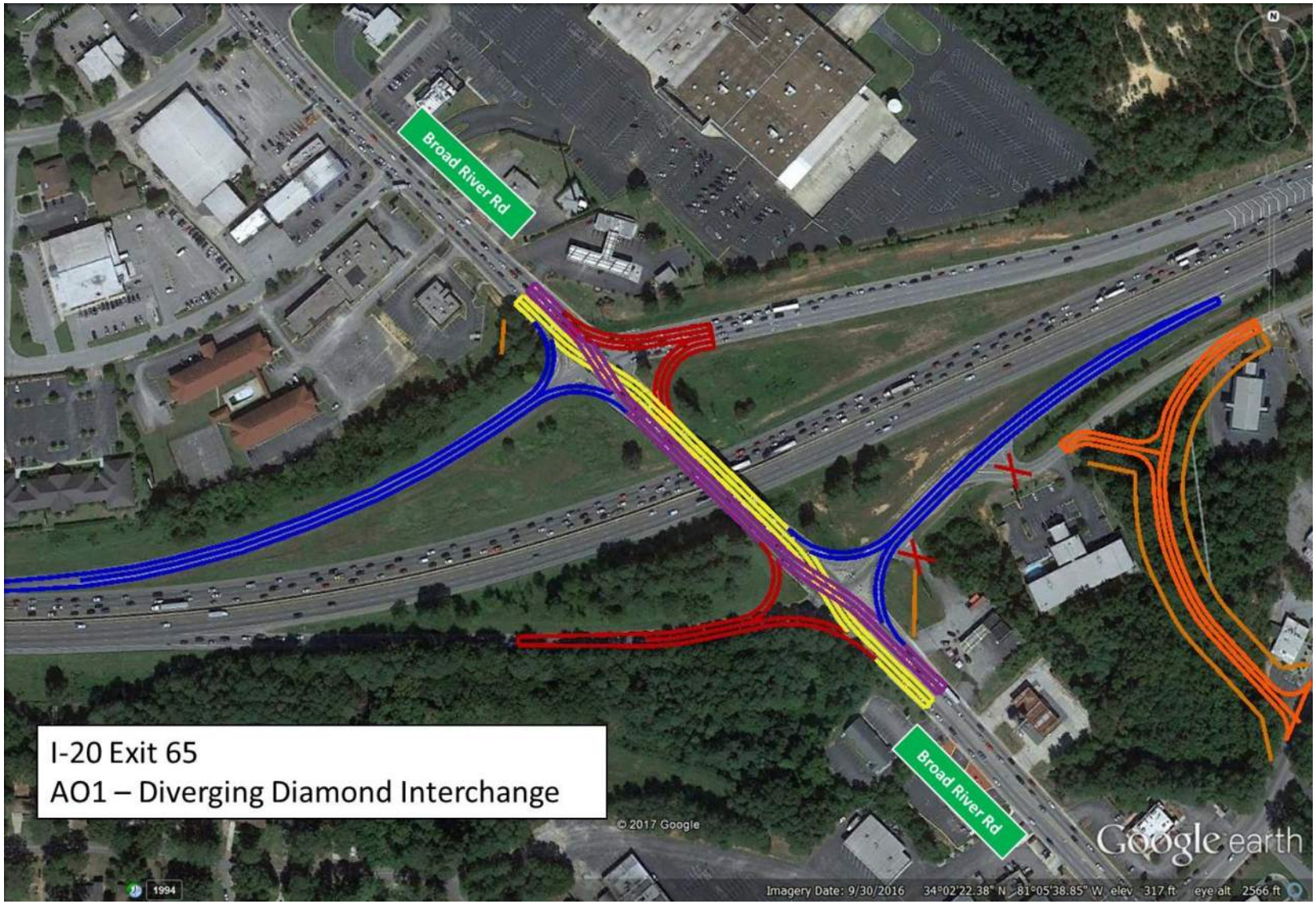


Figure 3-2 - AO1: Exit 65 Diverging Diamond Interchange

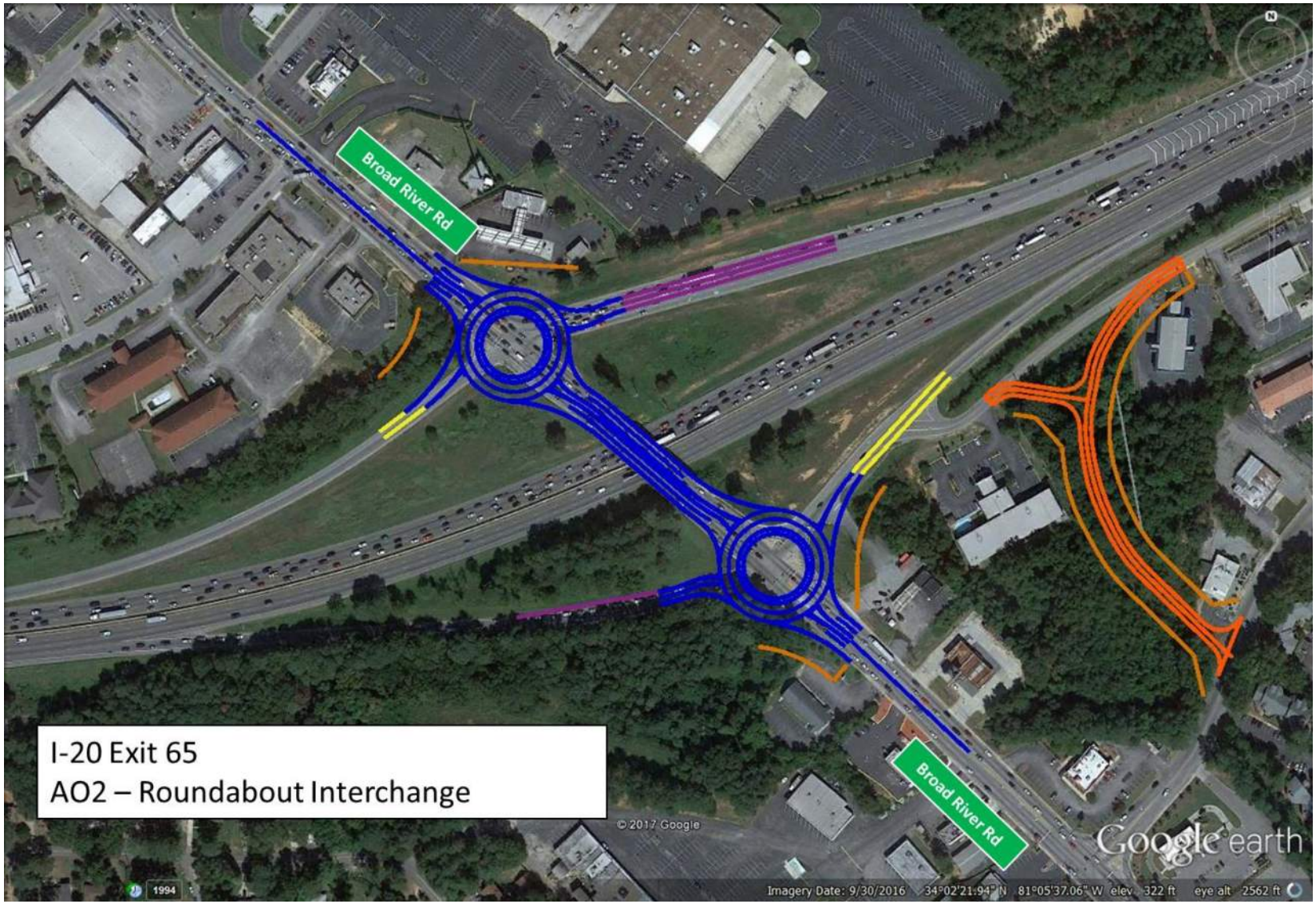


Figure 3-3 - AO2: Exit 65 Roundabout Interchange

The capacity screening incorporated the use of SIDRA to analyze the roundabout operation. The analysis indicated the two-lane roundabouts at AO2, would operate over capacity under 2040 traffic volumes. Incorporating additional lanes in the roundabouts would not be feasible. AO2 was not selected to be incorporated into the representative alternatives.

3.3.1.3 Exit 65 AO3 – Single Point Urban Interchange

The proposed single point urban interchange (SPUI) maintained two through lanes in each direction on Broad River Road through the interchange area. The eastbound off-ramp consisted of a single lane exiting I-26, which splits to provide a separate left turn and separate right turn lane to Broad River Road. The single lane eastbound on-ramp included a single left turn and single right turn lane from Broad River Road, with right turn traffic entering the on-ramp yielding to left turn traffic. The westbound off ramp included four turn lanes at Broad River Road: dual left turn and dual right turn lanes. The westbound on-ramp included a single left turn lane and single right turn lane from Broad River Road, creating a two lane on-ramp that merged into a single lane. The initial AO3 concept evaluated is shown in **Figure 3-4**.

The capacity screening incorporated the use of the Synchro Template file for a SPUI. The analysis indicated AO3 was undersized as proposed. Under 2040 traffic volumes, the SPUI intersection operates near capacity during the morning peak hour, and over capacity during the afternoon peak hour.

Modifying the initial concept to provide dual left turn lanes from southbound Broad River Road to the eastbound on-ramp improved the intersection condition to under capacity during the morning peak hour; its condition in the afternoon peak hour continues to be over capacity. Providing a third right turn lane on the westbound off-ramp would improve the intersection condition to near capacity during the afternoon peak hour but would require downstream widening of Broad River Road to provide three northbound lanes. In addition to signalizing the Broad River Road left turn and through movements (right turns onto the on-ramps would yield to left turn traffic entering the on-ramps), the left and right turn movements from the off-ramps would also have to be signalized (instead of providing a yield or stop condition for the off-ramp right turn movements. AO3 was selected to be evaluated further as part of the representative alternatives RA1, RA4, RA5, RA8, and RA9.

3.3.1.4 Exit 65 AO4 – Stacked Diamond Interchange

The proposed stacked diamond interchange carried one through lane in each direction on Broad River Road elevated above the existing interchange area, including the eastbound and westbound ramps intersections. The elevated section was conceived as beginning and ending at the adjacent intersections of Marley Drive/Briargate Circle (located approximately 1,025 feet north of the westbound ramp intersection) and Longcreek Drive (located approximately 860 feet south of the eastbound ramp intersection) and would function as a bypass of the interchange ramp intersections. The concept also included another lane in each direction running at the approximate current elevation of the bridge. These lanes are primarily intended to provide access to and from the interchange ramps but would also provide another way for traffic to travel through the interchange area along Broad River Road. Left turns would be prohibited at the end of the stacked lanes for traffic traveling away from the interchange in each direction. The initial AO4 concept evaluated is shown in **Figure 3-5**.

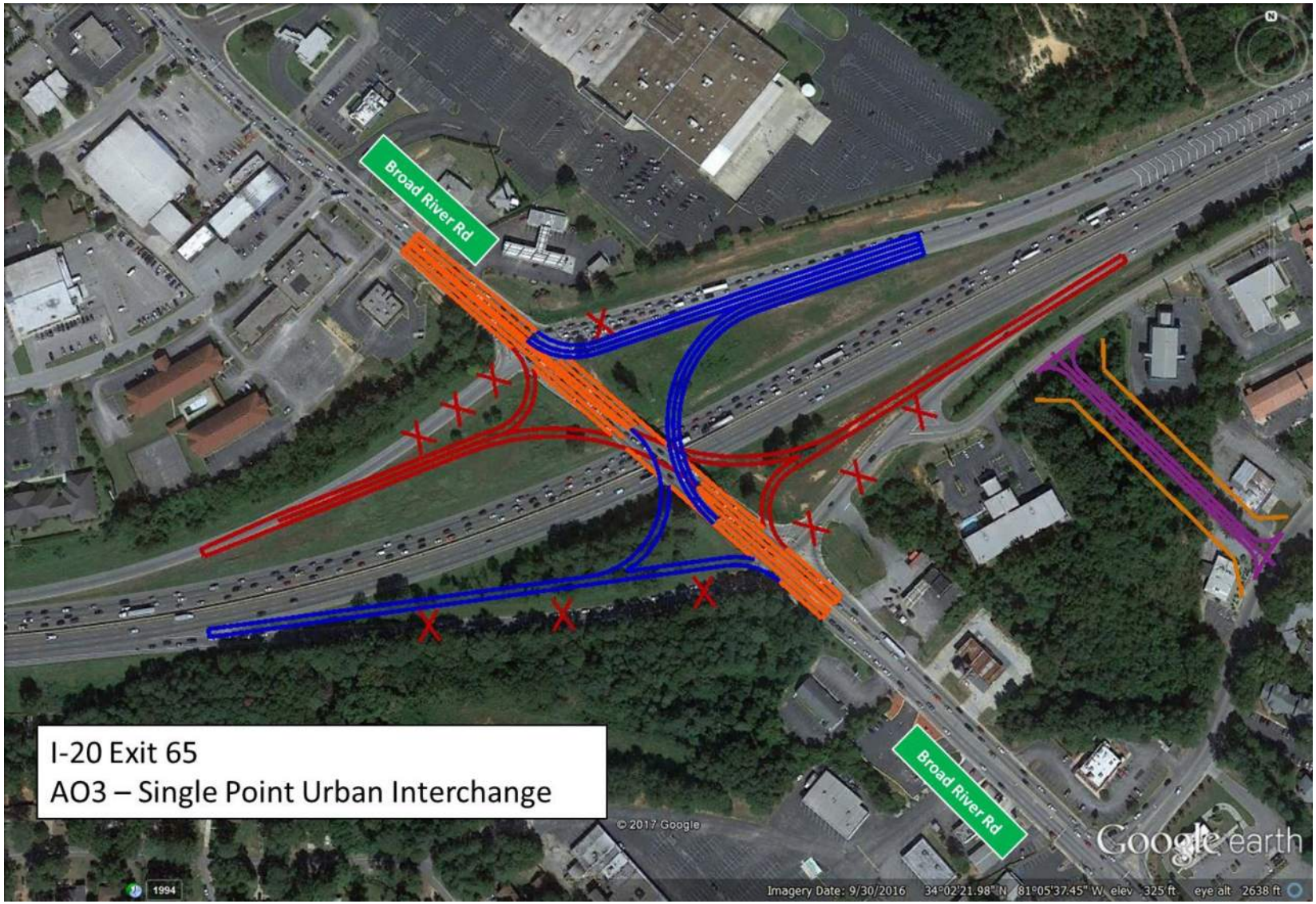


Figure 3-4 - AO3: Exit 65 Single Point Urban Interchange

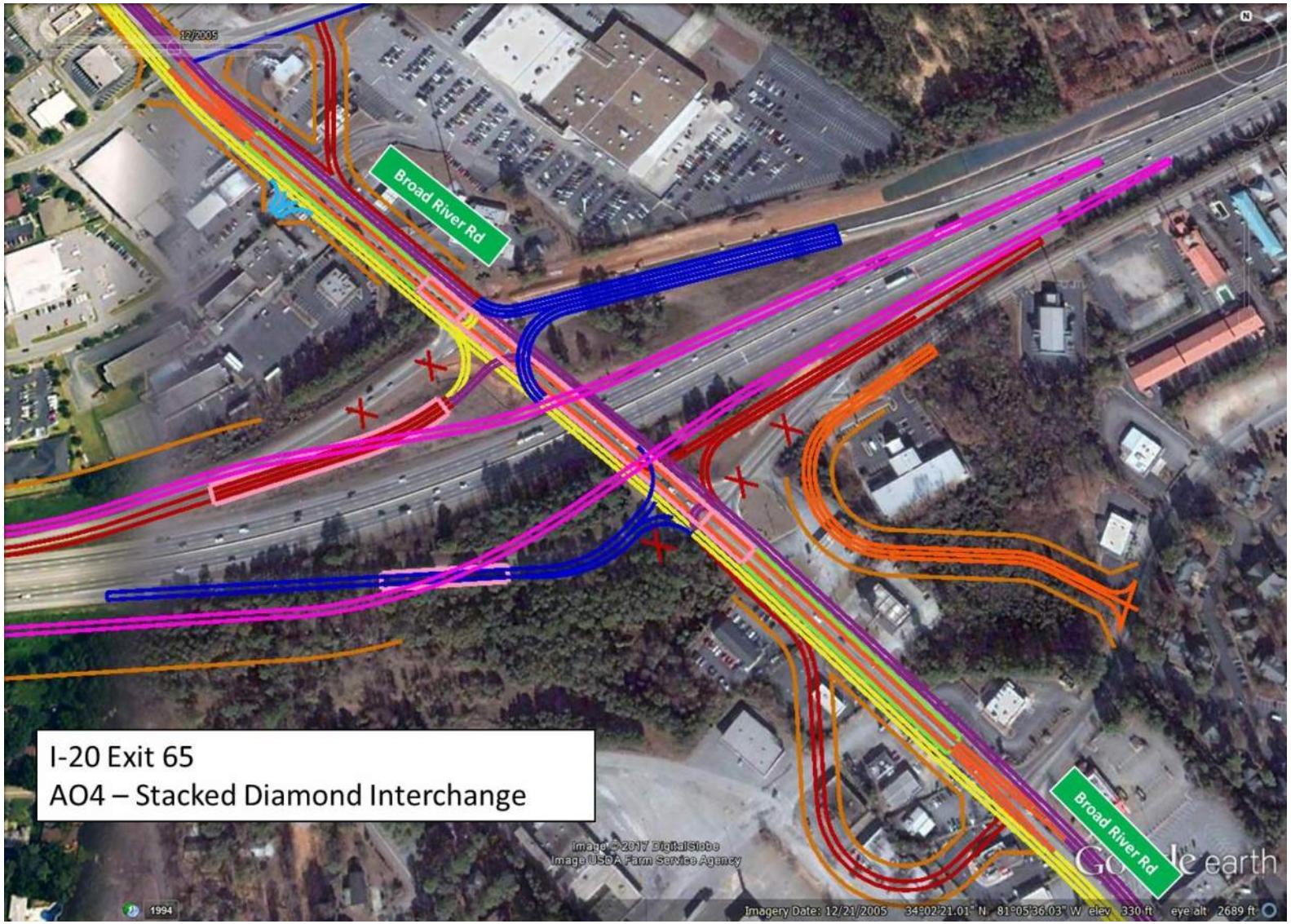


Figure 3-5 - AO4: Exit 65 Stacked Diamond Interchange

The advantage that was sought in AO4 was the removal of some of the through traffic traveling on Broad River Road through the ramp intersections. This would generally permit a reduction in the amount of time allocated towards moving traffic along Broad River Road, allowing it to be re-allocated to moving traffic on and off the ramps.

The single lane eastbound off-ramp would provide separate left turn and right turn lanes at Broad River Road. The eastbound the on-ramp would have separate single lanes for southbound left turning and northbound right turning traffic entering from Broad River Road and would maintain two lanes for a short distance down the ramp until it merged into one lane prior to entering eastbound I-20. The westbound off-ramp would provide two left turn lanes and two right turn lanes to Broad River Road. The section of southbound Broad River Road between the westbound ramp and the eastbound ramp intersections would have to have to lanes to accommodate the traffic from the dual left turn lanes on the westbound off-ramp. The westbound on-ramp would have separate lanes for the left and right turning traffic entering from Broad River Road and would maintain two lanes for a short distance down the ramp until it merged into one lane prior to entering westbound I-20.

In the vicinity of the westbound ramp intersection, the u-turn would be provided to allow southbound traffic on Broad River Road to travel back to the north. A similar u-turn would be present in the vicinity of the eastbound ramp intersection to permit northbound Broad River Road traffic to travel back to the south.

AO4 also included two short connector roads. In the northbound direction on Broad River Road, a connection would exit from the right side of the road to Marley Drive. In the southbound direction, a connector would exit from the right side of the road to align opposite Longcreek Drive. These connections were provided due to the removal of left turn movements from the end of the stacked lanes. Between the westbound ramp intersection and the connector to Marley Road, Broad River Road would have to have two lanes to accommodate the dual right turn lanes on the westbound off-ramp adjacent to the northbound stacked lane. The connector roads would function as a lane drop, reducing the through portion of Broad River Road to one lane.

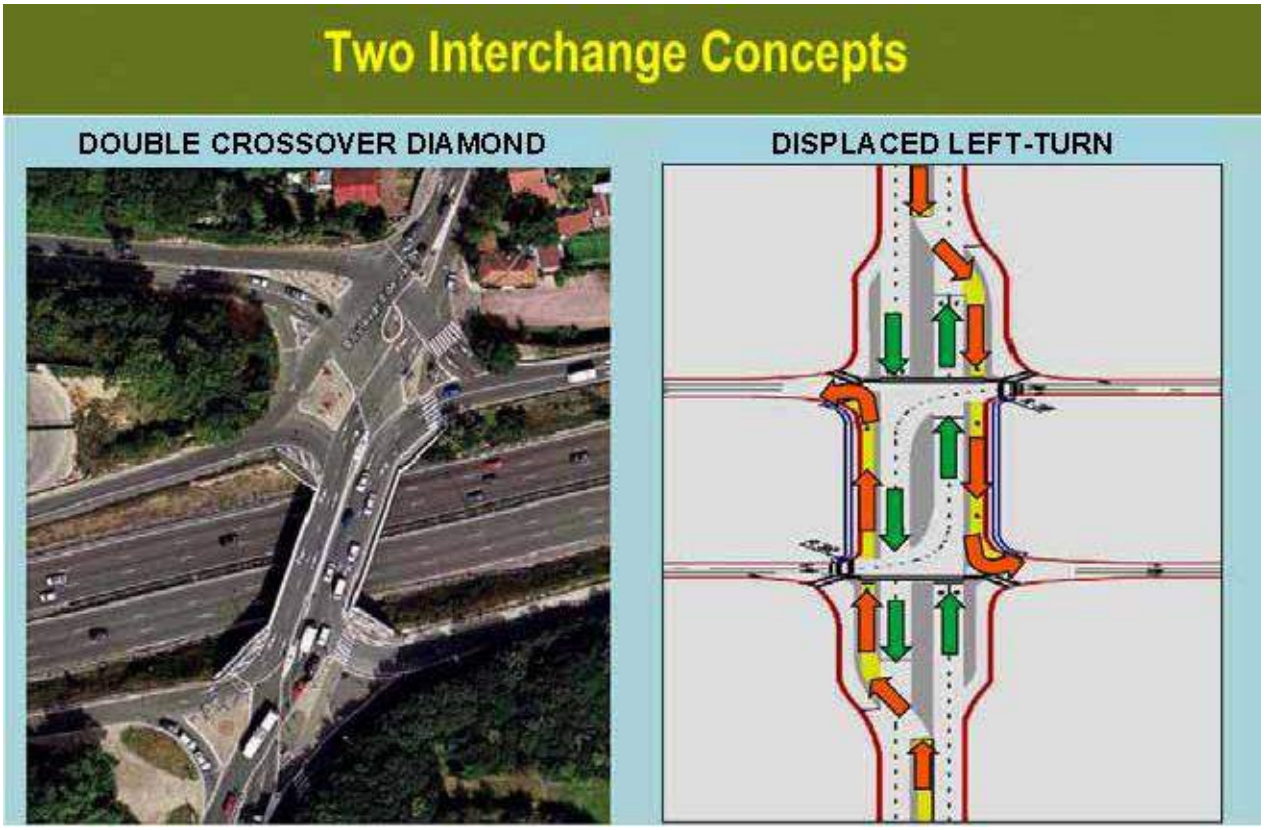
The capacity screening of AO4 was performed using a detailed Synchro model created specifically to assess this concept. The assessment indicated that the ramp intersections would operate under capacity in isolation, but that traffic would back up through the interchange due to the over capacity condition at the intersections at the ends of the stacked section. The addition of the stacked lanes complicated the signal operation at those intersections, requiring an additional phase to be incorporated into the signal operation to split running the traffic from the stacked lane and the adjacent Broad River Road lane. Left turn traffic entering the eastbound on-ramp also experienced delay due to having only a single lane to accommodate the high volume of traffic making this movement.

Efforts were made to improve the concept, such as providing two through lanes on the northbound side of the stacked roadway and extending the two lane section accommodating the westbound off-ramp right turn traffic to the end of the stacked section at Marley Drive. The intersections at the end of the stacked sections operated near capacity under existing traffic volumes, and over capacity under 2040 volumes. Extensive queuing was observed in simulations of both peak hours under existing traffic. AO4 was not selected to be evaluated further as part of the representative alternatives.

3.3.1.5 Exit 65 AO5 –Offset/Displaced Left Interchange

The proposed offset left interchange (also known as a displaced left interchange) is similar to a DDI. In an offset left interchange, the left turn movements are displaced to the opposite side of the road at an intersection adjacent to and upstream from the ramp intersections, where in a DDI, the crossover takes place at or adjacent to the ramp intersections. The two interchange types can be compared in **Figure 3.6**.

Figure 3-6 Comparison of DDI/Double Crossover and Displaced Left Interchanges



Source: Figure 2 - https://www.fhwa.dot.gov/publications/research/safety/09060/001.cfm

The concept for AO5 is technically more of a partial DDI than it is an offset left interchange. It can be considered "partial", because only the left turns for southbound Broad River Road are displaced; the northbound left turn are not displaced. It is also more of a DDI because the displacement takes place at the westbound ramp intersection as opposed to the upstream adjacent intersection at Marley Drive.

In the original AO5 concept, southbound Broad River crosses over at the westbound ramp intersection with one lane crossing over to the left, and two through lanes continuing through on the right. The northbound lanes on Broad River Road are similar to the existing configuration. The initial AO5 concept is shown in **Figure 3-7**.

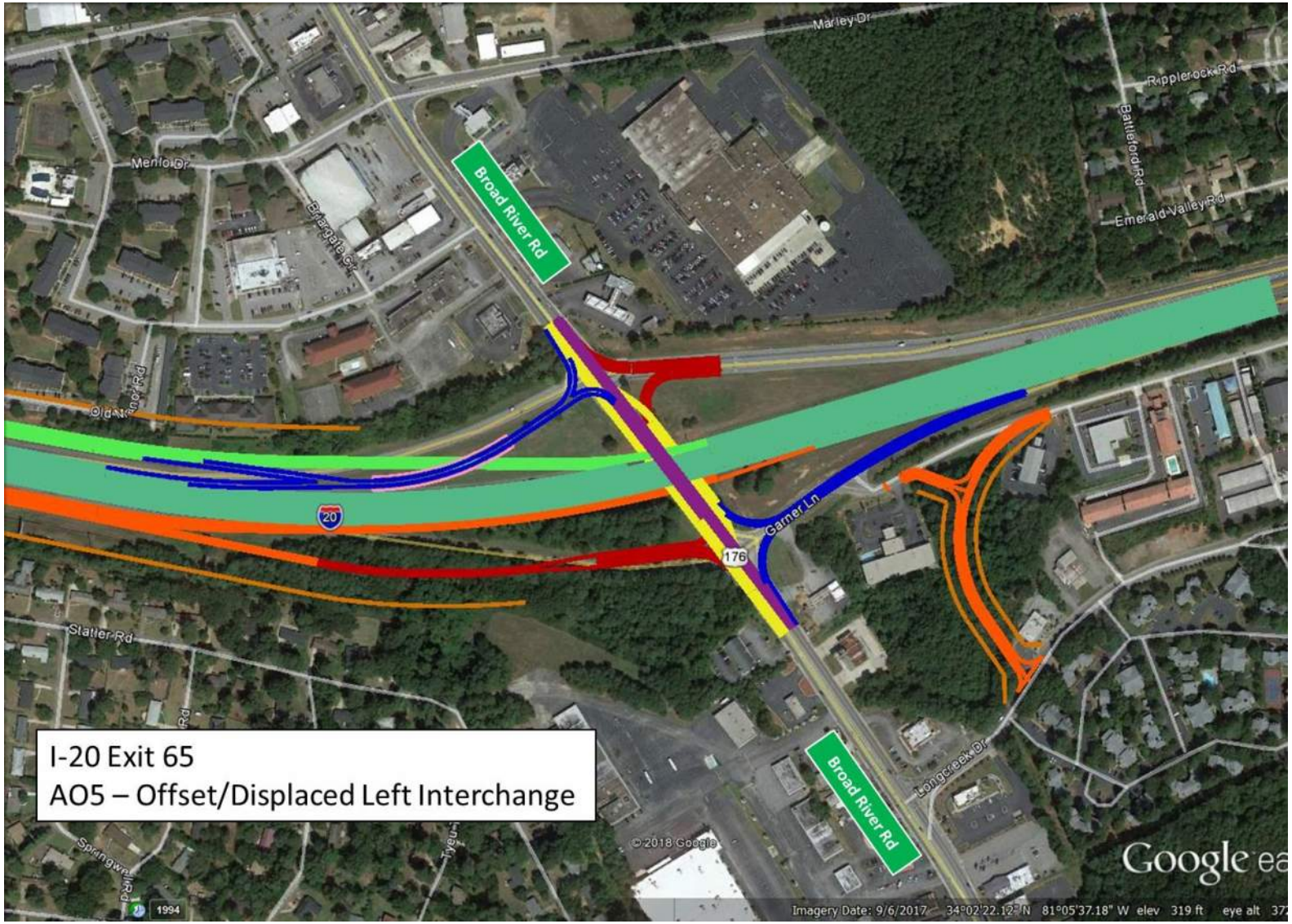


Figure 3-7 - AO5: Exit 65 Offset/Displaced Left Interchange

The original AO5 concept included a two lane eastbound off-ramp that would provide a separate left turn and two right turn lanes at Broad River Road. The eastbound on-ramp would accept one left turn lanes from the crossover portion of the interchange and a single right turn lane, in which traffic would yield to left turning traffic entering the single lane on-ramp. The westbound off-ramp consisted of dual left turn lanes and dual right turn lanes. The dual left turn lanes turn into the crossover portion of the interchange. The westbound on-ramp would have separate lanes for the left and right turning traffic entering from Broad River Road. Right turn traffic would yield to left turn traffic before entering the single lane ramp.

In the original AO5 concept, the interchange overpass portion of Broad River Road would include two lanes on the southbound crossover, three northbound lanes (one full length left turn lane to the westbound on-ramp and two through lanes), and a two lane southbound through section, creating a seven lane wide bridge.

The capacity screening of AO5 was performed using a detailed Synchro model created specifically to assess this concept. The assessment of the original AO5 concept indicated that the concept needed to be revised to accommodate the high volume of left turn traffic entering the eastbound on-ramp. This traffic could not be accommodated on a single lane ramp, which resulted in observations of backups of left turn traffic upstream on Broad River Road. The revised AO5, which shown in **Figure 3-8**, incorporated dual southbound left turns at the crossover at the westbound ramp intersection, and maintained two through lanes. At the eastbound ramp intersection, dual left turn lanes were provided with right turn traffic yielding to the left turn traffic entering the two lane on-ramp. The interchange overpass was expanded to a seven lane bridge, since the crossover section was increased to three lanes to accommodate the left turn traffic from the westbound off-ramp and the traffic crossing the overpass to turn left on the eastbound on-ramp.

The two ramp intersections were assessed to operate under capacity in the 2040 morning peak hour. In the 2040 afternoon peak hour, the westbound ramp intersection was assessed as operating near capacity while the eastbound ramp intersection was assessed as operating under capacity. Observations of the simulations indicated there was significant queuing of left turn traffic heading to the eastbound on-ramp at the crossover intersection during both peak hours. During the afternoon peak hour, significant queuing was also observed on the northbound through lanes of Broad River Road. In both simulations, the off-ramp traffic worked well, and AO5 seemed to best handle the high volume of right turn traffic on the westbound off-ramp. AO5 was selected to be evaluated further as part of the representative alternatives RA2, RA3, RA6, and RA7.

3.3.1.6 Exit 65 CAP-X Review

The Exit 65 traffic volumes and interchange geometry were entered into the CAP-X spreadsheet to determine which interchange alternatives scored the highest using the CAP-X methodology. The best rated interchange concept was a ParClo interchange, followed by the Displaced Left Turn (DLT), and the SPUI interchanges. The DDI and Traditional Diamond interchange both had equivalent ratings and were ranked last.

Partial Cloverleaf Interchange

A ParClo interchange would be a reasonable option for handling the higher volume movements using loop ramps. CAP-X only assesses ParClo interchanges with loop off-ramps replacing left turn movements from off-

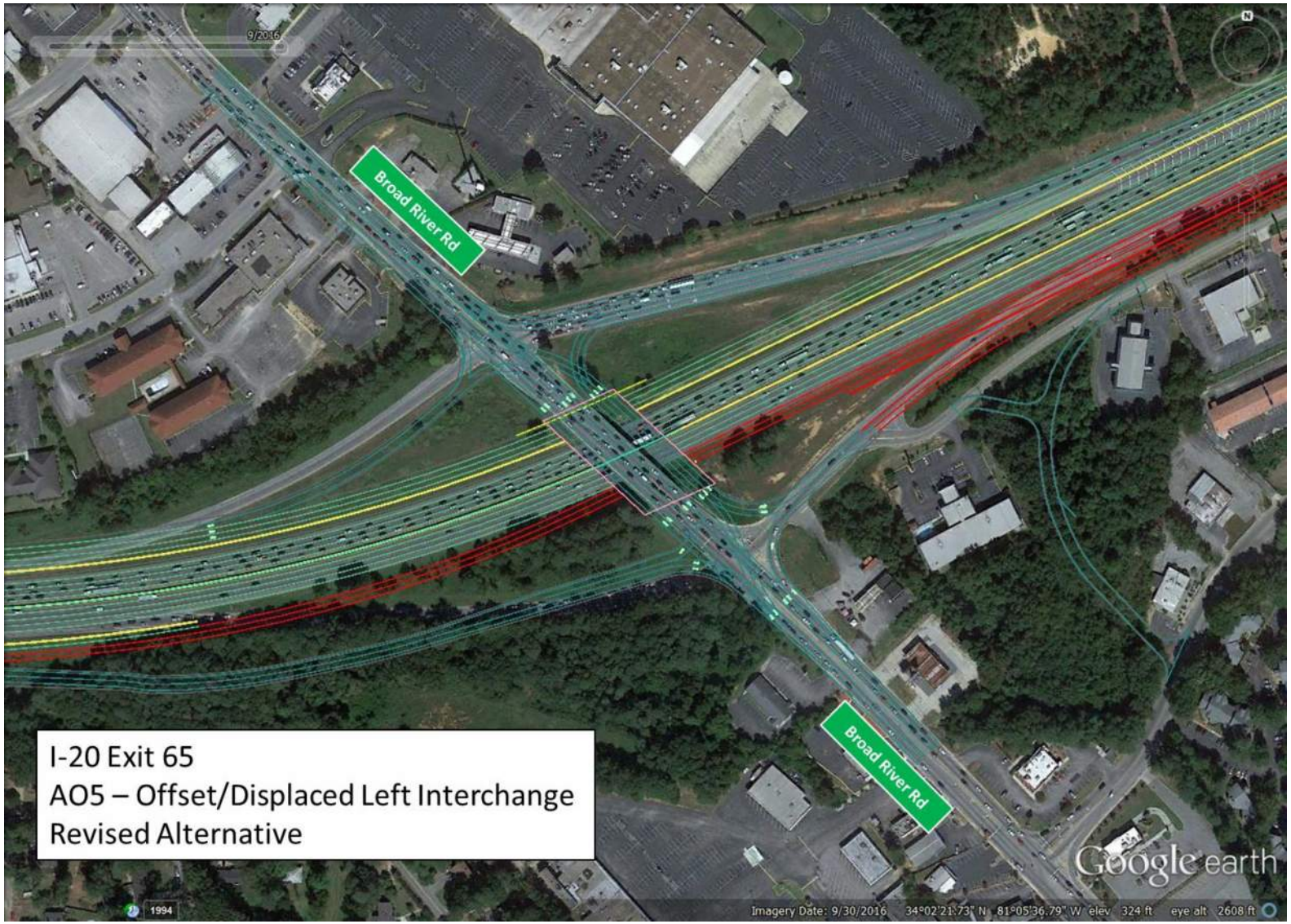


Figure 3-8 - AO5: Exit 65 Revised Offset/Displaced Left Interchange

ramps. It does not consider loop on-ramps replacing left turn on-ramp movements. So in this example, a ParClo would shift the eastbound and westbound off-ramp left turn traffic to loop ramps in the northwest and southeast interchange quadrants. This would be effective in processing the high westbound left turn traffic, but the eastbound left turn traffic is likely not high enough to warrant constructing a loop ramp. Though CAP-X cannot assess it, it is likely that a more efficient ParClo option would include the westbound loop off-ramp, as well as an eastbound loop on-ramp to eliminate the need for dual left turn lanes to accommodate traffic turning left onto the eastbound on-ramp.

Despite being highly rated in the CAP-X assessment, a ParClo interchange could not be constructed within the existing interchange footprint and would likely require the acquisition of a number of businesses in the northwest quadrant of the interchange.

Displaced Left Turn Interchange

The DLT interchange was also rated highly in the CAP-X assessment. This would appear to validate the AO5 concept, except that AO5 is more accurately described as a Partial Diverging Diamond interchange. A true DLT would locate the left turn crossovers upstream at the next adjacent intersections (Marley Drive/Briargate Circle to the north and Longcreek Drive to the south). The additional number of lanes needed between these intersections to accommodate the displaced left turn lanes would impact businesses that are located between these intersections and the interchange ramps. A true DLT could not be constructed within the existing interchange footprint.

These interchange concepts could be revisited in the future if AO3 and AO5 do not provide effective traffic flow in the representative alternatives, and if the resulting impacts to businesses along Broad River Road resulting from these options are considered acceptable trade-offs.

3.3.2 AO6 – AO10 (EXIT 63)

The following are a list of the AO developed and screened for Exit 63.

- AO6 – Diverging Diamond Interchange (Synchro Template)
- AO7 – Offset Diamond (detailed Synchro model)
- AO8 – Partial Cloverleaf Interchange (detailed Synchro Model)
- AO9 – Roundabout Interchange (SIDRA)
- AO10 – Single Point Urban Interchange (Synchro Template)

Note: The use of CAP-X was applicable for AO6, AO8, and AO10.

Existing traffic operations at Exit 63 are complicated by:

- High left turn volumes onto westbound I-20 during the afternoon peak hour (existing afternoon peak hour traffic is about 400 in the afternoon)
- High left turn volumes from the eastbound off-ramp during both peak hours (existing peak hour traffic is approximately 350 vehicles in the morning and around 400 vehicles in the afternoon)

- High right turn volumes from the eastbound off-ramp during the morning peak hour (existing peak hour traffic is approximately 550 vehicles during the morning peak hour)
- High right turn volumes from the westbound off-ramp to Bush River Road during both peak hours (existing peak hour traffic is about 450 vehicles in the morning, and over 300 vehicles in the afternoon)
- High through volumes on Bush River Road.
    - Traffic entering the interchange area from the east are approximately 500 vehicles during the morning peak hour and about 1,350 vehicles during the afternoon peak hour
    - High volumes of traffic enter the interchange area from the west in both peak hours (approximately 1,400 vehicles enter during the morning peak hour and 1,300 during the afternoon peak hour)
    - Traffic exiting the area to the east of the interchange are approximately 1,400 vehicles during the morning peak hour and over 900 vehicles during the afternoon peak hour
    - Traffic exiting the interchange area along westbound Bush River Road is approximately 1,100 vehicles during the morning peak hour and exceeds 1,500 vehicles per hour in the afternoon peak hour.
- West of the interchange are three conditions that contribute to congestion in the Exit 63 interchange area:
    - The intersection of the Berryhill Road frontage road connecting St Andrews Road and Bush River Road is located immediately adjacent to the westbound ramp intersection. The signals at the two intersections operate using a single controller and contribute to congestion along Bush River Road.
    - Between Rockland Road, which is located approximately 480 feet east of the westbound ramp intersection, and Outlet Pointe Boulevard, which is located approximately 500 feet west of the Berryhill Road intersection, there are five signalized intersections with approximately 2,000 feet.
    - Immediately west of Outlet Pointe Boulevard, Bush River Road is reduced from a five lane section to a two-lane section, creating a choke-point for the high westbound through traffic.

3.3.2.1 Exit 63 AO6 – Diverging Diamond Interchange

The proposed diverging diamond interchange (DDI) maintained two through lanes in each direction on Bush River Road through the interchange area. The eastbound off-ramp consisted of a single lane exiting I-20, and provided a separate left turn and separate right turn lane at Bush River Road. The eastbound on-ramp included a single left turn and single right turn lane from Bush River Road, with the right turn movement yielding to the left turn movement on the single lane ramp. The westbound off ramp consisted of a single lane exiting I-20, and originally provided only for single separate left turn and right turn lanes at Bush River Road. The westbound on-ramp included a single left turn lane and single right turn lane from Bush River Road, with the right turn movement yielding to the left turn movement on the single lane ramp. The initial AO6 concept evaluated is shown in **Figure 3-9**.

The capacity screening incorporated the use of the Synchro Template file for a DDI. The analysis indicated AO6 was undersized as proposed. The capacity assessment indicated that the eastbound and westbound off-ramps were required dual left turn lanes and dual right turn lanes to accommodate the high volume of turning traffic

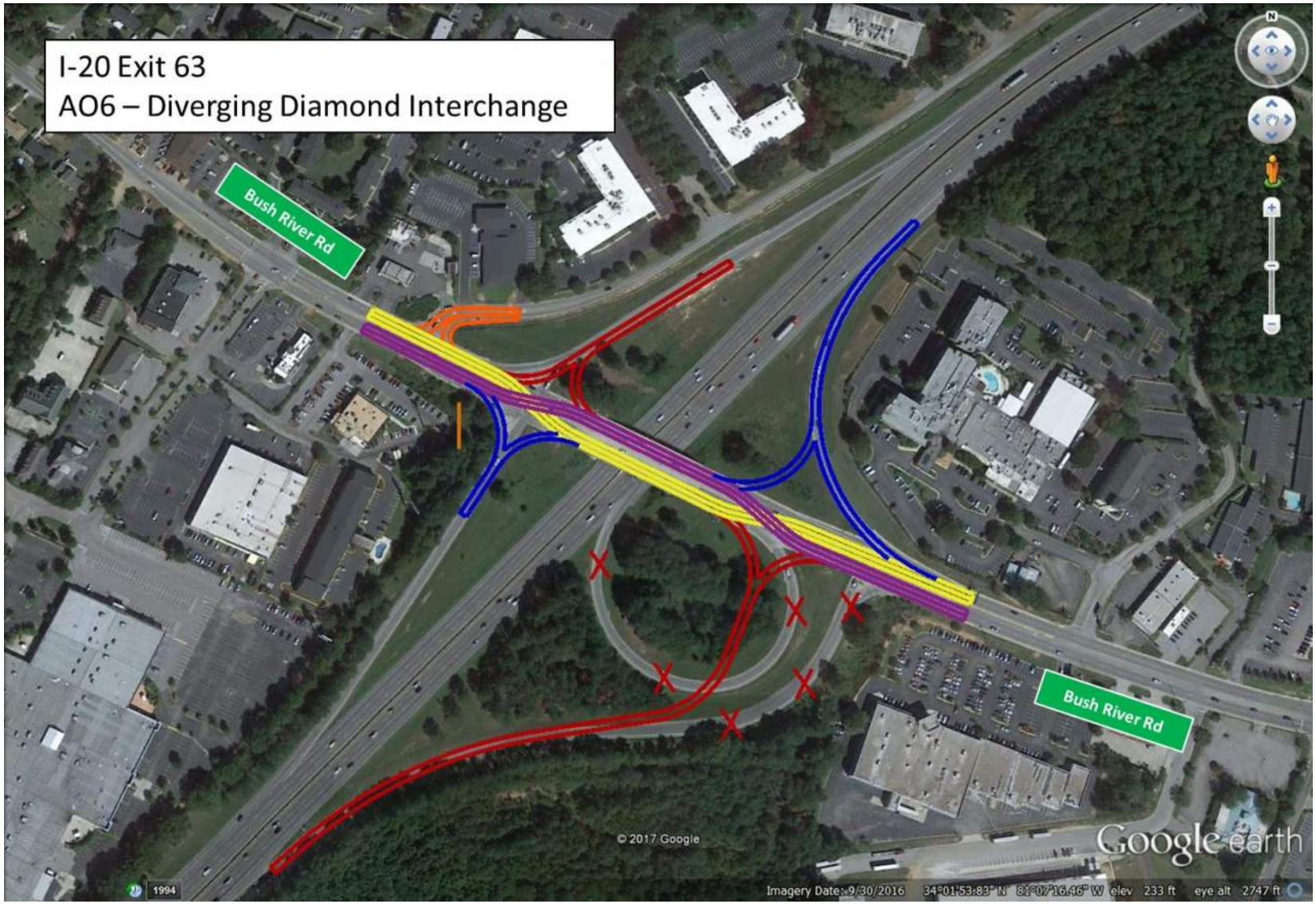


Figure 3-9 - AO6: Exit 63 Diverging Diamond Interchange

from the ramps. AO6 was also modified to provide three lanes on the westbound side of the DDI to facilitate two left turn lanes to the westbound on-ramp. Observations of SimTraffic simulations indicated that during the afternoon peak hour with 2040 traffic, the westbound traffic still creates congestion on the westbound crossover section, which in turn causes periodic queuing on the eastbound off-ramp.

While the Synchro template file used in the capacity assessment was not modified to incorporate the adjacent Berryhill Road intersection, the final version of AO6 included converting Berryhill Road to a right-in/right out intersection at Bush River Road. Also included in the final version of AO6 was an overpass connecting Rockland Road to Executive Center Drive to access to Berryhill Road from Bush River Road. AO6 was selected to be incorporated into the representative alternatives RA1 and RA3.

3.3.2.2 Exit 63 AO7 – Offset Diamond Interchange

The proposed offset diamond interchange carries two through lanes in each direction on Bush River Road. The interchange ramps would be elevated and aligned to intersection a single intersection located approximately where the eastbound loop on-ramp diverges from Bush River Road. The single lane eastbound and westbound off-ramps would provide separate left turn and right turn lanes at Bush River Road. The eastbound and westbound on-ramps would have separate single lanes for eastbound left turning and westbound right turning traffic entering from Bush River Road and would maintain two lanes for a short distance down the ramp until it merged into one lane. A particular advantage of AO7 was the combining of the two ramp signals and relocating the signals between the adjacent signals at Rockland Drive and Berryhill Road. AO7 would also permit full access to and from Berryhill Road. The initial AO7 concept evaluated is shown in **Figure 3-10**.

The capacity screening of AO7 was performed using a detailed Synchro model created specifically to assess this concept. The assessment indicated that dual eastbound and westbound left turn lanes were required to carry traffic from Bush River Road to the on-ramp. Additionally, due to the high volume of left turn traffic on the eastbound on-ramp, the approach was modified to provide two left turn lanes and a separate right turn lane.

Observations of simulations of the 2040 traffic on the modified version of AO7 indicated that the high volume of westbound traffic on Bush River Road turning left onto the westbound on-ramp would likely not be able to be accommodated with two left turn lanes. Left turn traffic was observed to spill out of the left turn lanes, blocking through traffic and increasing congestion. AO7 was selected to be evaluated further as part of the representative alternatives RA4 and RA6.

3.3.2.3 Exit 63 AO8 – Partial Cloverleaf Interchange

The proposed partial cloverleaf interchange eliminates the ramps on the east side of the interchange. A westbound loop off-ramp would replace the existing single lane off-ramp. The eastbound on-ramp would be removed, and the westbound Bush River Road traffic turning right onto that on-ramp would now turn left. The westbound loop off-ramp and the westbound on-ramp intersection would also be aligned to opposite Berryhill Road, eliminating one signalized intersection in the interchange area. Eastbound Bush River Road would carry three lanes across the bridge to provide for the weaving section between the two ramps. In the initial AO8

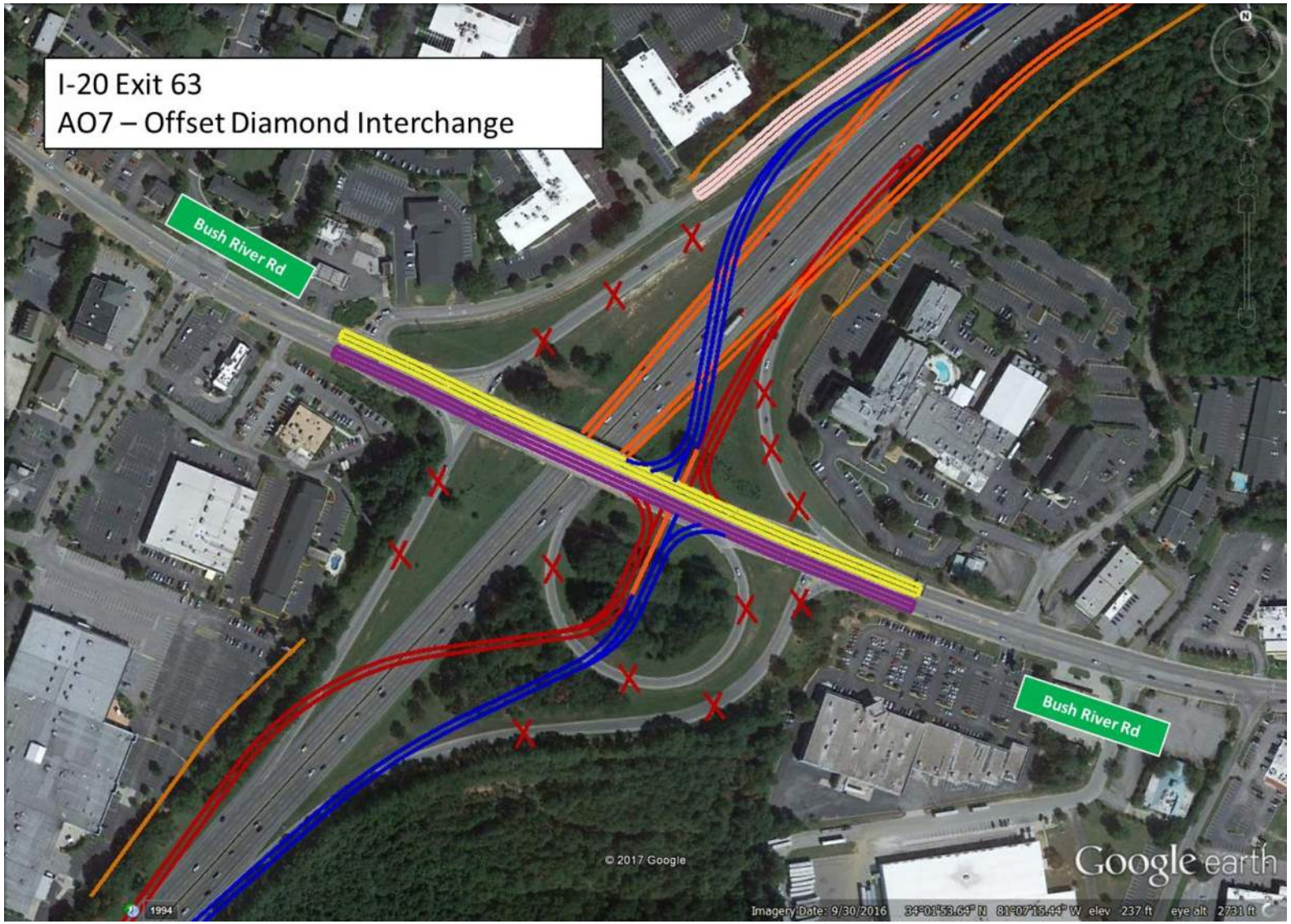


Figure 3-10 - AO7: Exit 63 Offset Diamond Interchange

concept, westbound Bush River Road would also carry three lanes across the bridge. The initial AO8 concept evaluated is shown in **Figure 3-11**.

The capacity screening of AO8 was performed using a detailed Synchro model created specifically to assess this concept. The assessment indicated that ramp intersections would function under capacity. However, to achieve better intersection operations at the westbound on-ramp intersection, a second westbound left turn lane on Bush River Road to the westbound on-ramp was added to the concept.

It should be noted that the ParClo interchange proposed in AO8 could not be constructed within the existing interchange footprint and would likely require the acquisition of businesses in the northwest quadrant of the interchange where the westbound loop off-ramp and westbound on-ramp would be relocated.

Observations of simulations of the 2040 traffic on the modified version of AO8 indicated that this alternative appeared to best handle the high volume of traffic at the interchange. AO8 was selected to be evaluated further as part of the representative alternatives RA5 and RA7.

3.3.2.4 Exit 63 AO9 – Roundabout Interchange

The proposed roundabout interchange incorporated two-lane roundabouts in place of traffic signals at the ramp intersections with Bush River Road. Roundabouts were also included at the adjacent Bush River Road intersections with Berryhill Road and Outlet Pointe Boulevard. Two lanes in each direction were maintained on Bush River Road through the interchange area. The interchange ramps would remain unchanged, with the exception of the westbound off-ramp, which was originally intended to include a direct u-turn lane from the ramp to Berryhill Road. The initial AO9 concept evaluated is shown in **Figure 3-12**.

The capacity screening incorporated the use of SIDRA to analyze the roundabout operation. The assessment indicated the two-lane roundabouts at the ramp intersections, would operate at or over capacity under existing traffic volumes, and over capacity under 2040 volumes. Incorporating additional lanes in the roundabouts would not be feasible. AO9 was not selected to be incorporated into the representative alternatives.

3.3.2.5 Exit 63 AO10 – Single Point Urban Interchange

The proposed single point urban interchange (SPUI) maintained two through lanes in each direction on Bush River Road through the interchange area. The eastbound and westbound off-ramps consisted of a single lane exiting I-20, which separates to provide a separate left turn and separate right turn lane to Bush River Road. The single lane eastbound and westbound on-ramps included a single left turn and single right turn lane from Bush River Road, with right turn traffic entering the on-ramp yielding to left turn traffic. The initial AO10 concept evaluated is shown in **Figure 3-13**.

The capacity screening incorporated the use of the Synchro Template file for a SPUI. The analysis indicated AO10 was undersized as proposed. Under 2040 traffic volumes, the SPUI intersection operates over capacity during both peak hours.

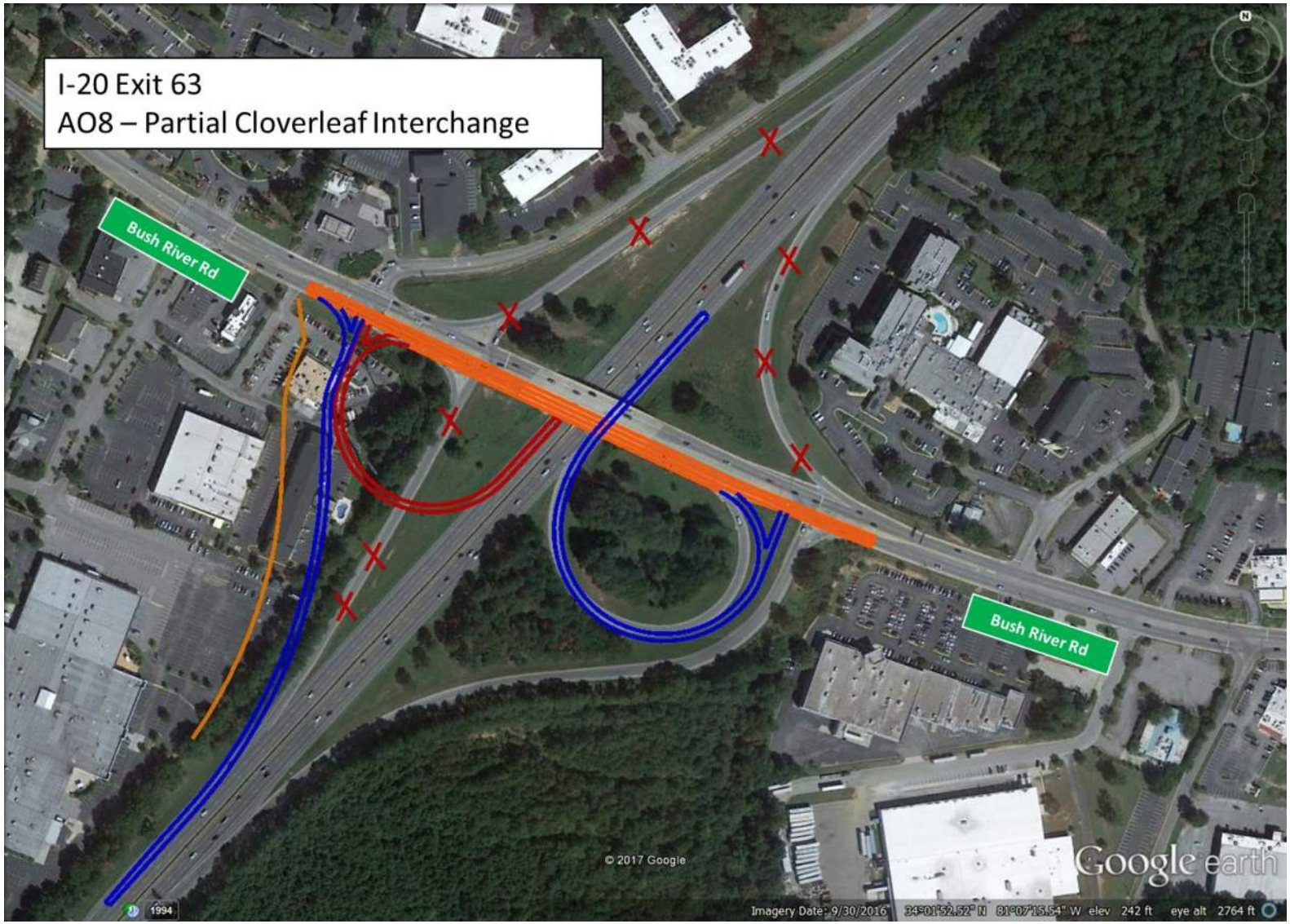


Figure 3-11 - AO8: Exit 63 Partial Cloverleaf Interchange

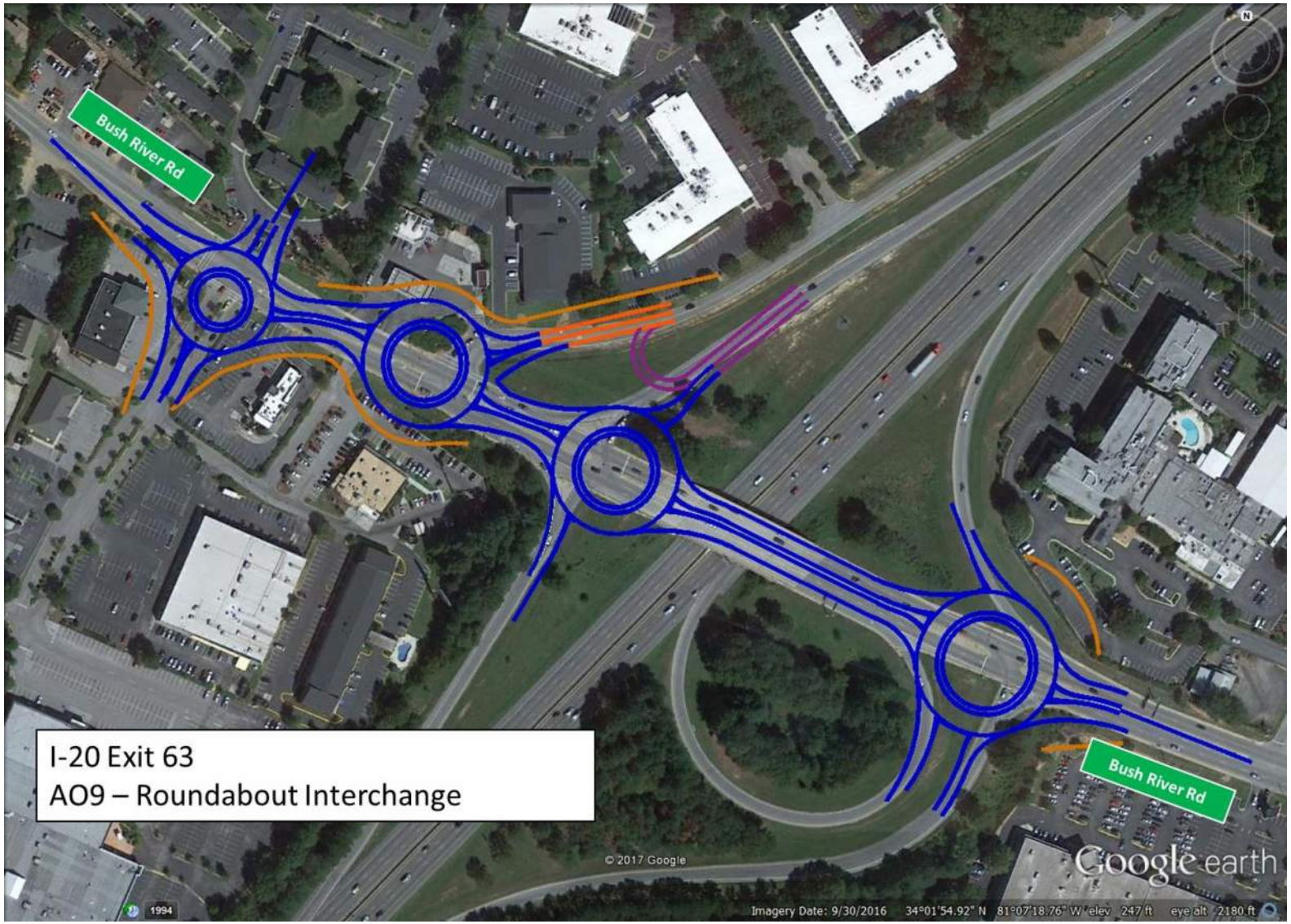


Figure 3-12 - AO9: Exit 63 Roundabout Interchange

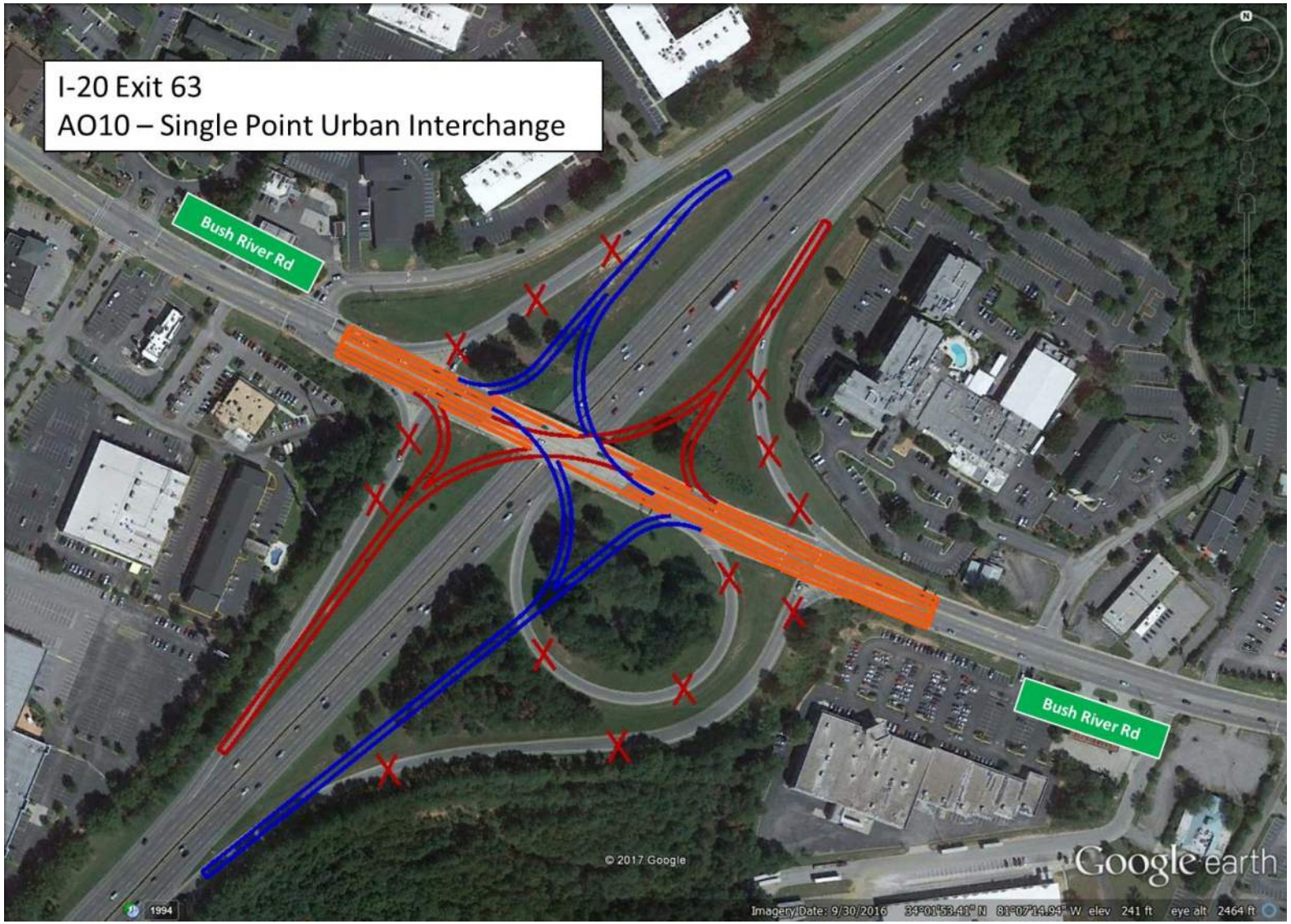


Figure 3-13 - AO10: Exit 63 Single Point Urban Interchange

The initial concept was modified to provide dual left turn lanes in each direction on Bush River Road, dual left turn lanes on the eastbound off-ramp, and dual right turn lanes on both off-ramps. With these modifications, the single point intersection was assessed to operate under capacity during both peak hours. Observations of the simulations of the alternative indicated that, with the additional turn lanes, there was occasional queuing on eastbound Bush River Road during the morning peak hour. This would likely only be alleviated by providing an additional eastbound through lanes through the SPUI. AO10 was selected to be evaluated further as part of the representative alternatives RA2 and RA9.

3.3.2.6 Exit 63 CAP-X Review

The Exit 63 traffic volumes and interchange geometry were entered into the CAP-X spreadsheet to determine which interchange alternatives scored the highest using the CAP-X methodology. The best rated interchange concept was a ParClo interchange, followed by the SPUI, and displaced left turn (DLT) interchanges. The DDI and Traditional Diamond interchange both had equivalent ratings and were ranked fourth and fifth respectively. The CAP-X results accurately reflect the results of the capacity screening of AO8 and AO10. A DLT was not considered as one of the Exit 63 interchange options.

Partial Cloverleaf Interchange

As demonstrated in the capacity screening of AO8, a ParClo interchange would be a reasonable option for handling the higher volume movements using loop ramps. However, CAP-X only assesses ParClo interchanges with loop off-ramps replacing left turn movements from off-ramps. It does not consider loop on-ramps replacing left turn on-ramp movements. Though CAP-X cannot assess AO8, which includes the eastbound loop on-ramp, the observations of the simulations indicate AO8 would likely perform well.

It should be noted that the ParClo interchange proposed in AO8 could not be constructed within the existing interchange footprint and would likely require the acquisition of businesses in the northwest quadrant of the interchange where the westbound loop off-ramp and westbound on-ramp would be relocated.

Displaced Left Turn Interchange

The DLT interchange option was the third highest rated in the CAP-X assessment. This concept was not developed as a design alternative at Exit 63. Were such a concept to be considered, the left turn movements at the ramps would have to be displaced upstream of the ramp intersections, most likely at Outlet Pointe Boulevard and at Rockland Road. The additional number of lanes needed between these intersections to accommodate the displaced left turn lanes would impact businesses that are located between these intersections and the interchange ramps. A true DLT could not be constructed within the existing interchange footprint.

3.3.3 AO11 – AO16, AO48 (EXIT 106)

The following are a list of the AO developed and screened for Exit 106.

- AO11 – Diverging Diamond Interchange (Synchro Template)

- AO12 – St Andrews Flyover (Capacity Screening Assessment)
- AO13 – Single Point Urban Interchange (Synchro Template)
- AO14 – Modified Diverging Diamond/Woodland Hills (detailed Synchro model)
- AO15 – Diverging Diamond/Frontage Road (detailed Synchro model)
- AO16 – Split Ramp Roundabouts Intersections (SIDRA)
- AO48 – Roundabout Intersections (SIDRA)

Note: The use of CAP-X was applicable for AO11, and AO13.

Existing traffic operations at Exit 106 are complicated by:

- Proximity to the I-20/I-26 system interchange.
- The atypical westbound off-ramp configuration. Approximately 570 feet from the off-ramp gore point, a right turn lane is provided to a short ramp. This ramp is signed to direct traffic to Burning Tree Road and Fernandina Road. Traffic intending to travel to Fernandina Road is supposed to use the ramp and turn left on Burning Tree Road, which intersects opposite Fernandina Road at St Andrews Road. Only traffic traveling to eastbound St Andrews Road are intended to use the entire ramp to travel to its intersection with St Andrews Road. However, many drivers do not use the signed connection to Fernandina Road via Burning Tree Road and attempt to cross two lanes of traffic to access the eastbound left turn lane to Fernandina Road from the end of the westbound off-ramp.
- The proximity of adjacent intersections to the ramp intersections.
    - Woodland Hills Road, which connects to a large residential subdivision, intersects the south side of St Andrews Road opposite the eastbound off-ramp intersection. There is about 60 feet separation from the eastbound curb line of St Andrews Road and the westbound curb lane of the Frontage Road/Berryhill Road that intersects Woodland Hills Road.
    - Fernandina Road is located approximately 180 feet from the westbound I-26 ramp intersections. Only traffic traveling through on eastbound St Andrews Road should use the ramp intersection with St Andrews Road. The drivers that use the eastbound ramp to St Andrews Road to turn left on to Fernandina Road have to cross two lanes of traffic to access the eastbound left turn lane. Due to the short distance, this can create safety and operational issues.
- High volumes of traffic on the loop on-ramp from westbound St Andrews Road to eastbound I-26 during both peak hours (existing peak hour traffic is approximately 900 vehicles in the morning and afternoon peak hours). This high volume of traffic will require multiple turn lanes in a traditional diamond interchange set-up, as well as several innovative interchange concepts. The high volume of loop ramp traffic for 2040 conditions results in the loop ramp being assessed as near capacity during both 2040 peak hours.
- High volume of on-ramp traffic from eastbound St Andrews to eastbound I-26 during both peak hours. Extremely high volumes of existing traffic uses the eastbound on-ramp during the morning peak hour (approaching 1,200 vehicles per hour). There is also a high volume of traffic on the ramp during the afternoon peak hour (about 700 vehicles per hour).
- High volume of westbound off-ramp traffic on an atypical ramp configuration, along with the ramp intersection on St Andrews Road almost immediately adjacent to the St Andrews Road intersection at Fernandina Road. The high volume of existing traffic (about 760 vehicles during the morning peak hour and about 400 vehicles during the afternoon peak hour) using the westbound off-ramp during both peak hours has two options.

    - Approximately 60 percent of the morning peak hour traffic (about 450 vehicles per hour) and 80 percent of the afternoon peak hour traffic (about 300 vehicles per hour) continue to the ramp terminus at St Andrews Road.
    - The remaining traffic (about 300 vehicles in the morning peak hour and 100 vehicles in the afternoon peak hour) uses the short ramp to access Burning Tree Road.
        - In the morning peak hour, about half the traffic turns left towards St Andrews and to continue on to Fernandina Road. The remaining traffic turns right to Burning Tree Road, which provides access to several office parks and residential areas located in the northeast quadrant of the I-20/I-26 system interchange.
        - In the afternoon peak hour, about 75 percent of the traffic turn left towards Fernandina Road.
- Relatively high existing westbound loop off-ramp traffic (about 350 vehicles during the morning peak hour and over 600 vehicles per hour in the afternoon peak hour). These volumes would require multiple left turn lanes in the ramp concepts that eliminate the loop ramp, such as a diamond, DDI, or SPUI.

3.3.3.1 Exit 106 AO11 – Diverging Diamond Interchange

The proposed diverging diamond interchange (DDI) maintained two through lanes in each direction on St Andrews Road through the interchange area. The eastbound and westbound off-ramps consisted of a single lane exiting I-26 and provided a separate left turn and separate right turn lane at St Andrews Road. The eastbound and westbound on-ramps included a single left turn and single right turn lane from St Andrews Road, with the right turn movement yielding to the left turn movement on the single lane ramp. AO11 did not alter the spacing between the westbound ramps and Burning Tree Road/Fernandina Road. However, it required the shifting of the Woodland Hills Road intersection to a relocation of the Frontage Road/Berry Hill Road intersection approximately 350 feet west of the existing Woodland Hills Road intersection. The initial AO11 concept evaluated is shown in **Figure 3-14**.

The capacity screening incorporated the use of the Synchro Template file for a DDI. The analysis indicated AO11 was significantly undersized as proposed. The combined traffic that would be relocated from the eastbound on-ramp (existing volume approaching 1,200 vehicles per hour in the morning peak hour and 700 vehicles per hour in the afternoon peak hour), and the eastbound loop on-ramp (approximately 900 vehicles per hour during both peak hours) would total about 2,100 vehicles per hour entering the eastbound on-ramp from the DDI in the morning peak hour and 1,600 vehicles per hour in the afternoon peak hour). This would require at least a two lane on-ramp to operate under capacity.

Additionally, since the 900 vehicles currently using the existing eastbound loop on-ramp in both peak hours would be shifted to a westbound left turn movement on St Andrews Road to access the eastbound on-ramp. Without sufficient through lanes and left turn lanes at the interchange, this volume of traffic is unlikely to be accommodated, creating extensive back-ups onto westbound St Andrews Road in both peak hours.

The Synchro template file for AO11 was modified to determine necessary improvements to the DDI concept to obtain acceptable operation in simulation observations with 2040 traffic volumes. These included providing a

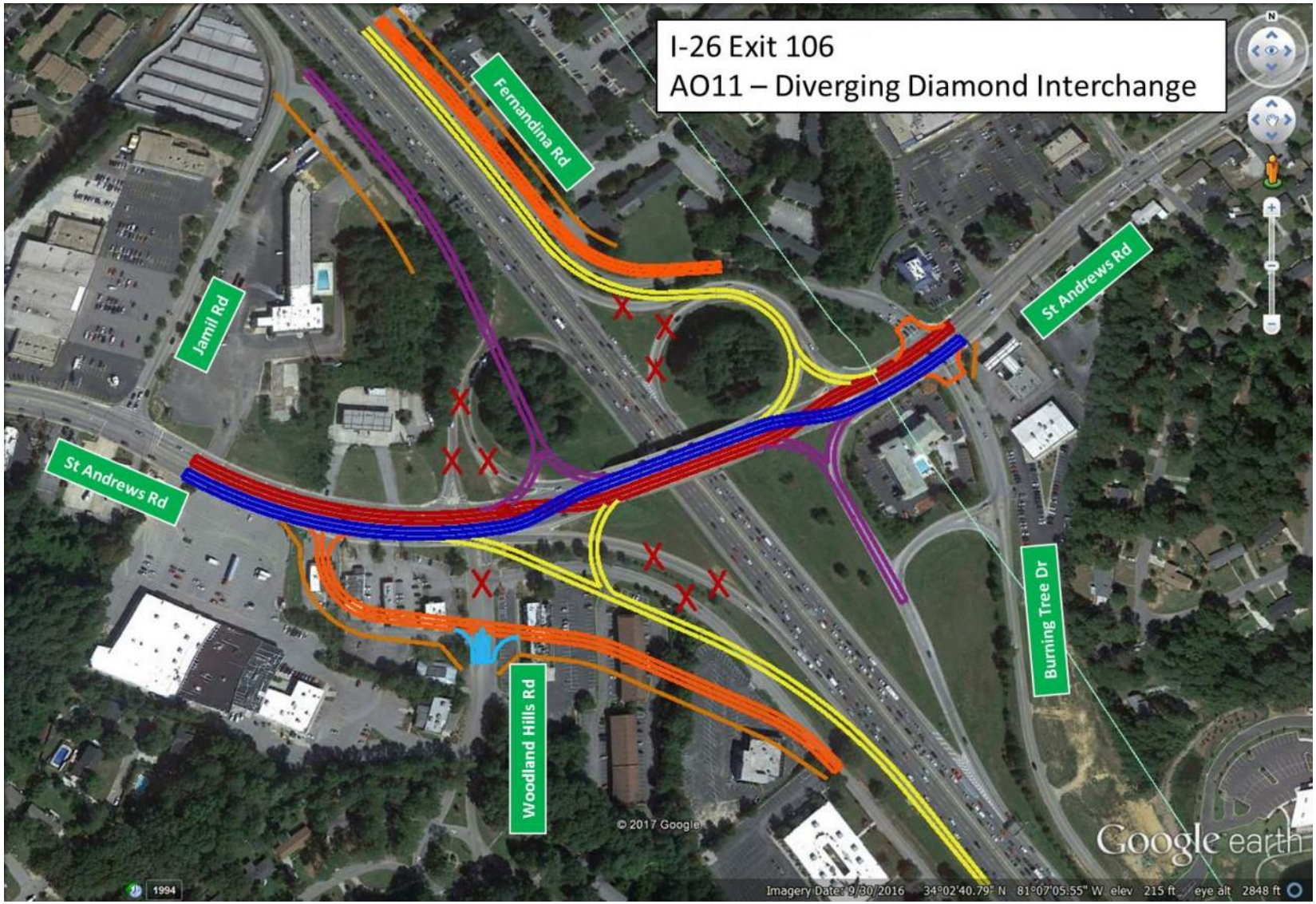


Figure 3-14 - AO11: Exit 106 Diverging Diamond Interchange

separate eastbound right turn lane and two westbound left turn lanes to create a three lane eastbound on-ramp to I-26. To accommodate this, four westbound lanes and three eastbound lanes would be required on the crossover section of the interstate overpass. Dual left turn lanes were also provided on the westbound off-ramp to accommodate the existing heavy volume of traffic on the westbound loop off-ramp. Since these improvements were not considered feasible, AO11 was not selected to be incorporated into the representative alternatives.

3.3.3.2 Exit 106 AO12 – St Andrews Flyover Interchange

AO12 considered the replacement of a typical interchange with a directional flyover ramps to/from the east on I-26.

Single lane interchange ramps from westbound St Andrews Road to eastbound I-26, and from westbound I-26 to westbound St Andrews Road would be separated from the other interchange ramps and elevated over St Andrews Road. The eastbound off-ramp would be relocated to the east of its existing location and would provide separate left turn and right turn lanes to St Andrews Road. The single lane flyover ramp from westbound St Andrews Road would begin to the east of the existing Fernandina Road/Burning Tree Road intersection and would connect with a single lane on-ramp from eastbound St Andrews Road to form a two lane ramp that would merge to a single lane prior to entering eastbound I-26. Due to the beginning of the flyover ramp from westbound St Andrews Road to eastbound I-26 being located east of Fernandina Road/Burning Tree Road, traffic from those roads could not enter I-26 eastbound.

The existing westbound off-ramp would be modified to eliminate the right turn connection to Burning Tree Road. Burning Tree Road would be maintained between this connection and St Andrews Road, but Fernandina Road would be reconfigured to begin on Burning Tree Road south of the current connection from the ramp and be routed to run parallel and adjacent to the interstate and the proposed westbound flyover ramp. It would cross under St Andrews Road before intersecting existing Fernandina Road. This would divert all traffic that currently travels to Burning Tree Road or to Fernandina Road using the connection to ramp intersection on St Andrews Road that is separated from Fernandina Road by approximately 200 feet. It would also reroute existing traffic between Fernandina Road and St Andrews Road via Burning Tree Road. For example, all the existing left turn movements from eastbound St Andrews Road to Fernandina Road would, in AO12, become right turn movements onto Burning Tree Road. That traffic would turn right from Burning Tree Road onto the new Fernandina connector. Similarly, existing traffic traveling south on Fernandina Road to St Andrews Road would be routed under St Andrews Road to Burning Tree Road, where it would turn left towards St Andrews Road. These diversions of traffic to/from Fernandina Road via Burning Tree Road would overwhelm the Burning Tree Road intersections with the proposed connector and with St Andrews Road.

The existing westbound loop off-ramp would be replaced by a single lane flyover ramp that would intersect westbound St Andrews Road within 300 feet of the Jamil Road intersection. The westbound on-ramp would be similar to the existing on-ramp: it would consist of separate lanes accepting left and right turn traffic from St Andrews Road. However, instead of right turn traffic yielding to left turn traffic entering the ramp, both accepting lanes would continue down the ramp before merging prior to entering I-26 westbound. Woodland

Hills Road and the Frontage Road/Berryhill Road would be reconfigured and would intersect St Andrews Road further west closer to Jamil Road. The westbound flyover ramp would merge into westbound St Andrews Road approximately opposite this intersection, making it impossible for traffic from westbound I-26 to access Woodland Hills Road/Berryhill Road. The initial AO12 concept evaluated is shown in **Figure 3-15**.

The capacity screening of AO12 was performed using the LOS thresholds used to evaluate existing and 2040 No-Build conditions. A single lane eastbound on-ramp, made up of the on-ramp from eastbound St Andrews Road and the proposed westbound flyover, was assessed to be over capacity under existing volumes during the morning peak hour and near capacity in the afternoon peak hour, and over capacity in both peak hour with 2040 traffic volumes. The westbound flyover off-ramp was assessed to be near capacity in both peak hours under 2040 traffic. Due to these assessments, along with the adverse operation at St Andrews Road/Burning Tree Road as a result of the Fernandina Connector, and the placement of the flyover ramps making some movements impossible to complete, AO12 was not selected to be evaluated further as part of the representative alternatives.

3.3.3.3 Exit 106 AO13 – Single Point Urban Interchange

The proposed single point urban interchange (SPUI) created maintained two through lanes in each direction on St Andrews Road through the interchange area. The eastbound and westbound off-ramps consisted of a single lane exiting I-26, which separates to provide a separate left turn and separate right turn lane to St Andrews Road. The single lane eastbound and westbound on-ramps included a single left turn and single right turn lane from St Andrews Road, with right turn traffic entering the on-ramp yielding to left turn traffic. The initial AO13 concept evaluated is shown in **Figure 3-16**.

The capacity screening incorporated the use of the Synchro Template file for a SPUI. The analysis indicated AO13 was undersized as proposed. Under 2040 traffic volumes, the SPUI intersection operates over capacity during both peak hours

The initial concept was modified to provide two through lane in each direction through the SPUI intersection and dual left turn lanes from westbound St Andrews Road to the eastbound on-ramp. The eastbound right turn movement from St Andrews Road to the on-ramp was given its own lane on the on-ramp. The resulting three lane ramp section narrowed to the minimum two lane on-ramp required to accommodate the high volume of traffic entering eastbound I-26 from Exit 106. The westbound off-ramp also was modified to incorporate dual left turn lanes.

Observations of the simulations of the alternative indicated that, with the additional turn lanes, the SPUI intersection should operate well with revised geometry. However, there were substantial left turn queues observed on the westbound dual left turn lanes onto the eastbound on-ramp. Queue lengths in the simulation approached 400 feet with 2040 traffic in the morning peak hour and 650 feet in the afternoon peak hour. These queues would extend past the location of the existing Fernandina Road/Burning Tree Road intersection. Excessive queuing in either direction would likely result in potentially severe back-ups on St Andrews Road, Fernandina Road, Burning Tree Road and Jamil Road. These interactions were not modeled in the template

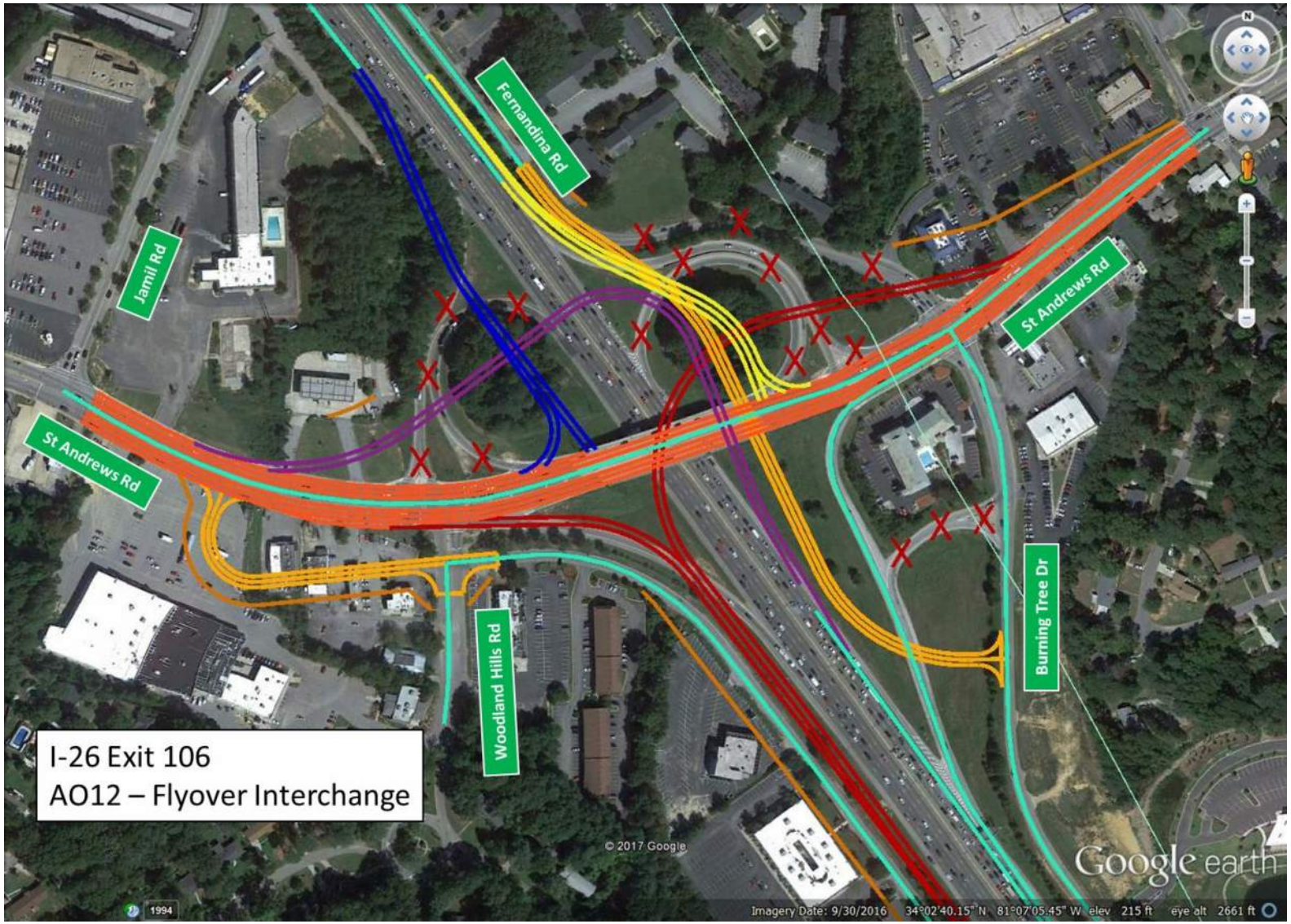


Figure 3-15 - AO12: Exit 106 Flyover Interchange

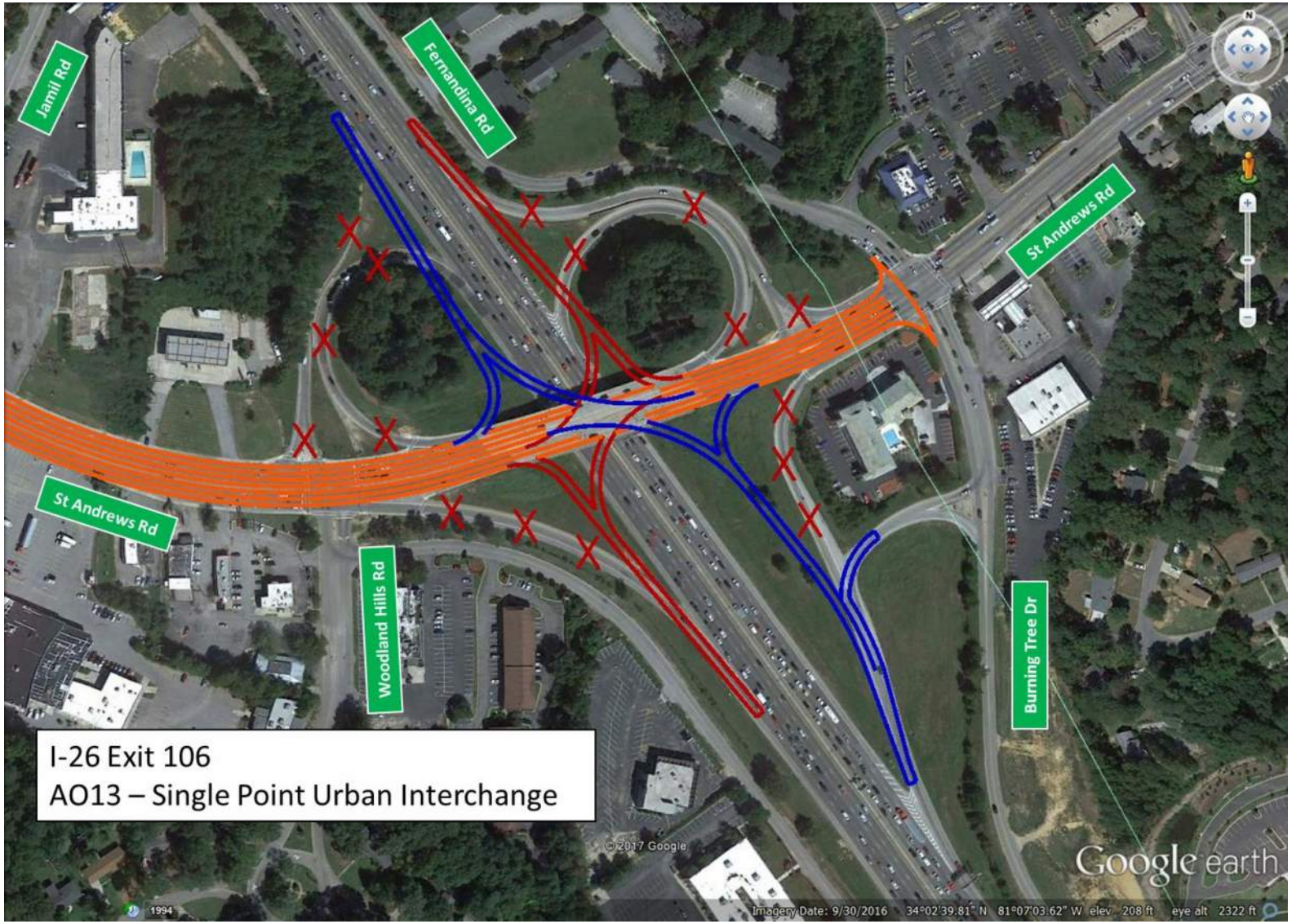


Figure 3-16 - AO13: Exit 106 Single Point Urban Interchange

intersection, but are noted and will be observed in the development of the representative alternative microsimulation networks incorporating AO13. AO13 was selected to be evaluated further as part of the representative alternatives RA1, RA5, RA7, and RA8.

3.3.3.4 Exit 106 AO14 – Modified Diverging Diamond Interchange

The proposed diverging diamond interchange (DDI) evaluated in AO11 was modified to maintain the existing intersection of Woodland Hills Road and St Andrews Road in its current location. In AO11, Woodland Hills Road and the Frontage Road/Berryhill Road were realigned and their intersection with St Andrews Road was relocated to the west closer to Jamil Road. To be able to keep the adjacent intersections at their current locations, the DDI ramps to/from I-26 have to be closer together. This shortens the crossover sections of the overpass but lengthens the storage areas between the crossover intersections and the next adjacent upstream intersections. AO 14 also maintains signal control at the present location of the Woodland Hills intersection.

The original AO14 concept maintained two through lanes in each direction on St Andrews Road through the interchange area. The eastbound and westbound off-ramps consisted of a single lane exiting I-26 and provided a separate left turn and separate right turn lane at St Andrews Road. The eastbound and westbound on-ramps included a single left turn and single right turn lane from St Andrews Road, with the right turn movement yielding to the left turn movement on the single lane ramp. The initial AO14 concept evaluated is shown in **Figure 3-17**.

The capacity screening incorporated the use of a detailed Synchro model to reflect the more closely spaced intersections a DDI. The analysis indicated AO14 was significantly undersized as proposed. The combined traffic that would be relocated from the eastbound on-ramp (existing volume approaching 1,200 vehicles per hour in the morning peak hour and 700 vehicles per hour in the afternoon peak hour), and the eastbound loop on-ramp (approximately 900 vehicles per hour during both peak hours) would total about 2,100 vehicles per hour entering the eastbound on-ramp from the DDI in the morning peak hour and 1,600 vehicles per hour in the afternoon peak hour). This would require at least a two lane on-ramp to operate under capacity.

Additionally, since the 900 vehicles currently using the existing eastbound loop on-ramp in both peak hours would be shifted to a westbound left turn movement on St Andrews Road to access the eastbound on-ramp. Without sufficient through lanes and left turn lanes at the interchange, this volume of traffic is unlikely to be accommodated, creating extensive back-ups onto westbound St Andrews Road in both peak hours.

The Synchro template file for AO14 was modified to determine necessary improvements to the DDI concept to obtain acceptable operation in simulation observations with 2040 traffic volumes. These included providing a separate eastbound right turn lane and two westbound left turn lanes to create a three lane eastbound on-ramp to I-26. Dual left turn lanes and dual right turn lanes were also provided on the westbound off-ramp to accommodate the existing heavy combined volume of traffic using both the existing westbound off-ramp and the westbound loop off-ramp.

Under existing traffic volumes, simulations of the concept were observed to perform well with the exception of excessive queuing of traffic waiting to enter the eastbound on-ramp in the morning peak hour. However, during

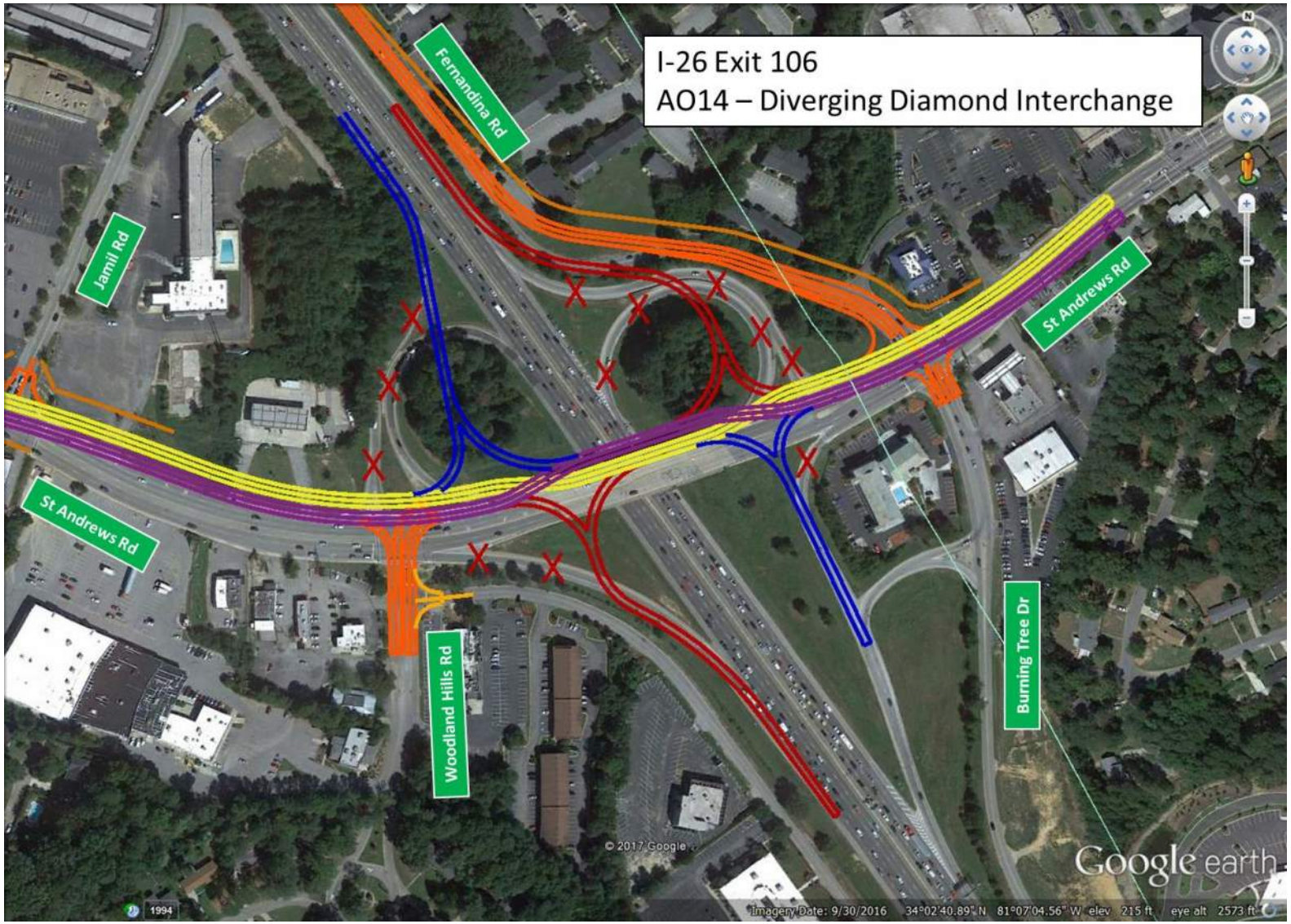


Figure 3-17 - AO14: Exit 106 Diverging Diamond Interchange

the afternoon peak hour, there was excessive queueing and delay noted on the westbound St Andrews Road approach and the northbound Burning Tree Road approach to the intersection of St Andrews Road and Fernandina Road/Burning Tree Road, along with excessive queuing of left turning traffic on the westbound off-ramp. These observations are the result of the more detailed examination of AO14 as opposed to using the DDI template file used for AO11. By including the adjacent intersections and their traffic, and assuming the signals along St Andrews Road are interconnected, the signal operation is affected and likely more realistic than that in the template files omitting the adjacent intersections.

Simulations of AO14 under 2040 traffic volume indicated increased queuing observed in the simulations of AO14 under existing traffic. In the morning peak hour, in addition to the queuing of eastbound St Andrews Road traffic lining up to enter the eastbound on-ramp, additional queuing also was observed on the southbound approach of Fernandina Road and the westbound approach of St Andrews Road at its intersection with Fernandina Road/Burning Tree Road and on the westbound off-ramp. In the afternoon peak hour, the queuing observed with existing traffic increased under the estimated 2040 volumes. Since maintaining the existing location of the Woodland Hills Road intersection with St Andrews Road in AO14 was preferable to the realignment and relocation included in AO11, AO14 was selected to be incorporated into the representative alternatives RA2 and RA6.

3.3.3.5 Exit 106 AO15 – Modified Diverging Diamond Interchange/Frontage Roads

The proposed diverging diamond interchange (DDI) evaluated in AO11 and AO14 was modified to incorporate significant changes to the adjacent frontage roads of Jamil Road, Woodland Hills Road, Berryhill Road, Burning Tree Road, and Fernandina Road, including limiting the movements to/from Fernandina Road/Burning Tree Road to right turns in/out at St Andrews Road, and the use of roundabouts at frontage road intersections.

The original AO15 concept maintained two through lanes in each direction on St Andrews Road through the interchange area. The eastbound and westbound off-ramps consisted of a single lane exiting I-26 and provided a separate left turn and separate right turn lane at St Andrews Road. The eastbound and westbound on-ramps included a single left turn and single right turn lane from St Andrews Road, with the right turn movement yielding to the left turn movement on the single lane ramp.

On the west side of the interchange, Jamil Road was realigned slightly at its bend located approximately 900 feet from St Andrews Road, with a roundabout placed at the bend to connect to a new roadway that would intersect Woodland Hills Road and the Frontage Road/Berryhill Road at another roundabout. This connection would not intersect St Andrews Road. Traffic from Woodland Hills Road that would want to access St Andrews Road would have to travel on the connector to the Jamil Roundabout, then south on Jamil Road before turning left onto St Andrews Road.

On the east side of the interchange, the St Andrews Road intersection with Fernandina Road and Berryhill Road was converted to provide right turns in and out of the side streets. A new direct connection between Fernandina Road and Burning Tree Road was included in AO15, with roundabouts at the connector intersections.

AO15 created a number of complex traffic movements. Traffic exiting the westbound off-ramp or traveling eastbound on St Andrews Road that currently turns left onto Fernandina Road would turn right onto Burning Tree Road, then double back through the roundabout on the connector to Fernandina Road. Traffic turning left from Burning Tree Road onto westbound St Andrews Road would instead use the roundabout and connector to St Andrews Road, then use the other roundabout to head back on Fernandina Road to turn right onto St Andrews Road. The initial AO15 concept evaluated is shown in **Figure 3-18**.

The capacity screening incorporated the use of a detailed Synchro model created to model the changes in frontage road access and the revised connections. Adjustments made to the DDI concept in AO11 and AO14 were incorporated into the first attempts to model AO15. This included increasing the number of lanes on the crossover section of the overpass from two to three lanes in each direction, with three westbound through lanes through the crossover area. Additional modifications were incorporated into the AO15 network to improve poor operations observed in the simulations. These improvements included providing dual left and right turn lanes on the westbound off-ramp as well as dual left turn lanes from westbound St Andrews Road to the eastbound on-ramp increasing from two to three lanes the number of lanes entering the westbound DDI crossover.

The observation of the simulations of existing traffic on AO15 indicated serious flaws in the concept, especially with the connection roadways, the roundabout intersections and the conversion of the intersection of Burning Tree Road/Fernandina Road to right turn in/out. In the morning peak our, significant queuing was observed in simulations on the westbound off-ramp, westbound St Andrews Road approaching the intersection, and along the Fernandina Road/Burning Tree Road connector. In the afternoon peak hour simulation, gridlock on the Burning Tree Road/Fernandina Road connector was so severe that it led to gridlock throughout the entire interchange.

Additional modifications to the concept were developed and simulated. These included replacing the roundabouts on the Burning Tree/Fernandina connectors with stop sign controlled T-intersections, and with signal controlled intersections, increasing the number of lanes on the Burning Tree/Fernandina connector and the providing three right turn lanes from Fernandina Road to St Andrews Road, and eventually abandoning the Burning Tree Road/Fernandina Road connector altogether and returning to a signalized intersection with all traffic movements at the Burning Tree Road/Fernandina Road intersection with St Andrews Road. Simulations of this final option with existing traffic appeared to provide the best operation. However, simulations of this option under design year traffic indicated the concept would not accommodate anticipated future volumes, even with additional capacity such as a third left turn lane on the westbound off-ramp, triple left turn lanes on Burning Tree Road and dual right turn lanes on Fernandina Road. This last version of AO15, which is also depicted in **Figure 3-19**, was incorporated into the representative alternatives RA4 and RA9.

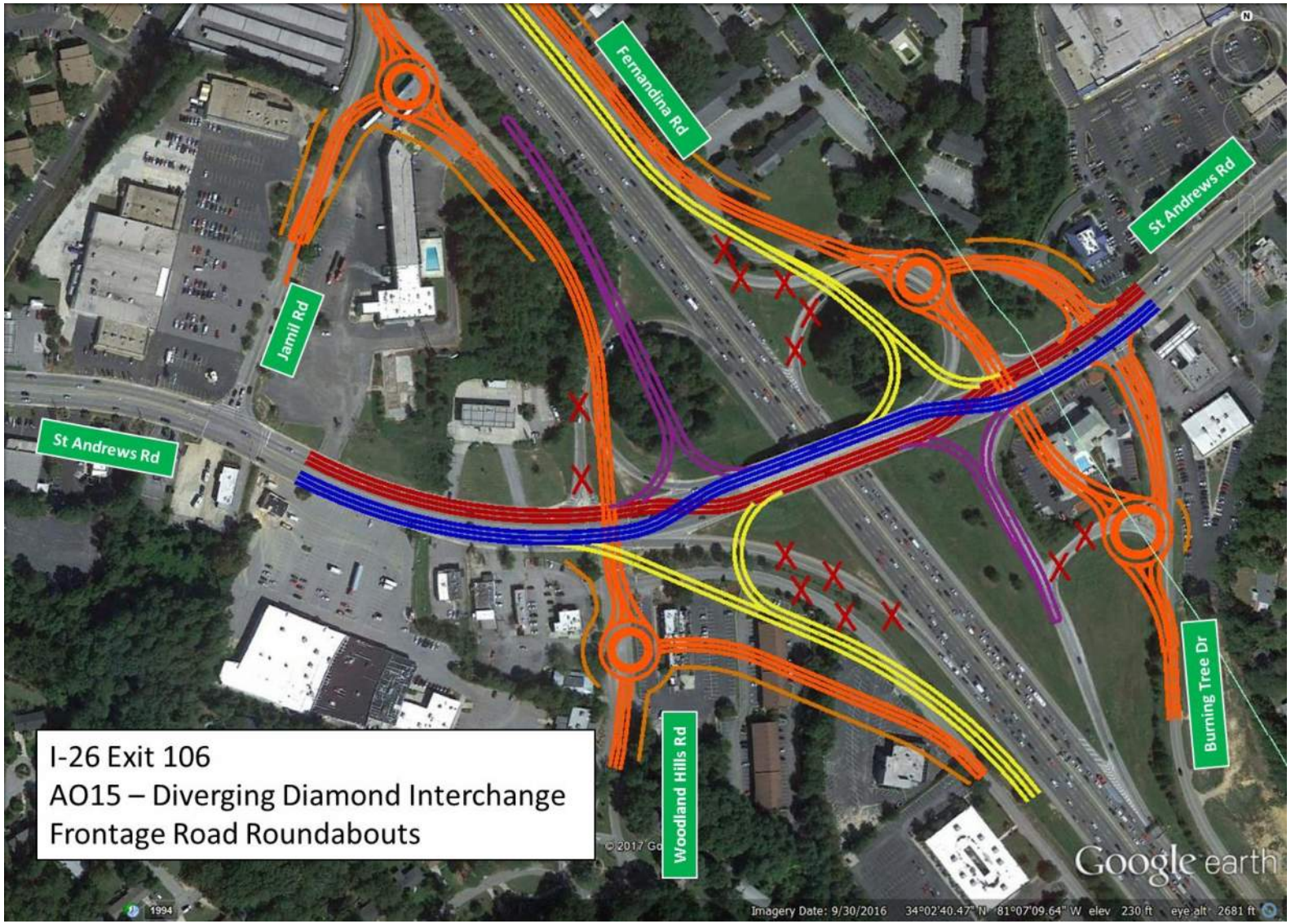


Figure 3-18 - AO15: Exit 106 Diverging Diamond Interchange with Frontage Road Roundabouts

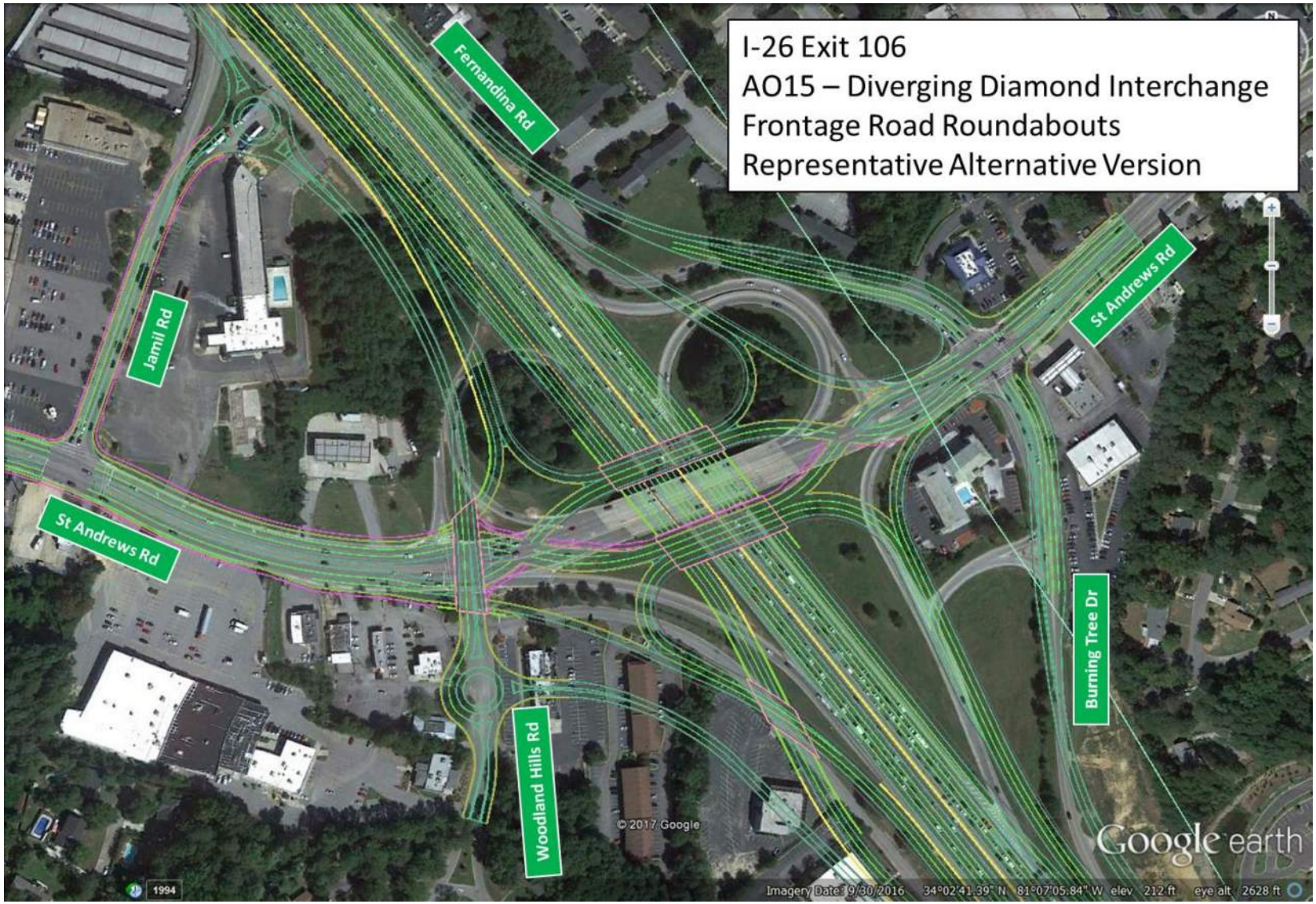


Figure 3-19 - AO15: Exit 106 Revised Diverging Diamond/Frontage Road Roundabouts

3.3.3.6 Exit 106 AO16 – Split Ramp Interchange/Frontage Road Roundabouts

The proposed split ramp interchange concept was an atypical interchange configuration. The original concept for AO16 incorporated a westbound off-ramp similar to those in the AO11, AO14, and AO15 concepts, and provided two left turn lanes and one right turn lane to St Andrews Road. The single lane westbound on-ramp was created using new connections to Fernandina Road and Burning Tree Road via roundabouts located several hundred feet from their intersection with St Andrews Road, similar to AO15. Similar to AO15, the movements to/from St Andrews Road to Fernandina Road and Burning Tree Road were limited to right turns in/out.

On the west side of the interchange, the eastbound off-ramp was relocated to the west of the existing off-ramp and provided widely separated two lane left turn and one lane right turn roadways intersecting St Andrews Road. Woodland Hills Road was limited to right turns in/out from St Andrews Road. The eastbound on-ramp was made up with a one lane connection from Jamil Road (via a roundabout) and a two lane connection from St Andrews Road. In the original concept of AO16, the portion of the eastbound on-ramp from St Andrews Road ran between and then over the separated left turn and right turn roadways making up the eastbound off-ramp. The eastbound ramp from St Andrews merged with an on-ramp connection from a roundabout on Jamil Road. St Andrews Road carried three lanes westbound and two lanes eastbound through the interchange. The initial AO16 concept evaluated is shown in **Figure 3-20**.

As in AO15, the frontage road connections introduced a number of complex traffic movements. Traffic from the westbound off-ramp that is heading to Fernandina Road has to combine with the right turn traffic traveling to Burning Tree Road. At the proposed roundabout on Burning Tree Road, the Fernandina Road traffic turns to the right to the connector roadway running under the westbound off-ramp and the St Andrews Road overpass, turning right back to Fernandina Road. Existing traffic that turns left from Burning Tree Road on to westbound St Andrews Road would use the connector and roundabouts to reach Fernandina Road to make a right turn onto westbound St Andrews Road.

Westbound on-ramp traffic movements from St Andrews Road also became more complex. From westbound St Andrews Road, traffic would turn right onto Fernandina Road, travel through the roundabout and use the connector to turn right onto the on-ramp. From eastbound St Andrews Road, traffic would turn right on to Burning Tree Road, travel through the roundabout, under the westbound off-ramp and St Andrews Road to reach the on-ramp.

Also complicating the operation of AO16 was the right in/out operation at Woodland Hills Road. Traffic from Woodland Hills Road and the Frontage Road/Berryhill Road wanting to travel to the west on St Andrews Road is forced to turn right onto St Andrews Road, cross the interchange, turn right onto Burning Tree Road, travel through the roundabout to the new connection to travel to Fernandina Road, travel through the new roundabout on Fernandina Road to turn right onto St Andrews round before traveling back across the interchange on westbound St Andrews Road. Traffic wanting to turn left into Woodland Hills Road has to make u-turns from westbound St Andrews Road at either the new eastbound ramp or Jamil Road intersections to turn right into Woodland Hills.

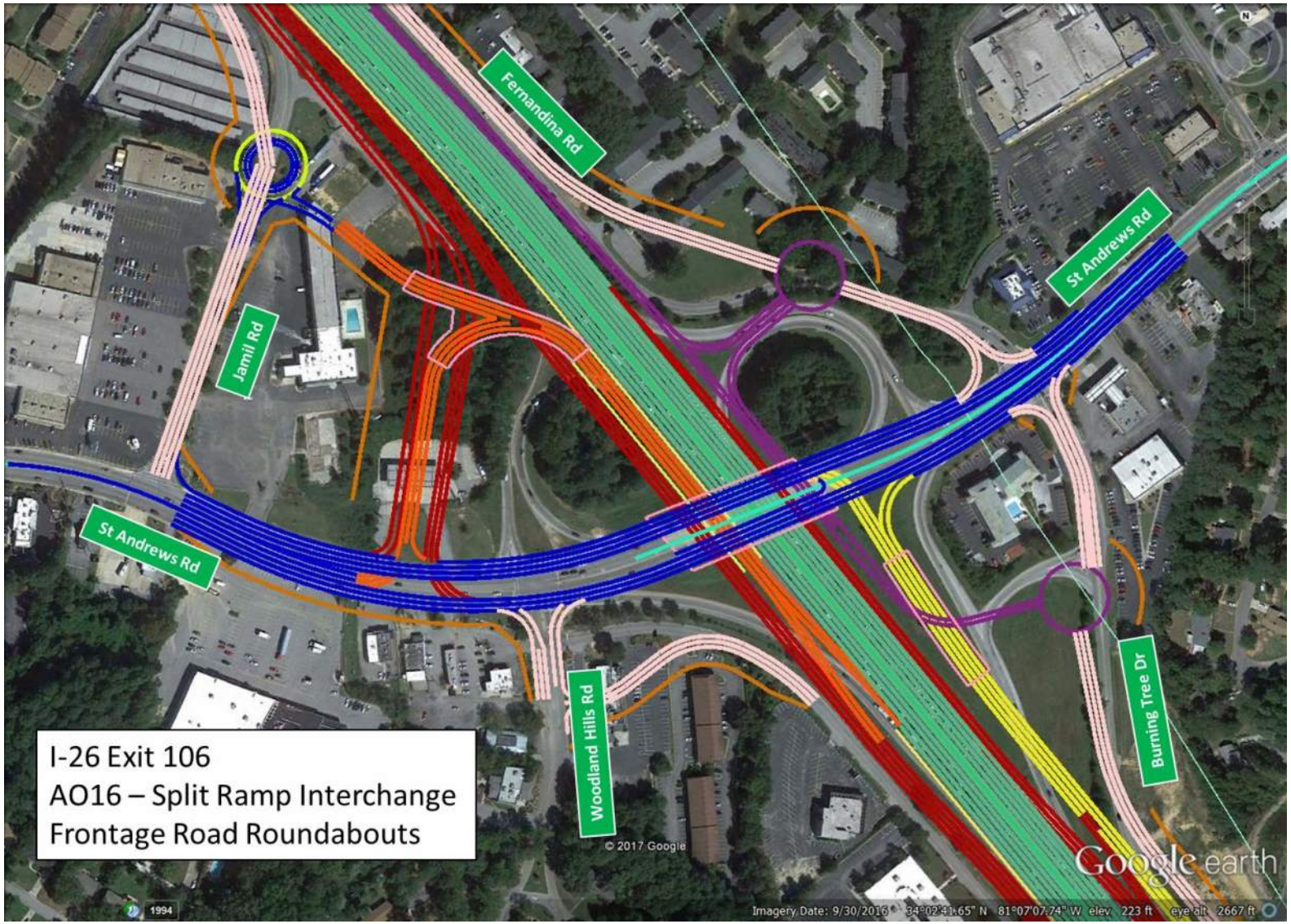


Figure 3-20 - AO16: Exit 106 Split Ramp Interchange with Frontage Road Roundabouts

For the eastbound on-ramps, the high volume of traffic using the existing on-ramp and loop on-ramp are redirected to the proposed ramps from St Andrews Road and Jamil Road. All of the traffic using the existing loop on-ramp would turn right from westbound St Andrews Road onto the new on-ramp roadway. A portion of the existing traffic entering the eastbound on-ramp would use the proposed ramp connection from the proposed roundabout on Jamil Road, while the remaining traffic would turn on two left turn lanes from eastbound St Andrews Road to the new on-ramp roadway. Traffic from Jamil Road entering the on-ramp would yield to the on-ramp roadway traffic from St Andrews Road.

The capacity screening incorporated the use of a detailed Synchro model created to model the changes in frontage road access and the revised connections. The observation of the simulations of existing traffic on AO16 immediately indicated serious flaws in the original AO16 concept resulting in extensive queuing and delays, especially with the connection roadways, the roundabout intersections, and the conversion of the intersection of Burning Tree Road/Fernandina Road to right turn in/out operation. As in AO15, the right in/out operation at Burning Tree Road/Fernandina Road overloads the new connector roadways and roundabouts. This condition is worsened in AO16 by also making all westbound on-ramp traffic use portions of the new connectors, Fernandina Road, and Burning Tree Road.

Additional modifications to the concept were iteratively developed and simulated. These included reinstating the full access for Fernandina Road at a signalized intersection with St Andrews Road (Burning Tree Road would continue to operate right in/out), replacing the roundabouts on the Burning Tree/Fernandina connectors with unsignalized T-intersections, adding a second right turn lane on the westbound off-ramp, increase the number of lanes on the Burning Tree Road, Fernandina Road, and Jamil Road connectors, and finally eliminating the Fernandina Road/Burning Tree Road connectors, incorporating a westbound on-ramp at a signalized intersection with the westbound off-ramp, and reinstating full access to/from Burning Tree Road at the signalized intersection with Fernandina Road. Traffic turning left into and out of Woodland Hills Road were still required to make u-turns, but the u-turn for the traffic traveling to westbound St Andrews Highway was relocated to the westbound ramp intersection.

Observations of AO16 under existing traffic indicated this revision to the concept functioned well, with some moderate queuing observed under existing afternoon peak hour traffic for westbound St Andrews Road traffic entering the interchange area, and on the Burning Tree Road approach to St Andrews Road.

Reviews of the simulation operation using estimated 2040 volumes resulted in some additional improvements that were incorporated into the concept. These included providing three lanes on the eastbound ramp connector from St Andrews Road, including triple eastbound left turn lanes and dual westbound right turn lanes onto the connector from St Andrews Road, providing triple left turn lanes from the westbound off-ramp, and a separate eastbound u-turn lane and left turn lane on St Andrews Road at the westbound ramp intersection; and providing dual right turn lanes from Fernandina Road and dual left turn lanes from Burning Tree Road to accommodate traffic turning onto westbound St Andrews Road. The simulations of the final alternative appeared to function well, with moderate queuing observed on the westbound left turn to Burning Tree Road and the westbound off-ramp right turn movements in the morning peak hour, and on the northbound Burning

Tree Road approach during the afternoon peak hour. This last version of AO16, which is depicted in **Figure 3-21** was incorporated into the representative alternative RA3.

3.3.3.7 Exit 106 AO48 – Roundabout Interchange

The proposed roundabout interchange at Exit 106 incorporated two-lane roundabouts in place of traffic signals at the ramp intersections with St Andrews Road. Roundabouts were also included at the adjacent St Andrews Road intersections with Jamil Road and with Fernandina/Burning Tree Road, as well as at the Burning Tree Road intersection with the ramp connector from the westbound off-ramp. Two lanes in each direction were maintained on St Andrews Road through the interchange area. The interchange ramps would remain unchanged. The initial AO48 concept evaluated is shown in **Figure 3-22**.

The capacity screening incorporated the use of SIDRA to analyze the roundabout operation. The assessment indicated the two-lane roundabouts at the ramp intersections, would operate over capacity under existing and 2040 traffic volumes. Incorporating additional lanes in the roundabouts would not be feasible. AO48 was not selected to be incorporated into the representative alternatives.

3.3.3.8 Exit 106 CAP-X Review

The Exit 106 traffic volumes and interchange geometry were entered into the CAP-X spreadsheet to determine which interchange alternatives scored the highest using the CAP-X methodology. The best rated interchange concept was a ParClo interchange, followed by DDI, and displaced left turn (DLT) interchanges (not considered as one of the Exit 106 interchange options). The Traditional Diamond interchange and SPUI were ranked fourth and fifth respectively.

Partial Cloverleaf Interchange

The existing Exit 106 is a ParClo interchange with an eastbound loop on-ramp and a westbound loop off-ramp. CAP-X only assesses ParClo interchanges with loop off-ramps and does not consider loop on-ramps. Though CAP-X cannot assess the existing interchange, it is clear that the existing interchange configuration is a result of the very high directional movements using the interchange.

Displaced Left Turn Interchange

The DLT interchange option was the third highest rated in the CAP-X assessment. This concept was not developed as a design alternative at Exit 106. Were such a concept to be considered, the left turn movements at the ramps would have to be displaced upstream of the ramp intersections, most likely at Jamil Road and at Fernandina Road/ Burning Tree Road.

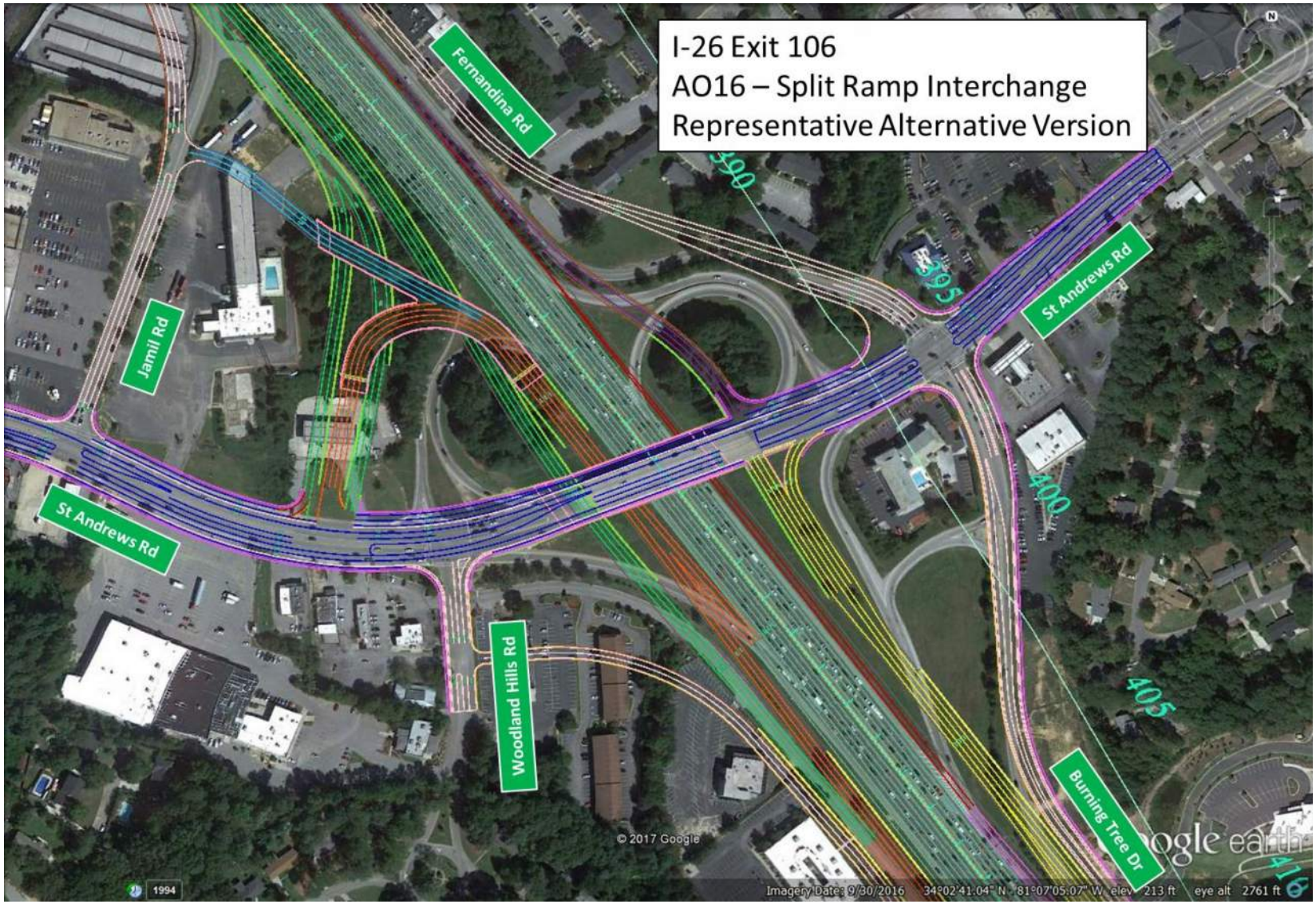


Figure 3-21 - AO16: Exit 106 Revised Split Ramp Interchange

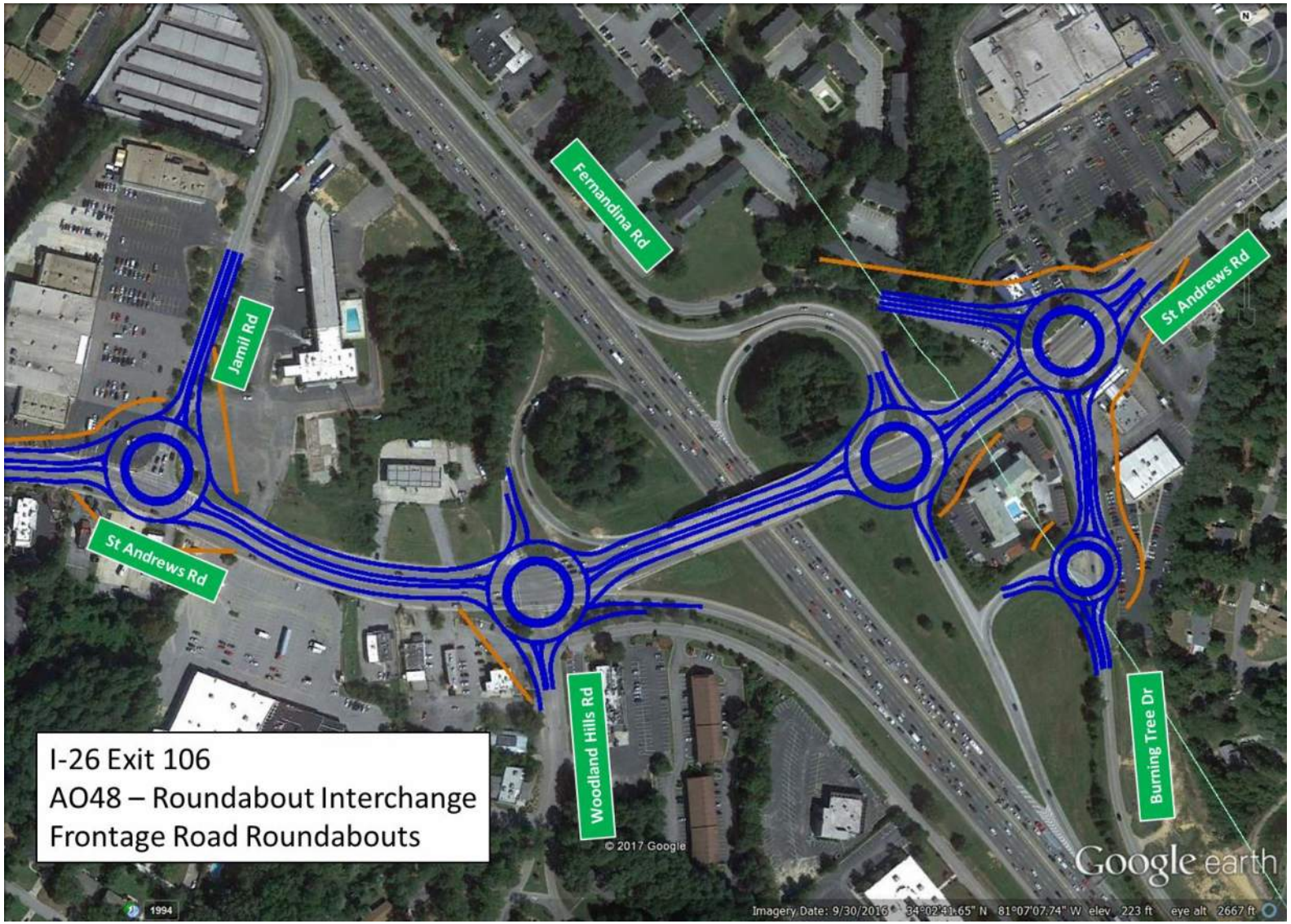


Figure 3-22 - AO48: Exit 106 Roundabout Interchange with Frontage Road Roundabouts

3.3.4 AO17 – AO22 (EXIT 107/64)

The following are a list of the AO developed and screened for the I-20/I-26 System Interchange.

- AO17 – I-20/I-26 Turbine Interchange (capacity assessment)
- AO18 – I-20/I-26 Directional with Interior Right Exits (capacity assessment)
- AO19 – I-20/I-26 Directional with Loop (I-20 EB to I-26 WB) and Ramps (capacity assessment)
- AO20 – I-20/I-26 Directional with Two Loop Ramps (I-20 EB to I-26 WB; I-20 WB to I-26 EB) (capacity assessment)
- AO21 – I-20/I-26 Turbine Braided-Directional with Two Loop Ramps (I-20 EB to I-26 WB) (capacity assessment)
- AO22 - I-20/I-26 Semi-Directional with Two Loop Ramps (I-20 EB to I-26 WB) (capacity assessment)

Existing traffic operations at the I-20/I-26 system interchange at Exit 107/64 are complicated by:

- The cloverleaf design that introduces short weaving sections carrying high volumes of weaving traffic between loop ramps in each direction on I-26 and I-20.
- High existing volumes of ramp traffic on the loop ramp from eastbound I-26 to eastbound I-20 (1,830 vehicles per hour in the morning peak hour and 1,610 vehicles per hour in the afternoon peak hour).
- High existing volumes of traffic on the loop ramp from westbound I-20 to eastbound I-26 in the morning peak hour (1,040 vehicles)
- High existing volumes of traffic on the ramp from eastbound I-20 to eastbound I-26 in the morning peak hour (1,690 vehicles)
- High existing volumes of traffic on the loop ramp from westbound I-26 to westbound I-20 in the afternoon peak hour (1,550 vehicles)
- High existing volumes on the ramp from westbound I-20 to westbound I-26 (1,460 vehicles per hour in the morning peak hour and 1,830 vehicles per hour in the afternoon peak hour).
- The proximity of Exit 107 on I-26 to Exit 106
    - A high volume of traffic traveling through an area with complex weaving movements in a short distance between the loop on ramp from westbound St Andrews Road and the on-ramp from eastbound St Andrews Road at Exit 106 and the Exit 107 ramps.
    - The high volume of traffic traveling through an area with complex weaving movements in a short distance between the Exit 107 and the westbound off-ramp to eastbound St Andrews Road and the westbound loop off-ramp to westbound St Andrews Road
- The proximity of Exit 107 on I-26 to Exit 108
    - There is a short weaving section between the on-ramp to eastbound I-26 from eastbound I-20 and the off-ramp to Bush River Road at Exit 108
    - There is a short distance weaving distance for traffic entering eastbound I-26 from Exit 107 to position themselves to either continue eastbound on I-26 or towards downtown Columbia on I-126.
    - The two lane ramps from westbound I-26 split three lanes originating from I-126 westbound (two lanes to the left, one to the right) with the five lanes creating a short weaving section with complex weaving movements and high traffic volumes positioning to enter ramps to I-20.
- The proximity of Exit 64 on I-20 to Exit 63
    - A short weaving section is introduced on westbound I-20 between the ramp from eastbound I-26 and the off-ramp to Exit 63.

- The proximity of Exit 64 on I-20 to Exit 65
    - On eastbound I-20, there is approximately 750 between the end of the acceleration lane taper from the ramp from westbound I-20 and the beginning of the deceleration lane taper to the eastbound off-ramp to Exit 65.
    - On westbound I-20, there is approximately 700 feet from the end of the acceleration lane taper from the on-ramp from Exit 65 to the beginning of the diverging taper to the off-ramp to westbound I-26.
        - Due to the congestion caused by downstream complex weaving movements and high traffic volumes on westbound I-26 to Exit 106, the high volume of traffic on the ramp from westbound I-20 to westbound I-26, and the short distance between the Exit 65 on-ramp, traffic on westbound I-20 frequently backs from the ramp to westbound I-26 onto westbound I-20. Drivers try to avoid the back-up of traffic heading to the ramp by traveling in the center westbound mainline lane and attempting to cut in to gaps between cars, creating a safety problem and additional congestion to traffic properly using the center lane to travel through the ramp area.

Because of the complexity of modeling the interchange concepts, capacity assessments based on the existing and estimated future volumes, and the ramp LOS thresholds were performed for each ramp in the AO concepts. Since the AO concepts incorporated collector-distributor roads, volume estimates were based on adjacent service ramp volume and network origin-destination data. This results in system ramps having volumes lower than recorded traffic data. If ramps were assessed to be at or over-capacity with these volumes, the initial designs would not handle higher volumes.

The ramps at the system interchanges may be described as “left turn” or “right turn” ramps. For traffic traveling on eastbound I-26, a left turn ramp would take traffic to eastbound I-20 (the freeway direction to their left), while the right turn ramp would take traffic to westbound I-20. Under existing conditions, eastbound I-26 would use the loop ramp to eastbound I-20 as the left turn ramp. In the proposed concepts, these ramps may be replaced with flyover ramps or other directional ramps to complete the same “left turn”.

All of the Exit 107/64 interchange concepts were incorporated into the representative alternatives.

3.3.4.1 Exit 107/64 AO17 – I-20/I-26 Turbine Interchange

The proposed system interchange at Exit 107/64 developed as AO 17 is a Turbine Interchange. A capacity screening using estimated future volumes was performed on the initial AO17 concept. Generally, the ramps in the proposed concept were assessed to be under capacity. There were several ramps that were at capacity (LOS E) during one or both of the peak hours. There were no ramps that were identified as over capacity.

The results of the capacity screening were used by the roadway engineers to improve and enhance the design to accommodate the estimated future traffic to improve the assessment of the at capacity ramps to under capacity. The initial AO 17 concept and the results of the capacity screening using estimated 2040 traffic are shown in **Figure 3-23**. AO17 as was incorporated into representative alternative RA1.

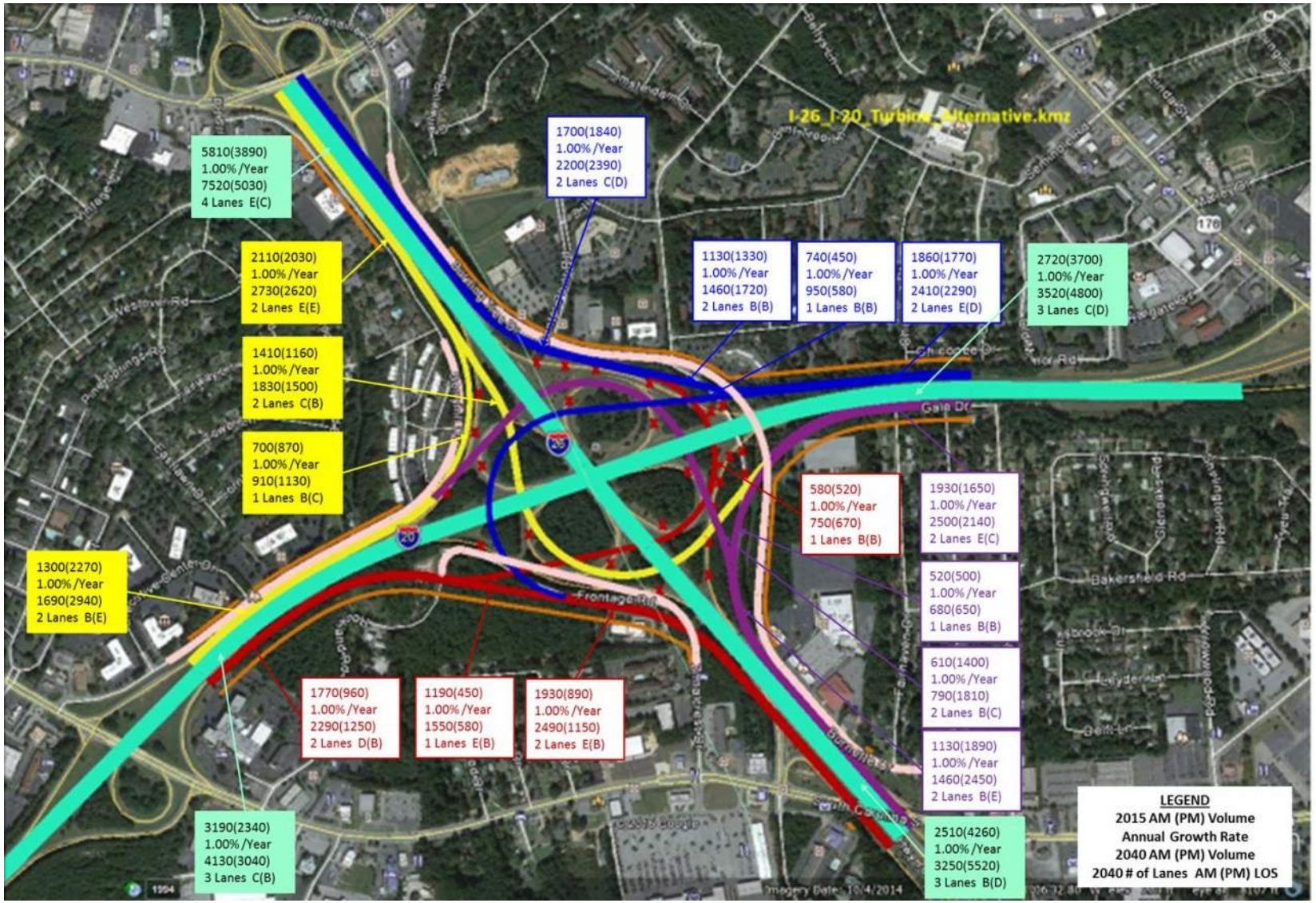


Figure 3-23 – AO 17 Turbine Interchange Concept and Capacity Screening Results

3.3.4.2 Exit 107/64 AO18 – I-20/I-26 Directional Interchange with Interior Right Ramps

The proposed system interchange at Exit 107/64 developed as AO18 is described as a Directional Interchange with Interior Right Exit Ramps. The left turn ramps from eastbound I-26 ramps to eastbound I-20, and from westbound I-26 to westbound I-20 are similar to the turbine ramps in AO17. The left turn ramps from I-20 eastbound and I-20 westbound are within the I-26 left turn ramps. The right turn ramps on all four freeway approaches to the interchange, rather than being routed outside of the left turn ramps as in AO17, are routed inside the left turn ramps on shorter length and smaller radii curves.

A capacity screening using the existing and estimated future volumes was performed on the initial AO18 concept. The capacity of the ramps in the initial version of AO18 were assessed to operate under capacity under 2040 traffic, with the exception of the two lane ramp taking westbound I-20 traffic to both directions on I-26. This design of the ramp would need to be increased to three lanes to be assessed as under capacity.

The initial AO18 concept and the results of the capacity screening using estimated 2040 volumes are shown in **Figure 3-24**. AO18 was incorporated into representative alternative RA2.

3.3.4.3 Exit 107/64 AO19 – I-20/I-26 Directional Interchange with Loop and Ramps

The proposed system interchange at Exit 107/64 developed as AO19 is described as a Directional Interchange with Loop and Ramp. The concept is similar to more typical directional interchange concepts, with the exception of maintaining the loop ramp from eastbound I-20 to westbound I-26. The interchange is likely to require more levels of crossing ramps than either AO17 or AO18. The loop ramp that was retained in AO19 was chosen for the eastbound I-20 to westbound I-26 traffic movement as this is the lowest volume ramp movement at the existing system interchange and would therefore be more likely to be assessed as under capacity under the estimated 2040 traffic than would the other ramps.

A capacity screening using the existing and estimated future volumes was performed on the initial AO19 concept. For the most part, the ramps in the proposed concepts were assessed to be under capacity. There were several ramps that were at capacity (LOS E) during one or both of the peak hours. There were no ramps that were identified as over capacity.

The results of the capacity screening were used by the roadway engineers to improve and enhance the design to accommodate the estimated future traffic to improve the assessment of the at capacity ramps to under capacity. The initial AO19 concept and the results of the capacity screening using estimated 2040 traffic are shown in **Figure 3-25**. AO19 was incorporated into representative alternative RA6.

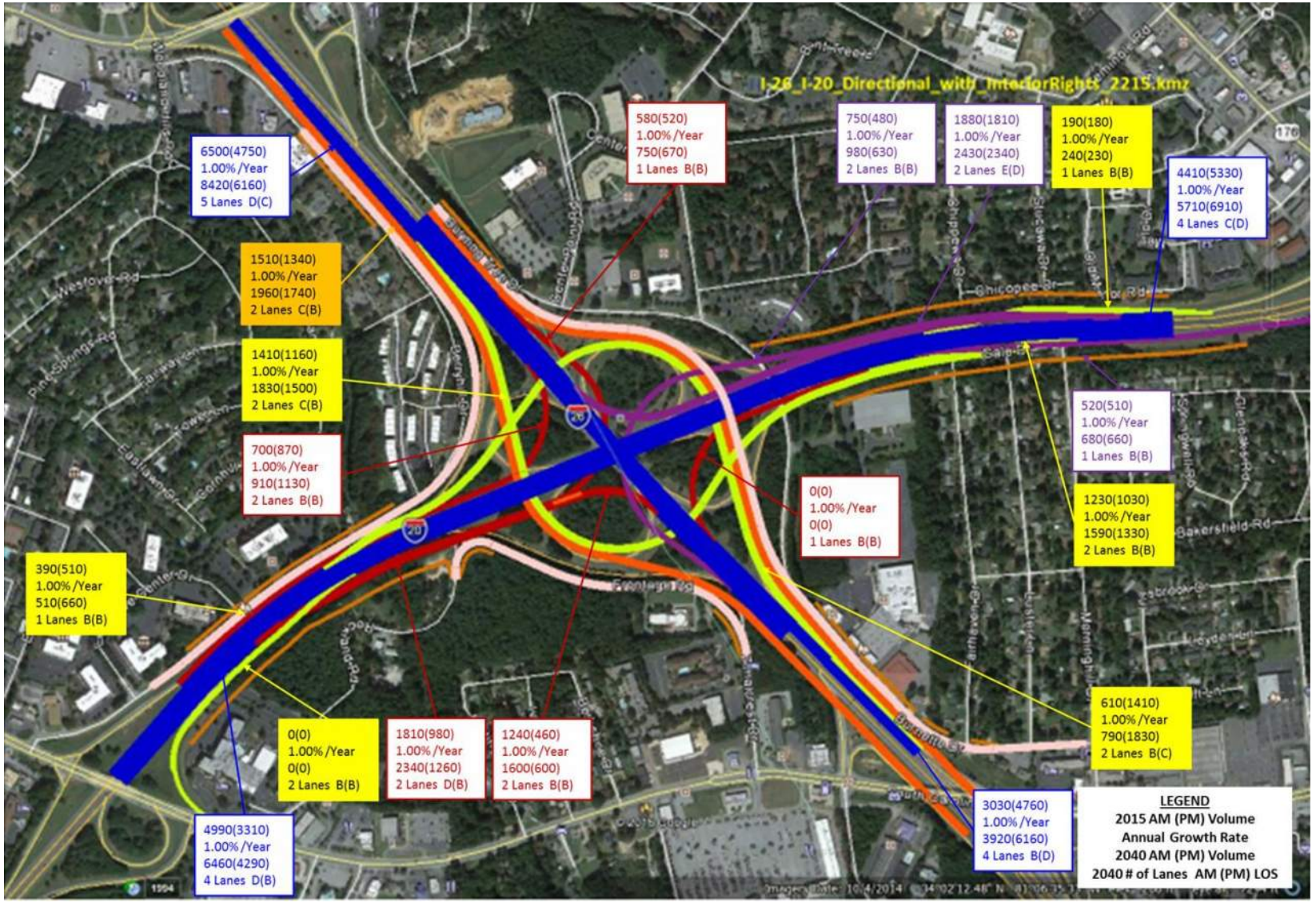


Figure 3-24 AO18 Directional Interchange with Interior Right Exit Ramps Concept and Capacity Screening Results

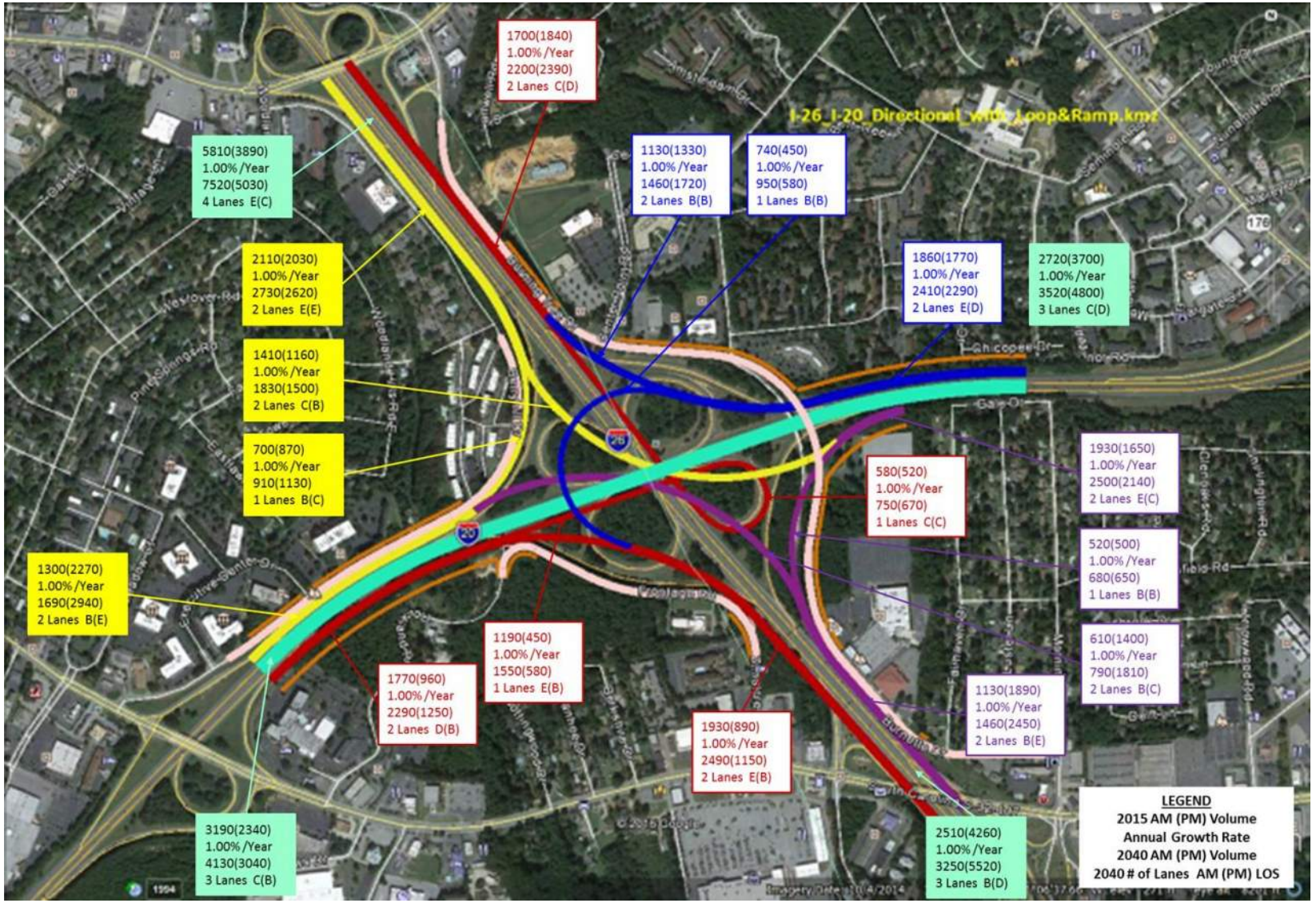


Figure 3-25 - AO 19 - Directional Interchange with Loop and Ramp Concept and Capacity Screening Results

3.3.4.4 Exit 107/64 AO20 – I-20/I-26 Directional Interchange with Two Loop Ramps

The proposed system interchange at Exit 107/64 developed as AO20 is identical to AO19, except a second loop ramp is retained for traffic traveling from westbound I-20 to eastbound I-26. This loop ramp was chosen since it carries the second lowest volume of ramp at the existing system interchange.

A capacity screening using the existing and estimated future volumes was performed on the initial AO20 concept. For the most part, the ramps in the proposed concepts were assessed to be under capacity. There were several ramps that were at capacity (LOS E) during one or both of the peak hours. There were no ramps that were identified as over capacity.

The results of the capacity screening were used by the roadway engineers to improve and enhance the design to accommodate the estimated future traffic to improve the assessment of the at capacity ramps to under capacity. The initial AO20 concept and the results of the capacity screening using estimated 2040 traffic are shown in **Figure 3-26**. AO20 was incorporated into representative alternatives RA5.

3.3.4.5 Exit 107/64 AO21 – I-20/I-26 Turbine Braided-Directional with Two Loop Ramps

The proposed AO21 concept at the system interchange incorporates a variety of interchange ramp elements. Elements of the Turbine interchange from AO17 are maintained from moving traffic to and from I-26 to I-20. The loop ramps from AO20 are also maintained. Braided ramps are introduced to move traffic to and from anticipated collector-distributor roadways traversing the interchange area.

The capacity screening using the existing and estimated future volumes performed on AO21 indicated that most ramps were assessed to be under capacity. Several ramps that were assessed to be at capacity are located just prior to ramps diverging or just after ramps merging. The anticipated two lane westbound I-20 collector-distributor road section was assessed to operate over capacity.

The results of the capacity screening were used by the roadway engineers to improve and enhance the design to accommodate the estimated future traffic to improve the assessment of at capacity and over capacity ramps to under capacity. The initial AO21 concept and the results of the capacity screening using estimated 2040 traffic are shown in **Figure 3-27**. AO21 was incorporated into representative alternative RA3.

3.3.4.6 Exit 107/64 AO22 – I-20/I-26 Semi-Directional Interchange with Two Loop Ramps

The proposed AO22 concept at the system interchange is incorporates directional ramps and the two loop ramps in AO21 and AO22 along with the introduction of some collector-distributor roadways through the interchange area.

The capacity screening using the existing and estimated future volumes performed on AO22 indicated that most ramps were assessed to be under capacity. Several ramps were assessed to be at capacity during one or both peak hours. A single lane flyover ramp from eastbound I-26 to eastbound I-20 was assessed to be over capacity during the morning peak hour and at capacity during the afternoon peak hour.

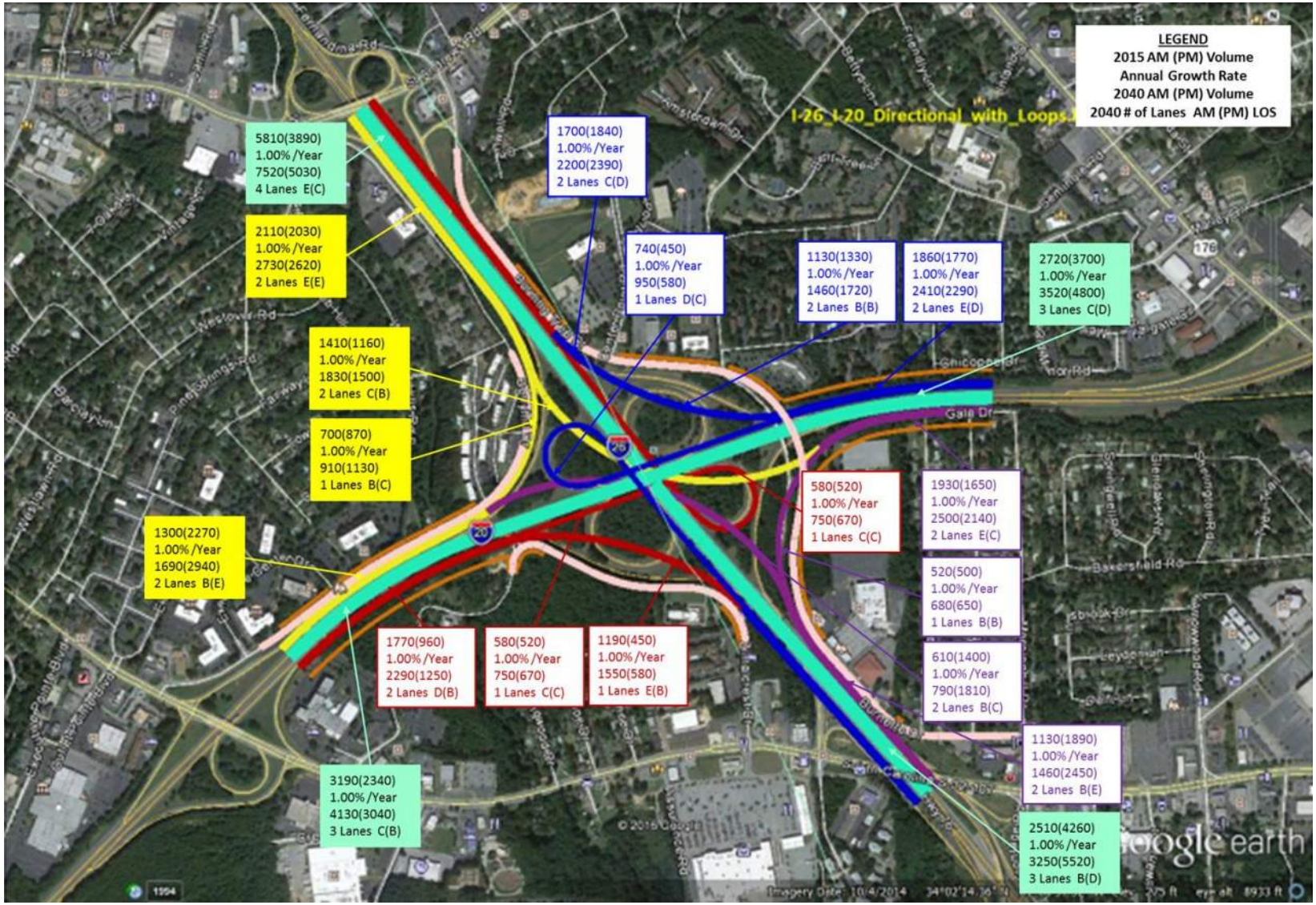


Figure 3-26 AO20 Directional Interchange with Two Loop Ramps Concept and Capacity Screening Results

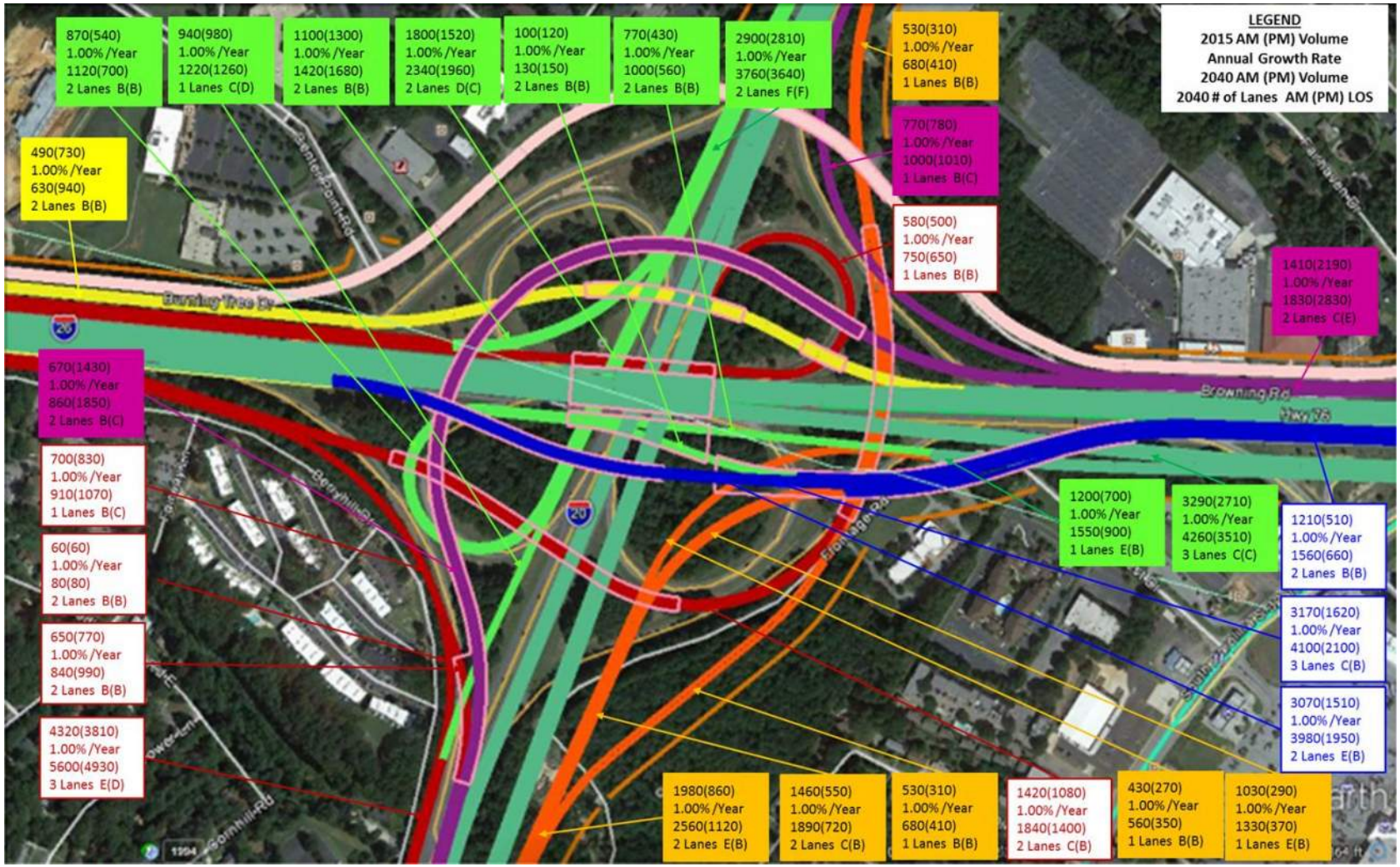


Figure 3-27 AO21 Turbine/Braided Interchange with Two Loops Concept and Capacity Screening Results

The results of the capacity screening were used by the roadway engineers to improve and enhance the design to accommodate the estimated future traffic to improve the assessment of at capacity and over capacity ramps to under capacity. The initial AO 22 concept and the results of the capacity screening using estimated 2040 traffic are shown in **Figure 3-28**. AO22 was incorporated into representative alternative RA4.

3.3.5 AO23 – AO26 (EXIT 108/108B)

The following are a list of the AO developed and screened for Exit 108 (the service interchange at Bush River Road) and at Exit 108B (the I-26/I-126 system interchange).

- AO23 – Offset Diamond at Exit 108 (detailed Synchro model)
- AO24 – I-26/I-126 Semi-Directional Flyover (capacity assessment)
- AO25 – I-26/I-126 C-D Road Connections (capacity assessment)
- AO26 – I-26/I-126 Braided C-D Road Connections (capacity assessment; detailed Synchro model)

Existing traffic operations at Exit 108 are complicated by:

- Its proximity to Exit 107 which
    - Creates a short weaving section between the ramp from eastbound I-20 to eastbound I-26 and the eastbound off-ramp to Exit 108.
    - Causes traffic from westbound I-26 to perform complex weaving movements to travel to the ramps to eastbound and westbound I-20 and to Exit 106 after I-26 merges into the three lanes from westbound I-126
    - Congestions created by the complex weaving area downstream of the merge of westbound I-26 with westbound I-126 results in substantial traffic back-ups on the mainline lanes of westbound I-26
- Congestion along Bush River Road causes the intersection of Bush River Road with the westbound I-26 off-ramp/Morninghill Drive to be over capacity during the afternoon peak hour, resulting in substantial queuing on the off-ramp approach to the intersection.

Existing traffic operations at the I-26/I-126 system interchange at Exit 108B are complicated by:

- Last minute positioning of traffic on eastbound I-26 just prior to the I-126 split.
- Three lanes continuing through to I-126 towards downtown Columbia to the left of the two lanes continuing east on I-26 gives the impression that the I-26 mainline is more of an off-ramp than a continuation of the interstate.
- Downstream congestion beginning at the merge of the two lanes of westbound I-26 between three lanes of westbound I-126 (two lanes to the left and one to the right of the merging I-26 lanes) and continuing through complex weaving movements at the system interchange at Exit 107 and the service interchange of Exit 106 results in stop-and-go traffic on westbound I-126 during the afternoon peak hour.

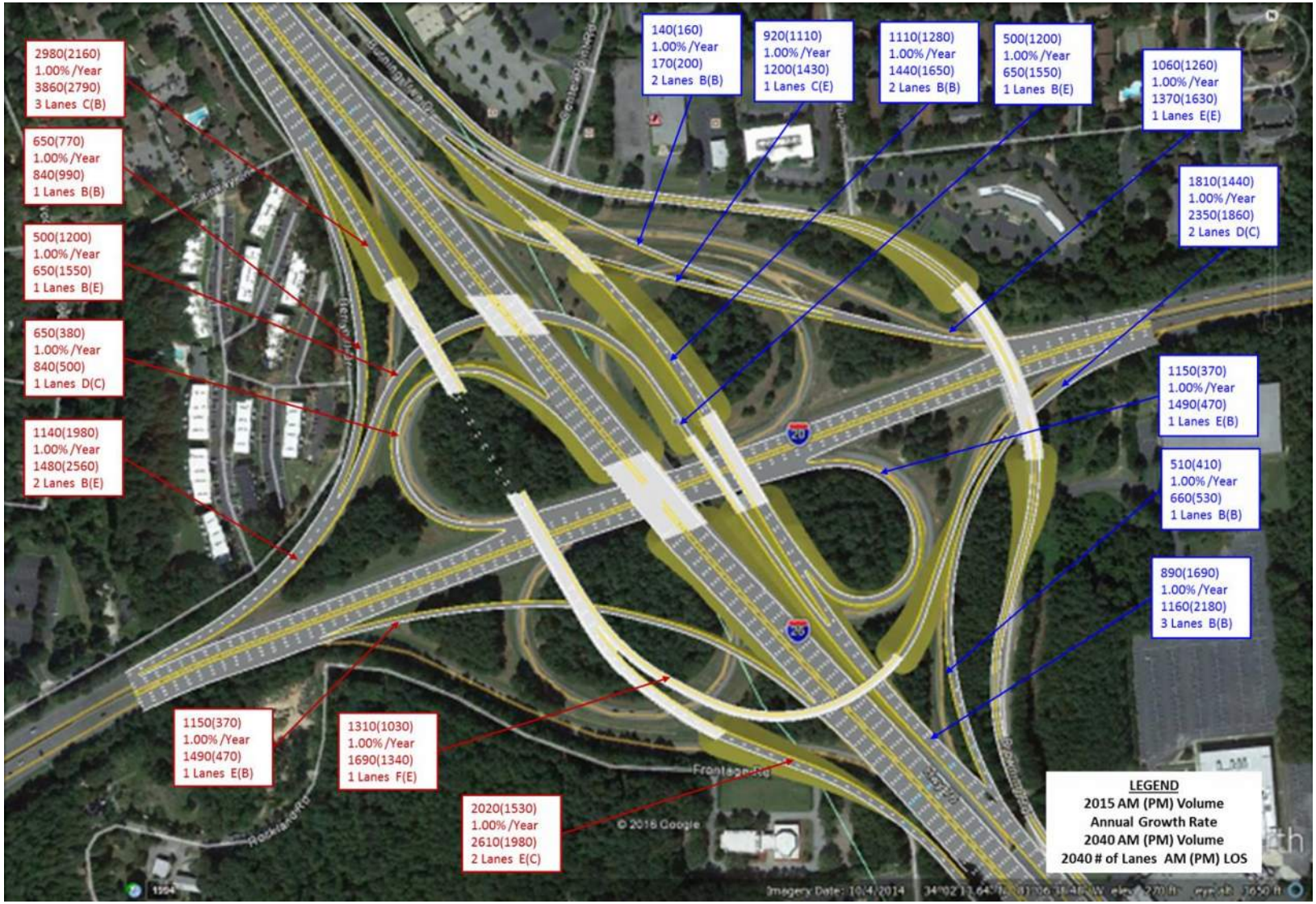


Figure 3-28 AO22 Semi-Directional Interchange with Two Loops Concept with Capacity Screening Results

3.3.5.1 Exit 108 AO23 – Offset Diamond Interchange

The proposed offset diamond interchange at Exit 108 relocates the existing ramps to/from I-26 and combines them into a single intersection on Bush River Road located approximately 600 feet west of the existing westbound off-ramp/Morninghill Drive intersection. The eastbound off-ramp would crossover I-26 before curving into the north approach of the new intersection. The eastbound on-ramp would exit to the south of the intersection, cross over I-26 and I-126, and run parallel to or merge with the flyover ramp from westbound I-126 to eastbound I-26. The westbound off-ramp would initially follow its current route but would bend to crossover I-126 into the south approach of the new intersection. The westbound on-ramp would exit to the north of the intersection and merge into westbound I-26 at approximately the same location as the current merge from the westbound on-ramp/I-126 ramp to I-20. A new Bush River Road overpass over I-26 would be constructed on the south side of the existing overpass.

The proposed intersection of the offset diamond ramps and Bush River Road was initially considered to provide a continuation of the existing five lane cross section on Bush River Road. The westbound approach of Bush River Road would incorporate a separate left turn lane for traffic entering the eastbound on-ramp, two through lanes, and a separate right turn lane for traffic entering the westbound on-ramp. The eastbound approach of Bush River Road would provide a separate left turn lane for traffic entering the westbound on-ramp, two through lanes, and a separate right turn lane for traffic entering the eastbound on-ramp. The southbound approach of the intersection would be the terminus of the eastbound off-ramp, and initially was to provide separate left and right turn lanes at Bush River Road. The northbound approach was initially assumed to require a separate left turn lane and a channelized separate right turn lane. The intersection would operate under signal control. Both on-ramps would start with two lanes before merging to one lane prior to entering I-26.

The concept of the Offset Diamond Interchange intersection at Bush River Road is shown in **Figure 3-29** and the I-26/I-126 system interchange portion of AO23 is shown in **Figure 3-30**

The capacity screening of AO23 was performed using a detailed Synchro model created specifically to assess this concept. The assessment indicated that dual left and right turn lanes would be needed on the westbound off-ramp approach to the proposed intersection. With these additions, observation of simulations indicated that Bush River Road would still experience queuing during the afternoon peak hour at the Morninghill Drive intersection. Westbound queues at the Morninghill Drive intersection would meter traffic entering the proposed ramp intersection, while queues from the high volume of eastbound left turns onto Morninghill Drive would have a tendency to back up out of the short left turn lane that is back-to-back with the westbound left turn lane to the eastbound on-ramp. The high volume of existing eastbound left turn traffic to Morninghill Drive (about 200 vehicles per hour in the morning peak hour and over 400 vehicles per hour in the afternoon peak hour) would also likely require a second left turn lane, with downstream improvements on Morninghill Drive to accept traffic from both turn lanes, to improve the intersection operation.

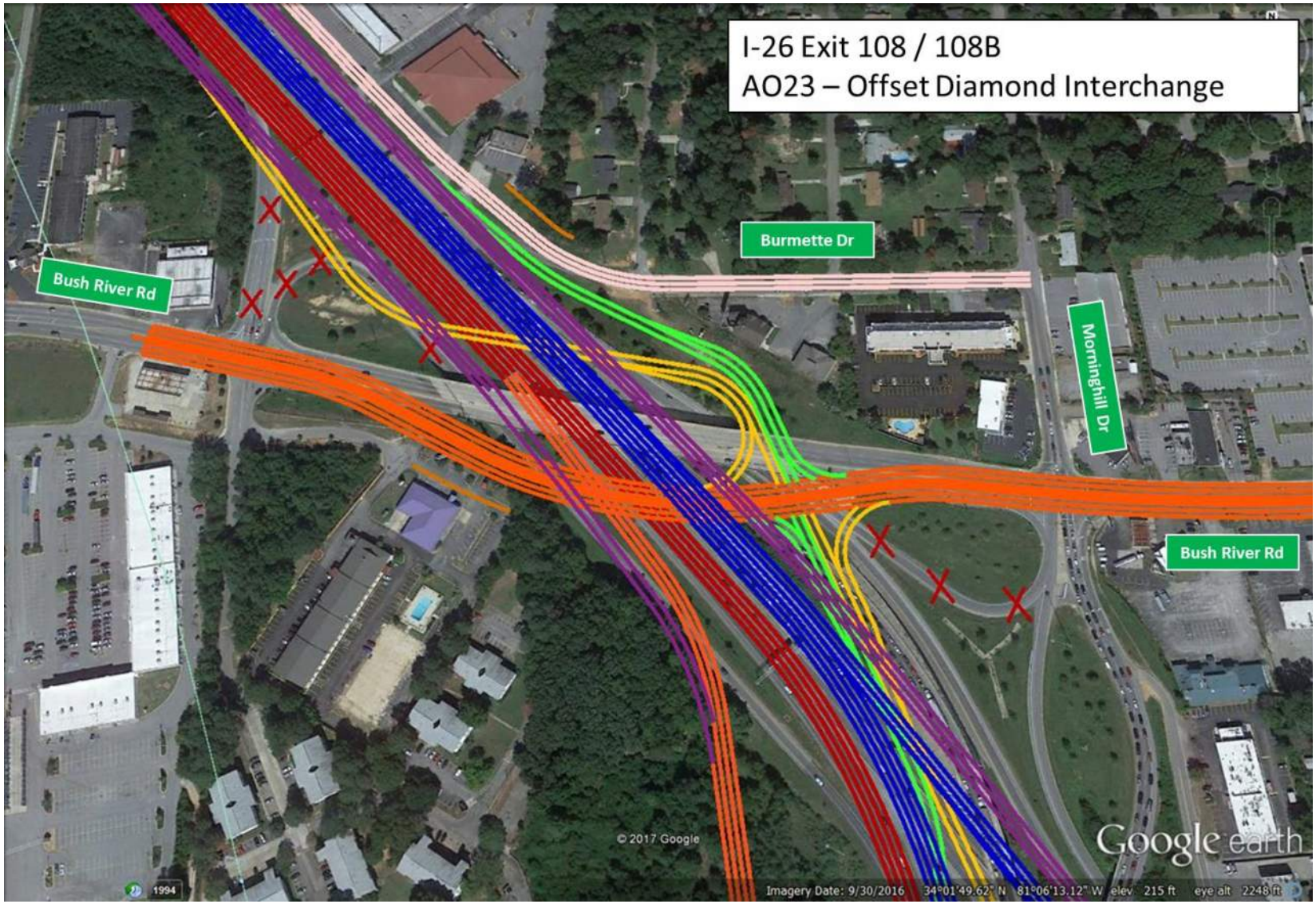


Figure 3-29 AO23 Offset Diamond Intersection Concept on Bush River Road

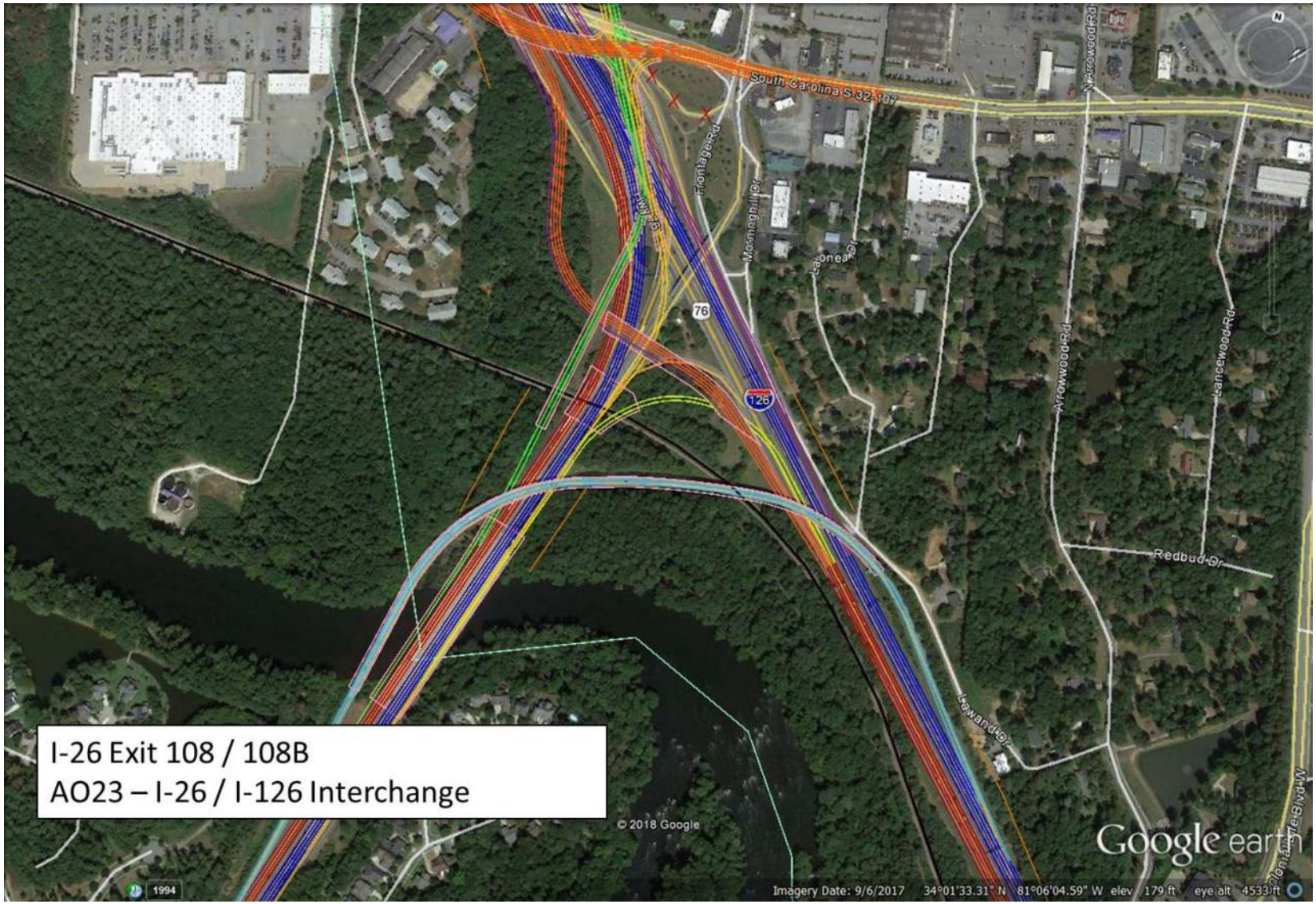


Figure 3-30 - AO23 I-26/I-126 System Interchange Concept

The estimated increase in 2040 traffic volumes resulted an over capacity traffic assessment eastbound during the morning peak hour and westbound during the afternoon peak hour. Observations of simulations of the 2040 traffic on AO23 indicated that substantial queuing would occur in the eastbound direction at the proposed ramp intersection during both peak hours, with excessive afternoon peak hour queuing observed on the eastbound off-ramp, the eastbound left turn to Morninghill Drive, and the westbound through traffic at Morninghill Drive. The close spacing of the signalized intersection of Morninghill Drive and the proposed ramp intersection contributes to the congestion observed in the simulations. On the basis of the intersection operation, AO23 was not selected to be evaluated further as part of the representative alternatives. Since the intersection operation precluded moving AO23 forward, no capacity screening was performed on the proposed I-26/I-126 ramp configuration that was part of AO23.

3.3.5.2 Exit 108/108B AO24 – I-126 Semi-Directional Flyover Interchange

The initial proposed AO24 concept incorporated several major changes at Exits 108 and 108B. The on-and off-ramps to Exit 108 were entirely eliminated from the concept. Traffic currently using these ramps would re-route to either the I-20 – Bush River Road service interchange (Exit 63) or to a modified Colonial Life Boulevard interchange that would include an eastbound off-ramp and westbound on-ramp. In the latter case, traffic currently using the Bush River Road service interchange would travel along Colonial Life Boulevard and through its intersection with Bush River Road.

Changes to the Exit 108B system interchange consisted of re-routing traffic so that eastbound I-26 would be the continuous movement to through traffic on the interstate (instead of to eastbound I-126 under existing conditions), while traffic to eastbound I-126 would use a right side exit before returning to its current alignments east of the existing westbound I-26 overpasses. Finally, the existing flyover ramp from westbound I-126 to eastbound I-26 would be replaced by a tighter flyover ramp located closer to the existing Bush River Road overpass.

The capacity screening using the existing and estimated future volumes performed on AO24 indicated that all ramps were assessed to be under capacity. The initial AO 24 concept and the results of the capacity screening using estimated 2040 traffic are shown in **Figure 3-31**. AO24 was selected to be evaluated further as part of representative alternatives RA1, RA2, RA5, RA6, RA7, and RA8.

3.3.5.3 Exit 108/108B AO25 – I-126/Bush River Road with C-D Connections

The proposed AO25 concept maintains the existing ramp configuration at Exit 108. There is some adjustment to the location of ramps between I-26 and I-126 at Exit 108B. The ramp from westbound I-26 to eastbound I-126 is located south of the railroad overpass on westbound I-26, requiring a new railroad crossing closer to eastbound I-126. The alignment of the other ramps are generally the same, but have increased separate provided between them, and additional ramps to frontage roads connecting to and through Exit 107 are also provided.

The capacity screening using the existing and estimated future volumes performed on AO25 indicated that most ramps were assessed to be under capacity. Several ramps were assessed to be at capacity, and no ramps were assessed to be over capacity. The initial AO25 concept and the results of the capacity screening using estimated

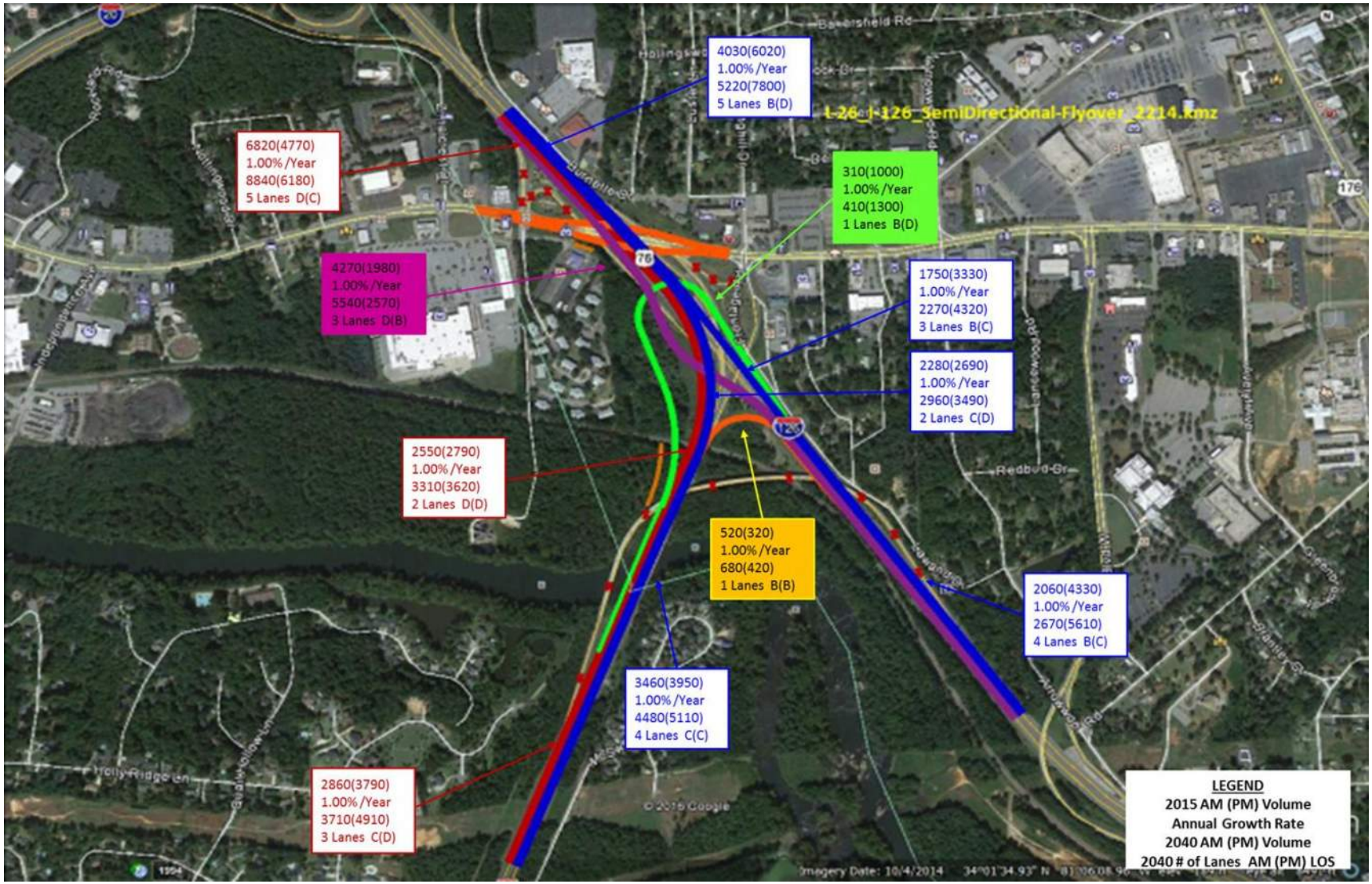


Figure 3-31 AO24 Semi-Directional Flyover with Capacity Screening Results

2040 traffic are shown in **Figure 3-32** and **Figure 3-33**. AO25 was selected to be evaluated further as part of representative alternative RA4.

3.3.5.4 Exit 108/108B AO26 – I-126/Bush River Road Turbine Braided Ramps

The proposed AO26 concept incorporates a variety of interchange ramp elements that change access to Bush River Road. The existing eastbound ramps are eliminated, as is their intersection with Bush River Road. The eastbound off-ramp is relocated to make a tight turn back to the north to intersection Bush River Road opposite Morninghill Drive. The existing westbound off-ramp to Bush River Road is relocated to exit to a new full interchange at Colonial Life Boulevard. The eastbound and westbound on-ramps begin at the intersection opposite Morninghill Drive. The two ramps run together for approximately 1,250 feet, at which point the eastbound on-ramp continues to the south, crossing over I-26 before merging into eastbound I-26 upstream of the location where the ramp from westbound I-126 merges into eastbound I-26. The westbound on-ramp follows a tight curve, making a 180 degree curve to return to merge into westbound I-26 west of the Bush River Road overpass. The concept also incorporates collector-distributor roads to separate traffic heading to I-20 from mainline I-26.

The capacity screening using the existing and estimated future volumes performed on AO26 indicated that most ramps were assessed to be under capacity. Several ramps were assessed to be at capacity, and no ramps were assessed to be over capacity. The initial AO 26 concept and the results of the capacity screening using estimated 2040 traffic are shown in **Figure 3-34**.

A capacity assessment was also performed on the proposed ramp intersection opposite Morninghill Drive on Bush River Road using a detailed Synchro model created for this intersection. The original concept of the ramps intersecting Bush River Road is shown in **Figure 3-35**.

For the initial capacity assessment of this intersection, the geometry on the approaches of existing intersection was maintained, with traffic redistributed to reflect the relocation of ramp movement through this intersection. The redistributed volumes significantly increased the volume of westbound left turns at the intersection to the on-ramps (approximately 250 vehicles per hour in the morning peak hour and almost 500 vehicles during the afternoon peak hour). This led to a revision to the intersection concept to include dual westbound left turn lanes and providing three lanes on the on ramp section departing the intersection to the south (one lane for the westbound on-ramp and two lanes for the eastbound on-ramp). With this addition, no operational issues were observed in simulations of existing traffic. In both peak hours, the capacity assessment indicated the intersection was at capacity.

Under estimated 2040 morning peak hour traffic volumes, queues on the eastbound approach to the intersection due were observed in the simulations. These queues are caused by the high volume of eastbound right turn traffic onto the on-ramps and through traffic. There is also a high estimated volume of left turn traffic from southbound Morninghill Drive onto eastbound Bush River Road that experiences queuing as well. Under estimated 2040 afternoon peak hours, congestion and queuing was observed in the simulations on both Bush

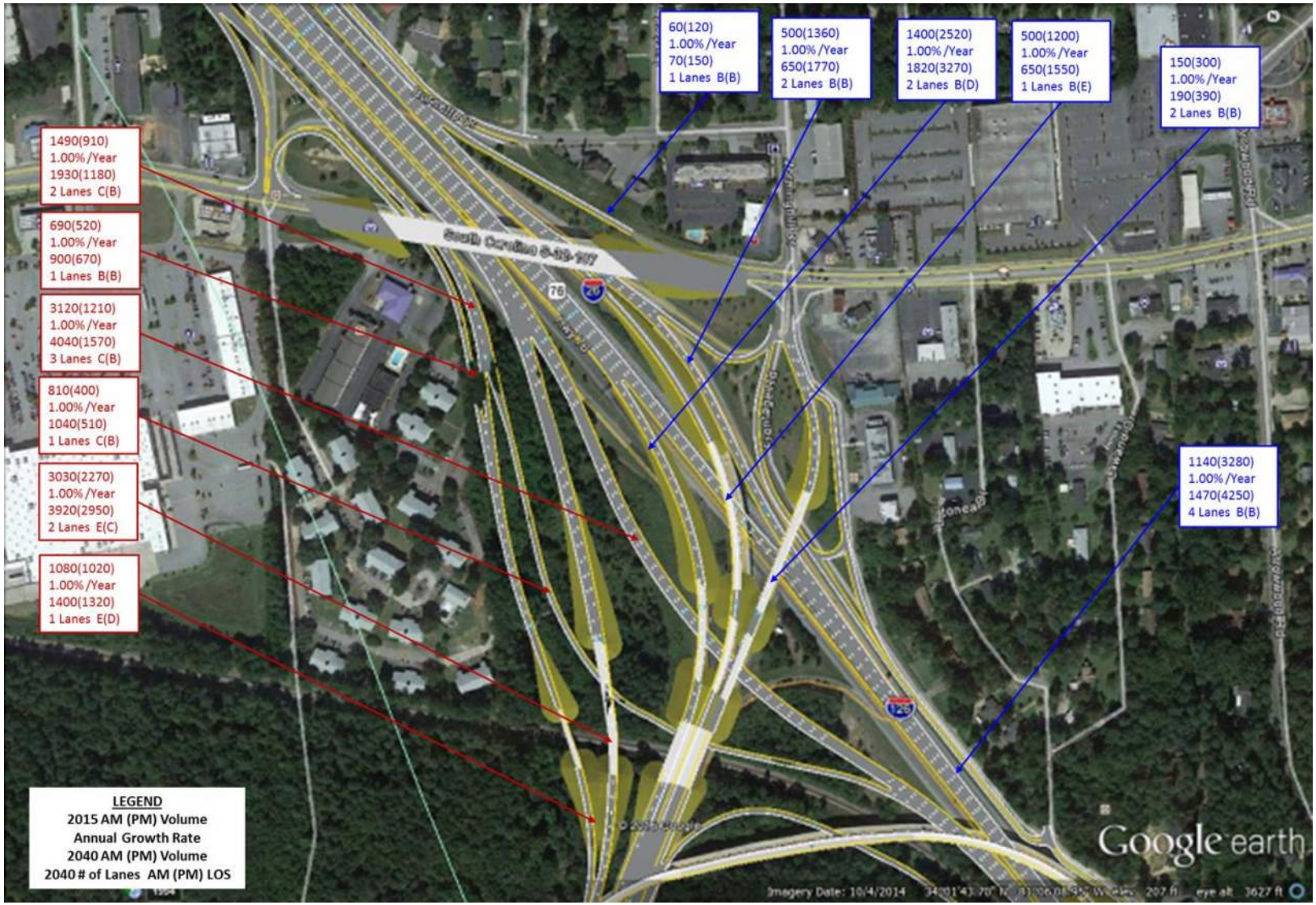


Figure 3-32 AO25 I-26/I-126 C-D Connections with Capacity Screening Results (north section)

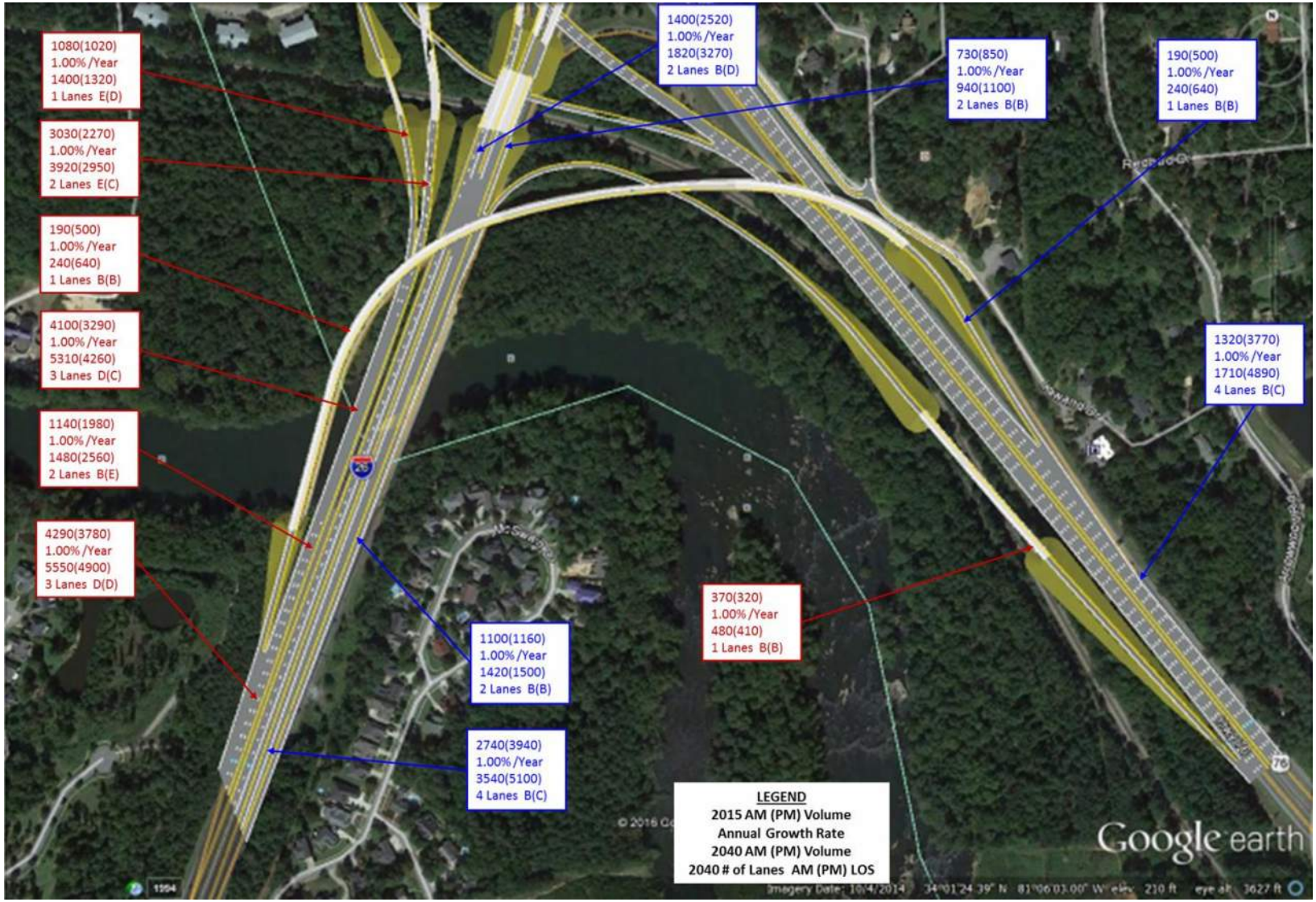


Figure 3-33 AO25 I-26/I-126 C-D Connections with Capacity Screening Results (south section)

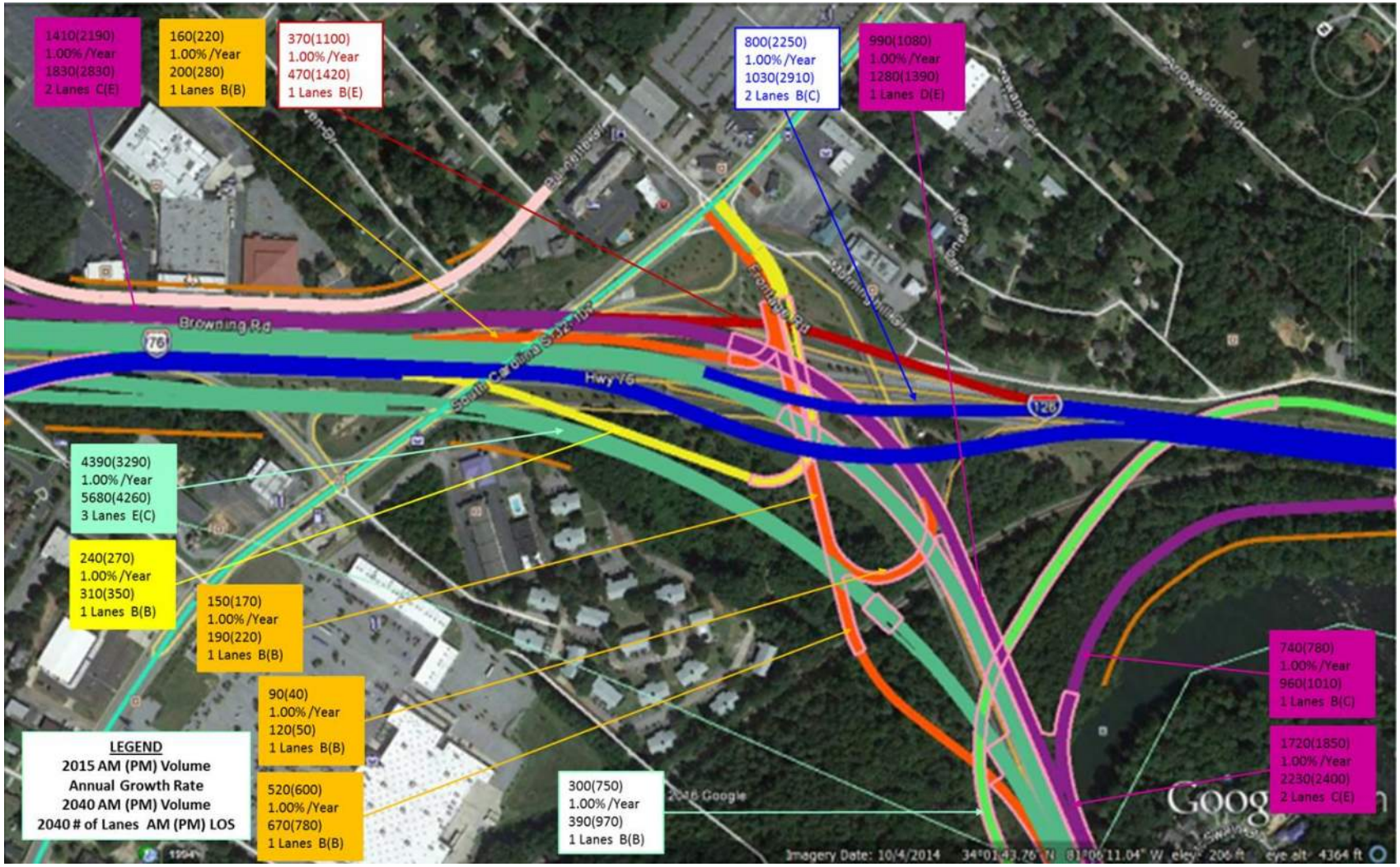


Figure 3-34 AO26 I-26/I-126 Braided C-D Roads with Capacity Screening Results

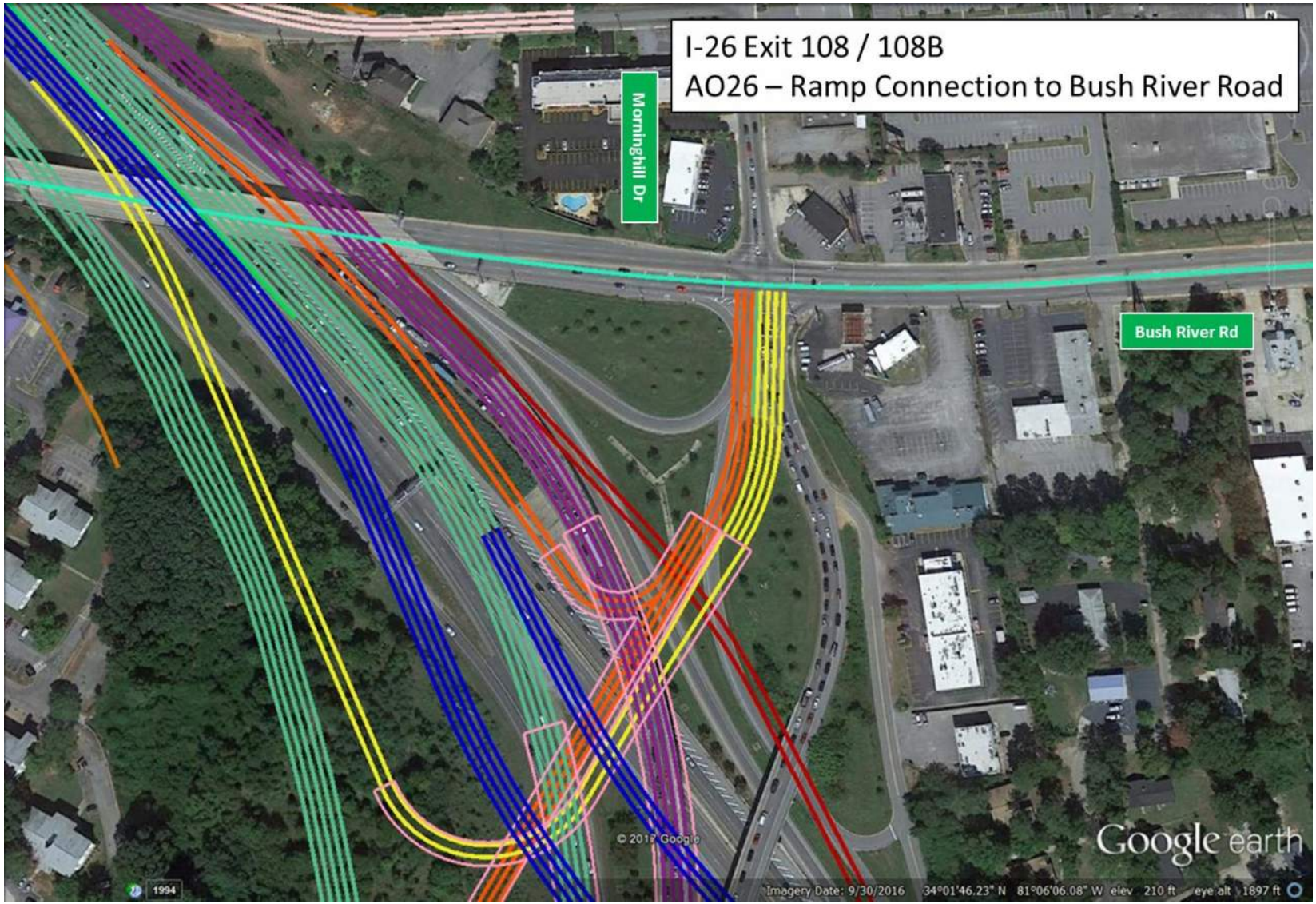


Figure 3-35 AO26 - Ramp Connections to Bush River Road

River Road approaches and on the southbound Morninghill Drive approach to the intersection. In both peak hours, the capacity assessment indicated the intersection was at capacity.

Based on the results of the capacity assessment of the ramp intersection, AO26 was recommended to be evaluated further as part of representative alternative RA3.

3.3.6 AO27 – AO29 (NEW CONNECTORS)

The following are a list of the AO developed and screened for new limited access roadways connecting I-20 and I-126.

- AO27 – East-West Connector (capacity screening)
- AO28 – East-West Connector with Bush River Road Access (capacity screening; detailed Synchro model)
- AO29 – Southern Connector with I-26 Turbine Interchange (capacity screening)

Three proposed connector concepts were developed to investigate if limited access roadways constructed on new alignment between I-20 and I-126 could reduce congestion through the existing I-20/I-26 and I-26/I-126 system interchanges. These connectors were evaluated using capacity screening based on the turning movement volume and mainline interstate volumes with an estimated distribution using origin-destination volume data. The new connector alternatives were also modeled in the SCSWM. The results of the travel demand modeling effort with be discussed further in **Section 5.2 Travel Demand Modeling**.

3.3.6.1 AO27 – East-West Connector

The proposed east-west connector consists of a limited access facility connecting I-20 on the west to I-126 on the east. The alignment of the connector runs generally parallel to and to the north of the Saluda River. Aside from the existing ramps connecting westbound I-126 to eastbound I-26, and westbound I-26 to eastbound I-126, no other ramps are provided between the connector and I-26. At the west end of the proposed connector, ramps are provided connecting eastbound I-20 to the eastbound connector, and the westbound connector to westbound I-20. No ramps are provided from westbound I-20 to the eastbound connector or from the westbound connector to eastbound I-20. These movements to use the I-20/I-26 system interchange at Exit 107/64. At the east end of the proposed connector, ramps are provided connecting the eastbound connector to eastbound I-126 and westbound I-126 to the westbound connector.

The capacity screening using the existing and estimated future volumes performed on AO27 indicated that the ramps and connector segments were assessed to be under capacity. The initial AO 27 concept and the results of the capacity screening using estimated 2040 traffic are shown in **Figure 3-36**. AO27 was evaluated further as part of representative alternative RA7.

3.3.6.2 AO28 – East-West Connector with Bush River Road Access

The proposed east-west connector with Bush River Road access consists of a limited access facility connecting I-20 on the west to I-126 on the east. The alignment of the connector runs generally parallel to and to the south of the Norfolk – Southern Railroad, and also to Bush River Road to the north and the Saluda River to the south.

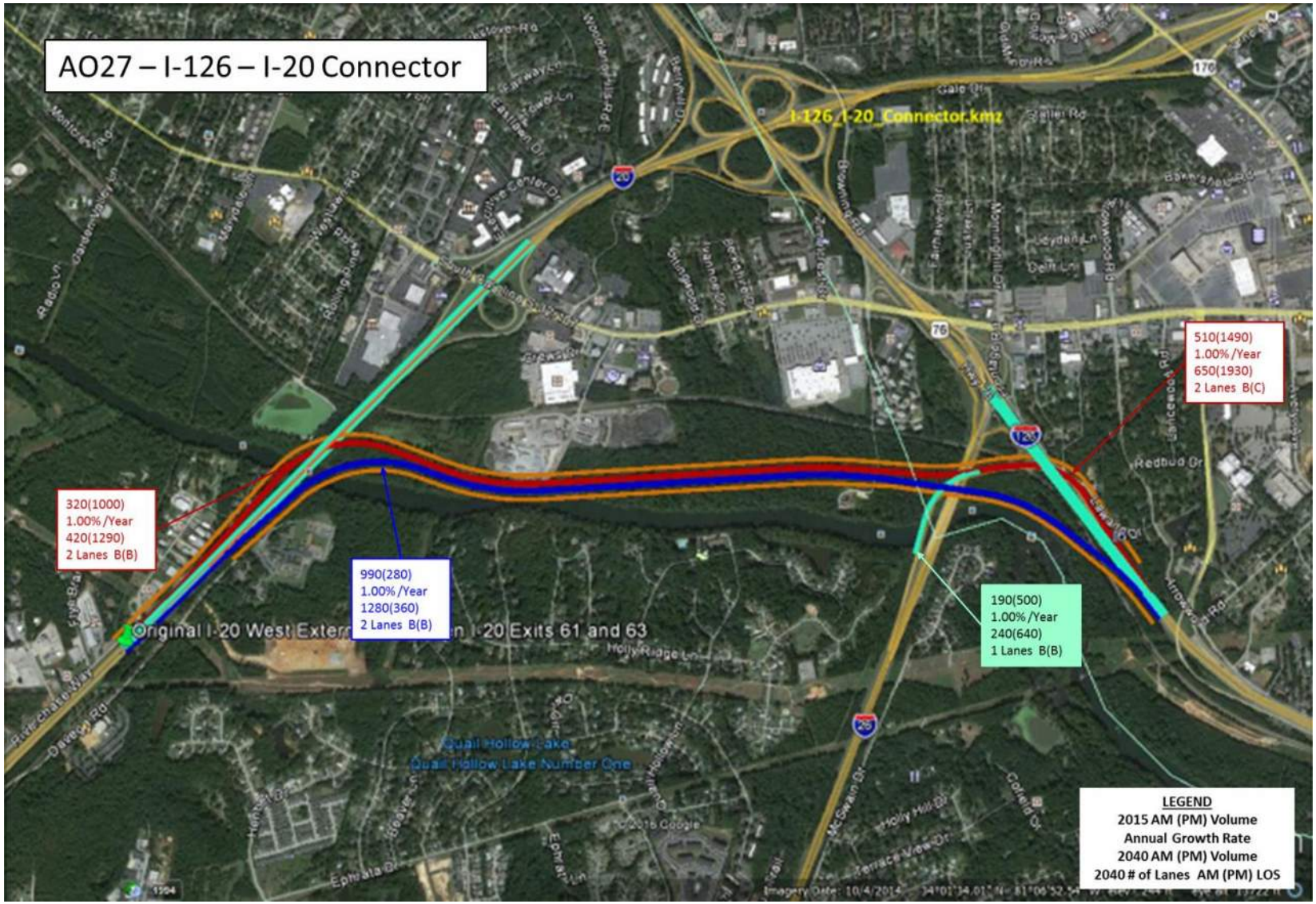


Figure 3-36 - AO27 Initial Concept and Capacity Screening Results

The western end of the connector replaces existing Exit 63 and its connections to Bush River Road and provides full access to the east and west on I-20. With access to Bush River Road at Exit 63 removed, an interchange located approximately midway in the connector is proposed to provide access to Bush River Road approximately opposite Nottingwood Drive. Both directions of the connector provide access to eastbound I-26, and access from westbound I-26 is provided to the eastbound connector that terminates at eastbound I-126. At the east end of the connector, the westbound connector begins on westbound I-126, and the eastbound connector ends on eastbound I-126.

With these new connections between I-26 and I-126, the existing ramps between westbound I-26 and eastbound I-126 and from westbound I-126 to eastbound I-26 would be removed. Also removed were all of the Exit 108 ramps to and from Bush River Road.

A fully directional I-20/I-26 system interchange would remain as part of this connector concept.

The capacity screening using the existing and estimated future volumes performed on the initial AO28 concept indicated that most of the ramps and connector segments were assessed to be under capacity using estimated 2040 traffic. Several ramps and connector segments were assessed to be near capacity and/or over capacity during one or both peak hours. These include the two lane section of the westbound I-20 collector-distributor road between Exit 65 and Exit 63 (at or over capacity in both peak hours), and the two lane westbound I-26 collector-distributor road between Exit 108 and Exit 107 (over capacity during the afternoon peak hour).

The initial AO 28 concept and the results of the capacity screening using estimated 2040 traffic are shown in **Figure 3-37**.

The capacity screening of AO28 was performed using a detailed Synchro model created specifically to assess this ramp intersection opposite Nottingwood Drive. The proposed intersection was initially assessed assuming two through lanes and a separate right turn lane on eastbound Bush River Road, dual left turn lanes and two through lanes on westbound Bush River Road, and dual left turn lanes and a separate right turn lane on the northbound ramp approach. For the purpose of the assessment, Nottingwood Drive was not included.

With the elimination of Exits 63 and 108 and the rerouting of that ramp traffic to this proposed interchange, turn volumes would be extremely high. During the morning peak hour, over 600 vehicles per hour were estimated to turn right onto the new on-ramp, and about 850 were assumed to turn left from the dual left turn lanes. From the off-ramp, about 850 vehicles were estimated to turn left and over 700 vehicles were estimated to turn right. During the afternoon peak hour, about 800 vehicles per hour were estimated to turn right onto the new ramp, and nearly 1,400 vehicles were estimated to turn left from westbound Bush River Road. About 850 vehicles and 600 vehicles were estimated to turn left and right from the off-ramp approach to the intersection. The initial intersection concept is shown in **Figure 3-38**.

The assessment indicated that, under existing traffic volumes, the intersection would be at capacity – assuring that the intersection would be assessed as being over capacity with estimated 2040 traffic volumes.

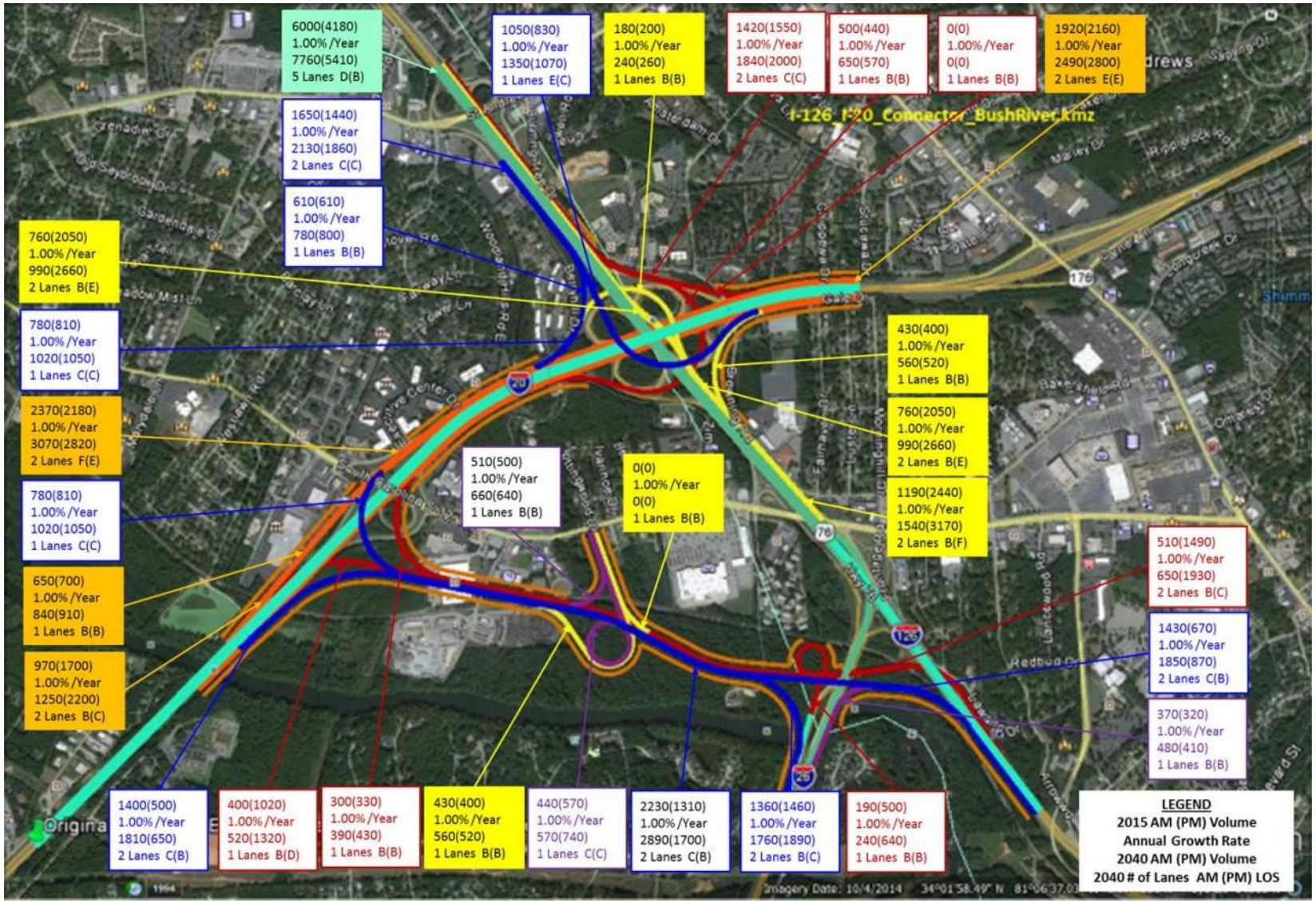


Figure 3-37 AO28 I-126/I-20 Connector, Bush River Connection - Capacity Assessment Results

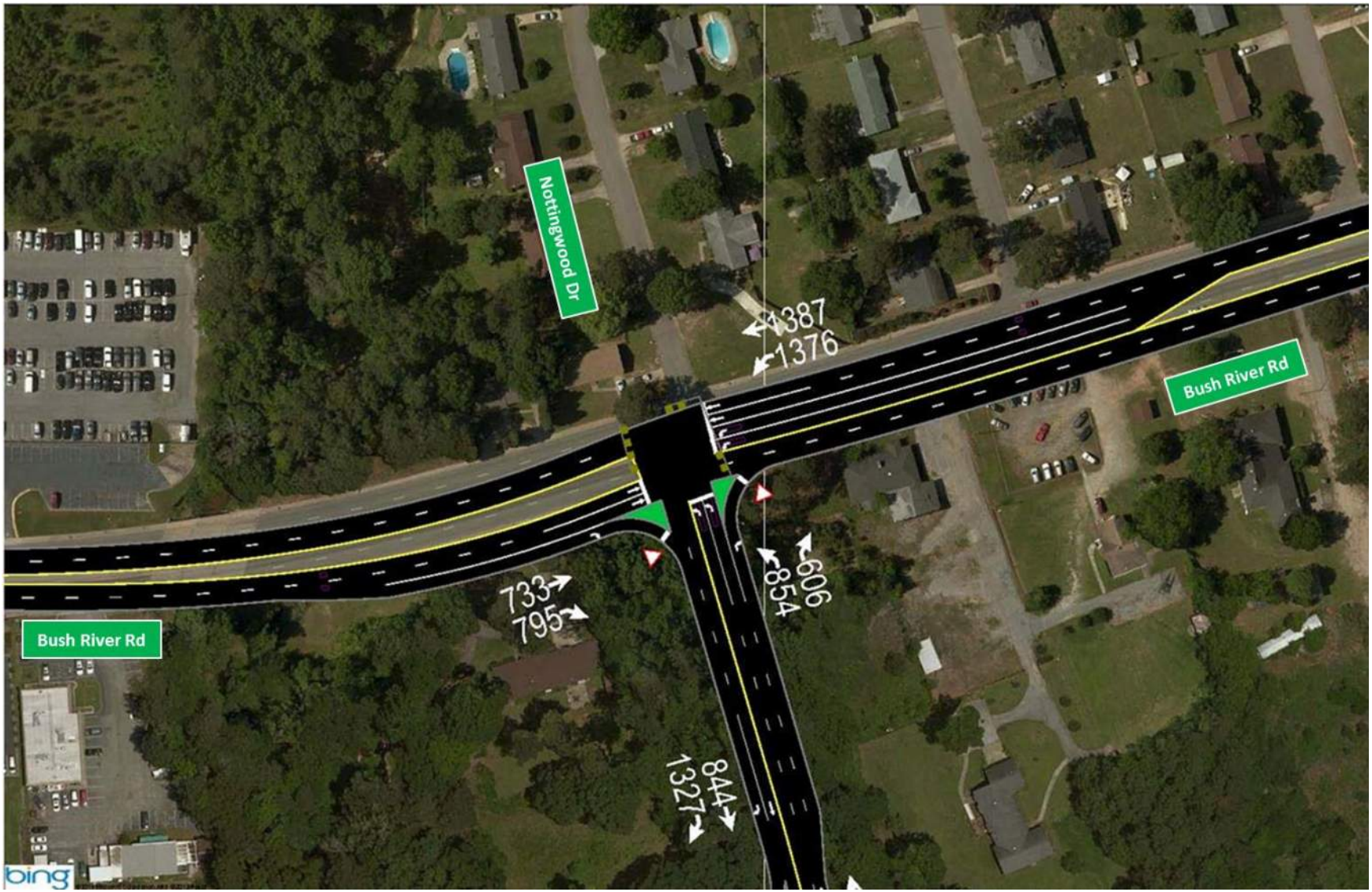


Figure 3-38 - AO28 - I-126/I-20 Connector - Bush River Road Ramp Intersection (Existing PM Volumes)

The connector concept received additional modification and development by the roadway engineers after the initial capacity screening. The most significant modifications were reintroducing the eastbound off-ramp from I-20 to Bush River Road and adding a westbound on-ramp from Bush River Road to I-20 near the existing Exit 63. The westbound off-ramp from I-26 to Bush River Road was reinstated into the concept along its current alignment, and a new on-ramp from Bush River Road to eastbound I-26 was also introduced. These modifications were intended to address the over capacity conditions introduced at the ramp intersection opposite Nottingwood Drive.

With the redistribution of traffic resulting from these additional ramps, the three ramp intersections along Bush River Road (revised Exit 63, proposed connector, revised Exit 108) were assessed to operate under capacity with existing traffic volumes in the morning and afternoon peak hours. With estimated 2040 traffic volumes, the Exit 108 ramp intersection with Bush River Road was assessed as being at capacity during the morning peak hour and over capacity in the afternoon peak hour. The capacity of the other two ramp intersections was assessed to be under capacity in both peak hours. AO28 was evaluated further as part of representative alternative RA8.

3.3.6.3 AO29 – Southern Connector with I-26 Turbine Interchange

The proposed southern connector was an east-west connector consisting of a limited access facility connecting I-20 on the west to I-126 on the east and incorporating a turbine interchange at I-26 on its alignment. The alignment of the connector runs generally along the existing electric power easement about 1,900 feet south of the Saluda River.

At the west end of the proposed connector, ramps are provided to and from both directions on I-20. Where the connector crosses I-26, a fully directional turbine interchange is proposed. At the east end of the connector, the eastbound connector ends at eastbound I-126, and the westbound connector begins at westbound I-126. The existing I-20/I-26 system interchange is removed from AO29. Exit 63 and Exit 108 would provide full directional access to I-20 and I-26 respectively. The initial AO 27 concept is shown in **Figure 3-39**.

A capacity screening could not be performed using the existing and estimated future volumes due to the difficulty in performing a sketch level origin-destination analysis to assign traffic to the new facilities and interchanges. The SCSWM assignments for this alternative were used to assess the potential utility of AO29. Information on the assessment using the SCSWM can be found in **Section 5.2**.

A visual review of the connector concept identifies obvious flaws. For example, traffic traveling from eastbound I-26 to eastbound I-20 currently use the existing I-20/I-26 system interchange at Exit 107/64. In AO29, this traffic would travel eastbound on I-26 past the location of the existing system interchange, travel through the proposed turbine interchange ramp to the westbound connector, travel through the ramp to eastbound I-20, travel again past the location of the existing system interchange before reaching the location where the existing ramp from eastbound I-26 merges with eastbound I-20. A similarly long, circuitous route is required to travel from westbound I-20 to westbound I-26.

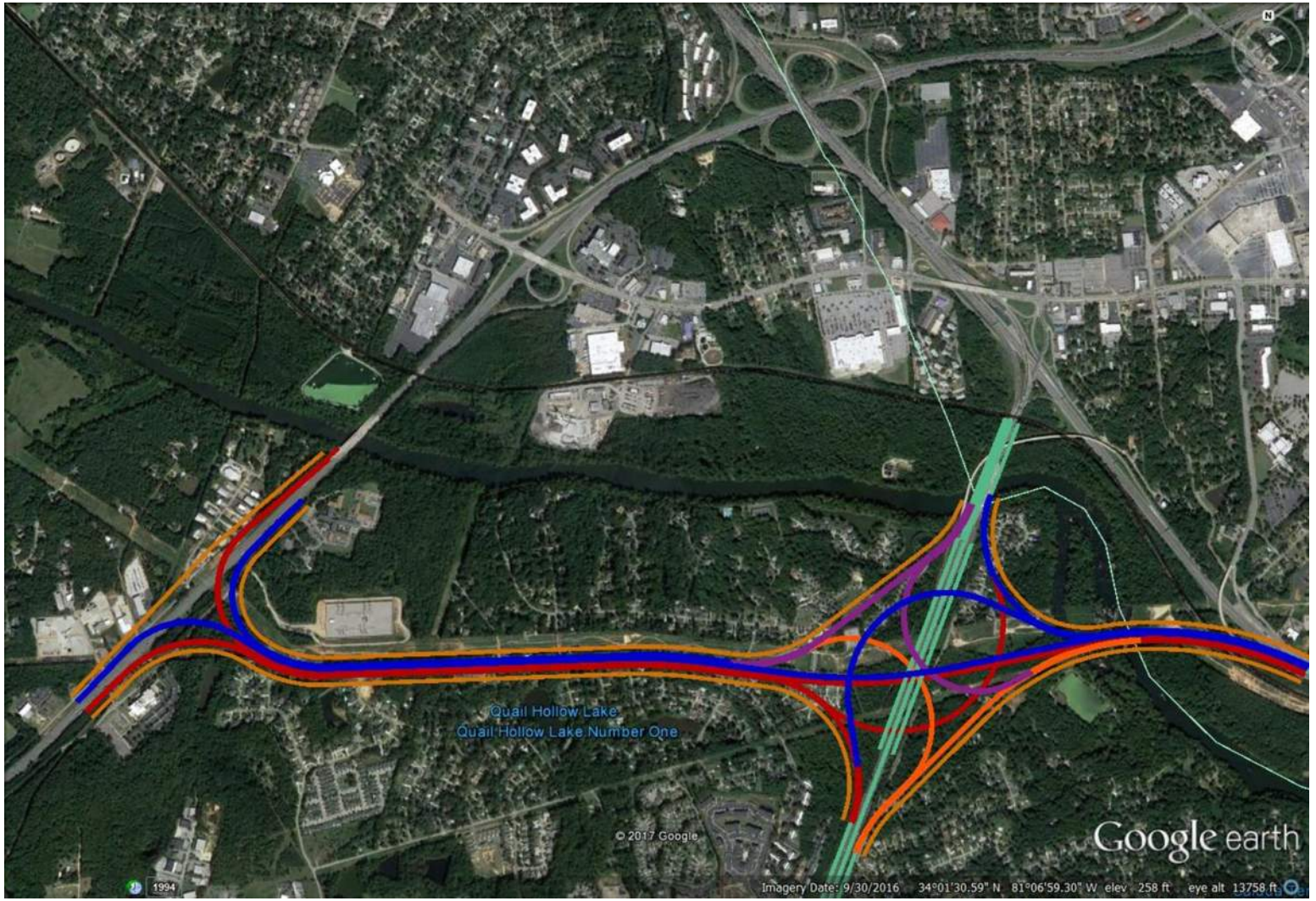


Figure 3-39 AO29 - Southern Connector with I-26 Turbine Interchange

In both instances, drivers familiar with the area would likely avoid the circuitous and lengthy routing and exit at service interchanges to complete part of the trip. For example, traffic traveling from eastbound I-26 to eastbound I-20 may exit at either Exit 106 or Exit 108, travel east on the arterial roadways (St Andrews Road and Bush River Road respectively) to Broad River Road where I-20 eastbound would be accessed via Exit 65. This diversion of mainline traffic to surface streets to complete travel that would normally completed entirely on the interstate system would lower travel on the interstate, but increase travel, perhaps significantly, on these arterials. It can be readily concluded that this could be contrary to the purpose and need of the project.

The connector concept received addition modification and development by the roadway engineers after the initial capacity screening. The most significant modification was the addition of ramps from westbound I-26 to the westbound connector, and from the eastbound connector to eastbound I-26. AO29 was evaluated further as part of representative alternative RA9.

3.3.7 AO30 – AO33 (EXIT 104)

The following are a list of the AO developed and screened for Exit 104.

- AO30 – Improvements to Existing Interchange (detailed Synchro model)
- AO31 – Diverging Diamond Interchange (Synchro Template)
- AO32 – Single Point Urban Interchange (Synchro Template)
- AO33 – Roundabout Interchange (SIDRA)

Note: The use of CAP-X was applicable for AO30, AO31, and AO32.

Existing traffic operations at Exit 104 are complicated by:

- The use of the interchange by traffic avoiding Exit 103 and Harbison Boulevard. This leads to higher left turn volumes on the westbound off-ramp traveling westbound on Piney Grove Road through the interchange to turn right onto Bower Parkway. Traffic frequently slows on westbound Piney Grove Road as traffic turning from both left turn lanes positions to enter the curb lane to turn right to Bower Parkway.

3.3.7.1 Exit 104 AO30 – Improvements to Existing Interchange

AO30 consists of evaluating improvements to the existing diamond interchange at Exit 104. The proposed modifications would revise the approaches to the interchange from two to three entering through lanes in each direction on Piney Grove Road. Separate right turn lanes would be maintained in each direction to the interstate on-ramps. The eastbound ramp intersection was modified to provide dual westbound left turn lanes to the eastbound on-ramp extending back to the westbound ramp intersection to provide maximum turn lane storage. At the westbound ramp intersection, the existing configuration of the eastbound approach would remain unchanged: a single left turn lane and two through lanes. The off-ramp approaches would remain unchanged, with the eastbound off-ramp providing separate left and right turn lanes at Piney Grove Road. The westbound off-ramp would remain dual left turn lanes and a separate right turn lane at Piney Grove Road. The westbound on-ramp would remain unchanged from its existing configuration, which provides two lanes to accommodate the left turn and right turn movements entering the ramp before narrowing to a single lane to

enter westbound I-26. The eastbound on-ramp, which is similarly configured today, would be modified to three initial lanes to accommodate the second left turn movement from westbound Piney Grove Road. These three lanes would narrow to a single lane entering eastbound I-26. The initial AO30 concept evaluated is shown in **Figure 3-40**.

Two intersections adjacent to the interchange influence interchange operation. As mentioned previously, the intersection of Bower Parkway/Jamil Road, located approximately 750 feet west of the eastbound ramp intersection, provides alternative access to the retail development located along Harbison Boulevard via Bower Parkway. The Fernandina Road intersection, located approximately 800 feet east of the westbound ramp intersection, provides access to a discount club center. Both intersections connect the frontage road systems running parallel to each side of the interstate that, through various connections, provide alternative routes to I-126 between Exit 101 and Exit 108.

The capacity screening incorporated the use of a detailed Synchro model for the interchange area. The capacity assessment with estimated 2040 volumes indicated the modifications to the existing interchange proposed as part of AO30 would result in under capacity ramp intersections and Piney Grove Road arterial sections. AO30 was selected to be incorporated into representative alternatives RA1, RA5, and RA7.

It should be noted, however, that observations of the simulations indicated that congestion at the adjacent Piney Grove Road intersections with Bower Parkway/Jamil Road and Fernandina Road, which are assessed to be over and at capacity respectively, would create congestion that would affect the interchange area. The Bower Parkway/Jamil Road intersection especially impacts all westbound movements and movements feeding into the westbound movements, such as the westbound off-ramp left turn movement. Queuing resulting from this over capacity intersection, extend back through the interchange area and the Fernandina Road intersection.

3.3.7.2 Exit 104 AO31 – Diverging Diamond Interchange

The proposed DDI maintained two through lanes and a separate right turn lane in each direction entering the Piney Grove Road interchange area. Three lanes are provided between the crossovers, one lane for left turn movements onto the on-ramps and two through lanes in the eastbound direction, and one left turn lane, a shared left turn-through lane and one through lane in the westbound direction. The westbound off-ramp included dual left turn and dual right turn lanes, while the eastbound off-ramp provided separate left and right turn lanes. The eastbound on-ramp had three lane to accept traffic from the two westbound left turn movements and the eastbound right turn movement. The westbound on-ramp had separate lanes accepting traffic from the eastbound left turn and westbound right turn movement. Both on-ramps merged into a single lane entering I-26. The initial AO31 concept evaluated is shown in **Figure 3-41**.

The capacity screening incorporated the use of the Synchro Template file for a DDI. The DDI template file was not modified to include the adjacent intersections at Bower Parkway/Jamil Road or Fernandina Road. The screening indicated the AO31 intersections would be under capacity under existing and estimated 2040 traffic volumes. Observations of simulations indicated queuing of westbound off-ramp left turn traffic was likely to

Figure 3-40 - AO30: Exit 104 Improvements to Existing Interchange

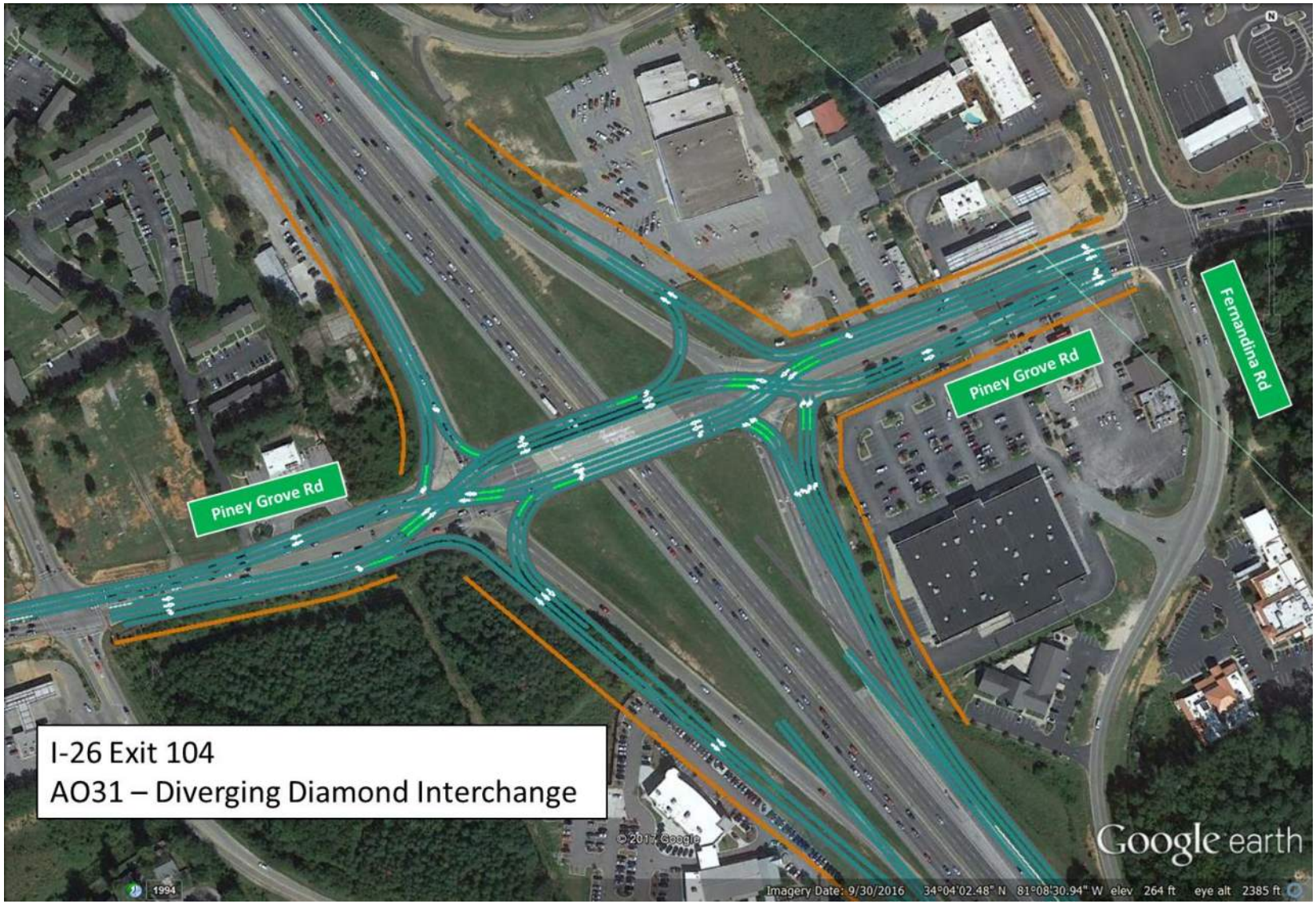


Figure 3-41 - AO31: Exit 104 Diverging Diamond Interchange

occur in the afternoon peak hour with estimated 2040 volumes. AO31 was selected to be incorporated into representative alternatives RA2, RA6, and RA8.

3.3.7.3 Exit 104 AO32 – Single Point Urban Interchange

The proposed SPUI has two through lanes entering and exiting the interchange area from each direction on Piney Grove Road. In the eastbound direction, the two entering lanes widen to four lanes, which include two through lanes, a shared through-right turn lane, and a separate right turn lane. Two right turn lanes enter the eastbound on-ramp, and the eastbound approach continues to the signal with three lanes: a separate left turn lane for traffic entering the westbound on-ramp and two through lanes, which continue to exit the interchange area. In the westbound direction, two entering lanes widen to five lanes, which includes four through lanes and a separate right turn lane that enters the westbound on-ramp. The four through lanes continue to the west, becoming two left turn lanes to the eastbound on-ramp and two through lanes at the signal. The two through lanes continue west and exit the interchange area. The eastbound off-ramp has separate left and right turn lanes, while the westbound off-ramp has dual left turn lanes and a separate right turn lane. The eastbound on-ramp merges the two lanes from the eastbound right turn movements entering the ramp and the two westbound left turn movements entering the ramp. These lanes eventually merge into a single lane on-ramp that enters eastbound I-26. The westbound on-ramp consists of a single lane from the westbound right turn movement and a single lane from the eastbound left turn movement entering the ramp. Both lane merge into a single lane that enters westbound I-26. The initial AO32 concept evaluated is shown in **Figure 3-42**.

The capacity screening incorporated the use of the Synchro Template file for a SPUI. The SPUI template file was modified to adjust for the proposed number of lanes in the AO32 SPUI concept but was not modified to include the adjacent intersections at Bower Parkway/Jamil Road or Fernandina Road. The influence of these adjacent intersections is not incorporated in the capacity screening. The screening indicated the AO32 SPUI intersection would be under capacity under existing and estimated 2040 traffic volumes. Observations of simulations indicated no significant queuing occurring with estimated 2040 volumes. AO32 was selected to be incorporated into representative alternatives RA3, RA4, RA9.

3.3.7.4 Exit 104 AO33 – Roundabout Interchange

The proposed roundabout interchange incorporated two-lane roundabouts in place of traffic signals at the ramp intersections with Piney Grove Road. Two lanes in each direction were maintained on Piney Grove Road through the interchange area. The eastbound Piney Grove Road approach to the roundabout at the eastbound ramp intersection would provide two lanes entering the roundabout. The westbound Piney Grove Road approach to the roundabout at the westbound ramp intersection would provide two lanes entering the roundabout and a right turn roundabout bypass lane. The eastbound off-ramp approach to the roundabouts would provide two lanes, while the westbound off-ramp approach would provide two lanes to the roundabout and a right turn roundabout bypass lane. The eastbound on-ramp approach departing from the roundabout would provide one lane, while the westbound on-ramp approach would provide two lanes – one lane exiting the roundabout and the westbound right turn roundabout bypass lane – which would merge into a single lane prior to entering westbound I-26. The initial AO33 concept evaluated is shown in **Figure 3-43**.

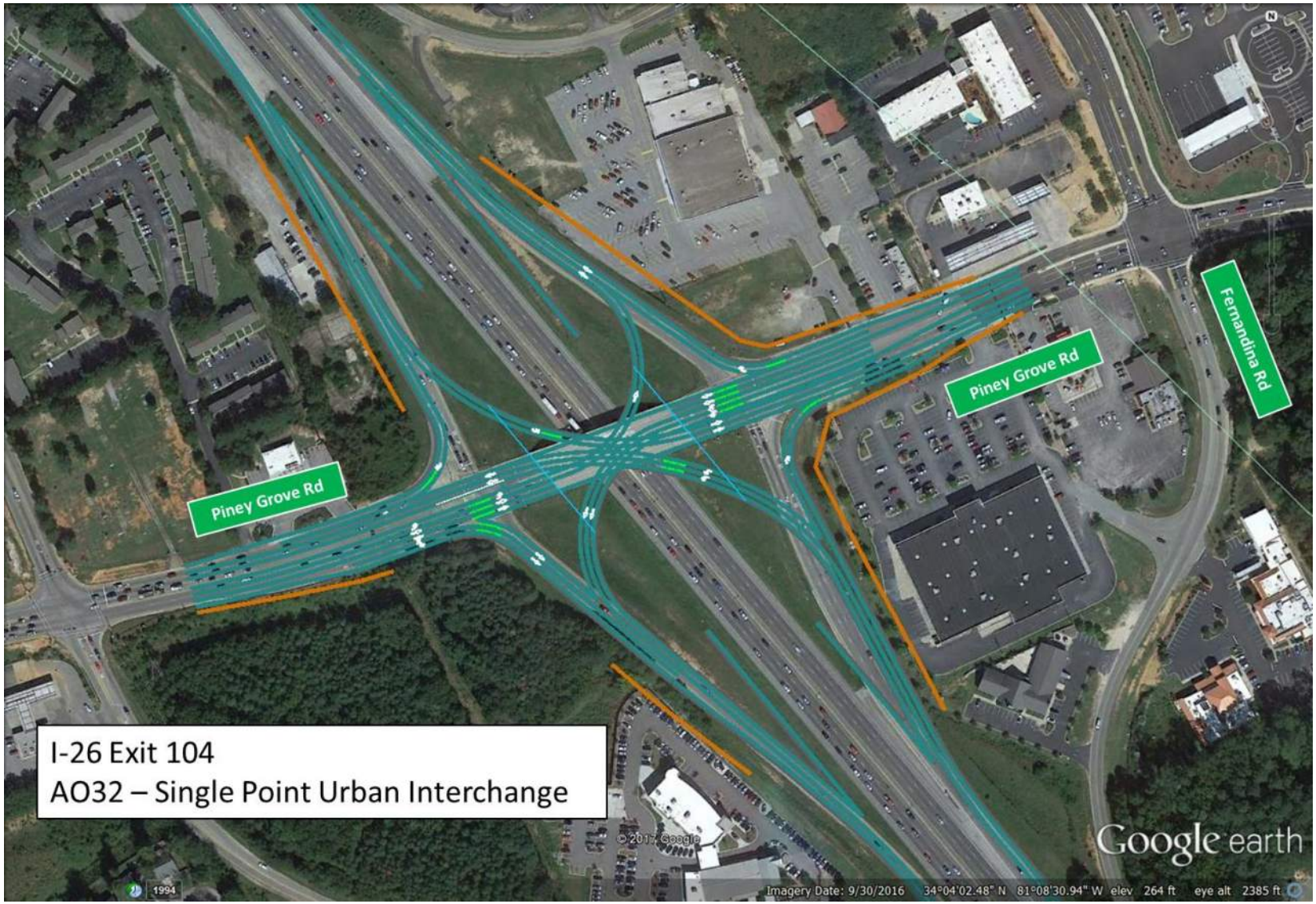


Figure 3-42 - AO32: Exit 104 Single Point Urban Interchange

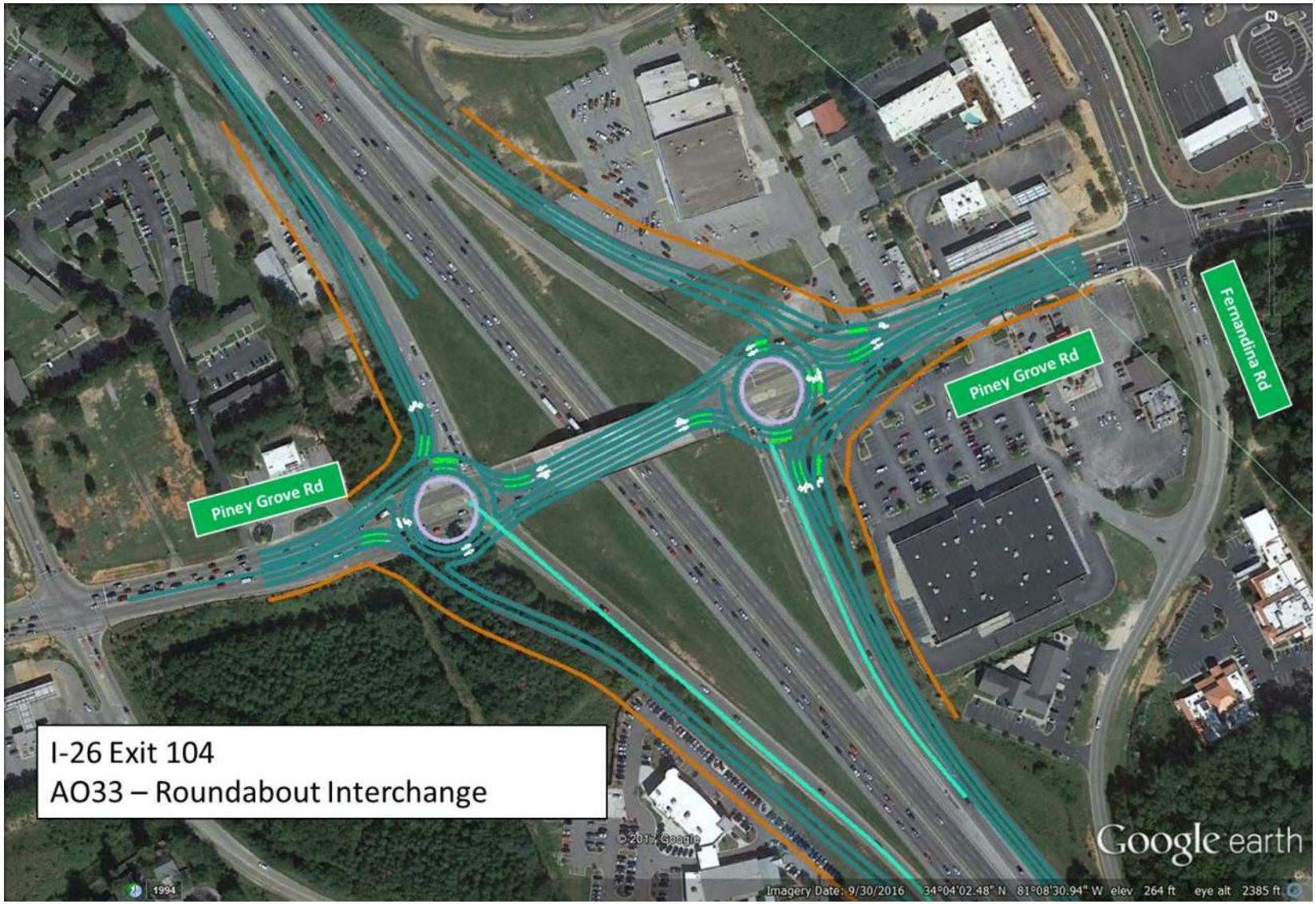


Figure 3-43 - AO33: Exit 104 Roundabout Interchange

The capacity screening incorporated the use of SIDRA to analyze the roundabout operation. The analysis indicated the two-lane roundabouts at AO33, would be over capacity under existing and 2040 traffic volumes at the eastbound ramp intersection. Incorporating additional lanes in the roundabouts would not be feasible. AO33 was not selected to be incorporated into the representative alternatives.

3.3.7.5 Exit 104 CAP-X Review

The Exit 104 traffic volumes and interchange geometry were entered into the CAP-X spreadsheet to determine which interchange alternatives scored the highest using the CAP-X methodology. The best rated interchange concept was a DDI interchange, followed by the Displaced Left Turn (DLT), and the ParClo interchanges. The Traditional Diamond interchange was ranked ahead of the SPUI, which ranked last.

Displaced Left Turn Interchange

The DLT interchange was the second highest rated option in the CAP-X assessment. A DLT at Exit 104 would locate the left turn crossovers upstream at the next adjacent intersections (Bower Parkway/Jamil Road to the west and Fernandina Road to the east). The DLT crossover at Bower Parkway appears to be feasible but constructing the crossover at Fernandina Road would be complicated by the business located between it and the westbound off-ramp intersection.

3.3.8 AO34 (EXIT 103-104)

AO 34 was specifically developed to access the operation of a split diamond interchange between Exit 103 and 104. The split diamond interchange would have the westbound off-ramp and eastbound on-ramp at Exit 104, and the eastbound off-ramp and westbound on-ramp at Exit 103. The interchanges would be connected by frontage roads that would allow traffic to travel between the interchanges without re-entering the interstate.

- AO34 – Split Diamond between Exits 103 and 104 (detailed Synchro model)

3.3.8.1 Exit 103-104 AO34 – Split Diamond Interchange

The proposed split diamond interchange would connect Exit 103 and Exit 104 with two-way connector roads on each side of the interstate. The eastbound split diamond connector road would begin opposite the eastbound off-ramp to Exit 103, replace the existing on-ramp with a two way, four lane road that would be realigned to intersect existing Saturn Parkway. The connector road would run parallel to eastbound I-26 along Saturn Parkway, and then would be extended to continue along and extend past existing Giles Parkway, where it would intersect the existing eastbound off-ramp to Exit 104 at Piney Grove Road. The eastbound on-ramp at Exit 104 would remain at its existing location. In addition to handling ramp traffic at the two interchanges, intersections would be provided with Saturn Parkway at two locations.

The westbound split diamond connector road would begin opposite the westbound off-ramp to Exit 104, replace the existing westbound on-ramp with a two-way, four lane road that would intersect existing Fernandina Road where that road turns to run parallel to westbound I-26. The connector road would run along the existing alignment of Fernandina Road to its intersection with Fernandina Court. The connector would follow

Fernandina Court, and would be extended to intersect Woodcross Drive. The connector would then follow the existing alignment of Woodcross Drive to its intersection at Harbison Boulevard opposite the existing westbound on-ramp. In addition to its intersections with Fernandina Road and Woodcross Drive, the connector would also have an intersection to maintain access to the restaurants and Home Depot store in the southeast quadrant of Exit 103.

The configuration of Exit 104 would largely remain the same as existing conditions along Piney Grove Road and the eastbound on-ramp and westbound off-ramp. The east connector road (parallel to westbound I-26) would have two lanes exiting the Piney Grove Road intersection with the westbound off-ramp and was assumed to provide a separate left turn lane and separate right turn lane from the southbound approach of the proposed connector road. The west connector road (parallel to eastbound I-26) would similarly have two lanes existing the Piney Grove Road intersection with the eastbound on-ramp and was assumed to provide a shared left turn-through lane and separate right turn lane on the southbound approach of the proposed connector road.

The configuration of Exit 103 would be modified by the elimination of the westbound loop off-ramp. Two lanes would be provided in each direction on Harbison Boulevard across the overpass, with left turn lanes provided at each intersection and a right turn lane provided to the east connector road. Two lanes would exit the eastbound off-ramp intersection on the Connector Road toward Exit 104, and the northbound approach intersecting opposite the eastbound ramp was initially considered to provide separate left and right turn lanes. The northbound approach of the connector road opposite the westbound on-ramp would have two lanes exiting the intersection to the south and was initially considered to provide a shared left turn-through lane and separate right turn lane on the northbound approach of the connector road.

A capacity screening for the split diamond concept of AO34 was prepared using detailed Synchro models for Exit 103 and 104 and assuming the connector roadways were one-way only. This assumption was due to the difficulty of estimating how two way traffic would travel between the two two-way roadways connecting the interchanges. For example, existing traffic turning right from the westbound loop-off ramp at Exit 103 to westbound Harbison Boulevard would have two options to complete this move in the spilt diamond concept: in both cases, they would exit on the westbound off-ramp at Exit 104 and either continue through on the east connector road to turn left onto westbound Harbison Boulevard, or turn left onto westbound Piney Grove Road, turn right onto the west connector, and then turn left onto westbound Harbison Boulevard opposite the eastbound off-ramp (these options ignore using Bower Parkway to access Harbison Boulevard from Piney Grove Road). Similar multiple pathways are available for traffic movements between the on and off-ramps at Exit 103 and 104.

Simulations of the existing and 2040 traffic on the original concept quickly indicated that modifications made to the existing configuration of Exit 104 in AO30 were necessary at Exit 104 in AO34 (including providing three westbound lanes on Piney Grove Road entering the interchange area and dual left turn lanes on westbound Piney Grove Road to the eastbound on-ramp). In addition, the relocation of the westbound loop off-ramp traffic (almost 500 vehicles per hour in the morning peak hour and about 800 vehicles per hour in the afternoon peak hour) from Exit 103 to Exit 104 required the addition of two through lanes on the westbound off-ramp at Exit

104. Similarly, the eastbound on-ramp traffic that would be relocated from Exit 103 to Exit 104 (almost 600 vehicles per hour in the morning peak hour and about 850 vehicles per hour in the afternoon peak hour) required two southbound lane on the connector to allow traffic to enter the eastbound on-ramp at Exit 104.

To accommodate existing volumes, observations in the simulations of Exit 103 indicated that additional lanes were needed to accommodate the eastbound off-ramp movements relocated from Exit 104 to the eastbound off-ramp through movement at Exit 103, as well as the northbound left turn movement from the east connector to westbound Harbison Boulevard (about 450 vehicles per hour in the morning peak hour and approaching 900 vehicles per hour in the afternoon peak hour). The concept was revised to provide a separate through lane on the eastbound off-ramp approach to Exit 103, dual left turn lanes to facilitate turns from eastbound Harbison Boulevard onto the westbound on-ramp, dual left turn lanes on the northbound approach of the east connector road to facilitate left turns onto westbound Harbison Boulevard, and providing three westbound through lanes on Harbison Boulevard through the eastbound ramp intersection.

With the additional improvements, observations of the simulations with 2040 traffic volumes indicated that Exit 104 would perform well in both peak hours. At Exit 103, the interchange was observed as performing well during the morning peak hour, but the eastbound approach of Harbison Boulevard at the eastbound ramp intersection was noted observed as being overly congested during the afternoon peak hour. The initial AO34 concept evaluated is shown in **Figure 3-44**. AO34 was not selected to be incorporated into the representative alternatives since the additional improvements necessary to achieve observably acceptable operations in the simulations with 2040 traffic volume were likely to be infeasible, and the concept without modification would be assessed as over capacity.

3.3.9 AO35 – AO39 (EXIT 103)

The following are a list of the AO developed and screened for Exit 103.

- AO35 – Tight Urban Diamond Interchange (detailed Synchro model)
- AO36 – Diverging Diamond Interchange (Synchro Template)
- AO37 – Single Point Urban Interchange (Synchro Template)
- AO38 – Roundabout Interchange (SIDRA)
- AO39 – Offset Single Point Urban Interchange (detailed Synchro model)
- AO49 – Do Nothing

Note: The use of CAP-X was applicable for AO35, AO36, and AO37.

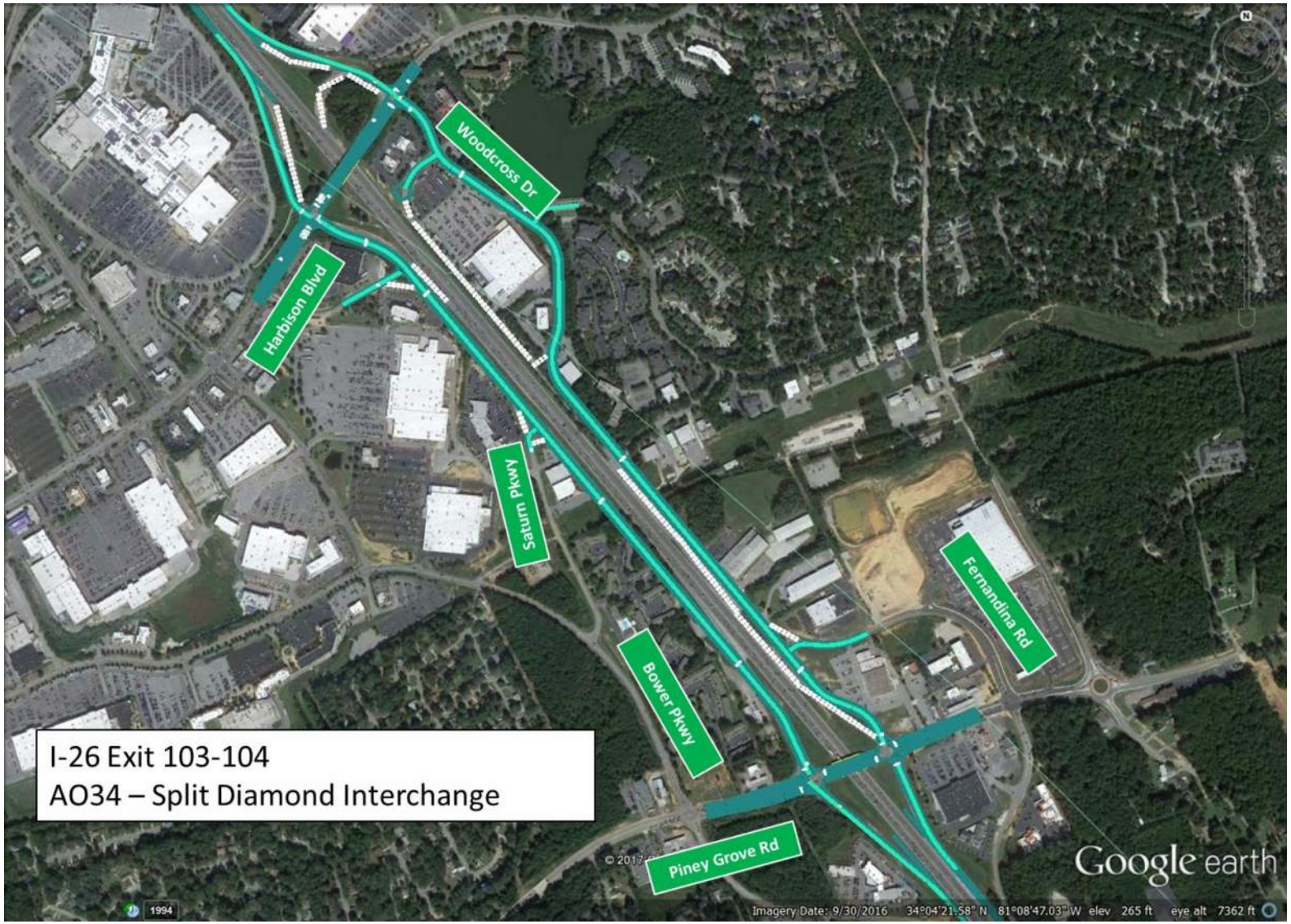


Figure 3-44 - AO34: Exits 103 and 104 Split Diamond Interchange

Existing traffic operations at Exit 103 are complicated by:

- A Partial Cloverleaf interchange design that incorporates a westbound loop off- ramp. The westbound ramp intersection is aligned opposite Woodcross Drive, which connects to the Fernandina Road frontage road system running generally parallel to westbound I-26 between Harbison Boulevard at Exit 103 and Piney Grove Road at Exit 104. Woodcross Drive also provides access to single family and multifamily residential developments that are part of the Harbison planned community.
- High volume of traffic attracted to the Columbiana Mall and the large amount of adjacent retail development. The existing high volume right turn movement from the westbound loop off-ramp (about 350 vehicles per hour during the morning peak hour and about 700 vehicles per hour during the afternoon peak hour) is oriented towards the west and the retail centers on the west side of the interstate. These volumes are higher on weekends when more shoppers patronize the retail developments.
- Even with a free flow movement provided to the right turn traffic on the westbound loop off-ramp, during periods with high off-ramp traffic, queues regularly back up onto the mainline lanes of westbound I-26. This blocks the right most lane on westbound I-26 and can also result in instances where drivers in the center lane temporarily block traffic in an effort to jump into gaps into the queued exit ramp traffic, affecting operations and safety.

3.3.9.1 Exit 103 AO35 – Tight Urban Diamond Interchange

AO35 consists of evaluating a proposed tight urban diamond interchange (TUDI) to replace the existing partial cloverleaf interchange at Exit 103. The proposed TUDI would maintain the configuration of the eastbound ramp intersection but shift it closer to the overpass. The westbound loop off-ramp would be replaced with a westbound off-ramp aligned opposite the westbound on-ramp. The westbound ramp intersection would also be shifted closer to the overpass. The separation between the ramp intersections would decrease from approximately 950 feet to about 500 feet. The Woodcross Drive approach to Harbison Boulevard would remain in place but would function as a T-intersection with the relocation of the westbound on-ramp. The relocated westbound ramp intersection would be located approximately 225 feet west of the Woodcross Drive T-intersection. The eastbound ramp, westbound ramp, and Woodcross Drive intersections are expected to operate under traffic signal control.

At the eastbound ramp intersection, separate left and right turn lanes would be maintained on the off-ramp approach. The westbound approach to the intersection would include a left turn lane for traffic turning onto the eastbound on-ramp, along with three through lanes. In the original AO35 concept, the three westbound through lanes would merge into two through lanes prior to their intersection with the next adjacent signal at Saturn Parkway. The eastbound approach to the intersection would consist of two through lanes and a separate right turn lane to the eastbound on-ramp. The eastbound on-ramp would leave the intersection with two lanes, which would merge into a single lane prior to entering eastbound I-26.

The westbound off-ramp would consist of a single lane diverging from westbound I-26, which widens to provide dual left turn lanes and a separate right turn lane the ramp's intersection with Harbison Boulevard. The eastbound approach to the intersection would consist of a separate left turn lane for traffic turning onto the westbound on-ramp, and two through lanes. The westbound approach would consist of two through lanes and

a separate right turn lane which would drop and direct traffic on the westbound on-ramp. The westbound on-ramp would depart from the intersection with two lanes that would merge into one lane prior to entering westbound I-26.

Woodcross Drive would continue to intersect Harbison Boulevard at its existing location. In the initial AO35 concept, Woodcross Drive was assumed to provide a separate left turn and separate right turn lane. Eastbound Harbison Boulevard provides a separate through lane and a shared through-right turn lane. Westbound Harbison Boulevard provides a separate left turn lane for traffic turning onto Woodcross Drive, and three through lanes. The rightmost through lane function as a direct lane taking traffic to the right turn lane drop at the westbound ramp intersection. The initial AO35 concept evaluated is shown in **Figure 3-45**.

The capacity screening incorporated the use of a detailed Synchro model developed for the assessment of the interchange ramps at Exit 104. The operation of the adjacent Woodcross Drive and Saturn Parkway intersections were not included in the screening. The capacity assessment with estimated 2040 volumes indicated the proposed AO35 concept would result in under capacity ramp intersections. AO35 was selected to be incorporated into the representative alternatives RA1, RA4, and RA8.

It should be noted, however, that the reduction is spacing between the ramp intersection signals, along with the close spacing between those signals and the next adjacent intersections with Woodcross Drive (approximately 225 feet east of the westbound ramp intersection) and with Saturn Parkway (approximately 715 feet from the eastbound ramp intersection, an increase of about 160 feet from the 550 feet spacing between the existing intersections) may complicate the operation of the four signals locate at or adjacent to the AO35 interchange. Coordination between these intersections with be essential to the successful operation of the concept. Additionally, it may be necessary to provide for a second left turn lane from Woodcross Drive onto westbound Harbison Boulevard to reduce the amount of signal cycle time needed to serve the side street traffic demand so the more time can be allocated to through traffic movements on Harbison Boulevard.

Additionally, downstream traffic operations on Harbison Boulevard at the many closely spaced congested signalized intersections may adversely affect the interchange operation with queue spillbacks metering the amount of traffic that can exit the interstate ramps. One recommendation to resolve a downstream chokepoint is to extend, rather than merge, the third westbound through lane at Saturn Parkway. Carrying a third through lane through the Saturn Parkway intersection and dropping it as a right turn lane to the mall entrance at Columbiana Circle would be preferable than merging it prior to the Saturn Parkway intersection.

3.3.9.2 Exit 103 AO36 – Diverging Diamond Interchange

The proposed DDI maintained two through lanes and a separate right turn lane in each direction entering the Harbison Boulevard interchange area. Three lanes are provided in each direction between the crossovers, with one lane for left turn movements onto the on-ramps and two through lanes through the overpass area. The westbound off-ramp included dual left turn lanes and a single right turn lane, while the eastbound off-ramp provided separate left and right turn lanes. The eastbound and westbound on-ramps have two lanes to accept traffic from the westbound left turn and the eastbound right turn movements. Both on-ramps initially begin

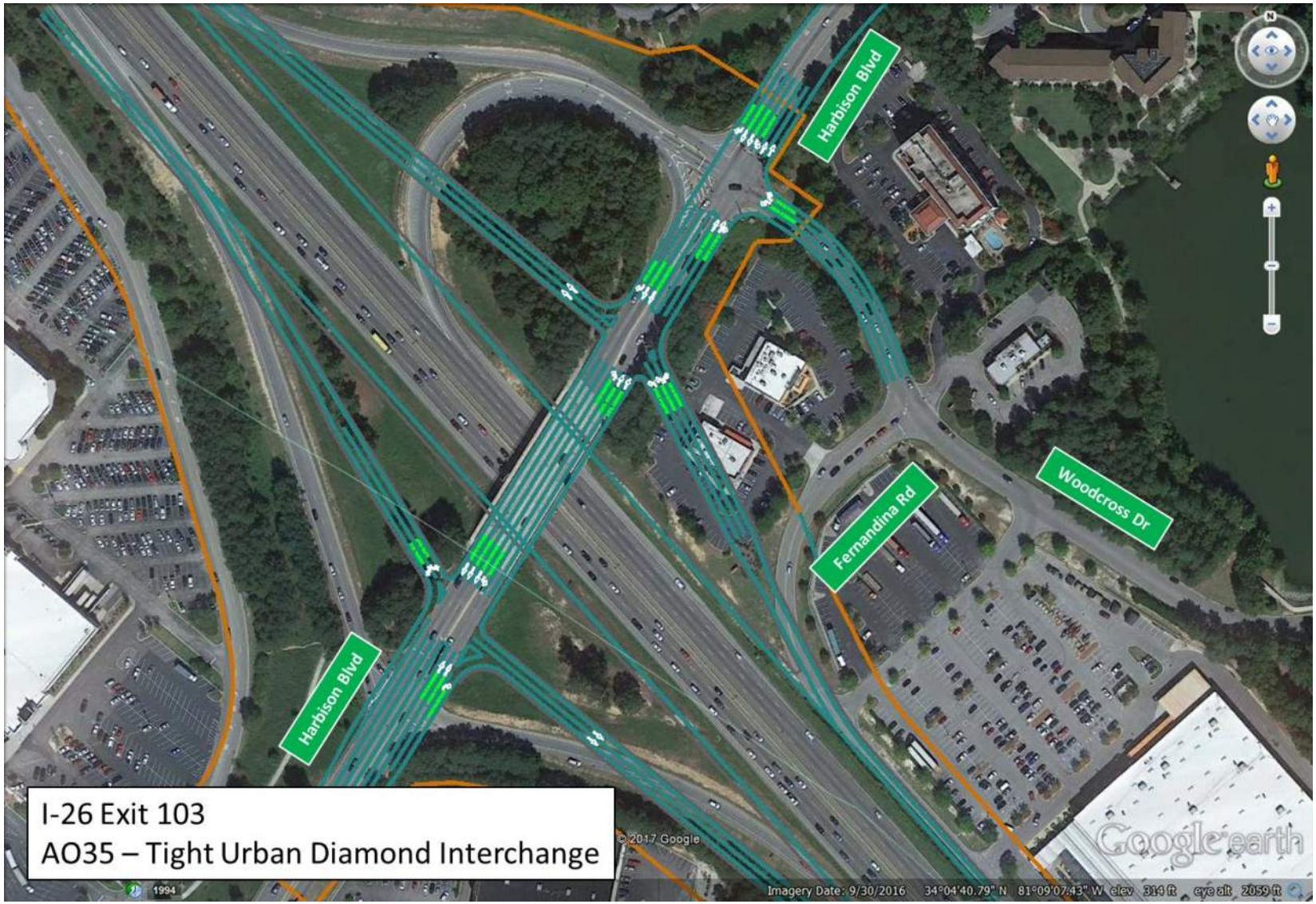


Figure 3-45 - AO35: Exit 103 Tight Urban Diamond Interchange

with two lanes, and merge into a single lane prior to entering I-26. The initial AO36 concept evaluated is shown in **Figure 3-46**.

The capacity screening incorporated the use of the Synchro Template file for a DDI. The DDI template file was not modified to include the adjacent intersections at Woodcross Drive or Saturn Parkway. The screening indicated the AO36 intersections would be under capacity during both peak hours under existing traffic and under estimated 2040 traffic volumes in the morning peak hour. Observations of simulations during the afternoon peak hour indicated queuing of westbound off-ramp left turn traffic was likely to occur with estimated 2040 volumes. AO36 was not selected to be incorporated into the representative alternatives.

3.3.9.3 Exit 103 AO37 – Single Point Urban Interchange

The proposed SPUI has two through lanes entering and exiting the interchange area from each direction on Harbison Boulevard. In the eastbound direction, the two entering lanes widen to four lanes, which include a long left turn lane leading to the SPUI signal, two through lanes, a separate right turn lane that enters the eastbound on-ramp. The eastbound approach continues to the signal with three lanes: a separate left turn lane for traffic entering the westbound on-ramp and two through lanes, which continue to exit the interchange area. In the westbound direction, three entering lanes consist of a long left turn lane leading to the SPUI signal, a separate through lane, and a shared through-right turn lane, from where the right turn traffic enters the westbound on-ramp. The three lanes continue to the west, becoming a separate left turn lane to the eastbound on-ramp and two through lanes at the signal. The two through lanes continue west and exit the interchange area. The eastbound off-ramp has separate left and right turn lanes, while the westbound off-ramp has dual left turn lanes and a separate right turn lane. The eastbound and westbound on-ramps merge the two lanes from the right turn movements entering the ramps and the left turn movements entering the ramps. These lanes eventually merge into a single lane on-ramp that enters eastbound and westbound I-26. The initial AO37 concept evaluated is shown in **Figure 3-47**.

The capacity screening incorporated the use of the Synchro Template file for a SPUI. The SPUI template file was modified to adjust for the proposed number of lanes in the AO37 SPUI concept but was not modified to include the adjacent intersections at Woodcross Drive and Saturn Parkway. The influence of these adjacent intersections is not incorporated in the capacity screening. The screening indicated the AO37 SPUI intersection would be under capacity under existing and estimated 2040 traffic volumes. Observations of simulations indicated no significant queuing occurring with estimated 2040 volumes. AO37 was selected to be incorporated into the representative alternatives RA2 and RA6.

3.3.9.4 Exit 103 AO38 – Roundabout Interchange

The proposed roundabout interchange incorporated a revision of the existing partial cloverleaf interchange to a diamond interchange with two-lane roundabouts in place of traffic signals at the ramp intersections with Harbison Boulevard. At the eastbound ramp roundabout intersection, the eastbound Harbison Boulevard approach to the roundabout at the eastbound ramp intersection would provide two lanes entering the roundabout and a right turn bypass lane that takes traffic directly to the eastbound on-ramp. The westbound approach and the eastbound off-ramp approach would provide two lanes entering the roundabout. The

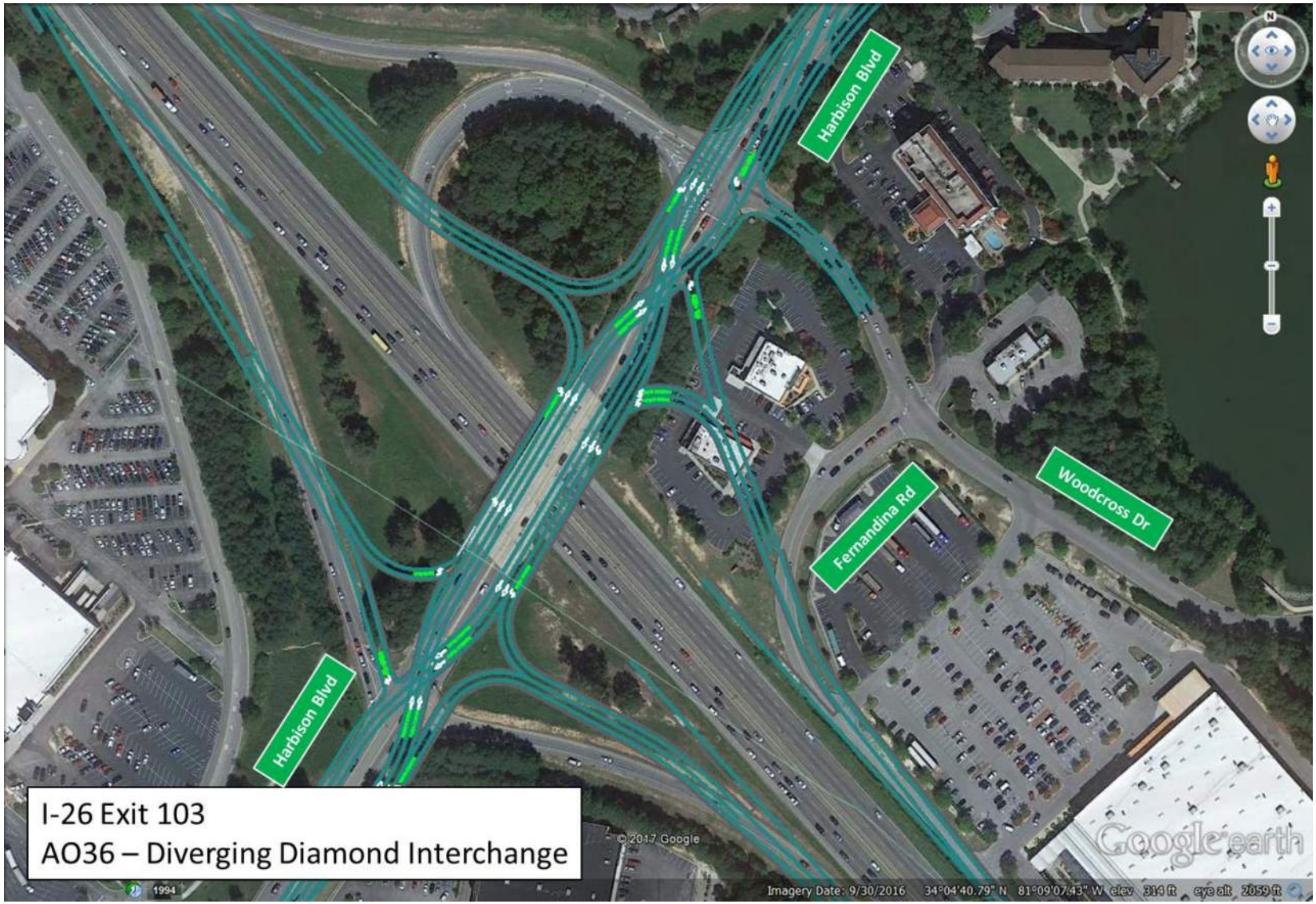


Figure 3-46 - AO36: Exit 103 Diverging Diamond Interchange

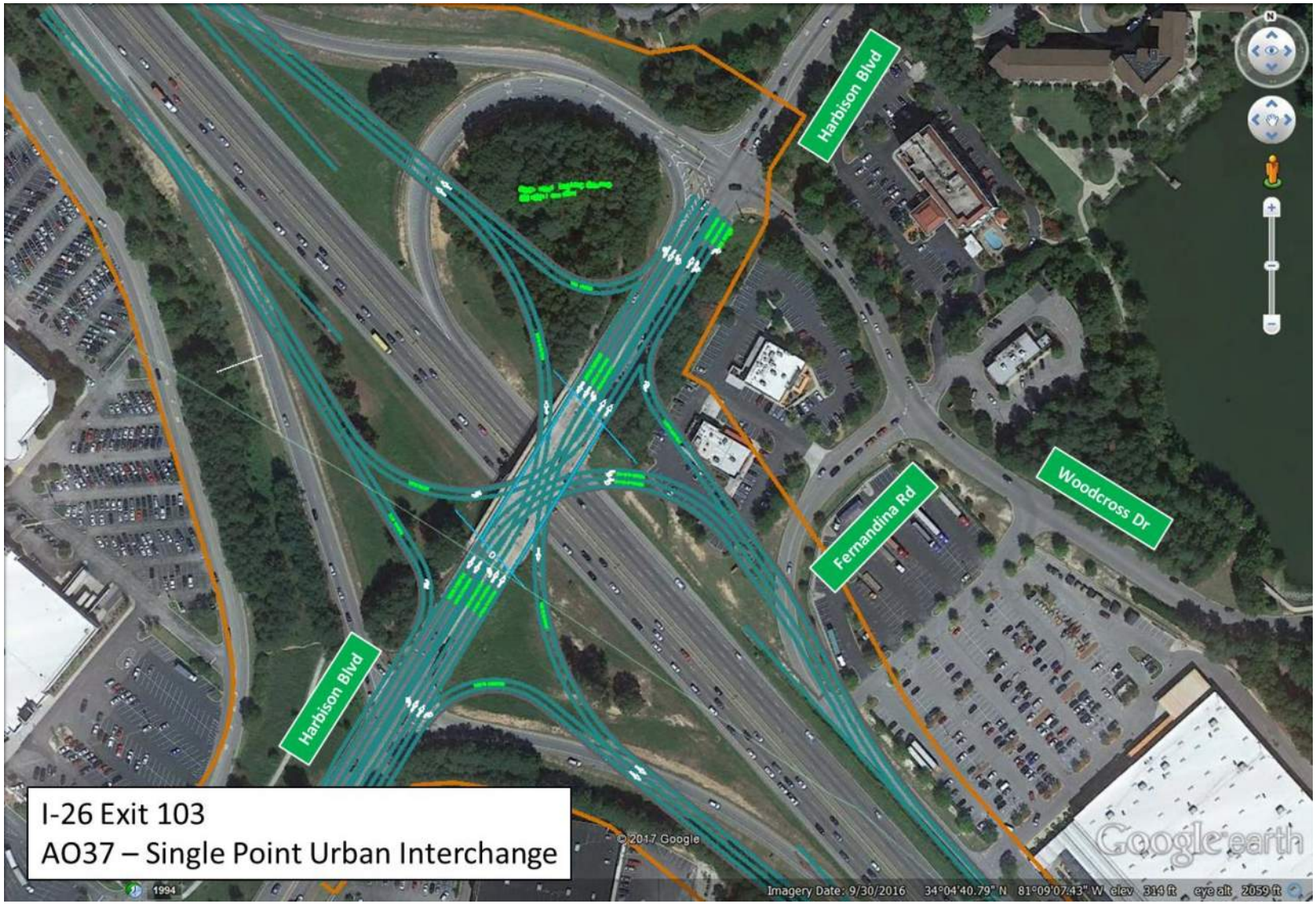


Figure 3-47 - AO37: Exit 103 Single Point Interchange

eastbound on-ramp approach departing from the roundabout would provide two lanes: one from the eastbound roundabout bypass lane and one coming from the roundabout to permit westbound traffic to enter the on-ramp. These two lanes would merge into a single lane prior to entering eastbound I-26.

Two lanes in each direction were maintained on Harbison Boulevard through the interchange area. At the westbound ramp roundabout intersection, the westbound and eastbound Harbison Boulevard approaches to the roundabout would provide two lanes entering the roundabout. Woodcross Drive would also enter this roundabout with two lanes and a right turn roundabout bypass lane. A single lane would exit the roundabout to Woodcross Drive. The westbound on-ramp approach would provide one lane exiting the roundabout. The initial AO38 concept evaluated is shown in **Figure 3-48**.

The capacity screening incorporated the use of SIDRA to analyze the roundabout operation. The analysis indicated individual approaches the two-lane roundabouts in AO38 would be over capacity under existing and 2040 traffic volumes. Under existing traffic, the eastbound off-ramp approach to the eastbound ramp roundabout intersection was assessed as being at capacity, while the westbound off-ramp approach to the westbound ramp roundabout was assessed as over capacity during the afternoon peak hour. Under 2040 estimated volumes at the westbound ramp roundabout intersection, the westbound Harbison Boulevard approach and the westbound off-ramp approach were assessed to be over capacity during the morning and afternoon peak hours, while the Woodcross Drive approach was assessed to be at capacity during the afternoon peak hour. At the eastbound ramp roundabout intersection, the eastbound off-ramp approach and the eastbound Harbison Boulevard approach were assessed as over capacity during the afternoon peak hour. Since incorporating additional lanes in the roundabouts would not be feasible, AO38 was not selected to be incorporated into the representative alternatives.

3.3.9.5 Exit 103 AO39 – Offset Single Point Urban Interchange

The proposed offset SPUI interchange concept in AO39 moves the westbound off-ramp approach to align approximately opposite the eastbound off-ramp approach which, in the concept, is shifted to the east by approximately 140 feet from the existing eastbound ramp intersection. The eastbound on-ramp would also be shifted east to be aligned generally opposite the eastbound on-ramp. Woodcross Drive would remain at its existing intersection location on Harbison Boulevard, but the westbound on-ramp intersection was proposed to be relocated approximately 300 feet closer to the westbound mainline from its current location opposite Woodcross Drive. An illustration of the original AO39 concept is contained in **Figure 3-49**.

At the eastbound ramp intersection (with the relocated westbound off-ramp), the eastbound off-ramp approach was designed to provide dual left turn lanes and a separate right turn lane. The westbound off-ramp approach would curve over the mainline lanes in both directions of I-26 and intersect Harbison Boulevard with dual left turn lanes and a separate right turn lane. Eastbound Harbison Boulevard would enter the intersection with two through lanes and a separate right turn lane to the eastbound on-ramp. Westbound Harbison Boulevard would provide a separate left turn lane from traffic entering the eastbound on-ramp, and two through lanes.

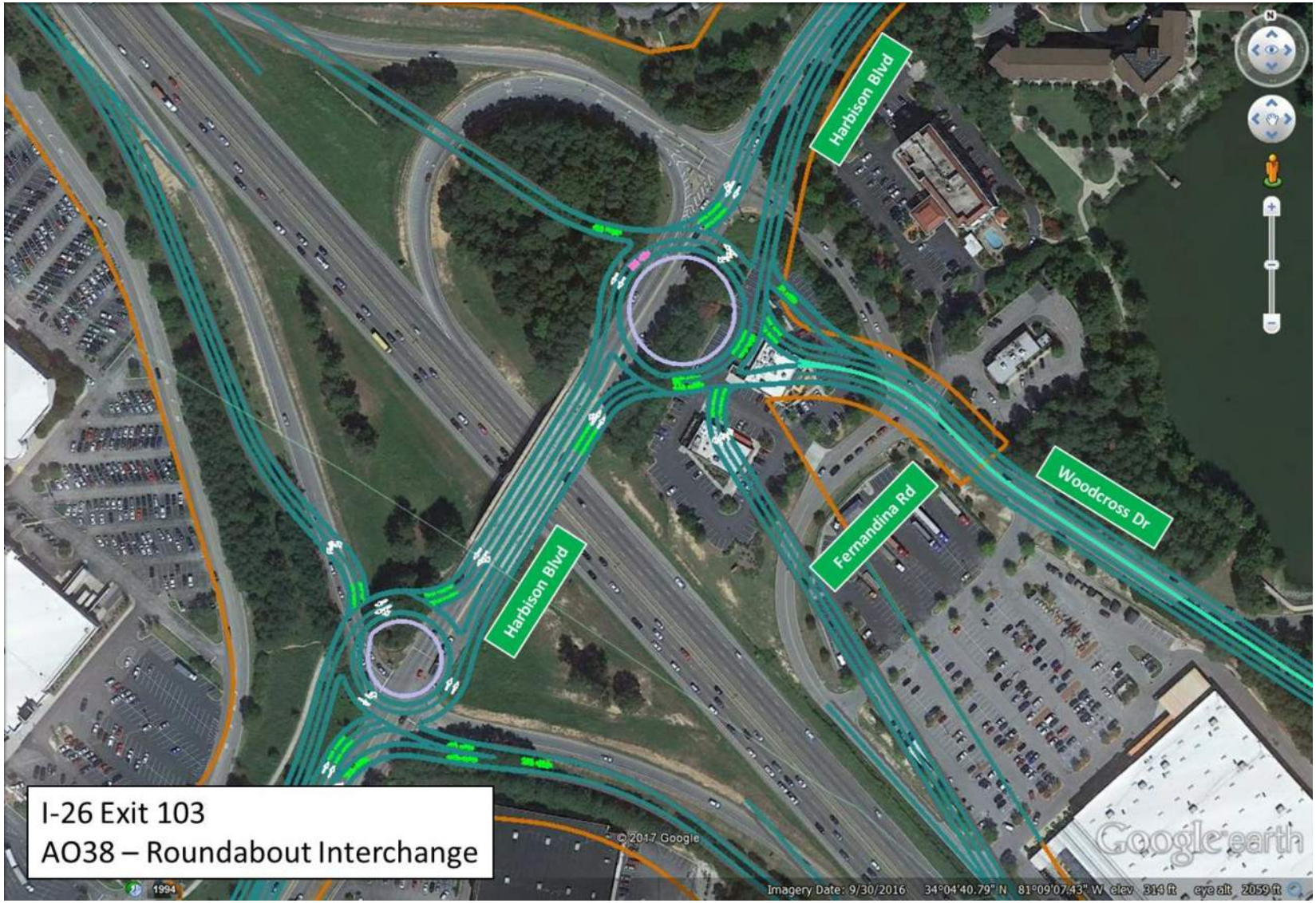


Figure 3-48 - AO38: Exit 103 Roundabout Interchange

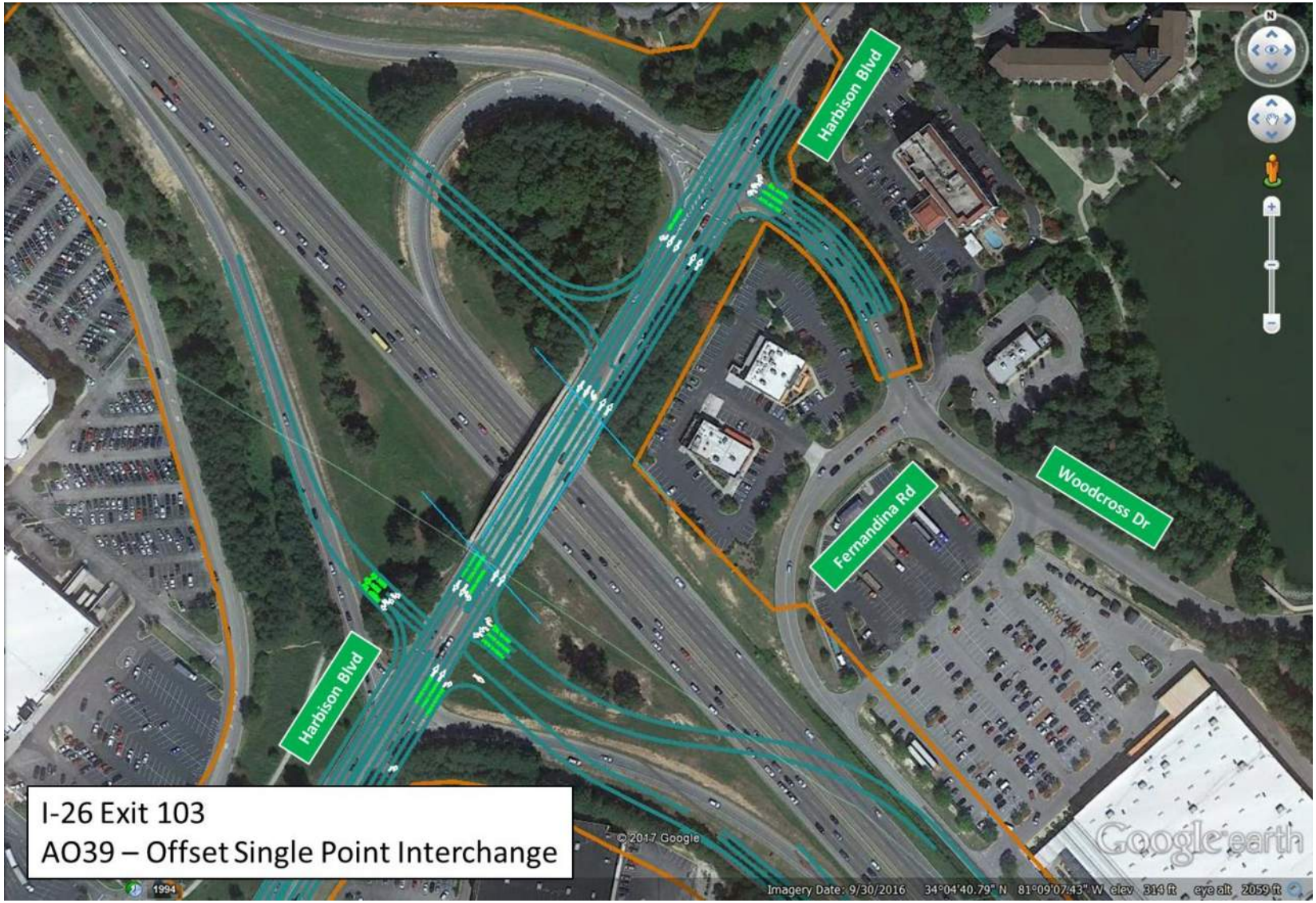


Figure 3-49 - AO39: Exit 103 Offset Single Point Interchange

To the east across the overpass, Harbison Boulevard would provide to through lanes in each direction, with a fifth lane allocated to back-to-back left turn lanes to the on-ramps.

Eastbound Harbison Boulevard would consist of a separate left turn lane for traffic turning onto the westbound on ramp and two through lanes. The westbound approach of Harbison Boulevard would have two through lanes and a separate right turn lane for traffic turning onto the westbound on-ramp. The westbound on-ramp would be made of up separate lanes accepting the left turn and right turn movements from Harbison Boulevard. The ramp would merge into a single lane before entering westbound I-26.

The Woodcross Drive approach to its intersection with Harbison Boulevard was assumed to provide dual left turn lanes and a separate right turn lane at the T-intersection created by the relocation of the westbound on-ramp.

The capacity screening incorporated the use of a detailed Synchro model developed for the offset SPUI concept. The initial capacity screening indicated that the dual left turn lanes provided in AO39 on the eastbound off-ramp approach were not necessary: a single left turn lane would be sufficient. However, due to the configuration of the eastbound off-ramp and the realigned westbound off-ramp, split signal phasing would most likely be required to serve both ramp movements without conflict to the opposing left turn movements and was incorporated into the model. Under existing traffic volume, the eastbound/relocated westbound off-ramp intersection was assessed to be under capacity during both peak hours, though some off-ramp queuing for the westbound off-ramp left turn movement was observed in the simulations during the afternoon peak hour. Under 2040 traffic volumes, the eastbound/relocated westbound off-ramp intersection was assessed to be under capacity during the morning peak hour and over capacity during the afternoon peak hour, when sizeable queues were observed in eastbound off-ramp right turn traffic and westbound off-ramp left turn traffic. This is largely due to not being able to accommodate the high volume of westbound off-ramp traffic and Harbison Boulevard through traffic with the split signal phasing for the off-ramps diverting so much of the cycle length away from the arterial through phases. Consequently, AO39 was not selected to be incorporated into the representative alternatives.

3.3.9.6 Exit 103 AO49 – Do-Nothing (No-Build)

A no-build, do-nothing alternative at Exit 103 was incorporated into the AO for cases where a Representative Alternative may be developed that did not require modification to the existing Harbison Boulevard interchange. The do-nothing alternative would largely keep the existing interchange configuration intact, with modifications made to accommodate the mainline widening and to adjust the connections of the interchange ramps with the mainline. The do-nothing alternative was selected to be incorporated into representative alternatives RA3, RA7, and RA 9.

3.3.9.7 Exit 103 CAP-X Review

The Exit 103 traffic volumes and proposed interchange geometry were entered into the CAP-X spreadsheet to determine which interchange alternatives scored the highest using the CAP-X methodology. The best rated

interchange concept was a ParClo, followed by the Displaced Left Turn (DLT), the SPUI, and the DDI interchanges. The Traditional Diamond interchange ranked last.

Partial Cloverleaf Interchange

The CAP-X ParClo concept includes the westbound loop off-ramp incorporated into the existing interchange configuration and assumed an eastbound loop off-ramp. The probable reason the existing interchange lacks the eastbound loop off-ramp is because the existing eastbound off-ramp left turn traffic, which would be relocated to a loop off-ramp, is too low (about 30 vehicles in the morning peak hour and about 80 vehicles in the afternoon peak hour) to warrant the loop off-ramp. Therefore, a full ParClo concept is not a feasible choice.

Displaced Left Turn Interchange

The DLT interchange was the second highest rated option in the CAP-X assessment. A DLT at Exit 103 would locate the left turn crossovers upstream at the next adjacent intersections. To the west of the interchange, that crossover would likely occur at the signalized intersection of Harbison Boulevard and Saturn Parkway. To the east of the interchange, the existing signalized intersection of Woodcross Road/westbound ramps is too close to be the crossover location. A crossover could occur at the currently unsignalized T-intersection of Harbison Boulevard and Parkridge Drive, combined with the realignment of Woodcross Road across from Parkridge Drive. This intersection would have to be signalized to permit the displacing of the left turn movement.

3.3.10 AO40 – AO42 (EXIT 102)

The following are a list of the AO developed and screened for Exit 102.

- AO40 – Diverging Diamond Interchange (Synchro Template)
- AO41 – Roundabout Interchange (SIDRA)
- AO42 –Tight Urban Diamond Interchange (Detailed Synchro Model)
- AO50 – Do Nothing

Note: The use of CAP-X was applicable for AO40, AO42, and AO50.

Existing traffic operations at Exit 102 are complicated by:

- Moderately high volumes of traffic oriented to the west to access the Town of Irmo and the retail areas along Harbison Boulevard via Columbiana Drive. This leads to:
    - Moderately high eastbound on-ramp volumes between 700 and 800 vehicles per hour during both peak hours
    - Moderate to moderately high westbound off-ramp volumes (approximately 450 vehicles per hour during the morning peak hour and about 600 vehicles per hour in the afternoon peak hour)
- Off-ramp lanes merging into westbound Lake Murray Boulevard from the westbound loop off-ramp and the eastbound off-ramp and into eastbound Lake Murray Boulevard from the eastbound loop off-ramp.
- The short distance between the westbound off-ramp and the intersection of Lake Murray Boulevard and Kinley Road. There is approximately 400 feet between the off-ramp gore point on eastbound Lake Murray Boulevard and the beginning of the taper for the eastbound left turn lane used by traffic turning

left onto Kinley Road. Because of the high volume of eastbound left turn movements at Kinley Road coming from the westbound off-ramp, multiple lane weaving movements take place at in a short distance.

3.3.10.1 Exit 102 AO40 – Diverging Diamond Interchange

The proposed DDI maintained two through lanes and a separate right turn lane in each direction entering the Lake Murray Boulevard interchange area. Two lanes are provided in each direction between the crossovers, with left turn movements onto the on-ramps taking place from the outside through lane. The westbound off-ramp included dual left turn lanes and a single right turn lane, while the eastbound off-ramp provided separate left and right turn lanes. The eastbound and westbound on-ramps have a single lane each that merge into a single lane on-ramp, with the right turn traffic from Lake Murray Boulevard yielding to left turn traffic entering the ramps. The initial AO40 concept evaluated is shown in **Figure 3-50**.

The capacity screening incorporated the use of the Synchro Template file for a DDI. The screening indicated the AO40 intersections would be under capacity during both peak hours under existing traffic and under estimated 2040 traffic volumes in both peak hours. Observations of simulations during the afternoon peak hour indicated queuing of westbound off-ramp left turn traffic was likely to occur with estimated 2040 volumes. Additionally, congestion was frequently observed in both directions of the crossover sections of the DDI. AO40 was not selected to be incorporated into the representative alternatives.

3.3.10.2 Exit 102 AO41 – Roundabout Interchange

The proposed roundabout interchange incorporated a revision of the existing partial cloverleaf interchange to a diamond interchange with two-lane roundabouts in place of traffic signals at the ramp intersections with Lake Murray Boulevard. At the eastbound ramp roundabout intersection, the eastbound Lake Murray Boulevard approach to the roundabout would provide two lanes entering the roundabout and a right turn bypass lane that takes traffic directly to the eastbound on-ramp. The westbound approach would provide two lanes entering the roundabout. The eastbound off-ramp approach would provide a separate roundabout bypass right turn lane generally following the alignment of the existing eastbound off-ramp to westbound Lake Murray Boulevard, while a single lane entering the roundabout would replace the loop off-ramp to facilitate the flow of traffic onto eastbound Lake Murray Boulevard. The eastbound on-ramp approach departing from the roundabout would provide two lanes: one from the eastbound roundabout bypass lane and one coming from the roundabout. These two lanes would merge into a single lane prior to entering eastbound I-26.

Two lanes in each direction were maintained on Lake Murray Boulevard through the interchange area. At the westbound ramp roundabout intersection, the westbound and eastbound Lake Murray Boulevard approaches to the roundabout would provide two lanes entering the roundabout. The westbound approach would include a right turn roundabout bypass lane. The westbound off-ramp approach would consist of a single lane that widens to two lanes. Traffic traveling east on Lake Murray Boulevard would turn right using a roundabout bypass lane, while traffic traveling west on Lake Murray Boulevard would enter the roundabout on a single lane. The westbound on-ramp approach would begin with two lanes: one lane exiting the roundabout and the other

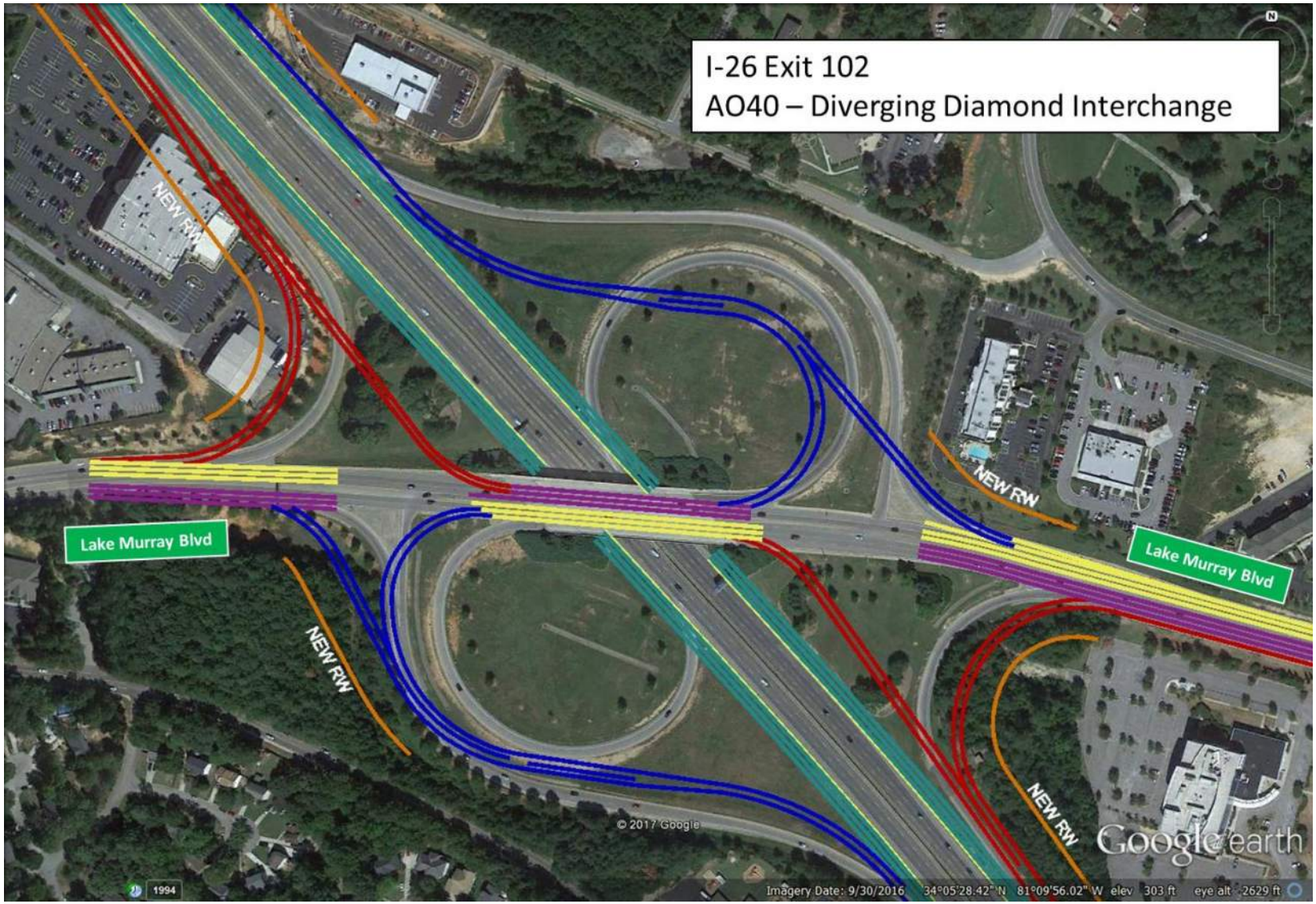


Figure 3-50 - AO40: Exit 102 Diverging Diamond Interchange

lane originating from the westbound right turn bypass lane. The two lanes would merge into a single on-ramp lane prior to entering westbound I-26. The initial AO41 concept evaluated is shown in **Figure 3-51**.

The capacity screening incorporated the use of SIDRA to analyze the roundabout operation. The screening indicated the approaches of the two-lane roundabouts in AO41 would be over capacity under 2040 traffic volumes. Since incorporating additional lanes in the roundabouts would not be feasible, AO41 was not selected to be incorporated into the representative alternatives.

3.3.10.3 Exit 102 AO42 – Tight Urban Diamond Interchange

AO42 consists of evaluating a proposed tight urban diamond interchange (TUDI) to replace the existing partial cloverleaf interchange at Exit 102. The proposed TUDI would locate the eastbound ramp intersection near the existing location of the eastbound on-ramp on Lake Murray Boulevard and the westbound ramp intersection near the existing location of the westbound on-ramp. The separation between the ramp intersections would be about 1,030 feet.

At the eastbound ramp intersection, separate left and right turn lanes would be maintained on the off-ramp approach. The westbound approach to the intersection would include a left turn lane for traffic turning onto the eastbound on-ramp, along with two through lanes. The eastbound approach to the intersection would consist of two through lanes and a separate right turn lane to the eastbound on-ramp. The eastbound on-ramp would leave the intersection with two lanes, which would merge into a single lane prior to entering eastbound I-26.

The westbound off-ramp would consist of a single lane diverging from westbound I-26, which widens to provide separate left turn and right turn lanes at the ramp's intersection with Lake Murray Boulevard. The eastbound approach to the intersection would consist of a separate left turn lane for traffic turning onto the westbound on-ramp, and two through lanes. The westbound approach would consist of two through lanes and a separate right turn lane which for traffic entering the westbound on-ramp. The westbound on-ramp would depart from the intersection with two lanes that would merge into one lane prior to entering westbound I-26. The right turn movements to both on-ramps would yield to left turning traffic. The initial AO42 concept evaluated is shown in **Figure 3-52**.

The capacity screening incorporated the use of the detailed Synchro model developed for Exit 104. The capacity assessment with estimated 2040 volumes indicated the proposed AO42 concept would result in under capacity ramp intersections. However, a second westbound left turn lane would be required on the westbound off-ramp to accommodate 2040 traffic volumes. AO42 was selected to be incorporated into the representative alternatives RA2 and RA6.

3.3.10.4 Exit 102 AO50 – Do-Nothing (No-Build)

A no-build, do nothing alternative at Exit 102 was incorporated into the AO for cases where a Representative Alternative may be developed that did not require modification to the existing Lake Murray Boulevard interchange. The do-nothing alternative would largely keep the existing interchange configuration intact, with modifications made to accommodate the mainline widening and to adjust the connections of the interchange

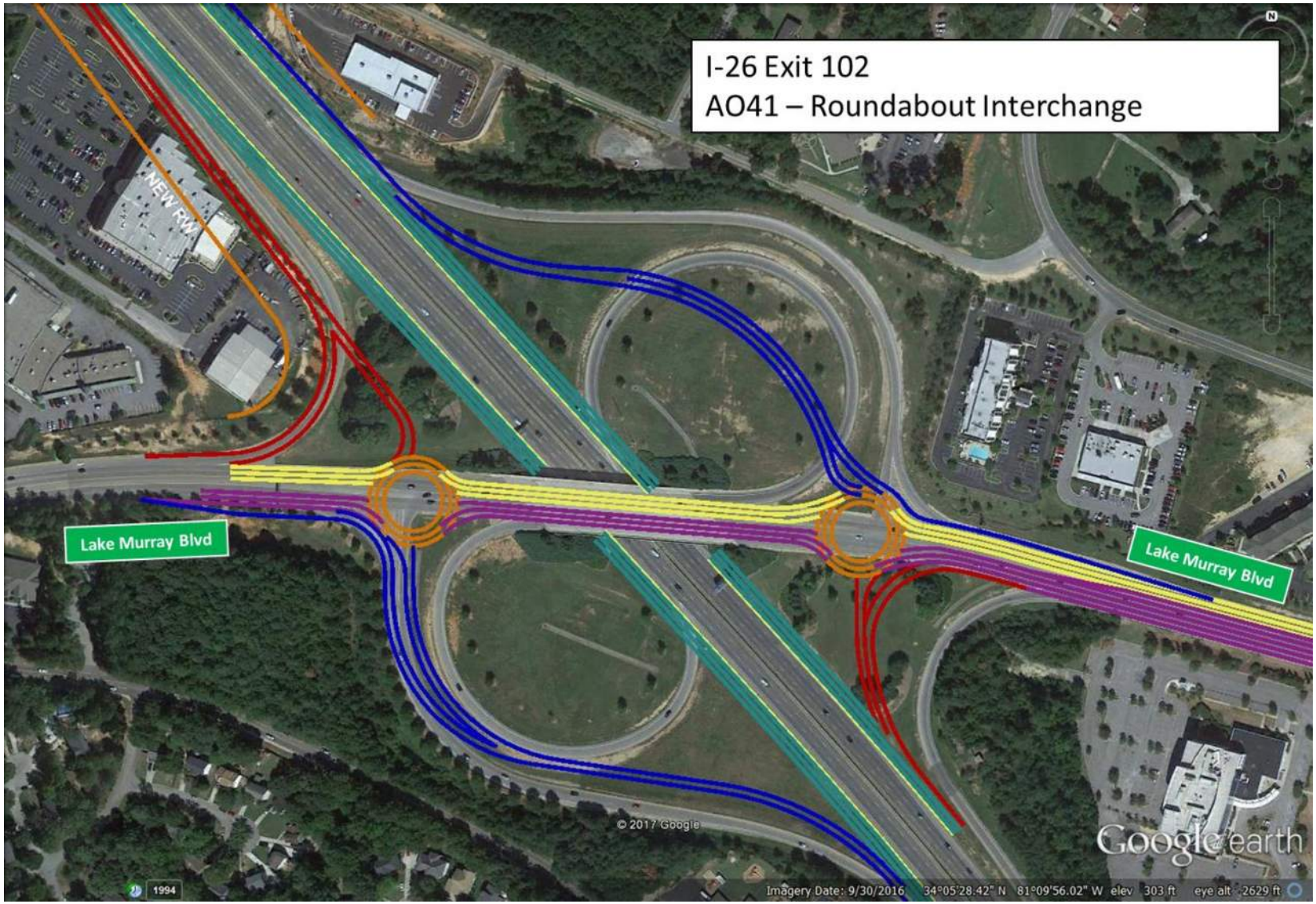


Figure 3-51 - AO41: Exit 102 Roundabout Interchange

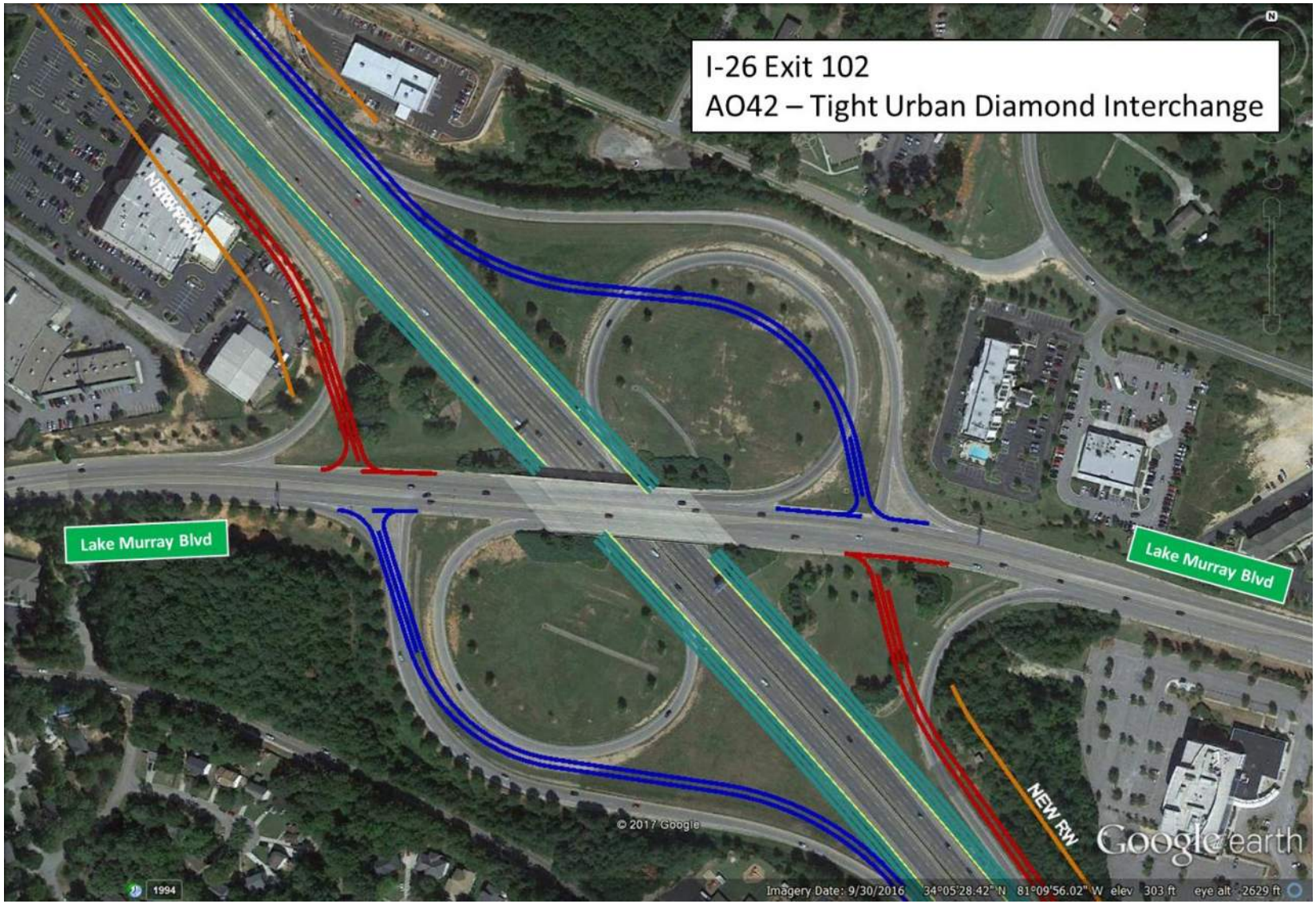


Figure 3-52 - AO42: Exit 102 Tight Urban Diamond Interchange

ramps with the mainline. The do-nothing alternative was selected for representative alternatives RA1, RA3, RA4, RA5, RA7, RA8, and RA9.

3.3.10.5 Exit 102 CAP-X Review

The Exit 102 traffic volumes and proposed interchange geometry were entered into the CAP-X spreadsheet to determine which interchange alternatives scored the highest using the CAP-X methodology. The best rated interchange concept was a ParClo, followed by the Displaced Left Turn (DLT), the DDI, and the SPUI interchanges. The Traditional Diamond interchange ranked last.

Partial Cloverleaf Interchange

The CAP-X ParClo concept reflects the existing interchange configuration, with loop off-ramps provided in the eastbound and westbound directions of I-26. The ParClo configuration was selected as the preferred alternative for Exit 102 prior to the interchange's construction in the late 1990's.

Displaced Left Turn Interchange

The DLT interchange was the second highest rated option in the CAP-X assessment. A DLT at Exit 102 would locate the left turn crossovers upstream at the next adjacent intersections. To the west of the interchange, that crossover would likely occur at the signalized intersection of Lake Murray Boulevard and Columbiana Drive. To the east of the interchange, the crossover would likely occur at the signalized intersection of Lake Murray Boulevard and Kinley Road/Parkridge Drive.

3.3.11 AO40 – AO42 (EXIT 101)

The following are a list of the AO developed and screened for Exit 101.

- AO43 – Diverging Diamond Interchange (Synchro Template)
- AO44 – Roundabout Interchange (SIDRA)
- AO45 –Tight Urban Diamond Interchange (Detailed Synchro Model)
- AO51 – Do Nothing

Note: The use of CAP-X was applicable for AO43, AO44, and AO51.

Existing traffic operations at Exit 101 are complicated by:

- Moderate left turn volumes onto eastbound I-26 during both peak hours (existing peak hour traffic is about 250 vehicles in the morning peak hour and about 300 vehicles in the afternoon peak hour). However, a single left turn lane with protected-permitted left turn phasing (with a flashing yellow arrow display for the permitted movement) is provided to the on-ramp, which allows for the left turn traffic to be served under a protected phase during periods of heavy demand.
- High right turn volumes from eastbound Broad River Road to the eastbound on-ramp during both peak hours (existing peak hour traffic is approximately 600 vehicles in the morning and about 550 vehicles in the afternoon).

Broad River Road provides two through lanes in each direction through the interchange area. However, Broad River Road narrows to a single lane each way within a relatively short distance from the interchange. Approximately 1,400 feet west of the eastbound off-ramp intersections, Broad River Road is reduced to two lanes just west of its intersection with Royal Tower Drive. Approximately 1,500 feet east of the westbound off-ramp intersections, Broad River Road is reduced to two lanes east of its intersection with Western Lane.

3.3.11.1 Exit 101 AO43 – Diverging Diamond Interchange

The proposed DDI maintained two through lanes and a separate right turn lane in each direction entering the Broad River Road interchange area. Two lanes are provided in each direction between the crossovers, with left turn movements onto the on-ramps taking place from the outside through lane. The westbound off-ramp included dual left turn lanes and a single right turn lane, while the eastbound off-ramp provided separate left and right turn lanes. The eastbound and westbound on-ramps have a single lane each that merge into a single lane on-ramp, with the right turn traffic from Broad River Road yielding to left turn traffic entering the ramps. The initial AO40 concept evaluated is shown in **Figure 3-53**.

The capacity screening incorporated the use of the Synchro Template file for a DDI. The screening indicated the AO43 intersections would be under capacity during both peak hours under existing traffic and under estimated 2040 traffic volumes in both peak hours. Observations of simulations during the afternoon peak hour indicated queuing of westbound off-ramp left turn and right turn traffic was likely to occur with estimated 2040 volumes. AO43 was selected to be incorporated into the representative alternatives RA3 and RA6.

3.3.11.2 Exit 101 AO44 – Roundabout Interchange

The proposed roundabout interchange incorporated a revision of the existing partial cloverleaf interchange to a diamond interchange with two-lane roundabouts in place of traffic signals at the ramp intersections with Broad River Road. At the eastbound ramp roundabout intersection, the eastbound Broad River Road approach to the roundabout would provide two lanes entering the roundabout and a right turn bypass lane that takes traffic directly to the eastbound on-ramp. The westbound approach would provide two lanes entering the roundabout. The eastbound off-ramp approach would provide a separate right turn bypass lane, while a single lane entering the roundabout would facilitate the flow of traffic onto eastbound Broad River Road. The eastbound on-ramp approach departing from the roundabout would provide two lanes: one from the eastbound roundabout bypass lane and one coming from the roundabout. These two lanes would merge into a single lane prior to entering eastbound I-26.

Two lanes in each direction were maintained on Broad River Road through the interchange area. At the westbound ramp roundabout intersection, the eastbound Broad River Road approach to the roundabout would provide two lanes entering the roundabout. The westbound approach would also consist of two lanes entering the roundabout and would include a right turn roundabout bypass lane to the westbound on-ramp. The westbound off-ramp approach would consist of a single lane that widens to two lanes. Traffic traveling east on Broad River Road would turn right using a roundabout bypass lane, while traffic traveling west on Broad River Road would enter the roundabout on a single lane. The westbound on-ramp approach would begin with two lanes: one lane exiting the roundabout and the other lane originating from the westbound right turn bypass

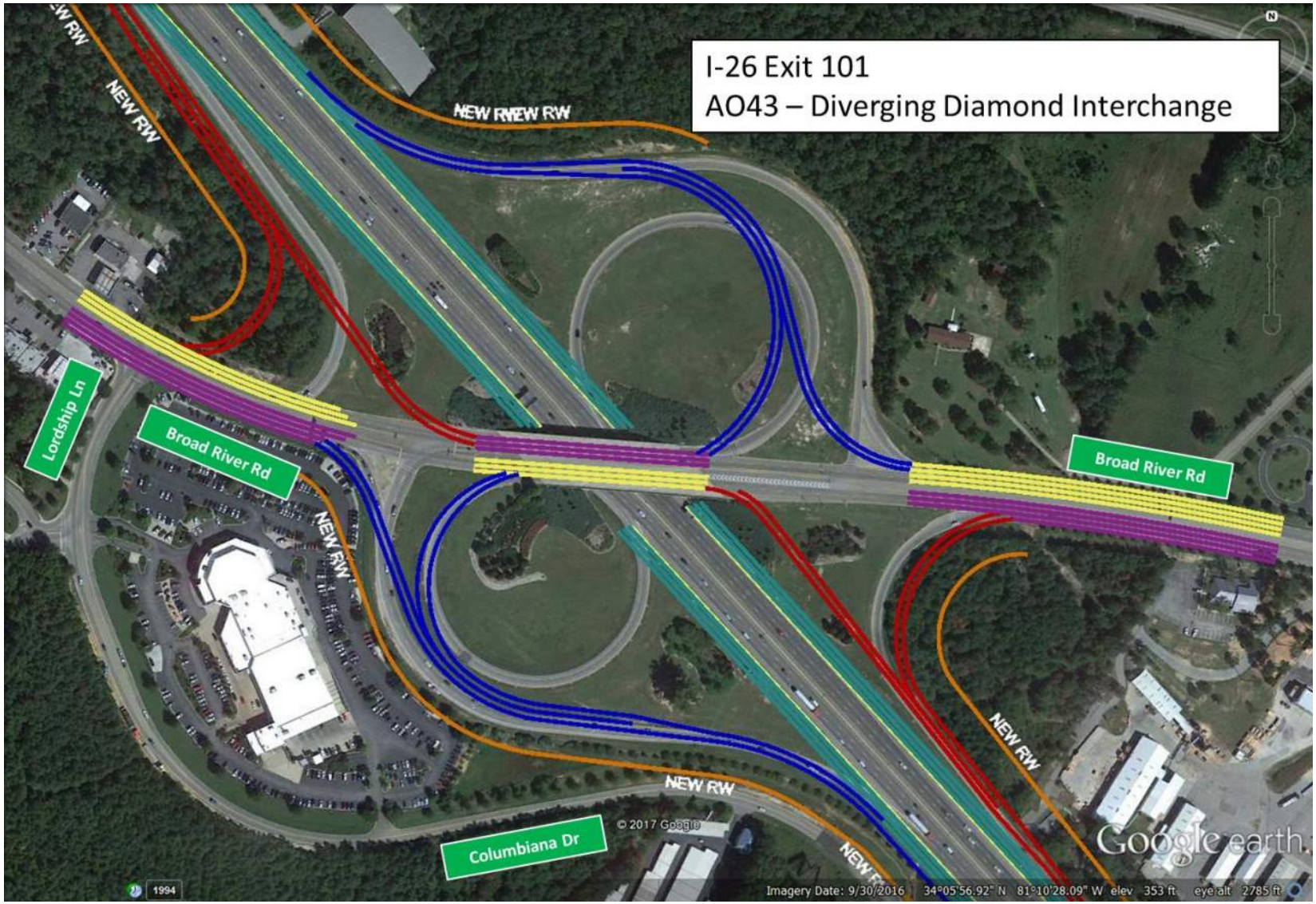


Figure 3-53 - AO43: Exit 101 Diverging Diamond Interchange

lane. The two lanes would merge into a single on-ramp lane prior to entering westbound I-26. The initial AO44 concept evaluated is shown in **Figure 3-54**.

The capacity screening incorporated the use of SIDRA to assess the roundabout operation. The screening indicated the off-ramp approaches to the two-lane roundabouts in AO44 would be over capacity under 2040 traffic volumes. Since incorporating additional lanes in the roundabouts would not be feasible, AO44 was not selected to be incorporated into the representative alternatives.

3.3.11.3 Exit 101 AO45 – Tight Urban Diamond Interchange

AO45 consists of evaluating a proposed tight urban diamond interchange (TUDI) to replace the existing partial cloverleaf interchange at Exit 101. The proposed TUDI would locate the eastbound ramp intersection near the existing location of the eastbound on-ramp on Broad River Road and the westbound ramp intersection near the existing location of the westbound on-ramp. The separation between the ramp intersections would be about 980 feet.

At the eastbound ramp intersection, separate left and right turn lanes would be maintained on the off-ramp approach. The westbound approach to the intersection would maintain the existing dual left turn lanes for traffic turning onto the eastbound on-ramp, along with three through lanes. The eastbound approach to the intersection would consist of two through lanes and a separate right turn lane to the eastbound on-ramp. The eastbound on-ramp would leave the intersection with two lanes, which would merge into a single lane prior to entering eastbound I-26.

The westbound off-ramp would consist of a single lane diverging from westbound I-26, which widens to provide separate left turn and right turn lanes at the ramp's intersection with Broad River Road. The eastbound approach to the intersection would consist of a separate left turn lane for traffic turning onto the westbound on-ramp, and two through lanes. The westbound approach would consist of two through lanes and a separate right turn lane which for traffic entering the westbound on-ramp. The westbound on-ramp would depart from the intersection with two lanes that would merge into one lane prior to entering westbound I-26. The right turn movements to both on-ramps would yield to left turning traffic. The initial AO45 concept evaluated is shown in **Figure 3-55**.

The capacity screening incorporated the use of the detailed Synchro model developed for Exit 104 modified to account for the differences in the design concept at Exit 101. The capacity assessment with estimated 2040 volumes indicated the proposed AO45 concept would result in under capacity ramp intersections. However, a second westbound left turn lane would be required on the westbound off-ramp to accommodate 2040 traffic volumes, especially during the afternoon peak hour, as observations of the simulations indicated there was moderate to significant left turn queuing occurring on the westbound off-ramp. AO45 was selected to be incorporated into the representative alternative RA2.

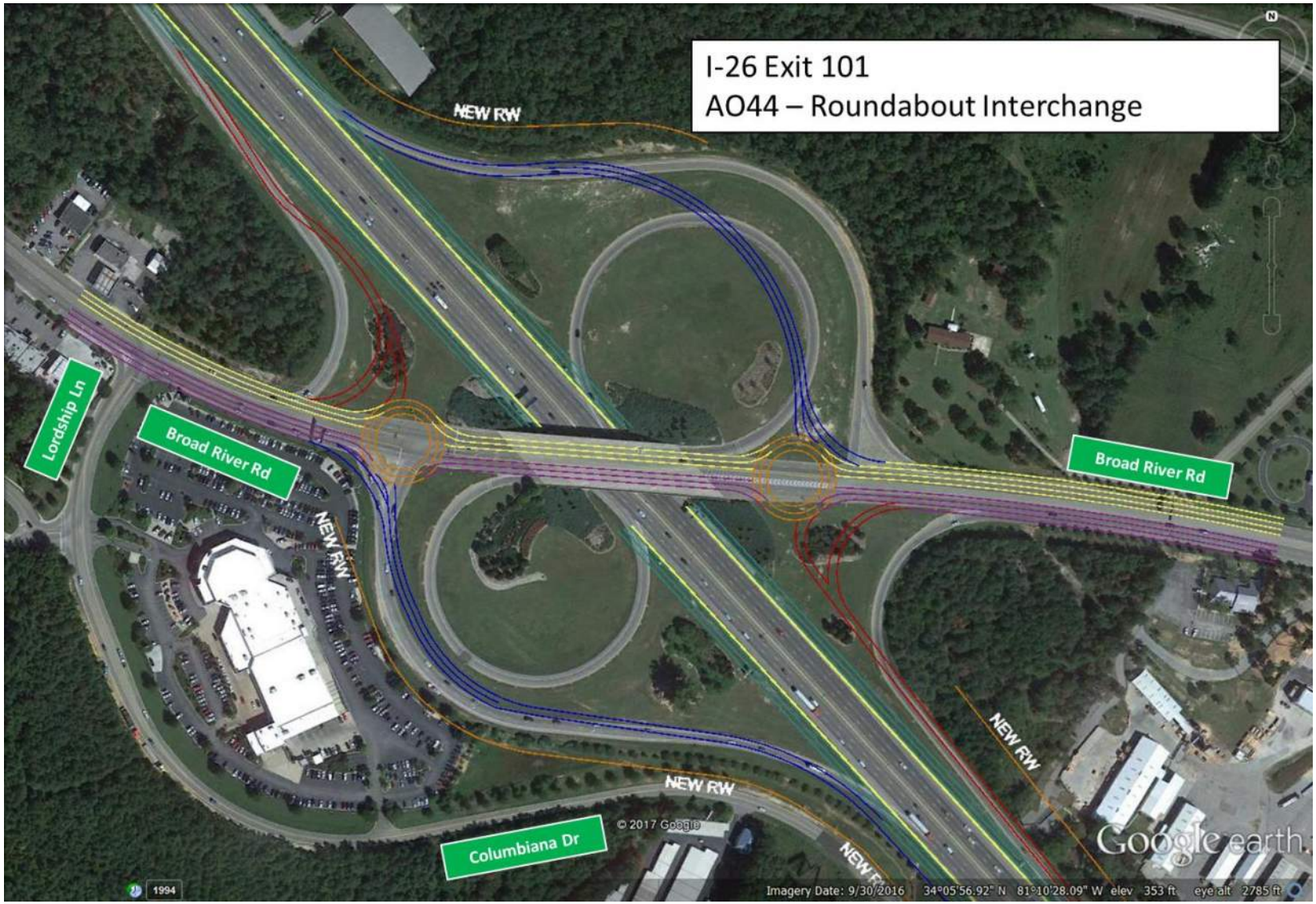


Figure 3-54 - AO44: Exit 101 Roundabout Interchange

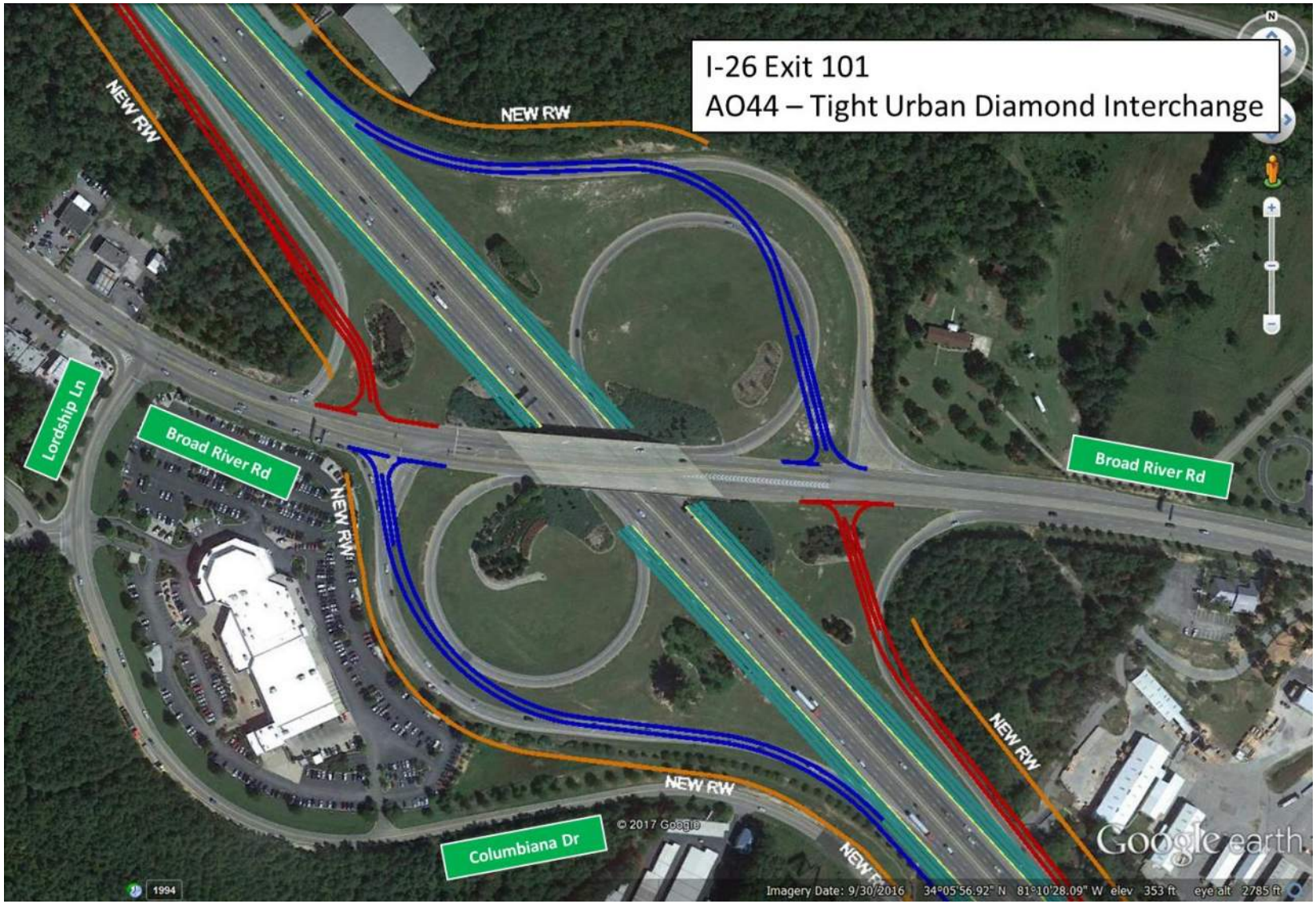


Figure 3-55 - AO44: Exit 101 Tight Urban Diamond Interchange

3.3.11.4 Exit 101 AO51 – Do-Nothing (No-Build)

A no-build, do nothing alternative at Exit 101 was incorporated into the AO for cases where a Representative Alternative may be developed that did not require modification to the existing Broad River Road interchange. The do-nothing alternative would largely keep the existing interchange configuration intact, with modifications made to accommodate the mainline widening and to adjust the connections of the interchange ramps with the mainline. The do-nothing alternative was incorporated into representative alternatives RA1, RA4, RA5, RA7, RA8, and RA9.

3.3.11.5 Exit 101 CAP-X Review

The Exit 101 traffic volumes and proposed interchange geometry were entered into the CAP-X spreadsheet to determine which interchange alternatives scored the highest using the CAP-X methodology. The best rated interchange concept was a ParClo, followed by the DDI and the Displaced Left Turn (DLT). The SPUI and Traditional Diamond interchange configurations ranked last.

Partial Cloverleaf Interchange

The CAP-X ParClo concept reflects the existing interchange configuration, with loop off-ramps provided in the eastbound and westbound directions of I-26. An obsolete ParClo configuration with loop ramps in the same quadrants of the existing interchange, was replaced at Exit 101 in the late 1990's.

Diverging Diamond Interchange

The DDI had the second highest ranking of the CAP-X interchange alternatives, though it was just slightly higher ranked than the Displaced Left Turn Interchange configuration

Displaced Left Turn Interchange

The DLT interchange was the third highest rated option in the CAP-X assessment, close to the DDI rating. A DLT at Exit 101 would locate the left turn crossovers upstream at the next adjacent intersections. To the west of the interchange, that crossover would likely occur at the signalized intersection of Broad River Road with Lordship Lane/Columbiana Drive. To the east of the interchange, the crossover would likely occur at the signalized intersection of Broad River Road and Western Lane. However, this intersection is located approximately 1,650 feet east of the westbound on-ramp intersection, which may farther than is typically considered for a DLT.

3.3.12 AO46 – AO47 (EXIT 110)

The following are a list of the AO developed and screened for Exit 110.

- AO46 – Eastbound Off-Ramp Extension (No Assessment)
- AO47 – Eastbound Direct Hospital Access (No Assessment)

Note: The use of CAP-X was applicable for AO46.

Existing traffic operations at Exit 110 are complicated by:

- High existing ramp volumes during the morning and afternoon peak hours.
    - Eastbound off-ramp (approximately 1,000 vehicles per hour in the morning peak hour and 800 vehicles per hour in the afternoon peak hour)
    - Eastbound on-ramp (about 700 vehicles per hour in the morning peak hour and 850 vehicles per hour in the afternoon peak hour)
    - Westbound off-ramp (about 900 vehicles per hour in the morning peak hour and 800 vehicles per hour in the afternoon peak hour.
    - Westbound on-ramp (about 850 vehicles per hour during both peak hours)
- High directional volumes of through traffic in each direction approaching the interchange on Sunset Boulevard
    - Existing eastbound volumes approaching the interchange are approximately 2,000 vehicles per hour during the morning peak hour and over 1,800 vehicles per hour during the afternoon peak hour.
        - Approximately 45 percent of the eastbound traffic approaching the interchange during the morning peak hour turns onto I-26; about 55 percent turns onto I-26 during the afternoon peak hour.
        - Approximately 50 percent of the westbound traffic approaching the interchange during the morning peak hour turns on to I-26; about 35 percent turns onto I-26 during the afternoon peak hour.
- The high volume of traffic traveling through the interchange along Sunset Boulevard causes substantial delay to right turn traffic on the off-ramps, especially on the eastbound off-ramp during the morning peak hour and throughout the day.
- The short distance between the off-ramp right turn lanes and the adjacent signalized intersections.
    - There is approximately 400 feet between the eastbound off-ramp right turn lane and the westbound stop line at the signalized intersection with E Hospital Drive/Harbor Drive. This short distance, the high volume of traffic traveling through the interchange, the high right turn volume from the eastbound off-ramp, and the driveway to the gas station located between the off-ramp and the signalized intersection contribute to congestion in the interchange area and to the creation of eastbound off-ramp queuing.
    - There is approximately 525 feet between the westbound off-ramp right turn lane and the eastbound stop line at the signalized intersection with McSwain Drive/Chris Drive. This short distance, the high volume of traffic traveling through the interchange, and the driveways to businesses located between McSwain Drive/Chris Drive and the interchange, contribute to congestion in the interchange area.
- The high volumes of traffic generated by Lexington Medical Center and the proximity of the intersections providing access to the hospital, contributes to congestion along the arterial.
- The stop sign control of the off-ramp right turn movements may not be efficient in moving traffic off the ramps. If feasible, consideration should be given to using other traffic control methods for these movements, such as placing the right turn movements under traffic signal control, to enhance traffic flow and safety and reduce queuing on the off-ramp.

3.3.12.1 Exit 110 AO46 – Eastbound Off-Ramp Extension

AO46 consists of an extension of the existing eastbound off-ramp to Exit 110. The existing off-ramp is approximately 1,400 feet long from the gore of where it diverges from eastbound I-26 to the stop line at Sunset Boulevard. The final approximately 700 feet of the ramp to the right turn stop line is marked for multiple lanes (two left turn lanes and the one right turn lane) of vehicle storage for the turn movements at the intersection. Despite the length of the ramp and the storage distances provided by the intersection turn lanes, the eastbound right turn movement frequently backs up along the ramp to the mainline during the peak hours, and long queues are common during other times of day.

AO46 extends the length of the ramp to a length of approximately 3,900 feet. The eastbound off-ramp diverges from eastbound I-26 and quickly widens to provide two lanes for about 3,200 feet. In the remaining 700 feet, the ramp widens to provide the current turn lane storage to the intersection with Sunset Boulevard.

A capacity screening was not performed for the proposed AO46 as the concept does not provide any change to the operation of the Exit 110 intersections. Rather, AO46 increases the amount of vehicle storage on the off-ramp to reduce or eliminate the possibility of ramp queues backing up onto mainline eastbound I-26.

The AO46 concept is shown in **Figure 3-56**. AO46 was selected to be incorporated into the representative alternatives RA1, RA3, RA4, RA5, RA7, RA8, and RA9.

3.3.12.2 Exit 110 AO47 – Eastbound Direct Hospital Access

AO47 consists of the AO46 extension of the existing eastbound off-ramp to Exit 110 and includes a direct connection from the off-ramp to the north end of the hospital campus beginning approximately 2,450 feet from the eastbound right turn stop line. This one-way connection from the eastbound off-ramp would intersect Hulon Lane at its intersection with Two Mac Lane/N Hospital Drive. The eastbound portion of Hulon Lane would be modified to intersection Two Mac Lane/N Hospital Drive to the discourage wrong-way entry movements onto the off-ramp.

A capacity screening was not performed for the proposed AO47 since at the time of the evaluation, there was insufficient traffic data to determine the volume of traffic that uses the eastbound off-ramp, turns right onto westbound Sunset Boulevard, and turns right into the hospital campus at E Hospital Drive, West Hospital Drive or the driveway located between those two roadways. Therefore, the level of improvement to the operation of the SPUI at Exit 110 through the diversion of traffic to the hospital via the direct ramp access could not be evaluated. The AO47 concept is shown in **Figure 3-57**.

In reviewing the development of AO47, it was noted that the level of interest the hospital management would have for the proposed direct access was unknown. The likelihood of SCDOT and/or FHWA approving a direct access from the eastbound off-ramp into the hospital property was similarly unknown. For these reasons, AO47 was selected to be incorporated into the representative alternatives RA2 and RA6.

Figure 3-56 - AO46: Exit 110 Eastbound Off-Ramp Extension

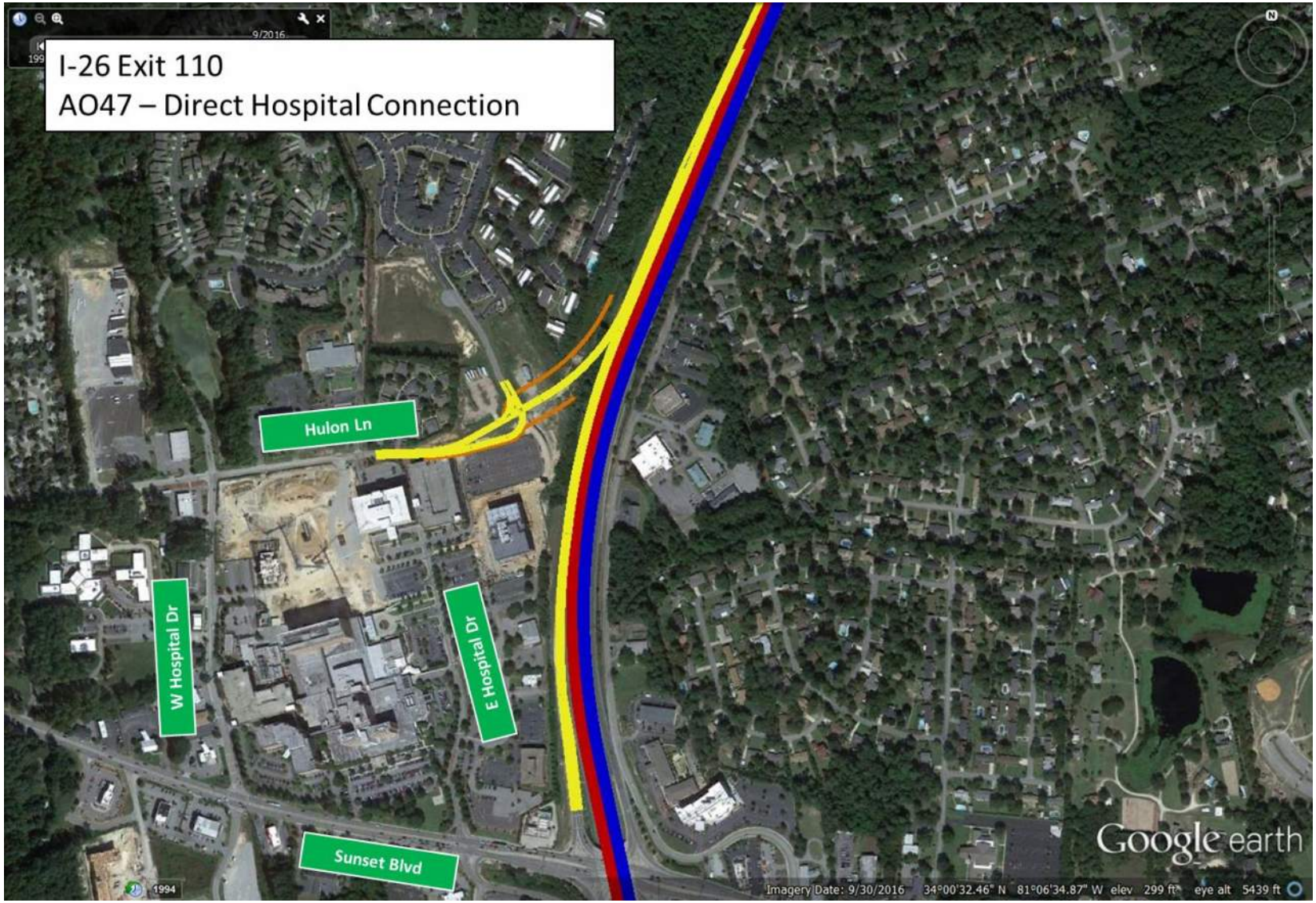


Figure 3-57 - AO47: Exit 110 Direct Hospital Connection

3.3.12.3 Exit 110 CAP-X Review

The Exit 110 traffic volumes and proposed interchange geometry were entered into the CAP-X spreadsheet to determine which interchange alternatives scored the highest using the CAP-X methodology. The best rated interchange concept was a ParClo, followed by a DDI, the Displaced Left Turn (DLT) and the SPUI. The Traditional Diamond interchange configuration ranked last.

Partial Cloverleaf Interchange

The CAP-X ParClo concept would not be a feasible option at Exit 110 given the proximity of development in the all quadrants of the interchange.

Diverging Diamond Interchange

The DDI had the second highest ranking of the CAP-X interchange alternatives, though it was just slightly higher ranked than the Displaced Left Turn Interchange and SPUI interchange configurations. Given that the existing Exit 110 SPUI interchange was completed in late 2005/early 2006, it is unlikely that the replacement of the SPUI interchange would be considered.

Displaced Left Turn Interchange

The DLT interchange was the third highest rated option in the CAP-X assessment, closely following the DDI rating and ranked just above the SPUI option. A DLT at Exit 110 would locate the left turn crossovers upstream at the next adjacent intersections. To the west of the interchange, that crossover would likely occur at the signalized intersection of E Hospital Drive/Harbor Drive. To the east of the interchange, the crossover would likely occur at the signalized intersection of McSwain Drive/Chris Drive. The construction of the displaced left turn lanes would likely impact businesses located between these intersections and the interchange.

3.3.13 AO52 – AO55 (COLONIAL LIFE BOULEVARD)

The following are a list of the AO developed and screened for the I-126 interchange at Colonial Life Boulevard.

- AO52 – Tight Diamond with Braided Ramps (Detailed Synchro Model)
- AO53 – Diamond with Free Flow Ramps (No Assessment)
- AO54 –Tight Urban Diamond (No Assessment)

Existing traffic operations at the Colonial Life Boulevard interchange are characterized by:

- Directional ramps oriented to I-126 only towards the east to the City of Columbia; there are no ramps to/from the west on either I-126 or I-26 from Colonial Life Boulevard.
    - Existing traffic traveling to the west on I-26 must use the existing westbound on ramp at Bush River Road (Exit 108)
    - Existing traffic traveling to the east on I-26 muse use the existing eastbound on-ramp at Bush River Road (Exit 108)

- Moderate traffic volumes using the on-ramp to eastbound I-126 from Colonial Life Boulevard (about 550 vehicles per hour during the morning peak hour and about 350 vehicles per hour during the afternoon peak hour).
- Low to moderate traffic volumes using the westbound I-126 off-ramp to Colonial Life Boulevard (about 250 vehicles per hour during the morning peak hour and approximately 750 vehicles per hour in the afternoon peak hour).

A key element of the AO52, AO53, and AO54 concepts is the elimination of the Exit 108 ramps to Bush River Road. Eliminating the Bush River Road ramps removes a service interchange within the complex system interchanges serving I-20/I-26 and I-26/I-126 at Exits 107 and 108. Traffic currently using the eastbound off-ramp to Bush River Road would be rerouted to the eastbound I-126 ramp system and exit at Colonial Life Boulevard. Traffic currently using the westbound off-ramp to Bush River Road would be rerouted on a ramp along with traffic traveling to eastbound I-126 but would turn left onto Colonial Life Boulevard instead of continuing through to eastbound I-126. Traffic currently using the eastbound on-ramp from Bush River Road to eastbound I-26 would have the option of using either the Bush River Road interchange with I-20 (Exit 63), traveling through the proposed I-20/I-26 system interchange to eastbound I-26, or traveling east from the existing on-ramp intersection on Bush River Road to turn right onto Colonial Life Boulevard to use the proposed westbound on-ramp from Colonial Life Boulevard to eastbound I-26. Existing traffic using the westbound on-ramp from Bush River Road to westbound I-26 would similarly be re-routed to the east through the Colonial Life Boulevard intersection to access the westbound on-ramp to westbound I-26 from the proposed Colonial Life Boulevard interchange.

3.3.13.1 Colonial Life Boulevard AO52 – Tight Diamond with Braided Ramps

AO52 consists of a proposed fully directional tight urban diamond interchange (TUDI) with braided ramps providing access to/from Colonial Life Boulevard instead of the partial interchange providing access to/from I-126 towards the City of Columbia. The westbound off-ramp from I-126 and the eastbound on-ramp to I-126 would intersect a new overpass with a separation of approximately 375 feet. The westbound off-ramp would consist of a single lane diverging from I-126 at about the same location as the existing off-ramp and would intersect the new Colonial Life Boulevard interchange with a single right turn lane to northbound Colonial Life Boulevard. The eastbound on-ramp would consist of a single lane for traffic turning left from the Colonial Life Boulevard. This lane would be joined to its right by a lane carrying traffic from westbound I-26 to eastbound I-126. The two lanes would merge into a single lane that would enter eastbound I-126 at about the same location as the existing on-ramp.

The eastbound off-ramp would combine two ramps from I-26. One eastbound off-ramp would provide access to Colonial Life Boulevard for traffic traveling from eastbound I-26 to eastbound I-126. A new ramp would replace the existing ramp between westbound I-26 to eastbound I-126. Traffic on this ramp would be combined with traffic currently using the existing westbound off-ramp from I-26 that intersects Bush River Road opposite Morninghill Drive. This existing ramp to Bush River Road would be eliminated. As the ramp from westbound I-26 approaches Colonial Life Boulevard, traffic would be divided so that traffic continuing eastbound to enter I-126 would continue through the interchange unimpeded while the traffic traveling to Colonial Life Boulevard

would run adjacent to the off-ramp from eastbound I-26/I-126, providing dual left turn lanes for traffic to travel north on Colonial Life Boulevard. Two lanes would be maintained across the overpass, through the westbound ramp intersection and would continue to the north on Colonial Life Boulevard.

Southbound Colonial Life Boulevard would extend two lanes into the interchange area approaching the westbound ramp intersection. At the westbound ramp intersection, southbound Colonial Life Boulevard would consist of a separate through lane that continues across the overpass to the eastbound ramp intersection and a separate right turn lane for traffic to turn onto the westbound on-ramp. The westbound on-ramp would depart from Colonial Life Boulevard with two lanes that separates traffic from the single southbound right turn lane on Colonial Life Boulevard. Of these two lanes, the left lane would provide access to westbound I-26, and the right lane would provide access to eastbound I-26. The lane to eastbound I-26 will merge with an off-ramp from westbound I-126 to eastbound I-26, which would be braided under the ramp to westbound I-26. The combined traffic would use either the existing flyover ramp from westbound I-126 to eastbound I-26, or a replacement flyover ramp constructed adjacent to and parallel with the existing ramp.

The ramp intersections with Colonial Life Boulevard are expected to be controlled by traffic signals. The initial AO52 concept evaluated is shown in **Figure 3-58**.

The capacity screening of AO52 was to incorporate the use of the detailed Synchro model developed to assess the operation of the proposed interchange configuration. While the capacity screening using the Synchro model indicated the ramp intersections would be under capacity under existing traffic, observations of simulations with existing afternoon peak hour traffic showed extensive queuing at the off-ramp approaches to the intersections.

As inputs into the detailed Synchro model, estimates of the existing traffic volume that would be rerouted from the current Exit 108 ramps to/from Bush River Road to the proposed interchange via Colonial Life Boulevard were calculated from existing peak hour turning movement counts at the ramp intersections. This resulted in a significant volume of traffic diverted to the proposed Colonial Life Boulevard full access interchange from the Bush River Road ramps at Exit 108.

For example, the existing off-ramp traffic to Bush River Road from eastbound and westbound I-26 would result in an estimated eastbound off-ramp left turn volume of about 850 vehicles during the morning peak hour and approximately 1,250 vehicles during the afternoon peak hour. Traffic currently using the eastbound on-ramp to eastbound I-26 (approximately 500 vehicles per hour in the morning peak hour and 600 vehicles per hour in the afternoon peak hour) and the traffic currently using the westbound on-ramp to westbound I-26 (approximately 150 vehicles per hour in the morning peak hour and 250 vehicles per hour in the afternoon peak hour) would combine (about 650 vehicles per hour total in the morning peak hour and about 850 vehicles per hour in the afternoon peak hour) to turn right from southbound Colonial Life Boulevard on to the westbound on-ramp.

The rerouting of traffic also increased the estimated volume of several of the turning movements at the intersection of Colonial Life Boulevard with Bush River Road. For example, the existing northbound left turn volume from Colonial Life Boulevard to westbound Bush River Road was estimated to increase by approximately 400 vehicles per hour in the morning peak hour and 750 vehicles per hour in the afternoon peak hour due to the

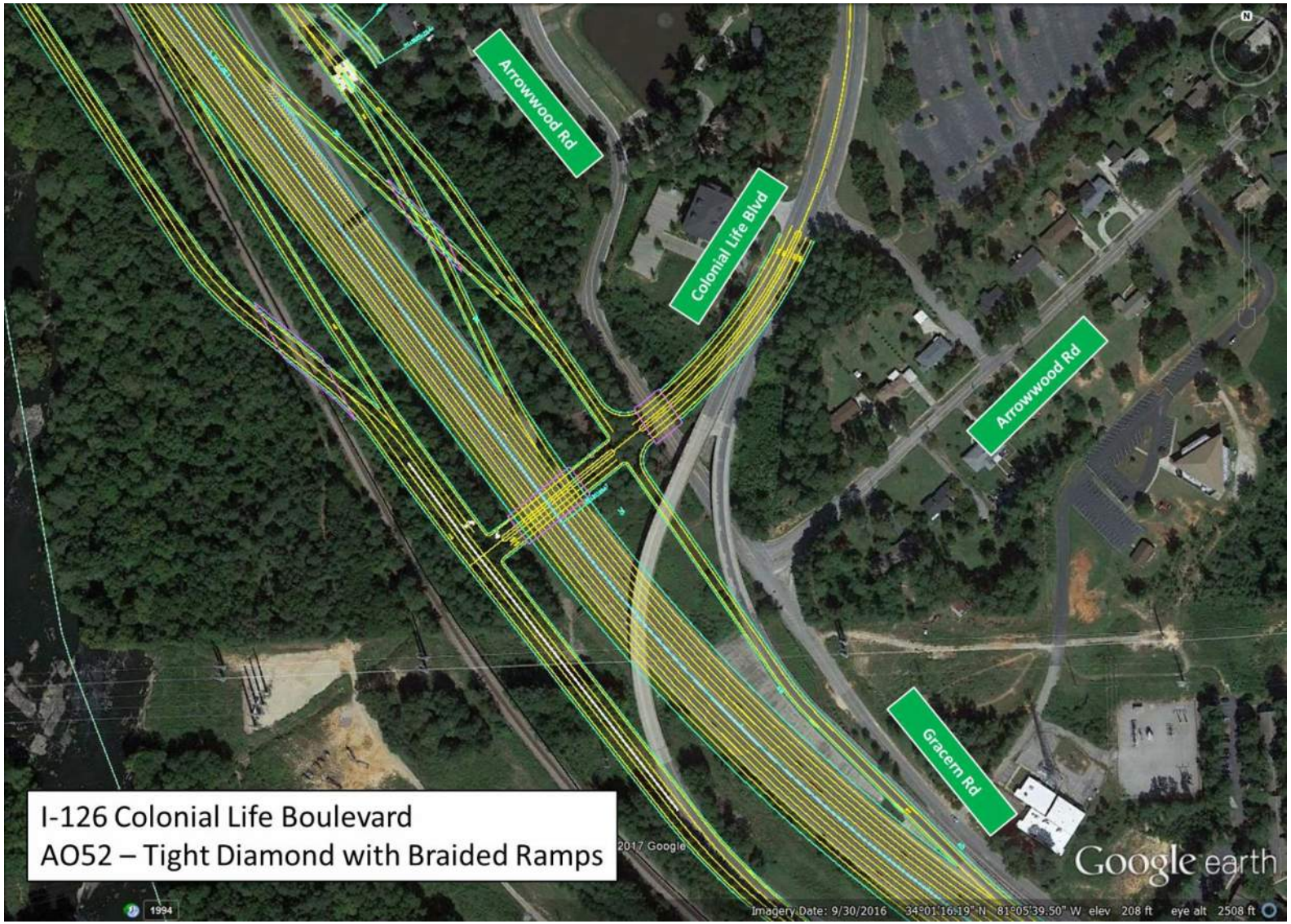


Figure 3-58 - AO52: Colonial Life Boulevard Tight Diamond with Braided Ramps

re-routing of off-ramp traffic from the existing ramps to Bush River Road to the proposed Colonial Life Boulevard interchange. These volumes, added to existing traffic volumes at the Bush River Road intersection with Colonial Life Boulevard, have the potential to overwhelm the operation of that intersection.

Other estimated volumes rerouted to and in addition to the existing traffic at the intersection of Colonial Life Boulevard and Bush River Road include the northbound right turn movement from Colonial Life Boulevard to eastbound Bush River Road (about 350 vehicles per hour in both the morning and afternoon peak hour), the eastbound right turn movement from Bush River Road to southbound Colonial Life Boulevard (about 400 vehicles per hour in the morning peak hour and 350 vehicles per hour in the afternoon peak hour), and the westbound left turn movement from Bush River Road to southbound Colonial Life Boulevard (about 300 vehicles per hour during the morning peak hour and about 550 vehicles per hour during the afternoon peak hour).

Based on the complexity of these movements and the alternative routing options available to traffic using the existing ramps to and from Bush River Road, it was decided that the assessment of the operation of AO52 should be based on the dynamic traffic assignment in the network microsimulation of the individual representative alternatives. This is likely to be more accurate than the 'all-or-nothing' rerouting of traffic assumed in the capacity screening. Therefore, AO52 was selected to be incorporated into the representative alternatives RA1 and RA5.

3.3.13.2 Colonial Life Boulevard AO53 – Diamond with Free-Flow Ramps

AO53 consists of a partially directional interchange that introduces modifications to the existing interchange configuration. The westbound off-ramp would consist of a two lane ramp diverging from I-126 at about the same location as the existing off-ramp. The off-ramp combines the traffic to the existing off-ramp to eastbound I-26 (left lane) and the traffic exiting to Colonial Life Boulevard. The existing eastbound on-ramp would consist of a single lane for traffic traveling from Colonial Life Boulevard to eastbound I-126 along a new alignment roughly parallel to the existing overpass and merging into eastbound I-126 at about the same location as the existing on-ramp.

An addition to the existing ramp modifications is the addition of a free-flow ramp from westbound I-26 to Colonial Life Boulevard. This two lane ramp would replace the existing one lane ramp and be on new alignment connecting westbound I-26 to eastbound I-126. As the ramp alignment runs parallel to and adjacent to eastbound I-126, the left lane crosses over I-126 and the eastbound on-ramp from Colonial Life Boulevard before merging into the westbound off-ramp lane to Colonial Life Boulevard. The right lane continues to merge with the eastbound on-ramp from Colonial Life Boulevard.

AO53 does not provide a ramp from Colonial Live Boulevard to either westbound I-26 or eastbound I-26. AO53 was developed as part of a larger concept that maintained access to Bush River Road from eastbound and westbound I-26 (AO26). The initial AO53 concept evaluated is shown in **Figure 3-59**. Based on the complexity of the ramp movements and necessary interaction with AO26, it was decided that the capacity assessment of AO53 should be based on the dynamic traffic assignment in the network microsimulation of the individual representative alternatives. AO53 was incorporated into the representative alternatives RA2, RA3, and RA6.

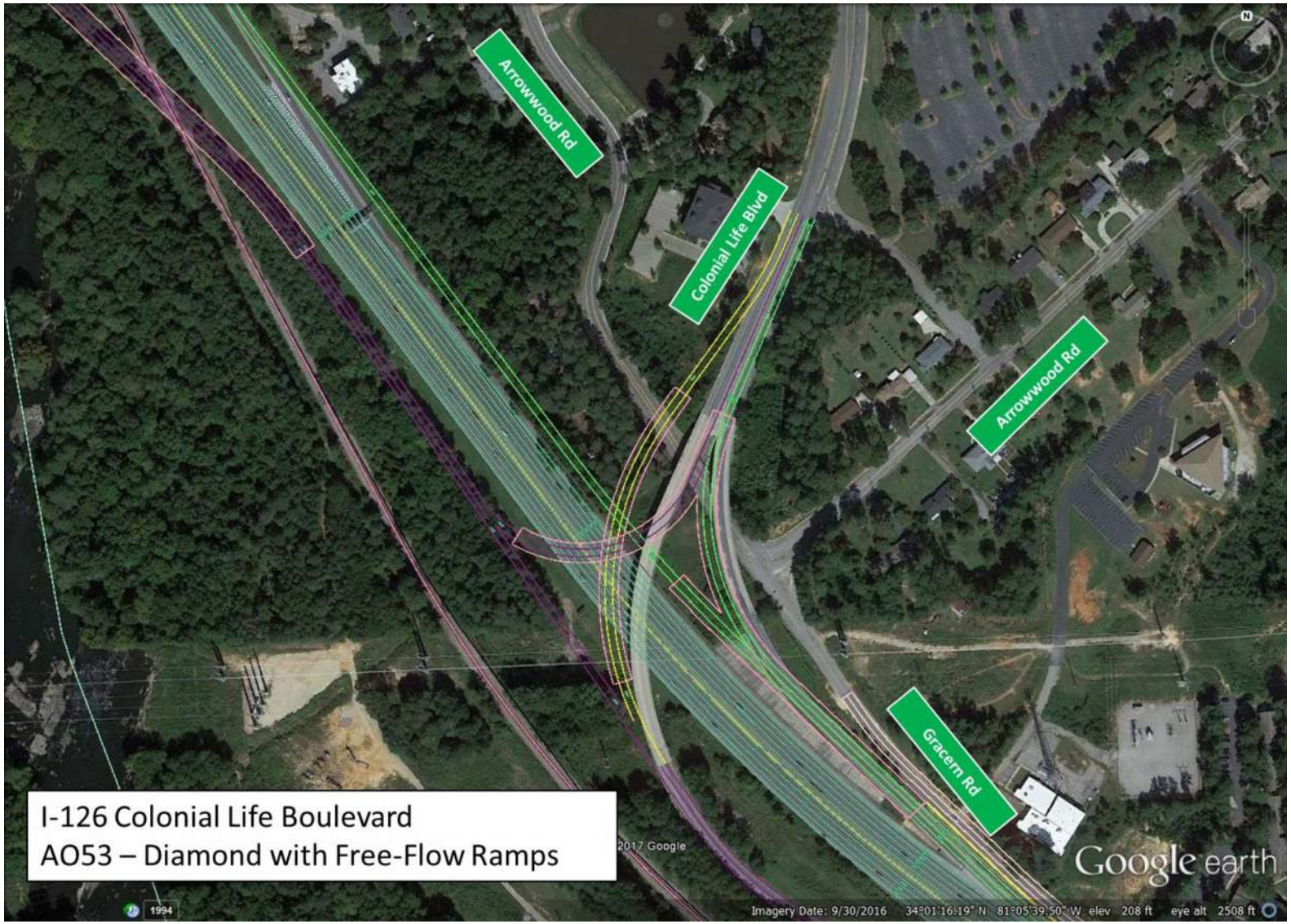


Figure 3-59 - AO53: Colonial Life Boulevard Diamond with Free-Flow Ramps

3.3.13.3 Colonial Life Boulevard AO54 – Tight Urban Diamond

AO54 consists of a proposed fully directional tight urban diamond interchange (TUDI) without braided ramps that is included as part of AO27. Like AO52, AO54 provides access to/from Colonial Life Boulevard instead of the partial interchange providing access to/from I-126 towards the City of Columbia.

The westbound off-ramp from diverges from I-126 with two lanes which split downstream to a two lane ramp to eastbound I-26 and a single lane off-ramp which intersects Colonial Life Boulevard with a right turn lane for traffic to turn onto northbound Colonial Life Boulevard. The westbound on-ramp begins with a single separate southbound right turn lane from Colonial Life Boulevard creating a two lane ramp. Downstream, the ramp splits, with the left lane merging into the two lane ramp to eastbound I-26 and the westbound AO27 connector and the right lane continuing westbound to merge into westbound I-126 before continuing on to merge into westbound I-26.

The eastbound off-ramp to Colonial Life Boulevard is made up of two lanes: one lane originates from the proposed eastbound connector developed in AO27 and the other from eastbound I-126. The ramp from the connector splits into two separate lanes. The right lane continues unimpeded through the Colonial Life interchange area to towards eastbound I-126 and the left lane runs parallel to and joins the ramp from eastbound I-126 to form two left turn lanes at the Colonial Life Boulevard interchange overpass. The overpass carries two lanes northbound from these left turn lanes through the interchange area to northbound Colonial Life Boulevard. The eastbound on-ramp begins as a single southbound left turn lane that is the end of the single lane crossing through the interchange area. This lane creates the on-ramp, which merges downstream with the ramp from the connector that crosses through the interchange area to a single lane ramp that enters eastbound I-126.

The initial AO54 concept evaluated is shown in **Figure 3-60**. Based on the complexity of the ramp movements and necessary interaction with AO27, it was decided that the capacity assessment of AO54 should be based on the dynamic traffic assignment in the network microsimulation of the individual representative alternatives. AO54 was incorporated into the representative alternative RA7.

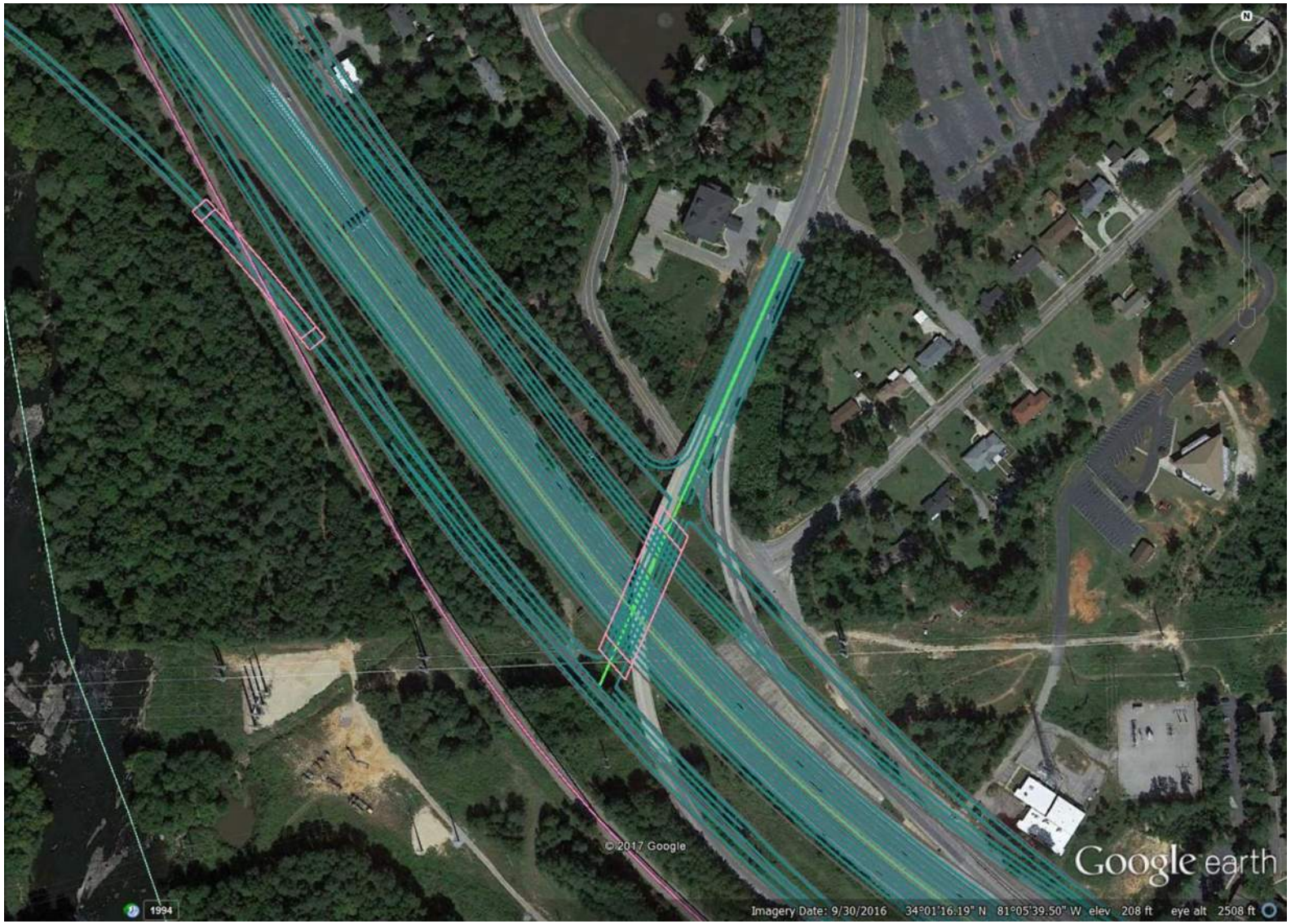


Figure 3-60 - AO54: Colonial Life Boulevard Tight Diamond Interchange

3.4 Development of Representative Alternatives

With the completion of the development and capacity assessments of the various AO, the project team began the development of Representative Alternatives. The Representative Alternatives were developed to incorporate various combinations of AO at each of the interchanges throughout the study area to create a set of comprehensive project area networks that represent proposed improvement options within the Carolina Crossroads study area. The process of the development and evaluation of the various representative alternatives is described in more detail in Section 4.5 of the *Alternatives Development and Screening Report*. A brief summary of that process follows.

3.4.1 DEVELOPMENT OF REPRESENTATIVE ALTERNATIVES

The project team developed a set of nine combinations of AO at the interchanges within the study area. The roadway designers and engineers created the necessary additional roadway connections to make the individual AO function as an independent network. When the individual networks, numbered from RA1 to RA9, were conceptually designed, microsimulation traffic models were constructed for each of the concepts.

The microsimulation traffic models were developed by modifying the existing/no-build networks (designated as RA10) to maintain as much of the unchanging elements of those networks while modifying and adding links to the network as necessary to replicate the individual RA network conceptual designs.

Table 3.6 summarizes the AO combinations incorporated into RA1 through RA9.

Table 3.6 - Representative Alternatives

Representative Alternative*	1	2	3	4	5	6	7	8	9
I-20/26/126 System/System	**AO17 Turbine**	**AO18 Directional w/ Interior Rights**	**A021 Turbine Braided**	**AO22 Semi-Dir w/ 2 Loops**	**AO20 Turbine Directional**	**AO19 Directional w/ Loop & Ramp**	**AO27 E-W Connector**	**AO28 E-W Connector Bush River**	**AO29 Southern Connector**
I-20/Broad	AO3	AO5	AO5	AO3	AO3	AO5	AO5	AO3	AO3
I-20/Bush	AO6	AO10	AO6	AO7	AO8 (5)	AO7	AO8	AO8	AO10
I-26/Bush	AO24	AO24	AO26	AO25	AO24	AO24	AO24	AO24	AO29
I-26/378	AO46	AO47	AO46	AO46	AO46	AO47	AO46	AO46	AO46
I-26/St. Andrews	AO13	AO14 (3)	AO16	AO15	AO13	AO14	AO13	AO13	AO15
I-26/Piney Grove	AO30	AO31	AO32	AO32	AO30	AO31	AO30	AO31	AO32
I-26/Harbison	AO35	AO37	AO49	AO35	AO35	AO37	AO49	AO35	AO49
I-26/Lake Murray	AO50	AO42	AO50	AO50	AO50	AO42	AO50	AO50	AO50
I-26/Broad	AO51	AO45	AO43	AO51	AO51	AO43	AO51	AO51	AO51
East-West Connector	NA	NA	NA	NA	NA	NA	AO27	AO28	AO29(2)

* Alternative 10 - 'No-build' or 'Do Nothing' Alternative is retained for comparison purposes.

4 Microsimulation Traffic Modeling

A series of traffic analyses were performed to assess existing and future operations of the I-26/I-20/I-126 study area. The analyses included:

- A traffic forecasting analysis to estimate future no-build and build condition traffic volumes
- Freeway segment operations analysis for existing, future no-build and future representative alternatives
- Freeway ramp merge/diverge area analysis for existing, future no-build and future representative alternatives
- Signalized and unsignalized intersection analysis for existing, future no-build and future representative alternatives

The individual interchanges were modeled using Synchro/SimTraffic to analyze and simulate the arterial and intersection operations and to aid in the development of traffic control and geometric recommendations. Traffic simulation models were created for the entire study area and at individual interchange locations for the existing, future no-build, and future representative alternatives. The entire study area was modeled using TransModeler 4.0, a micro-simulation software, to analyze and simulate the freeway operation.

4.1 Regional Microsimulation Network

A traffic microsimulation model was developed by Stantec for use in the I-20/26/77 Corridor Management Plan study. This calibrated Columbia model was provided to the Carolina Crossroads team for use in these analyses. The draft *Traffic Microsimulation Model Calibration Report* prepared by Stantec is included in Appendix K.

4.2 Additional Data Collection

In order to further develop the microsimulation network, additional data was collected, including traffic volume data, traffic signal plans and traffic signal timing plans.

4.2.1 DATA COLLECTION LOCATIONS

- Bower Parkway at Park Terrace Drive
- Broad River Road at Arrowwood Road/Means Avenue
- Broad River Road at Dutch Square Boulevard
- Broad River Road at Greystone Boulevard
- Broad River Road at Longcreek Drive
- Broad River Road at Marley Drive/Menlo Drive
- Broad River Road at Omarest Drive
- Bush River Road at Arrowwood Road
- Bush River Road at Ashland Road/Marydale Lane
- Bush River Road at Broad River Road
- Bush River Road at Colonial Life Boulevard
- Bush River Road at Independence Avenue
- Bush River Road at Outlet Pointe Boulevard
- Bush River Road at ZImalcrest Drive

- Columbiana Drive at Columbia Avenue/Gateway Academy Driveway
- Columbiana Drive at Columbiana Circle/Lanneau Court
- Columbiana Drive at Crossbow Drive/Texas Roadhouse Driveway
- Harbison Boulevard at Bower Parkway
- Harbison Boulevard at Columbiana Circle/Park Terrace Drive
- Harbison Boulevard at Columbiana Drive/Chick-Fil-A Driveway
- Harbison Boulevard at Rooms 2 Go/Pier 1 Driveways
- Harbison Boulevard/Emory Lane @ St Andrews Road
- Lake Murray Boulevard at College Street
- Lake Murray Boulevard at Columbiana Drive
- Lake Murray Boulevard at Kinley Road/Parkridge Drive
- Piney Grove Road at Bower Parkway/Jamil Road
- St Andrews Road at Sidney Road
- St Andrews Road at Ashland Road
- St Andrews Road at Broad River Road
- St Andrews Road at Jamil Road
- St Andrews Road at Kay St/Chartwell Road
- Sunset Boulevard at East Hospital Drive
- Sunset Boulevard at McSwain Drive/Chris Drive
- Sunset Boulevard at West Hospital Drive/Sunset Court
- Sunset Boulevard at Whippoorwill Drive/Keckley Drive

4.3 Existing Microsimulation Network

TransModeler 4.0 was used to analyze the Carolina Crossroads study area. The I-20/26/77 Corridor Management Plan (CMP) Study included a calibrated TransModeler model comprised of 110 miles of interstate and freeway, including six system interchanges and 43 service interchanges, in addition to 70 miles of highway, arterial, and local streets. This Columbia network, which included the full project limits of the Carolina Crossroads study area, was provided to develop the existing microsimulation network. Once the Columbia model was reviewed, the Carolina Crossroads network was extracted. A more detailed review was then conducted to assess the operation of the study area. Additional intersections were added, and input volume was verified and adjusted based on existing traffic count data.

4.3.1 REVIEW OF CORRIDOR NETWORK

The I-20/26/77 CMP Columbia model was reviewed as part of the preliminary process of modifying the network. The Carolina Crossroads study area roadway network was reviewed for geometry, lane use, and intersection control based on existing conditions.

4.3.2 DEVELOPMENT OF CAROLINA CROSSROADS NETWORK

The Carolina Crossroads existing network was extracted from the calibrated Columbia network. Freeways and arterials outside of the study area were removed from the model to develop a condensed microsimulation network. All entry and exit points, such as external nodes and centroids within the study area were preserved.

4.3.3 DEVELOPMENT OF ORIGIN-DESTINATION TRIP TABLE

The origin-destination (O-D) trip tables included in the Columbia network from the I-20/26/77 CMP were comprised of 170 external nodes and 65 centroids for a total of 235 unique entry and exit points. These unique entry and exit points were developed from subarea trip matrices output from the South Carolina Statewide Model (SCSWM) and directly correlate with the centroid connectors within the planning model. According to the I-20/27/77 CMP study, the AM and PM peak hour existing trip tables were then estimated based on the subarea seed trip tables of the SCSWM along with traffic counts in the TransModeler's Origin Destination Matrix Estimation (ODME) procedure. The dimensions of the trip matrices were 235 by 235. The origin-destination matrix development and matrix estimation procedure are discussed in section 2.4 of the I-20/26/77 CMP draft *Traffic Microsimulation Model Calibration Report*.

Within the Columbia network, auto and truck trip matrices were separated based on their own vehicle fleet characteristics. Auto trip matrices included "User A" and "User B" vehicles that accounted for the volume using the I-126 WB expressway to I-20 EB/WB. Each trip matrix from the Columbia network was then aggregated down matching the condensed existing model for Carolina Crossroads. External nodes which were removed as part of the modification to the study area network were combined, and their trips were assigned to the ten (10) newly created external nodes. Those external nodes are as follows:

- I-20 WB West of Exit 61
- I-20 EB West of Exit 61
- I-26 EB West of Exit 101
- I-26 WB West of Exit 101
- I-20 EB East of Exit 68
- I-20 WB East of Exit 68
- I-26 SB South of US 378 (Exit 110)
- I-26 NB South of US 378 (Exit 110)
- I-126 EB End of I-126
- I-126 WB End of I-126

The aggregation of the trip tables between the Columbia network and the Carolina Crossroads network was an iterative process, and as the model was adjusted during the calibration process, further modifications were required. This resulted in a final dimension of the trip matrices to be 102 x 102, including 56 external nodes and 46 centroids.

4.4 Arterial Microsimulation

The individual interchanges were modeled using Synchro/SimTraffic to analyze and simulate the arterial and intersection operations and to aid in the development of traffic control and geometric recommendations. The arterials coded into the TransModeler network were verified and adjusted based on existing conditions and collected traffic data. It was identified that the Columbia network was modeled to be high level along the arterials and did not include all of the signalized intersections within the Carolina Crossroads study area. Additional intersections were coded into the network that were missing from the Columbia network. The

purpose of adding these intersections, were to reflect a more realistic and detailed model for calibration purposes.

4.4.1 CREATION OF INTERCHANGE ARTERIAL NETWORKS

Synchro models of the existing arterial interchanges were created utilizing the previously collected traffic counts, signal plans and signal timing plans. These models were used to analyze arterial and intersection operations for major corridors within the network.

4.5 Microsimulation Model Calibration

Model calibration deals with refining the model's operation through observation of the simulation and detection of probable anomalies in the output and trip tables. Parameters in each model are modified through an iterative process so that observed traffic conditions, like travel speeds and link flows, are more accurately matched to predefined criteria.

4.5.1 REVIEW OF MICROSIMULATIONS

INRIX speed data provided for the Carolina Crossroads project and observations of queueing and speed along the I-20 corridor from the I-20/26/77 CMP were used to calibrate the Existing Conditions AM and PM peak hour models. General parameters, such as stopped gap and critical distance, were maintained from the Columbia network which is further described in section 3.1.2 of the I-20/26/77 CMP draft *Traffic Microsimulation Model Calibration Report*. Additional local parameters, such as lane connector bias at merge points and link speeds, were adjusted to improve free-flow speed and match INRIX data along the interstate mainlines. **Table 4-1** summaries the changes in freeway driver behavior parameters.

Table 4-1: Calibration Parameter Assumptions

Parameter	Calibration Change
Stopped Gap	The mean distance was decreased from 8 feet to 6 feet.
Critical Distance	Decreased by 750 feet, to ranging from between 500 feet to 2,750 feet.
Lane Bias at Merge Points	Decreased from 1.00 to 0.60.
Link Speed	Adjusted link speeds to match INRIX data for select links.

During visual inspection of the simulation model, the point where interstate I-126 terminates approaching downtown Columbia processed the vehicles at a faster rate than observed during the AM peak hour. As a result, volume was added along Huger Street to simulate observed traffic flow conditions. Also at Exit 58 (US 1), off-ramp right-turn movement could not process the input vehicles when coded as a STOP sign. Though STOP signs currently control the off-ramp right-turn movement, YIELD signs were used for calibration purposes to simulate realistic driver behavior for vehicles exiting I-20.

4.5.2 CALIBRATION RESULTS

Calibration Criteria

Page 64 of the *FHWA Traffic Analysis Toolbox Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software* outlines the microsimulation model calibration criteria developed by WDOT, which includes three metrics: traffic flow, travel times, and visual audits. Formulas for the first two metrics verify that the criteria thresholds are not violated, while satisfaction of the third depends on engineering judgement.

Appendix B: Confidence Intervals of the *FHWA Guidelines* suggests that, to account for the stochastic nature of traffic and to ensure that the mean statistics taken from the model are within an acceptable confidence interval of the true mean, each model should be run a certain number of randomly seeded runs. Based on the standard deviation of a sample of link speeds and flows from the TransModeler networks, it was determined that at least ten (10) simulation runs per model are required to maintain a 95% confidence interval.

Traffic Flow

Existing traffic flows on the mainline segments and interchange ramps were compared to the average link flows from the microsimulation runs at the same locations for both the AM and PM peak periods. In addition to an overall comparison of total model flow to total count volume, the *FHWA Guidelines* divide volumes into three categories, with separate criteria for each. The Guidelines also include the GEH statistic, computed as follows:

$$GEH = \sqrt{\frac{(E-V)^2}{(E+V)/2}}$$

In which:
E = model estimated volume
V = field count

Table 4-2 depicts the comparison of the mainline and ramp count locations for the morning and afternoon peak period models, inclusive of the calibration targets and flow statistics.

Table 4-2: Traffic Flow Calibration Statistics

Hourly Flows - Model v. Observed	Target	AM Peak Hour		PM Peak Hour	
		Total Links	% of Cases	Total Links	% of Cases
Individual Link Flows					
Within 15% for 700 veh/h < flow < 2700 veh/h	> 85% of cases	30	87%	27	85%
Within 100 veh/h for flows < 700 veh/h	> 85% of cases	56	86%	57	72%
Within 400 veh/h for flows > 2700 veh/h	> 85% of cases	32	88%	34	74%
Average Link Flows Criteria Compliance	> 85% of cases	118	86%	118	75%
Sum of All Links					
Sum of Link Flows	Within 5% of sum of all link counts		211,167		213,909
Sum of Counts			208,140		223,305
% Difference [abs(flow - count)/count]			1.45%		4.21%
Links with GEH statistic < 5	> 85% of cases	118	100%	112	95%

As shown in **Table 4-2**, the flow statistics satisfied the range of criteria targets for each volume category during the morning peak hour. During the afternoon peak hour, link flows fall slightly short of satisfying the range of criteria for link volumes less than 700 veh/h and link volumes greater than 2,700 veh/hr. It is worth noting, however, that the network-wide cumulative link flow difference during afternoon peak hour is within 5% of the counts. In addition, 95% of all links fall within a GEH value of less than five (5) in both the morning and afternoon peak hour models, satisfying the threshold.

Travel Speeds

The *FHWA Guidelines* suggest comparing the modeled vehicle travel speeds to those collected in the field; the modeled speeds should fall within 15% of the existing ones for greater than 85% of the segments to consider a model calibrated. Travel speeds for specific routes, however, are not provided in TransModeler outputs; rather, travel speeds are obtained from the simulation and compared with the model input speeds. **Table 4-3** provides a summary of the network segments and the percentage of which met the 15% threshold.

Table 4-3: Travel Speeds Calibration Statistics

Target	AM Peak Hour		PM Peak Hour	
	Segments	Within 15%	Segments	Within 15%
Within 15% of observed travel speeds	36	30	36	27
		83.33%		75.00%

Although the travel speeds do not fully meet the 85% target threshold, it should be noted that the I-20/I-26/I-126 system interchange was modeled to capture observed queues documented in the field. The corresponding speeds are, in general, slower than the INRIX data, therefore allowing for a more conservative analysis of Existing conditions. A summary of the link flows, speeds, and observed queues are provided in **Appendix F**.

Visual Audits

Visual audits were conducted by observing simulation runs while referring to recorded field traffic conditions, with the review focusing on vehicle speeds and queuing along the interstates, in addition to any related on- and off-ramps. Specific adjustments made to the Columbia network from the I-20/26/77 CMP study were maintained and verified within the Carolina Crossroads study are. The visual audit helped to identify TransModeler default parameters, including free flow speeds and headways, to be updated and better calibrate the network to existing conditions.

4.6 No-Build Microsimulation Network

The 2040 No-Build microsimulation network included SCDOT programmed projects to reflect additional capacity along I-20 and I-26. The 2040 No-Build volumes were developed using a 0.70 percent annual growth rate from the I-20/26/77 CMP study.

4.6.1 PROGRAMMED PROJECTS

The programmed and funded freeway projects incorporated into the existing network to create the No-Build network include:

- I-20 Widening MM49 – MM60 (west of Exit 61)
- I-26 Widening MM85 – MM101 (west of Exit 101)

4.6.2 ORIGIN-DESTINATION TRIP TABLES

The socio-economic data used in the SCSWM was developed as part of the Columbia Area Transportation Study (COATS) *Moving the Midlands 2040 Long Range Transportation Plan*, August 2015. The 2040 socio-economic data was developed using 2010 census information that was disaggregated to the individual traffic analysis zones. The 2040 socio-economic data forecasts were developed by establishing control numbers disaggregated to census tracts and further disaggregated to traffic analysis zones based on growth and development trend analyses. Other information from local and regional plans were also incorporated, with the 2010 base year and 2040 horizon year data reviewed, approved and adopted for use in the Long Range Transportation Plan.

The land use data in the SCSWM were updated in July 2015 based on COATS employment estimates and amended by SCDOT. Additional revisions to the land use data were made in April 2016 based on COATS and SCDOT guidance and validated by the I-20/26/77 CMP study team. These data were used in SCSWM runs by the I-20/26/77 CMP study team and existing year and 2040 origin-destination trip tables were produced.

According to the I-20/27/77 CMP study, the AM and PM peak hour 2040 trip tables for the Columbia network were developed based on the subarea analysis of the SCSWM trip tables. The zonal growth rates between the subarea base year and subarea future year matrices were applied to the calibrated Columbia Network existing trip tables to develop the 2040 trip tables. Any intrazonal shifts in traffic over time from the current and future year subarea matrices were distributed to ensure that the intended 2040 growth forecasts from the SCSWM were reflected in the 2040 trip tables for the peak hour operational analyses. These 2040 auto trip tables were

acquired from the I-20/26/77 CMP study model which were then aggregated to match the Carolina Crossroads matrix developed for the Existing Conditions model. An average growth rate of 0.70 percent was then confirmed within the Carolina Crossroads study area and applied to the existing trip tables.

4.7 No-Build Arterial Microsimulation

Upon completion of the Existing arterial Synchro networks, 2040 traffic projections were applied to develop the No-Build arterial network models. Existing configurations were maintained.

4.8 Analysis of Existing and No-Build Models

The freeway, merge and diverge densities for the I-26, I-20, and I-126 segments were obtained from the TransModeler microsimulation output files, which include an average of ten (10) runs. In calculating density TransModeler determines the segments and lanes within the influence area for freeway, merge and diverge analysis based on roadway classification. The HCM methodology is applied, considering only the vehicles within the influence area.

Unlike HCS, a macroscopic/deterministic model, TransModeler is a microscopic behavior-based multi-purpose traffic simulation program. TransModeler accounts for the interaction between the passenger cars and other vehicle types within the traffic stream, while HCS does not. In TransModeler, the density is calculated at each time step of the simulation for the entire peak hour per iteration and is considered to be a more accurate measure of density.

It should be noted that due to the high demand volumes, the network was not able to accommodate the demand volume in both the Existing and No-Build simulations. Extensive queuing was observed outside of the network, particularly in the No-Build scenario, at the end of the peak hour simulation during both the morning and afternoon peak hours.

4.8.1 EXISTING NETWORK RESULTS

Basic Freeway Segment Analysis

A summary of the Basic Freeway Segment Analysis results is shown in **Table 4-4**, **Table 4-5** and **Table 4-6** for I-26, I-20 and I-126, respectively.

Table 4-4: I-26 Freeway Segment Capacity Analysis TransModeler Results – Existing Conditions

Segment	Existing Conditions			
	AM Peak Hour		PM Peak Hour	
	LOS[1]	Density[2]	LOS[1]	Density[2]
I-26 Eastbound				
Exit 101 to Exit 102	C	26.0	B	18.0
Exit 102 to Exit 103	F	53.6	C	25.5
Exit 103 to Exit 104	F	52.7	C	24.8
Exit 104 to Exit 106	F	62.6	E	42.1
Exit 106 to Exit 107	F	78.9	D	32.1
I-126 Diverge to I-126 Merge	D	32.5	E	38.7
Exit 108 to Exit 110	D	32.2	F	74.3
I-26 Westbound				
Exit 110 to Exit 108	C	20.9	C	23.7
I-126 Diverge to I-126 Merge	D	34.5	F	85.2
Exit 107 to Exit 106	D	27.8	F	110.5
Exit 106 to Exit 104	D	34.4	F	47.8
Exit 104 to Exit 103	D	27.5	E	40.5
Exit 103 to Exit 102	C	22.5	E	36.1
Exit 102 to Exit 101	B	15.5	F	62.0

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 4-5: I-20 Freeway Segment Capacity Analysis TransModeler Results – Existing Conditions

Segment	Existing Conditions			
	AM Peak Hour		PM Peak Hour	
	LOS[1]	Density[2]	LOS[1]	Density[2]
I-20 Eastbound				
west of Exit 61	E	44.6	C	21.3
Exit 61 to Exit 63	D	32.6	C	18.8
Exit 63 to Exit 64	C	19.1	B	13.6
Exit 64 to Exit 65	C	25.0	C	21.1
Exit 65 to Exit 68	E	35.7	D	27.3
I-20 Westbound				
Exit 68 to Exit 65	D	29.3	F	51.1
Exit 65 to Exit 64	E	38.0	F	75.8
Exit 64 to Exit 63	B	12.9	C	21.4
Exit 63 to Exit 61	B	14.3	D	27.2
west of Exit 61	B	15.6	D	34.1

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 4-6: I-126 Freeway Segment Capacity Analysis TransModeler Results – Existing Conditions

Segment	Existing Conditions			
	AM Peak Hour		PM Peak Hour	
	LOS[1]	Density[2]	LOS[1]	Density[2]
I-126 Eastbound				
I-26 to Colonial Life Blvd	D	29.9	B	14.6
Colonial Life Blvd to Greystone Blvd	B	15.7	A	8.6
Greystone Blvd to Huger St	D	26.8	B	13.6
I-126 Westbound				
Huger St to Greystone Blvd	B	13.4	D	26.9
Greystone Blvd to Colonial Life Blvd	B	13.7	F	61.1
Colonial Life Blvd to I-26	C	18.6	F	97.1

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The analysis results for the freeway segments, summarized in **Table 4-4**, **Table 4-5** and **Table 4-6**, indicate the following:

- During the morning peak hour:
  - I-26 eastbound freeway segments between Exit 103 and Exit 107 operate at LOS F. All other segments along I-26 eastbound, and all I-26 westbound segments operate at LOS D or better.
  - I-20 eastbound freeway segment west of Exit 61, and the freeway segment east of Exit 68, and the westbound I-20 freeway segment between Exit 65 and Exit 64 operate at LOS E, while other I-20 segments operate at LOS D or better.
  - All I-126 freeway segments during the morning peak hour operate at LOS D or better.
- During the afternoon peak hour:
  - I-26 eastbound freeway segment between Exit 104 and Exit 106, and the diverge to I-126 operate at LOS E, while the freeway segment between Exit 108 and Exit 110 operate at LOS F. I-26 westbound segments operate at LOS E or worse from the I-26/I-126 merge to Exit 101.
  - I-20 eastbound freeway segments operate at LOS D or better. I-20 westbound freeway segments between Exit 68 and Exit 64 operate at LOS F, while all other westbound segments operate at LOS D or better.
  - I-126 eastbound freeway segments operate at LOS B or better, while I-126 westbound freeway segments operate at LOS D or worse.

Ramp Merge Analysis

A summary of the Ramp Merge Analyses results is shown in **Table 4-7**, **Table 4-8** and **Table 4-9** for I-26, I-20 and I-126, respectively. The merge analysis results for the eastbound on-ramp at Exit 101 and the westbound on-ramp from Exit 102 are summarized in these tables although each ramp are the entry lanes of existing weaving sections between Exit 101 and Exit 102.

Table 4-7: I-26 Ramp Merge Capacity Analysis TransModeler Results – Existing Conditions

Segment	Existing Conditions			
	AM Peak Hour		PM Peak Hour	
	LOS[1]	Density[2]	LOS[1]	Density[2]
I-26 Eastbound				
Exit 101	C	26.0	B	18.0
Exit 102	F	52.7	C	24.8
Exit 103	F	64.3	C	27.2
Exit 104	F	61.2	D	32.7
Exit 106 Loop	F	54.2	E	35.4
Exit 106	F	78.9	D	32.1
Exit 107 Loop	F	54.2	E	35.4
Exit 107	F	79.8	D	32.0
Exit 108	D	33.9	E	40.8
Exit 108 (I-126)	C	23.1	E	36.7
Exit 110	B	14.8	B	17.7
I-26 Westbound				
Exit 110	B	13.8	B	19.1
Exit 108 (I-126)	E	37.1	F	144.5
Exit 108	C	24.8	F	107.6
Exit 107 Loop	C	26.3	F	104.2
Exit 107	C	27.8	F	110.5
Exit 106	C	23.9	E	36.2
Exit 104	B	19.3	D	32.2
Exit 103	C	21.1	E	37.0
Exit 102	B	15.5	F	62.0
Exit 101	C	21.0	F	93.2

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 4-8: I-20 Ramp Merge Capacity Analysis TransModeler Results – Existing Conditions

Segment	Existing Conditions			
	AM Peak Hour		PM Peak Hour	
	LOS[1]	Density[2]	LOS[1]	Density[2]
I-20 Eastbound				
Exit 61 Loop	C	24.9	B	14.7
Exit 61	D	29.2	B	16.6
Exit 63 Loop	C	20.2	B	14.5
Exit 63	B	18.9	B	13.4
Exit 64 Loop	D	32.9	C	25.7
Exit 64	C	24.3	C	20.6
Exit 65	D	32.7	C	23.7
Exit 68	C	26.6	C	22.3
I-20 Westbound				
Exit 68	C	21.0	D	33.0
Exit 65	E	38.0	F	75.8
Exit 64 Loop	B	19.4	C	26.8
Exit 64	B	12.9	C	21.4
Exit 63	B	12.6	C	22.6
Exit 61	B	12.6	D	30.0

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 4-9: I-126 Ramp Merge Capacity Analysis TransModeler Results – Existing Conditions

Segment	Existing Conditions			
	AM Peak Hour		PM Peak Hour	
	LOS[1]	Density[2]	LOS[1]	Density[2]
I-126 Eastbound				
Colonial Life Blvd	B	15.7	A	8.6
Greystone Blvd	B	19.5	B	10.1
I-126 Westbound				
Greystone Blvd	B	11.6	D	30.6

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The analysis results for the ramp merge areas, summarized in **Table 4-7, Table 4-8** and **Table 4-9**, indicate the following:

- During the morning peak hour:
  - I-26 eastbound merge areas between Exit 102 and Exit 107 operate at LOS F, while I-26 westbound merge area at Exit 108 operates at LOS E. All other ramp merge areas operate at LOS D or better.
  - I-20 eastbound and westbound merge areas operate at LOS D or better with the exception of Exit 65, where the merge area operates at LOS E.
  - I-126 merge areas during the morning peak hour operate at LOS B.
- During the afternoon peak hour:
  - I-26 eastbound merge areas between Exit 104 and Exit 108 operate at LOS D or E, while all other segments operate at LOS C or better. All I-26 westbound merge areas operate at LOS E or worse with the exception of Exit 110 and Exit 104 merge areas which operate at LOS B and LOS D, respectively.
  - I-20 eastbound and westbound merge areas operate at LOS D or better with the exception of Exit 65, where the merge area operates at LOS F.
  - I-126 merge areas during the evening peak hour operate at LOS D or better.

Ramp Diverge Analysis

A summary of the Ramp Diverge Analyses results is shown in **Table 4-10**, **Table 4-11** and **Table 4-12** for I-26, I-20 and I-126, respectively. The diverge analysis results for the eastbound off-ramp at Exit 102 and the westbound off-ramp from Exit 101 are summarized in these tables although each ramp are the exit-only lanes of existing weaving sections between Exit 101 and Exit 102.

Table 4-10: I-26 Ramp Diverge Capacity Analysis TransModeler Results – Existing Conditions

Segment	Existing Conditions			
	AM Peak Hour		PM Peak Hour	
	LOS[1]	Density[2]	LOS[1]	Density[2]
I-26 Eastbound				
Exit 101	E	40.2	C	25.6
Exit 101 Loop	C	22.0	B	16.5
Exit 102	C	26.0	B	18.0
Exit 102 Loop	C	24.8	B	18.9
Exit 103	F	53.6	C	25.5
Exit 104	F	65.2	D	28.4
Exit 106	F	51.7	D	30.9
Exit 107	F	78.9	D	32.1
Exit 107 Loop	F	54.2	E	35.4
Exit 108	F	79.8	D	32.0
I-26 to I-26	F	52.6	E	39.8
Exit 110	F	46.6	F	89.7
I-26 Westbound				
Exit 110	C	22.8	C	24.6
Exit 108	C	24.8	F	107.6
Exit 107	C	24.8	F	107.6
Exit 107 Loop	C	26.3	F	104.2
Exit 106	C	27.8	F	110.5
Exit 106 Loop	C	26.3	F	85.9
Exit 104	D	29.2	E	41.0
Exit 103	B	18.8	D	29.2
Exit 102	C	20.2	E	38.4
Exit 102 Loop	B	16.7	D	34.6
Exit 101	B	15.5	F	62.0
Exit 101 Loop	B	12.2	F	75.2

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 4-11: I-20 Ramp Diverge Capacity Analysis TransModeler Results – Existing Conditions

Segment	Existing Conditions			
	AM Peak Hour		PM Peak Hour	
	LOS[1]	Density[2]	LOS[1]	Density[2]
I-20 Eastbound				
Exit 61	E	37.1	B	19.5
Exit 63	F	54.2	C	23.0
Exit 64	B	19.1	B	13.6
Exit 64 Loop	D	32.9	C	25.7
Exit 65	C	25.0	C	21.1
Exit 68	E	36.2	C	25.0
I-20 Westbound				
Exit 68	D	29.5	E	35.3
Exit 65	B	19.8	C	25.1
Exit 64	E	38.4	F	76.5
Exit 64 Loop	B	19.4	C	26.8
Exit 63	B	12.9	C	21.4
Exit 61	B	18.0	E	41.4

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 4-12: I-126 Ramp Diverge Capacity Analysis TransModeler Results – Existing Conditions

Segment	Existing Conditions			
	AM Peak Hour		PM Peak Hour	
	LOS[1]	Density[2]	LOS[1]	Density[2]
I-126 Eastbound				
Greystone Blvd	B	15.4	A	9.9
I-126 Westbound				
Greystone Blvd	B	15.2	C	27.8
Colonial Life Blvd	B	11.5	E	35.3

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The analysis results for the ramp diverge areas, summarized in **Table 4-10**, **Table 4-11** and **Table 4-12**, indicate the following:

- During the morning peak hour:
  - I-26 eastbound diverge areas between Exit 103 and Exit 110 operate at LOS F, while the Exit 101 diverge area operates at LOS E. All other ramp merge areas in both the eastbound and westbound directions operate at LOS D or better.
  - I-20 eastbound diverges areas operate at LOS D or better with the exception of Exit 61, Exit 63 and Exit 68, where the diverge areas operates at LOS E, LOS F and LOS E, respectively. I-20 westbound diverge areas operate at LOS D or better with the exception of Exit 64, which operates at LOS E.
  - All I-126 diverge areas during the morning peak hour operate at LOS B.
- During the afternoon peak hour:
  - I-26 eastbound diverge areas between Exit 104 and Exit 108 operate at LOS D or E, while the diverge area of Exit 110 operates at LOS F. All other eastbound segments operate at LOS C or better. All I-26 westbound diverge areas operate at LOS E or worse with the exception of Exit 110 and Exit 103 and the Exit 102 loop ramp areas which operate at LOS C, LOS D and LOS D, respectively.
  - I-20 eastbound diverge areas operate at LOS C or better. The westbound diverge areas operate at LOS C with the exception of Exit 64, which operates at LOS F and Exit 68 and Exit 61 which operate at LOS E.
  - I-126 diverge areas at Colonial Life Blvd operates at LOS E, while all other diverge areas operate at LOS C or better.

4.8.2 NO-BUILD NETWORK RESULTS

The No-Build Alternative assessment can be found in section 4.5.2.1 of the *Alternatives Development and Screening Report.*

Basic Freeway Segment Analysis

A summary of the No-Build Basic Freeway Segment Analysis results is shown in **Table 4-13**, **Table 4-14** and **Table 4 15** for I-26, I-20 and I-126, respectively.

Table 4-13: I-26 Freeway Segment Capacity Analysis TransModeler Results – No-Build Conditions

Segment	RA10 (No Build) Conditions			
	AM Peak Hour		PM Peak Hour	
	LOS[1]	Density[2]	LOS[1]	Density[2]
I-26 Eastbound				
Exit 101 to Exit 102	F	126.8	C	22.8
Exit 102 to Exit 103	F	118.2	D	30.1
Exit 103 to Exit 104	F	123.0	D	29.4
Exit 104 to Exit 106	F	80.2	F	74.7
Exit 106 to Exit 107	F	104.1	F	84.9
I-126 Diverge to I-126 Merge	E	37.2	F	130.1
Exit 108 to Exit 110	F	82.5	F	130.8
I-26 Westbound				
Exit 110 to Exit 108	D	29.8	F	76.5
I-126 Diverge to I-126 Merge	E	41.4	F	157.3
Exit 107 to Exit 106	D	33.2	F	123.2
Exit 106 to Exit 104	E	40.5	F	47.4
Exit 104 to Exit 103	D	31.7	E	39.5
Exit 103 to Exit 102	D	26.7	E	38.5
Exit 102 to Exit 101	B	17.6	C	23.6

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 4-14: I-20 Freeway Segment Capacity Analysis TransModeler Results – No-Build Conditions

Segment	RA10 (No Build) Conditions			
	AM Peak Hour		PM Peak Hour	
	LOS[1]	Density[2]	LOS[1]	Density[2]
I-20 Eastbound				
west of Exit 61	F	52.4	B	17.7
Exit 61 to Exit 63	F	69.9	C	22.6
Exit 63 to Exit 64	C	19.7	B	15.6
Exit 64 to Exit 65	D	26.7	C	22.7
Exit 65 to Exit 68	E	39.9	D	29.2
I-20 Westbound				
Exit 68 to Exit 65	E	41.5	F	69.9
Exit 65 to Exit 64	F	70.7	F	90.5
Exit 64 to Exit 63	E	43.0	C	19.5
Exit 63 to Exit 61	B	17.0	E	40.9
west of Exit 61	B	12.1	C	21.3

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 4-15: I-126 Freeway Segment Capacity Analysis TransModeler Results – No-Build Conditions

Segment	RA10 (No Build) Conditions			
	AM Peak Hour		PM Peak Hour	
	LOS[1]	Density[2]	LOS[1]	Density[2]
I-126 Eastbound				
I-26 to Colonial Life Blvd	D	30.0	B	16.2
Colonial Life Blvd to Greystone Blvd	B	16.4	A	10.5
Greystone Blvd to Huger St	D	27.8	B	14.4
I-126 Westbound				
Huger St to Greystone Blvd	B	15.2	F	73.1
Greystone Blvd to Colonial Life Blvd	B	15.5	F	106.5
Colonial Life Blvd to I-26	C	22.8	F	125.1

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The No-Build analysis results for the freeway segments, summarized in **Table 4-13**, **Table 4-14** and **Table 4-15** indicate the following:

- During the morning peak hour:
  - All I-26 eastbound freeway segments operate at LOS E and F. I-26 westbound freeway segments from I-126 Diverge to I-126 Merge and from Exit 106 to Exit 104 also operate at LOS E. All other segments operate at LOS D or better.
  - I-20 eastbound freeway segments from west of Exit 61 to Exit 63 operate at LOS F, and the eastbound segment between Exit 65 and Exit 68 operates at LOS E. I-26 westbound segments from Exit 68 to Exit 63 operate at LOS E and F. All other segments operate at LOS D or better.
  - All I-126 freeway segments operate at LOS D or better.
- During the afternoon peak hour:
  - I-26 eastbound and westbound freeway segments between Exit 104 and Exit 110 operate at LOS F. I-26 westbound segments between Exit 104 and Exit 102 operate at LOS E. All other I-26 freeway segments operate at LOS D or better.
  - I-20 westbound freeway segments between Exit 68 and Exit 64 operate at LOS F, and the I-20 westbound segment between Exit 63 and Exit 61 operates at LOS E. All other freeway segments, including all eastbound segments, operate at LOS D or better.
  - I-126 eastbound freeway segments operate at LOS B or better, while I-126 westbound freeway segments operate at LOS F.

Ramp Merge Analysis

A summary of the Ramp Merge Analyses results is shown in **Table 4-16**, **Table 4-17** and **Table 4-18** for I-26, I-20 and I-126, respectively. The merge analysis results for the eastbound on-ramp at Exit 101 and the westbound on-ramp from Exit 102 are summarized in these tables although each ramp are the entry lanes of existing weaving sections between Exit 101 and Exit 102.

Table 4-16: I-26 Ramp Merge Capacity Analysis TransModeler Results – No-Build Conditions

Segment	RA10 (No Build) Conditions			
	AM Peak Hour		PM Peak Hour	
	LOS[1]	Density[2]	LOS[1]	Density[2]
I-26 Eastbound				
Exit 101	F	126.8	C	22.8
Exit 102	F	123.0	D	29.4
Exit 103	F	109.3	F	48.1
Exit 104	F	87.0	F	66.6
Exit 106 Loop	F	58.2	F	81.4
Exit 106	F	104.1	F	84.9
Exit 107 Loop	F	58.2	F	81.4
Exit 107	F	92.1	F	87.4
Exit 108	E	40.3	F	132.8
Exit 108 (I-126)	F	46.4	F	150.5
Exit 110	B	16.3	B	17.7
I-26 Westbound				
Exit 110	B	15.6	F	67.8
Exit 108 (I-126)	F	47.7	F	185.1
Exit 108	D	29.5	F	135.9
Exit 107 Loop	D	32.2	F	124.7
Exit 107	D	33.2	F	123.2
Exit 106	D	28.7	D	34.8
Exit 104	C	22.8	D	31.3
Exit 103	C	24.8	E	36.4
Exit 102	B	17.6	C	23.6
Exit 101	A	7.2	A	9.0

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 4-17: I-20 Ramp Merge Capacity Analysis TransModeler Results – No-Build Conditions

Segment	RA10 (No Build) Conditions			
	AM Peak Hour		PM Peak Hour	
	LOS[1]	Density[2]	LOS[1]	Density[2]
I-20 Eastbound				
Exit 61 Loop	F	103.6	B	16.9
Exit 61	F	71.2	B	19.5
Exit 63 Loop	C	20.7	B	17.0
Exit 63	B	19.5	B	15.4
Exit 64 Loop	D	33.2	D	29.9
Exit 64	C	25.8	C	22.3
Exit 65	E	37.1	C	25.5
Exit 68	D	28.2	C	26.2
I-20 Westbound				
Exit 68	C	27.6	F	58.1
Exit 65	F	70.7	F	90.5
Exit 64 Loop	C	24.8	C	27.5
Exit 64	E	43.0	B	19.5
Exit 63	B	13.2	C	22.8
Exit 61	B	10.1	B	16.7

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 4-18: I-126 Ramp Merge Capacity Analysis TransModeler Results – No-Build Conditions

Segment	Existing Conditions			
	AM Peak Hour		PM Peak Hour	
	LOS[1]	Density[2]	LOS[1]	Density[2]
I-126 Eastbound				
Colonial Life Blvd	B	15.7	A	8.6
Greystone Blvd	B	19.5	B	10.1
I-126 Westbound				
Greystone Blvd	B	11.6	D	30.6

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The No-Build analysis results for the ramp merge areas, summarized in **Table 4-16**, **Table 4-17** and **Table 4-18**, indicate the following:

- During the morning peak hour:
  - I-26 eastbound merge areas between Exit 101 and Exit 107, and at Exit 108 (I-126), operate at LOS F. The I-26 eastbound merge area at Exit 108 operates at LOS E. The I-26 westbound merge area at Exit 108 (I-126) also operates at LOS F. All other ramp merge areas operate at LOS D or better.
  - I-20 eastbound merge areas at Exit 61 operate at LOS F and at Exit 65 operate at LOS E. I-20 westbound merge areas at Exit 65 operate at LOS F and at Exit 64 operate at LOS E. All other ramp merge areas operate at LOS D or better.
  - All I-126 merge areas operate at LOS B.
- During the afternoon peak hour:
  - I-26 eastbound merge areas between Exit 103 and Exit 108 (I-126) operate at LOS F. I-26 westbound merge areas between Exit 110 and Exit 110 also operate at LOS F, and the westbound merge area at Exit 103 operates at LOS E. All other ramp merge areas operate at LOS D or better.
  - I-20 eastbound and westbound merge areas operate at LOS D or better with the exception of westbound merge areas between Exit 68 and Exit 65, which operate at LOS F.
  - All I-126 eastbound merge areas operate at LOS B or better, and the westbound merge area at Greystone Boulevard operates at LOS D.

Ramp Diverge Analysis

A summary of the Ramp Diverge Analyses results is shown in **Table 4-19**, **Table 4-20** and **Table 4-21** for I-26, I-20 and I-126, respectively. The diverge analysis results for the eastbound off-ramp at Exit 102 and the westbound off-ramp from Exit 101 are summarized in these tables although each ramp are the exit-only lanes of existing weaving sections between Exit 101 and Exit 102.

Table 4-19: I-26 Ramp Diverge Capacity Analysis TransModeler Results – No-Build Conditions

Segment	RA10 (No Build) Conditions			
	AM Peak Hour		PM Peak Hour	
	LOS[1]	Density[2]	LOS[1]	Density[2]
I-26 Eastbound				
Exit 101	F	94.5	B	15.2
Exit 101 Loop	F	109.7	B	19.1
Exit 102	F	126.8	C	22.8
Exit 102 Loop	F	111.1	C	22.2
Exit 103	F	118.2	D	30.1
Exit 104	F	107.0	F	50.8
Exit 106	F	68.7	F	63.4
Exit 107	F	104.1	F	84.9
Exit 107 Loop	F	58.2	F	81.4
Exit 108	F	92.1	F	87.4
I-26 to I-26	F	55.9	F	135.5
Exit 110	F	101.3	F	146.0
I-26 Westbound				
Exit 110	F	52.1	F	81.3
Exit 108	D	29.5	F	135.9
Exit 107	D	29.5	F	135.9
Exit 107 Loop	D	32.2	F	124.7
Exit 106	D	33.2	F	123.2
Exit 106 Loop	D	30.0	F	94.5
Exit 104	D	34.4	E	40.1
Exit 103	C	22.0	D	28.9
Exit 102	C	25.3	E	37.3
Exit 102 Loop	B	19.0	C	26.9
Exit 101	B	17.6	C	23.6
Exit 101 Loop	B	14.9	C	20.2

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 4-20: I-20 Ramp Diverge Capacity Analysis TransModeler Results – No-Build Conditions

Segment	RA10 (No Build) Conditions			
	AM Peak Hour		PM Peak Hour	
	LOS[1]	Density[2]	LOS[1]	Density[2]
I-20 Eastbound				
Exit 61	F	65.4	B	17.1
Exit 63	F	67.7	C	26.8
Exit 64	B	19.7	B	15.6
Exit 64 Loop	D	33.2	D	29.9
Exit 65	C	26.7	C	22.7
Exit 68	F	46.8	C	27.9
I-20 Westbound				
Exit 68	E	37.7	F	75.1
Exit 65	C	24.5	C	25.6
Exit 64	F	71.4	F	91.4
Exit 64 Loop	C	24.8	C	27.5
Exit 63	E	43.0	B	19.5
Exit 61	C	22.1	F	92.4

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 4-21: I-126 Ramp Diverge Capacity Analysis TransModeler Results – No Build Conditions

Segment	RA10 (No Build) Conditions			
	AM Peak Hour		PM Peak Hour	
	LOS[1]	Density[2]	LOS[1]	Density[2]
I-126 Eastbound				
Greystone Blvd	B	15.9	D	32.7
I-126 Westbound				
Greystone Blvd	B	19.3	F	85.3
Colonial Life Blvd	B	13.4	F	72.1

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The No-Build analysis results for the ramp diverge areas, summarized in **Table 4-19**, **Table 4-20** and **Table 4-21**, indicate the following:

- During the morning peak hour:
  - All I-26 eastbound diverge areas and the westbound diverge area at Exit 110 operate at LOS F. All other ramp diverge areas operate at LOS D or better.
  - I-20 eastbound diverge areas at Exit 61, Exit 63, and Exit 68 operate at LOS F. I-20 westbound diverge areas at Exit 64 operate at LOS F, and at Exit 68 and Exit 63 operate at LOS E. All other ramp diverge areas operate at LOS D or better.
  - All I-126 diverge areas operate at LOS B.
- During the afternoon peak hour:
  - I-26 eastbound diverge areas between Exit 104 and Exit 110 and I-26 westbound diverge areas between Exit 110 and Exit 106 Loop operate at LOS F. I-26 westbound diverge areas at Exit 104 and Exit 102 operate at LOS E. All other ramp diverge areas operate at LOS D or better.
  - I-20 westbound diverge areas at Exit 68, Exit 64, and Exit 61 operate at LOS F. All other ramp diverge areas, including all eastbound diverge areas, operate at LOS D or better.
  - I-126 westbound diverge areas operate at LOS F, and the I-126 eastbound diverge area at Greystone Boulevard operates at LOS D.

5 Representative Alternative Microsimulation Modeling

Ten (10) representative alternatives were created by the design team. Each of these representative alternatives were modeled utilizing TransModeler. The breakdown of which AOs were used in each Representative Alternative are shown in **Table 5.1.** The results of the microsimulation modeling were incorporated into sub-sections of level 1B screening discussed in section 4.5.2 of the *Alternatives Development and Screening Report*.

Table 5.1 Breakdown of Representative Alternatives

Representative Alternative	1	2	3	4	5	6	7	8	9
I-20/26/126 System/System	**AO17 Turbine**	**AO18 Directional w/ Interior Rights**	**A021 Turbine Braided**	**AO22 Semi-Dir w/ 2 Loops**	**AO20 Turbine Directional**	**AO19 Directional w/ Loop & Ramp**	**AO27 E-W Connector**	**AO28 E-W Connector Bush River**	**AO29 Southern Connector**
I-20/Broad	AO3	AO5	AO5	AO3	AO3	AO5	AO5	AO3	AO3
I-20/Bush	AO6	AO10	AO6	AO7	AO8 (5)	AO7	AO8	AO8	AO10
I-26/Bush	AO24	AO24	AO26	AO25	AO24	AO24	AO24	AO24	AO29
I-26/378	AO46	AO47	AO46	AO46	AO46	AO47	AO46	AO46	AO46
I-26/St. Andrews	AO13	AO14 (3)	AO16	AO15	AO13	AO14	AO13	AO13	AO15
I-26/Piney Grove	AO30	AO31	AO32	AO32	AO30	AO31	AO30	AO31	AO32
I-26/Harbison	AO35	AO37	AO49	AO35	AO35	AO37	AO49	AO35	AO49
I-26/Lake Murray	AO50	AO42	AO50	AO50	AO50	AO42	AO50	AO50	AO50
I-26/Broad	AO51	AO45	AO43	AO51	AO51	AO43	AO51	AO51	AO51
East-West Connector	NA	NA	NA	NA	NA	NA	AO27	AO28	AO29(2)

* Alternative 10 - 'No-build' or 'Do Nothing' Alternative is retained for comparison purposes.

5.1 Development of the Representative Alternative Networks

The design files for each of the Representative Alternatives were converted to KMZ files to be imported into the TransModeler microsimulation network. The existing TransModeler network was modified to match the geometry of the KMZ files while maintaining the all external nodes and centroids of the existing network. Therefore, the same origin-destination trip tables were used for each of the alternatives. After updating the geometry to match the design of the representative alternatives, intersection controls were added for the new geometry. Where necessary, Synchro was utilized to develop basic traffic signal timing plans at the signal-controlled intersections based on initial AO analysis described in Section 3.3.

A simulation-based, Dynamic Traffic Assignment (DTA) was utilized in TransModeler to create new paths and assign demand volumes across the network for each of the Representative Alternatives with the intention of User Equilibrium. It is reasonable to assume that simulation models are better predictors of congested networks and may achieve enhanced results than a static traffic assignment method. With each DTA iteration, TransModeler will compute a relative gap between the previous iteration and an equilibrium solution. The DTA was run for 100 simulations with a goal of reaching a relative gap of 0.001. Each model was not able to converge due to the congestion, especially outside the project limits. Additional adjustments were made to the path assignments to remove unreasonable paths created by the DTA. It was assumed that the RA10 (No-Build) network paths remained consistent from the Existing conditions. Therefore, a DTA was not utilized in the analysis of RA10.

Once the traffic demand was distributed to the network, visual observations of the simulations were completed for each RA. Choke points in the network were identified, and where possible, were addressed by the design

team. The TransModeler networks were revised to update any revisions from the design team. This was an iterative process to develop the final representative alternative networks. **Appendix G** contains the microsimulation reviews which identified the choke points and were coordinated with the design team.

5.2 Travel Demand Modeling

The South Carolina Statewide Travel Demand Model (SCSWM) was used to evaluate three AO alternatives and two Representative Alternatives (RA). The three AO alternatives involved new roadway connections between I-20 and I-26. The two RA were modifications to the existing interstate network and interchanges that had been screened and selected for further evaluation as Reasonable Alternatives.

In each case, separate network files were developed in the SCSWM from the "Existing plus Committed" (EC) network. The TransCAD geographic file for the base EC network was exported and saved separately for each alternative. These networks were then modified to represent each proposed alternative. Complete individual runs of the SCSWM were performed using each separate alternative network.

The SCSWM produces estimates of daily traffic for the individual alternative networks. No adjustments or comparisons of the daily traffic volume estimates to collected peak hour volumes were considered necessary for this level of assessment of the alternatives, which included the review of minimum travel time routes through network elements. Had it been necessary to evaluate peak hour volume estimates, a conversion factor (such as 10%) would have been applied to the daily volumes to estimate design-hour volumes for the network elements.

The first alternatives modeled were those involving proposed facilities on new alignment and were developed and assessed as part of the AO review. Unlike the other AO evaluations taking place at existing interchanges, these proposed facilities on new alignment had no existing volumes to adjust and evaluate. Daily volumes assigned via the SCSWM would aid in assessing the effectiveness of diverting traffic from the existing system interchanges to the proposed facilities and in determining the number of lanes needed to accommodate design year traffic. The AO facilities modeled included:

- AO27 – East-West Connector (described in Section 3.3.6.1)
- AO28 – East-West Connector with Bush River Road Access (described in Section 3.3.6.2)
- AO29 – Southern Connector with I-26 Turbine Interchange (described in Section 3.3.6.3)

Each of these AO, along with additional AO improvements at service interchanges were developed into separate individual RA. AO27 was developed into RA7; AO28 was developed into RA8; and AO29 was developed into RA9. Since the goal was to evaluate the regional distribution of traffic on the proposed connectors, only the AO elements of the new connectors were modeled along with proposed modifications to the system interchanges proposed as part of the RA. Modifications to the various service interchanges in each RA were not incorporated into the individual SCSWM networks for the new connector alternatives and were not considered as part of the assessment of these alternatives.

The two RA that were modeled, RA1 and RA5, had been evaluated and moved forward from the Representative Alternatives to the Reasonable Alternatives. The modifications made to the SCSWM network for these

alternatives incorporated the complete network modifications at the system and service interchanges in each RA and included the C-D Road systems along I-26 and I-20. The SCSWM network modifications for these two RA were developed directly from the microsimulation networks by importing the microsimulation networks into TransCAD and removing the existing network links to be replaced by the proposed alternatives.

5.2.1 AO27 – EAST-WEST CONNECTOR

As described in Section 3.3.6.1, the proposed east-west connector was modeled as a limited access facility running generally parallel to and north of the Saluda River. Its only connections are the existing ramps connecting westbound I-126 to eastbound I-26, and westbound I-26 to eastbound I-126, ramps connecting eastbound I-20 to the eastbound connector and the westbound connector to westbound I-20, and ramps connecting the eastbound connector to eastbound I-26 and eastbound I-126, and a ramp connecting westbound I-126 to the westbound connector. No ramps are provided from westbound I-20 to the eastbound connector or from the westbound connector to eastbound I-20. These movements use the I-20/I-26 AO17 Turbine system interchange at Exit 107/64 and C-D Roads connector to I-20 and I-26. The SCSWM network modifications made for AO27 and AO17 are shown in **Figure 5-1**. The white roadways depict links in the EC network, while the green roadways depict the links added to the network for AO27and AO17.

Figure 5-2 shows the 2040 daily traffic assignment from the SCSWM run. The results of the assignment indicate the westbound connector would carry approximately 11,400 trips per day and the eastbound connector would carry about 12,600 trips per day (24,000 total trips). The forecast volume on the ramp from the eastbound connector to eastbound I-26 was essentially zero, as was the volume on the ramp from the westbound I-126 C-D road to eastbound I-20.

In both instances, the travel times along routes between various origins and destinations showed traffic expected to use these ramps were assigned along other routes. **Figure 5-3** illustrates some of the shortest travel time routes starting on westbound I-126 to multiple points, and from eastbound I-20 to eastbound I-26.

The eastbound connector traffic to eastbound I-26 was routed along US 378 (shown in **Figure 5-3** in light blue), which is parallel to and provides a shorter path in the model network than the proposed connector. Instead of traffic being assigned on the ramp from the westbound I-126 C-D road through the AO17 system interchange to eastbound I-20, the model assigns traffic from westbound I-126 traveling to the east on I-20 via Greystone Boulevard and Broad River Road (shown in **Figure 5-3** in green).

AO 27 was incorporated as a key element in RA7, which is discussed as part of the level 1B screening in section 4.5.2.9 of the *Alternatives Development and Screening Report.*

5.2.2 AO28 – EAST-WEST CONNECTOR WITH BUSH RIVER ROAD ACCESS

As described in Section 3.3.6.2, the proposed east-west connector with Bush River Road access is a limited access facility connecting I-20 on the west to I-126 on the east. The connector runs generally parallel to, and to the south of, the Norfolk – Southern Railroad. It is also generally parallel to Bush River Road to the north and the Saluda River to the south.

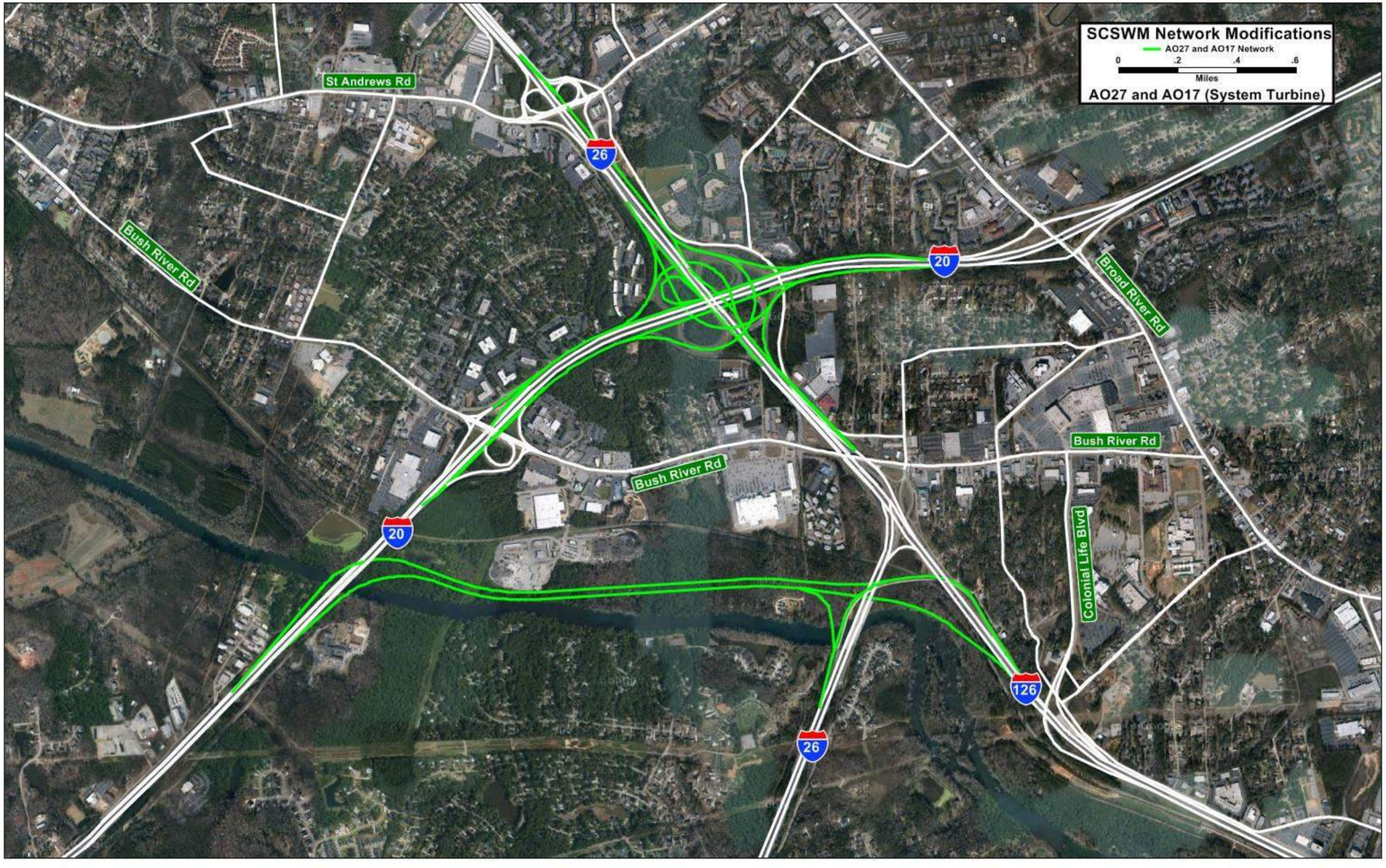


Figure 5-1 - AO 27/AO17 SCSWM Network Modifications

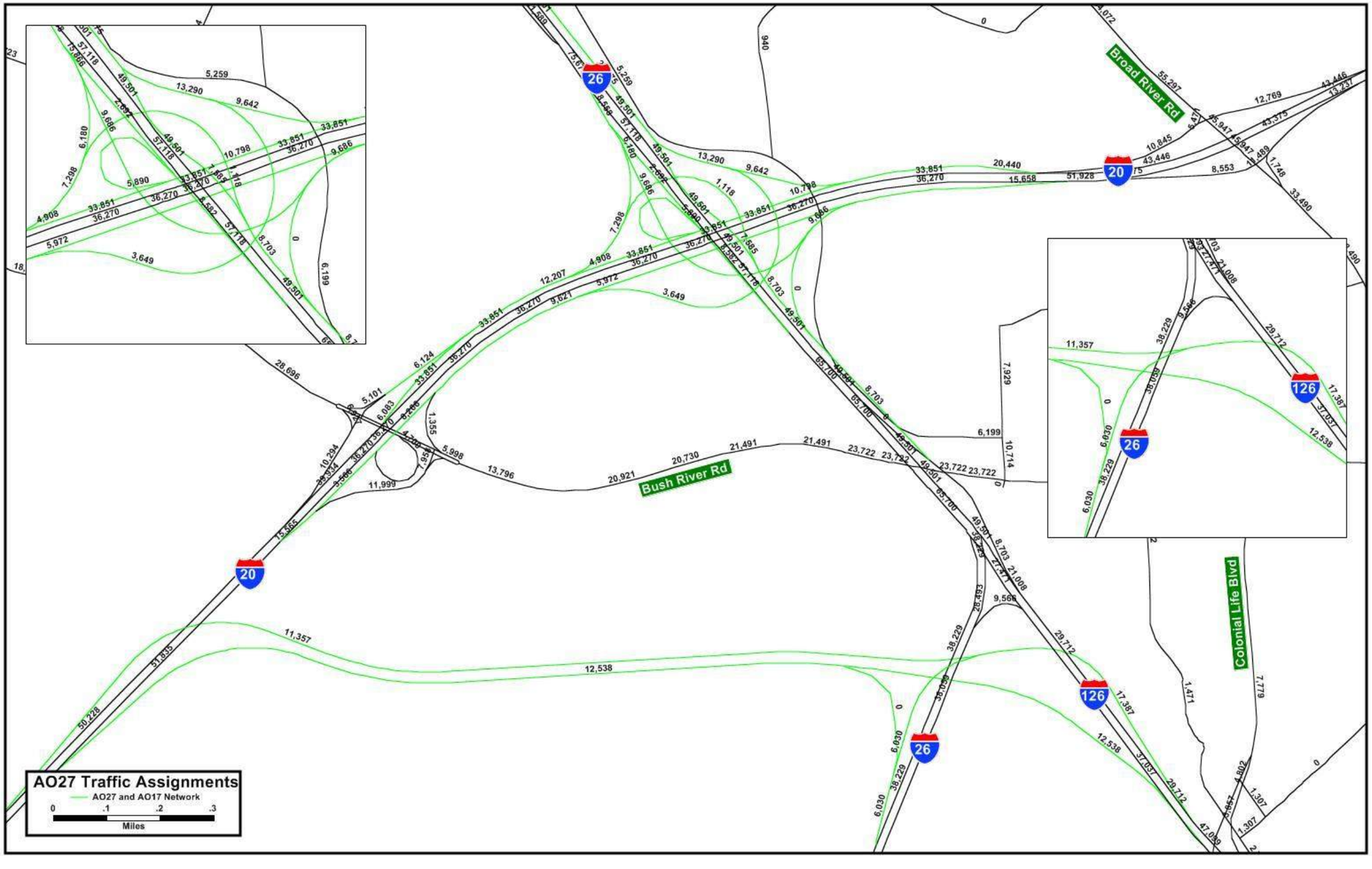


Figure 5-2: AO27 SCSWM 2040 Daily Volume

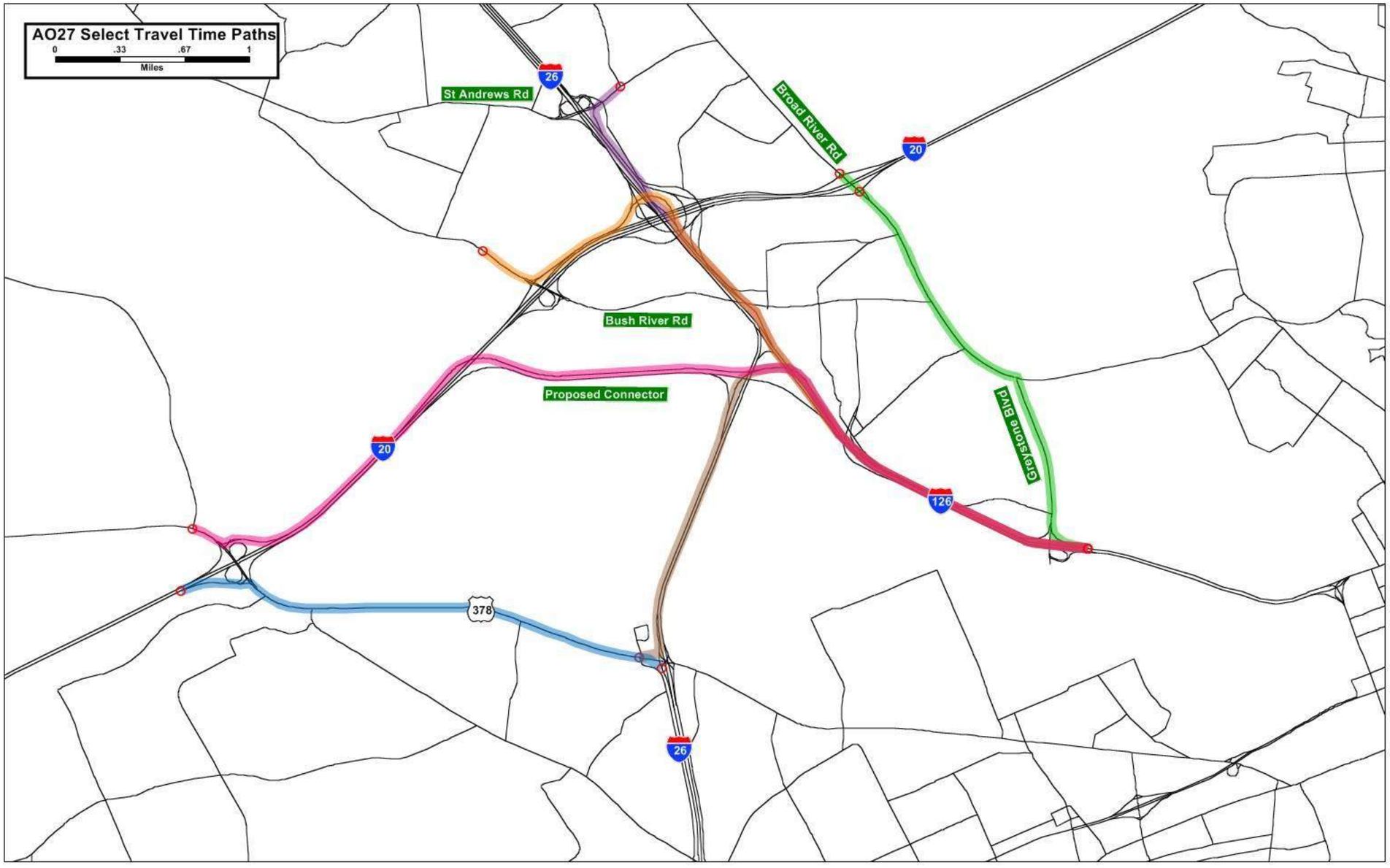


Figure 5-3: AO27 SCSWM Select Shortest Travel Time Paths

The existing I-20 interchange at Exit 63 and its connections to Bush River Road are removed as are the ramps to and from Bush River Road at the existing I-26 interchange at Exit 108. The connector provides full access to the east and west on I-20. A proposed interchange is located approximately midway along the connector is to provide access to Bush River Road approximately opposite Nottingwood Drive. This interchange replaces the removed interchanges at Exit 63 and Exit 108.

The proposed connector directly ties in to I-126 on its eastern end.

Both directions of the connector provide access to eastbound I-26, but there is no direct access provided to or from westbound I-26 from the connector. Rather than using the connector to access westbound I-26 near I-126, traffic from eastbound I-20 would use the proposed I-20/I-26 system interchange; traffic from westbound I-126 would use a comparable connection similar to the existing connection that merges with I-26 westbound lanes in the vicinity of the Bush River Road overpass

The I-20/I-26 system interchange would fully directional movements, except for two movements to eastbound I-26 that would be diverted to the connector. The movement from westbound I-20 to eastbound I-26 would continue through the I-20/I-26 system interchange, travel eastbound on the connector, and connect to either eastbound I-26 or eastbound I-126. The movement from eastbound I-20 to eastbound I-26 would enter the connector south of the Bush River Road bridge over I-20. This movement would also tie into either eastbound I-26 or eastbound I-126 at the east end of the proposed connector.

The SCSWM network modifications made for AO28 and at the I-20/I-26 system interchange as part of RA8 are shown in **Figure 5-4**. The white roadways depict links in the EC network, while the blue roadways depict the links present in the network for AO28.

Figure 5-5 shows the 2040 daily traffic assignment from the SCSWM run. The results of the assignment indicate that, west of the proposed Bush River Road interchange, the westbound connector is estimated to carry approximately 16,300 trips per day and the eastbound connector is estimated to carry about 23,100 trips per day (39,400 total trips). The majority of the trips would be oriented to/from the west on I-20.

East of the proposed interchange, the westbound connector would carry an estimated 15,500 trips per day while the eastbound connector would carry an estimated 22,600 trips per day (38,100 total trips). The majority of these trips would be oriented to/from the east on I-126.

The proposed interchange would carry approximately 34,700 two-way trips per day between the connector and Bush River Road.

Travel time paths between select origins and destinations for AO 28 are shown in **Figure 5-6**. **Figure 5-6** shows similar travel paths between most of the AO28 origin-destination pairs that were plotted in **Figure 5-3** for AO27. A big difference is in the path between traffic on westbound I-126 traveling to Bush River Road west of I-20. In AO27, this traffic progressed from westbound I-126 to westbound I-26, into the I-20/I-26 system interchange to westbound I-20 before exiting at Exit 63. In AO28, the path for the same origin-destination pair, shown in light

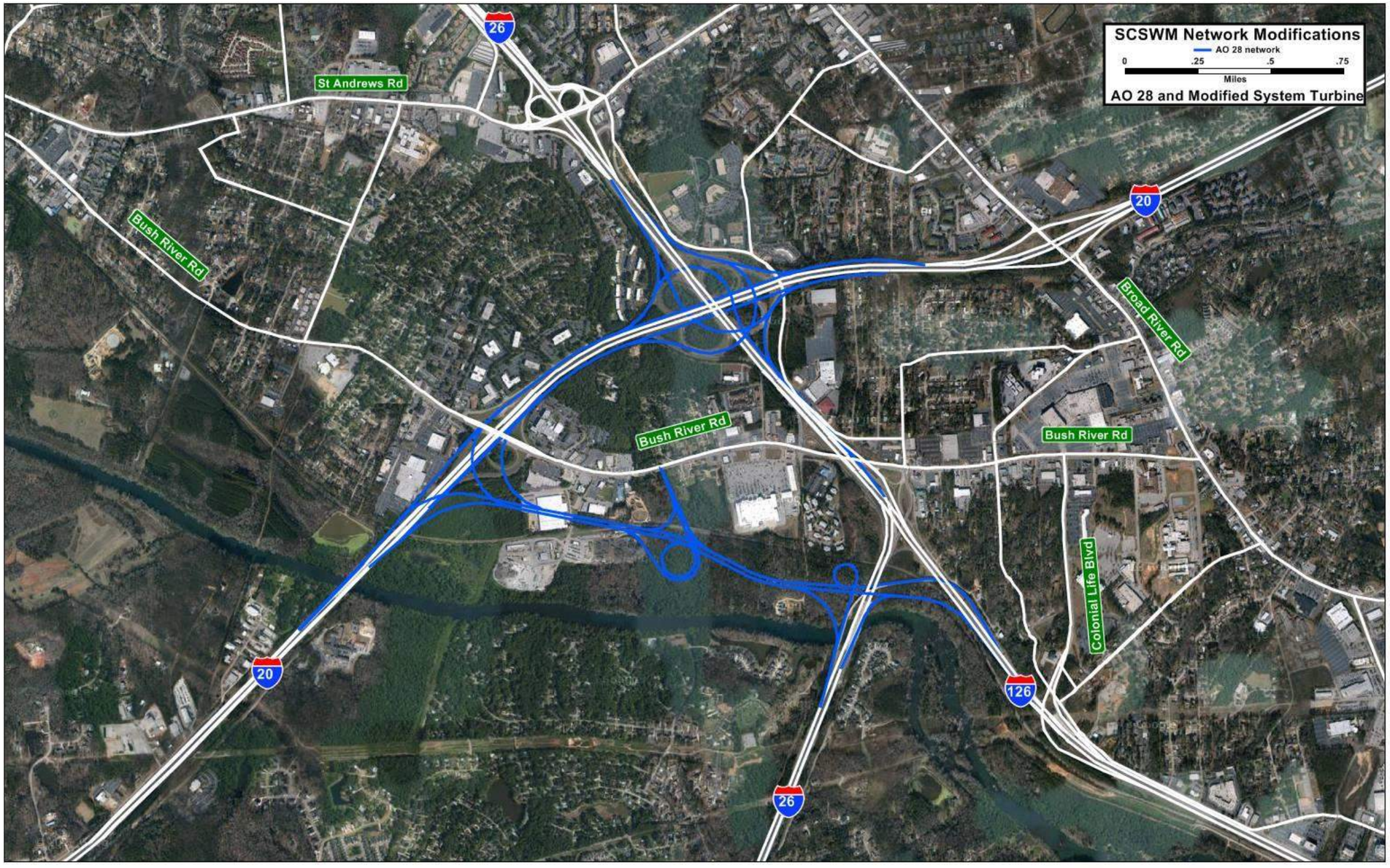


Figure 5-4: AO28 SCSWM Network Modifications

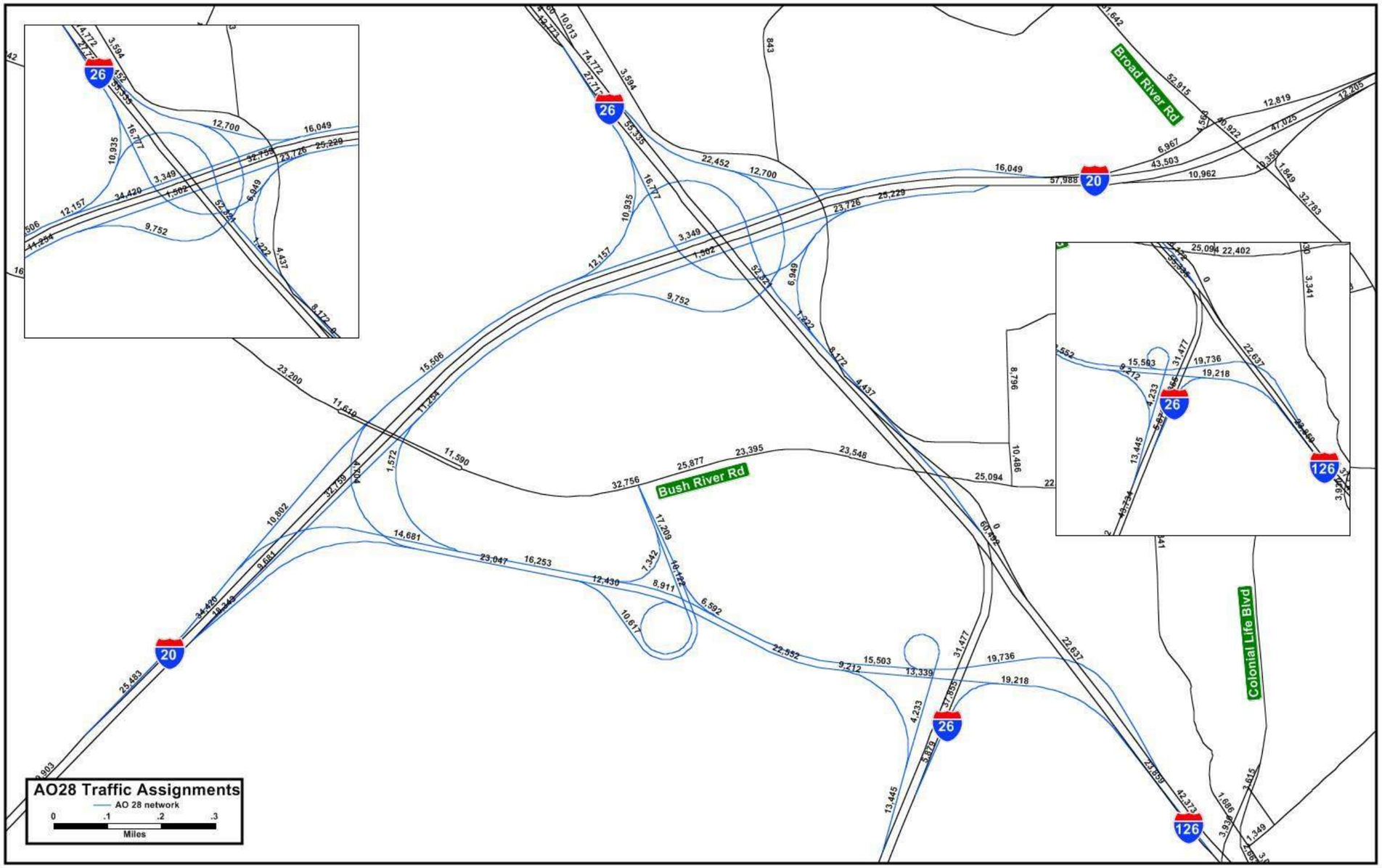


Figure 5-5: A028 SCSWM 2040 Daily Volume

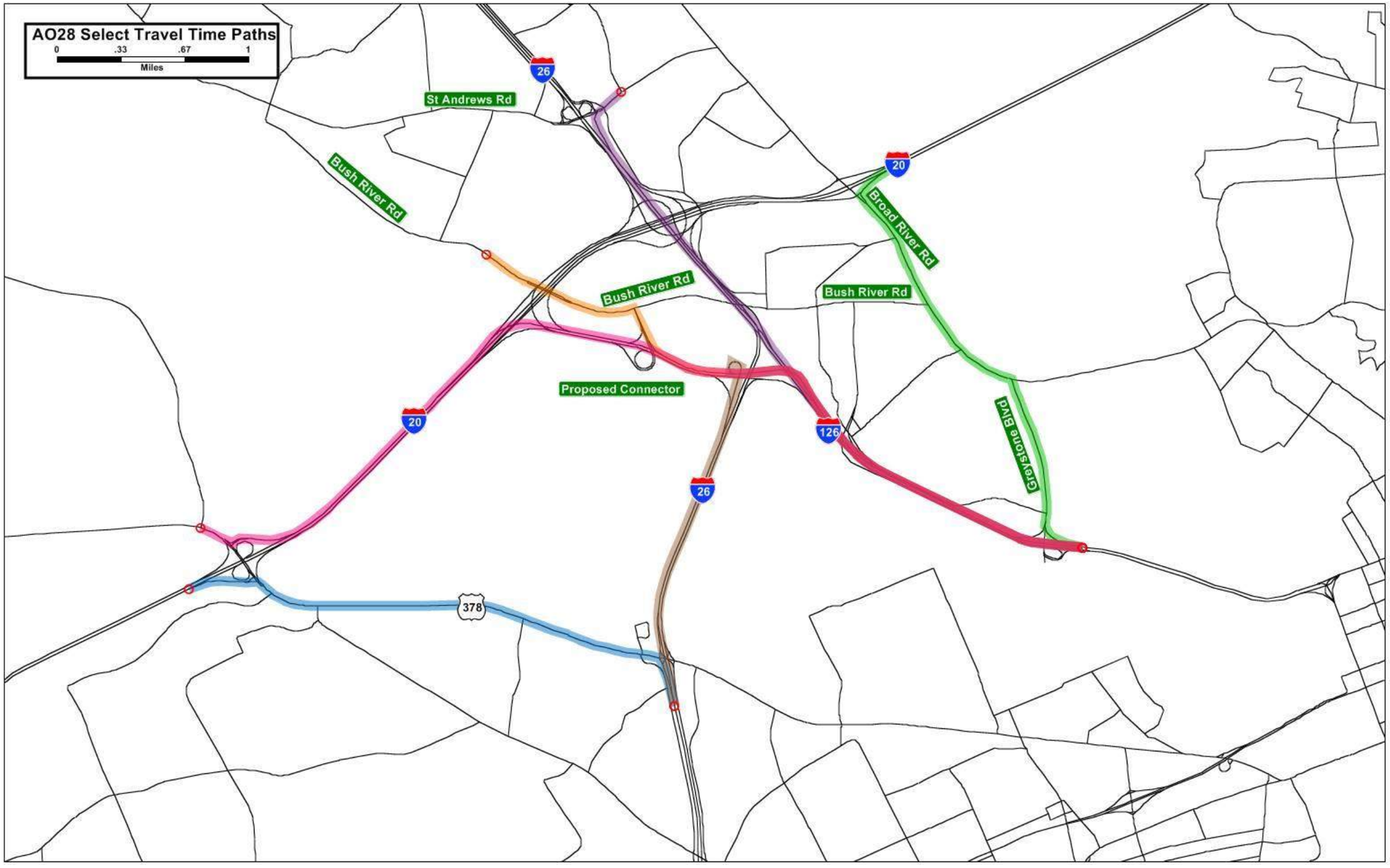


Figure 5-6: AO28 SCSWM Select Shortest Travel Time Paths

orange, uses the connector and the proposed interchange on Bush River Road to reach the Bush River Road destination west of I-20.

Traffic from eastbound I-20 to eastbound I-26 continues to be routed via a shorter path along US 378 (shown in **Figure 5-6** in light blue), rather than along the proposed connector. Traffic westbound on I-126 also continues to be routed via Greystone Boulevard and Broad River Road to reach I-20 at Exit 65 (shown in **Figure 5-6** in green).

AO 28 was incorporated as a key element in RA8, which is discussed as part of the level 1B screening in section 4.5.2.10 of the *Alternatives Development and Screening Report.*

5.2.3 AO29 – SOUTHERN CONNECTOR WITH TURBINE SYSTEM INTERCHANGE

As described in Section 3.3.6.3, the proposed southern connector was an east-west, limited-access connection between I-20 on the west to I-126 on the east. The alignment of the connector runs generally along the existing electric power easement about 1,900 feet south of the Saluda River.

AO29 as modeled in the SCSWM provides ramps to/from both direction on I-20 at the west end of the connector, eliminates the I-20/I-26 system interchange, maintains the I-26 Exit 108 and I-20 Exit 63 interchanges at Bush River Road, and implements a turbine interchange along the connector at I-26. I-126 traffic traveling to/from the west on I-26 are re-routed through the new I-26/connector turbine interchange. The eastbound connector ends at eastbound I-126, and the westbound connector begins at westbound I-126. The SCSWM network modifications made for AO29 as part of RA9 are shown in **Figure 5-7**. The white roadways depict links in the EC network, while the red roadways depict the links present in the network for AO29.

Figure 5-8 shows the 2040 daily traffic assignment from the SCSWM run. The results of the assignment indicate that, west of the proposed turbine interchange at I-26, the westbound connector is estimated to carry approximately 23,400 trips per day and the eastbound connector is estimated to carry about 26,100 trips per day (49,100 total). The majority of the trips would be oriented to/from the west on I-20.

East of the proposed I-26 turbine interchange, the westbound connector would carry an estimated 37,500 trips per day from westbound I-126, while the eastbound connector would carry an estimated 39,200 trips per day to eastbound I-126 (76,500 total trips). The majority of these trips would be oriented to/from the east on I-126.

Travel times paths between select origins and destinations for AO 29 are shown in **Figure 5-9**. While the model assignments predict a high volume of traffic using the connector, the circuitous routing between some origins and destinations lead to traffic exiting the interstate and traveling along arterials prior to re-entering an interstate. For example, it is intended for eastbound traffic on I-26 at the St Andrews Road on-ramp traveling to westbound I-20 to continue eastbound on I-26 to the proposed turbine interchange and travel westbound on the connector before entering I-20. The SCSWM shortest travel time path for this movement (shown in light blue in **Figure 5-9**, would route from eastbound I-26 to westbound I-20 along Bush River Road.

Other travel time paths show similar avoidance of the connector. Routes to or from the east on I-20 (east of the Broad River Road interchange), would have shorter travel times using surface arterials to access the ramps

to/from I-26 at Bush River Road rather than traveling westbound along I-20 and then eastbound on the proposed connector. These paths are shown in **Figure 5-9** in green and brown.

AO 29 was incorporated as a key element in RA9, which is discussed as part of the level 1B screening in section 4.5.2.2 of the *Alternatives Development and Screening Report.*

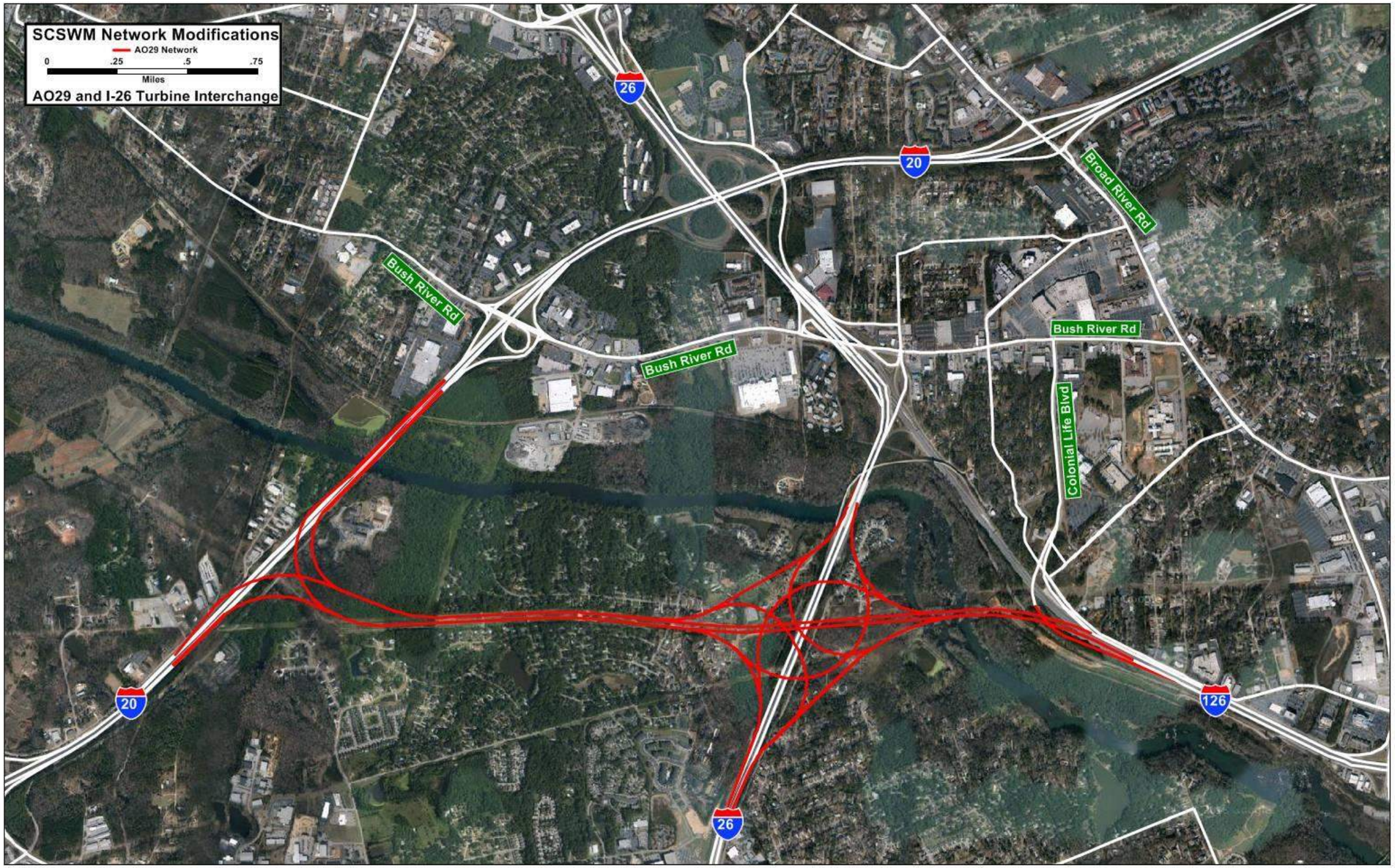


Figure 5-7: AO29 SCSWM Network Modifications

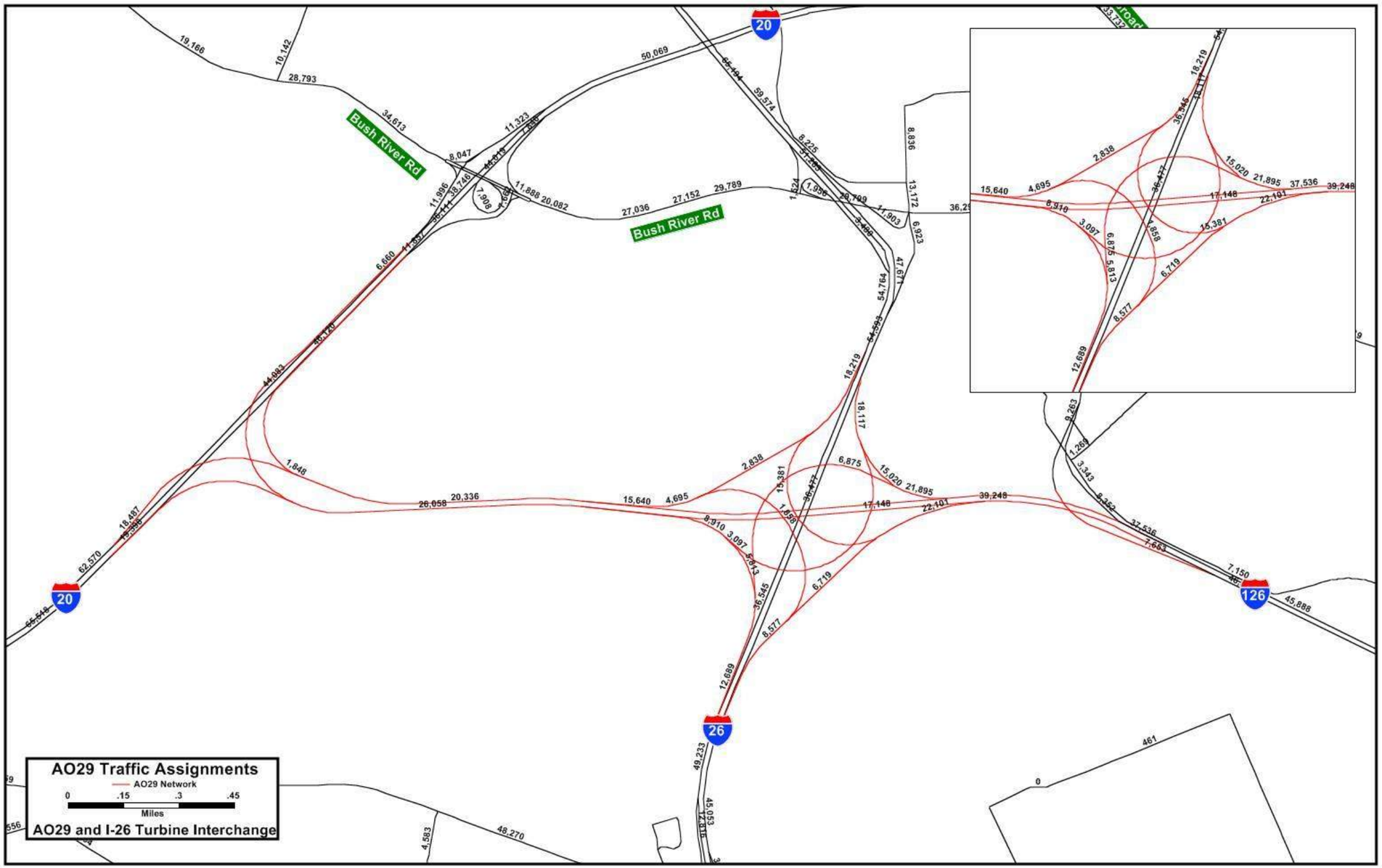


Figure 5-8: A029 SCSWM 2040 Daily Volume

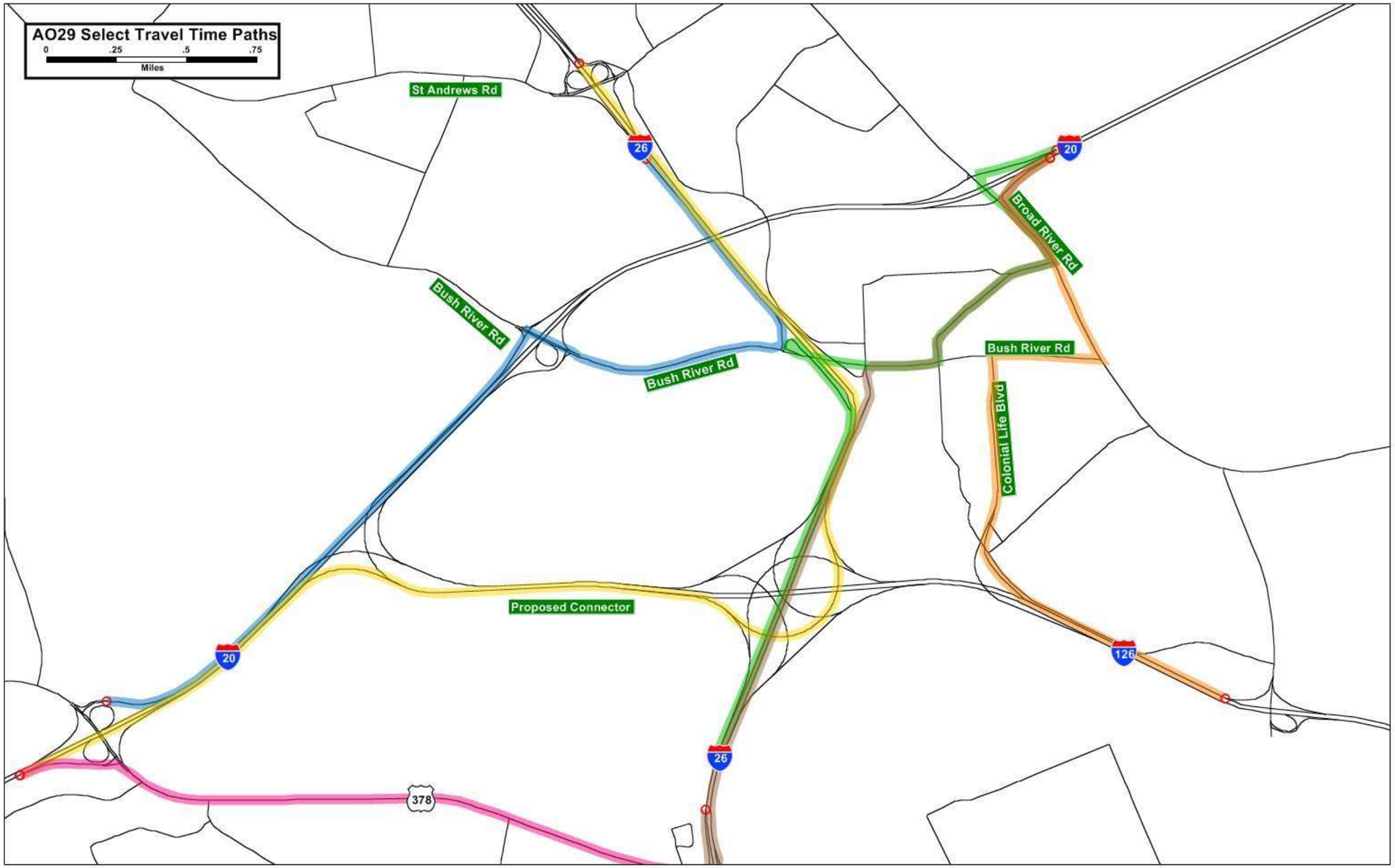


Figure 5-9: AO29 SCSWM Select Shortest Travel Time Paths

Consistent with the travel time paths for AO27 and AO28 shown in **Figure 5-3** and **Figure 5-6** respectively, paths from eastbound I-20 to eastbound I-26 continues to be routed via a shorter path along US 378 (shown in **Figure 5-9** in pink), rather than along the proposed connector. Traffic westbound on I-126 also continues to be routed via Greystone Boulevard and Broad River Road to reach I-20 at Exit 65 (shown in **Figure 5-9** in orange).

5.2.4 MODELING OF EC NETWORK

The SCSWM EC network represents the "No-Build Network for the 2040 design year. This network includes the existing network and planned and programmed projects funded and anticipated to be constructed by the design year. A SCSWM assignment for the EC network was run, and an overview of the EC network LOS is shown in **Figure 5.10**. Individual plots of the EC interchange and mainline volumes and planning LOS are contained in **Appendix H**.

The EC network LOS is based on SCDOT volume/capacity ratio (V/C) planning criteria. SCDOT's planning LOS are based on V/C calculated using daily assignments and the daily capacity thresholds for various roadway functional classifications and numbers of lanes. The V/C criteria used for SCDOT's Planning LOS are shown in **Table 5.2**.

Table 5.2 – SCDOT Planning LOS Criteria

SCDOT Planning LOS V/C Thresholds					
A	B	C	D	E	F
<0.50	0.50-0.75	0.75-1.00	1.00-1.15	1.15-1.35	>1.35

It is important to note that SCDOT's planning LOS establishes that a V/C of 1.00 defines the threshold between LOS C and LOS D. Typically, a V/C of 1.0 is considered to be the threshold between LOS E and LOS F, since a V/C=1.0 represents when the volume on the link equals the available link capacity. Therefore, any link identified as operating at LOS D in the SCSWM is technically over capacity since the estimated AADT assigned to the link is greater than the daily capacity for that link, based on the number of lanes on the link and the link's functional classification. As projects move from this general planning stage to more detailed peak hour operational capacity analyses, close attention must be given to links assigned LOS D by the SCSWM to ensure peak hour operations do not fail.

5.2.5 MODELING OF REASONABLE ALTERNATIVE RA1 NETWORK

The SCSWM EC network for RA1 incorporates elements of many AO at the interchanges in the network, along with the addition of C-D roads along I-20 and I-26, widening the mainline of I-20 and I-26, realigning the connection from eastbound I-26 to I-126, the elimination of the I-26 ramps to Bush River Road at Exit 108, and the modification of the partial Colonial Life Boulevard interchange on I-126 to a fully directional interchange. The I-20/I-26 system interchange is replaced with a turbine interchange. In RA1, a DDI is provided at Exit 63 (Bush River Road). **Table 5.1** lists the various AO options that have been incorporated in the development of RA1. The entire proposed alignment of RA1 is shown in **Figure 5.11** and an overview of the network LOS is shown in **Figure 5.12**. Individual plots of the RA1 interchange and mainline volumes and planning LOS are

contained in **Appendix I**. RA1 is discussed as part of the level 1B screening in section 4.5.2.3 in the *Alternatives Development and Screening Report.*

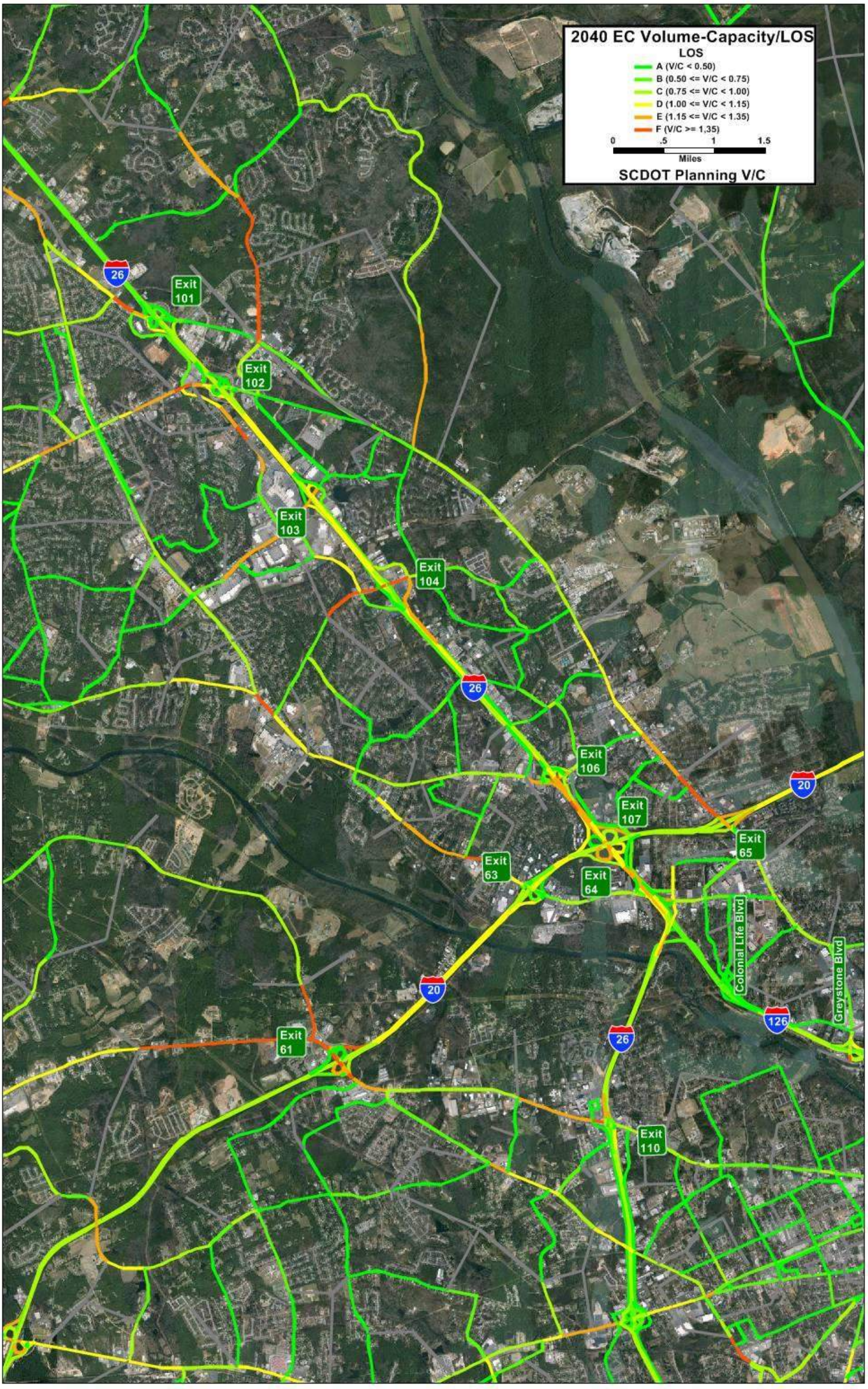


Figure 5-10: EC SCDOT Planning LOS Overview

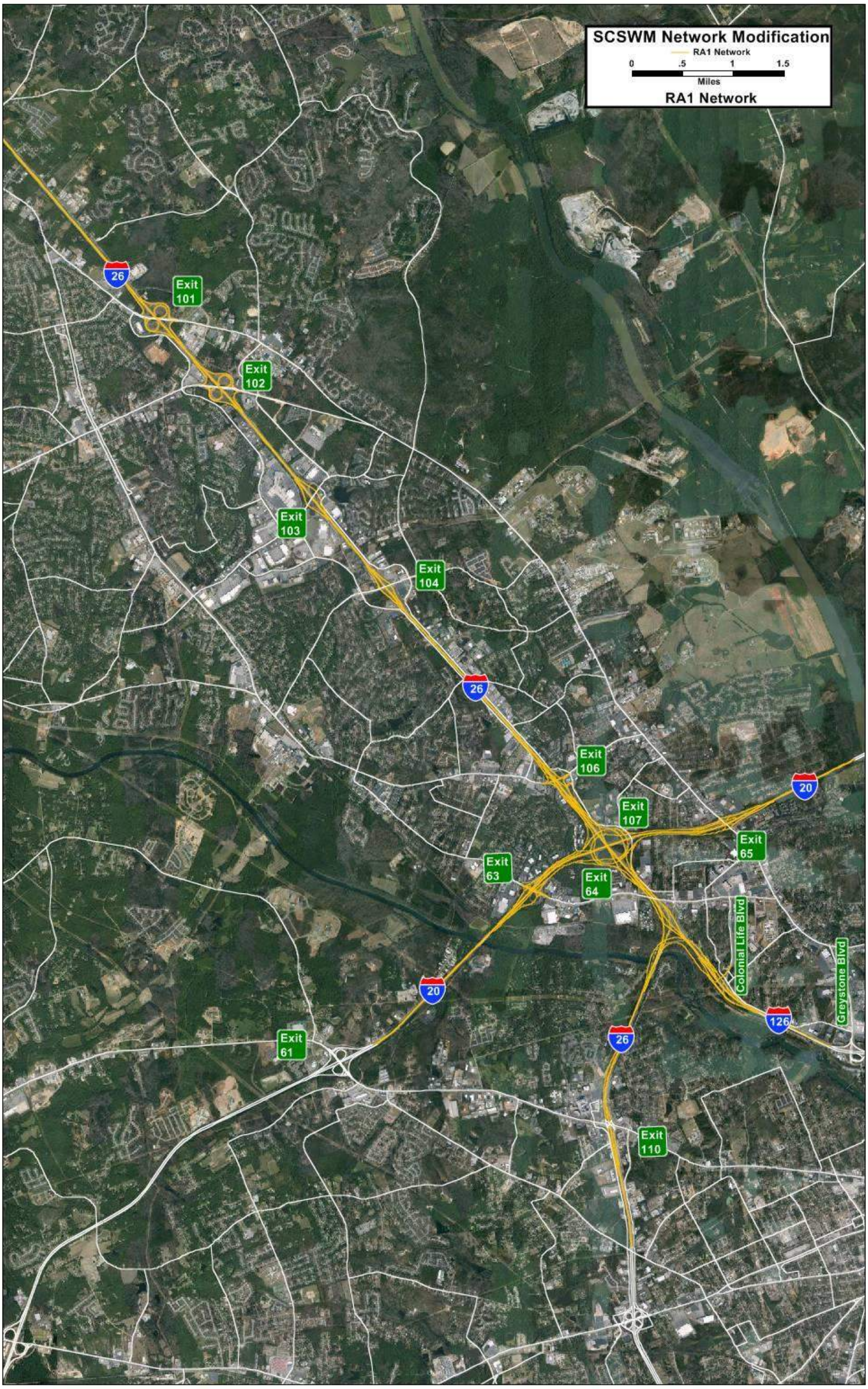


Figure 5-11: SCSWM RA1 Network

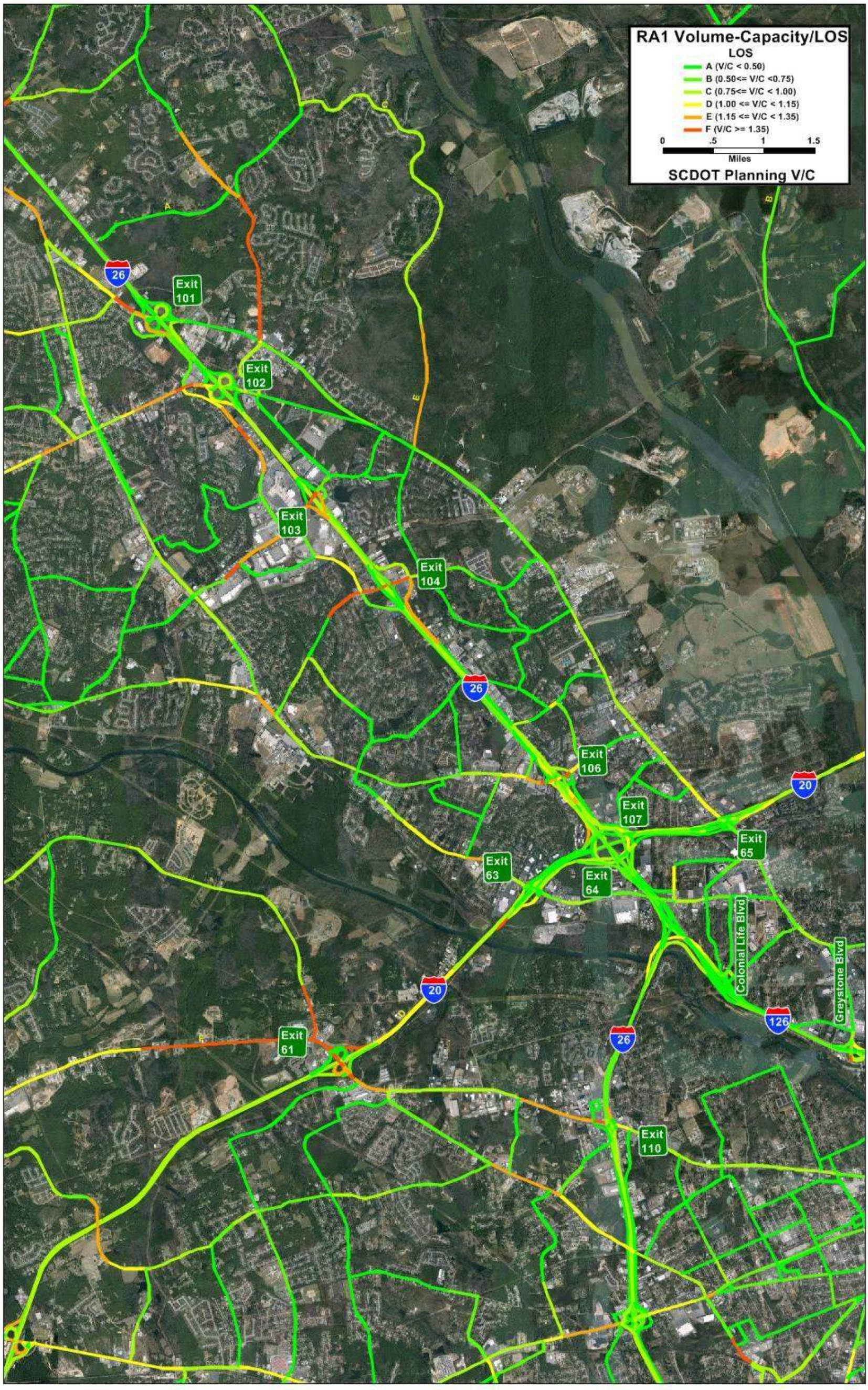


Figure 5-12: RA1 SCDOT Planning LOS Overview

5.2.6 MODELING OF REASONABLE ALTERNATIVE RA5 NETWORK

The SCSWM EC network for RA5 incorporates elements of many AO at the interchanges in the network, along with the addition of C-D roads along I-20 and I-26, widening the mainline of I-20 and I-26, realigning the connection from eastbound I-26 to I-126, the elimination of the I-26 ramps to Bush River Road at Exit 108, and the modification of the partial Colonial Life Boulevard interchange on I-126 to a fully directional interchange. The I-20/I-26 system interchange is replaced with a directional turbine interchange that includes loops ramps for westbound I-20 traffic traveling to eastbound I-26/I-126, and for eastbound I-20 traffic traveling to westbound I-26. In RA5, a partial cloverleaf interchange is provided at Exit 63, with loop ramps provided on the west side of Bush River Road. **Table 5.1** lists the various AO options that have been incorporated in the development of RA5. The entire proposed alignment of RA5 is shown in **Figure 5.13**. An overview of the network LOS for RA5 is shown in **Figure 5.14**. Individual plots of the RA5 interchange and mainline volumes and planning LOS are contained in **Appendix J**.

RA5 is discussed as part of the level 1B screening in section 4.5.2.7 in the *Alternatives Development and Screening Report.*

5.2.7 COMPARISON OF EC, RA1, AND RA5 NETWORKS

Plot of the links assessed to operate at LOS D, LOS E, and LOS F in the model assignments can be visually compared to assess the effectiveness of RA1 and RA5 in improving capacity compared to the EC network. **Figure 5.15** shows the links of the SCSWM EC network projected to operate at LOS D, LOS E, and LOS F. **Figure 5.16** shows these links for RA1, and **Figure 5.17** shows the links for RA5.

Comparing the three figures indicates that RA1 and RA5 will result in fewer mainline freeway segments and ramps operating at LOS D, LOS E or LOS F when compared to the EC network.

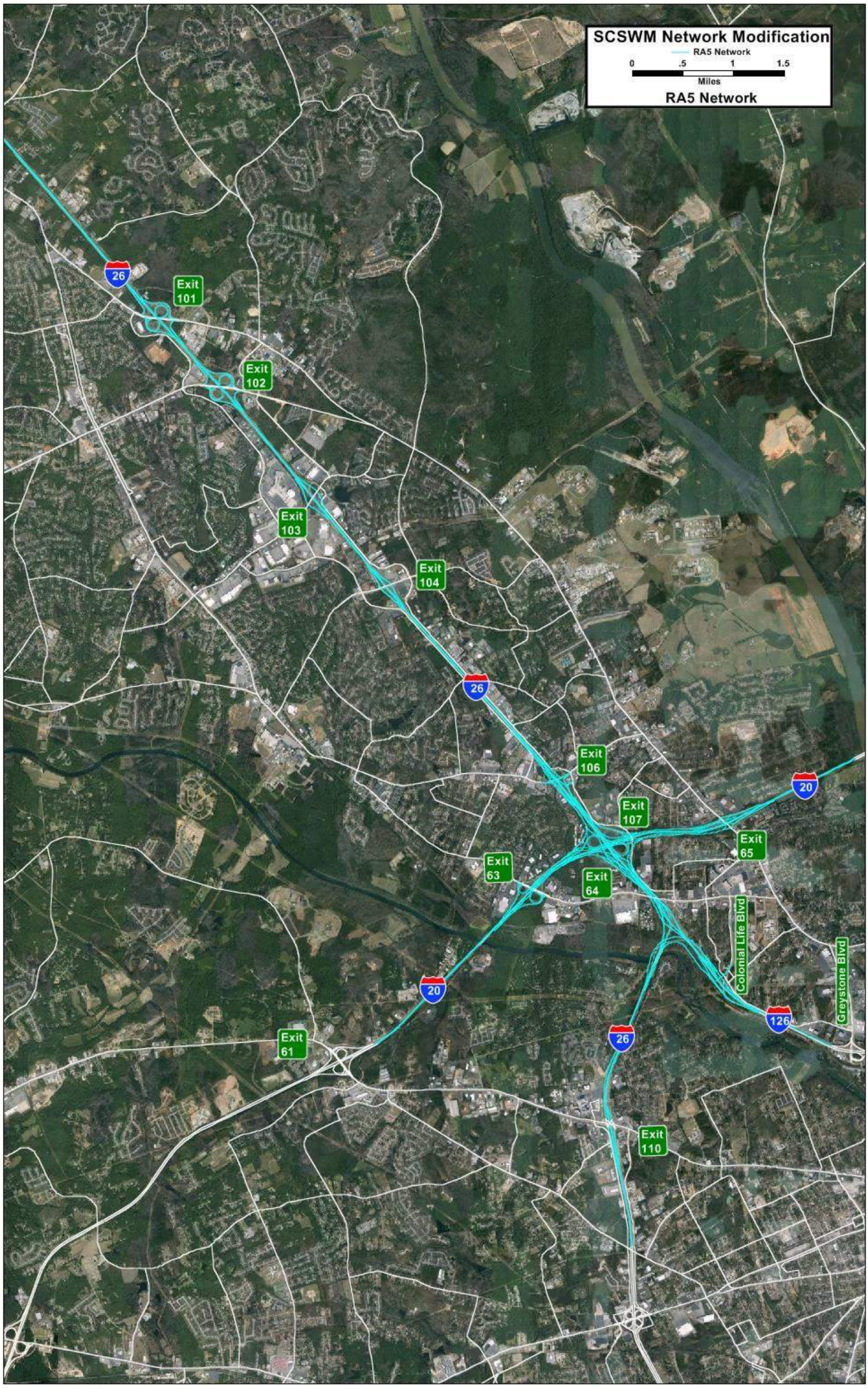


Figure 5-13: SCSWM RA5 Network

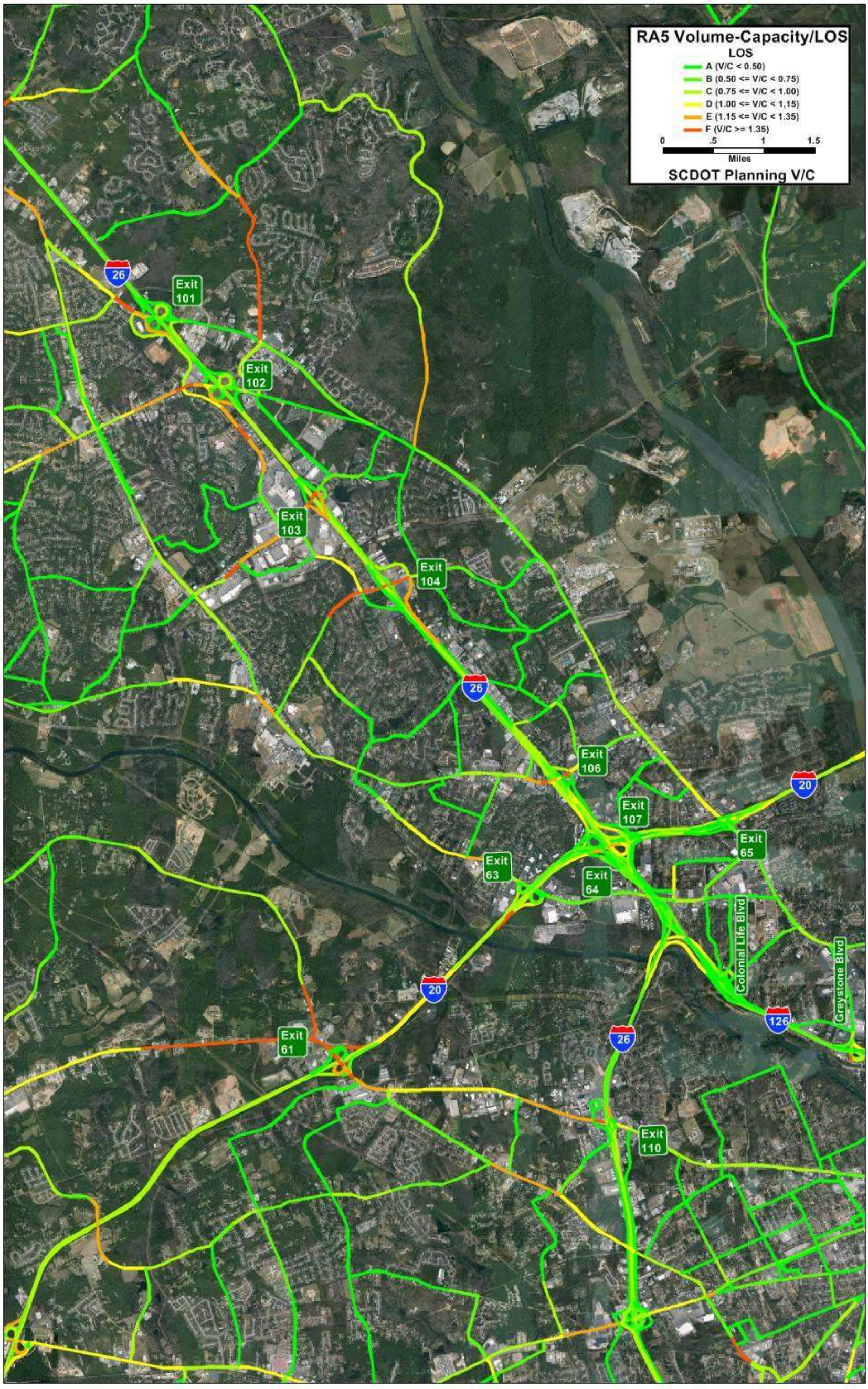


Figure 5-14: RA5 SCDOT Planning LOS Overview

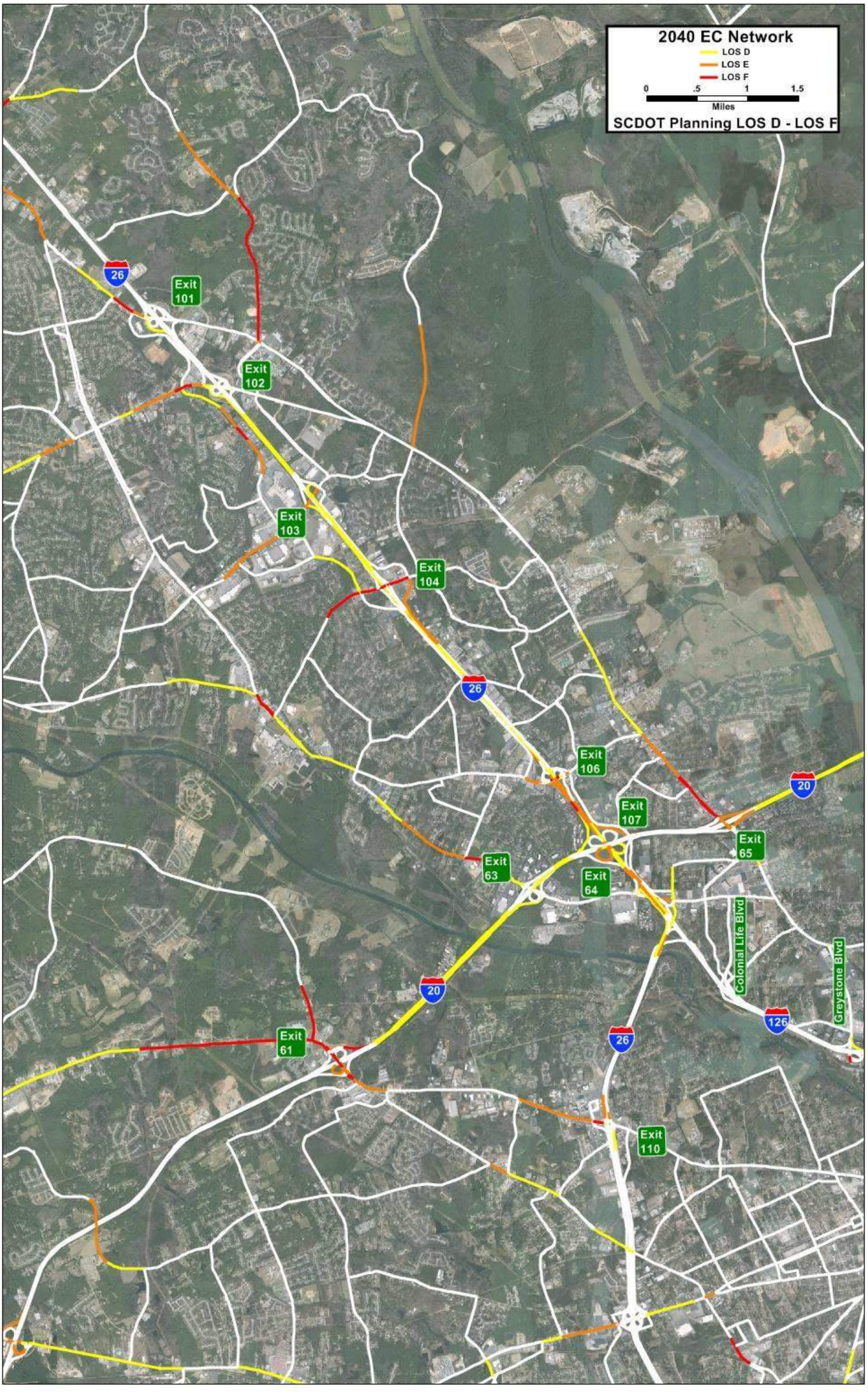


Figure 5-15: 2040 EC LOS D to LOS F Network Links

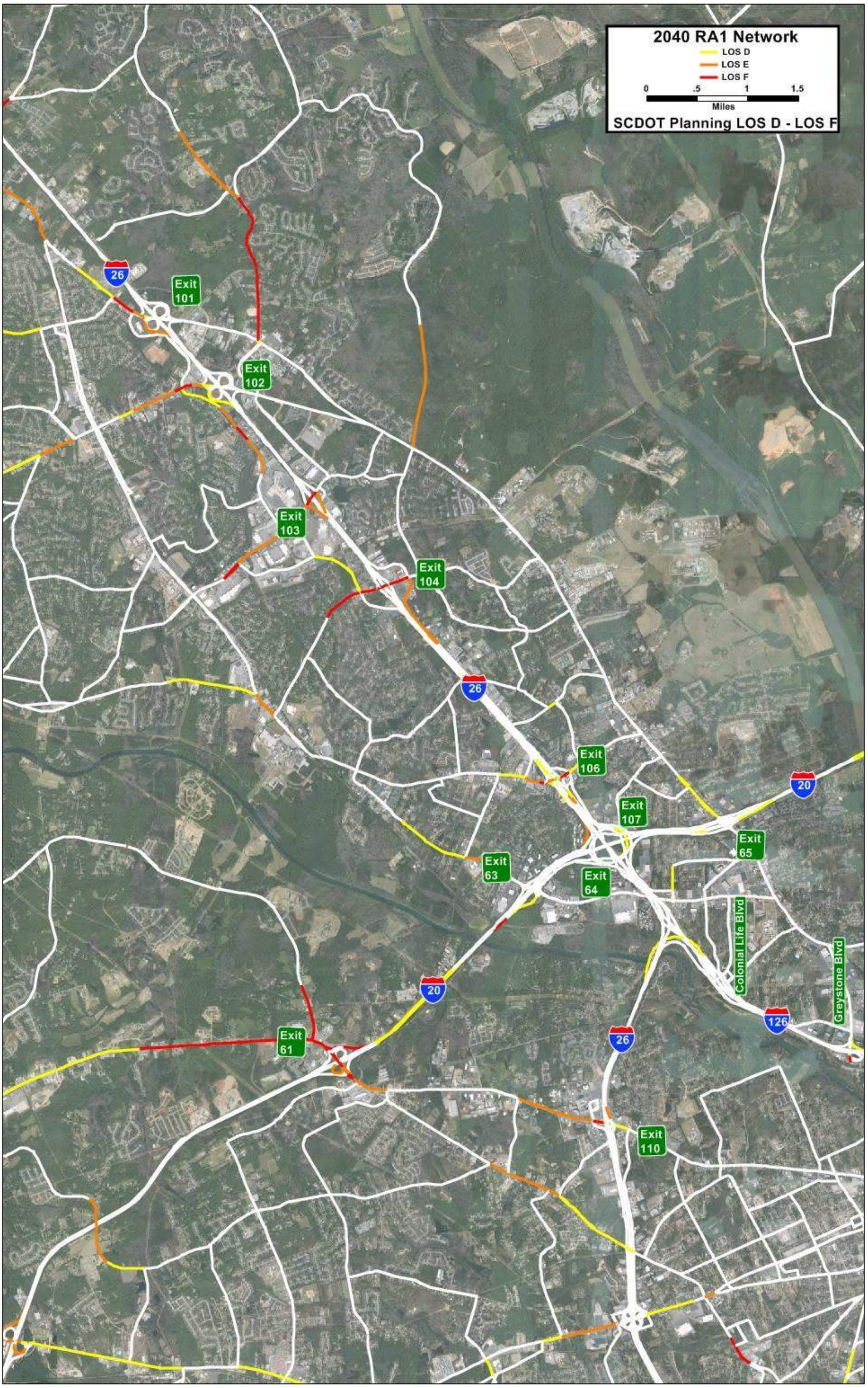


Figure 5-16: 2040 RA1 LOS D to LOS F Network Links

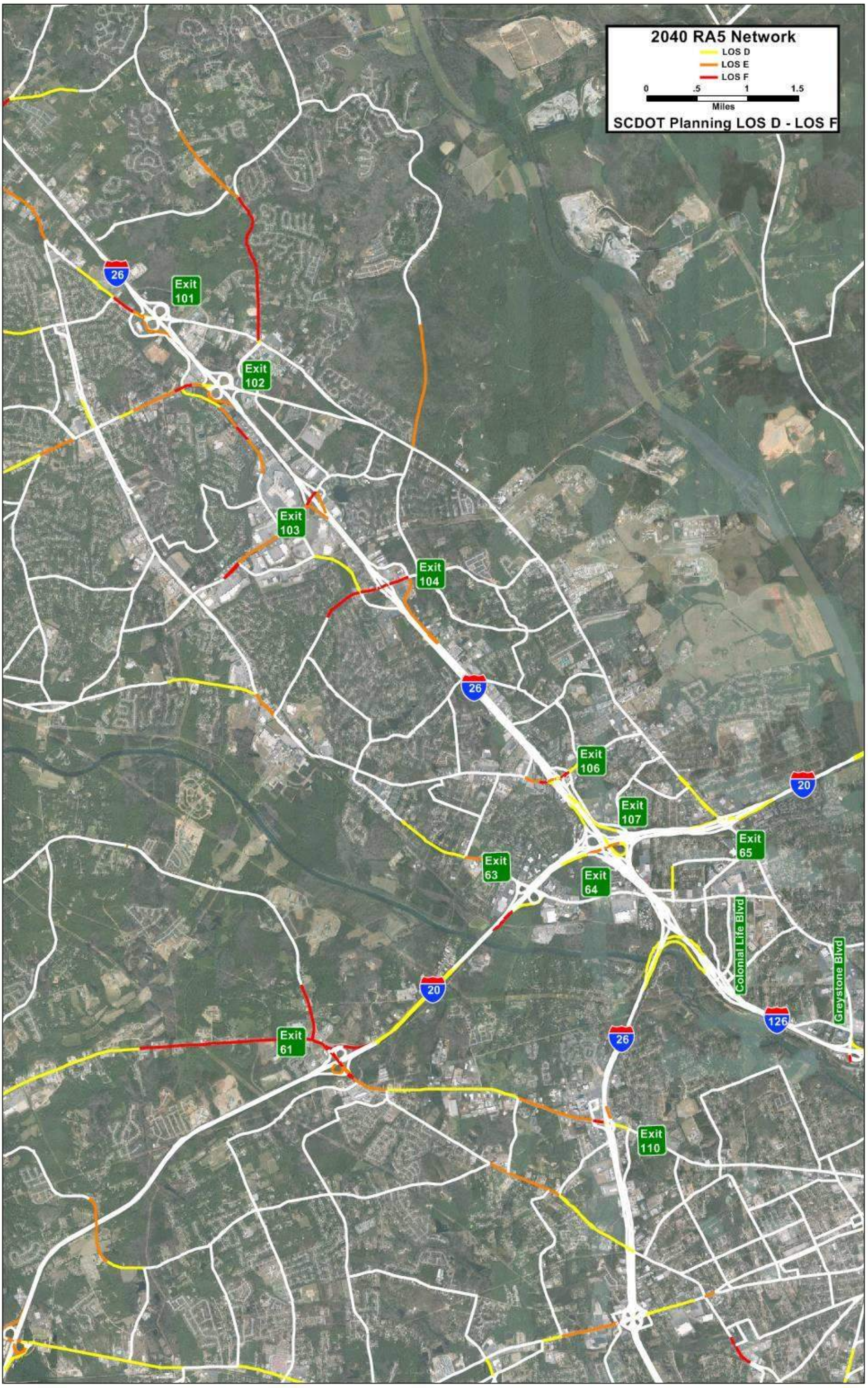


Figure 5-17: 2040 RA5 LOS D to LOS F Network Links

5.3 Analysis of Representative Alternatives

Each of the representative alternative TransModeler networks were run for the AM and PM Peak hours for 5 simulations runs and averaged to develop the outputs for the measures of effectiveness (MOEs). The following MOEs were analyzed for the representative alternative analysis:

- Mainline Volumes
- Mainline, Merge, and Diverge Density, v/C, and LOS
- Mainline Travel Times
- Arterial Travel Times
- Intersection LOS and Delay
- External to External Speeds and Travel Times

Discussion of the level 1B screening of the representative alternatives can be found in subsections under section 4.5.2 of the *Alternatives Development and Screening Report.*

5.3.1 RA1 ANALYSIS RESULTS

Mainline Volume Analysis

A summary of the Mainline Volume Analysis results is shown in **Table 5.3**, **Table 5.4** and **Table 5.5** for I-26, I-20 and I-126, respectively. These measures of effectiveness were incorporated into the level 1B screening of RA1 in section 4.5.2.3 of the *Alternatives Development and Screening Report.*

Table 5.3: I-26 Mainline Volume TransModeler Results – RA1

I-26 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
west of Exit 101 (Broad River Road)	4,623	2,861	3,610	5,433
Exit 101 to Exit 102 (Lake Murray Boulevard)	5,494	3,540	4,415	6,899
Exit 102 to Exit 103 (Harbison Boulevard)	5,809	3,991	4,989	7,045
Exit 103 to Exist 104 (Piney Grove Road)	6,413	4,559	5,639	7,584
Exit 104 to Exit 106 (St. Andrews Road/CD Road)	7,188	4,946	6,380	7,987
Exit 106 to Exit 107	5,852	3,182	4,810	5,788
I-26 to I-26	2,044	2,189	2,258	2,454
Exit 108 to Exit 110 (Sunset Boulevard)	3,191	2,189	3,437	2,454
southeast of Exit 110	3,451	4,299	4,016	4,762

Table 5.4: I-20 Mainline Volume TransModeler Results – RA1

I-20 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
west of Exit 61 (Sunset Boulevard)	4,285	1,884	2,971	3,819
Exit 61 to Exit 63 (Bush River Road/CD Road)	5,302	2,920	3,870	5,206
Exit 63 to Exit 65 (Broad River Road)	2,240	1,976	1,596	2,386
Exit 65 to Exit 68 (Monticello Road)	5,363	5,714	5,059	6,200
east of Exit 68	4,886	5,737	5,091	5,856

Table 5.5: I-126 Mainline Volume TransModeler Results – RA1

I-126 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
I-26 to Colonial Life Blvd	4,946	1,932	3,583	4,628
I-126 to I-26 WB	-	1,932	-	4,628
I-126 from Colonial Life Blvd to Greystone Blvd	5,947	3,229	3,810	7,181
I-126 from Greystone Blvd to Huger St	5,741	3,439	3,679	6,968

Basic Freeway Segment Analysis

A summary of the Basic Freeway Segment Analysis results is shown in **Table 5.6**, **Table 5.7** and **Table 5.8** for I-26, I-20 and I-126, respectively.

Table 5.6: I-26 Basic Freeway Segment TransModeler Results – RA1

Segment	RA1 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound						
Exit 101 to Exit 102	C	21.4	0.46	C	18.1	0.37
Exit 102 to Exit 103	C	26.0	0.61	C	23.1	0.52
Exit 103 to Exit 104	C	25.8	0.53	C	22.0	0.47
Exit 104 to Exit 107/Exit 106	E	35.6	0.60	C	24.3	0.53
Exit 107/106 to I-26 Split	F	77.9	0.52	E	36.8	0.43
I-26 to I-126	C	25.5	0.56	B	16.8	0.38
I-26 Split to Exit 110	C	18.6	0.40	F	45.2	0.46
I-26 Westbound						
Exit 110 to Exit 108	C	19.6	0.44	C	20.6	0.48
I-126 to I-26	C	22.0	0.46	C	22.7	0.51
I-26 Mege to Exit 106	B	15.7	0.34	D	28.8	0.59
Exit 106 to Exit 104	D	29.2	0.55	F	63.4	0.89
Exit 104 to Exit 103	C	22.1	0.38	D	33.1	0.63
Exit 103 to Exit 102	B	15.6	0.42	D	29.0	0.73
Exit 102 to Exit 101	B	14.2	0.29	D	26.9	0.57

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.7: I-20 Basic Freeway Segment TransModeler Results – RA1

Segment	RA1 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound						
west of Exit 61	E	44.5	0.60	C	25.7	0.41
Exit 61 to Exit 63	F	46.8	0.74	C	22.4	0.54
Exit 63 to Exit 68	D	30.5	0.56	D	28.3	0.53
Exit 65 to Exit 68	-	-	-	-	-	-
I-20 Westbound						
Exit 68 to Exit 65	D	30.4	0.79	E	39.8	0.86
Exit 65 to Exit 63	A	6.6	0.16	A	6.4	0.20
Exit 63 to Exit 61	B	13.8	0.30	F	81.8	0.54
west of Exit 61	B	17.3	0.26	E	37.9	0.53

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.8: I-126 Basic Freeway Segment TransModeler Results – RA1

Segment	RA1 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound						
I-26 to Colonial Life Blvd	C	19.9	0.55	C	18.5	0.40
Colonial Life Blvd to Greystone Blvd	C	25.8	0.62	B	15.9	0.40
Greystone Blvd to Huger St	D	28.8	0.60	B	15.9	0.38
I-126 Westbound						
Huger St to Greystone Blvd	B	14.9	0.36	D	31.3	0.73
Greystone Blvd to Colonial Life Blvd	B	16.4	0.34	E	38.4	0.75
Colonial Life Blvd to I-26	-	-	-	D	26.7	0.64

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The RA1 analysis results for the freeway segments, summarized in **Table 5.6**, **Table 5.7** and **Table 5.8** indicate the following:

- During the morning peak hour:
  - I-26 eastbound freeway segments between Exit 104 and the I-26 Split operate at LOS E or F. All other segments along I-26 eastbound, and all I-26 westbound segments operate at LOS D or better.
  - I-20 eastbound freeway segments west of Exit 61 to Exit 63 operate at LOS E or F, while other I-20 segments operate at LOS D or better.
  - All I-126 freeway segments during the morning peak hour operate at LOS D or better.
- During the afternoon peak hour:
  - I-26 eastbound freeway segment between Exit 106/107 and the I-26 split operates at a LOS E, and the I-26 split to Exit 110 operate at LOS F. I-26 westbound segments operate at LOS F from the Exit 106 to Exit 104, while all other segments operate at LOS D or better.
  - I-20 eastbound freeway segments operate at LOS D or better. I-20 westbound freeway segments between Exit 68 and Exit 65 as well as west of Exit 61 to Exit 63 operate at LOS E or F, while all other westbound segments operate at LOS D or better.
  - I-126 eastbound freeway segments operate at LOS C or better, while I-126 westbound freeway segments operate at LOS D or worse.

Ramp Merge Analysis

A summary of the Ramp Merge Analysis results is shown in **Table 5.9**, **Table 5.10** and **Table 5.11** for I-26, I-20 and I-126, respectively.

Table 5.9: I-26 Ramp Merge TransModeler Results – RA1

Segment	RA1 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound						
Exit 101	C	21.4	0.46	B	18.1	0.37
Exit 102	C	23.4	0.49	C	22.0	0.42
Exit 103	C	25.8	0.53	C	22.0	0.47
Exit 104	E	35.6	0.50	C	24.3	0.44
Exit CD Road	F	77.9	0.52	E	36.8	0.43
Exit 107 (From I-20)	B	12.6	0.27	B	15.5	0.29
Exit 108 (I-126)	B	18.6	0.32	F	45.2	0.37
Exit 110	B	18.3	0.36	B	19.1	0.42
I-26 Westbound						
Exit 110	B	18.6	0.44	B	19.0	0.48
Exit 108 (I-126)	B	15.3	0.34	C	26.6	0.59
Exit 107 (From I-20)	B	20.0	0.36	F	98.3	0.58
Exit 106	C	26.6	0.45	F	73.8	0.72
Exit 104	B	14.2	0.38	C	20.2	0.63
Exit 103	B	15.6	0.33	D	29.0	0.59
Exit 102	B	14.2	0.29	C	26.9	0.57
Exit 101	B	11.4	0.24	C	22.1	0.45

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.10: I-20 Ramp Merge TransModeler Results – RA1

Segment	RA1 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound						
Exit 61 Loop	C	24.1	0.46	B	16.4	0.35
Exit 61	F	46.8	0.56	C	22.4	0.40
Exit 65	D	30.5	0.45	D	28.3	0.42
Exit 65 (From CD)	B	15.2	0.36	B	16.8	0.32
Exit 68	C	26.2	0.51	D	28.1	0.53
I-20 Westbound						
Exit 68	D	30.4	0.60	E	39.8	0.65
Exit 65 (From CD)	A	6.6	0.16	A	6.4	0.20
Exit 63 (From CD)	A	9.7	0.21	C	20.2	0.35
Exit 63	B	11.9	0.24	F	46.7	0.45
Exit 61 Loop	A	8.8	0.18	B	14.5	0.38
Exit 61	B	12.5	0.20	D	29.0	0.40

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.11: I-126 Ramp Merge TransModeler Results – RA1

Segment	RA1 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound						
Colonial Life Blvd	C	21.7	0.50	B	14.3	0.32
Greystone Blvd	C	26.3	0.60	B	13.1	0.38
I-126 Westbound						
Colonial Life Blvd	A	8.9	0.27	C	22.1	0.66
Greystone Blvd	B	16.4	0.34	E	38.4	0.75

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The RA1 analysis results for the ramp merge areas, summarized in **Table 5.9**, **Table 5.10** and **Table 5.11** indicate the following:

- During the morning peak hour:
  - I-26 eastbound merge area at the CD Road operates at LOS F and at Exit 104 operate at LOS E. All other ramp merge areas operate at LOS C or better.

- I-20 eastbound and westbound merge areas operate at LOS D or better with the exception of Exit 61, where the merge area operates at LOS F.
- I-126 merge areas during the morning peak hour operate at LOS C or better.

- During the afternoon peak hour:
  - I-26 eastbound merge areas at the CD road and Exit 108 operate at LOS E and F, respectively, while all other segments operate at LOS C or better. All I-26 westbound merge areas operate at LOS D or better with the exception of Exit 107 and Exit 106 merge areas which operate at LOS F.
  - I-20 eastbound and westbound merge areas operate at LOS D or better with the exception of Exit 63 and Exit 68, where the merge area operates at LOS F and LOS E, respectively.
  - I-126 merge areas during the evening peak hour operate at LOS C or better, with the exception of the westbound Greystone Blvd merge area which operate at LOS E.

Ramp Diverge Analysis

A summary of the Ramp Diverge Analysis results is shown in **Table 5.12**, **Table 5.13** and **Table 5.14** for I-26, I-20 and I-126, respectively.

Table 5.12: I-26 Ramp Diverge TransModeler Results – RA1

Segment	RA1 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound						
Exit 101	C	23.5	0.48	B	18.1	0.38
Exit 101 Loop	B	17.7	0.37	B	13.5	0.29
Exit 102	C	21.4	0.46	B	18.1	0.37
Exit 102 Loop	C	20.1	0.43	B	16.5	0.35
Exit 103	C	23.4	0.60	C	22.2	0.52
Exit 104	C	25.8	0.53	C	22.0	0.47
Exit 106	F	89.1	0.54	D	29.9	0.50
Exit 107	F	45.3	0.56	C	26.7	0.53
Exit 110	B	19.2	0.40	F	48.2	0.45
I-26 Westbound						
Exit 110	D	28.9	0.45	F	65.1	0.49
Exit 107/I-126	C	20.2	0.44	C	21.1	0.48
Exit 106	B	14.0	0.34	C	25.1	0.59
Exit 104	C	26.7	0.44	F	73.6	0.71
Exit 103	B	14.2	0.38	C	21.3	0.63
Exit 102	B	18.7	0.41	D	34.5	0.73
Exit 102 Loop	B	16.5	0.31	C	27.0	0.57
Exit 101	B	14.2	0.29	C	26.9	0.57
Exit 101 Loop	B	10.9	0.26	C	22.1	0.52

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.13: I-20 Ramp Diverge TransModeler Results – RA1

Segment	RA1 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound						
Exit 61	D	29.2	0.44	B	18.5	0.31
Exit 63/64/65	C	22.8	0.43	B	17.0	0.32
Exit 68	E	38.2	0.71	D	32.5	0.70
I-20 Westbound						
Exit 68	E	39.6	0.79	F	66.1	0.81
Exit 65	D	33.2	0.38	E	43.1	0.43
Exit 65 (CD Road to I-26)	C	25.0	0.33	D	29.0	0.39
Exit 63	A	6.7	0.16	A	6.4	0.20
Exit 61	D	28.9	0.30	F	68.7	0.53

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.14: I-126 Ramp Diverge TransModeler Results – RA1

Segment	RA1 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound						
Colonial Life Boulevard	B	19.9	0.55	B	18.5	0.40
Greystone Boulevard	C	22.0	0.49	B	14.6	0.32
I-126 Westbound						
Greystone Boulevard	B	17.1	0.36	D	32.1	0.73
Colonial Life Boulevard	B	15.3	0.27	E	42.7	0.60
Colonial Life Boulevard to I-26 EB	B	13.3	0.30	E	38.1	0.68
Exit 107 (I-20)	B	11.2	0.27	D	29.5	0.66

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The RA1 analysis results for the ramp diverge areas, summarized in **Table 5.12**, **Table 5.13** and **Table 5.14** indicate the following:

- During the morning peak hour:
  - I-26 eastbound diverge areas between Exit 106 and Exit 107 operate at LOS F. All other ramp diverge areas in both the eastbound and westbound directions operate at LOS D or better.
  - I-20 eastbound and westbound diverges areas operate at LOS D or better with the exception of Exit 68, where the diverge areas operates at LOS E in both directions.
  - All I-126 diverge areas during the morning peak hour operate at LOS C or better.

- During the afternoon peak hour:
  - I-26 eastbound diverge area at Exit 110 operates at LOS F. All other eastbound segments operate at LOS D or better. All I-26 westbound diverge areas operate at LOS D or better with the exception of Exit 110 and Exit 104 which operate at LOS F.
  - I-20 eastbound diverge areas operate at LOS D or better. The westbound diverge areas operate at LOS D or better with the exception of Exit 65, which operates at LOS E and Exit 68 and Exit 61 which operate at LOS F.
  - I-126 diverge areas at Colonial Life Blvd operates at LOS E, while all other diverge areas operate at LOS D.

Mainline Travel Time Analysis

A summary of the Mainline Travel Time Analysis results is shown in **Table 5.15**.

Table 5.15: Mainline Travel Time TransModeler Results – RA1

Segments	Eastbound					Westbound				
	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)		Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM		AM	PM	AM	PM
I-26 between Exit 101 and Exit 110										
Exit 101 to Exit 102 (Lake Murray Boulevard)	0.76	00:46	00:45	58.6	60.4	0.90	00:54	00:58	59.9	56.5
Exit 102 to Exit 103 (Harbison Boulevard)	1.21	01:15	01:13	58.3	59.8	1.04	01:01	01:07	61.3	55.9
Exit 103 to Exist 104 (Piney Grove Road)	0.89	00:56	00:53	56.9	59.6	0.95	00:57	01:00	60.3	56.5
Exit 104 to Exit 107 (I-20)/ Exit106 (St. Andrews Road)	1.74	02:33	01:52	41.0	56.0	2.43	03:01	05:16	48.3	27.7
Exit 106 to I-26/I-126 Split	1.23	02:21	01:31	31.2	48.2	0.69	00:41	00:45	60.5	54.9
I-26 to I-126	1.22	01:14	01:15	59.4	58.3	0.73	00:42	00:42	62.8	62.8
I-26/I-126 Split to Exit 110 (Sunset Boulevard)	1.63	01:35	01:56	61.8	50.7	1.47	01:25	01:26	62.5	61.7
Total	**8.67**	**10:40**	**09:26**	**48.7**	**55.2**	**8.21**	**08:41**	**11:13**	**56.7**	**43.9**
I-20 between Exit 61 and Exit 68										
Exit 61 to Exit 63/64	1.83	02:42	01:50	40.7	59.8	2.32	02:26	04:31	18.7	30.8
Exit 63/64 to Exit 65	2.55	02:29	02:26	61.4	62.6	1.39	01:21	01:19	33.7	63.6
Exit 65 to Exist 68 (Monticello Road)	2.51	02:49	02:36	53.6	58.1	2.99	03:25	04:07	13.3	43.5
Total	**6.89**	**08:00**	**06:52**	**51.7**	**60.2**	**6.69**	**07:12**	**09:56**	**55.8**	**40.4**
I-126 between I-26 and Greystone Blvd										
I-26 to Colonial Life Blvd	1.13	01:20	01:18	50.8	52.0	0.97	00:56	01:08	48.4	51.4
Colonial Life Blvd to Greystone Blvd	1.49	01:32	01:28	58.3	61.1	1.13	01:06	01:37	41.4	41.8
Total	**2.61**	**02:52**	**02:46**	**54.8**	**56.8**	**2.11**	**02:02**	**02:46**	**62.1**	**45.8**

Arterial Travel Time Analysis

A summary of the Arterial Travel Time Analysis results is shown in **Table 5.16**.

Table 5.16: Arterial Travel Time TransModeler Results – RA1

Location	Eastbound					Westbound				
	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)		Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM		AM	PM	AM	PM
Broad River Road (west of Exit 101 to Greystone Blvd)	6.7	26:55	19:38	15.0	20.6	7.3	18:59	19:56	23.1	22.0
Lake Murray Boulevard (west of Exit 102 to Broad River Road)	1.5	03:51	05:01	23.9	18.3	1.5	03:27	04:08	25.4	21.2
Harbison Boulevard (west of Exit 103 to Broad River Road)	1.1	03:14	04:13	20.5	15.8	1.1	03:04	03:37	21.6	18.4
Piney Grove Road (west of Exit 104 to Broad River Road)	1.5	04:38	04:13	20.0	22.0	1.5	06:35	04:56	14.1	18.8
St. Andrews Road (west of Exit 106 to Broad River Road)	1.0	08:56	04:29	6.9	13.8	1.0	04:31	04:18	13.7	14.4
Bush River Road (west of Exit 63 to Broad River Road)	2.0	05:59	06:10	20.0	19.4	2.0	05:54	05:53	20.6	20.6
Location	Northbound					Southbound				
	Length (mi)	Travel Time		Average Speed		Length (mi)	Travel Time		Average Speed	
		AM	PM	AM	PM		AM	PM	AM	PM
Colonial Life Boulevard (I-126 Ramps to Bush River Road)	0.6	01:47	02:00	21.3	18.9	0.6	02:30	02:31	15.1	15.0

Intersection LOS and Delay Analysis

A summary of the Intersection LOS and Delay Analysis results is shown in **Table 5.18**.

External to External Speed and Travel Time Analysis

A summary of the External to External Speed and Travel Time Analysis results is shown in **Table 5.17**.

Table 5.17: External to External Speed and Travel Time TransModeler Results – RA1

Segments	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM
I-26 EB from West of Exit 101					
To I-26 EB (east of Exit 110)	13.84	18:45	13:28	44.3	61.7
To I-20 WB (west of Exit 61)	16.11	21:29	20:16	45.0	47.7
To I-20 EB (east of Exit 68)	15.64	25:59	19:08	36.1	49.1
To I-126 EB (Greystone Blvd)	14.78	21:21	14:56	41.5	59.4
I-26 WB from East of Exit 110					
To I-26 WB (west of Exit 110)	13.85	13:14	23:26	62.8	35.5
To I-20 EB (east of Exit 68)	8.40	10:26	11:09	48.3	45.2
I-20 EB from West of Exit 61					
To I-20 EB (east of Exit 68)	11.10	16:41	10:33	39.9	63.1
To I-26 WB (west of Exit 101)	16.64	22:33	29:08	44.3	34.3
To I-126 EB (east of Greystone Blvd)	10.33	17:37	11:03	35.2	56.1
I-20 WB from East of Exit 68					
To I-20 WB (east of Exit 61)	11.10	10:52	15:47	61.3	42.2
To I-26 EB (east of Exit 110)	8.92	10:13	13:51	52.4	38.7
To I-26 WB (west of Exit 101)	15.29	16:21	29:35	56.1	31.0
I-126 WB from East of Greystone Blvd					
To I-26 WB (wast of Exit 101)	14.75	14:43	26:40	60.2	33.2
To I-20 WB (west of Exit 61)	10.64	11:03	15:24	57.8	41.5

5.3.2 RA2 ANALYSIS RESULTS

Mainline Volume Analysis

A summary of the Mainline Volume Analysis results is shown in **Table 5.19**, **Table 5.20** and **Table 5.21** for I-26, I-20 and I-126, respectively. These measures of effectiveness were incorporated into the level 1B screening of RA2 in section 4.5.2.4 of the *Alternatives Development and Screening Report.*

Table 5.18: Intersection and LOS TransModeler Results – RA1

Node #	Intersection Name	AM		PM	
		LOS	Delay	LOS	Delay
Exit 101					
100000391	Broad River Road (US 176) at Columbiana Drive / Lordship Lane	B	17.7	A	4.0
100000150	Broad River Road (US 176) at I-26 EB Off-ramp[1]	B	15.2	F	85.1
100000151	Broad River Road (US 176) at I-26 EB On-ramp	A	3.9	A	4.4
100000160	Broad River Road (US 176) at I-26 WB On-ramp[2]	A	1.9	A	2.3
4	Broad River Road (US 176) at Western Lane	B	11.6	A	9.1
Exit 102					
100000395	Lake Murray Boulevard (SC 60) at Columbiana Drive	C	34.5	E	63.3
100000510	Lake Murray Boulevard (SC 60) at I-26 EB On-Ramp[2]	A	2.3	A	9.1
100000169	Lake Murray Boulevard (SC 60) at I-26 WB On-Ramp[2]	A	2.5	B	13.8
100000401	Lake Murray Boulevard (SC 60) at Parkridge Drive / Kinley Road	B	14.7	C	20.2
Exit 103					
100000364	Harbison Boulevard (S-757) at Columbiana Drive	B	15.1	B	11.4
100000365	Harbison Boulevard (S-757) at Park Terrace Drive / Columbiana Circle	A	7.4	C	26.2
100000362	Harbison Boulevard (S-757) at Saturn Parkway	A	5.2	B	11.9
104	Harbison Boulevard (S-757) at I-26 EB Ramps	B	16.0	B	11.7
99	Harbison Boulevard (S-757) at I-26 WB Ramps	C	20.5	D	42.1
100000165	Harbison Boulevard (S-757) at Woodcross Drive	B	19.9	D	40.5
Exit 104					
100000353	Piney Grove Road at Bower Parkway / Jamil Road	E	69.8	D	48.7
71	Piney Grove Road at I-26 EBR Off-ramp [1]	C	31.0	C	31.3
100000174	Piney Grove Road at I-26 EB Ramps	B	18.2	C	24.0
100000177	Piney Grove Road at I-26 WB Ramps	B	11.1	B	10.3
89	Piney Grove Road at I-26 WBR Off-ramp [1]	C	28.2	C	24.2
100000399	Piney Grove Road at Fernandina Road	C	24.3	D	35.8
Exit 106					
100000348	St. Andrews Road at Jamil Road	B	19.1	B	12.8
127	St. Andrews Road at Woodland Hills Road	B	13.9	A	8.8
40	St. Andrews Road at I-26 SPUI Intersection	D	30.6	E	41.2
100000182	St. Andrews Road at I-26 WBR Off-ramp	F	173.6	F	200.3
100000358	St. Andrews Road at Fernandina Road/Burning Tree Drive	C	17.2	D	30.0
100000354	St. Andrews Road at Kay Street / Chartwell Road	C	30.1	B	13.8
Exit 108					
100000256	Bush River Road at Zimalcrest Drive	A	9.6	A	9.1
100000898	Bush River Road at Driveway	A	4.2	A	5.3
100000252	Bush River Road at Morninghill Drive	C	22.9	C	21.3
100000184	Bush River Road at Arrowwood Road	B	16.2	B	19.4
Exit 110					
100000186	Sunset Boulevard (US 378) at E. Hospital Drive / Harbor Drive	D	45.1	F	159.4
100000093	Sunset Boulevard (US 378) at I-26 EBR Off-Ramp[1]	E	46.3	F	79.9
100000903	Sunset Boulevard (US 378) at I-26 Single Point Ramps Intersection	C	22.4	C	31.7
100000902	Sunset Boulevard (US 378) at I-26 WBR Off-Ramp[1]	D	33.6	F	55.6
100000163	Sunset Boulevard (US 378) at Chris Drive / McSwain Drive	A	6.8	F	80.0
Exit 63					
14	Bush River Road at Berryhill Drive[1]	B	10.4	B	17.4
134	Bush River Road at I-20 WB Ramps DDI Intersection	B	10.3	B	12.8
48	Bush River Road at I-20 EB Ramps DDI Intersection	B	11.2	B	10.5
120	Bush River Road at Rockland Road	A	5.7	B	14.7
100000255	Bush River Road at Independence Avenue	B	17.0	C	20.7
Exit 65					
100000187	Broad River Road at Marley Drive / Briargate Circle	D	44.7	C	34.8
54	Broad River Road at I-20 WB Ramps	C	26.4	B	13.5
79	Broad River Road at I-20 Single Point Ramps Intersection	C	31.3	C	31.6
100000190	Broad River Road at I-20 EB Ramps[1]	E	78.3	D	43.8
100000195	Broad River Road at Longcreek Drive	A	5.1	A	4.2
Additional Intersections					
100000012	Broad River Road (US 176) at Kinley Road	E	60.8	D	38.1
100000037	Broad River Road (US 176) at Harbison Boulevard	B	14.0	C	23.2
100000049	Broad River Road (US 176) at Piney Woods Road / Lost Creek Drive	C	22.1	C	20.5
100000068	Broad River Road (US 176) at Piney Grove Road	A	5.3	B	10.4
100000339	Broad River Road (US 176) at St. Andrews Road	F	131.7	D	44.5
100000349	Broad River Road (US 176) at St. Andrews Parkway	C	33.8	C	21.1
100000344	Broad River Road (US 176) at Seminole Road / Young Drive	F	92.7	E	73.1
41	Broad River Road (US 176) at Dutch Square Boulevard	A	6.3	C	27.3
100000046	Broad River Road (US 176) at Bush River Road	C	27.3	E	71.2
100000266	Broad River Road (US 176) at Greystone Boulevard	B	12.3	B	14.6
100000265	Greystone Boulevard at Stoneridge Drive	C	23.9	D	48.9
100000188	Greystone Boulevard at I-126 WB Ramps[1]	E	37.2	C	21.3
100000185	Greystone Boulevard at I-126 EB Ramps[1]	C	25.0	F	70.6
100000262	Bush River Road at Colonial Life Boulevard	B	18.0	C	22.8
100000897	Colonial Life Boulevard at West Colonial Life Road[1]	E	37.2	A	4.1
100000374	Park Terrance Drive at Bower Parkway	A	8.7	B	11.2

[1] Intersection unsignalized under all scenarios; worst approach LOS and delay reported.

[2] Delay unable to be processed per HCM 2010 methodology; Average control delay reported.

Table 5.19: I-26 Mainline Volume TransModeler Results – RA2

I-26 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
west of Exit 101 (Broad River Road)	4,816	3,211	3,608	5,118
Exit 101 to Exit 102 (Lake Murray Boulevard)	5,438	3,839	4,246	5,918
Exit 102 to Exit 103 (Harbison Boulevard)	4,997	4,130	4,886	6,098
Exit 103 to Exist 104 (Piney Grove Road)	4,937	4,634	5,777	6,903
Exit 104 to Exit 106 (St. Andrews Road/CD Road)	5,027	5,298	5,612	7,900
Exit 106 to Exit 107	1,629	5,141	1,646	7,885
I-126 Diverge to I-126 Merge	2,944	1,687	3,122	2,170
Exit 108 to Exit 110 (Sunset Boulevard)	3,813	4,601	4,330	5,067
southeast of Exit 110	3,234	4,388	4,309	4,774

Table 5.20: I-20 Mainline Volume TransModeler Results – RA2

I-20 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
west of Exit 61 (Sunset Boulevard)	4,437	1,952	2,948	3,763
Exit 61 to Exit 63 (Bush River Road/CD Road)	4,748	2,797	4,110	4,918
Exit 63 to Exit 65 (Broad River Road)	2,312	1,236	1,577	1,491
Exit 65 to Exit 68 (Monticello Road)	5,751	4,488	5,246	4,785
east of Exit 68	5,268	5,215	5,273	4,522

Table 5.21: I-126 Mainline Volume TransModeler Results – RA2

I-126 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
I-26 to Colonial Life Blvd	3,748	1,829	3,118	4,079
I-126 from Colonial Life Blvd to Greystone Blvd	5,274	3,322	3,899	7,218
I-126 from Greystone Blvd to Huger St	5,390	3,514	3,564	7,003

Basic Freeway Segment Analysis

A summary of the Basic Freeway Segment Analysis results is shown in **Table 5.22**, **Table 5.23** and **Table 5.24** for I-26, I-20 and I-126, respectively.

Table 5.22: I-26 Basic Freeway Segment TransModeler Results – RA2

Segment	RA2 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound						
Exit 101 to Exit 102	F	76.1	0.57	B	17.0	0.44
Exit 102 to Exit 103	B	14.1	0.52	C	18.6	0.51
Exit 103 to Exit 104	B	12.1	0.51	C	23.9	0.60
Exit 104 to Exit 106	F	139.9	0.52	F	114.4	0.58
Exit 106 to Exit 107	B	12.1	0.24	B	13.1	0.24
I-26 to I-26	B	13.2	0.41	B	13.6	0.43
Exit 108 to Exit 110	C	21.0	0.53	C	21.3	0.60
I-26 Westbound						
Exit 110 to Exit 108	D	26.5	0.48	C	24.6	0.53
I-126 Diverge to I-126 Merge	B	12.5	0.23	B	13.2	0.30
Exit 107 to Exit 106	C	19.4	0.38	F	57.1	0.58
Exit 106 to Exit 104	C	19.4	0.39	F	74.8	0.59
Exit 104 to Exit 103	C	23.4	0.48	F	58.2	0.72
Exit 103 to Exit 102	B	16.5	0.43	C	23.0	0.64
Exit 102 to Exit 101	B	13.9	0.40	D	33.8	0.62

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.23: I-20 Basic Freeway Segment TransModeler Results – RA2

Segment	RA2 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound						
west of Exit 61	F	46.3	0.62	C	25.4	0.41
Exit 61 to Exit 63	F	59.3	0.66	E	40.8	0.57
Exit 63 to Exit 65	A	10.9	0.24	A	7.9	0.16
Exit 65 to Exit 68	D	33.0	0.73	D	32.1	0.73
I-20 Westbound						
Exit 68 to Exit 65	F	101.6	0.62	F	108.3	0.66
Exit 65 to Exit 63	A	8.2	0.17	A	9.0	0.21
Exit 63 to Exit 61	D	29.3	0.39	F	86.2	0.68
west of Exit 61	C	18.1	0.27	E	36.2	0.52

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.24: I-126 Basic Freeway Segment TransModeler Results – RA2

Segment	RA2 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound						
I-26 to Colonial Life Blvd	B	14.1	0.57	B	12.2	0.47
Colonial Life Blvd to Greystone Blvd	C	21.6	0.55	B	16.0	0.41
Greystone Blvd to Huger St	C	24.8	0.56	B	15.0	0.37
I-126 Westbound						
Huger St to Greystone Blvd	B	16.0	0.37	D	30.9	0.73
Greystone Blvd to Colonial Life Blvd	B	16.3	0.35	F	58.1	0.75
Colonial Life Blvd to I-26	B	12.8	0.27	D	29.7	0.60

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The RA2 analysis results for the freeway segments, summarized in **Table 5.22**, **Table 5.23** and **Table 5.24** indicate the following:

- During the morning peak hour:
  - I-26 eastbound freeway segments between Exit 101 to 102 and 104 to 106 operate at LOS F. All other segments along I-26 eastbound, and all I-26 westbound segments operate at LOS D or better.
  - I-20 eastbound freeway segments west of Exit 61 to Exit 63 operate at LOS E or F. The westbound freeway segment from Exit 68 to Exit 65 operates at LOS F, while all other I-20 segments operate at LOS D or better.
  - All I-126 freeway segments during the morning peak hour operate at LOS C or better.
- During the afternoon peak hour:
  - I-26 eastbound freeway segment between 104 and Exit 106 operates at a LOS F. I-26 westbound segments operate at LOS F from the Exit 107 to Exit 103, while all other segments operate at LOS D or better.
  - I-20 eastbound freeway segments operate at LOS D or better except from Exit 61 to Exit 63 which operates at LOS E. I-20 westbound freeway segments between Exit 68 and Exit 65 as well as west of Exit 61 to Exit 63 operate at LOS E or F, while all other westbound segments operate at LOS A.
  - I-126 eastbound freeway segments operate at LOS B, while I-126 westbound freeway segments operate at LOS D or worse.

Ramp Merge Analysis

A summary of the Ramp Merge Analysis results is shown in **Table 5.25**, **Table 5.26** and **Table 5.27** for I-26, I-20 and I-126, respectively.

Table 5.25: I-26 Ramp Merge TransModeler Results – RA2

Segment	RA2 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound						
Exit 101	F	76.1	0.57	B	17.0	0.44
Exit 102	B	14.1	0.42	B	18.6	0.41
Exit 103	B	12.1	0.41	C	23.9	0.48
Exit 104	F	125.3	0.47	F	98.9	0.50
Exit CD Road	F	139.9	0.52	F	114.4	0.58
Exit 107 (From I-20)	B	13.2	0.31	B	13.6	0.33
Exit 108 (I-126)	C	21.0	0.40	C	21.3	0.45
Exit 110	B	14.8	0.34	C	21.2	0.45
I-26 Westbound						
Exit 110	D	28.1	0.38	C	27.6	0.42
Exit 108 (I-126)	B	18.1	0.31	D	29.0	0.56
Exit 107 (From I-20)	B	19.4	0.38	F	57.1	0.59
Exit 106	B	19.4	0.39	F	74.8	0.59
Exit 104	C	27.2	0.47	F	80.6	0.67
Exit 103	B	16.5	0.34	C	23.0	0.51
Exit 102	B	13.9	0.32	D	33.8	0.49
Exit 101	B	18.3	0.33	C	25.8	0.53

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.26: I-20 Ramp Merge TransModeler Results – RA2

Segment	RA2 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound						
Exit 61 Loop	C	27.1	0.44	B	19.5	0.36
Exit 65	D	29.6	0.48	C	27.2	0.44
Exit 68	D	29.9	0.57	D	30.1	0.55
I-20 Westbound						
Exit 68	F	82.6	0.53	F	99.2	0.50
Exit 64 (From CD)	B	10.0	0.19	C	24.7	0.33
Exit 63	B	13.4	0.23	F	63.1	0.42
Exit 61	B	13.6	0.20	D	29.4	0.39

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.27: I-126 Ramp Merge TransModeler Results – RA2

Segment	RA2 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound						
Colonial Life Blvd	C	20.5	0.55	B	14.1	0.41
Greystone Blvd	C	23.3	0.56	B	12.2	0.37
I-126 Westbound						
Greystone Blvd	B	18.3	0.35	F	58.0	0.76
Colonial Life Blvd	B	10.3	0.27	F	61.8	0.62

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The RA2 analysis results for the ramp merge areas, summarized in **Table 5.25**, **Table 5.26** and **Table 5.27** indicate the following:

- During the morning peak hour:
  - I-26 eastbound merge area at the Exit 101, Exit 104, and CD Road operates at LOS F. All other ramp merge areas operate at LOS D or better.
  - I-20 eastbound and westbound merge areas operate at LOS D or better with the exception of Exit 68, where the westbound merge area operates at LOS F.
  - I-126 merge areas during the morning peak hour operate at LOS C or better.
- During the afternoon peak hour:
  - I-26 eastbound merge areas at the CD road and Exit 104 operate at LOS F, while all other segments operate at LOS C or better. All I-26 westbound merge areas operate at LOS D or better with the exception of Exit 107, Exit 106, and Exit 104 merge areas which operate at LOS F.
  - I-20 eastbound and westbound merge areas operate at LOS D or better with the exception of Exit 63 and Exit 68, where the merge area operates at LOS F in the westbound direction.
  - I-126 eastbound merge areas during the evening peak hour operate at LOS B, whereas westbound merge areas operate at LOS F.

Ramp Diverge Analysis

A summary of the Ramp Diverge Analysis results is shown in **Table 5.28**, **Table 5.29** and **Table 5.30** for I-26, I-20 and I-126, respectively.

Table 5.28: I-26 Ramp Diverge TransModeler Results – RA2

Segment	RA2 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound						
Exit 101	D	30.5	0.67	C	20.2	0.50
Exit 102	F	76.1	0.55	B	17.0	0.44
Exit 103	B	15.6	0.52	C	20.3	0.51
Exit 104	B	12.5	0.41	C	24.0	0.48
Exit 106	F	139.9	0.52	F	114.4	0.58
Exit 110	C	24.2	0.53	C	24.0	0.60
I-26 Westbound						
Exit 110	D	30.8	0.46	E	40.0	0.49
Exit 108 (CD Road/I-126)	C	26.5	0.48	C	24.6	0.53
Exit 104	C	27.2	0.47	F	80.6	0.67
Exit 103	C	22.9	0.50	F	65.2	0.71
Exit 102	B	16.6	0.43	C	23.1	0.64
Exit 101	B	14.0	0.40	D	34.1	0.62

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.29: I-20 Ramp Diverge TransModeler Results – RA2

Segment	RA2 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound						
Exit 61	E	35.4	0.46	B	18.5	0.31
Exit 63	F	55.6	0.51	E	40.8	0.43
Exit 68	E	42.5	0.80	E	37.7	0.73
I-20 Westbound						
Exit 68	F	84.1	0.69	F	131.1	0.61
Exit 65	F	88.0	0.49	F	98.3	0.50
Exit 61	F	51.6	0.37	F	95.1	0.66

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.30: I-126 Ramp Diverge TransModeler Results – RA2

Segment	RA2 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound						
Colonial Life Boulevard	B	14.1	0.43	B	12.2	0.35
Greystone Boulevard	B	19.3	0.44	B	15.6	0.32
I-126 Westbound						
Greystone Boulevard	B	18.4	0.37	D	33.4	0.73
Colonial Life Boulevard	C	21.0	0.35	F	70.2	0.75

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The RA2 analysis results for the ramp diverge areas, summarized in **Table 5.28**, **Table 5.29** and **Table 5.30** indicate the following:

- During the morning peak hour:
  - I-26 eastbound diverge areas between Exit 102 and Exit 106 operate at LOS F. All other ramp diverge areas in both the eastbound and westbound directions operate at LOS D or better.
  - I-20 eastbound and westbound diverges areas operate at LOS E or worse in both directions.
  - All I-126 diverge areas during the morning peak hour operate at LOS C or better.
- During the afternoon peak hour:
  - I-26 eastbound diverge area at Exit 106 operates at LOS F. All other eastbound segments operate at LOS C or better. All I-26 westbound diverge areas operate at LOS D or better with the exception of Exit 103 and Exit 104 which operate at LOS F, and Exit 110 which operates at LOS E.
  - I-20 eastbound and westbound diverge areas operate at LOS E or worse except for eastbound at Exit 61 which operates at LOS B.
  - I-126 westbound diverge area at Colonial Life Blvd operates at LOS F, while all other diverge areas operate at LOS D or better.

Mainline Travel Time Analysis

A summary of the Mainline Travel Time Analysis results is shown in **Table 5.31**.

Table 5.31: Mainline Travel Time TransModeler Results – RA2

Segments	Eastbound					Westbound				
	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)		Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM		AM	PM	AM	PM
I-26 between Exit 101 and Exit 110										
Exit 101 to Exit 102 (Lake Murray Boulevard)	0.76	01:16	00:45	36.1	60.8	1.23	01:11	01:23	62.0	53.1
Exit 102 to Exit 103 (Harbison Boulevard)	1.15	01:09	01:08	59.5	60.3	1.08	01:03	01:08	61.2	57.1
Exit 103 to Exist 104 (Piney Grove Road)	0.95	00:58	01:00	58.8	57.7	0.85	00:51	01:24	59.4	36.3
Exit 104 to Exit 106 (St. Andrews Road)	1.78	07:00	04:56	15.2	21.6	1.39	01:45	03:50	47.4	21.6
Exit 106 to I-126	2.55	02:46	02:46	55.6	55.5	2.61	03:02	03:56	51.6	39.9
I-126 to Exit 110 (Sunset Boulevard)	1.53	01:29	01:30	61.8	61.5	1.31	01:23	01:21	57.1	58.1
Total	**8.72**	**14:38**	**12:04**	**35.8**	**43.4**	**8.46**	**09:16**	**13:02**	**54.8**	**38.9**
I-20 between Exit 61 and Exit 68										
Exit 61 to Exit 63/64/65 (Bush River Road)	1.52	02:42	02:14	33.7	40.9	4.08	04:41	06:07	52.3	40.0
Exit 63/64/65 to Exit 68 (Monticello Road)	5.11	05:18	05:06	57.8	60.2	2.71	08:33	10:39	19.0	15.3
Total	**6.63**	**08:01**	**07:19**	**49.7**	**54.3**	**6.79**	**13:13**	**16:46**	**30.8**	**24.3**
I-126 between I-26 and Greystone Blvd										
I-26 to Colonial Life Blvd	0.59	00:36	00:35	58.9	60.3	0.99	01:01	01:42	57.8	34.9
Colonial Life Blvd to Greystone Blvd	1.40	01:22	01:22	61.3	61.4	1.14	01:06	01:54	62.0	36.1
Total	**1.99**	**01:58**	**01:57**	**60.5**	**61.1**	**2.13**	**02:08**	**03:36**	**60.0**	**35.5**

Arterial Travel Time Analysis

A summary of the Arterial Travel Time Analysis results is shown in **Table 5.32**.

Table 5.32: Arterial Travel Time TransModeler Results – RA2

Location	Eastbound					Westbound				
	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)		Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM		AM	PM	AM	PM
Broad River Road (west of Exit 101 to Greystone Blvd)	7.9	45:12	25:03	10.4	18.8	7.9	22:32	28:59	20.9	16.3
Lake Murray Boulevard (west of Exit 102 to Broad River Road)	1.5	06:54	06:18	13.4	14.7	1.5	04:11	04:31	21.1	19.6
Harbison Boulevard (west of Exit 103 to Broad River Road)	1.1	04:15	04:58	15.3	13.1	1.1	03:20	03:22	19.4	19.2
Piney Grove Road (west of Exit 104 to Broad River Road)	1.6	06:00	05:10	15.6	18.1	1.6	07:19	05:30	12.8	17.1
St. Andrews Road (west of Exit 106 to Broad River Road)	1.0	04:27	06:24	13.7	9.5	1.0	04:41	05:30	13.0	11.0
Bush River Road (west of Exit 63 to Broad River Road)	2.0	07:47	07:58	15.1	14.7	2.0	06:36	08:00	17.8	14.7
Location	**Northbound**					**Southbound**				
	Length (mi)	Travel Time		Average Speed		Length (mi)	Travel Time		Average Speed	
		AM	PM	AM	PM		AM	PM	AM	PM
Colonial Life Boulevard (I-126 Ramps to Bush River Road)	0.7	02:15	02:40	17.5	14.7	0.7	02:21	02:15	16.7	17.4

Intersection LOS and Delay Analysis

A summary of the Intersection LOS and Delay Analysis results is shown in **Table 5.33**.

Table 5.33: Intersection and LOS TransModeler Results – RA2

Node #	Intersection Name	AM		PM	
		LOS	Delay	LOS	Delay
Exit 101					
106	Broad River Road (US 176) at Columbiana Drive / Lordship Lane	C	28.1	A	10.0
108	Broad River Road (US 176) at I-26 EBR Off-ramp[1]	A	0.8	A	0.1
101	Broad River Road (US 176) at I-26 EB Ramps	B	18.2	B	11.7
104	Broad River Road (US 176) at I-26 WB Ramps	B	16.9	C	22.9
100000522	Broad River Road (US 176) at I-26 WBR Off-ramp[1]	A	5.7	A	2.8
4	Broad River Road (US 176) at Western Lane	C	30.1	B	11.9
Exit 102					
100000395	Lake Murray Boulevard (SC 60) at Columbiana Drive	D	52.8	F	98.8
103	Lake Murray Boulevard (SC 60) at I-26 EB Off-Ramp	B	17.1	A	9.4
100000169	Lake Murray Boulevard (SC 60) at I-26 WB Ramps	C	30.7	D	45.4
100000516	Lake Murray Boulevard (SC 60) at I-26 WBR Off-Ramp[1]	A	0.6	A	6.8
100000401	Lake Murray Boulevard (SC 60) at Parkridge Drive / Kinley Road	C	24.3	C	33.1
Exit 103					
100000364	Harbison Boulevard (S-757) at Columbiana Drive	C	32.4	A	9.7
100000365	Harbison Boulevard (S-757) at Park Terrace Drive / Columbiana Circle	A	6.8	C	27.4
100000362	Harbison Boulevard (S-757) at Saturn Parkway	B	10.3	A	8.3
112	Harbison Boulevard (S-757) at I-26 EBR Off-Ramp	A	2.5	A	2.8
121	Harbison Boulevard (S-757) at I-26 SPUI Interchange	D	37.6	D	38.9
99	Harbison Boulevard (S-757) at I-26 WBR Off-Ramp	A	3.4	B	14.7
100000165	Harbison Boulevard (S-757) at Woodcross Drive	B	17.1	C	28.9
Exit 104					
100000353	Piney Grove Road at Bower Parkway / Jamil Road	F	82.1	E	65.6
152	Piney Grove Road at West DDI Intersection	B	15.8	B	18.2
100000174	Piney Grove Road at I-26 EBL Off-Ramp	A	0.6	B	10.4
123	Piney Grove Road at I-26 WBL Off-Ramp	B	16.4	B	11.2
154	Piney Grove Road at East DDI Interchange	C	22.2	B	14.2
100000399	Piney Grove Road at Fernandina Road	C	26.4	D	36.2
Exit 106					
100000348	St. Andrews Road at Jamil Road	E	60.4	D	44.2
100000178	St. Andrews Road at West DDI Intersection	B	19.5	B	14.2
54	St. Andrews Road at I-26 EBL Off-Ramp	A	0.2	A	0.3
45	St. Andrews Road at I-26 WBL Off-Ramp	A	8.5	A	6.5
142	St. Andrews Road at East DDI Intersection	B	11.0	B	19.5
100000354	St. Andrews Road at Kay Street / Chartwell Road	C	27.9	E	56.2
Exit 108					
100000256	Bush River Road at Zimalcrest Drive	B	10.3	B	11.0
100000898	Bush River Road at Driveway	A	6.4	A	4.0
100000252	Bush River Road at Morninghill Drive	B	19.1	C	21.6
100000184	Bush River Road at Arrowwood Road	C	27.2	C	21.7
Exit 110					
100000186	Sunset Boulevard (US 378) at E. Hospital Drive / Harbor Drive	F	148.1	D	35.6
100000093	Sunset Boulevard (US 378) at I-26 EBR Off-Ramp[1]	E	46.4	E	45.9
100000903	Sunset Boulevard (US 378) at I-26 Ramps	C	26.5	C	24.0
100000902	Sunset Boulevard (US 378) at I-26 WBR Off-Ramp[1]	D	29.2	F	50.1
100000163	Sunset Boulevard (US 378) at Chris Drive / McSwain Drive	A	5.8	D	35.4
Exit 63					
171	Bush River Road at Outlet Pointe Boulevard / E Meadow Court	B	11.4	C	30.3
164	Bush River Road at I-20 EBR Off-Ramp	B	10.5	A	5.1
64	Bush River Road at I-20 SPUI Interchange	D	36.0	D	37.1
100000142	Bush River Road at I-20 WBR Off-Ramp	A	5.3	A	4.4
100000255	Bush River Road at Independence Avenue	D	50.2	E	64.5
Exit 65					
100000187	Broad River Road at Marley Drive / Briargate Circle	C	32.3	C	21.6
91	Broad River Road at I-20 WB Ramps	D	42.4	D	48.2
37	Broad River Road at I-20 WBL Off-Ramp	A	4.8	A	3.6
98	Broad River Road at I-20 EB Ramps	B	17.9	B	18.4
100000195	Broad River Road at Longcreek Drive	A	1.4	A	5.8
Additional Intersections					
100000012	Broad River Road (US 176) at Kinley Road	E	66.6	E	60.2
100000037	Broad River Road (US 176) at Harbison Boulevard	D	37.3	B	19.4
100000049	Broad River Road (US 176) at Piney Woods Road / Lost Creek Drive	C	31.1	C	20.7
100000068	Broad River Road (US 176) at Piney Grove Road	D	46.4	B	12.3
100000339	Broad River Road (US 176) at St. Andrews Road	F	207.4	E	55.3
100000349	Broad River Road (US 176) at St. Andrews Parkway	B	11.5	B	14.6
100000344	Broad River Road (US 176) at Seminole Road / Young Drive	E	74.5	C	34.3
41	Broad River Road (US 176) at Dutch Square Boulevard	A	5.7	D	45.2
100000046	Broad River Road (US 176) at Bush River Road	F	93.7	F	120.2
100000266	Broad River Road (US 176) at Greystone Boulevard	B	15.9	B	18.9
100000265	Greystone Boulevard at Stoneridge Drive	D	37.9	C	33.1
100000188	Greystone Boulevard at I-126 WB Ramps	A	4.6	A	1.6
100000185	Greystone Boulevard at I-126 EB Ramps[1]	E	42.5	F	67.9
100000262	Bush River Road at Colonial Life Boulevard	B	16.7	C	20.9
166	Colonial Life Boulevard at West Colonial Life Road[1]	A	7.7	C	17.4
163	Colonial Life Boulevard at I-126 EB Ramps	C	20.4	B	15.0
100000374	Park Terrance Drive at Bower Parkway	D	51.2	B	13.6

[1] Intersection unsignalized under all scenarios; worst approach LOS and delay reported.

[2] Delay unable to be processed per HCM 2010 methodology; Average control delay reported.

External to External Speed and Travel Time Analysis

A summary of the External to External Speed and Travel Time Analysis results is shown in **Table 5.34**.

Table 5.34: External to External Speed and Travel Time TransModeler Results – RA2

Segments	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM
I-26 EB from West of Exit 101					
To I-26 EB (east of Exit 110)	13.86	21:19	14:39	39.0	56.8
To I-20 WB (west of Exit 61)	16.07	27:54	22:11	34.6	43.5
To I-20 EB (east of Exit 68)	15.55	27:48	18:52	33.6	49.4
To I-126 EB (Greystone Blvd)	14.81	29:30	18:28	30.1	48.1
I-26 WB from East of Exit 110					
To I-26 WB (west of Exit 101)	13.87	13:23	15:21	62.2	54.2
To I-20 EB (east of Exit 68)	8.45	09:31	09:50	53.2	51.6
I-20 EB from West of Exit 61					
To I-20 EB (east of Exit 68)	11.10	17:19	10:57	38.4	60.8
To I-26 WB (west of Exit 101)	16.28	22:56	22:08	42.6	44.1
To I-126 EB (east of Greystone Blvd)	10.36	24:10	13:11	25.7	47.1
I-20 WB from East of Exit 68					
To I-20 WB (east of Exit 61)	11.10	15:34	23:38	42.8	28.2
To I-26 EB (east of Exit 110)	8.61	16:26	22:50	31.4	22.6
To I-26 WB (west of Exit 101)	15.35	21:06	30:42	43.6	30.0
I-126 WB from East of Greystone Blvd					
To I-26 WB (west of Exit 101)	14.75	14:52	19:02	59.5	46.5
To I-20 WB (west of Exit 61)	10.67	11:05	16:08	57.8	39.7

5.3.3 RA3 ANALYSIS RESULTS

Mainline Volume Analysis

A summary of the Mainline Volume results is shown in **Table 5.35, Table 5.36** and **Table 5.37** for I-26, I-20 and I-126, respectively. These measures of effectiveness were incorporated into the level 1B screening of RA3 in section 4.5.2.5 of the *Alternatives Development and Screening Report.*

Table 5.35: I-26 Mainline Volume TransModeler Results – RA3

I-26 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
west of Exit 101 (Broad River Road)	4,811	3,285	3,592	5,194
Exit 101 to Exit 102 (Lake Murray Boulevard)	6,205	4,165	4,470	6,330
Exit 102 to Exit 103 (Harbison Boulevard)	6,193	4,500	5,106	6,997
Exit 103 to Exist 104 (Piney Grove Road)	6,620	5,113	5,567	6,775
Exit 104 to Exit 106 (St. Andrews Road)	6,932	5,436	6,062	7,858
Exit 106 to Exit 107 (I-20)	6,425	5,257	4,696	7,938
I-26 to I-26	3,917	2,241	3,544	2,551
Exit 108 to Exit 110 (Sunset Boulevard)	4,609	4,379	4,790	5,116
southeast of Exit 110	3,841	4,335	4,534	4,733

Table 5.36: I-20 Mainline Volume TransModeler Results – RA3

I-20 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
west of Exit 61 (Sunset Boulevard)	4,420	2,061	2,957	3,745
Exit 61 to Exit 63 (Bush River Road)	5,590	3,246	4,061	4,794
Exit 63 to Exit 64 (I-26)	2,853	2,075	2,005	3,570
Exit 64 to Exit 65 (Broad River Road)	2,218	1,590	1,462	2,175
Exit 65 to Exit 68 (Monticello Road)	6,071	5,707	5,336	6,100
east of Exit 68	5,682	5,855	5,359	5,787

Table 5.37: I-126 Mainline Volume TransModeler Results – RA3

I-20 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
I-126/I-26 Split	5,517	1,937	3,197	4,357
I-126 from I-26 to Colonial Life Blvd	5,501	2,615	3,197	5,903
I-126 from Colonial Life Blvd to Greystone Blvd	6,759	3,396	3,889	7,452
I-126 from Greystone Blvd to Huger St	6,469	3,524	3,779	6,992

Basic Freeway Segment Analysis

A summary of the Basic Freeway Segment Analysis results is shown in **Table 5.38**, **Table 5.39** and **Table 5.40** for I-26, I-20 and I-126, respectively.

Table 5.38: I-26 Basic Freeway Segment TransModeler Results – RA3

Segment	RA3 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound						
Exit 101 to Exit 102	C	24.3	0.52	C	18.1	0.37
Exit 102 to Exit 103	B	17.4	0.86	B	15.8	0.71
Exit 103 to Exit 104	D	31.7	0.55	C	21.5	0.46
Exit 104 to Exit 106	F	94.4	0.58	E	43.2	0.51
Exit 106 to Exit 107	D	31.9	0.48	C	20.6	0.35
I-26 to I-26	C	23.4	0.54	C	22.2	0.49
Exit 108 to Exit 110	A	0.0	0.51	A	0.0	0.53
I-26 Westbound						
Exit 110 to Exit 108	B	15.2	0.31	B	15.1	0.35
I-26 to I-26	D	33.5	0.31	F	112.8	0.35
Exit 107 to Exit 106	D	28.3	0.39	F	72.9	0.59
Exit 106 to Exit 104	D	27.8	0.48	F	98.0	0.70
Exit 104 to Exit 103	B	17.7	0.71	F	69.5	0.94
Exit 103 to Exit 102	C	23.2	0.38	E	37.9	0.58
Exit 102 to Exit 101	B	17.3	0.35	C	24.6	0.53

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.39: I-20 Basic Freeway Segment TransModeler Results – RA3

Segment	RA3 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound						
west of Exit 61	F	46.0	0.61	C	25.7	0.41
Exit 61 to Exit 63	F	54.6	0.78	C	23.9	0.56
Exit 63 to Exit 64	B	15.5	0.32	B	11.4	0.22
Exit 64 to Exit 65	B	13.6	0.25	A	9.6	0.16
Exit 65 to Exit 68	F	52.2	0.63	D	33.8	0.56
I-20 Westbound						
Exit 68 to Exit 65	F	47.9	0.59	F	52.2	0.64
Exit 65 to Exit 64	A	3.7	0.18	A	5.1	0.24
Exit 64 to Exit 63	A	8.3	0.23	C	23.8	0.40
Exit 63 to Exit 61	B	15.4	0.34	F	110.7	0.50
west of Exit 61	C	19.8	0.43	E	36.4	0.78

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.40: I-126 Basic Freeway Segment TransModeler Results – RA3

Segment	RA3 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound						
I-26 to Colonial Life Blvd	E	37.9	0.77	B	16.7	0.44
Colonial Life Blvd to Greystone Blvd	C	20.9	0.70	B	14.0	0.41
Greystone Blvd to Huger St	D	33.5	0.67	B	16.3	0.39
I-126 Westbound						
Huger St to Greystone Blvd	C	19.9	0.37	D	32.4	0.73
Greystone Blvd to Colonial Life Blvd	B	16.1	0.35	F	52.3	0.78
Colonial Life Blvd to I-26	E	42.7	0.81	F	66.4	0.80

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The RA3 analysis results for the freeway segments, summarized in **Table 5.38**, **Table 5.39** and **Table 5.40** indicate the following:

- During the morning peak hour:
  - I-26 eastbound freeway segment between Exit 104 and Exit 106 operate at LOS F. All other segments along I-26 eastbound, and all I-26 westbound segments operate at LOS D or better.
  - I-20 eastbound freeway segments west of Exit 61 to Exit 63 and from Exit 65 to Exit 68 operate at LOS F. The westbound freeway segment from Exit 68 to Exit 65 operates at LOS F, while all other I-20 segments operate at LOS C or better.

- All I-126 freeway segments during the morning peak hour operate at LOS D or better except between I-26 and Colonial Life Blvd in both directions which operate at LOS E.

- During the afternoon peak hour:
  - I-26 eastbound freeway segment between 104 and Exit 106 operates at a LOS E. I-26 westbound segments operate at LOS F from the I-26 to Exit 103 and LOS E from Exit 103 to Exit 102, while all other segments operate at LOS C or better.
  - I-20 eastbound freeway segments operate at LOS D or better. I-20 westbound freeway segments between Exit 68 and Exit 65 as well as west of Exit 61 to Exit 63 operate at LOS E or F, while all other westbound segments operate at LOS C or better.
  - I-126 eastbound freeway segments operate at LOS B, while I-126 westbound freeway segments operate at LOS D or worse.

Ramp Merge Analysis

A summary of the Ramp Merge Analysis results is shown in **Table 5.41**, **Table 5.42** and **Table 5.43** for I-26, I-20 and I-126, respectively.

Table 5.41: I-26 Ramp Merge TransModeler Results – RA3

Segment	RA3 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound						
Exit 101	C	24.3	0.52	B	18.1	0.37
Exit 102	B	17.4	0.86	B	15.8	0.71
Exit 103	B	15.9	0.46	B	16.6	0.39
Exit 104	F	87.0	0.48	E	36.2	0.42
Exit 106	D	31.9	0.48	C	20.6	0.35
Exit 107	C	20.4	0.33	B	17.9	0.30
Exit 108	B	20.0	0.47	C	20.8	0.46
Exit 108 (I-126)	C	25.0	0.41	C	22.9	0.43
Exit 110	B	19.0	0.40	C	23.0	0.47
I-26 Westbound						
Exit 110	B	18.2	0.37	C	21.4	0.43
Exit 108 (I-126)	B	15.8	0.28	C	25.9	0.47
Exit 107	D	28.3	0.39	F	72.9	0.59
Exit 106	C	23.5	0.40	F	79.2	0.60
Exit 104	B	17.7	0.71	F	69.5	0.94
Exit 103	B	14.3	0.38	B	18.2	0.58
Exit 102	B	17.3	0.35	C	24.6	0.53
Exit 101	B	19.3	0.34	C	26.9	0.54

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.42: I-20 Ramp Merge TransModeler Results – RA3

Segment	RA3 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound						
Exit 61 Loop	F	74.7	0.51	B	18.9	0.38
Exit 61	F	56.3	0.59	C	22.9	0.42
Exit 63/64	C	21.6	0.44	C	21.2	0.37
Exit 65	E	37.5	0.52	D	30.8	0.45
Exit 68	D	30.5	0.59	D	30.3	0.56
I-20 Westbound						
Exit 68	E	40.3	0.61	F	49.4	0.65
Exit 65	A	3.7	0.14	A	5.1	0.19
Exit 64 WB	A	8.3	0.23	C	23.8	0.40
Exit 64 EB	B	12.5	0.25	E	44.5	0.39
Exit 63	B	12.3	0.27	F	95.4	0.42
Exit 61	B	15.8	0.22	D	32.2	0.39
Exit 61	B	15.8	0.22	D	32.2	0.39

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.43: I-126 Ramp Merge TransModeler Results – RA3

Segment	RA3 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound						
Colonial Life Blvd	C	20.9	0.56	B	14.0	0.32
Greystone Blvd	D	28.5	0.68	B	14.4	0.39
I-126 Westbound						
Greystone Blvd	B	16.1	0.28	F	52.3	0.62

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The RA3 analysis results for the ramp merge areas, summarized in **Table 5.41**, **Table 5.42** and **Table 5.43** indicate the following:

- During the morning peak hour:
  - I-26 eastbound merge area at Exit 104 operates at LOS F. All other ramp merge areas operate at LOS D or better.
  - I-20 eastbound ramp merge areas at Exit 61 operate at LOS F, and at Exit 65 operates at LOS E. I-20 westbound merge area at Exit 68 operates at LOS E. All other ramp merge areas operate at LOS D or better.

- I-126 merge areas during the morning peak hour operate at LOS D or better.

- During the afternoon peak hour:
  - I-26 eastbound merge area at Exit 104 operate at LOS E, while all other segments operate at LOS C or better. All I-26 westbound merge areas operate at LOS C or better with the exception of Exit 107, Exit 106, and Exit 104 merge areas which operate at LOS F.
  - I-20 eastbound and westbound merge areas operate at LOS D or better with the exception of Exit 63 and Exit 68, where the merge area operates at LOS F and Exit 64 EB which operates at LOS E in the westbound direction.
  - I-126 eastbound merge areas during the evening peak hour operate at LOS B, whereas westbound merge areas operate at LOS F.

Ramp Diverge Analysis

A summary of the Ramp Diverge results is shown in **Table 5.44**, **Table 5.45** and **Table 5.46** for I-26, I-20 and I-126, respectively.

Table 5.44: I-26 Ramp Diverge TransModeler Results – RA3

Segment	RA3 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound						
Exit 101	C	21.6	0.50	B	16.0	0.37
Exit 102	C	24.3	0.52	B	18.1	0.37
Exit 102 Loop	B	19.9	0.47	B	14.3	0.35
Exit 103	B	17.4	0.86	B	15.8	0.71
Exit 104	D	28.7	0.55	B	17.7	0.46
Exit 106/107	F	91.8	0.57	E	41.8	0.50
Exit 108	C	26.7	0.54	B	14.8	0.33
I-26 to I-26	D	31.9	0.48	C	20.6	0.35
Exit 110	C	25.2	0.51	C	22.9	0.53
I-26 Westbound						
Exit 110	F	64.6	0.45	E	36.2	0.49
Exit 107/I-126	B	17.7	0.36	B	19.9	0.43
Exit 106	B	15.8	0.28	C	25.9	0.47
Exit 104	C	27.5	0.45	E	41.6	0.65
Exit 103	B	17.7	0.71	F	69.5	0.94
Exit 102	B	16.4	0.62	C	23.3	0.97
Exit 102 Loop	B	15.2	0.34	C	20.6	0.53
Exit 101	B	17.3	0.35	C	24.6	0.53

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.45: I-20 Ramp Diverge TransModeler Results – RA3

Segment	RA3 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound						
Exit 61	D	33.8	0.46	C	20.6	0.31
Exit 63/64/65	C	20.6	0.46	B	16.2	0.34
Exit 64 Loop	A	8.7	0.25	A	7.6	0.18
Exit 68	E	44.5	0.83	E	35.3	0.74
I-20 Westbound						
Exit 68	E	42.7	0.81	F	66.4	0.80
Exit 65	F	64.2	0.47	F	69.8	0.51
Exit 64/63	D	31.4	0.35	D	32.9	0.40
Exit 61	D	30.6	0.34	F	100.0	0.46

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.46: I-126 Ramp Diverge TransModeler Results – RA3

Segment	RA3 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound						
Greystone Blvd	C	22.2	0.56	B	14.7	0.32
I-126 Westbound						
Greystone Blvd	B	19.9	0.37	D	32.4	0.73
Colonial Life Blvd	B	16.2	0.28	F	53.2	0.61

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The RA3 analysis results for the ramp diverge areas, summarized in **Table 5.44**, **Table 5.45** and **Table 5.46** indicate the following:

- During the morning peak hour:
  - I-26 eastbound diverge area for Exit 106/107 operates at LOS E. I-26 westbound diverge area at Exit 110 operates at LS F. All other ramp diverge areas in both the eastbound and westbound directions operate at LOS D or better.
  - I-20 eastbound and westbound diverge areas at Exit 68 operate at LOS E. The I-20 westbound diverge area at Exit 65 operates at LOS F. All other diverge areas operate at LOS D or better in both directions.
  - All I-126 diverge areas during the morning peak hour operate at LOS C or better.
- During the afternoon peak hour:

- I-26 eastbound diverge area at Exit 106 operates at LOS F. All other eastbound segments operate at LOS C or better. All I-26 westbound diverge areas operate at LOS C or better with the exception of Exit 103 which operates at LOS F, and Exit 104 and Exit 110 which operate at LOS E.
- I-20 eastbound diverge areas operate at LOS C or better with the exception of Exit 68, which operates at LOS E. All I-20 westbound diverge areas operate at LOS D or worse.
- I-126 westbound diverge area at Colonial Life Blvd operates at LOS F, while all other diverge areas operate at LOS D or better.

Mainline Travel Time Analysis

A summary of the Mainline Travel Time Analysis results is shown in **Table 5.47**.

Table 5.47: Mainline Travel Time TransModeler Results – RA3

Segments	Eastbound					Westbound				
	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)		Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM		AM	PM	AM	PM
I-26 between Exit 101 and Exit 110										
Exit 101 to Exit 102 (Lake Murray Boulevard)	0.83	00:51	00:49	59.2	60.7	0.87	00:53	00:54	59.2	57.8
Exit 102 to Exit 103 (Harbison Boulevard)	1.23	01:15	01:13	58.6	60.6	1.25	00:50	00:53	89.9	85.6
Exit 103 to Exist 104 (Piney Grove Road)	0.91	01:06	00:56	49.9	58.3	1.23	01:13	02:10	60.7	33.9
Exit 104 to Exit 106 (St. Andrews Road)	1.69	05:04	02:28	20.0	41.0	2.53	03:05	05:45	49.3	26.5
Exit 106/107 to Exit 108 (I-26/Bush River Road)	0.96	01:32	01:12	37.8	48.0	-	-	-	-	-
Exit 108/107 to Exit 106 (St Andrews Road)	-	-	-	-	-	1.02	01:04	01:07	57.6	54.9
Exit 108 to Exit 110 (Sunset Boulevard)	2.92	03:14	03:14	54.2	54.3	-	-	-	-	-
Exit 110 to Exit 108/107 (I-20)	-	-	-	-	-	1.61	01:36	01:36	60.7	60.2
Total	**8.55**	**13:01**	**09:53**	**39.4**	**51.9**	**8.52**	**08:41**	**12:25**	**58.9**	**41.1**
I-20 between Exit 61 and Exit 68										
Exit 61 to Exit 63 (Bush River Road)	1.82	03:28	01:51	31.5	59.0	-	-	-	-	-
Exit 63/64 to Exit 61 (Sunset Blvd)	-	-	-	-	-	3.42	03:45	08:55	54.7	23.0
Exit 63 to Exit 64 (I-26)	1.23	01:27	01:26	50.8	51.5	-	-	-	-	-
Exit 65 to Exit 63/64 (I-26)	-	-	-	-	-	0.36	00:34	00:31	37.5	41.3
Exit 64 to Exit 68 (Monticello Road)	3.82	05:11	04:09	44.2	55.1	-	-	-	-	-
Exit 68 to Exist 65 (Broad River Road)	-	-	-	-	-	2.96	04:05	04:56	43.5	36.1
Total	**6.87**	**10:06**	**07:26**	**40.8**	**55.4**	**6.74**	**08:24**	**14:22**	**48.1**	**28.2**
I-126 between I-26 and Greystone Blvd										
I-26 to Exit 108(Bush River Road)	0.34	00:27	00:24	44.2	49.8	-	-	-	-	-
Colonial Life Boulevard to Exit 107 (I-20)	-	-	-	-	-	1.11	01:10	02:02	57.3	32.9
Exit 108 to Greystone Blvd	1.97	02:26	01:56	48.8	61.5	-	-	-	-	-
Greystone Blvd to Colonial Life Blvd	-	-	-	-	-	1.31	01:06	01:48	71.1	43.6
Total	**2.31**	**02:53**	**02:20**	**48.0**	**59.5**	**2.43**	**02:17**	**03:50**	**64.0**	**37.9**

Arterial Travel Time Analysis

A summary of the Arterial Travel Time Analysis results is shown in **Table 5.48**.

Table 5.48: Arterial Travel Time TransModeler Results – RA3

Location	Eastbound					Westbound				
	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)		Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM		AM	PM	AM	PM
Broad River Road (west of Exit 101 to Greystone Blvd)	7.1	20:58	25:13	20.2	16.8	6.4	19:42	20:01	19.3	19.0
Lake Murray Boulevard (west of Exit 102 to Broad River Road)	1.6	03:58	04:14	23.6	22.1	1.5	03:41	04:05	24.2	21.8
Harbison Boulevard (west of Exit 103 to Broad River Road)	1.1	03:11	03:36	20.8	18.5	1.1	03:47	03:16	17.3	20.0
Piney Grove Road (west of Exit 104 to Broad River Road)	1.7	05:07	04:24	19.5	22.6	1.7	05:40	04:41	17.6	21.3
St. Andrews Road (west of Exit 106 to Broad River Road)	1.0	06:50	07:37	8.7	7.8	1.0	03:40	04:02	16.2	14.7
Bush River Road (west of Exit 63 to Broad River Road)	2.1	04:26	04:48	28.5	26.4	1.8	05:40	08:23	19.2	13.0
Location	Northbound					Southbound				
	Length (mi)	Travel Time		Average Speed		Length (mi)	Travel Time		Average Speed	
		AM	PM	AM	PM		AM	PM	AM	PM
Colonial Life Boulevard (I-126 Ramps to Bush River Road)	0.4	01:28	02:36	15.7	8.9	0.4	00:51	01:00	29.8	25.6

Intersection LOS and Delay Analysis

A summary of the Intersection LOS and Delay Analysis results is shown in **Table 5.49**.

Table 5.49: Intersection and LOS TransModeler Results – RA3

Node #	Intersection Name	AM		PM	
		LOS	Delay	LOS	Delay
Exit 101					
100000391	Broad River Road (US 176) at Columbiana Drive / Lordship Lane	A	0.0	A	3.4
67	Broad River Road (US 176) at I-26 EBR Off-ramp[1]	B	14.7	B	19.5
174	Broad River Road (US 176) at West DDI Intersection	B	17.1	B	17.6
100000151	Broad River Road (US 176) at I-26 EBL Off-ramp	B	11.0	A	8.9
108	Broad River Road (US 176) at I-26 WBL Off-ramp	B	15.1	B	16.5
173	Broad River Road (US 176) at East DDI Intersection	B	16.1	C	20.3
4	Broad River Road (US 176) at Western Lane	B	18.4	C	24.0
Exit 102					
100000395	Lake Murray Boulevard (SC 60) at Columbiana Drive	D	36.6	F	82.0
100000510	Lake Murray Boulevard (SC 60) at I-26 EB On-Ramp[2]	A	2.7	A	2.6
100000169	Lake Murray Boulevard (SC 60) at I-26 WB On-Ramp[2]	A	2.2	A	2.4
100000401	Lake Murray Boulevard (SC 60) at Parkridge Drive / Kinley Road	B	16.5	C	24.7
Exit 103					
100000364	Harbison Boulevard (S-757) at Columbiana Drive	B	14.3	B	14.1
100000365	Harbison Boulevard (S-757) at Park Terrace Drive / Columbiana Circle	A	8.9	C	30.3
100000362	Harbison Boulevard (S-757) at Saturn Parkway	A	9.0	B	12.9
118	Harbison Boulevard (S-757) at I-26 EB Ramps	C	34.2	B	16.9
113	Harbison Boulevard (S-757) at I-26 WB Ramps / Woodcross Drive	B	17.5	D	36.7
Exit 104					
100000353	Piney Grove Road at Bower Parkway / Jamil Road	D	48.6	E	56.8
100000497	Piney Grove Road at I-26 EB Ramps	D	52.7	D	35.2
128	Piney Grove Road at I-26 SPUI Interchange	D	38.1	D	42.7
38	Piney Grove Road at I-26 WB Ramps	D	52.2	D	54.6
100000399	Piney Grove Road at Fernandina Road	C	33.8	D	47.0
Exit 106					
93	St. Andrews Road at Jamil Road	B	18.7	B	19.2
167	St. Andrews Road at I-26 EB Ramps	B	15.0	C	20.2
100000182	St. Andrews Road at I-26 WB Ramps	A	3.9	A	4.3
37	St. Andrews Road at Fernandina Road / Burning Tree Drive	C	21.8	E	73.8
100000354	St. Andrews Road at Kay Street / Chartwell Road	B	19.3	B	16.3
Exit 108					
100000256	Bush River Road at Zimalcrest Drive	A	7.9	A	5.9
100000898	Bush River Road at Driveway	A	3.3	A	7.3
100000252	Bush River Road at EB Ramp/Morninghill Drive	C	31.2	E	71.3
100000184	Bush River Road at Arrowwood Road	B	14.4	E	57.3
Exit 110					
100000186	Sunset Boulevard (US 378) at E. Hospital Drive / Harbor Drive	B	11.8	D	39.7
100000093	Sunset Boulevard (US 378) at I-26 EBR Off-Ramp[1]	B	10.1	F	80.6
100000903	Sunset Boulevard (US 378) at I-26 Ramps	C	25.8	C	29.9
100000902	Sunset Boulevard (US 378) at I-26 WBR Off-Ramp[1]	A	8.6	B	13.9
100000163	Sunset Boulevard (US 378) at Chris Drive / McSwain Drive	C	26.5	D	39.9
Exit 63					
14	Bush River Road at Berryhill Drive[1]	A	9.4	B	14.9
61	Buish River Road at West DDI Intersection (I-20 EB Ramps)	B	12.1	B	13.8
48	Bush River Road at East DDI Intersection (I-20 WB Ramps)	B	10.5	B	14.0
147	Bush River Road at Rockland Road	A	6.1	B	15.6
136	Bush River Road at Independence Avenue	C	24.3	C	26.9
Exit 65					
100000187	Broad River Road at Marley Drive / Briargate Circle	B	17.8	C	20.2
57	Broad River Road at I-20 WB Ramps	B	15.2	C	26.3
141	Broad River Road at I-20 EB Ramps	B	14.8	B	18.2
100000195	Broad River Road at Longcreek Drive	A	4.3	A	8.3
Additional Intersections					
100000012	Broad River Road (US 176) at Kinley Road	E	67.5	F	81.8
100000037	Broad River Road (US 176) at Harbison Boulevard	B	18.4	E	68.1
100000049	Broad River Road (US 176) at Piney Woods Road / Lost Creek Drive	C	25.0	F	91.5
100000068	Broad River Road (US 176) at Piney Grove Road	A	4.9	B	18.8
100000339	Broad River Road (US 176) at St. Andrews Road	D	37.6	E	69.4
100000349	Broad River Road (US 176) at St. Andrews Parkway	B	12.2	C	22.0
100000344	Broad River Road (US 176) at Seminole Road / Young Drive	A	9.1	F	86.2
41	Broad River Road (US 176) at Dutch Square Boulevard	A	6.2	C	29.3
100000046	Broad River Road (US 176) at Bush River Road	C	24.3	D	36.4
100000266	Broad River Road (US 176) at Greystone Boulevard	B	12.6	B	15.0
100000265	Greystone Boulevard at Stoneridge Drive	C	25.2	E	62.1
100000188	Greystone Boulevard at I-126 WB Ramps[1]	A	0.8	A	2.2
100000185	Greystone Boulevard at I-126 EB Ramps[1]	A	0.9	A	3.6
100000262	Bush River Road at Colonial Life Boulevard	B	18.3	D	44.6
100000897	Colonial Life Boulevard at West Colonial Life Road[1]	F	50.2	D	27.9
100000374	Park Terrance Drive at Bower Parkway	B	11.7	B	17.0

[1] Intersection unsignalized under all scenarios; worst approach LOS and delay reported.

[2] Delay unable to be processed per HCM 2010 methodology; Average control delay reported.

External to External Speed and Travel Time Analysis

A summary of the External to External Speed and Travel Time Analysis results is shown in **Table 5.50**.

Table 5.50: External to External Speed and Travel Time TransModeler Results – RA3

Segments	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM
I-26 EB from West of Exit 101					
To I-26 EB (east of Exit 110)	13.82	20:30	13:33	40.4	61.2
To I-20 WB (west of Exit 61)	16.07	24:21	23:13	39.6	41.5
To I-20 EB (east of Exit 68)	15.61	25:50	17:32	36.2	53.4
To I-126 EB (Greystone Blvd)	14.78	23:01	15:01	38.5	59.1
I-26 WB from East of Exit 110					
To I-26 WB (west of Exit 110)	13.85	13:27	23:29	61.8	35.4
To I-20 EB (east of Exit 68)	8.44	10:31	09:27	48.1	53.6
I-20 EB from West of Exit 61					
To I-20 EB (east of Exit 68)	11.09	18:23	11:08	36.2	59.8
To I-26 WB (west of Exit 101)	16.71	22:57	30:59	43.7	32.4
To I-126 EB (east of Greystone Blvd)	10.35	18:53	10:54	32.9	57.0
I-20 WB from East of Exit 68					
To I-20 WB (east of Exit 61)	11.10	11:40	17:48	57.1	37.4
To I-26 EB (east of Exit 110)	9.03	11:27	14:37	47.3	37.1
To I-26 WB (west of Exit 101)	15.34	17:18	32:02	53.2	28.7
I-126 WB from East of Greystone Blvd					
To I-26 WB (wast of Exit 101)	14.75	15:03	27:44	58.8	31.9
To I-20 WB (west of Exit 61)	10.72	11:12	18:37	57.4	34.5

5.3.4 RA4 ANALYSIS RESULTS

Mainline Volume Analysis

A summary of the Mainline Volume Analysis results is shown in **Table 5.51**, **Table 5.52** and **Table 5.53** for I-26, I-20 and I-126, respectively. These measures of effectiveness were incorporated into the level 1B screening of RA4 in section 4.5.2.6 of the *Alternatives Development and Screening Report.*

Table 5.51: I-26 Mainline Volume TransModeler Results – RA4

I-26 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
west of Exit 101 (Broad River Road)	4,816	3,352	3,614	5,391
Exit 101 to Exit 102 (Lake Murray Boulevard)	6,093	4,302	4,448	6,785
Exit 102 to Exit 103 (Harbison Boulevard)	6,337	4,590	5,052	7,299
Exit 103 to Exist 104 (Piney Grove Road)	6,894	5,167	5,548	7,757
Exit 104 to Exit 106 (St. Andrews Road/CD Road)	7,830	5,666	6,257	8,322
Exit 106 to Exit 107	6,149	3,438	4,356	5,779
I-26 to I-26	3,317	1,722	3,139	2,001
I-26 to I-126	5,367	1,746	3,043	3,794
Exit 108 to Exit 110 (Sunset Boulevard)	4,168	4,455	4,514	5,066
southeast of Exit 110	3,707	4,407	4,391	4,603

Table 5.52: I-20 Mainline Volume TransModeler Results – RA4

I-20 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
west of Exit 61 (Sunset Boulevard)	4,422	2,104	2,959	3,743
Exit 61 to Exit 63 (Bush River Road/CD Road)	5,449	3,155	3,892	5,060
Exit 63 to Exit 64 (Broad River Road)	3,200	1,566	2,267	2,185
	2,849	2,121	1,916	2,512
Exit 65 to Exit 68 (Monticello Road)	6,055	5,770	5,348	6,167
east of Exit 68	5,686	5,815	5,231	5,803

Table 5.53: I-126 Mainline Volume TransModeler Results – RA4

I-126 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
I-26 to Colonial Life Blvd	6,145	2,984	3,397	6,540
I-126 from Colonial Life Blvd to Greystone Blvd	6,839	3,408	3,913	7,305
I-126 from Greystone Blvd to Huger St	6,523	3,534	3,719	6,797

Basic Freeway Segment Analysis

A summary of the Basic Freeway Segment Analysis results is shown in **Table 5.54**, **Table 5.55** and **Table 5.56** for I-26, I-20 and I-126, respectively.

Table 5.54: I-26 Basic Freeway Segment TransModeler Results – RA4

Segment	RA4 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound						
Exit 101 to Exit 102	C	22.8	0.56	C	22.8	0.56
Exit 102 to Exit 103	D	26.6	0.66	C	23.5	0.53
Exit 103 to Exit 104	D	28.6	0.57	C	22.6	0.46
Exit 104 to Exit 106	E	44.7	0.57	C	23.8	0.46
Exit 106 to Exit 107	F	108.0	0.55	D	29.1	0.39
I-26 to I-26	E	39.2	0.74	E	38.6	0.70
Exit 108 to Exit 110	C	21.4	0.43	C	22.0	0.47
I-26 Westbound						
Exit 110 to Exit 108	C	19.8	0.46	C	21.6	0.53
I-26 to I-26	D	26.4	0.43	C	23.0	0.50
Exit 107 to Exit 106	C	24.5	0.31	C	25.2	0.51
Exit 106 to Exit 104	D	27.2	0.50	E	37.6	0.74
Exit 104 to Exit 103	C	21.8	0.43	D	31.5	0.65
Exit 103 to Exit 102	C	20.2	0.48	E	36.1	0.76
Exit 102 to Exit 101	C	18.4	0.36	D	27.5	0.57

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.55: I-20 Basic Freeway Segment TransModeler Results – RA4

Segment	RA4 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound						
west of Exit 61	F	45.9	0.61	C	25.6	0.41
Exit 61 to Exit 63	F	68.7	0.75	C	23.2	0.54
Exit 63 to Exit 64	B	14.4	0.33	A	10.7	0.24
Exit 64 to Exit 65	B	12.7	0.30	A	9.2	0.20
Exit 65 to Exit 68	E	42.3	0.62	D	34.5	0.56
I-20 Westbound						
Exit 68 to Exit 65	E	38.5	0.48	E	41.6	0.51
Exit 65 to Exit 64	A	7.9	0.22	A	7.8	0.26
Exit 64 to Exit 63	A	9.6	0.16	B	12.1	0.23
Exit 63 to Exit 61	C	19.2	0.44	F	99.8	0.72
west of Exit 61	C	20.3	0.29	E	36.7	0.52

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.56: I-126 Basic Freeway Segment TransModeler Results – RA4

Segment	RA4 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound						
I-26 to Colonial Life Blvd	B	17.2	0.51	A	9.8	0.28
Colonial Life Blvd to Greystone Blvd	C	23.7	0.71	C	21.6	0.41
Greystone Blvd to Huger St	E	44.7	0.67	B	15.9	0.39
I-126 Westbound						
Huger St to Greystone Blvd	B	16.2	0.37	D	29.7	0.71
Greystone Blvd to Colonial Life Blvd	B	17.1	0.36	D	34.3	0.76
Colonial Life Blvd to I-26	-	-	-	-	-	-

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The RA4 analysis results for the freeway segments, summarized in **Table 5.54**, **Table 5.55** and **Table 5.56** indicate the following:

- During the morning peak hour:
  - I-26 eastbound freeway segment between Exit 104 and I-26 to I-26 operate at LOS E or F. All other segments along I-26 eastbound, and all I-26 westbound segments operate at LOS D or better.

    - I-20 eastbound freeway segments west of Exit 61 to Exit 63 operate at LOS F and from Exit 65 to Exit 68 operate at LOS E. The westbound freeway segment from Exit 68 to Exit 65 operates at LOS E, while all other I-20 segments operate at LOS C or better.
    - All I-126 freeway segments during the morning peak hour operate at LOS C or better except eastbound between Greystone Blvd and Huger St which operate at LOS E.
- During the afternoon peak hour:
    - I-26 eastbound freeway segment between I-26 and I-26 operates at a LOS E. I-26 westbound segments operate at LOS E from the Exit 106 to Exit 104 and Exit 103 to Exit 102, while all other segments operate at LOS D or better.
    - I-20 eastbound freeway segments operate at LOS D or better. I-20 westbound freeway segments between Exit 68 and Exit 65 as well as west of Exit 61 to Exit 63 operate at LOS E or F, while all other westbound segments operate at LOS B or better.
    - I-126 eastbound freeway segments operate at LOS C or better, while I-126 westbound freeway segments operate at LOS D.

Ramp Merge Analysis

A summary of the Ramp Merge Analysis results is shown in **Table 5.57**, **Table 5.58** and **Table 5.59** for I-26, I-20 and I-126, respectively.

Table 5.57: I-26 Ramp Merge TransModeler Results – RA4

Segment	RA4 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound						
Exit 101	C	24.1	0.51	B	17.8	0.37
Exit 102	C	26.5	0.53	C	23.4	0.42
Exit 103	D	28.6	0.58	C	22.6	0.46
Exit 104	C	22.2	0.55	B	18.4	0.43
Exit 106	F	108.0	0.55	D	29.1	0.39
Exit 107 Loop	F	125.0	0.64	F	47.6	0.47
Exit 107 (CD Road From I-20)	F	89.1	0.77	F	51.0	0.55
Exit 108	C	22.8	0.56	C	22.8	0.56
Exit 108 (From I-126)	C	21.4	0.43	C	22.0	0.47
Exit 110	B	17.5	0.39	C	21.1	0.46
I-26 Westbound						
Exit 110	B	19.0	0.47	C	20.8	0.53
Exit 108 (I-126)	C	24.5	0.31	C	25.2	0.51
Exit 107 (From I-20)	C	25.8	0.41	E	36.7	0.61
Exit 106	C	27.0	0.42	E	36.3	0.62
Exit 104	C	21.8	0.43	D	31.5	0.65
Exit 103	C	20.2	0.38	E	36.1	0.61
Exit 102	B	18.4	0.36	C	27.5	0.57
Exit 101	B	19.3	0.28	F	48.2	0.47

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.58: I-20 Ramp Merge TransModeler Results – RA4

Segment	RA4 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound						
Exit 61 Loop	F	69.2	0.50	B	17.4	0.36
Exit 61	F	74.1	0.57	C	21.4	0.41
Exit 63	A	8.6	0.33	A	8.2	0.24
Exit 64	B	15.2	0.39	B	18.9	0.35
Exit 65	E	41.5	0.51	D	30.6	0.45
Exit 68	D	31.6	0.59	D	29.5	0.55
I-20 Westbound						
Exit 68	D	30.7	0.61	E	41.0	0.65
Exit 64 (From CD from I-26)	B	11.1	0.23	E	42.6	0.40
Exit 63	B	19.5	0.26	F	96.7	0.45
Exit 61 Loop	A	9.2	0.20	B	13.7	0.37
Exit 61	B	15.3	0.22	D	29.3	0.39

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.59: I-126 Ramp Merge TransModeler Results – RA4

Segment	RA4 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound						
Exit 108 (From I-26 WB)	B	17.2	0.51	A	9.8	0.28
Colonial Life Blvd	C	23.7	0.71	C	21.6	0.41
Greystone Blvd	D	31.2	0.68	B	12.2	0.39
I-126 Westbound						
Greystone Blvd	B	17.1	0.36	D	34.3	0.76

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The RA4 analysis results for the ramp merge areas, summarized in **Table 5.57**, **Table 5.58** and **Table 5.59** indicate the following:

- During the morning peak hour:
  - I-26 eastbound merge areas from Exit 106 to Exit 107 operate at LOS F. All other ramp merge areas operate at LOS D or better.
  - I-20 eastbound ramp merge areas at Exit 61 operate at LOS F. All other ramp merge areas operate at LOS D or better.

- I-126 merge areas during the morning peak hour operate at LOS D or better.

- During the afternoon peak hour:
  - I-26 eastbound merge areas at Exit 107 operate at LOS F, while all other segments operate at LOS D or better. All I-26 westbound merge areas operate at LOS D or better with the exception of Exit 107, Exit 106, and Exit 104 merge areas which operate at LOS E and Exit 101 which operates at LOS F.
  - I-20 eastbound and westbound merge areas operate at LOS D or better with the exception of westbound Exit 68 to Exit 63, where the merge area operates at LOS E or F.
  - I-126 merge areas during the evening peak hour operate at LOS D or better.

Ramp Diverge Analysis

A summary of the Ramp Diverge Analysis results is shown in **Table 5.60**, **Table 5.61** and **Table 5.62** for I-26, I-20 and I-126, respectively.

Table 5.60: I-26 Ramp Diverge TransModeler Results – RA4

Segment	RA4 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound						
Exit 101	C	24.8	0.50	B	17.7	0.38
Exit 101 Loop	B	17.9	0.39	B	13.6	0.29
Exit 102	C	24.1	0.51	B	17.8	0.37
Exit 102 Loop	C	21.6	0.47	B	16.9	0.35
Exit 103	C	26.6	0.66	C	23.5	0.53
Exit 104	D	28.6	0.57	C	22.6	0.46
Exit 106/107	E	44.7	0.57	C	23.8	0.46
Exit 108 (To I-26 and to I-126)	F	47.7	0.77	D	31.2	0.55
Exit 110	C	21.4	0.43	C	22.0	0.47
I-26 Westbound						
Exit 110	D	32.9	0.46	F	67.6	0.48
Exit 108/107/106	C	23.0	0.31	C	25.1	0.35
Exit 104	D	30.1	0.47	D	33.6	0.69
Exit 103	C	21.8	0.43	D	31.5	0.65
Exit 102	C	20.2	0.48	E	36.3	0.76
Exit 102 Loop	B	18.4	0.37	D	28.2	0.58
Exit 101	B	18.4	0.36	C	27.5	0.57
Exit 101 Loop	B	13.8	0.32	C	21.1	0.52

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.61: I-20 Ramp Diverge TransModeler Results – RA4

Segment	RA4 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound						
Exit 61	D	30.4	0.46	B	18.5	0.31
Exit 63/64	D	34.9	0.45	B	15.3	0.32
Exit 65	A	8.9	0.33	A	8.0	0.24
Exit 68	E	39.9	0.82	F	47.1	0.73
I-20 Westbound						
Exit 68	E	41.2	0.81	F	68.4	0.80
Exit 65	D	32.5	0.40	E	40.9	0.43
Exit 64	D	30.9	0.36	C	27.9	0.37
Exit 63	A	8.0	0.22	A	7.7	0.26
Exit 61	C	20.5	0.33	F	99.5	0.52

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.62: I-126 Ramp Diverge TransModeler Results – RA4

Segment	RA4 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound						
Greystone Boulevard	C	24.0	0.57	C	23.0	0.33
I-126 Westbound						
Greystone Boulevard	C	23.4	0.37	D	31.0	0.71
Colonial Life Boulevard	B	18.4	0.35	E	36.4	0.76
To I-26 EB	B	13.7	0.25	D	28.2	0.55

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The RA4 analysis results for the ramp diverge areas, summarized in **Table 5.60**, **Table 5.61** and **Table 5.62** indicate the following:

- During the morning peak hour:
  - I-26 eastbound diverge area for Exit 106/107 operates at LOS E and Exit 108 operates tat LOS F. All other ramp diverge areas in both the eastbound and westbound directions operate at LOS D or better.
  - I-20 eastbound and westbound diverge areas at Exit 68 operate at LOS E. All other diverge areas operate at LOS D or better in both directions.
  - All I-126 diverge areas during the morning peak hour operate at LOS C or better.
- During the afternoon peak hour:

- I-26 westbound diverge area at Exit 110 operates at LOS F and at Exit 102 operates at LOS E. All other diverge areas operate at LOS D or better.
- I-20 eastbound diverge areas operate at LOS B or better with the exception of Exit 68, which operates at LOS F. All I-20 westbound diverge areas operate at LOS C or better with the exception of Exit 68 and 61 which operate at LOS F and Exit 65 which operates at LOS E.
- I-126 westbound diverge area at Colonial Life Blvd operates at LOS E, while all other diverge areas operate at LOS D or better.

Mainline Travel Time Analysis

A summary of the Mainline Travel Time Analysis results is shown in **Table 5.63**.

Table 5.63: Mainline Travel Time TransModeler Results – RA4

Segments	Eastbound					Westbound				
	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)		Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM		AM	PM	AM	PM
I-26 between Exit 101 and Exit 110										
Exit 101 to Exit 102 (Lake Murray Boulevard)	0.78	00:48	00:46	59.0	61.0	0.90	00:54	00:58	59.8	56.3
Exit 102 to Exit 103 (Harbison Boulevard)	1.21	01:16	01:13	57.6	59.4	1.02	01:01	01:10	59.8	52.2
Exit 103 to Exist 104 (Piney Grove Road)	0.90	00:59	00:56	55.3	58.3	0.97	00:59	01:03	59.4	55.3
Exit 104 to Exit 106 (St. Andrews Road)	1.75	02:13	01:55	47.4	54.8	1.63	01:55	01:59	50.9	49.2
Exit 106 to I-126 Split	1.63	02:55	02:06	33.4	46.6	1.80	02:16	02:22	47.8	45.7
I-126 to Exit 110 (Sunset Boulevard)	2.20	02:17	02:18	57.8	57.3	1.81	01:48	01:52	60.6	58.4
Total	**8.47**	**10:27**	**09:14**	**48.6**	**55.0**	**8.13**	**08:53**	**09:23**	**54.9**	**51.9**
I-20 between Exit 61 and Exit 68										
Exit 61 to Exit 63 (Bush River Road)	1.77	03:51	01:48	27.6	58.9	2.32	02:20	06:17	20.1	22.1
Exit 63 to Exit 65 (Broad River Road)	1.47	01:23	01:22	63.8	64.5	1.38	01:19	01:19	35.7	63.0
Exit 65 to Exit 68 (Monticello Road)	3.63	04:14	03:55	51.4	55.6	3.00	03:25	04:19	13.7	41.8
Total	**6.87**	**09:28**	**07:05**	**43.6**	**58.1**	**6.70**	**07:04**	**11:55**	**57.0**	**33.8**
I-126 between I-26 and Greystone Blvd										
I-26 to Colonial Life Blvd	1.22	01:19	01:14	55.1	59.3	1.00	01:02	01:07	45.0	53.6
Colonial Life Blvd to Greystone Blvd	0.77	00:49	00:54	56.2	51.0	1.12	01:05	01:14	43.2	54.2
Total	**1.98**	**02:08**	**02:08**	**55.6**	**55.8**	**2.11**	**02:08**	**02:21**	**59.7**	**53.9**

Arterial Travel Time Analysis

A summary of the Arterial Travel Time Analysis results is shown in **Table 5.64**.

Table 5.64: Arterial Travel Time TransModeler Results – RA4

Location	Eastbound					Westbound				
	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)		Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM		AM	PM	AM	PM
Broad River Road (west of Exit 101 to Greystone Blvd)	6.8	25:36	24:56	16.0	16.4	7.4	17:51	21:25	24.8	20.7
Lake Murray Boulevard (west of Exit 102 to Broad River Road)	1.5	04:10	04:25	22.0	20.8	1.5	03:09	03:46	27.8	23.2
Harbison Boulevard (west of Exit 103 to Broad River Road)	1.1	02:54	03:32	22.8	18.7	1.1	02:33	03:42	25.8	17.8
Piney Grove Road (west of Exit 104 to Broad River Road)	1.5	04:45	04:32	19.2	20.2	1.5	04:33	04:45	20.1	19.2
St. Andrews Road (west of Exit 106 to Broad River Road)	1.1	06:06	04:57	10.4	12.8	1.1	06:28	07:22	10.0	8.8
Bush River Road (west of Exit 63 to Broad River Road)	1.9	08:00	07:36	13.9	14.6	1.9	06:05	08:20	18.3	13.3
Location	**Northbound**					**Southbound**				
	Length (mi)	Travel Time		Average Speed		Length (mi)	Travel Time		Average Speed	
		AM	PM	AM	PM		AM	PM	AM	PM
Colonial Life Boulevard (I-126 Ramps to Bush River Road)	0.6	01:27	01:38	23.5	21.0	0.6	01:55	01:43	17.8	20.0

Intersection LOS and Delay Analysis

A summary of the Intersection LOS and Delay Analysis results is shown in **Table 5.65**.

Table 5.65: Intersection and LOS TransModeler Results – RA4

Node #	Intersection Name	AM		PM	
		LOS	Delay	LOS	Delay
Exit 101					
100000391	Broad River Road (US 176) at Columbiana Drive / Lordship Lane	C	22.5	B	11.0
100000150	Broad River Road (US 176) at I-26 EB Off-ramp[1]	C	19.2	D	36.9
100000151	Broad River Road (US 176) at I-26 EB On-ramp	A	9.1	A	5.0
100000160	Broad River Road (US 176) at I-26 WB On-ramp[2]	A	2.2	A	2.2
4	Broad River Road (US 176) at Western Lane	C	24.4	D	39.9
Exit 102					
100000395	Lake Murray Boulevard (SC 60) at Columbiana Drive	D	47.9	F	92.7
100000510	Lake Murray Boulevard (SC 60) at I-26 EB On-Ramp[2]	A	2.8	A	3.8
100000520	Lake Murray Boulevard (SC 60) at I-26 WB On-Ramp[2]	A	2.8	A	3.8
100000401	Lake Murray Boulevard (SC 60) at Parkridge Drive / Kinley Road	B	16.7	B	17.9
Exit 103					
100000364	Harbison Boulevard (S-757) at Columbiana Drive	B	14.0	B	11.6
100000365	Harbison Boulevard (S-757) at Park Terrace Drive / Columbiana Circle	A	3.7	C	23.5
100000362	Harbison Boulevard (S-757) at Saturn Parkway	A	3.3	A	4.4
100000173	Harbison Boulevard (S-757) at I-26 EB Ramps	B	19.9	B	16.2
100000503	Harbison Boulevard (S-757) at I-26 EB On-Ramp[1]	A	0.0	A	0.0
136	Harbison Boulevard (S-757) at I-26 WB On-Ramp[1]	A	0.0	A	0.0
99	Harbison Boulevard (S-757) at I-26 WB Ramps	C	21.7	D	36.3
100000165	Harbison Boulevard (S-757) at Woodcross Drive	B	17.9	D	41.2
Exit 104					
100000174	Piney Grove Road at Bower Parkway / Jamil Road	C	34.6	E	59.6
100000463	Piney Grove Road at I-26 EBR Off-Ramp[1]	B	11.6	F	87.8
46	Piney Grove Road at I-26 Ramps	C	28.0	C	33.9
54	Piney Grove Road at I-26 WBR Off-Ramp[1]	F	69.1	E	41.2
100000177	Piney Grove Road at Fernandina Road	C	34.8	D	39.4
Exit 106					
100000348	St. Andrews Road at Jamil Road	B	12.1	D	35.4
69	St. Andrews Road at I-26 EBR Off-Ramp[1]	B	16.2	B	13.0
100000178	St. Andrews Road at West DDI Intersection	C	19.2	D	25.2
104	St. Andrews Road at I-26 EBL Off-Ramp	C	19.6	B	11.7
131	St. Andrews Road at I-26 WBL Off-Ramp	C	20.0	C	20.9
100000182	St. Andrews Road at East DDI Intersection	C	20.6	B	11.2
100000900	St. Andrews Road at I-26 WBR Off-Ramp	A	7.9	A	5.3
110	St. Andrews Road at Fernandina Road/Burning Tree Drive	F	52.8	F	146.0
100000354	St. Andrews Road at Kay Street / Chartwell Road	E	57.2	E	55.7
Exit 108					
100000256	Bush River Road at Zimalcrest Drive	A	8.9	A	9.7
30	Bush River Road at I-26 EB Ramps/Days Inn Driveway	D	35.0	C	27.2
100000252	Bush River Road at Morninghill Drive	C	21.0	C	35.0
100000184	Bush River Road at Arrowwood Road	C	21.9	C	30.3
Exit 110					
100000186	Sunset Boulevard (US 378) at E. Hospital Drive / Harbor Drive	E	56.9	E	71.0
100000093	Sunset Boulevard (US 378) at I-26 EBR Off-Ramp[1]	E	42.1	E	44.4
100000903	Sunset Boulevard (US 378) at I-26 Ramps	C	25.6	C	24.8
100000902	Sunset Boulevard (US 378) at I-26 WBR Off-Ramp[1]	E	47.7	F	58.7
100000163	Sunset Boulevard (US 378) at Chris Drive / McSwain Drive	A	4.2	C	27.6
Exit 63					
14	Bush River Road at Frontage Road	C	20.2	D	46.1
8	Bush River Road at I-20 Single Point Ramps Intersection	D	45.7	E	56.0
52	Bush River Road at Independence Avenue	B	16.2	B	15.7
Exit 65					
100000187	Broad River Road at Marley Drive / Briargate Circle	C	33.2	C	28.0
100000189	Broad River Road at I-20 WBR Off-Ramp	B	10.5	B	10.4
79	Broad River Road at I-20 Single Point Ramps Intersection	D	37.3	D	36.5
100000190	Broad River Road at I-20 EBR Off-Ramp	A	4.8	A	8.4
100000195	Broad River Road at Longcreek Drive	A	4.8	A	4.2
Additional Intersections					
100000012	Broad River Road (US 176) at Kinley Road	E	69.7	F	116.2
100000037	Broad River Road (US 176) at Harbison Boulevard	B	18.3	B	16.4
100000049	Broad River Road (US 176) at Piney Woods Road / Lost Creek Drive	C	24.2	C	24.4
100000068	Broad River Road (US 176) at Piney Grove Road	A	5.3	A	7.8
100000339	Broad River Road (US 176) at St. Andrews Road	F	112.3	D	36.5
100000349	Broad River Road (US 176) at St. Andrews Parkway	C	32.3	B	15.1
100000344	Broad River Road (US 176) at Seminole Road / Young Drive	E	67.2	D	35.7
41	Broad River Road (US 176) at Dutch Square Boulevard	A	6.1	C	30.9
100000046	Broad River Road (US 176) at Bush River Road	D	50.5	C	29.9
100000266	Broad River Road (US 176) at Greystone Boulevard	B	12.6	B	12.4
100000265	Greystone Boulevard at Stoneridge Drive	C	22.9	E	62.1
100000188	Greystone Boulevard at I-126 WB Ramps[1]	F	56.2	D	26.2
100000185	Greystone Boulevard at I-126 EB Ramps[1]	C	24.9	F	74.6
100000262	Bush River Road at Colonial Life Boulevard	B	17.8	C	23.4
100000374	Park Terrance Drive at Bower Parkway	A	9.1	A	6.7

[1] Intersection unsignalized under all scenarios; worst approach LOS and delay reported.

[2] Delay unable to be processed per HCM 2010 methodology; Average control delay reported.

External to External Speed and Travel Time Analysis

A summary of the External to External Speed and Travel Time Analysis results is shown in **Table 5.66**.

Table 5.66: External to External Speed and Travel Time TransModeler Results – RA4

Segments	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM
I-26 EB from West of Exit 101					
To I-26 EB (east of Exit 110)	13.84	20:54	13:50	39.7	60.0
To I-20 WB (west of Exit 61)	16.07	23:00	21:52	41.9	44.1
To I-20 EB (east of Exit 68)	15.56	25:45	18:53	36.3	49.4
To I-126 EB (Greystone Blvd)	14.77	21:27	14:34	41.3	60.8
I-26 WB from East of Exit 110					
To I-26 WB (west of Exit 110)	13.86	13:48	24:25	60.3	34.1
To I-20 EB (east of Exit 68)	8.46	11:38	11:49	43.7	43.0
I-20 EB from West of Exit 61					
To I-20 EB (east of Exit 68)	11.10	18:04	10:47	36.9	61.8
To I-26 WB (west of Exit 101)	16.76	25:10	29:49	40.0	33.7
To I-126 EB (east of Greystone Blvd)	10.43	20:00	11:11	31.3	55.9
I-20 WB from East of Exit 68					
To I-20 WB (east of Exit 61)	11.10	10:55	16:48	61.1	39.7
To I-26 EB (east of Exit 110)	9.02	12:38	14:12	42.8	38.1
To I-26 WB (west of Exit 101)	15.29	16:38	29:46	55.2	30.8
I-126 WB from East of Greystone Blvd					
To I-26 WB (wast of Exit 101)	14.75	15:16	27:10	58.0	32.6
To I-20 WB (west of Exit 61)	10.61	10:51	16:25	58.7	38.8

5.3.5 RA5 ANALYSIS RESULTS

Mainline Volume Analysis

A summary of the Mainline Volume Analysis results is shown in **Table 5.67**, **Table 5.68** and **Table 5.69** for I-26, I-20 and I-126, respectively. These measures of effectiveness were incorporated into the level 1B screening of RA5 in section 4.5.2.7 of the *Alternatives Development and Screening Report.*

Table 5.67: I-26 Mainline Volume TransModeler Results – RA5

I-26 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
west of Exit 101 (Broad River Road)	6,171	3,330	3,612	5,489
Exit 101 to Exit 102 (Lake Murray Boulevard)	7,288	4,164	4,466	6,133
Exit 102 to Exit 103 (Harbison Boulevard)	7,228	4,543	4,961	6,422
Exit 103 to Exist 104 (Piney Grove Road)	7,548	5,064	5,808	6,999
Exit 104 to Exit 106 (St. Andrews Road/CD Road)	8,652	5,577	6,377	7,915
Exit 106 to Exit 107	7,065	3,517	4,536	5,413
I-126 Diverge to I-126 Merge	3,653	2,297	3,569	2,522
Exit 108 to Exit 110 (Sunset Boulevard)	4,306	4,484	4,865	5,086
southeast of Exit 110	3,779	4,414	4,519	4,811

Table 5.68: I-20 Mainline Volume TransModeler Results – RA5

I-20 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
west of Exit 61 (Sunset Boulevard)	4,414	2,133	2,942	3,885
Exit 61 to Exit 63 (Bush River Road/CD Road)	5,401	3,469	4,003	5,235
Exit 63 to Exit 65 (Broad River Road)	2,403	1,842	1,590	2,353
Exit 65 to Exit 68 (Monticello Road)	6,070	5,734	5,353	6,079
east of Exit 68	5,742	5,839	5,368	5,778

Table 5.69: I-126 Mainline Volume TransModeler Results – RA5

I-126 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
I-26 to Colonial Life Blvd	6,564	2,845	3,604	5,868
I-126 from Colonial Life Blvd to Greystone Blvd	7,231	3,452	3,964	6,837
I-126 from Greystone Blvd to Huger St	6,646	3,560	3,771	7,013

Basic Freeway Segment Analysis

A summary of the Basic Freeway Segment Analysis results is shown in **Table 5.70**, **Table 5.71** and **Table 5.72** for I-26, I-20 and I-126, respectively.

Table 5.70: I-26 Basic Freeway Segment TransModeler Results – RA5

Segment	RA5 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound						
Exit 101 to Exit 102	D	31.5	0.61	B	17.7	0.37
Exit 102 to Exit 103	D	34.6	0.75	C	23.4	0.52
Exit 103 to Exit 104	D	31.2	0.63	C	24.6	0.48
Exit 104 to Exit 107/Exit 106	F	46.0	0.72	C	25.3	0.53
Exit 107/106 to I-26 Split	F	60.3	0.78	B	17.8	0.50
I-126 Diverge to I-126 Merge	D	26.6	0.54	D	26.3	0.53
I-26 Split to Exit 110	C	23.2	0.45	D	27.0	0.51
I-26 Westbound						
Exit 110 to Exit 108	C	21.5	0.47	C	23.1	0.53
I-126 Diverge to I-126 Merge	D	34.8	0.60	D	30.7	0.66
I-26 Mege to Exit 106	C	21.6	0.39	D	29.5	0.60
Exit 106 to Exit 104	D	27.8	0.58	F	59.6	0.82
Exit 104 to Exit 103	D	27.6	0.42	D	33.7	0.58
Exit 103 to Exit 102	C	22.9	0.47	D	29.9	0.67
Exit 102 to Exit 101	B	17.2	0.35	C	23.1	0.51

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.71: I-20 Basic Freeway Segment TransModeler Results – RA5

Segment	RA5 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound						
west of Exit 61	F	46.1	0.61	C	25.6	0.41
Exit 61 to Exit 63	D	27.9	0.45	C	19.2	0.33
Exit 63 to Exit 65	A	10.7	0.25	A	7.5	0.17
Exit 65 to Exit 68	F	48.3	0.84	D	33.2	0.74
I-20 Westbound						
Exit 68 to Exit 65	E	42.5	0.81	F	68.6	0.80
Exit 65 to Exit 63	E	43.2	0.80	F	49.6	0.84
Exit 63 to Exit 61	A	9.0	0.19	A	10.5	0.25
west of Exit 61	B	17.3	0.36	F	91.7	0.55

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.72: I-126 Basic Freeway Segment TransModeler Results – RA5

Segment	RA5 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound						
I-26 to Colonial Life Blvd	E	36.9	0.73	C	21.1	0.40
Colonial Life Blvd to Greystone Blvd	D	32.7	0.75	C	19.3	0.41
Greystone Blvd to Huger St	E	37.7	0.69	B	16.2	0.39
I-126 Westbound						
Huger St to Greystone Blvd	B	16.0	0.37	D	30.9	0.73
Greystone Blvd to Colonial Life Blvd	B	16.5	0.36	F	53.1	0.71
Colonial Life Blvd to I-26	A	10.8	0.30	E	41.1	0.61

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The RA5 analysis results for the freeway segments, summarized in **Table 5.70**, **Table 5.71** and **Table 5.72**, indicate the following:

- During the morning peak hour:
  - I-26 eastbound freeway segments between Exit 104 and Exit 107/106 to I-26 Split operate at LOS F. All other segments along I-26 eastbound and all I-26 westbound segments operate at LOS D or better.
  - I-20 eastbound freeway segments west of Exit 61 and between Exit 65 and Exit 68 operate at LOS F. I-20 westbound freeway segments between Exit 68 and Exit 63 operate at LOS E. All other I-20 segments operate at LOS D or better.
  - I-126 eastbound segments from I-26 to Colonial Life Boulevard and Greystone Boulevard to Huger Street operate at LOS E. All other I-126 freeway segments operate at LOS D or better.
- During the afternoon peak hour:
  - I-26 eastbound freeway segments between Exit 106 and Exit 104 operate at LOS F. All other segments along I-26 westbound and all I-26 eastbound segments operate at LOS D or better.
  - I-20 westbound freeway segments between Exit 68 and Exit 63 and west of Exit 61 operate at LOS F. All other I-20 segments, including all eastbound segments, operate at LOS D or better.
  - I-126 westbound freeway segments from Greystone Boulevard to I-26 operate at LOS E and F. All other I-126 segments operate at LOS D or better, including all eastbound segments.

Ramp Merge Analysis

A summary of the Ramp Merge Analysis results is shown in **Table 5.73**, **Table 5.74** and **Table 5.75** for I-26, I-20 and I-126, respectively.

Table 5.73: I-26 Ramp Merge TransModeler Results – RA5

Segment	RA5 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound						
Exit 101	D	31.5	0.61	B	17.7	0.37
Exit 102	D	31.9	0.60	C	23.0	0.41
Exit 103	D	31.2	0.63	C	24.6	0.49
Exit 104	D	34.0	0.61	C	23.3	0.44
Exit 106	F	60.3	0.63	B	17.8	0.40
Exit 107 (From I-20)	C	27.0	0.54	C	27.3	0.53
Exit 108 (I-126)	C	23.2	0.45	C	27.0	0.51
Exit 110	B	19.1	0.39	C	22.8	0.47
I-26 Westbound						
Exit 110	C	21.4	0.38	C	23.6	0.42
Exit 108 (I-126)	C	25.9	0.49	D	32.5	0.72
Exit 107 (From I-20)	C	21.7	0.40	E	40.6	0.58
Exit 106	C	25.6	0.39	F	70.6	0.57
Exit 104	B	14.9	0.42	B	17.6	0.58
Exit 103	B	18.9	0.38	C	24.1	0.53
Exit 102	B	17.2	0.35	C	23.1	0.51
Exit 101	B	15.4	0.28	C	24.1	0.46

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.74: I-20 Ramp Merge TransModeler Results – RA5

Segment	RA5 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound						
Exit 61 Loop	F	103.1	0.49	B	18.0	0.37
Exit 61	F	81.7	0.57	C	21.5	0.42
Exit 65	F	47.9	0.52	C	27.5	0.45
Exit 65 (From CD)	B	16.8	0.34	B	17.8	0.29
Exit 68	D	32.0	0.60	D	31.2	0.56
I-20 Westbound						
Exit 68	D	34.4	0.61	E	42.7	0.64
Exit 65	A	5.6	0.15	A	6.3	0.20
Exit 64 (From CD)	A	9.9	0.21	B	12.0	0.27
Exit 63 (From CD)	B	11.4	0.25	B	18.9	0.37
Exit 63	B	15.3	0.29	F	66.9	0.45
Exit 61 Loop	A	8.9	0.21	B	14.1	0.38
Exit 61	B	15.3	0.22	D	33.0	0.41

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.75: I-126 Ramp Merge TransModeler Results – RA5

Segment	RA5 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound						
Colonial Life Blvd	D	30.7	0.60	C	23.3	0.33
Greystone Blvd	D	32.7	0.70	B	13.2	0.39
I-126 Westbound						
Colonial Life Blvd	B	15.2	0.29	E	37.9	0.58
Greystone Blvd	B	10.8	0.30	E	41.1	0.61

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The RA5 analysis results for the ramp merge areas, summarized in **Table 5.73**, **Table 5.74** and **Table 5.75**, indicate the following:

- During the morning peak hour:
  - I-26 eastbound merge areas from Exit 106 to Exit 107 operate at LOS F. All other ramp merge areas operate at LOS D or better, including all westbound merge areas.
  - I-20 eastbound ramp merge areas at Exit 61 and Exit 65 operate at LOS F. All other ramp merge areas operate at LOS D or better, including all westbound merge areas.

- I-126 merge areas all operate at LOS D or better.

- During the afternoon peak hour:
  - I-26 westbound merge areas from Exit 106 to Exit 107 operate at LOS F. All other ramp merge areas operate at LOS D or better, including all eastbound merge areas.
  - I-20 eastbound and westbound merge areas operate at LOS D or better with the exception of westbound Exit 68 to Exit 63, where the merge area operates at LOS E or F.
  - I-126 eastbound merge areas all operate at LOS D or better, while all westbound merge areas operate at LOS E.

Ramp Diverge Analysis

A summary of the Ramp Diverge Analysis results is shown in **Table 5.76**, **Table 5.77** and **Table 5.78** for I-26, I-20 and I-126, respectively.

Table 5.76: I-26 Ramp Diverge TransModeler Results – RA5

Segment	RA5 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound						
Exit 101	D	33.5	0.64	B	17.4	0.38
Exit 101 Loop	C	26.1	0.50	B	14.9	0.29
Exit 102	D	31.5	0.61	B	17.7	0.37
Exit 102 Loop	C	27.7	0.56	B	17.8	0.35
Exit 103	D	32.0	0.75	C	23.1	0.52
Exit 104	D	31.2	0.63	C	24.6	0.48
Exit 106 (CD Road to I-20)	D	34.9	0.72	C	25.2	0.53
Exit 106	C	22.0	0.64	B	13.0	0.42
Exit 107 (CD Road to I-126)	F	57.9	0.78	C	26.2	0.50
Exit 110	C	23.2	0.45	C	27.0	0.51
I-26 Westbound						
Exit 110	D	30.2	0.46	F	53.7	0.50
Exit 107/I-126	D	29.9	0.47	D	31.9	0.53
Exit 106/CD Road	D	29.4	0.49	F	53.2	0.72
Exit 104	C	23.6	0.46	F	49.6	0.66
Exit 103	B	16.2	0.42	C	20.1	0.58
Exit 102	B	19.1	0.47	C	24.4	0.67
Exit 102 Loop	B	17.7	0.35	C	22.2	0.52
Exit 101	B	17.2	0.35	C	23.1	0.51
Exit 101 Loop	B	13.6	0.32	B	18.7	0.49

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.77: I-20 Ramp Diverge TransModeler Results – RA5

Segment	RA5 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound						
Exit 61	D	30.9	0.46	B	18.4	0.31
Exit 63/64	C	24.2	0.45	C	21.0	0.33
Exit 68	E	43.4	0.84	E	36.8	0.74
I-20 Westbound						
Exit 68	E	42.5	0.81	F	68.6	0.80
Exit 65	E	35.9	0.40	E	41.8	0.42
Exit 64 (CD Road to I-26)	C	26.5	0.35	C	25.5	0.38
Exit 63 (CD Road)	A	6.1	0.19	A	6.7	0.24
Exit 61	E	35.1	0.36	F	75.9	0.53

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.78: I-126 Ramp Diverge TransModeler Results – RA5

Segment	RA5 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound						
Colonial Life Boulevard	E	36.9	0.73	C	21.1	0.40
Greystone Boulevard	D	31.0	0.60	C	24.7	0.33
I-126 Westbound						
Greystone Boulevard	B	18.0	0.37	D	33.1	0.73
Colonial Life Boulevard	B	15.4	0.29	E	43.6	0.57
Colonial Life Boulevard to I-26 EB	B	14.6	0.31	F	56.5	0.65
Exit 107 (I-20)	B	10.8	0.30	E	41.1	0.61

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The RA5 analysis results for the ramp diverge areas, summarized in **Table 5.76**, **Table 5.77** and **Table 5.78**, indicate the following:

- During the morning peak hour:
  - I-26 eastbound diverge areas for Exit 107 (CD Road to I-126) operate at LOS F. All other ramp diverge areas in both the eastbound and westbound directions operate at LOS D or better.
  - I-20 eastbound diverge areas at Exit 68 and westbound diverge areas from Exit 68 to Exit 65 and at Exit 61 operate at LOS E. All other diverge areas operate at LOS D or better in both directions.
  - All I-126 diverge areas operate at LOS D or better, with the exception of the eastbound diverge area at Colonial Life Boulevard which operates at LOS E.

- During the afternoon peak hour:
  - I-26 westbound diverge areas at Exit 110 and from Exit 106/CD Road to Exit 104 operate at LOS F. All other diverge areas, including all eastbound diverge areas, operate at LOS D or better.
  - I-20 westbound diverge areas at Exit 68 and Exit 61 operate at LOS F, while the eastbound diverge area at Exit 68 and the westbound diverge area at Exit 65 operate at LOS E. All other diverge areas operate at LOS D or better.
  - I-126 westbound diverge areas at Colonial Life Boulevard and Exit 107 operate at LOS E and F. All other diverge areas, including all eastbound diverge areas, operate at LOS D or better.

Mainline Travel Time Analysis

A summary of the Mainline Travel Time Analysis results is shown in **Table 5.79**.

Table 5.79: Mainline Travel Time TransModeler Results – RA5

Segments	Eastbound					Westbound				
	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)		Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM		AM	PM	AM	PM
I-26 between Exit 101 and Exit 110										
Exit 101 to Exit 102 (Lake Murray Boulevard)	0.76	00:49	00:45	55.6	60.1	1.00	01:01	01:03	58.8	57.3
Exit 102 to Exit 103 (Harbison Boulevard)	1.21	01:19	01:13	55.4	59.7	0.86	00:51	00:55	60.1	56.7
Exit 103 to Exist 104 (Piney Grove Road)	0.89	00:58	00:54	54.8	59.5	0.95	00:57	00:59	60.0	57.6
Exit 104 to Exit 107 (I-20) / Exit 106 (St. Andrews Road)	1.77	02:18	01:51	46.2	57.7	2.80	03:04	04:32	54.7	37.0
Exit 106 to I-26/I-126 Split	1.22	02:13	01:26	33.0	51.0	0.32	00:25	00:30	46.3	38.7
I-26 to I-126	1.23	01:25	01:26	51.8	51.7	0.73	00:59	01:00	44.3	43.6
I-26/I-126 Split to Exit 110 (Sunset Boulevard)	1.60	01:35	01:37	60.7	59.3	1.46	01:27	01:28	60.5	59.5
Total	**8.68**	**10:38**	**09:12**	**49.0**	**56.6**	**8.11**	**08:44**	**10:27**	**55.7**	**46.6**
I-20 between Exit 61 and Exit 68										
Exit 61 to Exit 63/64	1.81	04:34	01:53	23.9	57.7	2.16	02:21	04:30	19.3	28.8
Exit 63/64 to Exit 65	2.58	02:29	02:26	62.0	63.4	1.36	01:17	01:17	35.2	63.8
Exit 65 to Exit 68 (Monticello Road)	2.52	03:31	02:43	43.0	55.7	3.00	03:46	04:47	12.0	37.6
Total	**6.91**	**10:34**	**07:02**	**39.2**	**58.9**	**6.52**	**07:24**	**10:35**	**52.9**	**37.0**
I-126 between I-26 and Greystone Blvd										
I-26 to Colonial Life Blvd	0.76	00:57	00:54	47.9	50.9	0.98	01:02	02:08	43.7	27.6
Colonial Life Blvd to Greystone Blvd	1.49	01:36	01:37	55.7	55.1	1.12	01:06	01:44	41.2	38.6
Total	**2.25**	**02:33**	**02:31**	**52.8**	**53.6**	**2.10**	**02:08**	**03:52**	**58.9**	**32.5**

Arterial Travel Time Analysis

A summary of the Arterial Travel Time Analysis results is shown in **Table 5.80**.

Table 5.80: Arterial Travel Time TransModeler Results – RA5

Location	Eastbound					Westbound				
	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)		Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM		AM	PM	AM	PM
Broad River Road (west of Exit 101 to Greystone Blvd)	7.9	20:05	25:12	23.5	18.7	7.9	23:16	29:26	20.3	16.0
Lake Murray Boulevard (west of Exit 102 to Broad River Road)	1.5	04:37	04:20	19.9	21.2	1.5	04:11	03:50	21.0	22.9
Harbison Boulevard (west of Exit 103 to Broad River Road)	1.1	03:28	04:35	19.0	14.4	1.1	03:13	03:17	20.5	20.1
Piney Grove Road (west of Exit 104 to Broad River Road)	1.5	05:05	04:29	18.3	20.7	1.5	07:48	04:22	11.9	21.3
St. Andrews Road (west of Exit 106 to Broad River Road)	1.0	05:52	03:58	10.5	15.4	1.0	08:51	04:27	6.9	13.8
Bush River Road (west of Exit 63 to Broad River Road)	2.0	07:02	08:03	17.2	15.0	2.0	06:04	06:12	19.9	19.5
Location	**Northbound**					**Southbound**				
	Length (mi)	Travel Time		Average Speed		Length (mi)	Travel Time		Average Speed	
		AM	PM	AM	PM		AM	PM	AM	PM
Colonial Life Boulevard (I-126 Ramps to Bush River Road)	0.6	01:59	02:33	19.4	15.1	0.6	02:39	02:28	14.5	15.6

Intersection LOS and Delay Analysis

A summary of the Intersection LOS and Delay Analysis results is shown in **Table 5.81**.

Table 5.81: Intersection and LOS TransModeler Results – RA5

Node #	Intersection Name	AM		PM	
		LOS	Delay	LOS	Delay
Exit 101					
100000391	Broad River Road (US 176) at Columbiana Drive / Lordship Lane	C	21.6	D	38.5
100000150	Broad River Road (US 176) at I-26 EB Off-ramp[1]	C	21.4	C	18.8
100000151	Broad River Road (US 176) at I-26 EB On-ramp	A	8.1	A	6.0
100000160	Broad River Road (US 176) at I-26 WB On-ramp[2]	A	2.1	A	1.9
4	Broad River Road (US 176) at Western Lane	B	10.9	B	10.2
Exit 102					
100000395	Lake Murray Boulevard (SC 60) at Columbiana Drive	E	59.3	E	72.6
100000510	Lake Murray Boulevard (SC 60) at I-26 EB On-Ramp[2]	A	3.3	A	3.1
100000169	Lake Murray Boulevard (SC 60) at I-26 WB On-Ramp[2]	A	2.3	A	3.2
100000401	Lake Murray Boulevard (SC 60) at Parkridge Drive / Kinley Road	B	16.6	C	23.4
Exit 103					
100000364	Harbison Boulevard (S-757) at Columbiana Drive	B	13.8	B	10.5
100000365	Harbison Boulevard (S-757) at Park Terrace Drive / Columbiana Circle	A	7.9	C	32.6
100000362	Harbison Boulevard (S-757) at Saturn Parkway	A	2.8	C	21.1
8	Harbison Boulevard (S-757) at I-26 EB Ramps	C	21.8	B	14.0
99	Harbison Boulevard (S-757) at I-26 WB Ramps	B	19.9	C	28.9
100000165	Harbison Boulevard (S-757) at Woodcross Drive	C	31.0	C	28.7
Exit 104					
100000353	Piney Grove Road at Bower Parkway / Jamil Road	E	65.3	E	73.2
83	Piney Grove Road at EBR Off-Ramp	A	0.0	A	0.0
100000174	Piney Grove Road at I-26 EB Ramps	C	26.0	C	24.9
100000177	Piney Grove Road at I-26 WB Ramps	B	13.1	B	18.6
89	Piney Grove Road at WBR Off-Ramp	A	0.0	A	0.0
100000399	Piney Grove Road at Fernandina Road	C	31.5	D	41.3
Exit 106					
100000348	St. Andrews Road at Jamil Road	C	22.7	A	9.4
100000182	St. Andrews Road at Woodland Hill Road	D	40.1	B	10.3
98	St. Andrews Road at I-26 SPUI	C	27.4	C	32.8
100000900	St. Andrews Road at I-26 WBR Off-Ramp[2]	C	15.8	C	21.1
100000358	St. Andrews Road at Burning Tree Drive/Fernandina Road	D	52.9	C	33.7
100000354	St. Andrews Road at Kay Street / Chartwell Road	F	81.3	B	14.8
Exit 108					
100000256	Bush River Road at Zimalcrest Drive	A	9.1	A	9.6
30	Bush River Road at Days Inn Driveway	A	4.6	A	8.7
100000252	Bush River Road at Morninghill Drive	C	21.3	B	19.5
100000184	Bush River Road at Arrowwood Road	C	20.1	B	18.6
Exit 110					
100000186	Sunset Boulevard (US 378) at E. Hospital Drive / Harbor Drive	C	27.2	E	60.0
100000093	Sunset Boulevard (US 378) at I-26 EBR Off-Ramp[1]	E	37.4	F	66.1
100000903	Sunset Boulevard (US 378) at I-26 Ramps	C	26.1	C	25.2
100000902	Sunset Boulevard (US 378) at I-26 WBR Off-Ramp[1]	E	45.2	F	54.3
100000163	Sunset Boulevard (US 378) at Chris Drive / McSwain Drive	A	3.6	B	15.6
Exit 63					
100000446	Bush River Road at Berryhill Drive/WB On-Ramp	B	14.6	B	16.6
118	Bush River Road at I-20 EBL Off-Ramp	A	9.0	B	14.6
21	Bush River Road at I-20 EBR Off-Ramp[1]	A	1.9	C	20.9
100000255	Bush River Road at Independence Avenue	B	12.1	B	19.4
Exit 65					
100000187	Broad River Road at Marley Drive / Briargate Circle	B	15.3	C	26.3
100000189	Broad River Road at I-20 WB Ramps	A	8.8	B	10.2
79	Broad River Road at I-20 Single Point Ramps Intersection	C	31.3	C	28.4
100000190	Broad River Road at I-20 EB Ramps[1]	B	14.2	F	68.1
100000195	Broad River Road at Longcreek Drive	A	5.1	A	5.8
Additional Intersections					
100000012	Broad River Road (US 176) at Kinley Road	E	58.4	F	114.1
100000037	Broad River Road (US 176) at Harbison Boulevard	D	41.3	D	39.4
100000049	Broad River Road (US 176) at Piney Woods Road / Lost Creek Drive	C	28.8	D	37.0
100000068	Broad River Road (US 176) at Piney Grove Road	A	5.8	B	14.5
100000339	Broad River Road (US 176) at St. Andrews Road	C	28.6	D	40.8
100000349	Broad River Road (US 176) at St. Andrews Parkway	B	10.4	B	14.7
100000344	Broad River Road (US 176) at Seminole Road / Young Drive	A	9.3	C	29.7
41	Broad River Road (US 176) at Dutch Square Boulevard	A	7.5	E	70.1
100000046	Broad River Road (US 176) at Bush River Road	D	47.5	F	105.1
100000266	Broad River Road (US 176) at Greystone Boulevard	B	13.7	B	13.6
100000265	Greystone Boulevard at Stoneridge Drive	C	26.9	C	34.5
100000188	Greystone Boulevard at I-126 WB Ramps[1]	F	91.8	E	42.6
100000185	Greystone Boulevard at I-126 EB Ramps[1]	D	34.9	F	95.0
100000262	Bush River Road at Colonial Life Boulevard	B	15.2	C	21.2
100000897	Colonial Life Boulevard at West Colonial Life Road[1]	A	1.3	F	332.5
100000374	Park Terrance Drive at Bower Parkway	B	12.1	B	12.1

[1] Intersection unsignalized under all scenarios; worst approach LOS and delay reported.

[2] Delay unable to be processed per HCM 2010 methodology; Average control delay reported.

External to External Speed and Travel Time Analysis

A summary of the External to External Speed and Travel Time Analysis results is shown in **Table 5.82**.

Table 5.82: External to External Speed and Travel Time TransModeler Results – RA5

Segments	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM
I-26 EB from West of Exit 101					
To I-26 EB (east of Exit 110)	13.84	15:30	13:23	53.6	62.1
To I-20 WB (west of Exit 61)	16.07	17:24	19:02	55.4	50.6
To I-20 EB (east of Exit 68)	15.39	18:22	16:01	50.3	57.7
To I-126 EB (Greystone Blvd)	14.78	17:20	14:29	51.2	61.2
I-26 WB from East of Exit 110					
To I-26 WB (west of Exit 101)	13.85	13:16	14:48	62.7	56.2
To I-20 EB (east of Exit 68)	8.40	09:57	09:43	50.7	51.9
I-20 EB from West of Exit 61					
To I-20 EB (east of Exit 68)	11.10	18:52	10:47	35.3	61.8
To I-26 WB (west of Exit 101)	16.71	23:54	19:34	42.0	51.2
To I-126 EB (east of Greystone Blvd)	10.37	19:52	11:19	31.3	54.9
I-20 WB from East of Exit 68					
To I-20 WB (east of Exit 61)	11.10	11:11	16:27	59.6	40.5
To I-26 EB (east of Exit 110)	9.05	10:50	14:13	50.1	38.2
To I-26 WB (west of Exit 101)	15.33	16:01	21:24	57.4	43.0
I-126 WB from East of Greystone Blvd					
To I-26 WB (west of Exit 101)	14.75	14:29	18:36	61.1	47.6
To I-20 WB (west of Exit 61)	10.46	10:55	16:01	57.5	39.2

5.3.6 RA6 ANALYSIS RESULTS

Mainline Volume Analysis

A summary of the Mainline Volume Analysis results is shown in **Table 5.83**, **Table 5.84** and **Table 5.85** for I-26, I-20 and I-126, respectively. These measures of effectiveness were incorporated into the level 1B screening of RA6 in section 4.5.2.8 of the *Alternatives Development and Screening Report.*

Table 5.83: I-26 Mainline Volume TransModeler Results – RA6

I-26 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
west of Exit 101 (Broad River Road)	4,733	2,975	3,580	5,370
Exit 101 to Exit 102 (Lake Murray Boulevard)	5,121	3,583	4,307	6,569
Exit 102 to Exit 103 (Harbison Boulevard)	5,370	3,851	4,708	7,170
Exit 103 to Exist 104 (Piney Grove Road)	5,123	4,499	5,093	7,662
Exit 104 to Exit 106 (St. Andrews Road/CD Road)	5,433	4,974	5,394	7,816
Exit 106 to Exit 107	1,593	4,084	1,644	6,695
I-26 to I-26	3,266	2,186	3,280	2,549
Exit 108 to Exit 110 (Sunset Boulevard)	3,858	4,363	4,597	4,940
southeast of Exit 110	3,415	4,034	4,415	4,684

Table 5.84: I-20 Mainline Volume TransModeler Results – RA6

I-20 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
west of Exit 61 (Sunset Boulevard)	4,229	1,856	2,977	3,767
Exit 61 to Exit 63 (Bush River Road/CD Road)	4,646	3,028	3,686	4,983
Exit 63 to Exit 65 (Broad River Road)	2,143	1,371	1,557	1,978
Exit 65 to Exit 68 (Monticello Road)	5,537	5,340	5,243	6,214
east of Exit 68	5,146	5,344	5,251	5,804

Table 5.85: I-126 Mainline Volume TransModeler Results – RA6

I-126 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
I-26 to Colonial Life Blvd	4,832	1,903	3,197	4,153
I-126 to I-26 WB	-	2,623	-	5,641
I-126 from Colonial Life Blvd to Greystone Blvd	4,836	3,162	3,201	6,305
I-126 from Greystone Blvd to Huger St	5,683	3,251	3,594	6,870

Basic Freeway Segment Analysis

A summary of the Basic Freeway Segment Analysis results is shown in **Table 5.86**, **Table 5.87** and **Table 5.88** for I-26, I-20 and I-126, respectively.

Table 5.86: I-26 Basic Freeway Segment TransModeler Results – RA6

Segment	RA6 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound						
Exit 101 to Exit 102	D	31.2	0.43	B	16.9	0.36
Exit 102 to Exit 103	C	24.7	0.56	C	22.3	0.49
Exit 103 to Exit 104	B	15.4	0.53	C	19.8	0.53
Exit 104 to Exit 106	F	135.2	0.56	F	80.8	0.57
Exit 106 to Exit 107	B	12.2	0.24	B	12.9	0.24
I-26 to I-26	C	23.0	0.48	C	24.1	0.49
Exit 108 to Exit 110	C	18.9	0.40	C	21.9	0.48
I-26 Westbound						
Exit 110 to Exit 108	C	21.3	0.45	C	23.3	0.51
I-26 to I-26	D	33.5	0.36	F	112.8	0.42
Exit 107 to Exit 106	C	19.3	0.30	C	25.7	0.50
Exit 106 to Exit 104	D	30.2	0.55	F	48.9	0.86
Exit 104 to Exit 103	C	20.2	0.47	F	61.5	0.80
Exit 103 to Exit 102	C	21.0	0.40	E	43.7	0.75
Exit 102 to Exit 101	B	15.3	0.30	C	25.4	0.55

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.87: I-20 Basic Freeway Segment TransModeler Results – RA6

Segment	RA6 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound						
west of Exit 61	F	46.3	0.59	C	25.8	0.41
Exit 61 to Exit 63	F	97.4	0.65	F	84.1	0.51
Exit 63 to Exit 65	B	12.6	0.30	A	9.8	0.22
Exit 65 to Exit 68	D	34.0	0.76	D	32.4	0.73
I-20 Westbound						
Exit 68 to Exit 65	F	69.7	0.53	F	93.0	0.63
Exit 65 to Exit 63	A	9.3	0.19	B	12.2	0.27
Exit 63 to Exit 61	B	16.1	0.42	F	82.3	0.69
west of Exit 61	B	17.7	0.26	E	37.2	0.52

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.88: I-126 Basic Freeway Segment TransModeler Results – RA6

Segment	RA6 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound						
I-26 to Colonial Life Blvd	D	29.6	0.73	C	19.3	0.48
Colonial Life Blvd to Greystone Blvd	C	25.1	0.62	B	15.2	0.39
Greystone Blvd to Huger St	D	26.9	0.59	B	15.4	0.37
I-126 Westbound						
Huger St to Greystone Blvd	B	14.5	0.34	D	30.6	0.73
Greystone Blvd to Colonial Life Blvd	B	17.1	0.33	F	81.8	0.66
Colonial Life Blvd to I-26	-	-	-	-	-	-

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The RA6 analysis results for the freeway segments, summarized in **Table 5.86**, **Table 5.87** and **Table 5.88**, indicate the following:

- During the morning peak hour:
  - I-26 eastbound freeway segments between Exit 104 and Exit 106 operate at LOS F. All other segments along I-26 eastbound and all I-26 westbound segments operate at LOS D or better.
  - I-20 eastbound freeway segments west of Exit 61 to Exit 63 operate at LOS F. I-20 westbound freeway segments between Exit 68 and Exit 65 also operate at LOS F. All other I-20 segments operate at LOS D or better.
  - I-126 freeway segments all operate at LOS D or better.
- During the afternoon peak hour:
  - I-26 eastbound freeway segments between Exit 104 and Exit 106 operate at LOS F. I-26 westbound freeway segments from I-26 to I-26 and Exit 106 to Exit 103 also operate at LOS F, and the westbound segment between Exit 103 and Exit 102 operates at LOS E. All other I-26 segments operate at LOS D or better.
  - I-20 westbound freeway segments between Exit 68 and Exit 65 and between Exit 63 and Exit 61 operate at LOS F, and segments west of Exit 61 operate at LOS E. I-20 eastbound segments between Exit 61 and 63 also operate at LOS F. All other I-20 segments operate at LOS D or better.
  - I-126 freeway segments all operate at LOS D or better with the exception of westbound segments from Greystone Boulevard to Colonial Life Boulevard, which operate at LOS F.

Ramp Merge Analysis

A summary of the Ramp Merge Analysis results is shown in **Table 5.89**, **Table 5.90** and **Table 5.91** for I-26, I-20 and I-126, respectively.

Table 5.89: I-26 Ramp Merge TransModeler Results – RA6

Segment	RA6 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound						
Exit 101	D	31.2	0.43	B	16.9	0.36
Exit 102	B	18.6	0.45	B	16.7	0.39
Exit 103	B	15.4	0.43	B	19.8	0.42
Exit 104	E	43.2	0.45	C	26.4	0.45
Exit CD Road	B	10.5	0.23	B	12.6	0.25
Exit 107 (From I-20)	B	16.5	0.36	B	17.2	0.36
Exit 108 (I-126)	B	18.9	0.40	C	21.9	0.48
Exit 110	B	17.9	0.36	C	23.5	0.46
I-26 Westbound						
Exit 110	C	21.7	0.36	C	22.4	0.41
Exit 108 (I-126)	B	19.3	0.30	C	25.7	0.50
Exit 107 (From I-20)	C	26.6	0.36	F	49.3	0.56
Exit 106	C	25.7	0.44	E	39.8	0.70
Exit 104	C	20.2	0.38	F	61.5	0.64
Exit 103	B	15.9	0.32	E	37.9	0.60
Exit 102	B	15.3	0.30	C	25.4	0.55
Exit 101	B	13.1	0.25	C	22.5	0.45

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.90: I-20 Ramp Merge TransModeler Results – RA6

Segment	RA6 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound						
Exit 61 Loop	F	85.7	0.43	E	38.4	0.38
Exit 65	C	27.2	0.46	C	26.4	0.44
Exit 68	C	26.8	0.54	D	29.3	0.55
I-20 Westbound						
Exit 68	C	21.8	0.74	F	45.7	0.86
Exit 64 (From CD)	B	11.8	0.22	E	35.2	0.37
Exit 63	B	15.0	0.25	F	69.9	0.44
Exit 61	B	14.0	0.19	D	33.0	0.39

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.91: I-126 Ramp Merge TransModeler Results – RA6

Segment	RA6 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound						
Colonial Life Blvd	C	20.7	0.62	B	13.1	0.39
Greystone Blvd	C	22.9	0.59	B	12.7	0.37
I-126 Westbound						
Greystone Blvd	B	17.1	0.33	F	81.8	0.66

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The RA6 analysis results for the ramp merge areas, summarized in **Table 5.89**, **Table 5.90** and **Table 5.91**, indicate the following:

- During the morning peak hour:
  - I-26 merge areas all operate at LOS D or better with the exception of the eastbound merge area at Exit 104, which operates at LOS E.
  - I-20 merge areas all operate at LOS D or better with the exception of the eastbound Exit 61 Loop merge area, which operates at LOS E.
  - I-126 merge areas all operate at LOS C or better.
- During the afternoon peak hour:
  - I-26 westbound merge areas from Exit 107 (From I-20) to Exit 103 operate at LOS E and F. All other ramp merge areas operate at LOS C or better, including all eastbound merge areas.
  - I-20 westbound merge areas from Exit 68 to Exit 63 operate at LOS E and F, and the eastbound Exit 61 Loop merge area also operates at LOS E. All other I-20 merge areas operate at LOS D or better.
  - I-126 eastbound merge areas all operate at LOS B or better, while the westbound Greystone Boulevard merge area operates at LOS F.

Ramp Diverge Analysis

A summary of the Ramp Diverge Analysis results is shown in **Table 5.92**, **Table 5.93** and **Table 5.94** for I-26, I-20 and I-126, respectively.

Table 5.92: I-26 Ramp Diverge TransModeler Results – RA6

Segment	RA6 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound						
Exit 101	C	26.2	0.49	B	16.2	0.37
Exit 102	D	31.2	0.43	B	16.9	0.36
Exit 103	C	23.0	0.56	C	20.3	0.49
Exit 104	B	14.5	0.43	B	16.8	0.42
Exit 106	F	135.2	0.56	F	80.8	0.57
Exit 110	B	18.9	0.40	C	21.9	0.48
I-26 Westbound						
Exit 110	C	27.1	0.42	F	66.2	0.48
Exit 108 (CD Road/I-126)	C	27.6	0.36	D	29.0	0.41
Exit 107/Exit 106	B	19.3	0.30	C	25.7	0.50
Exit 104	C	26.2	0.44	E	41.4	0.69
Exit 103	C	20.7	0.47	F	61.8	0.80
Exit 102	B	16.1	0.40	E	39.4	0.75
Exit 101	B	15.3	0.30	C	25.4	0.55

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.93: I-20 Ramp Diverge TransModeler Results – RA6

Segment	RA6 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound						
Exit 61	F	47.3	0.44	C	21.4	0.31
Exit 63	F	95.5	0.48	F	79.2	0.38
Exit 68	E	37.8	0.76	D	33.5	0.73
I-20 Westbound						
Exit 68	E	37.7	0.74	F	66.3	0.81
Exit 65	F	69.7	0.53	F	93.0	0.63
Exit 61	D	32.5	0.41	F	83.8	0.67

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.94: I-126 Ramp Diverge TransModeler Results – RA6

Segment	RA6 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound						
Colonial Life Boulevard	C	27.8	0.55	B	18.2	0.36
Greystone Boulevard	C	21.0	0.49	B	13.4	0.31
I-126 Westbound						
Greystone Boulevard	B	16.4	0.34	F	48.4	0.72
Colonial Life Boulevard	B	17.1	0.33	F	81.8	0.66

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The RA6 analysis results for the ramp diverge areas, summarized in **Table 5.92**, **Table 5.93** and **Table 5.94**, indicate the following:

- During the morning peak hour:
  - I-26 eastbound diverge areas for Exit 106 operate at LOS F. All other ramp diverge areas in both the eastbound and westbound directions operate at LOS D or better.
  - I-20 eastbound and westbound diverge areas all operate at LOS E and F with the exception of the westbound Exit 61 merge area, which operates at LOS D.
  - I-126 diverge areas all operate at LOS C or better.
- During the afternoon peak hour:
  - I-26 westbound diverge areas at Exit 110 and from Exit 104 Road to Exit 102 operate at LOS E and F. I-26 eastbound diverge areas at Exit 106 also operates at LOS F. All other diverge areas operate at LOS D or better.
  - I-20 westbound diverge areas at all operate at LOS F. The eastbound diverge area at Exit 63 also operates at LOS F. All other diverge areas operate at LOS D or better.
  - I-126 westbound diverge areas all operate at LOS F, and I-126 eastbound diverge areas all operate at LOS E.

Mainline Travel Time Analysis

A summary of the Mainline Travel Time Analysis results is shown in **Table 5.95**.

Table 5.95: Mainline Travel Time TransModeler Results – RA6

Segments	Eastbound					Westbound				
	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)		Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM		AM	PM	AM	PM
I-26 between Exit 101 and Exit 110										
Exit 101 to Exit 102 (Lake Murray Boulevard)	0.83	01:03	00:48	47.3	62.4	1.26	01:13	01:16	62.1	59.5
Exit 102 to Exit 103 (Harbison Boulevard)	1.19	01:12	01:10	59.6	61.1	1.06	01:02	01:15	61.3	51.2
Exit 103 to Exist 104 (Piney Grove Road)	0.96	00:58	00:58	59.4	59.8	0.86	00:52	01:26	59.5	35.9
Exit 104 to Exit 106 (St. Andrews Road)	1.70	04:48	01:53	21.3	54.5	2.03	02:32	02:57	48.1	41.3
Exit 106 to Exit 107 (I-20)	1.90	02:07	02:07	53.9	53.9	1.12	01:21	01:24	49.7	48.0
Exit 108 to I-26	1.08	01:11	01:10	54.8	55.5	0.77	01:00	01:00	46.6	46.5
I-26 to Exit 110 (Sunset Boulevard)	1.23	01:10	01:12	63.0	61.7	1.47	01:30	01:30	58.9	58.6
Total	**8.89**	**12:29**	**09:17**	**42.7**	**57.5**	**8.57**	**09:30**	**10:48**	**54.2**	**47.6**
I-20 between Exit 61 and Exit 68										
Exit 61 to Exit 63 (Bush River Road)	1.96	08:08	05:15	14.5	22.5	1.97	02:12	04:33	53.8	26.0
Exit 63 to Exit 65	2.52	02:20	02:17	65.0	66.1	2.73	02:30	02:38	65.5	62.4
Exit 65 to Exist 68 (Monticello Road)	2.49	02:46	02:35	54.1	57.9	2.65	04:15	03:59	37.4	40.0
Total	**6.98**	**13:13**	**10:07**	**31.7**	**41.4**	**7.36**	**08:57**	**11:09**	**49.3**	**39.6**
I-126 between I-26 and Greystone Blvd										
I-26 to Colonial Life Blvd	0.63	00:43	00:40	53.4	57.5	1.01	01:05	02:48	55.7	21.7
Colonial Life Blvd to Greystone Blvd	1.40	01:26	01:20	58.7	62.9	1.16	01:07	02:57	62.2	23.7
Total	**2.04**	**02:09**	**02:00**	**56.9**	**61.1**	**2.18**	**02:13**	**05:45**	**59.0**	**22.7**

Arterial Travel Time Analysis

A summary of the Arterial Travel Time Analysis results is shown in **Table 5.96**.

Table 5.96: Arterial Travel Time TransModeler Results – RA6

Location	Eastbound					Westbound				
	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)		Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM		AM	PM	AM	PM
Broad River Road (west of Exit 101 to Greystone Blvd)	6.8	19:08	18:23	21.2	22.1	6.2	21:01	17:51	17.6	20.7
Lake Murray Boulevard (west of Exit 102 to Broad River Road)	1.5	04:37	03:51	19.9	23.9	1.5	03:08	03:52	27.9	22.6
Harbison Boulevard (west of Exit 103 to Broad River Road)	1.1	03:49	03:32	17.1	18.5	1.0	06:04	03:22	10.4	18.7
Piney Grove Road (west of Exit 104 to Broad River Road)	1.6	05:26	04:11	17.4	22.6	1.6	07:48	04:17	12.2	22.1
St. Andrews Road (west of Exit 106 to Broad River Road)	1.0	13:27	03:39	4.3	16.0	1.0	03:13	04:25	18.2	13.2
Bush River Road (west of Exit 63 to Broad River Road)	2.0	09:01	06:27	13.3	18.6	1.7	06:14	07:39	16.4	13.3
Location	**Northbound**					**Southbound**				
	Length (mi)	Travel Time		Average Speed		Length (mi)	Travel Time		Average Speed	
		AM	PM	AM	PM		AM	PM	AM	PM
Colonial Life Boulevard (I-126 Ramps to Bush River Road)	0.4	00:31	01:34	44.6	14.9	0.4	01:23	00:48	18.6	32.2

Intersection LOS and Delay Analysis

A summary of the Intersection LOS and Delay Analysis results is shown in **Table 5.97**.

Table 5.97: Intersection and LOS TransModeler Results – RA6

Node #	Intersection Name	AM		PM	
		LOS	Delay	LOS	Delay
Exit 101					
106	Broad River Road (US 176) at Columbiana Drive / Lordship Lane	C	31.7	B	19.5
167	Broad River Road (US 176) at I-26 EBR Off-ramp	A	2.4	A	0.6
166	Broad River Road (US 176) at West DDI Intersection	B	12.8	B	10.8
105	Broad River Road (US 176) at I-26 EBL Off-ramp	A	7.7	A	5.3
181	Broad River Road (US 176) at I-26 WBL Off-ramp	B	11.0	C	16.7
113	Broad River Road (US 176) at East DDI Intersection	C	15.3	C	16.7
4	Broad River Road (US 176) at Western Lane	B	10.3	A	6.8
Exit 102					
100000395	Lake Murray Boulevard (SC 60) at Columbiana Drive	E	78.6	F	126.6
103	Lake Murray Boulevard (SC 60) at I-26 EB On-Ramp	B	13.1	B	13.4
100000169	Lake Murray Boulevard (SC 60) at I-26 WB On-Ramp	A	2.2	A	2.4
100000401	Lake Murray Boulevard (SC 60) at Parkridge Drive / Kinley Road	C	21.6	B	19.1
Exit 103					
100000364	Harbison Boulevard (S-757) at Columbiana Drive	B	16.8	B	11.4
100000365	Harbison Boulevard (S-757) at Park Terrace Drive / Columbiana Circle	A	9.1	C	28.6
100000362	Harbison Boulevard (S-757) at Saturn Parkway	A	8.4	A	7.8
121	Harbison Boulevard (S-757) at I-26 SPUI Interchange	D	39.6	D	43.5
115	Harbison Boulevard (S-757) at I-26 WBR Ramp	A	3.5	A	3.5
100000165	Harbison Boulevard (S-757) at Woodcross Drive	C	23.2	C	27.1
Exit 104					
100000353	Piney Grove Road at Bower Parkway / Jamil Road	F	82.9	E	62.2
173	Piney Grove Road at West DDI Intersection	B	15.9	C	20.5
122	Piney Grove Road at I-26 EBL Off-Ramp	B	12.4	B	18.1
123	Piney Grove Road at I-26 WBL Off-Ramp	B	16.1	B	12.9
171	Piney Grove Road at East DDI Intersection	C	22.2	B	16.3
162	Piney Grove Road at I-26 WBR Off-Ramps	A	1.7	A	1.4
100000399	Piney Grove Road at Fernandina Road	C	23.1	D	40.9
Exit 106					
100000348	St. Andrews Road at Jamil Road	D	47.8	E	62.2
100000178	St. Andrews Road at I-26 EBR Off-Ramp	A	0.6	A	1.7
193	St. Andrews Road at West DDI Intersection	C	21.1	C	15.3
195	St. Andrews Road at I-26 EBL Off-Ramp	A	6.8	A	2.9
48	St. Andrews Road at I-26 WBL Off-Ramp	A	5.8	A	6.0
62	St. Andrews Road at East DDI Intersection	A	8.4	A	9.9
142	St. Andrews Road at I-26 WBR Off-Ramp	B	11.1	B	12.9
100000354	St. Andrews Road at Kay Street / Chartwell Road	B	19.6	E	77.8
Exit 108					
100000256	Bush River Road at Zimalcrest Drive	A	7.9	A	9.1
30	Bush River Road at Driveway	A	3.4	A	3.8
100000252	Bush River Road at Morninghill Drive	B	19.1	C	20.1
100000184	Bush River Road at Arrowwood Road	B	18.5	B	18.5
Exit 110					
100000186	Sunset Boulevard (US 378) at E. Hospital Drive / Harbor Drive	F	103.7	E	63.7
100000093	Sunset Boulevard (US 378) at I-26 EBR Off-Ramp[1]	A	6.7	A	7.1
100000903	Sunset Boulevard (US 378) at I-26 Ramps	C	25.8	C	24.7
100000902	Sunset Boulevard (US 378) at I-26 WBR Off-Ramp[1]	A	0.0	A	0.0
100000163	Sunset Boulevard (US 378) at Chris Drive / McSwain Drive	A	6.7	D	46.8
Exit 63					
14	Bush River Road at Berryhill Drive	B	10.0	C	32.3
81	Bush River Road at I-20 Ramps	D	37.2	D	39.6
100000255	Bush River Road at Independence Avenue	B	15.3	D	47.9
Exit 65					
100000187	Broad River Road at Marley Drive / Briargate Circle	C	31.8	B	19.6
91	Broad River Road at I-20 WB Ramps	C	29.6	C	33.5
37	Broad River Road at I-20 WBL Off-Ramp	A	4.1	A	6.4
95	Broad River Road at I-20 EB Ramps	B	13.0	A	9.7
72	Broad River Road at Longcreek Drive	A	5.4	A	6.8
Additional Intersections					
100000012	Broad River Road (US 176) at Kinley Road	D	36.8	D	41.9
100000037	Broad River Road (US 176) at Harbison Boulevard	C	33.9	B	16.7
100000049	Broad River Road (US 176) at Piney Woods Road / Lost Creek Drive	C	26.6	B	19.9
100000068	Broad River Road (US 176) at Piney Grove Road	B	16.5	A	7.5
100000339	Broad River Road (US 176) at St. Andrews Road	F	125.2	E	75.5
100000349	Broad River Road (US 176) at St. Andrews Parkway	A	9.7	B	14.6
100000344	Broad River Road (US 176) at Seminole Road / Young Drive	B	16.9	C	32.4
41	Broad River Road (US 176) at Dutch Square Boulevard	A	6.3	C	21.7
100000046	Broad River Road (US 176) at Bush River Road	C	26.2	E	72.3
100000266	Broad River Road (US 176) at Greystone Boulevard	B	11.3	B	15.0
100000265	Greystone Boulevard at Stoneridge Drive	C	22.6	B	18.8
100000188	Greystone Boulevard at I-126 WB Ramps[1]	E	44.3	F	54.9
100000185	Greystone Boulevard at I-126 EB Ramps[1]	B	12.5	F	1619.7
100000262	Bush River Road at Colonial Life Boulevard	B	16.3	C	31.9
100000897	Colonial Life Boulevard at West Colonial Life Road[1]	A	0.0	A	0.0
100000374	Park Terrance Drive at Bower Parkway	D	46.9	B	12.1

[1] Intersection unsignalized under all scenarios; worst approach LOS and delay reported.

[2] Delay unable to be processed per HCM 2010 methodology; Average control delay reported.

External to External Speed and Travel Time Analysis

A summary of the External to External Speed and Travel Time Analysis results is shown in **Table 5.98**.

Table 5.98: External to External Speed and Travel Time TransModeler Results – RA6

Segments	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM
I-26 EB from West of Exit 101					
To I-26 EB (east of Exit 110)	13.86	19:53	13:30	41.8	61.6
To I-20 WB (west of Exit 61)	16.14	27:44	20:54	34.9	46.3
To I-20 EB (east of Exit 68)	15.42	28:04	17:47	33.0	52.0
To I-126 EB (Greystone Blvd)	14.77	24:26	15:30	36.3	57.2
I-26 WB from East of Exit 110					
To I-26 WB (west of Exit 110)	13.87	13:51	24:13	60.0	34.4
To I-20 EB (east of Exit 68)	8.44	09:38	10:04	52.5	50.3
I-20 EB from West of Exit 61					
To I-20 EB (east of Exit 68)	11.10	19:34	11:39	34.0	57.1
To I-26 WB (west of Exit 101)	16.72	26:53	30:18	37.3	33.1
To I-126 EB (east of Greystone Blvd)	10.36	22:42	16:18	27.4	38.1
I-20 WB from East of Exit 68					
To I-20 WB (east of Exit 61)	11.10	11:13	15:52	59.4	42.0
To I-26 EB (east of Exit 110)	8.91	11:36	14:44	46.1	36.3
To I-26 WB (west of Exit 101)	15.30	17:35	30:12	52.2	30.4
I-126 WB from East of Greystone Blvd					
To I-26 WB (wast of Exit 101)	14.75	15:16	29:36	58.0	29.9
To I-20 WB (west of Exit 61)	10.46	10:56	18:02	57.4	34.8

5.3.7 RA7 ANALYSIS RESULTS

Mainline Volume Analysis

A summary of the Mainline Volume Analysis results is shown in **Table 5.99**, **Table 5.100** and **Table 5.101** for I-26, I-20 and I-126, respectively. These measures of effectiveness were incorporated into the level 1B screening of RA7 in section 4.5.2.9 of the *Alternatives Development and Screening Report.*

Table 5.99: I-26 Mainline Volume TransModeler Results – RA7

I-26 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
west of Exit 101 (Broad River Road)	3,551	2,035	3,278	3,884
Exit 101 to Exit 102 (Lake Murray Boulevard)	4,477	2,763	4,021	6,267
Exit 102 to Exit 103 (Harbison Boulevard)	4,591	3,001	4,426	6,900
Exit 103 to Exist 104 (Piney Grove Road)	4,836	3,303	4,942	7,020
Exit 104 to Exit 106 (St. Andrews Road)	5,507	3,734	5,654	7,345
Exit 106 to Exit 107 (I-20)	4,683	3,802	4,179	7,635
I-26 to I-26	2,416	2,281	2,780	3,796
Exit 108 to Exit 110 (Sunset Boulevard)	2,733	2,961	3,154	4,558
southeast of Exit 110	2,631	3,158	4,086	4,437

Table 5.100: I-20 Mainline Volume TransModeler Results – RA7

I-20 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
west of Exit 61 (Sunset Boulevard)	3,293	1,403	2,697	3,698
Exit 61 to East West Connector	4,603	2,174	3,811	4,995
East West Connector to Exit 63 (Bush River Road)	3,211	1,949	2,996	4,244
Exit 63 to Exit 64 (I-26)	1,735	1,006	1,391	1,903
Exit 64 to Exit 65 (Broad River Road)	1,714	1,019	1,389	1,911
Exit 65 to Exit 68 (Monticello Road)	3,362	4,142	4,829	5,794
east of Exit 68	2,856	4,234	4,736	5,487

Table 5.101: I-126 Mainline Volume TransModeler Results – RA7

I-126 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
I-126 from I-26 to Colonial Life Blvd	3,788	1,813	3,156	4,640
I-126 from Colonial Life Blvd to Greystone Blvd	4,714	2,408	3,349	6,677
I-126 from Greystone Blvd to Huger St	4,467	2,567	3,365	6,487

Basic Freeway Segment Analysis

A summary of the Basic Freeway Segment Analysis results is shown in **Table 5.102**, **Table 5.103** and **Table 5.104** for I-26, I-20 and I-126, respectively.

Table 5.102: I-26 Basic Freeway Segment TransModeler Results – RA7

Segment	RA7 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound						
Exit 101 to Exit 102	B	17.6	0.37	C	18.3	0.34
Exit 102 to Exit 103	C	20.7	0.48	C	22.6	0.46
Exit 103 to Exit 104	B	17.2	0.40	C	20.1	0.41
Exit 104 to Exit 106	D	29.8	0.49	D	31.5	0.50
Exit 106 to Exit 107	C	21.2	0.42	B	14.5	0.37
I-26 to I-26	B	15.3	0.34	C	19.1	0.39
Exit 108 to Exit 110	B	17.6	0.38	C	21.4	0.44
I-26 Westbound						
Exit 110 to Exit 108	B	13.1	0.31	C	24.7	0.47
I-26 to I-26	D	33.5	0.35	F	112.8	0.58
Exit 107 to Exit 106	C	18.9	0.21	D	34.5	0.48
Exit 106 to Exit 104	C	21.1	0.33	F	78.2	0.65
Exit 104 to Exit 103	B	15.5	0.28	E	35.4	0.58
Exit 103 to Exit 102	C	23.2	0.31	E	37.9	0.72
Exit 102 to Exit 101	B	11.2	0.23	D	26.3	0.52

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.103: I-20 Basic Freeway Segment TransModeler Results – RA7

Segment	RA7 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound						
west of Exit 61	D	33.2	0.46	C	25.7	0.37
Exit 61 to EW	B	17.3	0.38	B	15.8	0.32
EW to Exit 63	B	12.1	0.27	C	19.8	0.25
Exit 63 to Exit 64	A	7.9	0.18	A	7.3	0.14
Exit 64 to Exit 65	F	59.4	0.24	C	23.5	0.28
Exit 65 to Exit 68	F	80.3	0.35	D	33.6	0.50
I-20 Westbound						
Exit 68 to Exit 65	D	26.6	0.58	E	40.1	0.80
Exit 65 to Exit 64	A	1.2	0.08	A	2.2	0.16
Exit 64 to Exit 63	A	4.4	0.10	A	9.3	0.20
Exit 63 to EW	A	8.9	0.20	C	21.5	0.44
EW to Exit 61	A	9.5	0.18	D	34.7	0.42
west of Exit 61	B	12.5	0.19	F	52.3	0.51

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.104: I-126 Basic Freeway Segment TransModeler Results – RA7

Segment	RA7 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound						
I-26 to Colonial Life Blvd	B	17.3	0.39	B	17.4	0.33
Colonial Life Blvd to Greystone Blvd	C	21.3	0.49	B	16.0	0.35
Greystone Blvd to Huger St	C	24.4	0.47	B	16.0	0.35
I-126 Westbound						
Huger St to Greystone Blvd	B	11.3	0.27	D	30.4	0.68
Greystone Blvd to Colonial Life Blvd	A	9.5	0.20	D	27.3	0.56
Colonial Life Blvd to I-26	B	12.8	0.19	F	131.5	0.48

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The RA7 analysis results for the freeway segments, summarized in **Table 5.102**, **Table 5.103** and **Table 5.104**, indicate the following:

- During the morning peak hour:
  - I-26 freeway segments all operate at LOS D or better.
  - I-20 freeway segments all operate at LOS D or better with the exception of eastbound segments from Exit 64 to Exit 68, which operate at LOS F.

- I-126 freeway segments all operate at LOS C or better.

- During the afternoon peak hour:
  - I-26 westbound freeway segments from I-26 to I-26 operate at LOS F, and westbound freeway segments from Exit 106 to Exit 102 operate at LOS E and F. All other I-26 segments operate at LOS D or better, including all eastbound segments.
  - I-20 westbound freeway segments west of Exit 61 operate at LOS F, and westbound segments from Exit 68 to Exit 65 operate at LOS E. All other I-20 segments operate at LOS D or better, including all eastbound segments.
  - I-126 freeway segments all operate at LOS D or better with the exception of westbound segments from Colonial Life Boulevard to I-26, which operate at LOS F.

Ramp Merge Analysis

A summary of the Ramp Merge Analysis results is shown in **Table 5.105**, **Table 5.106** and **Table 5.107** for I-26, I-20 and I-126, respectively.

Table 5.105: I-26 Ramp Merge TransModeler Results – RA7

Segment	RA7 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound						
Exit 101	B	17.6	0.37	B	18.3	0.34
Exit 102	B	15.5	0.38	B	17.3	0.37
Exit 103	B	17.2	0.34	C	20.1	0.34
Exit 104	B	16.2	0.39	B	18.2	0.39
Exit 106	C	21.2	0.42	B	14.5	0.37
Exit 107 Loop	F	46.4	0.42	B	19.8	0.39
Exit 107	B	12.4	0.29	B	15.3	0.33
East West Connector	B	12.1	0.28	B	16.7	0.37
Exit 110	B	13.4	0.28	C	23.0	0.43
I-26 Westbound						
Exit 110	A	9.9	0.26	B	17.0	0.40
I-26 to I-26	B	16.0	0.32	F	54.4	0.61
Exit 107	C	21.7	0.24	E	38.9	0.47
Exit 106	C	26.8	0.24	F	72.4	0.48
Exit 104	B	11.7	0.28	C	22.9	0.59
Exit 103	B	13.9	0.25	F	50.2	0.58
Exit 102	B	11.2	0.23	C	26.3	0.52
Exit 101	B	10.3	0.18	C	21.7	0.41

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.106: I-20 Ramp Merge TransModeler Results – RA7

Segment	RA7 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound						
Exit 61 Loop	D	31.6	0.41	C	23.1	0.34
Exit 61	B	18.8	0.48	B	16.1	0.40
Exit 65	F	74.7	0.25	C	24.1	0.34
Exit 68	B	14.0	0.30	D	29.3	0.50
I-20 Westbound						
Exit 68	C	24.5	0.44	E	44.9	0.61
Exit 65	A	1.2	0.08	A	2.2	0.16
Exit 63	A	9.8	0.16	C	22.0	0.35
East West Connector	A	9.5	0.15	D	34.7	0.35
Exit 61	B	10.9	0.15	F	63.1	0.40

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.107: I-126 Ramp Merge TransModeler Results – RA7

Segment	RA7 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound						
Colonial Life Blvd	B	16.0	0.39	B	10.8	0.28
Greystone Blvd	C	23.2	0.47	B	14.8	0.35
I-126 Westbound						
Greystone Blvd	A	9.5	0.20	C	27.3	0.56

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The RA7 analysis results for the ramp merge areas, summarized in **Table 5.105**, **Table 5.106** and **Table 5.107**, indicate the following:

- During the morning peak hour:
  - I-26 merge areas all operate at LOS C or better with the exception of the eastbound merge area at Exit 107 Loop, which operates at LOS F.
  - I-20 merge areas all operate at LOS D or better with the exception of the eastbound Exit 65 merge area, which operates at LOS F.
  - I-126 merge areas all operate at LOS C or better.
- During the afternoon peak hour:

- I-26 westbound merge areas from I-26 to Exit 106 operate at LOS E and F. The westbound merge area at Exit 103 also operates at LOS F. All other ramp merge areas operate at LOS C or better, including all eastbound merge areas.
- I-20 westbound merge areas at Exit 68 and Exit 61 operate at LOS E and F, respectively. All other I-20 merge areas operate at LOS D or better.
- I-126 merge areas all operate at LOS C or better.

Ramp Diverge Analysis

A summary of the Ramp Diverge Analysis results is shown in **Table 5.108**, **Table 5.109** and **Table 5.110** for I-26, I-20 and I-126, respectively.

Table 5.108: I-26 Ramp Diverge TransModeler Results – RA7

Segment	RA7 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound						
Exit 101	B	14.3	0.37	B	14.4	0.34
Exit 101 Loop	A	8.5	0.29	A	8.0	0.26
Exit 102	B	17.6	0.37	B	18.3	0.33
Exit 102 Loop	B	13.8	0.34	B	12.5	0.32
Exit 103	B	15.3	0.38	B	16.8	0.37
Exit 104	B	17.2	0.40	C	20.1	0.41
Exit 106	C	26.5	0.49	D	33.0	0.50
Exit 107	C	26.5	0.49	D	33.0	0.50
Exit 108	F	46.4	0.42	B	19.8	0.39
I-26 to I-26	B	15.3	0.34	B	19.1	0.39
East West Connector	B	14.1	0.32	C	22.3	0.49
Exit 110	B	12.1	0.28	B	16.7	0.37
I-26 Westbound						
Exit 110	C	20.6	0.33	D	29.3	0.46
Exit 108	B	13.1	0.31	C	24.7	0.47
Exit 107	B	16.0	0.32	F	54.4	0.61
Exit 104	C	27.1	0.33	F	75.8	0.65
Exit 103	B	12.9	0.27	C	26.6	0.58
Exit 102	B	14.4	0.31	F	51.5	0.72
Exit 102 Loop	B	14.4	0.24	D	31.5	0.55
Exit 101	B	11.2	0.23	C	26.3	0.52
Exit 101 Loop	B	10.8	0.21	C	20.7	0.47

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.109: I-20 Ramp Diverge TransModeler Results – RA7

Segment	RA7 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound						
Exit 61	C	24.5	0.34	C	21.0	0.28
East West Connector	B	16.9	0.32	B	16.8	0.26
Exit 63	C	24.7	0.25	D	32.1	0.36
Exit 64	B	18.2	0.27	F	60.1	0.25
Exit 65	B	18.2	0.27	F	60.1	0.25
Exit 68	F	90.6	0.37	E	37.4	0.66
I-20 Westbound						
Exit 68	D	28.7	0.59	F	66.2	0.76
Exit 65	F	50.8	0.34	F	66.2	0.48
Exit 64	C	24.7	0.25	D	32.1	0.36
Exit 63	C	24.7	0.25	D	32.1	0.36
Exit 61	B	10.4	0.22	F	50.7	0.49

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.110: I-126 Ramp Diverge TransModeler Results – RA7

Segment	RA7 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound						
Greystone Blvd	B	17.7	0.39	B	13.2	0.28
I-126 Westbound						
Greystone Blvd	B	14.4	0.27	E	37.9	0.68
Colonial Life Blvd	A	9.5	0.20	C	27.3	0.56

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The RA7 analysis results for the ramp diverge areas, summarized in **Table 5.108**, **Table 5.109** and **Table 5.110**, indicate the following:

- During the morning peak hour:
  - I-26 eastbound diverge areas for Exit 108 operate at LOS F. All other ramp diverge areas in both the eastbound and westbound directions operate at LOS C or better.
  - I-20 eastbound diverge areas all operate at LOS C or better with the exception of the Exit 68 diverge area, which operates at LOS F. I-20 westbound diverge areas all operate at LOS D or better with the exception of the Exit 65 diverge area, which also operates at LOS F.
  - I-126 diverge areas all operate at LOS A or B.

- During the afternoon peak hour:
  - I-26 westbound diverge areas at from Exit 107 to Exit 104 Road and at Exit 102 operate at LOS F. All other diverge areas operate at LOS D or better.
  - I-20 eastbound diverge areas from Exit 64 to Exit 68 and westbound diverge areas from Exit 68 to 65 and at Exit 61 operate at LOS E and F. All other diverge areas operate at LOS D or better.
  - I-126 diverge areas all operate at LOS C or better with the exception of Greystone Boulevard, which operates at LOS E.

Mainline Travel Time Analysis

A summary of the Mainline Travel Time Analysis results is shown in **Table 5.111**.

Table 5.111: Mainline Travel Time TransModeler Results – RA7

Segments	Eastbound					Westbound				
	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)		Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM		AM	PM	AM	PM
I-26 between Exit 101 and Exit 110										
Exit 101 to Exit 102 (Lake Murray Boulevard)	0.83	00:52	00:50	57.9	59.4	0.82	00:49	00:52	59.7	56.3
Exit 102 to Exit 103 (Harbison Boulevard)	1.21	01:15	01:12	58.6	60.5	0.89	00:54	01:12	59.5	44.6
Exit 103 to Exist 104 (Piney Grove Road)	0.88	00:55	00:53	57.8	59.8	1.16	01:09	01:14	60.2	56.5
Exit 106 to Exit 107 (I-20)[1]	1.74	02:04	01:57	50.6	53.7	2.13	02:51	03:59	44.9	32.0
Exit 107 to Exit 106 (St. Andrews Road)	0.51	00:41	00:38	44.6	48.7	0.64	00:42	00:53	53.9	43.2
Exit 106 to I-26	1.15	01:55	01:26	36.1	47.9	0.41	00:26	00:43	56.6	34.3
I-26 to EW Connector	1.41	01:23	01:22	61.2	62.1	0.76	00:44	00:46	61.6	59.4
EW Connector to Exit 110 (Sunset Boulevard)	0.95	00:54	00:55	63.3	62.5	1.19	01:07	01:09	63.7	62.2
Total	**8.69**	**09:58**	**09:13**	**52.3**	**56.6**	**7.98**	**08:43**	**10:47**	**55.0**	**44.4**
I-20 between Exit 61 and Exit 68										
Exit 61 to EW Connector	1.52	01:41	01:33	54.1	59.0	0.81	00:52	01:31	56.3	31.9
EW Connector to Exit 63 (Bush River Road)	0.28	00:18	00:21	56.0	48.4	0.90	00:52	00:55	62.4	59.5
Exit 63 to Exit 65 (Broad River Road)	1.26	02:04	01:11	36.5	63.2	2.05	02:07	02:03	58.2	60.0
Exit 65 to Exist 68 (Monticello Road)	2.74	11:56	03:01	13.8	54.5	2.97	03:33	03:56	50.2	45.3
Total	**5.80**	**15:59**	**06:06**	**21.8**	**57.0**	**6.73**	**07:23**	**08:25**	**54.6**	**48.0**
I-126 between I-26 and Greystone Blvd										
I-26 to Colonial Life Boulevard	0.63	00:42	00:41	53.6	55.3	2.23	02:18	02:56	58.1	45.6
Colonial Life Boulevard to Greystone Blvd	1.51	01:32	01:26	59.2	63.2	0.86	00:51	00:54	61.1	57.1
Total	**2.13**	**02:14**	**02:07**	**57.4**	**60.6**	**3.09**	**03:09**	**03:50**	**58.9**	**48.3**
E-W Connector										
I-20 to I-26	1.03	01:12	01:08	51.2	54.0	1.31	01:26	01:27	55.3	54.2
Total	**1.03**	**01:12**	**01:08**	**51.2**	**54.0**	**1.31**	**01:26**	**01:27**	**55.3**	**54.2**

[1] I-26 EB Exit 107 prior to Exit 106

Arterial Travel Time Analysis

A summary of the Arterial Travel Time Analysis results is shown in **Table 5.112**.

Table 5.112: Arterial Travel Time TransModeler Results – RA7

Location	Eastbound					Westbound				
	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)		Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM		AM	PM	AM	PM
Broad River Road (west of Exit 101 to Greystone Blvd)	6.8	19:09	17:58	21.3	22.7	7.3	19:45	19:05	22.1	22.9
Lake Murray Boulevard (west of Exit 102 to Broad River Road)	1.5	04:02	03:37	22.7	25.3	1.5	03:31	03:35	24.9	24.4
Harbison Boulevard (west of Exit 103 to Broad River Road)	1.1	02:59	04:53	22.4	13.7	1.1	02:43	02:52	24.5	23.3
Piney Grove Road (west of Exit 104 to Broad River Road)	1.6	04:25	03:54	21.4	24.2	1.6	04:53	05:14	19.4	18.1
St. Andrews Road (west of Exit 106 to Broad River Road)	0.9	04:51	05:04	11.6	11.1	0.9	03:19	03:07	16.9	18.0
Bush River Road (west of Exit 63 to Broad River Road)	2.0	06:43	07:10	18.2	17.0	2.0	06:15	05:32	19.5	22.1
Location	Northbound					Southbound				
	Length (mi)	Travel Time		Average Speed		Length (mi)	Travel Time		Average Speed	
		AM	PM	AM	PM		AM	PM	AM	PM
Colonial Life Boulevard (I-126 Ramps to Bush River Road)	0.6	01:28	01:39	25.4	22.6	0.6	01:31	01:41	24.6	22.2

Intersection LOS and Delay Analysis

A summary of the Intersection LOS and Delay Analysis results is shown in **Table 5.113**.

Table 5.113: Intersection and LOS TransModeler Results – RA7

Node #	Intersection Name	AM		PM	
		LOS	Delay	LOS	Delay
Exit 101					
100000391	Broad River Road (US 176) at Columbiana Drive / Lordship Lane	B	19.9	A	9.1
100000150	Broad River Road (US 176) at I-26 EB Off-ramp[1]	B	16.3	B	15.5
100000151	Broad River Road (US 176) at I-26 EB On-ramp	B	10.0	A	5.9
100000160	Broad River Road (US 176) at I-26 WB On-ramp[2]	A	2.3	A	1.8
4	Broad River Road (US 176) at Western Lane	A	9.9	A	9.6
Exit 102					
100000395	Lake Murray Boulevard (SC 60) at Columbiana Drive	D	37.1	D	39.6
100000510	Lake Murray Boulevard (SC 60) at I-26 EB On-Ramp[2]	A	3.5	A	3.0
100000169	Lake Murray Boulevard (SC 60) at I-26 WB On-Ramp[2]	A	2.4	A	4.0
100000401	Lake Murray Boulevard (SC 60) at Parkridge Drive / Kinley Road	B	13.2	B	13.5
Exit 103					
100000364	Harbison Boulevard (S-757) at Columbiana Drive	B	12.1	B	14.4
100000365	Harbison Boulevard (S-757) at Park Terrace Drive / Columbiana Circle	A	4.5	C	29.8
100000362	Harbison Boulevard (S-757) at Saturn Parkway	A	3.6	B	12.1
99	Harbison Boulevard (S-757) at I-26 EB Ramps	B	17.6	B	19.8
100000165	Harbison Boulevard (S-757) at I-26 WB Ramps / Woodcross Drive	B	14.8	D	43.1
100000398	Harbison Boulevard (S-757) at Parkridge Drive	A	4.0	B	17.7
Exit 104					
100000353	Piney Grove Road at Bower Parkway / Jamil Road	D	48.1	D	45.9
100000174	Piney Grove Road at I-26 EB Ramps	B	15.4	C	23.5
100000177	Piney Grove Road at I-26 WB Ramps	B	10.3	B	13.7
100000399	Piney Grove Road at Fernandina Road	B	14.1	C	29.7
Exit 106					
100000348	St. Andrews Road at Jamil Road	B	11.6	A	6.7
100000178	St. Andrews Road at Woodland Hills Road	A	5.3	A	7.4
100000180	St. Andrews Road at I-26 Ramps SPUI	D	25.1	D	38.2
100000358	St. Andrews Road at Fernandina Road / Burning Tree Drive	B	15.3	C	30.7
100000354	St. Andrews Road at Kay Street / Chartwell Road	B	17.5	B	12.4
Exit 108					
100000256	Bush River Road at Zimalcrest Drive	B	10.3	A	8.5
100000898	Bush River Road at I-26 EB Off-Ramp / Driveway	A	6.6	A	8.5
100000252	Bush River Road at Morninghill Drive	C	20.9	B	17.0
100000184	Bush River Road at Arrowwood Road	B	15.7	B	16.0
Exit 110					
100000186	Sunset Boulevard (US 378) at E. Hospital Drive / Harbor Drive	A	6.5	B	12.6
100000093	Sunset Boulevard (US 378) at I-26 EBR Off-Ramp[1]	E	47.7	E	43.5
100000903	Sunset Boulevard (US 378) at I-26 Ramps	C	27.3	C	23.3
100000902	Sunset Boulevard (US 378) at I-26 WBR Off-Ramp[1]	E	45.7	A	8.2
100000163	Sunset Boulevard (US 378) at Chris Drive / McSwain Drive	A	2.5	B	16.4
Exit 63					
100000446	Bush River Road at Berryhill Drive/WB Ramps	B	14.0	B	16.8
49	Bush River Road at I-20 EB Off-Ramp	C	20.7	B	13.2
-	Bush River Road at Rockland Road[1]	-	-	-	-
100000255	Bush River Road at Independence Avenue	B	11.4	B	14.8
Exit 65					
100000187	Broad River Road at Marley Drive / Briargate Circle	C	28.4	B	19.6
110	Broad River Road at I-20 WB Ramps	D	40.4	C	27.8
100000190	Broad River Road at I-20 EB Ramps / Garner Lane	B	11.7	B	13.6
100000195	Broad River Road at Longcreek Drive	A	4.9	A	4.2
Additional Intersections					
100000012	Broad River Road (US 176) at Kinley Road	D	41.5	E	59.2
100000037	Broad River Road (US 176) at Harbison Boulevard	B	16.1	B	14.0
100000049	Broad River Road (US 176) at Piney Woods Road / Lost Creek Drive	C	28.3	B	18.0
100000068	Broad River Road (US 176) at Piney Grove Road	A	4.1	A	6.8
100000339	Broad River Road (US 176) at St. Andrews Road	C	31.7	D	37.6
100000349	Broad River Road (US 176) at St. Andrews Parkway	A	9.7	B	13.6
100000344	Broad River Road (US 176) at Seminole Road / Young Drive	B	14.6	C	28.9
41	Broad River Road (US 176) at Dutch Square Boulevard	A	5.9	D	41.1
100000046	Broad River Road (US 176) at Bush River Road	C	25.5	D	48.7
100000266	Broad River Road (US 176) at Greystone Boulevard	B	13.3	B	13.6
100000265	Greystone Boulevard at Stoneridge Drive	C	23.2	C	33.3
100000188	Greystone Boulevard at I-126 WB Ramps[1]	D	32.5	B	13.5
100000185	Greystone Boulevard at I-126 EB Ramps[1]	C	24.4	F	52.0
100000262	Bush River Road at Colonial Life Boulevard	B	18.6	B	18.0
100000897	Colonial Life Boulevard at West Colonial Life Road[1]	A	8.1	C	16.9
100000374	Park Terrance Drive at Bower Parkway	B	10.2	A	7.0

[1] Intersection unsignalized under all scenarios; worst approach LOS and delay reported.

[2] Delay unable to be processed per HCM 2010 methodology; Average control delay reported.

External to External Speed and Travel Time Analysis

A summary of the External to External Speed and Travel Time Analysis results is shown in **Table 5.114**.

Table 5.114: External to External Speed and Travel Time TransModeler Results – RA7

Segments	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM
I-26 EB from West of Exit 101					
To I-26 EB (east of Exit 110)	13.85	19:29	13:39	42.6	60.9
To I-20 WB (west of Exit 61)	16.08	21:57	19:28	44.0	49.6
To I-20 EB (east of Exit 68)	15.53	23:31	16:31	39.6	56.4
To I-126 EB (Greystone Blvd)	14.77	21:23	15:09	41.4	58.5
I-26 WB from East of Exit 110					
To I-26 WB (west of Exit 110)	13.87	14:24	25:40	57.8	32.4
To I-20 EB (east of Exit 68)	8.47	10:52	09:40	46.8	52.6
I-20 EB from West of Exit 61					
To I-20 EB (east of Exit 68)	11.10	19:41	10:45	33.8	62.0
To I-26 WB (west of Exit 101)	16.59	24:38	29:32	40.4	33.7
To I-126 EB (east of Greystone Blvd)	9.93	20:23	10:57	29.2	54.4
I-20 WB from East of Exit 68					
To I-20 WB (east of Exit 61)	11.10	11:03	15:51	60.3	42.0
To I-26 EB (east of Exit 110)	9.60	13:51	14:59	41.6	38.4
To I-26 WB (west of Exit 101)	15.29	16:53	31:00	54.3	29.6
I-126 WB from East of Greystone Blvd					
To I-26 WB (wast of Exit 101)	14.75	15:00	27:03	59.0	32.7
To I-20 WB (west of Exit 61)	9.98	10:23	14:03	57.6	42.6

5.3.8 RA8 ANALYSIS RESULTS

Mainline Volume Analysis

A summary of the Mainline Volume Analysis results is shown in **Table 5.115**, **Table 5.116** and **Table 5.117** for I-26, I-20 and I-126, respectively. These measures of effectiveness were incorporated into the level 1B screening of RA8 in section 4.5.2.10 of the *Alternatives Development and Screening Report.*

Table 5.115: I-26 Mainline Volume TransModeler Results – RA8

I-26 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
west of Exit 101 (Broad River Road)	4,752	3,045	3,594	5,554
Exit 101 to Exit 102 (Lake Murray Boulevard)	6,040	3,962	4,482	6,761
Exit 102 to Exit 103 (Harbison Boulevard)	6,266	4,219	5,173	7,514
Exit 103 to Exist 104 (Piney Grove Road)	6,889	4,500	5,612	7,968
Exit 104 to Exit 106 (St. Andrews Road)	7,590	5,221	6,256	8,100
Exit 106 to Exit 107 (I-20)	6,226	3,214	4,498	5,675
I-26 to I-26	1,976	3,146	2,038	3,566
Exit 108 to Exit 110 (Sunset Boulevard)	4,123	4,192	4,621	5,035
southeast of Exit 110	3,540	3,993	4,362	4,570

Table 5.116: I-20 Mainline Volume TransModeler Results – RA8

I-20 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
west of Exit 61 (Sunset Boulevard)	4,373	1,945	2,969	4,032
Exit 61 to Exit 63 (Bush River Road)	5,484	3,297	4,050	5,757
Exit 63 to Exit 64 (I-26)	2,192	1,630	1,529	2,169
Exit 64 to Exit 65 (Broad River Road)	2,194	1,630	1,531	2,169
Exit 65 to Exit 68 (Monticello Road)	5,853	5,344	5,335	6,180
east of Exit 68	5,402	5,367	5,347	5,827

Table 5.117: I-126 Mainline Volume TransModeler Results – RA8

I-126 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
I-126 from I-26 to Colonial Life Blvd	3,966	2,940	2,184	6,795
I-126 from Colonial Life Blvd to Greystone Blvd	6,262	3,218	3,771	7,454
I-126 from Greystone Blvd to Huger St	6,085	3,230	3,675	6,920

Basic Freeway Segment Analysis

A summary of the Basic Freeway Segment Analysis results is shown in **Table 5.118**, **Table 5.119** and **Table 5.120** for I-26, I-20 and I-126, respectively.

Table 5.118: I-26 Basic Freeway Segment TransModeler Results – RA8

Segment	RA8 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound						
Exit 101 to Exit 102	C	24.7	0.50	C	19.2	0.37
Exit 102 to Exit 103	D	28.9	0.65	C	26.0	0.54
Exit 103 to Exit 104	C	25.3	0.72	C	21.1	0.58
Exit 104 to Exit 106	C	25.2	0.63	C	20.5	0.52
Exit 106 to Exit 107	C	23.6	0.55	B	13.3	0.40
I-26 to I-26	B	12.0	0.27	B	13.3	0.28
Exit 108 to Exit 110	E	41.6	0.34	D	27.4	0.39
I-26 Westbound						
Exit 110 to Exit 108	C	20.2	0.44	C	23.0	0.52
I-26 to I-26	D	33.5	0.48	F	112.8	0.54
Exit 107 to Exit 106	C	19.8	0.36	D	33.3	0.63
Exit 106 to Exit 104	D	32.7	0.58	F	58.2	0.90
Exit 104 to Exit 103	C	21.6	0.47	F	45.8	0.83
Exit 103 to Exit 102	C	23.2	0.44	E	37.9	0.78
Exit 102 to Exit 101	B	14.8	0.33	C	20.4	0.56

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.119: I-20 Basic Freeway Segment TransModeler Results – RA8

Segment	RA8 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound						
west of Exit 61	E	44.0	0.61	C	25.6	0.41
Exit 61 to Exit 63	F	62.0	0.57	C	22.6	0.42
Exit 63 to Exit 64	A	9.7	0.23	A	7.5	0.16
Exit 64 to Exit 65	B	11.7	0.30	A	8.7	0.21
Exit 65 to Exit 68	F	47.3	0.61	D	34.4	0.56
I-20 Westbound						
Exit 68 to Exit 65	D	34.7	0.74	E	41.1	0.86
Exit 65 to Exit 64	A	8.0	0.17	A	9.8	0.23
Exit 64 to Exit 63	A	8.0	0.17	A	9.8	0.23
Exit 63 to Exit 61	B	16.7	0.23	F	69.7	0.40
west of Exit 61	C	18.6	0.27	F	50.4	0.56

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.120: I-126 Basic Freeway Segment TransModeler Results – RA8

Segment	RA8 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound						
I-26 to Colonial Life Blvd	D	27.2	0.59	B	14.3	0.32
Colonial Life Blvd to Greystone Blvd	D	28.3	0.65	B	17.1	0.39
Greystone Blvd to Huger St	D	33.2	0.63	B	15.7	0.38
I-126 Westbound						
Huger St to Greystone Blvd	B	14.4	0.34	D	30.5	0.72
Greystone Blvd to Colonial Life Blvd	B	15.4	0.34	D	34.7	0.78
Colonial Life Blvd to I-26	B	15.0	0.31	D	30.8	0.71

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The RA8 analysis results for the freeway segments, summarized in **Table 5.118**, **Table 5.119** and **Table 5.120**, indicate the following:

- During the morning peak hour:
  - I-26 freeway segments all operate at LOS D or better with the exception of from Exit 108 to Exit 110, which operate at LOS E.
  - I-20 eastbound freeway segments from west of Exit 61 to Exit 63 and from Exit 65 to Exit 68 operate at LOS E and F. All other freeway segments, including all westbound segments, operate at LOS D or better.
  - I-126 eastbound freeway segments all operate at LOS D, and I-126 westbound segments operate at LOS B.
- During the afternoon peak hour:
  - I-26 westbound freeway segments from I-26 to I-26 operate at LOS F, and westbound freeway segments from Exit 106 to Exit 102 operate at LOS E and F. All other I-26 segments operate at LOS D or better, including all eastbound segments.
  - I-20 westbound freeway segments from Exit 63 to west of Exit 61 operate at LOS F, and westbound segments from Exit 68 to Exit 65 operate at LOS E. All other I-20 segments operate at LOS D or better, including all eastbound segments.
  - I-126 eastbound freeway segments all operate at LOS B, and I-126 westbound segments operate at LOS D.

Ramp Merge Analysis

A summary of the Ramp Merge Analysis results is shown in **Table 5.121**, **Table 5.122** and **Table 5.123** for I-26, I-20 and I-126, respectively.

Table 5.121: I-26 Ramp Merge TransModeler Results – RA8

Segment	RA8 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound						
Exit 101	C	24.7	0.50	B	19.2	0.37
Exit 102	C	24.4	0.52	C	25.9	0.43
Exit 103	C	25.3	0.57	C	21.1	0.47
Exit 104	C	25.2	0.63	C	20.5	0.52
Exit 106	C	23.6	0.55	B	13.3	0.40
E-W Connector	B	12.4	0.23	B	13.3	0.27
E-W Connector	E	37.2	0.29	C	24.1	0.32
Exit 110	B	17.3	0.37	C	21.4	0.45
I-26 Westbound						
Exit 110	B	15.5	0.35	B	18.2	0.42
Exit 107	C	26.0	0.38	E	35.7	0.59
Exit 106	E	36.7	0.47	F	78.3	0.73
Exit 104	C	21.6	0.38	F	45.8	0.66
Exit 103	B	16.8	0.35	E	36.6	0.63
Exit 102	B	14.8	0.33	C	20.4	0.56

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.122: I-20 Ramp Merge TransModeler Results – RA8

Segment	RA8 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound						
Exit 61 Loop	F	121.0	0.50	B	18.3	0.37
Exit 61	F	84.0	0.58	C	23.6	0.42
Exit 63	C	20.4	0.43	B	19.0	0.36
Exit 64	C	20.4	0.43	B	19.0	0.36
Exit 65	F	52.7	0.62	D	33.2	0.56
Exit 68	D	29.2	0.57	D	30.0	0.56
I-20 Westbound						
Exit 68	D	28.1	0.75	E	41.3	0.86
Exit 65	A	3.9	0.14	A	4.8	0.18
Exit 64	A	6.7	0.18	B	10.7	0.25
Exit 63	B	17.3	0.20	F	62.9	0.35
Exit 61	B	15.3	0.20	F	47.9	0.43

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.123: I-126 Ramp Merge TransModeler Results – RA8

Segment	RA8 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound						
Colonial Life Blvd	C	21.2	0.52	B	15.9	0.31
Greystone Blvd	D	30.6	0.64	B	12.9	0.38
I-126 Westbound						
Greystone Blvd	B	12.6	0.27	D	28.5	0.62

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The RA8 analysis results for the ramp merge areas, summarized in **Table 5.121**, **Table 5.122** and **Table 5.123**, indicate the following:

- During the morning peak hour:
  - I-26 merge areas all operate at LOS C or better with the exception of the eastbound merge area at E-W Connector and the westbound merge area at Exit 106, which operate at LOS F.
  - I-20 merge areas at Exit 61 and Exit 65 operate at LOS F. All other merge areas, including all westbound merge areas, operate at LOS D or better.
  - I-126 merge areas all operate at LOS D or better.
- During the afternoon peak hour:

- I-26 westbound merge areas from Exit 107 to Exit 103 operate at LOS E and F. All other ramp merge areas operate at LOS C or better, including all eastbound merge areas.
- I-20 westbound merge areas from Exit 63 to Exit 61 operate at LOS F, and the Exit 68 merge area operates at LOS E. All other I-20 merge areas operate at LOS D or better.
- I-126 merge areas all operate at LOS D or better.

Ramp Diverge Analysis

A summary of the Ramp Diverge Analysis results is shown in **Table 5.124**, **Table 5.125** and **Table 5.126** for I-26, I-20 and I-126, respectively.

Table 5.124: I-26 Ramp Diverge TransModeler Results – RA8

Segment	RA8 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound						
Exit 101	C	20.7	0.49	B	15.3	0.37
Exit 101 Loop	B	12.1	0.39	A	7.7	0.29
Exit 102	C	24.7	0.50	B	19.2	0.37
Exit 102 Loop	B	18.4	0.45	B	13.4	0.35
Exit 103	C	24.3	0.65	C	27.5	0.54
Exit 104	C	27.7	0.72	C	23.2	0.58
Exit 106	B	16.0	0.55	B	15.9	0.44
Exit 107	E	37.3	0.67	D	33.6	0.56
Exit 108	C	27.6	0.55	B	13.9	0.40
Exit 110	F	56.0	0.41	F	52.8	0.47
I-26 Westbound						
Exit 110	F	46.8	0.41	F	68.4	0.47
Exit 108	B	12.4	0.31	B	13.3	0.35
Exit 107	C	20.3	0.36	C	20.6	0.41
Exit 106	C	23.3	0.36	D	31.8	0.62
Exit 106 Loop	C	26.0	0.38	E	35.7	0.59
Exit 104	E	37.3	0.46	F	76.8	0.72
Exit 103	C	21.7	0.47	F	45.9	0.83
Exit 102	B	18.6	0.44	E	43.6	0.78
Exit 102 Loop	B	19.3	0.33	D	32.4	0.59
Exit 101	B	14.8	0.33	C	20.4	0.56
Exit 101 Loop	B	11.5	0.29	B	15.4	0.51

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.125: I-20 Ramp Diverge TransModeler Results – RA8

Segment	RA8 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound						
Exit 61	D	33.0	0.46	C	20.8	0.31
Exit 63	C	25.6	0.46	B	19.1	0.34
Exit 64	A	7.1	0.25	A	9.2	0.21
Exit 65	A	7.1	0.25	A	9.2	0.21
Exit 68	E	39.7	0.80	E	40.3	0.74
I-20 Westbound						
Exit 68	E	37.3	0.75	F	66.8	0.81
Exit 65	D	31.3	0.37	E	41.8	0.43
Exit 64	A	6.7	0.18	B	10.7	0.25
Exit 63	B	17.3	0.20	F	62.9	0.35
Exit 61	C	21.2	0.34	F	79.3	0.59

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

Table 5.126: I-126 Ramp Diverge TransModeler Results – RA8

Segment	RA8 Conditions					
	AM Peak Hour			PM Peak Hour		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound						
Greystone Blvd	C	22.7	0.52	C	20.0	0.31
I-126 Westbound						
Greystone Blvd	B	16.2	0.34	D	31.0	0.72
Colonial Life Blvd	B	13.1	0.27	D	29.1	0.62

[1] Per Highway Capacity Manual 2010 criteria.

[2] Density expressed as PCE/per mile/per lane.

The RA8 analysis results for the ramp diverge areas, summarized in **Table 5.124**, **Table 5.125** and **Table 5.126**, indicate the following:

- During the morning peak hour:
  - I-26 diverge areas for Exit 110 operate at LOS F in both directions. The eastbound merge area at Exit 107 and the westbound merge area at Exit 104 operate at LOS E. All other ramp diverge areas operate at LOS C or better.
  - I-20 eastbound diverge areas all operate at LOS D or better, with the exception of both the eastbound and westbound Exit 68 diverge areas which operate at LOS E.
  - I-126 diverge areas all operate at LOS C or better.
- During the afternoon peak hour:

- I-26 diverge areas for Exit 110 operate at LOS F in both directions. Diverge areas from Exit 106 Loop to Exit 102 operate at LOS E and F. All other diverge areas operate at LOS D or better.
- I-20 eastbound diverge area at Exit 68 operates at LOS E. I-20 westbound diverge areas from Exit 68 to Exit 65 and from Exit 63 to Exit 61 operate at LOS E and F. All other diverge areas operate at LOS C or better.
- I-126 diverge areas all operate at LOS D or better.

Mainline Travel Time Analysis

A summary of the Mainline Travel Time Analysis results is shown in **Table 5.127**.

Table 5.127: Mainline Travel Time TransModeler Results – RA8

Segments	Eastbound					Westbound				
	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)		Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM		AM	PM	AM	PM
I-26 between Exit 101 and Exit 110										
Exit 101 to Exit 102 (Lake Murray Boulevard)	0.76	00:47	00:46	57.4	59.2	0.83	00:53	00:56	57.1	53.4
Exit 102 to Exit 103 (Harbison Boulevard)	1.26	01:20	01:21	57.0	56.0	1.05	01:03	01:19	60.0	47.9
Exit 103 to Exist 104 (Piney Grove Road)	0.85	00:56	00:53	54.4	58.0	0.79	00:48	01:00	59.5	47.7
Exit 106 to Exit 107 (I-20)[1]	1.75	02:11	01:59	48.2	53.2	1.99	02:35	03:32	46.3	33.8
Exit 107 to Exit 106 (St. Andrews Road)	0.30	00:22	00:22	47.9	49.2	0.86	01:05	01:12	47.3	43.1
Exit 106 to Exit 108 (Bush River Road)	0.96	01:22	01:13	41.7	47.1	-	-	-	-	-
Exit 108 to I-26	0.39	00:31	00:30	44.8	47.3	-	-	-	-	-
I-26 to EW Connector	0.78	00:45	00:45	62.2	61.9	0.80	00:52	00:53	55.2	54.4
EW Connector to Exit 110 (Sunset Boulevard)	1.53	03:15	02:07	28.2	43.3	1.64	01:37	01:42	60.5	57.8
Total	**8.57**	**11:31**	**09:55**	**44.7**	**51.8**	**7.96**	**08:53**	**10:34**	**53.8**	**45.2**
I-20 between Exit 61 and Exit 68										
Exit 61 to EW Connector	1.76	05:05	01:49	20.7	58.0	1.12	01:36	03:08	41.9	21.5
EW Connector to Exit 63 (CD to I-20)	0.41	00:24	00:25	61.3	60.0	2.36	02:12	02:14	64.5	63.8
Exit 63 to Exit 65 (Broad River Road)	2.25	02:24	02:09	56.2	63.0	0.21	00:14	00:14	52.7	53.6
Exit 65 to Exist 68 (Monticello Road)	2.54	04:07	02:49	37.0	54.3	3.00	03:30	04:14	51.5	42.5
Total	**6.96**	**12:01**	**07:11**	**34.8**	**58.1**	**6.69**	**07:32**	**09:49**	**53.3**	**40.9**
I-126 between I-26 and Greystone Blvd										
I-26 to Colonial Life Boulevard	1.05	01:15	01:11	50.6	53.6	1.26	01:19	01:25	57.3	53.3
Colonial Life Boulevard to Greystone Blvd	0.67	00:44	00:50	55.1	48.4	1.12	01:06	01:16	61.6	53.0
Total	**1.73**	**01:59**	**02:01**	**52.2**	**51.4**	**2.38**	**02:25**	**02:42**	**59.3**	**53.1**
I-126 between I-26 and Greystone Blvd										
I-20 to I-26	1.02	01:09	01:06	52.8	55.2	1.24	01:19	01:22	56.6	54.6
Total	**2.74**	**03:08**	**03:07**	**52.4**	**52.8**	**3.63**	**03:44**	**04:03**	**58.3**	**53.6**

[1] I-26 EB Exit 107 prior to Exit 106

Arterial Travel Time Analysis

A summary of the Arterial Travel Time Analysis results is shown in **Table 5.128**.

Table 5.128: Arterial Travel Time TransModeler Results – RA8

Location	Eastbound					Westbound				
	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)		Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM		AM	PM	AM	PM
Broad River Road (west of Exit 101 to Greystone Blvd)	6.7	19:09	20:44	21.1	19.5	6.2	17:36	18:05	21.2	20.6
Lake Murray Boulevard (west of Exit 102 to Broad River Road)	1.5	03:45	05:52	24.4	15.6	1.5	03:27	04:18	25.4	20.4
Harbison Boulevard (west of Exit 103 to Broad River Road)	1.1	03:16	08:58	19.9	7.3	1.1	03:16	04:13	19.9	15.5
Piney Grove Road (west of Exit 104 to Broad River Road)	0.5	02:48	02:36	10.4	11.2	0.5	03:19	03:15	8.8	9.0
St. Andrews Road (west of Exit 106 to Broad River Road)	0.9	04:59	06:45	11.1	8.2	0.9	03:38	04:13	15.1	13.1
Bush River Road (west of Exit 63 to Broad River Road)	2.0	06:22	07:20	18.8	16.4	2.0	09:52	10:03	12.2	11.9
Location	Northbound					Southbound				
	Length (mi)	Travel Time		Average Speed		Length (mi)	Travel Time		Average Speed	
		AM	PM	AM	PM		AM	PM	AM	PM
Colonial Life Boulevard (I-126 Ramps to Bush River Road)	0.5	01:40	01:36	17.1	17.7	0.5	00:46	00:48	37.2	35.4

Intersection LOS and Delay Analysis

A summary of the Intersection LOS and Delay Analysis results is shown in **Table 5.129**.

Table 5.129: Intersection and LOS TransModeler Results – RA8

Node #	Intersection Name	AM		PM	
		LOS	Delay	LOS	Delay
Exit 101					
100000391	Broad River Road (US 176) at Columbiana Drive / Lordship Lane	B	10.5	B	19.2
100000150	Broad River Road (US 176) at I-26 EB Off-ramp[1]	B	16.3	B	15.5
100000151	Broad River Road (US 176) at I-26 EB On-ramp	B	12.7	A	8.5
100000160	Broad River Road (US 176) at I-26 WB On-ramp[2]	A	1.0	A	0.8
4	Broad River Road (US 176) at Western Lane	B	12.9	A	9.2
Exit 102					
100000395	Lake Murray Boulevard (SC 60) at Columbiana Drive	C	24.0	D	49.7
100000510	Lake Murray Boulevard (SC 60) at I-26 EB On-Ramp[2]	A	3.9	A	5.3
100000169	Lake Murray Boulevard (SC 60) at I-26 WB On-Ramp[2]	A	3.2	A	6.1
100000401	Lake Murray Boulevard (SC 60) at Parkridge Drive / Kinley Road	D	47.2	C	34.7
Exit 103					
100000364	Harbison Boulevard (S-757) at Columbiana Drive	B	15.6	B	13.9
100000365	Harbison Boulevard (S-757) at Park Terrace Drive / Columbiana Circle	A	8.8	D	38.9
100000362	Harbison Boulevard (S-757) at Saturn Parkway	A	8.2	D	48.7
99	Harbison Boulevard (S-757) at I-26 EB Ramps	C	24.2	D	50.2
100000165	Harbison Boulevard (S-757) at I-26 WB Ramps / Woodcross Drive	B	15.9	D	38.9
Exit 104					
100000353	Piney Grove Road at Bower Parkway / Jamil Road	C	30.0	D	38.5
94	Piney Grove Road at West DDI Intersection	A	8.7	B	11.3
138	Piney Grove at EB I-26 Off-Ramp	A	3.2	A	5.3
140	Piney Grove Road at East DDI Intersection	A	9.0	A	5.6
137	Piney Grove at WB I-26 Off-Ramp (RT)	A	3.1	A	2.1
108	Piney Grove at WB I-26 Off-Ramp (LT)	B	10.1	A	6.2
100000399	Piney Grove Road at Fernandina Road	C	26.3	C	34.9
Exit 106					
100000348	St. Andrews Road at Jamil Road	B	12.1	C	21.5
100000178	St. Andrews Road at Woodland Hills Road	A	5.7	A	8.0
100000180	St. Andrews Road at I-26 Ramps SPUI	C	25.9	C	31.6
100000358	St. Andrews Road at Fernandina Road / Burning Tree Drive	B	17.3	C	24.9
100000354	St. Andrews Road at Kay Street / Chartwell Road	C	30.6	B	13.8
Exit 108					
100000256	Bush River Road at Zimalcrest Drive	B	11.9	A	9.3
100000252	Bush River Road at Morninghill Drive/I-26 Ramps	C	26.8	C	27.8
100000184	Bush River Road at Arrowwood Road	B	12.0	C	20.1
Exit 110					
100000186	Sunset Boulevard (US 378) at E. Hospital Drive / Harbor Drive	F	97.8	E	65.3
100000093	Sunset Boulevard (US 378) at I-26 EBR Off-Ramp[1]	E	47.7	E	43.5
100000903	Sunset Boulevard (US 378) at I-26 Ramps	C	28.8	C	26.4
100000902	Sunset Boulevard (US 378) at I-26 WBR Off-Ramp[1]	E	45.7	A	8.2
100000163	Sunset Boulevard (US 378) at Chris Drive / McSwain Drive	B	13.9	B	16.5
Exit 63					
100000446	Bush River Road at Berryhill Drive	A	8.6	B	15.4
49	Bush River Road at I-20 Ramps	A	6.4	A	9.9
-	Bush River Road at Rockland Road[1]	-	-	-	-
100000255	Bush River Road at Independence Avenue	C	20.1	C	30.1
Exit 65					
100000187	Broad River Road at Marley Drive / Briargate Circle	C	25.3	B	16.4
126	Broad River Road at I-20 WB Ramps	A	6.4	A	5.1
100000190	Broad River Road at I-20 SPUI	D	36.1	D	37.4
110	Broad River Road at I-20 EB Ramps / Garner Lane	A	1.4	A	2.3
100000195	Broad River Road at Longcreek Drive	A	5.3	A	4.6
Additional Intersections					
100000012	Broad River Road (US 176) at Kinley Road	E	58.6	F	93.1
100000037	Broad River Road (US 176) at Harbison Boulevard	B	17.0	B	13.8
100000049	Broad River Road (US 176) at Piney Woods Road / Lost Creek Drive	D	36.9	C	29.9
100000068	Broad River Road (US 176) at Piney Grove Road	A	5.6	A	5.8
100000339	Broad River Road (US 176) at St. Andrews Road	C	31.9	D	44.6
100000349	Broad River Road (US 176) at St. Andrews Parkway	A	6.1	B	12.0
100000344	Broad River Road (US 176) at Seminole Road / Young Drive	B	19.6	D	48.9
41	Broad River Road (US 176) at Dutch Square Boulevard	B	10.2	B	16.4
100000046	Broad River Road (US 176) at Bush River Road	C	33.0	D	44.3
100000266	Broad River Road (US 176) at Greystone Boulevard	B	11.8	B	11.7
100000265	Greystone Boulevard at Stoneridge Drive	C	27.9	C	27.3
100000188	Greystone Boulevard at I-126 WB Ramps[1]	D	32.5	B	13.5
100000185	Greystone Boulevard at I-126 EB Ramps[1]	C	24.4	F	52.0
100000262	Bush River Road at Colonial Life Boulevard	E	59.6	D	41.9
100000897	Colonial Life Boulevard at West Colonial Life Road[1]	A	8.1	C	16.9
100000374	Park Terrance Drive at Bower Parkway	A	8.0	B	14.6

[1] Intersection unsignalized under all scenarios; worst approach LOS and delay reported.

[2] Delay unable to be processed per HCM 2010 methodology; Average control delay reported.

External to External Speed and Travel Time Analysis

A summary of the External to External Speed and Travel Time Analysis results is shown in **Table 5.130**.

Table 5.130: External to External Speed and Travel Time TransModeler Results – RA8

Segments	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM
I-26 EB from West of Exit 101					
To I-26 EB (east of Exit 110)	13.85	19:29	13:39	42.6	60.9
To I-20 WB (west of Exit 61)	16.08	21:57	19:28	44.0	49.6
To I-20 EB (east of Exit 68)	15.53	23:31	16:31	39.6	56.4
To I-126 EB (Greystone Blvd)	14.77	21:23	15:09	41.4	58.5
I-26 WB from East of Exit 110					
To I-26 WB (west of Exit 110)	13.87	14:24	25:40	57.8	32.4
To I-20 EB (east of Exit 68)	8.47	10:52	09:40	46.8	52.6
I-20 EB from West of Exit 61					
To I-20 EB (east of Exit 68)	11.10	19:41	10:45	33.8	62.0
To I-26 WB (west of Exit 101)	16.59	24:38	29:32	40.4	33.7
To I-126 EB (east of Greystone Blvd)	9.93	20:23	10:57	29.2	54.4
I-20 WB from East of Exit 68					
To I-20 WB (east of Exit 61)	11.10	11:03	15:51	60.3	42.0
To I-26 EB (east of Exit 110)	9.60	13:51	14:59	41.6	38.4
To I-26 WB (west of Exit 101)	15.29	16:53	31:00	54.3	29.6
I-126 WB from East of Greystone Blvd					
To I-26 WB (wast of Exit 101)	14.75	15:00	27:03	59.0	32.7
To I-20 WB (west of Exit 61)	9.98	10:23	14:03	57.6	42.6

5.3.9 RA9 ANALYSIS RESULTS

During the development and microsimulation of RA9 it was determined that it was not a viable alternative due to both operational issues and land impacts. Therefore, no analysis results were developed for RA9. The level 1B screening of RA9 in section 4.5.2.2 of the *Alternatives Development and Screening Report.*

5.3.10 RA10 (NO-BUILD) ANALYSIS RESULTS

RA10 (No-Build) is summarized in Section 4.8.2. Additional analysis comparative to the Representative Alternatives are provided below. These measures of effectiveness were incorporated into the level 1B screening of RA10 in section 4.5.2.1 of the *Alternatives Development and Screening Report.*

Mainline Volume Analysis

A summary of the Mainline Volume Analysis results is shown in **Table 5.131**, **Table 5.132** and **Table 5.133** for I-26, I-20 and I-126, respectively.

Table 5.131: I-26 Mainline Volume TransModeler Results – RA10

I-26 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
west of Exit 101 (Broad River Road)	4,387	2,950	3,628	4,399
Exit 101 to Exit 102 (Lake Murray Boulevard)	4,746	3,560	4,355	5,180
Exit 102 to Exit 103 (Harbison Boulevard)	4,552	4,190	4,766	5,853
Exit 103 to Exist 104 (Piney Grove Road)	4,880	4,772	5,163	6,033
Exit 104 to Exit 106 (St. Andrews Road)	5,447	5,148	5,350	6,114
Exit 106 to Exit 107 (I-20)	7,405	6,216	6,245	6,739
I-126 Diverge to I-126 Merge	2,765	2,926	2,305	2,319
Exit 108 to Exit 110 (Sunset Boulevard)	3,630	4,237	3,449	3,729
southeast of Exit 110	3,657	4,262	3,962	4,174

Table 5.132: I-20 Mainline Volume TransModeler Results – RA10

I-20 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
west of Exit 61 (Sunset Boulevard)	5,068	1,934	2,966	3,603
Exit 61 to Exit 63 (Bush River Road)	5,568	2,852	3,774	4,502
Exit 63 to Exit 64 (I-26)	5,063	2,987	3,781	4,093
Exit 64 to Exit 65 (Broad River Road)	5,278	4,261	4,200	4,507
Exit 65 to Exit 68 (Monticello Road)	5,724	5,566	4,665	5,743
east of Exit 68	5,413	5,599	4,797	5,501

Table 5.133: I-126 Mainline Volume TransModeler Results – RA10

I-126 Mainline	Volume			
	AM		PM	
	EB	WB	EB	WB
Location				
I-126/I-26 Split	4,676	2,096	2,656	3,044
I-126 from I-26 to Colonial Life Blvd	5,384	2,561	2,944	3,585
I-126 from Colonial Life Blvd to Greystone Blvd	5,913	3,361	3,313	5,464
I-126 from Greystone Blvd to Huger St	5,897	3,566	3,384	5,972

Basic Freeway Segment, Ramp Merge, and Ramp Diverge Analyses

A summary of the Basic Freeway Segment Analysis was previously shown in **Table 4-13**, **Table 4-14** and **Table 4-15** in Section 4.8.2 for I-26, I-20 and I-126, respectively.

A summary of the Ramp Merge Analysis was previously shown in **Table 4-16**, **Table 4-17** and **Table 4-18** in Section 4.8.2 for I-26, I-20 and I-126, respectively.

A summary of the Ramp Diverge Analysis was previously shown in **Table 4-19**, **Table 4-20** and **Table 4-21** in Section 4.8.2 for I-26, I-20 and I-126, respectively.

Mainline Travel Time Analysis

A summary of The Mainline Travel Time Analysis results is shown in **Table 5.134**.

Table 5.134: Mainline Travel Time TransModeler Results – RA10

Segments	Eastbound					Westbound				
	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)		Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM		AM	PM	AM	PM
I-26 between Exit 101 and Exit 110										
Exit 101 to Exit 102 (Lake Murray Boulevard)	0.93	04:18	00:56	13.0	59.4	0.91	00:55	00:57	60.2	57.4
Exit 102 to Exit 103 (Harbison Boulevard)	1.29	06:22	01:20	12.1	58.0	0.76	00:45	00:51	60.2	53.4
Exit 103 to Exist 104 (Piney Grove Road)	0.83	03:40	01:11	13.5	42.3	1.23	01:15	01:23	59.3	53.1
Exit 104 to Exit 106 (St. Andrews Road)	2.20	06:42	04:32	19.7	29.0	1.98	02:21	03:00	50.5	39.7
Exit 106 to Exit 107 (I-20)	0.53	01:57	01:41	16.2	18.8	0.72	00:59	03:55	44.3	11.1
Exit 107 to Exit 108 (Bush River Road)	0.60	01:36	02:09	22.3	16.6	0.20	00:16	01:12	44.8	10.2
Exit 108 to I-26	0.42	00:42	01:55	36.5	13.3	0.02	00:02	00:08	39.6	8.7
I-26 to Exit 110 (Sunset Boulevard)	1.56	03:23	07:42	27.6	12.1	2.37	02:43	13:05	52.3	10.9
Total	**8.35**	**28:41**	**21:26**	**17.5**	**23.4**	**8.20**	**09:16**	**24:32**	**53.1**	**20.1**
I-20 between Exit 61 and Exit 68										
Exit 61 to Exit 63 (Bush River Road)	2.01	05:11	02:02	23.3	59.4	1.98	02:00	03:46	28.0	31.6
Exit 63 to Exit 64 (I-26)	0.73	00:46	00:44	57.7	59.5	0.74	01:11	00:48	47.4	55.8
Exit 64 to Exit 65 (Broad River Road)	0.82	00:55	00:54	53.9	54.2	1.12	01:58	02:19	28.3	29.1
Exit 65 to Exit 68 (Monticello Road)	3.15	03:39	03:09	51.9	60.0	2.93	03:24	05:59	16.4	29.3
Total	**6.71**	**10:30**	**06:50**	**38.4**	**59.0**	**6.77**	**08:33**	**12:51**	**47.5**	**31.6**
I-126 between I-26 and Greystone Blvd										
Exit 108 to Colonial Life Boulevard	1.22	01:15	01:11	58.4	62.0	1.14	01:11	05:49	47.0	11.8
Colonial Life Boulevard to Greystone Blvd	0.77	00:48	00:58	58.3	47.7	0.98	00:58	04:28	57.9	13.2
Total	**1.99**	**02:03**	**02:09**	**58.4**	**55.6**	**2.13**	**02:09**	**10:17**	**59.3**	**12.4**

Arterial Travel Time Analysis

A summary of the Arterial Travel Time Analysis results is shown in **Table 5.135**.

Table 5.135: Arterial Travel Time TransModeler Results – RA10

Location	Eastbound					Westbound				
	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)		Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM		AM	PM	AM	PM
Broad River Road (west of Exit 101 to Greystone Blvd)	7.5	21:39	19:55	20.7	22.5	7.5	20:40	37:29	21.6	11.9
Lake Murray Boulevard (west of Exit 102 to Broad River Road)	1.8	04:12	05:25	25.7	19.9	1.7	04:57	55:12	20.9	1.9
Harbison Boulevard (west of Exit 103 to Broad River Road)	1.1	02:52	04:53	23.5	13.8	1.1	02:35	02:59	26.1	22.6
Piney Grove Road (west of Exit 104 to Broad River Road)	1.8	04:40	04:27	22.8	24.0	1.8	06:40	04:39	16.1	23.0
St. Andrews Road (west of Exit 106 to Broad River Road)	1.0	04:23	04:41	13.3	12.5	1.0	03:34	05:34	16.4	10.5
Bush River Road (west of Exit 63 to Broad River Road)	2.3	06:51	11:40	20.2	11.9	2.3	10:13	09:27	13.6	14.7
Location	**Northbound**					**Southbound**				
	Length (mi)	Travel Time (mm:ss)		Average Speed		Length (mi)	Travel Time		Average Speed	
		AM	PM	AM	PM		AM	PM	AM	PM
Colonial Life Boulevard (I-126 Ramps to Bush River Road)	0.5	01:33	01:56	18.5	14.9	0.5	00:46	00:49	37.2	35.0

Intersection LOS and Delay Analysis

A summary of the Intersection LOS and Delay Analysis results is shown in **Table 5.136**.

Table 5.136: Intersection and LOS TransModeler Results – RA10

Node #	Intersection Name	AM		PM	
		LOS	Delay	LOS	Delay
Exit 101					
100000391	Broad River Road (US 176) at Columbiana Drive / Lordship Lane	C	24.4	B	12.3
100000150	Broad River Road (US 176) at I-26 EB Off-ramp[1]	C	17.7	C	16.3
100000151	Broad River Road (US 176) at I-26 EB On-ramp	A	2.0	A	4.0
100000160	Broad River Road (US 176) at I-26 WB On-ramp[2]	A	1.8	A	1.8
4	Broad River Road (US 176) at Western Lane	A	5.6	A	3.7
Exit 102					
100000395	Lake Murray Boulevard (SC 60) at Columbiana Drive	E	58.5	F	140.1
100000510	Lake Murray Boulevard (SC 60) at I-26 EB On-Ramp[2]	A	3.5	F	54.1
100000169	Lake Murray Boulevard (SC 60) at I-26 WB On-Ramp[2]	A	2.8	F	54.0
100000401	Lake Murray Boulevard (SC 60) at Parkridge Drive / Kinley Road	F	115.5	F	283.1
Exit 103					
100000364	Harbison Boulevard (S-757) at Columbiana Drive	B	14.4	A	9.7
100000365	Harbison Boulevard (S-757) at Park Terrace Drive / Columbiana Circle	A	5.6	C	23.3
100000362	Harbison Boulevard (S-757) at Saturn Parkway	A	1.2	A	2.8
100000173	Harbison Boulevard (S-757) at I-26 EB Ramps	B	10.2	B	10.1
100000165	Harbison Boulevard (S-757) at I-26 WB Ramps / Woodcross Drive	D	37.4	E	56.5
100000398	Harbison Boulevard (S-757) at Parkridge Drive	A	8.7	A	9.9
Exit 104					
100000353	Piney Grove Road at Bower Parkway / Jamil Road	C	34.2	C	31.7
100000175	Piney Grove Road at I-26 EB Ramps	B	15.9	A	4.7
100000177	Piney Grove Road at I-26 WB Ramps	C	27.5	B	10.1
100000399	Piney Grove Road at Fernandina Road	C	31.3	D	36.4
Exit 106					
100000348	St. Andrews Road at Jamil Road	A	5.3	A	8.8
100000178	St. Andrews Road at I-26 EB Ramps / Woodland Hills Road	B	11.0	B	11.9
100000182	St. Andrews Road at I-26 WB Ramps[2]	A	4.1	A	8.9
100000358	St. Andrews Road at Fernandina Road / Burning Tree Drive	B	18.4	C	27.2
100000354	St. Andrews Road at Kay Street / Chartwell Road	D	49.8	F	80.3
Exit 108					
100000256	Bush River Road at Zimalcrest Drive	B	17.7	B	19.8
100000898	Bush River Road at I-26 EB Off-Ramp / Driveway	C	26.5	E	60.1
100000252	Bush River Road at Morninghill Drive	C	30.7	E	63.3
100000184	Bush River Road at Arrowwood Road	B	13.2	D	44.1
Exit 110					
100000186	Sunset Boulevard (US 378) at E. Hospital Drive / Harbor Drive	C	34.8	E	68.8
100000093	Sunset Boulevard (US 378) at I-26 EBR Off-Ramp[1]	F	62.0	F	121.8
100000903	Sunset Boulevard (US 378) at I-26 Ramps	C	27.9	C	29.1
100000902	Sunset Boulevard (US 378) at I-26 WBR Off-Ramp[1]	E	42.0	F	51.1
100000163	Sunset Boulevard (US 378) at Chris Drive / McSwain Drive	A	6.6	C	30.5
Exit 63					
100000455	Bush River Road at Berryhill Drive	A	7.3	C	23.3
100000139	Bush River Road at I-20 WB Ramps	B	10.6	A	7.7
100000142	Bush River Road at I-20 EB Off-Ramp	A	4.6	A	8.8
-	Bush River Road at Rockland Road[1]	-	-	-	-
100000255	Bush River Road at Independence Avenue	D	35.8	B	15.3
Exit 65					
100000187	Broad River Road at Marley Drive / Briargate Circle	D	46.3	C	30.3
100000189	Broad River Road at I-20 WB Ramps	D	47.4	E	65.5
100000190	Broad River Road at I-20 EB Ramps / Garner Lane	B	10.6	C	21.9
100000195	Broad River Road at Longcreek Drive	A	6.0	A	4.8
Additional Intersections					
100000012	Broad River Road (US 176) at Kinley Road	E	65.3	F	110.3
100000037	Broad River Road (US 176) at Harbison Boulevard	B	11.5	E	75.1
100000049	Broad River Road (US 176) at Piney Woods Road / Lost Creek Drive	C	32.9	E	57.1
100000068	Broad River Road (US 176) at Piney Grove Road	A	3.9	A	4.6
100000339	Broad River Road (US 176) at St. Andrews Road	D	45.6	D	55.0
100000349	Broad River Road (US 176) at St. Andrews Parkway	B	10.7	B	16.0
100000344	Broad River Road (US 176) at Seminole Road / Young Drive	E	70.6	D	37.2
41	Broad River Road (US 176) at Dutch Square Boulevard	A	6.4	F	127.2
100000046	Broad River Road (US 176) at Bush River Road	F	86.7	F	162.1
100000266	Broad River Road (US 176) at Greystone Boulevard	B	10.1	B	19.5
100000265	Greystone Boulevard at Stoneridge Drive	C	20.8	B	17.5
100000188	Greystone Boulevard at I-126 WB Ramps[1]	E	38.2	D	25.6
100000185	Greystone Boulevard at I-126 EB Ramps[1]	D	27.7	F	98.5
100000262	Bush River Road at Colonial Life Boulevard	B	13.7	C	20.1
100000897	Colonial Life Boulevard at West Colonial Life Road[1]	A	8.2	C	15.7
100000374	Park Terrance Drive at Bower Parkway	B	10.6	D	48.1

[1] Intersection unsignalized under all scenarios; worst approach LOS and delay reported.

[2] Delay unable to be processed per HCM 2010 methodology; Average control delay reported.

External to External Speed and Travel Time Analysis

A summary of the External to External Speed and Travel Time Analysis is shown in **Table 5.137**.

Table 5.137: External to External Speed and Travel Time TransModeler Results – RA10

Segments	Length (mi)	Travel Time (mm:ss)		Average Speed (mph)	
		AM	PM	AM	PM
I-26 EB from West of Exit 101					
To I-26 EB (east of Exit 110)	13.87	28:25	22:18	29.3	37.3
To I-20 WB (west of Exit 61)	16.10	29:12	19:05	33.1	50.6
To I-20 EB (east of Exit 68)	15.79	29:48	18:42	31.8	50.7
To I-126 EB (Greystone Blvd)	14.77	28:19	17:08	31.3	51.7
I-26 WB from East of Exit 110					
To I-26 WB (west of Exit 101)	13.90	14:25	26:36	57.9	31.4
To I-20 EB (east of Exit 68)	8.48	09:35	18:56	53.1	26.9
I-20 EB from West of Exit 61					
To I-20 EB (east of Exit 68)	11.10	14:57	10:34	44.6	63.1
To I-26 WB (west of Exit 101)	16.69	19:46	20:25	50.6	49.0
To I-126 EB (east of Greystone Blvd)	10.39	15:12	11:39	41.0	53.5
I-20 WB from East of Exit 68					
To I-20 WB (east of Exit 61)	11.11	11:19	17:36	58.9	37.9
To I-26 EB (east of Exit 110)	9.04	13:13	24:43	41.0	22.0
To I-26 WB (west of Exit 101)	15.32	16:53	24:26	54.4	37.6
I-126 WB from East of Greystone Blvd					
To I-26 WB (west of Exit 101)	14.75	14:55	26:53	59.3	32.9
To I-20 WB (west of Exit 61)	10.84	11:18	22:05	57.5	29.5

6 Identification of Reasonable Alternatives

The final reasonable alternatives were selected to be moved forward in the selection process. Though traffic operations were a consideration in the evaluation of alternatives, other factors, such as construction costs, business and residential relocations, and environmental impacts were used to identify the reasonable alternatives. RA1 and RA5 were the alternatives which were identified as the reasonable alternatives from the representative alternatives. In addition, RA1A and RA5A were created as reasonable alternatives. The main difference between RA1 and RA1A and between RA5 and RA5A was the interchange type at Exit 63, I-20 at Bush River Road. RA1A included the ParClo design from RA5 and RA5A included the DDI design from RA1.

6.1 Create Reasonable Alternative Networks

Revised KMZ files for the reasonable alternatives were used to update the TransModeler simulation networks. In addition, Dynamic Traffic Assignment was run to create the new paths and assign the traffic demand to the

network. Similar to the representative alternative network development, the network did not converge and therefore manual edits of the path flows were completed to ensure reasonable path volumes.

6.2 Analysis of Reasonable Alternatives

Each of the reasonable alternative TransModeler networks were run for the AM and PM Peak hours for 5 simulations runs which were averaged to develop the outputs for the measures of effectiveness (MOEs). The following MOEs were analyzed for the reasonable alternative analysis:

- Mainline Volumes
- Mainline, Merge, and Diverge Density, v/C, and LOS
- Mainline Travel Times
- Arterial Travel Times
- Total Network Vehicle Mile Traveled, Vehicle Hours Traveled, Completed Trips, Denied Entry Vehicles
- External to External Speeds and Travel Times

Comparisons between the RA's as well as RA10 (No-Build Alternative) were completed for each of the MOEs.

Sections 4.7 and 4.8 of the *Alternatives Development and Screening Report* discusses the evaluation and screening of the Reasonable Alternatives.

Mainline Volume Analysis

The Mainline Volume Analysis summary of results are shown in **Table 6.1**, **Table 6.2** and **Table 6.3** for I-26, I-20 and I-126, respectively.

As can be seen in the results below, along the mainline each of the reasonable alternatives carries more volume in the eastbound direction in the morning peak hour and in the westbound direction in the afternoon peak hour. This is reflective of improved operations throughout the study area allowing more vehicles to traverse the interstates without congestion and queuing.

Overall, while RA1, RA1A, RA5, and RA 5A each carry more volume than RA10, RA1 carries more volume than the other alternatives and RA5 carries the least volume of the reasonable alternatives.

Table 6.1: I-26 Mainline Volume TransModeler Results – Reasonable Alternatives

I-26 Mainline	Volume									
	AM									
	EB					WB				
Location	RA10	RA1	RA1A	RA5	RA5A	RA10	RA1	RA1A	RA5	RA5A
west of Exit 101 (Broad River Road)	4,387	6,194	6,166	6,162	6,153	2,950	2,990	2,978	2,944	3,032
Exit 101 to Exit 102 (Lake Murray Boulevard)	4,746	7,243	7,544	7,080	7,409	3,560	3,826	3,881	3,838	3,881
Exit 102 to Exit 103 (Harbison Boulevard)	4,552	7,372	7,363	7,163	7,367	4,190	4,083	4,180	4,263	4,175
Exit 103 to Exist 104 (Piney Grove Road)	4,880	7,750	7,877	7,611	7,738	4,772	4,759	4,746	4,813	4,878
Exit 104 to Exit 106 (St. Andrews Road/CD Road)	5,447	8,523	8,567	8,331	8,504	5,148	5,221	5,288	5,279	5,464
Exit 106 to Exit 107	7,405	7,331	7,225	7,298	7,198	6,216	3,335	3,356	3,229	3,439
I-126 Diverge to I-126 Merge	2,765	3,966	4,790	3,923	3,987	2,926	2,227	2,144	2,213	1,580
Exit 108 to Exit 110 (Sunset Boulevard)	3,630	4,629	4,593	4,552	4,718	4,237	4,513	4,502	4,473	4,407
southeast of Exit 110	3,657	3,921	3,950	4,008	3,981	4,262	4,235	4,255	4,249	4,273
I-26 Mainline	Volume									
	PM									
	EB					WB				
Location	RA10	RA1	RA1A	RA5	RA5A	RA10	RA1	RA1A	RA5	RA5A
west of Exit 101 (Broad River Road)	3,628	3,583	3,524	3,592	3,546	4,399	5,705	5,677	5,595	5,682
Exit 101 to Exit 102 (Lake Murray Boulevard)	4,355	4,361	4,401	4,347	4,298	5,180	6,947	7,000	6,876	7,103
Exit 102 to Exit 103 (Harbison Boulevard)	4,766	4,866	4,881	4,739	4,704	5,853	7,543	7,591	7,295	7,627
Exit 103 to Exist 104 (Piney Grove Road)	5,163	5,686	5,667	5,565	5,607	6,033	7,981	7,976	7,469	8,006
Exit 104 to Exit 106 (St. Andrews Road/CD Road)	5,350	6,113	6,192	5,966	6,113	6,114	8,371	8,407	8,173	8,470
Exit 106 to Exit 107	6,245	4,566	4,565	4,635	4,493	6,739	5,786	5,754	5,323	5,748
I-126 Diverge to I-126 Merge	2,305	3,579	2,333	3,712	3,321	2,319	2,586	2,580	2,550	1,999
Exit 108 to Exit 110 (Sunset Boulevard)	3,449	4,747	4,825	4,825	4,597	3,729	5,346	5,166	5,564	5,549
southeast of Exit 110	3,962	4,466	4,436	4,399	4,494	4,174	4,773	4,804	4,802	4,785

Table 6.2: I-20 Mainline Volume TransModeler Results – Reasonable Alternatives

I-20 Mainline	Volume									
	AM									
	EB					WB				
Location	RA10	RA1	RA1A	RA5	RA5A	RA10	RA1	RA1A	RA5	RA5A
west of Exit 61 (Sunset Boulevard)	5,068	5,587	5,426	5,545	5,570	1,934	2,104	2,110	2,059	2,105
Exit 61 to Exit 63 (Bush River Road/CD Road)	5,568	6,397	6,060	6,679	6,627	2,852	3,123	3,170	3,577	3,027
Exit 63 to Exit 64 (I-26)	5,063	-	-	-	-	2,987	-	-	-	-
Exit 63 to Exit 65 (Broad River Road)	5,278	2,732	2,698	2,791	2,779	4,261	1,902	1,412	2,008	2,005
Exit 65 to Exit 68 (Monticello Road)	5,724	6,204	6,230	6,113	5,981	5,566	5,546	5,587	5,631	5,617
east of Exit 68	5,413	5,742	5,774	5,783	5,668	5,599	5,562	5,591	5,616	5,598
I-20 Mainline	**Volume**									
	PM									
	EB					**WB**				
Location	**RA10**	**RA1**	**RA1A**	**RA5**	**RA5A**	**RA10**	**RA1**	**RA1A**	**RA5**	**RA5A**
west of Exit 61 (Sunset Boulevard)	2,966	2,979	2,955	2,954	2,981	3,603	3,995	4,080	4,132	4,289
Exit 61 to Exit 63 (Bush River Road/CD Road)	3,774	3,964	3,886	4,339	3,761	4,502	5,592	5,498	5,870	5,822
Exit 63 to Exit 64 (I-26)	3,781	-	-	-	-	4,093	-	-	-	-
Exit 63 to Exit 65 (Broad River Road)	4,200	1,487	1,469	1,504	1,521	4,507	2,471	2,370	2,488	2,409
Exit 65 to Exit 68 (Monticello Road)	4,665	5,385	5,404	5,314	5,392	5,743	6,194	6,216	6,093	6,074
east of Exit 68	4,797	5,383	5,387	5,283	5,375	5,501	5,867	5,865	5,826	5,823

Table 6.3: I-126 Mainline Volume TransModeler Results – Reasonable Alternatives

I-126 Mainline	Volume									
	AM									
	EB					WB				
Location	RA10	RA1	RA1A	RA5	RA5A	RA10	RA1	RA1A	RA5	RA5A
I-126 to I-26 WB	4,676	-	-	-	-	2,096	2,774	2,129	2,025	2,096
I-26 to Colonial Life Blvd	5,384	6,918	6,733	6,768	6,605	2,561	2,057	2,962	2,659	2,814
I-126 from Colonial Life Blvd to Greystone Blvd	5,913	7,588	7,589	7,333	7,257	3,361	3,488	3,659	3,370	3,480
I-126 from Greystone Blvd to Huger St	5,897	6,940	6,875	6,898	6,908	3,566	3,542	3,583	3,473	3,538
I-126 Mainline	**Volume**									
	PM									
	EB					**WB**				
Location	**RA10**	**RA1**	**RA1A**	**RA5**	**RA5A**	**RA10**	**RA1**	**RA1A**	**RA5**	**RA5A**
I-126 to I-26 WB	2,656	-	-	-	-	3,044	4,452	4,325	3,831	4,325
I-26 to Colonial Life Blvd	2,944	3,458	3,432	3,479	3,213	3,585	6,160	6,187	5,414	6,144
I-126 from Colonial Life Blvd to Greystone Blvd	3,313	4,092	4,059	3,963	3,784	5,464	7,391	7,524	6,345	7,117
I-126 from Greystone Blvd to Huger St	3,384	3,707	3,721	3,727	3,686	5,972	6,920	6,978	7,037	7,018

Basic Freeway Segment Analysis

The Basic Freeway Segment Analysis summary of results is shown in **Table 6.4**, **Table 6.5** and **Table 6.6** for I-26, I-20 and I-126, respectively.

As can be seen in the tables below, overall, all of the reasonable alternatives show improvement over the no-build alternative. However, one location that showed a consistent degradation is I-126 eastbound in the morning peak hour. This is due to the increased volume moving through the network backing up at Huger Street outside of the project improvement limits. RA1A shows the best improvement in overall LOS throughout the study area with RA5A showing the least improvement over the no-build alternative.

Table 6.4: I-26 Basic Freeway Segment TransModeler Results – Reasonable Alternatives

Segment	AM Peak Hour														
	RA10 (No Build) Conditions			RA1 Conditions			RA1A Conditions			RA5 Conditions			RA5A Conditions		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound															
Exit 101 to Exit 102	F	126.8	0.49	D	31.4	0.60	D	35.0	0.63	D	28.9	0.59	D	31.9	0.62
Exit 102 to Exit 103	F	118.2	0.63	E	35.4	0.77	D	34.8	0.77	E	35.6	0.75	E	35.8	0.77
Exit 103 to Exit 104	F	123.0	0.65	D	32.5	0.65	D	33.1	0.66	F	46.9	0.63	D	32.7	0.64
Exit 104 to Exit 106	F	80.2	0.81	E	37.4	0.71	D	34.3	0.71	F	61.9	0.69	F	48.1	0.71
Exit 106 to Exit 107	F	104.1	0.66	E	38.2	0.54	D	34.6	0.54	D	32.9	0.54	D	33.1	0.53
I-126 Diverge to I-126 Merge	E	37.2	0.71	E	36.3	0.72	E	35.3	0.71	C	25.6	0.58	D	28.2	0.59
Exit 108 to Exit 110	F	82.5	0.50	C	23.1	0.48	C	21.7	0.48	C	23.3	0.47	C	24.8	0.49
I-26 Westbound															
Exit 110 to Exit 108	D	29.8	0.59	B	16.8	0.38	B	16.6	0.38	C	20.1	0.47	C	21.5	0.46
I-126 Diverge to I-126 Merge	E	41.4	0.73	B	14.1	0.31	B	13.8	0.30	B	14.0	0.39	B	14.1	0.28
Exit 107 to Exit 106	D	33.2	0.55	B	13.5	0.30	B	13.4	0.30	C	19.6	0.36	C	20.1	0.38
Exit 106 to Exit 104	E	40.5	0.76	C	24.9	0.46	C	25.6	0.47	C	21.2	0.44	C	21.1	0.46
Exit 104 to Exit 103	D	31.7	0.66	C	18.0	0.40	C	22.0	0.40	D	27.8	0.40	C	24.0	0.41
Exit 103 to Exit 102	D	26.7	0.58	C	18.9	0.43	C	18.1	0.44	C	20.7	0.44	C	20.4	0.43
Exit 102 to Exit 101	B	17.6	0.37	B	15.8	0.32	B	15.3	0.32	B	14.2	0.32	B	15.6	0.32
Segment	PM Peak Hour														
	RA10 (No Build) Conditions			RA1 Conditions			RA1A Conditions			RA5 Conditions			RA5A Conditions		
	LOS1	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound															
Exit 101 to Exit 102	C	22.8	0.45	C	18.1	0.36	B	17.4	0.37	B	17.4	0.36	B	17.2	0.36
Exit 102 to Exit 103	D	30.1	0.66	C	22.6	0.51	C	23.0	0.51	C	22.6	0.49	C	22.6	0.49
Exit 103 to Exit 104	D	29.4	0.66	C	22.5	0.47	C	22.5	0.47	C	22.7	0.46	C	21.8	0.47
Exit 104 to Exit 106	F	74.7	0.79	C	24.1	0.51	C	19.9	0.52	C	25.9	0.50	C	24.1	0.51
Exit 106 to Exit 107	F	84.9	0.56	C	19.0	0.34	B	12.6	0.34	B	13.0	0.34	B	11.5	0.33
I-126 Diverge to I-126 Merge	F	130.1	0.60	B	16.4	0.35	B	16.3	0.35	C	24.7	0.55	C	24.0	0.49
Exit 108 to Exit 110	F	130.8	0.48	C	20.8	0.49	C	22.0	0.50	C	23.6	0.50	C	22.8	0.48
I-26 Westbound															
Exit 110 to Exit 108	F	76.5	0.58	C	19.5	0.45	C	19.1	0.43	D	29.6	0.58	D	30.8	0.58
I-126 Diverge to I-126 Merge	F	157.3	0.58	B	15.1	0.36	B	15.5	0.36	B	16.5	0.45	B	16.6	0.35
Exit 107 to Exit 106	F	123.2	0.60	C	22.0	0.49	C	22.0	0.48	D	32.9	0.59	D	32.2	0.64
Exit 106 to Exit 104	F	47.4	0.91	E	41.6	0.74	E	41.5	0.75	E	35.2	0.68	D	33.3	0.71
Exit 104 to Exit 103	E	39.5	0.84	D	31.8	0.67	E	35.0	0.66	E	40.5	0.62	E	37.6	0.67
Exit 103 to Exit 102	E	38.5	0.81	E	42.8	0.79	E	41.4	0.79	E	39.0	0.76	F	49.6	0.79
Exit 102 to Exit 101	C	23.6	0.54	D	26.2	0.58	D	26.9	0.58	D	26.7	0.57	D	26.9	0.59

Table 6.5: I-20 Basic Freeway Segment TransModeler Results – Reasonable Alternatives

Segment	AM Peak Hour														
	RA10 (No Build) Conditions			RA1 Conditions			RA1A Conditions			RA5 Conditions			RA5A Conditions		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound															
west of Exit 61	F	52.4	0.70	E	39.8	0.70	E	37.9	0.75	E	35.8	0.77	E	35.9	0.77
Exit 61 to Exit 63	F	69.9	0.77	D	29.1	0.61	F	58.1	0.63	E	38.4	0.56	D	33.8	0.55
Exit 63 to Exit 64	C	19.7	0.53	B	15.8	0.35	B	13.4	0.28	B	16.0	0.39	B	16.1	0.39
Exit 64 to Exit 65	D	26.7	0.73												
Exit 65 to Exit 68	E	39.9	0.80	E	42.8	0.79	F	54.3	0.85	F	57.1	0.85	F	61.6	0.83
I-20 Westbound															
Exit 68 to Exit 65	E	41.5	0.77	E	38.7	0.77	D	31.0	0.78	E	38.1	0.78	E	37.6	0.78
Exit 65 to Exit 64	F	70.7	0.59	A	8.1	0.16	A	2.6	0.12	E	35.1	0.78	E	36.9	0.78
Exit 64 to Exit 63	E	43.0	0.31												
Exit 63 to Exit 61	B	17.0	0.40	B	14.3	0.33	B	14.5	0.33	A	8.9	0.21	A	9.8	0.21
west of Exit 61	B	12.1	0.27	B	12.8	0.29	B	13.3	0.29	B	14.2	0.37	B	14.1	0.32
Segment	PM Peak Hour														
	RA10 (No Build) Conditions			RA1 Conditions			RA1A Conditions			RA5 Conditions			RA5A Conditions		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound															
west of Exit 61	B	17.7	0.41	C	18.5	0.41	B	17.5	0.41	B	17.8	0.41	B	17.7	0.41
Exit 61 to Exit 63	C	22.6	0.52	C	18.2	0.41	C	21.9	0.40	B	17.8	0.36	C	18.1	0.31
Exit 63 to Exit 64	B	15.6	0.39	A	8.9	0.21	A	7.4	0.15	A	9.7	0.21	A	9.3	0.21
Exit 64 to Exit 65	C	22.7	0.58												
Exit 65 to Exit 68	D	29.2	0.65	E	35.0	0.75	D	34.2	0.75	D	32.7	0.74	D	32.8	0.75
I-20 Westbound															
Exit 68 to Exit 65	F	69.9	0.80	F	54.1	0.86	E	39.4	0.86	F	66.0	0.81	F	65.2	0.81
Exit 65 to Exit 64	F	90.5	0.63	A	10.6	0.21	A	6.4	0.20	F	49.6	0.85	F	48.7	0.84
Exit 64 to Exit 63	C	19.5	0.43												
Exit 63 to Exit 61	E	40.9	0.63	E	36.3	0.58	C	25.3	0.57	A	10.4	0.26	A	10.4	0.25
west of Exit 61	C	21.3	0.50	C	24.0	0.55	C	24.1	0.57	D	28.9	0.61	E	38.0	0.61

Table 6.6: I-126 Basic Freeway Segment TransModeler Results – Reasonable Alternatives

Segment	AM Peak Hour														
	RA10 (No Build) Conditions			RA1 Conditions			RA1A Conditions			RA5 Conditions			RA5A Conditions		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound															
I-26 to Colonial Life Blvd	D	30.0	0.75	E	36.9	0.77	D	34.5	0.75	D	32.8	0.75	D	33.8	0.73
Colonial Life Blvd to Greystone Blvd	B	16.4	0.62	E	44.0	0.79	E	39.0	0.79	E	43.7	0.76	F	48.8	0.76
Greystone Blvd to Huger St	D	27.8	0.61	F	51.5	0.72	F	50.4	0.72	F	47.9	0.72	F	48.7	0.72
I-126 Westbound															
Huger St to Greystone Blvd	B	15.2	0.37	B	16.3	0.37	B	16.3	0.37	B	15.5	0.36	B	15.5	0.37
Greystone Blvd to Colonial Life Blvd	B	15.5	0.35	B	16.9	0.36	C	18.9	0.38	B	15.8	0.35	B	16.7	0.36
Colonial Life Blvd to I-26	C	22.8	0.47	A	11.0	0.29	B	12.6	0.30	A	9.2	0.28	A	9.7	0.29
Segment	PM Peak Hour														
	RA10 (No Build) Conditions			RA1 Conditions			RA1A Conditions			RA5 Conditions			RA5A Conditions		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound															
I-26 to Colonial Life Blvd	B	16.2	0.41	B	17.2	0.38	B	12.9	0.38	B	15.4	0.39	B	14.6	0.36
Colonial Life Blvd to Greystone Blvd	A	10.5	0.35	C	19.4	0.43	C	24.2	0.42	B	17.1	0.41	C	19.2	0.39
Greystone Blvd to Huger St	B	14.4	0.35	B	15.8	0.39	B	15.9	0.39	B	15.8	0.39	B	15.8	0.38
I-126 Westbound															
Huger St to Greystone Blvd	F	73.1	0.62	D	30.3	0.72	D	31.1	0.73	D	31.0	0.73	D	30.8	0.73
Greystone Blvd to Colonial Life Blvd	F	106.5	0.57	E	44.3	0.77	F	54.2	0.78	F	61.1	0.66	F	66.8	0.74
Colonial Life Blvd to I-26	F	125.1	0.68	D	30.1	0.62	D	27.7	0.60	D	33.2	0.56	D	31.8	0.64

Ramp Merge Analysis

The Ramp Merge Analysis summary of results is shown in **Table 6.7**, **Table 6.8** and **Table 6.9** for I-26, I-20 and I-126, respectively.

As can be seen in the results below, each of the reasonable alternatives show significant improvement over the operations of the no-build alternative. Two areas of note where there is a significant decrease in operations are at the eastbound Exit 65 merge on I-20 and the eastbound I-126 merge areas. The I-20 degradation is due to increased volume where the road narrows to 3 lanes at the river crossing between Exit 65 and Exit 68. The increased volume causes extensive queuing not seen in the no-build alternative which impacts the operations at Exit 65. Along I-126, the degradation in operations is due to increased queuing from Huger Street due to more volume getting to the outer limits of the study area.

Table 6.7: I-26 Ramp Merge TransModeler Results – Reasonable Alternatives

Segment	AM Peak Hour														
	RA10 (No Build) Conditions			RA1 Conditions			RA1A Conditions			RA5 Conditions			RA5A Conditions		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound															
Exit 101	F	126.8	0.49	D	31.4	0.60	D	35.0	0.63	D	28.9	0.59	D	31.9	0.62
Exit 102	F	123.0	0.49	E	38.4	0.61	D	31.6	0.61	D	32.9	0.60	D	32.9	0.62
Exit 103	F	109.3	0.69	D	31.7	0.65	D	33.1	0.66	F	46.9	0.63	D	32.7	0.64
Exit 104	F	87.0	0.59	D	29.9	0.59	D	34.3	0.60	F	52.2	0.59	E	38.4	0.60
Exit CD Road				E	38.2	0.54	D	34.6	0.54	D	32.9	0.54			
Exit 106 Loop	F	58.2	0.70												
Exit 106	F	104.1	0.66										D	33.1	0.53
Exit 107 Loop	F	58.2	0.70												
Exit 107 (from I-20)				B	12.5	0.28	B	12.6	0.27	C	25.0	0.44	C	27.7	0.44
Exit 107	F	92.1	0.69												
Exit 108	E	40.3	0.47												
Exit 108 (I-126)	F	46.4	0.52	B	18.6	0.39	C	21.7	0.38	C	23.3	0.47	C	24.8	0.49
Exit 110	B	16.3	0.38	B	19.6	0.41	C	20.5	0.41	B	19.5	0.42	B	19.8	0.42
I-26 Westbound															
Exit 110	B	15.6	0.35	B	17.4	0.38	B	16.7	0.38	B	18.9	0.37	C	20.5	0.37
Exit 108 (I-126)	F	47.7	0.56	B	15.9	0.30	B	13.2	0.30	B	17.2	0.38	B	17.5	0.31
Exit 108	D	29.5	0.51												
Exit 107 Loop	D	32.2	0.50												
Exit 107	D	33.2	0.55												
Exit 107 (from I-20)				C	20.3	0.38	C	23.2	0.38	C	25.2	0.38	C	24.7	0.39
Exit 106	D	28.7	0.57	C	24.7	0.46	C	27.5	0.47	C	25.8	0.37	C	24.2	0.38
Exit 104	C	22.8	0.50	B	18.5	0.40	B	16.2	0.40	B	19.7	0.40	B	16.2	0.41
Exit 103	C	24.8	0.44	B	15.7	0.34	B	18.1	0.35	B	18.4	0.36	B	17.9	0.35
Exit 102	B	17.6	0.37	B	15.8	0.32	B	15.3	0.32	B	14.2	0.32	B	15.6	0.32
Exit 101	A	7.2	0.31	B	12.3	0.25	A	9.0	0.25	A	8.8	0.25	A	9.0	0.25
Segment	PM Peak Hour														
	RA10 (No Build) Conditions			RA1 Conditions			RA1A Conditions			RA5 Conditions			RA5A Conditions		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound															
Exit 101	C	22.8	0.45	B	18.1	0.36	B	17.4	0.37	B	17.4	0.36	B	17.2	0.36
Exit 102	D	29.4	0.50	C	22.3	0.41	C	21.6	0.41	C	21.0	0.40	C	20.5	0.39
Exit 103	F	48.1	0.73	C	22.1	0.47	C	22.5	0.47	C	22.7	0.47	C	21.8	0.47
Exit 104	F	66.6	0.60	B	19.6	0.42	B	19.9	0.43	C	24.6	0.42	C	22.7	0.42
Exit CD Road				B	19.0	0.34	B	12.6	0.34	B	13.0	0.34			
Exit 106 Loop	F	81.4	0.54												
Exit 106	F	84.9	0.56										B	11.5	0.33
Exit 107 Loop	F	81.4	0.54												
Exit 107 (from I-20)				B	11.3	0.25	B	12.6	0.25	C	24.3	0.41	C	23.6	0.37
Exit 107	F	87.4	0.49												
Exit 108	F	132.8	0.42												
Exit 108 (I-126)	F	150.5	0.49	B	19.8	0.40	C	22.0	0.40	C	23.6	0.50	C	22.8	0.48
Exit 110	B	17.7	0.41	C	22.7	0.46	C	22.6	0.46	C	22.8	0.46	C	23.0	0.47
I-26 Westbound															
Exit 110	F	67.8	0.33	C	20.6	0.45	B	18.8	0.43	D	29.5	0.46	D	31.5	0.46
Exit 108 (I-126)	F	185.1	0.60	C	27.2	0.49	C	21.3	0.48	C	23.9	0.57	C	22.7	0.51
Exit 108	F	135.9	0.57												
Exit 107 Loop	F	124.7	0.57												
Exit 107	F	123.2	0.60												
Exit 107 (from I-20)				D	33.5	0.60	E	36.6	0.61	D	34.7	0.57	D	34.5	0.60
Exit 106	D	34.8	0.68	E	39.8	0.74	E	40.3	0.75	D	34.9	0.57	D	33.1	0.59
Exit 104	D	31.3	0.63	D	29.6	0.67	C	24.6	0.66	C	25.2	0.62	C	24.8	0.67
Exit 103	E	36.4	0.61	D	34.3	0.63	E	41.4	0.63	E	37.0	0.61	F	51.0	0.64
Exit 102	C	23.6	0.54	C	26.2	0.58	C	26.9	0.58	C	26.7	0.57	C	26.9	0.59
Exit 101	A	9.0	0.46	C	22.1	0.48	B	15.9	0.47	B	15.7	0.47	B	16.0	0.47

Table 6.8: I-20 Ramp Merge TransModeler Results – Reasonable Alternatives

Segment	AM Peak Hour														
	RA10 (No Build) Conditions			RA1 Conditions			RA1A Conditions			RA5 Conditions			RA5A Conditions		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound															
Exit 61 Loop	F	103.6	0.53	D	30.2	0.61	C	21.9	0.57	C	24.0	0.62	C	24.1	0.62
Exit 61	F	71.2	0.59	C	25.3	0.53	F	58.1	0.51	E	40.5	0.56	D	33.2	0.56
Exit 63 Loop	C	20.7	0.52												
Exit 63	B	19.5	0.42												
Exit 64 Loop	D	33.2	0.54												
Exit 64	C	25.8	0.55												
Exit 65	E	37.1	0.60	F	112.8	0.52	F	84.7	0.53	F	106.8	0.53	F	119.7	0.53
Exit 65 (from CD)				F	79.4	0.47	F	76.3	0.47	F	75.9	0.39	F	81.5	0.39
Exit 68	D	28.2	0.56	D	33.4	0.60	D	32.4	0.60	D	32.7	0.60	D	31.3	0.59
I-20 Westbound															
Exit 68	C	27.6	0.78	D	31.3	0.58	D	31.0	0.58	D	29.8	0.59	D	30.4	0.59
Exit 65	F	70.7	0.44							A	6.8	0.17	A	7.3	0.17
Exit 65 (from CD)				A	8.1	0.16	A	2.6	0.12						
Exit 64 Loop	C	24.8	0.37												
Exit 64	E	43.0	0.31												
Exit 64 (from CD)										A	8.9	0.20	A	8.5	0.19
Exit 63 (from CD)				B	12.2	0.22	B	12.4	0.23	B	11.2	0.26	A	10.0	0.22
Exit 63	B	13.2	0.30	B	12.5	0.26	B	12.3	0.29	B	16.5	0.30	B	15.1	0.25
Exit 61 Loop				A	9.9	0.20	B	10.0	0.20	B	10.4	0.20	A	9.8	0.20
Exit 61	B	10.1	0.20	B	11.5	0.22	B	12.3	0.22	B	11.8	0.22	B	12.1	0.22
Segment	PM Peak Hour														
	RA10 (No Build) Conditions			RA1 Conditions			RA1A Conditions			RA5 Conditions			RA5A Conditions		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound															
Exit 61 Loop	B	16.9	0.35	B	17.5	0.37	B	15.7	0.37	B	13.5	0.39	B	11.8	0.35
Exit 61	B	19.5	0.39	B	16.8	0.33	C	21.9	0.32	B	16.7	0.36	B	16.9	0.31
Exit 63 Loop	B	17.0	0.37												
Exit 63	B	15.4	0.31												
Exit 64 Loop	D	29.9	0.44												
Exit 64	C	22.3	0.44												
Exit 65	C	25.5	0.49	C	23.9	0.45	D	31.9	0.45	C	27.9	0.44	D	29.1	0.45
Exit 65 (from CD)				C	21.4	0.36	B	19.3	0.36	C	20.5	0.28	B	19.7	0.31
Exit 68	C	26.2	0.50	D	31.4	0.56	D	30.7	0.56	D	31.2	0.55	D	30.9	0.56
I-20 Westbound															
Exit 68	F	58.1	0.82	F	72.5	0.65	E	39.4	0.65	E	42.7	0.65	E	41.8	0.64
Exit 65	F	90.5	0.47							A	6.5	0.21	A	6.8	0.20
Exit 65 (from CD)				B	10.6	0.21	A	6.4	0.20						
Exit 64 Loop	C	27.5	0.42												
Exit 64	B	19.5	0.43												
Exit 64 (from CD)										B	11.6	0.27	B	11.8	0.26
Exit 63 (from CD)				C	21.5	0.37	C	20.6	0.36	C	22.6	0.42	C	22.4	0.39
Exit 63	C	22.8	0.47	C	24.2	0.48	C	20.4	0.45	D	31.9	0.50	E	37.9	0.49
Exit 61 Loop				B	17.6	0.39	B	15.6	0.40	B	17.4	0.41	B	17.0	0.42
Exit 61	B	16.7	0.38	B	19.6	0.42	B	19.7	0.42	C	21.8	0.43	C	21.4	0.45

Table 6.9: I-126 Ramp Merge TransModeler Results – Reasonable Alternatives

Segment	AM Peak Hour														
	RA10 (No Build) Conditions			RA1 Conditions			RA1A Conditions			RA5 Conditions			RA5A Conditions		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound															
Colonial Life Blvd	B	16.4	0.62	F	49.5	0.64	D	34.9	0.64	E	37.5	0.62	E	42.8	0.61
Greystone Blvd	C	20.2	0.61	F	50.2	0.73	E	43.8	0.73	F	59.8	0.73	F	63.6	0.73
I-126 Westbound															
Colonial Life Blvd				B	11.5	0.29	A	9.3	0.31	B	14.5	0.28	B	15.3	0.29
Greystone Blvd	B	13.4	0.28	B	16.9	0.36	B	18.9	0.38	A	9.2	0.28	A	9.7	0.29
Segment	PM Peak Hour														
	RA10 (No Build) Conditions			RA1 Conditions			RA1A Conditions			RA5 Conditions			RA5A Conditions		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound															
Colonial Life Blvd	B	10.5	0.35	B	13.9	0.34	C	27.4	0.34	C	20.2	0.33	C	21.6	0.32
Greystone Blvd	B	10.3	0.35	B	16.1	0.39	B	13.2	0.39	B	13.5	0.39	B	13.0	0.38
I-126 Westbound															
Colonial Life Blvd				D	30.7	0.64	B	19.8	0.64	F	53.0	0.54	F	60.1	0.60
Greystone Blvd	F	73.2	0.47	E	44.3	0.77	F	54.2	0.78	D	33.2	0.56	D	31.8	0.64

Ramp Diverge Analysis

The Ramp Diverge Analysis summary of results is shown in **Table 6.10**, **Table 6.11** and **Table 6.12** for I-26, I-20 and I-126, respectively.

As can be seen in the tables below, overall, all of the reasonable alternatives show improvement over the no-build alternative. However, one location that showed a consistent degradation is I-126 eastbound in the morning peak hour. This is due to the increased volume moving through the network backing up at Huger Street outside of the project improvement limits.

Table 6.10: I-26 Ramp Diverge TransModeler Results – Reasonable Alternatives

Segment	AM Peak Hour														
	RA10 (No Build) Conditions			RA1 Conditions			RA1A Conditions			RA5 Conditions			RA5A Conditions		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound															
Exit 101	F	94.5	0.45	D	30.8	0.58	D	28.9	0.64	C	25.7	0.64	C	24.6	0.64
Exit 101 Loop	F	109.7	0.42	C	24.1	0.45	C	21.8	0.50	C	22.1	0.50	C	21.0	0.50
Exit 102	F	126.8	0.49	D	32.0	0.55	D	35.0	0.63	D	28.9	0.59	D	31.9	0.62
Exit 102 Loop	F	111.1	0.45	C	27.2	0.51	C	27.3	0.57	C	25.6	0.55	C	27.3	0.57
Exit 103	F	118.2	0.63	E	35.6	0.69	D	31.6	0.77	D	33.1	0.74	D	33.0	0.77
Exit 104	F	107.0	0.68	D	32.1	0.58	D	33.1	0.66	F	46.9	0.63	D	32.7	0.64
Exit 106 (CD Road to I-20)				F	53.0	0.71	F	46.1	0.70	F	55.4	0.69	E	40.6	0.71
Exit 106	F	68.7	0.60	F	74.3	0.70	F	56.9	0.73	D	31.5	0.61	E	36.6	0.60
Exit 107	F	104.1	0.66												
Exit 107 Loop	F	58.2	0.70												
Exit 107 (CD Road to I-126)										D	29.3	0.54	D	30.1	0.53
Exit 108	F	92.1	0.69												
I-26 to I-26	F	55.9	0.83												
Exit 110	F	101.3	0.35	C	23.4	0.43	C	22.5	0.48	C	23.3	0.47	C	24.8	0.49
I-26 Westbound															
Exit 110	F	52.1	0.44	E	44.0	0.44	D	34.7	0.44	F	56.1	0.44	E	44.7	0.44
Exit 108	D	29.5	0.51												
Exit 107/I-126				B	17.9	0.38	B	18.6	0.37	C	22.3	0.37	C	22.9	0.37
Exit 107	D	29.5	0.51												
Exit 107 Loop	D	32.2	0.50												
Exit 106	D	33.2	0.55	B	13.4	0.30	A	8.0	0.30						
Exit 106/CD Road										B	17.2	0.38	B	17.5	0.31
Exit 106 Loop	D	30.0	0.60												
Exit 104	D	34.4	0.71	C	23.2	0.46	C	27.8	0.47	C	26.9	0.44	C	23.8	0.45
Exit 103	C	22.0	0.50	C	22.7	0.40	B	16.0	0.40	D	31.4	0.40	B	16.5	0.41
Exit 102	C	25.3	0.58	C	20.1	0.43	C	20.6	0.43	B	18.7	0.44	B	18.1	0.43
Exit 102 Loop	B	19.0	0.40	B	17.5	0.33	B	16.9	0.33	B	16.4	0.33	B	17.7	0.33
Exit 101	B	17.6	0.37	B	15.8	0.32	B	15.3	0.32	B	14.2	0.32	B	15.6	0.32
Exit 101 Loop	B	14.9	0.34	B	16.7	0.29	B	12.8	0.29	B	11.8	0.28	B	13.4	0.29
Segment	PM Peak Hour														
	RA10 (No Build) Conditions			RA1 Conditions			RA1A Conditions			RA5 Conditions			RA5A Conditions		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-26 Eastbound															
Exit 101	B	15.2	0.38	B	18.9	0.37	B	15.8	0.37	B	14.4	0.37	B	14.7	0.37
Exit 101 Loop	B	19.1	0.37	B	14.5	0.29	B	12.0	0.28	B	12.6	0.29	B	11.9	0.28
Exit 102	C	22.8	0.45	B	18.1	0.36	B	17.4	0.37	B	17.4	0.36	B	17.2	0.36
Exit 102 Loop	C	22.2	0.43	B	16.5	0.35	B	16.9	0.35	B	16.8	0.34	B	16.1	0.34
Exit 103	D	30.1	0.66	C	23.5	0.51	C	22.1	0.51	C	21.2	0.49	C	20.7	0.49
Exit 104	F	50.8	0.72	C	23.0	0.47	C	22.5	0.47	C	22.7	0.46	C	21.8	0.47
Exit 106 (CD Road to I-20)										C	26.9	0.50	C	24.6	0.51
Exit 106	F	63.4	0.59	D	28.1	0.51	D	34.0	0.52	B	19.7	0.41	B	18.9	0.40
Exit 107	F	84.9	0.56	E	35.7	0.51	C	22.7	0.51						
Exit 107 Loop	F	81.4	0.54												
Exit 107 (CD Road to I-126)										B	17.8	0.34	B	16.9	0.33
Exit 108	F	87.4	0.49												
I-26 to I-26	F	135.5	0.54												
Exit 110	F	146.0	0.30	C	22.9	0.49	C	22.6	0.50	C	23.6	0.50	C	22.8	0.48
I-26 Westbound															
Exit 110	F	81.3	0.43	D	28.3	0.50	D	32.8	0.50	D	31.2	0.50	D	31.5	0.50
Exit 108	F	135.9	0.57												
Exit 107/I-126				C	21.8	0.45	B	19.8	0.43	D	32.0	0.46	D	32.1	0.46
Exit 107	F	135.9	0.57												
Exit 107 Loop	F	124.7	0.57												
Exit 106	F	123.2	0.60	C	21.8	0.49	B	10.7	0.48						
Exit 106/CD Road										C	23.9	0.57	C	22.7	0.51
Exit 106 Loop	F	94.5	0.71												
Exit 104	E	40.1	0.85	E	38.0	0.74	E	41.6	0.75	E	36.2	0.68	D	33.5	0.70
Exit 103	D	28.9	0.63	E	36.7	0.66	C	25.5	0.66	D	29.7	0.62	C	26.7	0.67
Exit 102	E	37.3	0.81	E	40.8	0.78	E	44.6	0.79	E	37.4	0.76	F	51.1	0.79
Exit 102 Loop	C	26.9	0.57	D	30.8	0.61	D	30.5	0.61	D	29.7	0.58	D	31.1	0.61
Exit 101	C	23.6	0.54	C	26.2	0.58	C	26.9	0.58	C	26.7	0.57	C	26.9	0.59
Exit 101 Loop	C	20.2	0.50	D	28.2	0.53	C	22.0	0.53	C	22.0	0.52	C	21.7	0.53

Table 6.11: I-20 Ramp Diverge TransModeler Results – Reasonable Alternatives

Segment	AM Peak Hour														
	RA10 (No Build) Conditions			RA1 Conditions			RA1A Conditions			RA5 Conditions			RA5A Conditions		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound															
Exit 61	F	65.4	0.53	E	35.7	0.58	F	48.0	0.56	E	36.3	0.58	E	36.7	0.58
Exit 63/64/65				C	24.3	0.53	F	51.6	0.49						
Exit 63/64										E	40.9	0.55	C	26.4	0.55
Exit 63	F	67.7	0.77												
Exit 64	B	19.7	0.53												
Exit 64 Loop	D	33.2	0.54												
Exit 65	C	26.7	0.55												
Exit 68	F	46.8	0.79	E	44.1	0.84	F	45.7	0.84	E	44.2	0.85	F	51.5	0.83
I-20 Westbound															
Exit 68	E	37.7	0.78	E	40.1	0.77	E	38.8	0.78	E	38.1	0.78	E	37.6	0.78
Exit 65	C	24.5	0.58	C	22.1	0.38	E	35.9	0.38	D	31.9	0.39	D	32.3	0.39
Exit 65 (CD Road to I-26)				B	18.5	0.34	E	36.6	0.33						
Exit 64 (CD Road to I-26)										C	26.5	0.35	C	25.3	0.35
Exit 64	F	71.4	0.59												
Exit 64 Loop	C	24.8	0.37												
Exit 63 (CD Road)										A	7.5	0.21	A	7.8	0.21
Exit 63	E	43.0	0.31	A	9.5	0.16	A	2.8	0.12						
Exit 61	C	22.1	0.40	F	46.1	0.32	C	24.1	0.33	C	25.9	0.37	E	41.3	0.31
Segment	PM Peak Hour														
	RA10 (No Build) Conditions			RA1 Conditions			RA1A Conditions			RA5 Conditions			RA5A Conditions		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-20 Eastbound															
Exit 61	B	17.1	0.31	B	18.1	0.31	B	17.4	0.31	B	16.3	0.31	B	16.4	0.31
Exit 63/64/65				B	15.1	0.33	C	20.3	0.32						
Exit 63/64										B	15.4	0.36	B	15.0	0.31
Exit 63	C	26.8	0.52												
Exit 64	B	15.6	0.39												
Exit 64 Loop	D	29.9	0.44												
Exit 65	C	22.7	0.44												
Exit 68	C	27.9	0.65	E	37.2	0.74	E	35.6	0.75	D	34.7	0.74	D	35.0	0.75
I-20 Westbound															
Exit 68	F	75.1	0.76	F	69.1	0.81	F	65.5	0.81	F	66.0	0.81	F	65.2	0.81
Exit 65	C	25.6	0.60	C	24.6	0.43	E	43.8	0.43	E	41.4	0.42	E	41.3	0.42
Exit 65 (CD Road to I-26)				C	21.5	0.41	D	34.6	0.41						
Exit 64 (CD Road to I-26)										C	24.7	0.40	C	26.1	0.39
Exit 64	F	91.4	0.61												
Exit 64 Loop	C	27.5	0.42												
Exit 63 (CD Road)										A	6.6	0.26	A	7.4	0.25
Exit 63	B	19.5	0.43	B	11.1	0.21	A	6.4	0.20						
Exit 61	F	92.4	0.60	F	110.6	0.54	F	62.3	0.55	F	98.8	0.56	F	102.3	0.55

Table 6.12: I-126 Ramp Diverge TransModeler Results – Reasonable Alternatives

Segment	AM Peak Hour														
	RA10 (No Build) Conditions			RA1 Conditions			RA1A Conditions			RA5 Conditions			RA5A Conditions		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound															
Colonial Life Boulevard				E	36.9	0.77	D	34.5	0.75	D	32.8	0.75	D	33.8	0.73
Greystone Blvd	B	15.9	0.49	F	47.5	0.63	E	35.4	0.63	E	38.9	0.61	E	44.2	0.60
I-126 Westbound															
Greystone Boulevard	B	19.3	0.37	B	16.3	0.37	C	20.2	0.37	C	22.6	0.36	B	18.0	0.37
Colonial Life Boulevard	B	13.4	0.35	B	17.3	0.29	B	17.9	0.31	B	14.9	0.28	B	15.7	0.29
Colonial Life Boulevard to I-26 EB				B	15.1	0.32	B	14.8	0.34	B	14.1	0.30	B	14.8	0.32
Exit 107 (I-20)				B	14.0	0.29	B	13.1	0.31	A	9.2	0.28	A	9.7	0.29
Segment	PM Peak Hour														
	RA10 (No Build) Conditions			RA1 Conditions			RA1A Conditions			RA5 Conditions			RA5A Conditions		
	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C	LOS[1]	Density[2]	v/C
I-126 Eastbound															
Colonial Life Boulevard				B	17.2	0.38	B	12.9	0.38	B	15.4	0.39	B	14.6	0.36
Greystone Blvd	D	32.7	0.27	C	24.2	0.34	D	29.6	0.33	C	20.8	0.33	C	23.0	0.31
I-126 Westbound															
Greystone Boulevard	F	85.3	0.60	D	32.2	0.72	D	30.9	0.73	D	32.5	0.73	D	32.3	0.73
Colonial Life Boulevard	F	72.1	0.57	F	48.6	0.61	F	53.2	0.62	F	54.3	0.52	F	61.5	0.59
Colonial Life Boulevard to I-26 EB				E	44.4	0.69	E	40.2	0.69	E	35.8	0.59	E	39.2	0.68
Exit 107 (I-20)				E	36.0	0.64	D	30.7	0.64	D	33.2	0.56	D	31.8	0.64

Mainline Travel Time Analysis

The Mainline Travel Time Analysis summary of results is shown in **Table 6.13**, **Table 6.14**, and **Table 6.15**.

As shown in the tables below, mainline travel times and speeds are significantly increased throughout the study area in the eastbound direction in the morning peak hour and in the westbound direction in the afternoon peak hour. This reinforces the reduced congestion and queuing that was observed in the observations of the mainline operations in the peak directions for each of the peak hours. Overall, across I-26, I-20 and I-126, RA1 had the lowest travel times and highest speeds of the reasonable alternatives followed by RA1. RA5A had the highest travel times and lowest speeds of the reasonable alternatives.

Table 6.13: I-26 Mainline Travel Time TransModeler Results – Reasonable Alternatives

Segments	AM Eastbound													AM Westbound											
	Travel Time (mm:ss)								Average Speed (mph)					Travel Time (mm:ss)								Average Speed (mph)				
I-26 between Exit 101 and Exit 110	Length (mi)	RA10	Length (mi)	RA1	RA1A	Length (mi)	RA5	RA5A	RA10	RA1	RA1A	RA5	RA5A	Length (mi)	RA10	Length (mi)	RA1	RA1A	Length (mi)	RA5	RA5A	RA10	RA1	RA1A	RA5	RA5A
Exit 101 to Exit 102 (Lake Murray Boulevard)	0.93	04:18	0.76	00:50	00:51	0.76	00:49	00:50	13.0	54.7	53.2	55.6	54.3	0.91	00:55	0.90	00:55	00:54	1.00	01:00	01:01	60.2	59.3	59.8	59.7	59.1
Exit 102 to Exit 103 (Harbison Boulevard)	1.29	06:22	1.21	01:22	01:21	1.21	01:22	01:21	12.1	53.2	53.9	53.0	53.9	0.76	00:45	1.04	01:00	01:01	0.86	00:51	00:51	60.2	61.8	61.4	60.3	60.8
Exit 103 to Exist 104 (Piney Grove Road)	0.83	03:40	0.89	00:59	01:00	0.89	01:21	01:00	13.5	53.9	53.1	39.7	53.4	1.23	01:15	0.95	00:57	00:57	0.96	01:07	00:57	59.3	60.0	60.1	51.5	60.4
Exit 104 to Exit 106 (St. Andrews Road)	2.20	06:42	-	-	-	-	-	-	19.7	-	-	-	-	1.98	02:21	-	-	-	-	-	-	50.5	-	-	-	-
Exit 104 to Exit 107 (I-20)/ Exit106 (St. Andrews Road)	0.53	01:57	1.74	02:33	02:31	1.77	03:09	02:28	16.2	40.9	41.5	33.8	43.2	0.72	00:59	2.45	03:03	03:04	1.98	02:08	02:06	44.3	48.1	47.9	55.6	56.7
Exit 106 to I-26/I-126 Split	0.60	01:36	1.22	02:27	02:22	1.19	01:56	02:00	22.3	30.0	31.0	37.1	35.8	0.20	00:16	0.66	00:40	00:40	1.12	01:23	01:23	44.8	59.8	59.7	48.7	48.6
I-26 to I-126	0.42	00:42	0.94	00:58	00:58	1.24	01:27	01:28	36.5	58.6	58.6	51.3	50.8	0.02	00:02	0.73	00:40	00:40	0.73	00:54	00:54	39.6	64.9	65.1	48.2	48.4
I-26/I-126 Split to Exit 110 (Sunset Boulevard)	1.56	03:23	1.63	01:38	01:37	1.60	01:35	01:35	27.6	60.3	60.6	60.8	60.3	2.37	02:43	1.47	01:27	01:27	1.46	01:30	01:30	52.3	61.1	60.9	58.6	58.0
Total	**8.35**	**28:41**	**8.39**	**10:46**	**10:40**	**8.67**	**11:39**	**10:43**	**17.5**	**46.7**	**47.2**	**44.6**	**48.6**	**8.20**	**09:16**	**8.19**	**08:42**	**08:43**	**8.10**	**08:53**	**08:42**	**53.1**	**56.5**	**56.4**	**54.7**	**55.9**

Segments	PM Eastbound													PM Westbound											
	Travel Time (mm:ss)								Average Speed (mph)					Travel Time (mm:ss)								Average Speed (mph)				
I-26 between Exit 101 and Exit 110	Length (mi)	RA10	Length (mi)	RA1	RA1A	Length (mi)	RA5	RA5A	RA10	RA1	RA1A	RA5	RA5A	Length (mi)	RA10	Length (mi)	RA1	RA1A	Length (mi)	RA5	RA5A	RA10	RA1	RA1A	RA5	RA5A
Exit 101 to Exit 102 (Lake Murray Boulevard)	0.93	00:56	0.76	00:46	00:46	0.76	00:46	00:45	59.4	59.6	59.6	59.3	59.9	0.91	00:57	0.90	00:58	00:58	1.00	01:05	01:05	57.4	55.8	55.7	55.2	55.1
Exit 102 to Exit 103 (Harbison Boulevard)	1.29	01:20	1.21	01:13	01:13	1.21	01:13	01:13	58.0	59.6	59.4	59.5	59.9	0.76	00:51	1.04	01:13	01:16	0.86	00:59	01:13	53.4	50.8	49.1	52.7	42.5
Exit 103 to Exist 104 (Piney Grove Road)	0.83	01:11	0.89	00:54	00:54	0.89	00:54	00:54	42.3	59.1	59.2	59.2	59.7	1.23	01:23	0.95	01:02	01:01	0.96	01:04	01:02	53.1	55.5	55.5	53.7	55.4
Exit 104 to Exit 106 (St. Andrews Road)	2.20	04:32	-	-	-	-	-	-	29.0	-	-	-	-	1.98	03:00	-	-	-	-	-	-	39.7	-	-	-	-
Exit 104 to Exit 107 (I-20)/ Exit106 (St. Andrews Road)	0.53	01:41	1.74	01:49	01:49	1.77	01:53	01:51	18.8	57.5	57.3	56.3	57.5	0.72	03:55	2.45	03:19	03:20	1.98	02:23	02:19	11.1	44.3	44.1	50.0	51.5
Exit 106 to I-26/I-126 Split	0.60	02:09	1.22	01:33	01:33	1.19	01:24	01:23	16.6	47.3	47.5	51.3	51.7	0.20	01:12	0.66	00:43	00:43	1.12	01:32	01:30	10.2	55.4	55.6	43.8	44.7
I-26 to I-126	0.42	01:55	0.94	00:58	00:58	1.24	01:27	01:27	13.3	58.4	58.6	51.3	51.3	0.02	00:08	0.73	00:41	00:41	0.73	00:55	00:55	8.7	64.6	64.6	47.4	47.6
I-26/I-126 Split to Exit 110 (Sunset Boulevard)	1.56	07:42	1.63	01:36	01:36	1.60	01:35	01:34	12.1	61.0	61.0	60.5	60.9	2.37	13:05	1.47	01:28	01:27	1.46	01:41	01:43	10.9	60.1	60.7	51.9	51.2
Total	**8.35**	**21:26**	**8.39**	**08:49**	**08:49**	**8.67**	**09:13**	**09:08**	**23.4**	**57.1**	**57.1**	**56.4**	**57.0**	**8.20**	**24:32**	**8.19**	**09:24**	**09:26**	**8.10**	**09:39**	**09:46**	**20.1**	**52.3**	**52.1**	**50.4**	**49.7**

Table 6.14: I-20 Mainline Travel Time TransModeler Results – Reasonable Alternatives

Segments	AM Eastbound													AM Westbound											
	Travel Time (mm:ss)								Average Speed (mph)					Travel Time (mm:ss)								Average Speed (mph)				
I-20 between Exit 61 and Exit 68	Length (mi)	RA10	Length (mi)	RA1	RA1A	Length (mi)	RA5	RA5A	RA10	RA1	RA1A	RA5	RA5A	Length (mi)	RA10	Length (mi)	RA1	RA1A	Length (mi)	RA5	RA5A	RA10	RA1	RA1A	RA5	RA5A
Exit 61 to Exit 63 (Bush River Road)	2.01	05:11	-	-	-	-	-	-	23.3	-	-	-	-	1.98	02:00	-	-	-	-	-	-	28.0	-	-	-	-
Exit 61 to Exit 63/64	-	-	1.83	01:58	03:17	1.81	02:36	02:11	-	55.5	33.4	41.9	49.9	-	-	2.31	02:23	02:21	2.35	02:23	02:44	-	58.2	58.6	59.1	51.5
Exit 63 to Exit 64 (I-26)	0.73	00:46	-	-	-	-	-	-	57.7	-	-	-	-	0.74	01:11	-	-	-	-	-	-	47.4	-	-	-	-
Exit 63/64 to Exit 65	-	-	2.54	04:03	03:55	2.54	03:57	04:06	-	37.5	38.8	38.6	37.1	-	-	1.39	01:21	01:22	1.36	01:18	01:17	-	61.3	61.2	63.1	63.2
Exit 64 to Exit 65 (Broad River Road)	0.82	00:55	-	-	-	-	-	-	53.9	-	-	-	-	1.12	01:58	-	-	-	-	-	-	28.3	-	-	-	-
Exit 65 to Exit 68 (Monticello Road)	3.15	03:39	2.51	04:23	04:22	2.52	04:13	04:35	51.9	34.3	34.5	35.8	32.9	2.93	03:24	2.99	03:15	03:23	3.00	03:18	03:25	16.4	55.1	52.9	54.5	52.7
Total	**6.71**	**10:30**	**6.87**	**10:25**	**11:34**	**6.87**	**10:46**	**10:52**	**38.4**	**39.6**	**35.6**	**38.3**	**37.9**	**6.77**	**08:33**	**6.68**	**07:00**	**07:06**	**6.70**	**06:59**	**07:27**	**47.5**	**57.3**	**56.4**	**57.7**	**54.0**

Segments	PM Eastbound													PM Westbound											
	Travel Time (mm:ss)								Average Speed (mph)					Travel Time (mm:ss)								Average Speed (mph)				
I-20 between Exit 61 and Exit 68	Length (mi)	RA10	Length (mi)	RA1	RA1A	Length (mi)	RA5	RA5A	RA10	RA1	RA1A	RA5	RA5A	Length (mi)	RA10	Length (mi)	RA1	RA1A	Length (mi)	RA5	RA5A	RA10	RA1	RA1A	RA5	RA5A
Exit 61 to Exit 63 (Bush River Road)	2.01	02:02	-	-	-	-	-	-	59.4	-	-	-	-	1.98	03:46	-	-	-	-	-	-	31.6	-	-	-	-
Exit 61 to Exit 63/64	-	-	1.83	01:49	01:57	1.81	01:50	01:49	-	60.2	56.1	59.4	59.7	-	-	2.31	03:44	02:59	2.35	03:43	04:01	-	37.2	46.4	37.9	35.1
Exit 63 to Exit 64 (I-26)	0.73	00:44	-	-	-	-	-	-	59.5	-	-	-	-	0.74	00:48	-	-	-	-	-	-	55.8	-	-	-	-
Exit 63/64 to Exit 65	-	-	2.54	02:23	02:24	2.54	02:25	02:25	-	63.9	63.3	62.9	63.0	-	-	1.39	01:21	01:21	1.36	01:17	01:17	-	61.3	61.3	63.3	63.1
Exit 64 to Exit 65 (Broad River Road)	0.82	00:54	-	-	-	-	-	-	54.2	-	-	-	-	1.12	02:19	-	-	-	-	-	-	29.1	-	-	-	-
Exit 65 to Exit 68 (Monticello Road)	3.15	03:09	2.51	02:41	02:42	2.52	02:40	02:41	60.0	55.9	55.7	56.5	56.3	2.93	05:59	2.99	04:07	04:10	3.00	04:46	04:41	29.3	43.5	42.9	37.7	38.3
Total	**6.71**	**06:50**	**6.87**	**06:53**	**07:03**	**6.87**	**06:55**	**06:55**	**59.0**	**59.8**	**58.4**	**59.5**	**59.6**	**6.77**	**12:51**	**6.68**	**09:12**	**08:31**	**6.70**	**09:47**	**10:00**	**31.6**	**43.6**	**47.1**	**41.1**	**40.2**

Table 6.15: I-126 Mainline Travel Time TransModeler Results – Reasonable Alternatives

Segments	AM Eastbound													AM Westbound											
	Travel Time (mm:ss)								Average Speed (mph)					Travel Time (mm:ss)								Average Speed (mph)				
I-126 between I-26 and Greystone Blvd	**Length (mi)**	**RA10**	**Length (mi)**	**RA1**	**RA1A**	**Length (mi)**	**RA5**	**RA5A**	**RA10**	**RA1**	**RA1A**	**RA5**	**RA5A**	**Length (mi)**	**RA10**	**Length (mi)**	**RA1**	**RA1A**	**Length (mi)**	**RA5**	**RA5A**	**RA10**	**RA1**	**RA1A**	**RA5**	**RA5A**
Exit 108 to Colonial Life Boulevard	1.22	01:15	-	-	-	-	-	-	58.4	-	-	-	-	1.14	01:11	-	-	-	-	-	-	47.0	-	-	-	-
I-26 to Colonial Life Blvd	-	-	0.81	01:04	01:03	1.13	01:24	01:24	-	45.1	46.4	48.6	48.6	-	-	0.96	00:57	00:57	0.97	01:01	01:02	-	60.9	60.8	44.4	44.1
Colonial Life Blvd to Greystone Blvd	0.77	00:48	1.51	02:04	01:46	1.49	01:58	02:08	58.3	43.7	51.1	45.6	41.9	0.98	00:58	1.13	01:06	01:07	1.12	01:06	01:06	57.9	61.5	61.2	41.2	41.0
Total	**1.99**	**02:03**	**2.31**	**03:09**	**02:49**	**2.62**	**03:22**	**03:32**	**58.4**	**44.1**	**49.3**	**46.8**	**44.5**	**2.13**	**02:09**	**2.09**	**02:03**	**02:03**	**2.09**	**02:07**	**02:08**	**59.3**	**61.2**	**61.0**	**59.2**	**58.8**

Segments	PM Eastbound													PM Westbound											
	Travel Time (mm:ss)								Average Speed (mph)					Travel Time (mm:ss)								Average Speed (mph)				
I-126 between I-26 and Greystone Blvd	**Length (mi)**	**RA10**	**Length (mi)**	**RA1**	**RA1A**	**Length (mi)**	**RA5**	**RA5A**	**RA10**	**RA1**	**RA1A**	**RA5**	**RA5A**	**Length (mi)**	**RA10**	**Length (mi)**	**RA1**	**RA1A**	**Length (mi)**	**RA5**	**RA5A**	**RA10**	**RA1**	**RA1A**	**RA5**	**RA5A**
Exit 108 to Colonial Life Boulevard	1.22	01:11	-	-	-	-	-	-	62.0	-	-	-	-	1.14	05:49	-	-	-	-	-	-	11.8	-	-	-	-
I-26 to Colonial Life Blvd	-	-	0.81	00:57	00:58	1.13	01:19	01:19	-	50.6	50.5	51.6	51.8	-	-	0.96	01:17	01:16	0.97	01:24	01:23	-	45.2	45.6	41.8	42.5
Colonial Life Blvd to Greystone Blvd	0.77	00:58	1.51	01:35	01:49	1.49	01:35	01:41	47.7	57.0	49.9	56.6	52.9	0.98	04:28	1.13	01:36	01:50	1.12	02:06	02:18	13.2	42.3	36.9	32.0	29.2
Total	**1.99**	**02:09**	**2.31**	**02:33**	**02:46**	**2.62**	**02:54**	**03:00**	**55.6**	**54.6**	**50.1**	**54.3**	**52.5**	**2.13**	**10:17**	**2.09**	**02:53**	**03:06**	**2.09**	**03:30**	**03:41**	**12.4**	**43.6**	**40.4**	**35.9**	**34.1**

Arterial Travel Time Analysis

The Arterial Travel Time Analysis summary of results is shown in **Table 6.16**.

Overall, there is not a clear pattern of change from the RA10 No-Build alternative to the Reasonable Alternatives for Arterial Travel Times and Speeds. This is due in part to the Dynamic Traffic Assignment redistributing trips along the arterials. Some arterials showed significant improvements in operations while others showed a degradation. RA1A showed the best overall Arterial Travel Speeds while RA5 had the worst overall Arterial Travel Speeds.

Table 6.16: Arterial Travel Time TransModeler Results – Reasonable Alternatives

Location	Eastbound								Eastbound								Eastbound									
	Travel Time (mm:ss)								Travel Time (mm:ss)								Average Speed (mph)									
	AM								PM								AM					PM				
	Length (mi)	RA10	Length (mi)	RA1	RA1A	Length (mi)	RA5	RA5A	Length (mi)	RA10	Length (mi)	RA1	RA1A	Length (mi)	RA5	RA5A	RA10	RA1	RA1A	RA5	RA5A	RA10	RA1	RA1A	RA5	RA5A
Broad River Road (west of Exit 101 to Greystone Blvd)	7.5	21:39	6.7	26:31	20:21	8.5	23:53	23:25	7.5	19:55	6.7	22:25	21:57	8.5	25:55	21:04	20.7	16.6	21.6	21.4	21.9	22.5	19.6	20.0	19.8	24.3
Lake Murray Boulevard (west of Exit 102 to Broad River Road)	1.8	04:12	1.5	05:27	06:16	2.2	05:49	06:40	1.8	05:25	1.5	08:30	06:53	2.2	10:14	12:02	25.7	23.8	20.8	22.4	19.6	19.9	15.3	18.9	12.7	10.8
Harbison Boulevard (west of Exit 103 to Broad River Road)	1.1	02:52	1.1	03:49	03:52	1.2	03:52	03:53	1.1	04:53	1.1	05:03	05:09	1.2	05:26	05:11	23.5	18.1	17.9	19.0	18.9	13.8	13.7	13.5	13.5	14.2
Piney Grove Road (west of Exit 104 to Broad River Road)	1.8	04:40	1.5	05:27	05:54	1.7	06:26	05:23	1.8	04:27	1.5	05:20	05:16	1.7	05:27	05:19	22.8	19.3	17.9	16.2	19.3	24.0	19.7	20.0	19.1	19.5
St. Andrews Road (west of Exit 106 to Broad River Road)	1.0	04:23	1.0	05:28	05:46	1.1	05:05	04:32	1.0	04:41	1.0	05:11	05:08	1.1	04:38	04:41	13.3	14.4	13.6	13.0	14.4	12.5	15.2	15.3	14.3	13.9
Bush River Road (west of Exit 63 to Broad River Road)	2.3	06:51	2.0	07:46	07:42	2.3	07:07	06:56	2.3	11:40	2.0	07:06	07:28	2.3	07:32	07:07	20.2	16.8	17.7	19.4	18.9	11.9	18.4	18.3	18.3	18.4
Location	**Northbound**								**Northbound**								**Northbound**									
	Travel Time (mm:ss)								**Travel Time (mm:ss)**								**Average Speed (mph)**									
	AM								**PM**								**AM**					**PM**				
	Length (mi)	**RA10**	**Length (mi)**	**RA1**	**RA1A**	**Length (mi)**	**RA5**	**RA5A**	**Length (mi)**	**RA10**	**Length (mi)**	**RA1**	**RA1A**	**Length (mi)**	**RA5**	**RA5A**	**RA10**	**RA1**	**RA1A**	**RA5**	**RA5A**	**RA10**	**RA1**	**RA1A**	**RA5**	**RA5A**
Colonial Life Boulevard (I-126 Ramps to Bush River Road)	0.5	01:33	0.6	01:48	01:52	0.6	01:49	01:46	0.5	01:56	0.6	02:28	02:50	0.6	02:33	02:23	18.5	20.9	20.2	21.1	21.7	14.9	15.3	13.3	15.1	16.1
Location	**Westbound**								**Westbound**								**Westbound**									
	Travel Time (mm:ss)								**Travel Time (mm:ss)**								**Average Speed (mph)**									
	AM								**PM**								**AM**					**PM**				
	Length (mi)	**RA10**	**Length (mi)**	**RA1**	**RA1A**	**Length (mi)**	**RA5**	**RA5A**	**Length (mi)**	**RA10**	**Length (mi)**	**RA1**	**RA1A**	**Length (mi)**	**RA5**	**RA5A**	**RA10**	**RA1**	**RA1A**	**RA5**	**RA5A**	**RA10**	**RA1**	**RA1A**	**RA5**	**RA5A**
Broad River Road (west of Exit 101 to Greystone Blvd)	7.5	20:40	7.3	17:41	18:18	8.5	25:05	19:29	7.5	37:29	7.3	27:04	26:54	8.5	26:32	23:33	21.6	26.7	25.9	20.4	26.3	11.9	17.5	17.6	19.3	21.7
Lake Murray Boulevard (west of Exit 102 to Broad River Road)	1.7	04:57	1.5	04:46	04:51	2.1	05:30	04:50	1.7	55:12	1.5	05:14	05:08	2.2	05:50	05:52	20.9	26.3	25.9	22.9	26.1	1.9	24.0	24.5	21.6	21.5
Harbison Boulevard (west of Exit 103 to Broad River Road)	1.1	02:35	1.1	03:36	03:39	1.2	04:18	03:33	1.1	02:59	1.1	04:07	04:06	1.2	08:58	03:55	26.1	19.2	18.9	17.1	20.8	22.6	16.8	16.9	8.2	18.8
Piney Grove Road (west of Exit 104 to Broad River Road)	1.8	06:40	1.5	05:04	05:03	1.7	06:38	05:14	1.8	04:39	1.5	05:15	05:19	1.7	05:44	05:30	16.1	20.7	20.9	15.7	20.0	23.0	20.0	19.8	18.2	19.0
St. Andrews Road (west of Exit 106 to Broad River Road)	1.0	03:34	1.0	05:14	06:55	1.1	11:21	05:56	1.0	05:34	1.0	05:27	05:51	1.1	05:43	05:35	16.4	15.1	11.4	5.8	11.0	10.5	14.5	13.4	11.6	11.7
Bush River Road (west of Exit 63 to Broad River Road)	2.3	10:13	2.0	07:10	06:39	2.3	07:43	07:05	2.3	09:27	2.0	07:08	07:01	2.3	07:26	07:09	13.6	18.5	20.5	17.9	18.5	14.7	18.6	19.4	18.6	18.3
Location	**Southbound**								**Southbound**								**Southbound**									
	Travel Time (mm:ss)								**Travel Time (mm:ss)**								**Average Speed (mph)**									
	AM								**PM**								**AM**					**PM**				
	Length (mi)	**RA10**	**Length (mi)**	**RA1**	**RA1A**	**Length (mi)**	**RA5**	**RA5A**	**Length (mi)**	**RA10**	**Length (mi)**	**RA1**	**RA1A**	**Length (mi)**	**RA5**	**RA5A**	**RA10**	**RA1**	**RA1A**	**RA5**	**RA5A**	**RA10**	**RA1**	**RA1A**	**RA5**	**RA5A**
Colonial Life Boulevard (I-126 Ramps to Bush River Road)	0.5	00:46	0.6	02:31	02:51	0.6	02:22	02:26	0.5	00:49	0.6	02:55	02:57	0.6	02:51	02:38	37.2	15.0	13.3	16.3	15.8	35.0	13.0	12.8	13.5	14.6

Trip Statistics Summary

The Trip Statistics Summary Analysis summary of results is shown in **Table 6.17**.

Table 6.17: External to External Speed and Travel Time TransModeler Results – Reasonable Alternatives

Vehicle Miles Traveled (VMT)					
	RA10	RA1	RA1A	RA5	RA5A
AM	245,498	308,362	306,576	296,826	302,858
PM	230,931	326,410	325,872	318,291	319,204
Vehicle Hours Traveled (VHT)					
	RA10	RA1	RA1A	RA5	RA5A
AM	7,869	8,276	8,260	8,210	8,169
PM	8,996	8,988	9,172	9,116	8,965
Total Completed Trips (vehicles)					
	RA10	RA1	RA1A	RA5	RA5A
AM	50,102	54,377	54,026	53,670	54,656
PM	49,028	58,749	58,425	58,574	59,389
Total Denied Entry (vehicles)					
	RA10	RA1	RA1A	RA5	RA5A
AM	2,499	828	950	1,411	923
PM	5,432	1,355	1,281	1,659	1,386
Denied Entry (%)					
	RA10	RA1	RA1A	RA5	RA5A
AM	5.0	1.5	1.8	2.6	1.7
PM	11.1	2.3	2.2	2.8	2.3

The Trip Statistics Summary Analysis shows that there is a significant increase in Vehicle Miles Traveled in each of the reasonable alternatives as compared to RA10. RA1 showed the biggest improvement in both the morning and evening peak hours. There were also, significantly more Completed Trips and fewer Denied Entry vehicles in the reasonable alternatives than in RA10. RA1 showed the most significant improvement while RA5 showed the least significant improvement.

7 References

Central Midlands Council of Governments (CMCOG), 2015, *Columbia Area Transportation Study (COATS) - Moving the Midlands 2040 Long Range Transportation Plan*

Stantec, June 2016, *Draft Traffic Microsimulation Model Calibration Report, I-20/I-26/I-77 Corridor Management Plan Study*

FHWA, June 2004, *Traffic Analysis Toolbox Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software*

Carolina Crossroads, July 2018, *Alternatives Development and Screening Report*

Appendix A—Additional Turning Movement Count Locations

Additional turning movement counts were collected at the following locations:

1. Exit 102
   - Lake Murray Boulevard at College Street (signal) – Tuesday, November 22, 2016
   - Lake Murray Boulevard at Columbiana Drive (signal) Monday, November 21, 2016
   - Lake Murray Boulevard at Kinley/Parkridge Hospital (signal) – Tuesday, November 22, 2016
   - Lake Murray Boulevard at Parkridge Drive (signal) Monday, November 28, 2016
2. Exit 102 – 103
   - Columbiana Drive and Columbia Avenue/Gateway Academy (signal) Monday, November 28, 2016
   - Columbiana Drive and Crossbow Drive/Texas Roadhouse (signal) Wednesday, November 30, 2016
   - Columbiana Drive and Columbiana Circle (signal) Tuesday, November 29, 2016
3. Exit 103
   - Harbison Boulevard at Parkridge Drive (unsignalized) Wednesday, November 30, 2016
   - Woodcross Drive at Fernandina Road (unsignalized) Thursday, December 1, 2016
   - Harbison Boulevard at Saturn Parkway (signal) Friday, December 2, 2016
   - Harbison Boulevard at Columbiana Circle/Park Terrace Drive (signal) Monday, November 21, 2016
   - Harbison Boulevard at Columbiana Drive/Chik-Fil-A (signal) Tuesday, November 22, 2016
   - Harbison Boulevard at Rooms 2 Go/Pier One Driveways (signal) Monday, November 21, 2016
   - Harbison Boulevard at Bower Parkway (signal) Monday, November 21, 2016
   - Harbison Boulevard/Emory Lane at St. Andrews Road (signal) Monday, November 21, 2016
4. Exit 103 – 104
   - Bower Parkway at Park Terrace Drive (signal) Monday, November 21, 2016
   - Bower Parkway at Saturn Parkway (unsignalized) Tuesday, November 22, 2016
5. Exit 104
   - Piney Grove Road at Bower Parkway/Jamil Road (signal) Monday, November 21, 2016
   - Piney Grove Road at Foxfire Drive/Country Walk Apartments (unsignalized) Monday, November 21, 2016
   - Piney Grove Road at Fernandina Road (signal) Tuesday, November 22, 2016
   - Piney Grove Road at Piney Woods Road (roundabout) Tuesday, November 22, 2016
6. Exit 104 – Exit 106
   - Jamil Tram Road at Sidney Road (unsignalized) Tuesday, November 22, 2016
   - Jamil Road at Tram Road (unsignalized) Tuesday, November 22, 2016
   - Sidney Road at Tram Road (unsignalized) Tuesday, November 22, 2016
   - Fernandina Road and Beatty Road (unsignalized) Tuesday, November 22, 2016
   - Broad River Road and Beatty Road (unsignalized) Tuesday, November 22, 2016
   - Beatty Road and Evelyn Drive (unsignalized) Tuesday, November 22, 2016
   - Fernandina Road and Evelyn Drive (unsignalized) Monday, November 21, 2016
7. Exit 106
   - St. Andrews Road and Sidney Road (signal) Monday, November 28, 2016
   - St. Andrews Road and Ashland Road (signal) Monday, November 28, 2016

- St. Andrews Road and Kilbrannon Drive ((unsignalized) Monday, November 28, 2016
- St. Andrews Road and Jamil Road (signal) Monday, November 28, 2016
- Woodland Hills Road and Berry Hill Road (unsignalized) Monday, November 28, 2016
- St. Andrews Road at Kay Street/Chartwell Road (signal) Monday, November 28, 2016
- St. Andrews Road at Broad River Road (signal) Monday, November 28, 2016

8. Exit 106 – 108
    - Burning Tree Drive/Browning Road at Center Point Road (unsignalized) Tuesday, November 22, 2016
    - Browning Road at Zimalcrest Drive (unsignalized) Monday, November 28, 2016
9. Exit 108/Exit 63
    - Bush River Road at Ashland Road/Marydale Lane (signal) Tuesday, November 29, 2016
    - Bush River Road at Outlet Pointe Boulevard/E Meadow Court (signal) Monday, November 28, 2016
    - Bush River Road at Berryhill Road (signal) Wednesday, November 30, 2016
    - Bush River Road at Rockland Road (unsignalized) Tuesday, November 29, 2016
    - Bush River Road at Independence Avenue (signal) Wednesday, November 30, 2016
    - Bush River Road and Zimalcrest Drive (signal) Tuesday, November 29, 2016
    - Morninghill Drive and Burnette Drive (unsignalized) Thursday, December 1, 2016
    - Bush River Road at Arrowwood Road (signal) Tuesday, November 29, 2016
    - Bush River Road at Colonial Life Boulevard (signal) Tuesday, November 29, 2016
    - Bush River Road at Broad River Road (signal) Tuesday, November 29, 2016
10. Broad River Road (east of Exit 65)
    - Broad River Road at Arrowwood Road (signal) Tuesday, November 29, 2016
    - Broad River Road at Greystone Boulevard (signal) Tuesday, November 29, 2016
11. Exit 110
    - Sunset Boulevard at West Hospital Drive/Sunset Court (signal) Thursday, December 1, 2016
    - Sunset Boulevard at East Hospital Drive/Harbor Drive (signal) Thursday, December 1, 2016
    - Sunset Boulevard at McSwain Drive/Chris Drive (signal) Thursday, December 1, 2016
    - Sunset Boulevard at Whippoorwill Drive/Keckley Drive (signal) Thursday, December 1, 2016
12. Exit 65
    - Broad River Road at Marley Drive/Menlo Drive (signal) Thursday, December 1, 2016
    - Garner Lane at Eastbound on-ramp (unsignalized) Friday, December 2, 2016
    - Broad River Road at Longcreek Drive (signal) Thursday, December 1, 2016
    - Broad River Road at Dutch Square Boulevard (signal) Monday, November 28, 2016
    - Broad River Rd at Omarest Drive (signal) Friday, December 2, 2016

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/22/2016

Major Rt: Lake Murray Blvd * Not on State System Minor Rt: College St * Not on State System

Day of Week: Tuesday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: N-S Intersection ADT - 26120 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1

* Each Direction

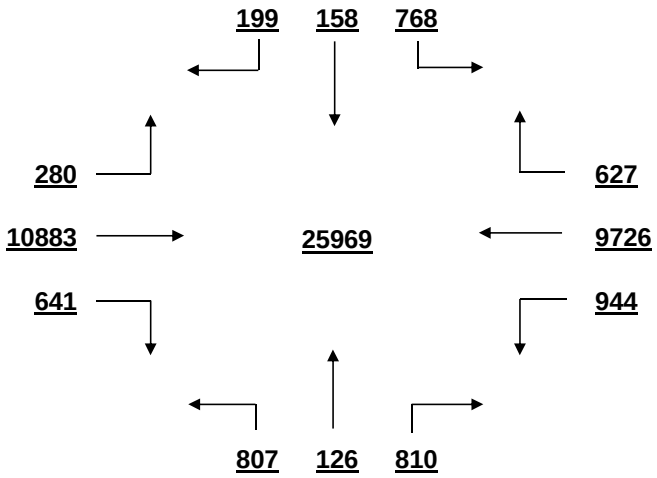
INTERSECTION VOLUME SUMMARY

	From N College St				From S College St				From E Lake Murray Blvd				From W Lake Murray Blvd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	8	0	2	10	6	0	16	22	4	151	8	163	3	245	5	253	448	0
7:15 - 7:30	18	3	3	24	13	1	25	39	7	159	11	177	7	272	4	283	523	1
7:30 - 7:45	7	2	4	13	14	0	23	37	6	181	9	196	0	270	8	278	524	0
7:45 - 8:00	21	0	2	23	11	1	13	25	17	191	17	225	4	240	11	255	528	2
8:00 - 8:15	24	1	4	29	8	1	17	26	9	164	13	186	3	224	11	238	479	2
8:15 - 8:30	16	1	3	20	9	0	12	21	11	161	12	184	3	214	6	223	448	0
8:30 - 8:45	13	2	5	20	11	0	13	24	15	176	14	205	4	222	9	235	484	0
8:45 - 9:00	16	1	3	20	17	3	15	35	29	173	4	206	9	234	16	259	520	0
9:00 - 9:15	13	1	2	16	14	1	16	31	14	181	10	205	5	233	20	258	510	0
9:15 - 9:30	11	0	9	20	12	0	21	33	8	152	8	168	3	196	6	205	426	0
9:30 - 9:45	15	1	8	24	14	4	27	45	14	157	6	177	4	200	8	212	458	0
9:45 - 10:00	14	2	3	19	15	3	25	43	12	180	11	203	4	247	16	267	532	2
10:00 - 10:15	17	4	3	24	12	4	10	26	17	169	9	195	10	200	12	222	467	0
10:15 - 10:30	15	1	6	22	12	1	17	30	13	143	4	160	8	193	15	216	428	0
10:30 - 10:45	9	2	5	16	17	3	17	37	13	205	16	234	8	270	9	287	574	0
10:45 - 11:00	12	4	4	20	16	4	14	34	23	197	18	238	6	218	15	239	531	0
11:00 - 11:15	14	1	4	19	11	2	13	26	21	152	14	187	2	176	12	190	422	0
11:15 - 11:30	14	1	6	21	17	4	19	40	9	187	10	206	4	235	15	254	521	0
11:30 - 11:45	22	3	4	29	14	5	8	27	15	159	11	185	1	172	11	184	425	0
11:45 - 12:00	16	1	4	21	15	5	18	38	29	234	13	276	1	261	19	281	616	0
12:00 - 12:15	6	5	7	18	25	1	21	47	22	256	18	296	4	266	19	289	650	0
12:15 - 12:30	24	3	5	32	19	3	19	41	22	224	10	256	2	272	18	292	621	0
12:30 - 12:45	10	1	6	17	21	3	24	48	15	244	12	271	7	261	14	282	618	0
12:45 - 13:00	13	2	2	17	17	2	18	37	23	195	11	229	7	234	14	255	538	0
13:00 - 13:15	22	3	2	27	17	3	19	39	27	195	12	234	5	230	20	255	555	0
13:15 - 13:30	12	4	3	19	16	5	9	30	18	141	13	172	12	161	18	191	412	0
13:30 - 13:45	9	7	3	19	12	4	9	25	16	201	15	232	4	238	14	256	532	0
13:45 - 14:00	15	6	2	23	24	2	15	41	23	239	19	281	4	254	11	269	614	0
14:00 - 14:15	18	4	4	26	16	2	14	32	16	245	24	285	6	233	10	249	592	0
14:15 - 14:30	20	8	2	30	22	4	23	49	9	232	13	254	8	216	20	244	577	0
14:30 - 14:45	12	2	5	19	23	5	23	51	18	160	15	193	6	162	9	177	440	0
14:45 - 15:00	23	1	7	31	25	2	26	53	11	224	16	251	13	219	16	248	583	0
15:00 - 15:15	18	4	6	28	30	7	17	54	36	253	17	306	8	241	17	266	654	0
15:15 - 15:30	17	3	2	22	21	4	15	40	17	235	23	275	13	254	19	286	623	0
15:30 - 15:45	12	2	2	16	19	2	12	33	19	233	21	273	9	232	16	257	579	0
15:45 - 16:00	15	5	2	22	18	3	19	40	23	237	21	281	6	219	17	242	585	1
16:00 - 16:15	17	5	7	29	26	1	10	37	34	239	8	281	6	238	14	258	605	0
16:15 - 16:30	18	8	6	32	24	1	14	39	22	216	18	256	4	248	15	267	594	1
16:30 - 16:45	32	6	4	42	24	0	16	40	30	240	18	288	5	272	21	298	668	0
16:45 - 17:00	15	4	6	25	18	1	14	33	27	267	15	309	13	268	22	303	670	0
17:00 - 17:15	20	10	6	36	27	6	28	61	29	248	14	291	11	265	16	292	680	0
17:15 - 17:30	12	9	1	22	20	1	9	30	30	168	5	203	0	228	11	239	494	0
17:30 - 17:45	14	8	0	22	14	4	10	28	27	100	3	130	6	153	6	165	345	0
17:45 - 18:00	21	7	8	36	23	5	24	52	38	230	15	283	4	216	21	241	612	0
18:00 - 18:15	16	1	6	23	11	6	17	34	23	240	10	273	6	199	10	215	545	0
18:15 - 18:30	21	1	2	24	14	4	14	32	25	246	13	284	5	205	8	218	558	0
18:30 - 18:45	21	5	7	33	11	3	18	32	34	281	14	329	5	199	12	216	610	0
18:45 - 19:00	20	3	2	25	12	0	14	26	24	265	16	305	12	178	5	195	551	0
TOTAL	768	158	199	1125	807	126	810	1743	944	9726	627	11297	280	10883	641	11804	25969	9
Trucks	5	0	2	7	1	0	3	4	0	50	3	53	0	60	1	61	125	0.5%
School Buses	0	0	5	5	1	0	6	7	2	14	0	16	2	16	0	18	46	0.2%

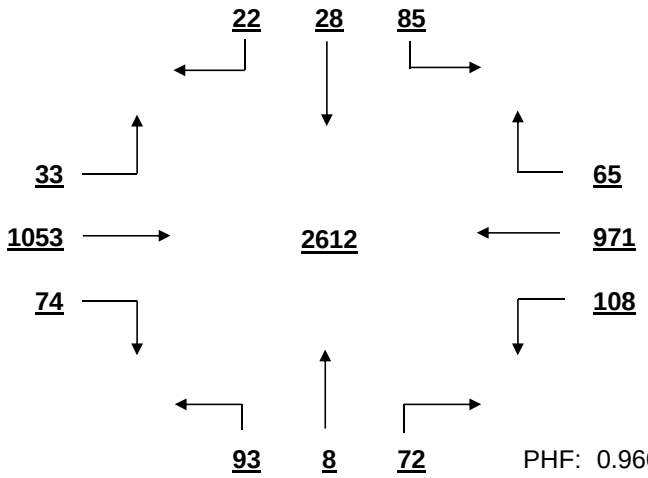
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Lake Murray Blvd AT College St Date: 11/22/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

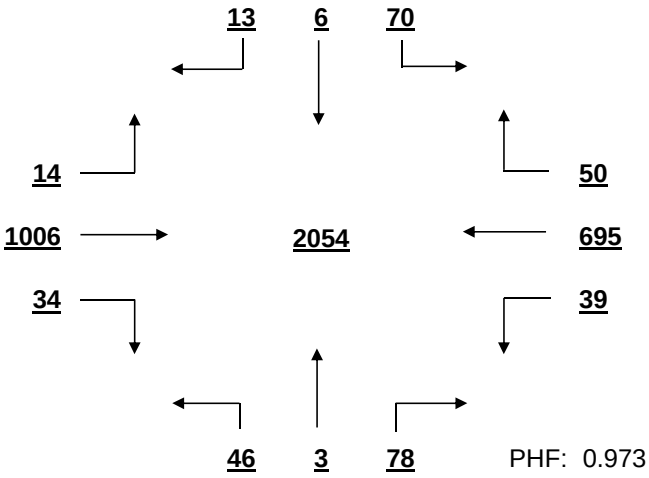


OVERALL PEAK HOUR VOLUME
FROM 16:15 TO 17:15



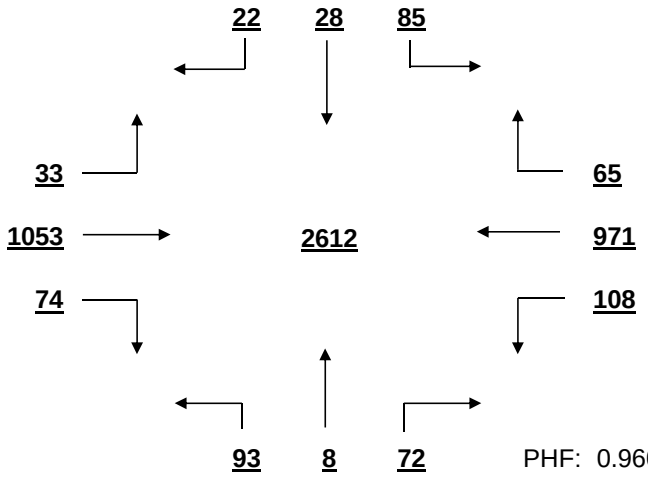
PHF: 0.960

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



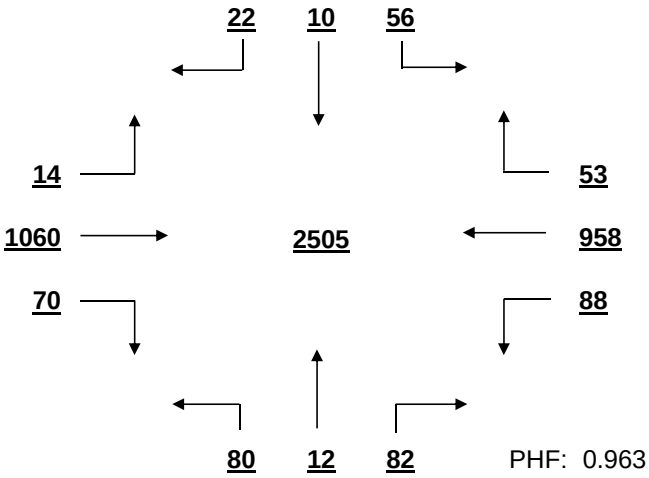
PHF: 0.973

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:15 TO 17:15



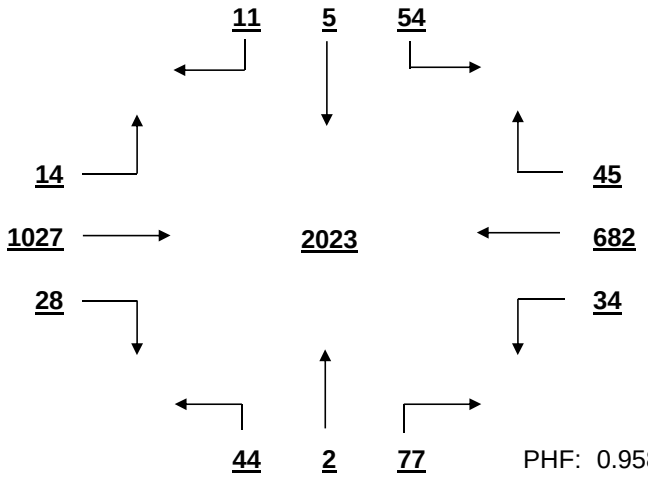
PHF: 0.960

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 11:45 TO 12:45



PHF: 0.963

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.958

SIGNAL WARRANT ANALYSIS

Lake Murray Blvd AT College St Date: 11/22/2016

Minor Street Volume, percent of total = 11.0%
Percent of Left Turns from Minor Street = 54.9%
Percent of Right Turns from Minor Street = 35.2%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1925.1	/ 600	=	321%	145.3	/ 150	=	97%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	305%	289%	283%	299%	294%	362%	315%	317%	364%	377%	307%	339%
Minor St.	82%	71%	101%	85%	87%	115%	90%	123%	111%	99%	114%	83%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1925.1	/ 900	=	214%	145.3	/ 75	=	194%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	203%	193%	188%	199%	196%	241%	210%	211%	243%	251%	205%	226%
Minor St.	164%	141%	203%	169%	175%	231%	180%	247%	223%	199%	228%	165%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	154%	133%	190%	159%	164%	216%	169%	231%	209%	186%	214%	155%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	16:15 - 17:15	Higher Volume Side Street Peak Hour:	14:15 - 15:15
Minor St.	173%	Minor St.	207%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	3	1	2	0	0	0	0	0	1	1	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/21/2016

Major Rt: Lake Murray Blvd * Not on State System Minor Rt: Columbiana Dr * Not on State System

Day of Week: Monday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: N-S Intersection ADT - 37170 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1

* Each Direction

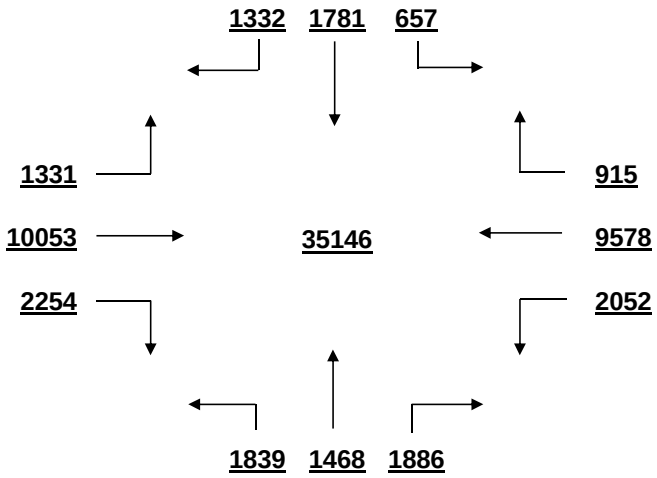
INTERSECTION VOLUME SUMMARY

	From N Columbiana Dr				From S Columbiana Dr				From E Lake Murray Blvd				From W Lake Murray Blvd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	17	15	10	42	8	11	30	49	22	163	5	190	14	233	27	274	555	0
7:15 - 7:30	20	40	18	78	22	14	35	71	41	155	9	205	23	263	37	323	677	0
7:30 - 7:45	29	54	23	106	14	10	35	59	53	176	11	240	21	210	36	267	672	0
7:45 - 8:00	19	50	25	94	12	12	22	46	33	181	11	225	24	253	17	294	659	0
8:00 - 8:15	24	46	28	98	11	8	24	43	28	179	9	216	24	218	42	284	641	0
8:15 - 8:30	15	50	29	94	20	9	31	60	52	208	16	276	26	255	35	316	746	0
8:30 - 8:45	11	27	29	67	17	12	33	62	28	177	15	220	18	194	29	241	590	0
8:45 - 9:00	20	32	25	77	14	7	18	39	25	201	12	238	27	227	31	285	639	0
9:00 - 9:15	10	43	31	84	22	20	16	58	31	181	19	231	21	226	35	282	655	0
9:15 - 9:30	10	38	17	65	18	10	36	64	36	154	16	206	18	192	35	245	580	0
9:30 - 9:45	9	32	31	72	22	16	23	61	26	194	14	234	20	221	49	290	657	0
9:45 - 10:00	6	52	25	83	15	17	24	56	42	183	15	240	24	233	42	299	678	0
10:00 - 10:15	19	32	38	89	23	25	25	73	44	182	19	245	23	182	43	248	655	0
10:15 - 10:30	15	28	22	65	23	17	28	68	23	162	10	195	25	207	55	287	615	0
10:30 - 10:45	9	34	22	65	43	28	21	92	38	186	17	241	20	224	61	305	703	2
10:45 - 11:00	15	36	28	79	33	24	23	80	30	197	16	243	20	174	48	242	644	0
11:00 - 11:15	13	34	27	74	41	26	37	104	43	205	19	267	19	225	63	307	752	0
11:15 - 11:30	5	37	15	57	38	27	17	82	61	187	22	270	19	199	64	282	691	0
11:30 - 11:45	7	19	22	48	34	15	17	66	25	131	9	165	15	141	38	194	473	0
11:45 - 12:00	10	43	35	88	39	33	36	108	52	226	20	298	26	222	68	316	810	0
12:00 - 12:15	17	46	41	104	46	38	40	124	47	224	20	291	41	205	70	316	835	0
12:15 - 12:30	14	51	43	108	43	34	47	124	49	209	25	283	33	230	67	330	845	0
12:30 - 12:45	8	35	54	97	34	32	33	99	39	168	13	220	21	194	40	255	671	0
12:45 - 13:00	17	41	23	81	56	49	55	160	40	234	29	303	26	247	77	350	894	0
13:00 - 13:15	20	36	41	97	65	50	63	178	35	210	19	264	39	204	61	304	843	0
13:15 - 13:30	17	33	32	82	49	35	58	142	31	183	17	231	29	182	44	255	710	3
13:30 - 13:45	13	27	16	56	45	26	34	105	25	170	9	204	44	120	42	206	571	0
13:45 - 14:00	12	37	30	79	50	46	43	139	24	193	14	231	29	218	48	295	744	0
14:00 - 14:15	13	13	29	55	38	28	34	100	33	192	12	237	19	172	42	233	625	0
14:15 - 14:30	10	33	29	72	54	45	38	137	54	205	24	283	33	225	58	316	808	0
14:30 - 14:45	13	31	29	73	50	45	60	155	41	254	16	311	32	215	82	329	868	0
14:45 - 15:00	10	39	25	74	48	39	55	142	52	218	17	287	24	214	60	298	801	0
15:00 - 15:15	18	29	22	69	39	33	54	126	39	108	6	153	25	174	29	228	576	1
15:15 - 15:30	13	33	21	67	55	46	48	149	38	154	15	207	28	207	37	272	695	0
15:30 - 15:45	9	33	24	66	68	46	47	161	38	178	19	235	30	203	53	286	748	0
15:45 - 16:00	11	41	30	82	57	31	53	141	47	209	31	287	34	204	44	282	792	2
16:00 - 16:15	11	39	34	84	45	42	45	132	56	245	33	334	40	219	54	313	863	0
16:15 - 16:30	9	39	39	87	59	45	42	146	50	202	26	278	23	169	33	225	736	0
16:30 - 16:45	12	45	27	84	52	46	58	156	66	296	43	405	46	239	59	344	989	0
16:45 - 17:00	10	41	35	86	48	55	50	153	66	303	41	410	40	223	46	309	958	2
17:00 - 17:15	9	33	23	65	34	33	43	110	52	252	29	333	26	251	32	309	817	0
17:15 - 17:30	13	58	28	99	44	49	68	161	66	246	27	339	44	262	48	354	953	0
17:30 - 17:45	13	53	25	91	42	35	48	125	62	247	46	355	66	267	47	380	951	0
17:45 - 18:00	18	37	32	87	53	53	72	178	71	233	24	328	52	197	40	289	882	0
18:00 - 18:15	18	34	20	72	53	36	45	134	56	227	29	312	16	179	44	239	757	0
18:15 - 18:30	16	43	26	85	57	50	42	149	57	257	26	340	26	232	68	326	900	0
18:30 - 18:45	20	34	38	92	56	35	50	141	56	206	15	277	22	191	45	258	768	0
18:45 - 19:00	10	25	16	51	30	25	30	85	29	127	6	162	16	111	29	156	454	0
TOTAL	657	1781	1332	3770	1839	1468	1886	5193	2052	9578	915	12545	1331	10053	2254	13638	35146	10
Trucks	1	3	4	8	4	3	6	13	1	55	2	58	4	49	6	59	138	0.4%
School Buses	1	7	2	10	3	4	7	14	7	11	2	20	1	16	8	25	69	0.2%

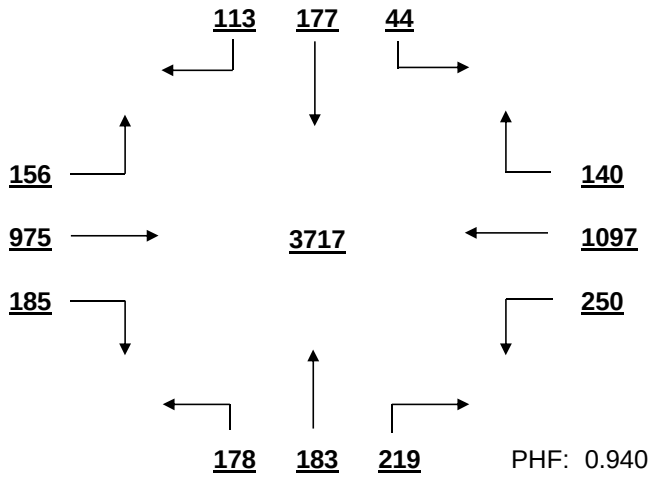
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Lake Murray Blvd AT Columbiana Dr Date: 11/21/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

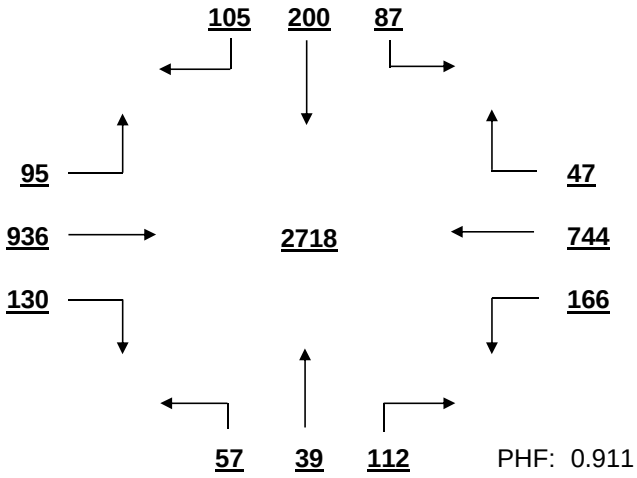


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



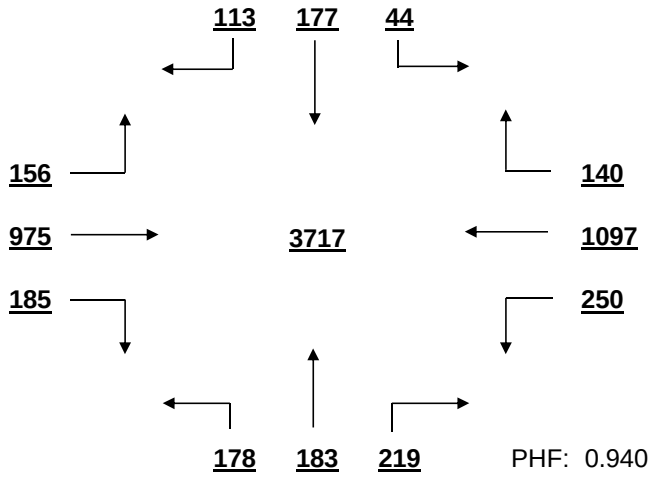
PHF: 0.940

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



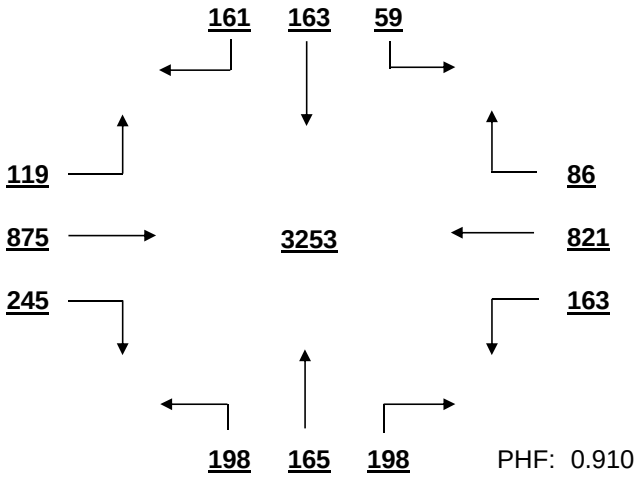
PHF: 0.911

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



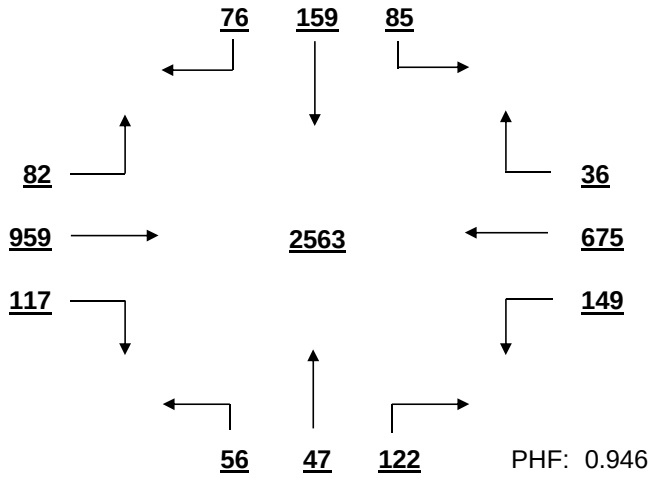
PHF: 0.940

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:15 TO 13:15



PHF: 0.910

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.946

SIGNAL WARRANT ANALYSIS

Lake Murray Blvd AT Columbiana Dr Date: 11/21/2016

Minor Street Volume, percent of total = 25.5%
Percent of Left Turns from Minor Street = 27.8%
Percent of Right Turns from Minor Street = 35.9%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
2181.9	/	600	= 364%	432.8	/	150	= 289%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	336%	346%	338%	334%	350%	391%	332%	382%	325%	436%	448%	345%
Minor St.	213%	224%	203%	209%	240%	338%	376%	356%	385%	391%	383%	339%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
2181.9	/	900	= 242%	432.8	/	75	= 577%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	224%	231%	225%	223%	233%	261%	221%	255%	217%	291%	299%	230%
Minor St.	427%	448%	405%	417%	480%	676%	752%	712%	769%	783%	765%	679%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	400%	420%	380%	391%	450%	634%	705%	668%	721%	734%	718%	636%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	16:30 - 17:30	Higher Volume Side Street Peak Hour:	17:45 - 18:45
Minor St.	580%	Minor St.	602%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	0	2	0	0	2	0	1	1	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/22/2016

Major Rt: Lake Murray Blvd * Not on State System Minor Rt: Kinley-Parkridge Dr * Not on State System

Day of Week: Tuesday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 45

Direction of Minor Street: N-S Intersection ADT - 23250 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1

* Each Direction

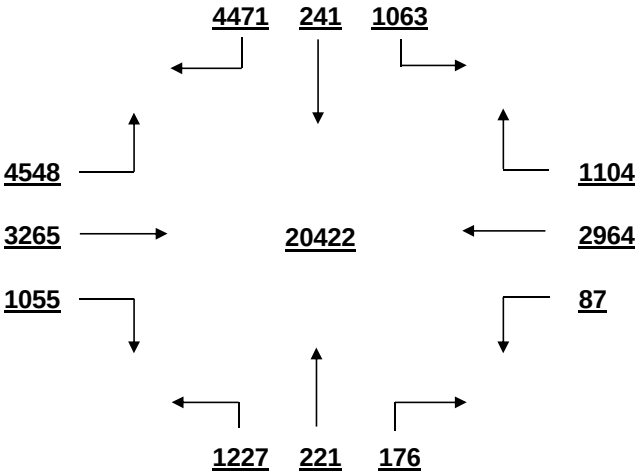
INTERSECTION VOLUME SUMMARY

	From N Kinley-Parkridge D				From S Kinley-Parkridge D				From E Lake Murray Blvd				From W Lake Murray Blvd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	10	3	151	164	5	1	1	7	1	44	8	53	55	59	21	135	359	0
7:15 - 7:30	31	9	133	173	7	0	2	9	3	48	9	60	83	87	24	194	436	0
7:30 - 7:45	49	10	135	194	5	1	1	7	5	49	6	60	96	138	48	282	543	0
7:45 - 8:00	58	8	113	179	14	3	5	22	4	40	10	54	93	150	46	289	544	0
8:00 - 8:15	62	7	93	162	6	1	5	12	0	45	9	54	57	116	54	227	455	1
8:15 - 8:30	29	13	98	140	13	0	3	16	5	44	13	62	59	85	38	182	400	0
8:30 - 8:45	22	7	84	113	14	5	5	24	3	45	8	56	85	66	38	189	382	0
8:45 - 9:00	35	5	77	117	22	1	3	26	2	51	12	65	72	65	31	168	376	1
9:00 - 9:15	29	5	88	122	21	1	1	23	3	59	9	71	72	63	18	153	369	0
9:15 - 9:30	23	2	106	131	21	6	3	30	1	50	16	67	73	49	34	156	384	0
9:30 - 9:45	13	3	88	104	17	4	2	23	1	42	14	57	79	40	37	156	340	0
9:45 - 10:00	28	7	81	116	22	6	4	32	2	47	14	63	82	52	22	156	367	0
10:00 - 10:15	15	8	97	120	23	2	8	33	2	42	17	61	55	50	26	131	345	0
10:15 - 10:30	23	13	78	114	31	4	8	43	1	48	20	69	62	40	31	133	359	0
10:30 - 10:45	13	5	54	72	18	3	2	23	1	48	9	58	50	46	20	116	269	0
10:45 - 11:00	24	10	88	122	24	7	5	36	0	48	19	67	62	60	29	151	376	0
11:00 - 11:15	20	7	104	131	31	6	9	46	0	43	19	62	76	65	17	158	397	0
11:15 - 11:30	18	5	83	106	25	2	3	30	5	54	21	80	62	61	15	138	354	0
11:30 - 11:45	23	7	74	104	38	2	3	43	2	44	22	68	75	34	11	120	335	0
11:45 - 12:00	13	3	44	60	9	2	0	11	2	26	5	33	29	25	15	69	173	0
12:00 - 12:15	27	3	104	134	30	11	4	45	0	96	28	124	94	59	14	167	470	0
12:15 - 12:30	29	11	77	117	33	10	2	45	0	53	21	74	98	67	20	185	421	1
12:30 - 12:45	10	2	51	63	2	0	1	3	0	17	7	24	56	21	6	83	173	1
12:45 - 13:00	16	4	74	94	22	2	3	27	1	40	22	63	91	61	23	175	359	0
13:00 - 13:15	23	2	96	121	23	7	2	32	1	84	34	119	96	71	33	200	472	0
13:15 - 13:30	15	4	108	127	35	11	4	50	1	66	29	96	96	59	28	183	456	0
13:30 - 13:45	16	8	89	113	21	3	4	28	3	50	22	75	98	62	34	194	410	0
13:45 - 14:00	14	1	96	111	26	1	4	31	4	61	27	92	108	58	26	192	426	0
14:00 - 14:15	28	2	83	113	27	2	3	32	0	52	28	80	109	56	19	184	409	0
14:15 - 14:30	13	5	83	101	20	2	2	24	1	44	14	59	52	47	18	117	301	0
14:30 - 14:45	15	5	93	113	26	4	4	34	5	53	23	81	109	61	29	199	427	1
14:45 - 15:00	21	12	125	158	46	6	7	59	2	66	39	107	146	54	22	222	546	0
15:00 - 15:15	21	4	111	136	43	7	1	51	7	75	22	104	125	61	30	216	507	1
15:15 - 15:30	12	3	101	116	34	6	2	42	0	81	32	113	105	68	15	188	459	0
15:30 - 15:45	18	6	85	109	51	6	9	66	1	77	25	103	118	68	22	208	486	0
15:45 - 16:00	16	9	90	115	37	6	6	49	3	78	37	118	110	65	29	204	486	0
16:00 - 16:15	23	6	106	135	42	7	9	58	2	90	38	130	118	68	19	205	528	0
16:15 - 16:30	22	2	80	104	29	8	9	46	0	91	30	121	126	76	10	212	483	1
16:30 - 16:45	27	1	95	123	63	15	7	85	0	108	50	158	127	53	11	191	557	0
16:45 - 17:00	16	4	127	147	58	11	2	71	1	128	48	177	146	53	14	213	608	0
17:00 - 17:15	22	2	108	132	48	16	6	70	1	129	62	192	151	72	6	229	623	0
17:15 - 17:30	22	0	83	105	28	9	2	39	0	107	59	166	143	73	11	227	537	0
17:30 - 17:45	31	1	118	150	42	5	3	50	0	79	21	100	132	54	6	192	492	0
17:45 - 18:00	10	0	87	97	26	0	1	27	0	73	35	108	147	78	5	230	462	0
18:00 - 18:15	13	1	88	102	18	3	2	23	1	56	24	81	122	115	4	241	447	3
18:15 - 18:30	18	1	98	117	12	2	0	14	10	48	9	67	96	121	6	223	421	0
18:30 - 18:45	17	4	89	110	14	0	2	16	0	81	45	126	152	127	11	290	542	0
18:45 - 19:00	10	1	57	68	5	4	2	11	0	64	13	77	100	86	9	195	351	0
TOTAL	1063	241	4471	5775	1227	221	176	1624	87	2964	1104	4155	4548	3265	1055	8868	20422	10
Trucks	2	1	8	11	1	1	0	2	0	9	2	11	17	14	2	33	57	0.3%
School Buses	1	0	13	14	2	1	0	3	0	6	1	7	16	7	0	23	47	0.2%

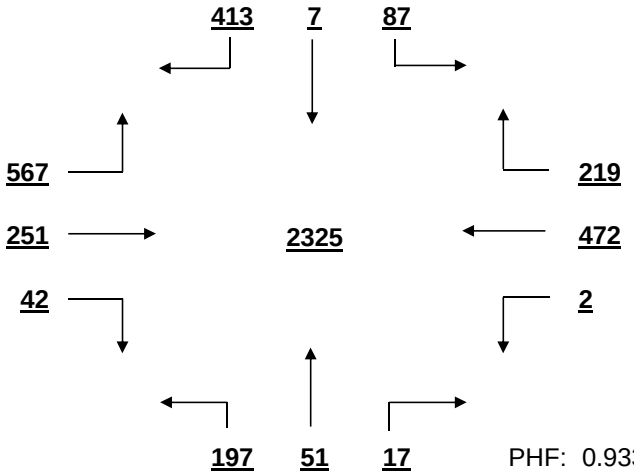
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Lake Murray Blvd AT Kinley-Parkridge Dr Date: 11/22/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

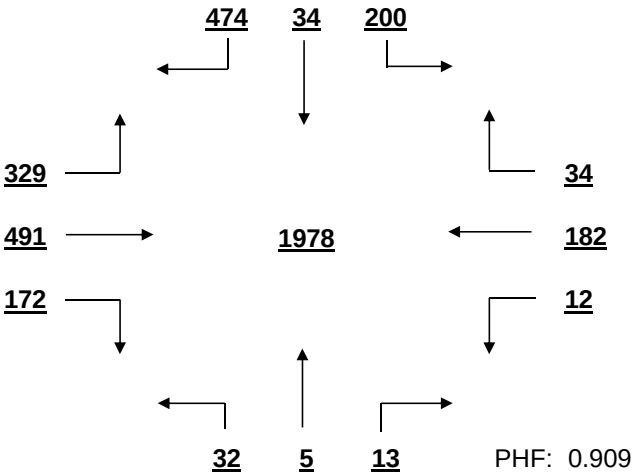


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



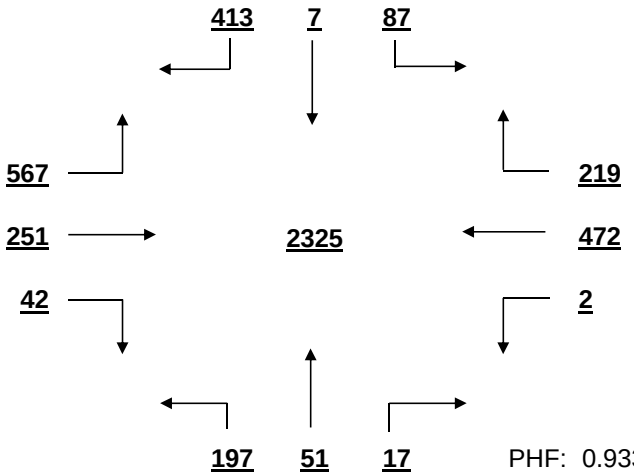
PHF: 0.933

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



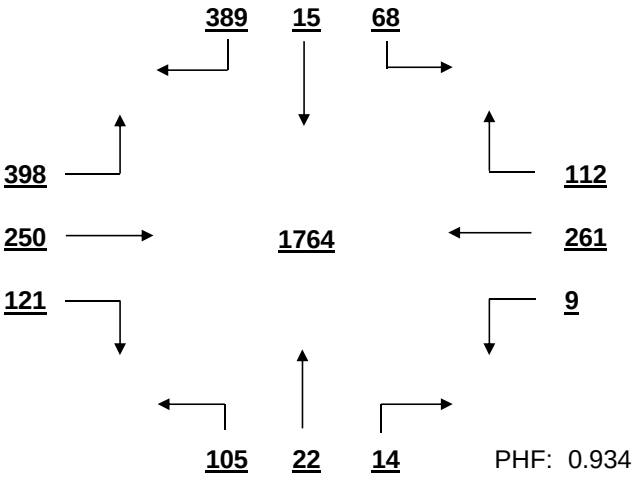
PHF: 0.909

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



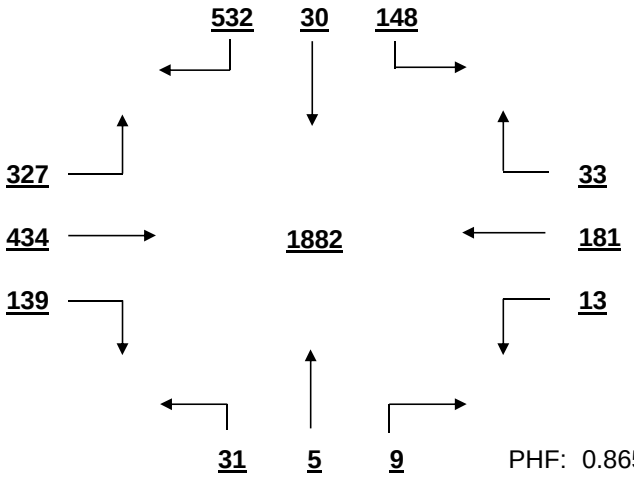
PHF: 0.933

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 13:00 TO 14:00



PHF: 0.934

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.865

SIGNAL WARRANT ANALYSIS

Lake Murray Blvd AT Kinley-Parkridge Dr Date: 11/22/2016

Minor Street Volume, percent of total = 36.2%
Percent of Left Turns from Minor Street = 31.0%
Percent of Right Turns from Minor Street = 62.8%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **70%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1085.3	/ 420	=	258%	481.3	/ 105	=	458%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	268%	239%	209%	187%	173%	213%	274%	250%	299%	335%	344%	310%
Minor St.	676%	507%	450%	408%	382%	389%	450%	462%	453%	485%	461%	378%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1085.3	/ 630	=	172%	481.3	/ 53	=	917%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	179%	159%	140%	125%	116%	142%	183%	167%	199%	223%	229%	206%
Minor St.	1352%	1013%	901%	815%	764%	777%	899%	924%	907%	970%	922%	756%

80% Combination of Conditions A & B is not applicable

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	1183%	887%	763%	538%	430%	686%	787%	808%	793%	848%	807%	662%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	16:30 - 17:30	Higher Volume Side Street Peak Hour:	7:00 - 8:00
Minor St.	676%	Minor St.	855%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street	Minimum peak hour ped. volume crossing major street
75	93

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	0	0	0	2	0	1	1	1	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/28/2016

Major Rt: Lake Murray Blvd * Not on State System Minor Rt: Parkridge Dr * Not on State System

Day of Week: Monday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 45

Direction of Minor Street: N-S Intersection ADT - 11730 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1 * Each Direction

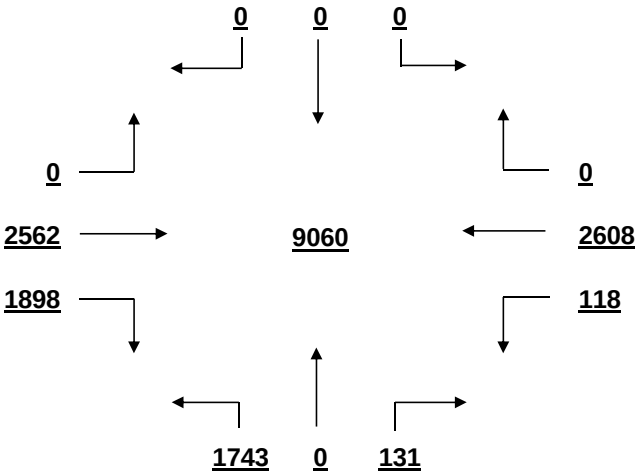
INTERSECTION VOLUME SUMMARY

	From N Parkridge Dr				From S Parkridge Dr				From E Lake Murray Blvd				From W Lake Murray Blvd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	0	0	0	0	10	0	3	13	3	47	0	50	0	43	30	73	136	0
7:15 - 7:30	0	0	0	0	5	0	4	9	2	61	0	63	0	89	56	145	217	0
7:30 - 7:45	0	0	0	0	20	0	1	21	5	46	0	51	0	115	96	211	283	0
7:45 - 8:00	0	0	0	0	18	0	1	19	4	49	0	53	0	109	119	228	300	0
8:00 - 8:15	0	0	0	0	17	0	2	19	4	53	0	57	0	92	97	189	265	0
8:15 - 8:30	0	0	0	0	16	0	2	18	5	43	0	48	0	81	51	132	198	0
8:30 - 8:45	0	0	0	0	14	0	0	14	3	35	0	38	0	64	53	117	169	2
8:45 - 9:00	0	0	0	0	22	0	2	24	2	54	0	56	0	77	50	127	207	0
9:00 - 9:15	0	0	0	0	16	0	1	17	3	36	0	39	0	58	33	91	147	1
9:15 - 9:30	0	0	0	0	19	0	0	19	1	41	0	42	0	29	31	60	121	0
9:30 - 9:45	0	0	0	0	20	0	0	20	4	31	0	35	0	32	30	62	117	0
9:45 - 10:00	0	0	0	0	24	0	2	26	0	40	0	40	0	25	37	62	128	0
10:00 - 10:15	0	0	0	0	24	0	0	24	1	39	0	40	0	41	26	67	131	0
10:15 - 10:30	0	0	0	0	21	0	2	23	3	28	0	31	0	35	37	72	126	0
10:30 - 10:45	0	0	0	0	18	0	0	18	4	17	0	21	0	15	26	41	80	0
10:45 - 11:00	0	0	0	0	36	0	3	39	3	20	0	23	0	20	32	52	114	0
11:00 - 11:15	0	0	0	0	35	0	2	37	4	39	0	43	0	29	26	55	135	0
11:15 - 11:30	0	0	0	0	26	0	1	27	3	46	0	49	0	30	41	71	147	0
11:30 - 11:45	0	0	0	0	24	0	4	28	2	49	0	51	0	31	45	76	155	0
11:45 - 12:00	0	0	0	0	32	0	4	36	4	55	0	59	0	53	44	97	192	0
12:00 - 12:15	0	0	0	0	44	0	2	46	0	53	0	53	0	44	43	87	186	0
12:15 - 12:30	0	0	0	0	45	0	1	46	1	54	0	55	0	46	53	99	200	0
12:30 - 12:45	0	0	0	0	34	0	3	37	4	49	0	53	0	54	39	93	183	0
12:45 - 13:00	0	0	0	0	26	0	0	26	3	39	0	42	0	39	44	83	151	0
13:00 - 13:15	0	0	0	0	39	0	2	41	1	55	0	56	0	46	52	98	195	0
13:15 - 13:30	0	0	0	0	35	0	4	39	3	25	0	28	0	36	26	62	129	0
13:30 - 13:45	0	0	0	0	51	0	1	52	4	32	0	36	0	36	36	72	160	0
13:45 - 14:00	0	0	0	0	45	0	6	51	0	37	0	37	0	37	32	69	157	0
14:00 - 14:15	0	0	0	0	45	0	5	50	1	42	0	43	0	32	30	62	155	0
14:15 - 14:30	0	0	0	0	46	0	5	51	2	55	0	57	0	52	38	90	198	0
14:30 - 14:45	0	0	0	0	41	0	3	44	0	35	0	35	0	40	33	73	152	0
14:45 - 15:00	0	0	0	0	45	0	3	48	2	46	0	48	0	43	33	76	172	0
15:00 - 15:15	0	0	0	0	44	0	3	47	2	51	0	53	0	53	26	79	179	0
15:15 - 15:30	0	0	0	0	39	0	2	41	6	59	0	65	0	40	38	78	184	0
15:30 - 15:45	0	0	0	0	52	0	5	57	2	60	0	62	0	40	31	71	190	0
15:45 - 16:00	0	0	0	0	58	0	2	60	3	63	0	66	0	48	29	77	203	0
16:00 - 16:15	0	0	0	0	49	0	5	54	1	66	0	67	0	62	32	94	215	0
16:15 - 16:30	0	0	0	0	58	0	3	61	3	102	0	105	0	78	37	115	281	0
16:30 - 16:45	0	0	0	0	72	0	8	80	0	90	0	90	0	69	32	101	271	0
16:45 - 17:00	0	0	0	0	34	0	3	37	1	91	0	92	0	59	28	87	216	0
17:00 - 17:15	0	0	0	0	60	0	5	65	1	137	0	138	0	76	27	103	306	0
17:15 - 17:30	0	0	0	0	79	0	8	87	4	138	0	142	0	75	32	107	336	0
17:30 - 17:45	0	0	0	0	55	0	4	59	2	101	0	103	0	90	28	118	280	0
17:45 - 18:00	0	0	0	0	55	0	5	60	3	94	0	97	0	62	32	94	251	0
18:00 - 18:15	0	0	0	0	52	0	2	54	3	65	0	68	0	69	28	97	219	0
18:15 - 18:30	0	0	0	0	45	0	2	47	3	53	0	56	0	66	21	87	190	0
18:30 - 18:45	0	0	0	0	36	0	2	38	2	43	0	45	0	45	31	76	159	0
18:45 - 19:00	0	0	0	0	42	0	3	45	1	44	0	45	0	57	27	84	174	0
TOTAL	0	0	0	0	1743	0	131	1874	118	2608	0	2726	0	2562	1898	4460	9060	3
Trucks	0	0	0	0	3	0	0	3	0	9	0	9	0	9	2	11	23	0.3%
School Buses	0	0	0	0	1	0	0	1	0	8	0	8	0	13	0	13	22	0.2%

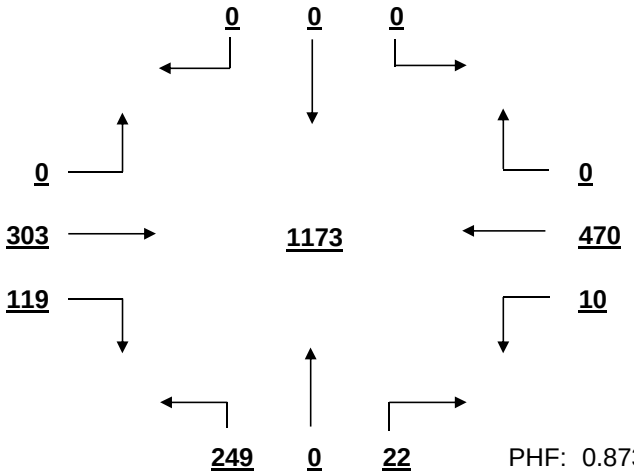
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Lake Murray Blvd AT Parkridge Dr Date: 11/28/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

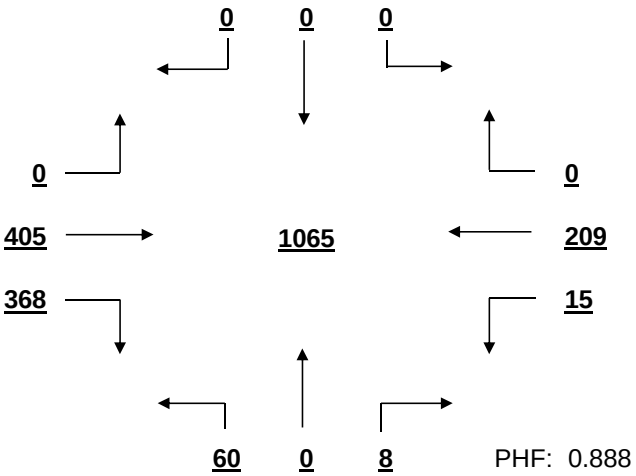


OVERALL PEAK HOUR VOLUME
FROM 17:00 TO 18:00



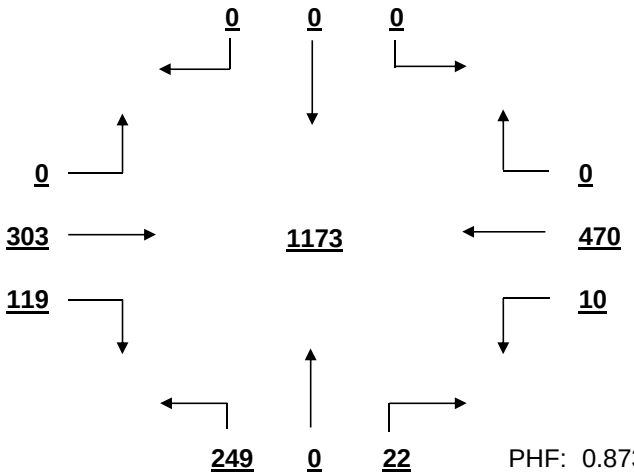
PHF: 0.873

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



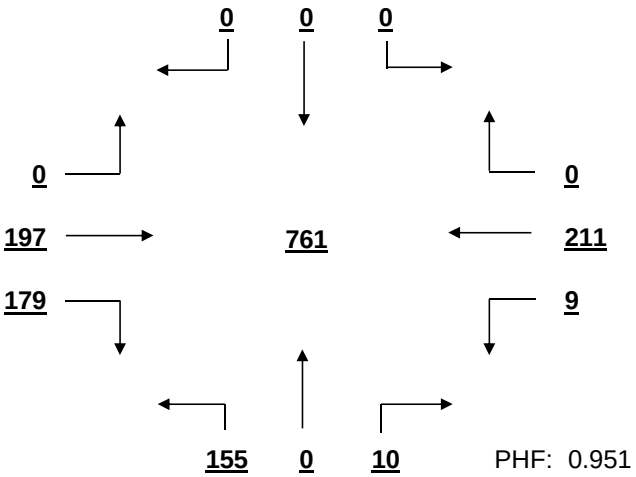
PHF: 0.888

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:00 TO 18:00



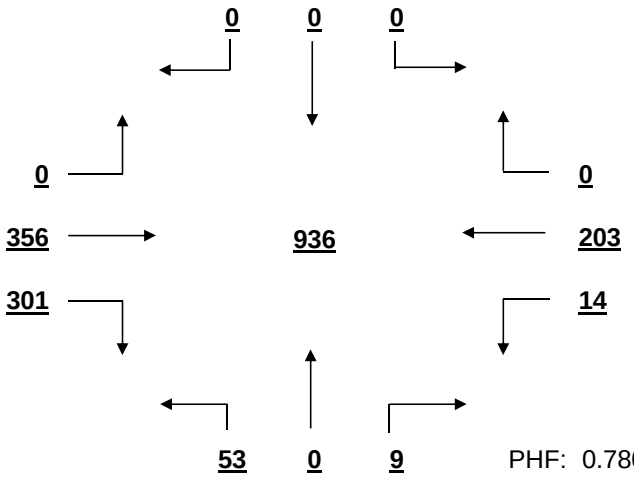
PHF: 0.873

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 11:45 TO 12:45



PHF: 0.951

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.780

SIGNAL WARRANT ANALYSIS

Lake Murray Blvd AT Parkridge Dr Date: 11/28/2016

Minor Street Volume, percent of total = 20.7%
Percent of Left Turns from Minor Street = 93.0%
Percent of Right Turns from Minor Street = 7.0%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **70%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant	Average Minor Street % of Warrant
598.8 / 420 = 143%	156.2 / 105 = 149%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	208%	182%	103%	83%	119%	135%	109%	115%	131%	179%	215%	133%
Minor St.	59%	71%	78%	99%	122%	148%	174%	184%	195%	221%	258%	175%

Condition B - Interruption to Continuous Traffic is not met

Average Major Street % of Warrant	Average Minor Street % of Warrant
598.8 / 630 = 95%	156.2 / 53 = 297%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	139%	121%	68%	55%	80%	90%	73%	77%	87%	119%	143%	89%
Minor St.	118%	143%	156%	198%	244%	295%	349%	368%	390%	442%	516%	350%

80% Combination of Conditions A & B is not applicable

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	99%	89%	41%	44%	76%	108%	98%	110%	138%	265%	463%	126%

Warrant No. 3 - Peak Hour is met

Percent of warrant		Percent of warrant	
Overall Peak Hour: 17:00 - 18:00		Higher Volume Side Street Peak Hour: 17:00 - 18:00	
Minor St.	206%	Minor St.	206%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street	Minimum peak hour ped. volume crossing major street
75	93

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	2	1	0	0	0	0	0	0	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/28/2016

Major Rt: Columbiana Dr * Not on State System Minor Rt: Columbia Ave-Gateway Academy * Not on State System

Day of Week: Monday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 30

Direction of Minor Street: N-S Intersection ADT - 12900 (Calc)

Number of Lanes (major st)* 1 Number of Lanes (minor st)* 1

* Each Direction

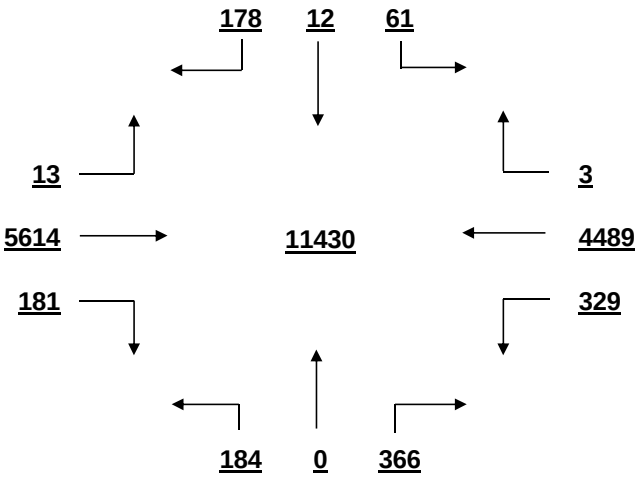
INTERSECTION VOLUME SUMMARY

	From N Columbia Ave-Gatew				From S Columbia Ave-Gatew				From E Columbiana Dr				From W Columbiana Dr				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	1	0	6	7	4	0	5	9	3	40	0	43	0	63	0	63	122	0
7:15 - 7:30	4	0	9	13	3	0	4	7	1	67	0	68	3	111	1	115	203	0
7:30 - 7:45	4	0	10	14	5	0	7	12	2	58	0	60	1	169	4	174	260	0
7:45 - 8:00	5	0	8	13	3	0	4	7	2	27	0	29	1	85	0	86	135	0
8:00 - 8:15	5	0	5	10	5	0	9	14	3	40	0	43	1	91	3	95	162	0
8:15 - 8:30	5	2	6	13	6	0	6	12	4	35	0	39	1	80	2	83	147	0
8:30 - 8:45	3	0	6	9	8	0	3	11	5	32	0	37	0	72	3	75	132	0
8:45 - 9:00	0	0	2	2	5	0	10	15	7	27	1	35	0	86	3	89	141	1
9:00 - 9:15	0	0	1	1	3	0	3	6	2	24	0	26	0	53	1	54	87	0
9:15 - 9:30	1	0	2	3	1	0	9	10	3	48	0	51	1	80	3	84	148	0
9:30 - 9:45	0	0	1	1	2	0	3	5	1	36	0	37	0	113	0	113	156	0
9:45 - 10:00	0	0	2	2	1	0	4	5	4	44	0	48	0	95	7	102	157	0
10:00 - 10:15	1	0	2	3	1	0	8	9	3	41	1	45	0	99	1	100	157	0
10:15 - 10:30	0	0	0	0	3	0	3	6	3	60	0	63	0	108	0	108	177	0
10:30 - 10:45	1	0	0	1	4	0	5	9	6	45	0	51	0	93	2	95	156	0
10:45 - 11:00	2	0	0	2	5	0	5	10	7	69	0	76	0	127	3	130	218	0
11:00 - 11:15	0	0	0	0	6	0	9	15	8	106	0	114	0	116	5	121	250	0
11:15 - 11:30	0	0	0	0	6	0	13	19	10	86	0	96	1	126	3	130	245	0
11:30 - 11:45	1	0	3	4	7	0	16	23	6	101	0	107	0	137	1	138	272	0
11:45 - 12:00	2	0	2	4	4	0	18	22	6	109	0	115	0	120	3	123	264	0
12:00 - 12:15	0	0	0	0	4	0	13	17	7	108	0	115	0	178	4	182	314	0
12:15 - 12:30	1	0	1	2	4	0	15	19	9	116	0	125	0	145	6	151	297	0
12:30 - 12:45	1	0	1	2	9	0	12	21	9	117	0	126	0	145	4	149	298	0
12:45 - 13:00	1	0	0	1	3	0	6	9	20	151	0	171	0	131	4	135	316	0
13:00 - 13:15	0	0	1	1	2	0	7	9	1	93	0	94	0	105	1	106	210	0
13:15 - 13:30	0	0	1	1	3	0	9	12	7	109	0	116	0	89	2	91	220	0
13:30 - 13:45	0	0	1	1	3	0	5	8	6	121	0	127	0	118	2	120	256	0
13:45 - 14:00	1	0	0	1	2	0	7	9	11	137	0	148	0	126	9	135	293	0
14:00 - 14:15	0	0	1	1	2	0	7	9	13	134	0	147	0	111	5	116	273	0
14:15 - 14:30	0	0	0	0	5	0	7	12	10	115	0	125	0	133	5	138	275	0
14:30 - 14:45	0	0	1	1	2	0	9	11	8	134	1	143	1	108	6	115	270	0
14:45 - 15:00	1	0	2	3	6	0	7	13	8	113	0	121	0	117	4	121	258	0
15:00 - 15:15	0	0	2	2	4	0	2	6	4	124	0	128	1	90	2	93	229	0
15:15 - 15:30	0	2	1	3	5	0	5	10	20	115	0	135	0	100	4	104	252	0
15:30 - 15:45	1	0	3	4	3	0	8	11	9	103	0	112	0	97	5	102	229	0
15:45 - 16:00	0	0	0	0	3	0	8	11	2	93	0	95	0	109	4	113	219	0
16:00 - 16:15	3	0	6	9	1	0	6	7	7	114	0	121	0	137	3	140	277	0
16:15 - 16:30	2	0	3	5	5	0	8	13	5	143	0	148	0	160	10	170	336	0
16:30 - 16:45	1	1	11	13	3	0	9	12	5	143	0	148	2	112	15	129	302	0
16:45 - 17:00	2	0	7	9	3	0	13	16	9	130	0	139	0	139	3	142	306	0
17:00 - 17:15	3	1	19	23	5	0	16	21	7	134	0	141	0	149	8	157	342	0
17:15 - 17:30	2	2	4	8	6	0	9	15	9	114	0	123	0	142	5	147	293	0
17:30 - 17:45	1	2	10	13	6	0	17	23	13	123	0	136	0	136	4	140	312	0
17:45 - 18:00	2	0	14	16	2	0	5	7	11	117	0	128	0	155	6	161	312	0
18:00 - 18:15	2	1	11	14	5	0	5	10	9	141	0	150	0	143	5	148	322	0
18:15 - 18:30	1	1	9	11	6	0	5	11	11	133	0	144	0	173	5	178	344	0
18:30 - 18:45	1	0	4	5	0	0	2	2	6	138	0	144	0	157	2	159	310	0
18:45 - 19:00	0	0	0	0	0	0	0	0	7	81	0	88	0	85	3	88	176	0
TOTAL	61	12	178	251	184	0	366	550	329	4489	3	4821	13	5614	181	5808	11430	1
Trucks	0	0	0	0	0	0	2	2	0	16	0	16	0	9	1	10	28	0.2%
School Buses	0	0	0	0	1	0	1	2	2	9	0	11	0	15	0	15	28	0.2%

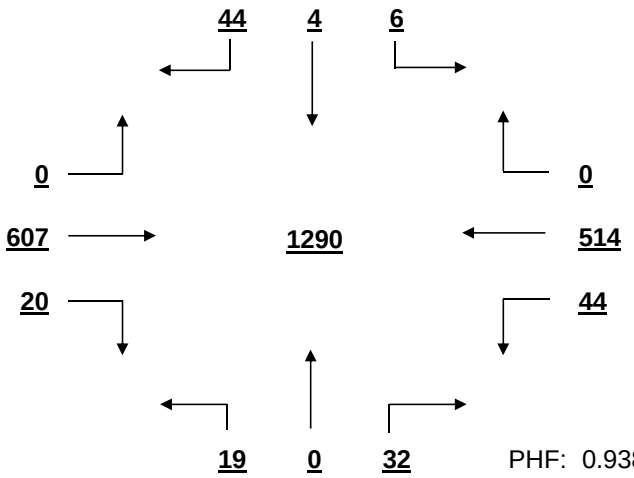
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Columbiana Dr AT Columbia Ave-Gateway Academy Date: 11/28/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

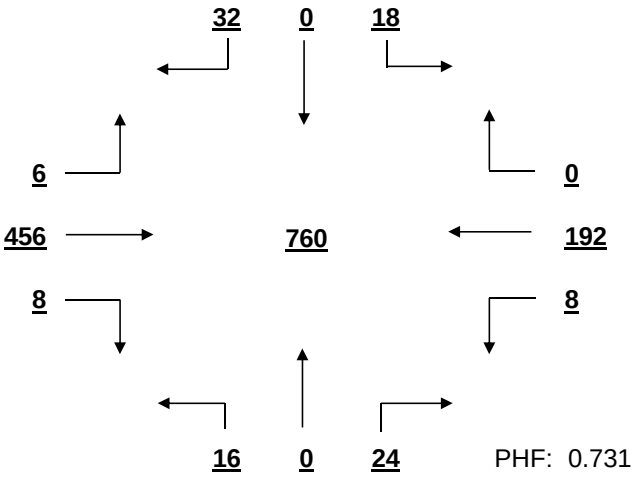


OVERALL PEAK HOUR VOLUME
FROM 17:30 TO 18:30



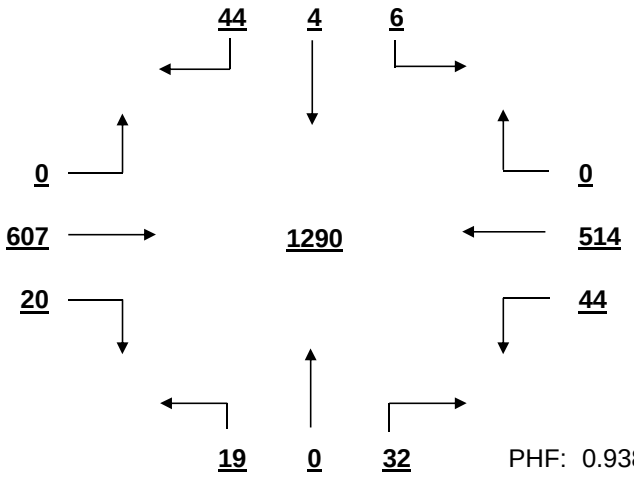
PHF: 0.938

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



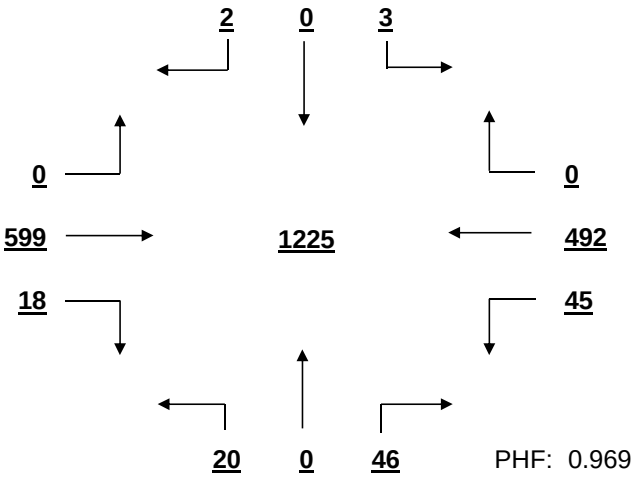
PHF: 0.731

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:30 TO 18:30



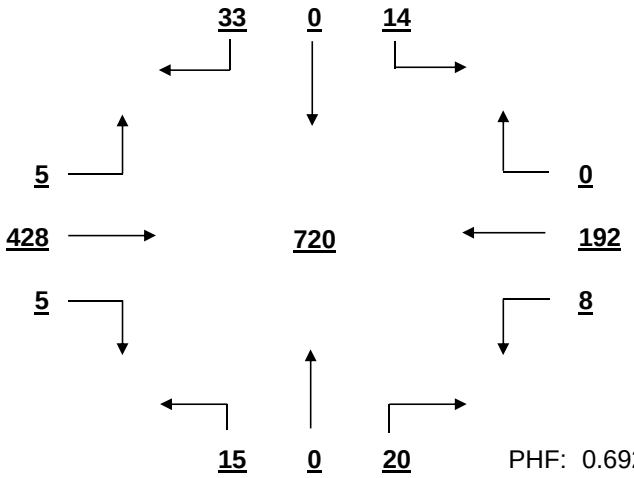
PHF: 0.938

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:00 TO 13:00



PHF: 0.969

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.692

SIGNAL WARRANT ANALYSIS

Columbiana Dr AT Columbia Ave-Gateway Academy Date: 11/28/2016

Minor Street Volume, percent of total = 7.0%
Percent of Left Turns from Minor Street = 30.6%
Percent of Right Turns from Minor Street = 67.9%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is not met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant	Average Minor Street % of Warrant
885.8 / 500 = 177%	45.8 / 150 = 31%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	128%	99%	103%	134%	189%	231%	187%	205%	176%	227%	227%	220%
Minor St.	31%	35%	17%	23%	53%	44%	25%	30%	25%	32%	44%	20%

Condition B - Interruption to Continuous Traffic is not met

Average Major Street % of Warrant	Average Minor Street % of Warrant
885.8 / 750 = 118%	45.8 / 75 = 61%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	85%	66%	69%	89%	126%	154%	125%	137%	118%	152%	151%	147%
Minor St.	63%	69%	35%	45%	105%	88%	51%	60%	51%	64%	88%	40%

80% Combination of Conditions A & B is not met

Warrant No. 2 - Four Hour Vehicular Volume is not met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	23%	20%	10%	18%	71%	83%	34%	48%	30%	64%	87%	37%

Warrant No. 3 - Peak Hour is not met

Percent of warrant		Percent of warrant	
Overall Peak Hour:	17:30 - 18:30	Higher Volume Side Street Peak Hour:	11:15 - 12:15
Minor St.	36%	Minor St.	40%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street	Minimum peak hour ped. volume crossing major street
107	133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	1	0	0	0	0	0	0	0	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/30/2016

Major Rt: Columbiana Dr * Not on State System Minor Rt: Crossbow Dr-Texas Roadhouse * Not on State System

Day of Week: Wednesday Weather: Rain Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 30

Direction of Minor Street: N-S Intersection ADT - 15540 (Calc)

Number of Lanes (major st)* 1 Number of Lanes (minor st)* 1

* Each Direction

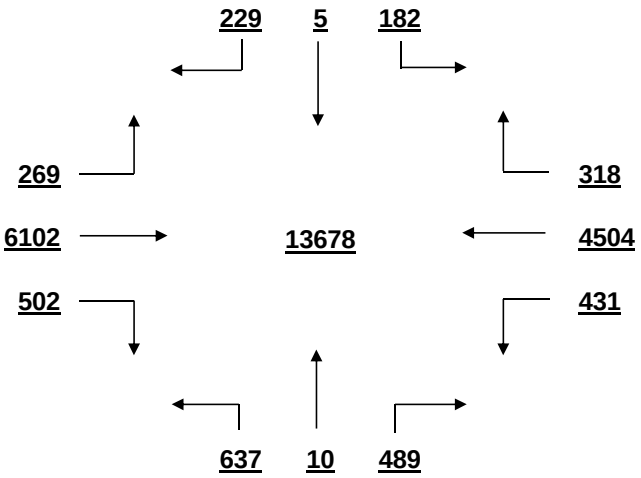
INTERSECTION VOLUME SUMMARY

	From N Crossbow Dr-Texas				From S Crossbow Dr-Texas				From E Columbiana Dr				From W Columbiana Dr				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	0	0	0	0	18	0	10	28	15	28	0	43	0	50	40	90	161	0
7:15 - 7:30	0	0	0	0	25	0	27	52	26	26	1	53	0	59	43	102	207	0
7:30 - 7:45	0	0	0	0	29	0	26	55	38	34	0	72	0	108	63	171	298	0
7:45 - 8:00	0	0	0	0	26	0	28	54	21	30	0	51	1	141	34	176	281	0
8:00 - 8:15	0	0	0	0	10	0	17	27	0	32	1	33	1	154	8	163	223	0
8:15 - 8:30	0	0	0	0	12	0	13	25	4	38	1	43	1	179	5	185	253	0
8:30 - 8:45	0	0	0	0	7	0	8	15	4	37	0	41	1	159	9	169	225	0
8:45 - 9:00	0	0	0	0	9	0	8	17	3	17	0	20	0	77	4	81	118	0
9:00 - 9:15	0	0	0	0	5	0	6	11	1	17	0	18	0	65	3	68	97	0
9:15 - 9:30	1	0	0	1	5	0	3	8	2	12	2	16	2	53	2	57	82	0
9:30 - 9:45	0	0	1	1	6	0	4	10	2	37	1	40	0	97	2	99	150	0
9:45 - 10:00	0	0	0	0	4	0	10	14	0	43	4	47	2	121	6	129	190	0
10:00 - 10:15	2	0	1	3	16	1	4	21	4	36	2	42	5	122	3	130	196	0
10:15 - 10:30	2	0	0	2	11	0	10	21	3	47	3	53	0	114	11	125	201	0
10:30 - 10:45	2	0	1	3	15	0	3	18	1	61	7	69	1	131	2	134	224	0
10:45 - 11:00	2	0	1	3	5	1	6	12	5	66	3	74	3	124	5	132	221	0
11:00 - 11:15	1	0	1	2	6	0	9	15	6	67	12	85	2	131	3	136	238	1
11:15 - 11:30	2	0	2	4	7	0	0	7	3	89	12	104	8	134	6	148	263	0
11:30 - 11:45	3	0	6	9	9	0	5	14	3	89	7	99	6	136	4	146	268	0
11:45 - 12:00	2	0	4	6	8	0	7	15	7	102	6	115	17	138	11	166	302	0
12:00 - 12:15	6	0	5	11	8	0	12	20	5	113	5	123	4	179	7	190	344	0
12:15 - 12:30	6	0	12	18	11	0	4	15	3	118	15	136	8	180	4	192	361	0
12:30 - 12:45	5	0	10	15	7	0	8	15	5	114	8	127	10	183	4	197	354	1
12:45 - 13:00	2	0	6	8	10	0	10	20	3	119	7	129	6	157	5	168	325	0
13:00 - 13:15	6	0	8	14	10	0	4	14	11	120	8	139	4	155	3	162	329	1
13:15 - 13:30	8	0	4	12	4	0	1	5	6	118	6	130	4	107	4	115	262	1
13:30 - 13:45	5	0	7	12	11	0	5	16	2	154	8	164	9	124	7	140	332	1
13:45 - 14:00	4	0	2	6	5	0	8	13	7	106	7	120	9	77	2	88	227	0
14:00 - 14:15	5	0	5	10	4	0	8	12	19	124	4	147	5	106	12	123	292	1
14:15 - 14:30	6	0	2	8	18	0	13	31	19	163	7	189	6	130	15	151	379	0
14:30 - 14:45	6	0	10	16	11	0	7	18	7	133	6	146	3	119	15	137	317	1
14:45 - 15:00	3	0	7	10	40	0	11	51	12	127	9	148	5	107	18	130	339	0
15:00 - 15:15	8	0	2	10	34	1	18	53	5	127	10	142	1	129	13	143	348	1
15:15 - 15:30	5	1	11	17	23	0	10	33	13	115	6	134	8	103	6	117	301	0
15:30 - 15:45	7	0	4	11	10	0	8	18	9	123	6	138	6	127	6	139	306	0
15:45 - 16:00	3	0	6	9	21	0	7	28	11	112	5	128	5	138	10	153	318	0
16:00 - 16:15	6	0	6	12	23	1	10	34	12	128	10	150	10	118	14	142	338	1
16:15 - 16:30	6	0	8	14	23	0	22	45	8	126	13	147	6	120	10	136	342	0
16:30 - 16:45	7	0	10	17	11	0	16	27	8	130	14	152	9	151	12	172	368	5
16:45 - 17:00	7	1	9	17	18	0	15	33	11	152	13	176	5	166	9	180	406	0
17:00 - 17:15	3	0	7	10	10	0	9	19	9	135	7	151	10	144	6	160	340	1
17:15 - 17:30	4	0	6	10	16	1	12	29	10	147	15	172	15	152	13	180	391	0
17:30 - 17:45	6	0	10	16	16	0	17	33	25	132	7	164	14	150	11	175	388	0
17:45 - 18:00	7	0	10	17	20	0	14	34	21	142	10	173	14	171	16	201	425	0
18:00 - 18:15	12	0	16	28	16	0	10	26	10	115	10	135	12	144	5	161	350	0
18:15 - 18:30	7	1	6	14	7	1	6	14	18	120	11	149	16	128	6	150	327	0
18:30 - 18:45	5	0	13	18	7	4	11	22	9	144	17	170	7	141	2	150	360	0
18:45 - 19:00	10	2	10	22	10	0	9	19	5	139	12	156	8	103	3	114	311	0
TOTAL	182	5	229	416	637	10	489	1136	431	4504	318	5253	269	6102	502	6873	13678	15
Trucks	0	0	0	0	1	0	1	2	1	5	2	8	1	10	0	11	21	0.2%
School Buses	0	0	0	0	13	0	2	15	2	7	0	9	0	10	6	16	40	0.3%

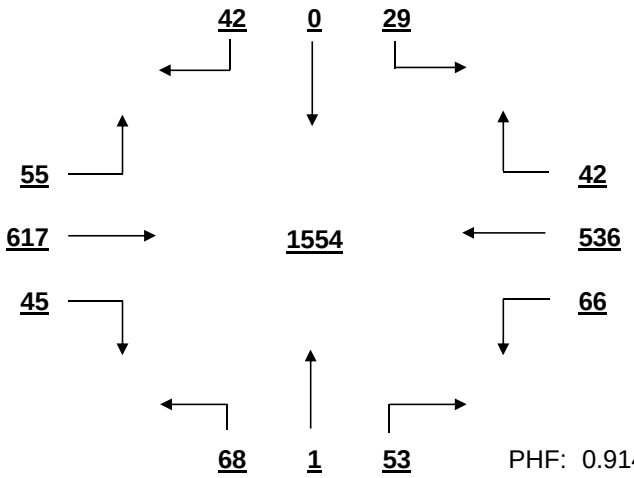
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Columbiana Dr AT Crossbow Dr-Texas Roadhouse Date: 11/30/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

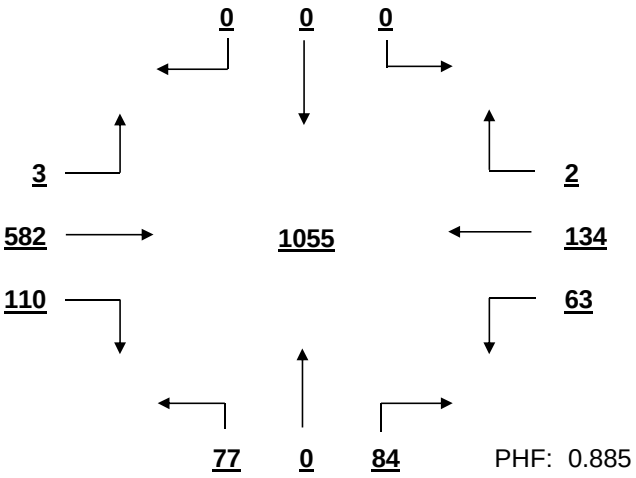


OVERALL PEAK HOUR VOLUME
FROM 17:15 TO 18:15



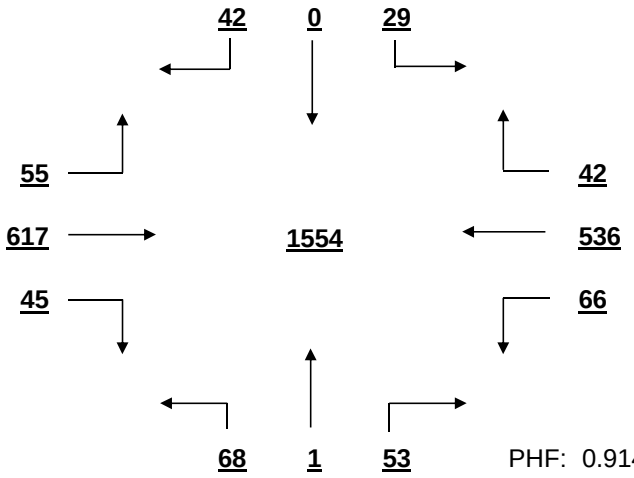
PHF: 0.914

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



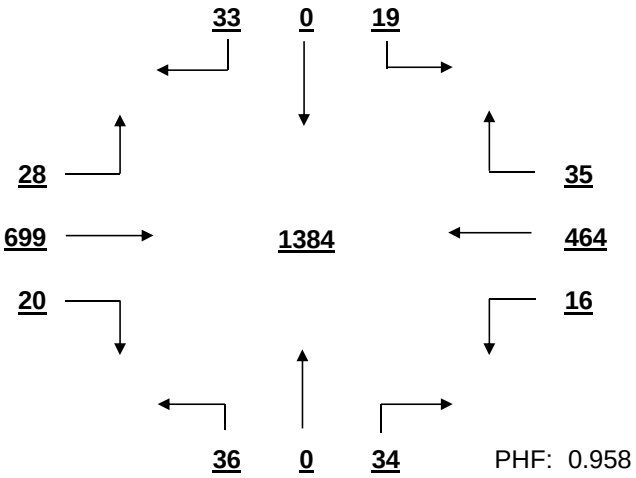
PHF: 0.885

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:15 TO 18:15



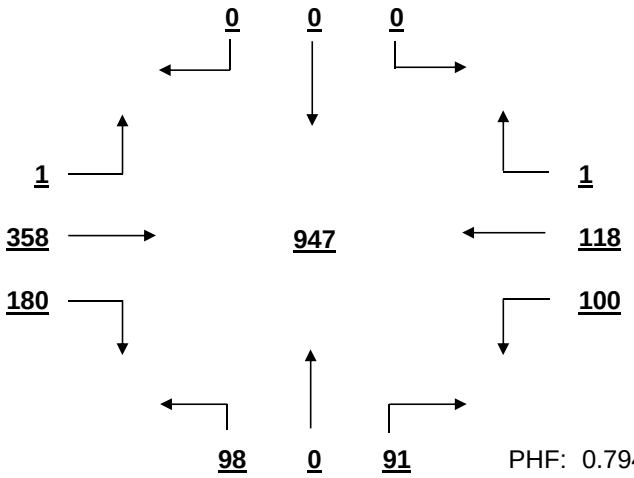
PHF: 0.914

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:00 TO 13:00



PHF: 0.958

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.794

SIGNAL WARRANT ANALYSIS

Columbiana Dr AT Crossbow Dr-Texas Roadhouse Date: 11/30/2016

Minor Street Volume, percent of total = 11.3%
Percent of Left Turns from Minor Street = 52.8%
Percent of Right Turns from Minor Street = 46.3%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is not met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1010.5	/	500	= 202%	94.7	/	150	= 63%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	152%	147%	95%	152%	200%	252%	212%	234%	219%	251%	275%	237%
Minor St.	126%	56%	29%	48%	34%	47%	32%	75%	88%	93%	77%	55%

Condition B - Interruption to Continuous Traffic is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1010.5	/	750	= 135%	94.7	/	75	= 126%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	101%	98%	63%	101%	133%	168%	141%	156%	146%	167%	183%	158%
Minor St.	252%	112%	57%	96%	68%	93%	64%	149%	176%	185%	153%	109%

80% Combination of Conditions A & B is not met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	117%	50%	16%	45%	52%	88%	55%	140%	162%	174%	144%	103%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	17:15 - 18:15	Higher Volume Side Street Peak Hour:	7:00 - 8:00
Minor St.	105%	Minor St.	64%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	0	0	1	1	3	2	0	6	1	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/29/2016

Major Rt: Columbiana Dr * Not on State System Minor Rt: Columbiana Cir-Lanneau Ct * Not on State System

Day of Week: Tuesday Weather: Rain Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 30

Direction of Minor Street: E-W Intersection ADT - 13720 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1 * Each Direction

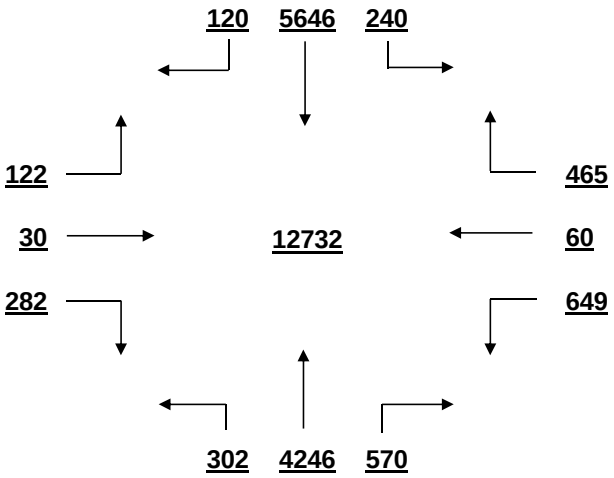
INTERSECTION VOLUME SUMMARY

	From N Columbiana Dr				From S Columbiana Dr				From E Columbiana Cir-Lan				From W Columbiana Cir-Lan				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	2	62	0	64	1	27	0	28	0	0	0	0	0	0	3	3	95	0
7:15 - 7:30	1	168	1	170	3	53	2	58	1	0	2	3	0	0	8	8	239	0
7:30 - 7:45	4	235	0	239	2	66	2	70	1	0	3	4	0	0	4	4	317	0
7:45 - 8:00	8	239	0	247	3	42	4	49	1	0	1	2	1	1	3	5	303	0
8:00 - 8:15	9	186	2	197	3	42	3	48	0	0	5	5	1	1	3	5	255	0
8:15 - 8:30	2	166	3	171	8	43	1	52	0	0	5	5	0	0	10	10	238	1
8:30 - 8:45	5	149	1	155	3	48	0	51	0	0	5	5	1	0	5	6	217	2
8:45 - 9:00	6	98	2	106	5	54	3	62	1	0	4	5	1	0	5	6	179	0
9:00 - 9:15	2	57	0	59	2	29	4	35	0	0	4	4	0	0	3	3	101	0
9:15 - 9:30	2	89	2	93	1	27	7	35	2	1	1	4	1	1	2	4	136	0
9:30 - 9:45	4	105	1	110	1	56	4	61	3	0	4	7	1	0	0	1	179	0
9:45 - 10:00	5	99	1	105	5	52	12	69	3	1	5	9	1	1	3	5	188	0
10:00 - 10:15	3	100	3	106	2	50	10	62	3	0	5	8	1	1	3	5	181	0
10:15 - 10:30	6	103	4	113	3	56	12	71	9	0	11	20	1	0	1	2	206	1
10:30 - 10:45	6	96	3	105	5	72	11	88	12	0	8	20	0	2	9	11	224	0
10:45 - 11:00	6	92	0	98	5	70	19	94	15	0	8	23	1	0	4	5	220	0
11:00 - 11:15	4	103	2	109	7	0	25	32	16	0	8	24	1	0	3	4	169	0
11:15 - 11:30	8	106	4	118	5	104	16	125	9	2	13	24	2	1	9	12	279	0
11:30 - 11:45	2	116	4	122	2	95	20	117	20	3	10	33	1	0	9	10	282	0
11:45 - 12:00	6	144	2	152	6	120	14	140	15	1	8	24	0	3	9	12	328	0
12:00 - 12:15	2	131	2	135	10	99	17	126	32	4	13	49	3	1	2	6	316	0
12:15 - 12:30	5	108	2	115	13	113	17	143	31	1	11	43	2	2	5	9	310	0
12:30 - 12:45	4	139	1	144	10	93	21	124	17	1	14	32	0	0	4	4	304	0
12:45 - 13:00	9	143	4	156	10	122	17	149	27	2	12	41	2	2	9	13	359	0
13:00 - 13:15	4	145	3	152	7	95	22	124	34	3	17	54	6	0	7	13	343	1
13:15 - 13:30	8	124	2	134	5	103	24	132	23	1	19	43	5	0	14	19	328	0
13:30 - 13:45	3	133	1	137	9	105	19	133	33	2	24	59	6	0	7	13	342	0
13:45 - 14:00	4	142	1	147	10	140	23	173	15	1	9	25	3	0	7	10	355	1
14:00 - 14:15	5	92	1	98	11	81	15	107	22	2	12	36	4	0	5	9	250	0
14:15 - 14:30	7	102	2	111	6	110	18	134	21	2	15	38	4	2	9	15	298	0
14:30 - 14:45	5	128	6	139	4	106	13	123	14	3	11	28	4	1	7	12	302	0
14:45 - 15:00	8	131	4	143	6	100	14	120	17	0	13	30	1	2	8	11	304	0
15:00 - 15:15	5	78	2	85	9	72	11	92	16	2	9	27	2	0	9	11	215	0
15:15 - 15:30	4	118	3	125	14	108	7	129	21	2	13	36	5	1	15	21	311	0
15:30 - 15:45	4	121	2	127	11	86	16	113	15	2	15	32	6	0	6	12	284	0
15:45 - 16:00	7	99	3	109	8	96	17	121	17	1	13	31	3	1	2	6	267	0
16:00 - 16:15	8	112	8	128	8	120	11	139	23	0	14	37	5	0	6	11	315	0
16:15 - 16:30	6	121	6	133	12	117	12	141	18	0	10	28	5	1	5	11	313	1
16:30 - 16:45	5	116	2	123	6	120	15	141	18	2	21	41	6	0	6	12	317	0
16:45 - 17:00	6	86	1	93	3	112	16	131	10	0	13	23	1	1	8	10	257	1
17:00 - 17:15	6	100	3	109	11	117	9	137	16	0	7	23	3	1	3	7	276	0
17:15 - 17:30	1	103	3	107	16	138	16	170	17	2	14	33	4	0	11	15	325	0
17:30 - 17:45	2	50	2	54	5	84	7	96	9	1	3	13	1	0	4	5	168	0
17:45 - 18:00	7	114	4	125	7	155	11	173	9	2	16	27	6	0	2	8	333	0
18:00 - 18:15	5	111	2	118	7	153	10	170	15	3	4	22	5	0	5	10	320	0
18:15 - 18:30	8	102	9	119	3	159	7	169	19	4	16	39	7	0	8	15	342	0
18:30 - 18:45	5	95	3	103	7	129	11	147	20	6	10	36	6	2	6	14	300	0
18:45 - 19:00	6	89	3	98	2	107	5	114	9	3	7	19	3	2	6	11	242	0
TOTAL	240	5646	120	6006	302	4246	570	5118	649	60	465	1174	122	30	282	434	12732	8
Trucks	0	18	1	19	1	13	4	18	1	0	3	4	0	0	2	2	43	0.3%
School Buses	0	21	0	21	1	11	1	13	1	0	0	1	0	0	0	0	35	0.3%

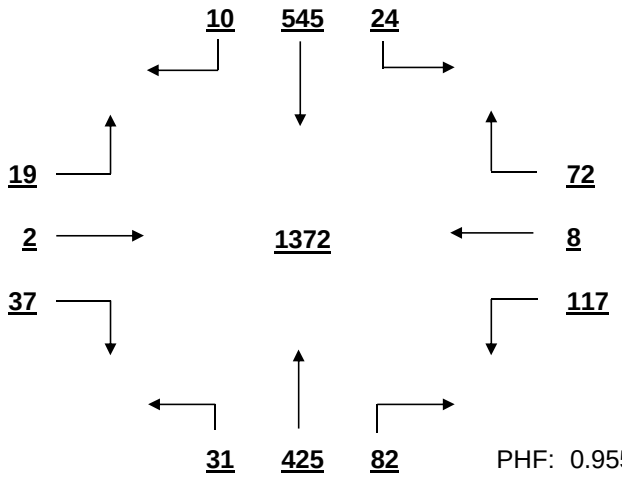
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Columbiana Dr AT Columbiana Cir-Lanneau Ct Date: 11/29/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

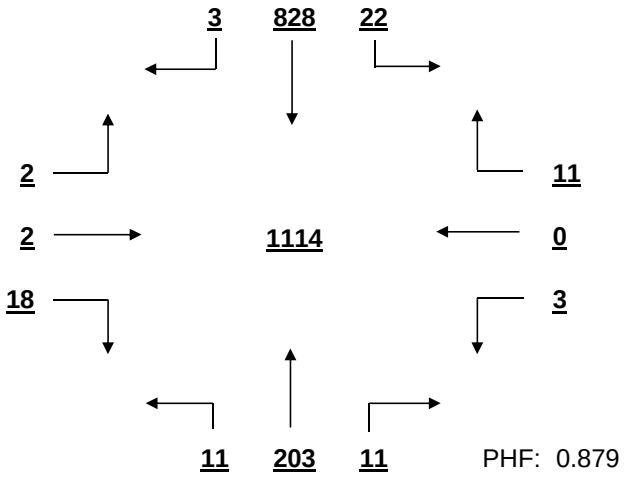


OVERALL PEAK HOUR VOLUME
FROM 12:45 TO 13:45



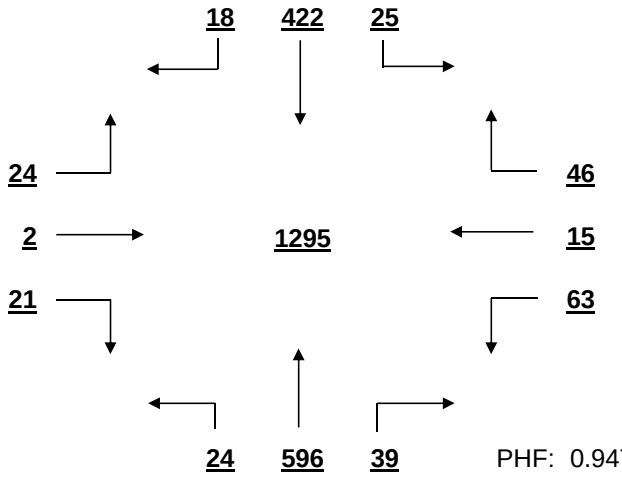
PHF: 0.955

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



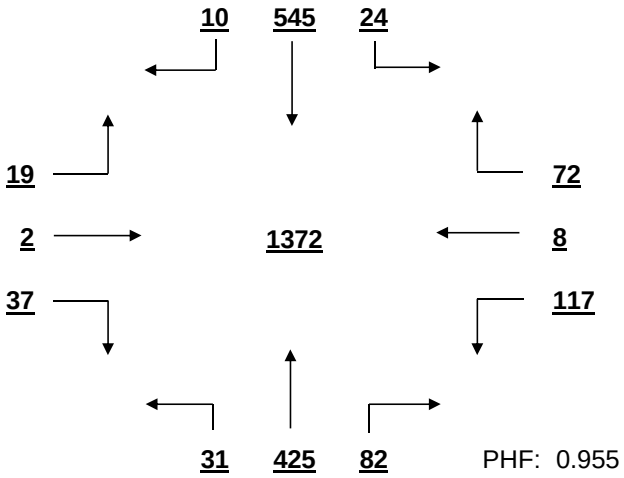
PHF: 0.879

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:45 TO 18:45



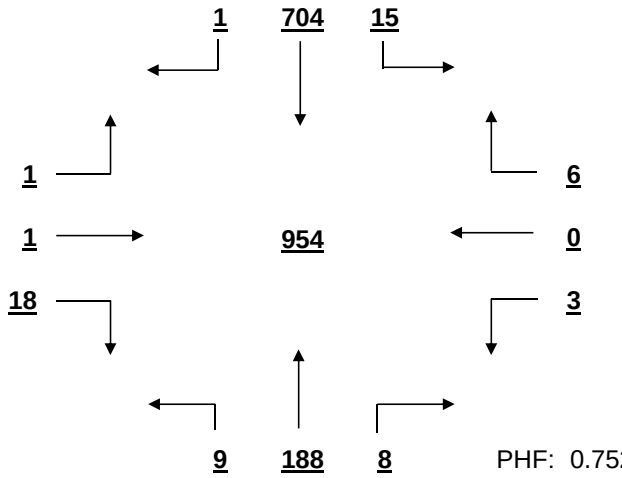
PHF: 0.947

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:45 TO 13:45



PHF: 0.955

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.752

SIGNAL WARRANT ANALYSIS

Columbiana Dr AT Columbiana Cir-Lanneau Ct Date: 11/29/2016

Minor Street Volume, percent of total = 12.6%
Percent of Left Turns from Minor Street = 47.9%
Percent of Right Turns from Minor Street = 46.5%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
927.0	/ 600	=	155%	97.8	/ 150	=	65%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	154%	140%	95%	123%	153%	182%	189%	163%	150%	172%	162%	173%
Minor St.	13%	18%	16%	47%	70%	110%	121%	88%	84%	86%	64%	77%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
927.0	/ 900	=	103%	97.8	/ 75	=	130%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	103%	94%	63%	82%	102%	121%	126%	108%	100%	114%	108%	115%
Minor St.	27%	36%	32%	95%	140%	220%	241%	176%	168%	172%	128%	155%

80% Combination of Conditions A & B is not met

Warrant No. 2 - Four Hour Vehicular Volume is not met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	12%	14%	8%	31%	63%	135%	158%	88%	74%	95%	64%	87%

Warrant No. 3 - Peak Hour is not met

Percent of warrant			Percent of warrant	
Overall Peak Hour: 12:45 - 13:45		Higher Volume Side Street Peak Hour: 12:45 - 13:45		
Minor St.	81%		Minor St.	81%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	3	0	1	0	0	1	0	0	2	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/30/2016

Major Rt: Harbison Blvd * Not on State System Minor Rt: Parkridge Dr * Not on State System

Day of Week: Wednesday Weather: Rain Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: N-S Intersection ADT - 13190 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1

* Each Direction

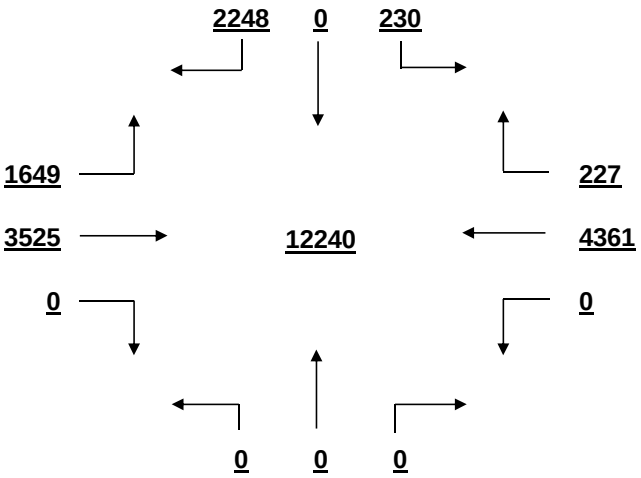
INTERSECTION VOLUME SUMMARY

	From N Parkridge Dr				From S Parkridge Dr				From E Harbison Blvd				From W Harbison Blvd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	3	0	22	25	0	0	0	0	0	92	3	95	11	27	0	38	158	0
7:15 - 7:30	4	0	58	62	0	0	0	0	0	94	6	100	26	48	0	74	236	1
7:30 - 7:45	4	0	124	128	0	0	0	0	0	105	4	109	12	39	0	51	288	0
7:45 - 8:00	3	0	155	158	0	0	0	0	0	91	9	100	25	55	0	80	338	2
8:00 - 8:15	10	0	130	140	0	0	0	0	0	79	5	84	28	45	0	73	297	0
8:15 - 8:30	4	0	124	128	0	0	0	0	0	81	4	85	25	49	0	74	287	2
8:30 - 8:45	4	0	101	105	0	0	0	0	0	96	8	104	17	51	0	68	277	0
8:45 - 9:00	6	0	77	83	0	0	0	0	0	103	3	106	20	47	0	67	256	0
9:00 - 9:15	4	0	43	47	0	0	0	0	0	67	3	70	11	35	0	46	163	1
9:15 - 9:30	2	0	21	23	0	0	0	0	0	53	1	54	21	37	0	58	135	0
9:30 - 9:45	2	0	23	25	0	0	0	0	0	92	4	96	32	46	0	78	199	0
9:45 - 10:00	2	0	25	27	0	0	0	0	0	74	1	75	12	50	0	62	164	0
10:00 - 10:15	7	0	40	47	0	0	0	0	0	75	2	77	30	63	0	93	217	0
10:15 - 10:30	5	0	28	33	0	0	0	0	0	95	5	100	24	55	0	79	212	2
10:30 - 10:45	3	0	29	32	0	0	0	0	0	76	2	78	29	59	0	88	198	0
10:45 - 11:00	3	0	33	36	0	0	0	0	0	81	4	85	28	63	0	91	212	0
11:00 - 11:15	2	0	18	20	0	0	0	0	0	79	2	81	22	53	0	75	176	1
11:15 - 11:30	2	0	25	27	0	0	0	0	0	88	2	90	25	61	0	86	203	0
11:30 - 11:45	4	0	35	39	0	0	0	0	0	93	1	94	32	65	0	97	230	0
11:45 - 12:00	4	0	55	59	0	0	0	0	0	96	3	99	48	82	0	130	288	0
12:00 - 12:15	6	0	66	72	0	0	0	0	0	100	1	101	26	69	0	95	268	0
12:15 - 12:30	5	0	43	48	0	0	0	0	0	90	6	96	34	91	0	125	269	0
12:30 - 12:45	9	0	34	43	0	0	0	0	0	73	4	77	40	88	0	128	248	2
12:45 - 13:00	9	0	48	57	0	0	0	0	0	98	4	102	39	90	0	129	288	0
13:00 - 13:15	6	0	45	51	0	0	0	0	0	108	7	115	32	95	0	127	293	2
13:15 - 13:30	5	0	38	43	0	0	0	0	0	80	6	86	28	86	0	114	243	0
13:30 - 13:45	5	0	18	23	0	0	0	0	0	78	4	82	23	76	0	99	204	0
13:45 - 14:00	4	0	35	39	0	0	0	0	0	85	5	90	32	79	0	111	240	0
14:00 - 14:15	4	0	36	40	0	0	0	0	0	83	5	88	30	102	0	132	260	0
14:15 - 14:30	3	0	34	37	0	0	0	0	0	54	3	57	36	77	0	113	207	0
14:30 - 14:45	5	0	31	36	0	0	0	0	0	85	4	89	32	83	0	115	240	0
14:45 - 15:00	6	0	34	40	0	0	0	0	0	99	5	104	32	73	0	105	249	0
15:00 - 15:15	6	0	42	48	0	0	0	0	0	84	4	88	35	90	0	125	261	0
15:15 - 15:30	10	0	37	47	0	0	0	0	0	84	3	87	40	70	0	110	244	0
15:30 - 15:45	3	0	36	39	0	0	0	0	0	92	7	99	33	79	0	112	250	0
15:45 - 16:00	7	0	30	37	0	0	0	0	0	101	3	104	41	83	0	124	265	0
16:00 - 16:15	7	0	31	38	0	0	0	0	0	100	7	107	53	98	0	151	296	0
16:15 - 16:30	3	0	37	40	0	0	0	0	0	112	5	117	42	93	0	135	292	1
16:30 - 16:45	9	0	51	60	0	0	0	0	0	121	3	124	58	86	0	144	328	0
16:45 - 17:00	6	0	40	46	0	0	0	0	0	119	6	125	64	91	0	155	326	1
17:00 - 17:15	3	0	42	45	0	0	0	0	0	128	6	134	58	95	0	153	332	1
17:15 - 17:30	2	0	36	38	0	0	0	0	0	114	11	125	60	79	0	139	302	0
17:30 - 17:45	6	0	49	55	0	0	0	0	0	111	7	118	52	117	0	169	342	1
17:45 - 18:00	4	0	33	37	0	0	0	0	0	117	8	125	74	107	0	181	343	0
18:00 - 18:15	7	0	49	56	0	0	0	0	0	90	10	100	37	91	0	128	284	0
18:15 - 18:30	2	0	40	42	0	0	0	0	0	94	7	101	48	107	0	155	298	0
18:30 - 18:45	9	0	34	43	0	0	0	0	0	76	5	81	46	103	0	149	273	0
18:45 - 19:00	1	0	33	34	0	0	0	0	0	75	9	84	46	97	0	143	261	0
TOTAL	230	0	2248	2478	0	0	0	0	0	4361	227	4588	1649	3525	0	5174	12240	17
Trucks	0	0	5	5	0	0	0	0	0	6	0	6	5	12	0	17	28	0.2%
School Buses	1	0	2	3	0	0	0	0	0	27	1	28	0	35	0	35	66	0.5%

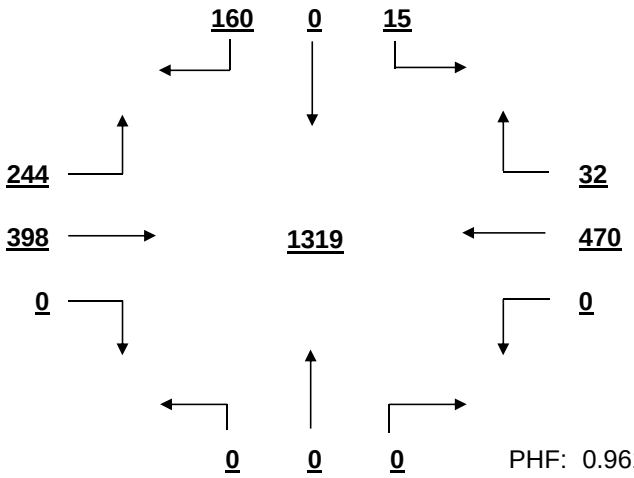
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Harbison Blvd AT Parkridge Dr Date: 11/30/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

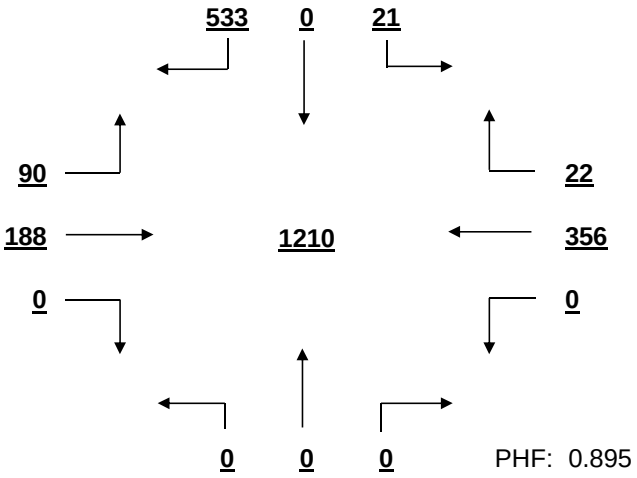


OVERALL PEAK HOUR VOLUME
FROM 17:00 TO 18:00



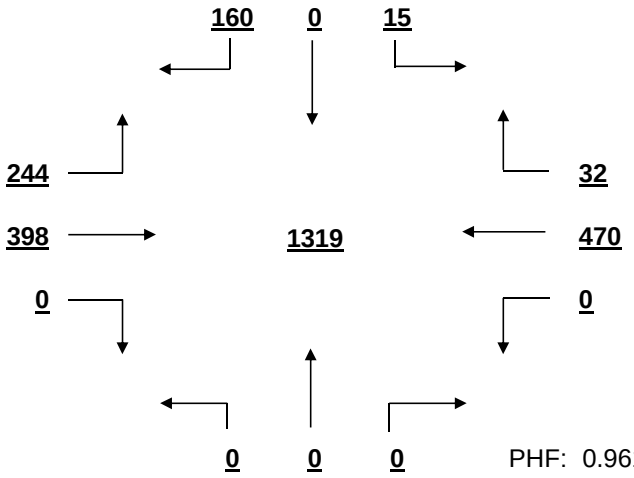
PHF: 0.961

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



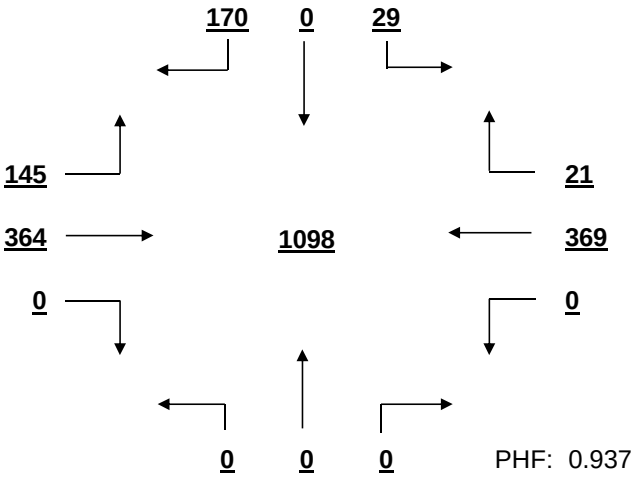
PHF: 0.895

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:00 TO 18:00



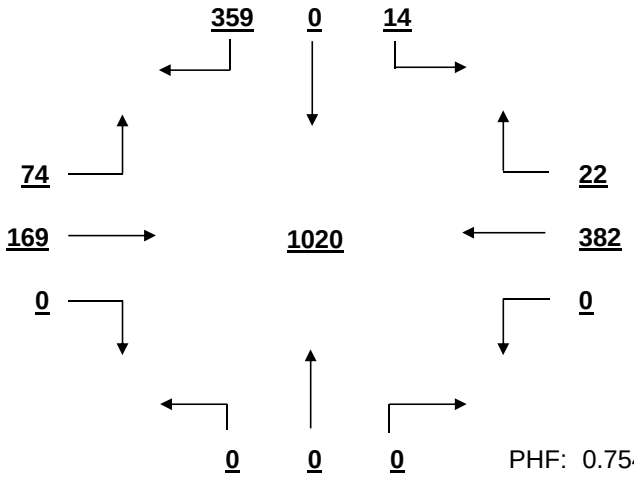
PHF: 0.961

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:15 TO 13:15



PHF: 0.937

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.754

SIGNAL WARRANT ANALYSIS

Harbison Blvd AT Parkridge Dr Date: 11/30/2016

Minor Street Volume, percent of total = 20.2%
Percent of Left Turns from Minor Street = 9.3%
Percent of Right Turns from Minor Street = 90.7%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant	Average Minor Street % of Warrant
813.5 / 600 = 136%	206.5 / 150 = 138%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	108%	110%	90%	115%	125%	142%	137%	134%	142%	176%	191%	157%
Minor St.	249%	304%	81%	99%	97%	147%	104%	102%	114%	123%	117%	117%

Condition B - Interruption to Continuous Traffic is not met

Average Major Street % of Warrant	Average Minor Street % of Warrant
813.5 / 900 = 90%	206.5 / 75 = 275%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	72%	73%	60%	77%	84%	95%	92%	89%	94%	118%	127%	105%
Minor St.	497%	608%	163%	197%	193%	293%	208%	204%	228%	245%	233%	233%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	141%	176%	39%	60%	65%	118%	80%	75%	91%	142%	155%	110%

Warrant No. 3 - Peak Hour is met

Percent of warrant		Percent of warrant	
Overall Peak Hour:	17:00 - 18:00	Higher Volume Side Street Peak Hour:	7:30 - 8:30
Minor St.	75%	Minor St.	127%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street	Minimum peak hour ped. volume crossing major street
107	133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	1	1	0	2	1	2	2	0	0	1	2	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 12/1/2016

Major Rt: Woodcross Dr * Not on State System Minor Rt: Fernandina Rd-Wendy's/Hotel * Not on State System

Day of Week: Thursday Weather: Clear Office: Short Counts JMS

Type of Control: Stop Sign Speed Limit (major st) 35

Direction of Minor Street: E-W Intersection ADT - 8900 (Calc)

Number of Lanes (major st)* 1 Number of Lanes (minor st)* 1 * Each Direction

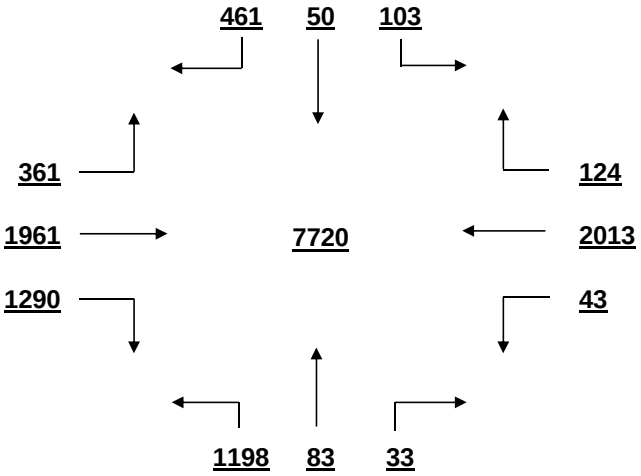
INTERSECTION VOLUME SUMMARY

	From N Woodcross Dr				From S Woodcross Dr				From E Fernandina Rd-Wend				From W Fernandina Rd-Wend				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	0	0	12	12	1	0	0	1	0	31	0	31	2	10	19	31	75	0
7:15 - 7:30	0	0	7	7	2	0	0	2	2	35	1	38	1	17	48	66	113	0
7:30 - 7:45	0	0	7	7	3	0	0	3	4	35	0	39	1	30	95	126	175	0
7:45 - 8:00	1	1	6	8	8	1	1	10	0	22	0	22	1	34	94	129	169	0
8:00 - 8:15	0	2	11	13	4	0	0	4	0	34	1	35	1	34	108	143	195	0
8:15 - 8:30	0	0	3	3	8	0	0	8	0	22	0	22	3	32	82	117	150	0
8:30 - 8:45	0	0	3	3	15	0	0	15	0	32	0	32	1	37	48	86	136	1
8:45 - 9:00	0	0	2	2	12	0	0	12	1	36	0	37	4	31	33	68	119	0
9:00 - 9:15	0	1	5	6	14	0	0	14	1	39	4	44	2	32	11	45	109	0
9:15 - 9:30	4	1	3	8	17	0	0	17	1	42	0	43	3	44	17	64	132	0
9:30 - 9:45	0	0	2	2	8	1	0	9	0	32	0	32	1	38	18	57	100	0
9:45 - 10:00	0	0	3	3	15	1	1	17	1	46	0	47	2	31	16	49	116	0
10:00 - 10:15	2	0	3	5	11	0	0	11	2	35	0	37	2	31	15	48	101	0
10:15 - 10:30	0	0	4	4	16	0	0	16	0	45	0	45	3	29	9	41	106	0
10:30 - 10:45	0	0	1	1	11	2	0	13	0	35	0	35	1	38	11	50	99	0
10:45 - 11:00	1	0	2	3	19	1	0	20	1	48	1	50	4	43	25	72	145	0
11:00 - 11:15	2	0	5	7	16	0	0	16	0	29	2	31	8	52	19	79	133	0
11:15 - 11:30	1	1	9	11	22	1	1	24	0	48	2	50	8	48	12	68	153	0
11:30 - 11:45	2	1	9	12	18	1	1	20	0	56	7	63	8	36	19	63	158	0
11:45 - 12:00	3	0	12	15	22	1	1	24	0	50	4	54	6	63	22	91	184	0
12:00 - 12:15	2	3	9	14	26	5	0	31	0	55	7	62	8	48	32	88	195	0
12:15 - 12:30	4	2	21	27	30	2	1	33	0	37	2	39	24	52	30	106	205	2
12:30 - 12:45	5	5	18	28	32	3	0	35	0	44	8	52	16	45	27	88	203	1
12:45 - 13:00	8	3	13	24	39	4	0	43	1	37	4	42	13	42	23	78	187	0
13:00 - 13:15	6	4	16	26	27	2	0	29	0	51	13	64	16	52	28	96	215	0
13:15 - 13:30	3	2	17	22	24	5	2	31	0	48	6	54	4	53	31	88	195	0
13:30 - 13:45	1	2	16	19	29	5	1	35	0	40	3	43	8	37	20	65	162	0
13:45 - 14:00	2	6	6	14	18	3	0	21	3	46	3	52	8	37	10	55	142	0
14:00 - 14:15	2	4	12	18	30	1	1	32	1	47	3	51	6	46	11	63	164	0
14:15 - 14:30	3	2	9	14	24	4	2	30	2	43	4	49	9	51	27	87	180	0
14:30 - 14:45	1	0	9	10	17	2	1	20	1	35	3	39	6	29	10	45	114	0
14:45 - 15:00	2	0	6	8	15	1	1	17	1	30	4	35	1	36	11	48	108	0
15:00 - 15:15	3	0	8	11	32	1	1	34	2	51	5	58	11	53	14	78	181	0
15:15 - 15:30	5	0	14	19	24	0	0	24	0	42	3	45	11	44	23	78	166	0
15:30 - 15:45	0	0	10	10	30	4	0	34	0	52	1	53	7	34	20	61	158	0
15:45 - 16:00	1	1	12	14	24	0	1	25	0	39	1	40	17	53	21	91	170	0
16:00 - 16:15	3	1	15	19	35	2	1	38	1	36	5	42	12	47	19	78	177	0
16:15 - 16:30	3	2	18	23	28	3	5	36	3	38	2	43	13	49	22	84	186	0
16:30 - 16:45	5	1	5	11	33	3	1	37	2	71	2	75	13	45	20	78	201	1
16:45 - 17:00	4	0	12	16	48	1	1	50	1	40	5	46	15	52	18	85	197	3
17:00 - 17:15	3	0	14	17	56	3	1	60	3	62	0	65	9	48	26	83	225	3
17:15 - 17:30	2	0	12	14	68	6	3	77	1	57	7	65	13	42	27	82	238	1
17:30 - 17:45	5	3	13	21	63	2	3	68	1	60	2	63	8	41	24	73	225	0
17:45 - 18:00	3	0	13	16	54	0	1	55	4	44	4	52	13	51	15	79	202	0
18:00 - 18:15	1	0	14	15	42	1	0	43	1	47	1	49	7	45	17	69	176	0
18:15 - 18:30	2	1	13	16	42	2	0	44	0	35	2	37	12	37	15	64	161	2
18:30 - 18:45	4	1	13	18	39	5	1	45	2	31	2	35	11	46	16	73	171	3
18:45 - 19:00	4	0	14	18	27	4	0	31	0	43	0	43	8	36	12	56	148	0
TOTAL	103	50	461	614	1198	83	33	1314	43	2013	124	2180	361	1961	1290	3612	7720	17
Trucks	1	0	2	3	6	0	0	6	0	5	0	5	2	5	8	15	29	0.4%
School Buses	0	0	0	0	0	0	0	0	0	5	0	5	0	5	3	8	13	0.2%

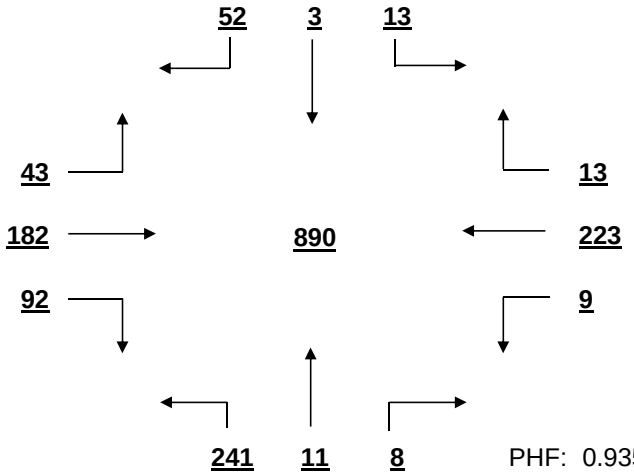
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Woodcross Dr AT Fernandina Rd-Wendy's/Hotel Date: 12/1/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

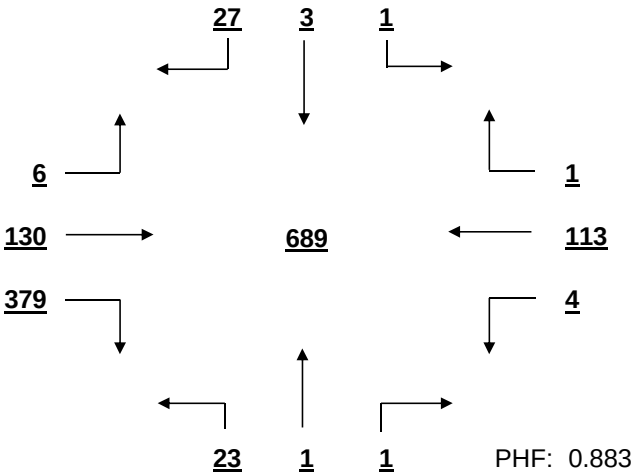


OVERALL PEAK HOUR VOLUME
FROM 17:00 TO 18:00



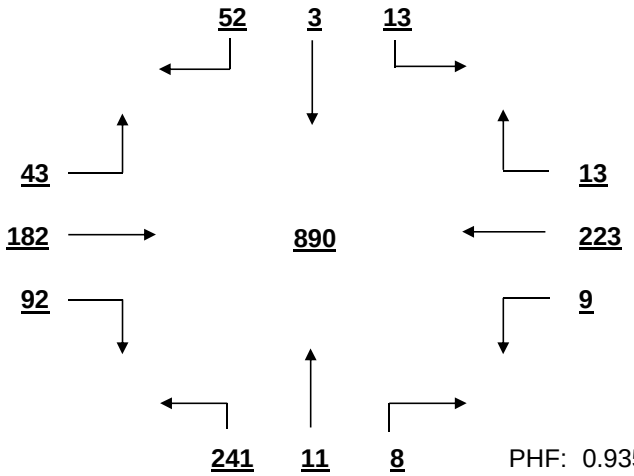
PHF: 0.935

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



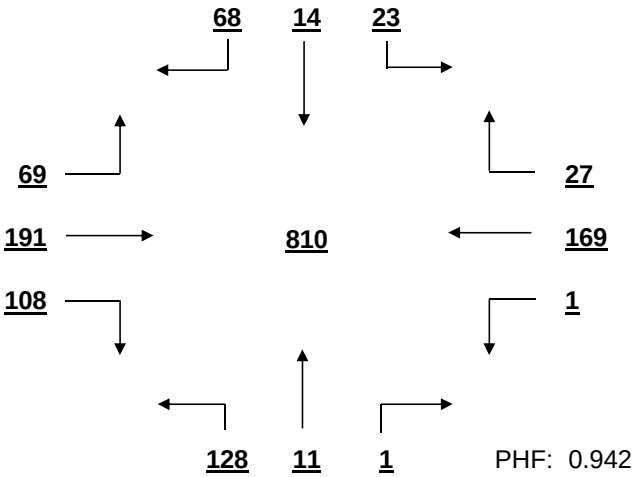
PHF: 0.883

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:00 TO 18:00



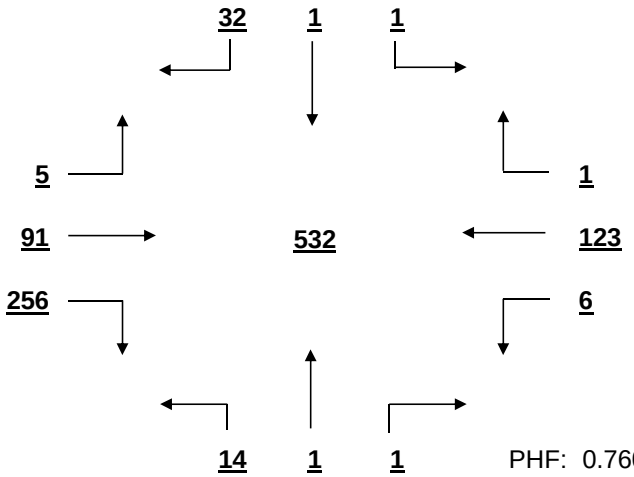
PHF: 0.935

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:15 TO 13:15



PHF: 0.942

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.760

SIGNAL WARRANT ANALYSIS

Woodcross Dr AT Fernandina Rd-Wendy's/Hotel Date: 12/1/2016

Minor Street Volume, percent of total = 75.0%
Percent of Left Turns from Minor Street = 7.0%
Percent of Right Turns from Minor Street = 24.4%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is not met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
160.7	/	500	= 32%	301.0	/	150	= 201%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	10%	12%	15%	15%	26%	47%	39%	30%	34%	46%	66%	46%
Minor St.	235%	276%	143%	141%	201%	240%	203%	162%	205%	217%	211%	175%

Condition B - Interruption to Continuous Traffic is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
160.7	/	750	= 21%	301.0	/	75	= 401%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	7%	8%	10%	10%	17%	31%	26%	20%	23%	31%	44%	31%
Minor St.	469%	552%	287%	281%	401%	480%	405%	324%	411%	433%	423%	349%

80% Combination of Conditions A & B is not met

Warrant No. 2 - Four Hour Vehicular Volume is not met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	69%	82%	44%	43%	66%	91%	73%	54%	71%	82%	92%	66%

Warrant No. 3 - Peak Hour is not met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	17:00 - 18:00	Higher Volume Side Street Peak Hour:	7:30 - 8:30
Minor St.	60%	Minor St.	71%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	0	0	0	0	0	0	0	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008

Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 12/2/2016

Major Rt: Harbison Blvd * Not on State System Minor Rt: Saturn Pkwy * Not on State System

Day of Week: Friday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 35

Direction of Minor Street: E-W Intersection ADT - 31850 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1

* Each Direction

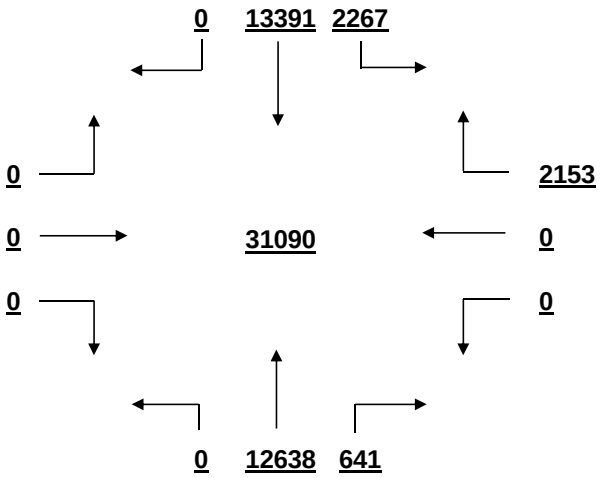
INTERSECTION VOLUME SUMMARY

	From N Harbison Blvd				From S Harbison Blvd				From E Saturn Pkwy				From W Saturn Pkwy				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	23	137	0	160	0	126	3	129	0	0	9	9	0	0	0	0	298	0
7:15 - 7:30	14	163	0	177	0	158	5	163	0	0	16	16	0	0	0	0	356	0
7:30 - 7:45	21	204	0	225	0	188	6	194	0	0	13	13	0	0	0	0	432	3
7:45 - 8:00	26	217	0	243	0	180	5	185	0	0	12	12	0	0	0	0	440	0
8:00 - 8:15	37	181	0	218	0	189	5	194	0	0	12	12	0	0	0	0	424	0
8:15 - 8:30	30	188	0	218	0	159	5	164	0	0	19	19	0	0	0	0	401	0
8:30 - 8:45	27	187	0	214	0	156	3	159	0	0	23	23	0	0	0	0	396	0
8:45 - 9:00	23	232	0	255	0	142	7	149	0	0	24	24	0	0	0	0	428	1
9:00 - 9:15	31	211	0	242	0	144	12	156	0	0	14	14	0	0	0	0	412	0
9:15 - 9:30	39	280	0	319	0	180	9	189	0	0	25	25	0	0	0	0	533	0
9:30 - 9:45	39	282	0	321	0	163	17	180	0	0	34	34	0	0	0	0	535	0
9:45 - 10:00	49	340	0	389	0	180	9	189	0	0	18	18	0	0	0	0	596	0
10:00 - 10:15	56	295	0	351	0	159	14	173	0	0	49	49	0	0	0	0	573	1
10:15 - 10:30	56	307	0	363	0	198	19	217	0	0	43	43	0	0	0	0	623	0
10:30 - 10:45	46	308	0	354	0	267	21	288	0	0	42	42	0	0	0	0	684	0
10:45 - 11:00	48	358	0	406	0	227	16	243	0	0	52	52	0	0	0	0	701	1
11:00 - 11:15	53	329	0	382	0	0	30	30	0	0	46	46	0	0	0	0	458	0
11:15 - 11:30	52	344	0	396	0	255	17	272	0	0	58	58	0	0	0	0	726	0
11:30 - 11:45	59	363	0	422	0	298	13	311	0	0	45	45	0	0	0	0	778	0
11:45 - 12:00	51	382	0	433	0	289	17	306	0	0	51	51	0	0	0	0	790	0
12:00 - 12:15	64	371	0	435	0	296	24	320	0	0	52	52	0	0	0	0	807	0
12:15 - 12:30	62	298	0	360	0	236	9	245	0	0	47	47	0	0	0	0	652	0
12:30 - 12:45	22	301	0	323	0	325	7	332	0	0	31	31	0	0	0	0	686	0
12:45 - 13:00	34	359	0	393	0	327	15	342	0	0	36	36	0	0	0	0	771	0
13:00 - 13:15	31	329	0	360	0	324	12	336	0	0	42	42	0	0	0	0	738	0
13:15 - 13:30	40	312	0	352	0	308	10	318	0	0	31	31	0	0	0	0	701	0
13:30 - 13:45	41	310	0	351	0	289	11	300	0	0	44	44	0	0	0	0	695	0
13:45 - 14:00	52	292	0	344	0	321	15	336	0	0	46	46	0	0	0	0	726	0
14:00 - 14:15	54	311	0	365	0	316	23	339	0	0	50	50	0	0	0	0	754	1
14:15 - 14:30	50	315	0	365	0	416	20	436	0	0	59	59	0	0	0	0	860	0
14:30 - 14:45	57	274	0	331	0	372	21	393	0	0	72	72	0	0	0	0	796	0
14:45 - 15:00	47	294	0	341	0	333	24	357	0	0	49	49	0	0	0	0	747	0
15:00 - 15:15	72	261	0	333	0	364	15	379	0	0	70	70	0	0	0	0	782	0
15:15 - 15:30	60	214	0	274	0	348	23	371	0	0	70	70	0	0	0	0	715	0
15:30 - 15:45	49	288	0	337	0	362	22	384	0	0	61	61	0	0	0	0	782	1
15:45 - 16:00	55	306	0	361	0	358	20	378	0	0	62	62	0	0	0	0	801	0
16:00 - 16:15	63	271	0	334	0	324	9	333	0	0	61	61	0	0	0	0	728	0
16:15 - 16:30	60	244	0	304	0	346	12	358	0	0	75	75	0	0	0	0	737	0
16:30 - 16:45	54	314	0	368	0	353	10	363	0	0	66	66	0	0	0	0	797	0
16:45 - 17:00	67	279	0	346	0	325	15	340	0	0	77	77	0	0	0	0	763	1
17:00 - 17:15	53	299	0	352	0	267	12	279	0	0	59	59	0	0	0	0	690	0
17:15 - 17:30	54	282	0	336	0	341	10	351	0	0	49	49	0	0	0	0	736	1
17:30 - 17:45	50	293	0	343	0	296	9	305	0	0	46	46	0	0	0	0	694	0
17:45 - 18:00	84	253	0	337	0	289	6	295	0	0	72	72	0	0	0	0	704	0
18:00 - 18:15	56	250	0	306	0	307	15	322	0	0	53	53	0	0	0	0	681	4
18:15 - 18:30	58	248	0	306	0	298	16	314	0	0	52	52	0	0	0	0	672	0
18:30 - 18:45	71	251	0	322	0	278	13	291	0	0	61	61	0	0	0	0	674	0
18:45 - 19:00	27	264	0	291	0	261	10	271	0	0	55	55	0	0	0	0	617	0
TOTAL	2267	13391	0	15658	0	12638	641	13279	0	0	2153	2153	0	0	0	0	31090	14
Trucks	19	39	0	58	0	41	2	43	0	0	15	15	0	0	0	0	116	0.4%
School Buses	4	35	0	39	0	35	0	35	0	0	4	4	0	0	0	0	78	0.3%

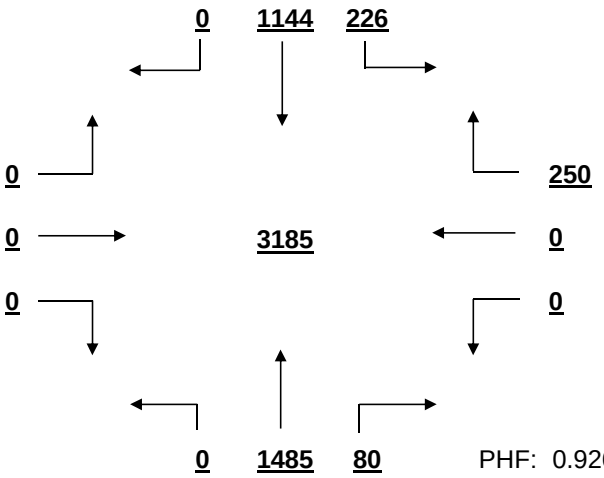
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Harbison Blvd AT Saturn Pkwy Date: 12/2/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

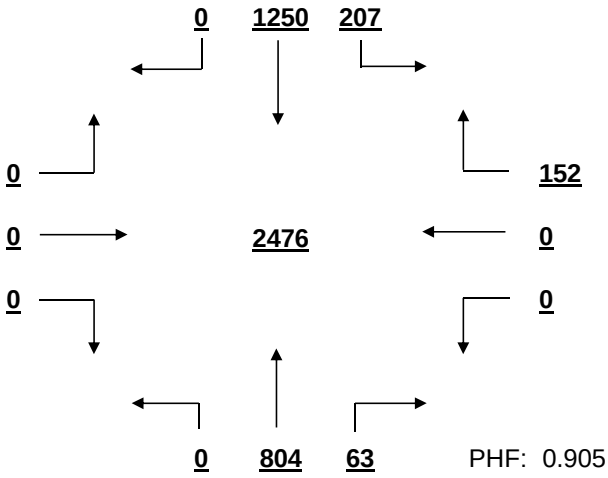


OVERALL PEAK HOUR VOLUME
FROM 14:15 TO 15:15



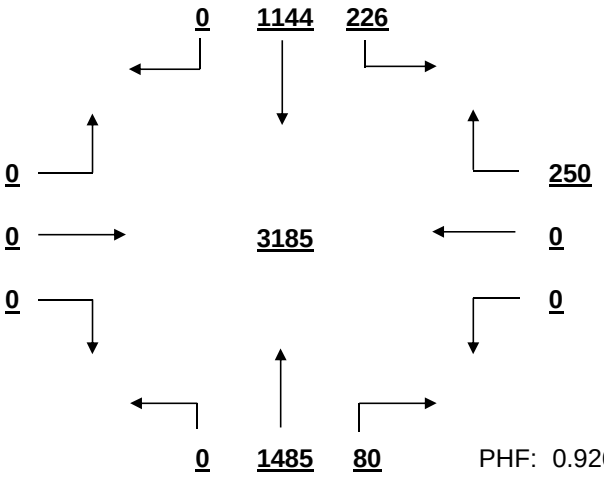
PHF: 0.926

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 9:45 TO 10:45



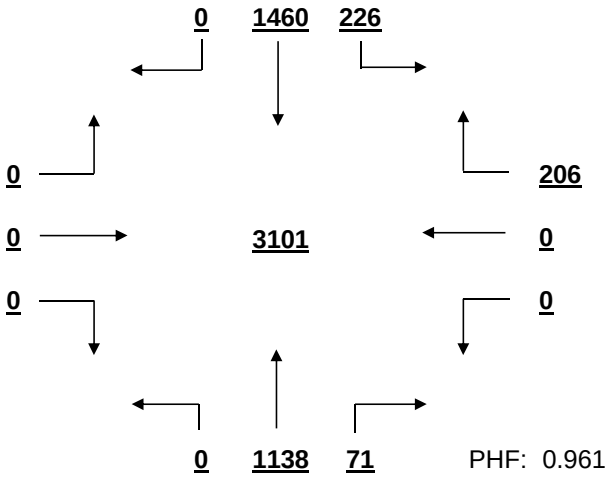
PHF: 0.905

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 14:15 TO 15:15



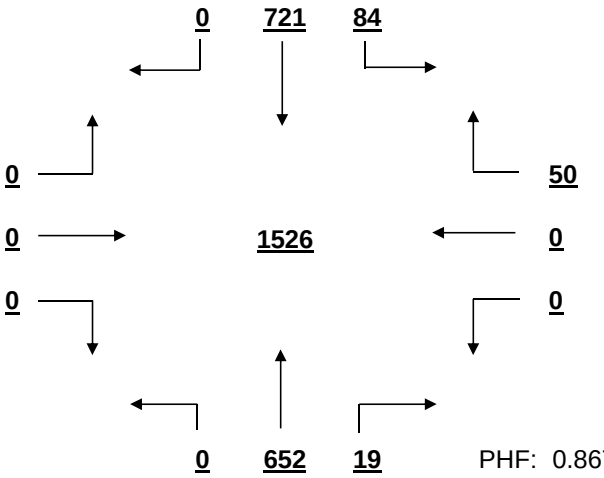
PHF: 0.926

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 11:15 TO 12:15



PHF: 0.961

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.867

SIGNAL WARRANT ANALYSIS

Harbison Blvd AT Saturn Pkwy Date: 12/2/2016

Minor Street Volume, percent of total = 6.9%
Percent of Left Turns from Minor Street = 0.0%
Percent of Right Turns from Minor Street = 100.0%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
2411.4	/ 600	=	402%	179.4	/ 150	=	120%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	246%	262%	331%	399%	425%	458%	450%	488%	470%	458%	433%	404%
Minor St.	33%	52%	61%	124%	133%	111%	109%	153%	175%	186%	151%	147%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
2411.4	/ 900	=	268%	179.4	/ 75	=	239%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	164%	175%	221%	266%	284%	306%	300%	325%	313%	305%	289%	269%
Minor St.	67%	104%	121%	248%	267%	221%	217%	307%	351%	372%	301%	295%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	63%	98%	114%	233%	250%	208%	204%	288%	329%	349%	283%	276%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	14:15 - 15:15	Higher Volume Side Street Peak Hour:	16:00 - 17:00
Minor St.	250%	Minor St.	279%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	2	1	0	2	0	0	0	1	1	0	1	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/21/2016

Major Rt: Harbison Blvd * Not on State System Minor Rt: Columbiana Cir-Park Terrace Dr * Not on State System

Day of Week: Monday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 35

Direction of Minor Street: E-W Intersection ADT - 39140 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 2

* Each Direction

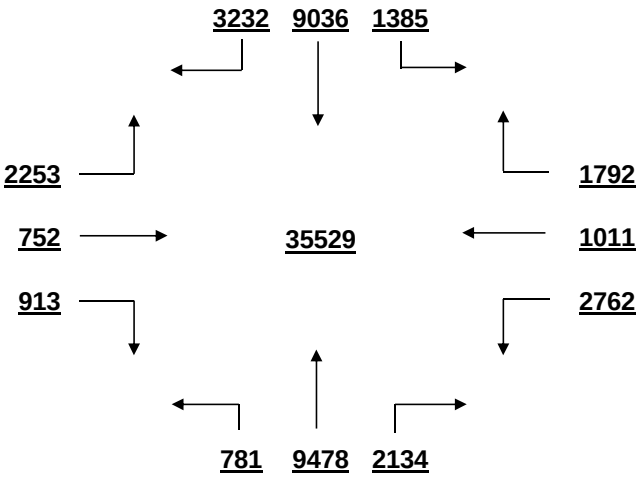
INTERSECTION VOLUME SUMMARY

	From N Harbison Blvd				From S Harbison Blvd				From E Columbiana Cir-Par				From W Columbiana Cir-Par				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	24	93	12	129	2	110	14	126	13	0	2	15	1	1	1	3	273	0
7:15 - 7:30	13	115	16	144	3	143	20	166	31	3	8	42	0	1	0	1	353	0
7:30 - 7:45	21	137	15	173	5	169	39	213	26	2	9	37	9	3	1	13	436	7
7:45 - 8:00	21	141	15	177	6	182	41	229	26	9	16	51	7	5	1	13	470	1
8:00 - 8:15	15	148	15	178	1	135	35	171	13	3	8	24	1	3	1	5	378	2
8:15 - 8:30	28	116	19	163	3	158	53	214	28	4	11	43	3	2	5	10	430	1
8:30 - 8:45	33	114	22	169	7	125	30	162	21	9	11	41	4	3	3	10	382	8
8:45 - 9:00	26	136	47	209	5	122	33	160	41	7	20	68	7	6	4	17	454	5
9:00 - 9:15	23	136	28	187	9	121	35	165	41	13	17	71	9	3	8	20	443	0
9:15 - 9:30	29	160	0	189	6	128	39	173	30	5	9	44	15	5	11	31	437	0
9:30 - 9:45	16	152	0	168	11	162	39	212	41	12	26	79	7	4	10	21	480	1
9:45 - 10:00	28	171	100	299	9	121	52	182	45	22	23	90	24	6	13	43	614	1
10:00 - 10:15	24	168	14	206	20	162	29	211	47	17	39	103	15	8	5	28	548	0
10:15 - 10:30	24	154	50	228	15	152	48	215	58	24	24	106	27	11	14	52	601	1
10:30 - 10:45	30	175	75	280	17	170	45	232	58	14	27	99	36	12	15	63	674	0
10:45 - 11:00	31	215	86	332	17	171	49	237	54	19	31	104	35	16	19	70	743	4
11:00 - 11:15	35	210	114	359	19	0	36	55	53	24	41	118	30	11	20	61	593	0
11:15 - 11:30	41	223	93	357	29	193	33	255	50	21	40	111	34	26	22	82	805	2
11:30 - 11:45	33	197	86	316	24	229	40	293	82	27	29	138	48	10	28	86	833	0
11:45 - 12:00	43	253	111	407	21	201	41	263	78	27	37	142	44	18	19	81	893	5
12:00 - 12:15	10	277	109	396	16	202	58	276	79	21	47	147	72	21	19	112	931	2
12:15 - 12:30	29	254	129	412	24	247	55	326	74	33	41	148	58	21	22	101	987	4
12:30 - 12:45	39	238	103	380	22	234	43	299	76	31	48	155	76	18	43	137	971	1
12:45 - 13:00	51	221	124	396	21	248	37	306	69	34	55	158	79	30	36	145	1005	1
13:00 - 13:15	19	219	88	326	13	275	69	357	72	38	28	138	70	29	31	130	951	0
13:15 - 13:30	28	196	75	299	19	307	34	360	60	37	58	155	62	31	35	128	942	0
13:30 - 13:45	42	221	99	362	22	239	49	310	80	16	56	152	71	29	21	121	945	0
13:45 - 14:00	29	203	89	321	21	242	53	316	75	32	59	166	74	28	27	129	932	2
14:00 - 14:15	21	199	92	312	19	262	53	334	68	24	69	161	75	27	33	135	942	1
14:15 - 14:30	36	203	94	333	24	254	59	337	71	35	55	161	64	23	34	121	952	2
14:30 - 14:45	24	166	83	273	22	268	50	340	70	20	43	133	75	21	24	120	866	2
14:45 - 15:00	29	193	66	288	22	243	52	317	63	23	49	135	66	29	31	126	866	0
15:00 - 15:15	26	151	55	232	30	261	50	341	58	25	50	133	63	25	28	116	822	1
15:15 - 15:30	17	127	0	144	17	223	44	284	65	34	38	137	75	23	17	115	680	1
15:30 - 15:45	28	175	68	271	17	211	59	287	67	27	36	130	63	22	25	110	798	1
15:45 - 16:00	43	174	64	281	47	206	48	301	57	30	58	145	62	13	27	102	829	5
16:00 - 16:15	31	243	91	365	16	238	43	297	71	33	42	146	74	21	21	116	924	6
16:15 - 16:30	24	210	97	331	17	227	48	292	77	11	59	147	60	17	26	103	873	3
16:30 - 16:45	34	232	88	354	26	231	37	294	68	24	45	137	57	16	33	106	891	0
16:45 - 17:00	37	209	85	331	23	184	38	245	75	25	35	135	65	26	17	108	819	0
17:00 - 17:15	23	228	73	324	14	253	61	328	54	28	54	136	81	16	20	117	905	1
17:15 - 17:30	41	221	71	333	16	227	48	291	68	22	66	156	59	15	31	105	885	1
17:30 - 17:45	31	204	75	310	12	210	43	265	77	27	45	149	68	24	20	112	836	1
17:45 - 18:00	24	207	79	310	18	192	61	271	74	27	40	141	48	11	12	71	793	1
18:00 - 18:15	30	212	86	328	13	239	55	307	57	21	51	129	77	13	13	103	867	1
18:15 - 18:30	36	216	76	328	17	184	42	243	71	27	53	151	89	17	18	124	846	0
18:30 - 18:45	35	228	89	352	12	203	39	254	70	26	43	139	67	22	30	119	864	0
18:45 - 19:00	30	195	66	291	12	214	55	281	60	18	41	119	47	10	19	76	767	0
TOTAL	1385	9036	3232	13653	781	9478	2134	12393	2762	1011	1792	5565	2253	752	913	3918	35529	75
Trucks	17	97	24	138	3	79	8	90	18	7	16	41	15	4	6	25	294	0.8%
School Buses	0	18	0	18	16	0	4	20	5	0	12	17	1	1	0	2	57	0.2%

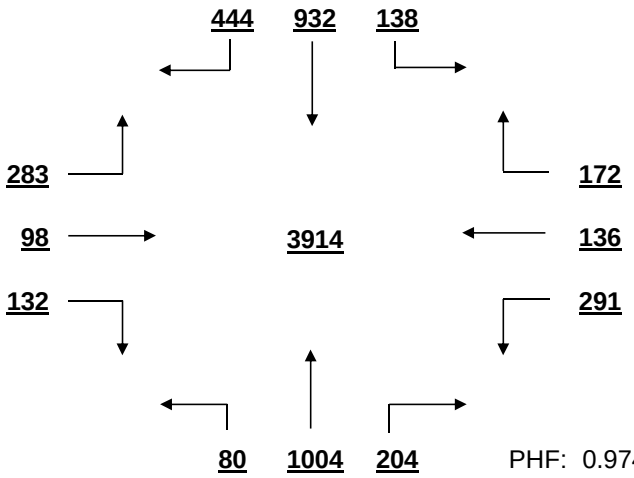
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Harbison Blvd AT Columbiana Cir-Park Terrace Dr Date: 11/21/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

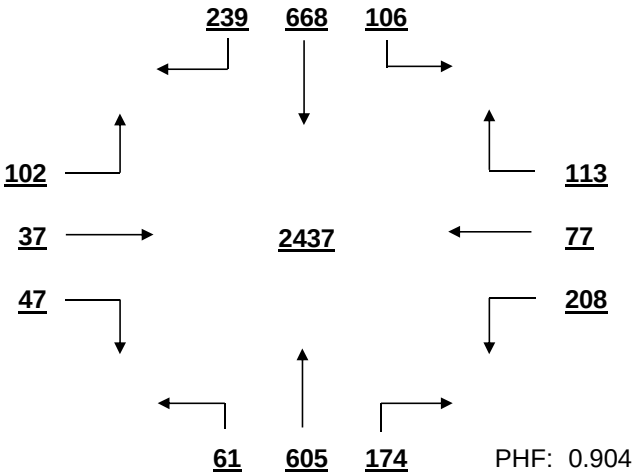


OVERALL PEAK HOUR VOLUME
FROM 12:15 TO 13:15



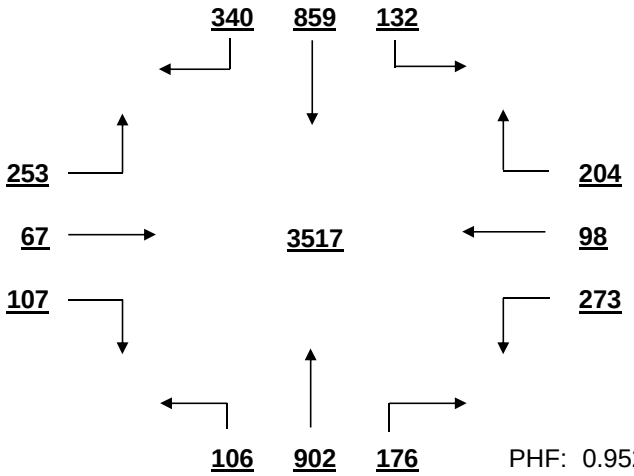
PHF: 0.974

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 9:45 TO 10:45



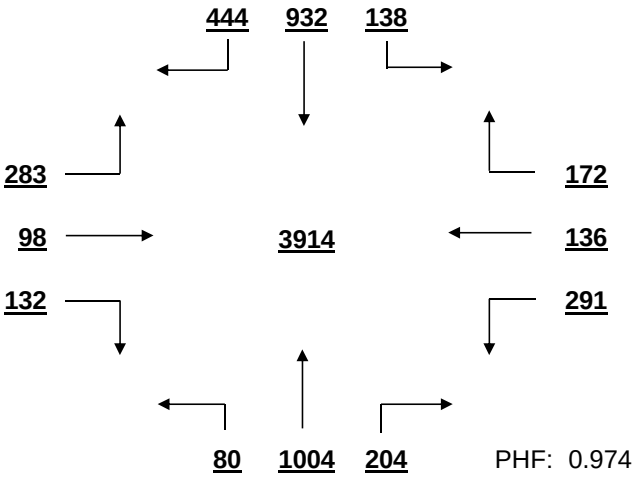
PHF: 0.904

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 15:45 TO 16:45



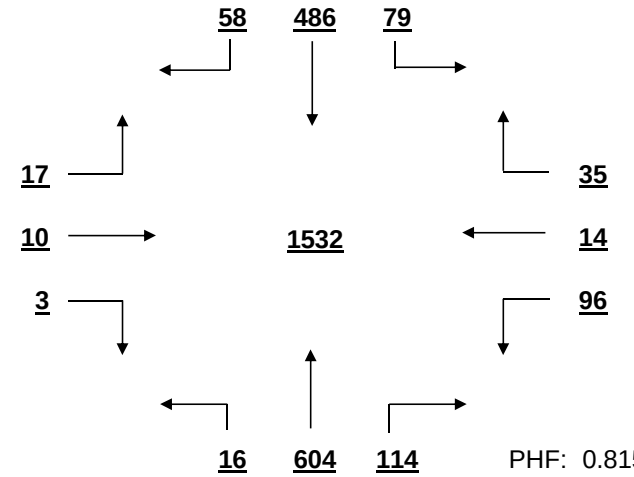
PHF: 0.952

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:15 TO 13:15



PHF: 0.974

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.815

SIGNAL WARRANT ANALYSIS

Harbison Blvd AT Columbiana Cir-Park Terrace Dr Date: 11/21/2016

Minor Street Volume, percent of total = 26.7%
Percent of Left Turns from Minor Street = 52.9%
Percent of Right Turns from Minor Street = 28.5%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
2170.5	/	600 =	362%	463.8	/	200 =	232%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	226%	238%	263%	324%	384%	465%	442%	422%	357%	418%	405%	397%
Minor St.	73%	88%	142%	206%	255%	304%	306%	295%	273%	283%	291%	269%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
2170.5	/	900 =	241%	463.8	/	100 =	464%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	151%	158%	175%	216%	256%	310%	295%	282%	238%	279%	270%	265%
Minor St.	145%	176%	284%	412%	509%	608%	611%	590%	545%	565%	582%	538%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	126%	153%	247%	358%	443%	529%	531%	513%	474%	491%	506%	468%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	12:15 - 13:15	Higher Volume Side Street Peak Hour:	13:30 - 14:30
Minor St.	399%	Minor St.	427%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	4	9	2	5	6	8	1	5	3	4	4	1

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008

Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/22/2016

Major Rt: Harbison Blvd * Not on State System Minor Rt: Columbiana Dr-Chick Fil A * Not on State System

Day of Week: Tuesday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 35

Direction of Minor Street: E-W Intersection ADT - 34400 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 2

* Each Direction

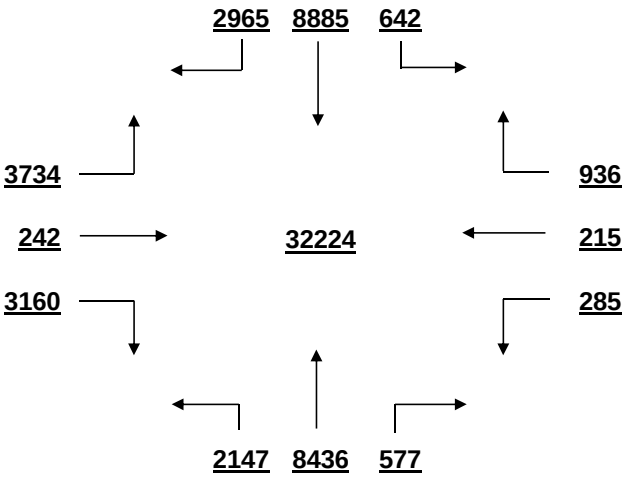
INTERSECTION VOLUME SUMMARY

	From N Harbison Blvd				From S Harbison Blvd				From E Columbiana Dr-Chic				From W Columbiana Dr-Chic				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	13	66	26	105	7	59	9	75	2	2	16	20	46	5	19	70	270	0
7:15 - 7:30	14	89	50	153	13	78	12	103	3	5	16	24	79	3	32	114	394	0
7:30 - 7:45	7	99	44	150	11	78	8	97	9	3	14	26	117	5	37	159	432	1
7:45 - 8:00	11	138	44	193	10	108	14	132	6	2	23	31	105	9	53	167	523	1
8:00 - 8:15	13	123	17	153	25	85	11	121	5	3	20	28	74	6	48	128	430	1
8:15 - 8:30	20	100	32	152	13	104	7	124	4	5	24	33	87	9	43	139	448	1
8:30 - 8:45	15	71	40	126	8	84	2	94	6	2	18	26	62	9	37	108	354	2
8:45 - 9:00	13	121	48	182	10	88	8	106	7	5	18	30	54	6	36	96	414	3
9:00 - 9:15	12	125	39	176	11	81	7	99	4	5	14	23	68	2	39	109	407	2
9:15 - 9:30	21	141	0	162	19	115	6	140	5	1	14	20	73	4	36	113	435	5
9:30 - 9:45	13	144	0	157	25	140	9	174	7	3	20	30	49	11	52	112	473	0
9:45 - 10:00	19	153	47	219	34	121	6	161	8	10	20	38	60	11	54	125	543	0
10:00 - 10:15	17	146	57	220	38	145	14	197	10	12	15	37	55	4	63	122	576	2
10:15 - 10:30	11	159	57	227	42	149	12	203	7	3	16	26	67	5	47	119	575	0
10:30 - 10:45	12	169	65	246	38	161	5	204	6	3	19	28	71	6	72	149	627	2
10:45 - 11:00	15	200	67	282	45	167	11	223	6	2	23	31	77	4	58	139	675	1
11:00 - 11:15	11	220	57	288	44	0	12	56	7	4	17	28	75	5	55	135	507	0
11:15 - 11:30	18	208	57	283	51	198	14	263	4	10	18	32	63	5	60	128	706	0
11:30 - 11:45	21	227	70	318	49	214	16	279	6	3	21	30	78	1	83	162	789	2
11:45 - 12:00	13	239	74	326	53	184	16	253	3	4	30	37	81	6	85	172	788	0
12:00 - 12:15	20	256	69	345	65	171	22	258	7	6	29	42	89	7	89	185	830	1
12:15 - 12:30	17	251	80	348	60	243	17	320	8	8	22	38	91	4	75	170	876	0
12:30 - 12:45	22	253	65	340	63	203	12	278	8	6	19	33	94	6	87	187	838	2
12:45 - 13:00	13	244	70	327	60	213	25	298	11	5	20	36	77	7	91	175	836	0
13:00 - 13:15	14	236	51	301	67	265	16	348	7	5	25	37	96	6	102	204	890	1
13:15 - 13:30	14	215	62	291	56	261	8	325	11	7	30	48	81	7	103	191	855	0
13:30 - 13:45	18	224	70	312	61	218	18	297	10	2	26	38	80	2	83	165	812	1
13:45 - 14:00	12	227	71	310	55	219	17	291	4	2	24	30	90	5	81	176	807	2
14:00 - 14:15	20	296	70	386	65	225	12	302	12	7	21	40	87	4	65	156	884	3
14:15 - 14:30	14	220	83	317	63	246	16	325	12	6	23	41	80	5	57	142	825	0
14:30 - 14:45	15	200	64	279	64	233	16	313	6	5	27	38	93	4	78	175	805	0
14:45 - 15:00	10	219	48	277	55	215	18	288	7	6	22	35	97	5	89	191	791	2
15:00 - 15:15	9	158	59	226	48	239	13	300	6	1	24	31	87	4	85	176	733	0
15:15 - 15:30	8	149	0	157	54	215	10	279	7	7	17	31	71	8	63	142	609	0
15:30 - 15:45	13	181	68	262	49	201	10	260	7	3	14	24	83	5	60	148	694	3
15:45 - 16:00	5	174	55	234	52	236	9	297	1	3	20	24	79	4	79	162	717	0
16:00 - 16:15	7	237	86	330	50	209	16	275	8	4	11	23	88	3	75	166	794	0
16:15 - 16:30	12	209	96	317	56	239	13	308	3	5	18	26	65	1	65	131	782	3
16:30 - 16:45	10	210	89	309	62	212	8	282	3	6	10	19	73	4	79	156	766	1
16:45 - 17:00	4	199	94	297	62	186	11	259	6	3	16	25	76	4	66	146	727	0
17:00 - 17:15	7	222	81	310	56	237	9	302	2	5	14	21	82	6	65	153	786	1
17:15 - 17:30	14	198	90	302	68	206	7	281	4	1	14	19	73	3	73	149	751	4
17:30 - 17:45	12	210	93	315	45	204	20	269	4	4	20	28	76	1	61	138	750	0
17:45 - 18:00	9	192	91	292	52	184	8	244	0	5	17	22	71	2	82	155	713	0
18:00 - 18:15	11	186	87	284	61	255	18	334	6	5	18	29	82	6	70	158	805	0
18:15 - 18:30	18	183	108	309	53	187	9	249	4	1	22	27	66	6	76	148	733	0
18:30 - 18:45	16	222	94	332	49	176	11	236	3	4	20	27	88	2	74	164	759	0
18:45 - 19:00	9	176	80	265	50	179	9	238	3	6	17	26	78	5	78	161	690	0
TOTAL	642	8885	2965	12492	2147	8436	577	11160	285	215	936	1436	3734	242	3160	7136	32224	47
Trucks	2	80	37	119	11	49	1	61	0	1	3	4	21	0	22	43	227	0.7%
School Buses	0	20	14	34	1	12	0	13	0	0	0	0	10	0	12	22	69	0.2%

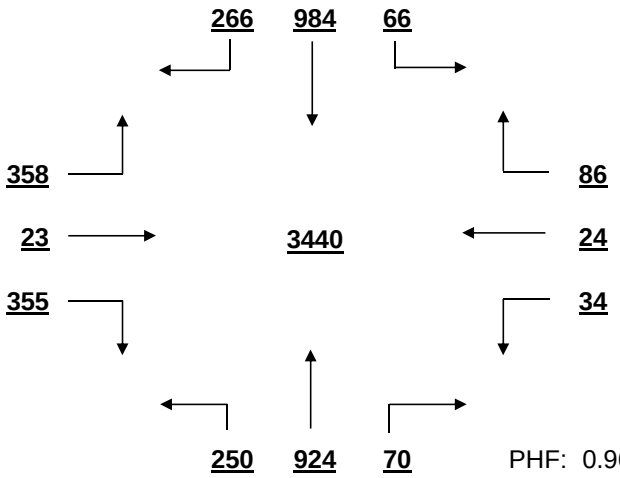
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Harbison Blvd AT Columbiana Dr-Chick Fil A Date: 11/22/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

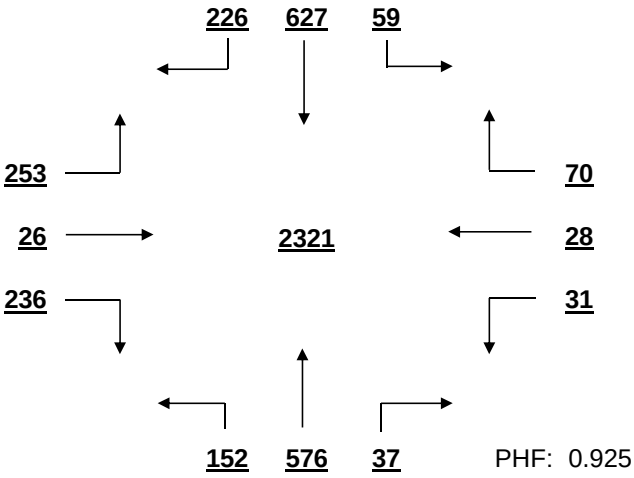


OVERALL PEAK HOUR VOLUME
FROM 12:15 TO 13:15



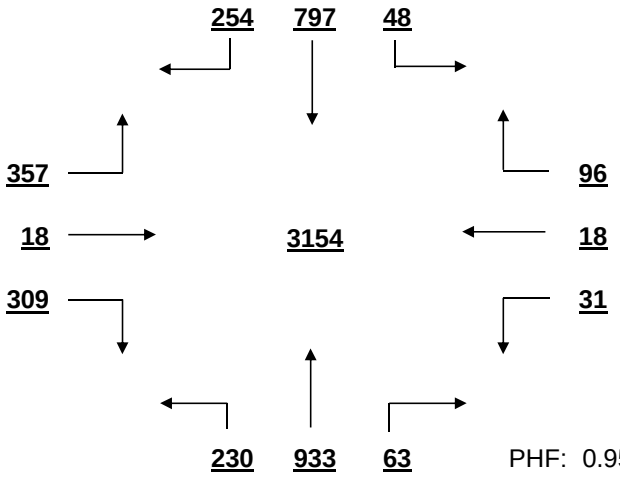
PHF: 0.966

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 9:45 TO 10:45



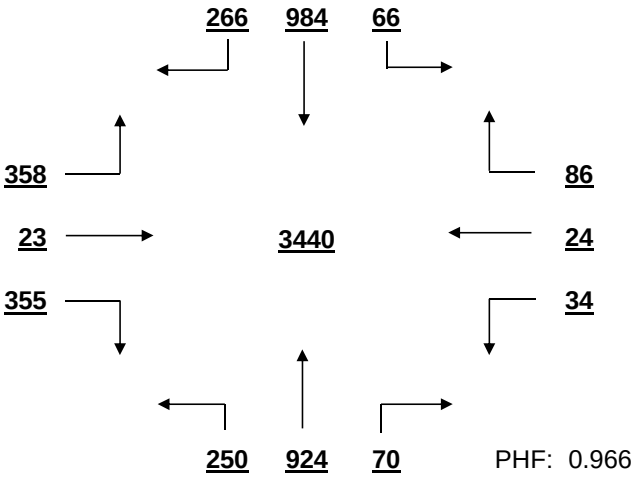
PHF: 0.925

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 14:15 TO 15:15



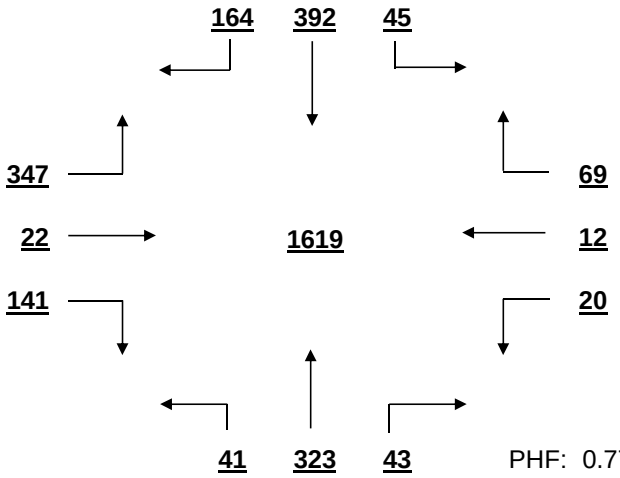
PHF: 0.956

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:15 TO 13:15



PHF: 0.966

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.774

SIGNAL WARRANT ANALYSIS

Harbison Blvd AT Columbiana Dr-Chick Fil A Date: 11/22/2016

Minor Street Volume, percent of total = 26.6%
Percent of Left Turns from Minor Street = 46.9%
Percent of Right Turns from Minor Street = 47.8%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1971.0	/ 600	=	329%	594.7	/ 200	=	297%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	168%	176%	215%	300%	344%	419%	413%	415%	336%	396%	386%	375%
Minor St.	255%	236%	230%	265%	299%	359%	368%	332%	314%	300%	298%	316%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1971.0	/ 900	=	219%	594.7	/ 100	=	595%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	112%	118%	143%	200%	230%	279%	275%	276%	224%	264%	257%	250%
Minor St.	510%	471%	459%	529%	597%	717%	736%	664%	628%	599%	595%	631%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	267%	271%	399%	460%	519%	623%	640%	577%	546%	521%	517%	549%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	12:15 - 13:15	Higher Volume Side Street Peak Hour:	12:30 - 13:30
Minor St.	491%	Minor St.	505%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	1	2	0	0	2	0	0	0	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008

Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/21/2016

Major Rt: Harbison Blvd * Not on State System Minor Rt: Rooms 2 Go-Pier 1 DW's * Not on State System

Day of Week: Monday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 35

Direction of Minor Street: E-W Intersection ADT - 28160 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1 * Each Direction

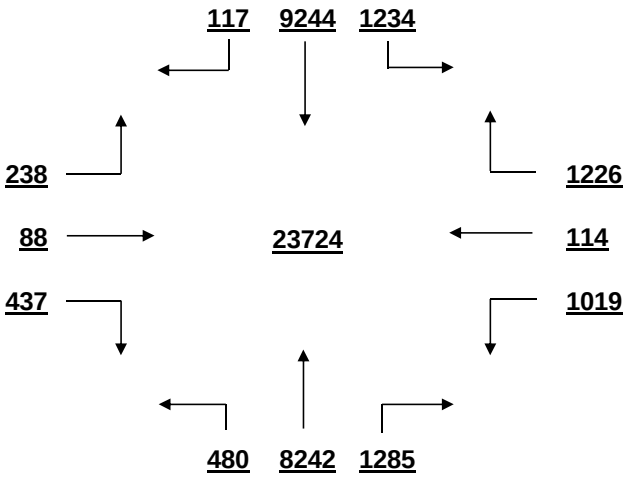
INTERSECTION VOLUME SUMMARY

	From N Harbison Blvd				From S Harbison Blvd				From E Rooms 2 Go-Pier 1				From W Rooms 2 Go-Pier 1				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	1	83	0	84	0	72	2	74	3	0	0	3	0	0	0	0	161	0
7:15 - 7:30	3	107	0	110	0	89	4	93	0	0	1	1	0	0	1	1	205	0
7:30 - 7:45	2	128	1	131	0	90	4	94	1	0	1	2	0	0	0	0	227	0
7:45 - 8:00	2	159	1	162	2	118	9	129	2	0	2	4	0	0	1	1	296	0
8:00 - 8:15	1	143	1	145	4	105	3	112	3	0	6	9	0	0	0	0	266	0
8:15 - 8:30	3	120	0	123	0	104	1	105	2	0	3	5	0	0	0	0	233	0
8:30 - 8:45	1	103	0	104	1	79	6	86	3	0	1	4	0	0	1	1	195	0
8:45 - 9:00	7	123	1	131	0	101	10	111	1	0	1	2	0	0	0	0	244	0
9:00 - 9:15	9	140	3	152	7	88	16	111	8	0	3	11	0	0	2	2	276	0
9:15 - 9:30	17	130	0	147	3	111	24	138	8	2	11	21	2	1	1	4	310	0
9:30 - 9:45	11	167	0	178	4	139	18	161	11	2	11	24	3	1	4	8	371	0
9:45 - 10:00	13	159	2	174	7	129	16	152	7	2	10	19	2	1	3	6	351	0
10:00 - 10:15	23	162	1	186	8	150	18	176	11	0	17	28	3	0	1	4	394	0
10:15 - 10:30	25	150	2	177	8	177	25	210	18	5	13	36	3	3	4	10	433	0
10:30 - 10:45	23	171	6	200	10	152	29	191	18	1	19	38	5	1	8	14	443	0
10:45 - 11:00	25	199	2	226	6	184	32	222	25	2	17	44	5	1	10	16	508	0
11:00 - 11:15	31	197	5	233	7	0	42	49	25	2	15	42	5	2	8	15	339	0
11:15 - 11:30	37	186	2	225	11	214	30	255	24	5	21	50	9	5	10	24	554	0
11:30 - 11:45	36	223	3	262	18	208	36	262	35	1	30	66	3	4	7	14	604	0
11:45 - 12:00	48	236	1	285	23	193	31	247	27	4	29	60	1	4	11	16	608	0
12:00 - 12:15	50	258	4	312	10	212	35	257	26	5	29	60	3	2	20	25	654	0
12:15 - 12:30	53	264	6	323	20	209	43	272	26	3	46	75	9	3	15	27	697	0
12:30 - 12:45	36	244	0	280	19	233	42	294	33	3	35	71	13	4	20	37	682	0
12:45 - 13:00	56	248	2	306	16	219	49	284	42	7	46	95	7	1	24	32	717	0
13:00 - 13:15	48	265	4	317	12	223	31	266	38	8	47	93	12	1	26	39	715	0
13:15 - 13:30	47	251	5	303	13	221	39	273	33	4	62	99	13	4	10	27	702	0
13:30 - 13:45	37	237	4	278	15	237	29	281	36	4	44	84	5	4	18	27	670	1
13:45 - 14:00	32	229	9	270	12	176	41	229	35	6	38	79	10	3	16	29	607	0
14:00 - 14:15	38	202	3	243	17	218	35	270	30	7	40	77	5	3	27	35	625	0
14:15 - 14:30	36	212	6	254	16	194	33	243	32	3	53	88	9	4	19	32	617	0
14:30 - 14:45	26	206	4	236	17	224	28	269	24	1	42	67	7	1	14	22	594	0
14:45 - 15:00	31	259	0	290	13	205	32	250	24	1	36	61	7	2	14	23	624	0
15:00 - 15:15	15	203	4	222	19	211	35	265	32	3	23	58	5	0	13	18	563	0
15:15 - 15:30	24	156	0	180	10	202	22	234	20	2	36	58	9	3	5	17	489	0
15:30 - 15:45	27	197	1	225	15	201	19	235	21	7	32	60	6	0	12	18	538	1
15:45 - 16:00	35	195	2	232	13	205	25	243	19	1	38	58	6	4	14	24	557	0
16:00 - 16:15	30	228	4	262	14	207	33	254	27	1	26	54	9	5	5	19	589	0
16:15 - 16:30	30	218	1	249	14	204	37	255	18	3	42	63	5	4	13	22	589	0
16:30 - 16:45	26	216	4	246	6	218	27	251	27	4	33	64	3	2	12	17	578	0
16:45 - 17:00	19	219	1	239	14	184	28	226	37	1	30	68	6	2	10	18	551	1
17:00 - 17:15	21	224	1	246	6	226	33	265	26	2	26	54	7	2	10	19	584	0
17:15 - 17:30	24	222	3	249	8	203	38	249	34	1	25	60	6	1	8	15	573	0
17:30 - 17:45	30	204	4	238	13	199	33	245	23	3	31	57	11	1	7	19	559	0
17:45 - 18:00	29	215	1	245	12	185	35	232	26	0	37	63	3	1	6	10	550	0
18:00 - 18:15	28	198	4	230	5	228	38	271	20	1	30	51	5	4	5	14	566	0
18:15 - 18:30	18	190	3	211	12	184	17	213	31	2	17	50	7	2	8	17	491	0
18:30 - 18:45	45	220	4	269	11	159	42	212	19	5	38	62	4	2	9	15	558	0
18:45 - 19:00	25	178	2	205	9	152	30	191	28	0	33	61	5	0	5	10	467	0
TOTAL	1234	9244	117	10595	480	8242	1285	10007	1019	114	1226	2359	238	88	437	763	23724	3
Trucks	9	83	1	93	2	115	4	121	5	2	3	10	0	0	0	0	224	0.9%
School Buses	1	32	0	33	0	11	0	11	0	0	0	0	0	0	0	0	44	0.2%

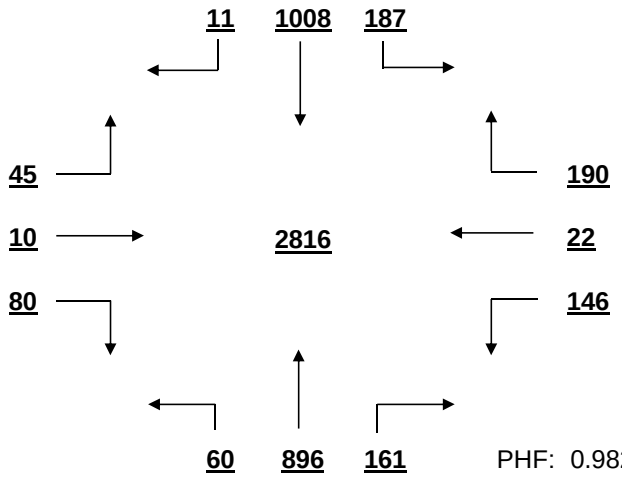
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Harbison Blvd AT Rooms 2 Go-Pier 1 DW's Date: 11/21/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

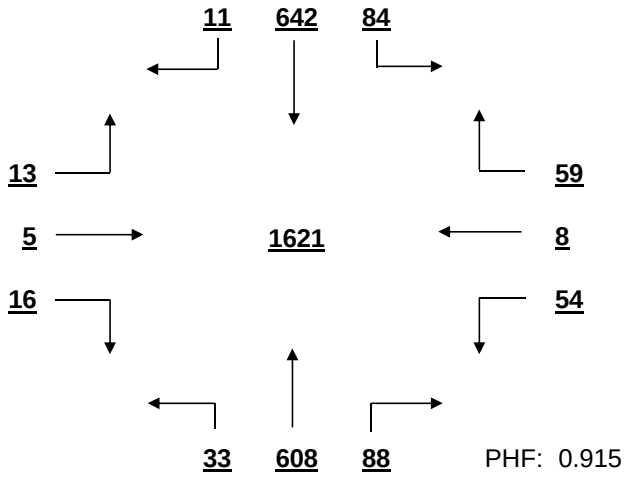


OVERALL PEAK HOUR VOLUME
FROM 12:30 TO 13:30



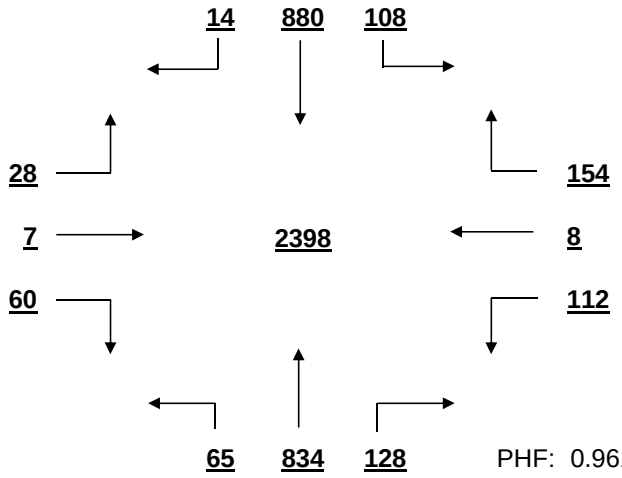
PHF: 0.982

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 9:45 TO 10:45



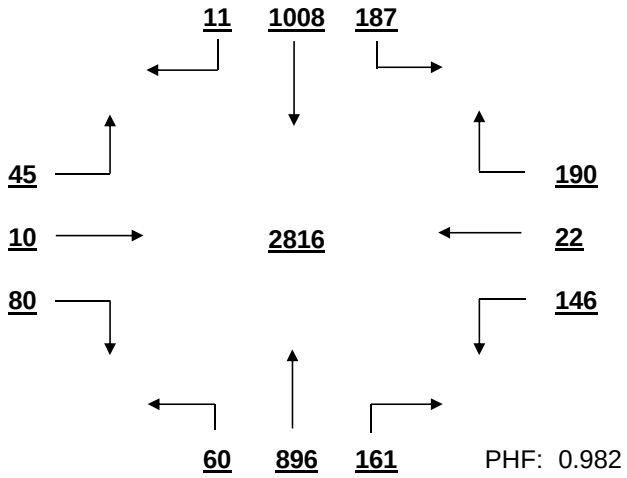
PHF: 0.915

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 14:15 TO 15:15



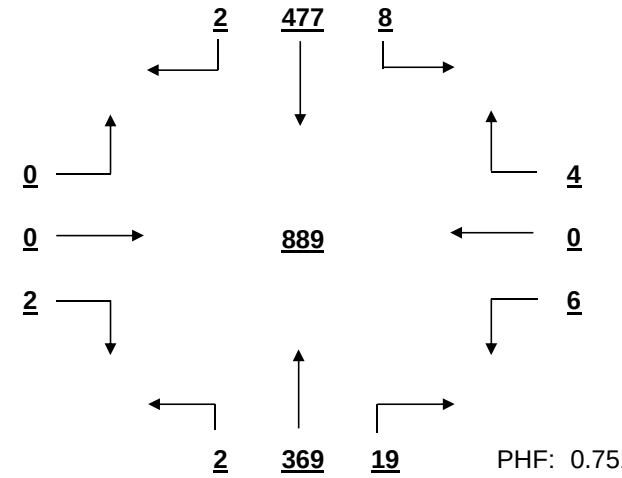
PHF: 0.961

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:30 TO 13:30



PHF: 0.982

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.751

SIGNAL WARRANT ANALYSIS

Harbison Blvd AT Rooms 2 Go-Pier 1 DW's Date: 11/21/2016

Minor Street Volume, percent of total = 13.2%
Percent of Left Turns from Minor Street = 40.3%
Percent of Right Turns from Minor Street = 53.3%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1716.8	/	600 =	286%	196.6	/	150 =	131%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	146%	153%	202%	265%	303%	388%	370%	343%	306%	330%	328%	300%
Minor St.	7%	13%	50%	97%	145%	201%	237%	195%	156%	166%	156%	149%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1716.8	/	900 =	191%	196.6	/	75 =	262%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	97%	102%	135%	176%	202%	259%	246%	228%	204%	220%	219%	200%
Minor St.	13%	27%	100%	195%	291%	401%	473%	391%	312%	332%	312%	299%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	6%	12%	74%	183%	273%	376%	444%	366%	293%	311%	293%	280%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	12:30 - 13:30	Higher Volume Side Street Peak Hour:	12:45 - 13:45
Minor St.	358%	Minor St.	371%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	0	0	0	0	0	0	0	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/21/2016

Major Rt: Harbison Blvd * Not on State System Minor Rt: Bower Pkwy-Shopping Center * Not on State System

Day of Week: Monday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 35

Direction of Minor Street: E-W Intersection ADT - 28380 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 2

* Each Direction

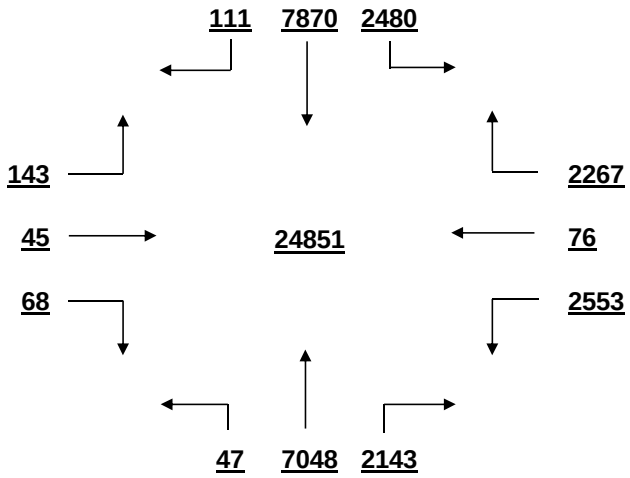
INTERSECTION VOLUME SUMMARY

	From N Harbison Blvd				From S Harbison Blvd				From E Bower Pkwy-Shoppin				From W Bower Pkwy-Shoppin				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	17	75	0	92	0	63	15	78	10	0	8	18	0	0	0	0	188	0
7:15 - 7:30	11	89	0	100	0	82	23	105	6	0	7	13	0	0	0	0	218	0
7:30 - 7:45	16	112	0	128	0	92	27	119	9	1	6	16	0	0	0	0	263	0
7:45 - 8:00	18	125	0	143	1	107	41	149	26	0	18	44	0	0	1	1	337	0
8:00 - 8:15	17	119	0	136	0	96	29	125	14	0	6	20	0	0	1	1	282	0
8:15 - 8:30	22	92	0	114	0	92	23	115	12	0	10	22	0	0	0	0	251	0
8:30 - 8:45	23	76	0	99	2	75	33	110	26	1	13	40	0	0	0	0	249	0
8:45 - 9:00	16	102	0	118	0	82	32	114	20	1	16	37	0	0	0	0	269	0
9:00 - 9:15	35	88	3	126	0	103	24	127	22	0	17	39	1	0	0	1	293	0
9:15 - 9:30	32	94	0	126	4	104	25	133	22	0	19	41	0	0	0	0	300	0
9:30 - 9:45	37	104	0	141	0	126	41	167	19	0	27	46	4	0	1	5	359	0
9:45 - 10:00	40	114	1	155	0	117	47	164	19	2	26	47	3	1	1	5	371	0
10:00 - 10:15	28	119	3	150	2	129	37	168	32	1	35	68	3	1	1	5	391	0
10:15 - 10:30	45	113	3	161	0	153	48	201	31	4	46	81	5	1	3	9	452	0
10:30 - 10:45	47	132	4	183	3	136	46	185	65	1	46	112	3	1	1	5	485	0
10:45 - 11:00	65	154	1	220	0	158	46	204	38	0	52	90	1	2	0	3	517	0
11:00 - 11:15	60	139	3	202	0	0	37	37	39	0	50	89	4	1	2	7	335	0
11:15 - 11:30	57	157	1	215	1	177	48	226	46	2	59	107	6	1	2	9	557	0
11:30 - 11:45	65	174	4	243	3	169	50	222	70	4	63	137	4	3	0	7	609	0
11:45 - 12:00	71	196	4	271	0	167	42	209	66	0	69	135	3	0	2	5	620	0
12:00 - 12:15	78	215	1	294	1	202	59	262	49	15	52	116	3	3	0	6	678	0
12:15 - 12:30	68	212	2	282	0	180	69	249	72	6	66	144	2	3	2	7	682	1
12:30 - 12:45	85	193	4	282	2	204	74	280	72	1	90	163	3	0	3	6	731	0
12:45 - 13:00	87	218	5	310	1	193	61	255	60	2	71	133	8	0	0	8	706	0
13:00 - 13:15	93	214	4	311	1	170	52	223	80	3	90	173	4	3	5	12	719	0
13:15 - 13:30	66	201	2	269	2	182	45	229	61	2	74	137	7	0	0	7	642	0
13:30 - 13:45	64	204	9	277	0	198	59	257	76	2	63	141	2	0	0	2	677	2
13:45 - 14:00	62	220	5	287	1	169	57	227	83	0	50	133	6	0	0	6	653	0
14:00 - 14:15	51	196	5	252	0	189	55	244	85	2	59	146	7	1	0	8	650	0
14:15 - 14:30	65	183	3	251	0	166	53	219	56	1	62	119	1	1	2	4	593	0
14:30 - 14:45	63	166	5	234	2	165	42	209	76	0	58	134	3	1	2	6	583	0
14:45 - 15:00	59	192	6	257	3	179	46	228	56	1	62	119	4	1	3	8	612	0
15:00 - 15:15	76	194	1	271	2	161	49	212	48	1	71	120	5	0	3	8	611	0
15:15 - 15:30	38	148	0	186	2	172	43	217	78	3	52	133	7	0	1	8	544	0
15:30 - 15:45	51	175	2	228	0	159	31	190	60	2	49	111	3	2	5	10	539	0
15:45 - 16:00	54	155	2	211	2	170	54	226	78	1	63	142	4	4	1	9	588	0
16:00 - 16:15	56	187	4	247	0	173	42	215	74	2	47	123	4	2	3	9	594	3
16:15 - 16:30	63	164	1	228	2	172	50	224	93	2	52	147	4	0	6	10	609	2
16:30 - 16:45	64	217	1	282	1	173	46	220	68	3	61	132	2	2	3	7	641	1
16:45 - 17:00	52	238	6	296	0	167	48	215	56	1	43	100	1	0	2	3	614	2
17:00 - 17:15	51	239	4	294	2	186	55	243	86	0	59	145	6	0	1	7	689	0
17:15 - 17:30	60	219	1	280	1	174	44	219	65	4	62	131	3	2	3	8	638	0
17:30 - 17:45	57	157	2	216	1	164	51	216	72	0	56	128	4	1	2	7	567	0
17:45 - 18:00	78	189	1	268	1	172	61	234	64	2	42	108	3	1	2	6	616	0
18:00 - 18:15	50	181	5	236	2	176	53	231	77	0	59	136	1	0	3	4	607	0
18:15 - 18:30	51	214	1	266	2	145	47	194	64	0	62	126	3	2	0	5	591	0
18:30 - 18:45	61	213	2	276	0	149	44	193	77	2	38	117	4	3	1	8	594	0
18:45 - 19:00	55	192	0	247	0	110	39	149	75	1	61	137	2	2	0	4	537	0
TOTAL	2480	7870	111	10461	47	7048	2143	9238	2553	76	2267	4896	143	45	68	256	24851	11
Trucks	28	45	0	73	0	36	5	41	16	0	22	38	0	0	2	2	154	0.6%
School Buses	0	30	0	30	0	10	4	14	14	0	3	17	0	0	0	0	61	0.2%

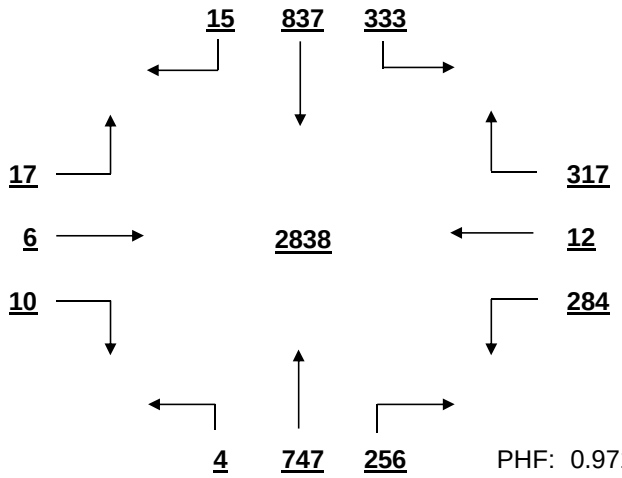
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Harbison Blvd AT Bower Pkwy-Shopping Center Date: 11/21/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

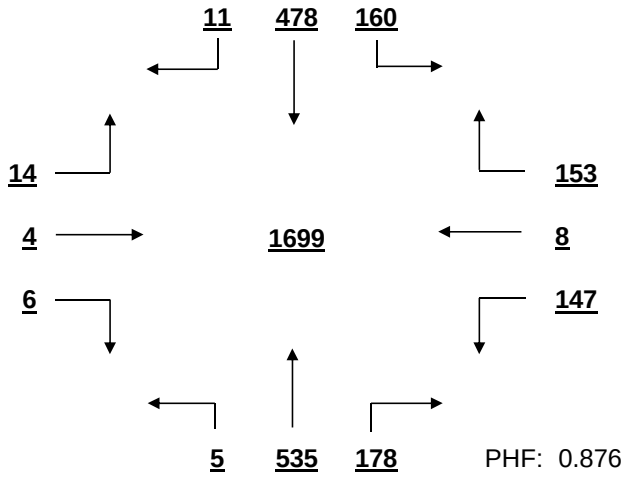


OVERALL PEAK HOUR VOLUME
FROM 12:15 TO 13:15



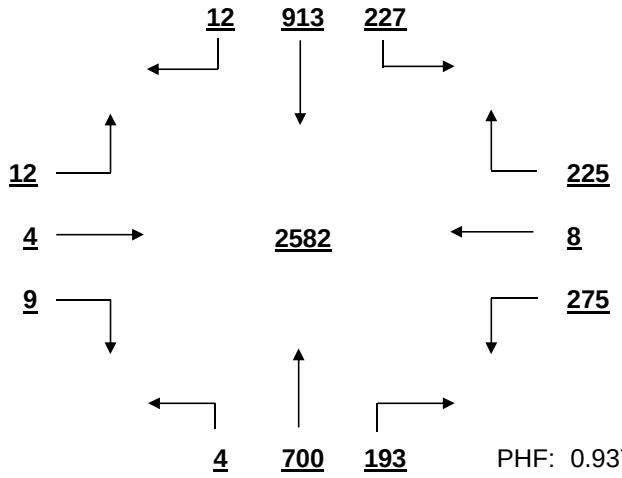
PHF: 0.971

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 9:45 TO 10:45



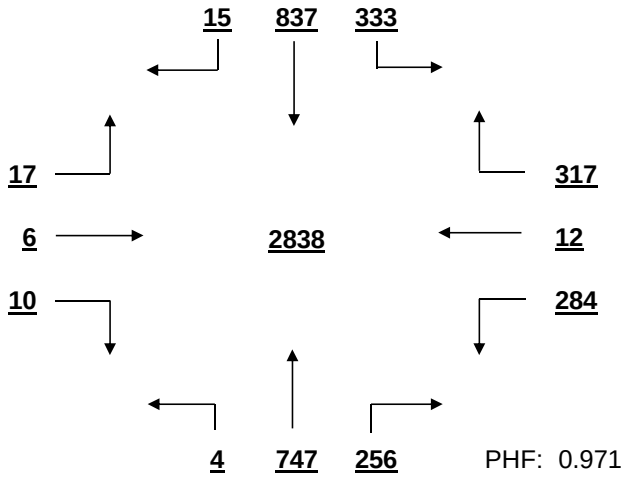
PHF: 0.876

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



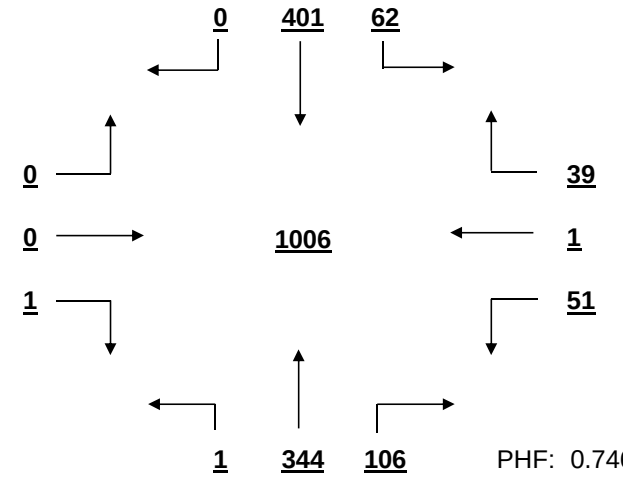
PHF: 0.937

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:15 TO 13:15



PHF: 0.971

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.746

SIGNAL WARRANT ANALYSIS

Harbison Blvd AT Bower Pkwy-Shopping Center Date: 11/21/2016

Minor Street Volume, percent of total = 20.7%
Percent of Left Turns from Minor Street = 52.3%
Percent of Right Turns from Minor Street = 45.3%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1641.6	/ 600	=	274%	408.0	/ 200	=	204%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	152%	155%	190%	245%	271%	369%	347%	316%	290%	321%	328%	299%
Minor St.	46%	60%	87%	176%	234%	278%	292%	259%	253%	251%	256%	258%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1641.6	/ 900	=	182%	408.0	/ 100	=	408%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	102%	103%	127%	164%	181%	246%	231%	210%	193%	214%	219%	199%
Minor St.	91%	119%	173%	351%	468%	556%	584%	518%	506%	502%	512%	516%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	40%	54%	116%	305%	407%	483%	508%	450%	440%	437%	445%	449%

Warrant No. 3 - Peak Hour is met

Percent of warrant
Overall Peak Hour: 12:15 - 13:15
Minor St. 409%

Percent of warrant
Higher Volume Side Street Peak Hour: 12:15 - 13:15
Minor St. 409%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	0	0	0	1	0	0	0	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/21/2016

Major Rt: St. Andrews Rd * Not on State System Minor Rt: Harbison Blvd-Emory Ln * Not on State System

Day of Week: Monday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: E-W Intersection ADT - 32050 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 2

* Each Direction

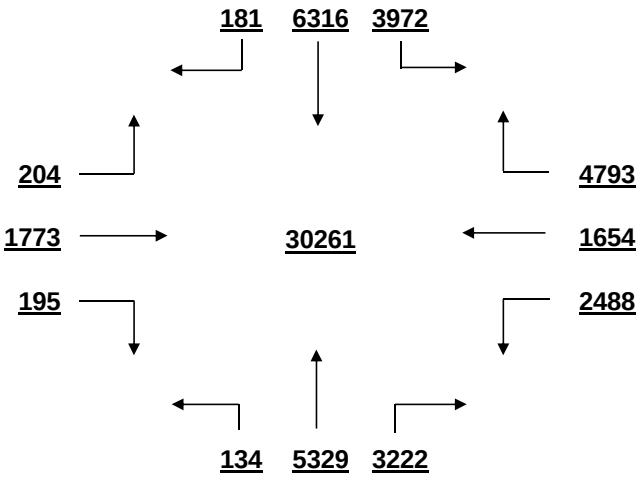
INTERSECTION VOLUME SUMMARY

	From N St. Andrews Rd				From S St. Andrews Rd				From E Harbison Blvd-Emor				From W Harbison Blvd-Emor				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	37	119	0	156	2	52	26	80	15	7	42	64	2	21	3	26	326	0
7:15 - 7:30	58	183	2	243	1	76	37	114	38	23	57	118	4	28	5	37	512	0
7:30 - 7:45	86	242	4	332	4	100	19	123	39	15	75	129	5	47	11	63	647	0
7:45 - 8:00	75	198	5	278	5	125	29	159	27	17	109	153	13	52	21	86	676	1
8:00 - 8:15	68	197	10	275	2	113	13	128	44	22	94	160	30	49	21	100	663	0
8:15 - 8:30	86	209	4	299	2	59	21	82	44	8	59	111	5	33	6	44	536	0
8:30 - 8:45	55	132	3	190	0	53	34	87	37	16	37	90	6	35	5	46	413	0
8:45 - 9:00	73	180	4	257	0	65	31	96	41	7	47	95	7	21	3	31	479	1
9:00 - 9:15	73	118	0	191	2	74	33	109	47	13	39	99	2	25	1	28	427	0
9:15 - 9:30	73	105	0	178	2	90	43	135	33	11	40	84	1	28	4	33	430	0
9:30 - 9:45	73	108	0	181	0	92	60	152	27	18	51	96	10	44	0	54	483	0
9:45 - 10:00	78	105	5	188	3	77	63	143	31	22	62	115	2	40	0	42	488	0
10:00 - 10:15	83	98	7	188	0	80	68	148	30	17	69	116	1	36	2	39	491	0
10:15 - 10:30	80	102	2	184	0	80	58	138	41	19	71	131	1	37	2	40	493	0
10:30 - 10:45	92	112	2	206	0	77	56	133	50	24	84	158	0	42	3	45	542	0
10:45 - 11:00	94	109	3	206	2	100	69	171	35	21	84	140	1	33	1	35	552	0
11:00 - 11:15	102	107	3	212	1	0	57	58	45	24	80	149	3	27	2	32	451	0
11:15 - 11:30	91	107	2	200	3	79	59	141	39	31	92	162	1	43	4	48	551	1
11:30 - 11:45	98	100	5	203	0	103	82	185	60	39	83	182	3	35	4	42	612	0
11:45 - 12:00	113	147	4	264	2	115	85	202	72	33	112	217	3	22	7	32	715	0
12:00 - 12:15	109	129	5	243	5	113	100	218	63	41	114	218	3	38	2	43	722	0
12:15 - 12:30	94	113	3	210	4	116	84	204	80	43	112	235	3	47	5	55	704	0
12:30 - 12:45	103	125	4	232	3	93	84	180	78	37	126	241	5	39	7	51	704	0
12:45 - 13:00	100	129	5	234	2	96	74	172	65	42	115	222	4	43	3	50	678	0
13:00 - 13:15	87	126	1	214	1	97	79	177	69	35	129	233	3	29	1	33	657	0
13:15 - 13:30	83	112	9	204	1	94	66	161	77	33	114	224	0	38	2	40	629	0
13:30 - 13:45	87	127	0	214	1	129	87	217	67	43	125	235	3	53	1	57	723	0
13:45 - 14:00	90	105	6	201	2	116	76	194	72	53	140	265	2	44	2	48	708	0
14:00 - 14:15	102	118	4	224	0	96	76	172	75	53	142	270	2	45	1	48	714	0
14:15 - 14:30	78	100	3	181	1	112	72	185	75	44	125	244	5	41	0	46	656	0
14:30 - 14:45	102	137	3	242	4	116	76	196	48	45	101	194	3	20	0	23	655	1
14:45 - 15:00	98	140	2	240	4	108	73	185	72	64	110	246	5	36	1	42	713	1
15:00 - 15:15	80	92	5	177	5	146	84	235	53	30	115	198	1	37	2	40	650	0
15:15 - 15:30	82	110	0	192	0	172	86	258	54	50	97	201	2	33	3	38	689	1
15:30 - 15:45	75	139	8	222	6	178	87	271	64	44	132	240	5	30	7	42	775	0
15:45 - 16:00	100	211	20	331	10	148	86	244	49	33	124	206	13	48	10	71	852	3
16:00 - 16:15	86	138	6	230	7	167	94	268	67	62	119	248	10	44	8	62	808	5
16:15 - 16:30	89	108	1	198	4	181	93	278	56	57	126	239	7	44	4	55	770	4
16:30 - 16:45	84	135	4	223	2	192	104	298	57	41	113	211	4	32	3	39	771	0
16:45 - 17:00	75	179	4	258	7	147	76	230	47	46	122	215	5	34	3	42	745	1
17:00 - 17:15	85	152	8	245	2	150	78	230	60	68	130	258	2	38	4	44	777	0
17:15 - 17:30	84	143	3	230	3	186	92	281	53	47	122	222	2	37	1	40	773	0
17:30 - 17:45	80	115	1	196	1	167	102	270	41	37	124	202	1	41	4	46	714	0
17:45 - 18:00	75	131	1	207	2	150	98	250	49	39	138	226	3	38	2	43	726	0
18:00 - 18:15	92	143	2	237	11	127	69	207	56	49	136	241	6	49	3	58	743	0
18:15 - 18:30	43	113	1	157	7	149	71	227	52	56	121	229	3	32	8	43	656	0
18:30 - 18:45	66	97	5	168	6	92	65	163	55	39	125	219	0	39	2	41	591	0
18:45 - 19:00	55	71	2	128	2	81	47	130	39	36	109	184	2	26	1	29	471	0
TOTAL	3972	6316	181	10469	134	5329	3222	8685	2488	1654	4793	8935	204	1773	195	2172	30261	19
Trucks	16	24	1	41	3	44	16	63	4	8	40	52	1	12	0	13	169	0.6%
School Buses	13	34	6	53	4	29	6	39	20	16	39	75	56	6	1	63	230	0.8%

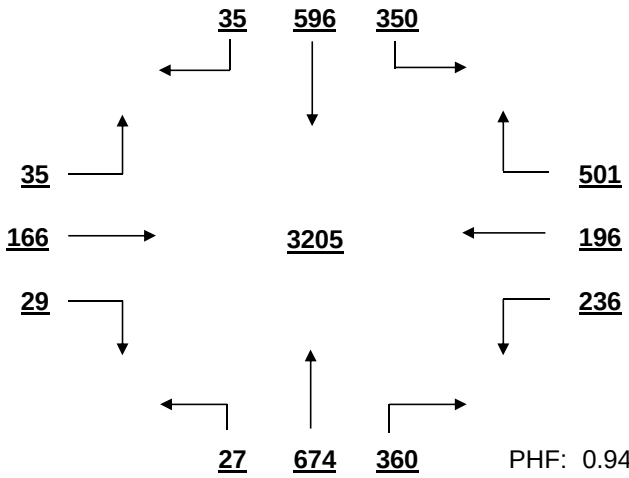
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

St. Andrews Rd AT Harbison Blvd-Emory Ln Date: 11/21/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

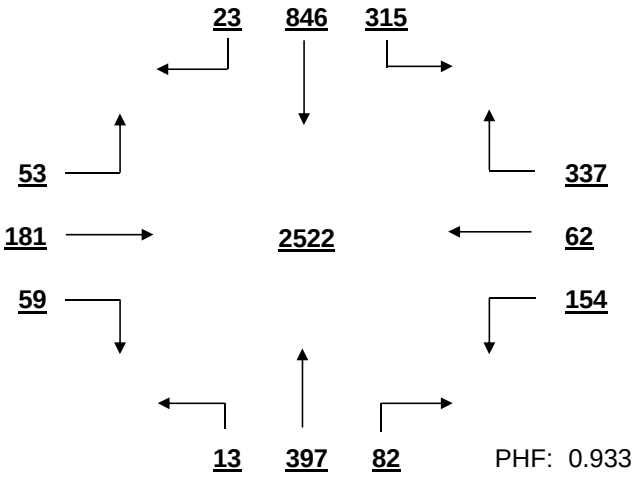


OVERALL PEAK HOUR VOLUME
FROM 15:30 TO 16:30



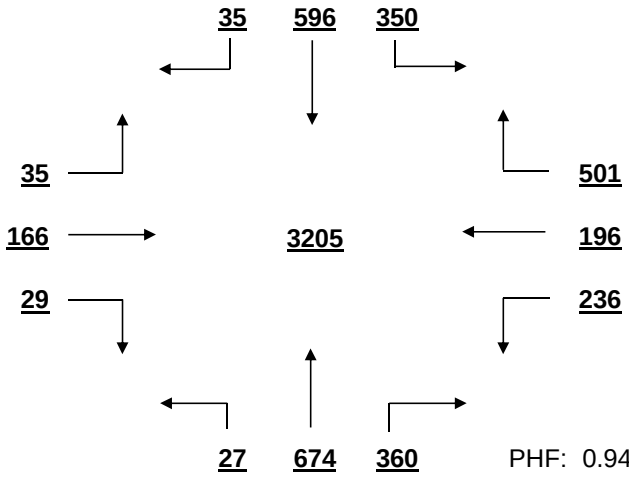
PHF: 0.940

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



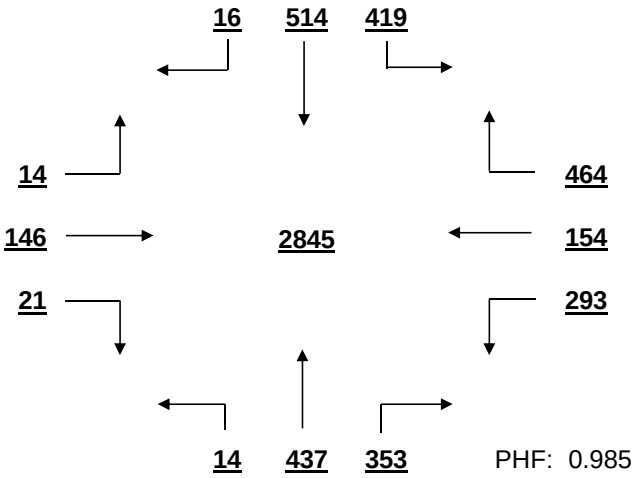
PHF: 0.933

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 15:30 TO 16:30



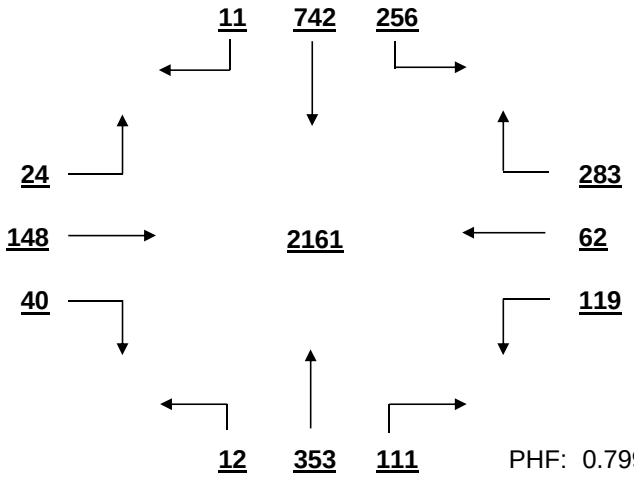
PHF: 0.940

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 11:45 TO 12:45



PHF: 0.985

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.799

SIGNAL WARRANT ANALYSIS

St. Andrews Rd AT Harbison Blvd-Emory Ln Date: 11/21/2016

Minor Street Volume, percent of total = 36.7%
Percent of Left Turns from Minor Street = 24.2%
Percent of Right Turns from Minor Street = 44.9%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1596.2	/ 600	=	266%	744.6	/ 200	=	372%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	248%	236%	213%	229%	244%	282%	264%	271%	322%	331%	318%	236%
Minor St.	232%	228%	197%	273%	355%	458%	479%	477%	423%	457%	454%	437%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1596.2	/ 900	=	177%	744.6	/ 100	=	745%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	165%	157%	142%	153%	163%	188%	176%	181%	214%	220%	212%	157%
Minor St.	464%	456%	394%	545%	710%	916%	957%	954%	845%	913%	908%	873%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	403%	397%	336%	474%	617%	797%	832%	830%	735%	794%	790%	759%

Warrant No. 3 - Peak Hour is met

Percent of warrant			Percent of warrant	
Overall Peak Hour:	15:30 - 16:30	Higher Volume Side Street Peak Hour:	13:30 - 14:30	
Minor St.	622%	Minor St.	611%	

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	0	0	0	0	0	1	0	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008

Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/21/2016

Major Rt: Bower Pkwy * Not on State System Minor Rt: Park Terrace Dr * Not on State System

Day of Week: Monday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 35

Direction of Minor Street: N-S Intersection ADT - 17080 (Calc)

Number of Lanes (major st)* 1 Number of Lanes (minor st)* 1

* Each Direction

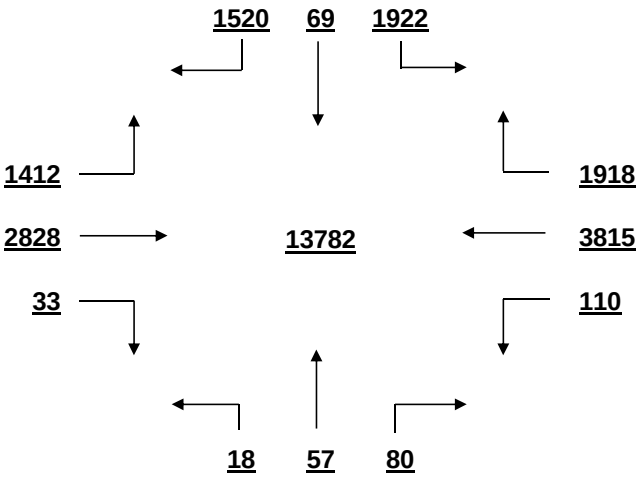
INTERSECTION VOLUME SUMMARY

	From N Park Terrace Dr				From S Park Terrace Dr				From E Bower Pkwy				From W Bower Pkwy				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	14	0	6	20	0	0	0	0	2	17	13	32	3	10	0	13	65	0
7:15 - 7:30	19	0	0	19	0	2	1	3	1	27	20	48	4	18	0	22	92	0
7:30 - 7:45	36	0	1	37	0	0	0	0	0	34	22	56	2	25	0	27	120	0
7:45 - 8:00	44	1	8	53	1	0	0	1	0	65	24	89	2	30	0	32	175	0
8:00 - 8:15	34	1	4	39	0	1	2	3	1	42	19	62	3	23	0	26	130	0
8:15 - 8:30	31	1	6	38	0	1	0	1	0	29	13	42	5	24	0	29	110	0
8:30 - 8:45	32	1	14	47	0	0	0	0	1	35	21	57	5	30	0	35	139	0
8:45 - 9:00	22	0	15	37	0	0	0	0	4	64	24	92	9	29	0	38	167	0
9:00 - 9:15	17	1	17	35	0	0	2	2	3	58	30	91	18	31	2	51	179	0
9:15 - 9:30	16	2	11	29	0	1	0	1	3	58	21	82	12	18	0	30	142	1
9:30 - 9:45	17	0	13	30	0	0	1	1	2	49	35	86	15	33	1	49	166	0
9:45 - 10:00	28	1	19	48	3	0	1	4	3	80	41	124	27	39	0	66	242	0
10:00 - 10:15	21	0	23	44	0	1	0	1	2	54	31	87	21	37	0	58	190	0
10:15 - 10:30	24	0	23	47	0	1	0	1	3	70	42	115	28	47	0	75	238	0
10:30 - 10:45	38	1	29	68	1	0	0	1	0	85	38	123	31	54	0	85	277	0
10:45 - 11:00	37	0	30	67	0	2	0	2	2	73	46	121	32	38	1	71	261	0
11:00 - 11:15	26	0	32	58	0	3	0	3	1	90	52	143	31	45	1	77	281	0
11:15 - 11:30	46	0	37	83	0	0	1	1	4	87	45	136	31	52	0	83	303	0
11:30 - 11:45	24	2	48	74	1	3	2	6	1	95	49	145	33	60	1	94	319	0
11:45 - 12:00	47	1	70	118	1	1	0	2	2	116	47	165	30	68	1	99	384	0
12:00 - 12:15	46	2	50	98	0	0	5	5	4	110	55	169	28	77	1	106	378	0
12:15 - 12:30	44	0	49	93	2	1	3	6	2	134	56	192	48	80	1	129	420	0
12:30 - 12:45	55	2	53	110	2	1	3	6	2	113	58	173	34	94	2	130	419	0
12:45 - 13:00	72	2	62	136	0	5	5	10	1	111	59	171	45	110	0	155	472	0
13:00 - 13:15	62	2	46	110	0	3	1	4	1	84	47	132	50	101	0	151	397	0
13:15 - 13:30	56	0	46	102	0	5	2	7	0	88	43	131	52	86	2	140	380	0
13:30 - 13:45	54	2	42	98	0	1	3	4	0	73	47	120	43	68	2	113	335	0
13:45 - 14:00	45	0	60	105	2	1	1	4	3	93	48	144	52	99	0	151	404	0
14:00 - 14:15	50	1	41	92	0	2	2	4	0	83	35	118	52	82	0	134	348	0
14:15 - 14:30	52	0	50	102	0	0	4	4	2	97	60	159	36	105	2	143	408	0
14:30 - 14:45	64	0	34	98	0	0	1	1	0	103	55	158	38	106	0	144	401	0
14:45 - 15:00	58	1	51	110	0	0	1	1	1	83	47	131	61	78	1	140	382	0
15:00 - 15:15	50	0	29	79	1	1	2	4	1	76	44	121	38	75	2	115	319	0
15:15 - 15:30	41	3	37	81	0	1	1	2	2	89	47	138	40	86	0	126	347	0
15:30 - 15:45	46	2	40	88	0	0	1	1	6	55	41	102	33	57	0	90	281	0
15:45 - 16:00	56	3	23	82	0	4	2	6	1	85	41	127	29	61	0	90	305	0
16:00 - 16:15	33	0	14	47	0	0	3	3	3	74	41	118	29	48	1	78	246	0
16:15 - 16:30	49	0	44	93	0	1	1	2	6	105	43	154	36	63	1	100	349	0
16:30 - 16:45	32	0	30	62	0	0	1	1	1	96	49	146	35	76	1	112	321	0
16:45 - 17:00	37	0	11	48	0	0	3	3	0	90	34	124	36	51	0	87	262	0
17:00 - 17:15	42	2	25	69	0	2	4	6	3	88	41	132	42	71	1	114	321	0
17:15 - 17:30	37	6	45	88	0	1	0	1	7	104	52	163	29	68	0	97	349	0
17:30 - 17:45	63	7	40	110	0	2	2	4	3	108	48	159	31	69	0	100	373	0
17:45 - 18:00	43	4	46	93	1	2	2	5	3	95	46	144	29	83	2	114	356	0
18:00 - 18:15	39	2	33	74	0	3	4	7	7	84	35	126	30	49	2	81	288	0
18:15 - 18:30	47	5	38	90	0	0	5	5	8	96	42	146	39	49	1	89	330	0
18:30 - 18:45	38	6	40	84	3	2	2	7	5	98	33	136	33	77	1	111	338	0
18:45 - 19:00	38	5	35	78	0	3	6	9	3	72	38	113	22	48	3	73	273	0
TOTAL	1922	69	1520	3511	18	57	80	155	110	3815	1918	5843	1412	2828	33	4273	13782	1
Trucks	7	1	1	9	0	1	0	1	1	11	10	22	2	16	0	18	50	0.4%
School Buses	4	0	0	4	0	0	0	0	0	13	15	28	0	5	0	5	37	0.3%

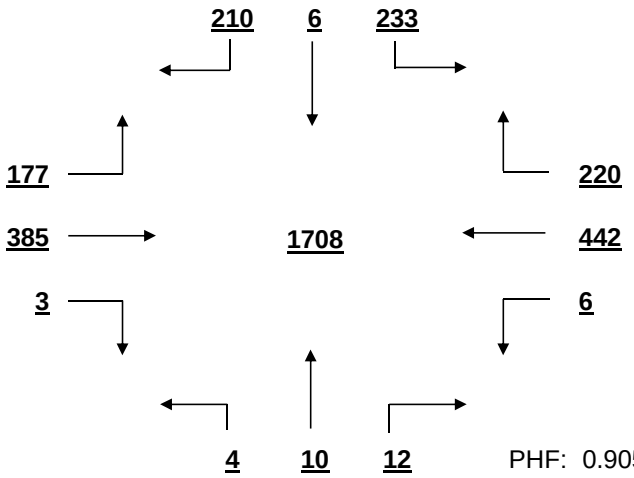
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Bower Pkwy AT Park Terrace Dr Date: 11/21/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

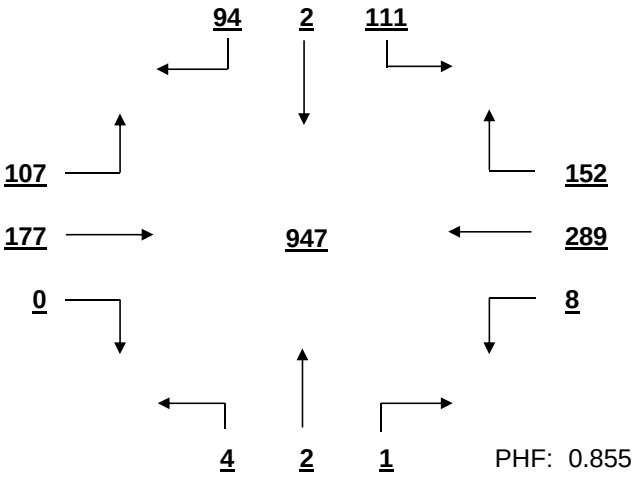


OVERALL PEAK HOUR VOLUME
FROM 12:15 TO 13:15



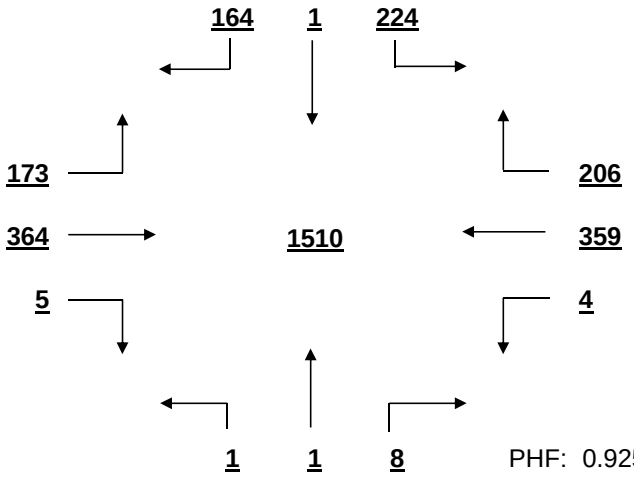
PHF: 0.905

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 9:45 TO 10:45



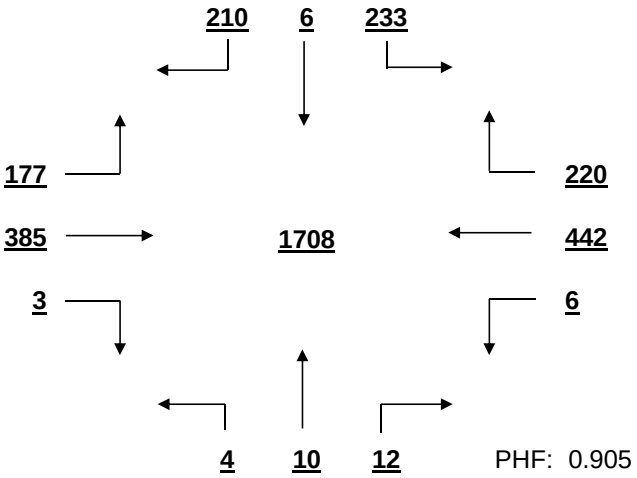
PHF: 0.855

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 14:15 TO 15:15



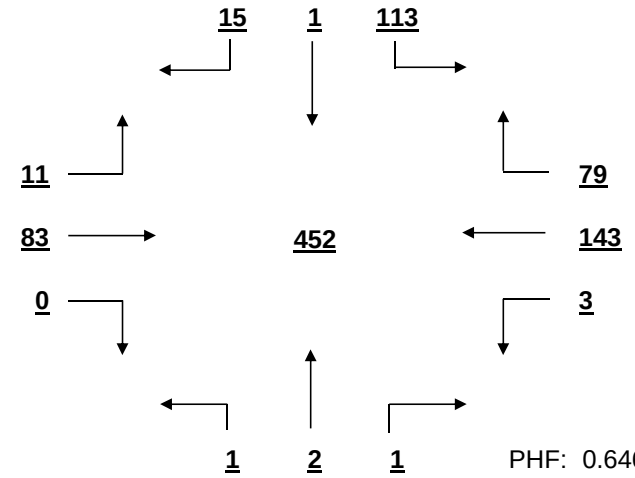
PHF: 0.925

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:15 TO 13:15



PHF: 0.905

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.646

SIGNAL WARRANT ANALYSIS

Bower Pkwy AT Park Terrace Dr Date: 11/21/2016

Minor Street Volume, percent of total = 26.6%
Percent of Left Turns from Minor Street = 52.9%
Percent of Right Turns from Minor Street = 43.6%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant	Average Minor Street % of Warrant
843.0 / 500 = 169%	292.6 / 150 = 195%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	64%	76%	116%	147%	188%	245%	216%	225%	182%	184%	205%	175%
Minor St.	86%	107%	95%	151%	222%	291%	277%	268%	220%	167%	240%	217%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant	Average Minor Street % of Warrant
843.0 / 750 = 112%	292.6 / 75 = 390%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	43%	51%	77%	98%	126%	163%	144%	150%	121%	123%	136%	117%
Minor St.	172%	215%	189%	301%	444%	583%	553%	536%	440%	333%	480%	435%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	37%	51%	63%	133%	299%	546%	496%	524%	277%	214%	382%	255%

Warrant No. 3 - Peak Hour is met

Percent of warrant		Percent of warrant	
Overall Peak Hour:	12:15 - 13:15	Higher Volume Side Street Peak Hour:	12:30 - 13:30
Minor St.	320%	Minor St.	302%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street	Minimum peak hour ped. volume crossing major street
107	133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	0	0	0	0	0	0	0	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/22/2016

Major Rt: Bower Pkwy * Not on State System Minor Rt: Saturn Pkwy * Not on State System

Day of Week: Tuesday Weather: Clear Office: Short Counts JMS

Type of Control: Stop Sign Speed Limit (major st) 35

Direction of Minor Street: E-W Intersection ADT - 14560 (Calc)

Number of Lanes (major st)* 1 Number of Lanes (minor st)* 1

* Each Direction

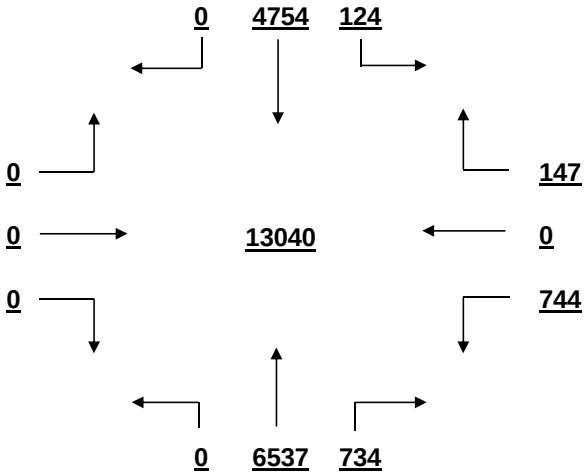
INTERSECTION VOLUME SUMMARY

	From N Bower Pkwy				From S Bower Pkwy				From E Saturn Pkwy				From W Saturn Pkwy				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	2	29	0	31	0	58	4	62	5	0	1	6	0	0	0	0	99	0
7:15 - 7:30	1	49	0	50	0	53	7	60	12	0	0	12	0	0	0	0	122	0
7:30 - 7:45	1	72	0	73	0	71	11	82	12	0	4	16	0	0	0	0	171	0
7:45 - 8:00	2	77	0	79	0	91	15	106	9	0	4	13	0	0	0	0	198	0
8:00 - 8:15	2	62	0	64	0	70	11	81	20	0	2	22	0	0	0	0	167	0
8:15 - 8:30	1	47	0	48	0	57	9	66	7	0	6	13	0	0	0	0	127	0
8:30 - 8:45	0	50	0	50	0	81	9	90	9	0	1	10	0	0	0	0	150	0
8:45 - 9:00	4	57	0	61	0	92	16	108	13	0	3	16	0	0	0	0	185	0
9:00 - 9:15	2	49	0	51	0	84	13	97	16	0	2	18	0	0	0	0	166	0
9:15 - 9:30	0	58	0	58	0	114	11	125	8	0	0	8	0	0	0	0	191	0
9:30 - 9:45	0	53	0	53	0	110	17	127	9	0	6	15	0	0	0	0	195	0
9:45 - 10:00	1	57	0	58	0	133	16	149	7	0	2	9	0	0	0	0	216	0
10:00 - 10:15	4	68	0	72	0	141	22	163	13	0	3	16	0	0	0	0	251	0
10:15 - 10:30	1	74	0	75	0	117	14	131	14	0	5	19	0	0	0	0	225	0
10:30 - 10:45	1	96	0	97	0	126	18	144	13	0	1	14	0	0	0	0	255	0
10:45 - 11:00	0	89	0	89	0	149	16	165	16	0	2	18	0	0	0	0	272	0
11:00 - 11:15	1	107	0	108	0	175	18	193	15	0	3	18	0	0	0	0	319	0
11:15 - 11:30	2	99	0	101	0	133	7	140	8	0	1	9	0	0	0	0	250	0
11:30 - 11:45	3	117	0	120	0	167	14	181	12	0	3	15	0	0	0	0	316	0
11:45 - 12:00	1	99	0	100	0	197	18	215	18	0	5	23	0	0	0	0	338	0
12:00 - 12:15	1	112	0	113	0	188	15	203	11	0	1	12	0	0	0	0	328	0
12:15 - 12:30	5	95	0	100	0	155	12	167	6	0	6	12	0	0	0	0	279	0
12:30 - 12:45	0	108	0	108	0	157	13	170	5	0	4	9	0	0	0	0	287	0
12:45 - 13:00	3	122	0	125	0	166	30	196	14	0	6	20	0	0	0	0	341	0
13:00 - 13:15	4	152	0	156	0	124	13	137	14	0	1	15	0	0	0	0	308	0
13:15 - 13:30	6	67	0	73	0	88	7	95	14	0	2	16	0	0	0	0	184	0
13:30 - 13:45	4	78	0	82	0	97	18	115	5	0	1	6	0	0	0	0	203	0
13:45 - 14:00	4	114	0	118	0	153	15	168	13	0	2	15	0	0	0	0	301	0
14:00 - 14:15	3	138	0	141	0	129	27	156	17	0	1	18	0	0	0	0	315	0
14:15 - 14:30	4	149	0	153	0	171	16	187	19	0	4	23	0	0	0	0	363	0
14:30 - 14:45	6	125	0	131	0	116	14	130	14	0	5	19	0	0	0	0	280	0
14:45 - 15:00	2	125	0	127	0	183	8	191	18	0	3	21	0	0	0	0	339	0
15:00 - 15:15	2	131	0	133	0	142	22	164	12	0	0	12	0	0	0	0	309	0
15:15 - 15:30	1	113	0	114	0	140	17	157	12	0	3	15	0	0	0	0	286	0
15:30 - 15:45	0	127	0	127	0	172	12	184	13	0	3	16	0	0	0	0	327	0
15:45 - 16:00	2	97	0	99	0	127	23	150	11	0	3	14	0	0	0	0	263	0
16:00 - 16:15	3	102	0	105	0	130	22	152	9	0	6	15	0	0	0	0	272	0
16:15 - 16:30	2	122	0	124	0	168	19	187	16	0	3	19	0	0	0	0	330	0
16:30 - 16:45	3	134	0	137	0	177	23	200	24	0	2	26	0	0	0	0	363	0
16:45 - 17:00	1	122	0	123	0	211	17	228	16	0	4	20	0	0	0	0	371	0
17:00 - 17:15	3	133	0	136	0	184	18	202	29	0	0	29	0	0	0	0	367	0
17:15 - 17:30	1	133	0	134	0	173	17	190	26	0	5	31	0	0	0	0	355	0
17:30 - 17:45	6	112	0	118	0	198	16	214	25	0	2	27	0	0	0	0	359	0
17:45 - 18:00	3	122	0	125	0	149	19	168	26	0	8	34	0	0	0	0	327	0
18:00 - 18:15	9	117	0	126	0	196	13	209	34	0	6	40	0	0	0	0	375	0
18:15 - 18:30	4	149	0	153	0	137	12	149	30	0	8	38	0	0	0	0	340	0
18:30 - 18:45	3	122	0	125	0	159	18	177	47	0	4	51	0	0	0	0	353	0
18:45 - 19:00	10	124	0	134	0	128	12	140	28	0	0	28	0	0	0	0	302	0
TOTAL	124	4754	0	4878	0	6537	734	7271	744	0	147	891	0	0	0	0	13040	0
Trucks	0	20	0	20	0	16	12	28	11	0	1	12	0	0	0	0	60	0.5%
School Buses	0	6	0	6	0	21	3	24	2	0	5	7	0	0	0	0	37	0.3%

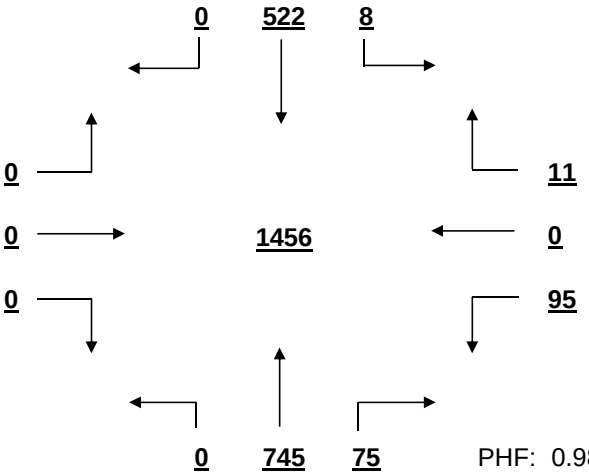
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Bower Pkwy AT Saturn Pkwy Date: 11/22/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

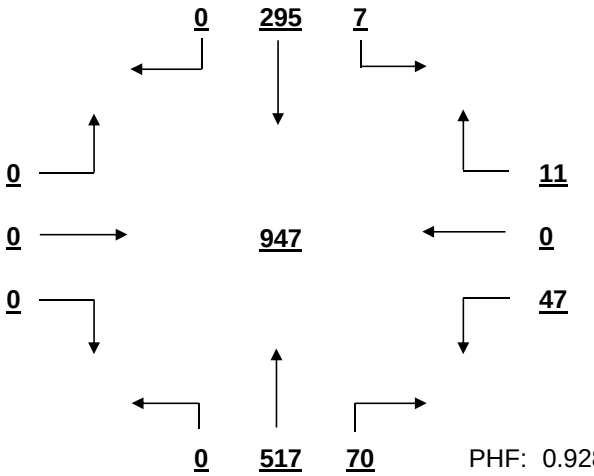


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



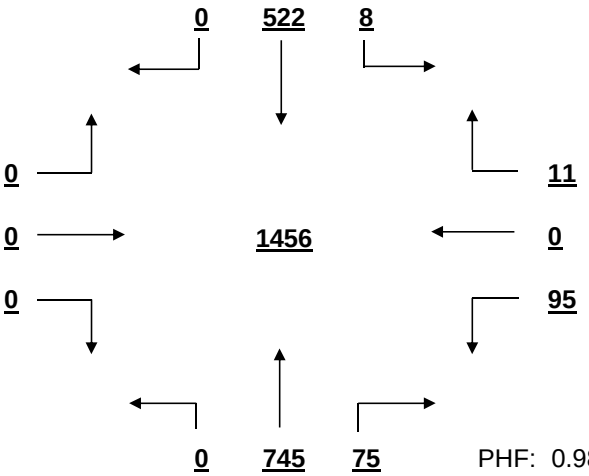
PHF: 0.981

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 9:45 TO 10:45



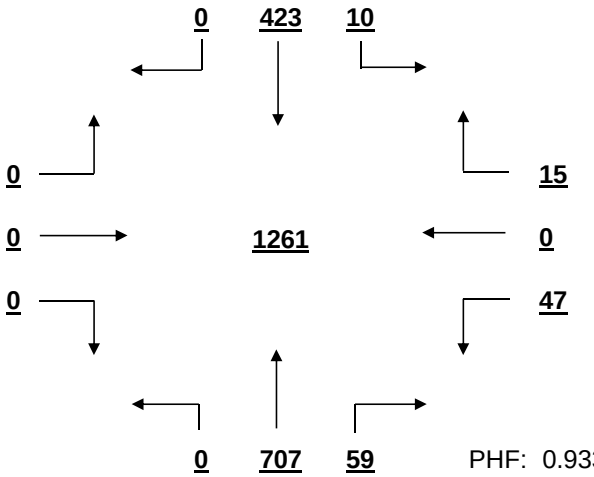
PHF: 0.928

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



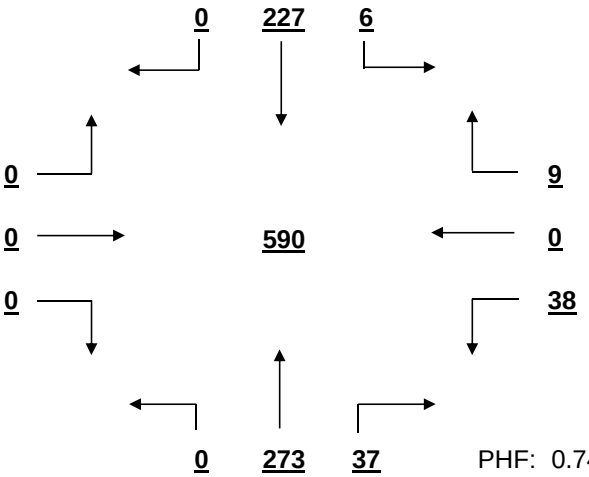
PHF: 0.981

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 11:30 TO 12:30



PHF: 0.933

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.745

SIGNAL WARRANT ANALYSIS

Bower Pkwy AT Saturn Pkwy Date: 11/22/2016

Minor Street Volume, percent of total = 6.8%
Percent of Left Turns from Minor Street = 83.5%
Percent of Right Turns from Minor Street = 16.5%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is not met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1012.4	/ 500	=	202%	74.3	/ 150	=	50%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	109%	114%	144%	187%	232%	236%	189%	243%	226%	251%	257%	243%
Minor St.	31%	41%	33%	45%	43%	35%	35%	54%	38%	53%	81%	105%

Condition B - Interruption to Continuous Traffic is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1012.4	/ 750	=	135%	74.3	/ 75	=	99%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	72%	76%	96%	125%	154%	158%	126%	162%	150%	167%	172%	162%
Minor St.	63%	81%	67%	89%	87%	71%	69%	108%	76%	107%	161%	209%

80% Combination of Conditions A & B is not met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	19%	26%	29%	59%	81%	66%	47%	101%	74%	100%	151%	196%

Warrant No. 3 - Peak Hour is met

Percent of warrant			Percent of warrant	
Overall Peak Hour:	16:30 - 17:30	Higher Volume Side Street Peak Hour:	17:45 - 18:45	
Minor St.	90%	Minor St.	116%	

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	0	0	0	0	0	0	0	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/21/2016

Major Rt: Piney Grove Rd * Not on State System Minor Rt: Bower Pkwy-Jamil Rd * Not on State System

Day of Week: Monday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 35

Direction of Minor Street: N-S Intersection ADT - 28910 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1

* Each Direction

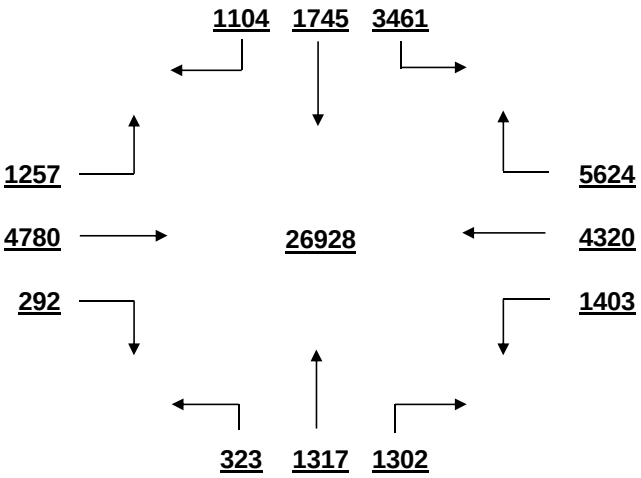
INTERSECTION VOLUME SUMMARY

	From N Bower Pkwy-Jamil R				From S Bower Pkwy-Jamil R				From E Piney Grove Rd				From W Piney Grove Rd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	13	12	9	34	7	11	23	41	29	48	24	101	9	96	5	110	286	1
7:15 - 7:30	30	15	15	60	2	13	27	42	31	49	42	122	19	176	5	200	424	0
7:30 - 7:45	42	37	16	95	4	16	20	40	27	77	49	153	13	157	16	186	474	0
7:45 - 8:00	40	40	11	91	6	15	24	45	41	42	68	151	18	165	8	191	478	0
8:00 - 8:15	46	34	10	90	3	10	21	34	34	53	50	137	14	126	4	144	405	1
8:15 - 8:30	36	34	15	85	2	4	22	28	19	53	66	138	12	126	8	146	397	0
8:30 - 8:45	35	27	6	68	4	9	17	30	22	62	55	139	14	101	6	121	358	0
8:45 - 9:00	34	21	15	70	4	13	19	36	33	58	104	195	26	100	3	129	430	1
9:00 - 9:15	42	11	15	68	2	18	20	40	20	59	74	153	17	83	3	103	364	1
9:15 - 9:30	19	15	0	34	4	15	23	42	16	61	87	164	20	83	4	107	347	0
9:30 - 9:45	45	11	0	56	3	19	22	44	24	61	102	187	10	73	1	84	371	0
9:45 - 10:00	40	28	15	83	3	25	24	52	29	68	109	206	17	70	2	89	430	2
10:00 - 10:15	56	13	10	79	3	17	21	41	16	62	104	182	17	71	5	93	395	0
10:15 - 10:30	60	14	13	87	6	20	20	46	21	62	120	203	25	76	5	106	442	0
10:30 - 10:45	54	26	17	97	6	15	25	46	10	70	119	199	22	67	2	91	433	0
10:45 - 11:00	59	20	24	103	4	24	24	52	24	83	125	232	22	90	10	122	509	0
11:00 - 11:15	62	20	17	99	7	0	36	43	23	63	135	221	20	58	3	81	444	0
11:15 - 11:30	80	21	18	119	2	22	24	48	16	85	128	229	25	86	3	114	510	2
11:30 - 11:45	64	25	15	104	5	27	22	54	32	82	168	282	22	133	6	161	601	0
11:45 - 12:00	77	35	20	132	2	32	20	54	36	86	183	305	36	103	2	141	632	0
12:00 - 12:15	95	48	24	167	6	33	25	64	33	102	208	343	20	88	4	112	686	0
12:15 - 12:30	95	38	30	163	6	35	24	65	20	103	204	327	28	74	3	105	660	0
12:30 - 12:45	104	56	36	196	9	31	29	69	31	88	160	279	29	95	2	126	670	1
12:45 - 13:00	109	74	35	218	5	25	30	60	44	76	155	275	36	92	4	132	685	1
13:00 - 13:15	111	58	32	201	4	29	26	59	29	84	134	247	19	104	4	127	634	1
13:15 - 13:30	108	49	20	177	4	29	18	51	37	91	115	243	29	93	9	131	602	2
13:30 - 13:45	107	36	31	174	5	27	25	57	36	97	117	250	30	91	9	130	611	3
13:45 - 14:00	101	52	35	188	6	31	25	62	26	82	156	264	17	106	5	128	642	0
14:00 - 14:15	108	57	28	193	9	32	48	89	34	104	129	267	29	87	6	122	671	0
14:15 - 14:30	114	48	32	194	6	21	31	58	39	101	117	257	19	85	9	113	622	1
14:30 - 14:45	101	52	27	180	4	24	27	55	30	100	156	286	25	86	7	118	639	0
14:45 - 15:00	95	46	38	179	14	39	35	88	22	87	91	200	26	104	5	135	602	0
15:00 - 15:15	24	39	43	106	11	54	52	117	23	62	83	168	34	102	4	140	531	2
15:15 - 15:30	88	43	0	131	8	63	42	113	55	56	71	182	43	83	7	133	559	0
15:30 - 15:45	77	32	28	137	6	32	33	71	94	117	76	287	46	112	3	161	656	0
15:45 - 16:00	88	46	34	168	16	43	38	97	35	105	105	245	30	118	8	156	666	0
16:00 - 16:15	87	46	37	170	6	49	25	80	32	95	162	289	51	122	6	179	718	0
16:15 - 16:30	93	50	18	161	14	38	34	86	31	109	139	279	45	108	9	162	688	1
16:30 - 16:45	91	39	27	157	12	52	20	84	20	123	134	277	37	70	5	112	630	0
16:45 - 17:00	87	42	38	167	7	28	25	60	37	158	153	348	33	104	10	147	722	0
17:00 - 17:15	90	50	33	173	16	38	41	95	25	162	120	307	34	119	10	163	738	1
17:15 - 17:30	72	41	35	148	13	44	44	101	35	139	144	318	38	114	13	165	732	1
17:30 - 17:45	93	47	36	176	11	40	24	75	23	163	120	306	33	99	10	142	699	1
17:45 - 18:00	90	43	38	171	14	51	25	90	23	117	125	265	27	111	9	147	673	0
18:00 - 18:15	76	46	26	148	14	36	35	85	29	141	130	300	34	117	8	159	692	3
18:15 - 18:30	77	35	30	142	9	26	29	64	24	133	140	297	32	88	9	129	632	0
18:30 - 18:45	73	34	31	138	5	22	20	47	21	133	132	286	24	92	8	124	595	0
18:45 - 19:00	73	39	21	133	4	20	18	42	12	108	136	256	31	76	5	112	543	0
TOTAL	3461	1745	1104	6310	323	1317	1302	2942	1403	4320	5624	11347	1257	4780	292	6329	26928	26
Trucks	38	11	6	55	6	10	29	45	38	67	50	155	3	51	3	57	312	1.2%
School Buses	5	6	4	15	2	5	12	19	4	9	5	18	21	11	4	36	88	0.3%

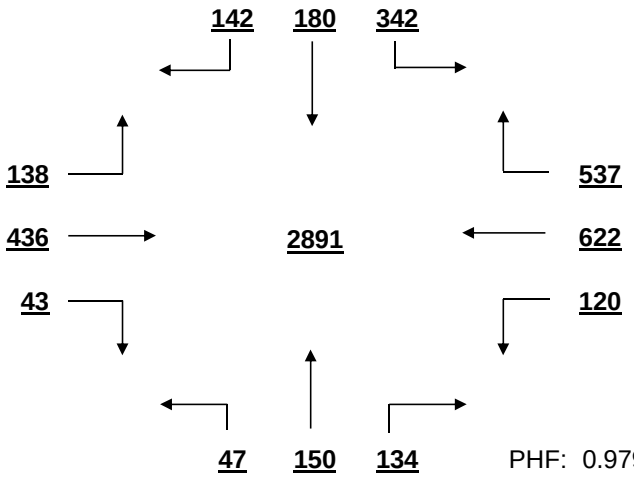
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Piney Grove Rd AT Bower Pkwy-Jamil Rd Date: 11/21/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

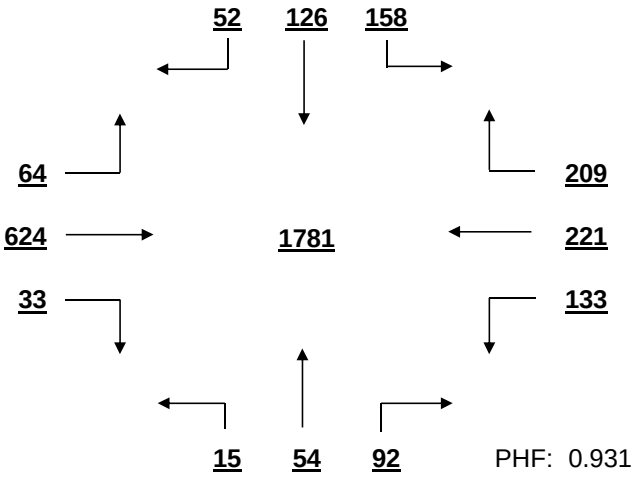


OVERALL PEAK HOUR VOLUME
FROM 16:45 TO 17:45



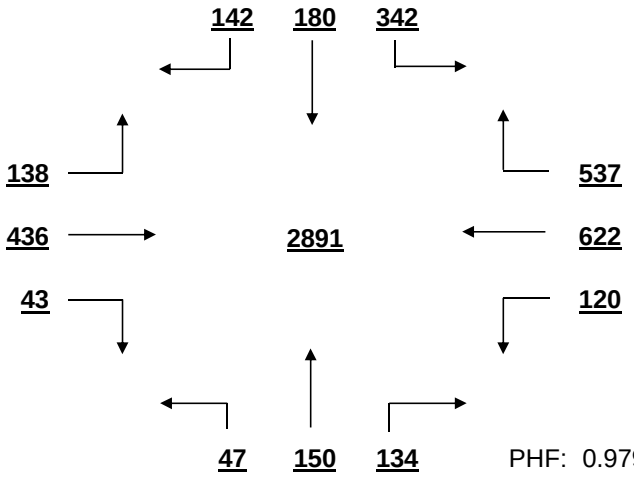
PHF: 0.979

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



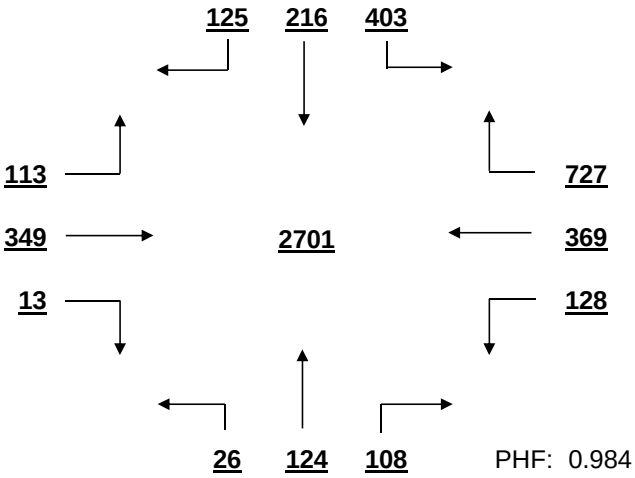
PHF: 0.931

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:45 TO 17:45



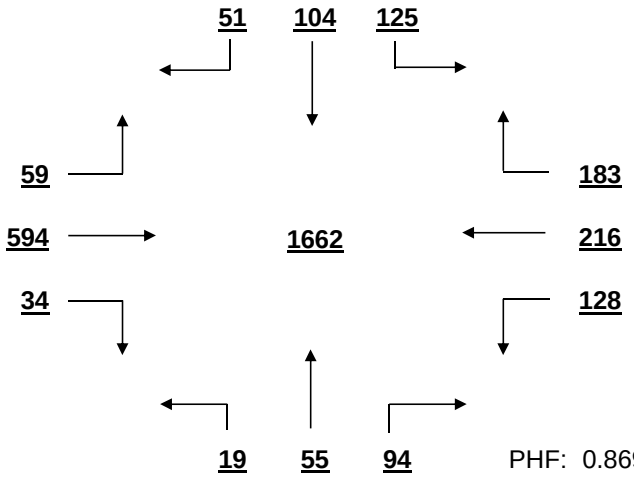
PHF: 0.979

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:00 TO 13:00



PHF: 0.984

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.869

SIGNAL WARRANT ANALYSIS

Piney Grove Rd AT Bower Pkwy-Jamil Rd Date: 11/21/2016

Minor Street Volume, percent of total = 34.4%
Percent of Left Turns from Minor Street = 40.9%
Percent of Right Turns from Minor Street = 26.0%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1473.0	/ 600	=	246%	525.8	/ 150	=	351%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	202%	192%	182%	205%	256%	283%	253%	250%	245%	299%	302%	277%
Minor St.	187%	209%	161%	244%	303%	496%	493%	497%	361%	437%	445%	374%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1473.0	/ 900	=	164%	525.8	/ 75	=	701%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	135%	128%	121%	136%	170%	189%	169%	166%	164%	199%	201%	185%
Minor St.	373%	417%	321%	488%	605%	992%	987%	995%	723%	873%	891%	748%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	275%	280%	197%	367%	568%	930%	925%	933%	678%	819%	835%	701%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	16:45 - 17:45	Higher Volume Side Street Peak Hour:	12:30 - 13:30
Minor St.	664%	Minor St.	626%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	1	0	1	0	0	1	1	1	0	0	1	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008

Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/21/2016

Major Rt: Piney Grove Rd * Not on State System Minor Rt: Foxfire Dr-Country Walk Apts * Not on State System

Day of Week: Monday Weather: Clear Office: Short Counts JMS

Type of Control: Stop Sign Speed Limit (major st) 35

Direction of Minor Street: N-S Intersection ADT - 23840 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1 * Each Direction

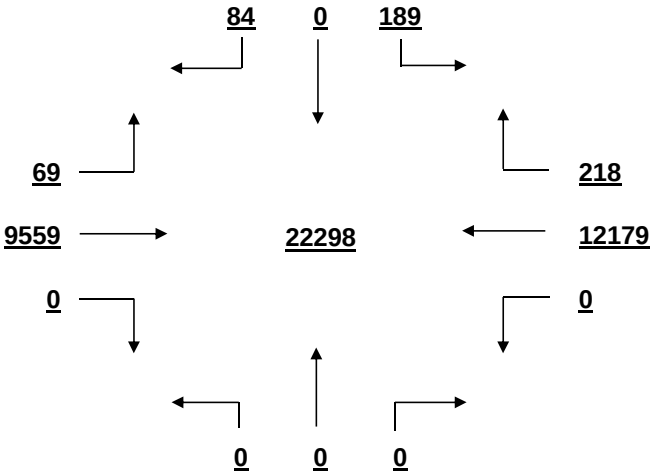
INTERSECTION VOLUME SUMMARY

	From N Foxfire Dr-Country				From S Foxfire Dr-Country				From E Piney Grove Rd				From W Piney Grove Rd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	8	0	3	11	0	0	0	0	0	103	1	104	0	124	0	124	239	0
7:15 - 7:30	3	0	4	7	0	0	0	0	0	124	0	124	2	215	0	217	348	0
7:30 - 7:45	9	0	5	14	0	0	0	0	0	153	3	156	3	213	0	216	386	0
7:45 - 8:00	7	0	3	10	0	0	0	0	0	182	1	183	3	241	0	244	437	0
8:00 - 8:15	3	0	2	5	0	0	0	0	0	133	2	135	0	208	0	208	348	0
8:15 - 8:30	3	0	2	5	0	0	0	0	0	146	1	147	0	188	0	188	340	0
8:30 - 8:45	6	0	4	10	0	0	0	0	0	127	2	129	1	164	0	165	304	0
8:45 - 9:00	3	0	0	3	0	0	0	0	0	185	4	189	0	155	0	155	347	1
9:00 - 9:15	5	0	2	7	0	0	0	0	0	159	0	159	0	146	0	146	312	0
9:15 - 9:30	2	0	0	2	0	0	0	0	0	205	5	210	3	117	0	120	332	1
9:30 - 9:45	7	0	0	7	0	0	0	0	0	172	1	173	0	134	0	134	314	0
9:45 - 10:00	5	0	3	8	0	0	0	0	0	234	5	239	0	137	0	137	384	2
10:00 - 10:15	2	0	1	3	0	0	0	0	0	220	3	223	0	138	0	138	364	1
10:15 - 10:30	0	0	1	1	0	0	0	0	0	199	5	204	1	160	0	161	366	0
10:30 - 10:45	4	0	2	6	0	0	0	0	0	203	6	209	0	148	0	148	363	0
10:45 - 11:00	3	0	1	4	0	0	0	0	0	239	4	243	0	173	0	173	420	0
11:00 - 11:15	4	0	2	6	0	0	0	0	0	248	3	251	2	159	0	161	418	0
11:15 - 11:30	1	0	0	1	0	0	0	0	0	239	5	244	0	183	0	183	428	1
11:30 - 11:45	4	0	3	7	0	0	0	0	0	288	4	292	0	161	0	161	460	0
11:45 - 12:00	1	0	2	3	0	0	0	0	0	360	2	362	1	200	0	201	566	0
12:00 - 12:15	3	0	3	6	0	0	0	0	0	373	7	380	3	223	0	226	612	0
12:15 - 12:30	5	0	2	7	0	0	0	0	0	392	2	394	0	181	0	181	582	0
12:30 - 12:45	2	0	0	2	0	0	0	0	0	350	4	354	2	223	0	225	581	0
12:45 - 13:00	3	0	0	3	0	0	0	0	0	319	5	324	1	230	0	231	558	1
13:00 - 13:15	2	0	2	4	0	0	0	0	0	312	7	319	2	247	0	249	572	0
13:15 - 13:30	5	0	1	6	0	0	0	0	0	347	6	353	0	219	0	219	578	1
13:30 - 13:45	5	0	2	7	0	0	0	0	0	371	4	375	1	213	0	214	596	1
13:45 - 14:00	4	0	0	4	0	0	0	0	0	308	5	313	0	240	0	240	557	0
14:00 - 14:15	5	0	1	6	0	0	0	0	0	399	4	403	1	243	0	244	653	0
14:15 - 14:30	2	0	1	3	0	0	0	0	0	286	3	289	2	230	0	232	524	0
14:30 - 14:45	3	0	2	5	0	0	0	0	0	301	5	306	3	209	0	212	523	1
14:45 - 15:00	1	0	0	1	0	0	0	0	0	250	8	258	1	244	0	245	504	0
15:00 - 15:15	7	0	4	11	0	0	0	0	0	160	3	163	3	221	0	224	398	4
15:15 - 15:30	6	0	0	6	0	0	0	0	0	192	3	195	2	220	0	222	423	0
15:30 - 15:45	3	0	1	4	0	0	0	0	0	256	4	260	2	218	0	220	484	0
15:45 - 16:00	2	0	1	3	0	0	0	0	0	264	12	276	2	237	0	239	518	0
16:00 - 16:15	6	0	3	9	0	0	0	0	0	250	5	255	2	226	0	228	492	1
16:15 - 16:30	1	0	2	3	0	0	0	0	0	278	4	282	2	224	0	226	511	0
16:30 - 16:45	3	0	5	8	0	0	0	0	0	216	10	226	3	200	0	203	437	0
16:45 - 17:00	9	0	2	11	0	0	0	0	0	346	6	352	3	196	0	199	562	0
17:00 - 17:15	4	0	1	5	0	0	0	0	0	313	4	317	4	257	0	261	583	1
17:15 - 17:30	5	0	2	7	0	0	0	0	0	320	5	325	0	240	0	240	572	0
17:30 - 17:45	1	0	2	3	0	0	0	0	0	296	10	306	1	214	0	215	524	0
17:45 - 18:00	7	0	0	7	0	0	0	0	0	282	9	291	3	235	0	238	536	0
18:00 - 18:15	3	0	2	5	0	0	0	0	0	277	7	284	3	245	0	248	537	1
18:15 - 18:30	6	0	1	7	0	0	0	0	0	291	7	298	5	213	0	218	523	0
18:30 - 18:45	3	0	2	5	0	0	0	0	0	255	5	260	0	186	0	186	451	0
18:45 - 19:00	3	0	2	5	0	0	0	0	0	256	7	263	2	161	0	163	431	0
TOTAL	189	0	84	273	0	0	0	0	0	12179	218	12397	69	9559	0	9628	22298	17
Trucks	3	0	0	3	0	0	0	0	0	138	1	139	1	151	0	152	294	1.3%
School Buses	2	0	1	3	0	0	0	0	0	12	5	17	3	21	0	24	44	0.2%

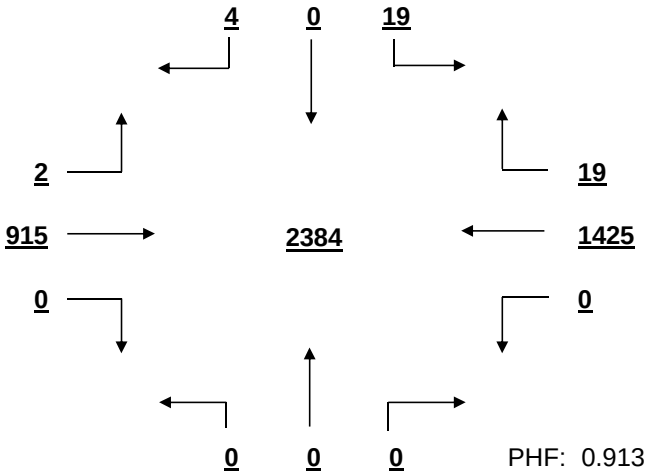
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Piney Grove Rd AT Foxfire Dr-Country Walk Apts Date: 11/21/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

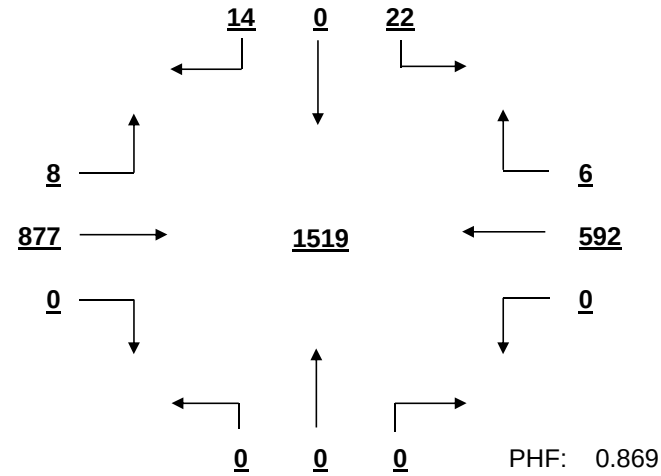


OVERALL PEAK HOUR VOLUME
FROM 13:15 TO 14:15



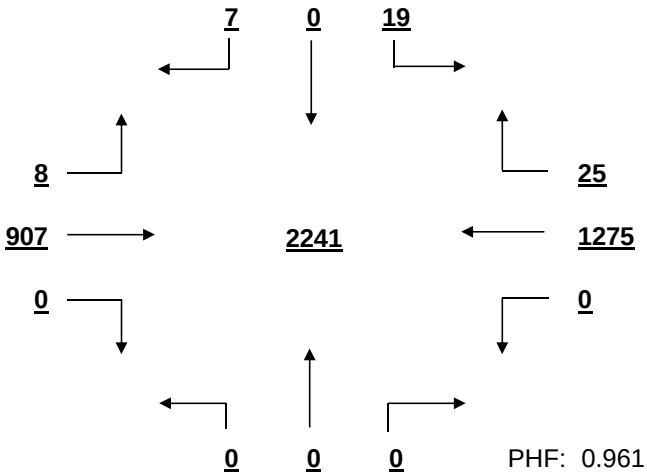
PHF: 0.913

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



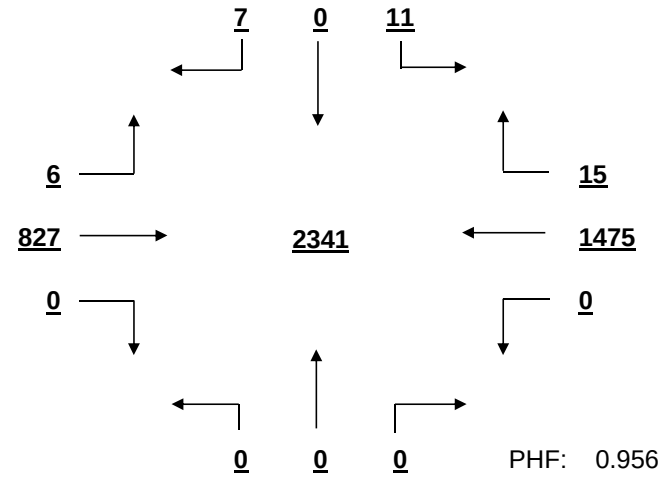
PHF: 0.869

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:45 TO 17:45



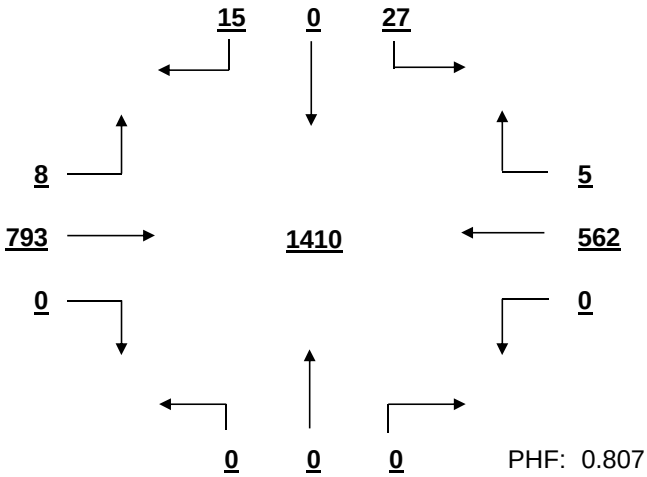
PHF: 0.961

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 11:45 TO 12:45



PHF: 0.956

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.807

SIGNAL WARRANT ANALYSIS

Piney Grove Rd AT Foxfire Dr-Country Walk Apts Date: 11/21/2016

Minor Street Volume, percent of total = 1.2%
Percent of Left Turns from Minor Street = 69.2%
Percent of Right Turns from Minor Street = 30.8%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is not met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1835.4	/	600	= 306%	22.8	/	150	= 15%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	228%	219%	220%	250%	309%	386%	380%	365%	300%	329%	366%	320%
Minor St.	28%	15%	16%	9%	11%	12%	14%	10%	16%	21%	15%	15%

Condition B - Interruption to Continuous Traffic is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1835.4	/	900	= 204%	22.8	/	75	= 30%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	152%	146%	146%	167%	206%	257%	254%	243%	200%	219%	244%	213%
Minor St.	56%	31%	32%	19%	23%	24%	28%	20%	32%	41%	29%	29%

80% Combination of Conditions A & B is not met

Warrant No. 2 - Four Hour Vehicular Volume is not met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	53%	25%	27%	18%	21%	23%	26%	19%	30%	39%	28%	28%

Warrant No. 3 - Peak Hour is not met

Percent of warrant
Overall Peak Hour: 13:15 - 14:15
Minor St. 23%

Percent of warrant
Higher Volume Side Street Peak Hour: 7:00 - 8:00
Minor St. 25%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	0	0	0	0	0	0	0	0	1	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/22/2016

Major Rt: Piney Grove Rd * Not on State System Minor Rt: Fernandina Rd * Not on State System

Day of Week: Tuesday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 35

Direction of Minor Street: N-S Intersection ADT - 24530 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1

* Each Direction

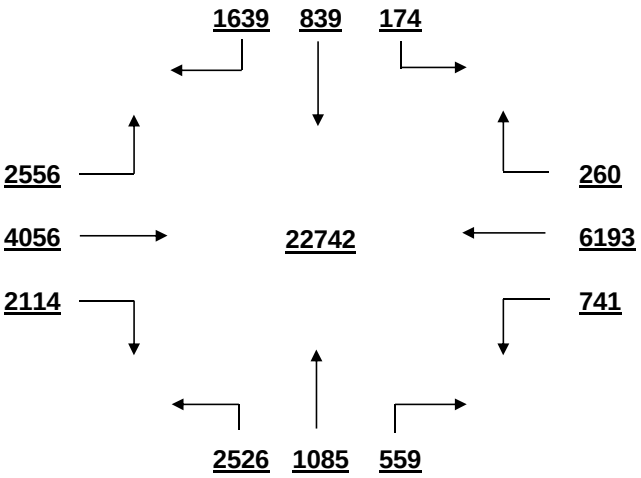
INTERSECTION VOLUME SUMMARY

	From N Fernandina Rd				From S Fernandina Rd				From E Piney Grove Rd				From W Piney Grove Rd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	1	7	8	16	14	0	0	14	9	108	0	117	4	52	42	98	245	0
7:15 - 7:30	1	21	10	32	14	2	4	20	25	124	3	152	8	75	41	124	328	0
7:30 - 7:45	3	71	32	106	20	1	0	21	37	158	5	200	13	71	63	147	474	0
7:45 - 8:00	0	65	13	78	15	4	2	21	50	167	0	217	27	78	78	183	499	0
8:00 - 8:15	2	43	21	66	25	3	3	31	37	142	0	179	22	94	68	184	460	0
8:15 - 8:30	1	21	11	33	30	5	10	45	29	138	2	169	39	93	88	220	467	1
8:30 - 8:45	2	24	12	38	27	3	3	33	17	90	1	108	36	65	63	164	343	0
8:45 - 9:00	0	17	22	39	24	6	4	34	19	92	1	112	27	63	53	143	328	0
9:00 - 9:15	1	6	13	20	31	9	3	43	12	79	2	93	26	65	41	132	288	0
9:15 - 9:30	1	3	21	25	33	9	6	48	8	104	3	115	31	61	42	134	322	0
9:30 - 9:45	1	6	23	30	32	5	4	41	7	90	7	104	36	56	39	131	306	0
9:45 - 10:00	2	3	19	24	32	4	5	41	8	68	2	78	51	62	21	134	277	1
10:00 - 10:15	2	3	29	34	29	9	4	42	3	93	6	102	66	70	47	183	361	0
10:15 - 10:30	5	8	34	47	46	12	7	65	11	85	4	100	79	67	40	186	398	0
10:30 - 10:45	3	5	34	42	38	11	4	53	3	111	6	120	58	68	32	158	373	0
10:45 - 11:00	3	7	36	46	39	18	3	60	5	92	6	103	72	58	35	165	374	0
11:00 - 11:15	2	5	33	40	44	11	10	65	11	112	5	128	72	65	33	170	403	0
11:15 - 11:30	2	10	42	54	52	12	10	74	11	123	2	136	69	57	35	161	425	0
11:30 - 11:45	4	10	44	58	50	14	10	74	8	127	1	136	93	74	39	206	474	0
11:45 - 12:00	3	10	49	62	65	23	9	97	6	135	7	148	84	76	38	198	505	0
12:00 - 12:15	2	18	43	63	73	18	13	104	4	142	11	157	84	85	36	205	529	1
12:15 - 12:30	3	14	38	55	63	43	9	115	11	126	5	142	88	86	43	217	529	0
12:30 - 12:45	5	16	31	52	59	26	14	99	16	142	10	168	83	83	36	202	521	1
12:45 - 13:00	5	19	42	66	61	21	12	94	14	140	6	160	65	82	50	197	517	1
13:00 - 13:15	4	16	53	73	63	16	6	85	20	126	7	153	95	76	64	235	546	0
13:15 - 13:30	2	18	42	62	53	17	9	79	23	138	10	171	70	82	50	202	514	0
13:30 - 13:45	4	22	45	71	59	18	7	84	16	136	3	155	60	97	45	202	512	0
13:45 - 14:00	4	10	42	56	49	11	9	69	12	142	11	165	79	78	41	198	488	1
14:00 - 14:15	2	12	49	63	58	16	10	84	11	122	8	141	52	91	52	195	483	2
14:15 - 14:30	4	11	39	54	53	14	13	80	10	138	2	150	66	88	43	197	481	1
14:30 - 14:45	1	5	44	50	45	9	7	61	6	147	7	160	69	85	51	205	476	0
14:45 - 15:00	7	14	33	54	58	23	16	97	9	120	8	137	62	99	32	193	481	0
15:00 - 15:15	4	18	43	65	49	16	11	76	9	118	3	130	72	86	37	195	466	0
15:15 - 15:30	5	10	38	53	56	16	10	82	8	129	9	146	62	92	31	185	466	0
15:30 - 15:45	7	14	48	69	60	20	15	95	5	152	7	164	49	82	34	165	493	0
15:45 - 16:00	3	11	29	43	51	34	20	105	6	143	6	155	50	101	38	189	492	1
16:00 - 16:15	8	10	37	55	66	34	14	114	13	153	6	172	59	97	34	190	531	1
16:15 - 16:30	6	8	45	59	63	44	21	128	18	145	9	172	51	105	38	194	553	0
16:30 - 16:45	6	12	48	66	97	48	13	158	14	154	8	176	42	103	41	186	586	1
16:45 - 17:00	5	22	27	54	88	41	24	153	17	155	5	177	63	106	49	218	602	0
17:00 - 17:15	5	9	76	90	129	64	29	222	8	176	7	191	47	96	33	176	679	0
17:15 - 17:30	10	14	42	66	82	36	25	143	7	144	16	167	40	132	38	210	586	0
17:30 - 17:45	8	23	35	66	94	37	32	163	11	138	7	156	45	104	42	191	576	0
17:45 - 18:00	9	22	38	69	81	47	27	155	12	133	8	153	51	106	36	193	570	1
18:00 - 18:15	2	38	30	70	72	71	27	170	19	157	1	177	33	117	42	192	609	0
18:15 - 18:30	5	40	31	76	65	65	19	149	20	153	4	177	37	116	48	201	603	0
18:30 - 18:45	5	40	34	79	61	61	23	145	42	146	7	195	43	116	49	208	627	0
18:45 - 19:00	4	28	31	63	58	58	23	139	64	140	6	210	26	95	43	164	576	0
TOTAL	174	839	1639	2652	2526	1085	559	4170	741	6193	260	7194	2556	4056	2114	8726	22742	13
Trucks	3	6	0	9	37	7	2	46	9	33	2	44	31	35	26	92	191	0.8%
School Buses	0	1	2	3	9	0	1	10	3	10	1	14	5	10	8	23	50	0.2%

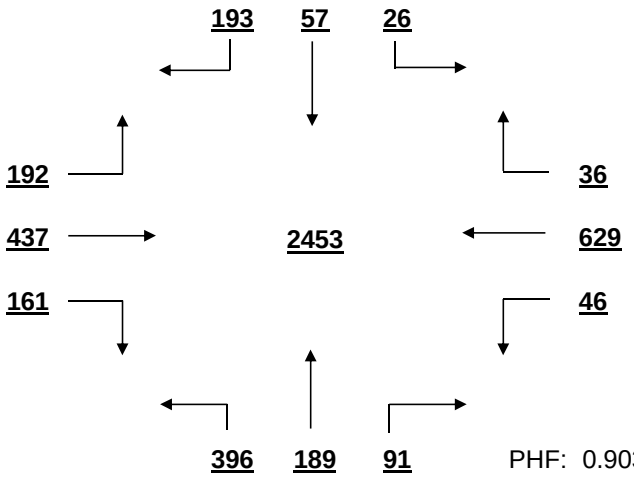
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Piney Grove Rd AT Fernandina Rd Date: 11/22/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

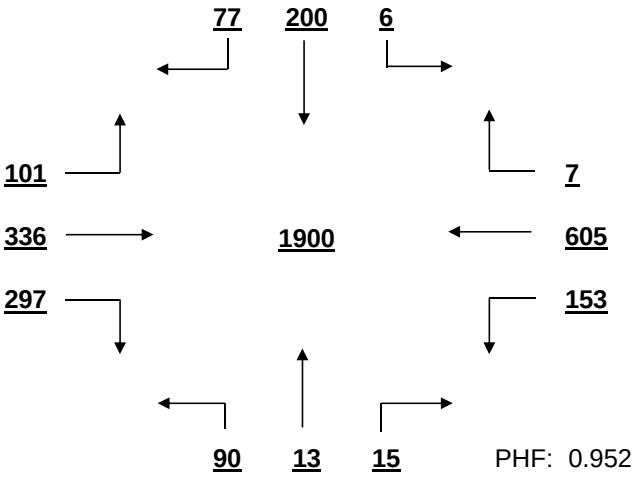


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



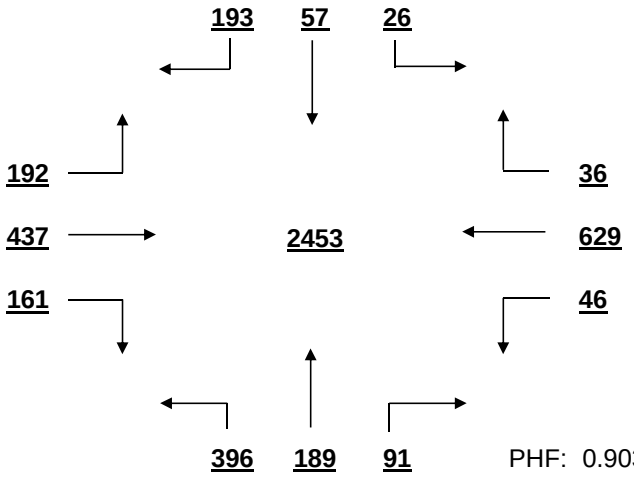
PHF: 0.903

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



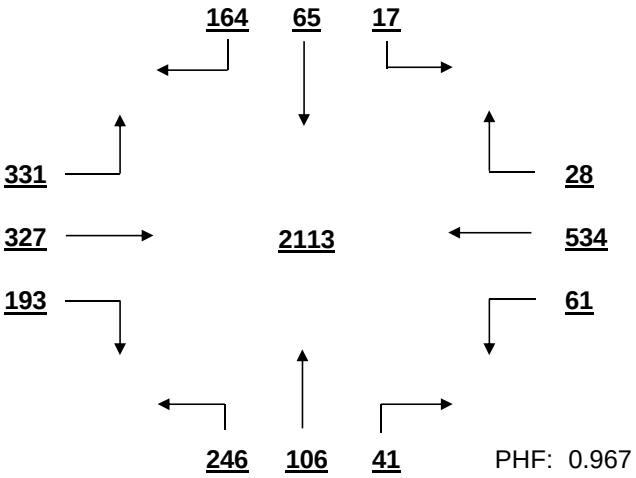
PHF: 0.952

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



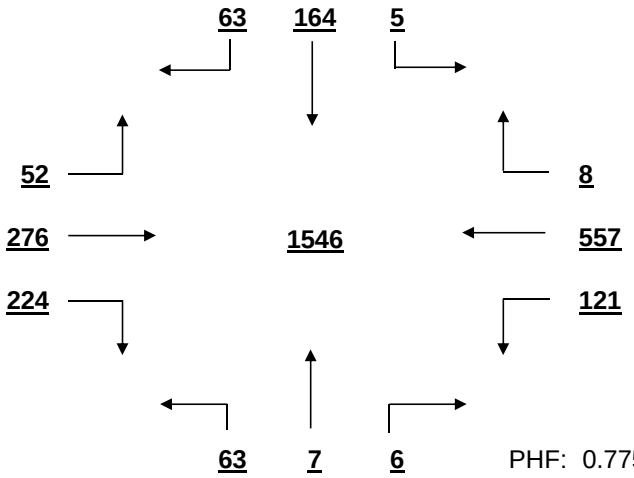
PHF: 0.903

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:15 TO 13:15



PHF: 0.967

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.775

SIGNAL WARRANT ANALYSIS

Piney Grove Rd AT Fernandina Rd Date: 11/22/2016

Minor Street Volume, percent of total = 30.0%
Percent of Left Turns from Minor Street = 39.6%
Percent of Right Turns from Minor Street = 32.2%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1326.7	/ 600	=	221%	347.5	/ 150	=	232%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	206%	213%	154%	186%	214%	241%	247%	230%	222%	248%	240%	254%
Minor St.	155%	117%	115%	147%	207%	275%	211%	215%	239%	369%	455%	402%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1326.7	/ 900	=	147%	347.5	/ 75	=	463%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	138%	142%	102%	124%	143%	161%	165%	153%	148%	165%	160%	169%
Minor St.	309%	235%	231%	293%	413%	549%	423%	429%	477%	737%	911%	804%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	236%	188%	105%	187%	332%	515%	396%	403%	401%	691%	854%	754%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	16:30 - 17:30	Higher Volume Side Street Peak Hour:	17:00 - 18:00
Minor St.	490%	Minor St.	451%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	1	0	0	0	3	1	2	1	1	1	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/22/2016

Major Rt: Piney Grove Rd * Not on State System Minor Rt: Piney Woods Rd * Not on State System

Day of Week: Tuesday Weather: Clear Office: Short Counts JMS

Type of Control: Other Speed Limit (major st) 35

Direction of Minor Street: N-S Intersection ADT - 12950 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1 * Each Direction

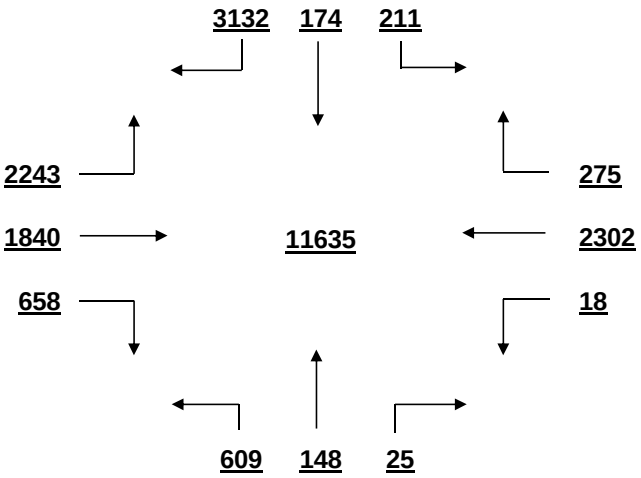
INTERSECTION VOLUME SUMMARY

	From N Piney Woods Rd				From S Piney Woods Rd				From E Piney Grove Rd				From W Piney Grove Rd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	1	3	82	86	9	0	0	9	0	36	3	39	14	36	9	59	193	0
7:15 - 7:30	2	4	108	114	11	2	0	13	1	31	4	36	30	37	10	77	240	0
7:30 - 7:45	5	6	142	153	13	2	0	15	0	51	3	54	28	41	10	79	301	0
7:45 - 8:00	3	3	127	133	13	3	0	16	1	52	4	57	31	42	17	90	296	0
8:00 - 8:15	3	5	121	129	5	2	0	7	0	36	3	39	32	46	10	88	263	0
8:15 - 8:30	5	4	102	111	8	2	1	11	0	32	2	34	23	65	15	103	259	0
8:30 - 8:45	1	5	69	75	7	2	0	9	0	26	2	28	19	34	6	59	171	0
8:45 - 9:00	2	2	61	65	16	0	0	16	0	30	4	34	27	27	13	67	182	0
9:00 - 9:15	3	5	123	131	6	4	0	10	0	35	3	38	24	35	12	71	250	0
9:15 - 9:30	5	4	104	113	7	2	0	9	0	38	3	41	32	24	4	60	223	1
9:30 - 9:45	3	3	71	77	11	3	0	14	0	39	2	41	32	25	10	67	199	0
9:45 - 10:00	2	2	61	65	6	3	0	9	0	30	5	35	30	28	15	73	182	0
10:00 - 10:15	1	4	67	72	9	2	0	11	1	40	6	47	37	19	11	67	197	0
10:15 - 10:30	1	2	41	44	12	1	3	16	1	34	3	38	37	27	14	78	176	0
10:30 - 10:45	3	1	45	49	11	5	2	18	0	29	6	35	32	26	6	64	166	0
10:45 - 11:00	7	2	40	49	6	4	1	11	1	36	2	39	31	22	13	66	165	0
11:00 - 11:15	5	2	50	57	6	2	0	8	0	46	4	50	35	23	14	72	187	0
11:15 - 11:30	2	6	51	59	11	0	1	12	0	28	4	32	36	26	5	67	170	0
11:30 - 11:45	2	3	48	53	15	3	0	18	0	44	7	51	44	30	10	84	206	0
11:45 - 12:00	3	4	46	53	6	1	0	7	0	51	3	54	33	41	13	87	201	0
12:00 - 12:15	5	1	63	69	11	4	0	15	0	45	14	59	48	41	9	98	241	0
12:15 - 12:30	2	2	43	47	11	1	0	12	0	56	5	61	37	48	13	98	218	0
12:30 - 12:45	6	5	48	59	7	3	0	10	1	49	5	55	49	43	16	108	232	0
12:45 - 13:00	10	1	51	62	13	5	0	18	1	46	6	53	41	52	10	103	236	0
13:00 - 13:15	5	4	54	63	10	3	1	14	2	44	5	51	39	36	7	82	210	0
13:15 - 13:30	5	5	40	50	11	2	1	14	1	33	5	39	42	38	17	97	200	0
13:30 - 13:45	3	4	51	58	15	3	0	18	2	52	7	61	48	41	16	105	242	1
13:45 - 14:00	2	4	49	55	19	4	2	25	1	45	9	55	33	41	13	87	222	0
14:00 - 14:15	6	2	44	52	12	1	2	15	0	52	3	55	57	48	13	118	240	0
14:15 - 14:30	8	3	50	61	21	2	0	23	0	38	7	45	55	46	18	119	248	0
14:30 - 14:45	4	2	56	62	13	3	0	16	2	55	6	63	37	43	9	89	230	0
14:45 - 15:00	6	0	46	52	15	5	2	22	0	43	6	49	61	47	13	121	244	0
15:00 - 15:15	3	4	32	39	5	3	1	9	0	55	7	62	54	43	7	104	214	0
15:15 - 15:30	6	4	45	55	9	4	0	13	1	49	5	55	54	44	16	114	237	0
15:30 - 15:45	4	2	47	53	18	3	2	23	0	80	12	92	57	38	8	103	271	0
15:45 - 16:00	7	4	45	56	11	1	0	12	0	49	5	54	56	44	13	113	235	0
16:00 - 16:15	8	3	62	73	23	1	0	24	1	74	4	79	63	33	17	113	289	0
16:15 - 16:30	7	4	58	69	15	3	0	18	0	64	4	68	62	40	15	117	272	0
16:30 - 16:45	5	3	57	65	16	8	0	24	0	70	12	82	62	42	20	124	295	0
16:45 - 17:00	7	2	49	58	20	5	2	27	0	83	5	88	70	43	18	131	304	0
17:00 - 17:15	5	4	73	82	8	9	0	17	0	84	13	97	76	42	17	135	331	0
17:15 - 17:30	7	9	53	69	21	6	1	28	0	67	12	79	80	50	25	155	331	0
17:30 - 17:45	5	6	57	68	21	3	0	24	0	39	5	44	74	42	25	141	277	0
17:45 - 18:00	7	6	66	79	16	8	0	24	0	52	4	56	83	36	16	135	294	0
18:00 - 18:15	5	5	71	81	15	4	1	20	0	61	12	73	76	45	21	142	316	0
18:15 - 18:30	4	7	87	98	18	2	0	20	0	55	4	59	74	40	29	143	320	0
18:30 - 18:45	8	5	83	96	19	6	1	26	0	51	11	62	72	51	25	148	332	0
18:45 - 19:00	2	3	93	98	28	3	1	32	1	67	9	77	76	29	15	120	327	0
TOTAL	211	174	3132	3517	609	148	25	782	18	2302	275	2595	2243	1840	658	4741	11635	2
Trucks	6	4	21	31	1	1	2	4	1	18	4	23	18	16	6	40	98	0.8%
School Buses	0	0	4	4	5	2	2	9	0	2	4	6	8	1	0	9	28	0.2%

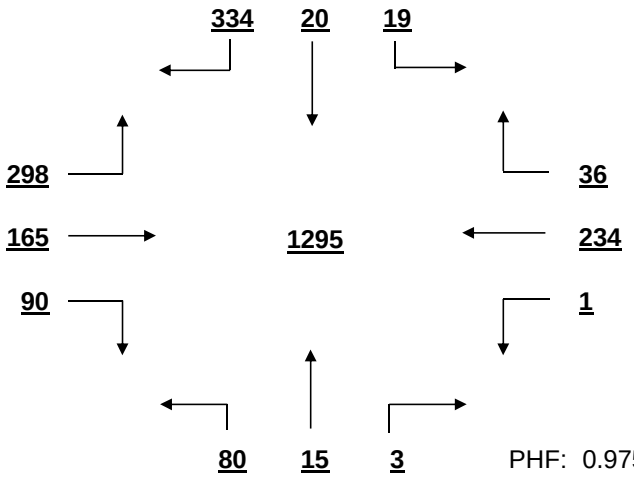
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Piney Grove Rd AT Piney Woods Rd Date: 11/22/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

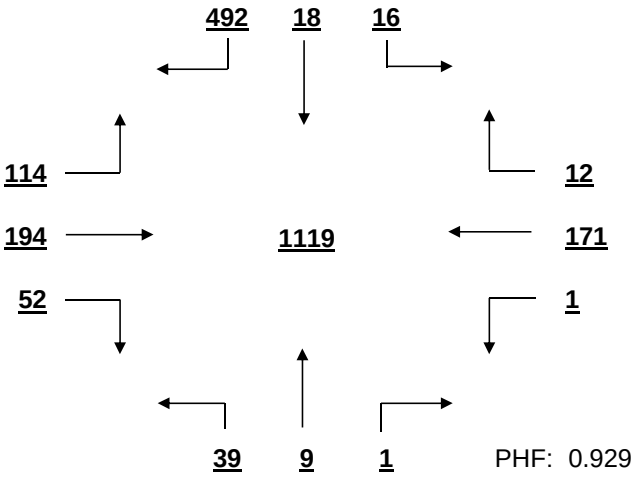


OVERALL PEAK HOUR VOLUME
FROM 18:00 TO 19:00



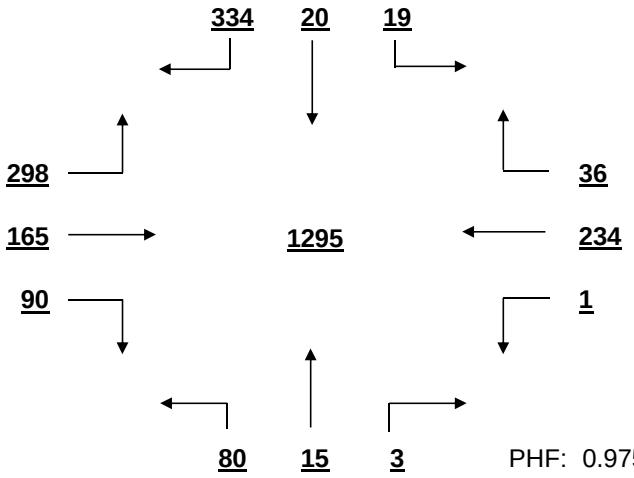
PHF: 0.975

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



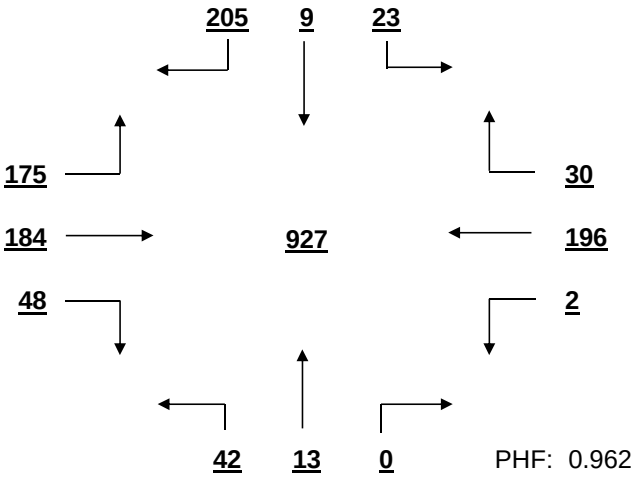
PHF: 0.929

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 18:00 TO 19:00



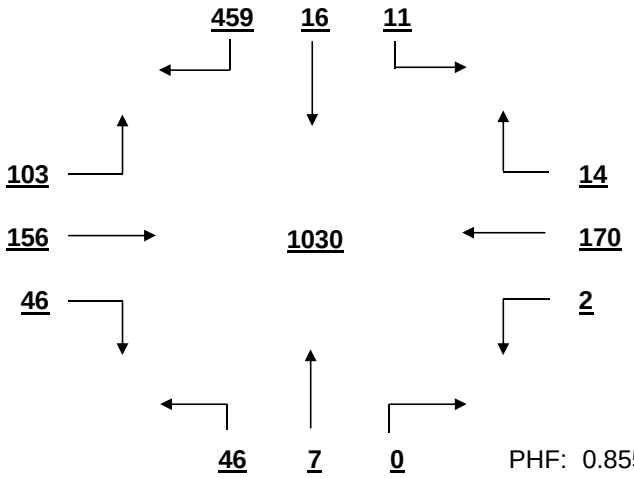
PHF: 0.975

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:00 TO 13:00



PHF: 0.962

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.855

SIGNAL WARRANT ANALYSIS

Piney Grove Rd AT Piney Woods Rd Date: 11/22/2016

Minor Street Volume, percent of total = 36.9%
Percent of Left Turns from Minor Street = 19.1%
Percent of Right Turns from Minor Street = 73.4%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is not met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
611.3	/ 600	=	102%	293.1	/ 150	=	195%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	82%	75%	71%	72%	83%	106%	96%	110%	116%	134%	140%	137%
Minor St.	324%	253%	257%	143%	148%	158%	151%	151%	135%	177%	199%	249%

Condition B - Interruption to Continuous Traffic is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
611.3	/ 900	=	68%	293.1	/ 75	=	391%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	55%	50%	47%	48%	55%	71%	64%	73%	77%	89%	94%	92%
Minor St.	648%	507%	515%	285%	296%	316%	301%	303%	271%	353%	397%	497%

80% Combination of Conditions A & B is not met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	143%	105%	103%	58%	66%	88%	76%	87%	83%	130%	157%	191%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	18:00 - 19:00	Higher Volume Side Street Peak Hour:	7:15 - 8:15
Minor St.	104%	Minor St.	104%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street	Minimum peak hour ped. volume crossing major street
107	133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	1	0	0	0	0	0	0	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/22/2016

Major Rt: Jamil Rd * Not on State System Minor Rt: Tram Rd * Not on State System

Day of Week: Tuesday Weather: Clear Office: Short Counts JMS

Type of Control: Stop Sign Speed Limit (major st) 35

Direction of Minor Street: E-W Intersection ADT - 8960 (Calc)

Number of Lanes (major st)* 1 Number of Lanes (minor st)* 1

* Each Direction

INTERSECTION VOLUME SUMMARY

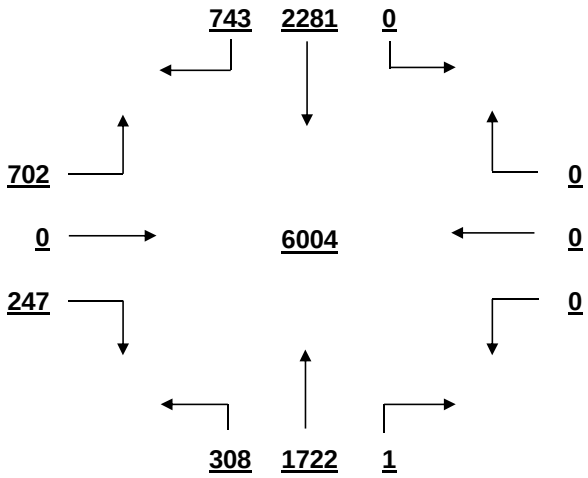
	From N Jamil Rd				From S Jamil Rd				From E Tram Rd				From W Tram Rd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	0	7	4	11	3	6	0	9	0	0	0	0	12	0	4	16	36	1
7:15 - 7:30	0	37	7	44	1	18	0	19	0	0	0	0	15	0	6	21	84	0
7:30 - 7:45	0	46	3	49	2	22	0	24	0	0	0	0	18	0	10	28	101	0
7:45 - 8:00	0	54	7	61	4	19	0	23	0	0	0	0	4	0	14	18	102	0
8:00 - 8:15	0	56	13	69	2	16	0	18	0	0	0	0	16	0	12	28	115	0
8:15 - 8:30	0	38	8	46	1	16	0	17	0	0	0	0	9	0	4	13	76	0
8:30 - 8:45	0	28	10	38	2	14	0	16	0	0	0	0	10	0	4	14	68	0
8:45 - 9:00	0	24	7	31	3	25	0	28	0	0	0	0	20	0	8	28	87	0
9:00 - 9:15	0	17	4	21	7	16	0	23	0	0	0	0	14	0	5	19	63	0
9:15 - 9:30	0	14	7	21	3	21	0	24	0	0	0	0	10	0	6	16	61	0
9:30 - 9:45	0	11	3	14	1	24	0	25	0	0	0	0	14	0	3	17	56	0
9:45 - 10:00	0	20	12	32	4	23	0	27	0	0	0	0	13	0	2	15	74	0
10:00 - 10:15	0	16	4	20	2	21	0	23	0	0	0	0	20	0	6	26	69	0
10:15 - 10:30	0	24	10	34	0	15	0	15	0	0	0	0	7	0	4	11	60	0
10:30 - 10:45	0	20	7	27	8	22	0	30	0	0	0	0	12	0	2	14	71	0
10:45 - 11:00	0	13	15	28	2	27	0	29	0	0	0	0	17	0	5	22	79	0
11:00 - 11:15	0	18	13	31	5	27	0	32	0	0	0	0	15	0	4	19	82	0
11:15 - 11:30	0	24	11	35	3	27	0	30	0	0	0	0	12	0	7	19	84	0
11:30 - 11:45	0	19	25	44	3	31	0	34	0	0	0	0	10	0	10	20	98	0
11:45 - 12:00	0	21	15	36	4	34	0	38	0	0	0	0	13	0	4	17	91	0
12:00 - 12:15	0	34	14	48	11	36	0	47	0	0	0	0	10	0	6	16	111	0
12:15 - 12:30	0	44	11	55	5	37	1	43	0	0	0	0	21	0	6	27	125	0
12:30 - 12:45	0	47	19	66	4	39	0	43	0	0	0	0	12	0	7	19	128	0
12:45 - 13:00	0	54	12	66	5	34	0	39	0	0	0	0	16	0	4	20	125	0
13:00 - 13:15	0	67	14	81	4	28	0	32	0	0	0	0	14	0	2	16	129	0
13:15 - 13:30	0	53	16	69	3	40	0	43	0	0	0	0	11	0	7	18	130	0
13:30 - 13:45	0	52	19	71	7	34	0	41	0	0	0	0	23	0	5	28	140	0
13:45 - 14:00	0	47	14	61	5	32	0	37	0	0	0	0	17	0	7	24	122	0
14:00 - 14:15	0	50	10	60	4	42	0	46	0	0	0	0	15	0	3	18	124	0
14:15 - 14:30	0	61	26	87	6	35	0	41	0	0	0	0	10	0	1	11	139	0
14:30 - 14:45	0	49	14	63	10	48	0	58	0	0	0	0	27	0	4	31	152	0
14:45 - 15:00	0	36	16	52	9	51	0	60	0	0	0	0	26	0	6	32	144	0
15:00 - 15:15	0	45	19	64	4	44	0	48	0	0	0	0	14	0	6	20	132	0
15:15 - 15:30	0	34	28	62	4	47	0	51	0	0	0	0	10	0	3	13	126	0
15:30 - 15:45	0	45	23	68	8	40	0	48	0	0	0	0	23	0	3	26	142	0
15:45 - 16:00	0	42	20	62	8	53	0	61	0	0	0	0	15	0	3	18	141	0
16:00 - 16:15	0	41	19	60	10	44	0	54	0	0	0	0	12	0	4	16	130	0
16:15 - 16:30	0	52	28	80	17	49	0	66	0	0	0	0	14	0	7	21	167	0
16:30 - 16:45	0	59	25	84	19	66	0	85	0	0	0	0	17	0	3	20	189	0
16:45 - 17:00	0	75	23	98	13	53	0	66	0	0	0	0	12	0	4	16	180	0
17:00 - 17:15	0	67	24	91	10	52	0	62	0	0	0	0	14	0	9	23	176	0
17:15 - 17:30	0	89	31	120	6	44	0	50	0	0	0	0	12	0	6	18	188	0
17:30 - 17:45	0	90	24	114	19	59	0	78	0	0	0	0	18	0	4	22	214	0
17:45 - 18:00	0	94	20	114	12	53	0	65	0	0	0	0	12	0	6	18	197	0
18:00 - 18:15	0	95	21	116	14	58	0	72	0	0	0	0	14	0	2	16	204	0
18:15 - 18:30	0	117	26	143	16	66	0	82	0	0	0	0	19	0	2	21	246	0
18:30 - 18:45	0	111	24	135	10	62	0	72	0	0	0	0	16	0	5	21	228	0
18:45 - 19:00	0	124	18	142	5	52	0	57	0	0	0	0	17	0	2	19	218	0
TOTAL	0	2281	743	3024	308	1722	1	2031	0	0	0	0	702	0	247	949	6004	1
Trucks	0	12	1	13	5	8	0	13	0	0	0	0	5	0	1	6	32	0.5%
School Buses	0	5	4	9	0	3	0	3	0	0	0	0	2	0	5	7	19	0.3%

TOTAL AND PEAK HOUR VOLUME DIAGRAMS

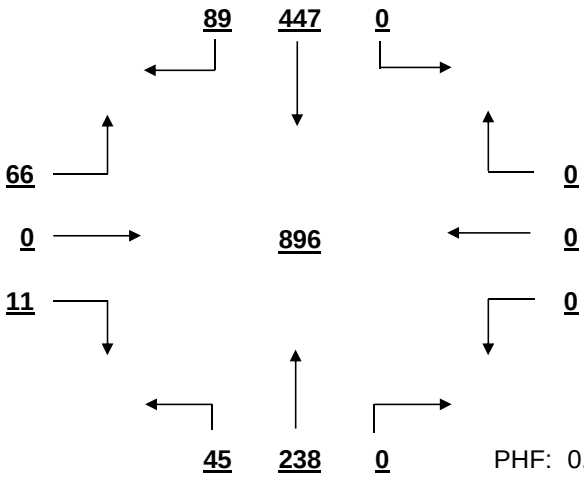
Jamil Rd AT Tram Rd

Date: 11/22/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

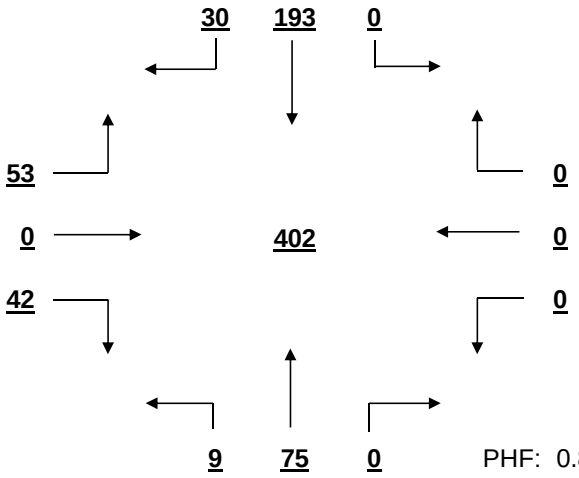


OVERALL PEAK HOUR VOLUME
FROM 18:00 TO 19:00



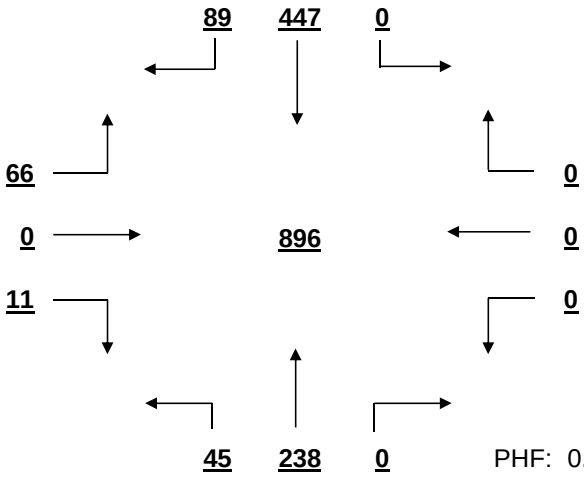
PHF: 0.911

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



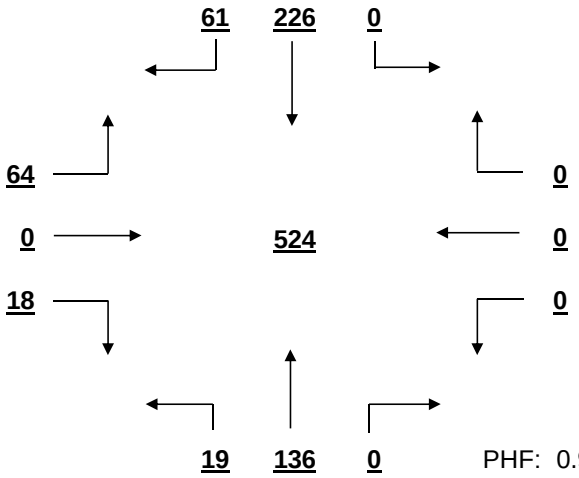
PHF: 0.874

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 18:00 TO 19:00



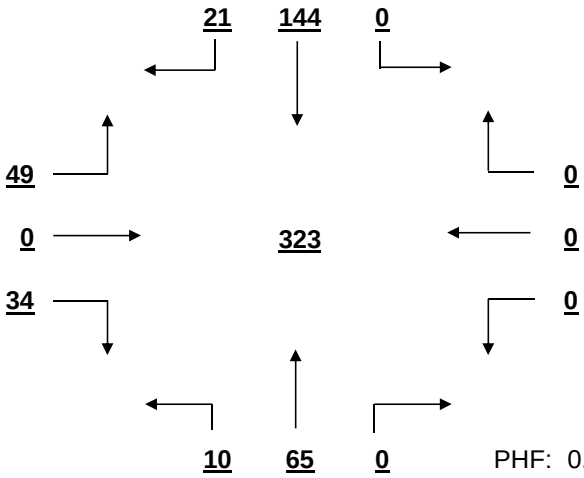
PHF: 0.911

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:45 TO 13:45



PHF: 0.936

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.792

SIGNAL WARRANT ANALYSIS

Jamil Rd AT Tram Rd Date: 11/22/2016

Minor Street Volume, percent of total = 15.8%
Percent of Left Turns from Minor Street = 74.0%
Percent of Right Turns from Minor Street = 26.0%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is not met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
421.3	/ 500	=	84%	79.1	/ 150	=	53%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	48%	53%	37%	41%	56%	81%	87%	93%	93%	119%	139%	164%
Minor St.	55%	55%	45%	49%	50%	55%	57%	61%	51%	49%	54%	51%

Condition B - Interruption to Continuous Traffic is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
421.3	/ 750	=	56%	79.1	/ 75	=	105%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	32%	35%	25%	27%	37%	54%	58%	62%	62%	79%	93%	109%
Minor St.	111%	111%	89%	97%	100%	109%	115%	123%	103%	97%	108%	103%

80% Combination of Conditions A & B is not met

Warrant No. 2 - Four Hour Vehicular Volume is not met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	21%	22%	16%	18%	20%	27%	30%	33%	28%	33%	44%	54%

Warrant No. 3 - Peak Hour is not met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	18:00 - 19:00	Higher Volume Side Street Peak Hour:	14:30 - 15:30
Minor St.	28%	Minor St.	21%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	0	0	0	0	0	0	0	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/22/2016

Major Rt: Tram Rd * Not on State System Minor Rt: Sidney Rd * Not on State System

Day of Week: Tuesday Weather: Clear Office: Short Counts JMS

Type of Control: Stop Sign Speed Limit (major st) 35

Direction of Minor Street: E-W Intersection ADT - 2830 (Calc)

Number of Lanes (major st)* 1 Number of Lanes (minor st)* 1

* Each Direction

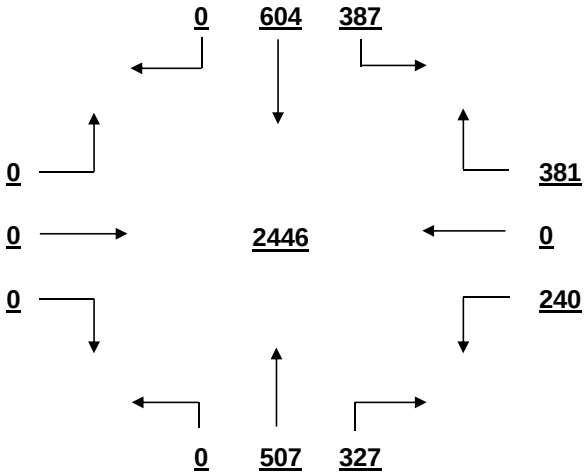
INTERSECTION VOLUME SUMMARY

	From N Tram Rd				From S Tram Rd				From E Sidney Rd				From W Sidney Rd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	3	3	0	6	0	7	11	18	2	0	7	9	0	0	0	0	33	0
7:15 - 7:30	5	5	0	10	0	12	12	24	1	0	7	8	0	0	0	0	42	0
7:30 - 7:45	6	3	0	9	0	15	22	37	3	0	7	10	0	0	0	0	56	0
7:45 - 8:00	5	5	0	10	0	14	13	27	3	0	2	5	0	0	0	0	42	0
8:00 - 8:15	5	11	0	16	0	14	15	29	2	0	9	11	0	0	0	0	56	0
8:15 - 8:30	5	3	0	8	0	7	14	21	0	0	5	5	0	0	0	0	34	0
8:30 - 8:45	3	8	0	11	0	6	9	15	1	0	3	4	0	0	0	0	30	0
8:45 - 9:00	5	5	0	10	0	19	8	27	4	0	7	11	0	0	0	0	48	0
9:00 - 9:15	4	7	0	11	0	12	10	22	1	0	4	5	0	0	0	0	38	0
9:15 - 9:30	2	6	0	8	0	11	8	19	6	0	3	9	0	0	0	0	36	0
9:30 - 9:45	4	4	0	8	0	9	8	17	4	0	8	12	0	0	0	0	37	0
9:45 - 10:00	8	5	0	13	0	8	6	14	2	0	7	9	0	0	0	0	36	0
10:00 - 10:15	1	10	0	11	0	15	2	17	4	0	5	9	0	0	0	0	37	0
10:15 - 10:30	3	8	0	11	0	7	6	13	3	0	6	9	0	0	0	0	33	0
10:30 - 10:45	3	9	0	12	0	5	2	7	1	0	8	9	0	0	0	0	28	0
10:45 - 11:00	7	11	0	18	0	13	10	23	4	0	9	13	0	0	0	0	54	0
11:00 - 11:15	11	13	0	24	0	8	7	15	3	0	8	11	0	0	0	0	50	0
11:15 - 11:30	6	7	0	13	0	8	8	16	7	0	7	14	0	0	0	0	43	0
11:30 - 11:45	13	12	0	25	0	11	5	16	2	0	5	7	0	0	0	0	48	0
11:45 - 12:00	8	7	0	15	0	7	2	9	2	0	9	11	0	0	0	0	35	0
12:00 - 12:15	5	18	0	23	0	7	4	11	5	0	6	11	0	0	0	0	45	0
12:15 - 12:30	6	9	0	15	0	18	6	24	4	0	13	17	0	0	0	0	56	0
12:30 - 12:45	8	12	0	20	0	14	6	20	6	0	1	7	0	0	0	0	47	0
12:45 - 13:00	9	6	0	15	0	11	1	12	6	0	8	14	0	0	0	0	41	0
13:00 - 13:15	12	10	0	22	0	11	1	12	3	0	8	11	0	0	0	0	45	0
13:15 - 13:30	7	10	0	17	0	13	3	16	4	0	7	11	0	0	0	0	44	0
13:30 - 13:45	8	15	0	23	0	14	6	20	5	0	9	14	0	0	0	0	57	0
13:45 - 14:00	11	11	0	22	0	11	11	22	2	0	8	10	0	0	0	0	54	0
14:00 - 14:15	6	6	0	12	0	12	6	18	6	0	5	11	0	0	0	0	41	0
14:15 - 14:30	13	15	0	28	0	5	1	6	6	0	6	12	0	0	0	0	46	1
14:30 - 14:45	9	17	0	26	0	12	8	20	5	0	14	19	0	0	0	0	65	0
14:45 - 15:00	7	15	0	22	0	16	6	22	5	0	15	20	0	0	0	0	64	0
15:00 - 15:15	13	11	0	24	0	13	3	16	6	0	5	11	0	0	0	0	51	0
15:15 - 15:30	12	18	0	30	0	9	6	15	5	0	4	9	0	0	0	0	54	0
15:30 - 15:45	9	22	0	31	0	10	3	13	6	0	12	18	0	0	0	0	62	0
15:45 - 16:00	9	12	0	21	0	5	3	8	8	0	14	22	0	0	0	0	51	0
16:00 - 16:15	8	17	0	25	0	11	9	20	13	0	7	20	0	0	0	0	65	0
16:15 - 16:30	16	25	0	41	0	12	5	17	8	0	13	21	0	0	0	0	79	0
16:30 - 16:45	8	31	0	39	0	10	4	14	8	0	12	20	0	0	0	0	73	0
16:45 - 17:00	6	29	0	35	0	9	6	15	8	0	6	14	0	0	0	0	64	0
17:00 - 17:15	10	16	0	26	0	9	5	14	12	0	14	26	0	0	0	0	66	0
17:15 - 17:30	15	18	0	33	0	8	5	13	6	0	10	16	0	0	0	0	62	0
17:30 - 17:45	11	32	0	43	0	12	12	24	13	0	11	24	0	0	0	0	91	0
17:45 - 18:00	4	21	0	25	0	9	8	17	5	0	10	15	0	0	0	0	57	0
18:00 - 18:15	16	15	0	31	0	11	4	15	9	0	6	15	0	0	0	0	61	0
18:15 - 18:30	14	19	0	33	0	8	9	17	5	0	12	17	0	0	0	0	67	0
18:30 - 18:45	14	23	0	37	0	13	4	17	10	0	7	17	0	0	0	0	71	0
18:45 - 19:00	14	9	0	23	0	6	4	10	6	0	12	18	0	0	0	0	51	0
TOTAL	387	604	0	991	0	507	327	834	240	0	381	621	0	0	0	0	2446	1
Trucks	3	5	0	8	0	7	5	12	2	0	5	7	0	0	0	0	27	1.1%
School Buses	2	0	0	2	0	2	1	3	6	0	4	10	0	0	0	0	15	0.6%

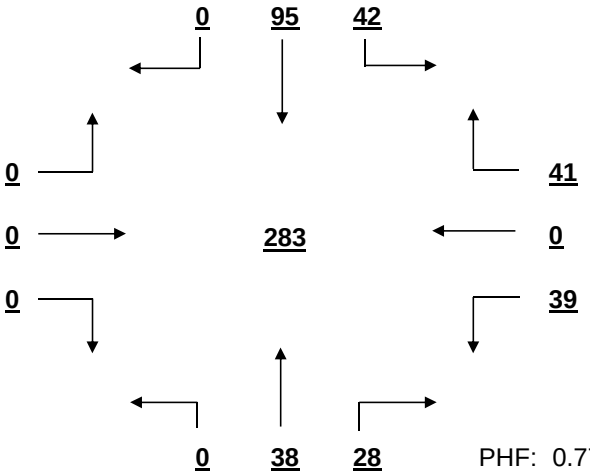
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Tram Rd AT Sidney Rd Date: 11/22/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

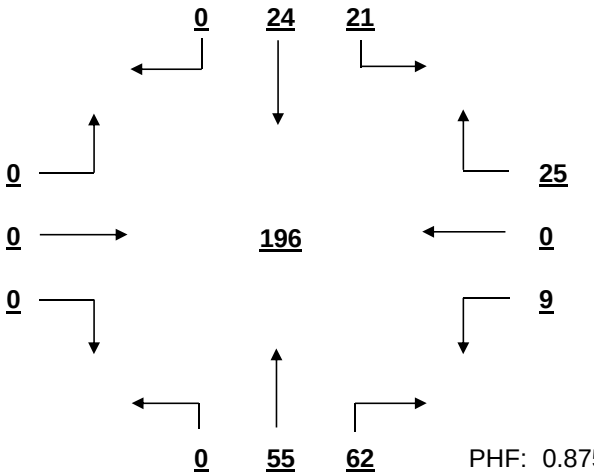


OVERALL PEAK HOUR VOLUME
FROM 16:45 TO 17:45



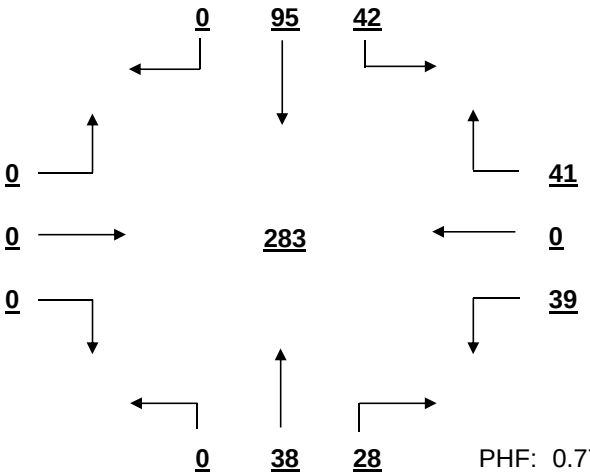
PHF: 0.777

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



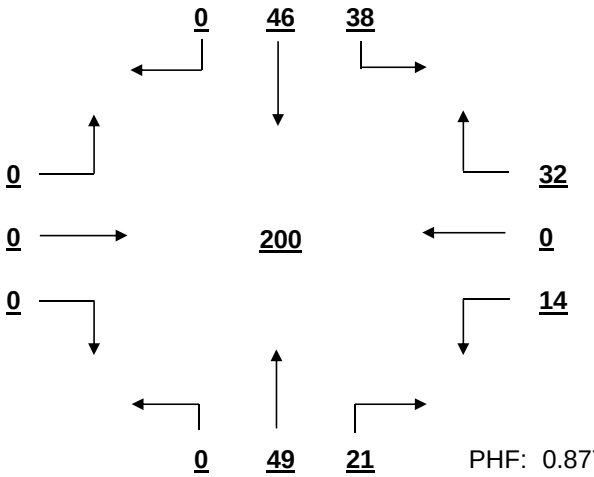
PHF: 0.875

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:45 TO 17:45



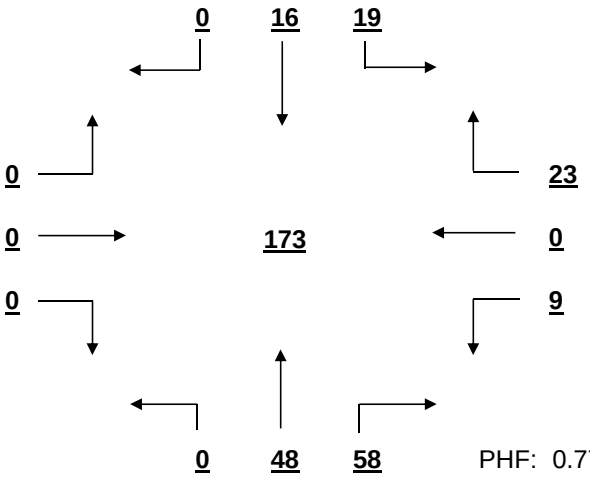
PHF: 0.777

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 13:00 TO 14:00



PHF: 0.877

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.772

SIGNAL WARRANT ANALYSIS

Tram Rd AT Sidney Rd Date: 11/22/2016

Minor Street Volume, percent of total = 25.4%
Percent of Left Turns from Minor Street = 38.6%
Percent of Right Turns from Minor Street = 61.4%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is not met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
152.1	/ 500	=	30%	51.8	/ 150	=	35%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	28%	27%	22%	22%	27%	28%	31%	31%	32%	41%	39%	37%
Minor St.	21%	21%	23%	27%	29%	33%	31%	41%	40%	50%	54%	45%

Condition B - Interruption to Continuous Traffic is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
152.1	/ 750	=	20%	51.8	/ 75	=	69%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	19%	18%	15%	15%	18%	19%	21%	21%	21%	27%	26%	24%
Minor St.	43%	41%	47%	53%	57%	65%	61%	83%	80%	100%	108%	89%

80% Combination of Conditions A & B is not met

Warrant No. 2 - Four Hour Vehicular Volume is not met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	7%	7%	7%	9%	9%	11%	10%	14%	14%	18%	19%	16%

Warrant No. 3 - Peak Hour is not met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	16:45 - 17:45	Higher Volume Side Street Peak Hour:	15:45 - 16:45
Minor St.	13%	Minor St.	13%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	0	0	0	0	0	1	0	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/22/2016

Major Rt: Fernandina Rd * Not on State System Minor Rt: Beatty Rd * Not on State System

Day of Week: Tuesday Weather: Clear Office: Short Counts JMS

Type of Control: Stop Sign Speed Limit (major st) 35

Direction of Minor Street: E-W Intersection ADT - 9810 (Calc)

Number of Lanes (major st)* 1 Number of Lanes (minor st)* 1

* Each Direction

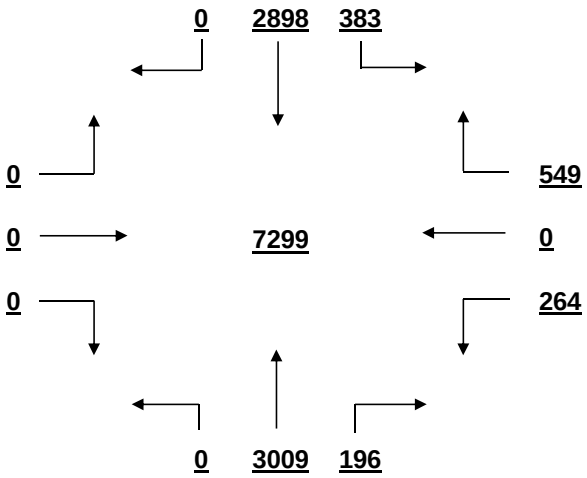
INTERSECTION VOLUME SUMMARY

	From N Fernandina Rd				From S Fernandina Rd				From E Beatty Rd				From W Beatty Rd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	6	33	0	39	0	21	1	22	7	0	4	11	0	0	0	0	72	0
7:15 - 7:30	4	58	0	62	0	35	3	38	9	0	7	16	0	0	0	0	116	0
7:30 - 7:45	6	125	0	131	0	43	2	45	11	0	12	23	0	0	0	0	199	0
7:45 - 8:00	5	123	0	128	0	44	2	46	10	0	11	21	0	0	0	0	195	0
8:00 - 8:15	3	98	0	101	0	56	2	58	7	0	7	14	0	0	0	0	173	0
8:15 - 8:30	12	78	0	90	0	68	0	68	5	0	9	14	0	0	0	0	172	0
8:30 - 8:45	6	61	0	67	0	36	6	42	1	0	10	11	0	0	0	0	120	0
8:45 - 9:00	6	45	0	51	0	51	1	52	9	0	9	18	0	0	0	0	121	0
9:00 - 9:15	10	54	0	64	0	32	3	35	5	0	10	15	0	0	0	0	114	0
9:15 - 9:30	6	24	0	30	0	47	5	52	2	0	14	16	0	0	0	0	98	0
9:30 - 9:45	5	34	0	39	0	42	1	43	4	0	7	11	0	0	0	0	93	0
9:45 - 10:00	5	26	0	31	0	33	6	39	5	0	8	13	0	0	0	0	83	0
10:00 - 10:15	4	28	0	32	0	37	6	43	5	0	9	14	0	0	0	0	89	0
10:15 - 10:30	4	37	0	41	0	30	2	32	6	0	16	22	0	0	0	0	95	0
10:30 - 10:45	8	36	0	44	0	34	0	34	2	0	12	14	0	0	0	0	92	0
10:45 - 11:00	6	38	0	44	0	53	1	54	3	0	8	11	0	0	0	0	109	0
11:00 - 11:15	8	39	0	47	0	43	4	47	2	0	6	8	0	0	0	0	102	0
11:15 - 11:30	6	52	0	58	0	46	1	47	5	0	7	12	0	0	0	0	117	0
11:30 - 11:45	9	44	0	53	0	57	2	59	5	0	18	23	0	0	0	0	135	0
11:45 - 12:00	7	44	0	51	0	58	2	60	5	0	14	19	0	0	0	0	130	0
12:00 - 12:15	9	52	0	61	0	66	5	71	5	0	9	14	0	0	0	0	146	0
12:15 - 12:30	9	56	0	65	0	50	7	57	4	0	10	14	0	0	0	0	136	0
12:30 - 12:45	7	49	0	56	0	62	5	67	6	0	19	25	0	0	0	0	148	0
12:45 - 13:00	11	6	0	17	0	60	1	61	5	0	7	12	0	0	0	0	90	0
13:00 - 13:15	4	76	0	80	0	44	8	52	10	0	11	21	0	0	0	0	153	0
13:15 - 13:30	9	45	0	54	0	53	3	56	4	0	13	17	0	0	0	0	127	0
13:30 - 13:45	3	57	0	60	0	37	3	40	4	0	13	17	0	0	0	0	117	0
13:45 - 14:00	9	47	0	56	0	65	4	69	7	0	9	16	0	0	0	0	141	0
14:00 - 14:15	6	46	0	52	0	51	3	54	8	0	13	21	0	0	0	0	127	0
14:15 - 14:30	10	39	0	49	0	38	3	41	5	0	10	15	0	0	0	0	105	0
14:30 - 14:45	10	38	0	48	0	52	1	53	6	0	10	16	0	0	0	0	117	0
14:45 - 15:00	4	59	0	63	0	63	7	70	5	0	17	22	0	0	0	0	155	0
15:00 - 15:15	17	42	0	59	0	50	3	53	6	0	15	21	0	0	0	0	133	0
15:15 - 15:30	7	36	0	43	0	77	6	83	3	0	13	16	0	0	0	0	142	0
15:30 - 15:45	8	48	0	56	0	79	4	83	6	0	15	21	0	0	0	0	160	0
15:45 - 16:00	12	47	0	59	0	83	0	83	10	0	12	22	0	0	0	0	164	0
16:00 - 16:15	9	61	0	70	0	85	6	91	6	0	8	14	0	0	0	0	175	0
16:15 - 16:30	10	58	0	68	0	97	3	100	5	0	14	19	0	0	0	0	187	0
16:30 - 16:45	15	79	0	94	0	119	14	133	6	0	15	21	0	0	0	0	248	0
16:45 - 17:00	10	98	0	108	0	113	9	122	6	0	20	26	0	0	0	0	256	0
17:00 - 17:15	14	93	0	107	0	126	5	131	4	0	16	20	0	0	0	0	258	0
17:15 - 17:30	12	72	0	84	0	106	12	118	3	0	14	17	0	0	0	0	219	0
17:30 - 17:45	11	84	0	95	0	113	4	117	3	0	14	17	0	0	0	0	229	0
17:45 - 18:00	8	71	0	79	0	120	8	128	2	0	13	15	0	0	0	0	222	0
18:00 - 18:15	10	111	0	121	0	100	9	109	5	0	14	19	0	0	0	0	249	0
18:15 - 18:30	8	92	0	100	0	74	4	78	3	0	7	10	0	0	0	0	188	0
18:30 - 18:45	6	134	0	140	0	95	4	99	8	0	10	18	0	0	0	0	257	0
18:45 - 19:00	9	125	0	134	0	65	5	70	11	0	10	21	0	0	0	0	225	0
TOTAL	383	2898	0	3281	0	3009	196	3205	264	0	549	813	0	0	0	0	7299	0
Trucks	7	37	0	44	0	37	3	40	4	0	6	10	0	0	0	0	94	1.3%
School Buses	3	14	0	17	0	15	2	17	0	0	4	4	0	0	0	0	38	0.5%

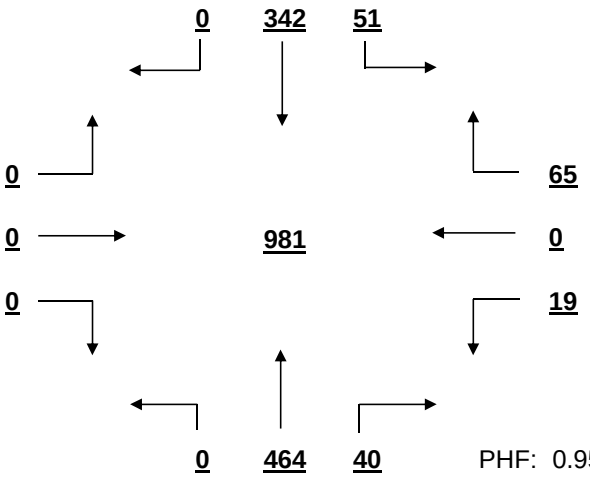
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Fernandina Rd AT Beatty Rd Date: 11/22/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

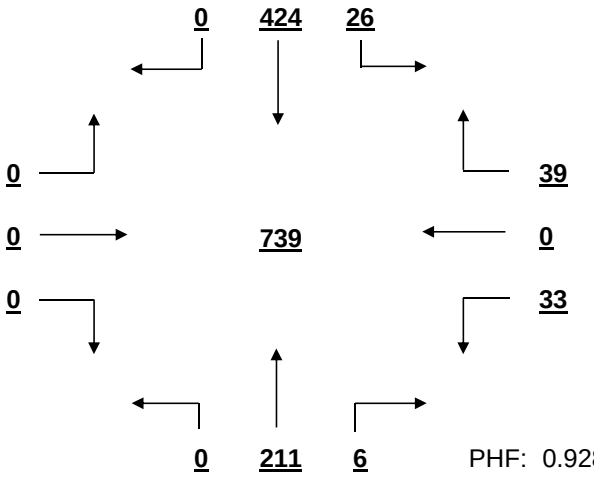


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



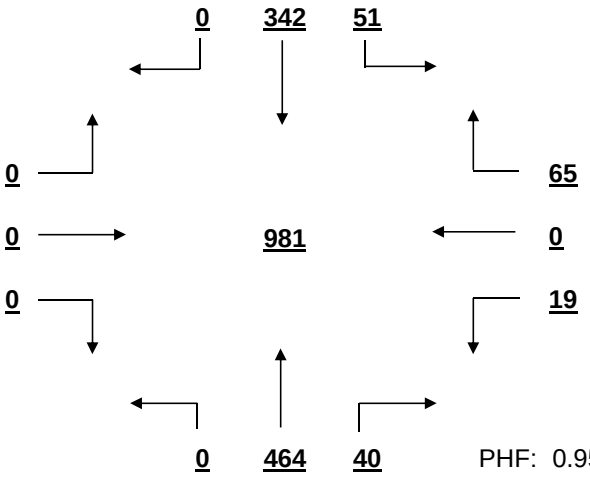
PHF: 0.951

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



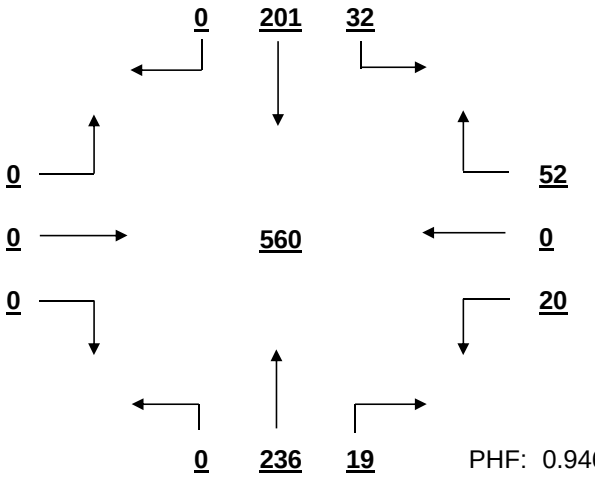
PHF: 0.928

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



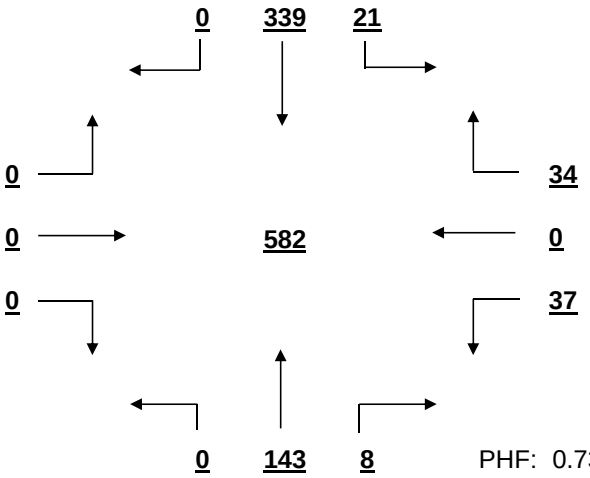
PHF: 0.951

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 11:45 TO 12:45



PHF: 0.946

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.731

SIGNAL WARRANT ANALYSIS

Fernandina Rd AT Beatty Rd Date: 11/22/2016

Minor Street Volume, percent of total = 11.1%
Percent of Left Turns from Minor Street = 32.5%
Percent of Right Turns from Minor Street = 67.5%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is not met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
540.5	/	500	= 108%	67.8	/	150	= 45%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	102%	106%	67%	65%	84%	91%	93%	86%	104%	157%	172%	170%
Minor St.	47%	38%	37%	41%	41%	43%	47%	49%	53%	53%	46%	45%

Condition B - Interruption to Continuous Traffic is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
540.5	/	750	= 72%	67.8	/	75	= 90%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	68%	71%	44%	43%	56%	61%	62%	57%	69%	105%	115%	113%
Minor St.	95%	76%	73%	81%	83%	87%	95%	99%	107%	107%	92%	91%

80% Combination of Conditions A & B is not met

Warrant No. 2 - Four Hour Vehicular Volume is not met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	28%	23%	16%	18%	21%	23%	26%	25%	32%	52%	52%	51%

Warrant No. 3 - Peak Hour is not met

Percent of warrant			Percent of warrant		
Overall Peak Hour: 16:30 - 17:30			Higher Volume Side Street Peak Hour: 16:15 - 17:15		
Minor St.	35%		Minor St.	34%	

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street	Minimum peak hour ped. volume crossing major street
107	133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	0	0	0	0	0	0	0	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/22/2016

Major Rt: Broad River Rd * Not on State System Minor Rt: Beatty Rd * Not on State System

Day of Week: Tuesday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: E-W Intersection ADT - 28800 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1

* Each Direction

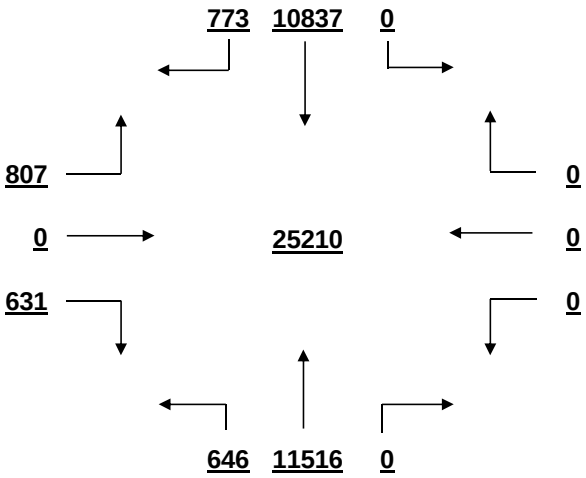
INTERSECTION VOLUME SUMMARY

	From N Broad River Rd				From S Broad River Rd				From E Beatty Rd				From W Beatty Rd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	0	252	10	262	7	173	0	180	0	0	0	0	14	0	3	17	459	1
7:15 - 7:30	0	373	30	403	11	225	0	236	0	0	0	0	20	0	10	30	669	3
7:30 - 7:45	0	385	26	411	8	263	0	271	0	0	0	0	16	0	2	18	700	0
7:45 - 8:00	0	309	30	339	20	302	0	322	0	0	0	0	25	0	14	39	700	0
8:00 - 8:15	0	300	15	315	10	228	0	238	0	0	0	0	13	0	9	22	575	2
8:15 - 8:30	0	227	20	247	12	235	0	247	0	0	0	0	22	0	11	33	527	3
8:30 - 8:45	0	233	17	250	16	182	0	198	0	0	0	0	15	0	10	25	473	0
8:45 - 9:00	0	212	6	218	7	171	0	178	0	0	0	0	15	0	12	27	423	0
9:00 - 9:15	0	157	9	166	3	140	0	143	0	0	0	0	4	0	11	15	324	4
9:15 - 9:30	0	161	9	170	11	147	0	158	0	0	0	0	10	0	20	30	358	0
9:30 - 9:45	0	176	4	180	9	160	0	169	0	0	0	0	11	0	8	19	368	0
9:45 - 10:00	0	177	8	185	9	167	0	176	0	0	0	0	7	0	16	23	384	1
10:00 - 10:15	0	155	7	162	12	145	0	157	0	0	0	0	6	0	13	19	338	0
10:15 - 10:30	0	180	8	188	8	171	0	179	0	0	0	0	8	0	7	15	382	0
10:30 - 10:45	0	167	11	178	10	147	0	157	0	0	0	0	11	0	13	24	359	0
10:45 - 11:00	0	167	9	176	17	155	0	172	0	0	0	0	10	0	9	19	367	1
11:00 - 11:15	0	170	12	182	10	144	0	154	0	0	0	0	13	0	15	28	364	1
11:15 - 11:30	0	210	13	223	14	182	0	196	0	0	0	0	15	0	8	23	442	0
11:30 - 11:45	0	198	10	208	13	178	0	191	0	0	0	0	8	0	13	21	420	5
11:45 - 12:00	0	190	16	206	11	196	0	207	0	0	0	0	13	0	15	28	441	2
12:00 - 12:15	0	231	8	239	11	202	0	213	0	0	0	0	23	0	15	38	490	0
12:15 - 12:30	0	175	6	181	0	227	0	227	0	0	0	0	9	0	13	22	430	0
12:30 - 12:45	0	206	12	218	0	193	0	193	0	0	0	0	13	0	16	29	440	0
12:45 - 13:00	0	191	13	204	23	226	0	249	0	0	0	0	15	0	12	27	480	2
13:00 - 13:15	0	209	4	213	20	225	0	245	0	0	0	0	15	0	16	31	489	1
13:15 - 13:30	0	203	13	216	10	193	0	203	0	0	0	0	14	0	12	26	445	0
13:30 - 13:45	0	183	14	197	0	229	0	229	0	0	0	0	19	0	16	35	461	0
13:45 - 14:00	0	192	8	200	22	233	0	255	0	0	0	0	13	0	13	26	481	4
14:00 - 14:15	0	226	9	235	13	238	0	251	0	0	0	0	13	0	15	28	514	1
14:15 - 14:30	0	217	19	236	20	209	0	229	0	0	0	0	16	0	10	26	491	1
14:30 - 14:45	0	262	26	288	14	261	0	275	0	0	0	0	14	0	13	27	590	1
14:45 - 15:00	0	236	13	249	22	215	0	237	0	0	0	0	19	0	14	33	519	0
15:00 - 15:15	0	239	9	248	14	229	0	243	0	0	0	0	20	0	13	33	524	0
15:15 - 15:30	0	251	10	261	18	227	0	245	0	0	0	0	14	0	11	25	531	0
15:30 - 15:45	0	236	15	251	0	253	0	253	0	0	0	0	5	0	14	19	523	3
15:45 - 16:00	0	198	17	215	0	266	0	266	0	0	0	0	25	0	14	39	520	1
16:00 - 16:15	0	315	24	339	11	276	0	287	0	0	0	0	21	0	20	41	667	1
16:15 - 16:30	0	249	21	270	0	345	0	345	0	0	0	0	20	0	11	31	646	0
16:30 - 16:45	0	302	25	327	18	363	0	381	0	0	0	0	25	0	14	39	747	2
16:45 - 17:00	0	254	29	283	24	351	0	375	0	0	0	0	16	0	13	29	687	0
17:00 - 17:15	0	247	35	282	11	417	0	428	0	0	0	0	28	0	12	40	750	1
17:15 - 17:30	0	216	22	238	13	408	0	421	0	0	0	0	20	0	17	37	696	1
17:30 - 17:45	0	224	19	243	22	378	0	400	0	0	0	0	27	0	21	48	691	1
17:45 - 18:00	0	267	24	291	18	323	0	341	0	0	0	0	15	0	11	26	658	1
18:00 - 18:15	0	314	17	331	22	345	0	367	0	0	0	0	40	0	24	64	762	5
18:15 - 18:30	0	266	18	284	37	355	0	392	0	0	0	0	37	0	17	54	730	0
18:30 - 18:45	0	172	40	212	34	321	0	355	0	0	0	0	34	0	15	49	616	2
18:45 - 19:00	0	157	33	190	31	297	0	328	0	0	0	0	21	0	20	41	559	0
TOTAL	0	10837	773	11610	646	11516	0	12162	0	0	0	0	807	0	631	1438	25210	51
Trucks	0	136	5	141	21	230	0	251	0	0	0	0	8	14	0	22	414	1.6%
School Buses	0	81	11	92	5	2	38	45	0	0	0	0	4	0	8	12	149	0.6%

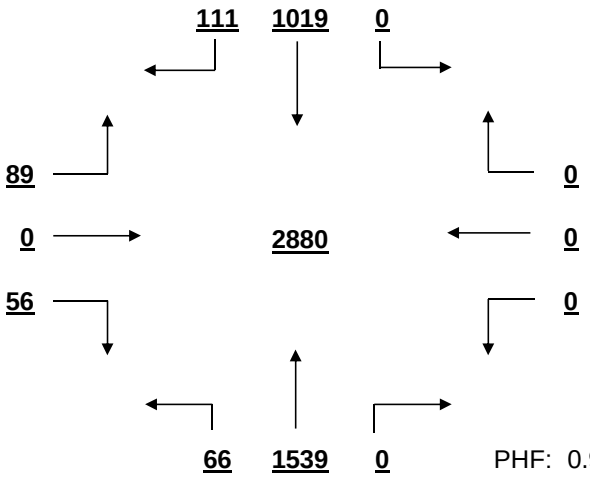
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Broad River Rd AT Beatty Rd Date: 11/22/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

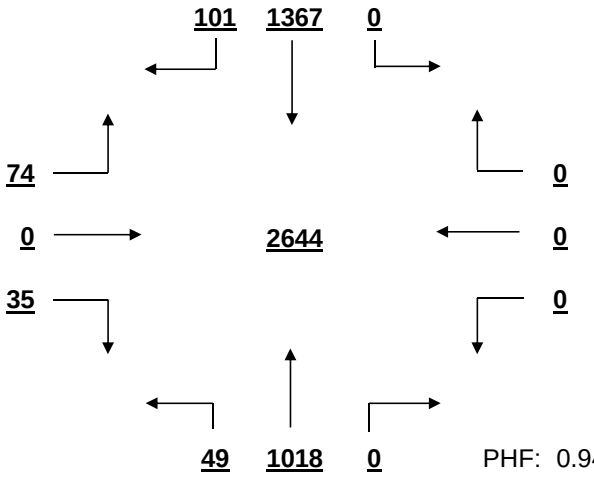


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



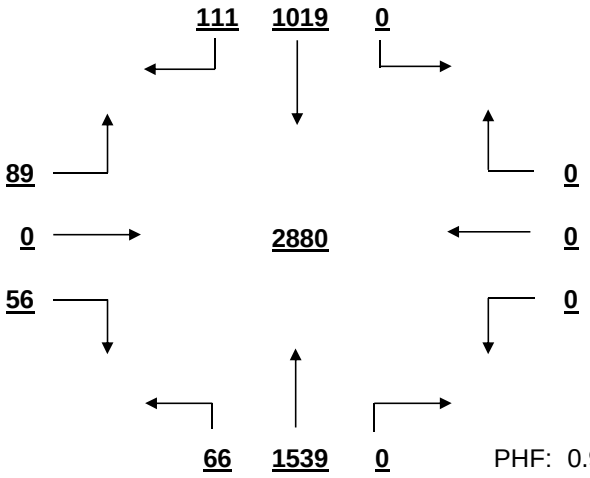
PHF: 0.960

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



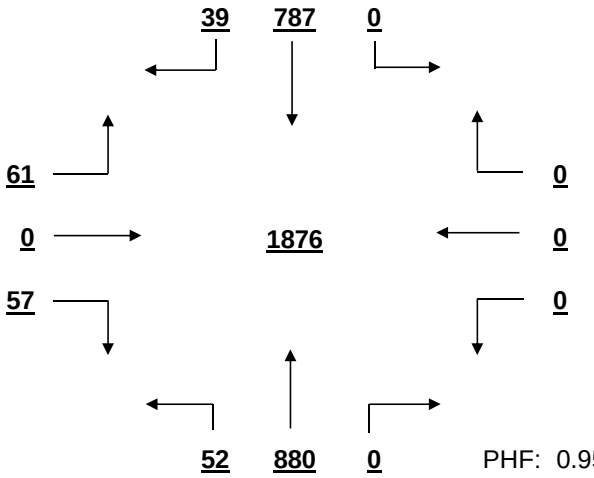
PHF: 0.944

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



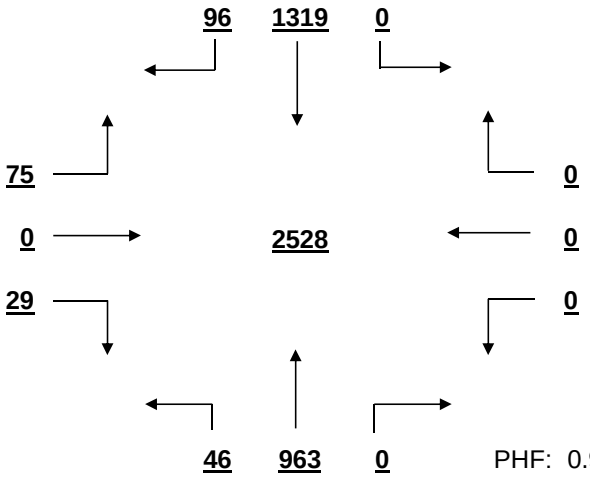
PHF: 0.960

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 13:00 TO 14:00



PHF: 0.959

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.903

SIGNAL WARRANT ANALYSIS

Broad River Rd AT Beatty Rd Date: 11/22/2016

Minor Street Volume, percent of total = 5.7%
Percent of Left Turns from Minor Street = 56.1%
Percent of Right Turns from Minor Street = 43.9%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1981.0	/ 600	=	330%	119.8	/ 150	=	80%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	404%	315%	225%	228%	261%	287%	293%	333%	330%	435%	441%	410%
Minor St.	69%	71%	58%	51%	67%	77%	79%	76%	77%	93%	101%	139%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1981.0	/ 900	=	220%	119.8	/ 75	=	160%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	269%	210%	150%	152%	174%	192%	195%	222%	220%	290%	294%	273%
Minor St.	139%	143%	116%	103%	133%	155%	157%	152%	155%	187%	201%	277%

80% Combination of Conditions A & B is not met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	130%	134%	99%	96%	125%	145%	148%	143%	145%	175%	189%	260%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	16:30 - 17:30	Higher Volume Side Street Peak Hour:	18:00 - 19:00
Minor St.	145%	Minor St.	208%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	4	0	3	0	8	1	2	0	1	2	2	6

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/22/2016

Major Rt: Beatty Rd-Evelyn * Not on State System Minor Rt: Evelyn Rd-Beatty * Not on State System

Day of Week: Tuesday Weather: Clear Office: Short Counts JMS

Type of Control: Stop Sign Speed Limit (major st) 35

Direction of Minor Street: E-W Intersection ADT - 3610 (Calc)

Number of Lanes (major st)* 1 Number of Lanes (minor st)* 1

* Each Direction

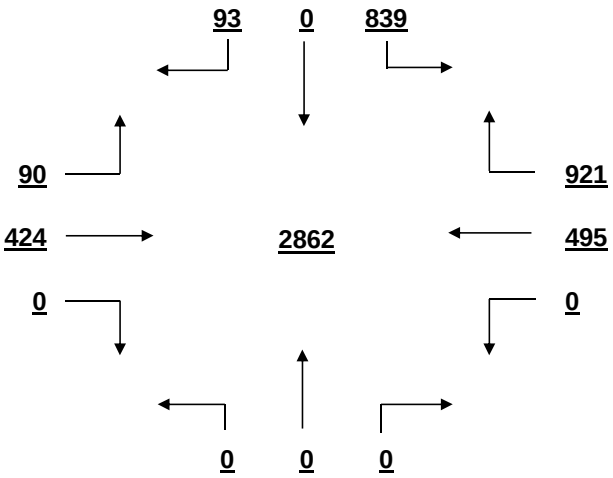
INTERSECTION VOLUME SUMMARY

	From N Beatty Rd-Evelyn				From S Beatty Rd-Evelyn				From E Evelyn Rd-Beatty				From W Evelyn Rd-Beatty				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	16	0	2	18	0	0	0	0	0	6	9	15	2	1	0	3	36	0
7:15 - 7:30	14	0	3	17	0	0	0	0	0	6	10	16	2	8	0	10	43	0
7:30 - 7:45	17	0	5	22	0	0	0	0	0	6	18	24	2	3	0	5	51	0
7:45 - 8:00	14	0	1	15	0	0	0	0	0	10	12	22	1	15	0	16	53	0
8:00 - 8:15	12	0	2	14	0	0	0	0	0	11	14	25	1	7	0	8	47	0
8:15 - 8:30	12	0	4	16	0	0	0	0	0	11	10	21	4	10	0	14	51	0
8:30 - 8:45	18	0	2	20	0	0	0	0	0	6	13	19	0	5	0	5	44	0
8:45 - 9:00	18	0	0	18	0	0	0	0	0	7	16	23	3	7	0	10	51	0
9:00 - 9:15	8	0	0	8	0	0	0	0	0	4	13	17	1	6	0	7	32	0
9:15 - 9:30	20	0	0	20	0	0	0	0	0	6	14	20	1	10	0	11	51	1
9:30 - 9:45	10	0	1	11	0	0	0	0	0	6	10	16	0	8	0	8	35	0
9:45 - 10:00	13	0	3	16	0	0	0	0	0	3	13	16	0	5	0	5	37	0
10:00 - 10:15	12	0	0	12	0	0	0	0	0	2	9	11	1	6	0	7	30	0
10:15 - 10:30	15	0	1	16	0	0	0	0	0	4	18	22	0	2	0	2	40	0
10:30 - 10:45	13	0	2	15	0	0	0	0	0	4	14	18	0	10	0	10	43	1
10:45 - 11:00	11	0	3	14	0	0	0	0	0	10	19	29	0	9	0	9	52	0
11:00 - 11:15	16	0	3	19	0	0	0	0	0	9	14	23	3	13	0	16	58	0
11:15 - 11:30	11	0	3	14	0	0	0	0	0	9	11	20	1	2	0	3	37	0
11:30 - 11:45	14	0	1	15	0	0	0	0	0	11	16	27	0	4	0	4	46	0
11:45 - 12:00	14	0	0	14	0	0	0	0	0	8	13	21	2	3	0	5	40	0
12:00 - 12:15	15	0	0	15	0	0	0	0	0	9	15	24	3	5	0	8	47	0
12:15 - 12:30	20	0	3	23	0	0	0	0	0	3	25	28	2	13	0	15	66	1
12:30 - 12:45	17	0	2	19	0	0	0	0	0	13	29	42	3	5	0	8	69	0
12:45 - 13:00	27	0	1	28	0	0	0	0	0	11	14	25	2	8	0	10	63	1
13:00 - 13:15	15	0	3	18	0	0	0	0	0	6	14	20	2	6	0	8	46	0
13:15 - 13:30	9	0	0	9	0	0	0	0	0	8	19	27	0	9	0	9	45	0
13:30 - 13:45	10	0	0	10	0	0	0	0	0	10	13	23	1	6	0	7	40	0
13:45 - 14:00	17	0	1	18	0	0	0	0	0	15	14	29	1	12	0	13	60	0
14:00 - 14:15	13	0	1	14	0	0	0	0	0	13	24	37	2	8	0	10	61	0
14:15 - 14:30	15	0	2	17	0	0	0	0	0	13	19	32	3	11	0	14	63	0
14:30 - 14:45	17	0	0	17	0	0	0	0	0	16	30	46	2	15	0	17	80	0
14:45 - 15:00	26	0	2	28	0	0	0	0	0	11	23	34	4	15	0	19	81	0
15:00 - 15:15	17	0	3	20	0	0	0	0	0	7	19	26	2	9	0	11	57	0
15:15 - 15:30	14	0	1	15	0	0	0	0	0	10	22	32	1	6	0	7	54	0
15:30 - 15:45	19	0	4	23	0	0	0	0	0	12	26	38	3	9	0	12	73	0
15:45 - 16:00	25	0	1	26	0	0	0	0	0	9	21	30	1	3	0	4	60	0
16:00 - 16:15	18	0	2	20	0	0	0	0	0	11	19	30	2	15	0	17	67	0
16:15 - 16:30	18	0	3	21	0	0	0	0	0	8	27	35	1	10	0	11	67	0
16:30 - 16:45	24	0	5	29	0	0	0	0	0	10	30	40	3	15	0	18	87	0
16:45 - 17:00	22	0	6	28	0	0	0	0	0	19	33	52	3	9	0	12	92	0
17:00 - 17:15	19	0	2	21	0	0	0	0	0	16	25	41	4	10	0	14	76	0
17:15 - 17:30	29	0	4	33	0	0	0	0	0	16	26	42	2	15	0	17	92	0
17:30 - 17:45	24	0	1	25	0	0	0	0	0	19	26	45	1	14	0	15	85	0
17:45 - 18:00	23	0	2	25	0	0	0	0	0	14	41	55	4	9	0	13	93	0
18:00 - 18:15	28	0	2	30	0	0	0	0	0	15	20	35	1	17	0	18	83	0
18:15 - 18:30	22	0	1	23	0	0	0	0	0	17	28	45	7	12	0	19	87	0
18:30 - 18:45	24	0	1	25	0	0	0	0	0	27	27	54	2	16	0	18	97	0
18:45 - 19:00	34	0	4	38	0	0	0	0	0	18	26	44	4	8	0	12	94	0
TOTAL	839	0	93	932	0	0	0	0	0	495	921	1416	90	424	0	514	2862	4
Trucks	15	0	1	16	0	0	0	0	0	12	10	22	6	9	0	15	53	1.9%
School Buses	3	0	1	4	0	0	0	0	0	4	5	9	5	8	0	13	26	0.9%

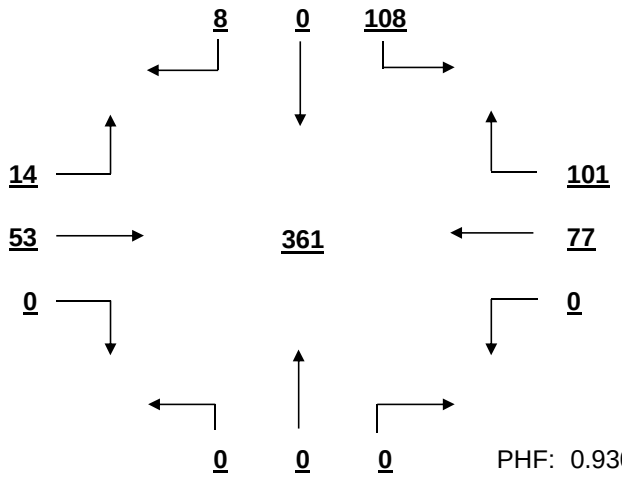
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Beatty Rd-Evelyn AT Evelyn Rd-Beatty Date: 11/22/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

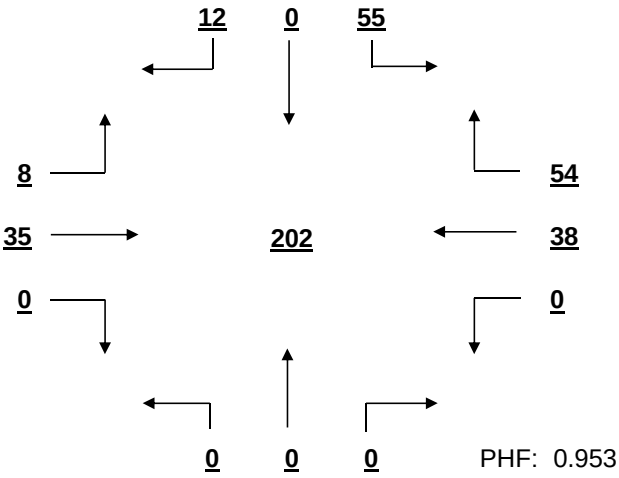


OVERALL PEAK HOUR VOLUME
FROM 18:00 TO 19:00



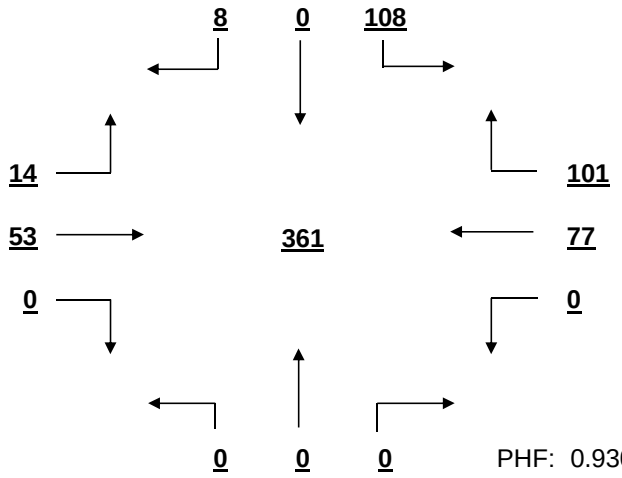
PHF: 0.930

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



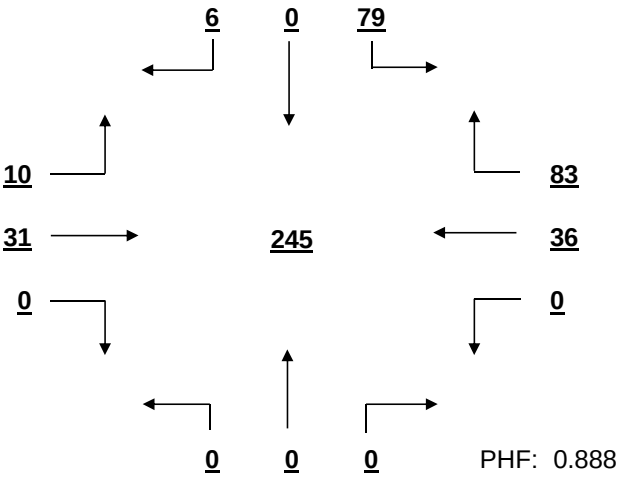
PHF: 0.953

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 18:00 TO 19:00



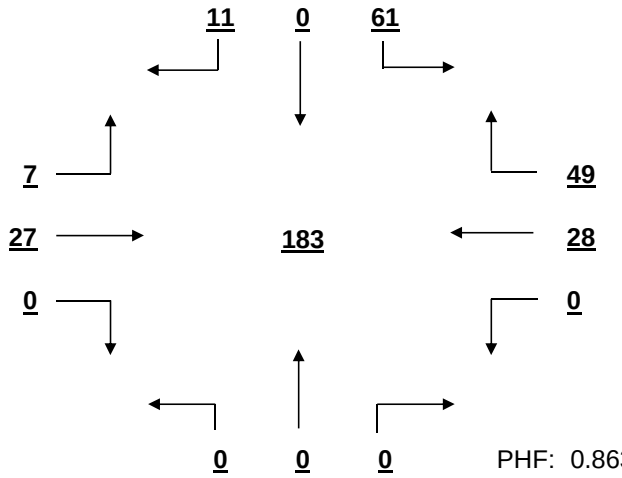
PHF: 0.930

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:00 TO 13:00



PHF: 0.888

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.863

SIGNAL WARRANT ANALYSIS

Beatty Rd-Evelyn AT Evelyn Rd-Beatty Date: 11/22/2016

Minor Street Volume, percent of total = 67.4%
Percent of Left Turns from Minor Street = 4.7%
Percent of Right Turns from Minor Street = 47.7%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is not met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
77.7	/ 500	=	16%	118.0	/ 150	=	79%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	14%	14%	11%	11%	12%	17%	11%	15%	17%	20%	21%	23%
Minor St.	51%	59%	46%	53%	61%	79%	66%	99%	84%	105%	122%	119%

Condition B - Interruption to Continuous Traffic is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
77.7	/ 750	=	10%	118.0	/ 75	=	157%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	10%	9%	7%	8%	8%	11%	7%	10%	11%	13%	14%	15%
Minor St.	103%	117%	92%	107%	121%	159%	132%	199%	168%	209%	244%	237%

80% Combination of Conditions A & B is not met

Warrant No. 2 - Four Hour Vehicular Volume is not met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	16%	18%	14%	16%	18%	24%	20%	30%	26%	33%	39%	38%

Warrant No. 3 - Peak Hour is not met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	18:00 - 19:00	Higher Volume Side Street Peak Hour:	17:45 - 18:45
Minor St.	26%	Minor St.	28%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	1	0	0	2	0	0	0	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008

Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/21/2016

Major Rt: Fernandina Rd * Not on State System Minor Rt: Evelyn Dr * Not on State System

Day of Week: Monday Weather: Clear Office: Short Counts JMS

Type of Control: Stop Sign Speed Limit (major st) 35

Direction of Minor Street: E-W Intersection ADT - 9670 (Calc)

Number of Lanes (major st)* 1 Number of Lanes (minor st)* 1

* Each Direction

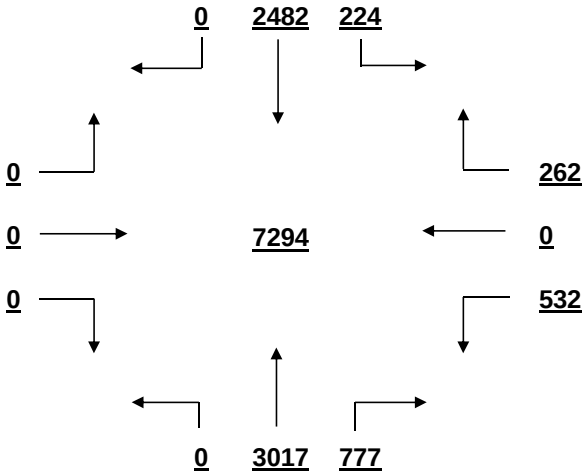
INTERSECTION VOLUME SUMMARY

	From N Fernandina Rd				From S Fernandina Rd				From E Evelyn Dr				From W Evelyn Dr				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	1	27	0	28	0	24	5	29	20	0	4	24	0	0	0	0	81	1
7:15 - 7:30	0	48	0	48	0	43	10	53	13	0	3	16	0	0	0	0	117	0
7:30 - 7:45	4	101	0	105	0	70	12	82	28	0	4	32	0	0	0	0	219	0
7:45 - 8:00	4	133	0	137	0	79	9	88	16	0	10	26	0	0	0	0	251	0
8:00 - 8:15	5	123	0	128	0	75	11	86	21	0	3	24	0	0	0	0	238	0
8:15 - 8:30	4	99	0	103	0	83	9	92	7	0	2	9	0	0	0	0	204	0
8:30 - 8:45	0	94	0	94	0	57	12	69	16	0	6	22	0	0	0	0	185	0
8:45 - 9:00	3	58	0	61	0	69	10	79	12	0	7	19	0	0	0	0	159	0
9:00 - 9:15	0	37	0	37	0	54	7	61	9	0	2	11	0	0	0	0	109	0
9:15 - 9:30	4	21	0	25	0	41	3	44	5	0	6	11	0	0	0	0	80	0
9:30 - 9:45	3	27	0	30	0	45	6	51	5	0	5	10	0	0	0	0	91	0
9:45 - 10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 - 10:15	1	36	0	37	0	43	7	50	5	0	5	10	0	0	0	0	97	0
10:15 - 10:30	5	22	0	27	0	35	8	43	8	0	7	15	0	0	0	0	85	0
10:30 - 10:45	3	34	0	37	0	41	4	45	6	0	4	10	0	0	0	0	92	0
10:45 - 11:00	3	38	0	41	0	29	3	32	11	0	5	16	0	0	0	0	89	0
11:00 - 11:15	2	34	0	36	0	39	9	48	4	0	9	13	0	0	0	0	97	0
11:15 - 11:30	5	49	0	54	0	54	8	62	9	0	1	10	0	0	0	0	126	0
11:30 - 11:45	3	49	0	52	0	53	8	61	6	0	3	9	0	0	0	0	122	0
11:45 - 12:00	7	36	0	43	0	47	9	56	14	0	5	19	0	0	0	0	118	0
12:00 - 12:15	3	64	0	67	0	49	4	53	11	0	12	23	0	0	0	0	143	0
12:15 - 12:30	6	59	0	65	0	65	12	77	8	0	3	11	0	0	0	0	153	0
12:30 - 12:45	3	50	0	53	0	75	7	82	11	0	6	17	0	0	0	0	152	0
12:45 - 13:00	6	54	0	60	0	52	10	62	12	0	2	14	0	0	0	0	136	0
13:00 - 13:15	5	37	0	42	0	67	11	78	3	0	3	6	0	0	0	0	126	0
13:15 - 13:30	5	61	0	66	0	46	7	53	5	0	3	8	0	0	0	0	127	0
13:30 - 13:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:45 - 14:00	2	57	0	59	0	60	9	69	9	0	10	19	0	0	0	0	147	1
14:00 - 14:15	6	50	0	56	0	52	7	59	8	0	2	10	0	0	0	0	125	0
14:15 - 14:30	2	46	0	48	0	46	8	54	5	0	6	11	0	0	0	0	113	0
14:30 - 14:45	4	46	0	50	0	52	7	59	13	0	11	24	0	0	0	0	133	0
14:45 - 15:00	5	31	0	36	0	53	28	81	11	0	9	20	0	0	0	0	137	0
15:00 - 15:15	14	11	0	25	0	29	101	130	16	0	2	18	0	0	0	0	173	0
15:15 - 15:30	15	4	0	19	0	11	139	150	21	0	3	24	0	0	0	0	193	0
15:30 - 15:45	6	29	0	35	0	66	91	157	31	0	6	37	0	0	0	0	229	1
15:45 - 16:00	3	61	0	64	0	147	6	153	15	0	5	20	0	0	0	0	237	0
16:00 - 16:15	12	55	0	67	0	156	11	167	13	0	9	22	0	0	0	0	256	0
16:15 - 16:30	1	62	0	63	0	127	15	142	13	0	6	19	0	0	0	0	224	0
16:30 - 16:45	5	90	0	95	0	93	15	108	12	0	10	22	0	0	0	0	225	0
16:45 - 17:00	4	83	0	87	0	98	11	109	8	0	10	18	0	0	0	0	214	0
17:00 - 17:15	9	125	0	134	0	118	12	130	19	0	8	27	0	0	0	0	291	0
17:15 - 17:30	6	83	0	89	0	112	19	131	9	0	8	17	0	0	0	0	237	0
17:30 - 17:45	7	61	0	68	0	119	19	138	5	0	4	9	0	0	0	0	215	0
17:45 - 18:00	6	55	0	61	0	114	14	128	11	0	7	18	0	0	0	0	207	0
18:00 - 18:15	10	47	0	57	0	98	25	123	10	0	5	15	0	0	0	0	195	0
18:15 - 18:30	9	28	0	37	0	71	15	86	14	0	11	25	0	0	0	0	148	0
18:30 - 18:45	8	42	0	50	0	42	12	54	16	0	6	22	0	0	0	0	126	0
18:45 - 19:00	5	25	0	30	0	18	12	30	8	0	4	12	0	0	0	0	72	0
TOTAL	224	2482	0	2706	0	3017	777	3794	532	0	262	794	0	0	0	0	7294	3
Trucks	0	16	0	16	0	19	11	30	2	0	0	2	0	0	0	0	48	0.7%
School Buses	1	6	0	7	0	12	13	25	7	0	1	8	0	0	0	0	40	0.5%

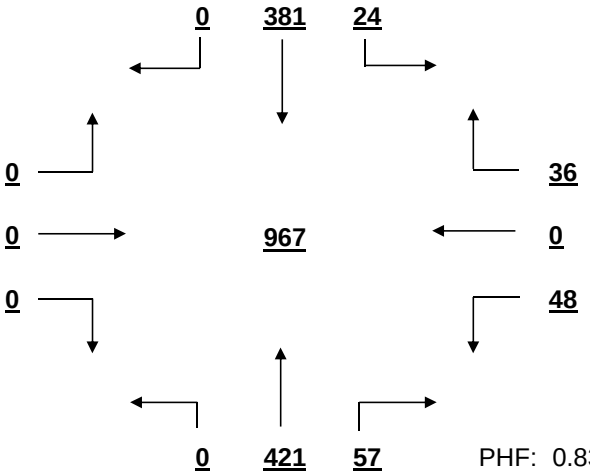
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Fernandina Rd AT Evelyn Dr Date: 11/21/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

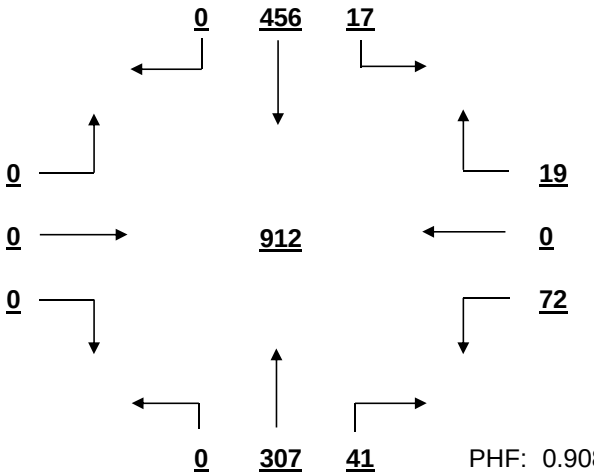


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



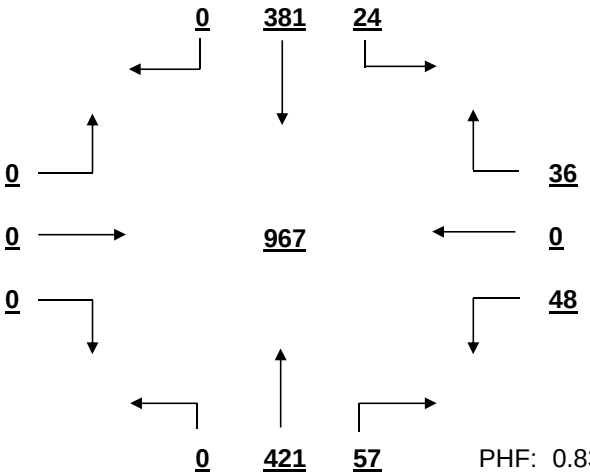
PHF: 0.831

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



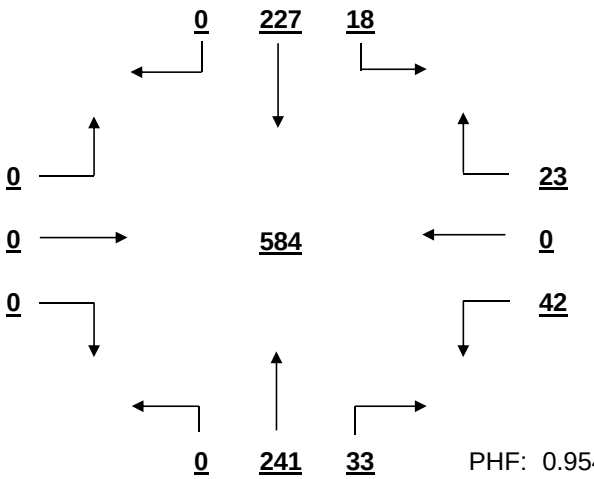
PHF: 0.908

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



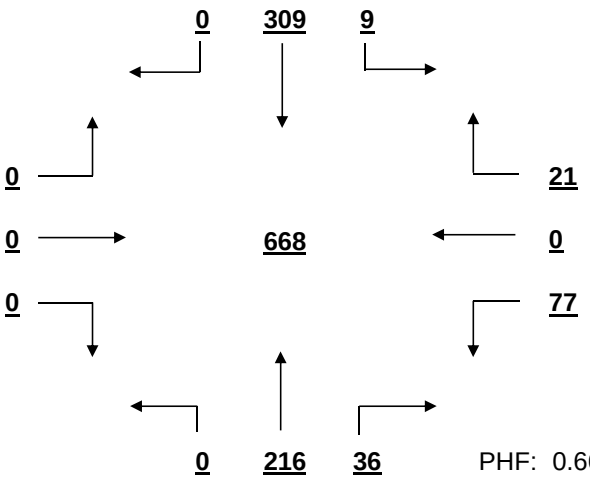
PHF: 0.831

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:00 TO 13:00



PHF: 0.954

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.665

SIGNAL WARRANT ANALYSIS

Fernandina Rd AT Evelyn Dr Date: 11/21/2016

Minor Street Volume, percent of total = 10.9%
Percent of Left Turns from Minor Street = 67.0%
Percent of Right Turns from Minor Street = 33.0%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is not met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
541.7	/ 500	=	108%	66.2	/ 150	=	44%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	114%	142%	50%	62%	82%	104%	73%	89%	147%	168%	176%	93%
Minor St.	65%	49%	21%	34%	34%	43%	22%	43%	66%	54%	47%	49%

Condition B - Interruption to Continuous Traffic is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
541.7	/ 750	=	72%	66.2	/ 75	=	88%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	76%	95%	33%	42%	55%	69%	49%	59%	98%	112%	117%	62%
Minor St.	131%	99%	43%	68%	68%	87%	44%	87%	132%	108%	95%	99%

80% Combination of Conditions A & B is not met

Warrant No. 2 - Four Hour Vehicular Volume is not met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	42%	42%	8%	14%	17%	26%	10%	23%	58%	59%	56%	27%

Warrant No. 3 - Peak Hour is not met

Percent of warrant			Percent of warrant	
Overall Peak Hour: 16:30 - 17:30		Higher Volume Side Street Peak Hour: 15:15 - 16:15		
Minor St.	34%		Minor St.	38%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street	Minimum peak hour ped. volume crossing major street
107	133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	1	0	0	0	0	0	1	0	1	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/28/2016

Major Rt: St. Andrews Rd * Not on State System Minor Rt: Sidney Rd * Not on State System

Day of Week: Monday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: N-S Intersection ADT - 17170 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1 * Each Direction

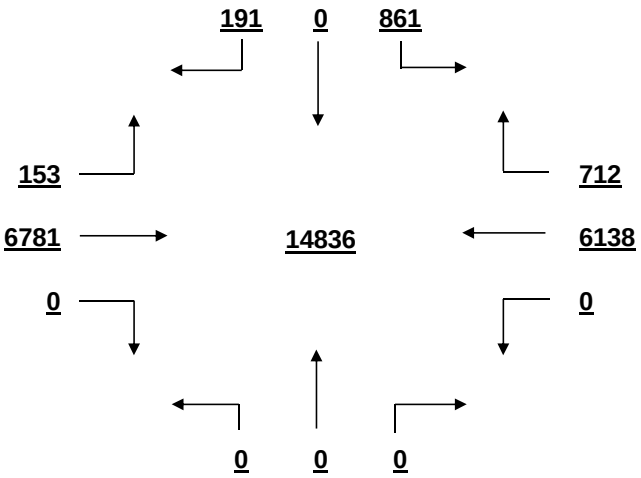
INTERSECTION VOLUME SUMMARY

	From N Sidney Rd				From S Sidney Rd				From E St. Andrews Rd				From W St. Andrews Rd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	32	0	4	36	0	0	0	0	0	57	7	64	2	167	0	169	269	0
7:15 - 7:30	40	0	2	42	0	0	0	0	0	85	15	100	3	210	0	213	355	0
7:30 - 7:45	44	0	7	51	0	0	0	0	0	100	19	119	0	263	0	263	433	0
7:45 - 8:00	30	0	3	33	0	0	0	0	0	112	11	123	6	260	0	266	422	0
8:00 - 8:15	24	0	2	26	0	0	0	0	0	89	9	98	2	241	0	243	367	0
8:15 - 8:30	24	0	0	24	0	0	0	0	0	80	11	91	0	197	0	197	312	0
8:30 - 8:45	24	0	0	24	0	0	0	0	0	81	7	88	1	183	0	184	296	0
8:45 - 9:00	21	0	3	24	0	0	0	0	0	100	13	113	2	146	0	148	285	0
9:00 - 9:15	16	0	3	19	0	0	0	0	0	88	10	98	4	147	0	151	268	0
9:15 - 9:30	17	0	2	19	0	0	0	0	0	80	6	86	1	166	0	167	272	0
9:30 - 9:45	8	0	6	14	0	0	0	0	0	90	14	104	1	96	0	97	215	0
9:45 - 10:00	12	0	6	18	0	0	0	0	0	97	11	108	1	101	0	102	228	0
10:00 - 10:15	10	0	0	10	0	0	0	0	0	94	10	104	3	113	0	116	230	0
10:15 - 10:30	13	0	6	19	0	0	0	0	0	90	10	100	4	116	0	120	239	0
10:30 - 10:45	12	0	3	15	0	0	0	0	0	92	15	107	3	112	0	115	237	0
10:45 - 11:00	17	0	4	21	0	0	0	0	0	98	6	104	1	108	0	109	234	0
11:00 - 11:15	13	0	4	17	0	0	0	0	0	101	13	114	1	106	0	107	238	0
11:15 - 11:30	18	0	6	24	0	0	0	0	0	96	16	112	1	105	0	106	242	0
11:30 - 11:45	15	0	2	17	0	0	0	0	0	118	11	129	8	110	0	118	264	0
11:45 - 12:00	13	0	4	17	0	0	0	0	0	116	13	129	4	125	0	129	275	0
12:00 - 12:15	11	0	7	18	0	0	0	0	0	120	11	131	3	130	0	133	282	0
12:15 - 12:30	14	0	2	16	0	0	0	0	0	132	15	147	4	138	0	142	305	0
12:30 - 12:45	20	0	2	22	0	0	0	0	0	128	20	148	2	151	0	153	323	0
12:45 - 13:00	15	0	4	19	0	0	0	0	0	115	14	129	4	141	0	145	293	0
13:00 - 13:15	13	0	4	17	0	0	0	0	0	119	15	134	5	134	0	139	290	3
13:15 - 13:30	19	0	5	24	0	0	0	0	0	123	14	137	4	145	0	149	310	0
13:30 - 13:45	15	0	6	21	0	0	0	0	0	122	15	137	4	135	0	139	297	0
13:45 - 14:00	21	0	5	26	0	0	0	0	0	118	12	130	1	129	0	130	286	0
14:00 - 14:15	12	0	6	18	0	0	0	0	0	109	13	122	1	132	0	133	273	0
14:15 - 14:30	20	0	2	22	0	0	0	0	0	138	12	150	2	115	0	117	289	0
14:30 - 14:45	12	0	4	16	0	0	0	0	0	125	13	138	5	129	0	134	288	0
14:45 - 15:00	17	0	6	23	0	0	0	0	0	121	17	138	4	130	0	134	295	0
15:00 - 15:15	21	0	6	27	0	0	0	0	0	158	9	167	3	167	0	170	364	1
15:15 - 15:30	16	0	3	19	0	0	0	0	0	138	20	158	3	115	0	118	295	0
15:30 - 15:45	16	0	5	21	0	0	0	0	0	143	13	156	6	141	0	147	324	0
15:45 - 16:00	11	0	4	15	0	0	0	0	0	153	18	171	6	145	0	151	337	0
16:00 - 16:15	17	0	5	22	0	0	0	0	0	154	26	180	6	148	0	154	356	0
16:15 - 16:30	21	0	7	28	0	0	0	0	0	171	15	186	1	137	0	138	352	1
16:30 - 16:45	14	0	6	20	0	0	0	0	0	176	26	202	6	120	0	126	348	0
16:45 - 17:00	24	0	2	26	0	0	0	0	0	205	23	228	3	134	0	137	391	0
17:00 - 17:15	20	0	3	23	0	0	0	0	0	229	3	232	5	170	0	175	430	0
17:15 - 17:30	20	0	6	26	0	0	0	0	0	254	20	274	4	162	0	166	466	0
17:30 - 17:45	20	0	5	25	0	0	0	0	0	236	18	254	3	118	0	121	400	0
17:45 - 18:00	19	0	3	22	0	0	0	0	0	217	34	251	4	144	0	148	421	0
18:00 - 18:15	14	0	4	18	0	0	0	0	0	152	31	183	5	135	0	140	341	1
18:15 - 18:30	14	0	3	17	0	0	0	0	0	174	25	199	5	93	0	98	314	0
18:30 - 18:45	9	0	5	14	0	0	0	0	0	135	20	155	4	91	0	95	264	0
18:45 - 19:00	13	0	4	17	0	0	0	0	0	109	13	122	2	80	0	82	221	0
TOTAL	861	0	191	1052	0	0	0	0	0	6138	712	6850	153	6781	0	6934	14836	6
Trucks	4	0	1	5	0	0	0	0	0	103	2	105	0	109	0	109	219	1.5%
School Buses	3	0	3	6	0	0	0	0	0	28	7	35	2	26	0	28	69	0.5%

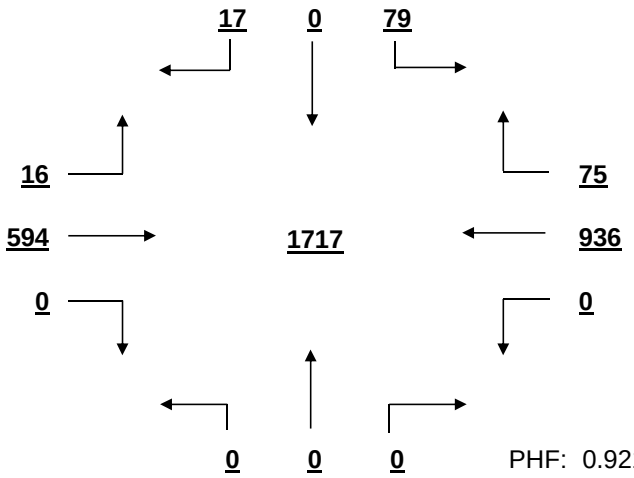
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

St. Andrews Rd AT Sidney Rd Date: 11/28/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

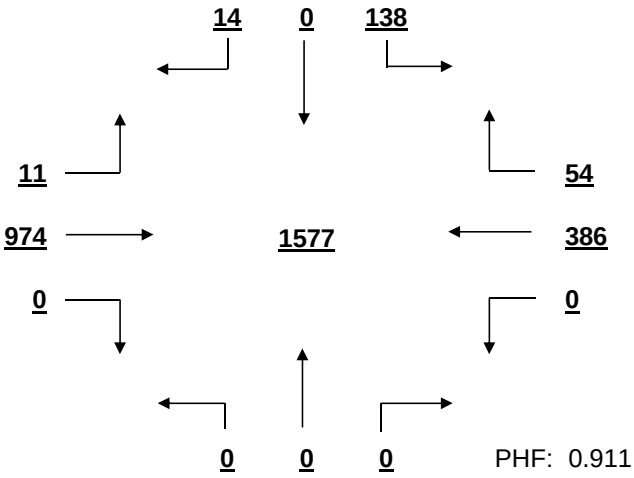


OVERALL PEAK HOUR VOLUME
FROM 17:00 TO 18:00



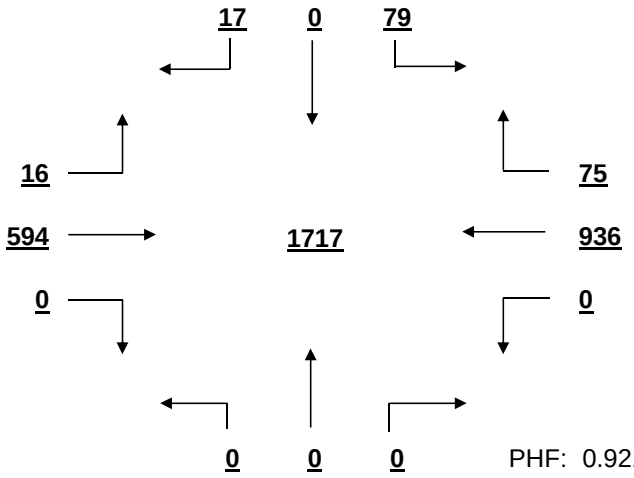
PHF: 0.921

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



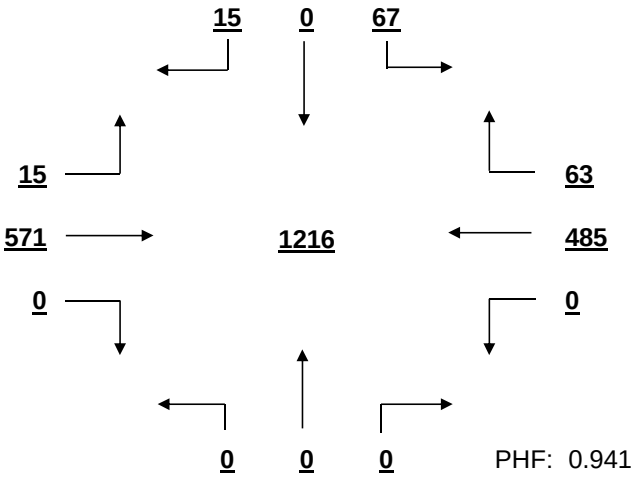
PHF: 0.911

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:00 TO 18:00



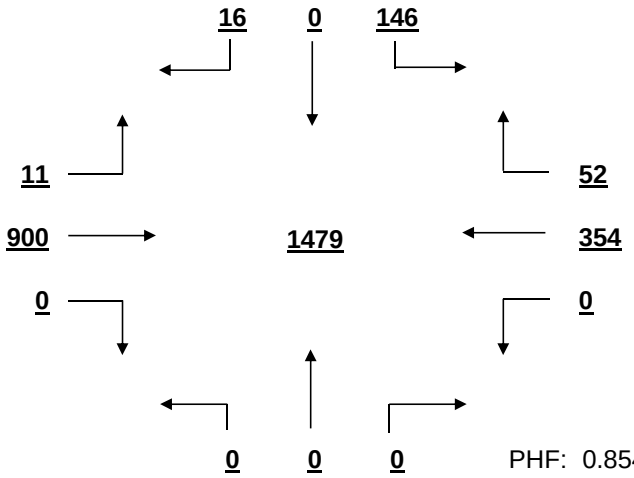
PHF: 0.921

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:30 TO 13:30



PHF: 0.941

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.854

SIGNAL WARRANT ANALYSIS

St. Andrews Rd AT Sidney Rd Date: 11/28/2016

Minor Street Volume, percent of total = 7.1%
Percent of Left Turns from Minor Street = 81.8%
Percent of Right Turns from Minor Street = 18.2%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1148.7	/	600	= 191%	87.7	/	150	= 58%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	220%	194%	152%	146%	157%	188%	183%	178%	206%	225%	270%	179%
Minor St.	108%	65%	47%	43%	50%	50%	59%	53%	55%	64%	64%	44%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1148.7	/	900	= 128%	87.7	/	75	= 117%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	146%	129%	101%	97%	105%	125%	122%	118%	138%	150%	180%	119%
Minor St.	216%	131%	93%	87%	100%	100%	117%	105%	109%	128%	128%	88%

80% Combination of Conditions A & B is not met

Warrant No. 2 - Four Hour Vehicular Volume is not met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	179%	90%	42%	36%	47%	65%	72%	62%	83%	120%	120%	52%

Warrant No. 3 - Peak Hour is not met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	17:00 - 18:00	Higher Volume Side Street Peak Hour:	7:00 - 8:00
Minor St.	83%	Minor St.	90%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	0	0	0	0	0	0	0	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/28/2016

Major Rt: St. Andrews Rd * Not on State System Minor Rt: Ashland Rd * Not on State System

Day of Week: Monday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: N-S Intersection ADT - 21960 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1 * Each Direction

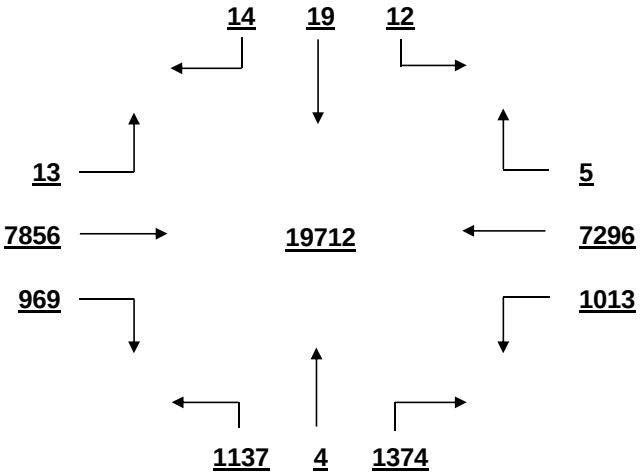
INTERSECTION VOLUME SUMMARY

	From N Ashland Rd				From S Ashland Rd				From E St. Andrews Rd				From W St. Andrews Rd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	0	0	0	0	10	0	26	36	27	69	0	96	0	181	31	212	344	4
7:15 - 7:30	0	0	0	0	32	1	49	82	37	84	0	121	0	220	49	269	472	2
7:30 - 7:45	0	0	0	0	37	0	65	102	42	93	0	135	1	271	47	319	556	2
7:45 - 8:00	0	0	0	0	23	0	45	68	17	121	0	138	0	262	29	291	497	1
8:00 - 8:15	0	0	0	0	15	0	33	48	21	111	1	133	0	259	26	285	466	1
8:15 - 8:30	0	0	0	0	14	0	39	53	25	107	0	132	1	224	14	239	424	7
8:30 - 8:45	0	0	0	0	10	0	16	26	17	90	0	107	0	189	17	206	339	0
8:45 - 9:00	0	0	0	0	17	0	21	38	16	118	0	134	1	161	10	172	344	2
9:00 - 9:15	0	0	0	0	20	0	23	43	15	93	0	108	0	153	15	168	319	1
9:15 - 9:30	1	0	0	1	13	0	20	33	13	97	0	110	0	115	16	131	275	6
9:30 - 9:45	0	0	1	1	15	0	24	39	12	110	0	122	1	127	11	139	301	5
9:45 - 10:00	0	0	0	0	12	0	12	24	8	117	0	125	0	113	5	118	267	0
10:00 - 10:15	0	0	1	1	12	0	19	31	7	124	0	131	0	112	14	126	289	1
10:15 - 10:30	0	0	0	0	17	0	27	44	17	104	0	121	0	138	15	153	318	6
10:30 - 10:45	1	0	0	1	16	0	10	26	12	111	0	123	1	119	8	128	278	0
10:45 - 11:00	1	0	1	2	19	0	23	42	7	112	0	119	0	133	11	144	307	5
11:00 - 11:15	0	0	0	0	11	0	17	28	14	128	0	142	0	129	10	139	309	0
11:15 - 11:30	0	0	0	0	20	0	18	38	10	142	0	152	3	126	17	146	336	4
11:30 - 11:45	0	0	2	2	19	0	21	40	11	136	1	148	0	150	25	175	365	4
11:45 - 12:00	0	0	0	0	22	0	28	50	26	145	0	171	0	146	18	164	385	2
12:00 - 12:15	0	0	2	2	26	0	29	55	18	146	0	164	0	151	22	173	394	8
12:15 - 12:30	1	0	1	2	35	0	19	54	33	161	0	194	0	171	20	191	441	5
12:30 - 12:45	0	0	0	0	18	0	29	47	22	171	1	194	0	174	25	199	440	5
12:45 - 13:00	0	0	0	0	22	0	28	50	25	150	0	175	0	169	23	192	417	8
13:00 - 13:15	0	1	0	1	26	0	26	52	23	152	0	175	0	170	19	189	417	2
13:15 - 13:30	0	0	0	0	31	0	27	58	21	147	0	168	1	192	21	214	440	2
13:30 - 13:45	0	0	0	0	28	0	37	65	20	157	1	178	0	161	27	188	431	2
13:45 - 14:00	0	1	0	1	18	1	29	48	26	161	0	187	0	159	21	180	416	6
14:00 - 14:15	0	0	0	0	11	0	33	44	21	130	1	152	0	164	19	183	379	2
14:15 - 14:30	0	1	0	1	22	0	25	47	20	163	0	183	0	141	29	170	401	4
14:30 - 14:45	0	0	0	0	29	0	30	59	19	154	0	173	0	148	21	169	401	5
14:45 - 15:00	1	3	1	5	30	1	45	76	33	144	0	177	0	153	19	172	430	2
15:00 - 15:15	1	0	0	1	33	0	29	62	23	172	0	195	0	202	17	219	477	8
15:15 - 15:30	0	3	0	3	28	0	27	55	22	163	0	185	0	141	24	165	408	0
15:30 - 15:45	0	1	0	1	32	0	29	61	28	200	0	228	0	181	15	196	486	4
15:45 - 16:00	0	0	0	0	23	0	26	49	27	194	0	221	2	166	18	186	456	2
16:00 - 16:15	0	1	0	1	36	0	34	70	21	182	0	203	0	186	19	205	479	10
16:15 - 16:30	1	2	0	3	30	0	35	65	23	185	0	208	0	166	30	196	472	4
16:30 - 16:45	0	1	0	1	30	0	23	53	31	218	0	249	0	139	20	159	462	3
16:45 - 17:00	0	1	0	1	35	0	32	67	26	238	0	264	0	177	30	207	539	1
17:00 - 17:15	1	0	2	3	36	0	39	75	27	215	0	242	0	188	27	215	535	6
17:15 - 17:30	0	1	0	1	41	0	36	77	17	291	0	308	1	183	29	213	599	7
17:30 - 17:45	3	1	0	4	36	0	31	67	41	249	0	290	1	148	13	162	523	1
17:45 - 18:00	0	0	1	1	42	0	39	81	20	218	0	238	0	161	21	182	502	1
18:00 - 18:15	1	0	2	3	25	0	33	58	15	182	0	197	0	159	13	172	430	1
18:15 - 18:30	0	2	0	2	21	1	26	48	25	218	0	243	0	136	12	148	441	0
18:30 - 18:45	0	0	0	0	23	0	24	47	20	181	0	201	0	126	12	138	386	3
18:45 - 19:00	0	0	0	0	16	0	18	34	12	142	0	154	0	116	15	131	319	2
TOTAL	12	19	14	45	1137	4	1374	2515	1013	7296	5	8314	13	7856	969	8838	19712	157
Trucks	0	0	0	0	3	0	11	14	10	122	1	133	0	139	6	145	292	1.5%
School Buses	1	17	0	18	9	0	5	14	2	13	0	15	0	27	11	38	85	0.4%

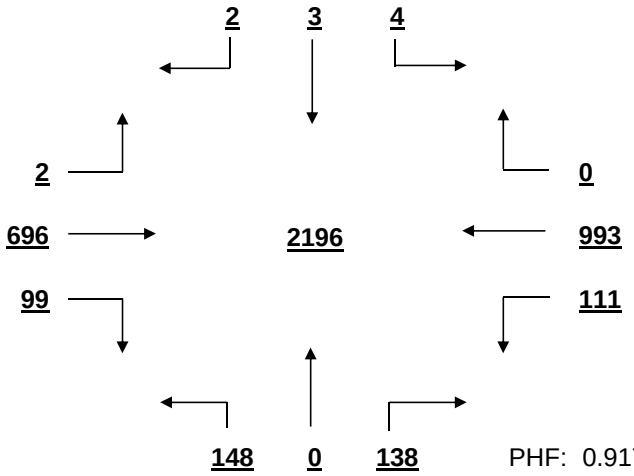
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

St. Andrews Rd AT Ashland Rd Date: 11/28/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

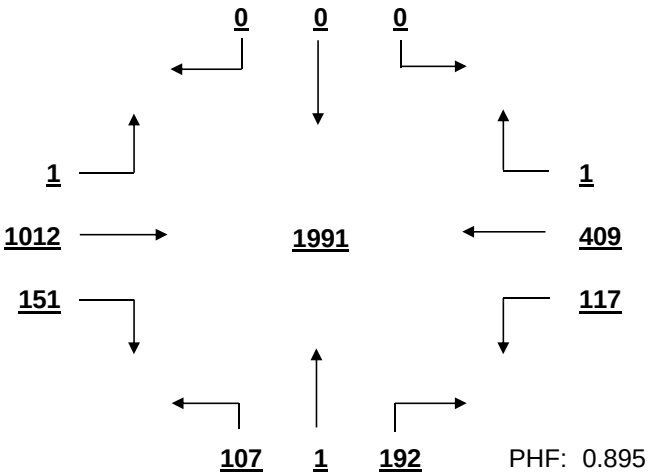


OVERALL PEAK HOUR VOLUME
FROM 16:45 TO 17:45



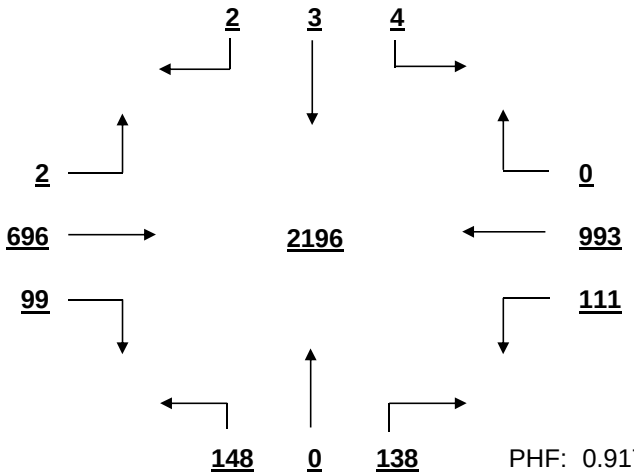
PHF: 0.917

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



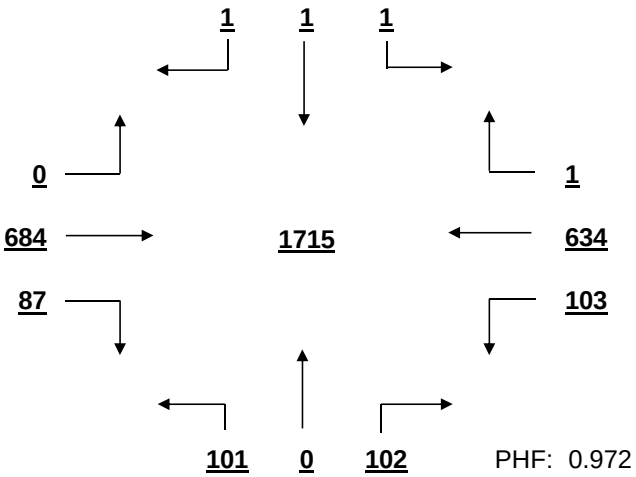
PHF: 0.895

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:45 TO 17:45



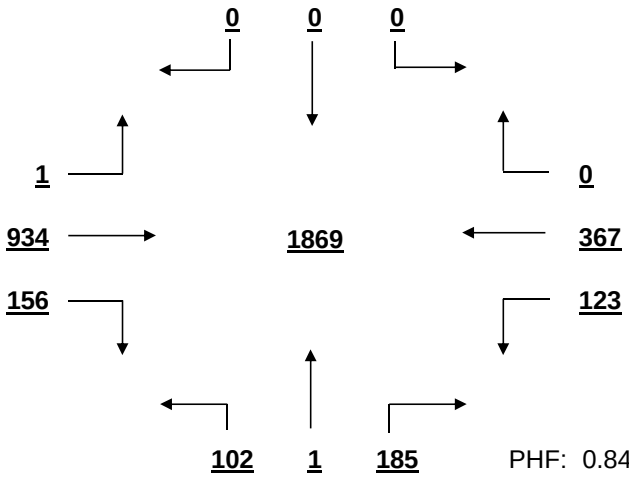
PHF: 0.917

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:15 TO 13:15



PHF: 0.972

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.840

SIGNAL WARRANT ANALYSIS

St. Andrews Rd AT Ashland Rd Date: 11/28/2016

Minor Street Volume, percent of total = 13.0%
Percent of Left Turns from Minor Street = 44.9%
Percent of Right Turns from Minor Street = 54.2%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1429.3	/	600 =	238%	209.6	/	150 =	140%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	264%	235%	170%	174%	206%	247%	247%	230%	266%	282%	308%	231%
Minor St.	192%	110%	93%	95%	104%	137%	149%	151%	151%	170%	200%	125%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1429.3	/	900 =	159%	209.6	/	75 =	279%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	176%	156%	113%	116%	137%	165%	164%	153%	177%	188%	206%	154%
Minor St.	384%	220%	185%	191%	208%	275%	297%	301%	303%	340%	400%	249%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	360%	206%	101%	108%	158%	258%	279%	283%	284%	319%	375%	234%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	16:45 - 17:45	Higher Volume Side Street Peak Hour:	7:15 - 8:15
Minor St.	286%	Minor St.	283%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	6	3	5	2	5	2	0	0	0	2	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/28/2016

Major Rt: St. Andrews Rd * Not on State System Minor Rt: Kilbrannon Dr-St Andrews Apts * Not on State System

Day of Week: Monday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: N-S Intersection ADT - 20170 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1 * Each Direction

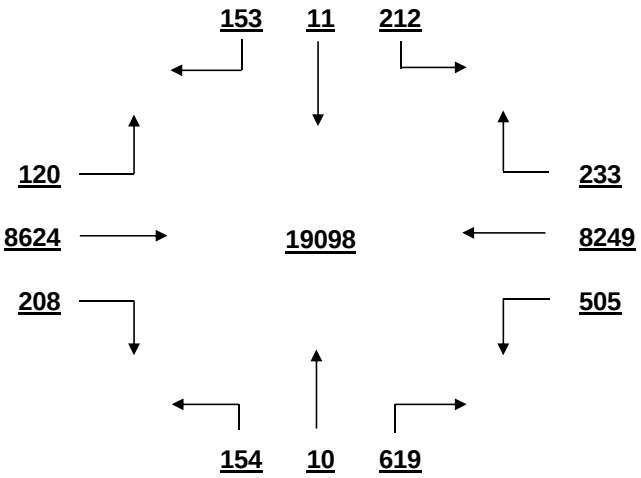
INTERSECTION VOLUME SUMMARY

	From N Kilbrannon Dr-St A				From S Kilbrannon Dr-St A				From E St. Andrews Rd				From W St. Andrews Rd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	3	0	1	4	1	0	10	11	8	94	5	107	3	189	5	197	319	2
7:15 - 7:30	6	0	5	11	0	1	15	16	11	108	4	123	3	254	3	260	410	1
7:30 - 7:45	7	0	7	14	1	0	20	21	17	129	3	149	7	325	7	339	523	0
7:45 - 8:00	7	1	2	10	3	1	11	15	7	130	6	143	2	297	12	311	479	1
8:00 - 8:15	1	0	10	11	0	0	11	11	10	124	7	141	2	274	3	279	442	0
8:15 - 8:30	5	0	0	5	0	0	21	21	10	125	3	138	2	266	7	275	439	0
8:30 - 8:45	5	0	3	8	3	0	11	14	8	105	1	114	2	203	2	207	343	0
8:45 - 9:00	1	0	3	4	3	0	13	16	7	128	1	136	1	168	9	178	334	1
9:00 - 9:15	3	0	3	6	2	0	12	14	13	102	1	116	2	178	6	186	322	0
9:15 - 9:30	3	0	3	6	2	0	12	14	12	101	5	118	1	133	2	136	274	3
9:30 - 9:45	5	0	3	8	2	0	8	10	12	119	3	134	2	140	2	144	296	3
9:45 - 10:00	1	0	1	2	2	0	13	15	10	127	1	138	1	125	5	131	286	3
10:00 - 10:15	4	1	1	6	5	0	7	12	12	125	1	138	4	120	5	129	285	1
10:15 - 10:30	6	0	3	9	4	0	5	9	12	114	1	127	1	156	1	158	303	0
10:30 - 10:45	4	0	4	8	9	0	5	14	8	111	4	123	2	130	4	136	281	0
10:45 - 11:00	3	0	2	5	1	0	12	13	9	113	4	126	1	140	7	148	292	2
11:00 - 11:15	2	0	2	4	0	0	15	15	14	148	1	163	0	139	2	141	323	1
11:15 - 11:30	2	0	3	5	2	0	12	14	15	134	3	152	0	118	7	125	296	0
11:30 - 11:45	6	0	2	8	2	0	12	14	14	145	4	163	2	144	5	151	336	6
11:45 - 12:00	4	0	0	4	2	0	12	14	6	169	6	181	5	171	6	182	381	1
12:00 - 12:15	1	2	1	4	3	0	14	17	20	152	10	182	0	165	5	170	373	6
12:15 - 12:30	1	1	4	6	9	0	23	32	14	170	7	191	2	184	3	189	418	0
12:30 - 12:45	2	0	0	2	6	0	17	23	13	182	4	199	1	173	4	178	402	1
12:45 - 13:00	6	0	2	8	5	0	32	37	12	173	3	188	3	190	6	199	432	1
13:00 - 13:15	4	1	4	9	2	0	24	26	20	166	8	194	1	183	6	190	419	2
13:15 - 13:30	4	2	2	8	5	0	16	21	16	163	2	181	1	198	5	204	414	2
13:30 - 13:45	5	0	1	6	2	1	15	18	8	159	4	171	4	192	9	205	400	0
13:45 - 14:00	5	0	3	8	5	0	22	27	13	182	1	196	4	184	2	190	421	0
14:00 - 14:15	5	1	1	7	2	0	17	19	11	154	4	169	0	182	3	185	380	1
14:15 - 14:30	6	0	2	8	1	0	16	17	16	174	4	194	1	162	4	167	386	1
14:30 - 14:45	2	0	5	7	5	2	25	32	10	163	5	178	3	170	5	178	395	1
14:45 - 15:00	4	0	3	7	1	2	13	16	4	176	7	187	2	184	4	190	400	0
15:00 - 15:15	5	0	6	11	2	0	11	13	11	185	5	201	3	219	7	229	454	2
15:15 - 15:30	5	0	4	9	2	1	14	17	12	180	3	195	6	162	2	170	391	1
15:30 - 15:45	6	0	7	13	1	0	16	17	10	191	8	209	3	185	2	190	429	3
15:45 - 16:00	5	1	2	8	5	0	11	16	6	206	2	214	3	183	3	189	427	3
16:00 - 16:15	6	0	5	11	8	1	1	10	7	199	9	215	4	187	1	192	428	4
16:15 - 16:30	5	0	1	6	6	0	2	8	6	216	10	232	2	157	0	159	405	1
16:30 - 16:45	6	0	5	11	9	0	4	13	11	231	8	250	1	144	0	145	419	1
16:45 - 17:00	3	0	3	6	11	0	1	12	11	256	10	277	2	165	5	172	467	0
17:00 - 17:15	5	0	4	9	1	0	20	21	5	243	3	251	3	210	6	219	500	1
17:15 - 17:30	0	0	7	7	3	0	9	12	7	291	4	302	2	198	3	203	524	2
17:30 - 17:45	10	0	6	16	1	0	12	13	5	283	8	296	2	183	2	187	512	1
17:45 - 18:00	3	0	3	6	3	0	7	10	8	237	12	257	7	197	4	208	481	2
18:00 - 18:15	8	1	2	11	4	1	12	17	18	241	4	263	5	180	3	188	479	1
18:15 - 18:30	12	0	3	15	2	0	6	8	3	293	4	300	2	150	5	157	480	0
18:30 - 18:45	5	0	3	8	2	0	14	16	10	284	8	302	5	147	4	156	482	2
18:45 - 19:00	5	0	6	11	4	0	8	12	3	248	12	263	5	120	5	130	416	3
TOTAL	212	11	153	376	154	10	619	783	505	8249	233	8987	120	8624	208	8952	19098	67
Trucks	0	0	0	0	1	0	3	4	4	171	7	182	0	172	0	172	358	1.9%
School Buses	0	0	1	1	0	0	0	0	0	20	2	22	1	19	0	20	43	0.2%

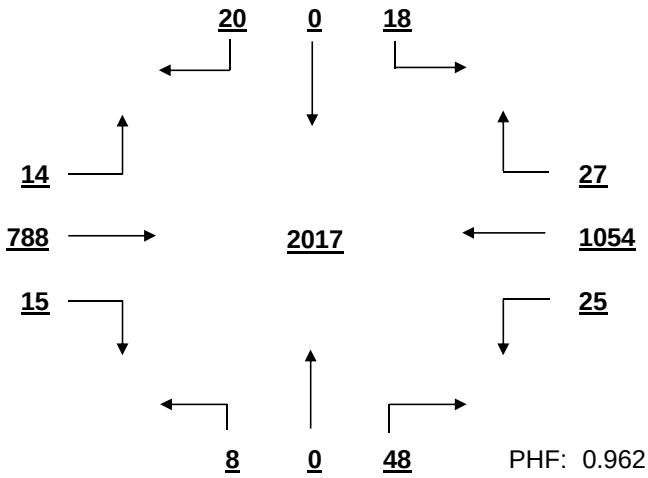
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

St. Andrews Rd AT Kilbrannon Dr-St Andrews Apts Date: 11/28/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

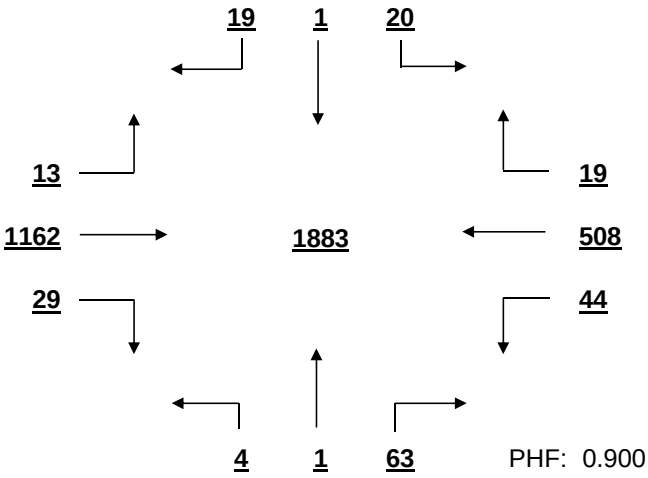


OVERALL PEAK HOUR VOLUME
FROM 17:00 TO 18:00



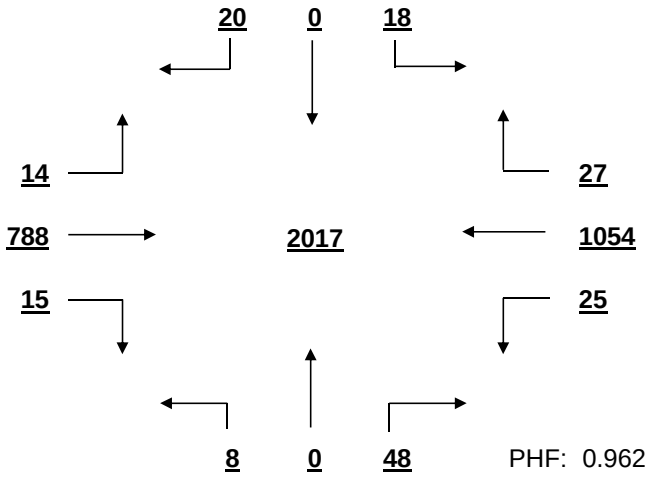
PHF: 0.962

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



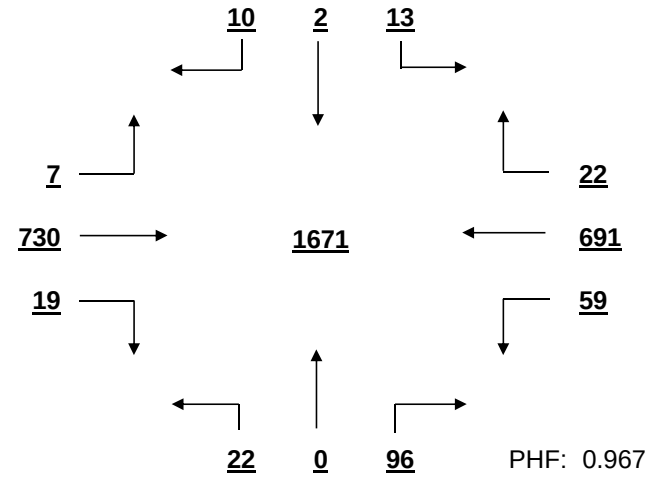
PHF: 0.900

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:00 TO 18:00



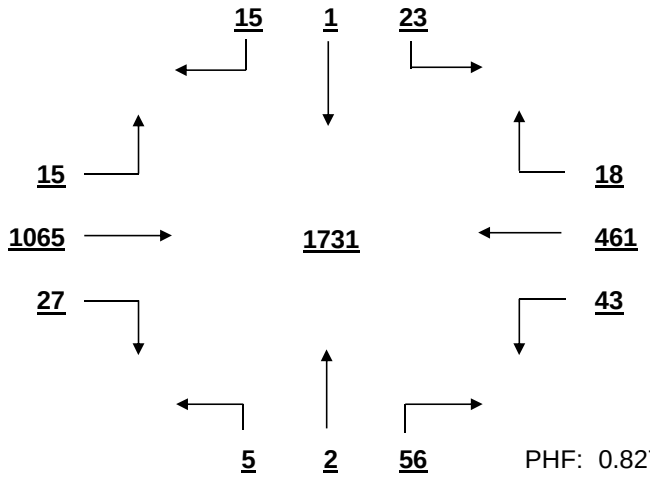
PHF: 0.962

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:15 TO 13:15



PHF: 0.967

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.827

SIGNAL WARRANT ANALYSIS

St. Andrews Rd AT Kilbrannon Dr-St Andrews Apts Date: 11/28/2016

Minor Street Volume, percent of total = 6.1%
Percent of Left Turns from Minor Street = 31.6%
Percent of Right Turns from Minor Street = 66.6%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is not met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1494.9	/ 600	=	249%	65.3	/ 150	=	44%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	272%	245%	184%	181%	210%	249%	255%	241%	266%	274%	321%	293%
Minor St.	42%	41%	35%	32%	38%	73%	61%	56%	42%	29%	37%	35%

Condition B - Interruption to Continuous Traffic is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1494.9	/ 900	=	166%	65.3	/ 75	=	87%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	181%	163%	123%	121%	140%	166%	170%	161%	177%	182%	214%	195%
Minor St.	84%	83%	71%	64%	76%	145%	123%	112%	84%	57%	75%	71%

80% Combination of Conditions A & B is not met

Warrant No. 2 - Four Hour Vehicular Volume is not met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	79%	78%	44%	39%	59%	136%	115%	105%	79%	54%	70%	66%

Warrant No. 3 - Peak Hour is not met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	17:00 - 18:00	Higher Volume Side Street Peak Hour:	12:15 - 13:15
Minor St.	56%	Minor St.	89%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	1	0	4	1	2	1	0	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/28/2016

Major Rt: St. Andrews Rd * Not on State System Minor Rt: Jamil Rd * Not on State System

Day of Week: Monday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: N-S Intersection ADT - 23890 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1

* Each Direction

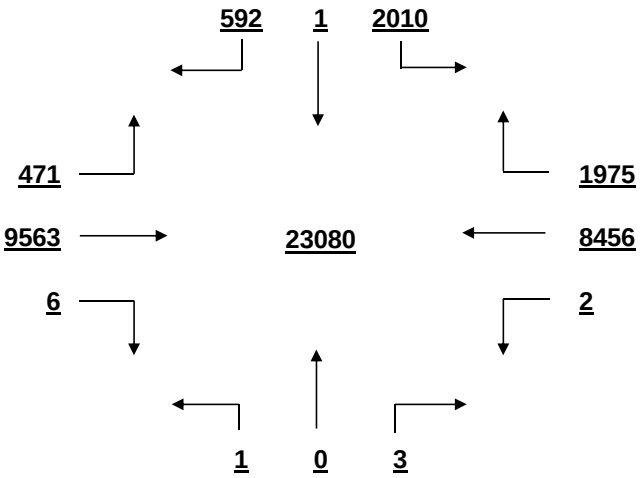
INTERSECTION VOLUME SUMMARY

	From N Jamil Rd				From S Jamil Rd				From E St. Andrews Rd				From W St. Andrews Rd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	17	0	9	26	0	0	0	0	0	91	12	103	2	193	0	195	324	3
7:15 - 7:30	30	0	14	44	0	0	0	0	1	114	15	130	7	263	1	271	445	1
7:30 - 7:45	54	0	17	71	0	0	0	0	0	123	27	150	5	337	0	342	563	0
7:45 - 8:00	62	0	8	70	0	0	0	0	0	144	18	162	4	313	0	317	549	1
8:00 - 8:15	60	0	13	73	0	0	0	0	0	131	18	149	4	296	0	300	522	0
8:15 - 8:30	47	0	0	47	0	0	0	0	0	127	25	152	5	285	0	290	489	0
8:30 - 8:45	25	0	7	32	0	0	0	0	0	108	24	132	3	217	0	220	384	1
8:45 - 9:00	33	0	5	38	0	0	0	0	0	147	31	178	5	184	0	189	405	1
9:00 - 9:15	26	0	5	31	0	0	0	0	0	117	37	154	7	187	0	194	379	0
9:15 - 9:30	38	0	4	42	0	0	0	0	0	112	31	143	2	147	0	149	334	1
9:30 - 9:45	33	0	6	39	0	0	0	0	0	135	25	160	10	153	0	163	362	2
9:45 - 10:00	34	0	9	43	0	0	0	0	0	137	45	182	3	133	0	136	361	1
10:00 - 10:15	26	0	9	35	0	0	0	0	0	122	23	145	5	124	0	129	309	0
10:15 - 10:30	29	0	9	38	0	0	0	0	0	118	32	150	9	165	0	174	362	1
10:30 - 10:45	38	0	9	47	0	0	0	0	0	130	31	161	5	140	0	145	353	2
10:45 - 11:00	28	0	11	39	0	0	0	0	0	115	24	139	9	152	0	161	339	1
11:00 - 11:15	32	0	12	44	0	0	0	0	0	155	25	180	15	158	0	173	397	1
11:15 - 11:30	28	0	9	37	0	0	0	0	0	163	31	194	12	146	0	158	389	1
11:30 - 11:45	29	0	14	43	0	0	0	0	0	167	55	222	15	175	0	190	455	0
11:45 - 12:00	43	0	18	61	0	0	0	0	0	165	43	208	9	184	0	193	462	2
12:00 - 12:15	41	0	7	48	0	0	0	0	0	193	44	237	9	163	0	172	457	4
12:15 - 12:30	44	0	9	53	0	0	0	0	0	211	33	244	10	206	0	216	513	0
12:30 - 12:45	40	0	24	64	0	0	0	0	0	203	36	239	10	205	0	215	518	0
12:45 - 13:00	46	0	20	66	0	0	0	0	0	182	45	227	12	239	0	251	544	1
13:00 - 13:15	54	0	9	63	0	0	0	0	0	191	42	233	13	225	0	238	534	0
13:15 - 13:30	57	0	19	76	0	0	1	1	0	177	60	237	8	213	1	222	536	1
13:30 - 13:45	43	0	19	62	1	0	0	1	0	166	42	208	11	220	1	232	503	1
13:45 - 14:00	58	0	21	79	0	0	1	1	0	186	44	230	12	230	1	243	553	3
14:00 - 14:15	51	0	13	64	0	0	0	0	0	166	39	205	15	206	0	221	490	2
14:15 - 14:30	49	0	18	67	0	0	0	0	0	195	59	254	12	168	0	180	501	0
14:30 - 14:45	38	0	17	55	0	0	0	0	0	170	49	219	17	190	0	207	481	3
14:45 - 15:00	43	0	14	57	0	0	0	0	0	176	41	217	18	199	0	217	491	3
15:00 - 15:15	60	0	18	78	0	0	0	0	0	193	35	228	11	238	0	249	555	3
15:15 - 15:30	60	0	13	73	0	0	0	0	0	201	33	234	10	183	1	194	501	1
15:30 - 15:45	47	0	8	55	0	0	0	0	0	202	51	253	14	216	0	230	538	5
15:45 - 16:00	31	0	11	42	0	0	1	1	0	201	53	254	8	212	1	221	518	3
16:00 - 16:15	61	0	22	83	0	0	0	0	1	211	62	274	9	208	0	217	574	2
16:15 - 16:30	62	0	12	74	0	0	0	0	0	234	62	296	14	221	0	235	605	5
16:30 - 16:45	52	0	24	76	0	0	0	0	0	229	72	301	16	188	0	204	581	3
16:45 - 17:00	43	0	19	62	0	0	0	0	0	274	54	328	9	194	0	203	593	1
17:00 - 17:15	55	1	14	70	0	0	0	0	0	244	51	295	13	206	0	219	584	3
17:15 - 17:30	40	0	10	50	0	0	0	0	0	294	74	368	9	204	0	213	631	2
17:30 - 17:45	41	0	15	56	0	0	0	0	0	242	54	296	10	187	0	197	549	4
17:45 - 18:00	33	0	13	46	0	0	0	0	0	260	67	327	20	206	0	226	599	0
18:00 - 18:15	54	0	10	64	0	0	0	0	0	210	65	275	16	195	0	211	550	0
18:15 - 18:30	36	0	9	45	0	0	0	0	0	249	63	312	12	176	0	188	545	1
18:30 - 18:45	36	0	10	46	0	0	0	0	0	209	43	252	10	167	0	177	475	2
18:45 - 19:00	23	0	6	29	0	0	0	0	0	166	30	196	7	146	0	153	378	2
TOTAL	2010	1	592	2603	1	0	3	4	2	8456	1975	10433	471	9563	6	10040	23080	74
Trucks	26	1	6	33	0	0	0	0	0	123	22	145	5	156	2	163	341	1.5%
School Buses	8	0	3	11	0	0	0	0	0	13	15	28	1	30	0	31	70	0.3%

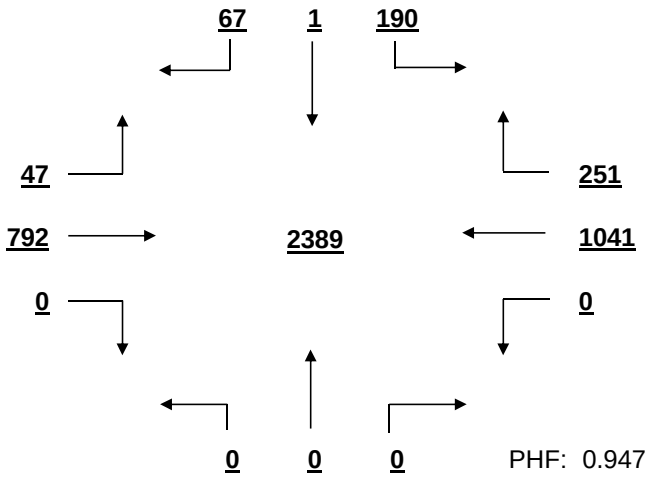
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

St. Andrews Rd AT Jamil Rd Date: 11/28/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

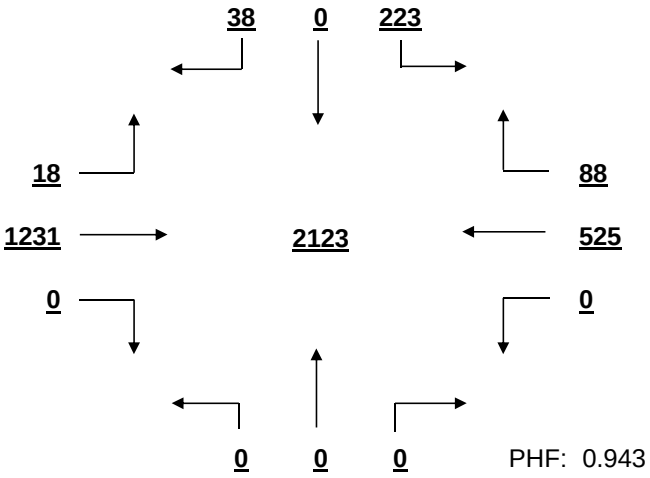


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



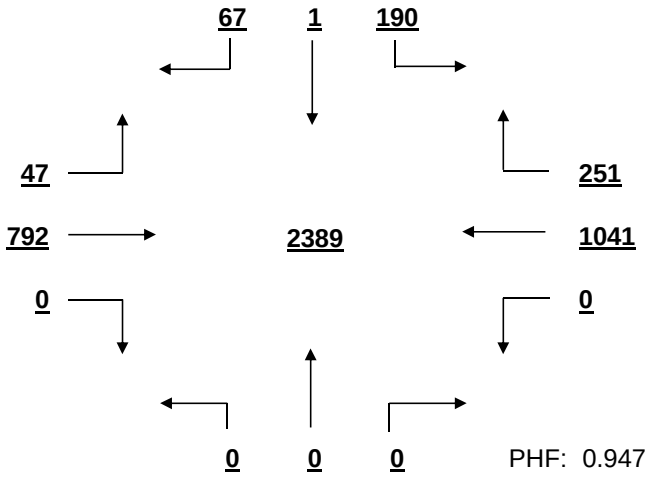
PHF: 0.947

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



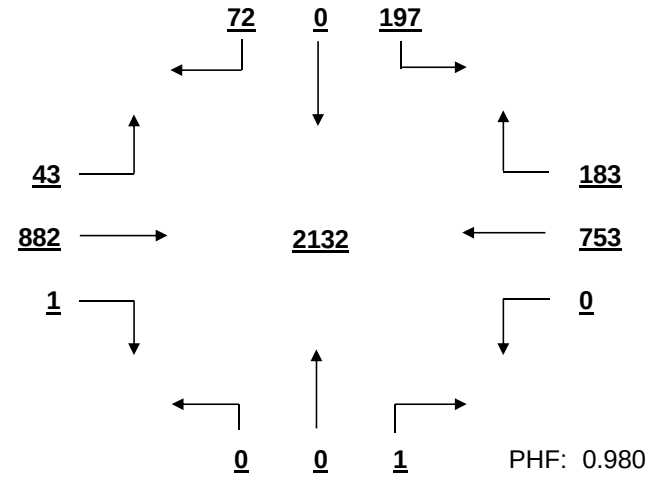
PHF: 0.943

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



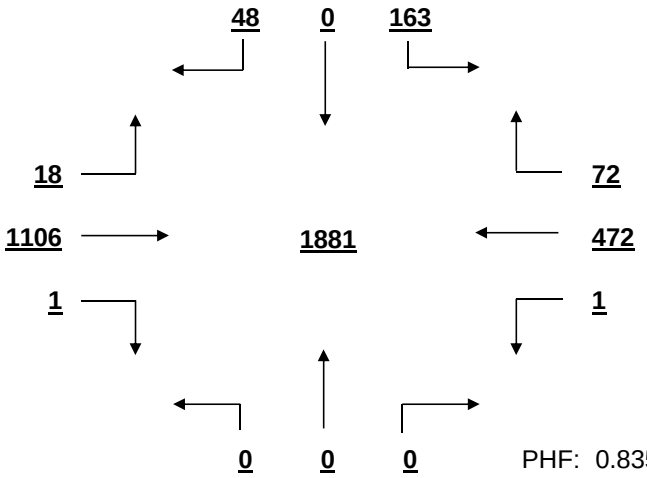
PHF: 0.947

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:30 TO 13:30



PHF: 0.980

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.835

SIGNAL WARRANT ANALYSIS

St. Andrews Rd AT Jamil Rd Date: 11/28/2016

Minor Street Volume, percent of total = 11.3%
Percent of Left Turns from Minor Street = 77.1%
Percent of Right Turns from Minor Street = 22.8%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1706.1	/ 600	=	284%	216.9	/ 150	=	145%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	278%	268%	214%	201%	253%	300%	307%	287%	311%	343%	357%	294%
Minor St.	141%	127%	103%	106%	123%	154%	187%	162%	165%	197%	148%	123%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1706.1	/ 900	=	190%	216.9	/ 75	=	289%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	186%	179%	142%	134%	169%	200%	205%	191%	207%	229%	238%	196%
Minor St.	281%	253%	207%	212%	247%	308%	373%	324%	331%	393%	296%	245%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	264%	238%	166%	154%	231%	289%	350%	304%	310%	369%	278%	230%

Warrant No. 3 - Peak Hour is met

Percent of warrant			Percent of warrant	
Overall Peak Hour:	16:30 - 17:30	Higher Volume Side Street Peak Hour:	16:00 - 17:00	
Minor St.	258%	Minor St.	295%	

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	0	2	0	0	0	0	0	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/28/2016

Major Rt: Woodland Hills Rd * Not on State System Minor Rt: Berry Hill Rd-Restaurant * Not on State System

Day of Week: Monday Weather: Clear Office: Short Counts JMS

Type of Control: Stop Sign Speed Limit (major st) 35

Direction of Minor Street: E-W Intersection ADT - 4820 (Calc)

Number of Lanes (major st)* 1 Number of Lanes (minor st)* 1

* Each Direction

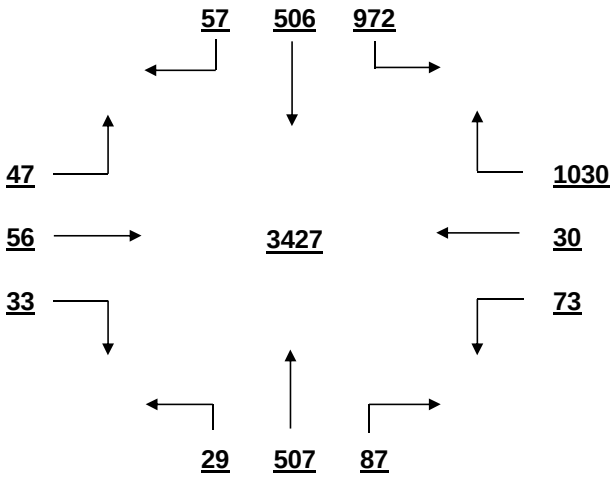
INTERSECTION VOLUME SUMMARY

	From N Woodland Hills Rd				From S Woodland Hills Rd				From E Berry Hill Rd-Rest				From W Berry Hill Rd-Rest				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	6	10	0	16	0	7	0	7	1	0	15	16	0	0	0	0	39	0
7:15 - 7:30	28	16	0	44	0	17	2	19	4	0	14	18	1	0	1	2	83	0
7:30 - 7:45	22	13	0	35	1	9	3	13	2	0	7	9	0	0	0	0	57	0
7:45 - 8:00	33	4	0	37	1	3	4	8	0	2	4	6	0	2	3	5	56	0
8:00 - 8:15	9	1	0	10	0	1	0	1	0	1	2	3	0	1	2	3	17	0
8:15 - 8:30	38	4	0	42	2	19	0	21	6	0	12	18	0	2	1	3	84	0
8:30 - 8:45	24	6	0	30	0	4	3	7	4	3	9	16	0	8	1	9	62	0
8:45 - 9:00	27	3	1	31	0	5	1	6	0	1	16	17	0	14	1	15	69	0
9:00 - 9:15	23	6	0	29	0	7	0	7	0	0	8	8	0	0	0	0	44	0
9:15 - 9:30	18	4	0	22	0	8	0	8	1	1	13	15	0	0	0	0	45	0
9:30 - 9:45	13	7	0	20	0	14	1	15	2	0	14	16	0	1	1	2	53	0
9:45 - 10:00	22	11	2	35	0	14	0	14	1	0	17	18	0	0	0	0	67	0
10:00 - 10:15	11	6	1	18	0	8	1	9	0	4	22	26	2	0	0	2	55	0
10:15 - 10:30	20	4	6	30	0	7	0	7	0	1	20	21	1	1	0	2	60	0
10:30 - 10:45	13	7	0	20	1	10	0	11	0	1	18	19	1	0	0	1	51	0
10:45 - 11:00	15	10	0	25	0	18	0	18	1	0	22	23	2	0	0	2	68	0
11:00 - 11:15	11	17	2	30	1	13	0	14	1	0	22	23	0	0	0	0	67	2
11:15 - 11:30	20	11	1	32	1	9	1	11	1	0	20	21	1	0	0	1	65	0
11:30 - 11:45	9	12	1	22	1	9	2	12	0	0	11	11	1	2	0	3	48	0
11:45 - 12:00	6	11	2	19	1	10	2	13	1	1	23	25	2	3	2	7	64	0
12:00 - 12:15	22	12	0	34	0	8	0	8	2	0	33	35	2	0	2	4	81	0
12:15 - 12:30	7	5	3	15	0	10	3	13	3	1	15	19	3	1	2	6	53	0
12:30 - 12:45	31	7	3	41	3	11	0	14	3	3	18	24	1	1	1	3	82	0
12:45 - 13:00	10	5	2	17	2	8	3	13	1	2	17	20	1	0	3	4	54	2
13:00 - 13:15	6	4	0	10	9	15	10	34	1	1	12	14	0	6	3	9	67	0
13:15 - 13:30	39	13	1	53	1	16	2	19	2	0	34	36	0	1	0	1	109	0
13:30 - 13:45	13	10	1	24	0	4	2	6	1	0	15	16	0	0	0	0	46	5
13:45 - 14:00	26	4	3	33	0	8	3	11	1	0	31	32	1	2	0	3	79	0
14:00 - 14:15	33	11	1	45	0	12	4	16	2	0	24	26	1	1	0	2	89	0
14:15 - 14:30	22	11	1	34	1	3	1	5	3	0	10	13	3	1	0	4	56	0
14:30 - 14:45	7	3	0	10	0	11	9	20	1	0	9	10	0	1	1	2	42	0
14:45 - 15:00	21	14	1	36	0	16	4	20	3	0	18	21	0	0	0	0	77	0
15:00 - 15:15	34	8	2	44	0	14	2	16	0	0	32	32	2	0	1	3	95	0
15:15 - 15:30	31	7	1	39	1	10	1	12	1	0	32	33	2	1	2	5	89	0
15:30 - 15:45	20	16	0	36	0	16	1	17	3	0	25	28	2	0	2	4	85	0
15:45 - 16:00	18	15	3	36	2	7	0	9	1	0	25	26	1	1	0	2	73	0
16:00 - 16:15	25	17	0	42	0	16	1	17	2	0	28	30	2	1	0	3	92	0
16:15 - 16:30	28	13	0	41	1	8	1	10	2	0	38	40	2	0	0	2	93	0
16:30 - 16:45	24	23	1	48	0	12	3	15	2	1	40	43	1	0	0	1	107	0
16:45 - 17:00	29	19	3	51	0	14	1	15	2	0	34	36	1	1	0	2	104	0
17:00 - 17:15	26	18	1	45	0	16	1	17	0	1	72	73	0	1	0	1	136	0
17:15 - 17:30	20	25	1	46	0	20	7	27	3	1	57	61	0	0	1	1	135	0
17:30 - 17:45	21	14	3	38	0	14	4	18	5	1	41	47	1	0	0	1	104	0
17:45 - 18:00	15	10	5	30	0	9	0	9	0	1	19	20	0	1	0	1	60	0
18:00 - 18:15	21	11	3	35	0	13	0	13	0	1	24	25	2	0	2	4	77	0
18:15 - 18:30	27	22	1	50	0	10	1	11	2	1	15	18	2	0	1	3	82	0
18:30 - 18:45	16	14	0	30	0	8	1	9	1	0	13	14	4	1	0	5	58	0
18:45 - 19:00	12	12	1	25	0	6	2	8	1	1	10	12	2	1	0	3	48	0
TOTAL	972	506	57	1535	29	507	87	623	73	30	1030	1133	47	56	33	136	3427	9
Trucks	4	7	0	11	0	3	1	4	0	0	2	2	0	1	1	2	19	0.6%
School Buses	7	0	0	7	0	3	0	3	0	0	5	5	0	0	0	0	15	0.4%

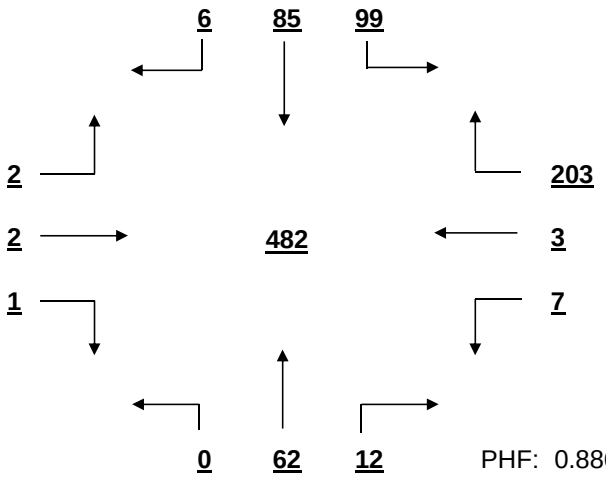
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Woodland Hills Rd AT Berry Hill Rd-Restaurant Date: 11/28/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

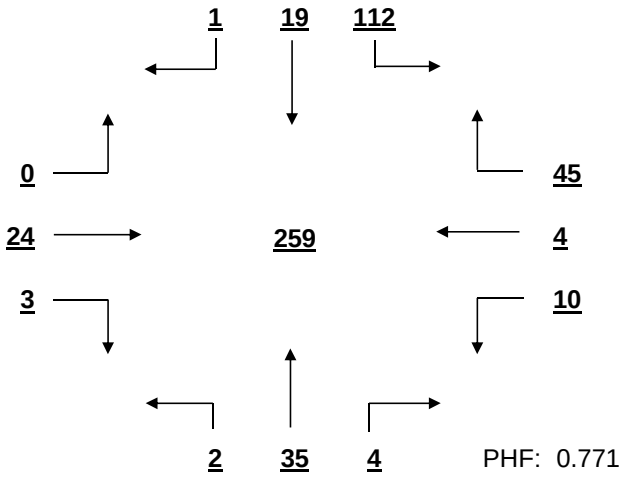


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



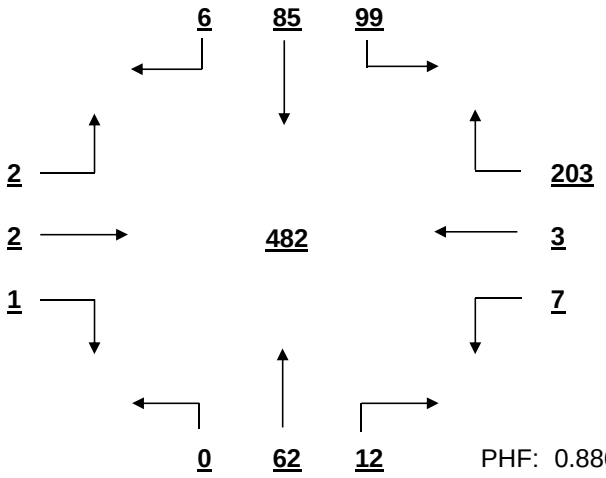
PHF: 0.886

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 8:15 TO 9:15



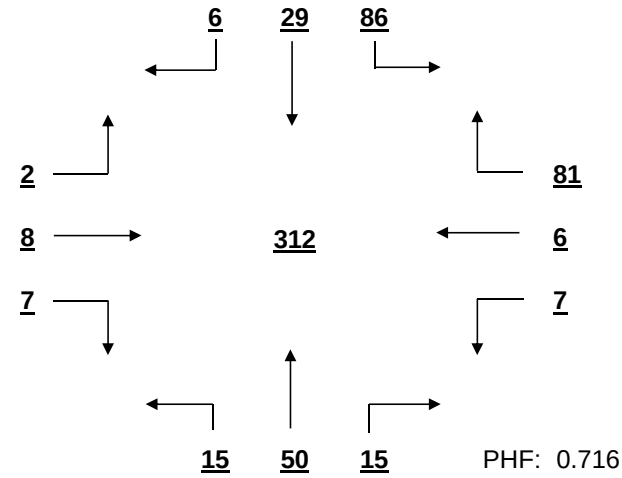
PHF: 0.771

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



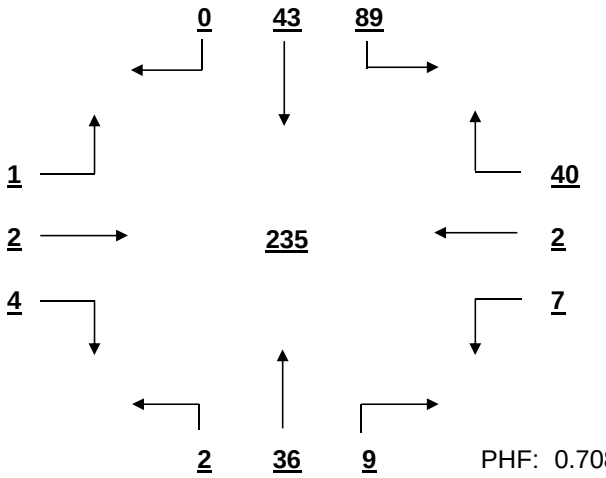
PHF: 0.886

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:30 TO 13:30



PHF: 0.716

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.708

SIGNAL WARRANT ANALYSIS

Woodland Hills Rd AT Berry Hill Rd-Restaurant Date: 11/28/2016

Minor Street Volume, percent of total = 37.0%
Percent of Left Turns from Minor Street = 9.5%
Percent of Right Turns from Minor Street = 83.8%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is not met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
179.8	/ 500	=	36%	94.4	/ 150	=	63%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	36%	30%	30%	28%	31%	31%	38%	37%	42%	48%	46%	36%
Minor St.	33%	36%	38%	59%	53%	65%	65%	47%	79%	99%	134%	46%

Condition B - Interruption to Continuous Traffic is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
179.8	/ 750	=	24%	94.4	/ 75	=	126%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	24%	20%	20%	18%	20%	21%	25%	25%	28%	32%	31%	24%
Minor St.	65%	72%	76%	119%	107%	131%	131%	93%	159%	199%	268%	92%

80% Combination of Conditions A & B is not met

Warrant No. 2 - Four Hour Vehicular Volume is not met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	11%	12%	13%	20%	18%	22%	23%	17%	29%	38%	51%	16%

Warrant No. 3 - Peak Hour is not met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	16:30 - 17:30	Higher Volume Side Street Peak Hour:	16:45 - 17:45
Minor St.	37%	Minor St.	38%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	0	0	2	0	0	0	0	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008

Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/28/2016

Major Rt: St. Andrews Rd * Not on State System Minor Rt: Kay St-Chartwell Rd * Not on State System

Day of Week: Monday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: N-S Intersection ADT - 18950 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1 * Each Direction

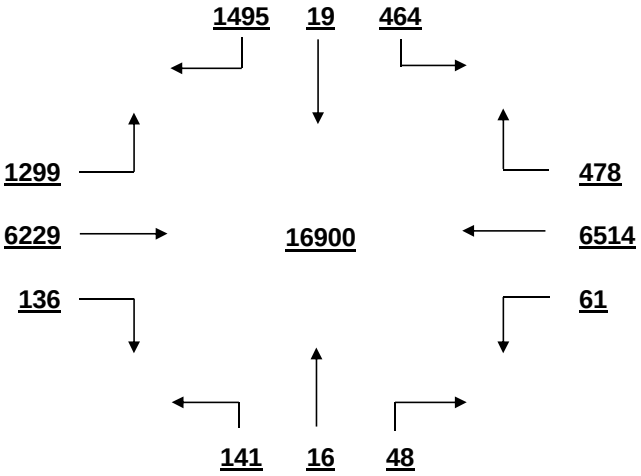
INTERSECTION VOLUME SUMMARY

	From N Kay St-Chartwell R				From S Kay St-Chartwell R				From E St. Andrews Rd				From W St. Andrews Rd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	5	0	37	42	3	0	2	5	2	96	1	99	22	86	1	109	255	0
7:15 - 7:30	8	0	45	53	6	1	1	8	2	110	2	114	20	107	1	128	303	1
7:30 - 7:45	10	0	60	70	3	0	1	4	0	162	5	167	28	97	2	127	368	0
7:45 - 8:00	10	1	64	75	3	1	2	6	1	181	4	186	18	118	1	137	404	1
8:00 - 8:15	5	0	60	65	2	0	1	3	2	136	6	144	21	121	3	145	357	0
8:15 - 8:30	6	0	0	6	4	0	2	6	0	130	6	136	22	122	1	145	293	0
8:30 - 8:45	4	0	29	33	1	0	1	2	0	119	1	120	23	116	2	141	296	0
8:45 - 9:00	5	0	16	21	3	0	0	3	0	112	3	115	23	118	2	143	282	0
9:00 - 9:15	7	0	20	27	3	0	1	4	0	110	3	113	14	100	1	115	259	0
9:15 - 9:30	8	0	19	27	1	0	0	1	1	96	7	104	14	89	0	103	235	1
9:30 - 9:45	9	0	28	37	0	0	1	1	1	95	2	98	10	94	0	104	240	1
9:45 - 10:00	3	0	25	28	1	0	2	3	2	117	4	123	11	94	1	106	260	0
10:00 - 10:15	1	0	20	21	1	0	0	1	0	88	11	99	15	98	0	113	234	0
10:15 - 10:30	6	0	19	25	2	0	0	2	0	109	4	113	17	104	1	122	262	0
10:30 - 10:45	10	0	20	30	3	0	0	3	1	97	7	105	25	101	4	130	268	0
10:45 - 11:00	5	0	20	25	0	0	0	0	0	99	10	109	17	106	1	124	258	0
11:00 - 11:15	7	0	25	32	0	1	0	1	0	109	10	119	17	103	3	123	275	2
11:15 - 11:30	9	1	16	26	2	0	1	3	1	108	15	124	21	113	3	137	290	1
11:30 - 11:45	13	1	14	28	3	1	0	4	1	116	6	123	21	107	1	129	284	0
11:45 - 12:00	11	0	25	36	3	0	1	4	0	116	14	130	19	126	4	149	319	2
12:00 - 12:15	16	1	34	51	1	0	0	1	1	115	16	132	26	128	3	157	341	0
12:15 - 12:30	13	1	29	43	4	0	1	5	1	148	12	161	25	156	3	184	393	0
12:30 - 12:45	13	0	26	39	3	0	0	3	1	138	9	148	19	129	2	150	340	2
12:45 - 13:00	11	0	25	36	2	1	1	4	1	136	15	152	34	151	1	186	378	0
13:00 - 13:15	12	0	22	34	7	0	1	8	4	138	15	157	32	176	2	210	409	0
13:15 - 13:30	8	0	23	31	6	0	0	6	2	134	15	151	23	133	1	157	345	0
13:30 - 13:45	14	1	25	40	8	2	2	12	2	142	10	154	25	140	2	167	373	1
13:45 - 14:00	11	0	16	27	3	0	1	4	1	126	7	134	28	146	3	177	342	0
14:00 - 14:15	17	0	29	46	7	1	2	10	0	136	13	149	33	129	1	163	368	2
14:15 - 14:30	13	3	27	43	0	1	0	1	2	167	9	178	24	146	1	171	393	1
14:30 - 14:45	8	0	32	40	2	0	0	2	2	170	9	181	23	140	3	166	389	1
14:45 - 15:00	9	1	29	39	3	1	3	7	3	129	10	142	29	123	3	155	343	2
15:00 - 15:15	15	0	34	49	5	0	1	6	2	145	7	154	26	125	7	158	367	0
15:15 - 15:30	12	0	34	46	3	1	1	5	1	129	7	137	29	130	4	163	351	3
15:30 - 15:45	10	0	33	43	3	0	2	5	0	154	10	164	30	138	9	177	389	3
15:45 - 16:00	9	0	35	44	2	1	1	4	1	168	11	180	23	164	4	191	419	0
16:00 - 16:15	6	3	35	44	3	0	2	5	1	187	15	203	32	155	2	189	441	1
16:15 - 16:30	9	1	46	56	1	0	1	2	2	161	10	173	38	163	3	204	435	0
16:30 - 16:45	11	0	53	64	1	0	3	4	3	206	19	228	39	136	5	180	476	2
16:45 - 17:00	10	1	48	59	2	1	2	5	0	167	11	178	53	144	4	201	443	0
17:00 - 17:15	12	1	63	76	4	1	1	6	2	183	17	202	32	151	8	191	475	0
17:15 - 17:30	12	0	58	70	4	0	2	6	4	159	15	178	59	182	6	247	501	1
17:30 - 17:45	10	0	33	43	6	0	1	7	3	181	22	206	49	146	4	199	455	0
17:45 - 18:00	13	1	31	45	5	0	0	5	3	149	13	165	43	173	7	223	438	0
18:00 - 18:15	10	1	20	31	2	0	1	3	3	169	13	185	40	166	7	213	432	2
18:15 - 18:30	14	0	37	51	1	0	2	3	1	139	22	162	43	179	4	226	442	0
18:30 - 18:45	16	0	32	48	3	1	1	5	0	124	21	145	31	144	4	179	377	1
18:45 - 19:00	8	1	24	33	6	1	0	7	1	108	4	113	33	116	1	150	303	1
TOTAL	464	19	1495	1978	141	16	48	205	61	6514	478	7053	1299	6229	136	7664	16900	32
Trucks	5	0	8	13	1	1	2	4	1	110	8	119	15	99	2	116	252	1.5%
School Buses	4	0	8	12	0	0	4	4	2	20	3	25	2	22	3	27	68	0.4%

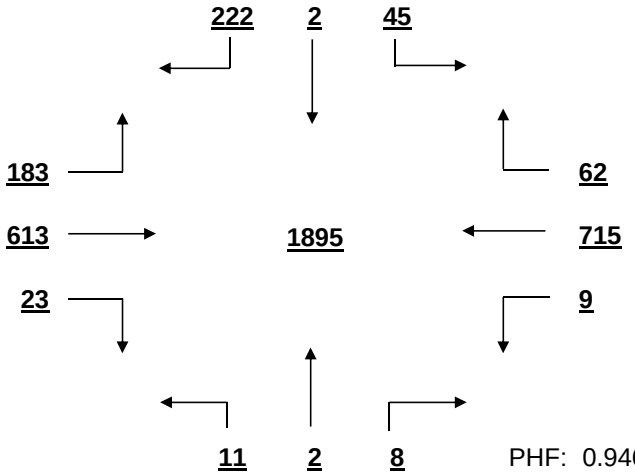
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

St. Andrews Rd AT Kay St-Chartwell Rd Date: 11/28/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

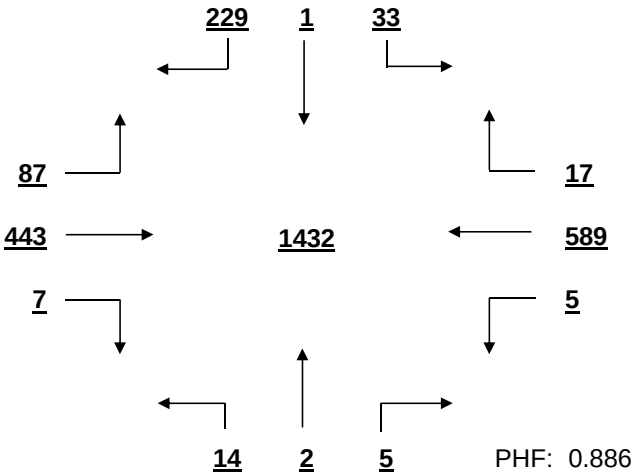


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



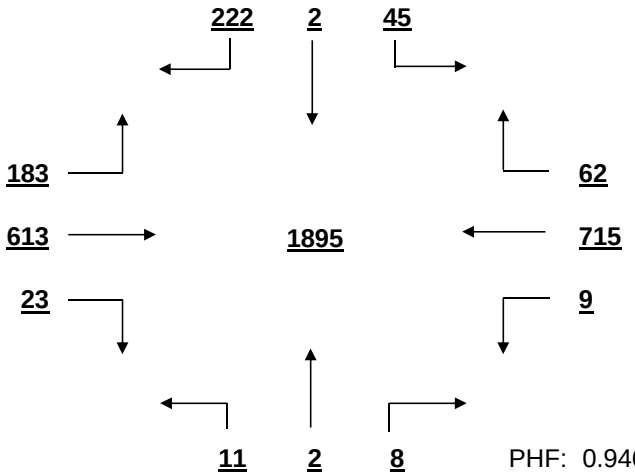
PHF: 0.946

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



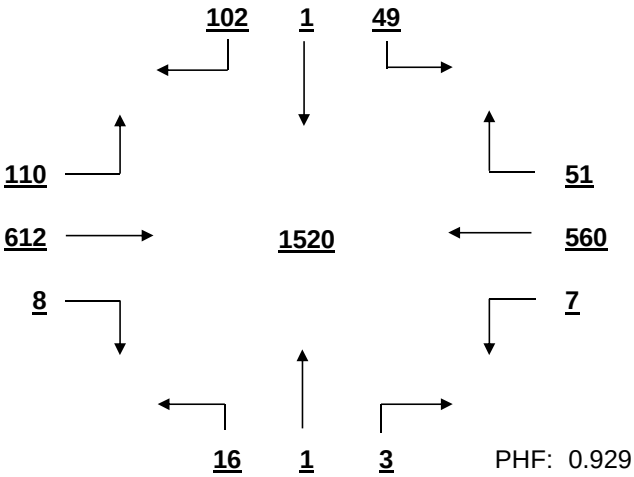
PHF: 0.886

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



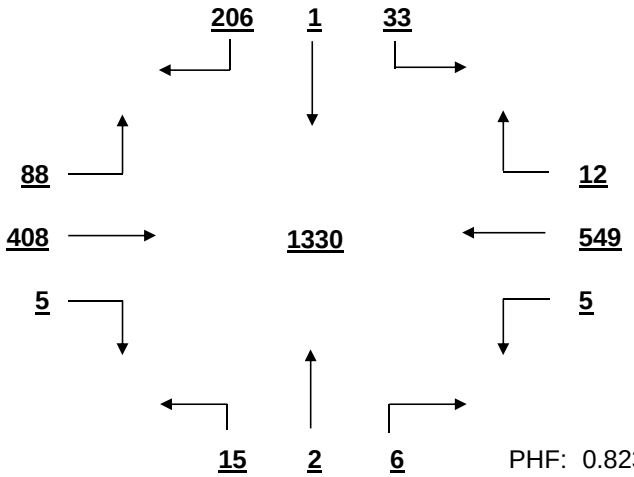
PHF: 0.946

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:15 TO 13:15



PHF: 0.929

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.823

SIGNAL WARRANT ANALYSIS

St. Andrews Rd AT Kay St-Chartwell Rd Date: 11/28/2016

Minor Street Volume, percent of total = 12.9%
Percent of Left Turns from Minor Street = 27.7%
Percent of Right Turns from Minor Street = 70.7%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1226.4	/ 600	=	204%	164.8	/ 150	=	110%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	178%	182%	144%	153%	172%	212%	218%	218%	221%	259%	269%	229%
Minor St.	160%	83%	79%	67%	81%	113%	88%	112%	121%	149%	156%	109%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1226.4	/ 900	=	136%	164.8	/ 75	=	220%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	119%	121%	96%	102%	115%	141%	145%	145%	147%	173%	179%	153%
Minor St.	320%	167%	159%	135%	163%	225%	176%	224%	243%	297%	312%	217%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	188%	102%	65%	61%	90%	178%	145%	184%	203%	279%	293%	204%

Warrant No. 3 - Peak Hour is met

Percent of warrant			Percent of warrant	
Overall Peak Hour:	16:30 - 17:30	Higher Volume Side Street Peak Hour:	16:30 - 17:30	
Minor St.	226%	Minor St.	226%	

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street	Minimum peak hour ped. volume crossing major street
107	133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	0	0	0	0	0	2	0	0	0	1

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/28/2016

Major Rt: Broad River Rd * Not on State System Minor Rt: St. Andrews Rd * Not on State System

Day of Week: Monday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: E-W Intersection ADT - 36170 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 2

* Each Direction

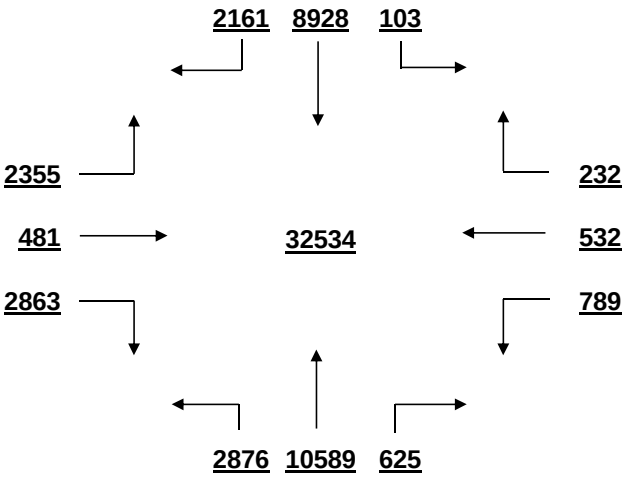
INTERSECTION VOLUME SUMMARY

	From N Broad River Rd				From S Broad River Rd				From E St. Andrews Rd				From W St. Andrews Rd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	3	236	48	287	26	174	13	213	13	8	1	22	50	5	36	91	613	0
7:15 - 7:30	1	271	35	307	37	224	9	270	23	8	3	34	67	8	48	123	734	0
7:30 - 7:45	2	303	42	347	57	243	29	329	19	10	3	32	60	6	35	101	809	0
7:45 - 8:00	2	288	51	341	57	248	27	332	24	13	8	45	65	12	45	122	840	2
8:00 - 8:15	6	207	59	272	47	213	22	282	26	9	10	45	65	15	41	121	720	0
8:15 - 8:30	4	221	0	225	49	200	25	274	20	12	4	36	62	9	42	113	648	0
8:30 - 8:45	3	204	46	253	32	193	6	231	23	8	4	35	65	15	41	121	640	1
8:45 - 9:00	1	172	47	220	41	181	9	231	12	5	2	19	35	7	43	85	555	1
9:00 - 9:15	1	154	34	189	40	131	4	175	13	8	0	21	32	7	42	81	466	1
9:15 - 9:30	3	134	40	177	43	143	8	194	3	5	3	11	46	7	35	88	470	3
9:30 - 9:45	2	149	32	183	38	133	4	175	13	7	4	24	30	5	41	76	458	1
9:45 - 10:00	2	171	35	208	53	150	8	211	10	6	5	21	29	6	38	73	513	1
10:00 - 10:15	1	138	32	171	45	143	10	198	11	6	3	20	35	10	47	92	481	3
10:15 - 10:30	0	173	42	215	45	167	5	217	15	11	4	30	33	9	51	93	555	1
10:30 - 10:45	2	120	30	152	54	134	14	202	12	10	5	27	32	10	63	105	486	0
10:45 - 11:00	2	158	41	201	48	173	16	237	18	8	6	32	33	11	54	98	568	1
11:00 - 11:15	1	182	33	216	60	144	10	214	9	9	5	23	38	9	59	106	559	0
11:15 - 11:30	2	148	45	195	50	169	9	228	12	8	5	25	33	8	62	103	551	3
11:30 - 11:45	1	179	43	223	59	151	6	216	8	9	4	21	31	7	55	93	553	0
11:45 - 12:00	0	150	40	190	41	160	5	206	12	9	1	22	43	8	72	123	541	1
12:00 - 12:15	3	222	47	272	68	197	8	273	7	9	4	20	35	7	75	117	682	1
12:15 - 12:30	1	167	42	210	67	187	9	263	7	8	5	20	62	8	77	147	640	0
12:30 - 12:45	0	176	40	216	79	209	12	300	19	9	6	34	41	7	62	110	660	3
12:45 - 13:00	1	198	47	246	58	219	9	286	18	16	5	39	47	16	70	133	704	3
13:00 - 13:15	1	154	41	196	60	199	21	280	14	15	3	32	61	14	82	157	665	3
13:15 - 13:30	4	163	52	219	67	215	15	297	20	14	6	40	57	10	60	127	683	3
13:30 - 13:45	2	154	42	198	61	170	12	243	15	15	6	36	48	9	71	128	605	0
13:45 - 14:00	7	210	35	252	62	214	11	287	25	5	6	36	44	12	55	111	686	2
14:00 - 14:15	9	188	41	238	53	195	26	274	31	19	9	59	38	24	86	148	719	1
14:15 - 14:30	1	193	34	228	91	209	32	332	33	26	6	65	53	12	78	143	768	4
14:30 - 14:45	2	196	57	255	67	232	21	320	28	11	11	50	47	14	62	123	748	4
14:45 - 15:00	2	172	35	209	60	223	14	297	24	16	2	42	38	6	74	118	666	4
15:00 - 15:15	0	203	50	253	59	180	9	248	14	16	4	34	29	8	81	118	653	1
15:15 - 15:30	1	212	49	262	53	225	10	288	15	10	4	29	36	10	58	104	683	2
15:30 - 15:45	1	181	48	230	65	256	17	338	19	17	8	44	54	12	64	130	742	4
15:45 - 16:00	0	197	61	258	56	218	15	289	18	12	2	32	69	8	60	137	716	5
16:00 - 16:15	0	198	66	264	76	252	11	339	19	16	5	40	52	15	72	139	782	5
16:15 - 16:30	2	186	66	254	62	296	9	367	12	16	9	37	53	15	67	135	793	3
16:30 - 16:45	2	196	88	286	78	354	12	444	19	11	2	32	47	9	66	122	884	3
16:45 - 17:00	1	183	39	223	87	364	13	464	14	13	10	37	77	10	60	147	871	3
17:00 - 17:15	1	201	72	274	76	372	10	458	18	13	6	37	71	13	68	152	921	7
17:15 - 17:30	1	220	50	271	87	391	10	488	13	9	6	28	65	10	60	135	922	4
17:30 - 17:45	3	181	62	246	98	374	17	489	18	10	5	33	60	13	62	135	903	3
17:45 - 18:00	5	170	59	234	64	354	17	435	10	14	6	30	63	15	67	145	844	0
18:00 - 18:15	4	156	53	213	90	316	17	423	16	13	3	32	57	6	72	135	803	5
18:15 - 18:30	4	170	42	216	74	259	6	339	21	12	4	37	79	12	73	164	756	2
18:30 - 18:45	4	168	42	214	77	226	9	312	16	7	6	29	46	7	69	122	677	5
18:45 - 19:00	2	155	26	183	59	209	14	282	10	11	3	24	42	5	62	109	598	0
TOTAL	103	8928	2161	11192	2876	10589	625	14090	789	532	232	1553	2355	481	2863	5699	32534	99
Trucks	1	130	52	183	45	145	11	201	6	4	4	14	49	4	40	93	491	1.5%
School Buses	0	44	5	49	21	32	7	60	2	1	4	7	7	0	13	20	136	0.4%

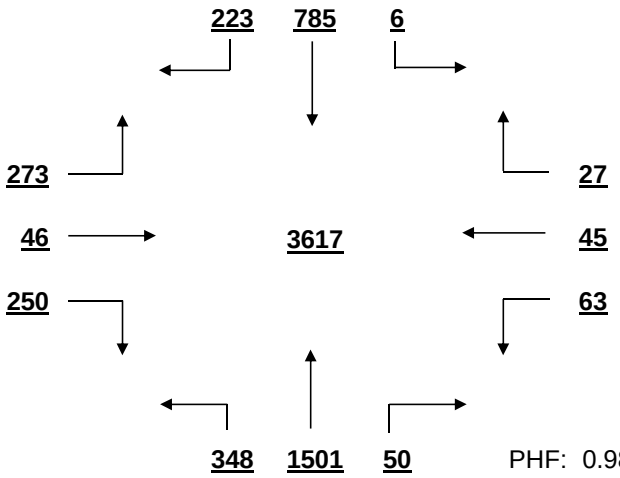
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Broad River Rd AT St. Andrews Rd Date: 11/28/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

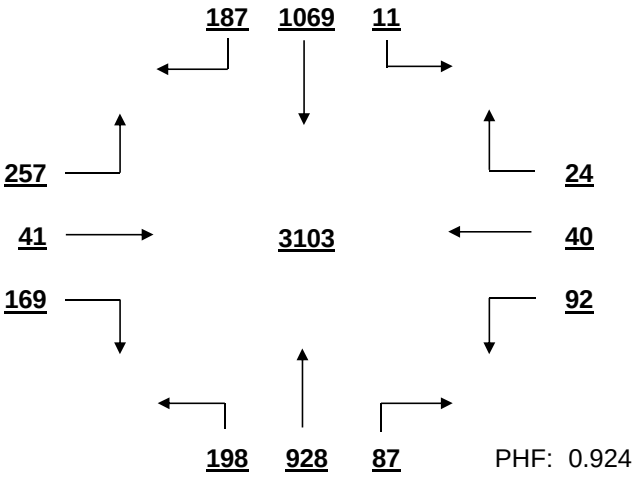


OVERALL PEAK HOUR VOLUME
FROM 16:45 TO 17:45



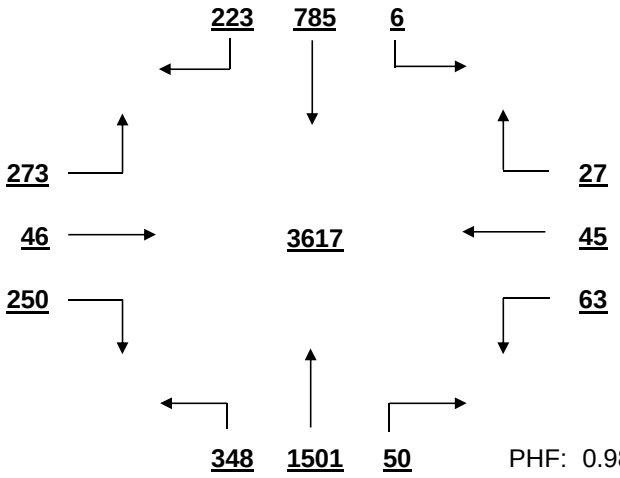
PHF: 0.981

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



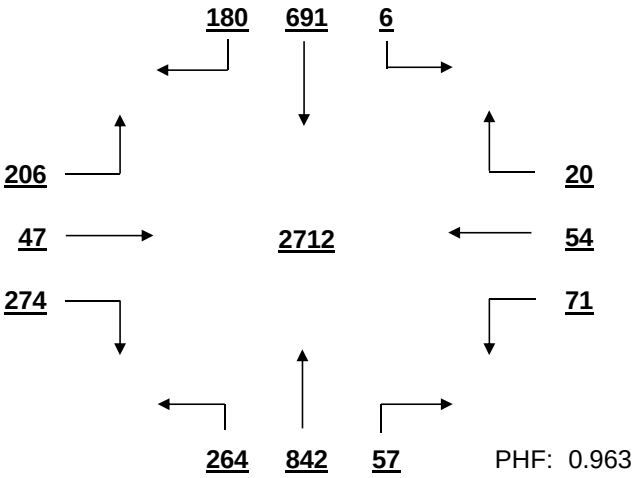
PHF: 0.924

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:45 TO 17:45



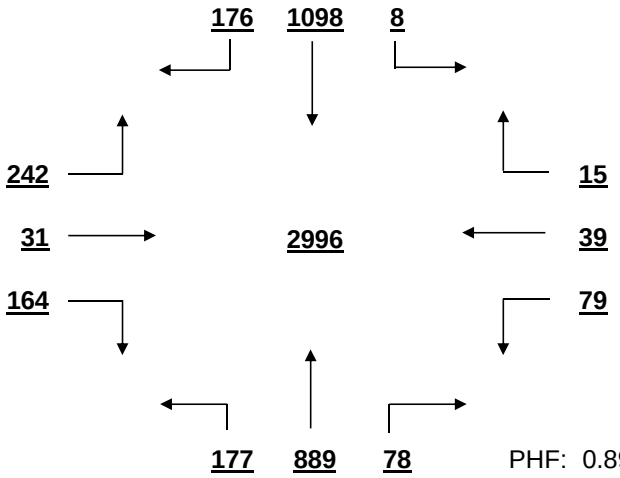
PHF: 0.981

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:30 TO 13:30



PHF: 0.963

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.892

SIGNAL WARRANT ANALYSIS

Broad River Rd AT St. Andrews Rd Date: 11/28/2016

Minor Street Volume, percent of total = 22.3%
Percent of Left Turns from Minor Street = 43.4%
Percent of Right Turns from Minor Street = 42.7%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
2106.8	/	600 =	351%	474.9	/	200 =	237%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	404%	331%	252%	266%	281%	344%	329%	359%	361%	440%	483%	364%
Minor St.	219%	220%	159%	194%	213%	254%	262%	266%	245%	272%	284%	265%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
2106.8	/	900 =	234%	474.9	/	100 =	475%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	270%	221%	168%	177%	188%	230%	219%	239%	241%	293%	322%	242%
Minor St.	437%	440%	318%	388%	425%	507%	523%	532%	489%	543%	567%	530%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	380%	383%	277%	337%	370%	441%	455%	463%	425%	472%	493%	461%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	16:45 - 17:45	Higher Volume Side Street Peak Hour:	17:30 - 18:30
Minor St.	379%	Minor St.	386%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	2	1	0	2	4	1	5	5	4	4

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/22/2016

Major Rt: Browning-Burning Tree * Not on State System Minor Rt: Center Point Rd Clear

Day of Week: Tuesday Weather: Clear Office: Short Counts JMS

Type of Control: Stop Sign Speed Limit (major st) 40

Direction of Minor Street: N-S Intersection ADT - 12490 (Calc)

Number of Lanes (major st)* 1 Number of Lanes (minor st)* 1

* Each Direction

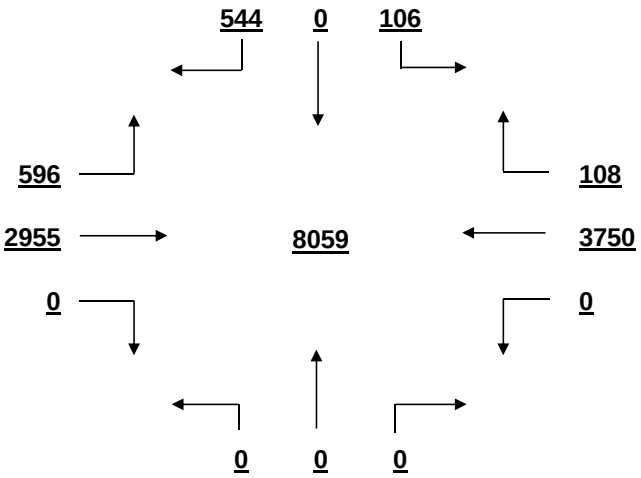
INTERSECTION VOLUME SUMMARY

	From N Center Point Rd				From S Center Point Rd				From E Browning-Burning T				From W Browning-Burning T				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	1	0	0	1	0	0	0	0	0	32	3	35	9	42	0	51	87	1
7:15 - 7:30	0	0	1	1	0	0	0	0	0	47	0	47	27	64	0	91	139	0
7:30 - 7:45	0	0	1	1	0	0	0	0	0	38	7	45	30	108	0	138	184	0
7:45 - 8:00	0	0	2	2	0	0	0	0	0	28	7	35	50	130	0	180	217	0
8:00 - 8:15	0	0	4	4	0	0	0	0	0	38	6	44	37	98	0	135	183	0
8:15 - 8:30	0	0	0	0	0	0	0	0	0	40	4	44	29	93	0	122	166	0
8:30 - 8:45	1	0	2	3	0	0	0	0	0	33	6	39	21	60	0	81	123	0
8:45 - 9:00	1	0	1	2	0	0	0	0	0	29	1	30	19	53	0	72	104	0
9:00 - 9:15	1	0	5	6	0	0	0	0	0	41	1	42	19	56	0	75	123	0
9:15 - 9:30	0	0	2	2	0	0	0	0	0	34	2	36	28	40	0	68	106	0
9:30 - 9:45	2	0	4	6	0	0	0	0	0	34	2	36	14	38	0	52	94	1
9:45 - 10:00	0	0	7	7	0	0	0	0	0	31	2	33	25	31	0	56	96	0
10:00 - 10:15	1	0	4	5	0	0	0	0	0	29	1	30	11	26	0	37	72	0
10:15 - 10:30	1	0	8	9	0	0	0	0	0	26	1	27	12	37	0	49	85	1
10:30 - 10:45	2	0	2	4	0	0	0	0	0	36	2	38	9	29	0	38	80	0
10:45 - 11:00	2	0	6	8	0	0	0	0	0	41	2	43	7	23	0	30	81	0
11:00 - 11:15	3	0	10	13	0	0	0	0	0	41	1	42	0	38	0	38	93	1
11:15 - 11:30	2	0	9	11	0	0	0	0	0	52	2	54	5	32	0	37	102	0
11:30 - 11:45	9	0	20	29	0	0	0	0	0	62	2	64	8	22	0	30	123	0
11:45 - 12:00	2	0	24	26	0	0	0	0	0	51	0	51	9	38	0	47	124	0
12:00 - 12:15	4	0	40	44	0	0	0	0	0	63	3	66	3	34	0	37	147	0
12:15 - 12:30	2	0	23	25	0	0	0	0	0	52	3	55	14	41	0	55	135	0
12:30 - 12:45	2	0	8	10	0	0	0	0	0	65	4	69	18	50	0	68	147	0
12:45 - 13:00	6	0	11	17	0	0	0	0	0	66	5	71	19	69	0	88	176	1
13:00 - 13:15	5	0	11	16	0	0	0	0	0	56	6	62	38	58	0	96	174	0
13:15 - 13:30	0	0	10	10	0	0	0	0	0	52	6	58	20	50	0	70	138	0
13:30 - 13:45	2	0	6	8	0	0	0	0	0	51	4	55	15	51	0	66	129	2
13:45 - 14:00	3	0	5	8	0	0	0	0	0	56	4	60	16	61	0	77	145	2
14:00 - 14:15	4	0	4	8	0	0	0	0	0	50	1	51	4	64	0	68	127	1
14:15 - 14:30	2	0	11	13	0	0	0	0	0	41	3	44	12	60	0	72	129	2
14:30 - 14:45	2	0	7	9	0	0	0	0	0	67	3	70	8	34	0	42	121	0
14:45 - 15:00	0	0	8	8	0	0	0	0	0	69	0	69	8	67	0	75	152	0
15:00 - 15:15	2	0	9	11	0	0	0	0	0	57	0	57	7	57	0	64	132	0
15:15 - 15:30	0	0	12	12	0	0	0	0	0	74	0	74	8	46	0	54	140	1
15:30 - 15:45	1	0	14	15	0	0	0	0	0	65	1	66	3	40	0	43	124	0
15:45 - 16:00	3	0	13	16	0	0	0	0	0	94	2	96	2	56	0	58	170	0
16:00 - 16:15	2	0	18	20	0	0	0	0	0	119	2	121	0	55	0	55	196	0
16:15 - 16:30	0	0	18	18	0	0	0	0	0	158	1	159	2	62	0	64	241	1
16:30 - 16:45	9	0	32	41	0	0	0	0	0	160	2	162	0	82	0	82	285	1
16:45 - 17:00	7	0	33	40	0	0	0	0	0	174	0	174	5	71	0	76	290	0
17:00 - 17:15	8	0	41	49	0	0	0	0	0	195	1	196	3	71	0	74	319	0
17:15 - 17:30	8	0	20	28	0	0	0	0	0	199	0	199	3	71	0	74	301	0
17:30 - 17:45	3	0	24	27	0	0	0	0	0	177	1	178	7	64	0	71	276	0
17:45 - 18:00	1	0	16	17	0	0	0	0	0	206	1	207	4	77	0	81	305	0
18:00 - 18:15	1	0	20	21	0	0	0	0	0	175	0	175	3	106	0	109	305	0
18:15 - 18:30	0	0	7	7	0	0	0	0	0	165	1	166	2	143	0	145	318	0
18:30 - 18:45	1	0	6	7	0	0	0	0	0	164	1	165	2	147	0	149	321	0
18:45 - 19:00	0	0	5	5	0	0	0	0	0	117	1	118	1	110	0	111	234	0
TOTAL	106	0	544	650	0	0	0	0	0	3750	108	3858	596	2955	0	3551	8059	15
Trucks	0	0	2	2	0	0	0	0	0	16	0	16	2	10	0	12	30	0.4%
School Buses	0	0	0	0	0	0	0	0	0	18	0	18	1	14	0	15	33	0.4%

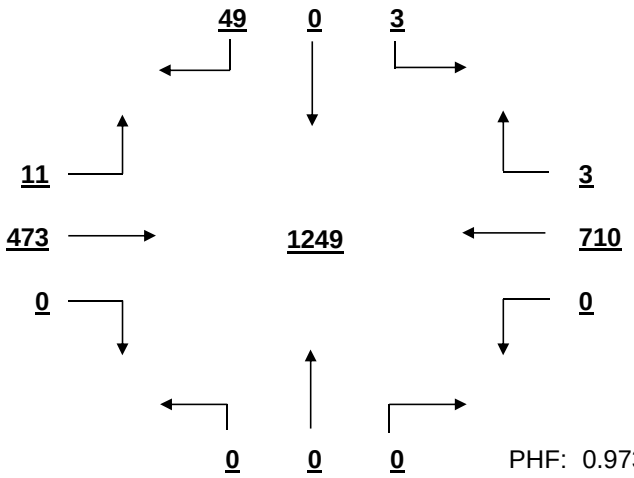
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Browning-Burning Tree AT Center Point Rd Date: 11/22/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

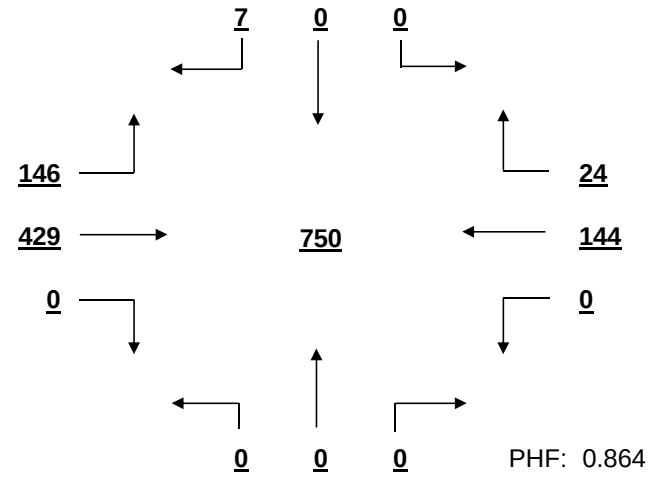


OVERALL PEAK HOUR VOLUME
FROM 17:45 TO 18:45



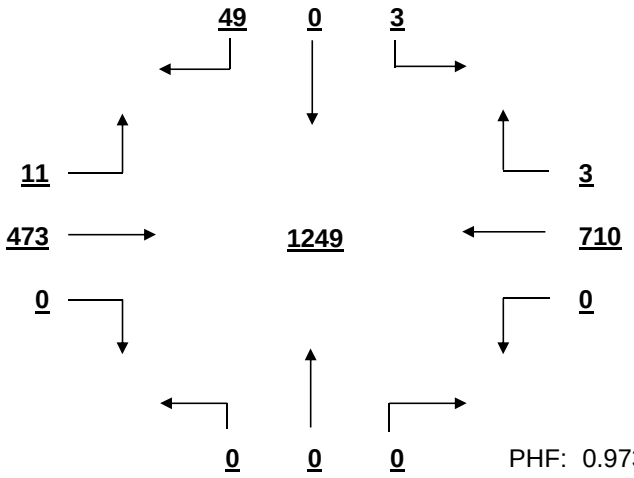
PHF: 0.973

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



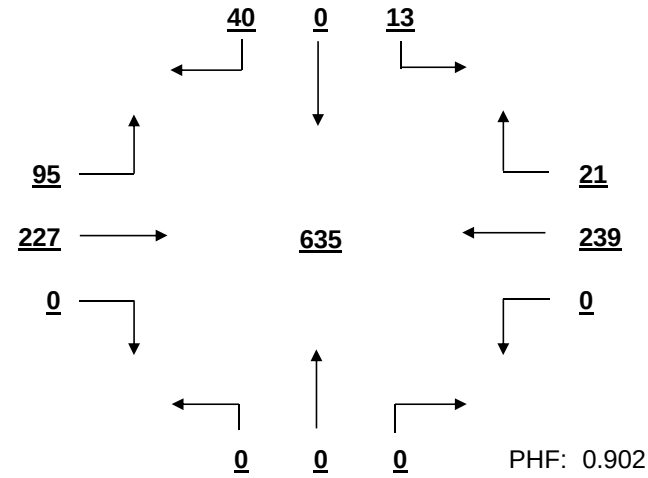
PHF: 0.864

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:45 TO 18:45



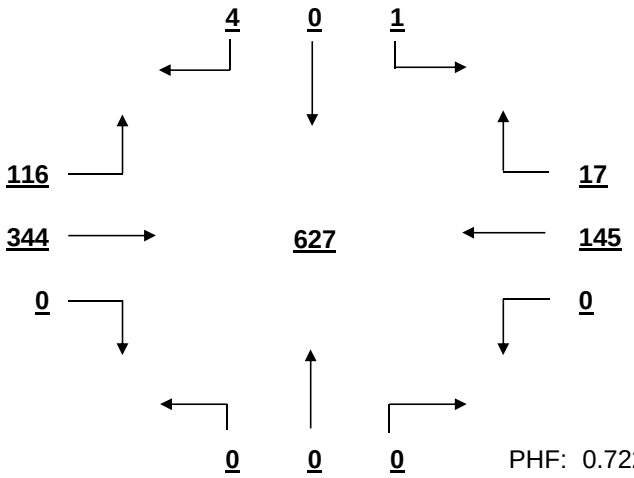
PHF: 0.973

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:30 TO 13:30



PHF: 0.902

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.722

SIGNAL WARRANT ANALYSIS

Browning-Burning Tree AT Center Point Rd Date: 11/22/2016

Minor Street Volume, percent of total = 8.1%
Percent of Left Turns from Minor Street = 16.3%
Percent of Right Turns from Minor Street = 83.7%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is not met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
617.4	/ 500	=	123%	54.2	/ 150	=	36%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	124%	113%	80%	58%	73%	102%	109%	98%	102%	179%	216%	228%
Minor St.	3%	6%	14%	17%	53%	64%	28%	25%	36%	79%	81%	27%

Condition B - Interruption to Continuous Traffic is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
617.4	/ 750	=	82%	54.2	/ 75	=	72%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	83%	76%	53%	39%	48%	68%	73%	65%	68%	119%	144%	152%
Minor St.	7%	12%	28%	35%	105%	128%	56%	51%	72%	159%	161%	53%

80% Combination of Conditions A & B is not met

Warrant No. 2 - Four Hour Vehicular Volume is not met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	2%	4%	7%	7%	24%	37%	17%	14%	21%	97%	144%	53%

Warrant No. 3 - Peak Hour is not met

Percent of warrant			Percent of warrant	
Overall Peak Hour:	17:45 - 18:45	Higher Volume Side Street Peak Hour:	16:30 - 17:30	
Minor St.	35%	Minor St.	82%	

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street	Minimum peak hour ped. volume crossing major street
107	133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	1	1	1	0	2	3	1	1	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/28/2016

Major Rt: Browning Rd * Not on State System Minor Rt: Zimalcrest Dr Clear

Day of Week: Monday Weather: Clear Office: Short Counts JMS

Type of Control: Stop Sign Speed Limit (major st) 40

Direction of Minor Street: N-S Intersection ADT - 12220 (Calc)

Number of Lanes (major st)* 1 Number of Lanes (minor st)* 1

* Each Direction

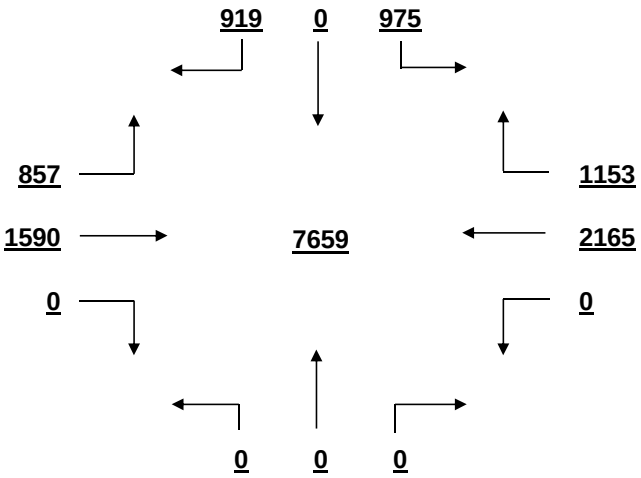
INTERSECTION VOLUME SUMMARY

	From N Zimalcrest Dr				From S Zimalcrest Dr				From E Browning Rd				From W Browning Rd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	22	0	31	53	0	0	0	0	0	8	26	34	15	29	0	44	131	1
7:15 - 7:30	36	0	31	67	0	0	0	0	0	16	23	39	18	43	0	61	167	0
7:30 - 7:45	40	0	23	63	0	0	0	0	0	25	21	46	16	74	0	90	199	0
7:45 - 8:00	48	0	18	66	0	0	0	0	0	23	23	46	27	113	0	140	252	0
8:00 - 8:15	26	0	17	43	0	0	0	0	0	21	14	35	8	73	0	81	159	0
8:15 - 8:30	29	0	0	29	0	0	0	0	0	28	18	46	10	64	0	74	149	0
8:30 - 8:45	27	0	10	37	0	0	0	0	0	22	16	38	9	47	0	56	131	0
8:45 - 9:00	21	0	12	33	0	0	0	0	0	22	17	39	17	46	0	63	135	0
9:00 - 9:15	19	0	11	30	0	0	0	0	0	14	8	22	13	36	0	49	101	0
9:15 - 9:30	17	0	10	27	0	0	0	0	0	21	22	43	13	25	0	38	108	0
9:30 - 9:45	15	0	12	27	0	0	0	0	0	22	10	32	5	28	0	33	92	1
9:45 - 10:00	12	0	11	23	0	0	0	0	0	12	11	23	10	21	0	31	77	0
10:00 - 10:15	10	0	9	19	0	0	0	0	0	13	10	23	9	16	0	25	67	0
10:15 - 10:30	12	0	11	23	0	0	0	0	0	17	12	29	5	13	0	18	70	1
10:30 - 10:45	14	0	9	23	0	0	0	0	0	14	14	28	11	12	0	23	74	0
10:45 - 11:00	10	0	19	29	0	0	0	0	0	23	17	40	10	11	0	21	90	0
11:00 - 11:15	11	0	9	20	0	0	0	0	0	25	16	41	17	13	0	30	91	0
11:15 - 11:30	23	0	15	38	0	0	0	0	0	26	11	37	11	23	0	34	109	0
11:30 - 11:45	10	0	11	21	0	0	0	0	0	29	22	51	14	25	0	39	111	0
11:45 - 12:00	18	0	15	33	0	0	0	0	0	37	13	50	21	33	0	54	137	0
12:00 - 12:15	9	0	22	31	0	0	0	0	0	58	17	75	14	26	0	40	146	1
12:15 - 12:30	21	0	19	40	0	0	0	0	0	42	12	54	10	33	0	43	137	0
12:30 - 12:45	11	0	13	24	0	0	0	0	0	31	27	58	27	31	0	58	140	0
12:45 - 13:00	27	0	15	42	0	0	0	0	0	36	21	57	20	29	0	49	148	1
13:00 - 13:15	19	0	20	39	0	0	0	0	0	45	23	68	15	41	0	56	163	0
13:15 - 13:30	13	0	24	37	0	0	0	0	0	32	17	49	15	33	0	48	134	0
13:30 - 13:45	26	0	17	43	0	0	0	0	0	30	21	51	17	36	0	53	147	0
13:45 - 14:00	16	0	19	35	0	0	0	0	0	39	24	63	26	29	0	55	153	0
14:00 - 14:15	21	0	19	40	0	0	0	0	0	31	32	63	19	37	0	56	159	0
14:15 - 14:30	17	0	20	37	0	0	0	0	0	42	27	69	14	22	0	36	142	1
14:30 - 14:45	21	0	25	46	0	0	0	0	0	37	22	59	20	26	0	46	151	0
14:45 - 15:00	27	0	29	56	0	0	0	0	0	32	33	65	15	25	0	40	161	0
15:00 - 15:15	25	0	27	52	0	0	0	0	0	25	14	39	18	38	0	56	147	0
15:15 - 15:30	17	0	17	34	0	0	0	0	0	36	21	57	11	31	0	42	133	0
15:30 - 15:45	24	0	30	54	0	0	0	0	0	39	28	67	21	28	0	49	170	0
15:45 - 16:00	15	0	23	38	0	0	0	0	0	34	27	61	22	23	0	45	144	0
16:00 - 16:15	28	0	24	52	0	0	0	0	0	68	26	94	26	32	0	58	204	0
16:15 - 16:30	21	0	25	46	0	0	0	0	0	72	31	103	31	38	0	69	218	0
16:30 - 16:45	29	0	21	50	0	0	0	0	0	95	32	127	22	32	0	54	231	0
16:45 - 17:00	22	0	31	53	0	0	0	0	0	117	45	162	21	41	0	62	277	0
17:00 - 17:15	21	0	24	45	0	0	0	0	0	126	46	172	32	37	0	69	286	0
17:15 - 17:30	28	0	28	56	0	0	0	0	0	153	58	211	21	38	0	59	326	0
17:30 - 17:45	20	0	20	40	0	0	0	0	0	159	38	197	28	31	0	59	296	0
17:45 - 18:00	19	0	29	48	0	0	0	0	0	150	54	204	27	35	0	62	314	0
18:00 - 18:15	18	0	28	46	0	0	0	0	0	94	37	131	26	22	0	48	225	0
18:15 - 18:30	11	0	20	31	0	0	0	0	0	67	32	99	36	15	0	51	181	0
18:30 - 18:45	19	0	23	42	0	0	0	0	0	30	30	60	26	18	0	44	146	0
18:45 - 19:00	10	0	23	33	0	0	0	0	0	27	34	61	18	18	0	36	130	0
TOTAL	975	0	919	1894	0	0	0	0	0	2165	1153	3318	857	1590	0	2447	7659	6
Trucks	6	0	5	11	0	0	0	0	0	6	10	16	3	6	0	9	36	0.5%
School Buses	4	0	8	12	0	0	0	0	0	5	3	8	1	10	0	11	31	0.4%

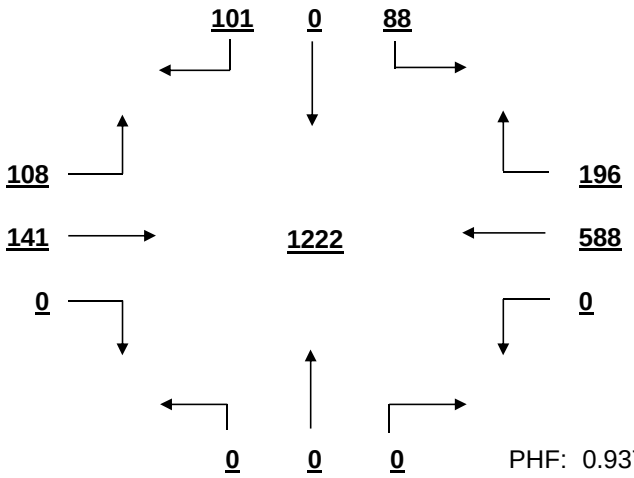
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Browning Rd AT Zimalcrest Dr Date: 11/28/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

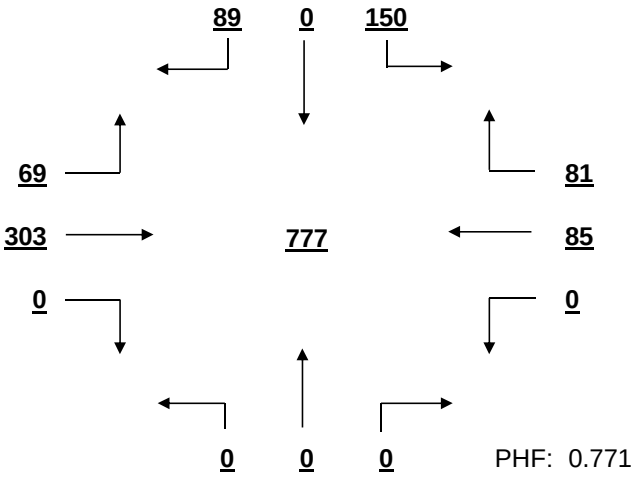


OVERALL PEAK HOUR VOLUME
FROM 17:00 TO 18:00



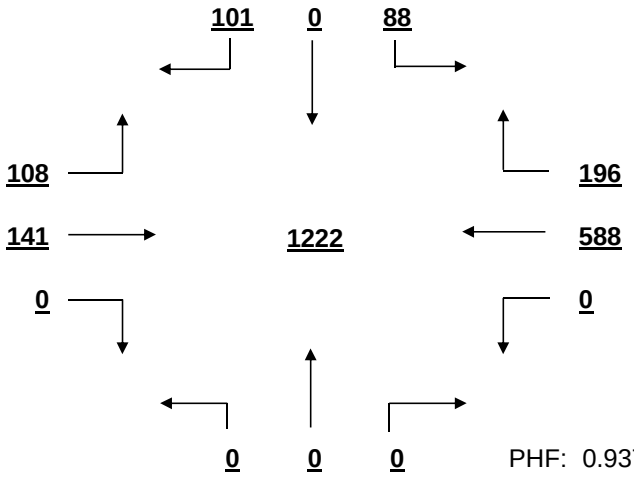
PHF: 0.937

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



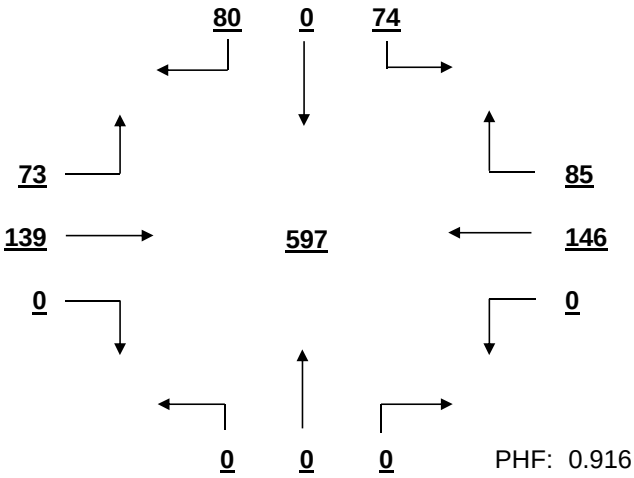
PHF: 0.771

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:00 TO 18:00



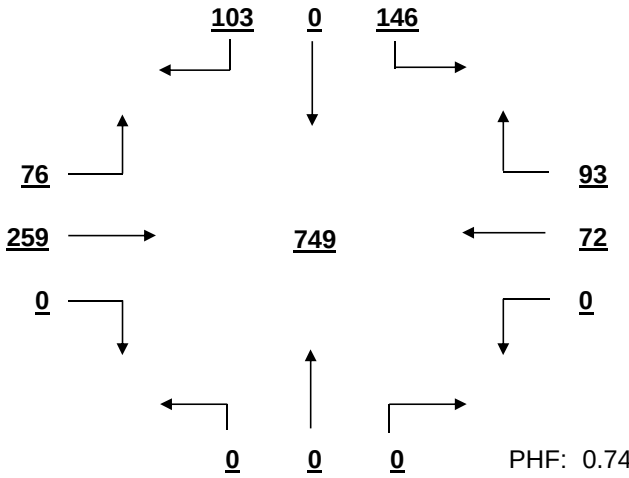
PHF: 0.937

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 13:00 TO 14:00



PHF: 0.916

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.743

SIGNAL WARRANT ANALYSIS

Browning Rd AT Zimalcrest Dr Date: 11/28/2016

Minor Street Volume, percent of total = 24.7%
Percent of Left Turns from Minor Street = 51.5%
Percent of Right Turns from Minor Street = 48.5%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is not met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
480.4	/ 500	=	96%	157.8	/ 150	=	105%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	100%	86%	54%	41%	67%	87%	89%	87%	83%	146%	207%	106%
Minor St.	166%	95%	71%	63%	75%	91%	103%	119%	119%	134%	126%	101%

Condition B - Interruption to Continuous Traffic is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
480.4	/ 750	=	64%	157.8	/ 75	=	210%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	67%	58%	36%	28%	45%	58%	59%	58%	55%	97%	138%	71%
Minor St.	332%	189%	143%	125%	149%	183%	205%	239%	237%	268%	252%	203%

80% Combination of Conditions A & B is not met

Warrant No. 2 - Four Hour Vehicular Volume is not met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	96%	49%	29%	23%	33%	47%	54%	62%	59%	117%	205%	61%

Warrant No. 3 - Peak Hour is not met

Percent of warrant			Percent of warrant	
Overall Peak Hour: 17:00 - 18:00		Higher Volume Side Street Peak Hour:	7:00 - 8:00	
Minor St.	98%	Minor St.	58%	

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street	Minimum peak hour ped. volume crossing major street
107	133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	1	0	1	1	0	2	0	1	0	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/29/2016

Major Rt: Bush River Rd * Not on State System Minor Rt: Ashland Rd-Marydale Ln Clear

Day of Week: Tuesday Weather: Rain Office: Short Counts JMS

Type of Control: Stop Sign Speed Limit (major st) 40

Direction of Minor Street: N-S Intersection ADT - 14340 (Calc)

Number of Lanes (major st)* 1 Number of Lanes (minor st)* 1

* Each Direction

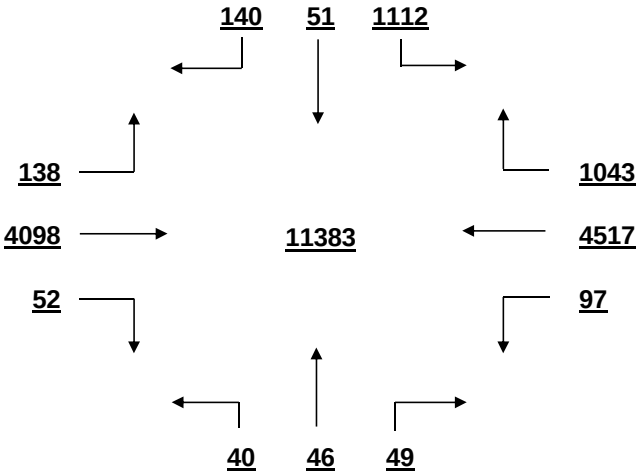
INTERSECTION VOLUME SUMMARY

	From N Ashland Rd-Marydal				From S Ashland Rd-Marydal				From E Bush River Rd				From W Bush River Rd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	26	0	2	28	0	0	0	0	0	49	16	65	4	141	0	145	238	0
7:15 - 7:30	24	0	3	27	0	0	0	0	2	38	9	49	9	173	0	182	258	0
7:30 - 7:45	56	0	2	58	1	0	0	1	2	64	12	78	6	189	2	197	334	1
7:45 - 8:00	84	0	7	91	0	0	0	0	2	82	19	103	1	219	1	221	415	0
8:00 - 8:15	42	0	0	42	0	0	1	1	4	55	15	74	1	149	5	155	272	0
8:15 - 8:30	67	3	0	70	2	4	0	6	6	53	16	75	0	177	2	179	330	0
8:30 - 8:45	33	4	1	38	0	1	3	4	2	46	13	61	0	155	5	160	263	0
8:45 - 9:00	35	0	1	36	0	0	1	1	0	58	17	75	3	114	2	119	231	0
9:00 - 9:15	14	1	1	16	0	0	0	0	0	42	18	60	3	86	1	90	166	0
9:15 - 9:30	13	0	1	14	0	0	1	1	1	69	15	85	1	62	1	64	164	0
9:30 - 9:45	16	0	2	18	0	3	0	3	1	55	16	72	6	52	0	58	151	0
9:45 - 10:00	26	2	3	31	0	0	0	0	2	47	11	60	23	32	2	57	148	0
10:00 - 10:15	28	7	4	39	0	4	1	5	2	63	15	80	1	68	3	72	196	0
10:15 - 10:30	20	2	1	23	1	1	1	3	4	46	14	64	1	61	1	63	153	0
10:30 - 10:45	12	1	4	17	2	1	0	3	2	51	10	63	1	62	2	65	148	0
10:45 - 11:00	21	1	2	24	0	1	1	2	1	71	13	85	1	76	3	80	191	0
11:00 - 11:15	10	1	0	11	0	2	0	2	2	76	21	99	2	59	0	61	173	0
11:15 - 11:30	19	0	3	22	3	0	1	4	1	61	14	76	1	50	0	51	153	0
11:30 - 11:45	14	0	1	15	1	2	2	5	2	90	29	121	5	82	0	87	228	0
11:45 - 12:00	17	1	4	22	4	1	0	5	1	57	28	86	2	69	2	73	186	0
12:00 - 12:15	14	2	1	17	1	0	3	4	5	86	22	113	3	73	4	80	214	0
12:15 - 12:30	12	1	2	15	1	2	3	6	2	80	24	106	2	70	2	74	201	0
12:30 - 12:45	17	1	3	21	2	0	0	2	1	88	30	119	1	82	2	85	227	0
12:45 - 13:00	24	0	7	31	0	2	2	4	0	95	25	120	6	100	0	106	261	0
13:00 - 13:15	19	1	2	22	1	1	1	3	3	94	31	128	5	83	1	89	242	0
13:15 - 13:30	22	0	2	24	1	1	1	3	0	74	27	101	9	80	1	90	218	0
13:30 - 13:45	23	1	1	25	0	1	2	3	1	84	19	104	3	71	0	74	206	0
13:45 - 14:00	29	0	5	34	0	0	2	2	2	82	13	97	4	90	1	95	228	0
14:00 - 14:15	16	2	0	18	0	2	2	4	2	62	12	76	4	58	1	63	161	0
14:15 - 14:30	21	1	1	23	0	0	2	2	0	69	9	78	3	64	0	67	170	0
14:30 - 14:45	20	1	0	21	1	3	0	4	1	97	21	119	2	70	1	73	217	0
14:45 - 15:00	26	2	6	34	3	1	1	5	1	99	19	119	2	84	1	87	245	0
15:00 - 15:15	30	0	6	36	1	0	2	3	1	93	23	117	3	82	0	85	241	0
15:15 - 15:30	16	0	0	16	0	1	0	1	3	104	25	132	2	81	0	83	232	0
15:30 - 15:45	10	0	3	13	0	0	0	0	0	68	11	79	0	53	0	53	145	1
15:45 - 16:00	11	1	2	14	0	1	1	2	1	110	15	126	1	59	0	60	202	0
16:00 - 16:15	14	2	7	23	1	1	2	4	0	75	17	92	1	60	1	62	181	0
16:15 - 16:30	21	1	6	28	0	2	1	3	0	181	34	215	5	89	1	95	341	0
16:30 - 16:45	24	0	5	29	1	1	3	5	0	148	19	167	0	79	0	79	280	0
16:45 - 17:00	24	0	7	31	1	0	0	1	3	156	32	191	1	51	0	52	275	0
17:00 - 17:15	23	1	4	28	5	0	2	7	2	205	41	248	1	82	0	83	366	0
17:15 - 17:30	32	0	2	34	3	1	0	4	2	196	44	242	0	87	1	88	368	0
17:30 - 17:45	22	0	2	24	0	0	0	0	1	221	33	255	2	80	1	83	362	0
17:45 - 18:00	15	0	4	19	1	1	0	2	3	207	32	242	2	73	0	75	338	0
18:00 - 18:15	15	3	2	20	0	0	1	1	3	140	36	179	2	52	0	54	254	0
18:15 - 18:30	8	0	8	16	0	0	0	0	2	176	46	224	0	59	0	59	299	0
18:30 - 18:45	16	4	2	22	3	3	3	9	2	157	34	193	1	63	1	65	289	0
18:45 - 19:00	11	4	8	23	0	2	3	5	19	97	28	144	2	47	1	50	222	0
TOTAL	1112	51	140	1303	40	46	49	135	97	4517	1043	5657	138	4098	52	4288	11383	2
Trucks	2	0	1	3	0	0	1	1	0	36	3	39	1	29	0	30	73	0.6%
School Buses	2	0	8	10	0	0	0	0	0	14	1	15	3	6	0	9	34	0.3%

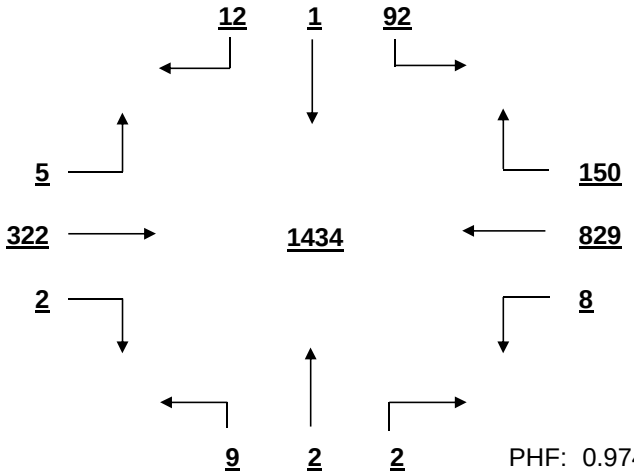
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Bush River Rd AT Ashland Rd-Marydale Ln Date: 11/29/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

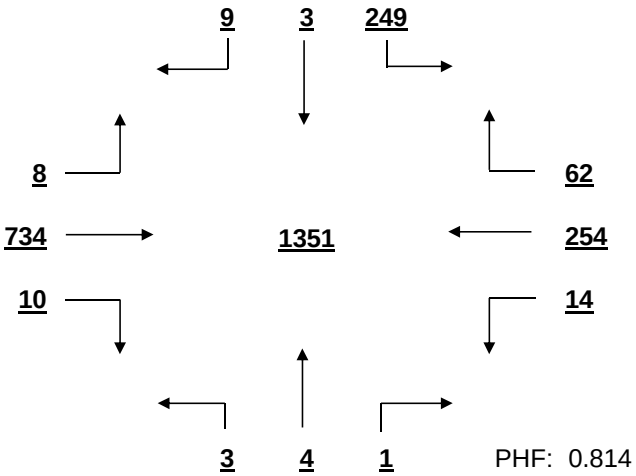


OVERALL PEAK HOUR VOLUME
FROM 17:00 TO 18:00



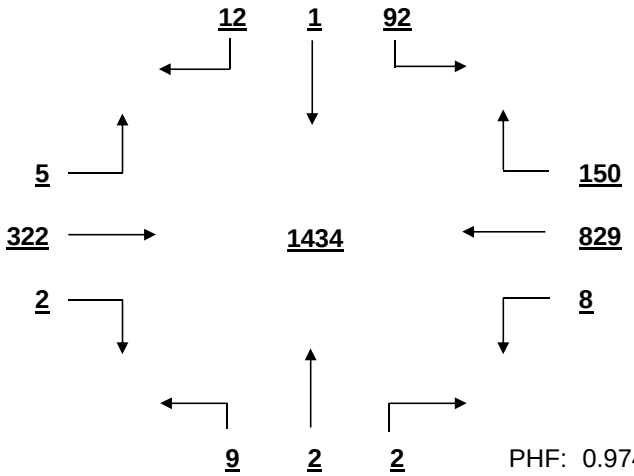
PHF: 0.974

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



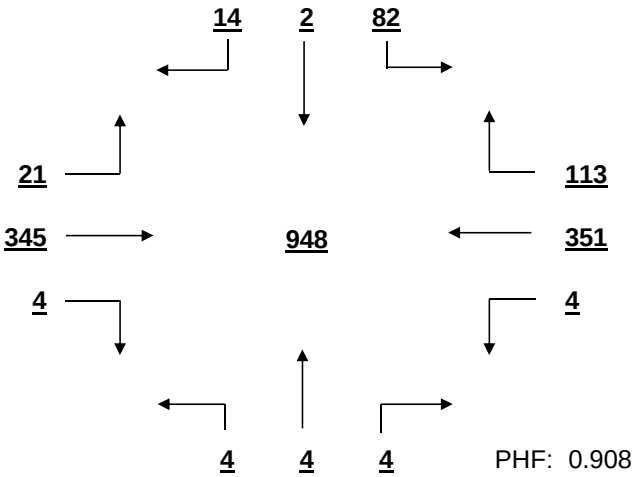
PHF: 0.814

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:00 TO 18:00



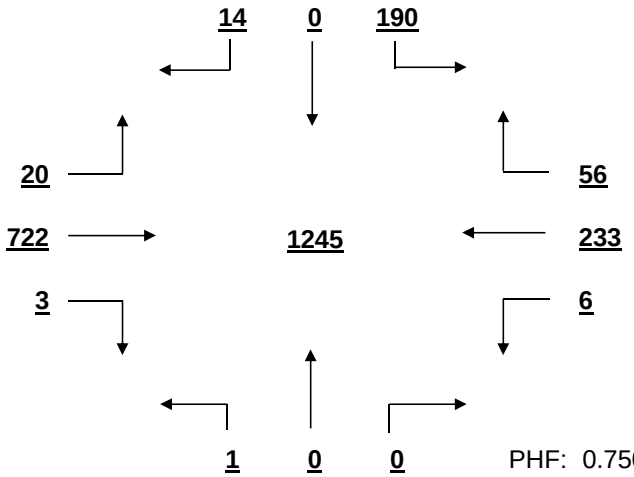
PHF: 0.974

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:30 TO 13:30



PHF: 0.908

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.750

SIGNAL WARRANT ANALYSIS

Bush River Rd AT Ashland Rd-Marydale Ln Date: 11/29/2016

Minor Street Volume, percent of total = 12.6%
Percent of Left Turns from Minor Street = 80.1%
Percent of Right Turns from Minor Street = 13.1%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is not met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
828.8	/	500	= 166%	108.6	/	150	= 72%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	208%	180%	109%	114%	131%	161%	156%	136%	147%	191%	263%	194%
Minor St.	136%	124%	53%	69%	47%	56%	70%	64%	53%	74%	70%	54%

Condition B - Interruption to Continuous Traffic is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
828.8	/	750	= 111%	108.6	/	75	= 145%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	139%	120%	73%	76%	87%	107%	104%	91%	98%	127%	175%	129%
Minor St.	272%	248%	105%	137%	93%	112%	140%	128%	105%	148%	140%	108%

80% Combination of Conditions A & B is not met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	224%	152%	33%	45%	35%	57%	67%	51%	47%	102%	131%	77%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	17:00 - 18:00	Higher Volume Side Street Peak Hour:	7:30 - 8:30
Minor St.	85%	Minor St.	146%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	0	0	0	0	0	0	0	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/28/2016

Major Rt: Bush River Rd * Not on State System Minor Rt: Outlet Pointe Blvd-Meadow Ct

Day of Week: Monday Weather: Rain (Clear) Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: N-S Intersection ADT - 24460 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 2

* Each Direction

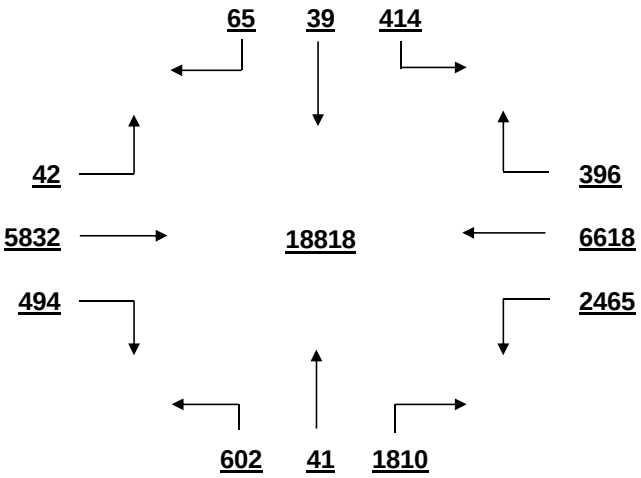
INTERSECTION VOLUME SUMMARY

	From N Outlet Pointe Blvd				From S Outlet Pointe Blvd				From E Bush River Rd				From W Bush River Rd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	10	1	1	12	1	0	2	3	21	46	6	73	1	141	1	143	231	0
7:15 - 7:30	19	1	1	21	2	0	0	2	55	87	5	147	1	236	8	245	415	0
7:30 - 7:45	21	2	4	27	2	0	5	7	56	87	4	147	1	273	8	282	463	0
7:45 - 8:00	22	0	3	25	1	0	4	5	87	75	10	172	0	287	9	296	498	0
8:00 - 8:15	16	0	3	19	4	1	3	8	100	107	5	212	1	188	12	201	440	1
8:15 - 8:30	11	1	0	12	2	0	17	19	113	117	4	234	0	185	10	195	460	0
8:30 - 8:45	14	1	0	15	4	0	8	12	77	89	6	172	0	171	12	183	382	2
8:45 - 9:00	16	0	1	17	2	0	10	12	62	78	4	144	1	149	5	155	328	1
9:00 - 9:15	7	2	0	9	3	0	18	21	59	76	1	136	0	114	7	121	287	2
9:15 - 9:30	8	1	2	11	4	0	16	20	48	88	1	137	1	90	8	99	267	0
9:30 - 9:45	5	0	1	6	9	2	17	28	30	85	3	118	1	73	10	84	236	0
9:45 - 10:00	8	1	0	9	8	0	20	28	35	91	3	129	0	75	8	83	249	2
10:00 - 10:15	8	0	1	9	6	1	23	30	34	87	5	126	0	70	11	81	246	0
10:15 - 10:30	7	0	1	8	7	0	21	28	33	90	3	126	2	76	6	84	246	0
10:30 - 10:45	6	0	1	7	6	0	26	32	32	96	3	131	1	67	5	73	243	0
10:45 - 11:00	5	0	0	5	6	0	27	33	41	83	7	131	1	76	11	88	257	2
11:00 - 11:15	2	1	1	4	10	0	32	42	40	101	4	145	0	89	6	95	286	0
11:15 - 11:30	8	0	0	8	10	0	30	40	56	88	2	146	0	86	7	93	287	1
11:30 - 11:45	4	0	0	4	8	0	50	58	61	123	4	188	0	85	6	91	341	1
11:45 - 12:00	8	0	2	10	7	2	54	63	66	136	6	208	1	96	11	108	389	0
12:00 - 12:15	6	1	1	8	30	1	88	119	66	132	10	208	1	99	24	124	459	0
12:15 - 12:30	5	1	3	9	15	2	56	73	57	140	9	206	0	106	17	123	411	2
12:30 - 12:45	7	1	1	9	21	5	68	94	82	164	6	252	0	122	17	139	494	2
12:45 - 13:00	5	0	1	6	18	0	53	71	92	150	4	246	0	104	11	115	438	2
13:00 - 13:15	9	1	1	11	28	2	86	116	77	146	8	231	3	123	16	142	500	1
13:15 - 13:30	6	2	2	10	17	1	54	72	82	131	10	223	0	119	22	141	446	1
13:30 - 13:45	7	0	0	7	17	0	51	68	67	116	7	190	0	109	24	133	398	0
13:45 - 14:00	4	1	0	5	12	1	32	45	67	133	10	210	1	106	14	121	381	1
14:00 - 14:15	6	3	2	11	11	1	35	47	73	109	8	190	0	93	8	101	349	0
14:15 - 14:30	7	3	1	11	22	0	39	61	45	124	5	174	0	137	12	149	395	3
14:30 - 14:45	11	0	0	11	5	1	35	41	45	125	4	174	1	116	12	129	355	0
14:45 - 15:00	9	1	2	12	12	3	35	50	48	150	6	204	1	146	14	161	427	1
15:00 - 15:15	7	3	1	11	9	0	28	37	35	118	9	162	0	117	6	123	333	0
15:15 - 15:30	11	0	2	13	12	0	35	47	40	140	9	189	2	110	8	120	369	1
15:30 - 15:45	5	0	0	5	10	1	51	62	44	150	13	207	0	109	8	117	391	0
15:45 - 16:00	8	0	0	8	17	1	36	54	46	140	7	193	2	107	8	117	372	0
16:00 - 16:15	5	1	1	7	25	1	88	114	36	185	16	237	1	105	7	113	471	1
16:15 - 16:30	10	1	0	11	16	6	39	61	41	219	14	274	2	107	14	123	469	0
16:30 - 16:45	4	0	3	7	25	0	86	111	36	198	16	250	2	140	13	155	523	0
16:45 - 17:00	7	2	2	11	20	1	80	101	31	269	6	306	2	118	10	130	548	0
17:00 - 17:15	7	2	5	14	52	1	108	161	34	252	20	306	2	190	8	200	681	2
17:15 - 17:30	10	0	3	13	20	1	79	100	47	298	28	373	1	161	11	173	659	3
17:30 - 17:45	7	2	2	11	21	3	57	81	38	297	16	351	2	102	11	115	558	0
17:45 - 18:00	16	1	2	19	15	1	32	48	27	261	20	308	3	112	9	124	499	0
18:00 - 18:15	3	0	2	5	14	0	20	34	27	220	13	260	3	101	9	113	412	1
18:15 - 18:30	7	0	4	11	15	0	15	30	27	185	18	230	1	86	7	94	365	0
18:30 - 18:45	7	2	2	11	12	1	20	33	25	135	9	169	0	83	7	90	303	0
18:45 - 19:00	13	0	0	13	9	1	21	31	24	101	9	134	0	77	6	83	261	0
TOTAL	414	39	65	518	602	41	1810	2453	2465	6618	396	9479	42	5832	494	6368	18818	33
Trucks	4	0	0	4	3	1	10	14	19	84	3	106	0	54	2	56	180	1.0%
School Buses	1	0	0	1	0	0	1	1	1	21	4	26	2	5	0	7	35	0.2%

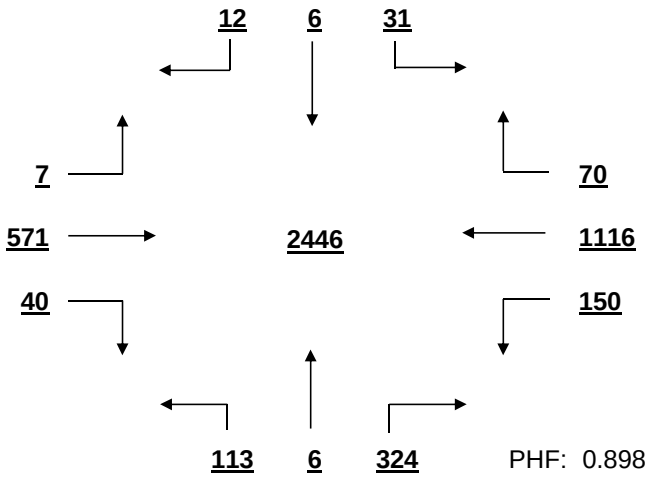
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Bush River Rd AT Outlet Pointe Blvd-Meadow Ct Date: 11/28/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

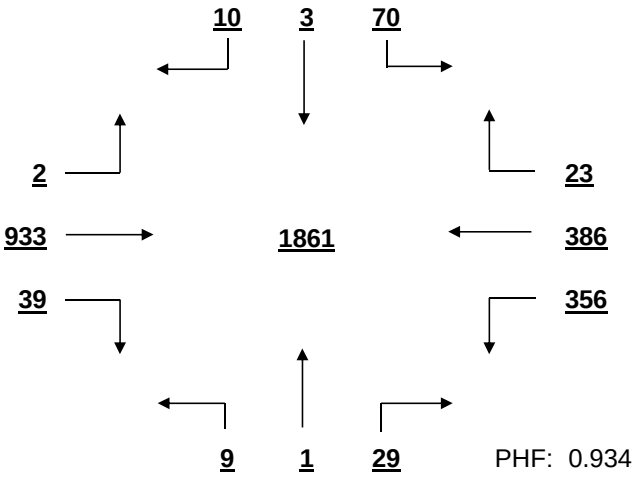


OVERALL PEAK HOUR VOLUME
FROM 16:45 TO 17:45



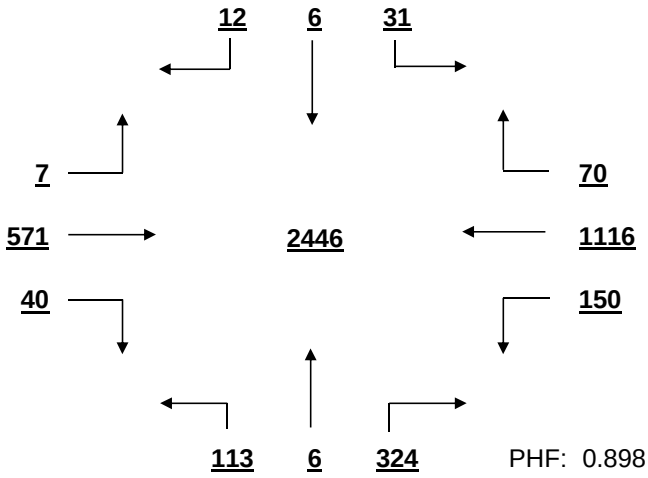
PHF: 0.898

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



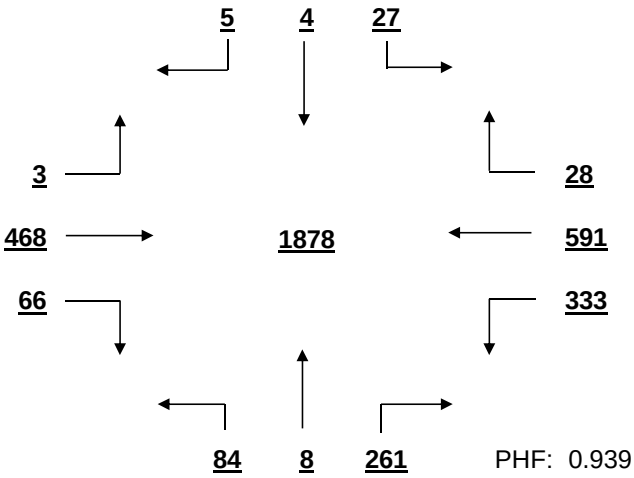
PHF: 0.934

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:45 TO 17:45



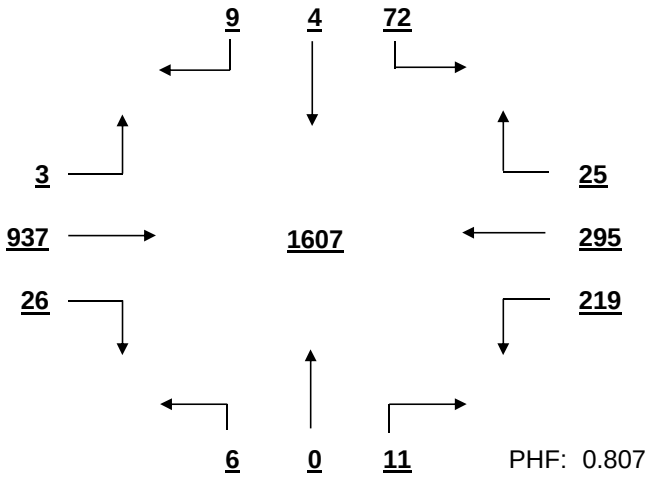
PHF: 0.898

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:30 TO 13:30



PHF: 0.939

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.807

SIGNAL WARRANT ANALYSIS

Bush River Rd AT Outlet Pointe Blvd-Meadow Ct Date: 11/28/2016

Minor Street Volume, percent of total = 15.8%
Percent of Left Turns from Minor Street = 34.2%
Percent of Right Turns from Minor Street = 63.1%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1320.6	/	600	= 220%	204.4	/	200	= 102%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	251%	249%	151%	140%	179%	236%	232%	214%	205%	265%	325%	196%
Minor St.	43%	32%	49%	62%	102%	179%	151%	100%	100%	194%	195%	64%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1320.6	/	900	= 147%	204.4	/	100	= 204%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	167%	166%	101%	93%	119%	157%	155%	142%	136%	176%	217%	130%
Minor St.	85%	63%	97%	123%	203%	357%	301%	199%	200%	387%	390%	128%

80% Combination of Conditions A & B is not met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	74%	55%	42%	47%	120%	310%	262%	171%	157%	337%	339%	91%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	16:45 - 17:45	Higher Volume Side Street Peak Hour:	16:30 - 17:30
Minor St.	295%	Minor St.	315%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	1	2	2	0	4	3	3	1	1	4	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008

Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/30/2016

Major Rt: Bush River Rd * Not on State System Minor Rt: Berryhill Dr Clear

Day of Week: Wednesday Weather: Rain Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: N-S Intersection ADT - 27690 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1

* Each Direction

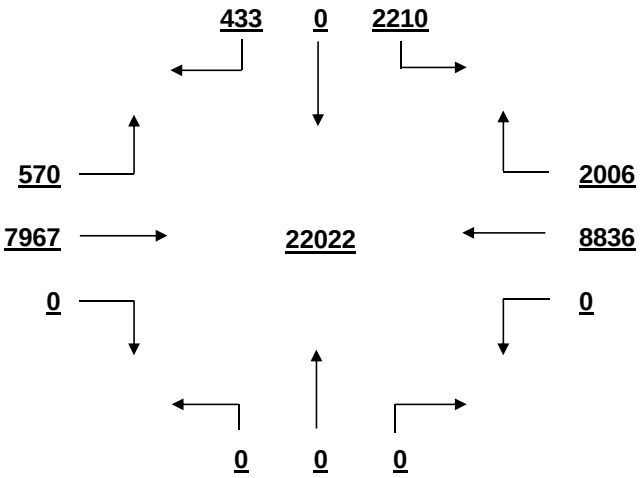
INTERSECTION VOLUME SUMMARY

	From N Berryhill Dr				From S Berryhill Dr				From E Bush River Rd				From W Bush River Rd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	12	0	1	13	0	0	0	0	0	80	33	113	11	112	0	123	249	0
7:15 - 7:30	51	0	2	53	0	0	0	0	0	144	65	209	10	258	0	268	530	0
7:30 - 7:45	48	0	7	55	0	0	0	0	0	185	103	288	14	309	0	323	666	0
7:45 - 8:00	46	0	5	51	0	0	0	0	0	193	87	280	12	287	0	299	630	0
8:00 - 8:15	33	0	4	37	0	0	0	0	0	180	106	286	7	267	0	274	597	0
8:15 - 8:30	13	0	0	13	0	0	0	0	0	95	49	144	4	116	0	120	277	0
8:30 - 8:45	35	0	16	51	0	0	0	0	0	190	104	294	18	206	0	224	569	0
8:45 - 9:00	25	0	6	31	0	0	0	0	0	167	94	261	11	181	0	192	484	0
9:00 - 9:15	18	0	5	23	0	0	0	0	0	128	51	179	13	156	0	169	371	0
9:15 - 9:30	19	0	4	23	0	0	0	0	0	118	54	172	9	133	0	142	337	0
9:30 - 9:45	31	0	3	34	0	0	0	0	0	112	46	158	12	128	0	140	332	0
9:45 - 10:00	17	0	4	21	0	0	0	0	0	126	38	164	10	130	0	140	325	0
10:00 - 10:15	29	0	6	35	0	0	0	0	0	106	21	127	12	96	0	108	270	0
10:15 - 10:30	19	0	4	23	0	0	0	0	0	115	32	147	13	111	0	124	294	1
10:30 - 10:45	35	0	3	38	0	0	0	0	0	96	21	117	11	82	0	93	248	0
10:45 - 11:00	22	0	6	28	0	0	0	0	0	125	25	150	11	97	0	108	286	0
11:00 - 11:15	40	0	10	50	0	0	0	0	0	143	28	171	10	110	0	120	341	0
11:15 - 11:30	33	0	7	40	0	0	0	0	0	131	25	156	14	115	0	129	325	0
11:30 - 11:45	46	0	17	63	0	0	0	0	0	164	35	199	12	149	0	161	423	0
11:45 - 12:00	53	0	18	71	0	0	0	0	0	158	37	195	15	176	0	191	457	0
12:00 - 12:15	71	0	27	98	0	0	0	0	0	188	23	211	18	210	0	228	537	1
12:15 - 12:30	47	0	17	64	0	0	0	0	0	223	39	262	15	206	0	221	547	0
12:30 - 12:45	41	0	10	51	0	0	0	0	0	184	35	219	24	214	0	238	508	0
12:45 - 13:00	48	0	12	60	0	0	0	0	0	211	53	264	19	191	0	210	534	0
13:00 - 13:15	60	0	23	83	0	0	0	0	0	166	47	213	29	225	0	254	550	0
13:15 - 13:30	46	0	20	66	0	0	0	0	0	218	55	273	18	168	0	186	525	0
13:30 - 13:45	42	0	10	52	0	0	0	0	0	194	51	245	21	219	0	240	537	0
13:45 - 14:00	42	0	8	50	0	0	0	0	0	207	64	271	20	187	0	207	528	0
14:00 - 14:15	40	0	14	54	0	0	0	0	0	165	32	197	27	156	0	183	434	1
14:15 - 14:30	32	0	7	39	0	0	0	0	0	142	35	177	12	129	0	141	357	0
14:30 - 14:45	28	0	5	33	0	0	0	0	0	130	23	153	8	110	0	118	304	0
14:45 - 15:00	52	0	8	60	0	0	0	0	0	154	18	172	13	154	0	167	399	0
15:00 - 15:15	53	0	7	60	0	0	0	0	0	169	15	184	10	149	0	159	403	0
15:15 - 15:30	51	0	7	58	0	0	0	0	0	172	17	189	3	108	0	111	358	0
15:30 - 15:45	45	0	7	52	0	0	0	0	0	172	26	198	6	164	0	170	420	0
15:45 - 16:00	48	0	12	60	0	0	0	0	0	208	38	246	6	158	0	164	470	0
16:00 - 16:15	73	0	17	90	0	0	0	0	0	214	23	237	11	193	0	204	531	0
16:15 - 16:30	68	0	3	71	0	0	0	0	0	194	19	213	6	139	0	145	429	0
16:30 - 16:45	111	0	18	129	0	0	0	0	0	214	38	252	2	192	0	194	575	2
16:45 - 17:00	89	0	10	99	0	0	0	0	0	326	31	357	13	168	0	181	637	0
17:00 - 17:15	131	0	16	147	0	0	0	0	0	321	32	353	9	302	0	311	811	1
17:15 - 17:30	90	0	10	100	0	0	0	0	0	341	61	402	7	237	0	244	746	0
17:30 - 17:45	87	0	9	96	0	0	0	0	0	265	51	316	8	137	0	145	557	0
17:45 - 18:00	60	0	10	70	0	0	0	0	0	288	29	317	6	164	0	170	557	0
18:00 - 18:15	58	0	5	63	0	0	0	0	0	329	34	363	8	149	0	157	583	0
18:15 - 18:30	31	0	2	33	0	0	0	0	0	251	32	283	8	122	0	130	446	1
18:30 - 18:45	21	0	6	27	0	0	0	0	0	227	15	242	8	105	0	113	382	0
18:45 - 19:00	20	0	5	25	0	0	0	0	0	207	16	223	6	92	0	98	346	1
TOTAL	2210	0	433	2643	0	0	0	0	0	8836	2006	10842	570	7967	0	8537	22022	8
Trucks	8	0	2	10	0	0	0	0	0	61	13	74	2	56	0	58	142	0.6%
School Buses	2	0	5	7	0	0	0	0	0	17	1	18	2	6	0	8	33	0.1%

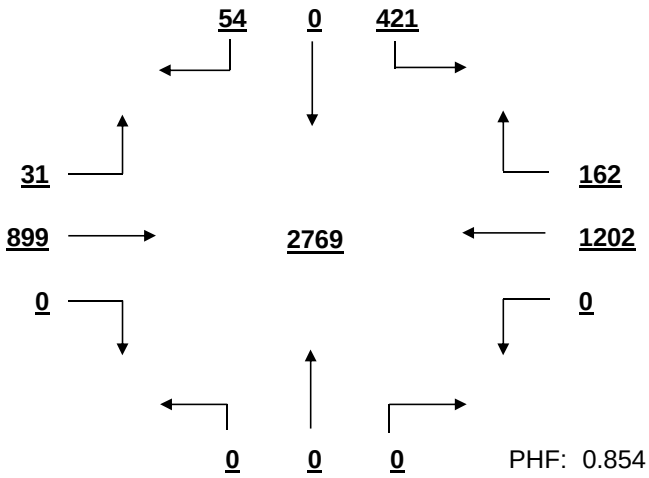
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Bush River Rd AT Berryhill Dr Date: 11/30/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

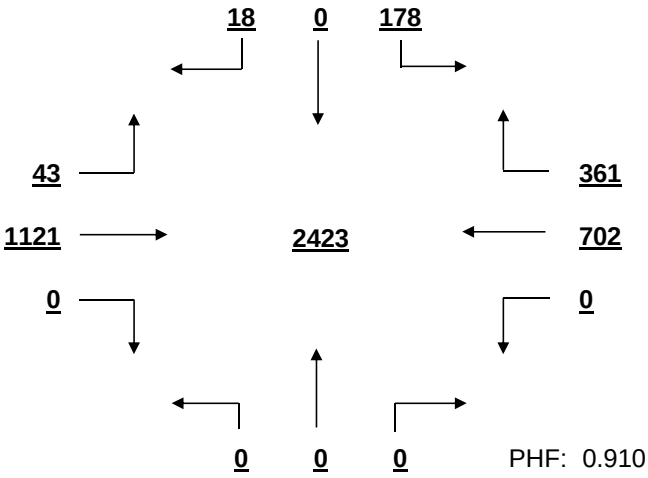


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



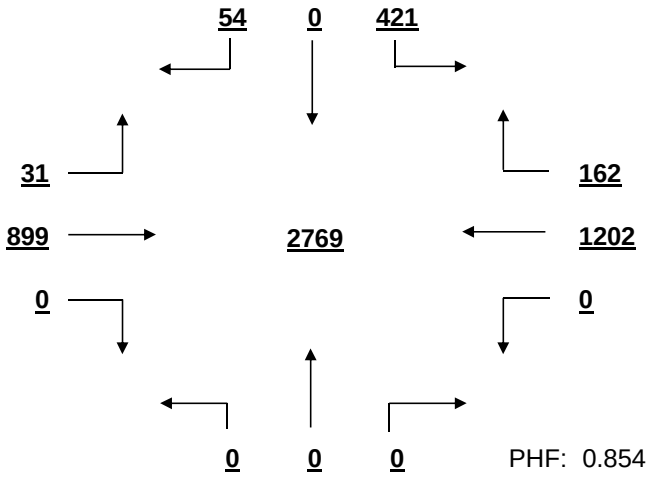
PHF: 0.854

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



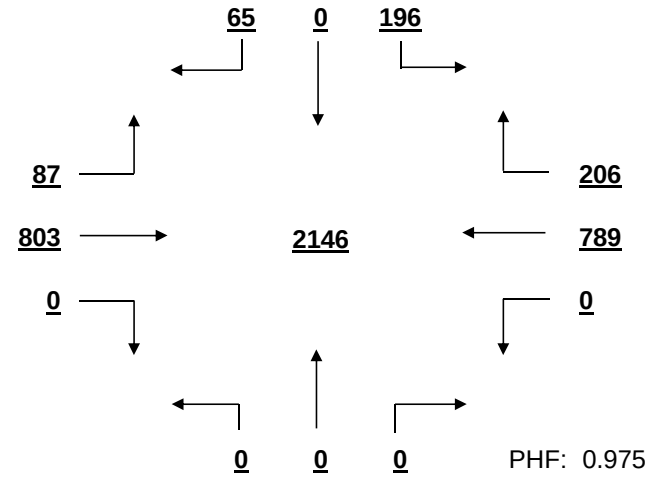
PHF: 0.910

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



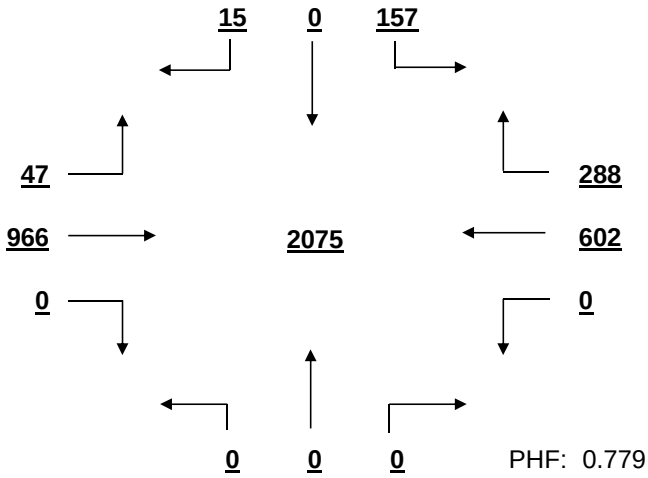
PHF: 0.854

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:45 TO 13:45



PHF: 0.975

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.779

SIGNAL WARRANT ANALYSIS

Bush River Rd AT Berryhill Dr Date: 11/30/2016

Minor Street Volume, percent of total = 12.0%
Percent of Left Turns from Minor Street = 83.6%
Percent of Right Turns from Minor Street = 16.4%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1614.9	/	600	= 269%	220.3	/	150	= 147%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	317%	299%	211%	162%	220%	309%	315%	218%	237%	297%	376%	268%
Minor St.	115%	88%	67%	83%	149%	182%	167%	124%	153%	259%	275%	99%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1614.9	/	900	= 179%	220.3	/	75	= 294%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	211%	199%	140%	108%	147%	206%	210%	145%	158%	198%	251%	179%
Minor St.	229%	176%	135%	165%	299%	364%	335%	248%	307%	519%	551%	197%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	215%	165%	106%	83%	249%	341%	314%	204%	288%	486%	516%	185%

Warrant No. 3 - Peak Hour is met

Percent of warrant			Percent of warrant	
Overall Peak Hour: 16:30 - 17:30		Higher Volume Side Street Peak Hour: 16:30 - 17:30		
Minor St.	475%		Minor St.	475%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	0	0	0	0	0	1	0	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008

Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/29/2016

Major Rt: Bush River Rd * Not on State System Minor Rt: Rockland Rd Clear

Day of Week: Tuesday Weather: Rain Office: Short Counts JMS

Type of Control: Stop Sign Speed Limit (major st) 40

Direction of Minor Street: N-S Intersection ADT - 21150 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1

* Each Direction

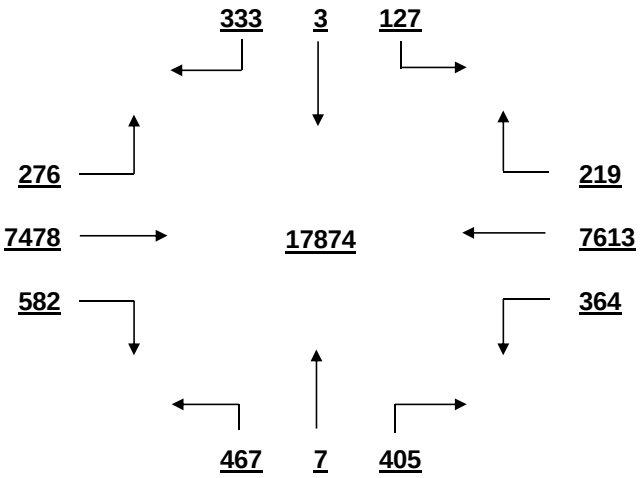
INTERSECTION VOLUME SUMMARY

	From N Rockland Rd				From S Rockland Rd				From E Bush River Rd				From W Bush River Rd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	2	0	6	8	0	0	1	1	2	79	3	84	10	215	1	226	319	1
7:15 - 7:30	3	0	6	9	0	0	1	1	0	96	2	98	8	321	0	329	437	0
7:30 - 7:45	3	0	14	17	1	0	0	1	2	120	3	125	7	343	1	351	494	5
7:45 - 8:00	2	0	13	15	0	0	1	1	2	117	6	125	5	355	0	360	501	0
8:00 - 8:15	3	0	13	16	0	0	1	1	1	125	3	129	1	361	1	363	509	0
8:15 - 8:30	2	0	0	2	0	0	1	1	2	117	0	119	8	361	4	373	495	0
8:30 - 8:45	5	0	7	12	1	0	2	3	3	115	5	123	8	248	1	257	395	1
8:45 - 9:00	1	0	9	10	1	0	1	2	4	99	0	103	8	181	8	197	312	0
9:00 - 9:15	3	0	8	11	1	0	0	1	6	95	3	104	10	143	11	164	280	1
9:15 - 9:30	0	0	3	3	3	0	1	4	5	94	5	104	3	111	9	123	234	1
9:30 - 9:45	3	0	5	8	6	0	2	8	9	71	5	85	6	113	15	134	235	1
9:45 - 10:00	2	0	5	7	6	0	4	10	6	85	6	97	7	116	13	136	250	2
10:00 - 10:15	3	0	4	7	0	0	0	0	10	82	2	94	1	101	13	115	216	0
10:15 - 10:30	0	0	1	1	7	0	7	14	7	76	1	84	3	104	17	124	223	0
10:30 - 10:45	1	0	2	3	10	1	8	19	13	77	3	93	3	87	24	114	229	0
10:45 - 11:00	2	0	5	7	11	0	6	17	18	94	3	115	3	107	19	129	268	0
11:00 - 11:15	0	0	7	7	10	0	17	27	12	113	1	126	6	99	26	131	291	0
11:15 - 11:30	3	0	2	5	14	1	12	27	11	103	2	116	2	115	21	138	286	0
11:30 - 11:45	2	0	10	12	12	1	12	25	16	125	2	143	2	127	18	147	327	0
11:45 - 12:00	2	0	7	9	11	0	14	25	11	129	0	140	4	141	20	165	339	2
12:00 - 12:15	2	0	9	11	18	0	16	34	15	133	4	152	3	180	20	203	400	0
12:15 - 12:30	2	0	6	8	22	0	12	34	9	175	4	188	10	170	24	204	434	0
12:30 - 12:45	3	0	5	8	25	0	12	37	16	181	5	202	1	158	23	182	429	0
12:45 - 13:00	1	0	7	8	17	0	13	30	8	164	1	173	5	150	25	180	391	0
13:00 - 13:15	2	0	5	7	16	0	12	28	11	155	2	168	3	144	26	173	376	1
13:15 - 13:30	2	0	6	8	18	0	16	34	16	158	3	177	2	142	29	173	392	1
13:30 - 13:45	3	0	8	11	17	0	13	30	15	170	6	191	7	138	21	166	398	0
13:45 - 14:00	3	1	7	11	24	0	17	41	14	166	4	184	5	131	14	150	386	1
14:00 - 14:15	3	0	3	6	21	0	15	36	7	128	3	138	6	124	23	153	333	2
14:15 - 14:30	0	1	1	2	19	0	8	27	14	147	6	167	1	119	0	120	316	0
14:30 - 14:45	7	0	4	11	19	1	20	40	9	145	6	160	4	112	15	131	342	0
14:45 - 15:00	5	0	2	7	17	0	11	28	8	129	3	140	5	123	13	141	316	0
15:00 - 15:15	5	0	12	17	21	0	9	30	9	154	11	174	7	139	13	159	380	0
15:15 - 15:30	6	0	6	12	18	0	14	32	10	152	2	164	8	121	9	138	346	0
15:30 - 15:45	3	0	8	11	14	1	16	31	5	137	2	144	6	113	4	123	309	0
15:45 - 16:00	3	1	10	14	11	0	5	16	3	145	11	159	3	107	15	125	314	3
16:00 - 16:15	8	0	10	18	10	0	9	19	7	203	4	214	8	125	9	142	393	0
16:15 - 16:30	2	0	4	6	8	0	11	19	7	252	9	268	9	140	2	151	444	0
16:30 - 16:45	2	0	16	18	7	1	8	16	5	274	8	287	14	148	6	168	489	0
16:45 - 17:00	0	0	6	6	5	1	8	14	6	325	4	335	12	138	7	157	512	0
17:00 - 17:15	3	0	15	18	5	0	12	17	4	319	7	330	9	181	9	199	564	0
17:15 - 17:30	1	0	13	14	1	0	9	10	5	289	2	296	5	150	9	164	484	0
17:30 - 17:45	3	0	10	13	2	0	9	11	1	348	7	356	1	164	7	172	552	1
17:45 - 18:00	5	0	9	14	8	0	8	16	9	317	9	335	8	133	9	150	515	0
18:00 - 18:15	2	0	7	9	8	0	11	19	2	249	8	259	5	131	10	146	433	0
18:15 - 18:30	2	0	7	9	7	0	10	17	3	237	10	250	13	98	6	117	393	0
18:30 - 18:45	5	0	6	11	7	0	4	11	2	195	9	206	5	70	9	84	312	0
18:45 - 19:00	2	0	4	6	8	0	6	14	4	154	14	172	6	80	3	89	281	0
TOTAL	127	3	333	463	467	7	405	879	364	7613	219	8196	276	7478	582	8336	17874	23
Trucks	1	0	8	9	0	0	0	0	0	134	1	135	8	134	1	143	287	1.6%
School Buses	0	0	0	0	1	0	0	1	0	24	0	24	0	11	1	12	37	0.2%

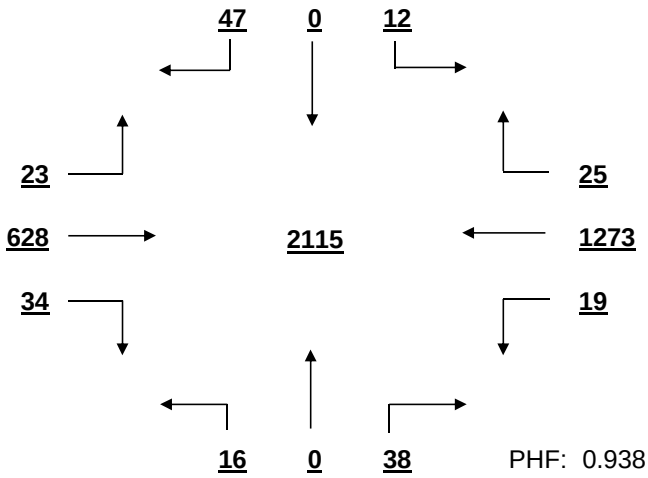
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Bush River Rd AT Rockland Rd Date: 11/29/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

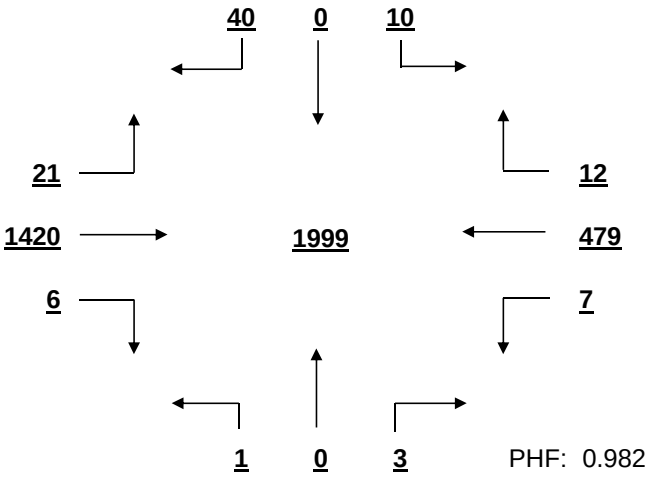


OVERALL PEAK HOUR VOLUME
FROM 17:00 TO 18:00



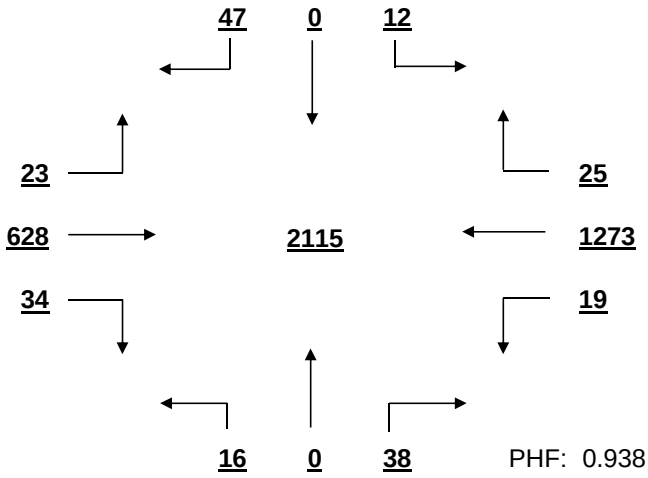
PHF: 0.938

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



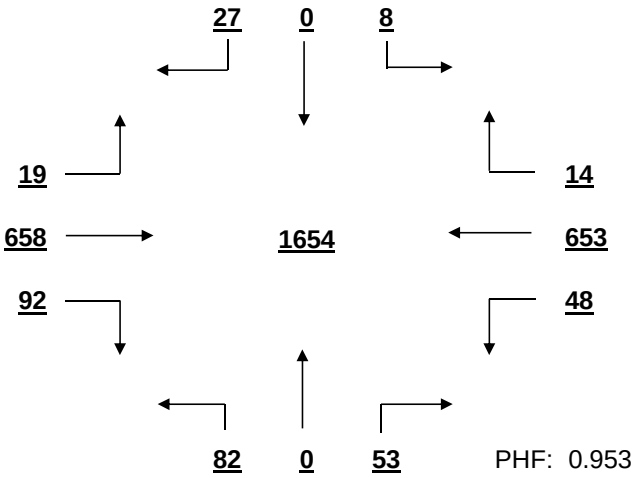
PHF: 0.982

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:00 TO 18:00



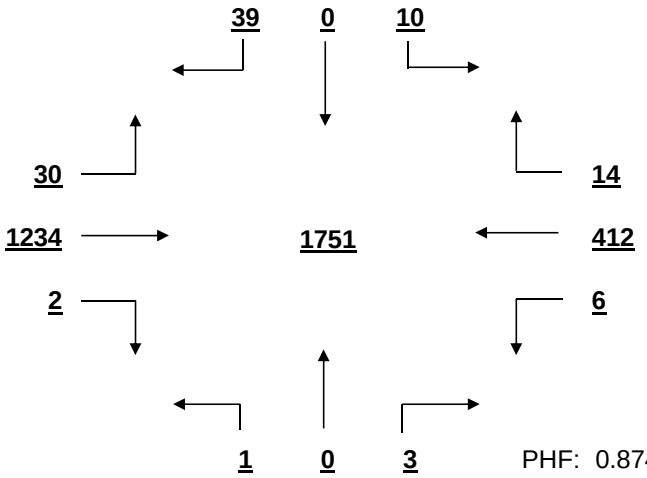
PHF: 0.938

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:00 TO 13:00



PHF: 0.953

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.874

SIGNAL WARRANT ANALYSIS

Bush River Rd AT Rockland Rd Date: 11/29/2016

Minor Street Volume, percent of total = 7.5%
Percent of Left Turns from Minor Street = 44.3%
Percent of Right Turns from Minor Street = 55.0%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is not met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1377.7	/	600 =	230%	73.3	/	150 =	49%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	283%	277%	158%	145%	184%	247%	230%	192%	198%	287%	334%	221%
Minor St.	33%	27%	19%	33%	69%	90%	89%	87%	73%	45%	39%	41%

Condition B - Interruption to Continuous Traffic is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1377.7	/	900 =	153%	73.3	/	75 =	98%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	189%	185%	105%	96%	123%	165%	154%	128%	132%	191%	222%	147%
Minor St.	65%	53%	39%	67%	139%	180%	177%	175%	145%	91%	79%	81%

80% Combination of Conditions A & B is not met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	61%	50%	18%	28%	87%	169%	166%	117%	103%	85%	74%	68%

Warrant No. 3 - Peak Hour is not met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	17:00 - 18:00	Higher Volume Side Street Peak Hour:	13:45 - 14:45
Minor St.	59%	Minor St.	67%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	3	1	5	0	0	0	3	1	3	0	1	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008

Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/30/2016

Major Rt: Bush River Rd * Not on State System Minor Rt: Independence Ave-Fuddruckers Clear

Day of Week: Wednesday Weather: Rain Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: N-S Intersection ADT - 21420 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1

* Each Direction

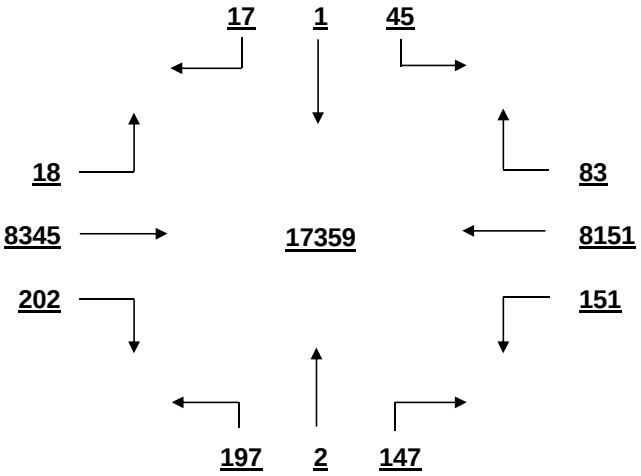
INTERSECTION VOLUME SUMMARY

	From N Independence Ave-F				From S Independence Ave-F				From E Bush River Rd				From W Bush River Rd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	0	0	1	1	5	0	1	6	4	58	0	62	0	213	8	221	290	1
7:15 - 7:30	0	0	0	0	2	0	3	5	1	99	0	100	0	299	0	299	404	0
7:30 - 7:45	2	0	0	2	1	0	0	1	1	161	2	164	0	345	10	355	522	1
7:45 - 8:00	0	0	0	0	4	0	5	9	2	146	0	148	0	354	9	363	520	0
8:00 - 8:15	1	0	0	1	1	0	6	7	3	135	1	139	0	359	4	363	510	1
8:15 - 8:30	0	0	0	0	5	0	4	9	1	142	0	143	0	337	0	337	489	0
8:30 - 8:45	0	0	0	0	2	0	2	4	2	130	0	132	0	287	2	289	425	3
8:45 - 9:00	0	0	0	0	4	0	1	5	3	106	1	110	0	196	3	199	314	1
9:00 - 9:15	0	0	0	0	5	0	2	7	4	90	2	96	1	174	2	177	280	0
9:15 - 9:30	1	0	0	1	2	0	3	5	6	100	0	106	0	130	5	135	247	0
9:30 - 9:45	0	0	0	0	0	0	3	3	2	97	0	99	0	124	7	131	233	1
9:45 - 10:00	0	0	0	0	4	0	4	8	0	80	0	80	0	131	3	134	222	3
10:00 - 10:15	0	0	0	0	0	0	0	0	3	87	1	91	0	98	4	102	193	0
10:15 - 10:30	1	0	1	2	2	0	1	3	2	112	1	115	0	119	0	119	239	1
10:30 - 10:45	0	0	0	0	1	0	1	2	1	97	1	99	0	108	1	109	210	1
10:45 - 11:00	0	0	0	0	4	0	1	5	2	104	3	109	0	119	4	123	237	1
11:00 - 11:15	0	0	0	0	4	0	2	6	3	143	0	146	1	117	5	123	275	1
11:15 - 11:30	1	0	0	1	5	0	6	11	2	133	4	139	0	131	0	131	282	1
11:30 - 11:45	1	0	0	1	6	0	2	8	3	155	4	162	0	128	4	132	303	0
11:45 - 12:00	0	0	0	0	6	0	2	8	1	123	1	125	0	147	3	150	283	1
12:00 - 12:15	2	0	1	3	5	0	2	7	4	158	5	167	1	210	6	217	394	0
12:15 - 12:30	4	0	1	5	2	0	5	7	5	189	5	199	2	189	7	198	409	0
12:30 - 12:45	1	0	0	1	5	0	2	7	2	170	3	175	0	170	8	178	361	0
12:45 - 13:00	4	0	1	5	7	0	3	10	2	181	3	186	2	188	4	194	395	1
13:00 - 13:15	1	0	0	1	3	0	3	6	1	164	7	172	3	202	2	207	386	1
13:15 - 13:30	1	0	1	2	3	0	6	9	5	175	3	183	0	170	5	175	369	4
13:30 - 13:45	2	0	1	3	1	0	2	3	3	155	2	160	1	171	4	176	342	2
13:45 - 14:00	3	0	3	6	1	0	1	2	11	174	4	189	0	174	6	180	377	1
14:00 - 14:15	0	0	1	1	3	0	1	4	1	158	3	162	0	128	7	135	302	0
14:15 - 14:30	0	0	2	2	1	0	6	7	2	181	0	183	1	125	0	126	318	3
14:30 - 14:45	1	0	0	1	4	0	2	6	1	152	1	154	0	152	5	157	318	0
14:45 - 15:00	1	0	0	1	5	0	2	7	2	154	1	157	0	138	6	144	309	0
15:00 - 15:15	0	0	0	0	4	0	2	6	0	148	1	149	0	121	3	124	279	0
15:15 - 15:30	1	0	0	1	4	0	1	5	3	157	1	161	0	149	5	154	321	0
15:30 - 15:45	0	0	0	0	9	0	2	11	2	161	1	164	0	139	8	147	322	1
15:45 - 16:00	1	0	0	1	2	0	3	5	5	164	3	172	0	128	5	133	311	0
16:00 - 16:15	1	0	0	1	13	0	7	20	2	197	0	199	0	146	5	151	371	1
16:15 - 16:30	0	0	1	1	6	0	3	9	4	238	3	245	2	137	9	148	403	0
16:30 - 16:45	2	0	0	2	4	0	7	11	10	267	0	277	0	171	7	178	468	1
16:45 - 17:00	2	0	0	2	5	0	7	12	7	294	2	303	1	165	2	168	485	1
17:00 - 17:15	3	0	0	3	12	1	9	22	8	321	4	333	0	214	2	216	574	1
17:15 - 17:30	0	1	0	1	5	0	6	11	2	326	0	328	0	201	2	203	543	5
17:30 - 17:45	0	0	3	3	11	0	6	17	8	333	2	343	2	166	1	169	532	0
17:45 - 18:00	1	0	0	1	9	0	3	12	5	309	2	316	0	157	7	164	493	2
18:00 - 18:15	2	0	0	2	4	1	3	8	3	285	3	291	1	149	6	156	457	6
18:15 - 18:30	0	0	0	0	3	0	3	6	3	256	2	261	0	138	1	139	406	0
18:30 - 18:45	4	0	0	4	3	0	1	4	3	203	0	206	0	117	4	121	335	0
18:45 - 19:00	1	0	0	1	0	0	0	0	1	183	1	185	0	114	1	115	301	0
TOTAL	45	1	17	63	197	2	147	346	151	8151	83	8385	18	8345	202	8565	17359	47
Trucks	0	0	0	0	19	0	28	47	54	72	0	126	0	56	51	107	280	1.6%
School Buses	0	0	0	0	0	0	0	0	2	24	0	26	0	11	0	11	37	0.2%

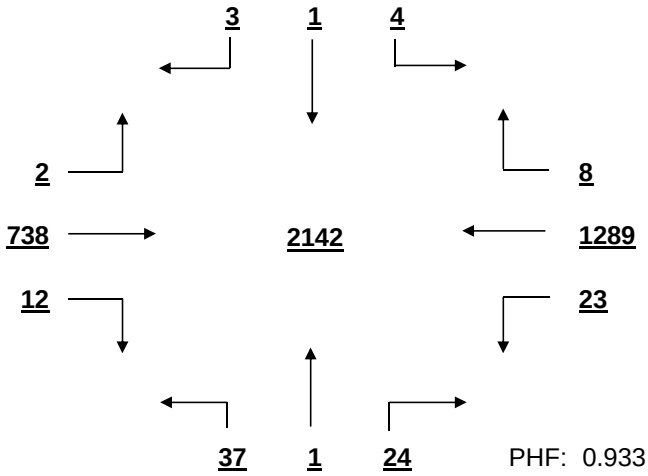
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Bush River Rd AT Independence Ave-Fuddruckers Date: 11/30/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

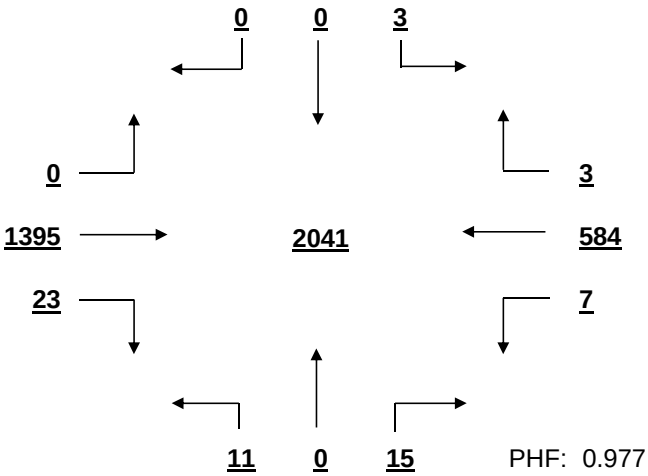


OVERALL PEAK HOUR VOLUME
FROM 17:00 TO 18:00



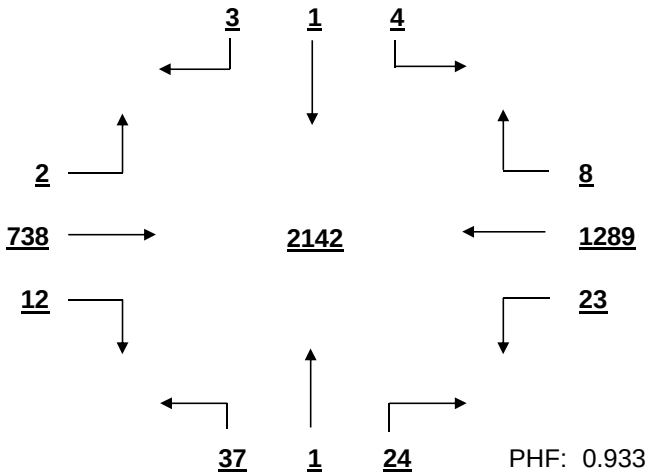
PHF: 0.933

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



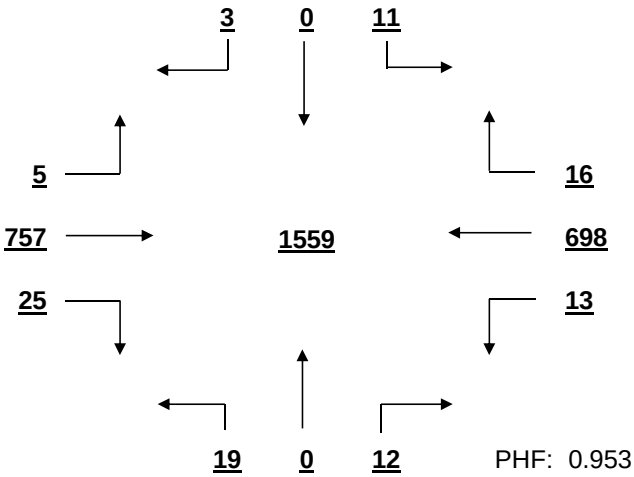
PHF: 0.977

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:00 TO 18:00



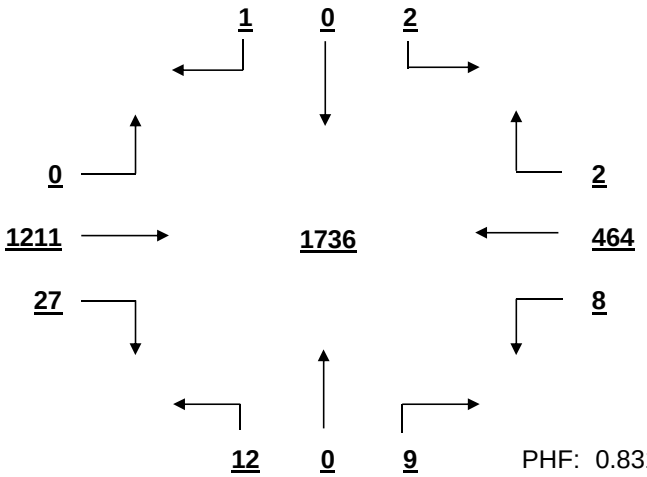
PHF: 0.933

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:00 TO 13:00



PHF: 0.953

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.831

SIGNAL WARRANT ANALYSIS

Bush River Rd AT Independence Ave-Fuddruckers Date: 11/30/2016

Minor Street Volume, percent of total = 2.4%
Percent of Left Turns from Minor Street = 59.2%
Percent of Right Turns from Minor Street = 40.1%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is not met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1412.5	/	600	= 235%	28.8	/	150	= 19%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	285%	285%	160%	145%	185%	252%	240%	203%	201%	278%	345%	246%
Minor St.	14%	17%	15%	7%	22%	21%	13%	16%	18%	35%	41%	12%

Condition B - Interruption to Continuous Traffic is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1412.5	/	900	= 157%	28.8	/	75	= 38%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	190%	190%	106%	96%	123%	168%	160%	135%	134%	185%	230%	164%
Minor St.	28%	33%	31%	13%	44%	41%	27%	32%	36%	69%	83%	24%

80% Combination of Conditions A & B is not met

Warrant No. 2 - Four Hour Vehicular Volume is not met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	26%	31%	15%	6%	28%	39%	25%	24%	26%	65%	78%	23%

Warrant No. 3 - Peak Hour is not met

Percent of warrant			Percent of warrant	
Overall Peak Hour:	17:00 - 18:00	Higher Volume Side Street Peak Hour:	16:45 - 17:45	
Minor St.	62%	Minor St.	62%	

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street	Minimum peak hour ped. volume crossing major street
107	133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	2	5	4	3	3	1	8	3	1	3	4	6

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/29/2016

Major Rt: Bush River Rd * Not on State System Minor Rt: Zimalcrest-Walmart Clear

Day of Week: Tuesday Weather: Rain Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: N-S Intersection ADT - 23410 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1

* Each Direction

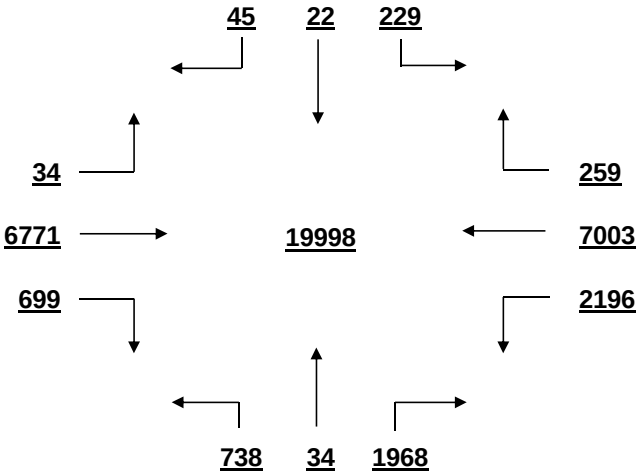
INTERSECTION VOLUME SUMMARY

	From N Zimalcrest-Walmart				From S Zimalcrest-Walmart				From E Bush River Rd				From W Bush River Rd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	3	0	0	3	2	1	31	34	26	69	4	99	0	181	10	191	327	0
7:15 - 7:30	11	1	0	12	6	0	23	29	18	88	3	109	1	293	0	294	444	2
7:30 - 7:45	6	0	1	7	8	0	26	34	38	112	2	152	1	329	8	338	531	0
7:45 - 8:00	12	1	0	13	9	0	40	49	30	113	7	150	1	290	18	309	521	2
8:00 - 8:15	5	1	0	6	6	1	28	35	25	117	7	149	1	330	15	346	536	1
8:15 - 8:30	4	0	0	4	8	0	31	39	35	105	1	141	1	327	17	345	529	1
8:30 - 8:45	3	0	0	3	7	0	33	40	35	101	3	139	2	262	10	274	456	1
8:45 - 9:00	3	1	1	5	9	0	29	38	26	84	5	115	0	141	8	149	307	1
9:00 - 9:15	1	0	0	1	6	0	25	31	38	110	4	152	1	140	9	150	334	2
9:15 - 9:30	6	0	1	7	6	0	29	35	33	88	6	127	0	100	9	109	278	1
9:30 - 9:45	3	0	0	3	6	0	30	36	24	83	0	107	0	95	12	107	253	0
9:45 - 10:00	5	1	3	9	7	0	32	39	33	79	5	117	0	84	9	93	258	1
10:00 - 10:15	6	1	0	7	0	3	0	3	42	76	2	120	1	97	13	111	241	0
10:15 - 10:30	6	0	0	6	9	1	33	43	44	76	5	125	0	84	11	95	269	4
10:30 - 10:45	3	0	0	3	13	1	37	51	48	84	4	136	0	91	16	107	297	3
10:45 - 11:00	3	0	1	4	8	0	37	45	45	99	8	152	0	84	11	95	296	1
11:00 - 11:15	5	0	2	7	11	1	37	49	35	99	1	135	0	93	16	109	300	0
11:15 - 11:30	7	1	0	8	11	1	49	61	44	92	4	140	0	106	20	126	335	1
11:30 - 11:45	3	0	0	3	20	0	34	54	42	129	4	175	0	129	12	141	373	2
11:45 - 12:00	5	0	0	5	14	0	47	61	71	128	5	204	1	128	19	148	418	0
12:00 - 12:15	3	0	1	4	14	0	43	57	63	149	7	219	0	154	24	178	458	0
12:15 - 12:30	5	1	2	8	34	0	58	92	75	137	11	223	1	143	26	170	493	0
12:30 - 12:45	4	1	4	9	17	2	57	76	57	163	5	225	0	149	14	163	473	3
12:45 - 13:00	2	1	3	6	20	1	64	85	55	135	4	194	0	128	27	155	440	0
13:00 - 13:15	5	0	0	5	20	0	54	74	66	173	4	243	0	165	16	181	503	0
13:15 - 13:30	6	0	0	6	35	0	55	90	60	128	4	192	0	136	18	154	442	0
13:30 - 13:45	3	1	0	4	15	1	52	68	71	163	5	239	1	131	12	144	455	1
13:45 - 14:00	5	1	2	8	22	1	58	81	33	141	3	177	2	124	15	141	407	1
14:00 - 14:15	4	1	1	6	8	0	42	50	56	126	5	187	2	114	22	138	381	0
14:15 - 14:30	7	1	0	8	18	0	44	62	37	131	9	177	2	96	0	98	345	1
14:30 - 14:45	6	0	1	7	18	0	38	56	53	139	10	202	0	124	10	134	399	1
14:45 - 15:00	3	0	0	3	19	0	52	71	38	103	6	147	2	108	14	124	345	4
15:00 - 15:15	7	2	2	11	20	0	43	63	51	136	9	196	2	124	18	144	414	1
15:15 - 15:30	6	0	0	6	16	0	40	56	45	143	9	197	0	118	23	141	400	0
15:30 - 15:45	5	0	1	6	19	2	39	60	57	117	5	179	1	117	18	136	381	0
15:45 - 16:00	4	0	1	5	16	1	41	58	39	131	7	177	0	92	15	107	347	2
16:00 - 16:15	3	0	0	3	16	2	49	67	48	178	10	236	0	109	13	122	428	0
16:15 - 16:30	6	0	0	6	21	1	48	70	55	209	6	270	0	120	16	136	482	0
16:30 - 16:45	8	1	5	14	19	0	51	70	55	230	3	288	1	143	19	163	535	1
16:45 - 17:00	4	0	3	7	34	1	41	76	48	275	5	328	0	103	16	119	530	0
17:00 - 17:15	4	0	1	5	23	0	45	68	44	275	2	321	1	170	18	189	583	0
17:15 - 17:30	5	0	1	6	18	1	46	65	48	317	8	373	1	130	21	152	596	0
17:30 - 17:45	5	1	0	6	27	0	44	71	68	313	6	387	1	137	20	158	622	3
17:45 - 18:00	3	1	1	5	20	4	56	80	46	261	13	320	0	117	18	135	540	0
18:00 - 18:15	5	1	1	7	24	2	53	79	38	243	5	286	3	106	12	121	493	0
18:15 - 18:30	7	0	2	9	24	1	50	75	45	231	9	285	3	96	12	111	480	1
18:30 - 18:45	2	1	2	5	17	3	35	55	61	192	6	259	1	59	10	70	389	0
18:45 - 19:00	2	1	2	5	18	2	39	59	52	132	3	187	0	74	9	83	334	1
TOTAL	229	22	45	296	738	34	1968	2740	2196	7003	259	9458	34	6771	699	7504	19998	43
Trucks	2	0	3	5	9	0	30	39	18	138	7	163	2	109	7	118	325	1.6%
School Buses	0	0	0	0	0	0	0	0	0	16	0	16	0	4	0	4	20	0.1%

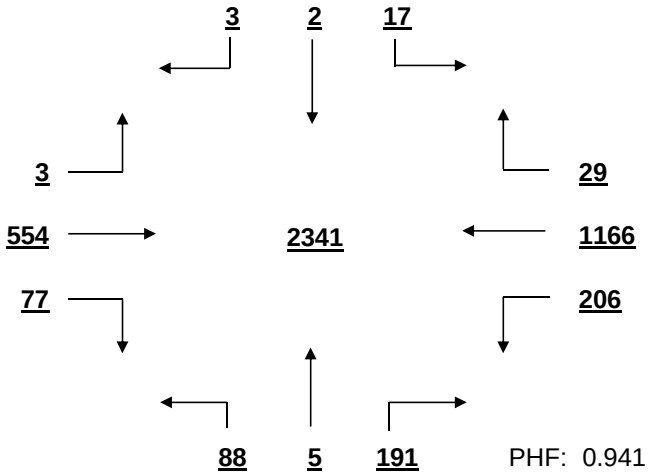
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Bush River Rd AT Zimalcrest-Walmart Date: 11/29/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

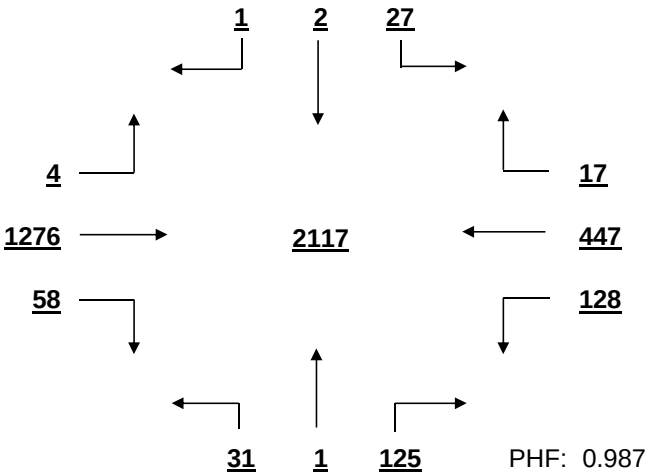


OVERALL PEAK HOUR VOLUME
FROM 17:00 TO 18:00



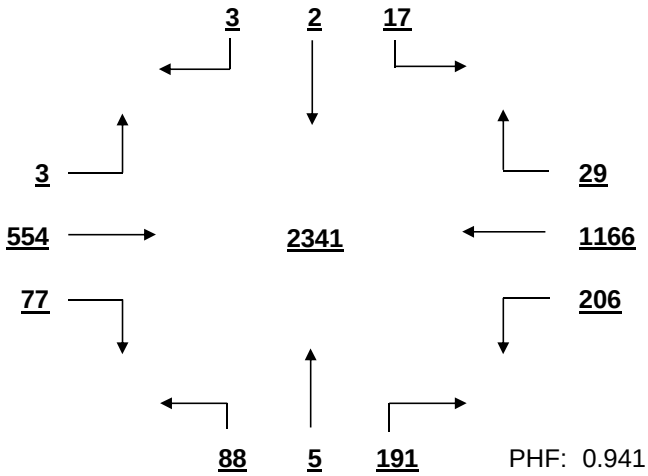
PHF: 0.941

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



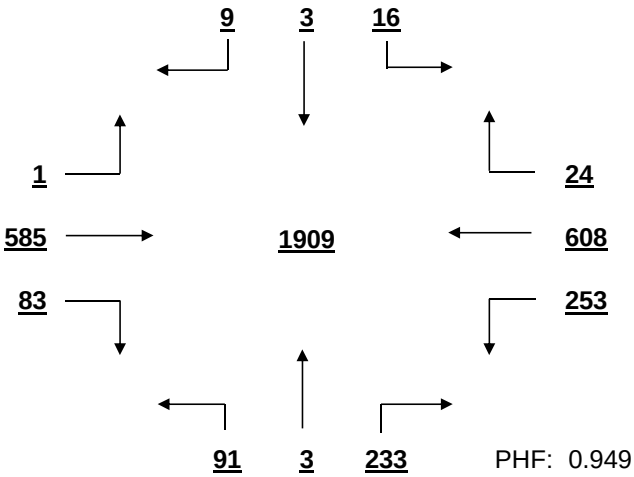
PHF: 0.987

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:00 TO 18:00



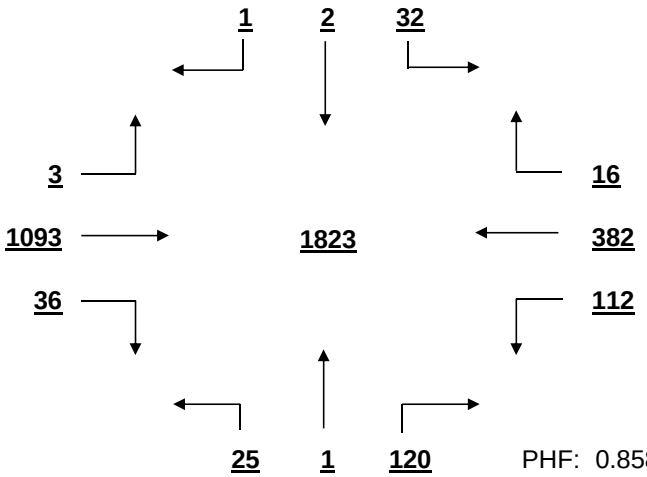
PHF: 0.941

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:15 TO 13:15



PHF: 0.949

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.858

SIGNAL WARRANT ANALYSIS

Bush River Rd AT Zimalcrest-Walmart Date: 11/29/2016

Minor Street Volume, percent of total = 15.2%
Percent of Left Turns from Minor Street = 31.9%
Percent of Right Turns from Minor Street = 66.3%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1413.5	/	600	= 236%	228.3	/	150	= 152%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	274%	276%	160%	157%	196%	255%	245%	201%	213%	277%	339%	234%
Minor St.	97%	101%	94%	95%	150%	207%	209%	159%	158%	189%	189%	179%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1413.5	/	900	= 157%	228.3	/	75	= 304%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	182%	184%	107%	105%	131%	170%	163%	134%	142%	185%	226%	156%
Minor St.	195%	203%	188%	189%	300%	413%	417%	319%	316%	377%	379%	357%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	183%	190%	92%	89%	210%	388%	391%	233%	252%	354%	355%	335%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	17:00 - 18:00	Higher Volume Side Street Peak Hour:	12:15 - 13:15
Minor St.	284%	Minor St.	256%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street	Minimum peak hour ped. volume crossing major street
107	133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	2	4	2	4	1	3	1	5	2	0	2	2

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 12/1/2016

Major Rt: Morning Hill Dr * Not on State System Minor Rt: Burnette Dr Clear

Day of Week: Thursday Weather: Clear Office: Short Counts JMS

Type of Control: Stop Sign Speed Limit (major st) 35

Direction of Minor Street: E-W Intersection ADT - 10850 (Calc)

Number of Lanes (major st)* 1 Number of Lanes (minor st)* 1 * Each Direction

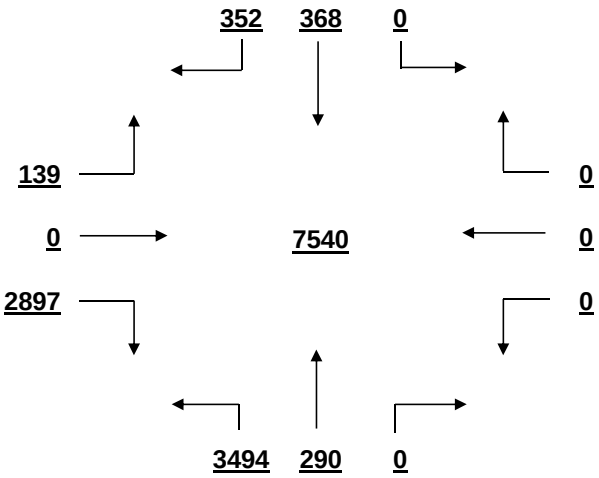
INTERSECTION VOLUME SUMMARY

	From N Morning Hill Dr				From S Morning Hill Dr				From E Burnette Dr				From W Burnette Dr				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	0	7	3	10	46	3	0	49	0	0	0	0	0	0	46	46	105	1
7:15 - 7:30	0	11	6	17	53	2	0	55	0	0	0	0	4	0	0	4	76	0
7:30 - 7:45	0	14	5	19	55	5	0	60	0	0	0	0	6	0	123	129	208	0
7:45 - 8:00	0	17	4	21	84	5	0	89	0	0	0	0	2	0	124	126	236	0
8:00 - 8:15	0	17	4	21	88	4	0	92	0	0	0	0	1	0	107	108	221	0
8:15 - 8:30	0	11	0	11	85	7	0	92	0	0	0	0	3	0	115	118	221	1
8:30 - 8:45	0	5	6	11	65	2	0	67	0	0	0	0	4	0	98	102	180	0
8:45 - 9:00	0	8	9	17	52	3	0	55	0	0	0	0	2	0	66	68	140	0
9:00 - 9:15	0	4	4	8	44	1	0	45	0	0	0	0	1	0	47	48	101	0
9:15 - 9:30	0	6	3	9	41	4	0	45	0	0	0	0	2	0	33	35	89	0
9:30 - 9:45	0	7	4	11	50	4	0	54	0	0	0	0	0	0	40	40	105	0
9:45 - 10:00	0	3	2	5	42	5	0	47	0	0	0	0	0	0	43	43	95	0
10:00 - 10:15	0	8	1	9	0	4	0	4	0	0	0	0	5	0	28	33	46	0
10:15 - 10:30	0	9	3	12	38	5	0	43	0	0	0	0	2	0	43	45	100	0
10:30 - 10:45	0	6	4	10	37	7	0	44	0	0	0	0	2	0	34	36	90	0
10:45 - 11:00	0	1	5	6	34	2	0	36	0	0	0	0	3	0	44	47	89	0
11:00 - 11:15	0	7	2	9	35	6	0	41	0	0	0	0	3	0	39	42	92	0
11:15 - 11:30	0	3	0	3	47	4	0	51	0	0	0	0	1	0	45	46	100	0
11:30 - 11:45	0	7	2	9	45	5	0	50	0	0	0	0	4	0	57	61	120	1
11:45 - 12:00	0	7	3	10	59	8	0	67	0	0	0	0	4	0	63	67	144	0
12:00 - 12:15	0	5	3	8	67	11	0	78	0	0	0	0	4	0	73	77	163	0
12:15 - 12:30	0	2	2	4	62	8	0	70	0	0	0	0	4	0	71	75	149	0
12:30 - 12:45	0	5	5	10	61	7	0	68	0	0	0	0	6	0	81	87	165	0
12:45 - 13:00	0	8	7	15	73	6	0	79	0	0	0	0	2	0	70	72	166	0
13:00 - 13:15	0	7	9	16	67	7	0	74	0	0	0	0	2	0	56	58	148	0
13:15 - 13:30	0	5	6	11	62	5	0	67	0	0	0	0	3	0	58	61	139	0
13:30 - 13:45	0	5	6	11	61	9	0	70	0	0	0	0	0	0	66	66	147	1
13:45 - 14:00	0	6	3	9	60	6	0	66	0	0	0	0	3	0	47	50	125	1
14:00 - 14:15	0	4	6	10	54	4	0	58	0	0	0	0	4	0	62	66	134	0
14:15 - 14:30	0	6	5	11	76	10	0	86	0	0	0	0	3	0	0	3	100	1
14:30 - 14:45	0	9	5	14	60	7	0	67	0	0	0	0	6	0	46	52	133	1
14:45 - 15:00	0	8	7	15	54	9	0	63	0	0	0	0	3	0	71	74	152	0
15:00 - 15:15	0	5	6	11	63	7	0	70	0	0	0	0	2	0	62	64	145	1
15:15 - 15:30	0	0	0	0	73	9	0	82	0	0	0	0	6	0	58	64	146	1
15:30 - 15:45	0	4	4	8	84	5	0	89	0	0	0	0	4	0	57	61	158	0
15:45 - 16:00	0	6	7	13	87	5	0	92	0	0	0	0	5	0	56	61	166	0
16:00 - 16:15	0	7	7	14	75	9	0	84	0	0	0	0	3	0	77	80	178	0
16:15 - 16:30	0	9	8	17	99	6	0	105	0	0	0	0	4	0	65	69	191	0
16:30 - 16:45	0	13	18	31	137	6	0	143	0	0	0	0	1	0	99	100	274	0
16:45 - 17:00	0	7	13	20	139	6	0	145	0	0	0	0	4	0	70	74	239	1
17:00 - 17:15	0	4	12	16	130	9	0	139	0	0	0	0	0	0	100	100	255	0
17:15 - 17:30	0	27	34	61	144	7	0	151	0	0	0	0	4	0	47	51	263	0
17:30 - 17:45	0	28	36	64	157	9	0	166	0	0	0	0	3	0	83	86	316	0
17:45 - 18:00	0	7	27	34	154	4	0	158	0	0	0	0	2	0	57	59	251	0
18:00 - 18:15	0	11	23	34	123	4	0	127	0	0	0	0	4	0	50	54	215	0
18:15 - 18:30	0	0	10	10	110	6	0	116	0	0	0	0	1	0	45	46	172	1
18:30 - 18:45	0	5	9	14	90	14	0	104	0	0	0	0	4	0	41	45	163	0
18:45 - 19:00	0	7	4	11	72	9	0	81	0	0	0	0	3	0	34	37	129	0
TOTAL	0	368	352	720	3494	290	0	3784	0	0	0	0	139	0	2897	3036	7540	11
Trucks	0	2	1	3	16	1	0	17	0	0	0	0	2	0	14	16	36	0.5%
School Buses	0	3	0	3	14	0	0	14	0	0	0	0	0	0	23	23	40	0.5%

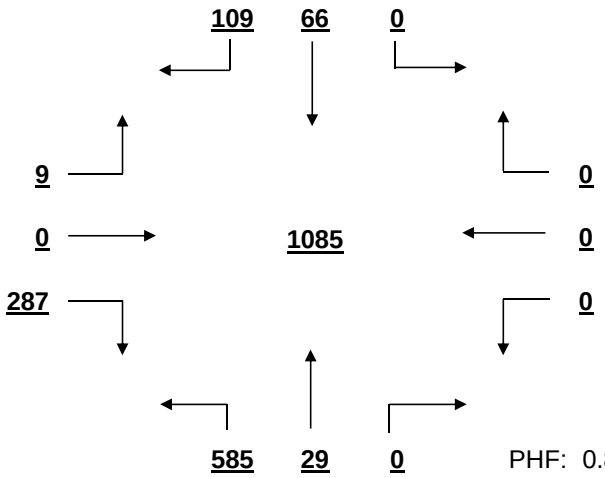
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Morning Hill Dr AT Burnette Dr Date: 12/1/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

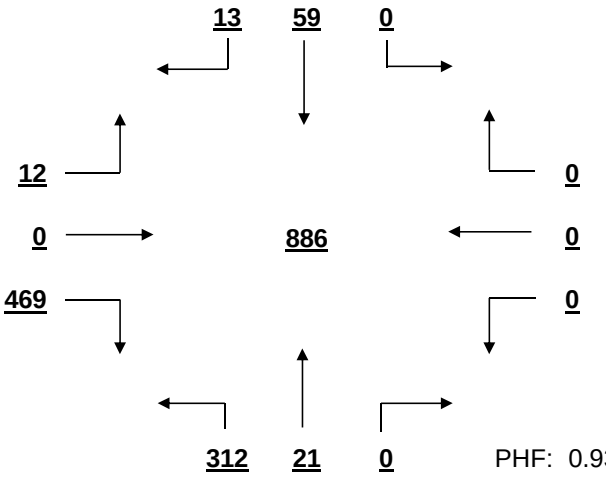


OVERALL PEAK HOUR VOLUME
FROM 17:00 TO 18:00



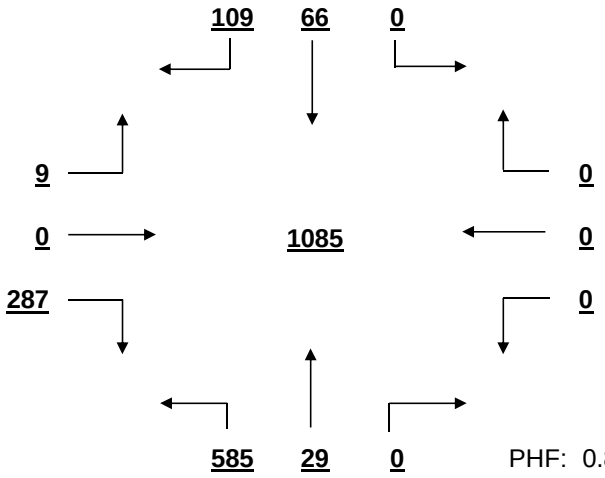
PHF: 0.858

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



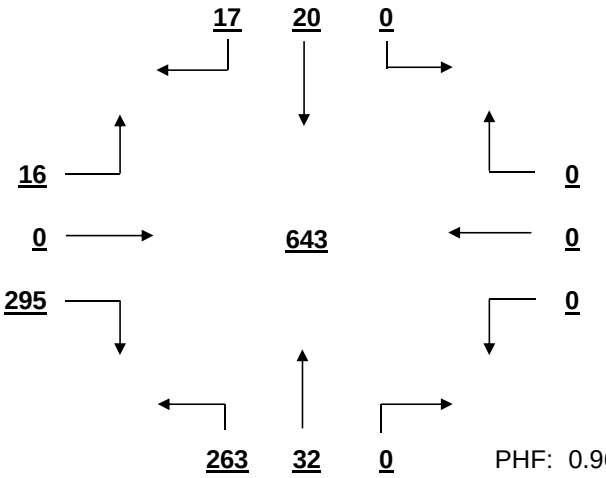
PHF: 0.939

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:00 TO 18:00



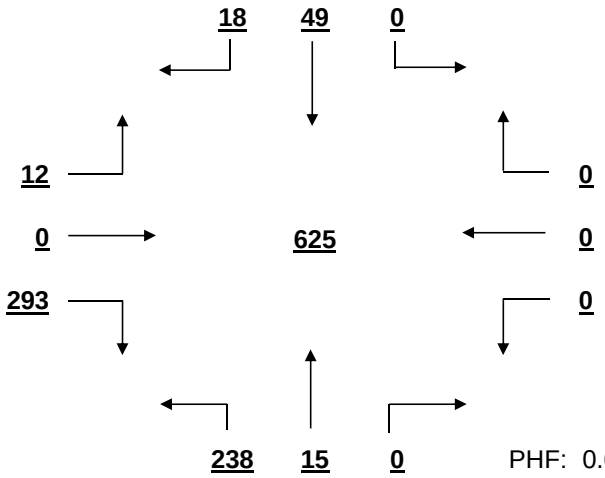
PHF: 0.858

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:00 TO 13:00



PHF: 0.968

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.662

SIGNAL WARRANT ANALYSIS

Morning Hill Dr AT Burnette Dr Date: 12/1/2016

Minor Street Volume, percent of total = 40.3%
Percent of Left Turns from Minor Street = 4.6%
Percent of Right Turns from Minor Street = 95.4%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is not met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
375.3	/ 500	=	75%	253.0	/ 150	=	169%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	64%	73%	45%	33%	48%	66%	65%	65%	73%	112%	158%	99%
Minor St.	203%	264%	111%	107%	144%	207%	157%	130%	167%	215%	197%	121%

Condition B - Interruption to Continuous Traffic is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
375.3	/ 750	=	50%	253.0	/ 75	=	337%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	43%	49%	30%	22%	32%	44%	43%	43%	49%	75%	105%	66%
Minor St.	407%	528%	221%	215%	288%	415%	313%	260%	333%	431%	395%	243%

80% Combination of Conditions A & B is not met

Warrant No. 2 - Four Hour Vehicular Volume is not met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	88%	122%	41%	37%	55%	91%	68%	56%	77%	137%	194%	69%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	17:00 - 18:00	Higher Volume Side Street Peak Hour:	7:30 - 8:30
Minor St.	105%	Minor St.	100%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	1	1	0	0	0	0	1	2	1	0	0	1

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/29/2016

Major Rt: Bush River Rd * Not on State System Minor Rt: Arrowwood Rd Clear

Day of Week: Tuesday Weather: Rain Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: N-S Intersection ADT - 29680 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 2

* Each Direction

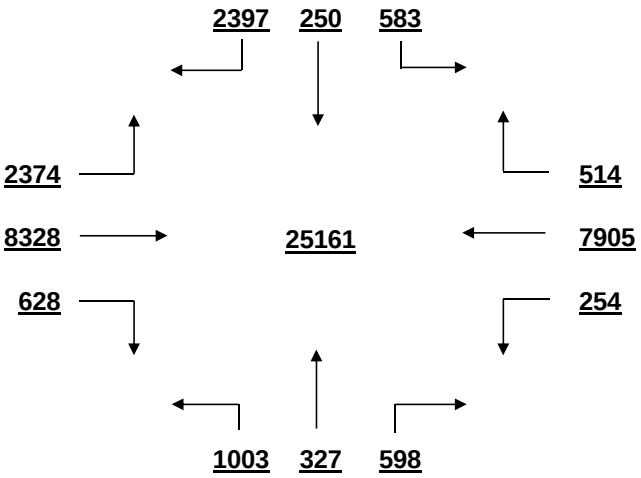
INTERSECTION VOLUME SUMMARY

	From N Arrowwood Rd				From S Arrowwood Rd				From E Bush River Rd				From W Bush River Rd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	6	2	34	42	10	0	26	36	0	73	1	74	26	199	22	247	399	0
7:15 - 7:30	7	8	36	51	32	1	49	82	0	92	7	99	43	310	0	353	585	0
7:30 - 7:45	12	5	44	61	37	0	66	103	1	99	12	112	63	340	31	434	710	1
7:45 - 8:00	17	2	33	52	20	0	42	62	1	105	12	118	60	0	44	104	336	0
8:00 - 8:15	12	9	34	55	15	0	34	49	1	98	12	111	51	332	36	419	634	0
8:15 - 8:30	9	5	0	14	15	0	38	53	3	125	11	139	70	354	33	457	663	0
8:30 - 8:45	6	6	36	48	10	0	16	26	1	103	10	114	50	270	26	346	534	0
8:45 - 9:00	14	6	42	62	17	0	21	38	3	87	18	108	47	227	18	292	500	0
9:00 - 9:15	10	3	34	47	8	5	1	14	3	85	12	100	37	179	11	227	388	0
9:15 - 9:30	10	5	36	51	9	1	2	12	1	78	10	89	42	129	13	184	336	0
9:30 - 9:45	13	4	32	49	8	3	4	15	0	95	10	105	36	126	11	173	342	0
9:45 - 10:00	11	4	34	49	9	4	4	17	2	84	10	96	41	141	16	198	360	0
10:00 - 10:15	9	3	35	47	0	5	0	5	6	97	7	110	45	138	8	191	353	0
10:15 - 10:30	19	1	33	53	5	6	6	17	3	99	11	113	27	118	10	155	338	0
10:30 - 10:45	11	2	36	49	12	2	1	15	5	133	7	145	51	132	5	188	397	0
10:45 - 11:00	11	3	44	58	11	3	1	15	8	105	9	122	47	131	9	187	382	0
11:00 - 11:15	15	3	40	58	12	7	10	29	5	108	10	123	35	140	12	187	397	0
11:15 - 11:30	15	3	56	74	17	2	11	30	4	111	9	124	40	146	9	195	423	2
11:30 - 11:45	7	4	46	57	17	6	7	30	5	164	16	185	39	172	10	221	493	0
11:45 - 12:00	16	6	55	77	19	13	10	42	9	140	17	166	52	187	19	258	543	1
12:00 - 12:15	22	13	78	113	16	14	15	45	12	208	14	234	64	187	16	267	659	2
12:15 - 12:30	21	14	63	98	28	20	15	63	13	181	16	210	66	0	17	83	454	0
12:30 - 12:45	14	9	54	77	23	9	15	47	8	175	13	196	63	193	14	270	590	2
12:45 - 13:00	18	8	76	102	24	15	13	52	12	187	19	218	63	192	12	267	639	2
13:00 - 13:15	11	7	66	84	12	6	13	31	10	194	19	223	56	175	11	242	580	1
13:15 - 13:30	23	7	71	101	24	7	13	44	12	165	10	187	43	208	16	267	599	1
13:30 - 13:45	16	8	61	85	32	5	13	50	10	166	13	189	47	175	11	233	557	0
13:45 - 14:00	24	14	53	91	23	10	11	44	4	153	16	173	45	173	10	228	536	0
14:00 - 14:15	12	7	57	76	17	3	10	30	2	153	10	165	42	149	10	201	472	0
14:15 - 14:30	21	3	62	86	14	8	6	28	8	153	8	169	41	164	0	205	488	0
14:30 - 14:45	7	5	48	60	21	6	12	39	8	185	8	201	39	151	9	199	499	0
14:45 - 15:00	21	7	57	85	15	4	10	29	6	132	10	148	48	153	10	211	473	0
15:00 - 15:15	6	3	47	56	20	5	5	30	11	187	10	208	38	154	8	200	494	1
15:15 - 15:30	11	0	57	68	15	6	3	24	6	148	11	165	39	173	11	223	480	0
15:30 - 15:45	10	4	59	73	14	5	4	23	1	192	8	201	49	156	9	214	511	1
15:45 - 16:00	11	2	45	58	15	9	5	29	5	156	9	170	59	172	11	242	499	0
16:00 - 16:15	10	3	48	61	27	2	2	31	2	230	12	244	48	186	11	245	581	0
16:15 - 16:30	7	4	59	70	28	7	4	39	13	221	13	247	48	192	8	248	604	1
16:30 - 16:45	10	12	73	95	42	10	14	66	11	275	10	296	74	188	15	277	734	0
16:45 - 17:00	7	6	43	56	40	11	14	65	5	289	10	304	66	161	13	240	665	0
17:00 - 17:15	12	7	82	101	34	21	4	59	3	300	11	314	58	187	11	256	730	0
17:15 - 17:30	12	5	75	92	55	33	3	91	4	326	8	338	57	203	11	271	792	0
17:30 - 17:45	11	5	70	86	52	19	12	83	4	364	13	381	51	174	6	231	781	0
17:45 - 18:00	10	3	57	70	38	9	5	52	7	217	10	234	56	160	6	222	578	0
18:00 - 18:15	8	3	50	61	34	6	4	44	3	269	2	274	49	156	13	218	597	0
18:15 - 18:30	5	0	46	51	20	9	7	36	9	222	8	239	57	143	6	206	532	0
18:30 - 18:45	7	2	52	61	19	5	10	34	1	191	5	197	64	109	4	177	469	0
18:45 - 19:00	6	5	48	59	18	5	7	30	3	185	7	195	42	123	6	171	455	0
TOTAL	583	250	2397	3230	1003	327	598	1928	254	7905	514	8673	2374	8328	628	11330	25161	15
Trucks	8	2	28	38	12	2	9	23	4	86	12	102	15	89	9	113	276	1.1%
School Buses	24	1	1	26	4	1	2	7	0	17	13	30	1	22	0	23	86	0.3%

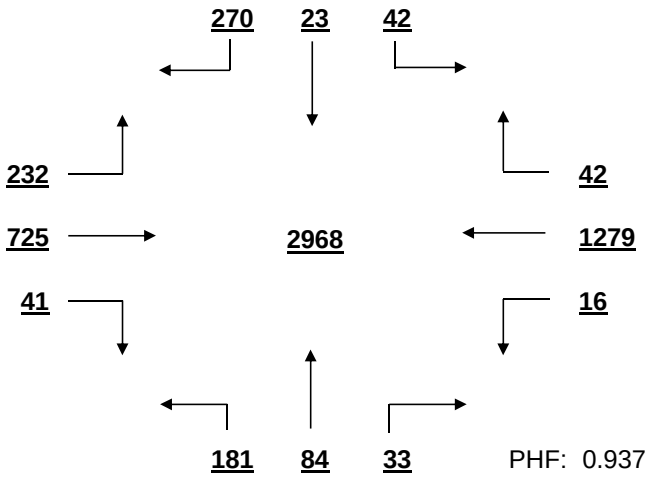
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Bush River Rd AT Arrowwood Rd Date: 11/29/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

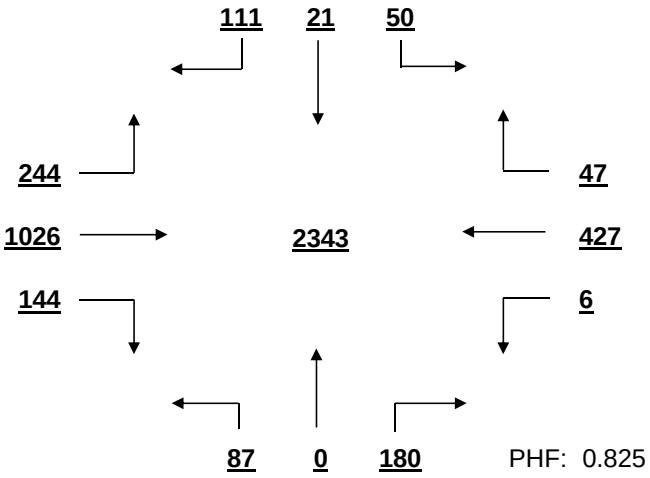


OVERALL PEAK HOUR VOLUME
FROM 16:45 TO 17:45



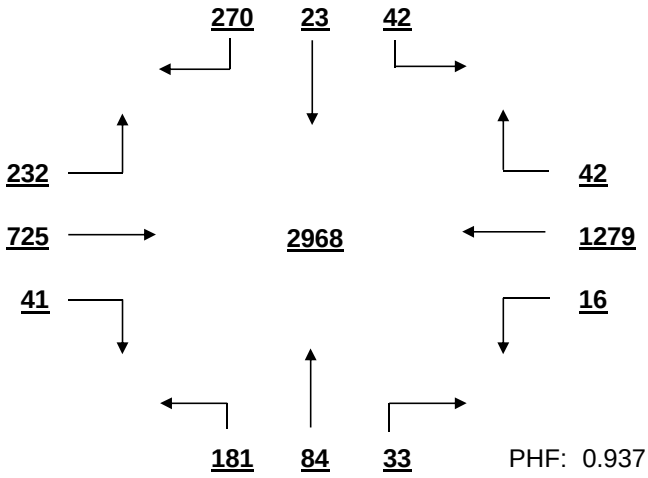
PHF: 0.937

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



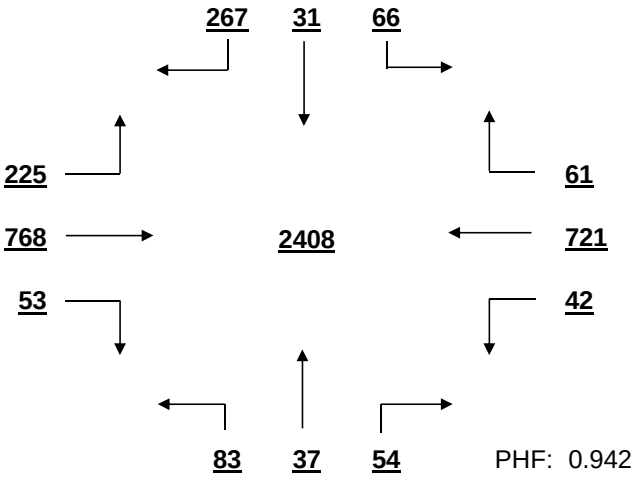
PHF: 0.825

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:45 TO 17:45



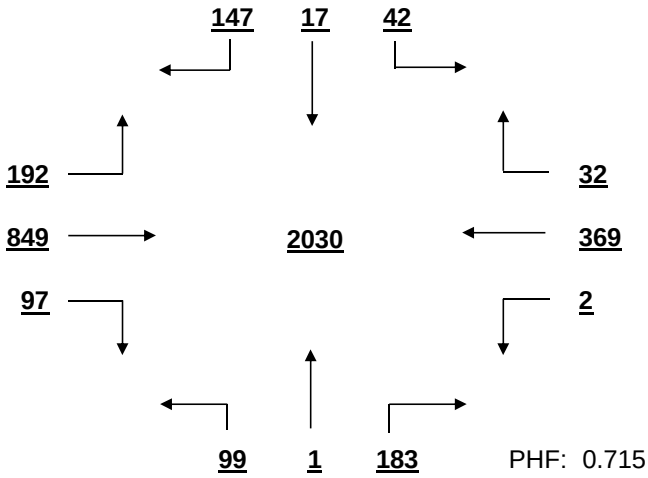
PHF: 0.937

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:30 TO 13:30



PHF: 0.942

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.715

SIGNAL WARRANT ANALYSIS

Bush River Rd AT Arrowwood Rd Date: 11/29/2016

Minor Street Volume, percent of total = 20.5%
Percent of Left Turns from Minor Street = 30.7%
Percent of Right Turns from Minor Street = 58.1%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1666.9	/ 600	=	278%	269.2	/ 200	=	135%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	257%	331%	195%	202%	243%	291%	290%	250%	271%	350%	375%	280%
Minor St.	142%	90%	98%	104%	133%	195%	181%	154%	128%	141%	175%	116%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1666.9	/ 900	=	185%	269.2	/ 100	=	269%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	171%	221%	130%	135%	162%	194%	194%	167%	180%	233%	250%	186%
Minor St.	283%	179%	196%	207%	266%	390%	361%	307%	255%	282%	349%	232%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	246%	156%	139%	158%	231%	339%	314%	267%	222%	245%	303%	202%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	16:45 - 17:45	Higher Volume Side Street Peak Hour:	12:00 - 13:00
Minor St.	223%	Minor St.	260%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	0	0	0	1	0	0	0	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008

Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/29/2016

Major Rt: Bush River Rd * Not on State System Minor Rt: Colonial Life Blvd-Mall Clear

Day of Week: Tuesday Weather: Rain Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: N-S Intersection ADT - 24450 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 2

* Each Direction

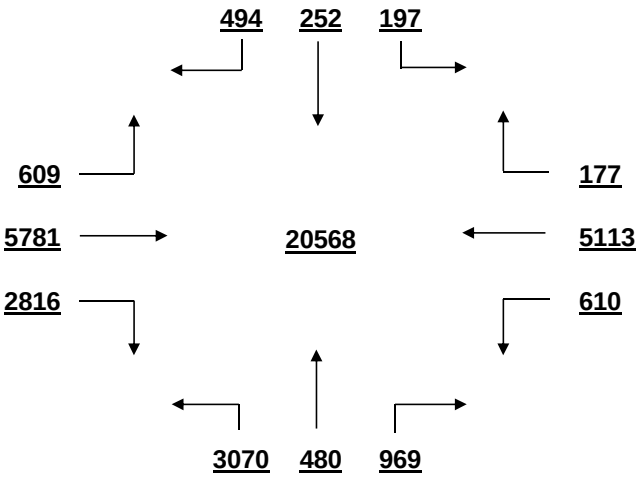
INTERSECTION VOLUME SUMMARY

	From N Colonial Life Blvd				From S Colonial Life Blvd				From E Bush River Rd				From W Bush River Rd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	2	5	1	8	21	2	4	27	16	61	0	77	1	114	86	201	313	0
7:15 - 7:30	1	4	0	5	24	2	8	34	20	79	0	99	3	162	0	165	303	0
7:30 - 7:45	2	7	0	9	24	3	8	35	9	91	1	101	2	174	161	337	482	0
7:45 - 8:00	0	7	5	12	23	5	8	36	16	108	2	126	3	0	184	187	361	0
8:00 - 8:15	1	8	4	13	40	8	10	58	16	78	5	99	3	149	169	321	491	0
8:15 - 8:30	2	3	0	5	35	6	6	47	16	95	3	114	6	191	168	365	531	0
8:30 - 8:45	2	6	1	9	32	5	16	53	19	91	5	115	3	143	123	269	446	0
8:45 - 9:00	0	0	2	2	31	2	14	47	24	76	0	100	10	115	116	241	390	1
9:00 - 9:15	3	1	2	6	35	3	10	48	11	64	2	77	5	98	76	179	310	1
9:15 - 9:30	3	2	3	8	21	3	9	33	8	69	5	82	10	95	37	142	265	0
9:30 - 9:45	3	3	4	10	24	5	10	39	10	80	1	91	6	67	37	110	250	0
9:45 - 10:00	0	3	4	7	28	3	11	42	12	72	0	84	7	103	48	158	291	0
10:00 - 10:15	2	3	6	11	0	3	0	3	2	79	1	82	16	108	33	157	253	0
10:15 - 10:30	3	3	8	14	34	4	19	57	7	84	3	94	11	96	41	148	313	1
10:30 - 10:45	2	6	12	20	43	5	12	60	11	85	0	96	12	80	44	136	312	0
10:45 - 11:00	3	2	8	13	34	7	15	56	10	77	4	91	19	88	44	151	311	0
11:00 - 11:15	6	4	9	19	33	9	18	60	8	87	2	97	18	94	45	157	333	0
11:15 - 11:30	3	4	12	19	39	6	24	69	9	88	3	100	15	116	45	176	364	0
11:30 - 11:45	3	8	6	17	74	13	32	119	15	104	4	123	18	116	50	184	443	0
11:45 - 12:00	4	3	14	21	66	8	27	101	16	100	2	118	23	131	62	216	456	2
12:00 - 12:15	4	3	13	20	92	12	39	143	8	123	1	132	21	151	55	227	522	2
12:15 - 12:30	2	9	10	21	57	10	26	93	27	143	6	176	34	0	57	91	381	0
12:30 - 12:45	7	8	21	36	67	17	26	110	32	111	4	147	17	130	70	217	510	1
12:45 - 13:00	7	10	18	35	71	12	30	113	21	137	5	163	21	133	65	219	530	1
13:00 - 13:15	7	5	15	27	79	12	35	126	21	125	4	150	13	141	51	205	508	0
13:15 - 13:30	3	7	14	24	59	10	37	106	14	125	2	141	23	155	71	249	520	0
13:30 - 13:45	8	4	16	28	54	11	26	91	20	110	5	135	20	124	49	193	447	2
13:45 - 14:00	9	10	36	55	50	8	22	80	22	118	8	148	14	143	51	208	491	1
14:00 - 14:15	10	8	14	32	49	10	19	78	23	97	4	124	9	116	40	165	399	0
14:15 - 14:30	6	10	17	33	38	13	13	64	19	119	2	140	12	131	0	143	380	0
14:30 - 14:45	6	5	16	27	61	6	32	99	9	121	5	135	17	111	34	162	423	0
14:45 - 15:00	5	6	11	22	45	10	19	74	9	106	4	119	12	138	36	186	401	0
15:00 - 15:15	3	5	8	16	57	10	23	90	16	124	4	144	12	123	29	164	414	0
15:15 - 15:30	6	0	11	17	59	9	20	88	8	107	4	119	12	121	51	184	408	0
15:30 - 15:45	3	5	15	23	67	7	22	96	13	98	1	112	8	127	28	163	394	0
15:45 - 16:00	3	7	14	24	80	11	25	116	10	83	0	93	11	143	36	190	423	0
16:00 - 16:15	5	2	15	22	120	10	21	151	6	141	2	149	13	139	47	199	521	0
16:15 - 16:30	9	7	6	22	104	8	23	135	10	129	6	145	18	137	52	207	509	0
16:30 - 16:45	4	8	13	25	154	19	33	206	6	132	5	143	14	143	57	214	588	0
16:45 - 17:00	6	2	9	17	183	29	37	249	8	130	4	142	14	136	31	181	589	0
17:00 - 17:15	9	13	13	35	191	29	36	256	9	108	5	122	14	135	63	212	625	0
17:15 - 17:30	5	12	15	32	168	31	28	227	7	127	7	141	17	150	53	220	620	0
17:30 - 17:45	5	11	11	27	123	28	18	169	7	170	11	188	20	142	65	227	611	0
17:45 - 18:00	8	7	13	28	79	17	17	113	9	156	10	175	8	122	45	175	491	0
18:00 - 18:15	7	2	13	22	82	14	32	128	11	160	8	179	13	130	32	175	504	0
18:15 - 18:30	3	0	7	10	64	7	19	90	2	157	5	164	13	128	25	166	430	0
18:30 - 18:45	2	2	13	17	69	4	14	87	5	101	6	112	6	99	24	129	345	0
18:45 - 19:00	0	2	16	18	87	14	16	117	3	87	6	96	12	93	30	135	366	0
TOTAL	197	252	494	943	3070	480	969	4519	610	5113	177	5900	609	5781	2816	9206	20568	12
Trucks	1	2	9	12	20	2	5	27	3	65	0	68	7	51	34	92	199	1.0%
School Buses	0	0	0	0	1	0	1	2	1	34	0	35	0	44	1	45	82	0.4%

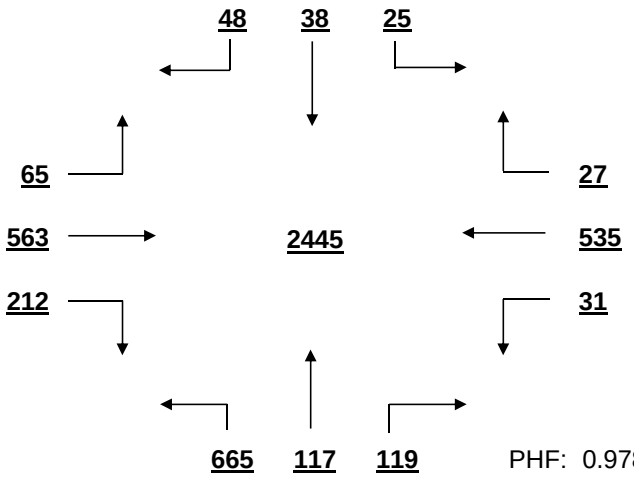
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Bush River Rd AT Colonial Life Blvd-Mall Date: 11/29/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

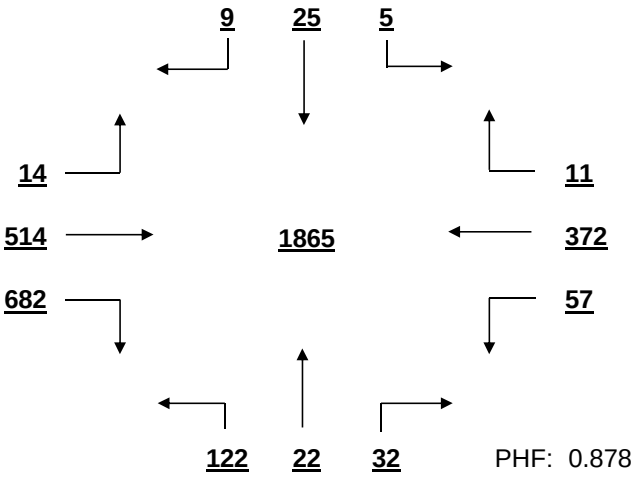


OVERALL PEAK HOUR VOLUME
FROM 16:45 TO 17:45



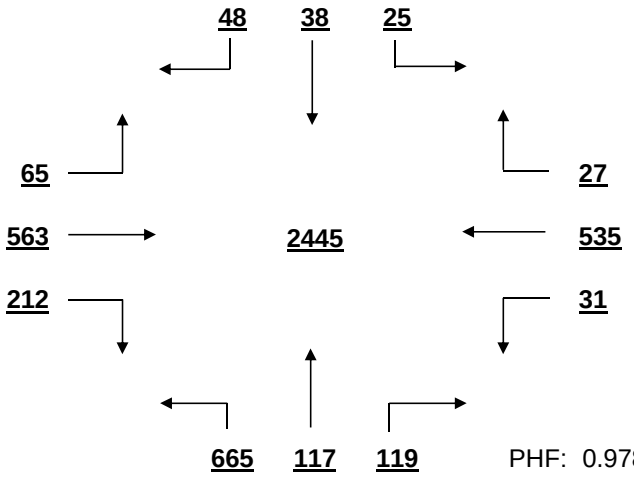
PHF: 0.978

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



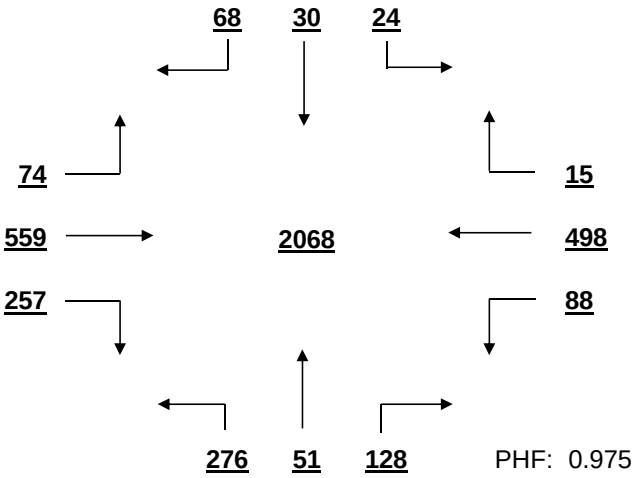
PHF: 0.878

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:45 TO 17:45



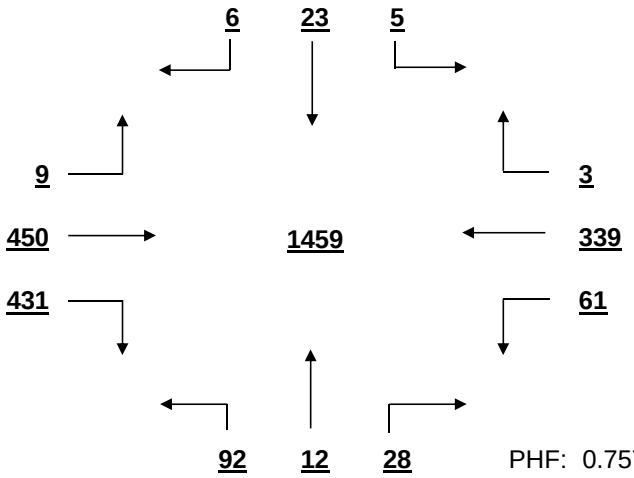
PHF: 0.978

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:30 TO 13:30



PHF: 0.975

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.757

SIGNAL WARRANT ANALYSIS

Bush River Rd AT Colonial Life Blvd-Mall Date: 11/29/2016

Minor Street Volume, percent of total = 26.6%
Percent of Left Turns from Minor Street = 59.8%
Percent of Right Turns from Minor Street = 26.8%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1258.8	/	600 =	210%	376.6	/	200 =	188%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	216%	271%	154%	159%	195%	229%	238%	196%	195%	230%	243%	193%
Minor St.	66%	103%	81%	88%	175%	230%	202%	158%	195%	371%	383%	211%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1258.8	/	900 =	140%	376.6	/	100 =	377%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	144%	180%	103%	106%	130%	152%	159%	130%	130%	153%	162%	128%
Minor St.	132%	205%	162%	176%	349%	459%	403%	315%	390%	741%	765%	422%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	116%	178%	72%	83%	248%	399%	350%	225%	276%	644%	665%	291%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	16:45 - 17:45	Higher Volume Side Street Peak Hour:	16:30 - 17:30
Minor St.	435%	Minor St.	416%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	0	1	0	2	1	0	0	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008

Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/29/2016

Major Rt: Broad River Rd * Not on State System Minor Rt: Bush River Rd Clear

Day of Week: Tuesday Weather: Rain Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: E-W Intersection ADT - 28070 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 2

* Each Direction

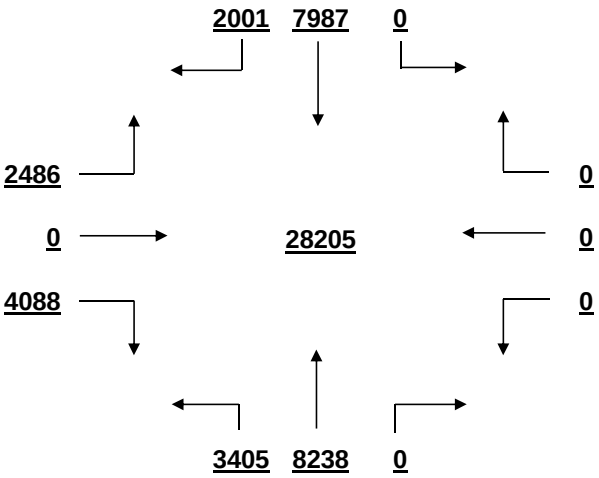
INTERSECTION VOLUME SUMMARY

	From N Broad River Rd				From S Broad River Rd				From E Bush River Rd				From W Bush River Rd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	0	185	54	239	42	106	0	148	0	0	0	0	30	0	79	109	496	0
7:15 - 7:30	0	256	72	328	48	118	0	166	0	0	0	0	41	0	0	41	535	1
7:30 - 7:45	0	298	68	366	49	142	0	191	0	0	0	0	46	0	131	177	734	0
7:45 - 8:00	0	256	61	317	69	161	0	230	0	0	0	0	50	0	121	171	718	0
8:00 - 8:15	0	285	59	344	59	140	0	199	0	0	0	0	30	0	96	126	669	0
8:15 - 8:30	0	262	0	262	68	154	0	222	0	0	0	0	40	0	121	161	645	0
8:30 - 8:45	0	263	64	327	59	138	0	197	0	0	0	0	36	0	88	124	648	1
8:45 - 9:00	0	237	54	291	47	123	0	170	0	0	0	0	46	0	60	106	567	0
9:00 - 9:15	0	175	35	210	50	113	0	163	0	0	0	0	33	0	72	105	478	0
9:15 - 9:30	0	168	23	191	51	118	0	169	0	0	0	0	30	0	58	88	448	1
9:30 - 9:45	0	172	40	212	51	126	0	177	0	0	0	0	37	0	64	101	490	0
9:45 - 10:00	0	138	43	181	47	137	0	184	0	0	0	0	32	0	55	87	452	2
10:00 - 10:15	0	174	25	199	0	121	0	121	0	0	0	0	39	0	70	109	429	0
10:15 - 10:30	0	140	31	171	56	140	0	196	0	0	0	0	29	0	56	85	452	0
10:30 - 10:45	0	155	37	192	59	138	0	197	0	0	0	0	30	0	62	92	481	0
10:45 - 11:00	0	143	22	165	55	138	0	193	0	0	0	0	52	0	55	107	465	0
11:00 - 11:15	0	141	33	174	63	138	0	201	0	0	0	0	40	0	68	108	483	0
11:15 - 11:30	0	141	42	183	82	133	0	215	0	0	0	0	53	0	74	127	525	0
11:30 - 11:45	0	130	43	173	81	140	0	221	0	0	0	0	48	0	79	127	521	1
11:45 - 12:00	0	167	53	220	70	159	0	229	0	0	0	0	50	0	80	130	579	0
12:00 - 12:15	0	144	52	196	71	159	0	230	0	0	0	0	74	0	94	168	594	0
12:15 - 12:30	0	197	71	268	85	184	0	269	0	0	0	0	44	0	101	145	682	0
12:30 - 12:45	0	180	49	229	88	168	0	256	0	0	0	0	62	0	101	163	648	0
12:45 - 13:00	0	166	49	215	80	182	0	262	0	0	0	0	48	0	108	156	633	0
13:00 - 13:15	0	183	48	231	86	154	0	240	0	0	0	0	58	0	117	175	646	3
13:15 - 13:30	0	164	42	206	72	169	0	241	0	0	0	0	57	0	100	157	604	0
13:30 - 13:45	0	169	45	214	68	162	0	230	0	0	0	0	53	0	95	148	592	0
13:45 - 14:00	0	154	38	192	72	174	0	246	0	0	0	0	51	0	107	158	596	1
14:00 - 14:15	0	162	46	208	68	170	0	238	0	0	0	0	51	0	98	149	595	0
14:15 - 14:30	0	166	51	217	76	144	0	220	0	0	0	0	49	0	0	49	486	0
14:30 - 14:45	0	158	39	197	67	167	0	234	0	0	0	0	49	0	78	127	558	0
14:45 - 15:00	0	176	24	200	79	153	0	232	0	0	0	0	62	0	98	160	592	0
15:00 - 15:15	0	125	46	171	76	170	0	246	0	0	0	0	57	0	96	153	570	2
15:15 - 15:30	0	0	46	46	68	169	0	237	0	0	0	0	44	0	89	133	416	0
15:30 - 15:45	0	147	27	174	59	179	0	238	0	0	0	0	60	0	103	163	575	0
15:45 - 16:00	0	147	40	187	68	203	0	271	0	0	0	0	71	0	84	155	613	0
16:00 - 16:15	0	160	42	202	80	210	0	290	0	0	0	0	82	0	95	177	669	0
16:15 - 16:30	0	135	41	176	85	209	0	294	0	0	0	0	68	0	101	169	639	0
16:30 - 16:45	0	170	42	212	94	246	0	340	0	0	0	0	88	0	95	183	735	0
16:45 - 17:00	0	169	25	194	92	214	0	306	0	0	0	0	87	0	96	183	683	1
17:00 - 17:15	0	165	36	201	73	270	0	343	0	0	0	0	53	0	110	163	707	0
17:15 - 17:30	0	140	36	176	99	206	0	305	0	0	0	0	85	0	92	177	658	0
17:30 - 17:45	0	138	27	165	105	225	0	330	0	0	0	0	65	0	99	164	659	0
17:45 - 18:00	0	154	47	201	113	297	0	410	0	0	0	0	67	0	81	148	759	0
18:00 - 18:15	0	116	37	153	130	279	0	409	0	0	0	0	70	0	99	169	731	0
18:15 - 18:30	0	0	39	39	94	235	0	329	0	0	0	0	62	0	103	165	533	0
18:30 - 18:45	0	174	36	210	78	232	0	310	0	0	0	0	31	0	75	106	626	1
18:45 - 19:00	0	142	21	163	73	225	0	298	0	0	0	0	46	0	84	130	591	0
TOTAL	0	7987	2001	9988	3405	8238	0	11643	0	0	0	0	2486	0	4088	6574	28205	14
Trucks	0	147	21	168	52	118	0	170	0	0	0	0	23	0	60	83	421	1.5%
School Buses	0	22	21	43	25	37	0	62	0	0	0	0	17	0	26	43	148	0.5%

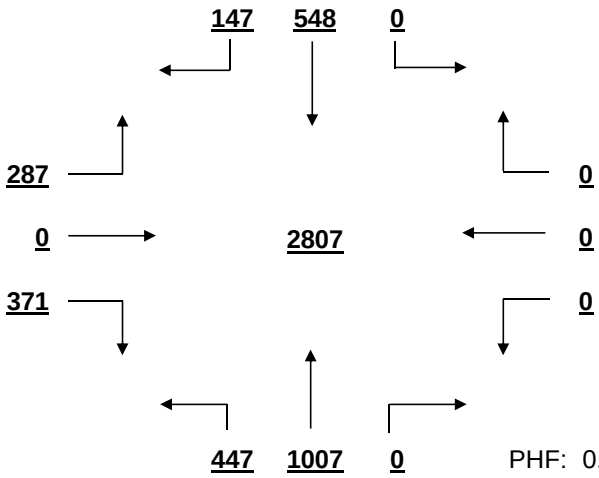
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Broad River Rd AT Bush River Rd Date: 11/29/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

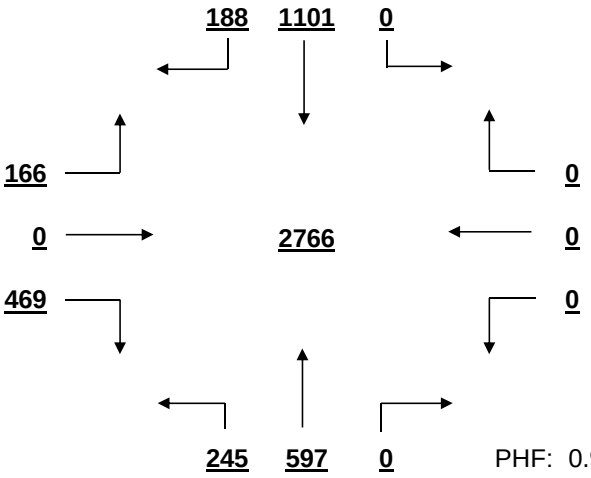


OVERALL PEAK HOUR VOLUME
FROM 17:15 TO 18:15



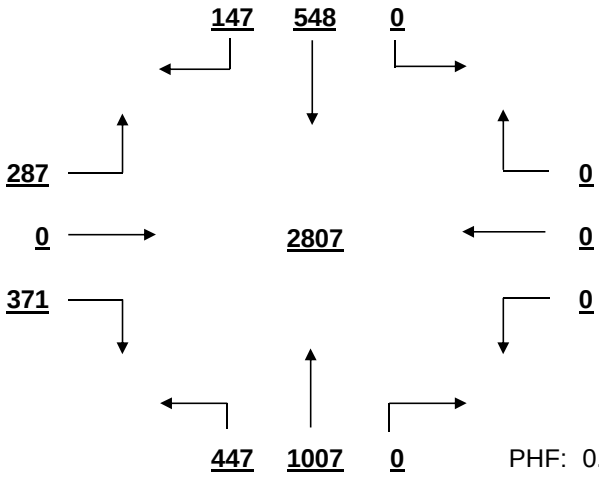
PHF: 0.925

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



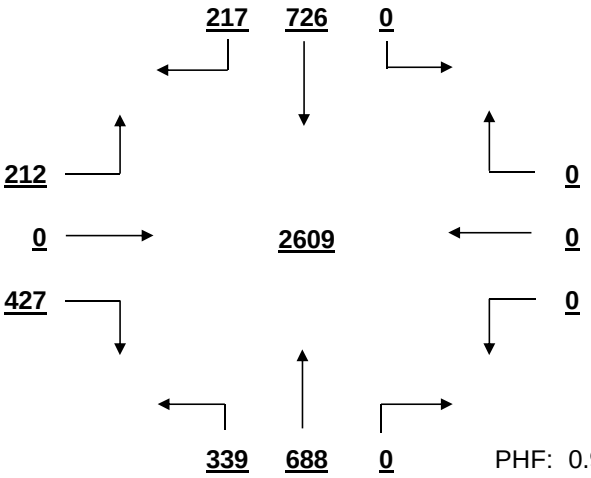
PHF: 0.942

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:15 TO 18:15



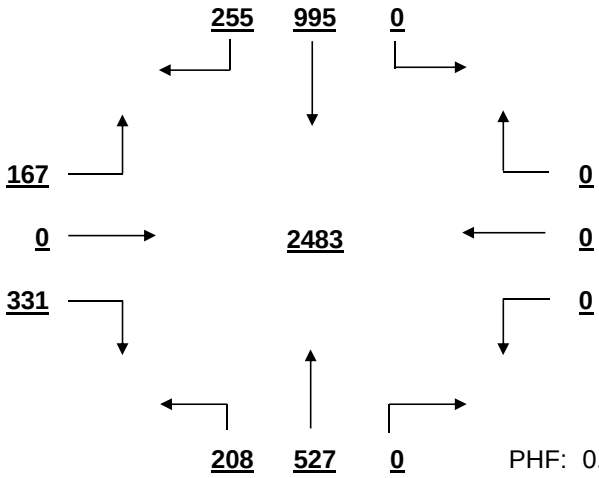
PHF: 0.925

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:15 TO 13:15



PHF: 0.956

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.846

SIGNAL WARRANT ANALYSIS

Broad River Rd AT Bush River Rd Date: 11/29/2016

Minor Street Volume, percent of total = 23.3%
Percent of Left Turns from Minor Street = 37.8%
Percent of Right Turns from Minor Street = 62.2%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1802.6	/ 600	=	300%	547.8	/ 200	=	274%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	331%	335%	248%	239%	269%	321%	300%	291%	262%	336%	355%	319%
Minor St.	249%	259%	191%	197%	246%	316%	319%	243%	302%	356%	326%	285%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1802.6	/ 900	=	200%	547.8	/ 100	=	548%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	221%	224%	165%	159%	180%	214%	200%	194%	174%	224%	237%	212%
Minor St.	498%	517%	381%	393%	492%	632%	638%	485%	604%	712%	652%	570%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	433%	450%	331%	342%	428%	550%	555%	422%	525%	619%	567%	496%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	17:15 - 18:15	Higher Volume Side Street Peak Hour:	16:00 - 17:00
Minor St.	439%	Minor St.	475%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	0	0	0	0	1	0	1	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008

Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/29/2016

Major Rt: Broad River Rd * Not on State System Minor Rt: Arrowwood Dr-Means Ave Clear

Day of Week: Tuesday Weather: Rain Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: E-W Intersection ADT - 23110 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1

* Each Direction

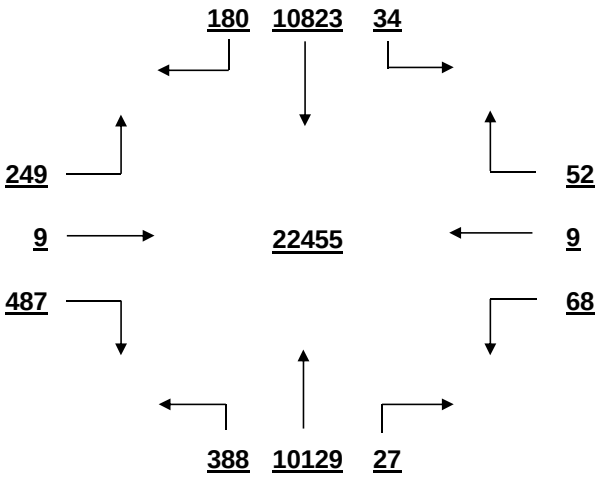
INTERSECTION VOLUME SUMMARY

	From N Broad River Rd				From S Broad River Rd				From E Arrowwood Dr-Means				From W Arrowwood Dr-Means				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	1	225	10	236	15	106	0	121	0	0	3	3	10	0	10	20	380	0
7:15 - 7:30	0	321	10	331	21	128	1	150	1	1	0	2	9	0	0	9	492	1
7:30 - 7:45	0	390	7	397	17	150	0	167	0	0	2	2	10	0	19	29	595	0
7:45 - 8:00	4	352	8	364	23	172	0	195	1	0	1	2	5	0	15	20	581	0
8:00 - 8:15	3	325	6	334	20	154	0	174	2	0	0	2	5	0	18	23	533	0
8:15 - 8:30	1	366	0	367	6	194	0	200	2	0	2	4	6	0	7	13	584	0
8:30 - 8:45	0	329	0	329	5	173	1	179	2	1	0	3	7	0	9	16	527	1
8:45 - 9:00	1	266	2	269	15	149	0	164	3	0	1	4	2	0	5	7	444	1
9:00 - 9:15	0	244	1	245	4	129	0	133	1	1	0	2	2	1	6	9	389	1
9:15 - 9:30	0	214	2	216	3	137	0	140	1	1	0	2	1	0	1	2	360	0
9:30 - 9:45	4	197	3	204	1	155	0	156	4	0	2	6	4	0	2	6	372	2
9:45 - 10:00	0	178	4	182	0	165	0	165	0	0	0	0	0	2	4	6	353	0
10:00 - 10:15	0	214	3	217	0	151	0	151	0	0	0	0	3	0	6	9	377	1
10:15 - 10:30	0	190	2	192	4	180	0	184	2	0	2	4	2	0	6	8	388	0
10:30 - 10:45	0	198	1	199	2	178	1	181	0	0	0	0	3	0	2	5	385	0
10:45 - 11:00	0	179	2	181	2	166	4	172	1	0	0	1	0	0	6	6	360	2
11:00 - 11:15	0	178	2	180	2	178	0	180	1	0	1	2	3	0	7	10	372	1
11:15 - 11:30	0	201	6	207	4	199	0	203	1	0	0	1	4	0	6	10	421	0
11:30 - 11:45	1	196	2	199	5	201	0	206	1	0	0	1	1	0	5	6	412	2
11:45 - 12:00	1	208	3	212	3	198	0	201	1	1	1	3	3	0	5	8	424	2
12:00 - 12:15	0	215	0	215	4	225	0	229	0	0	3	3	7	0	10	17	464	2
12:15 - 12:30	0	255	6	261	1	232	0	233	1	0	0	1	3	0	8	11	506	0
12:30 - 12:45	1	253	3	257	2	230	0	232	0	0	4	4	11	1	12	24	517	0
12:45 - 13:00	0	255	5	260	2	217	0	219	1	0	0	1	8	0	10	18	498	2
13:00 - 13:15	2	247	7	256	4	213	0	217	1	0	0	1	2	0	4	6	480	2
13:15 - 13:30	2	246	3	251	4	227	0	231	2	0	2	4	4	0	9	13	499	0
13:30 - 13:45	0	246	8	254	5	196	1	202	0	0	1	1	4	0	5	9	466	1
13:45 - 14:00	1	239	2	242	5	221	2	228	1	0	2	3	1	0	7	8	481	2
14:00 - 14:15	0	211	3	214	9	222	0	231	3	0	1	4	2	0	10	12	461	1
14:15 - 14:30	0	246	4	250	7	202	0	209	2	0	1	3	3	1	0	4	466	0
14:30 - 14:45	1	210	3	214	9	198	0	207	0	0	0	0	8	1	19	28	449	0
14:45 - 15:00	2	249	4	255	5	206	0	211	1	0	0	1	9	0	16	25	492	3
15:00 - 15:15	0	210	2	212	4	202	1	207	1	0	1	2	9	0	7	16	437	2
15:15 - 15:30	1	0	1	2	5	201	1	207	1	0	0	1	6	0	8	14	224	0
15:30 - 15:45	1	213	3	217	7	230	1	238	1	0	0	1	6	0	11	17	473	1
15:45 - 16:00	0	227	3	230	12	224	0	236	0	1	0	1	6	0	13	19	486	0
16:00 - 16:15	1	215	4	220	8	250	2	260	0	0	4	4	8	0	21	29	513	0
16:15 - 16:30	0	204	8	212	9	253	0	262	1	0	2	3	16	0	17	33	510	0
16:30 - 16:45	0	208	5	213	4	277	0	281	4	0	1	5	10	0	26	36	535	0
16:45 - 17:00	2	242	5	249	9	282	0	291	1	0	3	4	4	1	14	19	563	1
17:00 - 17:15	1	241	2	244	10	319	4	333	4	0	1	5	13	0	19	32	614	0
17:15 - 17:30	2	219	3	224	21	269	2	292	4	0	4	8	5	0	18	23	547	0
17:30 - 17:45	0	202	6	208	27	307	0	334	3	1	3	7	6	1	24	31	580	0
17:45 - 18:00	0	206	6	212	20	312	1	333	4	2	1	7	3	0	15	18	570	0
18:00 - 18:15	0	193	7	200	24	334	3	361	5	0	3	8	5	0	15	20	589	1
18:15 - 18:30	0	0	2	2	6	296	0	302	1	0	0	1	5	1	20	26	331	0
18:30 - 18:45	0	203	1	204	8	255	1	264	1	0	0	1	3	0	7	10	479	0
18:45 - 19:00	1	197	0	198	5	266	1	272	1	0	0	1	2	0	3	5	476	0
TOTAL	34	10823	180	11037	388	10129	27	10544	68	9	52	129	249	9	487	745	22455	32
Trucks	0	151	6	157	4	137	0	141	0	0	0	0	4	0	7	11	309	1.4%
School Buses	0	38	2	40	10	43	0	53	0	0	0	0	18	3	12	33	126	0.6%

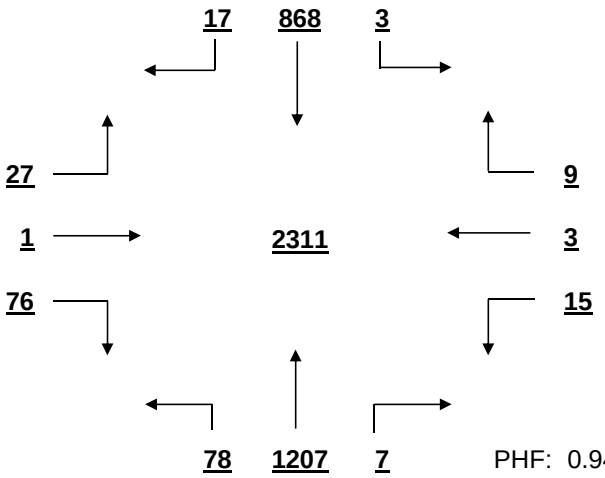
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Broad River Rd AT Arrowwood Dr-Means Ave Date: 11/29/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

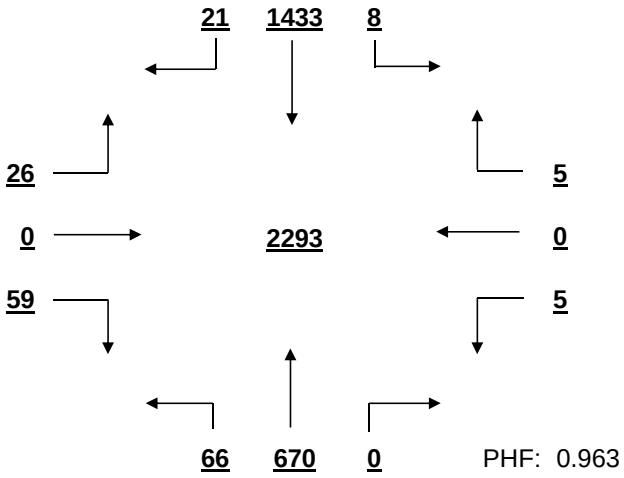


OVERALL PEAK HOUR VOLUME
FROM 17:00 TO 18:00



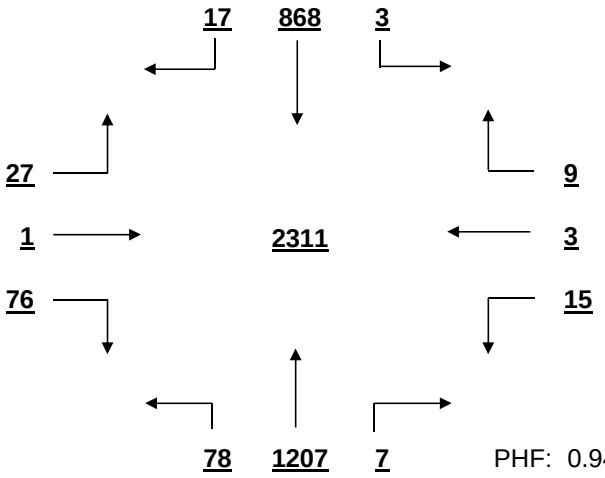
PHF: 0.941

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



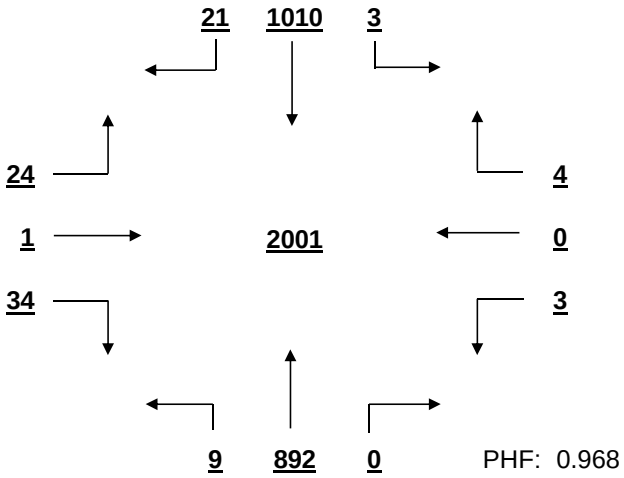
PHF: 0.963

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:00 TO 18:00



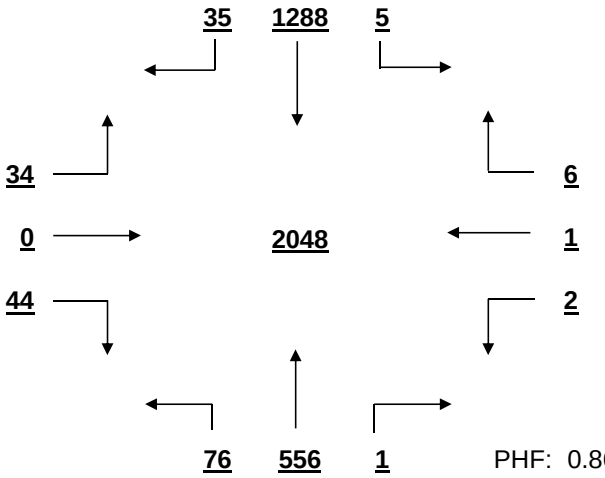
PHF: 0.941

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:15 TO 13:15



PHF: 0.968

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.861

SIGNAL WARRANT ANALYSIS

Broad River Rd AT Arrowwood Dr-Means Ave Date: 11/29/2016

Minor Street Volume, percent of total = 3.9%
Percent of Left Turns from Minor Street = 36.3%
Percent of Right Turns from Minor Street = 61.7%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is not met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1798.4	/	600 =	300%	62.1	/	150 =	41%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	327%	336%	240%	246%	265%	318%	314%	299%	258%	331%	363%	301%
Minor St.	52%	39%	15%	19%	23%	47%	24%	46%	44%	78%	69%	41%

Condition B - Interruption to Continuous Traffic is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1798.4	/	900 =	200%	62.1	/	75 =	83%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	218%	224%	160%	164%	176%	212%	209%	199%	172%	221%	242%	200%
Minor St.	104%	79%	31%	37%	45%	93%	48%	92%	88%	156%	139%	81%

80% Combination of Conditions A & B is not met

Warrant No. 2 - Four Hour Vehicular Volume is not met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	98%	74%	29%	35%	43%	88%	45%	86%	83%	146%	130%	76%

Warrant No. 3 - Peak Hour is met

Percent of warrant			Percent of warrant	
Overall Peak Hour:	17:00 - 18:00	Higher Volume Side Street Peak Hour:	16:15 - 17:15	
Minor St.	104%	Minor St.	120%	

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street	Minimum peak hour ped. volume crossing major street
107	133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	1	1	0	0	2	1	0	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/29/2016

Major Rt: Broad River Rd * Not on State System Minor Rt: Greystone Blvd-Gas Station Clear

Day of Week: Tuesday Weather: Rain Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: N-S Intersection ADT - 32150 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 2

* Each Direction

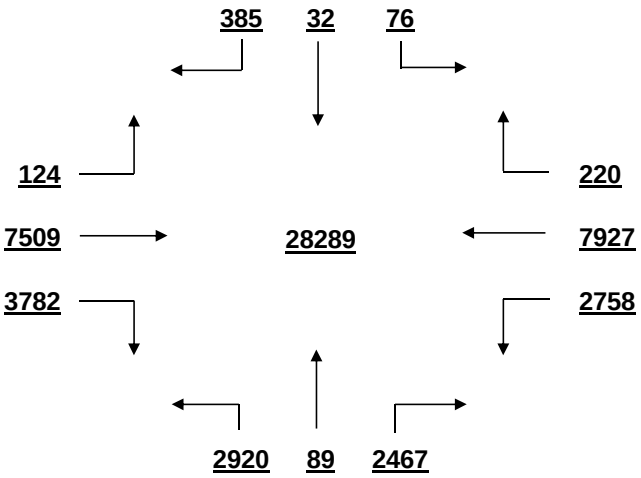
INTERSECTION VOLUME SUMMARY

	From N Greystone Blvd-Gas				From S Greystone Blvd-Gas				From E Broad River Rd				From W Broad River Rd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	2	0	5	7	24	0	30	54	66	86	8	160	4	173	80	257	478	1
7:15 - 7:30	1	0	11	12	34	1	52	87	101	125	4	230	6	218	0	224	553	0
7:30 - 7:45	1	0	8	9	27	3	52	82	101	129	9	239	4	261	151	416	746	2
7:45 - 8:00	0	1	8	9	40	2	54	96	123	174	7	304	4	0	137	141	550	0
8:00 - 8:15	2	0	7	9	33	2	43	78	103	146	4	253	5	243	135	383	723	0
8:15 - 8:30	2	0	0	2	42	2	36	80	100	173	4	277	2	231	142	375	734	1
8:30 - 8:45	1	0	4	5	32	2	40	74	85	134	4	223	0	200	129	329	631	2
8:45 - 9:00	3	2	2	7	42	0	32	74	81	127	7	215	0	192	119	311	607	1
9:00 - 9:15	0	1	5	6	32	0	40	72	52	99	5	156	3	149	91	243	477	0
9:15 - 9:30	3	1	4	8	42	0	38	80	69	105	3	177	1	118	77	196	461	2
9:30 - 9:45	4	0	7	11	51	1	46	98	57	107	5	169	2	121	85	208	486	1
9:45 - 10:00	1	0	7	8	51	3	29	83	47	124	5	176	2	105	78	185	452	1
10:00 - 10:15	1	1	6	8	0	1	0	1	49	108	3	160	2	146	68	216	385	0
10:15 - 10:30	2	1	6	9	54	2	37	93	41	134	5	180	4	121	63	188	470	0
10:30 - 10:45	2	2	10	14	54	3	36	93	48	125	8	181	5	125	75	205	493	1
10:45 - 11:00	1	1	7	9	35	1	38	74	45	116	4	165	1	125	79	205	453	0
11:00 - 11:15	0	2	7	9	49	1	33	83	37	127	1	165	2	131	57	190	447	0
11:15 - 11:30	4	1	7	12	47	0	37	84	23	137	0	160	1	125	75	201	457	0
11:30 - 11:45	1	0	4	5	80	0	40	120	37	133	0	170	4	119	58	181	476	0
11:45 - 12:00	3	2	4	9	51	3	40	94	50	133	0	183	0	128	88	216	502	0
12:00 - 12:15	3	1	9	13	98	3	59	160	39	108	0	147	6	136	79	221	541	0
12:15 - 12:30	1	1	9	11	74	0	26	100	49	153	0	202	1	0	91	92	405	0
12:30 - 12:45	1	0	14	15	70	4	48	122	60	146	0	206	2	155	128	285	628	1
12:45 - 13:00	1	1	6	8	84	3	40	127	61	146	0	207	1	166	89	256	598	3
13:00 - 13:15	3	2	8	13	85	5	56	146	43	146	6	195	3	172	93	268	622	0
13:15 - 13:30	2	0	9	11	67	2	43	112	48	145	7	200	3	159	85	247	570	0
13:30 - 13:45	1	1	13	15	53	2	51	106	43	142	11	196	4	174	90	268	585	1
13:45 - 14:00	2	1	9	12	78	3	51	132	56	150	7	213	2	147	85	234	591	0
14:00 - 14:15	2	0	12	14	63	2	59	124	39	140	7	186	2	161	67	230	554	3
14:15 - 14:30	3	0	6	9	52	2	58	112	50	158	6	214	1	178	0	179	514	0
14:30 - 14:45	2	1	6	9	62	3	54	119	60	150	7	217	2	155	67	224	569	0
14:45 - 15:00	1	0	10	11	65	0	55	120	44	148	8	200	3	177	80	260	591	0
15:00 - 15:15	1	1	9	11	74	3	50	127	45	151	5	201	4	146	61	211	550	1
15:15 - 15:30	3	0	11	14	53	4	51	108	55	153	7	215	4	172	73	249	586	0
15:30 - 15:45	1	0	5	6	67	2	49	118	55	173	3	231	2	151	76	229	584	0
15:45 - 16:00	3	1	4	8	45	0	73	118	53	190	3	246	5	151	63	219	591	1
16:00 - 16:15	2	0	7	9	77	2	98	177	48	199	5	252	2	187	55	244	682	0
16:15 - 16:30	2	3	7	12	66	4	72	142	55	211	3	269	2	145	72	219	642	0
16:30 - 16:45	0	0	4	4	86	2	87	175	57	201	6	264	2	199	50	251	694	0
16:45 - 17:00	2	1	8	11	82	1	88	171	43	235	4	282	2	190	73	265	729	0
17:00 - 17:15	0	1	7	8	135	0	93	228	59	243	11	313	0	197	83	280	829	0
17:15 - 17:30	1	1	13	15	115	4	74	193	55	266	10	331	2	163	74	239	778	0
17:30 - 17:45	0	0	11	11	80	0	98	178	47	330	4	381	0	175	67	242	812	0
17:45 - 18:00	0	0	14	14	62	1	61	124	63	341	4	408	1	173	76	250	796	0
18:00 - 18:15	1	0	11	12	75	1	66	142	70	285	6	361	5	167	71	243	758	0
18:15 - 18:30	2	0	15	17	84	1	65	150	56	231	2	289	5	161	47	213	669	0
18:30 - 18:45	1	1	18	20	54	4	52	110	51	251	2	304	4	181	51	236	670	0
18:45 - 19:00	1	0	11	12	94	4	37	135	39	193	0	232	2	140	49	191	570	1
TOTAL	76	32	385	493	2920	89	2467	5476	2758	7927	220	10905	124	7509	3782	11415	28289	23
Trucks	0	0	1	1	44	1	47	92	30	75	0	105	0	76	50	126	324	1.1%
School Buses	0	0	0	0	24	0	7	31	3	16	0	19	0	26	27	53	103	0.4%

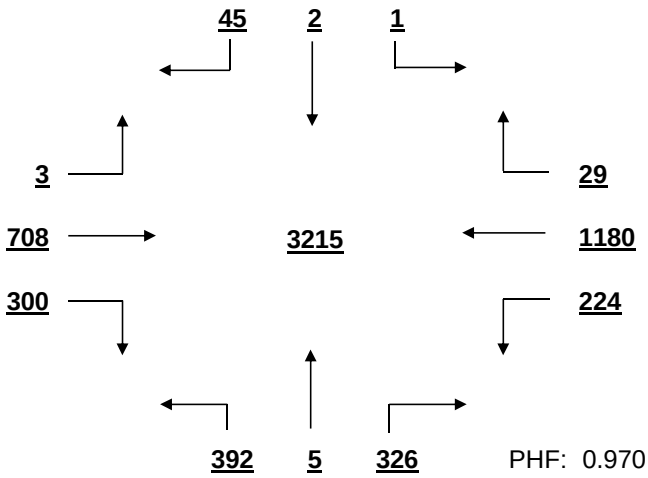
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Broad River Rd AT Greystone Blvd-Gas Station Date: 11/29/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

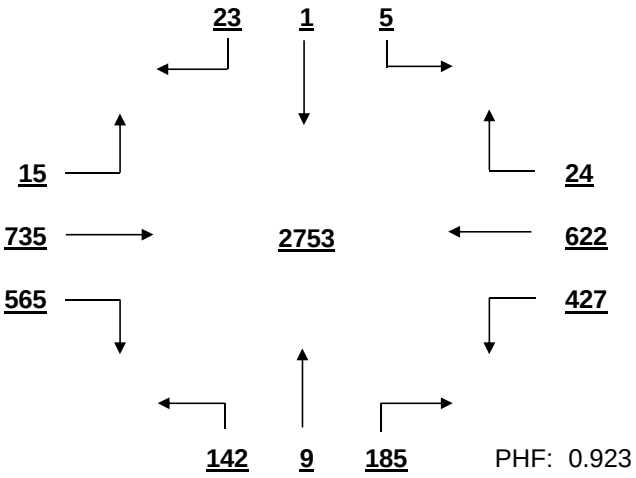


OVERALL PEAK HOUR VOLUME
FROM 17:00 TO 18:00



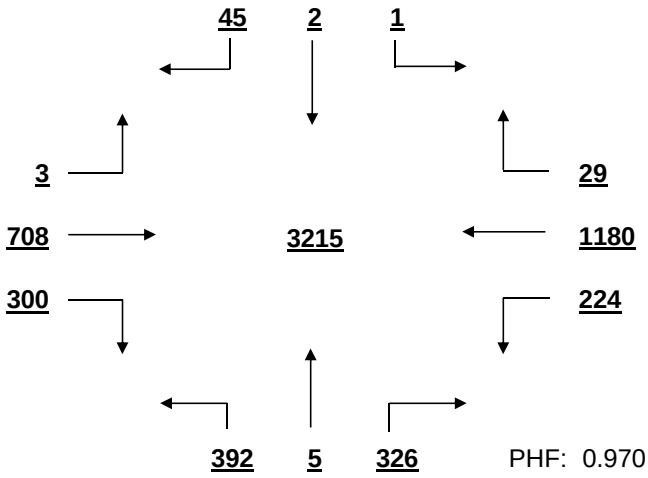
PHF: 0.970

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



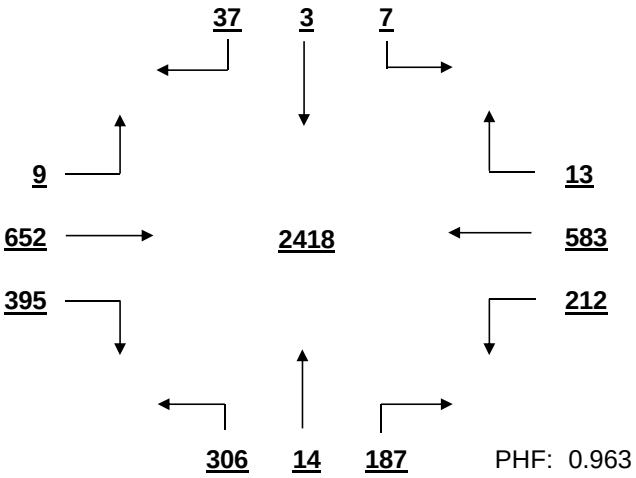
PHF: 0.923

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:00 TO 18:00



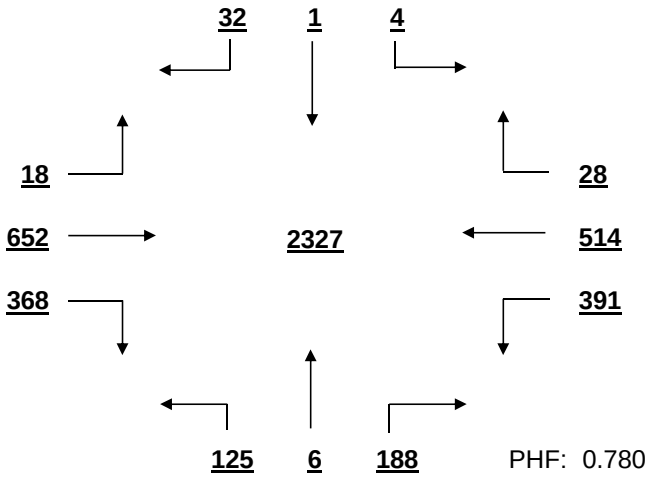
PHF: 0.970

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:30 TO 13:30



PHF: 0.963

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.780

SIGNAL WARRANT ANALYSIS

Broad River Rd AT Greystone Blvd-Gas Station Date: 11/29/2016

Minor Street Volume, percent of total = 21.1%
Percent of Left Turns from Minor Street = 50.2%
Percent of Right Turns from Minor Street = 47.8%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1860.0	/ 600	=	310%	456.3	/ 200	=	228%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	329%	394%	252%	250%	244%	269%	304%	285%	300%	341%	407%	345%
Minor St.	160%	153%	167%	131%	191%	255%	248%	238%	236%	333%	362%	269%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1860.0	/ 900	=	207%	456.3	/ 100	=	456%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	219%	263%	168%	167%	163%	180%	202%	190%	200%	227%	272%	230%
Minor St.	319%	306%	333%	261%	381%	509%	496%	475%	471%	665%	723%	537%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	277%	266%	290%	227%	331%	443%	431%	413%	410%	578%	629%	467%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	17:00 - 18:00	Higher Volume Side Street Peak Hour:	16:45 - 17:45
Minor St.	482%	Minor St.	513%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	2	2	3	0	0	0	1	1	1	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008

Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 12/1/2016

Major Rt: Sunset Blvd * Not on State System Minor Rt: W. Hospital Dr-Sunset Ct Clear

Day of Week: Thursday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: N-S Intersection ADT - 40670 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1

* Each Direction

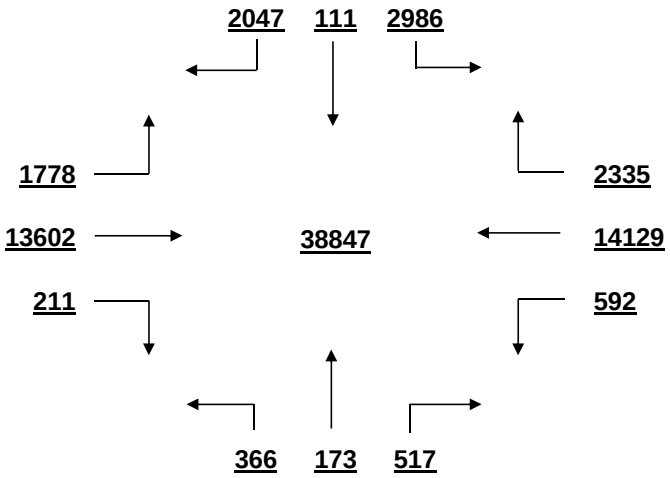
INTERSECTION VOLUME SUMMARY

	From N W. Hospital Dr-Sun				From S W. Hospital Dr-Sun				From E Sunset Blvd				From W Sunset Blvd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	26	1	16	43	2	3	0	5	9	164	85	258	71	348	9	428	734	1
7:15 - 7:30	63	3	21	87	3	4	5	12	20	209	97	326	112	389	0	501	926	0
7:30 - 7:45	49	1	42	92	2	5	6	13	20	249	70	339	87	460	9	556	1000	0
7:45 - 8:00	45	3	22	70	1	6	6	13	17	266	103	386	83	0	23	106	575	0
8:00 - 8:15	59	3	21	83	2	5	4	11	16	258	70	344	74	363	9	446	884	0
8:15 - 8:30	35	1	0	36	1	4	7	12	18	242	71	331	96	424	16	536	915	1
8:30 - 8:45	45	0	28	73	2	4	4	10	17	242	68	327	67	369	7	443	853	0
8:45 - 9:00	49	0	29	78	2	6	7	15	14	223	52	289	38	309	4	351	733	2
9:00 - 9:15	46	2	28	76	6	3	7	16	7	206	40	253	37	272	4	313	658	2
9:15 - 9:30	47	7	27	81	4	5	13	22	11	230	51	292	41	321	6	368	763	0
9:30 - 9:45	33	7	32	72	7	6	7	20	9	240	29	278	38	301	10	349	719	0
9:45 - 10:00	44	1	24	69	7	0	7	14	11	216	38	265	30	278	2	310	658	0
10:00 - 10:15	53	1	27	81	0	4	0	4	10	225	29	264	34	253	6	293	642	0
10:15 - 10:30	68	0	32	100	3	1	14	18	9	228	45	282	34	305	7	346	746	0
10:30 - 10:45	61	0	22	83	7	1	9	17	12	294	47	353	33	291	2	326	779	0
10:45 - 11:00	54	3	37	94	2	3	8	13	10	225	29	264	28	278	4	310	681	0
11:00 - 11:15	59	3	26	88	5	4	8	17	16	271	43	330	32	264	3	299	734	2
11:15 - 11:30	68	3	34	105	7	0	10	17	12	240	38	290	27	261	3	291	703	1
11:30 - 11:45	66	4	42	112	8	1	17	26	15	296	41	352	25	298	5	328	818	0
11:45 - 12:00	69	7	40	116	6	3	11	20	14	255	53	322	31	311	4	346	804	2
12:00 - 12:15	74	4	44	122	11	3	13	27	21	286	43	350	25	309	2	336	835	1
12:15 - 12:30	69	4	51	124	20	6	17	43	16	299	49	364	38	0	10	48	579	3
12:30 - 12:45	59	2	43	104	11	3	14	28	13	309	53	375	30	311	4	345	852	0
12:45 - 13:00	43	3	34	80	13	2	21	36	16	300	56	372	44	295	6	345	833	3
13:00 - 13:15	58	4	33	95	13	2	11	26	19	319	46	384	35	274	1	310	815	0
13:15 - 13:30	43	4	23	70	7	4	23	34	16	316	57	389	35	283	4	322	815	0
13:30 - 13:45	48	7	37	92	12	6	5	23	9	297	53	359	36	277	12	325	799	0
13:45 - 14:00	55	2	25	82	7	3	9	19	18	319	44	381	30	266	4	300	782	1
14:00 - 14:15	54	1	37	92	5	5	20	30	12	338	51	401	29	261	1	291	814	0
14:15 - 14:30	37	1	37	75	3	4	14	21	12	306	44	362	49	273	0	322	780	1
14:30 - 14:45	63	0	31	94	9	1	7	17	15	317	44	376	20	281	3	304	791	1
14:45 - 15:00	93	4	79	176	6	4	11	21	7	332	54	393	29	287	2	318	908	0
15:00 - 15:15	53	0	61	114	10	6	11	27	7	339	43	389	24	302	3	329	859	1
15:15 - 15:30	88	0	64	152	8	3	15	26	14	316	44	374	22	246	2	270	822	0
15:30 - 15:45	108	7	76	191	16	7	21	44	14	368	31	413	16	272	5	293	941	0
15:45 - 16:00	80	2	69	151	11	5	15	31	17	362	57	436	31	271	5	307	925	0
16:00 - 16:15	97	4	97	198	7	4	14	25	12	368	41	421	17	257	3	277	921	0
16:15 - 16:30	85	0	81	166	13	6	23	42	10	414	46	470	12	278	4	294	972	1
16:30 - 16:45	106	1	115	222	15	4	18	37	7	402	29	438	29	303	0	332	1029	0
16:45 - 17:00	97	3	84	184	12	6	13	31	8	433	49	490	12	285	2	299	1004	3
17:00 - 17:15	118	1	98	217	15	5	13	33	11	368	36	415	26	350	1	377	1042	1
17:15 - 17:30	96	2	56	154	16	5	18	39	13	379	46	438	29	331	1	361	992	0
17:30 - 17:45	108	0	66	174	3	4	11	18	3	348	36	387	26	314	0	340	919	0
17:45 - 18:00	56	1	45	102	15	4	9	28	10	344	49	403	23	317	1	341	874	1
18:00 - 18:15	56	3	38	97	10	2	9	21	3	352	32	387	19	272	1	292	797	2
18:15 - 18:30	43	0	24	67	9	1	3	13	9	324	31	364	19	245	1	265	709	0
18:30 - 18:45	37	1	29	67	7	0	3	10	5	277	38	320	35	196	0	231	628	0
18:45 - 19:00	23	0	20	43	5	0	6	11	8	218	34	260	20	151	0	171	485	0
TOTAL	2986	111	2047	5144	366	173	517	1056	592	14129	2335	17056	1778	13602	211	15591	38847	30
Trucks	53	4	17	74	2	1	6	9	4	486	48	538	15	505	3	523	1144	2.9%
School Buses	3	0	3	6	0	0	0	0	0	9	5	14	1	15	0	16	36	0.1%

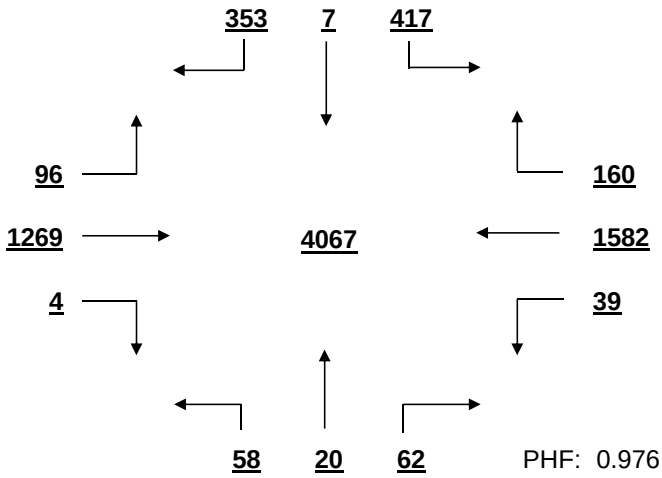
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Sunset Blvd AT W. Hospital Dr-Sunset Ct Date: 12/1/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

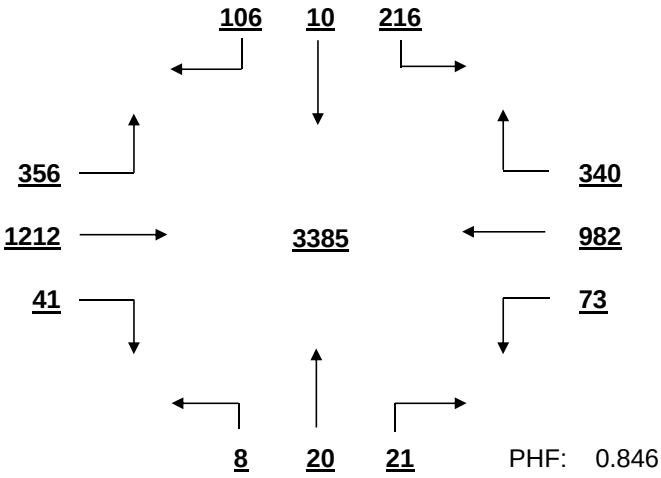


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



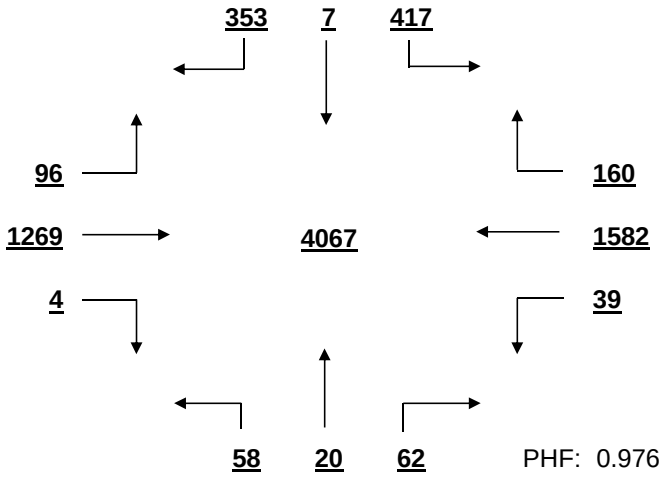
PHF: 0.976

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



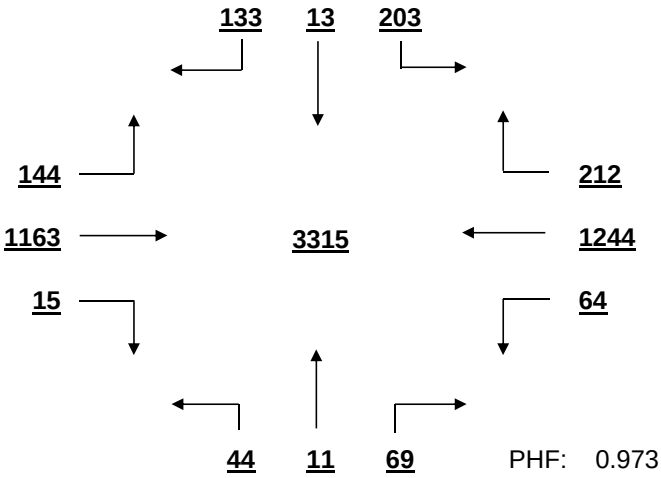
PHF: 0.846

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



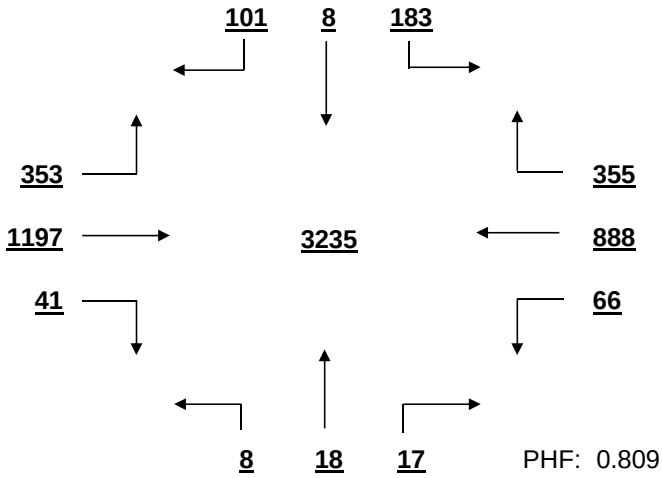
PHF: 0.976

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:30 TO 13:30



PHF: 0.973

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.809

SIGNAL WARRANT ANALYSIS

Sunset Blvd AT W. Hospital Dr-Sunset Ct Date: 12/1/2016

Minor Street Volume, percent of total = 16.0%
Percent of Left Turns from Minor Street = 54.1%
Percent of Right Turns from Minor Street = 41.4%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
2720.6	/	600 =	453%	428.7	/	150 =	286%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	483%	511%	405%	406%	426%	423%	462%	461%	469%	504%	510%	382%
Minor St.	195%	180%	199%	239%	281%	287%	226%	291%	405%	513%	431%	183%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
2720.6	/	900 =	302%	428.7	/	75 =	572%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	322%	341%	270%	271%	284%	282%	308%	307%	312%	336%	340%	254%
Minor St.	389%	360%	397%	477%	561%	573%	452%	583%	811%	1027%	863%	365%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	365%	338%	373%	448%	526%	538%	424%	546%	760%	963%	809%	343%

Warrant No. 3 - Peak Hour is met

Percent of warrant			Percent of warrant		
Overall Peak Hour: 16:30 - 17:30			Higher Volume Side Street Peak Hour: 16:15 - 17:15		
Minor St.	777%		Minor St.	789%	

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street	Minimum peak hour ped. volume crossing major street
107	133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	2	1	0	2	4	0	0	0	0	0	1

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 12/1/2016

Major Rt: Sunset Blvd * Not on State System Minor Rt: E. Hospital Dr-Harbor Dr Clear

Day of Week: Thursday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: N-S Intersection ADT - 40930 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1

* Each Direction

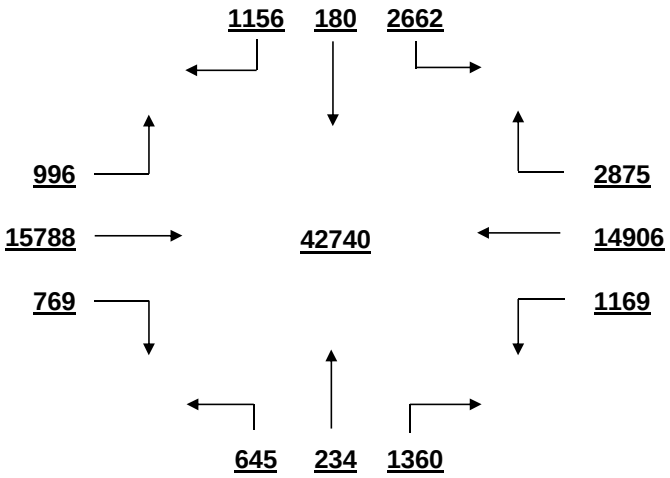
INTERSECTION VOLUME SUMMARY

	From N E. Hospital Dr-Har				From S E. Hospital Dr-Har				From E Sunset Blvd				From W Sunset Blvd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	23	0	9	32	6	12	26	44	19	229	89	337	21	329	10	360	773	0
7:15 - 7:30	37	2	8	47	17	9	39	65	15	317	84	416	25	414	18	457	985	0
7:30 - 7:45	52	3	10	65	8	9	44	61	26	341	86	453	28	423	21	472	1051	0
7:45 - 8:00	39	2	6	47	13	9	57	79	26	347	89	462	17	430	19	466	1054	0
8:00 - 8:15	43	4	18	65	17	6	53	76	29	301	74	404	40	352	13	405	950	1
8:15 - 8:30	31	2	0	33	11	7	55	73	28	343	79	450	37	438	7	482	1038	0
8:30 - 8:45	31	3	18	52	12	6	29	47	23	279	98	400	30	339	17	386	885	0
8:45 - 9:00	38	1	17	56	5	5	27	37	23	273	70	366	31	333	18	382	841	0
9:00 - 9:15	44	4	13	61	13	4	17	34	29	234	65	328	23	287	16	326	749	0
9:15 - 9:30	41	4	21	66	10	3	30	43	20	247	67	334	34	304	18	356	799	0
9:30 - 9:45	30	7	16	53	16	4	27	47	15	247	71	333	35	290	12	337	770	0
9:45 - 10:00	56	6	31	93	18	2	32	52	23	247	72	342	19	292	16	327	814	0
10:00 - 10:15	51	2	28	81	0	5	0	5	17	223	55	295	25	283	15	323	704	4
10:15 - 10:30	54	1	13	68	13	6	21	40	18	260	74	352	31	298	17	346	806	2
10:30 - 10:45	48	2	30	80	16	11	44	71	21	277	50	348	26	286	21	333	832	0
10:45 - 11:00	48	8	27	83	10	3	17	30	20	259	71	350	36	304	18	358	821	3
11:00 - 11:15	54	4	34	92	13	5	26	44	18	291	55	364	19	318	16	353	853	2
11:15 - 11:30	40	7	26	73	14	3	20	37	18	256	63	337	13	303	15	331	778	2
11:30 - 11:45	71	2	44	117	17	5	24	46	27	278	42	347	21	340	17	378	888	1
11:45 - 12:00	78	1	40	119	12	8	25	45	23	254	58	335	13	344	17	374	873	2
12:00 - 12:15	76	1	31	108	18	3	27	48	20	297	48	365	20	353	16	389	910	0
12:15 - 12:30	61	6	22	89	23	7	28	58	14	309	68	391	27	347	22	396	934	7
12:30 - 12:45	65	2	28	95	16	4	22	42	28	330	64	422	18	346	14	378	937	0
12:45 - 13:00	47	4	21	72	14	5	23	42	35	342	69	446	29	295	19	343	903	0
13:00 - 13:15	36	4	25	65	13	5	28	46	23	342	73	438	34	297	23	354	903	0
13:15 - 13:30	44	4	37	85	14	6	16	36	22	330	75	427	31	315	10	356	904	0
13:30 - 13:45	68	2	33	103	12	9	29	50	12	330	57	399	26	288	16	330	882	0
13:45 - 14:00	50	1	27	78	16	8	24	48	30	348	75	453	21	283	16	320	899	6
14:00 - 14:15	61	4	34	99	16	5	34	55	20	356	72	448	16	332	14	362	964	0
14:15 - 14:30	68	4	34	106	6	3	30	39	27	321	52	400	26	269	23	318	863	1
14:30 - 14:45	69	3	40	112	17	5	27	49	19	331	53	403	20	308	15	343	907	0
14:45 - 15:00	75	3	28	106	22	2	30	54	17	329	55	401	26	321	14	361	922	0
15:00 - 15:15	81	6	28	115	11	1	35	47	34	336	53	423	10	340	12	362	947	1
15:15 - 15:30	84	0	27	111	13	3	25	41	36	321	65	422	16	324	9	349	923	0
15:30 - 15:45	81	2	28	111	18	3	33	54	28	357	48	433	9	358	19	386	984	0
15:45 - 16:00	75	5	35	115	23	4	28	55	26	345	38	409	17	339	18	374	953	0
16:00 - 16:15	72	14	31	117	14	4	36	54	17	342	41	400	9	335	12	356	927	1
16:15 - 16:30	74	9	38	121	16	2	28	46	23	379	43	445	18	348	14	380	992	0
16:30 - 16:45	81	3	33	117	9	1	28	38	25	347	39	411	12	368	15	395	961	0
16:45 - 17:00	70	8	33	111	8	3	41	52	33	402	38	473	10	380	19	409	1045	0
17:00 - 17:15	86	4	21	111	18	2	23	43	25	350	36	411	8	405	25	438	1003	0
17:15 - 17:30	72	9	20	101	16	3	23	42	43	379	30	452	11	426	22	459	1054	0
17:30 - 17:45	63	6	20	89	12	2	24	38	43	362	39	444	7	393	17	417	988	0
17:45 - 18:00	31	2	9	42	10	4	19	33	31	358	42	431	10	346	19	375	881	0
18:00 - 18:15	43	8	15	66	14	5	20	39	30	303	57	390	7	301	17	325	820	0
18:15 - 18:30	43	0	18	61	14	6	30	50	33	326	36	395	12	274	15	301	807	1
18:30 - 18:45	44	1	14	59	12	2	16	30	23	292	56	371	14	218	9	241	701	2
18:45 - 19:00	33	0	17	50	9	5	20	34	14	239	41	294	8	172	4	184	562	0
TOTAL	2662	180	1156	3998	645	234	1360	2239	1169	14906	2875	18950	996	15788	769	17553	42740	36
Trucks	19	4	19	42	19	2	55	76	47	493	16	556	14	500	21	535	1209	2.8%
School Buses	2	0	0	2	2	0	15	17	9	24	1	34	0	27	3	30	83	0.2%

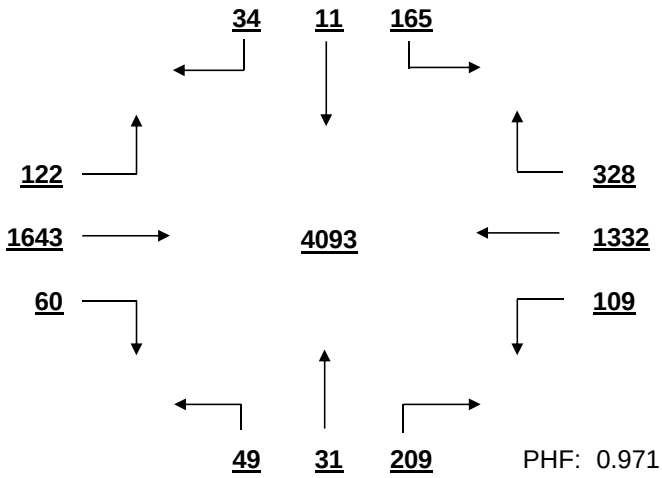
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Sunset Blvd AT E. Hospital Dr-Harbor Dr Date: 12/1/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

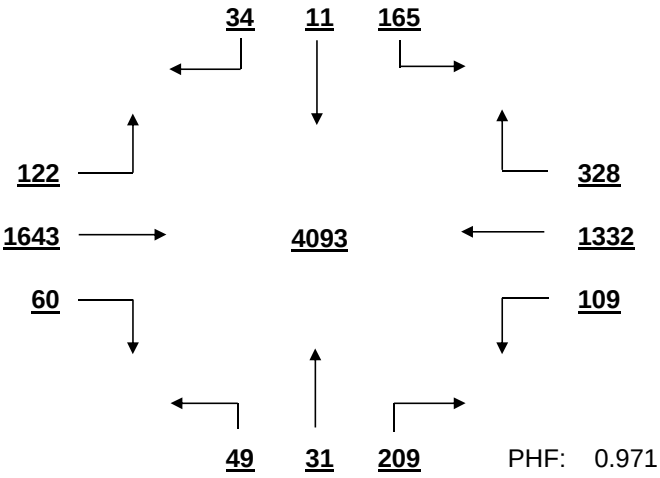


OVERALL PEAK HOUR VOLUME
FROM 7:30 TO 8:30



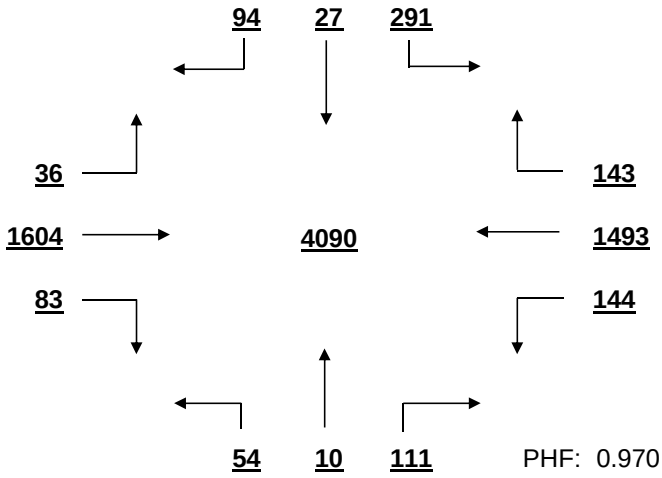
PHF: 0.971

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



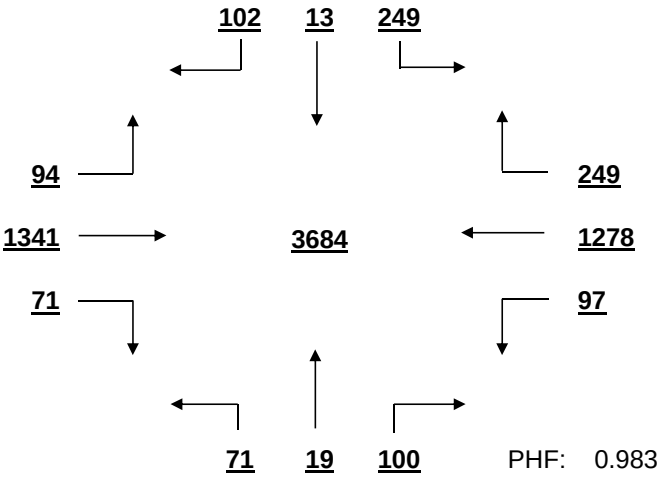
PHF: 0.971

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:45 TO 17:45



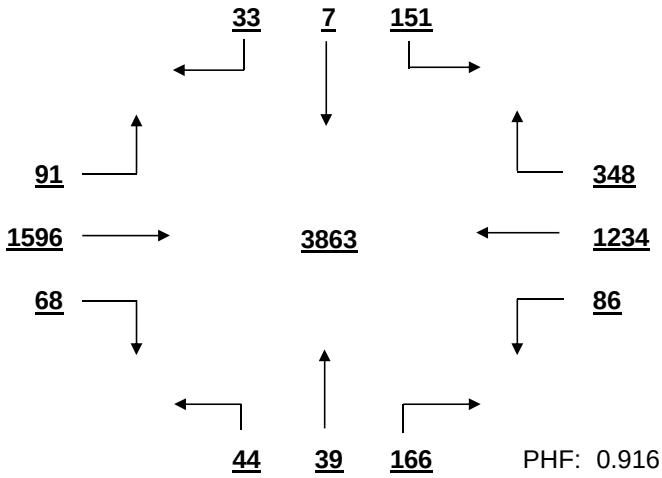
PHF: 0.970

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:00 TO 13:00



PHF: 0.983

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.916

SIGNAL WARRANT ANALYSIS

Sunset Blvd AT E. Hospital Dr-Harbor Dr Date: 12/1/2016

Minor Street Volume, percent of total = 14.6%
Percent of Left Turns from Minor Street = 53.0%
Percent of Right Turns from Minor Street = 40.3%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
3041.9	/ 600	=	507%	333.2	/ 150	=	222%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	571%	546%	447%	451%	470%	522%	513%	506%	526%	545%	571%	417%
Minor St.	166%	155%	182%	208%	267%	243%	221%	282%	301%	311%	229%	157%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
3041.9	/ 900	=	338%	333.2	/ 75	=	444%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	380%	364%	298%	301%	313%	348%	342%	337%	351%	363%	381%	278%
Minor St.	332%	311%	364%	416%	535%	485%	441%	564%	603%	621%	457%	315%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	311%	291%	341%	390%	501%	455%	414%	529%	565%	583%	429%	295%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	7:30 - 8:30	Higher Volume Side Street Peak Hour:	15:45 - 16:45
Minor St.	289%	Minor St.	470%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	0	5	4	4	3	0	0	0	0	1

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008

Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 12/1/2016

Major Rt: Sunset Blvd * Not on State System Minor Rt: McSwain Dr-Chris Dr Clear

Day of Week: Thursday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: N-S Intersection ADT - 34870 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1 * Each Direction

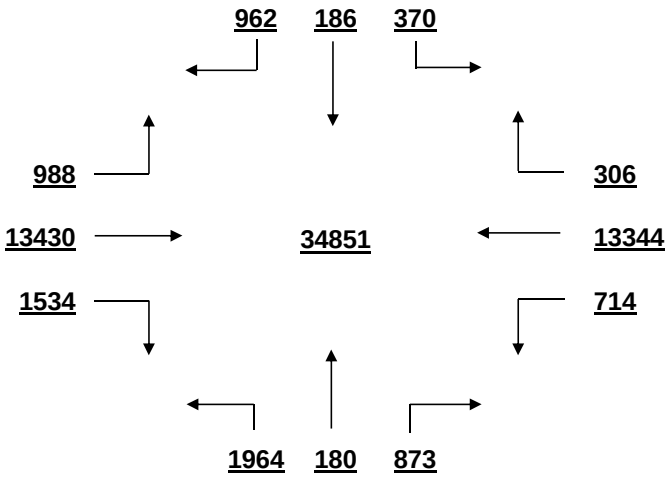
INTERSECTION VOLUME SUMMARY

	From N McSwain Dr-Chris D				From S McSwain Dr-Chris D				From E Sunset Blvd				From W Sunset Blvd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	12	7	23	42	42	2	13	57	15	146	3	164	13	280	24	317	580	2
7:15 - 7:30	6	7	21	34	30	3	12	45	13	220	2	235	18	350	0	368	682	0
7:30 - 7:45	13	2	28	43	48	4	21	73	20	250	7	277	14	416	42	472	865	1
7:45 - 8:00	9	3	22	34	45	6	19	70	14	264	6	284	31	0	49	80	468	0
8:00 - 8:15	7	4	14	25	41	8	16	65	17	218	4	239	33	371	35	439	768	1
8:15 - 8:30	7	6	0	13	53	3	13	69	8	246	8	262	28	372	52	452	796	0
8:30 - 8:45	5	1	32	38	39	3	17	59	5	210	6	221	37	320	44	401	719	3
8:45 - 9:00	5	0	26	31	46	4	15	65	13	168	9	190	22	297	48	367	653	1
9:00 - 9:15	5	3	19	27	41	2	11	54	9	176	4	189	25	239	39	303	573	2
9:15 - 9:30	5	3	18	26	49	6	18	73	15	183	4	202	14	250	36	300	601	0
9:30 - 9:45	9	5	15	29	43	2	14	59	11	234	5	250	10	244	36	290	628	0
9:45 - 10:00	2	2	10	14	48	2	12	62	13	188	5	206	18	269	29	316	598	3
10:00 - 10:15	4	6	12	22	0	5	0	5	14	192	8	214	16	214	30	260	501	0
10:15 - 10:30	8	3	14	25	45	1	11	57	12	211	10	233	22	258	44	324	639	0
10:30 - 10:45	12	5	20	37	66	8	16	90	17	229	8	254	20	241	27	288	669	1
10:45 - 11:00	12	3	19	34	40	4	20	64	9	212	7	228	12	255	33	300	626	2
11:00 - 11:15	14	5	44	63	30	3	23	56	10	213	3	226	14	258	34	306	651	1
11:15 - 11:30	8	4	22	34	29	1	24	54	14	272	6	292	18	299	36	353	733	1
11:30 - 11:45	7	6	15	28	42	4	20	66	6	269	5	280	19	313	36	368	742	0
11:45 - 12:00	14	3	21	38	47	4	19	70	14	239	2	255	20	312	40	372	735	1
12:00 - 12:15	8	3	19	30	45	4	21	70	14	296	6	316	26	358	38	422	838	3
12:15 - 12:30	9	2	17	28	37	6	15	58	13	292	7	312	20	0	28	48	446	0
12:30 - 12:45	14	6	15	35	56	1	31	88	18	348	5	371	25	359	30	414	908	2
12:45 - 13:00	7	7	20	34	58	6	38	102	18	345	6	369	19	295	41	355	860	7
13:00 - 13:15	6	4	16	26	49	4	25	78	32	313	5	350	24	288	42	354	808	1
13:15 - 13:30	6	3	17	26	47	5	19	71	20	337	11	368	25	281	41	347	812	2
13:30 - 13:45	3	9	18	30	44	1	13	58	22	322	15	359	24	252	35	311	758	3
13:45 - 14:00	8	2	19	29	49	6	14	69	16	320	13	349	27	253	32	312	759	0
14:00 - 14:15	6	2	22	30	44	6	17	67	17	298	6	321	19	297	39	355	773	0
14:15 - 14:30	6	2	19	27	38	2	13	53	18	305	5	328	27	263	0	290	698	1
14:30 - 14:45	3	4	16	23	37	5	17	59	16	300	3	319	21	249	41	311	712	0
14:45 - 15:00	7	7	18	32	46	3	30	79	22	339	4	365	20	287	31	338	814	3
15:00 - 15:15	9	5	33	47	40	4	9	53	12	322	9	343	20	287	35	342	785	0
15:15 - 15:30	11	0	15	26	39	5	23	67	18	305	7	330	23	300	29	352	775	0
15:30 - 15:45	11	3	20	34	36	5	14	55	12	340	8	360	24	320	33	377	826	1
15:45 - 16:00	6	3	21	30	38	9	20	67	16	322	8	346	18	332	27	377	820	1
16:00 - 16:15	9	4	35	48	43	2	16	61	13	363	5	381	25	267	34	326	816	1
16:15 - 16:30	12	4	31	47	31	4	15	50	13	354	3	370	16	312	26	354	821	3
16:30 - 16:45	2	3	22	27	55	4	32	91	16	356	10	382	17	291	31	339	839	0
16:45 - 17:00	7	6	29	42	35	1	18	54	18	366	9	393	20	330	32	382	871	0
17:00 - 17:15	12	8	38	58	60	4	23	87	15	368	7	390	31	308	23	362	897	2
17:15 - 17:30	13	5	21	39	35	5	24	64	20	360	8	388	24	333	32	389	880	6
17:30 - 17:45	8	3	19	30	36	0	26	62	17	333	5	355	10	307	28	345	792	1
17:45 - 18:00	4	8	18	30	29	1	20	50	15	302	7	324	17	321	21	359	763	1
18:00 - 18:15	3	2	17	22	45	3	20	68	11	310	8	329	18	290	25	333	752	0
18:15 - 18:30	6	0	11	17	18	3	19	40	16	295	4	315	17	273	13	303	675	3
18:30 - 18:45	3	3	13	19	29	6	11	46	15	263	3	281	12	221	16	249	595	6
18:45 - 19:00	7	0	8	15	21	0	16	37	12	230	7	249	15	198	17	230	531	11
TOTAL	370	186	962	1518	1964	180	873	3017	714	13344	306	14364	988	13430	1534	15952	34851	77
Trucks	3	1	14	18	105	1	23	129	11	278	5	294	9	252	125	386	827	2.4%
School Buses	0	1	1	2	0	1	1	2	0	22	2	24	0	25	3	28	56	0.2%

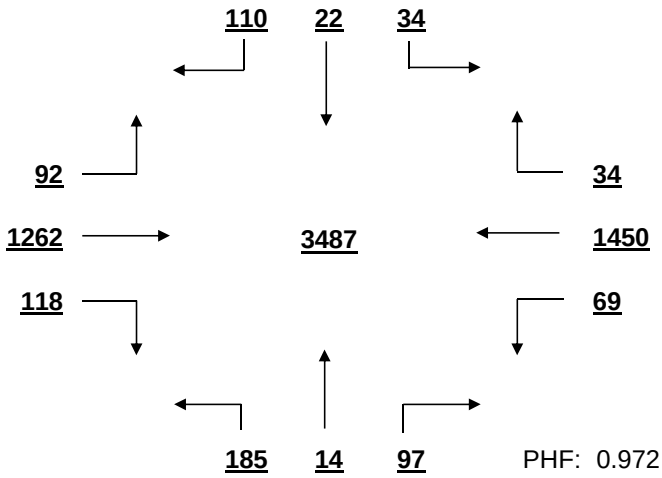
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Sunset Blvd AT McSwain Dr-Chris Dr Date: 12/1/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

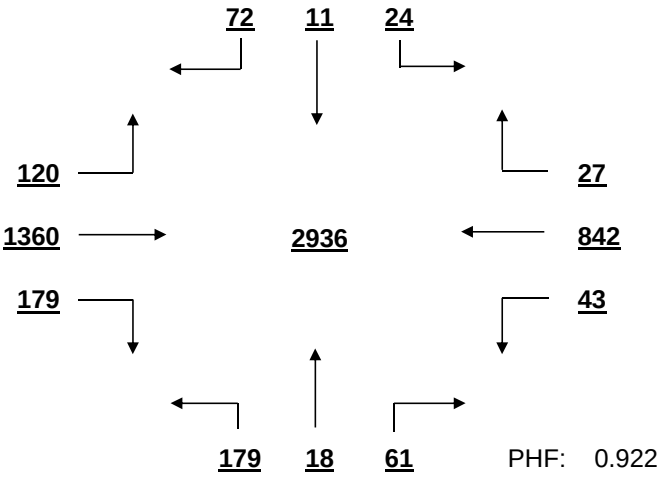


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



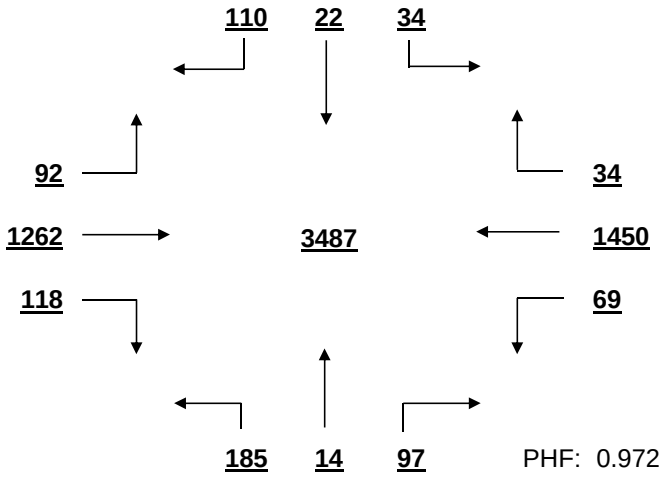
PHF: 0.972

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 8:00 TO 9:00



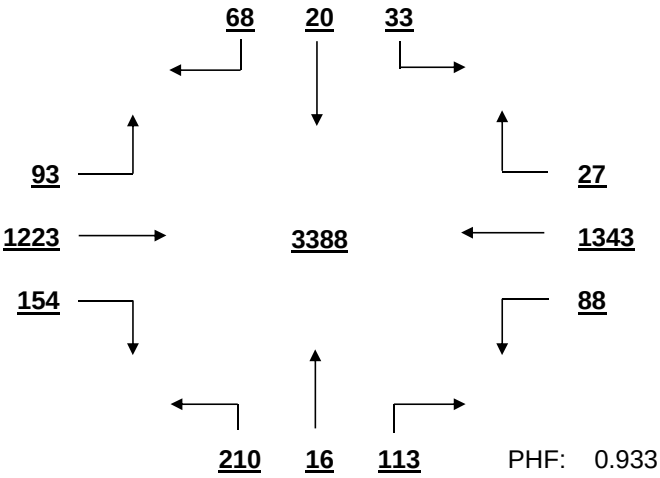
PHF: 0.922

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



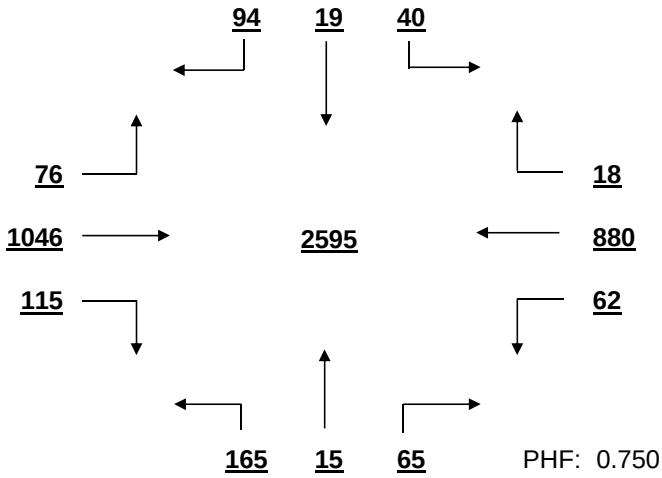
PHF: 0.972

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:30 TO 13:30



PHF: 0.933

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.750

SIGNAL WARRANT ANALYSIS

Sunset Blvd AT McSwain Dr-Chris Dr Date: 12/1/2016

Minor Street Volume, percent of total = 13.0%
Percent of Left Turns from Minor Street = 51.5%
Percent of Right Turns from Minor Street = 40.5%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
2526.3	/ 600	=	421%	251.4	/ 150	=	168%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	366%	429%	343%	350%	409%	435%	458%	438%	471%	488%	485%	382%
Minor St.	163%	172%	165%	144%	164%	212%	184%	172%	161%	171%	175%	127%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
2526.3	/ 900	=	281%	251.4	/ 75	=	335%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	244%	286%	228%	233%	272%	290%	306%	292%	314%	325%	324%	254%
Minor St.	327%	344%	331%	288%	328%	424%	368%	344%	323%	341%	351%	255%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	306%	323%	310%	270%	308%	398%	345%	323%	303%	320%	329%	239%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	16:30 - 17:30	Higher Volume Side Street Peak Hour:	12:30 - 13:30
Minor St.	296%	Minor St.	339%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	1	3	3	1	0	4	2	1	0	0	5	6

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008

Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 12/1/2016

Major Rt: Sunset Blvd * Not on State System Minor Rt: Whippoorwill Dr-Kleckley Dr Clear

Day of Week: Thursday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: N-S Intersection ADT - 30760 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1

* Each Direction

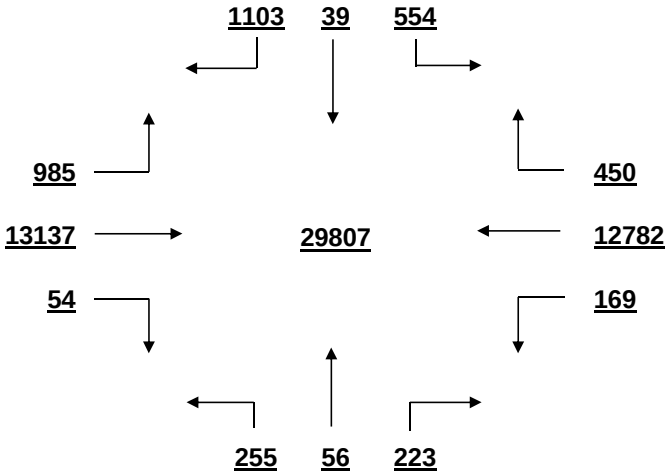
INTERSECTION VOLUME SUMMARY

	From N Whippoorwill Dr-Kl				From S Whippoorwill Dr-Kl				From E Sunset Blvd				From W Sunset Blvd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	5	0	23	28	0	0	0	0	0	140	0	140	11	285	0	296	464	1
7:15 - 7:30	6	0	25	31	0	0	1	1	1	191	4	196	4	342	0	346	574	2
7:30 - 7:45	13	0	28	41	1	0	0	1	1	232	6	239	11	405	0	416	697	0
7:45 - 8:00	9	0	23	32	0	0	0	0	1	283	6	290	10	0	2	12	334	0
8:00 - 8:15	4	0	24	28	3	0	1	4	1	223	3	227	12	390	1	403	662	0
8:15 - 8:30	11	0	0	11	5	0	1	6	1	224	6	231	5	366	2	373	621	0
8:30 - 8:45	10	0	6	16	1	0	1	2	2	227	5	234	13	301	1	315	567	0
8:45 - 9:00	7	0	13	20	1	0	4	5	2	168	6	176	15	300	1	316	517	2
9:00 - 9:15	8	0	14	22	5	0	2	7	2	182	2	186	9	228	2	239	454	0
9:15 - 9:30	13	0	17	30	5	0	2	7	1	187	4	192	16	242	2	260	489	0
9:30 - 9:45	3	1	22	26	9	0	3	12	2	205	6	213	9	268	0	277	528	0
9:45 - 10:00	10	2	22	34	3	0	1	4	3	180	8	191	11	258	1	270	499	3
10:00 - 10:15	12	1	19	32	0	1	0	1	7	176	8	191	14	206	2	222	446	0
10:15 - 10:30	5	1	20	26	6	0	2	8	1	189	7	197	13	257	1	271	502	0
10:30 - 10:45	10	0	26	36	4	0	3	7	1	224	3	228	20	239	0	259	530	2
10:45 - 11:00	7	1	15	23	5	0	3	8	9	202	4	215	22	268	3	293	539	3
11:00 - 11:15	12	2	15	29	9	0	12	21	1	226	6	233	14	271	2	287	570	0
11:15 - 11:30	9	0	20	29	7	1	10	18	3	260	12	275	22	278	0	300	622	0
11:30 - 11:45	10	2	23	35	10	1	4	15	4	238	9	251	21	311	1	333	634	2
11:45 - 12:00	6	3	31	40	3	1	1	5	0	208	10	218	25	302	1	328	591	0
12:00 - 12:15	12	1	27	40	6	4	5	15	3	261	10	274	38	329	1	368	697	2
12:15 - 12:30	17	0	30	47	2	1	4	7	4	293	7	304	27	0	3	30	388	0
12:30 - 12:45	21	0	27	48	5	2	8	15	3	333	10	346	36	359	2	397	806	0
12:45 - 13:00	21	1	37	59	9	2	6	17	5	313	15	333	25	291	0	316	725	0
13:00 - 13:15	18	0	31	49	8	2	3	13	3	315	11	329	28	287	0	315	706	0
13:15 - 13:30	14	0	29	43	6	1	7	14	4	306	10	320	25	269	2	296	673	1
13:30 - 13:45	25	3	44	72	9	1	8	18	2	313	15	330	21	236	3	260	680	0
13:45 - 14:00	14	5	28	47	7	2	5	14	6	309	19	334	15	236	2	253	648	0
14:00 - 14:15	21	0	37	58	7	1	8	16	5	294	10	309	20	280	3	303	686	2
14:15 - 14:30	7	0	16	23	6	4	3	13	4	277	19	300	25	245	0	270	606	2
14:30 - 14:45	16	0	26	42	2	0	7	9	3	290	8	301	21	232	0	253	605	0
14:45 - 15:00	10	1	44	55	5	2	10	17	6	280	9	295	22	283	0	305	672	2
15:00 - 15:15	10	0	19	29	5	1	3	9	2	342	13	357	28	267	0	295	690	2
15:15 - 15:30	12	0	19	31	7	4	6	17	2	288	14	304	26	299	2	327	679	1
15:30 - 15:45	10	0	25	35	3	0	7	10	7	339	14	360	15	308	1	324	729	2
15:45 - 16:00	9	1	31	41	7	1	5	13	5	294	12	311	29	322	0	351	716	1
16:00 - 16:15	18	1	23	42	6	4	8	18	7	358	12	377	21	259	2	282	719	0
16:15 - 16:30	13	0	24	37	5	1	7	13	4	321	9	334	33	290	0	323	707	1
16:30 - 16:45	8	0	27	35	5	0	5	10	8	342	9	359	28	288	1	317	721	4
16:45 - 17:00	18	1	28	47	12	3	10	25	5	352	12	369	32	317	1	350	791	0
17:00 - 17:15	13	1	18	32	6	1	12	19	7	355	12	374	24	328	1	353	778	3
17:15 - 17:30	15	1	17	33	11	2	7	20	3	364	12	379	25	319	2	346	778	0
17:30 - 17:45	12	2	19	33	7	3	4	14	5	326	15	346	36	300	0	336	729	1
17:45 - 18:00	16	2	26	44	3	3	4	10	4	286	11	301	22	314	3	339	694	2
18:00 - 18:15	10	2	13	25	9	4	8	21	8	302	15	325	26	295	0	321	692	4
18:15 - 18:30	11	0	22	33	7	2	7	16	4	289	5	298	25	253	0	278	625	1
18:30 - 18:45	9	3	18	30	11	0	3	14	5	257	12	274	16	229	2	247	565	1
18:45 - 19:00	4	1	12	17	2	1	2	5	2	218	15	235	19	185	1	205	462	3
TOTAL	554	39	1103	1696	255	56	223	534	169	12782	450	13401	985	13137	54	14176	29807	50
Trucks	3	0	16	19	0	0	3	3	1	270	7	278	12	259	1	272	572	1.9%
School Buses	0	0	2	2	0	0	0	0	0	60	1	61	2	51	0	53	116	0.4%

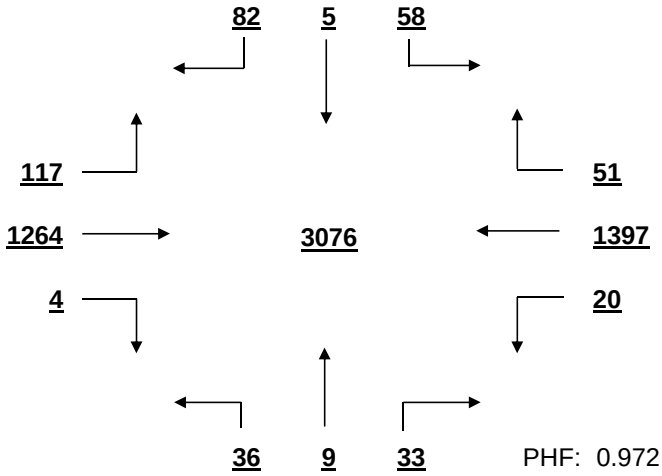
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Sunset Blvd AT Whippoorwill Dr-Kleckley Dr Date: 12/1/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

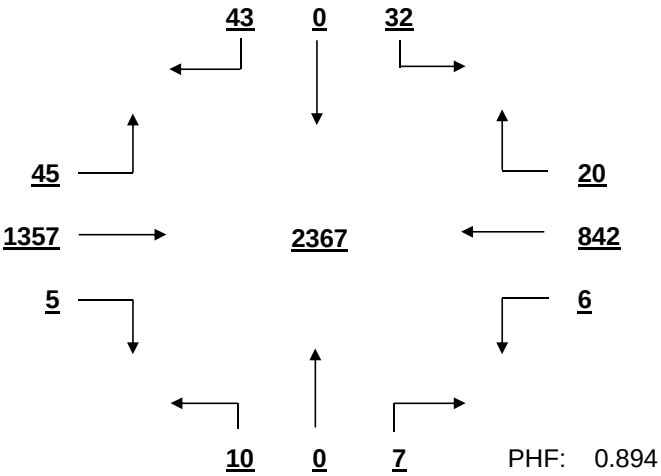


OVERALL PEAK HOUR VOLUME
FROM 16:45 TO 17:45



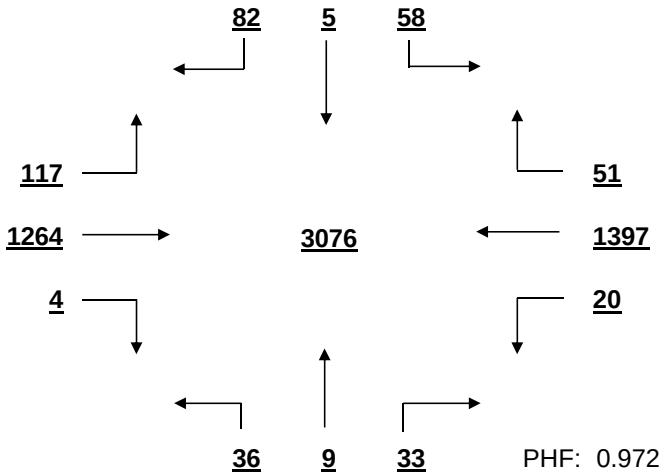
PHF: 0.972

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 8:00 TO 9:00



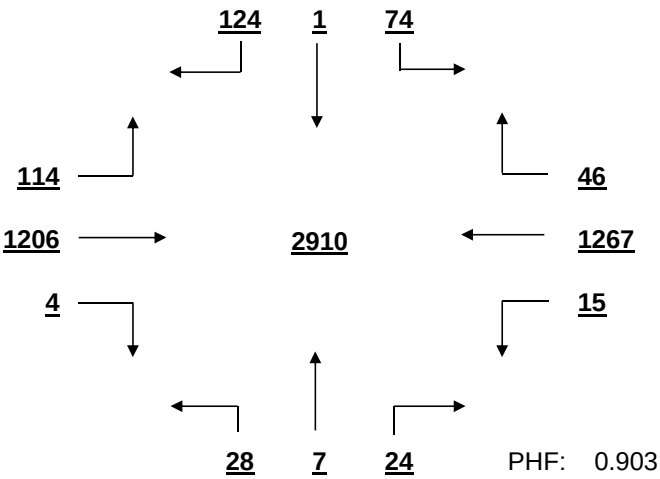
PHF: 0.894

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:45 TO 17:45



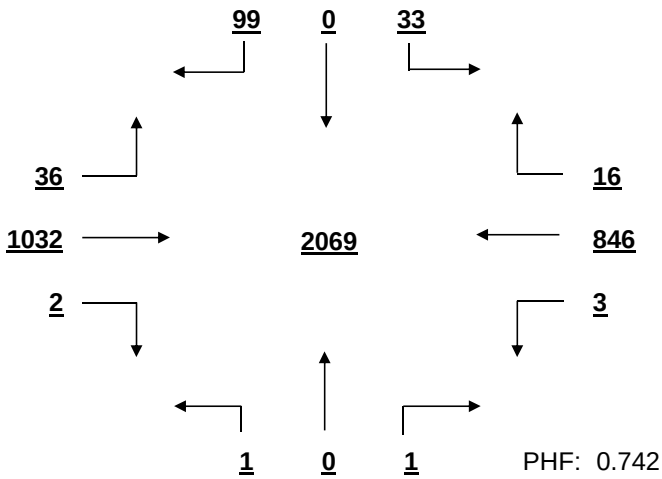
PHF: 0.972

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:30 TO 13:30



PHF: 0.903

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.742

SIGNAL WARRANT ANALYSIS

Sunset Blvd AT Whippoorwill Dr-Kleckley Dr Date: 12/1/2016

Minor Street Volume, percent of total = 7.5%
Percent of Left Turns from Minor Street = 36.3%
Percent of Right Turns from Minor Street = 59.5%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
2298.1	/ 600	=	383%	141.3	/ 150	=	94%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	323%	379%	305%	313%	371%	395%	406%	389%	438%	452%	462%	364%
Minor St.	88%	50%	75%	78%	89%	129%	141%	119%	91%	107%	95%	70%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
2298.1	/ 900	=	255%	141.3	/ 75	=	188%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	215%	253%	203%	208%	247%	263%	271%	260%	292%	301%	308%	243%
Minor St.	176%	100%	149%	156%	177%	259%	281%	237%	181%	215%	189%	140%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	165%	94%	140%	146%	166%	243%	264%	223%	170%	201%	178%	131%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	16:45 - 17:45	Higher Volume Side Street Peak Hour:	12:45 - 13:45
Minor St.	145%	Minor St.	223%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	1	0	1	0	1	0	1	0	1	0	1

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008

Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 12/1/2016

Major Rt: Broad River Rd * Not on State System Minor Rt: Marley Dr-Menlo (Briarsgate) Dr

Day of Week: Thursday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: E-W Intersection ADT - 34950 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1

* Each Direction

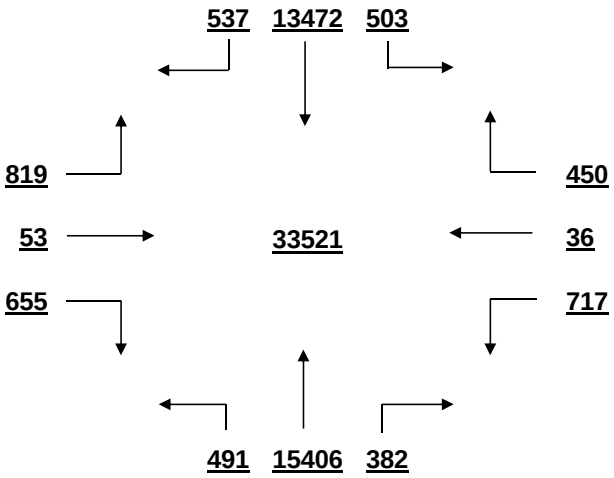
INTERSECTION VOLUME SUMMARY

	From N Broad River Rd				From S Broad River Rd				From E Marley Dr-Menlo (B				From W Marley Dr-Menlo (B				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	6	344	8	358	5	246	4	255	7	0	8	15	12	0	11	23	651	4
7:15 - 7:30	4	454	10	468	9	299	4	312	10	0	7	17	22	1	0	23	820	0
7:30 - 7:45	11	352	5	368	14	312	4	330	13	0	6	19	14	2	31	47	764	0
7:45 - 8:00	11	328	4	343	21	359	2	382	16	0	10	26	21	0	24	45	796	3
8:00 - 8:15	9	348	12	369	11	254	4	269	13	0	7	20	12	1	19	32	690	4
8:15 - 8:30	8	371	0	379	8	296	9	313	15	0	5	20	13	1	10	24	736	1
8:30 - 8:45	9	359	10	378	9	244	7	260	8	3	4	15	15	4	27	46	699	2
8:45 - 9:00	12	328	12	352	14	263	8	285	10	0	11	21	12	1	21	34	692	3
9:00 - 9:15	11	245	6	262	8	224	5	237	10	0	6	16	14	0	16	30	545	3
9:15 - 9:30	15	234	13	262	6	248	4	258	7	0	6	13	13	1	18	32	565	0
9:30 - 9:45	15	223	13	251	5	218	2	225	8	1	8	17	14	1	10	25	518	6
9:45 - 10:00	18	240	6	264	4	245	3	252	5	0	6	11	15	2	7	24	551	4
10:00 - 10:15	9	230	7	246	0	237	0	237	10	1	10	21	13	0	7	20	524	2
10:15 - 10:30	14	229	14	257	9	244	4	257	8	1	10	19	21	1	15	37	570	3
10:30 - 10:45	10	243	17	270	4	236	6	246	8	0	5	13	17	1	13	31	560	2
10:45 - 11:00	13	245	18	276	8	258	10	276	11	1	10	22	16	3	8	27	601	0
11:00 - 11:15	7	268	10	285	5	243	6	254	13	0	7	20	16	2	6	24	583	3
11:15 - 11:30	7	224	6	237	6	246	2	254	9	2	6	17	27	4	11	42	550	1
11:30 - 11:45	8	291	9	308	13	240	9	262	7	3	11	21	27	1	18	46	637	1
11:45 - 12:00	10	278	7	295	6	273	5	284	10	1	5	16	13	0	13	26	621	2
12:00 - 12:15	7	269	14	290	9	277	12	298	21	2	6	29	20	0	14	34	651	2
12:15 - 12:30	18	308	9	335	13	301	4	318	9	0	8	17	21	0	13	34	704	1
12:30 - 12:45	9	266	19	294	10	282	8	300	17	0	8	25	13	3	15	31	650	3
12:45 - 13:00	8	275	15	298	6	307	9	322	10	1	10	21	19	1	22	42	683	0
13:00 - 13:15	8	258	15	281	8	283	9	300	14	2	10	26	16	4	15	35	642	0
13:15 - 13:30	9	300	13	322	15	338	6	359	12	1	10	23	24	1	21	46	750	3
13:30 - 13:45	15	307	17	339	12	346	5	363	10	1	8	19	21	1	11	33	754	3
13:45 - 14:00	11	304	5	320	8	300	7	315	13	1	11	25	20	0	11	31	691	3
14:00 - 14:15	2	324	20	346	14	314	7	335	8	0	6	14	14	0	11	25	720	7
14:15 - 14:30	14	295	13	322	6	312	13	331	13	0	7	20	20	1	0	21	694	2
14:30 - 14:45	8	322	17	347	14	344	13	371	16	0	14	30	21	0	14	35	783	0
14:45 - 15:00	19	284	20	323	15	361	10	386	19	2	10	31	22	2	18	42	782	6
15:00 - 15:15	8	315	11	334	8	322	8	338	15	0	15	30	16	0	9	25	727	5
15:15 - 15:30	17	0	14	31	10	315	15	340	14	4	18	36	14	1	23	38	445	5
15:30 - 15:45	11	326	12	349	19	341	7	367	40	0	16	56	16	3	16	35	807	1
15:45 - 16:00	11	283	11	305	8	379	12	399	22	2	11	35	11	2	14	27	766	2
16:00 - 16:15	11	334	14	359	12	399	12	423	19	1	13	33	22	0	8	30	845	1
16:15 - 16:30	8	320	9	337	18	436	15	469	19	1	8	28	20	0	13	33	867	1
16:30 - 16:45	8	319	15	342	13	446	12	471	44	1	10	55	17	1	16	34	902	3
16:45 - 17:00	12	301	15	328	11	424	16	451	22	0	9	31	16	0	14	30	840	3
17:00 - 17:15	7	285	5	297	12	492	14	518	26	1	8	35	17	0	13	30	880	6
17:15 - 17:30	12	322	15	349	14	435	16	465	15	0	7	22	22	0	15	37	873	4
17:30 - 17:45	10	276	4	290	12	499	8	519	27	1	14	42	20	1	12	33	884	2
17:45 - 18:00	12	291	12	315	13	461	12	486	12	0	12	24	17	1	9	27	852	1
18:00 - 18:15	10	283	5	298	18	446	12	476	27	0	18	45	20	1	14	35	854	1
18:15 - 18:30	9	0	14	23	14	504	10	528	12	2	7	21	13	0	11	24	596	0
18:30 - 18:45	13	243	10	266	10	385	8	403	28	0	21	49	9	1	11	21	739	7
18:45 - 19:00	9	228	7	244	4	172	4	180	15	0	7	22	11	3	7	21	467	1
TOTAL	503	13472	537	14512	491	15406	382	16279	717	36	450	1203	819	53	655	1527	33521	117
Trucks	5	198	7	210	13	172	3	188	7	3	2	12	12	0	14	26	436	1.3%
School Buses	2	86	4	92	2	68	3	73	1	0	5	6	2	4	3	9	180	0.5%

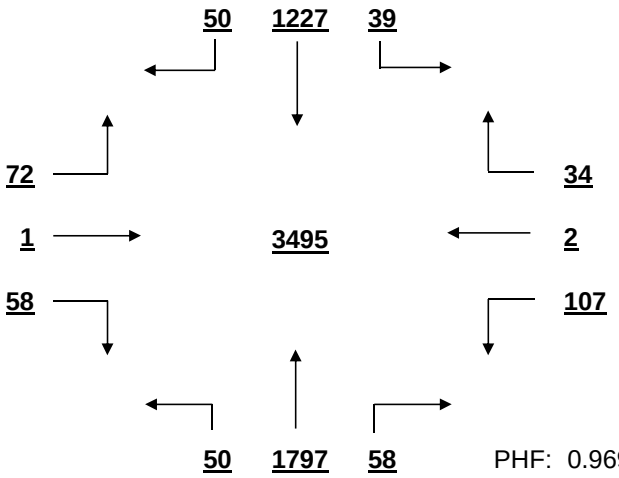
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Broad River Rd AT Marley Dr-Menlo (Briarsgate) Dr Date: 12/1/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

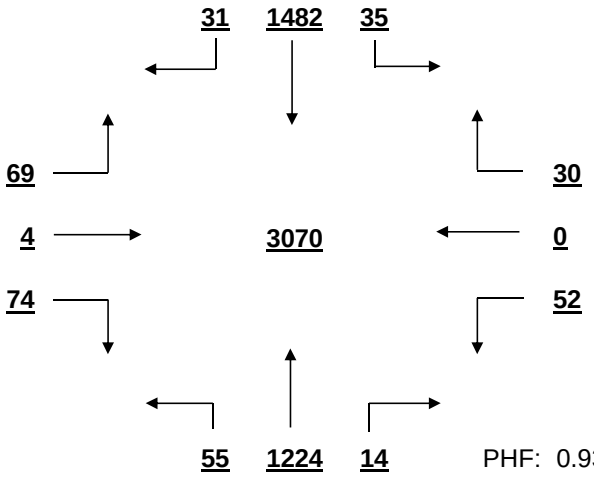


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



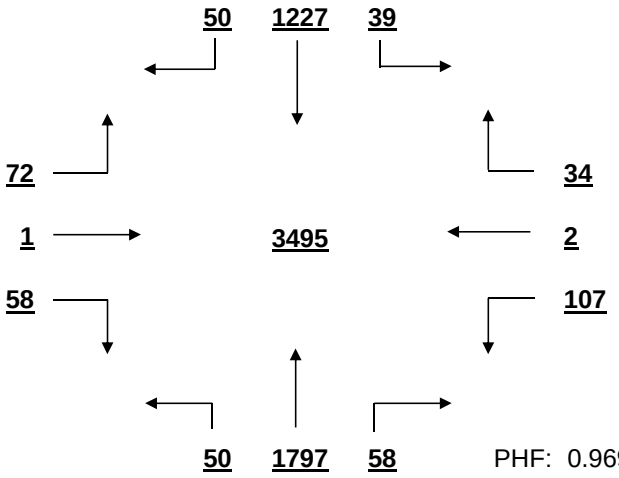
PHF: 0.969

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



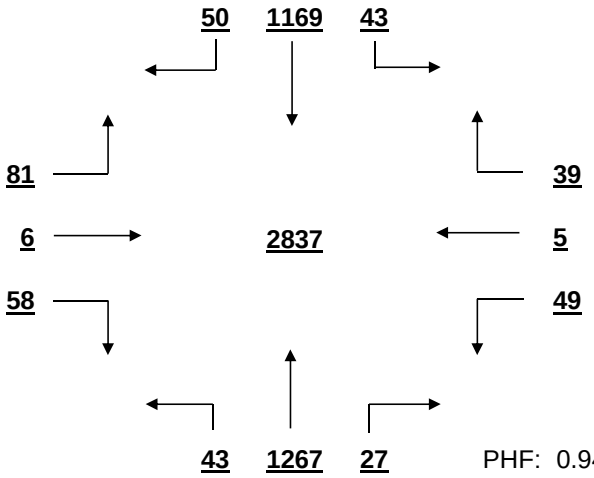
PHF: 0.936

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



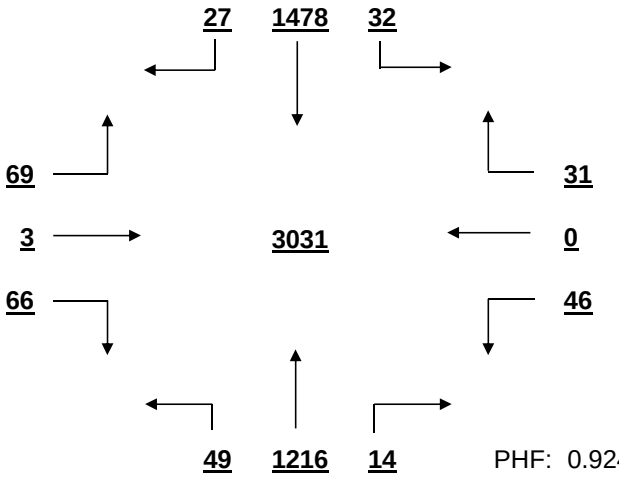
PHF: 0.969

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 13:00 TO 14:00



PHF: 0.941

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.924

SIGNAL WARRANT ANALYSIS

Broad River Rd AT Marley Dr-Menlo (Briarsgate) Dr Date: 12/1/2016

Minor Street Volume, percent of total = 8.1%
Percent of Left Turns from Minor Street = 56.3%
Percent of Right Turns from Minor Street = 40.5%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
2565.9	/	600 =	428%	127.3	/	150 =	85%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	469%	434%	335%	344%	363%	409%	433%	460%	411%	530%	540%	403%
Minor St.	92%	91%	74%	77%	92%	94%	97%	82%	105%	98%	85%	91%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
2565.9	/	900 =	285%	127.3	/	75 =	170%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	313%	289%	223%	229%	242%	273%	289%	307%	274%	353%	360%	269%
Minor St.	184%	181%	148%	153%	184%	188%	193%	164%	209%	196%	169%	183%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	173%	170%	139%	144%	173%	176%	181%	154%	196%	184%	159%	171%

Warrant No. 3 - Peak Hour is met

Percent of warrant			Percent of warrant	
Overall Peak Hour:	16:30 - 17:30	Higher Volume Side Street Peak Hour:	15:15 - 16:15	
Minor St.	143%	Minor St.	160%	

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	1	1	2	1	0	1	3	2	2	0	3	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008

Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 12/2/2016

Major Rt: I-20 EB On-Ramp Minor Rt: Garner Ln

Clear

Day of Week: Friday Weather: Clear Office: Short Counts JMS

Type of Control: Stop Sign Speed Limit (major st) NPSL

Direction of Minor Street: E-W Intersection ADT - 11070 (Calc)

Number of Lanes (major st)* 1 Number of Lanes (minor st)* 1

* Each Direction

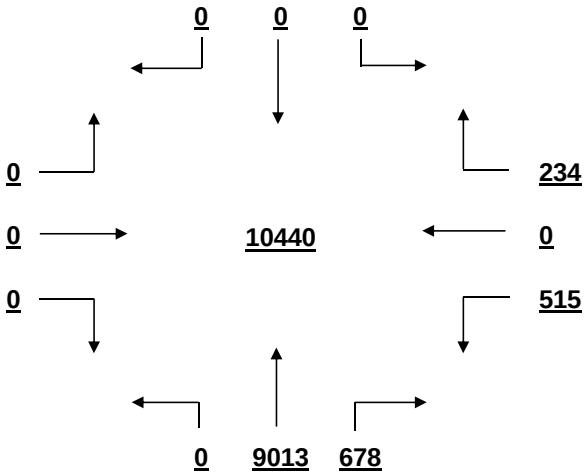
INTERSECTION VOLUME SUMMARY

	From N I-20 EB On-Ramp				From S I-20 EB On-Ramp				From E Garner Ln				From W Garner Ln				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	0	0	0	0	0	175	7	182	4	0	1	5	0	0	0	0	187	1
7:15 - 7:30	0	0	0	0	0	237	5	242	7	0	5	12	0	0	0	0	254	1
7:30 - 7:45	0	0	0	0	0	249	22	271	6	0	3	9	0	0	0	0	280	0
7:45 - 8:00	0	0	0	0	0	169	43	212	8	0	11	19	0	0	0	0	231	1
8:00 - 8:15	0	0	0	0	0	163	23	186	4	0	2	6	0	0	0	0	192	0
8:15 - 8:30	0	0	0	0	0	140	18	158	6	0	5	11	0	0	0	0	169	1
8:30 - 8:45	0	0	0	0	0	194	16	210	3	0	5	8	0	0	0	0	218	0
8:45 - 9:00	0	0	0	0	0	149	9	158	4	0	0	4	0	0	0	0	162	0
9:00 - 9:15	0	0	0	0	0	154	16	170	3	0	2	5	0	0	0	0	175	1
9:15 - 9:30	0	0	0	0	0	159	14	173	7	0	7	14	0	0	0	0	187	0
9:30 - 9:45	0	0	0	0	0	138	12	150	10	0	3	13	0	0	0	0	163	1
9:45 - 10:00	0	0	0	0	0	133	13	146	8	0	1	9	0	0	0	0	155	1
10:00 - 10:15	0	0	0	0	0	126	0	126	16	0	2	18	0	0	0	0	144	2
10:15 - 10:30	0	0	0	0	0	127	15	142	13	0	2	15	0	0	0	0	157	0
10:30 - 10:45	0	0	0	0	0	133	20	153	9	0	2	11	0	0	0	0	164	1
10:45 - 11:00	0	0	0	0	0	153	17	170	12	0	4	16	0	0	0	0	186	0
11:00 - 11:15	0	0	0	0	0	151	21	172	9	0	5	14	0	0	0	0	186	0
11:15 - 11:30	0	0	0	0	0	169	16	185	10	0	2	12	0	0	0	0	197	1
11:30 - 11:45	0	0	0	0	0	177	9	186	10	0	4	14	0	0	0	0	200	0
11:45 - 12:00	0	0	0	0	0	165	21	186	15	0	9	24	0	0	0	0	210	0
12:00 - 12:15	0	0	0	0	0	203	7	210	27	0	1	28	0	0	0	0	238	1
12:15 - 12:30	0	0	0	0	0	168	21	189	9	0	3	12	0	0	0	0	201	0
12:30 - 12:45	0	0	0	0	0	170	15	185	12	0	7	19	0	0	0	0	204	0
12:45 - 13:00	0	0	0	0	0	192	14	206	8	0	10	18	0	0	0	0	224	0
13:00 - 13:15	0	0	0	0	0	164	15	179	20	0	7	27	0	0	0	0	206	0
13:15 - 13:30	0	0	0	0	0	166	15	181	12	0	6	18	0	0	0	0	199	0
13:30 - 13:45	0	0	0	0	0	181	17	198	15	0	6	21	0	0	0	0	219	1
13:45 - 14:00	0	0	0	0	0	199	24	223	16	0	2	18	0	0	0	0	241	1
14:00 - 14:15	0	0	0	0	0	200	16	216	12	0	1	13	0	0	0	0	229	2
14:15 - 14:30	0	0	0	0	0	209	15	224	12	0	2	14	0	0	0	0	238	0
14:30 - 14:45	0	0	0	0	0	196	11	207	9	0	7	16	0	0	0	0	223	0
14:45 - 15:00	0	0	0	0	0	200	16	216	9	0	6	15	0	0	0	0	231	0
15:00 - 15:15	0	0	0	0	0	209	10	219	17	0	2	19	0	0	0	0	238	0
15:15 - 15:30	0	0	0	0	0	243	13	256	7	0	5	12	0	0	0	0	268	0
15:30 - 15:45	0	0	0	0	0	213	12	225	11	0	4	15	0	0	0	0	240	5
15:45 - 16:00	0	0	0	0	0	241	9	250	12	0	4	16	0	0	0	0	266	3
16:00 - 16:15	0	0	0	0	0	239	12	251	9	0	5	14	0	0	0	0	265	0
16:15 - 16:30	0	0	0	0	0	238	8	246	4	0	8	12	0	0	0	0	258	1
16:30 - 16:45	0	0	0	0	0	238	10	248	7	0	4	11	0	0	0	0	259	0
16:45 - 17:00	0	0	0	0	0	230	13	243	10	0	5	15	0	0	0	0	258	2
17:00 - 17:15	0	0	0	0	0	267	13	280	31	0	19	50	0	0	0	0	330	0
17:15 - 17:30	0	0	0	0	0	233	12	245	7	0	8	15	0	0	0	0	260	0
17:30 - 17:45	0	0	0	0	0	192	15	207	11	0	12	23	0	0	0	0	230	0
17:45 - 18:00	0	0	0	0	0	216	10	226	12	0	4	16	0	0	0	0	242	0
18:00 - 18:15	0	0	0	0	0	164	12	176	16	0	9	25	0	0	0	0	201	0
18:15 - 18:30	0	0	0	0	0	194	8	202	8	0	5	13	0	0	0	0	215	5
18:30 - 18:45	0	0	0	0	0	216	9	225	15	0	5	20	0	0	0	0	245	2
18:45 - 19:00	0	0	0	0	0	171	9	180	13	0	2	15	0	0	0	0	195	0
TOTAL	0	0	0	0	0	9013	678	9691	515	0	234	749	0	0	0	0	10440	34
Trucks	0	0	0	0	0	103	6	109	5	0	2	7	0	0	0	0	116	1.1%
School Buses	0	0	0	0	0	56	0	56	1	0	0	1	0	0	0	0	57	0.5%

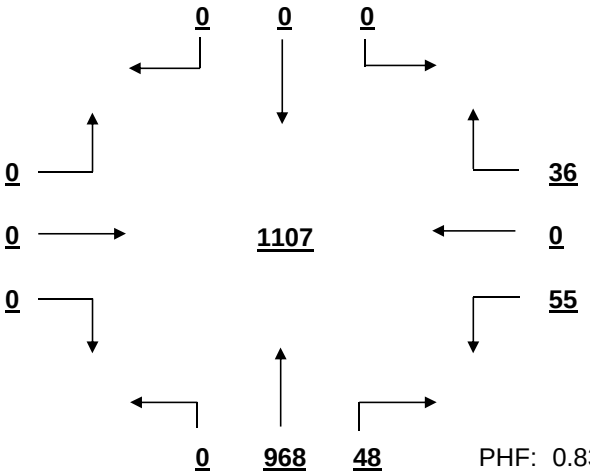
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

I-20 EB On-Ramp AT Garner Ln Date: 12/2/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

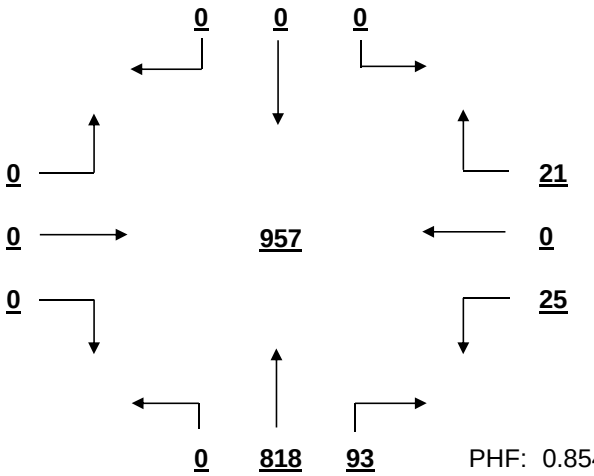


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



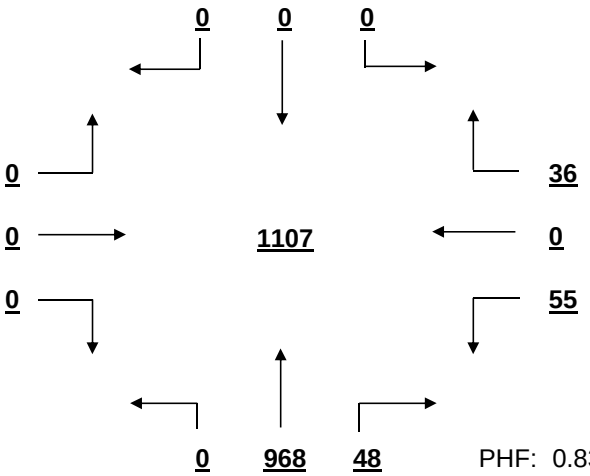
PHF: 0.839

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



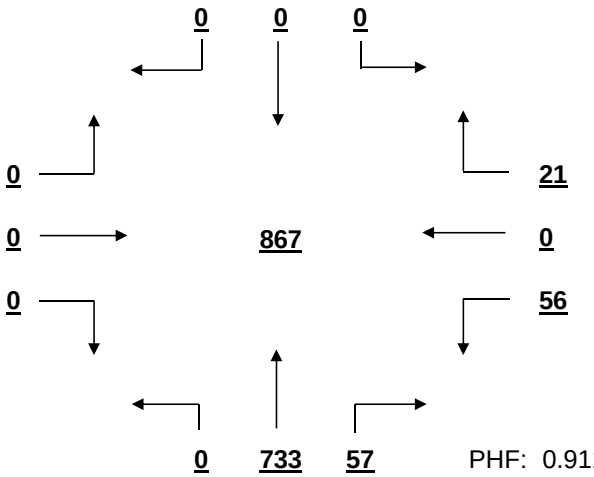
PHF: 0.854

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



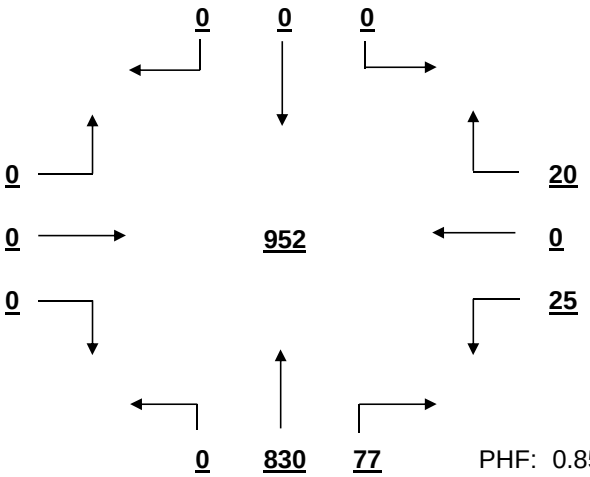
PHF: 0.839

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 12:00 TO 13:00



PHF: 0.911

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.850

SIGNAL WARRANT ANALYSIS

I-20 EB On-Ramp AT Garner Ln Date: 12/2/2016

Minor Street Volume, percent of total = 7.2%
Percent of Left Turns from Minor Street = 68.8%
Percent of Right Turns from Minor Street = 31.2%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **70%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
807.6	/	350	= 231%	62.4	/	105	= 59%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	259%	203%	183%	169%	208%	226%	223%	247%	271%	282%	274%	224%
Minor St.	43%	28%	39%	57%	61%	73%	80%	55%	59%	50%	99%	70%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
807.6	/	525	= 154%	62.4	/	53	= 119%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	173%	136%	122%	113%	139%	150%	149%	164%	181%	188%	182%	149%
Minor St.	86%	55%	78%	114%	122%	147%	160%	110%	118%	99%	198%	139%

80% Combination of Conditions A & B is not applicable

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	75%	43%	49%	62%	101%	147%	156%	97%	103%	87%	173%	137%

Warrant No. 3 - Peak Hour is met

Percent of warrant			Percent of warrant	
Overall Peak Hour:	16:30 - 17:30	Higher Volume Side Street Peak Hour:	17:00 - 18:00	
Minor St.	119%	Minor St.	125%	

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 75

Minimum peak hour ped. volume crossing major street: 93

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	3	1	3	3	1	1	2	2	8	3	0	7

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 12/1/2016

Major Rt: Broad River Rd * Not on State System Minor Rt: Longcreek Dr Clear

Day of Week: Thursday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: E-W Intersection ADT - 30830 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1

* Each Direction

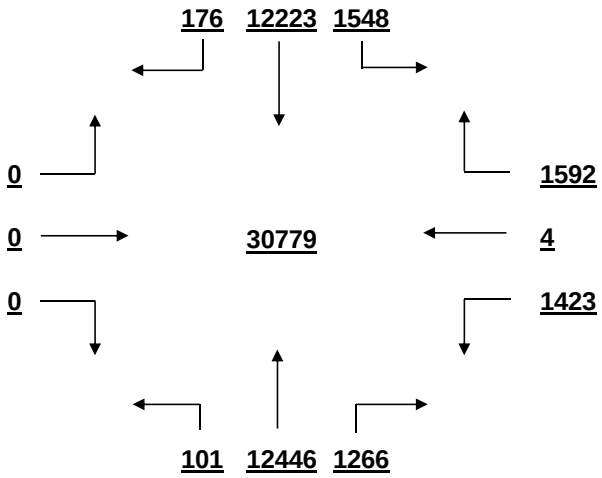
INTERSECTION VOLUME SUMMARY

	From N Broad River Rd				From S Broad River Rd				From E Longcreek Dr				From W Longcreek Dr				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	7	258	1	266	0	153	10	163	32	0	37	69	0	0	0	0	498	1
7:15 - 7:30	22	357	3	382	0	175	26	201	42	0	36	78	0	0	0	0	661	0
7:30 - 7:45	31	331	0	362	0	221	26	247	33	0	56	89	0	0	0	0	698	0
7:45 - 8:00	21	355	0	376	0	215	18	233	34	0	56	90	0	0	0	0	699	0
8:00 - 8:15	18	364	1	383	0	171	14	185	39	0	31	70	0	0	0	0	638	0
8:15 - 8:30	21	354	0	375	1	188	17	206	26	0	27	53	0	0	0	0	634	3
8:30 - 8:45	12	395	2	409	0	192	18	210	27	0	29	56	0	0	0	0	675	3
8:45 - 9:00	23	339	2	364	0	190	21	211	31	0	25	56	0	0	0	0	631	1
9:00 - 9:15	21	260	1	282	1	185	8	194	17	0	32	49	0	0	0	0	525	0
9:15 - 9:30	14	232	1	247	0	182	14	196	29	0	26	55	0	0	0	0	498	3
9:30 - 9:45	15	224	1	240	0	176	14	190	15	0	22	37	0	0	0	0	467	1
9:45 - 10:00	19	244	2	265	0	182	11	193	20	1	33	54	0	0	0	0	512	0
10:00 - 10:15	24	226	1	251	0	207	0	207	25	0	25	50	0	0	0	0	508	1
10:15 - 10:30	27	238	0	265	1	176	14	191	17	0	35	52	0	0	0	0	508	2
10:30 - 10:45	23	223	1	247	0	206	16	222	15	0	16	31	0	0	0	0	500	0
10:45 - 11:00	21	238	6	265	1	212	16	229	21	1	33	55	0	0	0	0	549	3
11:00 - 11:15	23	242	4	269	2	222	21	245	30	0	21	51	0	0	0	0	565	1
11:15 - 11:30	26	211	1	238	2	207	18	227	24	0	32	56	0	0	0	0	521	1
11:30 - 11:45	21	271	1	293	4	228	29	261	24	0	25	49	0	0	0	0	603	0
11:45 - 12:00	22	246	16	284	5	248	26	279	21	0	18	39	0	0	0	0	602	0
12:00 - 12:15	33	280	3	316	8	259	34	301	38	0	33	71	0	0	0	0	688	0
12:15 - 12:30	32	262	11	305	8	286	27	321	32	0	31	63	0	0	0	0	689	2
12:30 - 12:45	31	287	9	327	4	281	26	311	31	0	31	62	0	0	0	0	700	0
12:45 - 13:00	21	246	7	274	2	254	17	273	41	0	26	67	0	0	0	0	614	4
13:00 - 13:15	38	286	8	332	8	276	34	318	35	0	36	71	0	0	0	0	721	2
13:15 - 13:30	32	271	4	307	6	286	39	331	27	0	26	53	0	0	0	0	691	2
13:30 - 13:45	38	273	6	317	4	319	27	350	34	0	30	64	0	0	0	0	731	0
13:45 - 14:00	36	238	5	279	4	295	30	329	30	0	31	61	0	0	0	0	669	2
14:00 - 14:15	33	274	8	315	8	274	32	314	35	0	40	75	0	0	0	0	704	2
14:15 - 14:30	39	255	3	297	2	306	36	344	26	0	47	73	0	0	0	0	714	1
14:30 - 14:45	24	249	4	277	0	271	25	296	20	0	42	62	0	0	0	0	635	0
14:45 - 15:00	44	277	5	326	1	294	32	327	35	0	29	64	0	0	0	0	717	2
15:00 - 15:15	50	266	3	319	0	288	35	323	36	0	30	66	0	0	0	0	708	1
15:15 - 15:30	32	0	3	35	4	293	29	326	31	1	49	81	0	0	0	0	442	3
15:30 - 15:45	43	290	4	337	2	277	43	322	28	0	26	54	0	0	0	0	713	0
15:45 - 16:00	42	259	7	308	2	281	36	319	29	0	45	74	0	0	0	0	701	0
16:00 - 16:15	36	262	4	302	3	328	21	352	22	1	32	55	0	0	0	0	709	2
16:15 - 16:30	56	286	7	349	5	308	37	350	28	0	27	55	0	0	0	0	754	0
16:30 - 16:45	37	256	0	293	1	371	36	408	31	0	46	77	0	0	0	0	778	1
16:45 - 17:00	47	233	2	282	1	388	22	411	22	0	26	48	0	0	0	0	741	2
17:00 - 17:15	41	219	1	261	1	398	33	432	37	0	36	73	0	0	0	0	766	0
17:15 - 17:30	37	259	0	296	1	394	36	431	43	0	28	71	0	0	0	0	798	1
17:30 - 17:45	52	235	5	292	2	349	39	390	37	0	38	75	0	0	0	0	757	2
17:45 - 18:00	60	205	2	267	2	291	54	347	48	0	54	102	0	0	0	0	716	3
18:00 - 18:15	40	247	3	290	2	320	32	354	27	0	29	56	0	0	0	0	700	1
18:15 - 18:30	59	0	7	66	1	303	35	339	39	0	41	80	0	0	0	0	485	3
18:30 - 18:45	53	225	6	284	1	284	36	321	39	0	31	70	0	0	0	0	675	0
18:45 - 19:00	51	175	5	231	1	236	46	283	20	0	37	57	0	0	0	0	571	0
TOTAL	1548	12223	176	13947	101	12446	1266	13813	1423	4	1592	3019	0	0	0	0	30779	56
Trucks	22	137	2	161	0	118	11	129	10	0	16	26	0	0	0	0	316	1.0%
School Buses	6	75	0	81	0	72	9	81	4	0	9	13	0	0	0	0	175	0.6%

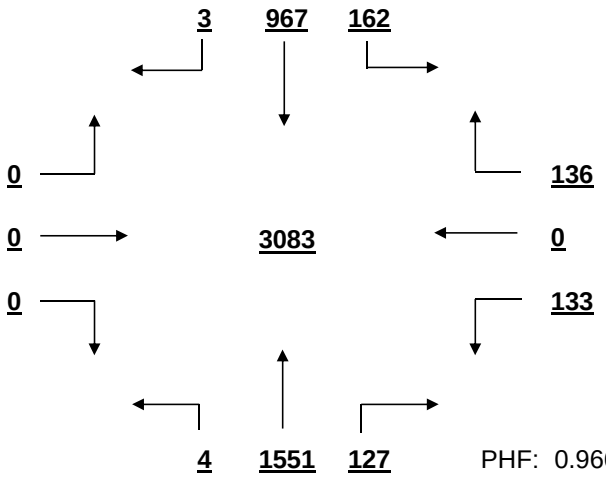
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Broad River Rd AT Longcreek Dr Date: 12/1/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

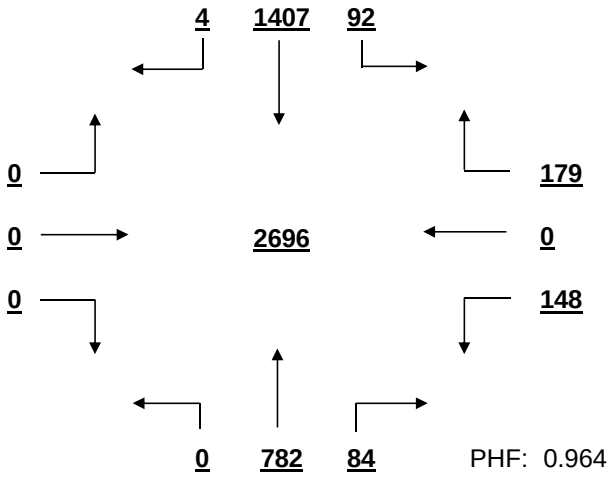


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



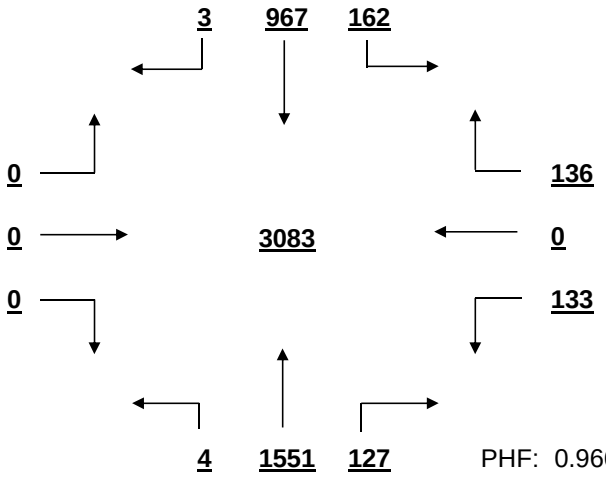
PHF: 0.966

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



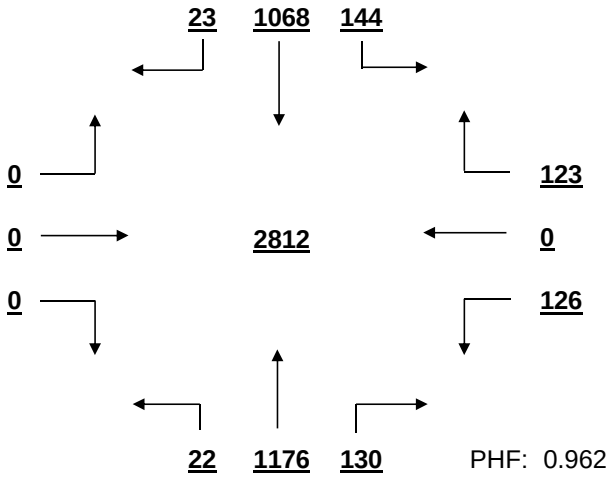
PHF: 0.964

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



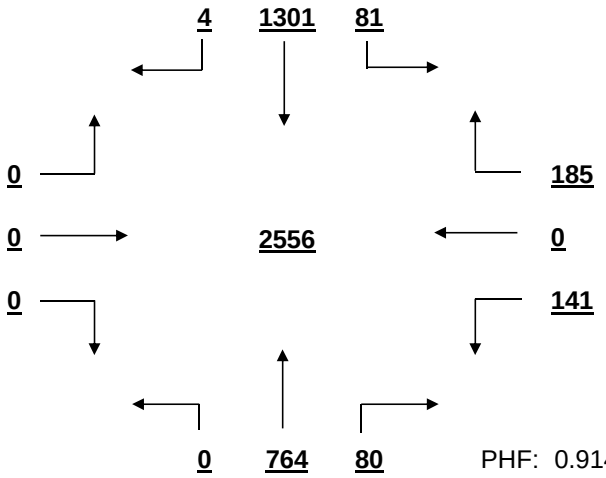
PHF: 0.966

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 13:00 TO 14:00



PHF: 0.962

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.914

SIGNAL WARRANT ANALYSIS

Broad River Rd AT Longcreek Dr Date: 12/1/2016

Minor Street Volume, percent of total = 9.8%
Percent of Left Turns from Minor Street = 47.1%
Percent of Right Turns from Minor Street = 52.7%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
2313.3	/ 600	=	386%	251.6	/ 150	=	168%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	372%	391%	301%	313%	349%	405%	427%	416%	382%	458%	453%	361%
Minor St.	217%	157%	130%	125%	130%	175%	166%	183%	183%	157%	214%	175%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
2313.3	/ 900	=	257%	251.6	/ 75	=	335%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	248%	260%	201%	209%	233%	270%	285%	277%	254%	305%	302%	241%
Minor St.	435%	313%	260%	251%	260%	351%	332%	365%	367%	313%	428%	351%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	408%	294%	244%	235%	244%	329%	311%	343%	344%	294%	401%	329%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	16:30 - 17:30	Higher Volume Side Street Peak Hour:	7:15 - 8:15
Minor St.	269%	Minor St.	327%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	1	4	1	2	0	4	4	3	2	1	3	3

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008

Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 11/28/2016

Major Rt: Broad River Rd * Not on State System Minor Rt: Dutch Square Blvd * Not on State System

Day of Week: Monday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: E-W Intersection ADT - 25260 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1

* Each Direction

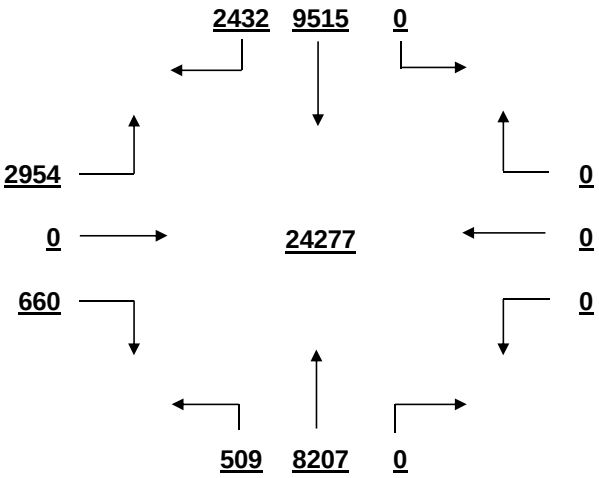
INTERSECTION VOLUME SUMMARY

	From N Broad River Rd				From S Broad River Rd				From E Dutch Square Blvd				From W Dutch Square Blvd				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	0	178	28	206	1	99	0	100	0	0	0	0	33	0	2	35	341	1
7:15 - 7:30	0	311	38	349	3	139	0	142	0	0	0	0	40	0	3	43	534	0
7:30 - 7:45	0	168	23	191	5	105	0	110	0	0	0	0	42	0	7	49	350	0
7:45 - 8:00	0	256	39	295	4	146	0	150	0	0	0	0	44	0	16	60	505	0
8:00 - 8:15	0	246	31	277	4	134	0	138	0	0	0	0	38	0	5	43	458	0
8:15 - 8:30	0	267	35	302	0	102	0	102	0	0	0	0	32	0	7	39	443	0
8:30 - 8:45	0	322	41	363	11	148	0	159	0	0	0	0	40	0	13	53	575	0
8:45 - 9:00	0	309	50	359	15	158	0	173	0	0	0	0	42	0	8	50	582	0
9:00 - 9:15	0	218	54	272	7	157	0	164	0	0	0	0	20	0	11	31	467	0
9:15 - 9:30	0	197	57	254	8	121	0	129	0	0	0	0	48	0	19	67	450	0
9:30 - 9:45	0	188	53	241	11	117	0	128	0	0	0	0	60	0	22	82	451	0
9:45 - 10:00	0	195	57	252	18	143	0	161	0	0	0	0	36	0	14	50	463	0
10:00 - 10:15	0	189	41	230	15	157	0	172	0	0	0	0	50	0	14	64	466	0
10:15 - 10:30	0	163	48	211	13	123	0	136	0	0	0	0	35	0	12	47	394	0
10:30 - 10:45	0	171	51	222	17	136	0	153	0	0	0	0	52	0	25	77	452	0
10:45 - 11:00	0	191	59	250	10	138	0	148	0	0	0	0	42	0	18	60	458	0
11:00 - 11:15	0	162	54	216	7	127	0	134	0	0	0	0	54	0	17	71	421	0
11:15 - 11:30	0	161	62	223	13	164	0	177	0	0	0	0	61	0	26	87	487	0
11:30 - 11:45	0	200	67	267	12	187	0	199	0	0	0	0	49	0	17	66	532	0
11:45 - 12:00	0	201	47	248	6	182	0	188	0	0	0	0	80	0	15	95	531	0
12:00 - 12:15	0	194	64	258	16	209	0	225	0	0	0	0	64	0	24	88	571	0
12:15 - 12:30	0	181	60	241	14	157	0	171	0	0	0	0	102	0	22	124	536	1
12:30 - 12:45	0	238	72	310	13	195	0	208	0	0	0	0	74	0	40	114	632	0
12:45 - 13:00	0	202	66	268	12	156	0	168	0	0	0	0	77	0	16	93	529	0
13:00 - 13:15	0	211	71	282	9	147	0	156	0	0	0	0	81	0	11	92	530	0
13:15 - 13:30	0	202	66	268	9	183	0	192	0	0	0	0	79	0	8	87	547	0
13:30 - 13:45	0	145	35	180	5	109	0	114	0	0	0	0	59	0	4	63	357	2
13:45 - 14:00	0	181	53	234	12	181	0	193	0	0	0	0	84	0	13	97	524	2
14:00 - 14:15	0	206	56	262	18	170	0	188	0	0	0	0	82	0	11	93	543	0
14:15 - 14:30	0	185	71	256	6	199	0	205	0	0	0	0	73	0	17	90	551	2
14:30 - 14:45	0	200	55	255	9	208	0	217	0	0	0	0	43	0	17	60	532	0
14:45 - 15:00	0	132	37	169	5	88	0	93	0	0	0	0	54	0	7	61	323	0
15:00 - 15:15	0	208	64	272	10	186	0	196	0	0	0	0	65	0	12	77	545	0
15:15 - 15:30	0	252	76	328	17	235	0	252	0	0	0	0	68	0	15	83	663	1
15:30 - 15:45	0	242	55	297	7	197	0	204	0	0	0	0	61	0	13	74	575	0
15:45 - 16:00	0	163	50	213	12	175	0	187	0	0	0	0	58	0	11	69	469	0
16:00 - 16:15	0	175	45	220	14	182	0	196	0	0	0	0	79	0	8	87	503	0
16:15 - 16:30	0	228	57	285	16	223	0	239	0	0	0	0	63	0	14	77	601	0
16:30 - 16:45	0	204	55	259	12	251	0	263	0	0	0	0	94	0	15	109	631	0
16:45 - 17:00	0	165	47	212	15	263	0	278	0	0	0	0	87	0	11	98	588	0
17:00 - 17:15	0	178	50	228	8	285	0	293	0	0	0	0	120	0	21	141	662	1
17:15 - 17:30	0	200	51	251	17	254	0	271	0	0	0	0	105	0	18	123	645	0
17:30 - 17:45	0	200	51	251	20	255	0	275	0	0	0	0	75	0	15	90	616	0
17:45 - 18:00	0	153	43	196	14	213	0	227	0	0	0	0	84	0	8	92	515	0
18:00 - 18:15	0	155	38	193	12	245	0	257	0	0	0	0	54	0	9	63	513	0
18:15 - 18:30	0	147	30	177	10	159	0	169	0	0	0	0	47	0	6	53	399	0
18:30 - 18:45	0	147	42	189	8	155	0	163	0	0	0	0	66	0	11	77	429	1
18:45 - 19:00	0	128	37	165	9	144	0	153	0	0	0	0	58	0	12	70	388	0
TOTAL	0	9515	2432	11947	509	8207	0	8716	0	0	0	0	2954	0	660	3614	24277	11
Trucks	0	34	9	43	2	31	0	33	0	0	0	0	7	0	3	10	86	0.4%
School Buses	0	38	25	63	0	43	0	43	0	0	0	0	19	0	6	25	131	0.5%

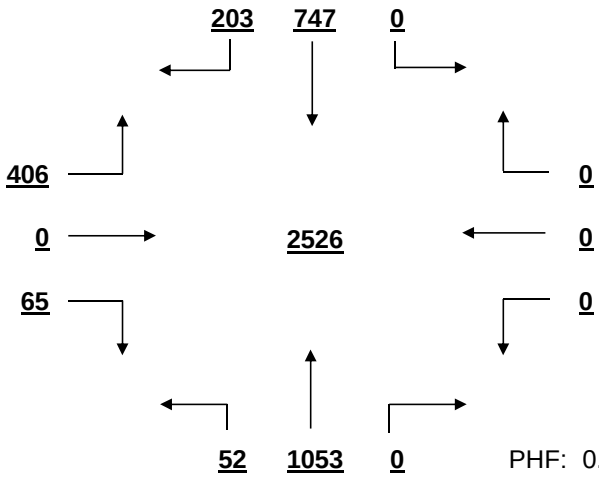
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Broad River Rd AT Dutch Square Blvd Date: 11/28/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

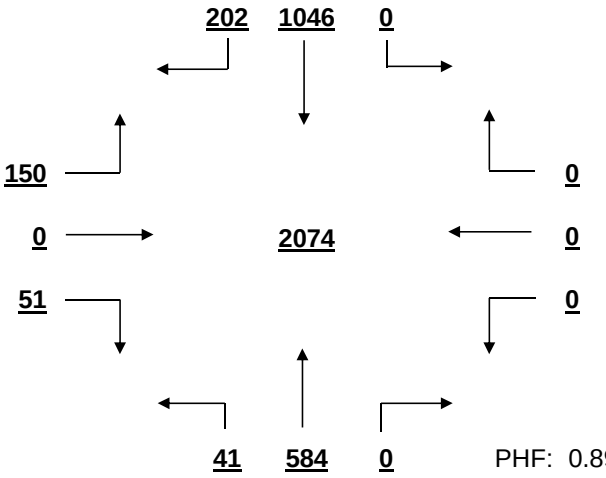


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



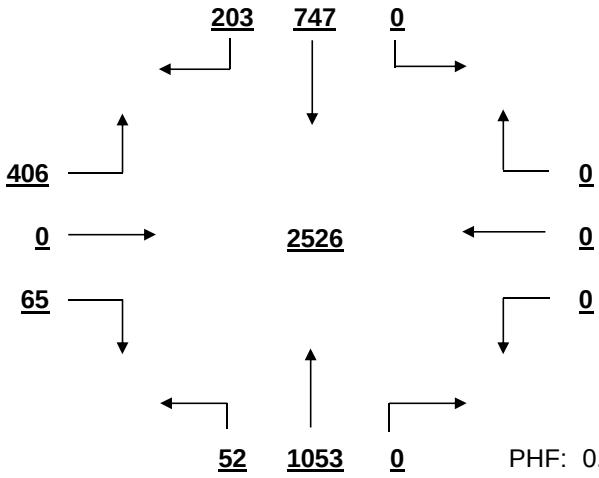
PHF: 0.954

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 8:30 TO 9:30



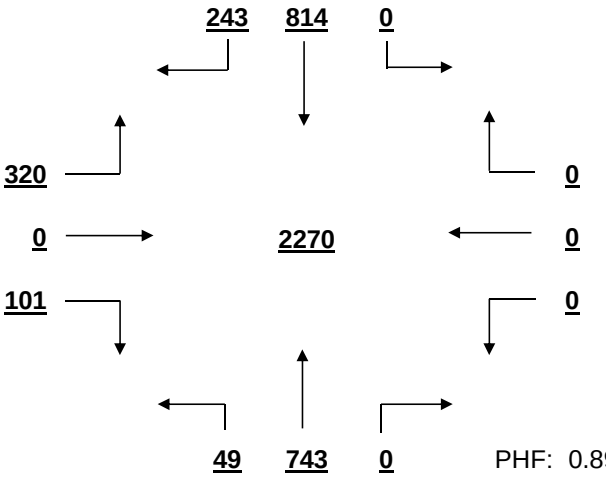
PHF: 0.891

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



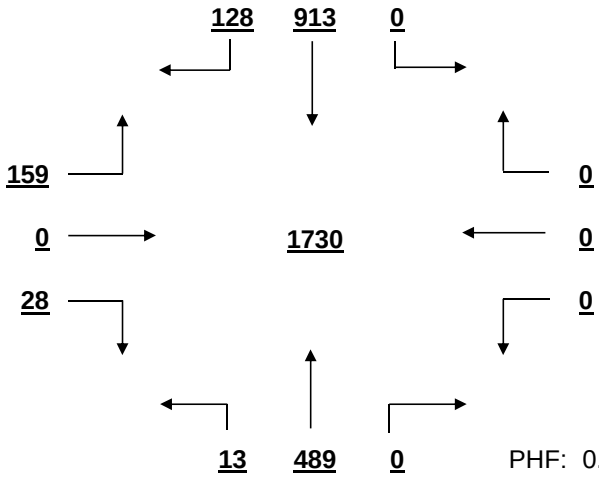
PHF: 0.954

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 11:45 TO 12:45



PHF: 0.898

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.810

SIGNAL WARRANT ANALYSIS

Broad River Rd AT Dutch Square Blvd Date: 11/28/2016

Minor Street Volume, percent of total = 14.9%
Percent of Left Turns from Minor Street = 81.7%
Percent of Right Turns from Minor Street = 18.3%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1721.9	/ 600	=	287%	301.2	/ 150	=	201%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	257%	312%	267%	254%	275%	308%	270%	274%	325%	325%	332%	244%
Minor St.	125%	123%	153%	165%	213%	279%	226%	203%	202%	247%	297%	175%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1721.9	/ 900	=	191%	301.2	/ 75	=	402%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	171%	208%	178%	169%	184%	205%	180%	183%	217%	217%	221%	163%
Minor St.	249%	247%	307%	331%	425%	559%	452%	405%	404%	495%	595%	351%

80% Combination of Conditions A & B is met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	234%	231%	288%	310%	399%	524%	424%	380%	379%	464%	558%	329%

Warrant No. 3 - Peak Hour is met

	Percent of warrant		Percent of warrant
Overall Peak Hour:	16:30 - 17:30	Higher Volume Side Street Peak Hour:	16:30 - 17:30
Minor St.	471%	Minor St.	471%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	0	0	0	0	0	0	0	0	0	0	0	0

Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008

Accident Rate: 0.00 per million entering vehicles

Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DISTRICT 1
TRAFFIC ENGINEERING

County: Richland City: Columbia Date: 12/2/2016

Major Rt: Broad River Rd * Not on State System Minor Rt: Omarest Dr-Private Dr Clear

Day of Week: Friday Weather: Clear Office: Short Counts JMS

Type of Control: Signal Speed Limit (major st) 40

Direction of Minor Street: E-W Intersection ADT - 24170 (Calc)

Number of Lanes (major st)* 2 Number of Lanes (minor st)* 1 * Each Direction

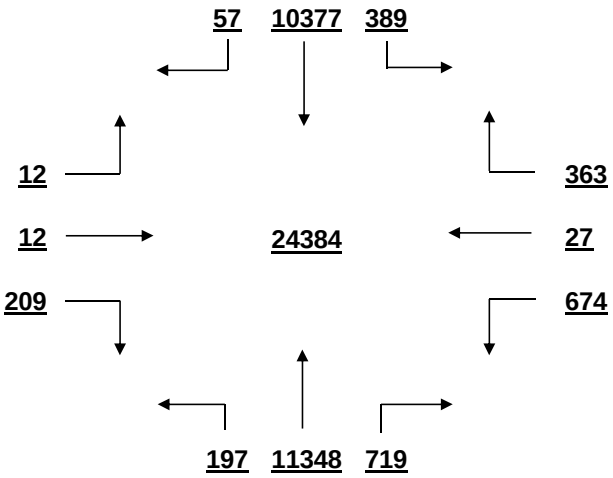
INTERSECTION VOLUME SUMMARY

	From N Broad River Rd				From S Broad River Rd				From E Omarest Dr-Private				From W Omarest Dr-Private				Total	Total
	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	LT	STR	RT	TOT	Vol	Peds
7:00 - 7:15	5	262	0	267	0	140	5	145	23	0	8	31	0	0	0	0	443	1
7:15 - 7:30	5	321	0	326	1	156	10	167	24	0	8	32	0	0	0	0	525	0
7:30 - 7:45	5	309	3	317	0	198	14	212	17	0	5	22	0	0	2	2	553	1
7:45 - 8:00	9	259	2	270	2	183	8	193	26	0	10	36	0	0	3	3	502	2
8:00 - 8:15	8	246	0	254	1	149	9	159	14	0	10	24	0	0	1	1	438	3
8:15 - 8:30	4	261	0	265	2	154	8	164	16	0	5	21	0	0	1	1	451	0
8:30 - 8:45	7	245	0	252	3	170	7	180	7	0	7	14	1	0	1	2	448	4
8:45 - 9:00	6	204	0	210	5	170	7	182	23	0	8	31	1	0	2	3	426	3
9:00 - 9:15	9	222	1	232	2	162	8	172	10	0	8	18	0	1	3	4	426	2
9:15 - 9:30	5	194	1	200	4	165	7	176	19	0	10	29	0	0	5	5	410	4
9:30 - 9:45	4	224	1	229	3	192	8	203	10	0	5	15	1	0	7	8	455	3
9:45 - 10:00	4	197	2	203	7	187	13	207	8	0	8	16	1	0	5	6	432	4
10:00 - 10:15	4	208	2	214	0	183	0	183	10	0	6	16	0	0	6	6	419	6
10:15 - 10:30	8	197	1	206	7	173	10	190	9	0	7	16	0	0	7	7	419	7
10:30 - 10:45	12	215	1	228	3	187	8	198	11	0	5	16	0	0	1	1	443	5
10:45 - 11:00	7	188	3	198	3	203	10	216	12	1	6	19	1	0	0	1	434	2
11:00 - 11:15	7	212	0	219	0	204	9	213	8	0	10	18	0	0	2	2	452	0
11:15 - 11:30	4	196	2	202	8	216	12	236	13	0	7	20	1	0	3	4	462	3
11:30 - 11:45	6	207	0	213	2	257	14	273	15	0	7	22	0	0	4	4	512	2
11:45 - 12:00	3	231	2	236	7	221	14	242	15	1	4	20	0	0	3	3	501	0
12:00 - 12:15	6	213	2	221	3	270	14	287	12	1	5	18	0	0	3	3	529	5
12:15 - 12:30	5	257	2	264	5	269	11	285	17	2	5	24	0	0	6	6	579	8
12:30 - 12:45	7	254	2	263	7	247	8	262	14	0	7	21	0	0	5	5	551	0
12:45 - 13:00	4	222	3	229	6	273	13	292	4	1	3	8	0	1	3	4	533	2
13:00 - 13:15	8	271	0	279	4	267	10	281	11	1	12	24	0	1	10	11	595	2
13:15 - 13:30	8	265	2	275	6	221	17	244	10	0	9	19	0	1	5	6	544	3
13:30 - 13:45	12	259	0	271	2	286	10	298	14	0	12	26	1	0	11	12	607	2
13:45 - 14:00	9	239	1	249	3	276	17	296	17	0	12	29	0	0	6	6	580	4
14:00 - 14:15	7	244	0	251	4	278	18	300	11	1	8	20	0	0	7	7	578	2
14:15 - 14:30	10	265	1	276	3	232	8	243	14	0	8	22	0	0	0	0	541	4
14:30 - 14:45	10	230	3	243	2	262	15	279	12	1	7	20	0	0	4	4	546	2
14:45 - 15:00	11	249	2	262	6	275	17	298	8	0	10	18	0	0	6	6	584	2
15:00 - 15:15	11	220	0	231	4	259	18	281	21	4	10	35	1	1	3	5	552	5
15:15 - 15:30	9	0	0	9	4	280	25	309	16	0	7	23	0	0	4	4	345	1
15:30 - 15:45	16	210	3	229	3	281	19	303	7	1	6	14	0	0	9	9	555	6
15:45 - 16:00	10	206	0	216	6	289	24	319	18	2	7	27	1	0	5	6	568	5
16:00 - 16:15	10	219	0	229	1	299	23	323	12	0	4	16	2	1	9	12	580	12
16:15 - 16:30	7	223	1	231	2	321	24	347	13	0	7	20	0	0	5	5	603	13
16:30 - 16:45	8	187	1	196	8	315	20	343	16	3	2	21	0	0	6	6	566	11
16:45 - 17:00	14	213	1	228	5	334	36	375	11	2	8	21	0	1	9	10	634	6
17:00 - 17:15	14	210	4	228	9	316	27	352	17	1	9	27	0	2	5	7	614	10
17:15 - 17:30	10	194	2	206	13	295	23	331	16	2	5	23	1	0	5	6	566	0
17:30 - 17:45	13	184	0	197	5	275	21	301	12	0	13	25	0	0	5	5	528	4
17:45 - 18:00	11	186	3	200	9	300	38	347	16	0	9	25	0	1	6	7	579	0
18:00 - 18:15	8	183	0	191	7	290	39	336	19	1	13	33	0	1	4	5	565	2
18:15 - 18:30	5	0	1	6	4	252	17	273	15	0	8	23	0	0	3	3	305	0
18:30 - 18:45	13	173	1	187	6	229	14	249	18	2	9	29	0	1	6	7	472	0
18:45 - 19:00	11	203	1	215	0	187	12	199	13	0	4	17	0	0	3	3	434	1
TOTAL	389	10377	57	10823	197	11348	719	12264	674	27	363	1064	12	12	209	233	24384	164
Trucks	3	103	1	107	3	122	1	126	5	1	8	14	0	1	3	4	251	1.0%
School Buses	2	53	1	56	2	61	4	67	3	0	0	3	0	1	0	1	127	0.5%

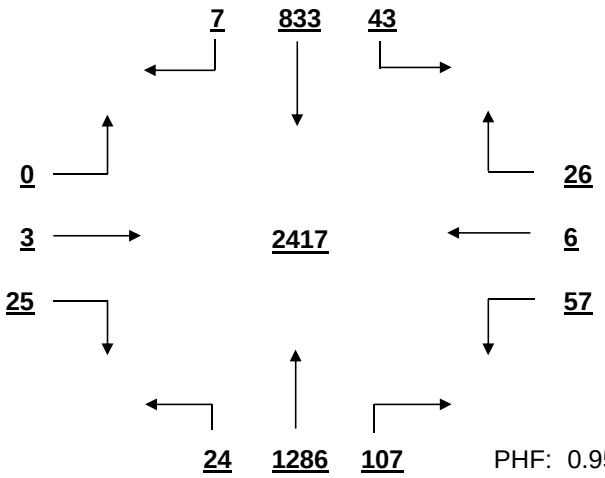
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Broad River Rd AT Omarest Dr-Private Dr Date: 12/2/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

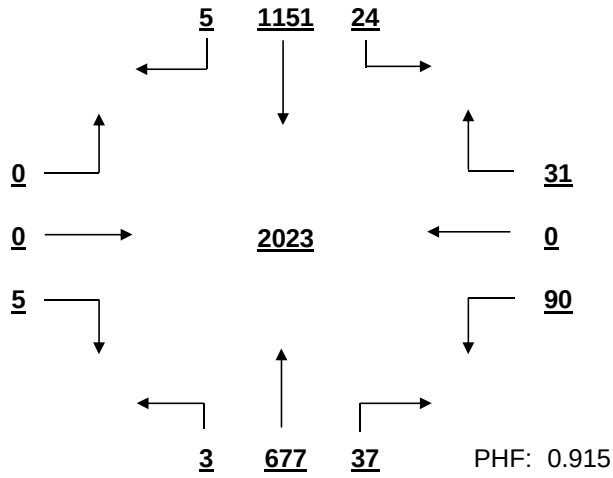


OVERALL PEAK HOUR VOLUME
FROM 16:15 TO 17:15



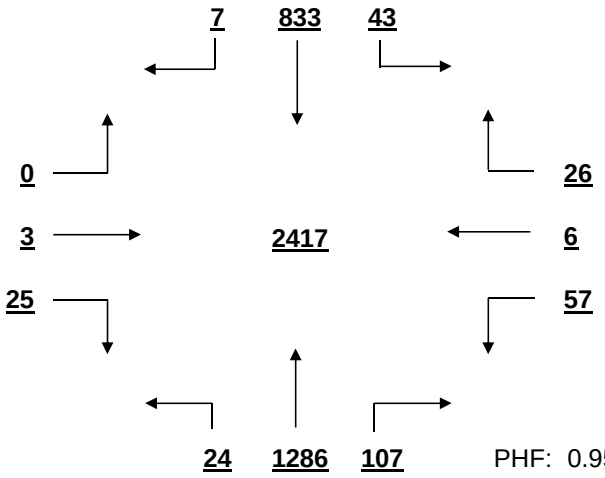
PHF: 0.953

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:00 TO 8:00



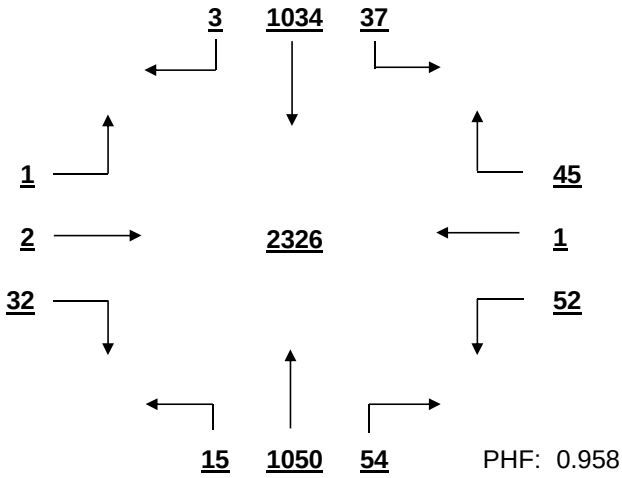
PHF: 0.915

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:15 TO 17:15



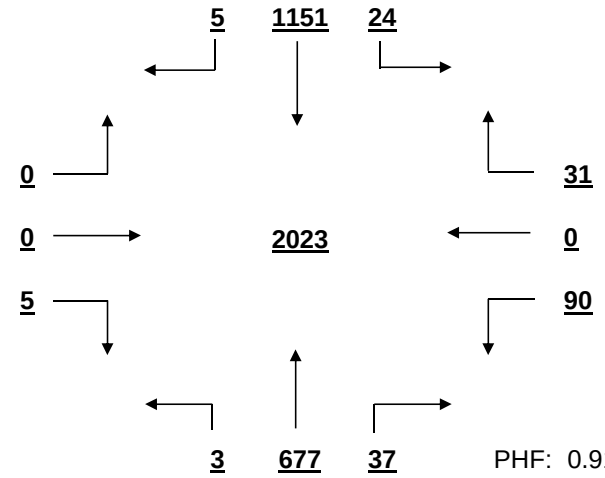
PHF: 0.953

MID-DAY PEAK HOUR VOLUME (11:00-14:00)
FROM 13:00 TO 14:00



PHF: 0.958

OTHER HOUR VOLUME
FROM 7:00 TO 8:00



PHF: 0.915

SIGNAL WARRANT ANALYSIS

Broad River Rd AT Omarest Dr-Private Dr Date: 12/2/2016

Minor Street Volume, percent of total = 5.3%
Percent of Left Turns from Minor Street = 52.9%
Percent of Right Turns from Minor Street = 44.1%
Percent of Minor Street Right Turns to Remove from Warrant Analysis = 0%
WARRANT BASIS = **100%**

Warrant No. 1 - Vehicular Volume is met

Condition A - Minimum Vehicular Volume is not met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1923.9	/	600	= 321%	88.7	/	150	= 59%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	316%	278%	270%	272%	306%	351%	366%	359%	316%	379%	360%	276%
Minor St.	81%	60%	52%	45%	53%	47%	65%	53%	66%	52%	67%	68%

Condition B - Interruption to Continuous Traffic is met

Average Major Street % of Warrant				Average Minor Street % of Warrant			
1923.9	/	900	= 214%	88.7	/	75	= 118%

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	211%	185%	180%	181%	204%	234%	244%	239%	211%	252%	240%	184%
Minor St.	161%	120%	104%	89%	107%	95%	131%	107%	132%	104%	133%	136%

80% Combination of Conditions A & B is not met

Warrant No. 2 - Four Hour Vehicular Volume is met

Hourly percent of warrant

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Minor St.	151%	113%	98%	84%	100%	89%	123%	100%	124%	98%	125%	128%

Warrant No. 3 - Peak Hour is met

Percent of warrant
Overall Peak Hour: 16:15 - 17:15
Minor St. 89%

Percent of warrant
Higher Volume Side Street Peak Hour: 7:00 - 8:00
Minor St. 121%

Warrant No. 4 - Pedestrian Volume. Pedestrian volume shown are minumum volumes assuming heavy major street traffic. If these volumes are met, warrant 4 requires further engineering analysis

Minimum 4 hour ped. volume crossing major street: 107

Minimum peak hour ped. volume crossing major street: 133

Number of pedestrians crossing major street

	7:00 - 8:00	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 13:00	13:00 - 14:00	14:00 - 15:00	15:00 - 16:00	16:00 - 17:00	17:00 - 18:00	18:00 - 19:00
Major St.	1	1	2	2	0	3	0	3	4	16	3	1

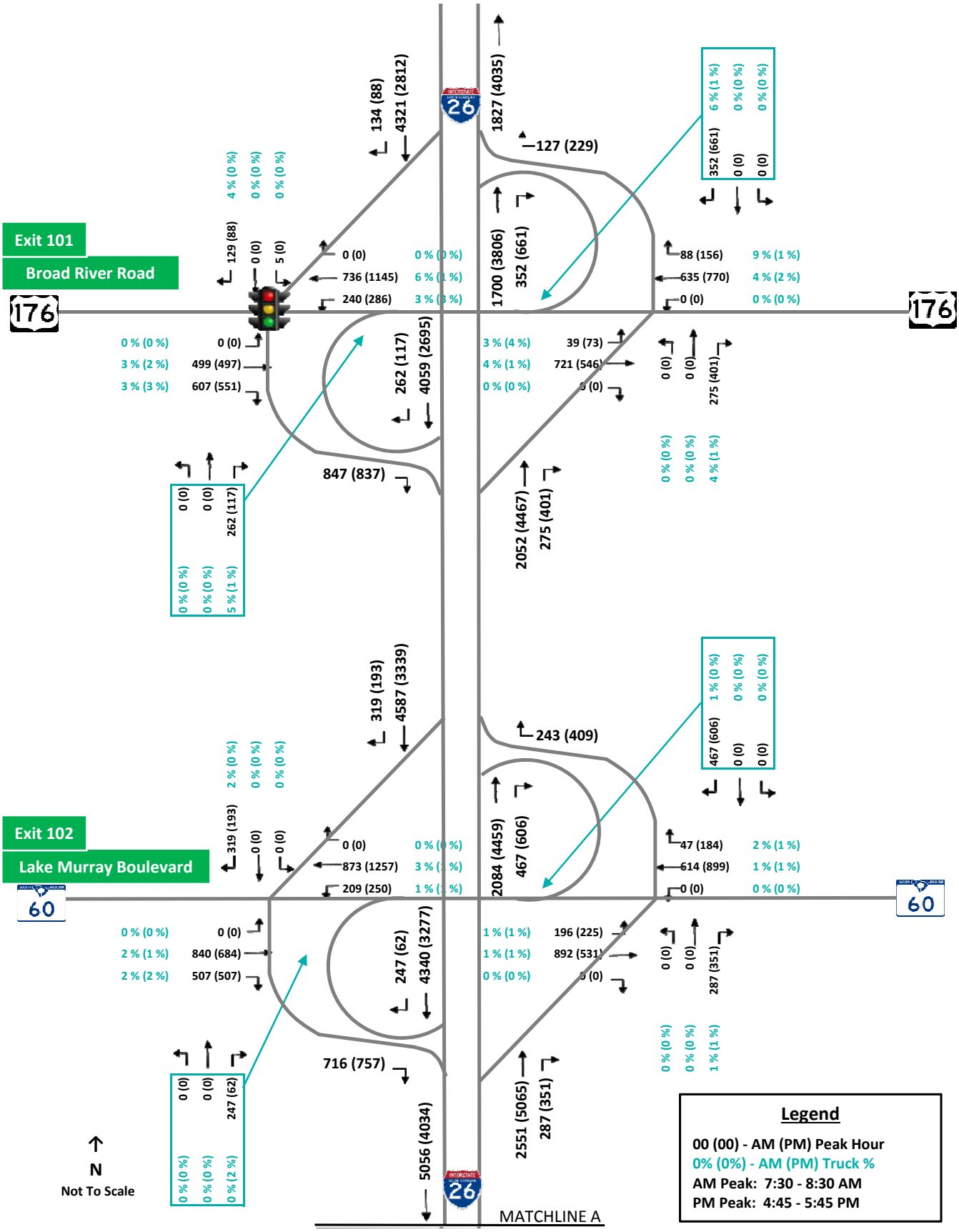
Warrant No. 7 - Crash Experience (Requires 3 criteria analysis by engineering)

Total Number: 0 From: 1/1/2005 to 1/1/2008
Accident Rate: 0.00 per million entering vehicles

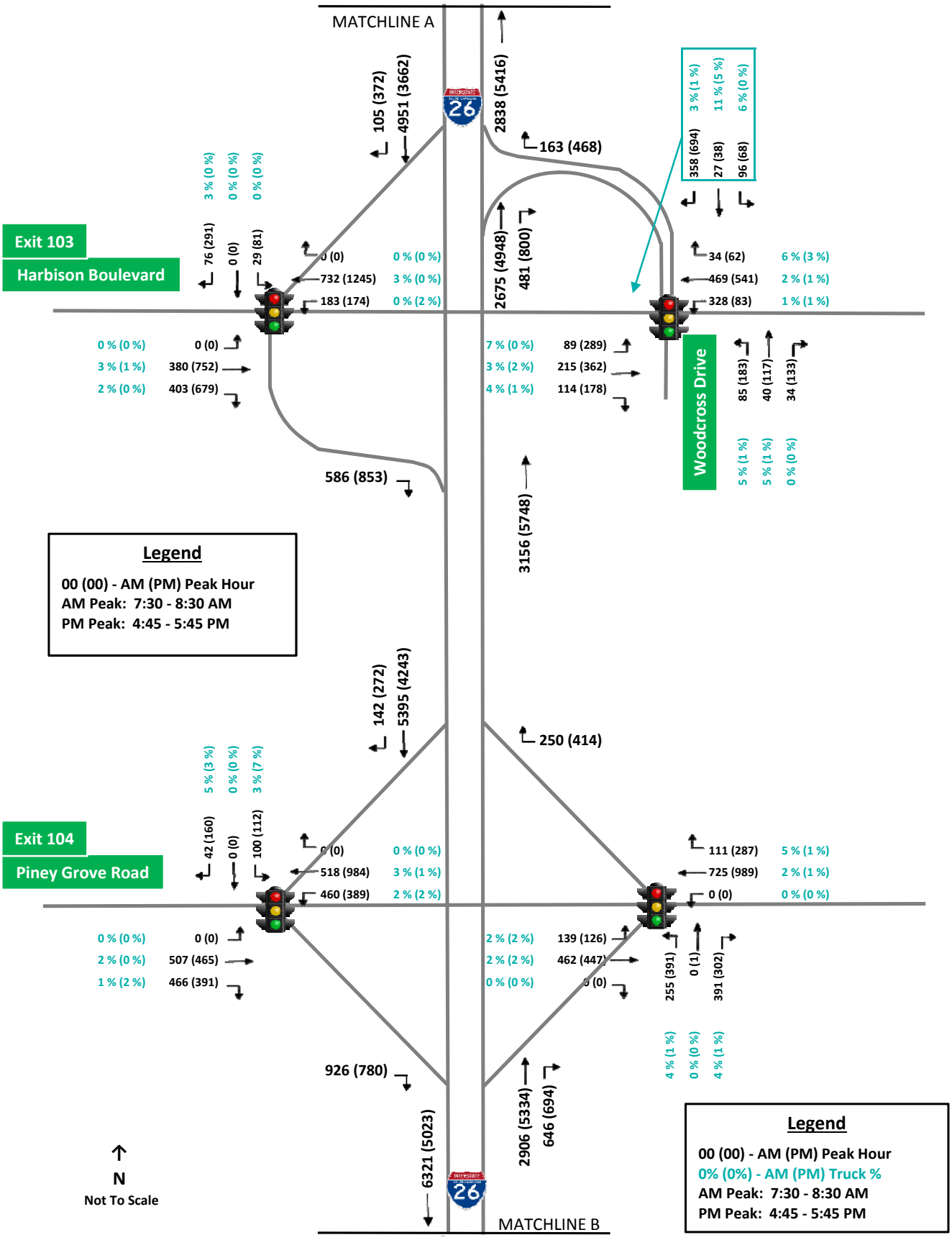
Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

Appendix B—Existing Volumes

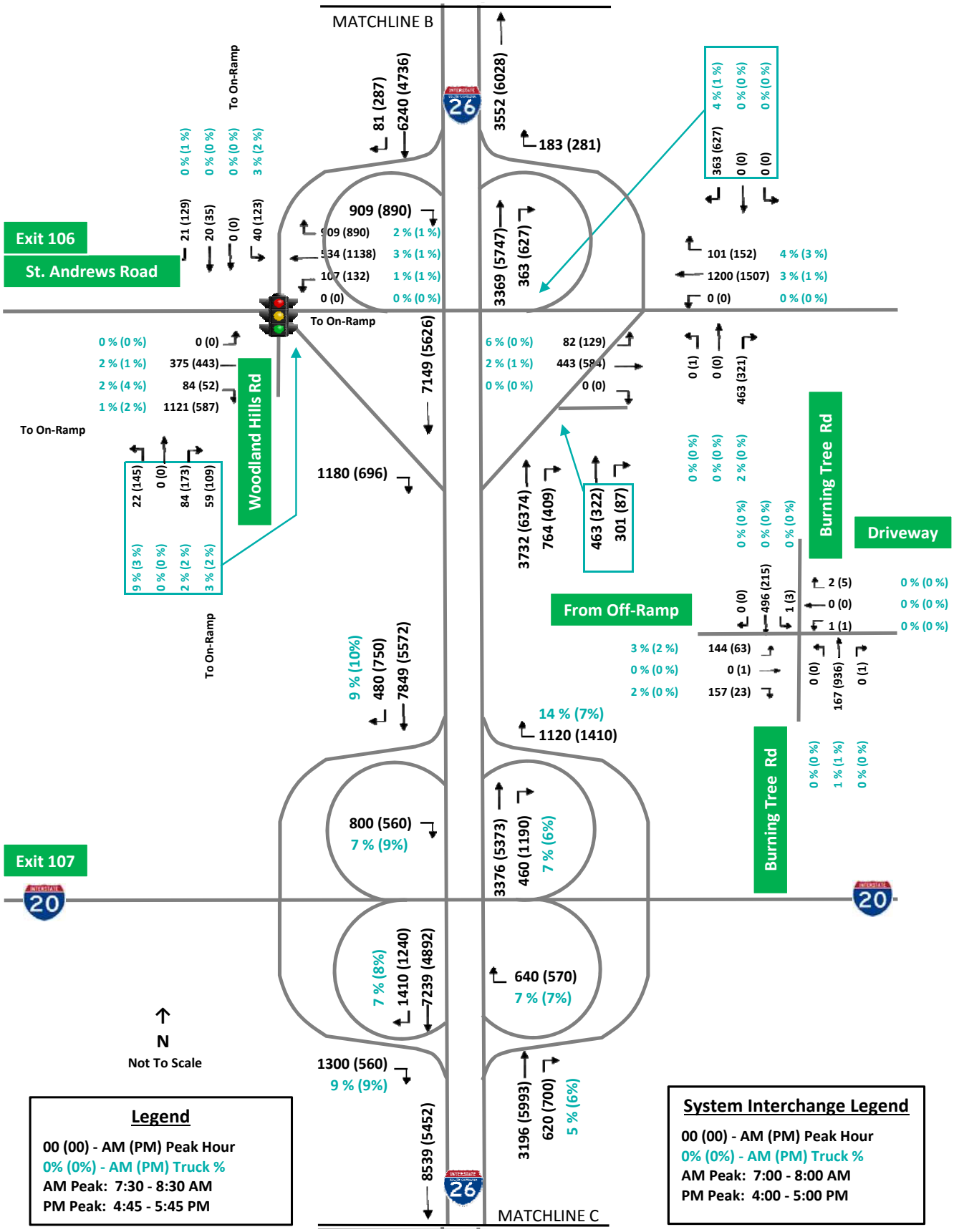
Carolina Crossroads
Existing Interchange Volumes



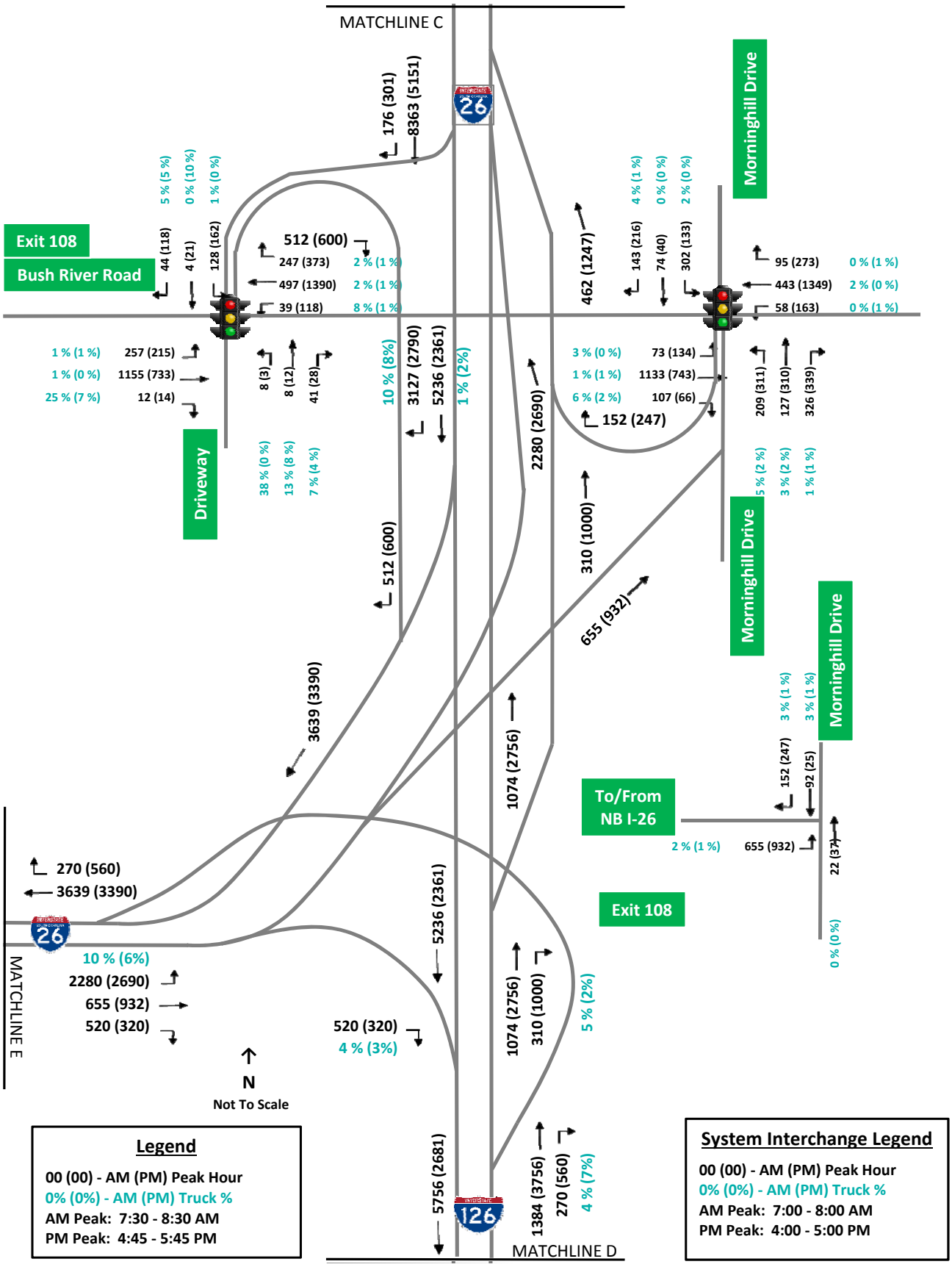
Carolina Crossroads
Existing Interchange Volumes



Carolina Crossroads
Existing Interchange Volumes



Carolina Crossroads
Existing Interchange Volumes



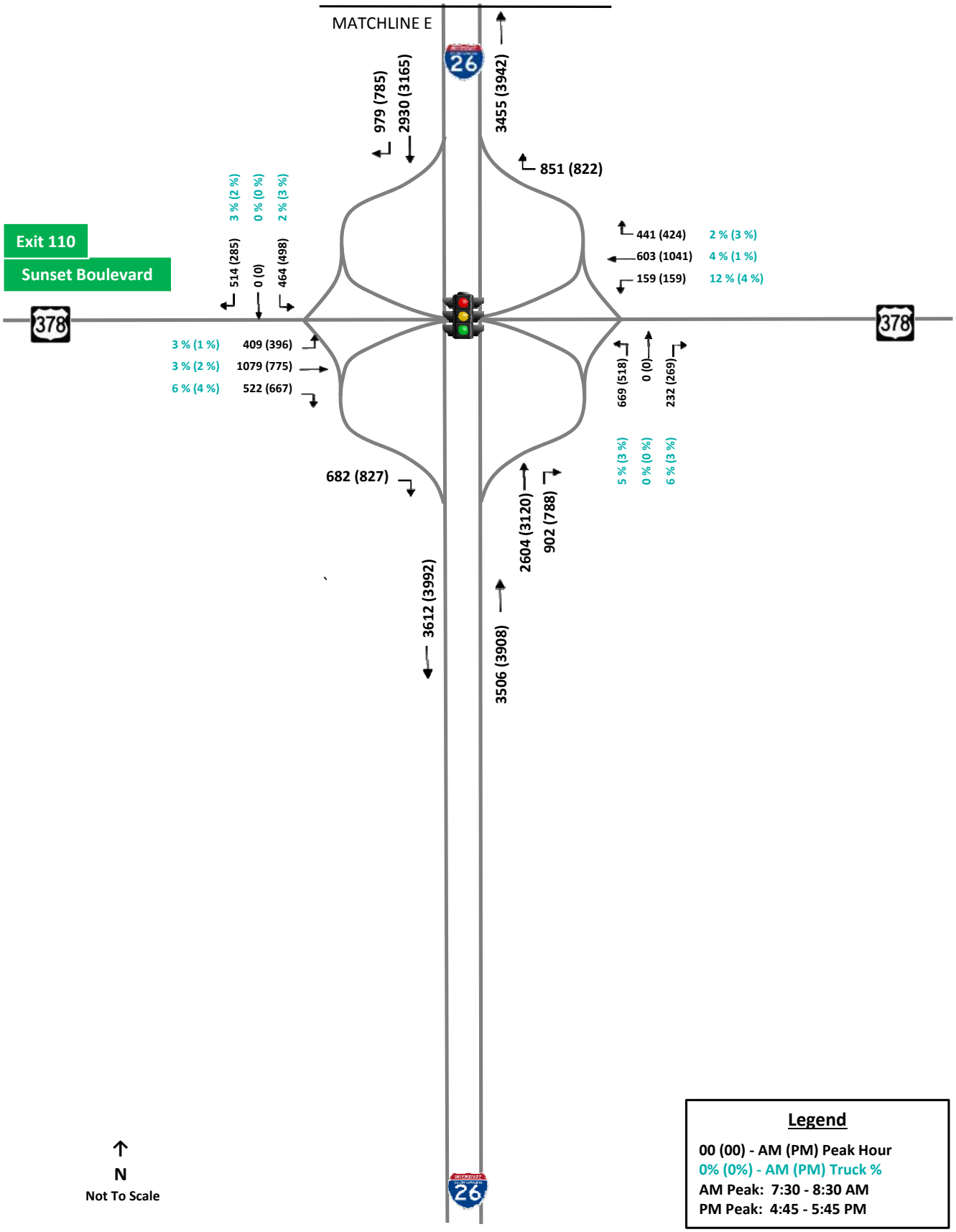
Legend

00 (00) - AM (PM) Peak Hour
0% (0%) - AM (PM) Truck %
AM Peak: 7:30 - 8:30 AM
PM Peak: 4:45 - 5:45 PM

System Interchange Legend

00 (00) - AM (PM) Peak Hour
0% (0%) - AM (PM) Truck %
AM Peak: 7:00 - 8:00 AM
PM Peak: 4:00 - 5:00 PM

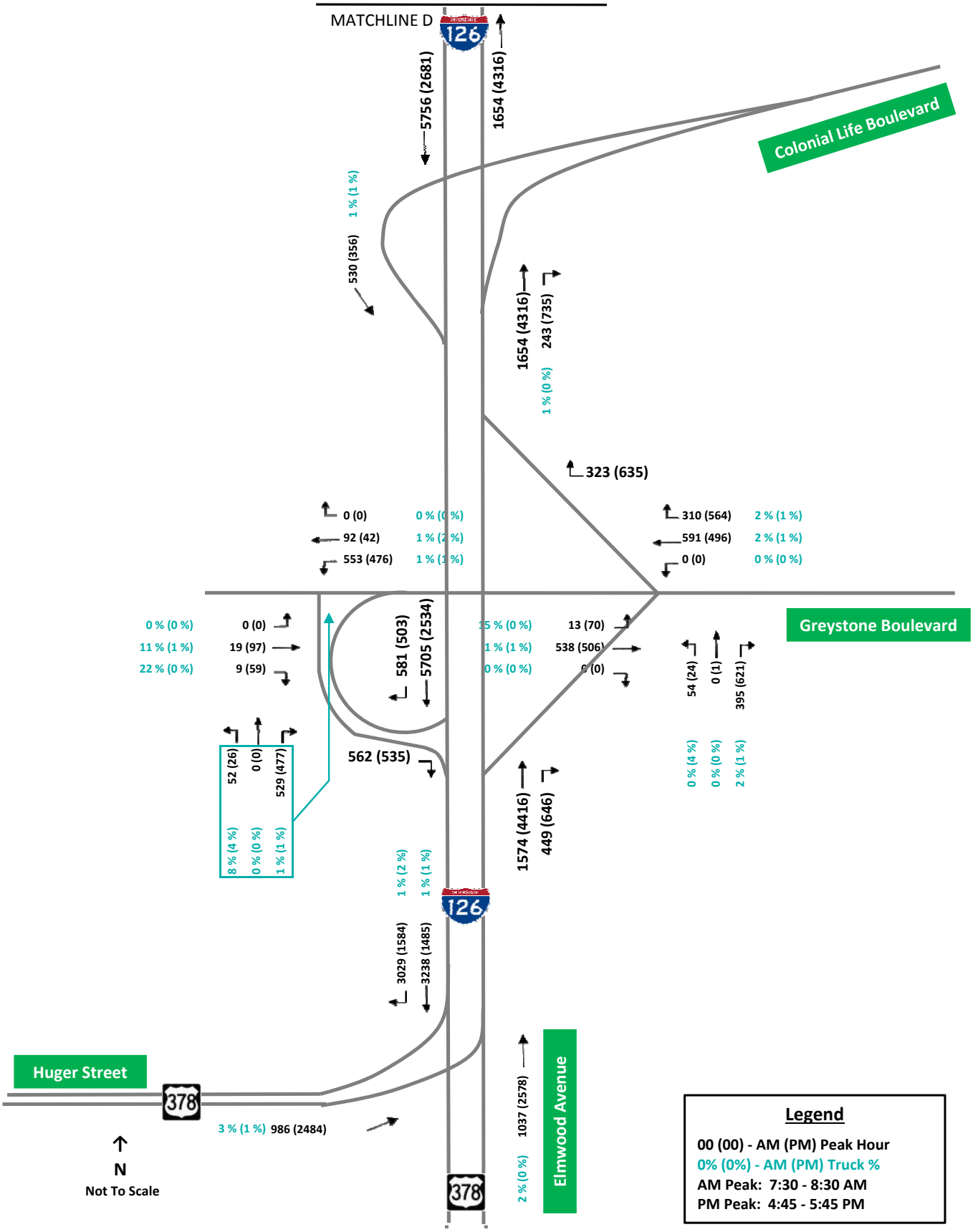
Carolina Crossroads
Existing Interchange Volumes



Legend

00 (00) - AM (PM) Peak Hour
0% (0%) - AM (PM) Truck %
AM Peak: 7:30 - 8:30 AM
PM Peak: 4:45 - 5:45 PM

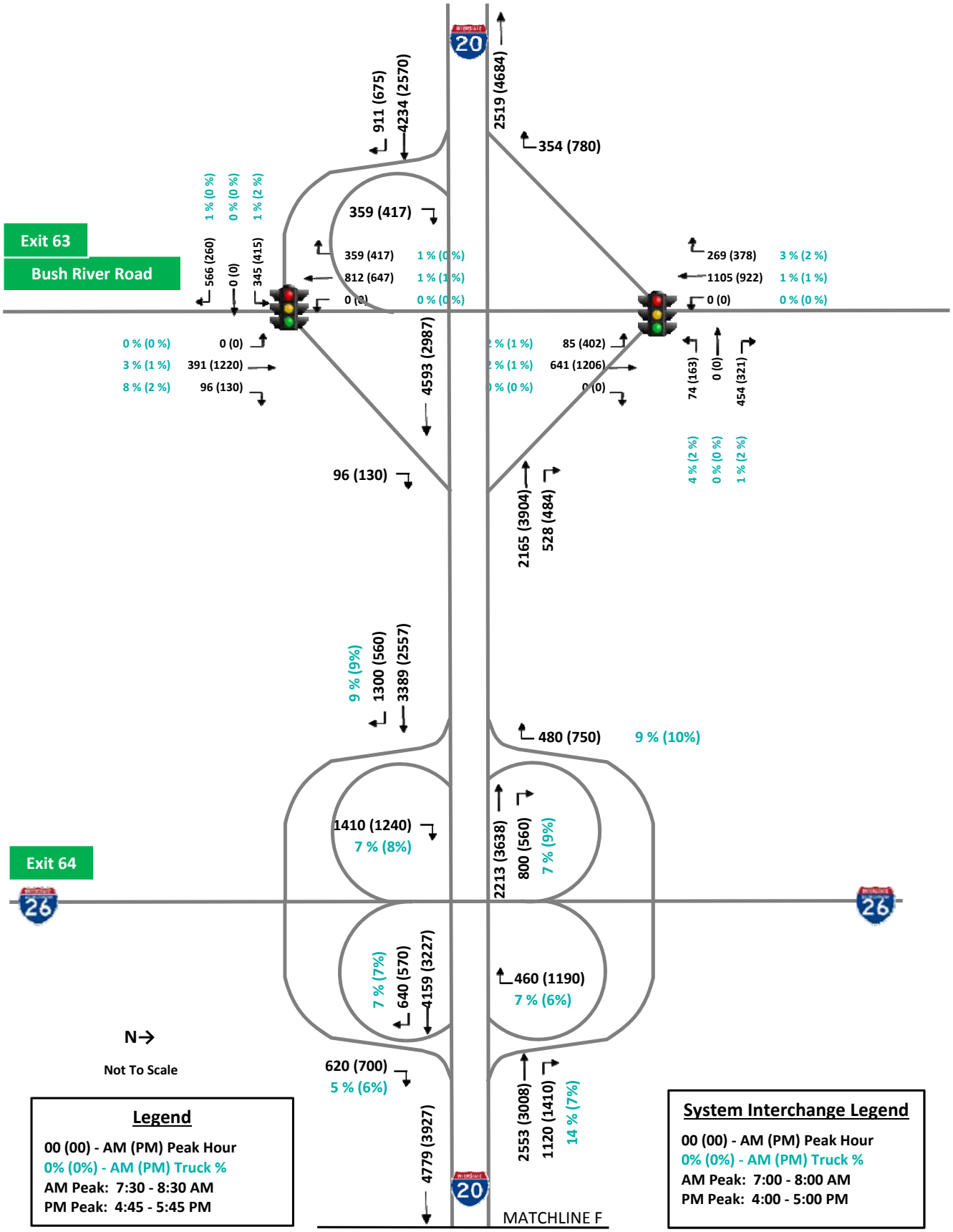
Carolina Crossroads
Existing Interchange Volumes



Legend

00 (00) - AM (PM) Peak Hour
0% (0%) - AM (PM) Truck %
AM Peak: 7:30 - 8:30 AM
PM Peak: 4:45 - 5:45 PM

Carolina Crossroads
Existing Interchange Volumes



Legend

00 (00) - AM (PM) Peak Hour
0% (0%) - AM (PM) Truck %
AM Peak: 7:30 - 8:30 AM
PM Peak: 4:45 - 5:45 PM

System Interchange Legend

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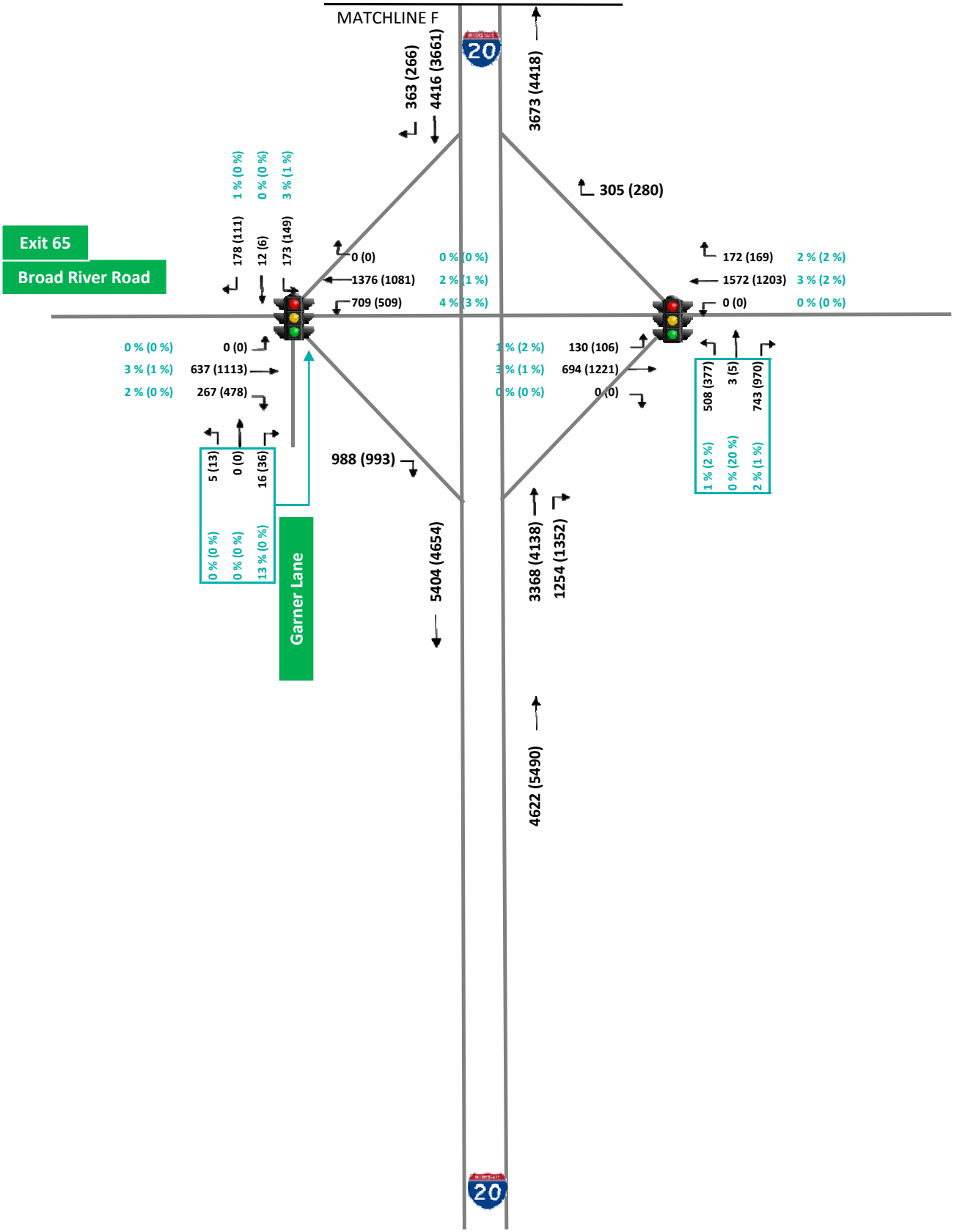
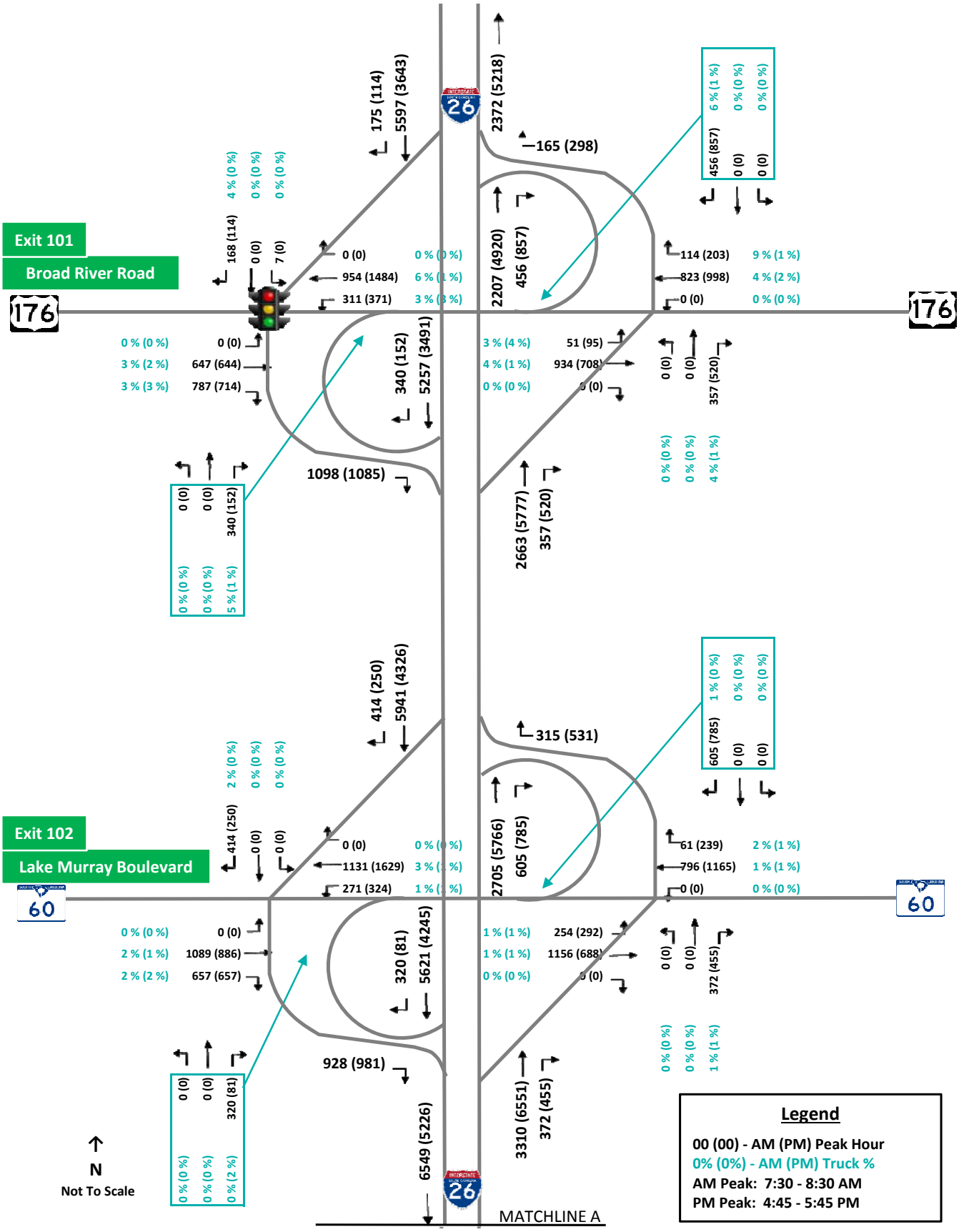
AM Peak: 7:00 - 8:00 AM
PM Peak: 4:00 - 5:00 PM

Carolina Crossroads
Existing Interchange Volumes

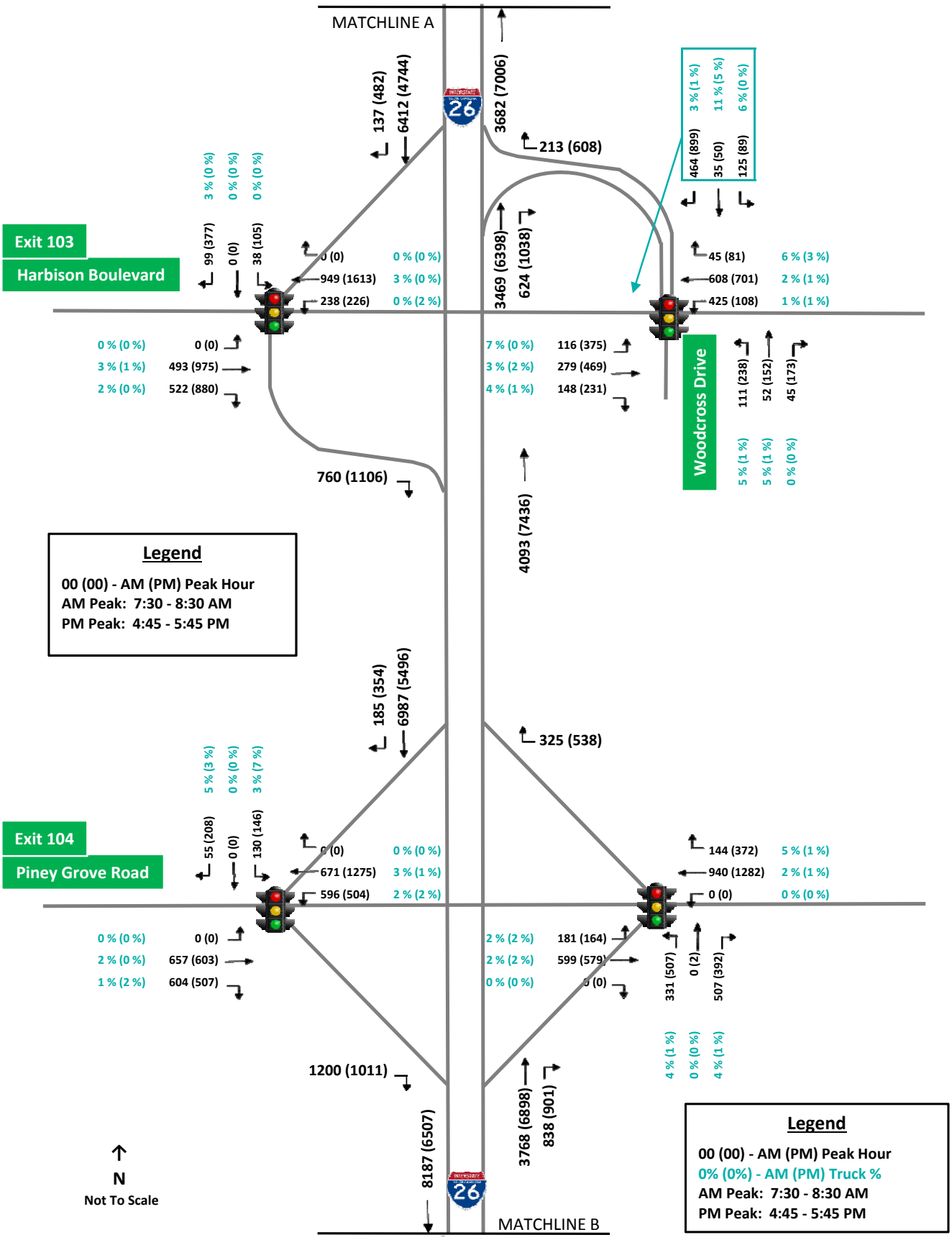


Appendix C—2040 Volumes

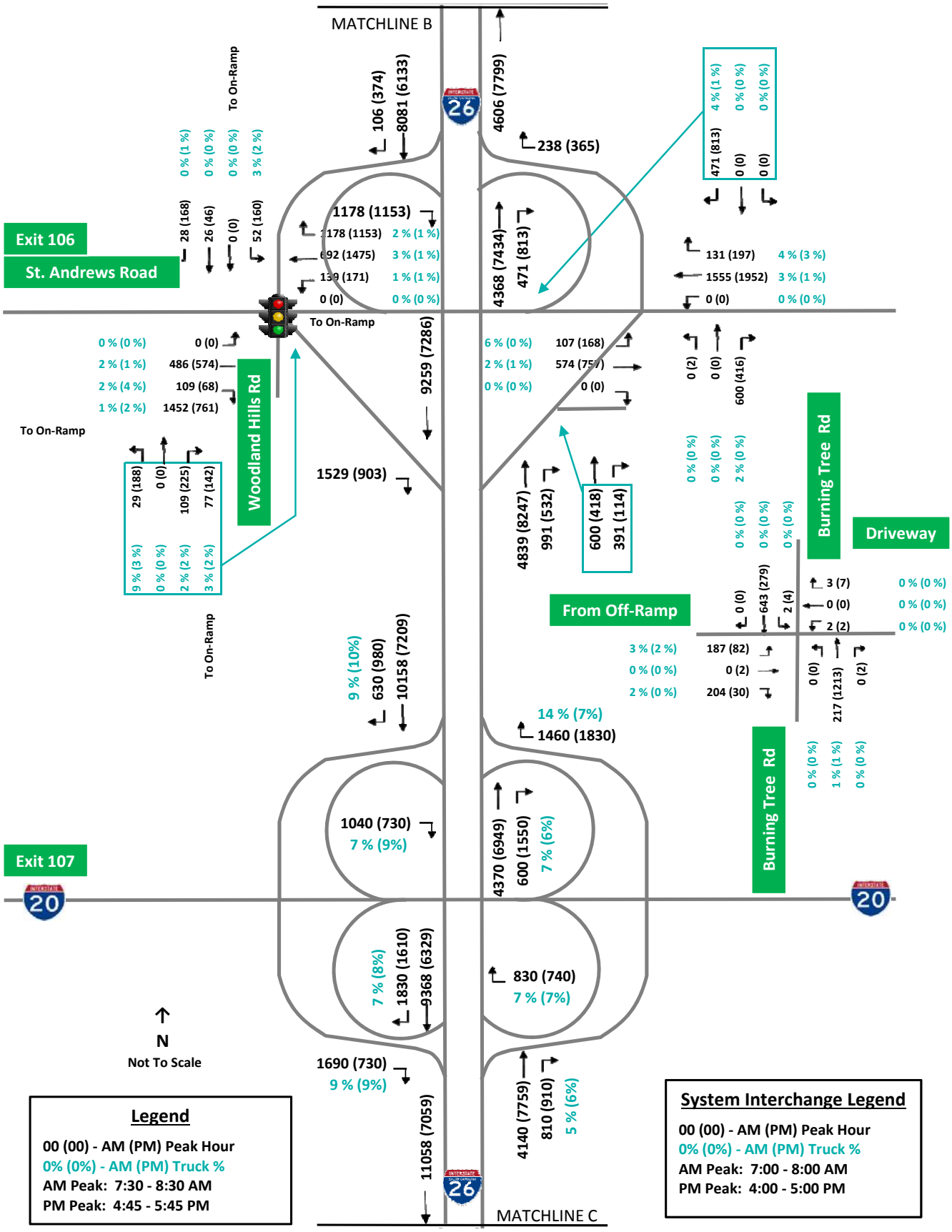
Carolina Crossroads
2040 Estimated Interchange Volumes



Carolina Crossroads
2040 Estimated Interchange Volumes



Carolina Crossroads
2040 Estimated Interchange Volumes



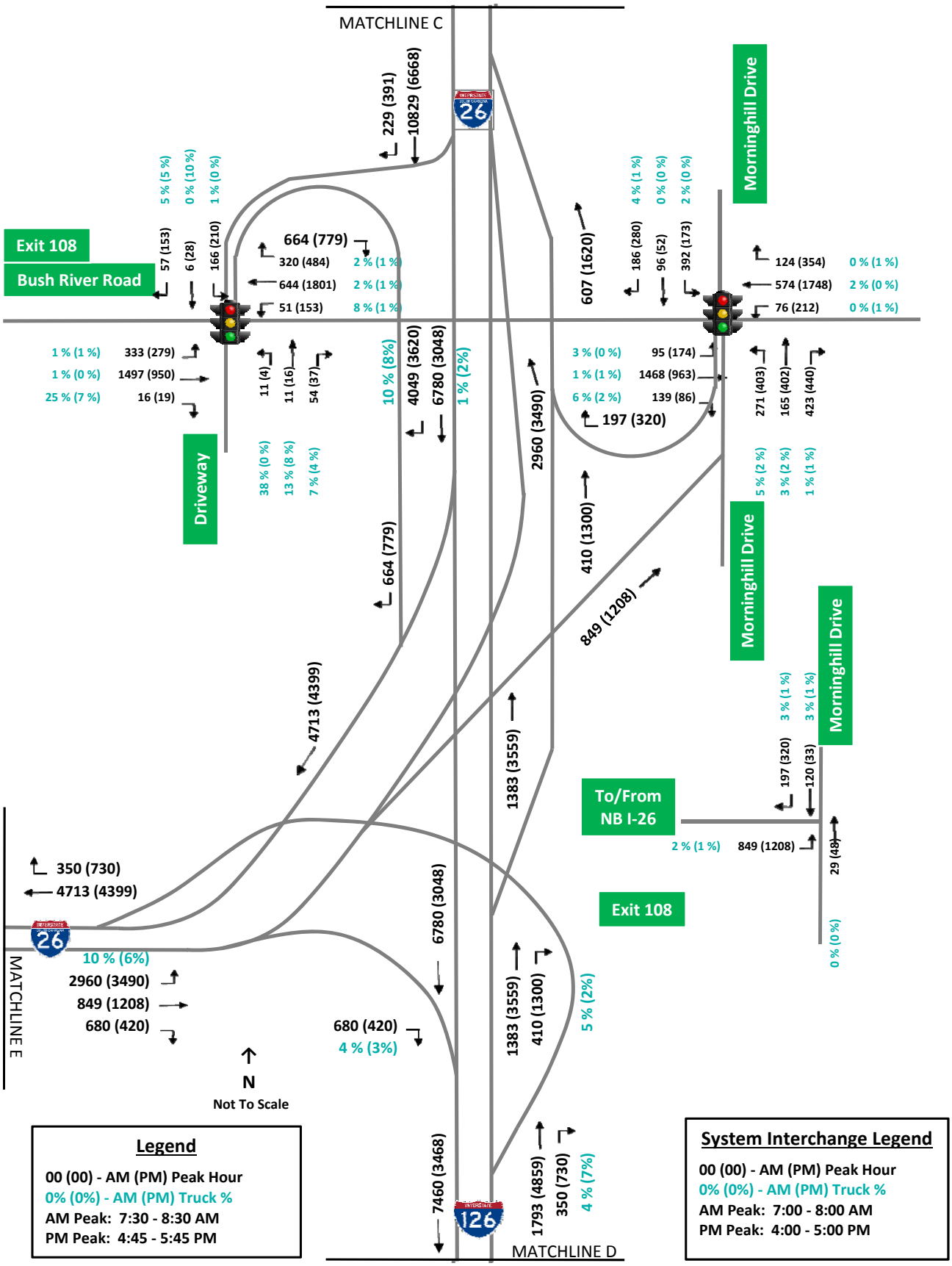
Legend

00 (00) - AM (PM) Peak Hour
0% (0%) - AM (PM) Truck %
AM Peak: 7:30 - 8:30 AM
PM Peak: 4:45 - 5:45 PM

System Interchange Legend

00 (00) - AM (PM) Peak Hour
0% (0%) - AM (PM) Truck %
AM Peak: 7:00 - 8:00 AM
PM Peak: 4:00 - 5:00 PM

Carolina Crossroads
2040 Estimated Interchange Volumes



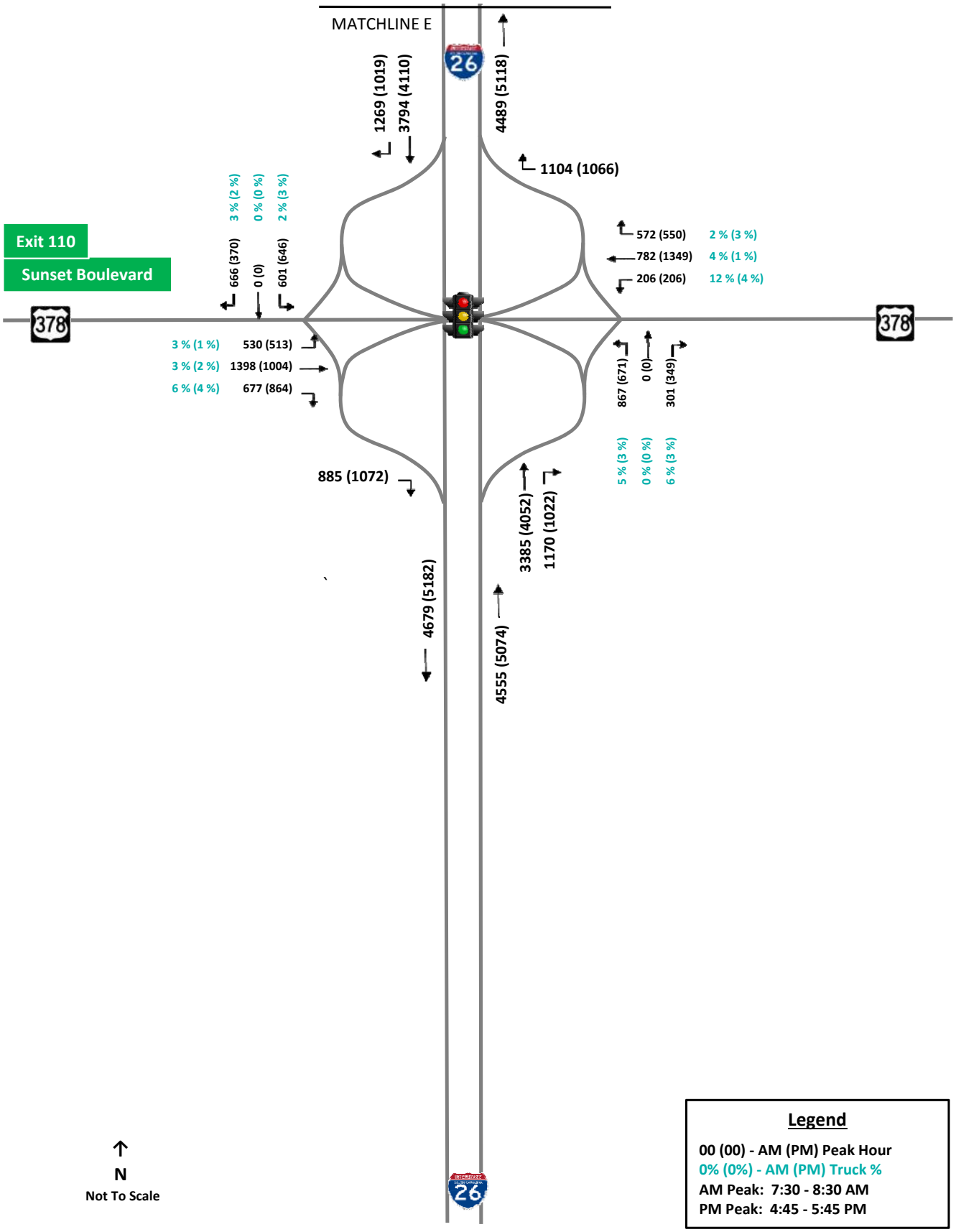
Legend

00 (00) - AM (PM) Peak Hour
0% (0%) - AM (PM) Truck %
AM Peak: 7:30 - 8:30 AM
PM Peak: 4:45 - 5:45 PM

System Interchange Legend

00 (00) - AM (PM) Peak Hour
0% (0%) - AM (PM) Truck %
AM Peak: 7:00 - 8:00 AM
PM Peak: 4:00 - 5:00 PM

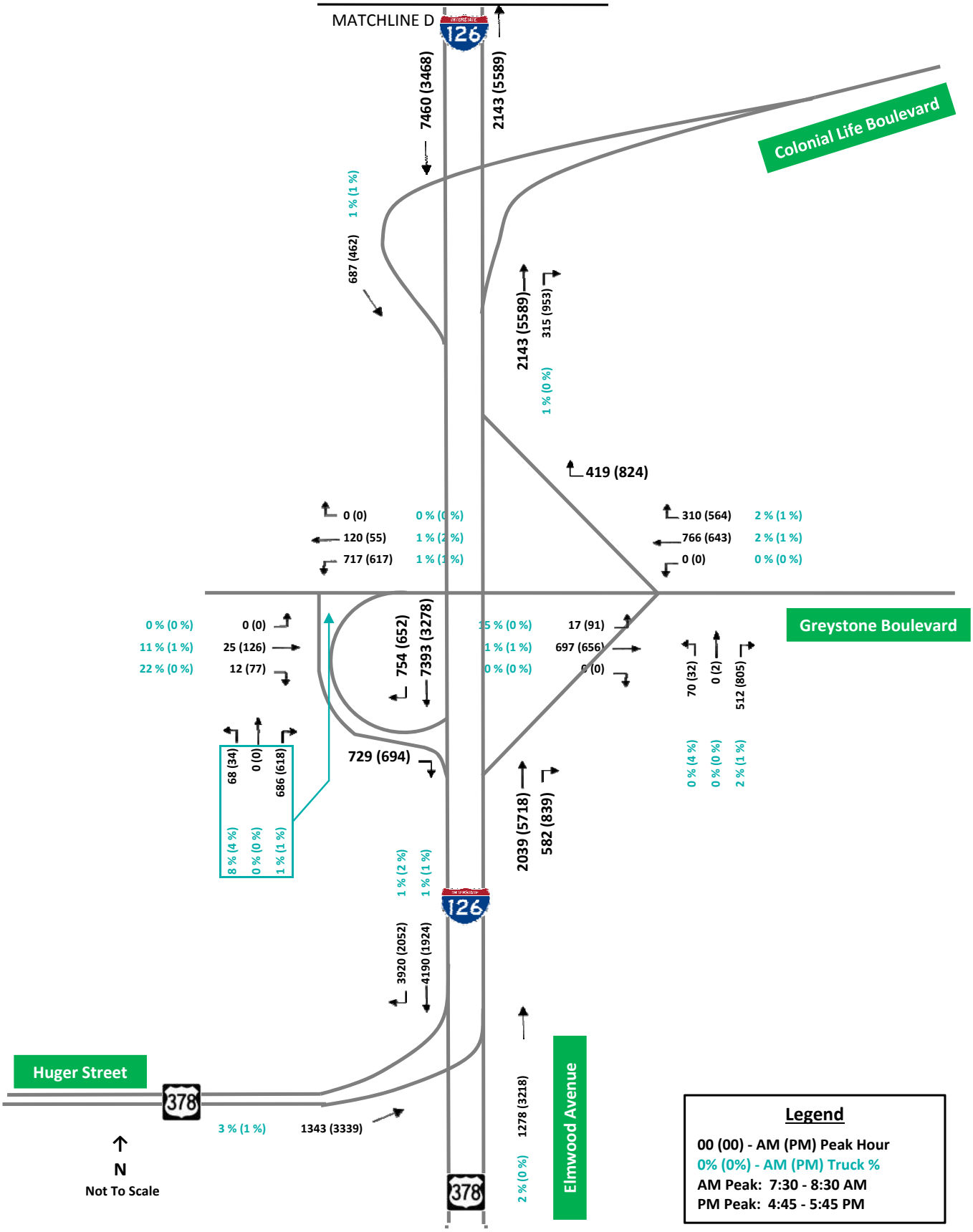
Carolina Crossroads
2040 Estimated Interchange Volumes



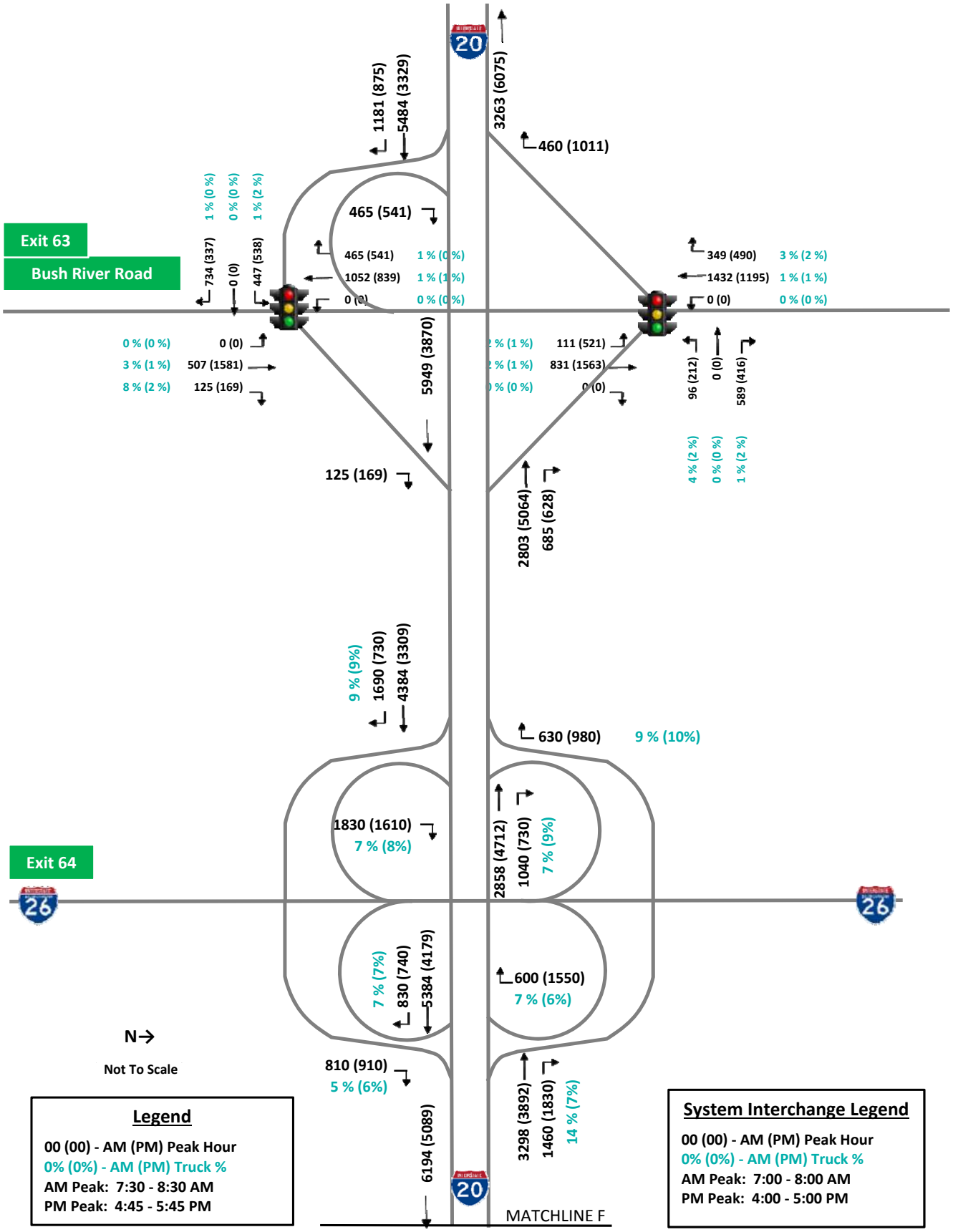
Legend

00 (00) - AM (PM) Peak Hour
0% (0%) - AM (PM) Truck %
AM Peak: 7:30 - 8:30 AM
PM Peak: 4:45 - 5:45 PM

Carolina Crossroads
2040 Estimated Interchange Volumes



Carolina Crossroads
2040 Estimated Interchange Volumes



Legend

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0% (0%) - AM (PM) Truck %
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System Interchange Legend

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Carolina Crossroads
2040 Estimated Interchange Volumes