Appendix D—Alternatives Traffic Analysis Technical Memo - Part 2

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

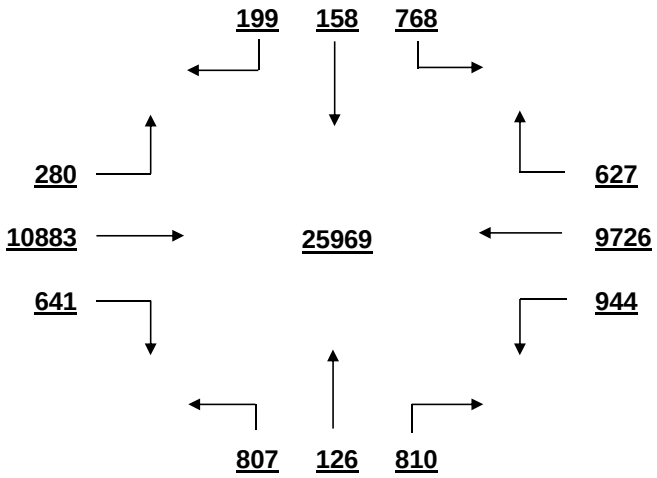
INTERSECTION VOLUME SUMMARY

	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%

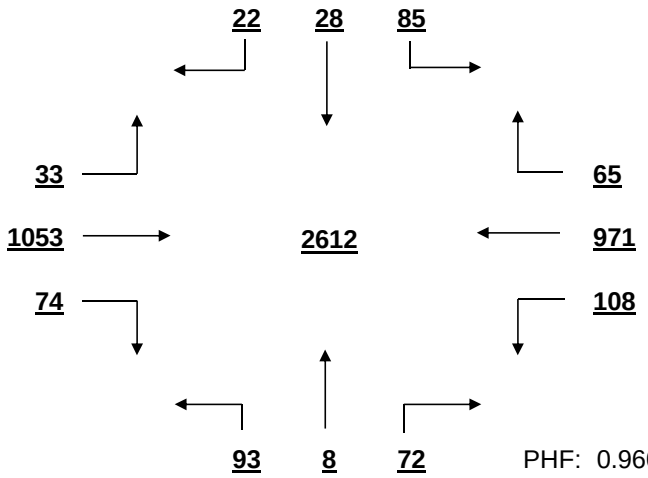
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Lake Murray Blvd AT College St Date: 11/22/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

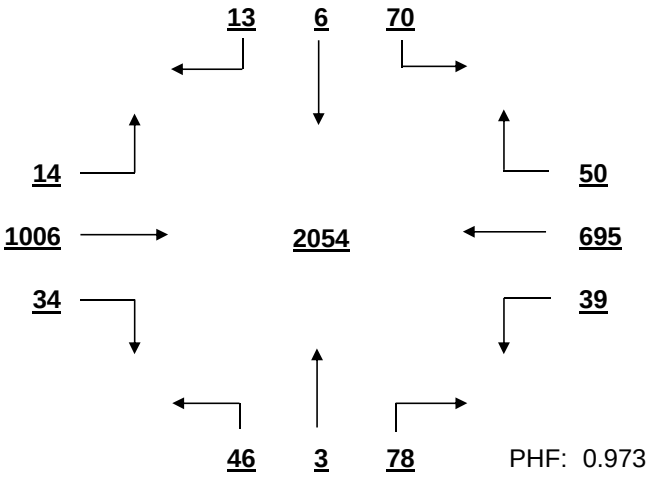


OVERALL PEAK HOUR VOLUME
FROM 16:15 TO 17:15



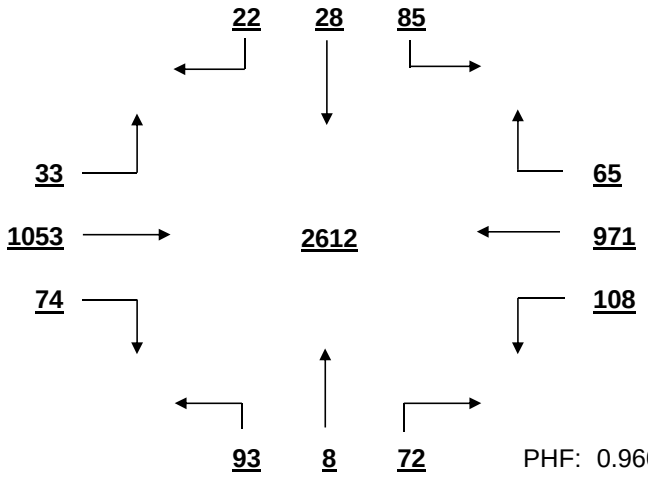
PHF: 0.960

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



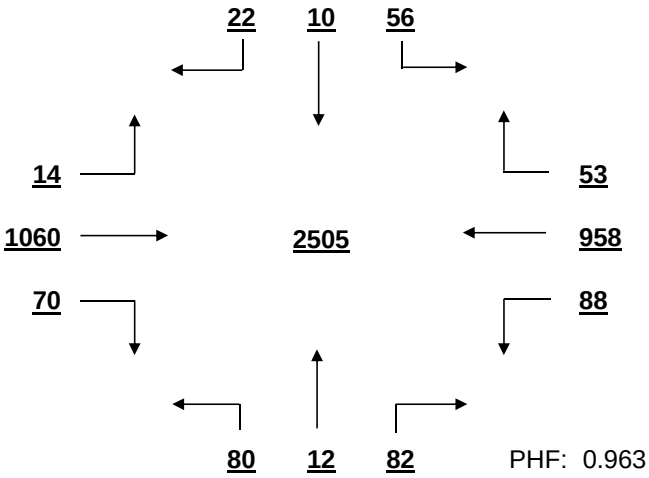
PHF: 0.973

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:15 TO 17:15



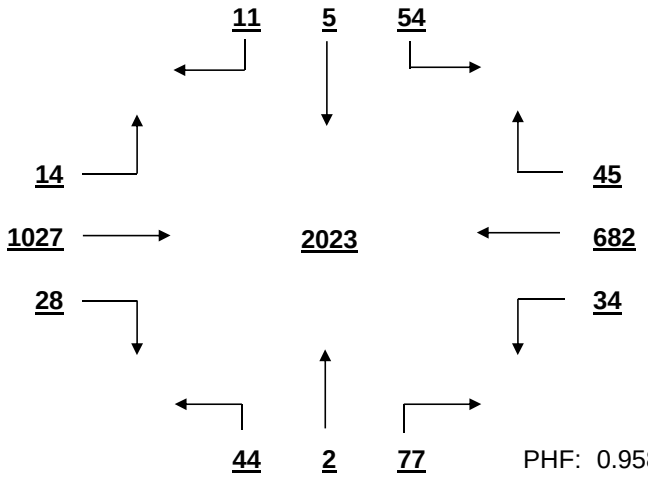
PHF: 0.960

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	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.	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

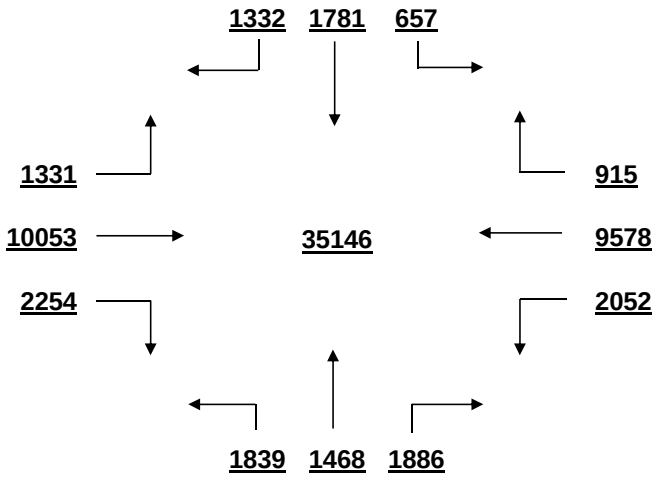
INTERSECTION VOLUME SUMMARY

	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%

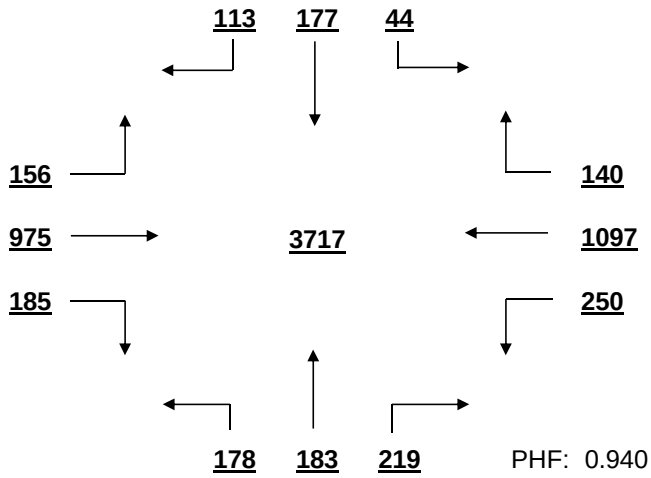
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Lake Murray Blvd AT Columbiana Dr Date: 11/21/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

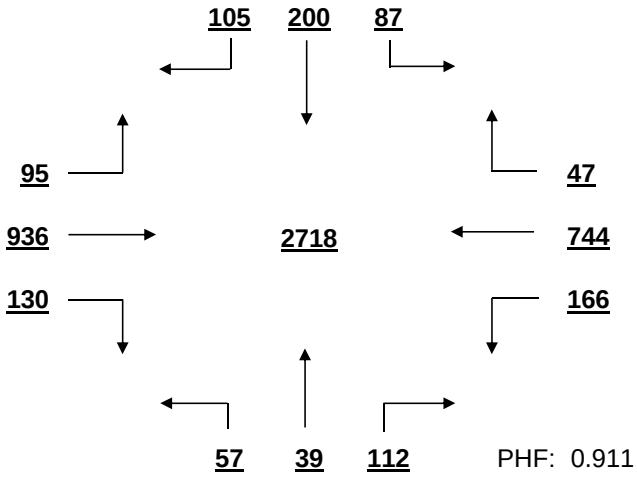


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



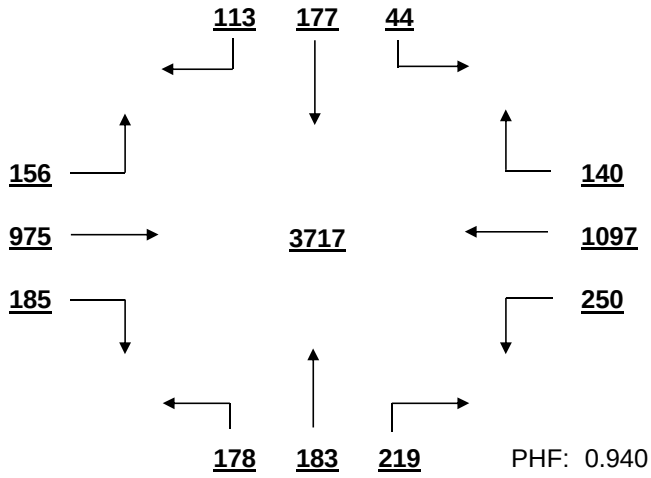
PHF: 0.940

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



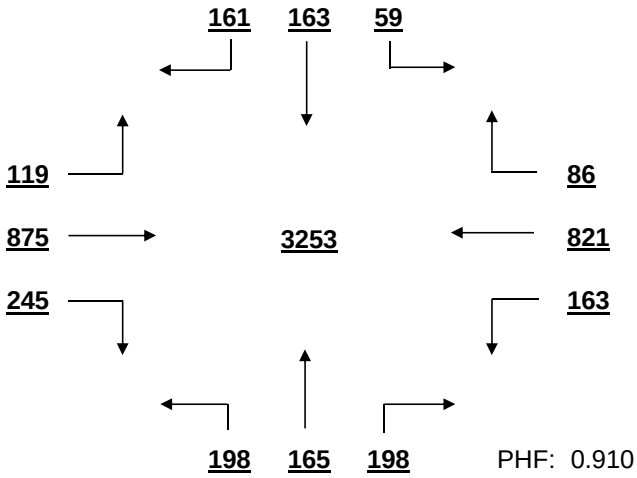
PHF: 0.911

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



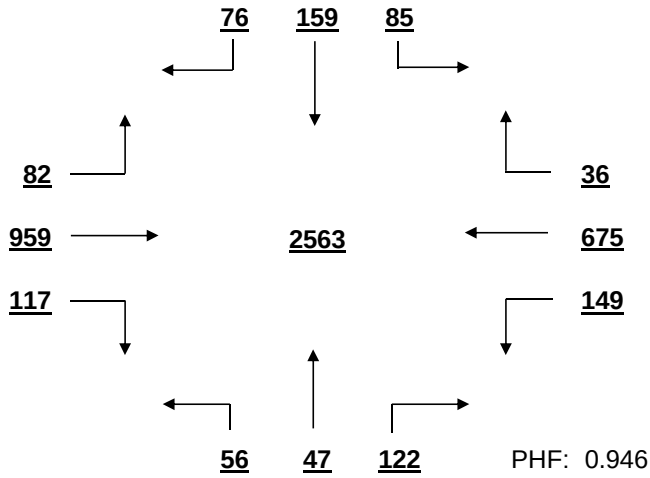
PHF: 0.940

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

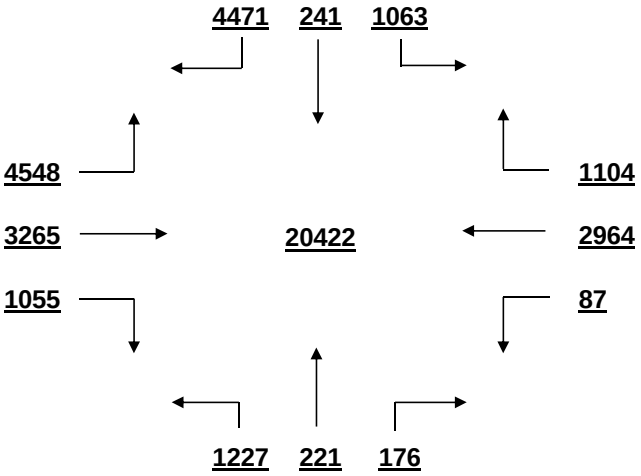
INTERSECTION VOLUME SUMMARY

	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%

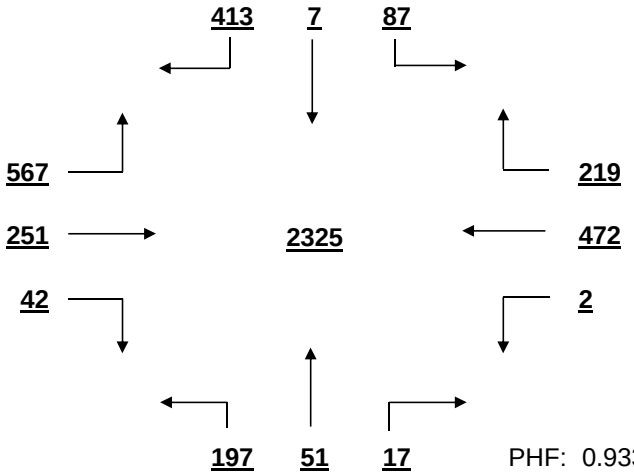
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Lake Murray Blvd AT Kinley-Parkridge Dr Date: 11/22/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

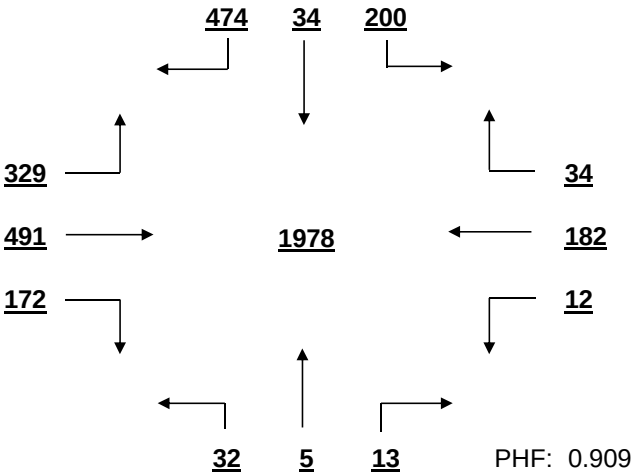


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



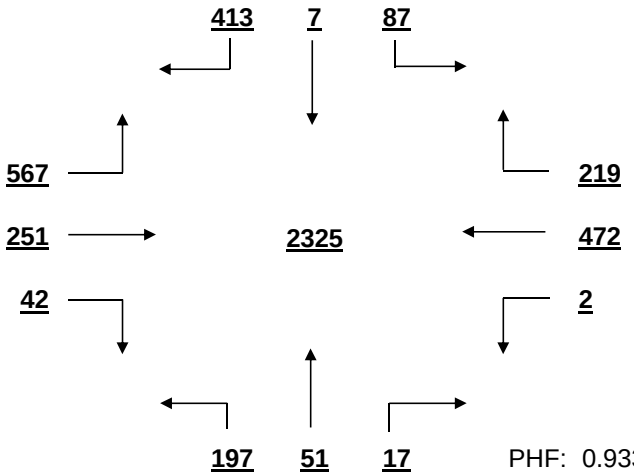
PHF: 0.933

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



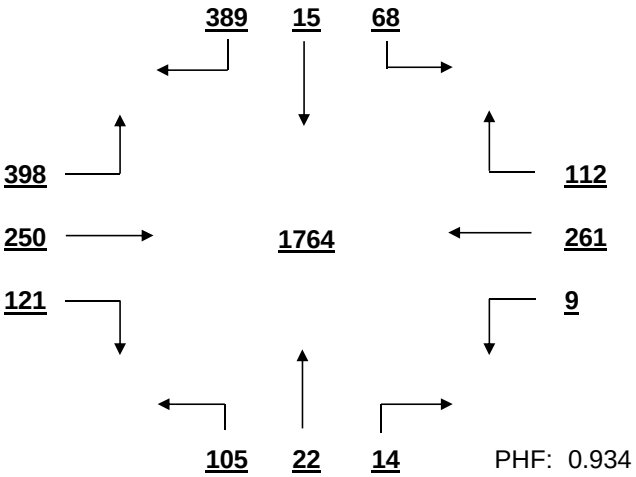
PHF: 0.909

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



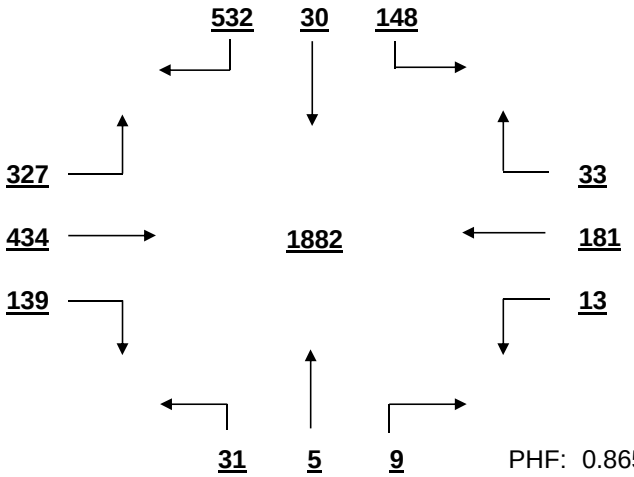
PHF: 0.933

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: 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.	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

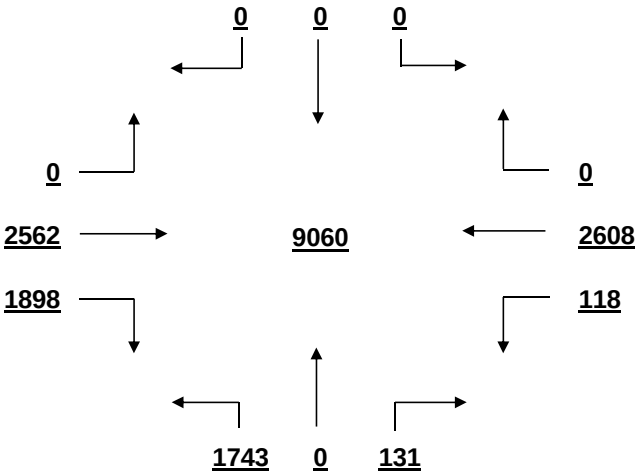
INTERSECTION VOLUME SUMMARY

	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%

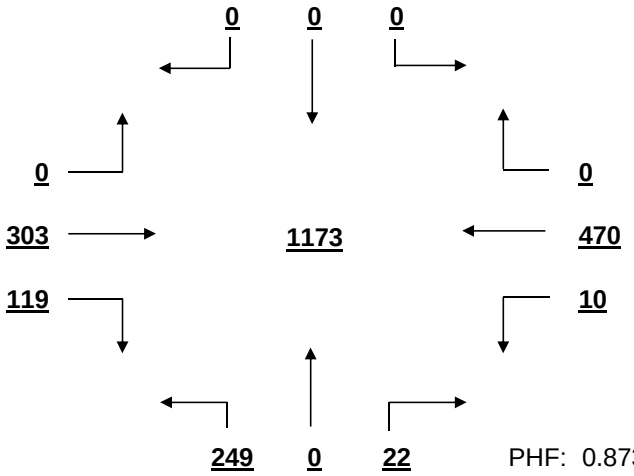
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Lake Murray Blvd AT Parkridge Dr Date: 11/28/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

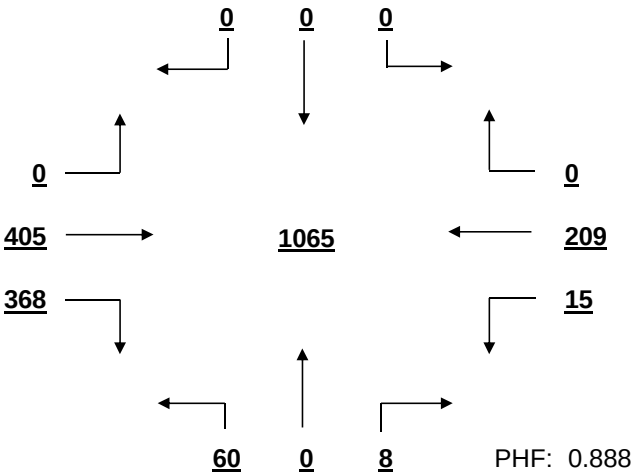


OVERALL PEAK HOUR VOLUME
FROM 17:00 TO 18:00



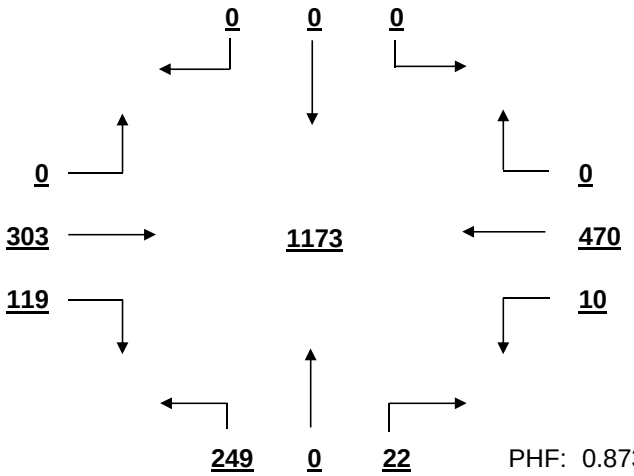
PHF: 0.873

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



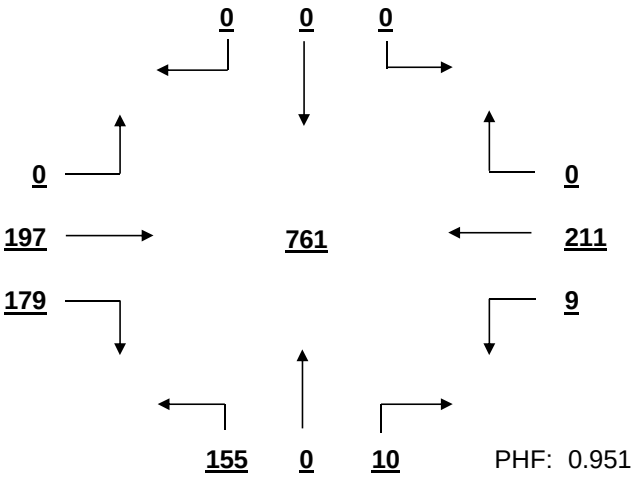
PHF: 0.888

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:00 TO 18:00



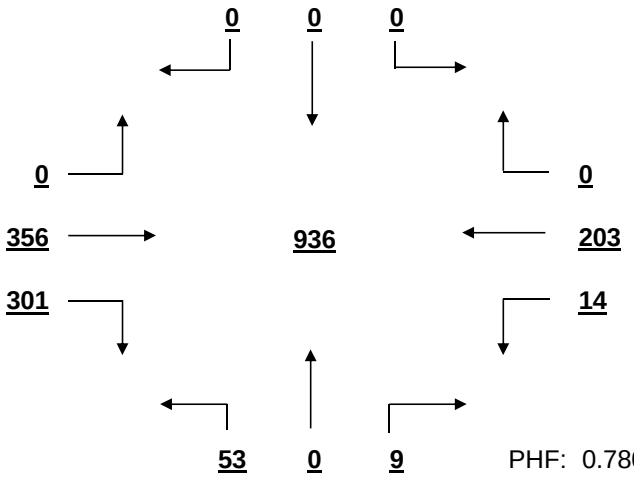
PHF: 0.873

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: 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.	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

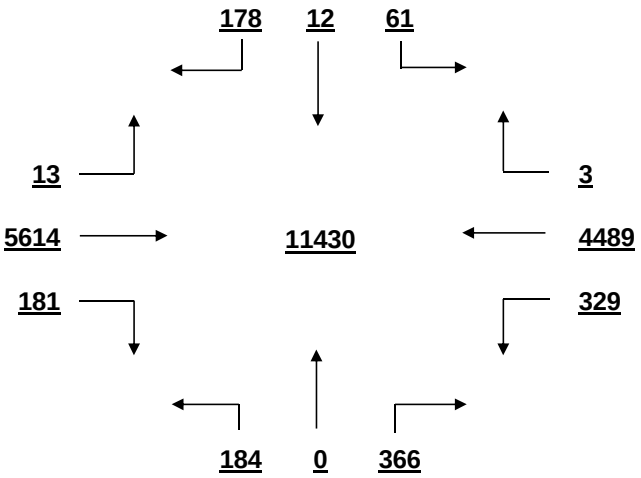
INTERSECTION VOLUME SUMMARY

	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%

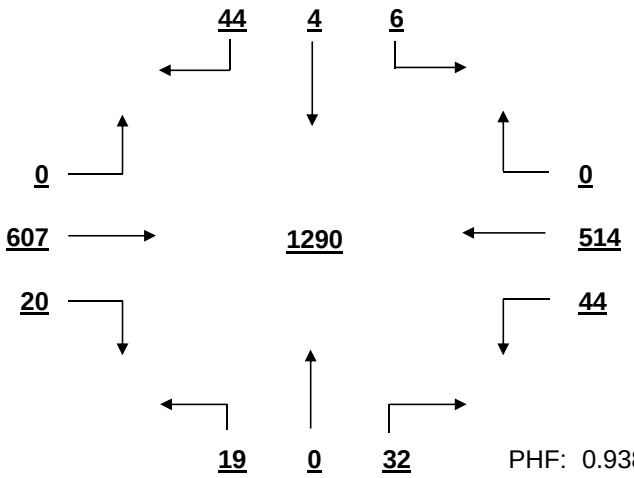
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Columbiana Dr AT Columbia Ave-Gateway Academy Date: 11/28/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

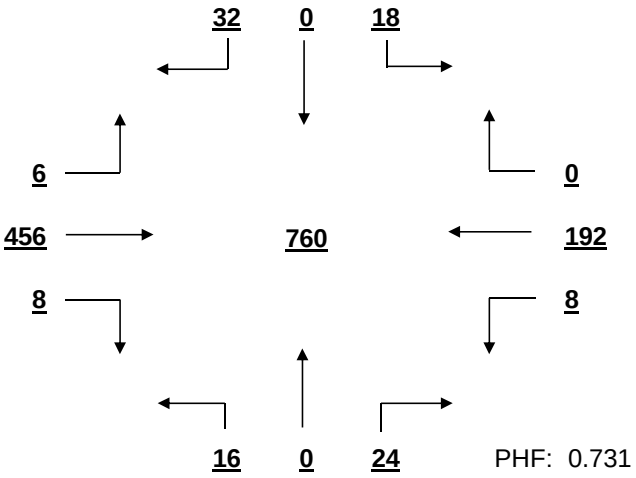


OVERALL PEAK HOUR VOLUME
FROM 17:30 TO 18:30



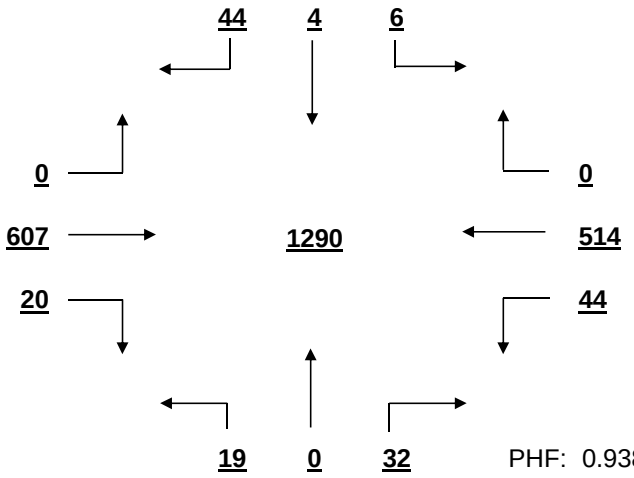
PHF: 0.938

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



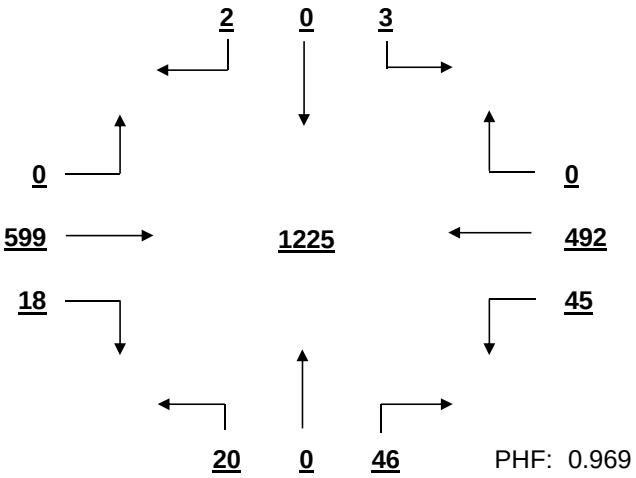
PHF: 0.731

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:30 TO 18:30



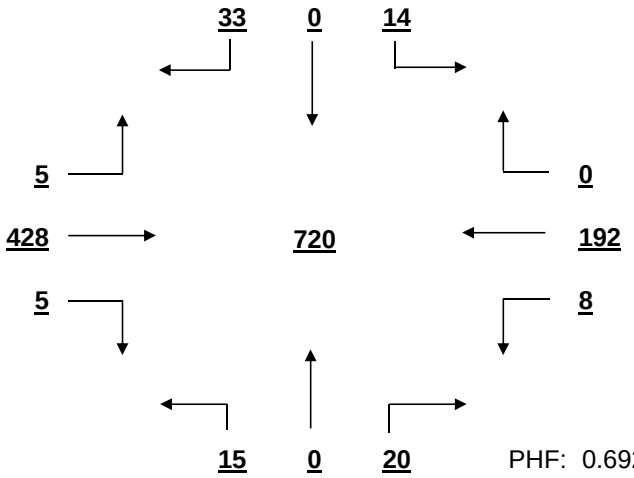
PHF: 0.938

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

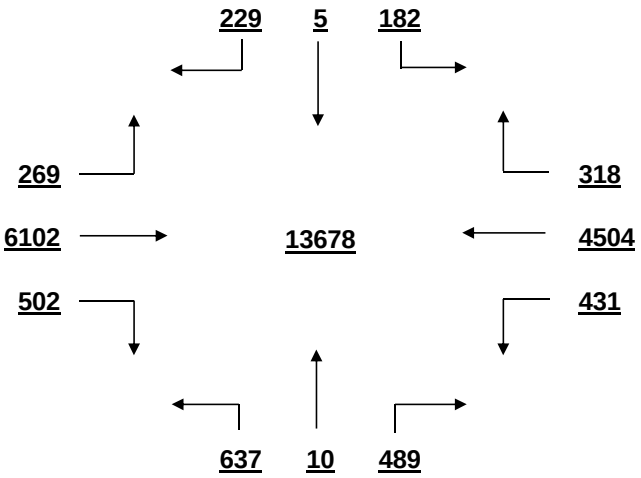
INTERSECTION VOLUME SUMMARY

	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%

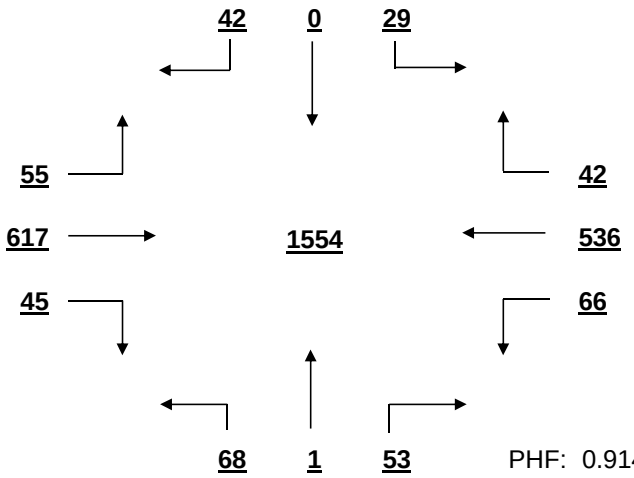
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Columbiana Dr AT Crossbow Dr-Texas Roadhouse Date: 11/30/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

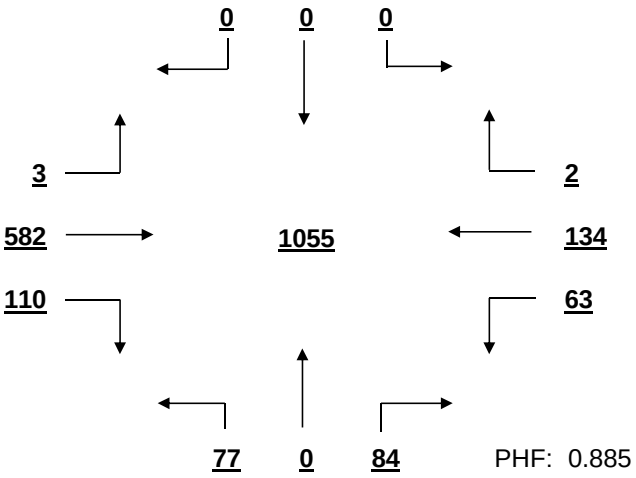


OVERALL PEAK HOUR VOLUME
FROM 17:15 TO 18:15



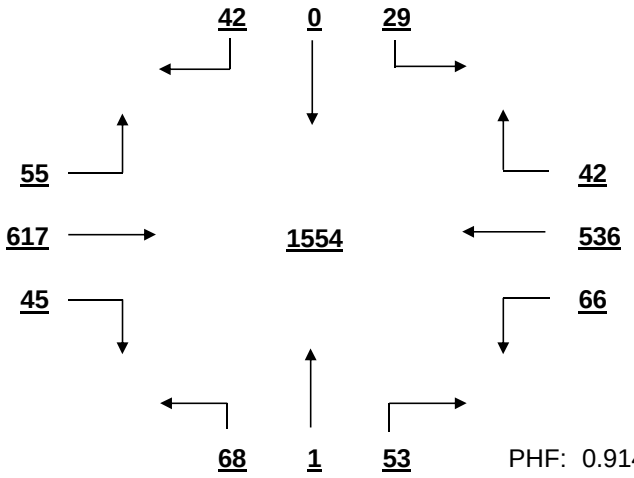
PHF: 0.914

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



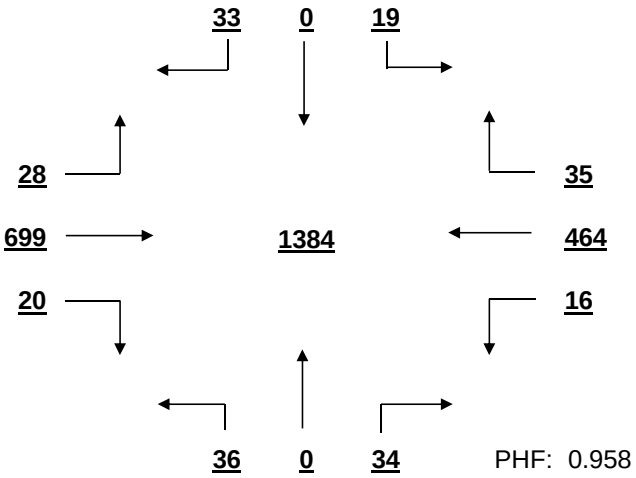
PHF: 0.885

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:15 TO 18:15



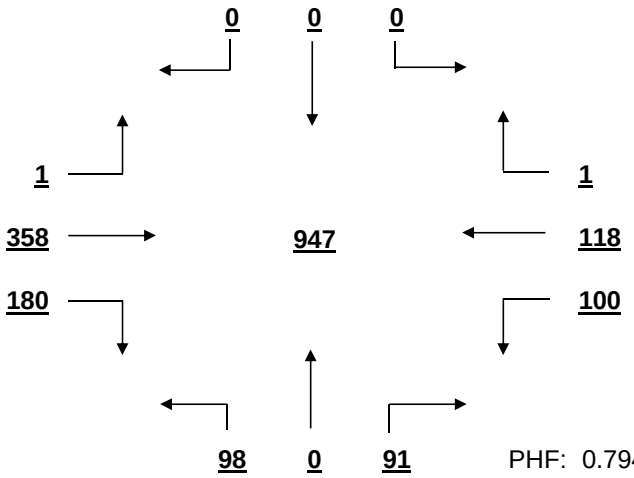
PHF: 0.914

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

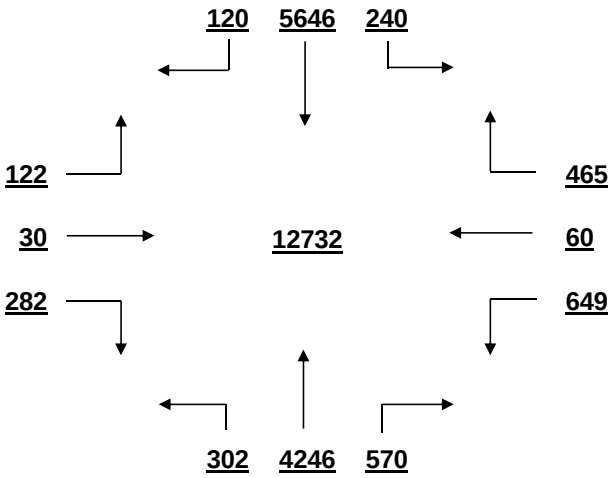
INTERSECTION VOLUME SUMMARY

	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%

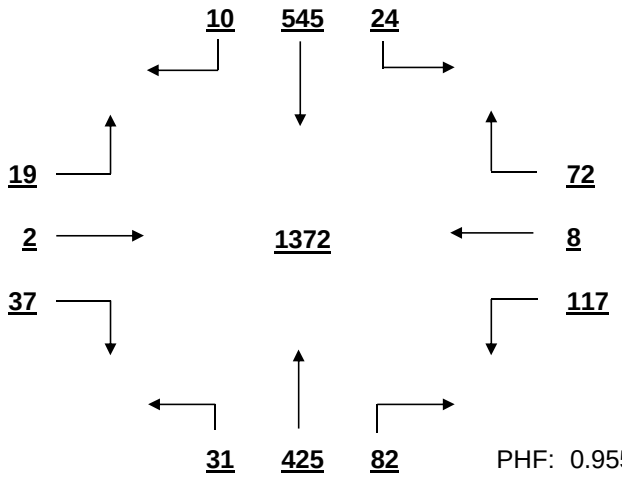
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Columbiana Dr AT Columbiana Cir-Lanneau Ct Date: 11/29/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

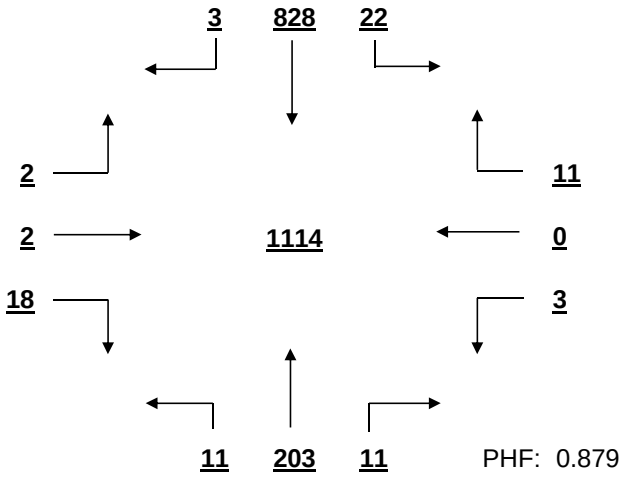


OVERALL PEAK HOUR VOLUME
FROM 12:45 TO 13:45



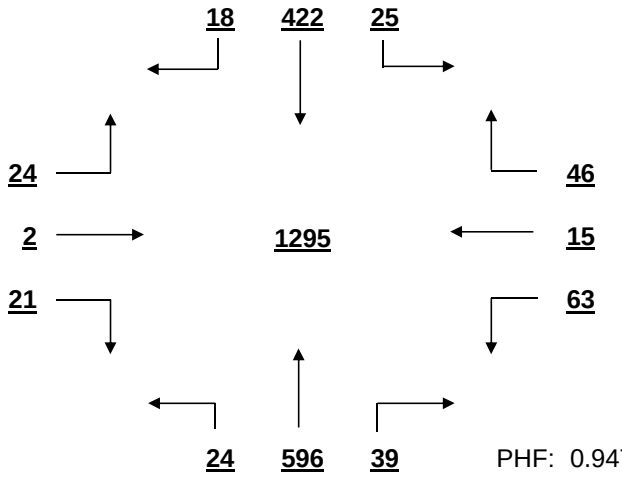
PHF: 0.955

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



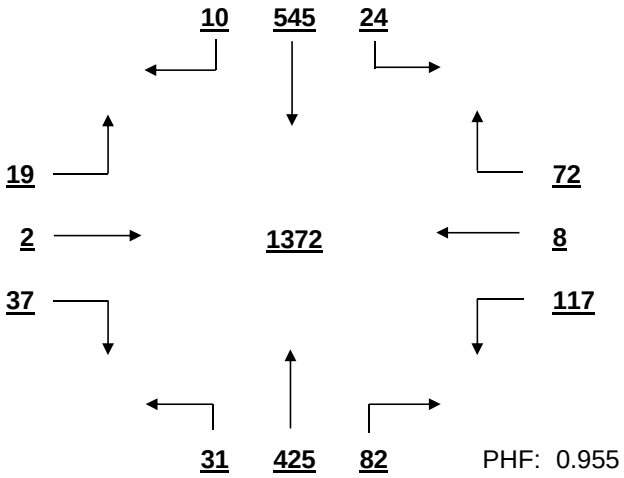
PHF: 0.879

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:45 TO 18:45



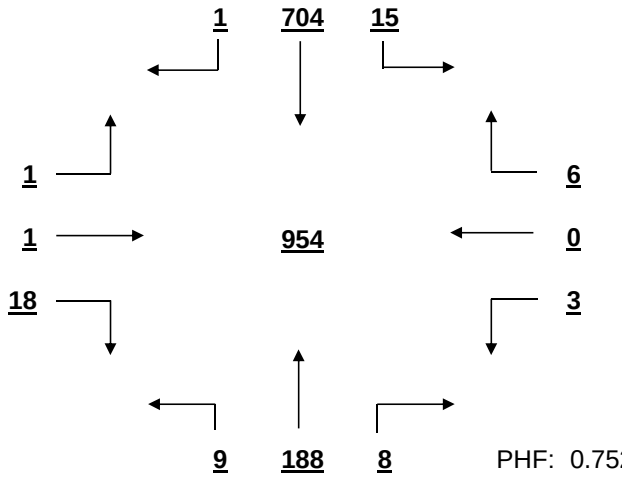
PHF: 0.947

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

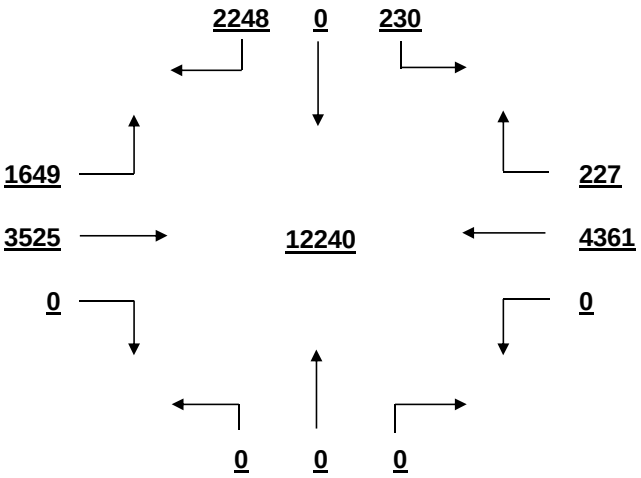
INTERSECTION VOLUME SUMMARY

	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%

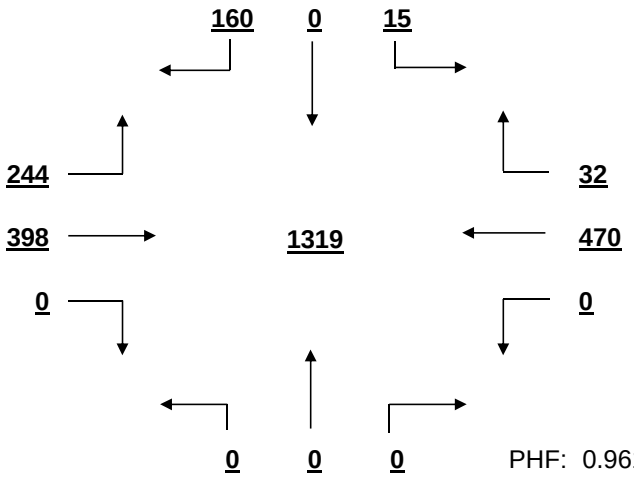
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Harbison Blvd AT Parkridge Dr Date: 11/30/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

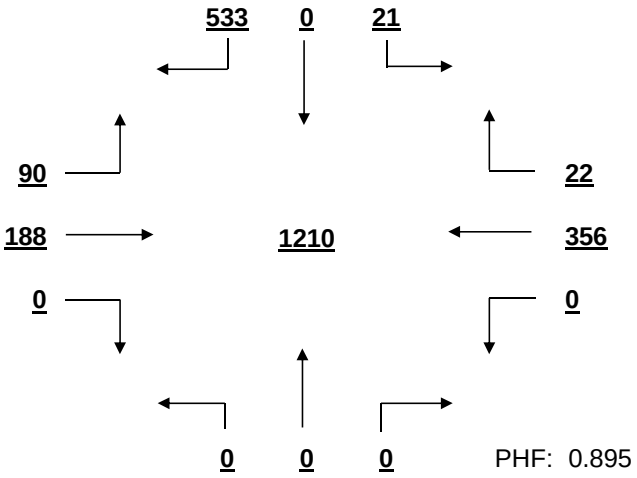


OVERALL PEAK HOUR VOLUME
FROM 17:00 TO 18:00



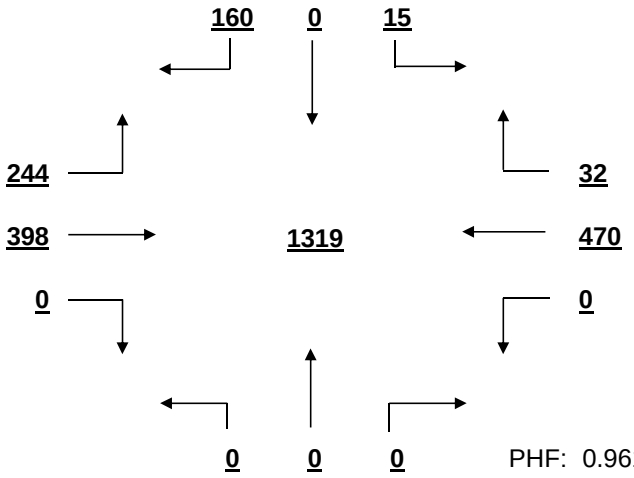
PHF: 0.961

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



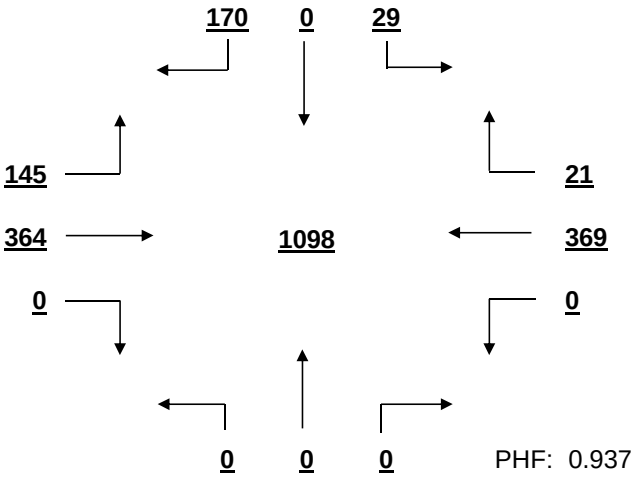
PHF: 0.895

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:00 TO 18:00



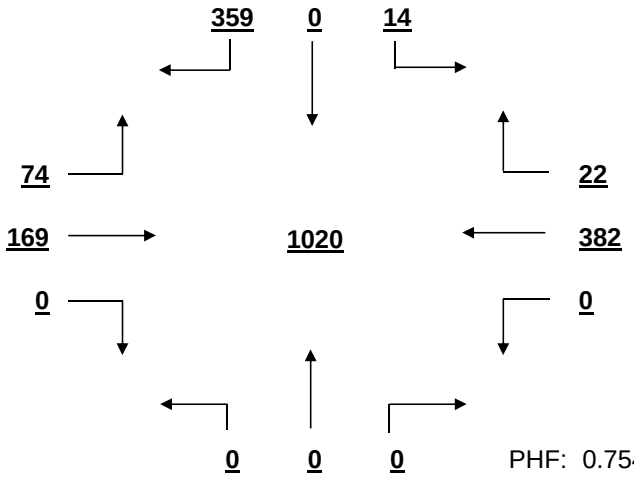
PHF: 0.961

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

Overall Peak Hour: 17:00 - 18:00 — Percent of warrant — Minor St. 75%

Higher Volume Side Street Peak Hour: 7:30 - 8:30 — Percent of warrant — 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: 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	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

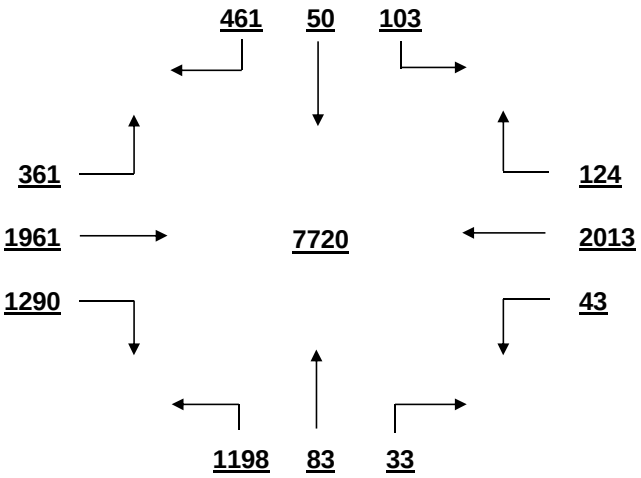
INTERSECTION VOLUME SUMMARY

	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%

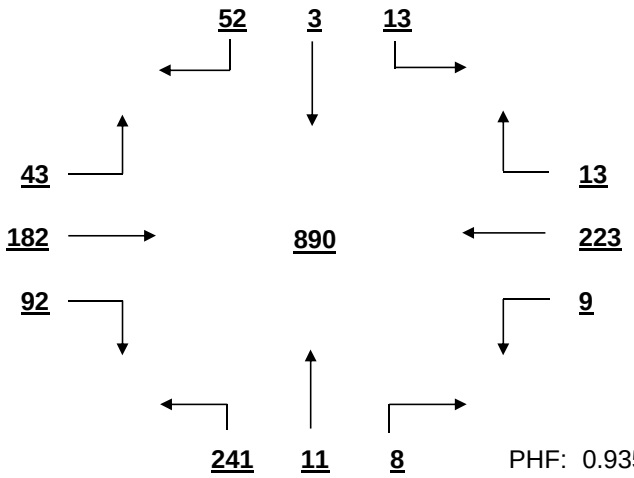
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Woodcross Dr AT Fernandina Rd-Wendy's/Hotel Date: 12/1/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

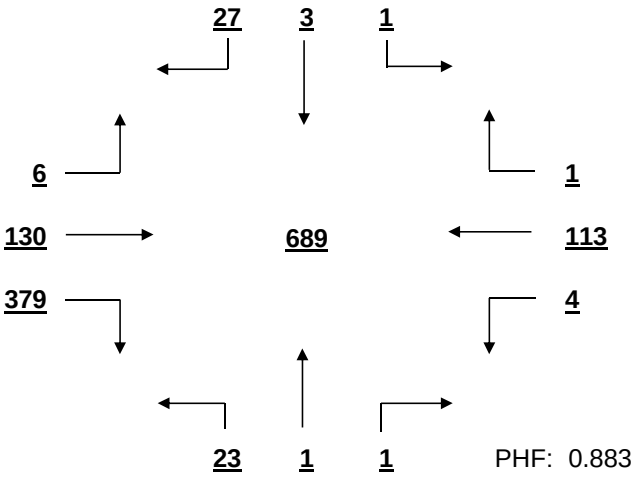


OVERALL PEAK HOUR VOLUME
FROM 17:00 TO 18:00



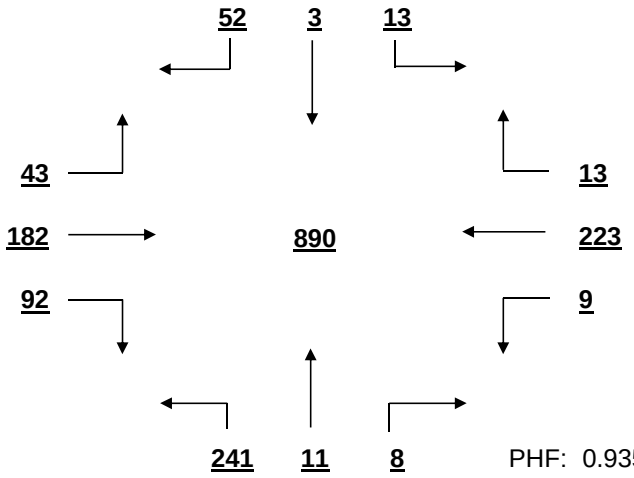
PHF: 0.935

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



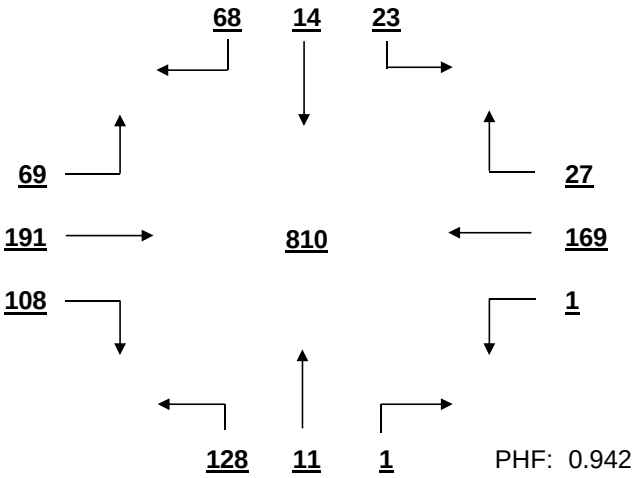
PHF: 0.883

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:00 TO 18:00



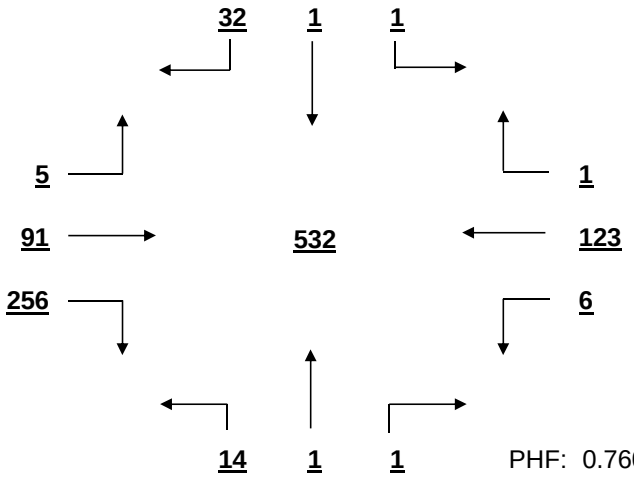
PHF: 0.935

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	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: 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

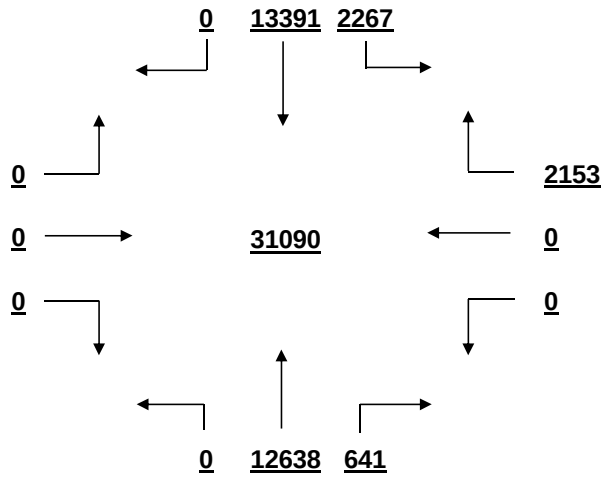
INTERSECTION VOLUME SUMMARY

	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%

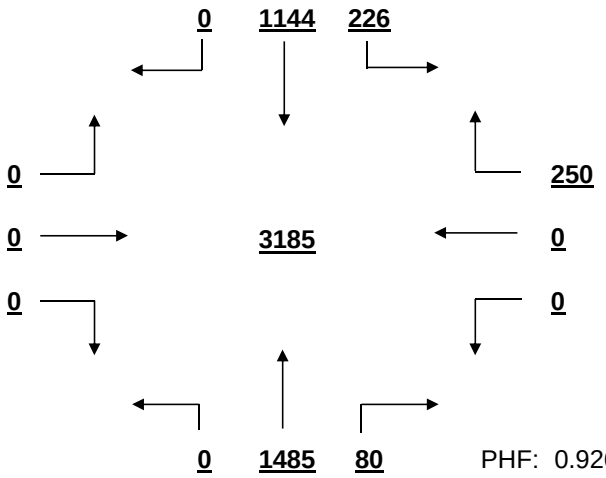
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Harbison Blvd AT Saturn Pkwy Date: 12/2/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

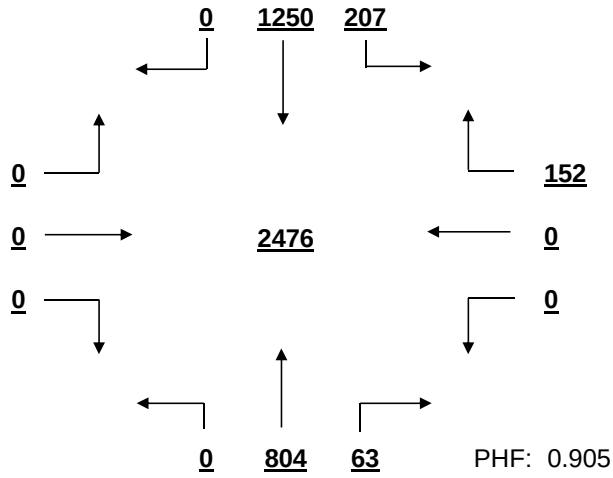


OVERALL PEAK HOUR VOLUME
FROM 14:15 TO 15:15



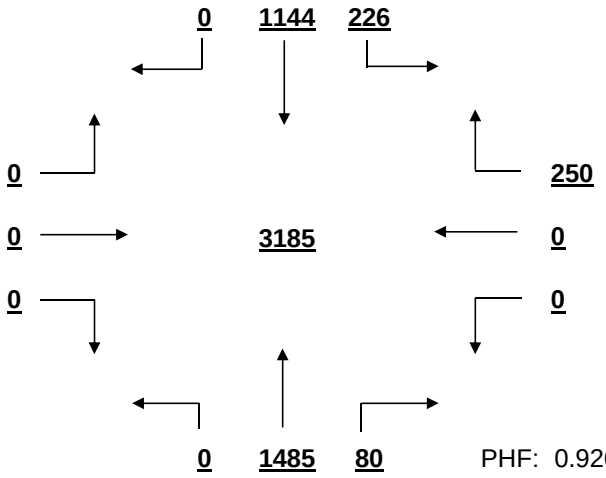
PHF: 0.926

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 9:45 TO 10:45



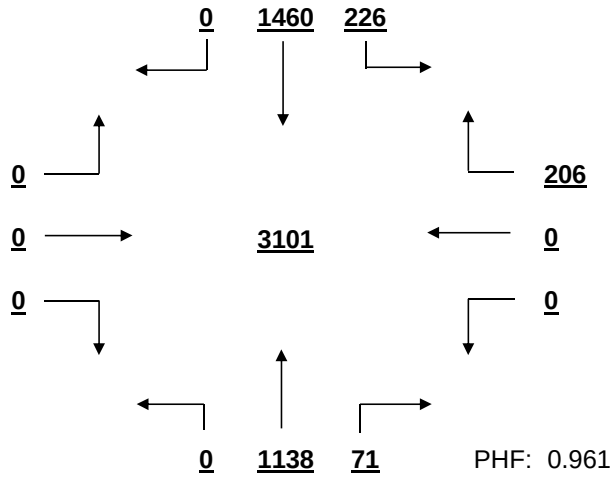
PHF: 0.905

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 14:15 TO 15:15



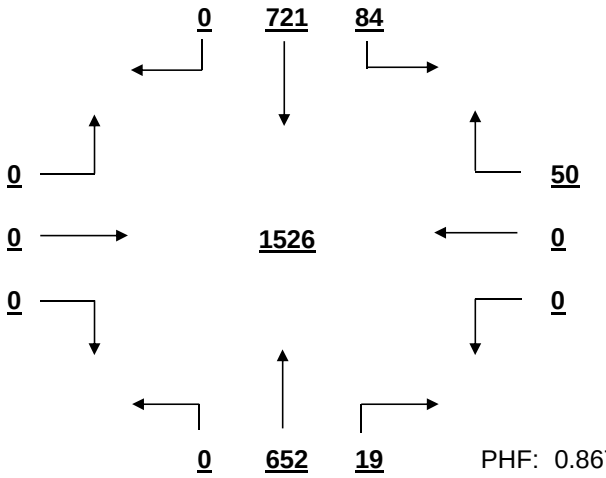
PHF: 0.926

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

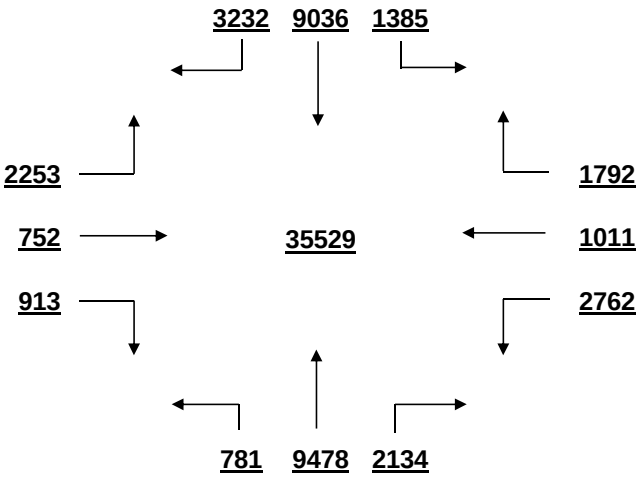
INTERSECTION VOLUME SUMMARY

	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%

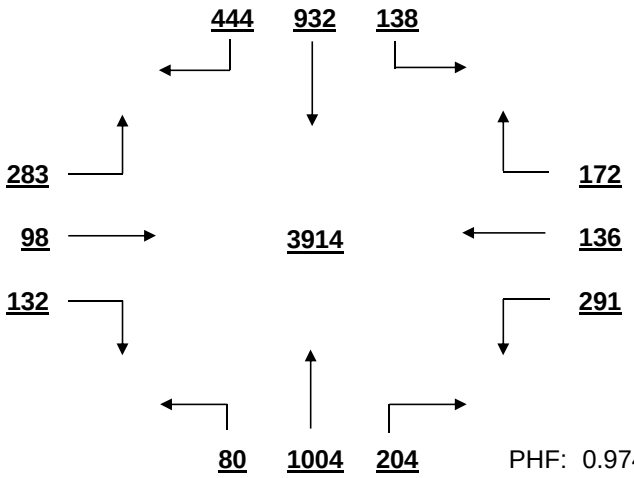
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Harbison Blvd AT Columbiana Cir-Park Terrace Dr Date: 11/21/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

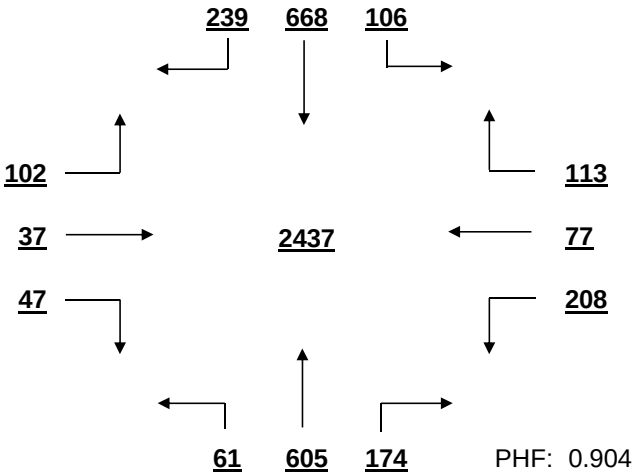


OVERALL PEAK HOUR VOLUME
FROM 12:15 TO 13:15



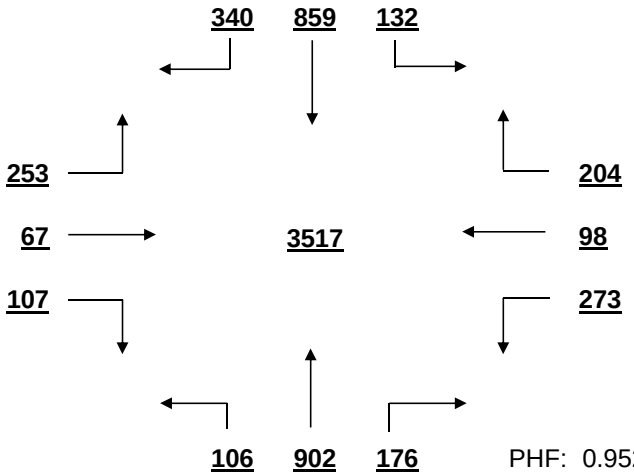
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AM PEAK HOUR VOLUME (0:00-10:45)
FROM 9:45 TO 10:45



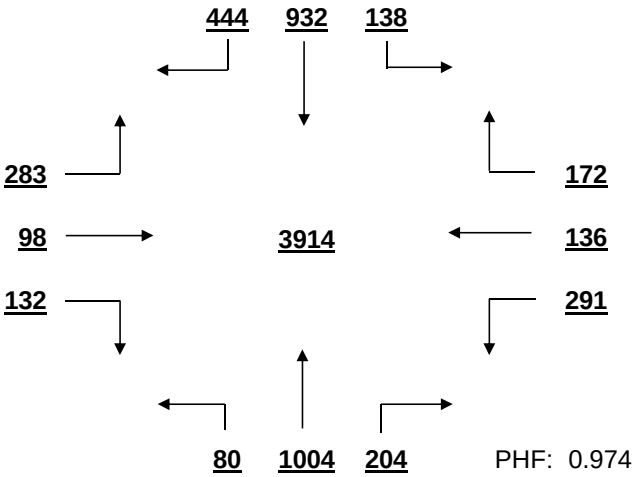
PHF: 0.904

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 15:45 TO 16:45



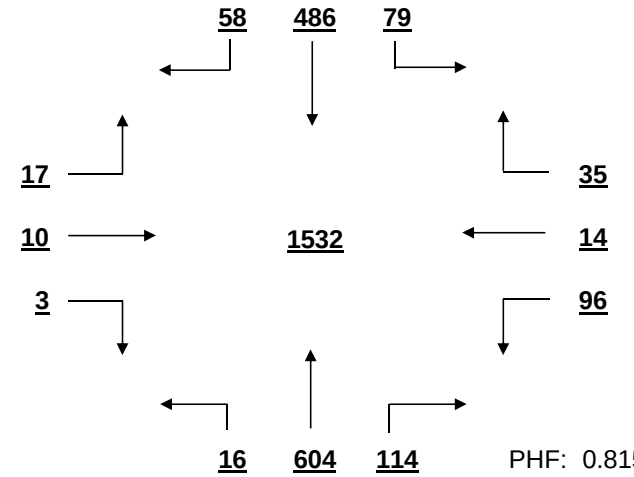
PHF: 0.952

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	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.	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

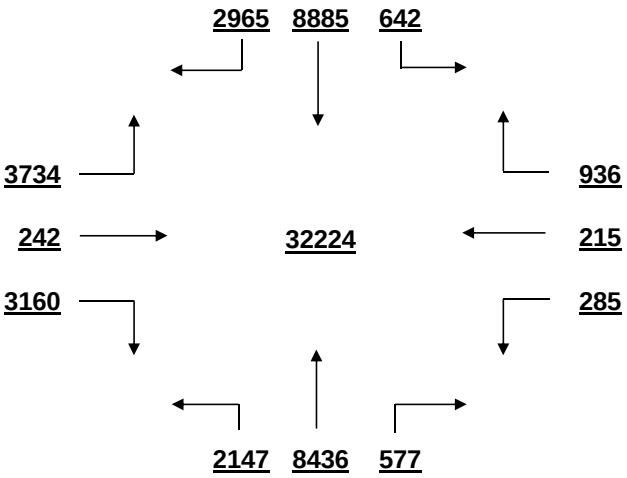
INTERSECTION VOLUME SUMMARY

	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%

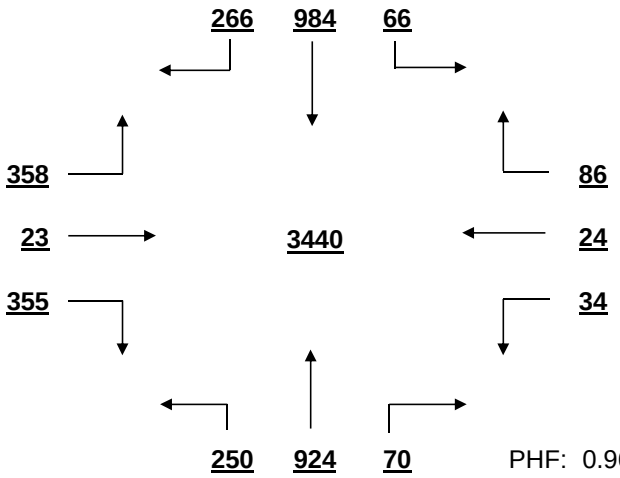
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Harbison Blvd AT Columbiana Dr-Chick Fil A Date: 11/22/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

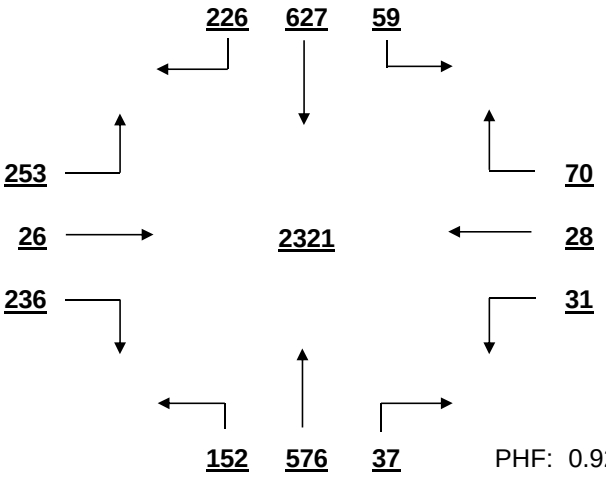


OVERALL PEAK HOUR VOLUME
FROM 12:15 TO 13:15



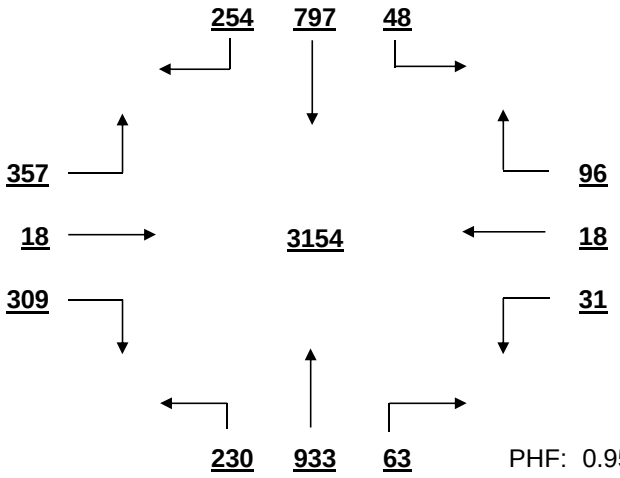
PHF: 0.966

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 9:45 TO 10:45



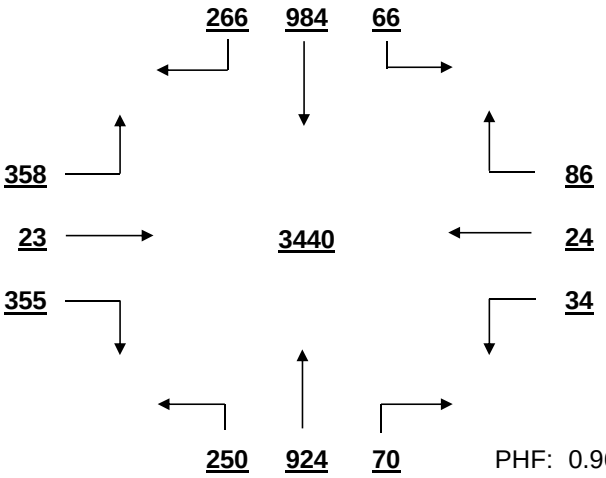
PHF: 0.925

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 14:15 TO 15:15



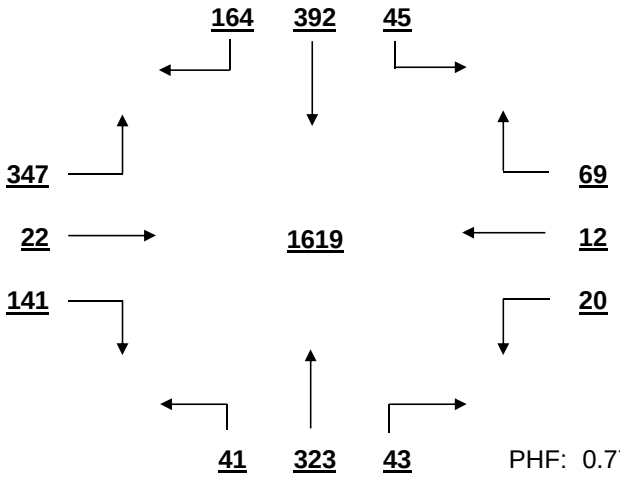
PHF: 0.956

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

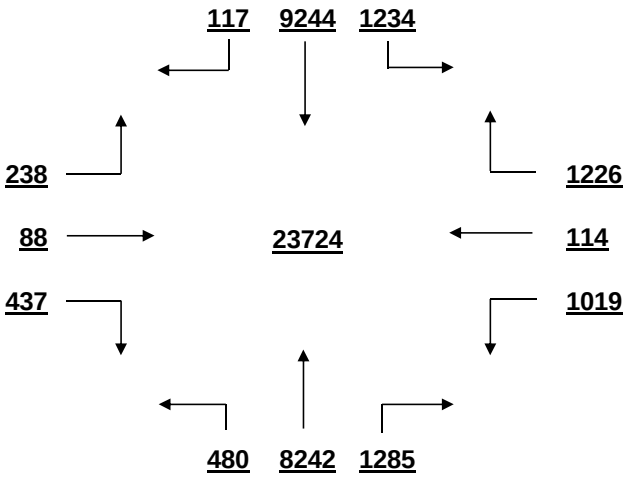
INTERSECTION VOLUME SUMMARY

	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%

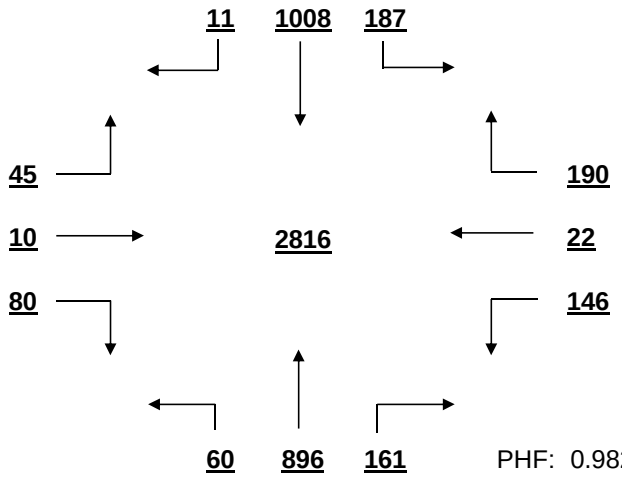
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

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

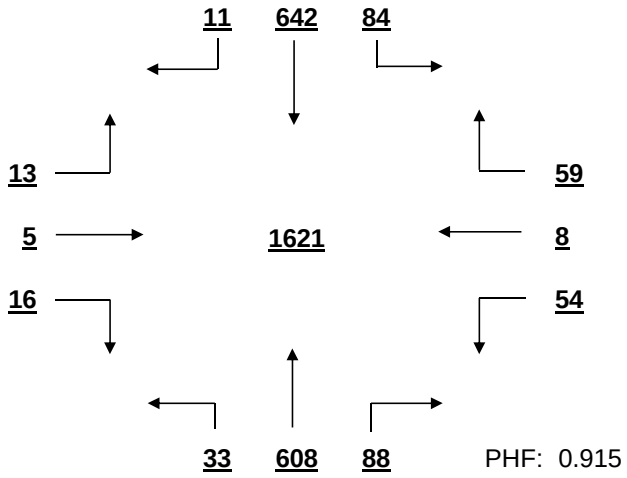


OVERALL PEAK HOUR VOLUME
FROM 12:30 TO 13:30



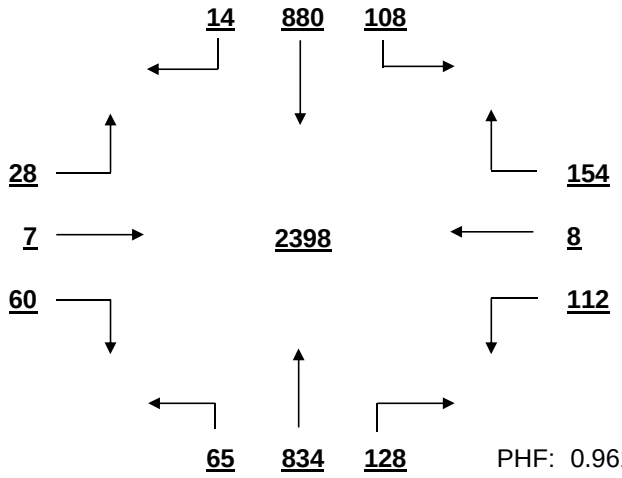
PHF: 0.982

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 9:45 TO 10:45



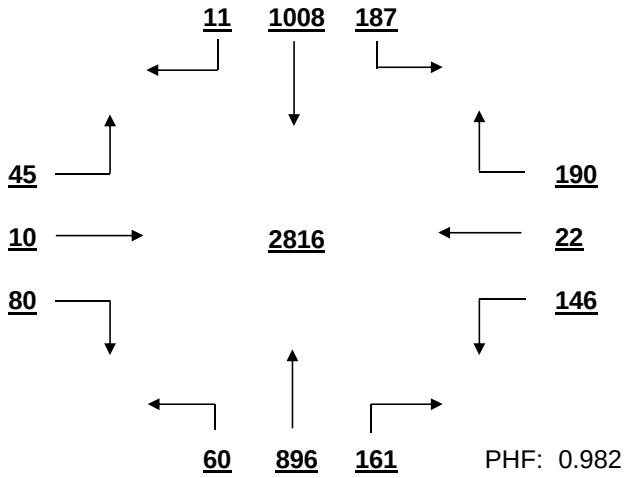
PHF: 0.915

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 14:15 TO 15:15



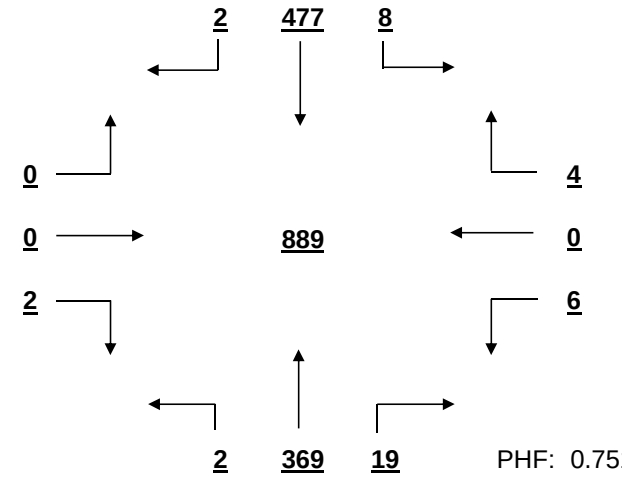
PHF: 0.961

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

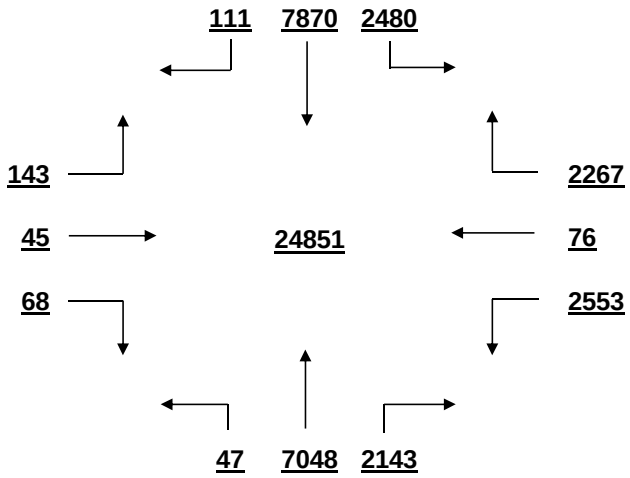
INTERSECTION VOLUME SUMMARY

	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%

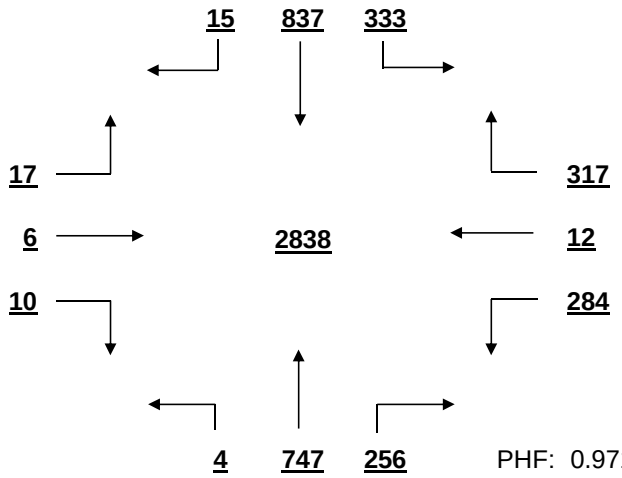
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Harbison Blvd AT Bower Pkwy-Shopping Center Date: 11/21/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

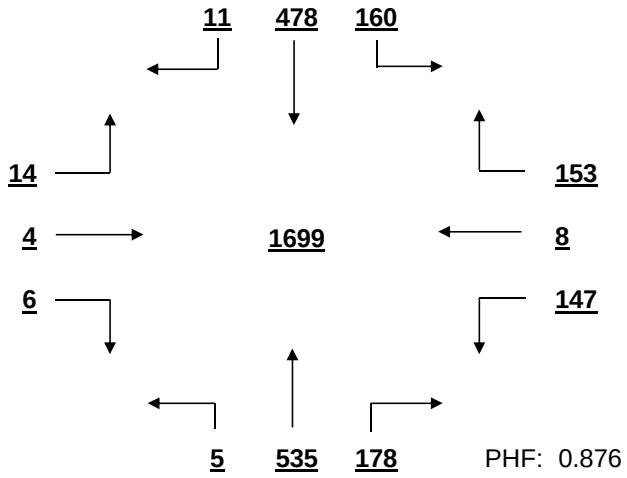


OVERALL PEAK HOUR VOLUME
FROM 12:15 TO 13:15



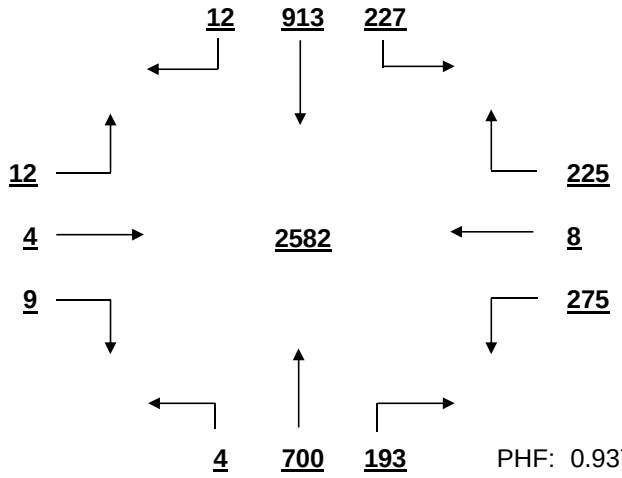
PHF: 0.971

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 9:45 TO 10:45



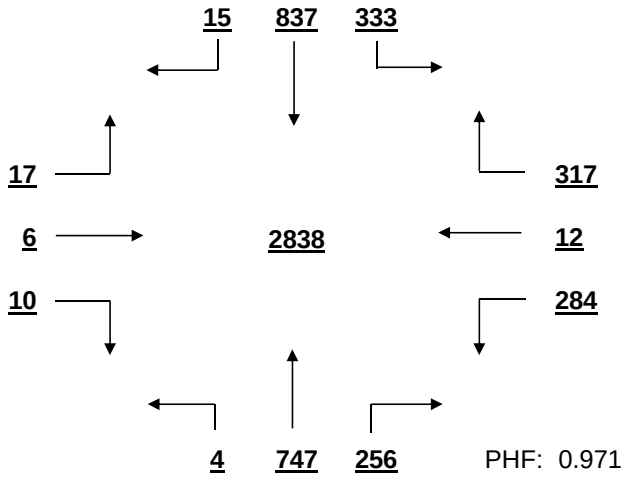
PHF: 0.876

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



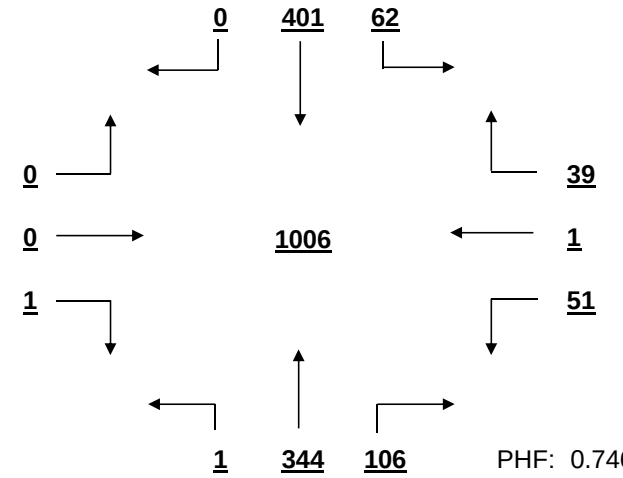
PHF: 0.937

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

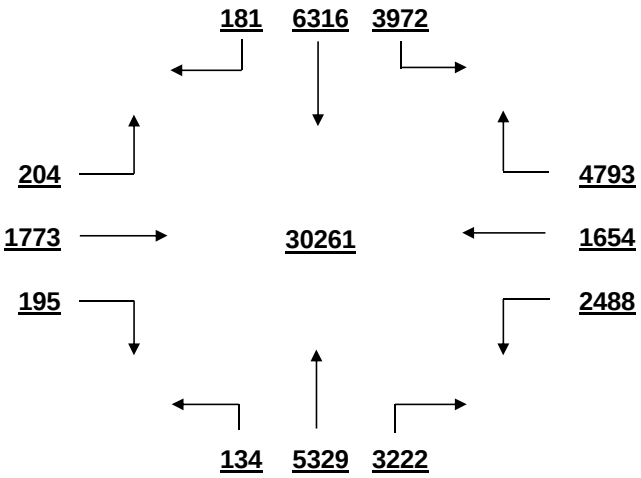
INTERSECTION VOLUME SUMMARY

	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%

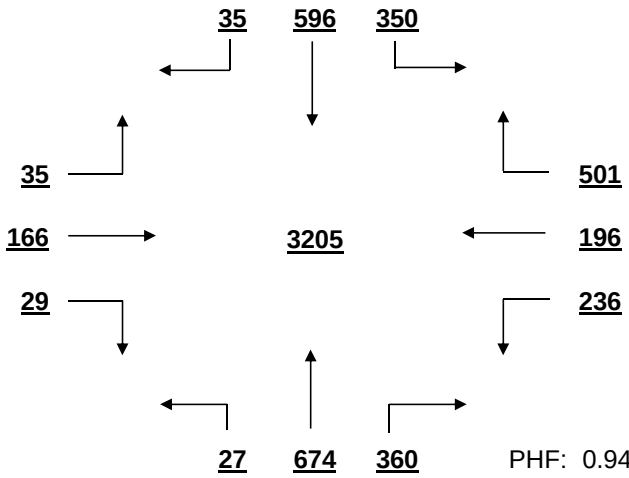
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

St. Andrews Rd AT Harbison Blvd-Emory Ln Date: 11/21/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

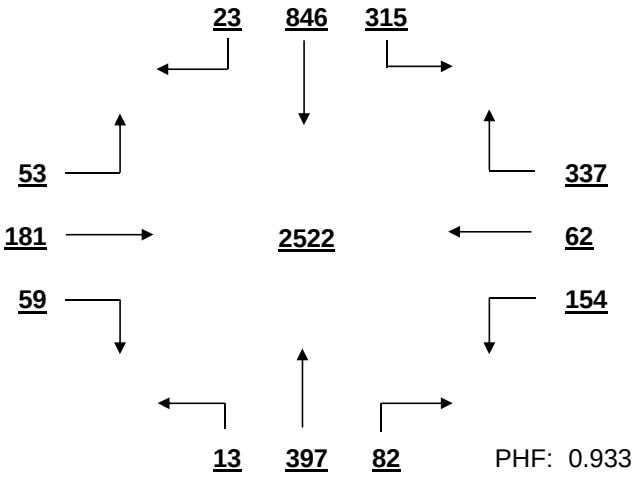


OVERALL PEAK HOUR VOLUME
FROM 15:30 TO 16:30



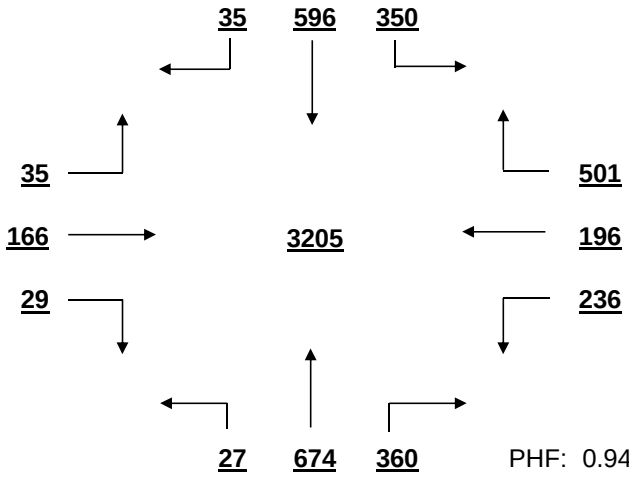
PHF: 0.940

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



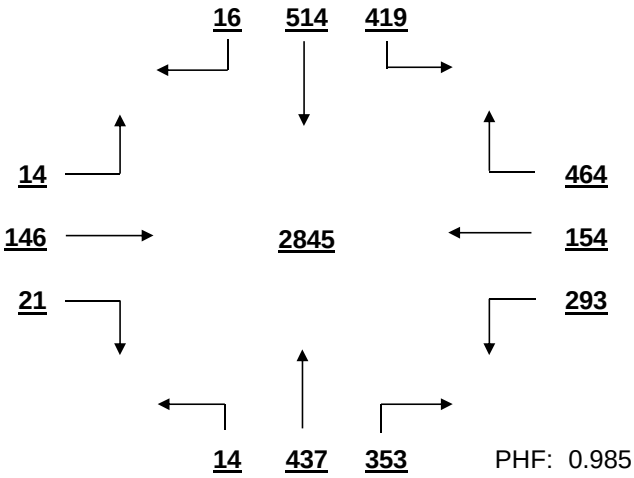
PHF: 0.933

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 15:30 TO 16:30



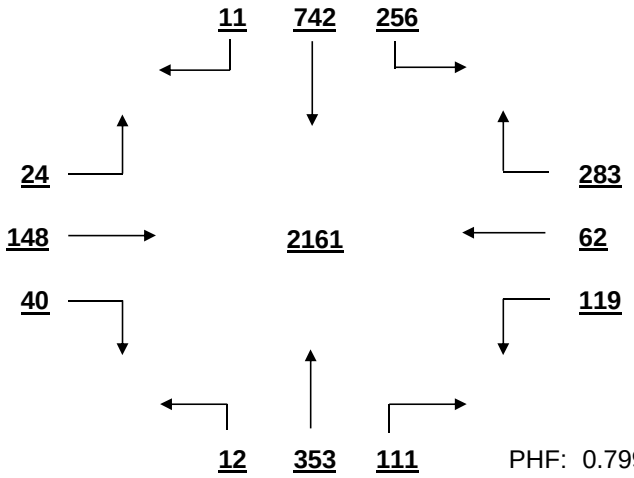
PHF: 0.940

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

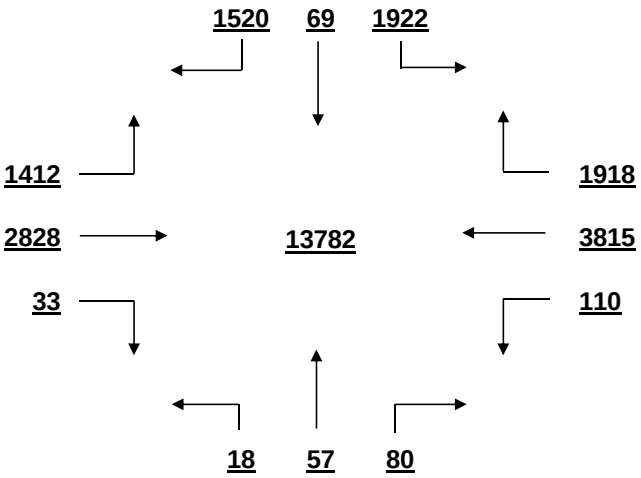
INTERSECTION VOLUME SUMMARY

	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%

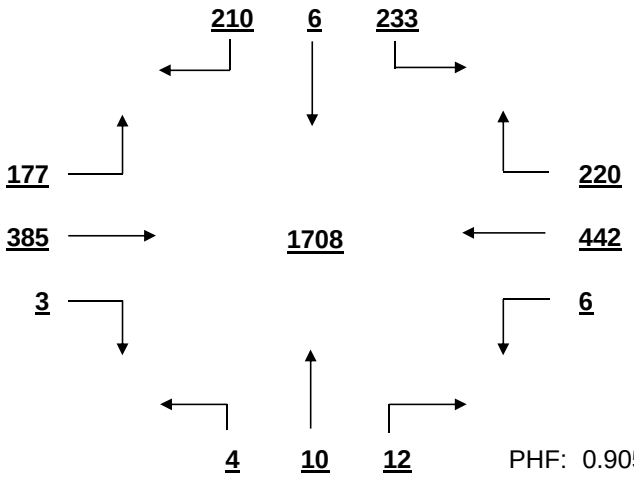
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Bower Pkwy AT Park Terrace Dr Date: 11/21/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

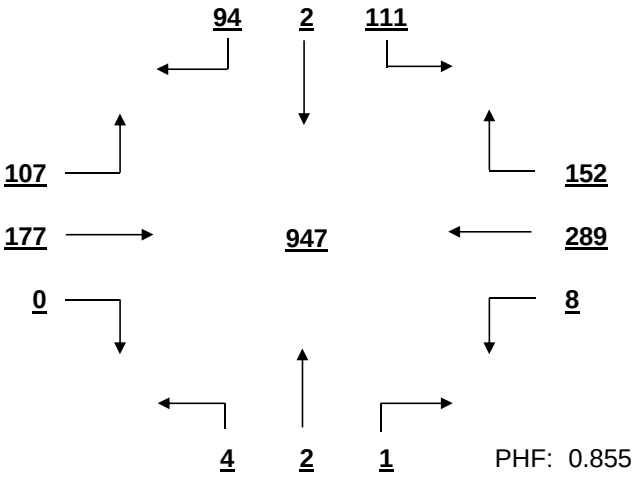


OVERALL PEAK HOUR VOLUME
FROM 12:15 TO 13:15



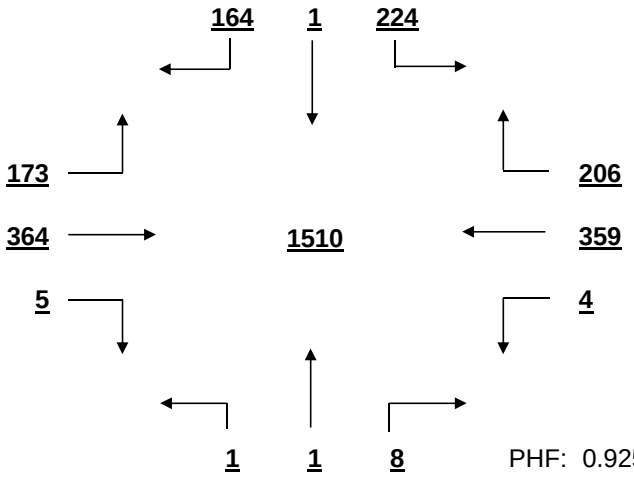
PHF: 0.905

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 9:45 TO 10:45



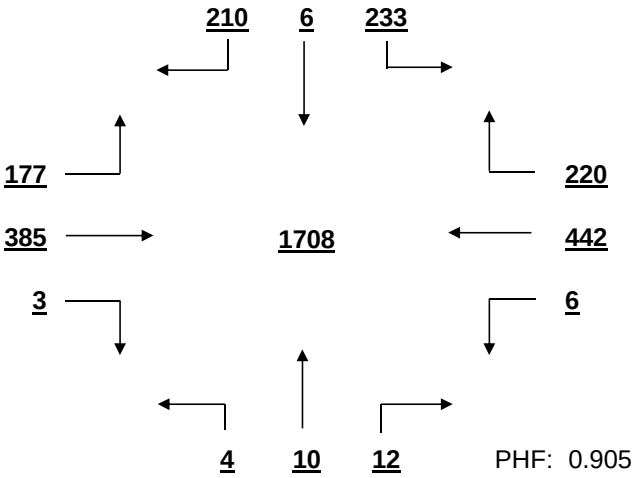
PHF: 0.855

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 14:15 TO 15:15



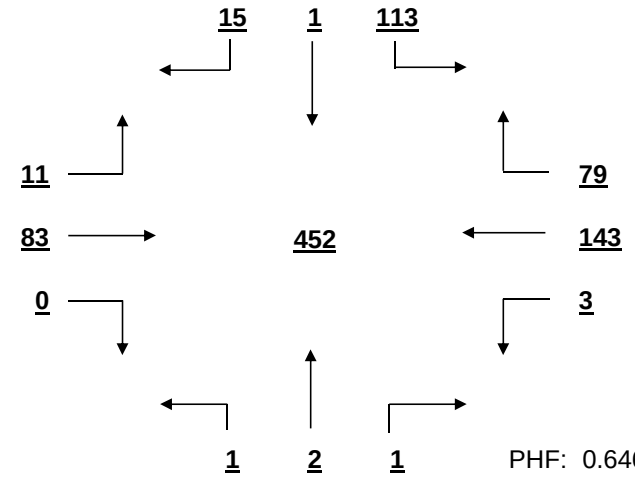
PHF: 0.925

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: 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: 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

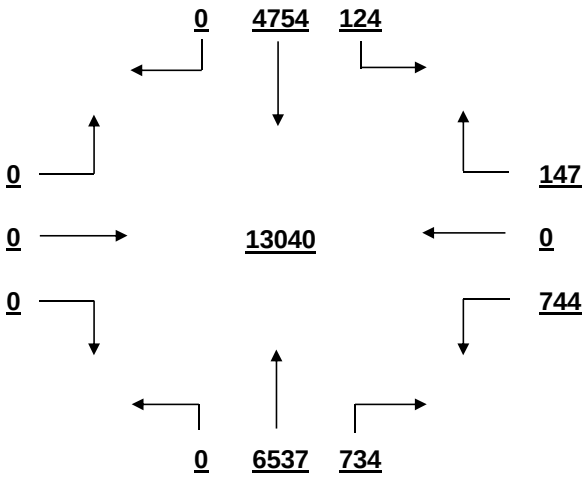
INTERSECTION VOLUME SUMMARY

	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%

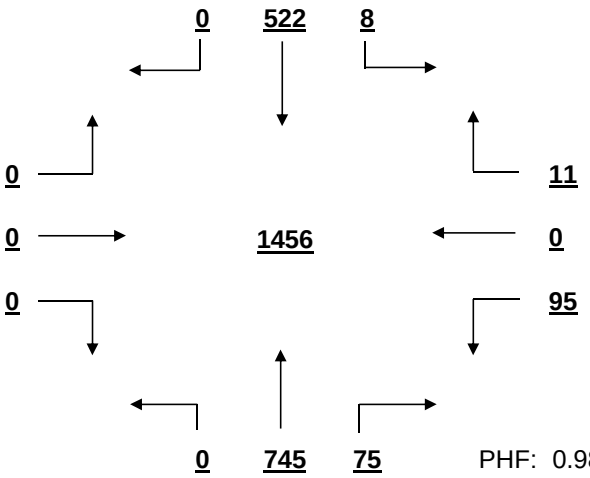
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Bower Pkwy AT Saturn Pkwy Date: 11/22/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

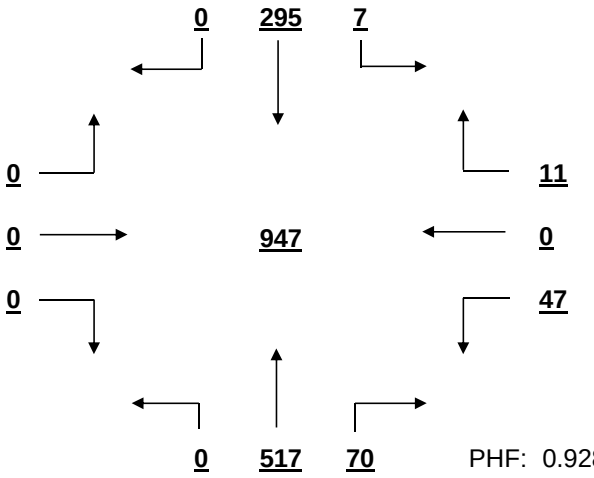


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



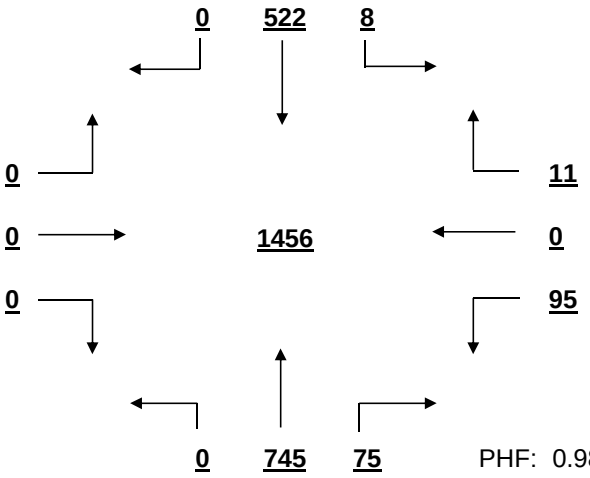
PHF: 0.981

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 9:45 TO 10:45



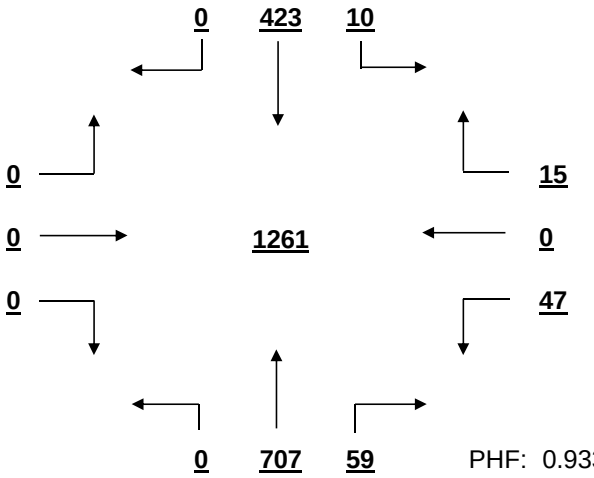
PHF: 0.928

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



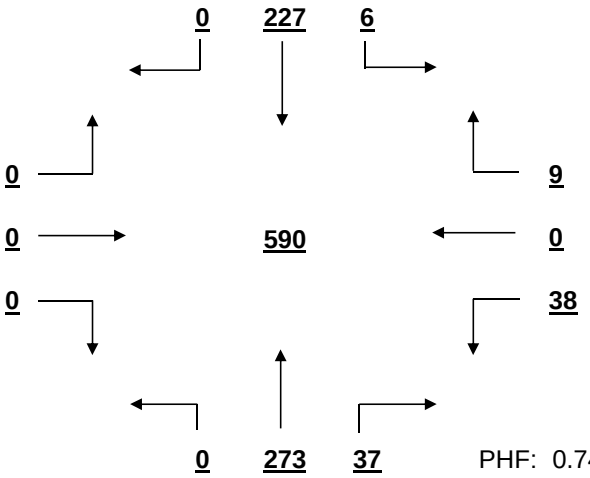
PHF: 0.981

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	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: 11/21/2016

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

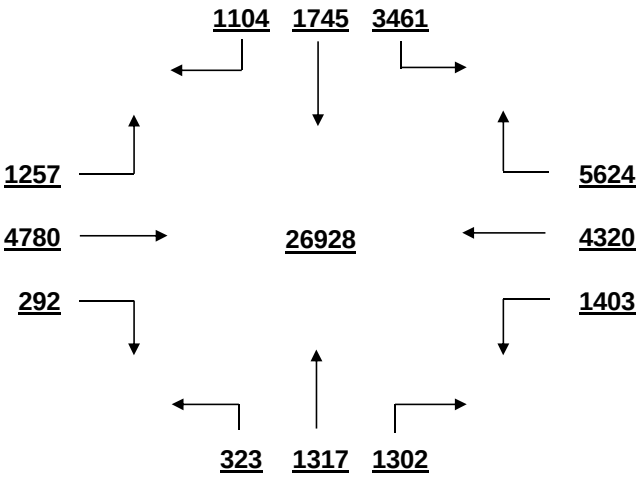
INTERSECTION VOLUME SUMMARY

	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%

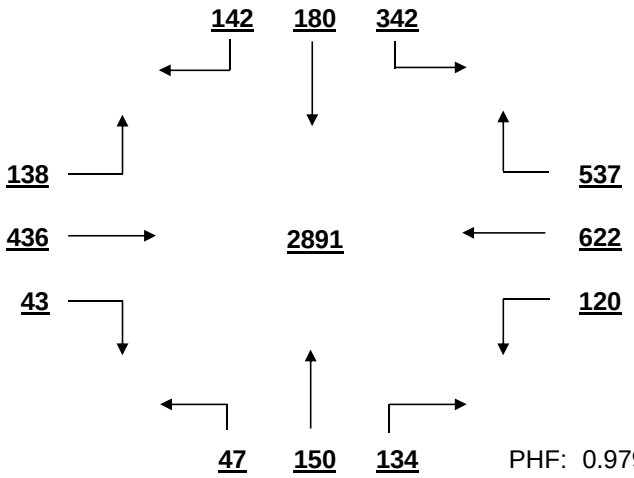
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Piney Grove Rd AT Bower Pkwy-Jamil Rd Date: 11/21/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

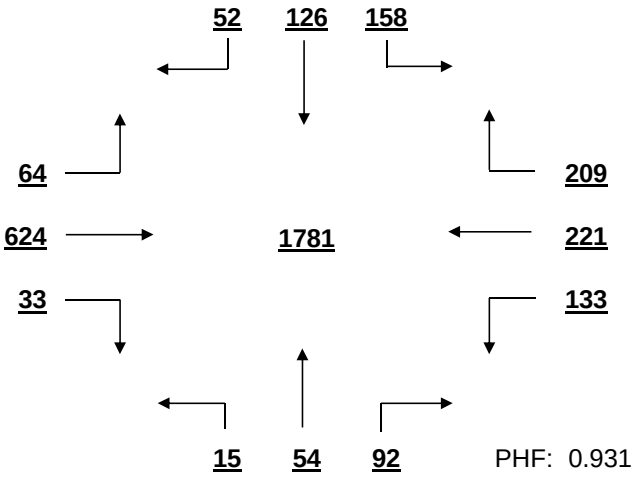


OVERALL PEAK HOUR VOLUME
FROM 16:45 TO 17:45



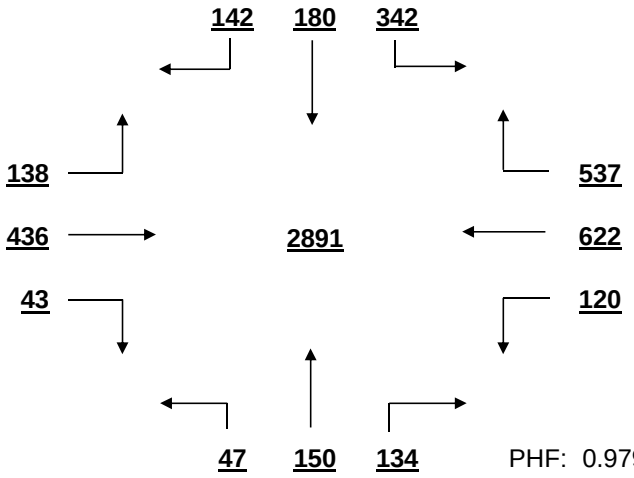
PHF: 0.979

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



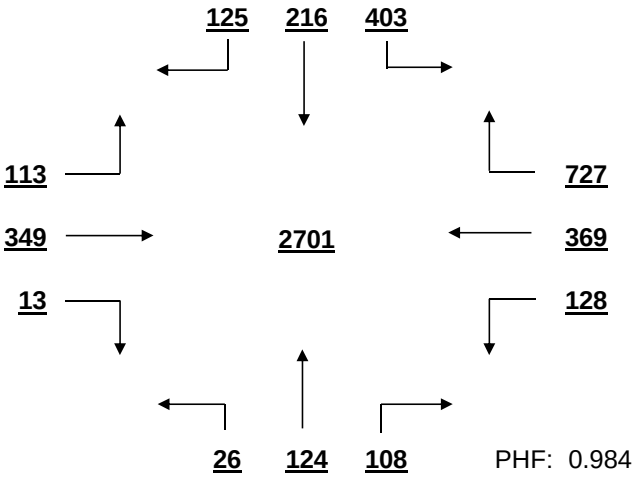
PHF: 0.931

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:45 TO 17:45



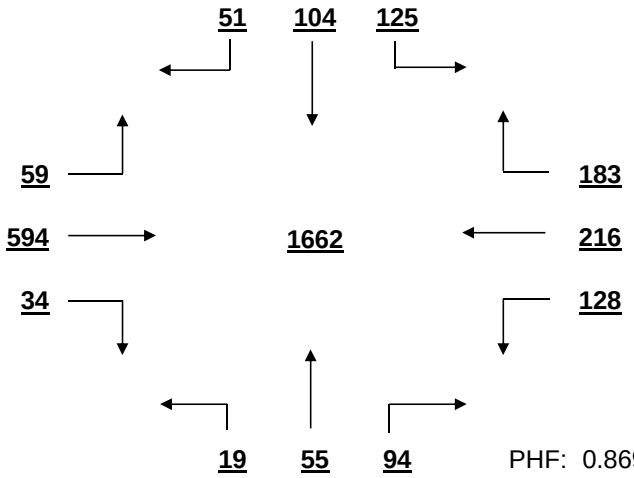
PHF: 0.979

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

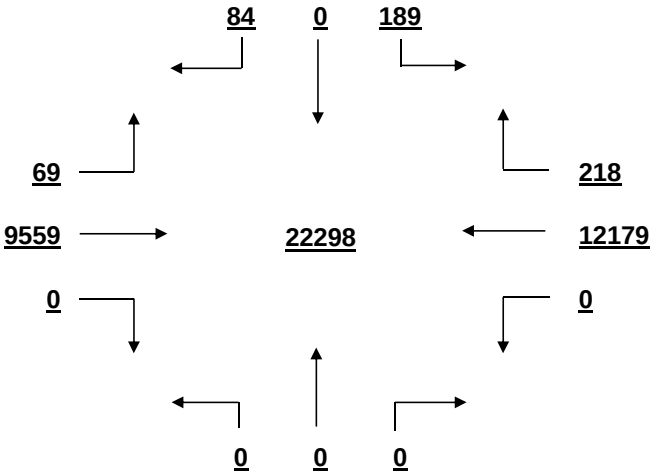
INTERSECTION VOLUME SUMMARY

	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%

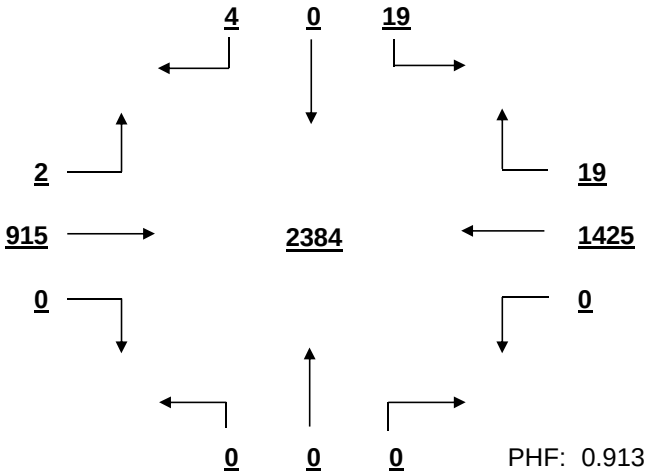
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Piney Grove Rd AT Foxfire Dr-Country Walk Apts Date: 11/21/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

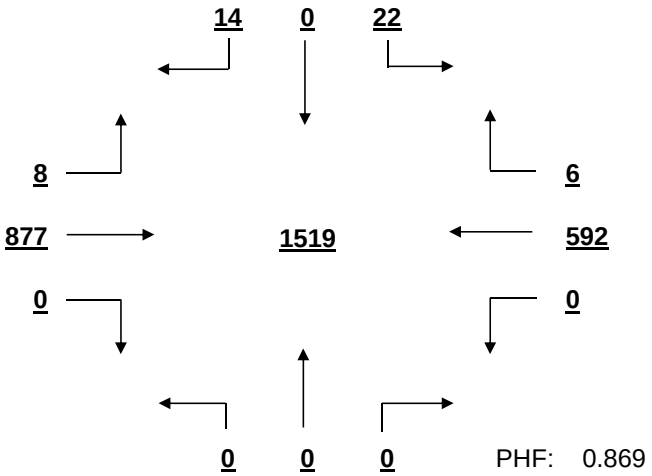


OVERALL PEAK HOUR VOLUME
FROM 13:15 TO 14:15



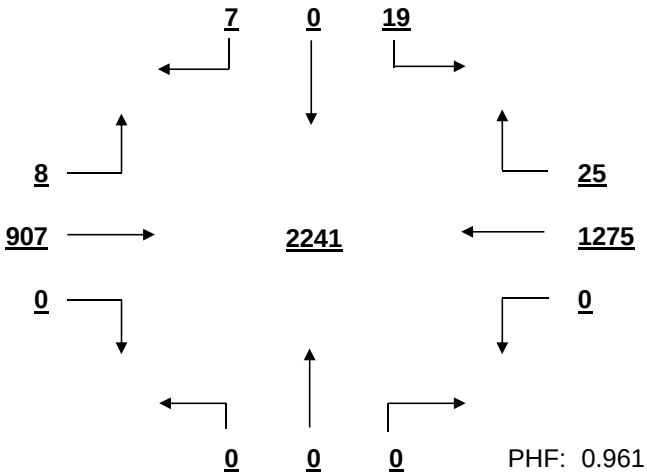
PHF: 0.913

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



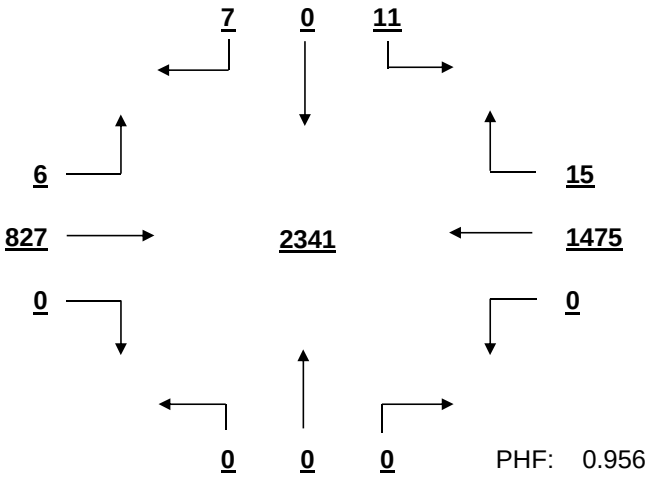
PHF: 0.869

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:45 TO 17:45



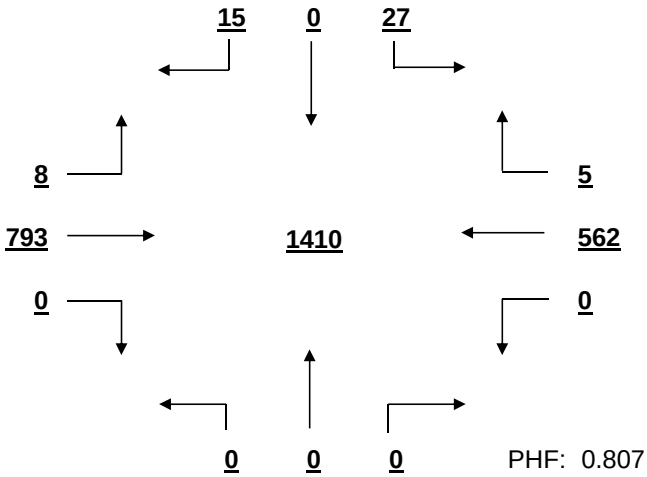
PHF: 0.961

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			Percent of warrant	
Overall Peak Hour: 13:15 - 14:15		Higher Volume Side Street Peak Hour:	7:00 - 8:00	
Minor St.	23%	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	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	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

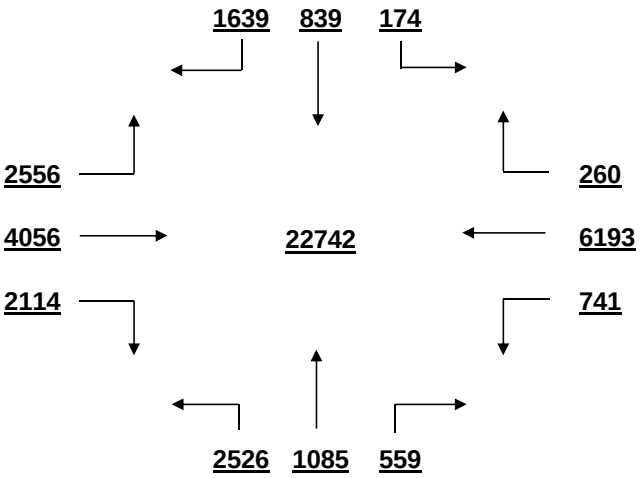
INTERSECTION VOLUME SUMMARY

	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%

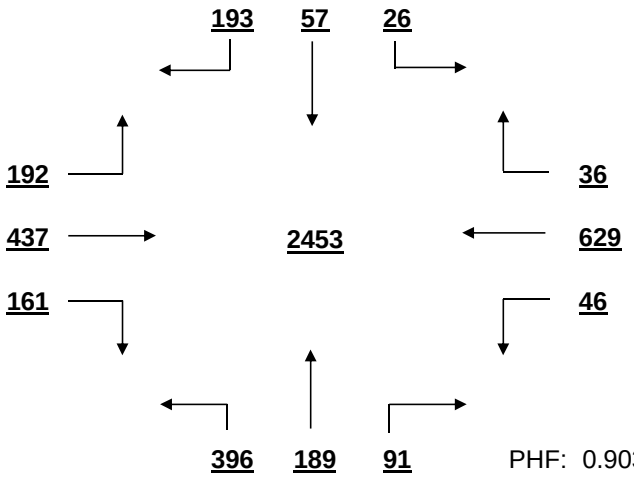
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Piney Grove Rd AT Fernandina Rd Date: 11/22/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

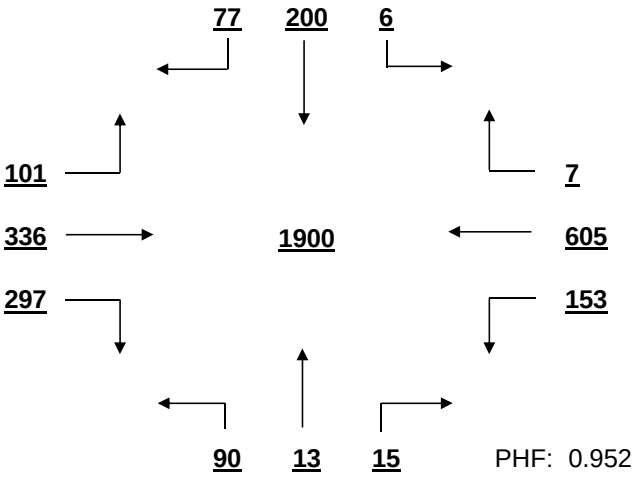


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



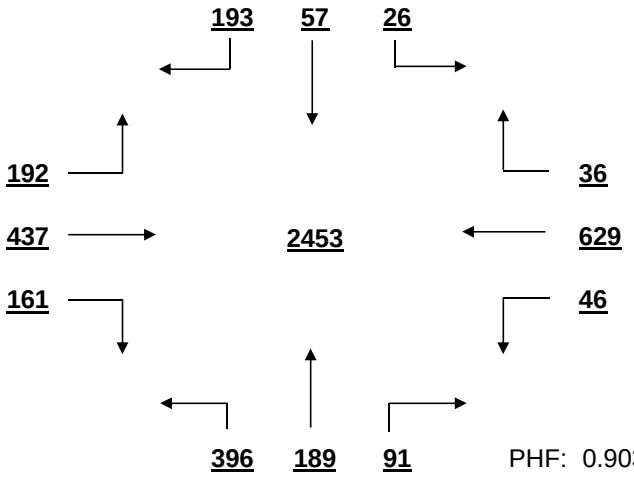
PHF: 0.903

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



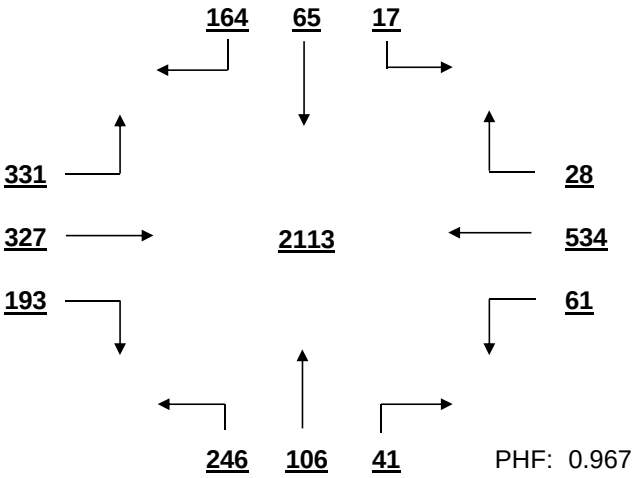
PHF: 0.952

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



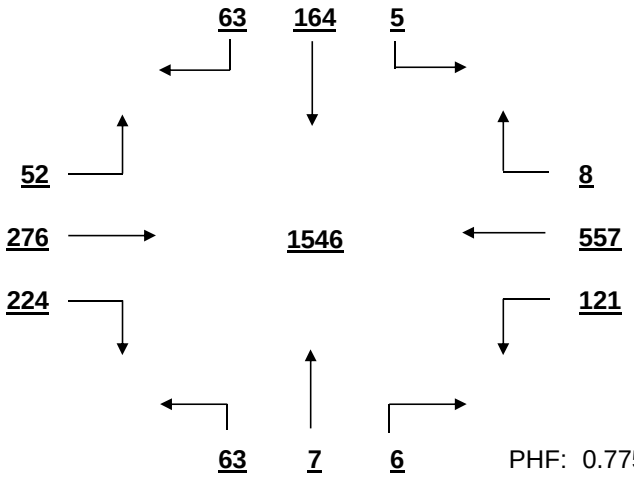
PHF: 0.903

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

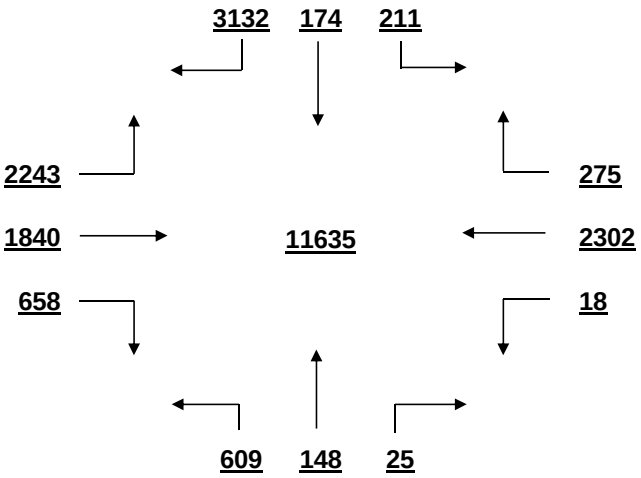
INTERSECTION VOLUME SUMMARY

	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%

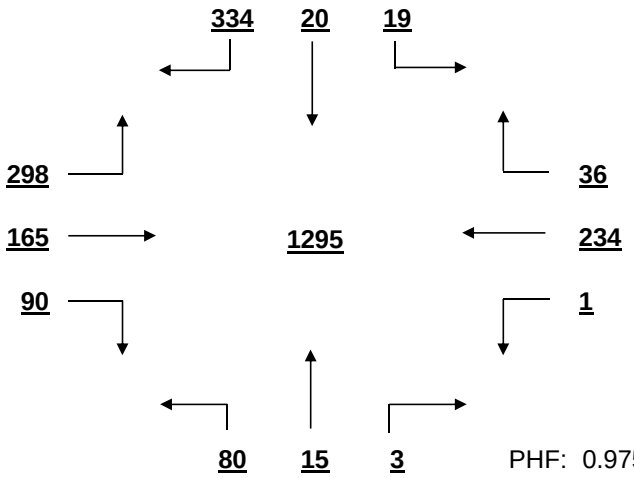
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Piney Grove Rd AT Piney Woods Rd Date: 11/22/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

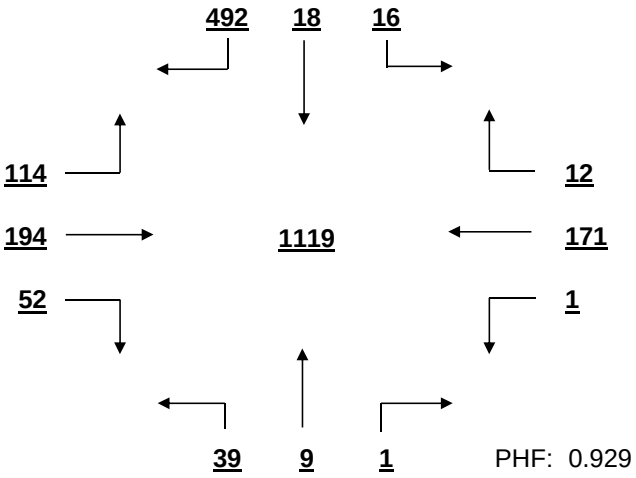


OVERALL PEAK HOUR VOLUME
FROM 18:00 TO 19:00



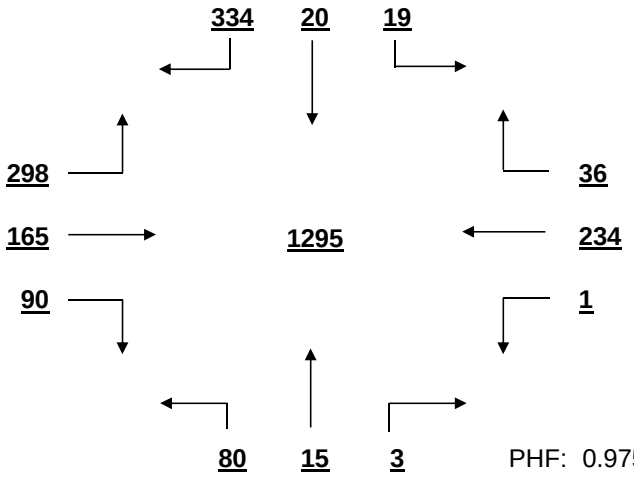
PHF: 0.975

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



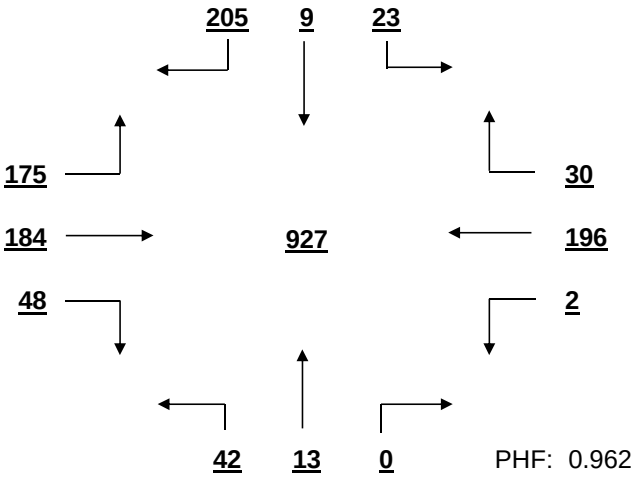
PHF: 0.929

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 18:00 TO 19:00



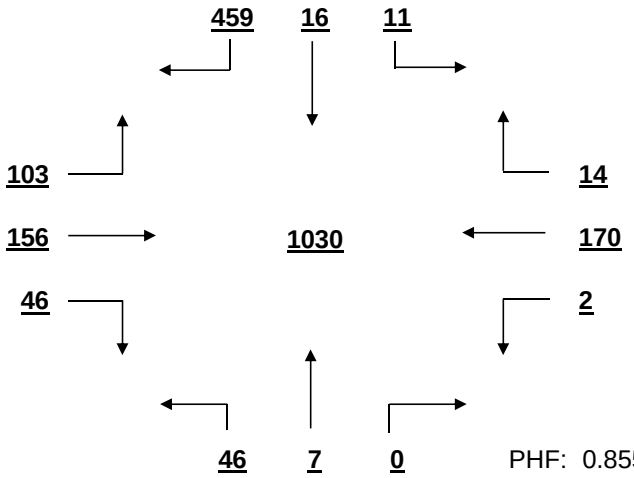
PHF: 0.975

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%

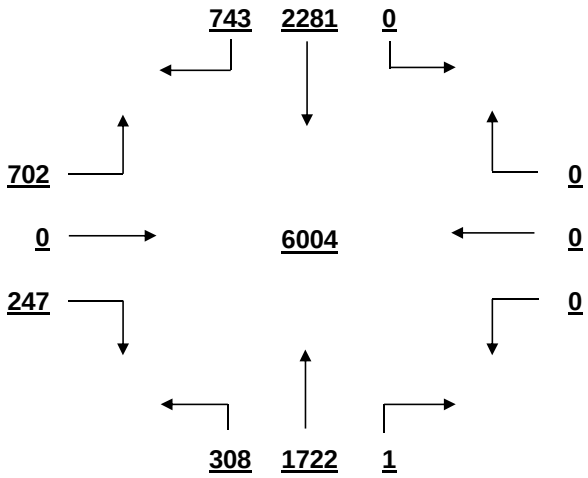
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Jamil Rd AT Tram Rd

Date: 11/22/2016

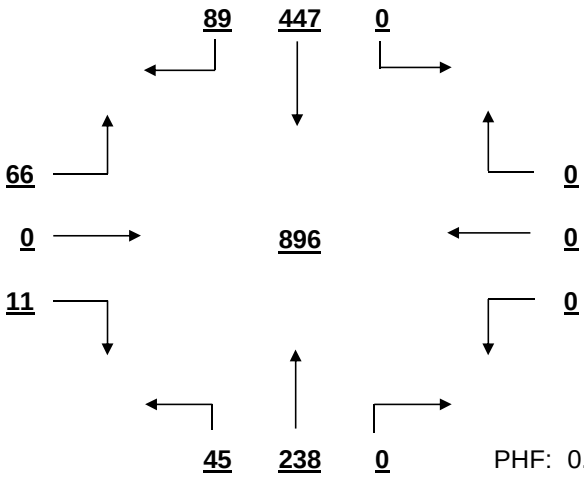
12.0 HOUR TOTAL VOLUME

FROM 7:00 TO 15:00



OVERALL PEAK HOUR VOLUME

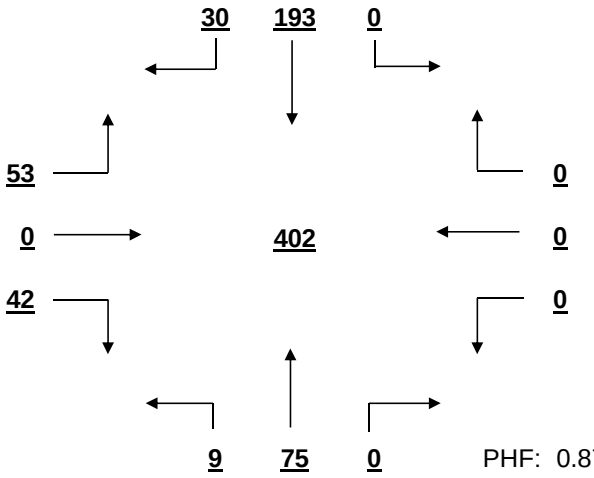
FROM 18:00 TO 19:00



PHF: 0.911

AM PEAK HOUR VOLUME (0:00-10:45)

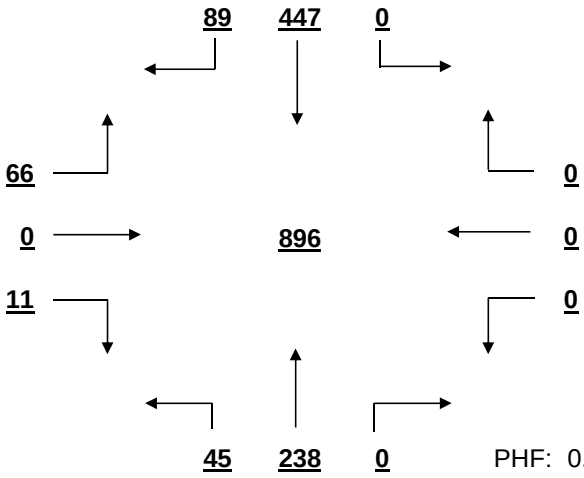
FROM 7:15 TO 8:15



PHF: 0.874

PM PEAK HOUR VOLUME (14:15-23:45)

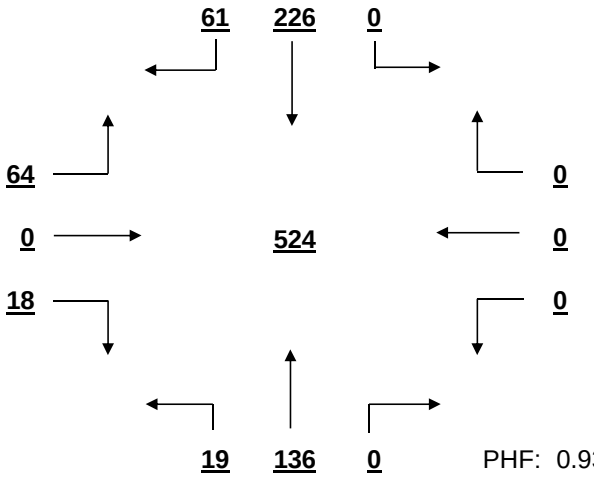
FROM 18:00 TO 19:00



PHF: 0.911

MID-DAY PEAK HOUR VOLUME (11:00-14:00)

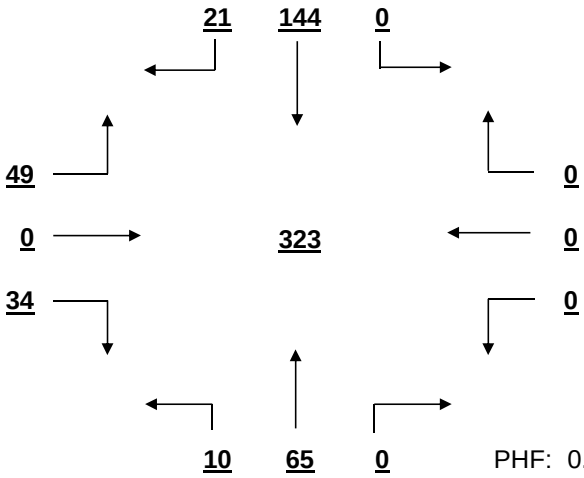
FROM 12:45 TO 13:45



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

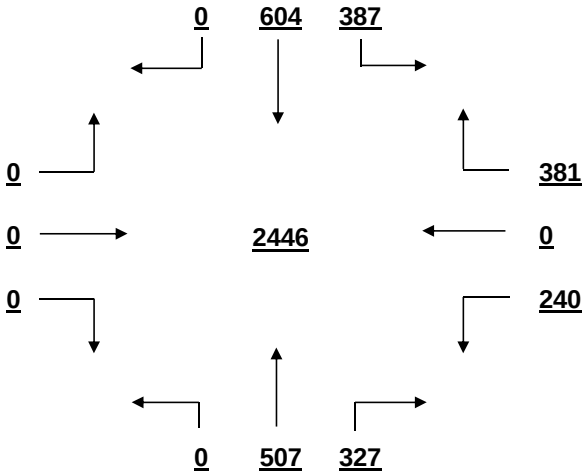
INTERSECTION VOLUME SUMMARY

	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%

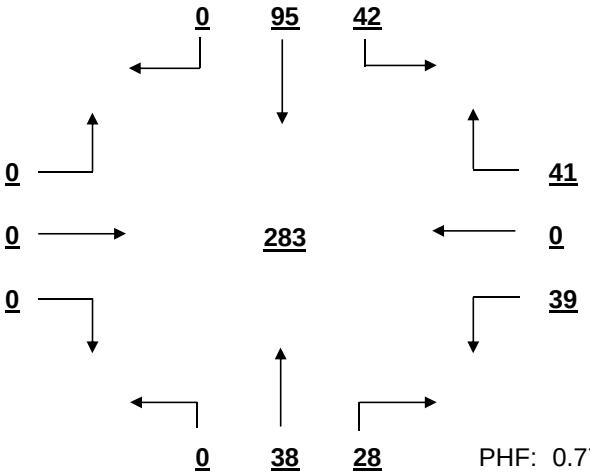
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Tram Rd AT Sidney Rd Date: 11/22/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

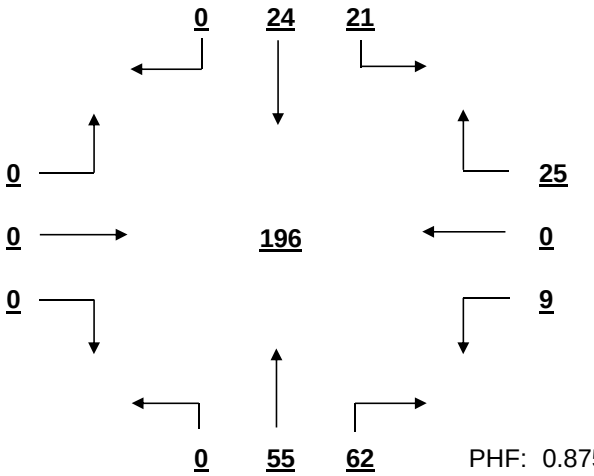


OVERALL PEAK HOUR VOLUME
FROM 16:45 TO 17:45



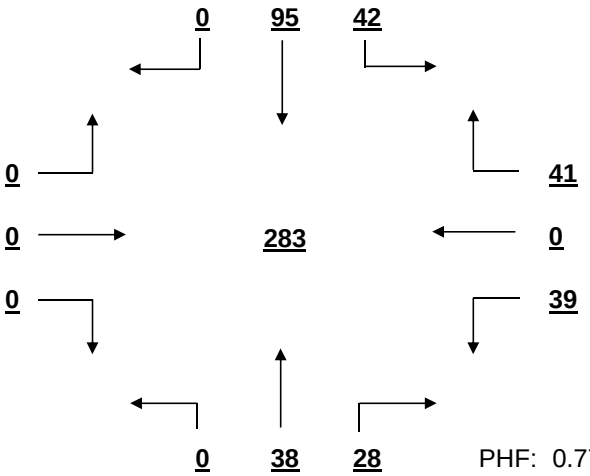
PHF: 0.777

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



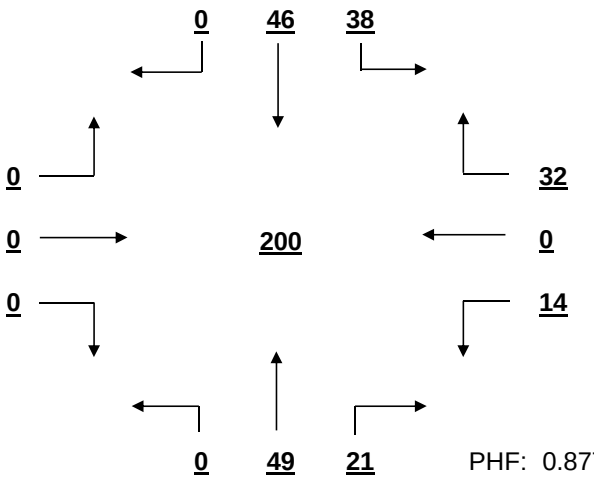
PHF: 0.875

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:45 TO 17:45



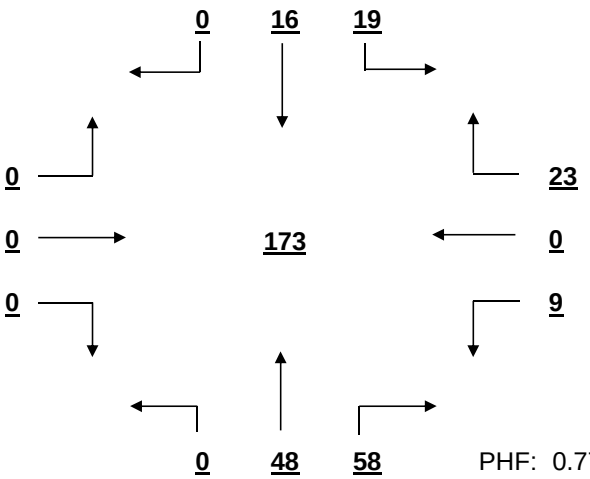
PHF: 0.777

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

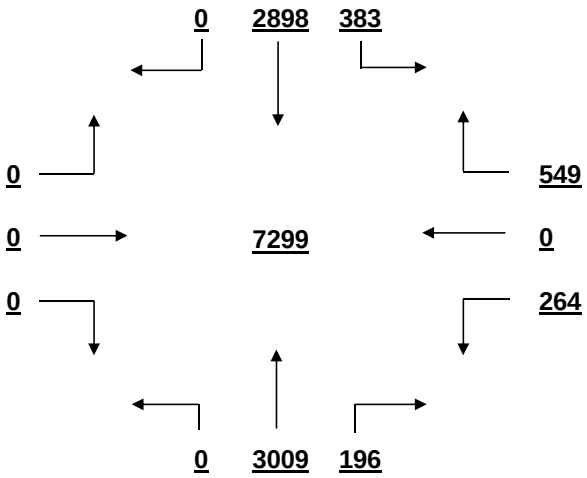
INTERSECTION VOLUME SUMMARY

	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%

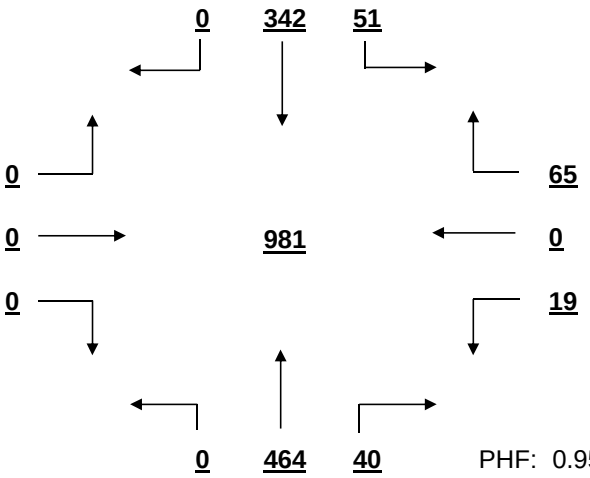
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Fernandina Rd AT Beatty Rd Date: 11/22/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

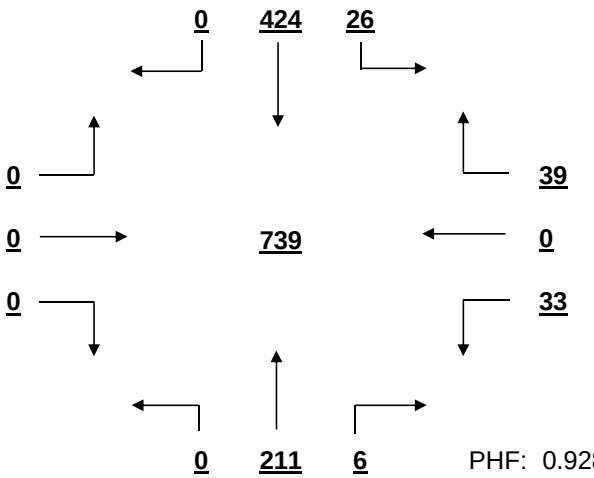


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



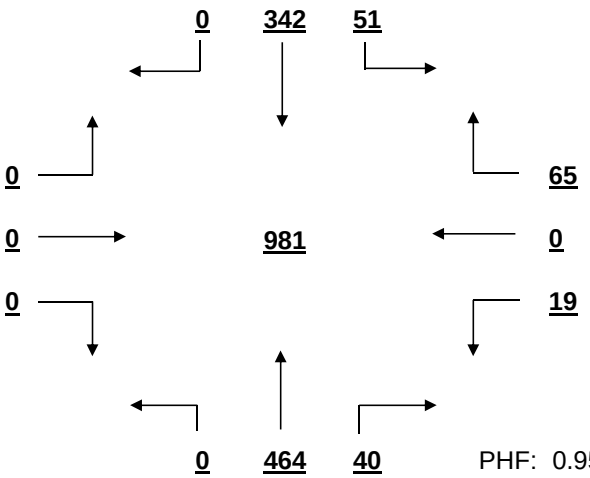
PHF: 0.951

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



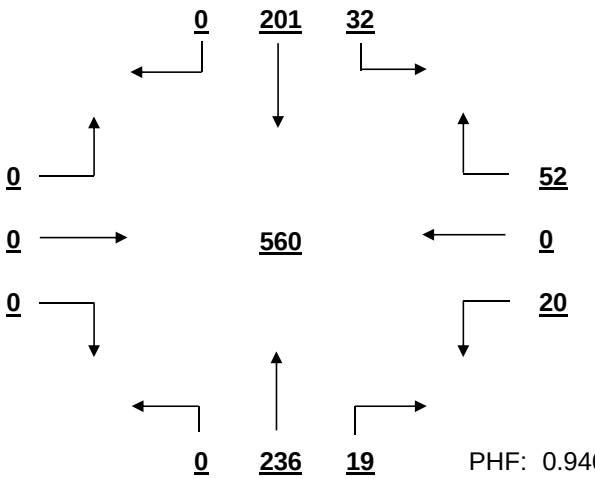
PHF: 0.928

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



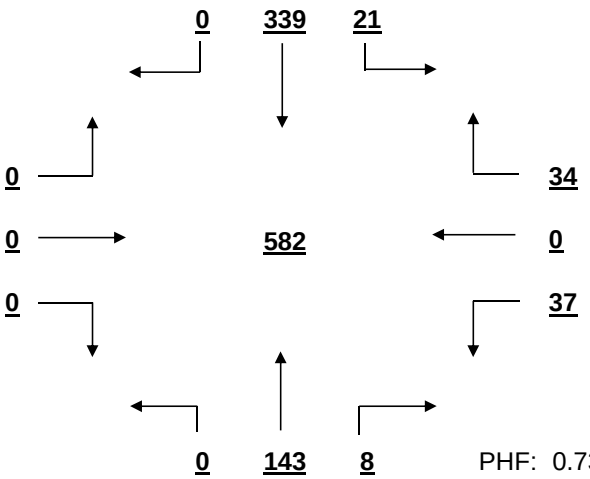
PHF: 0.951

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: 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: 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

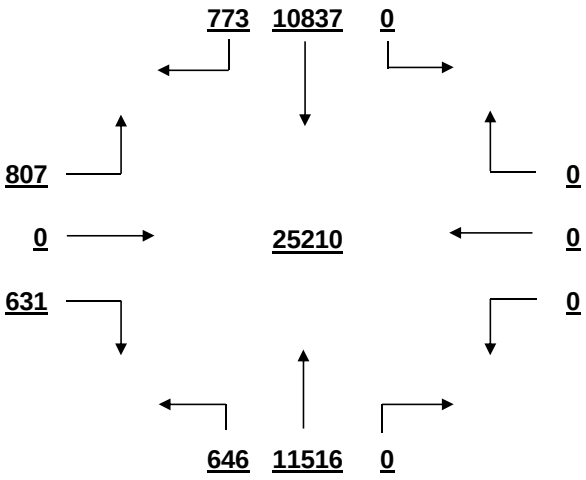
INTERSECTION VOLUME SUMMARY

	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%

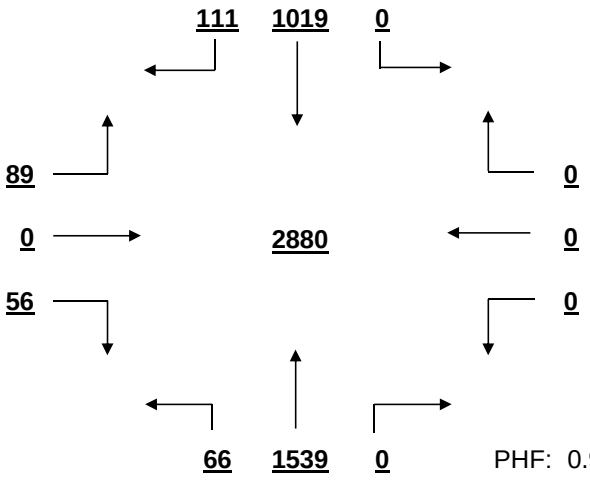
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Broad River Rd AT Beatty Rd Date: 11/22/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

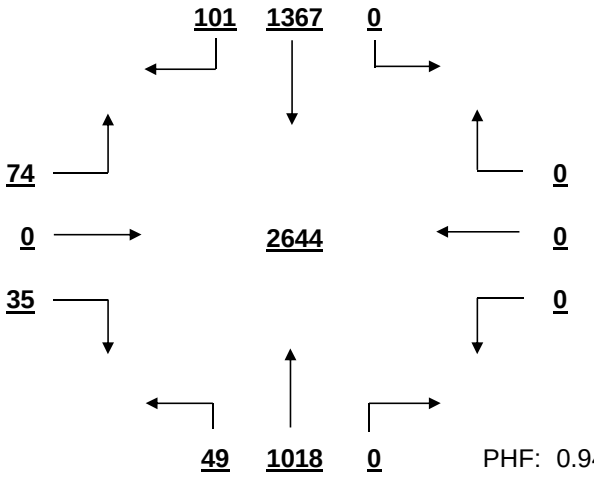


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



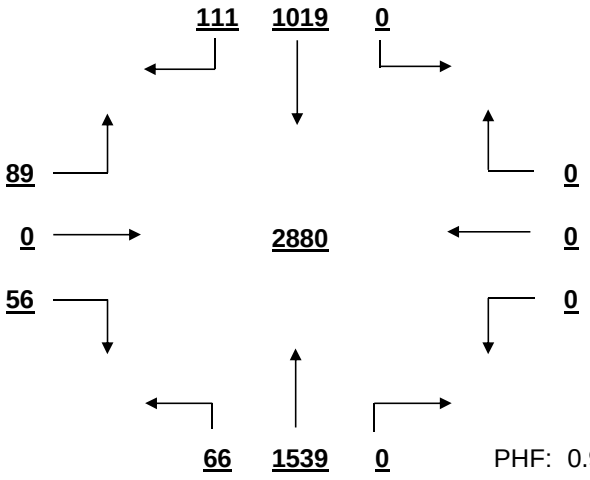
PHF: 0.960

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



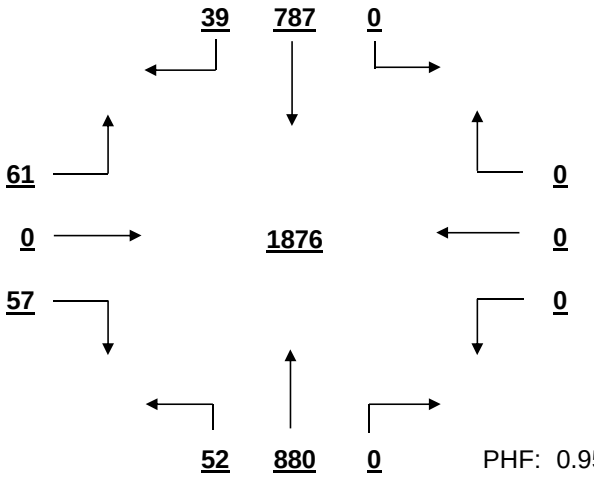
PHF: 0.944

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



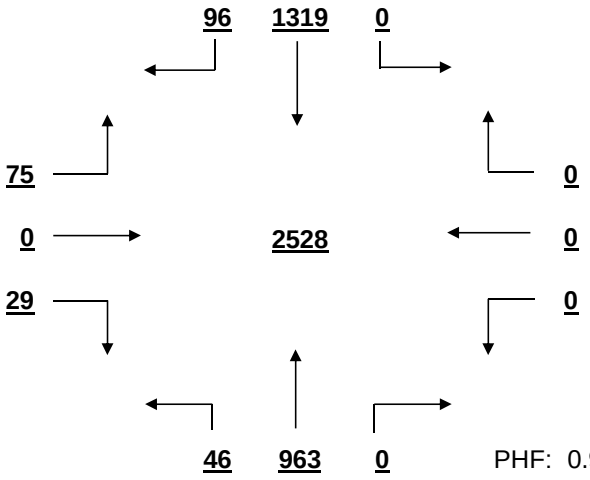
PHF: 0.960

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

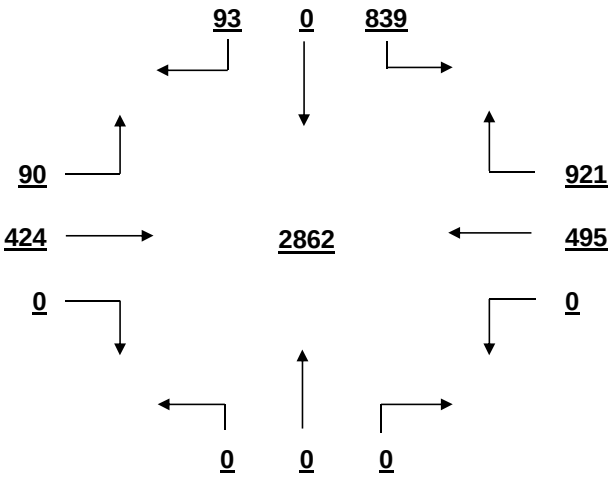
INTERSECTION VOLUME SUMMARY

	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%

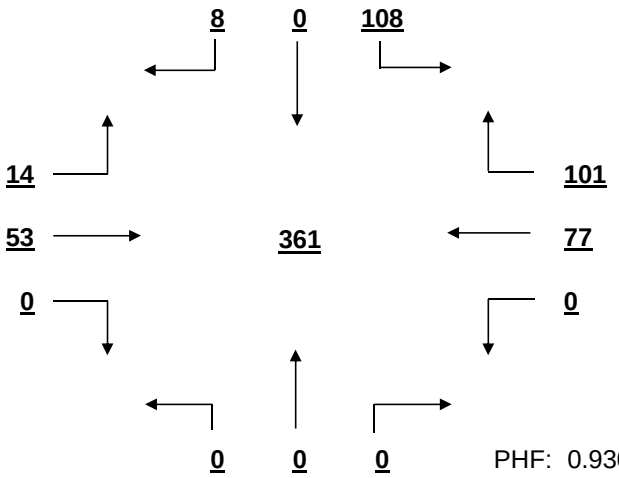
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Beatty Rd-Evelyn AT Evelyn Rd-Beatty Date: 11/22/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

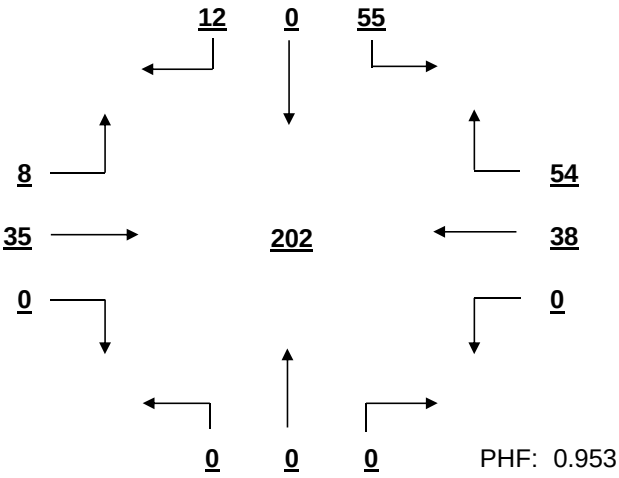


OVERALL PEAK HOUR VOLUME
FROM 18:00 TO 19:00



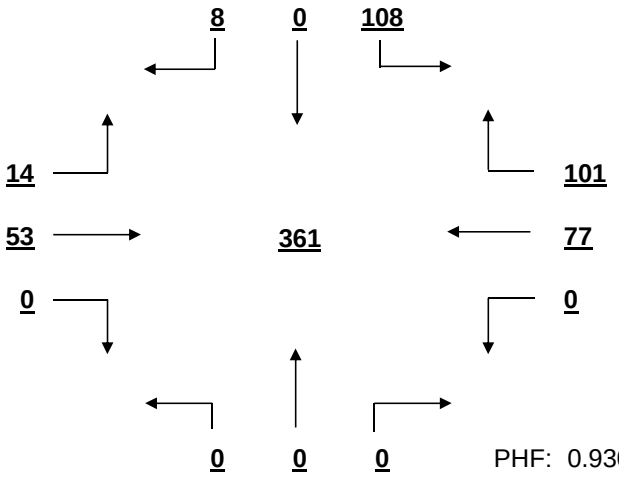
PHF: 0.930

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



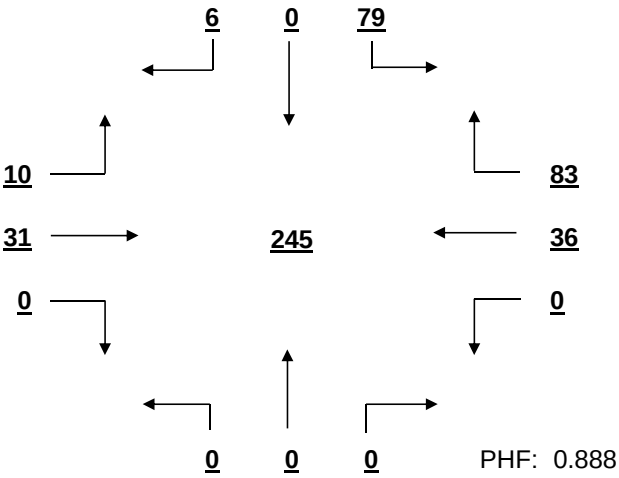
PHF: 0.953

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 18:00 TO 19:00



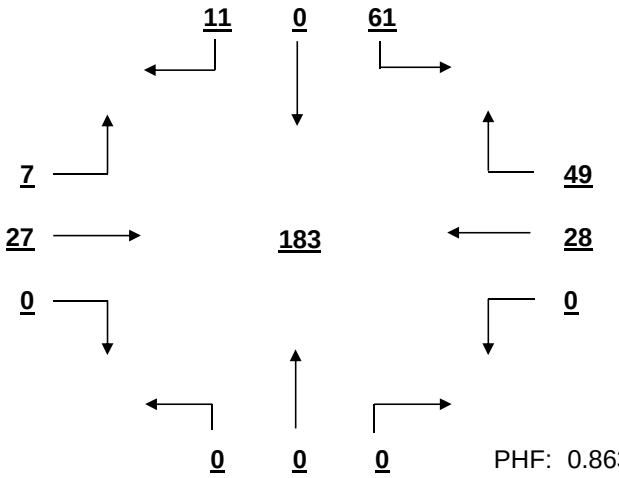
PHF: 0.930

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

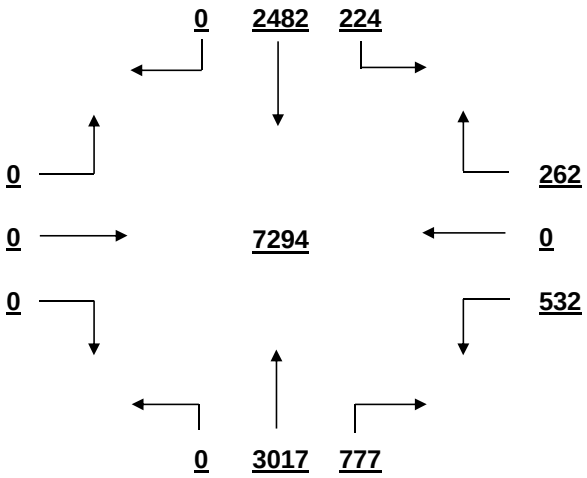
INTERSECTION VOLUME SUMMARY

	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%

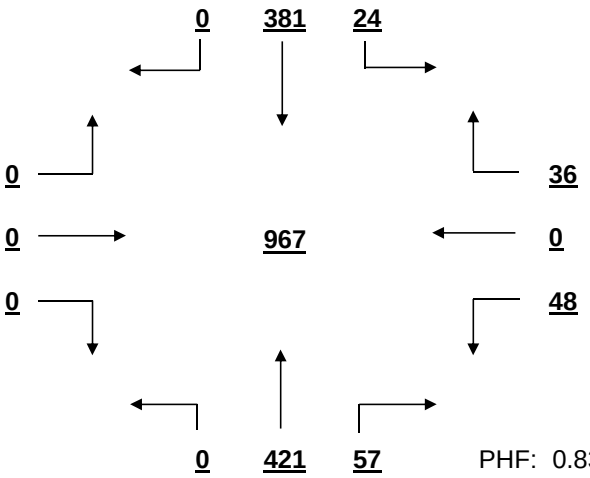
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Fernandina Rd AT Evelyn Dr Date: 11/21/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

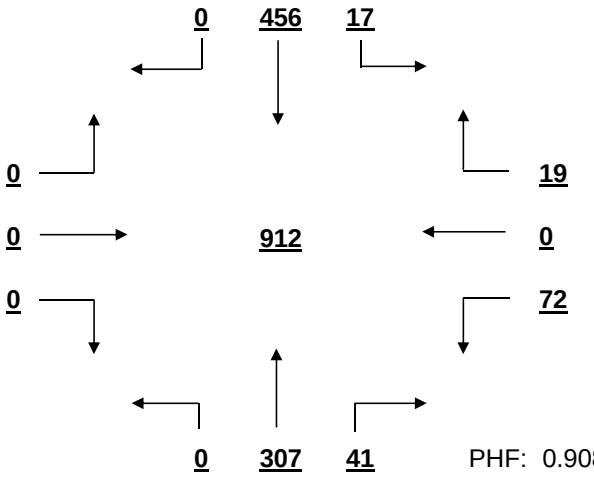


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



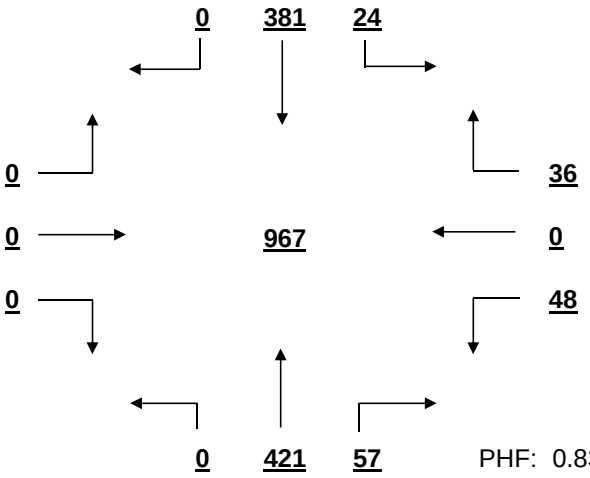
PHF: 0.831

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



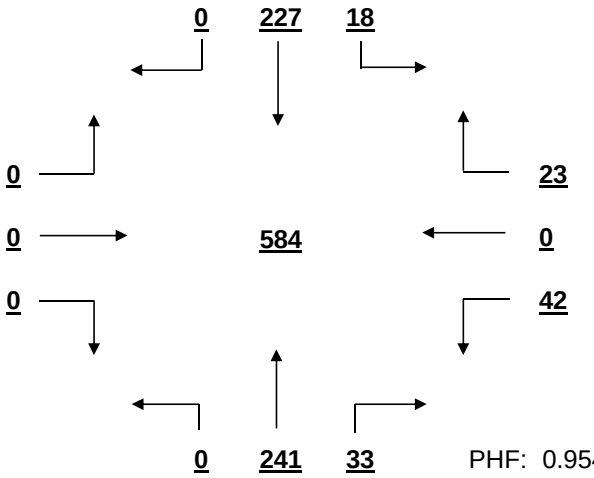
PHF: 0.908

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



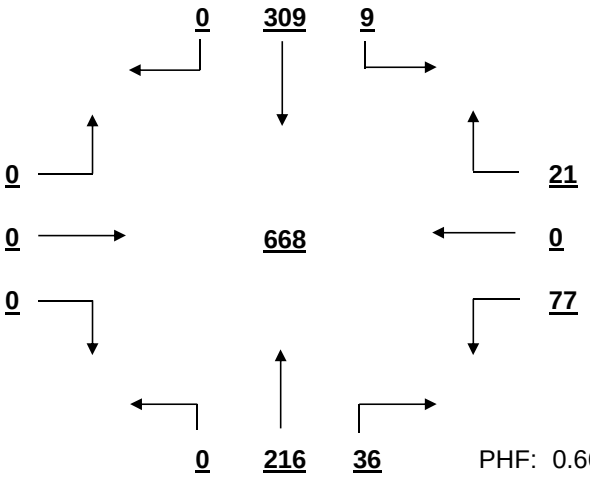
PHF: 0.831

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

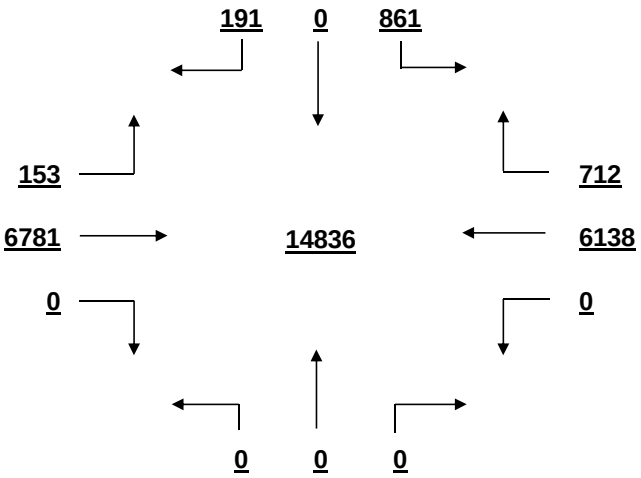
INTERSECTION VOLUME SUMMARY

	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%

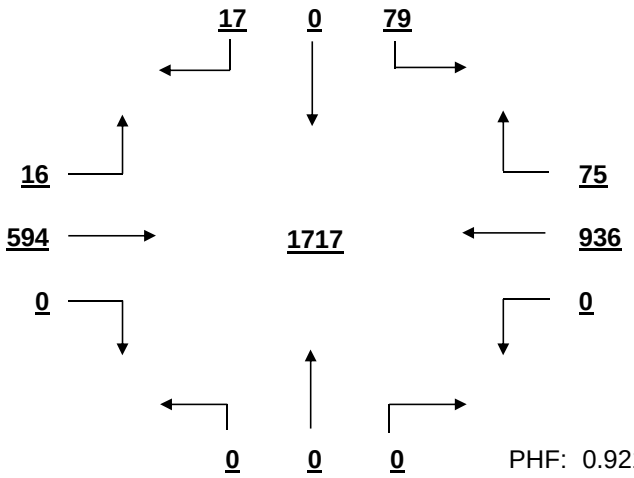
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

St. Andrews Rd AT Sidney Rd Date: 11/28/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

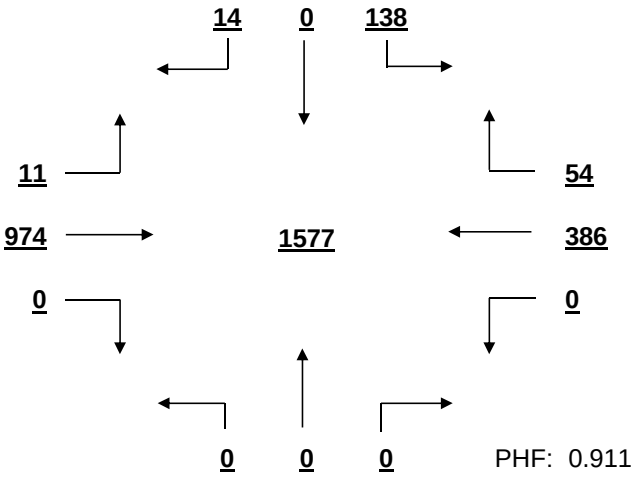


OVERALL PEAK HOUR VOLUME
FROM 17:00 TO 18:00



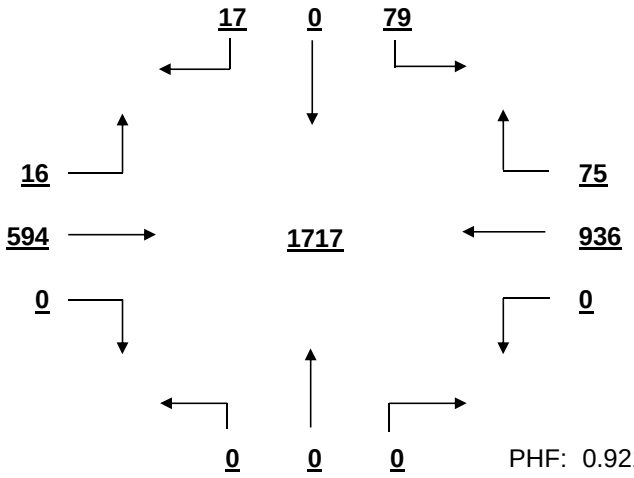
PHF: 0.921

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



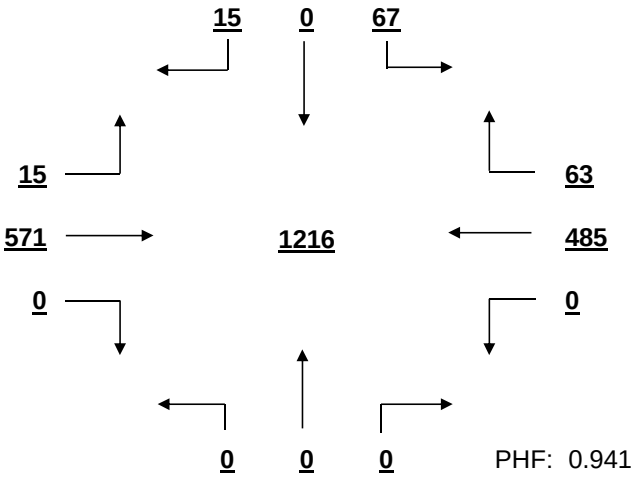
PHF: 0.911

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:00 TO 18:00



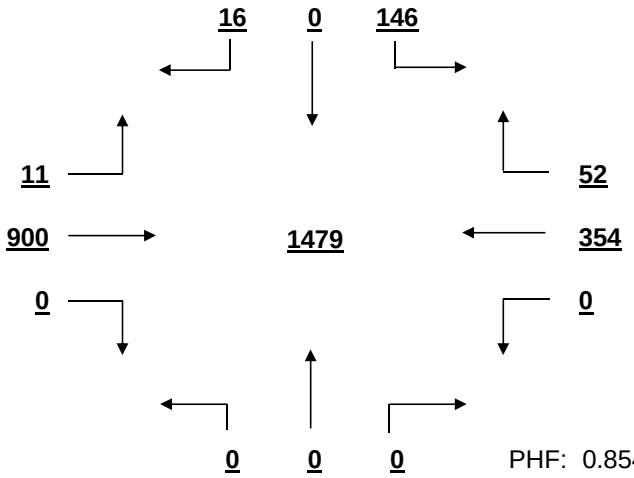
PHF: 0.921

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

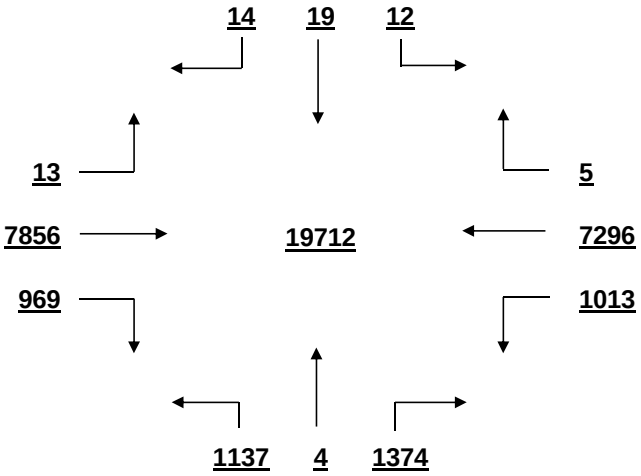
INTERSECTION VOLUME SUMMARY

	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%

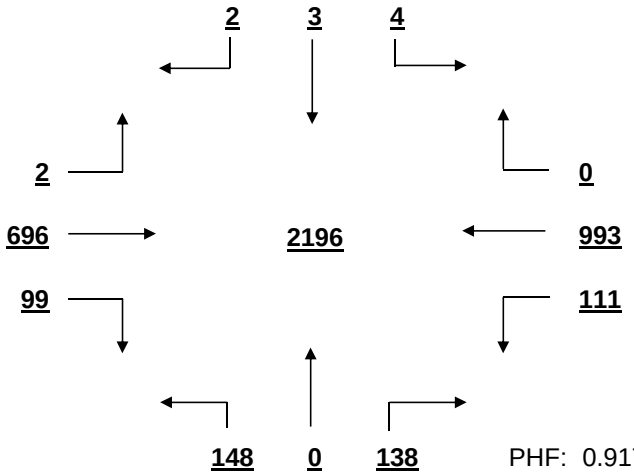
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

St. Andrews Rd AT Ashland Rd Date: 11/28/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

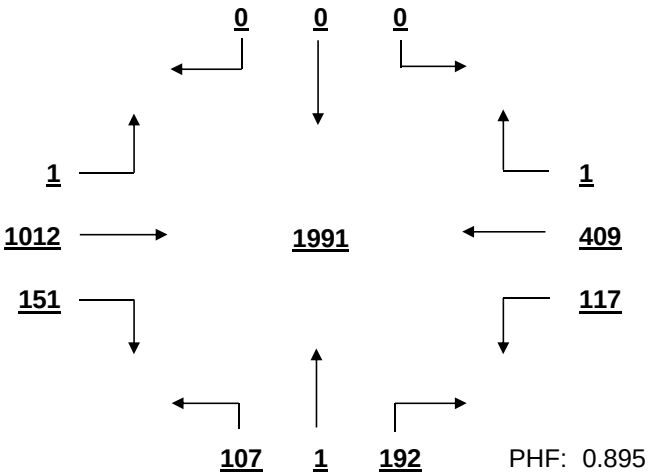


OVERALL PEAK HOUR VOLUME
FROM 16:45 TO 17:45



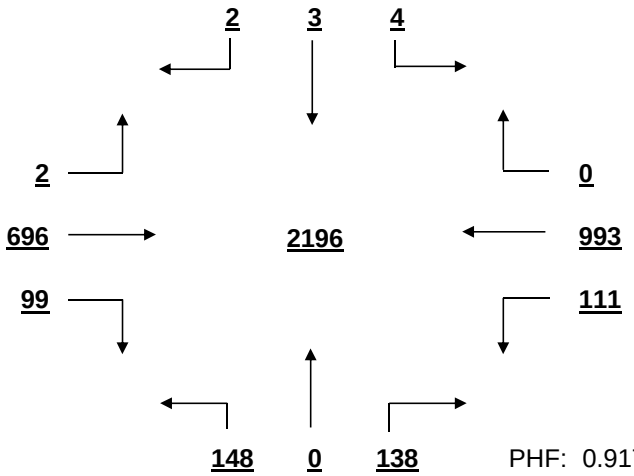
PHF: 0.917

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



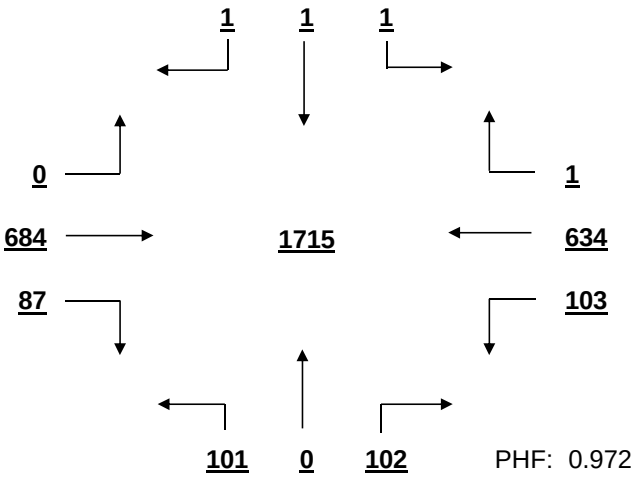
PHF: 0.895

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:45 TO 17:45



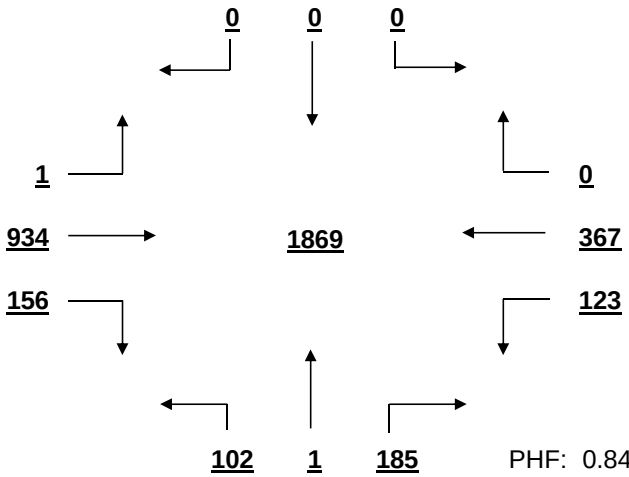
PHF: 0.917

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

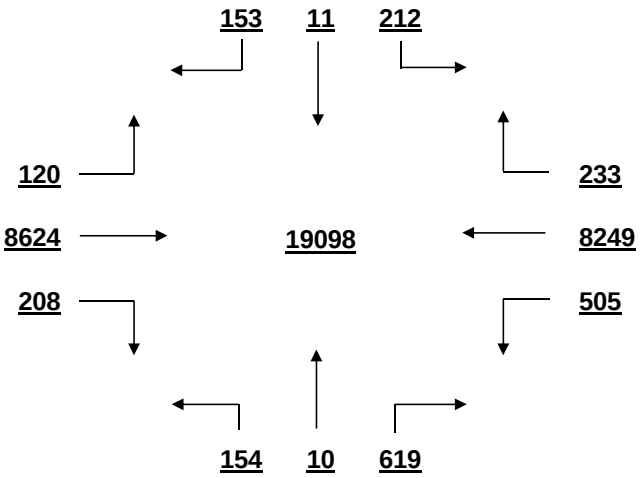
INTERSECTION VOLUME SUMMARY

	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%

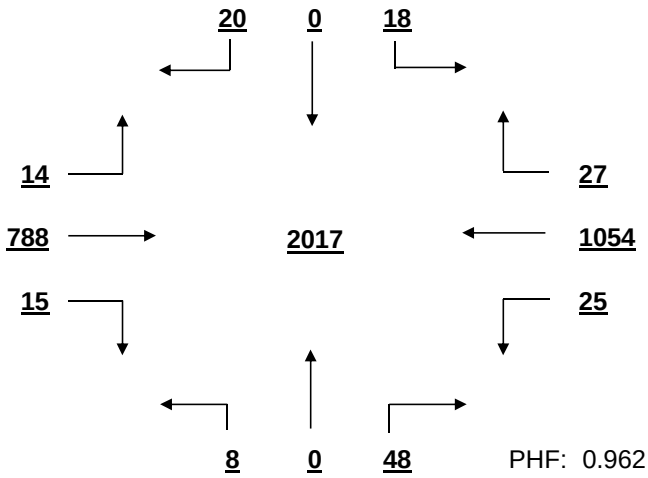
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

St. Andrews Rd AT Kilbrannon Dr-St Andrews Apts Date: 11/28/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

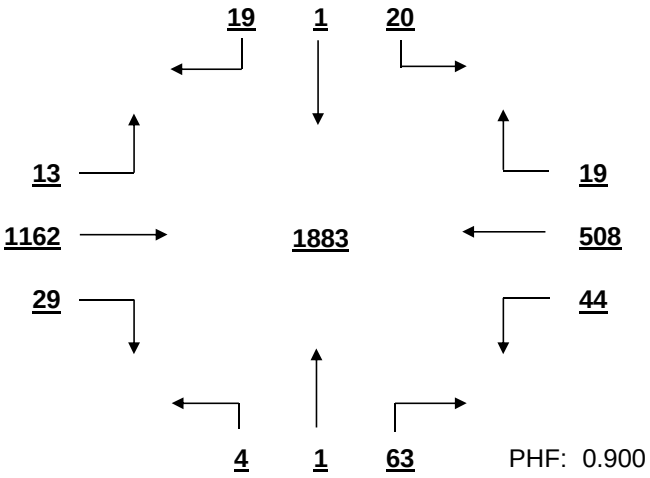


OVERALL PEAK HOUR VOLUME
FROM 17:00 TO 18:00



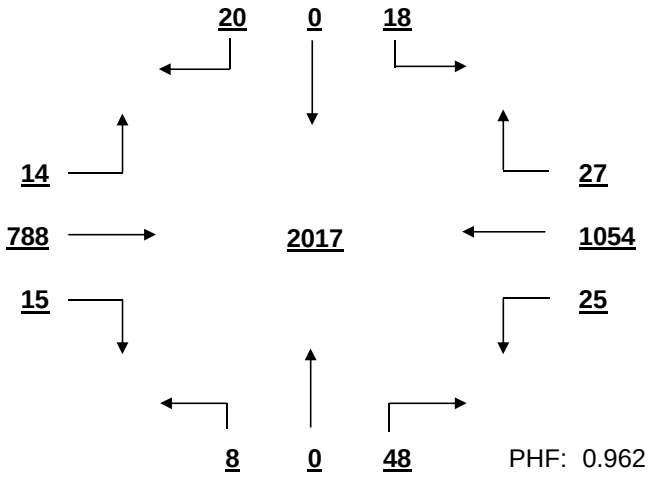
PHF: 0.962

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



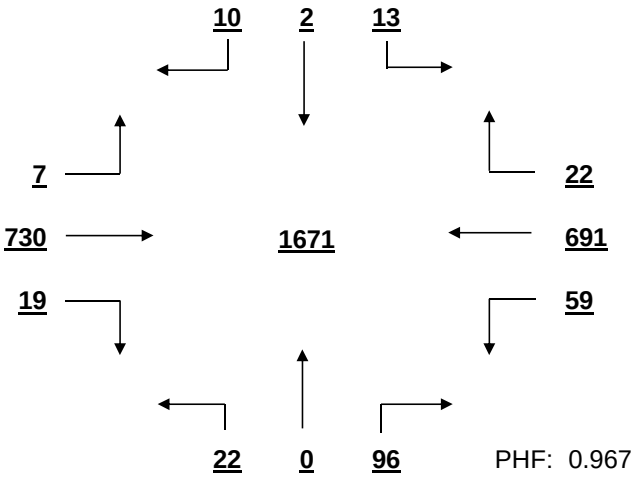
PHF: 0.900

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:00 TO 18:00



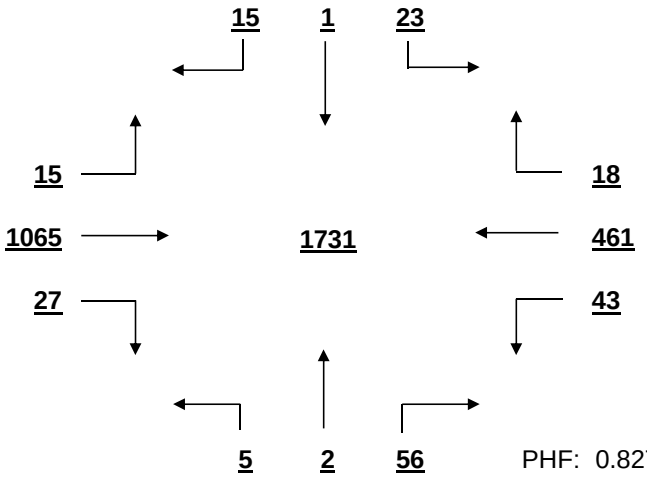
PHF: 0.962

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	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	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

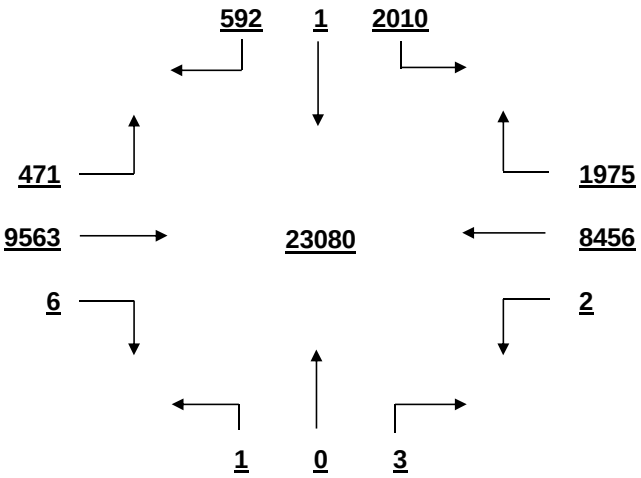
INTERSECTION VOLUME SUMMARY

	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%

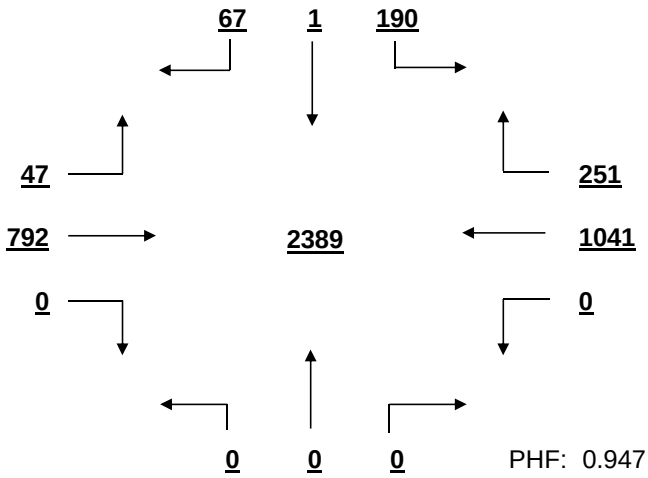
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

St. Andrews Rd AT Jamil Rd Date: 11/28/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

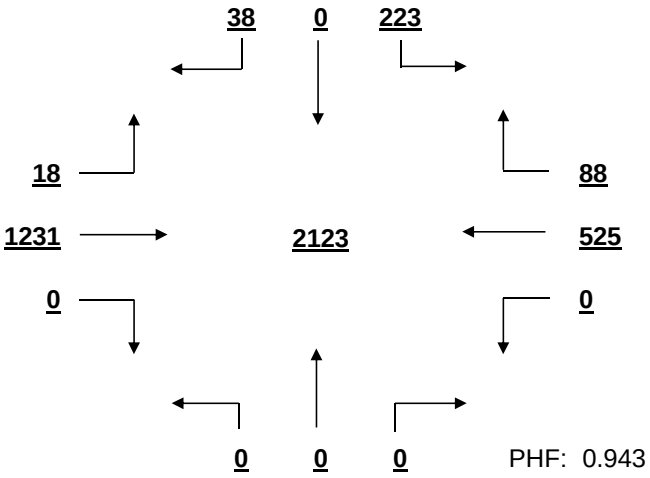


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



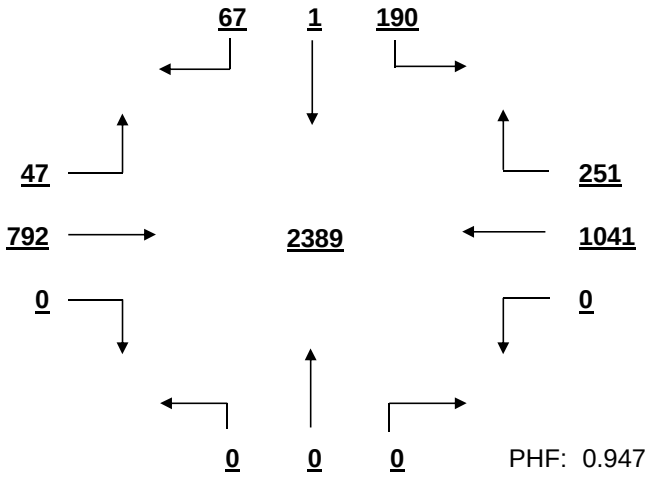
PHF: 0.947

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



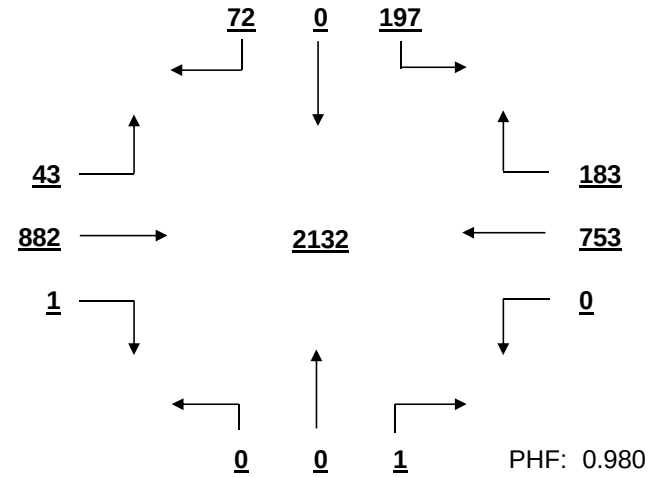
PHF: 0.943

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



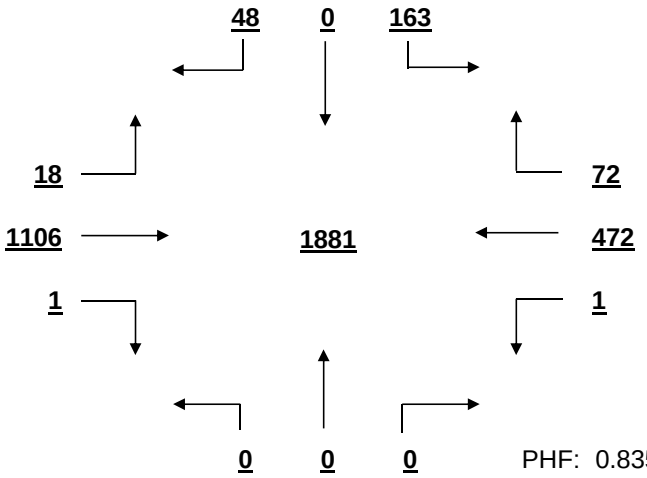
PHF: 0.947

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

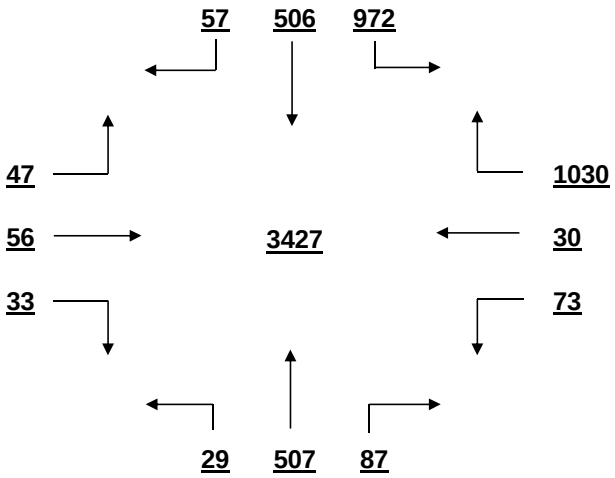
INTERSECTION VOLUME SUMMARY

	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%

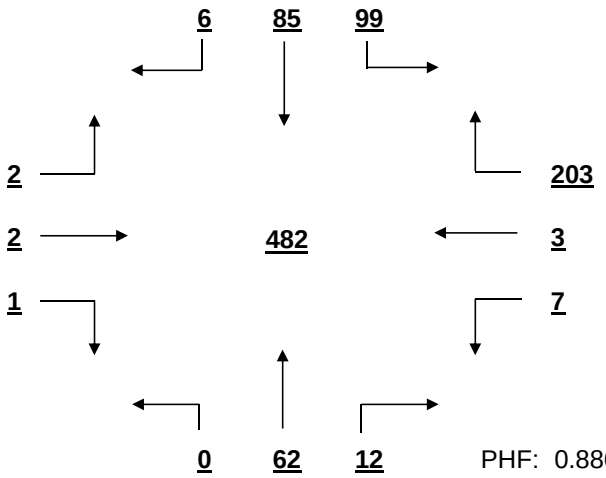
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Woodland Hills Rd AT Berry Hill Rd-Restaurant Date: 11/28/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

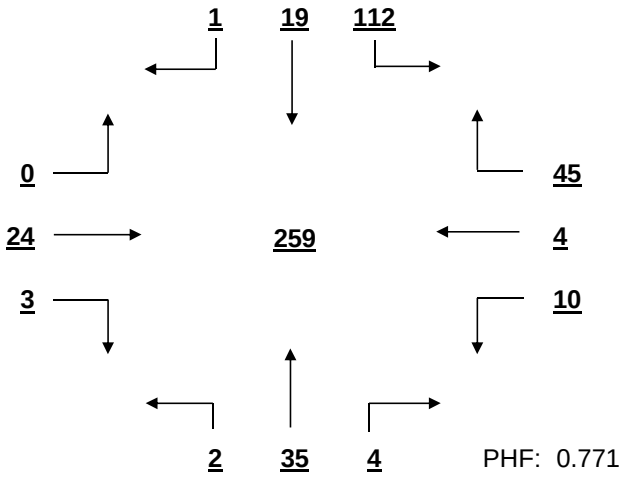


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



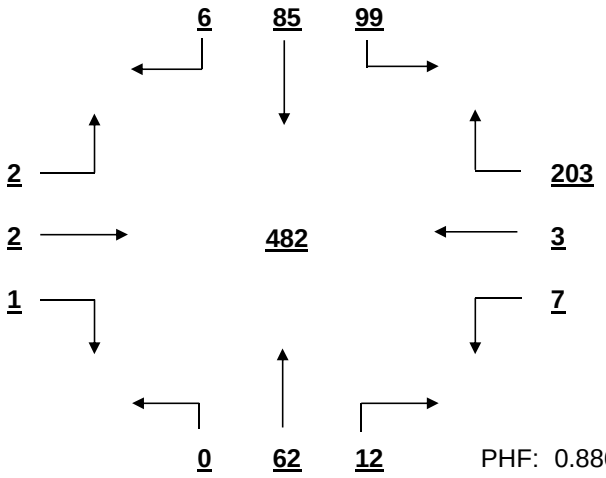
PHF: 0.886

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 8:15 TO 9:15



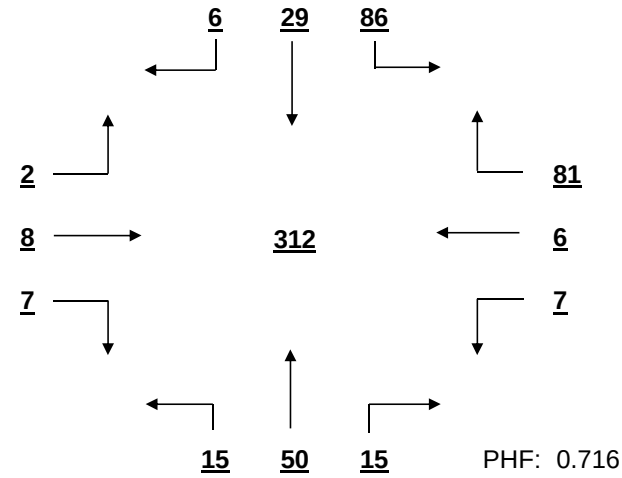
PHF: 0.771

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



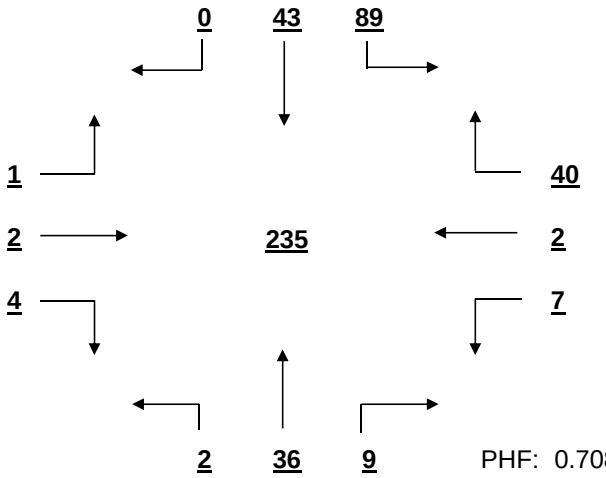
PHF: 0.886

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

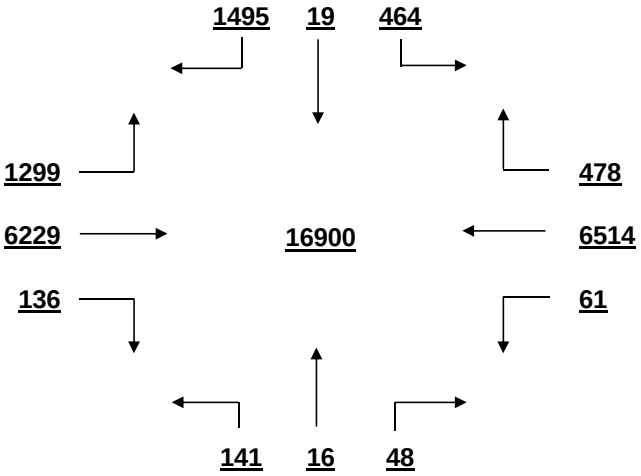
INTERSECTION VOLUME SUMMARY

	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%

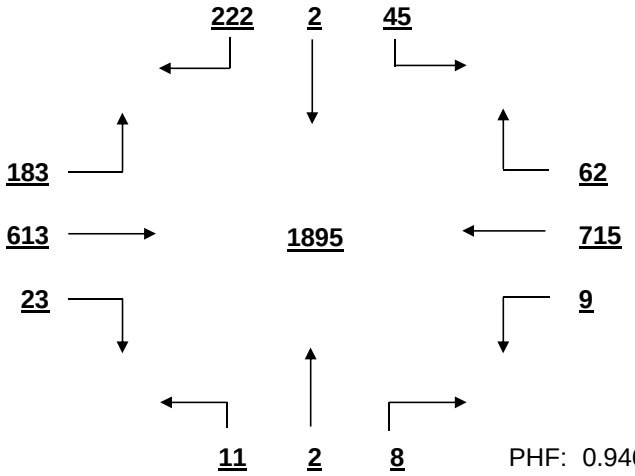
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

St. Andrews Rd AT Kay St-Chartwell Rd Date: 11/28/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

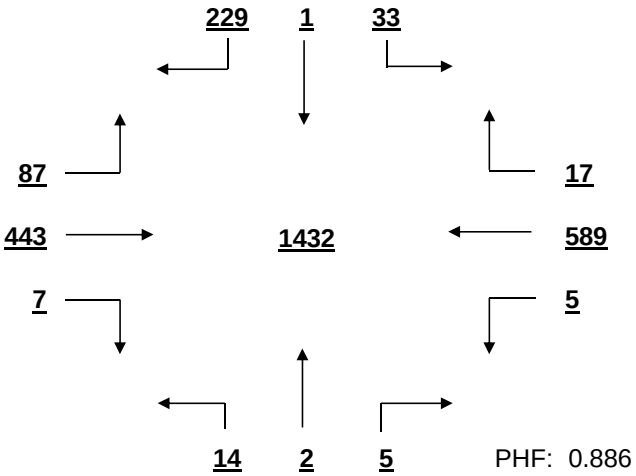


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



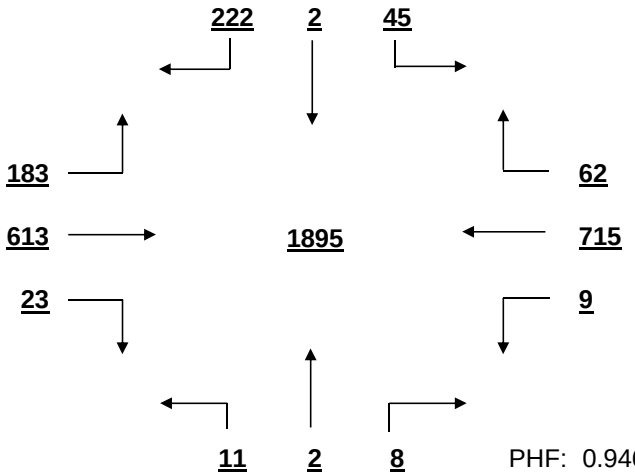
PHF: 0.946

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



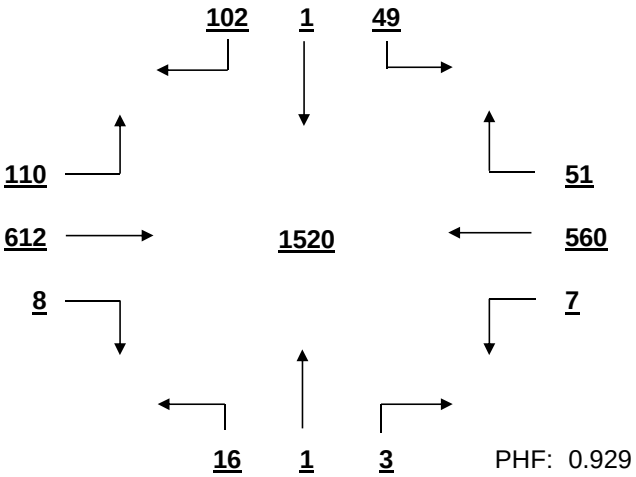
PHF: 0.886

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



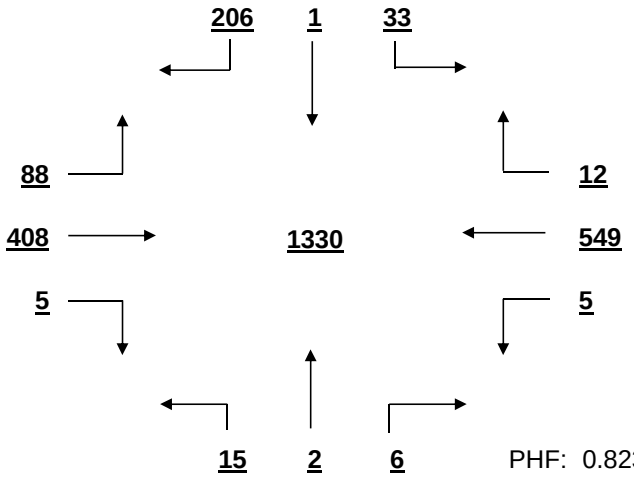
PHF: 0.946

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: 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	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

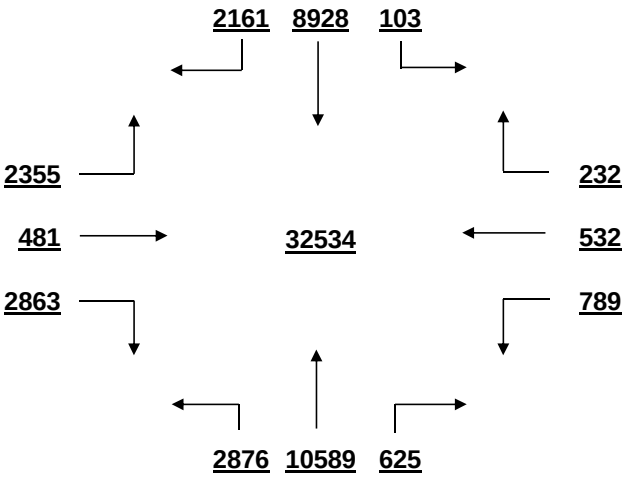
INTERSECTION VOLUME SUMMARY

	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%

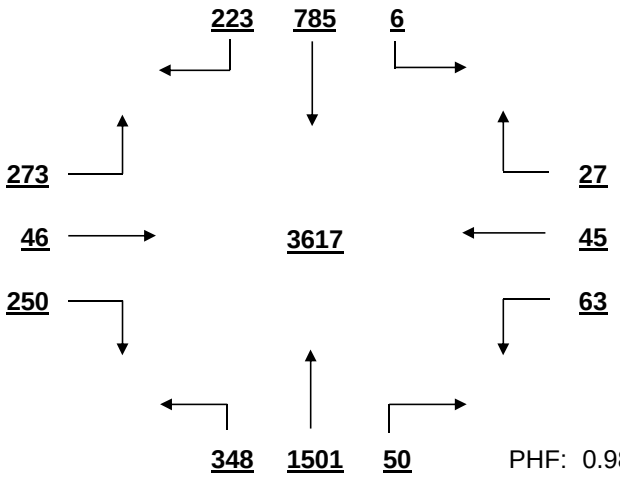
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Broad River Rd AT St. Andrews Rd Date: 11/28/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

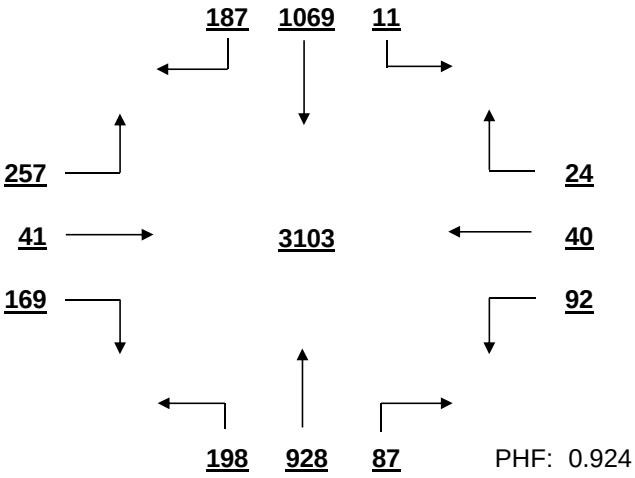


OVERALL PEAK HOUR VOLUME
FROM 16:45 TO 17:45



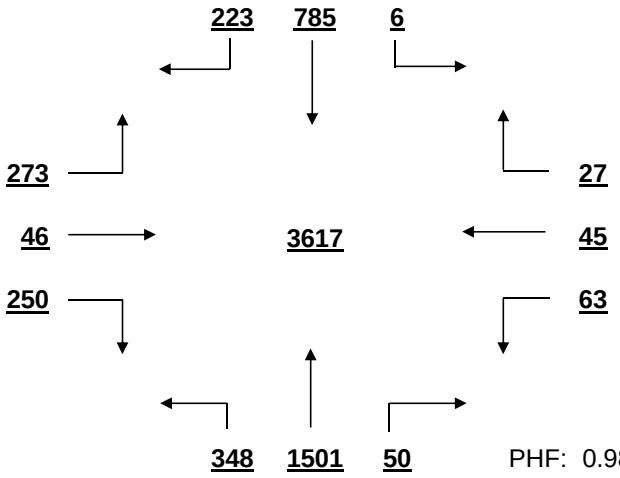
PHF: 0.981

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



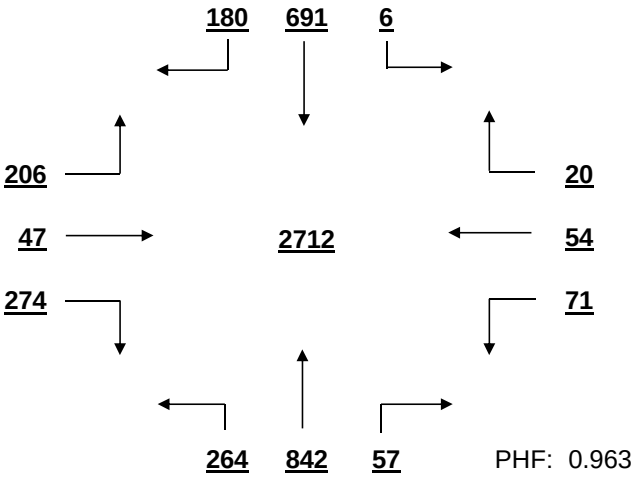
PHF: 0.924

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:45 TO 17:45



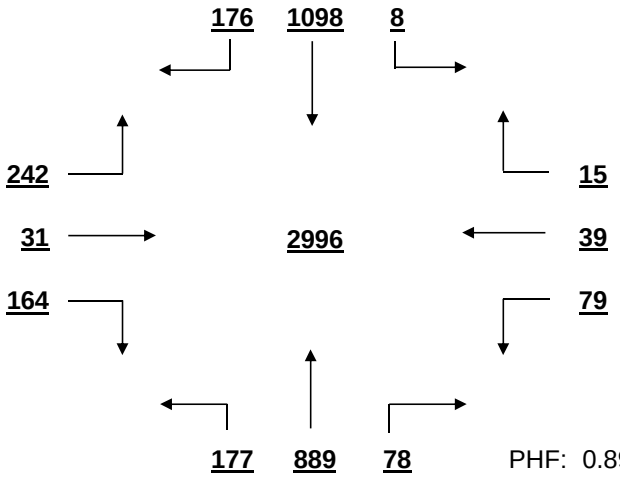
PHF: 0.981

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

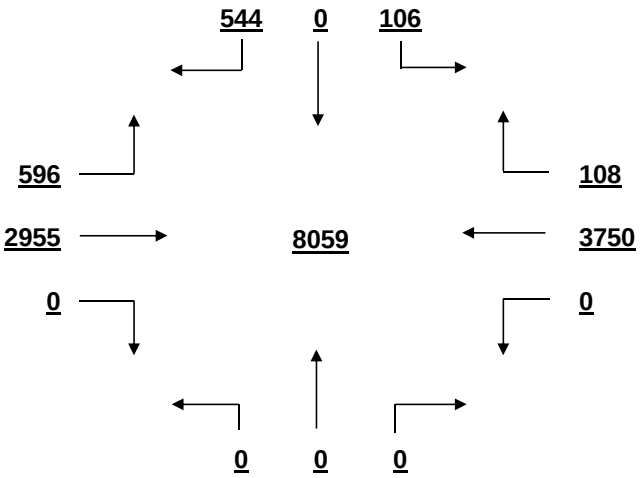
INTERSECTION VOLUME SUMMARY

	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%

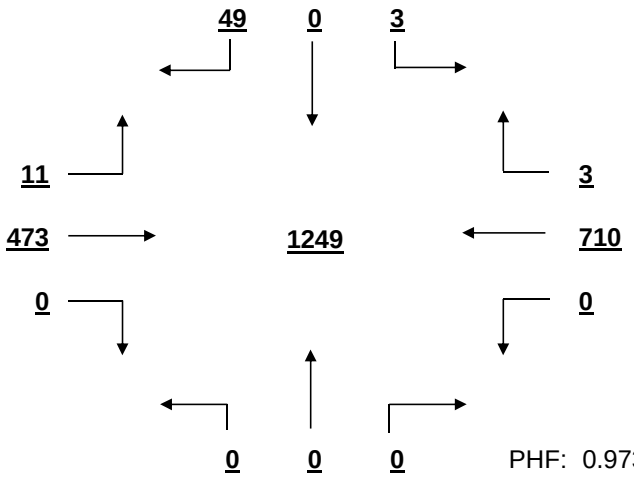
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Browning-Burning Tree AT Center Point Rd Date: 11/22/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

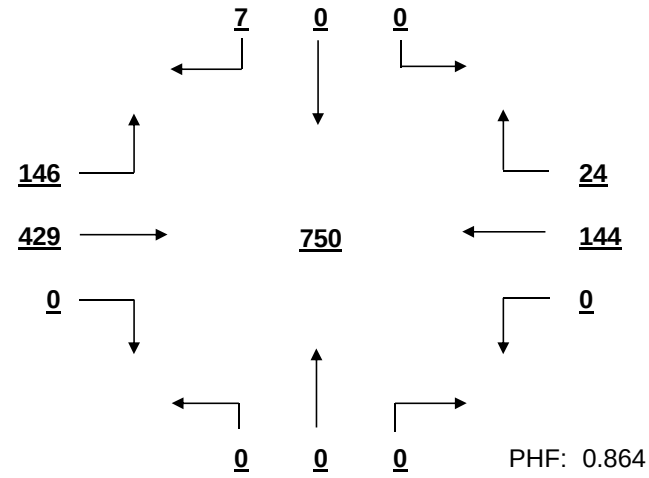


OVERALL PEAK HOUR VOLUME
FROM 17:45 TO 18:45



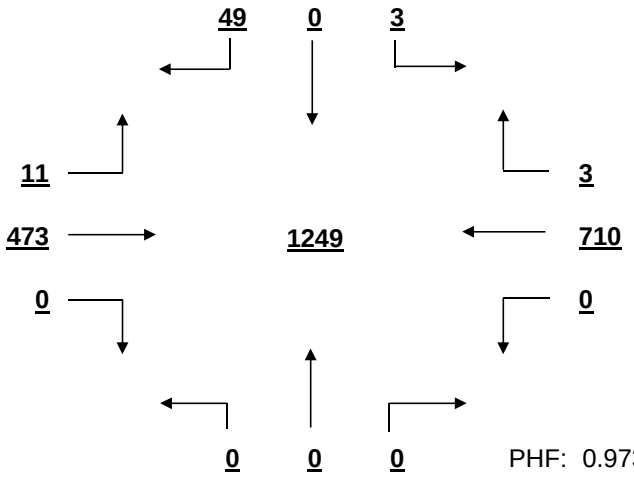
PHF: 0.973

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



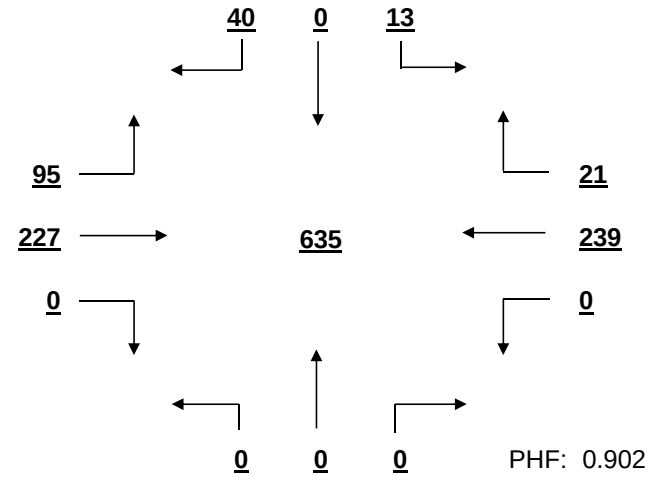
PHF: 0.864

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:45 TO 18:45



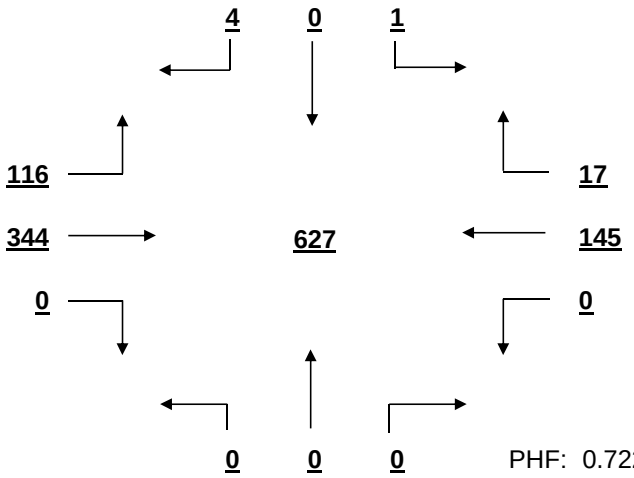
PHF: 0.973

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

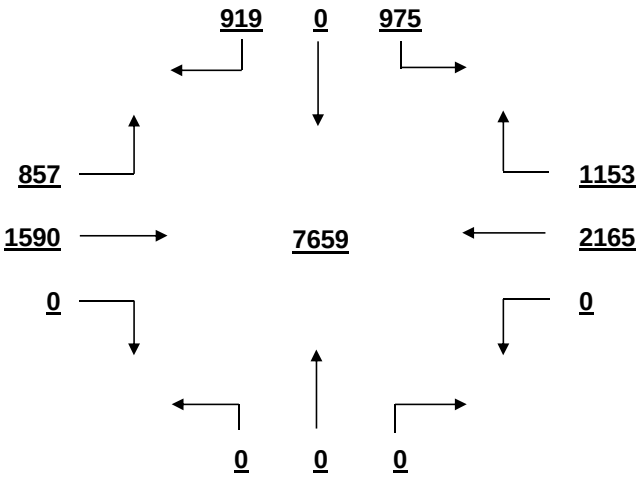
INTERSECTION VOLUME SUMMARY

	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%

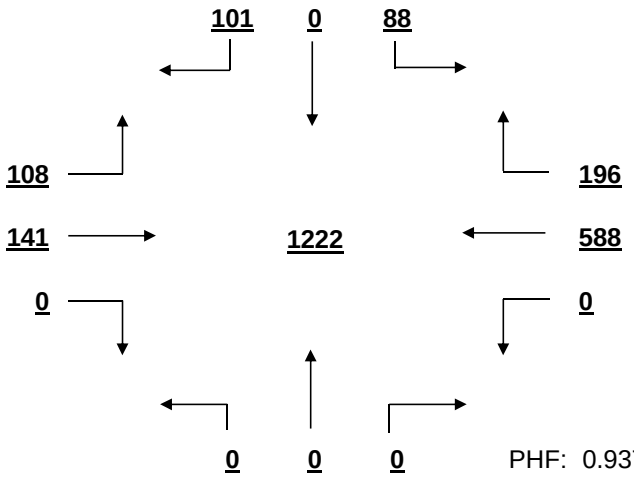
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Browning Rd AT Zimalcrest Dr Date: 11/28/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

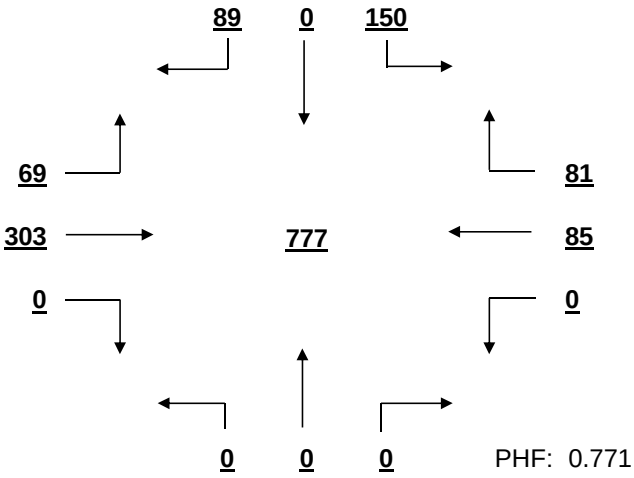


OVERALL PEAK HOUR VOLUME
FROM 17:00 TO 18:00



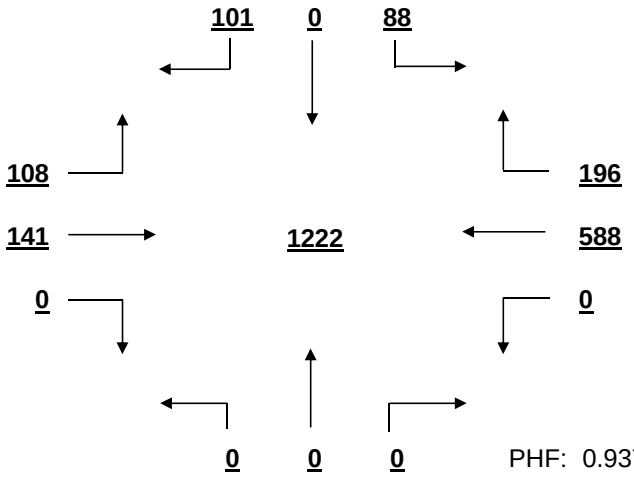
PHF: 0.937

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



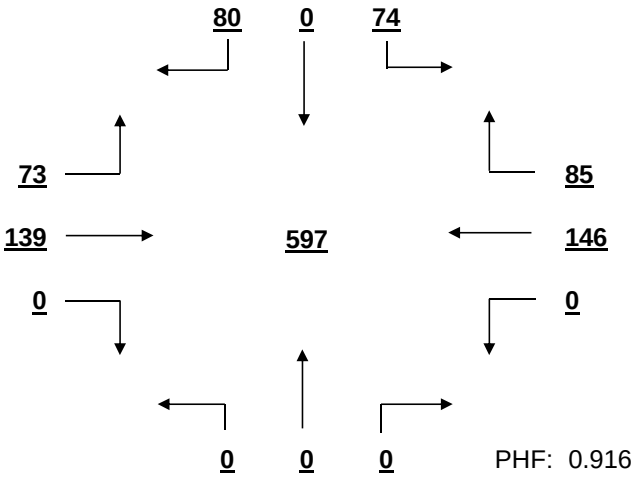
PHF: 0.771

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:00 TO 18:00



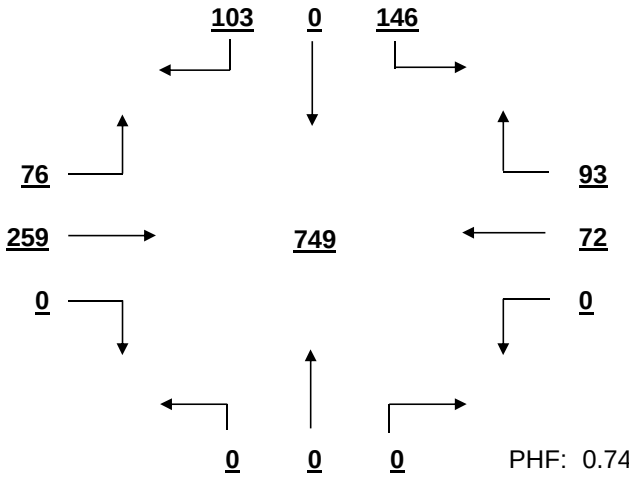
PHF: 0.937

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

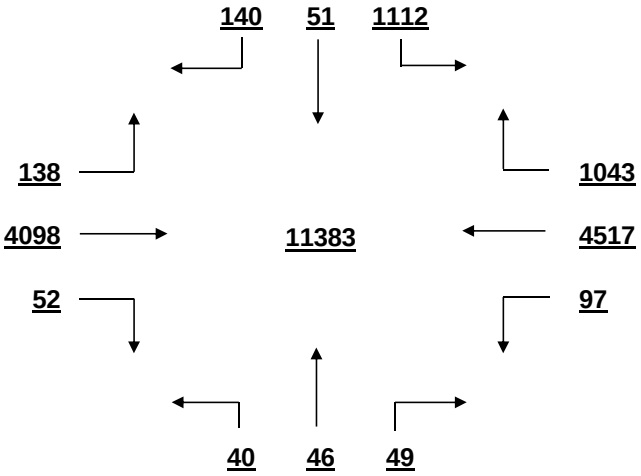
INTERSECTION VOLUME SUMMARY

	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%

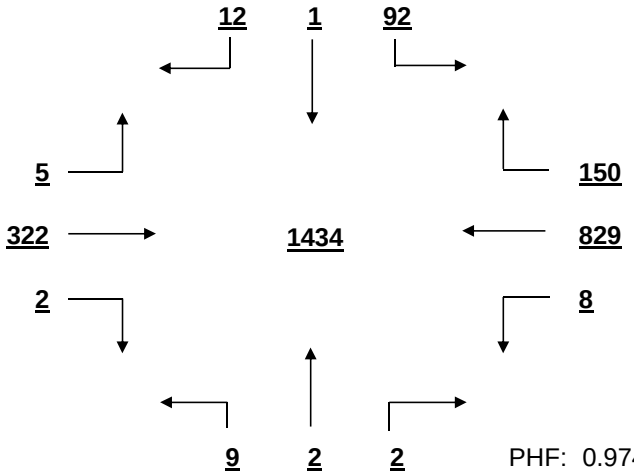
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Bush River Rd AT Ashland Rd-Marydale Ln Date: 11/29/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

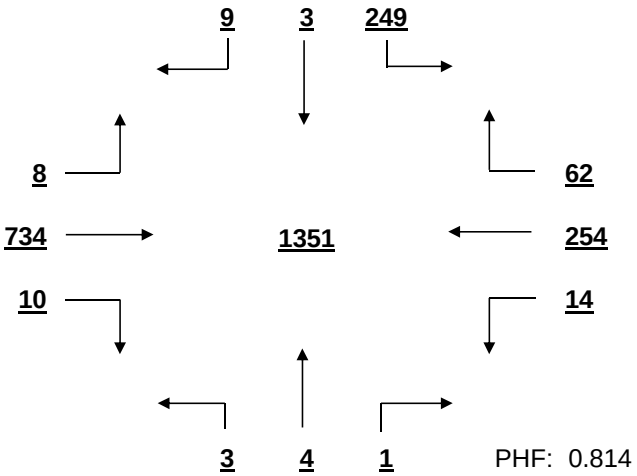


OVERALL PEAK HOUR VOLUME
FROM 17:00 TO 18:00



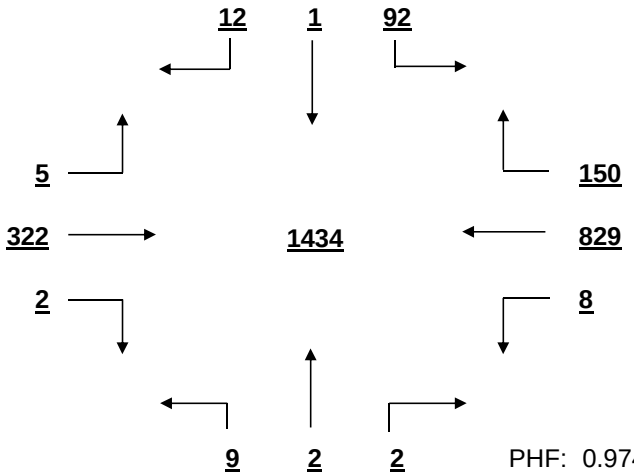
PHF: 0.974

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



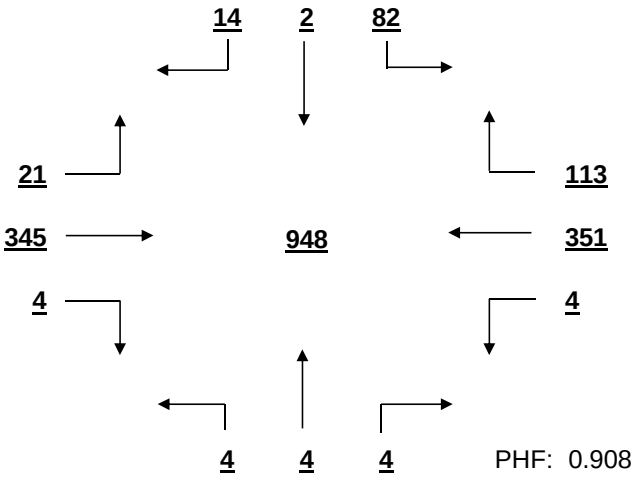
PHF: 0.814

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:00 TO 18:00



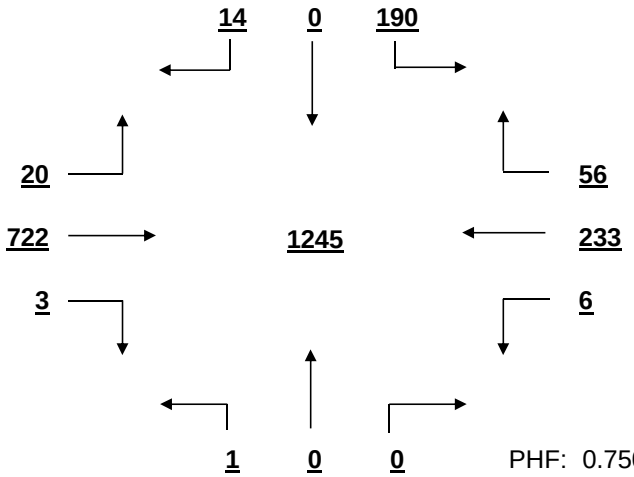
PHF: 0.974

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	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: 11/28/2016

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

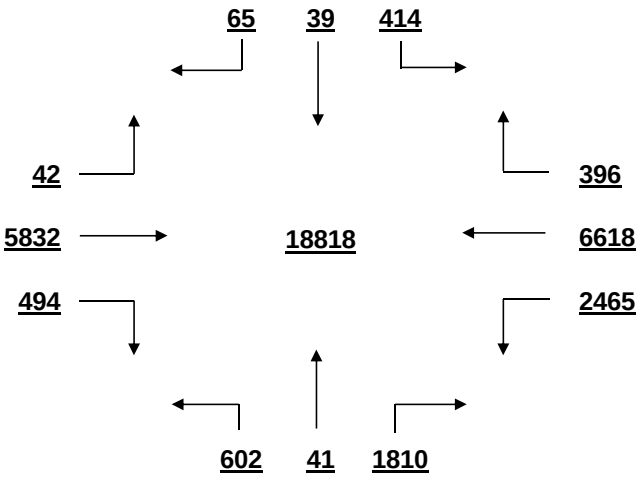
INTERSECTION VOLUME SUMMARY

	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%

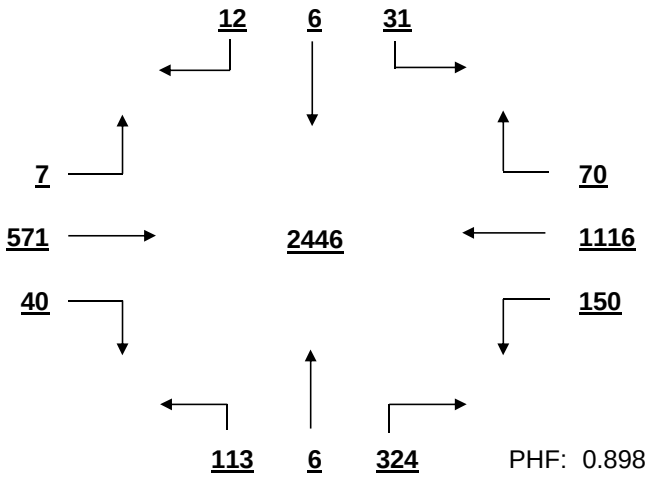
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Bush River Rd AT Outlet Pointe Blvd-Meadow Ct Date: 11/28/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

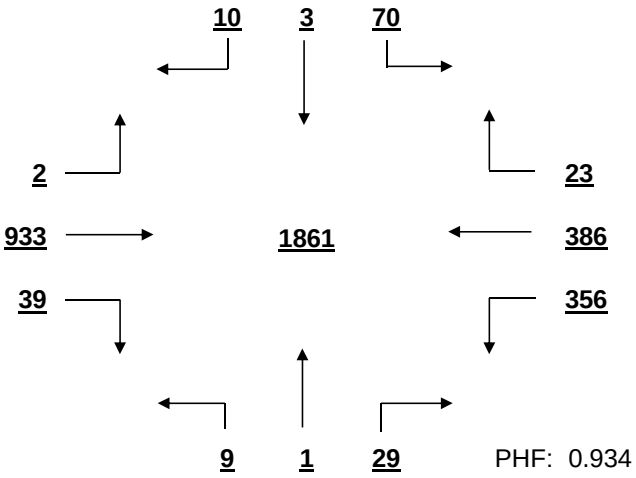


OVERALL PEAK HOUR VOLUME
FROM 16:45 TO 17:45



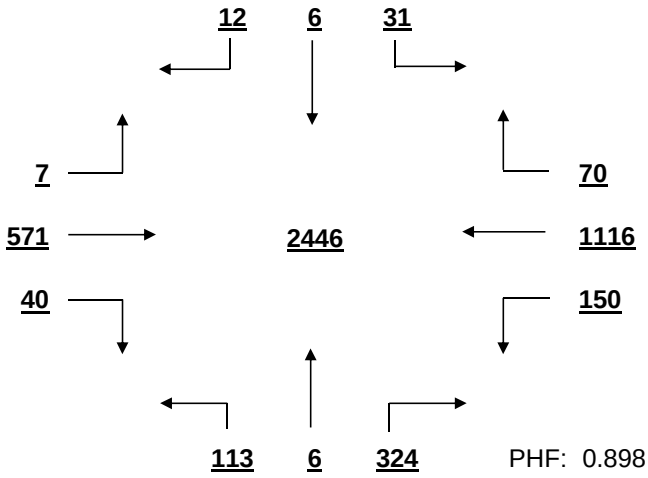
PHF: 0.898

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



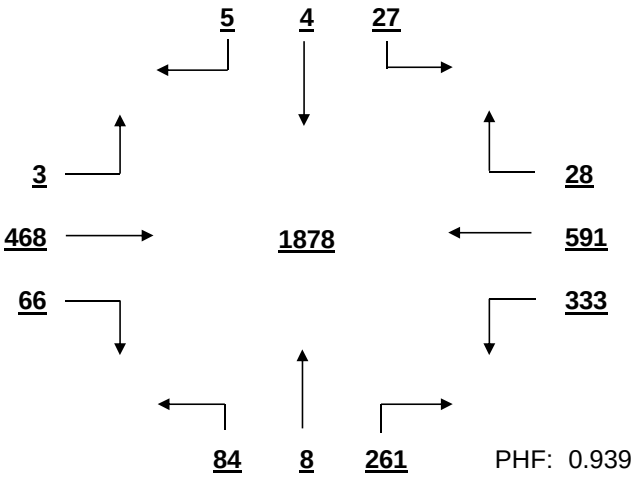
PHF: 0.934

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:45 TO 17:45



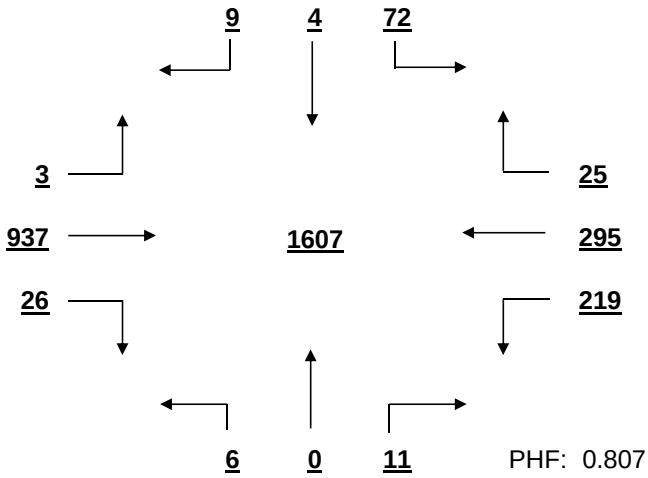
PHF: 0.898

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

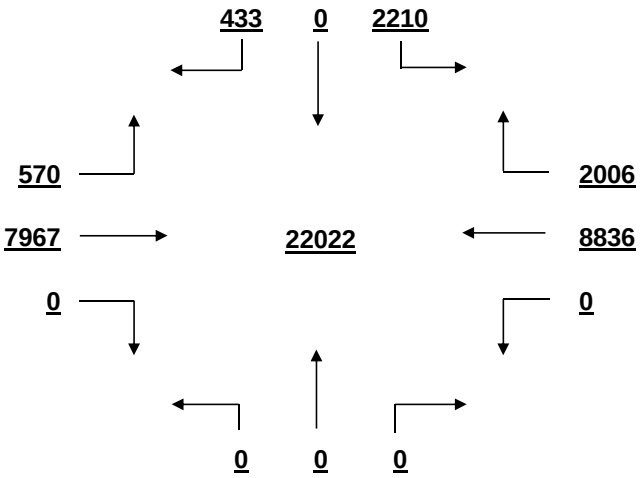
INTERSECTION VOLUME SUMMARY

	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%

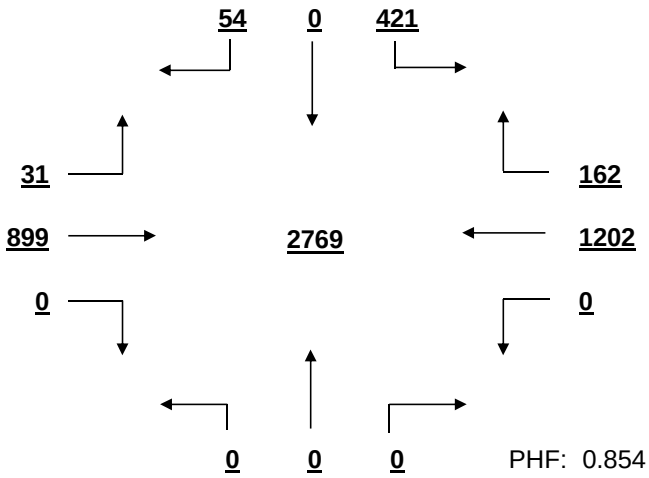
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Bush River Rd AT Berryhill Dr Date: 11/30/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

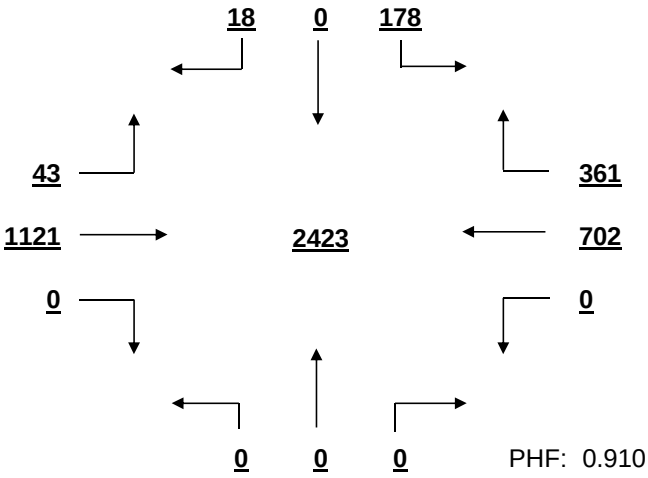


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



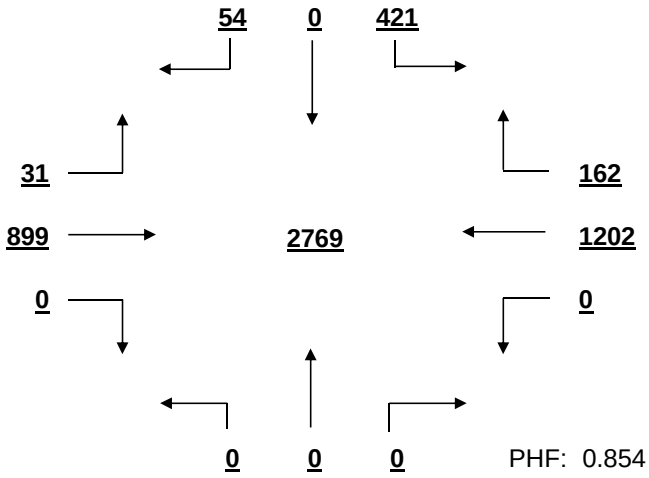
PHF: 0.854

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



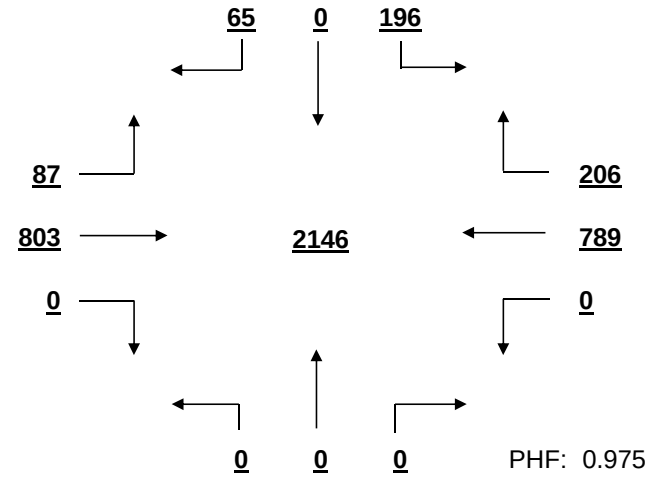
PHF: 0.910

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



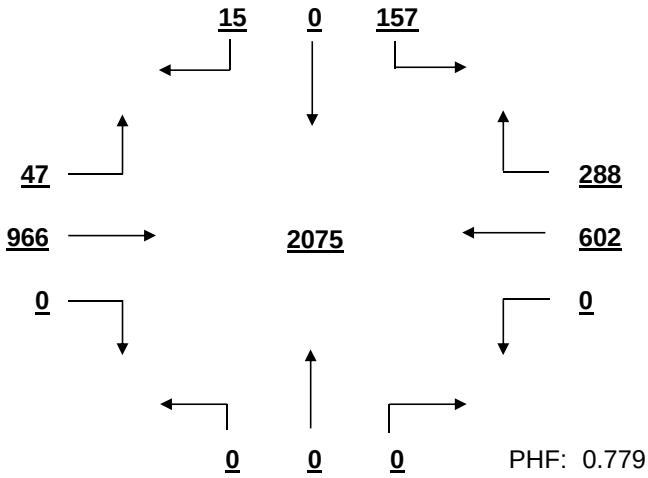
PHF: 0.854

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

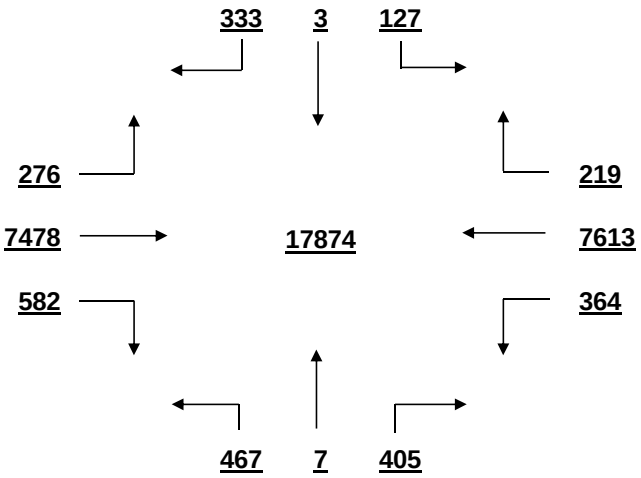
INTERSECTION VOLUME SUMMARY

	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%

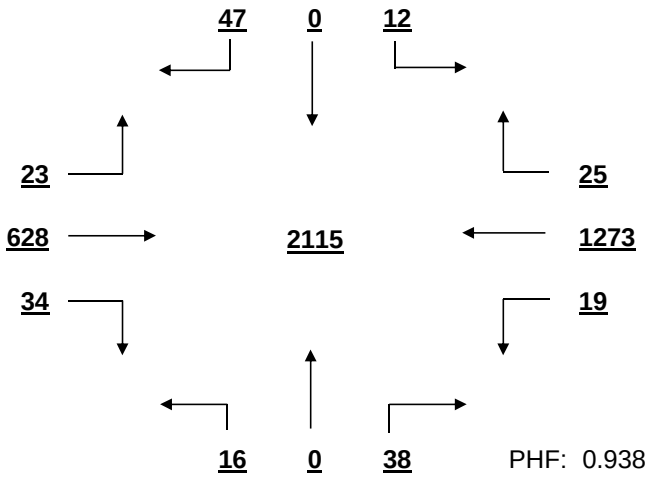
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Bush River Rd AT Rockland Rd Date: 11/29/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

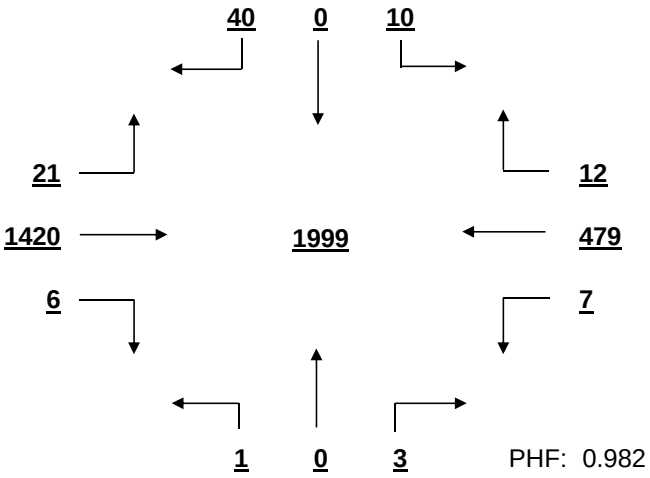


OVERALL PEAK HOUR VOLUME
FROM 17:00 TO 18:00



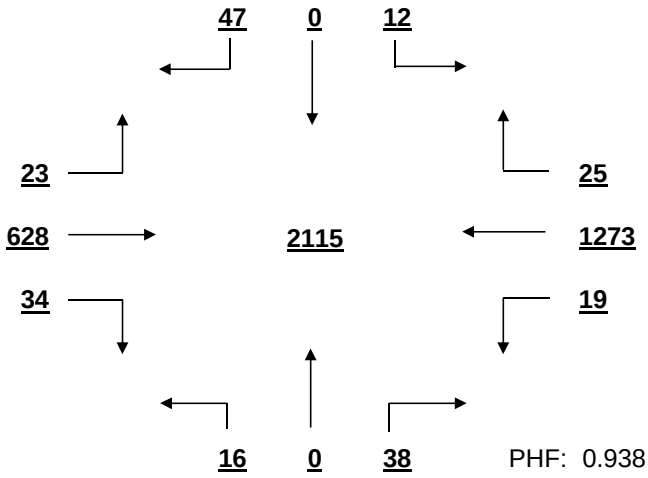
PHF: 0.938

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



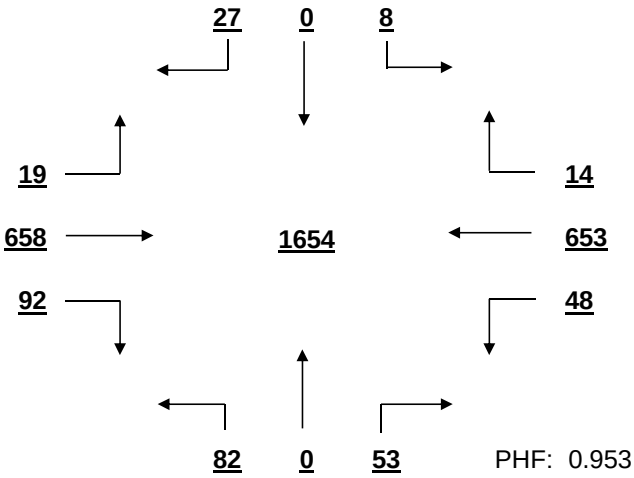
PHF: 0.982

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:00 TO 18:00



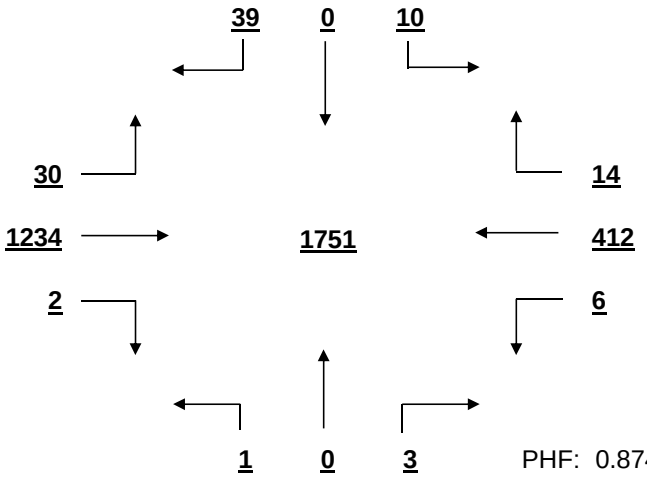
PHF: 0.938

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

Overall Peak Hour: 17:00 - 18:00 — Percent of warrant
Minor St. 59%

Higher Volume Side Street Peak Hour: 13:45 - 14:45 — Percent of warrant
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

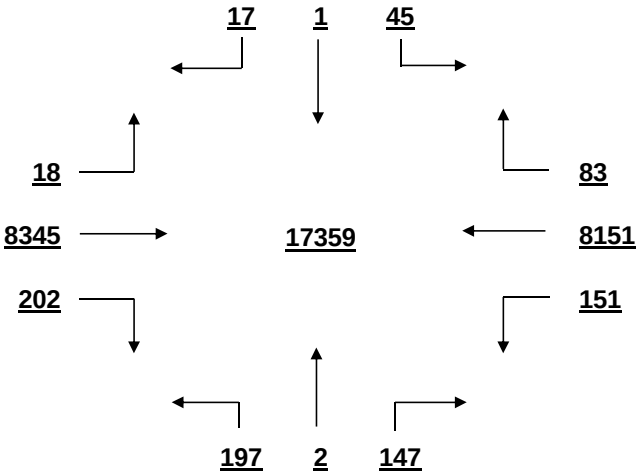
INTERSECTION VOLUME SUMMARY

	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%

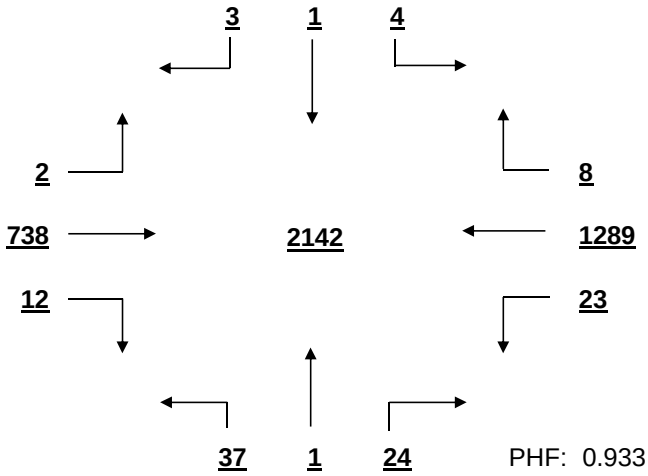
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Bush River Rd AT Independence Ave-Fuddruckers Date: 11/30/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

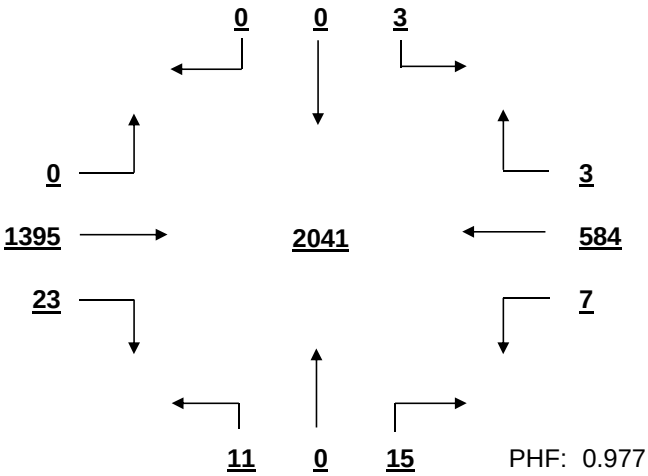


OVERALL PEAK HOUR VOLUME
FROM 17:00 TO 18:00



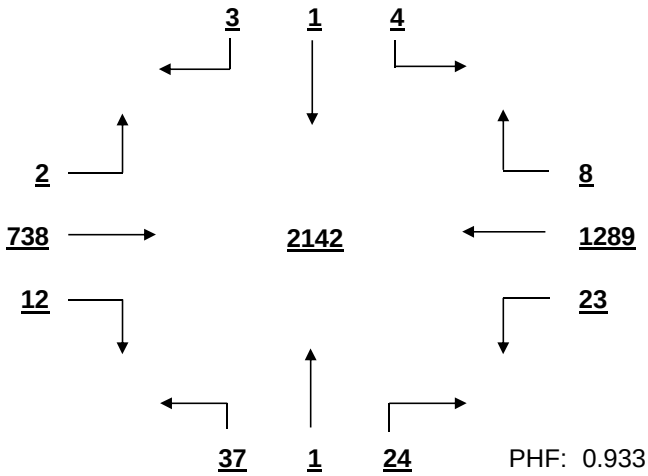
PHF: 0.933

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



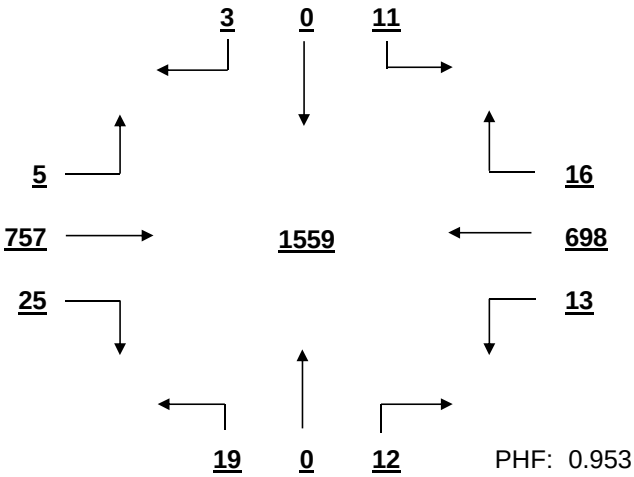
PHF: 0.977

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:00 TO 18:00



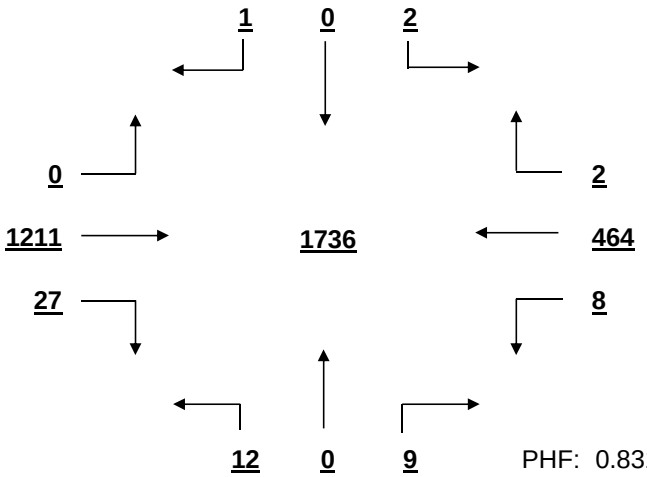
PHF: 0.933

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: 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	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

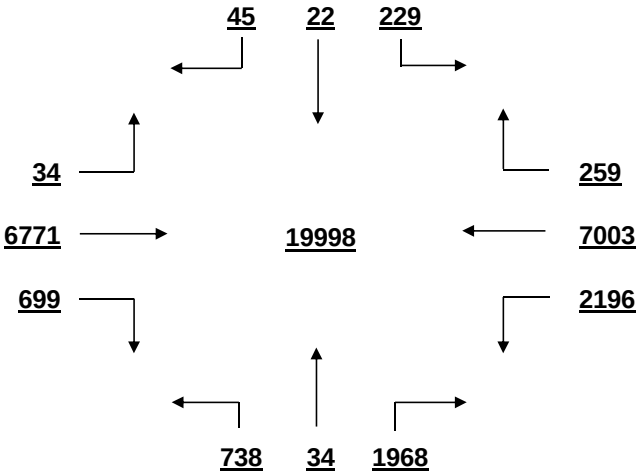
INTERSECTION VOLUME SUMMARY

	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%

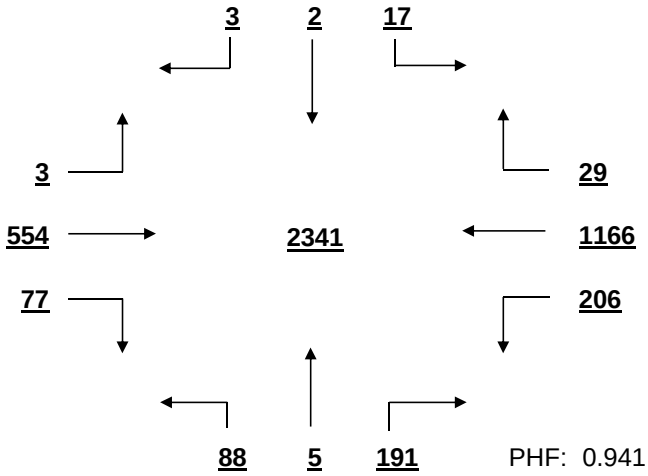
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Bush River Rd AT Zimalcrest-Walmart Date: 11/29/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

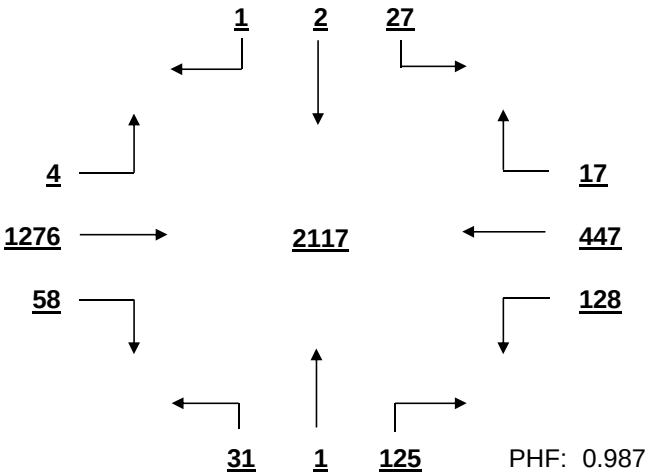


OVERALL PEAK HOUR VOLUME
FROM 17:00 TO 18:00



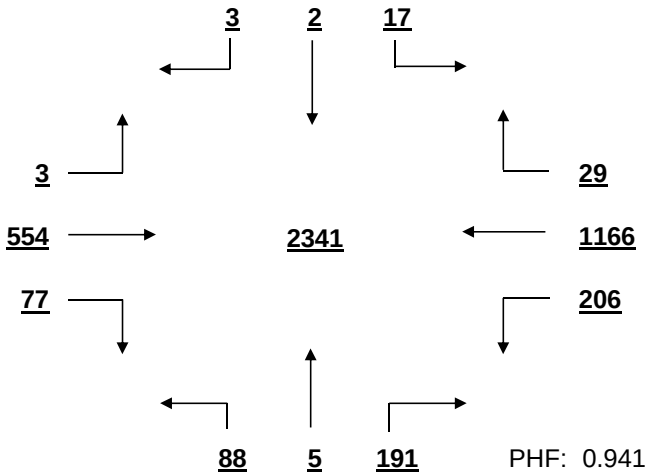
PHF: 0.941

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



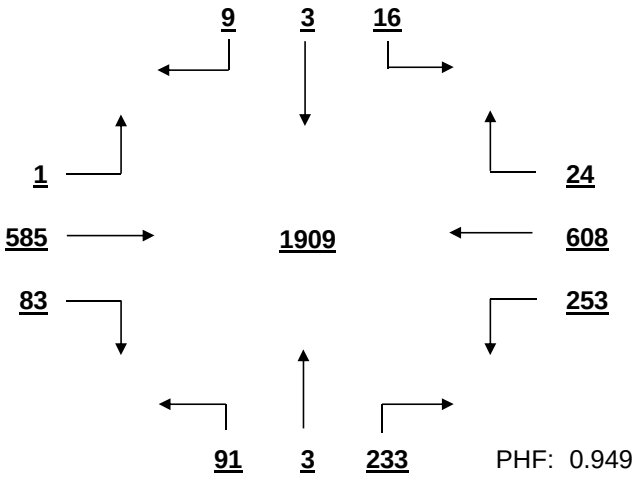
PHF: 0.987

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:00 TO 18:00



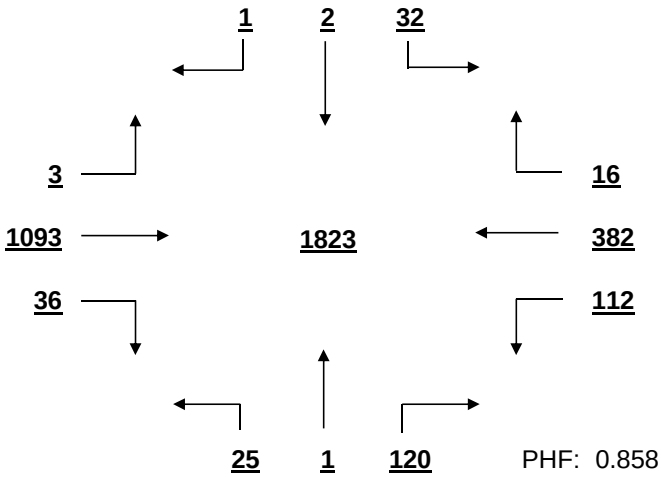
PHF: 0.941

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
Overall Peak Hour: 17:00 - 18:00
Minor St. 284%

Percent of warrant
Higher Volume Side Street Peak Hour: 12:15 - 13:15
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: 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	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

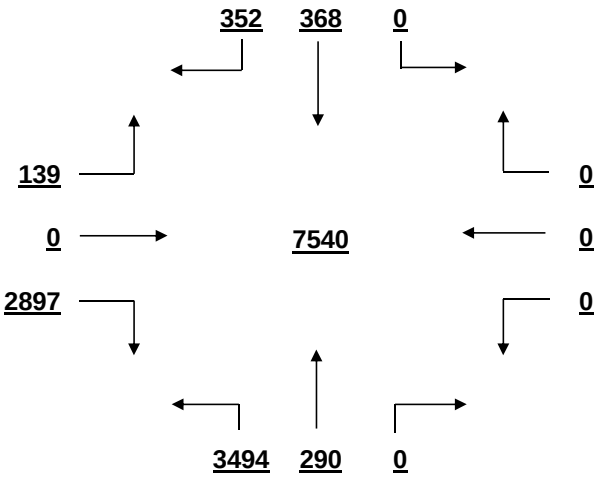
INTERSECTION VOLUME SUMMARY

	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%

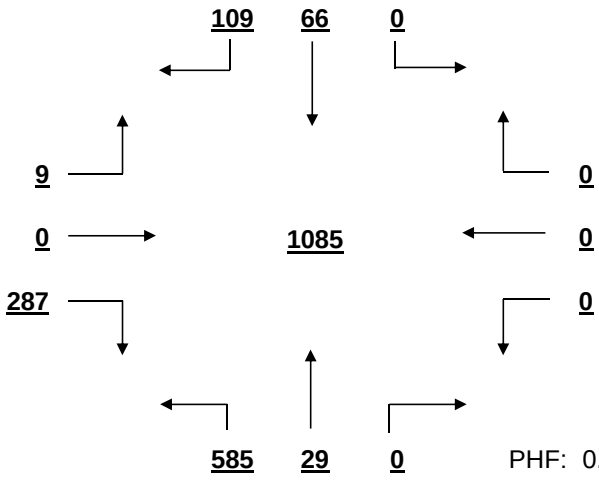
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Morning Hill Dr AT Burnette Dr Date: 12/1/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

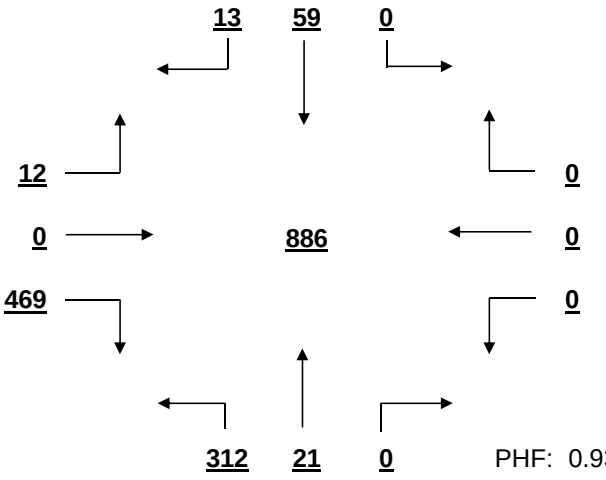


OVERALL PEAK HOUR VOLUME
FROM 17:00 TO 18:00



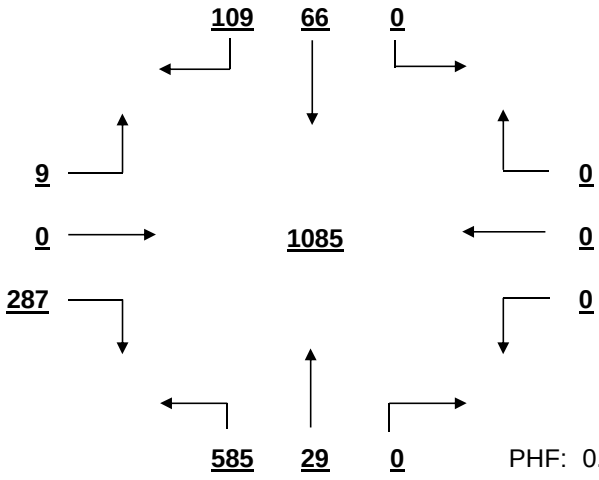
PHF: 0.858

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



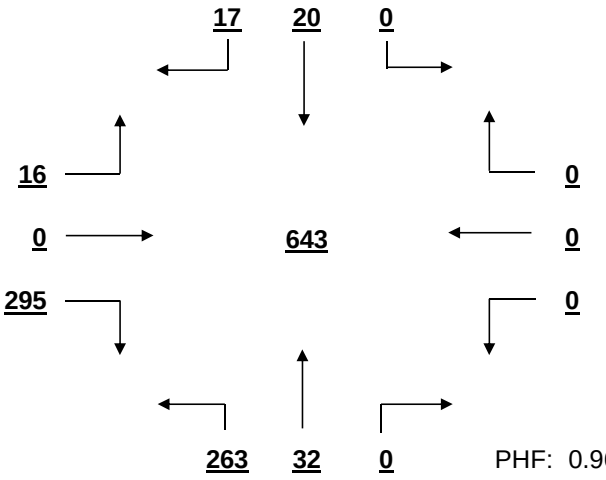
PHF: 0.939

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:00 TO 18:00



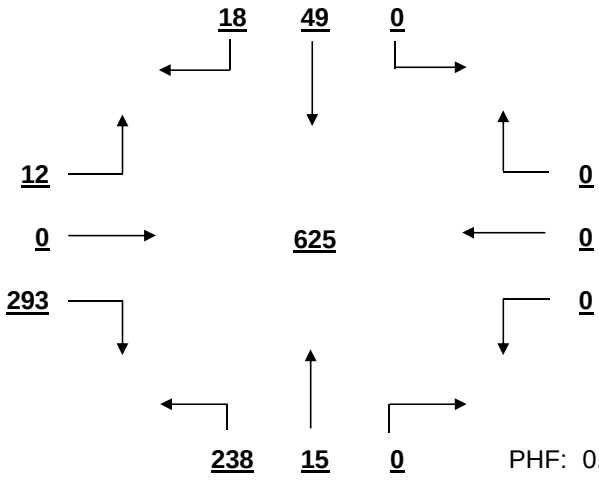
PHF: 0.858

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

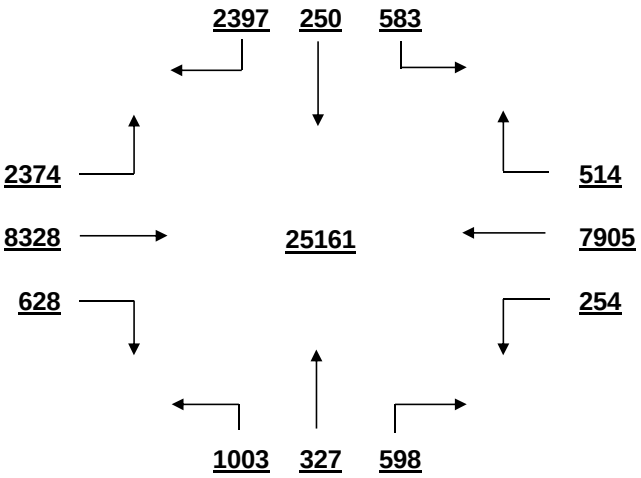
INTERSECTION VOLUME SUMMARY

	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%

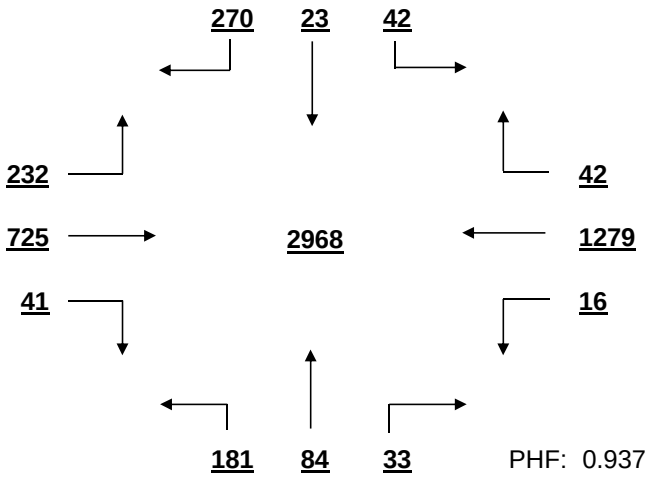
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Bush River Rd AT Arrowwood Rd Date: 11/29/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

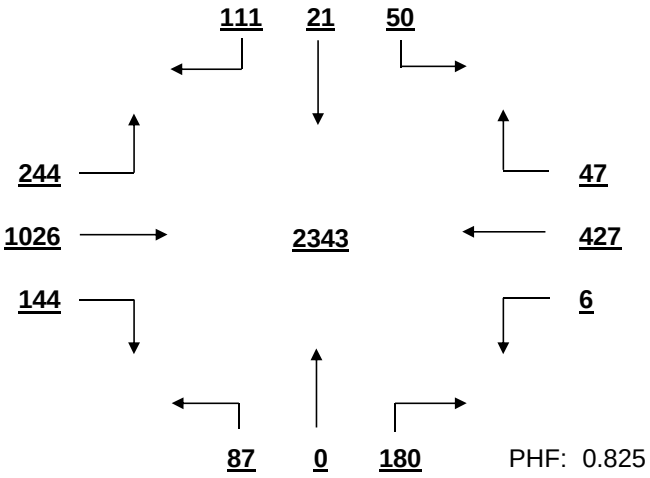


OVERALL PEAK HOUR VOLUME
FROM 16:45 TO 17:45



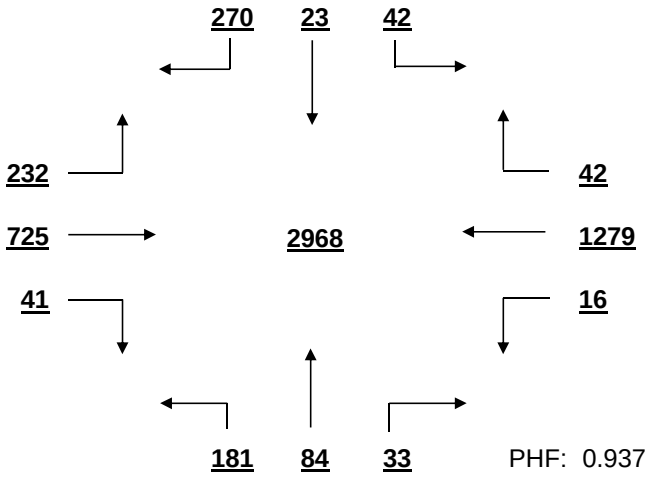
PHF: 0.937

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



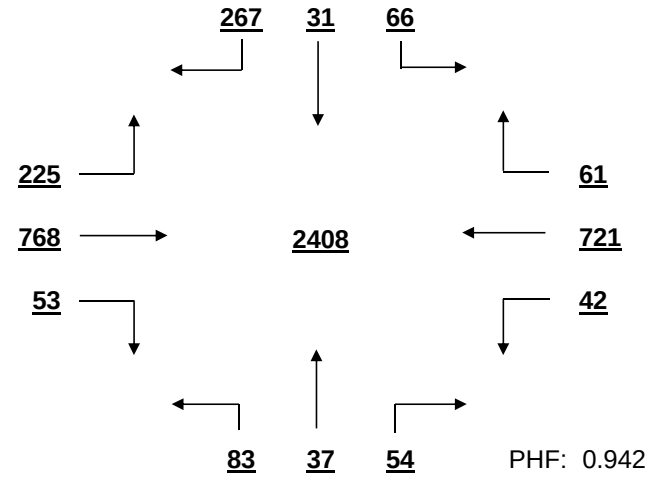
PHF: 0.825

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:45 TO 17:45



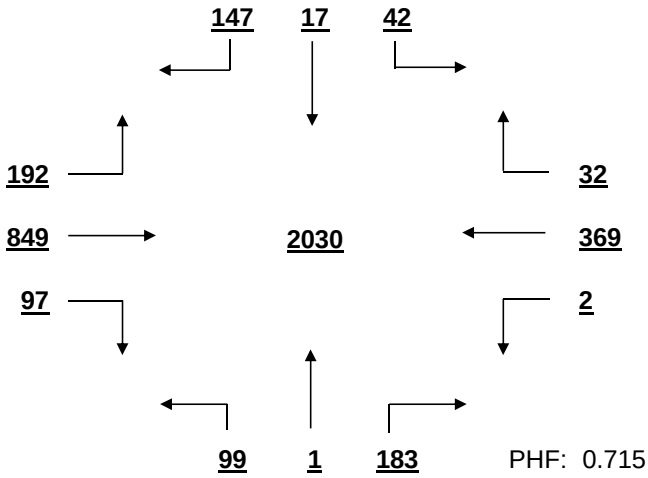
PHF: 0.937

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

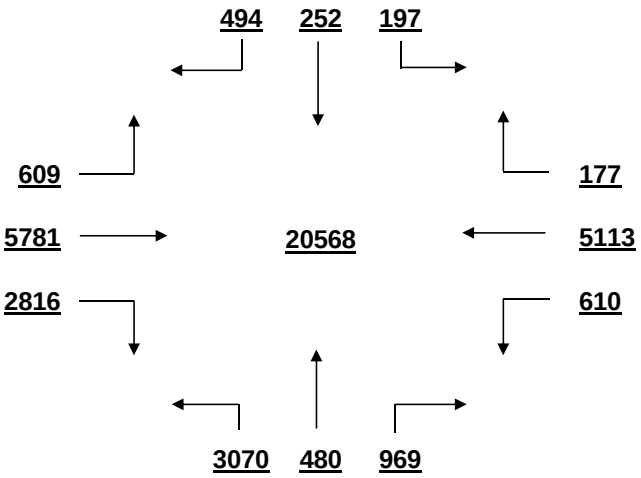
INTERSECTION VOLUME SUMMARY

	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%

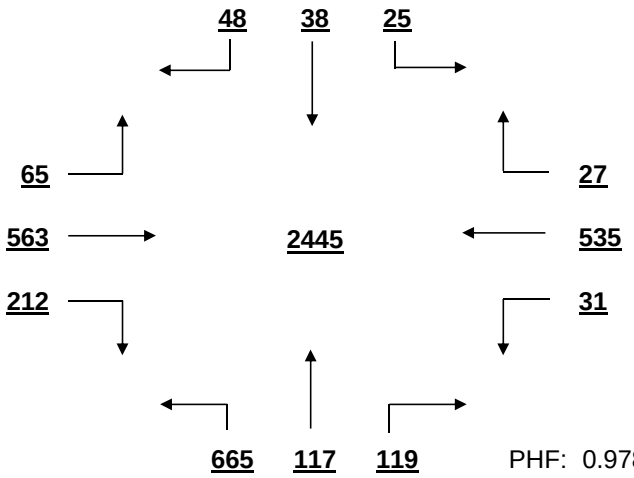
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Bush River Rd AT Colonial Life Blvd-Mall Date: 11/29/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

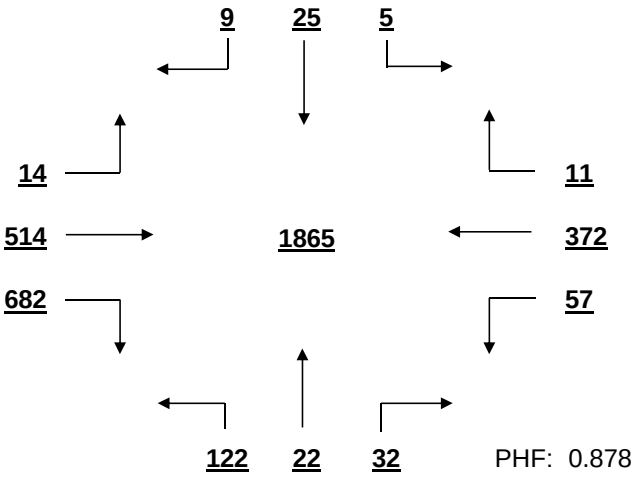


OVERALL PEAK HOUR VOLUME
FROM 16:45 TO 17:45



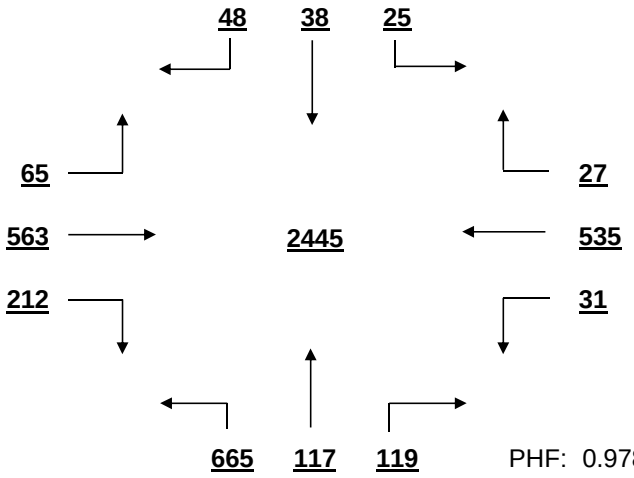
PHF: 0.978

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



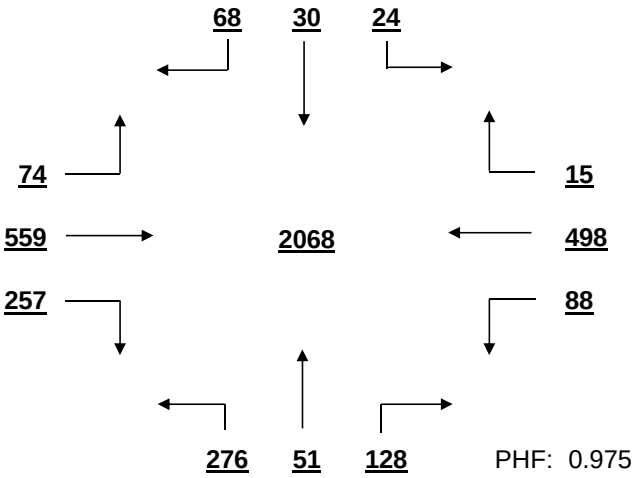
PHF: 0.878

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:45 TO 17:45



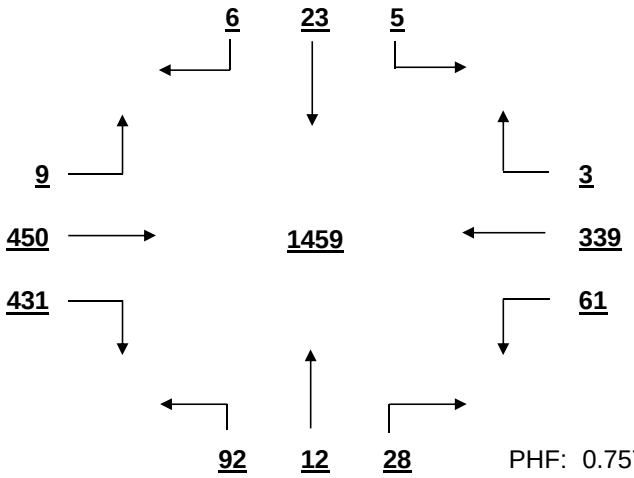
PHF: 0.978

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

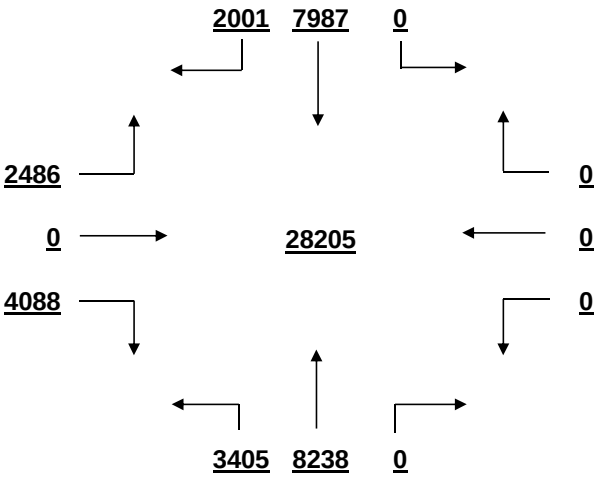
INTERSECTION VOLUME SUMMARY

	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%

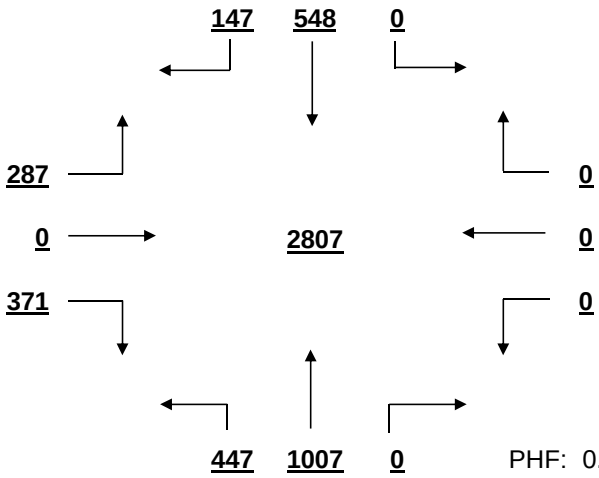
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Broad River Rd AT Bush River Rd Date: 11/29/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

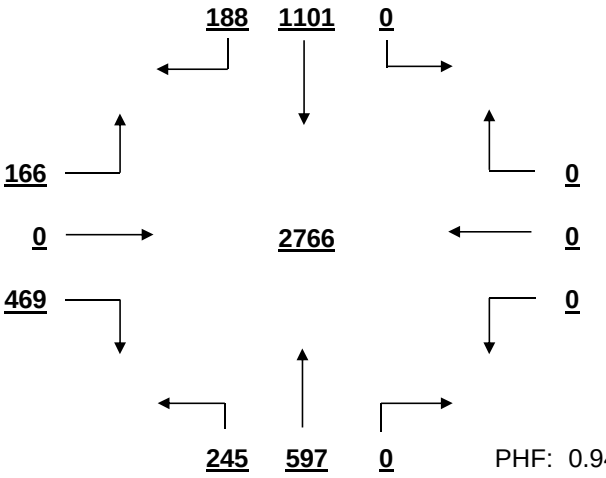


OVERALL PEAK HOUR VOLUME
FROM 17:15 TO 18:15



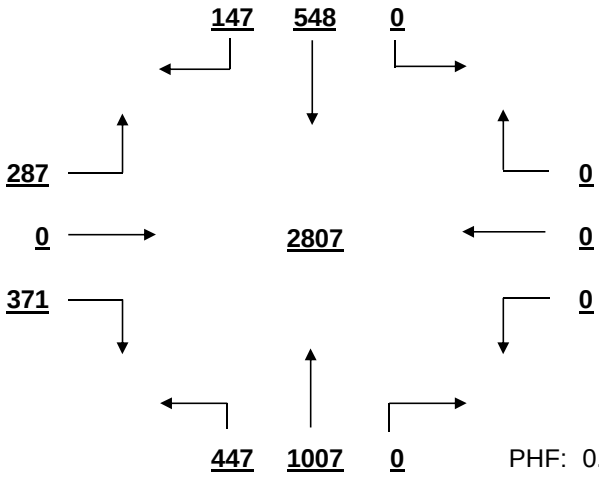
PHF: 0.925

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



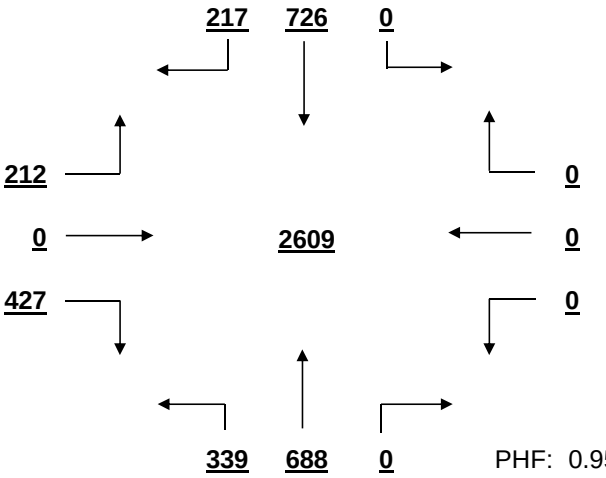
PHF: 0.942

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:15 TO 18:15



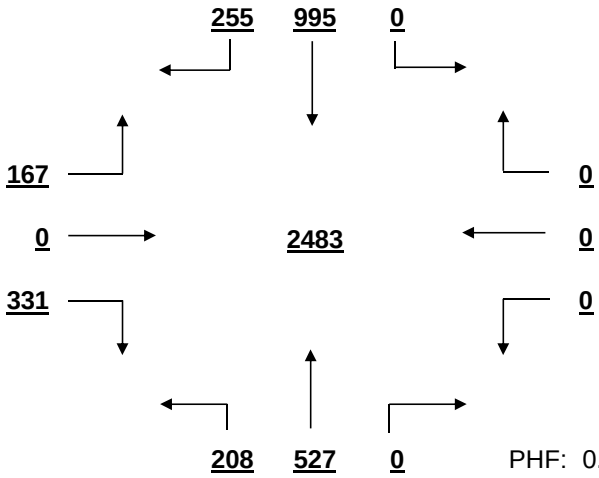
PHF: 0.925

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

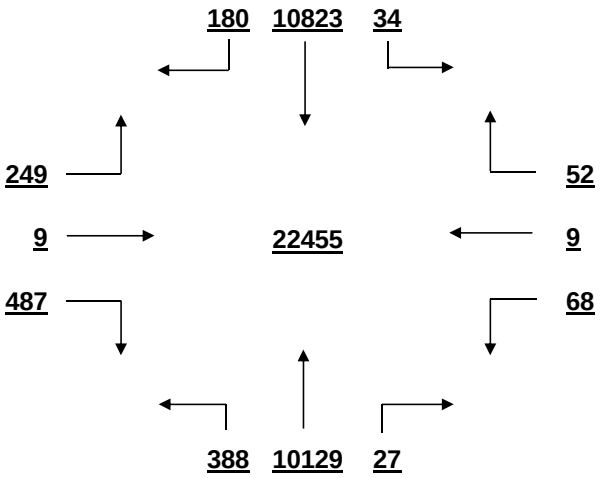
INTERSECTION VOLUME SUMMARY

	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%

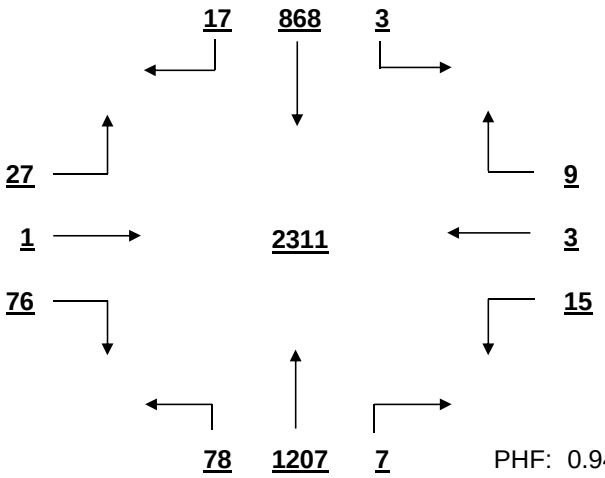
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Broad River Rd AT Arrowwood Dr-Means Ave Date: 11/29/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

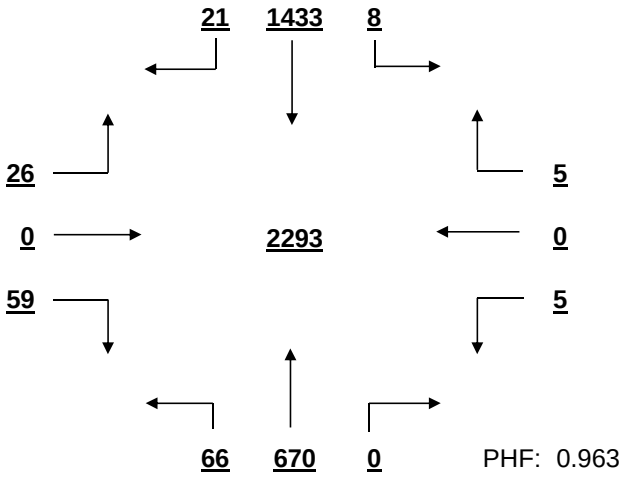


OVERALL PEAK HOUR VOLUME
FROM 17:00 TO 18:00



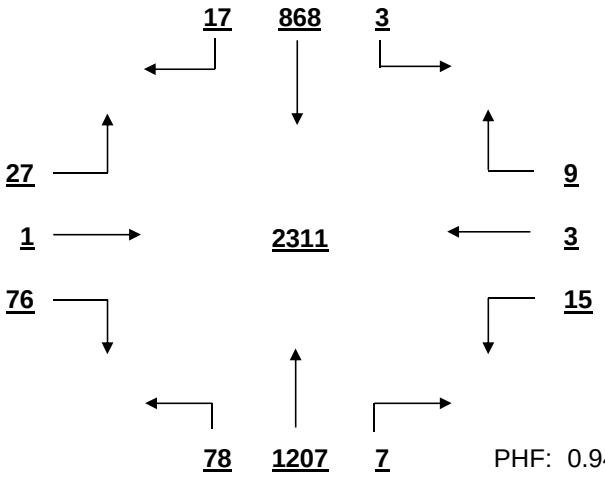
PHF: 0.941

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



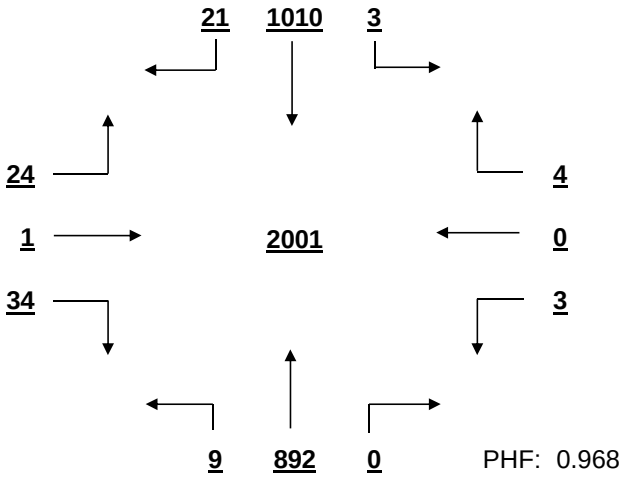
PHF: 0.963

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:00 TO 18:00



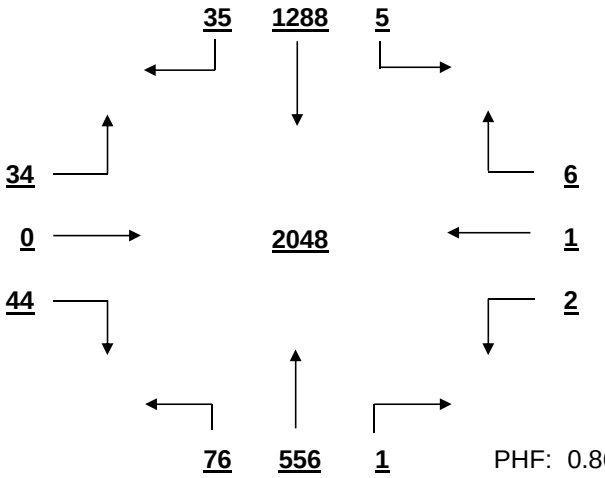
PHF: 0.941

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: 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	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

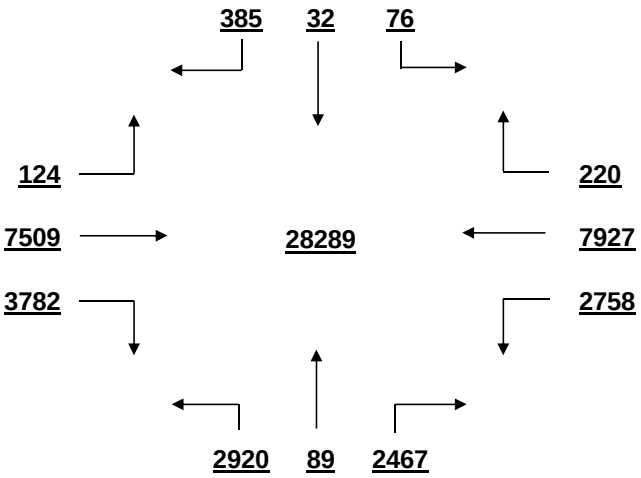
INTERSECTION VOLUME SUMMARY

	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%

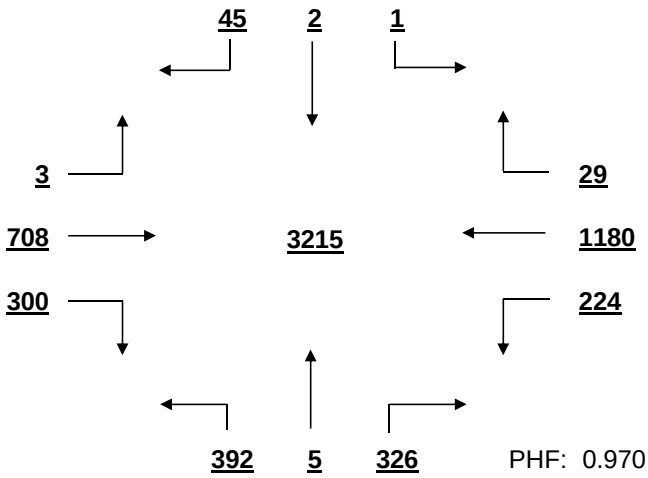
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Broad River Rd AT Greystone Blvd-Gas Station Date: 11/29/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

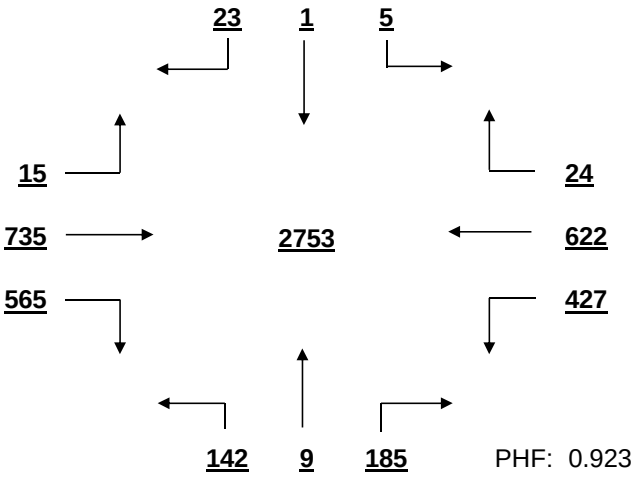


OVERALL PEAK HOUR VOLUME
FROM 17:00 TO 18:00



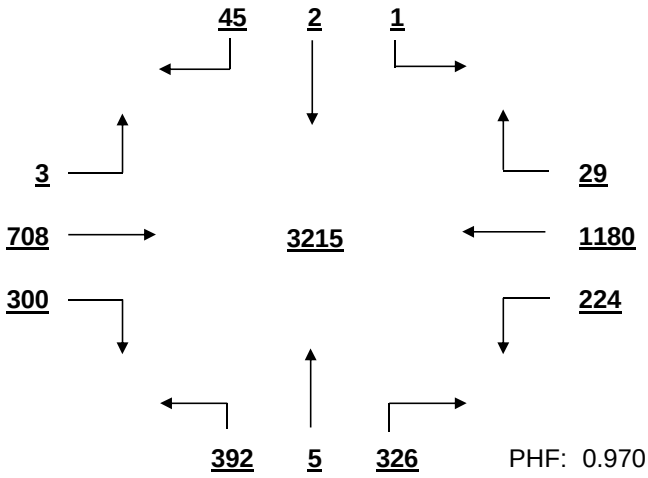
PHF: 0.970

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



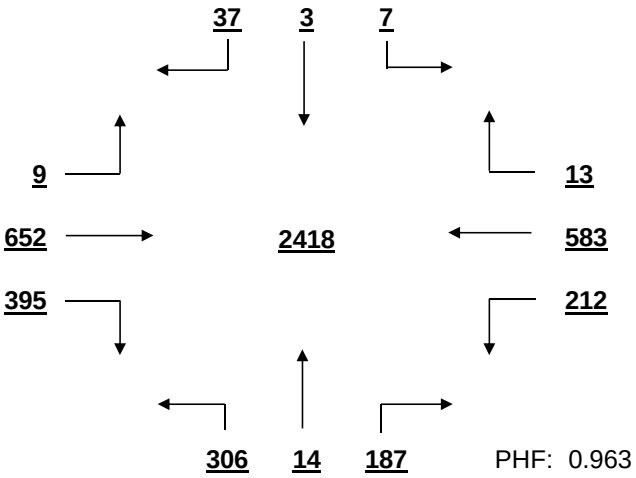
PHF: 0.923

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 17:00 TO 18:00



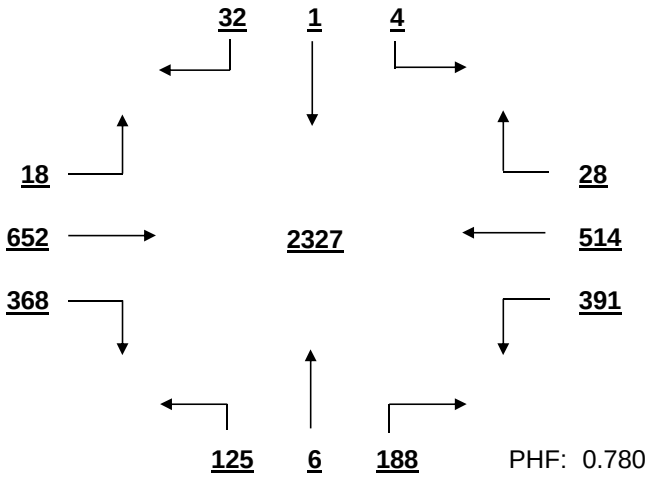
PHF: 0.970

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

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

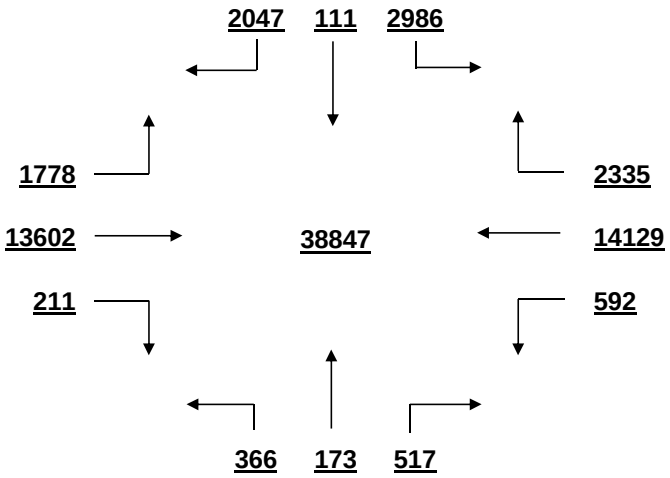
INTERSECTION VOLUME SUMMARY

	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%

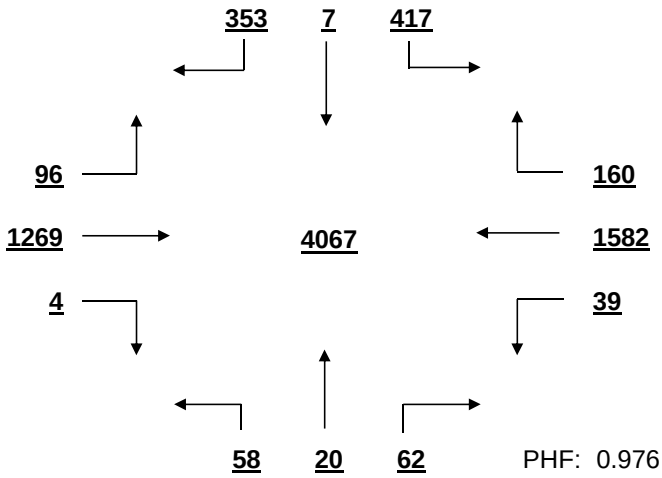
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Sunset Blvd AT W. Hospital Dr-Sunset Ct Date: 12/1/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

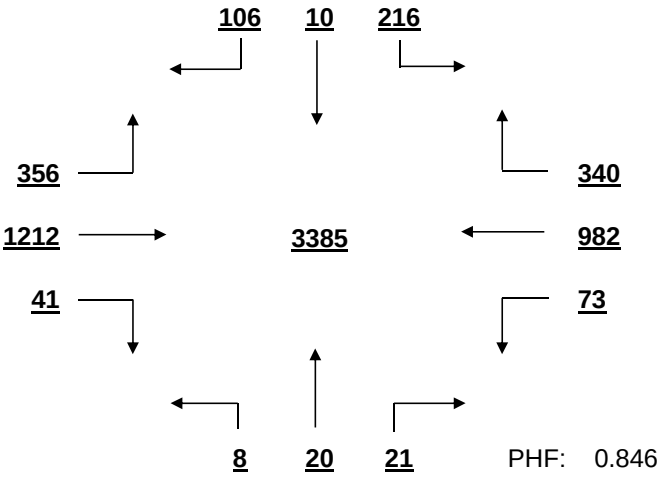


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



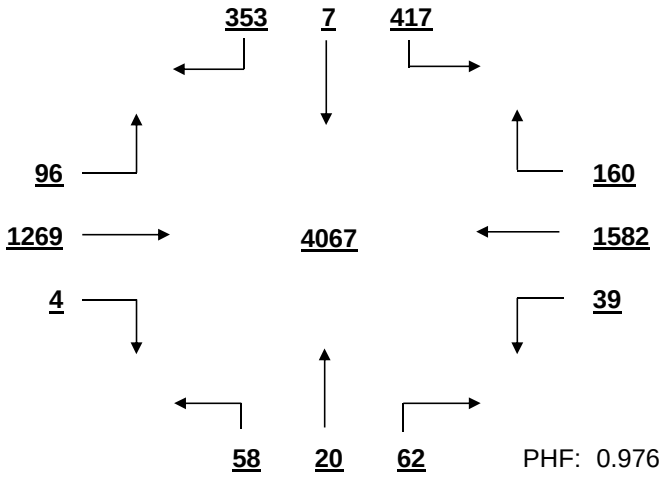
PHF: 0.976

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



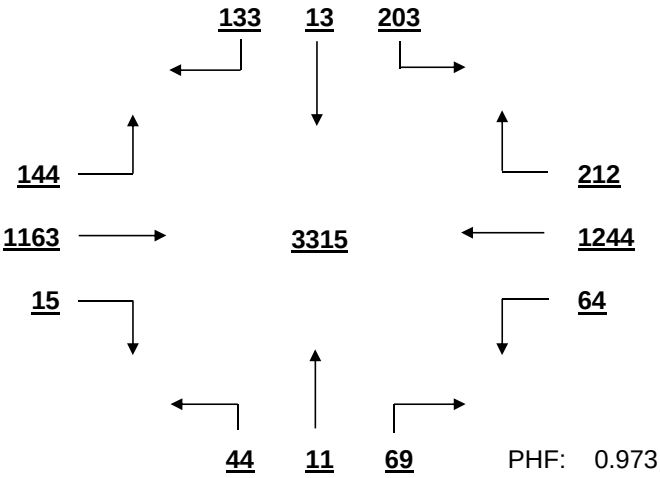
PHF: 0.846

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



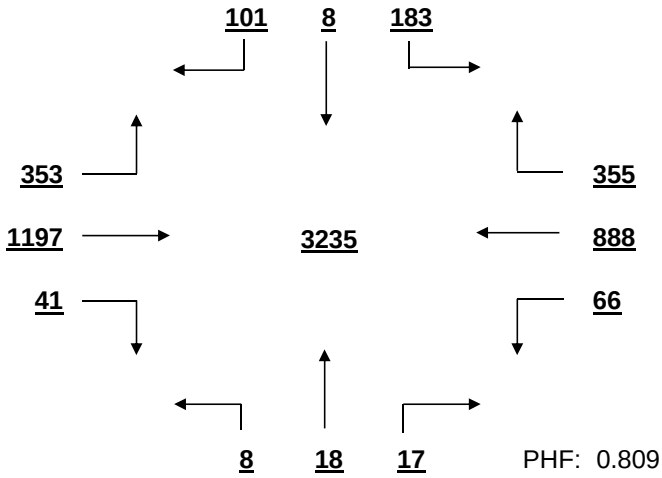
PHF: 0.976

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

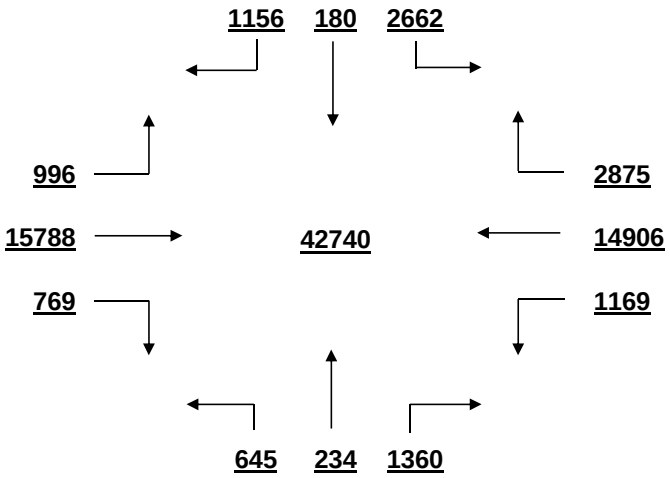
INTERSECTION VOLUME SUMMARY

	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%

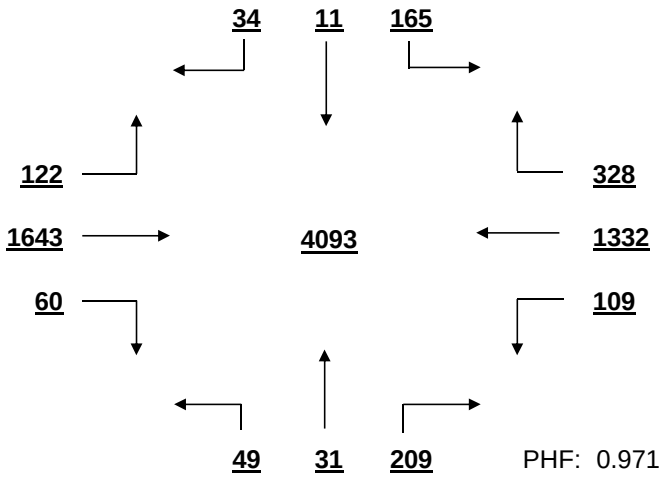
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Sunset Blvd AT E. Hospital Dr-Harbor Dr Date: 12/1/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

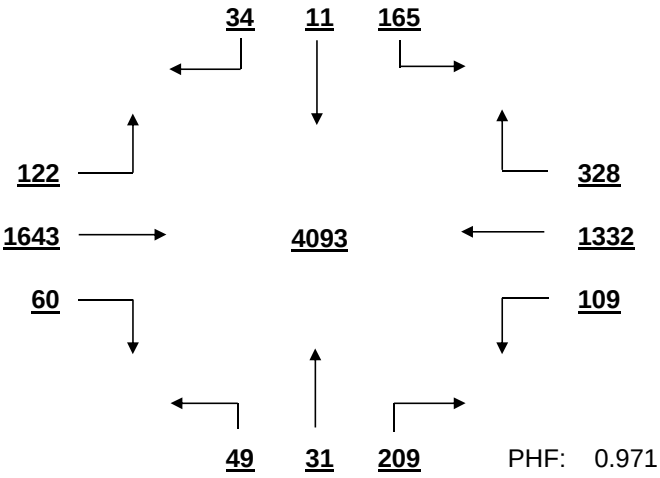


OVERALL PEAK HOUR VOLUME
FROM 7:30 TO 8:30



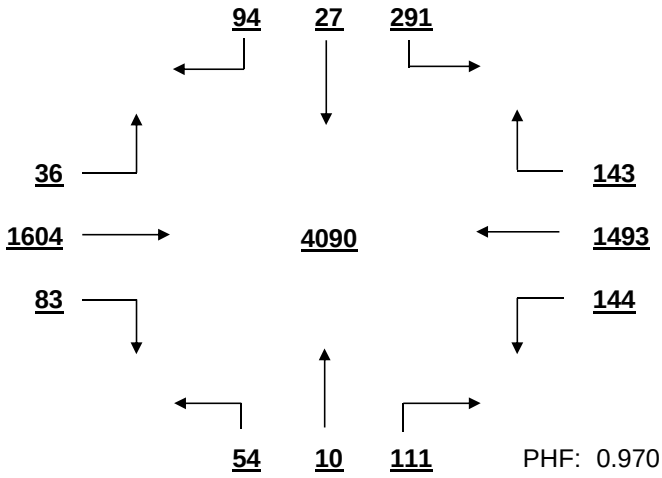
PHF: 0.971

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:30 TO 8:30



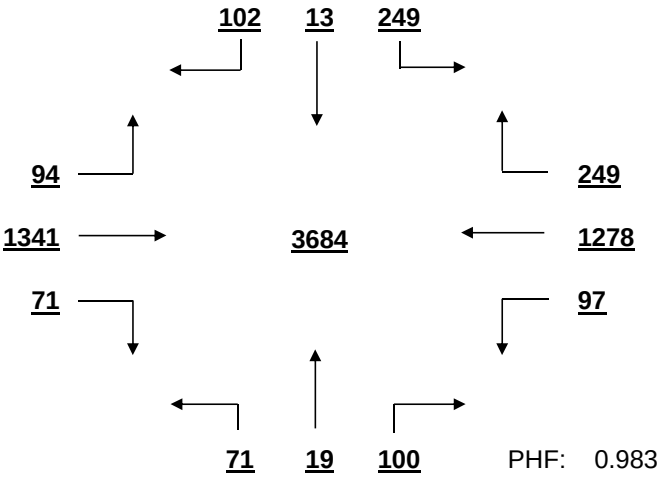
PHF: 0.971

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:45 TO 17:45



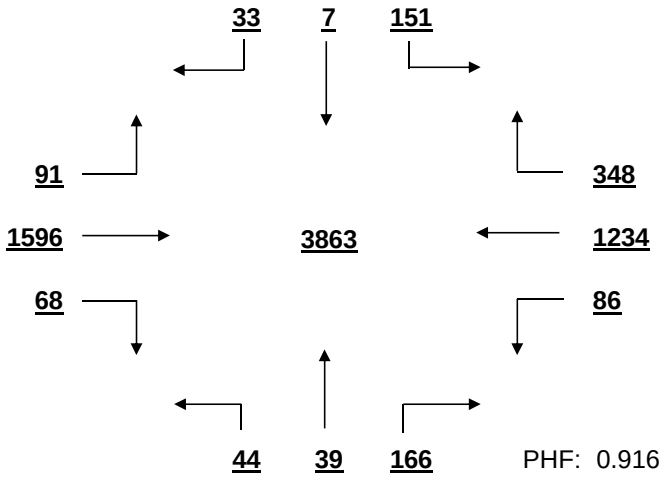
PHF: 0.970

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

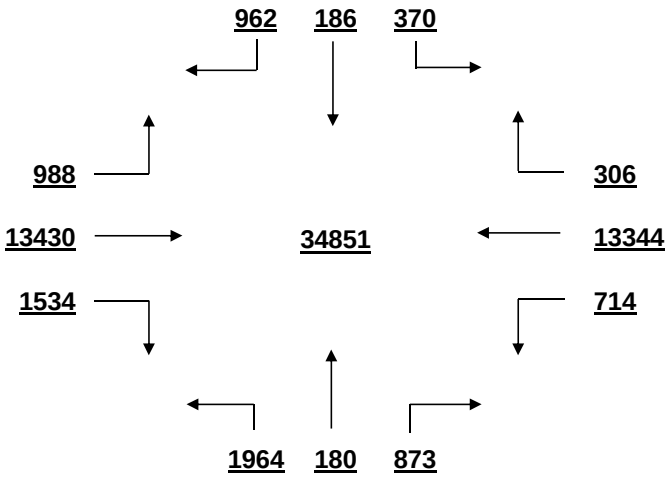
INTERSECTION VOLUME SUMMARY

	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%

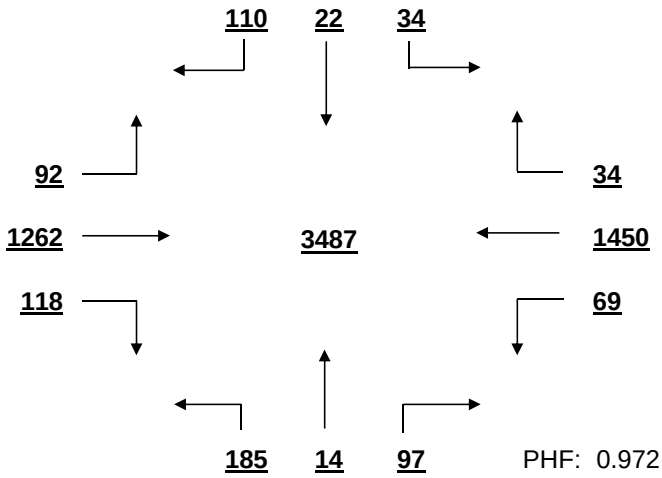
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Sunset Blvd AT McSwain Dr-Chris Dr Date: 12/1/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

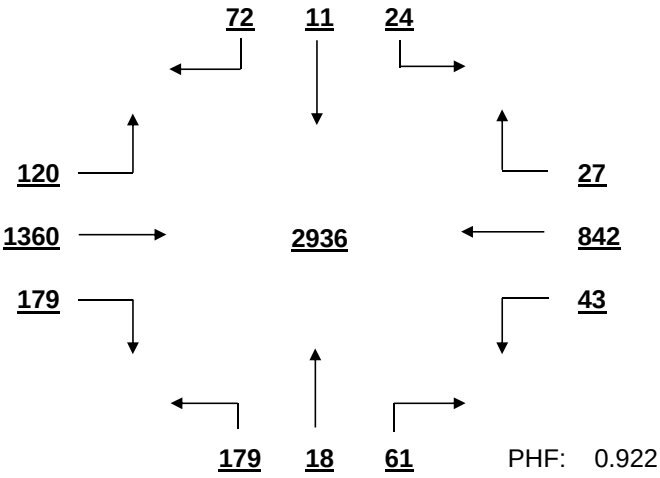


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



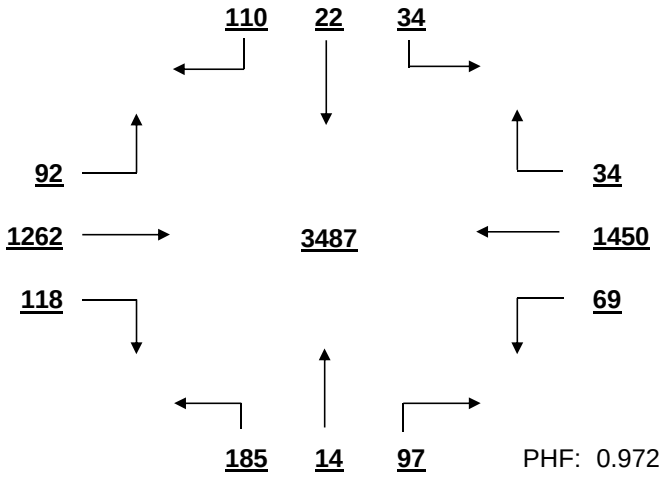
PHF: 0.972

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 8:00 TO 9:00



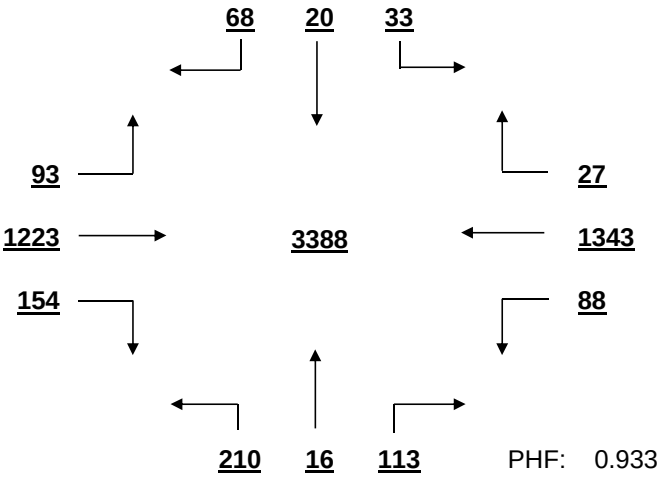
PHF: 0.922

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



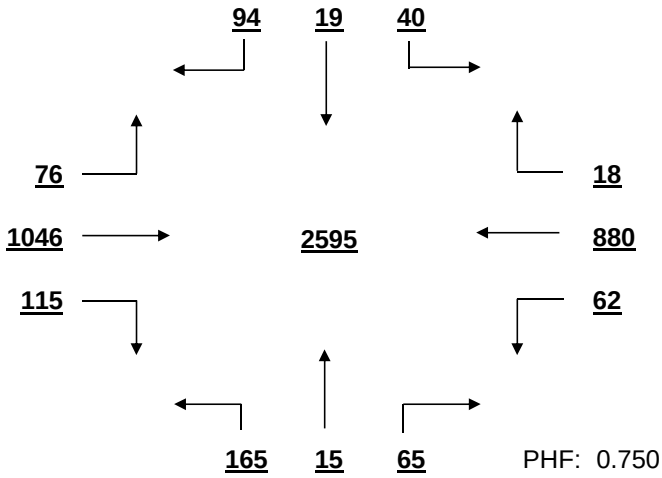
PHF: 0.972

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	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	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

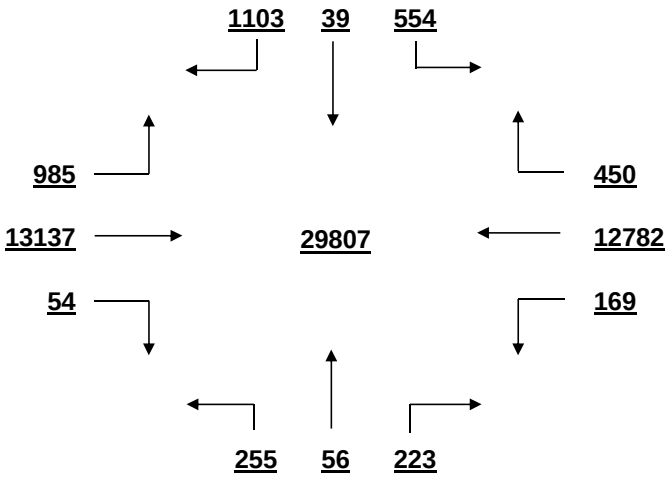
INTERSECTION VOLUME SUMMARY

	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%

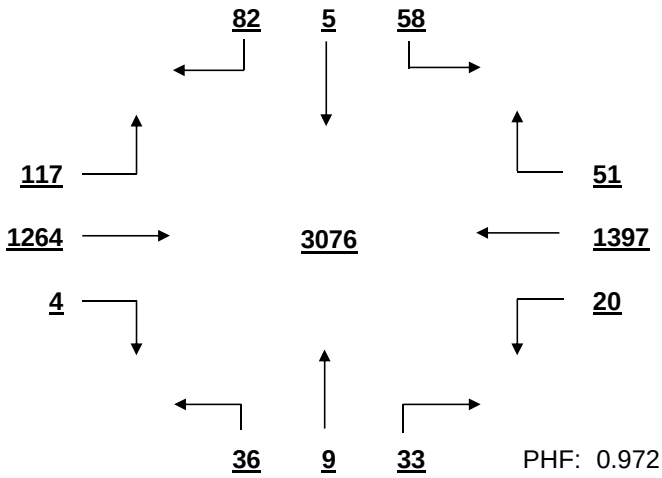
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Sunset Blvd AT Whippoorwill Dr-Kleckley Dr Date: 12/1/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

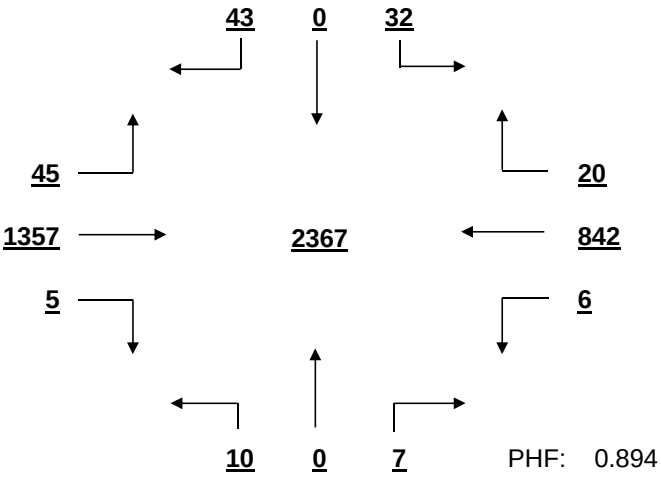


OVERALL PEAK HOUR VOLUME
FROM 16:45 TO 17:45



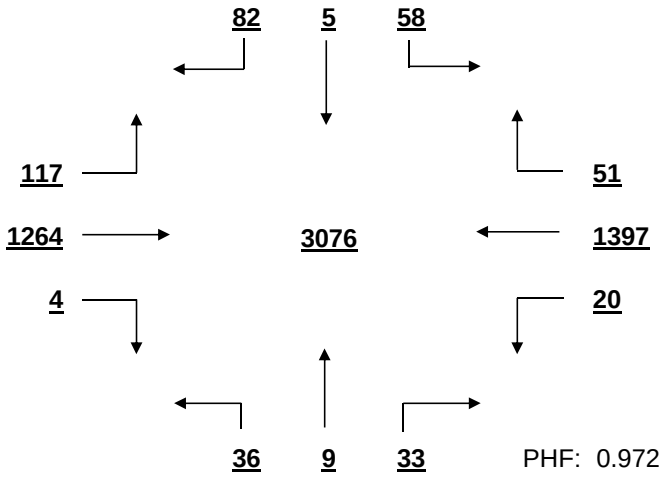
PHF: 0.972

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 8:00 TO 9:00



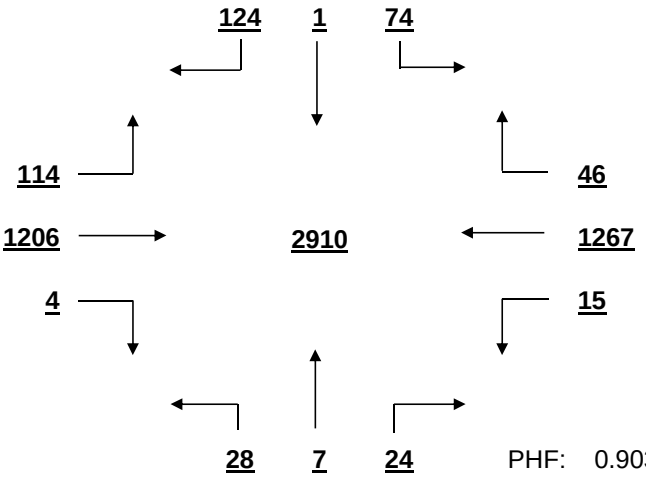
PHF: 0.894

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:45 TO 17:45



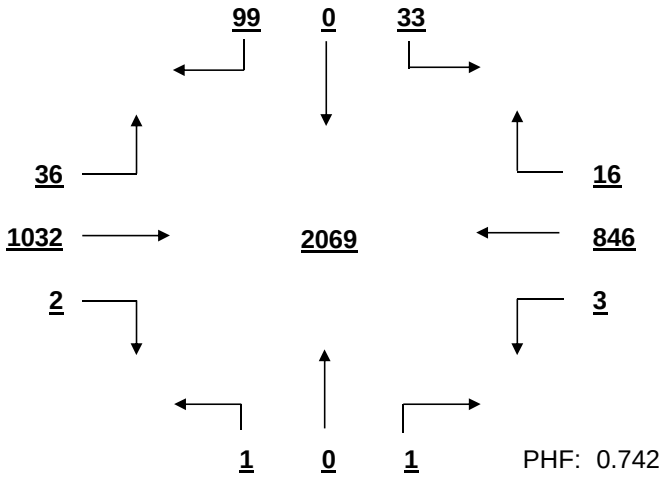
PHF: 0.972

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

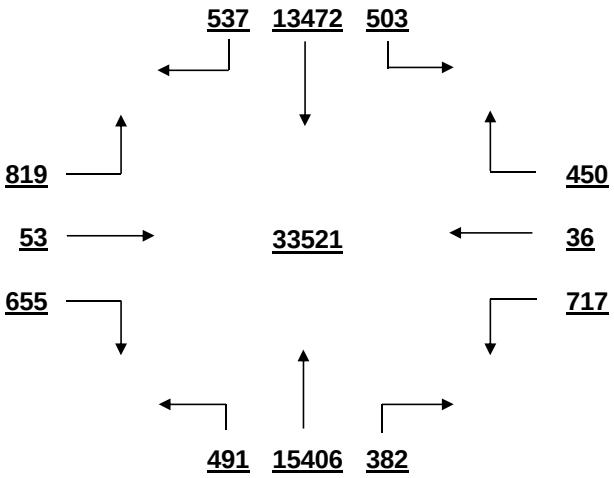
INTERSECTION VOLUME SUMMARY

	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%

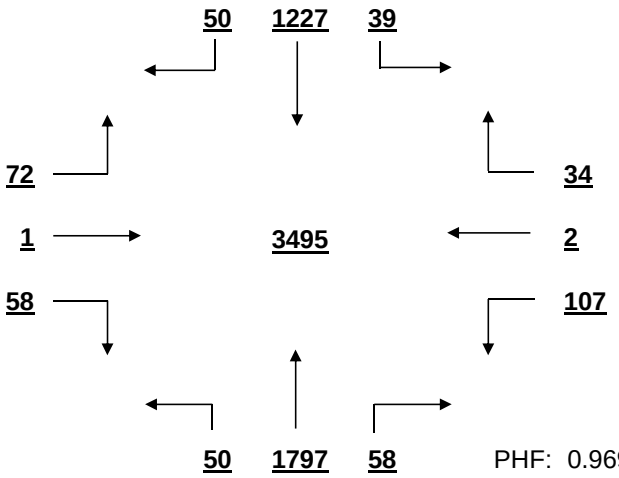
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Broad River Rd AT Marley Dr-Menlo (Briarsgate) Dr Date: 12/1/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

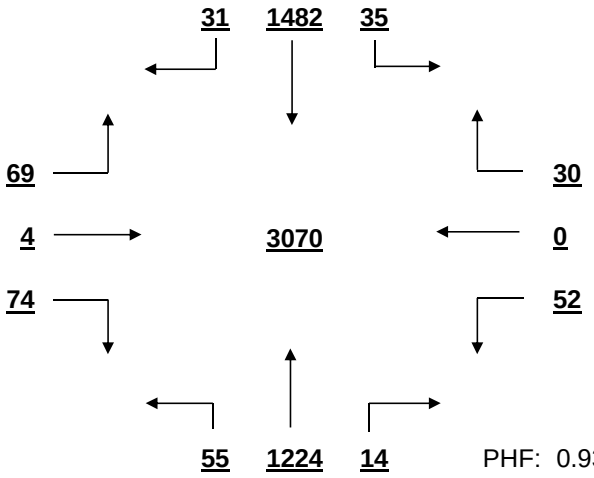


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



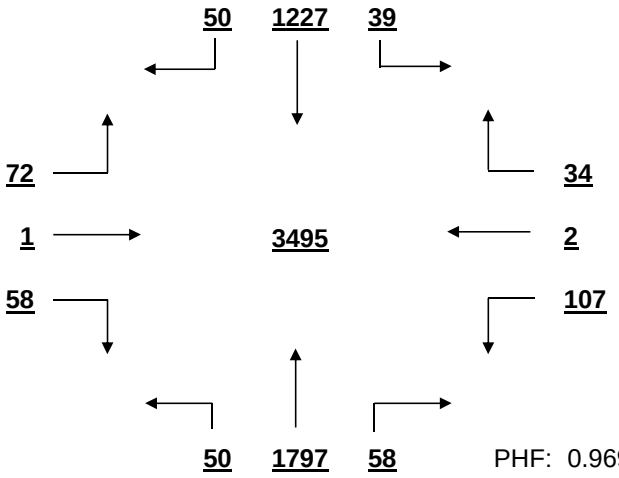
PHF: 0.969

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



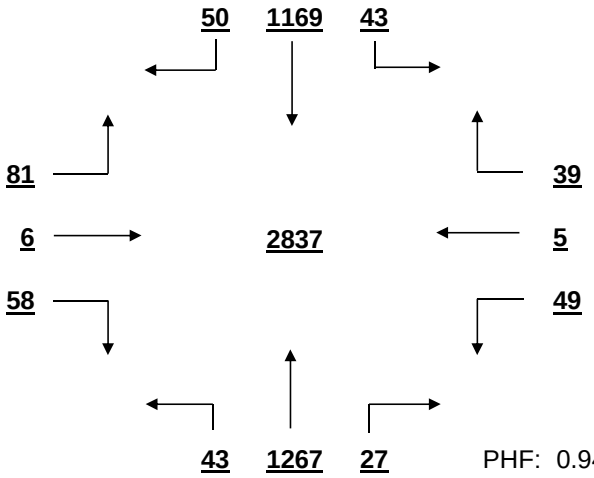
PHF: 0.936

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



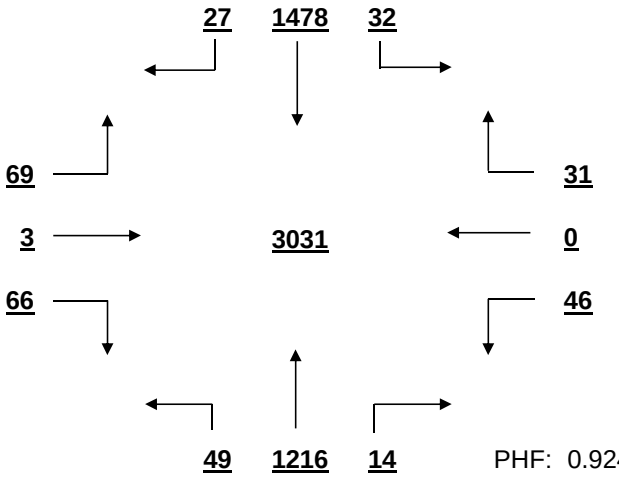
PHF: 0.969

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

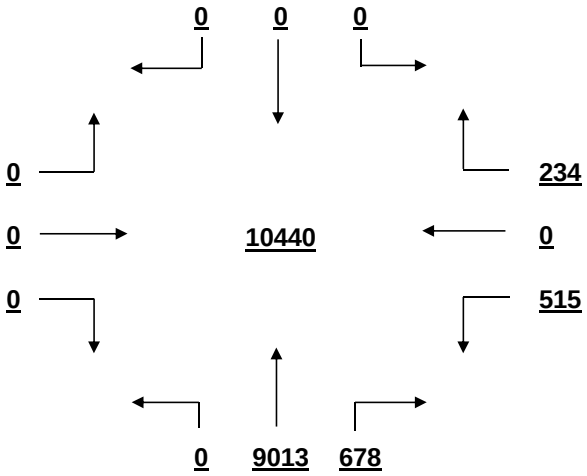
INTERSECTION VOLUME SUMMARY

	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%

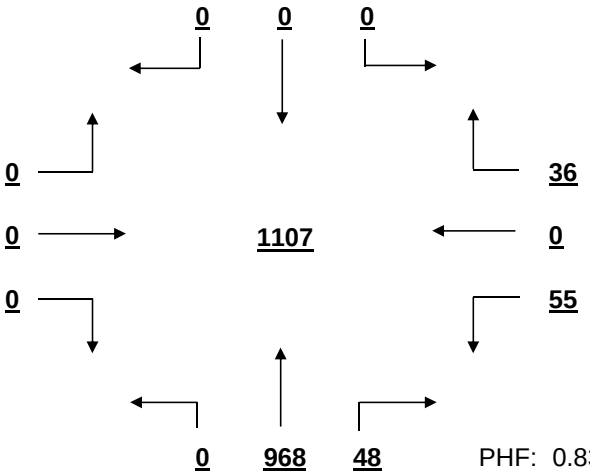
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

I-20 EB On-Ramp AT Garner Ln Date: 12/2/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

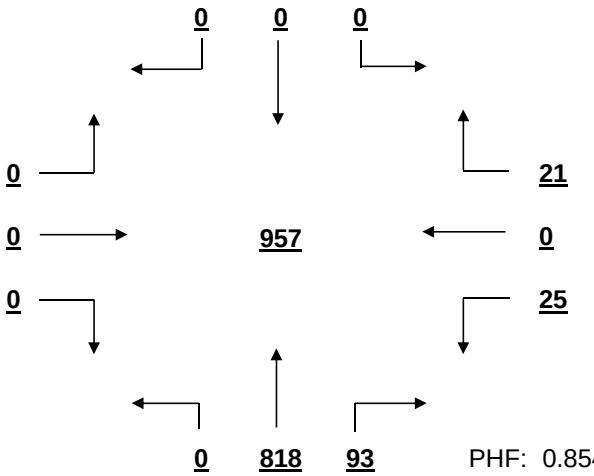


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



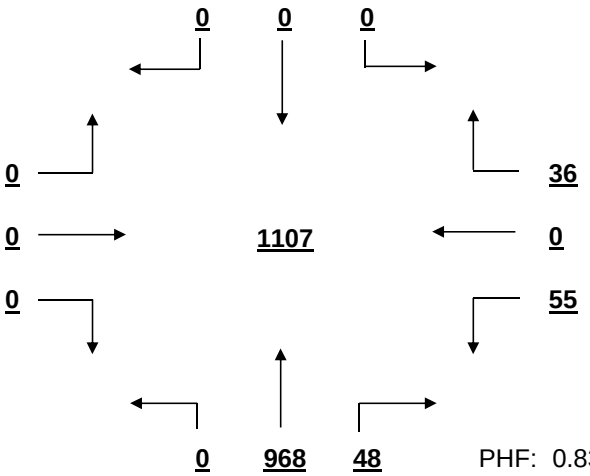
PHF: 0.839

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



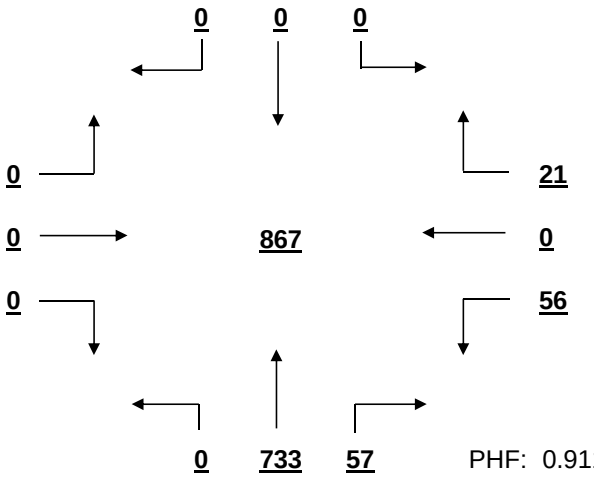
PHF: 0.854

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



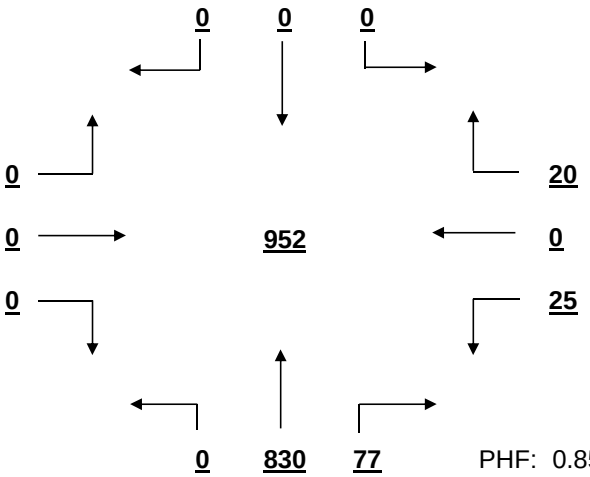
PHF: 0.839

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

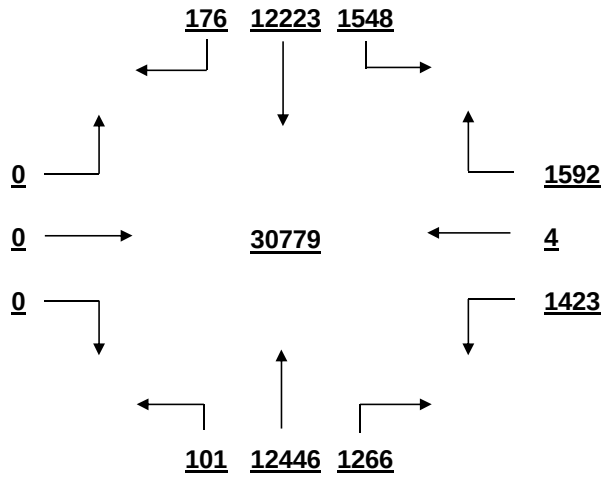
INTERSECTION VOLUME SUMMARY

	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%

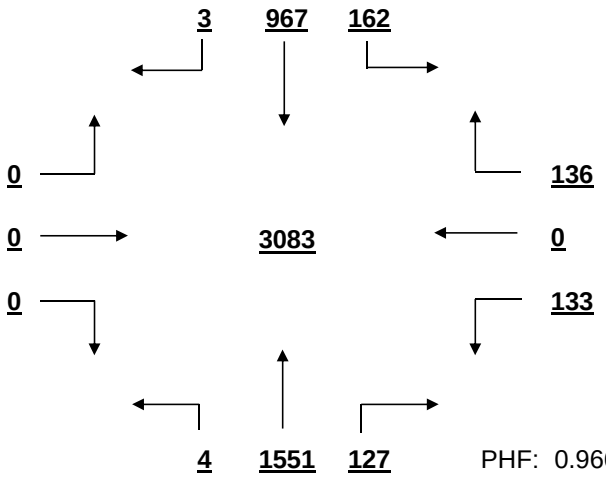
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Broad River Rd AT Longcreek Dr Date: 12/1/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

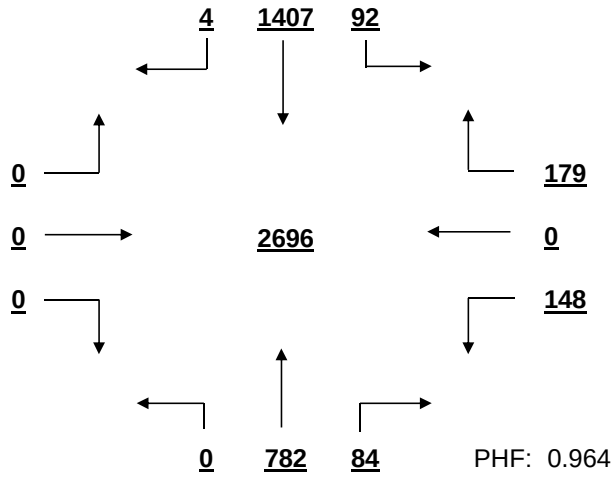


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



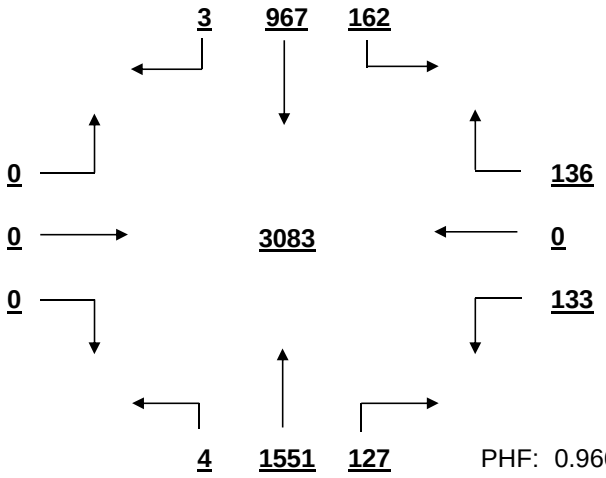
PHF: 0.966

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:15 TO 8:15



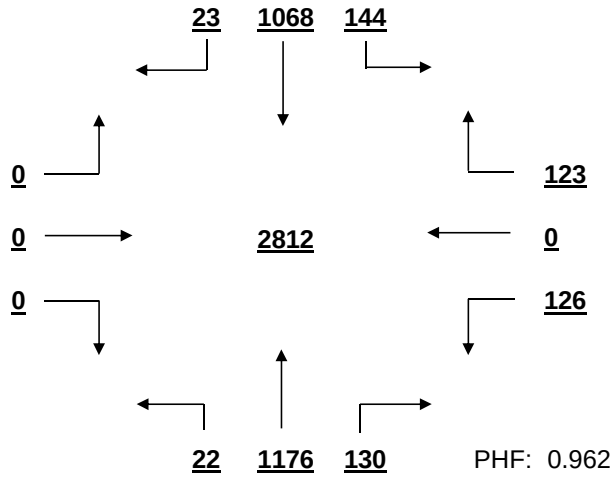
PHF: 0.964

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



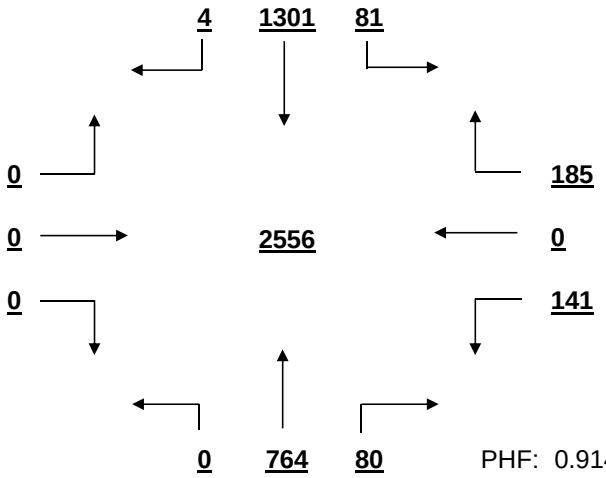
PHF: 0.966

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

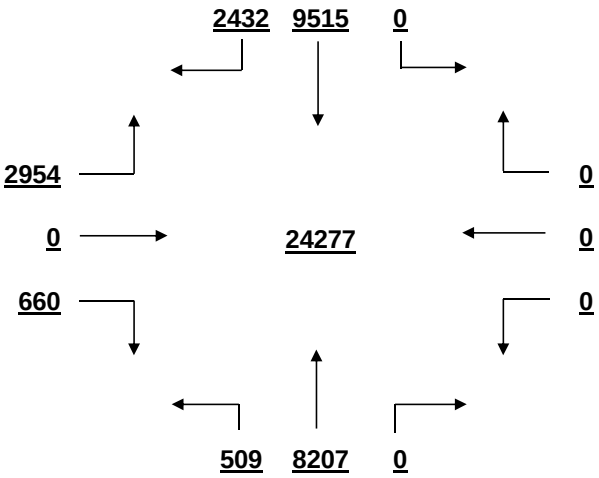
INTERSECTION VOLUME SUMMARY

	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%

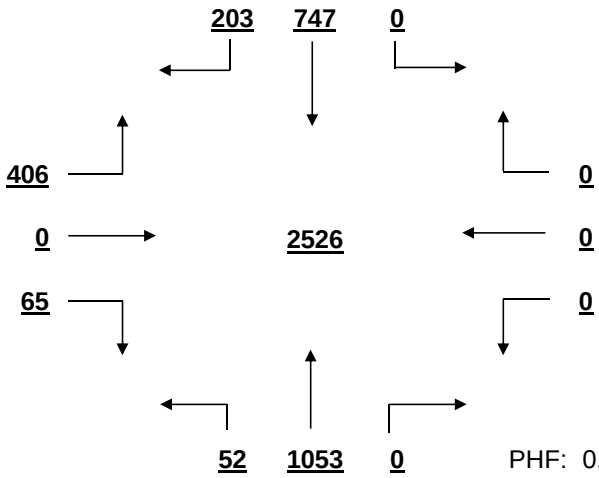
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Broad River Rd AT Dutch Square Blvd Date: 11/28/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

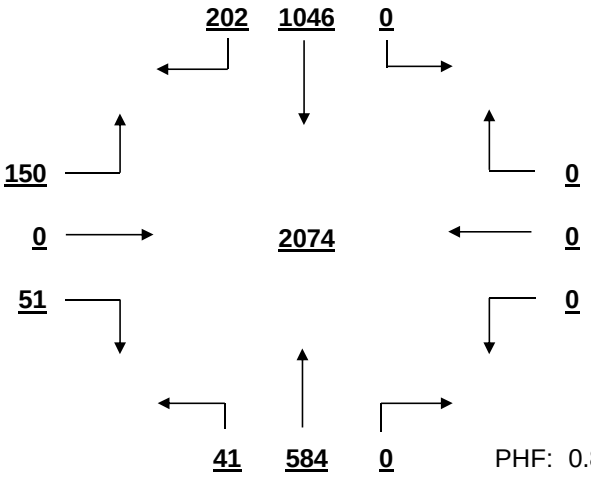


OVERALL PEAK HOUR VOLUME
FROM 16:30 TO 17:30



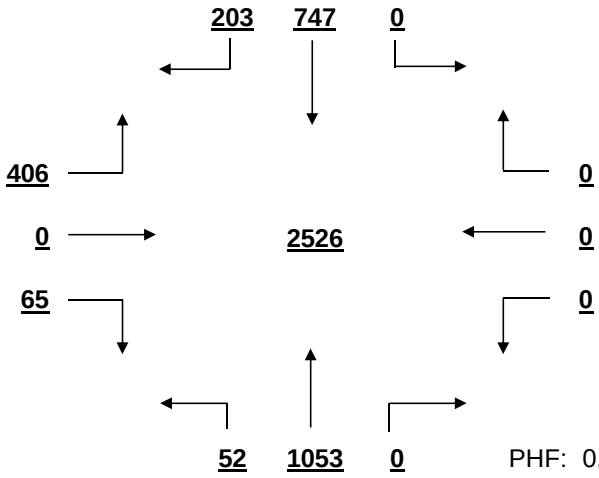
PHF: 0.954

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 8:30 TO 9:30



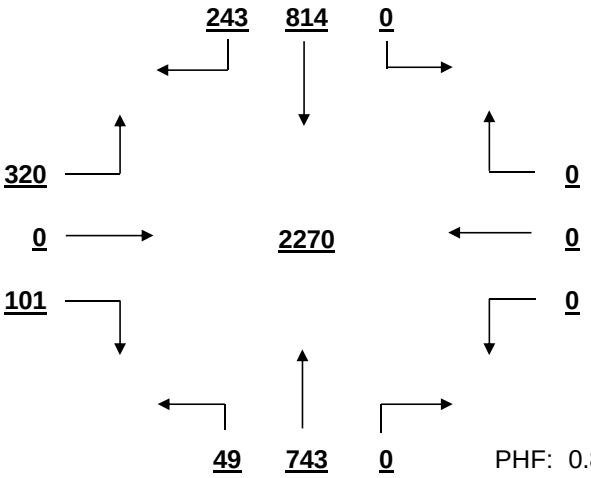
PHF: 0.891

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:30 TO 17:30



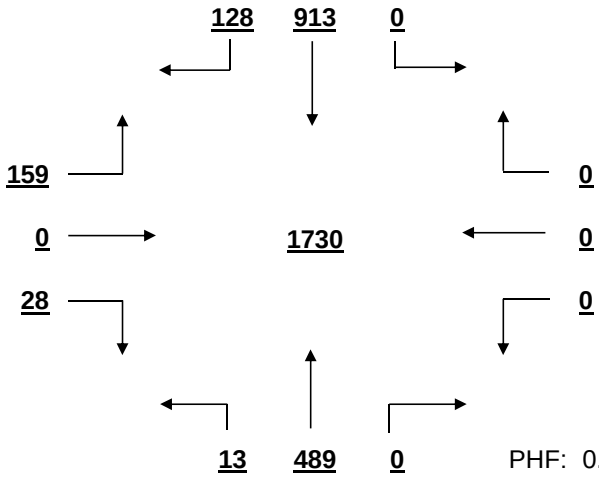
PHF: 0.954

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

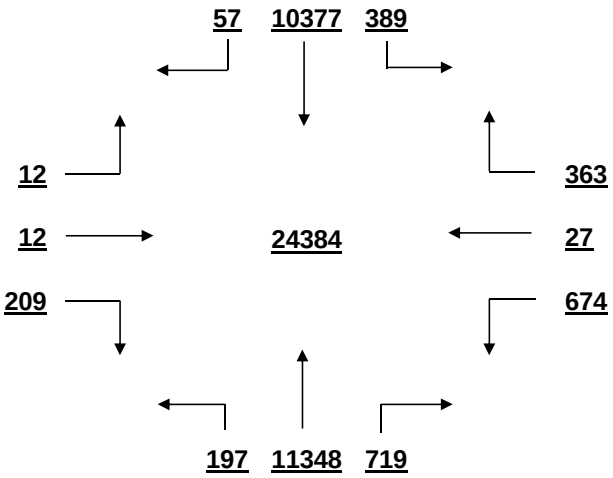
INTERSECTION VOLUME SUMMARY

	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%

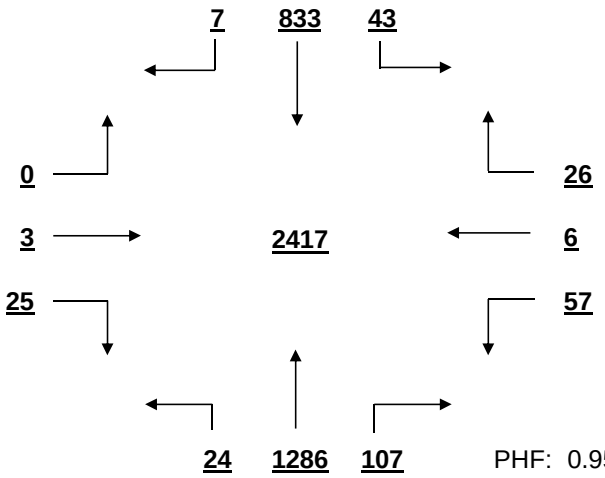
TOTAL AND PEAK HOUR VOLUME DIAGRAMS

Broad River Rd AT Omarest Dr-Private Dr Date: 12/2/2016

12.0 HOUR TOTAL VOLUME
FROM 7:00 TO 15:00

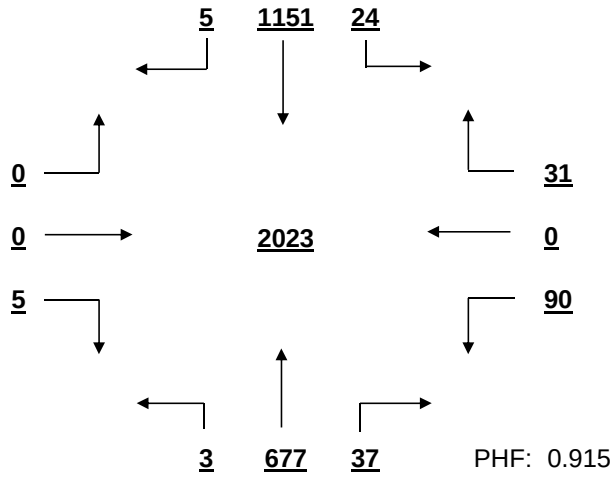


OVERALL PEAK HOUR VOLUME
FROM 16:15 TO 17:15



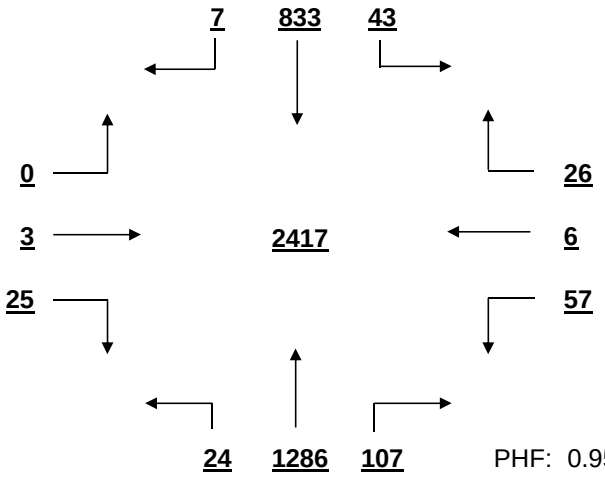
PHF: 0.953

AM PEAK HOUR VOLUME (0:00-10:45)
FROM 7:00 TO 8:00



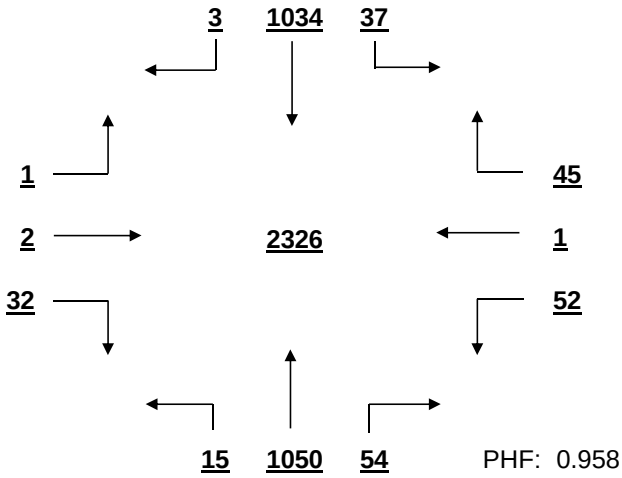
PHF: 0.915

PM PEAK HOUR VOLUME (14:15-23:45)
FROM 16:15 TO 17:15



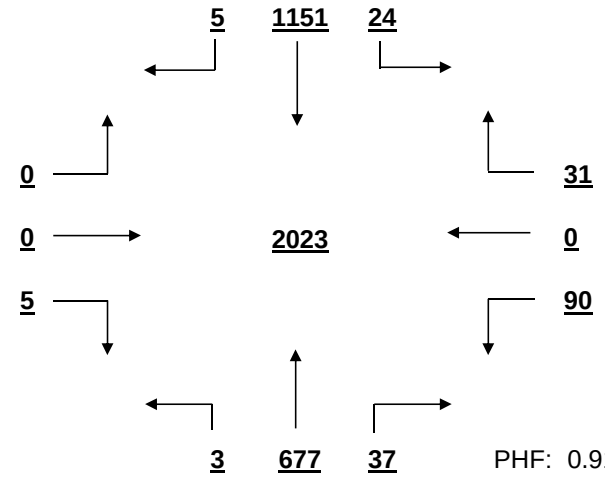
PHF: 0.953

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		Percent of warrant
Overall Peak Hour:	16:15 - 17:15	Higher Volume Side Street Peak Hour:	7:00 - 8:00
Minor St.	89%	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)

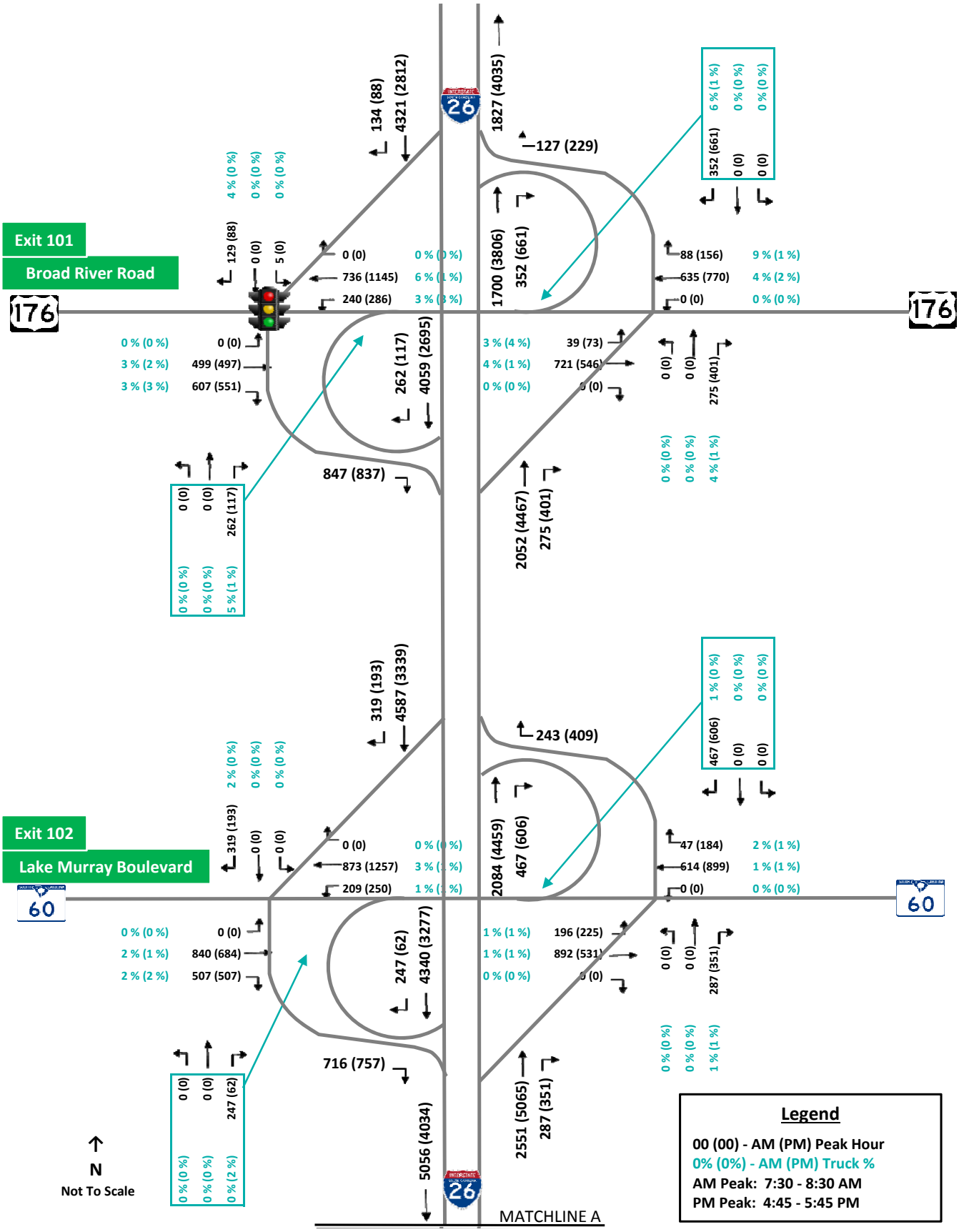
Total Number: 0 From: 1/1/2005 to 1/1/2008

Accident Rate: 0.00 per million entering vehicles

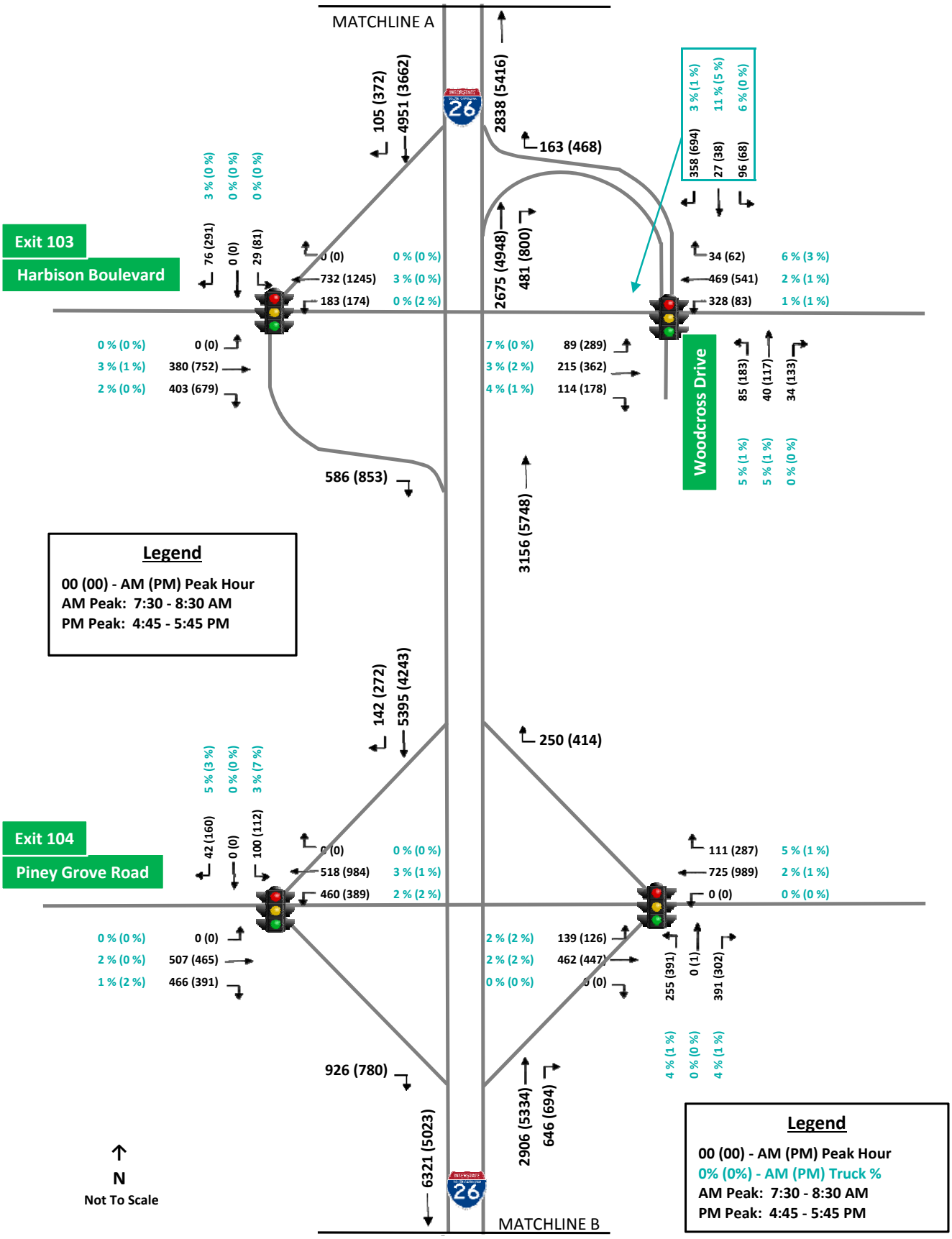
Types of Accidents	No.	/	Avg.		No.	/	Avg.
Right Angle	0	/	0.0	Rear End	0	/	0.0
Lost Control	0	/	0.0	Side Swipe	0	/	0.0
Left Turn	0	/	0.0	Other	0	/	0.0

Appendix B—Existing Volumes

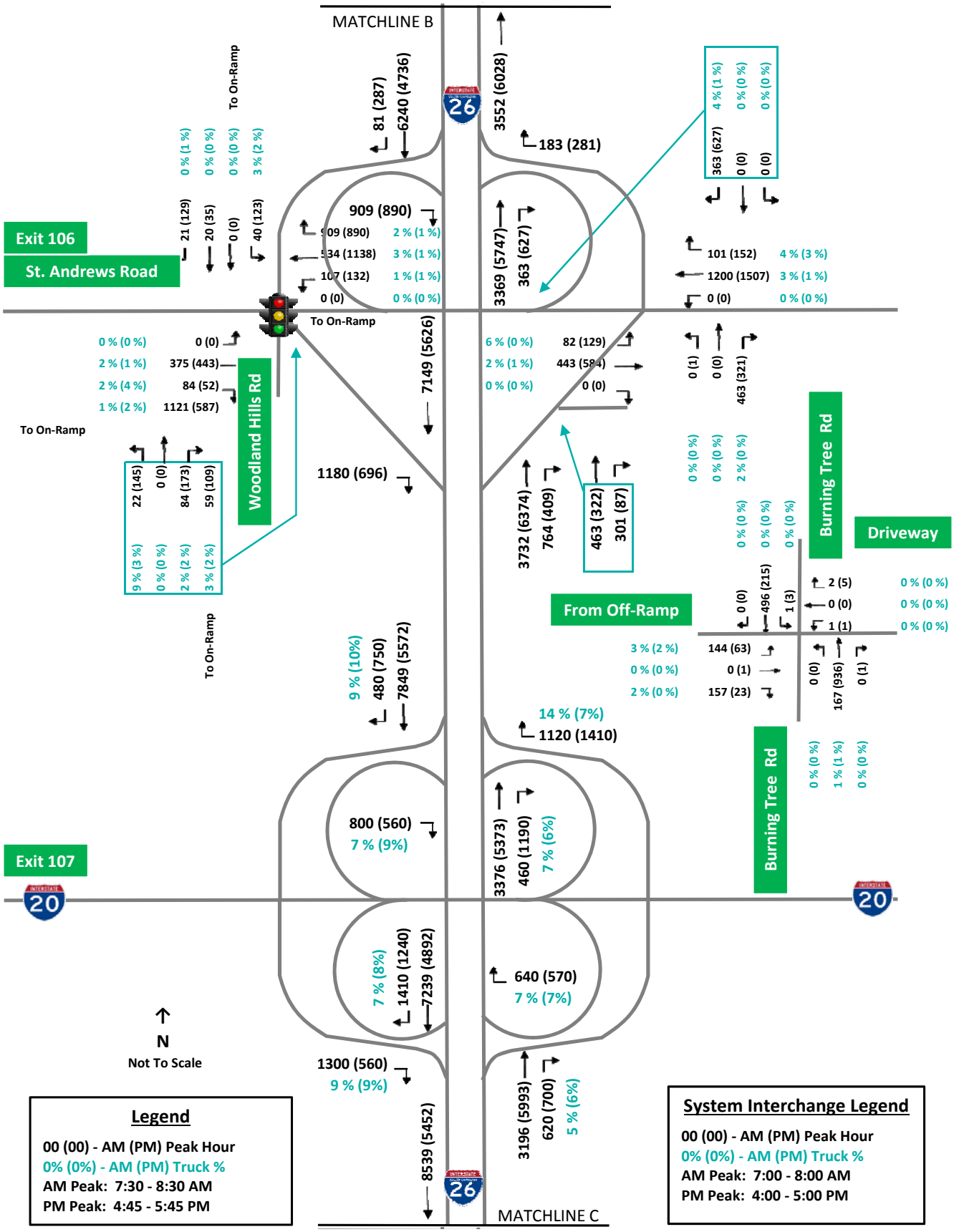
Carolina Crossroads
Existing Interchange Volumes



Carolina Crossroads
Existing Interchange Volumes



Carolina Crossroads
Existing Interchange Volumes



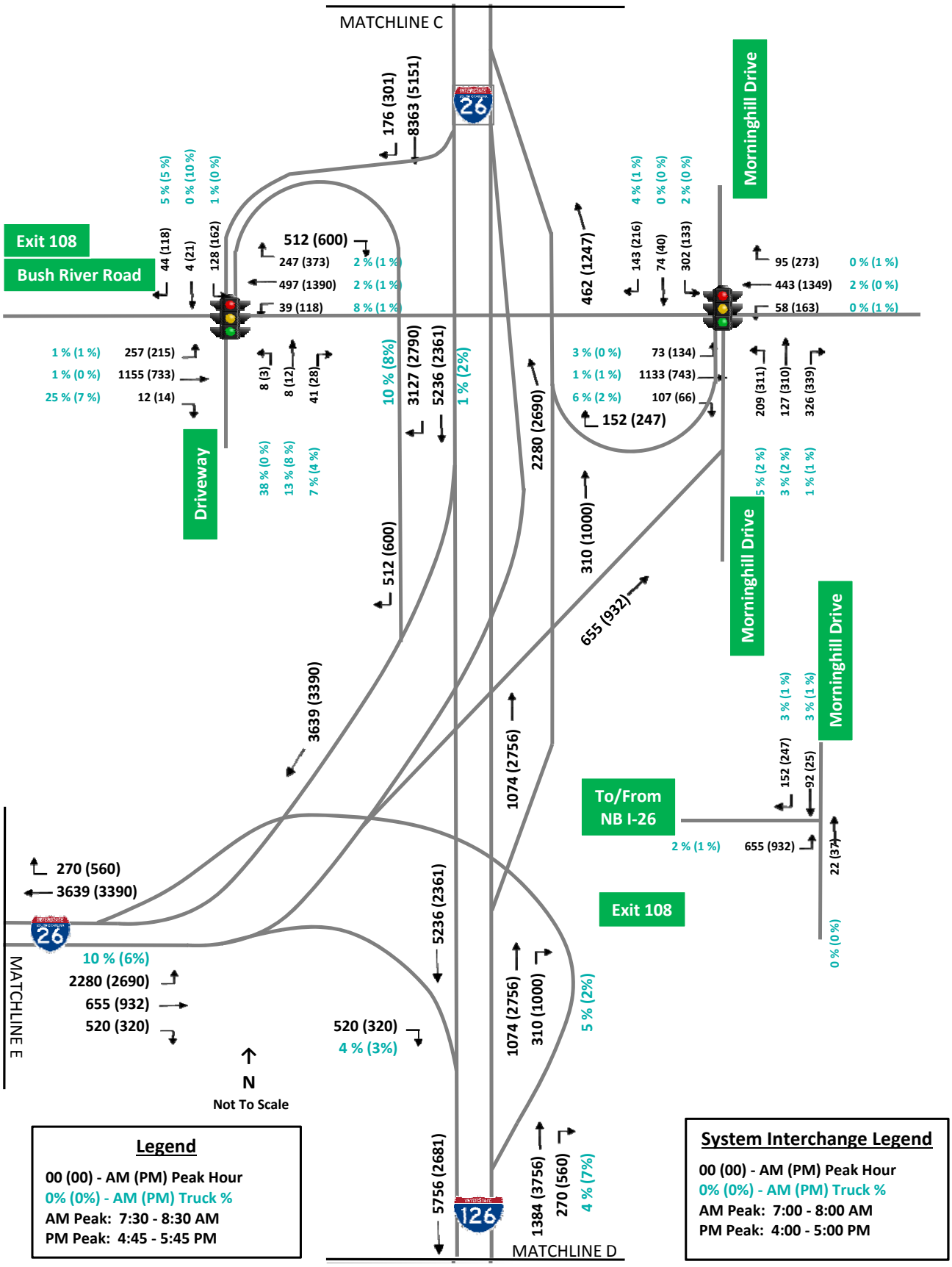
Legend

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



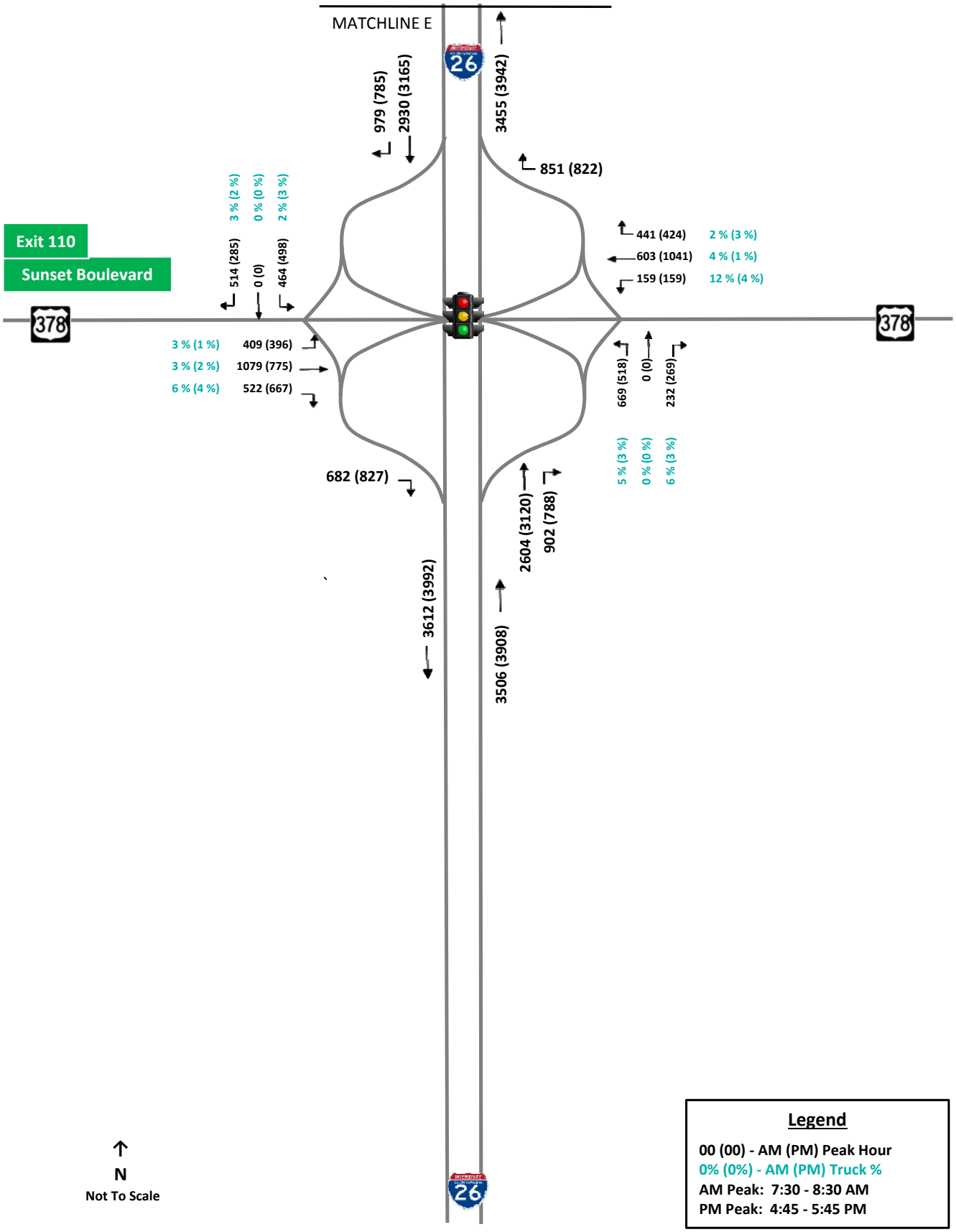
Legend

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

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

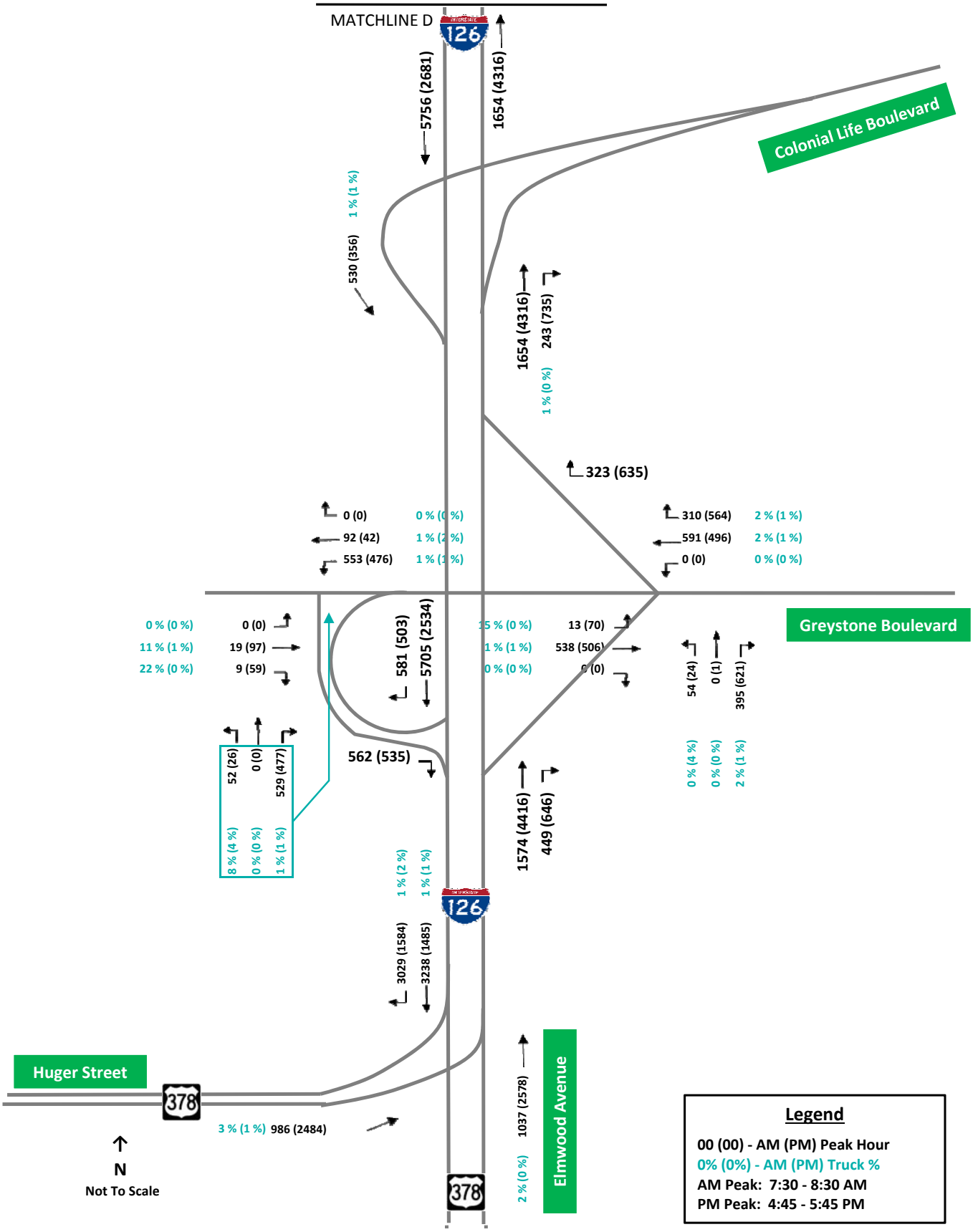
Carolina Crossroads
Existing Interchange Volumes



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

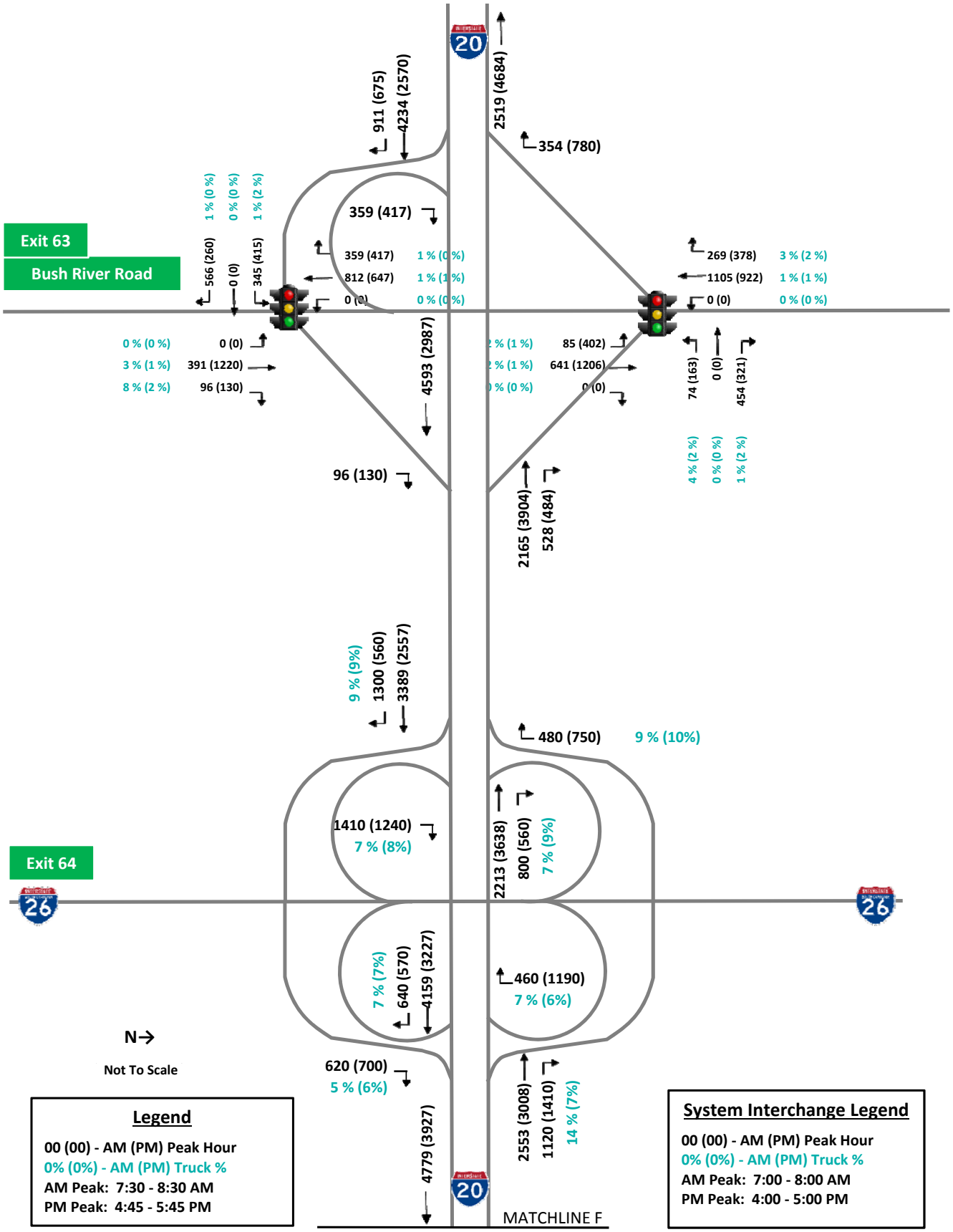
Carolina Crossroads
Existing Interchange Volumes



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



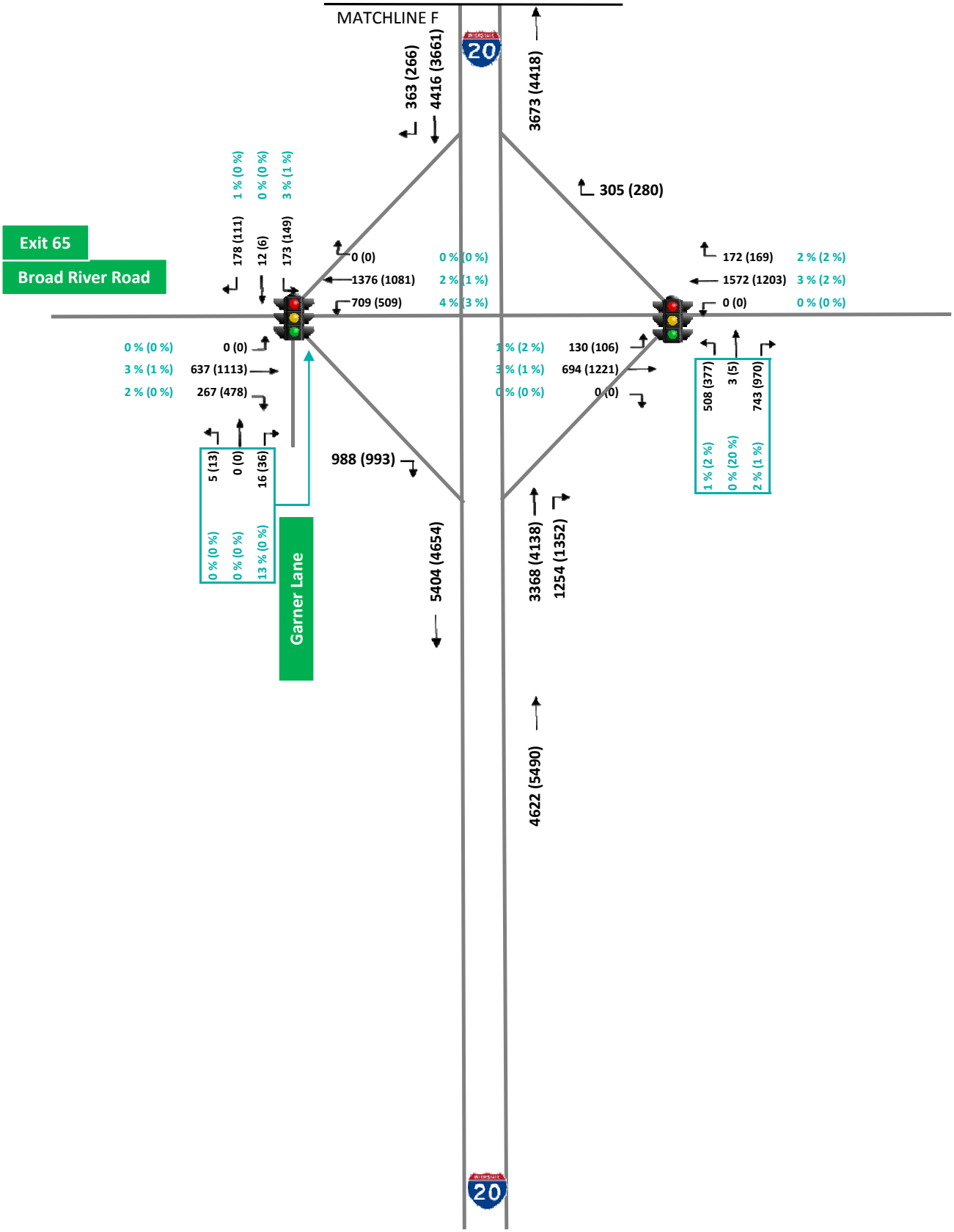
Legend

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

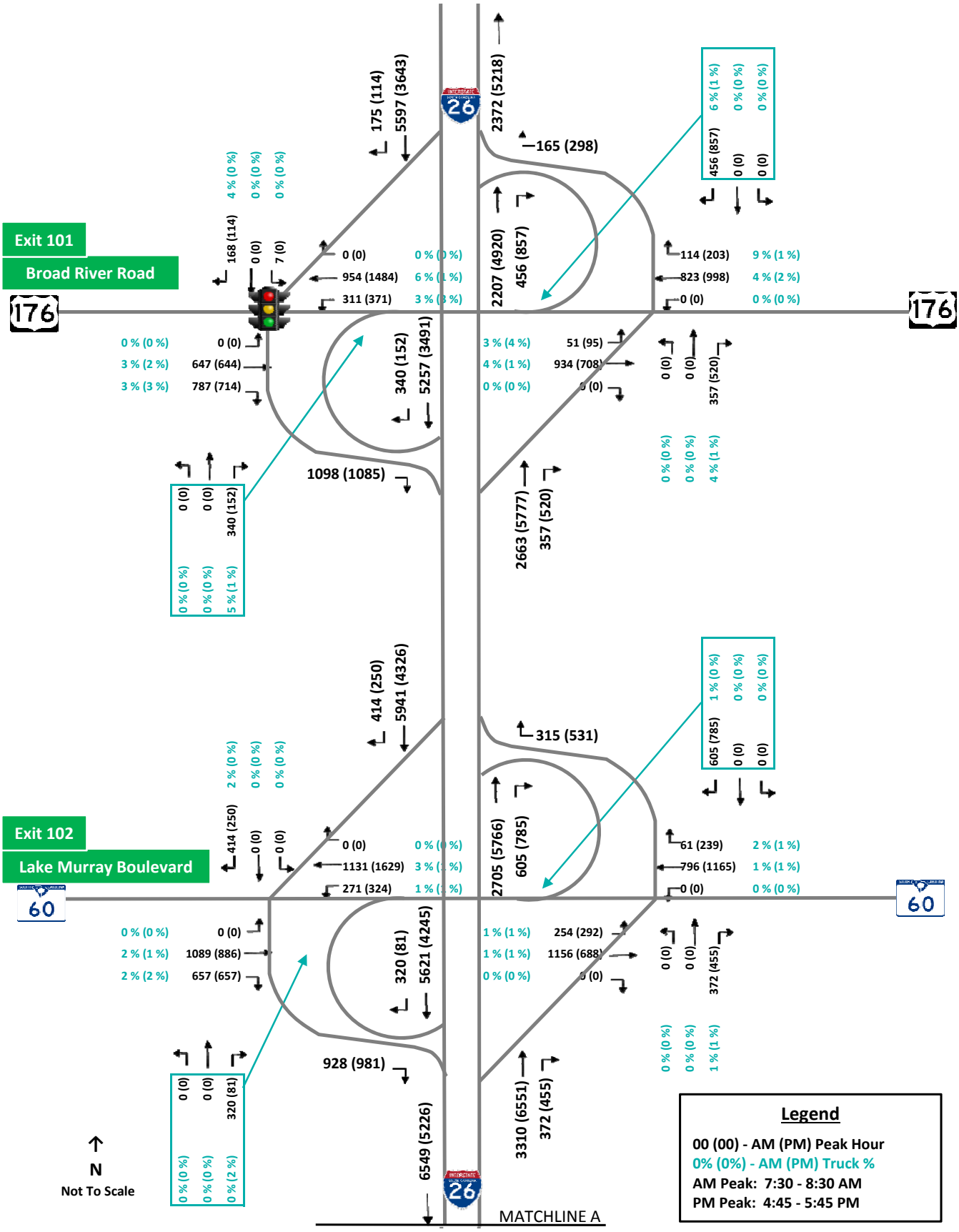
00 (00) - AM (PM) Peak Hour
0% (0%) - AM (PM) Truck %
AM Peak: 7:00 - 8:00 AM
PM Peak: 4:00 - 5:00 PM

Carolina Crossroads
Existing Interchange Volumes

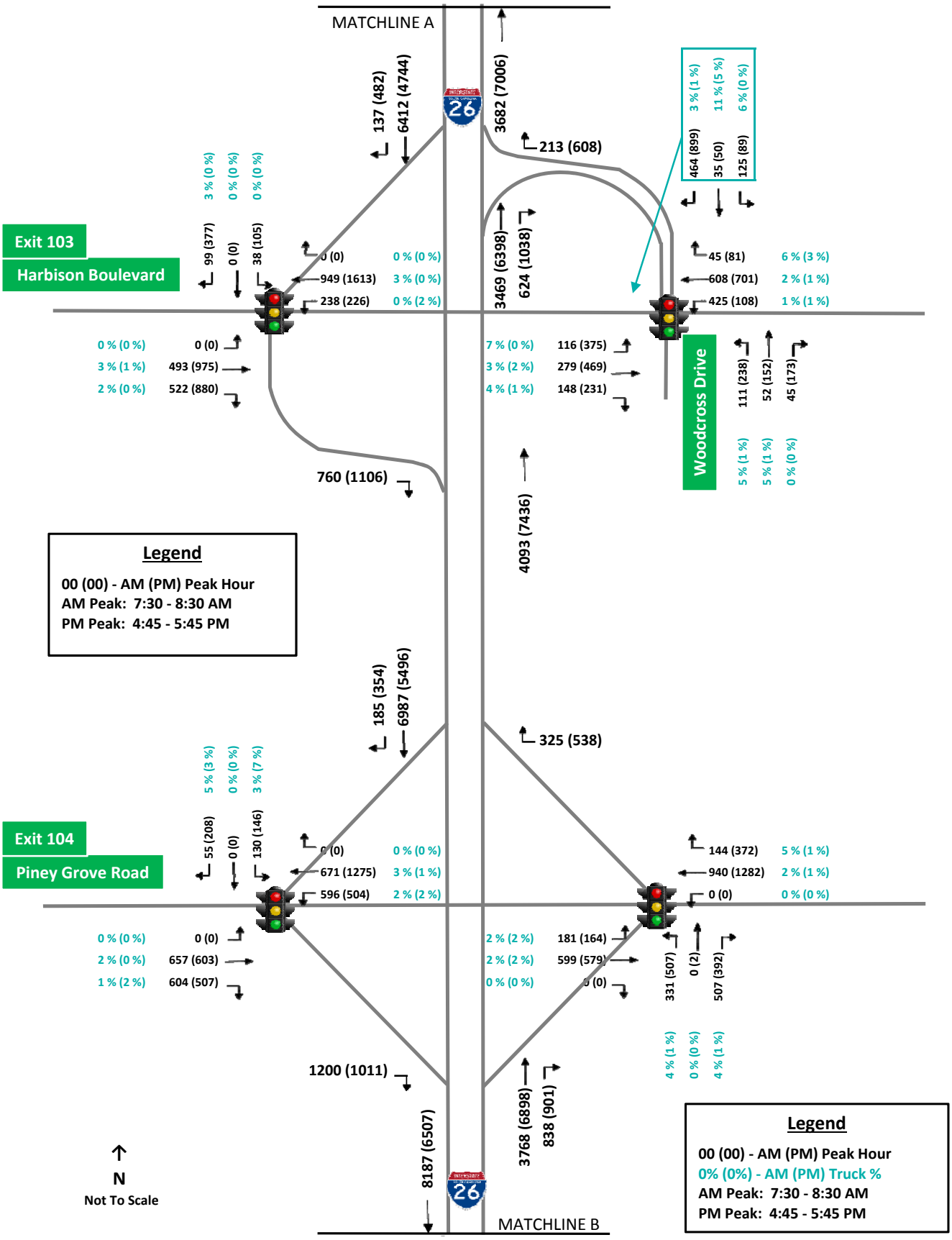


Appendix C—2040 Volumes

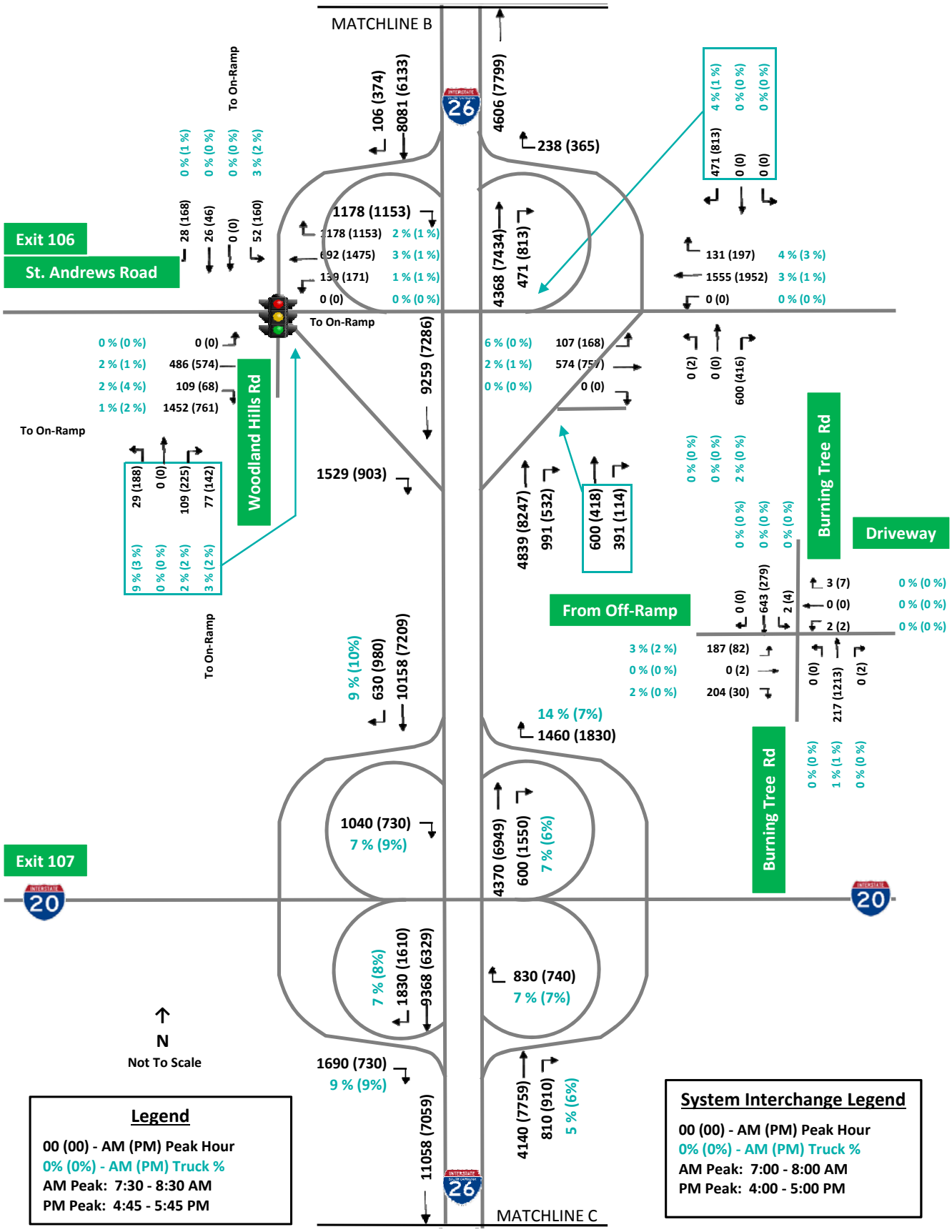
Carolina Crossroads
2040 Estimated Interchange Volumes



Carolina Crossroads
2040 Estimated Interchange Volumes



Carolina Crossroads
2040 Estimated Interchange Volumes



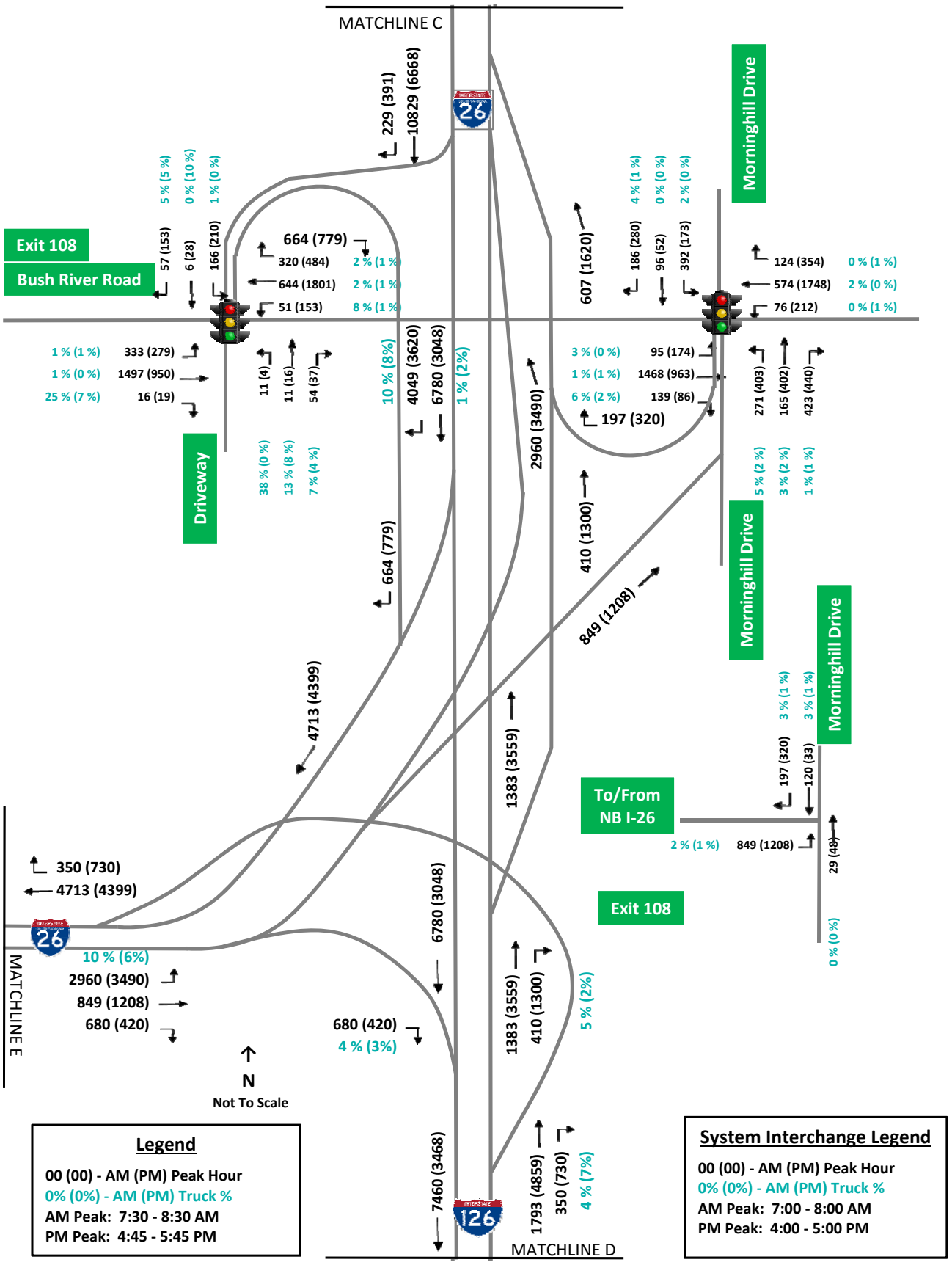
Legend

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



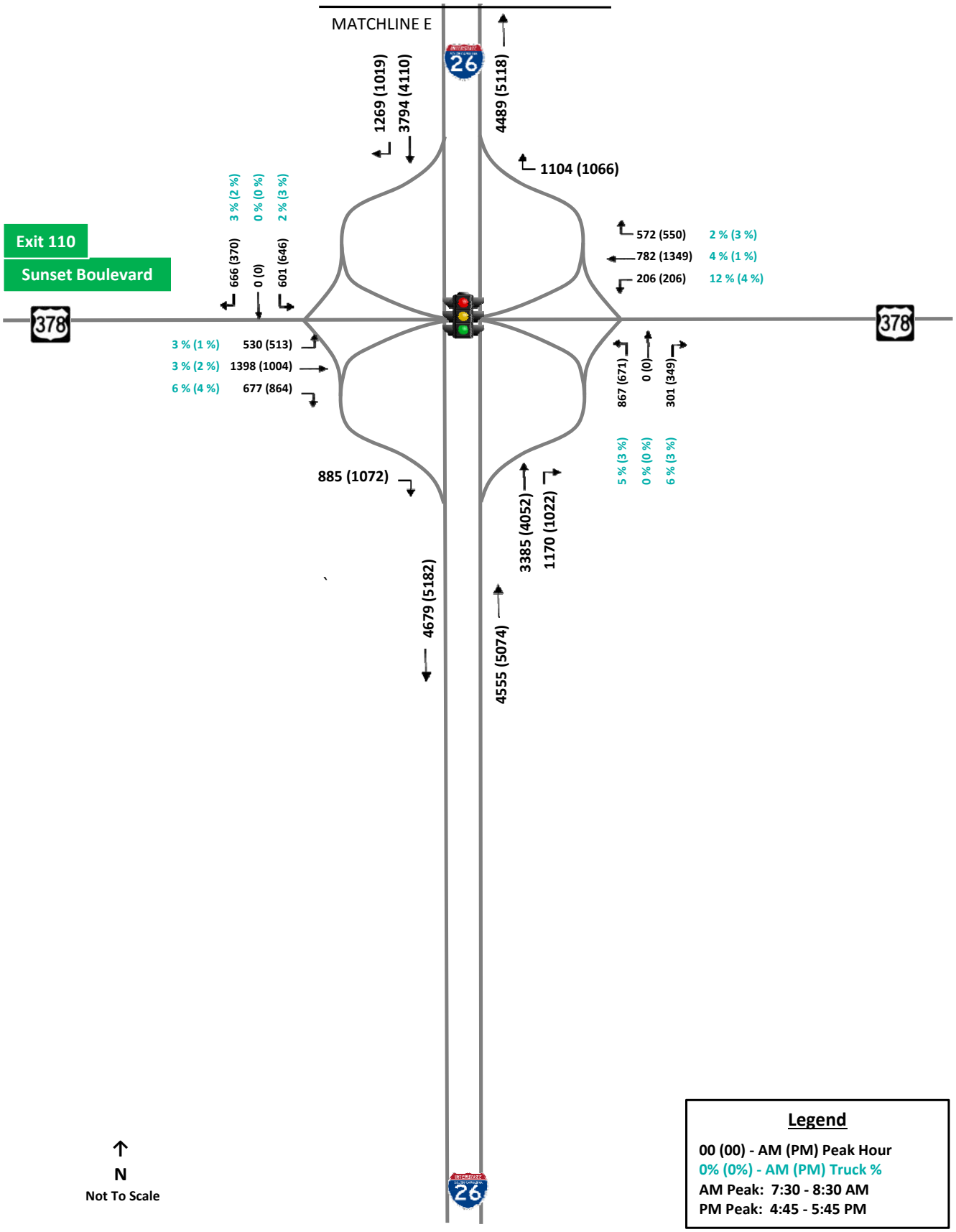
Legend

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

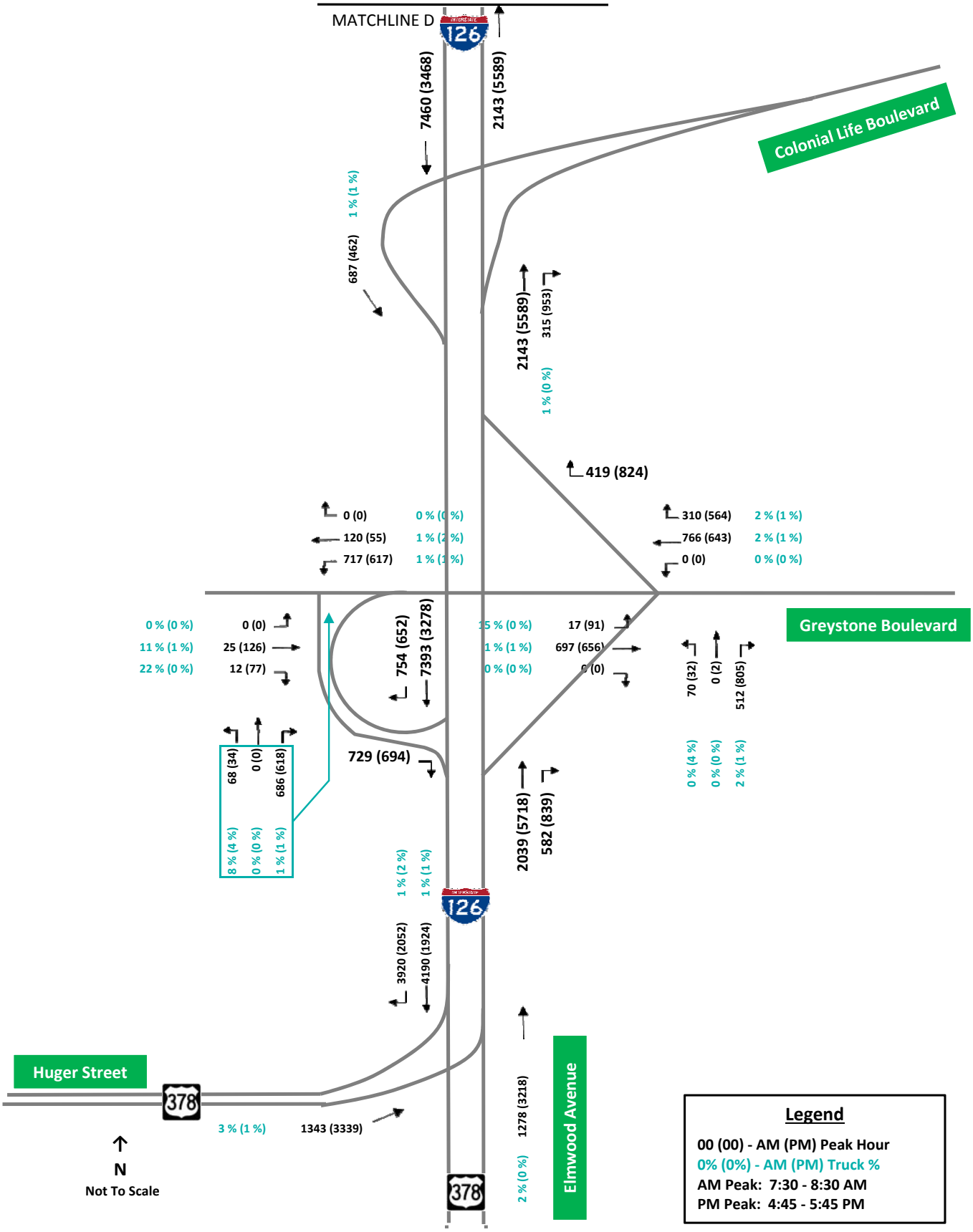
Carolina Crossroads
2040 Estimated Interchange Volumes



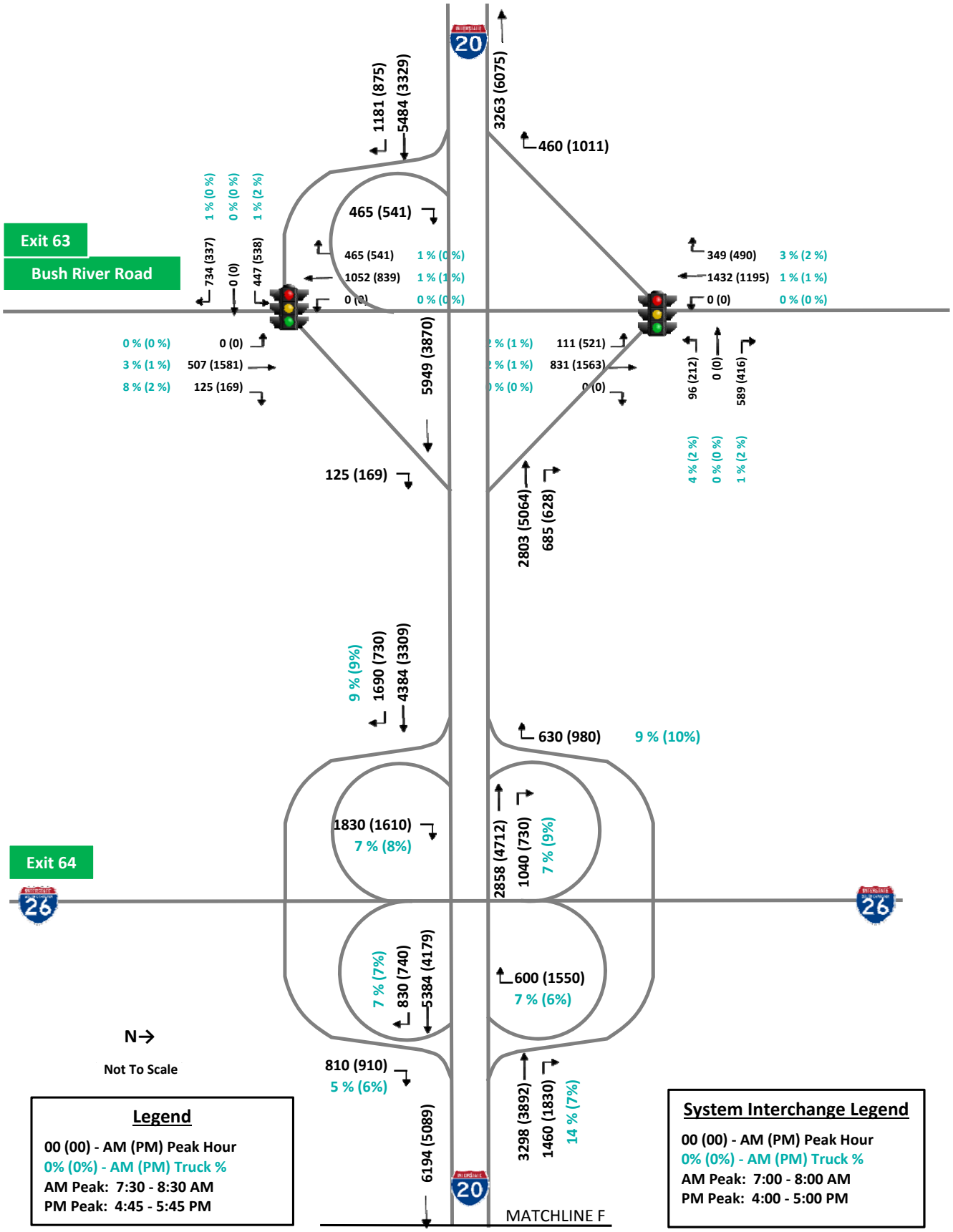
Legend

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



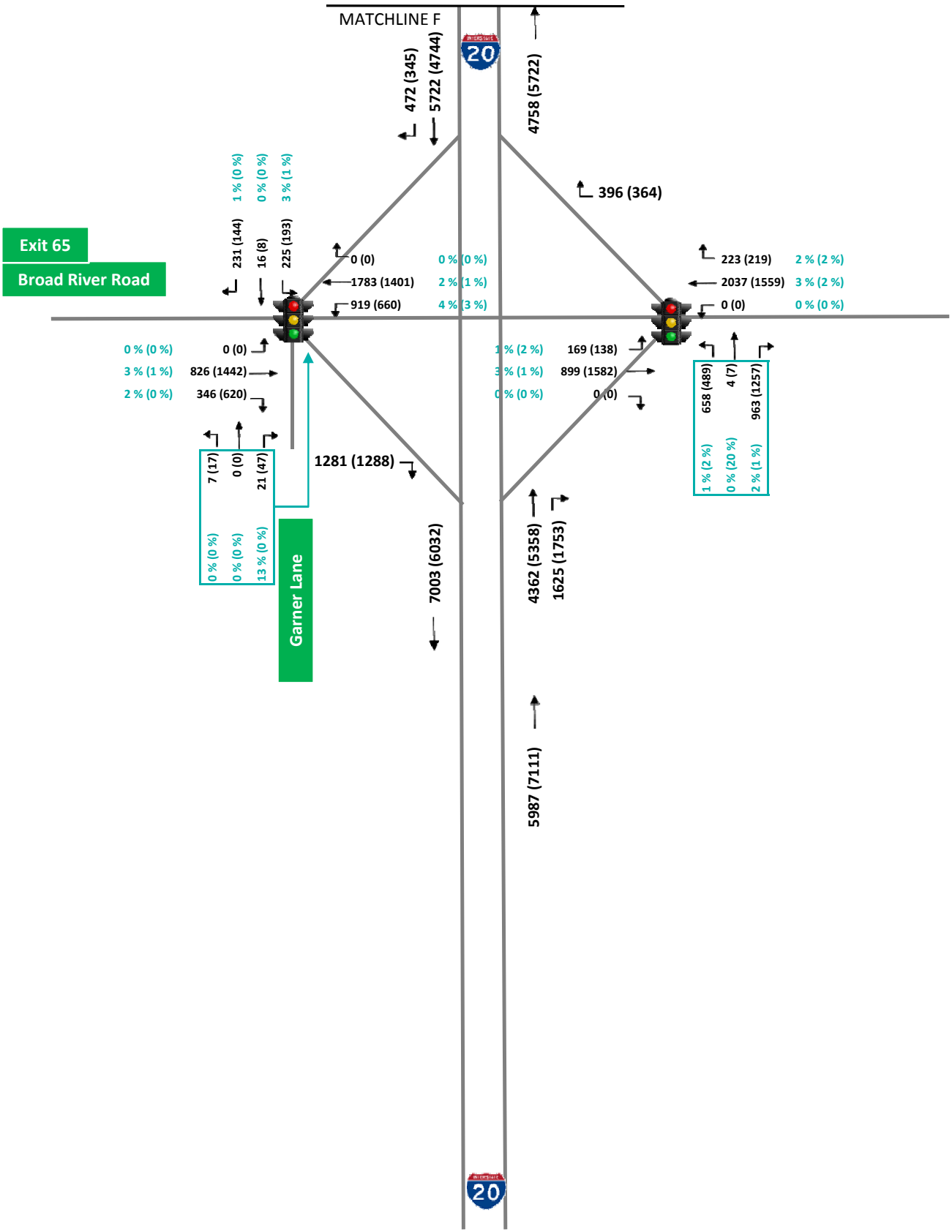
Legend

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



Appendix D—Generalized LOS Tables

TABLE 7

Generalized **Peak Hour Directional** Volumes for Florida's **Urbanized Areas**[1]

12/18/12

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
1	Undivided	*	830	880	**
2	Divided	*	1,910	2,000	**
3	Divided	*	2,940	3,020	**
4	Divided	*	3,970	4,040	**

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
1	Undivided	*	370	750	800
2	Divided	*	730	1,630	1,700
3	Divided	*	1,170	2,520	2,560
4	Divided	*	1,610	3,390	3,420

Non-State Signalized Roadway Adjustments

(Alter corresponding state volumes by the indicated percent.)

Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
1	Divided	Yes	No	+5%
1	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
–	–	–	Yes	+ 5%

One-Way Facility Adjustment

Multiply the corresponding directional volumes in this table by 1.2

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Lanes	B	C	D	E
2	2,260	3,020	3,660	3,940
3	3,360	4,580	5,500	6,080
4	4,500	6,080	7,320	8,220
5	5,660	7,680	9,220	10,360
6	7,900	10,320	12,060	12,500

Freeway Adjustments

Auxiliary Lane	Ramp Metering
+ 1,000	+ 5%

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Median	B	C	D	E
1	Undivided	420	840	1,190	1,640
2	Divided	1,810	2,560	3,240	3,590
3	Divided	2,720	3,840	4,860	5,380

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
1	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

BICYCLE MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	150	390	1,000
50-84%	110	340	1,000	>1,000
85-100%	470	1,000	>1,000	**

PEDESTRIAN MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	140	480
50-84%	*	80	440	800
85-100%	200	540	880	>1,000

BUS MODE (Scheduled Fixed Route)[3]

(Buses in peak hour in peak direction)

Sidewalk Coverage	B	C	D	E
0-84%	> 5	≥ 4	≥ 3	≥ 2
85-100%	> 4	≥ 3	≥ 2	≥ 1

[1] Values shown are presented as peak hour directional volumes for levels of service and are for the automobile/truck modes unless specifically stated. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The table and deriving computer models should not be used for corridor or intersection design, where more refined techniques exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual.

[2] Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians using the facility.

[3] Buses per hour shown are only for the peak hour in the single direction of the higher traffic flow.

* Cannot be achieved using table input value defaults.

** Not applicable for that level of service letter grade. For the automobile mode, volumes greater than level of service D become F because intersection capacities have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.

Source:
Florida Department of Transportation
Systems Planning Office
www.dot.state.fl.us/planning/systems/sm/los/default.shtm

TABLE 7

Generalized **Peak Hour Directional** Volumes for Florida's **Urbanized Areas**[1]

10/4/10

STATE SIGNALIZED ARTERIALS

Class I (>0.00 to 1.99 signalized intersections per mile)

Lanes	Median	B	C	D	E
1	Undivided	510	820	880	***
2	Divided	1,560	1,890	1,960	***
3	Divided	2,400	2,860	2,940	***
4	Divided	3,240	3,830	3,940	***

Class II (2.00 to 4.50 signalized intersections per mile)

Lanes	Median	B	C	D	E
1	Undivided	**	560	810	860
2	Divided	**	1,330	1,770	1,870
3	Divided	**	2,080	2,680	2,830
4	Divided	**	2,830	3,590	3,780

Class III/IV (more than 4.50 signalized intersections per mile)

Lanes	Median	B	C	D	E
1	Undivided	**	270	630	790
2	Divided	**	670	1,500	1,700
3	Divided	**	1,050	2,330	2,570
4	Divided	**	1,440	3,170	3,450

Non-State Signalized Roadway Adjustments

(Alter corresponding state volumes by the indicated percent.)

Major City/County Roadways	- 10%
Other Signalized Roadways	- 35%

State & Non-State Signalized Roadway Adjustments

(Alter corresponding state volumes by the indicated percent.)

Divided/Undivided & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
2	Divided	Yes	No	+5%
2	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
–	–	–	Yes	+ 5%

One-Way Facility Adjustment

Multiply the corresponding volumes in this table by 1.20.

FREEWAYS

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

Freeway Adjustments

Auxiliary Lanes	Ramp Metering
+ 1,000	+ 5%

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Median	B	C	D	E
1	Undivided	400	800	1,140	1,440
2	Divided	1,770	2,560	3,320	3,760
3	Divided	2,660	3,840	4,980	5,650

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
2	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

BICYCLE MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Paved Shoulder/ Bicycle Lane Coverage	B	C	D	E
0-49%	**	170	650	>650
50-84%	130	200	>200	***
85-100%	340	>340	***	***

PEDESTRIAN MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	**	**	270	770
50-84%	**	100	600	1000
85-100%	**	610	1000	>1000

BUS MODE (Scheduled Fixed Route)[3]

(Buses in peak hour in peak direction)

Sidewalk Coverage	B	C	D	E
0-84%	>5	≥4	≥3	≥2
85-100%	>4	≥3	≥2	≥1

[1] Values shown are presented as hourly directional volumes for levels of service and are for the automobile/truck modes unless specifically stated. To convert to annual average daily traffic volumes, these volumes must be divided by appropriate D and K factors. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The table and deriving computer models should not be used for corridor or intersection design, where more refined techniques exist. Calculations are based on planning applications of the Highway Capacity Manual, Bicycle LOS Model, Pedestrian LOS Model and Transit Capacity and Quality of Service Manual, respectively for the automobile/truck, bicycle, pedestrian and bus modes.

[2] Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians using the facility.

[3] Buses per hour shown are only for the peak hour in the single direction of the higher traffic flow.

** Cannot be achieved using table input value defaults.

*** Not applicable for that level of service letter grade. For the automobile mode, volumes greater than level of service D become F because intersection capacities have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.

Source:
Florida Department of Transportation
Systems Planning Office
605 Suwannee Street, MS 19
Tallahassee, FL 32399-0450

TABLE 7
(continued)

Generalized **Peak Hour Directional** Volumes for Florida's

Urbanized Areas

9/4/09

INPUT VALUE ASSUMPTIONS	Uninterrupted Flow Facilities			Interrupted Flow Facilities								
				State Arterials						Class II		
	Freeways	Highways		Class I		Class II		Class III		Bicycle	Pedestrian	Bus
ROADWAY CHARACTERISTICS												
Area type (l,o)	l	l	l	l	l	l	l	l	l	l	l	l
Number of through lanes	2-6	1	2-3	1	2-4	1	2-4	1	2-4	2	2	
Posted speed (mph)	65	50	50	45	50	45	45	35	35	45	45	
Free flow speed (mph)	70	55	55	50	55	50	50	40	40	50	50	
Aux, meter, or accel/decel ≥1500 (n,y)	n											
Median (n, nr, r)		n	r	n	r	n	r	n	r	r	r	
Terrain (l,r)	l	l	l									
% no passing zone		80										
Exclusive left turn lanes /[impact](n, y)		[n]	y	y	y	y	y	y	y	y	y	
Exclusive right turn lanes (n, y)				n	n	n	n	n	n	n	n	
Paved shoulder/bicycle lane (n, y)										n, 50%,y	n	
Outside lane width										t	t	
Pavement condition										t		
Sidewalk (n, y)											n, 50%,y	n,y
Sidewalk/roadway separation (a, t, w)											t	
Sidewalk protective barrier (n, y)											n	
Obstacle to bus stop (n, y)												n
Facility length (mi)	4	5	5	2	2	2	2	2	2	2	2	2
Number of segments	4											
TRAFFIC CHARACTERISTICS												
Planning analysis hour factor (K)	0.092	0.094	0.094	0.097	0.097	0.097	0.097	0.097	0.097	0.097	0.097	
Directional distribution factor (D)	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	
Peak hour factor (PHF)	0.95	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	
Base saturation flow rate (pcphpl)		1700	2100	1950	1950	1950	1950	1950	1950	1950	1950	
Heavy vehicle percent	4.0	2.0	2.0	2.0	2.0	2.0	2.0	1.5	1.5	2.0	2.0	
Local adjustment factor	0.98	1.0	0.98									
% left turns				12	12	12	12	12	12	12	12	
% right turns				12	12	12	12	12	12	12	12	
Bus span of service												15
CONTROL CHARACTERISTICS												
Number of signals				2	2	6	6	10	10	6	6	
Arrival type (1-6)				3	3	4	4	4	4	4	4	
Signal type (a, s, p)				a	a	s	s	s	s	s	s	
Cycle length (C)				120	120	120	120	120	120	120	120	
Effective green ratio (g/C)				0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	

LEVEL OF SERVICE THRESHOLDS

Level of Service	Freeways	Highway Segments		State & Non-State Signalized Arterials			Bicycle	Pedestrian	Bus
		Two-Lane	Multilane	Class I	Class II	Class III			
	Density	%ffs	Density	ats	ats	ats	Score	Score	Buses per hr.
B	≤17	≥0.833	≤18	> 34 mph	> 28 mph	> 24 mph	≤2.5	≤2.5	≥4
C	≤24	>0.750	≤26	> 27 mph	> 22 mph	> 18 mph	≤3.5	≤3.5	≥3
D	≤31	>0.667	≤35	> 21 mph	> 17 mph	> 14 mph	≤4.5	≤4.5	≥2
E	≤39	>0.583	≤41	> 16 mph	> 13 mph	> 10 mph	≤5.5	≤5.5	≥1

% ffs = Percent free flow speed ats = Average travel speed

7.7.1.4 Vertical Alignment

Maximum grades for vertical alignment cannot be as definitively expressed as for highway mainline. The minimum grade is 0.50%. General values of limiting gradient for upgrades are shown in Exhibit 7-26, but for any one ramp the selected gradient is dependent upon a number of factors including:

- The flatter the gradient on the ramp, the longer it will be.
- The steepest gradients should be designed for the center part of the ramp. Landing areas or storage platforms at at-grade intersections with ramps should be as flat as possible.
- Downgrades on ramps should follow the same guidelines as upgrades. They may, however, safely exceed these values by 2 percent, with 8 percent considered the desired maximum grade.
- Ramp gradients and lengths can be significantly impacted by the angle of intersection between the two highways and the direction and amount of gradient on the two mainlines.
- K values and desirable stopping sight distance should meet the minimum design values for vertical curves.

Exhibit 7-26
Ramp Gradient Guidelines

	Ramp Design Speed (mph)			
	20 to 25	25 to 30	30 to 45	45 to 50
Maximum Desirable Grades (%)	6-8	5-7	4-6	3-5

Source: MassHighway

7.7.2 Capacity

Exhibit 7-27 provides the volumes for a given ramp design speed and level of service. Although the exhibit indicates that up to 1,700 passenger car equivalents per hour (pcph) can be accommodated on a single-lane ramp, freeway/ramp junctions are not capable of handling this volume; therefore, 1,500 pcph should be used as a threshold to warrant a two-lane ramp.

Exhibit 7-27
Approximate Service Volumes for Single-lane Ramps

LOS	Ramp Design Speed (mph)				
	≤ 20	20 - 30	30 - 45	45 - 50	≥50
A	--	--	--	--	700
B	--	--	--	1,000	1050
C	--	--	1,125	1,250	1,300
D	--	1,025	1,200	1,325	1,500
E	1,250	1,450	1,600[1]	1,650[1]	1,700[1]
F	--Widely Variable --				

Source, Highway Capacity Manual, Washington DC 2000
Note: Based on Peak Hour Factor of 1.0, service volumes expressed in passenger cars per hour.
1 For two-Lane Ramps, Multiply Above Values By 1.7 for < 20 mph, 1.8 for 20-30 mph & 45-50 mph, 1.9 for 30-45 mph, and 2.0 for ≥50 mph
-- LOS not achievable due to restricted design speeds

The minimum radius of a two-lane ramp should be 1,000 feet. The capacity of a loop ramp is about 1,250 pcph; however, two-lane loop ramps are very undesirable because of their restrictive geometry. Therefore, if a left-turn movement will exceed 1,250, a directional or semi-directional connection may be needed. Ramps must be designed with sufficient capacity to avoid backups on the main line. The *Highway Capacity Manual* further discusses the capacity of ramps.

7.8 Ramp/Minor Road Intersections

At service interchanges the ramp or loop normally intersects the minor road at-grade at approximately a 90-degree angle. This intersection should be treated as described in Chapter 6. This will involve a consideration of the necessary traffic control devices, capacity, and the physical geometric design elements such as sight distance, angle of intersection, grade, channelization, and turning lanes. However, the following points warrant special attention in the design of the ramp/minor road intersection:

- **Capacity** – In urban areas where traffic volumes may be high, inadequate capacity of the ramp/minor road intersection can adversely affect the operation of the ramp/freeway junction. In a worst case situation the safety and operation of the mainline itself may be impaired by a back-up onto the freeway. Therefore, special attention should be given to providing sufficient capacity and storage for an at-grade intersection with the minor road. This could lead to the addition of lanes at the intersection or on the ramp

Appendix E—Interchange Capacity Screening Inputs and Results

Exit 101		Existing Interstate		Existing Ramps								Existing Arterial		Annual Growth Rate
Interchange	Alternative	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	EB/SB	WB/NB	
Existing	Lanes	3	3	1	-	1	1	1	-	1	1	2	2	1.00%
	AM Peak Vol	4,455	2,327	134	-	262	847	275	-	352	127	1,106	976	**Design Year**
	AM LOS	C	B	B	-	B	B	B	-	B	B	D	D	
	PM Peak Vol	2,900	4,868	88	-	117	837	401	-	661	229	1,048	1,431	2040
	PM LOS	B	D	B	-	B	B	B	-	C	B	D	D	**Arterial Class**
AO45 - Tight Urban Diamond	Lanes	3	3	1	-	-	1	1	-	-	1	2	2	
	AM Peak Vol	4,455	2,327	396	-	-	847	627	-	-	127	1,106	976	III/IV
	AM LOS	C	B	B	-	-	B	B	-	-	B	D	D	
	PM Peak Vol	2,900	4,868	205	-	-	837	1,062	-	-	229	1,048	1,431	
	PM LOS	B	D	B	-	-	B	C	-	-	B	D	D	
AO44 - Roundabout Intersections	Lanes	3	3	1	-	-	1	1	-	-	1	2	2	
	AM Peak Vol	4,455	2,327	396	-	-	847	627	-	-	127	1,106	976	
	AM LOS	C	B	B	-	-	B	B	-	-	B	D	D	
	PM Peak Vol	2,900	4,868	205	-	-	837	1,062	-	-	229	1,048	1,431	
	PM LOS	B	D	B	-	-	B	C	-	-	B	D	D	
AO43 - Diverging Diamond Interchange	Lanes	3	3	1	-	-	1	1	-	-	1	2	2	
	AM Peak Vol	4,455	2,327	396	-	-	847	627	-	-	127	1,106	976	
	AM LOS	C	B	B	-	-	B	B	-	-	B	D	D	
	PM Peak Vol	2,900	4,868	205	-	-	837	1,062	-	-	229	1,048	1,431	
	PM LOS	B	D	B	-	-	B	C	-	-	B	D	D	

Exit 101		Future Interstate		Future Ramp								Future Arterial	
Interchange	Alternative	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	EB/SB	WB/NB
Existing	Lanes	3	3	1	-	1	1	1	-	1	1	2	2
	AM Peak Vol	5,771	3,015	174	-	340	1,098	357	-	456	165	1,433	1,265
	AM LOS	E	B	B	-	B	C	B	-	B	B	D	D
	PM Peak Vol	3,757	6,306	114	-	152	1,085	520	-	857	297	1,358	1,854
	PM LOS	C	F	B	-	B	C	B	-	D	B	D	F
AO45 - Tight Urban Diamond	Lanes	3	3	1	-	-	1	1	-	-	1	2	2
	AM Peak Vol	5,771	3,015	513	-	-	1,098	813	-	-	165	1,433	1,265
	AM LOS	E	B	B	-	-	C	B	-	-	B	D	D
	PM Peak Vol	3,757	6,306	266	-	-	1,085	1,376	-	-	297	1,358	1,854
	PM LOS	C	F	B	-	-	C	E	-	-	B	D	F
AO44 - Roundabout Intersections	Lanes	3	3	1	-	-	1	1	-	-	1	2	2
	AM Peak Vol	5,771	3,015	513	-	-	1,098	813	-	-	165	1,433	1,265
	AM LOS	E	B	B	-	-	C	B	-	-	B	D	D
	PM Peak Vol	3,757	6,306	266	-	-	1,085	1,376	-	-	297	1,358	1,854
	PM LOS	C	F	B	-	-	C	E	-	-	B	D	F
AO43 - Diverging Diamond Interchange	Lanes	3	3	1	-	-	1	1	-	-	1	2	2
	AM Peak Vol	5,771	3,015	513	-	-	1,098	813	-	-	165	1,433	1,265
	AM LOS	E	B	B	-	-	C	B	-	-	B	D	D
	PM Peak Vol	3,757	6,306	266	-	-	1,085	1,376	-	-	297	1,358	1,854
	PM LOS	C	F	B	-	-	C	E	-	-	B	D	F

Exit 101 (Broad River Road) Capacity Assessment														
			Freeway Segment		Arterial		EB/SB Ramps				WB/NB Ramps			
Alternative	Year	Peak Hour	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
Existing No-Build (AO51)	Existing	AM	Under	Under	Under	Under	Under	-	Under	Under	Under	-	Under	Under
		PM	Under	Under	Under	Under	Under	-	Under	Under	Under	-	Under	Under
	2040	AM	Near	Under	Under	Under	Under	-	Under	Under	Under	-	Under	Under
		PM	Under	Over	Under	Over	Under	-	Under	Under	Under	-	Under	Under
AO43 (DDI)	Existing	AM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
	2040	AM	Near	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Over	Under	Over	Under	-	-	Under	Near	-	-	Under
AO44 (Roundabout)	Existing	AM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
	2040	AM	Near	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Over	Under	Over	Under	-	-	Under	Near	-	-	Under
AO45 (TUDI)	Existing	AM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
	2040	AM	Near	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Over	Under	Over	Under	-	-	Under	Near	-	-	Under
CAP-X Results			First: Partial Cloverleaf				Second: Diverging Diamond				Third: Displaced Left			

Exit 102		Existing Interstate		Existing Ramps								Existing Arterial		Annual Growth Rate
Interchange	Alternative	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	EB/SB	WB/NB	
Existing	Lanes	3	3	1	-	1	1	1	-	1	1	2	2	1.00%
	AM Peak Vol	4,906	2,838	319	-	247	716	287	-	467	243	1,347	1,082	**Design Year**
	AM LOS	D	B	B	-	B	B	B	-	C	B	D	D	
	PM Peak Vol	3,532	5,416	193	-	62	757	351	-	606	409	1,191	1,507	
	PM LOS	C	D	B	-	B	B	B	-	C	B	D	E	
AO42 - Tight Urban Diamond	Lanes	3	3	1	-	-	1	1	-	-	1	2	2	2040
	AM Peak Vol	4,906	2,838	566	-	-	716	754	-	-	243	1,347	1,082	**Arterial Class**
	AM LOS	D	B	B	-	-	B	B	-	-	B	D	C	
	PM Peak Vol	3,532	5,416	255	-	-	757	957	-	-	409	1,191	1,507	II
	PM LOS	C	D	B	-	-	B	B	-	-	B	C	D	
AO41 - Roundabout Intersections	Lanes	3	3	1	-	-	1	1	-	-	1	2	2	
	AM Peak Vol	4,906	2,838	566	-	-	716	754	-	-	243	1,347	1,082	
	AM LOS	D	B	B	-	-	B	B	-	-	B	D	C	
	PM Peak Vol	3,532	5,416	255	-	-	757	957	-	-	409	1,191	1,507	
	PM LOS	C	D	B	-	-	B	B	-	-	B	C	D	
AO40 - Diverging Diamond Interchange	Lanes	3	3	1	-	-	1	1	-	-	1	2	2	
	AM Peak Vol	4,906	2,838	566	-	-	716	754	-	-	243	1,347	1,082	
	AM LOS	D	B	B	-	-	B	B	-	-	B	D	C	
	PM Peak Vol	3,532	5,416	255	-	-	757	957	-	-	409	1,191	1,507	
	PM LOS	C	D	B	-	-	B	B	-	-	B	C	D	

Exit 102		Future Interstate		Future Ramp								Future Arterial	
Interchange	Alternative	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	EB/SB	WB/NB
Existing	Lanes	3	3	1	-	1	1	1	-	1	1	2	2
	AM Peak Vol	6,355	3,676	414	-	320	928	372	-	605	315	1,745	1,402
	AM LOS	F	C	B	-	B	B	B	-	C	B	F	D
	PM Peak Vol	4,575	7,016	250	-	81	981	455	-	785	530	1,543	1,952
	PM LOS	C	F	B	-	B	B	B	-	D	B	E	F
AO42 - Tight Urban Diamond	Lanes	3	3	1	-	-	1	1	-	-	1	2	2
	AM Peak Vol	6,355	3,676	734	-	-	928	977	-	-	315	1,745	1,402
	AM LOS	F	C	B	-	-	B	B	-	-	B	D	D
	PM Peak Vol	4,575	7,016	331	-	-	981	1,240	-	-	530	1,543	1,952
	PM LOS	C	F	B	-	-	B	C	-	-	B	D	F
AO41 - Roundabout Intersections	Lanes	3	3	1	-	-	1	1	-	-	1	2	2
	AM Peak Vol	6,355	3,676	734	-	-	928	977	-	-	315	1,745	1,402
	AM LOS	F	C	B	-	-	B	B	-	-	B	D	D
	PM Peak Vol	4,575	7,016	331	-	-	981	1,240	-	-	530	1,543	1,952
	PM LOS	C	F	B	-	-	B	C	-	-	B	D	F
AO40 - Diverging Diamond Interchange	Lanes	3	3	1	-	-	1	1	-	-	1	2	2
	AM Peak Vol	6,355	3,676	734	-	-	928	977	-	-	315	1,745	1,402
	AM LOS	F	C	B	-	-	B	B	-	-	B	D	D
	PM Peak Vol	4,575	7,016	331	-	-	981	1,240	-	-	530	1,543	1,952
	PM LOS	C	F	B	-	-	B	C	-	-	B	D	F

Exit 102 (Lake Murray Boulevard) Capacity Assessment														
			Freeway Segment		Arterial		EB/SB Ramps				WB/NB Ramps			
Alternative	Year	Peak Hour	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
Existing No-Build (AO50)	Existing	AM	Under	Under	Under	Under	Under	-	Under	Under	Under	-	Under	Under
		PM	Under	Under	Under	Near	Under	-	Under	Under	Under	-	Under	Under
	2040	AM	Over	Under	Over	Under	Under	-	Under	Under	Under	-	Under	Under
		PM	Under	Over	Near	Over	Under	-	Under	Under	Under	-	Under	Under
AO40 (DDI)	Existing	AM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
	2040	AM	Over	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Over	Under	Over	Under	-	-	Under	Under	-	-	Under
AO41 (Roundabout)	Existing	AM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
	2040	AM	Over	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Over	Under	Over	Under	-	-	Under	Under	-	-	Under
AO42 (TUDI)	Existing	AM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
	2040	AM	Over	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Over	Under	Over	Under	-	-	Under	Under	-	-	Under
CAP-X Results			First: Partial Cloverleaf				Second: Displaced Left				Third: Diverging Diamond			

Exit 103		Existing Interstate		Existing Ramps								Existing Arterial		Annual Growth Rate
Interchange	Alternative	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	EB/SB	WB/NB	
Existing	Lanes	3	3	1	-	-	1	1	-	1	1	2	2	1.00%
	AM Peak Vol	5,056	3,156	105	-	-	586	481	-	481	163	783	915	**Design Year**
	AM LOS	D	B	B	-	-	B	B	-	C	B	D	D	
	PM Peak Vol	4,034	5,748	372	-	-	853	800	-	800	468	1,431	1,419	
	PM LOS	C	E	B	-	-	B	B	-	D	B	D	D	
AO35 - Tight Urban Diamond	Lanes	3	3	1	-	-	1	1	-	-	1	2	2	2040
	AM Peak Vol	5,056	3,156	105	-	-	586	481	-	-	163	783	915	**Arterial Class**
	AM LOS	D	B	B	-	-	B	B	-	-	B	D	D	
	PM Peak Vol	4,034	5,748	372	-	-	853	800	-	-	468	1,431	1,419	III/IV
	PM LOS	C	E	B	-	-	B	B	-	-	B	D	D	
AO37 - Single Point Urban Interchange	Lanes	3	3	1	-	-	1	1	-	-	1	2	2	
	AM Peak Vol	5,056	3,156	105	-	-	586	481	-	-	163	783	915	
	AM LOS	D	B	B	-	-	B	B	-	-	B	D	D	
	PM Peak Vol	4,034	5,748	372	-	-	853	800	-	-	468	1,431	1,419	
	PM LOS	C	E	B	-	-	B	B	-	-	B	D	D	
AO38 0 5-leg roundabout	Lanes	3	3	1	-	-	1	1	-	-	1	2	2	
	AM Peak Vol	5,056	3,156	105	-	-	586	481	-	-	163	783	915	
	AM LOS	D	B	B	-	-	B	B	-	-	B	D	D	
	PM Peak Vol	4,034	5,748	372	-	-	853	800	-	-	468	1,431	1,419	
	PM LOS	C	E	B	-	-	B	B	-	-	B	D	D	
AO36 - Diverging Diamond Interchange	Lanes	3	3	1	-	-	1	1	-	-	1	2	2	
	AM Peak Vol	5,056	3,156	105	-	-	586	481	-	-	163	783	915	
	AM LOS	D	B	B	-	-	B	B	-	-	B	D	D	
	PM Peak Vol	4,034	5,748	372	-	-	853	800	-	-	468	1,431	1,419	
	PM LOS	C	E	B	-	-	B	B	-	-	B	D	D	

Exit 103		Future Interstate		Future Ramp								Future Arterial	
Interchange	Alternative	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	EB/SB	WB/NB
Existing	Lanes	3	3	1	-	-	1	-	-	1	1	2	2
	AM Peak Vol	6,549	4,088	137	-	-	760	-	-	624	212	1,015	1,186
	AM LOS	F	C	B	-	-	B	-	-	C	B	D	D
	PM Peak Vol	5,226	7,446	482	-	-	1,105	-	-	1,037	607	1,854	1,838
	PM LOS	D	F	B	-	-	C	-	-	E	B	F	F
AO35 - Tight Urban Diamond	Lanes	3	3	1	-	-	1	1	-	-	1	2	2
	AM Peak Vol	6,549	4,088	137	-	-	760	624	-	-	212	1,015	1,186
	AM LOS	F	C	B	-	-	B	B	-	-	B	D	D
	PM Peak Vol	5,226	7,446	482	-	-	1,105	1,037	-	-	607	1,854	1,838
	PM LOS	D	F	B	-	-	C	C	-	-	B	F	F
AO37 - Single Point Urban Interchange	Lanes	3	3	1	-	-	1	1	-	-	1	2	2
	AM Peak Vol	6,549	4,088	137	-	-	760	624	-	-	212	1,015	1,186
	AM LOS	F	C	B	-	-	B	B	-	-	B	D	D
	PM Peak Vol	5,226	7,446	482	-	-	1,105	1,037	-	-	607	1,854	1,838
	PM LOS	D	F	B	-	-	C	C	-	-	B	F	F
AO38 0 5-leg roundabout	Lanes	3	3	1	-	-	1	1	-	-	1	2	2
	AM Peak Vol	6,549	4,088	137	-	-	760	624	-	-	212	1,015	1,186
	AM LOS	F	C	B	-	-	B	B	-	-	B	D	D
	PM Peak Vol	5,226	7,446	482	-	-	1,105	1,037	-	-	607	1,854	1,838
	PM LOS	D	F	B	-	-	C	C	-	-	B	F	F
AO36 - Diverging Diamond Interchange	Lanes	3	3	1	-	-	1	1	-	-	1	2	2
	AM Peak Vol	6,549	4,088	137	-	-	760	624	-	-	212	1,015	1,186
	AM LOS	F	C	B	-	-	B	B	-	-	B	D	D
	PM Peak Vol	5,226	7,446	482	-	-	1,105	1,037	-	-	607	1,854	1,838
	PM LOS	D	F	B	-	-	C	C	-	-	B	F	F

Exit 103 (Harbison Boulevard) Capacity Assessment														
			Freeway Segment		Arterial		EB/SB Ramps				WB/NB Ramps			
Alternative	Year	Peak Hour	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
Existing No-Build (AO49)	Existing	AM	Under	Under	Under	Under	Under	-	-	Under	Under	-	Under	Under
		PM	Under	Near	Under	Under	Under	-	-	Under	Under	-	Under	Under
	2040	AM	Over	Under	Under	Under	Under	-	-	Under	-	-	Under	Under
		PM	Under	Over	Over	Over	Under	-	-	Under	-	-	Near	Under
AO35 (TUDI)	Existing	AM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Near	Under	Under	Under	-	-	Under	Under	-	-	Under
	2040	AM	Over	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Over	Over	Over	Under	-	-	Under	Under	-	-	Under
AO36 (DDI)	Existing	AM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Near	Under	Under	Under	-	-	Under	Under	-	-	Under
	2040	AM	Over	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Over	Over	Over	Under	-	-	Under	Under	-	-	Under
AO37 (SPUI)	Existing	AM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Near	Under	Under	Under	-	-	Under	Under	-	-	Under
	2040	AM	Over	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Over	Over	Over	Under	-	-	Under	Under	-	-	Under
AO38 (Roundabout	Existing	AM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Near	Under	Under	Under	-	-	Under	Under	-	-	Under
	2040	AM	Over	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Over	Over	Over	Under	-	-	Under	Under	-	-	Under
AO39 (Offset SPUI)	Existing	AM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Near	Under	Under	Under	-	-	Under	Under	-	-	Under
	2040	AM	Over	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Over	Over	Over	Under	-	-	Under	Under	-	-	Under
CAP-X Results			First: Partial Cloverleaf				Second: Displaced Left				Third: SPUI			

Exit 104		Existing Interstate		Existing Ramps								Existing Arterial		Annual Growth Rate
Interchange	Alternative	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	EB/SB	WB/NB	
Existing	Lanes	3	3	1	-	-	1	1	-	-	1	2	2	1.00%
	AM Peak Vol	5,537	3,552	319	-	-	716	287	-	-	243	973	978	**Design Year**
	AM LOS	D	C	B	-	-	B	B	-	-	B	D	D	
	PM Peak Vol	4,515	6,028	193	-	-	757	351	-	-	409	856	1,373	
	PM LOS	C	E	B	-	-	B	B	-	-	B	D	D	
AO32 - Single Point Urban Interchange	Lanes	3	3	1	-	-	1	1	-	-	1	2	2	2040
	AM Peak Vol	5,537	3,552	319	-	-	716	287	-	-	243	973	978	**Arterial Class**
	AM LOS	D	C	B	-	-	B	B	-	-	B	D	D	
	PM Peak Vol	4,515	6,028	193	-	-	757	351	-	-	409	856	1,373	III/IV
	PM LOS	C	E	B	-	-	B	B	-	-	B	D	D	
AO33 - Roundabouts	Lanes	3	3	1	-	-	1	1	-	-	1	2	2	
	AM Peak Vol	5,537	3,552	319	-	-	716	287	-	-	243	973	978	
	AM LOS	D	C	B	-	-	B	B	-	-	B	D	D	
	PM Peak Vol	4,515	6,028	193	-	-	757	351	-	-	409	856	1,373	
	PM LOS	C	E	B	-	-	B	B	-	-	B	D	D	
AO31 - Diverging Diamond Interchange	Lanes	3	3	1	-	-	1	1	-	-	1	2	2	
	AM Peak Vol	5,537	3,552	319	-	-	716	287	-	-	243	973	978	
	AM LOS	D	C	B	-	-	B	B	-	-	B	D	D	
	PM Peak Vol	4,515	6,028	193	-	-	757	351	-	-	409	856	1,373	
	PM LOS	C	E	B	-	-	B	B	-	-	B	D	D	
AO30 - Existing - with improvements	Lanes	3	3	1	-	-	1	1	-	-	1	3	3	
	AM Peak Vol	5,537	3,552	319	-	-	716	287	-	-	243	973	978	
	AM LOS	D	C	B	-	-	B	B	-	-	B	C	C	
	PM Peak Vol	4,515	6,028	193	-	-	757	351	-	-	409	856	1,373	
	PM LOS	C	E	B	-	-	B	B	-	-	B	C	D	

Exit 104		Future Interstate		Future Ramp								Future Arterial	
Interchange	Alternative	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	EB/SB	WB/NB
Existing	Lanes	3	3	1	-	-	1	1	-	-	1	2	2
	AM Peak Vol	7,172	4,601	414	-	-	928	372	-	-	315	1,261	1,267
	AM LOS	F	D	B	-	-	B	B	-	-	B	D	D
	PM Peak Vol	5,849	7,808	250	-	-	981	455	-	-	530	1,109	1,779
	PM LOS	E	F	B	-	-	B	B	-	-	B	D	F
AO32 - Single Point Urban Interchange	Lanes	3	3	1	-	-	1	1	-	-	1	2	2
	AM Peak Vol	7,172	4,601	414	-	-	928	372	-	-	315	1,261	1,267
	AM LOS	F	D	B	-	-	B	B	-	-	B	D	D
	PM Peak Vol	5,849	7,808	250	-	-	981	455	-	-	530	1,109	1,779
	PM LOS	E	F	B	-	-	B	B	-	-	B	D	F
AO33 - Roundabouts	Lanes	3	3	1	-	-	1	1	-	-	1	2	2
	AM Peak Vol	7,172	4,601	414	-	-	928	372	-	-	315	1,261	1,267
	AM LOS	F	D	B	-	-	B	B	-	-	B	D	D
	PM Peak Vol	5,849	7,808	250	-	-	981	455	-	-	530	1,109	1,779
	PM LOS	E	F	B	-	-	B	B	-	-	B	D	F
AO31 - Diverging Diamond Interchange	Lanes	3	3	1	-	-	1	1	-	-	1	2	2
	AM Peak Vol	7,172	4,601	414	-	-	928	372	-	-	315	1,261	1,267
	AM LOS	F	D	B	-	-	B	B	-	-	B	D	D
	PM Peak Vol	5,849	7,808	250	-	-	981	455	-	-	530	1,109	1,779
	PM LOS	E	F	B	-	-	B	B	-	-	B	D	F
AO30 - Existing - with improvements	Lanes	3	3	1	-	-	1	1	-	-	1	3	3
	AM Peak Vol	7,172	4,601	414	-	-	928	372	-	-	315	1,261	1,267
	AM LOS	F	D	B	-	-	B	B	-	-	B	D	D
	PM Peak Vol	5,849	7,808	250	-	-	981	455	-	-	530	1,109	1,779
	PM LOS	E	F	B	-	-	B	B	-	-	B	D	D

Exit 104 (Piney Grove Road) Capacity Assessment														
			Freeway Segment		Arterial		EB/SB Ramps				WB/NB Ramps			
Alternative	Year	Peak Hour	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
Existing No-Build	Existing	AM	Under	Under	Under	Under	Under	-	-	Under	Under	-	Under	Under
		PM	Under	Near	Under	Under	Under	-	-	Under	Under	-	Under	Under
	2040	AM	Over	Under	Under	Under	Under	-	-	Under	-	-	Under	Under
		PM	Under	Over	Over	Over	Under	-	-	Under	-	-	Near	Under
AO30 (Improve Existing)	Existing	AM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Near	Under	Under	Under	-	-	Under	Under	-	-	Under
	2040	AM	Over	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Over	Over	Over	Under	-	-	Under	Under	-	-	Under
AO31 (DDI)	Existing	AM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Near	Under	Under	Under	-	-	Under	Under	-	-	Under
	2040	AM	Over	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Over	Over	Over	Under	-	-	Under	Under	-	-	Under
AO32 (SPUI)	Existing	AM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Near	Under	Under	Under	-	-	Under	Under	-	-	Under
	2040	AM	Over	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Over	Over	Over	Under	-	-	Under	Under	-	-	Under
AO33 (Roundabout	Existing	AM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Near	Under	Under	Under	-	-	Under	Under	-	-	Under
	2040	AM	Over	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Over	Over	Over	Under	-	-	Under	Under	-	-	Under
AO34 (Split Diamond)	Existing	AM (103)	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		AM (104)			Under	Under	Under	-	-	Under	Under	-	-	Under
		PM (103)	Under	Over	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM (104)			Under	Under	Under	-	-	Near	Under	-	-	Under
	2040	AM (103)	Over	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		AM (104)			Under	Under	Under	-	-	Over	Under	-	-	Under
		PM (103)	Under	Over	Over	Over	Under	-	-	Near	Near	-	-	Under
		PM (104)			Under	Under	Near	-	-	Over	Near	-	-	Under
CAP-X Results			First: Diverging Diamond				Second: Displaced Left				Third: Partial Cloverleaf			

Existing Interstate		Existing Ramps								Existing Arterial		Annual Growth Rate
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	EB/SB	WB/NB	
3	5	1	1	-	1	1	-	1	1	3	3	1.00%
6,321	4,496	81	909	-	1,180	764	-	363	183	973	978	Design Year
F	B	B	D	-	C	B	-	B	B	C	C	
5,023	6,783	287	890	-	696	409	-	627	281	856	1,373	
D	C	B	D	-	B	B	-	C	B	C	D	
3	5	1	-	-	1	1	-	-	1	3	3	2040
6,321	4,496	81	-	-	2,089	1,127	-	-	183	973	978	Arterial Class
F	B	B	-	-	F	C	-	-	B	C	C	
5,023	6,783	287	-	-	1,586	1,036	-	-	281	973	978	III/IV
D	C	B	-	-	E	C	-	-	B	C	C	
3	5	1	-	-	1	1	-	1	1	3	3	
6,321	4,496	81	-	-	2,089	764	-	363	183	973	978	
F	B	B	-	-	F	B	-	B	B	C	C	
5,023	6,783	287	-	-	1,586	409	-	627	281	856	1,373	
D	C	B	-	-	E	B	-	C	B	C	D	
3	3	1	-	-	1	1	-	-	1	2	2	
6,321	4,496	81	-	-	2,089	1,127	-	-	183	973	978	
F	C	B	-	-	F	C	-	-	B	D	D	
5,023	6,783	287	-	-	1,586	1,036	-	-	281	856	1,373	
D	F	B	-	-	E	C	-	-	B	D	D	
3	3	1	-	-	1	1	-	-	1	2	2	
6,321	4,496	81	-	-	2,089	1,127	-	-	183	973	978	
F	C	B	-	-	F	C	-	-	B	D	D	
5,023	6,783	287	-	-	1,586	1,036	-	-	281	856	1,373	
D	F	B	-	-	E	C	-	-	B	D	D	
3	3	1	-	-	1	1	-	-	1	2	2	
6,321	4,496	81	-	-	2,089	1,127	-	-	183	973	978	
F	C	B	-	-	F	C	-	-	B	D	D	
5,023	6,783	287	-	-	1,586	1,036	-	-	281	856	1,373	
D	F	B	-	-	E	C	-	-	B	D	D	
3	3	1	-	-	1	1	-	-	1	2	2	
6,321	4,496	81	-	-	2,089	1,127	-	-	183	973	978	
F	C	B	-	-	F	C	-	-	B	D	D	
5,023	6,783	287	-	-	1,586	1,036	-	-	281	856	1,373	
D	F	B	-	-	E	C	-	-	B	D	D	

Future Interstate		Future Ramp								Future Arterial	
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	EB/SB	WB/NB
3	5	1	1	-	1	1	-	1	1	3	3
8,188	5,824	105	1,178	-	1,529	990	-	471	238	1,261	1,267
F	C	B	E	-	E	B	-	C	B	D	D
6,507	8,786	372	1,153	-	902	530	-	813	364	1,109	1,779
F	D	B	E	-	B	B	-	D	B	D	D
3	5	1	-	-	1	1	-	-	1	3	3
8,188	5,824	105	-	-	2,706	1,460	-	-	238	1,261	1,267
F	C	B	-	-	F	E	-	-	B	D	D
6,507	8,786	372	-	-	2,055	1,342	-	-	364	1,261	1,267
F	D	B	-	-	F	E	-	-	B	D	D
3	5	1	-	-	1	1	-	1	1	3	3
8,188	5,824	105	-	-	2,706	990	-	471	238	1,261	1,267
F	C	B	-	-	F	B	-	C	B	D	D
6,507	8,786	372	-	-	2,055	530	-	813	364	1,109	1,779
F	D	B	-	-	F	B	-	D	B	D	D
3	3	1	-	-	1	1	-	-	1	2	2
8,188	5,824	105	-	-	2,706	1,460	-	-	238	1,261	1,267
F	E	B	-	-	F	E	-	-	B	D	D
6,507	8,786	372	-	-	2,055	1,342	-	-	364	1,109	1,779
F	F	B	-	-	F	E	-	-	B	D	F
3	3	1	-	-	1	1	-	-	1	3	3
8,188	5,824	105	-	-	2,706	1,460	-	-	238	1,261	1,267
F	E	B	-	-	F	E	-	-	B	D	D
6,507	8,786	372	-	-	2,055	1,342	-	-	364	1,109	1,779
F	F	B	-	-	F	E	-	-	B	D	D
3	3	1	-	-	1	1	-	-	1	3	3
8,188	5,824	105	-	-	2,706	1,460	-	-	238	1,261	1,267
F	E	B	-	-	F	E	-	-	B	D	D
6,507	8,786	372	-	-	2,055	1,342	-	-	364	1,109	1,779
F	F	B	-	-	F	E	-	-	B	D	D
3	3	1	-	-	1	1	-	-	1	3	3
8,188	5,824	105	-	-	2,706	1,460	-	-	238	1,261	1,267
F	E	B	-	-	F	E	-	-	B	D	D
6,507	8,786	372	-	-	2,055	1,342	-	-	364	1,109	1,779
F	F	B	-	-	F	E	-	-	B	D	D

Exit 106 (St Andrews Road) Capacity Assessment														
			Freeway Segment		Arterial		EB/SB Ramps				WB/NB Ramps			
Alternative	Year	Peak Hour	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
Existing No-Build	Existing	AM	Over	Under	Under	Under	Under	Under	-	Under	Under	-	Under	Under
		PM	Under	Under	Under	Under	Under	Under	-	Under	Under	-	Under	Under
	2040	AM	Over	Under	Under	Under	Under	Near	-	Near	Under	-	Under	Under
		PM	Over	Under	Under	Under	Under	Near	-	Under	Under	-	Under	Under
AO11 (DDA)	Existing	AM	Over	Under	Under	Under	Under	-	-	Over	Under	-	-	Under
		PM	Under	Over	Under	Under	Under	-	-	Near	Under	-	-	Under
	2040	AM	Over	Near	Under	Under	Under	-	-	Over	Near	-	-	Under
		PM	Over	Over	Under	Over	Under	-	-	Over	Near	-	-	Under
AO12 (Flyover)	Existing	AM	Over	Under	Under	Under	Under	-	-	Over	Under	-	-	Under
		PM	Under	Over	Under	Under	Under	-	-	Near	Under	-	-	Under
	2040	AM	Over	Near	Under	Under	Under	-	-	Over	Near	-	-	Under
		PM	Over	Over	Under	Under	Under	-	-	Over	Near	-	-	Under
AO13 (SPUI)	Existing	AM	Over	Under	Under	Under	Under	-	-	Over	Under	-	-	Under
		PM	Under	Under	Under	Under	Under	-	-	Near	Under	-	-	Under
	2040	AM	Over	Under	Under	Under	Under	-	-	Over	Near	-	-	Under
		PM	Over	Under	Under	Under	Under	-	-	Over	Near	-	-	Under
AO14 (Modified DDI)	Existing	AM	Over	Under	Under	Under	Under	-	-	Over	Under	-	-	Under
		PM	Under	Over	Under	Under	Under	-	-	Near	Under	-	-	Under
	2040	AM	Over	Near	Under	Under	Under	-	-	Over	Near	-	-	Under
		PM	Over	Over	Under	Under	Under	-	-	Over	Near	-	-	Under
AO15 (DDI - Frontage Rd)	Existing	AM	Over	Under	Under	Under	Under	-	-	Over	Under	-	-	Under
		PM	Under	Over	Under	Under	Under	-	-	Near	Under	-	-	Under
	2040	AM	Over	Near	Under	Under	Under	-	-	Over	Near	-	-	Under
		PM	Over	Over	Under	Under	Under	-	-	Over	Near	-	-	Under
AO16 (Roundabout)	Existing	AM	Over	Under	Under	Under	Under	-	-	Over	Under	-	Under	Under
		PM	Under	Under	Under	Under	Under	-	-	Near	Under	-	Under	Under
	2040	AM	Over	Under	Under	Under	Under	-	-	Over	Under	-	Under	Under
		PM	Over	Under	Under	Under	Under	-	-	Over	Under	-	Under	Under
CAP-X Results			First: Partial Cloverleaf				Second: Diverging Diamond				Third: Displaced Left			

Exit 107/64		Existing Interstate		Existing Ramps								Existing Arterial		Annual Growth Rate
Interchange	Alternative	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	EB/SB	WB/NB	
	Lanes	5	5	1	1	1	1	1	1	1	1	-	-	1.00%
	AM Peak Vol	8,329	3,816	480	800	1,410	1,300	620	640	460	1,120	-	-	**Design Year**
Existing	AM LOS	D	B	B	D	F	D	B	C	B	C	-	-	
	PM Peak Vol	6,322	6,693	750	560	1,240	560	700	570	1,190	1,410	-	-	
	PM LOS	C	C	B	C	E	B	B	C	E	E	-	-	
														2040
														Arterial Class
														-

Exit 107/64		Future Interstate		Future Ramp								Future Arterial	
Interchange	Alternative	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	EB/SB	WB/NB
	Lanes	5	5	1	1	1	1	1	1	1	1	-	-
	AM Peak Vol	10,789	4,943	622	1,037	1,827	1,684	804	829	596	1,451	-	-
Existing	AM LOS	F	B	B	E	F	F	B	D	C	E	-	-
	PM Peak Vol	8,189	8,670	972	726	1,607	726	907	739	1,542	1,827	-	-
	PM LOS	D	D	B	C	F	B	B	C	F	F	-	-

Exit 108		Existing Interstate		Existing Ramps								Existing Arterial		Annual Growth Rate
Interchange	Alternative	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	EB/SB	WB/NB	
	Lanes	5	4	1	1	-	-	2	1	-	-	2	2	1.00%
	AM Peak Vol	8,539	3,455	176	512	-	-	655	152	-	-	1,424	783	**Design Year**
Existing	AM LOS	D	B	B	C	-	-	B	B	-	-	D	D	
	PM Peak Vol	5,452	3,942	301	600	-	-	932	247	-	-	962	1,881	
	PM LOS	B	B	B	C	-	-	B	B	-	-	D	F	
	Lanes	5	4	1	-	-	1	1	-	-	1	2	2	2040
	AM Peak Vol	8,539	3,455	176	-	-	512	655	-	-	152	1,424	783	**Arterial Class**
AO23 - Offset Diamond_2213	AM LOS	D	B	B	-	-	B	B	-	-	B	D	D	
	PM Peak Vol	5,452	3,942	301	-	-	600	932	-	-	247	962	1,881	III/IV
	PM LOS	B	B	B	-	-	B	B	-	-	B	D	F	
	Lanes	4	2	1	1	-	-	1	-	-	1	2	2	
	AM Peak Vol	8,539	3,455	1,359	1042	-	-	243	-	-	809	1,424	783	
I-126_I-20_Connector_BushRiver	AM LOS	F	D	E	E	-	-	B	-	-	B	D	D	
	PM Peak Vol	5,452	3,942	1,359	1042	-	-	243	-	-	809	962	1,881	
	PM LOS	C	E	E	E	-	-	B	-	-	B	D	F	
	Lanes	3	4	1	-	-	1	1	-	-	1	2	2	
	AM Peak Vol	8,539	3,455	176	-	-	512	655	-	-	152	1,424	783	
roundabouts	AM LOS	F	B	B	-	-	B	B	-	-	B	D	D	
	PM Peak Vol	5,452	3,942	301	-	-	600	932	-	-	247	962	1,881	
	PM LOS	D	B	B	-	-	B	B	-	-	B	D	F	
	Lanes	3	4	1	-	-	1	1	-	-	1	2	2	
	AM Peak Vol	8,539	3,455	176	-	-	512	655	-	-	152	1,424	783	
DDI	AM LOS	F	B	B	-	-	B	B	-	-	B	D	D	
	PM Peak Vol	5,452	3,942	301	-	-	600	932	-	-	247	962	1,881	
	PM LOS	D	B	B	-	-	B	B	-	-	B	D	F	
	Lanes	3	4	1	1	-	-	-	-	1	1	2	2	
	AM Peak Vol	8,539	3,455	176	512	-	-	-	-	655	152	1,424	783	
Partial Cloverleaf	AM LOS	F	B	B	C	-	-	-	-	C	B	D	D	
	PM Peak Vol	5,452	3,942	301	600	-	-	-	-	932	247	962	1,881	
	PM LOS	D	B	B	C	-	-	-	-	D	B	D	F	

Exit 108		Future Interstate		Future Ramp								Future Arterial	
Interchange	Alternative	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	EB/SB	WB/NB
Existing	Lanes	5	4	1	1	-	-	2	1	-	-	2	2
	AM Peak Vol	11,061	4,476	228	664	-	-	849	197	-	-	1,845	1,015
	AM LOS	F	C	B	C	-	-	B	B	-	-	F	D
	PM Peak Vol	7,062	5,106	390	778	-	-	1,208	320	-	-	1,247	2,437
	PM LOS	C	C	B	D	-	-	B	B	-	-	D	F
AO23 - Offset Diamond_2213	Lanes	5	4	1	-	-	1	1	-	-	1	2	2
	AM Peak Vol	11,061	4,476	228	-	-	664	849	-	-	197	1,845	1,015
	AM LOS	F	C	B	-	-	B	B	-	-	B	F	D
	PM Peak Vol	7,062	5,106	390	-	-	778	1,208	-	-	320	1,247	2,437
	PM LOS	C	C	B	-	-	B	C	-	-	B	D	F
I-126_I-20_Connector_BushRiver	Lanes	4	2	1	1	-	-	1	-	-	1	2	2
	AM Peak Vol	11,061	4,476	1,761	1,350	-	-	315	-	-	1,048	1,845	1,015
	AM LOS	F	F	F	F	-	-	B	-	-	C	F	D
	PM Peak Vol	7,062	5,106	1,761	1,350	-	-	315	-	-	1,048	1,247	2,437
	PM LOS	D	F	F	F	-	-	B	-	-	C	D	F
roundabouts	Lanes	3	4	1	-	-	1	1	-	-	1	2	2
	AM Peak Vol	11,061	4,476	228	-	-	664	849	-	-	197	1,845	1,015
	AM LOS	F	C	B	-	-	B	B	-	-	B	F	D
	PM Peak Vol	7,062	5,106	390	-	-	778	1,208	-	-	320	1,247	2,437
	PM LOS	F	C	B	-	-	B	C	-	-	B	D	F
DDI	Lanes	3	4	1	-	-	1	1	-	-	1	2	2
	AM Peak Vol	11,061	4,476	228	-	-	664	849	-	-	197	1,845	1,015
	AM LOS	F	C	B	-	-	B	B	-	-	B	F	D
	PM Peak Vol	7,062	5,106	390	-	-	778	1,208	-	-	320	1,247	2,437
	PM LOS	F	C	B	-	-	B	C	-	-	B	D	F
Partial Cloverleaf	Lanes	3	4	1	1	-	-	-	-	1	1	2	2
	AM Peak Vol	11,061	4,476	228	664	-	-	-	-	849	197	1,845	1,015
	AM LOS	F	C	B	C	-	-	-	-	D	B	F	D
	PM Peak Vol	7,062	5,106	390	778	-	-	-	-	1,208	320	1,247	2,437
	PM LOS	F	C	B	D	-	-	-	-	E	B	D	F

Exit 108 (Bush River Road) Capacity Assessment														
			Freeway Segment		Arterial		EB/SB Ramps				WB/NB Ramps			
Alternative	Year	Peak Hour	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
Existing No-Build	Existing	AM	Under	Under	Under	Under	Under	Under	-	-	Under	Under	-	-
		PM	Under	Under	Under	Over	Under	Under	-	-	Under	Under	-	-
	2040	AM	Over	Under	Over	Under	Under	Under	-	-	Under	Under	-	-
		PM	Under	Under	Under	Over	Under	Under	-	-	Under	Under	-	-
AO23 (Offset Diamond)	Existing	AM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Under	Over	Under	-	-	Under	Under	-	-	Under
	2040	AM	Over	Under	Over	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Under	Over	Under	-	-	Under	Under	-	-	Under
CAP-X Results			Not Evaluated				Not Evaluated				Not Evaluated			

108B		Existing Interstate		Existing Ramps								Existing Arterial		Annual Growth Rate
Interchange	Alternative	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	EB/SB	WB/NB	
	Lanes	4	4	2	1	3	-	2	2	1	1	-	-	1.00%
	AM Peak Vol	8,363	3,455	3,127	270	5,236	-	2,280	1,074	310	520	-	-	**Design Year**
Existing	AM LOS	E	B	D	B	D	-	D	E	B	B	-	-	
	PM Peak Vol	5,151	3,942	2,790	560	2,361	-	2,690	2,756	1,000	320	-	-	
	PM LOS	C	B	C	C	B	-	E	F	D	B	-	-	
														2040
														Arterial Class
														-

108B		Future Interstate		Future Ramp								Future Arterial	
Interchange	Alternative	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	EB/SB	WB/NB
	Lanes	4	4	2	1	3	1	1	1	1	1	-	-
	AM Peak Vol	10,833	4,476	4,051	350	6,782	-	2,954	1,392	402	674	-	-
Existing	AM LOS	F	C	F	B	F	B	F	F	B	B	-	-
	PM Peak Vol	6,672	5,106	3,614	726	3,059	-	3,485	3,570	1,296	415	-	-
	PM LOS	D	C	D	C	B	B	F	F	F	B	-	-

Exit 110		Existing Interstate		Existing Ramps								Existing Arterial		Annual Growth Rate
Interchange	Alternative	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	EB/SB	WB/NB	
Existing	Lanes	3	3	1	-	-	1	1	-	-	1	2	2	1.00%
	AM Peak Vol	3,909	3,506	978	-	-	681	901	-	-	850	2,010	1,786	**Design Year**
	AM LOS	C	C	B	-	-	B	B	-	-	B	F	F	
	PM Peak Vol	3,950	3,908	783	-	-	826	901	-	-	820	1,838	1,844	
	PM LOS	C	C	B	-	-	B	B	-	-	B	F	F	
AO46 - Sunset Blvd Exit	Lanes	4	3	2	-	-	1	1	-	-	1	2	2	2040
	AM Peak Vol	3,909	3,506	978	-	-	681	901	-	-	850	2,010	1,786	**Arterial Class**
	AM LOS	B	C	B	-	-	B	B	-	-	B	F	F	
	PM Peak Vol	3,950	3,908	783	-	-	826	901	-	-	820	1,838	1,844	III/IV
	PM LOS	B	C	B	-	-	B	B	-	-	B	F	F	
AO47 - Hospital Connector	Lanes	4	3	2	-	-	1	1	-	-	1	2	2	
	AM Peak Vol	3,909	3,506	978	-	-	681	901	-	-	850	2,010	1,786	
	AM LOS	B	C	B	-	-	B	B	-	-	B	F	F	
	PM Peak Vol	3,950	3,908	783	-	-	826	901	-	-	820	1,838	1,844	
	PM LOS	B	C	B	-	-	B	B	-	-	B	F	F	

Exit 110		Future Interstate		Future Ramp								Future Arterial	
Interchange	Alternative	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	EB/SB	WB/NB
Existing	Lanes	3	3	1	-	-	1	1	-	-	1	2	2
	AM Peak Vol	5,064	4,542	1,267	-	-	883	1,168	-	-	1,101	2,604	2,314
	AM LOS	D	C	D	-	-	B	C	-	-	C	F	F
	PM Peak Vol	5,117	5,062	1,015	-	-	1,070	1,168	-	-	1,063	2,381	2,389
	PM LOS	D	D	C	-	-	C	C	-	-	C	F	F
AO46 - Sunset Blvd Exit	Lanes	4	3	2	-	-	1	1	-	-	1	2	2
	AM Peak Vol	5,064	4,542	1,267	-	-	883	1,168	-	-	1,101	2,604	2,314
	AM LOS	C	C	B	-	-	B	C	-	-	C	F	F
	PM Peak Vol	5,117	5,062	1,015	-	-	1,070	1,168	-	-	1,063	2,381	2,389
	PM LOS	C	D	B	-	-	C	C	-	-	C	F	F
AO47 - Hospital Connector	Lanes	4	3	2	-	-	1	1	-	-	1	2	2
	AM Peak Vol	5,064	4,542	1,267	-	-	883	1,168	-	-	1,101	2,604	2,314
	AM LOS	C	C	B	-	-	B	C	-	-	C	F	F
	PM Peak Vol	5,117	5,062	1,015	-	-	1,070	1,168	-	-	1,063	2,381	2,389
	PM LOS	C	D	B	-	-	C	C	-	-	C	F	F

Exit 110 (Sunset Boulevard - US 378) Capacity Assessment														
			Freeway Segment		Arterial		EB/SB Ramps				WB/NB Ramps			
Alternative	Year	Peak Hour	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
Existing No-Build	Existing	AM	Under	Under	Over	Over	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Over	Over	Under	-	-	Under	Under	-	-	Under
	2040	AM	Under	Under	Over	Over	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Over	Over	Under	-	-	Under	Under	-	-	Under
AO46 (EB Ramp Extension)	Existing	AM	Under	Under	Over	Over	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Over	Over	Under	-	-	Under	Under	-	-	Under
	2040	AM	Under	Under	Over	Over	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Over	Over	Under	-	-	Under	Under	-	-	Under
AO47 (EB Direct Hospital Access)	Existing	AM	Under	Under	Over	Over	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Over	Over	Under	-	-	Under	Under	-	-	Under
	2040	AM	Under	Under	Over	Over	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Over	Over	Under	-	-	Under	Under	-	-	Under
CAP-X Results			First: Partial Cloverleaf				Second: DDI				Third: Displaced Left			

Exit 63		Existing Interstate		Existing Ramps								Existing Arterial		Annual Growth Rate
Interchange	Alternative	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	EB/SB	WB/NB	
Existing	Lanes	3	4	1	1	-	1	1	-	-	1	2	2	1.00%
	AM Peak Vol	5,145	2,693	911	359	-	96	528	-	-	354	1,374	726	**Design Year**
	AM LOS	D	B	B	B	-	B	B	-	-	B	D	D	
	PM Peak Vol	3,245	4,388	675	417	-	130	484	-	-	780	1,300	1,608	
	PM LOS	B	B	B	B	-	B	B	-	-	B	D	E	
AO7 - Offset Diamond	Lanes	3	4	1	-	-	1	1	-	-	1	2	2	2040
	AM Peak Vol	5,145	2,693	911	-	-	455	528	-	-	354	1,374	726	**Arterial Class**
	AM LOS	D	B	B	-	-	B	B	-	-	B	D	D	
	PM Peak Vol	3,245	4,388	675	-	-	547	484	-	-	780	1,300	1,608	III/IV
	PM LOS	B	B	B	-	-	B	B	-	-	B	D	E	
AO10 - Single Point Urban Interchange	Lanes	3	4	1	-	-	1	1	-	-	1	2	2	
	AM Peak Vol	5,145	2,693	911	-	-	455	528	-	-	354	1,374	726	
	AM LOS	D	B	B	-	-	B	B	-	-	B	D	D	
	PM Peak Vol	3,245	4,388	675	-	-	547	484	-	-	780	1,300	1,608	
	PM LOS	B	B	B	-	-	B	B	-	-	B	D	E	
AO9 - Roundabouts	Lanes	3	4	1	-	-	1	1	-	-	1	2	2	
	AM Peak Vol	5,145	2,693	911	-	-	455	528	-	-	354	1,374	726	
	AM LOS	D	B	B	-	-	B	B	-	-	B	D	D	
	PM Peak Vol	3,245	4,388	675	-	-	547	484	-	-	780	1,300	1,608	
	PM LOS	B	B	B	-	-	B	B	-	-	B	D	E	
AO6 - Diverging Diamond Interchange	Lanes	3	4	1	-	-	1	1	-	-	1	2	2	
	AM Peak Vol	5,145	2,693	911	-	-	455	528	-	-	354	1,374	726	
	AM LOS	D	B	B	-	-	B	B	-	-	B	D	D	
	PM Peak Vol	3,245	4,388	675	-	-	547	484	-	-	780	1,300	1,608	
	PM LOS	B	B	B	-	-	B	B	-	-	B	D	E	
AO8 - Partial Cloverleaf	Lanes	3	4	1	1	-	-	-	-	1	1	2	2	
	AM Peak Vol	5,145	2,693	911	455	-	-	-	-	528	354	1,374	726	
	AM LOS	D	B	B	B	-	-	-	-	C	B	D	D	
	PM Peak Vol	3,245	4,388	675	547	-	-	-	-	484	780	1,300	1,608	
	PM LOS	B	B	B	C	-	-	-	-	C	B	D	E	

Exit 63		Future Interstate		Future Ramp								Future Arterial	
Interchange	Alternative	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	EB/SB	WB/NB
Existing	Lanes	3	4	1	1	-	1	1	-	-	1	2	2
	AM Peak Vol	6,665	3,489	1,180	465	-	125	684	-	-	459	1,780	941
	AM LOS	F	B	C	C	-	B	B	-	-	B	F	D
	PM Peak Vol	4,204	5,684	875	541	-	169	627	-	-	1,011	1,684	2,083
	PM LOS	C	C	B	C	-	B	B	-	-	C	E	F
AO7 - Offset Diamond	Lanes	3	4	1	-	-	1	1	-	-	1	2	2
	AM Peak Vol	6,665	3,489	1,180	-	-	590	684	-	-	459	1,780	941
	AM LOS	F	B	C	-	-	B	B	-	-	B	F	D
	PM Peak Vol	4,204	5,684	875	-	-	709	627	-	-	1,011	1,684	2,083
	PM LOS	C	C	B	-	-	B	B	-	-	C	E	F
AO10 - Single Point Urban Interchange	Lanes	3	4	1	-	-	1	1	-	-	1	2	2
	AM Peak Vol	6,665	3,489	1,180	-	-	590	684	-	-	459	1,780	941
	AM LOS	F	B	C	-	-	B	B	-	-	B	F	D
	PM Peak Vol	4,204	5,684	875	-	-	709	627	-	-	1,011	1,684	2,083
	PM LOS	C	C	B	-	-	B	B	-	-	C	E	F
AO9 - Roundabouts	Lanes	3	4	1	-	-	1	1	-	-	1	2	2
	AM Peak Vol	6,665	3,489	1,180	-	-	590	684	-	-	459	1,780	941
	AM LOS	F	B	C	-	-	B	B	-	-	B	F	D
	PM Peak Vol	4,204	5,684	875	-	-	709	627	-	-	1,011	1,684	2,083
	PM LOS	C	C	B	-	-	B	B	-	-	C	E	F
AO6 - Diverging Diamond Interchange	Lanes	3	4	1	-	-	1	1	-	-	1	2	2
	AM Peak Vol	6,665	3,489	1,180	-	-	590	684	-	-	459	1,780	941
	AM LOS	F	B	C	-	-	B	B	-	-	B	F	D
	PM Peak Vol	4,204	5,684	875	-	-	709	627	-	-	1,011	1,684	2,083
	PM LOS	C	C	B	-	-	B	B	-	-	C	E	F
AO8 - Partial Cloverleaf	Lanes	3	4	1	1	-	-	-	-	1	1	2	2
	AM Peak Vol	6,665	3,489	1,180	590	-	-	-	-	684	459	1,780	941
	AM LOS	F	B	C	C	-	-	-	-	C	B	F	D
	PM Peak Vol	4,204	5,684	875	709	-	-	-	-	627	1,011	1,684	2,083
	PM LOS	C	C	B	C	-	-	-	-	C	C	E	F

Exit 63 (Bush River Road) Capacity Assessment														
			Freeway Segment		Arterial		EB/SB Ramps				WB/NB Ramps			
Alternative	Year	Peak Hour	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
Existing No-Build	Existing	AM	Under	Under	Under	Under	Under	Under	-	Under	Under	-	-	Under
		PM	Under	Under	Under	Near	Under	Under	-	Under	Under	-	-	Under
	2040	AM	Over	Under	Over	Under	Under	Under	-	Under	Under	-	-	Under
		PM	Under	Under	Near	Over	Under	Under	-	Under	Under	-	-	Under
AO 6 (DDI)	Existing	AM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Under	Near	Under	-	-	Under	Under	-	-	Under
	2040	AM	Over	Under	Over	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Near	Over	Under	-	-	Under	Under	-	-	Under
AO 7 (Offset Diamond)	Existing	AM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Under	Near	Under	-	-	Under	Under	-	-	Under
	2040	AM	Over	Under	Over	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Near	Over	Under	-	-	Under	Under	-	-	Under
AO 8 (Partial Cloverleaf)	Existing	AM	Under	Under	Under	Under	Under	Under	-	-	-	-	Under	Under
		PM	Under	Under	Under	Near	Under	Under	-	-	-	-	Under	Under
	2040	AM	Over	Under	Over	Under	Under	Under	-	-	-	-	Under	Under
		PM	Under	Under	Near	Over	Under	Under	-	-	-	-	Under	Under
AO 9 (Roundabout)	Existing	AM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Under	Near	Under	-	-	Under	Under	-	-	Under
	2040	AM	Over	Under	Over	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Near	Over	Under	-	-	Under	Under	-	-	Under
AO 10 (SPUI)	Existing	AM	Under	Under	Under	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Under	Near	Under	-	-	Under	Under	-	-	Under
	2040	AM	Over	Under	Over	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Near	Over	Under	-	-	Under	Under	-	-	Under
CAP-X Results			First: Partial Cloverleaf				Second: SPUI				Third: Displaced Left			

Exit 65		Existing Interstate		Existing Ramps								Existing Arterial		Annual Growth Rate
Interchange	Alternative	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	EB/SB	WB/NB	
Existing	Lanes	3	3	1	-	-	1	2	-	-	1	2	2	1.00%
	AM Peak Vol	4,779	4,622	363	-	-	988	1,254	-	-	305	2,085	904	**Design Year**
	AM LOS	D	D	B	-	-	B	B	-	-	B	F	D	
	PM Peak Vol	3,927	5,490	266	-	-	993	1,352	-	-	280	1,590	1,591	
	PM LOS	C	D	B	-	-	B	B	-	-	B	E	E	
AO4 - Stacked Diamond - Asymmetrical	Lanes	3	3	1	-	-	1	2	-	-	1	2	2	2040
	AM Peak Vol	4,779	4,622	363	-	-	988	1,254	-	-	305	2,085	904	**Arterial Class**
	AM LOS	D	D	B	-	-	B	B	-	-	B	F	D	
	PM Peak Vol	3,927	5,490	266	-	-	993	1,352	-	-	280	1,590	1,591	III/IV
	PM LOS	C	D	B	-	-	B	B	-	-	B	E	E	
AO3 - Single Point Urban Interchange	Lanes	3	3	1	-	-	1	2	-	-	1	2	2	
	AM Peak Vol	4,779	4,622	363	-	-	988	1,254	-	-	305	2,085	904	
	AM LOS	D	D	B	-	-	B	B	-	-	B	F	D	
	PM Peak Vol	3,927	5,490	266	-	-	993	1,352	-	-	280	1,590	1,591	
	PM LOS	C	D	B	-	-	B	B	-	-	B	E	E	
AO2 - Roundabouts	Lanes	3	3	1	-	-	1	2	-	-	1	2	2	
	AM Peak Vol	4,779	4,622	363	-	-	988	1,254	-	-	305	2,085	904	
	AM LOS	D	D	B	-	-	B	B	-	-	B	F	D	
	PM Peak Vol	3,927	5,490	266	-	-	993	1,352	-	-	280	1,590	1,591	
	PM LOS	C	D	B	-	-	B	B	-	-	B	E	E	
AO1 - Diverging Diamond Interchange	Lanes	3	4	1	-	-	1	2	-	-	1	2	2	
	AM Peak Vol	4,779	4,622	363	-	-	988	1,254	-	-	305	2,085	904	
	AM LOS	D	C	B	-	-	B	B	-	-	B	F	D	
	PM Peak Vol	3,927	5,490	266	-	-	993	1,352	-	-	280	1,590	1,591	
	PM LOS	C	C	B	-	-	B	B	-	-	B	E	E	
AO5 - Stacked Diamond - Offset Lefts	Lanes	3	3	1	-	-	1	2	-	-	1	2	2	
	AM Peak Vol	4,779	4,622	363	-	-	988	1,254	-	-	305	2,085	904	
	AM LOS	D	D	B	-	-	B	B	-	-	B	F	D	
	PM Peak Vol	3,927	5,490	266	-	-	993	1,352	-	-	280	1,590	1,591	
	PM LOS	C	D	B	-	-	B	B	-	-	B	E	E	

Exit 65		Future Interstate		Future Ramp								Future Arterial	
Interchange	Alternative	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	EB/SB	WB/NB
Existing	Lanes	3	3	1	-	-	1	2	-	-	1	2	2
	AM Peak Vol	6,191	5,987	471	-	-	1,280	1,625	-	-	396	2,701	1,171
	AM LOS	E	E	B	-	-	D	B	-	-	B	F	D
	PM Peak Vol	5,087	7,111	345	-	-	1,287	1,752	-	-	363	2,060	2,061
	PM LOS	D	F	B	-	-	D	B	-	-	B	F	F
AO4 - Stacked Diamond - Asymmetrical	Lanes	3	3	1	-	-	1	2	-	-	1	2	2
	AM Peak Vol	6,191	5,987	471	-	-	1,280	1,625	-	-	396	2,701	1,171
	AM LOS	E	E	B	-	-	D	B	-	-	B	F	D
	PM Peak Vol	5,087	7,111	345	-	-	1,287	1,752	-	-	363	2,060	2,061
	PM LOS	D	F	B	-	-	D	B	-	-	B	F	F
AO3 - Single Point Urban Interchange	Lanes	3	3	1	-	-	1	2	-	-	1	2	2
	AM Peak Vol	6,191	5,987	471	-	-	1,280	1,625	-	-	396	2,701	1,171
	AM LOS	E	E	B	-	-	D	B	-	-	B	F	D
	PM Peak Vol	5,087	7,111	345	-	-	1,287	1,752	-	-	363	2,060	2,061
	PM LOS	D	F	B	-	-	D	B	-	-	B	F	F
AO2 - Roundabouts	Lanes	3	3	1	-	-	1	2	-	-	1	2	2
	AM Peak Vol	6,191	5,987	471	-	-	1,280	1,625	-	-	396	2,701	1,171
	AM LOS	E	E	B	-	-	D	B	-	-	B	F	D
	PM Peak Vol	5,087	7,111	345	-	-	1,287	1,752	-	-	363	2,060	2,061
	PM LOS	D	F	B	-	-	D	B	-	-	B	F	F
AO1 - Diverging Diamond Interchange	Lanes	3	3	1	-	-	1	2	-	-	1	2	2
	AM Peak Vol	6,191	5,987	471	-	-	1,280	1,625	-	-	396	2,701	1,171
	AM LOS	E	E	B	-	-	D	B	-	-	B	F	D
	PM Peak Vol	5,087	7,111	345	-	-	1,287	1,752	-	-	363	2,060	2,061
	PM LOS	D	F	B	-	-	D	B	-	-	B	F	F
AO5 - Stacked Diamond - Offset Lefts	Lanes	3	3	1	-	-	1	2	-	-	1	2	2
	AM Peak Vol	6,191	5,987	471	-	-	1,280	1,625	-	-	396	2,701	1,171
	AM LOS	E	E	B	-	-	D	B	-	-	B	F	D
	PM Peak Vol	5,087	7,111	345	-	-	1,287	1,752	-	-	363	2,060	2,061
	PM LOS	D	F	B	-	-	D	B	-	-	B	F	F

Exit 65 (Broad River Road) Capacity Assessment														
			Freeway Segment		Arterial		EB/SB Ramps				WB/NB Ramps			
Alternative	Year	Peak Hour	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
Existing No-Build	Existing	AM	Under	Under	Over	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Near	Near	Under	-	-	Under	Under	-	-	Under
	2040	AM	Near	Near	Over	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Over	Over	Over	Under	-	-	Under	Under	-	-	Under
AO1 (DDI)	Existing	AM	Under	Under	Over	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Near	Near	Under	-	-	Under	Under	-	-	Under
	2040	AM	Near	Near	Over	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Over	Over	Over	Under	-	-	Under	Under	-	-	Under
AO2 (Roundabout)	Existing	AM	Under	Under	Over	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Near	Near	Under	-	-	Under	Under	-	-	Under
	2040	AM	Near	Near	Over	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Over	Over	Over	Under	-	-	Under	Under	-	-	Under
AO3 (SPUI)	Existing	AM	Under	Under	Over	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Near	Near	Under	-	-	Under	Under	-	-	Under
	2040	AM	Near	Near	Over	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Over	Over	Over	Under	-	-	Under	Under	-	-	Under
AO4 (Stacked Diamond)	Existing	AM	Under	Under	Over	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Near	Near	Under	-	-	Under	Under	-	-	Under
	2040	AM	Near	Near	Over	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Over	Over	Over	Under	-	-	Under	Under	-	-	Under
AO5 (Offset Left)	Existing	AM	Under	Under	Over	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Under	Near	Near	Under	-	-	Under	Under	-	-	Under
	2040	AM	Near	Near	Over	Under	Under	-	-	Under	Under	-	-	Under
		PM	Under	Over	Over	Over	Under	-	-	Under	Under	-	-	Under
CAP-X Results			First: Partial Cloverleaf				Second: Displaced Left				Third: SPUI			

Appendix F—Summary of Link Flow, Speed, and Observed Queues

Carolina Crossroads
Link Flows Comparison

EB Ramp Volume							
	7:15 - 8:15 AM				Condition Range		Within
Ramp Location	Segment	Input	Output	GEH	Target		Range
I-26							
Exit 101 (Broad River Road) off ramp (WB)	4758	127	116	0	227	27	TRUE
Exit 101 (Broad River Road) off ramp (EB)	4754	256	238	1	356	156	TRUE
Exit 101 (Broad River Road) on ramp	4747	847	1,141	5	974	720	FALSE
Exit 102 (Lake Murray Boulevard) off ramp (WB)	4749	319	289	1	419	219	TRUE
Exit 102 (Lake Murray Boulevard) off ramp (EB)	4735	247	294	1	347	147	TRUE
Exit 102 (Lake Murray Boulevard) on ramp	4724	720	810	2	828	612	TRUE
Exit 103 (Harbison Boulevard) off ramp	4556	105	127	1	205	5	TRUE
Exit 103 (Harbison Boulevard) on ramp	4713	586	599	0	686	486	TRUE
Exit 104 (Piney Grove Road) off ramp	4582	134	158	1	234	34	TRUE
Exit 104 (Piney Grove Road) on ramp	4686	906	959	1	1,042	770	TRUE
Exit 106 (St. Andrews Road) off ramp	4671	81	139	3	181	-19	TRUE
Exit 106 (St. Andrews Road) EB on	4664	909	875	1	1,045	773	TRUE
Exit 106 (St. Andrews Road) on ramp	4648	1,120	1,196	1	1,288	952	TRUE
Exit 107 (to WB I-20) off ramp	4655	480	550	2	580	380	TRUE
Exit 107 (from WB I-20) on ramp	4640	790	917	2	909	672	FALSE
Exit 107 (to EB I-20) off ramp	4644	1,410	1,554	2	1,622	1,199	TRUE
Exit 107 (from EB I-20) on ramp	6214	1,300	1,293	0	1,495	1,105	TRUE
Exit 108 (Bush River Road) off ramp	4620	324	350	1	424	224	TRUE
Exit 108 (Bush River Road) on ramp	8584	512	580	1	612	412	TRUE
Exit 108 (from/to I-126) off ramp	8583	270	441	5	370	170	FALSE
Exit 110 (US 378 - Sunset Boulevard) off ramp	6179	978	935	1	1,125	831	TRUE
Exit 110 (US 378 - Sunset Boulevard) on ramp	6168	702	737	1	807	597	TRUE
I-20							
Exit 61 (US 378 - Sunset Boulevard) off ramp	2827	864	823	1	994	734	TRUE
Exit 61 (US 378 - Sunset Boulevard) on ramp (WB)	2833	674	675	0	774	574	TRUE
Exit 61 (US 378 - Sunset Boulevard) on ramp (EB)	2821	1,163	1,136	0	1,337	989	TRUE
Exit 63 (Bush River Road) off ramp	2849	911	918	0	1,048	774	TRUE
Exit 63 (Bush River Road) on ramp	2862	99	93	0	199	-1	TRUE
Exit 63 (Bush River Road) on ramp (EB)	2853	367	349	0	467	267	TRUE
Exit 64 (to EB I-26) off ramp	6214	1,300	1,293	0	1,495	1,105	TRUE
Exit 64 (from EB I-26) on ramp	4644	1,410	1,554	2	1,622	1,199	TRUE
Exit 64 (to WB I-26) off ramp	6224	640	615	0	740	540	TRUE
Exit 64 (from WB I-26) on ramp	6203	619	621	0	719	519	TRUE
Exit 65 (Broad River Road) off ramp	6235	363	438	2	463	263	TRUE
Exit 65 (Broad River Road) on ramp	6240	1,014	971	1	1,166	862	TRUE
Exit 68 (Monticello Road) off ramp	6252	736	781	1	846	626	TRUE
Exit 68 (Monticello Road) on ramp	7270	530	460	2	630	430	TRUE
I-126							
From WB I-26 / to WB I-26/I-20	8581	589	657	1	689	489	TRUE
From / To Colonial Life Boulevard	4592	530	471	1	630	430	TRUE
Greystone Boulevard off ramps	4580	588	530	1	688	488	TRUE
Greystone Boulevard on ramps	4571	530	474	1	630	430	TRUE

Carolina Crossroads
Link Flows Comparison

WB Ramp Volume							
	7:15 - 8:15 AM				Condition Range Target		Within Range
Ramp Location	Segment	Input	Output	GEH			
I-26							
Exit 101 (Broad River Road) off ramp (WB)	4752	362	396	1	462	262	TRUE
Exit 101 (Broad River Road) off ramp (EB)	4740	287	232	2	387	187	TRUE
Exit 101 (Broad River Road) on ramp	4759	132	120	1	232	32	TRUE
Exit 102 (Lake Murray Boulevard) off ramp (WB)	4731	484	439	1	584	384	TRUE
Exit 102 (Lake Murray Boulevard) off ramp (EB)	4734	348	346	0	448	248	TRUE
Exit 102 (Lake Murray Boulevard) on ramp	4743	243	249	0	343	143	TRUE
Exit 103 (Harbison Boulevard) off ramp	4709	472	606	3	572	372	FALSE
Exit 103 (Harbison Boulevard) on ramp	4596	158	106	2	258	58	TRUE
Exit 104 (Piney Grove Road) off ramp	4680	617	700	2	717	517	TRUE
Exit 104 (Piney Grove Road) on ramp	4699	251	381	4	351	151	FALSE
Exit 106 (St. Andrews Road) off ramp	4652	764	690	1	879	649	TRUE
Exit 106 (St. Andrews Road) WB off ramp	4658	342	374	1	442	242	TRUE
Exit 106 (St. Andrews Road) on ramp	4674	188	171	1	288	88	TRUE
Exit 107 (to WB I-20) off ramp	4645	460	509	1	560	360	TRUE
Exit 107 (from WB I-20) on ramp	4647	1,122	1,070	1	1,290	954	TRUE
Exit 107 (to EB I-20) off ramp	6203	619	621	0	719	519	TRUE
Exit 107 (from EB I-20) on ramp	6224	640	615	0	740	540	TRUE
Exit 108 (Bush River Road) off ramp	6080	655	458	4	755	555	FALSE
Exit 108 (Bush River Road) on ramp	4607	462	604	3	562	362	FALSE
Exit 108 (from/to I-126) off ramp	8581	520	657	3	620	420	FALSE
Exit 110 (US 378 - Sunset Boulevard) off ramp	6162	901	922	0	1,036	766	TRUE
Exit 110 (US 378 - Sunset Boulevard) on ramp	6173	832	916	1	957	707	TRUE
I-20							
Exit 61 (US 378 - Sunset Boulevard) off ramp	2841	1,104	1,137	0	1,270	938	TRUE
Exit 61 (US 378 - Sunset Boulevard) on ramp (WB)	2824	191	206	1	291	91	TRUE
Exit 61 (US 378 - Sunset Boulevard) on ramp (EB)	2820	138	143	0	238	38	TRUE
Exit 63 (Bush River Road) off ramp	2861	528	611	2	628	428	TRUE
Exit 63 (Bush River Road) on ramp	2851	342	406	2	442	242	TRUE
Exit 64 (to EB I-26) off ramp	4647	1,122	1,070	1	1,290	954	TRUE
Exit 64 (from EB I-26) on ramp	4655	480	550	2	580	380	TRUE
Exit 64 (to WB I-26) off ramp	4640	790	917	2	909	672	FALSE
Exit 64 (from WB I-26) on ramp	4645	460	509	1	560	360	TRUE
Exit 65 (Broad River Road) off ramp	6244	1,210	1,312	1	1,392	1,029	TRUE
Exit 65 (Broad River Road) on ramp	6233	307	266	1	407	207	TRUE
Exit 68 (Monticello Road) off ramp	6262	441	469	1	541	341	TRUE
Exit 68 (Monticello Road) on ramp	6250	484	503	0	584	384	TRUE
I-126							
From WB I-26 / to WB I-26/I-20	4602	332	405	2	432	232	TRUE
To SB (EB) I-26	6184	316	442	3	416	216	FALSE
From / To Colonial Life Boulevard	4597	243	326	2	343	143	TRUE
Greystone Boulevard off ramps	4568	449	466	0	549	349	TRUE
Greystone Boulevard on ramps	4585	321	429	3	421	221	FALSE

Carolina Crossroads
Link Flows Comparison

EB Mainline Volume							
	7:15 - 8:15 AM				Condition Range Target		Within Range
Mainline Location	Segment	Input	Output	GEH			
I-26							
W of Exit 101	8784	4,509	4,366	1	4,909	4,109	TRUE
Exit 101-Exit 102	4748	4,960	5,146	1	5,360	4,560	TRUE
Exit 102-Exit 103	4720	5,110	5,094	0	5,510	4,710	TRUE
Exit 103-Exit 104	4707	5,591	5,345	2	5,991	5,191	TRUE
Exit 104-Exit 106	8552	6,375	5,849	3	6,775	5,975	FALSE
Exit 106-Exit 107	4650	8,383	7,611	4	8,783	7,983	FALSE
Exit 107-Exit 108	4624	8,539	7,668	5	8,939	8,139	FALSE
I-26 to I-26	4612	3,062	2,640	4	3,462	2,662	FALSE
I-26 to Exit 110	8553	3,322	3,596	2	3,722	2,922	TRUE
E of Exit 110	6152	3,035	3,355	3	3,435	2,635	TRUE
I-20							
W of Exit 61	2807	4,158	4,353	1	4,558	3,758	TRUE
Exit 61-Exit 63	8542	5,145	5,304	1	5,545	4,745	TRUE
Exit 63-Exit 64	6216	4,689	4,808	1	5,089	4,289	TRUE
Exit 64-Exit 65	6208	4,779	5,055	2	5,179	4,379	TRUE
Exit 65-Exit 68	8659	5,404	5,545	1	5,804	5,004	TRUE
E of Exit 68	6259	4,968	5,198	2	5,368	4,568	TRUE
I-126							
I-126 Split to Colonial Life Blvd	4609	4,790	4,662	1	5,190	4,390	TRUE
Colonial Life Blvd to Greystone Blvd	4578	5,320	5,768	3	5,720	4,920	FALSE
Greystone to Huger St.	8560	5,320	5,705	3	5,720	4,920	TRUE

Carolina Crossroads
Link Flows Comparison

WB Mainline Volume							
	7:15 - 8:15 AM				Condition Range		Within
Mainline Location	Station	Input	Output	GEH	Target		Range
I-26							
W of Exit 101	4761	2,667	2,510	2	3,067	2,267	TRUE
Exit 101-Exit 102	4739	3,167	3,052	1	3,567	2,767	TRUE
Exit 102-Exit 103	4726	3,678	3,597	1	4,078	3,278	TRUE
Exit 103-Exit 104	4701	3,996	4,098	1	4,396	3,596	TRUE
Exit 104-Exit 106	4677	4,392	4,432	0	4,792	3,992	TRUE
Exit 106-Exit 107	4651	5,336	5,339	0	5,736	4,936	TRUE
Exit 107-Exit 108	6200	4,683	4,799	1	5,083	4,283	TRUE
I-26 to I-26	4604	2,280	2,452	2	2,622	1,938	TRUE
I-26 to Exit 110	6175	3,455	3,579	1	3,855	3,055	TRUE
E of Exit 110	8773	3,506	3,592	1	3,906	3,106	TRUE
I-20							
W of Exit 61	2814	1,664	1,728	1	1,914	1,414	TRUE
Exit 61-Exit 63	8539	2,439	2,524	1	2,805	2,073	TRUE
Exit 63-Exit 64	2859	2,613	2,730	1	3,005	2,221	TRUE
Exit 64-Exit 65	6230	3,563	3,663	1	3,963	3,163	TRUE
Exit 65-Exit 68	8658	4,512	4,729	2	4,912	4,112	TRUE
E of Exit 68	8770	4,469	4,731	2	4,869	4,069	TRUE
I-126							
I-126 Split to Colonial Life Blvd	4601	2,494	2,149	4	2,868	2,120	TRUE
Colonial Life Blvd to Greystone Blvd	4587	2,737	2,929	2	3,137	2,337	TRUE
Greystone to Huger St.	4566	2,863	2,966	1	3,263	2,463	TRUE

Carolina Crossroads
Link Flows Comparison

EB Ramp Volume							
	4:45 - 5:45 PM				Condition Range Target		Within Range
Ramp Location	Segment	Input	Output	GEH			
I-26							
Exit 101 (Broad River Road) off ramp (WB)	4758	88	81	0	188	-12	TRUE
Exit 101 (Broad River Road) off ramp (EB)	4754	117	108	0	217	17	TRUE
Exit 101 (Broad River Road) on ramp	4747	837	756	1	963	711	TRUE
Exit 102 (Lake Murray Boulevard) off ramp (WB)	4749	193	189	0	293	93	TRUE
Exit 102 (Lake Murray Boulevard) off ramp (EB)	4735	62	58	0	162	-38	TRUE
Exit 102 (Lake Murray Boulevard) on ramp	4724	757	636	2	871	643	FALSE
Exit 103 (Harbison Boulevard) off ramp	4556	372	276	3	472	272	TRUE
Exit 103 (Harbison Boulevard) on ramp	4713	857	711	3	986	728	FALSE
Exit 104 (Piney Grove Road) off ramp	4582	272	179	3	372	172	TRUE
Exit 104 (Piney Grove Road) on ramp	4686	780	823	1	897	663	TRUE
Exit 106 (St. Andrews Road) off ramp	4671	287	339	1	387	187	TRUE
Exit 106 (St. Andrews Road) EB on	4664	890	723	3	1,024	757	FALSE
Exit 106 (St. Andrews Road) on ramp	4648	696	648	1	796	596	TRUE
Exit 107 (to WB I-20) off ramp	4655	750	784	1	863	638	TRUE
Exit 107 (from WB I-20) on ramp	4640	560	574	0	660	460	TRUE
Exit 107 (to EB I-20) off ramp	4644	1,240	1,206	0	1,426	1,054	TRUE
Exit 107 (from EB I-20) on ramp	6214	560	683	2	660	460	FALSE
Exit 108 (Bush River Road) off ramp	4620	340	444	3	440	240	FALSE
Exit 108 (Bush River Road) on ramp	8584	638	684	1	738	538	TRUE
Exit 108 (from/to I-126) off ramp	8583	560	607	1	660	460	TRUE
Exit 110 (US 378 - Sunset Boulevard) off ramp	6179	783	603	3	900	666	FALSE
Exit 110 (US 378 - Sunset Boulevard) on ramp	6168	826	809	0	950	702	TRUE
I-20							
Exit 61 (US 378 - Sunset Boulevard) off ramp	2827	315	307	0	415	215	TRUE
Exit 61 (US 378 - Sunset Boulevard) on ramp (WB)	2833	493	367	3	593	393	FALSE
Exit 61 (US 378 - Sunset Boulevard) on ramp (EB)	2821	709	609	2	815	603	TRUE
Exit 63 (Bush River Road) off ramp	2849	675	589	2	775	575	TRUE
Exit 63 (Bush River Road) on ramp	2862	130	149	1	230	30	TRUE
Exit 63 (Bush River Road) on ramp (EB)	2853	419	452	1	519	319	TRUE
Exit 64 (to EB I-26) off ramp	6214	560	683	2	660	460	FALSE
Exit 64 (from EB I-26) on ramp	4644	1,240	1,206	0	1,426	1,054	TRUE
Exit 64 (to WB I-26) off ramp	6224	570	560	0	670	470	TRUE
Exit 64 (from WB I-26) on ramp	6203	700	670	1	805	595	TRUE
Exit 65 (Broad River Road) off ramp	6235	266	427	4	366	166	FALSE
Exit 65 (Broad River Road) on ramp	6240	1,018	899	2	1,171	865	TRUE
Exit 68 (Monticello Road) off ramp	6252	478	469	0	578	378	TRUE
Exit 68 (Monticello Road) on ramp	7270	609	522	2	709	509	TRUE
I-126							
From WB I-26 / to WB I-26/I-20	8581	280	269	0	380	180	TRUE
From / To Colonial Life Boulevard	4592	308	285	1	408	208	TRUE
Greystone Boulevard off ramps	4580	503	407	2	603	403	TRUE
Greystone Boulevard on ramps	4571	535	538	0	635	435	TRUE

Carolina Crossroads
Link Flows Comparison

WB Ramp Volume							
	4:45 - 5:45 PM				Condition Range Target		Within Range
Ramp Location	Segment	Input	Output	GEH			
I-26							
Exit 101 (Broad River Road) off ramp (WB)	4752	661	527	3	761	561	FALSE
Exit 101 (Broad River Road) off ramp (EB)	4740	401	333	2	501	301	TRUE
Exit 101 (Broad River Road) on ramp	4759	229	193	1	329	129	TRUE
Exit 102 (Lake Murray Boulevard) off ramp (WB)	4731	606	478	3	706	506	FALSE
Exit 102 (Lake Murray Boulevard) off ramp (EB)	4734	351	314	1	451	251	TRUE
Exit 102 (Lake Murray Boulevard) on ramp	4743	409	234	5	509	309	FALSE
Exit 103 (Harbison Boulevard) off ramp	4709	800	628	3	920	680	FALSE
Exit 103 (Harbison Boulevard) on ramp	4596	468	369	2	568	368	TRUE
Exit 104 (Piney Grove Road) off ramp	4680	693	592	2	793	593	FALSE
Exit 104 (Piney Grove Road) on ramp	4699	413	429	0	513	313	TRUE
Exit 106 (St. Andrews Road) off ramp	4652	470	370	2	570	370	FALSE
Exit 106 (St. Andrews Road) WB off ramp	4658	632	527	2	732	532	FALSE
Exit 106 (St. Andrews Road) on ramp	4674	256	214	1	356	156	TRUE
Exit 107 (to WB I-20) off ramp	4645	1,190	1,083	2	1,369	1,012	TRUE
Exit 107 (from WB I-20) on ramp	4647	1,410	1,372	1	1,622	1,199	TRUE
Exit 107 (to EB I-20) off ramp	6203	700	670	1	805	595	TRUE
Exit 107 (from EB I-20) on ramp	6224	570	560	0	670	470	TRUE
Exit 108 (Bush River Road) off ramp	6080	932	750	3	1,072	792	FALSE
Exit 108 (Bush River Road) on ramp	4607	1,247	1,084	2	1,434	1,060	TRUE
Exit 108 (from/to I-126) off ramp	8581	280	269	0	380	180	TRUE
Exit 110 (US 378 - Sunset Boulevard) off ramp	6162	787	740	1	905	669	TRUE
Exit 110 (US 378 - Sunset Boulevard) on ramp	6173	820	899	1	943	697	TRUE
I-20							
Exit 61 (US 378 - Sunset Boulevard) off ramp	2841	1,737	1,353	5	1,998	1,476	FALSE
Exit 61 (US 378 - Sunset Boulevard) on ramp (WB)	2824	355	302	1	455	255	TRUE
Exit 61 (US 378 - Sunset Boulevard) on ramp (EB)	2820	209	202	0	309	109	TRUE
Exit 63 (Bush River Road) off ramp	2861	460	564	2	560	360	FALSE
Exit 63 (Bush River Road) on ramp	2851	840	770	1	966	714	TRUE
Exit 64 (to EB I-26) off ramp	4647	1,410	1,372	1	1,622	1,199	TRUE
Exit 64 (from EB I-26) on ramp	4655	750	784	1	863	638	TRUE
Exit 64 (to WB I-26) off ramp	4640	560	574	0	660	460	TRUE
Exit 64 (from WB I-26) on ramp	4645	1,190	1,083	2	1,369	1,012	TRUE
Exit 65 (Broad River Road) off ramp	6244	1,556	1,482	1	1,789	1,323	TRUE
Exit 65 (Broad River Road) on ramp	6233	284	377	3	384	184	TRUE
Exit 68 (Monticello Road) off ramp	6262	358	374	0	458	258	TRUE
Exit 68 (Monticello Road) on ramp	6250	776	708	1	892	660	TRUE
I-126							
From WB I-26 / to WB I-26/I-20	4602	828	559	5	952	704	FALSE
To SB (EB) I-26	6184	560	609	1	660	460	TRUE
From / To Colonial Life Boulevard	4597	812	734	1	934	690	TRUE
Greystone Boulevard off ramps	4568	645	641	0	745	545	TRUE
Greystone Boulevard on ramps	4585	634	615	0	734	534	TRUE

Carolina Crossroads
Link Flows Comparison

EB Mainline Volume							
	4:45 - 5:45 PM				Condition Range Target		Within Range
Mainline Location	Segment	Input	Output	GEH			
I-26							
W of Exit 101	8784	2,900	3,046	1	3,300	2,500	TRUE
Exit 101-Exit 102	4748	3,532	3,650	1	3,932	3,132	TRUE
Exit 102-Exit 103	4720	4,034	4,064	0	4,434	3,634	TRUE
Exit 103-Exit 104	4707	4,515	4,521	0	4,915	4,115	TRUE
Exit 104-Exit 106	8552	5,023	5,220	1	5,423	4,623	TRUE
Exit 106-Exit 107	4650	6,322	6,317	0	6,722	5,922	TRUE
Exit 107-Exit 108	4624	5,452	5,473	0	5,852	5,052	TRUE
I-26 to I-26	4612	2,790	2,531	3	3,190	2,390	TRUE
I-26 to Exit 110	8553	3,950	3,604	3	4,350	3,550	TRUE
E of Exit 110	6152	3,993	3,906	1	4,393	3,593	TRUE
I-20							
W of Exit 61	2807	2,452	2,482	0	2,820	2,084	TRUE
Exit 61-Exit 63	8542	3,144	3,204	1	3,544	2,744	TRUE
Exit 63-Exit 64	6216	3,228	3,207	0	3,628	2,828	TRUE
Exit 64-Exit 65	6208	3,639	3,895	2	4,039	3,239	TRUE
Exit 65-Exit 68	8659	4,391	4,374	0	4,791	3,991	TRUE
E of Exit 68	6259	4,522	4,439	1	4,922	4,122	TRUE
I-126							
I-126 Split to Colonial Life Blvd	4609	2,681	2,401	3	3,083	2,279	TRUE
Colonial Life Blvd to Greystone Blvd	4578	3,037	2,994	0	3,437	2,637	TRUE
Greystone to Huger St.	8560	3,069	3,121	0	3,469	2,669	TRUE

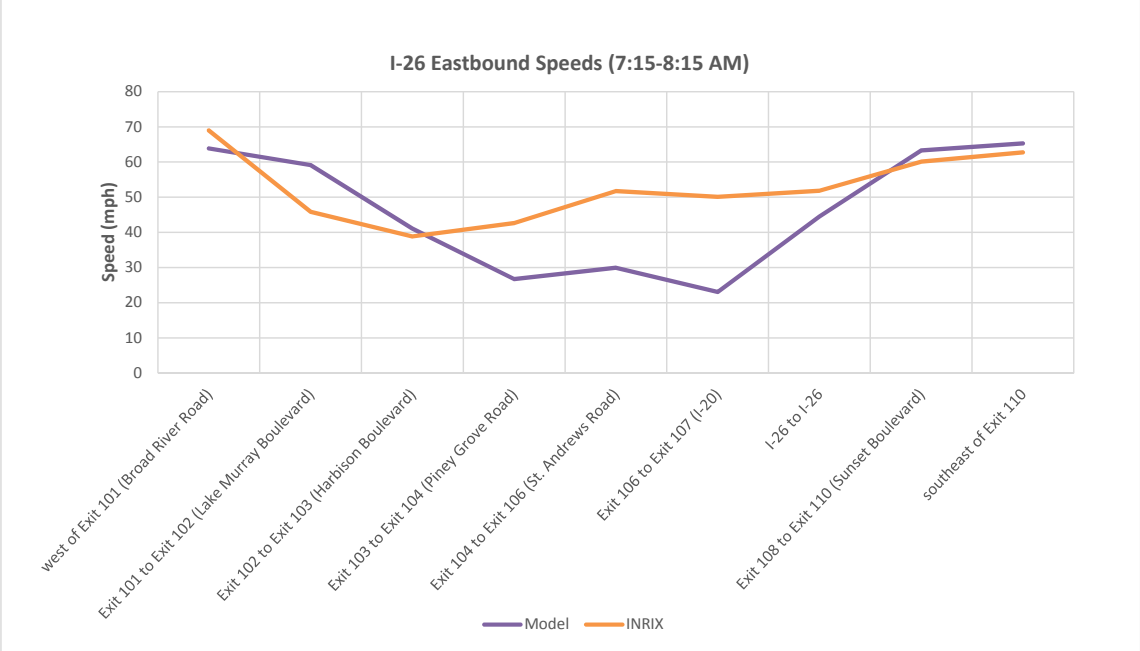
Carolina Crossroads
Link Flows Comparison

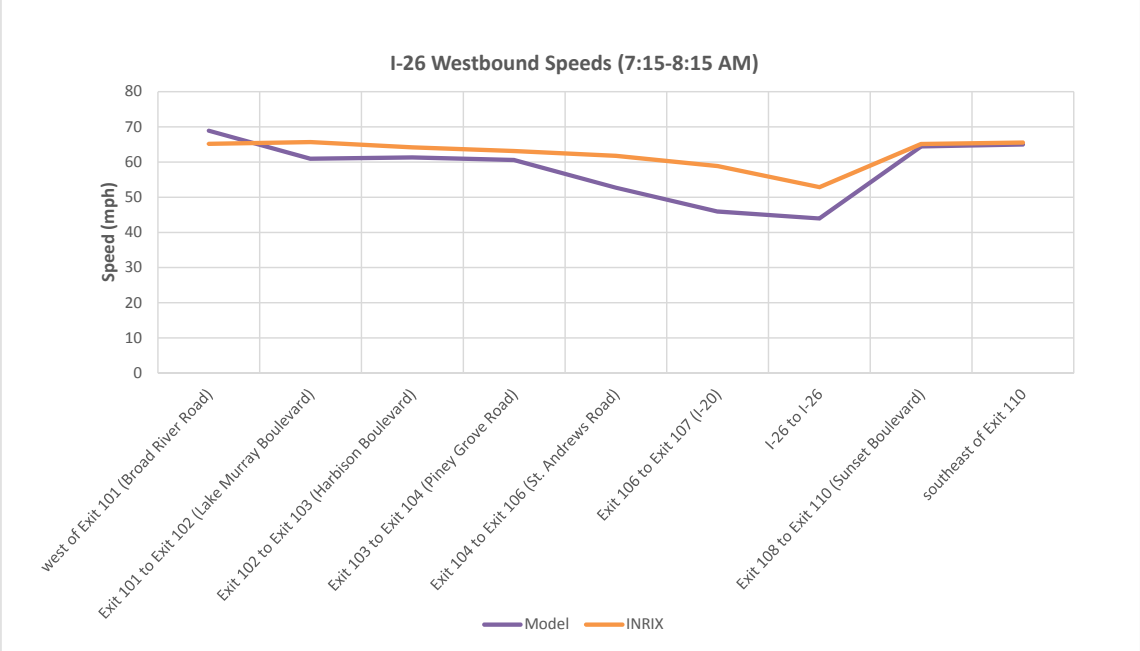
WB Mainline Volume							
	4:45 - 5:45 PM				Condition Range Target		Within Range
Mainline Location	Station	Input	Output	GEH			
I-26							
W of Exit 101	4761	5,083	4,135	7	5,483	4,683	FALSE
Exit 101-Exit 102	4739	5,916	5,034	6	6,316	5,516	FALSE
Exit 102-Exit 103	4726	6,464	5,696	5	6,864	6,064	FALSE
Exit 103-Exit 104	4701	6,796	5,967	5	7,196	6,396	FALSE
Exit 104-Exit 106	4677	7,076	6,128	6	7,476	6,676	FALSE
Exit 106-Exit 107	4651	6,306	6,832	3	6,706	5,906	FALSE
Exit 107-Exit 108	6200	6,216	6,811	4	6,616	5,816	FALSE
I-26 to I-26	4604	2,690	2,545	1	3,094	2,287	TRUE
I-26 to Exit 110	6175	3,942	3,968	0	4,342	3,542	TRUE
E of Exit 110	8773	4,023	4,026	0	4,423	3,623	TRUE
I-20							
W of Exit 61	2814	3,422	3,490	1	3,822	3,022	TRUE
Exit 61-Exit 63	8539	4,558	4,434	1	4,958	4,158	TRUE
Exit 63-Exit 64	2859	4,547	4,198	3	4,947	4,147	TRUE
Exit 64-Exit 65	6230	4,577	4,415	1	4,977	4,177	TRUE
Exit 65-Exit 68	8658	5,649	5,677	0	6,049	5,249	TRUE
E of Exit 68	8770	5,231	5,389	1	5,631	4,831	TRUE
I-126							
I-126 Split to Colonial Life Blvd	4601	5,364	3,910	11	5,764	4,964	FALSE
Colonial Life Blvd to Greystone Blvd	4587	6,099	5,690	3	6,499	5,699	FALSE
Greystone to Huger St.	4566	6,110	6,054	0	6,510	5,710	TRUE

I-26 Segment Speed Comparison

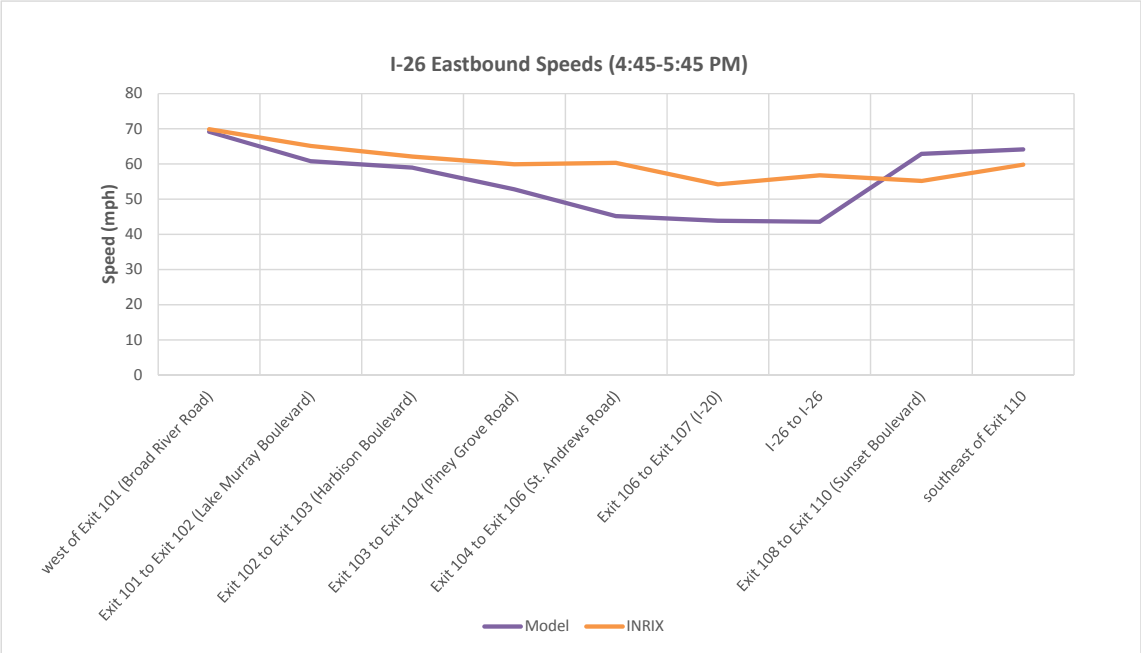
Location	Eastbound					Westbound				
	Segment	AM Peak		PM Peak		Segment	AM Peak		PM Peak	
	ID	INRIX	Model	INRIX	Model	ID	INRIX	Model	INRIX	Model
west of Exit 101 (Broad River Road)	4768	69	64	70	69	8783	65	69	63	66
Exit 101 to Exit 102 (Lake Murray Boulevard)	4748	46	59	65	61	4739	66	61	64	61
Exit 102 to Exit 103 (Harbison Boulevard)	4720	39	41	62	59	4726	64	61	62	53
Exit 103 to Exit 104 (Piney Grove Road)	4707	43	27	60	53	4701	63	61	50	54
Exit 104 to Exit 106 (St. Andrews Road)	8552	52	30	60	45	4677	62	53	24	43
Exit 106 to Exit 107 (I-20)	4650	50	23	54	44	4651	59	46	24	17
I-26 to I-26	4612	52	45	57	44	4604	53	44	20	14
Exit 108 to Exit 110 (Sunset Boulevard)	8553	60	63	55	63	6175	65	64	32	41
southeast of Exit 110	6152	63	65	60	64	8773	66	65	59	64

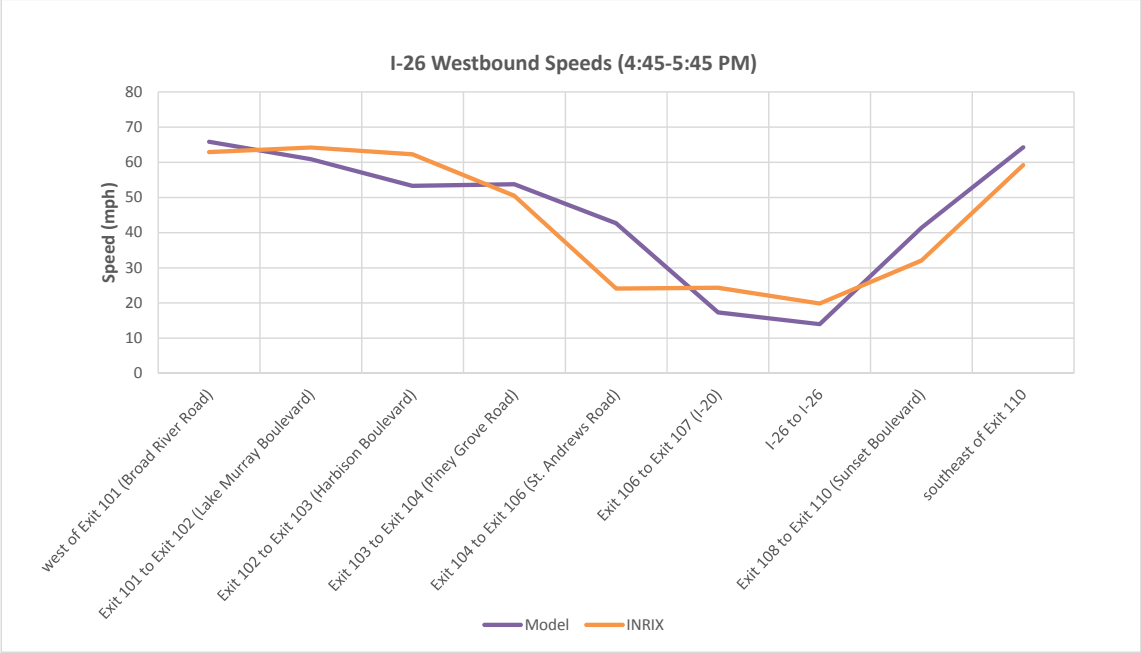
I-26 Segment Speed Comparison





I-26 Segment Speed Comparison

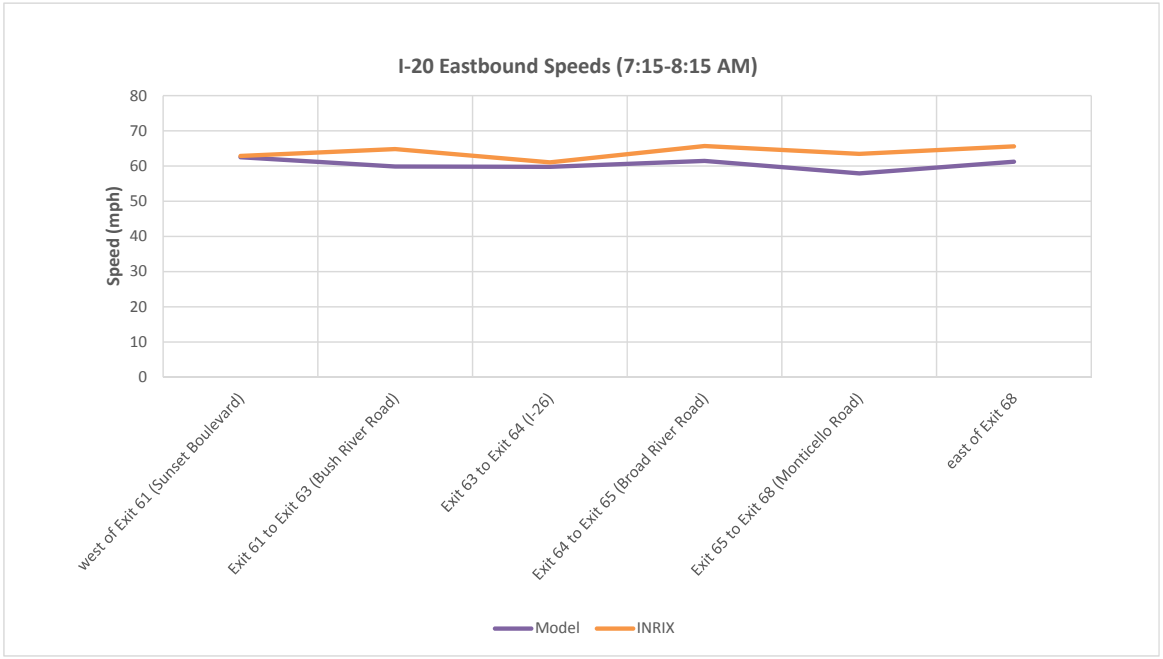


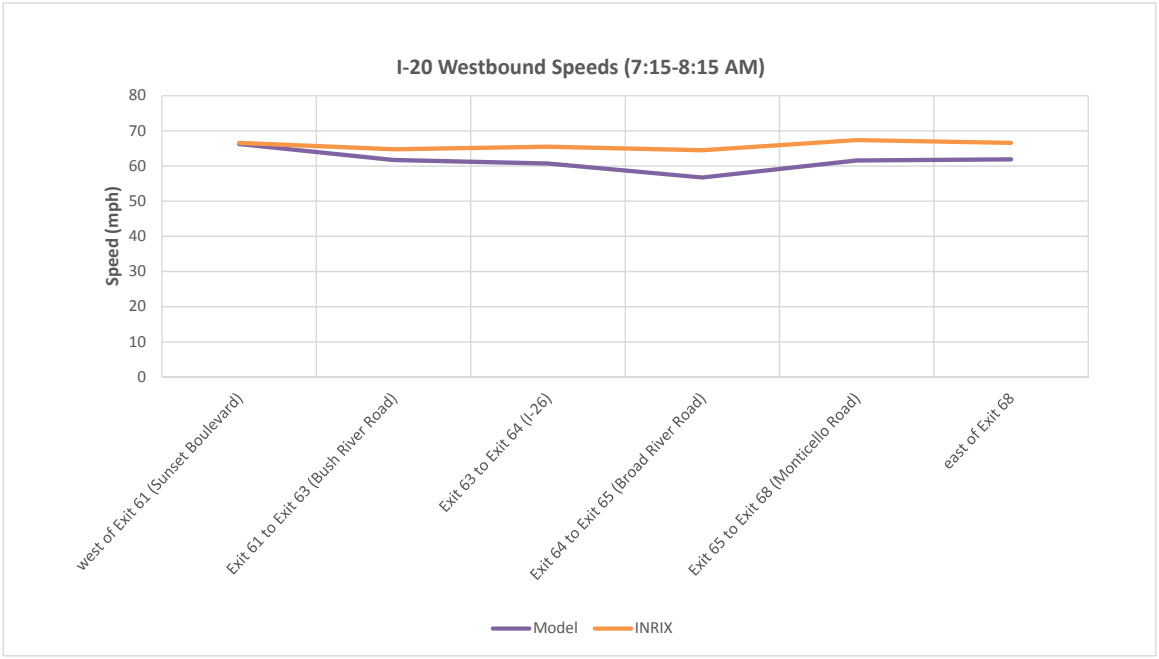


I-20 Segment Speed Comparison

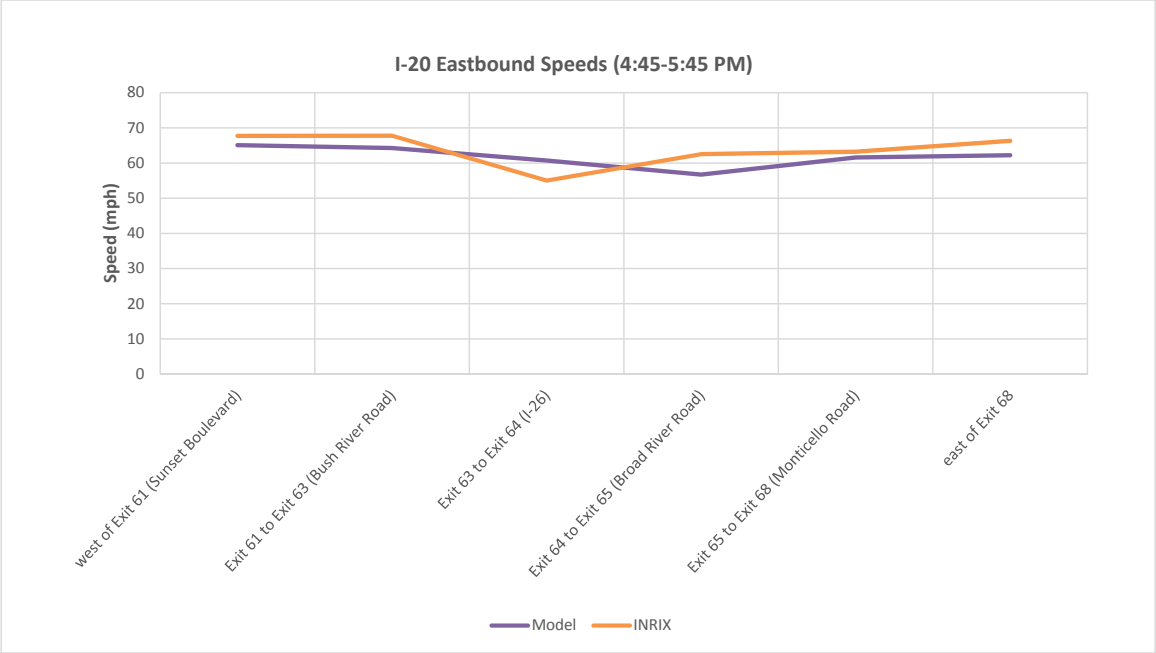
Location	Eastbound					Westbound				
	Segment	AM Peak		PM Peak		Segment	AM Peak		PM Peak	
	ID	INRIX	Model	INRIX	Model	ID	INRIX	Model	INRIX	Model
west of Exit 61 (Sunset Boulevard)	2807	63	63	68	65	2814	67	66	52	52
Exit 61 to Exit 63 (Bush River Road)	8542	65	60	68	64	8539	65	62	41	56
Exit 63 to Exit 64 (I-26)	6216	61	60	55	61	2859	65	61	45	57
Exit 64 to Exit 65 (Broad River Road)	6208	66	61	63	57	6230	64	57	43	38
Exit 65 to Exit 68 (Monticello Road)	8659	63	58	63	62	8658	67	62	54	48
east of Exit 68	6259	66	61	66	62	8770	67	62	52	59

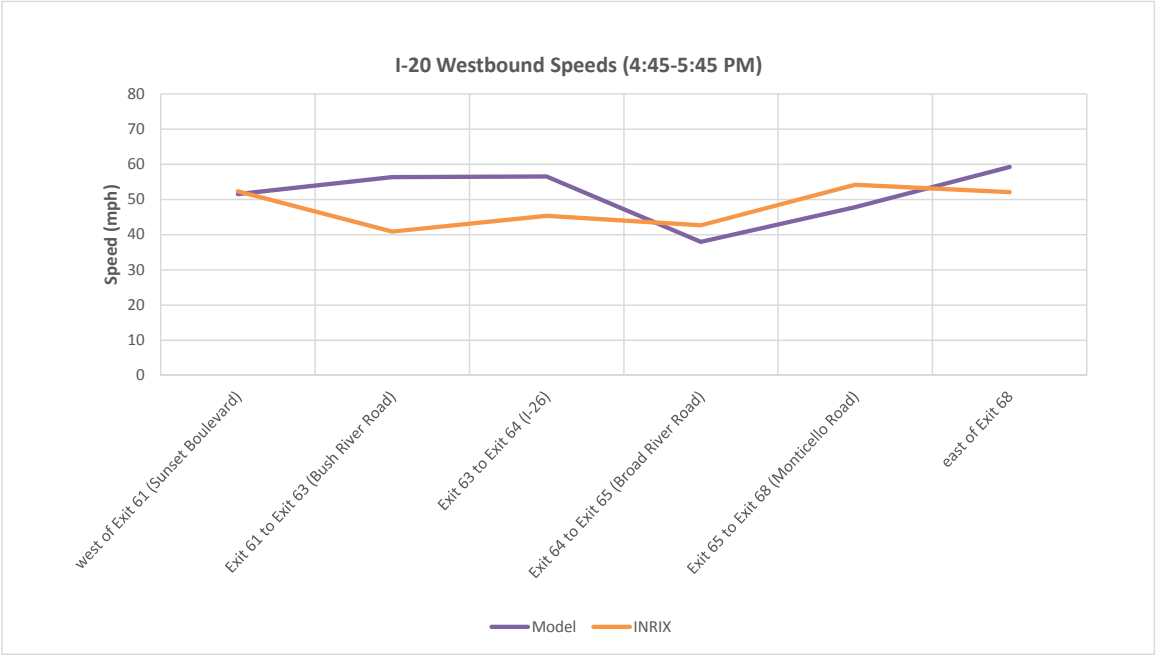
I-20 Segment Speed Comparison





I-20 Segment Speed Comparison

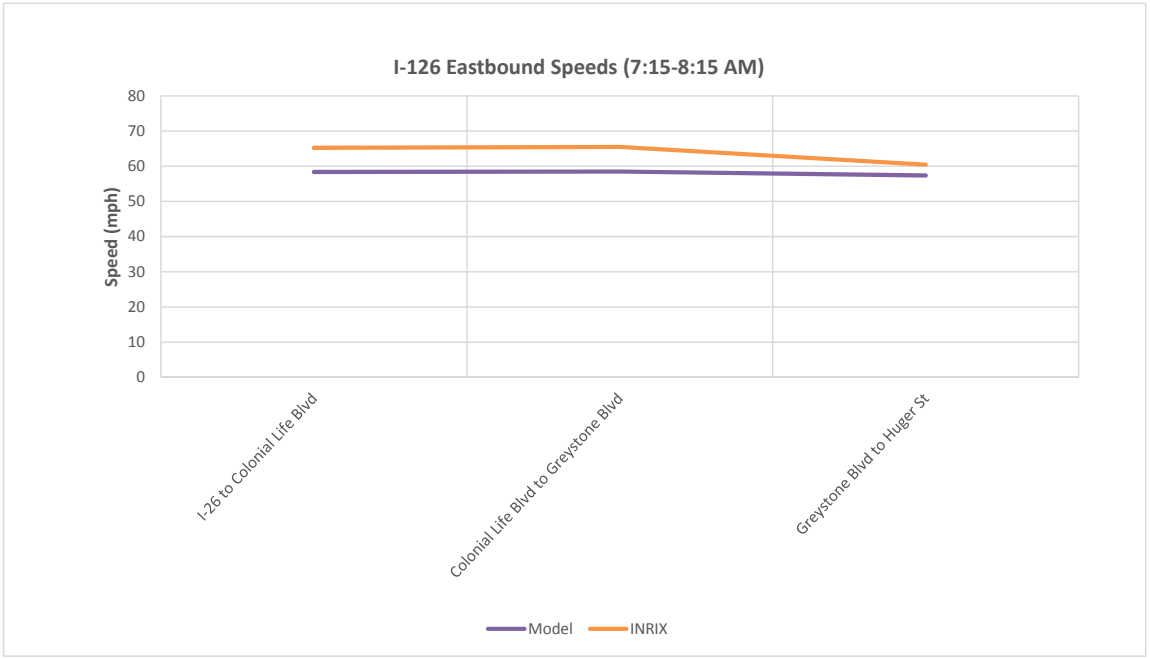


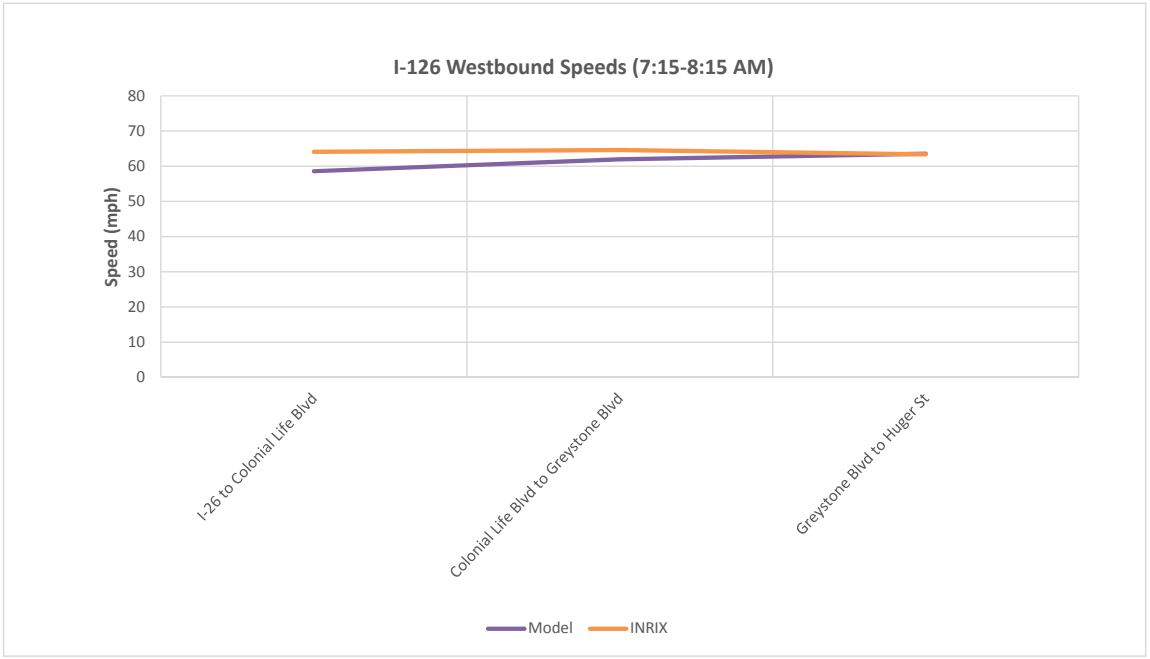


I-126 Segment Speed Comparison

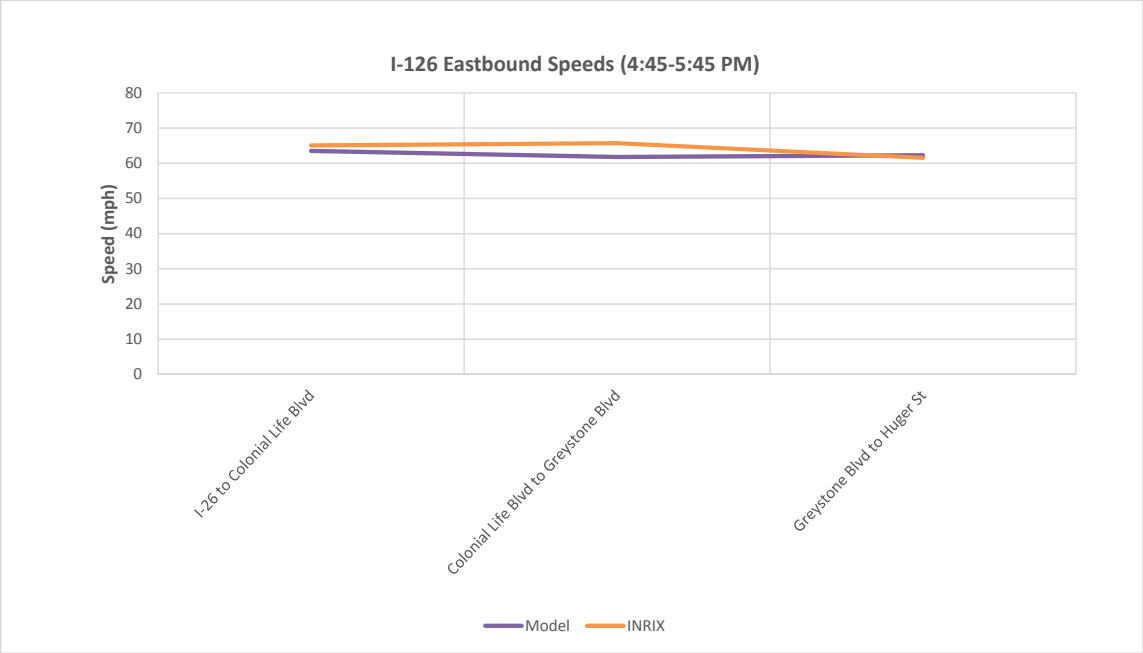
Location	Eastbound					Westbound				
	Segment	AM Peak		PM Peak		Segment	AM Peak		PM Peak	
	ID	INRIX	Model	INRIX	Model	ID	INRIX	Model	INRIX	Model
I-26 to Colonial Life Blvd	4594	65	58	65	64	4599	64	59	23	22
Colonial Life Blvd to Greystone Blvd	4578	66	59	66	62	4587	65	62	39	35
Greystone Blvd to Huger St	8560	60	57	62	62	4566	63	64	61	61

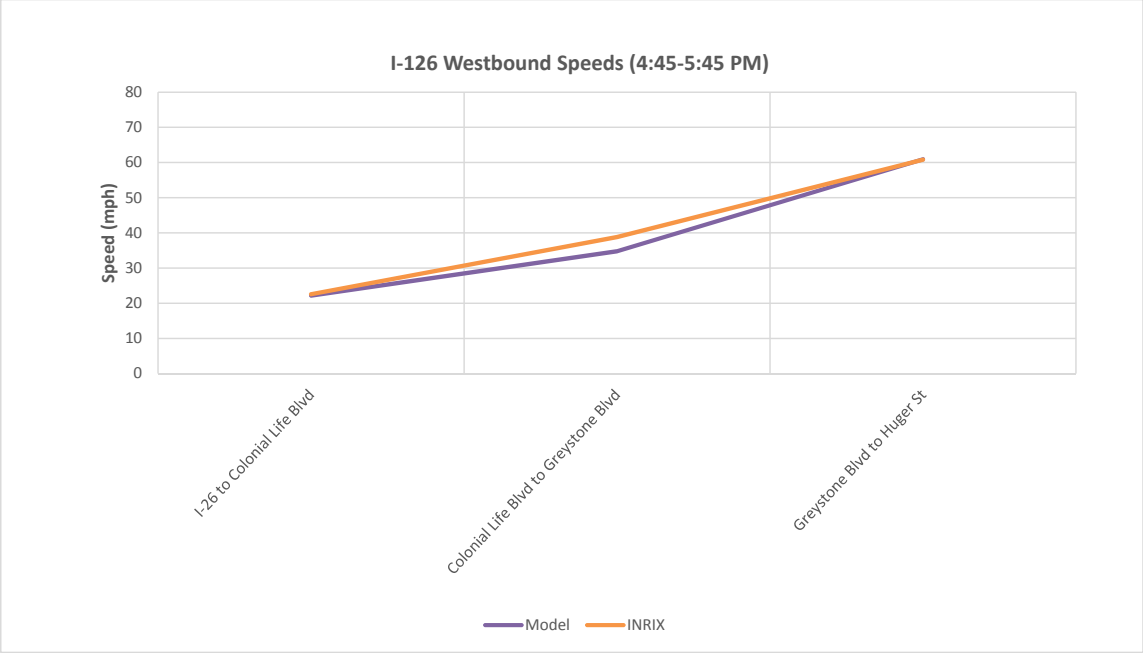
I-126 Segment Speed Comparison





I-126 Segment Speed Comparison





Observations from the I-20/26/77 Corridor Management Plan Study

Interstate Segment		Eastbound Observations	Westbound Observations
I-26	Columbia Avenue to US 176	--	--
I-26	US 176 to US 76/US 176	--	AM Peak: Traffic is moving at free flow speeds. But the ramp merging area is not being utilized. Recent construction extended the lane but traffic is merging too quickly. Most WB traffic get in fast lane to avoid ramp traffic. PM Peak: --
I-26	US 76/US 176 to Lake Murray Boulevard	AM Peak: Congested, but traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 30-40 mph. PM Peak: --	AM Peak: -- PM Peak: Congested, but traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 30-40 mph.
I-26	Lake Murray Boulevard to Harbison Boulevard	AM Peak: Congested, but traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 20-30 mph. PM Peak: --	AM Peak: -- PM Peak: Congested, but traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 20-30 mph.
I-26	Harbison Boulevard to Piney Grove Road	AM Peak: Congested, but traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 20-30 mph. PM Peak: --	AM Peak: -- PM Peak: Congested traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 20-30 mph.
I-26	Piney Grove Road to Saint Andrews Road	AM Peak: Congested traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 15-20 mph. PM Peak: --	AM Peak: -- PM Peak: Congested traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 15-20 mph.
I-26	Saint Andrews Road to I 20	AM Peak: Congested traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 15-20 mph. PM Peak: Within the past year congested has started heavily in the middle lane, but traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 10-15 mph.	AM Peak: -- PM Peak: Heavily congested stop and go traffic.
I-26	I-20 to Bush River Road	AM Peak: Heavily Congested traffic, but is not typically stop and go. Traffic moves less than free flow speed, approximately 10-15 mph. PM Peak: Within the past year congested has started heavily in the middle lane, but traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 10-15 mph.	AM Peak: -- PM Peak: Heavily congested stop and go traffic. Ramp to Bush River Rd. backs up as well bu may just be a timing issue.

Observations from the I-20/26/77 Corridor Management Plan Study

Interstate Segment		Eastbound Observations	Westbound Observations
I-26	Bush River Road to I-126	AM Peak: Heavily Congested traffic, but is not typically stop and go. Traffic moves less than free flow speed, approximately 10-15 mph. PM Peak: Within the past year congested has started heavily in the middle lane, but traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 10-15 mph. Merge on-ramp to I-26 EB from Bush River Rd. backs up about half the length of the ramp.	AM Peak: -- PM Peak: Heavily congested stop and go traffic.
I-26	I-126 to Sunset Boulevard	AM Peak: Heavily Congested traffic, but is not typically stop and go. Traffic moves less than free flow speed, approximately 10-15 mph. PM Peak: Congested, but traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 30-40 mph. Off-ramp to Sunset Blvd backs up about the full length of the ramp.	AM Peak: -- PM Peak: Heavily congested stop and go traffic from the beginning of the bridge through the fly over to I-26 WB.
I-26	Sunset Boulevard to Augusta Road	AM Peak: -- PM Peak: Off-ramp to WB August Rd backs up on about half or the ramp.	--

Observations from the I-20/26/77 Corridor Management Plan Study

Interstate Segment		Eastbound Observations	Westbound Observations
I-20	Sunset Boulevard to Bush River Road	AM Peak: Congested, but traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 40-50 mph PM Peak: --	AM Peak: -- PM Peak: Congestion starts at Bush River Rd and is stop and goes all the way to the Sunset Blvd. interchange. This is due in part from the lane drop around MM 61.5. There are plans to begin construction in the next 4 months to add the third lane from MM 61.5 to MM 49.
I-20	Bush River Road to I-26	AM Peak: Congested traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 40-50 mph. PM Peak: --	AM Peak: -- PM Peak: Congested after on-ramps from I-26, but traffic is not typically stop and go . Traffic is approimately moving at 30-40 mph.
I-20	I-26 to Broad River Road	AM Peak: Congested traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 40-50 mph. PM Peak: --	AM Peak: -- PM Peak: Heavily congested traffic is typically stop and go. On-ramp to I-26 WB backs up onto I-20.
I-20	Broad River Road to Monticello Road	AM Peak: Congested traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 40-50 mph. The off-ramp to Monticello Rd backs up but it under construction to widened the ramp to two lanes. PM Peak: --	AM Peak: -- PM Peak: Congested to about a mile west of Monticello Rd., but not stop and go. Typically traffic is not at free-flow speed but moving at appromiately 40-50 mph. Off-ramp to Broad River Rd. can get congested due to traffic on Broad River Rd.

Observations from the I-20/26/77 Corridor Management Plan Study

Interstate Segment		Eastbound Observations	Westbound Observations
I-126	I-26 to Colonial Life Boulevard	AM Peak: Heavily Congested traffic, but is not typically stop and go. Traffic moves less than free flow speed, approximately 10-15 mph. PM Peak: --	AM Peak: -- PM Peak: Heavily congested stop and go traffic.
I-126	Colonial Life Boulevard to Greystone Boulevard	AM Peak: Heavily Congested traffic, but is not typically stop and go. Traffic moves less than free flow speed, approximately 20-30 mph. PM Peak: --	AM Peak: -- PM Peak: Heavily congested stop and go traffic.
I-126	Greystone Boulevard to Huger Street/Elmwood Avenue	AM Peak: Heavily Congested traffic is typically stop and go from the river to Elmwood Avenue. PM Peak: --	

Observations from the I-20/26/77 Corridor Management Plan Study

Roadway	Observations
Longs Pond Road	Significant congestion in AM from Two Notch Road that backs up to fork with Barr Road. PM congestion as well at fork of Two Notch Road and Barr Road that backs up to ramp off I-20. This may warrent a signal it is currently stop control.
South Lake Drive	No significant congestion issues.
Sunset Boulevard at I-20	AM peak hour EB congestionfrom Northside Blvd. through to Cromer Rd PM peak hour congestion WB from the I-20 WB off-ramp traffic.
Bush River Road at I-20	PM peak hour congestion in the WB direction.
Broad River Road at I-20	PM peak hour congestion near the I-20 ramps.
Monticello Road	No significant congestion issues.
Columbia Avenue	No significant congestion issues.
US 176	No significant congestion issues.
US 76/US 176 at I-26	No significant congestion issues.
Lake Murray Boulevard	No significant congestion issues.
Harbison Boulevard	AM stop and go NB traffic through the interchange. PM stop and go NB and SB traffic, this may be a timing issue.
Piney Grove Road	Am peak hour congestion to get to EB on-ramp. Merge on ramp causes back ups, a two lane ramp may help alleviate some issues. PM peak hour congestion on WB off-ramp with short merging lane.
Saint Andrews Road	No significant congestion issues.
Bush River Road at I-26	Slight PM peak hour congestion from WB traffic.
Sunset Boulevard at I-26	PM peak hour congestion on ramps from short signal time and hospital traffic.
Colonial Life Boulevard	No significant congestion issues.
Greystone Boulevard	No significant congestion issues.
Huger Street/Elmwood Avenue	AM peak hour EB congestion to Assembly Street. PM peak hour congestion on Huger Street at Laruel Street that may be a timing issue.

Appendix G—Choke Point Review

Reasonable Alternative 1 – Microsimulation Summary (2040 Volumes)

Freeway Segments

Segment	AM		PM		Comment
	EB	WB	EB	WB	
Exit 101-102	Under	Under	Under	Under	
Exit 102-103	Under	Under	Under	At	As shown in new .KMZ file, the westbound on-ramp acceleration lane from Exit 103 will be extended to the westbound off-ramp at Exit 102 which will increase capacity.
Exit 103-104	Under	Under	Under	Over	Additional weaving issues with the westbound off-ramp to Harbison Boulevard closer to the westbound on-ramp from Piney Grove Road; may have to consider extending westbound on-ramp acceleration lane to the westbound off-ramp lane, creating a westbound weaving section between Piney Grove
Exit 104-106	Over	Under	Over	Over	Overcapacity in EB direction due to Exit ramp queue back up toward I-20 in both the AM and PM peak hours. (Additional through lane on I-26 EB necessary (as shown in new .KMZ file). Heavy PM queuing at on-ramp merge from Exit 106
Exit 106-107	Under	Under	Under	At	Heavy volume in the westbound direction during the PM peak hour. However, flow is steady
Exit 107-108	Under	Under	Under	At	Heavy volume in the westbound direction during the PM peak hour. However, flow is steady
Exit 108-110	Under	Under	Under	Under	
Exit 108 – Colonial Life	At	Under	At	Under	Heavy volume along I-126 eastbound after the on-ramp from I-20. Merge causes slow down. New .KMZ file maintains four lanes.
Exit 63-64	Under	Under	Under	Under	Will update (as shown in new .KMZ file)
Exit 64-65	Under	Under	Under	Under	Will update (as shown in new .KMZ file)

Interchanges

Exit		AM		PM		
Location	AO	EB Ramp	WB Ramp	EB Ramp	WB Ramp	Comment
Exit 101	Par.Clo.	Under	Under	Under	Under	
Exit 102	Par.Clo.	Under	Under	Under	Under	
Exit 103	AO35	Under	Under	Under	At	WB off-ramp experiences queuing on arterial. However, flow is steady.
Exit 104	AO30	At	Under	Under	Under	Eastbound on-ramp experiences queuing on arterial. However, flow is steady.
Exit 106	AO13	Over	Under	Under	Over	Eastbound on-ramp experiences heavy queuing on arterial from the west during AM peak hour. Eastbound on-ramp experiences heavy queuing on arterial from the east during the PM peak hour.
Exit 107/Exit 64	AO17	At	Under	Under	Under	Heavy weaving/merging from I-26 eastbound on-ramp from I-20.
Exit 108 – I-126	AO24	At	Under	Under	At	Heavy volume along I-126 eastbound after the on-ramp from I-20 during the AM peak hour. New .KMZ file maintains four lanes. Heavy volume along I-126 westbound before merge to I-26. New .KMZ file maintains three lanes.
Exit 110	AO46	Under	Under	Over	At	Arterial experiences heavy queuing causing backup on both eastbound and westbound off-ramps.
Colonial Life	AO17	Under	Under	Under	Under	Will update (as shown in new .KMZ file)

Interchanges - continued

Exit		AM		PM		
Location	AO	EB Ramp	WB Ramp	EB Ramp	WB Ramp	Comment
Exit 63	AO6	At	Over	At	Over	Although not shown in simulation, Bush River Road arterial experiences heavy queuing. Currently, DDI signals are clustered with the Berryhill Road signal; this adds additional delay to the operation of the DDI. Westbound off-ramp queue extends to I-20.
Exit 65	AO3	At	Under	Over	Over	The southbound left turn onto I-20 eastbound experiences moderate queuing during the AM peak hour. Broad River Road experiences heavy northbound queuing causing backup on the westbound off-ramps. The eastbound off ramp experiences heavy queuing. Traffic control modifications may be necessary to alleviate off-ramp queuing.

Simulation Observations and Alternative Modifications

The greenline work is the KMZ file used for the simulation observations. The gray linework is the revised design which will be incorporated into the simulation model.

- Exit 101 (Par.Clo) – Interchange design slightly differs in new .KMZ file, but there should be no significant impact to operations with these changes.
    - AM Peak Hour – See **Figure 1** – interchange operates at under capacity
    - PM Peak Hour – See **Figure 2** – interchange operates at under capacity

Figure 1 - Exit 101 (Partial Cloverleaf) Simulation - AM Peak Hour

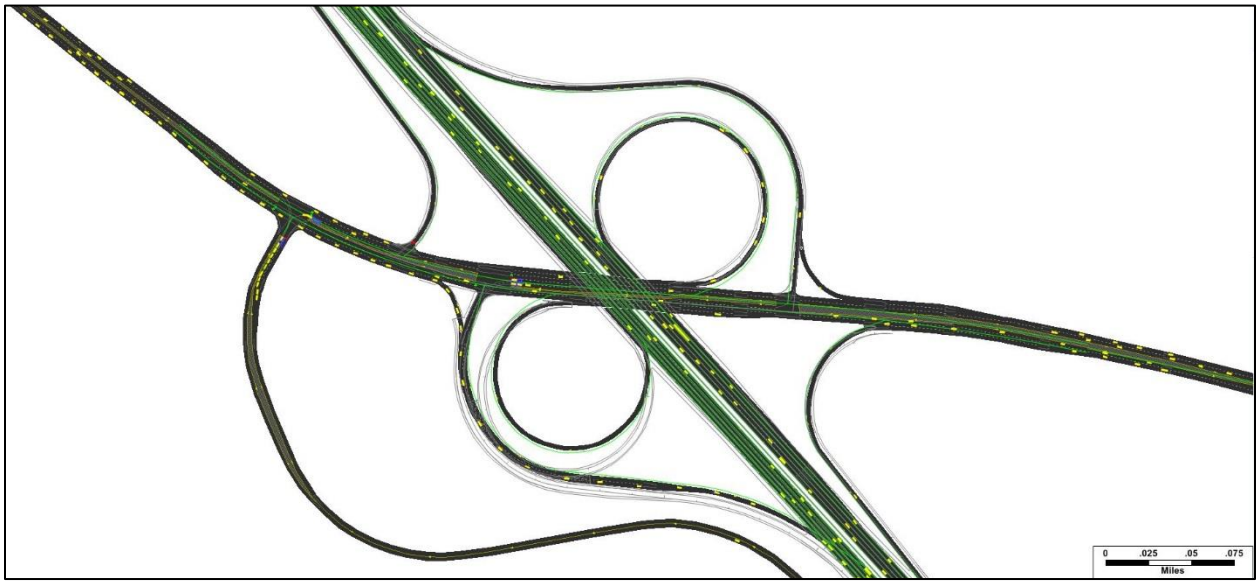
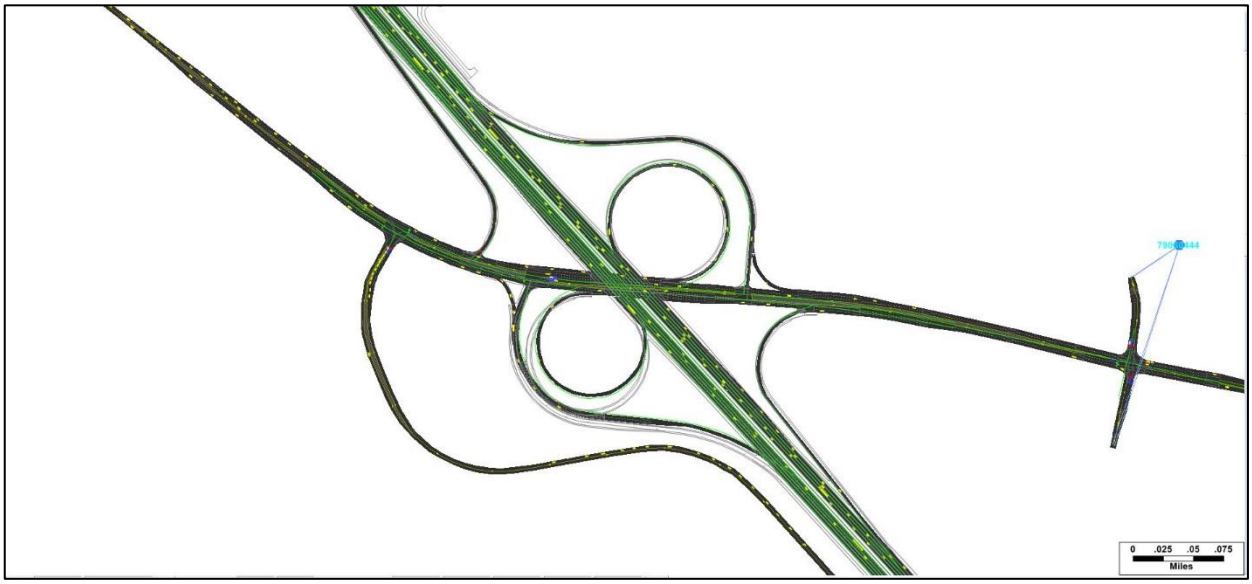


Figure 2 - Exit 101 (Partial Cloverleaf) Simulation - PM Peak Hour



- Exit 102 (Par.Clo) – Interchange design slightly differs in new .KMZ file, but there should be no significant impact to operations with these changes.
    - AM Peak Hour – See **Figure 3** – interchange operates at under capacity
    - PM Peak Hour – See **Figure 4** – interchange operates at under capacity

Figure 3 - Exit 102 (Partial Cloverleaf) Simulation - AM Peak Hour

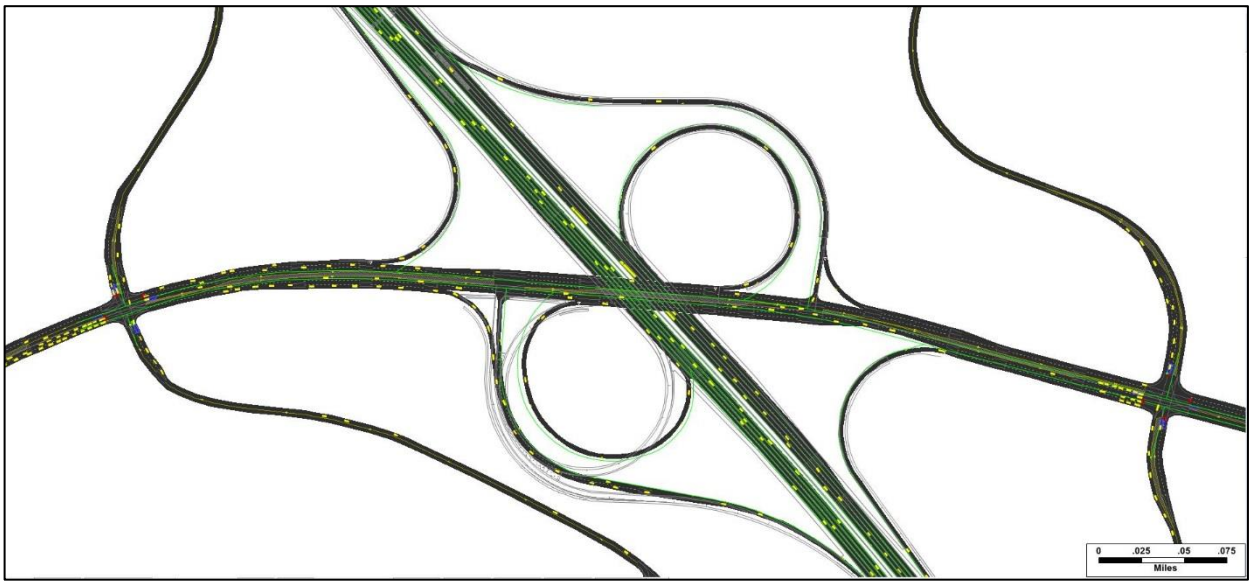


Figure 4 - Exit 102 (Partial Cloverleaf) Simulation - PM Peak Hour



- Exit 103 (AO35) – Interchange design differs in new .KMZ file, but there should be no significant impact to operations with these changes as capacity remains the same.
    - AM Peak Hour – See **Figure 5** – interchange operates at under capacity
    - PM Peak Hour – See **Figure 6** – interchange operates at capacity at the westbound ramps intersection.

Figure 5 - Exit 103 (AO35) Simulation - AM Peak Hour

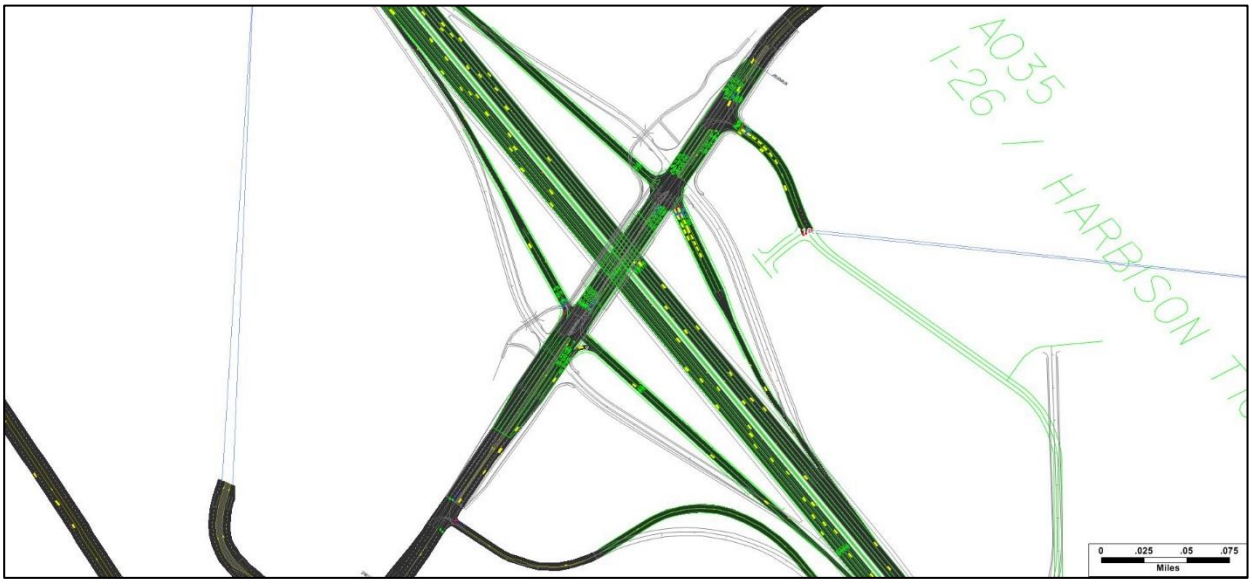
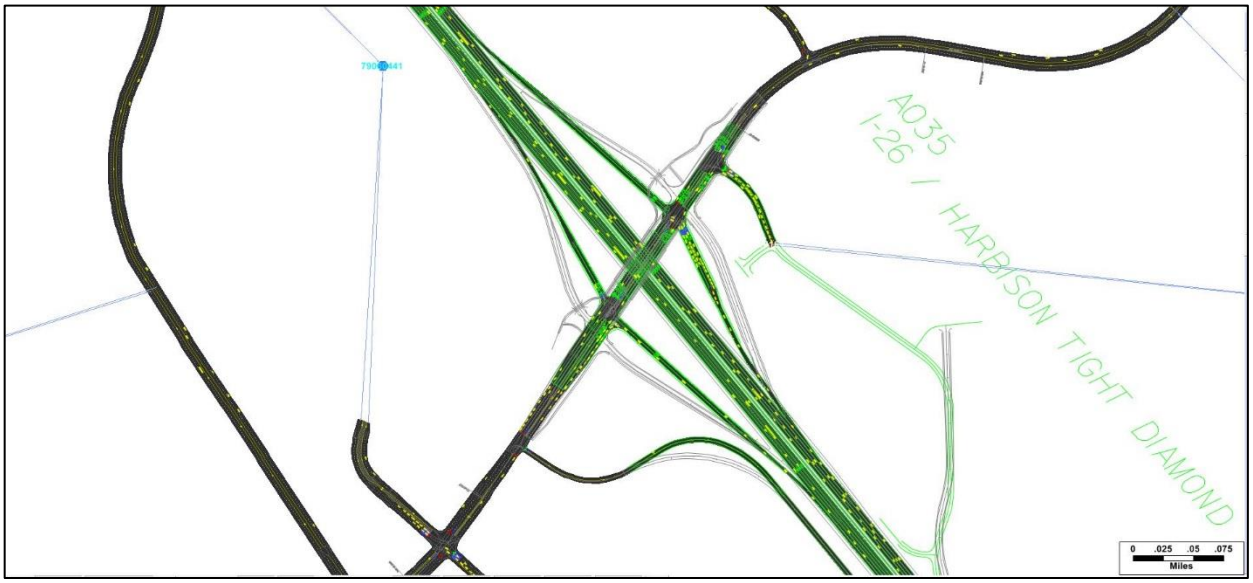


Figure 6 - Exit 103 (AO35) Simulation - PM Peak Hour



- Exit 104 (AO30) – Interchange design slightly differs in new .KMZ file, but there should be no significant impact to operations with these changes.
    - AM Peak Hour – See **Figure 7** – interchange operates at capacity at the eastbound ramps intersection. I-26 eastbound is over capacity due to off-ramp queuing toward I-20 and Exit 106. New design incorporates additional lane for collector-distributor off-ramp.
    - PM Peak Hour – See **Figure 8** – interchange operates under capacity

Figure 7 - Exit 104 (AO30) Simulation - AM Peak Hour

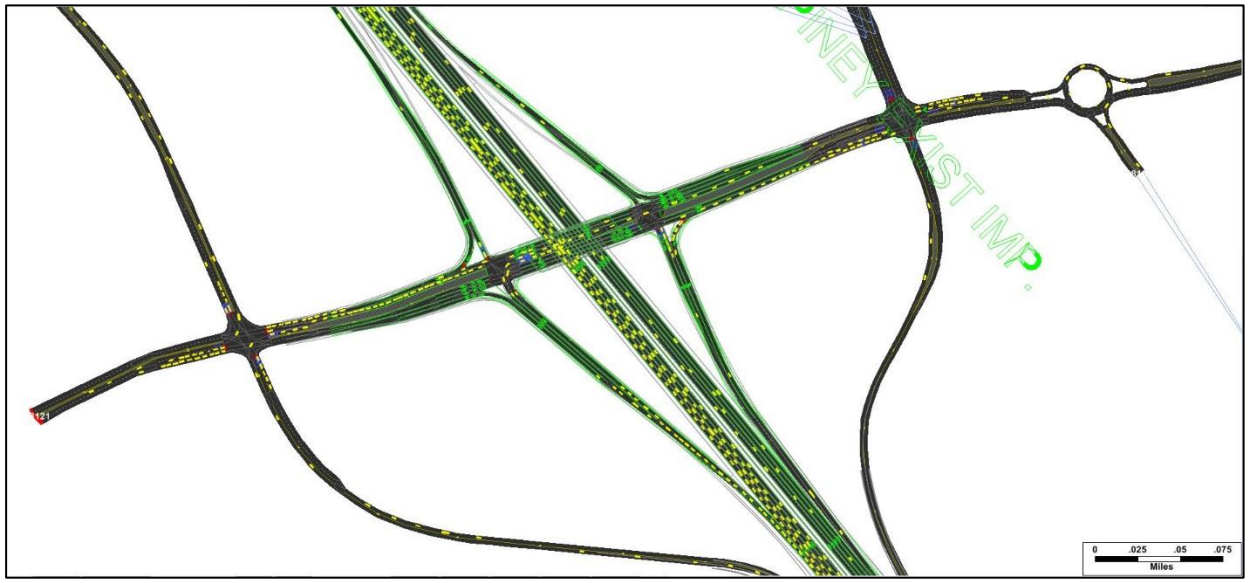
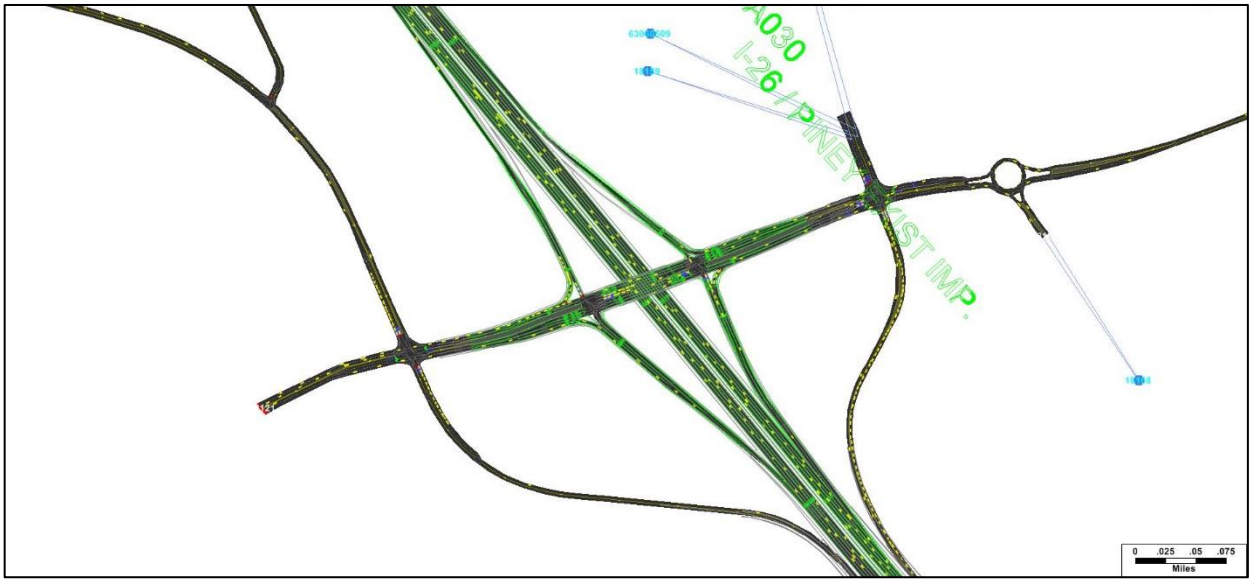


Figure 8 - Exit 104 (AO30) Simulation - PM Peak Hour



- Exit 106 (AO13) – Interchange design differs in new .KMZ file. Revised runs will need to be completed to see if there are any additional capacity issues. Fernandina/Burning Tree existing configuration maintained in current simulation. New .KMZ file includes widened arterial.
    - AM Peak Hour – See **Figure 9** – interchange operates over capacity at the eastbound ramps intersection. Additional right turn lane onto EB I-26 was added for capacity. Interchange operates at capacity at the westbound ramps intersection.
    - PM Peak Hour – See **Figure 10** – interchange operates over capacity at the WB left turns onto I-26 eastbound.

Figure 9 - Exit 106 (AO13) Simulation - AM Peak Hour

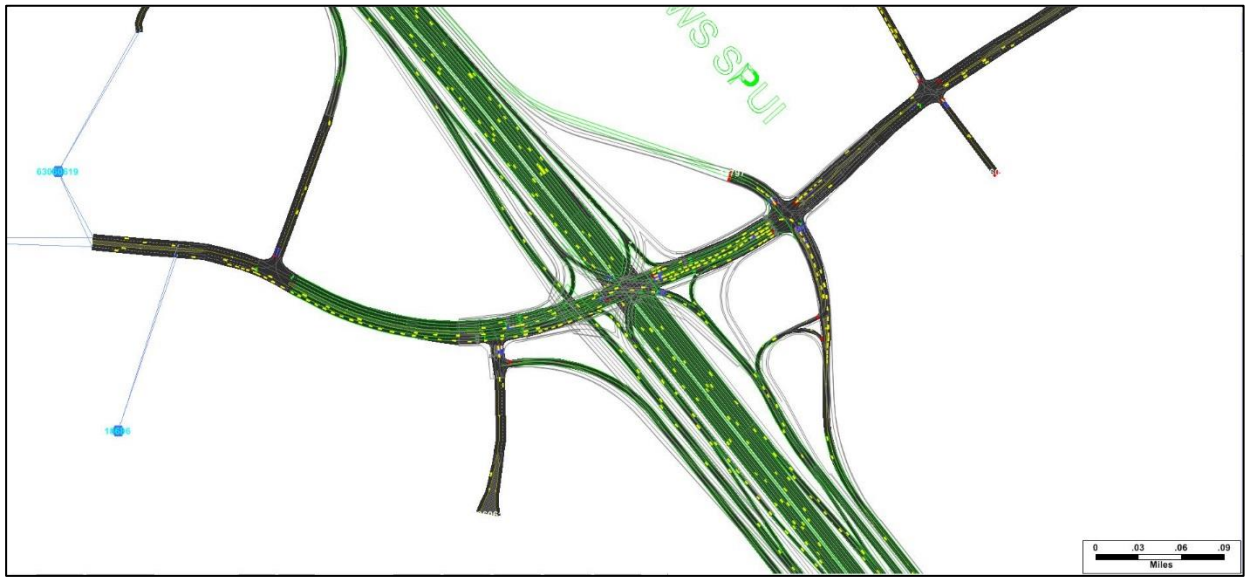
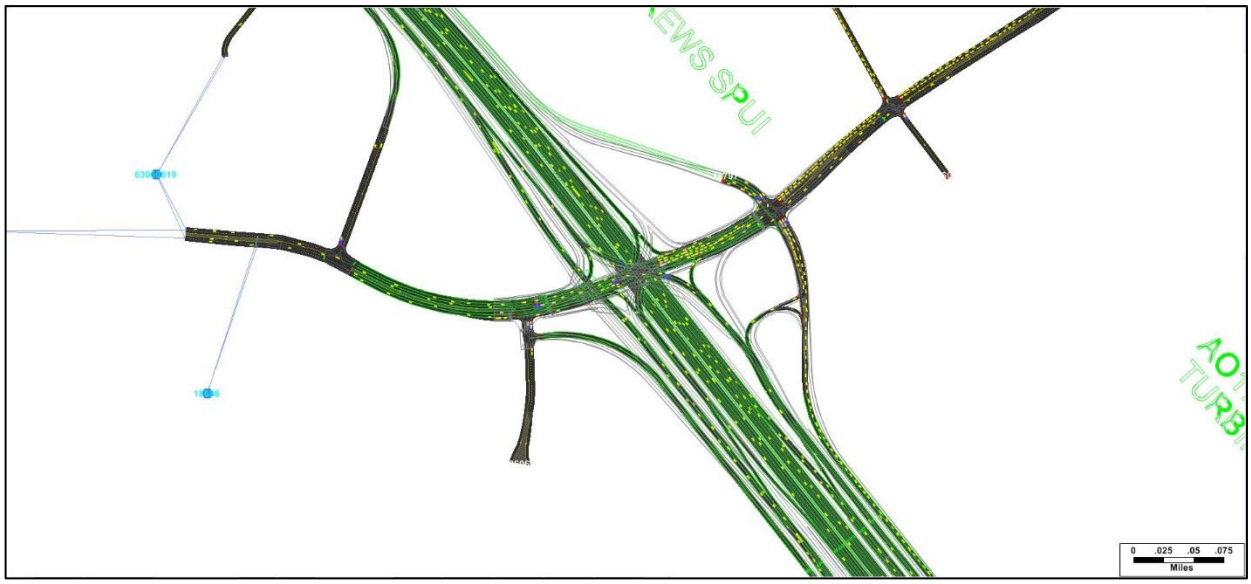


Figure 10 - Exit 106 (AO13) Simulation - PM Peak Hour



- Exit 107/Exit 64 (AO17) – Interchange design slightly differs in new .KMZ file. Revised runs will need to be completed to see if there are any additional capacity issues.
    - AM Peak Hour – See **Figure 11** – The I-26 eastbound on-ramp from I-20 is at capacity but experiences weaving issues.
    - PM Peak Hour – See **Figure 12** – interchange operates under capacity.

Figure 11 - Exit 107/Exit 64 (AO17) Simulation - AM Peak Hour

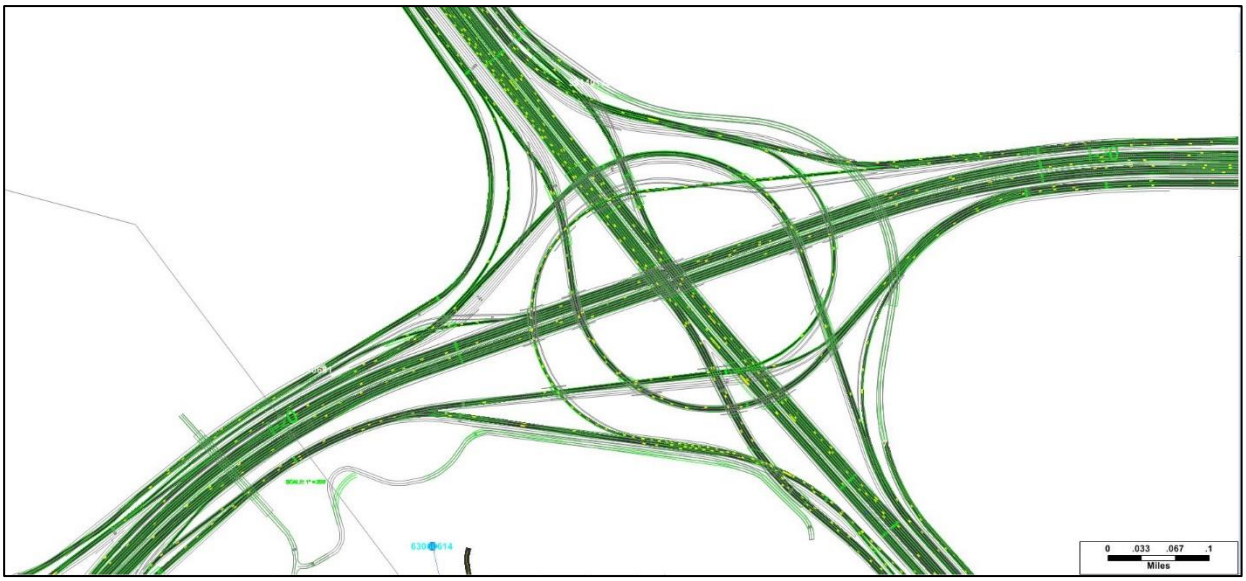


Figure 12 - Exit 107/Exit 64 (AO17) Simulation - PM Peak Hour



Exit 108 (I-126) – The revised KMZ file shows significant modifications to the ramp alignments and split locations. Revised runs will need to be completed to see if there are any additional capacity issues.

- AM Peak Hour – See **Figure 13** – I-126 eastbound operates at capacity. Additional lane added in new .kmz file.
- PM Peak Hour – See **Figure 14** – I-126 westbound operates at capacity. Additional lane added in new .kmz file.

Figure 13 - Exit 108 (I-126) Simulation - AM Peak Hour



Figure 14 - Exit 108 (I-126) Simulation - PM Peak Hour



- Exit 110 (AO46)
    - AM Peak Hour – See **Figure 15** – Interchange operates at capacity.
    - PM Peak Hour – See **Figure 16** – Interchanges operates over capacity at the I-26 eastbound off-ramp due to the arterial queuing along US 378.

Figure 15 - Exit 110 (AO46) Simulation - AM Peak Hour

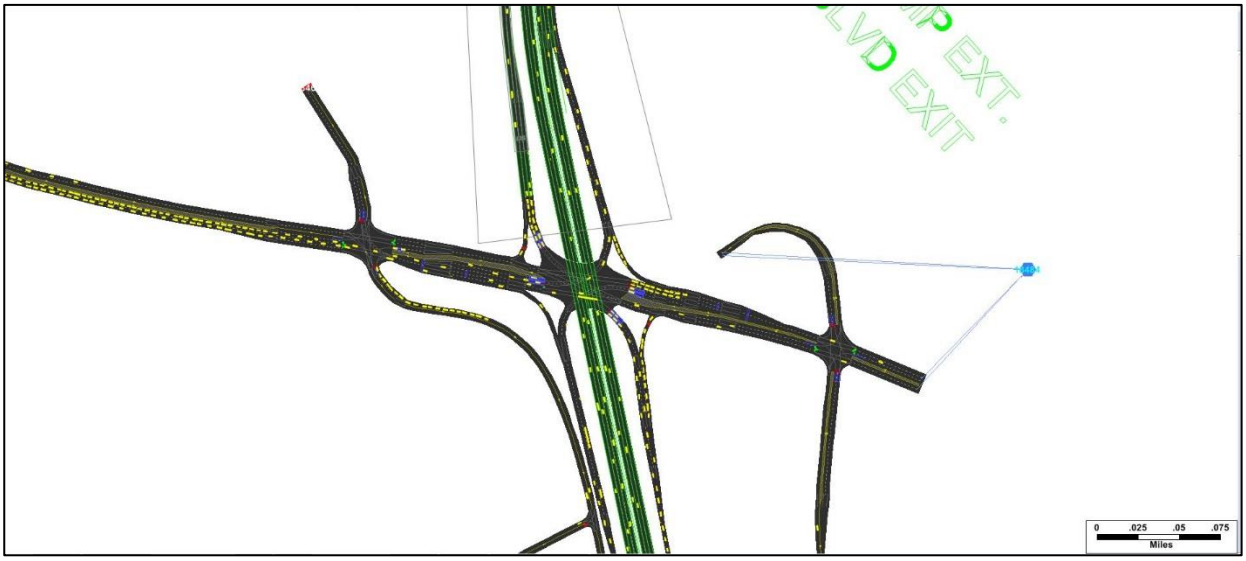


Figure 16 - Exit 110 (AO46) Simulation - PM Peak Hour



- I-126 at Colonial Life Boulevard – The revised KMZ file shows significant interchange modifications at Colonial Life Boulevard. Revised runs will need to be completed to see if there are any additional capacity issues.
    - AM Peak Hour – See **Figure 17** – Interchange operates under capacity with installation of signal.
    - PM Peak Hour – See **Figure 18** – Interchanges operates at capacity with installation of signal. Without signal, the Colonial Live Boulevard arterial in the southbound direction will queue to Bush River Road.

Figure 17 – I-126 at Colonial Life Boulevard Simulation - AM Peak Hour

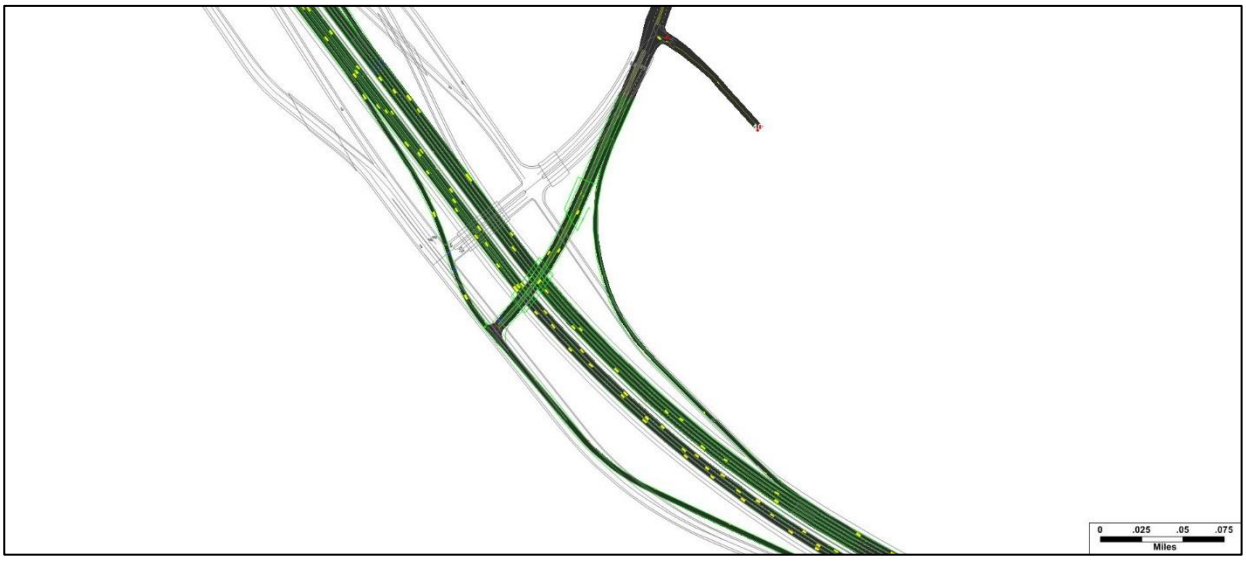


Figure 18 – I-126 at Colonial Life Boulevard Simulation - PM Peak Hour



- Exit 63 (AO6) – Interchange design similar to new .KMZ file. However, slip-ramp connection to BerryHill Road will seem beneficial to DDI design. Currently, DDI signals are clustered with the Berryhill Road signal; this adds additional delay to the operation of the DDI.
    - AM Peak Hour – See **Figure 19** – interchange operation at capacity
    - PM Peak Hour – See **Figure 20** – interchange operates over capacity Major queuing in both directions along Bush River Road and on the I-20 westbound off-ramp

Figure 19 - Exit 63 (AO6) Simulation - AM Peak Hour

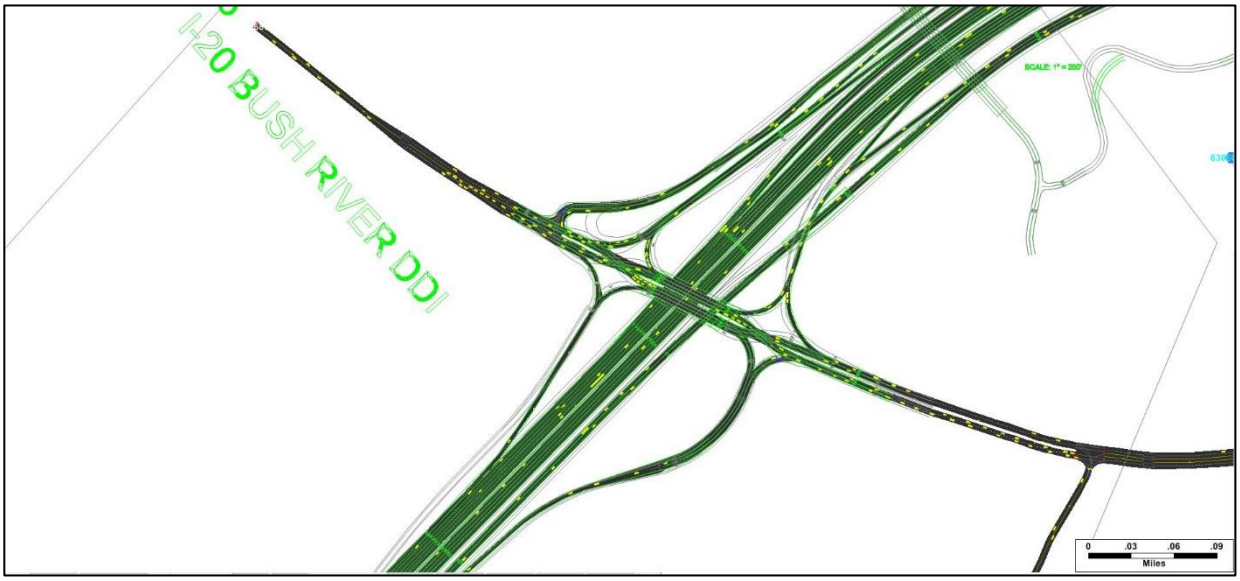
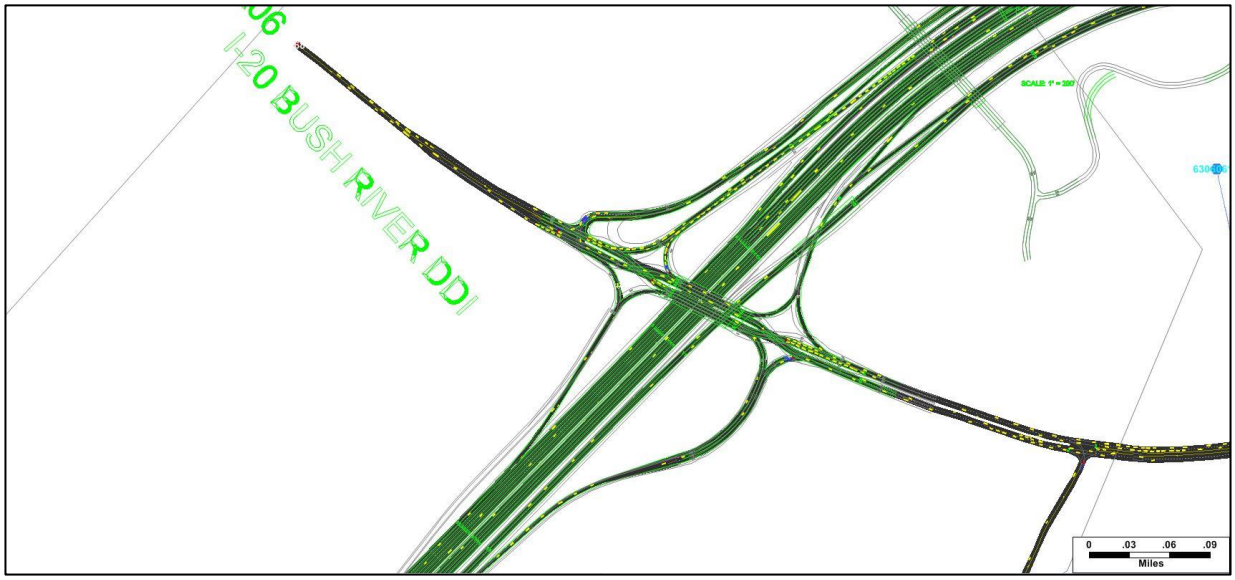


Figure 20 - Exit 63 (AO6) Simulation - PM Peak Hour



- Exit 65 (AO3) – The revised KMZ file shows significant interchange modifications at Broad River Road. Revised runs will need to be completed to see if there are any additional capacity issues.
    - AM Peak Hour – See **Figure 21** – interchange operates at capacity. The southbound left turn onto I-20 eastbound experiences moderate queuing.
    - PM Peak Hour – See **Figure 22** – interchange operates over capacity. Major queuing on the I-20 eastbound off-ramp.

Figure 21 - Exit 65 (AO6) Simulation - AM Peak Hour

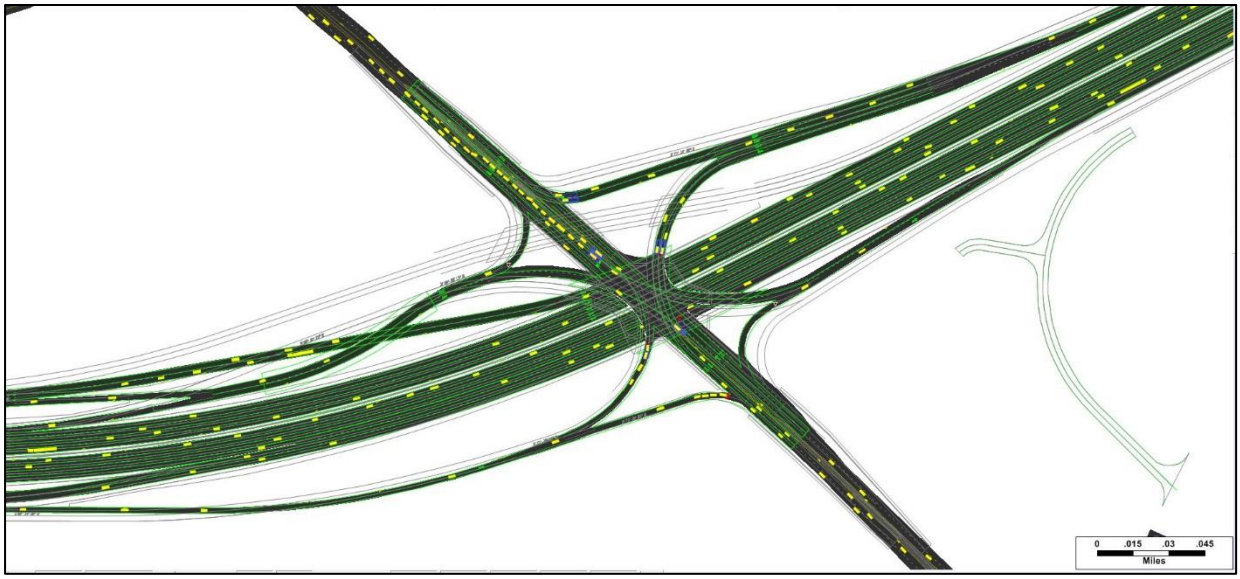
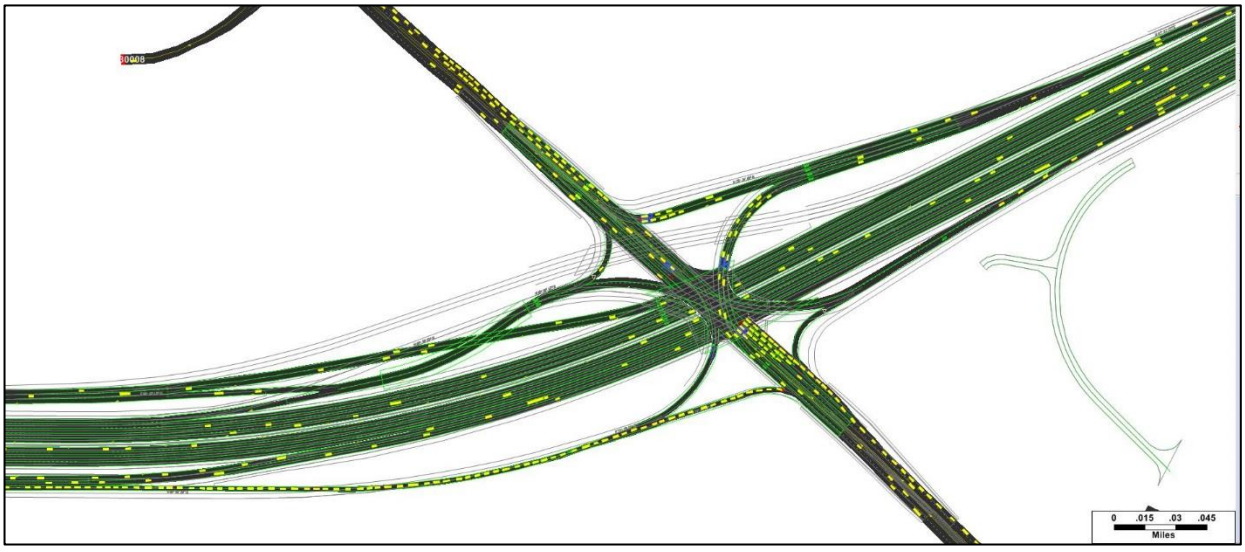
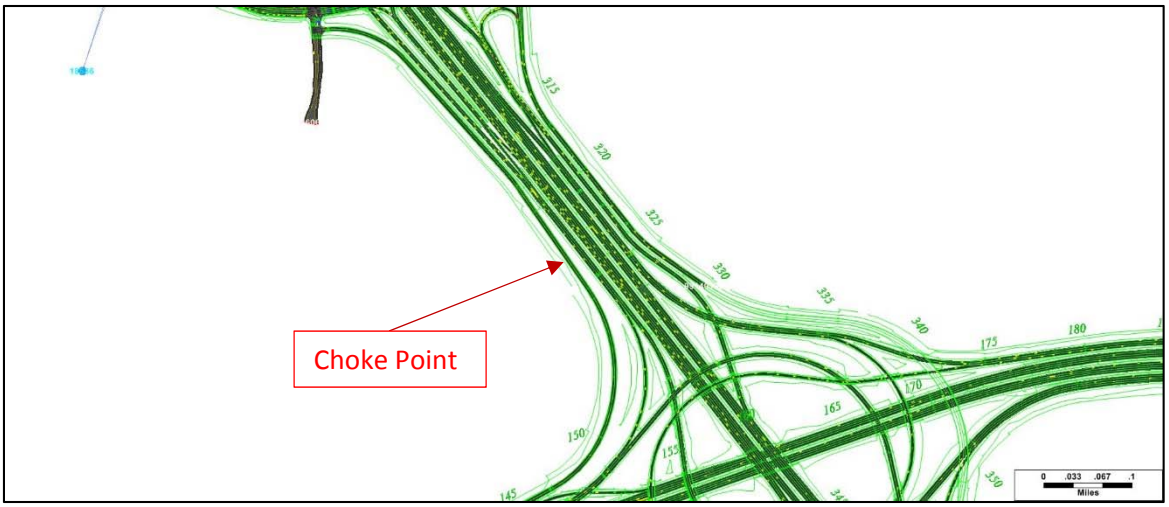


Figure 22 - Exit 65 (AO3) Simulation - PM Peak Hour

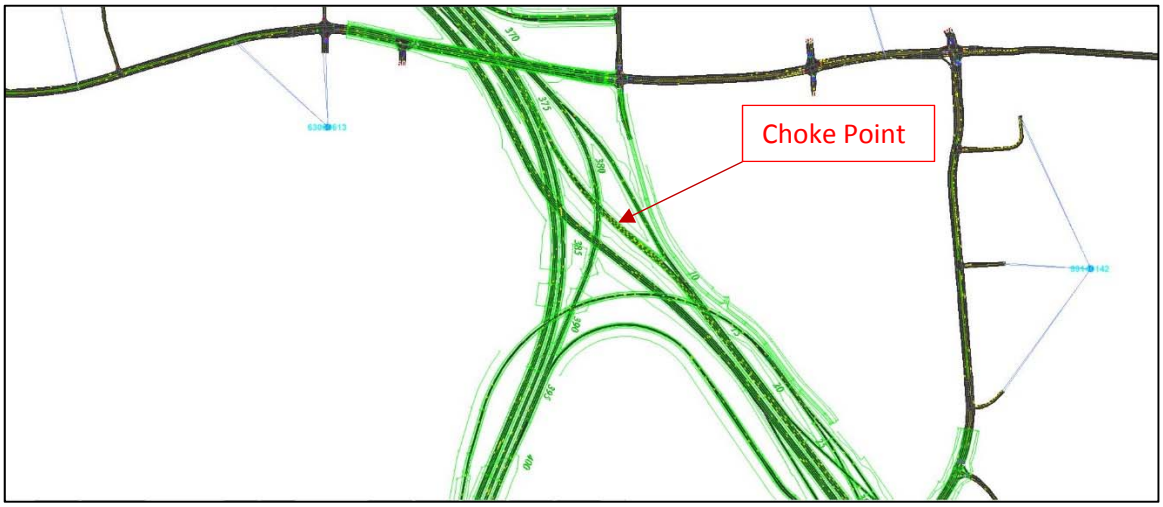


RA1 Specific Issues/Choke Points:

1. I-26 EB weaving and slow down between Exit 106 on-ramp and I-26/I-126 EB split



2. I-126 WB lane drop prior to merge with I-26 WB



Reasonable Alternative 2 – Microsimulation Summary (2040 Volumes)

Freeway Segments

Segment	AM		PM		Comment
	EB	WB	EB	WB	
Exit 101-102	Under	Under	Under	Over	Heavy volume in the PM from the westbound off-ramp. Additional signal timing changes may improve the operations of the ramp.
Exit 102-103	Over	Under	Under	Under	Heavy volume in the AM from the off-ramp at exit 103 due to congestion along Park Terrace/Bower stemming from Exit 104 congestion
Exit 103-104	Over	Under	Under	Over	Heavy volume in the AM from the off-ramp at exit 104 due to congestion along Piney Grove turning onto Jamil. Heavy WB PM congestion from the off-ramp at Exit 103 due to the arterial congestion. Improvements at adjacent interchanges may help this deficiency.
Exit 104-106	Over	Under	Over	Over	Heavy EB congestion from the split with the CD road in the AM and PM. Heavy WB PM congestion stems from the Exit 103 off-ramp.
Exit 106-107	Under	Under	Under	At	While the PM density showed the WB at capacity, the simulation showed good operations.
Exit 107-108	Under	Under	Under	At	While the PM density showed the WB at capacity, the simulation showed good operations.
Exit 108-110	Under	Under	Under	Under	
Exit 108 – Colonial Life	At	Under	Under	At	AM volume slows a little at the merge point from WB I-26 to EB I-126. PM WB operations were slowed from the off-ramp to EB I-26. Revised KMZ may alleviate this issue.
Exit 63-64	Under	Under	Under	Under	
Exit 64-65	Under	Under	Under	Under	

Interchanges

Exit		AM		PM		
Location	AO	EB Ramp	WB Ramp	EB Ramp	WB Ramp	Comment
Exit 101	AO45	Under	Over	Over	Over	There were cycle failures for the WB ramp in the AM, further signal timing changes may alleviate this. Heavy volume in the PM from the WB off-ramp. Additional signal timing changes may improve the operations of the ramp. EB Off-ramp simulation operates better than the densities indicate.
Exit 102	AO42	Over	Over	Under	Over	Simulation shows better results at the ramp termini in the AM and the PM than the density indicates.
Exit 103	AO37	Over	Over	Under	Under	Heavy arterial congestion associated with the left turn onto Park Terrace is degrading the performance of the ramps in the AM and PM. May need to revise timings/paths to better understand the deficiencies.
Exit 104	AO31	Over	Under	At	Under	Heavy arterial congestion associated with the left turn onto Jamil is degrading the performance of the ramps in the AM. May need to revise timings/paths to better understand the deficiencies. In the PM, the simulation operates better than the density indicates.
Exit 106	AO16	Under	Over	Under	Over	Heavy arterial congestion associated with the closely spaced intersections is causing the ramp to severely back up in the AM and PM. The revised KMZ may alleviate this issue.
Exit 107/Exit 64	AO18	Under	Under	Under	Under	
Exit 108	AO24	Over	Under	Over	Under	Simulation showed ramp was heavy but moving steadily in the AM.
Exit 110	AO47	Over	Under	Over	Under	There are signal cycle failures in the AM but the ramp

Exit		AM		PM		
Location	AO	EB Ramp	WB Ramp	EB Ramp	WB Ramp	Comment
						congestion does not extend to the mainline. PM operations show significant queuing on the off-ramps which is stemming from the EB left turn onto McSwain Dr. Additional investigation may be needed into why this volume is so high.
Colonial Life		Under	Under	Under	At	In the PM, the simulation operates better than the density indicates. The higher density recorded from the simulation implies the simulation operation would appear more congested. Additional investigation will be performed as to why this is occurring.
Exit 63	AO10	Over	Over	Over	Over	The tightly spaced intersection of the Berryhill Rd causes congestion along the arterial but the simulation shows better ramp operations than the density indicates in the AM. The WB ramp operates better than the densities indicate in the PM. The possible disconnect between the measured densities and the simulation visualization will be checked into further. The EB ramp shows heavy congestion. Additional turn lane as shown in the new KMZ may help alleviate this issue.
Exit 65	AO5	Over	Under	Over	Under	Broad River Road congestion is spilling back onto the eastbound off-ramp in the AM and PM. Additional arterial improvements may solve this issue.

Simulation Observations and Alternative Modifications

The greenline work is the KMZ file used for the simulation observations. The gray linework is the revised design which will be incorporated into the simulation model.

- Exit 101 (AO45)
  - Eastbound Broad River Road Right turn onto I-26 EB on-ramp converted to double right
  - WB I-26 off ramp provides for double left turn movement
  - Based on the latest file, adjustments are needed at the ramp termini including the channelized right turn at the EB I-26 on-ramp which should improve operations.
  - Significant queuing WB I-26 off-ramp in the PM peak hour.
  - **See Figure 1 and 2**

Figure 1 - Exit 101 (AO45) Simulation - AM Peak Hour

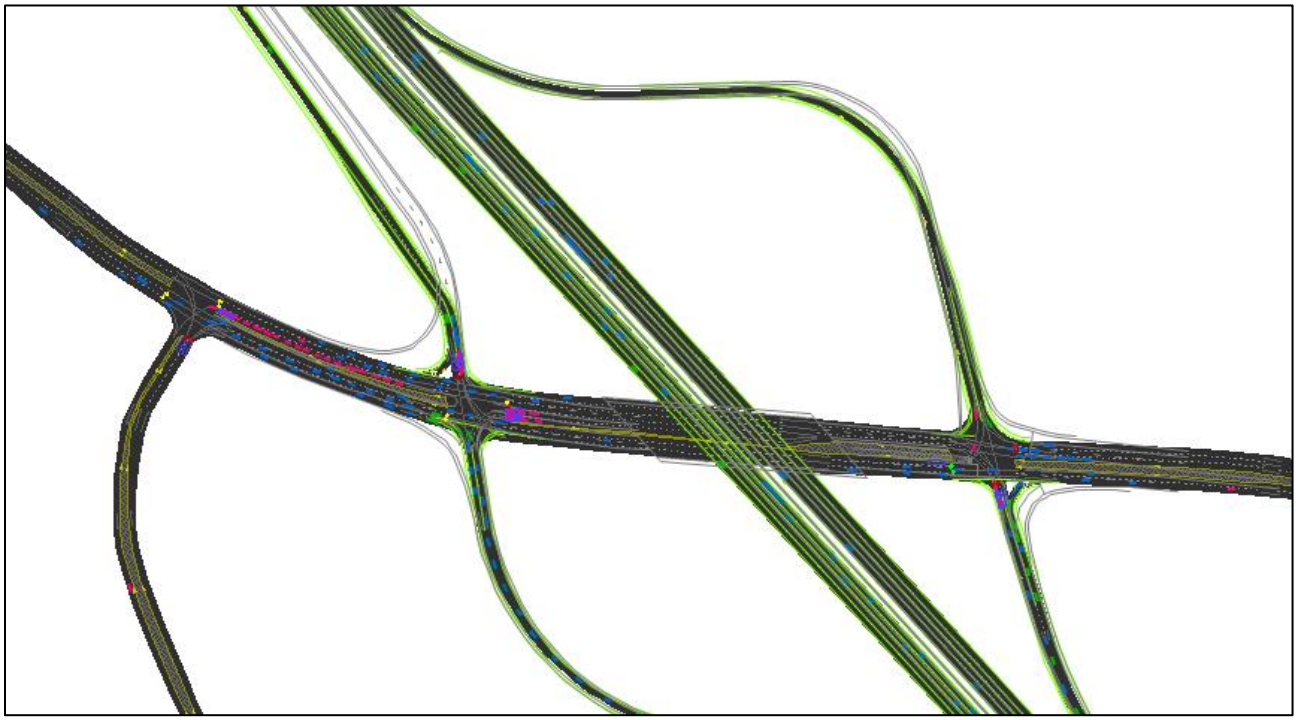
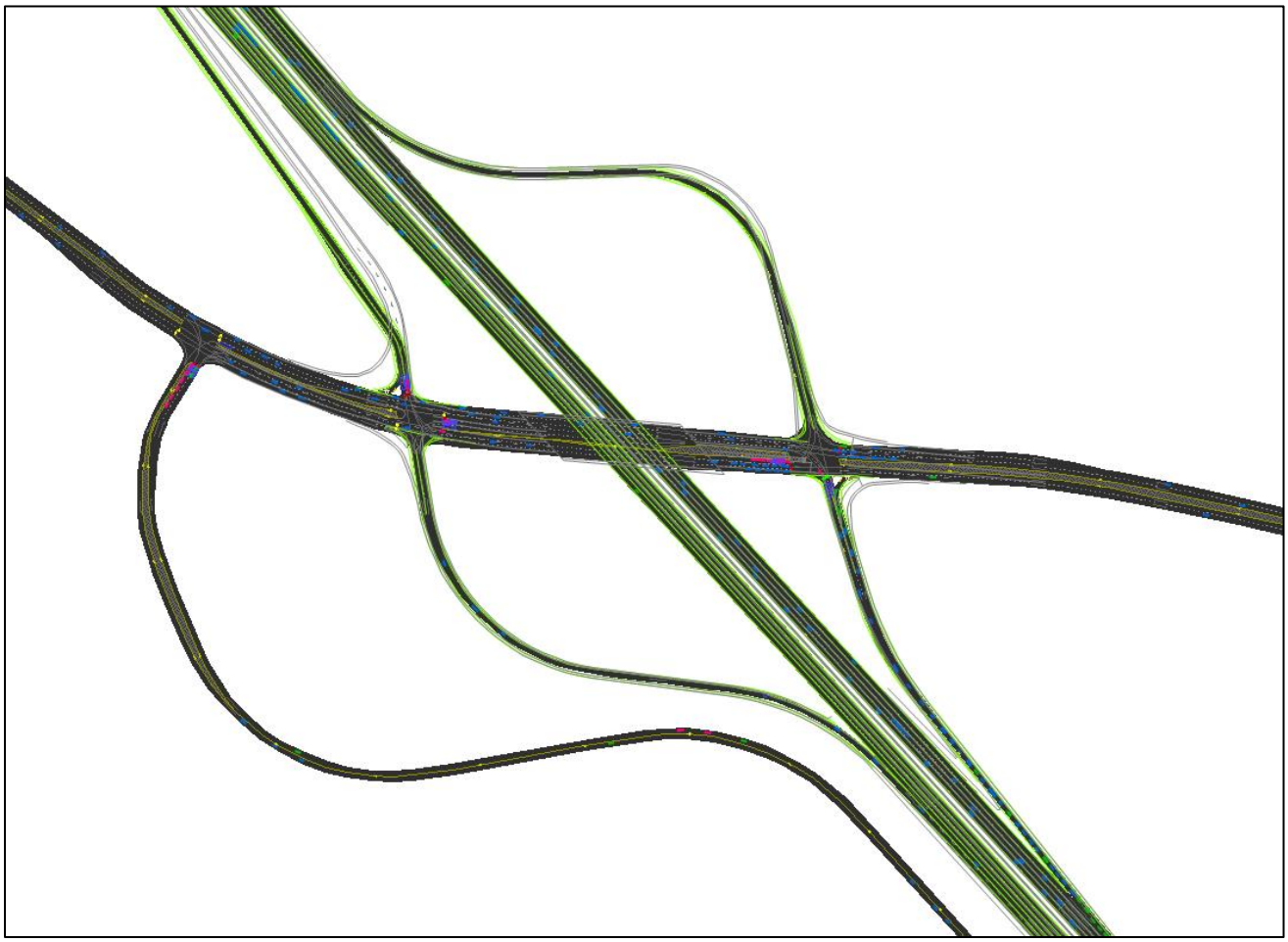


Figure 2 - Exit 101 (AO45) Simulation - PM Peak Hour



- Exit 102 (AO42) - No geometry changes made from original concept.
    - AM operations are good.
    - PM operations have queuing along the EB arterial, Ramp termini have good PM operations.
    - **See Figure 3 and 4**

Figure 3 - Exit 102 (AO42) Simulation - AM Peak Hour

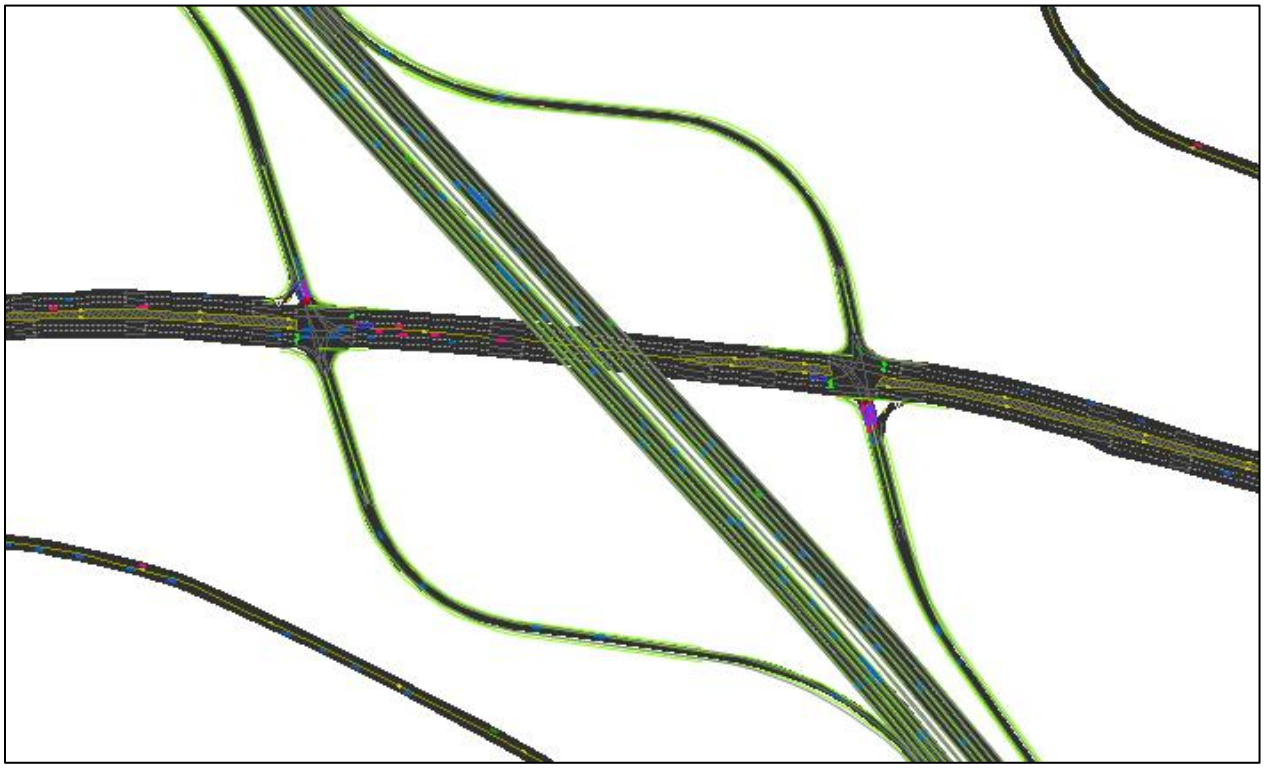
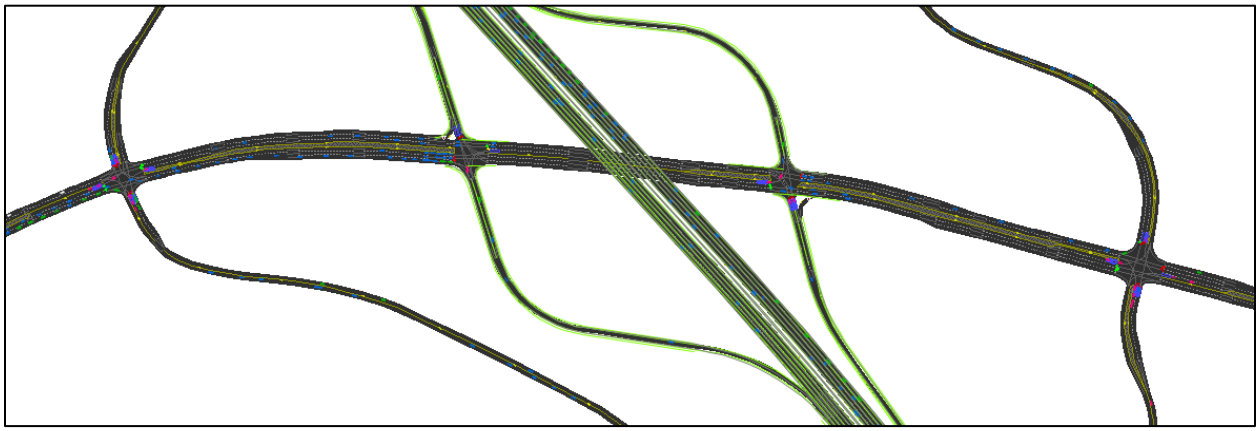


Figure 4 - Exit 102 (AO42) Simulation - PM Peak Hour



- Exit 103 (AO37) - No geometry changes made from the original concept.
    - AM operations show heavy queuing for the eastbound and westbound I-26 off ramps. Much of this queuing is stemming from congestion at Exit 106. The congestion at Exit 106 forces traffic to other routes such as Saturn Parkway and Park Terrace Drive (Exit 106 congestion will need to be fixed to get a truer look at the Exit 103 operations.
    - Significant queuing present along the WB arterial as well as the WB I-26 off-ramp in the PM peak hour.
    - Latest KMZ file shows slight ramp alignment adjustments but that should not impact the operations.
    - **See Figure 5 and 6**

Figure 5 - Exit 103 (AO37) Simulation - AM Peak Hour

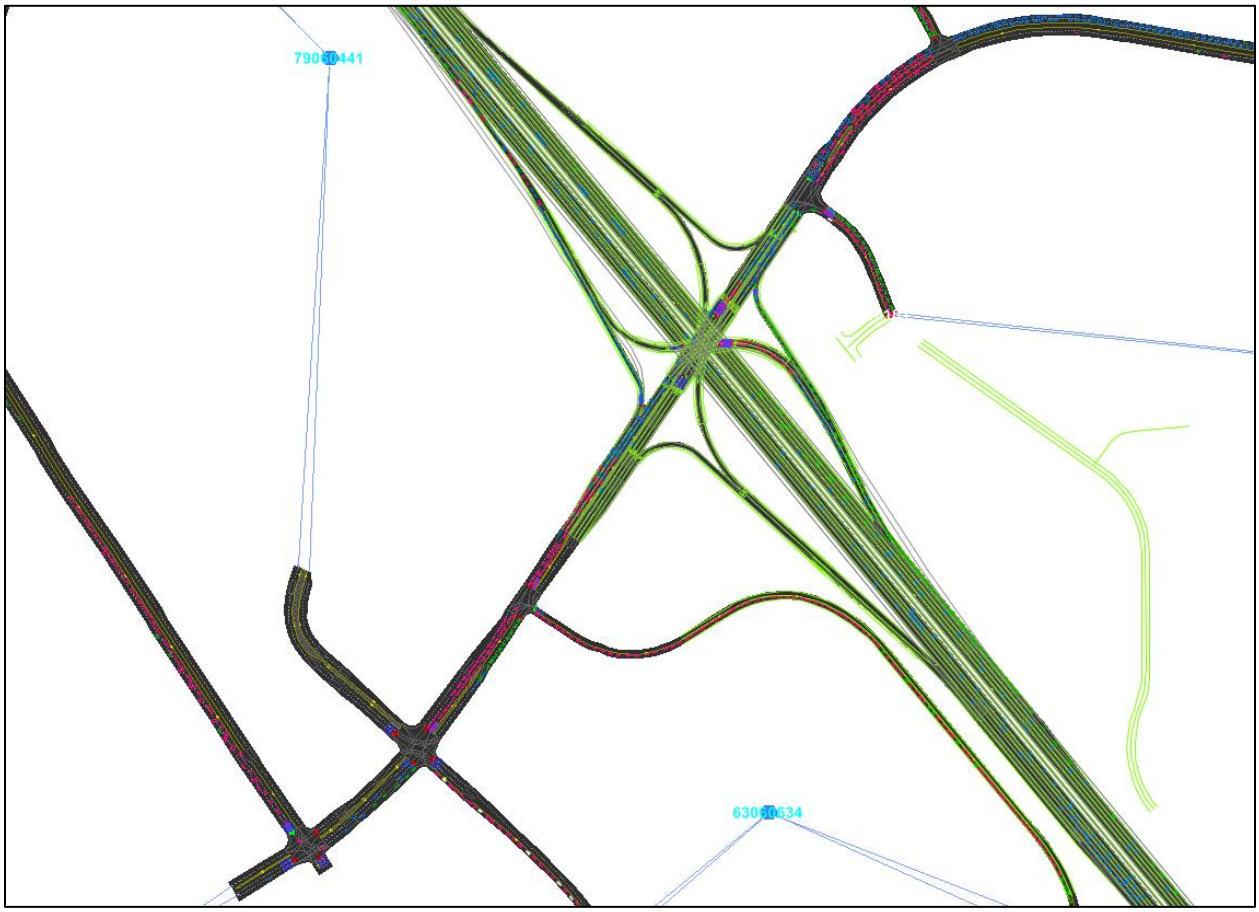
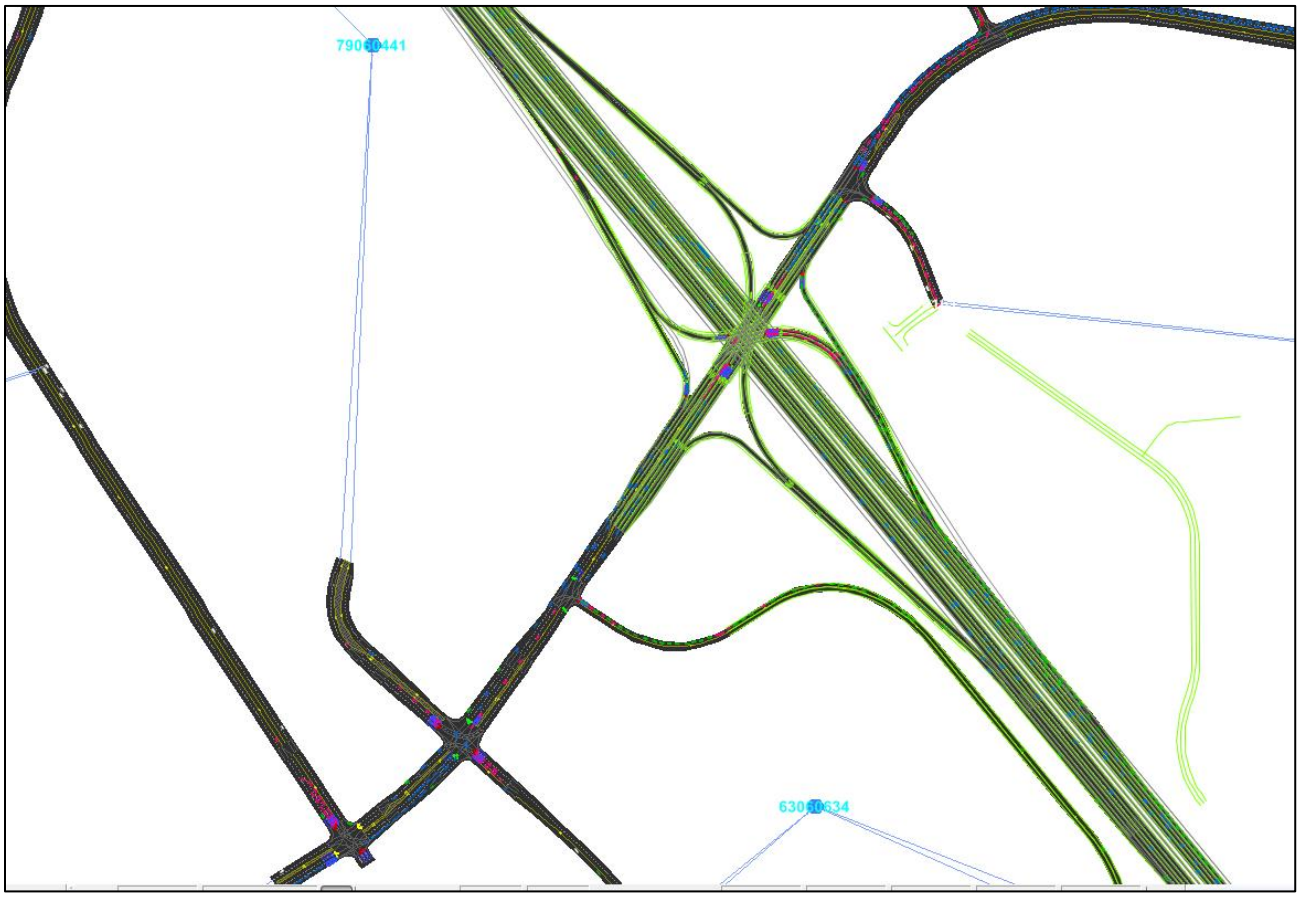


Figure 6 - Exit 103 (AO37) Simulation - PM Peak Hour



- Exit 104 (AO31) - No geometry changes made from the original concept.
    - AM operations show heavy queuing for the EB I-26 off ramp and all of the approaches to Jamil Road. The queuing results from congestion at Exit 106 causing traffic to seek other routes in the network. Exit 106 will need to be fixed in order to get a truer look at the Exit 104 operations. Otherwise the AM operations look good.
    - PM operations show significant queuing on the EB I-26 on-ramp which stems from congestion at the split at the CD road just before Exit 106.
    - Latest KMZ file shows slight alignment adjustments and longer left turn bays for the EB Piney Grove left turn at Fernandina Road but there should be no significant impact to operations with these changes.
    - **See Figure 7 and 8**

Figure 7 - Exit 104 (AO31) Simulation - AM Peak Hour

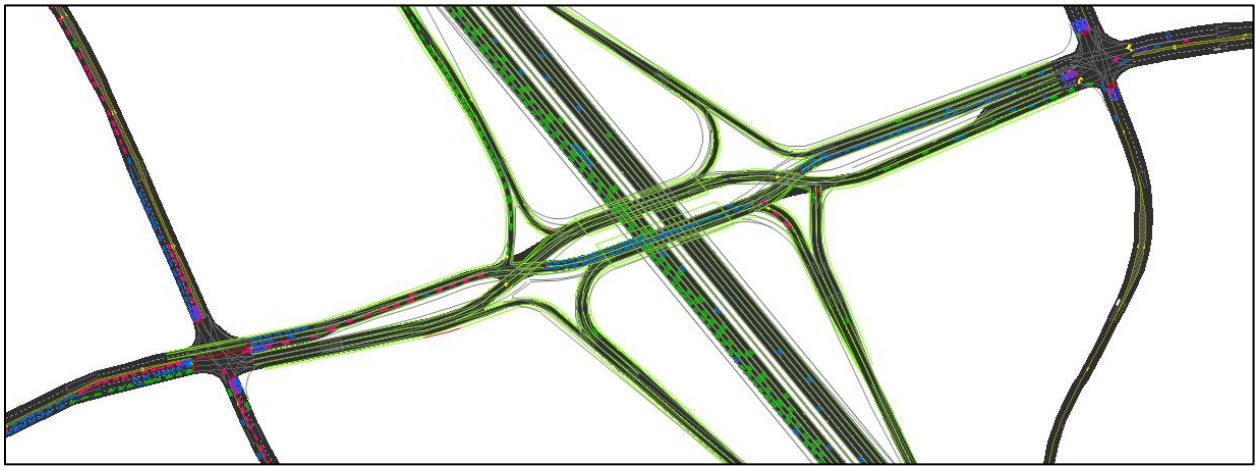
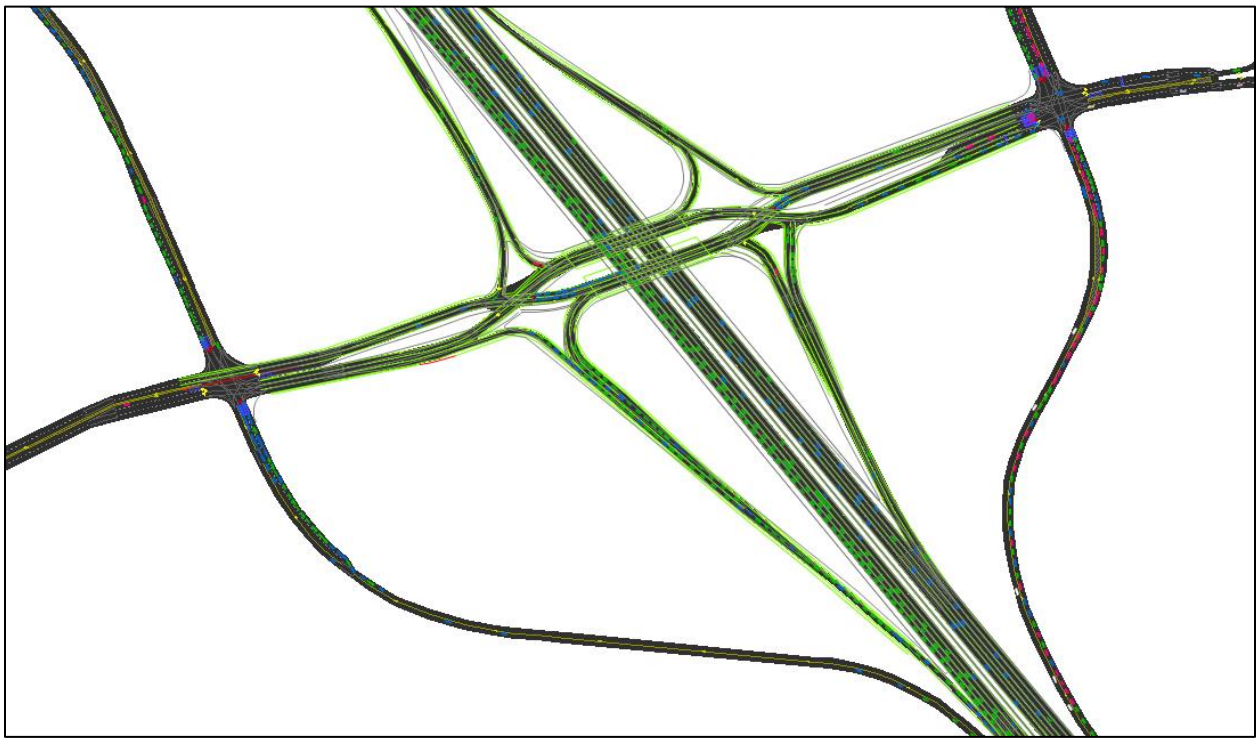


Figure 8 - Exit 104 (AO31) Simulation - PM Peak Hour



- Exit 106 (AO16)
    - Added second left turn lane to the WB I-26 off-ramp
    - Added unsignalized EB Right turn lane onto the EB I-26 on-ramp
    - Due to the closely spaced intersections with the DDI in the original design, the microsimulation had heavy arterial queuing which created gridlock in the system. In additionally there was heavy queuing along the EB CD road that runs parallel to EB I-26.
    - PM peak hour operations show issues with the WB I-26 off–ramp and WB St. Andrews Road operations. The proposed revised alignment shown in the revised KMZ file may provide improvements to the corridor operations and in turn the ramp operations.
    - The revised KMZ file may improve the operation of the arterial, which in turn should have a positive impact on the operation of the Exit 103 and 104 interchanges. This will be tested as the microsimulation network is revised to reflect the revised KMZ file.
    - **See Figure 9 and 10**

Figure 9 - Exit 106 (AO16) Simulation - AM Peak Hour

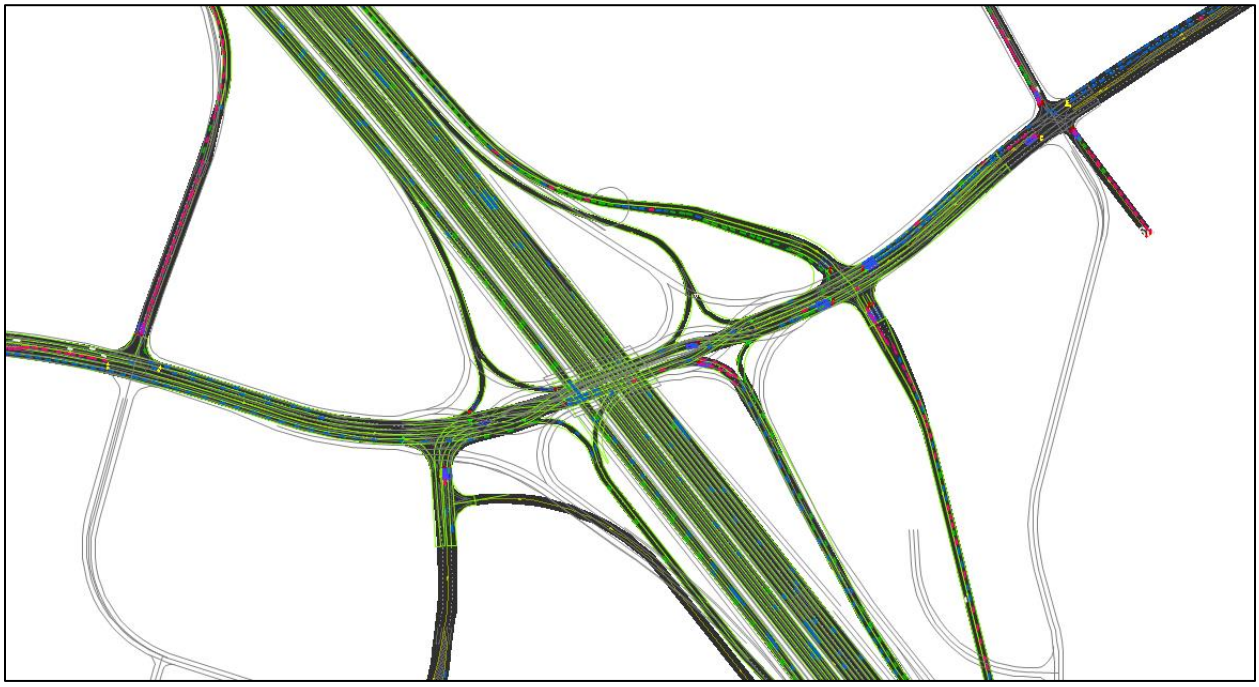
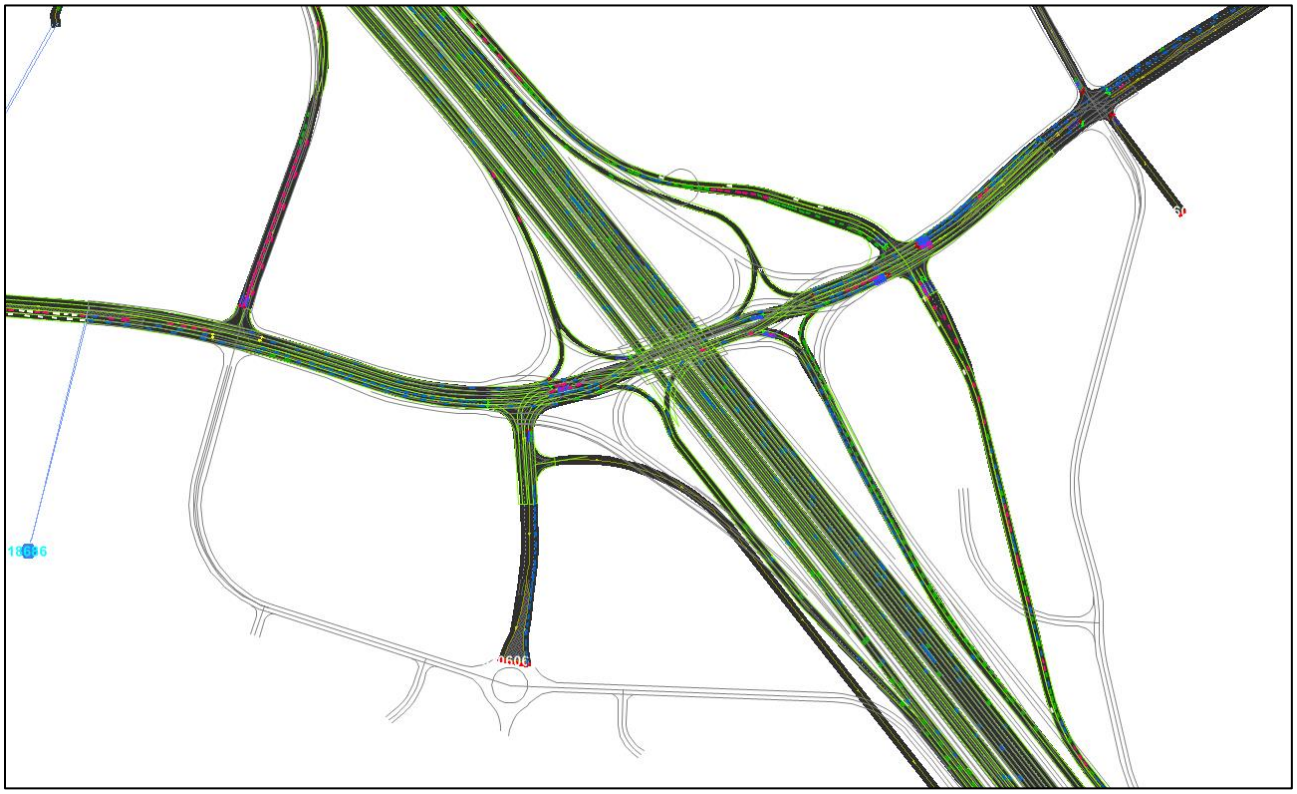


Figure 10 - Exit 106 (AO16) Simulation - PM Peak Hour



- Exit 107 (AO18)
    - Added an additional lane along the EB I-26 CD road from the on-ramp at Exit 106 to the split between I-126 and I-26 to deal with excessive queuing.
    - In the AM, the ramp from WB I-20 to EB I-26 is showing significant queuing due to the weaving area with the ramp from EB I-26 to I-126 and EB I-20 to EB I-26.
    - PM operations appear to be working well.
    - The revised KMZ file shows significant modifications to the ramp alignments and split locations. Revised runs will need to be completed to see if there are any additional capacity issues.
    - **See Figure 11 and 12**

Figure 11 - Exit 107 (AO18) Simulation - AM Peak Hour

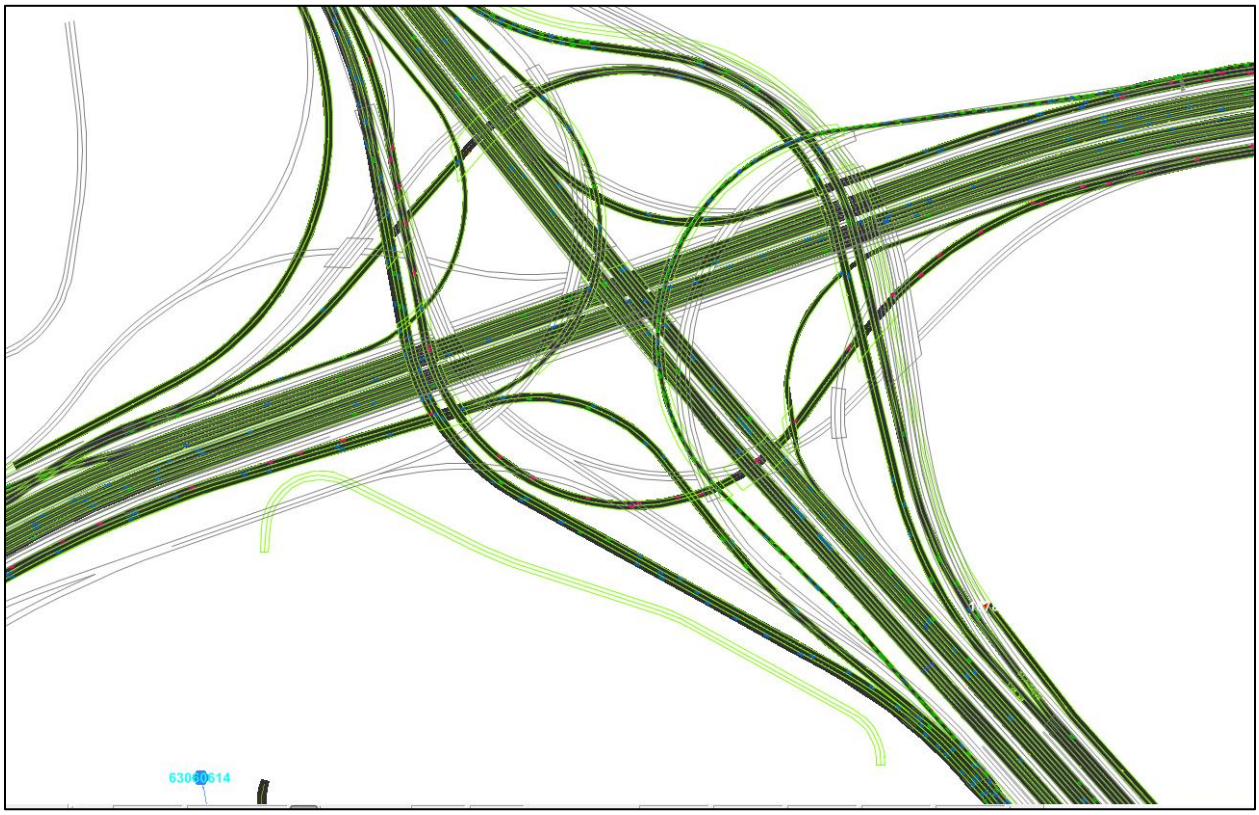
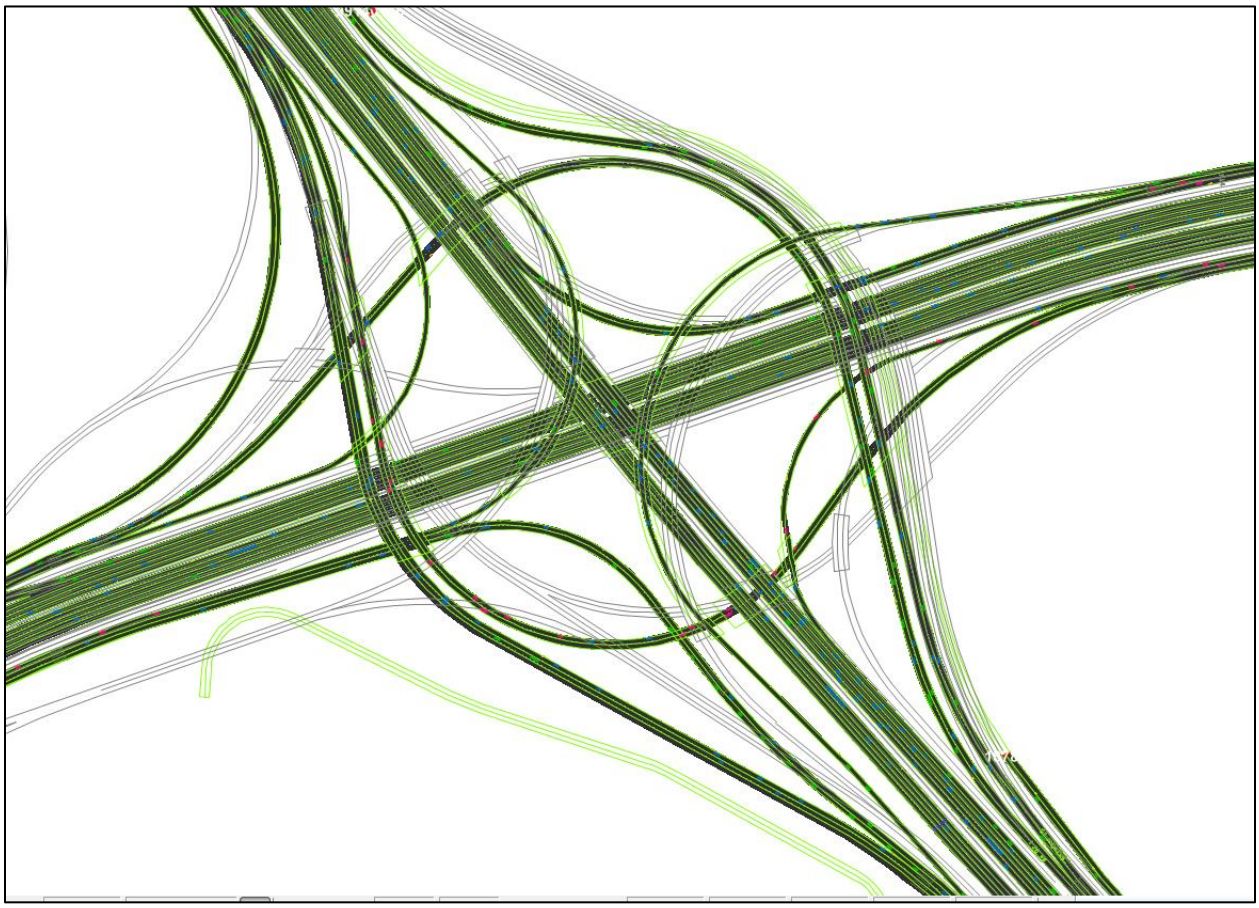


Figure 12 - Exit 107 (AO18) Simulation - PM Peak Hour

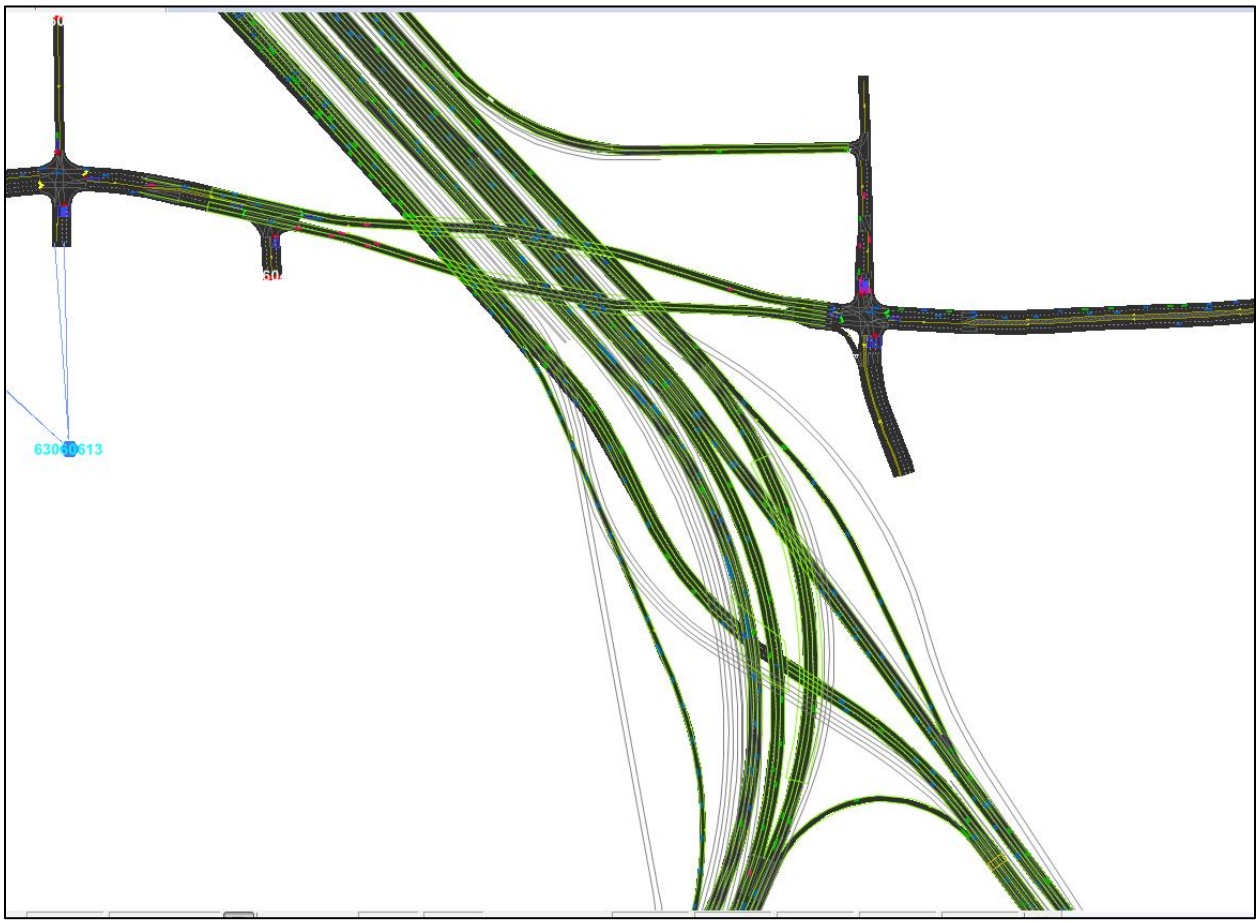


- Exit 108 (AO24)
    - No significant changes at this interchange other than ramp realignments between I-26 and I-126.
    - SB Morninghill Dr. changed to double left turn to accommodate heavy left turn volumes.
    - There is congestion in the AM on the mainline ramp from EB I-26 to EB I-126 from where it merges with the ramp from WB I-26 to EB I-126
    - **See Figure 13 and 14**

Figure 13 - Exit 108 (AO24) Simulation - AM Peak Hour



Figure 14 - Exit 108 (AO24) Simulation - PM Peak Hour



- Exit 110 (AO47)
    - No changes at this interchange
    - PM operations show significant queuing on the off-ramps which is stemming from the EB left turn onto McSwain Dr. additional investigation may be needed into why this volume is so high.
    - **See Figure 15 and 16**

Figure 15 - Exit 110 (AO47) Simulation - AM Peak Hour

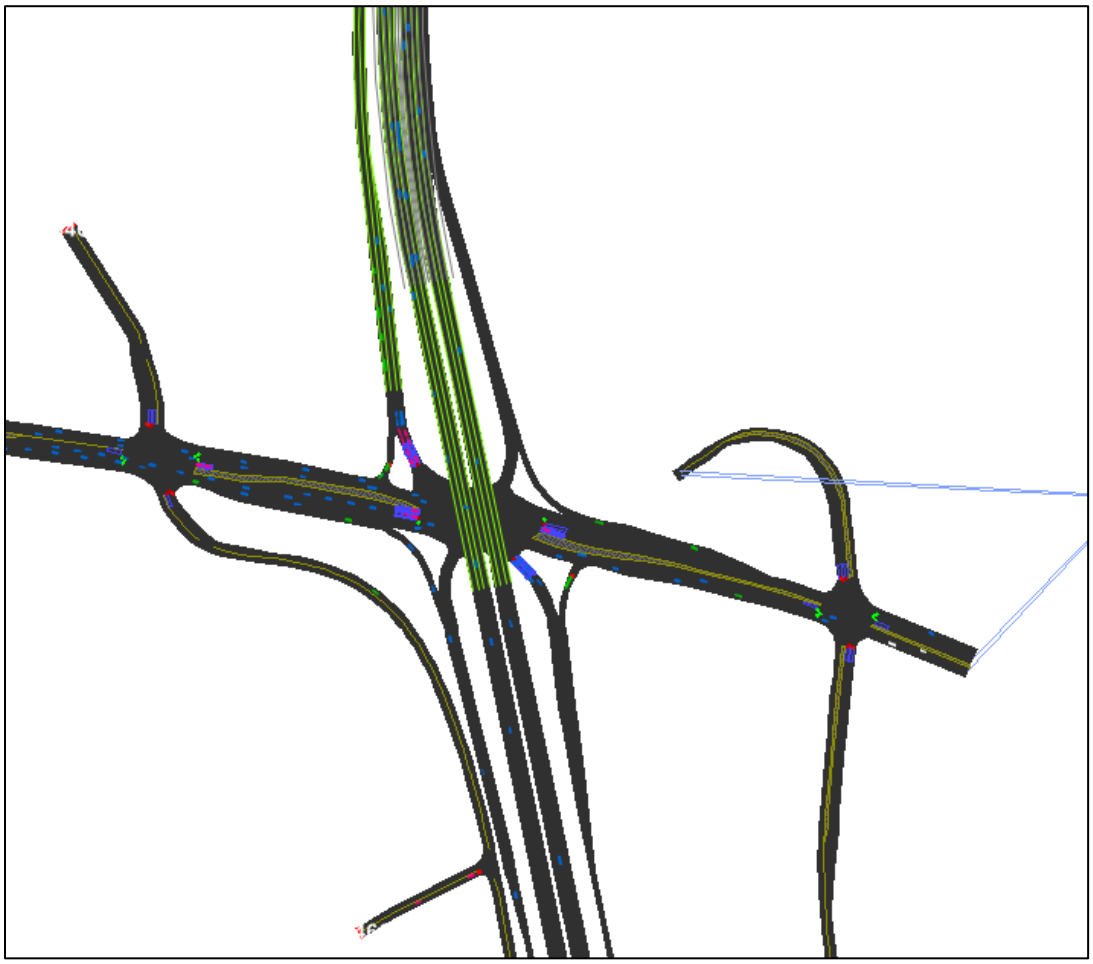
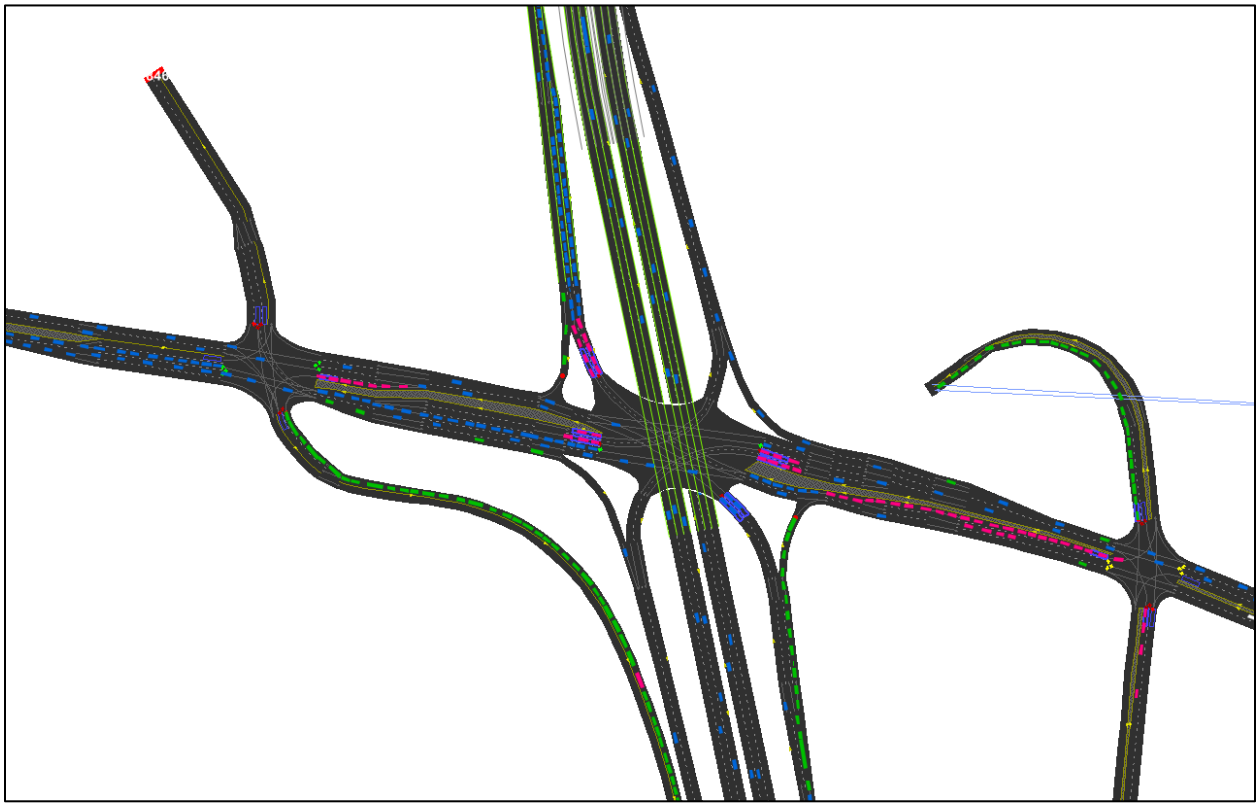


Figure 16 - Exit 110 (AO47) Simulation - PM Peak Hour



- I-126 at Colonial Life Blvd.
    - Existing interchange analyzed based on original KMZ file.
    - No operational issues were noted in the original analysis except that additional control was needed at the Greystone Blvd interchange to account for vehicles U-turning at the Greystone Blvd interchange to get back to Colonial Life Blvd. This should be resolved by modifying the microsimulation model to include the EB off-ramp to Colonial Life Blvd to match the new KMZ file.
    - PM operations show queuing along WB I-126 stemming from the Exit 108 interchange
    - New KMZ show significant changes to the interchange and will need to be reanalyzed.
    - **See Figure 17 and 18**

Figure 17 - I-126 at Colonial Life Boulevard Simulation - AM Peak Hour

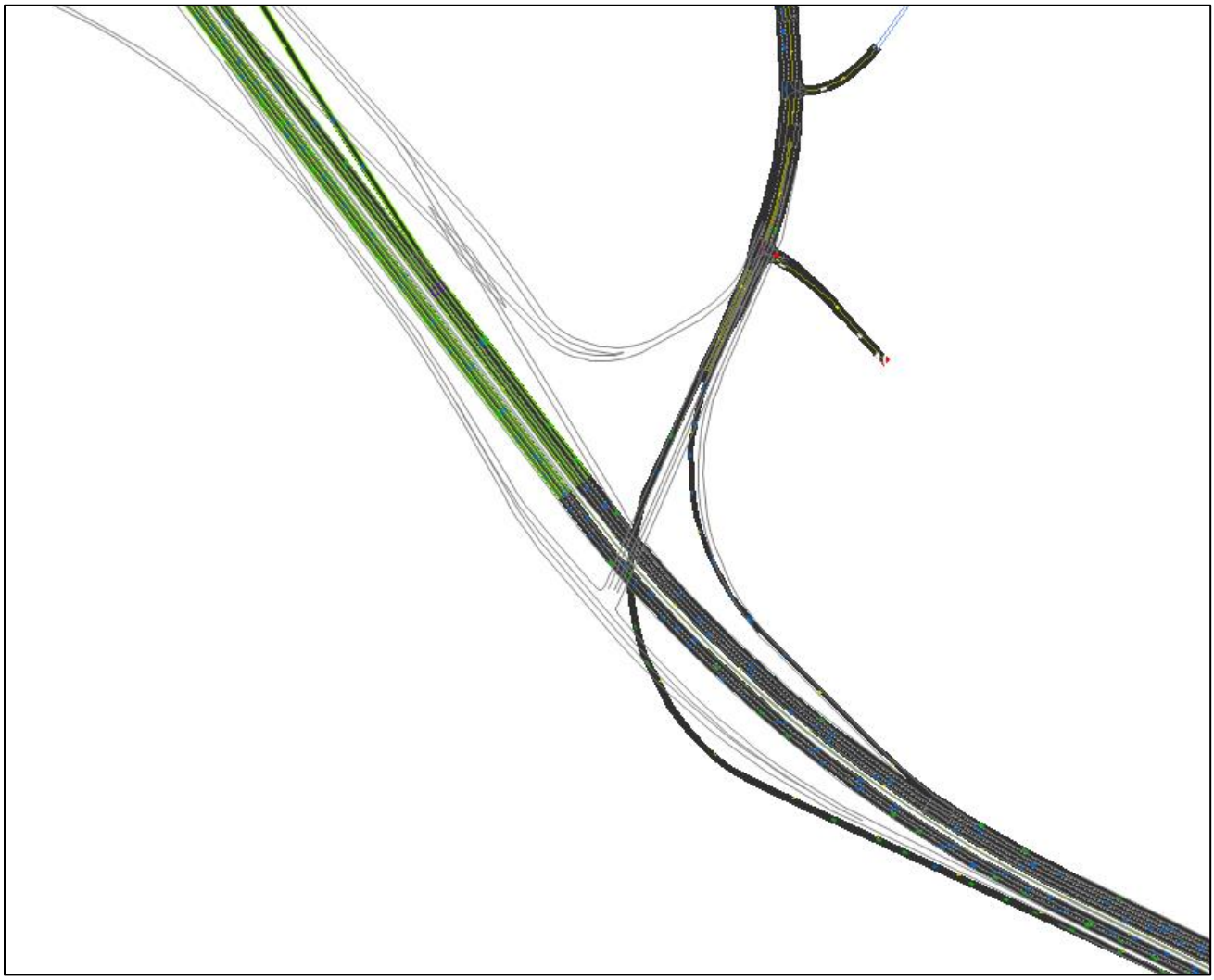
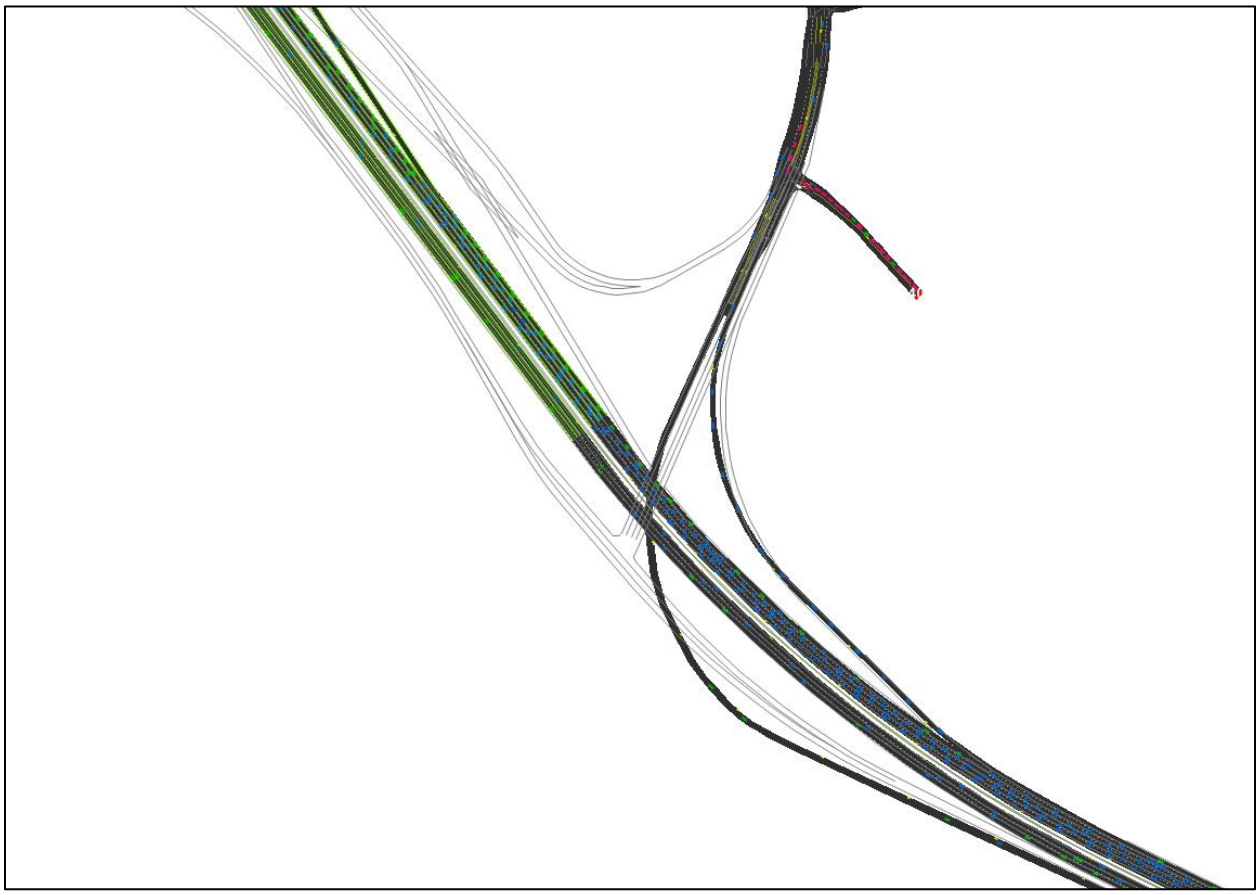


Figure 18 - I-126 at Colonial Life Boulevard Simulation - PM Peak Hour



- Exit 63 (AO10)
    - No geometric changes made to this interchange.
    - Revised KMZ file shows significant changes to the ramp alignments and lane usages which will need to be reflected revisions to the microsimulation network.
    - No operation issues noted in the original design for the AM peak period other than queuing along Berryhill Road. Need to clarify how the frontage signal road ties in with the SPUI signal.
    - PM operations show significant queuing along Berryhill Road as well as the EB I-20 off-ramp. Revised KMZ geometry may allow for better signal timing which could resolve the off-ramp queuing issues but further analysis will be needed.
    - **See Figure 19 and 20**

Figure 19 - Exit 63 (AO10) Simulation - AM Peak Hour

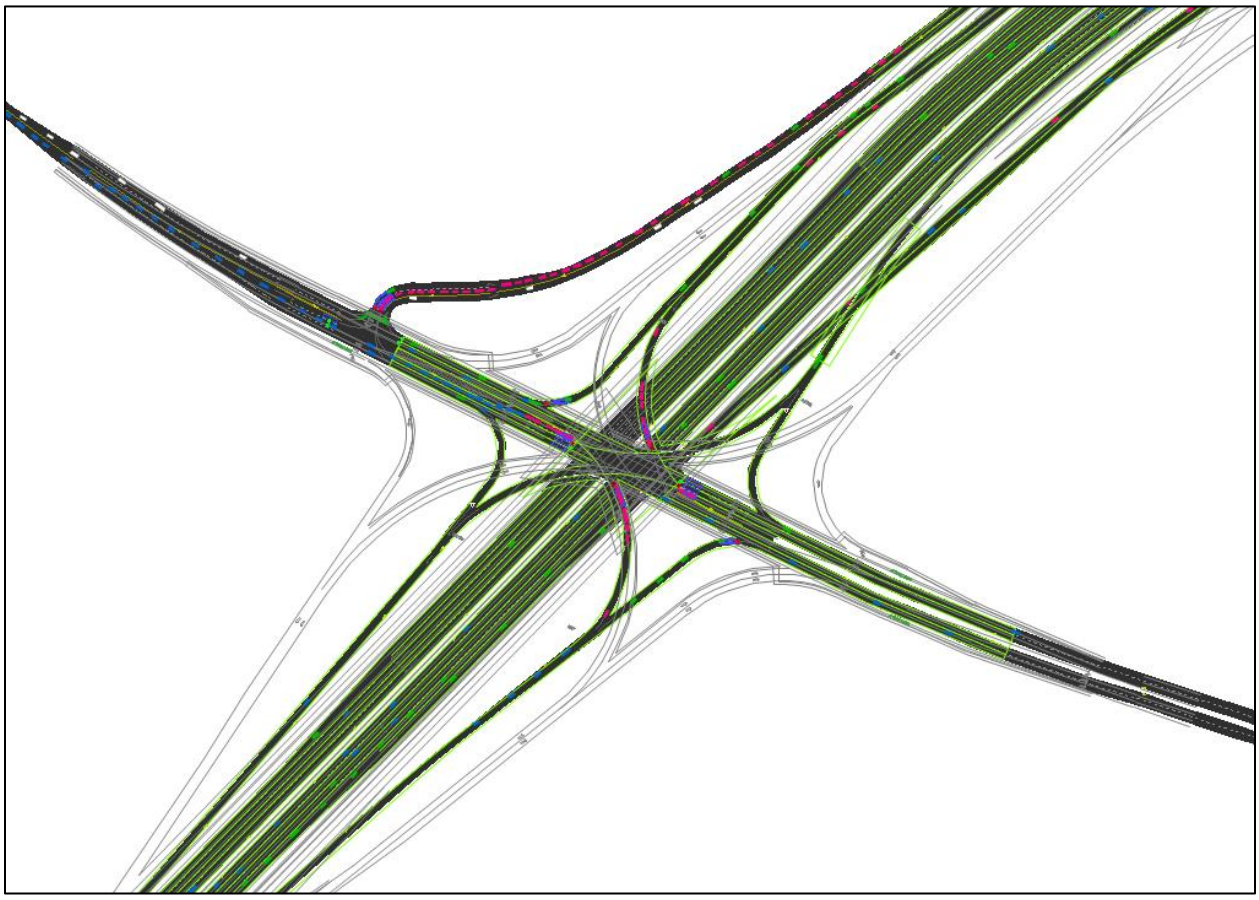
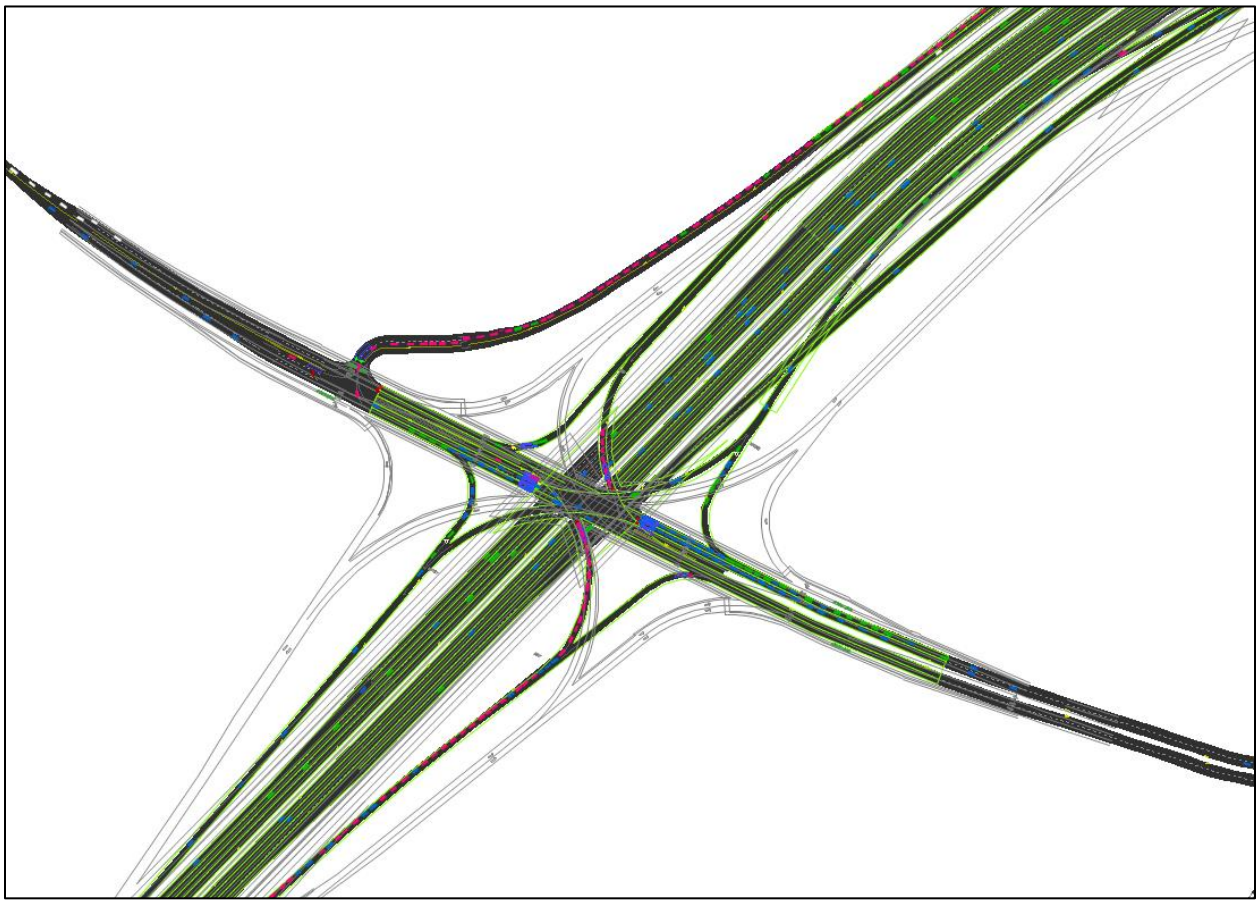


Figure 20 - Exit 63 (AO10) Simulation - PM Peak Hour



- Exit 65 (AO5)
    - Double left turn added to SB Broad River Road, however, significant queuing is still present along SB Broad River upstream from this interchange during the AM peak hour.
    - Revised KMZ file shows revised ramp alignments that will need to be re-run in the microsimulation model.
    - PM operations show significant queuing in the NB direction of Broad River Road which is impacting the EB I-20 off-ramp. Additional signal timing adjustments may improve this queuing.
    - **See Figure 21 and 22**

Figure 21 - Exit 65 (AO5) Simulation - AM Peak Hour

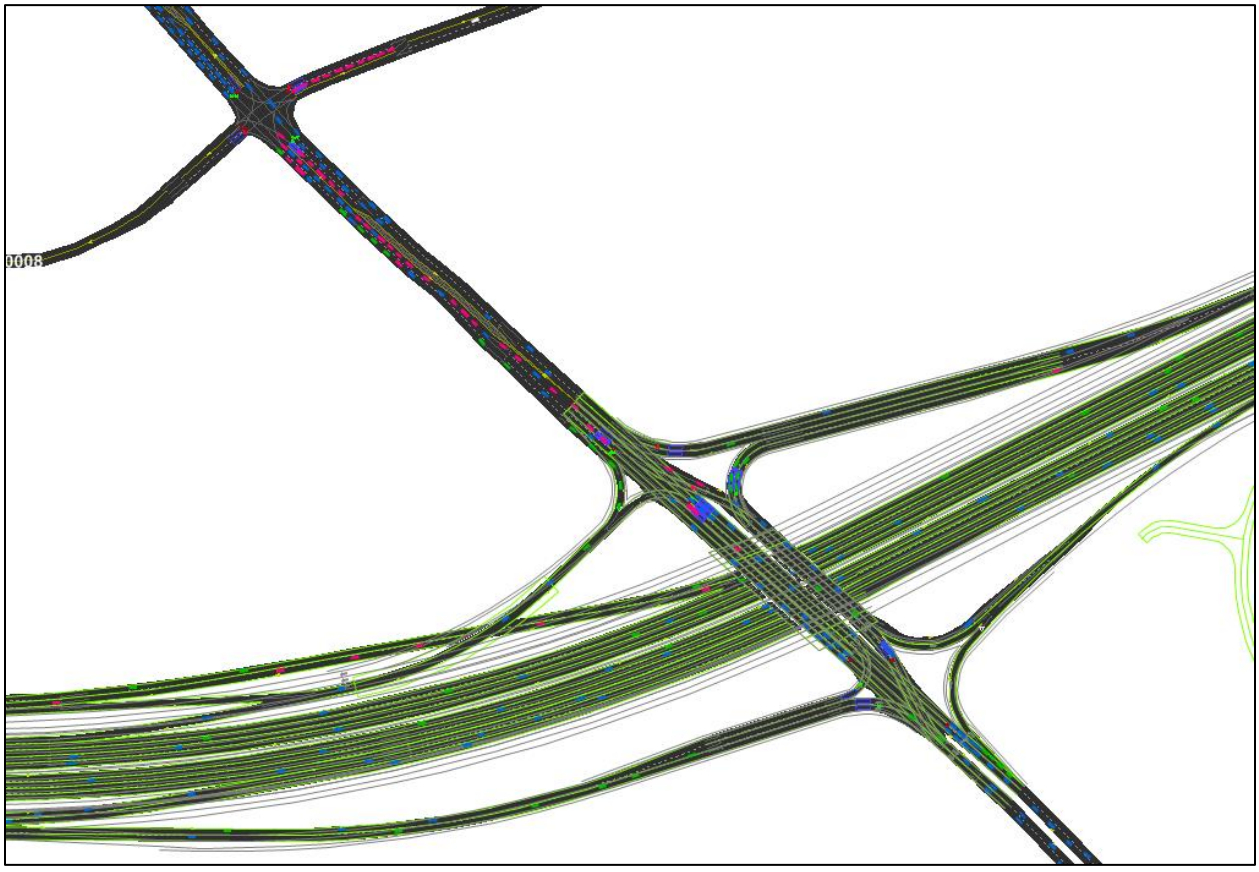
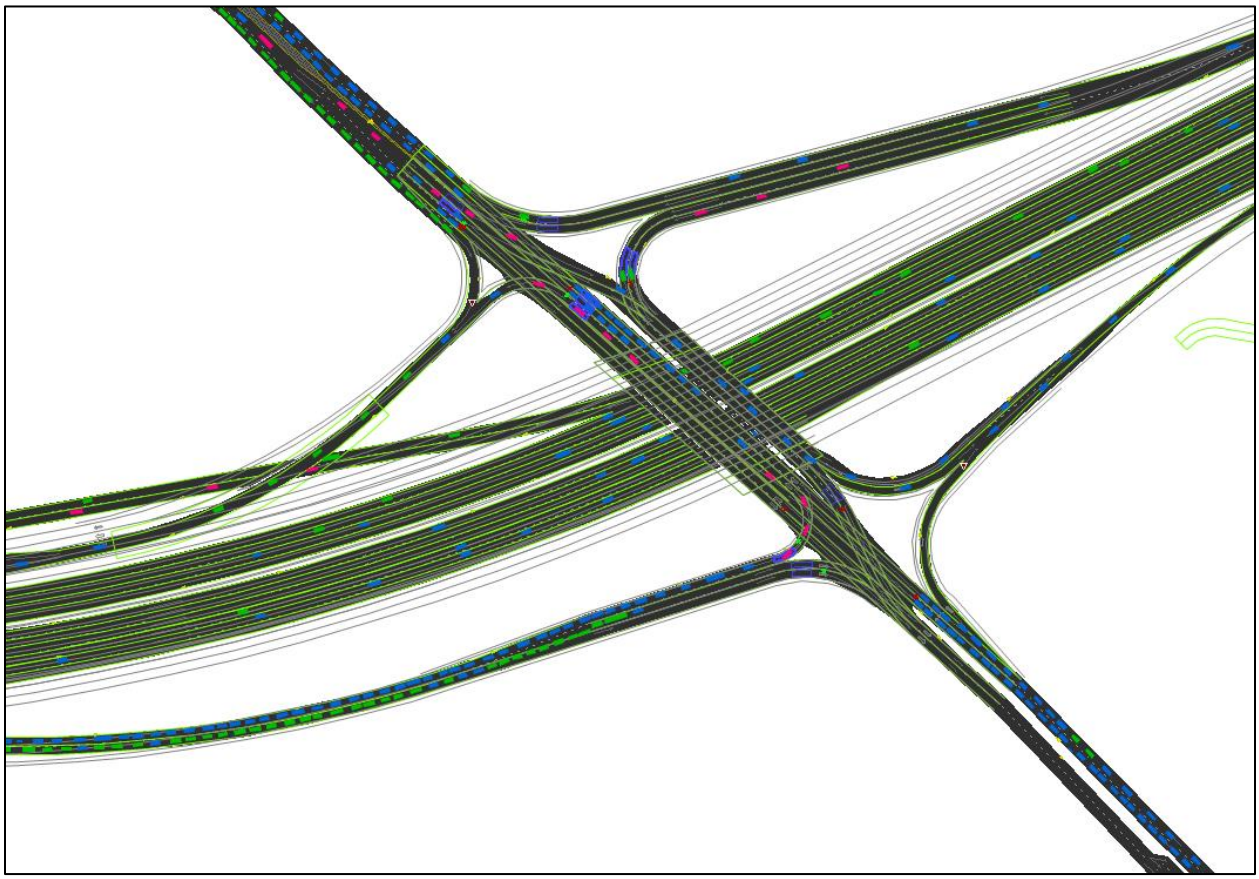
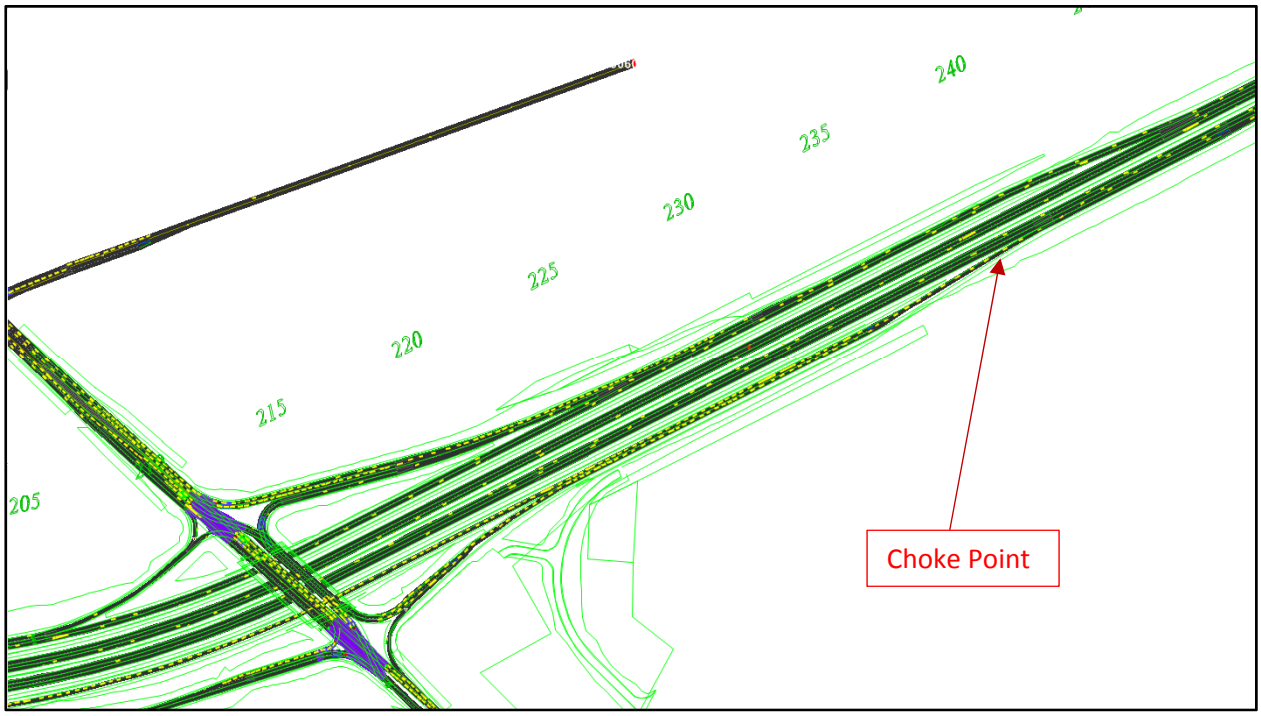


Figure 22 - Exit 65 (AO5) Simulation - PM Peak Hour

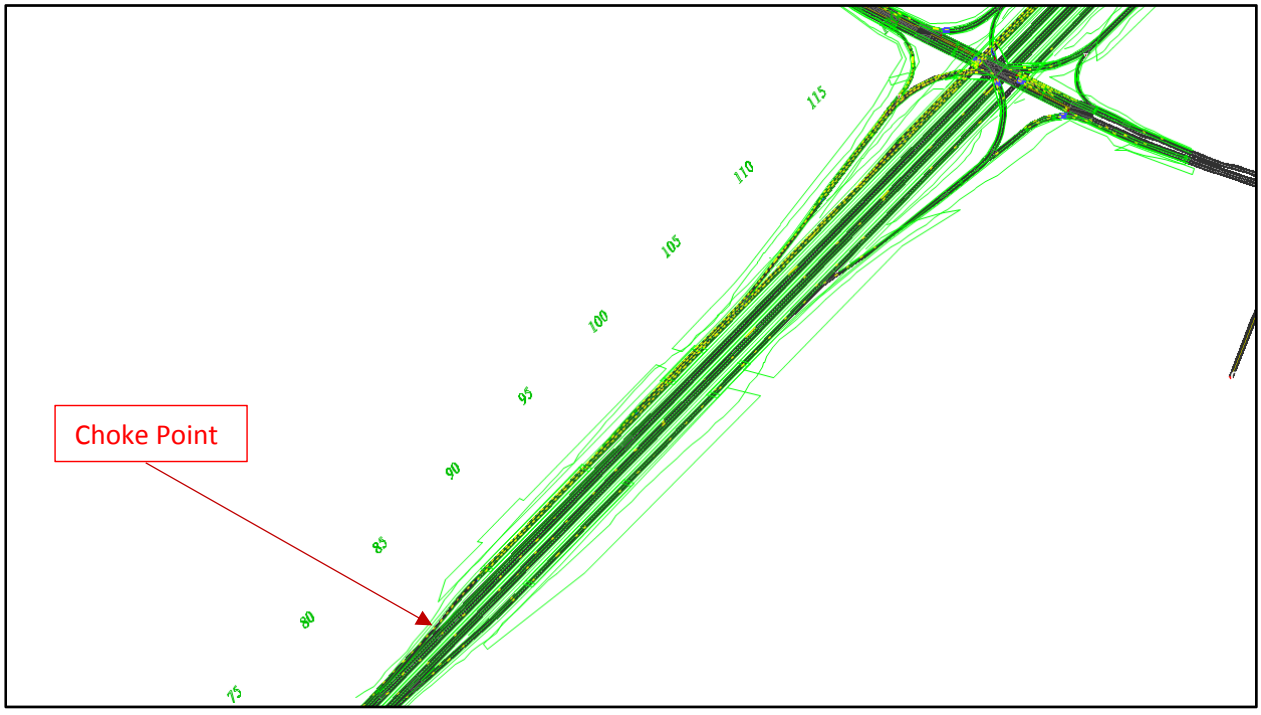


RA2 Specific Choke Points:

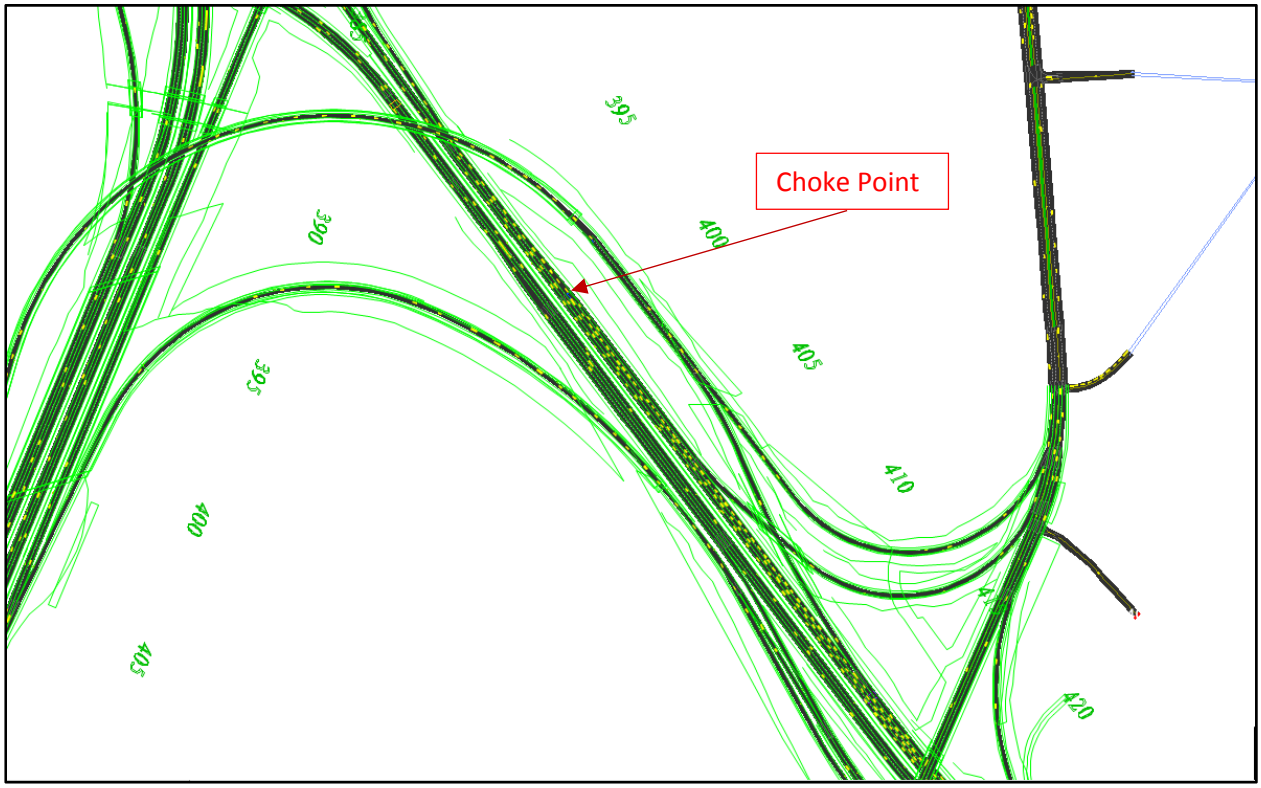
1. I-20 EB east of Exit 65 at the where the CD road merges into the mainline



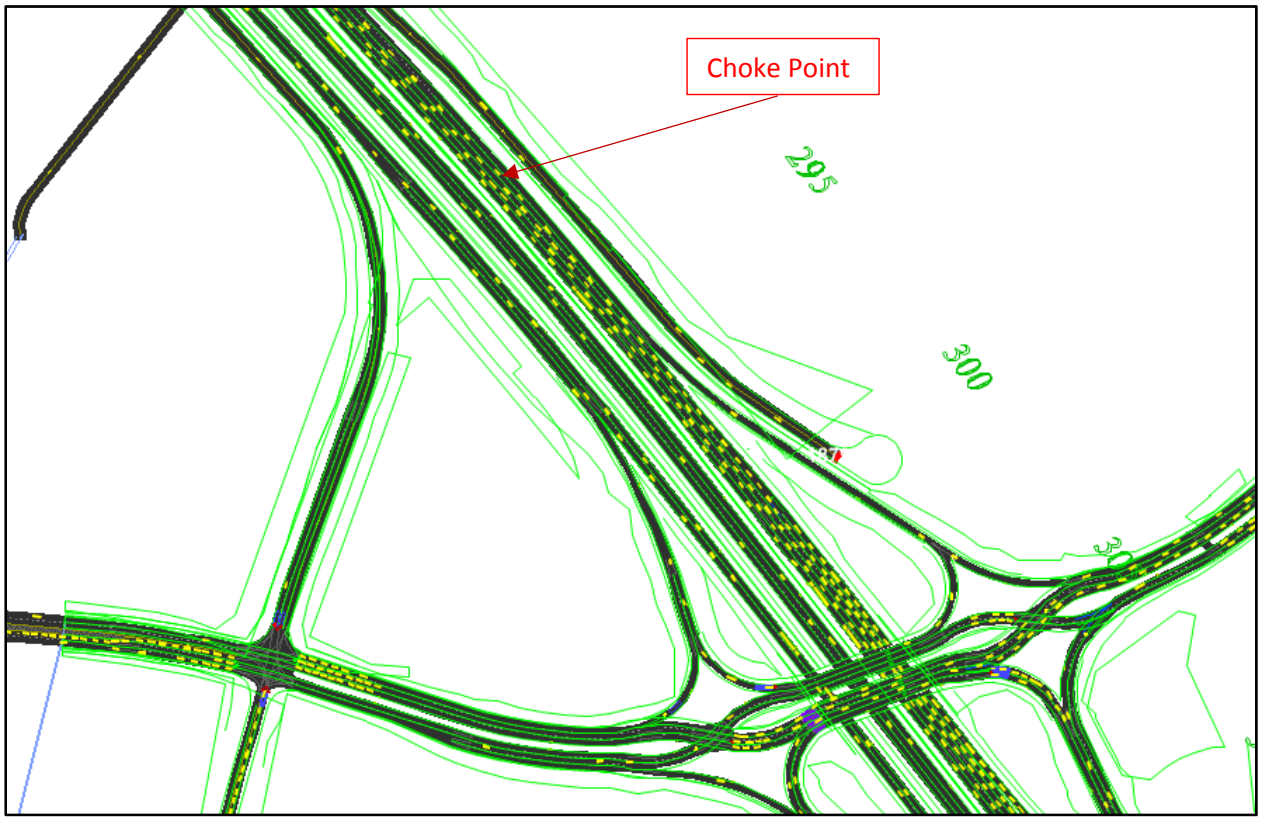
2. I-20 WB west of Exit 63 at the where the CD road merges into the mainline



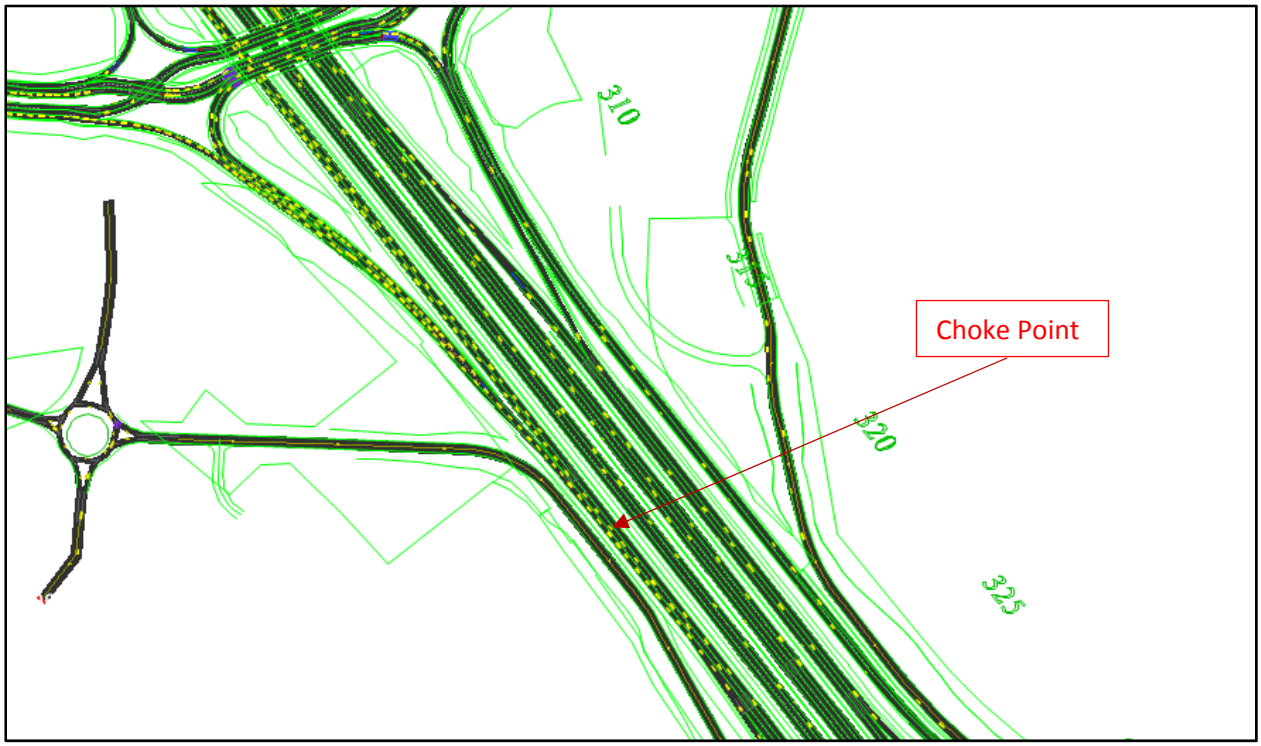
3. Merge Point for on-ramp from Colonial Life Blvd to I-126 WB



4. Merge point for the on-ramp from Exit 106 to WB I-26



5. Weaving area at merge point between Exit 106 EB on-ramp and the CD road for EB I-26



Reasonable Alternative 3 – Microsimulation Summary (2040 Volumes)

Freeway Segments

Segment	AM		PM		Comment
	EB	WB	EB	WB	
Exit 101-102	Under	Under	Under	Under	
Exit 102-103	Under	Under	Under	Under	
Exit 103-104	Under	Under	Under	Under	
Exit 104-106	Over	Under	At	At	Heavy volume on the EB C-D road that exits to the I-20 WB/EB ramps during both peak hours. C-D road narrows from two lanes to one lane prior to merge with Exit 106 on-ramp volume. Maintaining two lanes may alleviate heavy queuing. Heavy PM queuing at WB on-ramp merge from Exit 106. However, flow is steady after exit on-ramp merge.
Exit 106-107	Over	Under	Under	At	Heavy queuing at the I-26 EB/I-126 EB split. Only two lanes are dedicated to I-126 resulting in major queue back up to Exit 104. Prior to I-26 EB/I-126 split, the Exit 106 EB on-ramp merges onto I-26, resulting in major weaving at the same location. Additional capacity may be required to improve traffic flow.
Exit 107-108	Under	Under	Under	Under	
Exit 108-110	Under	Under	Under	Under	
Exit 108 – Colonial Life	At	Under	Under	Over	Heavy AM volume along I-126 EB after the traffic from the on-ramp from I-20 merge causes slower traffic flow. Heavy volume along I-126 WB prior merges from four lanes to two lanes prior to merge with I-26 WB, causing queuing back to Greystone Boulevard.
Exit 63-64	Under	Under	Under	Under	
Exit 64-65	Under	Under	Under	Under	

Interchanges

Exit		AM		PM		
Location	AO	EB Ramp	WB Ramp	EB Ramp	WB Ramp	Comment
Exit 101	AO43	At	At	Under	At	During the AM peak hour, the eastbound on-ramp and the westbound off-ramp experience heavy delay. Although traffic signal timing modifications may alleviate queuing, an additional lane on the eastbound on ramp (similar to existing) and a second left turn lane on the westbound off ramp may be necessary.
Exit 102	Par.Clo.	Under	Under	Under	Under	
Exit 103	AO49	Under	At	Under	Over	During the PM peak hour, traffic exiting on the westbound off-ramp queues off the ramp and back to the mainline.
Exit 104	AO32	Under	At	Under	Under	During the AM peak hour, the westbound off-ramp queuing results from heavy queuing along the arterial.
Exit 106	AO16	Under	At	Under	Over	During both the AM and PM peak hours the westbound off-ramps intersection dual right turns experience major queuing while maneuvering to the far left lane on St. Andrews Road to access Fernandina Road. This closely spaced intersection of St. Andrews Road at Fernandina Road adds additional delay to the operation at both the westbound ramps and the intersection. Traffic signal timing modifications may improve queuing along the arterial and ramp.

Interchanges – continued

Exit		AM		PM		Comment
Location	AO	EB Ramp	WB Ramp	EB Ramp	WB Ramp	
Exit 107/Exit 64	AO21	Over	Under	Under	Under	Heavy queuing at the I-26 EB/I-126 EB split during the AM peak hour. Only two lanes are dedicated to I-126 resulting in major queue back up to Exit 104. Heavy AM volume along I-126 EB after the traffic from the on-ramp from I-20 merge causes slower traffic flow. Additional capacity may be required to improve traffic flow. In addition, there is moderate queuing on the I-20 EB C-D road to I-26 EB.
Exit 108 – I-126	AO26	Under	Under	At	Over	Heavy volume along I-126 WB prior to I-26 WB merge during the PM peak hour. Four lanes drop to two lanes prior to merge with I-26 WB causing queuing back to Greystone Boulevard. I-26 EB off-ramp to Bush River Road operates at capacity with stop-control at ramp-termini. The installation of a signal and/or additional capacity may alleviate queuing on ramp.
Exit 110	AO46	Over	At	Under	At	Arterial experiences heavy traffic and turning queues causing backups on the eastbound off-ramps during the AM peak hour and the westbound off-ramps during the PM peak hour. Further adjustments may be made to signals on US 378 to improve arterial operations.
Colonial Life	AO21	Under	Under	Under	Under	Heavy volume along I-126 WB prior to I-26 merge during the PM peak hour. Four lanes drop to two lanes prior to merge with I-26 WB.
Exit 63	AO6	Under	Under	Under	Under	
Exit 65	AO5	Under	Under	Under	Over	The westbound off-ramp is overcapacity during the PM peak hour, which results in queue spillback into the I-20 westbound mainline.

Simulation Observations and Alternative Modifications

The greenline work is the KMZ file used for the simulation observations.

- Exit 101 (AO43)
    - AM Peak Hour – See **Figure 1** – interchange operates at capacity. The eastbound on-ramp and the westbound off-ramp experience heavy delay. Although traffic signal timing modifications may alleviate queuing, an additional lane on the eastbound on ramp where the eastbound right turn and westbound left turn traffic meets (similar to existing conditions) and a second left turn lane on the westbound off-ramp may be necessary.
    - PM Peak Hour – See **Figure 2** – interchange operates under capacity

Figure 1 - Exit 101 (AO43) Simulation - AM Peak Hour



Figure 2 - Exit 101 (Partial Cloverleaf) Simulation - PM Peak Hour



- Exit 102 (Par.Clo)
    - AM Peak Hour – See **Figure 3** – interchange operates under capacity
    - PM Peak Hour – See **Figure 4** – interchange operates under capacity

Figure 3 - Exit 102 (Partial Cloverleaf) Simulation - AM Peak Hour

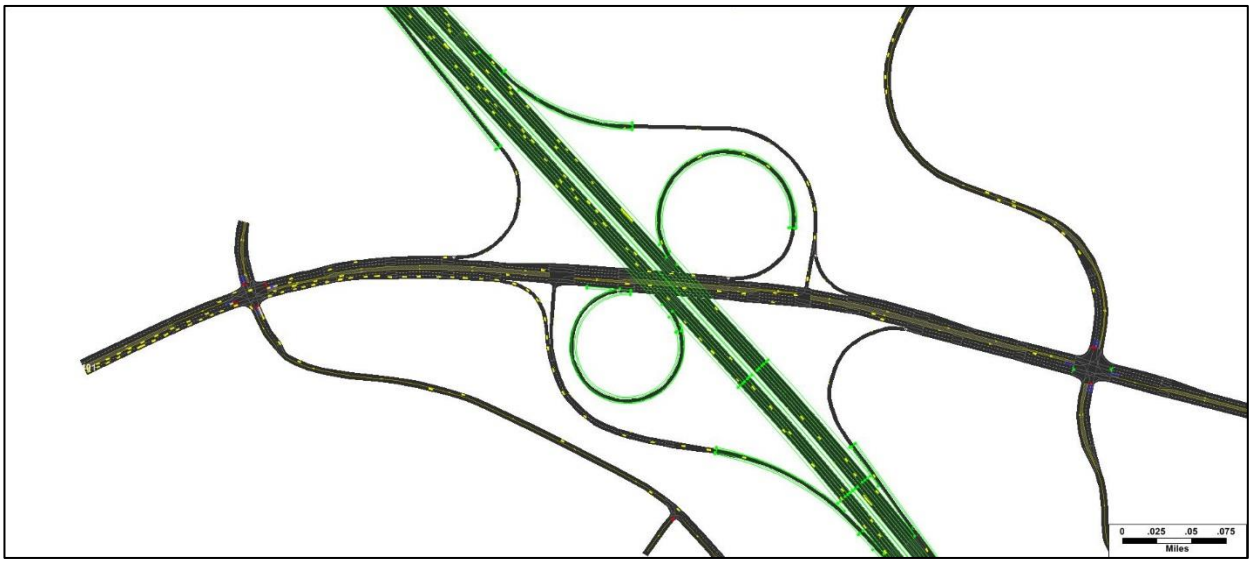


Figure 4 - Exit 102 (Partial Cloverleaf) Simulation - PM Peak Hour



- Exit 103 (AO49)
    - AM Peak Hour – See **Figure 5** – interchange operates at capacity. The westbound off ramp intersection experiences heavy queuing for the westbound left turn movement from Woodcross Drive onto Harbison Boulevard. Traffic signal timing modifications may alleviate delay and queuing.
    - PM Peak Hour – See **Figure 6** – interchange operates over capacity. The westbound off-ramp volume queues back into the mainline and the northbound left turn onto I-26 WB operates heavily queues on the mainline. Traffic signal timing modifications may alleviate delay and queuing.

Figure 5 - Exit 103 (AO49) Simulation - AM Peak Hour

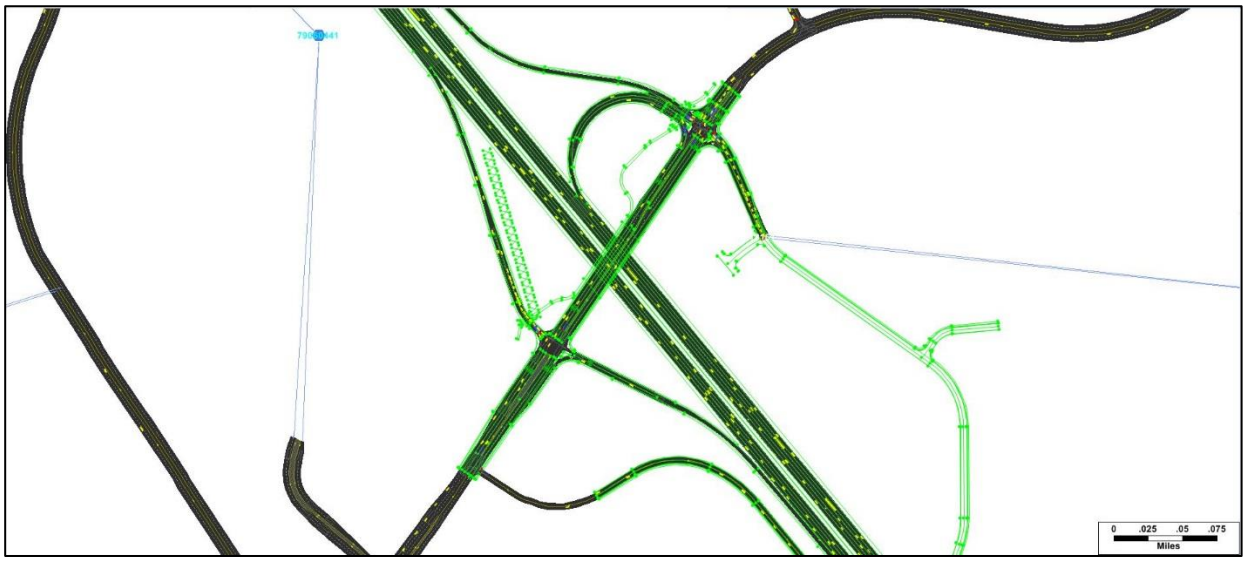
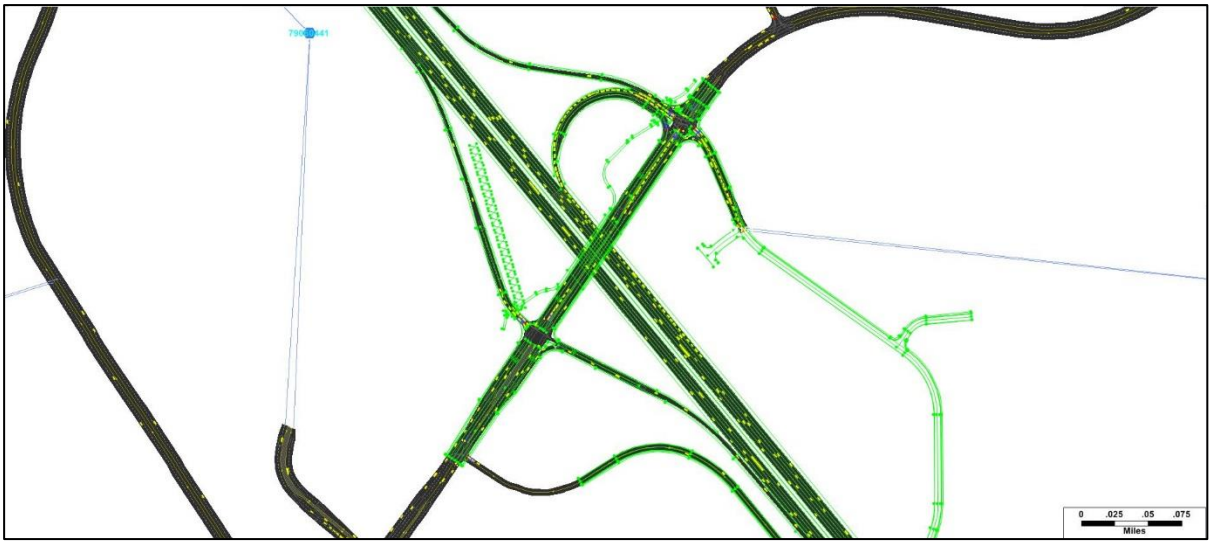


Figure 6 - Exit 103 (AO49) Simulation - PM Peak Hour



- Exit 104 (AO32)
    - AM Peak Hour – See **Figure 7** – interchange operates at capacity at the westbound ramps intersection. The eastbound off-ramp right turn experiences queuing due to heavy queuing along the arterial.
    - PM Peak Hour – See **Figure 8** – interchange operates under capacity. Heavy northbound left turn volume on Fernandina Road will require geometric and signal timing modifications to improve queuing and overall traffic operations.

Figure 7 - Exit 104 (AO32) Simulation - AM Peak Hour

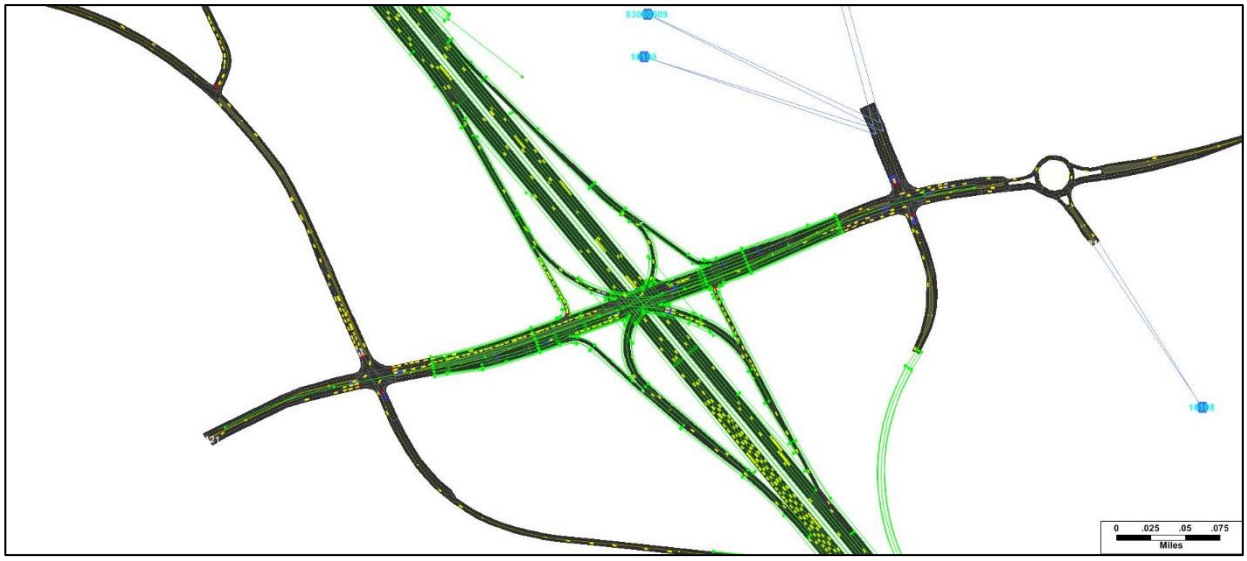
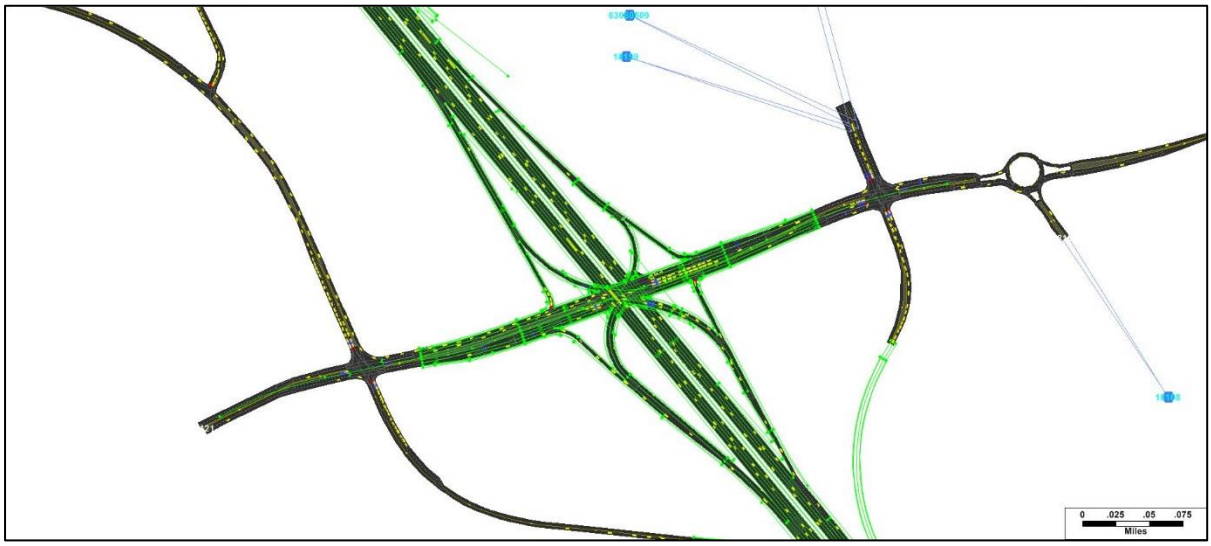


Figure 8 - Exit 104 (AO32) Simulation - PM Peak Hour



- Exit 106 (AO16) - In this alternative, access to Woodland Hills Road is converted to a RIRO intersection. Dedicated U-turn lanes/phasings have been provided which result in heavy arterial queuing.
    - AM Peak Hour – See **Figure 9** – interchange operates at capacity at the westbound off-ramps intersection. The dual right turns experience major queuing while maneuvering to the far left lane on St. Andrews Road to access Fernandina Road. This closely spaced intersection of St. Andrews Road at Fernandina Road adds additional delay to the operation at both the westbound ramps and the intersection. Traffic signal timing modifications may improve queuing along the arterial and ramp. Traffic entering the EB on-ramp backs up to the Jamil Road connection. Queuing from the system interchange at Exit 107 is evident on the EB mainline.
    - PM Peak Hour – See **Figure 10** – interchange operates over capacity at the westbound off ramps intersection. Similar to AM conditions, the dual right turns experience major queuing while maneuvering to the far left lane on St. Andrews Road to access Fernandina Road. In addition, demand volume from Burning Tree Road requires additional capacity and/or traffic signal timing modifications.

Figure 9 - Exit 106 (AO16) Simulation - AM Peak Hour

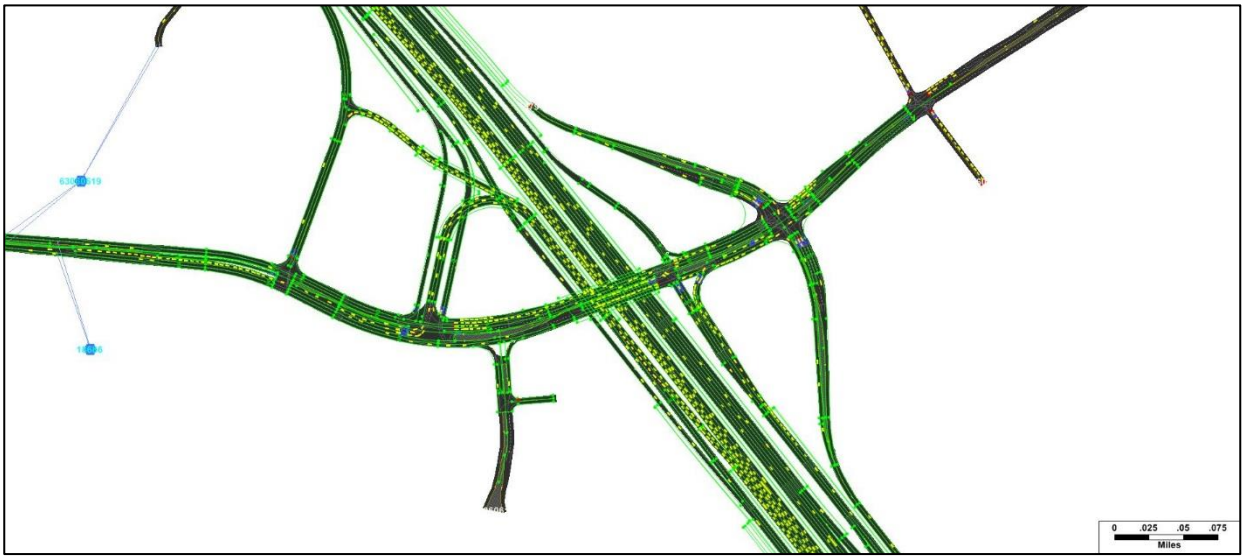
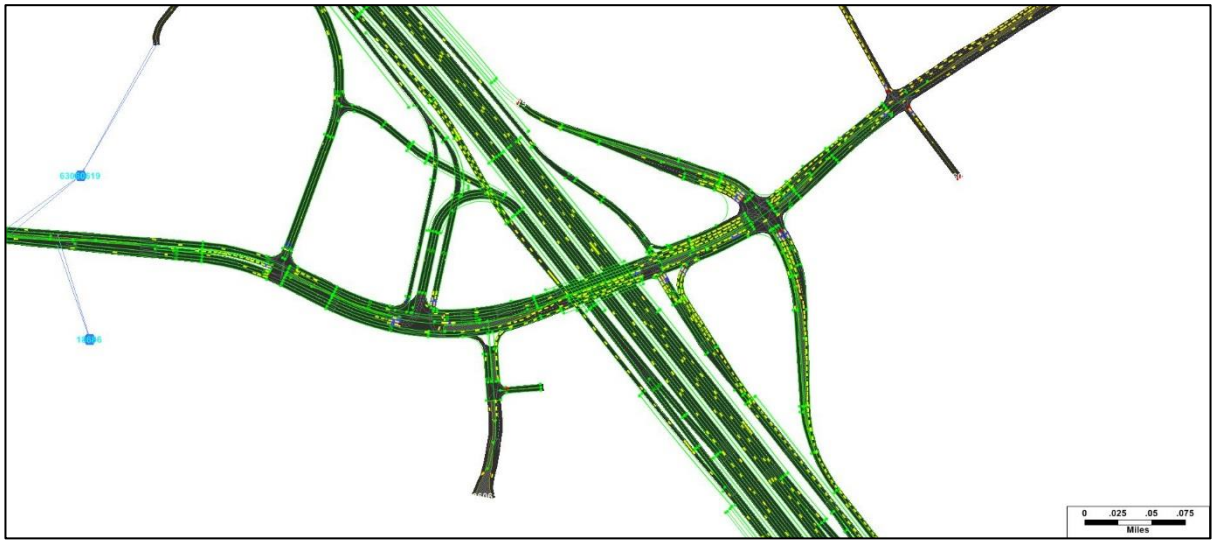


Figure 10 - Exit 106 (AO16) Simulation - PM Peak Hour



- Exit 107/Exit 64 (AO21)
    - AM Peak Hour – See **Figure 11** – interchange operates under capacity. The I-20 eastbound C-D ramp to I-26 EB/I-126 experiences moderate queuing however, flow is steady.
    - PM Peak Hour – See **Figure 12** – interchange operates under capacity.

Figure 11 - Exit 107/Exit 64 (AO21) Simulation - AM Peak Hour

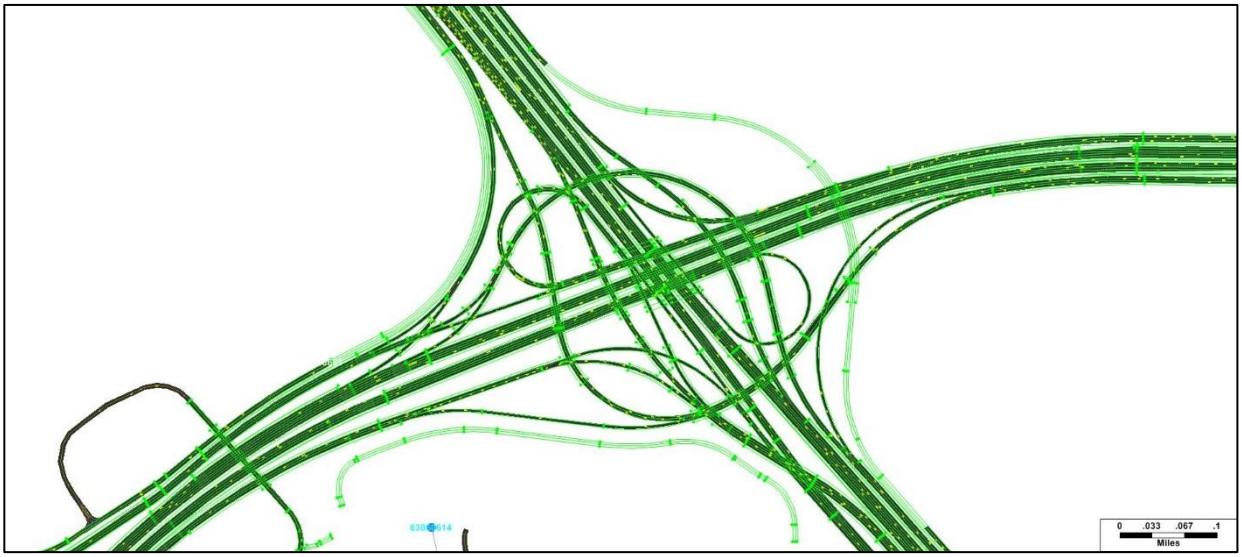
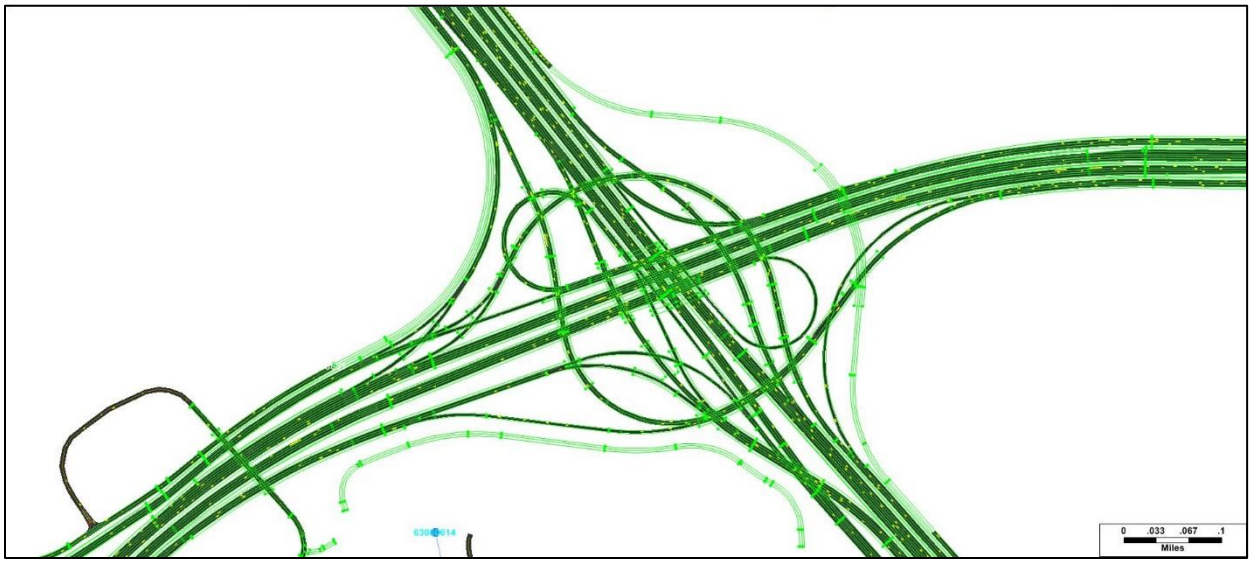


Figure 12 - Exit 107/Exit 64 (AO21) Simulation - PM Peak Hour



Exit 108 (I-126)

- AM Peak Hour – See **Figure 13** – I-126 eastbound operates under capacity.
- PM Peak Hour – See **Figure 14** – I-126 westbound operates at capacity. I-126 WB experiences heavy queuing as it narrows down from four lanes to two lane prior to meeting with I-26 westbound. I-26 EB off-ramp to Bush River Road operates at capacity with stop-control at ramp-termini. The installation of a signal and/or additional capacity may alleviate queuing on ramp.

Figure 13 - Exit 108 (I-126) Simulation - AM Peak Hour

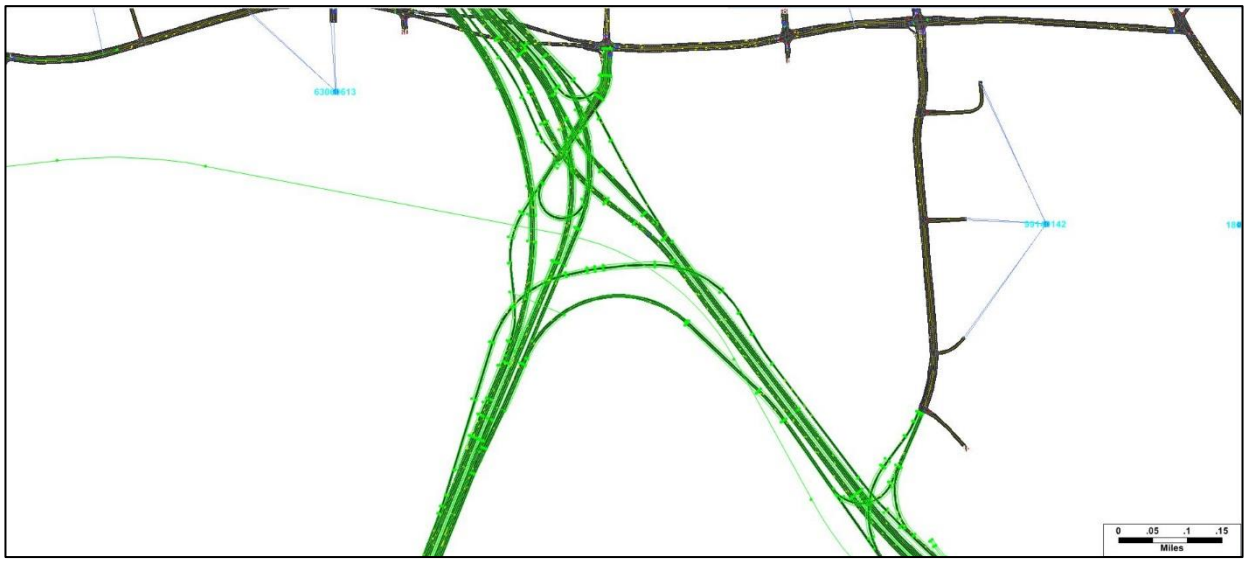
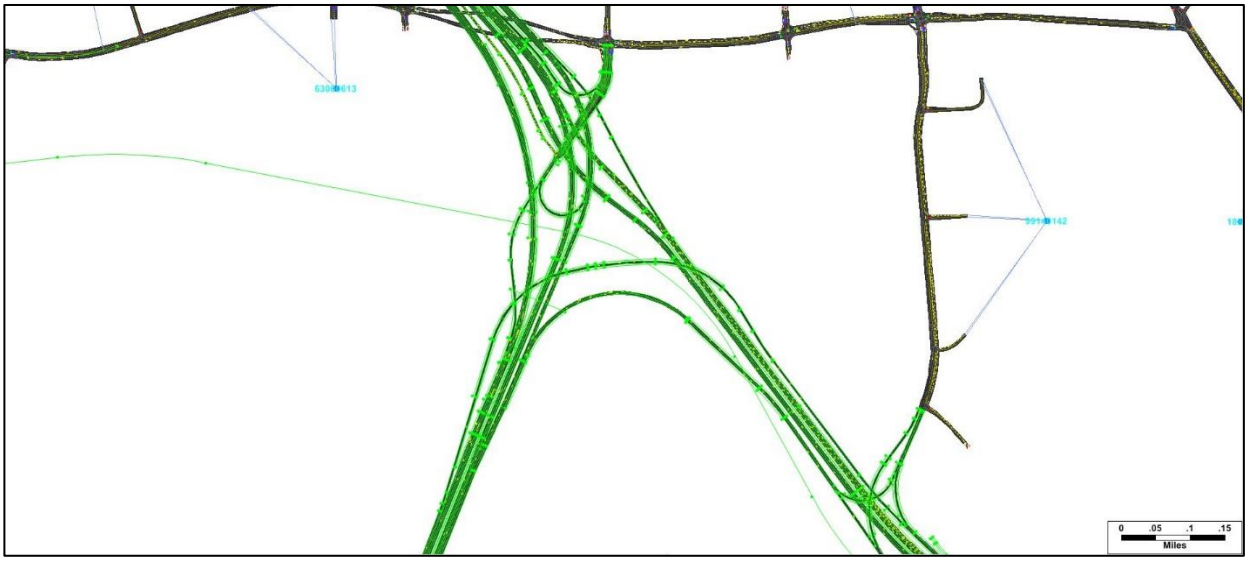


Figure 14 - Exit 108 (I-126) Simulation - PM Peak Hour



- Exit 110 (AO46)
    - AM Peak Hour – See **Figure 15** – Interchange operates over capacity at the I-26 eastbound off-ramp termini. The westbound off-ramp operates at capacity.
    - PM Peak Hour – See **Figure 16** – Interchange operates at capacity at the I-26 eastbound and westbound off-ramps due to the arterial queuing along US 378.

Figure 15 - Exit 110 (AO46) Simulation - AM Peak Hour

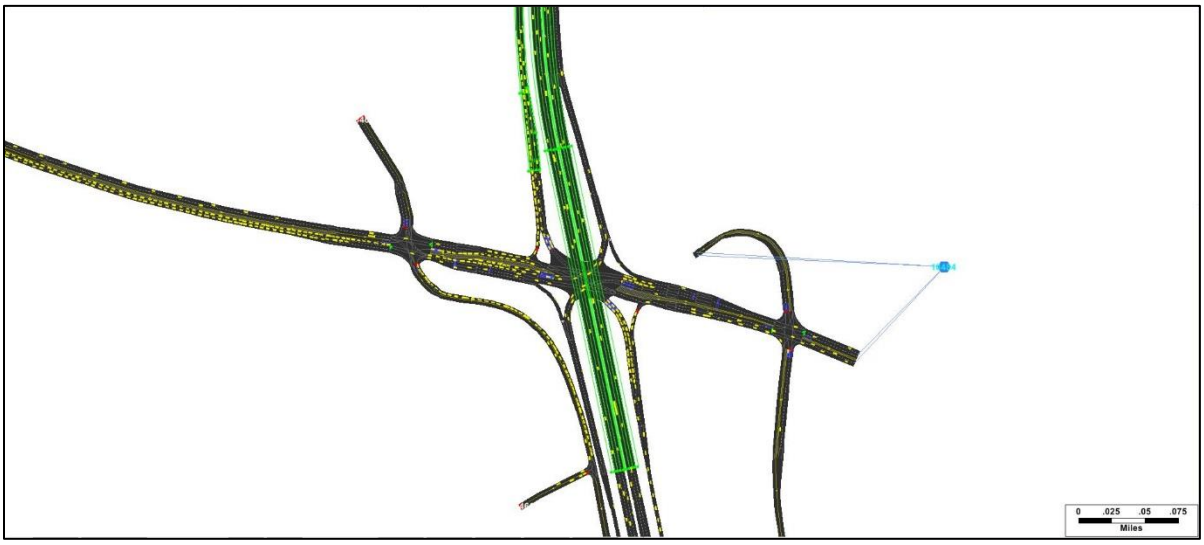
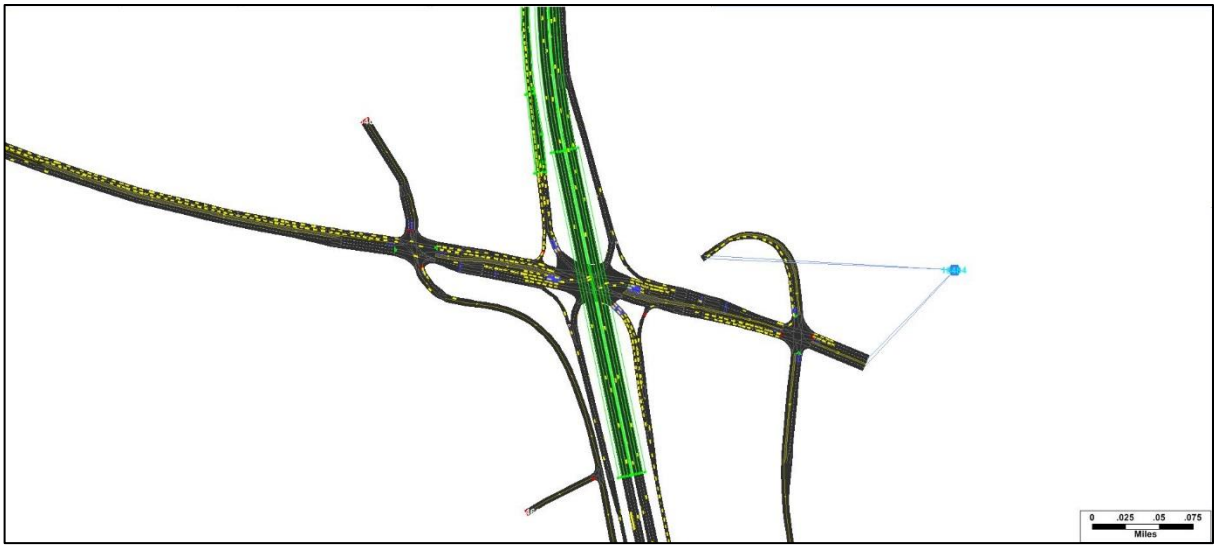


Figure 16 - Exit 110 (AO46) Simulation - PM Peak Hour



- I-126 at Colonial Life Boulevard
    - AM Peak Hour – See **Figure 17** – Interchange operates under capacity.
    - PM Peak Hour – See **Figure 18** – Interchanges operates under capacity. Heavy volume along I-126 WB prior to I-26 merge during the PM peak hour. Four lanes drop to two lanes prior to merge with I-26 WB.

Figure 17 – I-126 at Colonial Life Boulevard Simulation - AM Peak Hour

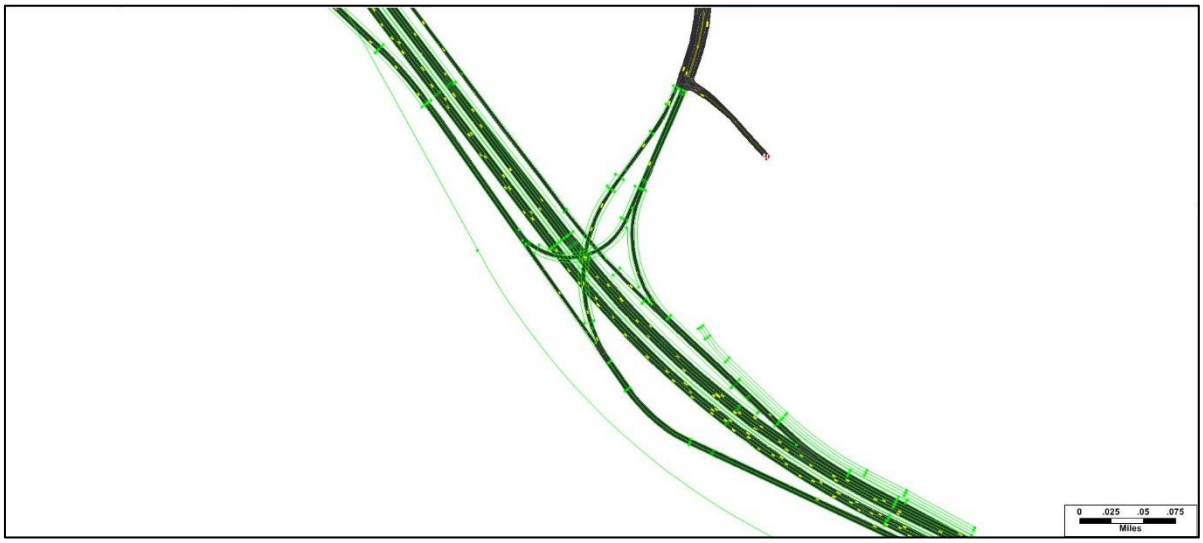
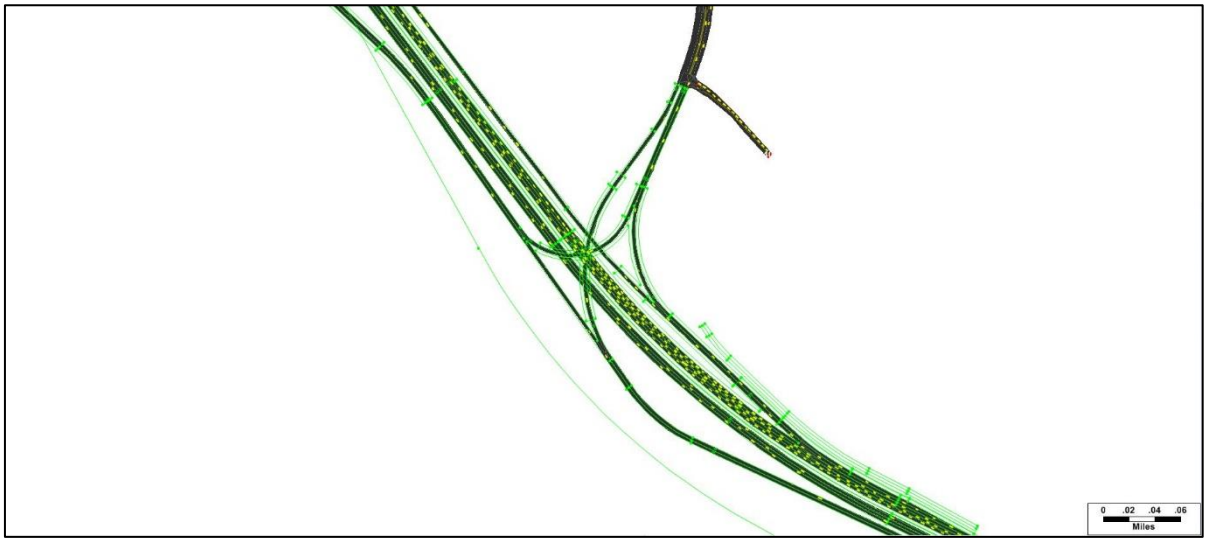


Figure 18 – I-126 at Colonial Life Boulevard Simulation - PM Peak Hour



- Exit 63 (AO7) – The new connection from Executive Center Drive to Rockland Road to access Bush River Road, alleviates the congestion from the closely spaced intersections of Berryhill Drive and the westbound ramps along Bush River Road.
    - AM Peak Hour – See **Figure 19** – interchange operates under capacity.
    - PM Peak Hour – See **Figure 20** – interchange operates under capacity.

Figure 19 - Exit 63 (AO5) Simulation - AM Peak Hour

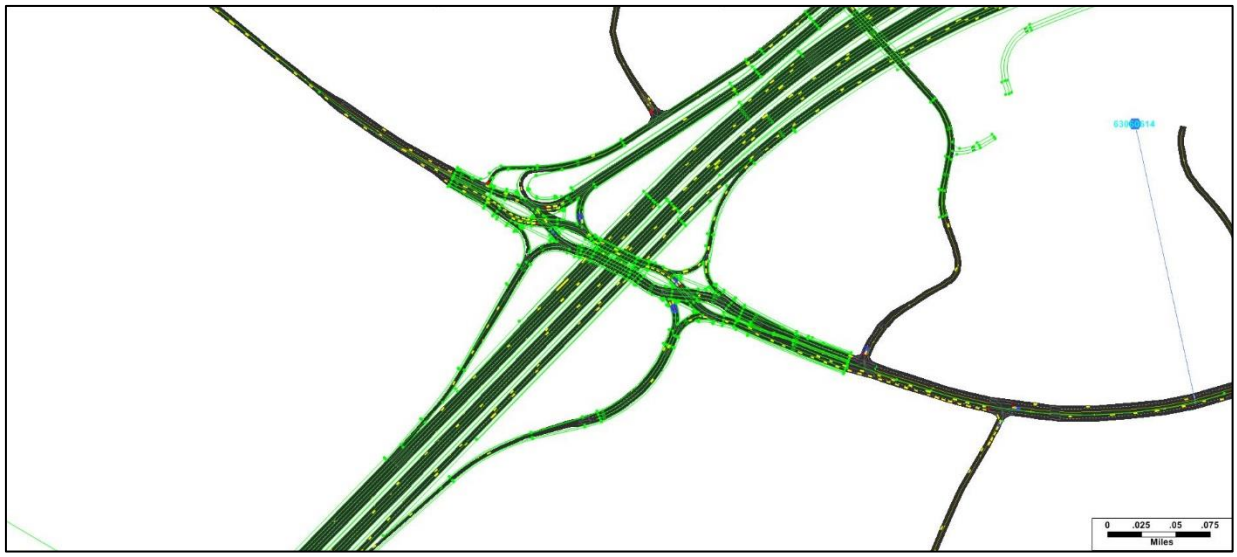
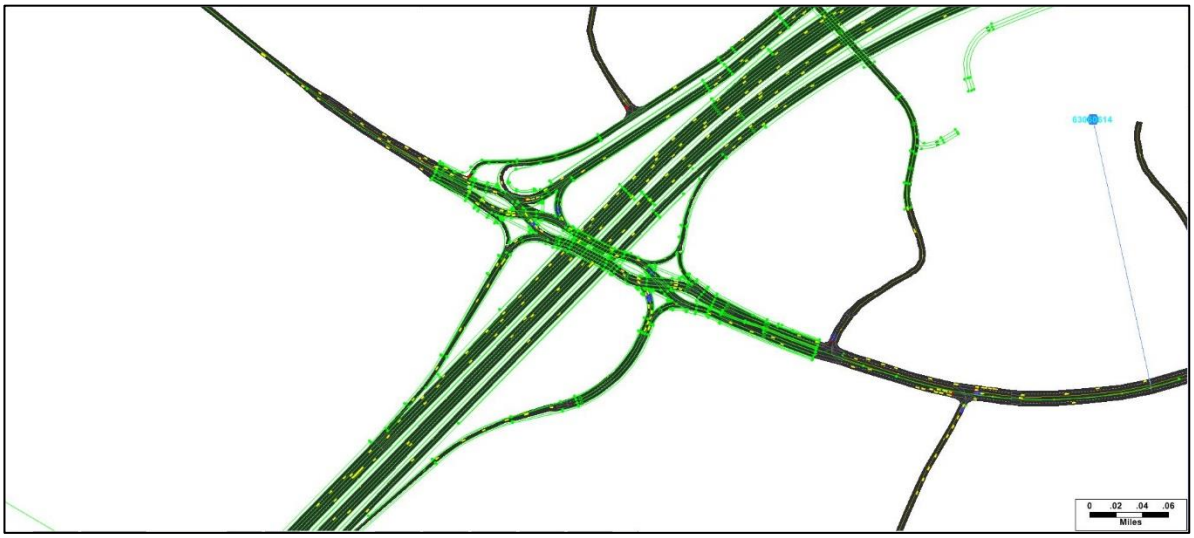


Figure 20 - Exit 63 (AO5) Simulation - PM Peak Hour



- Exit 65 (AO3)
    - AM Peak Hour – See **Figure 21** – interchange operates under capacity.
    - PM Peak Hour – See **Figure 22** – interchange operates over capacity. The westbound off-ramp is over capacity during the PM peak hour, which results in queue spillback into the I-20 westbound mainline.

Figure 21 - Exit 65 (AO6) Simulation - AM Peak Hour

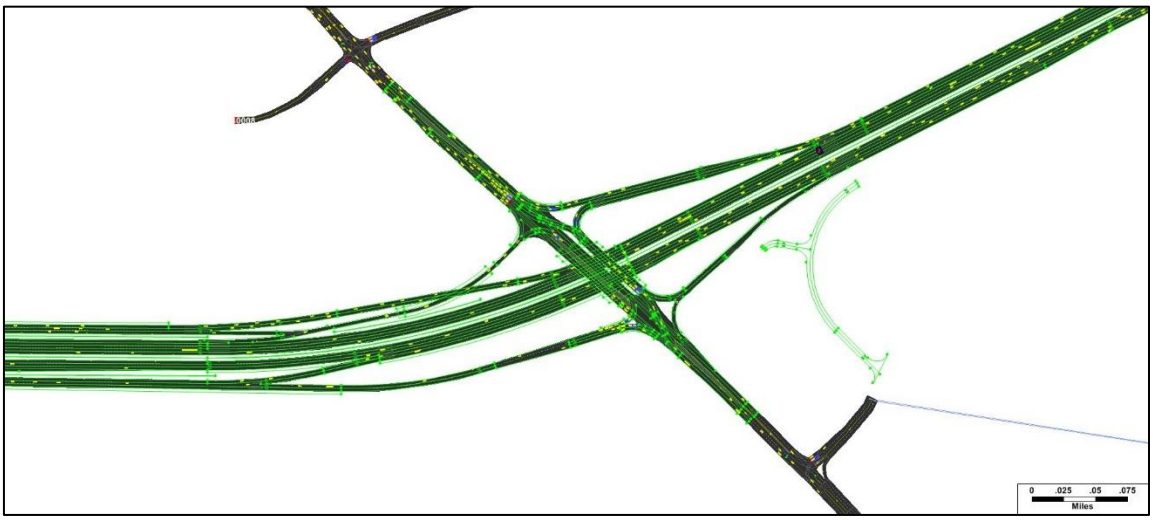
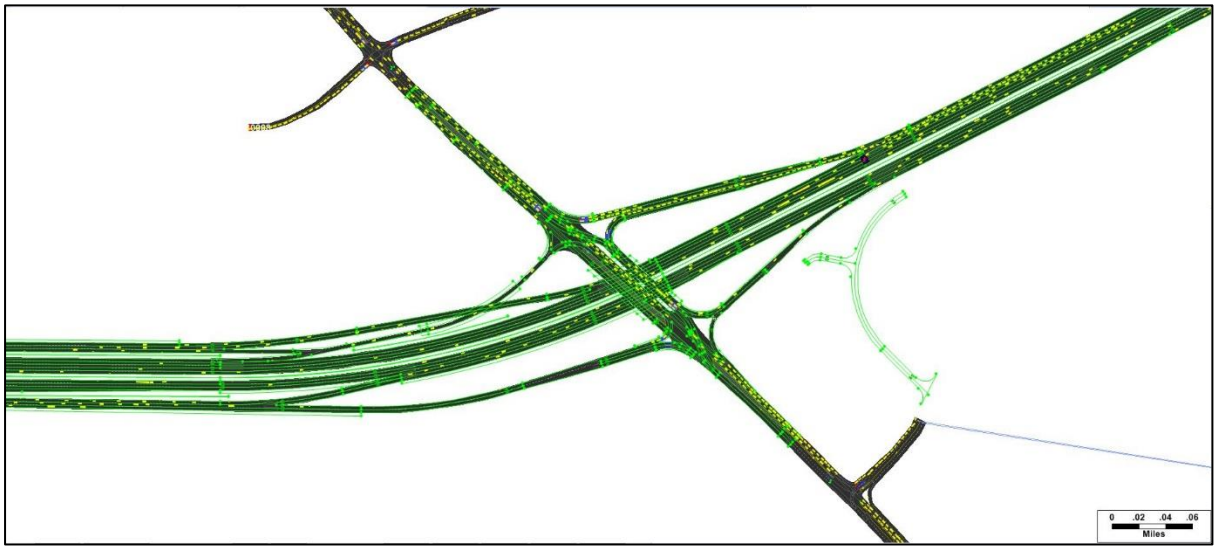
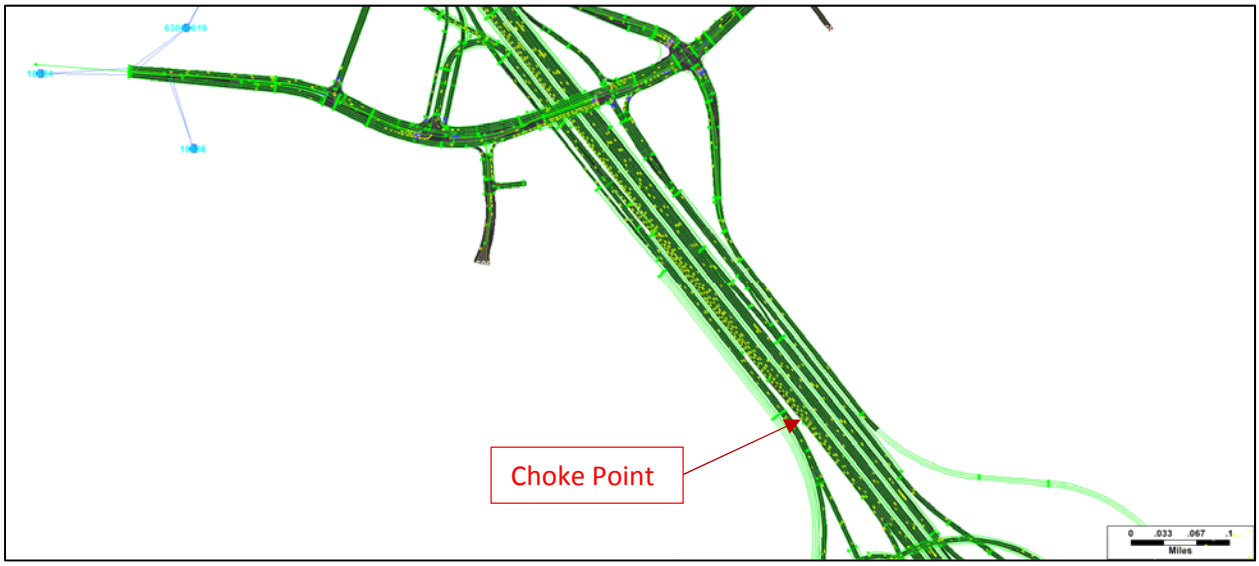


Figure 22 - Exit 65 (AO6) Simulation - PM Peak Hour

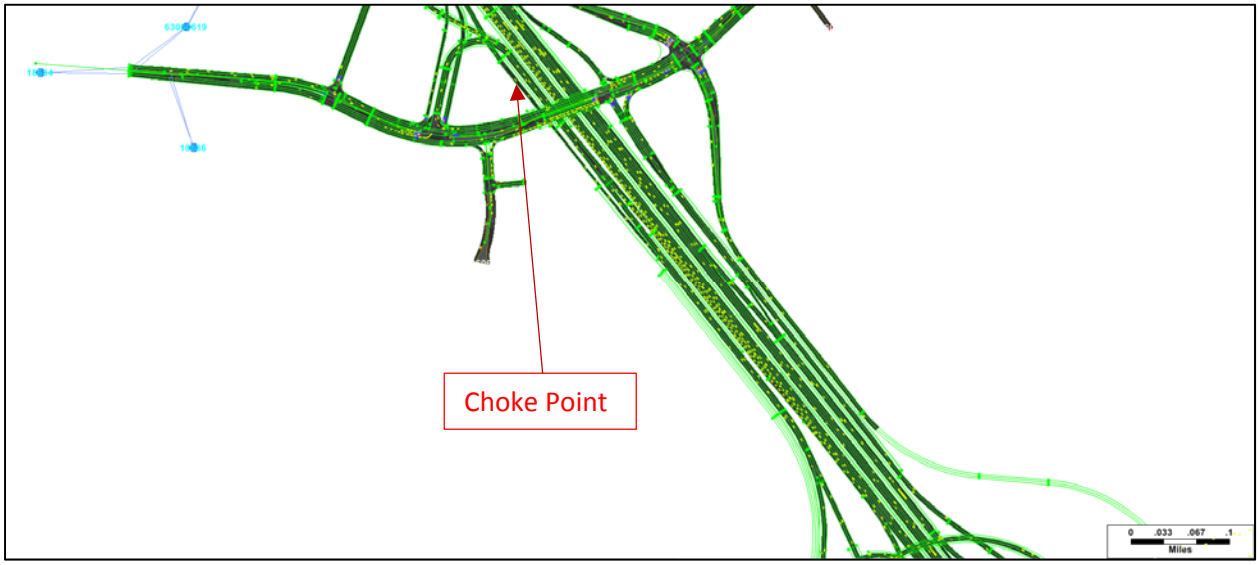


RA3 Specific Choke Points:

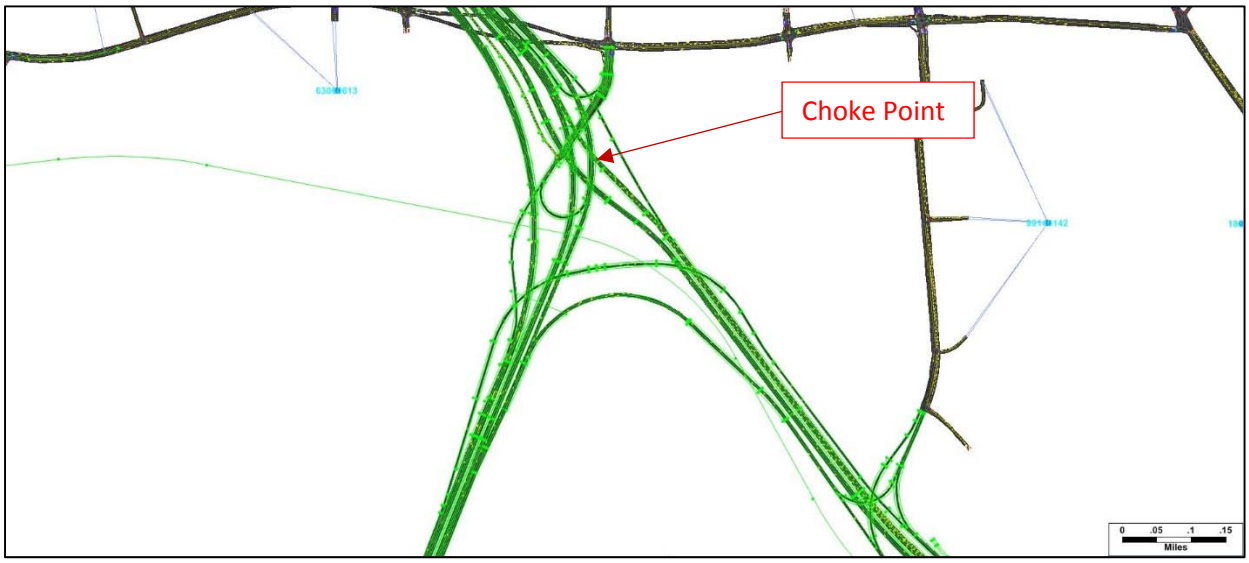
1. I-26 EB Exit 106 on-ramp onto I-26 EB mainline, lane drop within a heavy weaving area. (Only two lanes to I-126)



2. I-26 EB C-D lane drop down to one lane, vehicles exiting at Exit 106 and looping onto I-26 EB.



3. I-126 WB lane drop down prior to merge with I-26 WB.



Reasonable Alternative 4 – Microsimulation Summary (2040 Volumes)

Freeway Segments

Segment	AM		PM		Comment
	EB	WB	EB	WB	
Exit 101-102	Under	Under	Under	Under	
Exit 102-103	Under	Under	Under	Under	
Exit 103-104	Under	Under	Under	Under	
Exit 104-106	Over	Under	Under	Over	Overcapacity on the EB C-D road that exits to the I-20 WB/EB ramps during the AM peak hour. Heavy PM queuing at WB on-ramp merge from Exit 106.
Exit 106-107	Under	Under	Under	Under	Heavy volume on the westbound C-D road during the PM peak hour. This stems from the westbound off-ramp queuing at Exit 106. However, flow is steady on the mainline.
Exit 107-108	Under	Under	Under	Under	
Exit 108-110	Under	Under	Under	Under	
Exit 108 – Colonial Life	At	Under	Under	At	Heavy volume along I-126 EB after the traffic from the on-ramp from I-20. Merge causes slower traffic flow. Heavy volume along I-126 WB prior to I-26 split. However, flow is steady.
Exit 63-64	Under	Under	Under	Under	Overcapacity on the WB C-D road that merges onto I-20 during the PM peak hour. Additional capacity to merge onto I-20 may improve traffic flow on ramps.
Exit 64-65	Under	Under	Under	Under	Overcapacity on the WB C-D road that exits to the I-26 WB/EB ramps during the PM peak hour. This stems from the westbound off-ramp queuing at Exit 106.

Interchanges

Exit		AM		PM		
Location	AO	EB Ramp	WB Ramp	EB Ramp	WB Ramp	Comment
Exit 101	Par.Clo.	Under	Under	Under	Under	
Exit 102	Par.Clo.	Under	Under	Under	Under	
Exit 103	AO35	Under	Under	Under	Under	
Exit 104	AO32	Under	At	Under	Under	During the AM peak hour, the westbound off-ramp queuing results from heavy queuing along the arterial.
Exit 106	AO15	Under	Under	Under	Over	
Exit 107/Exit 64	AO22	At	Under	Under	Over	Moderate queuing on the I-26 EB C-D road during the AM peak hour. During the PM peak hour, the I-20 WB on-ramp experiences heavy queuing as a result of one lane (narrowing from three) entering I-20. Additional capacity may be required to improve traffic flow.
Exit 108 – I-126	AO25	At	Under	Under	At	Heavy volume along I-126 EB after the traffic from the I-20 EB on-ramp merges . Merge causes slower traffic flow. Heavy volume along I-126 WB prior to merge with I-26 WB during the PM Peak hour.
Exit 110	AO46	Over	Under	Under	Over	Arterial experiences heavy traffic and turning queues causing backups on the eastbound off-ramps during the AM peak hour and the westbound off-ramps during the PM peak hour. Further adjustments may be made to signals on US 378 to improve arterial operations.
Colonial Life	AO22	Under	Under	Under	Under	

Interchanges - continued

Exit		AM		PM		
Location	AO	EB Ramp	WB Ramp	EB Ramp	WB Ramp	Comment
Exit 63	AO7	Over	Under	At	At	The eastbound left turns onto I-20 experiences heavy queuing during the AM peak hour. Extending the dual left turn lanes may improve intersection operations. During the PM peak hour, the overall intersection experiences moderate queuing.
Exit 65	AO3	At	Under	At	Under	The southbound left turn on-ramp to I-20 experiences heavy queuing during the AM peak hour. Dual left turn lanes may be necessary to improve intersection operations. The signalized EB off-ramp experiences moderate queues during the PM peak hour. Traffic signal timing modifications may improve operations.

Simulation Observations and Alternative Modifications

The greenline work is the KMZ file used for the simulation observations.

- Exit 101 (Par.Clo)
    - AM Peak Hour – See **Figure 1** – interchange operates under capacity
    - PM Peak Hour – See **Figure 2** – interchange operates under capacity

Figure 1 - Exit 101 (Partial Cloverleaf) Simulation - AM Peak Hour

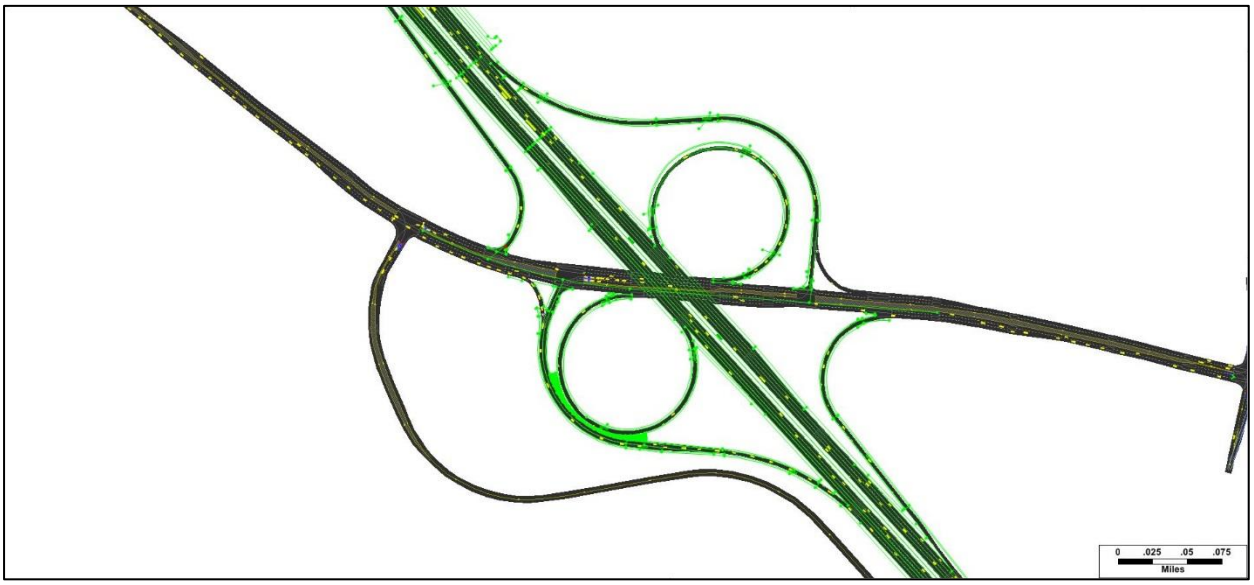
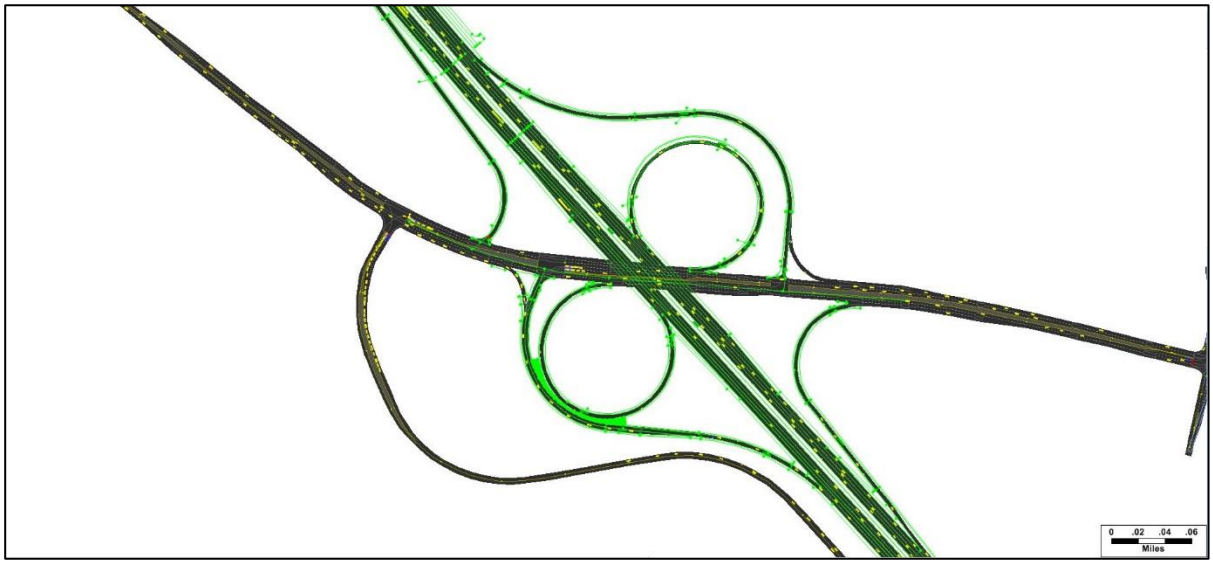


Figure 2 - Exit 101 (Partial Cloverleaf) Simulation - PM Peak Hour



- Exit 102 (Par.Clo)
    - AM Peak Hour – See **Figure 3** – interchange operates under capacity
    - PM Peak Hour – See **Figure 4** – interchange operates under capacity

Figure 3 - Exit 102 (Partial Cloverleaf) Simulation - AM Peak Hour

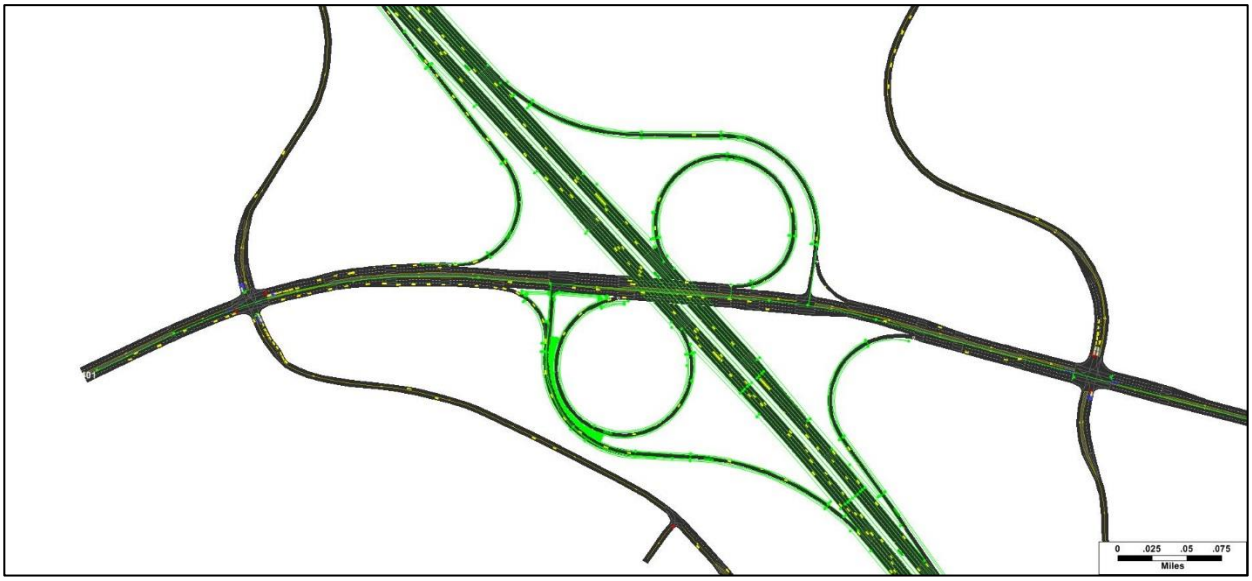
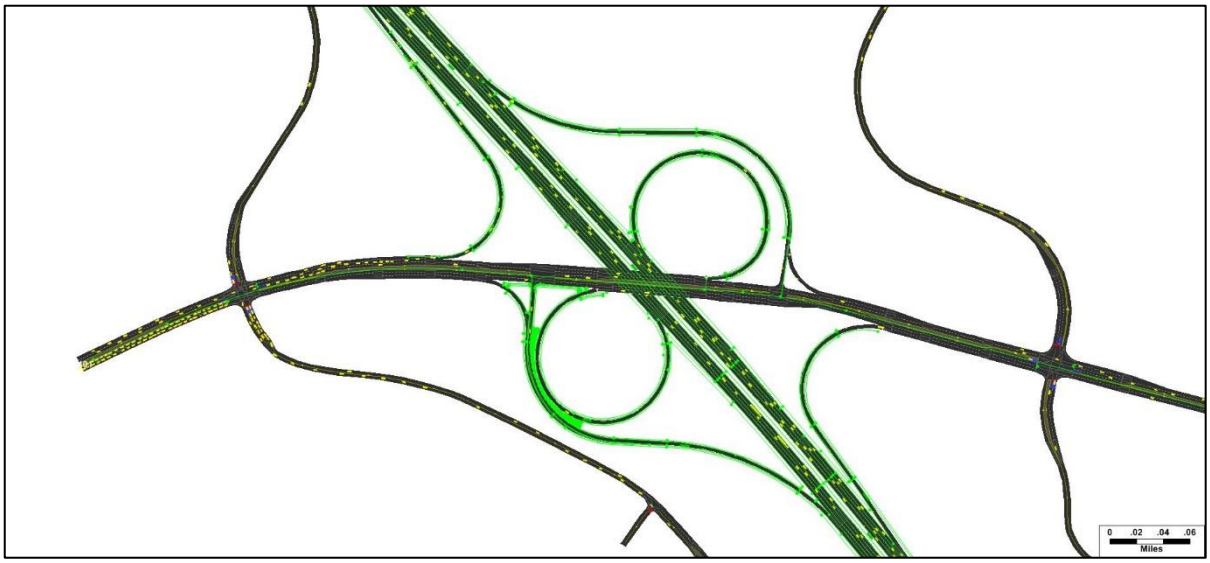


Figure 4 - Exit 102 (Partial Cloverleaf) Simulation - PM Peak Hour



- Exit 103 (AO35)
    - AM Peak Hour – See **Figure 5** – interchange operates under capacity
    - PM Peak Hour – See **Figure 6** – interchange operates under capacity.

Figure 5 - Exit 103 (AO35) Simulation - AM Peak Hour

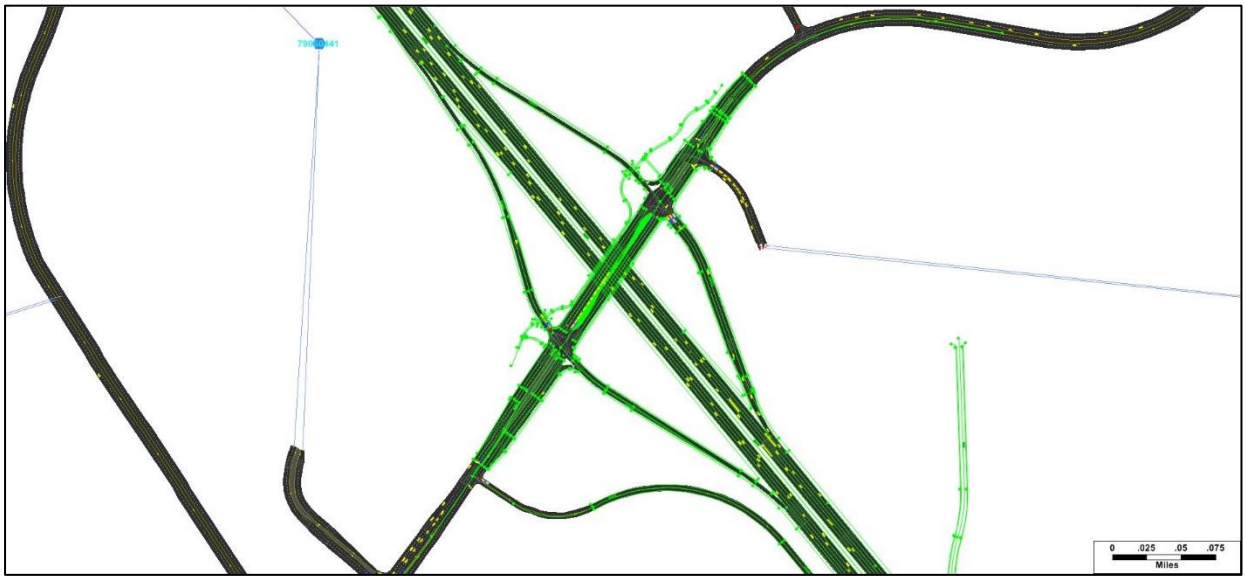
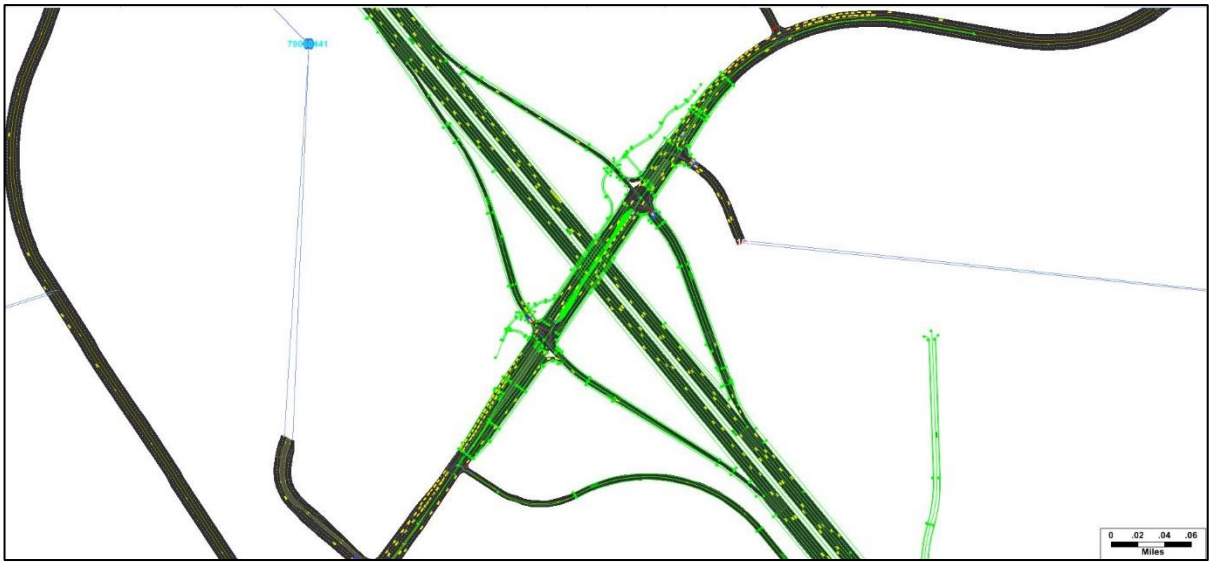


Figure 6 - Exit 103 (AO35) Simulation - PM Peak Hour



- Exit 104 (AO32)
    - AM Peak Hour – See **Figure 7** – interchange operates at capacity at the westbound ramps intersection. The westbound off-ramp right turn experiences queuing due to heavy queuing along the arterial.
    - PM Peak Hour – See **Figure 8** – interchange operates under capacity. Heavy northbound left turn volume at the intersection of Piney Grove Road at Fernandina Road will require geometric and signal timing modifications to improve queuing and overall traffic operations.

Figure 7 - Exit 104 (AO32) Simulation - AM Peak Hour

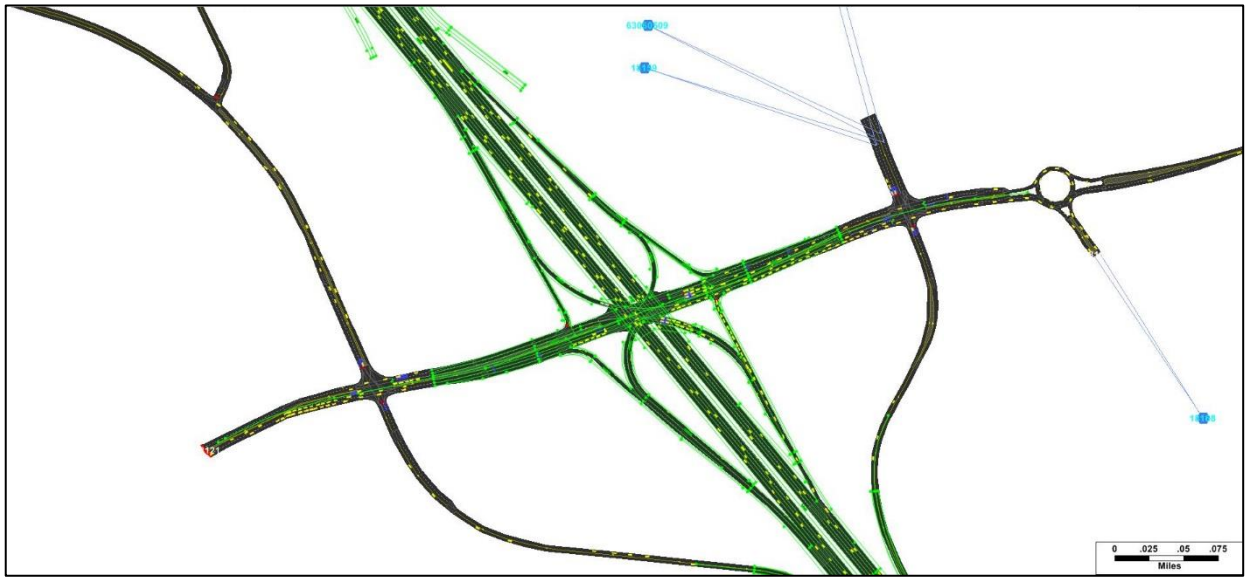
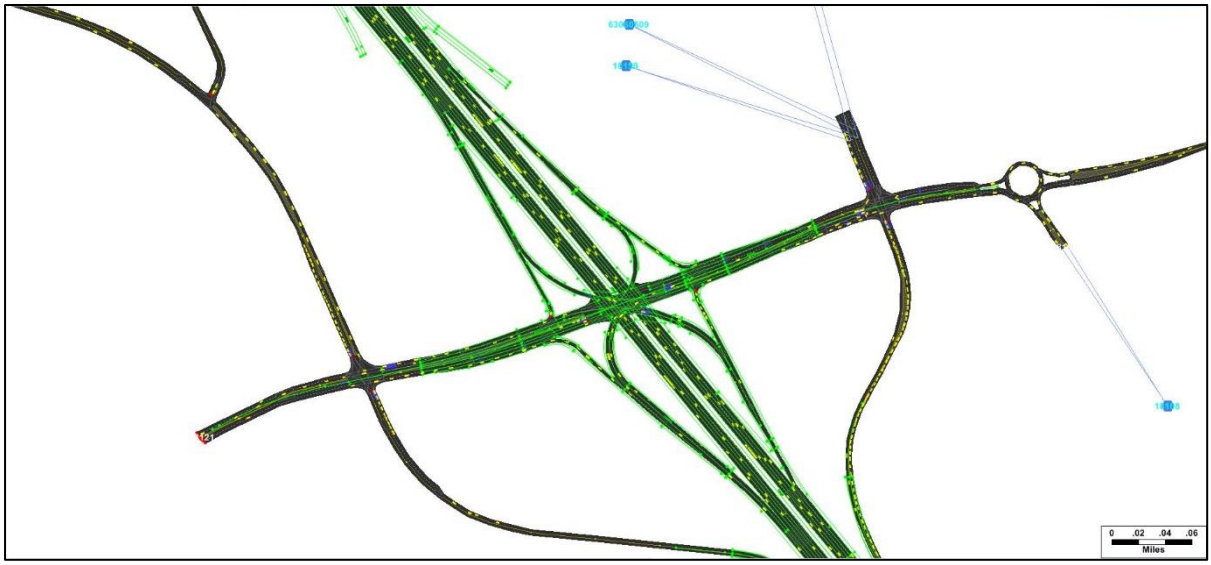


Figure 8 - Exit 104 (AO32) Simulation - PM Peak Hour

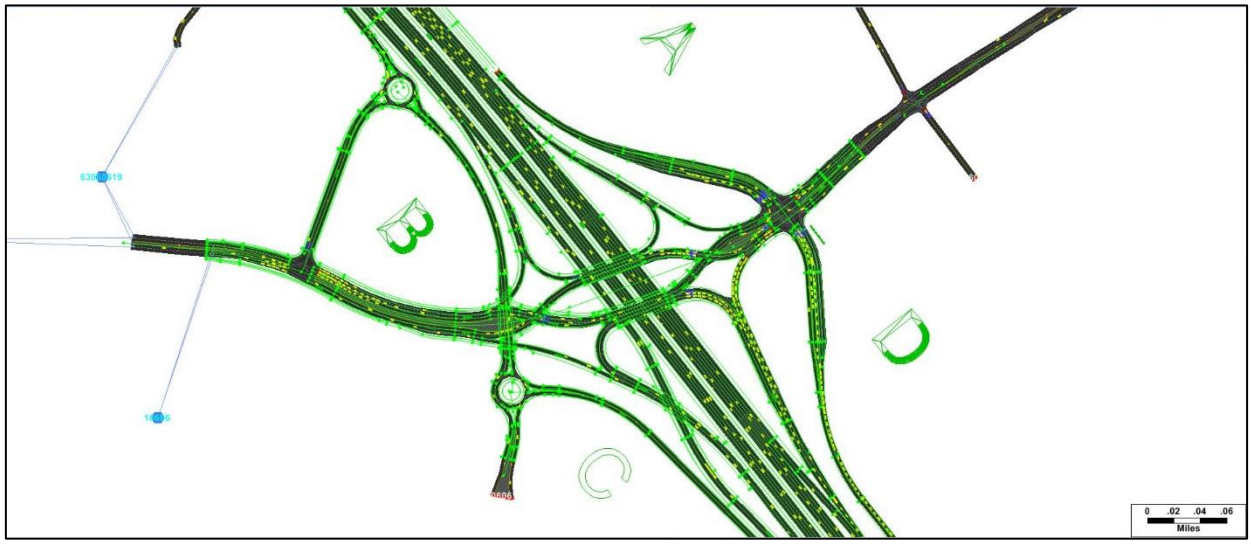


- Exit 106 (AO15)
    - AM Peak Hour – See **Figure 9** – interchange operates at capacity at the WB off-ramps intersection. The dual right turns experience major queuing while maneuvering to the far left lane on St. Andrews Road to access Fernandina Road. This closely spaced intersection of St. Andrews Road at Fernandina Road adds additional delay to the operation of both the DDI and the intersection. Traffic signal timing modifications may improve queuing along the arterial and ramp.
    - PM Peak Hour – See **Figure 10** – interchange operates over capacity at the WB off ramps intersection. Similar to AM conditions, the dual right turns experience major queuing while maneuvering to the far left lane on St. Andrews Road to access Fernandina Road. This queue spills onto the C-D ramp. In addition, demand volume from Burning Tree Road requires traffic signal timing modifications.

Figure 9 - Exit 106 (AO15) Simulation - AM Peak Hour



Figure 10 - Exit 106 (AO15) Simulation - PM Peak Hour



- Exit 107/Exit 64 (AO22)
    - AM Peak Hour – See **Figure 11** – interchange operates under capacity. The I-26 eastbound C-D ramp to I-20 experiences moderate queuing however, flow is steady.
    - PM Peak Hour – See **Figure 12** – interchange operates over capacity. The I-26 westbound off-ramp to I-20 WB experiences heavy queuing. The ramp volume to I-20 westbound from I-26 in both the eastbound and westbound directions merges from three lanes to one lane causing major queuing. Additional lanes may be needed to merge into I-20 to improve traffic flow on these ramps. In addition, the westbound on ramp from I-20 WB experiences heavy queuing which stems from the Exit 106 interchange. The westbound off-ramp volume at that exit backs up onto the C-D road which causes a major queue backup onto I-20 westbound to Exit 65.

Figure 11 - Exit 107/Exit 64 (AO22) Simulation - AM Peak Hour

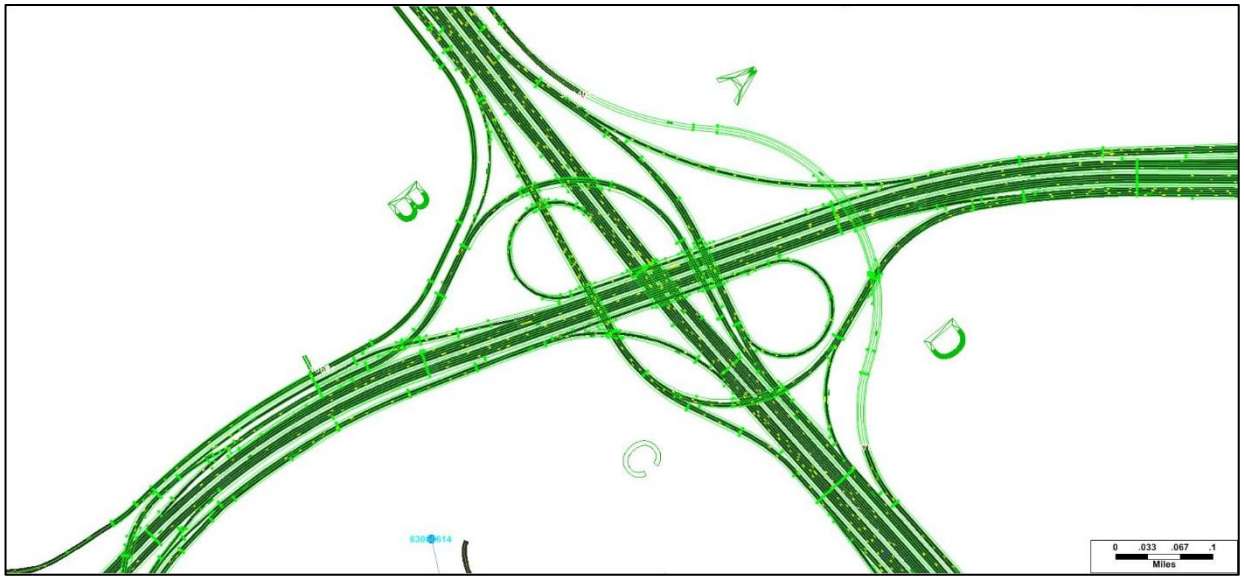
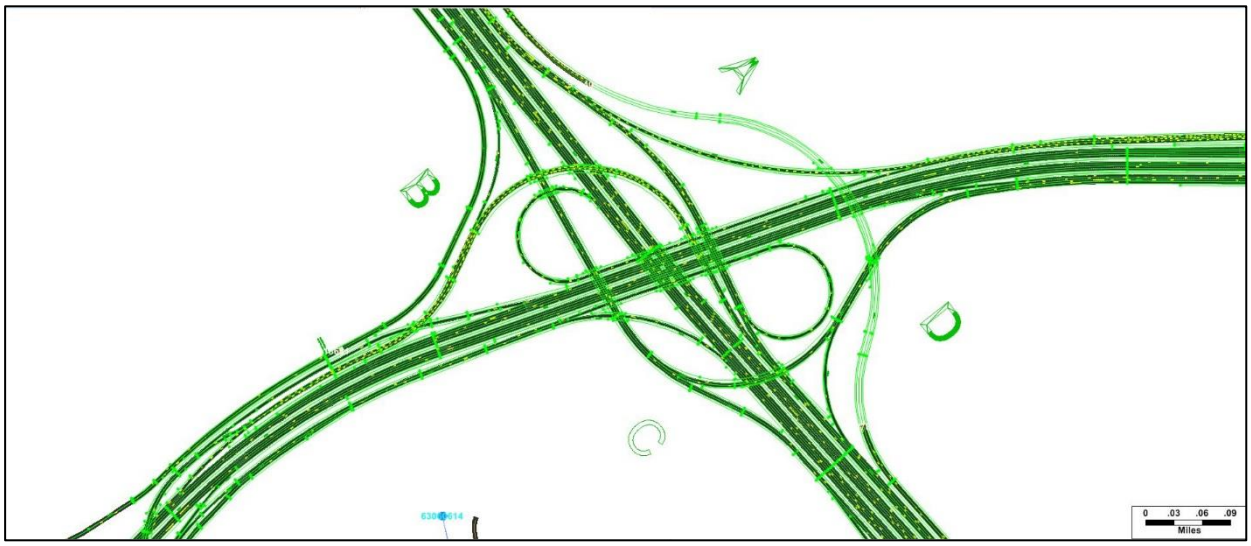


Figure 12 - Exit 107/Exit 64 (AO22) Simulation - PM Peak Hour



Exit 108 (I-126)

- AM Peak Hour – See **Figure 13** – I-126 eastbound operates at capacity towards I-126 eastbound. However, flow is steady.
- PM Peak Hour – See **Figure 14** – I-126 westbound operates at capacity. The I-126 WB expressway to I-20 experiences moderate queuing as it narrows down from two lanes to one lane prior to meeting with Bush River Road on ramp.

Figure 13 - Exit 108 (I-126) Simulation - AM Peak Hour



Figure 14 - Exit 108 (I-126) Simulation - PM Peak Hour



- Exit 110 (AO46)
    - AM Peak Hour – See **Figure 15** – Interchange operates over capacity at the eastbound off-ramp termini.
    - PM Peak Hour – See **Figure 16** – Interchange operates over capacity at the I-26 westbound off-ramp due to the arterial queuing along US 378.

Figure 15 - Exit 110 (AO46) Simulation - AM Peak Hour

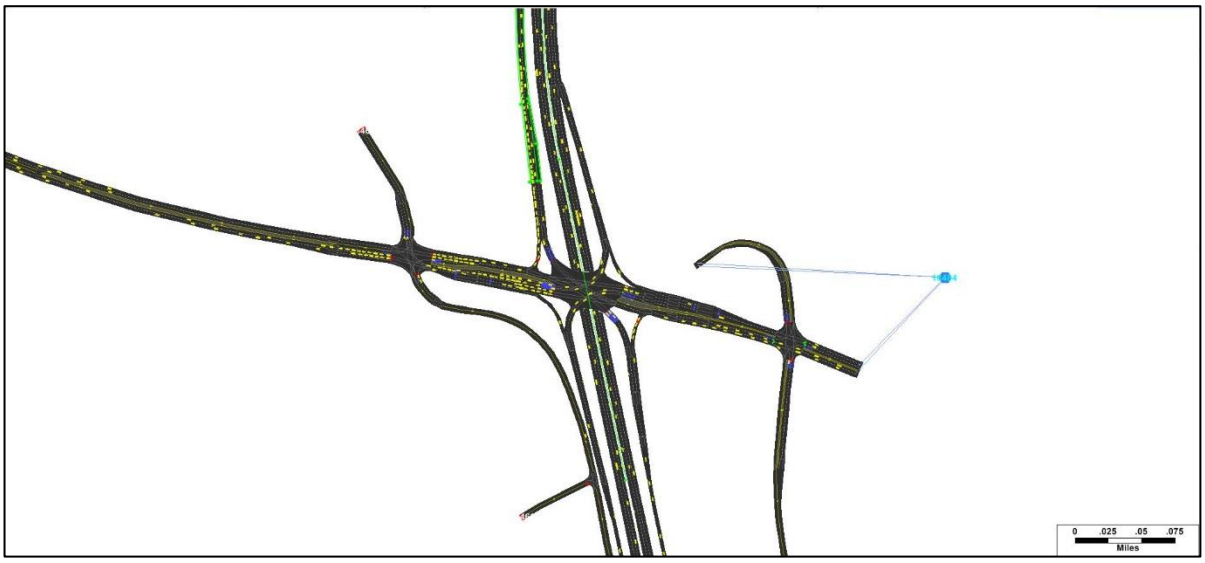
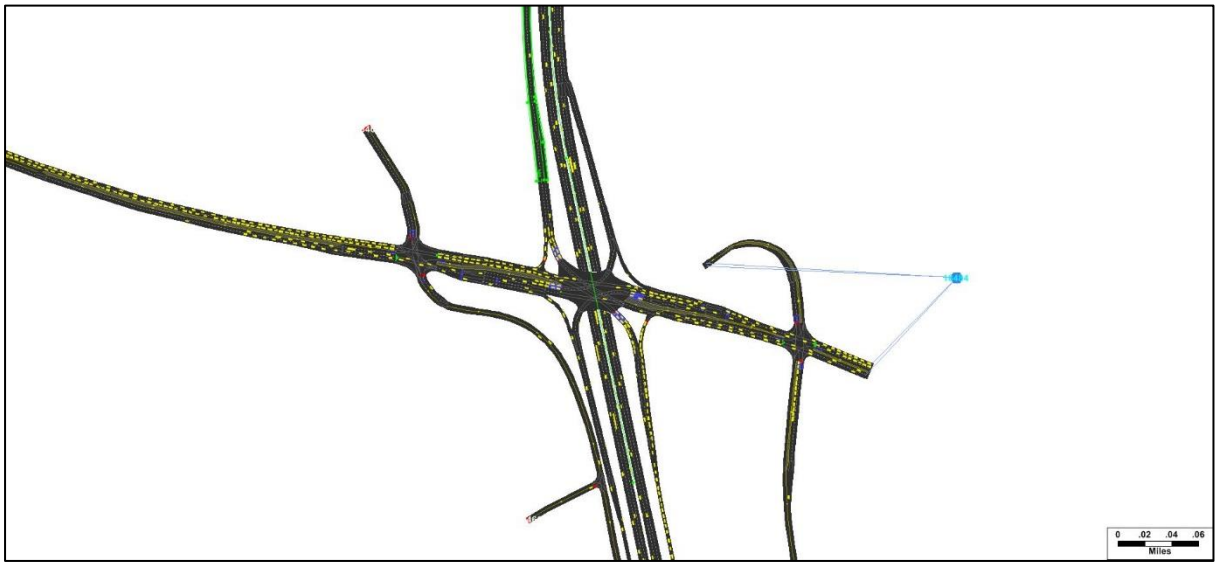


Figure 16 - Exit 110 (AO46) Simulation - PM Peak Hour



- I-126 at Colonial Life Boulevard
    - AM Peak Hour – See **Figure 17** – Interchange operates under capacity. Mainline volume slightly queues in the eastbound direction. However, flow is steady.
    - PM Peak Hour – See **Figure 18** – Interchanges operates under capacity.

Figure 17 – I-126 at Colonial Life Boulevard Simulation - AM Peak Hour

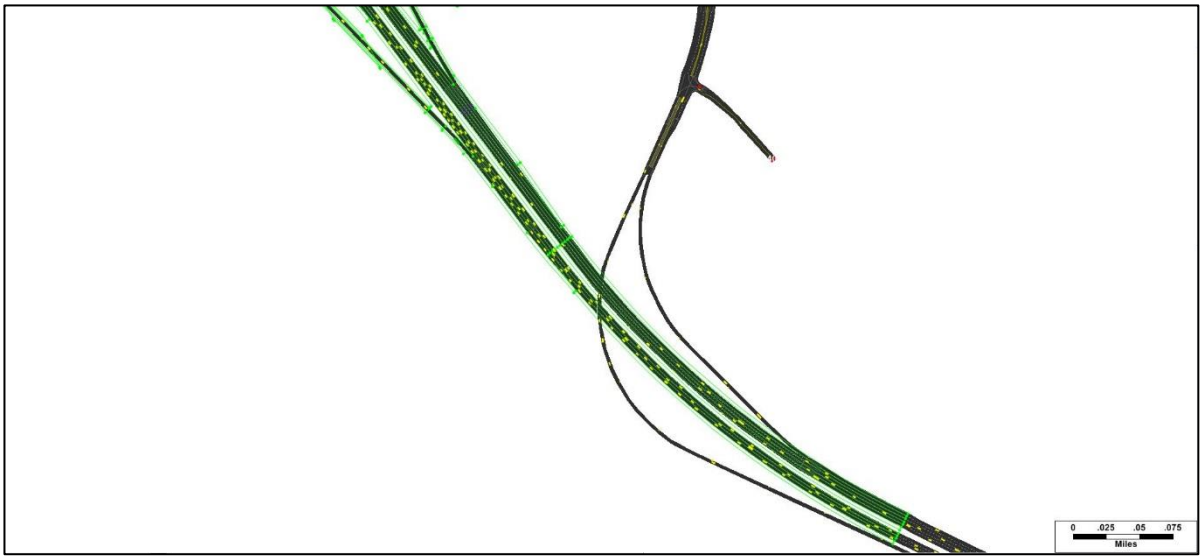
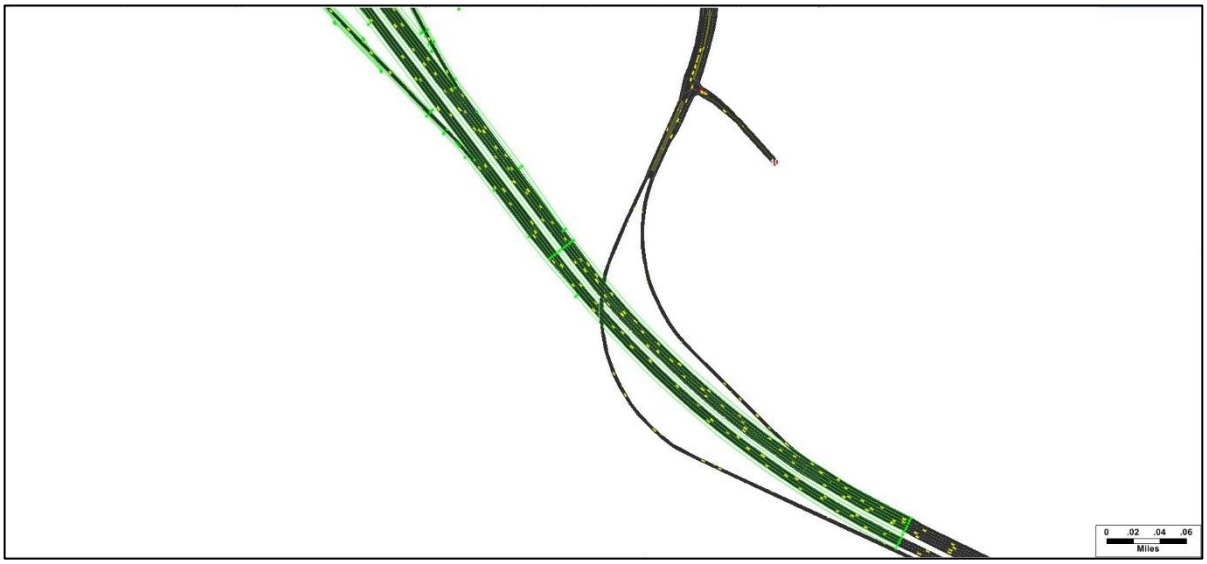


Figure 18 – I-126 at Colonial Life Boulevard Simulation - PM Peak Hour



- Exit 63 (AO7) – Bush River Road is widened to provide dual left turn lanes and a single right turn lane in both the eastbound and westbound direction. Also, channelized right turn lanes were provided for the I-20 off-ramps.
    - AM Peak Hour – See **Figure 19** – interchange operates over capacity for the eastbound dual left turn lanes. Geometric changes such as extending the dual left turn lanes and modifying traffic signal timing may improve intersection operations.
    - PM Peak Hour – See **Figure 20** – interchange operates at capacity. The intersection experiences moderate delay.

Figure 19 - Exit 63 (AO7) Simulation - AM Peak Hour

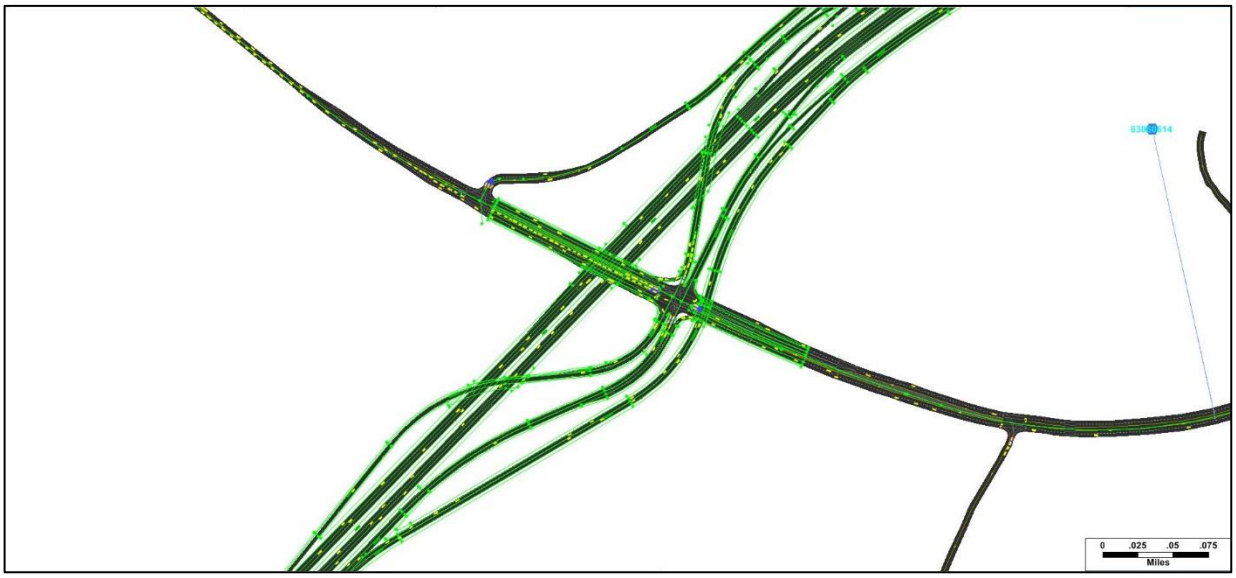
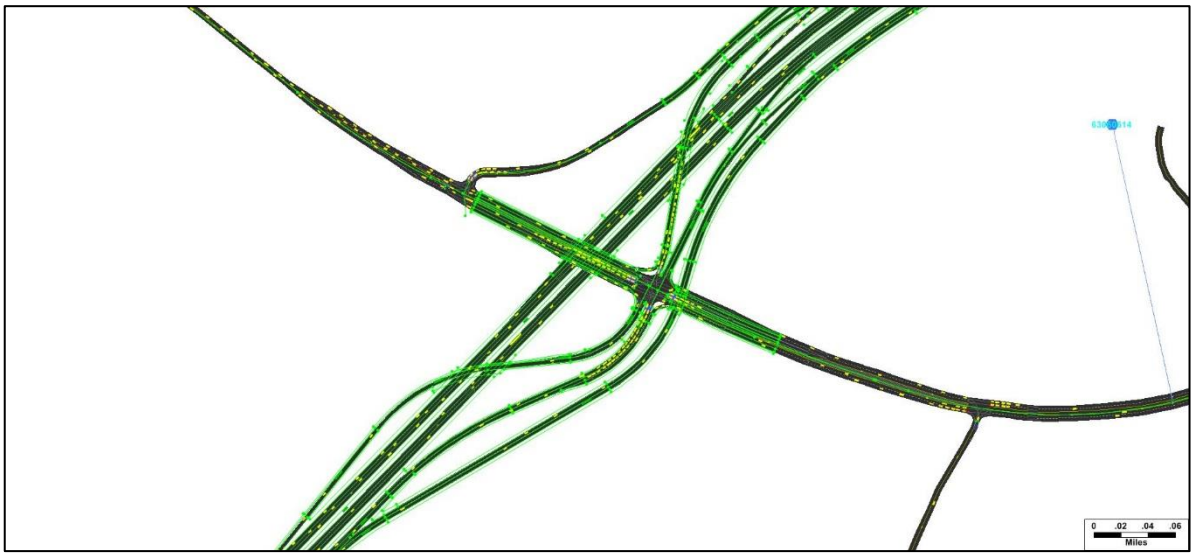


Figure 20 - Exit 63 (AO7) Simulation - PM Peak Hour



- Exit 65 (AO3) – Simulation file differs slightly from .KMZ file. The original design narrowed the eastbound C-D ramp volume down to one lane as the ramp was merging with I-20 mainline, causing major bottleneck issues. Two lanes merging onto I-20 eastbound were modeled, and a lane drop was added shortly after merge to improve traffic flow.
    - AM Peak Hour – See **Figure 21** – interchange operates at capacity. The southbound left turn onto I-20 eastbound experiences heavy queuing. The southbound left turn volume may require dual turn lanes to improve intersection operations. Although not shown in Figure 21, the eastbound off-ramp experiences moderate queuing at the ramp termini.
    - PM Peak Hour – See **Figure 22** – interchange operates at capacity. The eastbound off-ramp experiences heavy queuing at the ramp termini. The westbound C-D road from I-20 westbound to I-26 westbound is overcapacity during the PM peak hour, which results in queue spillback into the I-20 westbound mainline. This stems from the I-26 westbound off-ramp queuing at Exit 106.

Figure 21 - Exit 65 (AO3) Simulation - AM Peak Hour

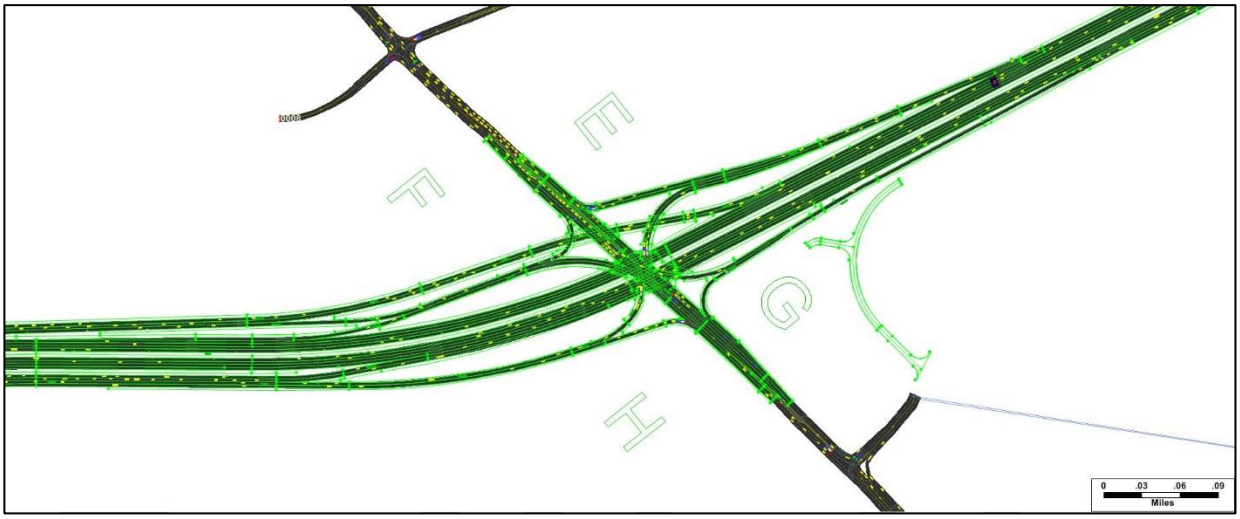
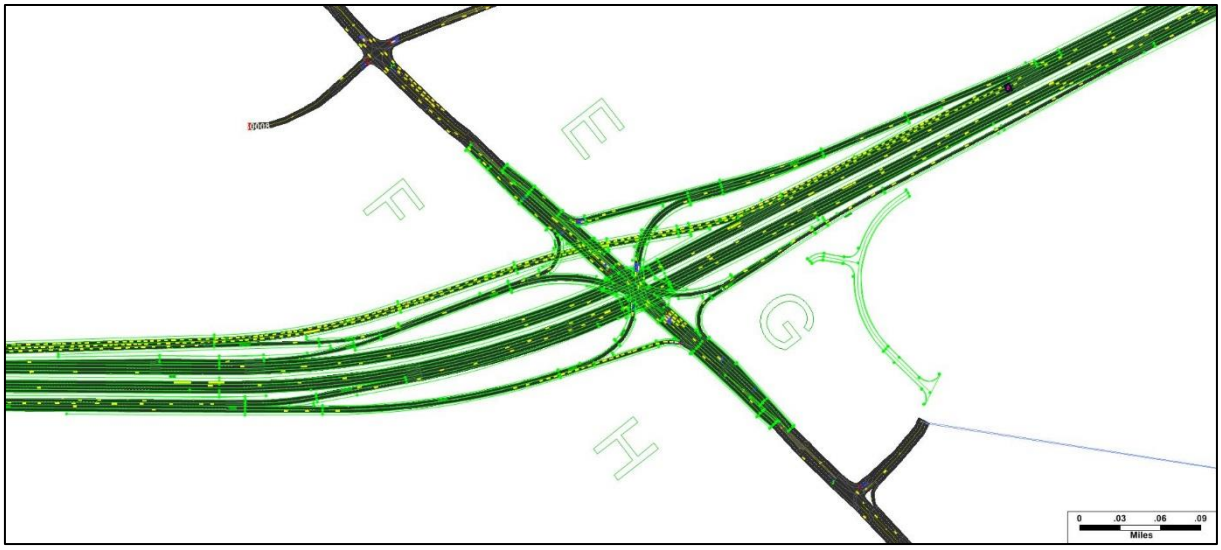
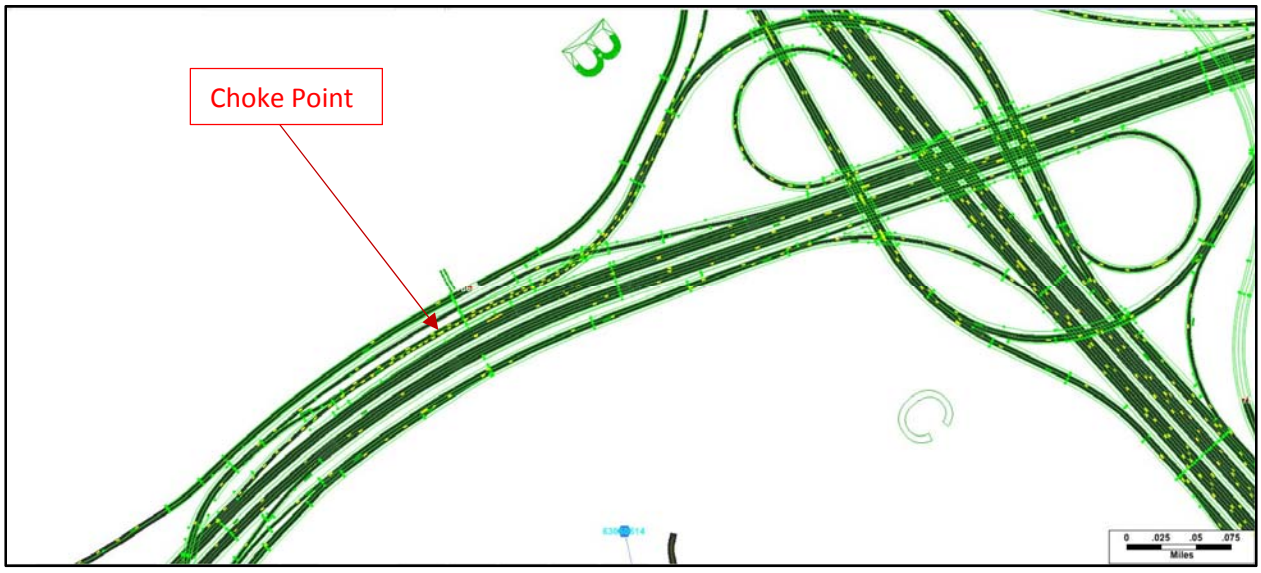


Figure 22 - Exit 65 (AO3) Simulation - PM Peak Hour

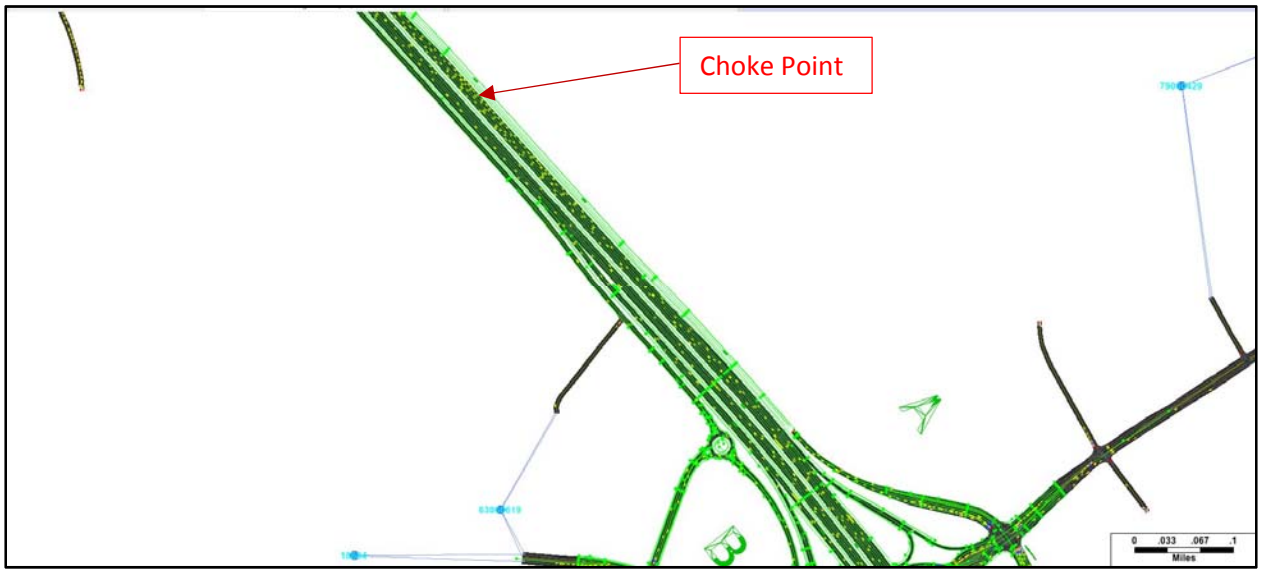


RA4 Specific Choke Points:

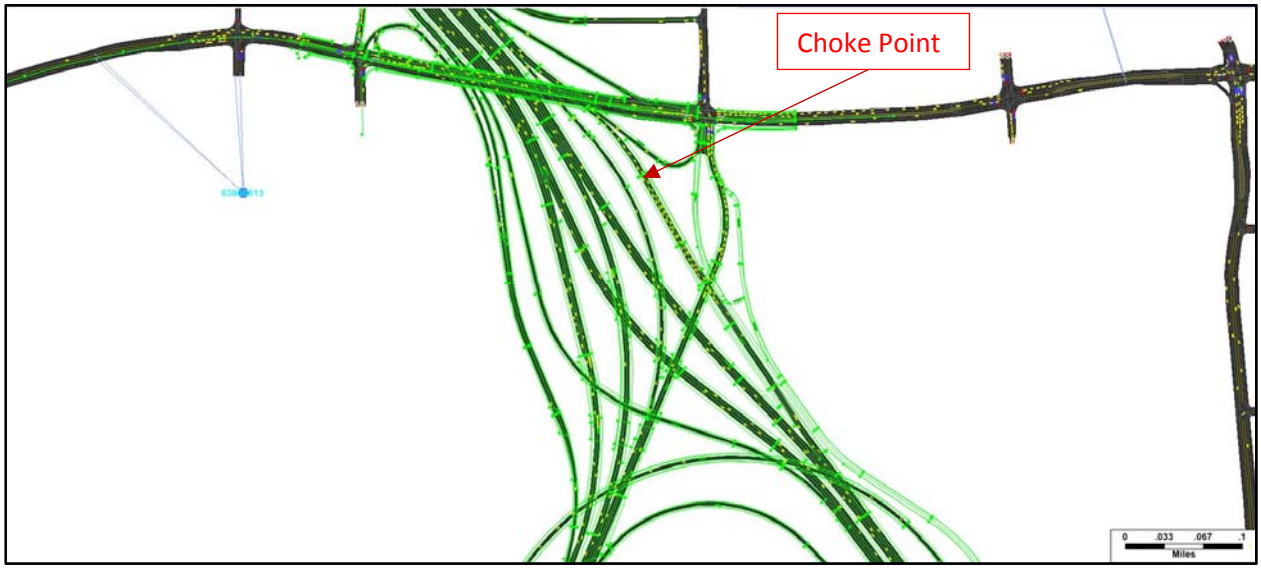
1. I-20 on-ramp from I-26 EB/WB lane drop prior to merge onto the mainline



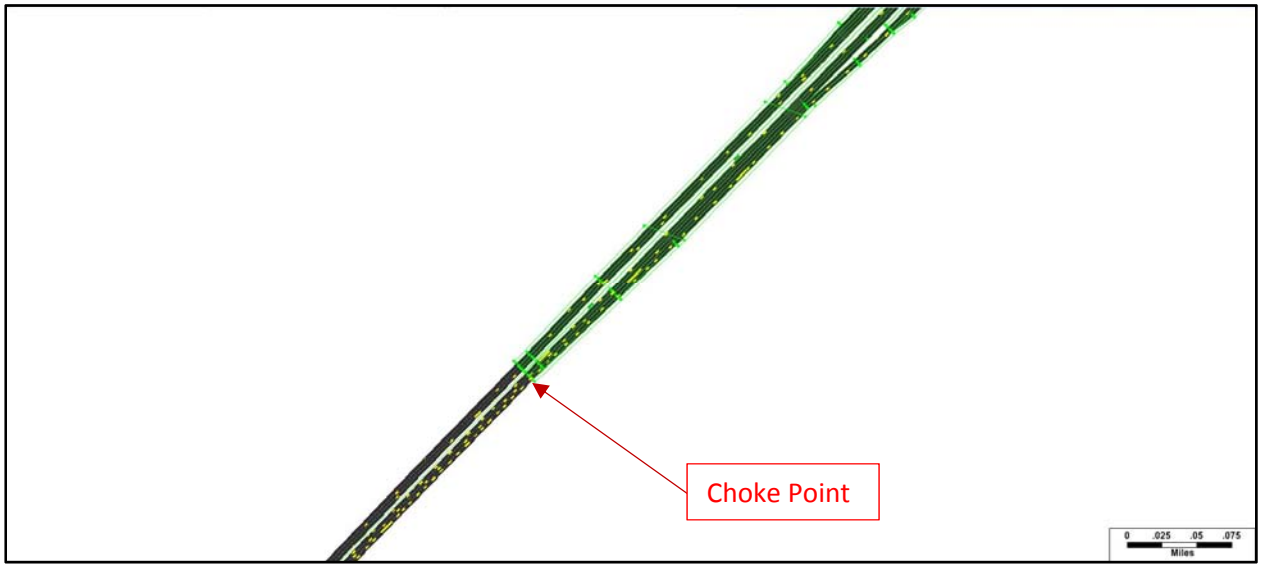
2. I-26 WB lane drop between Exit 106 and Exit 104



3. Merge Point for off-ramp from I-126 WB to I-26 C-D Road



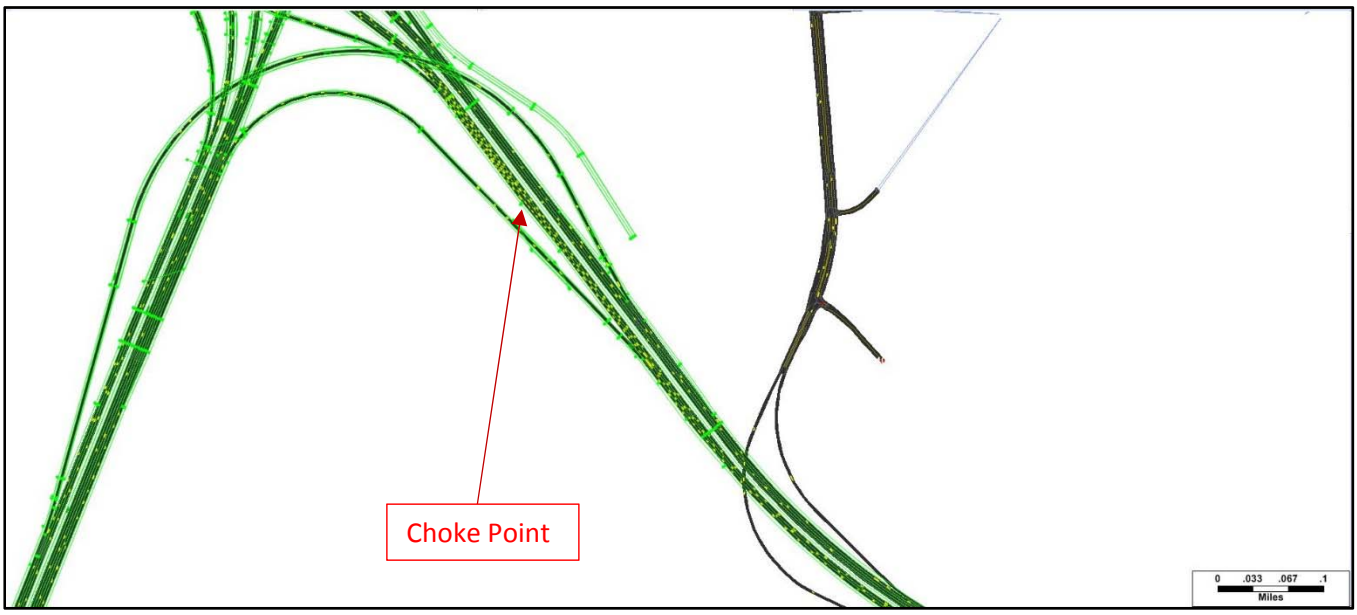
4. I-20 EB prior to C-D road split



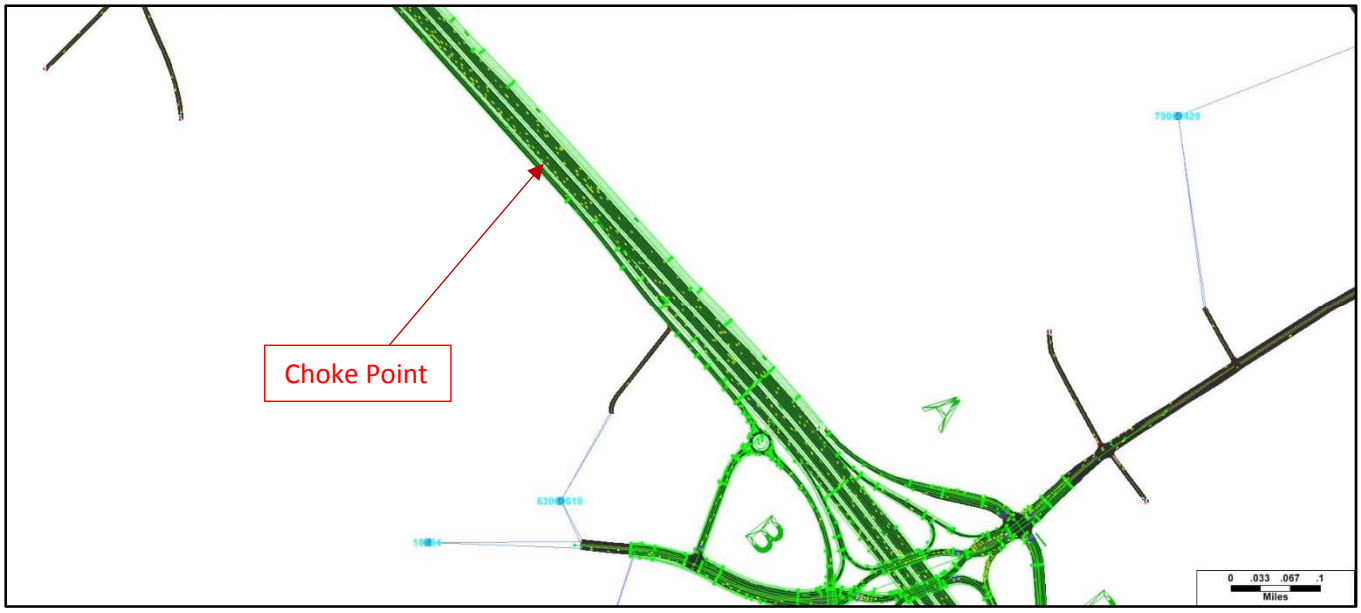
5. Weaving area at merge point between Exit 106 WB off-ramp and the I-26 WB C-D road and Choke point at lane drop on I-20 WB C-D road



6. I-126 EB bottleneck at on-ramps from I-26



7. I-26 EB prior to I-26 EB C-D off-ramp east of Exit 106



Reasonable Alternative 5 – Microsimulation Summary (2040 Volumes)

Freeway Segments

Segment	AM		PM		Comment
	EB	WB	EB	WB	
Exit 101-102	Under	Under	Under	Under	
Exit 102-103	Under	Under	Under	Under	As shown in the new .KMZ file, the westbound on-ramp acceleration lane from Exit 103 will be extended to the westbound off-ramp at Exit 102 which will increase capacity.
Exit 103-104	Over	Under	Under	Over	There is congestion on the mainline between the on-ramp at Exit 103 and downstream off-ramp at Exit 104. In new .KMZ file, the eastbound on-ramp acceleration lane from Exit 103 will be extended to the eastbound off-ramp at Exit 104 which will create a weaving section and should increase capacity. Similar issues between the westbound on-ramp from from Exit 104 to the off-ramp at Exit 103; In the new KMZ file, the ramps connect, creating a westbound weaving section that should increase capacity.
Exit 104-106	Over	Under	Over	Over	Overcapacity on the EB C-D road that goes to I-20 WB/EB ramps at Exit 107 in both the AM and PM peak hours. (In the new .KMZ file, the EB C-D Road has four lanes instead of two, which should alleviate most of the capacity issues. Heavy PM queuing at WB on-ramp merge from Exit 106. In the new KMZ file, the WB on-ramp from Exit 106 extends to the off-ramp at Exit 104, creating a weaving section that should increase capacity.
Exit 106-107	At	Under	Under	At	Heavy volume on the eastbound mainline during the AM peak hour and on the westbound mainline during the PM peak hour. However, flow is steady
Exit 107-108	Under	Under	Under	At	Heavy volume in the westbound direction during the PM peak hour. However, flow is steady
Exit 108-110	Under	Under	Under	Under	
Exit 108 – Colonial Life	Under	Under	At	Over	Heavy volume along I-126 EB after the traffic from the on-ramp from I-20 EB

					merges just to the west of the Bush River Road bridge. Merge causes slower traffic flow. The New .KMZ file maintains four lanes and incorporates a new design – this should improve flow as the currently modeled section goes from four to three lanes west of the location where the I-26 WB ramp to I-126 EB merges.
Exit 63-64	Under	Under	Under	Under	The current network is missing a connection from I-26 WB to Exit 63 via I-20 WB. This and other elements of the Exit 107 interchange will be addressed in a new .KMZ file)
Exit 64-65	Under	Under	Under	Under	Ramp connections from I-20 and Exit 65 to I-26 and the Exit 107 interchange will be updated in the new .KMZ file

Interchanges

Exit		AM		PM		
Location	**AO**	**EB Ramp**	**WB Ramp**	**EB Ramp**	**WB Ramp**	**Comment**
Exit 101	Par.Clo.	Under	Under	Under	Under	During the AM peak hour, the eastbound on-ramp queues at the merge point; however the new .KMZ file shows an acceleration lane/weaving section that should reduce or eliminate this queuing.
Exit 102	Par.Clo.	Under	Under	Under	Under	
Exit 103	AO35	Under	Under	Under	Under	
Exit 104	AO30	Under	Under	Under	Under	
Exit 106	AO13	Over	Under	Under	Over	EB right turn to the EB on-ramp experiences heavy queuing on the arterial during AM peak hour due to the heavy WB left turn to the EB on-ramp. WB left turn to the EB on-ramp experiences heavy queuing on the arterial during the PM peak hour. The westbound off-ramp also experiences heavy queuing during the PM peak hour.
Exit 107/Exit 64	AO20	At	Under	Under	Under	Heavy weaving/merging from I-26 eastbound on-ramp from I-20. This may be addressed by

Exit		AM		PM		
Location	AO	EB Ramp	WB Ramp	EB Ramp	WB Ramp	Comment
						changes in the concept as shown in the new KMZ
Exit 108 – I-126	AO24	At	Under	Under	At	Heavy volume along I-126 EB after the traffic from the on-ramp from I-20 EB merges just to the west of the Bush River Road bridge. Merge causes slower traffic flow. The New .KMZ file maintains four lanes and incorporates a new design – this should improve flow as the currently modeled section goes from four to three lanes west of the location where the I-26 WB ramp to I-126 EB merges. Heavy volume along I-126 WB prior to merge with I-26. New .KMZ file maintains three lanes but is reduced to two lanes prior to merge with I-26. This is also reflected in the existing KMZ where two lanes from I-126 WB merge to I-26. This may have to be adjusted further to improve flow and keep traffic from backing up on I-126 WB to the Colonial Life interchange.
Exit 110	AO46	Under	Under	Over	At	Arterial experiences heavy traffic and turning queues causing backups on both the eastbound and westbound off-ramps. Further adjustments may be able to be made to signals on US 378.
Colonial Life	AO20	Under	Under	Under	Under	Will update (as shown in new .KMZ file)

Interchanges - continued

Exit		AM		PM		
Location	AO	EB Ramp	WB Ramp	EB Ramp	WB Ramp	Comment
Exit 63	AO8	Over	Under	Over	Over	During the AM peak hour, the eastbound off-ramp experiences

Exit		AM		PM		
Location	AO	EB Ramp	WB Ramp	EB Ramp	WB Ramp	Comment
						heavy delay. Traffic control modifications may be necessary to alleviate off-ramp queuing. It should be noted in the current and new KMZ, there is no access from I-26 WB/I-126 WB to this exit. This will need to be addressed. In addition to the removal of the ramps to Bush River Road at Exit 108, vehicle paths were either exiting at Exit 106 then returning back to I-26 eastbound or taking I-20 westbound, exiting at Exit 61, then getting off at the eastbound exit ramps. Both the westbound and eastbound ramp termini experience heavy queuing because of the detoured traffic.
Exit 65	AO3	Under	Under	Under	Over	Broad River Road experiences heavy northbound queuing causing backup on the westbound off-ramps. Traffic control modifications may be necessary to alleviate off-ramp queuing.

Simulation Observations and Alternative Modifications

The greenline work is the KMZ file used for the simulation observations. The gray linework is the revised design which will be incorporated into the simulation model.

- Exit 101 (Par.Clo) – Interchange design slightly differs in new .KMZ file, but there should be no significant impact to operations with these changes.
    - AM Peak Hour – See **Figure 1** – interchange operates under capacity
    - PM Peak Hour – See **Figure 2** – interchange operates under capacity

Figure 1 - Exit 101 (Partial Cloverleaf) Simulation - AM Peak Hour

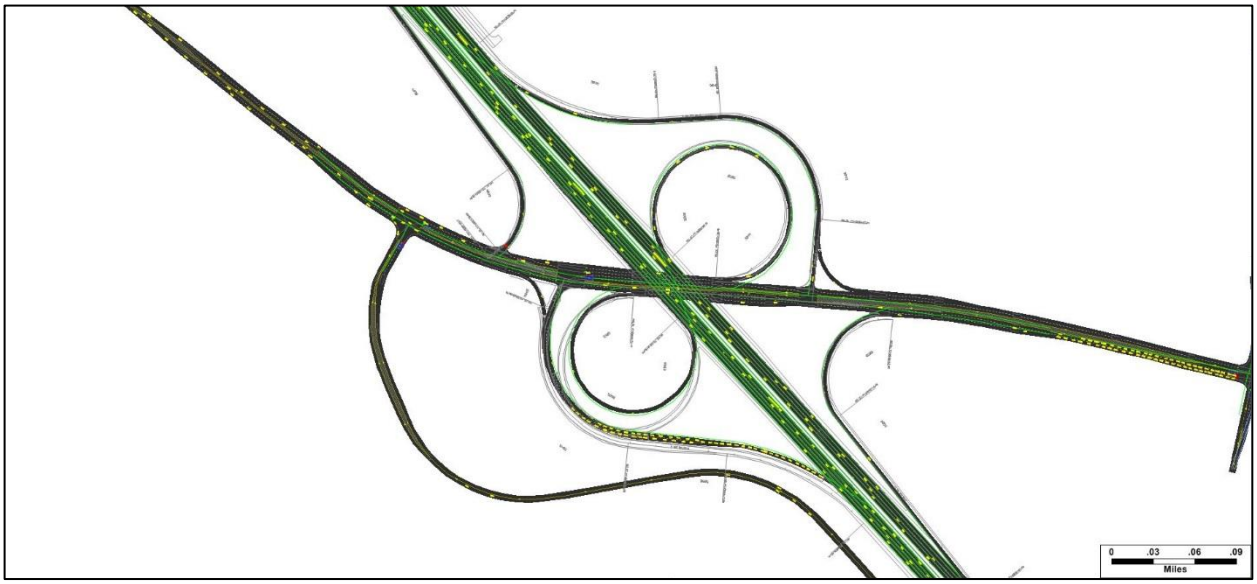
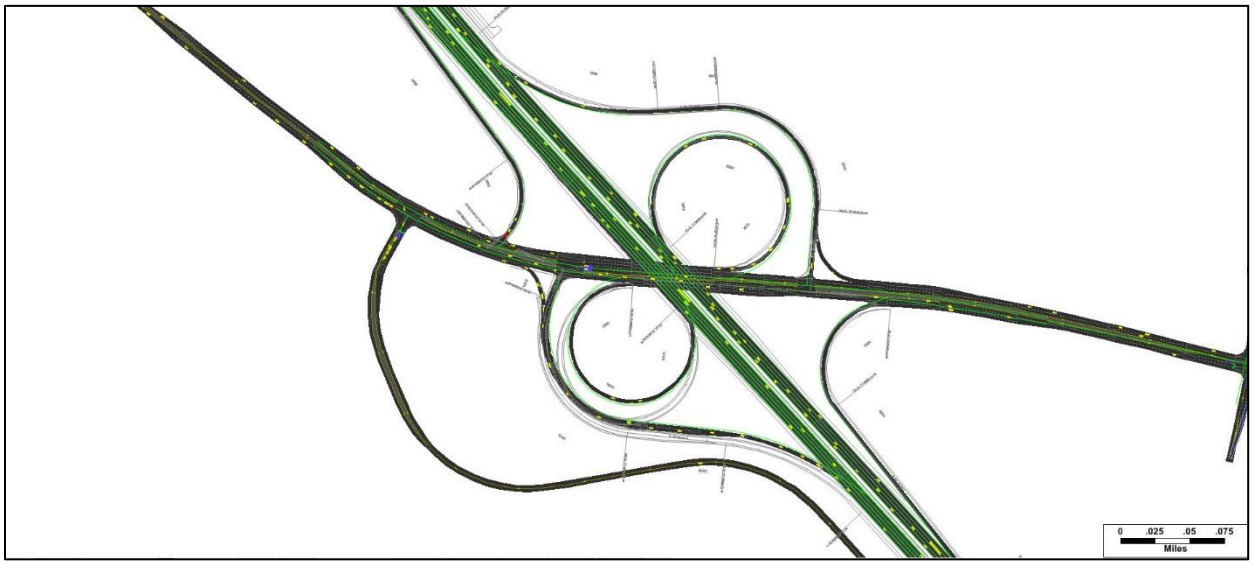


Figure 2 - Exit 101 (Partial Cloverleaf) Simulation - PM Peak Hour



- Exit 102 (Par.Clo) – Interchange design slightly differs in new .KMZ file, but there should be no significant impact to operations with these changes.
    - AM Peak Hour – See **Figure 3** – interchange operates under capacity
    - PM Peak Hour – See **Figure 4** – interchange operates under capacity

Figure 3 - Exit 102 (Partial Cloverleaf) Simulation - AM Peak Hour

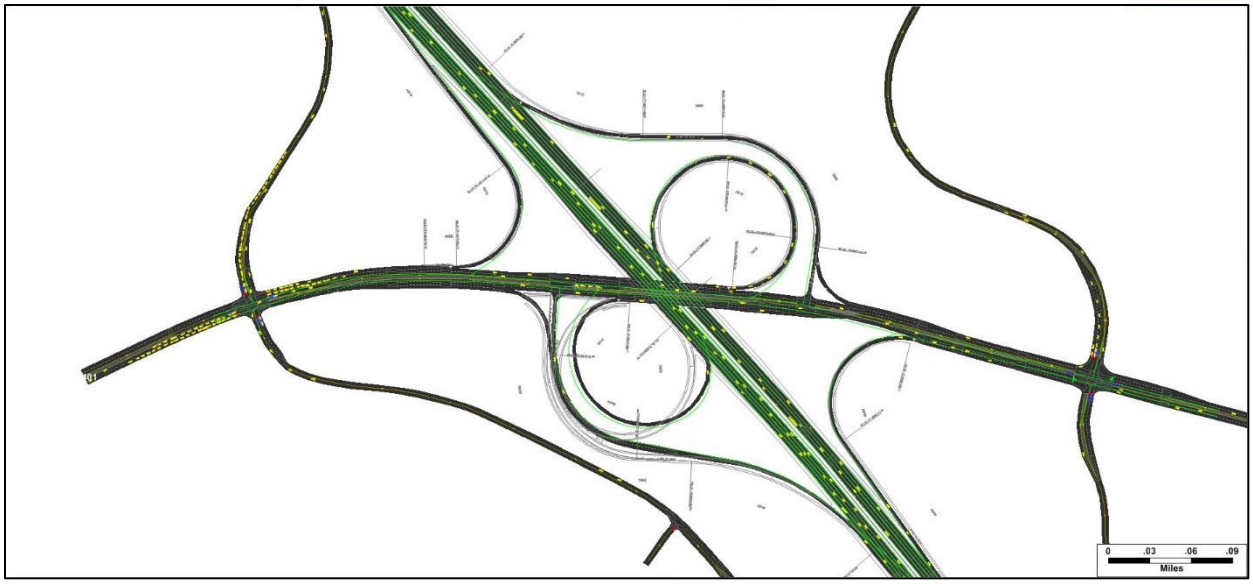
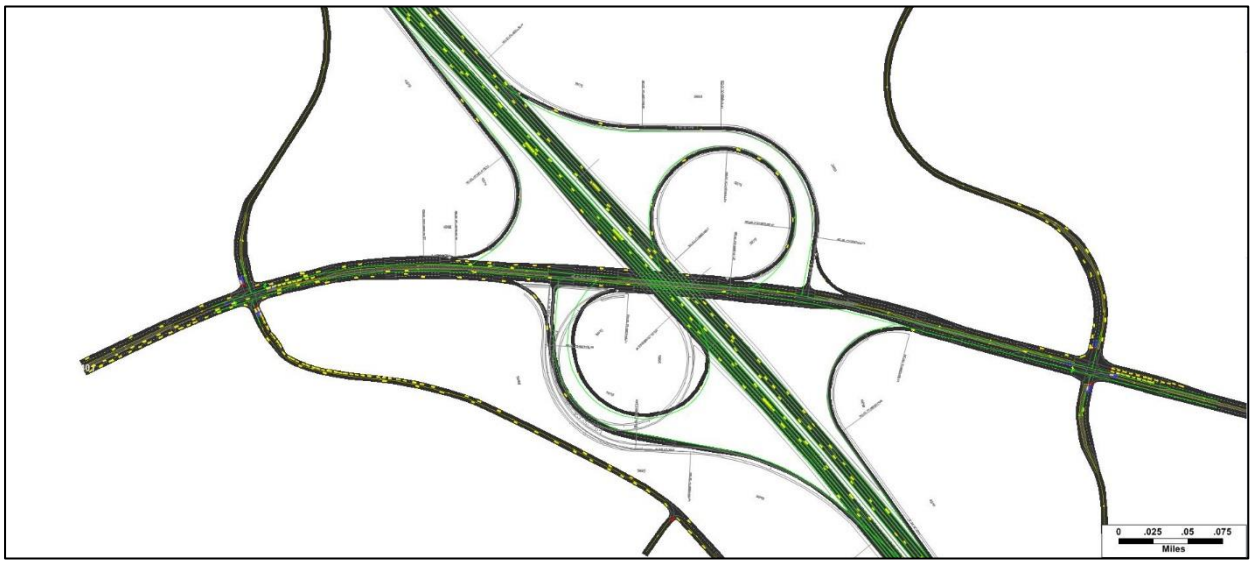


Figure 4 - Exit 102 (Partial Cloverleaf) Simulation - PM Peak Hour



- Exit 103 (AO35) – Interchange design differs in new .KMZ file, but there should be no significant impact to operations with these changes as capacity remains the same.
    - AM Peak Hour – See **Figure 5** – interchange operates under capacity
    - PM Peak Hour – See **Figure 6** – interchange operates under capacity.

Figure 5 - Exit 103 (AO35) Simulation - AM Peak Hour

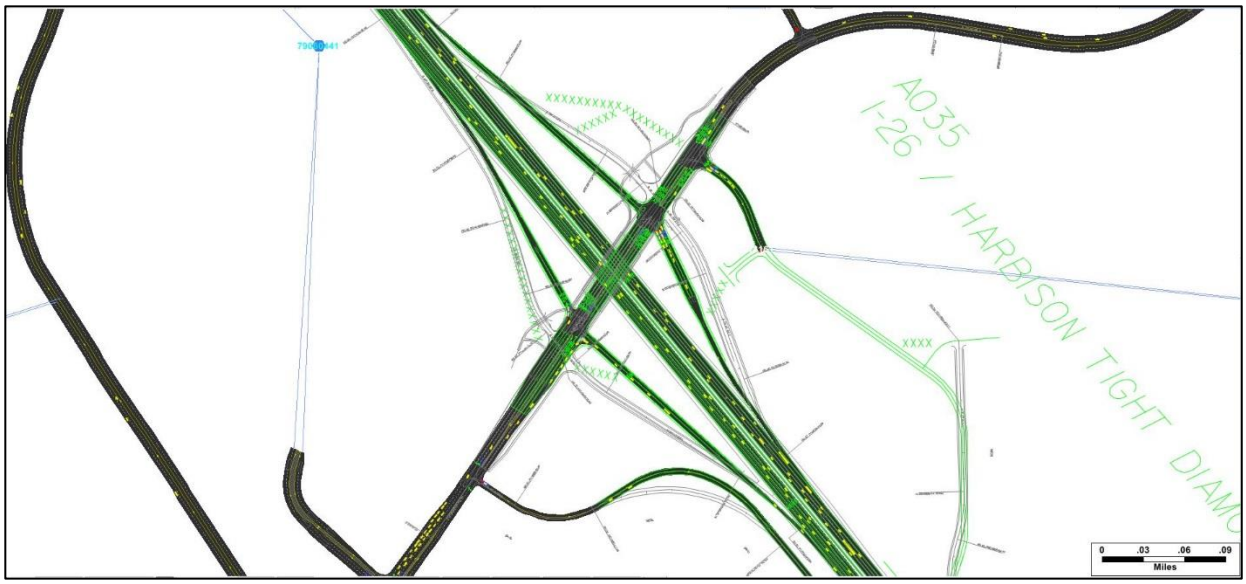
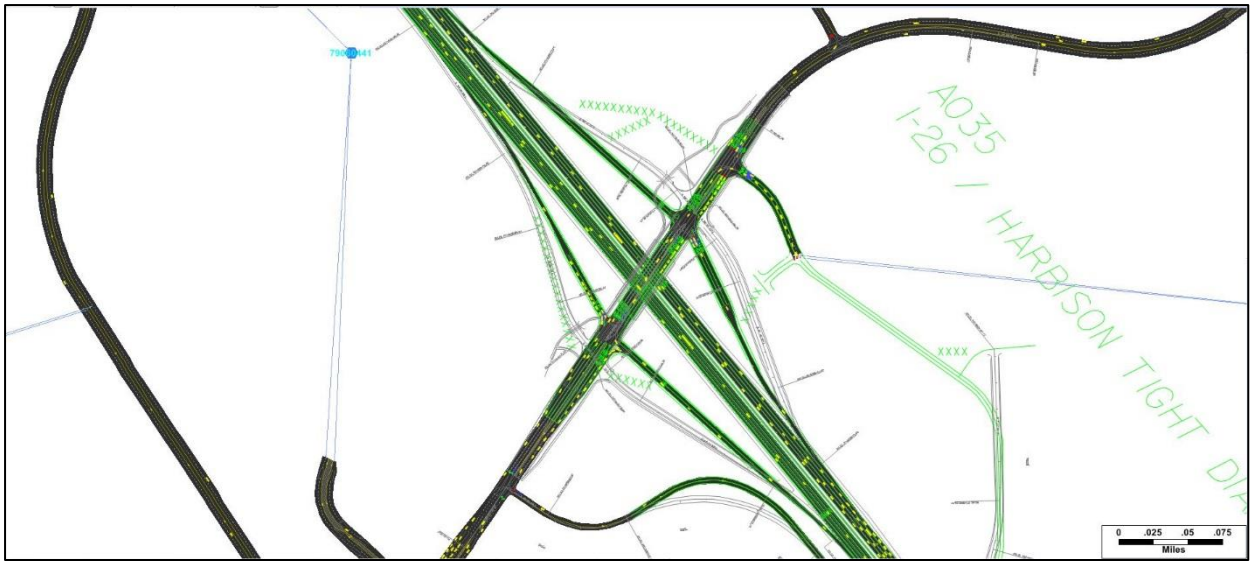


Figure 6 - Exit 103 (AO35) Simulation - PM Peak Hour



- Exit 104 (AO30) – Interchange design slightly differs in new .KMZ file, but there should be no significant impact to operations with these changes.
    - AM Peak Hour – See **Figure 7** – interchange operates under capacity at the eastbound ramps intersection. I-26 eastbound is over capacity due to off-ramp queuing from the C-D Road to Exit 106 and I-20. The new KMZ incorporates additional lane for collector-distributor off-ramp (currently modeled as two lanes).
    - PM Peak Hour – See **Figure 8** – interchange operates under capacity

Figure 7 - Exit 104 (AO30) Simulation - AM Peak Hour

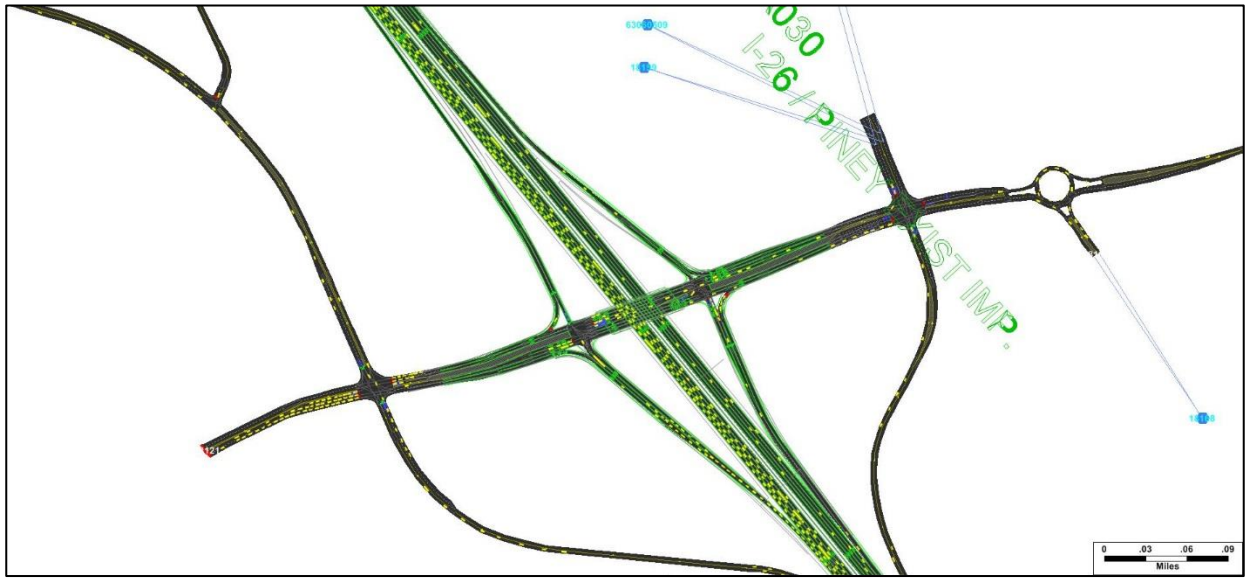
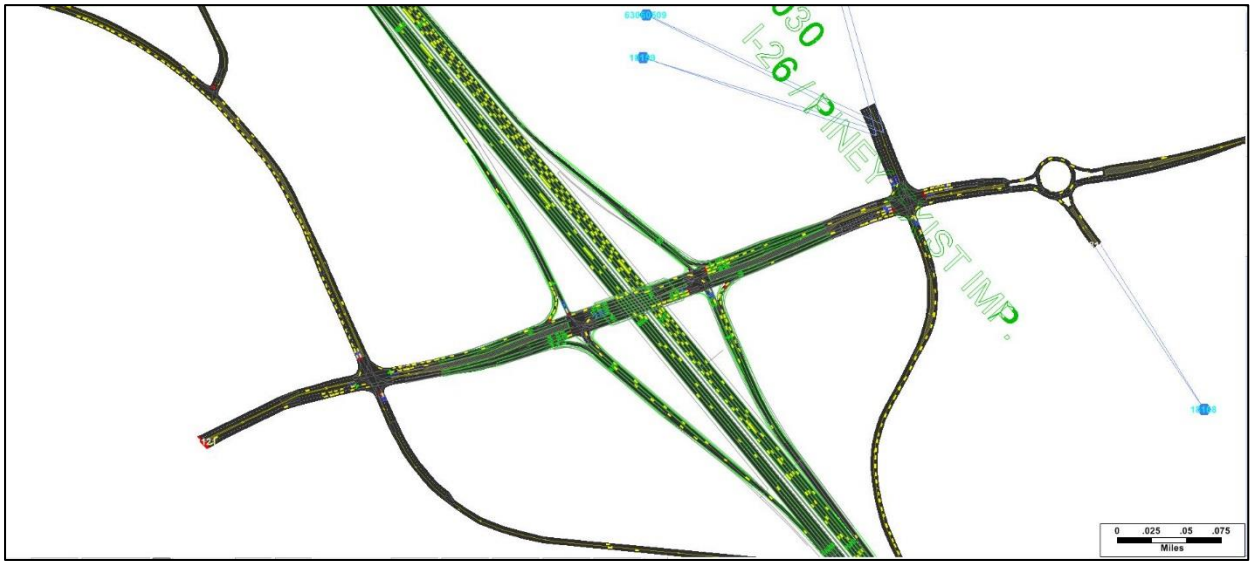


Figure 8 - Exit 104 (AO30) Simulation - PM Peak Hour

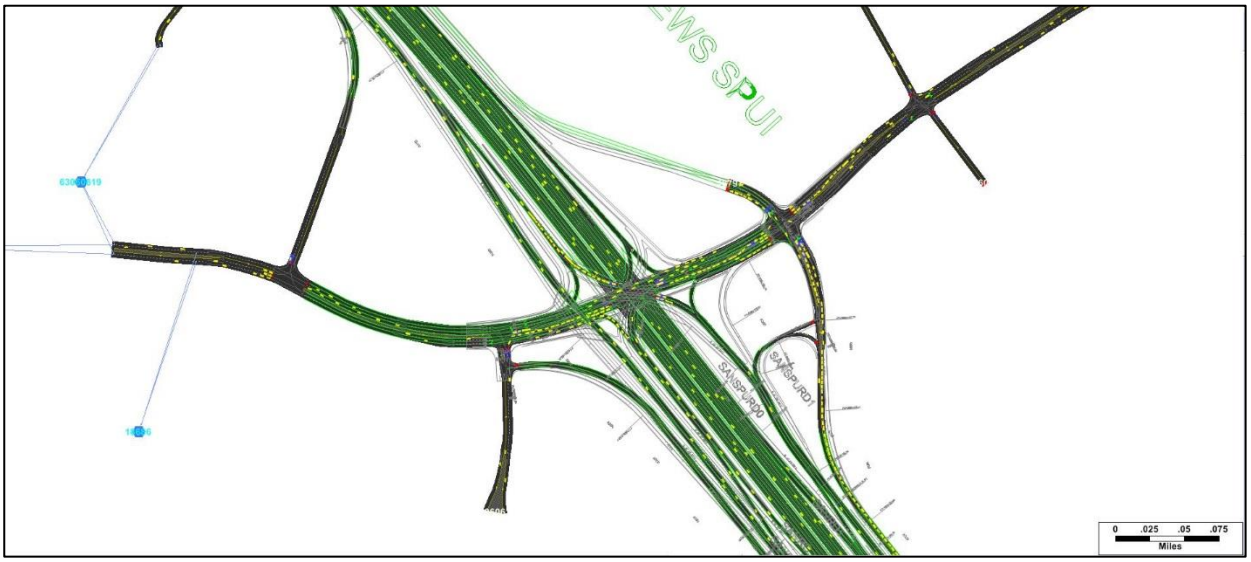


- Exit 106 (AO13) – Interchange design differs in new .KMZ file. The SPUI ramps are pushed out towards the existing ramps in new KMZ. Also, the new KMZ shows a wider arterial footprint within the interchange. Revised runs will need to be completed to see how these changes improve capacity. Fernandina/Burning Tree existing configuration maintained both KMZ.
    - AM Peak Hour – See **Figure 9** – interchange operates over capacity at the eastbound ramps intersection. An additional EB right turn lane onto EB I-26 was added for capacity. Interchange operates at capacity at the westbound ramps intersection. Dual WB left turn movement from St Andrews to the EB on-ramp was included in the simulation network.
    - PM Peak Hour – See **Figure 10** – interchange operates over capacity at the WB dual left turns onto I-26 eastbound.

Figure 9 - Exit 106 (AO13) Simulation - AM Peak Hour



Figure 10 - Exit 106 (AO13) Simulation - PM Peak Hour



- Exit 107/Exit 64 (AO20) – Interchange design slightly differs in new .KMZ file. Revised runs will need to be completed to see if there are any additional capacity issues. Also need to address providing access to Exit 63 from WB I-26.
    - AM Peak Hour – See **Figure 11** – The I-26 eastbound on-ramp from I-20 WB is at capacity but experiences weaving issues where the I-20 EB to I-26 EB ramp and the C-D Road to EB I-126 meet.
    - PM Peak Hour – See **Figure 12** – interchange operates under capacity.

Figure 11 - Exit 107/Exit 64 (AO20) Simulation - AM Peak Hour

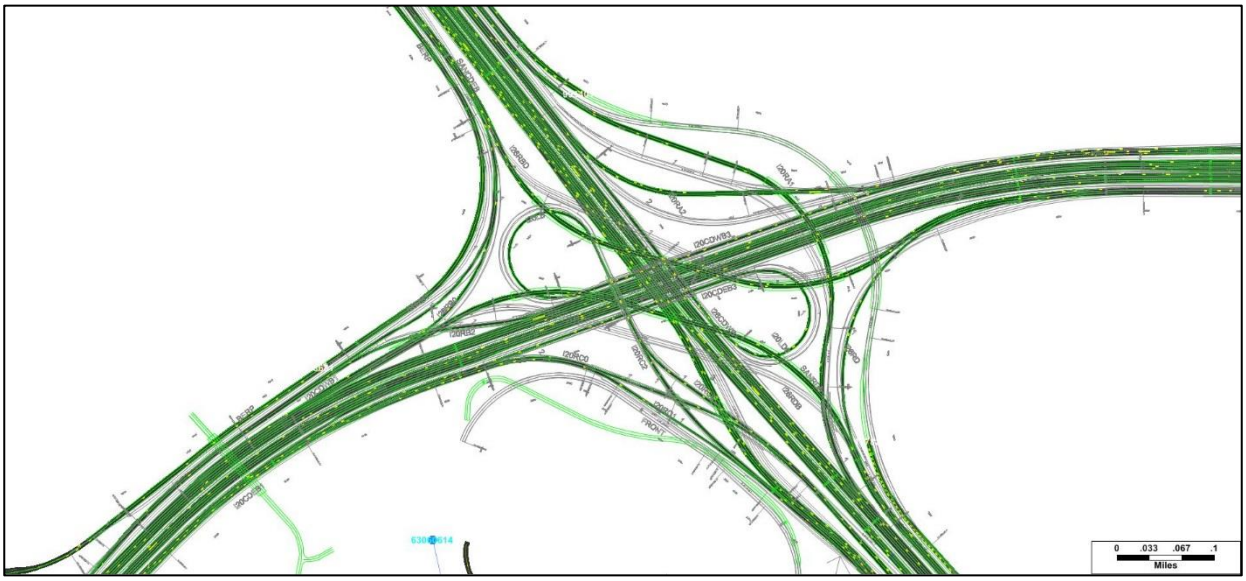
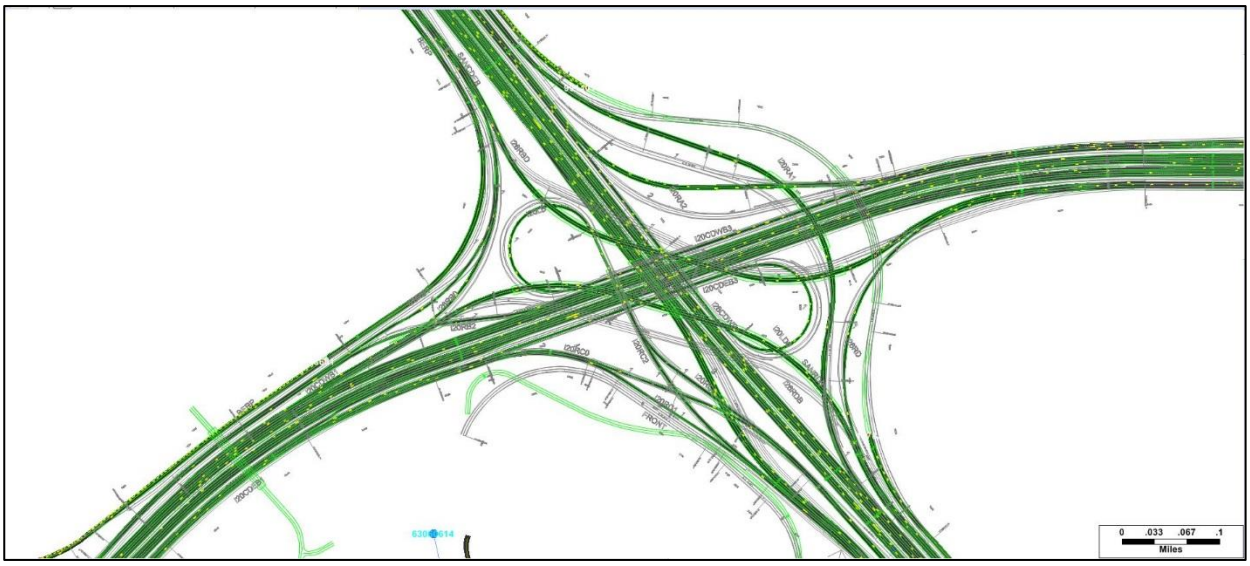


Figure 12 - Exit 107/Exit 64 (AO20) Simulation - PM Peak Hour



Exit 108 (I-126) – The revised KMZ file shows significant modifications to the ramp alignments and split locations. Revised runs will need to be completed to see if there are any additional capacity issues.

- AM Peak Hour – See **Figure 13** – I-126 eastbound operates at capacity. An additional lane to EB I-126 is added in new .kmz file and should improve flow.
- PM Peak Hour – See **Figure 14** – I-126 westbound operates at capacity. Additional lane added in new .kmz file which should improve flow, but I-126 WB still merges into I-26 WB with two lanes (narrowing from three) similar to the existing KMZ. It may be necessary to add another lane to improve flow and keep WB traffic on I-126 from backing up to the Colonial Life interchange, .

Figure 13 - Exit 108 (I-126) Simulation - AM Peak Hour



Figure 14 - Exit 108 (I-126) Simulation - PM Peak Hour



- Exit 110 (AO46) – no geometric changes
    - AM Peak Hour – See **Figure 15** – Interchange operates at capacity at the eastbound ramp termini. The westbound off-ramp termini queues.
    - PM Peak Hour – See **Figure 16** – Interchange operates over capacity at the I-26 westbound off-ramp due to the arterial queuing along US 378.

Figure 15 - Exit 110 (AO46) Simulation - AM Peak Hour

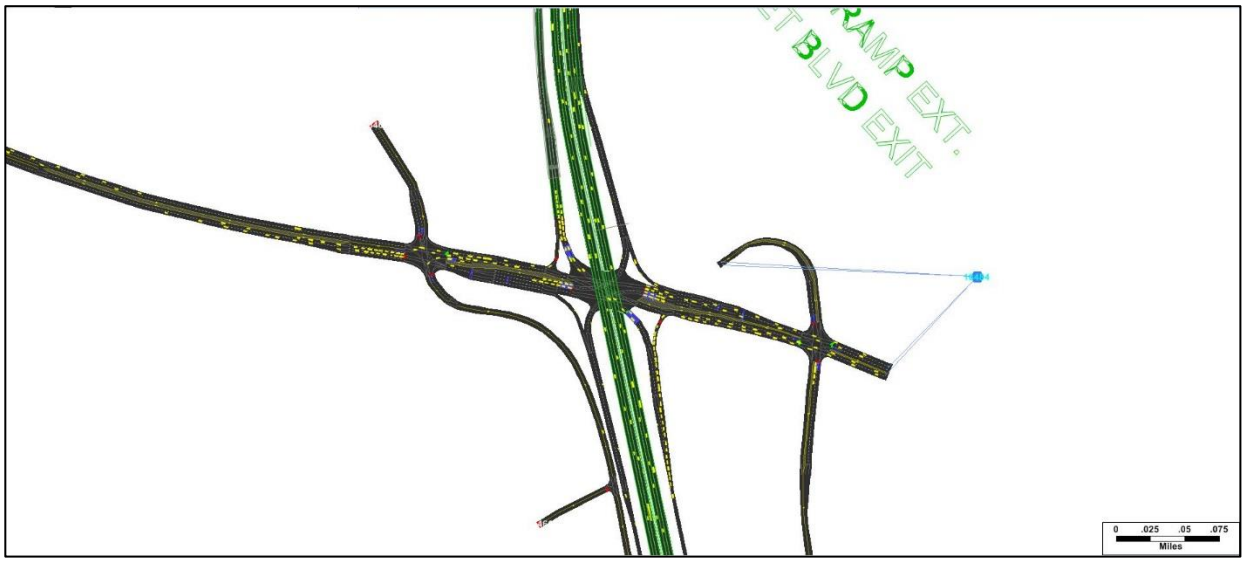
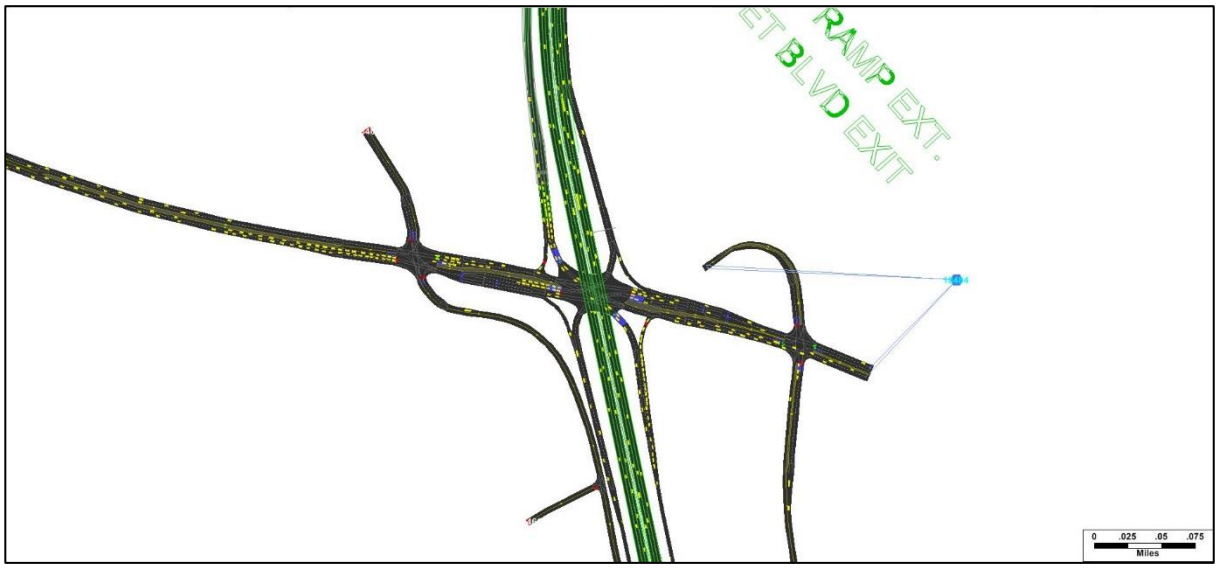


Figure 16 - Exit 110 (AO46) Simulation - PM Peak Hour



- I-126 at Colonial Life Boulevard – The revised KMZ file shows significant interchange modifications at Colonial Life Boulevard. Revised runs will need to be completed to see if there are any additional capacity issues.
    - AM Peak Hour – See **Figure 17** – Interchange operates under capacity with installation of signal.
    - PM Peak Hour – See **Figure 18** – Interchanges operates at capacity with installation of signal. Without a signal, the Colonial Life Boulevard arterial in the southbound direction will queue to Bush River Road.

Figure 17 – I-126 at Colonial Life Boulevard Simulation - AM Peak Hour

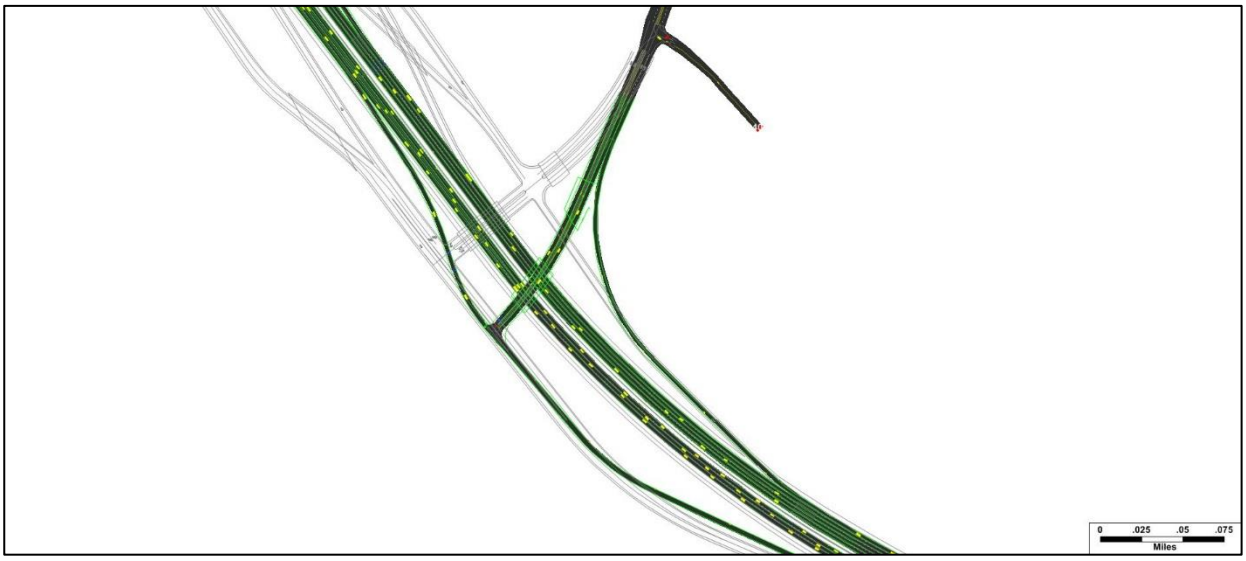


Figure 18 – I-126 at Colonial Life Boulevard Simulation - PM Peak Hour



- Exit 63 (AO8) – Interchange design similar to new .KMZ file.
    - AM Peak Hour – See **Figure 19** – interchange operates over capacity at the eastbound off-ramp termini. Currently, the northbound right turn operates under signal control with no right turn on red. Traffic signal timing modifications may help the intersection operation.
    - PM Peak Hour – See **Figure 20** – interchange operates over capacity.
    - It should be noted, based on this alternative design, there is no access from I-26 WB/I-126 WB to this exit. In addition to the closure of the Bush River Road exits, it was observed that most vehicle paths on I-26 westbound with a destination to Bush River Road at Exit 63 were using I-20 westbound, making a u-turn at Exit 61, then exiting at the eastbound off-ramps. Both the westbound and eastbound ramp termini experience heavy queuing because of this detoured traffic.

Figure 19 - Exit 63 (AO6) Simulation - AM Peak Hour

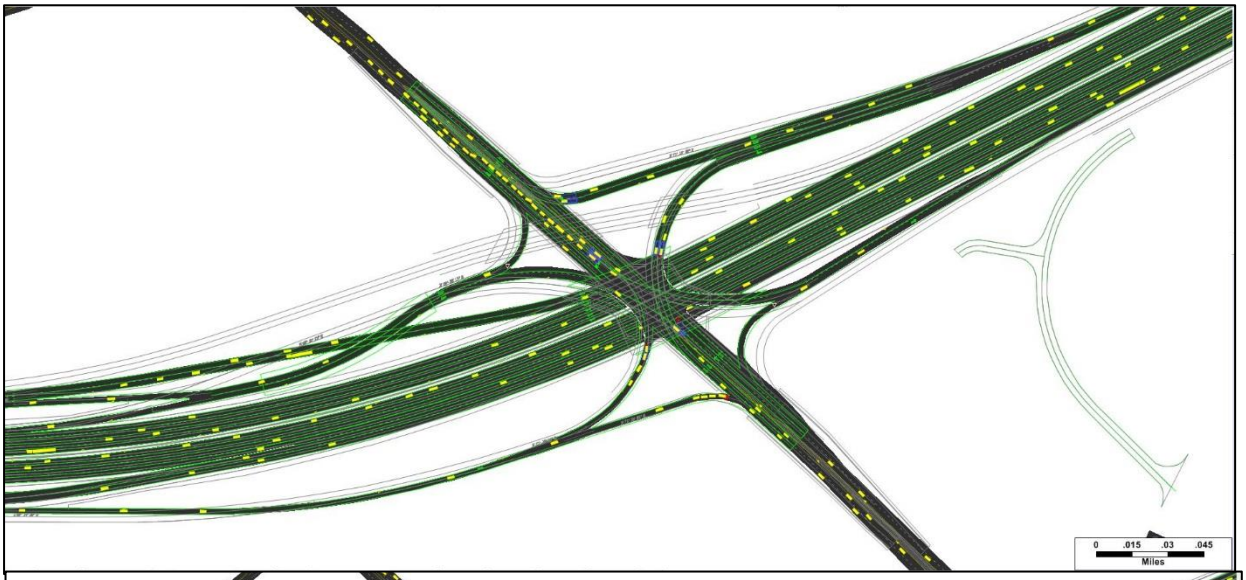


Figure 20 - Exit 63 (AO6) Simulation - PM Peak Hour



- Exit 65 (AO3) – The revised KMZ file shows significant interchange modifications to the ramps from Exit 65 and from I-20 WB towards the system interchange at Exit 107. Revised runs will need to be completed to see if these difference result in any capacity issues.
    - AM Peak Hour – See **Figure 21** – interchange operates at capacity. The southbound left turn onto I-20 eastbound experiences moderate queuing on dual left turn lanes.
    - PM Peak Hour – See **Figure 22** – interchange operates over capacity. Major queuing on the I-20 eastbound off-ramp due to stop sign control on the right turn movement. Adapting this to signal control may improve operations.

Figure 21 - Exit 65 (AO6) Simulation - AM Peak Hour



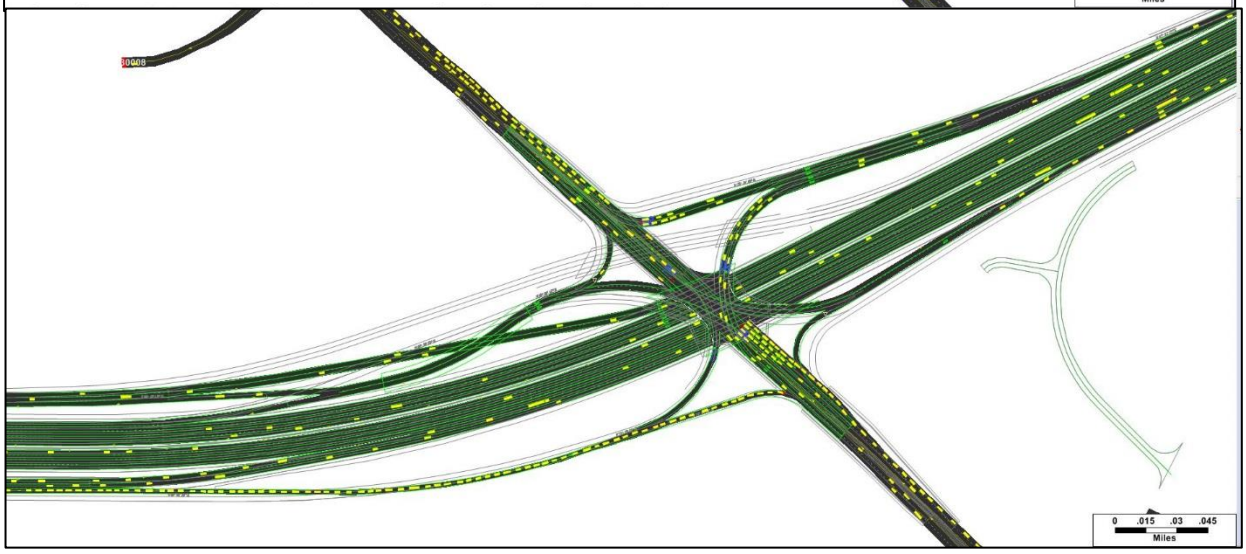
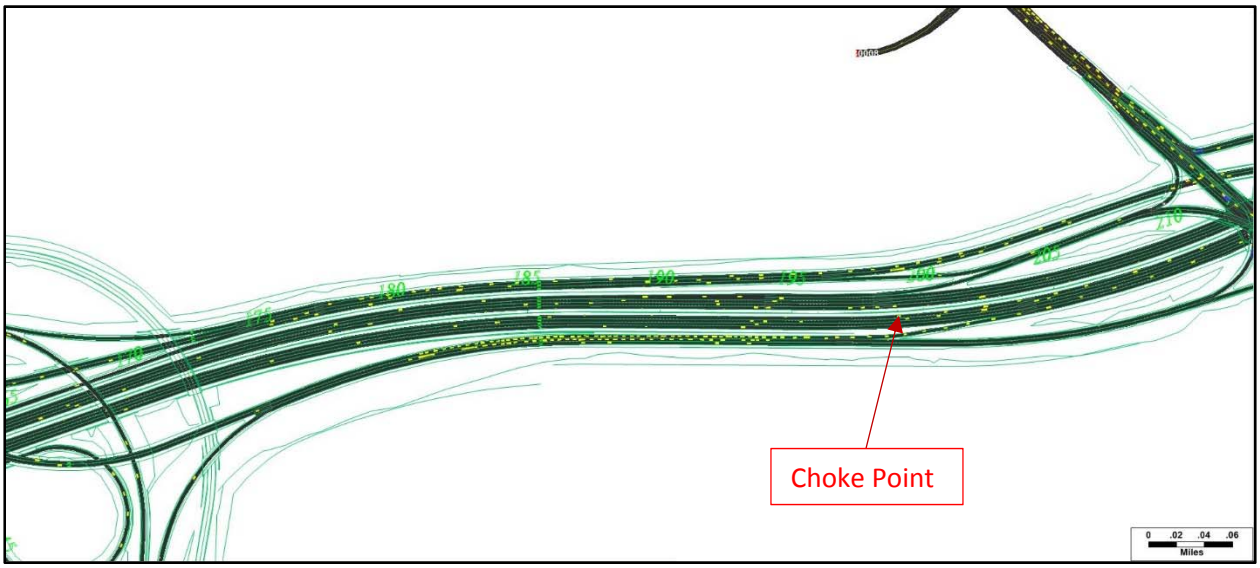


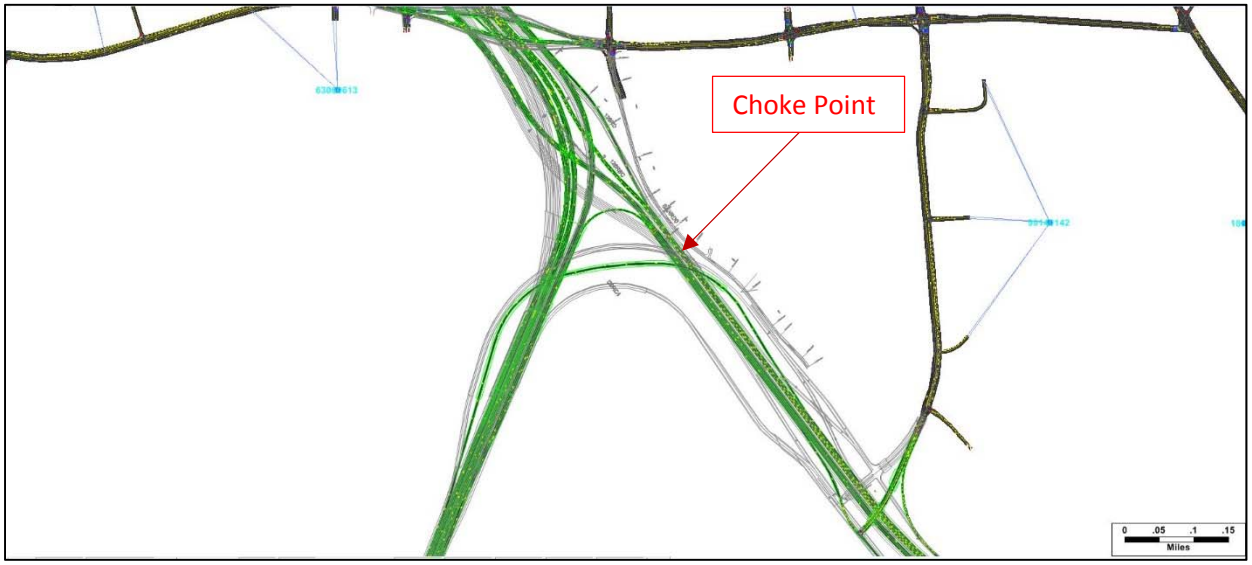
Figure 22 - Exit 65 (AO3) Simulation - PM Peak Hour

RA5 Specific Choke Points:

1. I-20 EB C-D on-ramp to I-20 WB, only one lane onto I-20 EB mainline



2. I-126 WB prior to merge with I-26 WB mainline



Reasonable Alternative 6 – Microsimulation Summary (2040 Volumes)

Freeway Segments

Segment	AM		PM		Comment
	EB	WB	EB	WB	
Exit 101-102	Under	Under	Under	Under	
Exit 102-103	Under	Under	Under	Under	
Exit 103-104	Over	Under	Under	Under	Severe congestion is observed on the mainline in the eastbound direction during the AM peak hour. In the new .KMZ file, the connection between I-26 and I-20 is provided via an eastbound C-D Road. Traffic is diverted to this C-D Road west of Exit 106 and merged back to I-20 east of Exit 65 (There is no direct connection to the mainline in between). The C-D Road doesn't have the capacity to carry this high traffic volume and also has multiple lane drops at close proximity. These cause severe queuing that propagates all the way back to Exit 103.
Exit 104-106	Over	Under	Over	Over	Severe congestion is observed on the mainline in the eastbound direction during the AM peak hour. In the new .KMZ file, the connection between I-26 and I-20 is provided via an eastbound C-D Road. Traffic is diverted to this C-D Road west of Exit 106 and merged back to I-20 east of Exit 65 (There is no direct connection to the mainline in between). The C-D Road doesn't have the capacity to carry this high traffic volume and also has multiple lane drops at close proximity. These cause severe queuing that propagates all the way back to Exit 103. During the PM peak hour, the EB C-D Road carries volume towards I-20 and I-126 which causes major queuing on the EB I-26 mainline.
Exit 106-107	Under	Under	Under	At	Over capacity on the EB C-D road that goes to I-20 WB/EB ramps at Exit 107 in the AM peak hour. Mainline operates well.

					During the PM peak hour. WB traffic weaving on the short segment from where the ramps from I-20 EB and I-20 WB meet prior to Exit 106 and then separate to exit to the mainline WB I-26 or to Exit 106, weaving slows traffic and causes moderate congestion.
Exit 107-108	Under	Under	Under	At	
Exit 108-110	Under	Under	Under	Under	
Exit 108 – Colonial Life	Under	Under	At	Over	In the PM peak, heavy volume along I-126 WB and I-26 WB where the two roadways meet under Bush River Road experiences congestion due to the weaving movement of WB I-26 traffic shifting to the right to the ramp that leads to Exit 106 and the WB I-126 traffic shifting to the left to continue on mainline WB I-26.
Exit 63-64	Under	Under	Under	Under	Mainline sections operate under capacity in both peak hours. The westbound C-D Road, which carries traffic from the ramp from I-26 EB to I-20 WB, traffic from the WB on-ramp from Exit 65, and traffic from I-20 WB that enters the C-D road east of Exit 65 is operating over capacity. Additionally, the WB C-D Road design includes closely spaced merge areas that reduce three lanes to the one lane entering I-20 WB. As a result, severe queuing was observed on both the C-D Road and the System Ramp from WB I-26 to WB I-20. Increased capacity and the elimination of the bottlenecks may reduce congestion and improve traffic operation.
Exit 64-65	Under	Under	Under	Under	Mainline sections operate under capacity in both peak hours. Traffic on the two lane I-26 eastbound System Ramp splits to provide a single lane to EB I-20 and to Exit 65. The portion of the ramp entering EB I-20 merges from two lanes to one lane west of Exit 65. This bottleneck causes

					congestion and results in upstream back-ups. Increased capacity and the elimination of the bottlenecks may reduce congestion and improve traffic operation.

Interchanges

Exit		AM		PM		
Location	AO	EB Ramp	WB Ramp	EB Ramp	WB Ramp	Comment
Exit 101	AO43	Under	Under	Under	Under	
Exit 102	AO42	Under	Under	Under	Under	
Exit 103	AO37	Under	Under	Under	Under	Moderate queuing is observed on the WB Off-ramp during the AM peak hour.
Exit 104	AO31	Under	Under	Under	Under	During the AM peak hour, congestion on the EB mainline causes queues to be observed backing up onto the EB on-ramp from Exit 104
Exit 106	AO14	Over	Over	Under	Under	During the AM peak hour, queue backups on the EB C-D Road causes eastbound on-ramp traffic from Exit 106 to back up all the way to the interchange and block access to the ramp for both the EB right and WB left turns on St Andrews Road. The WB left turn queue on St Andrews Road propagates beyond the DDI interchange and blocks access for the WB Off-ramp left turn traffic to St Andrews Road. Increased capacity and the elimination of bottleneck on the C-D Road may reduce congestion and improve traffic operation.
Exit 107/Exit 64	AO19	Over	Under	Under	Over	During the AM peak hour, heavy weaving and merging was observed on the C-D Road from the EB I-26 System Ramp to EB I-20. This causes severe congestion along the C-D Road with queues backing up to Exit 103 on the EB I-26 mainline. Congestion on the Eastbound C-D Road was also observed during the PM peak hour. However, the queue backup does not extend beyond the merge point between the I-26

Exit		AM		PM		
Location	AO	EB Ramp	WB Ramp	EB Ramp	WB Ramp	Comment
						EB System Ramp and the EB C-D Road to EB I-20.. Lack of capacity, merging and weaving problems on the westbound C-D Road from the I-26 system ramps to the merge into I-20 WB west of Exit 63 is congested during the PM peak hour. Increased capacity and the elimination of bottlenecks may reduce congestion and improve traffic operation.
Exit 108 – I-126	AO24	Under	Under	Under	Under	During the PM peak hour, heavy volume along I-126 WB merges with the traffic from the on-ramp from I-26 WB just to the west of the Bush River Road bridge. The merge causes slower traffic flow. This also cause moderate queuing on WB I-126 which extends beyond Colonial Life Boulevard.
Exit 110	AO47	Under	Under	Over	Over	Arterial experiences heavy traffic and turning queues are causing backups on both the eastbound and westbound off-ramps. Further adjustments may be able to be made to the signals on US 378.
Colonial Life	AO19	Under	Under	Under	Under	Queuing issues were observed during the AM peak hour on both the EB C-D Road and SB Colonial Life Boulevard. A left turn lane on the C-D Road at the intersection may improve traffic operation further.

Interchanges - continued

Exit		AM		PM		
Location	AO	EB Ramp	WB Ramp	EB Ramp	WB Ramp	Comment
Exit 63	AO7	Under	Under	Over	Over	Severe queuing was observed on the westbound Off-and On-Ramp during the PM peak hour. The WB On-ramp congestion is caused by merging at the ramp terminus on the mainline.
Exit 65	AO5	Over	Over	Under	Over	During the PM peak hour, the merging of the EB on-ramp traffic on to EB I-20 creates a major backup on the EB On-ramp and blocks southbound left turn traffic from Broad River Road from entering the EB On-ramp.

Simulation Observations and Alternative Modifications

The greenline work is the KMZ file used for the simulation observations.

- Exit 101 (AO43)
    - AM Peak Hour – See **Figure 1** – interchange operates under capacity
    - PM Peak Hour – See **Figure 2** – interchange operates under capacity

Figure 1 - Exit 101 (AO43) Simulation - AM Peak Hour

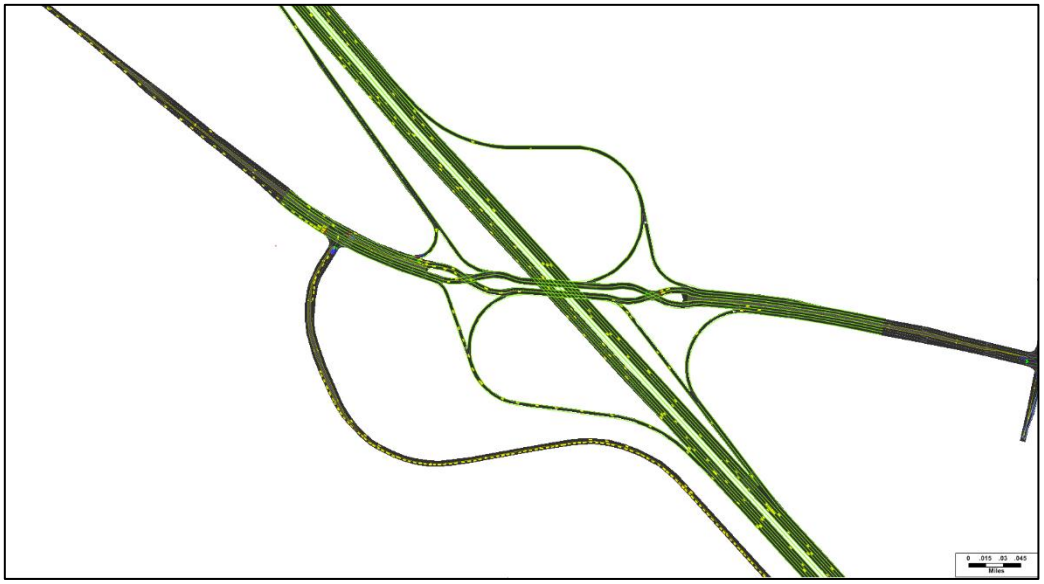
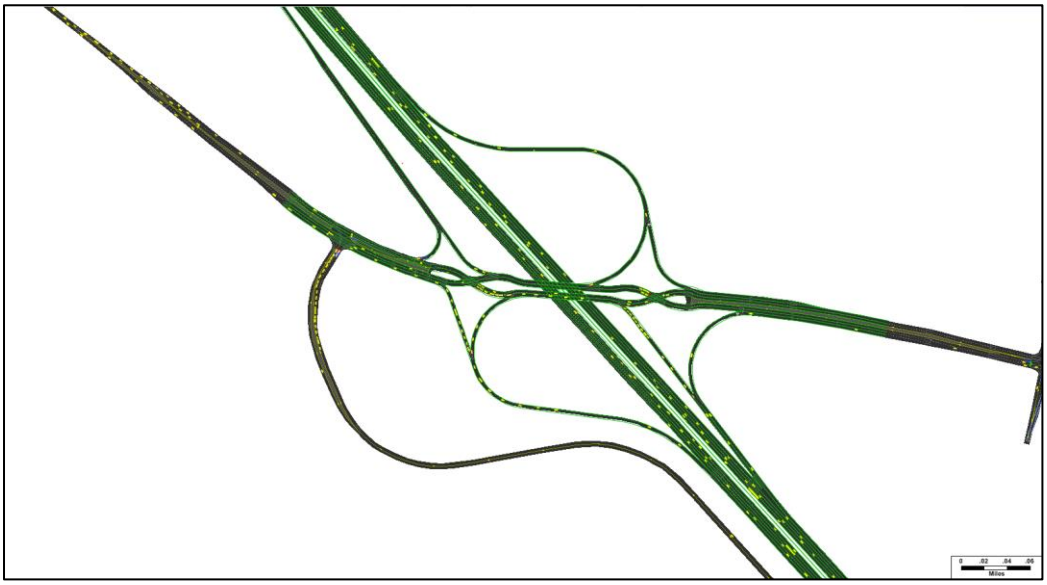


Figure 2 - Exit 101 (AO43) Simulation - PM Peak Hour



- Exit 102 (AO42)
    - AM Peak Hour – See **Figure 3** – interchange operates under capacity
    - PM Peak Hour – See **Figure 4** – interchange operates under capacity

Figure 3 - Exit 102 (AO42) Simulation - AM Peak Hour

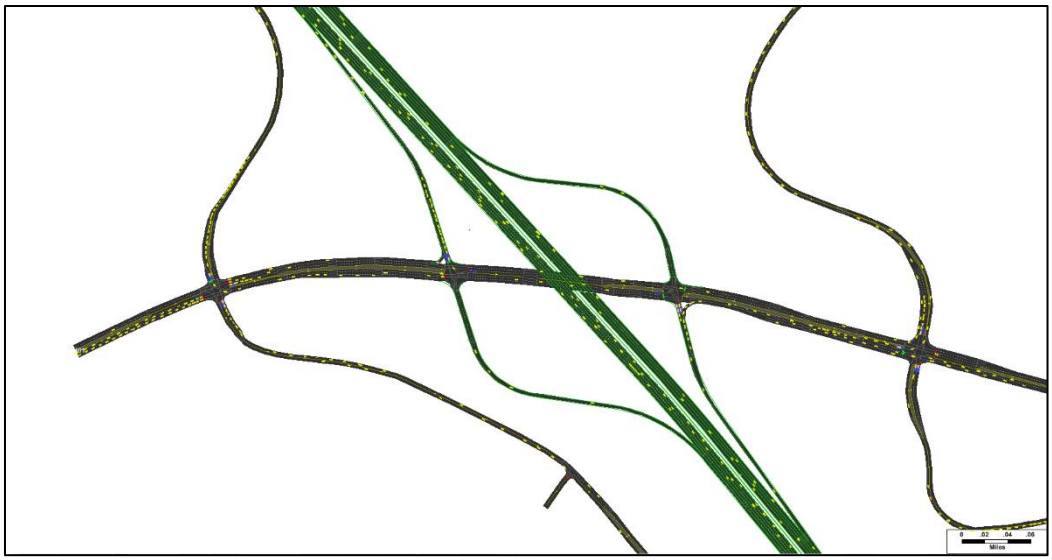
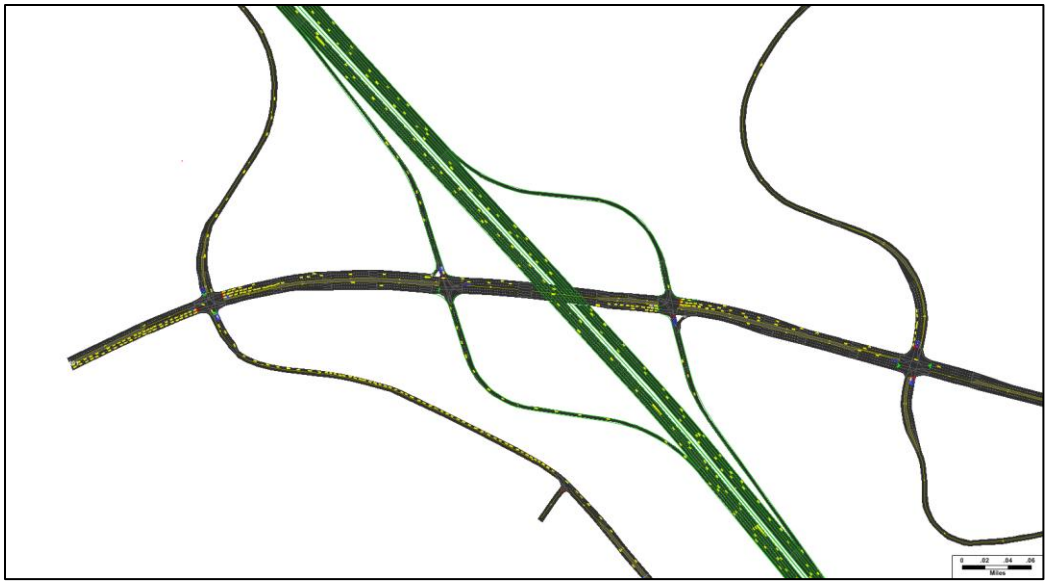


Figure 4 - Exit 102 (AO42) Simulation - PM Peak Hour



- Exit 103 (AO37)
    - AM Peak Hour – See **Figure 5** – interchange operates under capacity. I-26 eastbound is operating over capacity due to off-ramp queuing from the C-D Road to Exit 106 and I-20. Queuing is also observed at the EB On-ramp merge area
    - PM Peak Hour – See **Figure 6** – interchange operates under capacity. Moderate queuing occurs on the WB Off-ramp due to the signal operation. Traffic signal modifications may address this issue.

Figure 5 - Exit 103 (AO37) Simulation - AM Peak Hour

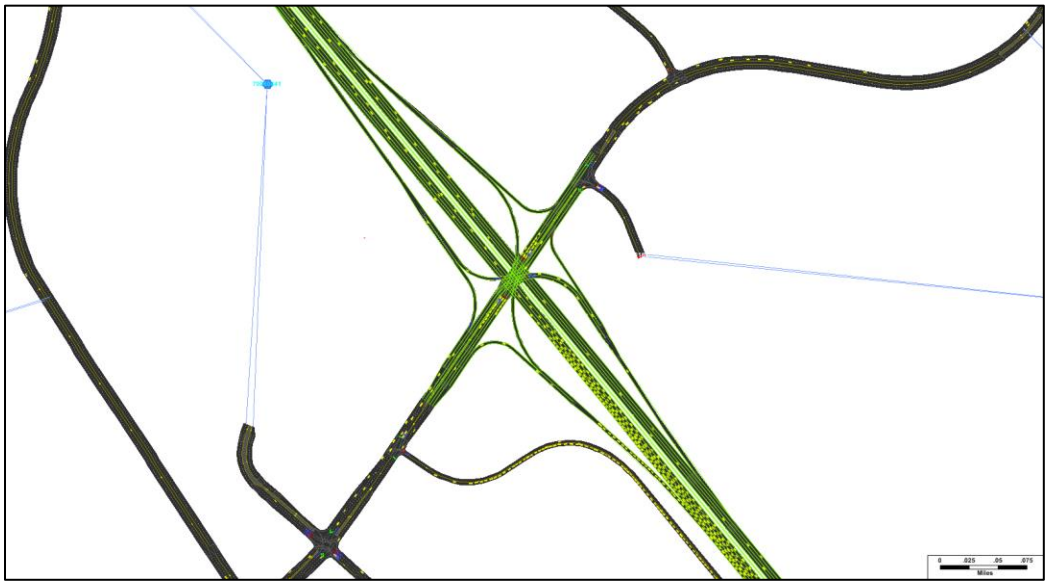
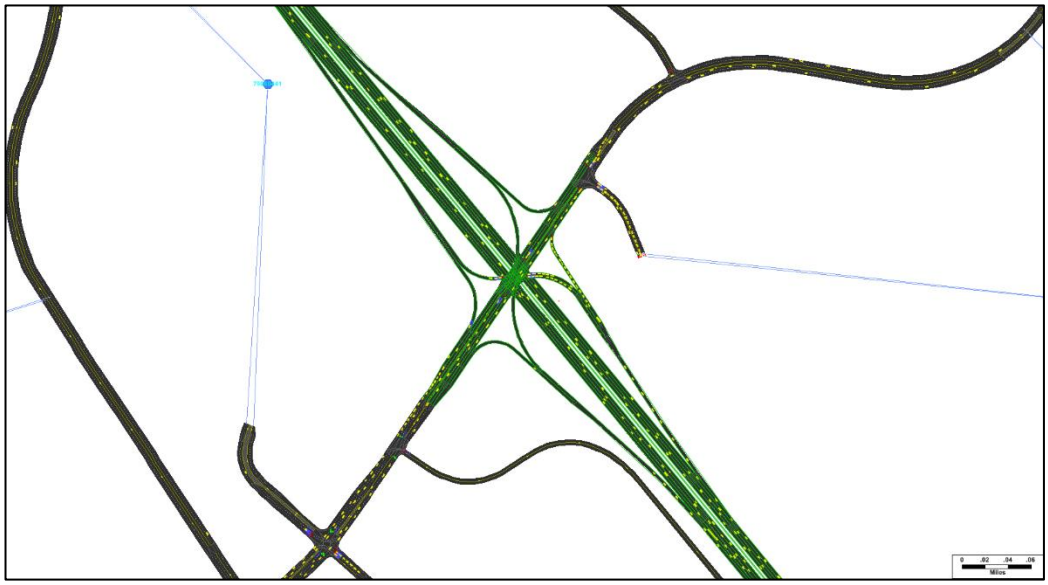


Figure 6 - Exit 103 (AO37) Simulation - PM Peak Hour



- Exit 104 (AO31)
    - AM Peak Hour – See **Figure 7** – interchange operates under capacity at the eastbound ramps intersection. I-26 eastbound is over capacity due to off-ramp queuing from the C-D Road to Exit 106 and I-20. Because of this, the eastbound On-Ramp also backs up all the way to Piney Grove Road, resulting in queuing on the DDI in the westbound direction between the eastbound on-ramp and westbound off-ramp
    - PM Peak Hour – See **Figure 8** – interchange operates under capacity

Figure 7 - Exit 104 (AO31) Simulation - AM Peak Hour

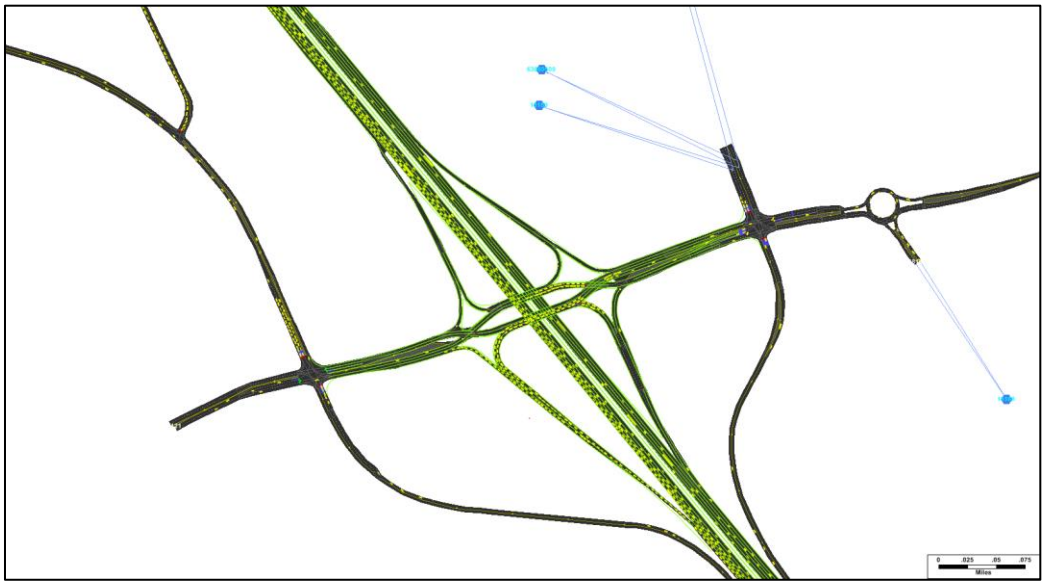
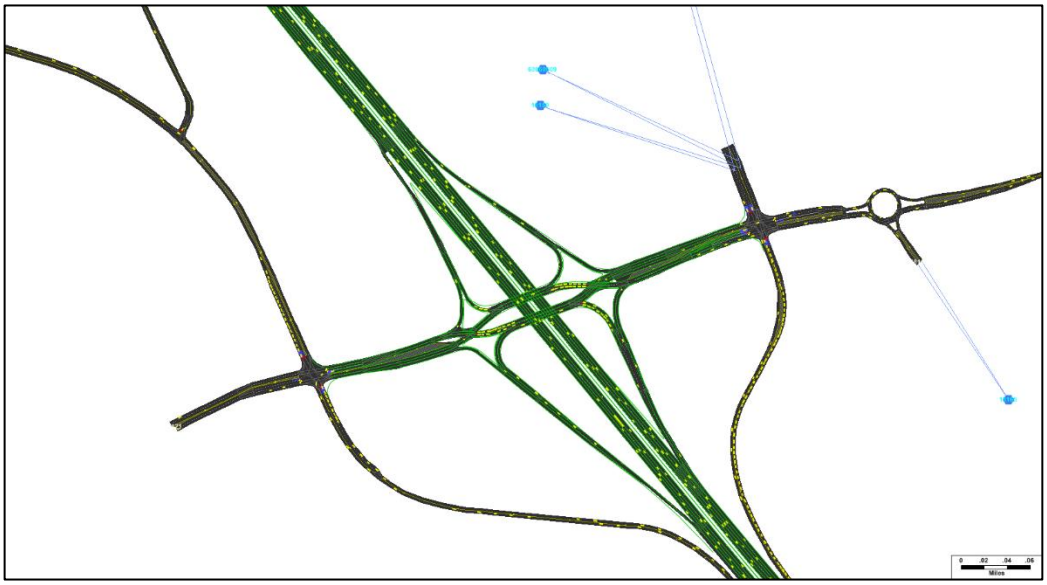


Figure 8 - Exit 104 (AO31) Simulation - PM Peak Hour



- Exit 106 (AO14)
    - AM Peak Hour – See **Figure 9** – The I-26 eastbound on-and off-ramps are completely blocked due to the severe queuing on the C-D Road, which in turn causes severe queuing in both directions along the arterial. Queue backup propagates beyond the westbound ramp intersection and blocks access to the interchange for the left turning traffic on the westbound off-ramp. Increased capacity and the elimination of bottlenecks on the eastbound C-D Road may reduce congestion and improve traffic operation.
    - PM Peak Hour – See **Figure 10** – interchange operates under capacity at the WB dual left turns onto I-26 eastbound.
    - The proposed closure of Fernandina Road and rerouting traffic via Kay Street will adversely impact traffic operations at the intersections of Kay Street and St. Andrews Road and Kay Street and Beatty Road.
        - The diverted left turn traffic on the eastbound approach of St. Andrews Road at the Kay Street intersection results in major queuing in the eastbound direction**.** Geometric improvements, such as providing a second eastbound left turn lane for traffic turning on to Kay Street and traffic control modification at this intersection may improve traffic operation and reduce queuing
        - The intersection of Kay Street and Beatty Road will also experience severe queuing if the Kay Street approach continues to be stop sign controlled. Queues were observed extending all the way to St. Andrews Road. Installation of a traffic signal at this intersection may need to be considered to improve traffic operation and reduce queuing.
    - Adjustments are likely needed to turn lanes and signal operation at the intersection of Jamil Road and relocated Woodland Hills Road to reduce observed queuing in the peak hours.

Figure 9 - Exit 106 (AO14) Simulation - AM Peak Hour

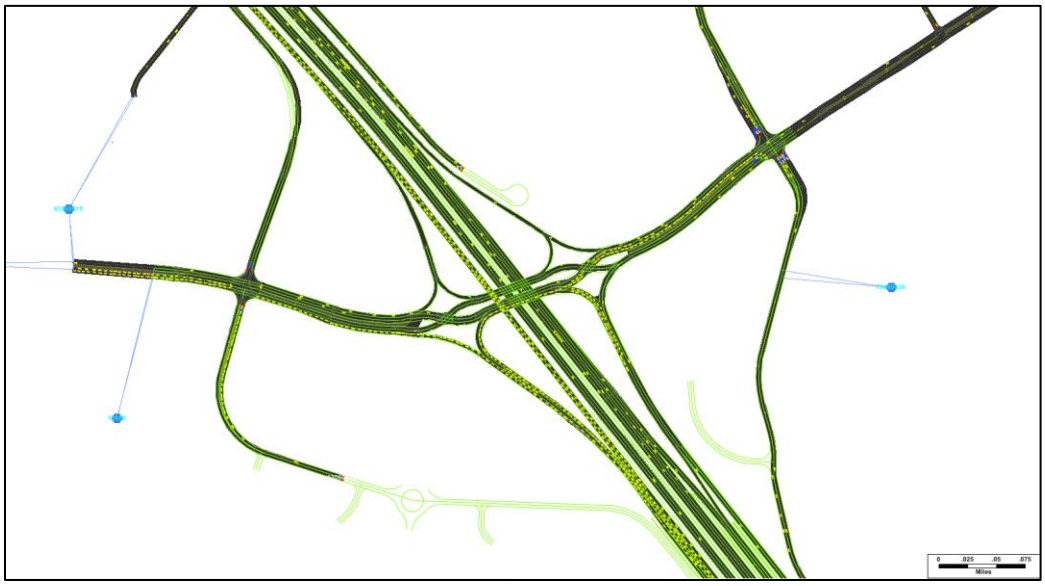
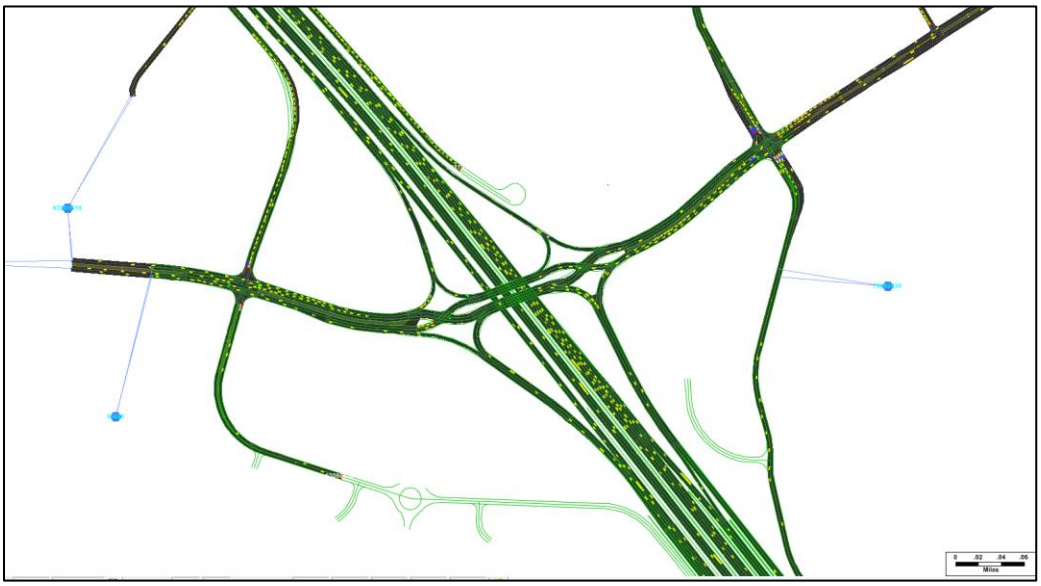


Figure 10 - Exit 106 (AO14) Simulation - PM Peak Hour



- Exit 107/Exit 64 (AO19)
    - AM Peak Hour – See **Figure 11** – the eastbound I-20 C-D Road operates over capacity and has several lane drops in close proximity, creating localized bottlenecks. Additionally, weaving issues were observed where the I-26 EB system ramp merges with the EB I-20 C-D Road. This causes a severe backup on the I-26 eastbound System Ramp onto I-26 EB upstream of Exit 106. Increases in capacity and the elimination of bottlenecks may reduce congestion and improve traffic operation.
    - PM Peak Hour – See **Figure 12** –.Congestion issues similar to the AM peak hour were observed on the EB I-20 C-D Road to the west of Exit 65, although the queue backup is less severe and doesn't propagate all the way back to I-26 EB System Ramp. The westbound I-20 C-D Road also experiences congestion due to lack of capacity and closely spaced weaving and merging areas. The resulting congestion creates severe queueing on the WB I-26 System Ramp to I-20 WB. Capacity increases and the elimination of bottlenecks may reduce congestion and improve traffic operation.

Figure 11 - Exit 107/Exit 64 (AO19) Simulation - AM Peak Hour



Figure 12 - Exit 107/Exit 64 (AO19) Simulation - PM Peak Hour



Exit 108 (I-126)

- AM Peak Hour – See **Figure 13** –eastbound and westbound I-126 operate under capacity.
- PM Peak Hour – See **Figure 14** – I-126 westbound operates over capacity with queues extending beyond the Colonial Life interchange. This is the result of the congestion introduced by weaving traffic at the location where I-26 WB and I-126 WB meet at the Bush River Road bridge.

Figure 13 - Exit 108 (I-126) Simulation - AM Peak Hour



Figure 14 - Exit 108 (I-126) Simulation - PM Peak Hour



- Exit 110 (AO47) – no geometric changes
    - AM Peak Hour – See **Figure 15** – Interchange operates at capacity at the eastbound ramp terminus. Both the eastbound and westbound off-ramp experiences queuing, however these queuing do not impact I-26 mainline operation.
    - PM Peak Hour – See **Figure 16** – Interchange operates over capacity at the I-26 westbound off-ramp due to the arterial queuing along US 378.

Figure 15 - Exit 110 (AO47) Simulation - AM Peak Hour

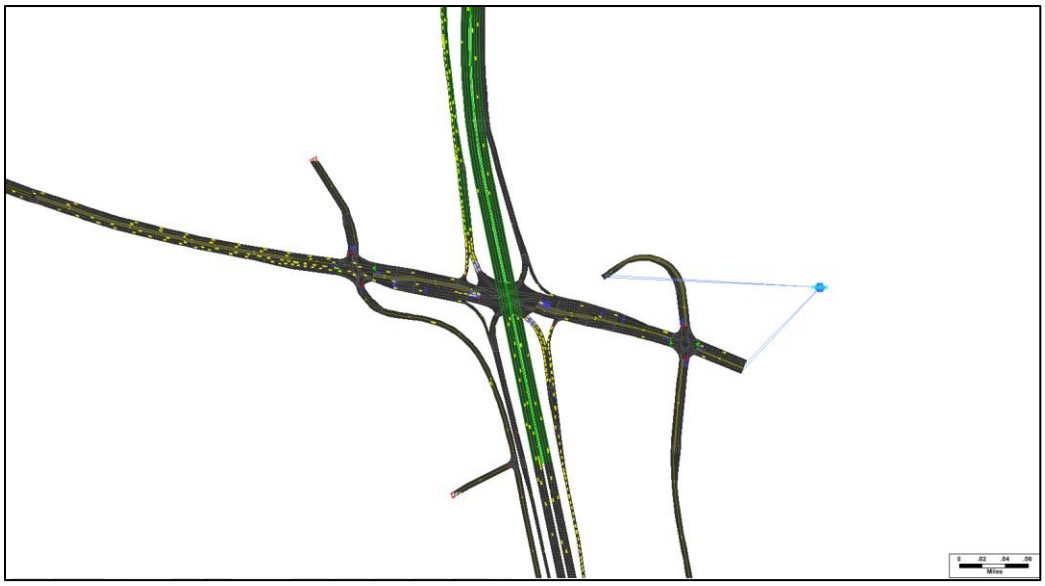
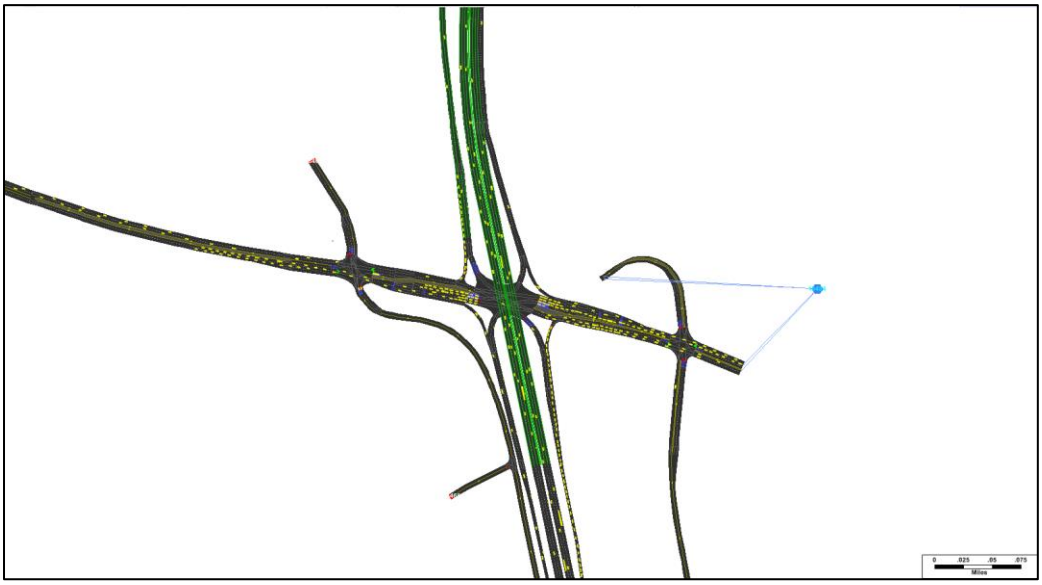


Figure 16 - Exit 110 (AO47) Simulation - PM Peak Hour



- I-126 at Colonial Life Boulevard
    - AM Peak Hour – See **Figure 17** – Interchange operates under capacity with the eastbound ramp intersection operating under signal control. Queuing is observed at the eastbound ramp intersection both on southbound Colonial Life Boulevard and the eastbound C-D Road/off-ramp.
    - PM Peak Hour – See **Figure 18** – Interchange operates under capacity with installation of signal.

Figure 17 – I-126 at Colonial Life Boulevard Simulation - AM Peak Hour

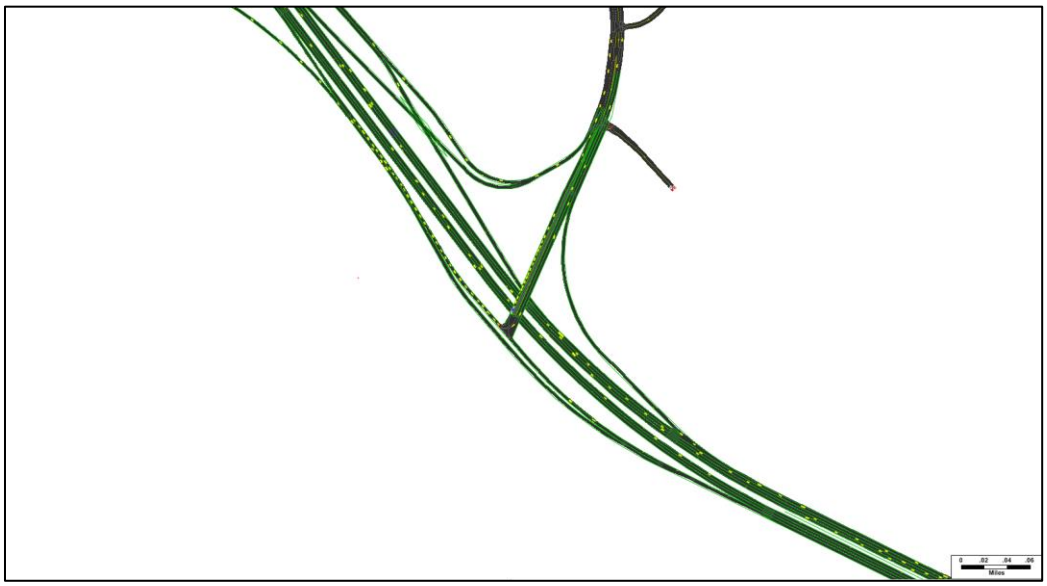
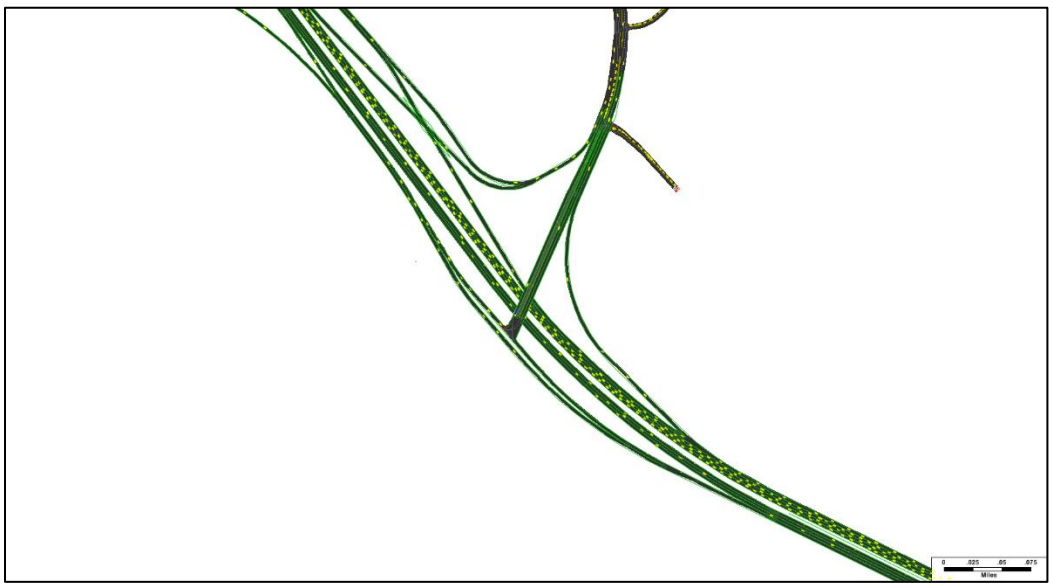


Figure 18 – I-126 at Colonial Life Boulevard Simulation - PM Peak Hour



- Exit 63 (AO7) – Interchange design differs from the .KMZ file. In the simulation network, Bush River Road is widened to provide dual eastbound left turn lanes and a single westbound right turn lane to facilitate traffic entering the eastbound on-ramp. Also, a channelized right turn was provided on the westbound off-ramp.
    - AM Peak Hour – See **Figure 19** – interchange operates under capacity
    - PM Peak Hour – See **Figure 20** – interchange operates over capacity. Severe queuing is observed on the westbound On-and Off-ramps.

Figure 19 - Exit 63 (AO7) Simulation - AM Peak Hour

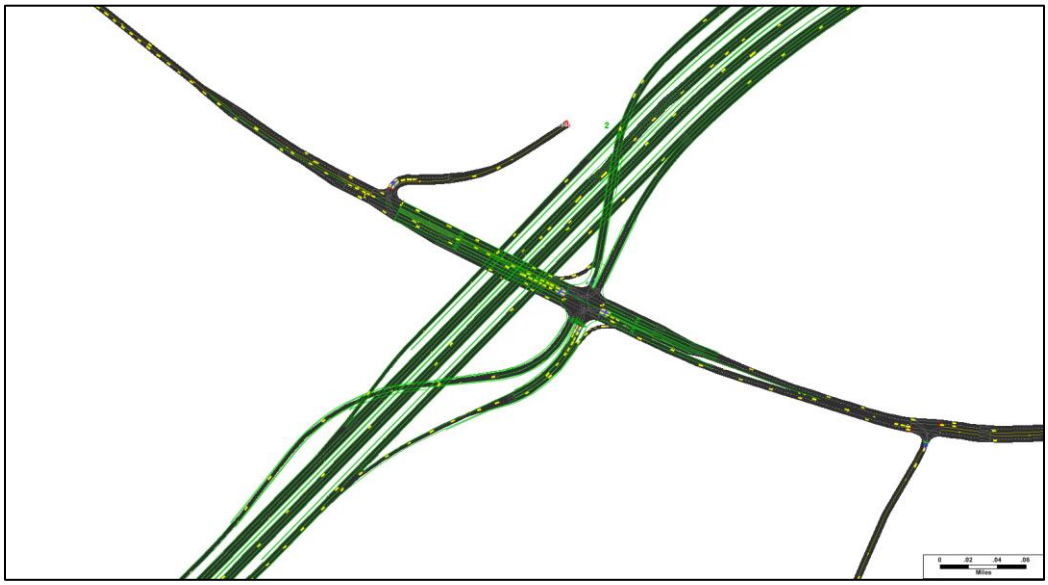
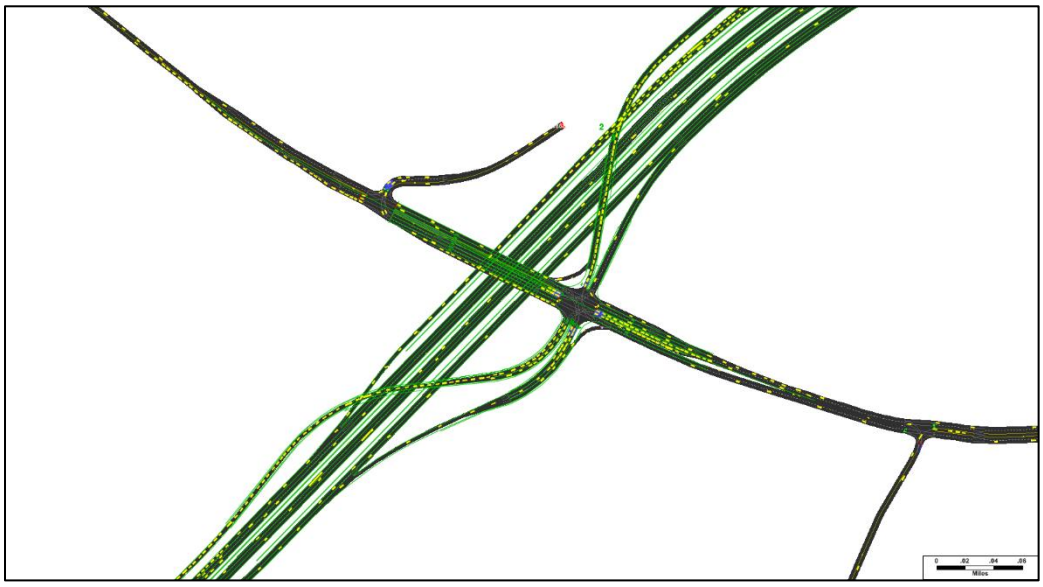


Figure 20 - Exit 63 (AO7) Simulation - PM Peak Hour



- Exit 65 (AO5)
    - AM Peak Hour – See **Figure 21** – interchange operates at capacity. The southbound traffic at the crossover heading to the left turn to the EB on-ramp experiences queuing back towards Marley Drive.
    - PM Peak Hour – See **Figure 22** – interchange operates over capacity. Severe queuing is present on the eastbound On-ramp extending back from the merge area into EB I-20, which in turn creates significant backup on the displaced left turn lanes on the Broad River Road overpass. There is also queuing along northbound Broad River Road between Marley Drive to the south of Longcreek Drive.

Figure 21 - Exit 65 (AO5) Simulation - AM Peak Hour

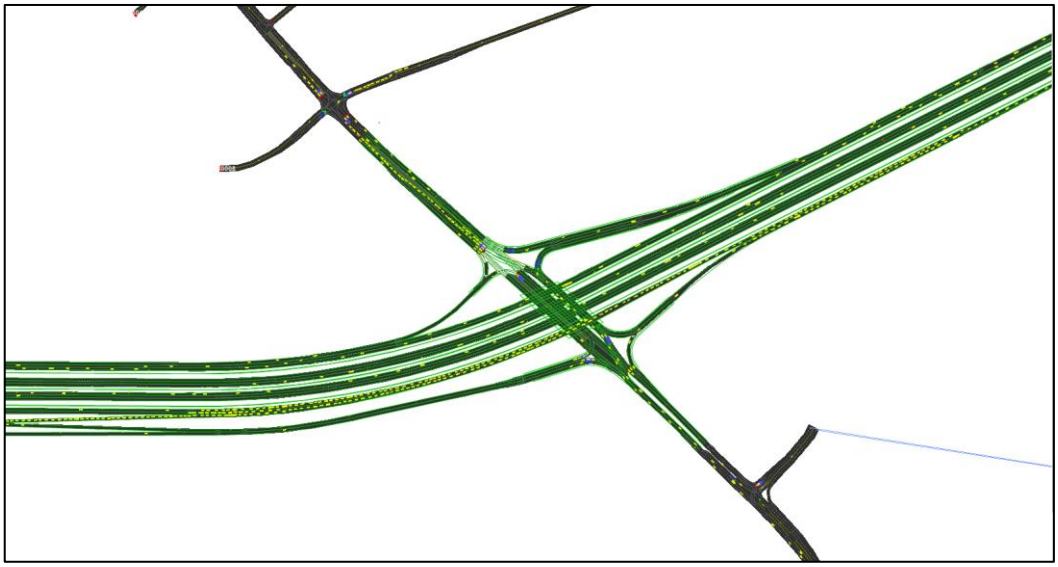
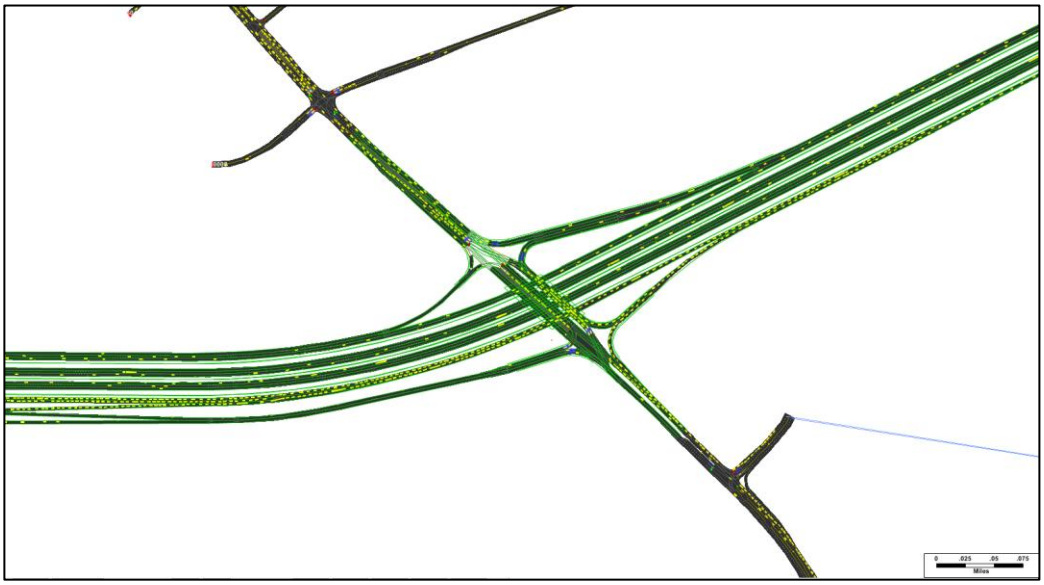
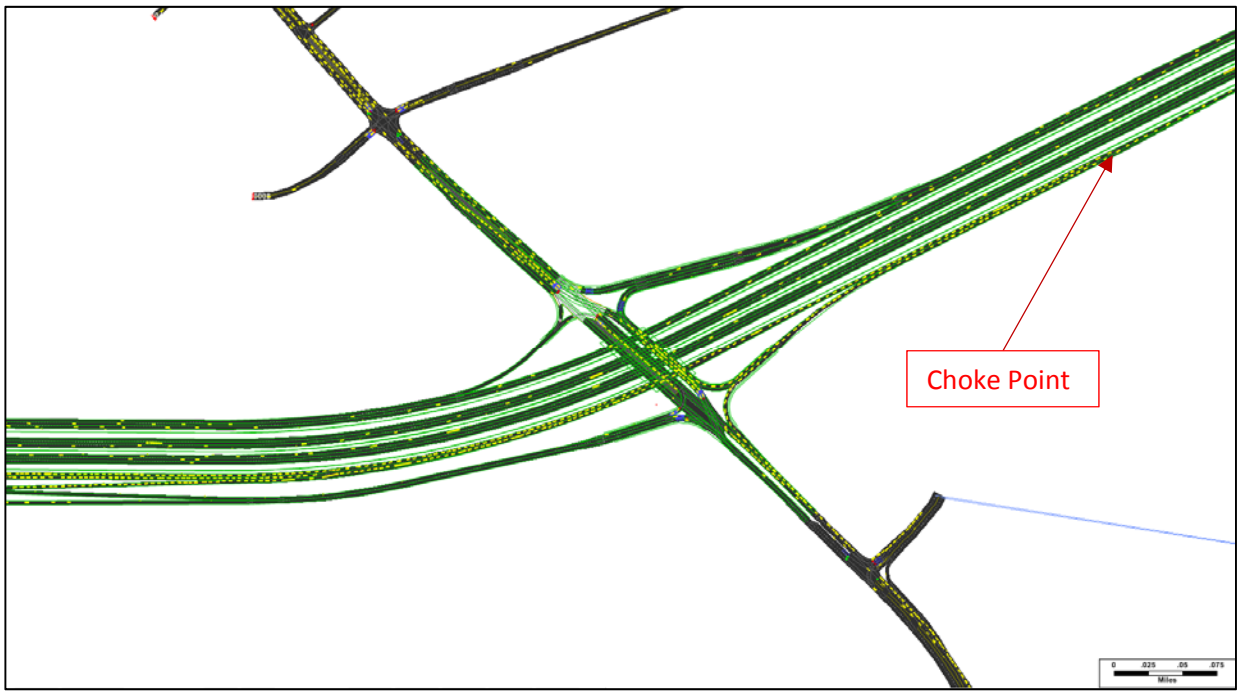


Figure 22 - Exit 65 (AO5) Simulation - PM Peak Hour

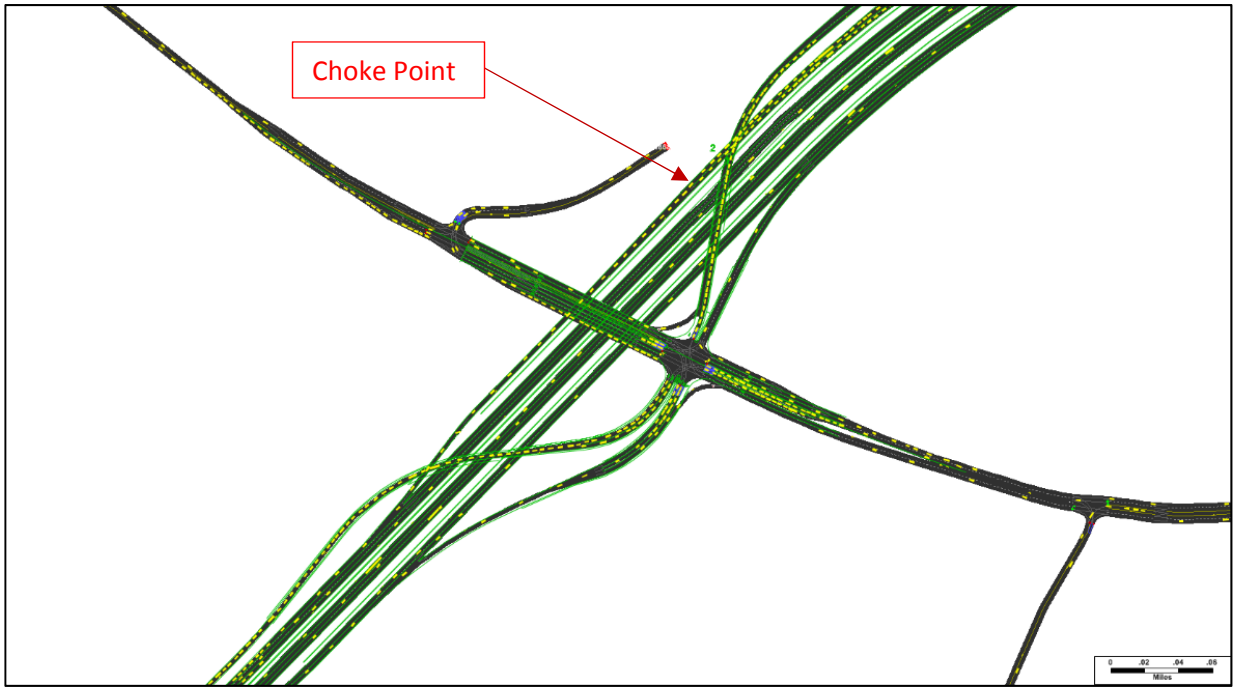


RA6 Specific Choke Points:

1. I-20 EB on-ramp from C-D road, lane drop prior to merge onto the mainline



2. I-20 WB on-ramp from C-D road, lane drop prior to merge onto the mainline



Reasonable Alternative 7 – Microsimulation Summary (2040 Volumes)

Freeway Segments

Segment	AM		PM		Comment
	EB	WB	EB	WB	
Exit 101-102	Under	Under	Under	Under	
Exit 102-103	Under	Under	Under	Under	
Exit 103-104	Under	Under	Under	At	Simulation did not show any significant issues in this section, however some volume may be getting held up due to Exit 106 queuing.
Exit 104-106	Under	Under	Under	At	Simulation did not show any significant issues in this section, however some volume may be getting held up due to Exit 106 queuing.
Exit 106-107	At	Under	Under	At	Congestion from the lane drop on EB I-26 in the AM peak hour. Simulation did not show any significant issues in this section, however some volume may be getting held up due to Exit 106 queuing in the PM peak hour.
Exit 107-108	Over	Under	Under	Under	Congestion at the lane drop on EB I-26 combined with the on-ramp volume from WB I-20 to EB I-26 causes over capacity conditions in the AM peak hour.
Exit 108-110	Under	Under	At	Under	Simulation did not show any significant issues in this section.
Exit 108 – Colonial Life	Under	Under	Under	At	Queuing from Exit 106 causing WB congestion issues in this section during the PM peak.
Exit 63-64	Under	Under	Under	Under	
Exit 64-65	Under	Under	Under	Under	

Interchanges

Exit		AM		PM		
Location	AO	EB Ramp	WB Ramp	EB Ramp	WB Ramp	Comment
Exit 101	Par. Clo.	Under	Under	Under	Under	
Exit 102	Par. Clo.	Under	Under	Under	Under	
Exit 103	AO49	Under	Under	Under	Under	
Exit 104	AO30	Under	Under	Over	Under	Additional signal improvements may get this to be at/under capacity
Exit 106	AO13	Under	Under	Under	Over	Excessive queuing stemming from the interaction with the Burning Tree Dr/Fernandina Rd intersection. Minor geometric /timing changes have not been able to alleviate the issue. A detailed comparison of the microsimulation volumes and the existing turning movement volumes may be required to verify traffic is not being over-assigned to this intersection.
Exit 107/Exit 64	AO27	Under	Under	Under	Over	Spillback queuing from the Exit 106 issues is causing congestion on the ramps at this interchange.
Exit 108 – I-126	AO27	Under	Under	Under	Under	
Exit 110	AO46	Under	Under	Under	Over	Issues with the adjacent intersection volumes are causing spillback queuing. An excessive number of vehicles are trying to make a left turn onto McSwain Drive due to the split centroid. This may be able to be corrected by adjusting the routes to the centroid.
Colonial Life	AO24	Under	Under	Under	Under	
Exit 63	AO8	Under	At	Over	Over	Heavy off ramp volumes causing queuing, however, additional signal timing changes may be able to improve the conditions.
Exit 65	AO5	Under	Under	Under	Under	

Simulation Observations and Alternative Modifications

The green line work is the KMZ file used for the simulation observations.

- Exit 101 (Par.Clo) – .KMZ file did not contain WB I-26 off-ramp to southbound Broad River Road, however, it was maintained for the simulation.
    - AM Peak Hour – See **Figure 1** – interchange operates under capacity
    - PM Peak Hour – See **Figure 2** – interchange operates under capacity

Figure 1 - Exit 101 (Partial Cloverleaf) Simulation - AM Peak Hour

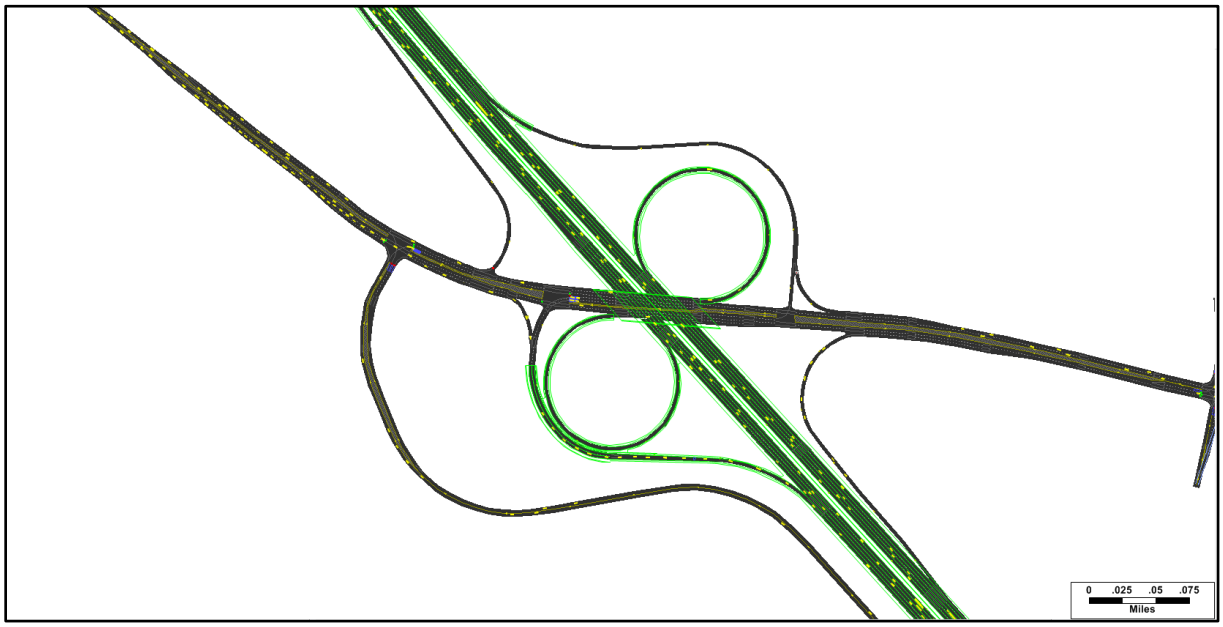
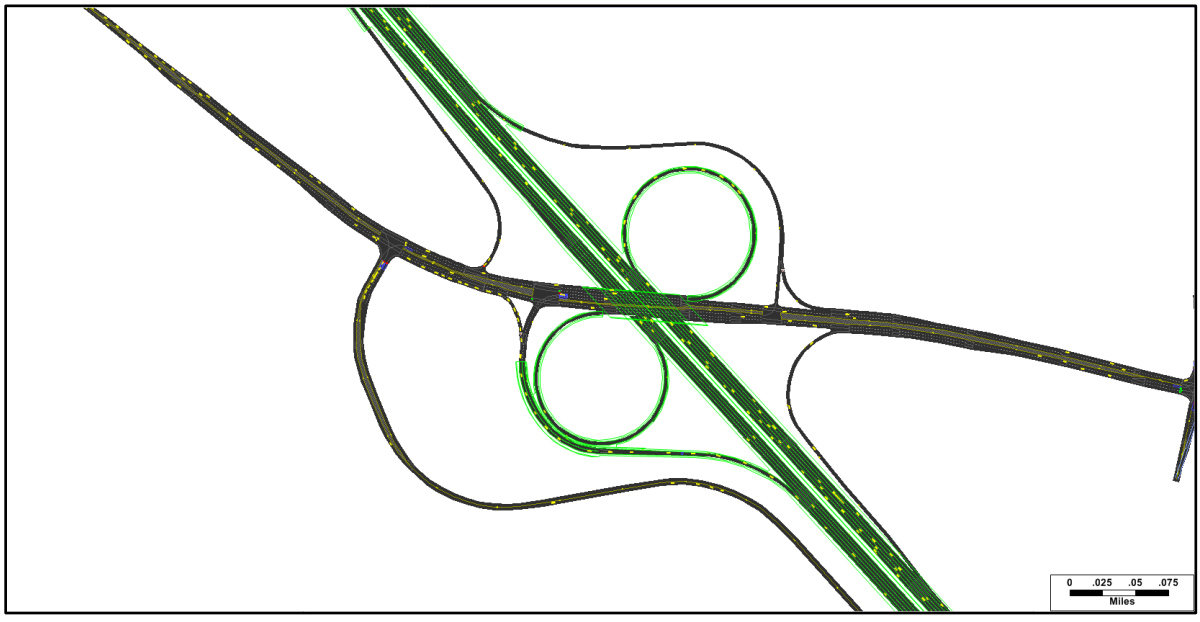


Figure 2 - Exit 101 (Partial Cloverleaf) Simulation - PM Peak Hour



- Exit 102 (Par.Clo) – No geometric changes made from the .KMZ file.
    - AM Peak Hour – See **Figure 3** – interchange operates under capacity
    - PM Peak Hour – See **Figure 4** – interchange operates under capacity. Queuing on Columbiana Dr. may be able to be corrected with further signal timing improvements.

Figure 3 - Exit 102 (Partial Cloverleaf) Simulation - AM Peak Hour

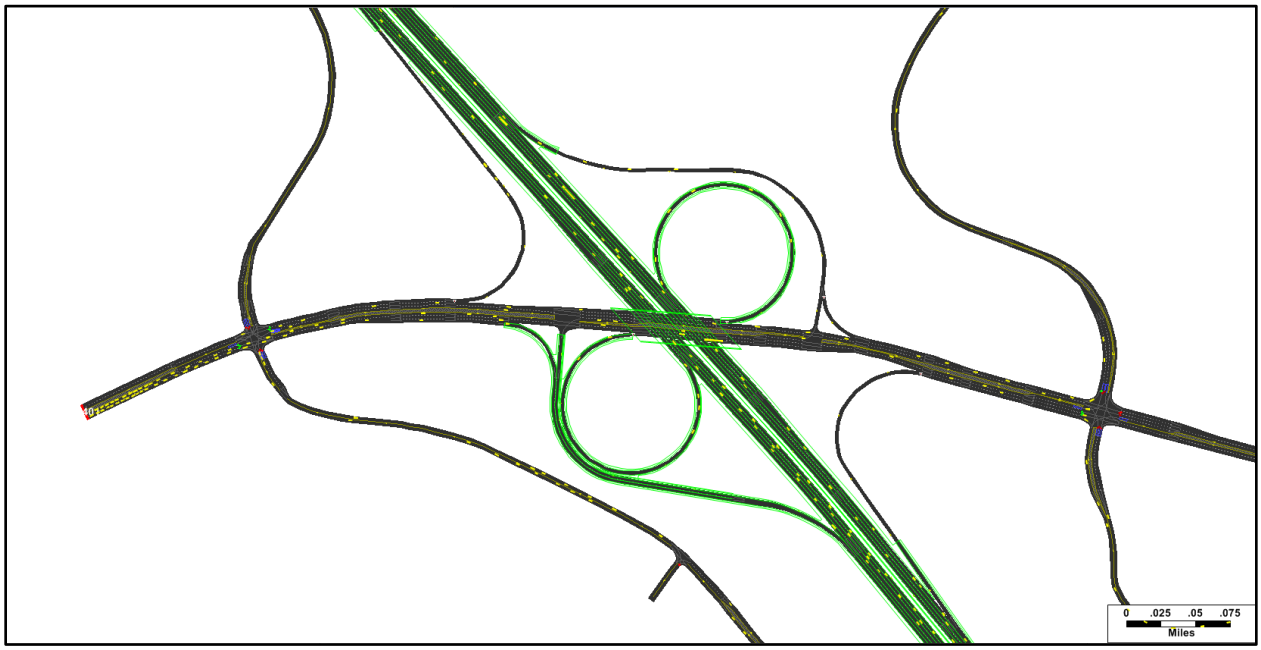
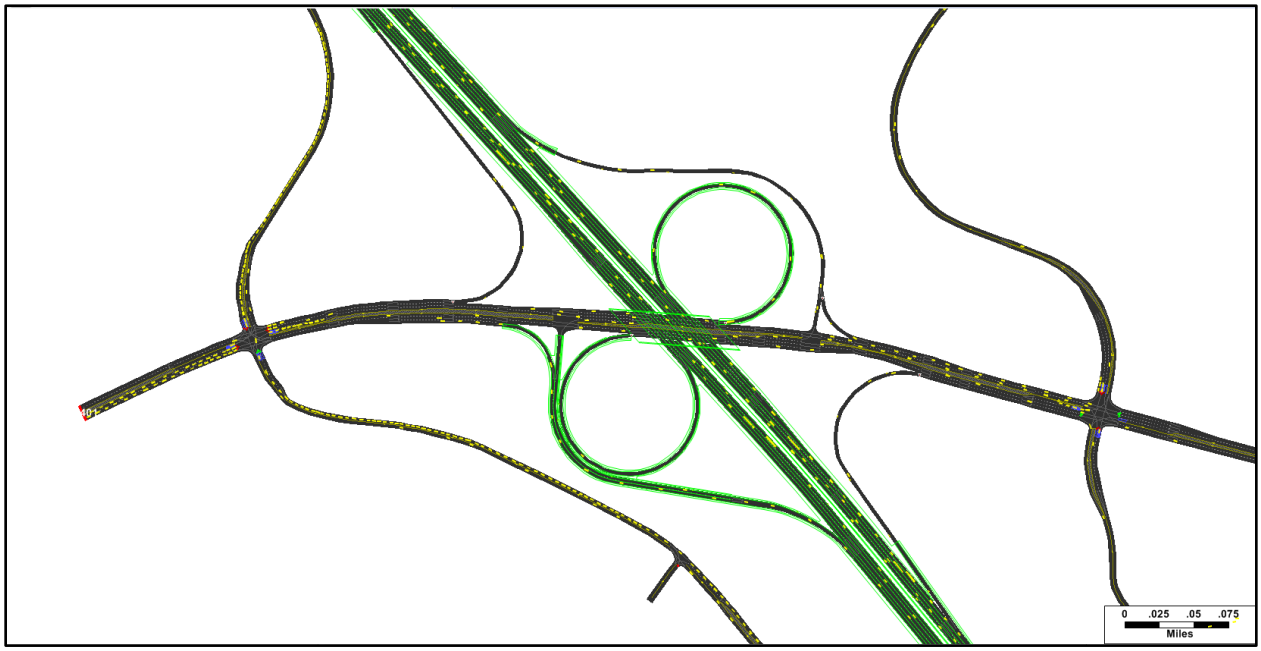


Figure 4 - Exit 102 (Partial Cloverleaf) Simulation - PM Peak Hour



- Exit 103 (AO49) – No geometric changes made from the .KMZ file.
    - AM Peak Hour – See **Figure 5** – interchange operates under capacity
    - PM Peak Hour – See **Figure 6** – interchange operates under capacity. Queueing on Woodcross Drive may be able to be relieved with further signal timing adjustments.

Figure 5 - Exit 103 (AO49) Simulation - AM Peak Hour

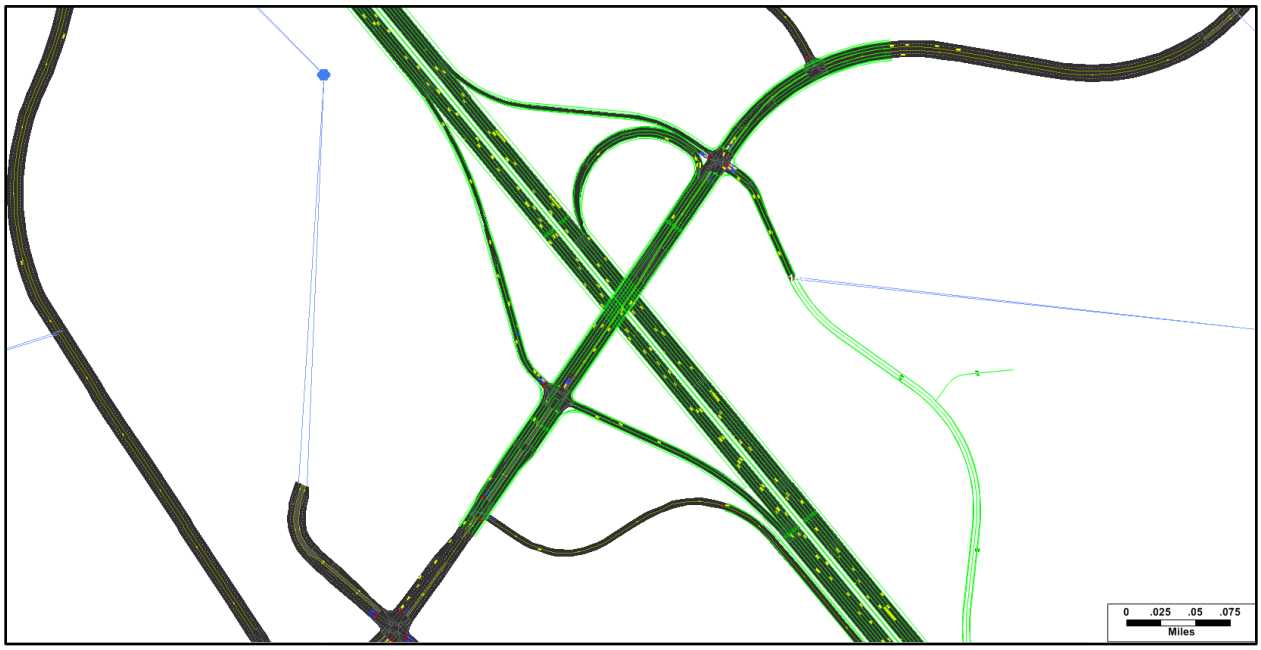
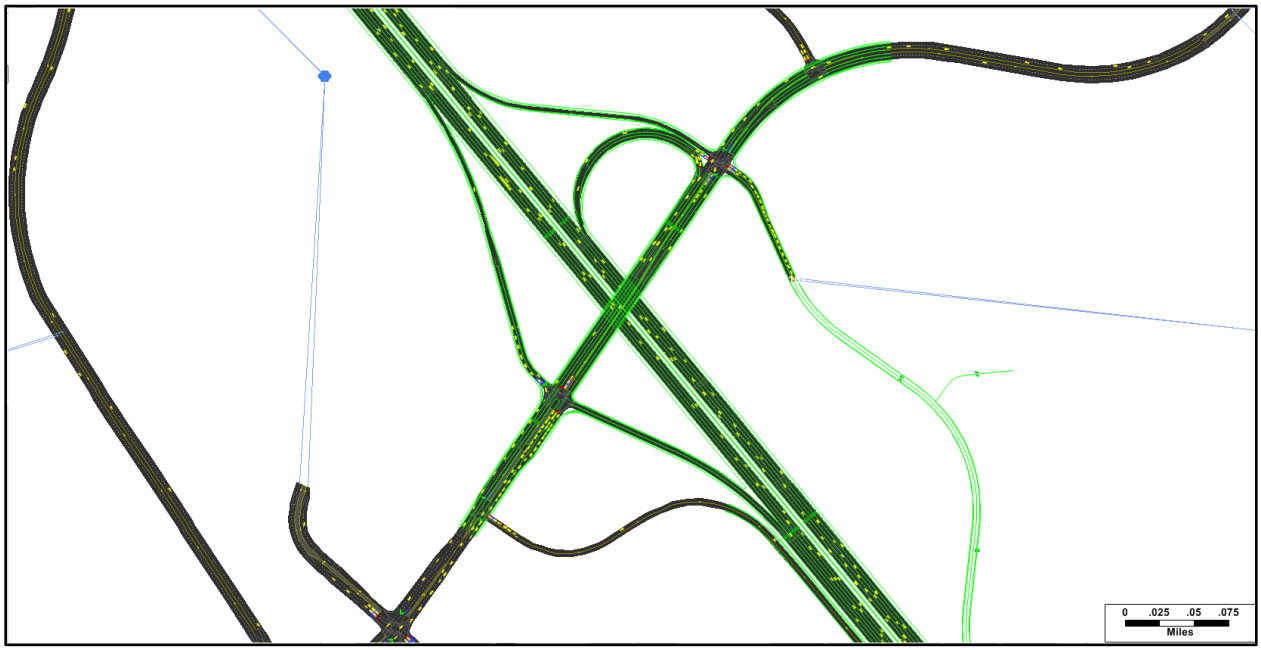


Figure 6 - Exit 103 (AO49) Simulation - PM Peak Hour



- Exit 104 (AO30) – No geometric changes made from the .KMZ file.
    - AM Peak Hour – See **Figure 7** – interchange operates under capacity.
    - PM Peak Hour – See **Figure 8** – Eastbound I-26 off-ramp operates at capacity, otherwise interchange operates under capacity.

Figure 7 - Exit 104 (AO30) Simulation - AM Peak Hour

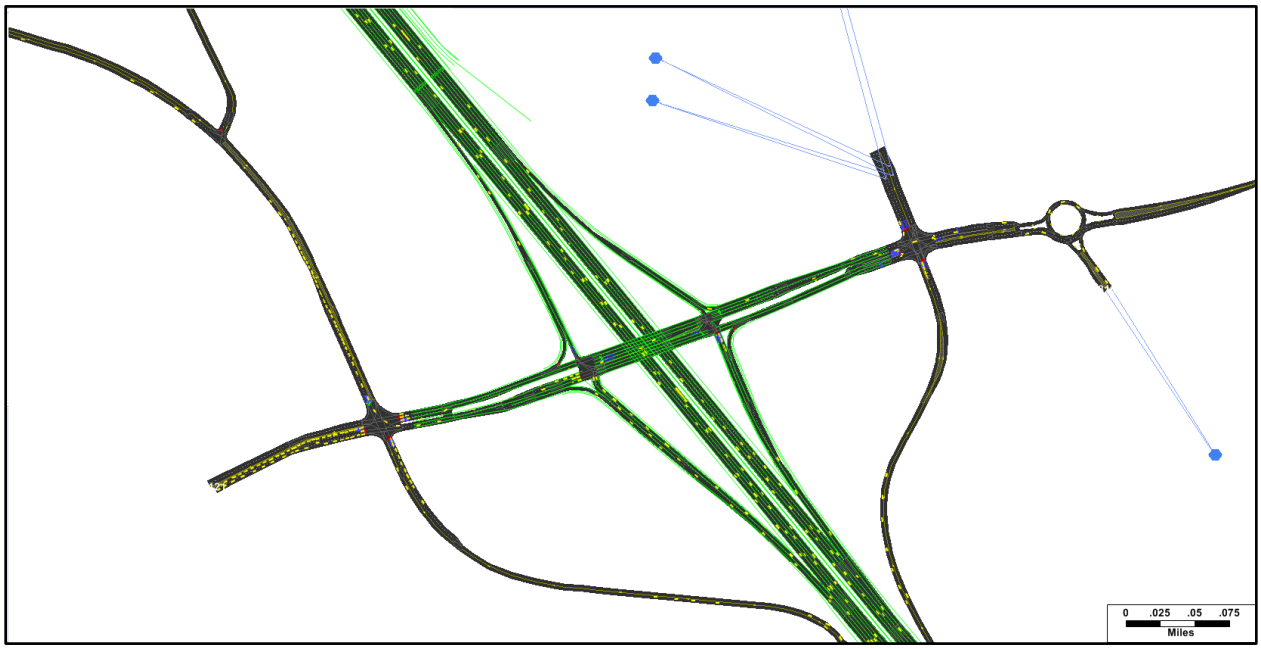
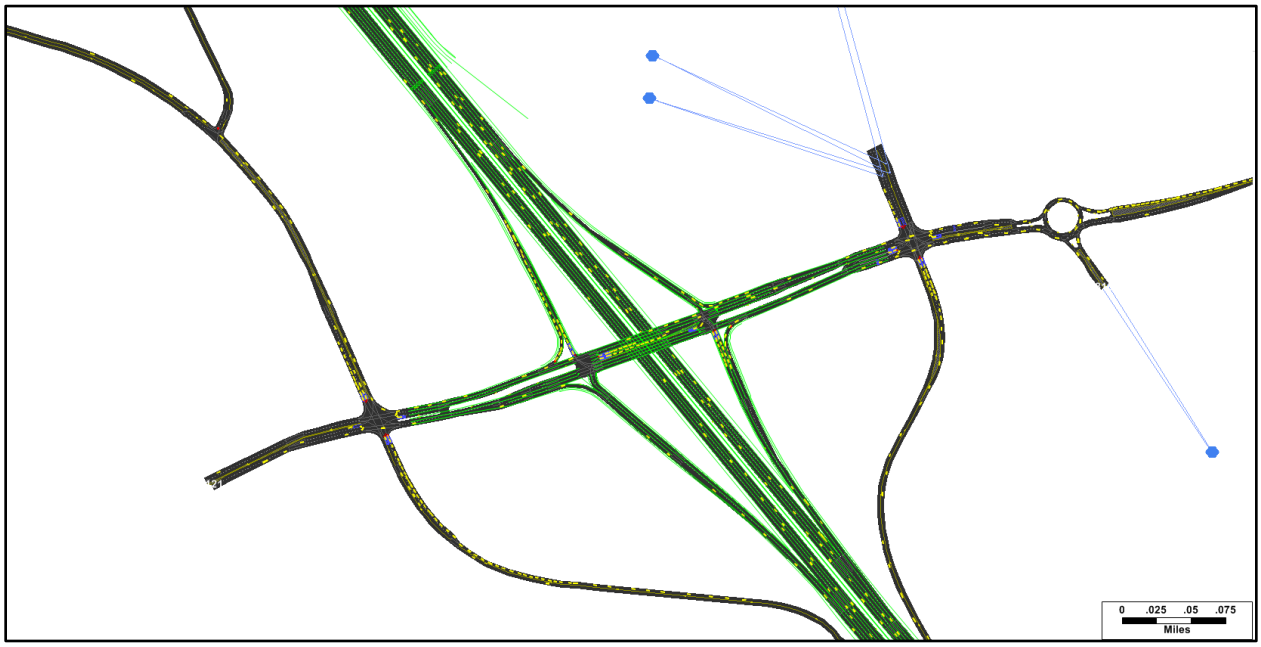


Figure 8 - Exit 104 (AO30) Simulation - PM Peak Hour



- Exit 106 (AO13) – Northbound approach of Burning Tree Dr modified from the .KMZ to ease the movement of vehicles from the westbound off-ramp as well as help with PM queuing issues.
    - AM Peak Hour – See **Figure 9** – interchange operates under capacity except for the heavy movement from eastbound right turn movement from St. Andrews Road to the on-ramp to eastbound I-26.
    - PM Peak Hour – See **Figure 10** – interchange operates over capacity at the Fernandina Rd/Burning Tree Dr. intersection which causes spillback queuing onto I-26 and I-20. The Burning Tree Dr. approach combined with the westbound off-ramp traffic making a left-turn onto St. Andrews Road is a very heavy movement and conflicts with the westbound off-ramp right turn onto St. Andrews Road. As more time is given to the Burning Tree Dr approach. This impacts the eastbound off ramp left-turn movement as well as the westbound ramp right-turn movement, causing spillback on those ramps. A detailed comparison of the microsimulation volumes and the existing turning movement volumes may be required to verify traffic is not being over-assigned to this intersection, however, many lane configurations and timing changes were explored with little improvement.

Figure 9 - Exit 106 (AO13) Simulation - AM Peak Hour

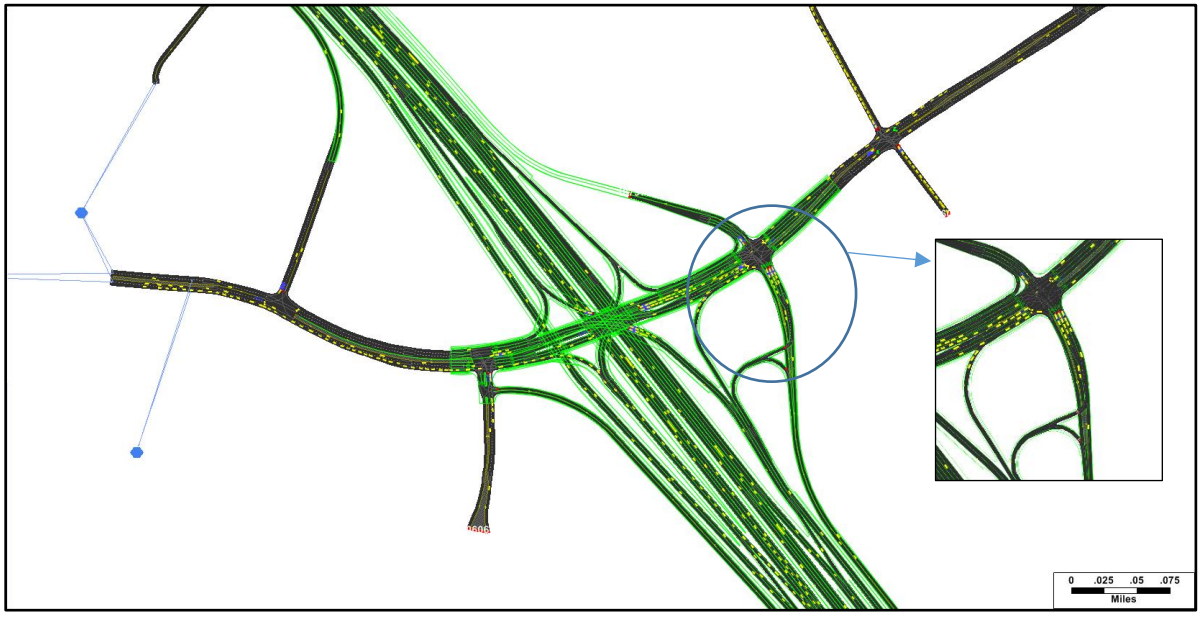
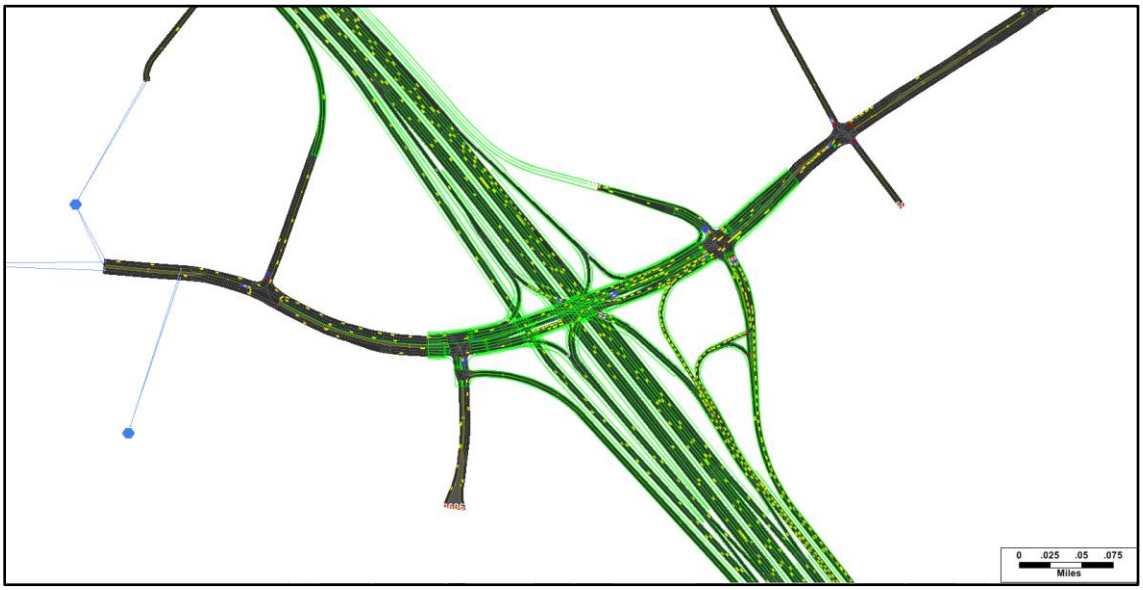


Figure 10 - Exit 106 (AO13) Simulation - PM Peak Hour



- Exit 107/Exit 64 (AO27) – Due to queueing in the AM and PM Peak hours on the ramp from westbound I-126 and I-26 where it merged down to 1 lane, 1 lane was dropped on mainline I-26 and a 2nd lane was merged on from the overcapacity ramp (See Figure 12 for details). Review of the microsimulation assignments may be necessary to ensure a majority of vehicles coming from I-126 are staying on the main through lanes through the interchange, however, the single lane ramp may still be an issue at the merge point.
    - AM Peak Hour – See **Figure 11** – The I-26 eastbound mainline is over capacity due to the lane drop west of the on-ramp from I-20 westbound. Additional design changes needed to address this issue. Queuing does not extend back into the Exit 106 interchange during the peak hour. Otherwise the interchange operates under capacity.
    - PM Peak Hour – See **Figure 12** – interchange operates under capacity with the exception of the spillback queuing from Exit 106.

Figure 11 - Exit 107/Exit 64 (AO27) Simulation - AM Peak Hour

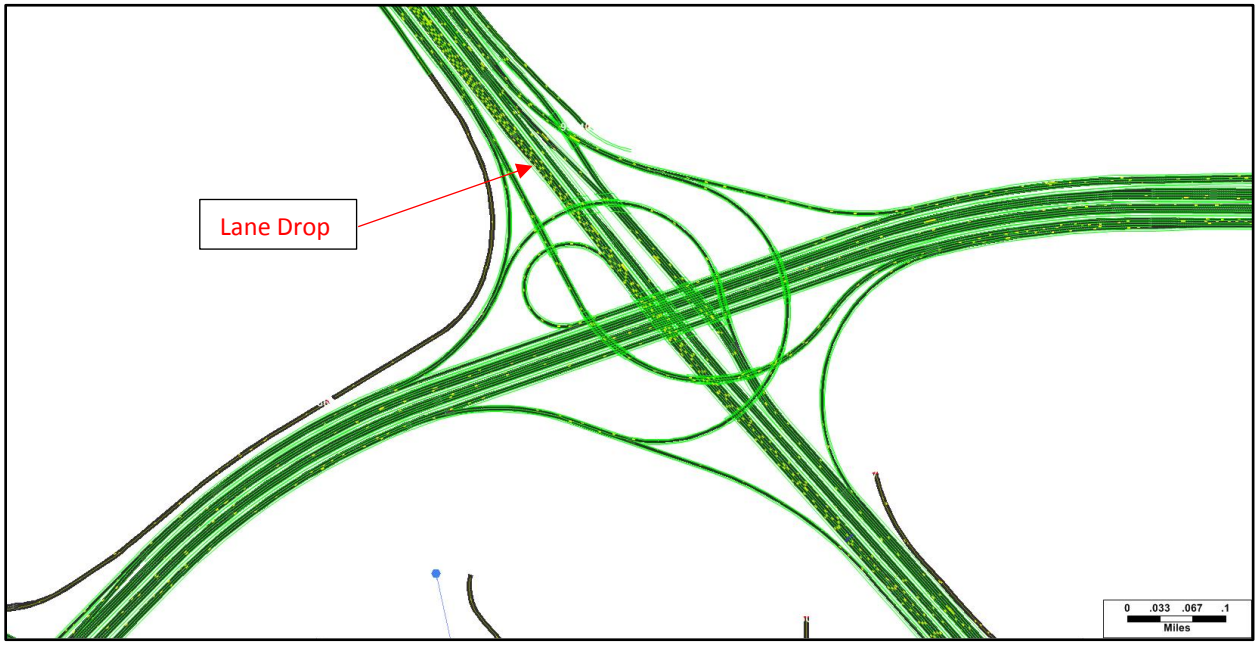
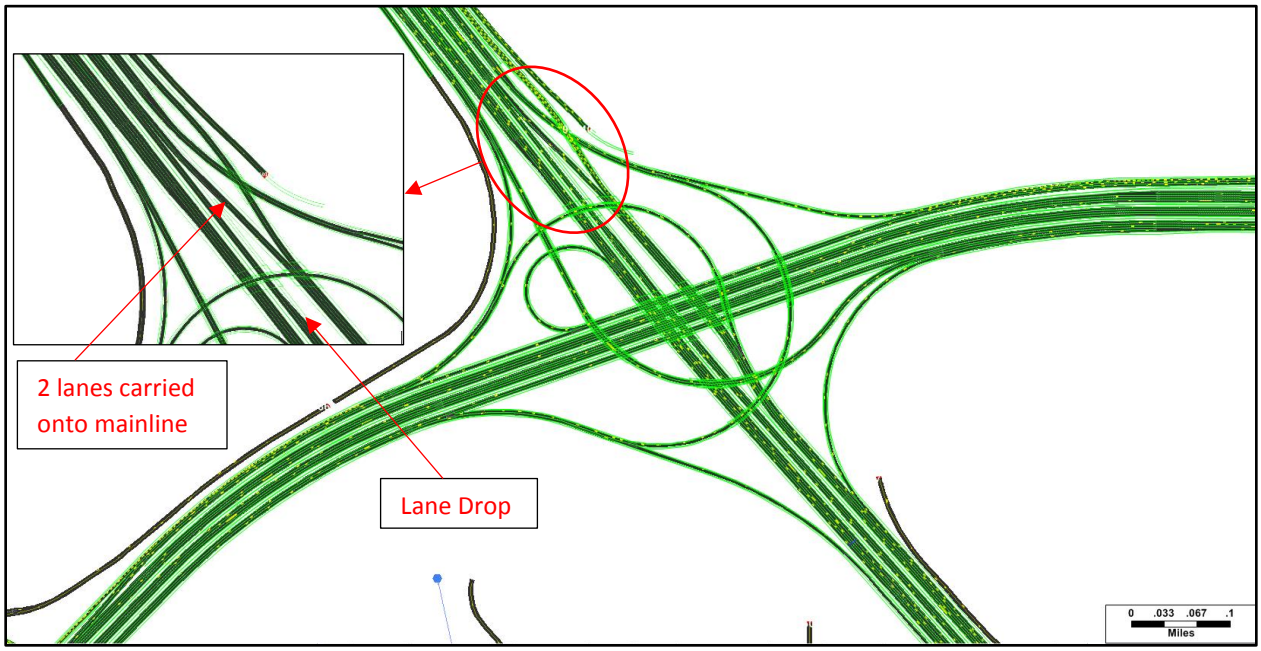


Figure 12 - Exit 107/Exit 64 (AO27) Simulation - PM Peak Hour



Exit 108 (AO27) – No geometric changes made from the .KMZ file.

- AM Peak Hour – See **Figure 13** – The interchange operates under capacity.
- PM Peak Hour – See **Figure 14** Interchange operates under capacity with the exception of the spillback queuing from Exit 106.

Figure 13 - Exit 108 (AO27) Simulation - AM Peak Hour



Figure 14 - Exit 108 (AO27) Simulation - PM Peak Hour



- Exit 110 (AO46) – No geometric changes made from the .KMZ file.
    - AM Peak Hour – See **Figure 15** – Interchange operates under capacity.
    - PM Peak Hour – See **Figure 16** – Interchange operates over capacity at the I-26 westbound off-ramp due to the arterial queuing along US 378. This appears due to an excessive number of vehicles trying to turn left onto McSwain Drive due to the split centroid. Routing changes may alleviate this queuing.

Figure 15 - Exit 110 (AO46) Simulation - AM Peak Hour

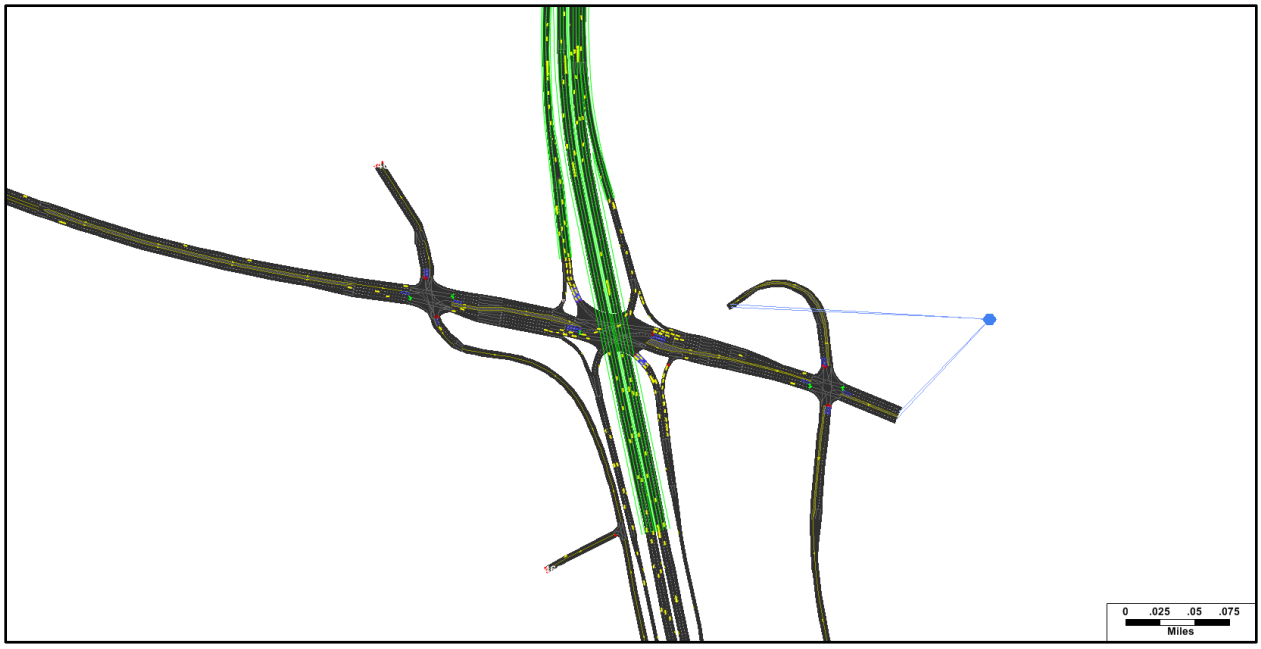
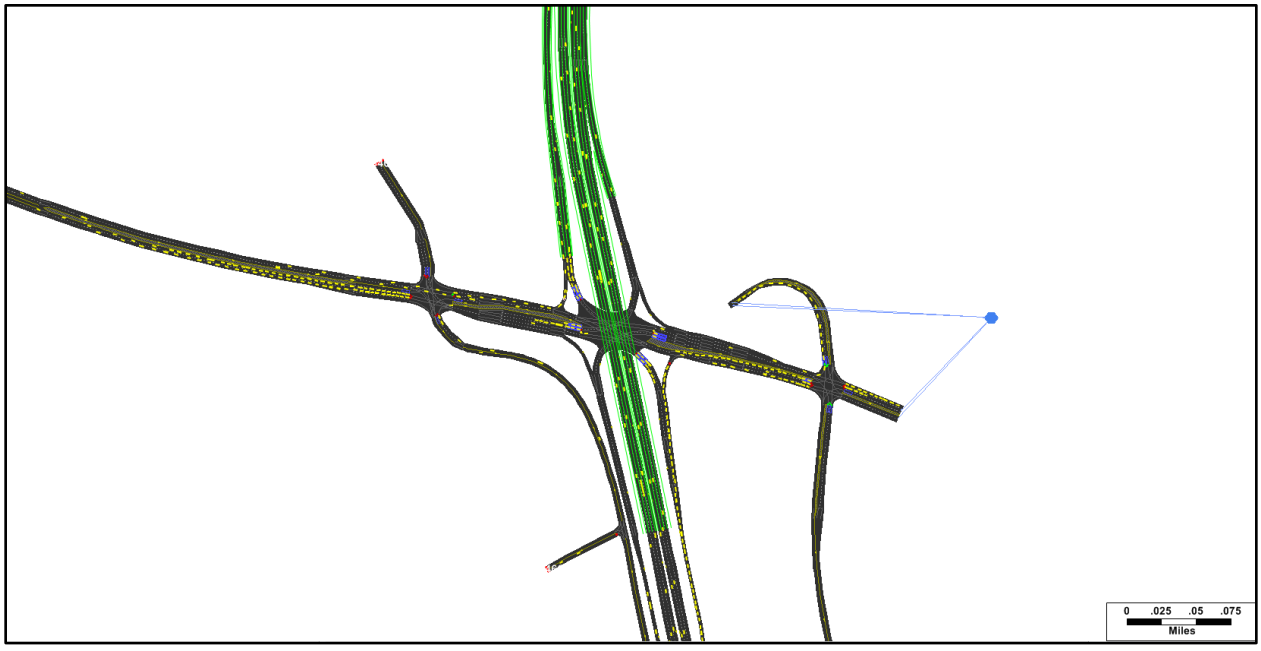


Figure 16 - Exit 110 (AO46) Simulation - PM Peak Hour



- I-126 at Colonial Life Boulevard – No geometric changes made from the .KMZ file.
    - AM Peak Hour – See **Figure 17** – Interchange operates under capacity with installation of signal.
    - PM Peak Hour – See **Figure 18** – Interchange operates under capacity with installation of signals.

Figure 17 – I-126 at Colonial Life Boulevard Simulation - AM Peak Hour

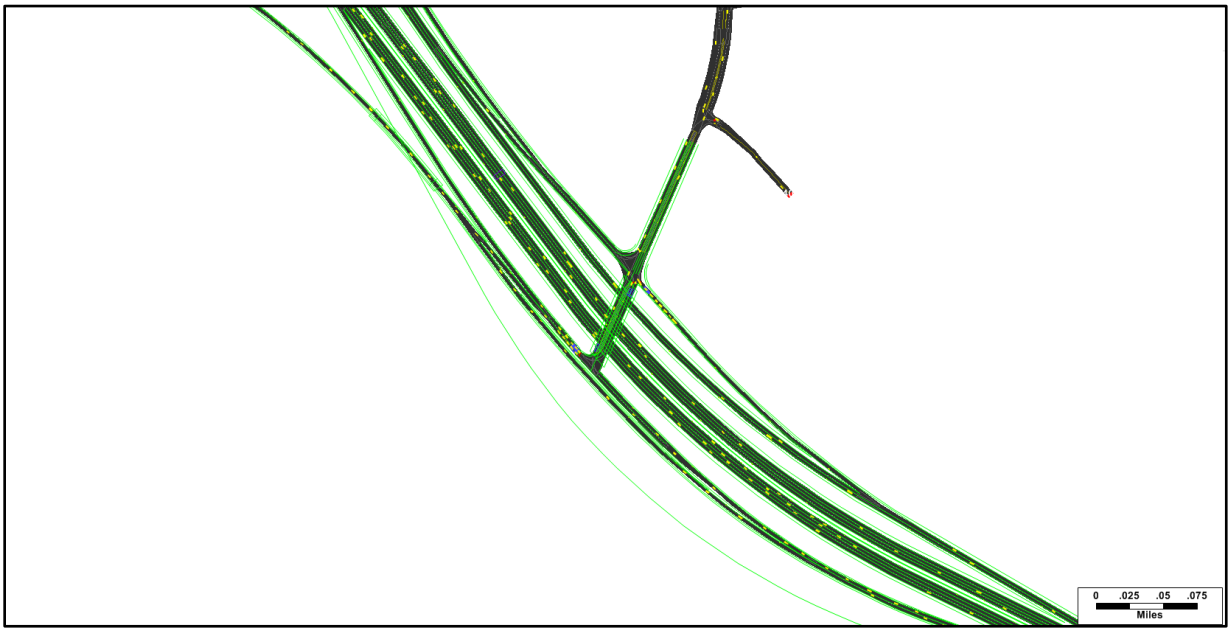
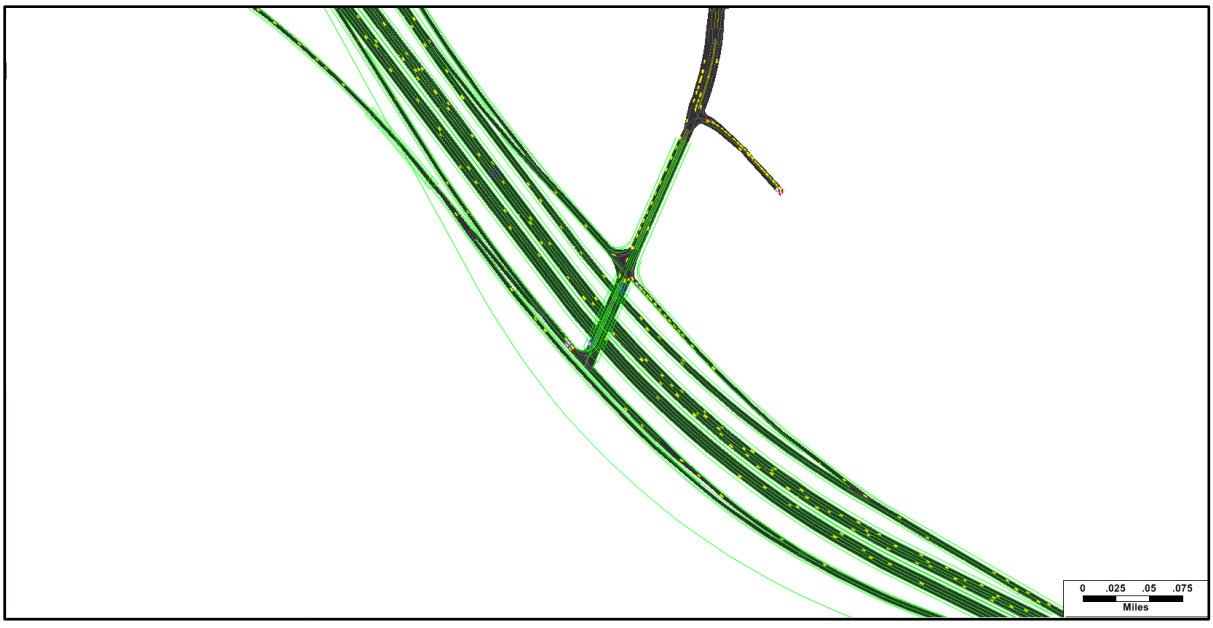


Figure 18 – I-126 at Colonial Life Boulevard Simulation - PM Peak Hour



- Exit 63 (AO8) – Interchange design similar to new .KMZ file except for the addition of a left-turn bay at the eastbound I-20 off-ramp termini.
    - AM Peak Hour – See **Figure 19** – interchange operates over capacity along eastbound Bush River Road at the intersection with the westbound I-20 ramps. Traffic signal timing modifications may help the intersection operation. Most vehicles appear to be stacking in the right lane in anticipation of the eastbound I-20 on-ramp.
    - PM Peak Hour – See **Figure 20** – interchange operates over capacity. However, further signal timing changes may alleviate some of the queuing improving the interchange operations.

Figure 19 - Exit 63 (AO8) Simulation - AM Peak Hour

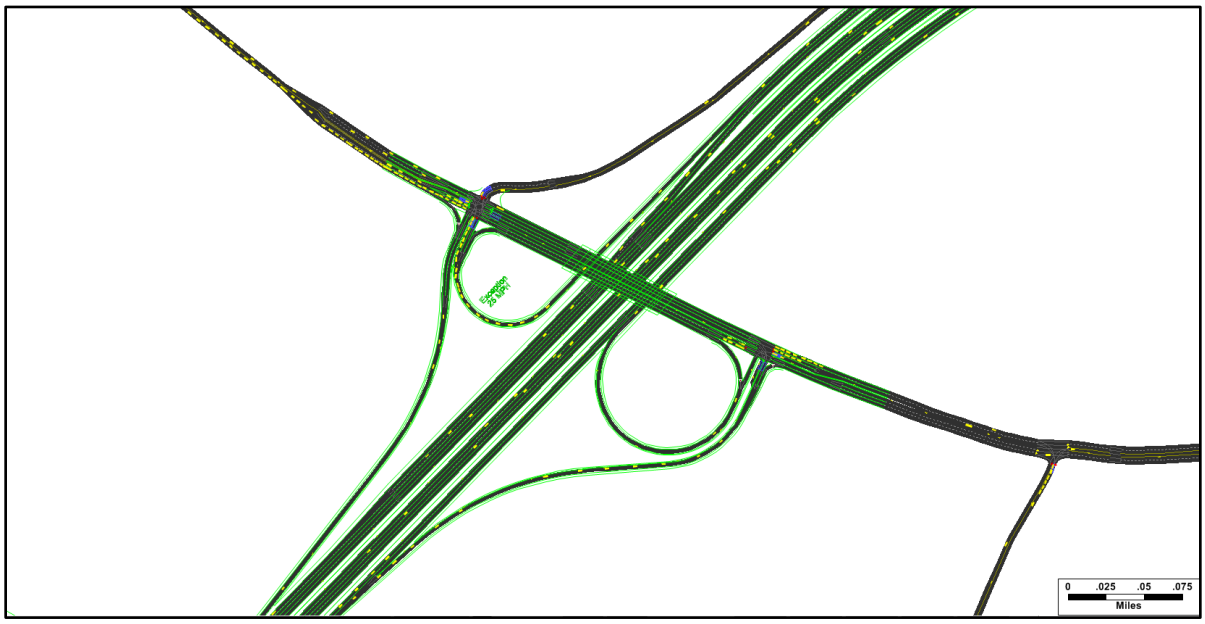
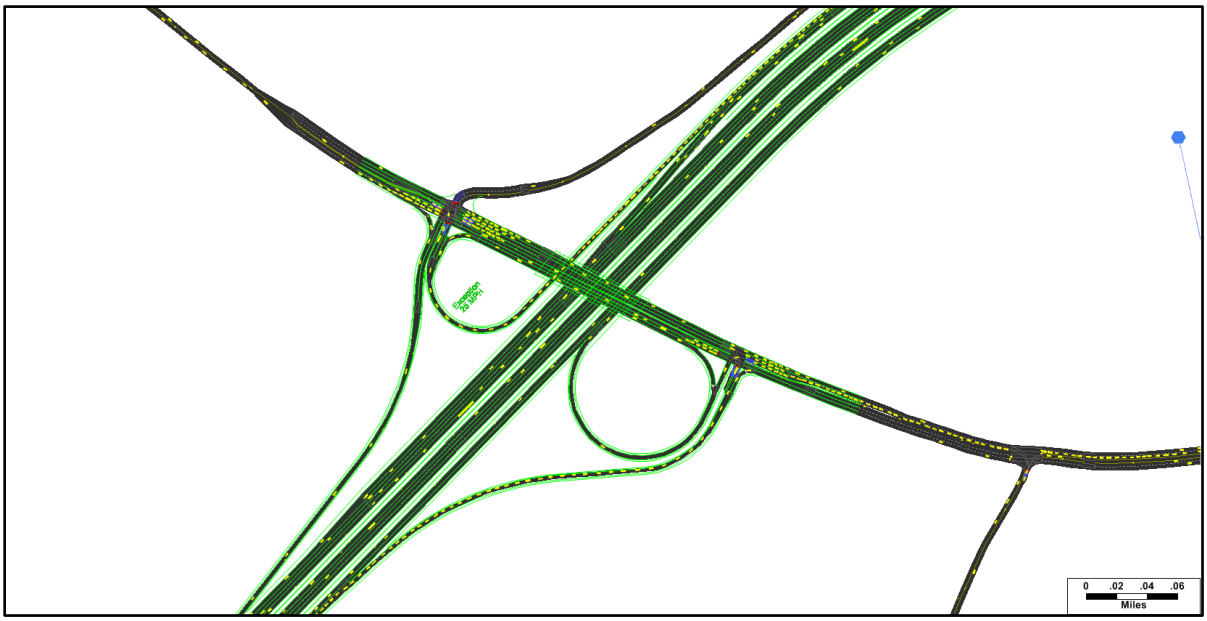


Figure 20 - Exit 63 (AO8) Simulation - PM Peak Hour



- Exit 65 (AO5) – No geometric changes made from the .KMZ file.
    - AM Peak Hour – See **Figure 21** – interchange operates under capacity. Eastbound I-20 experiences congestion east of the interchange at the lane drop
    - PM Peak Hour – See **Figure 22** – interchange operates under capacity.

Figure 21 - Exit 65 (AO5) Simulation - AM Peak Hour

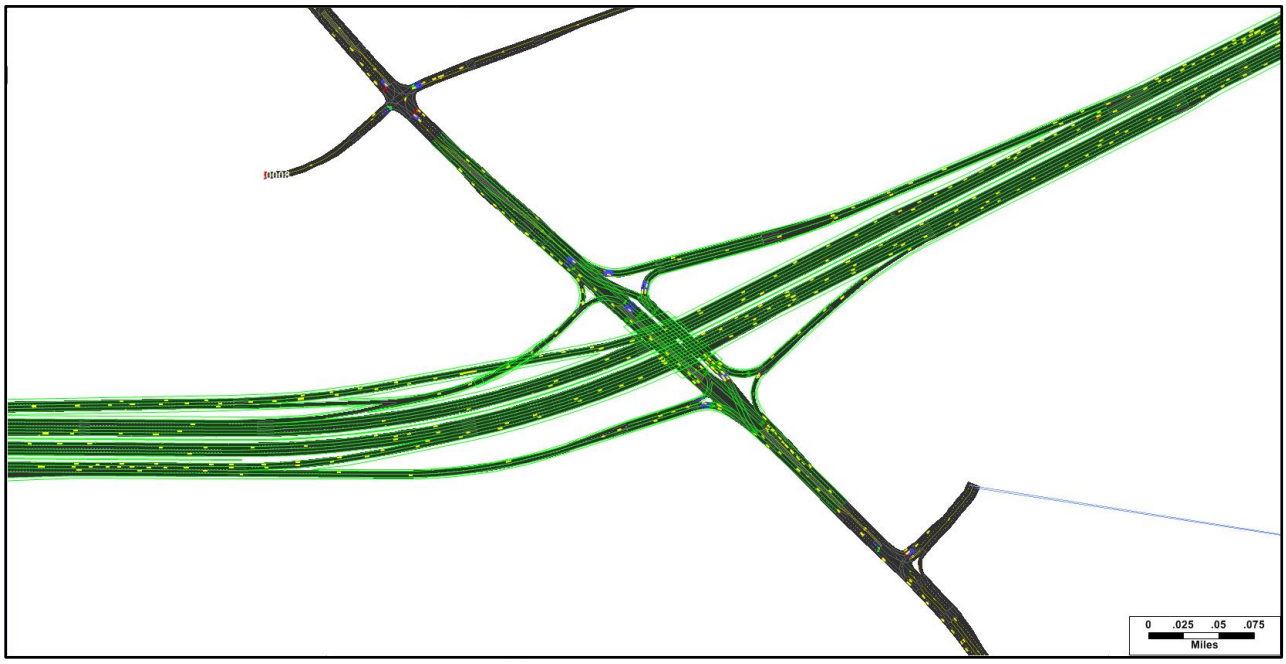
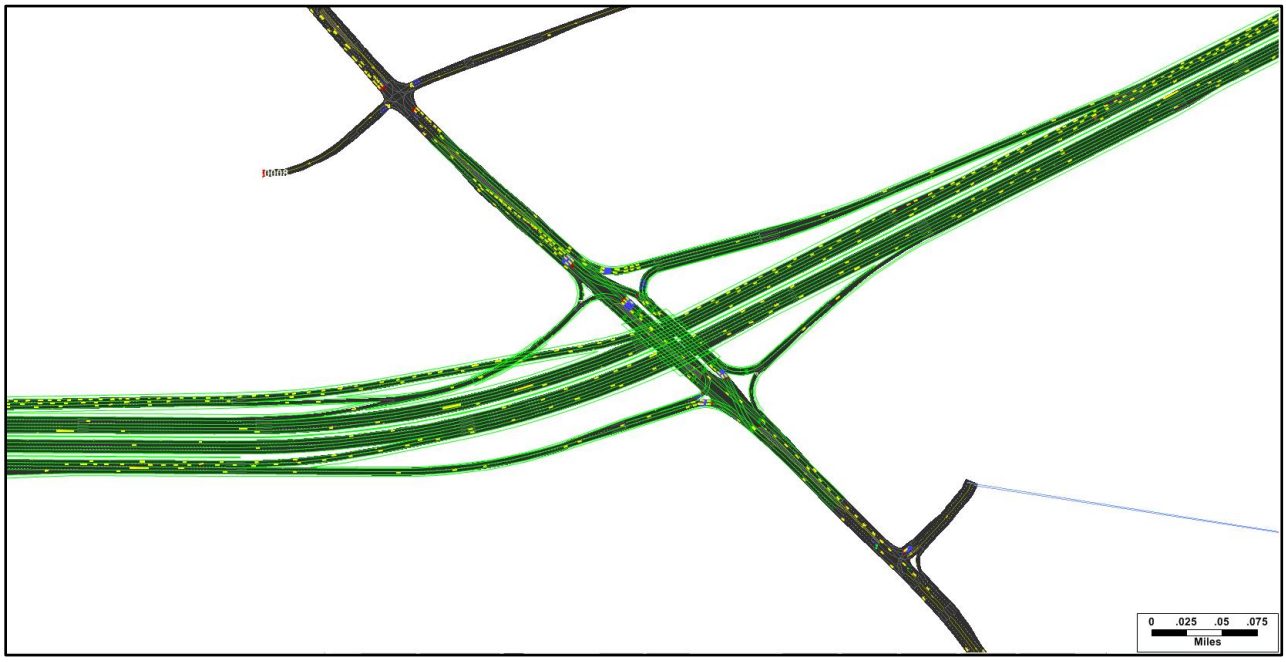
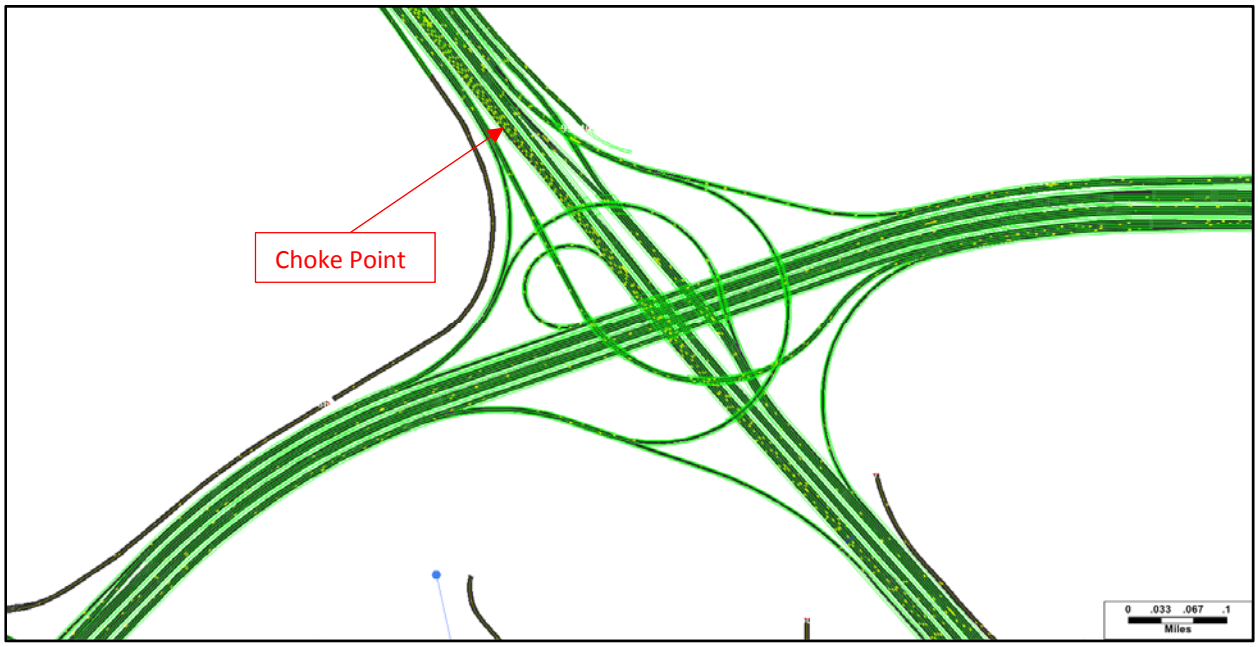


Figure 22 - Exit 65 (AO5) Simulation - PM Peak Hour

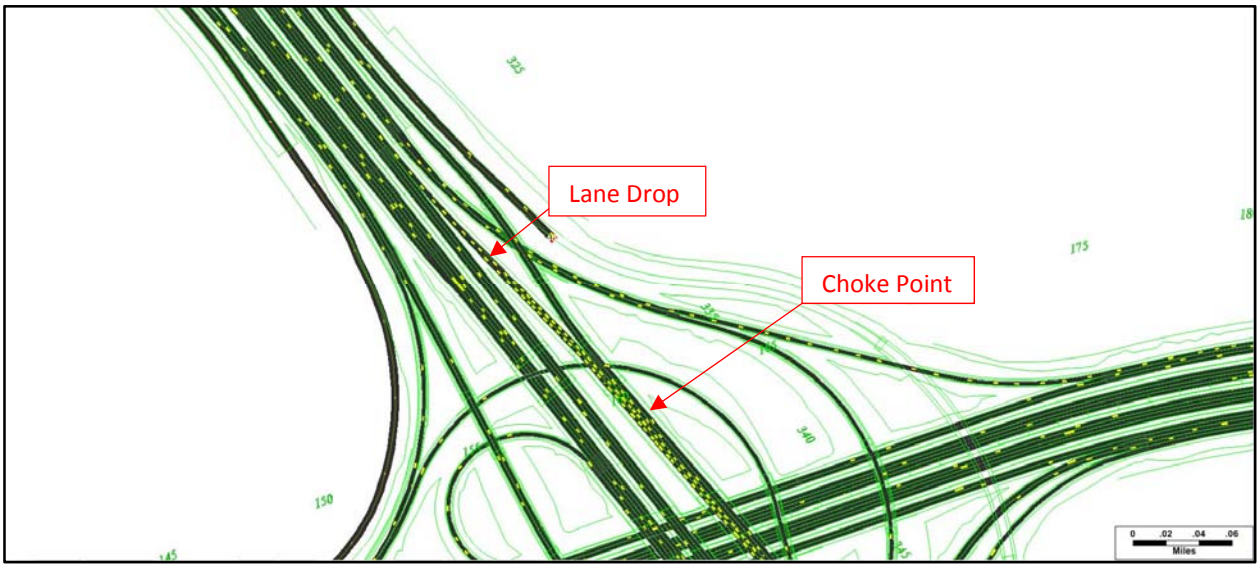


RA7 Specific Choke Points:

1. I-26 EB mainline lane drop prior to on-ramp from I-20 westbound C-D road



2. I-126 WB/I-26 WB merge



Reasonable Alternative 8 – Microsimulation Summary (2040 Volumes)

Freeway Segments

Segment	AM		PM		Comment
	EB	WB	EB	WB	
Exit 101-102	Under	Under	Under	Under	
Exit 102-103	Under	At	Under	Under	Simulation did not show any operational issues
Exit 103-104	At	Under	Under	Under	
Exit 104-106	At	Under	At	At	Eastbound queuing issues are a result of the merge from I-26 to eastbound I-20. Westbound capacity issues due to the lane reduction. If additional lane is carried through to Exit 104, this may reduce the capacity issue.
Exit 106-107	Under	Under	Under	Under	
Exit 107-108	Under	Under	Under	At	Some minor congestion was observed in the simulation in the westbound direction between Exits 108 and 107 due to weaving.
Exit 108-110	Under	Under	Under	Under	
Exit 108 – Colonial Life	Under	Under	Under	Under	
Exit 63-64	Under	Under	Under	Under	
Exit 64-65	Under	Under	Under	Under	
E-W Connector	Under	Under	Under	Under	

Interchanges

Exit		AM		PM		
Location	AO	EB Ramp	WB Ramp	EB Ramp	WB Ramp	Comment
Exit 101	Par. Clo.	At	Under	Under	Under	Eastbound on ramp operates at capacity due to heavy traffic from the west of the interchange
Exit 102	Par. Clo.	Under	Under	Under	Under	
Exit 103	AO35	Under	Under	Under	At	Westbound off-ramp operates at capacity, further signal timing changes may alleviate the queuing.
Exit 104	AO31	Under	Under	Under	Under	
Exit 106	AO13	Over	Under	Under	Over	Heavy right turn volume from St. Andrews Road to the eastbound on-ramp queues onto St. Andrews Road.

Exit		AM		PM		
Location	AO	EB Ramp	WB Ramp	EB Ramp	WB Ramp	Comment
						Additional on-ramp capacity needed to ease congestion in the AM. In the PM, heavy westbound off-ramp traffic necessitates additional geometric changes. Some of the westbound off-ramp congestion is due to its interaction with and proximity to Fernandina/Burning Tree Road.
Exit 107/Exit 64	AO28	Over	Under	Over	Under	Ramp from I-26 to eastbound to both I-20 ramps operates over capacity due to the capacity reduction right at the merge point of the CD road onto the mainline of eastbound I-20. This creates extensive queuing back along the I-20 eastbound C-D road onto eastbound I-26. The new .KMZ file shows revised ramp alignments which will need to be evaluated.
Exit 108 – I-126	AO28	Under	Under	Under	Under	
Exit 110	AO46	At	At	At	At	Signal timing changes have made some improvement to the operation of the off-ramps, however, further geometric and/or signal timing changes may be necessary to improve the operations of the interchange.
Colonial Life		At	Under	Under	Under	The lane drop in the eastbound direction causes minor congestion.
Exit 63	AO28	Under	Under	Under	Under	
Exit 65	AO3	Under	Under	Under	Under	
E-W Connector at Bush River Road	AO28	Under	Under	Under	Under	

Simulation Observations and Alternative Modifications

The green line work is the KMZ file used for the simulation observations. The gray line work represents the latest provided KMZ file.

- Exit 101 (Par. Clo) – .KMZ file did not contain WB I-26 off-ramp to southbound Broad River Road, however, it was maintained for the simulation. There are some slight alignment changes for the new .KMZ file which should not cause any operation changes.
    - AM Peak Hour – See **Figure 1** – interchange operates under capacity except the EB on-ramp which operates at capacity.
    - PM Peak Hour – See **Figure 2** – interchange operates under capacity.

Figure 1 - Exit 101 (Partial Cloverleaf) Simulation - AM Peak Hour

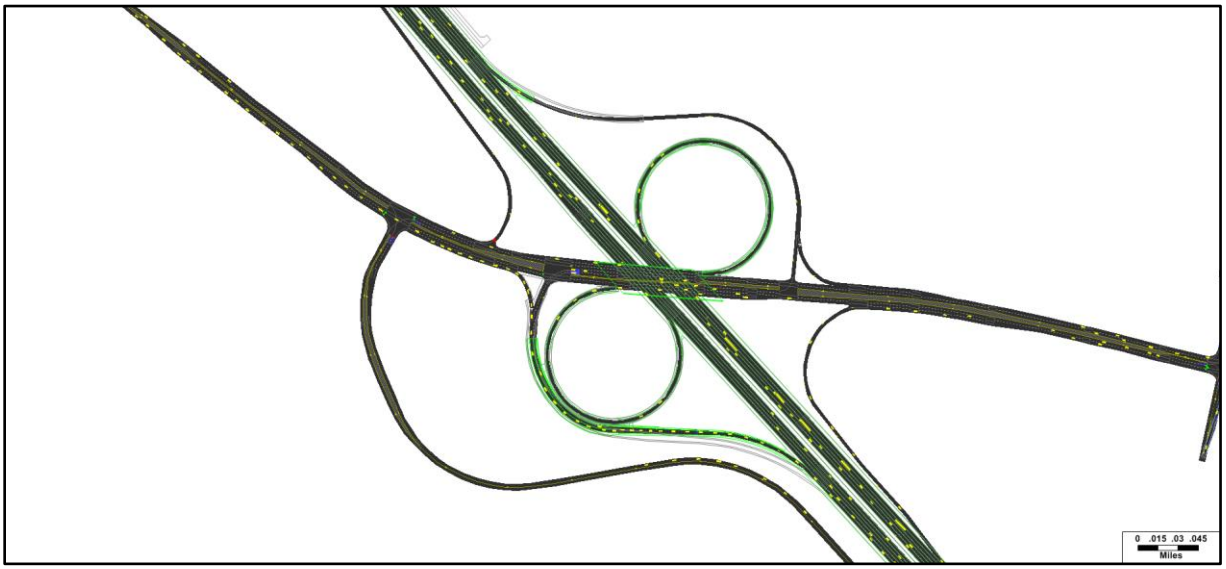
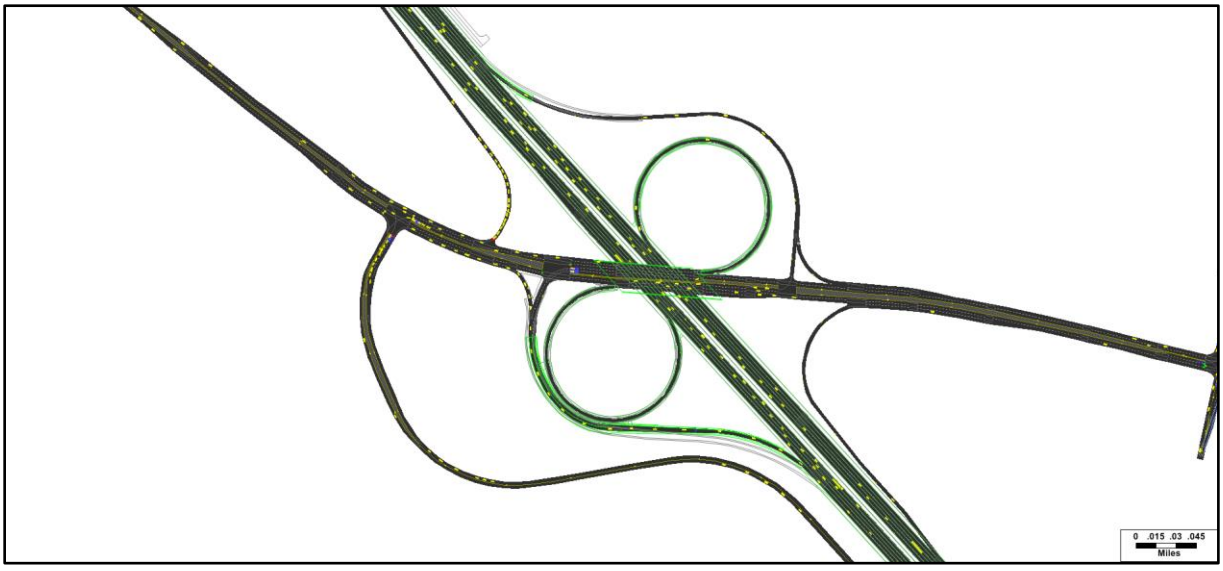


Figure 2 - Exit 101 (Partial Cloverleaf) Simulation - PM Peak Hour



- Exit 102 (Par.Clo) – No geometric changes made from the .KMZ file. There are some slight alignment changes for the new .KMZ file which should not result in any operation changes.
    - AM Peak Hour – See **Figure 3** – interchange operates under capacity
    - PM Peak Hour – See **Figure 4** – interchange operates under capacity. Queuing on Columbiana Dr. may be able to be corrected with further signal timing and geometric improvements.

Figure 3 - Exit 102 (Partial Cloverleaf) Simulation - AM Peak Hour

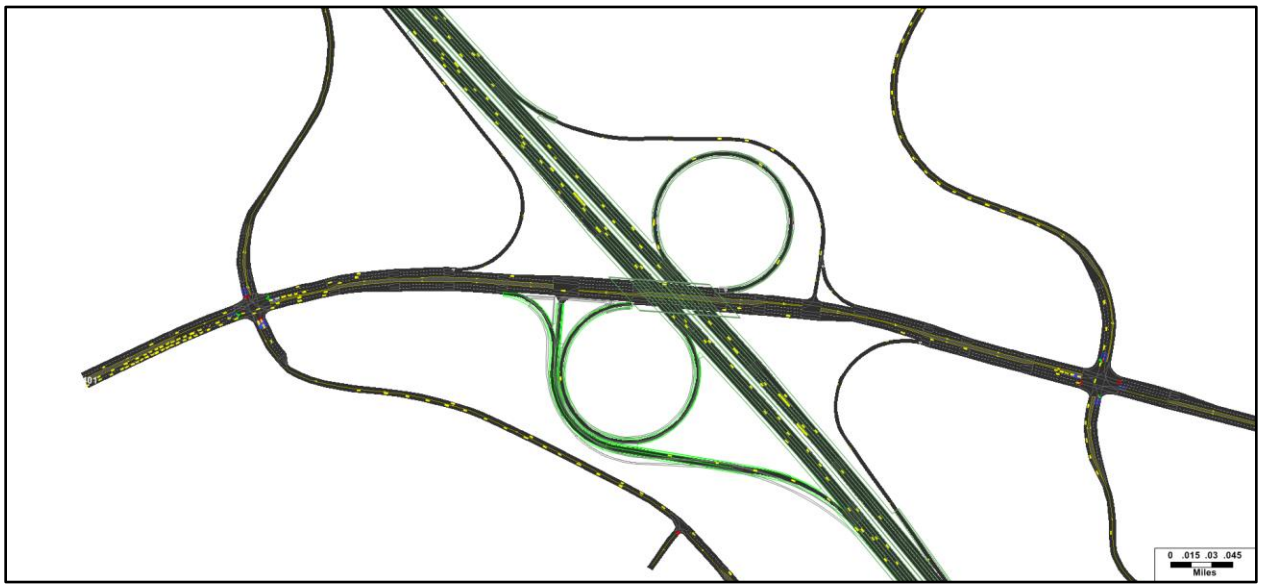
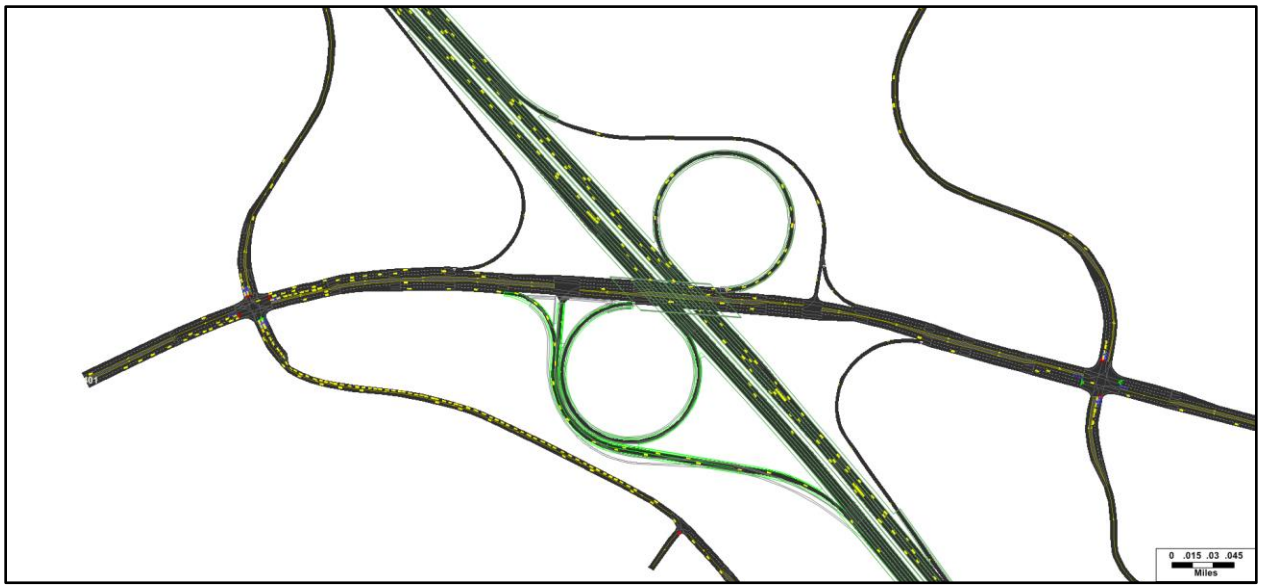


Figure 4 - Exit 102 (Partial Cloverleaf) Simulation - PM Peak Hour



- Exit 103 (AO35) – No geometric changes made from the .KMZ file. Revised .KMZ file changes the locations of the intersections as well as impacts some of the storage lengths. For example, moving the westbound ramp intersection closer to Woodcross Road may negatively impact operation along Harbison Boulevard. Further signal timing changes may be necessary to accommodate the geometric changes.
    - AM Peak Hour – See **Figure 5** – interchange operates under capacity
    - PM Peak Hour – See **Figure 6** – interchange operates under capacity except the westbound off-ramp. Further signal timing changes may improve the operations.

Figure 5 - Exit 103 (AO35) Simulation - AM Peak Hour

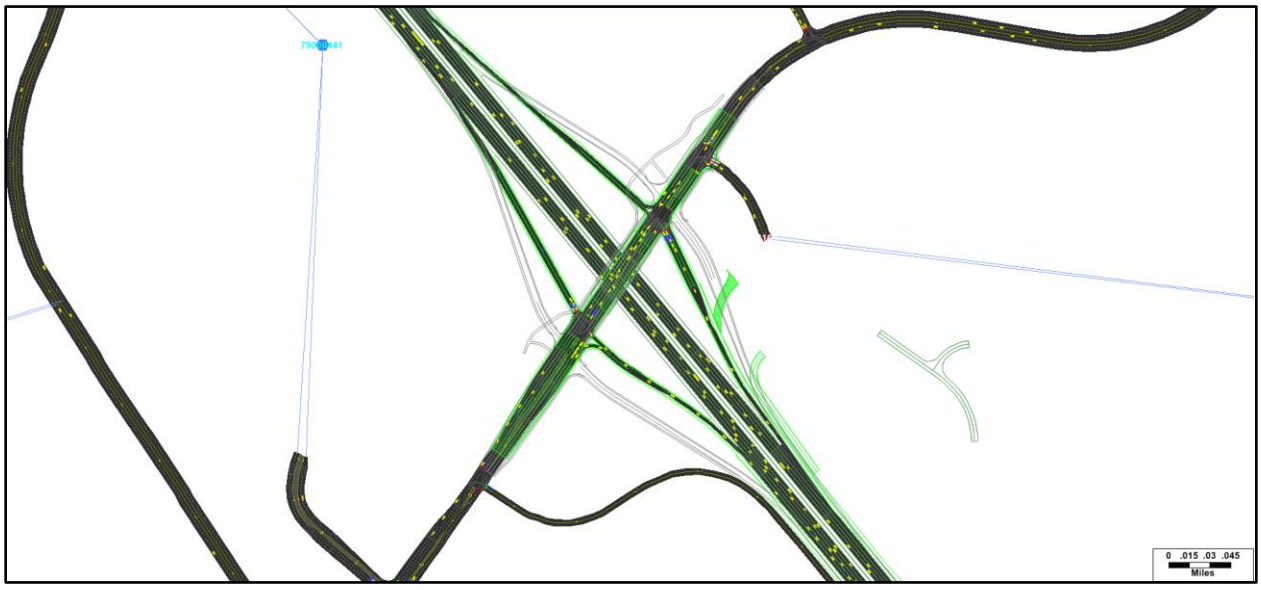
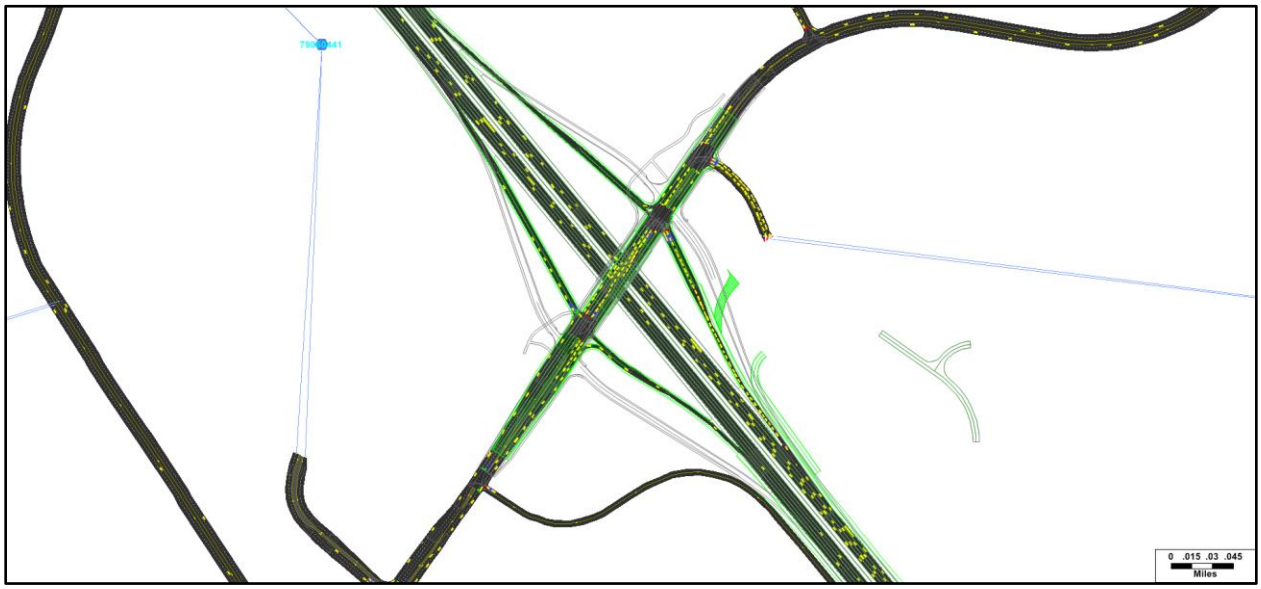


Figure 6 - Exit 103 (AO35) Simulation - PM Peak Hour



- Exit 104 (AO31) – No geometric changes made from the .KMZ file.
    - AM Peak Hour – See **Figure 7** – interchange operates under capacity.
    - PM Peak Hour – See **Figure 8** – interchange operates under capacity. Heavy queuing on NB Jamil Rd and NB Fernandina Rd may be corrected with additional signal timing and geometric changes.

Figure 7 - Exit 104 (AO31) Simulation - AM Peak Hour

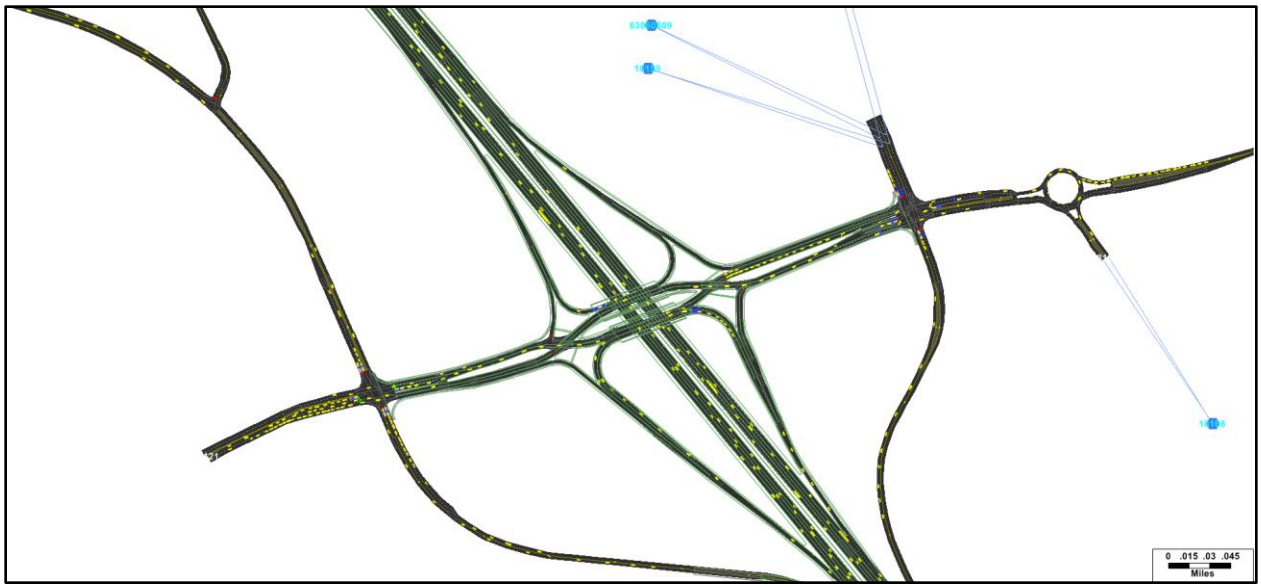
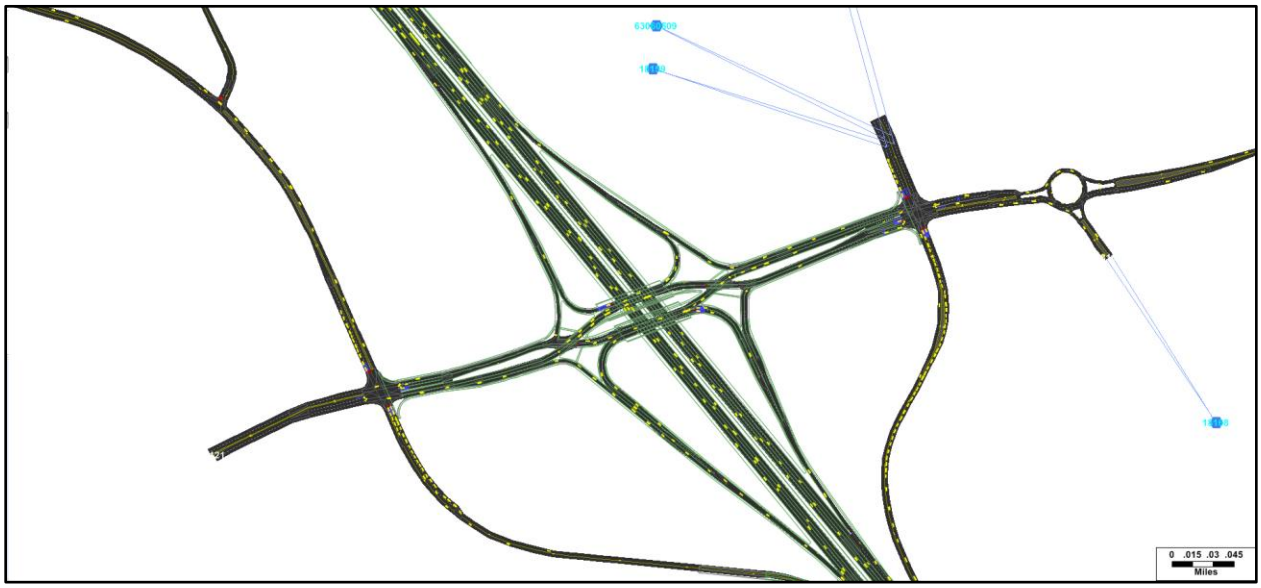


Figure 8 - Exit 104 (AO31) Simulation - PM Peak Hour



- Exit 106 (AO13) – Northbound approach of Burning Tree Dr. modified from the .KMZ to ease the movement of vehicles from the westbound off-ramp as well as help with PM queuing issues. Modifications included widening the approach to St. Andrews Road to 4 lanes (double left, through, right). Queuing is evident on the eastbound C-D road leading to the system interchange in AM/PM.
    - AM Peak Hour – See **Figure 9** – interchange operates under capacity except for the heavy movement from eastbound right turn movement from St. Andrews Road to the on-ramp to eastbound I-26.
    - PM Peak Hour – See **Figure 10** – interchange operates at capacity except at the Fernandina Rd/Burning Tree Dr. intersection. Additional signal timing changes may improve arterial operations which currently shows heavy queuing along St. Andrews Road approaching the interchange from the east and west.

Figure 9 - Exit 106 (AO13) Simulation - AM Peak Hour

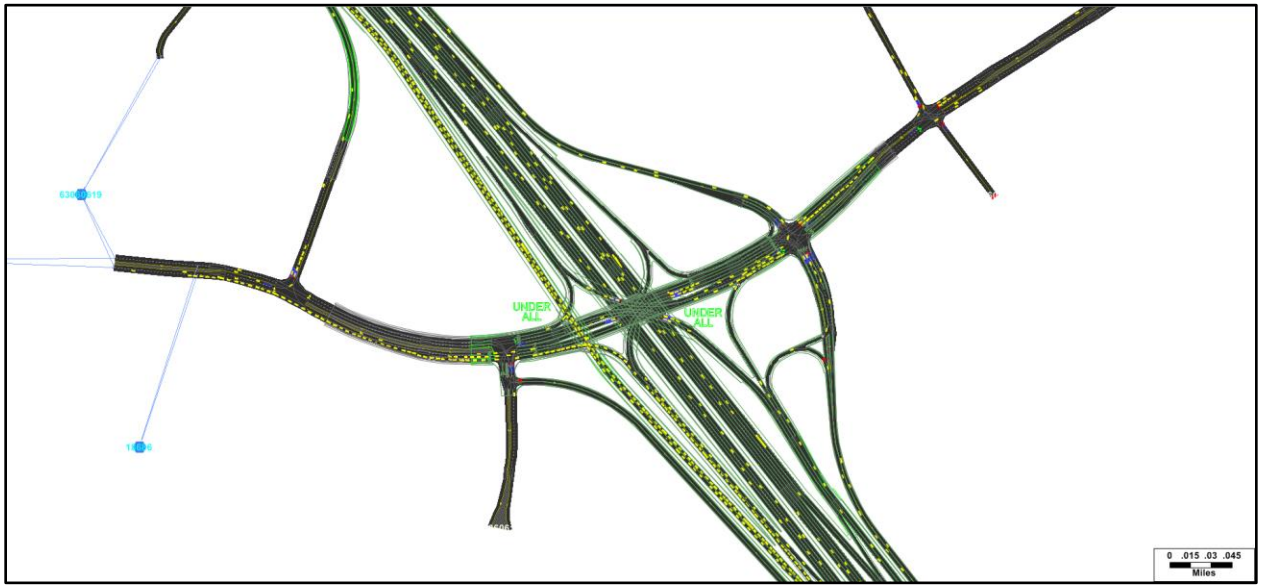
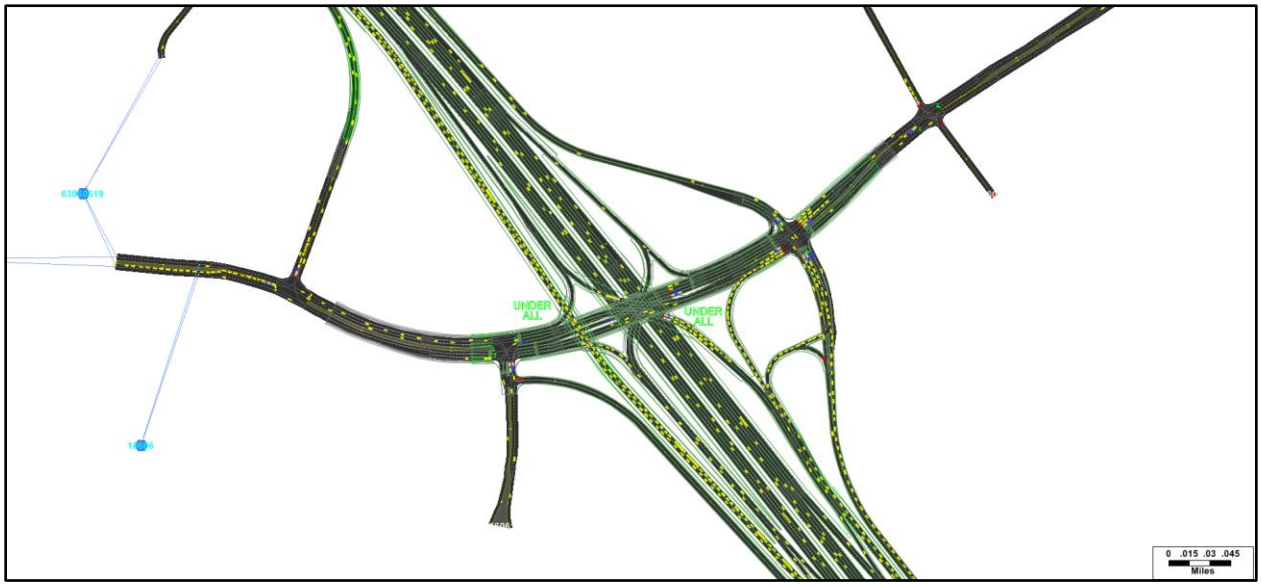


Figure 10 - Exit 106 (AO13) Simulation - PM Peak Hour



- Exit 107/Exit 64 (AO28) –The I-20 eastbound on-ramp from the I-26 EB CD road operates over capacity and creates heavy queuing conditions on the ramp from I-26 eastbound as constructed in the .KMZ file where it merges to a single lane at the merge point with I-20. The revised .KMZ file shows significant changes to the ramp arrangement of the interchange and will need to be further evaluated.
    - AM Peak Hour – See **Figure 11** – interchange operates over capacity due to the merge of the CD road onto eastbound I-20.
    - PM Peak Hour – See **Figure 12** – interchange operates over capacity due to the merge of the CD road onto eastbound I-20. The I-20 westbound off-ramp to I-26 westbound is at capacity and causes minor congestion at the diverge point.

Figure 11 - Exit 107/Exit 64 (AO28) Simulation - AM Peak Hour

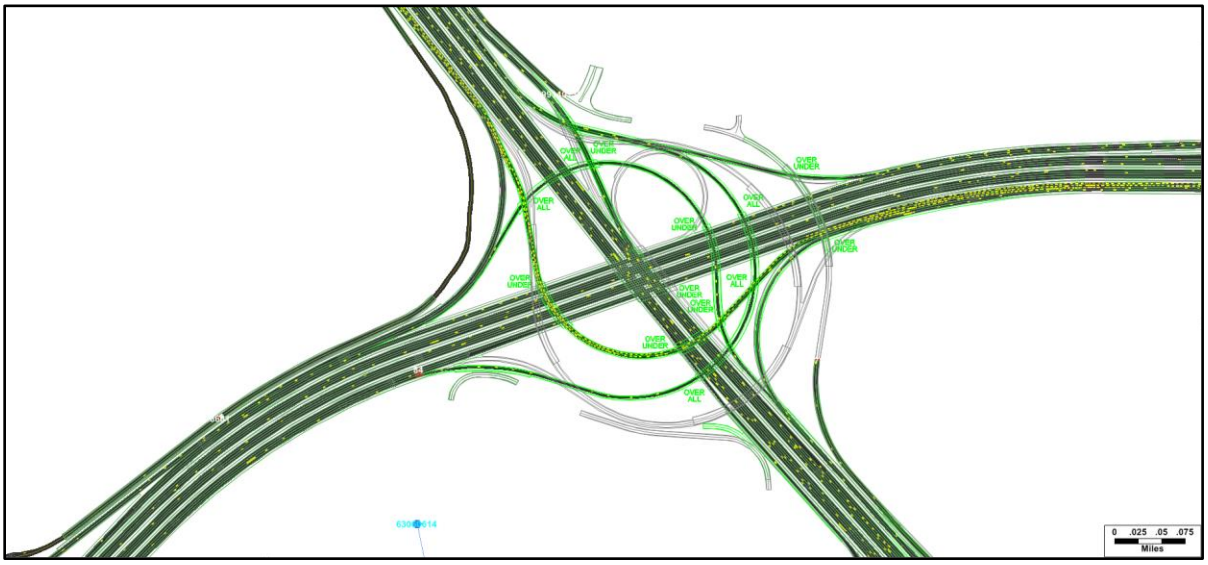
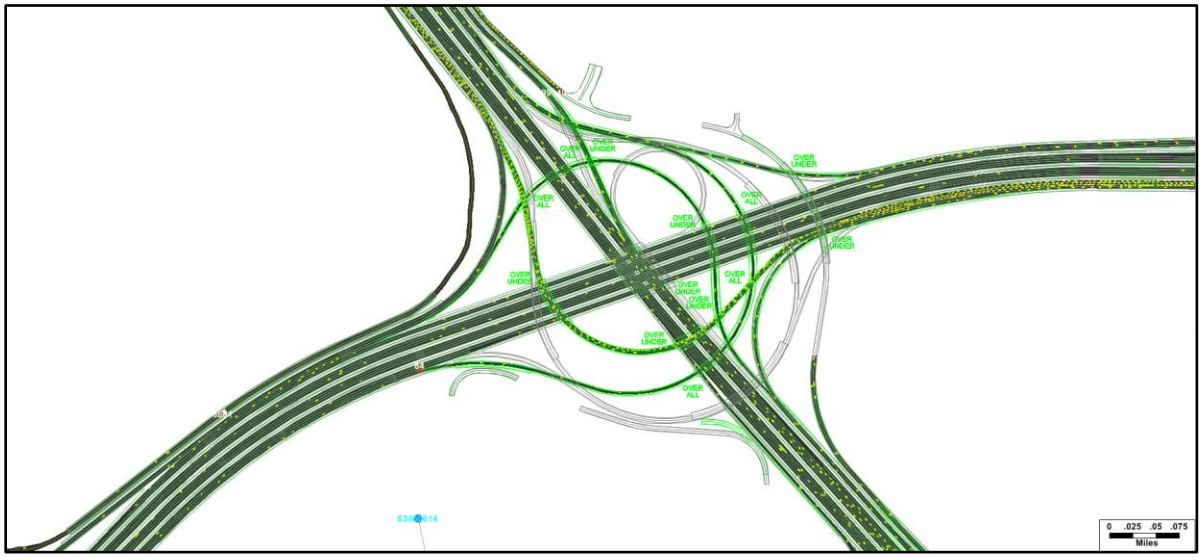


Figure 12 - Exit 107/Exit 64 (AO28) Simulation - PM Peak Hour



- Exit 108 (AO28) – No geometric changes made from the .KMZ file. Revised .KMZ shows a channelized right turn at the intersection of Bush River Road and Morninghill Dr./Ramps to/from I-26 which should help operations. Other changes in the revised .KMZ file include realignment of multiple ramps but they should not have a significant impact on the operations.
    - AM Peak Hour – See **Figure 13** – The interchange operates under capacity.
    - PM Peak Hour – See **Figure 14** - Interchange operates under capacity with the exception of the intersection of Bush River Road and Morninghill Dr./Ramps to/from I-26. The off-ramp experienced spillback queuing. An overlap right turn was added which improved operations so that it operates under capacity. Some minor congestion was observed in the simulation in the westbound direction between Exits 108 and 107 due to weaving.

Figure 13 - Exit 108 (AO28) Simulation - AM Peak Hour



Figure 14 - Exit 108 (AO28) Simulation - PM Peak Hour



- Exit 110 (AO46) – No geometric changes made from the .KMZ file.
    - AM Peak Hour – See **Figure 15** – Congested conditions along the arterial. Both the northbound and southbound ramps operate at capacity. Additional signal timing and geometric changes may help alleviate this congestion.
    - PM Peak Hour – See **Figure 16** – Both the northbound and southbound ramps operate at capacity. Additional signal timing and geometric changes may help alleviate this congestion.

Figure 15 - Exit 110 (AO46) Simulation - AM Peak Hour

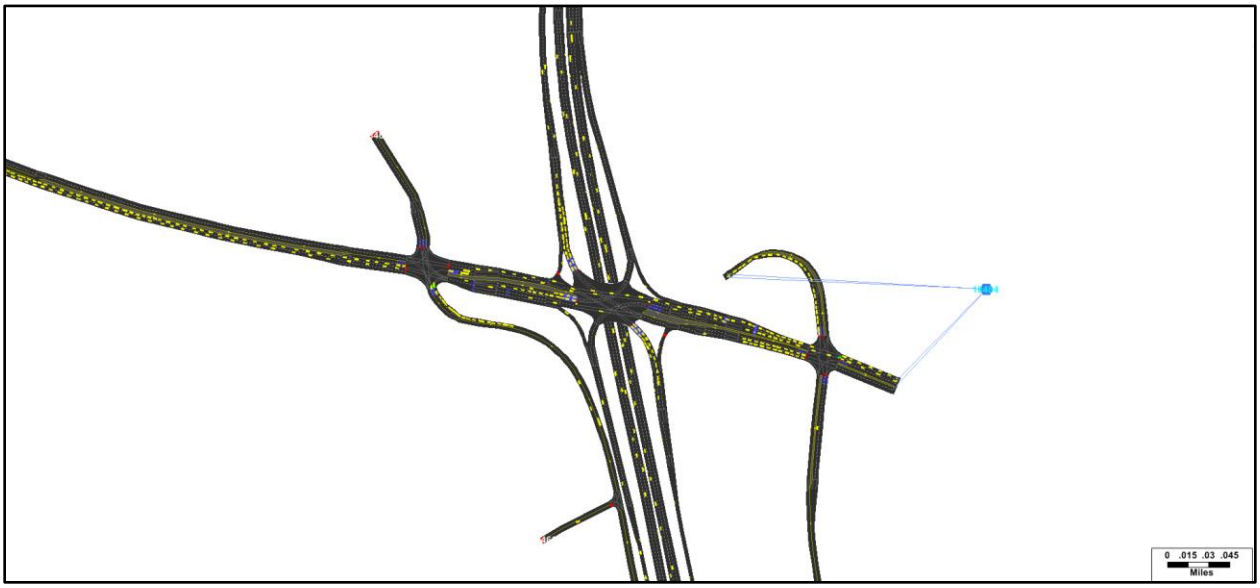
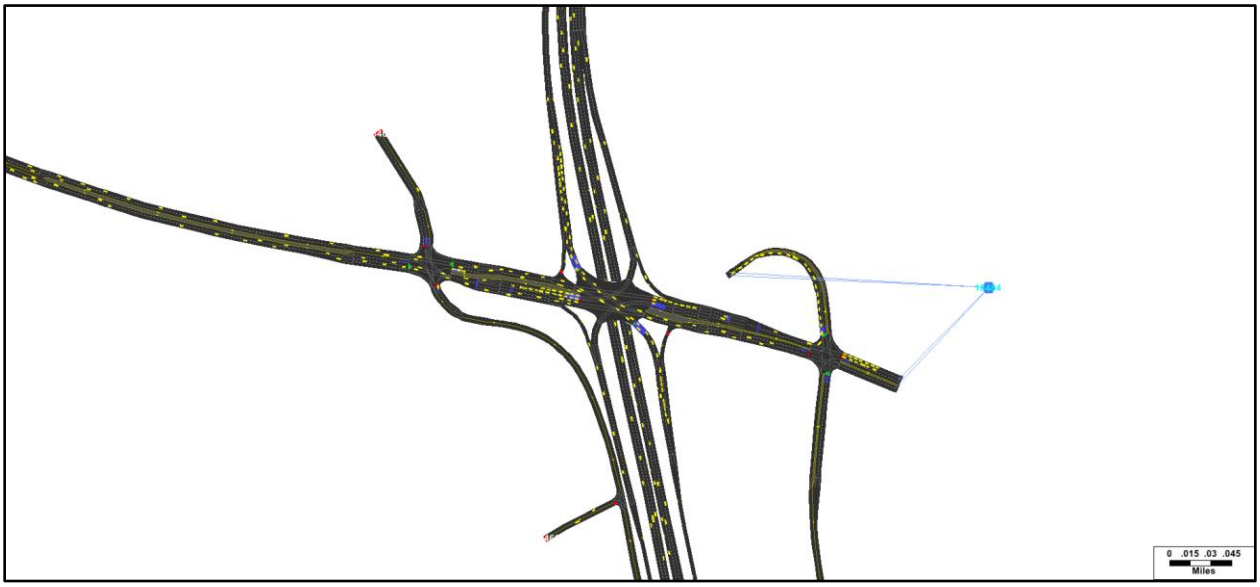


Figure 16 - Exit 110 (AO46) Simulation - PM Peak Hour



- I-126 at Colonial Life Boulevard – No geometric changes made from the .KMZ file.
    - AM Peak Hour – See **Figure 17** – Interchange operates under capacity with the exception of at the lane drop on the eastbound ramp approaching Colonial Life Boulevard, which causes minor congestion.
    - PM Peak Hour – See **Figure 18** – Interchange operates under capacity.

Figure 17 – I-126 at Colonial Life Boulevard Simulation - AM Peak Hour

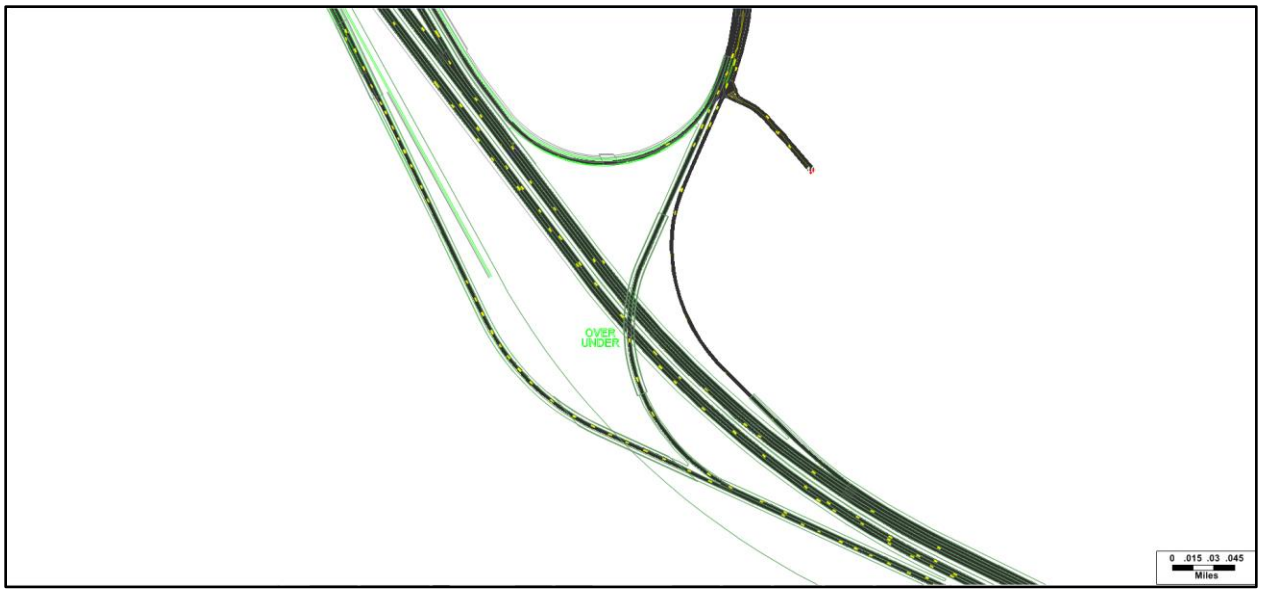
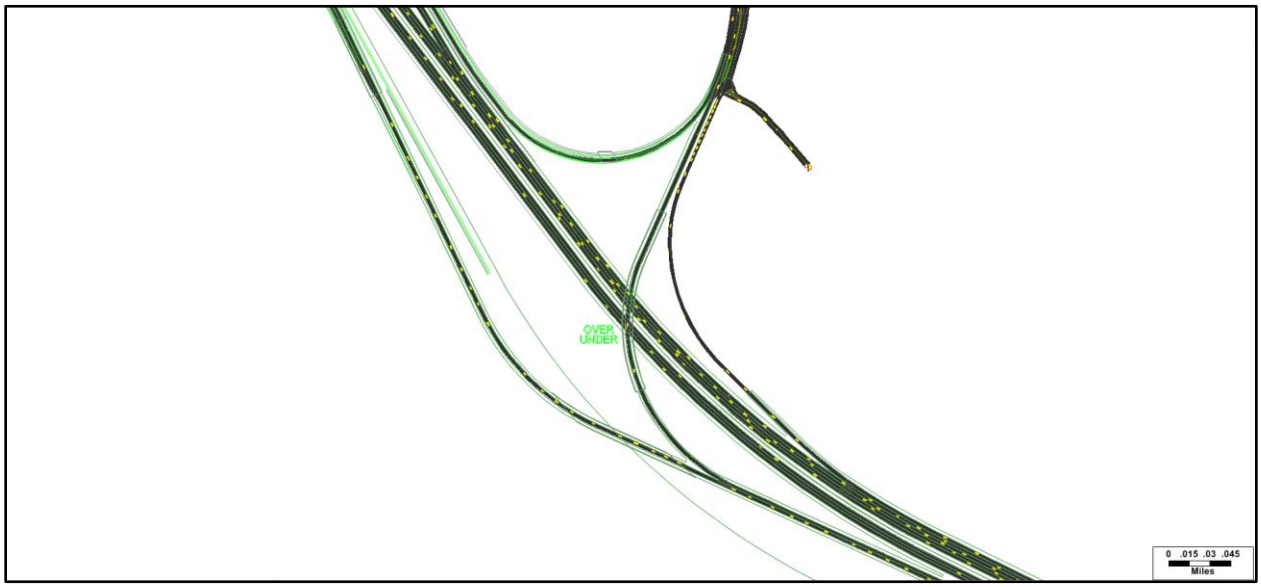


Figure 18 – I-126 at Colonial Life Boulevard Simulation - PM Peak Hour



- Exit 63 (AO28) – No geometric changes made from the .KMZ file. New .KMZ file has realigned ramps and merge points but significant changes to the operations are not expected.
    - AM Peak Hour – See **Figure 19** – interchange operates over capacity. However, further signal timing changes may alleviate some of the queuing along the arterial.
    - PM Peak Hour – See **Figure 20** – interchange operates over capacity.

Figure 19 - Exit 63 (AO28) Simulation - AM Peak Hour

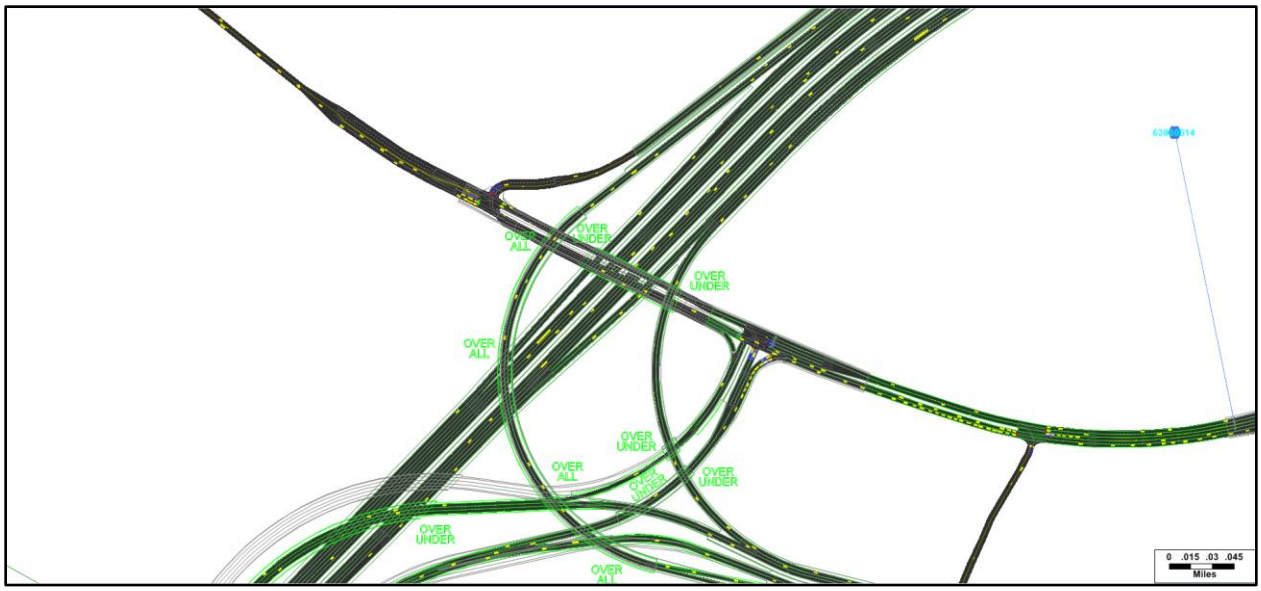
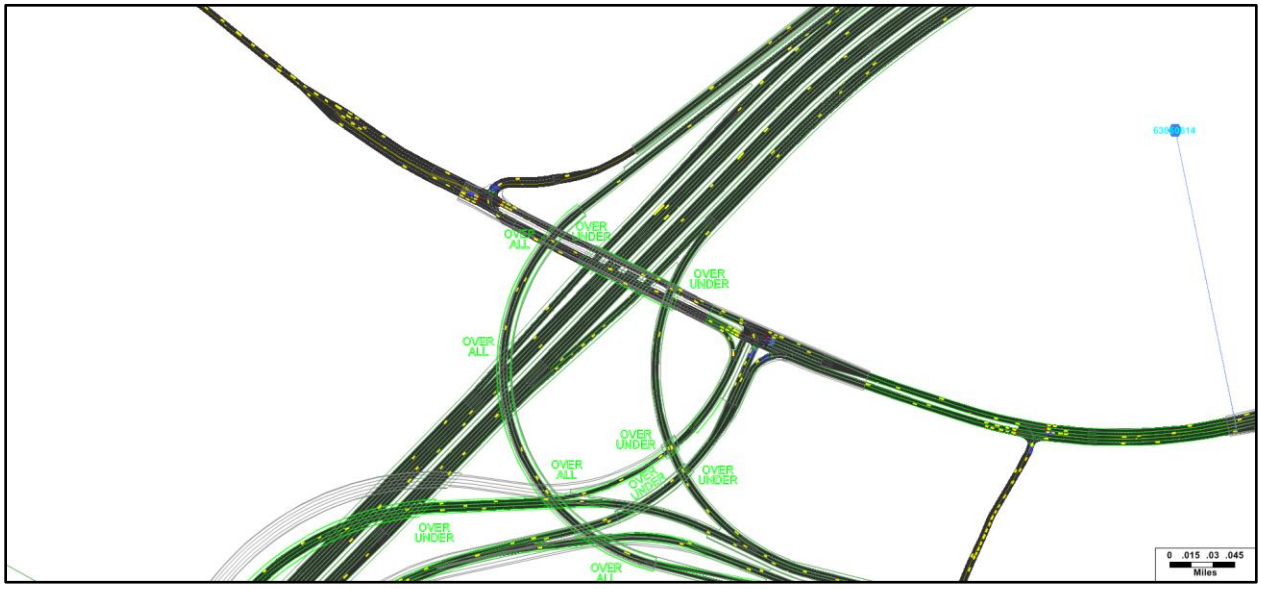


Figure 20 - Exit 63 (AO28) Simulation - PM Peak Hour



- Exit 65 (AO3) – No geometric changes made from the .KMZ file.
    - AM Peak Hour – See **Figure 21** – interchange operates under capacity with the exception of the left turn from Broad River Road onto eastbound I-20.
    - PM Peak Hour – See **Figure 22** – interchange operates under capacity.

Figure 21 - Exit 65 (AO3) Simulation - AM Peak Hour

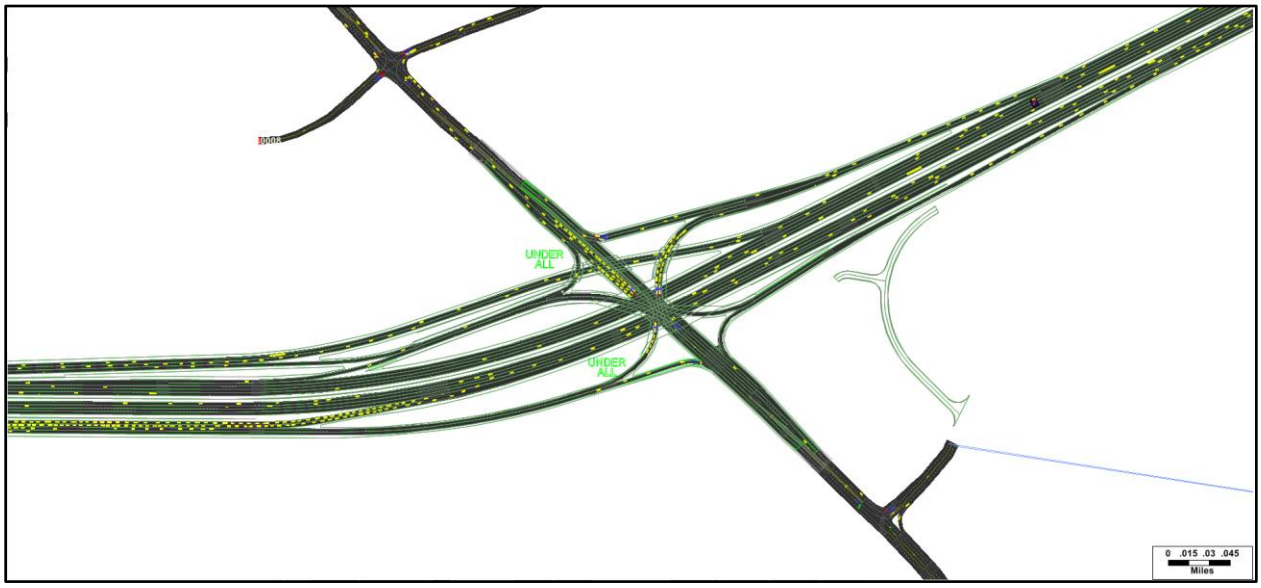
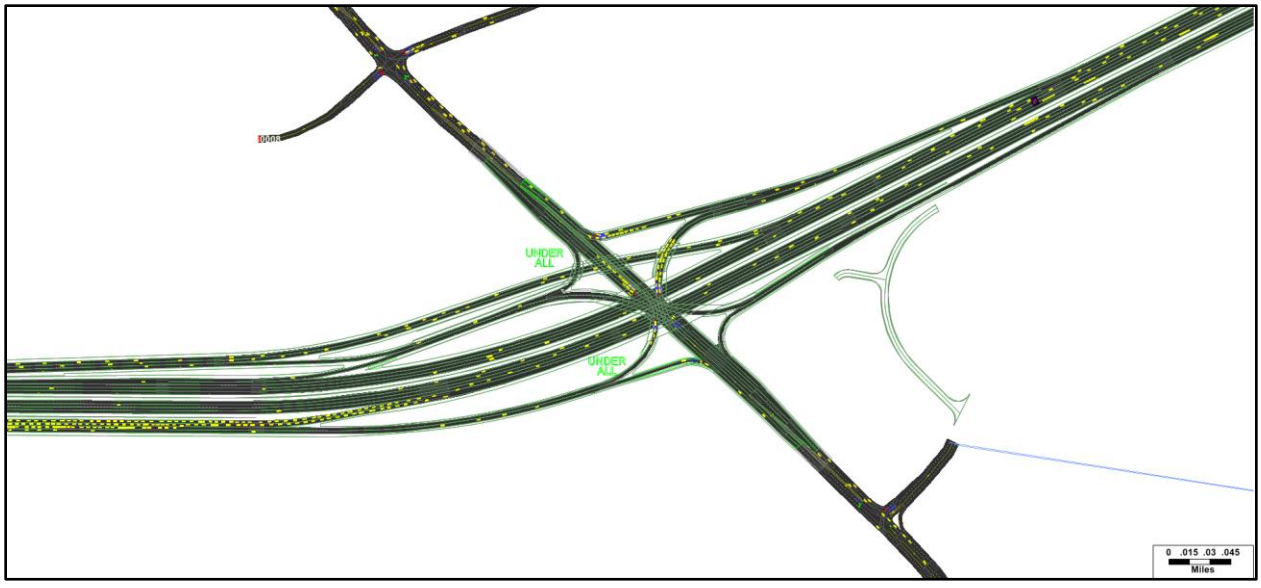


Figure 22 - Exit 65 (AO3) Simulation - PM Peak Hour



- E-W Connector (AO28) – No geometric changes made from the .KMZ file.
    - AM Peak Hour – See **Figure 23** – connector operates under capacity.
    - PM Peak Hour – See **Figure 24** – connector operates under capacity.

Figure 23 - E-W Connector (AO28) Simulation - AM Peak Hour

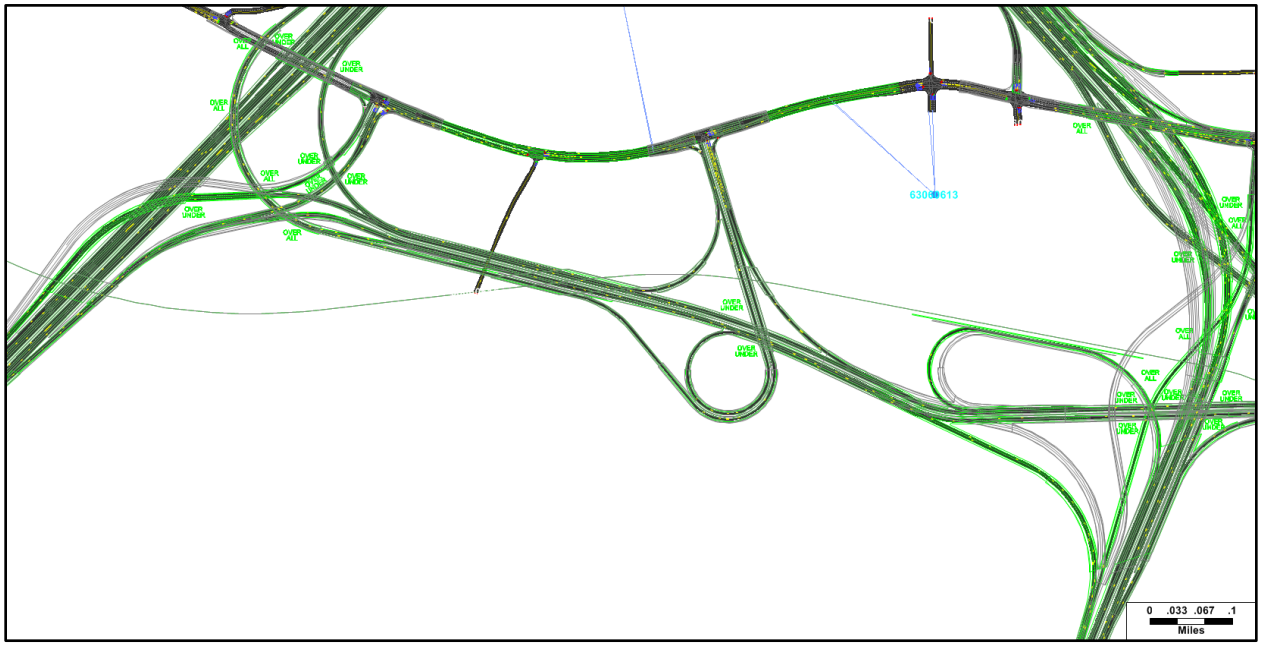
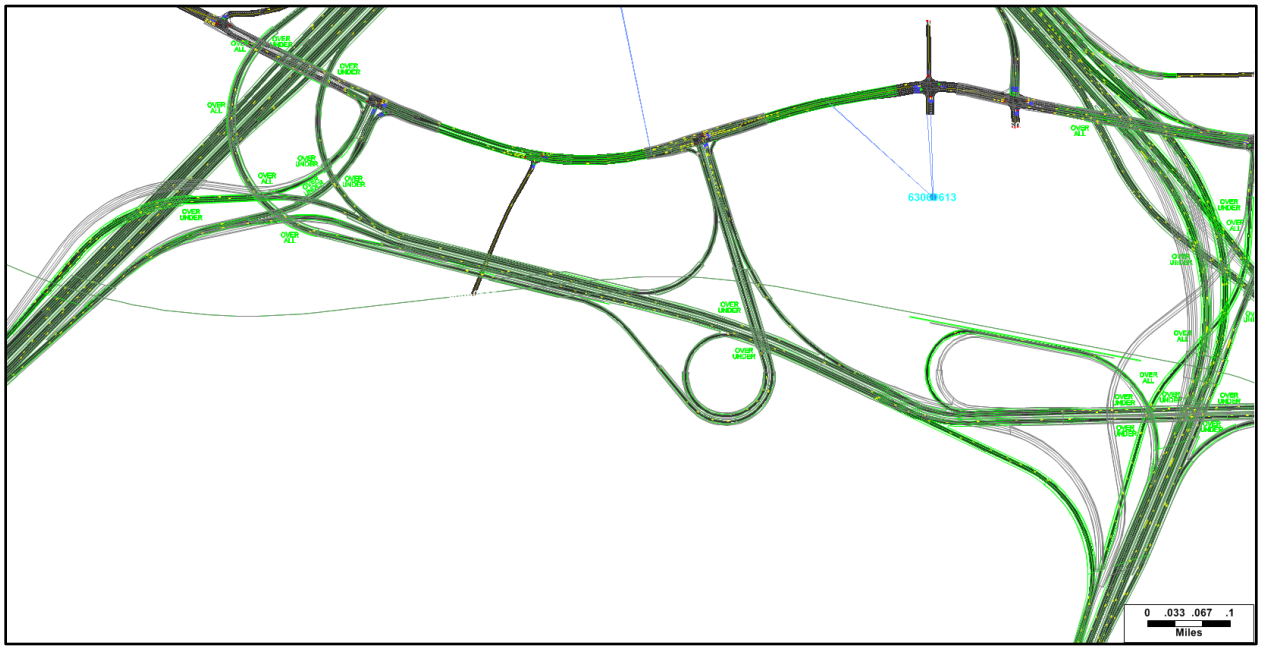
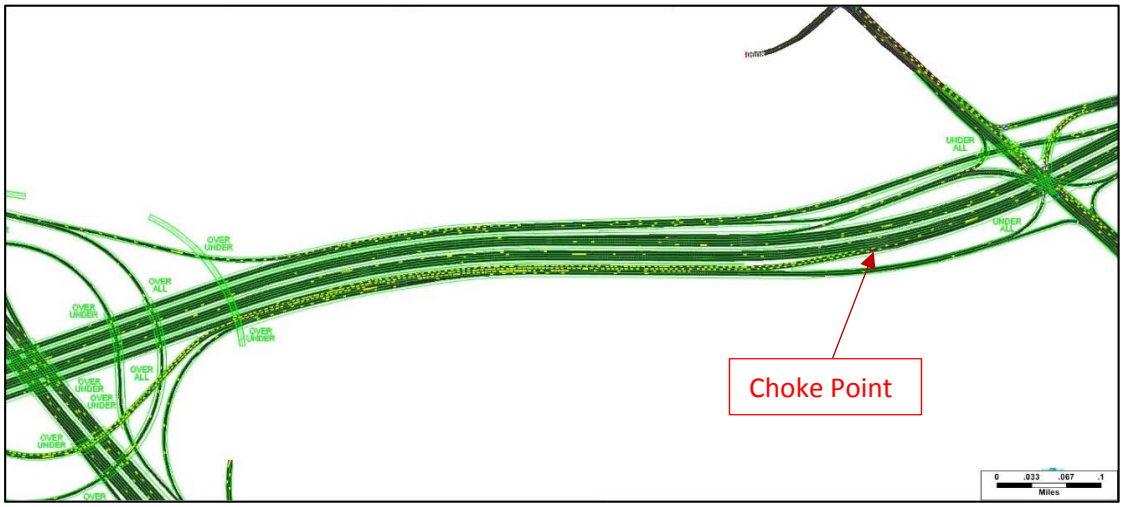


Figure 24 - E-W Connector (AO28) Simulation - PM Peak Hour



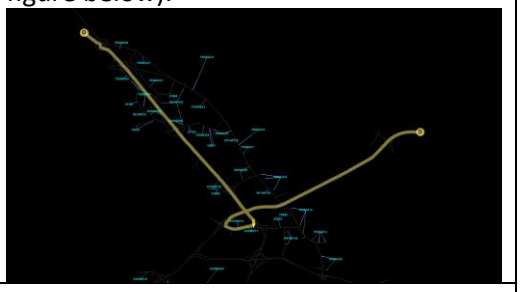
RA8 Specific Issues/Choke Points:

1. I-20 EB C-D road lane drop at same location of on-ramp merge into the I-20 EB mainline.

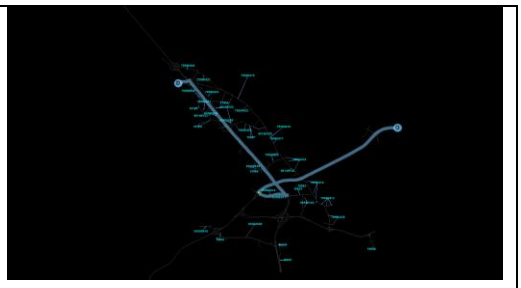
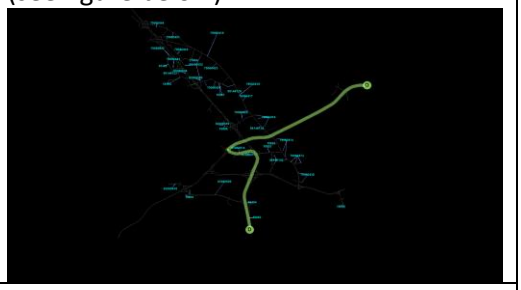


Reasonable Alternative 9 – Microsimulation Summary (2040 Volumes)

Freeway Segments

Segment	AM		PM		Comment
	EB	WB	EB	WB	
Exit 101-102	Over	Under	Under	Under	During the AM peak hour, heavy queueing is observed on EB I-26. This queueing is the result of the traffic back up that originated at I-26 EB Off-Ramp onto Bush River Road and propagated back beyond exit 102. The path of the assignment from the west end of the project to EB I-20 indicates traffic will likely not use the proposed the East-West connector. The assignment path shows EB traffic exiting at Exit 108, traveling west along Bush River Road, and entering I-20 EB at Exit 63 (see the figure below). 
Exit 102-103	Over	Under	Under	Under	During the AM peak hour, heavy queuing was observed on the EB I-26. This queueing is the result of the traffic back up that originated at I-26 EB Off-Ramp at Exit 108 and propagated back beyond exit 102.
Exit 103-104	Over	Under	Under	Under	During the AM peak hour, heavy queuing was observed on the EB I-26. This queueing is the result of the traffic back up that originated at I-26 EB Off-Ramp at Exit 108 and propagated back beyond exit 102.
Exit 104-106	Over	Under	Over	Under	During the AM peak hour, heavy queuing was observed on the EB I-26. This queueing is the result of the traffic back up that originated at I-26 EB Off-Ramp at Exit 108 and propagated back beyond exit 102. Similar queues on EB I-26 extend between Exits 106 and 104 in the PM peak hour on EB I-26 . As in the AM peak

					hour, this queuing originates at the -26 EB Off-Ramp at Exit 108 by traffic destined towards EB I-20.
Exit 106-108	Over	Over	Over	Over	Heavy queuing was observed on EB I-26 during both peak hours. This results from traffic going to I-20 EB getting off the I-26 EB Off-Ramp at Exit 108. Heavy queuing was also observed along WB I-26 during the AM peak hour. This results from WB Off-Ramp left turn queues at Exit 106 being gridlocked by traffic on WB St Andrews unable to enter the Exit 106 EB On-Ramp. During the PM peak hour, a combination of diverging traffic at Exit 106 and merging traffic from WB On-ramp at exit 108 is slowing traffic down on WB I-26.
Exit 108-110	Under	Over	Under	Under	During the AM peak hour, queuing was observed on WB I-26 between Exit 108 and proposed E-W Connector system interchange. This results from the westbound Off-Ramp queuing at Exit 106. Queuing was also observed on I-26 WB east of the proposed E-W Connector interchange. This results from queuing on the I-26 WB Off-Ramp at Exit 108. During the PM peak hour, the area where traffic from WB I-126 and WB I-26 merge is congested.
Exit 108 – Colonial Life	Under	Under	Under	Under	The WB I-126 traffic traveling to the E-W Connector to the ramp to WB I-26 results in congestion extending past the Colonial Life interchange during the PM peak hour.
Exit 63-64	Under	Over	Under	Over	During both peak hours, heavy WB off-ramp traffic causes upstream queuing on WB I-20. The model assignment path shows that majority of the trips on WB I-20 do not use the proposed East-West Connector to reach WB I-26., Instead traffic is routed from WB I-20 to Exit 63, travel east on Bush River Road and then get onto WB I-26 I-26 WB On-Ramp at Exit 108(See the Figure below).

					 Similarly, majority of the trips between WB I-20 to EB I-26 exit on at Exit 63, travel east on Bush River Road and enter EB I-26 using the on-ramp at Exit 108 (see figure below) 
Exit 64-65	Under	Over	Under	Under	During the AM peak hour, heavy queuing was observed on WB I-20. This results from queuing on WB Off-Ramp at Exit 63 by traffic using Bush River Road as a bypass to either WB I-26 or EB I-26.

Interchanges

Exit		AM		PM		
Location	AO	EB Ramp	WB Ramp	EB Ramp	WB Ramp	Comment
Exit 101	Par.Clo.	Under	Under	Under	Under	
Exit 102	Par.Clo.	Over	Under	Under	Under	During the AM Peak hour, queuing was observed on EB Lake Murray Blvd as a result of traffic backup on the EB I-26 On-Ramp. This backup is caused by severe queuing on EB I-26 mainline.
Exit 103	AO49	Over	Under	Under	Under	During the AM peak hour, the traffic backup on the EB On-Ramp caused by the congestion on EB I-26 results in queuing along Harbison Blvd in both the eastbound and westbound directions. The resulting arterial queuing extends in each direction beyond the interchange area.
Exit 104	AO32	Over	Under	Under	Under	During the AM peak hour, the traffic backup on the EB On-Ramp causes heavy queuing along the arterial in both the eastbound and westbound directions.
Exit 106	AO15	Over	Over	Over	Under	During the AM peak hour, traffic backup on the EB On-Ramp causes heavy queuing along the arterial in both the eastbound and westbound directions. These queuing extends beyond the interchange in both directions. The resulting westbound queue also impacts traffic operation at the westbound Off-Ramp termini intersection, blocking access for the westbound left turn traffic. This in turn causes heavy congestion on the westbound Off-Ramp which extends beyond the ramp and spills back on to WB I-26 mainline.

Exit		AM		PM		
Location	AO	EB Ramp	WB Ramp	EB Ramp	WB Ramp	Comment
						Heavy queuing was also observed on the EB on-ramp during the PM peak hour. This queuing blocks eastbound right turn traffic from entering the on-ramp, resulting in congestion along the arterial in the eastbound direction.
Exit 107/Exit 64	Removed					
Exit 108	AO29	Over	Over	Over	Over	Arterial experiences heavy congestion that in turn causes significant backup on both the EB and WB Off-Ramps from I-26. These traffic backup extends beyond the ramp and spills back on the mainline.
Exit 110	AO46	Under	Over	Over	Over	During the AM peak hour, the traffic backup on the westbound on-ramp, caused by congestion on WB I-26, results in congestion on the arterial in both the eastbound and westbound directions. During the PM peak hour, due to heavy traffic volume along the arterial, both the EB and WB off-ramps experiences queuing. Mainline traffic flow is not impacted by these queuing.
Colonial Life		Under	Under	Under	Under	
Exit 63	A010	Over	Over	Over	Over	Lack of ramp capacity and heavy traffic along Bush River Road creates traffic backup on both the eastbound and westbound off-ramps from I-20, which propagates beyond the ramps and onto the mainline.
Exit 65	AO3	Over	Over	Under	Over	During the AM peak hour, I-20 WB on-ramp experience backup due to heavy queuing on the mainline. This traffic backup also blocks northbound left turners from entering the ramp,

Exit		AM		PM		
Location	AO	EB Ramp	WB Ramp	EB Ramp	WB Ramp	Comment
						resulting queuing on the arterial in the northbound direction. Moderate queuing is also observed on the eastbound off-ramp, however traffic flows steadily on EB I-20. During the PM peak hour queuing on the westbound off-ramp was observed due to congestion on the arterial.

Simulation Observations and Alternative Modifications

The greenline work is the KMZ file used for the simulation observations.

- Exit 101 (Par.Clo)
    - AM Peak Hour – See **Figure 1** – interchange operates under capacity
    - PM Peak Hour – See **Figure 2** – interchange operates under capacity

Figure 1 - Exit 101 (Partial Cloverleaf) Simulation - AM Peak Hour

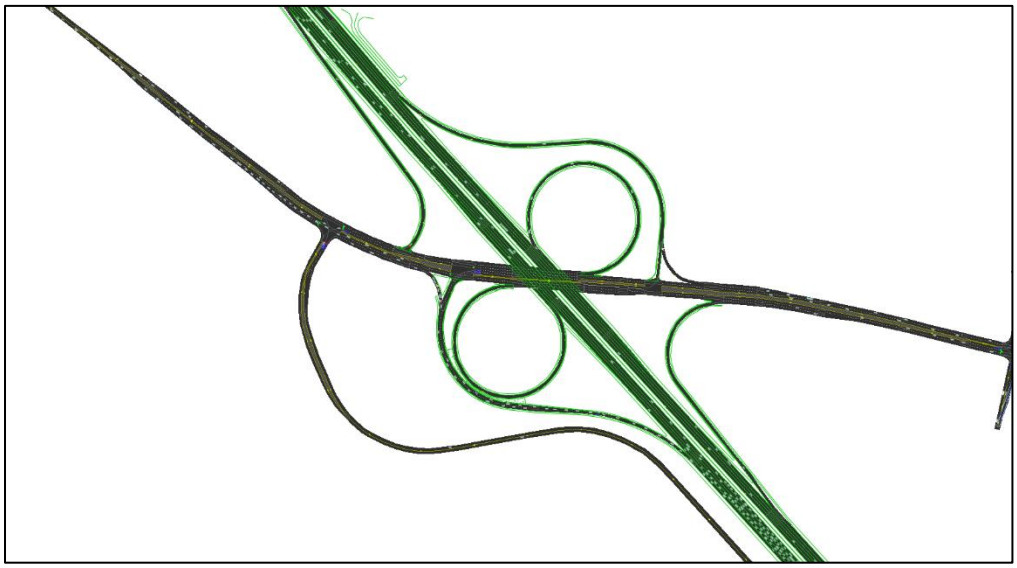
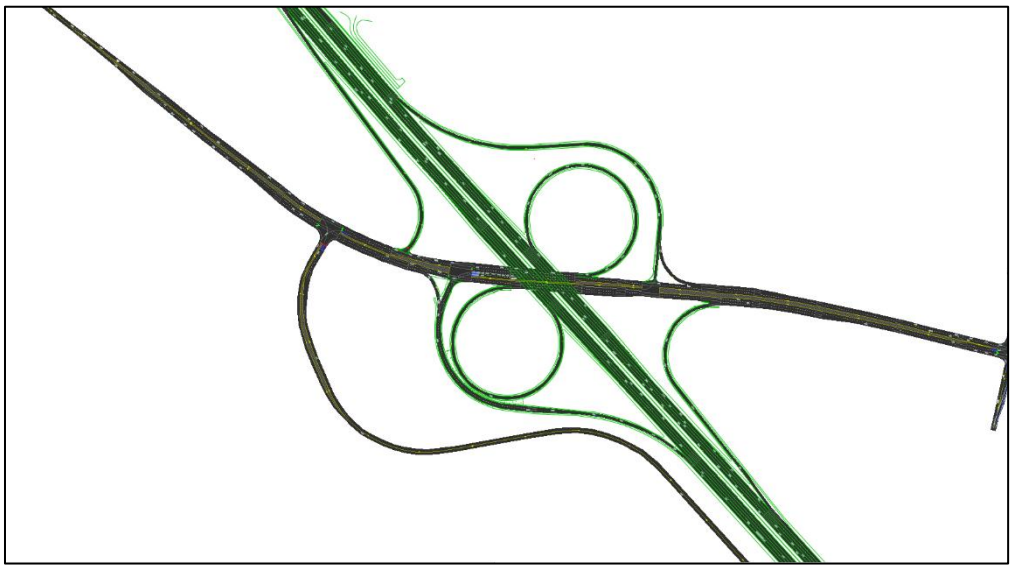


Figure 2 - Exit 101 (Partial Cloverleaf) Simulation - PM Peak Hour

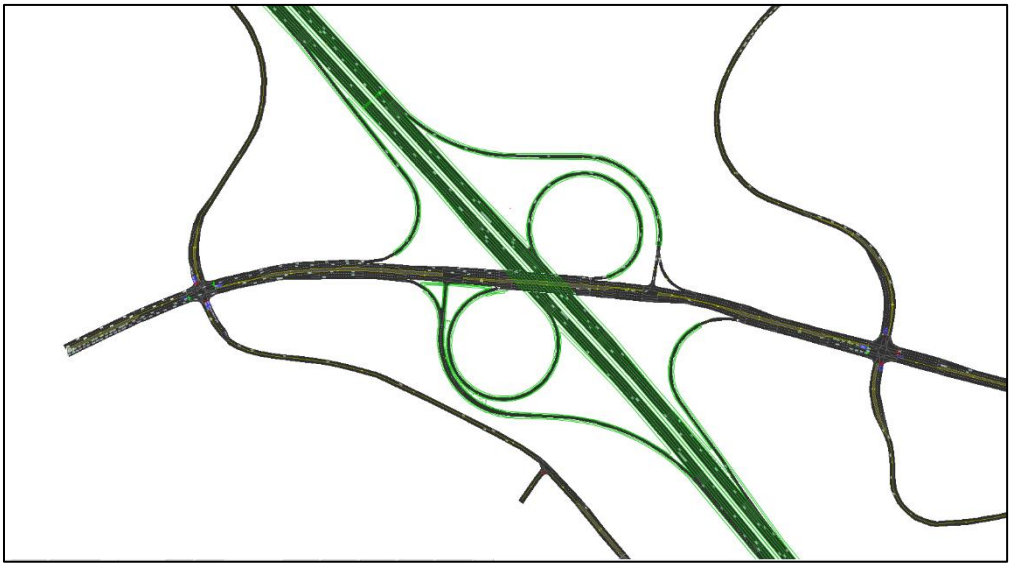


- Exit 102 (Par.Clo)
    - AM Peak Hour – See **Figure 3** – interchange operates under capacity. However, queuing was observed on EB Lake Murray Blvd as a result of the traffic backup on the I-26 EB On-Ramp. This backup is caused by severe queuing on EB I-26 mainline.
    - PM Peak Hour – See **Figure 4** – interchange operates under capacity

Figure 3 - Exit 102 (Partial Cloverleaf) Simulation - AM Peak Hour



Figure 4 - Exit 102 (Partial Cloverleaf) Simulation - PM Peak Hour



- Exit 103 (AO49)-Simulation file differs slightly from .KMZ file. The original design showed dual right turns and a shared through/left turn lane on the westbound off-ramp approach at ramp termini intersection. Separate left turn and through lanes were modeled instead.
    - AM Peak Hour – See **Figure 5** – interchange operates over capacity. The traffic backup on the EB On-Ramp caused by the congestion on EB I-26 results in queuing along Harbison Blvd in both the eastbound and westbound directions. The resulting arterial queuing extends in each direction beyond the interchange area.
    - PM Peak Hour – See **Figure 6** – interchange operates under capacity.

Figure 5 - Exit 103 (AO49) Simulation - AM Peak Hour

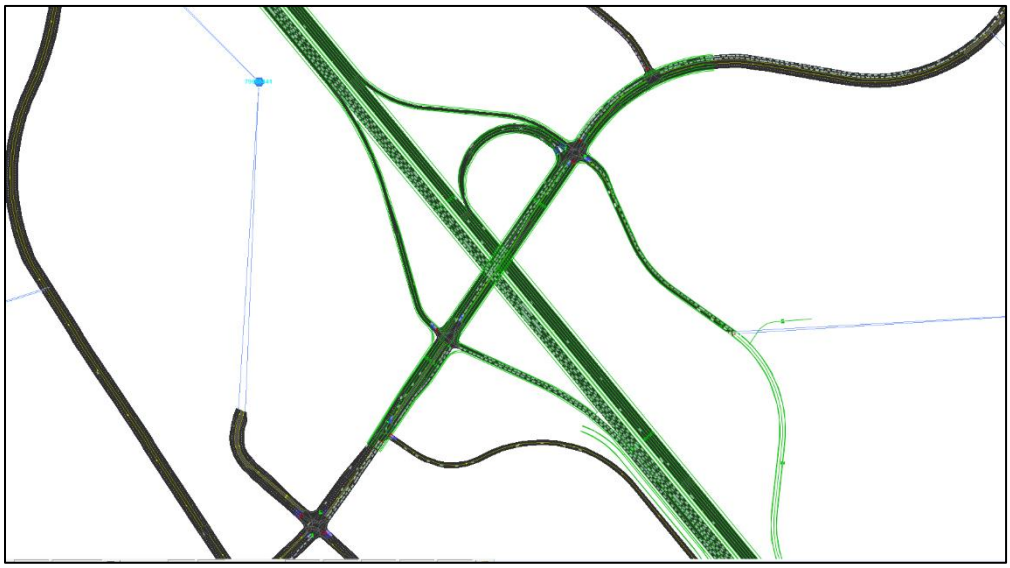
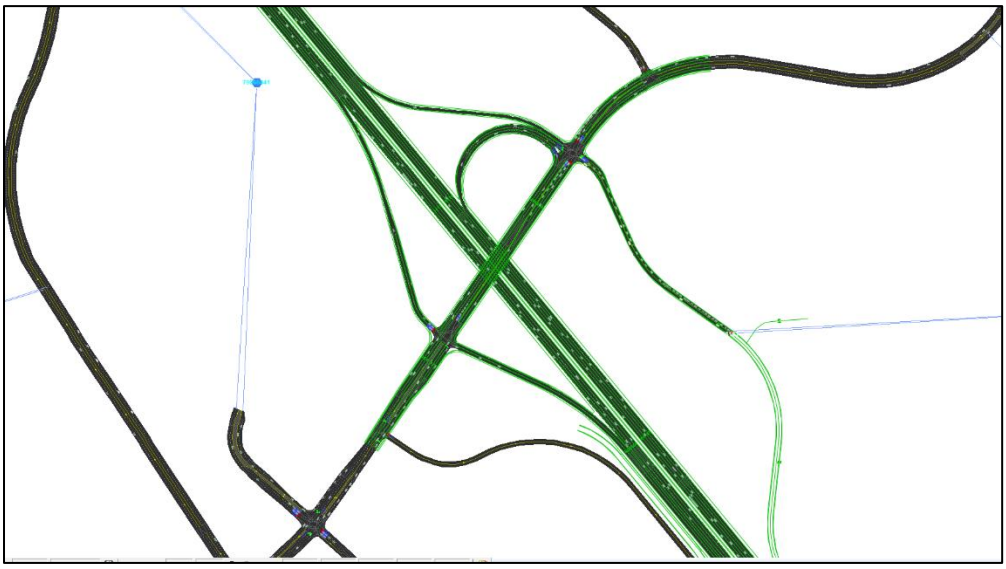


Figure 6 - Exit 103 (AO49) Simulation - PM Peak Hour



- Exit 104 (AO32)
    - AM Peak Hour – See **Figure 7** – interchange operates over capacity. The traffic backup on the EB On-Ramp caused by congestion on EB I-26 results in heavy queuing along the arterial in both the eastbound and westbound directions.
    - PM Peak Hour – See **Figure 8** – interchange operates under capacity. Heavy northbound left turn volume at the intersection of Piney Grove Road at Fernandina Road will require geometric and signal timing modifications to improve queuing and overall traffic operations.

Figure 7 - Exit 104 (AO32) Simulation - AM Peak Hour

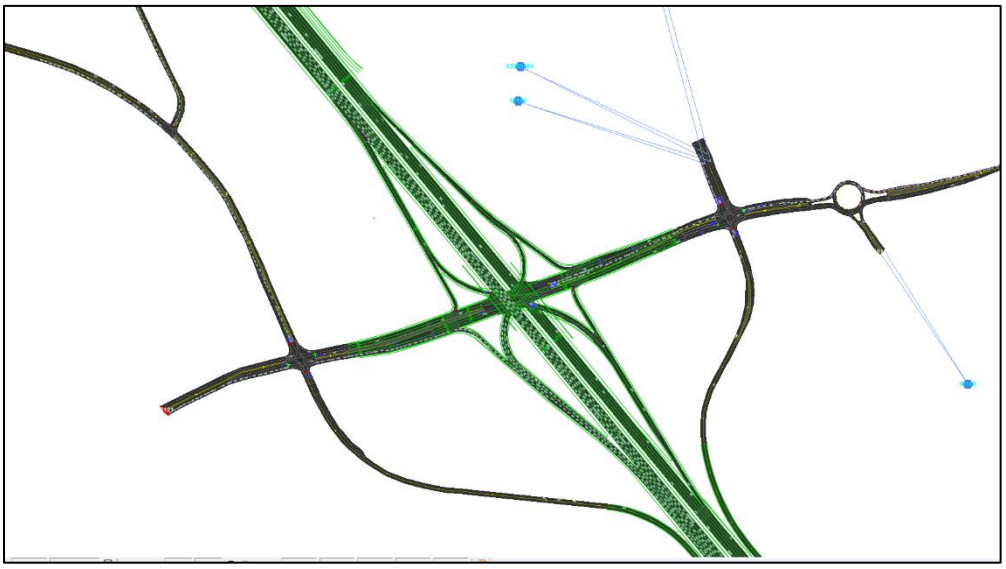
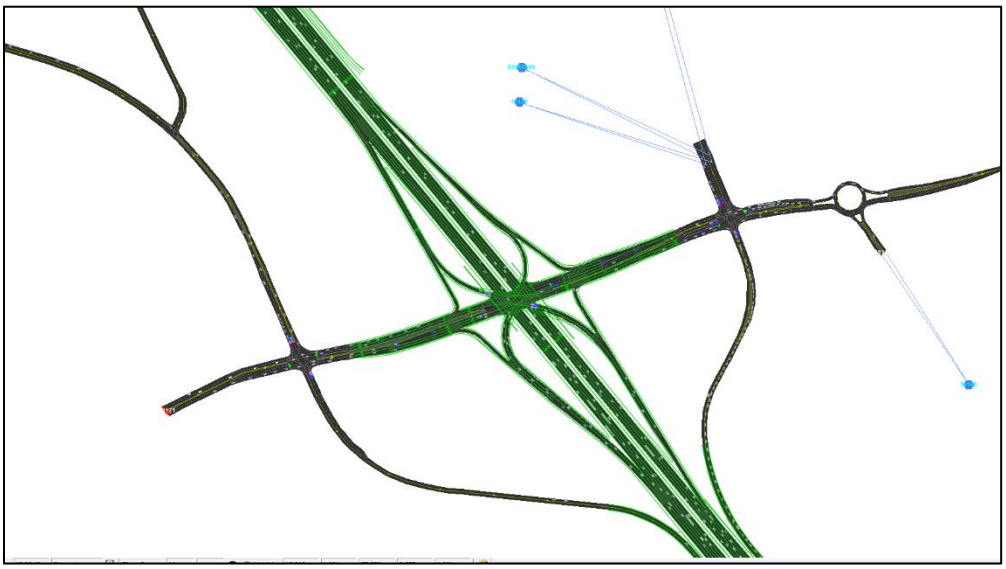


Figure 8 - Exit 104 (AO32) Simulation - PM Peak Hour



- Exit 106 (AO15)
    - AM Peak Hour – See **Figure 9** – Interchange operates at capacity at the EB Off-Ramp intersection while WB Off-Ramp operates over capacity. The traffic backup on the EB On-Ramp causes heavy queuing along the arterial in both the eastbound and westbound directions. These queuing extends beyond the interchange in both directions. The resulting westbound queue on St Andrews Road also impacts the operation at the westbound Off-Ramp intersection, blocking access for the westbound off-ramp left turn traffic. This in turn causes heavy congestion on the westbound off-ramp that spills back on to the WB I-26 mainline.
    - PM Peak Hour – See **Figure 10** – interchange operates under capacity. However, the EB on-ramp experiences heavy queuing which blocks eastbound right turn traffic from entering the on-ramp, resulting in congestion along the arterial in the eastbound direction.

Figure 9 - Exit 106 (AO15) Simulation - AM Peak Hour

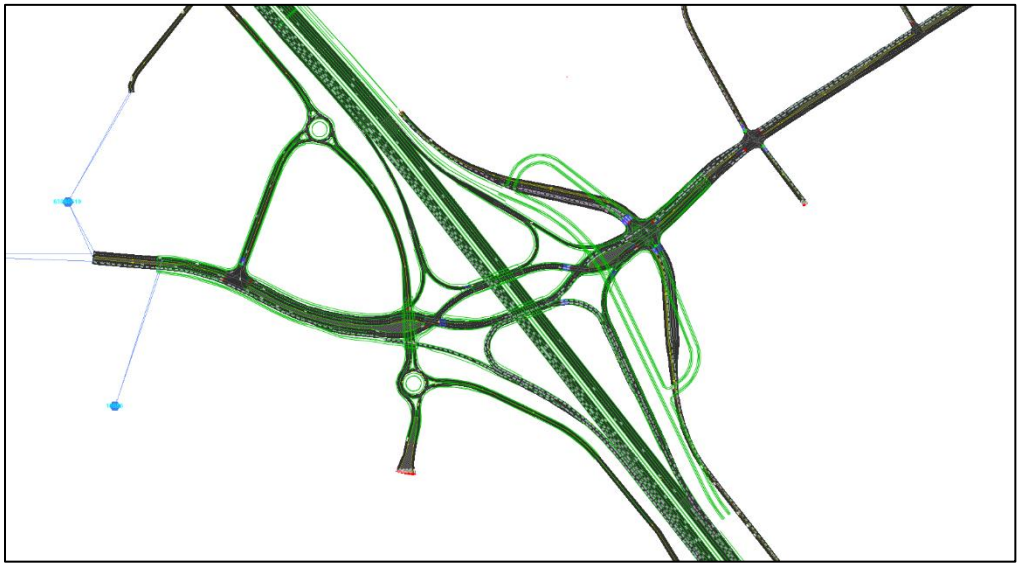


Figure 10 - Exit 106 (AO15) Simulation - PM Peak Hour



Exit 108 (AO29)

- AM Peak Hour – See **Figure 11** – Interchange operates over capacity. Due to traffic congestion along Bush River Road, both the eastbound and westbound off-ramps from I-26 experiences queuing that extends beyond the ramps onto the mainline.
- PM Peak Hour – See **Figure 12** – Interchange operates over capacity. Due to traffic congestion along Bush River Road, both the eastbound and westbound off-ramps from I-26 experiences queuing that extends beyond the ramps onto the mainline.

Figure 11 - Exit 108 (AO29) Simulation - AM Peak Hour

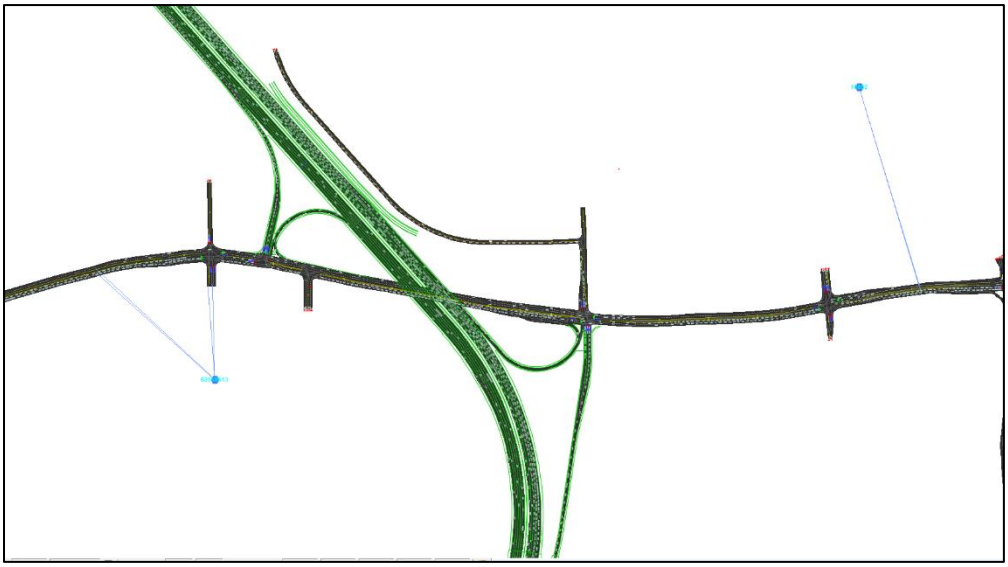
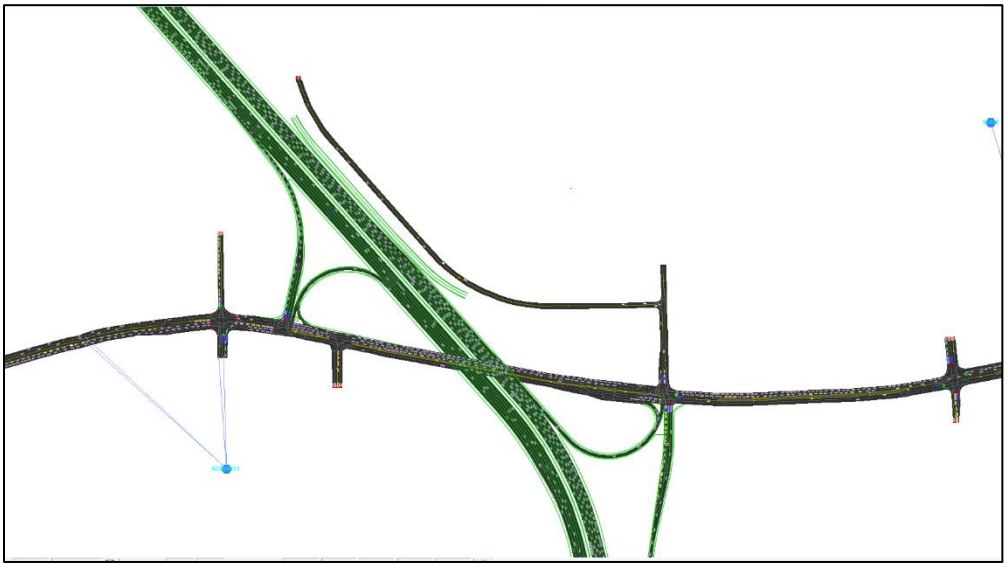


Figure 12 - Exit 108 (AO29) Simulation - PM Peak Hour



- Exit 110 (AO46)
    - AM Peak Hour – See **Figure 13** – Interchange operates over capacity. The traffic backup on the westbound on-ramp, resulting from congestion on WB I-26, causes in congestion along the arterial in both the eastbound and westbound directions. The resulting congestions extends beyond the adjacent signalized intersections and impacts traffic operation.
    - PM Peak Hour – See **Figure 14** – Interchange operates over capacity. Due to heavy traffic volume along the arterial, both the EB and WB off-ramps experiences queuing. Mainline traffic flow is not impacted by these queuing.

Figure 13 - Exit 110 (AO46) Simulation - AM Peak Hour

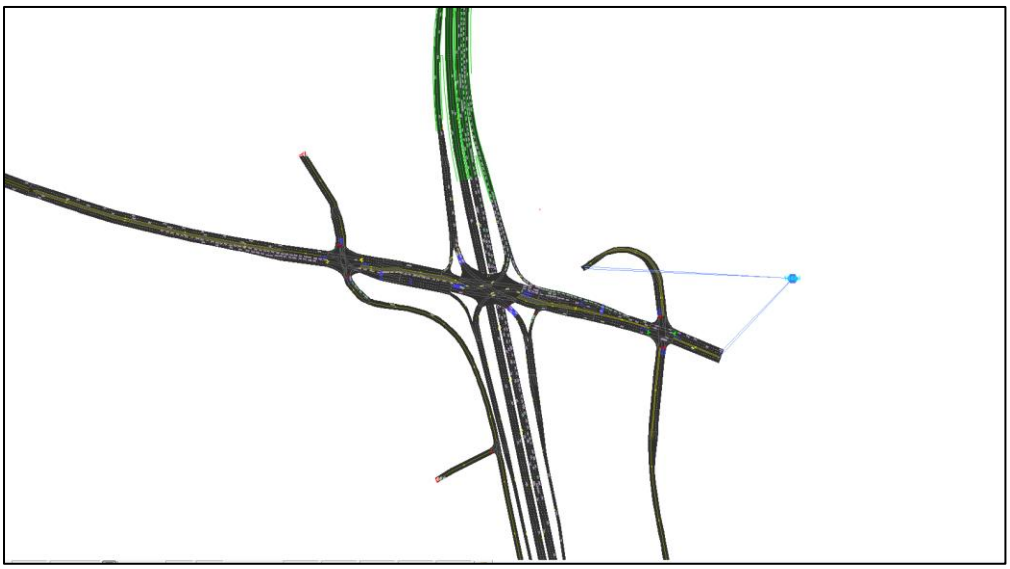
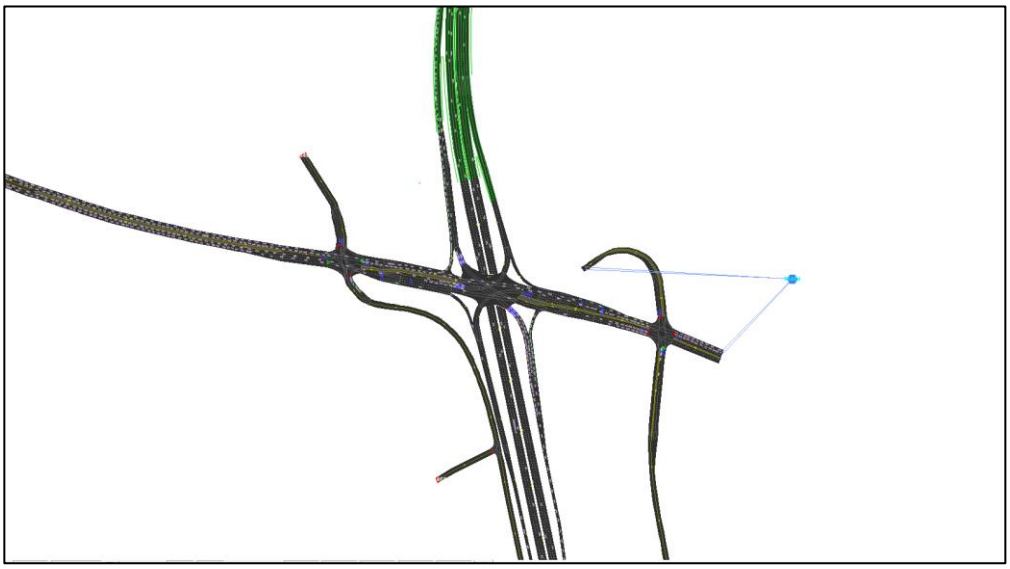


Figure 14 - Exit 110 (AO46) Simulation - PM Peak Hour



- I-126 at Colonial Life Boulevard
    - AM Peak Hour – See **Figure 15** – Interchange operates under capacity.
    - PM Peak Hour – See **Figure 16** – Interchanges operates under capacity.

Figure 15 – I-126 at Colonial Life Boulevard Simulation - AM Peak Hour

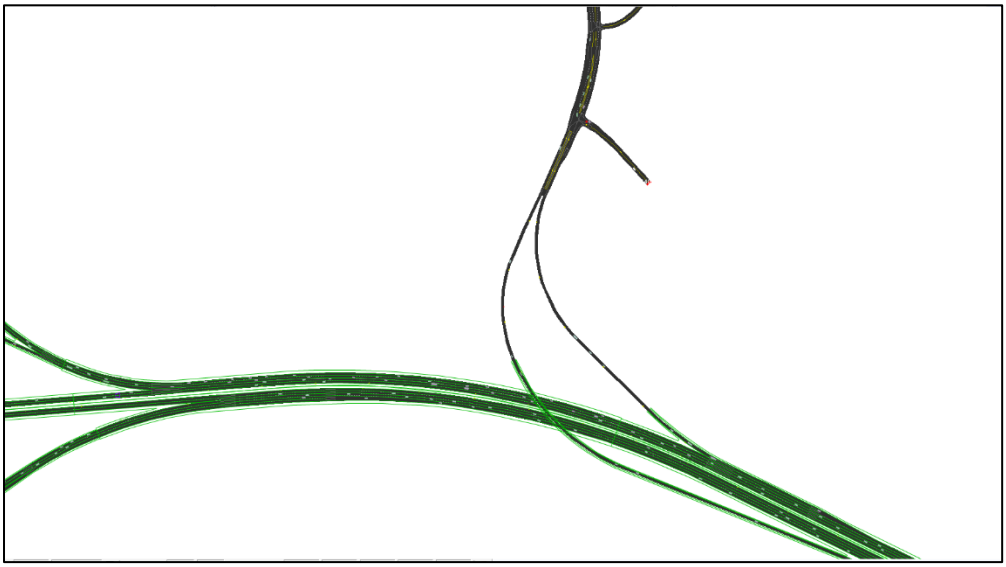
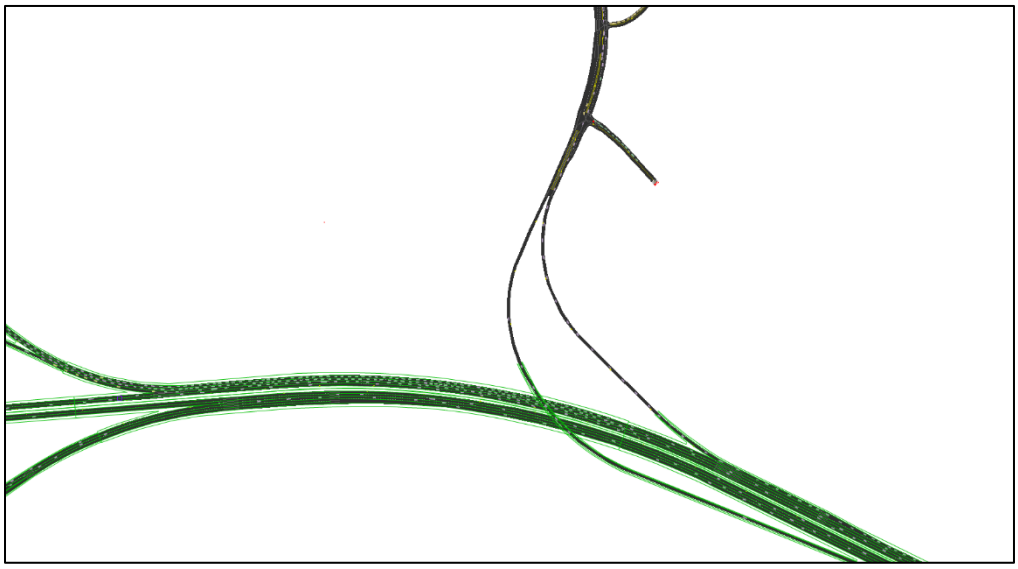


Figure 16 – I-126 at Colonial Life Boulevard Simulation - PM Peak Hour



- Exit 63 (AO10)
    - AM Peak Hour – See **Figure 17** – interchange operates over capacity. Severe congestion along Bush River Road creates backups on both the eastbound and westbound off-ramps from I-20; these backups extend onto I-20.
    - PM Peak Hour – See **Figure 18** – interchange operates over capacity. Congestion on both the EB and WB off-ramps from I-20 was observed, these backups extend onto I-20.

Figure 17 - Exit 63 (AO10) Simulation - AM Peak Hour

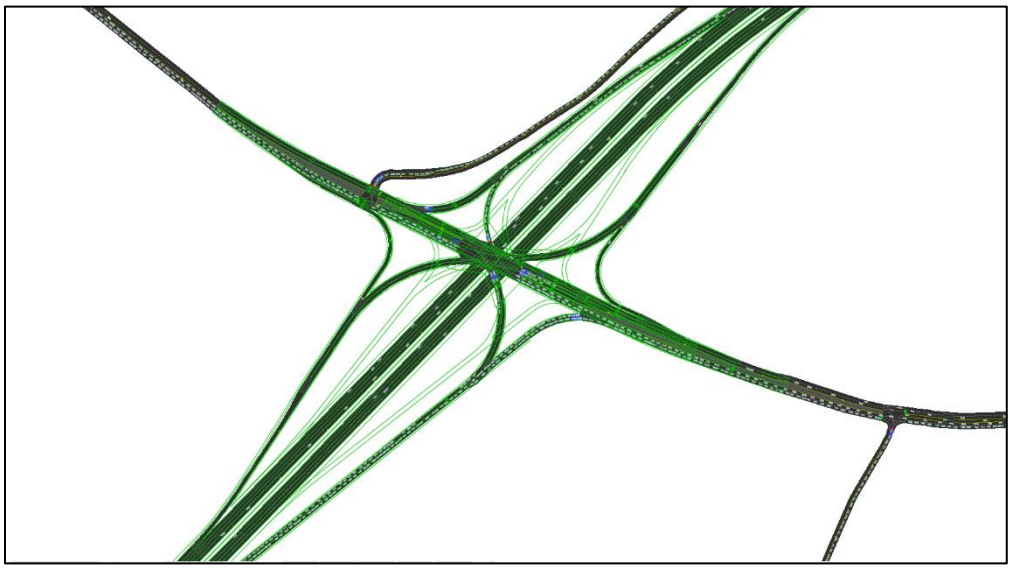
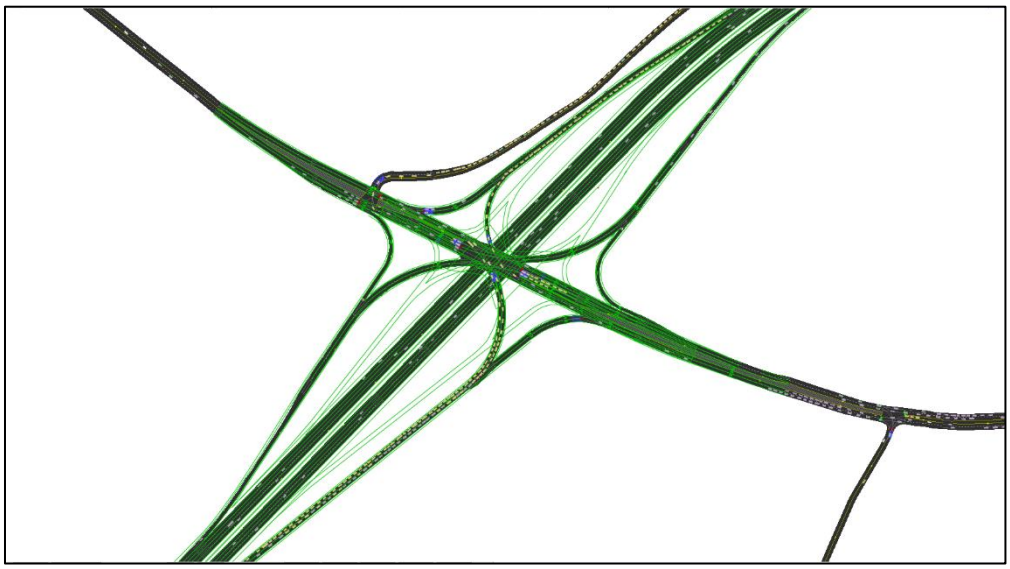


Figure 18 - Exit 63 (AO10) Simulation - PM Peak Hour



- Exit 65 (AO3)
    - AM Peak Hour – See **Figure 19** – interchange operates over capacity. The southbound left turn onto EB I-20 experiences heavy queuing – dual left turn lanes may improve the operation of this movement. The I-20 WB on-ramp experiences congestion back onto Broad River Road due to congestion on the mainline. This on-ramp congestion also blocks northbound left turners from entering the ramp, resulting queuing on the NB arterial. Moderate queuing is also observed on the eastbound off-ramp, however traffic flows steadily on EB I-20.
    - PM Peak Hour – See **Figure 20** – interchange operates over capacity. Due to heavy traffic volume along the arterial, queuing observed on the WB Off-Ramp extends back towards the mainline.

Figure *19* - Exit 65 (AO3) Simulation - AM Peak Hour

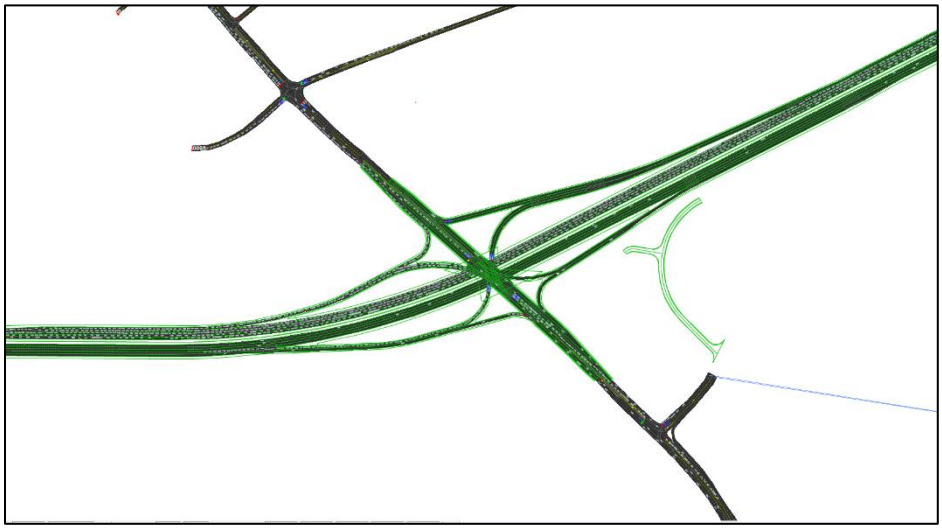
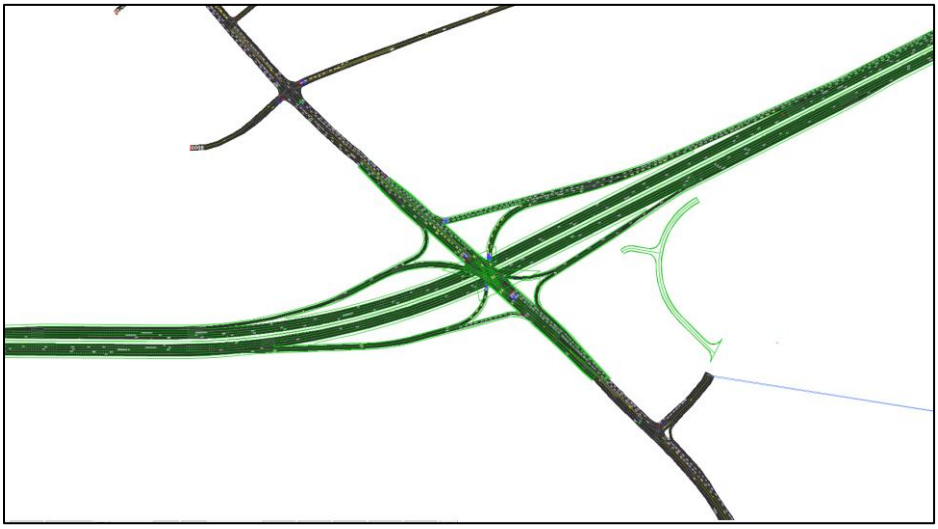


Figure 18 - Exit 65 (AO3) Simulation - PM Peak Hour



- E-W Connector (AO29)
    - AM Peak Hour – See **Figure 21** –the WB connector operates over capacity due to queuing on the EB I-20 mainline. The resulting traffic backup was along the WB connector, and extended back onto WB I-126.
    - PM Peak Hour – See **Figure 22** – connector operates under capacity.

Figure *21* – E-W Connector (AO3) Simulation - AM Peak Hour

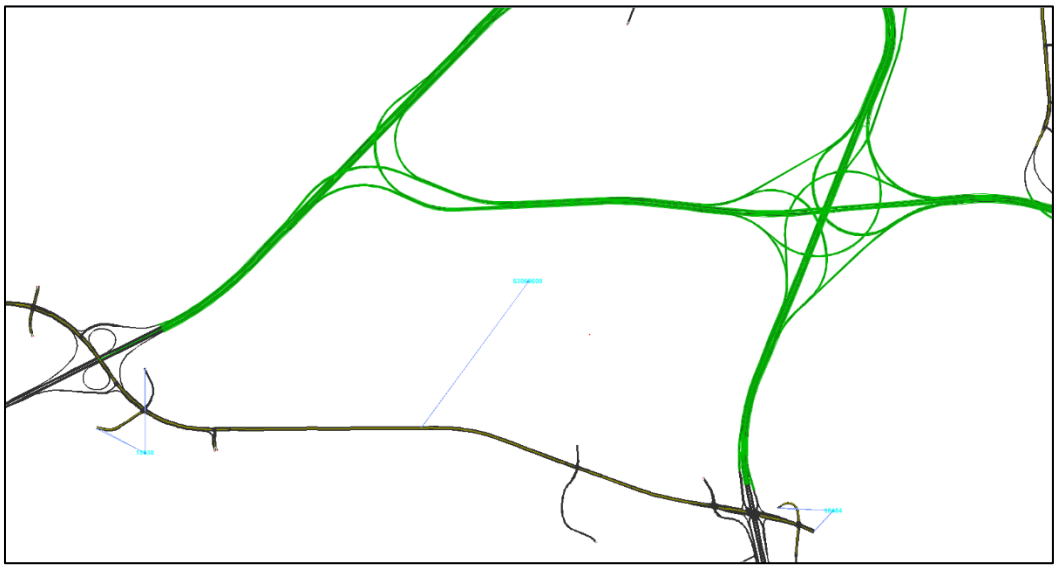
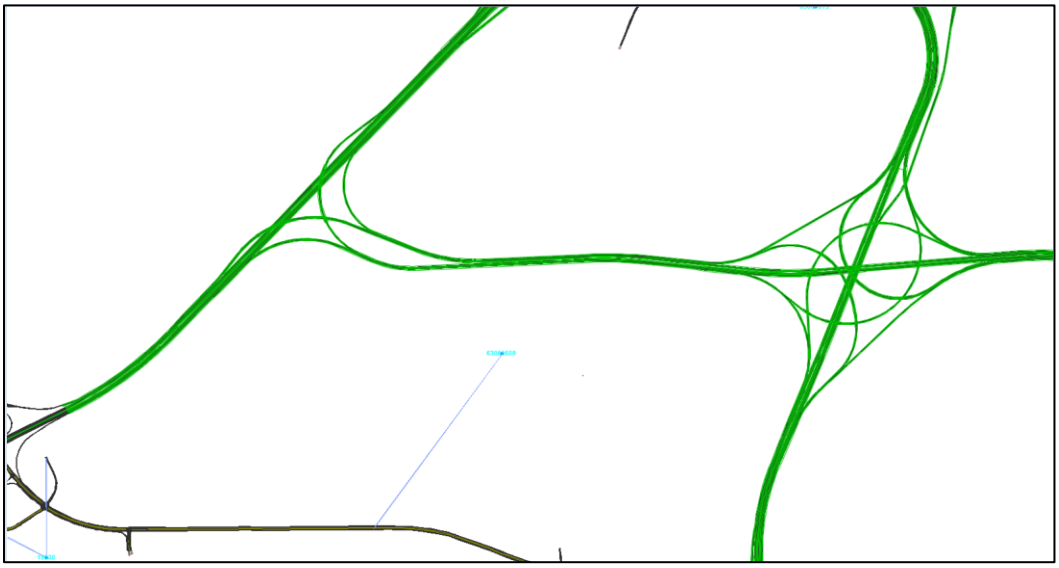
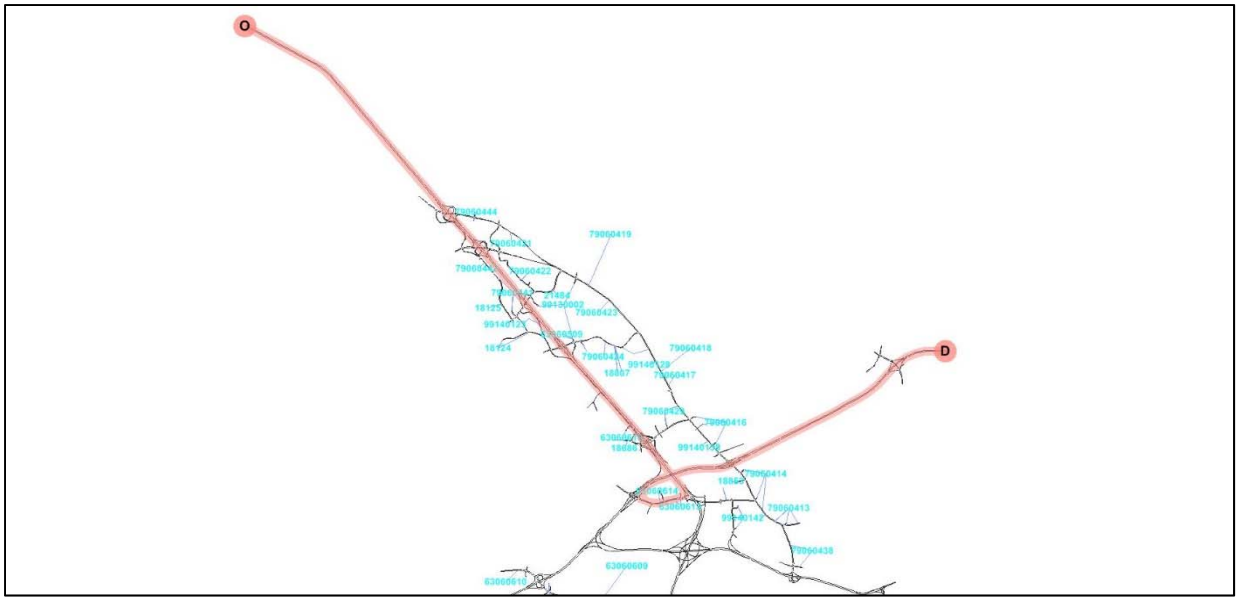


Figure *22* – E-W Connector (AO3) Simulation - PM Peak Hour

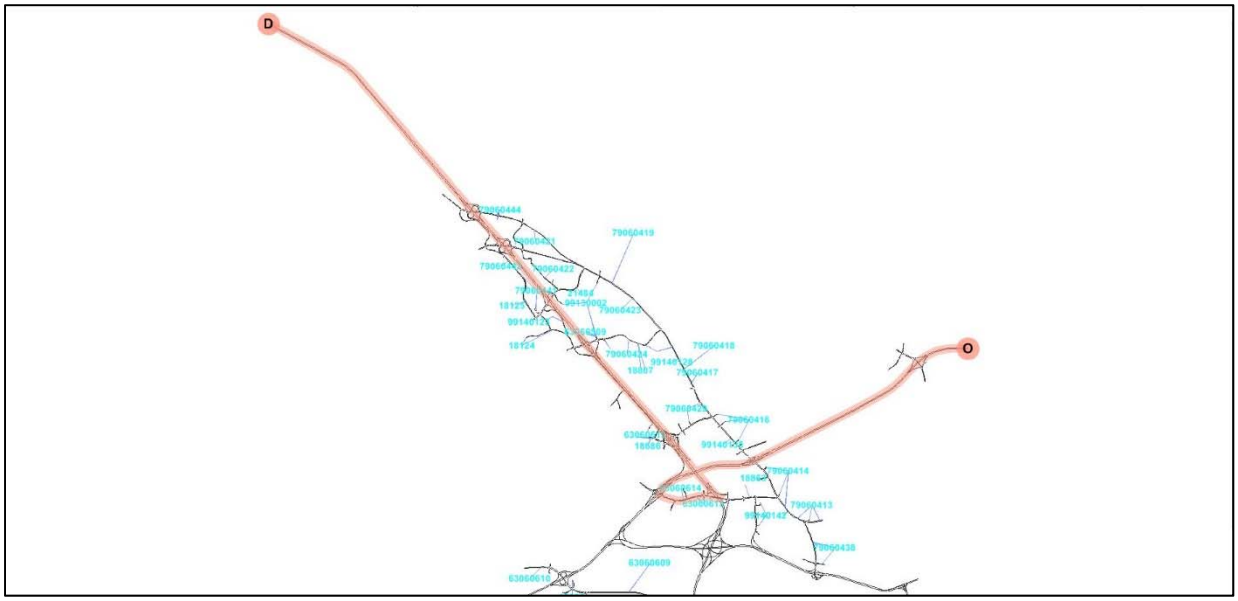


RA9 Specific Issues/Choke Points:

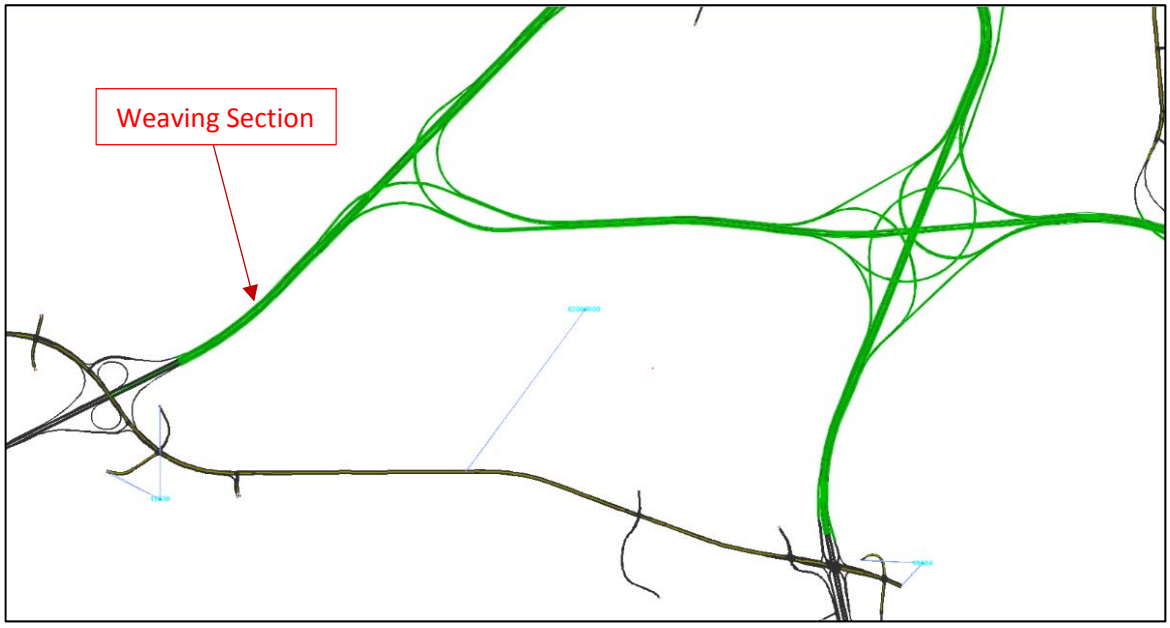
1. I-26 EB to I-20 EB uses Exit 108 Bush River Road and enters I-20 at Exit 63, EB on ramp.



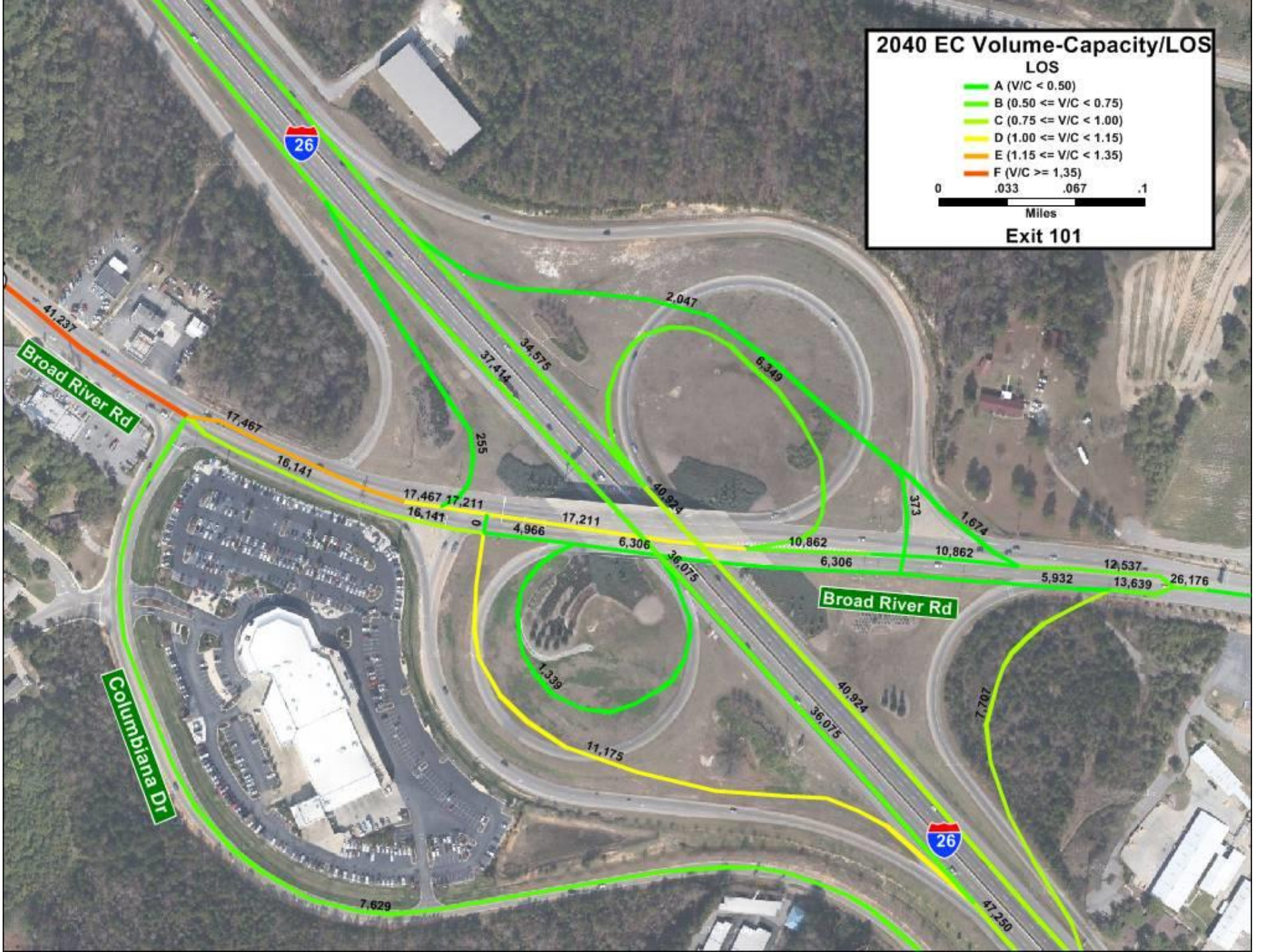
2. I-20 WB to I-26 WB uses Exit 63 Bush River Road and enters I-26 at Exit 108, WB on ramp.



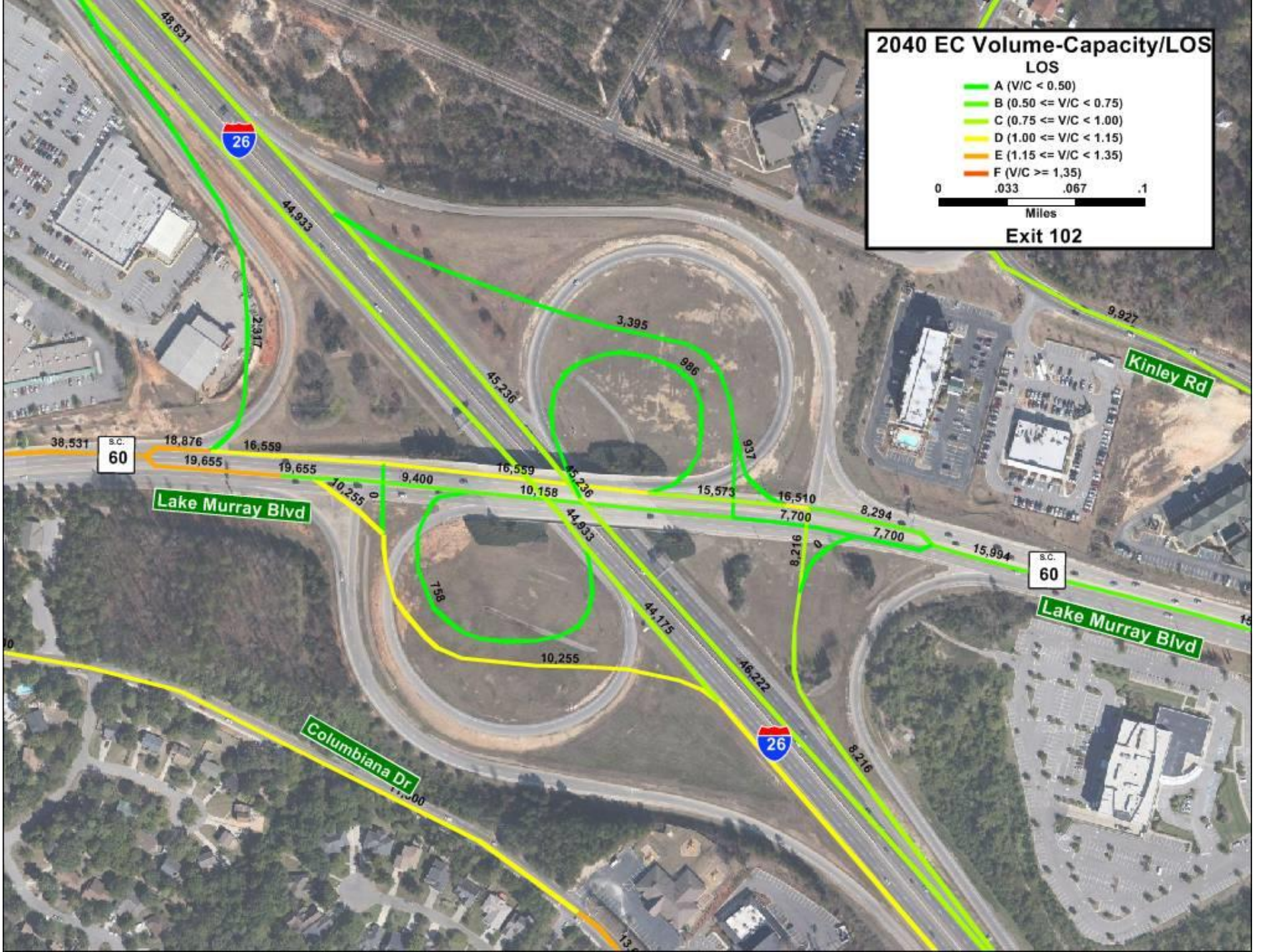
3. I-20 WB weaving between Exit 61 and Exit 63, short distance between E-W connector on-ramp and Exit 61 off-ramp



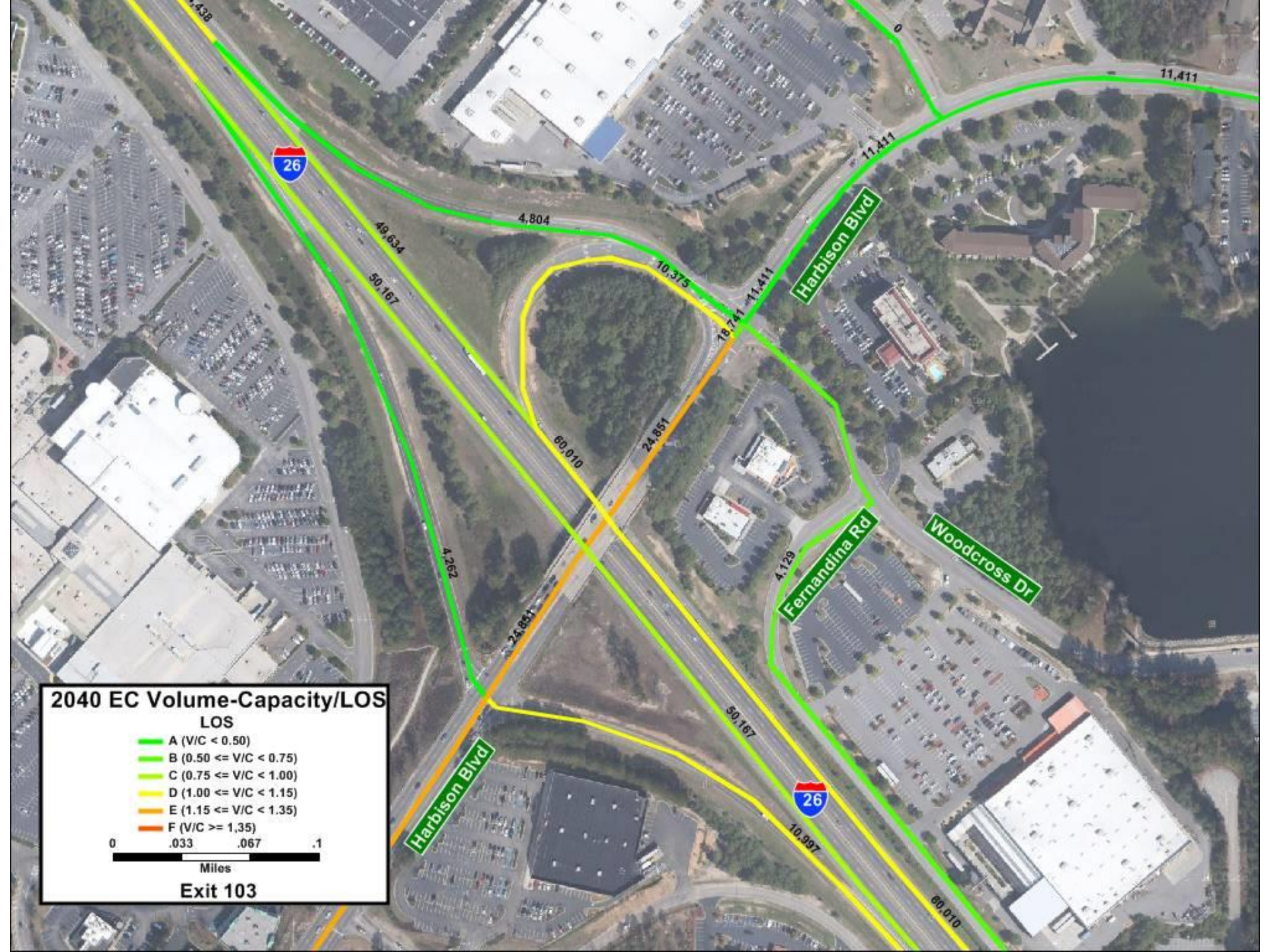
Appendix H—SCSWM EC (RA10) Volume/LOS

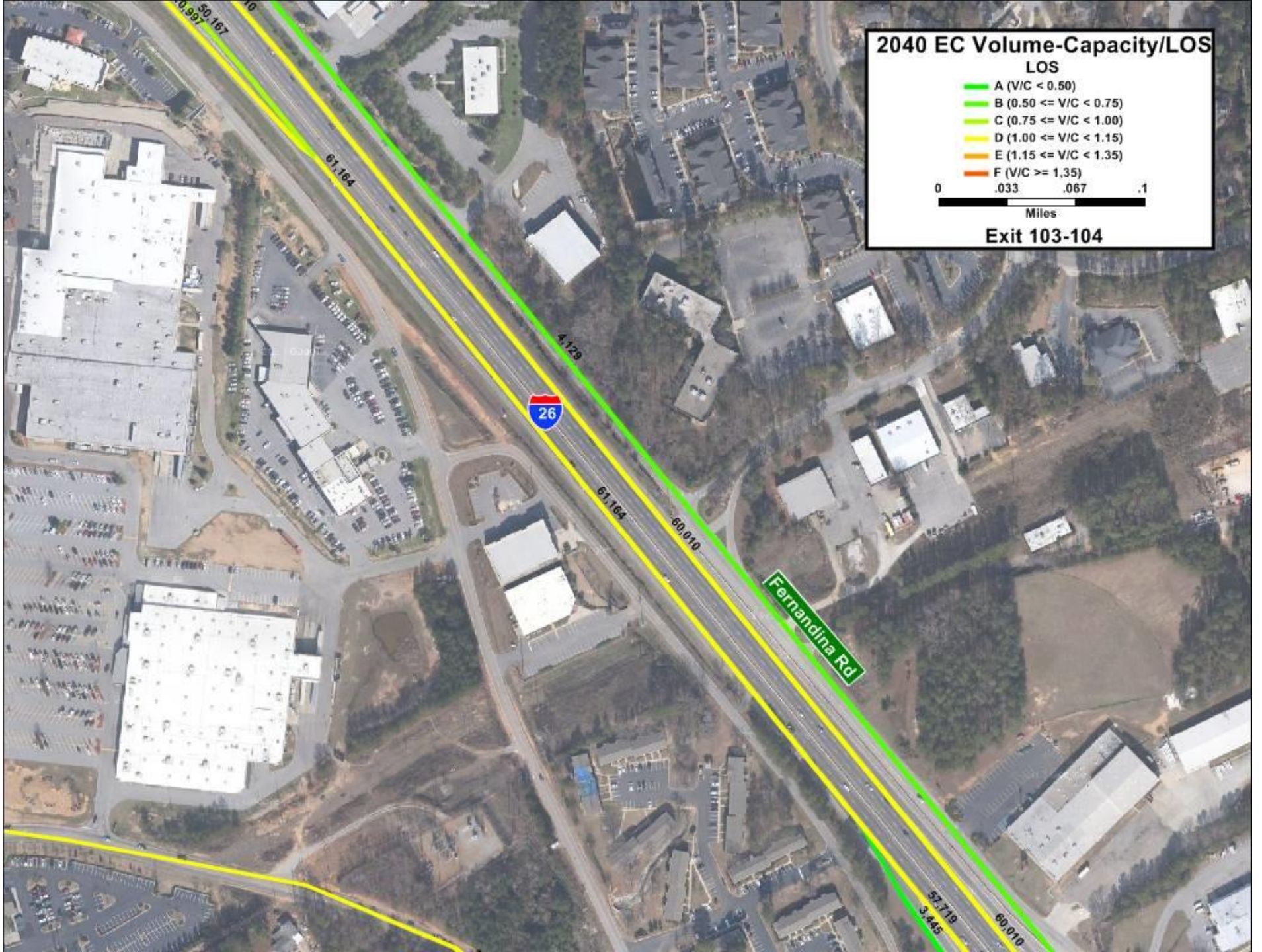

2040 EC Volume-Capacity/LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1,35)
0
.033
.067
.1
Miles
Exit 101
26
Broad River Rd
Columbiana Dr
41,237
17,467
16,141
17,467
17,211
16,141
0
4,966
17,211
6,306
10,862
6,306
10,862
12,537
5,932
13,639
26,176
2,047
6,349
34,575
37,414
255
40,924
373
1,674
36,075
1,339
11,175
40,924
36,075
7,707
7,629
47,250

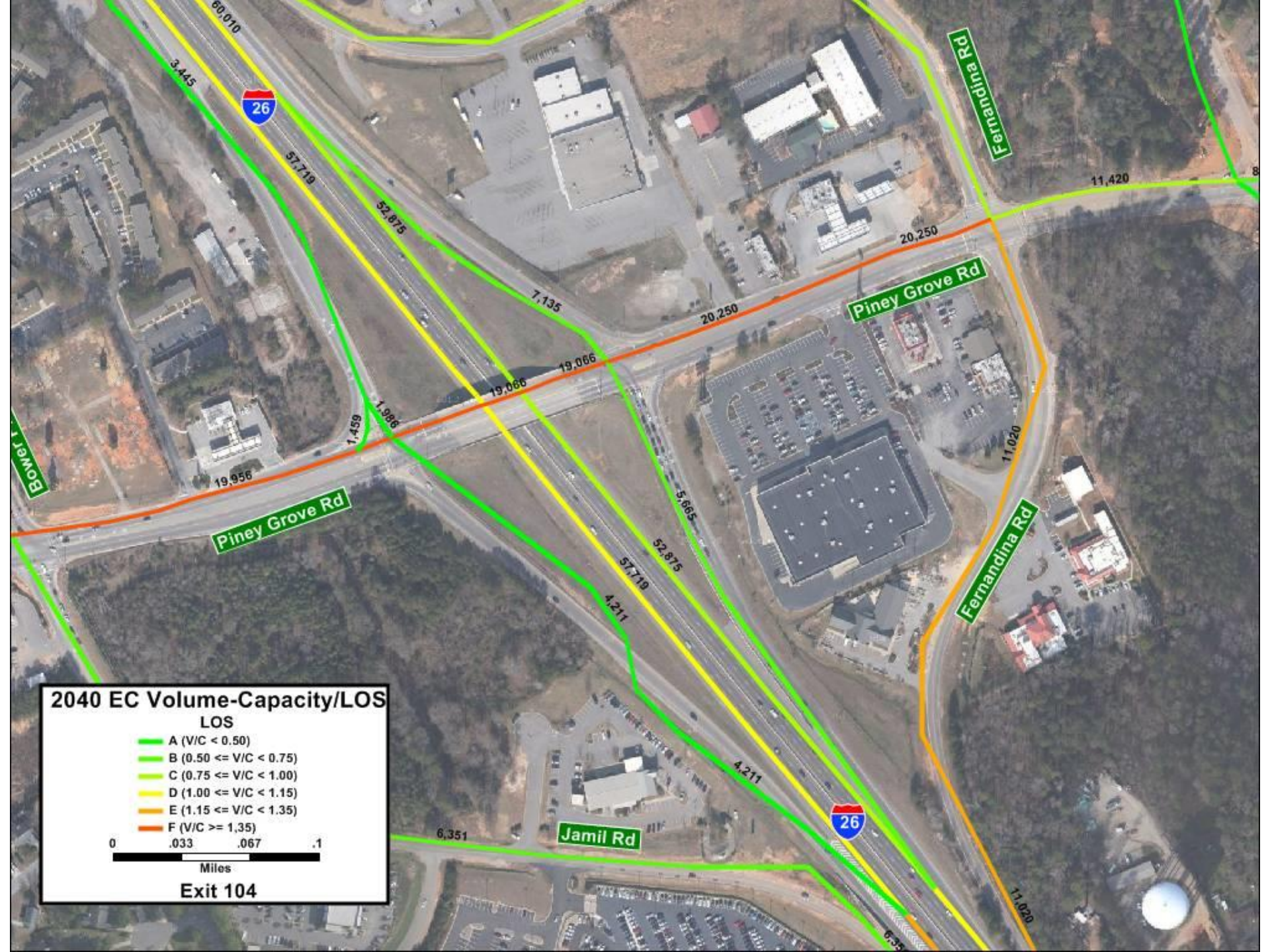

2040 EC Volume-Capacity/LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1,35)
0
.033
.067
.1
Miles
Exit 101-102
Columbiana Dr
40,924
47,250
48,631
7,629
44,933
26
26


2040 EC Volume-Capacity/LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1,35)
0
.033
.067
.1
Miles
Exit 102
26
S.C. 60
Lake Murray Blvd
Kinley Rd
Columbiana Dr
48,631
44,933
2,317
3,395
986
45,236
9,927
937
38,531
18,876
16,559
19,655
19,655
16,559
45,236
9,400
10,158
15,573
16,510
7,700
8,294
7,700
10,255
0
8,216
0
15,994
758
44,175
10,255
46,222
8,216

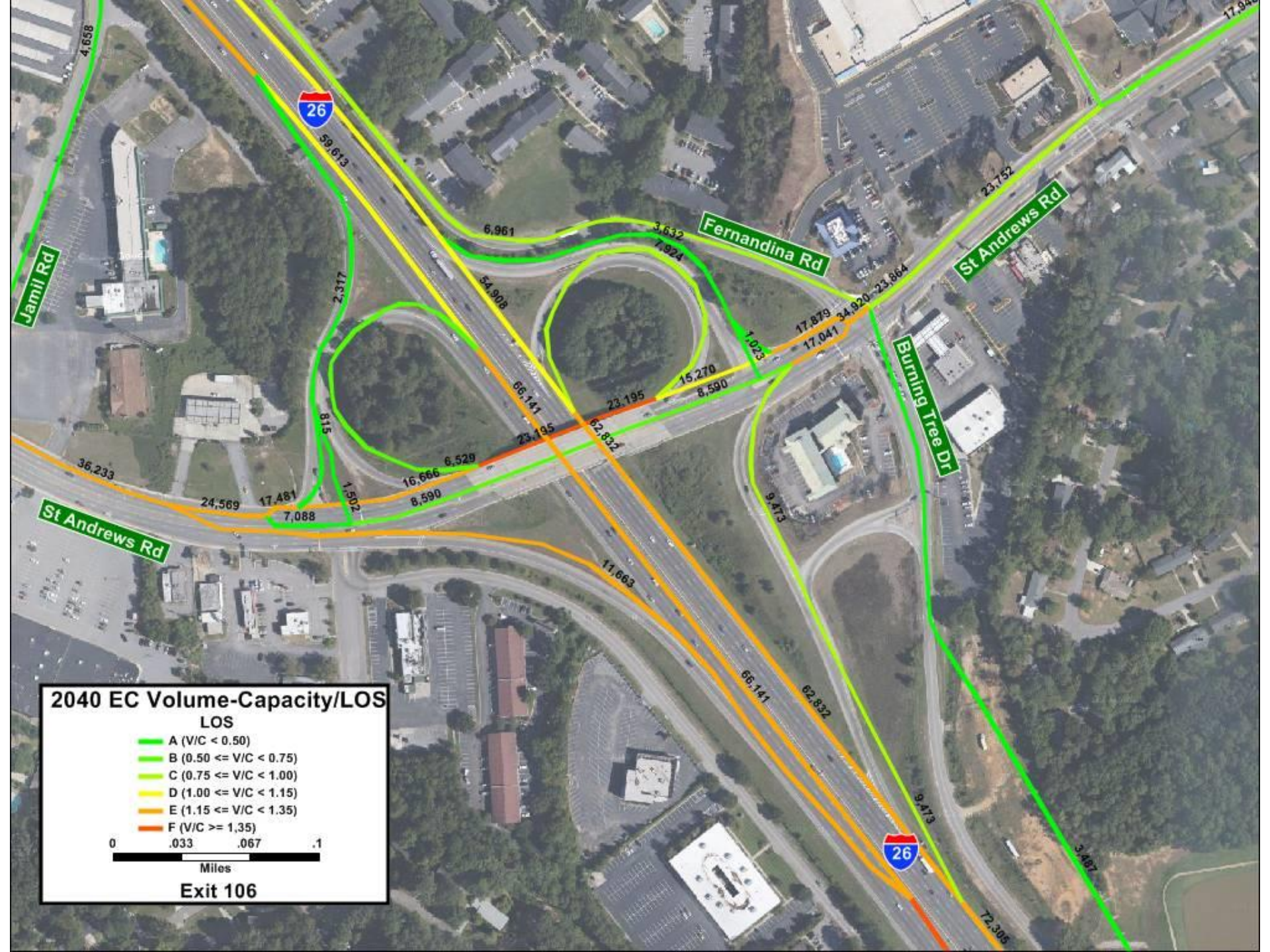

2040 EC Volume-Capacity/LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1,35)
0
.03
.06
.09
Miles
Exit 102-103
26
Columbiana Dr
54,438
14,824


2040 EC Volume-Capacity/LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1,35)
0
.033
.067
.1
Miles
Exit 103
26
Harbison Blvd
Fernandina Rd
Woodcross Dr
49,634
50,167
4,804
10,375
18,741
11,411
60,010
24,851
4,262
4,129
10,997

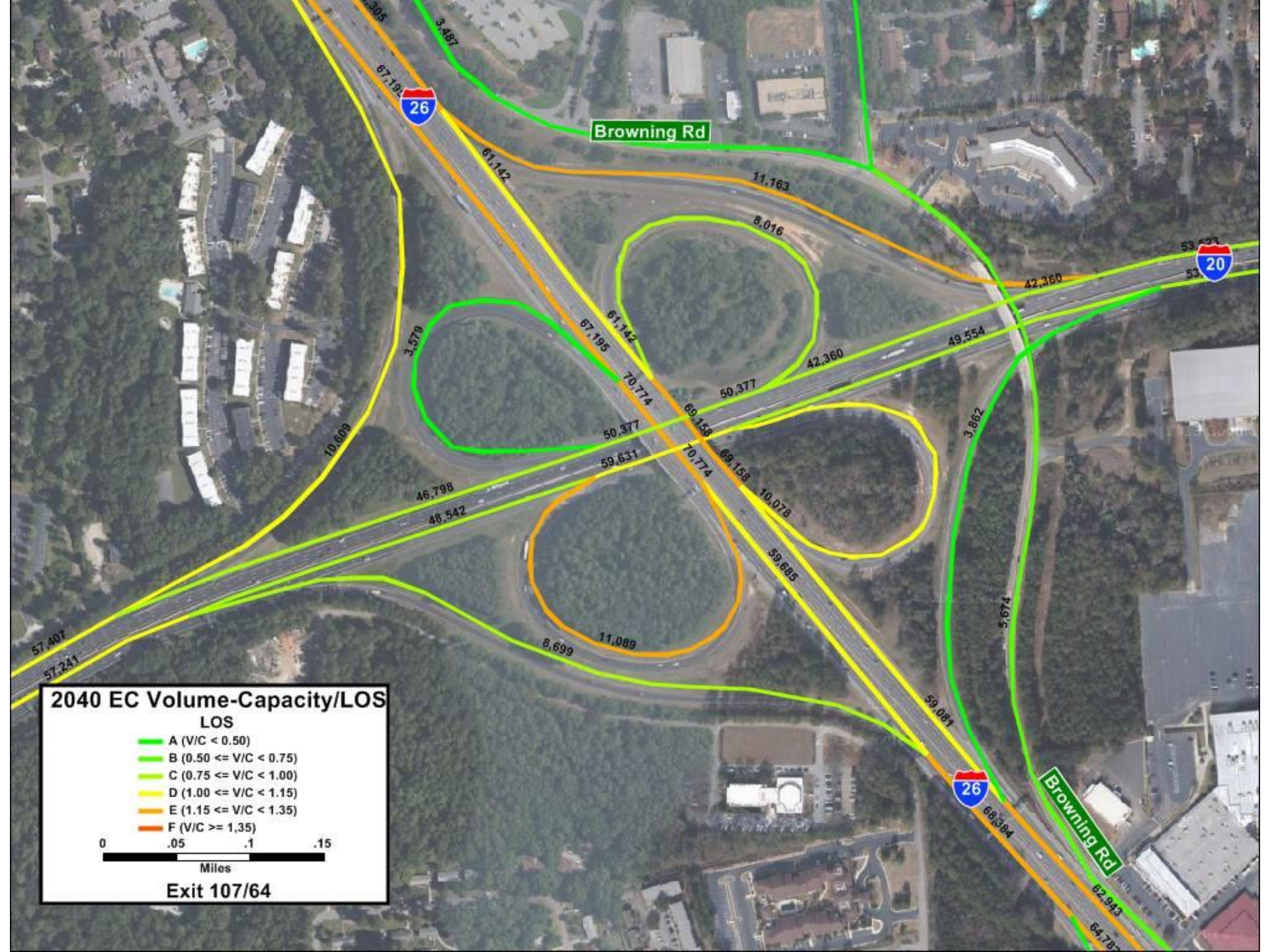

2040 EC Volume-Capacity/LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1,35)
0
.033
.067
.1
Miles
Exit 103-104
50,167
61,164
4,129
26
61,164
60,010
Fernandina Rd
57,719
3,445
60,010


2040 EC Volume-Capacity/LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1,35)
0
.033
.067
.1
Miles
Exit 104
Piney Grove Rd
Piney Grove Rd
Piney Grove Rd
Fernandina Rd
Fernandina Rd
Jamil Rd
26
26
60,010
3,445
57,719
52,875
7,135
20,250
20,250
19,066
19,066
1,986
1,459
19,956
11,420
11,020
5,665
52,875
57,719
4,211
4,211
6,351
11,020


2040 EC Volume-Capacity/LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1,35)
0
.033
.067
.1
Miles
Exit 104-106
6,163
6,351
26
Fernandina Rd
Jamil Rd
1,569
1,569
Beatty Rd
61,930
Tram Rd
2,656
Fernandina Rd
Jamil Rd
58,539
26
6,303
8,249


Jamil Rd
Fernandina Rd
St Andrews Rd
Burning Tree Dr
St Andrews Rd
26
26
4,658
59,613
6,961
3,632
7,924
2,317
54,908
17,879
34,920
23,864
17,041
1,023
15,270
8,590
66,141
23,195
23,195
62,832
815
6,529
16,666
8,590
36,233
24,569
17,481
7,088
1,502
9,473
11,663
66,141
62,832
9,473
3,487
72,305
23,752
2040 EC Volume-Capacity/LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1,35)
0
.033
.067
.1
Miles
Exit 106


2040 EC Volume-Capacity/LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1,35)
0
.033
.067
.1
Miles
Exit 106-107
66,141
62,832
9,473
77,804
72,305
67,195
3,487
61,142
11,163
8,016
10,609
26
26
Burning Tree Dr
Browning Rd

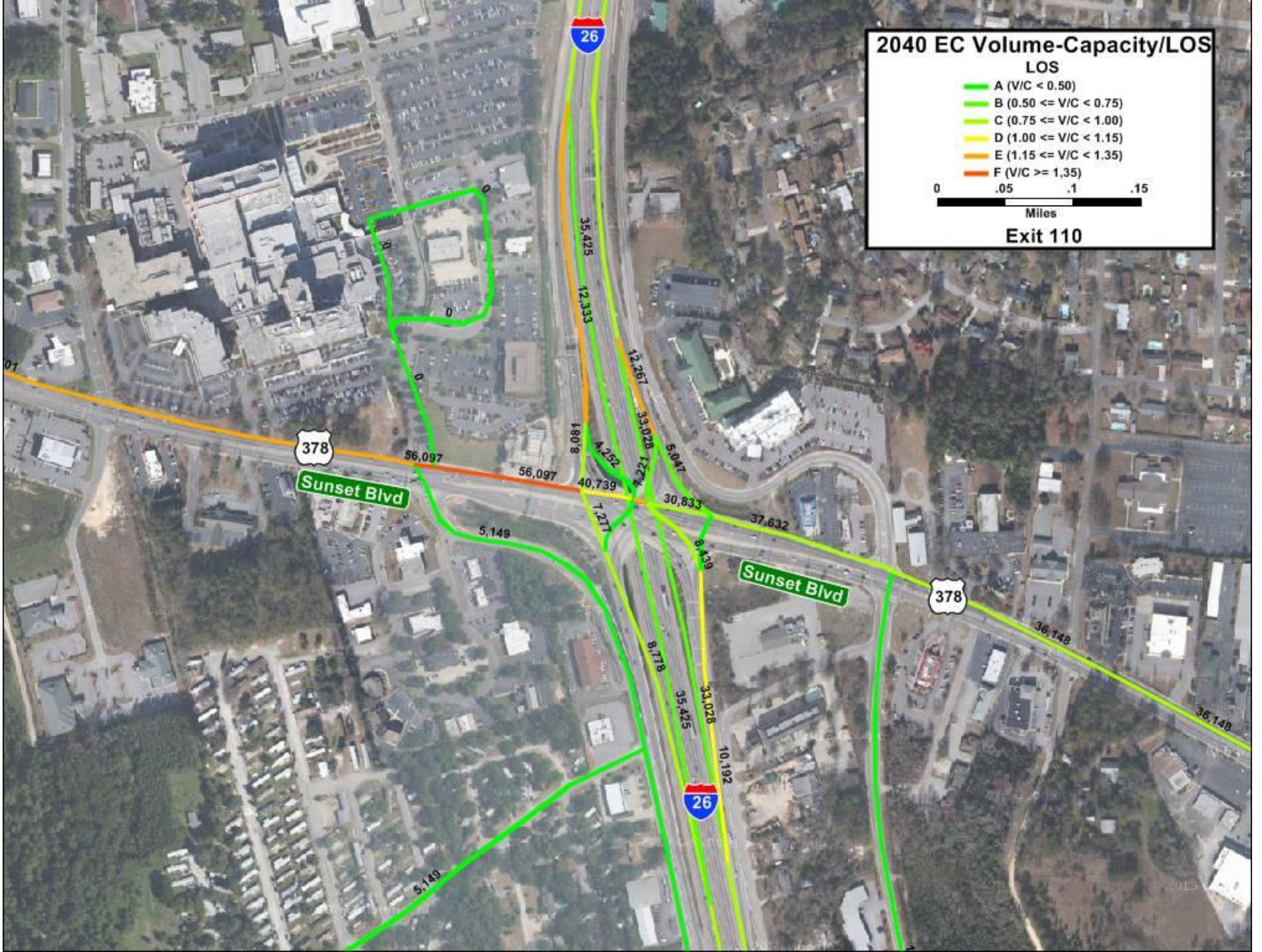

Browning Rd
26
20
61,142
11,163
8,016
42,360
67,195
3,579
49,554
50,377
70,774
69,158
10,609
59,631
46,798
48,542
10,078
3,862
59,685
5,674
57,407
57,241
8,699
11,089
59,081
68,384
62,943
2040 EC Volume-Capacity/LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1,35)
0
.05
.1
.15
Miles
Exit 107/64

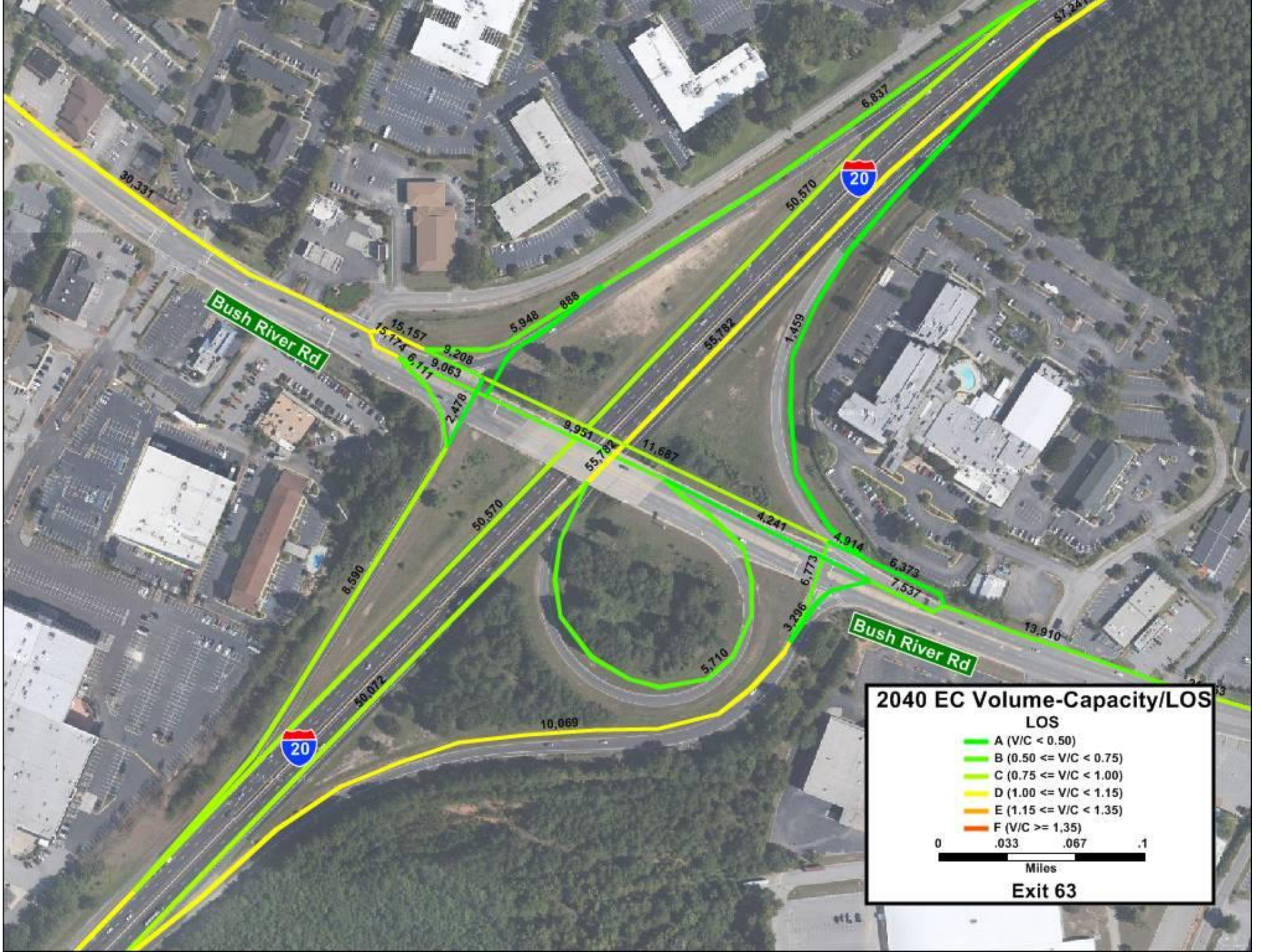

2040 EC Volume-Capacity/LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1,35)
0
.033
.067
.1
Miles
Exit 107-108
26
Browning Rd
59,081
5,674
68,384
62,943
64,782
1,316
3,602
10,337
23,943
23,943

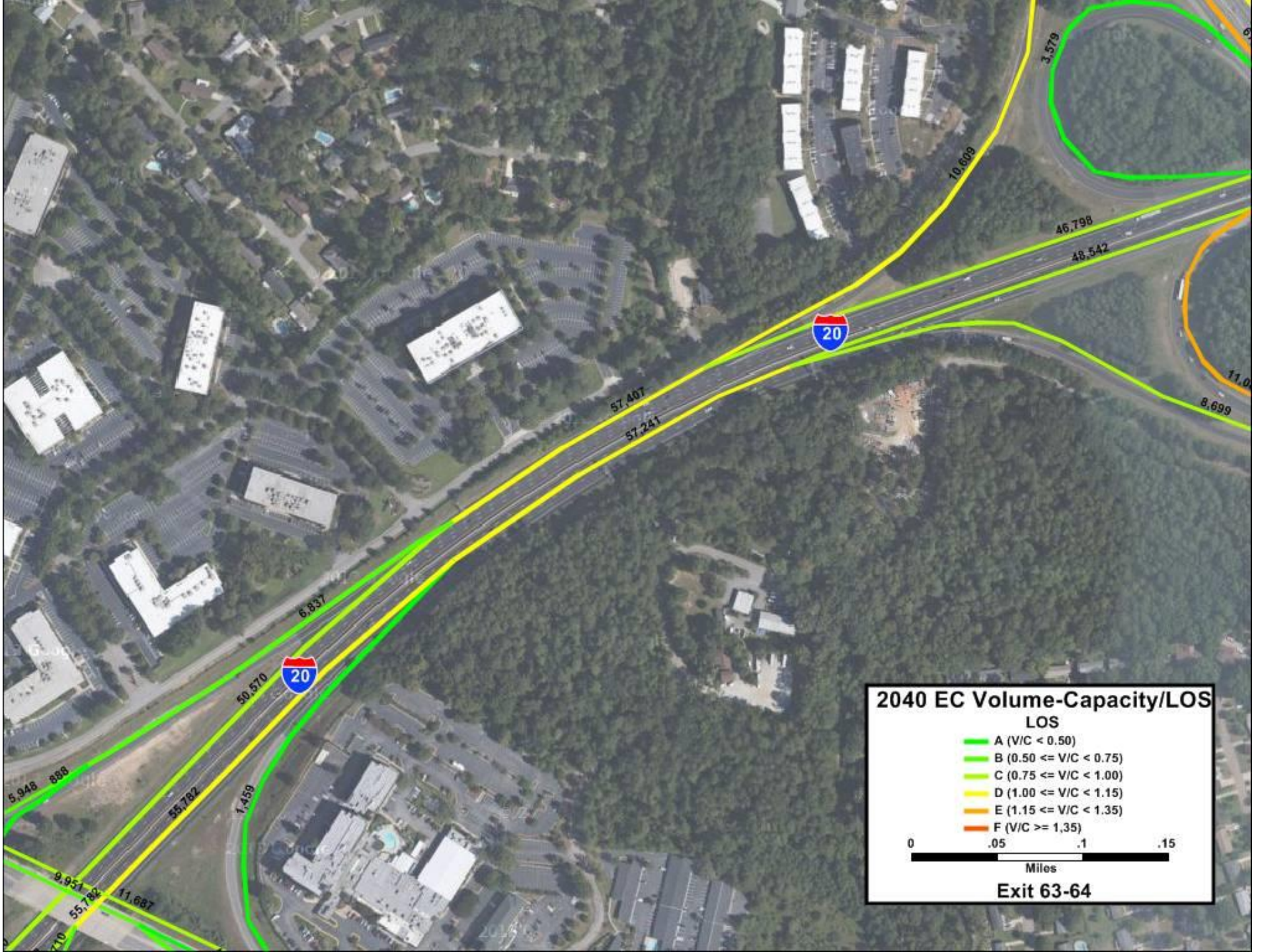

Burnette Dr
Bush River Rd
Morninghill Dr
Bush River Rd
26
26
64,782
1,316
3,602
23,943
23,943
24,266
3,922
6,414
23,110
61,627
29,524
29,524
64,782
29,524
10,337
61,627
29,524
64,782
29,152
1,316
1,316
64,782
61,627
0
61,627
64,782
30,228
34,554
10,047
30,683
30,943
40,565
2,837
2040 EC Volume-Capacity/LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1,35)
0
.033
.067
.1
Miles
Exit 108A


2040 EC Volume-Capacity/LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1,35)
0
.033
.067
.1
Miles
Exit 108B
30,228
34,554
0
16,047
30,683
30,943
4,305
40,565
30,683
38,659
7,193
45,295
26
26
126

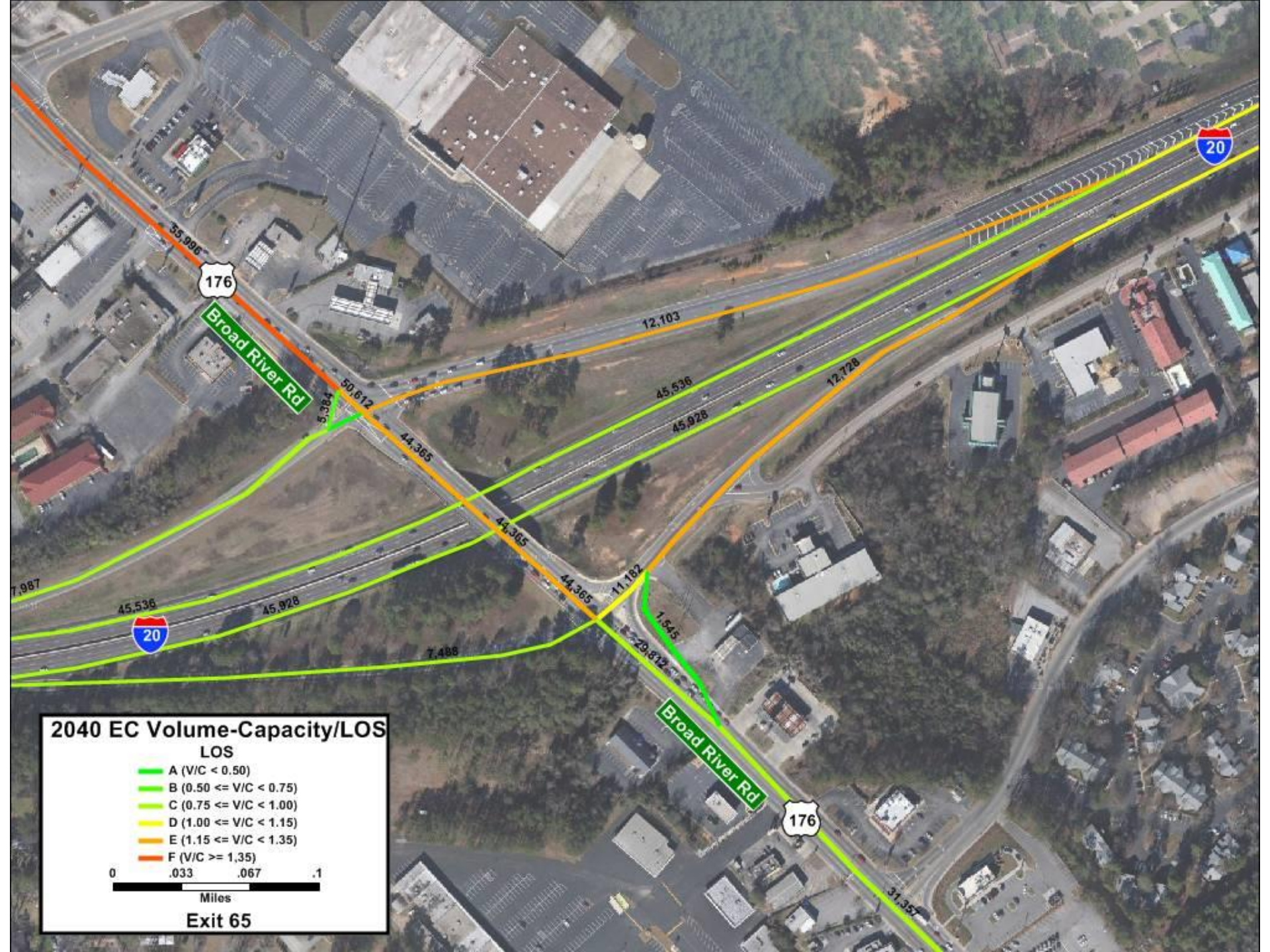

26
26
47,758
45,295
12,333
35,425
0
0
2040 EC Volume-Capacity/LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1,35)
0
.05
.1
.15
Miles
Exit 108-110

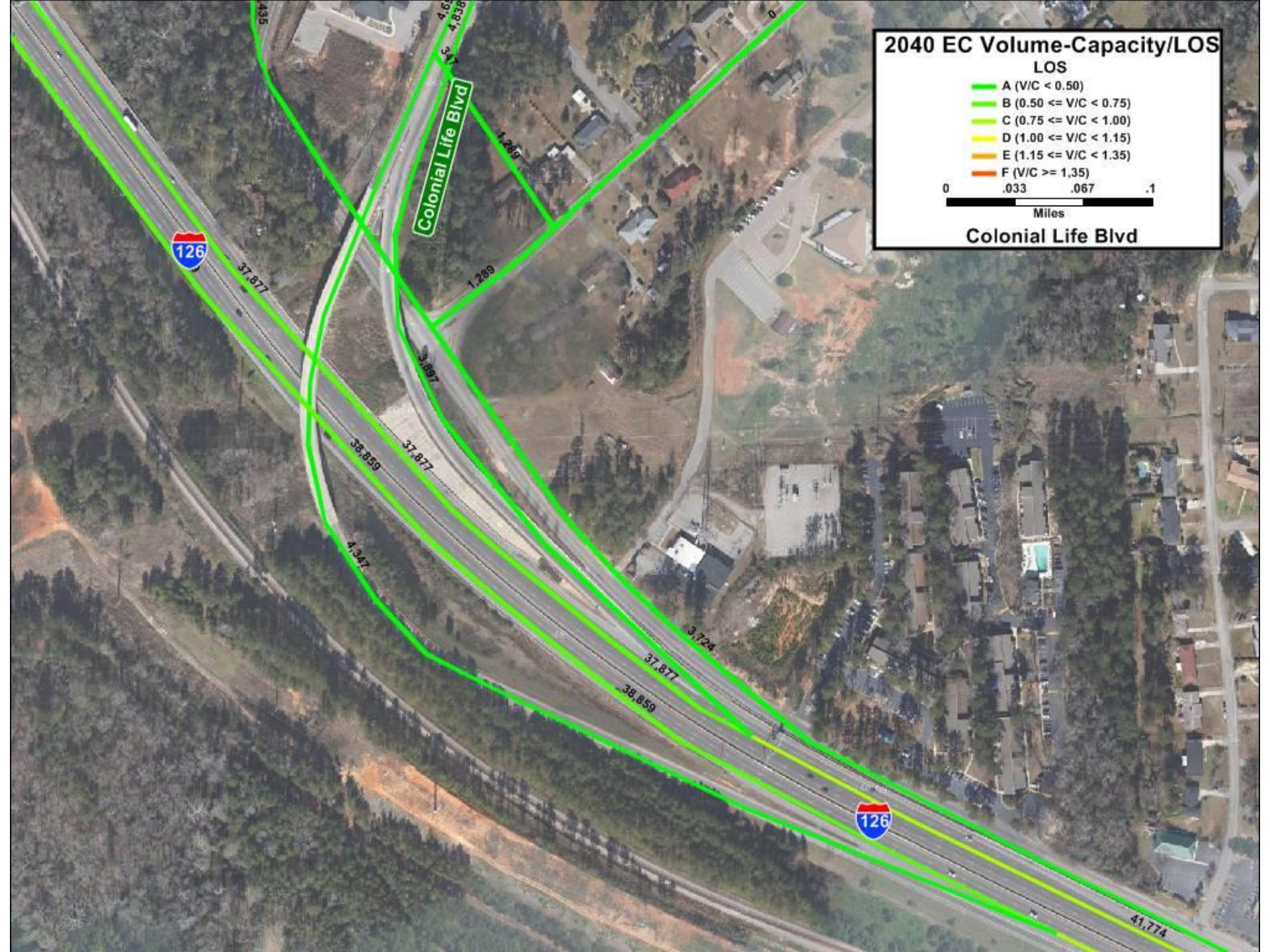

2040 EC Volume-Capacity/LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1,35)
0
.05
.1
.15
Miles
Exit 110
26
378
Sunset Blvd
35,425
12,333
12,267
33,028
5,047
8,081
4,252
4,221
56,097
56,097
40,739
30,833
37,632
7,277
5,149
8,439
36,148
8,778
35,425
33,028
10,192
0


Bush River Rd
Bush River Rd
20
20
30,331
6,837
50,570
55,782
1,459
5,948
888
15,157
15,174
9,208
6,111
9,063
2,478
9,951
55,782
11,687
50,570
4,241
4,914
6,373
7,537
6,773
3,296
13,910
6,590
5,710
50,072
10,069
2040 EC Volume-Capacity/LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1,35)
0
.033
.067
.1
Miles
Exit 63

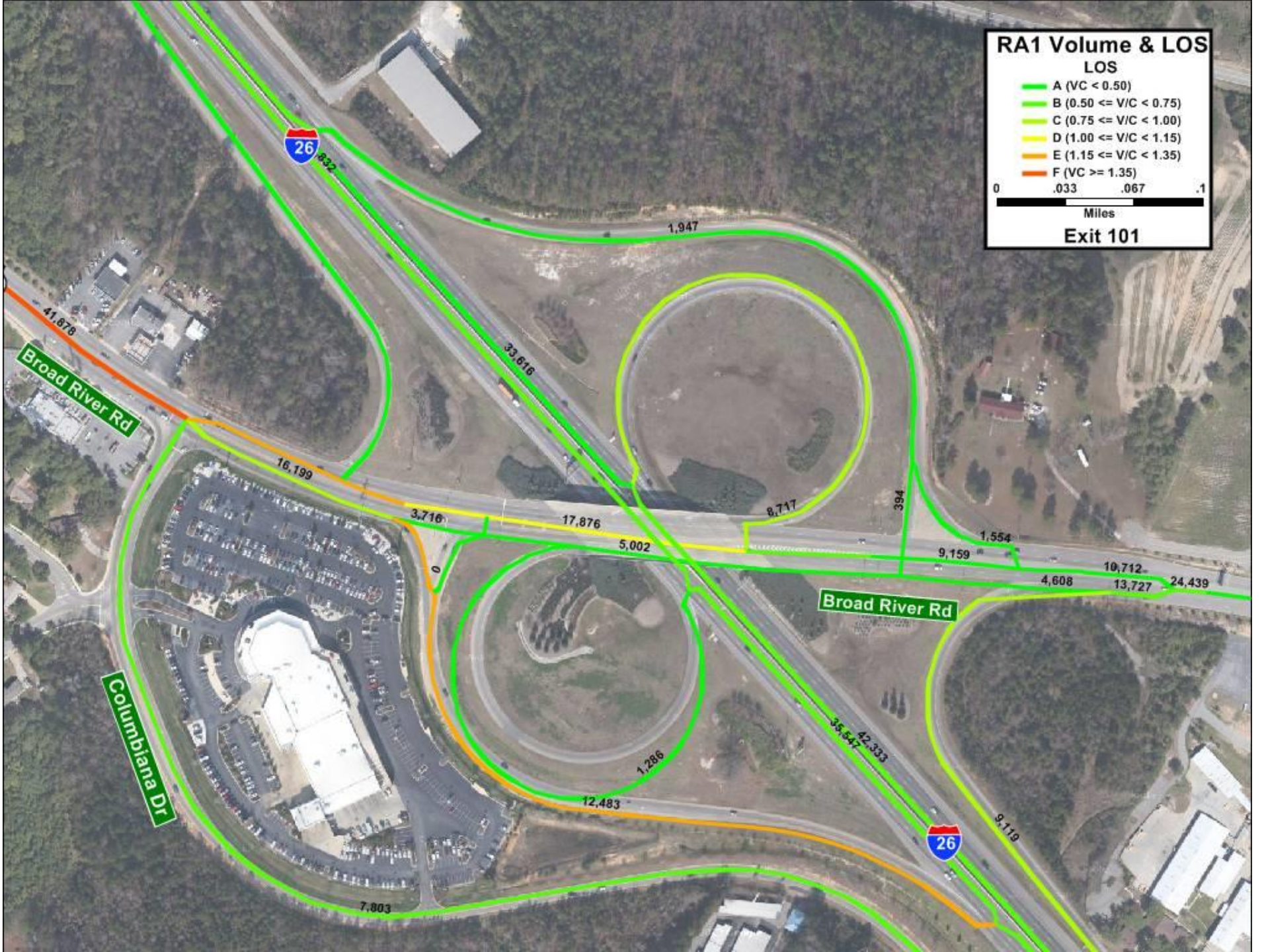

3,579
10,609
46,798
48,542
57,407
57,241
8,699
6,837
50,570
5,948
888
55,782
1,459
9,951
55,782
11,687
20
20
2040 EC Volume-Capacity/LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1,35)
0
.05
.1
.15
Miles
Exit 63-64

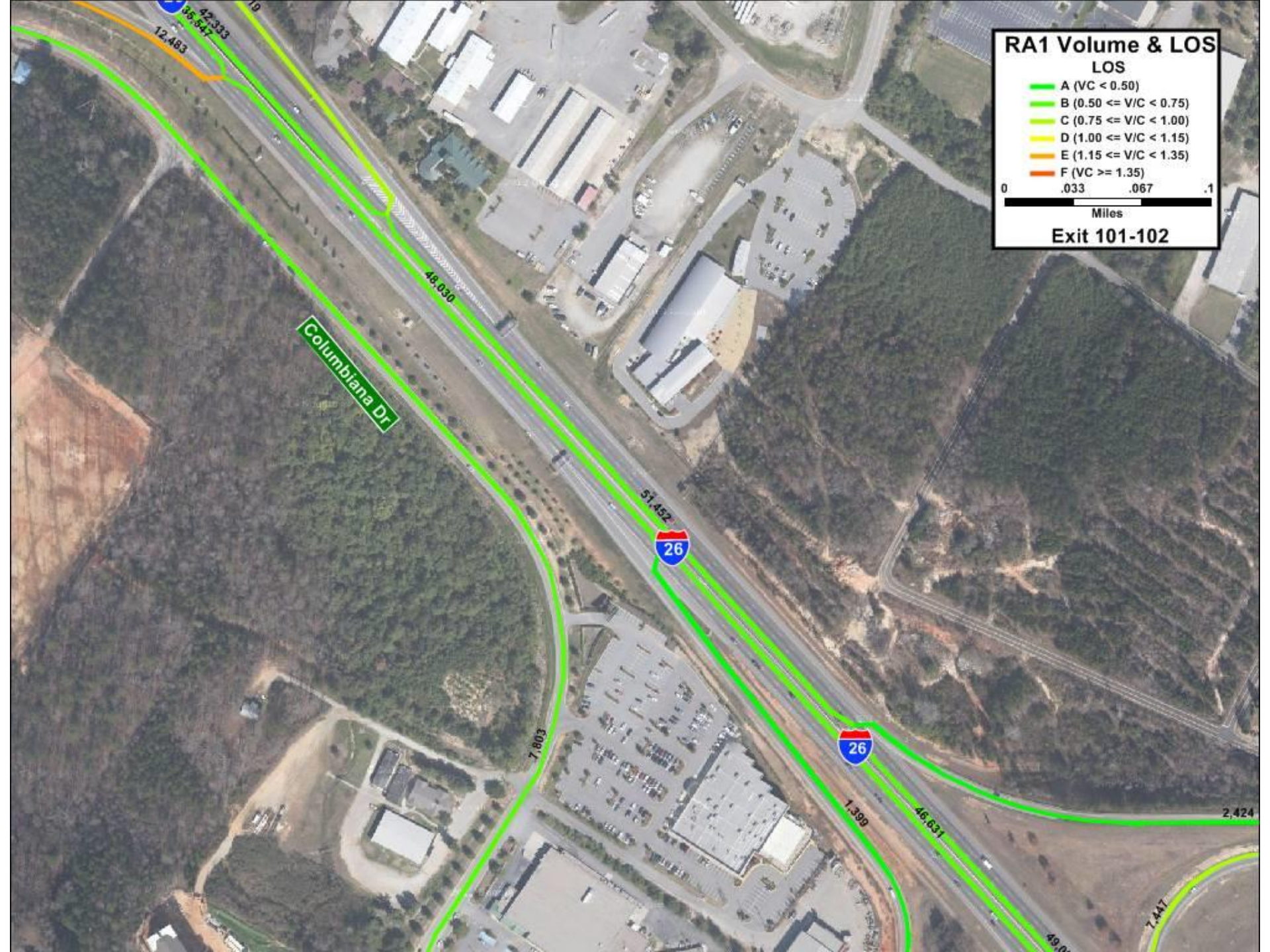

7,987
45,536
53,523
20
7,488
53,416
20
2040 EC Volume-Capacity/LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1,35)
0
.033
.067
.1
Miles
Exit 64-65

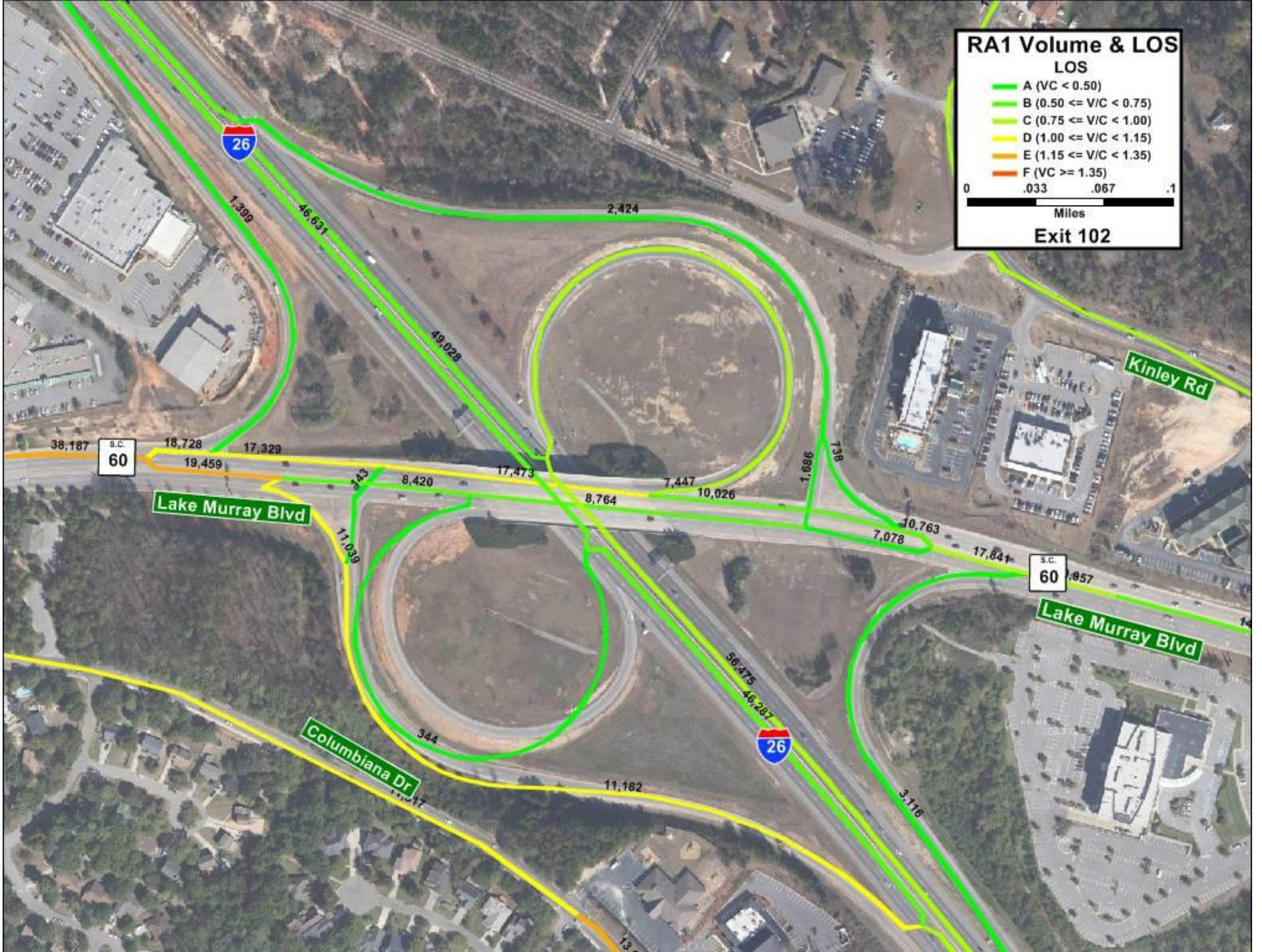

2040 EC Volume-Capacity/LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1,35)
0
.033
.067
.1
Miles
Exit 65
176
Broad River Rd
20
55,996
50,612
5,384
12,103
45,536
45,928
12,728
44,365
44,365
44,365
11,182
1,545
29,812
31,357
7,488
45,536
45,928
7,987

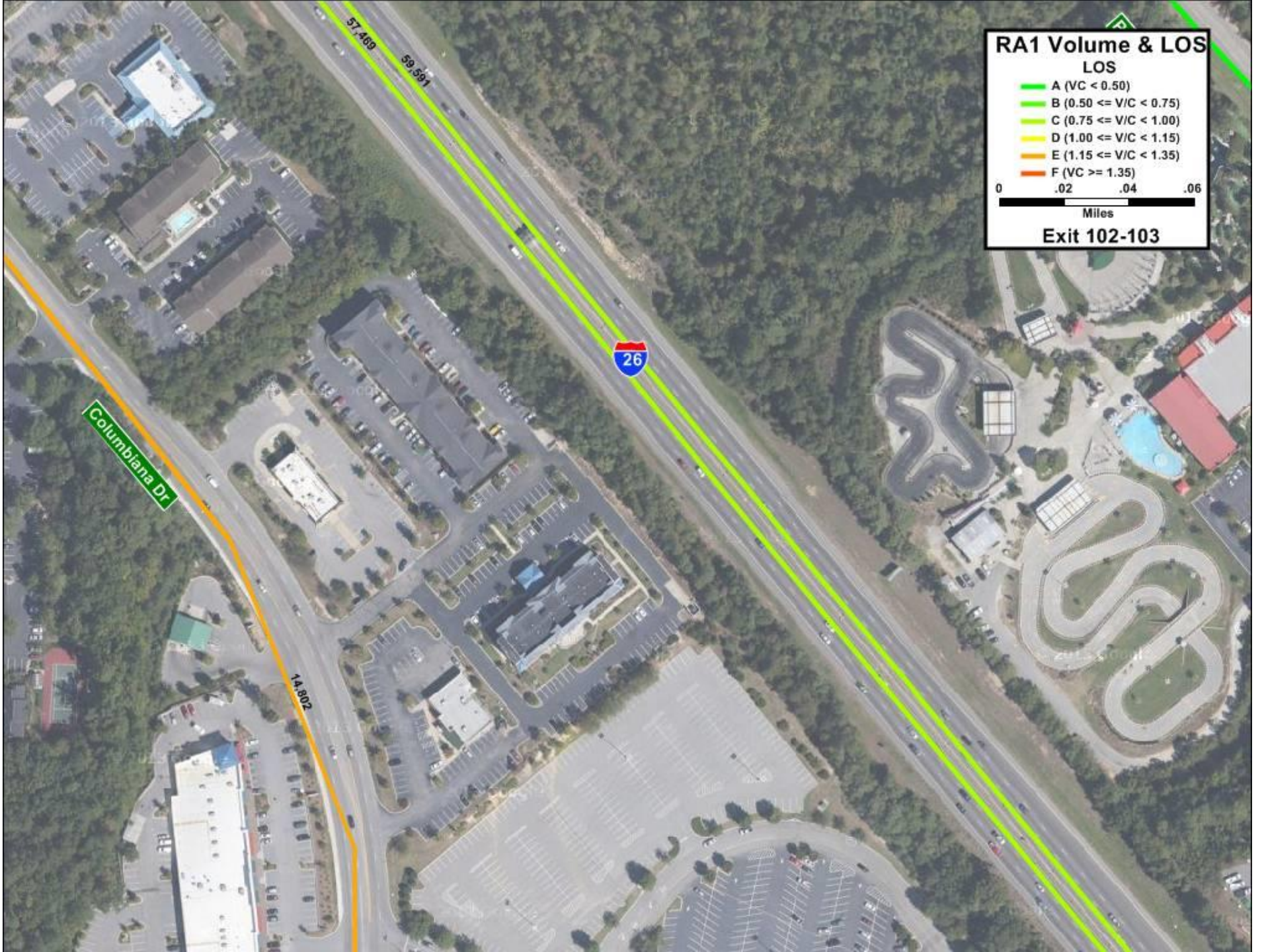

2040 EC Volume-Capacity/LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1,35)
0
.033
.067
.1
Miles
Colonial Life Blvd
Colonial Life Blvd
126
126
37,877
1,289
3,897
38,859
37,877
4,347
3,724
37,877
38,859
41,774

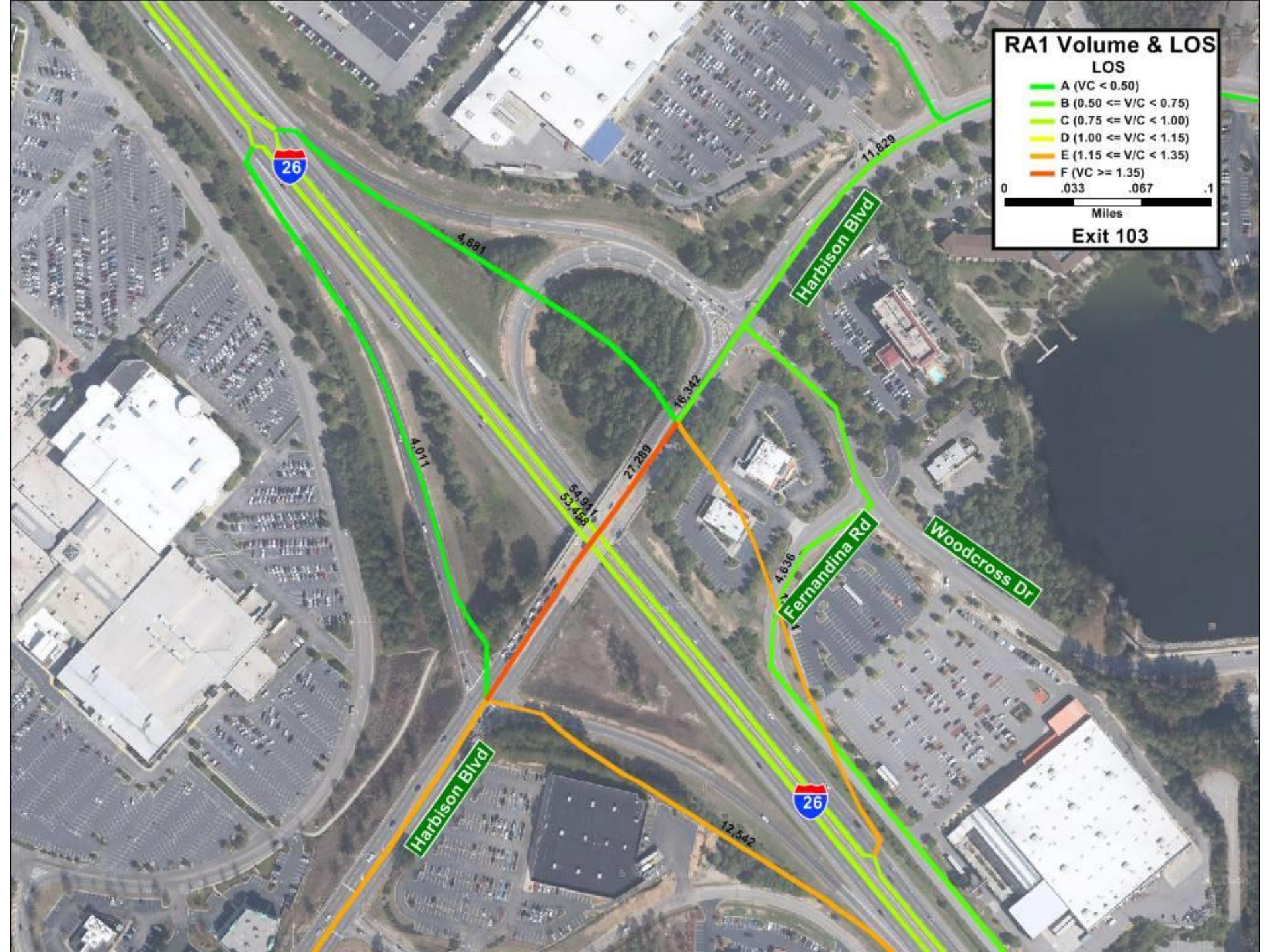
Appendix I—SCSWM RA1 Volume/LOS

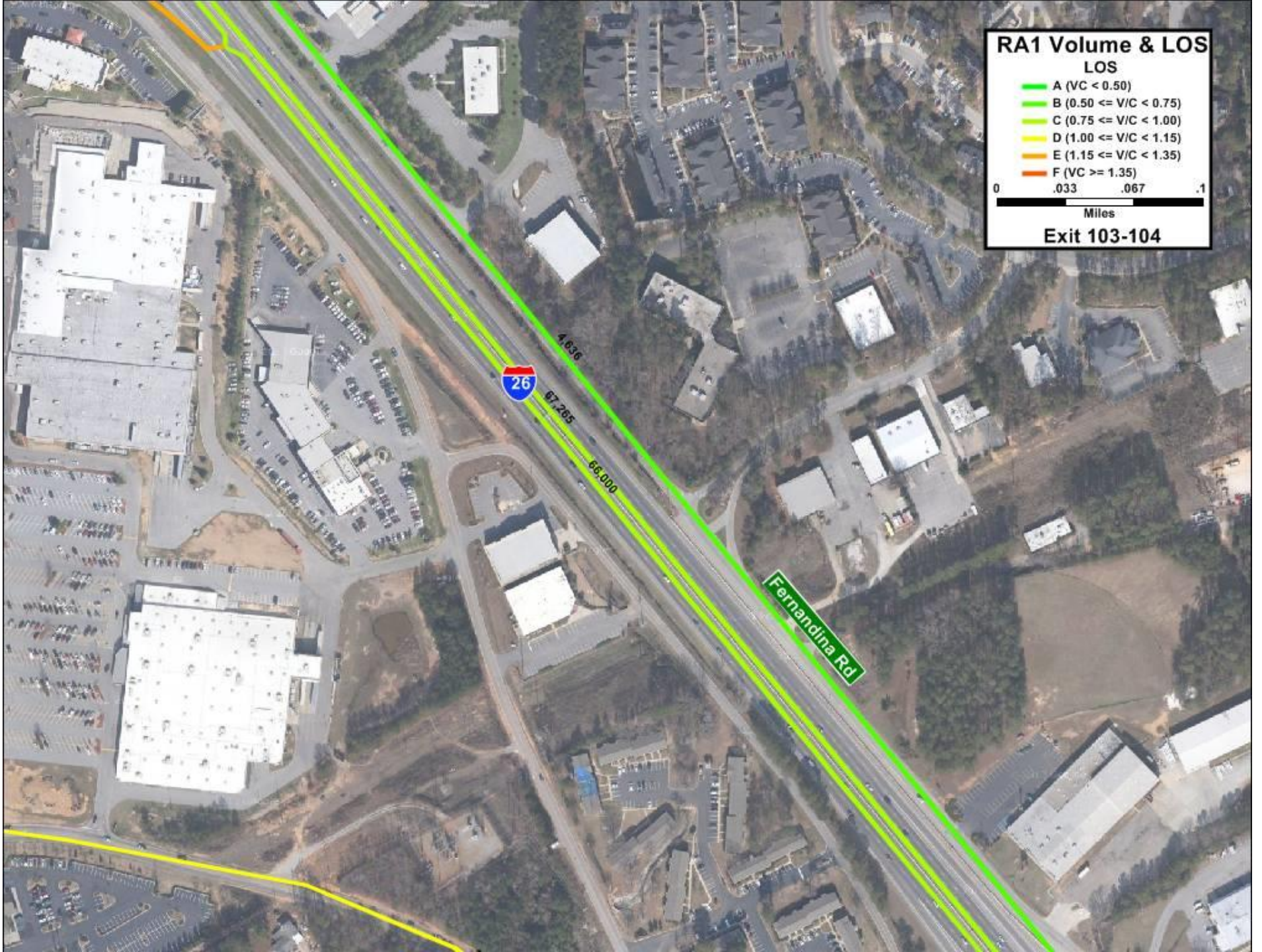

RA1 Volume & LOS
LOS
A (VC < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (VC >= 1.35)
0
.033
.067
.1
Miles
Exit 101
26
832
1,947
41,678
Broad River Rd
33,616
16,199
3,716
17,876
8,717
394
1,554
5,002
9,159
10,712
4,608
13,727
24,439
0
Broad River Rd
Columbiana Dr
35,647
42,333
1,286
12,483
9,119
26
7,803

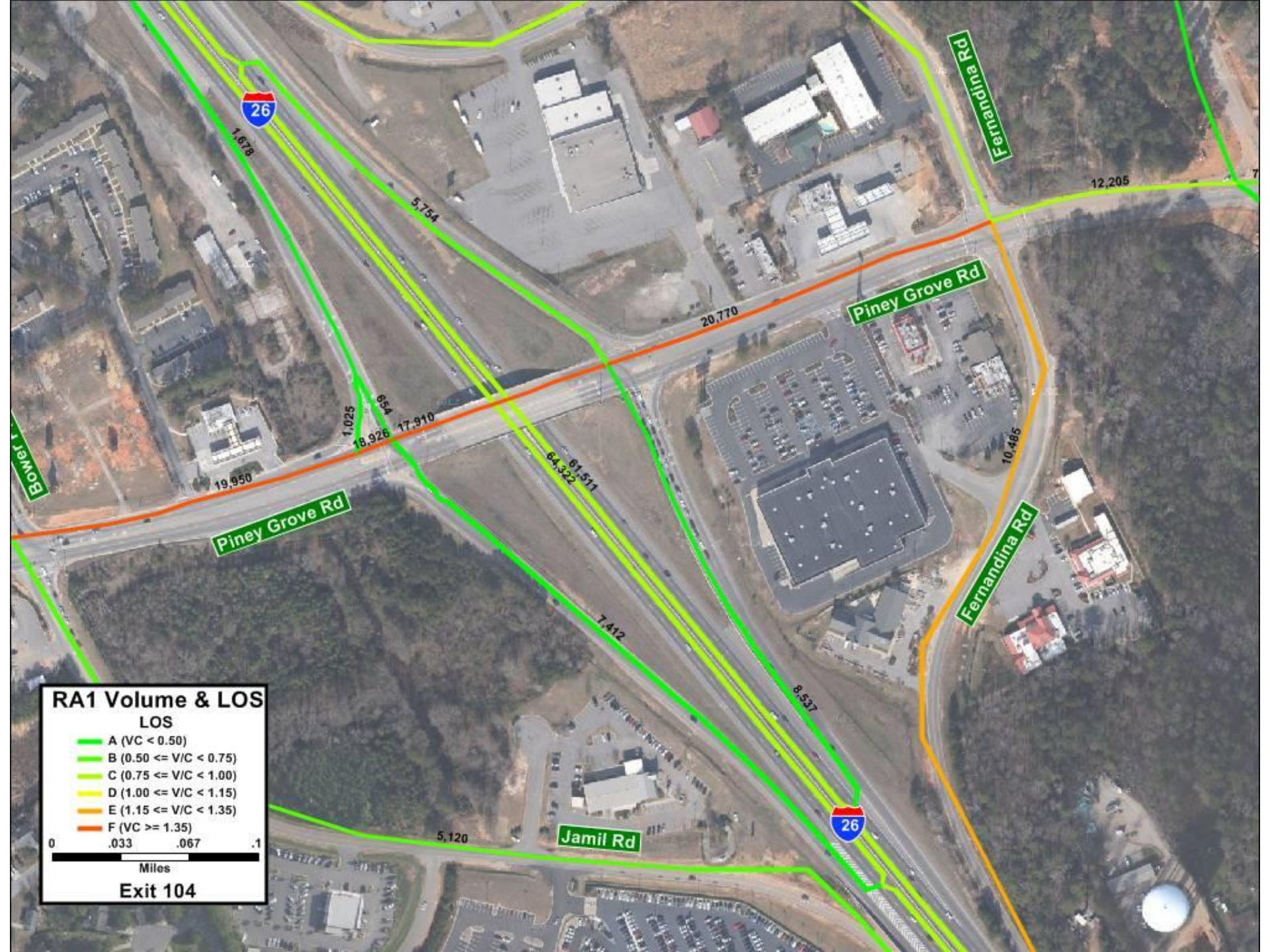

RA1 Volume & LOS
LOS
A (VC < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (VC >= 1.35)
0
.033
.067
.1
Miles
Exit 101-102
Columbiana Dr
26
26
42,333
35,547
12,483
48,030
51,452
7,803
1,399
46,631
2,424
7,447


RA1 Volume & LOS
LOS
A (VC < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (VC >= 1.35)
0
.033
.067
.1
Miles
Exit 102
26
1,399
46,631
2,424
49,029
Kinley Rd
38,187
S.C. 60
18,728
19,459
17,329
143
8,420
17,473
7,447
10,026
8,764
1,686
738
Lake Murray Blvd
11,039
10,763
7,078
17,841
S.C. 60
Lake Murray Blvd
56,475
46,287
26
Columbiana Dr
344
11,182
3,116


RA1 Volume & LOS
LOS
A (VC < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (VC >= 1.35)
0
.02
.04
.06
Miles
Exit 102-103
57,469
59,591
26
Columbiana Dr
14,802


RA1 Volume & LOS
LOS
A (VC < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (VC >= 1.35)
0
.033
.067
.1
Miles
Exit 103
26
Harbison Blvd
Fernandina Rd
Woodcross Dr
11,829
4,681
16,342
4,011
27,289
54,911
53,449
4,636
12,542

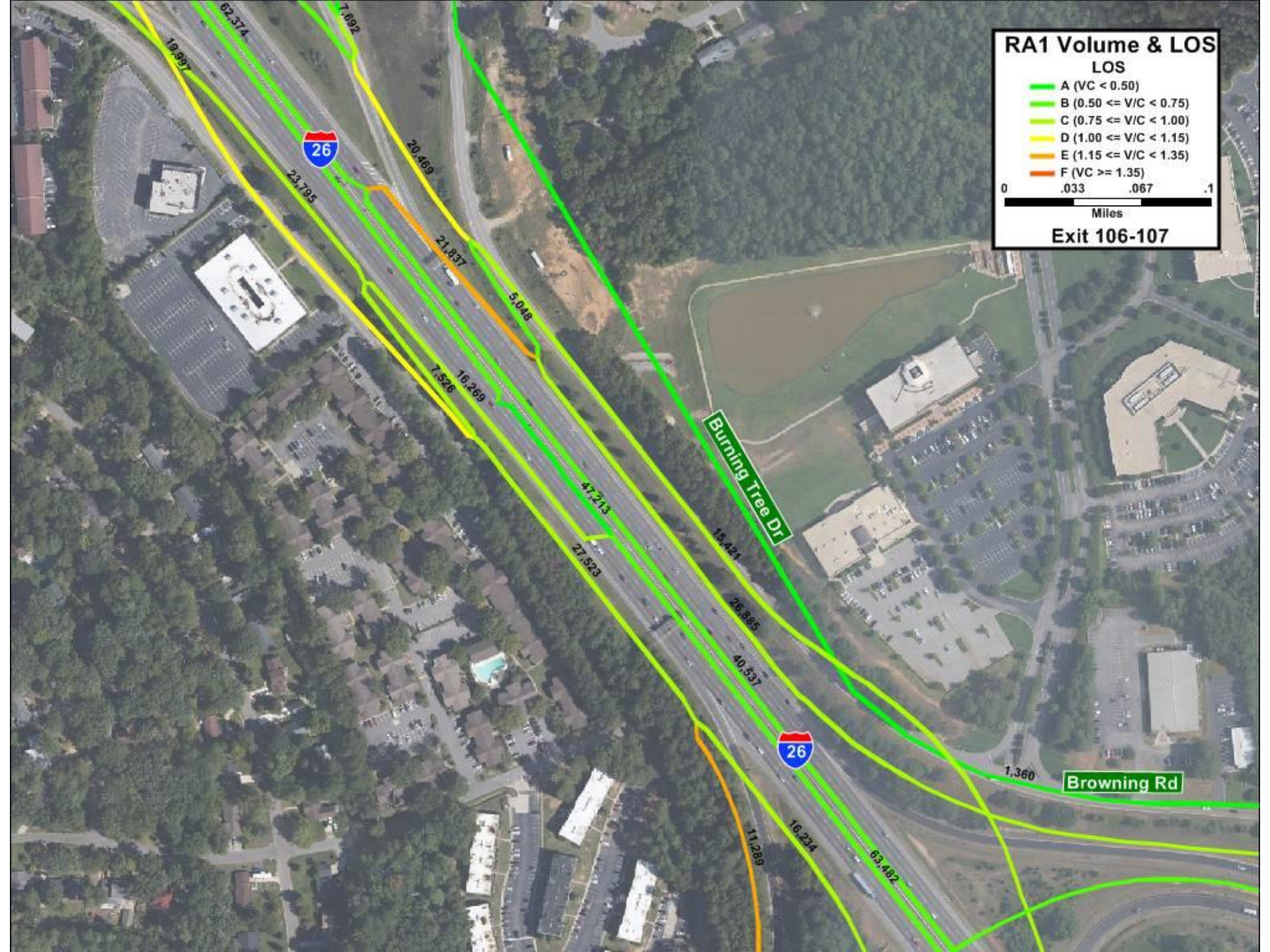

RA1 Volume & LOS
LOS
A (VC < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (VC >= 1.35)
0
.033
.067
.1
Miles
Exit 103-104
4,636
67,265
66,000
26
Fernandina Rd

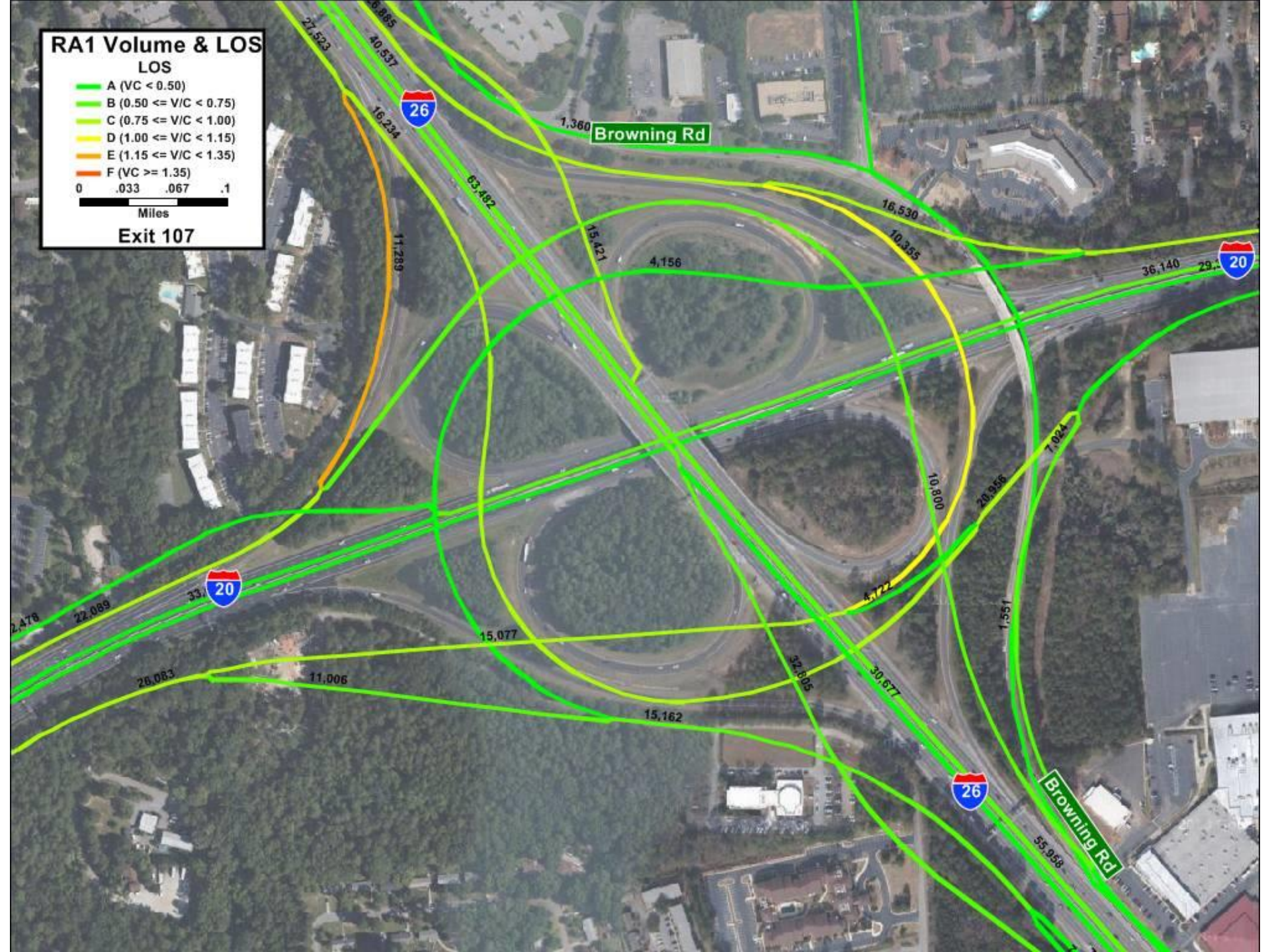

RA1 Volume & LOS
LOS
A (VC < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (VC >= 1.35)
0
.033
.067
.1
Miles
Exit 104
26
Fernandina Rd
Piney Grove Rd
Jamil Rd
1,678
5,754
12,205
20,770
1,025
654
17,910
18,926
19,950
64,322
61,511
10,485
7,412
8,537
5,120

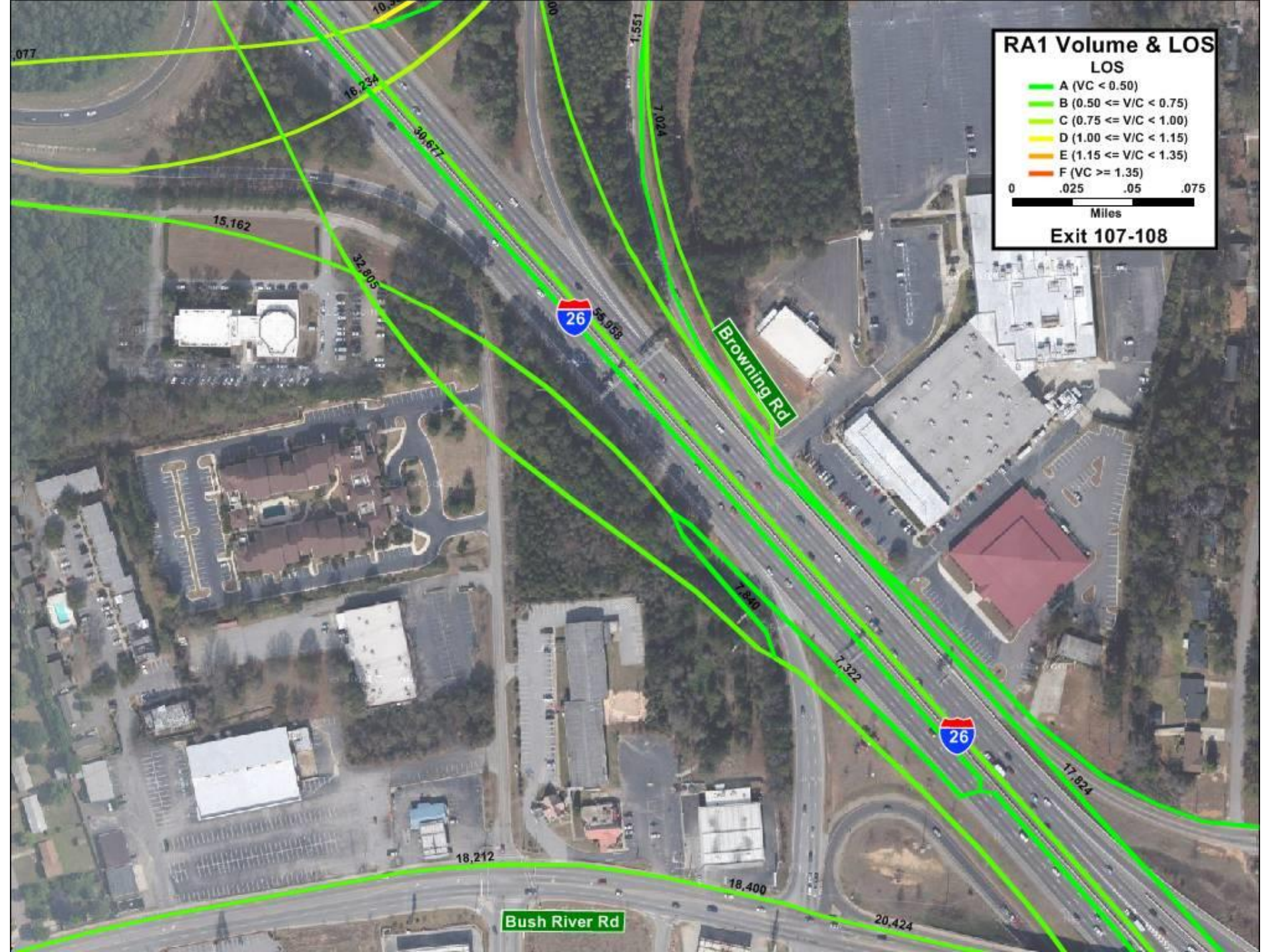

RA1 Volume & LOS
LOS
A (VC < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (VC >= 1.35)
0
.033
.067
.1
Miles
Exit 104-106
5,628
71,734
5,120
26
Fernandina Rd
Jamil Rd
1,539
Beatty Rd
70,048
Tram Rd
2,325
Fernandina Rd
Jamil Rd
26
5,562
7,355

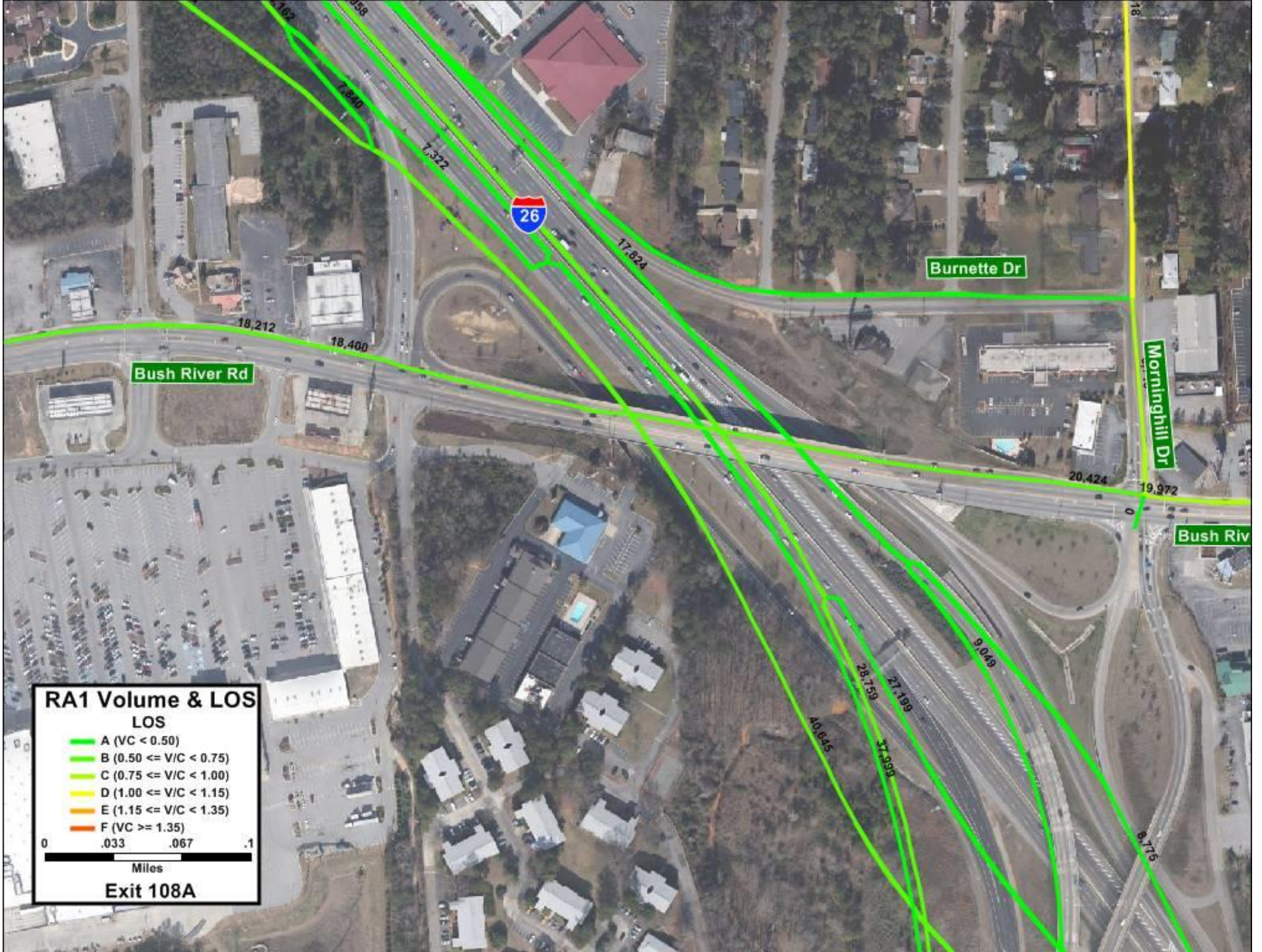

RA1 Volume & LOS
LOS
A (VC < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (VC >= 1.35)
0
.033
.067
.1
Miles
Exit 104-106
4,089
7,355
7,389
Evelyn Dr
26
67,211
4,523

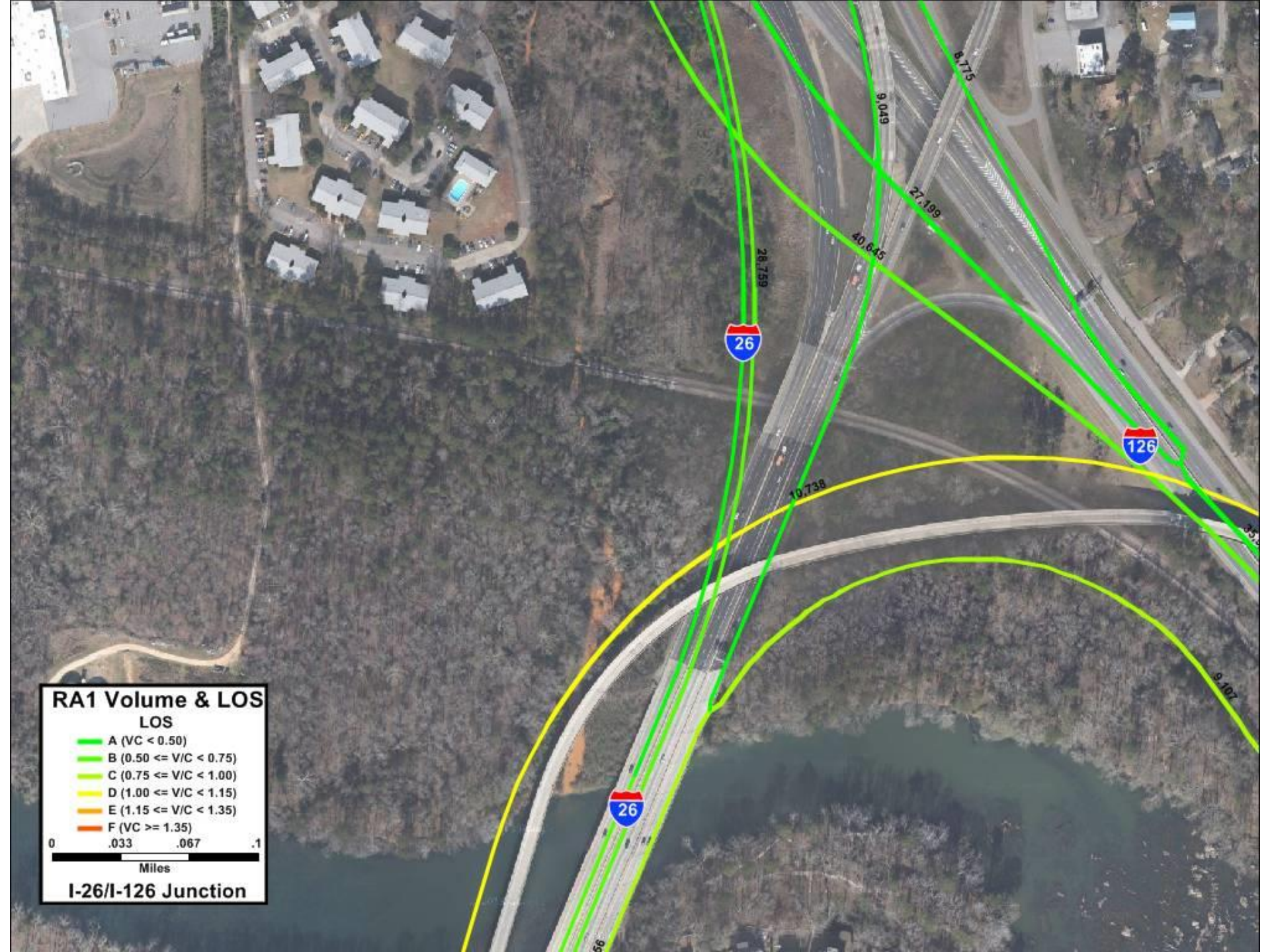

RA1 Volume & LOS
LOS
A (VC < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (VC >= 1.35)
0
.033
.067
.1
Miles
Exit 106
Jamil Rd
Fernandina Rd
St Andrews Rd
St Andrews Rd
Burning Tree Dr
26
26
6,283
4,523
7,674
7,477
25,225
26,386
26,272
62,374
47,213
5,209
1,128
3,395
2,465
21,063
27,570
26,618
38,742
37,613
12,799
10,996
12,771
6,069
1,623
7,692
1,360
0
19,997
20,469
23,795
21,837
5,048


RA1 Volume & LOS
LOS
A (VC < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (VC >= 1.35)
0
.033
.067
.1
Miles
Exit 106-107
62,374
7,692
19,997
20,469
23,795
21,837
5,048
7,526
16,269
47,213
27,523
15,424
26,885
40,537
1,360
Browning Rd
16,224
11,289
63,482
Burning Tree Dr
26
26

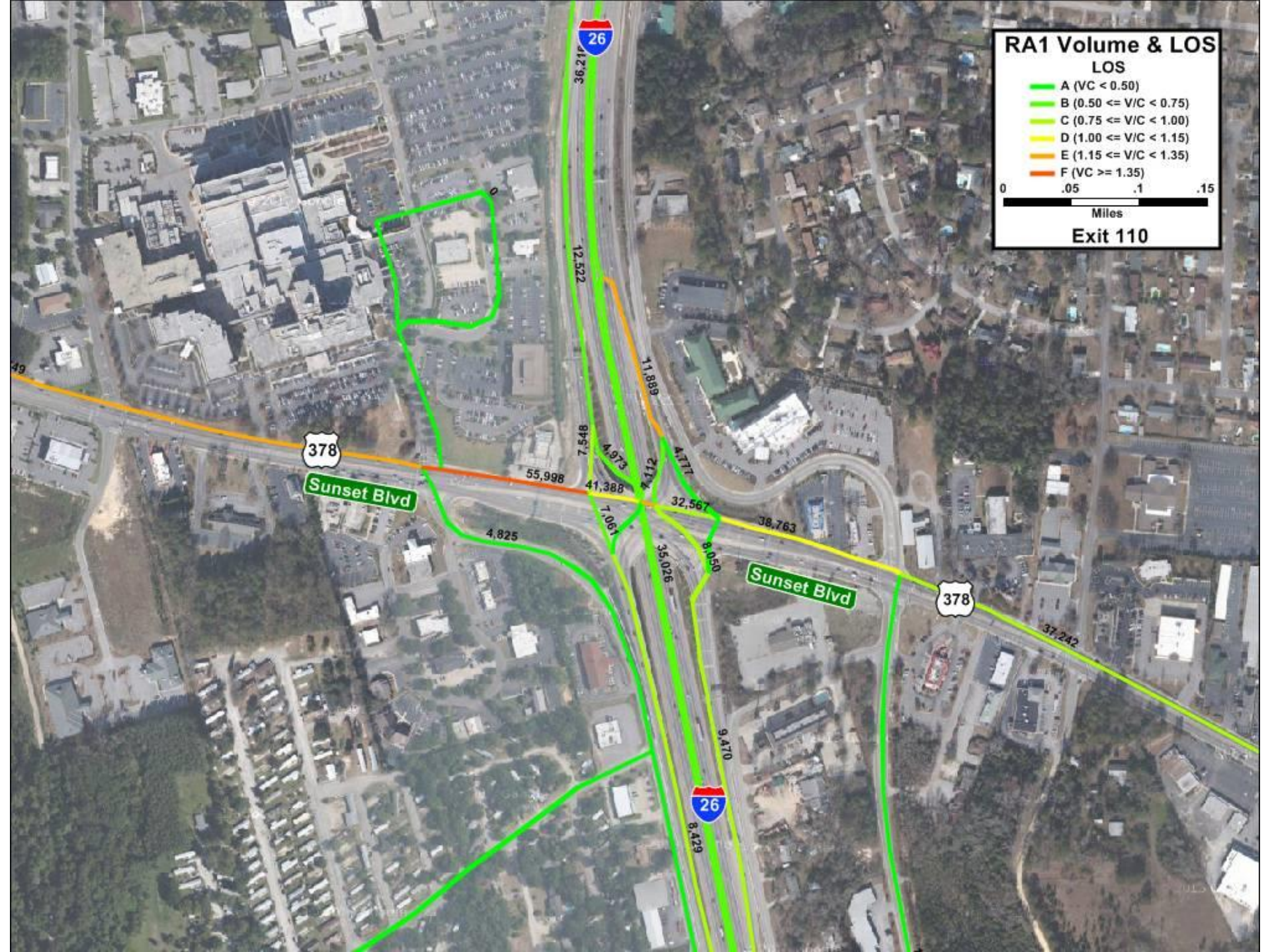

RA1 Volume & LOS
LOS
A (VC < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (VC >= 1.35)
0 .033 .067 .1
Miles
Exit 107
Browning Rd
Browning Rd
26
20
20
26
27,523
40,537
16,234
63,482
11,289
1,360
15,421
4,156
16,530
10,355
36,140
10,800
20,956
7,024
1,551
4,722
32,605
30,677
55,958
15,077
11,006
15,162
26,083
22,089

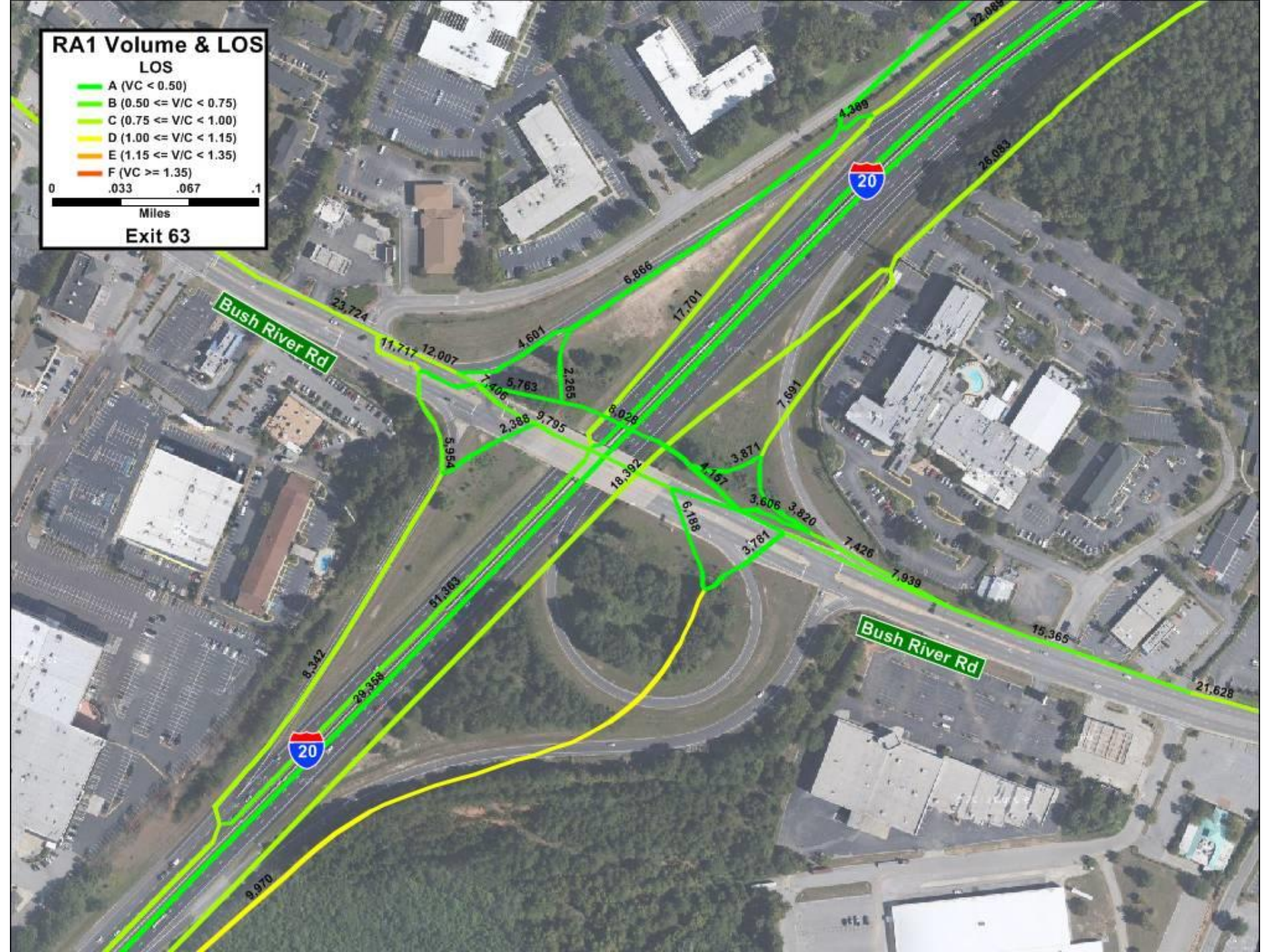

RA1 Volume & LOS
LOS
A (VC < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (VC >= 1.35)
0
.025
.05
.075
Miles
Exit 107-108
,077
16,234
30,677
1,551
7,024
15,162
32,805
26
55,958
Browning Rd
7,840
7,322
26
17,824
18,212
18,400
20,424
Bush River Rd

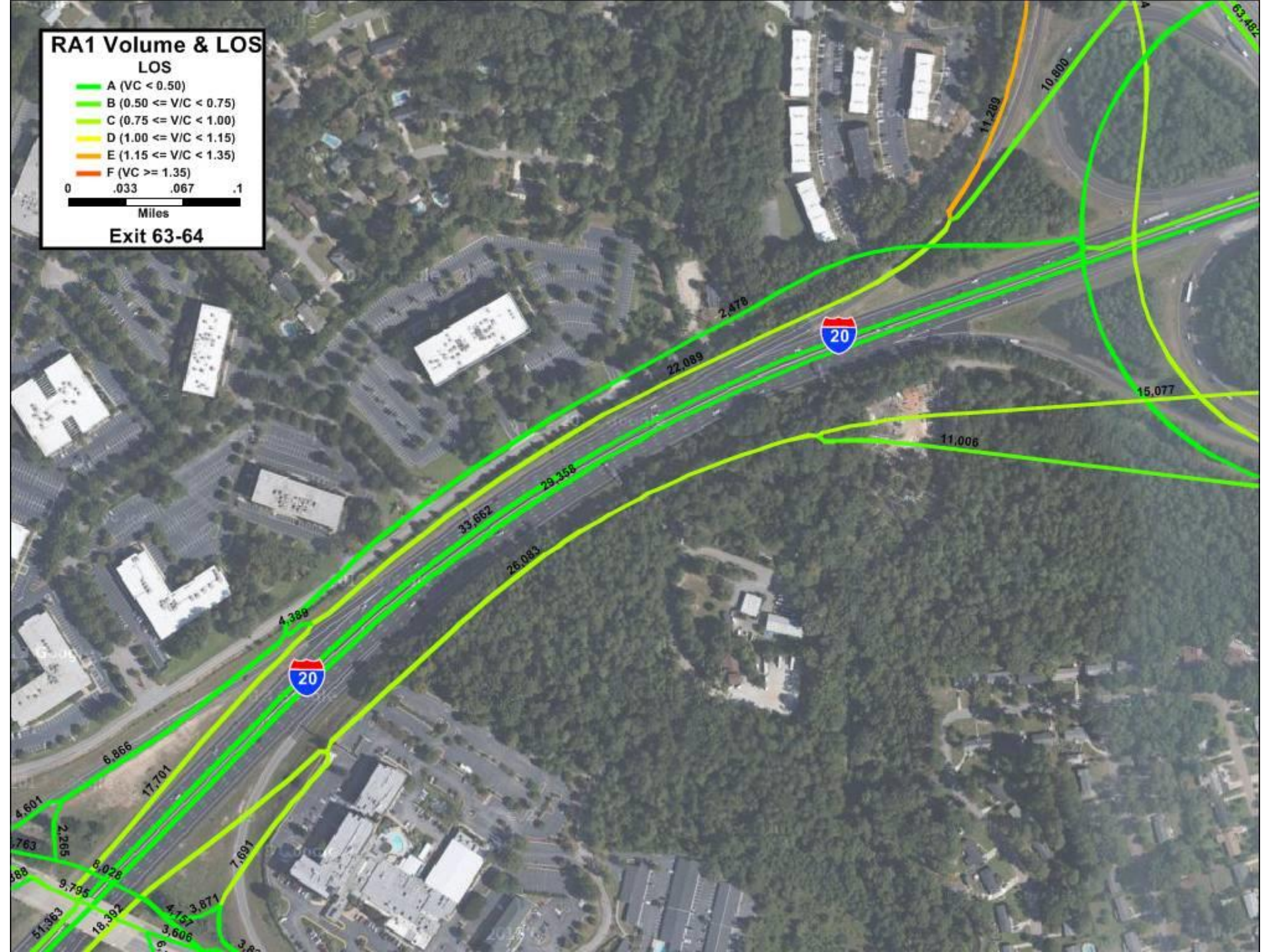

RA1 Volume & LOS
LOS
A (VC < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (VC >= 1.35)
0
.033
.067
.1
Miles
Exit 108A
26
Burnette Dr
Bush River Rd
Morninghill Dr
Bush Riv
18,212
18,400
17,624
7,322
7,840
20,424
19,972
9,049
28,759
27,199
40,645
37,999
6,775

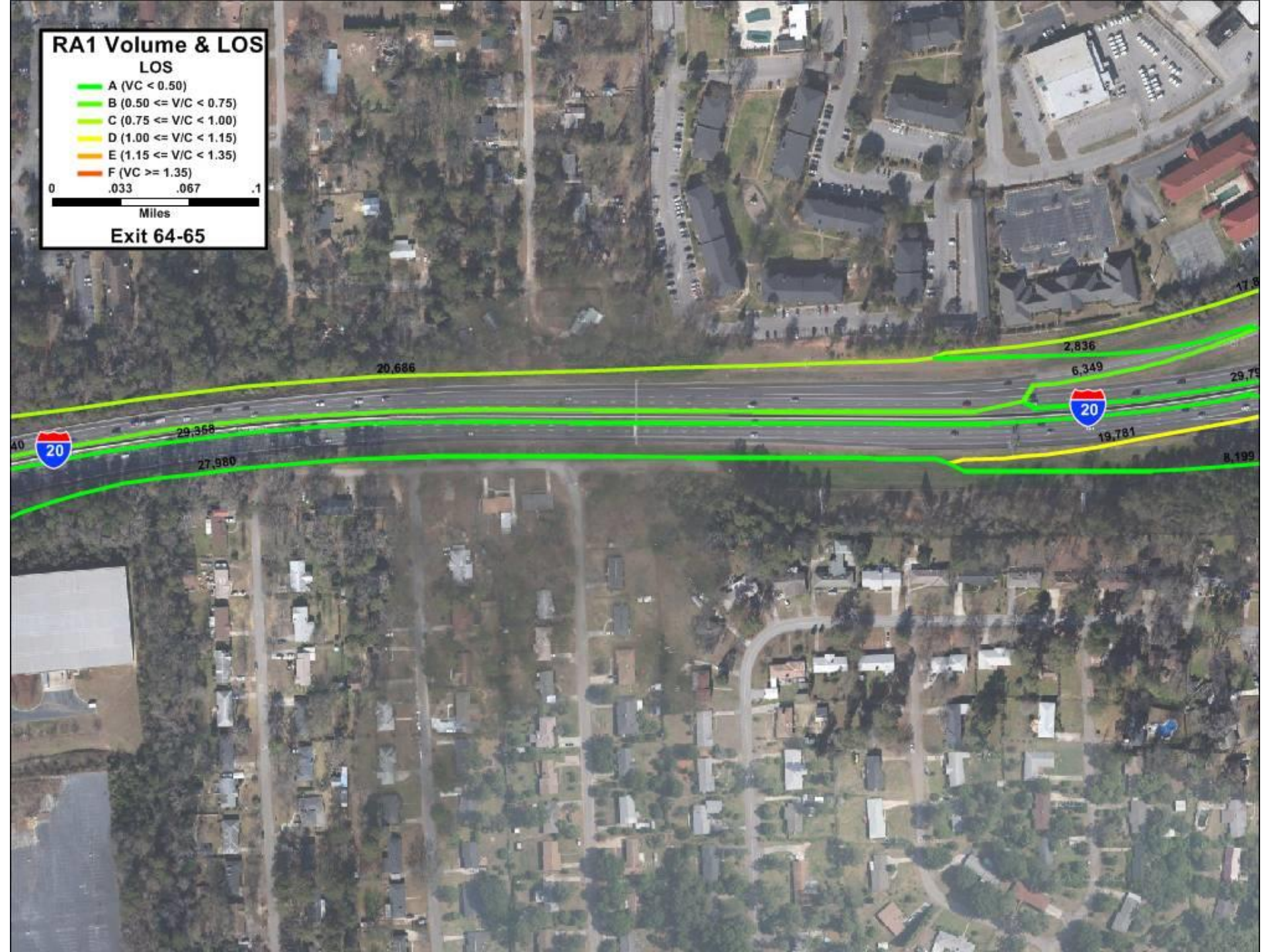

RA1 Volume & LOS
LOS
A (VC < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (VC >= 1.35)
0
.033
.067
.1
Miles
I-26/I-126 Junction
26
126
26
8,775
9,049
27,199
40,645
28,759
10,738
9,107

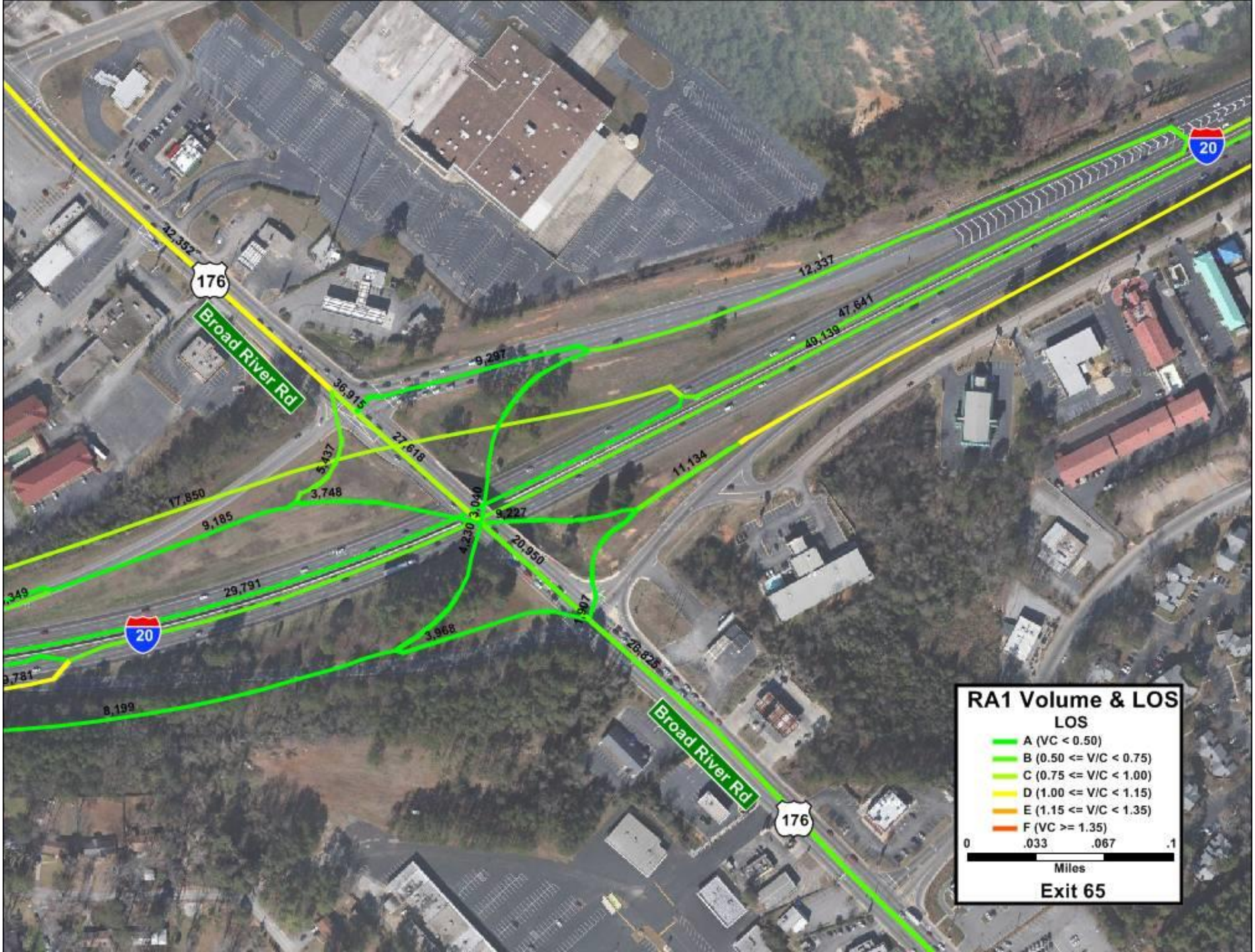

RA1 Volume & LOS
LOS
A (VC < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (VC >= 1.35)
0
.05
.1
.15
Miles
Exit 108-110
12,522
46,315
36,21
26
26


RA1 Volume & LOS
LOS
A (VC < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (VC >= 1.35)
0
.05
.1
.15
Miles
Exit 110
26
36,214
12,522
11,889
7,548
4,973
2,112
4,777
55,998
41,388
32,567
38,763
7,061
4,825
35,026
8,050
37,242
9,470
8,429
378
Sunset Blvd
Sunset Blvd
378
26

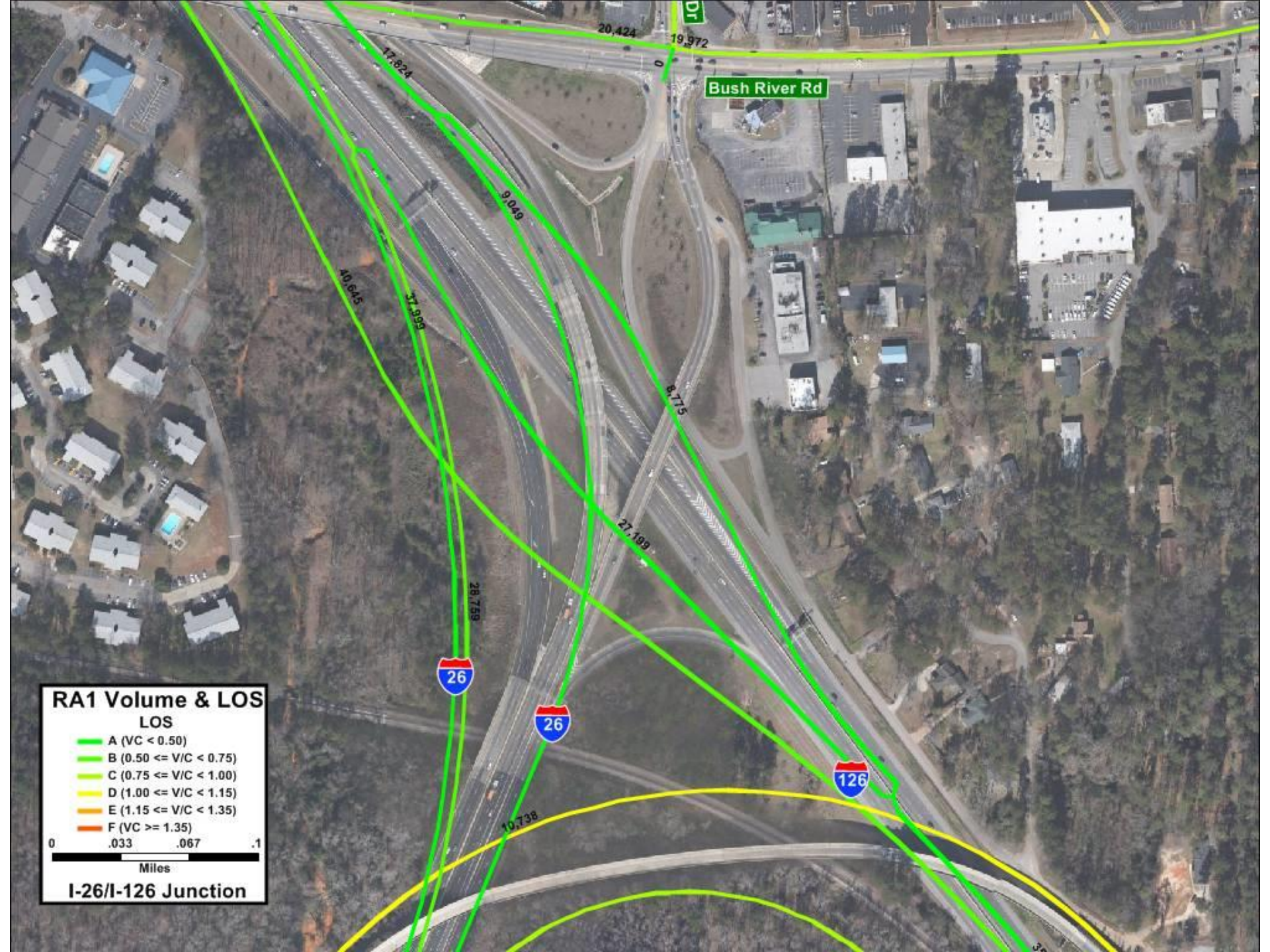

RA1 Volume & LOS
LOS
A (VC < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (VC >= 1.35)
0
.033
.067
.1
Miles
Exit 63
Bush River Rd
Bush River Rd
20
20
4,389
26,083
6,866
17,701
23,724
11,717
12,007
4,601
2,265
7,406
5,763
8,028
2,388
9,795
5,954
7,691
3,871
4,157
18,392
6,188
3,606
3,820
3,761
7,426
7,939
15,365
21,628
51,363
8,342
29,358
9,970

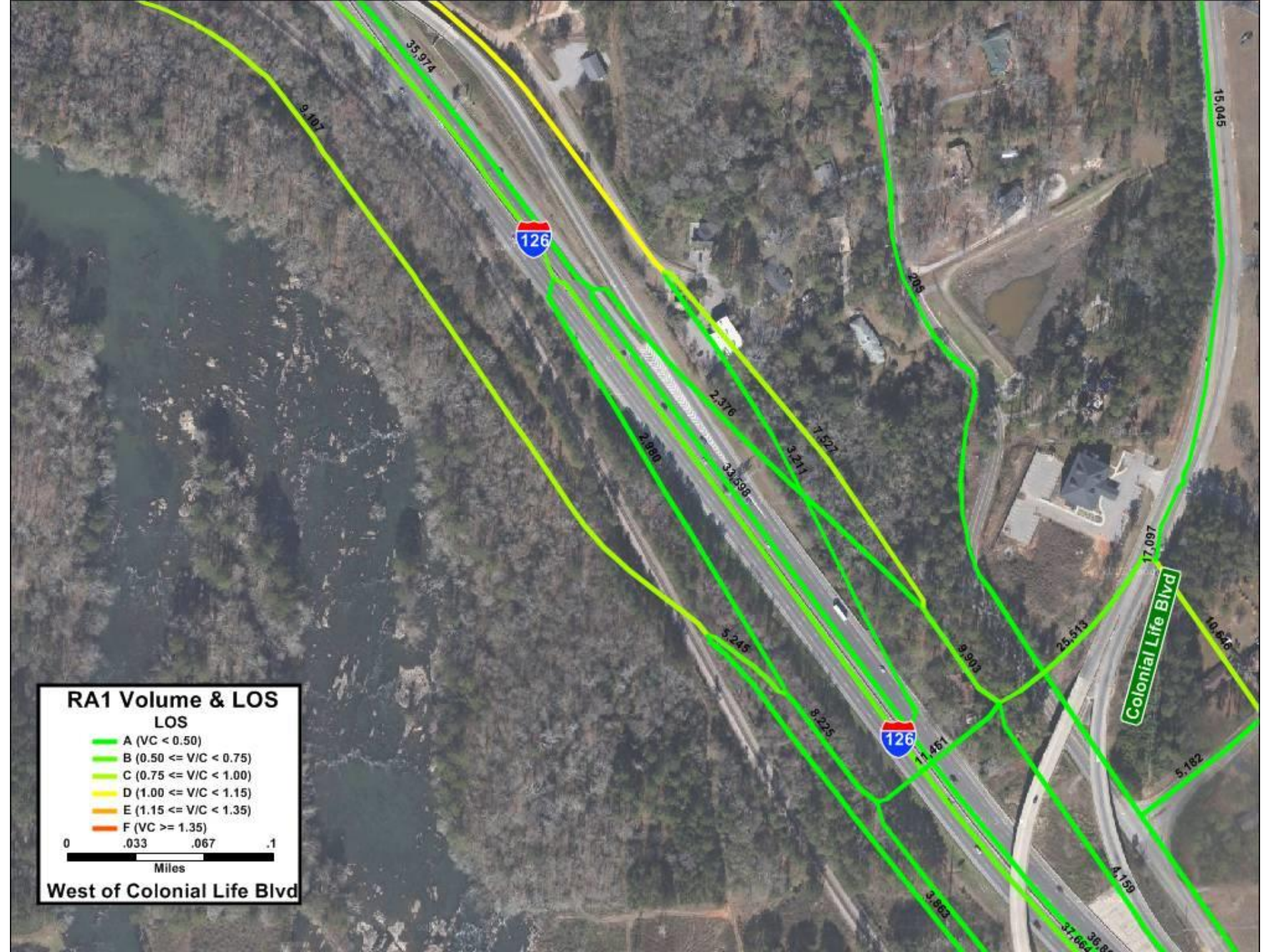

RA1 Volume & LOS
LOS
A (VC < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (VC >= 1.35)
0
.033
.067
.1
Miles
Exit 63-64
20
20
11,289
10,600
2,478
22,089
15,077
11,006
29,358
33,662
26,083
4,389
6,866
17,701
4,601
2,265
8,028
7,691
9,795
3,871
4,157
3,606
18,392
51,363

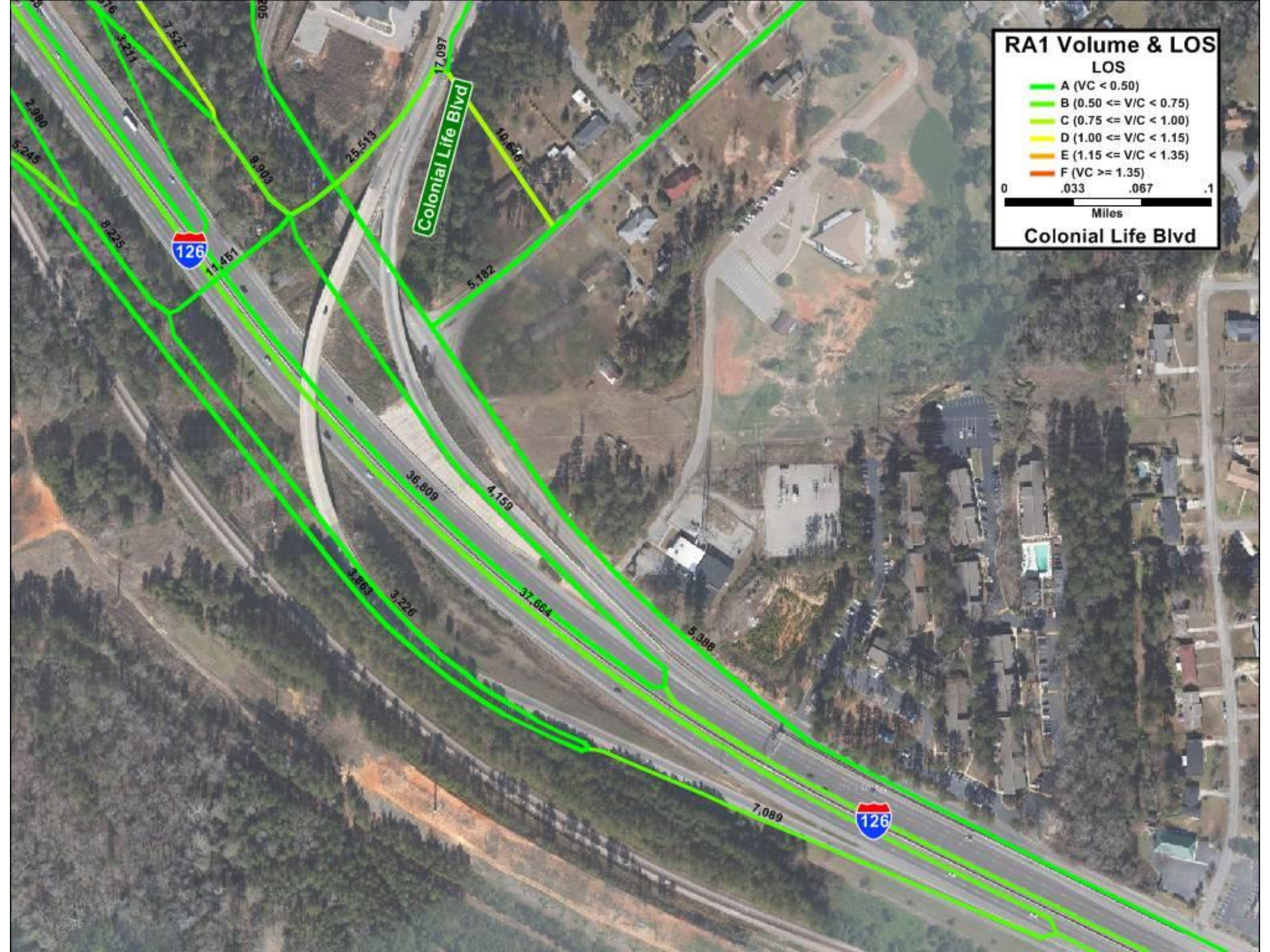

RA1 Volume & LOS
LOS
A (VC < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (VC >= 1.35)
0
.033
.067
.1
Miles
Exit 64-65
20,686
29,358
27,980
2,836
6,349
19,781
8,199
20
20


RA1 Volume & LOS
LOS
A (VC < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (VC >= 1.35)
0
.033
.067
.1
Miles
Exit 65
Broad River Rd
Broad River Rd
176
176
20
20
42,392
36,915
27,618
9,297
12,337
47,641
49,139
11,134
3,437
3,748
17,850
9,185
3,040
9,227
4,230
20,950
29,791
3,968
8,199
26,825

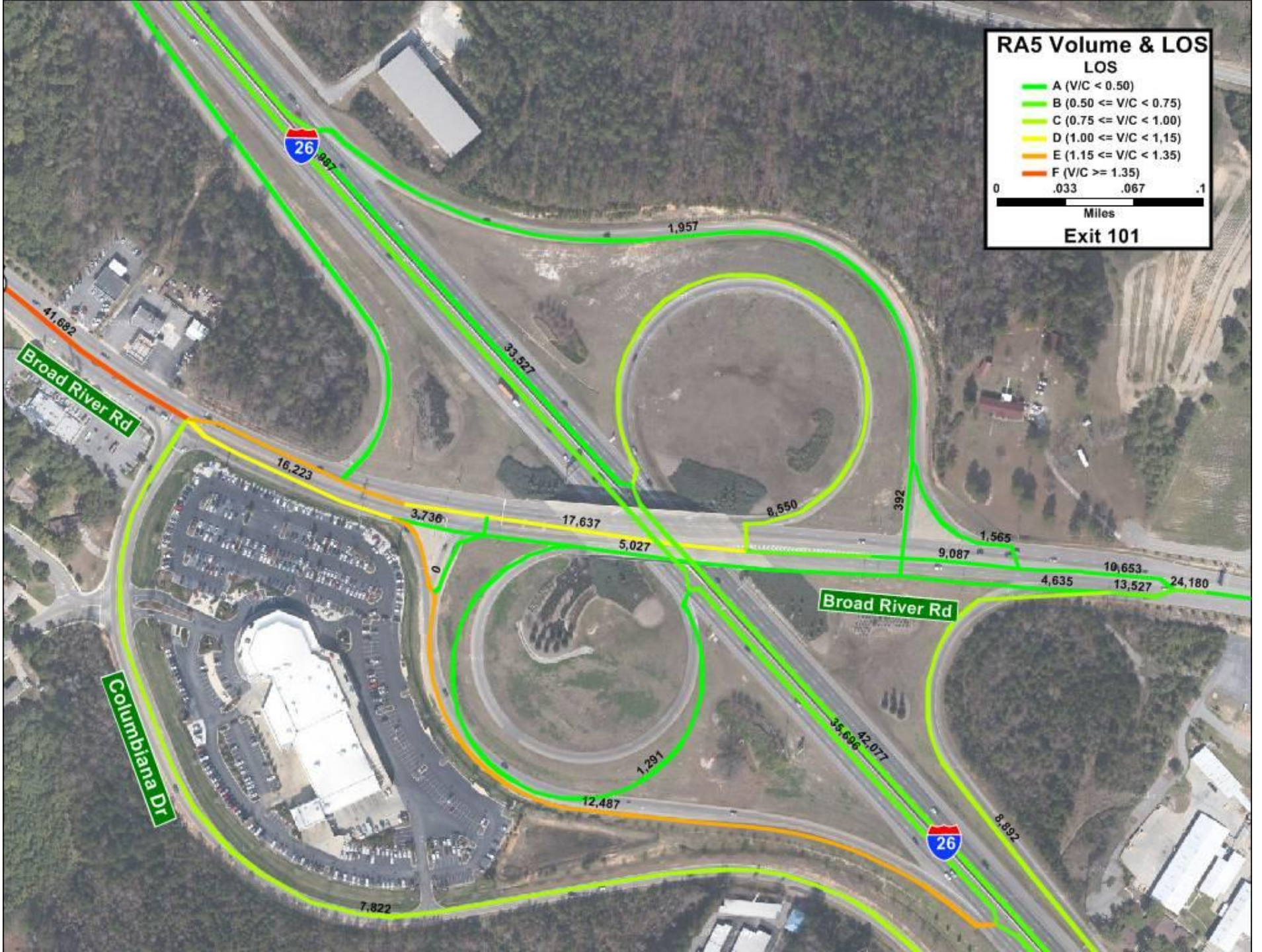

59,978
20
60,273
RA1 Volume & LOS
LOS
A (VC < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (VC >= 1.35)
0
.033
.067
.1
Miles
East of Exit 65

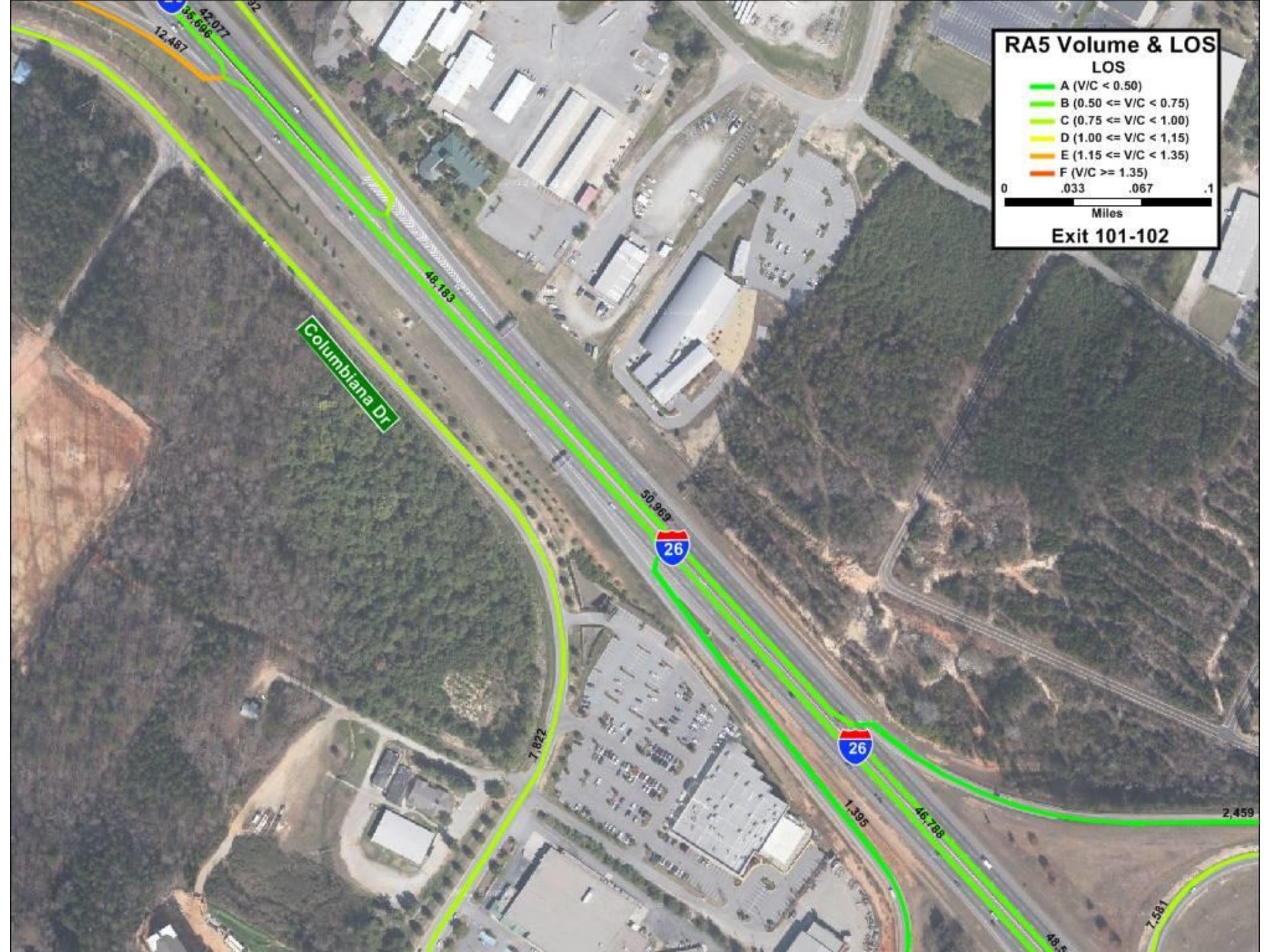

Bush River Rd
20,424
19,972
17,824
0
9,049
40,645
37,999
8,775
27,199
28,759
10,738
26
26
126
RA1 Volume & LOS
LOS
A (VC < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (VC >= 1.35)
0
.033
.067
.1
Miles
I-26/I-126 Junction

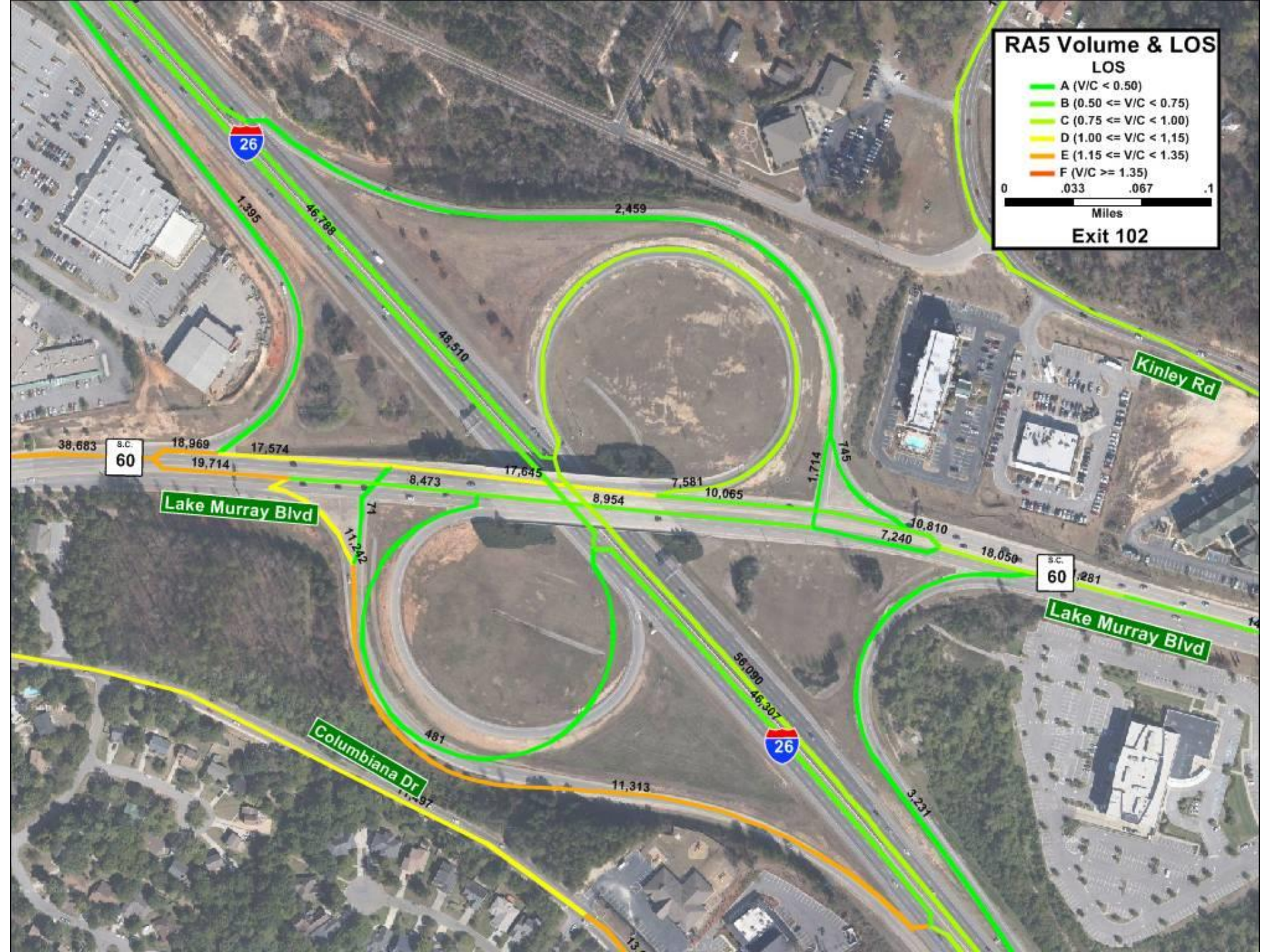

RA1 Volume & LOS
LOS
A (VC < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (VC >= 1.35)
0
.033
.067
.1
Miles
West of Colonial Life Blvd
126
126
Colonial Life Blvd
35,974
9,107
15,045
208
2,376
7,527
3,211
2,980
33,598
17,097
10,646
25,513
9,903
5,245
9,225
11,461
5,182
4,159
3,863


RA1 Volume & LOS
LOS
A (VC < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (VC >= 1.35)
0
.033
.067
.1
Miles
Colonial Life Blvd
Colonial Life Blvd
126
126
7,521
3,211
17,097
2,980
5,245
9,903
25,513
10,646
8,225
11,451
5,182
36,809
4,159
3,863
3,226
37,664
5,388
7,089

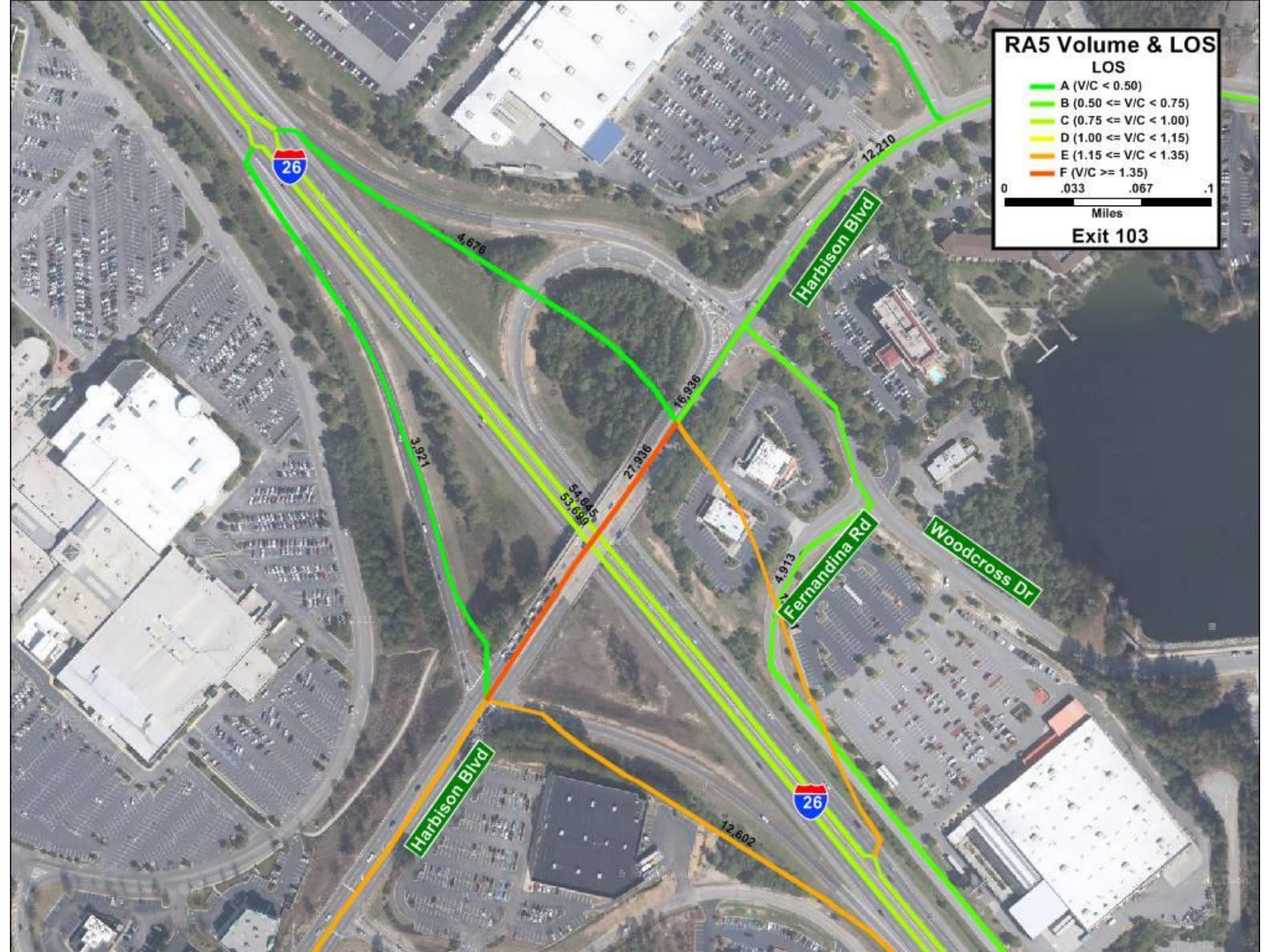
Appendix J— SCSWM RA5 Volume/LOS


RA5 Volume & LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1,15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1.35)
0
.033
.067
.1
Miles
Exit 101
26
987
1,957
41,682
Broad River Rd
33,527
16,223
3,736
17,637
8,550
392
1,565
5,027
9,087
10,653
4,635
13,527
24,180
Broad River Rd
0
Columbiana Dr
35,606
42,077
1,291
12,487
8,892
26
7,822

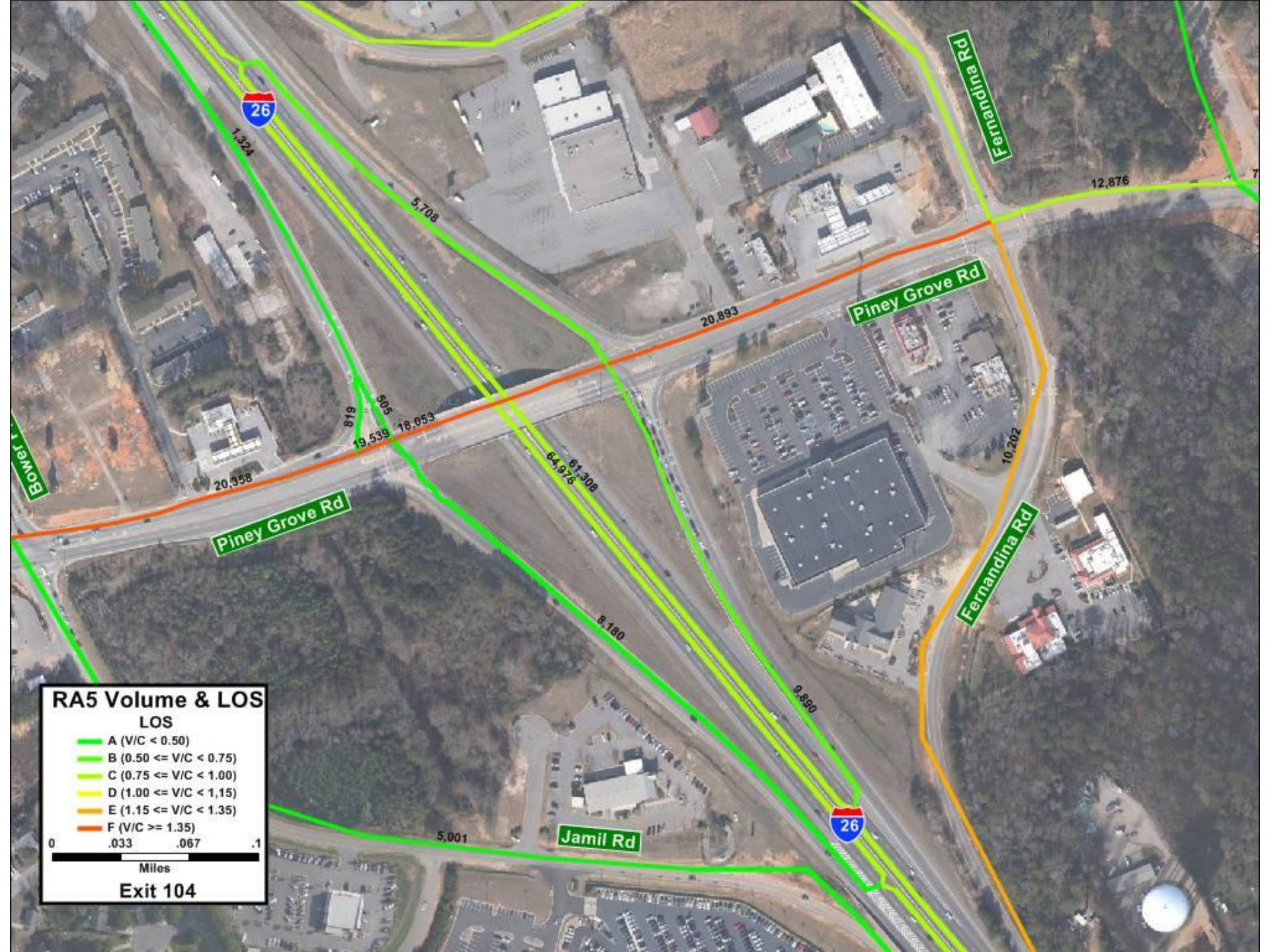

RA5 Volume & LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1,15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1.35)
0
.033
.067
.1
Miles
Exit 101-102
Columbiana Dr
26
26
42,077
35,696
12,487
48,183
50,969
7,822
1,395
46,788
2,459
7,581


RA5 Volume & LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1,15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1.35)
0
.033
.067
.1
Miles
Exit 102
26
1,395
46,788
2,459
48,510
Kinley Rd
38,683
S.C. 60
18,969
19,714
17,574
17,645
8,473
8,954
7,581
10,065
1,714
745
Lake Murray Blvd
71
11,242
10,810
7,240
18,050
S.C. 60
Lake Murray Blvd
56,090
46,307
26
481
Columbiana Dr
11,313
3,231


RA5 Volume & LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1,15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1.35)
0
.02
.04
.06
Miles
Exit 102-103
57,620
59,321
26
Columbiana Dr
14,823


RA5 Volume & LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1,15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1.35)
0
.033
.067
.1
Miles
Exit 103
26
4,676
12,210
Harbison Blvd
16,936
3,921
27,936
54,645
53,699
4,913
Fernandina Rd
Woodcross Dr
Harbison Blvd
26
12,602


RA5 Volume & LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1,15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1.35)
0
.033
.067
.1
Miles
Exit 103-104
26
4,913
67,016
66,300
Fernandina Rd

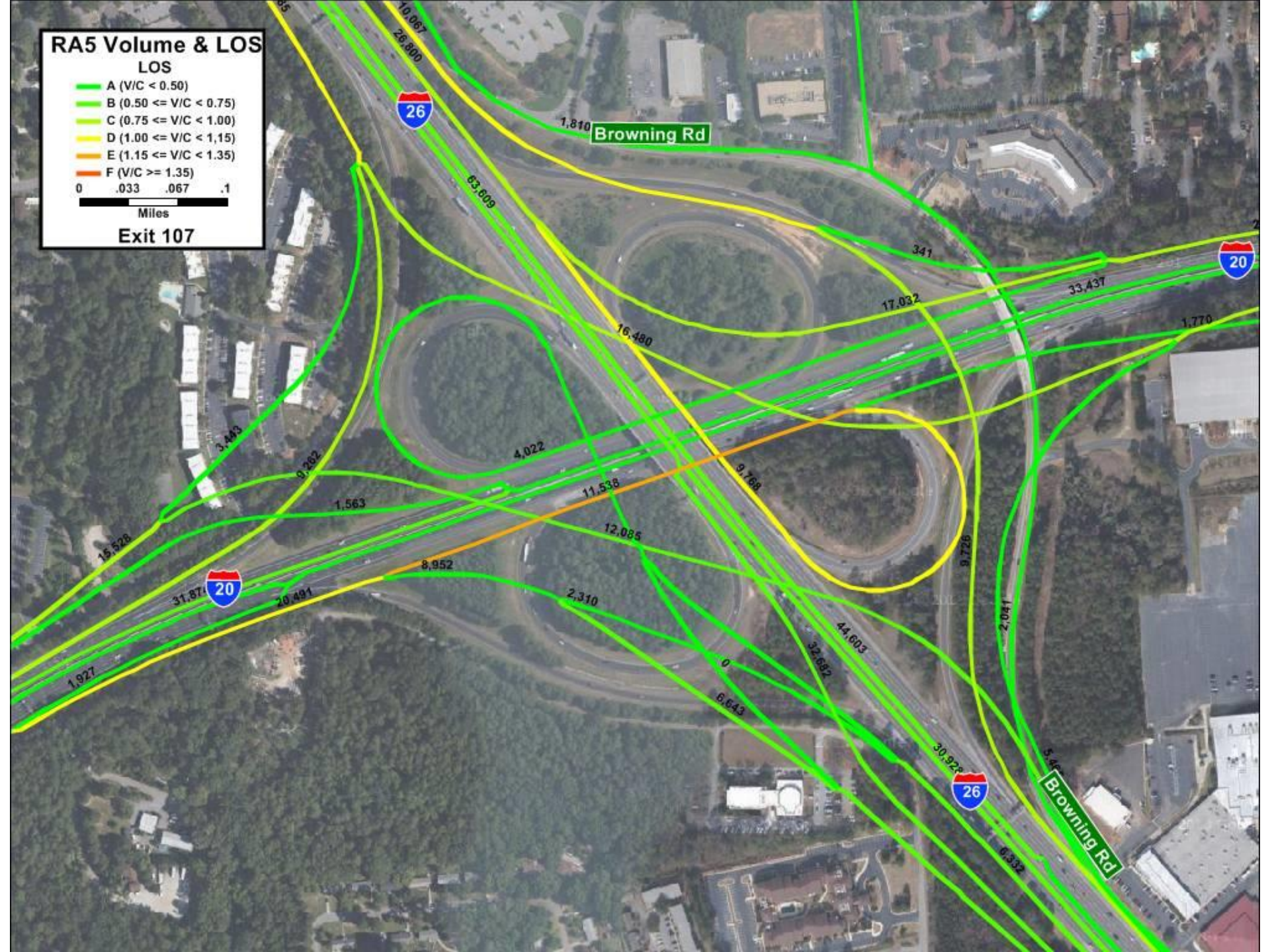

RA5 Volume & LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1,15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1.35)
0
.033
.067
.1
Miles
Exit 104
26
Fernandina Rd
Piney Grove Rd
Jamil Rd
1,324
5,708
12,876
20,893
819
505
16,053
19,539
20,358
64,976
61,309
10,202
8,180
9,890
5,001

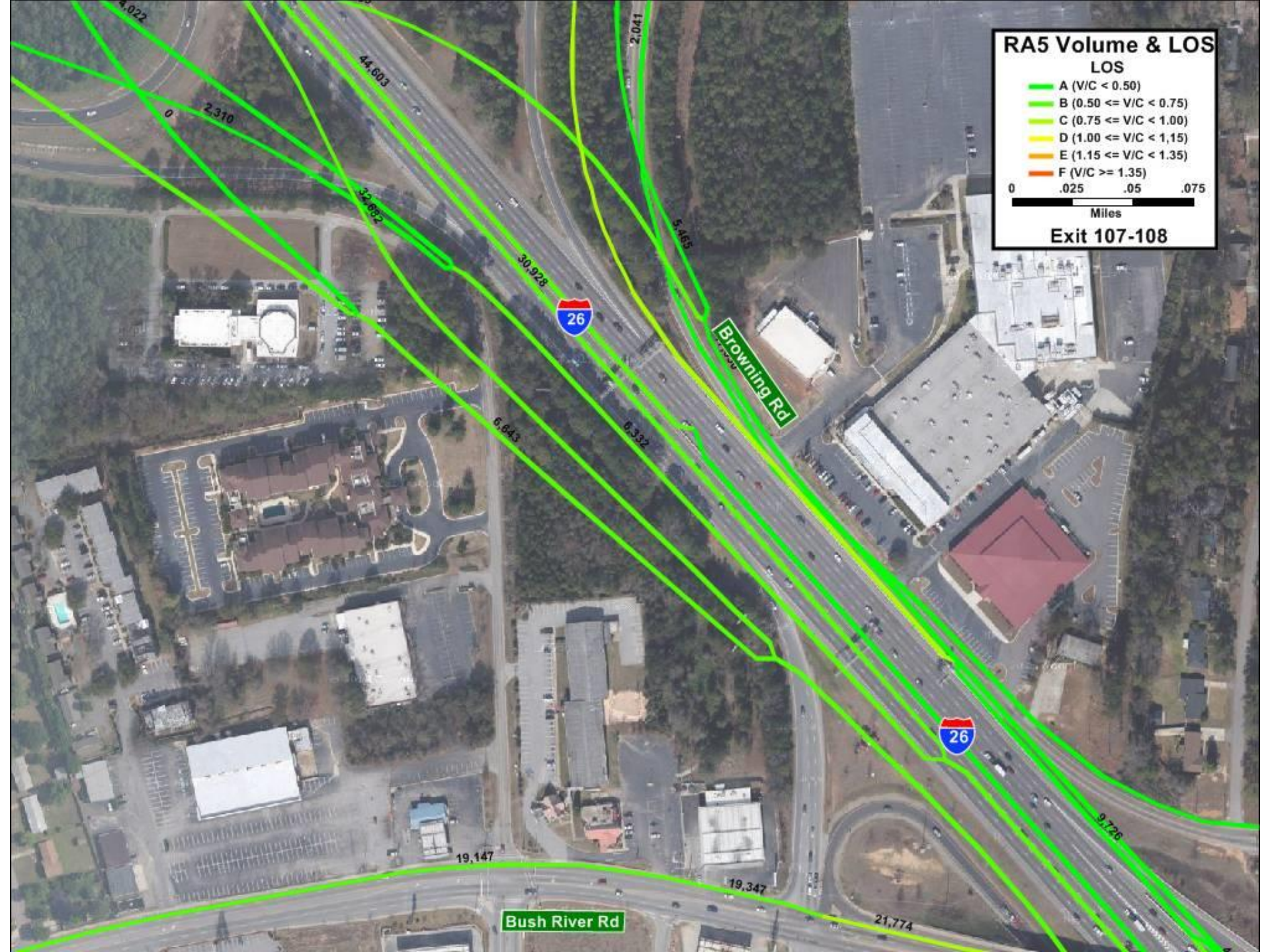

RA5 Volume & LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1.15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1.35)
0
.033
.067
.1
Miles
Exit 104-106
Fernandina Rd
Jamil Rd
Tram Rd
Beatty Rd
26
5,137
23,156
5,001
1,208
71,198
2,316
5,435
7,246

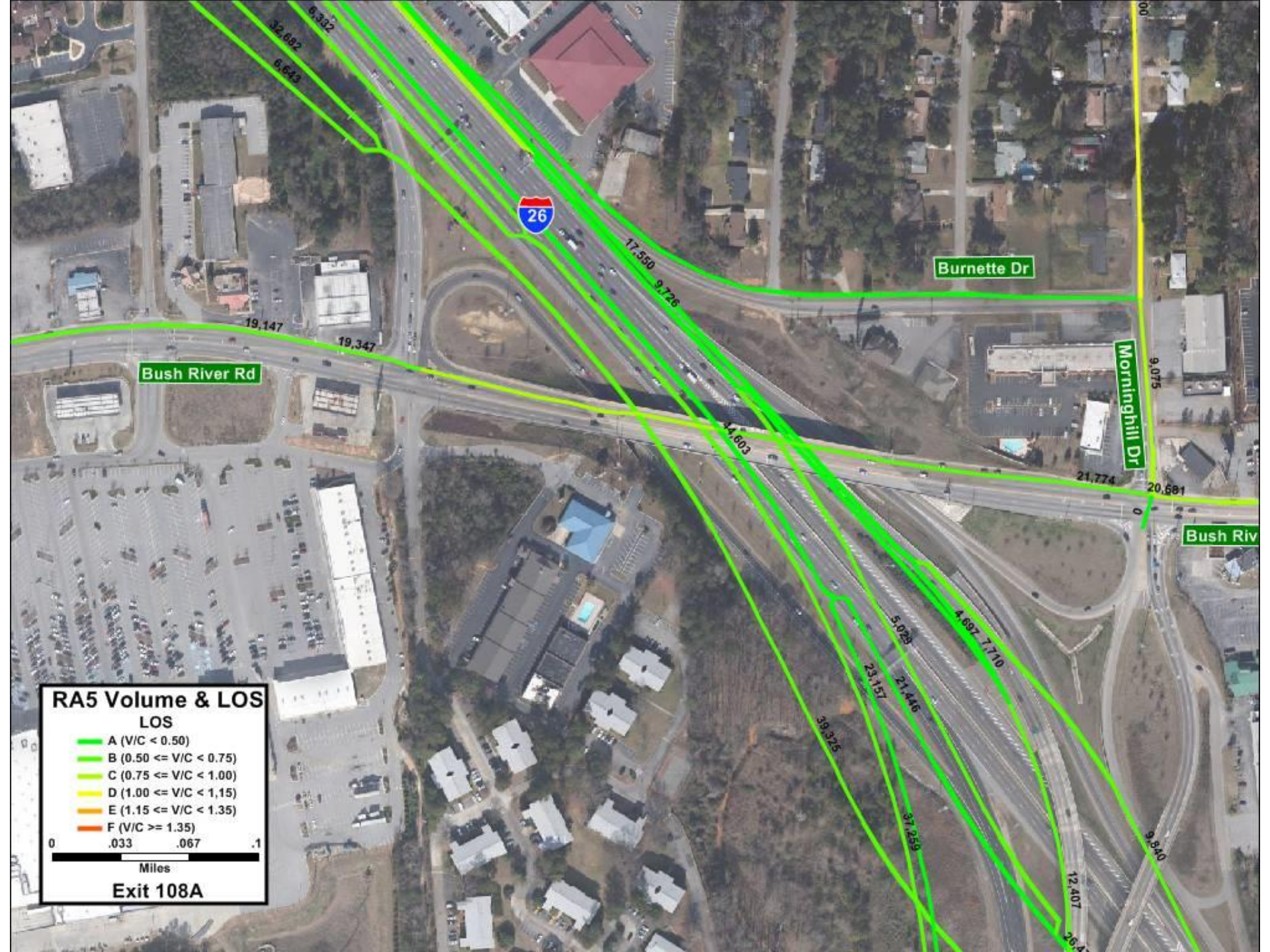

RA5 Volume & LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1,15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1.35)
0
.033
.067
.1
Miles
Exit 104-106
7,246
7,269
Evelyn Dr
26
54,969

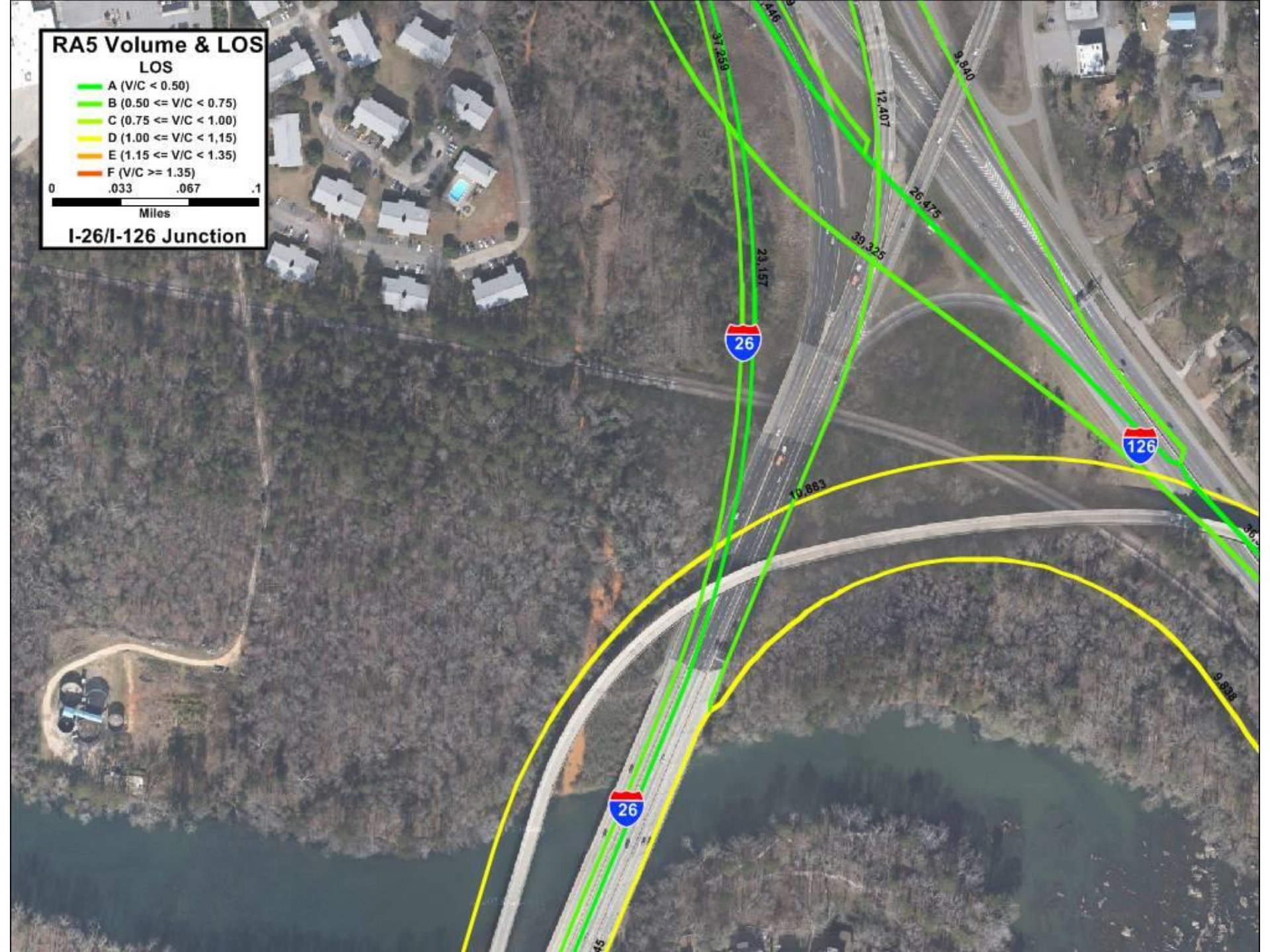

RA5 Volume & LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1,15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1.35)
0
.033
.067
.1
Miles
Exit 106
Jamil Rd
Fernandina Rd
St Andrews Rd
St Andrews Rd
Burning Tree Dr
26
26
6,422
8,321
18,187
6,260
7,338
25,103
26,261
27,610
64,938
46,647
2,173
4,087
1,440
6,881
23,522
26,461
17,391
38,469
10,568
10,423
4,882
1,227
6,109
1,810
0
27,960
16,532
20,335
6,465


RA5 Volume & LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1,15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1.35)
0
.033
.067
.1
Miles
Exit 106-107
64,938
46,647
6,109
10,423
27,960
16,532
20,335
6,465
10,998
16,962
63,609
29,185
26,800
44,603
10,067
1,810
Burning Tree Dr
Browning Rd
26
26


RA5 Volume & LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1,15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1.35)
0 .033 .067 .1
Miles
Exit 107
26
Browning Rd
20
1,810
63,609
341
33,437
17,032
1,770
16,480
4,022
3,443
9,262
1,563
11,538
9,768
12,085
15,528
8,952
31,87
20,491
2,310
44,603
32,692
9,726
2,041
0
6,643
1,927
30,92
6,332
Browning Rd

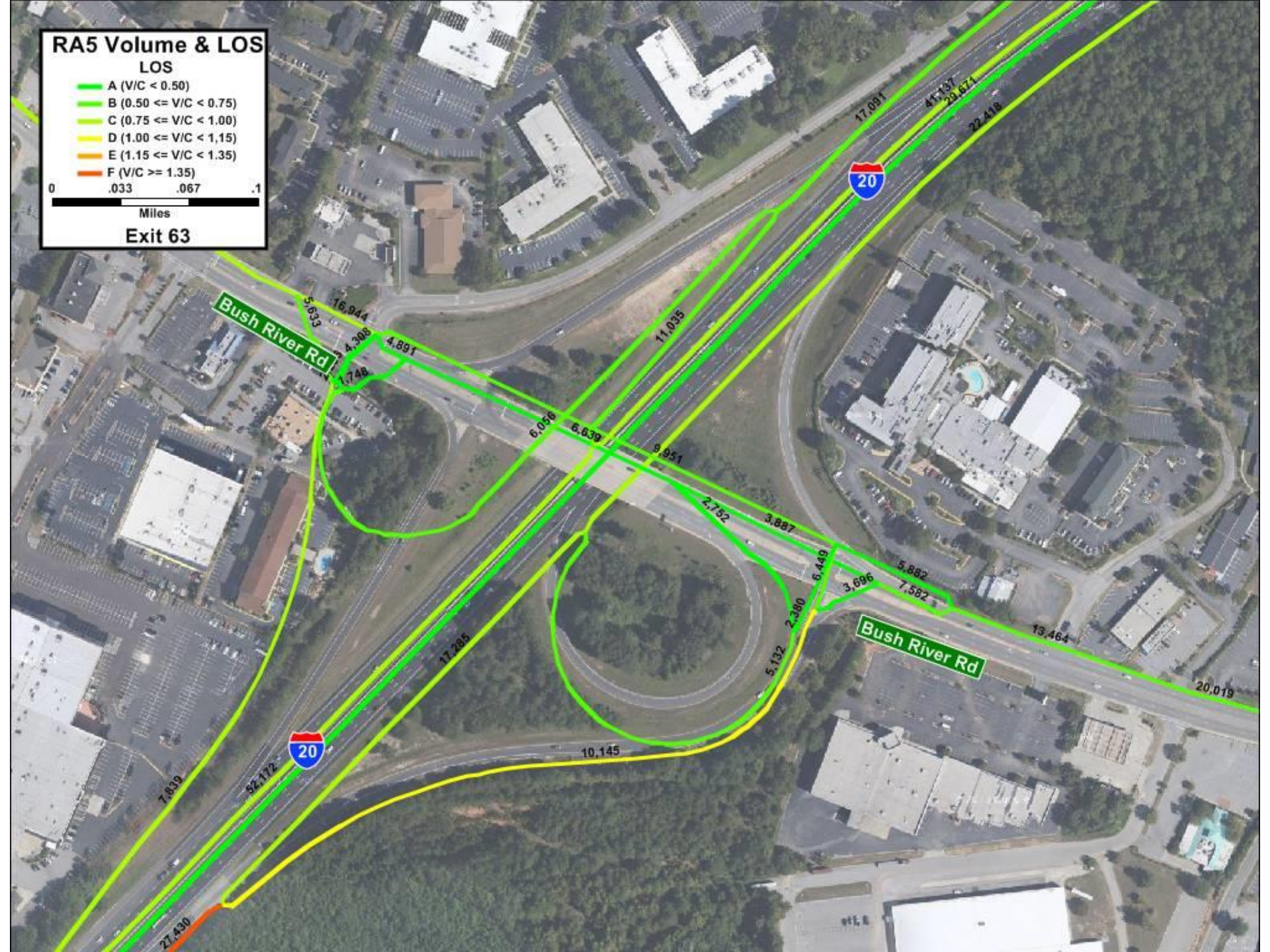

RA5 Volume & LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1,15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1.35)
0
.025
.05
.075
Miles
Exit 107-108
4,022
0
2,310
44,603
2,041
32,692
30,928
5,465
6,643
6,332
Browning Rd
26
26
9,726
19,147
19,347
21,774
Bush River Rd

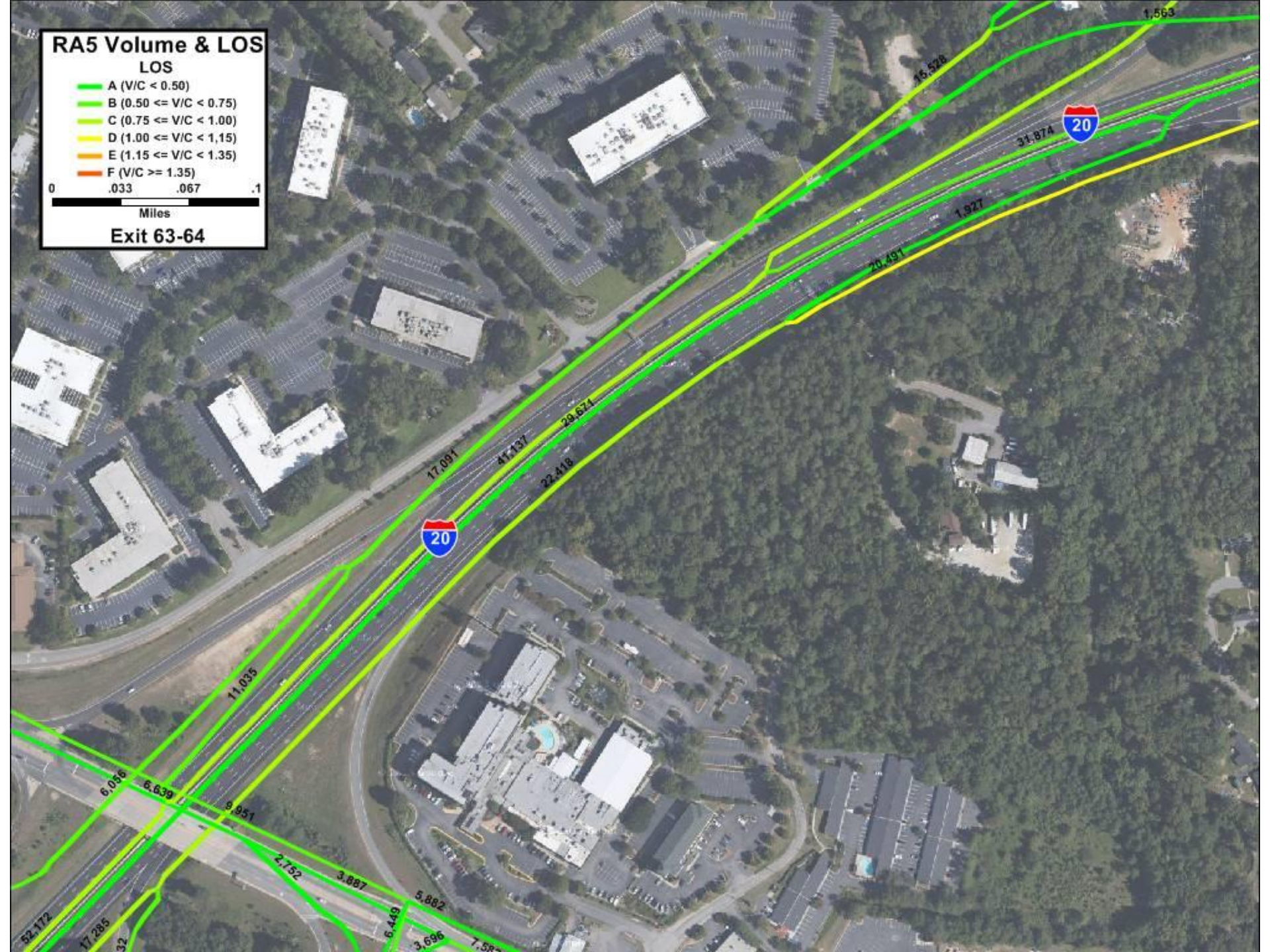

RA5 Volume & LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1,15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1.35)
0
.033
.067
.1
Miles
Exit 108A
26
Bush River Rd
Burnette Dr
Morninghill Dr
Bush Riv
6,302
32,692
6,643
17,550
9,726
19,147
19,347
34,603
21,774
20,681
0
9,075
5,929
4,697
7,710
23,157
21,446
39,325
37,259
9,840
12,407

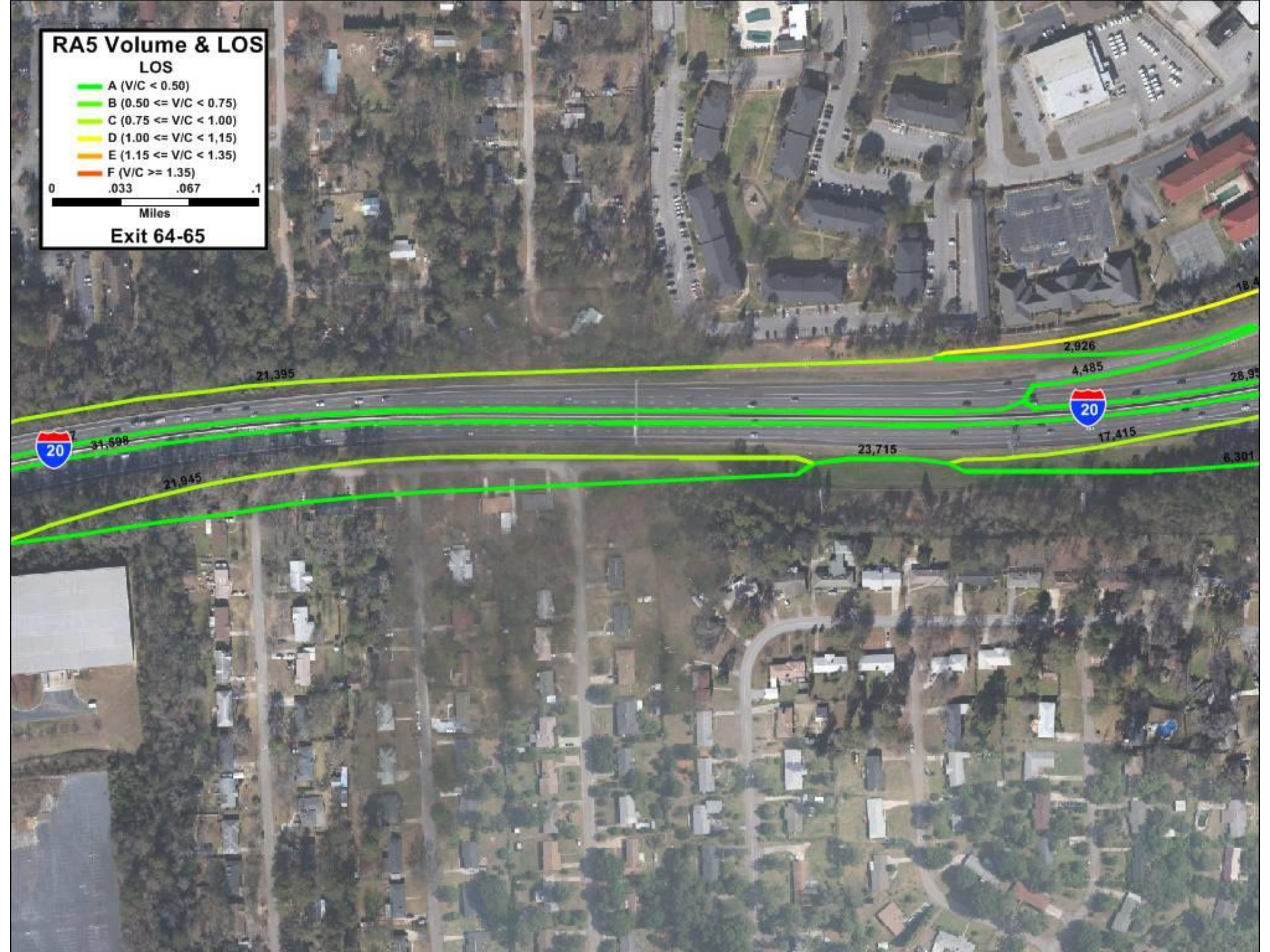

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LOS
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C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1,15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1.35)
0
.033
.067
.1
Miles
I-26/I-126 Junction
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9,840
26,475
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23,157
19,883
9,838
26
126
26

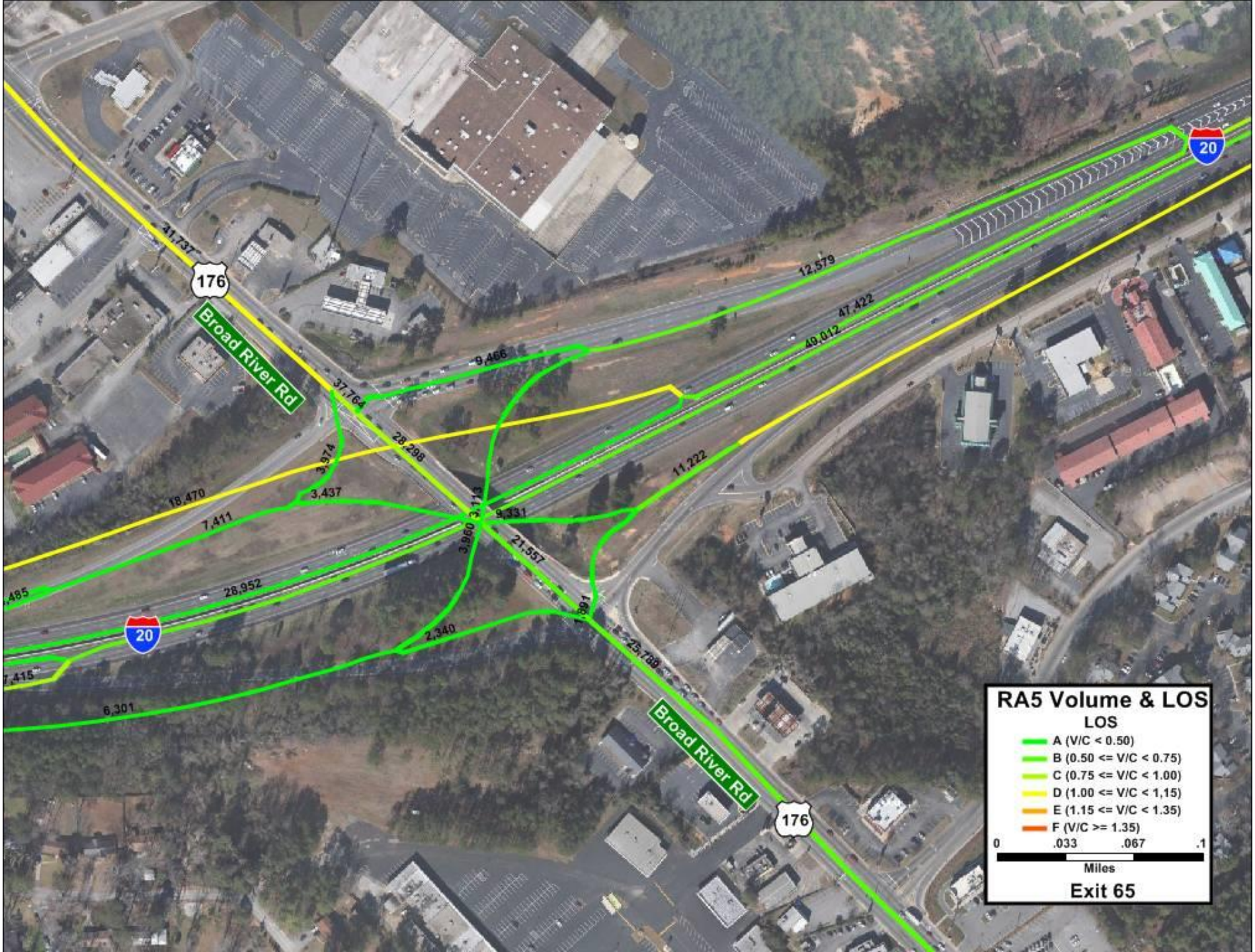

RA5 Volume & LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1,15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1.35)
0
.05
.1
.15
Miles
Exit 108-110
12,279
45,401
35,867
26
26


RA5 Volume & LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1,15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1.35)
0
.05
.1
.15
Miles
Exit 110
26
35,867
12,279
0
11,580
7,526
4,754
4,143
4,437
56,264
41,654
32,609
38,476
4,917
7,085
33,821
8,047
378
Sunset Blvd
Sunset Blvd
378
37,008
9,477
8,477
26

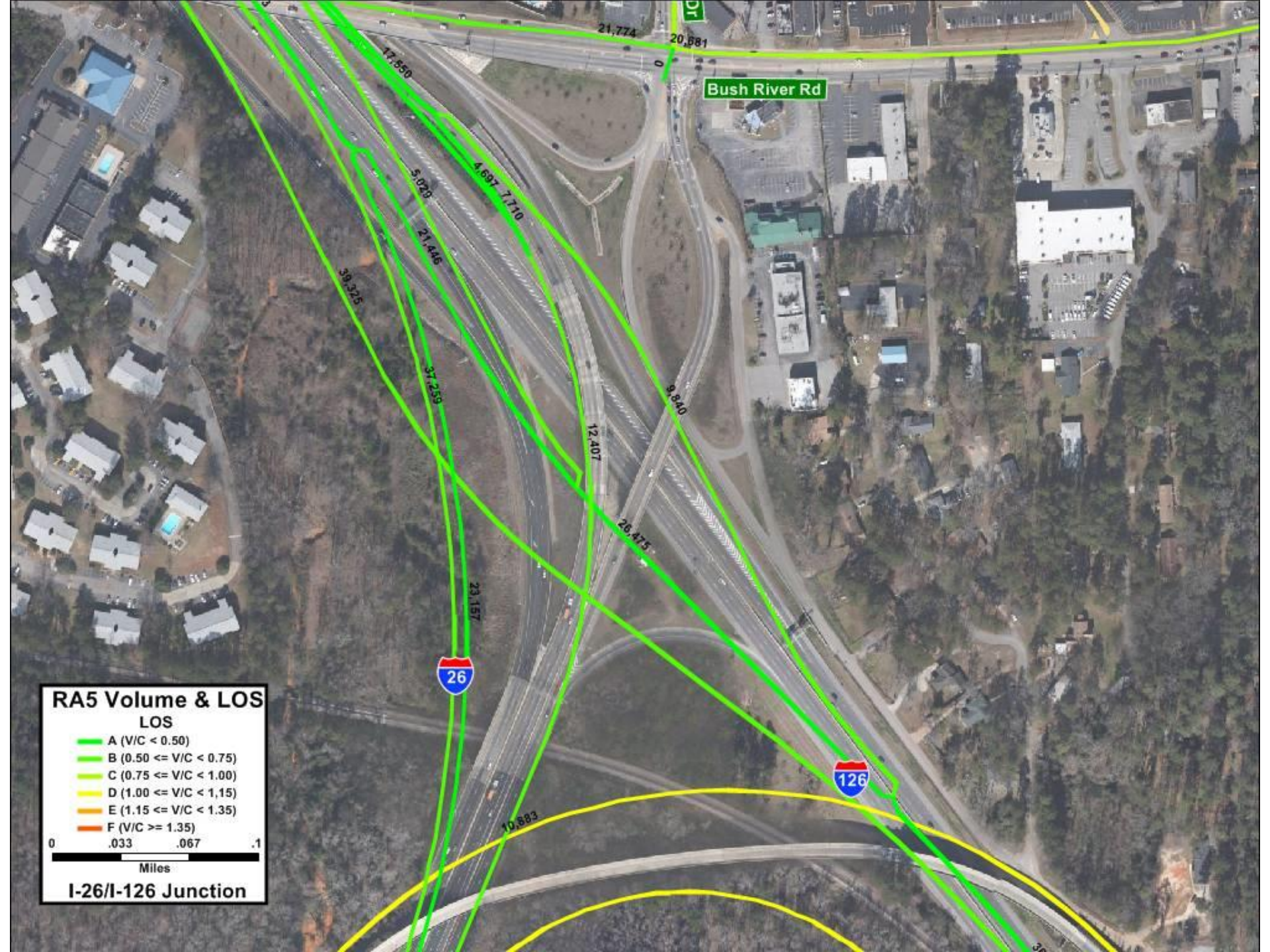

RA5 Volume & LOS
LOS
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B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1,15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1.35)
0
.033
.067
.1
Miles
Exit 63
Bush River Rd
Bush River Rd
20
20
17,091
41,137
29,671
22,418
11,035
16,944
5,633
4,308
4,891
1,748
6,056
6,639
9,951
2,752
3,887
6,449
5,882
3,696
7,582
13,464
20,019
2,380
5,132
17,285
10,145
7,839
52,172
27,430

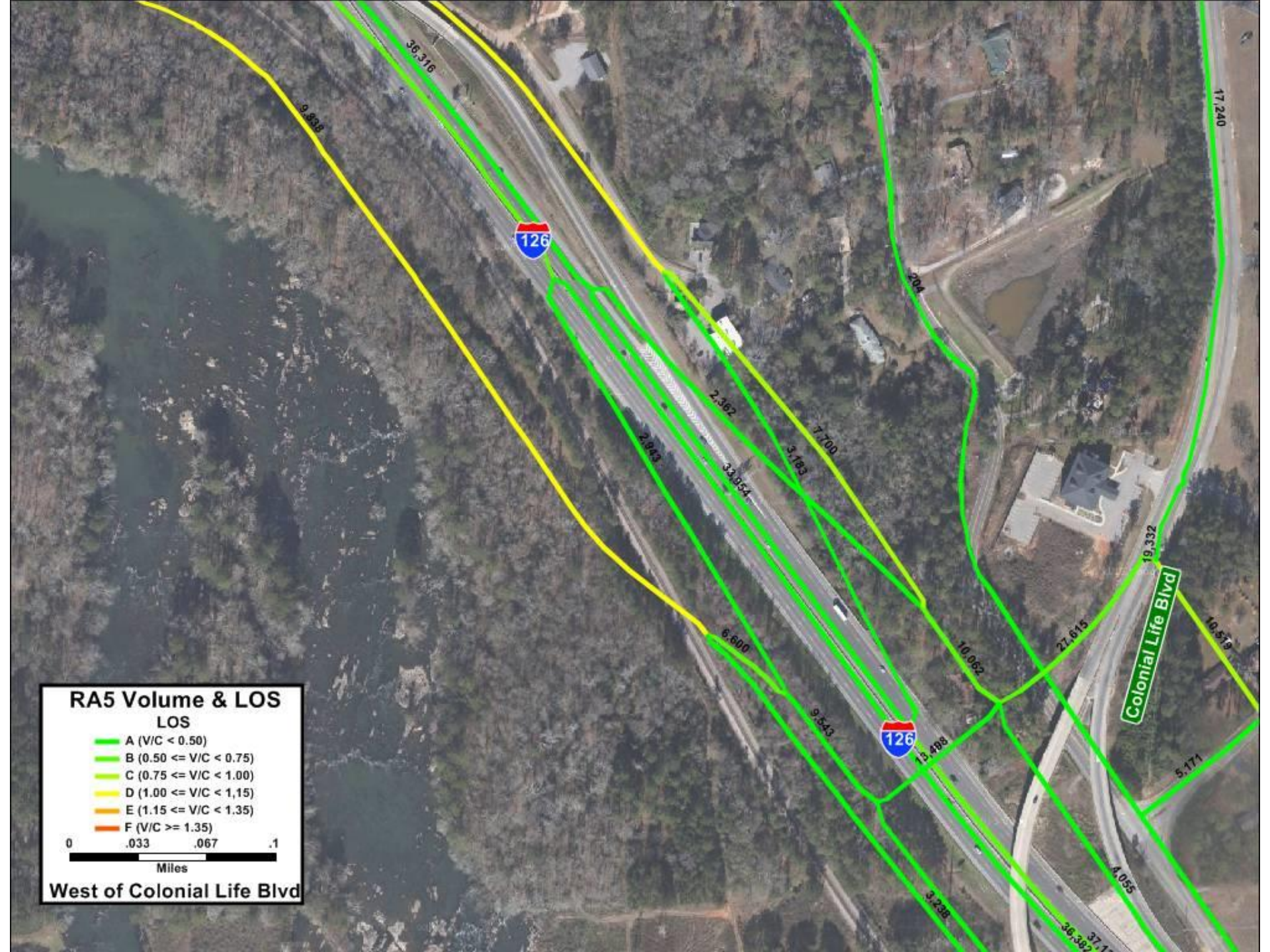

RA5 Volume & LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1,15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1.35)
0
.033
.067
.1
Miles
Exit 63-64
1,563
15,528
31,874
1,927
20,491
29,671
41,137
17,091
22,418
20
20
11,035
6,056
6,639
9,951
2,752
3,887
5,882
6,449
3,696
52,172
17,285

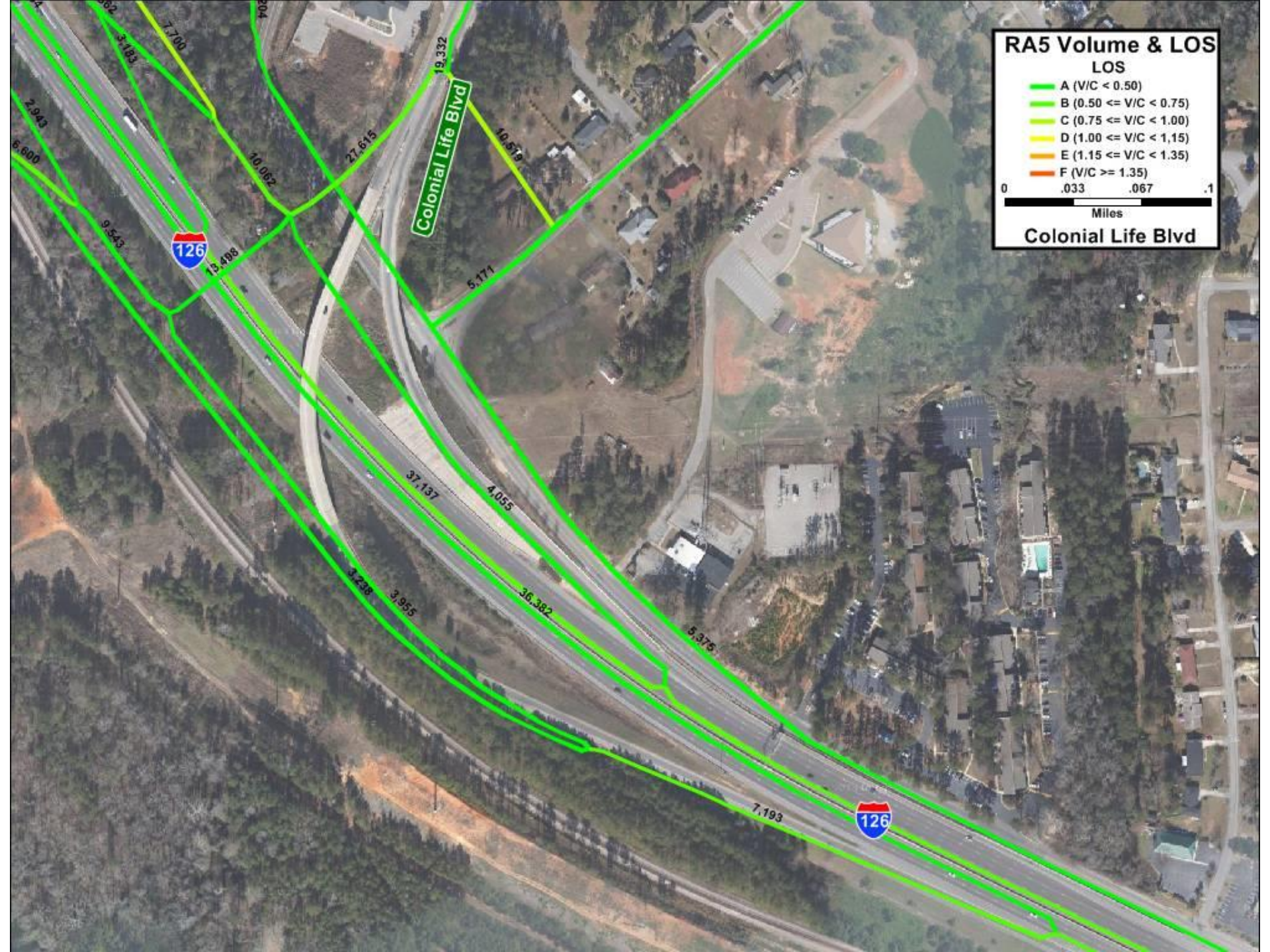

RA5 Volume & LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1,15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1.35)
0
.033
.067
.1
Miles
Exit 64-65
21,395
31,598
21,945
2,926
4,485
23,715
17,415
6,301
20
20


RA5 Volume & LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1,15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1.35)
0
.033
.067
.1
Miles
Exit 65
Broad River Rd
Broad River Rd
176
176
20
20
41,737
37,764
9,466
12,579
47,422
49,012
28,298
11,222
3,974
3,437
18,470
7,411
3,960
3,113
9,331
21,557
28,952
2,340
6,301
25,788


60,001
20
60,234
RA5 Volume & LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1,15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1.35)
0
.033
.067
.1
Miles
East of Exit 65


Bush River Rd
21,774
20,681
17,550
0
4,697
7,710
5,029
21,446
39,325
37,259
9,840
12,407
26,475
23,157
10,883
26
126
RA5 Volume & LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1,15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1.35)
0
.033
.067
.1
Miles
I-26/I-126 Junction


RA5 Volume & LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1,15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1.35)
0
.033
.067
.1
Miles
West of Colonial Life Blvd
126
126
Colonial Life Blvd
36,316
9,838
17,240
204
2,362
7,700
2,843
3,183
33,954
19,332
10,519
6,600
10,062
27,615
9,543
15,498
5,171
4,055
3,238


RA5 Volume & LOS
LOS
A (V/C < 0.50)
B (0.50 <= V/C < 0.75)
C (0.75 <= V/C < 1.00)
D (1.00 <= V/C < 1,15)
E (1.15 <= V/C < 1.35)
F (V/C >= 1.35)
0
.033
.067
.1
Miles
Colonial Life Blvd
Colonial Life Blvd
126
126
7,700
3,183
19,332
2,943
6,600
10,062
27,615
10,519
9,543
13,498
5,171
37,137
4,055
3,238
3,955
36,382
5,375
7,193

Appendix K— Draft I-20/I-26/I-77 Traffic Microsimulation Model Calibration Report

DRAFT Traffic Microsimulation Model Calibration Report

I-20/I-26/I-77 Corridor Management Plan Study

Draft - June 16, 2016

Stantec

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Executive Summary

A traffic microsimulation model has been developed for use in the I-20/26/77 Corridor Management Plan study to help identify and evaluate congestion management and capacity improvement strategies for the interstate and freeway system in Columbia, South Carolina region. General facts regarding the model include:

- The model is developed and runs in version 4 of the TransModeler simulation software, developed by the Caliper Corporation, which provided the initial network.
- The model includes approximately 110 miles of interstate and freeway, including six system interchanges and 43 service interchanges with the surface street network. The model includes approximately 70 miles of highway, arterial, and local streets.
- The existing 2015 base year model and 2040 future year model includes separate AM peak hour (7:15 AM to 8:15 AM) and PM peak hour (4:45 PM to 5:45 PM) analysis periods. Thirty minute "preload" periods are simulated before the analysis periods.
- The model incorporates approximately130 traffic signals, with signal timing plans provided by SCDOT.
- Almost 300 traffic counts, including directional and turning movement counts, were used to estimate, calibrate, and validate the model in both the AM and PM peak periods.
- The initial AM and PM seed tables used to develop the existing and future year trip tables for autos and trucks were provided from a subarea analysis of the South Carolina Statewide Model (SCSWM). The subarea's network and matrices correspond directly with the simulation model network and trip tables.
- The trip tables include 170 external nodes and 65 centroids for a total of 235 unique entry and exits points in the matrix. The final existing year peak hour AM matrices include over 112,000 auto and 5,200 truck trips. The final existing year peak hour PM matrices include over 123,000 auto and 4,200 truck trips.

The calibration process of the model entailed identifying issues, making the appropriate adjustments and corrections, and ultimately validating the model's traffic flows and travel speeds, along with other traffic conditions such as bottlenecks and queues, to observed count and speed data. Many of the issues identified during calibration were resolved through a process of trial and error of various techniques and adjustments. Some of the issues identified and adjustments made included:

- Corrections and redevelopment of the seed matrices from the SCSWM planning model which originally contained higher than actual peak period trip levels.

- Network adjustments to reflect how lane queues are informally formed and operated at exit ramps during peak period congestion, and changes to driver behavior regarding stopped gaps and stop times.

- Adjustments to TransModeler's critical distance parameters affecting lane changing behavior.

- The representation of local streets and driveways serving as traffic entry and exits points with stubs and centroid connectors.

- The incorporation of a defined 30-minute preload period to ensure that sufficient levels of traffic congestion existed on the network at the start of the model's analysis periods.

Several areas of the model required additional focus to resolve identified calibration issues related to travel speed and congestion.

- The Elmwood Avenue Corridor through the Columbia Central Business District (CBD) experienced gridlock conditions due to high volumes of local downtown cross traffic, which was blocking traffic from and to the interstate and freeway system from the larger network. A portion of these local trips, with both trip ends within the corridor, were removed from the trip tables so that operations along the corridor resembled field observations and interstate traffic flowed to and from the CBD appropriately.

- Left-turning traffic on Broad River Road in the vicinity of I-20 was creating significant queues at the two intersections north of the interstate ramps, resulting in gridlock backups on the interstate. An additional centroid was added to this area to help better distribute local traffic from Broad River Road, which has many commercial driveways and local streets in this section.

- Travel speeds and bottleneck conditions on the segment between the interchanges of I-26 and I-126 and I-26 and I-20, particularly in the westbound direction during the PM peak hour, were not reflecting speed data and field observations. A lack of the significant weaving was not generating the disruption to traffic flow that occurs in this section. Among other adjustments, separate matrices were created for trips arriving from I-126, with half of the trips exiting to I-20 required to use the right auxiliary ramp as directed by traffic control signs, while the other half or trips could continue in the left lanes and weave across incoming I-26 lanes to the I-20 extra ramps. This additional weaving, along with other adjustments, resulted in the traffic conditions observed in this section.

Traffic flows and travel speeds for the AM and PM peak hour models were compared to the criteria presented in Table 4 of the FHWA's *Traffic Analysis Toolbox Volume III: Guidelines for*

Applying Traffic Microsimulation Modeling Software, July 2004. The models generally met those criteria. The criteria general required traffic flows and travel speeds being within fifteen percent (15%) of observed counts and speeds for at least 85% of cases. The traffic flow criteria differed slightly according to the volume of the roadway. With the exception of one volume class in the PM peak hour missing the 85% target by a single link, both model met criteria targets. Additional criteria for speed-flow conditions and bottlenecks, as determined by a visual audit of the model in operation, were met by a consensus of the model's developers and reviewers.

1.0 INTRODUCTION

This report describes the development process of a TransModeler traffic microsimulation model ("the model") for use in the I-20/26/77 Corridor Management Plan study ("the study"). The study's primary goal is to identify effective strategies for congestion relief and improved capacity on I-20, I-26, I-77, I-126, and SC-277 in metropolitan Columbia, South Carolina. The model is intended to establish baseline traffic conditions, in the form of quantifiable performance measures for both the present existing condition and the future no-build condition, in order to help identify and evaluate such strategies. The two primary phases of the model's development process are data development and model calibration. Data development encompasses the assembly and coordination of the component parts of the model itself. These components include the network and its attributes and associated files; trip tables for both autos and trucks; traffic control and signal plans; traffic counts for use in calibration; and operational parameters affecting vehicular behavior under various conditions. Model calibration is the process of refining the model's operation, primarily through the adjustment of network attributes, trip tables, and parameters to accurately match observed traffic conditions such as travel speeds and link flows using predefined criteria.

The process of model development and calibration for this project generally followed the resource guidance of FHWA's *Traffic Analysis Toolbox Volume III: Guidelines for Applying Traffic Microsimulation Software*, published in July 2004, although many of calibration parameters discussed in the guidebook are estimated and incorporated by default in the TransModeler software and are adjusted as warranted during the calibration. Wisconsin DOT's calibration criteria for observable metrics, as described in the guidebook, are the source of the primary calibration criteria used to validate the model.

The report begins with a description of the development of model components and their subsequent calibration and concludes with the presentation of calibration statistics.

2.0 DATA DEVELOPMENT

A TransModeler microsimulation model is a large collection of component database and executable files that are linked through a common directory structure which can be archived to a zip file, transferred, and then reinstalled on a new computer running TransModeler software. Once installed, the model is initiated within TransModeler through a single project file, which for this model is ***Columbia.smp***. The major components of the model are the network files, traffic signal timing plans, trip tables, traffic counts, and parameter files. This section describes the development of these major components for the purposes of creating a base year model of existing conditions.

2.1 NETWORK COMPONENTS

The Caliper Corporation, developer of the TransModeler software, provided SCDOT with an initial model network for this project. This network was based on roadway network attributes previously stored in a geocoded link layer database similar to those used in traditional TransCAD travel demand model networks. The simulation network differs from a conventional link layer from a travel demand model in that the proportions of the roadway network and its lane, median and intersection configurations are shown in precise detail as to reflect the actual roadway geometry as designed. In addition to providing an accurate illustration of the network, this presentation allows for the visual observation of traffic traversing the network itself. In addition, unlike the traditional demand model networks which consist solely of database files for links and nodes, the simulation model network includes separate database files for the following:

- Links: the primary roadway between intersections (nodes) which consist of segments and lanes;
- Nodes: the intersections of links or the external endpoint of a link, in which case it serves as a source point for traffic entering and exiting the network;
- Segments: the component parts of links that distinguish unique attributes of the link at that segment, such as the number of lanes, direction, and presence of a median;
- Lanes: the individual lanes included in a segment;
- Lane Connectors: the acceptable connecting paths between corresponding lanes entering and exiting intersections and between lanes of connected segments;
- Centroids: the theoretical sources for some of the traffic entering or exiting the network if such traffic is not entering or exiting from an external node;
- Centroid Connectors: the theoretical connection points where traffic from a centroid appears and disappears on a link segment; (There may be multiple centroid connectors for a single centroid.)
- Sensors: the location and dimension of vehicle sensors on the network, typically occurring at intersections and related to signal operation, but also capable of recording vehicle data as needed.

Figure 1 provides an illustration of the simulation network's various components. In addition to the depictions of links, lanes and intersections (nodes), the illustration shows the gray lane connectors traversing the intersections and connecting lanes in link segments. The light blue boxes indicate the location of vehicle sensors tied to the traffic signal. Centroids and centroid connectors are depicted in red and the ID number represents the corresponding record in the trip tables. Trip table records also correspond to external nodes, which are also identified by an ID number.

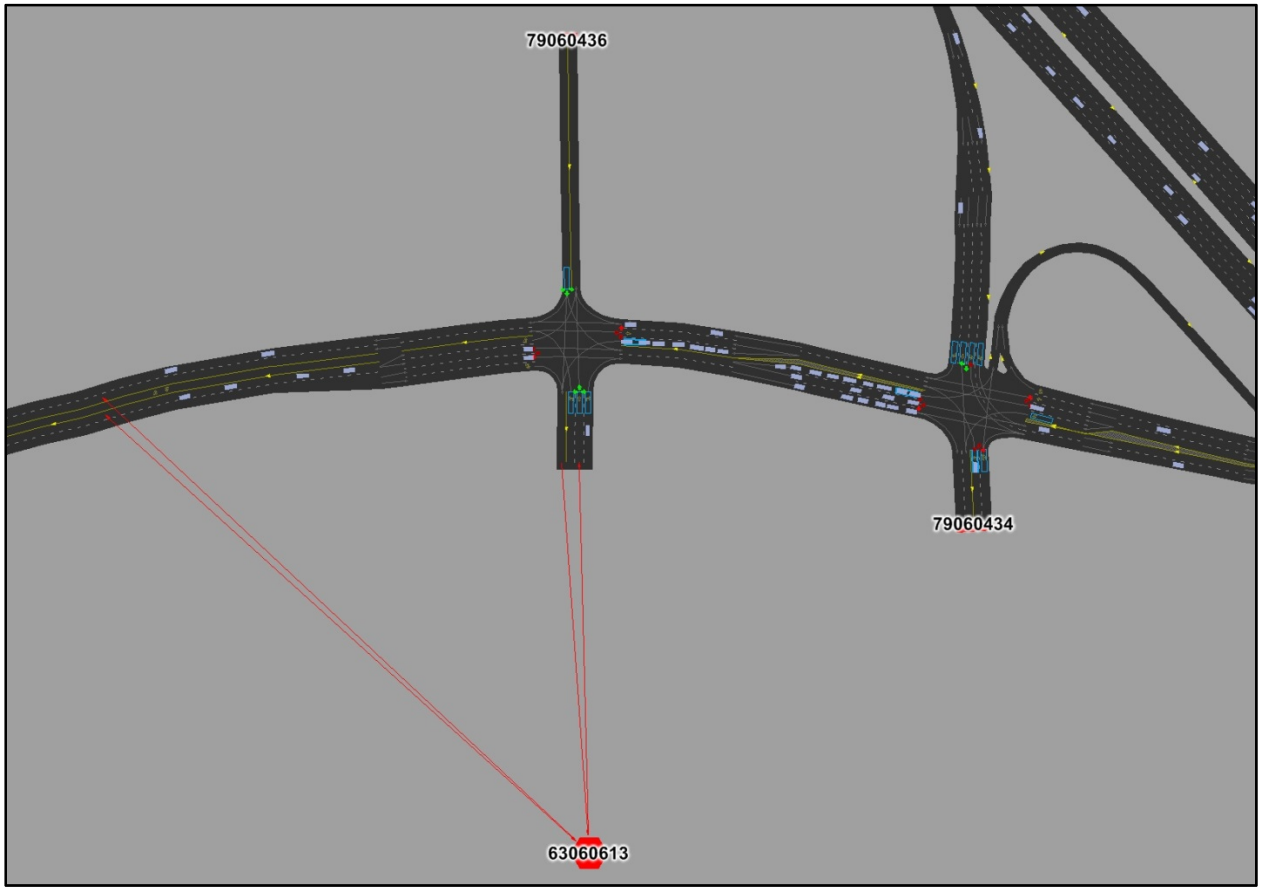


Figure 1. Network Components

The initial network from Caliper originally included more than 110 miles of interstate and expressway surrounding and bisecting the Columbia metropolitan area, including six system interchanges and 43 service interchanges. In addition to I-20, I-26, I-77, I-126, and SC-277, the network also included approximately 70 miles of surface streets, including connecting portions of five major arterial routes:

1. Broad River Road (US 176),from exit 97 of I-26 to I-126 via its intersection with Greystone Boulevard;
2. Bush River Road from exit 63 of I-20 to its intersection with Broad River Road;
3. Sunset Boulevard (US 378), from exit 61 of I-20 to exit 110 of I-26;
4. Elmwood Avenue and Bull Street, from I-126 to SC-277; and,

5. Two Notch Road (US 1) from exit 74 of I-20 to exit 17 of I-77.

Segments of the surface arterials connected with interstate and freeway service interchanges, as well as the local legs of the most adjacent surface intersections were also included.

With a goal of keeping the emphasis of the model on the freeway system, SCDOT staff identified approximately 40 miles of surface network as superfluous to this project and eligible for deletion. The network links identified for removal include local road stubs attached to surface arterials, frontage roads, and some downtown streets. Other stub links were shortened or disconnected from one another, effectively becoming stubs. The stub links that remain in the network serve as the entry points for traffic entering and exiting the system, along with supplemental centroids and centroid connectors that load traffic from multiple local surface streets not adjacent to interstate and freeway ramps.

Caliper produced the initial network from a transformation of a conventional line and node layer network with limited editing. While most of the network attributes such as geographic location, lane configuration and connectivity were correct, given the size and complexity of the network, many details of the network required refinement and correction. Using underlying aerial imagery as a guide, the network was edited and refined to reflect the actual geometries and attributes of the network as accurately as possible. Network editing was continuous through the model development and calibration process. Initial editing began upon receipt of the model files and in conjunction with network revisions incorporating SCDOT's red-line edits of the extended surface network.

The network was further refined to ensure compatibility with the SCSWM's subarea network, particularly the location of external nodes and centroid connectors. The geometry and lane configuration of intersections were again reviewed and refined during the installation of traffic signal timing plans and again as directional and turn movement counts were appended to the network. As trip tables were introduced and the model simulations started, unusual traffic congestion patterns, particularly at individual intersections, revealed additional network errors and areas needing refinement. Reviews of the completed model by the larger model team identified additional corrections, including the incorporation of additional centroids or external nodes to properly accommodate traffic at local legs of ancillary intersections.

The bulk of network edits, corrections and revisions involved the position and length of lanes and the application of lane connectors at intersections and between link segments. Common corrections and edits included:

- The creation or revision of turn lane pockets at intersections, particularly in regard to free right turn islands and the length and starting point of turn lanes;
- The actual length of individual lane queue storage, particularly on exit ramps where vehicle queues extend into the median or beyond the designated lane stripes;
- The correct configuration of lane connectors through an intersection, both at the upstream and downstream locations, particularly for left turns and shared through and turn lanes;
- The configuration and location of lane connectors on lane origins and lane drops on interstates and freeways;
- The exact curvature and shape of irregularly shaped intersections and their individual approaches.

- The placement of stop bars, yield signs and sensors at intersections;
- The placement of centroid and centroid connectors to correspond with the South Carolina Statewide Travel Demand Model (planning model).

2.2 TRAFFIC SIGNAL TIMING PLANS

SCDOT provided timing plans for approximately 130 traffic signals located within the model network. These plans were input into the model using TransModeler's Intersection Toolbox, and are maintained within an intersection control plan file. In locations where timing plans vary between the AM and PM peak hours, both plans are included and used, respectively. While most signals operate independently, coordinated timing plans were included for the Elmwood Avenue, Bush River Road, and Two Notch Road corridors. While a few signals are pre-timed, most signal feature some degree of traffic actuation, in connection with the vehicle sensors embed in each lane connected to the intersection. Figure 3 presents an example of a timing plan as presented in TransModeler's Intersection Toolbox.

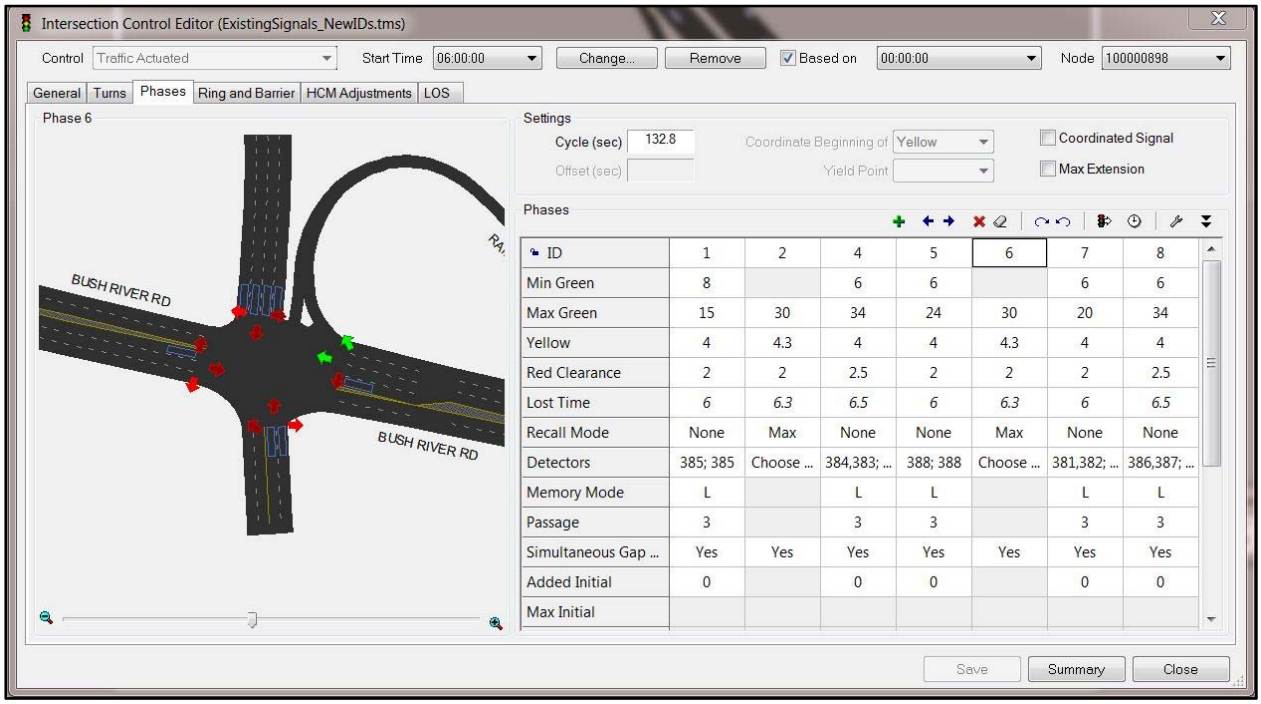


Figure 2. Signal Timing Plan

As previously stated the processing and testing of signal timing plans offered an additional opportunity to review the geometry of the intersection and its approaches against underlying aerial imagery. This included verification of the placement of lane connectors, signal detectors, stop bars, and yield signs. Unsignalized intersections are also included in the intersection control file and these intersections were also reviewed to ensure all traffic controls such as stop bars and yield signs are correctly entered.

2.3 TRAFFIC COUNTS

For the purposes of model calibration and validation, traffic counts were collected from several sources:

- Peak Period Turn Movement Counts (TMCS):
  - 168 locations collected for this project in May, 2015;
  - 32 locations provided by SCDOT, collected in April, 2015;
- 48-Hour Ramp Tube Counts:
  - 63 location collected for this project in May, 2015;
  - 12 locations collected for the Carolina Crossroads project in April 2015;
- 48-Hour Mainline Interstate and Freeway Counts:
  - 8 locations collected for this project in May, 2015;
  - 9 locations collected by SCDOT from Automatic Traffic Recorders (ATR), recorded in May, 2015.

Figure 3 provides the location of the counts recorded in the model's link database and in the turn movement files.

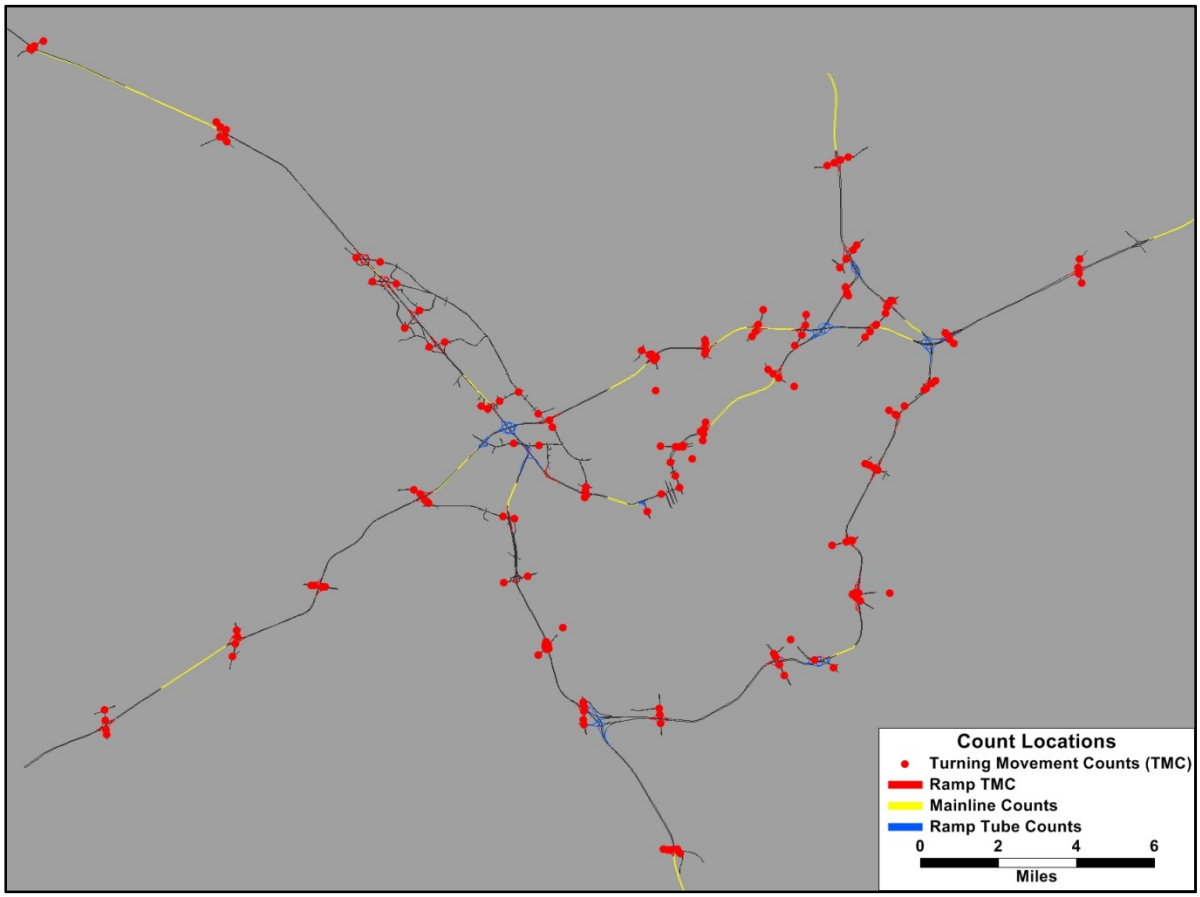


Figure 3. Count Locations

With the exception of the mainline ATR counts, all counts were recorded in 15 minute increments and covered the complete AM (6:00 AM to 9:00 AM) and PM (3:00 PM to 7:00 PM) peak periods established in the SCSWM. Fifteen minute increments from the mainline counts were analyzed to determine four time parameters used in the development of the model:

1. The consecutive 60 minute increment with the highest trips per peak hour:
    a. AM peak hour: 7:15 AM to 8:15 AM;
    b. PM peak hour: 4:45 PM to 5:45 PM;

2. The percentage of peak period trips occurring within the peak hour:
    a. AM peak hour: 43% out of the 3 hour AM peak period (6:00 AM to 9:00 AM);
    b. PM peak hour: 30% out of the 4 hour PM peak period (3:00 PM to 7:00 PM);

3. The distribution of the traffic peak within the peak hour, per four consecutive 15 minute increments:
    a. AM peak hour: 24%, 25%, 26%, 23%;
    b. PM peak hour: 25%, 27%, 26%, 22%;

4. The percentage of trips occurring in the 30 minute preload period, as compared to the peak hour total, per two consecutive15 minute increments:
    a. AM preload period: 17%, 20%;
    b. PM preload period: 21%, 26%.

AM and PM peak hour TMC's are stored in AM and PM turn movement files which can be queried using TransModeler's intersection toolbox. Mainline and ramp tube counts are appended to the model network's link database on a directional basis. Separate counts are included for all traffic and for trucks, where truck counts were available. Using a procedure in TransModeler, the total counts of all turn movements were aggregated to their respective approach link. For interstate and freeway ramps without tube counts, these aggregated counts were also appended to the model network's link database.

As previously stated, as turning movement counts were entered at each intersection, the geometry of the intersection as well as the intersection's approaches were reviewed again against underlying aerial imagery. Similarly, the geometry of ramps was also reviewed as counts are entered.

2.4 TRIP TABLES

The simulation model contains several trip tables, also referred to as trip matrices. Trip tables exist for each AM and PM scenario, with a row and column for each external node and centroid in the network. Each cell in the trip tables contains the total number of vehicles traveling along the network between that particular pair of external nodes or centroids. The trip tables all share the same dimensions, with 235 rows and columns, represented in the network by 170 external nodes and 65 centroids. Trucks and autos each have separate trip tables with their own fleet characteristics and separate trip tables exist for the 30 minute preload periods and the 60 minute peak hour analysis periods.

2.4.1 SCSWM Subarea Network and Trip Matrices

The simulation model trip tables were developed from subarea trip matrices output from the SCSWM planning model. The row and column ID's from the subarea trip matrices correlate exactly with the row and column ID's in the simulation model trip tables. The subarea trip matrices represent the select geographic area of the larger SCSWM network that corresponds to the simulation model network, with the similar location of external nodes and centroids in both networks.

The process of coordinating the simulation network with the subarea network from the planning network involved several steps. The first step was development of the simulation network sub area within the larger SCSWM network. The subarea network must encompass enough area and link connectivity for the SCSWM to properly distribute and assign trips while also reflecting the desired limits of the simulation model network. Further, the subarea network must reflect the greater detail and granularity of the simulation model network while preserving the larger flexibility of the SCSWM to distribute traffic effectively over the larger region.

The coordination of the two networks was achieved by overlaying the simulation model network over the planning network and zone structure and identifying the specific links in the planning network that corresponded with the external nodes of the simulation model. This process was relatively straightforward because both model networks contained the same corresponding links. Identifying centroid connectors within the SCSWM was more complex. It was important to ensure that all trips generated from one of the SCSWM's centroids were distributed entirely within the subarea network area. This was important to ensure that any intrazonal shifts in traffic over time are reflected in the current and future year subarea matrices. Therefore, in cases where some centroid connectors connected within the network and other connectors extended outside the network area, the latter connectors were either moved within the model area or the zone was split to more accurately correspond with the model area limits. The coordination of the two networks and trip tables and matrices was an iterative process. As the trip tables for the simulation model was tested and reviewed, new subarea networks and trip matrices were required to reflect individual areas where further network definition was needed. The final dimensions of the trip matrices are 235 x 235, with 170 external nodes and 65 centroids.

2.4.2 Origin Destination Matrix Estimation

Originally developed as a daily model, the SCSWM was adapted for this project to provide AM and PM peak period subarea trip matrices to reflect the peak directionality for both the AM and PM peak periods. These trip matrices serve as the seed tables used in the development of AM and PM peak hour trip tables for the simulation model. The seed tables are inputs along with traffic counts in TransModeler's Origin Destination Matrix Estimation (ODME) procedure. The ODME procedure is an iterative assignment process that uses algorithms to estimate the trip matrices which, when assigned to the network, most closely match the observed traffic counts recorded in the network layer.

In regard to inputs into the ODME process, traffic counts are the most influential element of the ODME process, as assignment iterations will continue until the best fit between an assigned trip matrix and observed counts is established. However, seed matrices that accurately reflect the true distribution of trips within the study area increase the likelihood of the ODME process estimating a good fit more quickly in fewer iterations.

The assignment produced from the ODME process is analogous to the assignment produced in a conventional travel demand model. It uses general assumptions regarding capacity constraints on the network to establish travel speeds and trip times, and ultimately trip paths. The ODME assignment effectively illustrates the best theoretical simulation outcome available using the trip tables estimated, assuming basic and predictable operating conditions. In fact, the implementation of more detailed traffic operational rules and behaviors during the simulation runs substantially affect traffic flows and operations, revealing which aspects of the model network and operational assumptions need to be corrected or refined.

Because the AM and PM subarea trip matrices reflect larger peak periods, the subarea matrices were factored to reflect the smaller portion of trips occurring in the peak hour before applying the ODME procedure. This adjustment helped more accurately define the magnitude of trips estimated. The factors used were calculated from comparing peak period and peak hour counts from the mainline count data. For the three hour AM peak period, the peak hour factor was 43% of total trips. For the four hour PM peak period, the factor was 30% of total trips.

Given their distinct trip patterns, truck matrices were estimated separately from autos. While the planning subarea matrices included trip matrices for both medium and heavy trucks the majority of turning movement counts did not distinguish between truck classes. Therefore the two truck classes could not be estimated separately. However, the difference between the subarea trip matrix totals for medium and heavy trucks were compared to the available classification data collected from the mainline counts and it was determined that the proportion of medium to heavy trucks was reasonable and could be preserved. Therefore, while the ODME process for medium and heavy trucks used the same count data and produced a single truck trip table, the proportion of medium trucks to heavy trucks within each cell was preserved by factoring the cells of the estimated trip table by the respective proportion of medium to heavy trucks from the subarea trip matrices to create separate trip tables for medium and heavy trucks.

The first ODME process for total traffic incorporated all available counts in the estimation, including the individual turn movements at intersections. However, the output trip tables and the associated assignments of these trips to the network fit very poorly with the mainline and ramp tube counts, which were primary and critical metrics. It appeared that the high number of turn movement counts on the surface street network effectively diluted the estimation process's ability to prioritize interstate and ramp flows. As a result, the ODME process converged at a lower threshold of accuracy as it attempted to equally incorporate all counts regardless of location or type.

In response to this result, only mainline and ramp tube counts and turn movement volumes aggregated to ramp links were used during the next iteration of the ODME process. Individual turn movements were not included in the process. With fewer constraints and a priority given to matching interstate and ramp counts, the resulting ODME assignment significantly improved the fit on the mainline interstate and freeway system, closely matching their respective counts. However with few counts included on the surface network, the fit of the ODME assignment on the surface street network needed improvement in many location. Therefore an iterative process was used in which a small number of surface links with the worst fit between counts and ODME assignment were identified. At these locations, turn movement counts were aggregated to the link, and the ODME process run again, with counts at these locations included in the process.



With each iteration of this process, the overall fit between counts and ODME assignment improved. The process continued for multiple iterations of additional links until the fit between the ODME assignment and all mainline and ramp counts (including aggregated turn movement counts) met the criteria for the overall GEH statistic presented in the FHWA's *Traffic Analysis Toolbox Volume III: Guidelines*. Specifically, the percentage of links with a GEH statistic under 5 must be greater than 85 percent, and the GEH statistic for the sum of all link flows must be under 5. The GEH statistic is described in further detail in Section 3.2. Setting this threshold was intended to include enough counts in the ODME process to produce trip tables that reflect the interstate and freeway flows without overwhelming it with too many counts that could have the effect of deprioritizing the interstates and freeways. Further, it was understood that additional ODME iterations were likely to occur once the testing and calibration phase of the simulation model.

Table 1 presents the trip totals from the subarea matrices before and after factoring to peak hour, and the original and final ODME estimated trip tables used in the simulation model.

Table 1. Trip Table Totals

AM Peak Hour			
	Auto	Medium Truck	Heavy Truck
SCSWM Subarea (3-hour Period)	242,393	9,677	2,489
43% of Subarea (Peak Hour)	104,229	4,161	1,070
ODME	112,068	3,953	1,229
Final (adjusted)	112,884	3,953	1,229
PM Peak Hour			
	Auto	Medium Truck	Heavy Truck
SCSWM Subarea (4-hour Period)	381,057	12,050	3,097
30% of Subarea (Peak Hour)	114,317	3,615	929
ODME	123,539	2,993	1,250
Final (adjusted)	123,838	2,993	1,250

2.5 MODEL PARAMETERS

TransModeler includes parameters for various components and procedures occurring in the model, including aspects of the vehicle fleet, roadway characteristics, route choice, and driver behavior. TransModeler initially sets these parameters to default values that can be adjusted according to available local information. While most parameter adjustments occur during the testing and calibration and phase, the following parameter adjustments made during initial develop include:

- Vehicle fleet: TransModeler includes several vehicle classes to represent the trips simulated in the model. The distinct classes look and operate differently based on their class attributes. The model uses separate trip tables for autos, medium and heavy trucks.

The fleet mix for the auto trip tables was therefore adjusted to reflect the absence of medium and heavy trucks in those particular tables. The default distribution of high, mid and low performance passenger cars; pickups and vans; and motorcycles was maintained, as the registration data provided by SCDOT did not distinguish between the model type or performance class of passenger vehicles. Table 2 presents the vehicle fleet mix for the trip tables.

Table 2. Vehicle Fleet Mix per Trip Table

	Trip Table		
Vehicle Class	Autos	Truck 1	Truck 2
High Performance Passenger Cars	32%		
Medium Performance Passenger Cars	36%		
Low Performance Passenger Cars	21%		
Pickups, Vans, and SUVs	10%		
Motorcycles	1%		
Single-unit Trucks		100%	
Trailer Trucks			100%

- Heavy truck appearance: TransModeler's default configuration for tractor trailers has a much longer cab section than is typical, resulting in the joint of the truck being articulated in the middle. The initial settings for the appearance heavy trailer trucks were adjusted to reflect a more standard truck configuration with the articulation in the front.
- Road Classes: As this model focuses primarily on the interstate and freeway system, an additional freeway class was added to help distinguish between segments of rural interstates, suburban interstates, and complex urban freeway segments. These classes represent not only distinct posted speeds but also distinct free flow speed parameters.

Other parameter adjustments made during the testing and calibration phase are discussed in the next section.

3.0 MODEL CALIBRATION

For the purposes of this simulation model exercise, the term model calibration is used in its most expansive sense to mean all of the adjustments and refinements that occur after all of the model components have been initially developed and assembled. It also refers to the validation of the model's calibration, as compared to specific metrics and conditions. Section 3.1 addresses the adjustments that were made to achieve a calibrated model. Sections 3.2 and 3.3 present the calibration criteria and statistics for the model.

3.1 TESTING AND CALIBRATION

Once all model data components were prepared and organized within the simulation project file, the testing and calibration process began. The calibration process is an iterative process of running the model and making adjustments and refinements to the various model components until the model meets the specified criteria for reflecting observed conditions, as measured via visual audit and quantifiable metrics. A visual audit involves watching simulations as they run in real time to verify realistic traffic operations in general and specific observed conditions, such as identified bottlenecks and queues at specific locations. Visual audits initially precede the comparison of quantifiable metrics, since it is literally the "eye test" that must be passed before quantifiable metrics are of value. However visual audits are also a formal aspect of the calibration criteria and therefore occur as part of the final model validation as well.

The process of visually inspecting the simulations as they ran initially began by determining whether the traffic loading and volume in general met reasonable expectations based on field observation notes and common sense. Upon initiation, the model begins by establishing a preload condition. During this period, traffic is loaded onto the empty network until TransModeler has determined that sufficient traffic exists to reflect the conditions at the start of the analysis period. This determination is based on an algorithm involving the duration of the model period the total traffic in the trip tables, and the size of the network. Once TransModeler determines that the preload condition has been met, the analysis period begins, with vehicles from the trip table loaded onto the network at the proportional rate established in the scenario settings. Trips for the AM and PM models were loaded at varying rates over four 15 minute increments according to the distribution determined from the analysis of traffic counts:

- AM peak hour: 24%, 25%, 26%, 23%;
- PM peak hour: 25%, 27%, 26%, 22%;

In this manner, the peak traffic demand within the peak hour could be captured in the model as traffic was loaded onto the network. However, as the distributions within the peak hours indicate, the peaking characteristics for both AM and PM peak hours were relatively flat, which should be reflected in relatively even levels of traffic conditions throughout the analysis period.

3.1.1 Initial Model Runs and Error Checking

One of the first issues to arise when initially running the model was how quickly the surface network intersections became overwhelmed during the early period of the model. Conversely, traffic on the interstates and freeways was light, primarily due to bottlenecks at intersections preventing traffic to access the interstates and freeways in significant volumes. While it was eventually determined that a post-processing issue in the SCSWM's subarea extraction process had resulted in excessive traffic volumes, a strategy was initially devised to investigate the bottlenecks that were occurring at intersections in the order that they arose, as soon as they began to appear in the simulation period. This strategy had the immediate benefit of revealing previously undetected errors in network coding and signal plans, as the excessive trip volumes quickly exacerbated and identified these problems first. As errors were detected and corrected, subsequent simulation runs would identify new hot spots as upstream bottlenecks were resolved and downstream bottlenecks resulted. Ultimately the processing issues from the SCSWM's subarea extraction were identified and corrected, and traffic volumes from subsequent trip tables decreased to the generally reasonable levels. However, the initially high traffic did prove valuable in quickly identifying network and traffic control errors.

Another source for checking errors is the warning files that are produced by TransModeler before and after model runs. These files often include warnings that are ultimately irrelevant, such as a warning for a non-standard signal plan or trip path errors for trips that do not exist in the trip table. However, the warning files also include relevant problems such as missing lane connectors or diverted trips. While most of the relevant problems are resolved early in the development process, as new edits are made, review of the warning files helps identify new problems.

3.1.2 General Calibration Issues

Once the issue with the subarea trip tables from the SCSWM had been resolved and specific network and signal errors were identified and corrected, the total traffic loadings decreased and traffic operations began to resemble reasonable expectations. Identifying and addressing issues with less readily apparent resolutions then became the focus the calibration process. During this phase, comparisons of model outputs for speeds and traffic volumes observed data became an integral aspect of the review process, in combination with visual inspection of the model simulations. Below are a summary of the general issues that were identified addressed during the calibration phase.

1. Exit ramp queues: At many intersection exit ramps, traffic queues extended beyond their observed or reasonable limits despite matching the traffic counts on the ramps. In many cases, this was the result of distinct differences between the official pavement markings and the actual queuing patterns at these exits. For example, at Exit 9B on southbound I-77 at Leesburg Road, the dual lane queue, identifiable by two distinct elongated pavement stains, extends at least 200 feet beyond the last lane stripe delimiter. In addition to increased storage capacity, this longer queue separation results in the more efficient sorting of left versus right-turning vehicles. A similar issue is the presence of a separate, informal right-turn queue at the end of a ramp, despite the lack of an official lane stripe delimiter. (for example, Exit 51 on westbound I-20). These distinctions between official and informal lanes may only occur during peak congestion periods, but their impact on the ultimate flow and operation of the ramp and intersection is significant. Therefore at ramp locations where traffic queues in the model exceeded observed limits,

and where indications suggested that lane queues differed from official markings, the network was edited to reflect how the queues were realistically forming.

2. Stopped gaps and times: Related to establishing proper queue lengths on ramps and surface intersections in general, two driver behavior parameters were adjusted to reflect the more compressed nature of peak hour queues and increased volume through stop controlled intersections. First, the mean distance between stopped light vehicles was reduced from 8 feet to 6 feet. The 4 foot standard deviation and the 12 foot mean stopped gap behind trucks was not adjusted. Second, the distribution of stopped time at stop controlled intersections where there is no competing traffic was adjusted on average of 0.2 seconds. These two adjustments decreased the follow up time between vehicles at intersections, thereby increasing the volume through the intersections and decreasing queue backups.

3. Critical Distance: As part of the methodology directing driver behavior, the "critical distance" parameter sets the general distribution of distance from a downstream intersection or path diversion at which point a vehicle must seek to be in the correct lane in order to maintain the correct path through that intersection or diversion. A short critical distance could cause vehicles to delay changing into the correct lane until the last moment, while a longer critical distance could find vehicles prematurely queuing in a slower lane in anticipation of turn far ahead. TransModeler maintains separate critical distance distributions for streets and freeways. In the case of this model, visual inspections of the simulation found multiple incidents of interstate and freeway traffic queuing early in order to make future ramp movements. The consequences were significant imbalances in volume and lane speed despite significant distance from exit ramps. At one location on westbound I-20, mainline traffic queuing too early for the downstream SC-277 ramp prevented vehicles entering from Two Notch Road from merging correctly. To resolve this issue, the distribution of the critical distance was decreased by roughly 750 feet, to between 500 and 2,750 feet.

   Conversely, at one location on northbound Broad River Road, the critical distance distribution was increased through the use of a local parameter so that the queue to turn left onto Bush River Road would form properly without excess conflict at the intersection from late lane changers.

4. Multiple local streets and driveways: A specific challenge of coordinating of the simulation model with the SCSWM is reflecting the distinct difference in how trips are loaded onto the two respective networks. Many of the entry and exit points in both the simulation model and the subarea network of the SCSWM are external nodes that represent endpoints of actual roads. However, other entry points are represented by centroids via centroid connectors located within internal areas of the network. Unlike external nodes, centroid connectors are theoretical entry points without physical attributes. Cars simply appear on the network at these locations. The reason for this is that as a large scale planning model, the SCSWM must aggregate the individual driveways and local roads connecting to major streets and highways. In the simulation model, centroid connectors were generally located where they occur in the SCSWM. In many cases, centroid connecters were attached to physical stubs of local roads so that they entered the network through controlled intersections. However, if the volume of traffic for the centroid in question significantly exceeded the capacity of such a local

intersection, centroid connectors were attached directly to the network but away from intersections so as not to disrupt their operation. Also, centroids often have multiple connectors. In some at intersections where commercial driveways or a low volume local street is included in the traffic signal with a higher volume street included in the network, centroid connectors were employed to distribute some traffic to those legs of the intersections. However, in a few cases where this approach proved unworkable, the networks of both the SCSWM and the simulation models had to be edited and the trip tables expanded to create new distinct external nodes. This step would require the rerunning of the SCSWM subarea extraction process and the development of new ODME trip tables.

5. Preload Period: As a part of its standard operation, TransModeler begins each simulation by "preloading" the network with trips based on volumes and trip patterns from the model's trip tables. This is done so that vehicles enter a network that reflects the real conditions occurring when the official analysis period begins. The preload period is supposed to continue until a "preload condition" has been met, signifying that the network is sufficiently congested. However, over the course of the calibration process, it was generally observed that at the start of the analysis period, traffic conditions were relatively light and that expected congested conditions did not occur until late into the analysis period. It was therefore decided to add a static 30-minute preload periods with trip tables reflecting the traffic occurring before the AM and PM peak hours. TransModeler's preload procedure still begins the simulation, but now begins before the static 30 minute preload period. The 60 minute peak hour analysis periods remain the same. The preload trip tables were proportioned from the peak hour trip tables to match the observed volumes of the two 15 minute increments occurring before each of the AM and PM peak hours.

   The introduction of the static preload periods had the desired effect of creating congestion build up similar to observed conditions. The peak of congestion now occurs towards the middle of the peak hour and is tapering towards the end of the simulation period.

6. Manual Matrix Adjustments: The intention of using the SCSWM subarea seed tables and the ODME process to develop the trip tables is to have a transparent and repeatable methodology. In comparison, manual alternations to the cells in the table, in order to supplement or reduce traffic volumes between particular points, are independent and arbitrarily estimated outside of any formal methodology governing trip generation and distribution. They should be limited because such alterations must be consistently accounted for and reflected in the future year trip tables. However, the SCSWM and the ODME process are not exact in their ability to create trip tables that produce accurate traffic flows in a microsimulation. Particularly in such a large and complex model network with so many counts and point of entry, some manual adjustments were ultimately required to achieve the critical mainline volumes on the interstates and freeways necessary to match and reflect the level of congestion recorded in counts and in field observations.

   Given the comparatively lower volume of trucks compared to passenger vehicles, no trips in the ODME truck matrices were adjusted. For the AM auto trip table a total of 25 trip pairs representing 16 entry points and 16 exit points were adjusted from the final

ODME matrix. For the PM auto trip table, 34 trip pairs representing 11 entry points and 19 exit points were adjusted. Trip adjustments were both positive and negative. Most trip reductions occurred among trip pairs located along the Elmwood Avenue corridor in the Central Business District (CBD) downtown, while most additions represented trips from the CBD onto the larger interstate network via I-126 and SC-277. A further explanation of these adjustments occurs in the next section.

3.1.3 Location Specific Concerns

As the overall simulation output data began to fit relatively well with recorded traffic counts travel speeds, and the simulation generally appeared reasonable upon visual inspection, three geographic areas in the model remained problematic and required particular intervention. The issues and resolutions regarding these areas are presented below.

1. Central Business District: The CBD is incorporated in the model through Elmwood Avenue and Bull Street, which connect to I-126 and SC-277 respectively. Stubs from side streets, some carrying significant volumes of traffic, are connected to Elmwood, along with their associated traffic signals. Given that the corridor is in the CBD, a large amount of local trip paths initially crossed and traversed the relatively short and dense Elmwood corridor. These local CBD trips were only on the model's network for a few blocks but effectively overloaded Elmwood Avenue between Assembly Street and Bull Street, creating a gridlock situation in both the AM and PM peak periods. Despite the inclusion of a coordinated traffic signal plan for Elmwood Avenue, vehicle queues and vehicles waiting to queue in their target lanes effectively blocked traffic from both entering and traversing the corridor. This resulted in through traffic and CBD traffic destined for the interstate system via I-126 or SC-277 being severely restricted and delayed, and backups on inbound traffic extending far along both I-126 and SC-277.

   A possible explanation for this situation was the sheer volume of the CBD traffic and how it was assigned to the subarea matrices via the SCSWM's subarea extraction process. Perhaps a larger CBD grid network, with more directionality and interconnectivity to distribute CBD traffic was required. However it was determined that as the operation of the CBD was not the focus of the model, the best solution given the network and count data available was to manually remove enough of the purely local CBD trips from the trip tables so that the Elmwood Avenue corridor would appear to function as depicted in field observations. With sufficient local trips removed from the trip tables, traffic congestion in the corridor remains heavy but does not ultimately degrade into a paralyzed gridlock state. However, given persistently low volumes on I-126 and SC-277 away from the CBD even after the gridlock conditions in the corridor were resolved, some supplement traffic was added to peripheral CBD links to destinations along the I-26 and I-20 corridors. These trips helped ensure that enough traffic flowed on I-126 and SC-277 to create conditions identified in field observations and recorded in counts and link travel speeds.

2. Broad River Road at I-20: Broad River Road is one of the parallel arterial corridors included in the model. It parallels I-26 from Exit 97 on the northwest to I-20, continuing to a point east of Greystone Boulevard, which connects it to I-126. As a major urban arterial, Broad River Road serves dense commercial and residential development particular around its interchange with I-20, where traffic conditions are very congested. A particular

problem in the PM model was left-tuning westbound traffic on Broad River Road directly north of I-20, backing up and creating gridlock that extended onto the westbound I-20 exit ramps. Initially traffic destined for the west side of Broad River was queuing at a single intersection, Briargate Circle. However, in reality this left-turning traffic is distributed between multiple driveways and local streets between I-20 and Zimalcrest Drive. To resolve the issues associated with the channeling of left turns, Seminole Road and an additional centroid between Seminole Road and Zimalcrest Drive (see **Figure 4**, red oval) was added to the SCSWM subarea network and the subarea analysis rerun, producing new trip matrices. These additional links distributed the left turns among multiple locations, reducing left turn queues at Briargate Circle to reasonable levels. On the south side of I-20, Bakersfield Road, which had previously been represented by a centroid connecter, was converted to a road stub and the traffic signal plans at this intersection were installed (see **Figure 4**, purple oval). The addition of this signal helped complete a more accurate representation of traffic operations at the critical corridor.

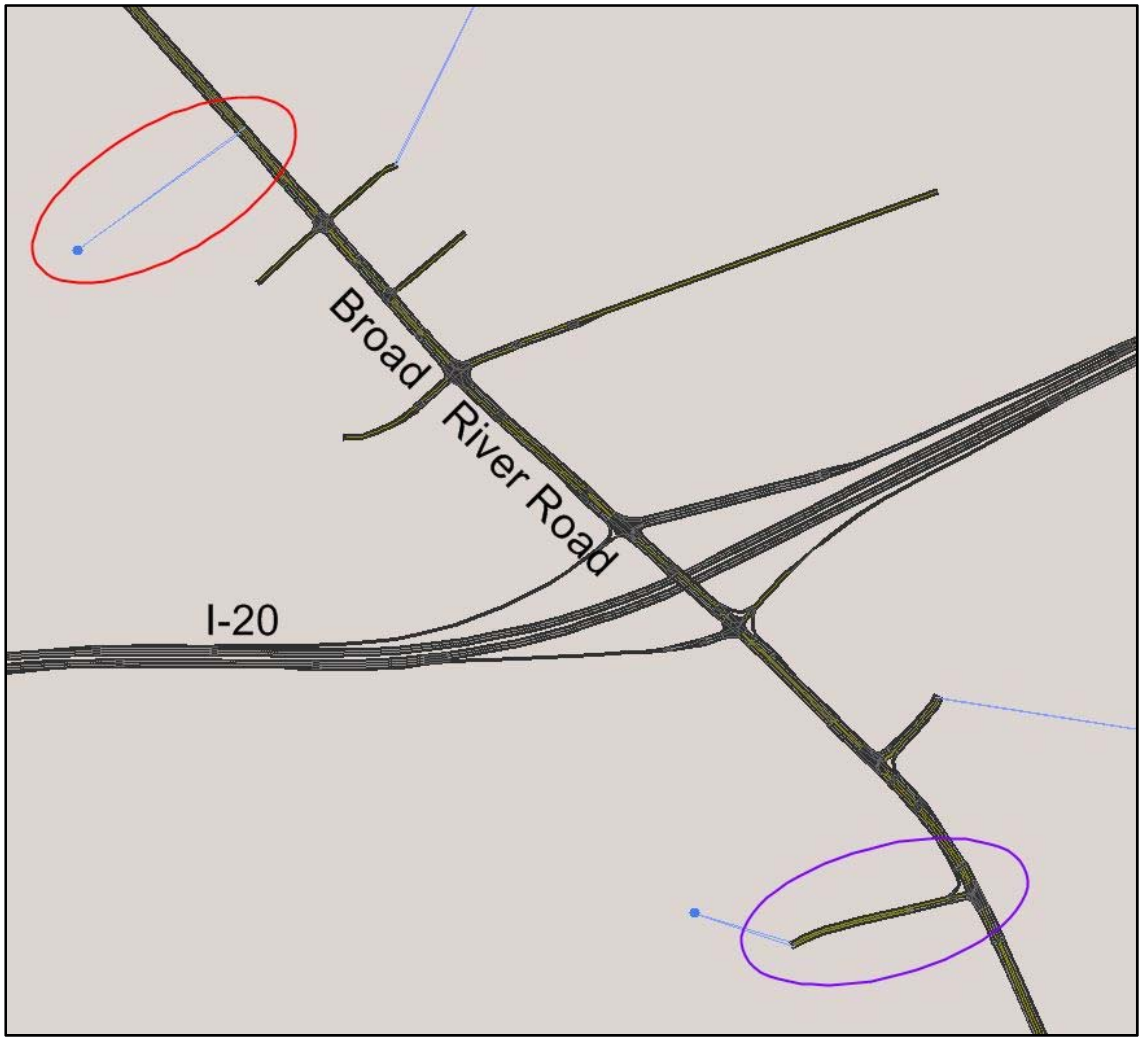


Figure 4. Broad River Road at I-20

3. Westbound Interchanges of I-26, I-126 and I-20: During the PM peak hour simulation, traffic volumes generally reflected counts along the corridor from westbound I-126 and its merge with westbound I-26, to the I-26 interchange with I-20. However, travel speeds in this corridor remained stubbornly high and did not reflect travel time data that indicated a severe slowdown as traffic merged and weaved within a 1-mile 5-lane section. An analysis of trip paths in both the SCSWM and the simulation model's path file demonstrated that larger trip patterns through this area were generally appropriate. Traffic from westbound I-26 through the I-20 interchange generally continued westbound on I-26 or exited to eastbound I-20, while traffic from I-126 continued on I-26 or exited to westbound I-20. Further, ramp volumes at the I-20/I-26 interchange were high but within reasonable range with counts. The incongruity in observed versus model travel speeds did not appear to be due to a lack of traffic volume or incorrect trip paths, but rather the

absence of significant weaving as vehicles positioned themselves across the five lanes in this section.

A review of the network settings and traffic patterns in this area determined factors possible factors contributing to the relative lack of weaving and higher than observed travel speeds. First, and most significant was the path choices of vehicles approaching the section from I-126. Second was a lower than expected volume of traffic entering from the Bush River Road westbound entrance ramp. The third factor was the project settings for lane speed variability.

The first factor related to trips from I-126 bound for I-20. Traffic signs direct drivers on I-126 that are exiting to eastbound and westbound I-20 to use a an auxiliary exit ramp positioned on the right side of the flyover that conveys the traffic merging from I-26. By using this side ramp, the exiting traffic from I-126 is positioned to the right of the I-26 traffic as it merges with I-126. (See **Figure 4**, ramp in red.) After diverging from mainline I-126, this auxiliary ramp first merges with traffic from a Bush River Road entrance ramp before realigning with the other lanes of I-26 briefly before becoming an exit-only lane for the I-20 eastbound ramp. In contrast, the left lanes on I-126 are intended for through traffic continuing on I-26 westbound, with the lanes from the I-26 flyover landing to their right. In practice, many I-126 drivers bound for the I-20 ramps stay in the left lanes through the merge with the flyover and then cross over the I-26 traffic lanes to get to the I-20 exit ramps. In fact, initial model runs demonstrated that the preferred path for I-126 traffic exiting to I-20 was via the left lanes because of their higher speeds. In order to force I-126 exiting traffic to use the right auxiliary ramp as directed, a full turn movement prohibition was set in the model's project settings which prevented the movement of vehicles from the left lanes of I-126 to the I-20 exit ramps. When this path prohibition was implemented, all I-126 traffic destined for I-20 used the auxiliary ramp. As a result, disruption caused from lane weaving significantly decreased and speeds for all lanes except the right lane actually increased.



Figure 5. I-26/I-126 Merge Approaching the I-20 Interchange

As field observation and observed travel speeds make clear, a full path prohibition preventing I-126 traffic from approaching I-20 exit ramps from the left is not reflective of what occurs at this location. Therefore a method to direct some I-126 exiting traffic to use the right auxiliary ramp while others continue to weave over from the left lanes was devised. This method involved extracting trips originating from I-126 to I-20 from the larger trip tables and transferring them into two new exclusive trip tables named User A or User B. User B trips are prohibited from using the left lanes and crossing over, while User A trips use the left lanes, as it is the preferred faster free-flow path. User A trips therefore weave across the incoming I-26 traffic lanes to get to the exit ramps for I-20, consequently creating the disruption and slowdown in this section observed in the travel time data. The number trips in the User A and User B matrices were adjusted to determine what proportion of total I-126 trips should be in each matrix to effectively reflect the ramp counts on the auxiliary ramp and the level of disruption required to lower speeds and create backup queues as observed in the field notes. The number of User A trips and User B trips was ultimately set evenly, with the same number trips in both matrices.

The second factor affecting the weaving in this section relates to the traffic entering from the Bush River Road entrance ramp. This traffic merges first with the I-126 traffic on the right side ramp and then, unless bound for the immediate I-20 eastbound ramp, must weave quickly into the center and left lanes to continue on I-26 westbound. However, based a comparison of ramp counts, not enough traffic was using this ramp and making this movement. In the model network, Bush River Road connects to both I-26 and I-20, and it appeared that too much of the traffic generated between the two interstates was directed toward I-20. With less traffic merging and weaving onto I-26 from the right, the disruption that was observed in the field was not being captured in the model. To encourage more local traffic on Bush River Road to use the ramp at I-26 as opposed to the I-20 ramp to the west, a lower free-flow speed was set for Bush River Road between the two interstates. A lower free flow speed may in fact be justified given the presence of local streets and driveways that are not in the model. This adjustment effectively increased the ramp traffic at I-26. As expected, this additional ramp traffic increased the overall disruption observed in this section as it merged and weaved into this section of I-26.

The third and final factor regards lane speeds in this section in general. TransModeler includes variable speed adjustments per lane position on multi-lane highways, with left lane traffic traveling fastest. As the number of lanes in a segment increases, the variance between the speeds from the left lanes to the right lanes increases. Being one of the few 5-lane sections in the network, the speed bias for the left lanes in this section was significant, with the speed of the far left lane set six percent higher than the average link speed set at 55 mph for this section. However, given that the presence of five lanes in this location is due to the merging of the I-126 and I-26 lanes and a right auxiliary lane, the disparity between lane speeds here should not be so pronounced. Further, a portion of the traffic in the left lanes is in fact trying to weave through the center lanes to the right lanes, which reduces the potential for higher speeds.

Having made the described adjustments for these three factors, link speeds dropped to the levels observed in the speed data and backup queues began to form on both the I-26 flyover and I-126 towards Colonial Life Boulevard.

3.2 CALIBRATION CRITERIA

The criteria used to confirm that the simulation models have been sufficiently calibrated were taken from the FHWA's *Traffic Analysis Toolbox Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software¸ July 2004 (FHWA Publication No. FHWA-HRT-04-040)*. The specific criteria, which were originally developed by The Wisconsin Department of Transportation, are found in Table 4 on page 64 of that document. The criteria consist of three general metrics: 1) traffic flow, 2) travel times, and 3) visual audits. The first two metrics are quantifiable based on observed data and model output while the third metric is based on a visual audit to the "analyst's satisfaction."

As each microsimulation run incorporates random seeds to reflect the daily variance in traffic conditions, multiple simulations runs of each model scenario are performed, with their output statistics averaged to provide mean statistics for comparison to observed values. For comparing traffic flow and travel speeds, the *FHWA Toolbox Guidelines, Appendix B: Confidence Intervals*,

was consulted to establish the proper number of simulations required to ensure that the mean statistics taken from the model are within an acceptable confidence level of the true mean. Based on the standard deviation of a sample of link speeds and link flows from model output, it was determined that an average of ten (10) model runs would be sufficient to ensure that the mean model speeds and traffic flows are within a single standard deviation of the true mean at the 95% confidence level. This has a practical implication in that the minimum computer processing time for each 90 minute simulation (including the 30-minute preload period), is approximately 10-12 minutes. Therefore developing output statistics for a single model scenario based on 10 runs requires approximately two hours of processing time, in addition to any input adjustments and output processing.

3.2.1 Traffic Flows

To compare traffic flows, traffic counts from every mainline, ramp tube, and aggregate ramp TMC were compared to average traffic flows at the same locations for both AM and PM peak hour models. In addition to an overall comparison of total model flow to total count volume, the *FHWA Guidelines* criteria divides flows into three volume groups, with separate criteria for each. The criteria also includes the GEH statistic, which is computed as follows:

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

Where:

E = model estimated volume
V = field count

A total of 277 count locations were compared. Table 3 presents the calibration targets and flow statistics from the AM and PM peak hour models. As Table 3 shows, the flow statistics were within the range of criteria targets for each volume category, with one exception. In the PM peak hour, the only 83% of links with counts over 2,700 vehicles per hour were within 400 of the count, one link short of the 85% target. However, all but one link in this volume class was within 15% of its respective count volume. The total flow to count ratio is slightly higher than counts in both the AM and PM peak periods, but within the target five percent (5%) threshold. The target threshold of total links meeting a maximum GEH statistic less than five (5) was also met for both the AM and PM models. A second criteria for cumulative GEH under four (4) could not be met, but was considered not relevant since the total flow to count thresholds were within the 5% thresholds.

Table 3. Traffic Flow Calibration Statistics

	Target	AM Peak Hr		PM Peak Hr	
Hourly Flows, Model Versus Observed		Total Links	% of cases	Total Links	% of cases
Individual Link Flows					
Within 15%, for 700 for veh/h <Flow < 2700 veh/h	> 85% of cases	171	92%	169	89%
Within 100 veh/h, for Flow < 700 veh/h	> 85% of cases	84	95%	82	85%
Within 400 veh/h, for Flow > 2700 veh/h	> 85% of cases	22	91%	24	83%
Sum of All Links	Within 5% of sum of all link counts	277		277	
Sum of Link Flow			254,644		269,572
Sum of Counts			250,214		257,562
(Flow-Counts)/Counts			1.77%		4.66%
Links with GEH Statistic < 5	> 85% of cases	250	90%	239	86%

3.2.2 Travel Speeds

The criteria for travel times in the *FHWA Guidelines* are a comparison of journey travel times. Given the size of the network and the multitude of available paths within it, travel times for specific paths were not measured in the model output. Instead, travel speeds were compared for each segment of the interstate and freeway corridors. Each segment between both system and service interchanges, for both directions were included. Table 4 presents a comparison of the total number of segments and the number of segments that were within the *FHWA Guidelines* criteria of fifteen percent (15%) of the observed travel speed. Both the AM and PM models meet the target threshold of 85% of segments within 15% of the observed speed.

Table 4. Interstate and Freeway Segments within 15% of Observed Travel Speeds

	AM Peak Hour		PM Peak Hour	
	Segments	Within 15%	Segments	Within 15%
I-26	30	25	30	27
I-20	32	30	32	32
I-77	26	26	26	23
I-126/SC 277	14	11	14	9
Total	102	92	102	91
85% Target		90%		89%

3.2.3 Visual Audits

Visual audits were conducted by watching the model simulations live while referring to field notes of traffic conditions, including the location and length of bottlenecks and intersection queues. Given the size of the network, subjective interpretation of the field notes,(such as "very congested" and "traffic moves between 40-50 mph"), and the *FHWA Guidelines* criteria being "to analyst's satisfaction," the visual audit process was primarily based a consensus among the

model developers and reviewers that conditions were generally within the expectations of a congested peak hour, as informed by the field notes and input from project leaders and the client. A memorandum of the field notes is included as Appendix A.

3.3 CORRIDOR STATISTICS

In addition to the calibration criteria, graphical representations of the link flow and travel speed comparisons between observed data and model output were developed to show the fit of the model for each corridor. Where mainline counts exist, the model flow is compared to the counts. Otherwise segment volumes are calculated by adding and subtracting ramp counts at each interchange. This section is organized by interstate system with tables and corresponding graphs for mainline segment volumes, ramp volumes, and segment travel speeds.

3.3.1 I-26 Corridor Statistics

Table 5. I-26 Eastbound Volume Comparison

I-26 Mainline Volume Calibration Summary		Eastbound								
			7:15-8:15 AM				4:45-5:45 PM			
#	Location	Link ID	Field Count	Calc. Volume	Model Output	GEH	Field Count	Calc. Volume	Model Output	GEH
1	west of Exit 91 (Columbia Ave)	3384		1,326	1,507			1,354	1,590	
2	Exit 91 to Exit 97 (Broad River Rd)	3376	1,984		2,170	4	1,821		2,103	6
3	Exit 97 to Exit 101 (Broad River Rd)	3365		3,126	3,333			2,314	2,677	
4	Exit 101 to Exit 102 (Lake Murray Blvd)	3353		3,782	4,103		3,435		3,296	2
5	Exit 102 to Exit 103 (Harbison Blvd)	3333		3,902	4,221			3,834	3,635	
6	Exit 103 to Exit 104 (Piney Grove Rd)	3324		4,436	4,673			4,205	4,052	
7	Exit I 104 to Exit 106 (St. Andrews Rd)	6369	5,597		5,432	2	4,690		4,633	1
8	Exit 106 to Exit 107 (I-20)	3284		7,377	7,141			5,662	5,575	
9	I-26 to I-26	3254	2,954		3,111	3	2,505		3,124	12
10	Exit 108 to Exit 110 (Sunset Blvd)	6370	3,628		3,414	4	4,029		3,919	2
11	Exit 110 to Exit 111 (Augusta Rd)	4281		3,512	3,287			4,072	3,887	
12	Exit 111 to Exit 113 (Edmund Hwy)	4267		4,262	3,938			4,423	4,331	
13	Exit 113 to Exit 115 (Charleston Hwy)	4255		4,189	3,823			4,144	3,991	
14	Exit 116 (I-77) to Exit 119 (Charleston Hwy)	1269		1,552	1,974			2,063	2,729	
15	southeast of Exit 119	1280	1,323		1,701	10	1,895		2,518	13

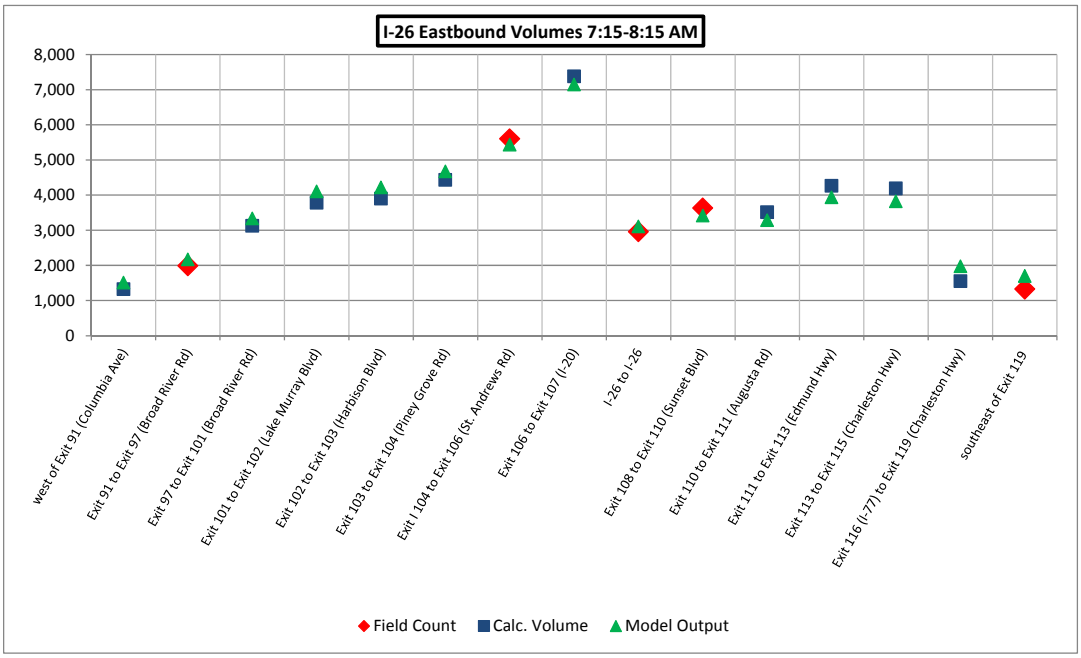


Figure 6. I-26 Eastbound Volume Comparison: AM Peak Hour

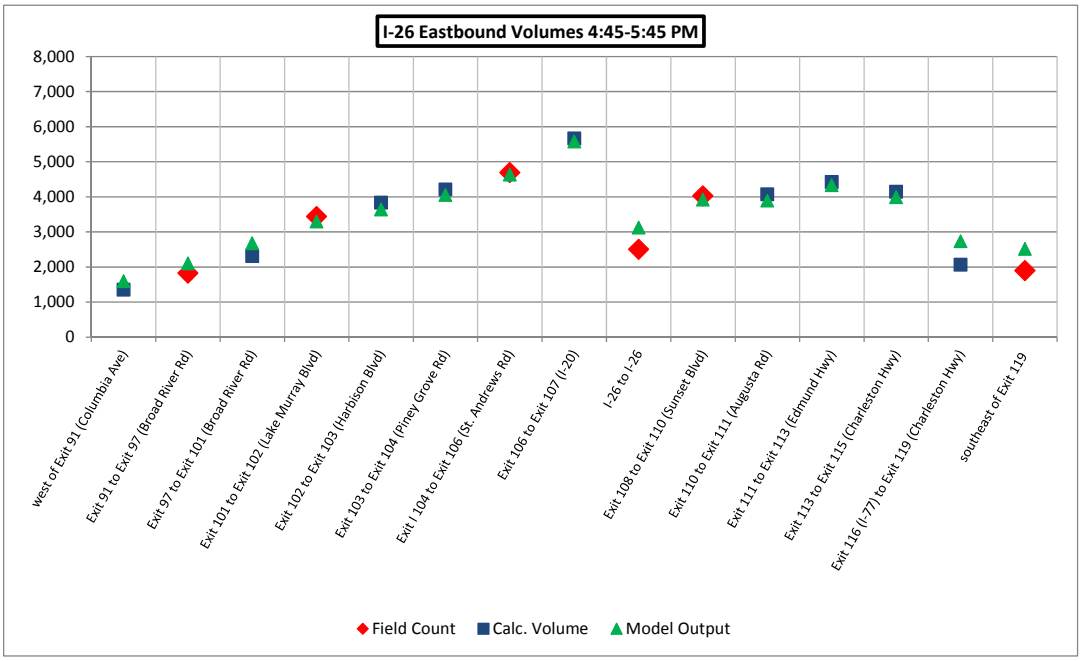


Figure 7. I-26 Eastbound Volume Comparison: PM Peak Hour

Table 6. I-26 Westbound Volume Comparison

I-26 Mainline Volume Calibration Summary		Westbound								
			7:15-8:15 AM				4:45-5:45 PM			
#	Location	Link ID	Field Count	Calc. Volume	Model Output	GEH	Field Count	Calc. Volume	Model Output	GEH
1	west of Exit 91 (Columbia Ave)	3382		851	1,190			1,543	1,953	
2	Exit 91 to Exit 97 (Broad River Rd)	3369	1,389		1,574	5	2,114		2,499	8
3	Exit 97 to Exit 101 (Broad River Rd)	3363		1,381	1,892			2,292	3,702	
4	Exit 101 to Exit 102 (Lake Murray Blvd)	3346	2,700		2,405	6	4,679		4,679	0
5	Exit 102 to Exit 103 (Harbison Blvd)	3337		3,152	2,929			5,367	5,421	
6	Exit 103 to Exit 104 (Piney Grove Rd)	3322		2,849	3,405			5,097	5,961	
7	Exit I 104 to Exit 106 (St. Andrews Rd)	3304	3,514		3,722	3	5,623		6,186	7
8	Exit 106 to Exit 107 (I-20)	3285		3,788	4,642			5,380	7,286	
9	I-26 to I-26	3249	2,102		2,503	8	2,437		2,754	6
10	Exit 108 to Exit 110 (Sunset Blvd)	4294	3,700		3,593	2	3,578		3,977	6
11	Exit 110 to Exit 111 (Augusta Rd)	4283		3,700	3,574			3,578	3,883	
12	Exit 111 to Exit 113 (Edmund Hwy)	4265		3,700	4,095			3,578	4,514	
13	Exit 113 to Exit 115 (Charleston Hwy)	4253		3,700	3,950			3,578	4,502	
14	Exit 116 (I-77) to Exit 119 (Charleston Hwy)	1267		1,525	2,446			1,833	2,835	
15	southeast of Exit 119	1277	1,525		2,027	12	1,833		2,407	12

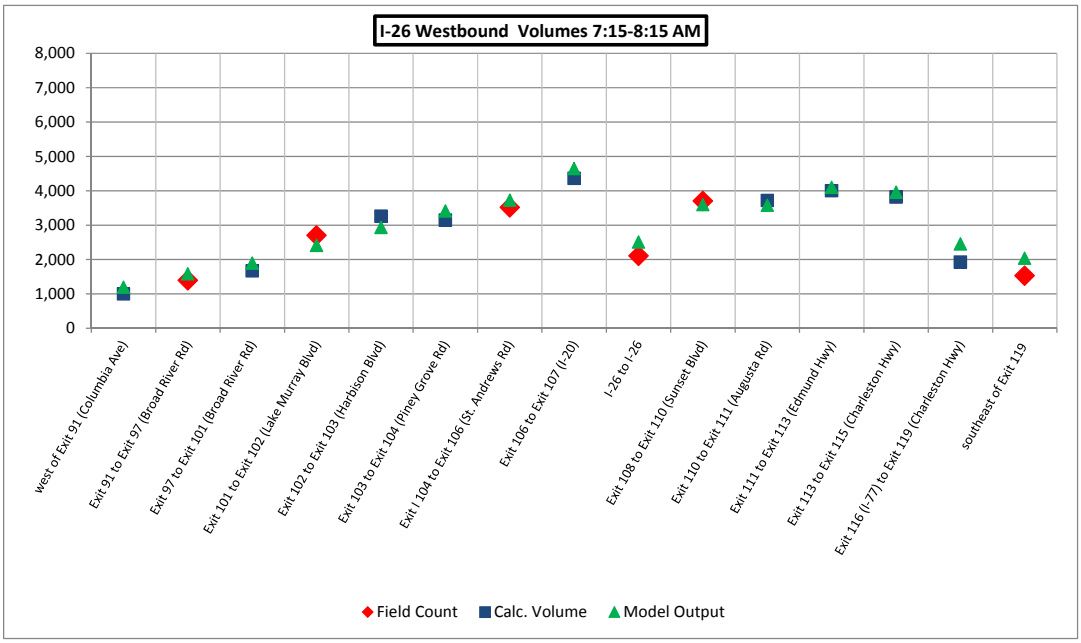


Figure 8. I-26 Westbound Volume Comparison: AM Peak Hour

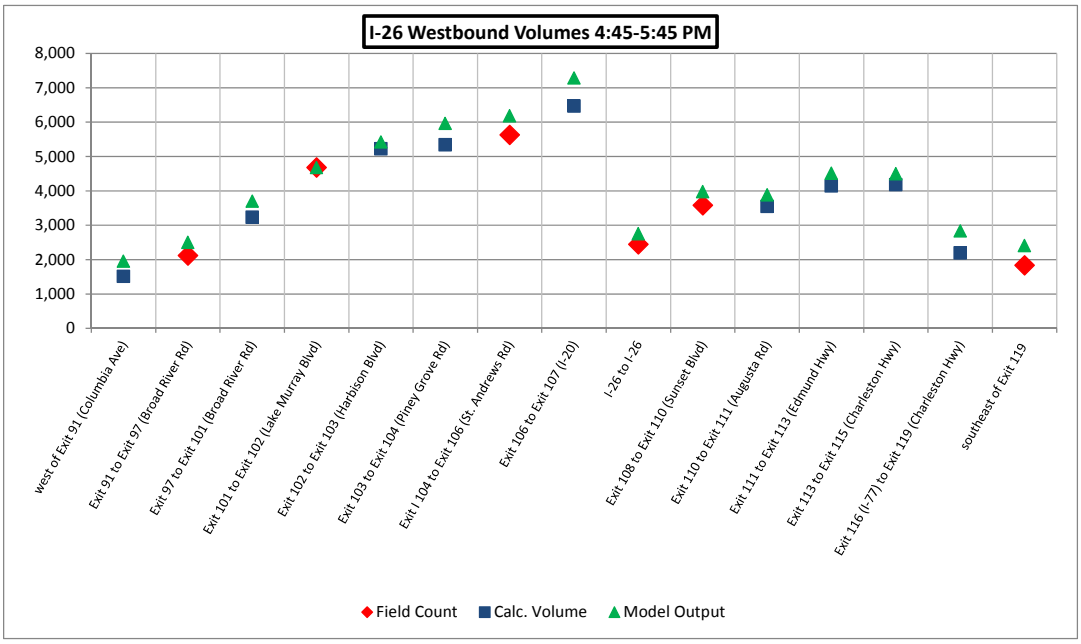


Figure 9. I-26 Westbound Volume Comparison: PM Peak Hour

Table 7. I-26 Ramp Volume Comparison

	I-26 Ramp Volume Calibration Summary		Eastbound								Westbound								
			7:15-8:15 AM				4:45-5:45 PM					7:15-8:15 AM				4:45-5:45 PM			
#	Location	Link ID	Field Count	Model Output	GEH	Diff.	Field Count	Model Output	GEH	Diff.	Link ID	Field Count	Model Output	GEH	Diff.	Field Count	Model Output	GEH	Diff.
1	Exit 91 (Columbia Ave) off ramp	3383	113	116	0	3	82	83	0	1	3377	503	476	1	-27	721	683	1	-38
2	Exit 91 (Columbia Ave) on ramp	6299	771	794	1	23	549	582	1	33	3381	112	128	1	16	118	126	1	8
3	Exit 97 (Broad River Rd) off ramp	3375	119	111	1	-8	216	226	1	10	3366	457	470	1	13	1,240	1,272	1	32
4	Exit 97 (Broad River Rd) on ramp	5064	1,261	1,300	1	39	709	761	2	52	5046	178	172	0	-6	119	136	1	17
5	Exit 101 (Broad River Rd) off ramp (wb)	3361	127	114	1	-13	88	92	0	4	3357	362	386	1	24	661	707	2	46
6	Exit 101 (Broad River Rd) off ramp (eb)	3358	256	247	1	-9	117	119	0	2	3347	287	239	3	-48	401	426	1	25
7	Exit 101 (Broad River Rd) on ramp	3352	1,039	1,159	4	120	837	811	1	-26	3362	132	132	0	0	229	221	1	-8
8	Exit 102 (Lake Murray Blvd) off ramp (wb)	3354	288	295	0	7	193	199	0	6	3339	484	434	2	-50	606	622	1	16
9	Exit 102 (Lake Murray Blvd) off ramp (eb)	3343	312	338	1	26	193	204	1	11	3342	348	318	2	-30	351	403	3	52
10	Exit 102 (Lake Murray Blvd) on ramp	3336	720	786	2	66	757	753	0	-4	3349	276	244	2	-32	409	301	6	-108
11	Exit 103 (Harbison Blvd) off ramp	3211	105	164	5	59	372	316	3	-56	3326	472	597	5	125	800	875	3	75
12	Exit 103 (Harbison Blvd) on ramp	3328	639	640	0	1	857	741	4	-116	3242	158	122	3	-36	468	309	8	-159
13	Exit 104 (Piney Grove Rd) off ramp	3233	134	170	3	36	272	204	4	-68	3307	617	671	2	54	693	750	2	57
14	Exit 104 (Piney Grove Rd) on ramp	3311	906	950	1	44	780	745	1	-35	3321	251	391	8	140	413	571	7	158
15	Exit 106 (St. Andrews Rd) off ramp	3300	117	172	5	55	287	372	5	85	3286	697	725	1	28	470	583	5	113
16	Exit 106 (St. Andrews Rd) eb on / wb off ramp	3296	829	859	1	30	890	769	4	-121	3290	342	369	1	27	632	673	2	41
17	Exit 106 (St. Andrews Rd) on ramp	3282	1,120	1,093	1	-27	696	575	5	-121	3303	188	173	1	-15	256	175	6	-81
18	Exit 107 to wb I-20	3288	518	645	5	127	793	918	4	125	3279	419	500	4	81	1,016	1,424	12	408
19	Exit 107 to eb I-20	3278	1,410	1,472	2	62	1,366	1,229	4	-137	4316	619	545	3	-74	579	551	1	-28
20	Exit 107 from wb I-20	3274	790	706	3	-84	594	618	1	24	3281	1,122	1,059	2	-63	1,145	1,112	1	-33
21	Exit 107 from eb I-20	4322	1,203	1,244	1	41	677	980	11	303	4332	584	572	0	-12	574	674	4	100
22	Exit 108 (Bush River Rd) off ramp	51	324	450	6	126	340	506	8	166	6399	324	392	4	68	1,006	868	5	-138
23	Exit 108 (Bush River Rd) on ramp	3261	472	598	5	126	638	746	4	108	6402	332	392	3	60	828	576	10	-252
24	Exit 108 to/from I-126	6400	316	351	2	35	763	792	1	29	6398	589	631	2	42	280	309	2	29
25	Exit 110 (Sunset Blvd) off ramp	4297	818	818	0	0	783	883	3	100	4285	851	859	0	8	787	824	1	37
26	Exit 110 (Sunset Blvd) on ramp	4288	702	690	0	-12	826	839	0	13	4293	832	898	2	66	820	927	4	107
27	Exit 111 (Augusta Rd) off ramp (wb)	4280	185	254	5	69	342	400	3	58	4278	623	818	7	195	829	1,014	6	185
28	Exit 111 (Augusta Rd) on ramp (wb)	4268	425	413	1	-12	527	482	2	-45	6404	264	271	0	7	280	314	2	34
29	Exit 111 (Augusta Rd) off ramp (eb)	6406	247	312	4	65	351	372	1	21	4275	435	465	1	30	421	392	1	-29
30	Exit 111 (Augusta Rd) on ramp (eb)	4272	757	827	2	70	517	719	8	202	6405	511	513	0	2	375	439	3	64
31	Exit 113 (Edmund Hwy) off ramp	4266	782	770	0	-12	936	991	2	55	4262	675	657	1	-18	676	703	1	27
32	Exit 113 (Edmund Hwy) on ramp	5991	709	685	1	-24	657	645	0	-12	5996	858	821	1	-37	639	699	2	60
33	Exit 115 (Charleston Hwy) off ramp	1253	758	816	2	58	1,096	1,154	2	58	6420	193	221	2	28	113	183	6	70
34	Exit 115 (Charleston Hwy) on ramp (sb)	4823	76	70	1	-6	178	188	1	10	1251	235	252	1	17	299	368	4	69
35	Exit 115 (Charleston Hwy) on ramp (nb)	6412	85	73	1	-12	82	78	1	-5	4821	1,161	1,185	1	24	616	613	0	-3
36	Exit 116 to I-77	1258	2,161	2,170	0	9	1,556	1,523	1	-33	4230	1,122	1,203	2	81	1,158	1,228	2	70
37	Exit 116 from I-77	6416	994	1,037	1	43	1,005	1,156	5	151	6415	1,574	1,512	2	-62	2,132	2,056	2	-76
38	Exit 119 (Charleston Hwy) off ramp	1273	285	333	3	48	249	302	3	53	1276	90	116	3	26	39	44	1	5
39	Exit 119 (Charleston Hwy) on ramp	1279	56	72	2	16	81	94	1	13	6017	494	553	3	59	401	469	3	68

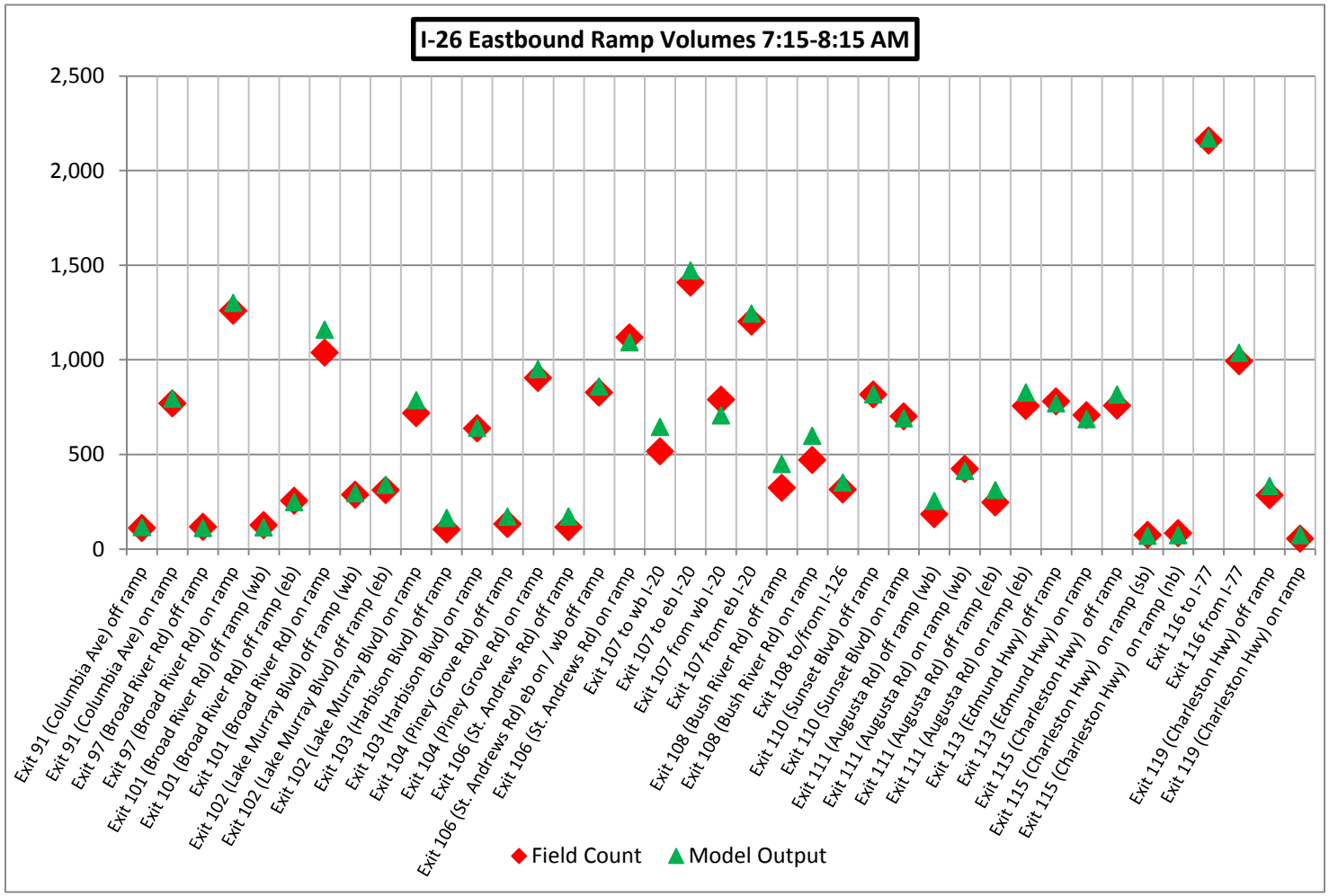


Figure 10. I-26 Eastbound Ramp Volumes: AM Peak Hour

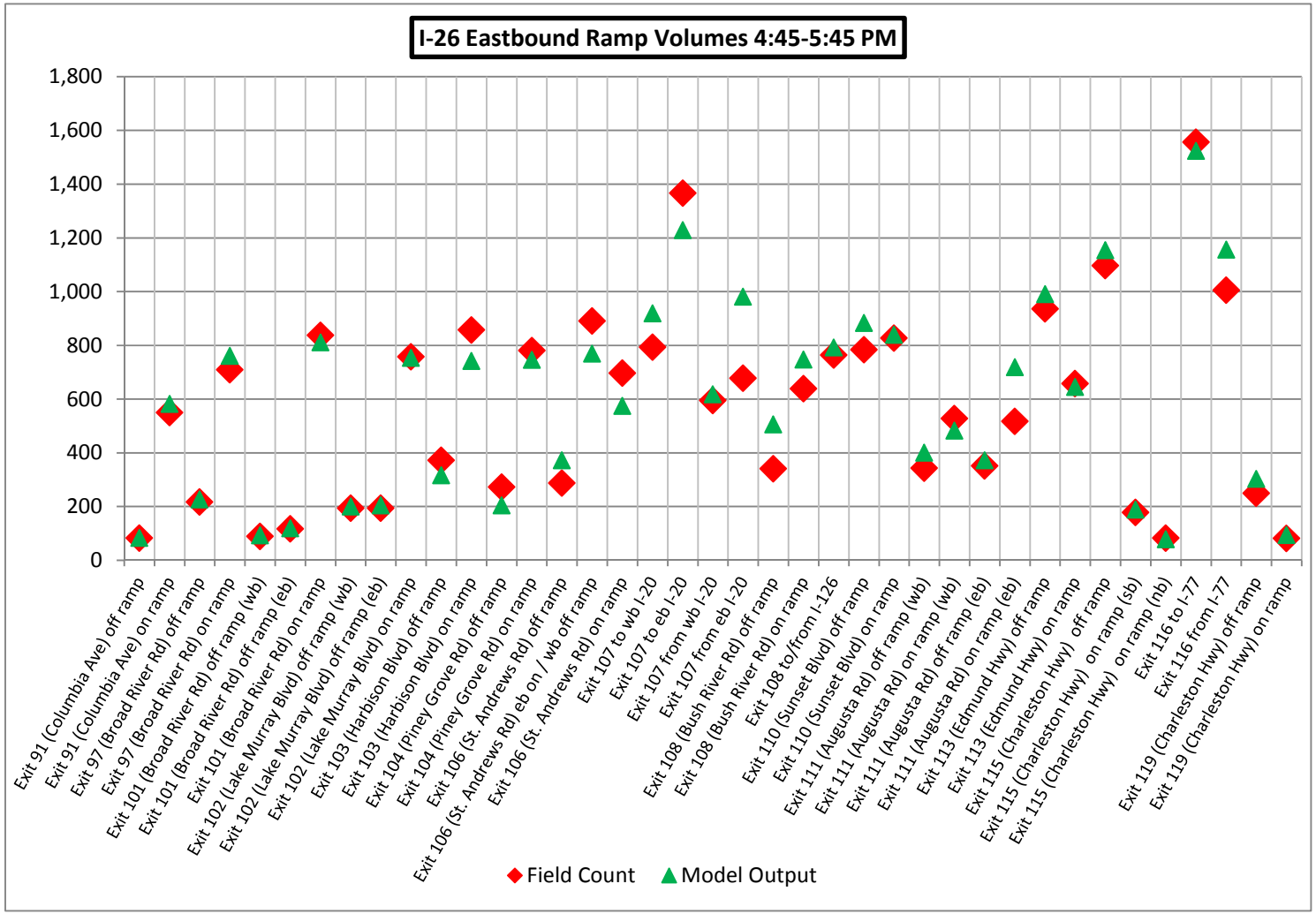


Figure 11. I-26 Eastbound Ramp Volumes: PM Peak Hour

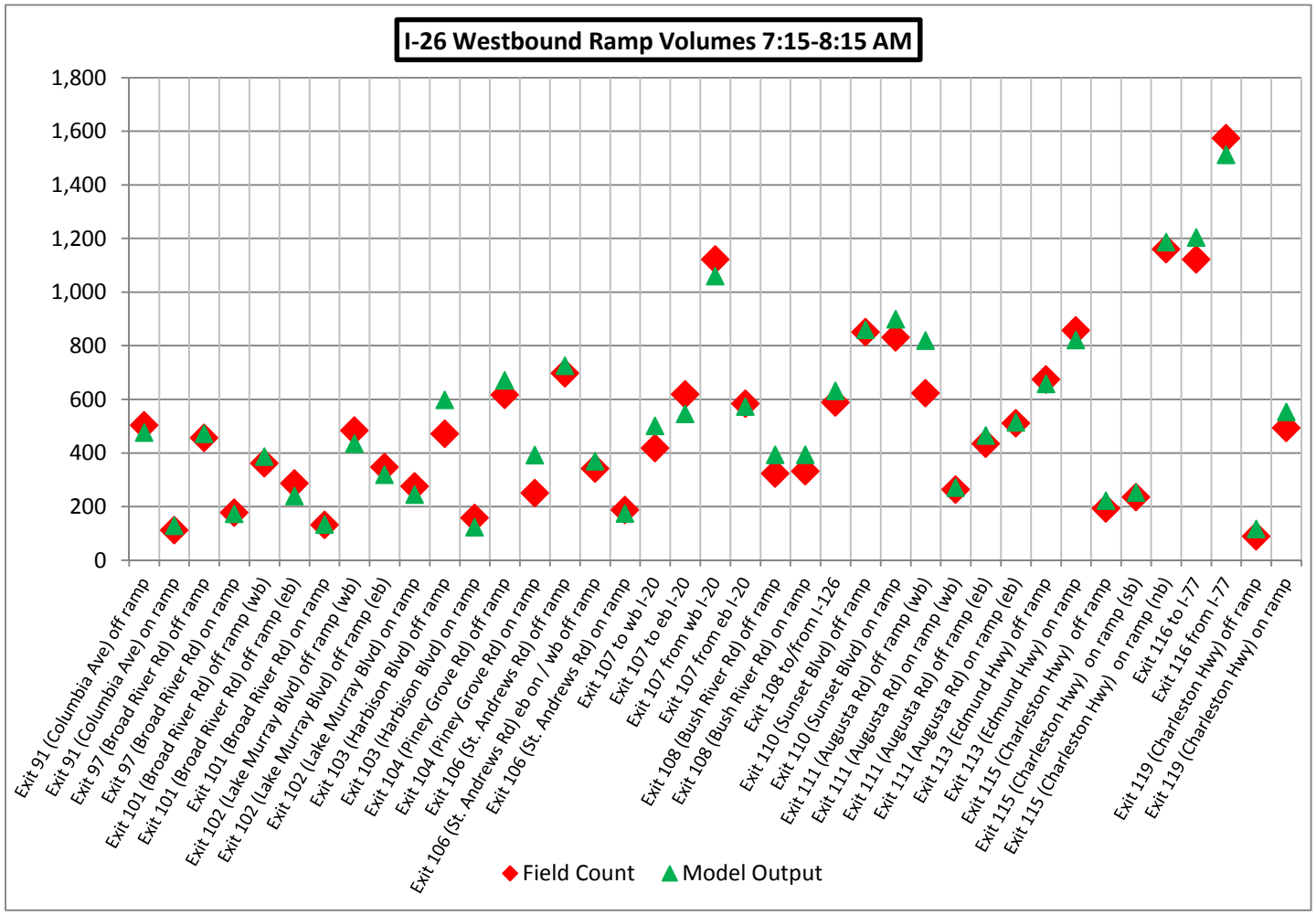


Figure 12. I-26 Westbound Ramp Volumes: AM Peak Hour

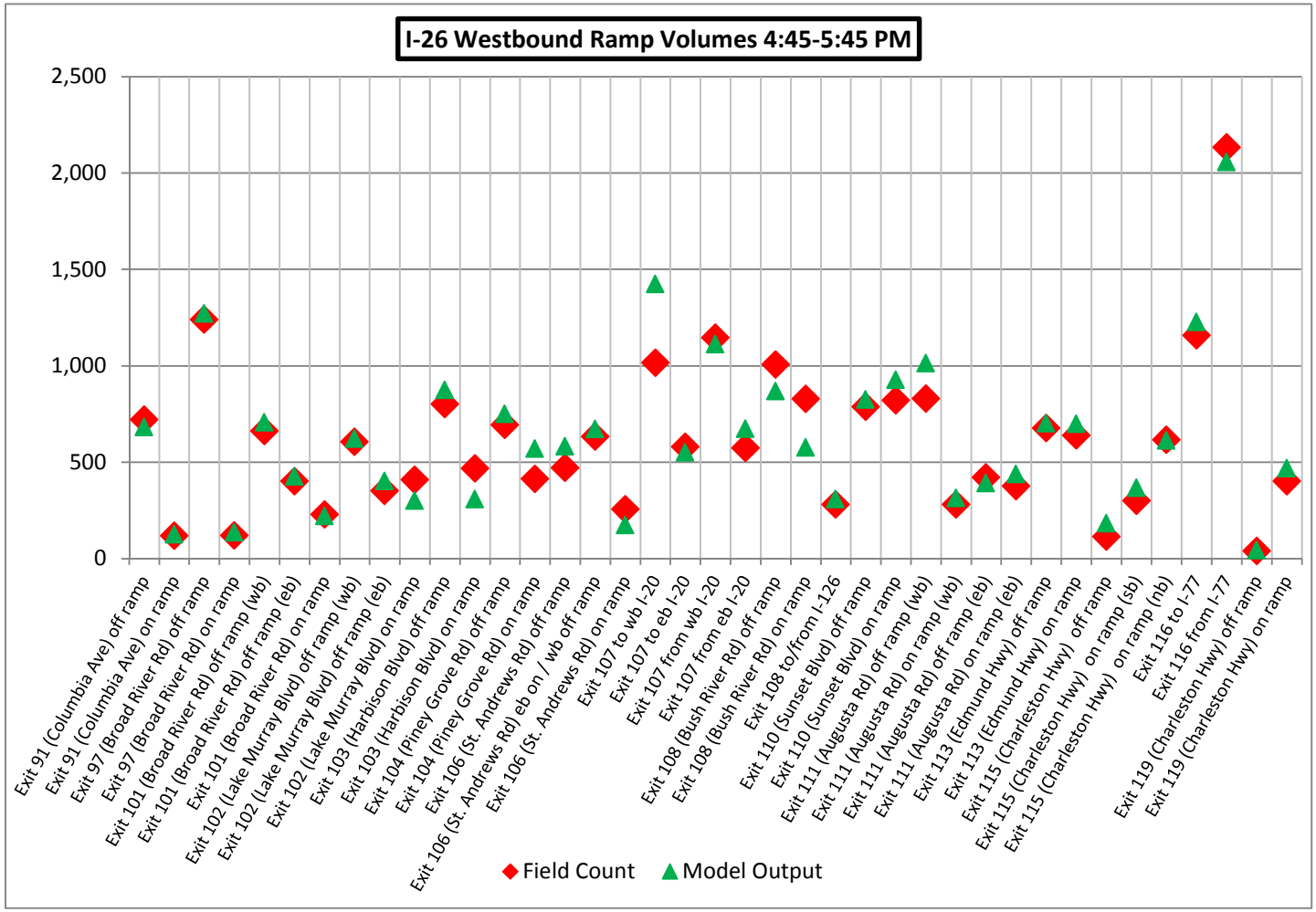


Figure 13. I-26 Westbound Ramp Volumes: PM Peak Hour

Table 8. I-26 Segment Speed Comparison

		Eastbound						Westbound				
Segment	Location	Segment	AM		PM			Segment	AM		PM	
		ID	INRIX	Model	INRIX	Model		ID	INRIX	Model	INRIX	Model
1	west of Exit 91 (Columbia Ave)	4801	71	70	70	70		4796	68	71	70	69
2	Exit 91 to Exit 97 (Broad River Rd)	4787	70	67	71	67		4774	69	70	70	69
3	Exit 97 to Exit 101 (Broad River Rd)	4768	68	64	69	66		4762	68	69	68	54
4	Exit 101 to Exit 102 (Lake Murray Blvd)	4748	54	59	65	62		4741	64	66	64	63
5	Exit 102 to Exit 103 (Harbison Blvd)	4720	44	60	63	62		4726	63	65	62	58
6	Exit 103 to Exit 104 (Piney Grove Rd)	4707	49	60	63	62		4701	63	64	59	49
7	Exit I 104 to Exit 106 (St. Andrews Rd)	4669	53	57	60	61		8551	62	62	52	49
8	Exit 106 to Exit 107 (I-20)	4649	52	42	56	48		4651	58	48	32	29
9	I-26 to I-26	6186	59	57	58	56		4604	57	48	31	31
10	Exit 108 to Exit 110 (Sunset Blvd)	6177	60	63	59	62		8554	61	58	45	57
11	Exit 110 to Exit 111 (Augusta Rd)	6152	60	65	62	63		6158	61	65	61	64
12	Exit 111 to Exit 113 (Edmund Hwy)	6134	61	63	64	62		6127	60	62	60	61
13	Exit 113 to Exit 115 (Charleston Hwy)	6114	61	63	62	62		6108	61	60	62	60
14	Exit 116 to Exit 119 (Charleston Hwy)	1548	64	63	63	62		1544	64	60	64	58
15	southeast of Exit 119	1565	64	69	64	67		1560	67	70	66	69

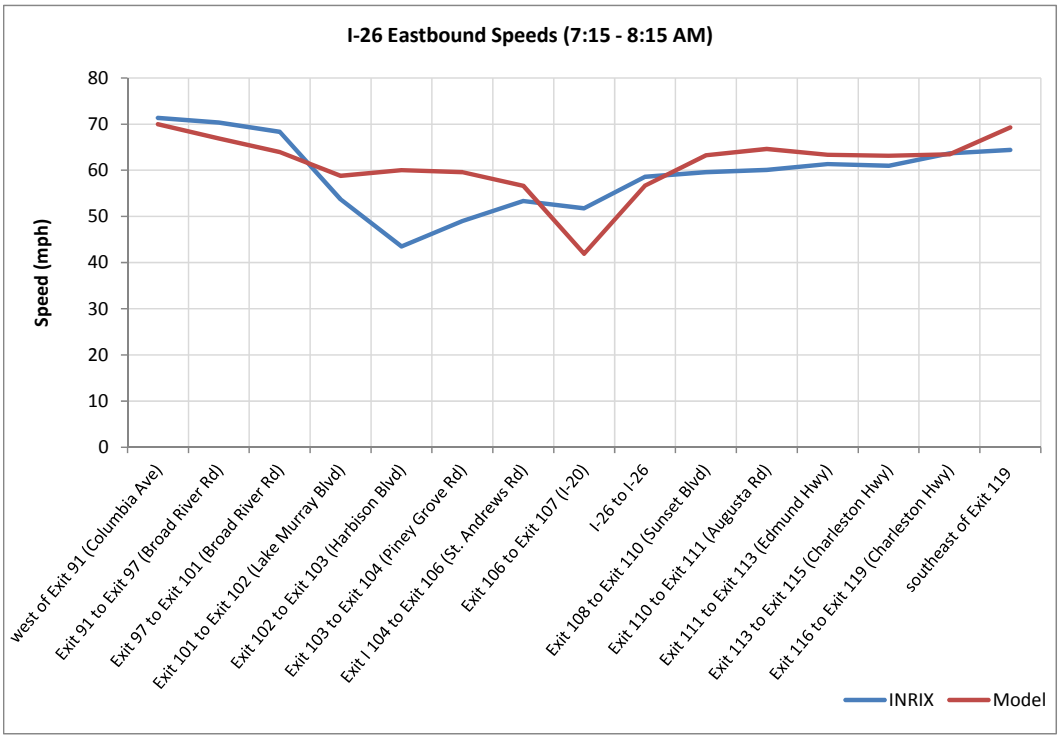


Figure 14. I-26 Eastbound Speeds: AM Peak Hour

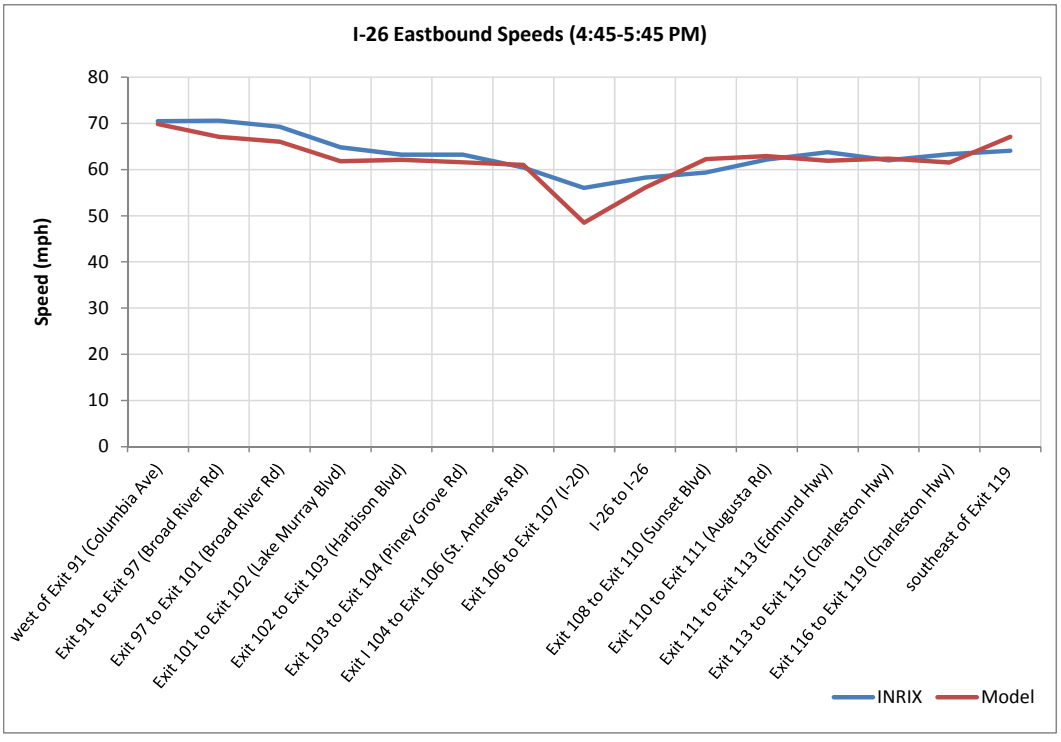


Figure 15. I-26 Eastbound Speeds: PM Peak Hour

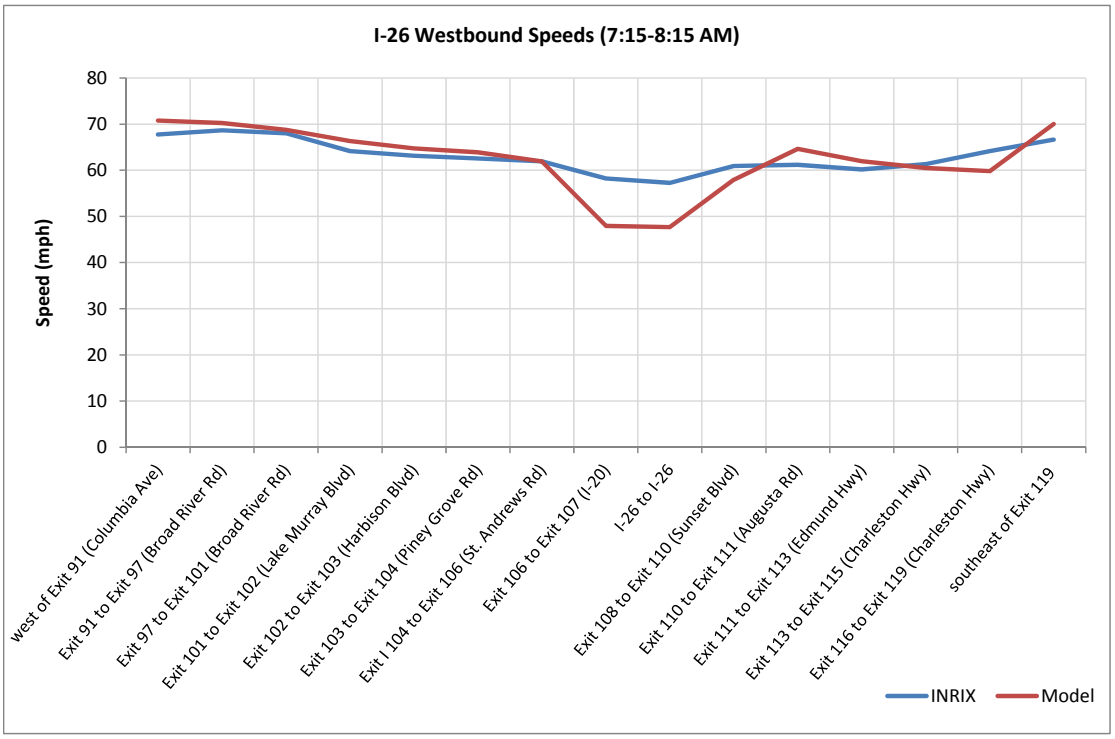


Figure 16. I-26 Westbound Speeds: AM Peak Hour

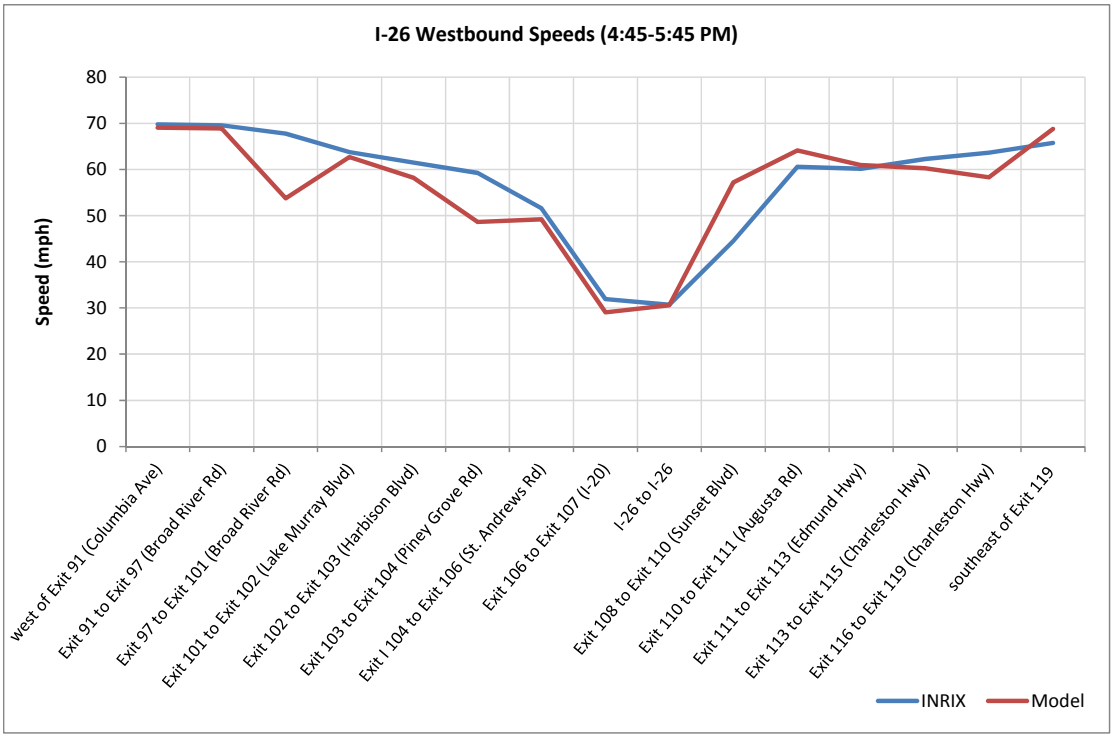


Figure 17. I-26 Westbound Speeds: PM Peak Hour

3.3.2 I-20 Corridor Statistics

Table 9. I-20 Eastbound Volume Comparison

I-20 Mainline Volume Calibration Summary		Eastbound								
			7:15-8:15 AM				4:45-5:45 PM			
#	Location	Link ID	Field Count	Calc. Volume	Model Output	GEH	Field Count	Calc. Volume	Model Output	GEH
1	west of Exit 51 (Long Pond Rd)	6443		1,450	1,551			1,367	1,425	
2	Exit 51 to Exit 55 (S Lake Dr)	6461	2,620		2,516	2	1,678		1,853	4
3	Exit 55 to Exit 58 (Augusta Rd)	2018		3,668	3,443			2,347	2,567	
4	Exit 58 to Exit 61 (Sunset Blvd)	2028		4,158	4,049			2,257	2,570	
5	Exit 61 to Exit 63 (Bush River Rd)	2051	5,131		4,927	3	3,144		3,390	4
6	Exit 63 to Exit 64 (I-26)	2068		4,734	4,405			3,228	3,875	
7	Exit 64 to Exit 65 (Broad River Rd)	4319		4,523	4,580			3,639	4,004	
8	Exit 65 to Exit 68 (Monticello Rd)	6463	5,174		5,094	1	4,391		4,466	1
9	Exit 68 to Exit 70 (Fairfield Rd)	4355		4,968	4,817			4,522	4,558	
10	Exit 70 to Exit 71 (N Main St)	4372	4,561		4,620	1	4,106		4,418	5
11	Exit 71 to Exit 72 (Farrow Rd)	4389	4,340		4,274	1	4,132		4,210	1
12	Exit 72 to Exit 73 (SC 277)	4404		3,643	3,651			3,900	3,960	
13	Exit 73 to Exit 74 (Two Notch Rd)	4422		2,959	2,870			4,042	4,273	
14	Exit 74 to Exit 76 (I-77)	4435	2,241		2,171	1	3,242		3,402	3
15	Exit 76 to Exit 80 (Clemson Rd)	947		2,325	2,483			3,990	4,317	
16	Exit 80 to Exit 82 (Spear Creek Church Rd)	36		1,524	1,713			2,840	3,203	
17	east of Exit 82	981	1,114		1,203	3	2,390		2,469	2

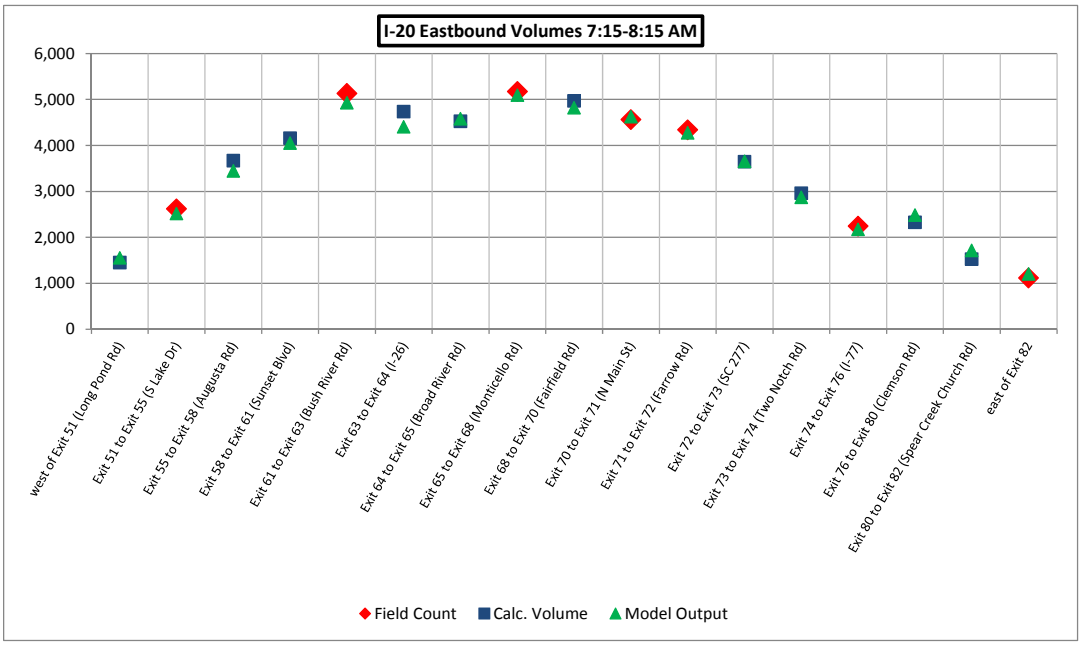


Figure 18. I-20 Eastbound Volume Comparison: AM Peak Hour

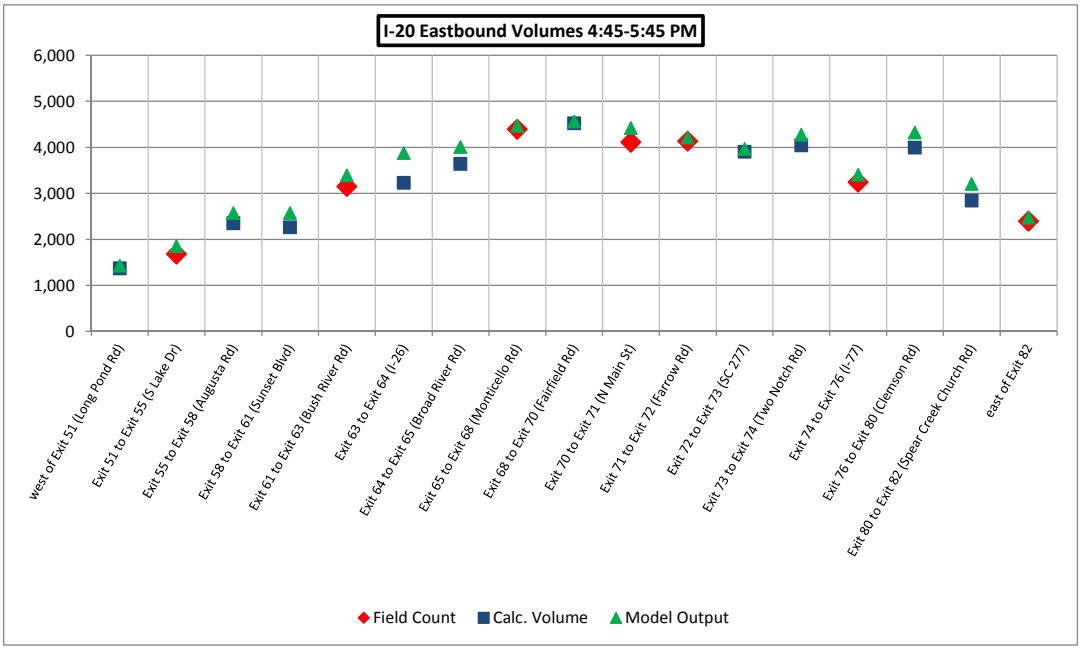


Figure 19. I-20 Eastbound Volume Comparison: PM Peak Hour

Table 10. I-20 Westbound Volume Comparison

I-20 Mainline Volume Calibration Summary		Westbound								
			7:15-8:15 AM				4:45-5:45 PM			
#	Location	Link ID	Field Count	Calc. Volume	Model Output	GEH	Field Count	Calc. Volume	Model Output	GEH
1	west of Exit 51 (Long Pond Rd)	1987		1,008	1,108			2,024	1,647	
2	Exit 51 to Exit 55 (S Lake Dr)	2000	1,219		1,348	4	2,167		2,335	4
3	Exit 55 to Exit 58 (Augusta Rd)	2016		2,153	1,827			2,815	3,308	
4	Exit 58 to Exit 61 (Sunset Blvd)	2033		1,237	1,983			3,422	3,568	
5	Exit 61 to Exit 63 (Bush River Rd)	2049	2,618		2,857	5	4,558		4,718	2
6	Exit 63 to Exit 64 (I-26)	2064		1,919	3,061			3,924	4,878	
7	Exit 64 to Exit 65 (Broad River Rd)	4337		4,151	3,695			4,637	4,246	
8	Exit 65 to Exit 68 (Monticello Rd)	4347	4,580		4,629	1	4,884		5,427	8
9	Exit 68 to Exit 70 (Fairfield Rd)	4357		5,838	4,576			5,749	5,071	
10	Exit 70 to Exit 71 (N Main St)	4362	4,318		4,395	1	4,731		5,005	4
11	Exit 71 to Exit 72 (Farrow Rd)	4383	4,246		4,215	0	4,197		4,680	7
12	Exit 72 to Exit 73 (SC 277)	4399		4,246	4,049			4,197	4,170	
13	Exit 73 to Exit 74 (Two Notch Rd)	4409		3,738	4,375			2,795	3,416	
14	Exit 74 to Exit 76 (I-77)	4429	3,738		3,684	1	2,795		2,888	2
15	Exit 76 to Exit 80 (Clemson Rd)	943		3,738	4,561			2,795	2,917	
16	Exit 80 to Exit 82 (Spear Creek Church Rd)	968		3,738	3,679			2,795	2,247	
17	east of Exit 82	971	2,763		2,850	2	1,580		1,763	4

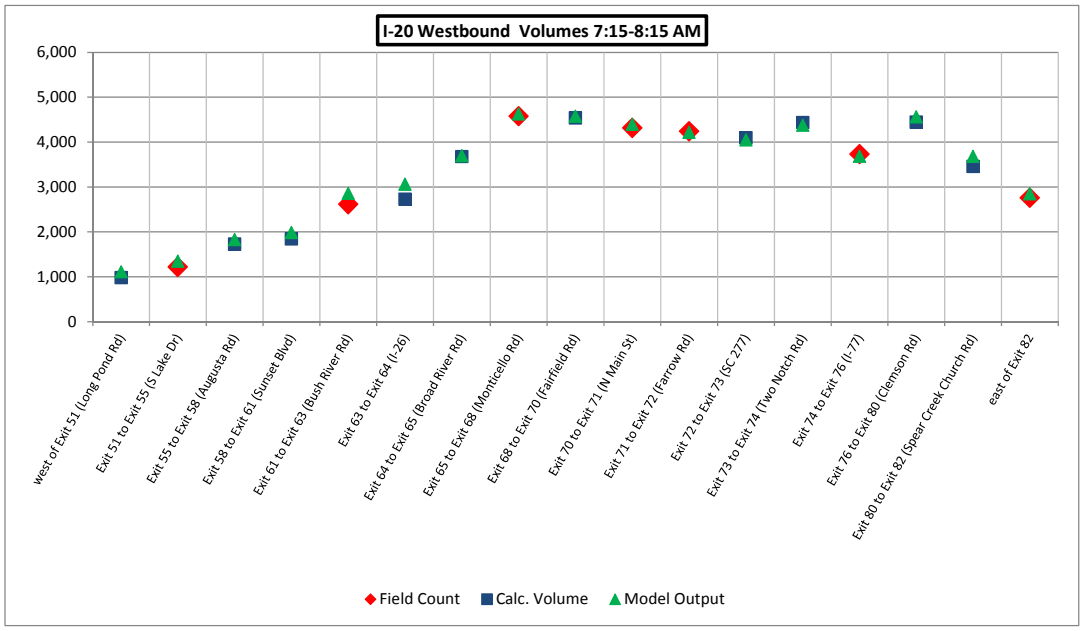


Figure 20. I-20 Westbound Volume Comparison: AM Peak Hour

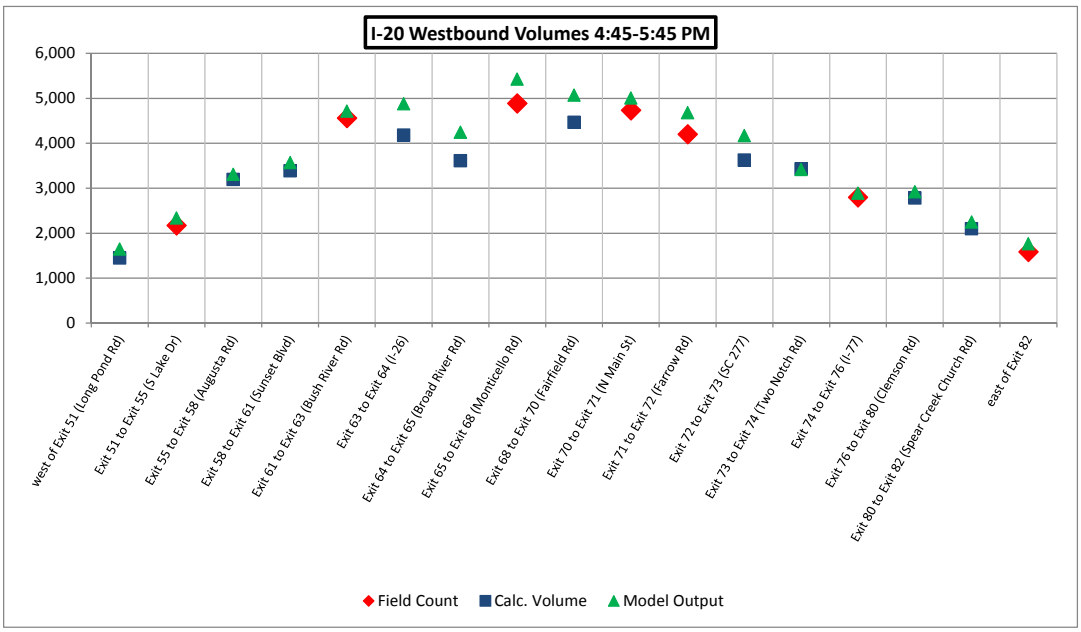


Figure 21. I-20 Westbound Volume Comparison: PM Peak Hour

Table 11. I-20 Ramp Volume Comparison

	I-20 Ramp Volume Calibration Summary		Eastbound								Westbound								
			7:15-8:15 AM				4:45-5:45 PM					7:15-8:15 AM				4:45-5:45 PM			
#	Location	Link ID	Field Count	Model Output	GEH	Diff.	Field Count	Model Output	GEH	Diff.	Link ID	Field Count	Model Output	GEH	Diff.	Field Count	Model Output	GEH	Diff.
1	Exit 51 (Long Pond Rd) off ramp	1996	134	169	3	35	156	173	1	17	2003	379	375	0	-4	897	826	2	-71
2	Exit 51 (Long Pond Rd) on ramp	1998	1,304	1,134	5	-170	467	542	3	75	1991	138	158	2	20	173	201	2	28
3	Exit 55 off ramp (S Lake Dr) (nb)	2012	251	239	1	-12	199	209	1	10	2015	309	300	0	-9	452	430	1	-22
4	Exit 55 on ramp (S Lake Dr) (sb)										6380	370	364	0	-6	774	803	1	29
5	Exit 55 (S Lake Dr) on ramp	5004	1,299	1,251	1	-48	868	909	1	41	2008	170	180	1	10	196	204	1	8
6	Exit 58 (Augusta Rd) off ramp	2023	458	467	0	9	516	558	2	42	2034	487	455	1	-32	762	793	1	31
7	Exit 58 (Augusta Rd) on ramp	2027	1,318	1,233	2	-85	478	540	3	62	2019	308	353	2	45	605	623	1	18
8	Exit 61 (Sunset Blvd) off ramp	2041	864	812	2	-52	315	400	5	85	2050	1,104	1,169	2	65	1,737	1,646	2	-91
9	Exit 61 (Sunset Blvd) on ramp (wb)	2045	674	650	1	-24	493	478	1	-15	2038	191	194	0	3	355	361	0	6
10	Exit 61 (Sunset Blvd) on ramp (eb)	2036	1,163	1,053	3	-110	709	722	0	13	2035	138	139	0	1	209	219	1	10
11	Exit 63 (Bush River Rd) off ramp	2055	863	790	3	-73	684	563	5	-121	2066	449	588	6	139	460	835	15	375
12	Exit 63 (Bush River Rd) on ramp	2067	99	80	2	-19	176	177	0	1	2056	342	383	2	41	840	666	6	-174
13	Exit 63 (Bush River Rd) on ramp (eb)	2058	367	237	7	-130	592	860	10	268									
14	Exit 64 from eb I-26	3278	1,410	1,472	2	62	1,366	1,229	4	-137	3288	518	645	5	127	793	918	4	125
15	Exit 64 from wb I-26	4316	619	545	3	-74	579	551	1	-28	3279	419	500	4	81	1,016	1,424	12	408
16	Exit 64 to eb I-26	4322	1,203	1,244	1	41	677	980	11	303	3274	790	706	3	-84	594	618	1	24
17	Exit 64 to wb I-26	4332	584	572	0	-12	574	674	4	100	3281	1,122	1,059	2	-63	1,145	1,112	1	-33
18	Exit 65 (Broad River Rd) off ramp	4341	363	381	1	18	266	464	10	198	4346	1,210	1,131	2	-79	1,556	1,574	0	18
19	Exit 65 (Broad River Rd) on ramp	4344	1,014	1,078	2	64	1,018	1,008	0	-10	4339	307	272	2	-35	284	430	8	146
20	Exit 68 (Monticello Rd) off ramp	4350	736	781	2	45	478	554	3	76	4356	441	458	1	17	358	409	3	51
21	Exit 68 (Monticello Rd) on ramp	5159	530	450	4	-80	609	568	2	-41	4348	484	506	1	22	776	740	1	-36
22	Exit 70 (Fairfield Rd) off ramp	4366	639	629	0	-10	426	465	2	39	4360	475	497	1	22	373	378	0	5
23	Exit 70 (Fairfield Rd) on ramp	4371	451	461	0	10	302	325	1	23	4363	264	270	0	6	230	298	4	68
24	Exit 71 (N Main St) off ramp	4380	513	556	2	43	494	505	1	11	4384	464	463	0	-1	232	247	1	15
25	Exit 71 (N Main St) on ramp	4388	240	247	0	7	270	294	1	24	4376	647	669	1	22	516	559	2	43
26	Exit 72 (Farrow Rd) off ramp	4393	824	822	0	-2	415	455	2	40	4400	177	180	0	3	100	129	3	29
27	Exit 72 (Farrow Rd)on ramp	4403	127	230	8	103	183	212	2	29	4394	327	364	2	37	673	640	1	-33
28	Exit 73 to sb SC 277	4408	170	1	18	-169	132	103	3	-30	4410	1,829	1,749	2	-80	579	590	0	11
29	Exit 73 from sb SC 277										4412	1,477	1,369	3	-108	1,270	1,330	2	60
30	Exit 73 to nb SC 277	4417	1,256	1,227	1	-29	1,244	1,261	0	17									
31	Exit 73 from nb SC 277	4421	498	448	2	-50	1,839	1,642	5	-197	4416	96	77	2	-19	134	0	16	-134
32	Exit 74 (Two Notch Rd) off ramp	4424	859	836	1	-24	1,093	1,121	1	28	4430	272	259	1	-13	201	259	4	58
33	Exit 74 (Two Notch Rd) on ramp	4434	141	156	1	15	293	274	1	-19	4426	971	985	0	14	835	783	2	-52
34	Exit 76 to sb I-77	6387	631	407	10	-224	629	519	5	-110	6388	1,720	1,615	3	-105	938	998	2	60
35	Exit 76 from sb I-77	4102	433	400	2	-33	467	478	0	11	6389	34	1	8	-33	56	1	10	-55
36	Exit 76 to nb I-77										938	1,778	1,749	1	-29	964	1,010	1	46
37	Exit 76 from nb I-77	4108	863	877	0	14	1,656	1,730	2	74	4107	557	488	3	-69	603	591	0	-12
	Exit 76A (Alpine Rd) off ramp	5264	733	698	1	-35	931	911	1	-20	944	220	217	0	-3	110	115	0	5
	Exit76A (Alpine Rd) on ramp	956	152	177	2	25	185	190	0	5	6396	699	567	5	-132	431	413	1	-18
38	Exit 80 (Clemson Rd) off ramp	945	958	916	1	-42	1,408	1,359	1	-49	969	270	281	1	11	184	189	0	5
39	Exit 80 (Clemson Rd) on ramp	39	157	160	0	3	258	258	0	0	960	1,258	1,272	0	14	865	898	1	33

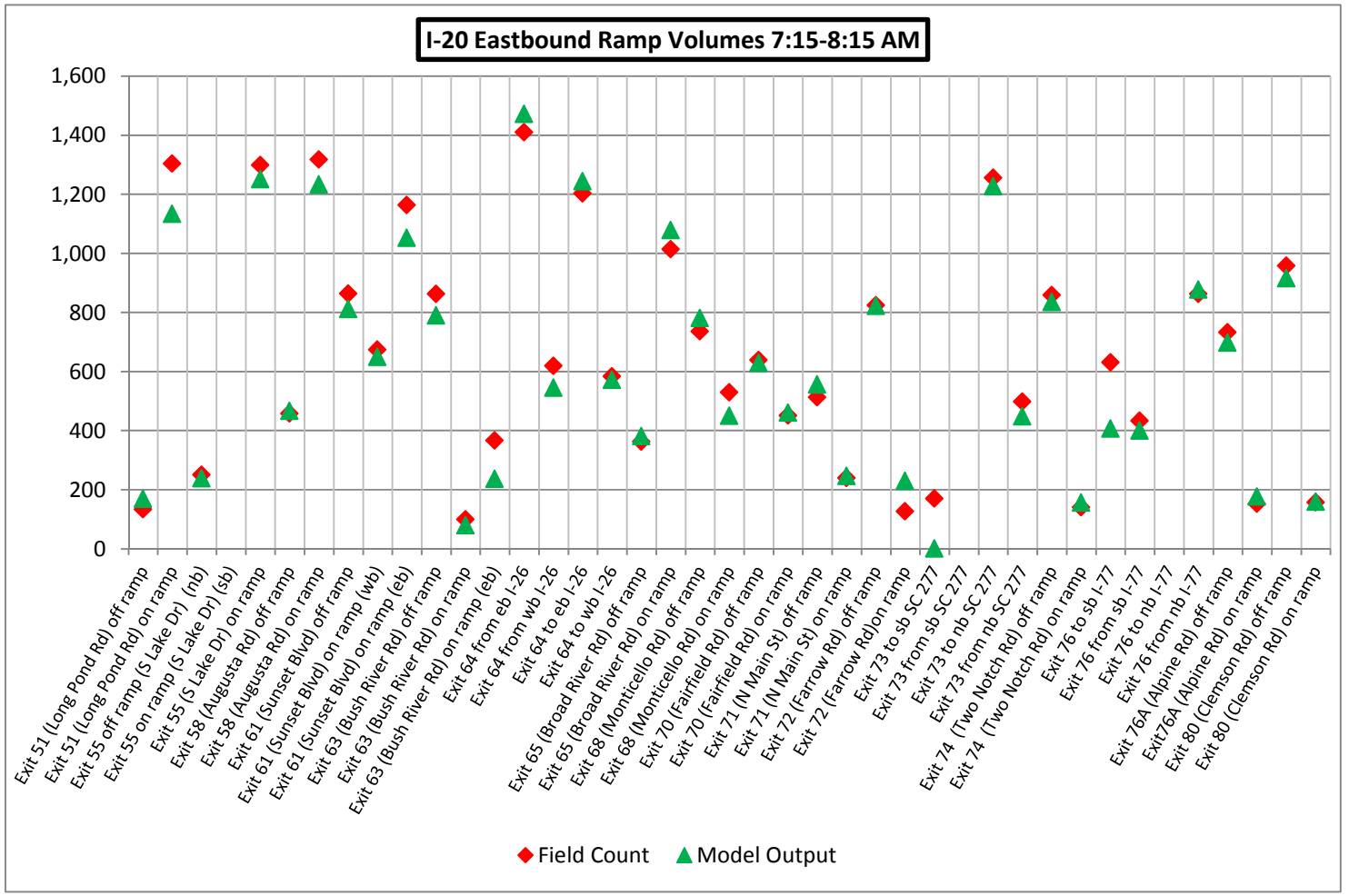


Figure 22. I-20 Eastbound Ramp Volumes: AM Peak Hour

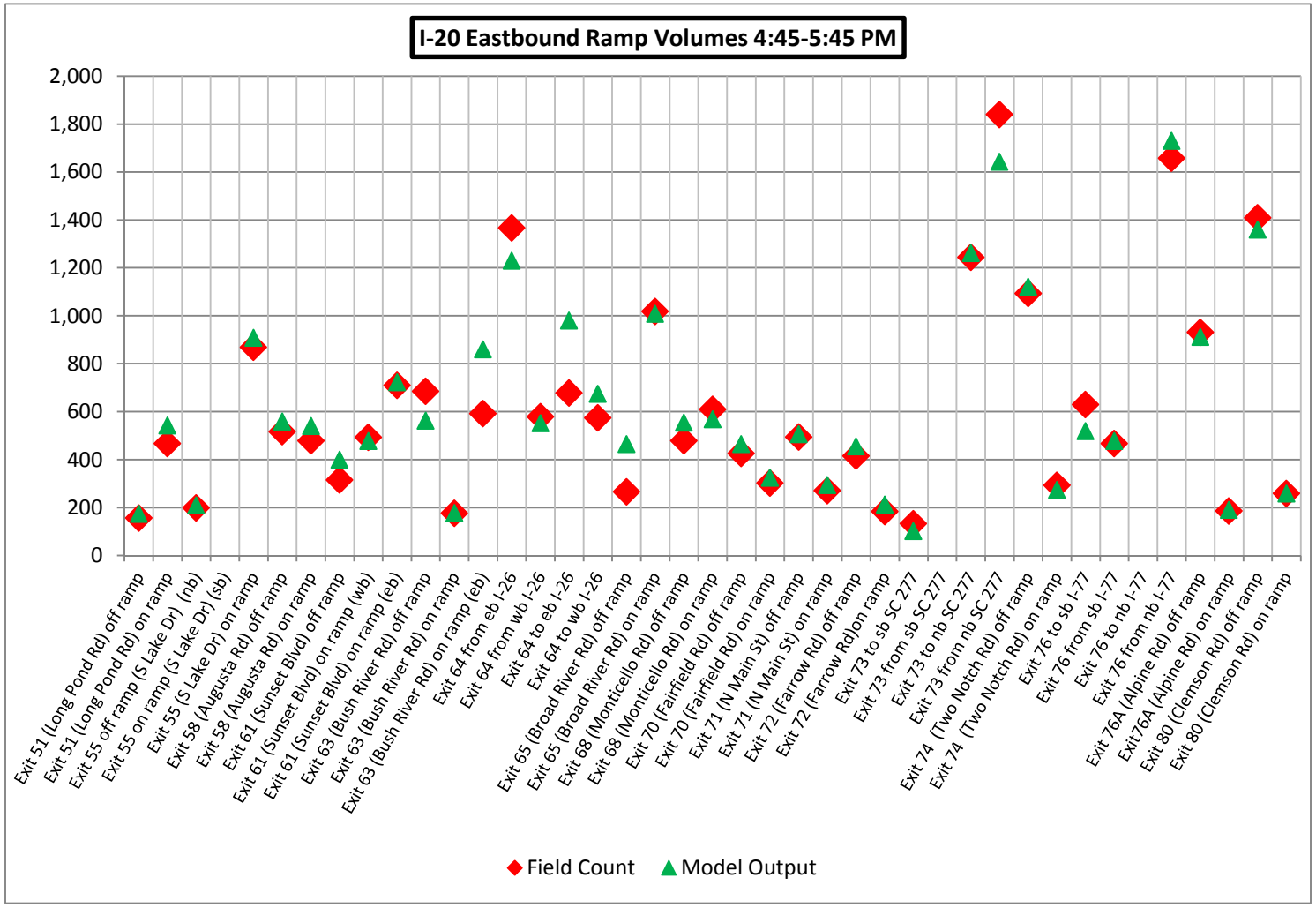


Figure 23. I-20 Eastbound Ramp Volumes: PM Peak Hour

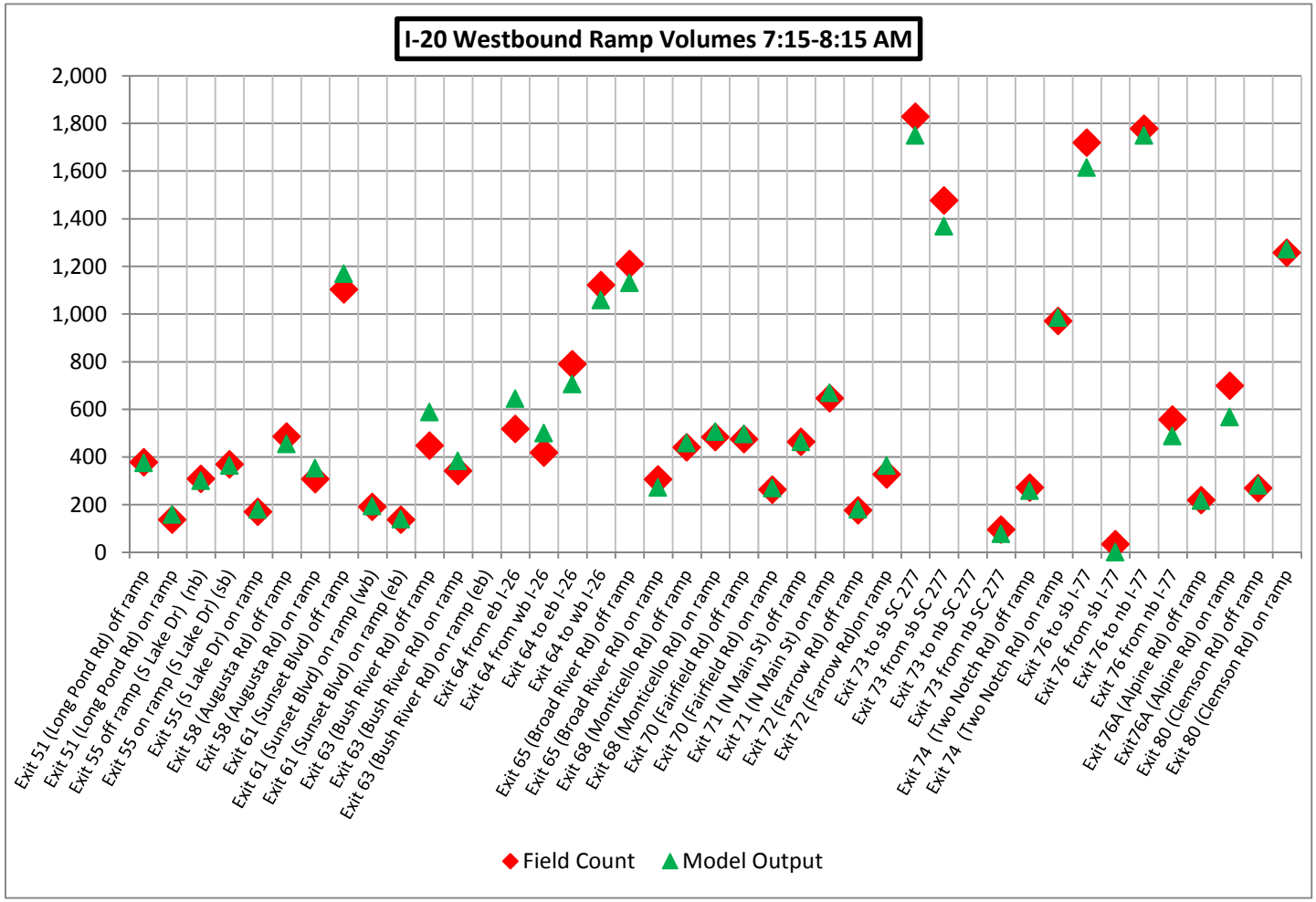


Figure 24. I-20 Westbound Ramp Volumes: AM Peak Hour

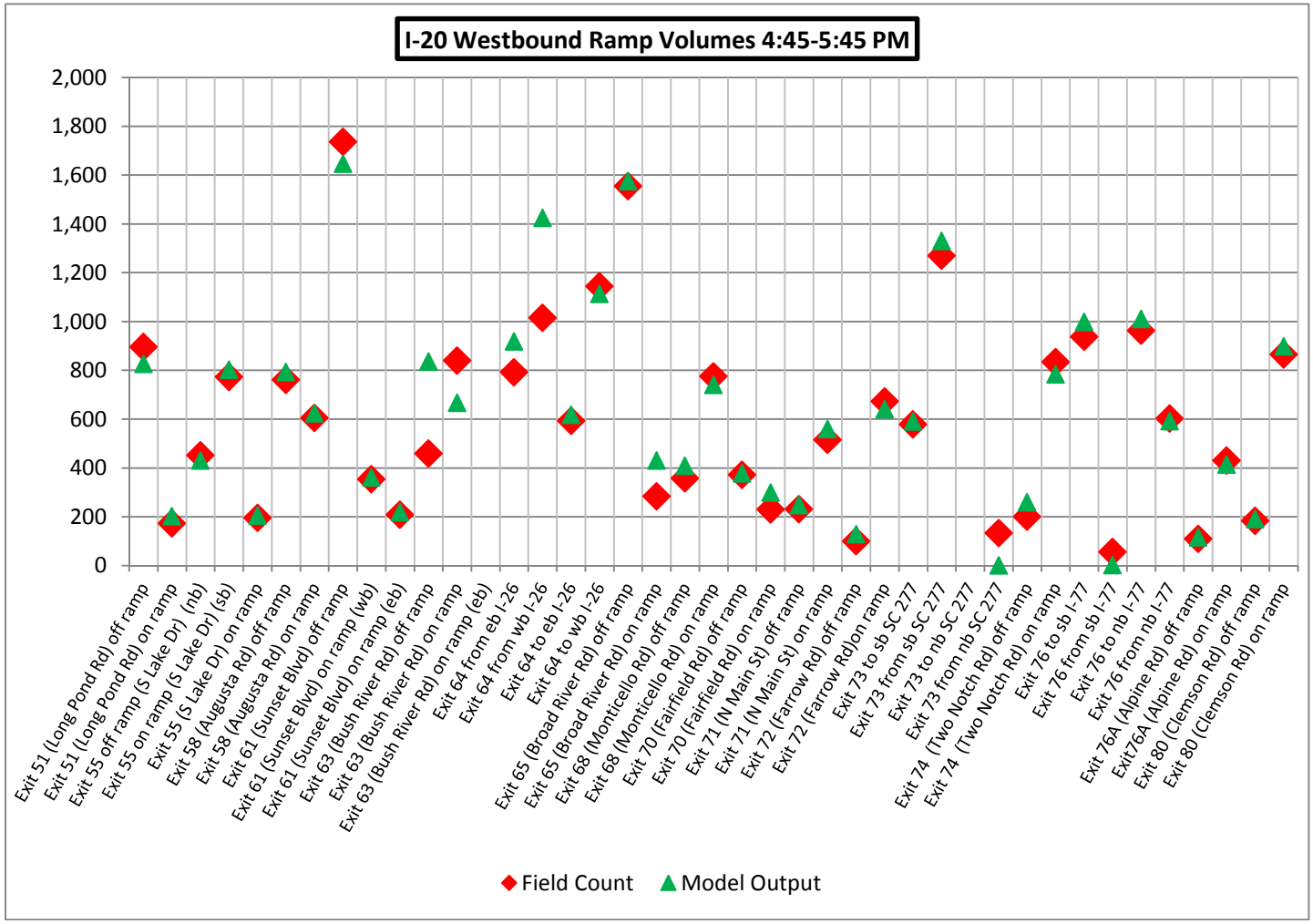


Figure 25. I-20 Westbound Ramp Volumes: PM Peak Hour

Table 12. I-20 Segment Speed Comparison

Segment	Location	Eastbound						Westbound				
		Segment	AM		PM			Segment	AM		PM	
		ID	INRIX	Model	INRIX	Model		ID	INRIX	Model	INRIX	Model
1	west of Exit 51 (Long Pond Rd)	8626		71	70	72		8627		71	70	72
2	Exit 51 to Exit 55 (S Lake Dr)	8657		62	70	64		2767		62	70	64
3	Exit 55 to Exit 58 (Augusta Rd)	2793	53	49	67	61		2790	53	49	67	61
4	Exit 58 to Exit 61 (Sunset Blvd)	2805	61	55	67	62		2816	61	55	67	62
5	Exit 61 to Exit 63 (Bush River Rd)	8542	62	61	65	64		2838	62	61	65	64
6	Exit 63 to Exit 64 (I-26)	2863	58	63	61	62		2859	58	63	61	62
7	Exit 64 to Exit 65 (Broad River Rd)	6207	60	61	60	62		6230	60	61	60	62
8	Exit 65 to Exit 68 (Monticello Rd)	6243	63	59	64	61		8658	63	59	64	61
9	Exit 68 to Exit 70 (Fairfield Rd)	6259	62	61	63	61		6265	62	61	63	61
10	Exit 70 to Exit 71 (N Main St)	6285	62	61	64	62		6273	62	61	64	62
11	Exit 71 to Exit 72 (Farrow Rd)	8548	60	61	62	63		8547	60	61	62	63
12	Exit 73 (SC 277) to Exit 74 (Two Notch Rd)	6351	63	65	63	59		6334	63	65	63	59
13	Exit 74 to Exit 76 (I-77)	6374	63	65	63	64		6365	63	65	63	64
14	Exit 76 to Exit 80 (Clemson Rd)	8643	62	65	59	61		1059	62	65	59	61
15	Exit 80 to Exit 82 (Spear Creek Church Rd)	1112	63	66	63	63		1098	63	66	63	63
16	east of Exit 82	8645	67	72	69	67		1106	67	72	69	67

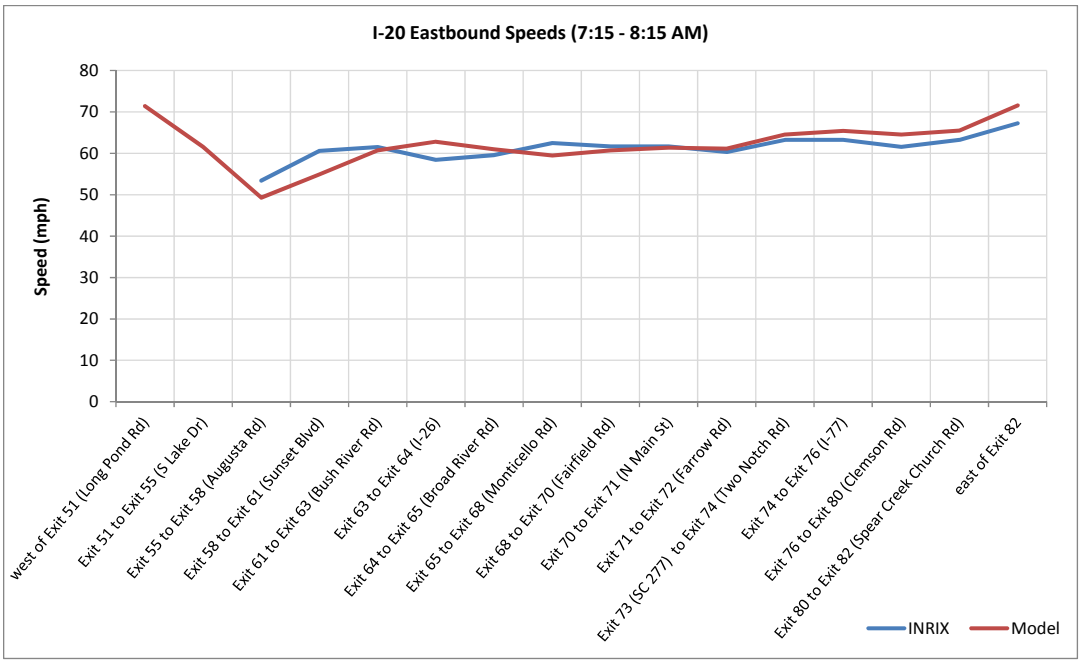


Figure 26. I-20 Eastbound Speeds: AM Peak Hour

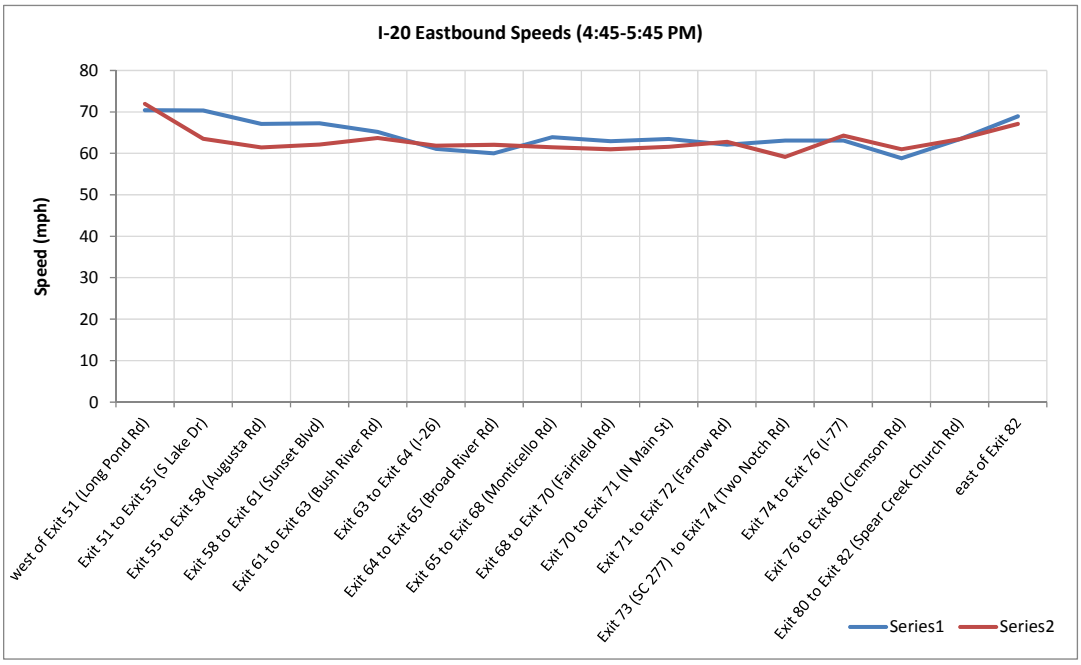


Figure 27. I-20 Eastbound Speeds: PM Peak Hour

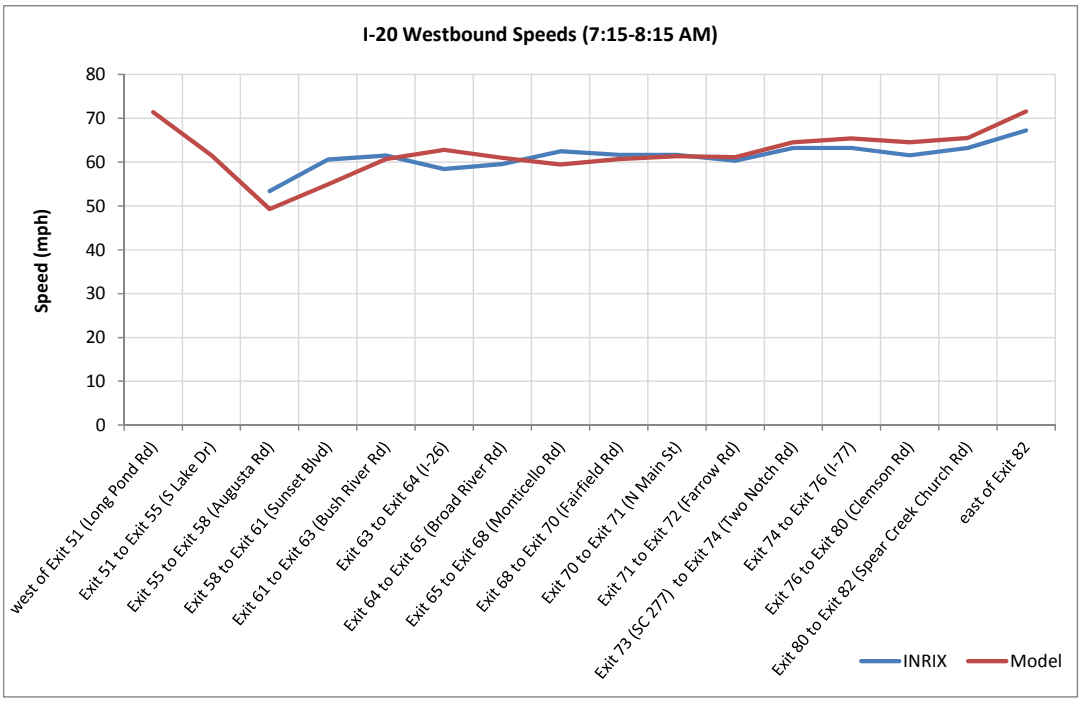


Figure 28. I-20 Westbound Speeds: AM Peak Hour

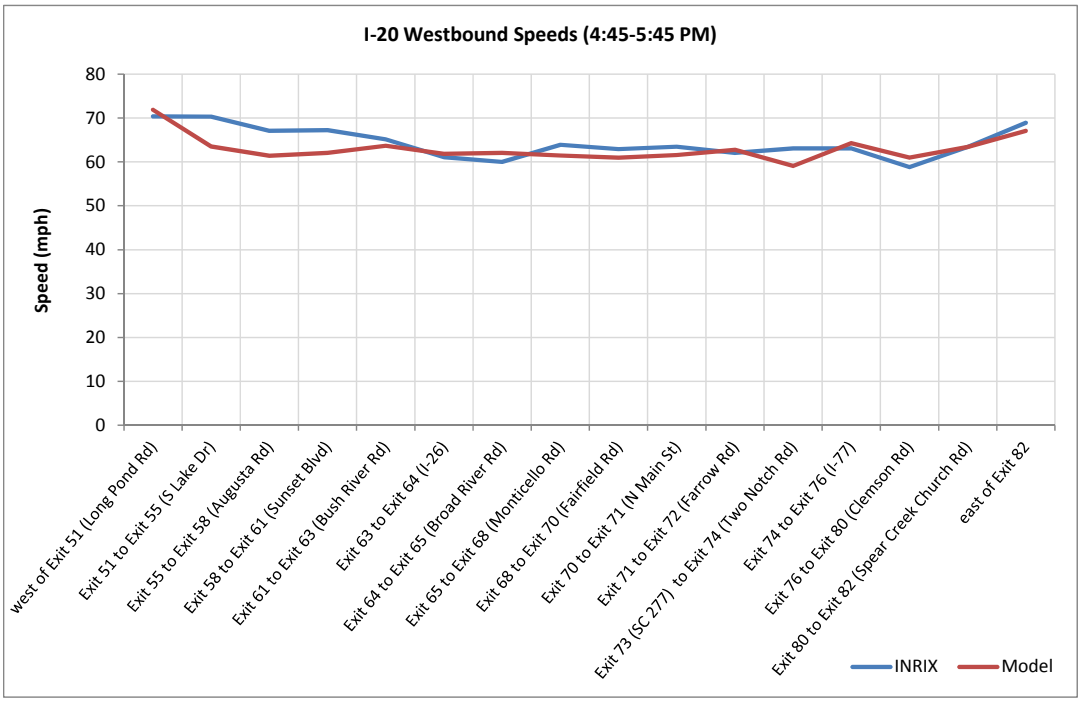


Figure 29. I-20 Westbound Speeds: PM Peak Hour

3.3.3 I-77 Corridor Statistics

Table 13. I-77 Northbound Volume Comparison

I-77 Mainline Volume Calibration Summary		Northbound								
			7:15-8:15 AM				4:45-5:45 PM			
#	Location	Link ID	Field Count	Calc. Volume	Model Output	GEH	Field Count	Calc. Volume	Model Output	GEH
1	north of Exit 22 (Killian Rd)	3879	1,874		1,945	2	2,742		3,092	6
2	Exit 22 to Exit 19 (Farrow Rd)	3971		2,495	2,641			4,351	4,824	
4	Exit 18 (SC 277) to Exit 17 (Two Notch Road)	4049		2,106	2,156			2,775	2,881	
5	Exit 17 to Exit 16 (I-20)	4083	2,202		2,304	2	2,889		3,052	3
6	Exit 16 to Exit 15 (Percival Rd)	4105		3,016	3,099			4,770	5,011	
7	Exit 15 to Exit 13 (Decker Blvd)	4126		3,041	3,079			4,774	4,918	
8	Exit 15 to Exit 12 (Forest Dr)	4128		3,630	3,695			5,471	5,645	
9	Exit 12 to Exit 10 (Fort Jackson)	4139		3,543	3,932			4,830	5,033	
10	Exit 10 to Exit 9 (Garners Ferry Rd / Leesburg Rd)	4155		3,657	3,818			4,040	4,455	
11	Exit 9 to Exit 6 (Shop Rd)	4173	2,453		2,723	5	3,203		3,595	7
12	Exit 6 to Exit 5 (Bluff Rd)	4190		3,248	3,427			3,815	3,874	
13	Exit 5 to Exit 2 (12 St. Extension)	4205		3,895	4,217			3,771	3,853	
14	Exit 2 to Exit 1 (I-26)	4217		4,094	4,520			3,395	3,416	

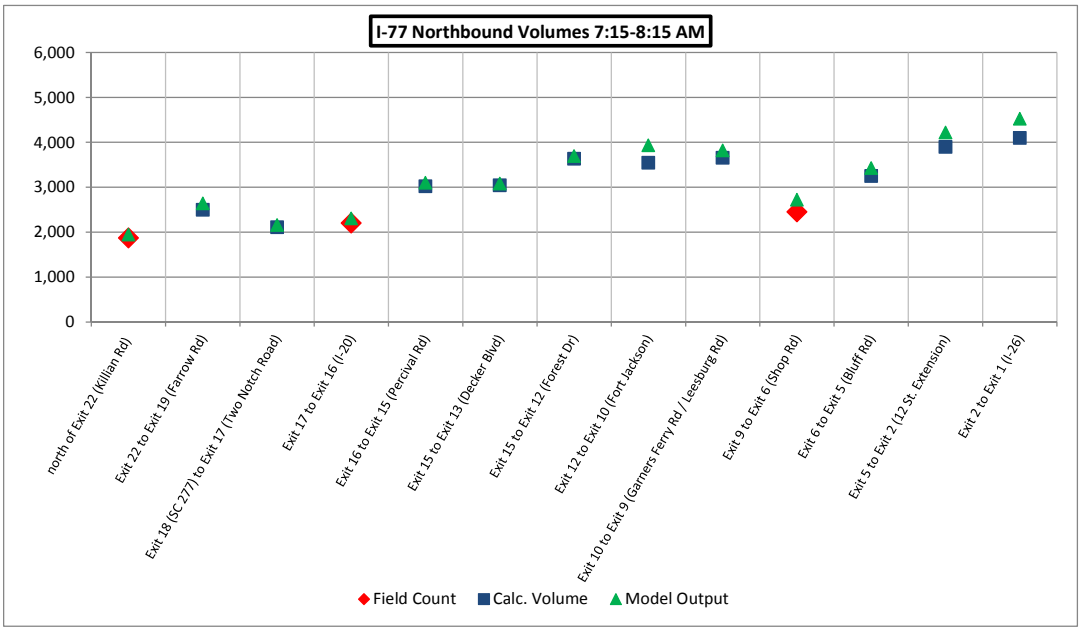


Figure 30. I-77 Northbound Volume Comparison: AM Peak Hour

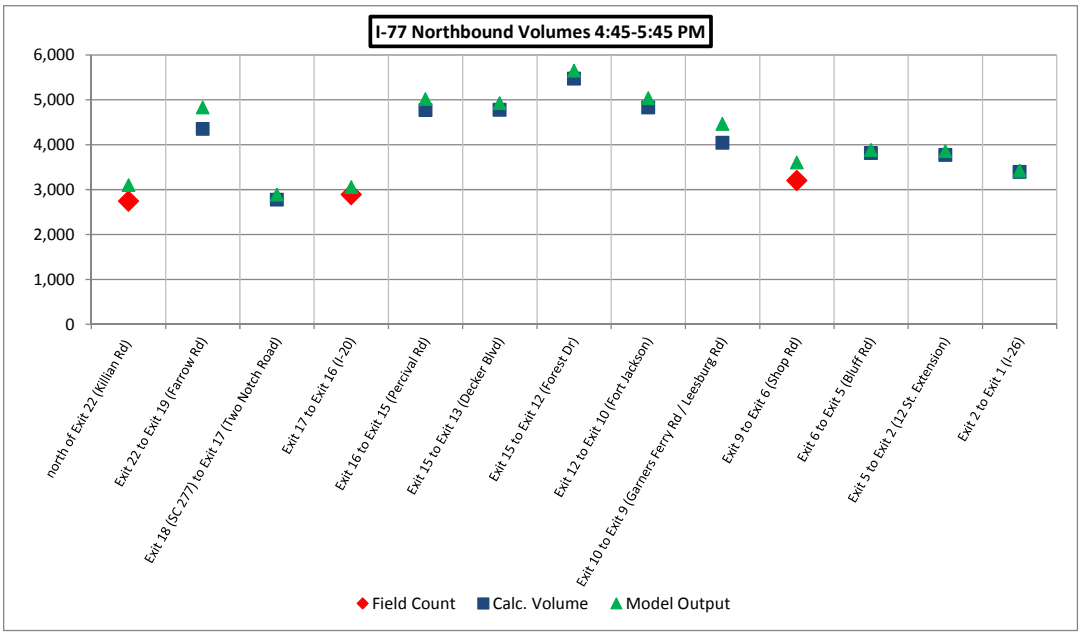


Figure 31. I-77 Northbound Volume Comparison: PM Peak Hour

Table 14. I-77 Southbound Volume Comparison

I-77 Mainline Volume Calibration Summary		Southbound								
			7:15-8:15 AM				4:45-5:45 PM			
#	Location	Link ID	Field Count	Calc. Volume	Model Output	GEH	Field Count	Calc. Volume	Model Output	GEH
1	north of Exit 22 (Killian Rd)	3864	3,208		3,490	5	2,254		2,650	8
2	Exit 22 to Exit 19 (Farrow Rd)	3968		3,688	5,220			3,036	3,550	
4	Exit 18 (SC 277) to Exit 17 (Two Notch Road)	4053		2,797	2,531			1,834	2,465	
5	Exit 17 to Exit 16 (I-20)	6375	3,010		2,899	2	2,367		2,609	5
6	Exit 16 to Exit 15 (Percival Rd)	4110		2,776	4,499			3,026	3,648	
7	Exit 15 to Exit 13 (Decker Blvd)	3861		4,982	4,092			3,092	3,586	
8	Exit 15 to Exit 12 (Forest Dr)	4124		6,556	4,697			5,224	4,246	
9	Exit 12 to Exit 10 (Fort Jackson)	4143		6,556	4,574			5,224	4,399	
10	Exit 10 to Exit 9 (Garners Ferry Rd / Leesburg Rd)	4158		3,323	4,070			2,771	3,909	
11	Exit 9 to Exit 6 (Shop Rd)	6372	3,323		3,500	3	2,771		3,139	7
12	Exit 6 to Exit 5 (Bluff Rd)	4192		3,323	3,855			2,771	3,757	
13	Exit 5 to Exit 2 (12 St. Extension)	4204		3,323	3,875			2,771	4,716	
14	Exit 2 to Exit 1 (I-26)	4222		3,323	3,272			2,771	4,533	

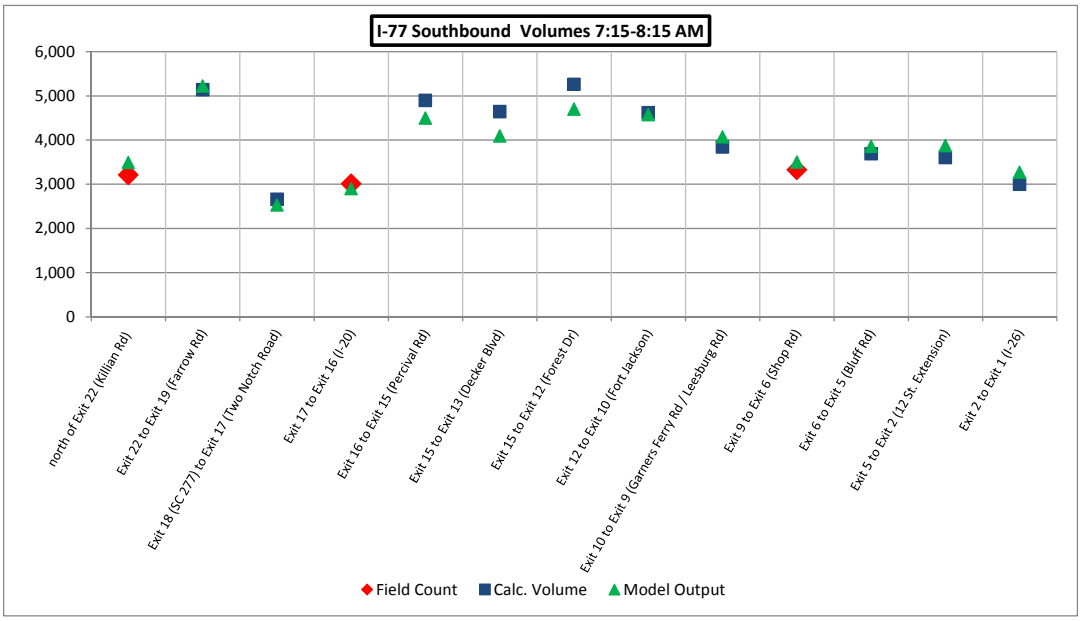


Figure 32. I-77 Southbound Volume Comparison: AM Peak Hour

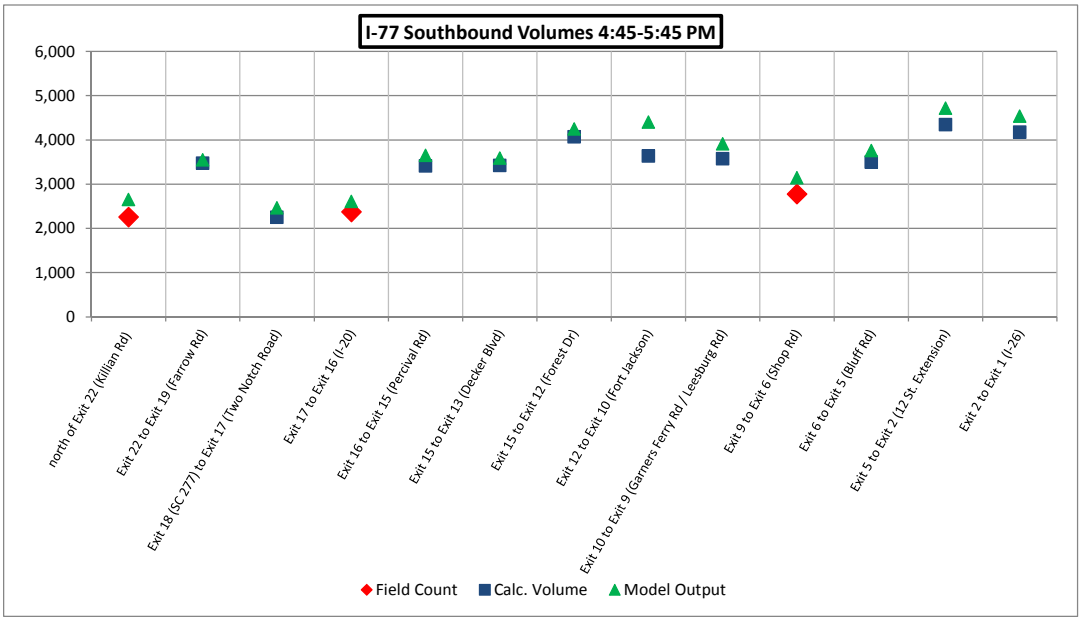


Figure 33. I-77 Southbound Volume Comparison: PM Peak Hour

Table 15. I-77 Ramp Volume Comparison

	I-77 Ramp Volume Calibration Summary		Northbound								Southbound								
			7:15-8:15 AM				4:45-5:45 PM					7:15-8:15 AM				4:45-5:45 PM			
#	Location	Link ID	Field Count	Model Output	GEH	Diff.	Field Count	Model Output	GEH	Diff.	Link ID	Field Count	Model Output	GEH	Diff.	Field Count	Model Output	GEH	Diff.
1	Exit 22 (Killian Rd) off ramp	3972	784	781	0	-3	1,877	1,808	2	-69	3918	204	217	1	13	581	588	0	7
2	Exit 22 (Killian Rd) on ramp	3956	163	143	2	-20	268	226	3	-42	3967	2,136	2,031	2	-105	1,801	1,467	8	-334
3	Exit 19 (Farrow Rd) off ramp	4044	759	732	1	-27	512	513	0	1	4021	292	286	0	-6	166	168	0	2
4	Exit 19 (Farrow) on ramp	4006	79	81	0	2	163	151	1	-12	4515	445	564	5	119	651	632	1	-19
5	Exit 18 from nb SC 277 /to sb SC 277	4031	1,162	1,179	1	17	2,348	2,475	3	127	6436	2,723	2,837	2	114	1,286	1,362	2	76
6	Exit 17 (Two Notch Road) off ramp	4084	360	378	1	18	408	452	2	44	4068	290	259	2	-31	252	261	1	9
7	Exit 17 (Two Notch Road) on ramp	4074	264	254	1	-10	294	295	0	1	4078	642	638	0	-4	373	397	1	24
8	Exit 16 to wb I-20	4107	557	488	3	-69	603	591	0	-12	6389	34	1	8	-33	56	1	10	-55
9	Exit 16 to eb I-20	4108	863	877	0	14	1,656	1,730	2	74	4102	433	400	2	-33	467	478	0	11
10	Exit 16 from wb I-20	4092	606	583	1	-23	378	370	0	-8	6388	1,720	1,615	3	-105	938	998	2	60
11	Exit 16 from eb I-20										6387	631	407	10	-224	629	519	5	-110
12	Exit 15 (Percival Rd) off ramp	4125	301	318	1	17	370	378	0	8	4114	668	658	0	-11	355	366	1	11
13	Exit 15 (Percival Rd) off ramp (eb)	4121	70	48	3	-22	96	82	1	-14									
14	Exit 15 (Percival Rd) on ramp	4111	346	354	0	8	462	488	1	26	3860	287	285	0	-2	307	317	1	10
15	Exit 13 (Decker Blvd) nb off / sb on ramp	4127	589	594	0	5	697	709	0	12	4123	621	625	0	4	650	647	0	-3
16	Exit 12 (Forest Dr) off ramp	4140	568	530	2	-38	793	793	0	0	4142	977	948	1	-29	774	811	1	37
17	Exit 12 (Forest Dr) on ramp	4130	317	326	1	9	1,372	1,409	1	37	3303	188	173	1	-15	256	175	6	-81
18	Exit 10 (Fort Jackson) off ramp	4156	495	459	2	-36	260	297	2	37	4151	965	839	4	-126	781	810	1	29
19	Exit 10 (Fort Jackson) on ramp	4145	582	628	2	46	901	929	1	28	4157	320	353	2	33	348	372	1	24
20	Exit 9 (Leesburg Rd) off ramp	6429	154	185	2	31	315	341	1	26	4163	800	837	1	37	1,130	1,015	4	-115
21	Exit 9 (Leesburg Rd) on ramp	4161	1,684	1,626	1	-58	1,154	1,161	0	7	4171	290	224	4	-66	150	133	1	-17
22	Exit 9 (Garners Ferry Rd) off ramp	6426	659	672	1	13	430	454	1	24	4169	540	484	2	-56	452	447	0	-5
23	Exit 9 (Garners Ferry Rd) on ramp	6427	333	356	1	23	428	481	2	53	4175	529	575	2	46	628	611	1	-17
24	Exit 6 (Shop Rd) off ramp	4189	803	862	2	59	768	832	2	64	4181	481	443	2	-38	264	287	1	23
25	Exit 6 (Shop Rd) wb off ramp/on ramp	4185	132	109	2	-23	89	2	13	-87	4183	694	750	2	56	797	771	1	-26
26	Exit 6 (Shop Rd) on ramp	4178	140	141	0	1	245	208	2	-37	6421	151	72	7	-79	190	136	4	-54
27	Exit 5 (Bluff Rd) off ramp	4206	961	1,051	3	90	421	484	3	63	4193	575	557	1	-18	196	225	2	29
28	Exit 5 (Bluff Rd) on ramp (nb)	4197	79	81	0	2	131	126	0	-5	4199	205	242	2	37	402	460	3	58
29	Exit 5 (Bluff Rd) on ramp (sb)	4202	235	214	1	-21	334	378	2	44	4201	287	363	4	76	643	719	3	76
30	Exit 2 (12 St. Extension) off ramp	4218	527	605	3	78	199	195	0	-4	4210	751	728	1	-23	547	543	0	-4
31	Exit 2 (12 St. Extension) on ramp	4213	328	355	1	27	575	599	1	24	4221	144	184	3	40	379	398	1	19
32	Exit 1 from/to wb I-26	4230	1,122	1,203	2	81	1,158	1,228	2	70	6416	994	1,037	1	43	1,005	1,156	5	151
33	Exit 1 from/to eb I-26	1258	2,161	2,170	0	9	1,556	1,523	1	-33	6415	1,574	1,512	2	-62	2,132	2,056	2	-76
34	Exit 1 from/to Fish Hatchery Rd	4246	1,171	1,199	1	28	644	650	0	6	6414	652	712	2	60	1,155	1,308	4	153

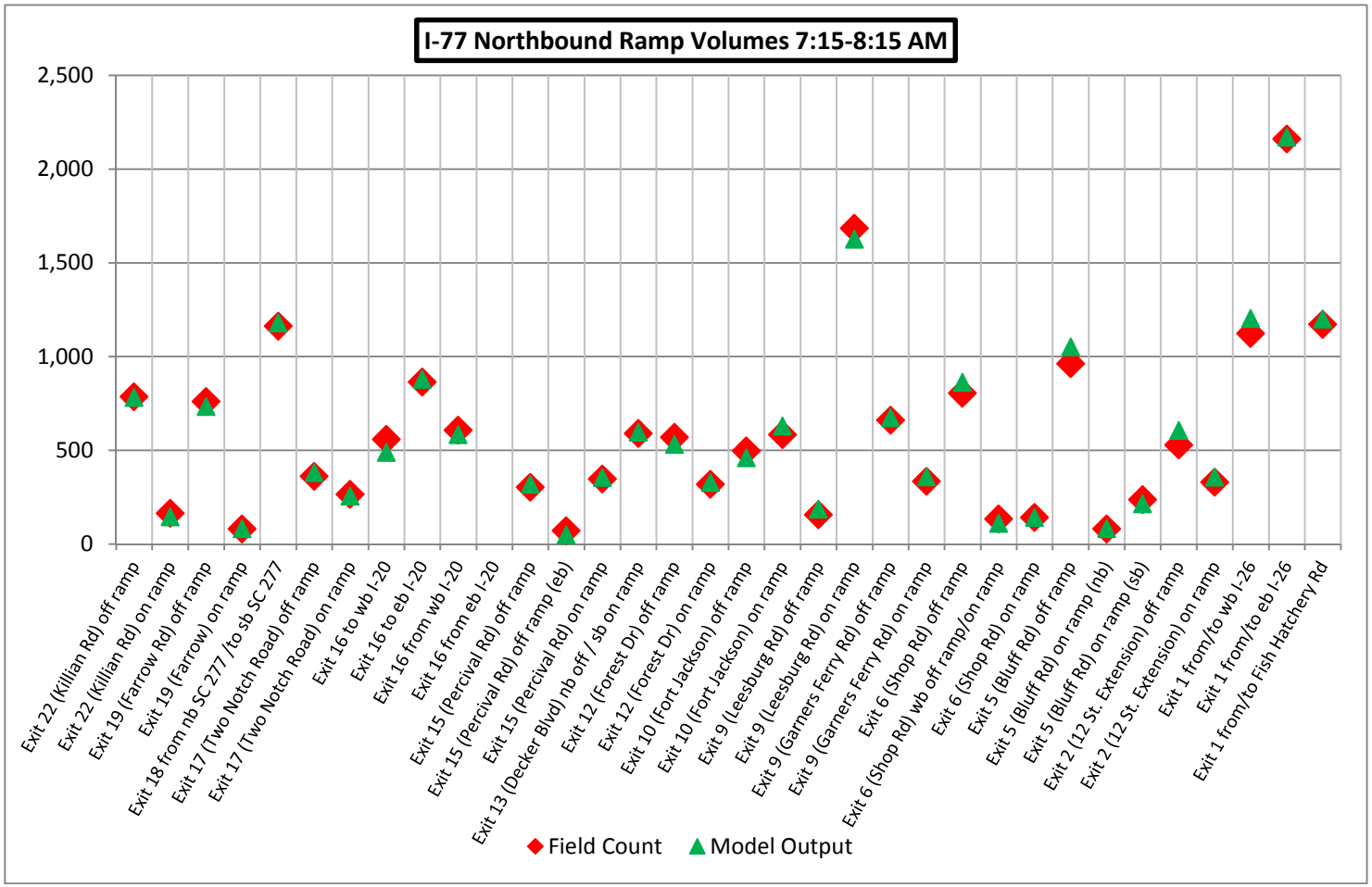


Figure 34. I-77 Northbound Ramp Volumes: AM Peak Hour

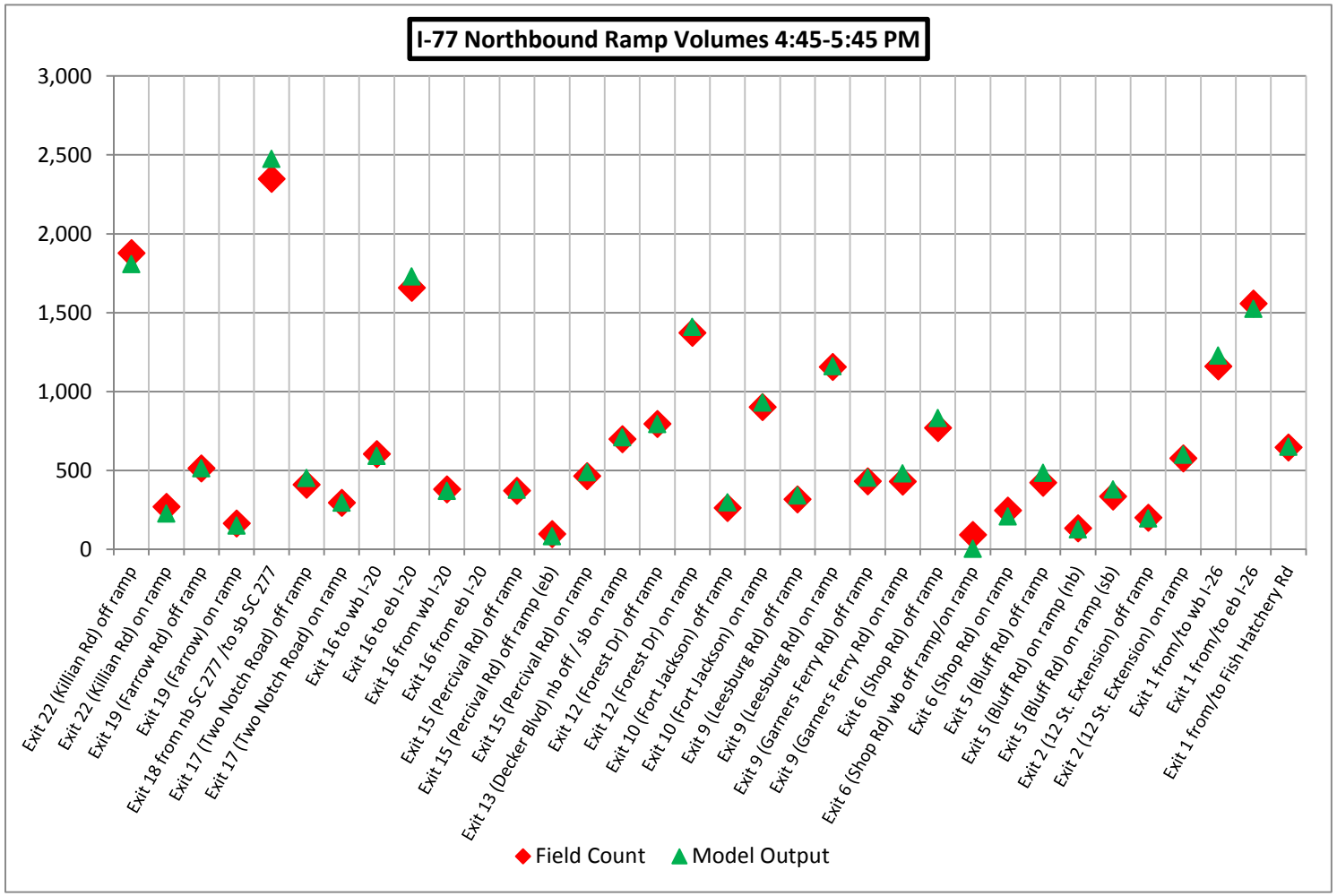


Figure 35. I-77 Northbound Ramp Volumes: PM Peak Hour

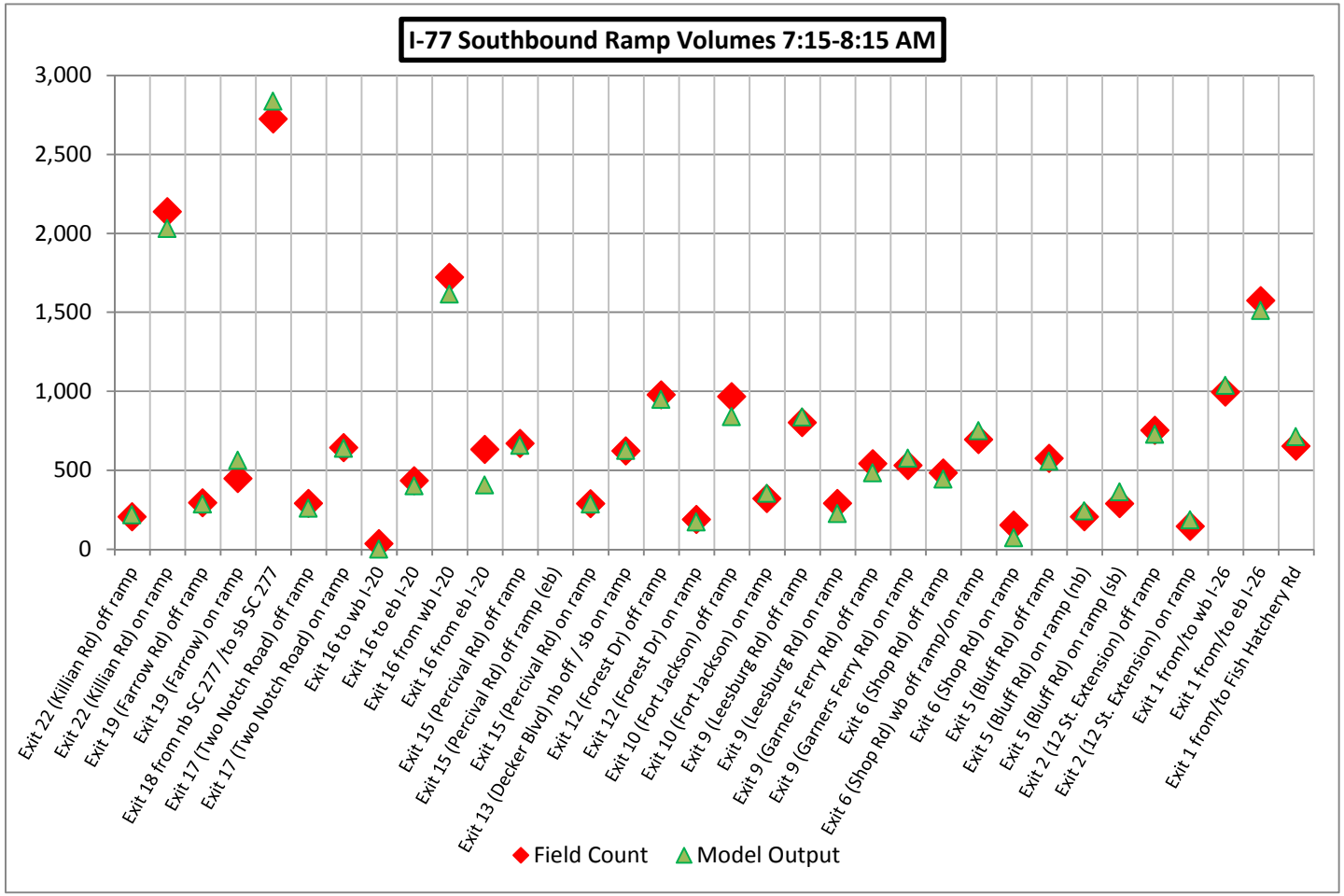


Figure 36. Southbound Ramp Volumes: AM Peak Hour

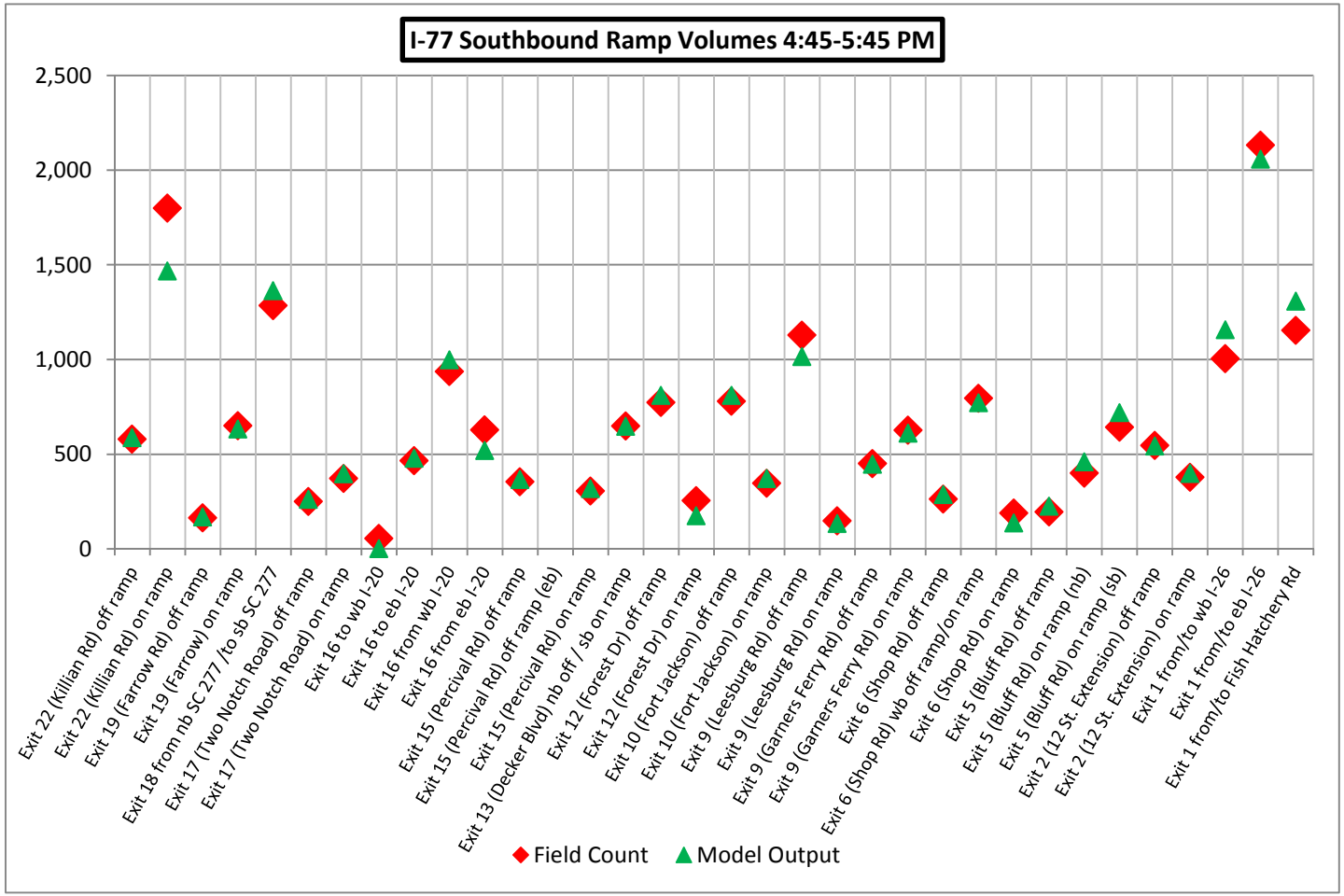


Figure 37. Southbound Ramp Volumes: PM Peak Hour

Table 16. I-77 Segment Speed Comparison

Segment	Location	Northbound						Southbound				
		Segment	AM		PM			Segment	AM		PM	
		ID	INRIX	Model	INRIX	Model		ID	INRIX	Model	INRIX	Model
1	north of Exit 22 (Killian Rd)	5586	67	71	68	70		5561	70	70	70	71
2	Exit 22 to Exit 19 (Farrow Rd)	5712	67	71	63	62		5707	68	61	68	68
3	Exit 18 (SC 277) to Exit 17 (Two Notch Rd)	5762	64	66	65	54		5829	66	64	65	63
5	Exit 17 to Exit 16 (I-20)	5869	64	63	65	61		8558	63	63	63	63
6	Exit 16 to Exit 15 (Percival Rd)	5899	61	63	62	52		5904	63	57	63	62
7	Exit 15 to Exit 13 (Decker Blvd)	5925	62	65	64	61		5557	64	63	64	63
8	Exit 13 to Exit 12 (Forest Dr)	5931	62	62	63	54		5922	62	56	63	59
9	Exit 12 to Exit 10 (Fort Jackson)	5946	63	63	64	59		5952	63	61	63	60
10	Exit 10 to Exit 9 (Garners Ferry Rd / Leesburg Rd)	5976	63	62	62	45		5969	63	63	65	61
11	Exit 9 to Exit 6 (Shop Rd)	8556	62	64	64	63		6002	65	64	64	65
12	Exit 6 to Exit 5 (Bluff Rd)	6020	60	64	63	63		6022	61	64	61	63
13	Exit 5 to Exit 2 (12 St. Extension)	6042	64	66	67	68		6038	65	67	63	65
14	Exit 2 to Exit 1 (I-26)	6060	64	57	66	68		6065	63	68	62	64

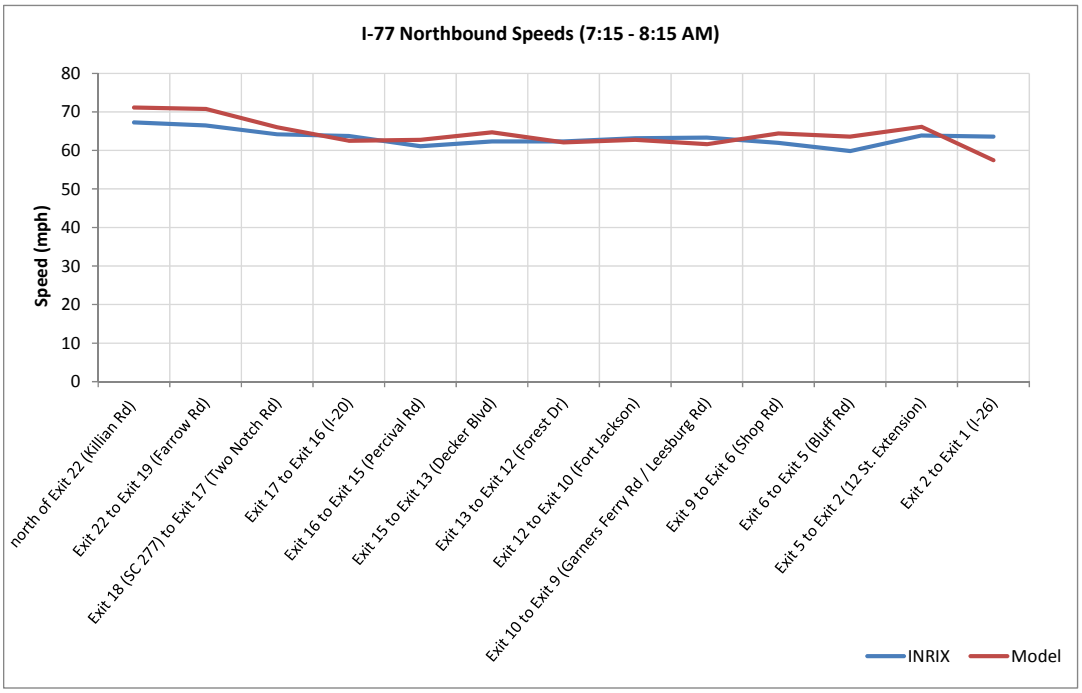


Figure 38. I-77 Northbound Speeds: AM Peak Hour

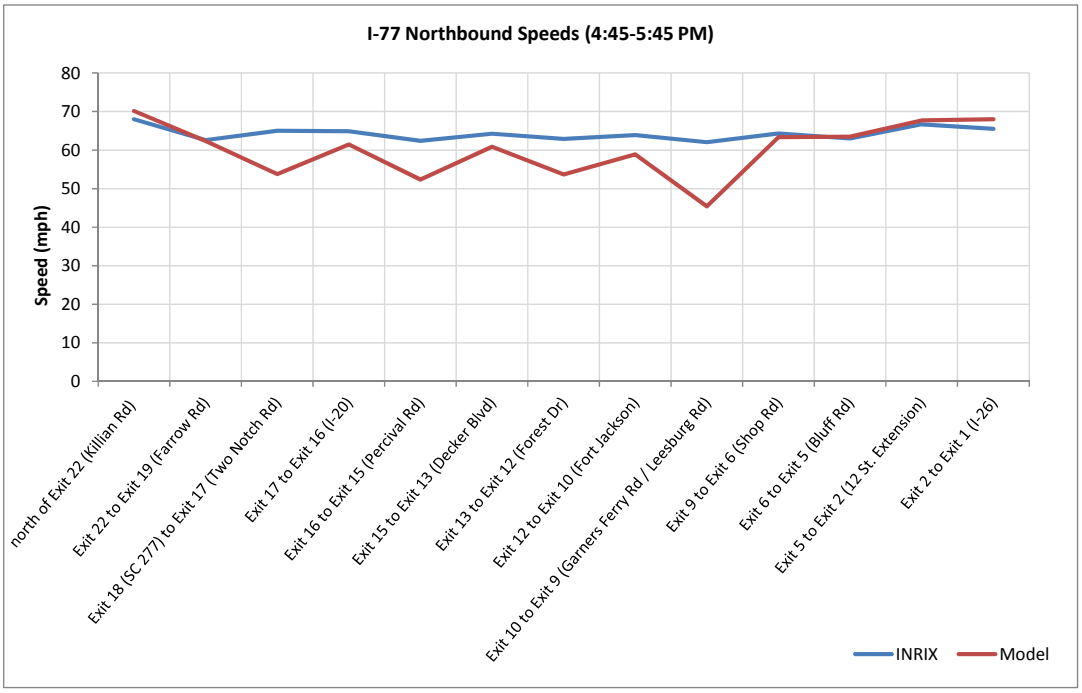


Figure 39. I-77 Northbound Speeds: PM Peak Hour

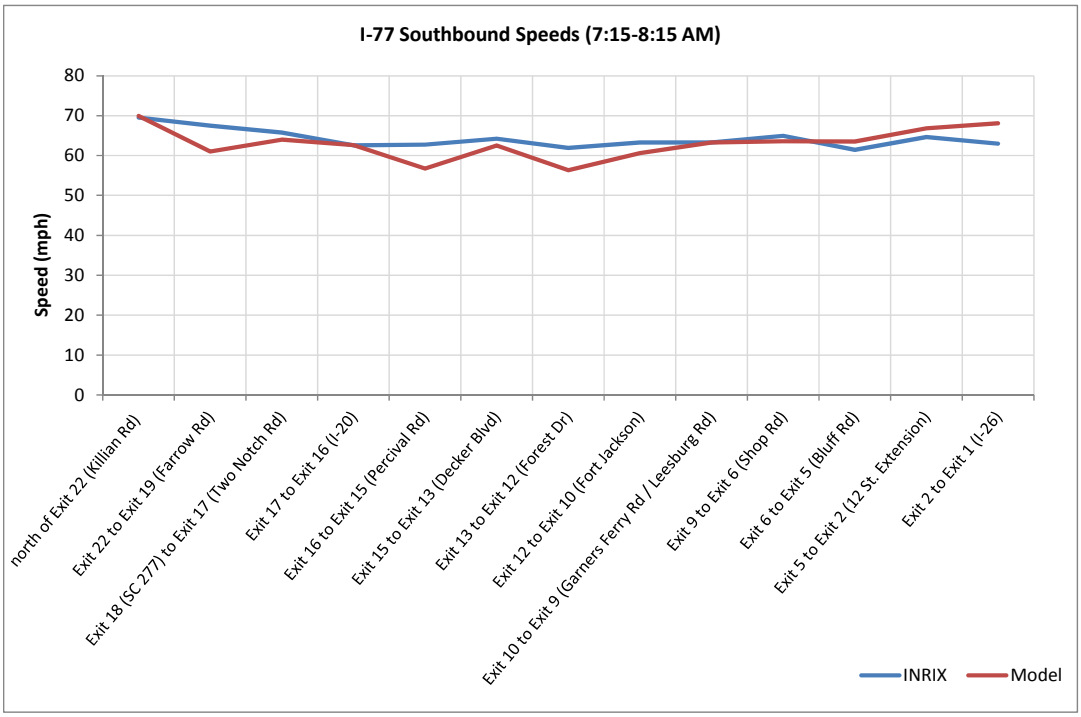


Figure 40. I-77 Southbound Speeds: AM Peak Hour

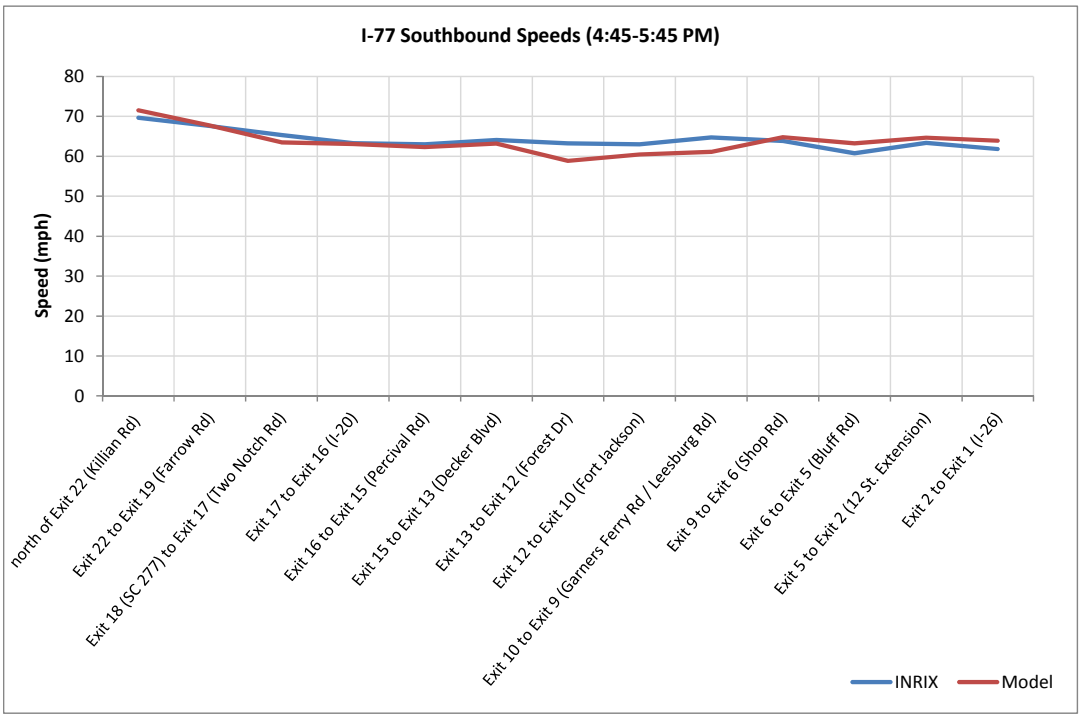


Figure 41. I-77 Southbound Speeds: PM Peak Hour

3.3.4 I-126 / SC-277 Corridor Statistics

Table 17. I-126 / SC-277 Eastbound Volume Comparison

I-126 / SC 277 Volume Summary		Eastbound								
			7:15-8:15 AM				4:45-5:45 PM			
#	Location	Link ID	Field Count	Calc. Volume	Model Output	GEH	Field Count	Calc. Volume	Model Output	GEH
1	I-126 from I-26 to Colonial Life Blvd	3253	3,970		3,959	0	1,981		2,174	4
2	I-126 from Colonial Life Blvd to Greystone Blvd	3231		5,032	5,028			2,569	2,750	
3	I-126 from Greystone Blvd to Huger St	6377	5,295		4,960	5	2,747		2,579	3
1	SC 277 from Sunset Dr to Farrow Rd	4482		890	874			3,256	3,015	
2	SC 277 from Farrow Rd to Fontaine Rd	4472	1,040		968	2	3,753		3,525	4
3	SC 277 from Fontaine Rd to I-20	4423		1,208	1,124			4,149	3,918	
4	SC 277 from I-20 to Parklane Rd	4415		1,870	1,800			3,420	3,498	

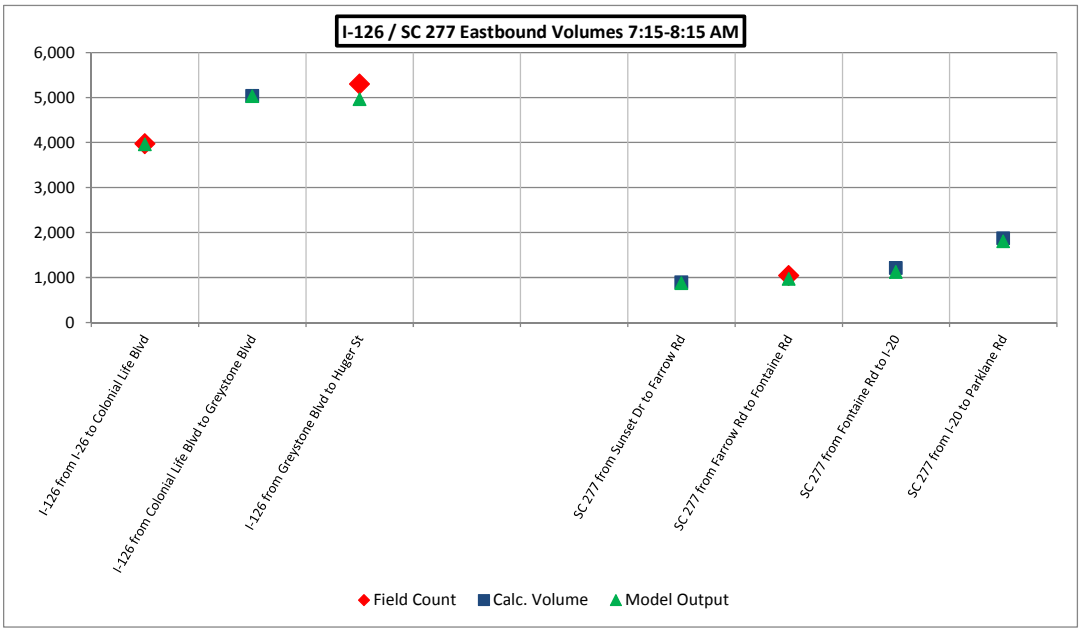


Figure 42. I-126 / SC-277 Eastbound Volume Comparison: AM Peak Hour

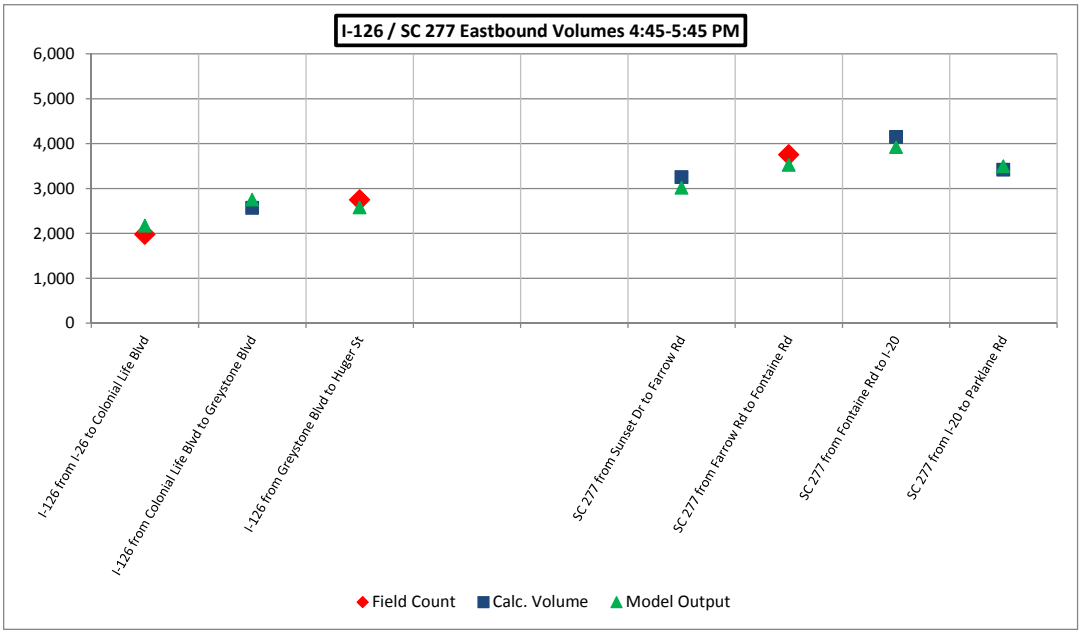


Figure 43. I-126 / SC-277 Eastbound Volume Comparison: PM Peak Hour

Table 18. I-126 / SC-277 Westbound Volume Comparison

I-126 / SC 277 Volume Calibration Summary		Westbound								
			7:15-8:15 AM				4:45-5:45 PM			
#	Location	Link ID	Field Count	Calc. Volume	Model Output	GEH	Field Count	Calc. Volume	Model Output	GEH
1	I-126 from I-26 to Colonial Life Blvd	3248	876		970	3	2,702		3,228	10
2	I-126 from Colonial Life Blvd to Greystone Blvd	3236		-270	1,914			4,326	5,441	
3	I-126 from Greystone Blvd to Huger St	3220	2,008		2,001	0	4,961		5,171	3
1	SC 277 from Sunset Dr to Farrow Rd	4486		3,886	3,354			1,351	1,366	
2	SC 277 from Farrow Rd to Fontaine Rd	4470	3,886		3,634	4	1,351		1,418	2
3	SC 277 from Fontaine Rd to I-20	4458		3,886	3,977			1,351	1,701	
4	SC 277 from I-20 to Parklane Rd	4453		3,886	3,681			1,351	2,325	

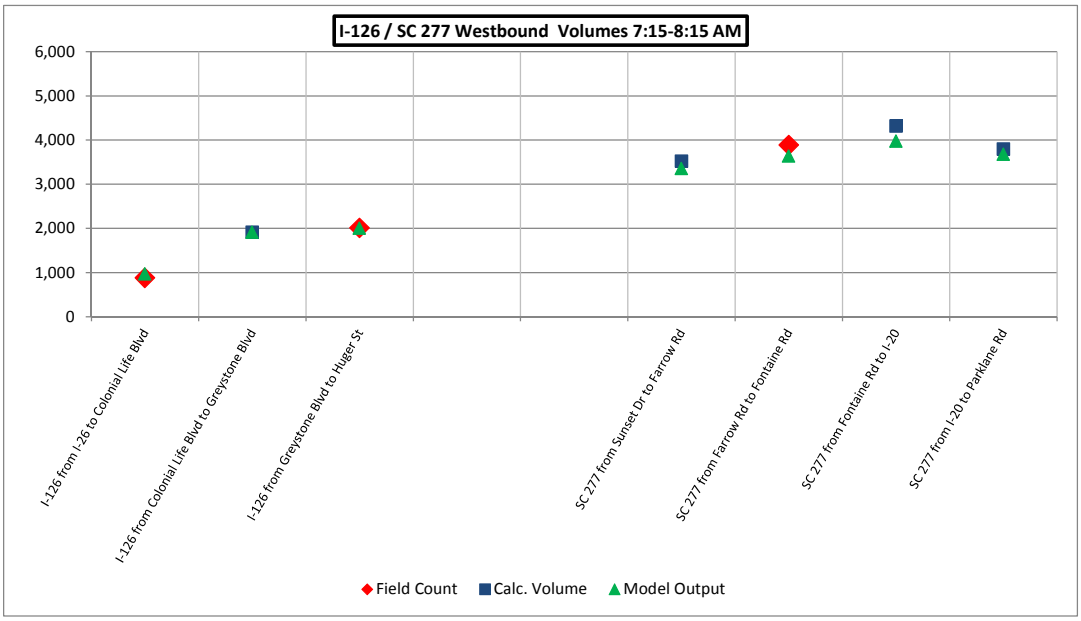


Figure 44. I-126 / SC-277 Westbound Volume Comparison: AM Peak Hour

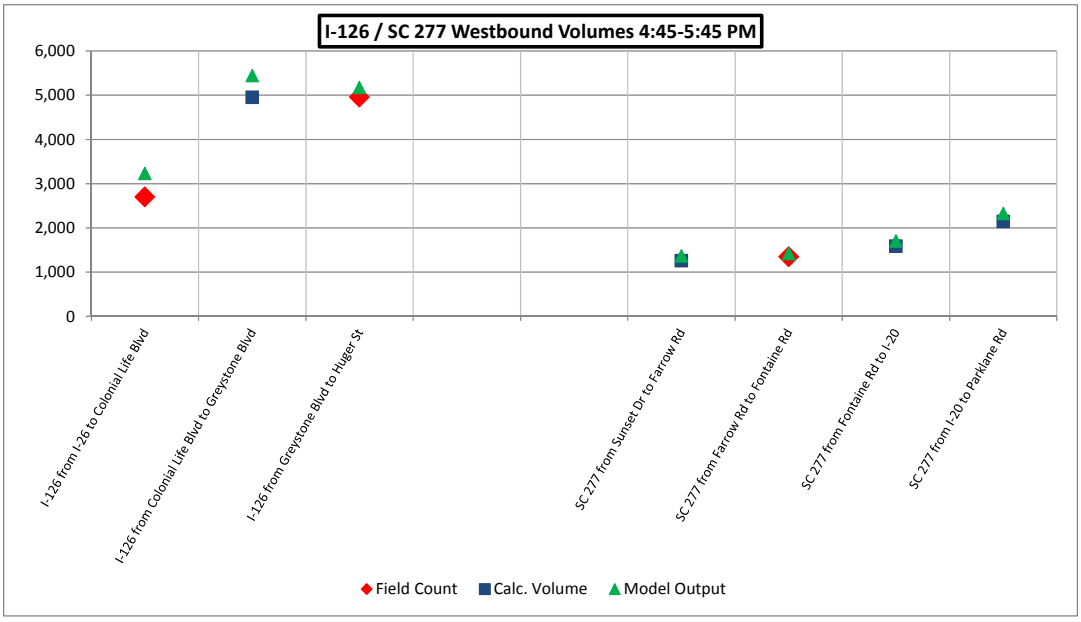


Figure 45. I-126 / SC-277 Westbound Volume Comparison: PM Peak Hour

Table 19. I-126 / SC-277 Ramp Volume Comparison

	I-126 / SC 277 Ramp Volume Calibration Summary		Eastbound								Westbound								
			7:15-8:15 AM				4:45-5:45 PM					7:15-8:15 AM				4:45-5:45 PM			
#	Location	Link ID	Field Count	Model Output	GEH	Diff.	Field Count	Model Output	GEH	Diff.	Link ID	Field Count	Model Output	GEH	Diff.	Field Count	Model Output	GEH	Diff.
1	from nb I-26 / to nb I-26 (side)	6398	589	631	2	42	280	309	2	29	6402	332	349	1	17	828	576	10	-252
2	to sb I-26	6400	316	351	2	35	763	792	1	29									
3	from / to Colonial Life Blvd	3239	473	502	1	29	308	282	2	-27	3243	200	224	2	24	812	870	2	58
4	Greystone Blvd off ramps	3232	588	550	2	-39	503	497	0	-6	3222	415	456	2	41	645	582	3	-63
5	Greystone Blvd on ramps	3224	530	531	0	1	535	471	3	-64	3235	321	360	2	39	634	708	3	74
1	Farrow Rd off ramps	4483	59	110	6	51	158	182	2	24	4477	546	475	3	-71	213	216	0	3
2	Farrow Rd on ramps	4479	209	203	0	-6	655	676	1	21	4485	183	239	4	56	121	170	4	49
3	Fontaine Rd off ramps	4473	183	177	0	-6	253	147	7	-106	4464	634	535	4	-100	399	439	2	40
4	Fontaine Rd on ramps	4459	351	342	0	-9	649	582	3	-68	4469	206	216	1	10	167	151	1	-16
5	to I-20 eb	4421	498	448	2	-50	1,839	1,642	5	-197									
6	to I-20 wb	4416	96	77	2	-19	134	0	16	-134	4412	1,477	1,369	3	-108	1,270	1,330	2	60
7	from I-20 eb	4417	1,256	1,227	1	-29	1,244	1,261	0	17	4408	170	1	18	-169	132	103	3	-30
8	from I-20 wb										4410	1,829	1,749	2	-80	579	590	0	11
9	Parklane Rd off ramps	4450	400	381	1	-19	428	469	2	41	4442	147	118	3	-29	151	162	1	11
10	Parklane Rd on ramps	4445	153	153	0	0	327	290	2	-38	4452	478	504	1	26	514	490	1	-24
11	to / from I-77 nb	4031	1,162	1,179	1	17	2,348	2,475	3	127	6436	2,723	2,837	2	114	1,286	1,362	2	76
12	Farrow Rd off / on ramps	4512	432	398	2	-34	914	867	2	-47	4515	445	564	5	119	651	632	1	-19

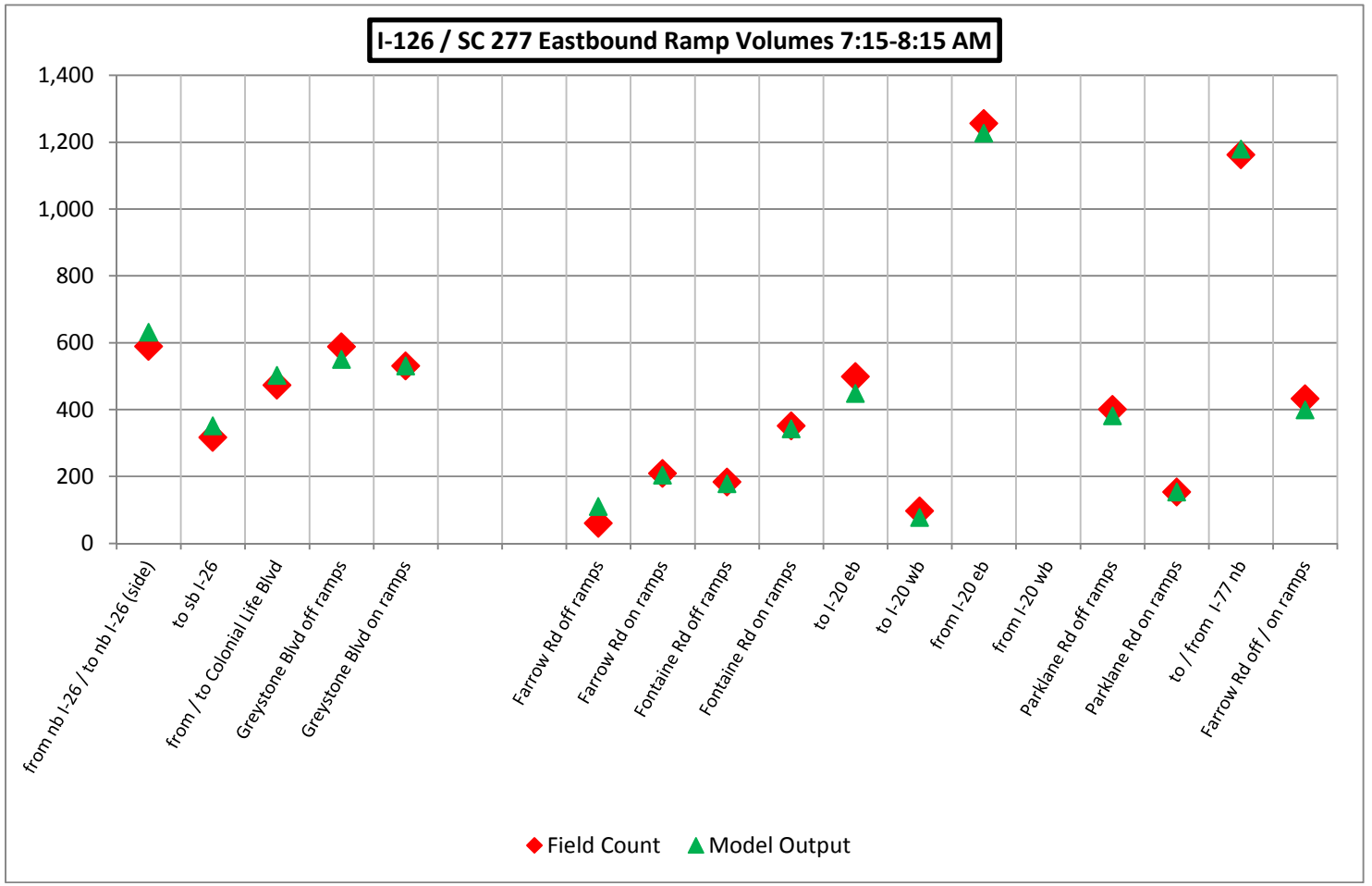


Figure 46. I-126 / SC-277 Eastbound Ramp Volumes: AM Peak Hour

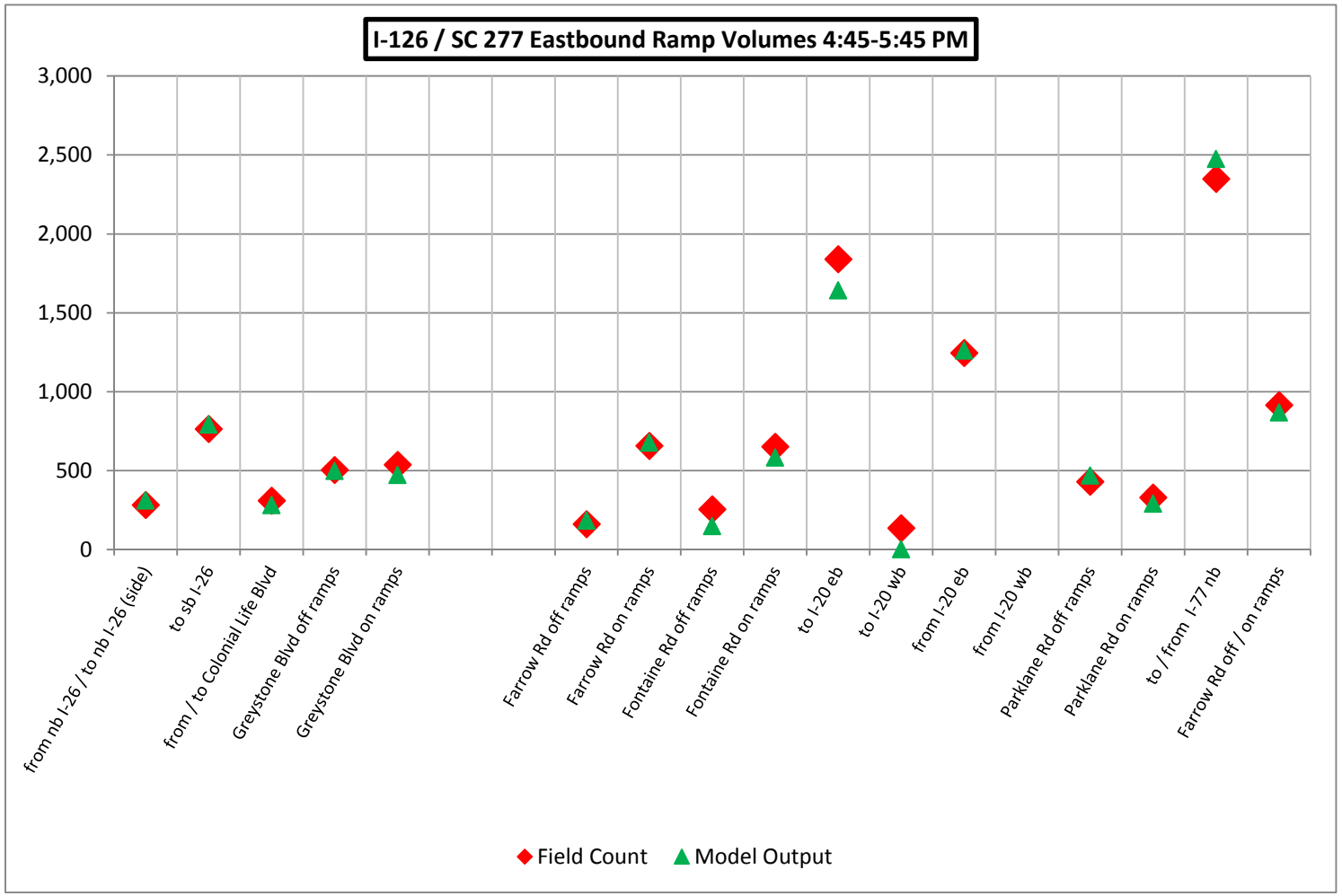


Figure 47. I-126 / SC-277 Eastbound Ramp Volumes: PM Peak Hour

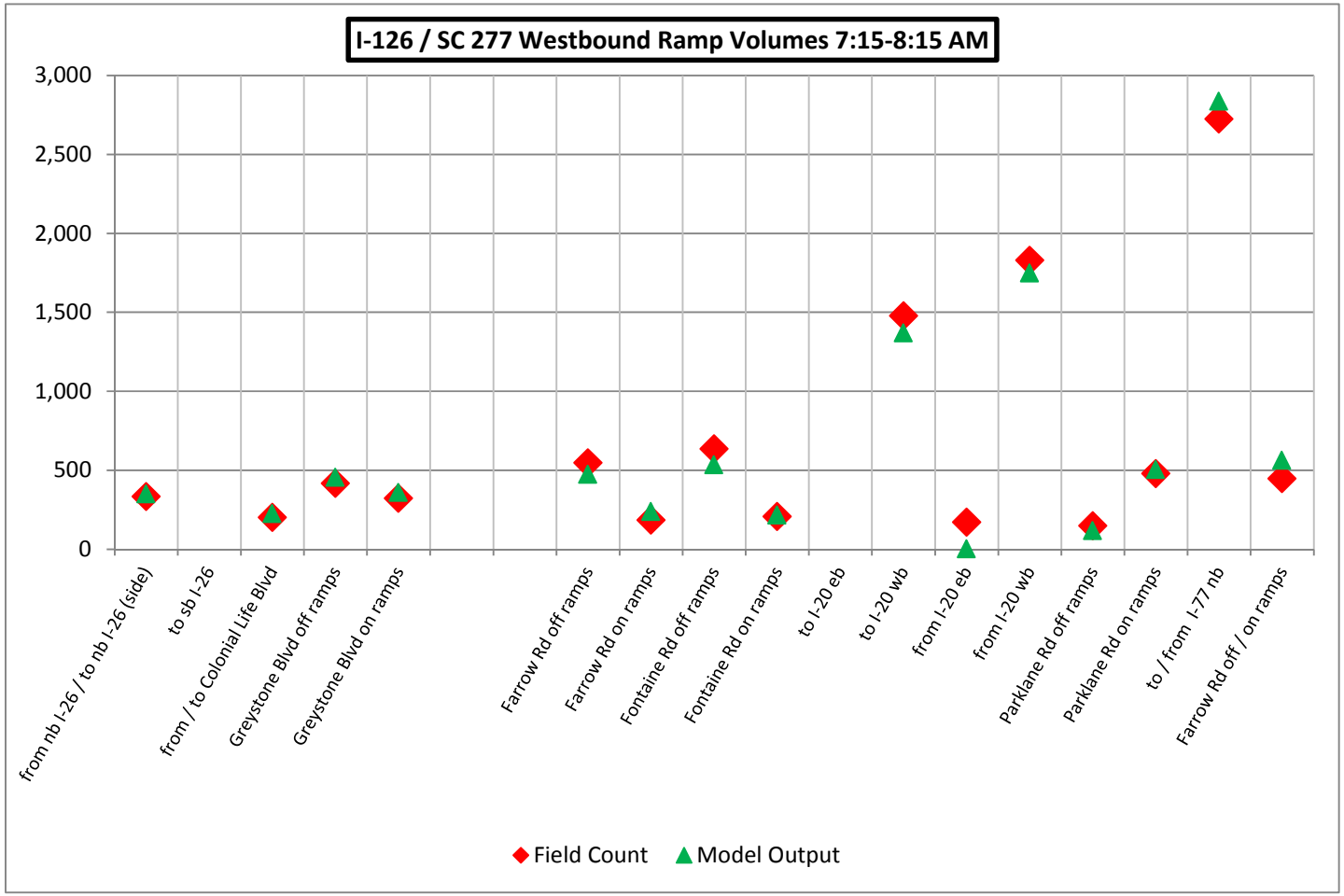


Figure 48. I-126 / SC-277 Westbound Ramp Volumes: AM Peak Hour

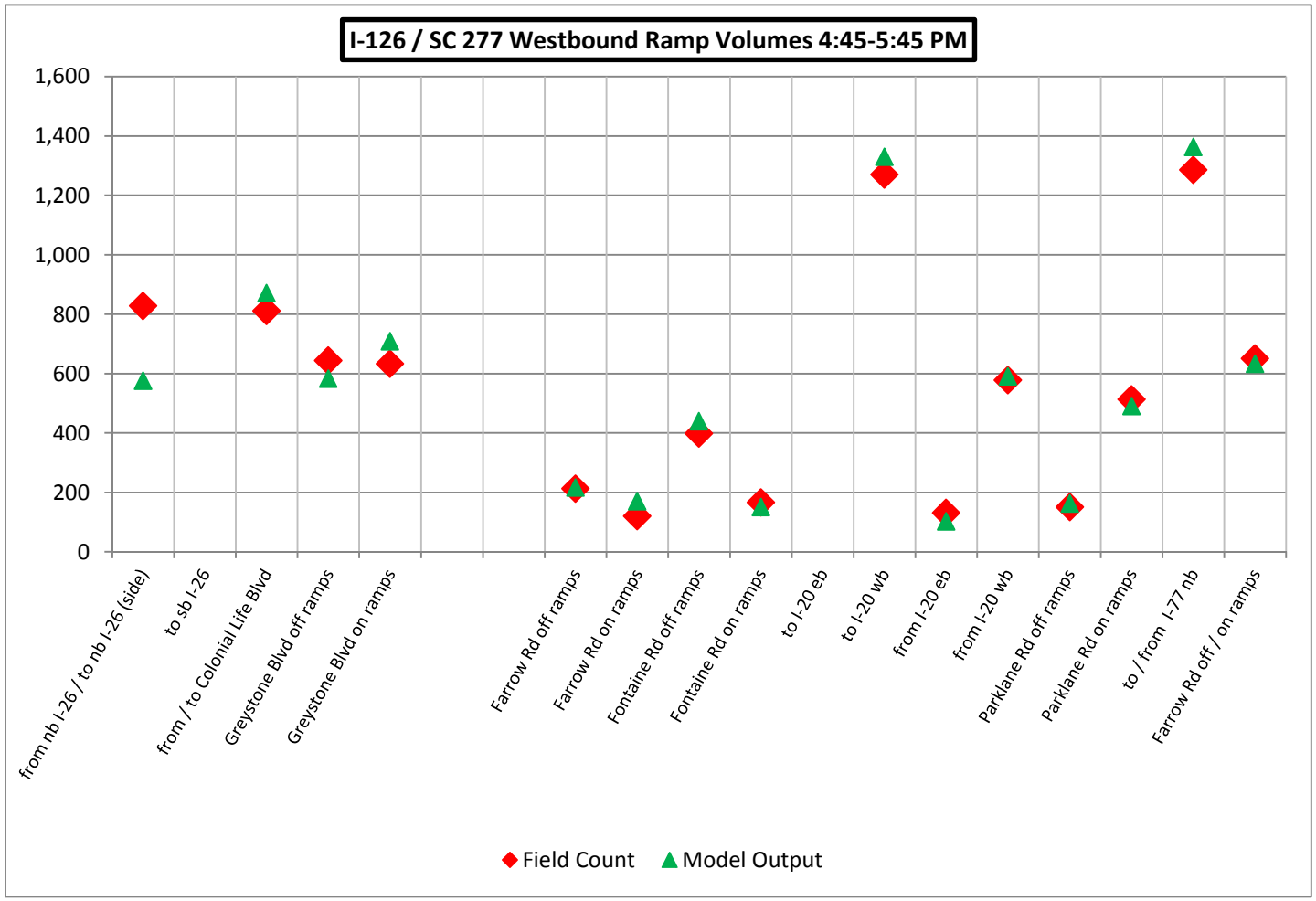


Figure 49. I-126 / SC-277 Westbound Ramp Volumes: PM Peak Hour

Table 20. I-126 / SC-277 Segment Speed Comparison

Segment	Location	Eastbound						Westbound				
		Segment	AM		PM			Segment	AM		PM	
		ID	INRIX	Model	INRIX	Model		ID	INRIX	Model	INRIX	Model
1	I-126 from I-26 to Colonial Life Blvd	4594	62	63	65	67		4599	61	66	41	60
2	I-126 from Colonial Life Blvd to Greystone Blvd	4578	62	62	62	65		4587	61	67	48	61
3	I-126 from Greystone Blvd to Huger St	4563	51	62	55	66		4566	57	65	56	62
1	SC 277 from Sunset Dr to Farrow Rd	6434		64	50	56		6439		59	56	62
2	SC 277 from Farrow Rd to Fontaine Rd	8561		61	58	40		8562		54	63	61
3	SC 277 from Fontaine Rd to I-20	6355		59	60	46		6403		45	62	60
4	SC 277 from I-20 to Parklane Rd	6342		59	60	55		6396		32	61	53

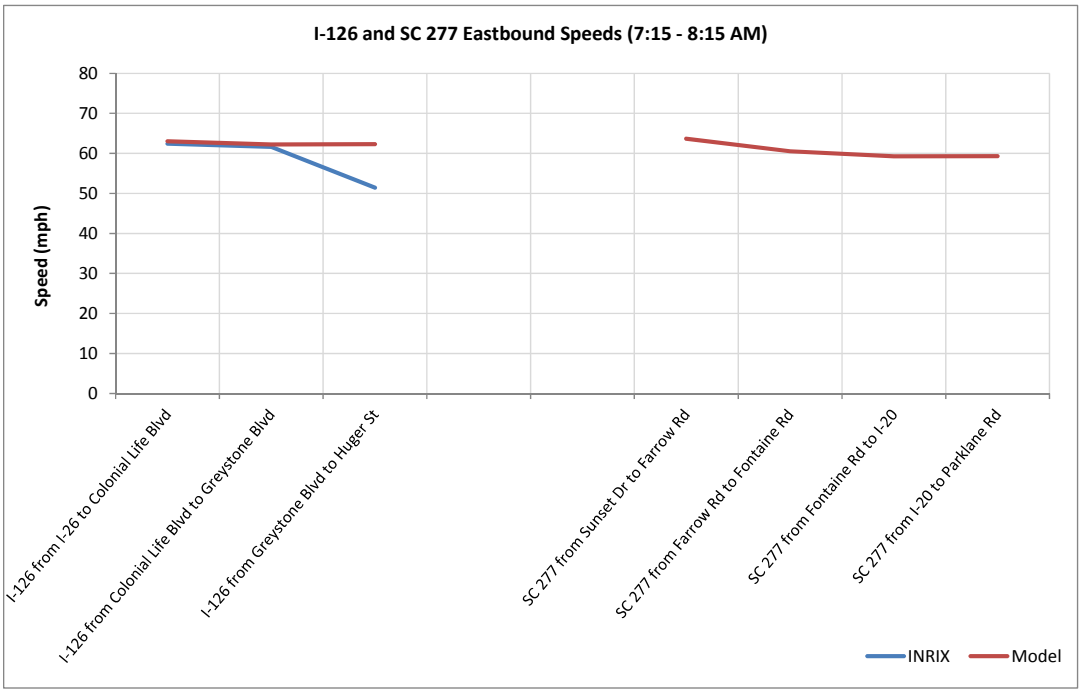


Figure 50. I-126 / SC-277 Eastbound Speeds: AM Peak Hour

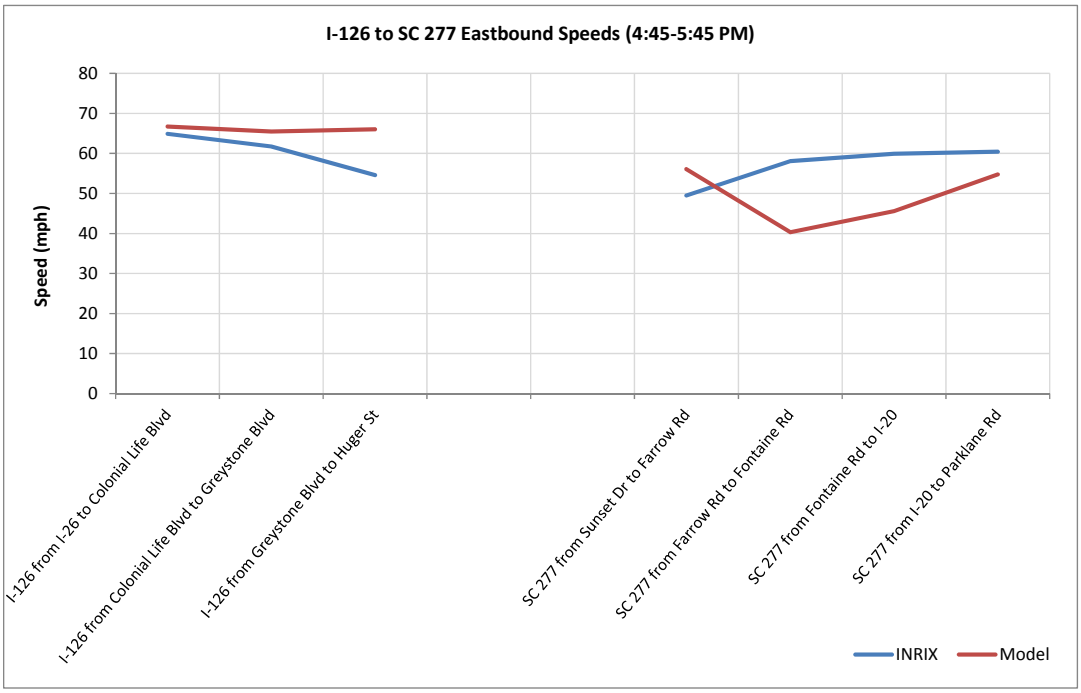


Figure 51. I-126 / SC-277 Eastbound Speeds: PM Peak Hour

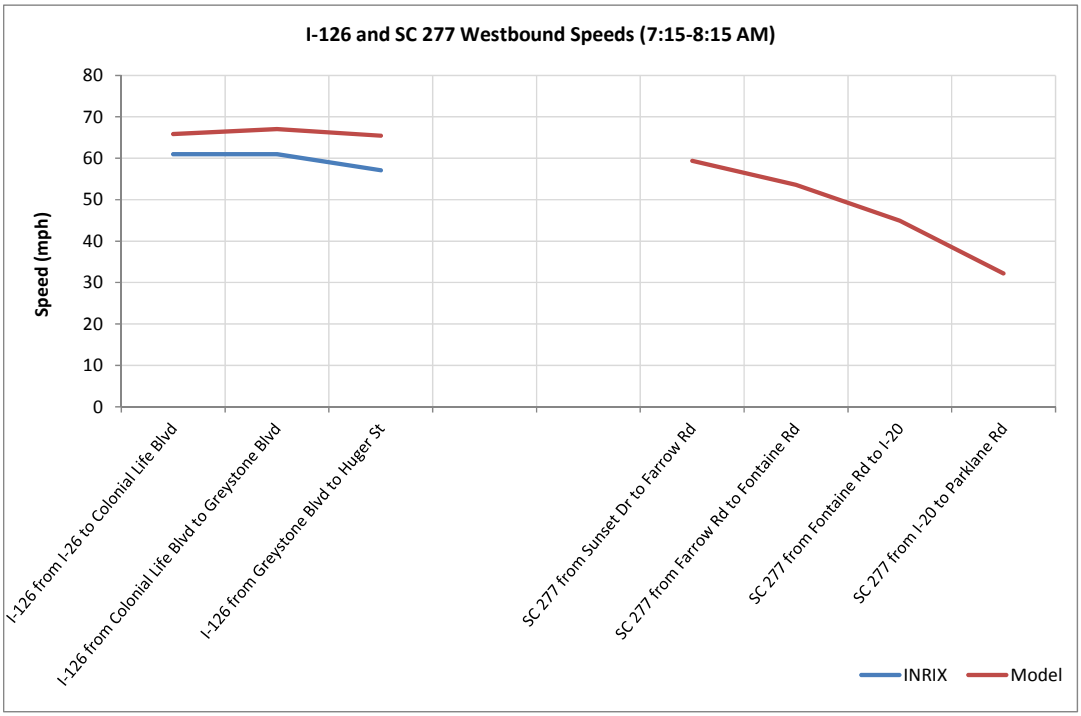


Figure 52. I-126 / SC-277 Westbound Speeds: AM Peak Hour

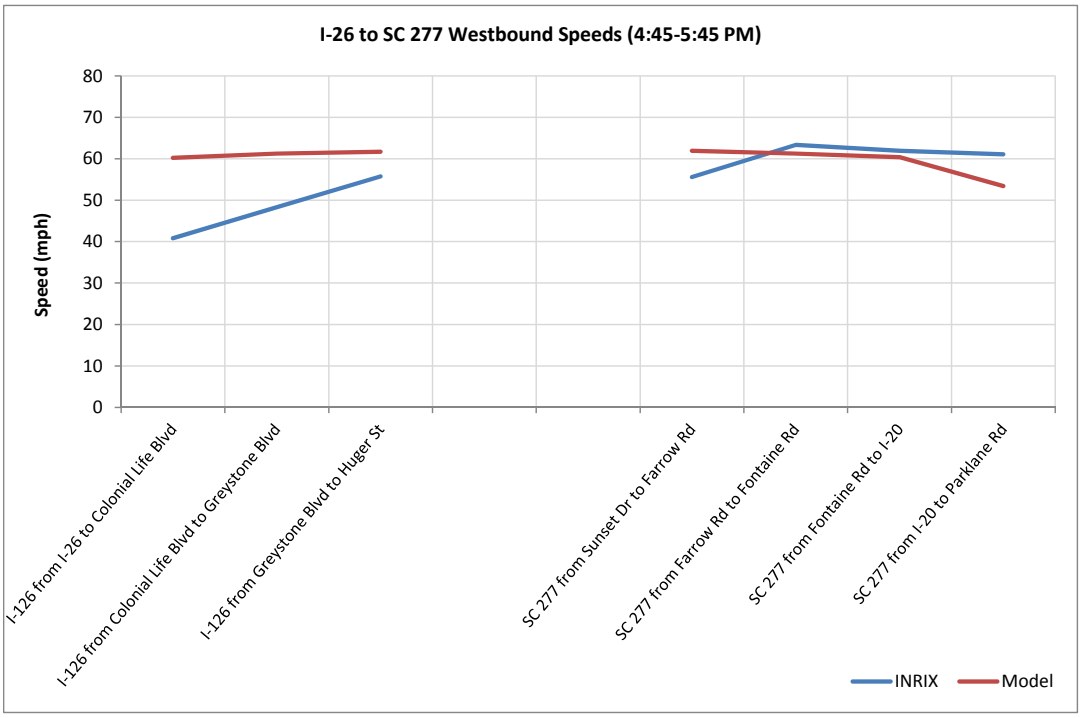


Figure 53. I-126 / SC-277 Westbound Speeds: PM Peak Hour

APPENDIX A: EXISTING CONGESTION OBSERVATIONS

Observations from the I-20/26/77 Corridor Management Plan Study

Interstate Segment		Eastbound Observations	Westbound Observations
I-26	Columbia Avenue to US 176	--	--
I-26	US 176 to US 76/US 176	--	AM Peak: Traffic is moving at free flow speeds. But the ramp merging area is not being utilized. Recent construction extended the lane but traffic is merging too quickly. Most WB traffic get in fast lane to avoid ramp traffic. PM Peak: --
I-26	US 76/US 176 to Lake Murray Boulevard	AM Peak: Congested, but traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 30-40 mph. PM Peak: --	AM Peak: -- PM Peak: Congested, but traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 30-40 mph.
I-26	Lake Murray Boulevard to Harbison Boulevard	AM Peak: Congested, but traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 20-30 mph. PM Peak: --	AM Peak: -- PM Peak: Congested, but traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 20-30 mph.
I-26	Harbison Boulevard to Piney Grove Road	AM Peak: Congested, but traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 20-30 mph. PM Peak: --	AM Peak: -- PM Peak: Congested traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 20-30 mph.
I-26	Piney Grove Road to Saint Andrews Road	AM Peak: Congested traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 15-20 mph. PM Peak: --	AM Peak: -- PM Peak: Congested traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 15-20 mph.
I-26	Saint Andrews Road to I 20	AM Peak: Congested traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 15-20 mph. PM Peak: Within the past year congested has started heavily in the middle lane, but traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 10-15 mph.	AM Peak: -- PM Peak: Heavily congested stop and go traffic.
I-26	I-20 to Bush River Road	AM Peak: Heavily Congested traffic, but is not typically stop and go. Traffic moves less than free flow speed, approximately 10-15 mph. PM Peak: Within the past year congested has started heavily in the middle lane, but traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 10-15 mph.	AM Peak: -- PM Peak: Heavily congested stop and go traffic. Ramp to Bush River Rd. backs up as well bu may just be a timing issue.

Observations from the I-20/26/77 Corridor Management Plan Study

Interstate Segment		Eastbound Observations	Westbound Observations
I-26	Bush River Road to I-126	AM Peak: Heavily Congested traffic, but is not typically stop and go. Traffic moves less than free flow speed, approximately 10-15 mph. PM Peak: Within the past year congested has started heavily in the middle lane, but traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 10-15 mph. Merge on-ramp to I-26 EB from Bush River Rd. backs up about half the length of the ramp.	AM Peak: -- PM Peak: Heavily congested stop and go traffic.
I-26	I-126 to Sunset Boulevard	AM Peak: Heavily Congested traffic, but is not typically stop and go. Traffic moves less than free flow speed, approximately 10-15 mph. PM Peak: Congested, but traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 30-40 mph. Off-ramp to Sunset Blvd backs up about the full length of the ramp.	AM Peak: -- PM Peak: Heavily congested stop and go traffic from the beginning of the bridge through the fly over to I-26 WB.
I-26	Sunset Boulevard to Augusta Road	AM Peak: -- PM Peak: Off-ramp to WB August Rd backs up on about half or the ramp.	--

Observations from the I-20/26/77 Corridor Management Plan Study

Interstate Segment		Eastbound Observations	Westbound Observations
I-20	Sunset Boulevard to Bush River Road	AM Peak: Congested, but traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 40-50 mph PM Peak: --	AM Peak: -- PM Peak: Congestion starts at Bush River Rd and is stop and goes all the way to the Sunset Blvd. interchange. This is due in part from the lane drop around MM 61.5. There are plans to begin construction in the next 4 months to add the third lane from MM 61.5 to MM 49.
I-20	Bush River Road to I-26	AM Peak: Congested traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 40-50 mph. PM Peak: --	AM Peak: -- PM Peak: Congested after on-ramps from I-26, but traffic is not typically stop and go . Traffic is approimately moving at 30-40 mph.
I-20	I-26 to Broad River Road	AM Peak: Congested traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 40-50 mph. PM Peak: --	AM Peak: -- PM Peak: Heavily congested traffic is typically stop and go. On-ramp to I-26 WB backs up onto I-20.
I-20	Broad River Road to Monticello Road	AM Peak: Congested traffic is not typically stop and go. Traffic moves less than free flow speed, approximately 40-50 mph. The off-ramp to Monticello Rd backs up but it under construction to widened the ramp to two lanes. PM Peak: --	AM Peak: -- PM Peak: Congested to about a mile west of Monticello Rd., but not stop and go. Typically traffic is not at free-flow speed but moving at appromiately 40-50 mph. Off-ramp to Broad River Rd. can get congested due to traffic on Broad River Rd.

Interstate Segment		Northbound Observations	Southbound Observations
I-77	I-26 to 12th Street Extension	--	--
I-77	12th Street Extension to Bluff Road	--	--
I-77	Bluff Road to Shop Road	--	--
I-77	Shop Road to Garners Ferry Road	AM Peak: Off-ramp to Garners Ferry Road backs up about half way on the ramp. PM Peak: --	--
I-77	Garners Ferry Road to Leesburg Road	--	AM Peak: -- PM Peak: Off-ramp to Leesburg Road backs up about 3/4 the length of the ramp.
I-77	Leesburg Road to Fort Jackson Boulevard	--	--
I-77	Fort Jackson Boulevard to Forest Drive	AM Peak: Off-ramp in the morning backs up with traffic turning right into Fort Jackson at the ID Check Gate. PM Peak: --	--
I-77	Forest Drive to Decker Boulevard	--	--
I-77	Decker Boulevard to Percival Road	--	--
I-77	Percival Road to I-20	--	AM Peak: -- PM Peak: Off-ramp to I-20 backs up slightly because of the merging of traffic
I-77	I-20 to Two Notch Road	--	AM Peak: -- PM Peak: Off-ramp to Two Notch Road backs up from traffic turning right. The merge lane on Two Notch Road is very short.
I-77	Two Notch Road to SC 277	--	--
I-77	SC 277 to Farrow Road	--	--
I-77	Farrow Road to Killian Road	Recent construction widened Killian Road and the ramps. Construction has been completed for about 10 months and has alleviated congestion.	Recent construction widened Killian Road and the ramps. Construction has been completed for about 10 months and has alleviated congestion.

Observations from the I-20/26/77 Corridor Management Plan Study

Interstate Segment		Eastbound Observations	Westbound Observations
I-126	I-26 to Colonial Life Boulevard	AM Peak: Heavily Congested traffic, but is not typically stop and go. Traffic moves less than free flow speed, approximately 10-15 mph. PM Peak: --	AM Peak: -- PM Peak: Heavily congested stop and go traffic.
I-126	Colonial Life Boulevard to Greystone Boulevard	AM Peak: Heavily Congested traffic, but is not typically stop and go. Traffic moves less than free flow speed, approximately 20-30 mph. PM Peak: --	AM Peak: -- PM Peak: Heavily congested stop and go traffic.
I-126	Greystone Boulevard to Huger Street/Elmwood Avenue	AM Peak: Heavily Congested traffic is typically stop and go from the river to Elmwood Avenue. PM Peak: --	

Interstate Segment		Northbound Observations	Southbound Observations
SC 277	Harden Street Extension to Sunset Drive	--	--
SC 277	Sunset Drive to Farrow Road	--	--
SC 277	Farrow Road to Fontaine Road	--	--
SC 277	Fontaine Road to I-20	--	--
SC 277	I-20 to Parklane Road	AM Peak: -- PM Peak: Off-ramp backs up from left turning traffic about half the length of the ramp.	--
SC 277	Parklane Road to I-77	--	--

* SC 277 is not monitored by SCDOT TMC

Observations from the I-20/26/77 Corridor Management Plan Study

Roadway	Observations
Longs Pond Road	Significant congestion in AM from Two Notch Road that backs up to fork with Barr Road. PM congestion as well at fork of Two Notch Road and Barr Road that backs up to ramp off I-20. This may warrent a signal it is currently stop control.
South Lake Drive	No significant congestion issues.
Sunset Boulevard at I-20	AM peak hour EB congestionfrom Northside Blvd. through to Cromer Rd PM peak hour congestion WB from the I-20 WB off-ramp traffic.
Bush River Road at I-20	PM peak hour congestion in the WB direction.
Broad River Road at I-20	PM peak hour congestion near the I-20 ramps.
Monticello Road	No significant congestion issues.
Columbia Avenue	No significant congestion issues.
US 176	No significant congestion issues.
US 76/US 176 at I-26	No significant congestion issues.
Lake Murray Boulevard	No significant congestion issues.
Harbison Boulevard	AM stop and go NB traffic through the interchange. PM stop and go NB and SB traffic, this may be a timing issue.
Piney Grove Road	Am peak hour congestion to get to EB on-ramp. Merge on ramp causes back ups, a two lane ramp may help alleviate some issues. PM peak hour congestion on WB off-ramp with short merging lane.
Saint Andrews Road	No significant congestion issues.
Bush River Road at I-26	Slight PM peak hour congestion from WB traffic.
Sunset Boulevard at I-26	PM peak hour congestion on ramps from short signal time and hospital traffic.
Colonial Life Boulevard	No significant congestion issues.
Greystone Boulevard	No significant congestion issues.
Huger Street/Elmwood Avenue	AM peak hour EB congestion to Assembly Street. PM peak hour congestion on Huger Street at Laruel Street that may be a timing issue.