TRAFFIC IMPACT STUDY
FOR
SPORTS AVENUE RESIDENTIAL DEVELOPMENT

SMYRNA, GEORGIA

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March 29, 2019
A & R Project # 19-025

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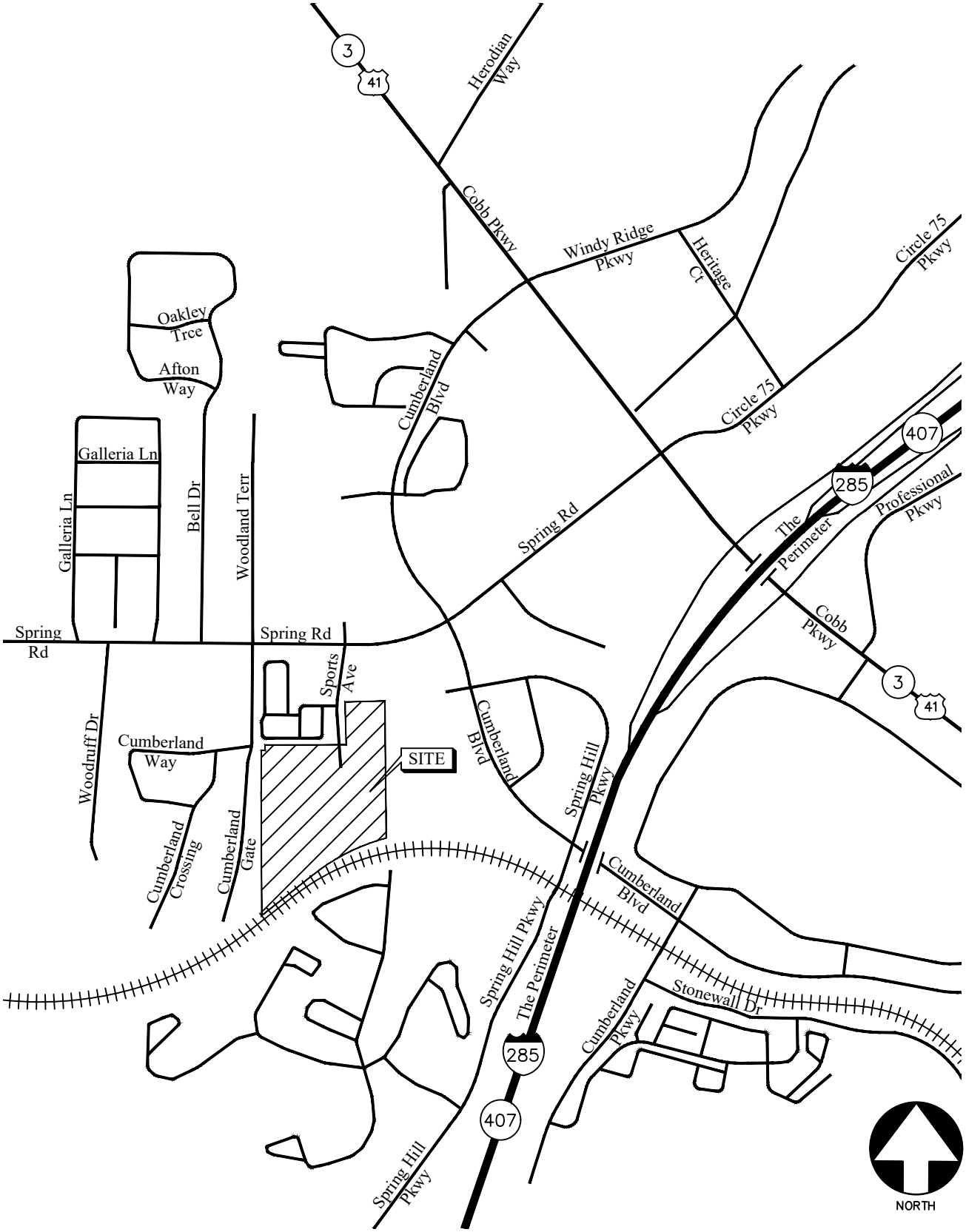
1.0 INTRODUCTION

The purpose of this study is to determine the traffic impact that will result from the proposed 108-unit townhome development located on Sports Avenue south of Spring Road in Smyrna, Georgia. The traffic analysis evaluates the current operations compared to the future conditions with the traffic generated by the development. The development will replace the existing Cumberland Community Church with access via Sports Avenue.

The AM and PM peak hours have been analyzed in this study. This study includes the evaluation of traffic operations at the intersections of:

- Spring Road at Cumberland Boulevard
- Spring Road at Sports Avenue

Recommendations to improve traffic operations have been identified as appropriate and are discussed in detail in the following sections of the report. The location of the development and the surrounding roadway network is shown in Figure 1.



LOCATION MAP FIGURE 1

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2.0 EXISTING FACILITIES / CONDITIONS

The following is a brief description of each of the roadway facilities located in proximity to the site:

2.1 Spring Road

Spring Road is an east-west, six-lane, median-divided roadway with a posted speed limit of 45 mph in the vicinity of the site. GDOT traffic counts (Station ID 067-2806) indicate that the daily traffic volume on Spring Road in 2017 was 34,000 vehicles per day west of Woodland Terrace/Cumberland Gate. GDOT classifies Spring Road as a Minor Arterial roadway.

2.2 Cumberland Boulevard

Cumberland Boulevard is a north-south, undivided roadway with a posted speed limit of 35 mph in the vicinity of the site. Cumberland Boulevard is a five-lane roadway with a two-way left-turn lane to the north of Spring Road and a four-lane roadway to the south of Spring Road. GDOT traffic counts (Station ID 067-3015) indicate that the daily traffic volume on Cumberland Boulevard in 2017 was 20,000 vehicles per day north of Spring Hill Parkway. GDOT classifies Cumberland Boulevard as a Minor Arterial roadway.

2.3 Sports Avenue

Sports Avenue is a north-south, two-lane, undivided roadway with no posted speed limit.

3.0 STUDY METHODOLOGY

In this study, the methodology used for evaluating traffic operations at each of the subject intersections is based on the criteria set forth in the Transportation Research Board's Highway Capacity Manual, 2010 edition (HCM 2010). Synchro software, which utilizes the HCM 2010 methodology, was used for the analysis. The following is a description of the methodology employed for the analysis of unsignalized and signalized intersections.

3.1 Unsignalized Intersections

For unsignalized intersections at which the side street or minor street is controlled by a stop sign, the criteria for evaluating traffic operations are the level-of-service (LOS) for the turning movements at the intersection and the level-of-service for the overall intersection. Level-of-service is based on the average controlled delay incurred at the intersection. Controlled delay for unsignalized intersections includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Several factors affect the controlled delay for unsignalized intersections, such as the availability and distribution of gaps in the conflicting traffic stream, critical gaps, and follow-up time for a vehicle in the queue.

Level-of-service is assigned a letter designation from "A" through "F". Level-of-service "A" indicates excellent operations with little delay to motorists, while level-of-service "F" exists when there are insufficient gaps of acceptable size to allow vehicles on the side street to cross safely, resulting in extremely long total delays and long queues. The level-of-service criteria for two-way stop-controlled and all-way stop-controlled (unsignalized) intersections are given in Table 1.

TABLE 1 – LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

Level-of-service	Average Delay (sec)
A	≤ 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

Source: Highway Capacity Manual

3.2 Signalized Intersections

For signalized intersections, it is necessary to evaluate both capacity and level-of-service in order to evaluate the overall operation of the intersection. The capacity analysis of an intersection is performed by comparing the volume of traffic using the various lane groups at the intersection to the capacity of those lane groups. This results in a volume/capacity (v/c) ratio for each lane group. A v/c ratio greater than 1.0 indicates that the volume of traffic has exceeded the capacity available, resulting in a temporary excess of demand. Although the capacity of the entire intersection is not defined, a composite v/c ratio for the sum of the critical lane groups within the intersection is computed. This composite v/c ratio is an indication of the overall intersection sufficiency.

Level-of-service for a signalized intersection is defined in terms of average controlled delay per vehicle, which is composed of initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The level-of-service criteria for signalized intersections, based on average controlled delay, are shown in Table 2. Level-of-service "A" indicates operations with very low controlled delay, while level-of-service "F" describes operations with extremely high average controlled delay. Level-of-service "E" is typically considered to be the limit of acceptable delay, and level-of-service "F" is considered unacceptable by most drivers.

TABLE 2 – LEVEL-OF-SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

Level-of-service	Average Control Delay (sec)
A	≤ 10
B	> 10 and ≤ 20
C	> 20 and ≤ 35
D	> 35 and ≤ 55
E	> 55 and ≤ 80
F	> 80

Source: Highway Capacity Manual

4.0 EXISTING TRAFFIC ANALYSIS

Existing traffic counts were obtained at the following study intersections:

- Spring Road at Cumberland Boulevard
- Spring Road at Sports Avenue / Aldi Driveway

Turning movement counts were collected on Tuesday, February 26, 2019. All turning movement counts were recorded during the AM and PM peak hours between 7:00am to 9:00am and 4:00pm to 6:00pm, respectively. The four consecutive 15-minute interval volumes that summed to produce the highest volume at the intersections were then determined. These volumes make up the peak hour traffic volumes for the intersections counted and are shown in Figure 2.

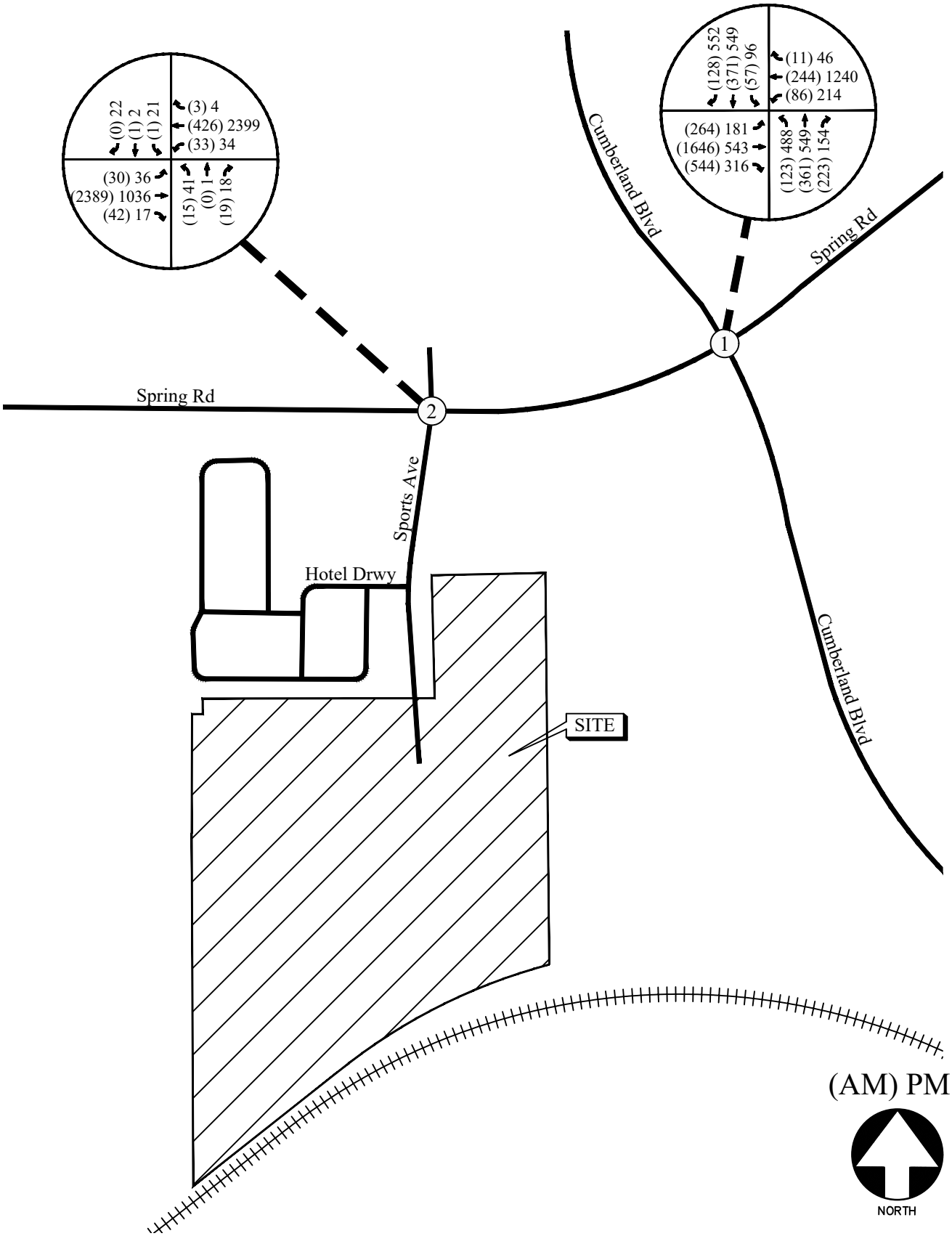
4.1 Existing Traffic Operations

Existing traffic operations were analyzed at the study intersections using existing signal timings and in accordance with the HCM methodology. The results of the analysis are shown in Table 3. The existing traffic control and lane geometry for the intersections are shown in Figure 3.

TABLE 3 – EXISTING INTERSECTION OPERATIONS

Intersection		Traffic Control	LOS (Delay)	
			AM Peak Hour	PM Peak Hour
1	**Spring Rd @ Cumberland Blvd**	Signalized	**F (82.4)**	**F (110.9)**
	-Eastbound Approach		F (116.5)	F (132.9)
	-Westbound Approach		C (22.3)	F (195.1)
	-Northbound Approach		D (35.2)	E (67.6)
	-Southbound Approach		C (28.5)	C (29.4)
2	**Spring Rd @ Sports Ave**	Signalized	**A (8.8)**	**A (6.1)**
	-Eastbound Approach		A (9.0)	A (5.9)
	-Westbound Approach		A (5.8)	A (4.9)
	-Northbound Approach		D (36.4)	D (37.7)
	-Southbound Approach		D (36.0)	D (36.2)

The results of existing traffic operations analysis indicate that the intersection of Spring Road at Cumberland Boulevard is operating at a level-of-service “F” during the AM and PM peak hours. These areas are addressed the Future Traffic Analysis section.



EXISTING WEEKDAY PEAK HOUR VOLUMES FIGURE 2

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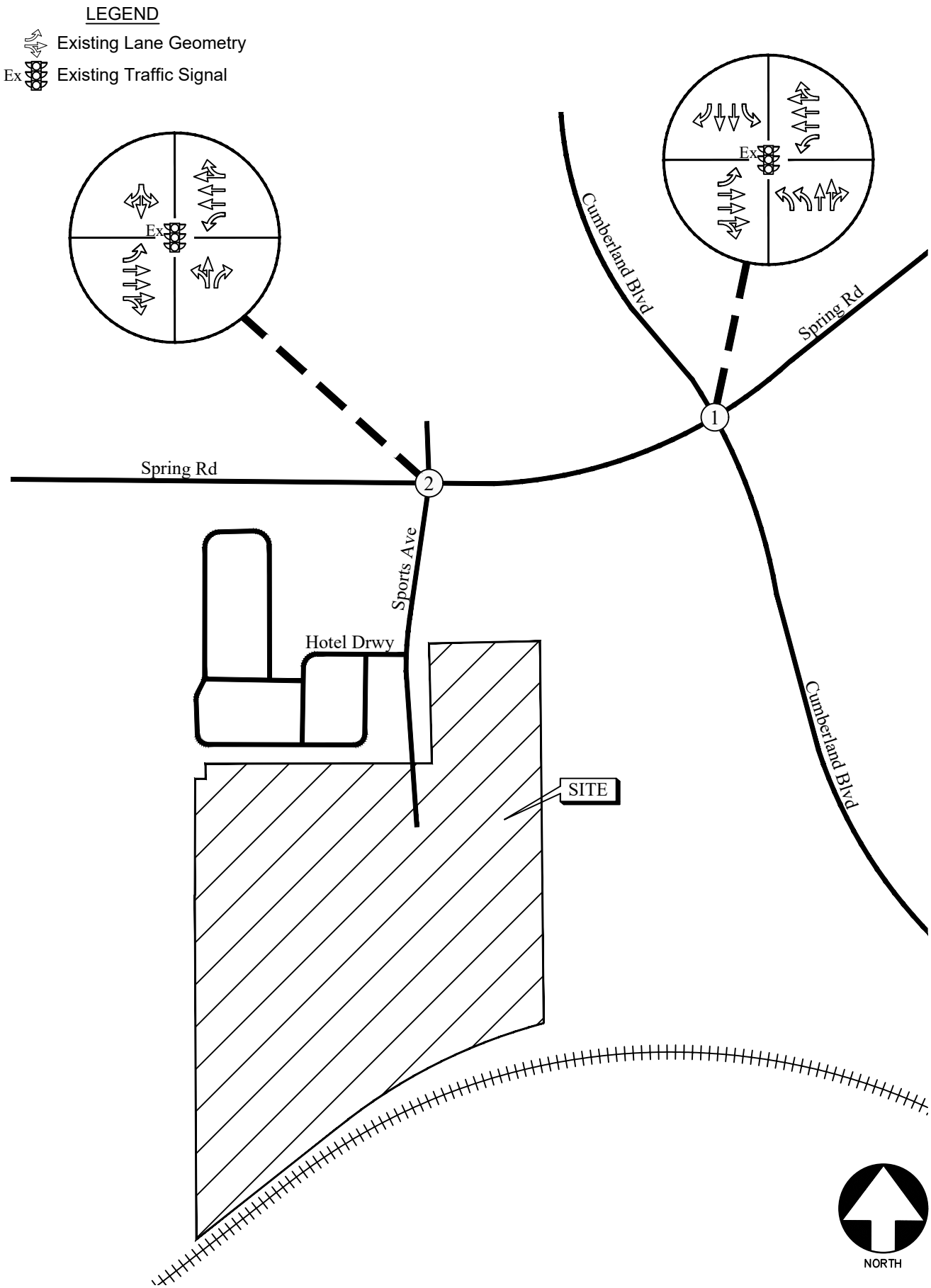

EXISTING TRAFFIC CONTROL AND LANE GEOMETRY FIGURE 3

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5.0 PROPOSED DEVELOPMENT

The proposed 108-unit townhome development will be located on Sports Avenue south of Spring Road in Smyrna, Georgia. A site plan is shown in Figure 4.

5.1 Trip Generation

Trip generation estimates for the project were based on the rates and equations published in the 10th edition of the Institute of Transportation Engineers (ITE) Trip Generation report. This reference contains traffic volume count data collected at similar facilities nationwide. The trip generation was based on the following ITE Land Use: *221 – Multifamily Housing (Mid-Rise)*. The calculated total trip generation for the proposed development is shown in Table 4.

TABLE 4 – TRIP GENERATION

Land Use	Size	AM Peak Hour			PM Peak Hour			24-Hour
		Enter	Exit	Total	Enter	Exit	Total	Two-way
Multifamily Housing (Mid-Rise)	108 Units	10	27	37	29	19	48	587

5.2 Trip Distribution

The trip distribution describes how traffic arrives and departs from the site. An overall trip distribution was developed for the site based on a review of the existing travel patterns in the area and the locations of major roadways and highways that will serve the development. The site-generated peak hour traffic volumes, shown in Table 4, were assigned to the study area intersections based on this distribution. The outer-leg distribution and AM and PM peak hour new traffic generated by the site is shown in Figure 5.

SPORTS AVENUE & SPRING ROAD

A MASTER PLANNED TOWNHOME DEVELOPMENT

FOR

LENNAR GEORGIA

LAND LOT 846
17TH DISTRICT

CITY OF SMYRNA,
COBB COUNTY,
GEORGIA

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REVISIONS:

NO.	DATE	BY	DESCRIPTION

CONCEPTUAL MASTER PLAN

0 25 50 100 150

SCALE: 1" = 50'
DATE: NOV. 3, 2018
PROJECT: 16235.00D

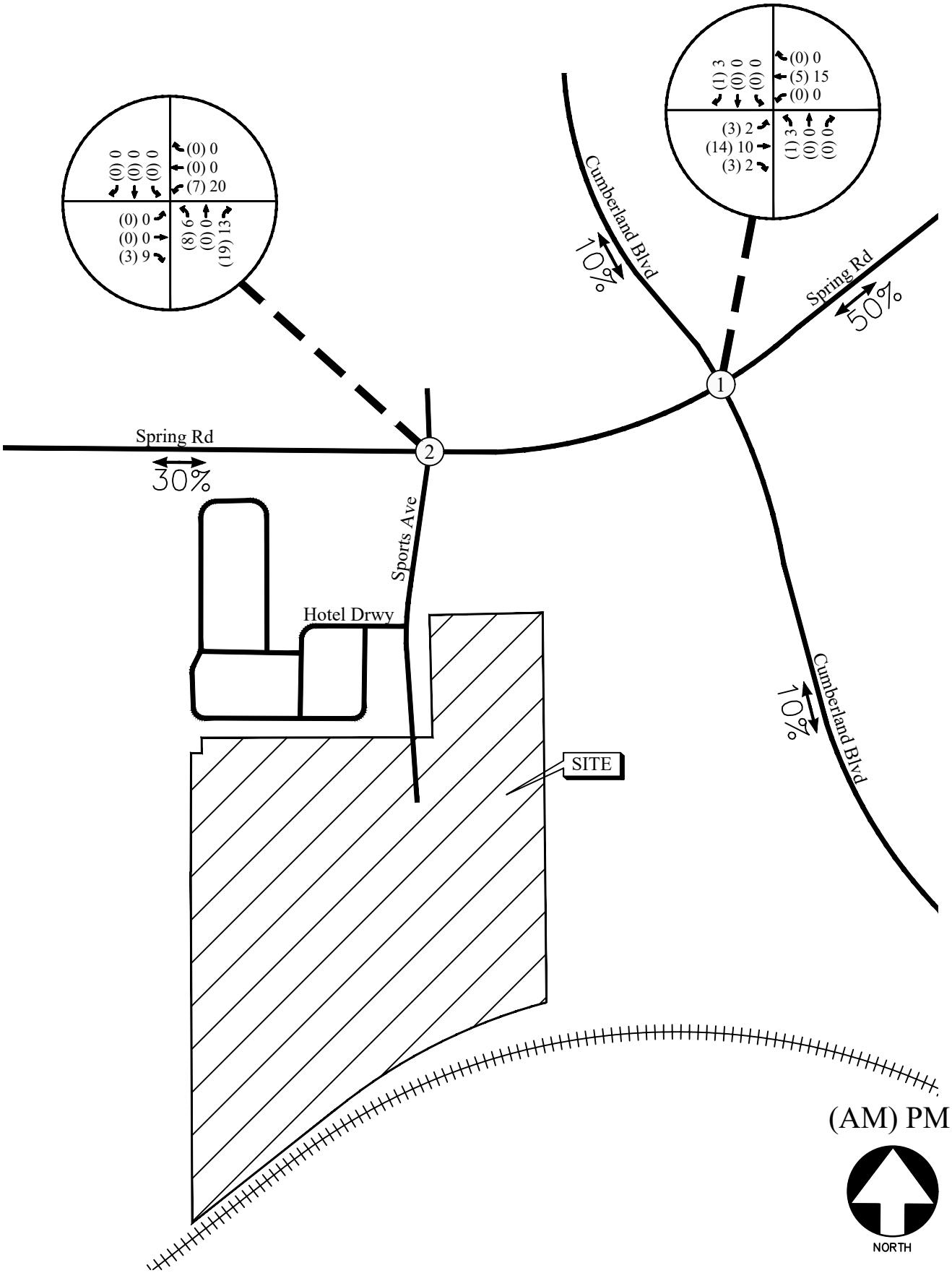
THIS SEAL IS ONLY VALID IF COUNTER SIGNED AND DATED WITH AN ORIGINAL SIGNATURE.

PRELIMINARY

NOT TO BE RELEASED FOR CONSTRUCTION

C2
SHEET

SITE DATA:	
SITE AREA	12.495 ACRES
ZONING	
EXISTING ZONING	GC
PROPOSED ZONING	TD
ZONING JURISDICTION	CITY OF SMYRNA
USE CALCULATIONS	
TOTAL SITE AREA	12.495 ACRES
20' REAR LOADED TOWNHOMES	30 UNITS
24' FRONT LOADED TOWNHOMES	78 UNITS
TOTAL PROPOSED TOWNHOMES	108 UNITS
MAXIMUM DENSITY	10 UNITS PER ACRE
PROPOSED DENSITY	8.64 UNITS PER ACRE
SETBACK REQUIREMENTS	
PERIMETER FRONT SETBACK	35 FEET (VARIANCE FROM 50 FEET)
PERIMETER SIDE SETBACK	35 FEET
PERIMETER REAR SETBACK	40 FEET
INTERIOR FRONT SETBACK	25 FT/ 8 FT: ALLEYS (VARIANCE FROM 25 FEET)
INTERIOR SIDE SETBACK	0 FEET ON ATTACHED BLDGS
INTERIOR REAR SETBACK	30 FT/ 15FT: ALLEYS (VARIANCE FROM 30 FEET)
DEVELOPMENT STANDARDS	
MAXIMUM UNITS PER ROW	6 UNITS
MINIMUM FLOOR AREA	1200 SF PER UNIT
MAXIMUM LOT COVERAGE	30 %
MINIMUM LOT WIDTH	20 FT
MAXIMUM HEIGHT	35 FT, 3 STORIES
SIDEWALK & LANDSCAPE	5' SIDEWALK, 2' LANDSCAPE STRIP
OPEN SPACE CALCULATIONS	
REQUIRED OPEN SPACE	20 % OR 2.01 ACRES
PROPOSED OPEN SPACE	34.86 % OR 3.50 ACRES



OUTER LEG TRIP DISTRIBUTION AND SITE-GENERATED PEAK HOUR VOLUMES

FIGURE 5

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6.0 FUTURE 2021 TRAFFIC ANALYSIS

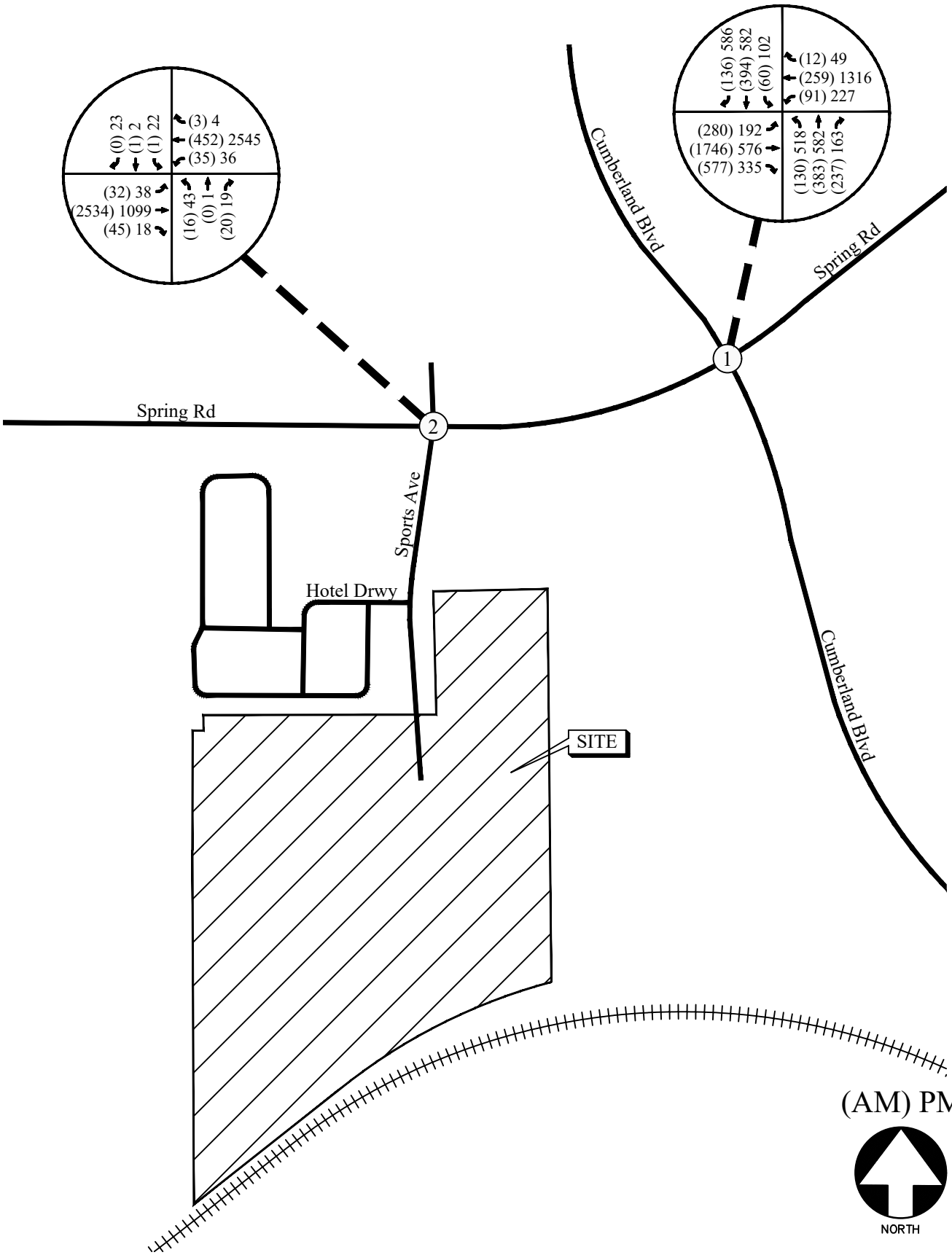
The future traffic operations are analyzed for the "No-Build" and "Build" conditions for the proposed buildout year of 2021. Improvements that are identified as "System Improvements" are recommended to address deficiencies in the roadway network and can be considered as benefitting traffic that may or may not include site-generated traffic. These improvements are recommended for the local municipality to use/consider in future transportation planning efforts. "Site Mitigation Improvements" are recommended as directly benefitting proposed site-generated traffic.

6.1 Future "No-Build" 2021 Conditions

The "No-Build" (or background) conditions provide an assessment of how traffic will operate in the study horizon year without the study site being developed as proposed, with projected increases in through traffic volumes due to normal annual growth. The Future "No-Build" volumes consist of the existing traffic volumes (Figure 2) plus increases for annual growth of through traffic.

6.1.1 Annual Traffic Growth

In order to evaluate future traffic operations in this area, a projection of normal traffic growth was applied to the existing volumes. The Georgia Department of Transportation recorded average daily traffic volumes at several locations in the vicinity of the site. Reviewing the growth over the last three years revealed a growth of approximately 3.3% in the area. For conservative purposes, a growth rate of 3% was used in the analysis. This growth factor was applied to the existing traffic volumes between collector and arterial roadways in order to estimate the future year traffic volumes prior to the addition of site-generated traffic. The resulting Future "No-Build" volumes on the roadway are shown in Figure 6.



FUTURE (NO-BUILD) PEAK HOUR VOLUMES FIGURE 6

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6.2 Future "Build" 2021 Conditions

The "Build" or development conditions include the estimated background traffic from the "No-Build" conditions plus the added traffic from the proposed development. In order to evaluate future traffic operations in this area, the additional traffic volumes from the site (Figure 5) were added to base traffic volumes to calculate the future traffic volumes after the construction of the development. These total future traffic volumes are shown in Figure 7.

6.2.1 Site Access Configuration

The site will replace the existing Cumberland Community Church and will have access via Sports Avenue. The existing layout of Sports Avenue was used in modeling the site access.

6.3 Future 2021 Traffic Operations

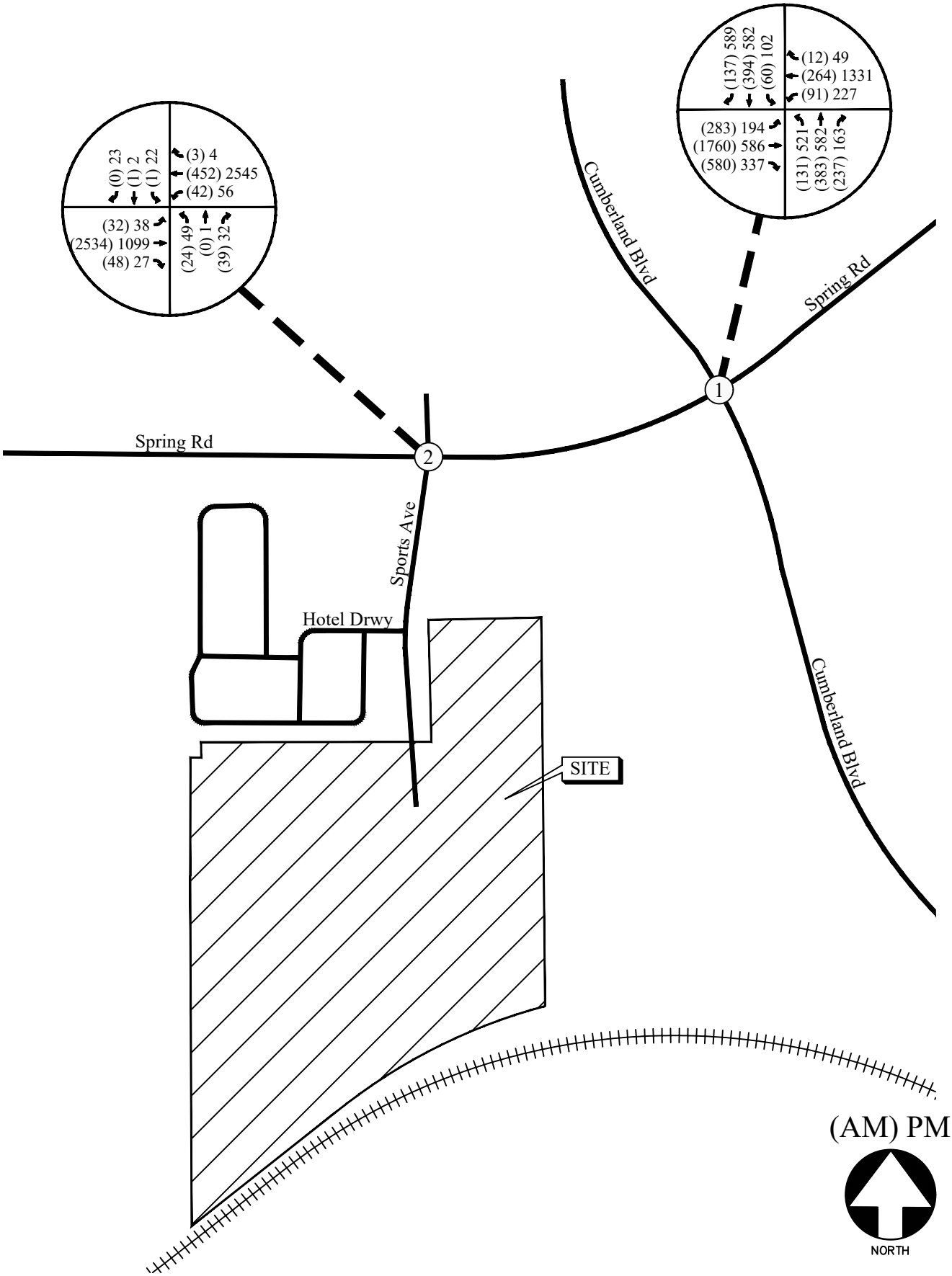
The future "No-Build" and "Build" traffic operations were analyzed using the volumes in Figure 6 and Figure 7, respectively. The results of the future traffic operations analyses are shown below in Table 5. Recommendations on traffic control and lane geometry are shown graphically in Figure 8.

TABLE 5 – FUTURE INTERSECTION OPERATIONS

Intersection		LOS (Delay)			
		NO-BUILD		BUILD	
		AM Peak	PM Peak	AM Peak	PM Peak
1	**Spring Rd @ Cumberland Blvd**	**F (118.2)**	**F (142.8)**	**F (121.0)**	**F (146.3)**
	-Eastbound Approach	F (176.0)	F (153.9)	F (180.4)	F (158.2)
	-Westbound Approach	C (23.7)	F (274.7)	C (23.7)	F (281.1)
	-Northbound Approach	C (34.1)	E (79.2)	C (34.1)	F (80.6)
	-Southbound Approach	C (28.3)	C (30.8)	C (28.3)	C (31.2)
2	**Spring Rd @ Sports Ave**	**A (9.6)**	**A (6.6)**	**B (10.2)**	**A (7.3)**
	-Eastbound Approach	A (9.8)	A (6.1)	B (10.2)	A (6.9)
	-Westbound Approach	A (6.2)	A (5.5)	A (7.0)	A (6.1)
	-Northbound Approach	D (36.3)	D (37.8)	D (36.3)	D (35.0)
	-Southbound Approach	D (35.9)	D (36.2)	D (35.5)	C (34.1)
3	**Site Driveway on Sports Avenue**				
	-Eastbound Approach	-	-	A (8.9)	A (9.1)

6.3.1 Summary of Findings

The proposed development will not add a significant amount of additional traffic to the Spring Road corridor. The intersection of Spring Road at Cumberland Boulevard will see less than a 2.5% increase in overall delay and the Sports Avenue intersection will continue to operate acceptably with the addition of site traffic. Because the Spring Road corridor was recently widened and the study intersections were upgraded with several improvements, no further improvements have been recommended as part of this study.



FUTURE (BUILD) PEAK HOUR VOLUMES FIGURE 7

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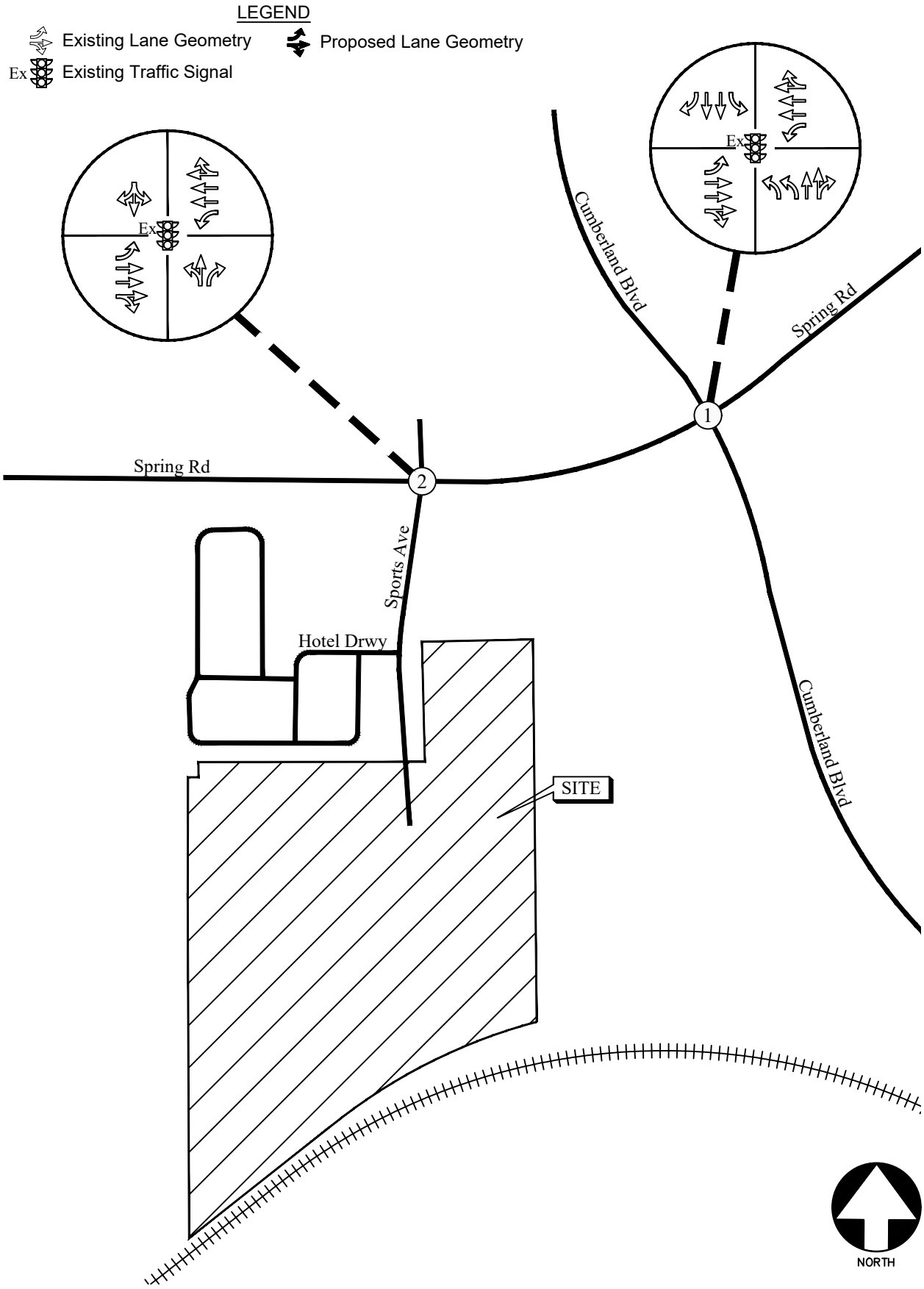

FUTURE TRAFFIC CONTROL AND LANE GEOMETRY FIGURE 8

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7.0 CONCLUSIONS AND RECOMMENDATIONS

Traffic impacts were evaluated for the added traffic from the proposed 108-unit townhome development that will be located on Sports Avenue south of Spring Road in Smyrna, Georgia. The development will replace the existing Cumberland Community Church with access via Sports Avenue.

Existing and future operations after completion of the project were analyzed at the intersections of:

- Spring Road at Cumberland Boulevard
- Spring Road at Sports Avenue

The analysis included the evaluation of Future operations for "No-Build" and "Build" conditions, both of which account for increases in annual growth of through traffic. The results of the analysis are listed below:

7.1 Summary of Findings

The proposed development will not add a significant amount of additional traffic to the Spring Road corridor. The intersection of Spring Road at Cumberland Boulevard will see less than a 2.5% increase in overall delay and the Sports Avenue intersection will continue to operate acceptably with the addition of site traffic. Because the Spring Road corridor was recently widened and the study intersections were upgraded with several improvements, no further improvements have been recommended as part of this study.

Appendix

EXISTING INTERSECTION TRAFFIC COUNTS

A & R Engineering, Inc.

2160 Kingston Court, Suite 'O',
Marietta, GA 30067

TMC Data
Cumberland Blvd @ Spring Rd
7-9 am | 4-6 pm

File Name : 20190051
Site Code : 20190051
Start Date : 2/26/2019
Page No : 1

Groups Printed- Car, Trucks & Buses

	Cumberland Blvd Northbound				Cumberland Blvd Southbound				Spring Rd Eastbound				Spring Rd Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	20	37	22	79	12	74	28	114	45	447	111	603	9	51	3	63	859
07:15 AM	23	67	43	133	12	62	31	105	68	479	160	707	7	49	3	59	1004
07:30 AM	27	97	51	175	12	101	33	146	79	422	130	631	15	46	2	63	1015
07:45 AM	33	110	71	214	7	80	47	134	62	394	122	578	27	72	4	103	1029
Total	103	311	187	601	43	317	139	499	254	1742	523	2519	58	218	12	288	3907
08:00 AM	40	87	58	185	26	128	17	171	55	351	132	538	37	77	2	116	1010
08:15 AM	38	95	76	209	10	116	30	156	41	342	106	489	61	57	7	125	979
08:30 AM	24	86	57	167	14	118	19	151	71	348	124	543	51	93	9	153	1014
08:45 AM	39	115	69	223	21	87	22	130	44	345	124	513	27	59	2	88	954
Total	141	383	260	784	71	449	88	608	211	1386	486	2083	176	286	20	482	3957
*** BREAK ***																	
04:00 PM	90	90	23	203	16	129	137	282	49	150	66	265	54	248	9	311	1061
04:15 PM	142	108	33	283	24	88	130	242	55	151	78	284	43	309	14	366	1175
04:30 PM	110	86	38	234	9	116	127	252	50	143	74	267	46	357	15	418	1171
04:45 PM	129	111	38	278	21	101	129	251	50	135	67	252	41	309	12	362	1143
Total	471	395	132	998	70	434	523	1027	204	579	285	1068	184	1223	50	1457	4550
05:00 PM	117	151	37	305	25	120	118	263	42	139	80	261	54	371	16	441	1270
05:15 PM	106	126	33	265	24	161	144	329	48	171	76	295	73	298	13	384	1273
05:30 PM	136	161	46	343	26	167	161	354	41	98	93	232	46	262	5	313	1242
05:45 PM	55	63	20	138	16	99	74	189	31	96	52	179	26	200	9	235	741
Total	414	501	136	1051	91	547	497	1135	162	504	301	967	199	1131	43	1373	4526
Grand Total	1129	1590	715	3434	275	1747	1247	3269	831	4211	1595	6637	617	2858	125	3600	16940
Apprch %	32.9	46.3	20.8		8.4	53.4	38.1		12.5	63.4	24		17.1	79.4	3.5		
Total %	6.7	9.4	4.2	20.3	1.6	10.3	7.4	19.3	4.9	24.9	9.4	39.2	3.6	16.9	0.7	21.3	

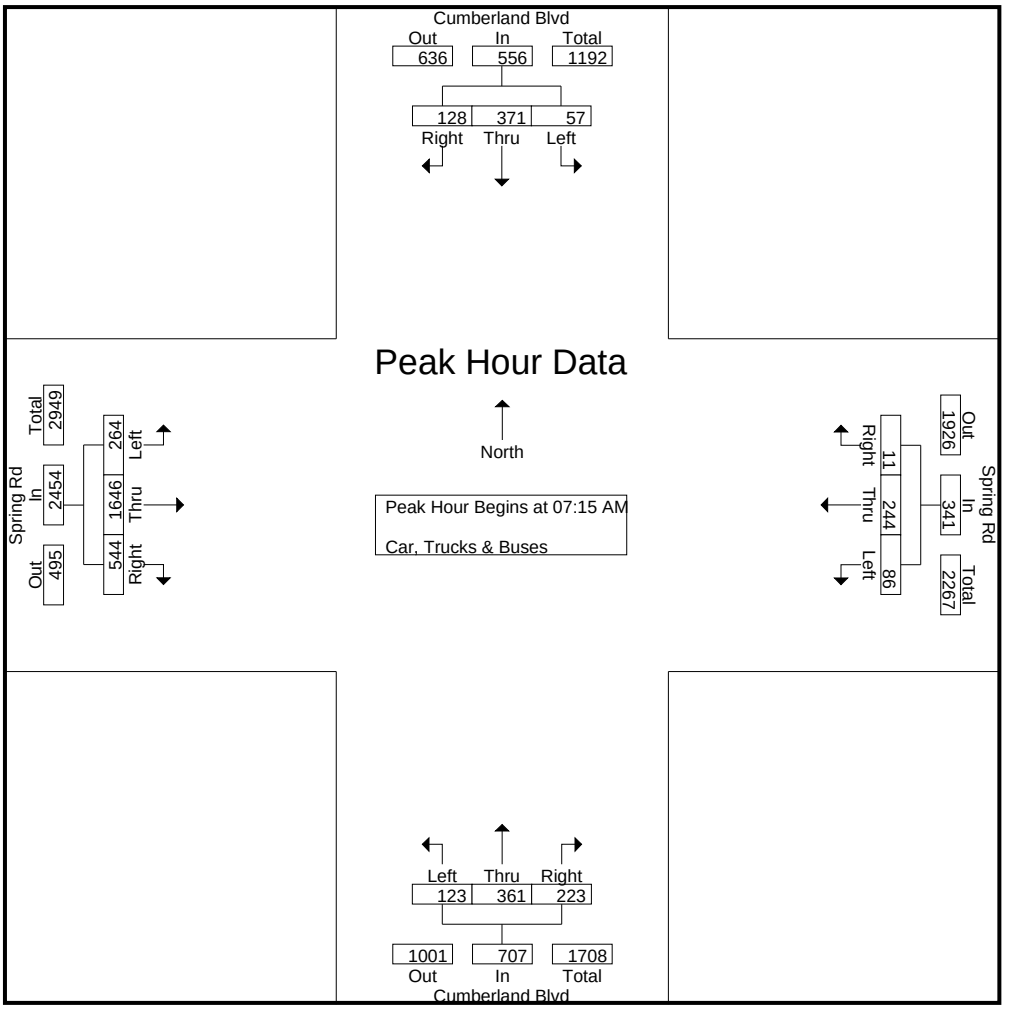
A & R Engineering, Inc.

2160 Kingston Court, Suite 'O',
Marietta, GA 30067

TMC Data
Cumberland Blvd @ Spring Rd
7-9 am | 4-6 pm

File Name : 20190051
Site Code : 20190051
Start Date : 2/26/2019
Page No : 2

	Cumberland Blvd Northbound				Cumberland Blvd Southbound				Spring Rd Eastbound				Spring Rd Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	23	67	43	133	12	62	31	105	68	**479**	**160**	**707**	7	49	3	59	1004
07:30 AM	27	97	51	175	12	101	33	146	**79**	422	130	631	15	46	2	63	1015
07:45 AM	33	**110**	**71**	**214**	7	80	**47**	134	62	394	122	578	27	72	**4**	103	**1029**
08:00 AM	**40**	87	58	185	**26**	**128**	17	**171**	55	351	132	538	**37**	**77**	2	**116**	1010
Total Volume	123	361	223	707	57	371	128	556	264	1646	544	2454	86	244	11	341	4058
% App. Total	17.4	51.1	31.5		10.3	66.7	23		10.8	67.1	22.2		25.2	71.6	3.2		
PHF	.769	.820	.785	.826	.548	.725	.681	.813	.835	.859	.850	.868	.581	.792	.688	.735	.986



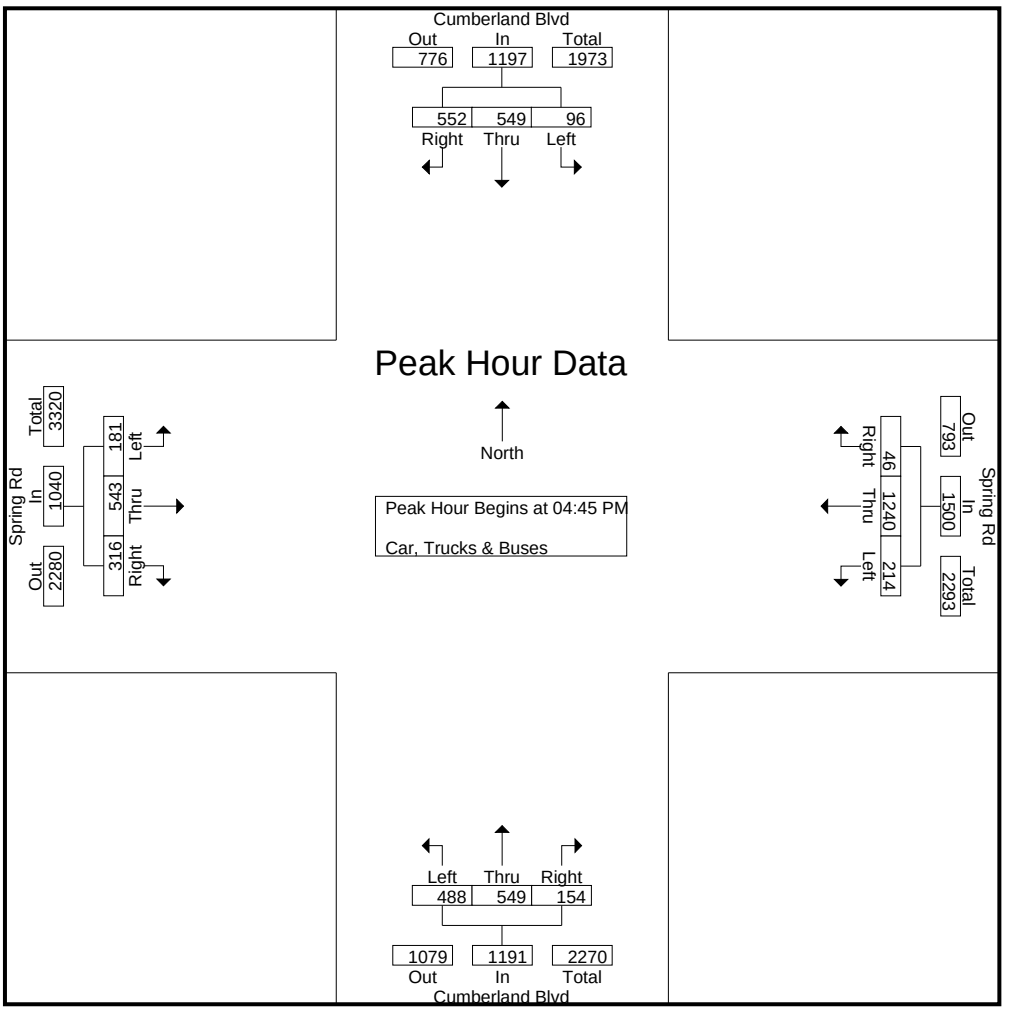
A & R Engineering, Inc.

2160 Kingston Court, Suite 'O',
Marietta, GA 30067

TMC Data
Cumberland Blvd @ Spring Rd
7-9 am | 4-6 pm

File Name : 20190051
Site Code : 20190051
Start Date : 2/26/2019
Page No : 3

	Cumberland Blvd Northbound				Cumberland Blvd Southbound				Spring Rd Eastbound				Spring Rd Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	129	111	38	278	21	101	129	251	**50**	135	67	252	41	309	12	362	1143
05:00 PM	117	151	37	305	25	120	118	263	42	139	80	261	54	**371**	**16**	**441**	1270
05:15 PM	106	126	33	265	24	161	144	329	48	**171**	76	**295**	**73**	298	13	384	**1273**
05:30 PM	**136**	**161**	**46**	**343**	**26**	**167**	**161**	**354**	41	98	**93**	232	46	262	5	313	1242
Total Volume	488	549	154	1191	96	549	552	1197	181	543	316	1040	214	1240	46	1500	4928
% App. Total	41	46.1	12.9		8	45.9	46.1		17.4	52.2	30.4		14.3	82.7	3.1		
PHF	.897	.852	.837	.868	.923	.822	.857	.845	.905	.794	.849	.881	.733	.836	.719	.850	.968



A&R Engineering, Inc.

2160 Kingston Court, Suite O
Marietta, GA 30067

TMC Data
Spring Rd @ Sports Ave
7-9 am | 4-6 pm

File Name : 20190052
Site Code : 20190052
Start Date : 2/26/2019
Page No : 1

Groups Printed- Cars, Trucks & Buses

	Sports Ave Northbound				Aldi Drwy Southbound				Spring Rd Eastbound				Spring Rd Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	1	0	4	5	0	1	0	1	3	593	13	609	5	96	0	101	716
07:15 AM	3	0	7	10	0	0	0	0	7	628	12	647	7	91	0	98	755
07:30 AM	4	0	3	7	1	0	0	1	6	623	8	637	9	108	1	118	763
07:45 AM	7	0	5	12	0	0	0	0	14	545	9	568	12	131	2	145	725
Total	15	0	19	34	1	1	0	2	30	2389	42	2461	33	426	3	462	2959
08:00 AM	1	0	3	4	1	1	2	4	7	522	8	537	7	114	1	122	667
08:15 AM	4	0	8	12	1	0	0	1	3	469	6	478	8	122	2	132	623
08:30 AM	2	0	8	10	1	2	1	4	7	468	8	483	15	123	0	138	635
08:45 AM	1	0	9	10	0	1	0	1	7	457	10	474	6	129	1	136	621
Total	8	0	28	36	3	4	3	10	24	1916	32	1972	36	488	4	528	2546
*** BREAK ***																	
04:00 PM	3	1	7	11	5	0	2	7	15	241	5	261	11	471	3	485	764
04:15 PM	6	0	4	10	10	0	7	17	9	264	4	277	8	548	2	558	862
04:30 PM	10	0	8	18	6	1	5	12	10	238	4	252	9	610	1	620	902
04:45 PM	8	0	4	12	4	0	7	11	7	249	3	259	8	592	0	600	882
Total	27	1	23	51	25	1	21	47	41	992	16	1049	36	2221	6	2263	3410
05:00 PM	17	1	5	23	8	1	7	16	8	255	4	267	8	613	3	624	930
05:15 PM	6	0	1	7	3	0	3	6	11	294	6	311	9	584	0	593	917
05:30 PM	4	0	3	7	5	0	12	17	7	255	4	266	7	557	2	566	856
05:45 PM	4	0	5	9	11	0	4	15	11	260	6	277	14	590	1	605	906
Total	31	1	14	46	27	1	26	54	37	1064	20	1121	38	2344	6	2388	3609
Grand Total	81	2	84	167	56	7	50	113	132	6361	110	6603	143	5479	19	5641	12524
Apprch %	48.5	1.2	50.3		49.6	6.2	44.2		2	96.3	1.7		2.5	97.1	0.3		
Total %	0.6	0	0.7	1.3	0.4	0.1	0.4	0.9	1.1	50.8	0.9	52.7	1.1	43.7	0.2	45	

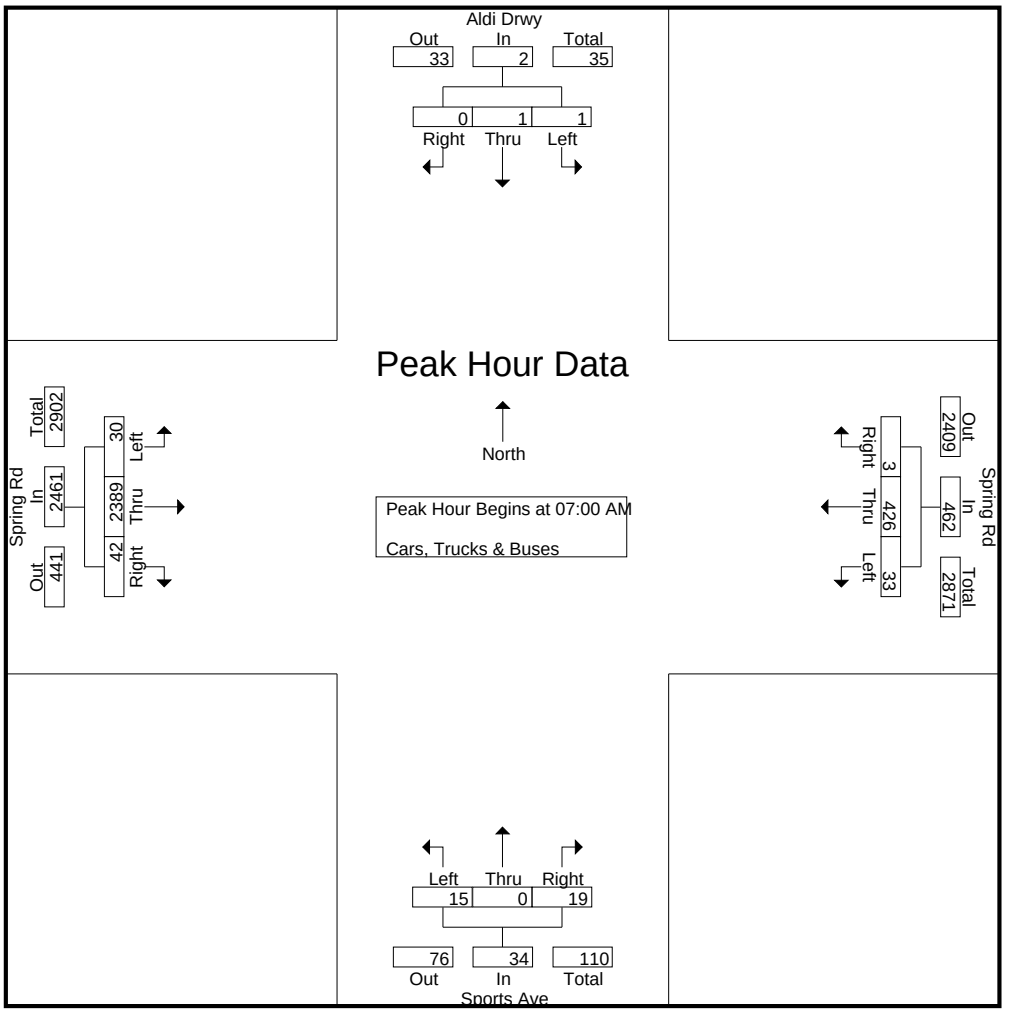
A&R Engineering, Inc.

2160 Kingston Court, Suite O
Marietta, GA 30067

TMC Data
Spring Rd @ Sports Ave
7-9 am | 4-6 pm

File Name : 20190052
Site Code : 20190052
Start Date : 2/26/2019
Page No : 2

	Sports Ave Northbound				Aldi Drwy Southbound				Spring Rd Eastbound				Spring Rd Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	1	0	4	5	0	**1**	0	**1**	3	593	**13**	609	5	96	0	101	716
07:15 AM	3	0	**7**	10	0	0	0	0	7	**628**	12	**647**	7	91	0	98	755
07:30 AM	4	0	3	7	**1**	0	0	1	6	623	8	637	9	108	1	118	**763**
07:45 AM	**7**	0	5	**12**	0	0	0	0	**14**	545	9	568	**12**	**131**	**2**	**145**	725
Total Volume	15	0	19	34	1	1	0	2	30	2389	42	2461	33	426	3	462	2959
% App. Total	44.1	0	55.9		50	50	0		1.2	97.1	1.7		7.1	92.2	0.6		
PHF	.536	.000	.679	.708	.250	.250	.000	.500	.536	.951	.808	.951	.688	.813	.375	.797	.970



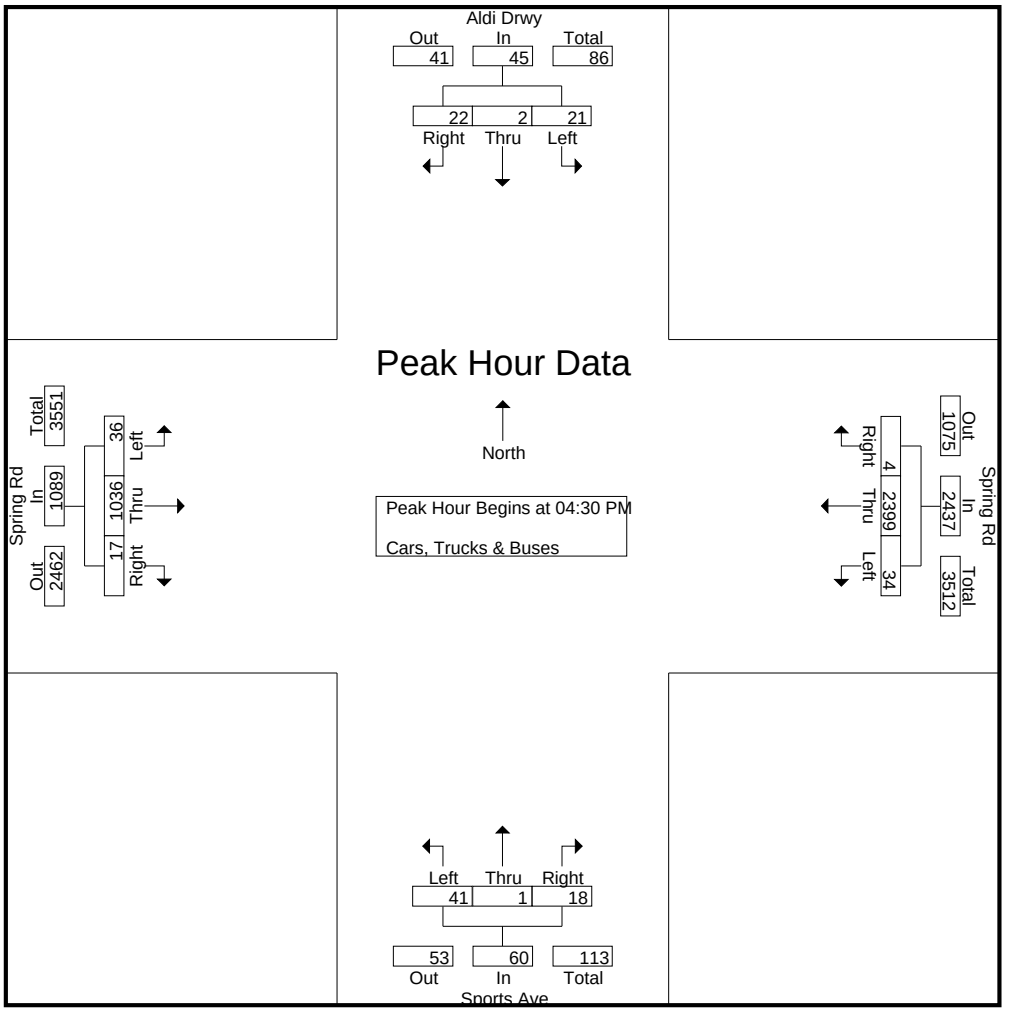
A&R Engineering, Inc.

2160 Kingston Court, Suite O
Marietta, GA 30067

TMC Data
Spring Rd @ Sports Ave
7-9 am | 4-6 pm

File Name : 20190052
Site Code : 20190052
Start Date : 2/26/2019
Page No : 3

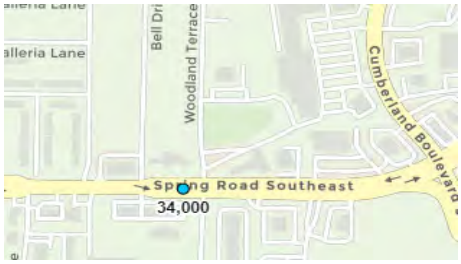
	Sports Ave Northbound				Aldi Drwy Southbound				Spring Rd Eastbound				Spring Rd Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	10	0	**8**	18	6	**1**	5	12	10	238	4	252	**9**	610	1	620	902
04:45 PM	8	0	4	12	4	0	**7**	11	7	249	3	259	8	592	0	600	882
05:00 PM	**17**	**1**	5	**23**	**8**	1	7	**16**	8	255	4	267	8	**613**	**3**	**624**	**930**
05:15 PM	6	0	1	7	3	0	3	6	**11**	**294**	**6**	**311**	9	584	0	593	917
Total Volume	41	1	18	60	21	2	22	45	36	1036	17	1089	34	2399	4	2437	3631
% App. Total	68.3	1.7	30		46.7	4.4	48.9		3.3	95.1	1.6		1.4	98.4	0.2		
PHF	.603	.250	.563	.652	.656	.500	.786	.703	.818	.881	.708	.875	.944	.978	.333	.976	.976

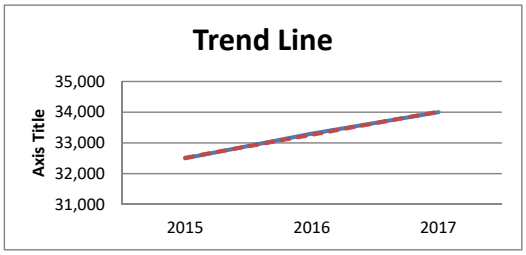


LINEAR REGRESSION OF DAILY TRAFFIC

Location	Growth Rate	R Squared	Station ID	Route	2015	2016	2017	
Spring Rd (West of Woodland T	2.3%	1.00	067-2806	00178200	32,500	33,300	34,000	Local (Urban)
Cumberland Blvd (North of Spri	4.6%	0.97	067-3015	00202600	18,300	18,900	20,000	Minor Arterial (Urban
Cobb Pkwy (South of Plum Tree	3.5%	0.88	067-2143	00000300	39,500	40,000	42,300	
Campbell Rd (North of Nancy C	4.1%	0.98	067-8806	0000000	5,080	5,350	5,510	
Weighted Average	**3.3%**	0.97	Sum of Count Stations =		95,380	97,550	101,810	

Location	Traffic Counter	RCLINK	2015	2016	2017
Spring Rd (West of Woodland Terr)	067-2806	00178200	32,500	33,300	34,000

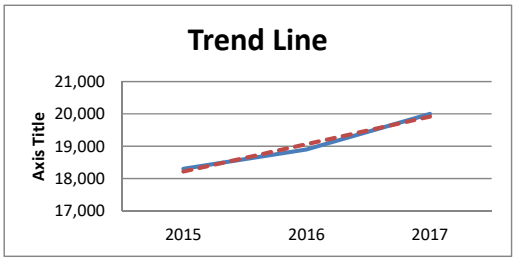




Growth Rate	2.3%	Intercept	-1,478,733	Slope	750.00
Trend Line			32,517	33,267	34,017

Sum X
Sum Y
Sum XY
Sum X^2
Count
a
b
Mean Y
SS_{tot}
SS_{res}
R^2

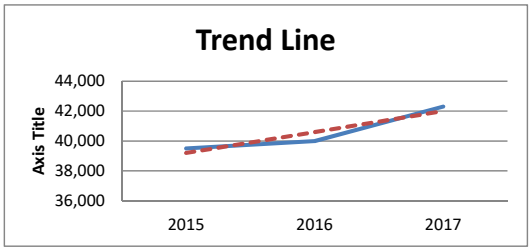
Location	Traffic Counter	RCLINK	2015	2016	2017
Cumberland Blvd (North of Spring Hill Pkwy)	067-3015	00202600	18,300	18,900	20,000



Growth Rate	4.6%	Intercept	-1,694,533	Slope	850.00
Trend Line			18,217	19,067	19,917

Sum X
Sum Y
Sum XY
Sum X^2
Count
a
b
Mean Y
SS_{tot}
SS_{res}
R^2

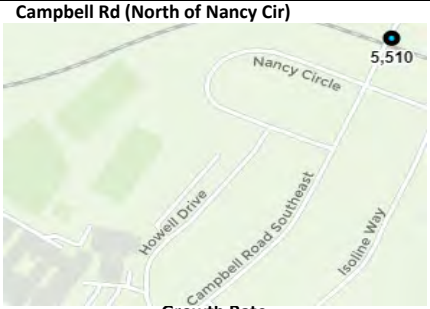
Location	Traffic Counter	RCLINK	2015	2016	2017
Cobb Pkwy (South of Plum Tree Pkwy)	067-2143	00000300	39,500	40,000	42,300

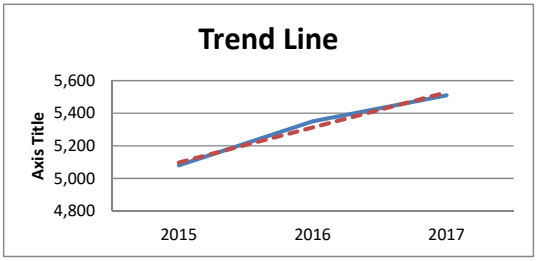


Growth Rate	3.5%	Intercept	-2,781,800	Slope	1,400.00
Trend Line			39,200	40,600	42,000

Sum X
Sum Y
Sum XY
Sum X^2
Count
a
b
Mean Y
SS_{tot}
SS_{res}
R^2

Location	Traffic Counter	RCLINK	2015	2016	2017
Campbell Rd (North of Nancy Cir)	067-8806	0000000	5,080	5,350	5,510





Growth Rate	4.1%	Intercept	-428,127	Slope	215.00
Trend Line			5,098	5,313	5,528

Sum X
Sum Y
Sum XY
Sum X^2
Count
a
b
Mean Y
SS_{tot}
SS_{res}
R^2

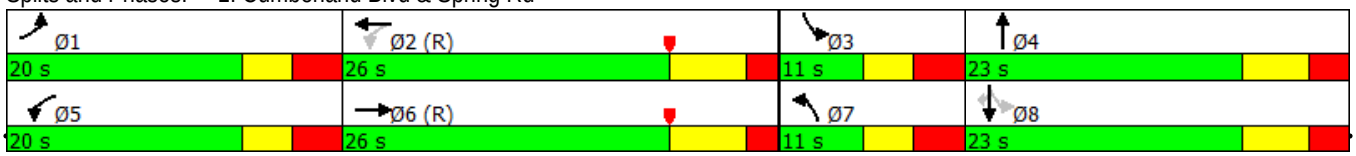
EXISTING INTERSECTION ANALYSIS

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	264	1646	86	244	123	361	57	371	128
Future Volume (vph)	264	1646	86	244	123	361	57	371	128
Lane Group Flow (vph)	267	2212	87	257	124	590	58	375	129
Turn Type	Prot	NA	pm+pt	NA	Prot	NA	pm+pt	NA	Perm
Protected Phases	1	6	5	2	7	4	3	8	
Permitted Phases			2				8		8
Detector Phase	1	6	5	2	7	4	3	8	8
Switch Phase									
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	6.0	5.0	6.0	6.0
Minimum Split (s)	15.0	44.0	15.0	41.0	15.0	45.0	15.0	44.0	44.0
Total Split (s)	20.0	26.0	20.0	26.0	11.0	23.0	11.0	23.0	23.0
Total Split (%)	25.0%	32.5%	25.0%	32.5%	13.8%	28.8%	13.8%	28.8%	28.8%
Yellow Time (s)	3.0	4.5	3.0	4.5	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	2.0	3.0	2.0	3.0	2.5	3.0	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.5	6.0	6.5	6.0	6.5	6.0	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
v/c Ratio	0.88	1.09	0.32	0.17	0.58	0.73	0.29	0.58	0.28
Control Delay	62.6	69.7	14.7	22.2	48.0	27.7	22.0	33.5	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.6	69.7	14.7	22.2	48.0	27.7	22.0	33.5	2.2
Queue Length 50th (ft)	106	~526	22	36	31	109	19	88	0
Queue Length 95th (ft)	#255	#633	45	57	#62	166	44	131	7
Internal Link Dist (ft)		535		1417		716		840	
Turn Bay Length (ft)	225		395				145		575
Base Capacity (vph)	309	2035	415	1515	214	856	200	729	489
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	1.09	0.21	0.17	0.58	0.69	0.29	0.51	0.26

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 7 (9%), Referenced to phase 2:WBTL and 6:EBT, Start of Yellow
Natural Cycle: 140
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Cumberland Blvd & Spring Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	264	1646	544	86	244	11	123	361	223	57	371	128
Future Volume (vph)	264	1646	544	86	244	11	123	361	223	57	371	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.5		6.0	6.5		6.0	6.5		6.0	6.5	6.5
Lane Util. Factor	1.00	0.91		1.00	0.91		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.96		1.00	0.99		1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	4878		1770	5050		3433	3320		1770	3539	1559
Flt Permitted	0.95	1.00		0.19	1.00		0.95	1.00		0.28	1.00	1.00
Satd. Flow (perm)	1770	4878		347	5050		3433	3320		512	3539	1559
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	267	1663	549	87	246	11	124	365	225	58	375	129
RTOR Reduction (vph)	0	63	0	0	6	0	0	117	0	0	0	104
Lane Group Flow (vph)	267	2149	0	87	251	0	124	473	0	58	375	25
Confl. Peds. (#/hr)	1		3	1		1	2		1			3
Turn Type	Prot	NA		pm+pt	NA		Prot	NA		pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases				2						8		8
Actuated Green, G (s)	13.7	28.8		27.9	21.5		4.0	16.8		18.8	15.8	15.8
Effective Green, g (s)	13.7	28.8		27.9	21.5		4.0	16.8		18.8	15.8	15.8
Actuated g/C Ratio	0.17	0.36		0.35	0.27		0.05	0.21		0.24	0.20	0.20
Clearance Time (s)	6.0	6.5		6.0	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	303	1756		234	1357		171	697		167	698	307
v/s Ratio Prot	c0.15	c0.44		0.03	0.05		c0.04	c0.14		0.01	0.11	
v/s Ratio Perm				0.10						0.07		0.02
v/c Ratio	0.88	1.22		0.37	0.19		0.73	0.68		0.35	0.54	0.08
Uniform Delay, d1	32.4	25.6		19.9	22.5		37.5	29.1		24.4	28.8	26.2
Progression Factor	1.15	0.73		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	20.2	105.0		1.0	0.3		14.2	2.6		1.3	0.8	0.1
Delay (s)	57.4	123.6		20.8	22.8		51.6	31.8		25.7	29.6	26.3
Level of Service	E	F		C	C		D	C		C	C	C
Approach Delay (s)		116.5			22.3			35.2			28.5	
Approach LOS		F			C			D			C	

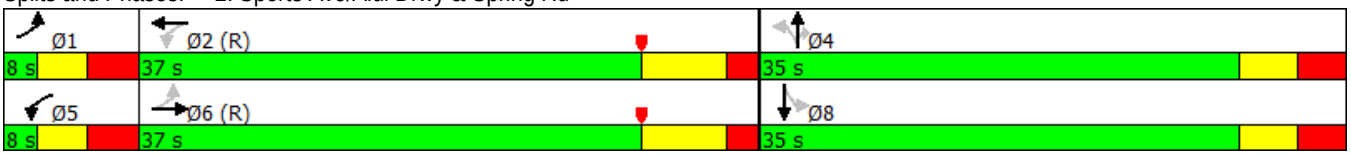
Intersection Summary			
HCM 2000 Control Delay	82.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	91.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	30	2389	33	426	15	0	19	1	1
Future Volume (vph)	30	2389	33	426	15	0	19	1	1
Lane Group Flow (vph)	31	2506	34	442	0	15	20	0	2
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	1	6	5	2		4			8
Permitted Phases	6		2		4	4	4	8	
Detector Phase	1	6	5	2	4	4	4	8	8
Switch Phase									
Minimum Initial (s)	5.0	15.0	5.0	15.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	15.0	41.0	15.0	25.0	41.0	41.0	41.0	41.0	41.0
Total Split (s)	8.0	37.0	8.0	37.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	10.0%	46.3%	10.0%	46.3%	43.8%	43.8%	43.8%	43.8%	43.8%
Yellow Time (s)	3.0	5.0	3.0	5.0	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	3.0	2.0	3.0	2.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)	6.0	7.0	6.0	7.0		6.5	6.5		6.5
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?									
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
v/c Ratio	0.04	0.63	0.23	0.11		0.10	0.08		0.02
Control Delay	2.8	8.1	11.4	4.2		34.9	0.6		33.0
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Delay	2.8	8.1	11.4	4.2		34.9	0.6		33.0
Queue Length 50th (ft)	3	276	6	30		7	0		1
Queue Length 95th (ft)	9	362	m23	47		25	0		7
Internal Link Dist (ft)		679		535		262			55
Turn Bay Length (ft)	175		165						
Base Capacity (vph)	725	3977	147	4086		615	642		552
Starvation Cap Reductn	0	0	0	0		0	0		0
Spillback Cap Reductn	0	0	0	0		0	0		0
Storage Cap Reductn	0	0	0	0		0	0		0
Reduced v/c Ratio	0.04	0.63	0.23	0.11		0.02	0.03		0.00

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 11 (14%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow
Natural Cycle: 120
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Sports Ave/Aldi Drwy & Spring Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	2389	42	33	426	3	15	0	19	1	1	0
Future Volume (vph)	30	2389	42	33	426	3	15	0	19	1	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	7.0		6.0	7.0			6.5	6.5		6.5	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00		1.00	1.00			1.00	0.85		1.00	
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.98	
Satd. Flow (prot)	1768	5071		1770	5079			1766	1557		1813	
Flt Permitted	0.49	1.00		0.07	1.00			0.93	1.00		0.83	
Satd. Flow (perm)	906	5071		134	5079			1729	1557		1550	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	31	2463	43	34	439	3	15	0	20	1	1	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	19	0	0	0
Lane Group Flow (vph)	31	2505	0	34	442	0	0	15	1	0	2	0
Confl. Peds. (#/hr)	1		3			7	3		6	6		4
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4	4	4	8		
Actuated Green, G (s)	55.8	55.0		56.6	55.4			4.3	4.3		4.3	
Effective Green, g (s)	55.8	55.0		56.6	55.4			4.3	4.3		4.3	
Actuated g/C Ratio	0.70	0.69		0.71	0.69			0.05	0.05		0.05	
Clearance Time (s)	6.0	7.0		6.0	7.0			6.5	6.5		6.5	
Vehicle Extension (s)	3.0	5.0		3.0	5.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	640	3486		119	3517			92	83		83	
v/s Ratio Prot	0.00	c0.49		c0.00	0.09							
v/s Ratio Perm	0.03			0.20				c0.01	0.00		0.00	
v/c Ratio	0.05	0.72		0.29	0.13			0.16	0.01		0.02	
Uniform Delay, d1	3.7	7.7		6.3	4.1			36.1	35.8		35.9	
Progression Factor	1.00	1.00		2.78	1.14			1.00	1.00		1.00	
Incremental Delay, d2	0.0	1.3		1.3	0.1			0.8	0.1		0.1	
Delay (s)	3.8	9.0		18.8	4.8			37.0	35.9		36.0	
Level of Service	A	A		B	A			D	D		D	
Approach Delay (s)		9.0			5.8			36.4			36.0	
Approach LOS		A			A			D			D	

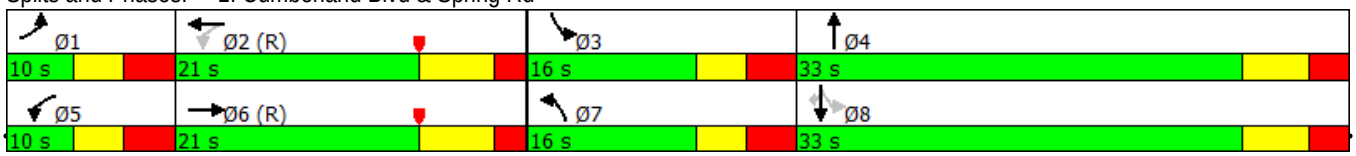
Intersection Summary			
HCM 2000 Control Delay	8.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	19.5
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	181	543	214	1240	488	549	96	549	552
Future Volume (vph)	181	543	214	1240	488	549	96	549	552
Lane Group Flow (vph)	187	886	221	1325	503	725	99	566	569
Turn Type	Prot	NA	pm+pt	NA	Prot	NA	pm+pt	NA	Perm
Protected Phases	1	6	5	2	7	4	3	8	
Permitted Phases			2				8		8
Detector Phase	1	6	5	2	7	4	3	8	8
Switch Phase									
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	6.0	5.0	6.0	6.0
Minimum Split (s)	15.0	44.0	15.0	41.0	15.0	45.0	15.0	44.0	44.0
Total Split (s)	10.0	21.0	10.0	21.0	16.0	33.0	16.0	33.0	33.0
Total Split (%)	12.5%	26.3%	12.5%	26.3%	20.0%	41.3%	20.0%	41.3%	41.3%
Yellow Time (s)	3.0	4.5	3.0	4.5	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	2.0	3.0	2.0	3.0	2.5	3.0	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.5	6.0	6.5	6.0	6.5	6.0	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
v/c Ratio	2.12	0.79	1.16	1.26	1.17	0.57	0.28	0.52	0.91
Control Delay	566.5	30.2	141.8	155.8	133.7	21.7	11.8	24.5	37.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	566.5	30.2	141.8	155.8	133.7	21.7	11.8	24.5	37.9
Queue Length 50th (ft)	~159	73	~110	~337	~157	140	23	116	172
Queue Length 95th (ft)	#288	#152	#250	#428	#250	205	45	164	#368
Internal Link Dist (ft)		535		1417		716		840	
Turn Bay Length (ft)	225		395				145		575
Base Capacity (vph)	88	1116	191	1051	429	1267	407	1172	657
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	2.13	0.79	1.16	1.26	1.17	0.57	0.24	0.48	0.87

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 26 (33%), Referenced to phase 2:WBTL and 6:EBT, Start of Yellow
Natural Cycle: 120
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Cumberland Blvd & Spring Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	181	543	316	214	1240	46	488	549	154	96	549	552
Future Volume (vph)	181	543	316	214	1240	46	488	549	154	96	549	552
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.5		6.0	6.5		6.0	6.5		6.0	6.5	6.5
Lane Util. Factor	1.00	0.91		1.00	0.91		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.99		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	4778		1770	5056		3433	3413		1770	3539	1559
Flt Permitted	0.95	1.00		0.26	1.00		0.95	1.00		0.32	1.00	1.00
Satd. Flow (perm)	1770	4778		484	5056		3433	3413		596	3539	1559
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	187	560	326	221	1278	47	503	566	159	99	566	569
RTOR Reduction (vph)	0	129	0	0	5	0	0	31	0	0	0	143
Lane Group Flow (vph)	187	757	0	221	1320	0	503	694	0	99	566	426
Confl. Peds. (#/hr)	1		3	1		1	2		1			3
Turn Type	Prot	NA		pm+pt	NA		Prot	NA		pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases				2						8		8
Actuated Green, G (s)	4.0	15.4		19.4	15.4		10.0	29.0		32.2	25.6	25.6
Effective Green, g (s)	4.0	15.4		19.4	15.4		10.0	29.0		32.2	25.6	25.6
Actuated g/C Ratio	0.05	0.19		0.24	0.19		0.12	0.36		0.40	0.32	0.32
Clearance Time (s)	6.0	6.5		6.0	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	88	919		181	973		429	1237		336	1132	498
v/s Ratio Prot	c0.11	0.16		0.06	c0.26		c0.15	c0.20		0.02	0.16	
v/s Ratio Perm				0.23						0.09		c0.27
v/c Ratio	2.12	0.82		1.22	1.36		1.17	0.56		0.29	0.50	0.85
Uniform Delay, d1	38.0	31.0		29.5	32.3		35.0	20.4		15.2	22.0	25.5
Progression Factor	1.18	0.94		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	541.5	8.1		138.8	167.3		99.8	0.6		0.5	0.3	13.4
Delay (s)	586.2	37.2		168.3	199.6		134.8	21.0		15.7	22.4	38.8
Level of Service	F	D		F	F		F	C		B	C	D
Approach Delay (s)		132.9			195.1			67.6			29.4	
Approach LOS		F			F			E			C	

Intersection Summary			
HCM 2000 Control Delay	110.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	89.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	36	1036	34	2399	41	1	18	21	2
Future Volume (vph)	36	1036	34	2399	41	1	18	21	2
Lane Group Flow (vph)	37	1074	35	2452	0	43	18	0	45
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	1	6	5	2		4			8
Permitted Phases	6		2		4	4	4	8	
Detector Phase	1	6	5	2	4	4	4	8	8
Switch Phase									
Minimum Initial (s)	5.0	15.0	5.0	15.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	15.0	41.0	15.0	25.0	41.0	41.0	41.0	41.0	41.0
Total Split (s)	8.0	51.0	8.0	51.0	21.0	21.0	21.0	21.0	21.0
Total Split (%)	10.0%	63.8%	10.0%	63.8%	26.3%	26.3%	26.3%	26.3%	26.3%
Yellow Time (s)	3.0	5.0	3.0	5.0	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	3.0	2.0	3.0	2.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)	6.0	7.0	6.0	7.0		6.5	6.5		6.5
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?									
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
v/c Ratio	0.25	0.28	0.09	0.63		0.32	0.06		0.27
Control Delay	7.6	5.6	2.0	4.9		38.7	0.4		24.1
Queue Delay	0.0	0.0	0.0	0.1		0.0	0.0		0.0
Total Delay	7.6	5.6	2.0	5.0		38.7	0.4		24.1
Queue Length 50th (ft)	4	81	2	100		20	0		11
Queue Length 95th (ft)	12	117	m3	m94		49	0		39
Internal Link Dist (ft)		679		535		265			55
Turn Bay Length (ft)	175		165						
Base Capacity (vph)	147	3889	388	3896		235	393		277
Starvation Cap Reductn	0	0	0	261		0	0		0
Spillback Cap Reductn	0	0	0	0		0	0		0
Storage Cap Reductn	0	0	0	0		0	0		0
Reduced v/c Ratio	0.25	0.28	0.09	0.67		0.18	0.05		0.16

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 57 (71%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow
Natural Cycle: 120
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Sports Ave/Aldi Drwy & Spring Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	1036	17	34	2399	4	41	1	18	21	2	22
Future Volume (vph)	36	1036	17	34	2399	4	41	1	18	21	2	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	7.0		6.0	7.0			6.5	6.5		6.5	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00		1.00	1.00			1.00	0.85		0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.98	
Satd. Flow (prot)	1770	5072		1770	5084			1772	1557		1684	
Flt Permitted	0.07	1.00		0.25	1.00			0.70	1.00		0.83	
Satd. Flow (perm)	139	5072		469	5084			1297	1557		1430	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	37	1057	17	35	2448	4	42	1	18	21	2	22
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	17	0	20	0
Lane Group Flow (vph)	37	1072	0	35	2452	0	0	43	1	0	25	0
Confl. Peds. (#/hr)	1		3			7	3		6	6		4
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4	4	4	8		
Actuated Green, G (s)	54.7	53.5		54.7	53.5			5.8	5.8		5.8	
Effective Green, g (s)	54.7	53.5		54.7	53.5			5.8	5.8		5.8	
Actuated g/C Ratio	0.68	0.67		0.68	0.67			0.07	0.07		0.07	
Clearance Time (s)	6.0	7.0		6.0	7.0			6.5	6.5		6.5	
Vehicle Extension (s)	3.0	5.0		3.0	5.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	119	3391		340	3399			94	112		103	
v/s Ratio Prot	c0.00	0.21		0.00	c0.48							
v/s Ratio Perm	0.21			0.07				c0.03	0.00		0.02	
v/c Ratio	0.31	0.32		0.10	0.72			0.46	0.01		0.24	
Uniform Delay, d1	6.9	5.6		4.1	8.5			35.6	34.4		35.0	
Progression Factor	1.00	1.00		0.59	0.57			1.00	1.00		1.00	
Incremental Delay, d2	1.5	0.2		0.0	0.1			3.5	0.0		1.2	
Delay (s)	8.4	5.8		2.4	5.0			39.1	34.5		36.2	
Level of Service	A	A		A	A			D	C		D	
Approach Delay (s)		5.9			4.9			37.7			36.2	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	6.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	19.5
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

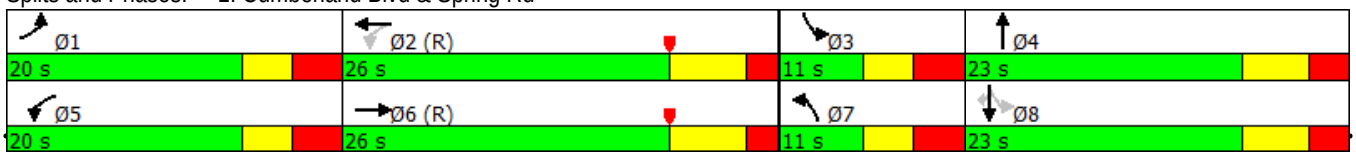
FUTURE "NO-BUILD" INTERSECTION ANALYSIS

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	280	1746	91	259	130	383	60	394	136
Future Volume (vph)	280	1746	91	259	130	383	60	394	136
Lane Group Flow (vph)	283	2347	92	274	131	626	61	398	137
Turn Type	Prot	NA	pm+pt	NA	Prot	NA	pm+pt	NA	Perm
Protected Phases	1	6	5	2	7	4	3	8	
Permitted Phases			2				8		8
Detector Phase	1	6	5	2	7	4	3	8	8
Switch Phase									
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	6.0	5.0	6.0	6.0
Minimum Split (s)	15.0	44.0	15.0	41.0	15.0	45.0	15.0	44.0	44.0
Total Split (s)	20.0	26.0	20.0	26.0	11.0	23.0	11.0	23.0	23.0
Total Split (%)	25.0%	32.5%	25.0%	32.5%	13.8%	28.8%	13.8%	28.8%	28.8%
Yellow Time (s)	3.0	4.5	3.0	4.5	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	2.0	3.0	2.0	3.0	2.5	3.0	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.5	6.0	6.5	6.0	6.5	6.0	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
v/c Ratio	0.92	1.26	0.34	0.21	0.61	0.75	0.31	0.60	0.30
Control Delay	66.9	141.6	15.3	23.4	49.8	29.1	22.1	33.5	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.9	141.6	15.3	23.4	49.8	29.1	22.1	33.5	2.6
Queue Length 50th (ft)	118	~583	23	38	33	118	20	94	0
Queue Length 95th (ft)	#279	#691	47	60	#67	#182	46	138	11
Internal Link Dist (ft)		535		1417		716		840	
Turn Bay Length (ft)	225		395				145		575
Base Capacity (vph)	309	1868	410	1328	214	844	199	729	489
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	1.26	0.22	0.21	0.61	0.74	0.31	0.55	0.28

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 7 (9%), Referenced to phase 2:WBTL and 6:EBT, Start of Yellow
Natural Cycle: 150
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Cumberland Blvd & Spring Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	280	1746	577	91	259	12	130	383	237	60	394	136
Future Volume (vph)	280	1746	577	91	259	12	130	383	237	60	394	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.5		6.0	6.5		6.0	6.5		6.0	6.5	6.5
Lane Util. Factor	1.00	0.91		1.00	0.91		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.96		1.00	0.99		1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	4878		1770	5049		3433	3320		1770	3539	1559
Flt Permitted	0.95	1.00		0.20	1.00		0.95	1.00		0.25	1.00	1.00
Satd. Flow (perm)	1770	4878		376	5049		3433	3320		460	3539	1559
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	283	1764	583	92	262	12	131	387	239	61	398	137
RTOR Reduction (vph)	0	65	0	0	6	0	0	119	0	0	0	109
Lane Group Flow (vph)	283	2282	0	92	268	0	131	507	0	61	398	28
Confl. Peds. (#/hr)	1		3	1		1	2		1			3
Turn Type	Prot	NA		pm+pt	NA		Prot	NA		pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases				2						8		8
Actuated Green, G (s)	14.0	27.3		26.3	19.8		5.0	17.2		20.2	16.2	16.2
Effective Green, g (s)	14.0	27.3		26.3	19.8		5.0	17.2		20.2	16.2	16.2
Actuated g/C Ratio	0.18	0.34		0.33	0.25		0.06	0.21		0.25	0.20	0.20
Clearance Time (s)	6.0	6.5		6.0	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	309	1664		236	1249		214	713		181	716	315
v/s Ratio Prot	c0.16	c0.47		0.03	0.05		c0.04	c0.15		0.02	0.11	
v/s Ratio Perm				0.10						0.07		0.02
v/c Ratio	0.92	1.37		0.39	0.21		0.61	0.71		0.34	0.56	0.09
Uniform Delay, d1	32.4	26.4		20.7	23.9		36.6	29.1		23.4	28.7	25.9
Progression Factor	1.16	0.75		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	24.5	170.0		1.1	0.4		5.1	3.4		1.1	0.9	0.1
Delay (s)	62.0	189.8		21.7	24.3		41.7	32.5		24.5	29.6	26.0
Level of Service	E	F		C	C		D	C		C	C	C
Approach Delay (s)		176.0			23.7			34.1			28.3	
Approach LOS		F			C			C			C	

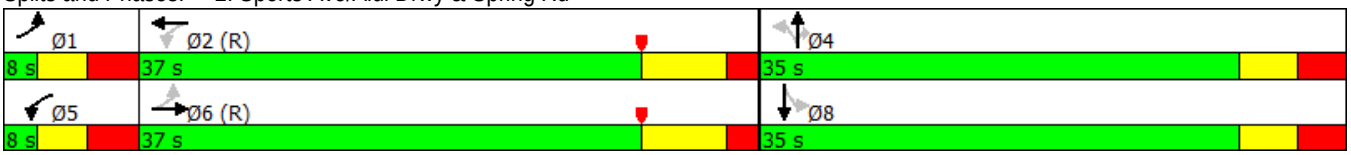
Intersection Summary			
HCM 2000 Control Delay	118.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	95.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	32	2534	35	452	16	0	20	1	1
Future Volume (vph)	32	2534	35	452	16	0	20	1	1
Lane Group Flow (vph)	33	2658	36	469	0	16	21	0	2
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	1	6	5	2		4			8
Permitted Phases	6		2		4	4	4	8	
Detector Phase	1	6	5	2	4	4	4	8	8
Switch Phase									
Minimum Initial (s)	5.0	15.0	5.0	15.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	15.0	41.0	15.0	25.0	41.0	41.0	41.0	41.0	41.0
Total Split (s)	8.0	37.0	8.0	37.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	10.0%	46.3%	10.0%	46.3%	43.8%	43.8%	43.8%	43.8%	43.8%
Yellow Time (s)	3.0	5.0	3.0	5.0	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	3.0	2.0	3.0	2.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)	6.0	7.0	6.0	7.0		6.5	6.5		6.5
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?									
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
v/c Ratio	0.05	0.67	0.25	0.12		0.11	0.08		0.02
Control Delay	2.8	8.8	12.0	4.8		35.1	0.7		33.0
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Delay	2.8	8.8	12.0	4.8		35.1	0.7		33.0
Queue Length 50th (ft)	3	311	6	34		8	0		1
Queue Length 95th (ft)	9	411	m24	50		25	0		7
Internal Link Dist (ft)		679		535		262			55
Turn Bay Length (ft)	175		165						
Base Capacity (vph)	705	3975	146	3982		601	642		552
Starvation Cap Reductn	0	0	0	0		0	0		0
Spillback Cap Reductn	0	0	0	0		0	0		0
Storage Cap Reductn	0	0	0	0		0	0		0
Reduced v/c Ratio	0.05	0.67	0.25	0.12		0.03	0.03		0.00

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 11 (14%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow
Natural Cycle: 130
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Sports Ave/Aldi Drwy & Spring Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	2534	45	35	452	3	16	0	20	1	1	0
Future Volume (vph)	32	2534	45	35	452	3	16	0	20	1	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	7.0		6.0	7.0			6.5	6.5		6.5	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00		1.00	1.00			1.00	0.85		1.00	
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.98	
Satd. Flow (prot)	1769	5071		1770	5079			1766	1557		1813	
Flt Permitted	0.47	1.00		0.07	1.00			0.91	1.00		0.83	
Satd. Flow (perm)	881	5071		136	5079			1689	1557		1549	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	33	2612	46	36	466	3	16	0	21	1	1	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	20	0	0	0
Lane Group Flow (vph)	33	2657	0	36	469	0	0	16	1	0	2	0
Confl. Peds. (#/hr)	1		3			7	3		6	6		4
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4	4	4	8		
Actuated Green, G (s)	56.1	54.9		56.1	54.9			4.4	4.4		4.4	
Effective Green, g (s)	56.1	54.9		56.1	54.9			4.4	4.4		4.4	
Actuated g/C Ratio	0.70	0.69		0.70	0.69			0.06	0.06		0.06	
Clearance Time (s)	6.0	7.0		6.0	7.0			6.5	6.5		6.5	
Vehicle Extension (s)	3.0	5.0		3.0	5.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	631	3479		119	3485			92	85		85	
v/s Ratio Prot	0.00	c0.52		c0.00	0.09							
v/s Ratio Perm	0.04			0.21				c0.01	0.00		0.00	
v/c Ratio	0.05	0.76		0.30	0.13			0.17	0.01		0.02	
Uniform Delay, d1	3.6	8.3		7.4	4.3			36.1	35.7		35.8	
Progression Factor	1.00	1.00		2.83	1.13			1.00	1.00		1.00	
Incremental Delay, d2	0.0	1.6		1.4	0.1			0.9	0.1		0.1	
Delay (s)	3.7	9.9		22.3	5.0			37.0	35.8		35.9	
Level of Service	A	A		C	A			D	D		D	
Approach Delay (s)		9.8			6.2			36.3			35.9	
Approach LOS		A			A			D			D	

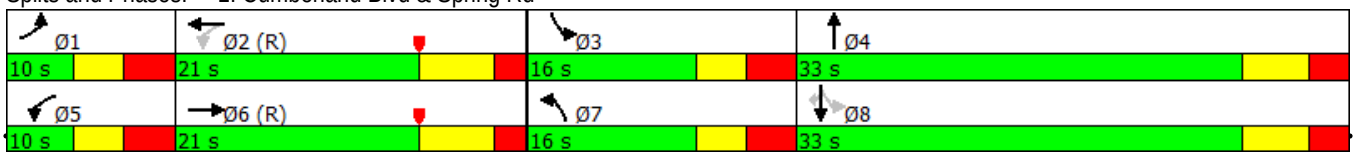
Intersection Summary			
HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	19.5
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	192	576	227	1316	518	582	102	582	586
Future Volume (vph)	192	576	227	1316	518	582	102	582	586
Lane Group Flow (vph)	198	939	234	1408	534	768	105	600	604
Turn Type	Prot	NA	pm+pt	NA	Prot	NA	pm+pt	NA	Perm
Protected Phases	1	6	5	2	7	4	3	8	
Permitted Phases			2				8		8
Detector Phase	1	6	5	2	7	4	3	8	8
Switch Phase									
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	6.0	5.0	6.0	6.0
Minimum Split (s)	15.0	44.0	15.0	41.0	15.0	45.0	15.0	44.0	44.0
Total Split (s)	10.0	21.0	10.0	21.0	16.0	33.0	16.0	33.0	33.0
Total Split (%)	12.5%	26.3%	12.5%	26.3%	20.0%	41.3%	20.0%	41.3%	41.3%
Yellow Time (s)	3.0	4.5	3.0	4.5	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	2.0	3.0	2.0	3.0	2.5	3.0	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.5	6.0	6.5	6.0	6.5	6.0	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
v/c Ratio	2.25	0.89	1.21	1.42	1.24	0.59	0.30	0.53	0.95
Control Delay	619.9	37.6	161.8	225.1	161.1	21.8	11.9	24.2	43.3
Queue Delay	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.6
Total Delay	619.9	37.6	161.8	225.1	162.0	21.8	11.9	24.2	43.9
Queue Length 50th (ft)	~171	79	~119	~370	~173	152	24	125	197
Queue Length 95th (ft)	#304	#179	#266	#462	#269	221	48	174	#410
Internal Link Dist (ft)		535		1417		716		840	
Turn Bay Length (ft)	225		395				145		575
Base Capacity (vph)	88	1060	193	989	429	1303	400	1172	657
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	40	0	0	0	5
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	2.25	0.89	1.21	1.42	1.37	0.59	0.26	0.51	0.93

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 26 (33%), Referenced to phase 2:WBTL and 6:EBT, Start of Yellow
Natural Cycle: 130
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Cumberland Blvd & Spring Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	192	576	335	227	1316	49	518	582	163	102	582	586
Future Volume (vph)	192	576	335	227	1316	49	518	582	163	102	582	586
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.5		6.0	6.5		6.0	6.5		6.0	6.5	6.5
Lane Util. Factor	1.00	0.91		1.00	0.91		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.99		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	4779		1770	5055		3433	3413		1770	3539	1559
Flt Permitted	0.95	1.00		0.28	1.00		0.95	1.00		0.30	1.00	1.00
Satd. Flow (perm)	1770	4779		521	5055		3433	3413		551	3539	1559
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	198	594	345	234	1357	51	534	600	168	105	600	604
RTOR Reduction (vph)	0	132	0	0	5	0	0	30	0	0	0	141
Lane Group Flow (vph)	198	807	0	234	1403	0	534	738	0	105	600	463
Confl. Peds. (#/hr)	1		3	1		1	2		1			3
Turn Type	Prot	NA		pm+pt	NA		Prot	NA		pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases				2						8		8
Actuated Green, G (s)	4.0	14.3		18.3	14.3		10.0	29.9		33.5	26.7	26.7
Effective Green, g (s)	4.0	14.3		18.3	14.3		10.0	29.9		33.5	26.7	26.7
Actuated g/C Ratio	0.05	0.18		0.23	0.18		0.12	0.37		0.42	0.33	0.33
Clearance Time (s)	6.0	6.5		6.0	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	88	854		181	903		429	1275		334	1181	520
v/s Ratio Prot	c0.11	0.17		0.06	c0.28		c0.16	c0.22		0.03	0.17	
v/s Ratio Perm				0.23						0.10		c0.30
v/c Ratio	2.25	0.94		1.29	1.55		1.24	0.58		0.31	0.51	0.89
Uniform Delay, d1	38.0	32.5		30.7	32.9		35.0	20.0		14.5	21.4	25.3
Progression Factor	1.17	0.98		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	596.3	19.6		166.5	254.7		128.4	0.6		0.5	0.3	17.3
Delay (s)	640.6	51.3		197.2	287.5		163.4	20.7		15.1	21.7	42.5
Level of Service	F	D		F	F		F	C		B	C	D
Approach Delay (s)		153.9			274.7			79.2			30.8	
Approach LOS		F			F			E			C	

Intersection Summary			
HCM 2000 Control Delay	142.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	93.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	38	1099	36	2545	43	1	19	22	2
Future Volume (vph)	38	1099	36	2545	43	1	19	22	2
Lane Group Flow (vph)	39	1139	37	2601	0	45	19	0	47
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	1	6	5	2		4			8
Permitted Phases	6		2		4	4	4	8	
Detector Phase	1	6	5	2	4	4	4	8	8
Switch Phase									
Minimum Initial (s)	5.0	15.0	5.0	15.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	15.0	41.0	15.0	25.0	41.0	41.0	41.0	41.0	41.0
Total Split (s)	8.0	51.0	8.0	51.0	21.0	21.0	21.0	21.0	21.0
Total Split (%)	10.0%	63.8%	10.0%	63.8%	26.3%	26.3%	26.3%	26.3%	26.3%
Yellow Time (s)	3.0	5.0	3.0	5.0	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	3.0	2.0	3.0	2.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)	6.0	7.0	6.0	7.0		6.5	6.5		6.5
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?									
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
v/c Ratio	0.27	0.29	0.10	0.67		0.33	0.07		0.28
Control Delay	8.0	5.8	2.0	5.7		38.8	0.5		23.9
Queue Delay	0.0	0.0	0.0	0.1		0.0	0.0		0.0
Total Delay	8.0	5.8	2.0	5.8		38.8	0.5		23.9
Queue Length 50th (ft)	4	88	2	108		21	0		11
Queue Length 95th (ft)	13	128	m3	m93		50	0		41
Internal Link Dist (ft)		679		535		265			55
Turn Bay Length (ft)	175		165						
Base Capacity (vph)	146	3881	361	3888		234	393		277
Starvation Cap Reductn	0	0	0	254		0	0		0
Spillback Cap Reductn	0	0	0	0		0	0		0
Storage Cap Reductn	0	0	0	0		0	0		0
Reduced v/c Ratio	0.27	0.29	0.10	0.72		0.19	0.05		0.17

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 57 (71%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow
Natural Cycle: 120
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Sports Ave/Aldi Drwy & Spring Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	1099	18	36	2545	4	43	1	19	22	2	23
Future Volume (vph)	38	1099	18	36	2545	4	43	1	19	22	2	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	7.0		6.0	7.0			6.5	6.5		6.5	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00		1.00	1.00			1.00	0.85		0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.98	
Satd. Flow (prot)	1770	5072		1770	5084			1772	1557		1684	
Flt Permitted	0.07	1.00		0.23	1.00			0.70	1.00		0.83	
Satd. Flow (perm)	140	5072		434	5084			1294	1557		1427	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	39	1121	18	37	2597	4	44	1	19	22	2	23
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	18	0	21	0
Lane Group Flow (vph)	39	1137	0	37	2601	0	0	45	1	0	26	0
Confl. Peds. (#/hr)	1		3			7	3		6	6		4
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4	4	4	8		
Actuated Green, G (s)	54.6	53.4		54.6	53.4			5.9	5.9		5.9	
Effective Green, g (s)	54.6	53.4		54.6	53.4			5.9	5.9		5.9	
Actuated g/C Ratio	0.68	0.67		0.68	0.67			0.07	0.07		0.07	
Clearance Time (s)	6.0	7.0		6.0	7.0			6.5	6.5		6.5	
Vehicle Extension (s)	3.0	5.0		3.0	5.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	120	3385		316	3393			95	114		105	
v/s Ratio Prot	c0.00	0.22		0.00	c0.51							
v/s Ratio Perm	0.22			0.08				c0.03	0.00		0.02	
v/c Ratio	0.33	0.34		0.12	0.77			0.47	0.01		0.24	
Uniform Delay, d1	8.0	5.7		4.1	9.1			35.6	34.3		34.9	
Progression Factor	1.00	1.00		0.58	0.60			1.00	1.00		1.00	
Incremental Delay, d2	1.6	0.3		0.0	0.2			3.7	0.0		1.2	
Delay (s)	9.6	6.0		2.4	5.6			39.3	34.4		36.2	
Level of Service	A	A		A	A			D	C		D	
Approach Delay (s)		6.1			5.5			37.8			36.2	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	6.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	19.5
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

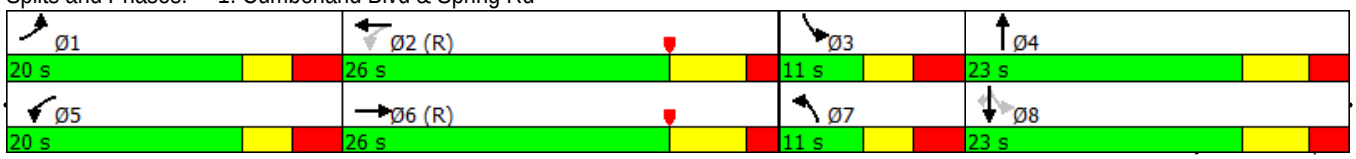
FUTURE "BUILD" INTERSECTION ANALYSIS

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	283	1760	91	264	131	383	60	394	137
Future Volume (vph)	283	1760	91	264	131	383	60	394	137
Lane Group Flow (vph)	286	2364	92	279	132	626	61	398	138
Turn Type	Prot	NA	pm+pt	NA	Prot	NA	pm+pt	NA	Perm
Protected Phases	1	6	5	2	7	4	3	8	
Permitted Phases			2				8		8
Detector Phase	1	6	5	2	7	4	3	8	8
Switch Phase									
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	6.0	5.0	6.0	6.0
Minimum Split (s)	15.0	44.0	15.0	41.0	15.0	45.0	15.0	44.0	44.0
Total Split (s)	20.0	26.0	20.0	26.0	11.0	23.0	11.0	23.0	23.0
Total Split (%)	25.0%	32.5%	25.0%	32.5%	13.8%	28.8%	13.8%	28.8%	28.8%
Yellow Time (s)	3.0	4.5	3.0	4.5	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	2.0	3.0	2.0	3.0	2.5	3.0	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.5	6.0	6.5	6.0	6.5	6.0	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
v/c Ratio	0.93	1.27	0.34	0.21	0.62	0.75	0.31	0.60	0.30
Control Delay	68.9	145.8	15.3	23.5	50.1	29.1	22.1	33.5	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.9	145.8	15.3	23.5	50.1	29.1	22.1	33.5	2.7
Queue Length 50th (ft)	121	~590	23	39	34	118	20	94	0
Queue Length 95th (ft)	m#280	#697	47	61	#68	#182	46	138	12
Internal Link Dist (ft)		535		1417		716		840	
Turn Bay Length (ft)	225		395				145		575
Base Capacity (vph)	309	1868	410	1329	214	844	199	729	489
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	1.27	0.22	0.21	0.62	0.74	0.31	0.55	0.28

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 7 (9%), Referenced to phase 2:WBTL and 6:EBT, Start of Yellow
Natural Cycle: 150
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Cumberland Blvd & Spring Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	283	1760	580	91	264	12	131	383	237	60	394	137
Future Volume (vph)	283	1760	580	91	264	12	131	383	237	60	394	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.5		6.0	6.5		6.0	6.5		6.0	6.5	6.5
Lane Util. Factor	1.00	0.91		1.00	0.91		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.96		1.00	0.99		1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	4878		1770	5050		3433	3320		1770	3539	1559
Flt Permitted	0.95	1.00		0.20	1.00		0.95	1.00		0.25	1.00	1.00
Satd. Flow (perm)	1770	4878		376	5050		3433	3320		460	3539	1559
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	286	1778	586	92	267	12	132	387	239	61	398	138
RTOR Reduction (vph)	0	65	0	0	6	0	0	119	0	0	0	110
Lane Group Flow (vph)	286	2299	0	92	273	0	132	507	0	61	398	28
Confl. Peds. (#/hr)	1		3	1		1	2		1			3
Turn Type	Prot	NA		pm+pt	NA		Prot	NA		pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases				2						8		8
Actuated Green, G (s)	14.0	27.3		26.3	19.8		5.0	17.2		20.2	16.2	16.2
Effective Green, g (s)	14.0	27.3		26.3	19.8		5.0	17.2		20.2	16.2	16.2
Actuated g/C Ratio	0.18	0.34		0.33	0.25		0.06	0.21		0.25	0.20	0.20
Clearance Time (s)	6.0	6.5		6.0	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	309	1664		236	1249		214	713		181	716	315
v/s Ratio Prot	c0.16	c0.47		0.03	0.05		c0.04	c0.15		0.02	0.11	
v/s Ratio Perm				0.10						0.07		0.02
v/c Ratio	0.93	1.38		0.39	0.22		0.62	0.71		0.34	0.56	0.09
Uniform Delay, d1	32.5	26.4		20.7	23.9		36.6	29.1		23.4	28.7	25.9
Progression Factor	1.17	0.75		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	26.2	174.7		1.1	0.4		5.2	3.4		1.1	0.9	0.1
Delay (s)	64.2	194.5		21.7	24.3		41.8	32.5		24.5	29.6	26.0
Level of Service	E	F		C	C		D	C		C	C	C
Approach Delay (s)		180.4			23.7			34.1			28.3	
Approach LOS		F			C			C			C	

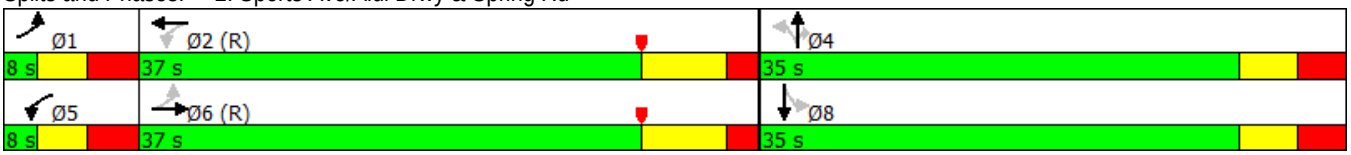
Intersection Summary			
HCM 2000 Control Delay	121.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	95.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	32	2534	42	452	24	0	39	1	1
Future Volume (vph)	32	2534	42	452	24	0	39	1	1
Lane Group Flow (vph)	33	2661	43	469	0	25	40	0	2
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	1	6	5	2		4			8
Permitted Phases	6		2		4	4	4	8	
Detector Phase	1	6	5	2	4	4	4	8	8
Switch Phase									
Minimum Initial (s)	5.0	15.0	5.0	15.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	15.0	41.0	15.0	25.0	41.0	41.0	41.0	41.0	41.0
Total Split (s)	8.0	37.0	8.0	37.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	10.0%	46.3%	10.0%	46.3%	43.8%	43.8%	43.8%	43.8%	43.8%
Yellow Time (s)	3.0	5.0	3.0	5.0	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	3.0	2.0	3.0	2.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)	6.0	7.0	6.0	7.0		6.5	6.5		6.5
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?									
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
v/c Ratio	0.05	0.67	0.30	0.12		0.18	0.15		0.01
Control Delay	3.0	9.2	15.2	5.0		36.0	1.2		32.0
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Delay	3.0	9.2	15.2	5.0		36.0	1.2		32.0
Queue Length 50th (ft)	3	319	8	34		12	0		1
Queue Length 95th (ft)	10	429	m30	50		34	0		7
Internal Link Dist (ft)		679		535		271			55
Turn Bay Length (ft)	175		165						
Base Capacity (vph)	700	3947	145	3954		551	642		548
Starvation Cap Reductn	0	0	0	0		0	0		0
Spillback Cap Reductn	0	0	0	0		0	0		0
Storage Cap Reductn	0	0	0	0		0	0		0
Reduced v/c Ratio	0.05	0.67	0.30	0.12		0.05	0.06		0.00

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 11 (14%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow
Natural Cycle: 130
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Sports Ave/Aldi Drwy & Spring Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	2534	48	42	452	3	24	0	39	1	1	0
Future Volume (vph)	32	2534	48	42	452	3	24	0	39	1	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	7.0		6.0	7.0			6.5	6.5		6.5	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00		1.00	1.00			1.00	0.85		1.00	
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.98	
Satd. Flow (prot)	1769	5070		1770	5079			1766	1557		1813	
Flt Permitted	0.47	1.00		0.07	1.00			0.83	1.00		0.83	
Satd. Flow (perm)	881	5070		137	5079			1549	1557		1541	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	33	2612	49	43	466	3	25	0	40	1	1	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	38	0	0	0
Lane Group Flow (vph)	33	2660	0	43	469	0	0	25	2	0	2	0
Confl. Peds. (#/hr)	1		3			7	3		6	6		4
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4	4	4	8		
Actuated Green, G (s)	55.7	54.5		55.7	54.5			4.8	4.8		4.8	
Effective Green, g (s)	55.7	54.5		55.7	54.5			4.8	4.8		4.8	
Actuated g/C Ratio	0.70	0.68		0.70	0.68			0.06	0.06		0.06	
Clearance Time (s)	6.0	7.0		6.0	7.0			6.5	6.5		6.5	
Vehicle Extension (s)	3.0	5.0		3.0	5.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	626	3453		119	3460			92	93		92	
v/s Ratio Prot	0.00	c0.52		c0.01	0.09							
v/s Ratio Perm	0.04			0.24				c0.02	0.00		0.00	
v/c Ratio	0.05	0.77		0.36	0.14			0.27	0.03		0.02	
Uniform Delay, d1	3.8	8.6		7.9	4.5			35.9	35.4		35.4	
Progression Factor	1.00	1.00		3.25	1.12			1.00	1.00		1.00	
Incremental Delay, d2	0.0	1.7		1.8	0.1			1.6	0.1		0.1	
Delay (s)	3.8	10.3		27.4	5.1			37.5	35.5		35.5	
Level of Service	A	B		C	A			D	D		D	
Approach Delay (s)		10.2			7.0			36.3			35.5	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	10.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	19.5
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	36	0	0	27	10	81
Future Vol, veh/h	36	0	0	27	10	81
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	39	0	0	29	11	88

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	40	11	99	0	-	0
Stage 1	11	-	-	-	-	-
Stage 2	29	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	972	1070	1494	-	-	-
Stage 1	1012	-	-	-	-	-
Stage 2	994	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	972	1070	1494	-	-	-
Mov Cap-2 Maneuver	972	-	-	-	-	-
Stage 1	1012	-	-	-	-	-
Stage 2	994	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.9	0	0
HCM LOS	A		

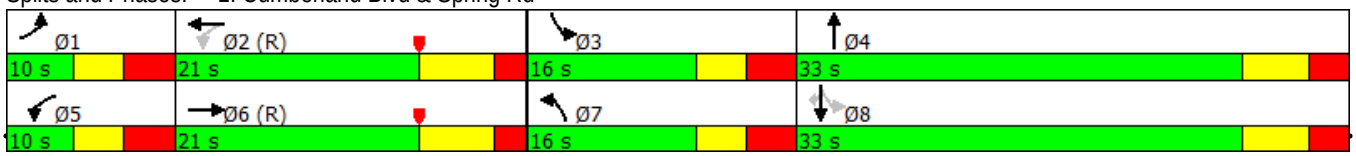
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1494	-	972	-	-
HCM Lane V/C Ratio	-	-	0.04	-	-
HCM Control Delay (s)	0	-	8.9	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	194	586	227	1331	521	582	102	582	589
Future Volume (vph)	194	586	227	1331	521	582	102	582	589
Lane Group Flow (vph)	200	951	234	1423	537	768	105	600	607
Turn Type	Prot	NA	pm+pt	NA	Prot	NA	pm+pt	NA	Perm
Protected Phases	1	6	5	2	7	4	3	8	
Permitted Phases			2				8		8
Detector Phase	1	6	5	2	7	4	3	8	8
Switch Phase									
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	6.0	5.0	6.0	6.0
Minimum Split (s)	15.0	44.0	15.0	41.0	15.0	45.0	15.0	44.0	44.0
Total Split (s)	10.0	21.0	10.0	21.0	16.0	33.0	16.0	33.0	33.0
Total Split (%)	12.5%	26.3%	12.5%	26.3%	20.0%	41.3%	20.0%	41.3%	41.3%
Yellow Time (s)	3.0	4.5	3.0	4.5	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	2.0	3.0	2.0	3.0	2.5	3.0	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.5	6.0	6.5	6.0	6.5	6.0	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
v/c Ratio	2.27	0.90	1.22	1.45	1.25	0.59	0.30	0.53	0.95
Control Delay	630.1	39.4	163.3	234.7	163.8	21.7	11.9	24.1	43.8
Queue Delay	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.6
Total Delay	630.1	39.4	163.3	234.7	164.8	21.7	11.9	24.1	44.5
Queue Length 50th (ft)	~173	80	~119	~376	~175	152	24	125	200
Queue Length 95th (ft)	#305	#190	#266	#468	#272	221	48	174	#414
Internal Link Dist (ft)		535		1417		716		840	
Turn Bay Length (ft)	225		395				145		575
Base Capacity (vph)	88	1054	192	984	429	1307	400	1172	657
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	40	0	0	0	5
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	2.27	0.90	1.22	1.45	1.38	0.59	0.26	0.51	0.93

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 26 (33%), Referenced to phase 2:WBTL and 6:EBT, Start of Yellow
Natural Cycle: 140
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Cumberland Blvd & Spring Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	194	586	337	227	1331	49	521	582	163	102	582	589
Future Volume (vph)	194	586	337	227	1331	49	521	582	163	102	582	589
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.5		6.0	6.5		6.0	6.5		6.0	6.5	6.5
Lane Util. Factor	1.00	0.91		1.00	0.91		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.95		1.00	0.99		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	4781		1770	5056		3433	3413		1770	3539	1559
Flt Permitted	0.95	1.00		0.28	1.00		0.95	1.00		0.30	1.00	1.00
Satd. Flow (perm)	1770	4781		521	5056		3433	3413		551	3539	1559
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	200	604	347	234	1372	51	537	600	168	105	600	607
RTOR Reduction (vph)	0	131	0	0	5	0	0	30	0	0	0	141
Lane Group Flow (vph)	200	820	0	234	1418	0	537	738	0	105	600	466
Confl. Peds. (#/hr)	1		3	1		1	2		1			3
Turn Type	Prot	NA		pm+pt	NA		Prot	NA		pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases				2						8		8
Actuated Green, G (s)	4.0	14.3		18.3	14.3		10.0	29.9		33.5	26.7	26.7
Effective Green, g (s)	4.0	14.3		18.3	14.3		10.0	29.9		33.5	26.7	26.7
Actuated g/C Ratio	0.05	0.18		0.23	0.18		0.12	0.37		0.42	0.33	0.33
Clearance Time (s)	6.0	6.5		6.0	6.5		6.0	6.5		6.0	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	88	854		181	903		429	1275		334	1181	520
v/s Ratio Prot	c0.11	0.17		0.06	c0.28		c0.16	c0.22		0.03	0.17	
v/s Ratio Perm				0.23						0.10		c0.30
v/c Ratio	2.27	0.96		1.29	1.57		1.25	0.58		0.31	0.51	0.90
Uniform Delay, d1	38.0	32.6		30.7	32.9		35.0	20.0		14.5	21.4	25.3
Progression Factor	1.24	0.98		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	606.1	22.1		166.5	262.1		131.3	0.6		0.5	0.3	17.9
Delay (s)	653.4	54.1		197.3	294.9		166.3	20.7		15.1	21.7	43.3
Level of Service	F	D		F	F		F	C		B	C	D
Approach Delay (s)		158.2			281.1			80.6			31.2	
Approach LOS		F			F			F			C	

Intersection Summary			
HCM 2000 Control Delay	146.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	94.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	38	1099	56	2545	49	1	32	22	2
Future Volume (vph)	38	1099	56	2545	49	1	32	22	2
Lane Group Flow (vph)	39	1149	57	2601	0	51	33	0	47
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	1	6	5	2		4			8
Permitted Phases	6		2		4	4	4	8	
Detector Phase	1	6	5	2	4	4	4	8	8
Switch Phase									
Minimum Initial (s)	5.0	15.0	5.0	15.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	15.0	41.0	15.0	25.0	41.0	41.0	41.0	41.0	41.0
Total Split (s)	8.0	51.0	8.0	51.0	21.0	21.0	21.0	21.0	21.0
Total Split (%)	10.0%	63.8%	10.0%	63.8%	26.3%	26.3%	26.3%	26.3%	26.3%
Yellow Time (s)	3.0	5.0	3.0	5.0	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	3.0	2.0	3.0	2.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)	6.0	7.0	6.0	7.0		6.5	6.5		6.5
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?									
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
v/c Ratio	0.27	0.32	0.17	0.72		0.36	0.11		0.27
Control Delay	8.6	6.6	2.2	6.4		39.2	0.8		23.2
Queue Delay	0.0	0.0	0.0	0.2		0.0	0.0		0.0
Total Delay	8.6	6.6	2.2	6.6		39.2	0.8		23.2
Queue Length 50th (ft)	4	90	4	108		24	0		11
Queue Length 95th (ft)	13	131	m4	m92		55	0		40
Internal Link Dist (ft)		679		535		272			55
Turn Bay Length (ft)	175		165						
Base Capacity (vph)	143	3596	338	3610		234	393		276
Starvation Cap Reductn	0	0	0	239		0	0		0
Spillback Cap Reductn	0	0	0	0		0	0		0
Storage Cap Reductn	0	0	0	0		0	0		0
Reduced v/c Ratio	0.27	0.32	0.17	0.77		0.22	0.08		0.17

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 57 (71%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow
Natural Cycle: 120
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Sports Ave/Aldi Drwy & Spring Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	1099	27	56	2545	4	49	1	32	22	2	23
Future Volume (vph)	38	1099	27	56	2545	4	49	1	32	22	2	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	7.0		6.0	7.0			6.5	6.5		6.5	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00		1.00	1.00			1.00	0.85		0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.98	
Satd. Flow (prot)	1770	5065		1770	5084			1772	1557		1684	
Flt Permitted	0.08	1.00		0.23	1.00			0.70	1.00		0.83	
Satd. Flow (perm)	144	5065		424	5084			1293	1557		1422	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	39	1121	28	57	2597	4	50	1	33	22	2	23
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	30	0	21	0
Lane Group Flow (vph)	39	1147	0	57	2601	0	0	51	3	0	26	0
Confl. Peds. (#/hr)	1		3			7	3		6	6		4
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4	4	4	8		
Actuated Green, G (s)	52.9	51.7		52.9	51.7			7.6	7.6		7.6	
Effective Green, g (s)	52.9	51.7		52.9	51.7			7.6	7.6		7.6	
Actuated g/C Ratio	0.66	0.65		0.66	0.65			0.09	0.09		0.09	
Clearance Time (s)	6.0	7.0		6.0	7.0			6.5	6.5		6.5	
Vehicle Extension (s)	3.0	5.0		3.0	5.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	119	3273		300	3285			122	147		135	
v/s Ratio Prot	c0.00	0.23		0.00	c0.51							
v/s Ratio Perm	0.21			0.12				c0.04	0.00		0.02	
v/c Ratio	0.33	0.35		0.19	0.79			0.42	0.02		0.19	
Uniform Delay, d1	9.2	6.5		4.8	10.3			34.1	32.8		33.4	
Progression Factor	1.00	1.00		0.57	0.58			1.00	1.00		1.00	
Incremental Delay, d2	1.6	0.3		0.0	0.2			2.3	0.1		0.7	
Delay (s)	10.8	6.8		2.7	6.2			36.4	32.9		34.1	
Level of Service	B	A		A	A			D	C		C	
Approach Delay (s)		6.9			6.1			35.0			34.1	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	7.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	19.5
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	64	0	0	19	29	56
Future Vol, veh/h	64	0	0	19	29	56
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	70	0	0	21	32	61

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	53	32	93	0	-	0
Stage 1	32	-	-	-	-	-
Stage 2	21	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	955	1042	1501	-	-	-
Stage 1	991	-	-	-	-	-
Stage 2	1002	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	955	1042	1501	-	-	-
Mov Cap-2 Maneuver	955	-	-	-	-	-
Stage 1	991	-	-	-	-	-
Stage 2	1002	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.1	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1501	-	955	-	-
HCM Lane V/C Ratio	-	-	0.073	-	-
HCM Control Delay (s)	0	-	9.1	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

TRAFFIC VOLUME WORKSHEETS

19-025 - Residential Development on Sports Avenue in Smyrna GA

Traffic Volumes

A&R Engineering
March 2019

1. Spring Rd @ Cumberland Blvd

A.M. Peak Hour

	Cumberland Boulevard **Northbound**					Cumberland Boulevard **Southbound**					Spring Road **Eastbound**					Spring Road **Westbound**			
Condition	L	T	R	Tot		L	T	R	Tot		L	T	R	Tot		L	T	R	Tot
Existing 2019 Volumes:	123	361	223	707		57	371	128	556		264	1646	544	2454		86	244	11	341
Growth Factor (%):	3	3	3			3	3	3			3	3	3			3	3	3	
No-Build 2021 Volumes:	130	383	237	750		60	394	136	590		280	1746	577	2603		91	259	12	362
Total New Trips:	1	0	0	1		0	0	1	1		3	14	3	20		0	5	0	5
Future 2021 Traffic Volumes:	131	383	237	751		60	394	137	591		283	1760	580	2623		91	264	12	367

P.M. Peak Hour

	Cumberland Boulevard **Northbound**					Cumberland Boulevard **Southbound**					Spring Road **Eastbound**					Spring Road **Westbound**			
Condition	L	T	R	Tot		L	T	R	Tot		L	T	R	Tot		L	T	R	Tot
Existing 2019 Volumes:	488	549	154	1191		96	549	552	1197		181	543	316	1040		214	1240	46	1500
Growth Factor (%):	3	3	3			3	3	3			3	3	3			3	3	3	
No-Build 2021 Volumes:	518	582	163	1263		102	582	586	1270		192	576	335	1103		227	1316	49	1592
Total New Trips:	3	0	0	3		0	0	3	3		2	10	2	14		0	15	0	15
Future 2021 Traffic Volumes:	521	582	163	1266		102	582	589	1273		194	586	337	1117		227	1331	49	1607

19-025 - Residential Development on Sports Avenue in Smyrna GA

Traffic Volumes

A&R Engineering
March 2019

2. Spring Rd @ Sports Ave

A.M. Peak Hour

	Sports Avenue **Northbound**					Aldi Driveway **Southbound**					Spring Road **Eastbound**					Spring Road **Westbound**			
Condition	L	T	R	Tot		L	T	R	Tot		L	T	R	Tot		L	T	R	Tot
Existing 2019 Volumes:	15	0	19	34		1	1	0	2		30	2389	42	2461		33	426	3	462
Growth Factor (%):	3	3	3			3	3	3			3	3	3			3	3	3	
No-Build 2021 Volumes:	16	0	20	36		1	1	0	2		32	2534	45	2611		35	452	3	490
Total New Trips:	8	0	19	27		0	0	0	0		0	0	3	3		7	0	0	7
Future 2021 Traffic Volumes:	24	0	39	63		1	1	0	2		32	2534	48	2614		42	452	3	497

P.M. Peak Hour

	Sports Avenue **Northbound**					Aldi Driveway **Southbound**					Spring Road **Eastbound**					Spring Road **Westbound**			
Condition	L	T	R	Tot		L	T	R	Tot		L	T	R	Tot		L	T	R	Tot
Existing 2019 Volumes:	41	1	18	60		21	2	22	45		36	1036	17	1089		34	2399	4	2437
Growth Factor (%):	3	3	3			3	3	3			3	3	3			3	3	3	
No-Build 2021 Volumes:	43	1	19	63		22	2	23	47		38	1099	18	1155		36	2545	4	2585
Total New Trips:	6	0	13	19		0	0	0	0		0	0	9	9		20	0	0	20
Future 2021 Traffic Volumes:	49	1	32	82		22	2	23	47		38	1099	27	1164		56	2545	4	2605