RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

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July 11, 2018

Mr. Travis Bridewell
City of Richmond Public Works
900 East Broad Street
Richmond, Virginia 23219
Phone: (804) 646-5745

Reference: Semmes Avenue Mixed-Use – Traffic Impact Analysis (TIA)

Dear Mr. Bridewell,

Ramey Kemp & Associates, Inc. (RKA) has performed a Traffic Impact Analysis (TIA) for the proposed redevelopment of the property southwest of the U.S. 60 (Semmes Avenue) at Cowardin Avenue intersection in Richmond, Virginia. The conceptual site plan includes replacing the vacant warehouse buildings with 120 townhomes, 170 apartments, and 20,000 square feet (s.f.) of retail space.

The access plan includes retaining the existing full-movement driveway on Semmes Avenue across from W. 21st Street, and the right-in / right-out driveway on Semmes Avenue across from W. 20th Street. Figure 1 shows the site location and study intersections and Figure 2 shows the conceptual site plan.

Based on the scooping meeting with the City on May 22, the purpose of this letter report is to provide the following:

- Trip generation calculations
- Evaluation of turn lane warrants for the study intersections
- Capacity and queueing analysis of the study intersections

Existing Roadway Conditions

Cowardin Avenue is a six-lane divided Principal Arterial with a 2018 average daily traffic (ADT) volume of approximately 28,900 vehicles per day (vpd), and a posted speed limit of 35 miles per hour (mph).

U.S. 60 (Semmes Avenue) is a four-lane divided Principal Arterial with a 2018 ADT volume of approximately 22,500 vpd, and a posted speed limit of 35 mph in the vicinity of the site.

Figure 3 shows existing lane configuration.

Existing Traffic Volumes
The AM peak hour (7:00 to 9:00 AM) and PM peak hour (4:00 to 6:00 PM) turning movement counts were conducted during the week of September 25th 2017 by Quality Counts at the following intersection:

- Cowardin Avenue at U.S. 60 (Semmes Avenue)

The AM peak hour (7:00 to 9:00 AM) and PM peak hour (4:00 to 6:00 PM) turning movement counts were conducted during the week of May 28th by Burns Service, Inc. at the following intersection:

- Semmes Avenue at W. 21st Street

The traffic count data are enclosed, and the existing 2018 peak hour volumes are shown in Figure 4. Note that some volumes were increased and balanced between the study intersections.

Background Traffic Growth
The 2018 peak hour traffic volumes were grown by an annual rate of 1.0% for two years to estimate the 2020 peak hour traffic volumes. Figure 5 shows the estimated 2020 no-build peak hour traffic volumes.

Trip Generation
The trip generation potential of the proposed mixed-use development during a typical weekday, AM peak hour, and PM peak hour was estimated using the methodologies published by the Institute of Transportation Engineers (ITE) *Trip Generation Manual – 10th Edition*. Table 1 summarizes the trip generation calculations.

Table 1
ITE Trip Generation – Weekday – 10th Edition

Land Use (ITE Land Use Code)	Size	Average Daily Traffic (vpd)		AM Peak Hour (vph)		PM Peak Hour (vph)	
		Enter	Exit	Enter	Exit	Enter	Exit
Multifamily Housing (Low-Rise) (220)	120 units	439	439	13	44	43	26
Multifamily Housing (Mid-Rise) (221)	170 units	463	463	16	45	46	29
General Retail (820)	20,000 s.f.	378	378	12	7	36	40
Driveway Volumes		1,280	1,280	41	96	125	95
General Retail Pass-By Trips – 34%		-128	-128	-3	-3	-13	-13
Net New External Trips		**1,152**	**1,152**	**38**	**93**	**112**	**82**

Retail stores attract pass-by trips, which are made by drivers who are already driving by the site today and will visit the store in the future because it is convenient.

Approved Development Traffic and Bike Path Widening
Based on discussion with the City, there are no approved developments in the vicinity of the site that will generate a significant amount of traffic.

Additionally, the City is planning to restripe Semmes Avenue, along the property frontage, to create bike lanes in both directions. The bike lanes will improve bicycle access to the site, but to be conservative, we assumed none of the site trips will be bicycle or pedestrian trips. However, the future bike lanes will need to be considered with the design of off-site roadway improvements.

Site Traffic Distribution
The following site traffic distribution was applied based on a review of the existing traffic volumes, the adjacent roadway network, and engineering judgement:

- 40% to / from the east on Semmes Avenue
- 35% to / from the north on Cowardin Avenue
- 20% to / from the west on Semmes Avenue
- 5% to / from the south on Cowardin Avenue

It was assumed that 100% of the total pass-by trips will originate from Semmes Avenue with the following directional distribution:

- AM Peak – 70% eastbound / 30% westbound
- PM Peak – 30% eastbound / 70% westbound

Figures 6 and 7 show the primary and pass-by site traffic distributions, respectively. Figure 8 shows the primary site trip assignment, and Figure 9 shows the pass-by site trip assignment. Figure 10 shows the total site trips, and Figure 11 shows the build 2020 peak hour traffic volumes**.**

VDOT Turn Lane Warrant Analysis
The projected build-out AM and PM peak hour traffic volumes at the proposed site driveways were compared to the turn lane warrants in the Virginia Department of Transportation (VDOT) *Access Management Design Standards for Entrances and Intersections*.

- A westbound left-turn lane on Semmes Avenue at Full-Movement Driveway is warranted
- An eastbound right-turn taper on Semmes Avenue at Full-Movement Driveway is warranted
- An eastbound right-turn lane or taper on Semmes Avenue at Right-in / Right-out Driveway is not warranted

The VDOT turn lane warrant diagrams are enclosed for reference. Figure 12 shows the recommended roadway laneage at the proposed driveways.

Intersection Spacing Standards

VDOT requires at least 305 feet of separation between partial access driveways and intersections on Principal Arterial roadways posted 35 mph. The proposed right-in / right-out driveway on Semmes Avenue is approximately 655 feet west of Cowardin Avenue and approximately 305 feet east of the prosed full-movement site driveway.

VDOT requires at least 565 feet of separation between full access driveways and intersections on Principal Arterial roadways posted 35 mph. The proposed full-movement driveway on Semmes Avenue is approximately 1,010 feet east of W. 24th Street. Both proposed driveways meet VDOT's minimum intersection spacing standards.

Traffic Capacity Analysis

Traffic capacity analysis for the study intersections was performed using Synchro 10, which is a comprehensive software package that allows the user to model signalized and unsignalized intersections to determine levels-of-service based on the thresholds specified in the 2010 Highway Capacity Manual (HCM).

Table 2 summarizes the capacity analysis results for the signalized intersection of Cowardin Avenue at Semmes Avenue, and the Synchro outputs are enclosed for reference.

Table 2
Level-of-Service Summary for Cowardin Avenue at Semmes Avenue

CONDITION	LANE GROUP	AM PEAK HOUR				PM PEAK HOUR			
		Lane LOS	Lane Delay (sec)	Queue (ft)	Overall LOS (Delay)	Lane LOS	Lane Delay (sec)	Queue (ft)	Overall LOS (Delay)
Existing (2018) Traffic Conditions	EBL	D	49.0	291	C (34.2 sec)	E	59.9	202	D (36.6 sec)
	EBT	D	44.6	384		D	46.2	198	
	EBR	A	0.4	0		A	0.6	0	
	WBL	D	53.1	84		E	57.4	266	
	WBT	D	53.1	136		D	52.0	368	
	WBR	A	0.7	0		A	0.7	0	
	NBL	D	54.7	146		E	65.3	260	
	NBT	C	31.0	297		C	29.7	205	
	NBR	A	4.6	53		A	0.4	0	
	SBL	E	61.5	202		E	61.9	123	
	SBT	C	25.8	147		D	41.1	286	
	SBR	A	0.3	0		A	1.1	0	
No-Build (2020) Traffic Conditions	EBL	D	49.6	298	C (34.6 sec)	E	60.6	206	D (37.0 sec)
	EBT	D	45.3	397		D	46.5	203	
	EBR	A	0.4	0		A	0.6	0	
	WBL	D	53.3	85		E	57.6	271	
	WBT	D	53.8	140		D	52.9	382	
	WBR	A	0.7	0		A	0.7	0	
	NBL	E	55.0	150		E	65.9	266	
	NBT	C	31.4	305		C	30.0	210	
	NBR	A	4.6	53		A	0.4	0	
	SBL	E	62.0	207		E	62.5	126	
	SBT	C	26.0	151		D	41.7	349	
	SBR	A	0.3	0		A	1.2	0	

Build (2020) Traffic Conditions	EBL	D	45.6	304	C (34.2 sec)	E	64.1	239	D (37.9 sec)
	EBT	D	39.2	367		D	45.0	216	
	EBR	A	0.4	0		A	0.5	0	
	WBL	E	57.9	86		E	57.6	271	
	WBT	D	54.4	147		D	51.4	396	
	WBR	A	0.7	0		A	0.7	0	
	NBL	E	57.2	154		E	70.0	291	
	NBT	C	35.0	323		C	31.1	213	
	NBR	A	5.2	56		A	0.5	0	
	SBL	E	59.4	192		E	65.0	127	
	SBT	C	27.7	155		D	44.0	353	
	SBR	A	0.4	0		A	1.3	0	

Capacity analysis indicates that the intersection currently operates at LOS C during the AM and LOS D during the PM peak hours. Under no-build and build conditions, the intersection is expected to continue to operate at LOS C during the AM and LOS D during the PM peak hours and all movements are expected to operate at LOS E or better.

No improvements are warranted or recommended at this intersection at build out of the site.

Table 3 summarizes the capacity analysis results for the unsignalized intersection of Semmes Avenue and W. 20th Street / Right-In / Right-Out Site Driveway, and the Synchro outputs are enclosed for reference.

Table 3
Level-of-Service Summary for Semmes Avenue at W. 20th Street / Right-In / Right-Out Site Driveway

CONDITION	LANE GROUP	AM PEAK HOUR				PM PEAK HOUR			
		Lane LOS	Lane Delay (sec)	Queue (ft)	Overall LOS (Delay)[2]	Lane LOS	Lane Delay (sec)	Queue (ft)	Overall LOS (Delay)[2]
Existing (2018) Traffic Conditions	EBT/R	-	-	-	N/A[2]	-	-	-	N/A[2]
	WBT/R	-	-	-		-	-	-	
	SBR[1]	B	10.8	0		C	17.6	3	
No-Build (2020) Traffic Conditions	EBT/R	-	-	-	N/A[2]	-	-	-	N/A[2]
	WBT/R	-	-	-		-	-	-	
	SBR[1]	B	10.9	0		C	18.1	3	
Build (2020) Traffic Conditions	EBT/R	-	-	-	N/A[2]	-	-	-	N/A[2]
	WBT/R	-	-	-		-	-	-	
	NBR[1]	C	17.5	10		B	11.9	5	
	SBR[1]	B	11.0	0		C	19.0	3	

1. Level of service for minor approach
2. HCM methodology does not provide lane group or overall LOS, delay, and queue lengths for major street through movements or right turns at unsignalized intersections.

Capacity analysis indicates that the minor street right-turn movement currently operates with short delays (less than 25 seconds) during both the AM and PM peak hours. Under no-build conditions and build conditions, the minor street right-turn movement is expected to continue to operate with short delays (less than 25 seconds) during the AM and PM peak hours with queue lengths of one vehicle or less. Under build conditions, the minor street right-turn movement is expected to operate with short delays (less than 25 seconds) during the AM and PM peak hours.

Table 4 summarizes the capacity analysis results for the unsignalized intersection of Semmes Avenue and W. 21st Street / Full-Movement Site Driveway, and the Synchro outputs are enclosed for reference.

Table 4
Level-of-Service Summary for Semmes Avenue at W. 21st Street / Full-Movement Site Driveway

CONDITION	LANE GROUP	AM PEAK HOUR				PM PEAK HOUR			
		Lane LOS	Lane Delay (sec)	Queue (ft)	Overall LOS (Delay)[3]	Lane LOS	Lane Delay (sec)	Queue (ft)	Overall LOS (Delay)[3]
Existing (2018) Traffic Conditions	EBL/T[2] WBT/R SBL/R[1]	A - C	9.2 - 19.6	0 - 3	N/A	C - F	15.7 - 82.4	5 - 23	N/A
No-Build (2020) Traffic Conditions	EBL/T[2] WBT/R SBL/R[1]	A - C	9.3 - 20.4	0 - 5	N/A	C - F	16.1 - 87.6	5 - 23	N/A
Build (2020) Traffic Conditions	EBL/T/R[2] WBL[2] WBT/R NBL/T/R[1] SBL/T/R[1]	A B - F E	9.2 14.3 - 191.4 42.0	0 8 - 115 10	N/A	C B - F F	16.0 10.4 - 283.0 400.7	5 13 - 140 55	N/A

1. Level of service for minor approach
2. Level of service for major street left-turn movement
3. HCM methodology does not provide lane group or overall LOS, delay, and queue lengths for major street through movements or right turns at unsignalized intersections.

Capacity analysis indicates that the minor street left-turn movement currently operates with short delays (less than 25 seconds) during the AM peak hour and with long delays (greater than 50 seconds) during the PM peak hour. Under no-build conditions, the minor street right-turn movement is expected to continue to operate with short delays (less than 25 seconds) during the AM peak hour and with long delays (greater than 50 seconds) during the PM peak hour.

Under build conditions, the minor street left-turn movement is expected to operate with long delays (greater than 50 seconds) during the AM and PM peak hours. Long delays are common for minor street left-turn movements at intersections with major thoroughfares. The projected build-out traffic volumes are not expected to meet the Manual on Uniform Traffic Control Devices (MUTCD) traffic signal warrant thresholds.

Recommendations
Based on the trip generation potential of the mixed-use center, the following improvements are recommended:

<u>Semmes Avenue at Proposed Right-in / Right-out Driveway</u>

- Construct right-in / right-out driveway with one ingress lane and one egress lane

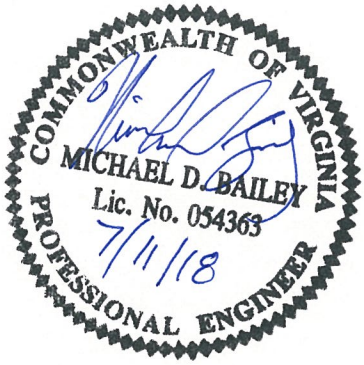
<u>Semmes Avenue at Proposed Right-in / Right-out Driveway</u>

- Construct full-movement driveway with one ingress lane and one egress lane
- Construct an eastbound right-turn taper on Semmes Avenue
- Construct a westbound left-turn lane on Semmes Avenue with 100 feet of storage

Figure 12 shows recommended lane configuration.

We appreciate your attention to this matter. Please contact me at (804) 217-8560 if you have any questions about this report.

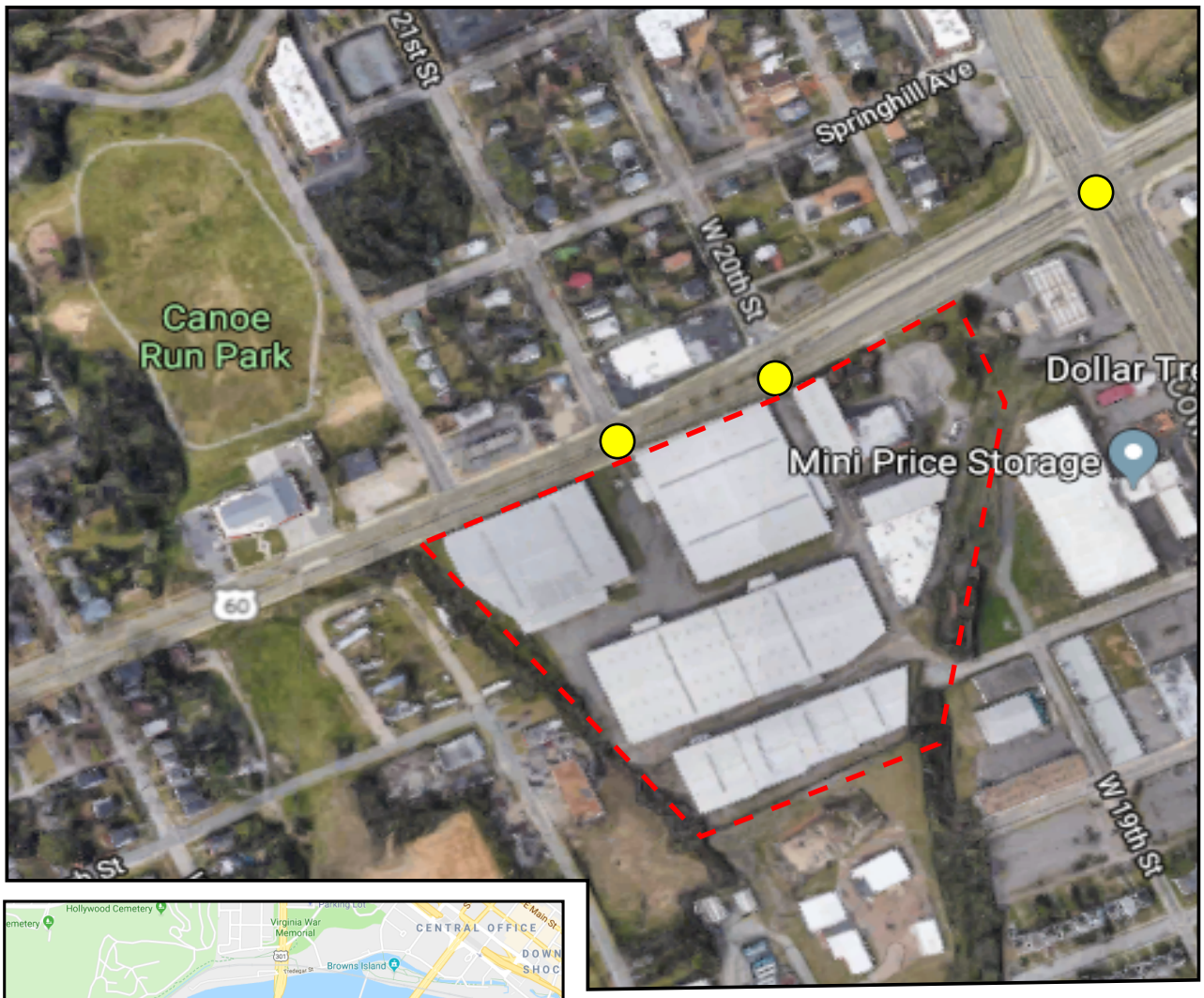
Sincerely yours,
Ramey Kemp & Associates, Inc.



Michael Bailey, P.E., PTOE
Project Manager

Enclosures: Figures, Traffic count data, Synchro output, VDOT turn lane warrant diagrams,

Copy to: Mr. Will Allen, Harper & Associates, LLC
Mr. Preston Lloyd, Jr., Williams Mullen



Inset

Overview

LEGEND

Study Intersection

Site Boundary

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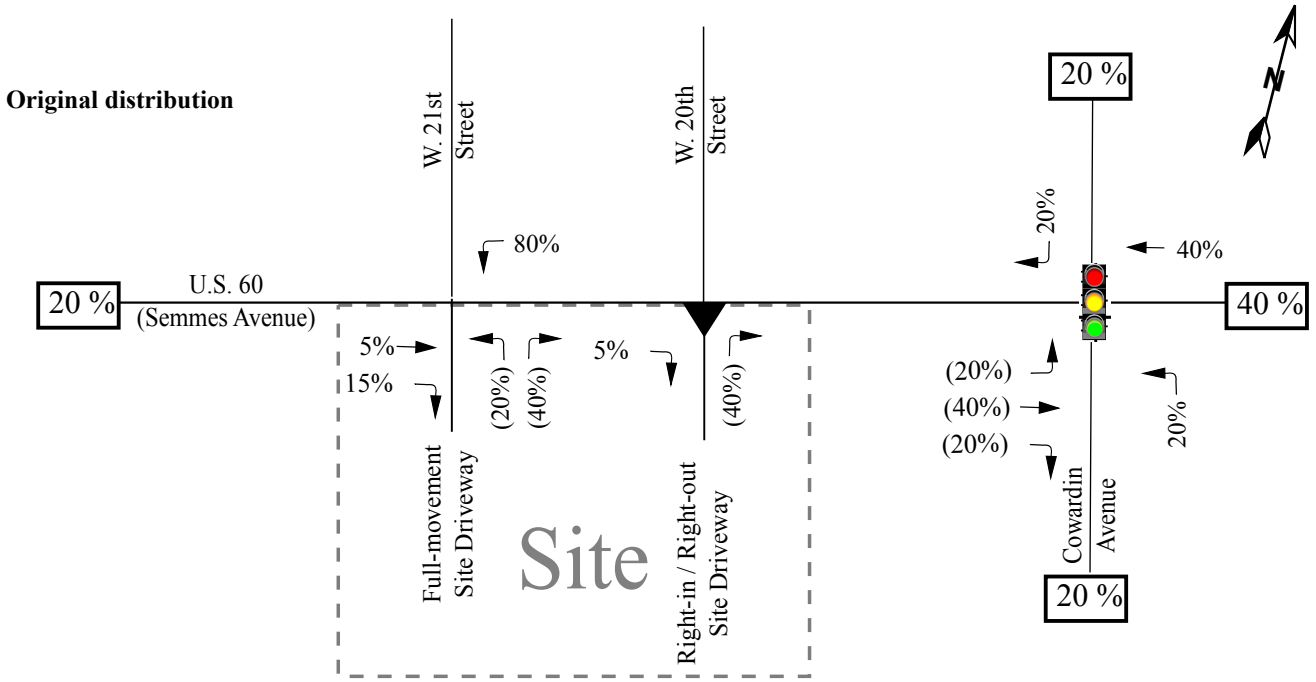
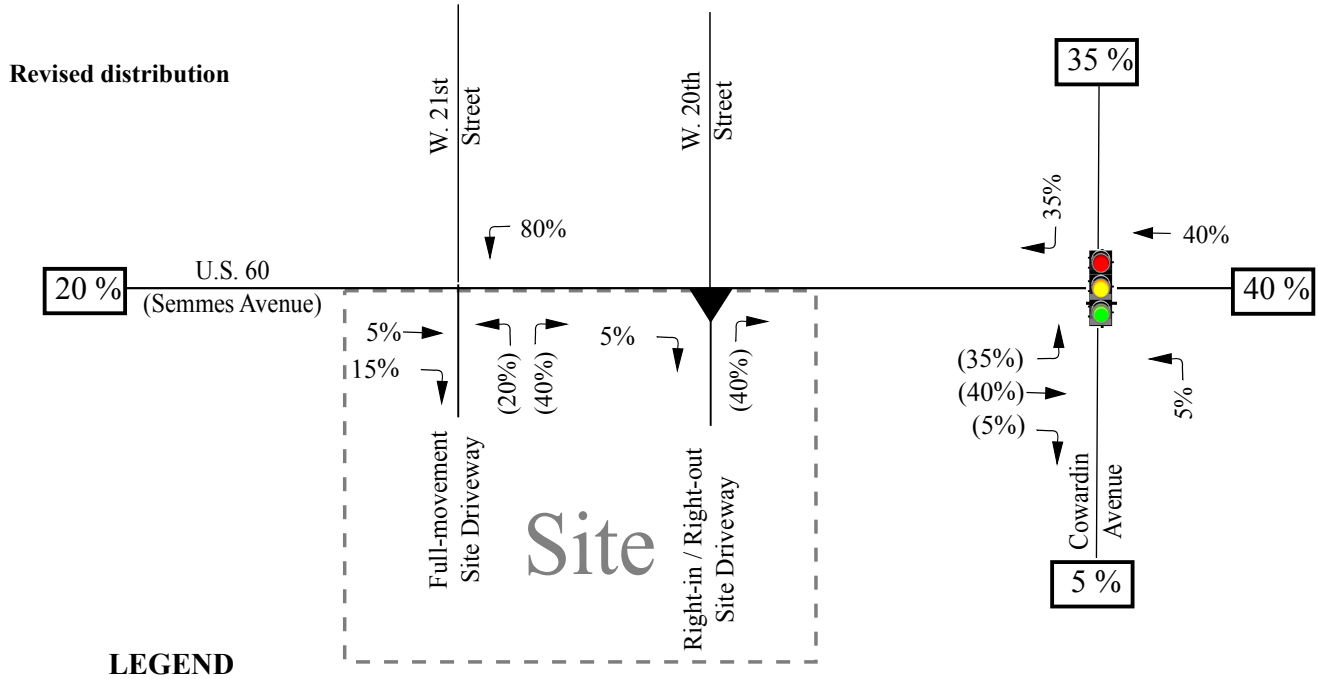
RAMEY KEMP & ASSOCIATES TRANSPORTATION ENGINEERS	Semmes Avenue Richmond, Virginia	Site Location and Study Intersections Scale: Not to Scale | Figure 1



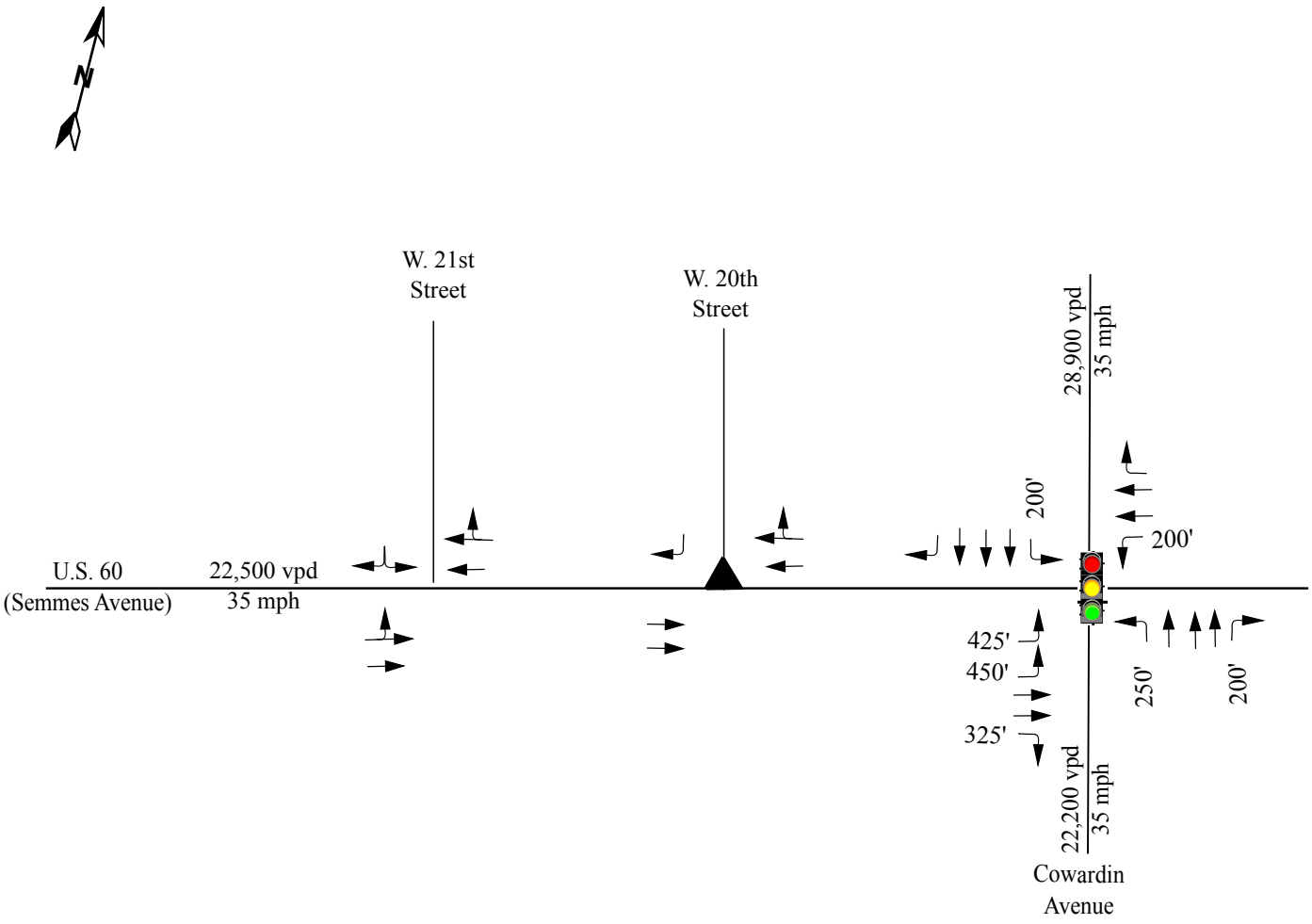


LEGEND

XX% Regional Trip Distribution

X% (Y%) Entering (Exiting) Trip Distribution

RAMEY KEMP & ASSOCIATES TRANSPORTATION ENGINEERS	Semmes Avenue Richmond, Virginia	Revised Site Trip Distribution Scale: Not to Scale | Figure 2



LEGEND

- Existing Traffic Signal
- Existing Lane
- X' Storage (In Feet)
- Right-in / Right-out Driveway

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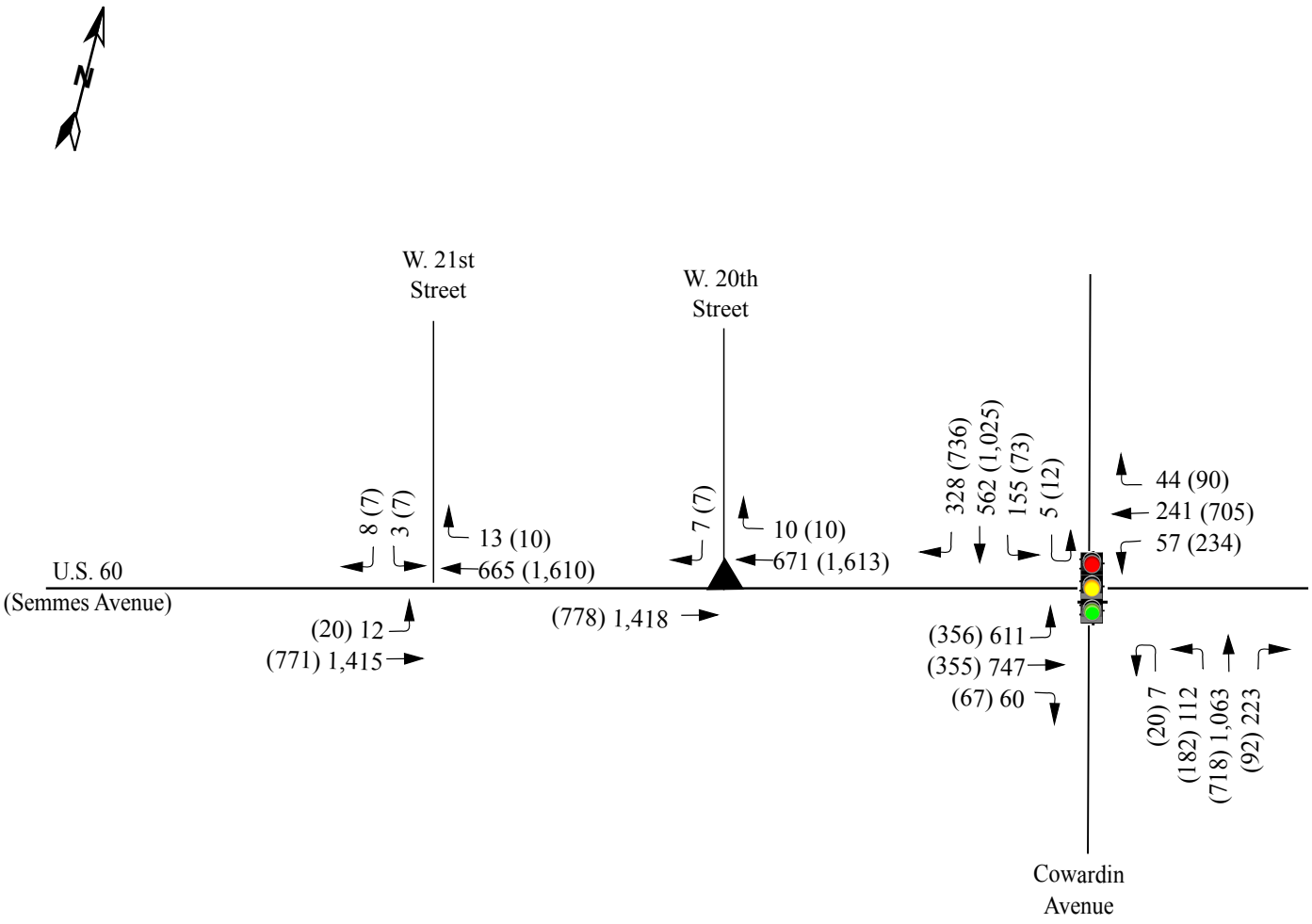
TRANSPORTATION ENGINEERS

Semmes Avenue
Richmond, Virginia

Existing
Lane Configurations

Scale: Not to Scale

Figure 3



LEGEND

X (Y) AM (PM) Peak Hour

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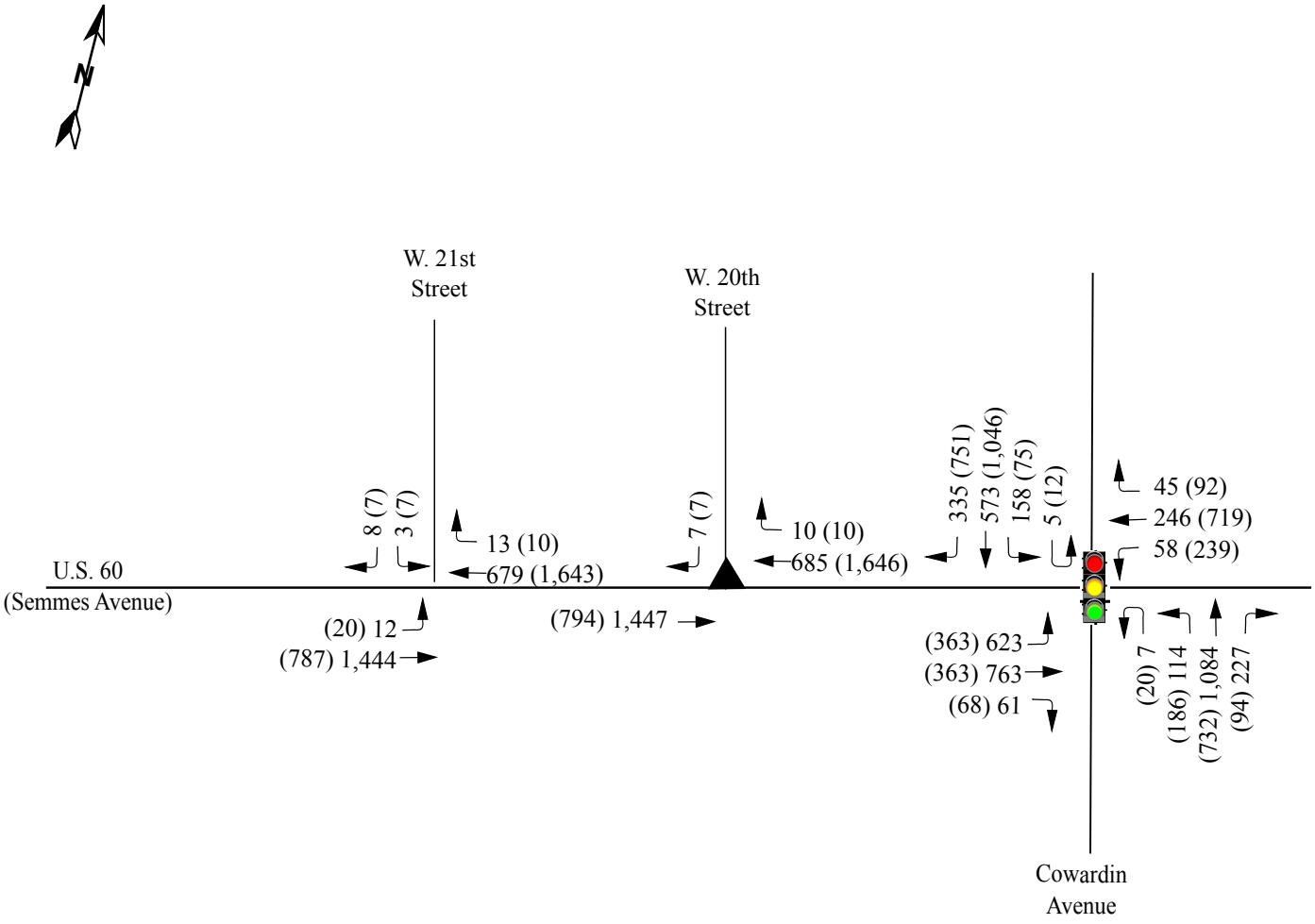
Semmes Avenue
Richmond, Virginia

Existing (2018)
Peak Hour Traffic Volumes

Scale: Not to Scale

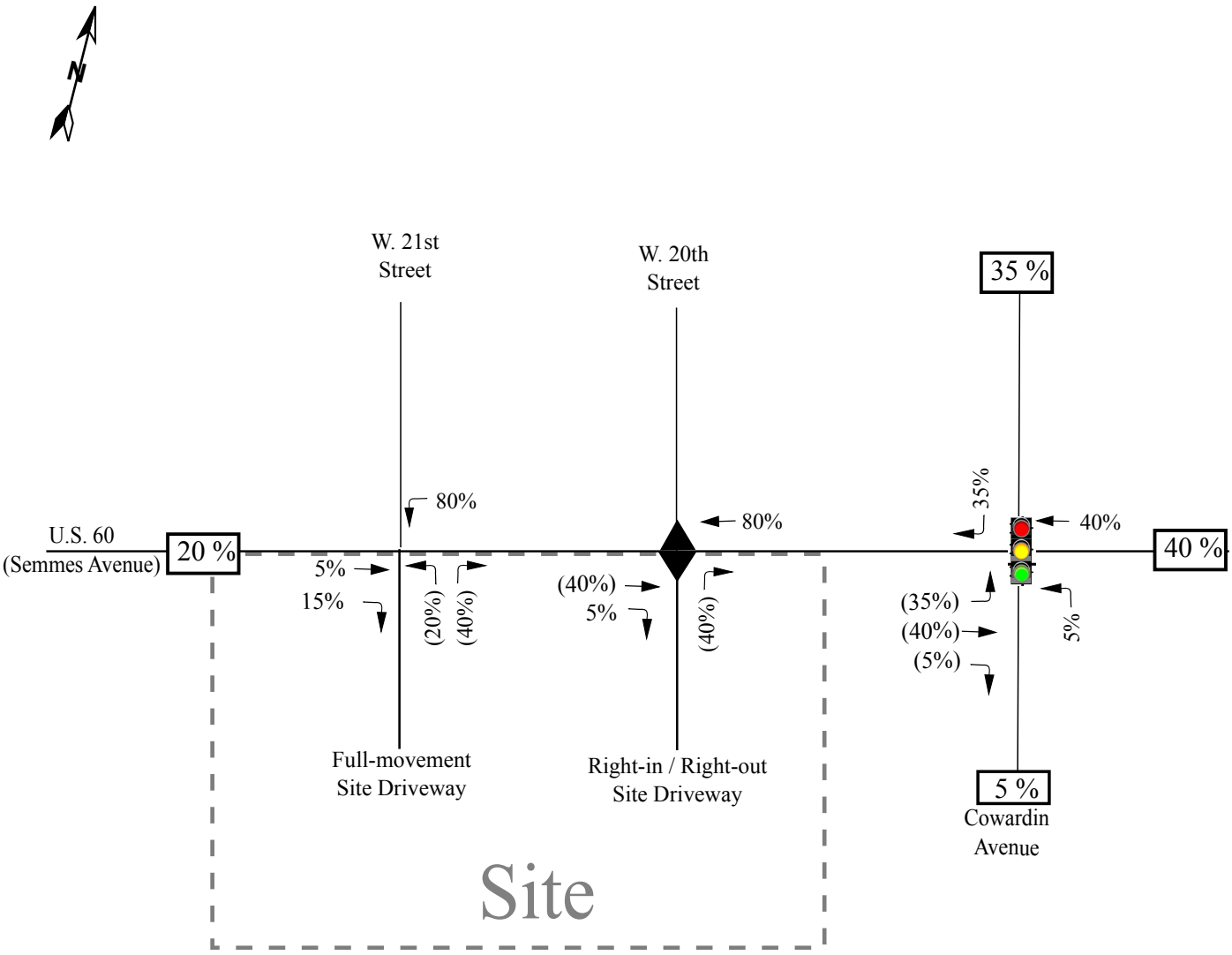
Figure 4



LEGEND

X (Y) AM (PM) Peak Hour

RAMEY KEMP & ASSOCIATES TRANSPORTATION ENGINEERS	Semmes Avenue Richmond, Virginia	No Build (2020) Peak Hour Traffic Volumes Scale: Not to Scale | Figure 5

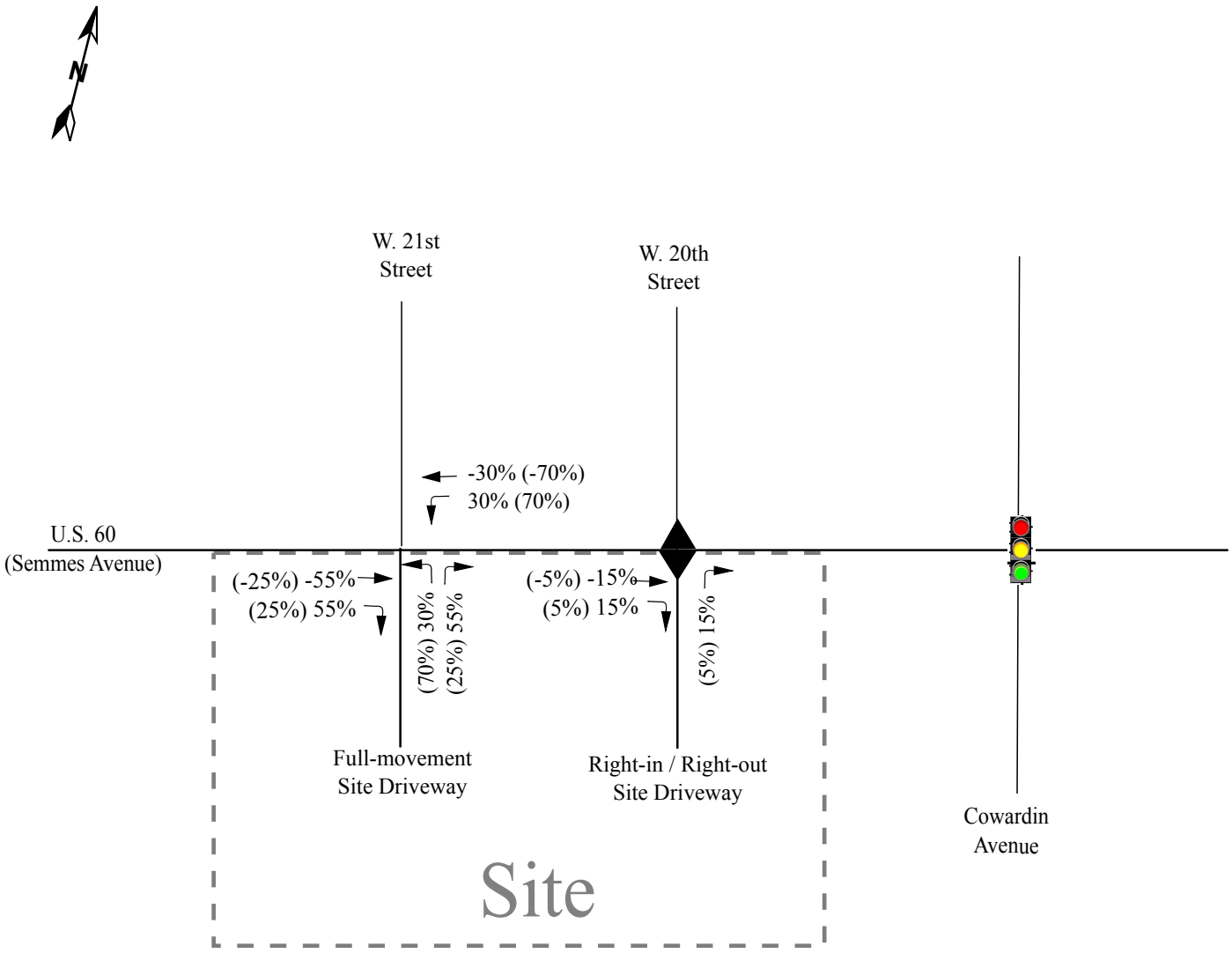


LEGEND

XX% Regional Trip Distribution

X% (Y%) Entering (Exiting) Trip Distribution

RAMEY KEMP & ASSOCIATES TRANSPORTATION ENGINEERS	Semmes Avenue Richmond, Virginia	Primary Site Trip Distribution Scale: Not to Scale | Figure 6



LEGEND

X% (Y%) AM (PM) Trip Distribution

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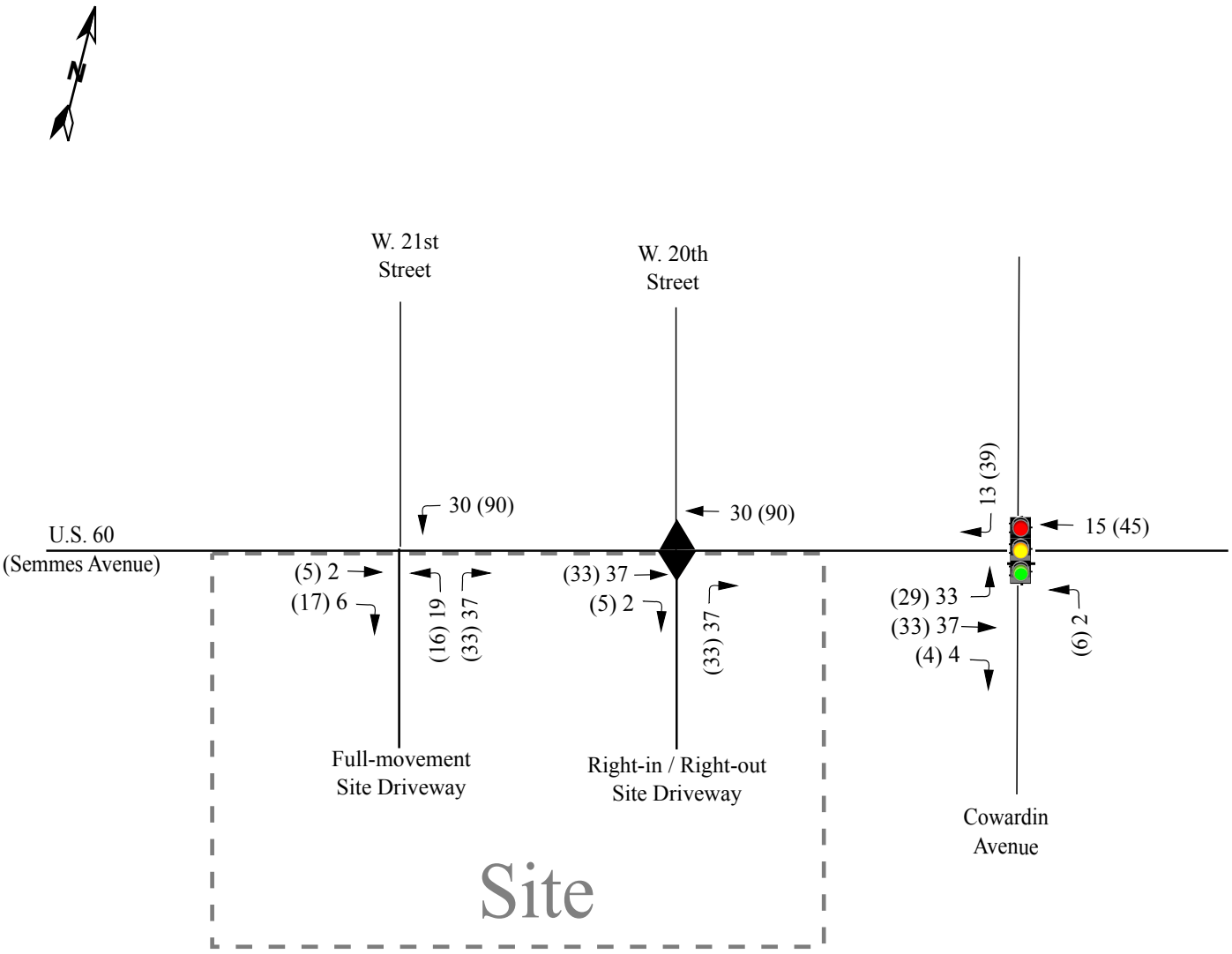
Semmes Avenue
Richmond, Virginia

Pass-By
Site Trip Distribution

Scale: Not to Scale

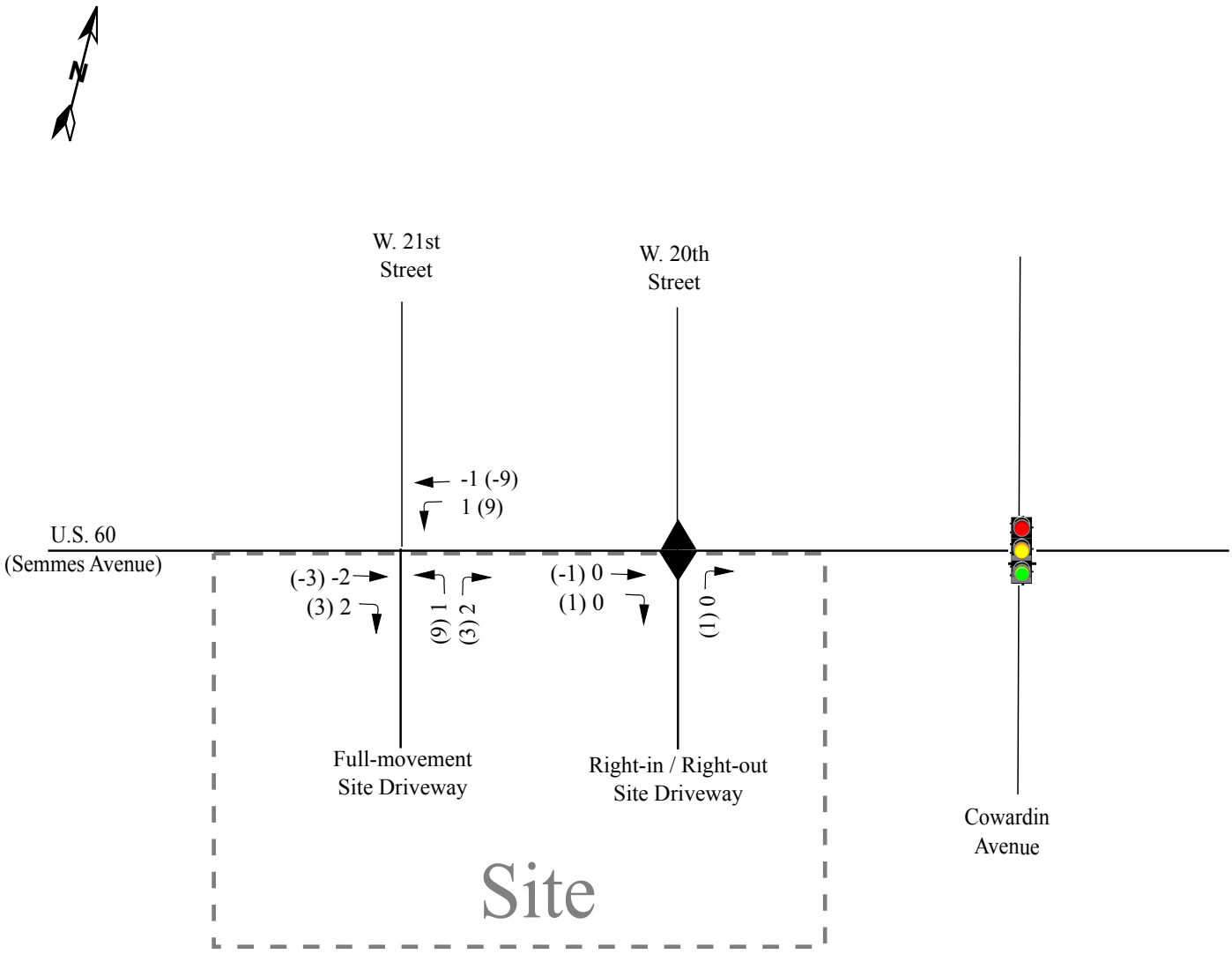
Figure 7



LEGEND

X (Y) AM (PM) Peak Hour

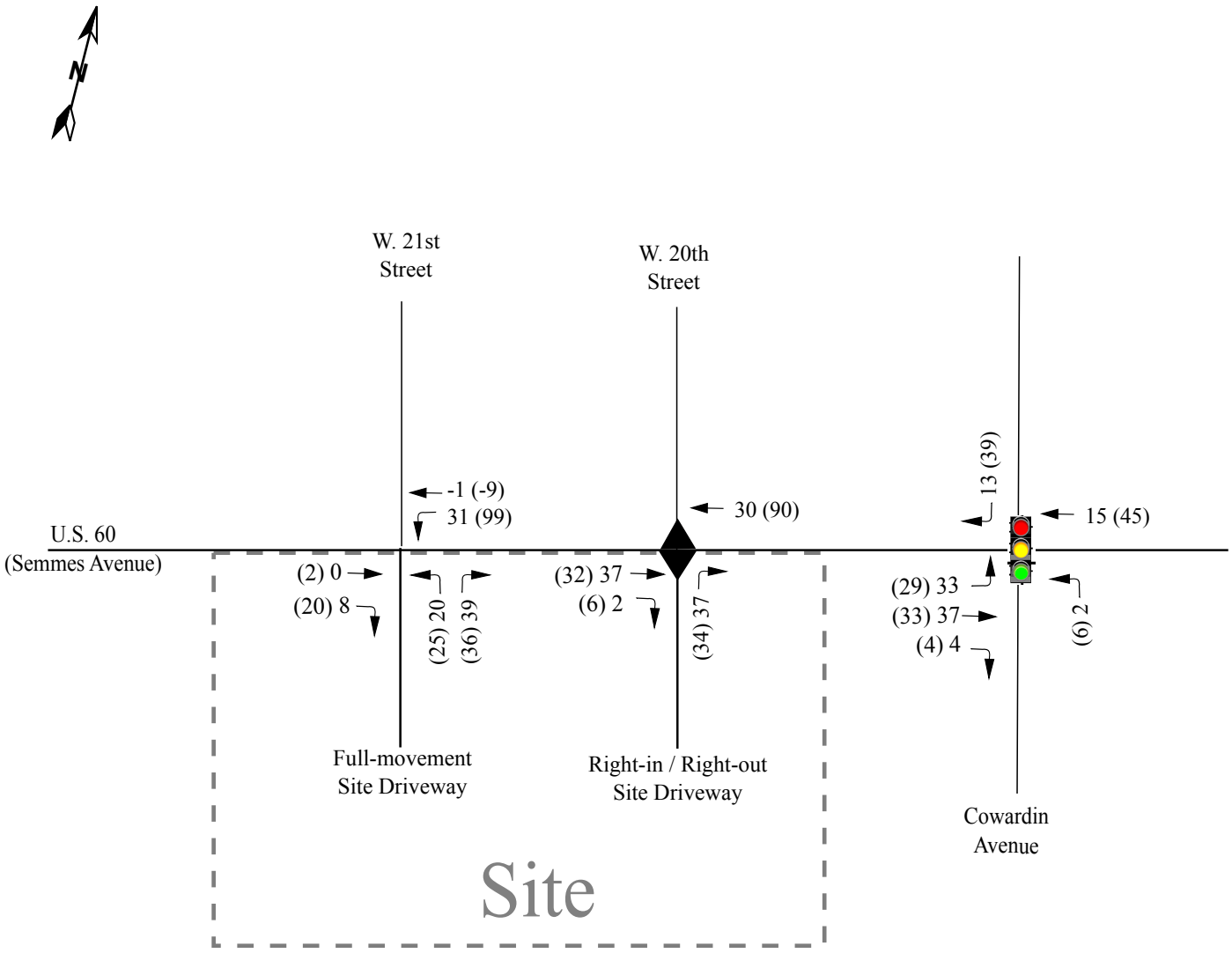
RAMEY KEMP & ASSOCIATES TRANSPORTATION ENGINEERS	Semmes Avenue Richmond, Virginia	Primary Site Trip Assignment Scale: Not to Scale | Figure 8



LEGEND

X (Y) AM (PM) Peak Hour

RAMEY KEMP & ASSOCIATES TRANSPORTATION ENGINEERS	Semmes Avenue Richmond, Virginia	Pass-By Site Trip Asignment Scale: Not to Scale | Figure 9



LEGEND

X (Y) AM (PM) Peak Hour

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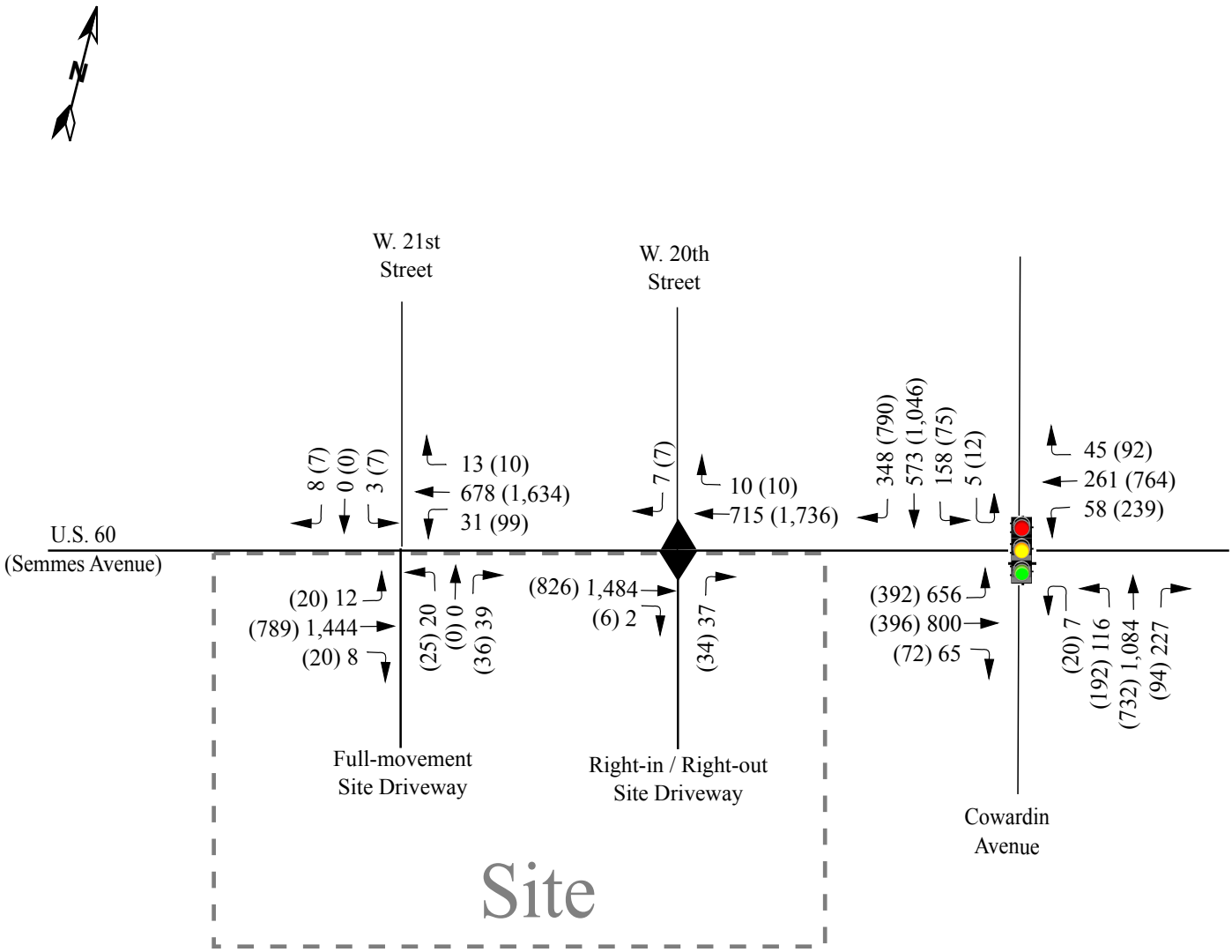
Semmes Avenue
Richmond, Virginia

Total Site Trip Assignment

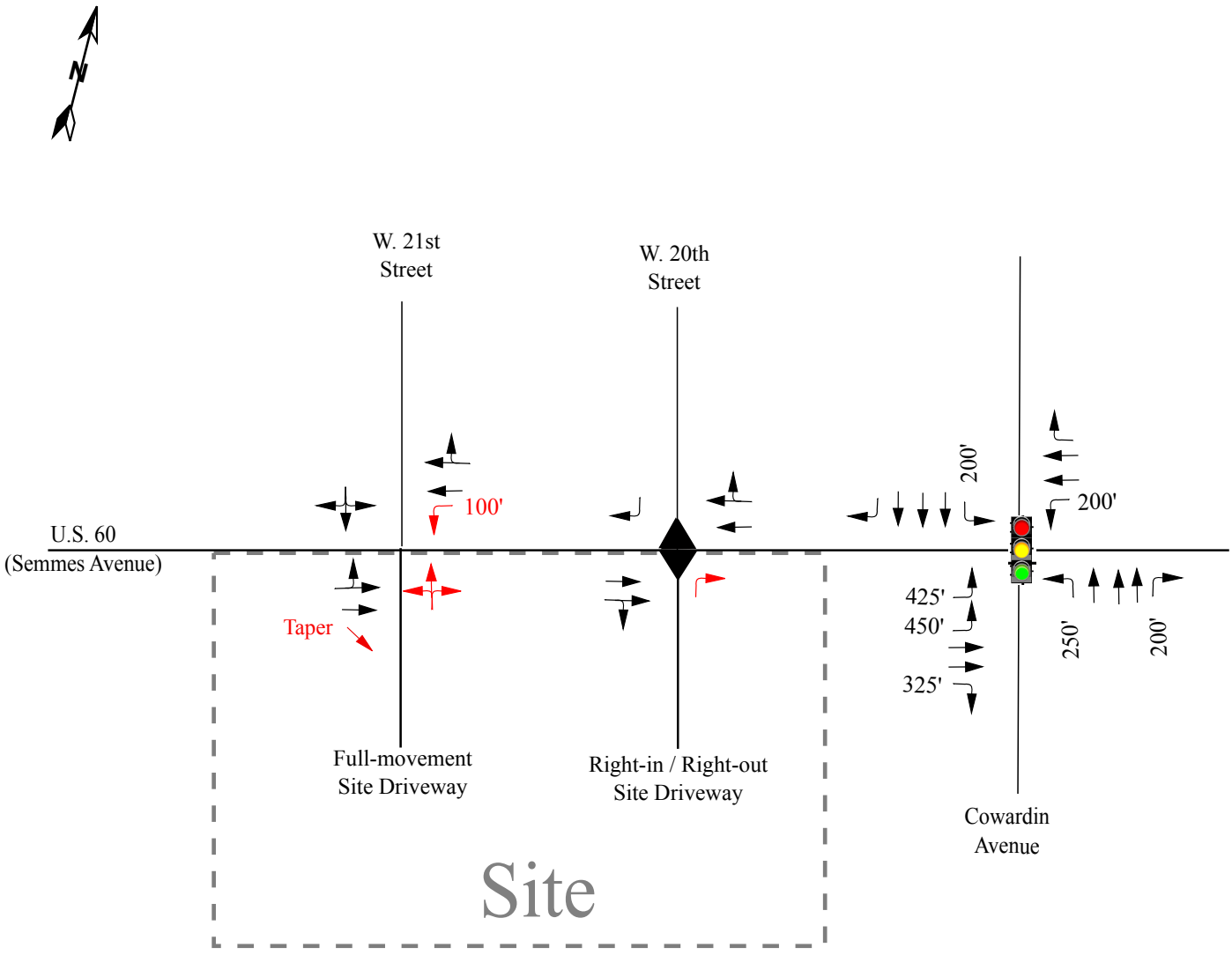
Scale: Not to Scale | Figure 10



LEGEND

X (Y) AM (PM) Peak Hour

RAMEY KEMP & ASSOCIATES TRANSPORTATION ENGINEERS	Semmes Avenue Richmond, Virginia	Build (2020) Peak Hour Traffic Volumes Scale: Not to Scale | Figure 11



LEGEND

- Existing Lane
- Recommended Lane
- X' Storage (In Feet)
- Existing Traffic Signal

RAMEY KEMP & ASSOCIATES TRANSPORTATION ENGINEERS	Semmes Avenue Richmond, Virginia	Recommended Lane Configuration Scale: Not to Scale | Figure 12

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Location: Jefferson Davis Hwy/Cowardin Ave & Semmes Ave
Date: 9/26/2017
Site Code: 14509593

	Jefferson Davis Hwy/Cowardin Ave Southbound				Semmes Ave Westbound				Jefferson Davis Hwy/Cowardin Ave Northbound				Semmes Ave Eastbound			
Start Time	Right	Thru	Left	U-Turns	Right	Thru	Left	U-Turns	Right	Thru	Left	U-Turns	Right	Thru	Left	U-Turns
7:00 AM	70	170	38	0	15	59	11	0	65	261	18	0	18	179	131	0
7:15 AM	75	129	43	2	10	49	16	0	49	262	25	2	15	210	165	0
7:30 AM	74	120	40	0	13	44	11	0	51	234	26	3	14	181	162	0
7:45 AM	67	100	32	3	5	45	12	0	51	228	19	2	11	165	136	0
8:00 AM	67	110	18	0	8	32	8	1	45	169	20	6	8	120	121	0
8:15 AM	66	100	22	0	13	26	5	0	30	159	12	6	15	100	130	0
8:30 AM	60	96	25	0	4	35	8	0	23	130	17	7	10	71	70	1
8:45 AM	52	104	11	1	10	32	7	0	16	129	9	1	15	60	76	1
Total	**531**	**929**	**229**	**6**	**78**	**322**	**78**	**1**	**330**	**1572**	**146**	**27**	**106**	**1086**	**991**	**2**

Location: Jefferson Davis Hwy/Cowardin Ave & Semmes Ave
Date: 9/26/2017
Site Code: 14509594

	Jefferson Davis Hwy/Cowardin Ave Southbound				Semmes Ave Westbound				Jefferson Davis Hwy/Cowardin Ave Northbound				Semmes Ave Eastbound			
Start Time	Right	Thru	Left	U-Turns	Right	Thru	Left	U-Turns	Right	Thru	Left	U-Turns	Right	Thru	Left	U-Turns
11:00	84	119	17	1	12	52	17	1	14	142	29	4	12	47	73	1
11:00 AM	74	132	9	0	5	52	6	0	17	130	22	7	11	46	71	0
11:15 AM	102	147	14	0	10	51	12	0	13	127	25	1	9	61	73	1
11:30 AM	87	118	15	1	10	38	9	0	20	124	24	3	21	77	66	2
11:45 AM	67	122	25	0	8	41	14	0	17	116	25	7	15	47	84	0
12:00 PM	82	131	18	0	7	33	12	0	15	112	22	4	9	59	72	0
12:15 PM	68	125	16	1	8	42	11	0	17	140	22	4	15	58	85	1
12:30 PM	97	109	13	0	10	34	8	0	21	127	21	4	6	53	69	0
12:45 PM	**661**	**1003**	**127**	**3**	**70**	**343**	**89**	**1**	**134**	**1018**	**190**	**34**	**98**	**448**	**593**	**5**

Location: Jefferson Davis Hwy/Cowardin Ave & Semmes Ave
Date: 9/26/2017
Site Code: 14509595

	Jefferson Davis Hwy/Cowardin Ave Southbound				Semmes Ave Westbound				Jefferson Davis Hwy/Cowardin Ave Northbound				Semmes Ave Eastbound			
Start Time	Right	Thru	Left	U-Turns	Right	Thru	Left	U-Turns	Right	Thru	Left	U-Turns	Right	Thru	Left	U-Turns
16:00	174	226	18	3	38	182	68	0	20	184	43	3	15	84	84	0
16:15	183	276	18	4	15	192	50	0	26	175	51	5	24	86	92	0
4:00 PM	167	289	20	3	20	175	72	0	23	167	42	7	9	60	70	2
4:15 PM	175	201	17	2	16	126	38	0	19	174	38	5	12	93	76	0
4:30 PM	131	192	20	3	13	124	35	0	16	130	40	4	20	65	75	2
4:45 PM	142	177	16	0	12	109	21	0	14	132	43	2	15	59	80	0
5:00 PM	107	160	15	0	11	79	23	0	10	128	27	6	7	63	84	0
5:15 PM	125	151	17	2	8	63	15	0	10	110	25	4	13	53	74	1
5:30 PM	**1204**	**1672**	**141**	**17**	**133**	**1050**	**322**	**0**	**138**	**1200**	**309**	**36**	**115**	**563**	**635**	**5**
5:45 PM																

Location: Jefferson Davis Hwy/Cowardin Ave & Semmes Ave
Date: 9/26/2017
Site Code: 14509511

	Jefferson Davis Hwy/Cowardin Ave Southbound				Semmes Ave Westbound				Jefferson Davis Hwy/Cowardin Ave Northbound				Semmes Ave Eastbound			
Start Time	Right	Thru	Left	U-Turns	Right	Thru	Left	U-Turns	Right	Thru	Left	U-Turns	Right	Thru	Left	U-Turns
11:00	68	106	10	2	7	32	3	0	8	91	25	3	14	39	78	0
11:15	78	129	9	1	9	30	10	0	9	106	20	3	6	54	80	1
11:30	74	106	13	4	7	26	7	0	16	109	23	5	16	47	72	0
11:00 AM	79	111	9	3	7	32	5	0	7	140	31	4	18	56	83	0
11:15 AM	71	111	14	2	3	39	6	0	8	111	26	5	19	50	80	0
11:30 AM	74	119	6	4	5	33	8	0	10	105	29	5	20	56	74	1
11:45 AM	102	124	9	0	8	25	1	0	13	113	41	4	19	47	68	0
12:00 PM	85	106	9	2	5	46	7	0	15	104	36	10	14	56	93	0
12:15 PM	**631**	**912**	**79**	**18**	**51**	**263**	**47**	**0**	**86**	**879**	**231**	**39**	**126**	**405**	**628**	**2**
12:30 PM																
12:45 PM																

Burns Service Inc.

1202 Langdon Terrace Drive
Indian Trail, NC, 28079

We Count because YOU Count

File Name : Richmond(Semmes and 21st) AM Peak
Site Code :
Start Date : 5/31/2018

Groups Printed- Cars + - Trucks

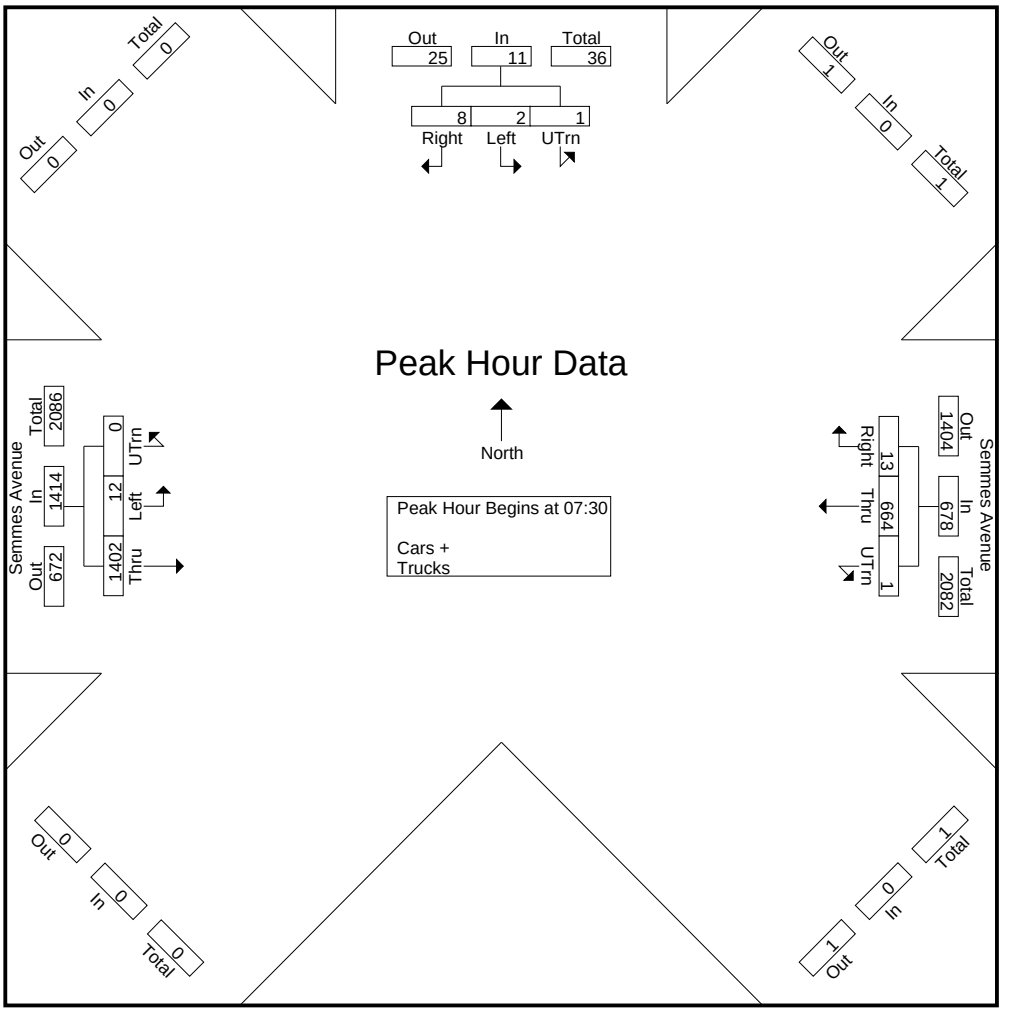
	Southbound				Semmes Avenue Westbound				Semmes Avenue Eastbound				
Start Time	Right	Left	UTrn	App. Total	Right	Thru	UTrn	App. Total	Thru	Left	UTrn	App. Total	Int. Total
07:00	1	0	0	1	0	105	0	105	218	1	0	219	325
07:15	0	0	0	0	1	122	0	123	296	1	0	297	420
07:30	2	0	0	2	5	178	0	183	332	2	0	334	519
07:45	2	0	0	2	1	152	0	153	399	2	0	401	556
Total	5	0	0	5	7	557	0	564	1245	6	0	1251	1820
08:00	1	1	0	2	4	180	1	185	332	3	0	335	522
08:15	3	1	1	5	3	154	0	157	339	5	0	344	506
08:30	1	2	0	3	1	167	0	168	329	0	0	329	500
08:45	4	1	0	5	0	152	2	154	280	3	0	283	442
Total	9	5	1	15	8	653	3	664	1280	11	0	1291	1970
Grand Total	14	5	1	20	15	1210	3	1228	2525	17	0	2542	3790
Apprch %	70	25	5		1.2	98.5	0.2		99.3	0.7	0		
Total %	0.4	0.1	0	0.5	0.4	31.9	0.1	32.4	66.6	0.4	0	67.1	
Cars +	13	5	1	19	14	1191	3	1208	2518	17	0	2535	3762
% Cars +	92.9	100	100	95	93.3	98.4	100	98.4	99.7	100	0	99.7	99.3
Trucks	1	0	0	1	1	19	0	20	7	0	0	7	28
% Trucks	7.1	0	0	5	6.7	1.6	0	1.6	0.3	0	0	0.3	0.7

Burns Service Inc.

1202 Langdon Terrace Drive
Indian Trail, NC, 28079
We Count because YOU Count

File Name : Richmond(Semmes and 21st) AM Peak
Site Code :
Start Date : 5/31/2018
Page No : 2

	Southbound				Semmes Avenue Westbound				Semmes Avenue Eastbound				
Start Time	Right	Left	UTrn	App. Total	Right	Thru	UTrn	App. Total	Thru	Left	UTrn	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30													
07:30	2	0	0	2	**5**	178	0	183	332	2	0	334	519
07:45	2	0	0	2	1	152	0	153	**399**	2	0	**401**	**556**
08:00	1	**1**	0	2	4	**180**	**1**	**185**	332	3	0	335	522
08:15	**3**	1	**1**	**5**	3	154	0	157	339	**5**	0	344	506
Total Volume	8	2	1	11	13	664	1	678	1402	12	0	1414	2103
% App. Total	72.7	18.2	9.1		1.9	97.9	0.1		99.2	0.8	0		
PHF	.667	.500	.250	.550	.650	.922	.250	.916	.878	.600	.000	.882	.946



Burns Service Inc.

1202 Langdon Terrace Drive
Indian Trail, NC, 28079
We Count because YOU Count

File Name : Richmond(Semmes and 21st) PM Peak
Site Code :
Start Date : 5/31/2018
Page No : 1

Groups Printed- Cars + - Trucks

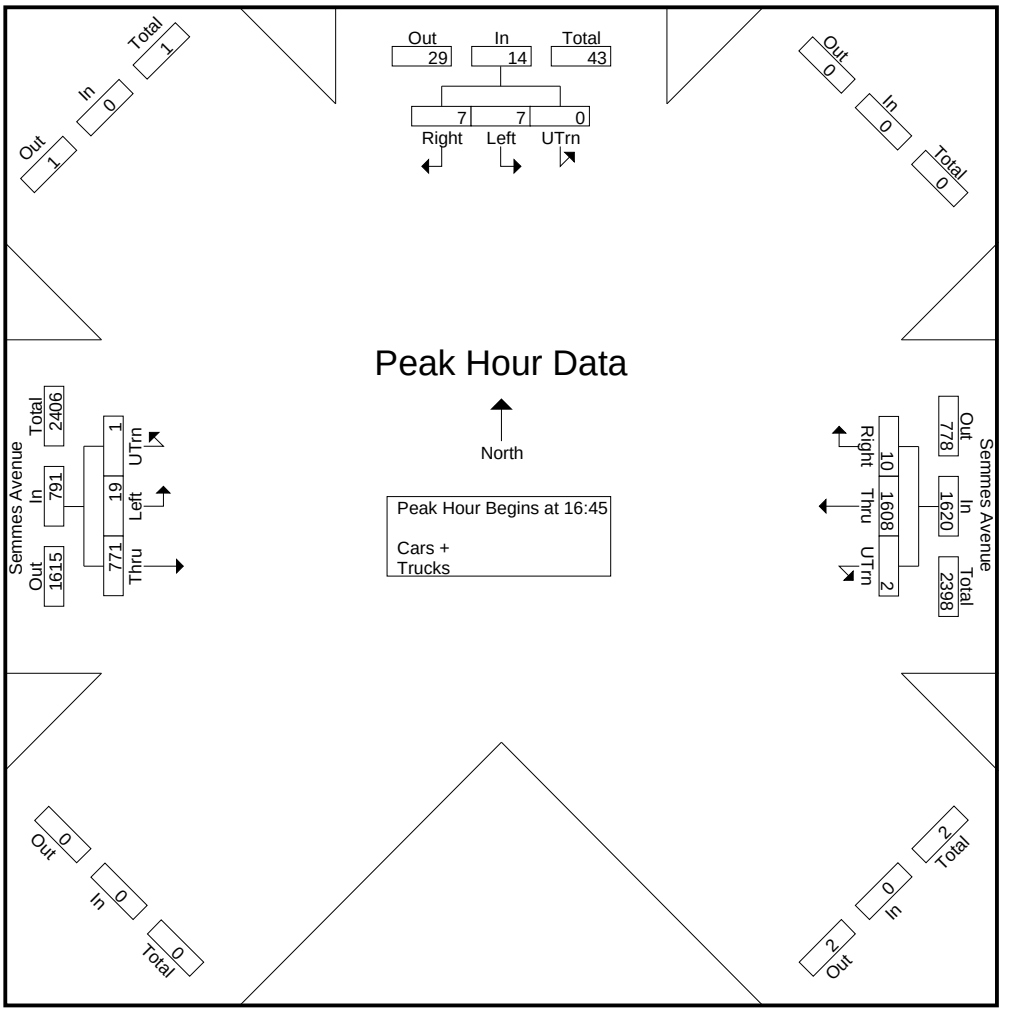
	Southbound				Semmes Avenue Westbound				Semmes Avenue Eastbound				
Start Time	Right	Left	UTrn	App. Total	Right	Thru	UTrn	App. Total	Thru	Left	UTrn	App. Total	Int. Total
16:00	3	5	0	8	2	269	4	275	163	3	1	167	450
16:15	2	0	0	2	2	322	3	327	171	5	0	176	505
16:30	2	0	0	2	2	386	5	393	164	7	0	171	566
16:45	2	2	0	4	2	384	0	386	190	7	1	198	588
Total	9	7	0	16	8	1361	12	1381	688	22	2	712	2109
17:00	1	1	0	2	0	396	0	396	180	6	0	186	584
17:15	3	0	0	3	4	426	1	431	183	1	0	184	618
17:30	1	4	0	5	4	402	1	407	218	5	0	223	635
17:45	1	1	0	2	0	342	0	342	189	4	0	193	537
Total	6	6	0	12	8	1566	2	1576	770	16	0	786	2374
Grand Total	15	13	0	28	16	2927	14	2957	1458	38	2	1498	4483
Apprch %	53.6	46.4	0		0.5	99	0.5		97.3	2.5	0.1		
Total %	0.3	0.3	0	0.6	0.4	65.3	0.3	66	32.5	0.8	0	33.4	
Cars +	15	12	0	27	15	2920	14	2949	1450	37	2	1489	4465
% Cars +	100	92.3	0	96.4	93.8	99.8	100	99.7	99.5	97.4	100	99.4	99.6
Trucks	0	1	0	1	1	7	0	8	8	1	0	9	18
% Trucks	0	7.7	0	3.6	6.2	0.2	0	0.3	0.5	2.6	0	0.6	0.4

Burns Service Inc.

1202 Langdon Terrace Drive
Indian Trail, NC, 28079
We Count because YOU Count

File Name : Richmond(Semmes and 21st) PM Peak
Site Code :
Start Date : 5/31/2018
Page No : 2

	Southbound				Semmes Avenue Westbound				Semmes Avenue Eastbound				
Start Time	Right	Left	UTrn	App. Total	Right	Thru	UTrn	App. Total	Thru	Left	UTrn	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 16:45													
16:45	2	2	0	4	2	384	0	386	190	**7**	**1**	198	588
17:00	1	1	0	2	0	396	0	396	180	6	0	186	584
17:15	**3**	0	0	3	**4**	**426**	**1**	**431**	183	1	0	184	618
17:30	1	**4**	0	**5**	4	402	1	407	**218**	5	0	**223**	**635**
Total Volume	7	7	0	14	10	1608	2	1620	771	19	1	791	2425
% App. Total	50	50	0		0.6	99.3	0.1		97.5	2.4	0.1		
PHF	.583	.438	.000	.700	.625	.944	.500	.940	.884	.679	.250	.887	.955



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	611	747	60	57	241	44	7	112	1063	223	5	155
Future Volume (vph)	611	747	60	57	241	44	7	112	1063	223	5	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	400		300	200		0		250		200		200
Storage Lanes	2		1	1		1		1		1		1
Taper Length (ft)	100			100				100				100
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	0	1770	5085	1583	0	1770
Flt Permitted	0.950			0.950				0.950				0.950
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	0	1770	5085	1583	0	1770
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)			149			208				240		
Link Speed (mph)		35			35				35			
Link Distance (ft)		661			416				771			
Travel Time (s)		12.9			8.1				15.0			
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	657	803	65	61	259	47	0	128	1143	240	0	172
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot	Prot
Protected Phases	7	4		3	8		5	5	2		1	1
Permitted Phases			4			8				2		
Detector Phase	7	4	4	3	8	8	5	5	2	2	1	1
Switch Phase												
Minimum Initial (s)	1.0	10.0	10.0	7.0	9.0	9.0	7.0	7.0	10.0	10.0	7.0	7.0
Minimum Split (s)	13.0	16.0	16.0	13.0	16.0	16.0	13.0	13.0	16.0	16.0	13.0	13.0
Total Split (s)	31.0	33.0	33.0	15.0	17.0	17.0	20.0	20.0	42.0	42.0	20.0	20.0
Total Split (%)	28.2%	30.0%	30.0%	13.6%	15.5%	15.5%	18.2%	18.2%	38.2%	38.2%	18.2%	18.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0		-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	None	C-Min	C-Min	None	None
Act Effct Green (s)	25.8	31.0	31.0	10.3	13.0	13.0		14.1	40.0	40.0		15.2
Actuated g/C Ratio	0.23	0.28	0.28	0.09	0.12	0.12		0.13	0.36	0.36		0.14
v/c Ratio	0.82	0.80	0.12	0.37	0.62	0.13		0.57	0.62	0.33		0.70
Control Delay	49.0	44.6	0.4	53.1	53.1	0.7		54.7	31.0	4.6		61.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0
Total Delay	49.0	44.6	0.4	53.1	53.1	0.7		54.7	31.0	4.6		61.5
LOS	D	D	A	D	D	A		D	C	A		E
Approach Delay		44.7			46.4				28.8			
Approach LOS		D			D				C			
Queue Length 50th (ft)	224	284	0	41	93	0		85	247	0		117
Queue Length 95th (ft)	291	#384	0	84	136	0		146	297	53		#202
Internal Link Dist (ft)		581			336				691			
Turn Bay Length (ft)	400		300	200				250		200		200
Base Capacity (vph)	842	998	554	177	427	374		257	1850	728		257
Starvation Cap Reductn	0	0	0	0	0	0		0	0	0		0

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	562	328
Future Volume (vph)	562	328
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		0
Storage Lanes		1
Taper Length (ft)		
Satd. Flow (prot)	5085	1583
Flt Permitted		
Satd. Flow (perm)	5085	1583
Right Turn on Red		Yes
Satd. Flow (RTOR)		353
Link Speed (mph)	35	
Link Distance (ft)	443	
Travel Time (s)	8.6	
Peak Hour Factor	0.93	0.93
Shared Lane Traffic (%)		
Lane Group Flow (vph)	604	353
Turn Type	NA	Free
Protected Phases	6	
Permitted Phases		Free
Detector Phase	6	
Switch Phase		
Minimum Initial (s)	10.0	
Minimum Split (s)	16.0	
Total Split (s)	42.0	
Total Split (%)	38.2%	
Yellow Time (s)	4.0	
All-Red Time (s)	2.0	
Lost Time Adjust (s)	-2.0	
Total Lost Time (s)	4.0	
Lead/Lag	Lag	
Lead-Lag Optimize?	Yes	
Recall Mode	C-Min	
Act Effct Green (s)	41.1	110.0
Actuated g/C Ratio	0.37	1.00
v/c Ratio	0.32	0.22
Control Delay	25.8	0.3
Queue Delay	0.0	0.0
Total Delay	25.8	0.3
LOS	C	A
Approach Delay	23.2	
Approach LOS	C	
Queue Length 50th (ft)	113	0
Queue Length 95th (ft)	147	0
Internal Link Dist (ft)	363	
Turn Bay Length (ft)		
Base Capacity (vph)	1900	1583
Starvation Cap Reductn	0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Spillback Cap Reductn	0	0	0	0	0	0		0	0	0		0
Storage Cap Reductn	0	0	0	0	0	0		0	0	0		0
Reduced v/c Ratio	0.78	0.80	0.12	0.34	0.61	0.13		0.50	0.62	0.33		0.67

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 82 (75%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 34.2 Intersection LOS: C
Intersection Capacity Utilization 69.2% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Cowardin Avenue & Semmes Avenue

Lane Group	SBT	SBR
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.32	0.22

Intersection Summary

Intersection						
Int Delay, s/veh	0					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↱			↱
Traffic Vol, veh/h	0	1418	671	10	0	7
Future Vol, veh/h	0	1418	671	10	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	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	0	1541	729	11	0	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	370
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	-	0	627
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	627
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.8
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	627
HCM Lane V/C Ratio	-	-	-	0.012
HCM Control Delay (s)	-	-	-	10.8
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	1415	665	13	3	8
Future Vol, veh/h	12	1415	665	13	3	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	1522	715	14	3	9

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	729	0	-	0	1509	365
Stage 1	-	-	-	-	722	-
Stage 2	-	-	-	-	787	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	871	-	-	-	111	632
Stage 1	-	-	-	-	442	-
Stage 2	-	-	-	-	409	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	871	-	-	-	100	632
Mov Cap-2 Maneuver	-	-	-	-	100	-
Stage 1	-	-	-	-	400	-
Stage 2	-	-	-	-	409	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	19.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	871	-	-	-	258
HCM Lane V/C Ratio	0.015	-	-	-	0.046
HCM Control Delay (s)	9.2	0.4	-	-	19.6
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	356	355	67	234	705	90	20	182	718	92	12	73
Future Volume (vph)	356	355	67	234	705	90	20	182	718	92	12	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	400		300	200		0		250		200		200
Storage Lanes	2		1	1		1		1		1		1
Taper Length (ft)	100			100				100				100
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	0	1770	5085	1583	0	1770
Flt Permitted	0.950			0.950				0.950				0.950
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	0	1770	5085	1583	0	1770
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)			245			191				191		
Link Speed (mph)		35			35				35			
Link Distance (ft)		661			416				771			
Travel Time (s)		12.9			8.1				15.0			
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	383	382	72	252	758	97	0	218	772	99	0	91
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot	Prot
Protected Phases	7	4		3	8		5	5	2		1	1
Permitted Phases			4			8				2		
Detector Phase	7	4	4	3	8	8	5	5	2	2	1	1
Switch Phase												
Minimum Initial (s)	1.0	10.0	10.0	7.0	9.0	9.0	7.0	7.0	10.0	10.0	7.0	7.0
Minimum Split (s)	13.0	16.0	16.0	13.0	16.0	16.0	13.0	13.0	16.0	16.0	13.0	13.0
Total Split (s)	22.0	25.0	25.0	32.0	35.0	35.0	25.0	25.0	46.0	46.0	17.0	17.0
Total Split (%)	18.3%	20.8%	20.8%	26.7%	29.2%	29.2%	20.8%	20.8%	38.3%	38.3%	14.2%	14.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0		-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	None	C-Min	C-Min	None	None
Act Effct Green (s)	17.6	24.7	24.7	23.5	30.6	30.6		19.5	43.9	43.9		11.9
Actuated g/C Ratio	0.15	0.21	0.21	0.20	0.26	0.26		0.16	0.37	0.37		0.10
v/c Ratio	0.76	0.53	0.14	0.73	0.84	0.18		0.76	0.42	0.14		0.52
Control Delay	59.9	46.2	0.6	57.4	52.0	0.7		65.3	29.7	0.4		61.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0
Total Delay	59.9	46.2	0.6	57.4	52.0	0.7		65.3	29.7	0.4		61.9
LOS	E	D	A	E	D	A		E	C	A		E
Approach Delay		48.6			48.7				34.2			
Approach LOS		D			D				C			
Queue Length 50th (ft)	148	139	0	183	292	0		161	166	0		67
Queue Length 95th (ft)	202	198	0	266	368	0		#260	205	0		123
Internal Link Dist (ft)		581			336				691			
Turn Bay Length (ft)	400		300	200				250		200		200
Base Capacity (vph)	514	727	520	413	914	550		309	1859	700		191
Starvation Cap Reductn	0	0	0	0	0	0		0	0	0		0

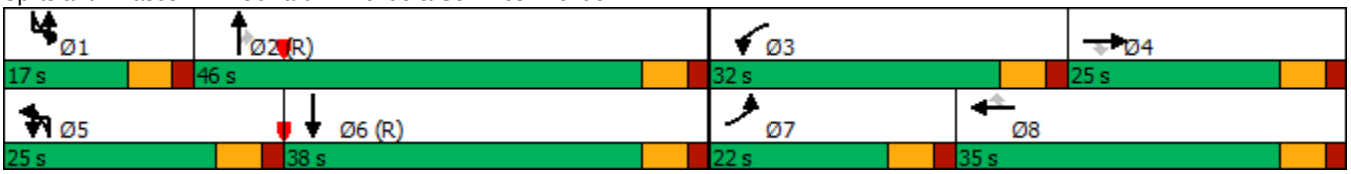
Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	1025	736
Future Volume (vph)	1025	736
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		0
Storage Lanes		1
Taper Length (ft)		
Satd. Flow (prot)	5085	1583
Flt Permitted		
Satd. Flow (perm)	5085	1583
Right Turn on Red		Yes
Satd. Flow (RTOR)		646
Link Speed (mph)	35	
Link Distance (ft)	443	
Travel Time (s)	8.6	
Peak Hour Factor	0.93	0.93
Shared Lane Traffic (%)		
Lane Group Flow (vph)	1102	791
Turn Type	NA	Free
Protected Phases	6	
Permitted Phases		Free
Detector Phase	6	
Switch Phase		
Minimum Initial (s)	10.0	
Minimum Split (s)	16.0	
Total Split (s)	38.0	
Total Split (%)	31.7%	
Yellow Time (s)	4.0	
All-Red Time (s)	2.0	
Lost Time Adjust (s)	-2.0	
Total Lost Time (s)	4.0	
Lead/Lag	Lag	
Lead-Lag Optimize?	Yes	
Recall Mode	C-Min	
Act Effct Green (s)	36.3	120.0
Actuated g/C Ratio	0.30	1.00
v/c Ratio	0.72	0.50
Control Delay	41.0	1.1
Queue Delay	0.0	0.0
Total Delay	41.0	1.1
LOS	D	A
Approach Delay	26.0	
Approach LOS	C	
Queue Length 50th (ft)	286	0
Queue Length 95th (ft)	341	0
Internal Link Dist (ft)	363	
Turn Bay Length (ft)		
Base Capacity (vph)	1538	1583
Starvation Cap Reductn	0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Spillback Cap Reductn	0	0	0	0	0	0		0	0	0		0
Storage Cap Reductn	0	0	0	0	0	0		0	0	0		0
Reduced v/c Ratio	0.75	0.53	0.14	0.61	0.83	0.18		0.71	0.42	0.14		0.48

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 63 (53%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 36.6 Intersection LOS: D
Intersection Capacity Utilization 74.0% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Cowardin Avenue & Semmes Avenue



Lane Group	SBT	SBR
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.72	0.50

Intersection Summary

Intersection						
Int Delay, s/veh	0.1					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	778	1613	10	0	7
Future Vol, veh/h	0	778	1613	10	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	837	1734	11	0	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	873
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	-	0	293
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	293
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	17.6
HCM LOS			C

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	293
HCM Lane V/C Ratio	-	-	-	0.026
HCM Control Delay (s)	-	-	-	17.6
HCM Lane LOS	-	-	-	C
HCM 95th %tile Q(veh)	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	771	1610	10	7	7
Future Vol, veh/h	20	771	1610	10	7	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	829	1731	11	8	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1742	0	-	0	2196	871
Stage 1	-	-	-	-	1737	-
Stage 2	-	-	-	-	459	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	357	-	-	-	38	294
Stage 1	-	-	-	-	127	-
Stage 2	-	-	-	-	603	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	357	-	-	-	34	294
Mov Cap-2 Maneuver	-	-	-	-	34	-
Stage 1	-	-	-	-	113	-
Stage 2	-	-	-	-	603	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	82.4
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	357	-	-	-	61
HCM Lane V/C Ratio	0.06	-	-	-	0.247
HCM Control Delay (s)	15.7	0.9	-	-	82.4
HCM Lane LOS	C	A	-	-	F
HCM 95th %tile Q(veh)	0.2	-	-	-	0.9

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	623	763	61	58	246	45	7	114	1084	227	5	158
Future Volume (vph)	623	763	61	58	246	45	7	114	1084	227	5	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	400		300	200		0		250		200		200
Storage Lanes	2		1	1		1		1		1		1
Taper Length (ft)	100			100				100				100
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	0	1770	5085	1583	0	1770
Flt Permitted	0.950			0.950				0.950				0.950
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	0	1770	5085	1583	0	1770
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)			149			208				244		
Link Speed (mph)		35			35				35			
Link Distance (ft)		661			416				771			
Travel Time (s)		12.9			8.1				15.0			
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	670	820	66	62	265	48	0	131	1166	244	0	175
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot	Prot
Protected Phases	7	4		3	8		5	5	2		1	1
Permitted Phases			4			8				2		
Detector Phase	7	4	4	3	8	8	5	5	2	2	1	1
Switch Phase												
Minimum Initial (s)	1.0	10.0	10.0	7.0	9.0	9.0	7.0	7.0	10.0	10.0	7.0	7.0
Minimum Split (s)	13.0	16.0	16.0	13.0	16.0	16.0	13.0	13.0	16.0	16.0	13.0	13.0
Total Split (s)	31.0	33.0	33.0	15.0	17.0	17.0	20.0	20.0	42.0	42.0	20.0	20.0
Total Split (%)	28.2%	30.0%	30.0%	13.6%	15.5%	15.5%	18.2%	18.2%	38.2%	38.2%	18.2%	18.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0		-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	None	C-Min	C-Min	None	None
Act Effct Green (s)	26.0	31.2	31.2	10.3	13.0	13.0		14.2	39.8	39.8		15.3
Actuated g/C Ratio	0.24	0.28	0.28	0.09	0.12	0.12		0.13	0.36	0.36		0.14
v/c Ratio	0.83	0.82	0.12	0.37	0.64	0.13		0.57	0.63	0.34		0.71
Control Delay	49.6	45.3	0.4	53.3	53.8	0.7		55.0	31.4	4.6		62.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0
Total Delay	49.6	45.3	0.4	53.3	53.8	0.7		55.0	31.4	4.6		62.0
LOS	D	D	A	D	D	A		E	C	A		E
Approach Delay		45.2			46.9				29.2			
Approach LOS		D			D				C			
Queue Length 50th (ft)	229	292	0	41	95	0		87	254	0		119
Queue Length 95th (ft)	298	#397	0	85	140	0		150	305	53		#207
Internal Link Dist (ft)		581			336				691			
Turn Bay Length (ft)	400		300	200				250		200		200
Base Capacity (vph)	842	1003	555	177	424	372		257	1840	728		257
Starvation Cap Reductn	0	0	0	0	0	0		0	0	0		0

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	573	335
Future Volume (vph)	573	335
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		0
Storage Lanes		1
Taper Length (ft)		
Satd. Flow (prot)	5085	1583
Flt Permitted		
Satd. Flow (perm)	5085	1583
Right Turn on Red		Yes
Satd. Flow (RTOR)		360
Link Speed (mph)	35	
Link Distance (ft)	443	
Travel Time (s)	8.6	
Peak Hour Factor	0.93	0.93
Shared Lane Traffic (%)		
Lane Group Flow (vph)	616	360
Turn Type	NA	Free
Protected Phases	6	
Permitted Phases		Free
Detector Phase	6	
Switch Phase		
Minimum Initial (s)	10.0	
Minimum Split (s)	16.0	
Total Split (s)	42.0	
Total Split (%)	38.2%	
Yellow Time (s)	4.0	
All-Red Time (s)	2.0	
Lost Time Adjust (s)	-2.0	
Total Lost Time (s)	4.0	
Lead/Lag	Lag	
Lead-Lag Optimize?	Yes	
Recall Mode	C-Min	
Act Effct Green (s)	40.9	110.0
Actuated g/C Ratio	0.37	1.00
v/c Ratio	0.33	0.23
Control Delay	26.0	0.3
Queue Delay	0.0	0.0
Total Delay	26.0	0.3
LOS	C	A
Approach Delay	23.4	
Approach LOS	C	
Queue Length 50th (ft)	116	0
Queue Length 95th (ft)	151	0
Internal Link Dist (ft)	363	
Turn Bay Length (ft)		
Base Capacity (vph)	1889	1583
Starvation Cap Reductn	0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Spillback Cap Reductn	0	0	0	0	0	0		0	0	0		0
Storage Cap Reductn	0	0	0	0	0	0		0	0	0		0
Reduced v/c Ratio	0.80	0.82	0.12	0.35	0.63	0.13		0.51	0.63	0.34		0.68

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 82 (75%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 34.6 Intersection LOS: C
Intersection Capacity Utilization 70.2% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Cowardin Avenue & Semmes Avenue

Lane Group	SBT	SBR
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.33	0.23

Intersection Summary

Intersection						
Int Delay, s/veh	0					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↱			↱
Traffic Vol, veh/h	0	1447	685	10	0	7
Future Vol, veh/h	0	1447	685	10	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	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	0	1573	745	11	0	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	378
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	-	0	620
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	620
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	620
HCM Lane V/C Ratio	-	-	-	0.012
HCM Control Delay (s)	-	-	-	10.9
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0

Intersection						
Int Delay, s/veh	0.5					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	1444	679	13	3	8
Future Vol, veh/h	12	1444	679	13	3	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	1553	730	14	3	9

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	744	0	-	0	1540	372
Stage 1	-	-	-	-	737	-
Stage 2	-	-	-	-	803	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	859	-	-	-	106	625
Stage 1	-	-	-	-	434	-
Stage 2	-	-	-	-	401	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	859	-	-	-	94	625
Mov Cap-2 Maneuver	-	-	-	-	94	-
Stage 1	-	-	-	-	386	-
Stage 2	-	-	-	-	401	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	20.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	859	-	-	-	246
HCM Lane V/C Ratio	0.015	-	-	-	0.048
HCM Control Delay (s)	9.3	0.5	-	-	20.4
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	363	363	68	239	719	92	20	186	732	94	12	75
Future Volume (vph)	363	363	68	239	719	92	20	186	732	94	12	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	400		300	200		0		250		200		200
Storage Lanes	2		1	1		1		1		1		1
Taper Length (ft)	100			100				100				100
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	0	1770	5085	1583	0	1770
Flt Permitted	0.950			0.950				0.950				0.950
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	0	1770	5085	1583	0	1770
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)			245			191				191		
Link Speed (mph)		35			35				35			
Link Distance (ft)		661			416				771			
Travel Time (s)		12.9			8.1				15.0			
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	390	390	73	257	773	99	0	222	787	101	0	94
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot	Prot
Protected Phases	7	4		3	8		5	5	2		1	1
Permitted Phases			4			8				2		
Detector Phase	7	4	4	3	8	8	5	5	2	2	1	1
Switch Phase												
Minimum Initial (s)	1.0	10.0	10.0	7.0	9.0	9.0	7.0	7.0	10.0	10.0	7.0	7.0
Minimum Split (s)	13.0	16.0	16.0	13.0	16.0	16.0	13.0	13.0	16.0	16.0	13.0	13.0
Total Split (s)	22.0	25.0	25.0	32.0	35.0	35.0	25.0	25.0	46.0	46.0	17.0	17.0
Total Split (%)	18.3%	20.8%	20.8%	26.7%	29.2%	29.2%	20.8%	20.8%	38.3%	38.3%	14.2%	14.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0		-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	None	C-Min	C-Min	None	None
Act Effct Green (s)	17.6	24.6	24.6	23.7	30.7	30.7		19.6	43.6	43.6		12.0
Actuated g/C Ratio	0.15	0.20	0.20	0.20	0.26	0.26		0.16	0.36	0.36		0.10
v/c Ratio	0.77	0.54	0.14	0.73	0.85	0.18		0.77	0.43	0.14		0.53
Control Delay	60.6	46.5	0.6	57.6	52.9	0.7		65.9	30.0	0.4		62.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0
Total Delay	60.6	46.5	0.6	57.6	52.9	0.7		65.9	30.0	0.4		62.5
LOS	E	D	A	E	D	A		E	C	A		E
Approach Delay		49.0			49.4				34.5			
Approach LOS		D			D				C			
Queue Length 50th (ft)	151	143	0	187	300	0		164	170	0		70
Queue Length 95th (ft)	206	203	0	271	#382	0		#266	210	0		126
Internal Link Dist (ft)		581			336				691			
Turn Bay Length (ft)	400		300	200				250		200		200
Base Capacity (vph)	514	726	519	413	914	550		309	1849	697		191
Starvation Cap Reductn	0	0	0	0	0	0		0	0	0		0

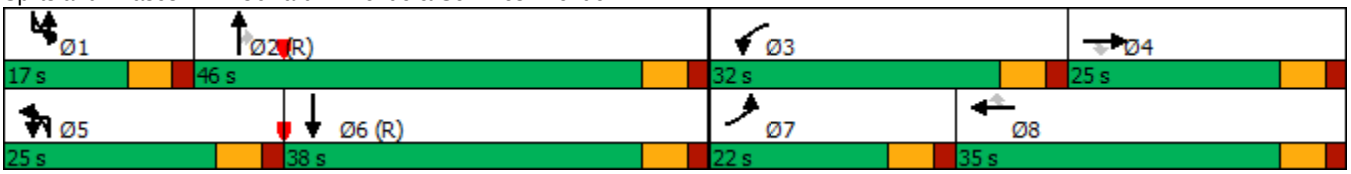
Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	1046	751
Future Volume (vph)	1046	751
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		0
Storage Lanes		1
Taper Length (ft)		
Satd. Flow (prot)	5085	1583
Flt Permitted		
Satd. Flow (perm)	5085	1583
Right Turn on Red		Yes
Satd. Flow (RTOR)		647
Link Speed (mph)	35	
Link Distance (ft)	443	
Travel Time (s)	8.6	
Peak Hour Factor	0.93	0.93
Shared Lane Traffic (%)		
Lane Group Flow (vph)	1125	808
Turn Type	NA	Free
Protected Phases	6	
Permitted Phases		Free
Detector Phase	6	
Switch Phase		
Minimum Initial (s)	10.0	
Minimum Split (s)	16.0	
Total Split (s)	38.0	
Total Split (%)	31.7%	
Yellow Time (s)	4.0	
All-Red Time (s)	2.0	
Lost Time Adjust (s)	-2.0	
Total Lost Time (s)	4.0	
Lead/Lag	Lag	
Lead-Lag Optimize?	Yes	
Recall Mode	C-Min	
Act Effct Green (s)	36.0	120.0
Actuated g/C Ratio	0.30	1.00
v/c Ratio	0.74	0.51
Control Delay	41.7	1.2
Queue Delay	0.0	0.0
Total Delay	41.7	1.2
LOS	D	A
Approach Delay	26.5	
Approach LOS	C	
Queue Length 50th (ft)	294	0
Queue Length 95th (ft)	349	0
Internal Link Dist (ft)	363	
Turn Bay Length (ft)		
Base Capacity (vph)	1526	1583
Starvation Cap Reductn	0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Spillback Cap Reductn	0	0	0	0	0	0		0	0	0		0
Storage Cap Reductn	0	0	0	0	0	0		0	0	0		0
Reduced v/c Ratio	0.76	0.54	0.14	0.62	0.85	0.18		0.72	0.43	0.14		0.49

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 63 (53%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 37.0 Intersection LOS: D
Intersection Capacity Utilization 75.2% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Cowardin Avenue & Semmes Avenue



Lane Group	SBT	SBR
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.74	0.51

Intersection Summary

Intersection						
Int Delay, s/veh	0.1					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↱			↱
Traffic Vol, veh/h	0	794	1646	10	0	7
Future Vol, veh/h	0	794	1646	10	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	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	0	863	1789	11	0	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	900
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	-	0	282
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	282
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	18.1
HCM LOS			C

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	282
HCM Lane V/C Ratio	-	-	-	0.027
HCM Control Delay (s)	-	-	-	18.1
HCM Lane LOS	-	-	-	C
HCM 95th %tile Q(veh)	-	-	-	0.1

Intersection						
Int Delay, s/veh	0.9					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	787	1643	10	7	7
Future Vol, veh/h	20	787	1643	10	7	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	846	1767	11	8	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1778	0	-	0	2240	889
Stage 1	-	-	-	-	1773	-
Stage 2	-	-	-	-	467	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	346	-	-	-	36	286
Stage 1	-	-	-	-	121	-
Stage 2	-	-	-	-	597	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	346	-	-	-	32	286
Mov Cap-2 Maneuver	-	-	-	-	32	-
Stage 1	-	-	-	-	106	-
Stage 2	-	-	-	-	597	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	87.6
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	346	-	-	-	58
HCM Lane V/C Ratio	0.062	-	-	-	0.26
HCM Control Delay (s)	16.1	0.9	-	-	87.6
HCM Lane LOS	C	A	-	-	F
HCM 95th %tile Q(veh)	0.2	-	-	-	0.9

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	656	800	65	58	261	45	7	116	1084	227	5	158
Future Volume (vph)	656	800	65	58	261	45	7	116	1084	227	5	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	400		300	200		0		250		200		200
Storage Lanes	2		1	1		1		1		1		1
Taper Length (ft)	100			100				100				100
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	0	1770	5085	1583	0	1770
Flt Permitted	0.950			0.950				0.950				0.950
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	0	1770	5085	1583	0	1770
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)			149			208				244		
Link Speed (mph)		35			35				35			
Link Distance (ft)		661			416				771			
Travel Time (s)		12.9			8.1				15.0			
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	705	860	70	62	281	48	0	133	1166	244	0	175
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot	Prot
Protected Phases	7	4		3	8		5	5	2		1	1
Permitted Phases			4			8				2		
Detector Phase	7	4	4	3	8	8	5	5	2	2	1	1
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	9.0	9.0	7.0	7.0	10.0	10.0	7.0	7.0
Minimum Split (s)	13.0	16.0	16.0	13.0	16.0	16.0	13.0	13.0	16.0	16.0	13.0	13.0
Total Split (s)	34.0	38.0	38.0	13.0	17.0	17.0	19.0	19.0	38.0	38.0	21.0	21.0
Total Split (%)	30.9%	34.5%	34.5%	11.8%	15.5%	15.5%	17.3%	17.3%	34.5%	34.5%	19.1%	19.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0		-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	None	C-Min	C-Min	None	None
Act Effct Green (s)	28.3	35.2	35.2	9.0	13.3	13.3		13.8	36.7	36.7		15.8
Actuated g/C Ratio	0.26	0.32	0.32	0.08	0.12	0.12		0.13	0.33	0.33		0.14
v/c Ratio	0.80	0.76	0.12	0.43	0.66	0.13		0.60	0.69	0.35		0.69
Control Delay	45.6	39.2	0.4	57.9	54.4	0.7		57.2	35.0	5.2		59.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0
Total Delay	45.6	39.2	0.4	57.9	54.4	0.7		57.2	35.0	5.2		59.4
LOS	D	D	A	E	D	A		E	C	A		E
Approach Delay		40.3			48.3				32.2			
Approach LOS		D			D				C			
Queue Length 50th (ft)	235	290	0	42	101	0		89	269	0		117
Queue Length 95th (ft)	304	367	0	86	147	0		154	323	56		192
Internal Link Dist (ft)		581			336				691			
Turn Bay Length (ft)	400		300	200				250		200		200
Base Capacity (vph)	936	1130	607	144	431	375		241	1695	690		273
Starvation Cap Reductn	0	0	0	0	0	0		0	0	0		0

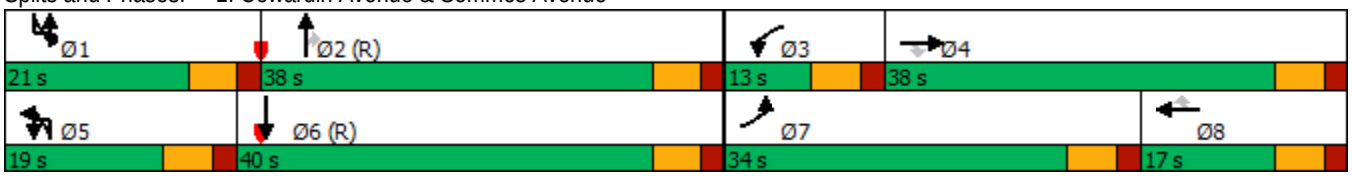
Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	573	348
Future Volume (vph)	573	348
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		0
Storage Lanes		1
Taper Length (ft)		
Satd. Flow (prot)	5085	1583
Flt Permitted		
Satd. Flow (perm)	5085	1583
Right Turn on Red		Yes
Satd. Flow (RTOR)		374
Link Speed (mph)	35	
Link Distance (ft)	443	
Travel Time (s)	8.6	
Peak Hour Factor	0.93	0.93
Shared Lane Traffic (%)		
Lane Group Flow (vph)	616	374
Turn Type	NA	Free
Protected Phases	6	
Permitted Phases		Free
Detector Phase	6	
Switch Phase		
Minimum Initial (s)	10.0	
Minimum Split (s)	16.0	
Total Split (s)	40.0	
Total Split (%)	36.4%	
Yellow Time (s)	4.0	
All-Red Time (s)	2.0	
Lost Time Adjust (s)	-2.0	
Total Lost Time (s)	4.0	
Lead/Lag	Lag	
Lead-Lag Optimize?	Yes	
Recall Mode	C-Min	
Act Effct Green (s)	38.7	110.0
Actuated g/C Ratio	0.35	1.00
v/c Ratio	0.34	0.24
Control Delay	27.7	0.4
Queue Delay	0.0	0.0
Total Delay	27.7	0.4
LOS	C	A
Approach Delay	23.7	
Approach LOS	C	
Queue Length 50th (ft)	121	0
Queue Length 95th (ft)	155	0
Internal Link Dist (ft)	363	
Turn Bay Length (ft)		
Base Capacity (vph)	1788	1583
Starvation Cap Reductn	0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Spillback Cap Reductn	0	0	0	0	0	0		0	0	0		0
Storage Cap Reductn	0	0	0	0	0	0		0	0	0		0
Reduced v/c Ratio	0.75	0.76	0.12	0.43	0.65	0.13		0.55	0.69	0.35		0.64

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 82 (75%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 34.2 Intersection LOS: C
Intersection Capacity Utilization 71.3% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1: Cowardin Avenue & Semmes Avenue



Lane Group	SBT	SBR
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.34	0.24

Intersection Summary

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1484	2	0	715	10	0	0	37	0	0	7
Future Vol, veh/h	0	1484	2	0	715	10	0	0	37	0	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1596	2	0	769	11	0	0	40	0	0	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	799	-	-	390
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	6.94	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.32	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	328	0	0	609
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	328	-	-	609
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	17.5	11
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	328	-	-	-	-	609
HCM Lane V/C Ratio	0.121	-	-	-	-	0.012
HCM Control Delay (s)	17.5	-	-	-	-	11
HCM Lane LOS	C	-	-	-	-	B
HCM 95th %tile Q(veh)	0.4	-	-	-	-	0

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	1444	8	31	678	13	20	1	39	3	1	8
Future Vol, veh/h	12	1444	8	31	678	13	20	1	39	3	1	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	1553	9	33	729	14	22	1	42	3	1	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	743	0	0	1562	0	0	2015	2393	781	1605	2390	372
Stage 1	-	-	-	-	-	-	1584	1584	-	802	802	-
Stage 2	-	-	-	-	-	-	431	809	-	803	1588	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	860	-	-	419	-	-	34	33	338	70	33	625
Stage 1	-	-	-	-	-	-	113	167	-	344	395	-
Stage 2	-	-	-	-	-	-	573	392	-	343	166	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	860	-	-	419	-	-	28	27	338	51	27	625
Mov Cap-2 Maneuver	-	-	-	-	-	-	28	27	-	51	27	-
Stage 1	-	-	-	-	-	-	100	148	-	304	364	-
Stage 2	-	-	-	-	-	-	519	361	-	264	147	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.6	191.4	42
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	69	860	-	-	419	-	-	110
HCM Lane V/C Ratio	0.935	0.015	-	-	0.08	-	-	0.117
HCM Control Delay (s)	191.4	9.2	0.5	-	14.3	-	-	42
HCM Lane LOS	F	A	A	-	B	-	-	E
HCM 95th %tile Q(veh)	4.6	0	-	-	0.3	-	-	0.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	392	396	72	239	764	92	20	192	732	94	12	75
Future Volume (vph)	392	396	72	239	764	92	20	192	732	94	12	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	400		300	200		0		250		200		200
Storage Lanes	2		1	1		1		1		1		1
Taper Length (ft)	100			100				100				100
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	0	1770	5085	1583	0	1770
Flt Permitted	0.950			0.950				0.950				0.950
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	0	1770	5085	1583	0	1770
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)			245			191				191		
Link Speed (mph)		35			35				35			
Link Distance (ft)		661			416				771			
Travel Time (s)		12.9			8.1				15.0			
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	422	426	77	257	822	99	0	228	787	101	0	94
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot	Prot
Protected Phases	7	4		3	8		5	5	2		1	1
Permitted Phases			4			8				2		
Detector Phase	7	4	4	3	8	8	5	5	2	2	1	1
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	9.0	9.0	7.0	7.0	10.0	10.0	7.0	7.0
Minimum Split (s)	13.0	16.0	16.0	13.0	16.0	16.0	13.0	13.0	16.0	16.0	13.0	13.0
Total Split (s)	22.0	27.0	27.0	32.0	37.0	37.0	24.0	24.0	45.0	45.0	16.0	16.0
Total Split (%)	18.3%	22.5%	22.5%	26.7%	30.8%	30.8%	20.0%	20.0%	37.5%	37.5%	13.3%	13.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0		-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	None	C-Min	C-Min	None	None
Act Effct Green (s)	17.9	26.7	26.7	23.7	32.6	32.6		19.2	42.1	42.1		11.4
Actuated g/C Ratio	0.15	0.22	0.22	0.20	0.27	0.27		0.16	0.35	0.35		0.10
v/c Ratio	0.83	0.54	0.14	0.73	0.86	0.17		0.80	0.44	0.15		0.56
Control Delay	64.1	45.0	0.5	57.6	51.4	0.7		70.0	31.1	0.5		65.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0
Total Delay	64.1	45.0	0.5	57.6	51.4	0.7		70.0	31.1	0.5		65.0
LOS	E	D	A	E	D	A		E	C	A		E
Approach Delay		50.0			48.5				36.3			
Approach LOS		D			D				D			
Queue Length 50th (ft)	165	155	0	187	317	0		171	172	0		70
Queue Length 95th (ft)	#239	216	0	271	396	0		#291	213	0		127
Internal Link Dist (ft)		581			336				691			
Turn Bay Length (ft)	400		300	200				250		200		200
Base Capacity (vph)	514	788	543	413	973	573		295	1784	679		177
Starvation Cap Reductn	0	0	0	0	0	0		0	0	0		0

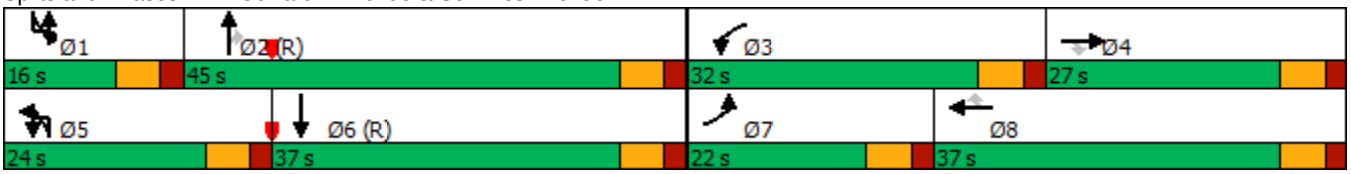
Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	1046	790
Future Volume (vph)	1046	790
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		0
Storage Lanes		1
Taper Length (ft)		
Satd. Flow (prot)	5085	1583
Flt Permitted		
Satd. Flow (perm)	5085	1583
Right Turn on Red		Yes
Satd. Flow (RTOR)		647
Link Speed (mph)	35	
Link Distance (ft)	443	
Travel Time (s)	8.6	
Peak Hour Factor	0.93	0.93
Shared Lane Traffic (%)		
Lane Group Flow (vph)	1125	849
Turn Type	NA	Free
Protected Phases	6	
Permitted Phases		Free
Detector Phase	6	
Switch Phase		
Minimum Initial (s)	10.0	
Minimum Split (s)	16.0	
Total Split (s)	37.0	
Total Split (%)	30.8%	
Yellow Time (s)	4.0	
All-Red Time (s)	2.0	
Lost Time Adjust (s)	-2.0	
Total Lost Time (s)	4.0	
Lead/Lag	Lag	
Lead-Lag Optimize?	Yes	
Recall Mode	C-Min	
Act Effct Green (s)	34.3	120.0
Actuated g/C Ratio	0.29	1.00
v/c Ratio	0.77	0.54
Control Delay	44.0	1.3
Queue Delay	0.0	0.0
Total Delay	44.0	1.3
LOS	D	A
Approach Delay	27.4	
Approach LOS	C	
Queue Length 50th (ft)	297	0
Queue Length 95th (ft)	353	0
Internal Link Dist (ft)	363	
Turn Bay Length (ft)		
Base Capacity (vph)	1452	1583
Starvation Cap Reductn	0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Spillback Cap Reductn	0	0	0	0	0	0		0	0	0		0
Storage Cap Reductn	0	0	0	0	0	0		0	0	0		0
Reduced v/c Ratio	0.82	0.54	0.14	0.62	0.84	0.17		0.77	0.44	0.15		0.53

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 63 (53%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 37.9 Intersection LOS: D
Intersection Capacity Utilization 77.6% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Cowardin Avenue & Semmes Avenue



Lane Group	SBT	SBR
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.77	0.54

Intersection Summary

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	826	6	0	1736	10	0	0	34	0	0	7
Future Vol, veh/h	0	826	6	0	1736	10	0	0	34	0	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	888	6	0	1867	11	0	0	37	0	0	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	447	-	-	939
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	6.94	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.32	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	559	0	0	265
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	559	-	-	265
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	11.9	19
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	559	-	-	-	-	265
HCM Lane V/C Ratio	0.065	-	-	-	-	0.028
HCM Control Delay (s)	11.9	-	-	-	-	19
HCM Lane LOS	B	-	-	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	-	0.1

Intersection	
Int Delay, s/veh	9.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	789	20	99	1634	10	25	1	36	7	1	7
Future Vol, veh/h	20	789	20	99	1634	10	25	1	36	7	1	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	848	22	106	1757	11	27	1	39	8	1	8

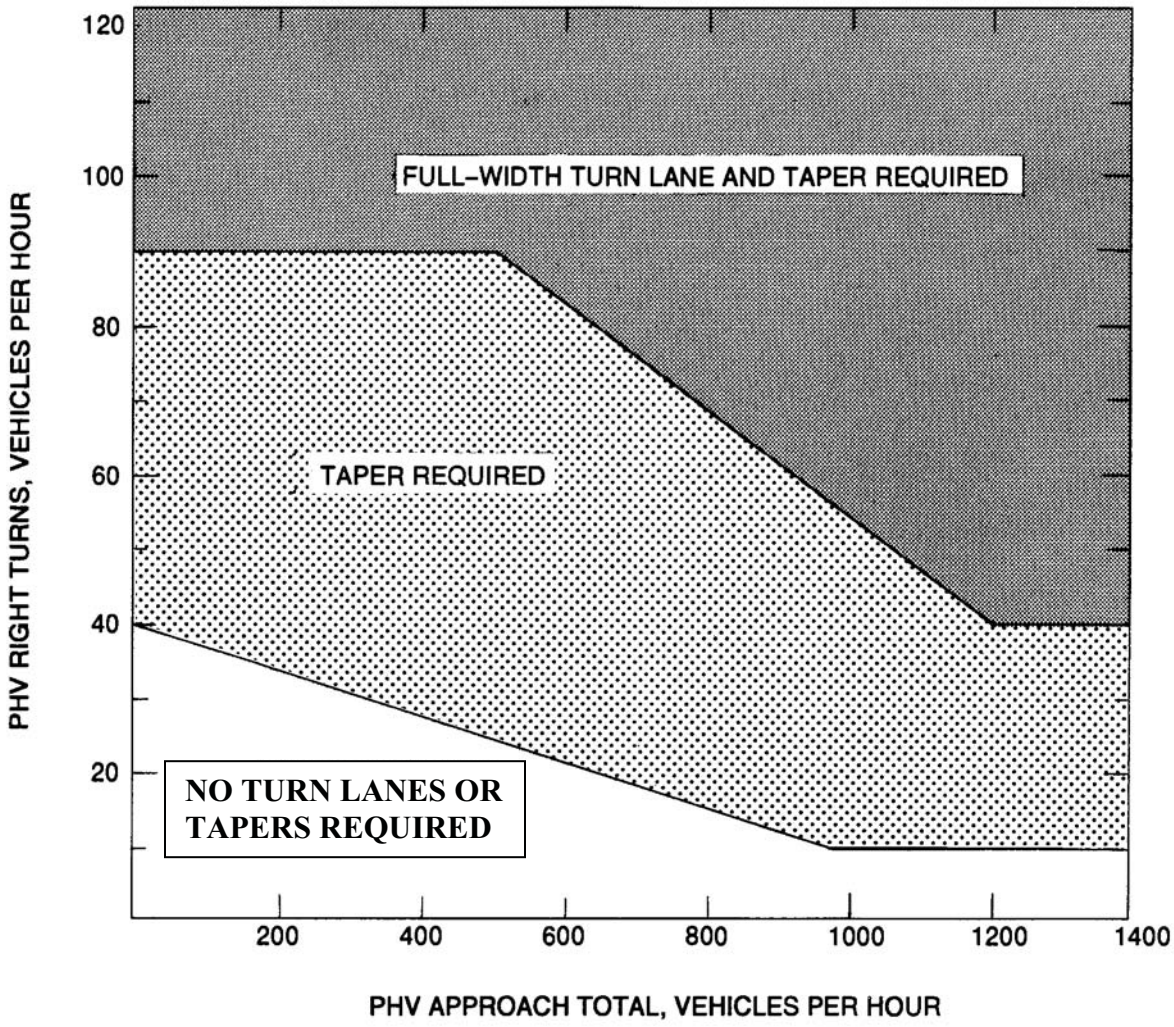
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1768	0	0	870	0	0	1994	2883	435	2444	2889	884
Stage 1	-	-	-	-	-	-	903	903	-	1975	1975	-
Stage 2	-	-	-	-	-	-	1091	1980	-	469	914	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	349	-	-	770	-	-	36	16	569	16	16	288
Stage 1	-	-	-	-	-	-	299	354	-	64	106	-
Stage 2	-	-	-	-	-	-	229	106	-	544	350	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	349	-	-	770	-	-	27	12	569	11	12	288
Mov Cap-2 Maneuver	-	-	-	-	-	-	27	12	-	11	12	-
Stage 1	-	-	-	-	-	-	262	310	-	56	91	-
Stage 2	-	-	-	-	-	-	190	91	-	443	307	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.2	0.6	283	$ 400.7
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	58	349	-	-	770	-	-	20
HCM Lane V/C Ratio	1.149	0.062	-	-	0.138	-	-	0.806
HCM Control Delay (s)	283	16	0.9	-	10.4	-	-	$ 400.7
HCM Lane LOS	F	C	A	-	B	-	-	F
HCM 95th %tile Q(veh)	5.6	0.2	-	-	0.5	-	-	2.2

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon



Appropriate Radius required at all Intersections and Entrances (Commercial or Private).

LEGEND

PHV- - Peak Hour Volume (also Design Hourly Volume equivalent)

Adjustment for Right Turns

If PHV is not known use formula: PHV = ADT x K x D

K = the percent of AADT occurring in the peak hour
D = the percent of traffic in the peak direction of flow

Note: An average of 11% for K x D will suffice.

When right turn facilities are warranted, see Figure 3-1 for design criteria.*

FIGURE 3-27 WARRANTS FOR RIGHT TURN TREATMENT (4-LANE HIGHWAY)

* Rev. 1/15

Warrants for Left Turn Storage Lanes on Four-Lane Highways

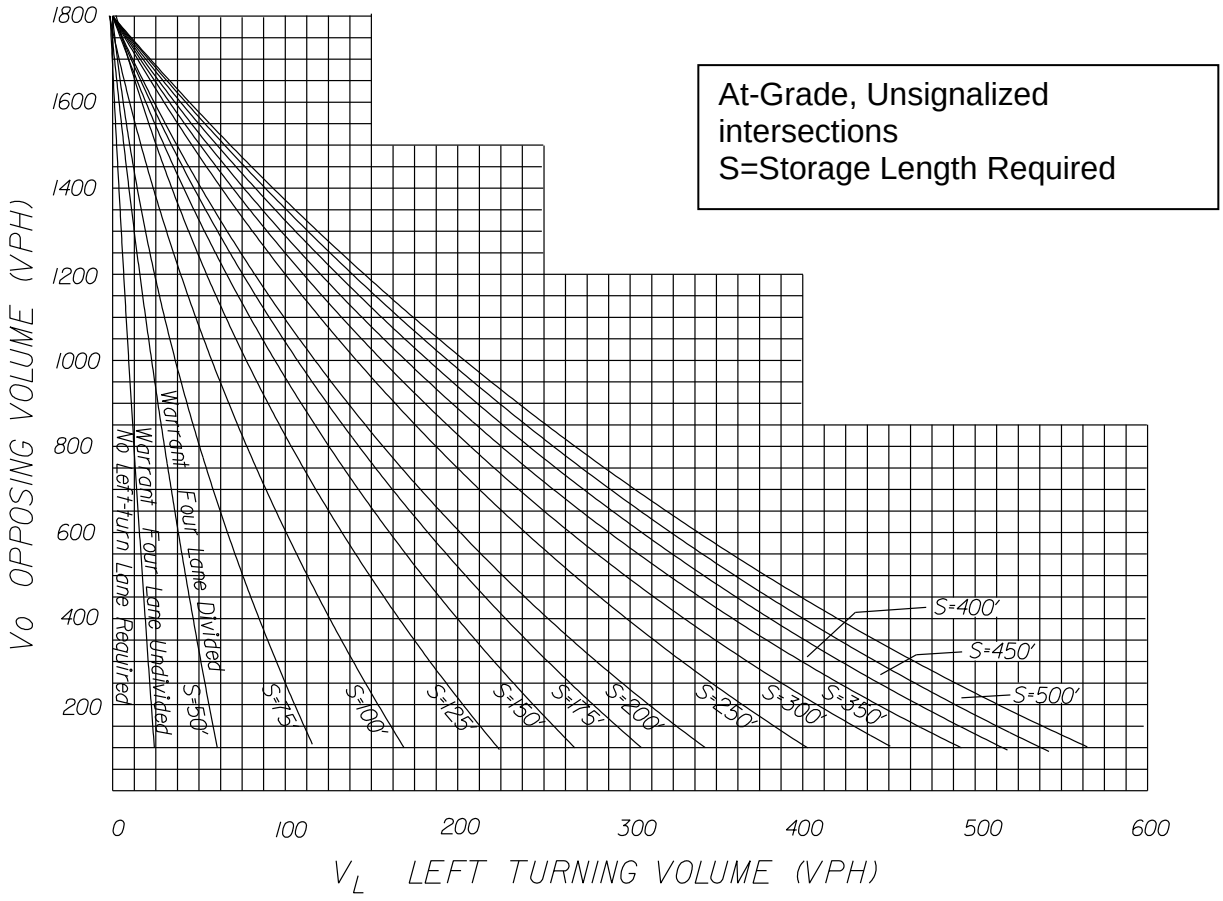


FIGURE 3-3 WARRANTS FOR LEFT TURN STORAGE LANES ON FOUR-LANE HIGHWAYS

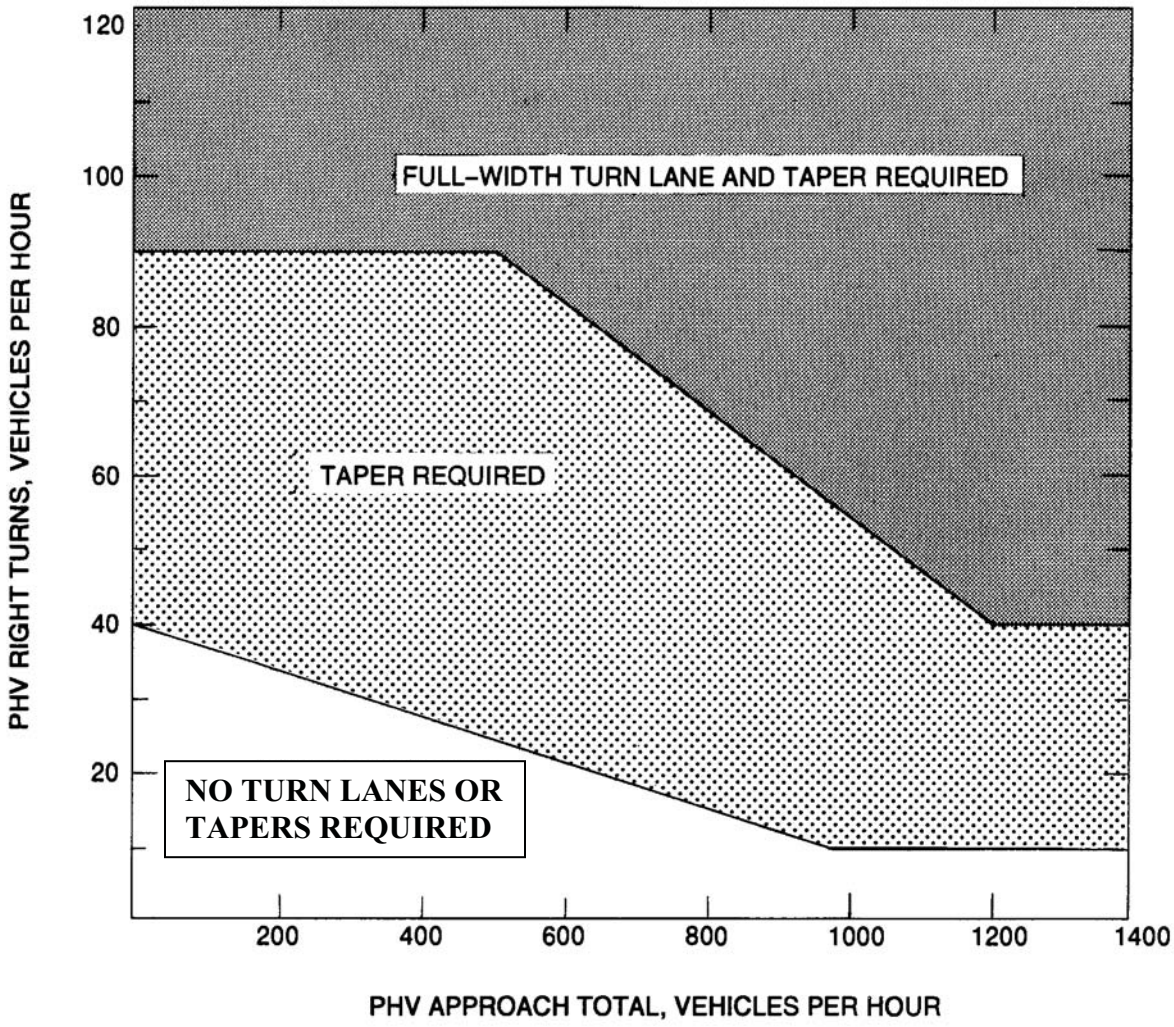
Figure 3-3 was derived from *Highway Research Report No. 211*.

Opposing volume and left turning volume in vehicles per hour (VPH) are used for left turn storage lane warrants on four-lane highways.

For plan detail requirements when curb and/or gutter are used, see VDOT's *Road Design Manual*, Section 2E-3 on the VDOT web site: *http://www.virginiadot.org/business/locdes/rdmanual-index.asp*.

Left-turn lanes shall* also be established on two-lane highways where traffic volumes are high enough to warrant them.

* Rev. 1/15



Appropriate Radius required at all Intersections and Entrances (Commercial or Private).

LEGEND

PHV- - Peak Hour Volume (also Design Hourly Volume equivalent)

Adjustment for Right Turns

If PHV is not known use formula: PHV = ADT x K x D

K = the percent of AADT occurring in the peak hour
D = the percent of traffic in the peak direction of flow

Note: An average of 11% for K x D will suffice.

When right turn facilities are warranted, see Figure 3-1 for design criteria.*

FIGURE 3-27 WARRANTS FOR RIGHT TURN TREATMENT (4-LANE HIGHWAY)

* Rev. 1/15