

**TRAFFIC IMPACT STUDY
FOR
RESIDENTIAL DEVELOPMENT ON THOMPSON MILL
ROAD**

HALL COUNTY, GEORGIA



Prepared for:

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A & R Project # 23-071

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1.0 INTRODUCTION

The purpose of this study is to determine the traffic impact from the proposed residential development located off Thompson Mill Road across from Oaks at Braselton, in Hall County, Georgia. The traffic analysis includes evaluation of the current operations and future conditions with the traffic generated by the development. The proposed development will consist of 133 Units of Single-Family Detached Housing.



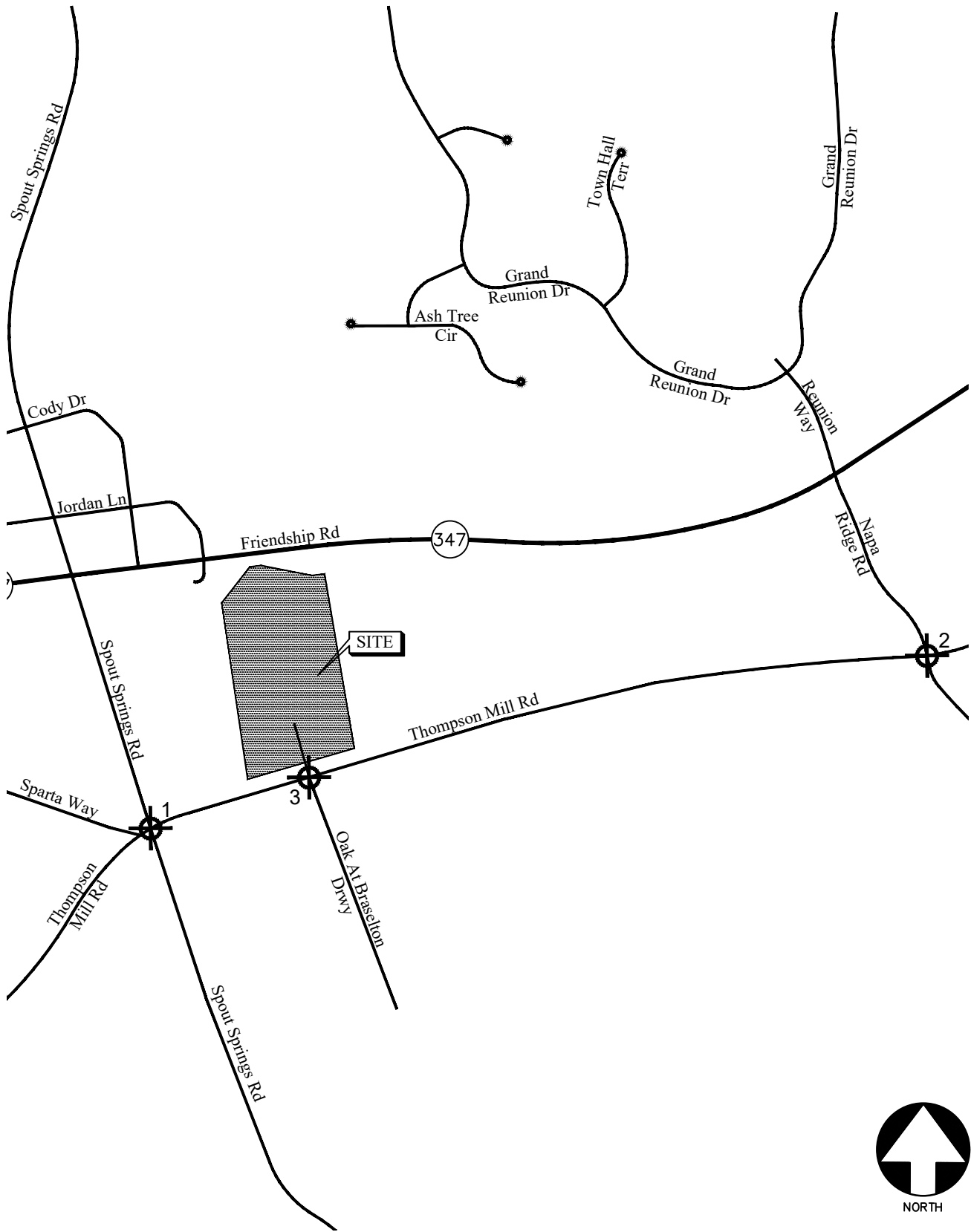
The development proposes a full access driveway on Thompson Mill Road aligned with Oaks at Braselton Driveway.

The AM and PM peak hours have been analyzed in this study. In addition to the site access points, this study includes the evaluation of traffic operations at the intersections of:

- Thompson Mill Road at Spout Springs Road
- Thompson Mill Road at Napa Ridge Road
- Thompson Mill Road at Oaks at Braselton Driveway
-

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.

⊕ Study Intersection



LOCATION MAP

FIGURE 1
A&R Engineering Inc.

2.0 EXISTING FACILITIES / CONDITIONS

2.1 Roadway Facilities

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

2.1.1 Thompson Mill Road

Thompson Mill Road is an east-west, two-lane, undivided roadway with a posted speed limit of 45 mph in the vicinity of the site. Georgia Department of Transportation (GDOT) traffic counts (Station ID's 139-0493 & 135-0476) indicate that the daily traffic volume on Thompson Mill Road in 2021 was 13,600 and 5,930 vehicles per day to the east and west of the Spout Springs Road. GDOT classifies Thompson Mill Road as a Local (Urban) roadway.

2.1.2 Spout Springs Road

Spout Springs Road is a north-south, two-lane, undivided roadway with a posted speed limit of 40 mph in the vicinity of the site. GDOT traffic counts (Station ID's 139-0437 & 135-7360) indicate that the daily traffic volume on Spout Springs Road in 2021 was 11,100 and 9,750 vehicles per day to the north and south of the Thompson Mill Road. GDOT classifies Spout Springs Road as a Minor Arterial (Urban) towards north and Major Collector roadway towards south.

2.1.3 Napa Ridge Road

Napa Ridge Road is a north-south, two-lane, undivided roadway and posted with a speed limit of 25 mph in the vicinity of the site.

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, 6th edition (HCM 6). Synchro software, which utilizes the HCM 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 controlled by a stop sign on minor streets, the level-of-service (LOS) for motor vehicles with controlled movements is determined by the computed control delay according to the thresholds stated in Table 1 below. LOS is determined for each minor street movement (or shared movement), as well as major street left turns. LOS is not defined for the intersection as a whole or for major street approaches. The LOS of any controlled movement which experiences a volume to capacity ratio greater than 1 is designated as “F” regardless of the control delay.

Control delay for unsignalized intersections includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Several factors affect the control 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 the main road without experiencing long delays.

TABLE 1 — LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS		
Control Delay (sec/vehicle)	LOS by Volume-to-Capacity Ratio*	
	v/c ≤ 1.0	v/c > 1.0
≤ 10	A	F
> 10 and ≤ 15	B	F
> 15 and ≤ 25	C	F
> 25 and ≤ 35	D	F
> 35 and ≤ 50	E	F
> 50	F	F

*The LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or for the intersection.

Source: Highway Capacity Manual, 6th edition, Exhibit 20-2 *LOS Criteria: Motorized Vehicle Mode*

3.2 Signalized Intersections

According to HCM procedures, LOS can be calculated for the entire intersection, each intersection approach, and each lane group. HCM uses control delay alone to characterize LOS for the entire intersection or an approach. Control delay per vehicle is composed of initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Both control delay and volume-to-capacity ratio are used to characterize LOS for a lane group. A volume-to-capacity ratio of 1.0 or more for a lane group indicates failure from capacity perspective. Therefore, such a lane group is assigned LOS F regardless of the amount of control delay.

Table 2 below summarizes the LOS criteria from HCM for motorized vehicles at signalized intersection.

TABLE 2 – LEVEL-OF-SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS		
Control Delay (sec/vehicle) *	LOS for Lane Group by Volume-to-Capacity Ratio*	
	v/c ≤ 1.0	v/c > 1.0
≤ 10	A	F
> 10 and ≤ 20	B	F
> 20 and ≤ 35	C	F
> 35 and ≤ 55	D	F
> 55 and ≤ 80	E	F
> 80	F	F

*For approach-based and intersection wide assessments, LOS is defined solely by control delay

Source: Highway Capacity Manual, 6th edition, Exhibit 19-8 *LOS Criteria: Motorized Vehicle Mode*

LOS A is typically assigned when the volume-to-capacity (v/c) ratio is low and either progression is exceptionally favorable, or the cycle length is very short. LOS B is typically assigned when the v/c ratio is low and either progression is highly favorable, or the cycle length is short. However, more vehicles are stopped than with LOS A. LOS C is typically assigned when progression is favorable, or the cycle length is moderate. Individual *cycle failures* (one or more queued vehicles are not able to depart because of insufficient capacity during the cycle) may begin to appear at this level. Many vehicles still pass through the intersection without stopping, but the number of vehicles stopping is significant. LOS D is typically assigned when the v/c ratio is high and either progression is ineffective, or the cycle length is long. There are many vehicle-stops and individual cycle failures are noticeable. LOS E is typically assigned when the v/c ratio is high, progression is very poor, the cycle length is long, and individual cycle failures are frequent. LOS F is typically assigned when the v/c ratio is very high, progression is very poor, the cycle length is long, and most cycles fail to clear the queue.

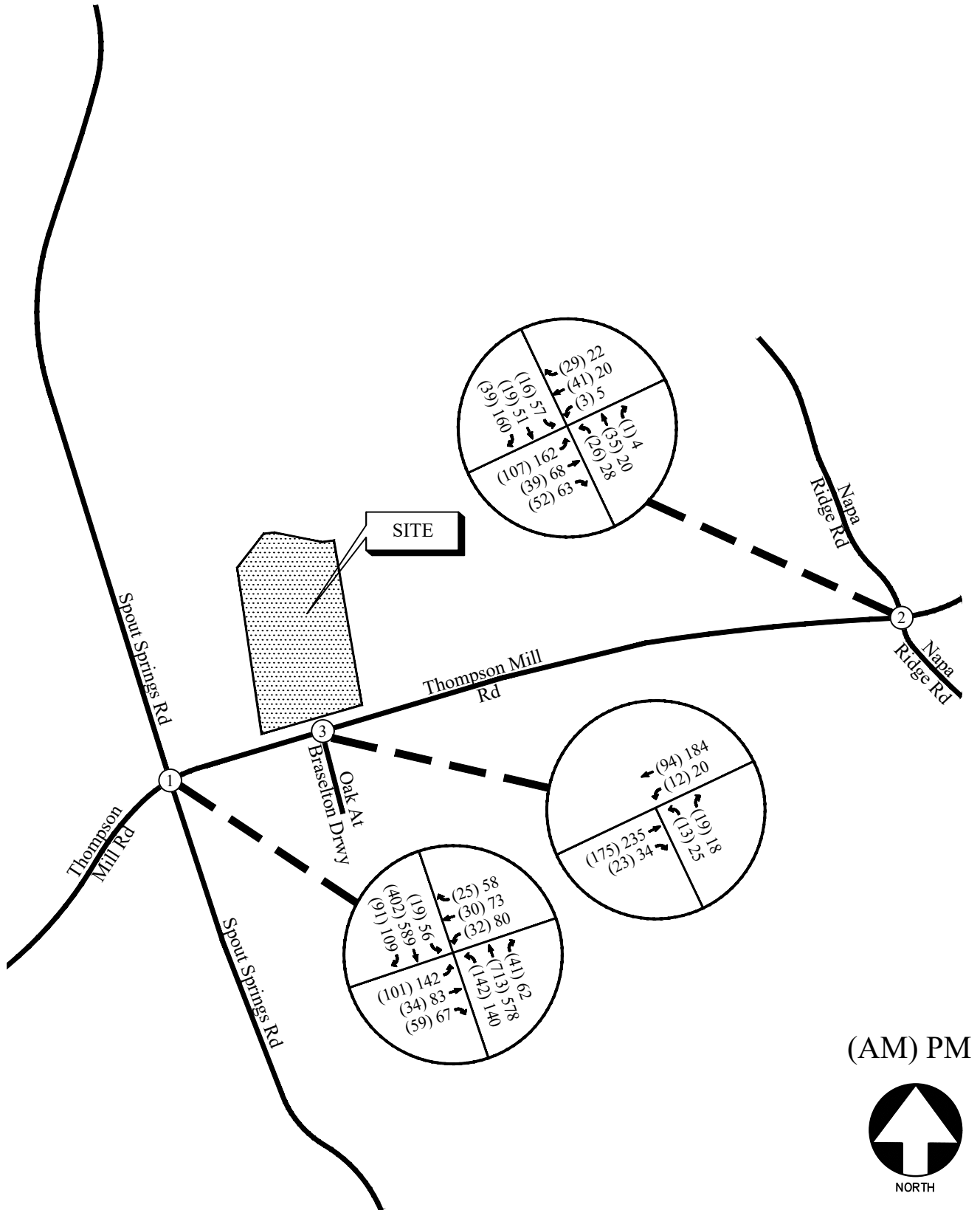
4.0 EXISTING 2023 TRAFFIC ANALYSIS

4.1 Existing Traffic Volumes

Existing traffic counts were obtained at the following study intersections:

- Thompson Mill Road at Spout Springs Road
- Thompson Mill Road at Napa Ridge Road
- Thompson Mill Road at Oaks at Braselton Driveway




Turning movement counts were collected on Tuesday, May 02, 2023. 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.

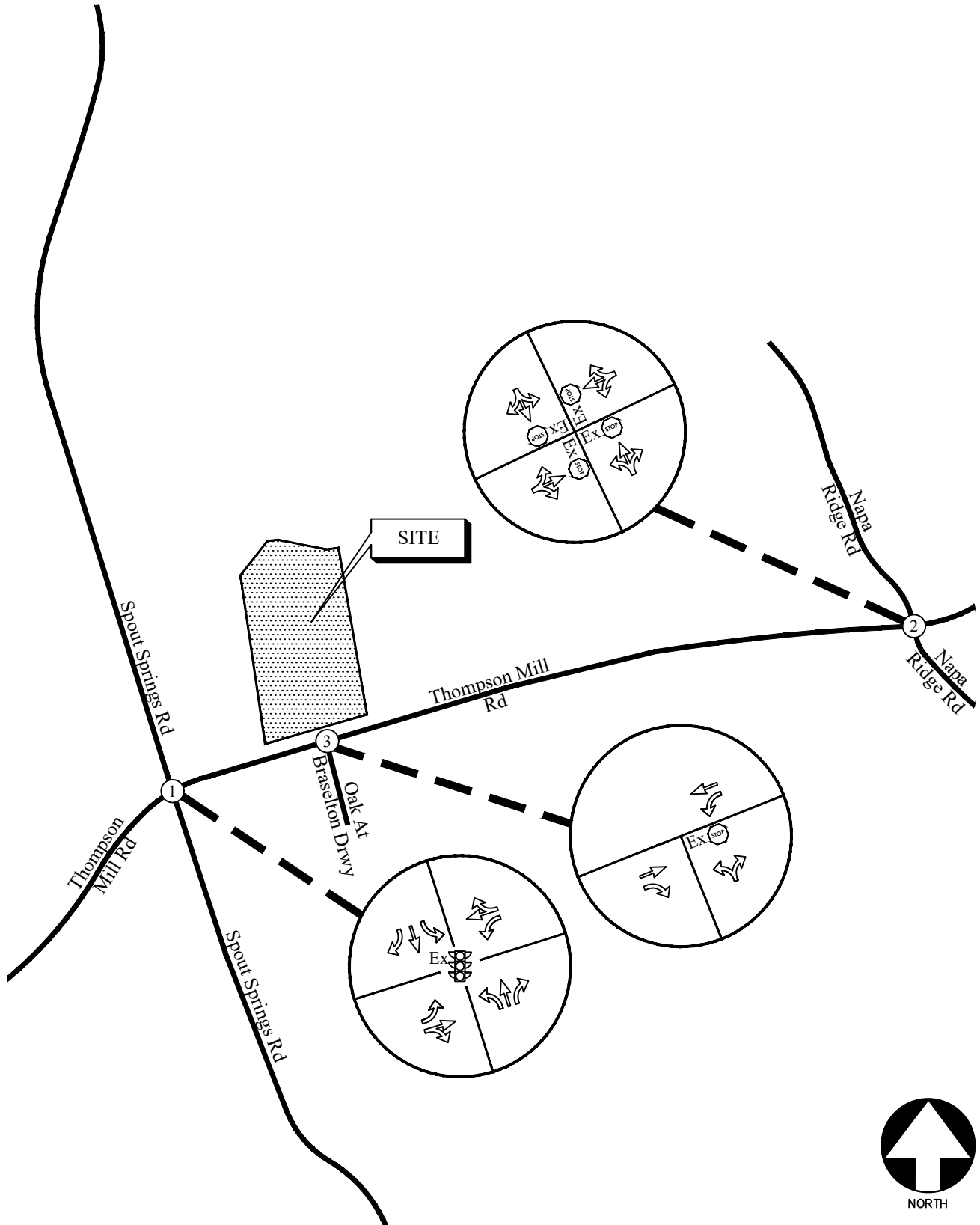


EXISTING WEEKDAY PEAK-HOUR VOLUMES

FIGURE 2
A&R Engineering Inc.

LEGEND

- Ex  Existing Signed Approach
-  Existing Lane Geometry
- Ex  Existing Traffic Signal



EXISTING TRAFFIC CONTROL AND LANE GEOMETRY

FIGURE 3

A&R Engineering Inc.

4.2 Existing Traffic Operations

Existing 2023 traffic operations were analyzed at the study intersections in accordance with the HCM methodology. The result of the analysis is shown in Table 3. The existing traffic control and lane geometry for the intersections are shown in Figure 3.

- Thompson Mill Road at Spout Springs Road
- Thompson Mill Road at Napa Ridge Road
- Thompson Mill Road at Oaks at Braselton Driveway

TABLE 3 – EXISTING INTERSECTION OPERATIONS				
Intersection		Traffic Control	LOS (Delay)	
			AM Peak Hour	PM Peak Hour
1	<u>Thompson Mill Road at Spout Springs Road</u>	Signalised	<u>B (18.8)</u>	<u>C (24.6)</u>
	-Eastbound Approach		D (52.7)	D (53.2)
	- Westbound Approach		E (59.7)	E (56.1)
	-Northbound Approach		B (12.3)	B (14.3)
	-Southbound Approach		B (10.3)	B (15.4)
2	<u>Thompson Mill Road at Napa Ridge Road</u>	All-Way Stop Controlled	<u>A (8.6)</u>	<u>B (10.3)</u>
	-Eastbound Approach		A (8.3)	A (8.7)
	- Westbound Approach		A (9.1)	B (11.1)
	-Northbound Approach		A (7.9)	A (8.3)
	-Southbound Approach		A (8.0)	B (10.1)
3	<u>Thompson Mill Road at Oaks at Braselton Driveway</u>	Stop Controlled on NB Approach		
	-Westbound Left		A (7.7)	A (7.8)
	-Northbound Approach		B (10.0)	B (11.3)

The results of existing traffic operations analysis indicate that all study intersection are operating at satisfactory level of service “C” or better in both the AM and PM peak hours.

5.0 PROPOSED DEVELOPMENT

The proposed development will consist of 133 Units of Single-Family Detached Housing.



The development proposes a full access driveway on Thompson Mill Road aligning with Oaks at Braselton Driveway.

A site plan is shown in Figure 4.



LAND USE SUMMARY

1 Bedroom Unit	40 units	30.08 %
2 Bedroom Unit	55 units	41.35 %
3 Bedroom Unit	38 units	28.57 %
Unit Total:	133 units	

PARKING SUMMARY

Uncovered Parking	235 spaces
Garage Parking	31 spaces
Unit Total:	266 spaces
Parking Ratio:	2.00 spaces/unit

Drive Isle Width: 26 ft.
 Parking Space Size: 9 ft. x 18 ft.

Gross Site Area: 13.97 acres
 Gross Density: 9.52 dwelling units/acre

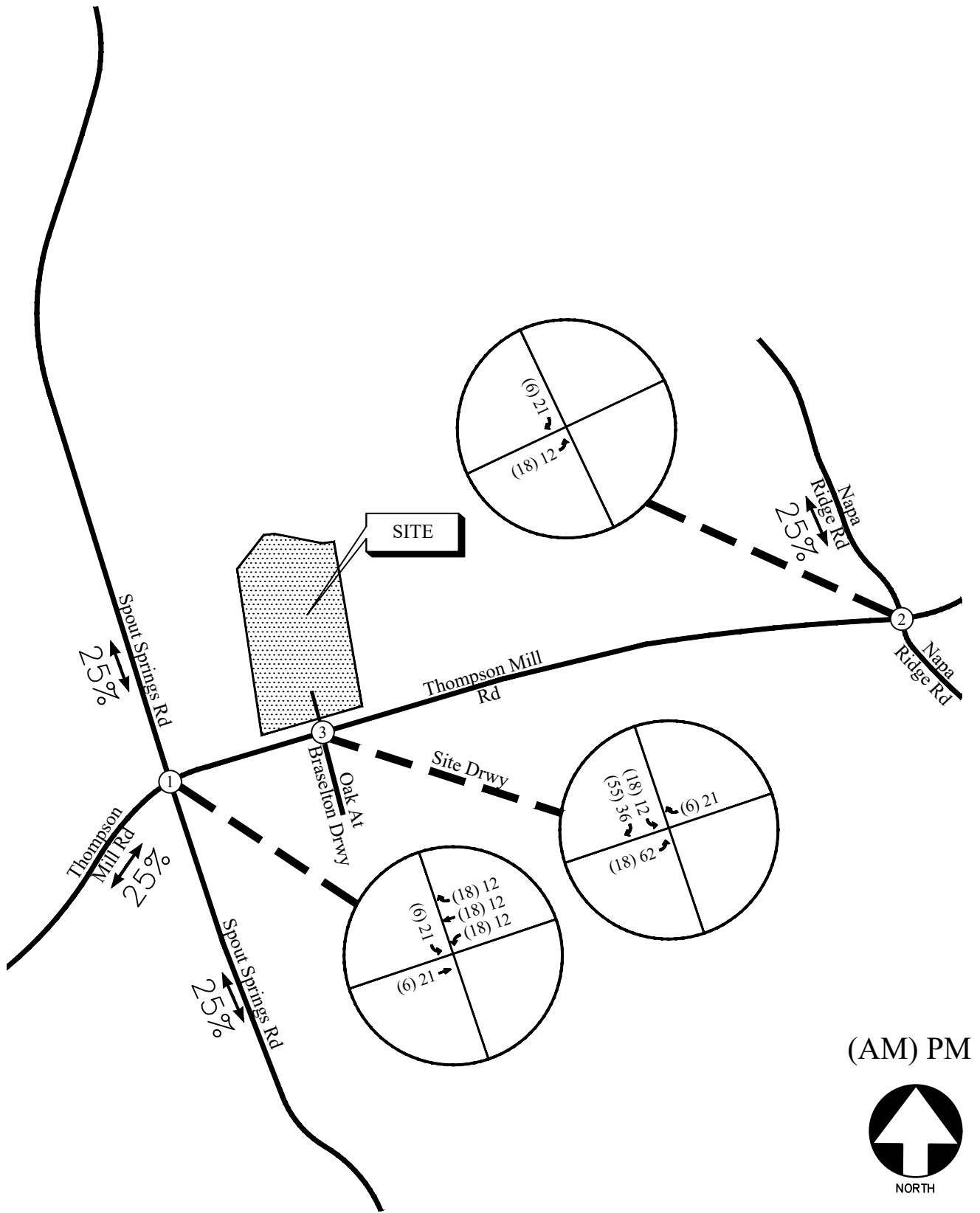
5.1 Trip Generation

Trip generation estimates for the project were based on the rates and equations published in the 11th 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: *210 – Single Family Detached Housing*. 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
ITE 210 – Single Family Detached Housing	133 Units	24	73	97	82	48	130	1,312

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 are shown in Figure 5.



TRIP DISTRIBUTION AND SITE-GENERATED
WEEKDAY PEAK HOUR VOLUMES

FIGURE 5
A&R Engineering Inc.

6.0 FUTURE 2025 TRAFFIC ANALYSIS

The future 2025 traffic operations are analysed for the “Build” and “No-Build” conditions.

6.1 Future “No-Build” Conditions

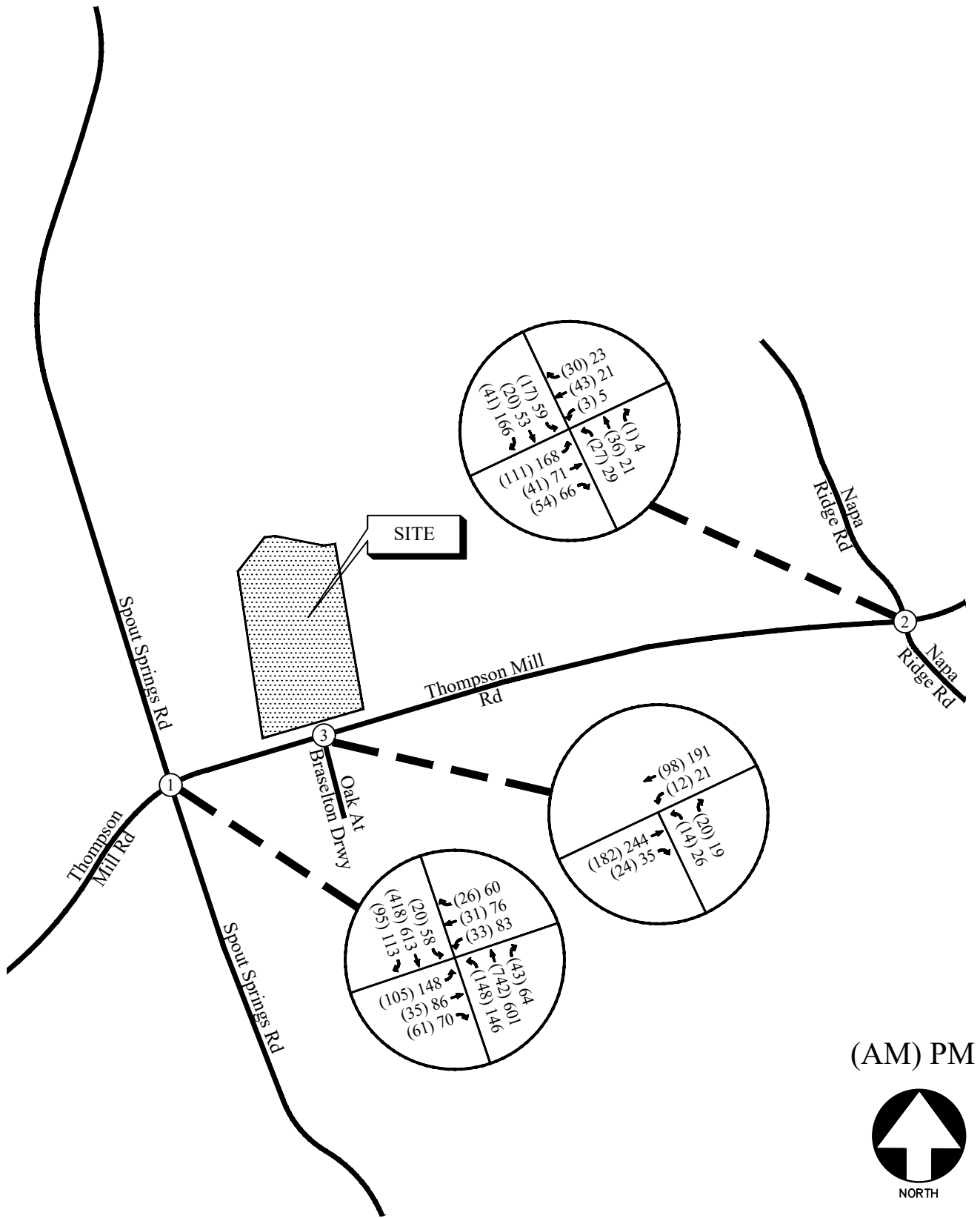
The “No-Build” (or background) conditions provide an assessment of how traffic will operate in the study horizon year without the study site being developed as proposed, with projected increases in through traffic volumes due to normal annual growth. The Future “No-Build” volumes consist of the existing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

6.1.1 Annual Traffic Growth

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 growth of approximately 2% in the area. This growth factor was applied to the existing traffic volumes between collector and arterial roadways 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.

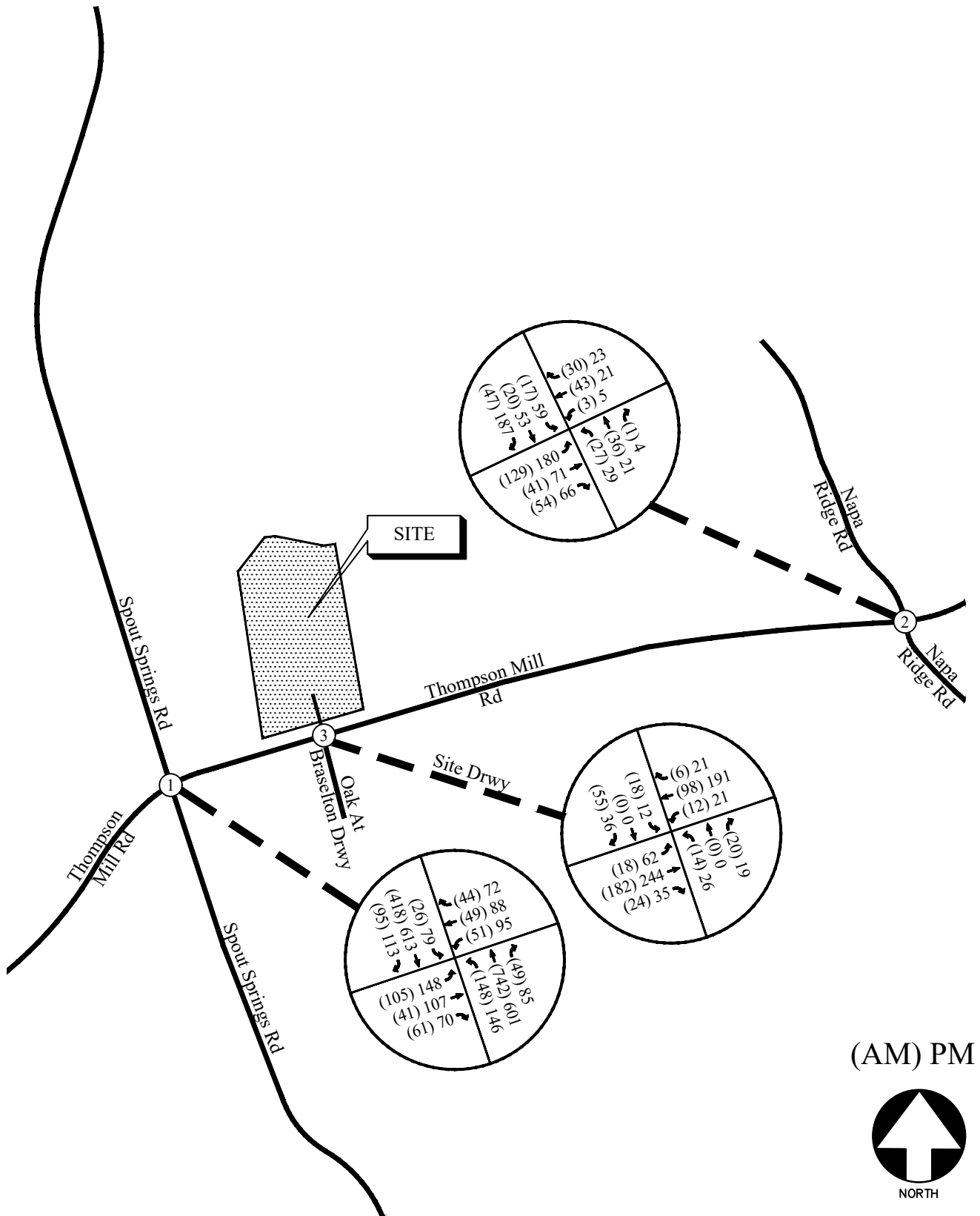
6.2 Future “Build” Conditions

The “Build” or development conditions include the estimated background traffic from the “No-Build” conditions plus the added traffic from the proposed development. To evaluate future traffic operations in this area, the additional traffic volumes from the site (Figure 5) were added to base traffic volumes (Figure 6) to calculate the future traffic volumes after the construction of the development. These total future “Build” traffic volumes are shown in Figure 7.



FUTURE (NO-BUILD) WEEKDAY PEAK HOUR VOLUMES

FIGURE 6
A&R Engineering Inc.



FUTURE (BUILD) WEEKDAY PEAK HOUR VOLUMES

FIGURE 7
A&R Engineering Inc.

6.3 Auxiliary Lane Analysis

Included below are analyses for left-turn lanes and deceleration lanes for all site driveways per GDOT standards. The analyses below are based off the trip distribution included in Section 5.2. According to the trip distribution, the 24-hour two-way volume entering and exiting the site is 1,294 vehicles.

6.3.1.1 Left Turn Lane Analysis

For two lane roadways with AADT's greater than 10,000 vehicles and a posted speed limit of 45 mph, the daily site generated traffic left-turn movements threshold to warrant a left-turn lane is 175 left-turning vehicles a day. The projected left-turn volumes per day for each driveway is included below.

TABLE 5 – GDOT REQUIREMENTS FOR LEFT TURN LANES					
Intersection	Left turn traffic (% total entering)	Left-turn Volume (vehicles/day)	Roadway Speed/ # lanes / ADT	GDOT Threshold (vehicles/day)	Warrants met?
Thompson Mill Road at Oaks at Braselton Driveway / Site Driveway	75%	485 (total trips) ÷ 2 × 0.75 = (1294) ÷ 2 × 0.75 = 485	45 mph / 2-Lane / > 10,000	175	Yes

A left turn lane is warranted at the site driveway as per GDOT Standards.

6.3.1.2 Deceleration Turn Lane Analysis

For two lane roadways with AADT's greater than 10,000 vehicles and a posted speed limit of 45 mph, the daily site generated traffic right-turn movements threshold to warrant a deceleration lane is 75 right turning vehicles a day. The projected right-turn volumes per day for each driveway is included below.

TABLE 6 – GDOT REQUIREMENTS FOR DECELERATION LANES					
Intersection	Right-turn traffic (% total entering)	Right-turn Volume (vehicles/day)	Roadway Speed/ # lanes / ADT	GDOT Threshold (vehicles/day)	Warrants met?
Thompson Mill Road at Oaks at Braselton Driveway / Site Driveway	25%	162 (total trips) ÷ 2 × 0.25 = (1294) ÷ 2 × 0.25 = 162	45 mph / 2-Lane / > 10,000	75	Yes

A deceleration lane is warranted at the site driveway as per GDOT Standards






6.4 Future Traffic Operations

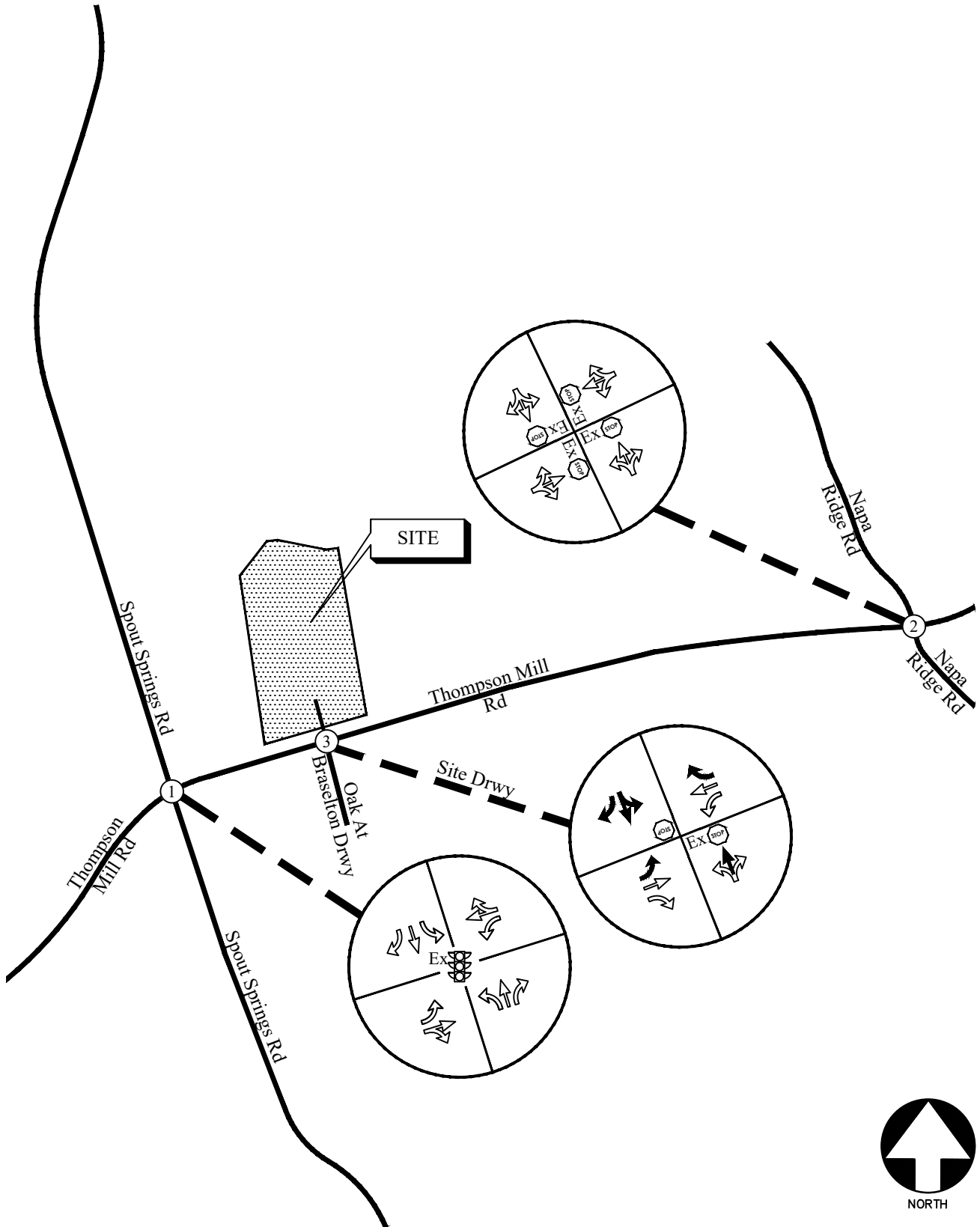
The future “No-Build” and “Build” traffic operations were analysed using the volumes in Figure 6 and Figure 7, respectively. The results of the future traffic operations analysis are shown below in Table 7. Recommendations on traffic control and lane geometry are shown in Figure 8.

TABLE 7 – FUTURE INTERSECTION OPERATIONS					
Intersection		LOS (Delay)			
		NO-BUILD		BUILD	
		AM Peak	PM Peak	AM Peak	PM Peak
1	<u>Thompson Mill Road at Spout Springs Road</u>	<u>B (19.3)</u>	<u>C (25.2)</u>	<u>C (21.7)</u>	<u>C (26.5)</u>
	-Eastbound Approach	D (52.5)	D (54.0)	D (50.6)	D (53.7)
	- Westbound Approach	E (59.6)	E (55.9)	E (58.1)	D (54.9)
	-Northbound Approach	B (13.1)	B (14.9)	B (15.2)	B (16.1)
	-Southbound Approach	B (10.8)	B (16.1)	B (12.3)	B (17.3)
2	<u>Thompson Mill Road at Napa Ridge Road</u>	<u>A (8.6)</u>	<u>B (10.6)</u>	<u>A (8.9)</u>	<u>B (11.0)</u>
	-Eastbound Approach	A (8.4)	A (8.8)	A (9.5)	A (11.9)
	- Westbound Approach	A (9.2)	B (11.5)	A (8.0)	A (8.5)
	-Northbound Approach	A (7.9)	A (8.4)	A (8.5)	A (8.9)
	-Southbound Approach	A (8.1)	B (10.4)	A (8.2)	B (10.8)
3	<u>Thompson Mill Rd at Oaks at Braselton / Site Drwy</u>	-	-	-	-
	-Eastbound Left	A (7.7)	A (7.8)	A (7.5)	A (7.8)
	-Westbound Left	B (10.1)	B (11.5)	A (7.7)	A (7.8)
	-Northbound Approach	-	-	B (10.9)	C (15.6)
	-Southbound Approach	-	-	A (9.9)	B (11.0)

The results of future traffic operations analysis indicate that all study intersections will continue to operate at satisfactory levels of service “C” or better in both peak hours of “No-Build” and “Build” conditions. The impact of the site generated traffic on the operations of study intersections will be minimal.

LEGEND

- Ex  Existing Signed Approach
-  Existing Lane Geometry
- Ex  Existing Traffic Signal
-  Proposed Signed Approach
-  Proposed Lane Geometry



FUTURE TRAFFIC CONTROL AND LANE GEOMETRY

FIGURE 8

A&R Engineering Inc.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study is to determine the traffic impact from the proposed residential development located north of Thompson Mill Road, across from Oaks at Braselton, in Hall County, Georgia. The proposed development will consist of 133 Units of Single-Family Detached Housing. The development proposes a full access driveway on Thompson Mill Road aligning with Oaks at Braselton Driveway.

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

- Thompson Mill Road at Spout Springs Road
- Thompson Mill Road at Napa Ridge Road
- Thompson Mill Road at Oaks at Braselton Driveway / Site Driveway

The analysis included the evaluation of future traffic operations for “No-Build” and “Build” conditions.

The results of future traffic operations analysis indicate that all study intersections will continue to operate at satisfactory levels of service “C” or better in both peak hours of “No-Build” and “Build” conditions. The impact of the site generated traffic on the operations of study intersections will be minimal.

7.1 Recommendation for Site Access Configuration

The following access configuration is recommended for the proposed site driveway intersections.

- Site Driveway: Full access driveway on Thompson Mill Road aligned with Oaks at Braselton Driveway
 - One entering and two exiting lanes (one right-turn lane and a shared through/left-turn lane).
 - Stop-sign controlled on the driveway approach with Thompson Mill Road remaining free flow.
 - Provide a left-turn lane by re-striping the existing asphalt.
 - Provide a right-turn lane.
 - Provide / Confirm adequate sight distance per AASHTO standards.

Appendix

Existing Intersection Traffic Counts	
Linear Regression of Daily Traffic.....	
Existing Intersection Analysis.....	
Future “No-Build” Intersection Analysis	
Future “Build” Intersection Analysis	
Traffic Volume Worksheets	

EXISTING INTERSECTION TRAFFIC COUNTS

A & R Engineering, Inc.

2160 Kingston Court Suite 'O'
Marietta, GA 30067

TMC Data
Thompson Mill Rd @ Oaks At Braselton
Drwy
7-9 am | 4-6 pm

File Name : 20230205
Site Code : 20230205
Start Date : 05-02-2023
Page No : 1

Groups Printed- Cars, Buses & Trucks

Start Time	Oaks At Braselton Drwy Northbound				Southbound				Thompson Mill Road Eastbound				Thompson Mill Road Westbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	4	0	5	9	0	0	0	0	0	25	5	30	3	22	0	25	64
07:15 AM	3	0	7	10	0	0	0	0	0	36	6	42	2	20	0	22	74
07:30 AM	5	0	6	11	0	0	0	0	0	45	4	49	1	15	0	16	76
07:45 AM	4	0	4	8	0	0	0	0	0	53	5	58	2	29	0	31	97
Total	16	0	22	38	0	0	0	0	0	159	20	179	8	86	0	94	311
08:00 AM	2	0	5	7	0	0	0	0	0	39	7	46	3	19	0	22	75
08:15 AM	3	0	6	9	0	0	0	0	0	38	6	44	4	24	0	28	81
08:30 AM	4	0	4	8	0	0	0	0	0	45	5	50	3	22	0	25	83
08:45 AM	3	0	5	8	0	0	0	0	0	45	4	49	4	21	0	25	82
Total	12	0	20	32	0	0	0	0	0	167	22	189	14	86	0	100	321
*** BREAK ***																	
04:00 PM	6	0	5	11	0	0	0	0	0	66	8	74	4	28	0	32	117
04:15 PM	5	0	6	11	0	0	0	0	0	50	9	59	5	45	0	50	120
04:30 PM	8	0	4	12	0	0	0	0	0	14	8	22	6	40	0	46	80
04:45 PM	7	0	0	7	0	0	0	0	0	71	7	78	5	47	0	52	137
Total	26	0	15	41	0	0	0	0	0	201	32	233	20	160	0	180	454
05:00 PM	6	0	7	13	0	0	0	0	0	59	9	68	4	50	0	54	135
05:15 PM	5	0	6	11	0	0	0	0	0	58	8	66	6	50	0	56	133
05:30 PM	7	0	5	12	0	0	0	0	0	47	10	57	5	37	0	42	111
05:45 PM	6	0	4	10	0	0	0	0	0	68	9	77	7	43	0	50	137
Total	24	0	22	46	0	0	0	0	0	232	36	268	22	180	0	202	516
Grand Total	78	0	79	157	0	0	0	0	0	759	110	869	64	512	0	576	1602
Apprch %	49.7	0	50.3		0	0	0		0	87.3	12.7		11.1	88.9	0		
Total %	4.9	0	4.9	9.8	0	0	0	0	0	47.4	6.9	54.2	4	32	0	36	

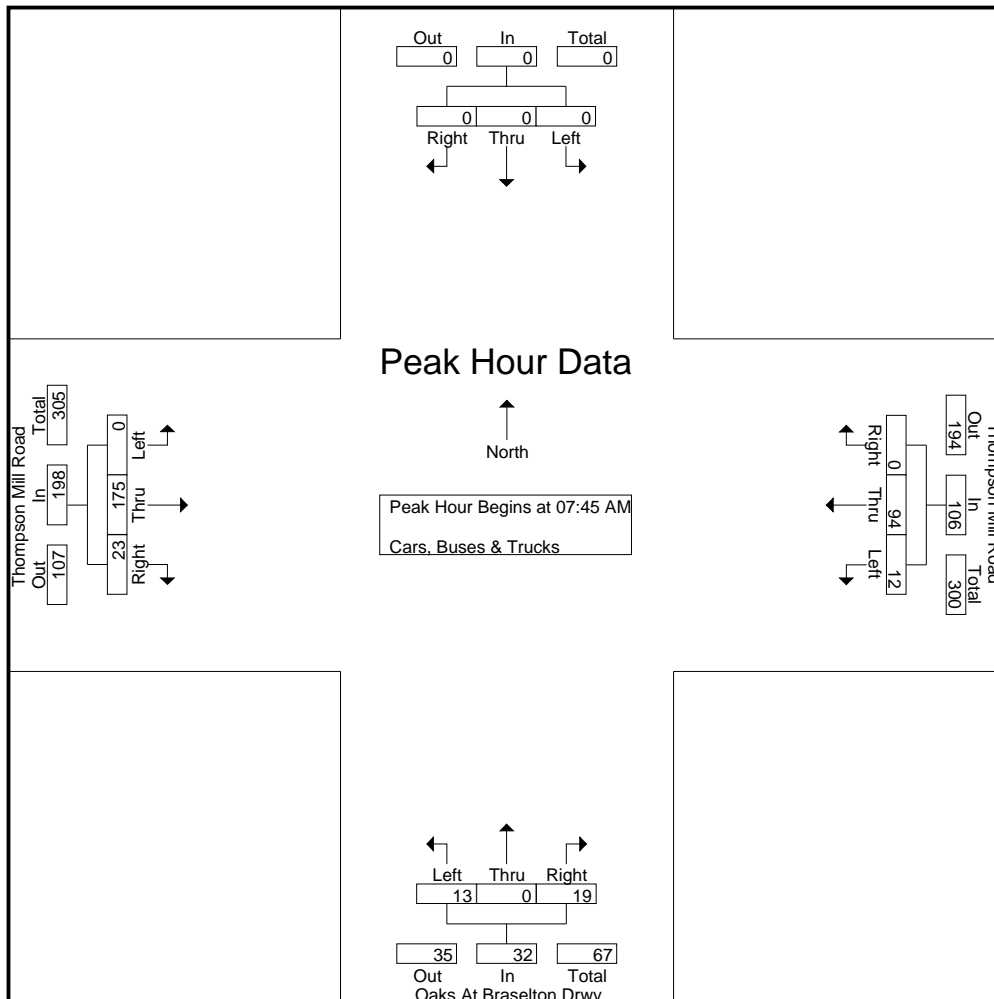
A & R Engineering, Inc.

2160 Kingston Court Suite 'O'
Marietta, GA 30067

TMC Data
Thompson Mill Rd @ Oaks At Braselton
Drwy
7-9 am | 4-6 pm

File Name : 20230205
Site Code : 20230205
Start Date : 05-02-2023
Page No : 2

Start Time	Oaks At Braselton Drwy Northbound				Southbound				Thompson Mill Road Eastbound				Thompson Mill Road Westbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	4	0	4	8	0	0	0	0	0	53	5	58	2	29	0	31	97
08:00 AM	2	0	5	7	0	0	0	0	0	39	7	46	3	19	0	22	75
08:15 AM	3	0	6	9	0	0	0	0	0	38	6	44	4	24	0	28	81
08:30 AM	4	0	4	8	0	0	0	0	0	45	5	50	3	22	0	25	83
Total Volume	13	0	19	32	0	0	0	0	0	175	23	198	12	94	0	106	336
% App. Total	40.6	0	59.4		0	0	0		0	88.4	11.6		11.3	88.7	0		
PHF	.813	.000	.792	.889	.000	.000	.000	.000	.000	.825	.821	.853	.750	.810	.000	.855	.866



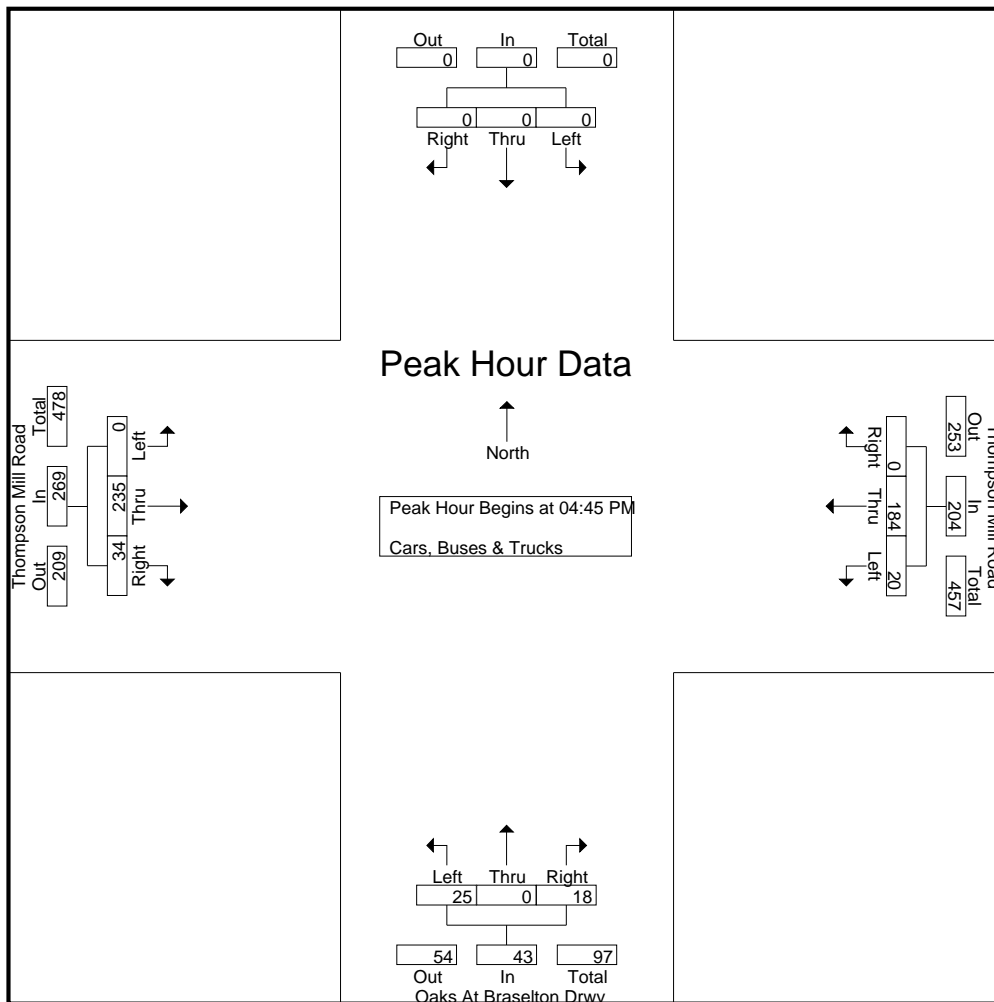
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Marietta, GA 30067

TMC Data
Thompson Mill Rd @ Oaks At Braselton
Drwy
7-9 am | 4-6 pm

File Name : 20230205
Site Code : 20230205
Start Date : 05-02-2023
Page No : 3

Start Time	Oaks At Braselton Drwy Northbound				Southbound				Thompson Mill Road Eastbound				Thompson Mill Road Westbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	7	0	0	7	0	0	0	0	0	71	7	78	5	47	0	52	137
05:00 PM	6	0	7	13	0	0	0	0	0	59	9	68	4	50	0	54	135
05:15 PM	5	0	6	11	0	0	0	0	0	58	8	66	6	50	0	56	133
05:30 PM	7	0	5	12	0	0	0	0	0	47	10	57	5	37	0	42	111
Total Volume	25	0	18	43	0	0	0	0	0	235	34	269	20	184	0	204	516
% App. Total	58.1	0	41.9		0	0	0		0	87.4	12.6		9.8	90.2	0		
PHF	.893	.000	.643	.827	.000	.000	.000	.000	.000	.827	.850	.862	.833	.920	.000	.911	.942



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TMC Data
Thompson Mill Road @ Napa Ridge Rd
7-9 am | 4-6 pm

File Name : 20230206
Site Code : 20230206
Start Date : 05-02-2023
Page No : 1

Groups Printed- Cars, Buses & Trucks

Start Time	Napa Ridge Rd Northbound				Napa Ridge Rd Southbound				Thompson Mill Road Eastbound				Thompson Mill Road Westbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	5	8	1	14	3	4	11	18	16	5	9	30	0	9	5	14	76
07:15 AM	6	9	0	15	4	3	8	15	25	6	11	42	0	8	6	14	86
07:30 AM	5	10	1	16	5	5	7	17	28	9	12	49	1	4	5	10	92
07:45 AM	7	11	0	18	4	6	15	25	32	9	17	58	1	9	6	16	117
Total	23	38	2	63	16	18	41	75	101	29	49	179	2	30	22	54	371
08:00 AM	6	9	0	15	3	5	7	15	25	10	11	46	0	9	7	16	92
08:15 AM	5	8	1	14	5	4	11	20	23	10	11	44	1	12	9	22	100
08:30 AM	8	7	0	15	4	4	6	14	27	10	13	50	1	11	7	19	98
08:45 AM	9	6	1	16	3	3	5	11	26	13	10	49	1	11	6	18	94
Total	28	30	2	60	15	16	29	60	101	43	45	189	3	43	29	75	384
09:00 AM	7	8	0	15	0	0	0	0	0	0	0	0	0	0	0	0	15
*** BREAK ***																	
Total	7	8	0	15	0	0	0	0	0	0	0	0	0	0	0	0	15
*** BREAK ***																	
04:00 PM	4	2	1	7	9	12	23	44	47	13	14	74	1	5	5	11	136
04:15 PM	5	3	1	9	17	11	42	70	33	15	11	59	2	3	6	11	149
04:30 PM	6	5	2	13	8	15	35	58	49	16	16	81	1	5	7	13	165
04:45 PM	8	4	1	13	17	13	38	68	45	18	15	78	1	6	5	12	171
Total	23	14	5	42	51	51	138	240	174	62	56	292	5	19	23	47	621
05:00 PM	9	6	0	15	14	12	41	67	35	17	16	68	2	4	4	10	160
05:15 PM	5	5	1	11	18	11	46	75	33	17	16	66	1	5	6	12	164
05:30 PM	7	4	0	11	8	14	32	54	35	10	12	57	1	3	5	9	131
05:45 PM	8	5	1	14	11	13	38	62	51	13	13	77	1	4	3	8	161
Total	29	20	2	51	51	50	157	258	154	57	57	268	5	16	18	39	616
Grand Total	110	110	11	231	133	135	365	633	530	191	207	928	15	108	92	215	2007
Apprch %	47.6	47.6	4.8		21	21.3	57.7		57.1	20.6	22.3		7	50.2	42.8		
Total %	5.5	5.5	0.5	11.5	6.6	6.7	18.2	31.5	26.4	9.5	10.3	46.2	0.7	5.4	4.6	10.7	

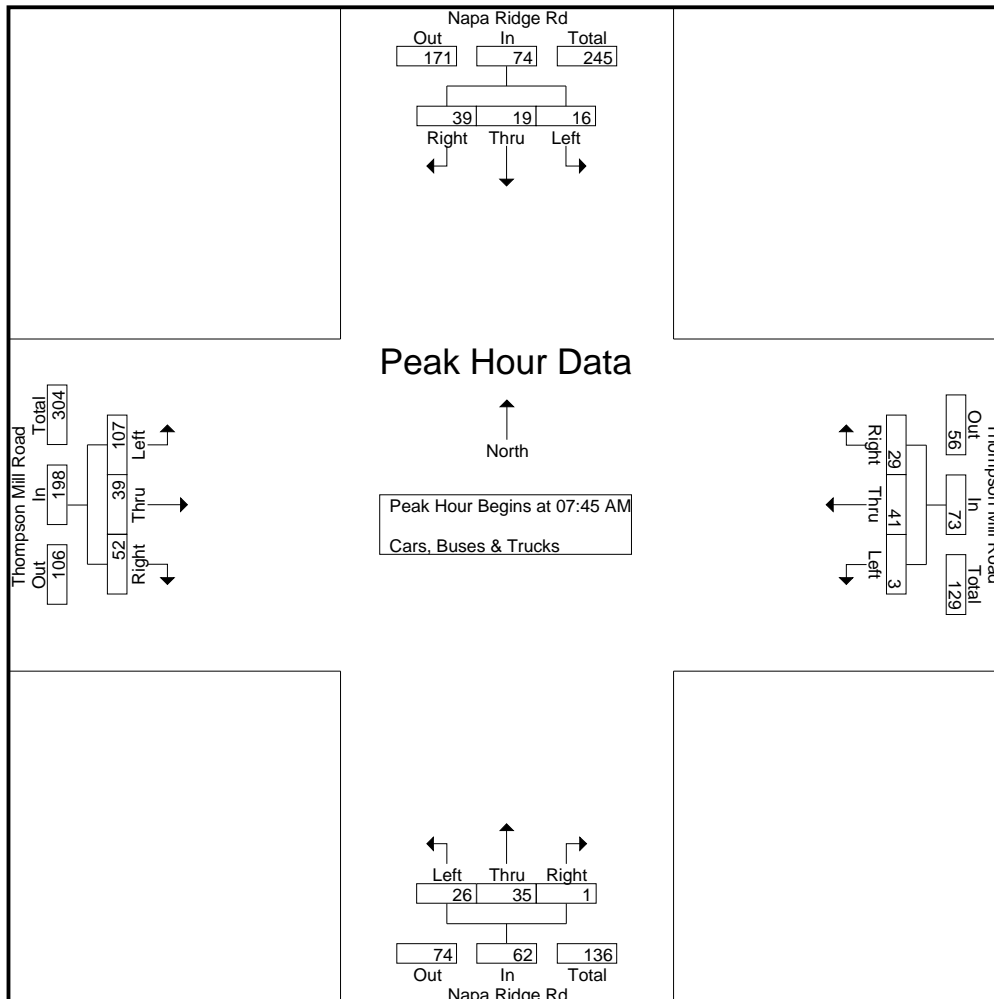
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TMC Data
Thompson Mill Road @ Napa Ridge Rd
7-9 am | 4-6 pm

File Name : 20230206
Site Code : 20230206
Start Date : 05-02-2023
Page No : 2

	Napa Ridge Rd Northbound				Napa Ridge Rd Southbound				Thompson Mill Road Eastbound				Thompson Mill Road 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 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	7	11	0	18	4	6	15	25	32	9	17	58	1	9	6	16	117
08:00 AM	6	9	0	15	3	5	7	15	25	10	11	46	0	9	7	16	92
08:15 AM	5	8	1	14	5	4	11	20	23	10	11	44	1	12	9	22	100
08:30 AM	8	7	0	15	4	4	6	14	27	10	13	50	1	11	7	19	98
Total Volume	26	35	1	62	16	19	39	74	107	39	52	198	3	41	29	73	407
% App. Total	41.9	56.5	1.6		21.6	25.7	52.7		54	19.7	26.3		4.1	56.2	39.7		
PHF	.813	.795	.250	.861	.800	.792	.650	.740	.836	.975	.765	.853	.750	.854	.806	.830	.870



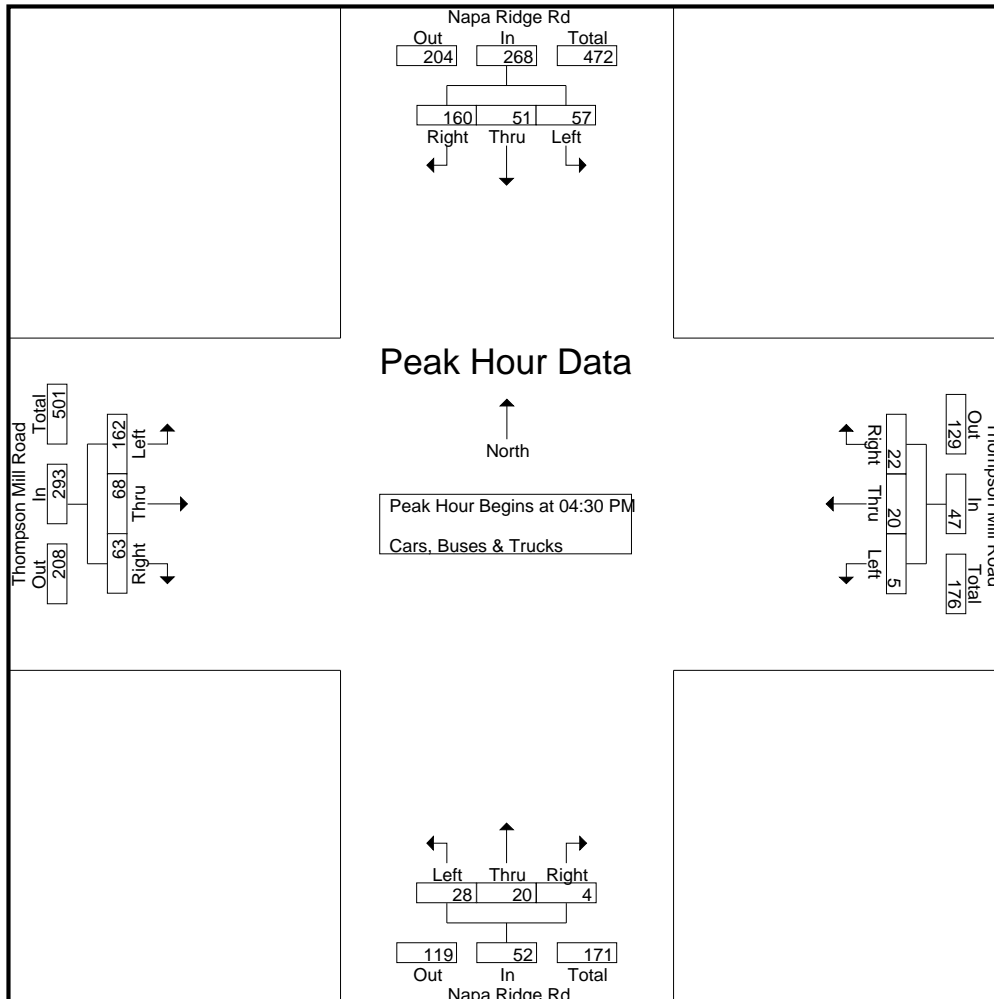
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TMC Data
Thompson Mill Road @ Napa Ridge Rd
7-9 am | 4-6 pm

File Name : 20230206
Site Code : 20230206
Start Date : 05-02-2023
Page No : 3

Start Time	Napa Ridge Rd Northbound				Napa Ridge Rd Southbound				Thompson Mill Road Eastbound				Thompson Mill Road Westbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	6	5	2	13	8	15	35	58	49	16	16	81	1	5	7	13	165
04:45 PM	8	4	1	13	17	13	38	68	45	18	15	78	1	6	5	12	171
05:00 PM	9	6	0	15	14	12	41	67	35	17	16	68	2	4	4	10	160
05:15 PM	5	5	1	11	18	11	46	75	33	17	16	66	1	5	6	12	164
Total Volume	28	20	4	52	57	51	160	268	162	68	63	293	5	20	22	47	660
% App. Total	53.8	38.5	7.7		21.3	19	59.7		55.3	23.2	21.5		10.6	42.6	46.8		
PHF	.778	.833	.500	.867	.792	.850	.870	.893	.827	.944	.984	.904	.625	.833	.786	.904	.965



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TMC Data
Thompson Mill Road @ Spout Springs Road
7-9 am | 4-6 pm

File Name : 20230174
Site Code : 20230173
Start Date : 05-02-2023
Page No : 1

Groups Printed- Cars, Buses & Trucks

Start Time	Spout Springs Rd Northbound				Spout Springs Rd Southbound				Thompson Mill Rd Eastbound				Thompson Mill Rd Westbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	30	166	10	206	6	90	18	114	16	5	11	32	12	9	4	25	377
07:15 AM	26	178	5	209	1	91	19	111	23	6	17	46	3	8	6	17	383
07:30 AM	37	202	14	253	8	114	21	143	22	9	18	49	5	4	5	14	459
07:45 AM	41	178	12	231	4	100	25	129	30	9	17	56	18	9	7	34	450
Total	134	724	41	899	19	395	83	497	91	29	63	183	38	30	22	90	1669
08:00 AM	38	155	10	203	6	97	26	129	26	10	7	43	6	9	7	22	397
08:15 AM	25	149	13	187	13	84	10	107	23	10	11	44	9	12	12	33	371
08:30 AM	33	158	16	207	6	116	26	148	22	10	18	50	7	11	3	21	426
08:45 AM	26	120	11	157	16	102	23	141	26	13	10	49	11	11	6	28	375
Total	122	582	50	754	41	399	85	525	97	43	46	186	33	43	28	104	1569
*** BREAK ***																	
04:00 PM	23	151	10	184	9	165	26	200	29	21	21	71	13	10	10	33	488
04:15 PM	42	143	11	196	17	163	20	200	28	16	15	59	21	18	16	55	510
04:30 PM	25	150	19	194	8	143	29	180	42	28	16	86	16	16	18	50	510
04:45 PM	36	143	16	195	17	131	30	178	37	21	20	78	22	20	11	53	504
Total	126	587	56	769	51	602	105	758	136	86	72	294	72	64	55	191	2012
05:00 PM	37	142	16	195	14	152	30	196	35	18	16	69	21	19	13	53	513
05:15 PM	31	138	17	186	18	127	29	174	33	19	16	68	18	25	14	57	485
05:30 PM	25	134	13	172	8	148	24	180	26	10	21	57	14	17	14	45	454
05:45 PM	19	108	17	144	11	137	27	175	36	20	21	77	20	16	12	48	444
Total	112	522	63	697	51	564	110	725	130	67	74	271	73	77	53	203	1896
Grand Total	494	2415	210	3119	162	1960	383	2505	454	225	255	934	216	214	158	588	7146
Apprch %	15.8	77.4	6.7		6.5	78.2	15.3		48.6	24.1	27.3		36.7	36.4	26.9		
Total %	6.9	33.8	2.9	43.6	2.3	27.4	5.4	35.1	6.4	3.1	3.6	13.1	3	3	2.2	8.2	

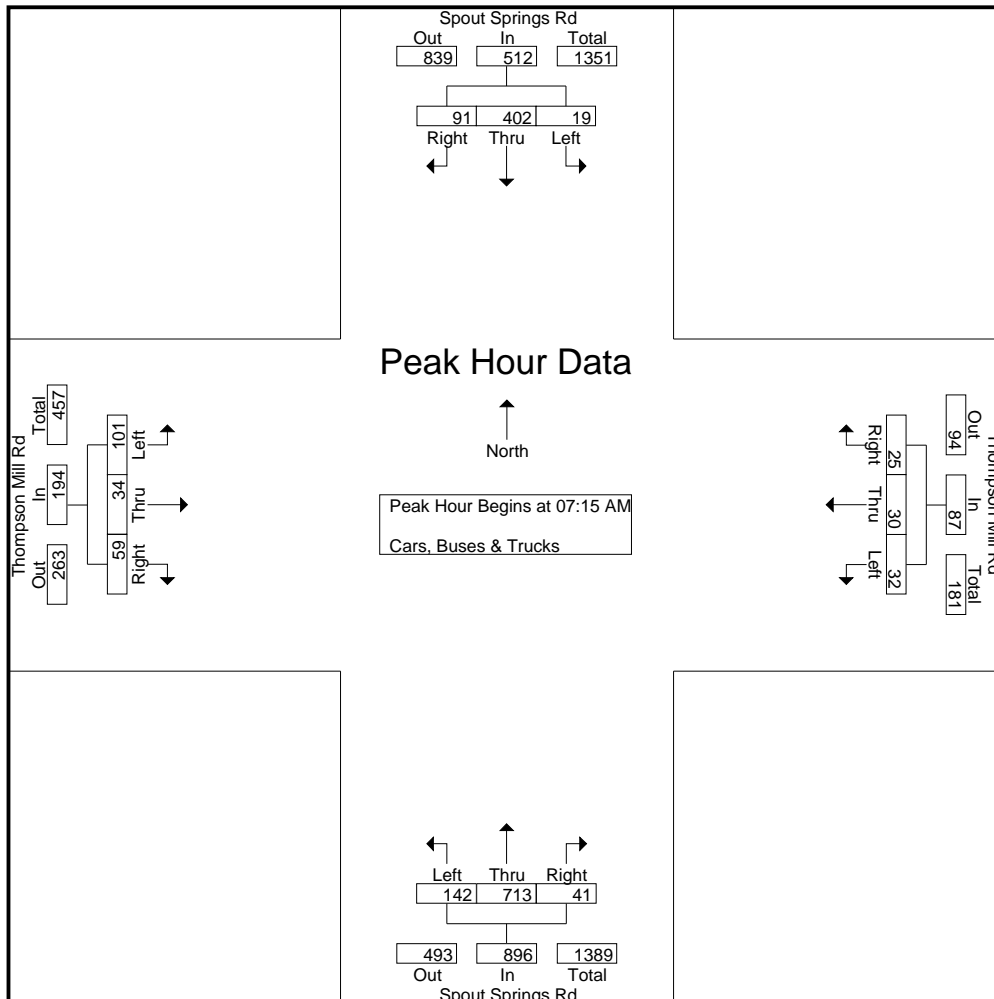
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Marietta, GA 30067

TMC Data
Thompson Mill Road @ Spout Springs Road
7-9 am | 4-6 pm

File Name : 20230174
Site Code : 20230173
Start Date : 05-02-2023
Page No : 2

Start Time	Spout Springs Rd Northbound				Spout Springs Rd Southbound				Thompson Mill Rd Eastbound				Thompson Mill Rd Westbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	26	178	5	209	1	91	19	111	23	6	17	46	3	8	6	17	383
07:30 AM	37	202	14	253	8	114	21	143	22	9	18	49	5	4	5	14	459
07:45 AM	41	178	12	231	4	100	25	129	30	9	17	56	18	9	7	34	450
08:00 AM	38	155	10	203	6	97	26	129	26	10	7	43	6	9	7	22	397
Total Volume	142	713	41	896	19	402	91	512	101	34	59	194	32	30	25	87	1689
% App. Total	15.8	79.6	4.6		3.7	78.5	17.8		52.1	17.5	30.4		36.8	34.5	28.7		
PHF	.866	.882	.732	.885	.594	.882	.875	.895	.842	.850	.819	.866	.444	.833	.893	.640	.920



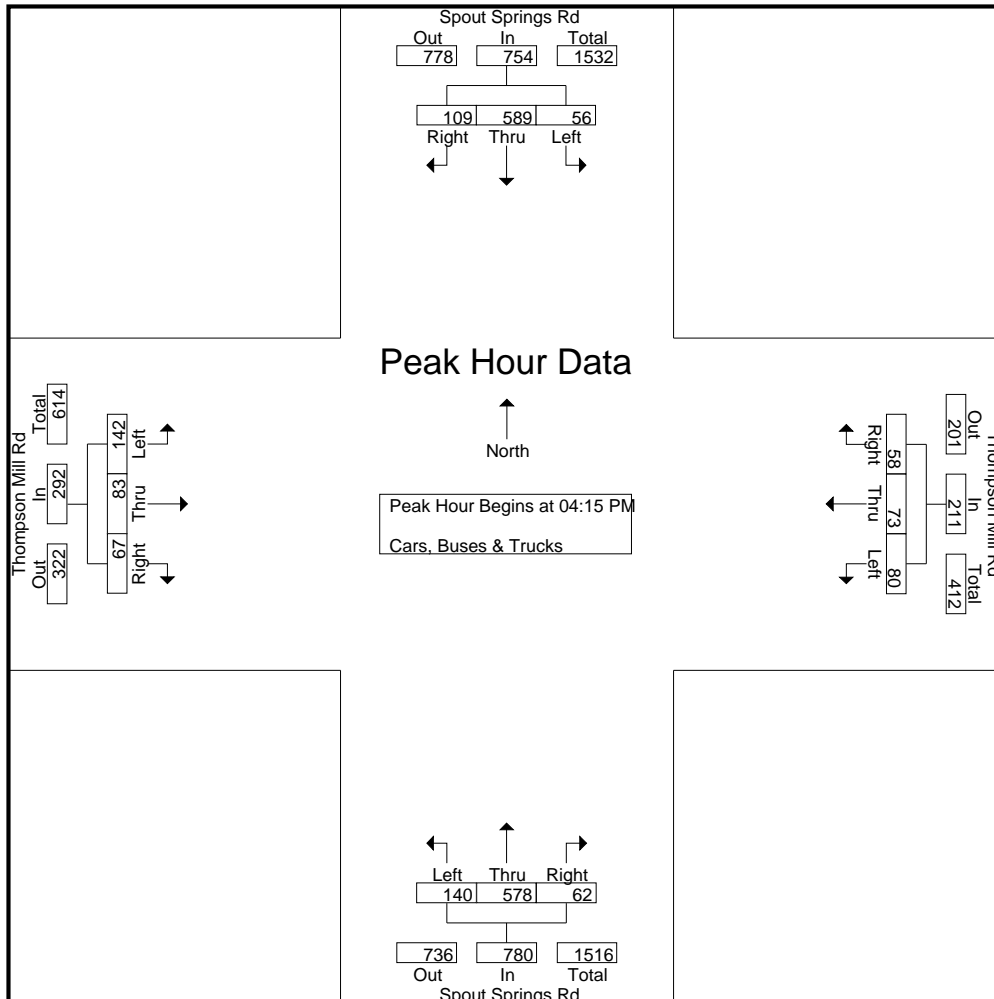
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Marietta, GA 30067

TMC Data
Thompson Mill Road @ Spout Springs Road
7-9 am | 4-6 pm

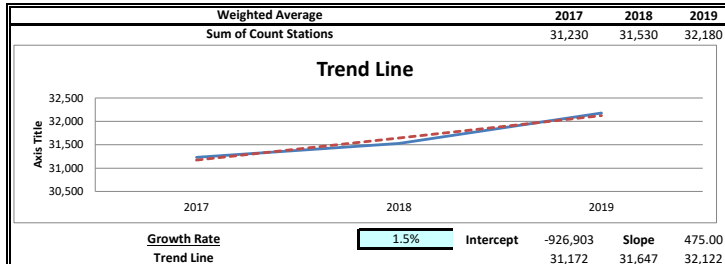
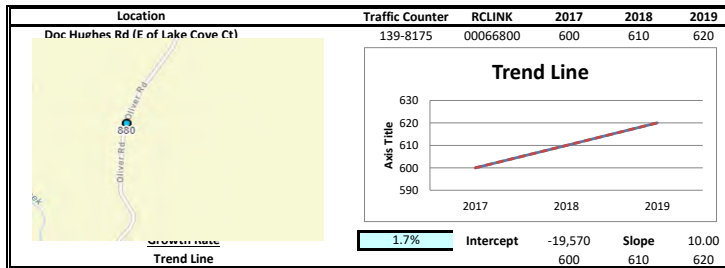
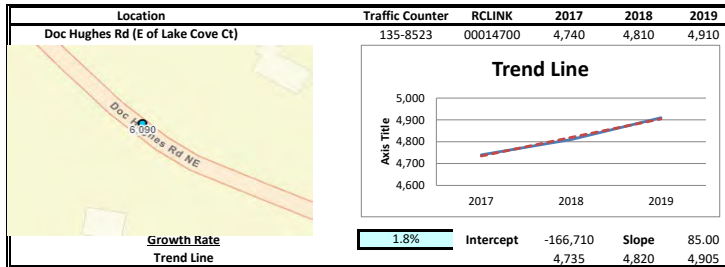
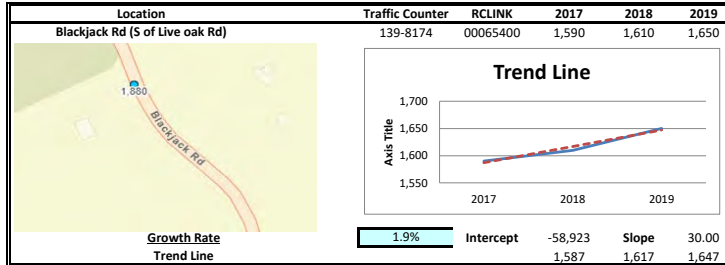
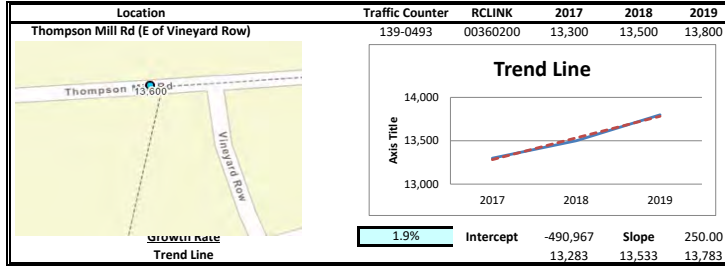
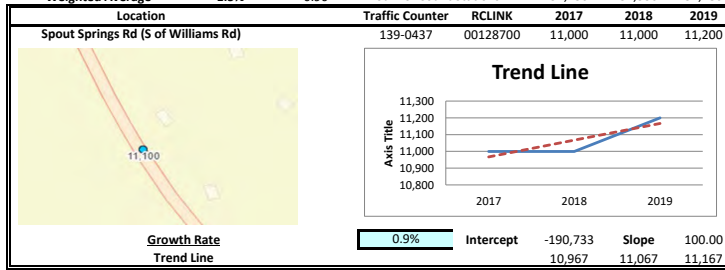
File Name : 20230174
Site Code : 20230173
Start Date : 05-02-2023
Page No : 3

Start Time	Spout Springs Rd Northbound				Spout Springs Rd Southbound				Thompson Mill Rd Eastbound				Thompson Mill Rd Westbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	42	143	11	196	17	163	20	200	28	16	15	59	21	18	16	55	510
04:30 PM	25	150	19	194	8	143	29	180	42	28	16	86	16	16	18	50	510
04:45 PM	36	143	16	195	17	131	30	178	37	21	20	78	22	20	11	53	504
05:00 PM	37	142	16	195	14	152	30	196	35	18	16	69	21	19	13	53	513
Total Volume	140	578	62	780	56	589	109	754	142	83	67	292	80	73	58	211	2037
% App. Total	17.9	74.1	7.9		7.4	78.1	14.5		48.6	28.4	22.9		37.9	34.6	27.5		
PHF	.833	.963	.816	.995	.824	.903	.908	.943	.845	.741	.838	.849	.909	.913	.806	.959	.993



LINEAR REGRESSION OF DAILY TRAFFIC

Location	Growth Rate	R Squared	Station ID	Route	2017	2018	2019
Spout Springs Rd (S of Williams)	0.9%	0.75	139-0437	00128700	11,000	11,000	11,200
Thompson Mill Rd (E of Vineyard)	1.9%	0.99	139-0493	00360200	13,300	13,500	13,800
Blackjack Rd (S of Live oak Rd)	1.9%	0.96	139-8174	00065400	1,590	1,610	1,650
Doc Hughes Rd (E of Lake Cove Ct)	1.8%	0.99	135-8523	00014700	4,740	4,810	4,910
Doc Hughes Rd (E of Lake Cove Ct)	1.7%	1.00	139-8175	00066800	600	610	620
Weighted Average	1.5%	0.96	Sum of Count Stations =		31,230	31,530	32,180



EXISTING INTERSECTION ANALYSIS

Timings
1: Spout Springs Rd & Thompson Mill Rd

1a. Existing AM
06-22-2023

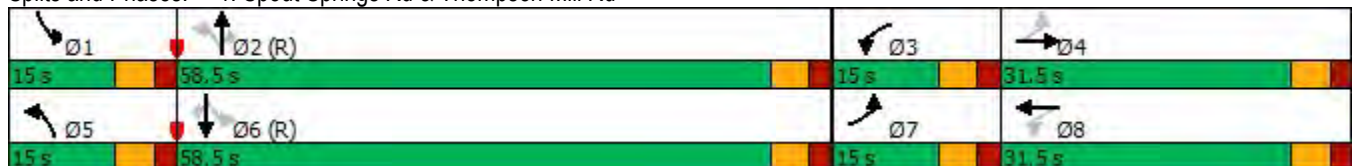


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	101	34	32	30	142	713	41	19	402	91
Future Volume (vph)	101	34	32	30	142	713	41	19	402	91
Lane Group Flow (vph)	110	101	35	60	154	775	45	21	437	99
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	6.0	5.0	6.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	15.0	31.5	15.0	30.5	15.0	35.5	35.5	15.0	33.5	33.5
Total Split (s)	15.0	31.5	15.0	31.5	15.0	58.5	58.5	15.0	58.5	58.5
Total Split (%)	12.5%	26.3%	12.5%	26.3%	12.5%	48.8%	48.8%	12.5%	48.8%	48.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio	0.55	0.44	0.19	0.41	0.25	0.61	0.04	0.05	0.39	0.10
Control Delay	52.6	28.1	40.9	40.4	6.6	15.0	0.1	6.5	14.6	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.6	28.1	40.9	40.4	6.6	15.0	0.1	6.5	14.6	1.6
Queue Length 50th (ft)	77	29	24	26	34	268	0	4	174	0
Queue Length 95th (ft)	127	85	51	69	67	610	0	14	297	18
Internal Link Dist (ft)		891		812		386			435	
Turn Bay Length (ft)	175		235		245		115	50		100
Base Capacity (vph)	204	408	214	390	630	1280	1126	440	1133	1010
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
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	0.54	0.25	0.16	0.15	0.24	0.61	0.04	0.05	0.39	0.10

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Spout Springs Rd & Thompson Mill Rd



HCM 6th Signalized Intersection Summary
 1: Spout Springs Rd & Thompson Mill Rd

1a. Existing AM
 06-22-2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	101	34	59	32	30	25	142	713	41	19	402	91
Future Volume (veh/h)	101	34	59	32	30	25	142	713	41	19	402	91
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1841	1841	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	110	37	64	35	33	27	154	775	45	21	437	99
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	4	4	4	4	4	4	3	3	3	3	3	3
Cap, veh/h	211	58	101	158	49	40	604	1244	1054	384	1196	1013
Arrive On Green	0.07	0.10	0.10	0.03	0.05	0.05	0.05	0.67	0.67	0.02	0.64	0.64
Sat Flow, veh/h	1753	605	1047	1753	937	766	1767	1856	1572	1767	1856	1572
Grp Volume(v), veh/h	110	0	101	35	0	60	154	775	45	21	437	99
Grp Sat Flow(s),veh/h/ln	1753	0	1652	1753	0	1703	1767	1856	1572	1767	1856	1572
Q Serve(g_s), s	6.9	0.0	7.1	2.2	0.0	4.2	3.5	28.4	1.2	0.5	13.1	2.9
Cycle Q Clear(g_c), s	6.9	0.0	7.1	2.2	0.0	4.2	3.5	28.4	1.2	0.5	13.1	2.9
Prop In Lane	1.00		0.63	1.00		0.45	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	211	0	160	158	0	90	604	1244	1054	384	1196	1013
V/C Ratio(X)	0.52	0.00	0.63	0.22	0.00	0.67	0.25	0.62	0.04	0.05	0.37	0.10
Avail Cap(c_a), veh/h	223	0	358	247	0	369	661	1244	1054	487	1196	1013
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.5	0.0	52.2	51.7	0.0	55.8	7.1	11.2	6.7	9.5	9.9	8.1
Incr Delay (d2), s/veh	2.0	0.0	4.1	0.7	0.0	8.2	0.2	2.4	0.1	0.1	0.9	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	0.0	3.0	1.0	0.0	1.9	1.2	11.0	0.4	0.2	5.2	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.5	0.0	56.3	52.4	0.0	64.0	7.4	13.6	6.8	9.6	10.8	8.3
LnGrp LOS	D	A	E	D	A	E	A	B	A	A	B	A
Approach Vol, veh/h		211			95			974			557	
Approach Delay, s/veh		52.7			59.7			12.3			10.3	
Approach LOS		D			E			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.0	85.9	8.9	17.1	11.1	82.8	14.2	11.8				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Gmax), s	9.5	53.0	9.5	26.0	9.5	53.0	9.5	26.0				
Max Q Clear Time (g_c+I1), s	2.5	30.4	4.2	9.1	5.5	15.1	8.9	6.2				
Green Ext Time (p_c), s	0.0	10.5	0.0	0.4	0.1	6.7	0.0	0.2				
Intersection Summary												
HCM 6th Ctrl Delay				18.8								
HCM 6th LOS				B								

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	107	39	52	3	41	29	26	35	1	16	19	39
Future Vol, veh/h	107	39	52	3	41	29	26	35	1	16	19	39
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	4	4	4	4	4	4	2	2	2	2	2	2
Mvmt Flow	123	45	60	3	47	33	30	40	1	18	22	45
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.1	7.9	8.3	8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	42%	54%	4%	22%
Vol Thru, %	56%	20%	56%	26%
Vol Right, %	2%	26%	40%	53%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	62	198	73	74
LT Vol	26	107	3	16
Through Vol	35	39	41	19
RT Vol	1	52	29	39
Lane Flow Rate	71	228	84	85
Geometry Grp	1	1	1	1
Degree of Util (X)	0.095	0.277	0.101	0.105
Departure Headway (Hd)	4.812	4.377	4.354	4.453
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	745	822	823	805
Service Time	2.838	2.398	2.379	2.478
HCM Lane V/C Ratio	0.095	0.277	0.102	0.106
HCM Control Delay	8.3	9.1	7.9	8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	1.1	0.3	0.4

Intersection						
Int Delay, s/veh	1.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Traffic Vol, veh/h	175	23	12	94	13	19
Future Vol, veh/h	175	23	12	94	13	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	None
Storage Length	-	135	245	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	4	4	4	4	2	2
Mvmt Flow	201	26	14	108	15	22

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	201	0	337
Stage 1	-	-	-	-	201
Stage 2	-	-	-	-	136
Critical Hdwy	-	-	4.14	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.236	-	3.518
Pot Cap-1 Maneuver	-	-	1359	-	658
Stage 1	-	-	-	-	833
Stage 2	-	-	-	-	890
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1359	-	651
Mov Cap-2 Maneuver	-	-	-	-	651
Stage 1	-	-	-	-	833
Stage 2	-	-	-	-	881

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	10
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	751	-	-	1359	-
HCM Lane V/C Ratio	0.049	-	-	0.01	-
HCM Control Delay (s)	10	-	-	7.7	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Timings
1: Spout Springs Rd & Thompson Mill Rd

1b. Existing PM
06-22-2023

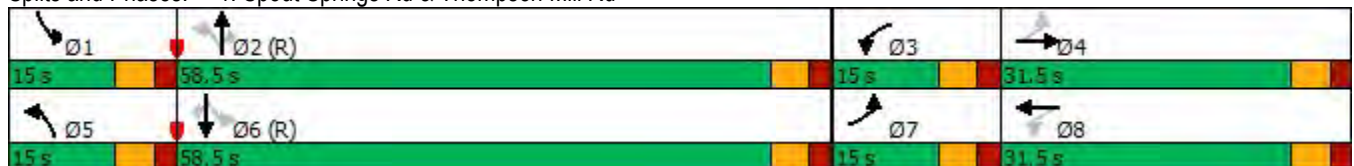


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	142	83	80	73	140	578	62	56	589	109
Future Volume (vph)	142	83	80	73	140	578	62	56	589	109
Lane Group Flow (vph)	143	152	81	133	141	584	63	57	595	110
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	6.0	5.0	6.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	15.0	31.5	15.0	30.5	15.0	35.5	35.5	15.0	33.5	33.5
Total Split (s)	15.0	31.5	15.0	31.5	15.0	58.5	58.5	15.0	58.5	58.5
Total Split (%)	12.5%	26.3%	12.5%	26.3%	12.5%	48.8%	48.8%	12.5%	48.8%	48.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio	0.59	0.57	0.33	0.60	0.33	0.54	0.07	0.13	0.59	0.12
Control Delay	47.7	47.6	38.8	49.1	10.2	19.7	0.1	8.9	22.7	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.7	47.6	38.8	49.1	10.2	19.7	0.1	8.9	22.7	2.7
Queue Length 50th (ft)	96	94	52	78	38	289	0	14	308	0
Queue Length 95th (ft)	148	161	91	140	74	464	0	35	509	27
Internal Link Dist (ft)		891		812		386			435	
Turn Bay Length (ft)	175		235		245		115	50		100
Base Capacity (vph)	244	393	256	393	438	1075	965	473	1010	922
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
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	0.59	0.39	0.32	0.34	0.32	0.54	0.07	0.12	0.59	0.12

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Spout Springs Rd & Thompson Mill Rd



HCM 6th Signalized Intersection Summary
 1: Spout Springs Rd & Thompson Mill Rd

1b. Existing PM
 06-22-2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	83	67	80	73	58	140	578	62	56	589	109
Future Volume (veh/h)	142	83	67	80	73	58	140	578	62	56	589	109
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1841	1841	1856	1856	1856	1856	1856	1870
Adj Flow Rate, veh/h	143	84	68	81	74	59	141	584	63	57	595	110
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	4	4	4	4	4	4	3	3	3	3	3	2
Cap, veh/h	224	115	93	199	92	73	440	1122	951	452	1098	938
Arrive On Green	0.08	0.12	0.12	0.05	0.10	0.10	0.05	0.60	0.60	0.04	0.59	0.59
Sat Flow, veh/h	1753	941	762	1753	948	756	1767	1856	1572	1767	1856	1585
Grp Volume(v), veh/h	143	0	152	81	0	133	141	584	63	57	595	110
Grp Sat Flow(s),veh/h/ln	1753	0	1704	1753	0	1705	1767	1856	1572	1767	1856	1585
Q Serve(g_s), s	8.8	0.0	10.3	4.9	0.0	9.2	3.7	21.8	2.0	1.5	23.1	3.7
Cycle Q Clear(g_c), s	8.8	0.0	10.3	4.9	0.0	9.2	3.7	21.8	2.0	1.5	23.1	3.7
Prop In Lane	1.00		0.45	1.00		0.44	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	224	0	208	199	0	166	440	1122	951	452	1098	938
V/C Ratio(X)	0.64	0.00	0.73	0.41	0.00	0.80	0.32	0.52	0.07	0.13	0.54	0.12
Avail Cap(c_a), veh/h	224	0	369	243	0	369	494	1122	951	529	1098	938
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.7	0.0	50.8	45.5	0.0	53.0	11.2	13.7	9.8	10.4	14.7	10.7
Incr Delay (d2), s/veh	5.9	0.0	4.9	1.3	0.0	8.7	0.4	1.7	0.1	0.1	1.9	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	0.0	4.6	2.2	0.0	4.2	1.4	8.9	0.7	0.5	9.6	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.6	0.0	55.6	46.9	0.0	61.8	11.6	15.4	9.9	10.6	16.6	11.0
LnGrp LOS	D	A	E	D	A	E	B	B	A	B	B	B
Approach Vol, veh/h		295			214			788			762	
Approach Delay, s/veh		53.2			56.1			14.3			15.4	
Approach LOS		D			E			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.8	78.1	12.0	20.2	11.3	76.5	15.0	17.2				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Gmax), s	9.5	53.0	9.5	26.0	9.5	53.0	9.5	26.0				
Max Q Clear Time (g_c+I1), s	3.5	23.8	6.9	12.3	5.7	25.1	10.8	11.2				
Green Ext Time (p_c), s	0.0	8.4	0.0	0.6	0.1	8.8	0.0	0.5				
Intersection Summary												
HCM 6th Ctrl Delay				24.6								
HCM 6th LOS				C								

Intersection												
Intersection Delay, s/veh	10.3											
Intersection LOS	B											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	162	68	63	5	20	22	28	20	4	57	51	160
Future Vol, veh/h	162	68	63	5	20	22	28	20	4	57	51	160
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	4	4	4	4	4	4	2	2	2	2	2	2
Mvmt Flow	169	71	66	5	21	23	29	21	4	59	53	167
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.1	8.3	8.7	10.1
HCM LOS	B	A	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	54%	55%	11%	21%
Vol Thru, %	38%	23%	43%	19%
Vol Right, %	8%	22%	47%	60%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	52	293	47	268
LT Vol	28	162	5	57
Through Vol	20	68	20	51
RT Vol	4	63	22	160
Lane Flow Rate	54	305	49	279
Geometry Grp	1	1	1	1
Degree of Util (X)	0.078	0.406	0.066	0.353
Departure Headway (Hd)	5.208	4.789	4.881	4.556
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	682	748	727	787
Service Time	3.279	2.845	2.957	2.605
HCM Lane V/C Ratio	0.079	0.408	0.067	0.355
HCM Control Delay	8.7	11.1	8.3	10.1
HCM Lane LOS	A	B	A	B
HCM 95th-tile Q	0.3	2	0.2	1.6

Intersection						
Int Delay, s/veh	1.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Traffic Vol, veh/h	235	34	20	184	25	18
Future Vol, veh/h	235	34	20	184	25	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	None
Storage Length	-	135	245	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	4	4	4	2	2	2
Mvmt Flow	250	36	21	196	27	19

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	250	0	488
Stage 1	-	-	-	-	250
Stage 2	-	-	-	-	238
Critical Hdwy	-	-	4.14	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.236	-	3.518
Pot Cap-1 Maneuver	-	-	1304	-	539
Stage 1	-	-	-	-	792
Stage 2	-	-	-	-	802
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1304	-	530
Mov Cap-2 Maneuver	-	-	-	-	530
Stage 1	-	-	-	-	792
Stage 2	-	-	-	-	789

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	11.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	614	-	-	1304	-
HCM Lane V/C Ratio	0.075	-	-	0.016	-
HCM Control Delay (s)	11.3	-	-	7.8	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

**FUTURE “NO-BUILD” INTERSECTION
ANALYSIS**

Timings
1: Spout Springs Rd & Thompson Mill Rd

2a. No Build AM
06-22-2023

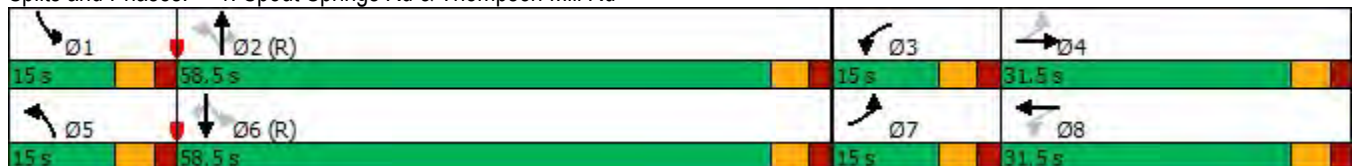


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	105	35	33	31	148	742	43	20	418	95
Future Volume (vph)	105	35	33	31	148	742	43	20	418	95
Lane Group Flow (vph)	114	104	36	62	161	807	47	22	454	103
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	6.0	5.0	6.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	15.0	31.5	15.0	30.5	15.0	35.5	35.5	15.0	33.5	33.5
Total Split (s)	15.0	31.5	15.0	31.5	15.0	58.5	58.5	15.0	58.5	58.5
Total Split (%)	12.5%	26.3%	12.5%	26.3%	12.5%	48.8%	48.8%	12.5%	48.8%	48.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio	0.57	0.45	0.19	0.42	0.27	0.65	0.04	0.06	0.40	0.10
Control Delay	53.5	28.0	40.9	40.3	6.8	17.3	0.1	6.6	14.9	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.5	28.0	40.9	40.3	6.8	17.3	0.1	6.6	14.9	1.8
Queue Length 50th (ft)	80	29	24	27	36	407	0	4	184	0
Queue Length 95th (ft)	131	86	52	71	70	658	0	15	313	20
Internal Link Dist (ft)		891		812		386			435	
Turn Bay Length (ft)	175		235		245		115	50		100
Base Capacity (vph)	204	409	215	390	615	1243	1097	404	1129	1007
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
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	0.56	0.25	0.17	0.16	0.26	0.65	0.04	0.05	0.40	0.10

Intersection Summary























Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Spout Springs Rd & Thompson Mill Rd



HCM 6th Signalized Intersection Summary
 1: Spout Springs Rd & Thompson Mill Rd

2a. No Build AM
 06-22-2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	35	61	33	31	26	148	742	43	20	418	95
Future Volume (veh/h)	105	35	61	33	31	26	148	742	43	20	418	95
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1841	1841	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	114	38	66	36	34	28	161	807	47	22	454	103
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	4	4	4	4	4	4	3	3	3	3	3	3
Cap, veh/h	215	60	104	161	50	42	588	1237	1048	361	1186	1005
Arrive On Green	0.07	0.10	0.10	0.03	0.05	0.05	0.05	0.67	0.67	0.02	0.64	0.64
Sat Flow, veh/h	1753	604	1048	1753	934	769	1767	1856	1572	1767	1856	1572
Grp Volume(v), veh/h	114	0	104	36	0	62	161	807	47	22	454	103
Grp Sat Flow(s),veh/h/ln	1753	0	1652	1753	0	1702	1767	1856	1572	1767	1856	1572
Q Serve(g_s), s	7.1	0.0	7.3	2.3	0.0	4.3	3.8	30.8	1.2	0.5	14.0	3.0
Cycle Q Clear(g_c), s	7.1	0.0	7.3	2.3	0.0	4.3	3.8	30.8	1.2	0.5	14.0	3.0
Prop In Lane	1.00		0.63	1.00		0.45	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	215	0	164	161	0	92	588	1237	1048	361	1186	1005
V/C Ratio(X)	0.53	0.00	0.63	0.22	0.00	0.67	0.27	0.65	0.04	0.06	0.38	0.10
Avail Cap(c_a), veh/h	223	0	358	248	0	369	641	1237	1048	463	1186	1005
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.1	0.0	51.9	51.5	0.0	55.7	7.4	11.8	6.9	10.3	10.3	8.4
Incr Delay (d2), s/veh	2.2	0.0	4.0	0.7	0.0	8.3	0.2	2.7	0.1	0.1	0.9	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.0	3.1	1.0	0.0	2.0	1.3	12.1	0.4	0.2	5.5	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.3	0.0	55.9	52.2	0.0	64.0	7.7	14.5	7.0	10.3	11.3	8.6
LnGrp LOS	D	A	E	D	A	E	A	B	A	B	B	A
Approach Vol, veh/h		218			98			1015			579	
Approach Delay, s/veh		52.5			59.6			13.1			10.8	
Approach LOS		D			E			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.1	85.5	9.0	17.4	11.4	82.2	14.4	12.0				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Gmax), s	9.5	53.0	9.5	26.0	9.5	53.0	9.5	26.0				
Max Q Clear Time (g_c+I1), s	2.5	32.8	4.3	9.3	5.8	16.0	9.1	6.3				
Green Ext Time (p_c), s	0.0	10.3	0.0	0.4	0.1	7.0	0.0	0.2				
Intersection Summary												
HCM 6th Ctrl Delay				19.3								
HCM 6th LOS				B								

Intersection												
Intersection Delay, s/veh	8.6											
Intersection LOS	A											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	111	41	54	3	43	30	27	36	1	17	20	41
Future Vol, veh/h	111	41	54	3	43	30	27	36	1	17	20	41
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	4	4	4	4	4	4	2	2	2	2	2	2
Mvmt Flow	128	47	62	3	49	34	31	41	1	20	23	47
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.2	7.9	8.4	8.1
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	42%	54%	4%	22%
Vol Thru, %	56%	20%	57%	26%
Vol Right, %	2%	26%	39%	53%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	64	206	76	78
LT Vol	27	111	3	17
Through Vol	36	41	43	20
RT Vol	1	54	30	41
Lane Flow Rate	74	237	87	90
Geometry Grp	1	1	1	1
Degree of Util (X)	0.099	0.29	0.106	0.112
Departure Headway (Hd)	4.851	4.402	4.388	4.489
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	739	817	817	798
Service Time	2.881	2.424	2.415	2.518
HCM Lane V/C Ratio	0.1	0.29	0.106	0.113
HCM Control Delay	8.4	9.2	7.9	8.1
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	1.2	0.4	0.4

Intersection						
Int Delay, s/veh	1.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↘	↙
Traffic Vol, veh/h	182	24	12	98	14	20
Future Vol, veh/h	182	24	12	98	14	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	None
Storage Length	-	135	245	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	4	4	4	4	2	2
Mvmt Flow	209	28	14	113	16	23

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	209	0	350 209
Stage 1	-	-	-	-	209 -
Stage 2	-	-	-	-	141 -
Critical Hdwy	-	-	4.14	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.236	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1350	-	647 831
Stage 1	-	-	-	-	826 -
Stage 2	-	-	-	-	886 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1350	-	641 831
Mov Cap-2 Maneuver	-	-	-	-	641 -
Stage 1	-	-	-	-	826 -
Stage 2	-	-	-	-	877 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	10.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	741	-	-	1350	-
HCM Lane V/C Ratio	0.053	-	-	0.01	-
HCM Control Delay (s)	10.1	-	-	7.7	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Timings
1: Spout Springs Rd & Thompson Mill Rd

2b. No Build PM
06-22-2023

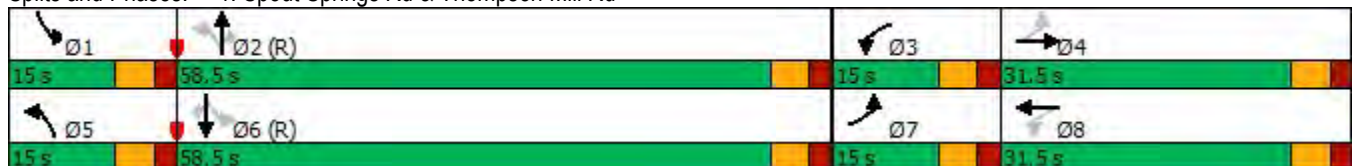


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	148	86	83	76	146	601	64	58	613	113
Future Volume (vph)	148	86	83	76	146	601	64	58	613	113
Lane Group Flow (vph)	149	158	84	138	147	607	65	59	619	114
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	6.0	5.0	6.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	15.0	31.5	15.0	30.5	15.0	35.5	35.5	15.0	33.5	33.5
Total Split (s)	15.0	31.5	15.0	31.5	15.0	58.5	58.5	15.0	58.5	58.5
Total Split (%)	12.5%	26.3%	12.5%	26.3%	12.5%	48.8%	48.8%	12.5%	48.8%	48.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio	0.61	0.59	0.34	0.61	0.36	0.57	0.07	0.14	0.62	0.12
Control Delay	48.5	47.9	38.7	49.9	10.8	20.6	0.1	9.2	24.0	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.5	47.9	38.7	49.9	10.8	20.6	0.1	9.2	24.0	3.0
Queue Length 50th (ft)	100	99	54	83	40	308	0	15	331	0
Queue Length 95th (ft)	152	166	93	146	78	496	0	36	547	29
Internal Link Dist (ft)		891		812		386			435	
Turn Bay Length (ft)	175		235		245		115	50		100
Base Capacity (vph)	245	393	256	393	417	1068	959	451	1000	914
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
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	0.61	0.40	0.33	0.35	0.35	0.57	0.07	0.13	0.62	0.12

Intersection Summary























Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Spout Springs Rd & Thompson Mill Rd



HCM 6th Signalized Intersection Summary
 1: Spout Springs Rd & Thompson Mill Rd

2b. No Build PM
 06-22-2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	148	86	70	83	76	60	146	601	64	58	613	113
Future Volume (veh/h)	148	86	70	83	76	60	146	601	64	58	613	113
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1841	1841	1856	1856	1856	1856	1856	1870
Adj Flow Rate, veh/h	149	87	71	84	77	61	147	607	65	59	619	114
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	4	4	4	4	4	4	3	3	3	3	3	2
Cap, veh/h	225	116	95	199	95	75	422	1116	946	433	1090	931
Arrive On Green	0.08	0.12	0.12	0.06	0.10	0.10	0.05	0.60	0.60	0.04	0.59	0.59
Sat Flow, veh/h	1753	938	765	1753	951	754	1767	1856	1572	1767	1856	1585
Grp Volume(v), veh/h	149	0	158	84	0	138	147	607	65	59	619	114
Grp Sat Flow(s),veh/h/ln	1753	0	1703	1753	0	1705	1767	1856	1572	1767	1856	1585
Q Serve(g_s), s	9.1	0.0	10.8	5.1	0.0	9.5	3.9	23.2	2.1	1.6	24.8	3.8
Cycle Q Clear(g_c), s	9.1	0.0	10.8	5.1	0.0	9.5	3.9	23.2	2.1	1.6	24.8	3.8
Prop In Lane	1.00		0.45	1.00		0.44	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	225	0	210	199	0	171	422	1116	946	433	1090	931
V/C Ratio(X)	0.66	0.00	0.75	0.42	0.00	0.81	0.35	0.54	0.07	0.14	0.57	0.12
Avail Cap(c_a), veh/h	225	0	369	240	0	369	473	1116	946	510	1090	931
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.6	0.0	50.8	45.2	0.0	52.9	11.8	14.2	9.9	10.9	15.3	11.0
Incr Delay (d2), s/veh	7.1	0.0	5.3	1.4	0.0	8.7	0.5	1.9	0.1	0.1	2.1	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.0	4.8	2.2	0.0	4.4	1.5	9.6	0.7	0.6	10.3	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.7	0.0	56.1	46.6	0.0	61.6	12.3	16.1	10.1	11.1	17.5	11.3
LnGrp LOS	D	A	E	D	A	E	B	B	B	B	B	B
Approach Vol, veh/h		307			222			819			792	
Approach Delay, s/veh		54.0			55.9			14.9			16.1	
Approach LOS		D			E			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.8	77.7	12.2	20.3	11.5	76.0	15.0	17.5				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Gmax), s	9.5	53.0	9.5	26.0	9.5	53.0	9.5	26.0				
Max Q Clear Time (g_c+I1), s	3.6	25.2	7.1	12.8	5.9	26.8	11.1	11.5				
Green Ext Time (p_c), s	0.0	8.6	0.0	0.6	0.1	9.1	0.0	0.5				
Intersection Summary												
HCM 6th Ctrl Delay				25.2								
HCM 6th LOS				C								

Intersection												
Intersection Delay, s/veh	10.6											
Intersection LOS	B											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	168	71	66	5	21	23	29	21	4	59	53	166
Future Vol, veh/h	168	71	66	5	21	23	29	21	4	59	53	166
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	4	4	4	4	4	4	2	2	2	2	2	2
Mvmt Flow	175	74	69	5	22	24	30	22	4	61	55	173
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.5	8.4	8.8	10.4
HCM LOS	B	A	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	54%	55%	10%	21%
Vol Thru, %	39%	23%	43%	19%
Vol Right, %	7%	22%	47%	60%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	54	305	49	278
LT Vol	29	168	5	59
Through Vol	21	71	21	53
RT Vol	4	66	23	166
Lane Flow Rate	56	318	51	290
Geometry Grp	1	1	1	1
Degree of Util (X)	0.082	0.426	0.07	0.37
Departure Headway (Hd)	5.269	4.825	4.935	4.599
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	674	740	718	779
Service Time	3.349	2.888	3.02	2.655
HCM Lane V/C Ratio	0.083	0.43	0.071	0.372
HCM Control Delay	8.8	11.5	8.4	10.4
HCM Lane LOS	A	B	A	B
HCM 95th-tile Q	0.3	2.1	0.2	1.7

Intersection						
Int Delay, s/veh	1.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↘	↙
Traffic Vol, veh/h	244	35	21	191	26	19
Future Vol, veh/h	244	35	21	191	26	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	None
Storage Length	-	135	245	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	4	4	4	2	2	2
Mvmt Flow	260	37	22	203	28	20

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	260	0	507
Stage 1	-	-	-	-	260
Stage 2	-	-	-	-	247
Critical Hdwy	-	-	4.14	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.236	-	3.518
Pot Cap-1 Maneuver	-	-	1293	-	525
Stage 1	-	-	-	-	783
Stage 2	-	-	-	-	794
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1293	-	516
Mov Cap-2 Maneuver	-	-	-	-	516
Stage 1	-	-	-	-	783
Stage 2	-	-	-	-	781

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	11.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	602	-	-	1293	-
HCM Lane V/C Ratio	0.08	-	-	0.017	-
HCM Control Delay (s)	11.5	-	-	7.8	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-

FUTURE "BUILD" INTERSECTION ANALYSIS

Timings
1: Spout Springs Rd & Thompson Mill Rd



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	105	41	51	49	148	742	49	26	418	95
Future Volume (vph)	105	41	51	49	148	742	49	26	418	95
Lane Group Flow (vph)	114	111	55	101	161	807	53	28	454	103
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	6.0	5.0	6.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	15.0	31.5	15.0	30.5	15.0	35.5	35.5	15.0	33.5	33.5
Total Split (s)	15.0	31.5	15.0	31.5	15.0	58.5	58.5	15.0	58.5	58.5
Total Split (%)	12.5%	26.3%	12.5%	26.3%	12.5%	48.8%	48.8%	12.5%	48.8%	48.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio	0.50	0.47	0.25	0.57	0.28	0.68	0.05	0.09	0.43	0.11
Control Delay	47.2	33.2	40.2	46.5	7.9	19.9	0.1	7.5	17.0	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.2	33.2	40.2	46.5	7.9	19.9	0.1	7.5	17.0	1.9
Queue Length 50th (ft)	78	42	37	52	39	432	0	6	195	0
Queue Length 95th (ft)	128	101	71	108	73	685	0	18	325	21
Internal Link Dist (ft)		891		812		386			435	
Turn Bay Length (ft)	175		235		245		115	50		100
Base Capacity (vph)	232	404	244	395	578	1180	1047	370	1062	964
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
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	0.49	0.27	0.23	0.26	0.28	0.68	0.05	0.08	0.43	0.11

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Spout Springs Rd & Thompson Mill Rd



HCM 6th Signalized Intersection Summary
 1: Spout Springs Rd & Thompson Mill Rd

3a. Build AM
 06/27/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	41	61	51	49	44	148	742	49	26	418	95
Future Volume (veh/h)	105	41	61	51	49	44	148	742	49	26	418	95
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1841	1841	1856	1856	1856	1856	1856	1870
Adj Flow Rate, veh/h	114	45	66	55	53	48	161	807	53	28	454	103
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	4	4	4	4	4	4	3	3	3	3	3	2
Cap, veh/h	214	77	112	190	70	63	563	1187	1006	336	1139	973
Arrive On Green	0.07	0.11	0.11	0.04	0.08	0.08	0.05	0.64	0.64	0.03	0.61	0.61
Sat Flow, veh/h	1753	674	989	1753	890	806	1767	1856	1572	1767	1856	1585
Grp Volume(v), veh/h	114	0	111	55	0	101	161	807	53	28	454	103
Grp Sat Flow(s),veh/h/ln	1753	0	1663	1753	0	1696	1767	1856	1572	1767	1856	1585
Q Serve(g_s), s	7.0	0.0	7.6	3.4	0.0	7.0	4.0	33.3	1.5	0.7	15.0	3.2
Cycle Q Clear(g_c), s	7.0	0.0	7.6	3.4	0.0	7.0	4.0	33.3	1.5	0.7	15.0	3.2
Prop In Lane	1.00		0.59	1.00		0.48	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	214	0	189	190	0	132	563	1187	1006	336	1139	973
V/C Ratio(X)	0.53	0.00	0.59	0.29	0.00	0.76	0.29	0.68	0.05	0.08	0.40	0.11
Avail Cap(c_a), veh/h	224	0	360	262	0	367	613	1187	1006	431	1139	973
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.8	0.0	50.5	48.4	0.0	54.2	8.6	13.8	8.1	11.9	11.8	9.6
Incr Delay (d2), s/veh	2.2	0.0	2.9	0.8	0.0	8.7	0.3	3.2	0.1	0.1	1.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	0.0	3.2	1.5	0.0	3.2	1.4	13.4	0.5	0.3	6.1	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.0	0.0	53.4	49.2	0.0	62.9	8.8	16.9	8.2	12.0	12.9	9.8
LnGrp LOS	D	A	D	D	A	E	A	B	A	B	B	A
Approach Vol, veh/h		225			156			1021			585	
Approach Delay, s/veh		50.6			58.1			15.2			12.3	
Approach LOS		D			E			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.5	82.3	10.1	19.1	11.6	79.2	14.3	14.9				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Gmax), s	9.5	53.0	9.5	26.0	9.5	53.0	9.5	26.0				
Max Q Clear Time (g_c+I1), s	2.7	35.3	5.4	9.6	6.0	17.0	9.0	9.0				
Green Ext Time (p_c), s	0.0	9.5	0.0	0.4	0.1	6.9	0.0	0.4				
Intersection Summary												
HCM 6th Ctrl Delay				21.7								
HCM 6th LOS				C								

Intersection												
Intersection Delay, s/veh	8.9											
Intersection LOS	A											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	129	41	54	3	43	30	27	36	1	17	20	47
Future Vol, veh/h	129	41	54	3	43	30	27	36	1	17	20	47
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	4	4	4	4	4	4	2	2	2	2	2	2
Mvmt Flow	148	47	62	3	49	34	31	41	1	20	23	54
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.5	8	8.5	8.2
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	42%	58%	4%	20%
Vol Thru, %	56%	18%	57%	24%
Vol Right, %	2%	24%	39%	56%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	64	224	76	84
LT Vol	27	129	3	17
Through Vol	36	41	43	20
RT Vol	1	54	30	47
Lane Flow Rate	74	257	87	97
Geometry Grp	1	1	1	1
Degree of Util (X)	0.1	0.318	0.108	0.121
Departure Headway (Hd)	4.913	4.441	4.432	4.52
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	729	811	808	792
Service Time	2.948	2.465	2.462	2.553
HCM Lane V/C Ratio	0.102	0.317	0.108	0.122
HCM Control Delay	8.5	9.5	8	8.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	1.4	0.4	0.4

Intersection												
Int Delay, s/veh	2.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	182	24	12	98	6	14	0	20	18	0	53
Future Vol, veh/h	18	182	24	12	98	6	14	0	20	18	0	53
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	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	235	-	135	245	-	175	-	-	-	-	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	4	4	4	4	4	4	2	2	2	2	2	2
Mvmt Flow	21	209	28	14	113	7	16	0	23	21	0	61

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	120	0	0	209	0	0	426	399	209	404	392	113
Stage 1	-	-	-	-	-	-	251	251	-	141	141	-
Stage 2	-	-	-	-	-	-	175	148	-	263	251	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.236	-	-	2.236	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1455	-	-	1350	-	-	539	539	831	557	544	940
Stage 1	-	-	-	-	-	-	753	699	-	862	780	-
Stage 2	-	-	-	-	-	-	827	775	-	742	699	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1455	-	-	1350	-	-	495	526	831	531	531	940
Mov Cap-2 Maneuver	-	-	-	-	-	-	495	526	-	531	531	-
Stage 1	-	-	-	-	-	-	742	689	-	850	772	-
Stage 2	-	-	-	-	-	-	765	767	-	711	689	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			0.8			10.9			9.9		
HCM LOS							B			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	649	1455	-	-	1350	-	-	531	940
HCM Lane V/C Ratio	0.06	0.014	-	-	0.01	-	-	0.039	0.065
HCM Control Delay (s)	10.9	7.5	-	-	7.7	-	-	12.1	9.1
HCM Lane LOS	B	A	-	-	A	-	-	B	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1	0.2

Timings
1: Spout Springs Rd & Thompson Mill Rd



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	148	107	95	88	146	601	85	79	613	113
Future Volume (vph)	148	107	95	88	146	601	85	79	613	113
Lane Group Flow (vph)	149	179	96	162	147	607	86	80	619	114
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	6.0	5.0	6.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	15.0	31.5	15.0	30.5	15.0	35.5	35.5	15.0	33.5	33.5
Total Split (s)	15.0	31.5	15.0	31.5	15.0	58.5	58.5	15.0	58.5	58.5
Total Split (%)	12.5%	26.3%	12.5%	26.3%	12.5%	48.8%	48.8%	12.5%	48.8%	48.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
v/c Ratio	0.60	0.70	0.42	0.64	0.37	0.59	0.09	0.20	0.64	0.13
Control Delay	46.5	56.6	39.3	50.6	11.7	22.7	1.3	10.2	25.8	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.5	56.6	39.3	50.6	11.7	22.7	1.3	10.2	25.8	3.2
Queue Length 50th (ft)	97	120	61	101	42	325	0	22	343	0
Queue Length 95th (ft)	148	190	101	167	82	525	13	49	569	30
Internal Link Dist (ft)		891		812		386			435	
Turn Bay Length (ft)	175		235		245		115	50		100
Base Capacity (vph)	248	392	238	393	406	1031	930	434	971	883
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
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	0.60	0.46	0.40	0.41	0.36	0.59	0.09	0.18	0.64	0.13

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Spout Springs Rd & Thompson Mill Rd



HCM 6th Signalized Intersection Summary
 1: Spout Springs Rd & Thompson Mill Rd

3b. Build PM
 06/27/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	148	107	70	95	88	72	146	601	85	79	613	113
Future Volume (veh/h)	148	107	70	95	88	72	146	601	85	79	613	113
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1841	1841	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	149	108	71	96	89	73	147	607	86	80	619	114
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	4	4	4	4	4	4	3	3	3	3	3	3
Cap, veh/h	225	137	90	205	107	88	407	1084	918	413	1060	899
Arrive On Green	0.08	0.13	0.13	0.06	0.11	0.11	0.05	0.58	0.58	0.04	0.57	0.57
Sat Flow, veh/h	1753	1037	681	1753	935	767	1767	1856	1572	1767	1856	1572
Grp Volume(v), veh/h	149	0	179	96	0	162	147	607	86	80	619	114
Grp Sat Flow(s),veh/h/ln	1753	0	1718	1753	0	1703	1767	1856	1572	1767	1856	1572
Q Serve(g_s), s	9.0	0.0	12.1	5.7	0.0	11.2	4.1	24.3	2.9	2.2	25.7	4.0
Cycle Q Clear(g_c), s	9.0	0.0	12.1	5.7	0.0	11.2	4.1	24.3	2.9	2.2	25.7	4.0
Prop In Lane	1.00		0.40	1.00		0.45	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	225	0	227	205	0	195	407	1084	918	413	1060	899
V/C Ratio(X)	0.66	0.00	0.79	0.47	0.00	0.83	0.36	0.56	0.09	0.19	0.58	0.13
Avail Cap(c_a), veh/h	225	0	372	235	0	369	456	1084	918	484	1060	899
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.2	0.0	50.5	43.5	0.0	52.0	12.8	15.4	11.0	12.0	16.5	11.9
Incr Delay (d2), s/veh	7.1	0.0	6.1	1.7	0.0	8.7	0.5	2.1	0.2	0.2	2.4	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	0.0	5.5	2.5	0.0	5.1	1.5	10.1	1.0	0.8	10.9	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.3	0.0	56.6	45.1	0.0	60.7	13.3	17.5	11.2	12.2	18.9	12.2
LnGrp LOS	D	A	E	D	A	E	B	B	B	B	B	B
Approach Vol, veh/h		328			258			840			813	
Approach Delay, s/veh		53.7			54.9			16.1			17.3	
Approach LOS		D			D			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.2	75.6	12.9	21.3	11.7	74.1	15.0	19.3				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Gmax), s	9.5	53.0	9.5	26.0	9.5	53.0	9.5	26.0				
Max Q Clear Time (g_c+I1), s	4.2	26.3	7.7	14.1	6.1	27.7	11.0	13.2				
Green Ext Time (p_c), s	0.1	8.7	0.0	0.6	0.1	8.9	0.0	0.6				
Intersection Summary												
HCM 6th Ctrl Delay			26.5									
HCM 6th LOS			C									

Intersection	
Intersection Delay, s/veh	11
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	180	71	66	5	21	23	29	21	4	59	53	187
Future Vol, veh/h	180	71	66	5	21	23	29	21	4	59	53	187
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	4	4	4	4	4	2	2	2	2	2	2	2
Mvmt Flow	188	74	69	5	22	24	30	22	4	61	55	195
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.9	8.5	8.9	10.8
HCM LOS	B	A	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	54%	57%	10%	20%
Vol Thru, %	39%	22%	43%	18%
Vol Right, %	7%	21%	47%	63%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	54	317	49	299
LT Vol	29	180	5	59
Through Vol	21	71	21	53
RT Vol	4	66	23	187
Lane Flow Rate	56	330	51	311
Geometry Grp	1	1	1	1
Degree of Util (X)	0.083	0.448	0.071	0.4
Departure Headway (Hd)	5.341	4.887	5.013	4.621
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	664	730	705	772
Service Time	3.429	2.957	3.11	2.681
HCM Lane V/C Ratio	0.084	0.452	0.072	0.403
HCM Control Delay	8.9	11.9	8.5	10.8
HCM Lane LOS	A	B	A	B
HCM 95th-tile Q	0.3	2.3	0.2	1.9

Intersection												
Int Delay, s/veh	2.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	62	244	35	21	191	21	26	0	19	12	0	36
Future Vol, veh/h	62	244	35	21	191	21	26	0	19	12	0	36
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	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	235	-	135	245	-	175	-	-	-	-	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	4	4	4	4	4	4	2	2	2	2	2	2
Mvmt Flow	66	260	37	22	203	22	28	0	20	13	0	38

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	225	0	0	260	0	0	669	661	260	649	639	203
Stage 1	-	-	-	-	-	-	392	392	-	247	247	-
Stage 2	-	-	-	-	-	-	277	269	-	402	392	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.236	-	-	2.236	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1332	-	-	1293	-	-	371	383	779	383	394	838
Stage 1	-	-	-	-	-	-	633	606	-	757	702	-
Stage 2	-	-	-	-	-	-	729	687	-	625	606	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1332	-	-	1293	-	-	336	358	779	354	368	838
Mov Cap-2 Maneuver	-	-	-	-	-	-	336	358	-	354	368	-
Stage 1	-	-	-	-	-	-	601	576	-	719	690	-
Stage 2	-	-	-	-	-	-	684	675	-	579	576	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.4			0.7			14.1			11		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	442	1332	-	-	1293	-	-	354	838
HCM Lane V/C Ratio	0.108	0.05	-	-	0.017	-	-	0.036	0.046
HCM Control Delay (s)	14.1	7.8	-	-	7.8	-	-	15.6	9.5
HCM Lane LOS	B	A	-	-	A	-	-	C	A
HCM 95th %tile Q(veh)	0.4	0.2	-	-	0.1	-	-	0.1	0.1

TRAFFIC VOLUME WORKSHEETS

23-071 - Residential Development on Thompson Mill Road - Hall County
Traffic Volumes

A&R Engineering
 June 2023

1.ThompsonMillRd@SpoutSpringsRd

A.M. Peak Hour

Condition	Spout Springs Road Northbound			Spout Springs Road Southbound			Thompson Mill Road Eastbound			Thompson Mill Road Westbound				
	L	T	R	L	T	R	L	T	R	L	T	R	Tot	
Existing 2023 Traffic Counts:	142	713	41	19	402	91	101	34	59	194	32	30	25	87
Growth Factor (%):	2	2	2	2	2	2	2	2	2	2	2	2	2	2
No-Build 2025 Volumes:	148	742	43	20	418	95	105	35	61	201	33	31	26	90
Total New Trips:	0	0	6	6	0	0	0	6	0	6	18	18	18	54
Future 2025 Traffic Volumes:	148	742	49	26	418	95	105	41	61	207	51	49	44	144

P.M. Peak Hour

Condition	Spout Springs Road Northbound			Spout Springs Road Southbound			Thompson Mill Road Eastbound			Thompson Mill Road Westbound				
	L	T	R	L	T	R	L	T	R	L	T	R	Tot	
Existing 2023 Traffic Counts:	140	578	62	56	589	109	142	83	67	292	80	73	58	211
Growth Factor (%):	2	2	2	2	2	2	2	2	2	2	2	2	2	2
No-Build 2025 Volumes:	146	601	64	58	613	113	148	86	70	304	83	76	60	219
Total New Trips:	0	0	21	21	0	0	0	21	0	21	12	12	12	36
Future 2025 Traffic Volumes:	146	601	85	79	613	113	148	107	70	325	95	88	72	255

23-071 - Residential Development on Thompson Mill Road - Hall County
Traffic Volumes

A&R Engineering
 June 2023

2. Thompson Mill Rd @ Nape Ridge Rd

A.M. Peak Hour

Condition	Napa Bridge Road Northbound			Napa Bridge Road Southbound			Thompson Mill Road Eastbound			Thompson Mill Road Westbound				
	L	T	R	L	T	R	L	T	R	L	T	R	Tot	
Existing 2023 Traffic Counts:	26	35	1	16	19	39	107	39	52	198	3	41	29	73
Growth Factor (%):	2	2	2	2	2	2	2	2	2	2	2	2	2	2
No-Build 2025 Volumes:	27	36	1	17	20	41	111	41	54	206	3	43	30	76
Total New Trips:	0	0	0	0	0	6	18	0	0	18	0	0	0	0
Future 2025 Traffic Volumes:	27	36	1	17	20	47	129	41	54	224	3	43	30	76

P.M. Peak Hour

Condition	Napa Bridge Road Northbound			Napa Bridge Road Southbound			Thompson Mill Road Eastbound			Thompson Mill Road Westbound				
	L	T	R	L	T	R	L	T	R	L	T	R	Tot	
Existing 2023 Traffic Counts:	28	20	4	57	51	160	162	68	63	293	5	20	22	47
Growth Factor (%):	2	2	2	2	2	2	2	2	2	2	2	2	2	2
No-Build 2025 Volumes:	29	21	4	59	53	166	168	71	66	305	5	21	23	49
Total New Trips:	0	0	0	0	0	21	12	0	0	12	0	0	0	0
Future 2025 Traffic Volumes:	29	21	4	59	53	187	180	71	66	317	5	21	23	49

23-071 - Residential Development on Thompson Mill Road - Hall County
Traffic Volumes

A&R Engineering
 June 2023

3.ThompsonMill@OaksBraselton-SD

A.M. Peak Hour

Condition	Oaks at Braselton Driveway Northbound			Site Driveway Southbound			Thompson Mill Road Eastbound			Thompson Mill Road Westbound						
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot				
Existing 2023 Traffic Counts:	13	0	19	32	0	0	0	0	0	175	23	198	12	94	0	106
Growth Factor (%):	2	2	2		2	2	2		2	2	2		2	2	2	
No-Build 2025 Volumes:	14	0	20	34	0	0	0	0	0	182	24	206	12	98	0	110
Total New Trips:	0	0	0	0	18	0	55	73	18	0	0	18	0	0	6	6
Future 2025 Traffic Volumes:	14	0	20	34	18	0	55	73	18	182	24	224	12	98	6	116

P.M. Peak Hour

Condition	Oaks at Braselton Driveway Northbound			Site Driveway Southbound			Thompson Mill Road Eastbound			Thompson Mill Road Westbound						
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot				
Existing 2023 Traffic Counts:	25	0	18	43	0	0	0	0	0	235	34	269	20	184	0	204
Growth Factor (%):	2	2	2		2	2	2		2	2	2		2	2	2	
No-Build 2025 Volumes:	26	0	19	45	0	0	0	0	0	244	35	279	21	191	0	212
Total New Trips:	0	0	0	0	12	0	36	48	62	0	0	62	0	0	21	21
Future 2025 Traffic Volumes:	26	0	19	45	12	0	36	48	62	244	35	341	21	191	21	233