

**TRAFFIC IMPACT STUDY
FOR
RESIDENTIAL DEVELOPMENT ON STANLEY ROAD
CITY OF DACULA, GEORGIA**



Prepared for:

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A & R Project # 21-173

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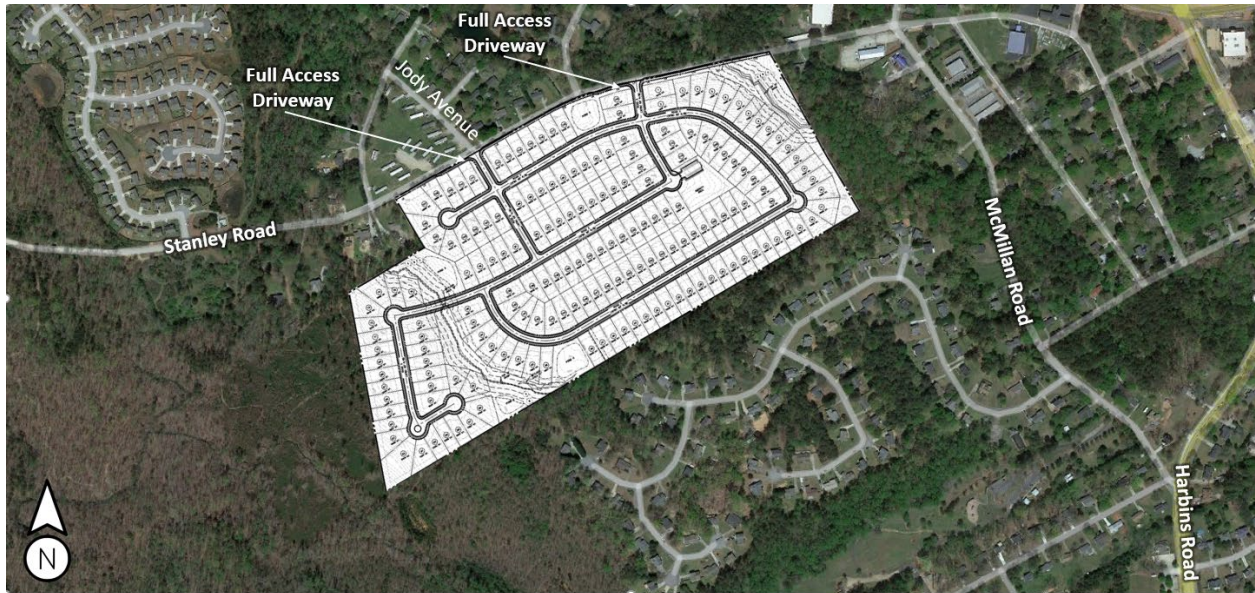
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1.0 INTRODUCTION

The purpose of this study is to determine the traffic impact that will result from the proposed residential development located on Stanley Road in City of Dacula, Georgia and to determine if left-turn lanes are warranted on Stanley Road at the two driveway intersections. The traffic analysis evaluates the current operations compared to the future conditions with the traffic generated by the development. The proposed development will consist of 173 units of single-family homes.

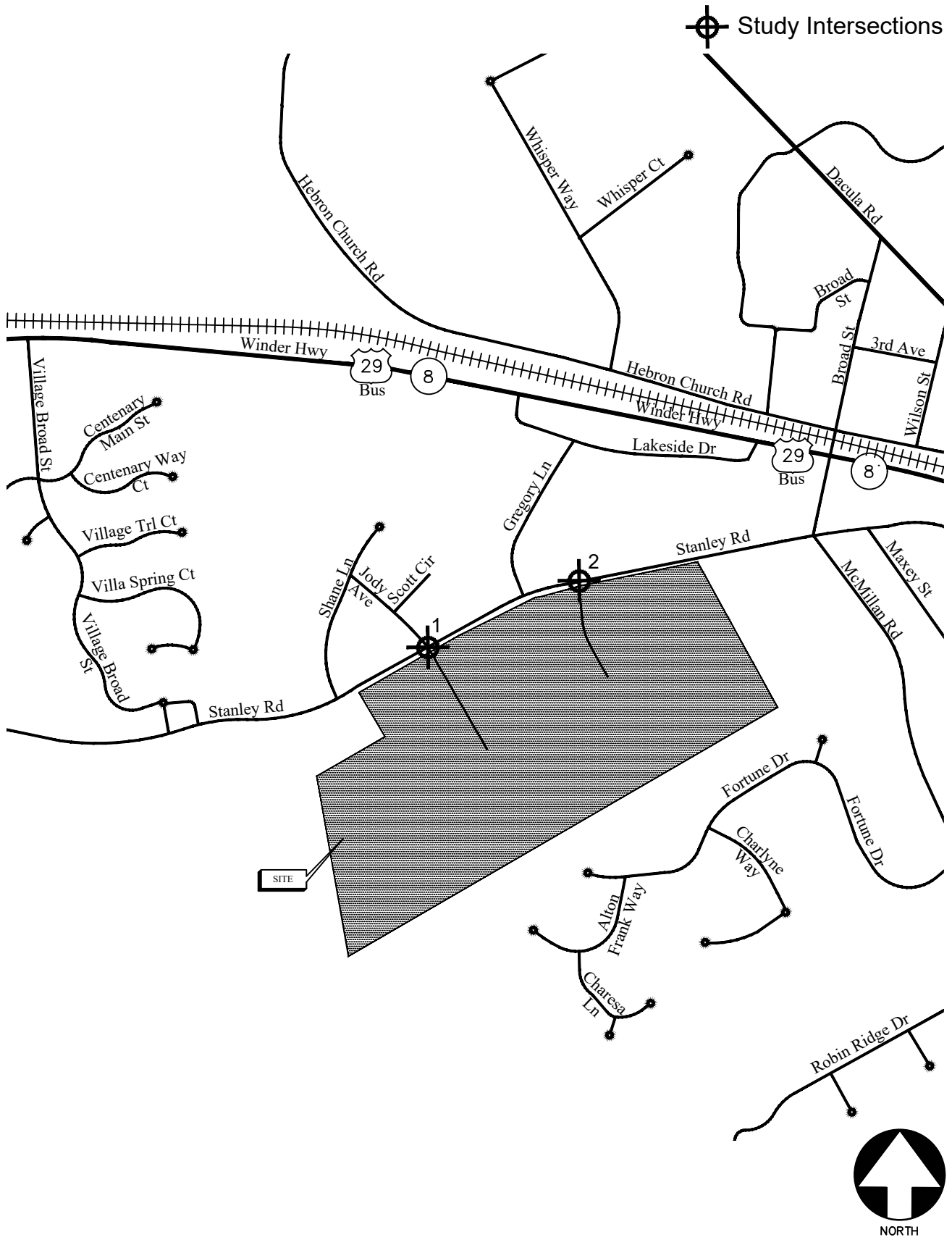


The development proposes access at the following locations:

- Site Driveway 1: Full-access western driveway on Stanley Road aligned with Jody Avenue
- Site Driveway 2: Full-access eastern driveway on Stanley Road

The AM and PM peak hours have been analyzed in this study.

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



LOCATION MAP

FIGURE 1
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2.0 EXISTING FACILITIES / CONDITIONS

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 Stanley Road

Stanley Road is an east-west, two-lane, undivided roadway with a posted speed limit of 25 mph.

2.1.2 Jody Avenue

Jody Avenue is a north-south, two-lane, undivided roadway with a posted speed limit of 25 mph.

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 at which the side street or minor street is controlled by a stop sign, the criteria for evaluating traffic operations are the level-of-service (LOS) for the turning movements at the intersection and the level-of-service for the overall intersection. Level-of-service is based on control delay incurred at the intersection. 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 safely, resulting in extremely long total delays and long queues. The level-of-service criteria for two-way stop-controlled and all-way stop-controlled (unsignalized) intersections are given in Table 1.

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

Source: Highway Capacity Manual

3.2 Signalized Intersections

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

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

TABLE 2 – LEVEL-OF-SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS	
Level-of-service	Control Delay (sec)
A	≤ 10
B	> 10 and ≤ 20
C	> 20 and ≤ 35
D	> 35 and ≤ 55
E	> 55 and ≤ 80
F	> 80

Source: Highway Capacity Manual

4.0 EXISTING 2021 TRAFFIC ANALYSIS

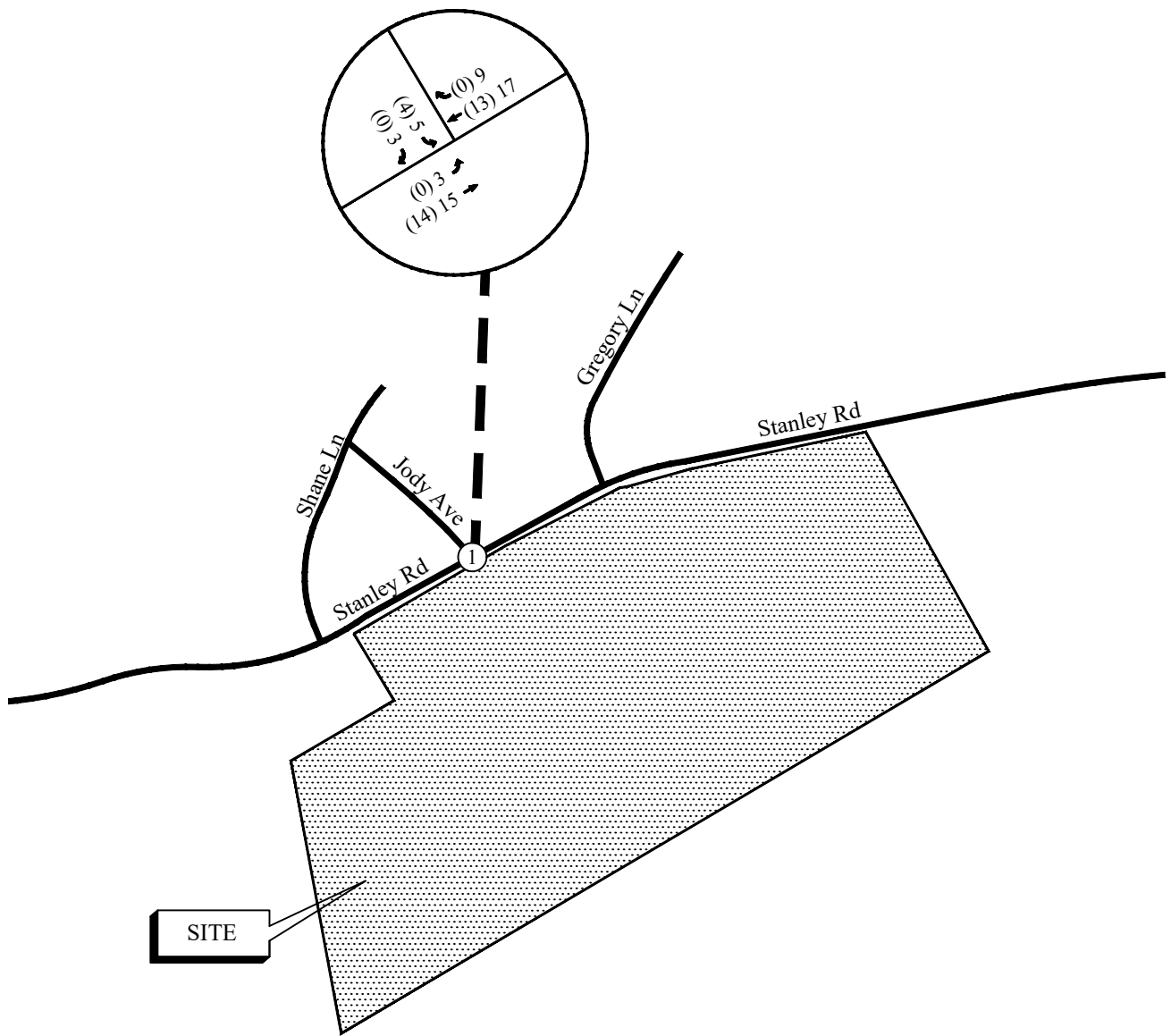
4.1 Existing Traffic Volumes

Existing traffic counts were obtained at the following study intersection:

- Stanley Road at Jody Avenue

Turning movement counts were collected on Tuesday, October 26, 2021. 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 intersection were then determined. These volumes make up the peak hour traffic volumes for the intersection counted and are shown in Figure 2.

A 24-hour bi-directional volume count was also collected on October 26, 2021, to determine the daily traffic on Stanley Road. The daily bi-directional volume on Stanley Road just east of Gregory Lane is 478. Raw traffic counts are included in the Appendix.



(AM) PM



EXISTING WEEKDAY PEAK-HOUR VOLUMES

FIGURE 2
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4.2 Existing Traffic Operations

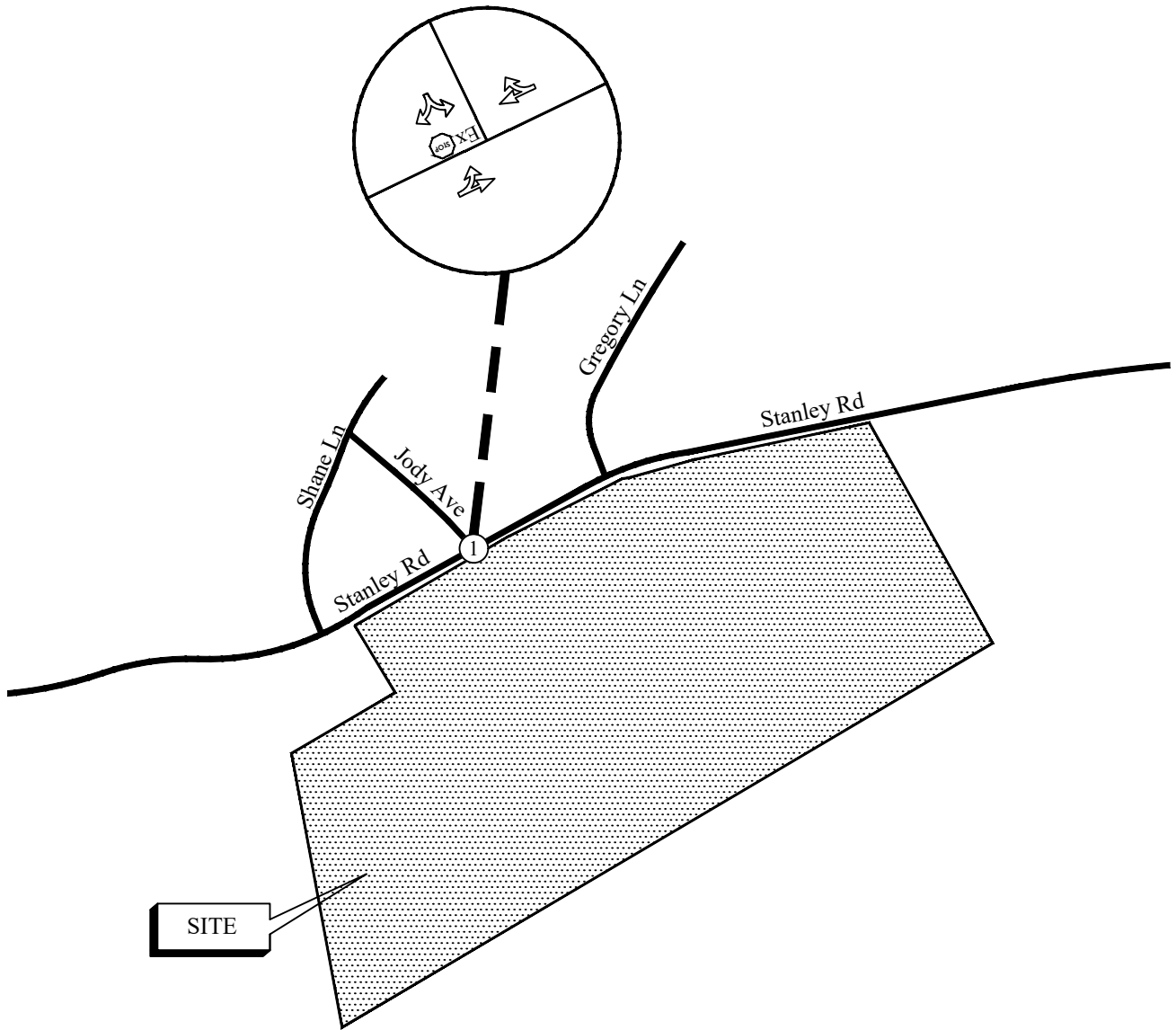
Existing 2021 traffic operations were analyzed at the study intersection in accordance with the HCM methodology. The results of the analysis are shown in Table 3. The existing traffic control and lane geometry for the intersection are shown in Figure 3.

TABLE 3 – EXISTING INTERSECTION OPERATIONS				
Intersection		Traffic Control	LOS (Delay)	
			AM Peak Hour	PM Peak Hour
1	<u>Stanley Road @ Jody Avenue</u>	Stop Controlled on SB Approach	A (0.0)	A (7.3)
	-Eastbound Left -Southbound Approach		A (8.8)	A (8.7)

The results of existing traffic operations analysis indicate that the study intersection is operating at satisfactory level of service “A” in both the AM and PM peak hours.

LEGEND

- Ex  Existing Signed Approach
-  Existing Lane Geometry



EXISTING TRAFFIC CONTROL AND LANE GEOMETRY

FIGURE 3
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5.0 PROPOSED DEVELOPMENT

The proposed site will be located on Stanley Road in City of Dacula, Georgia. The development will consist of 173 units of single-family homes. A site plan is shown in Figure 4.

The development proposes access at the following locations:

- Site Driveway 1: Full-access western driveway on Stanley Road aligned with Jody Avenue
- Site Driveway 2: Full-access eastern driveway on Stanley Road

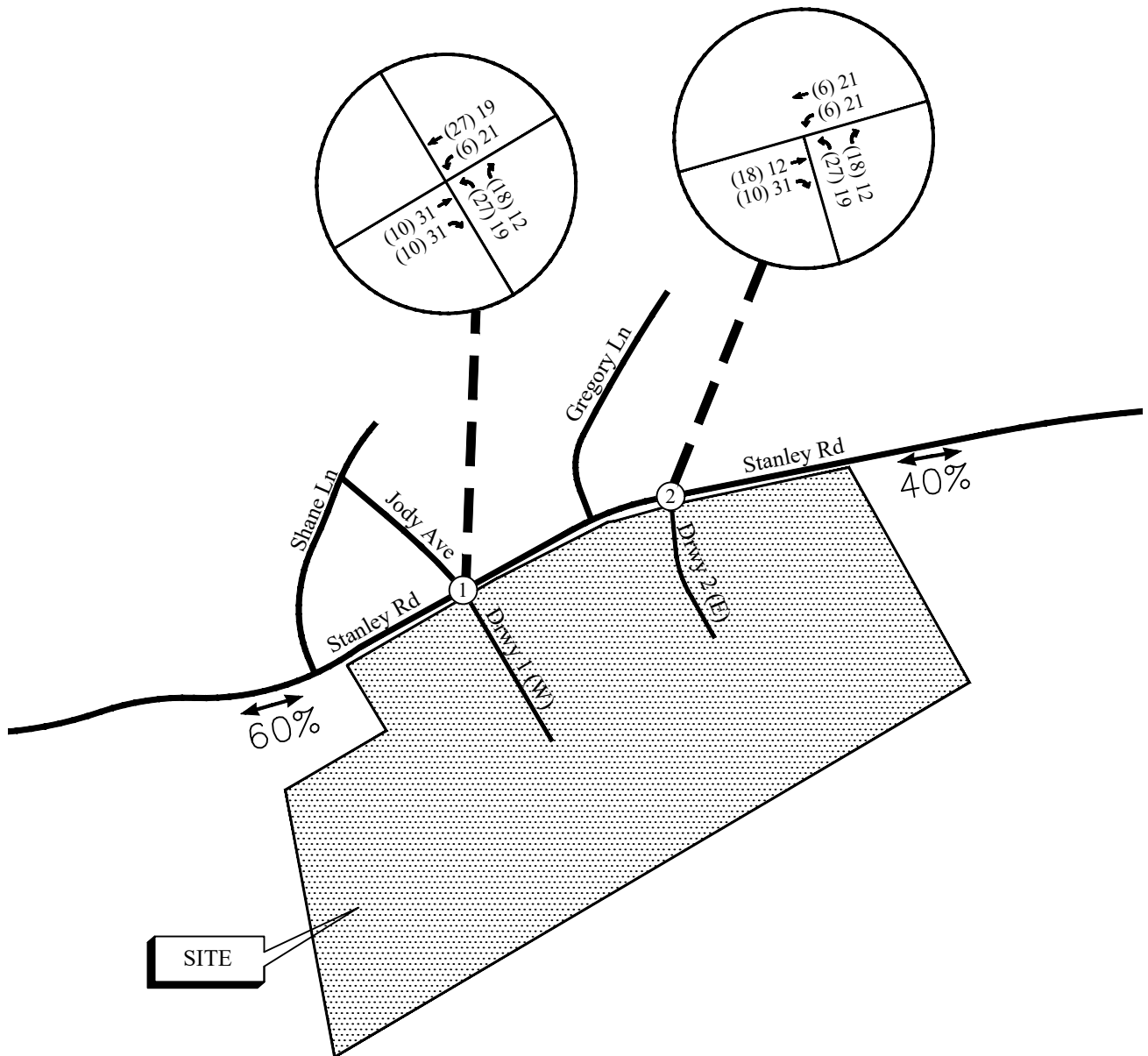
5.1 Trip Generation

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.

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	173 units	32	91	123	104	62	166	1,671

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.



(AM) PM



TRIP DISTRIBUTION AND SITE-GENERATED
WEEKDAY PEAK HOUR VOLUMES

FIGURE 5
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6.0 FUTURE 2023 TRAFFIC ANALYSIS

The future 2023 traffic operations are analyzed for the “Build” and “No-Build” conditions.

6.1 Future “No-Build” Conditions

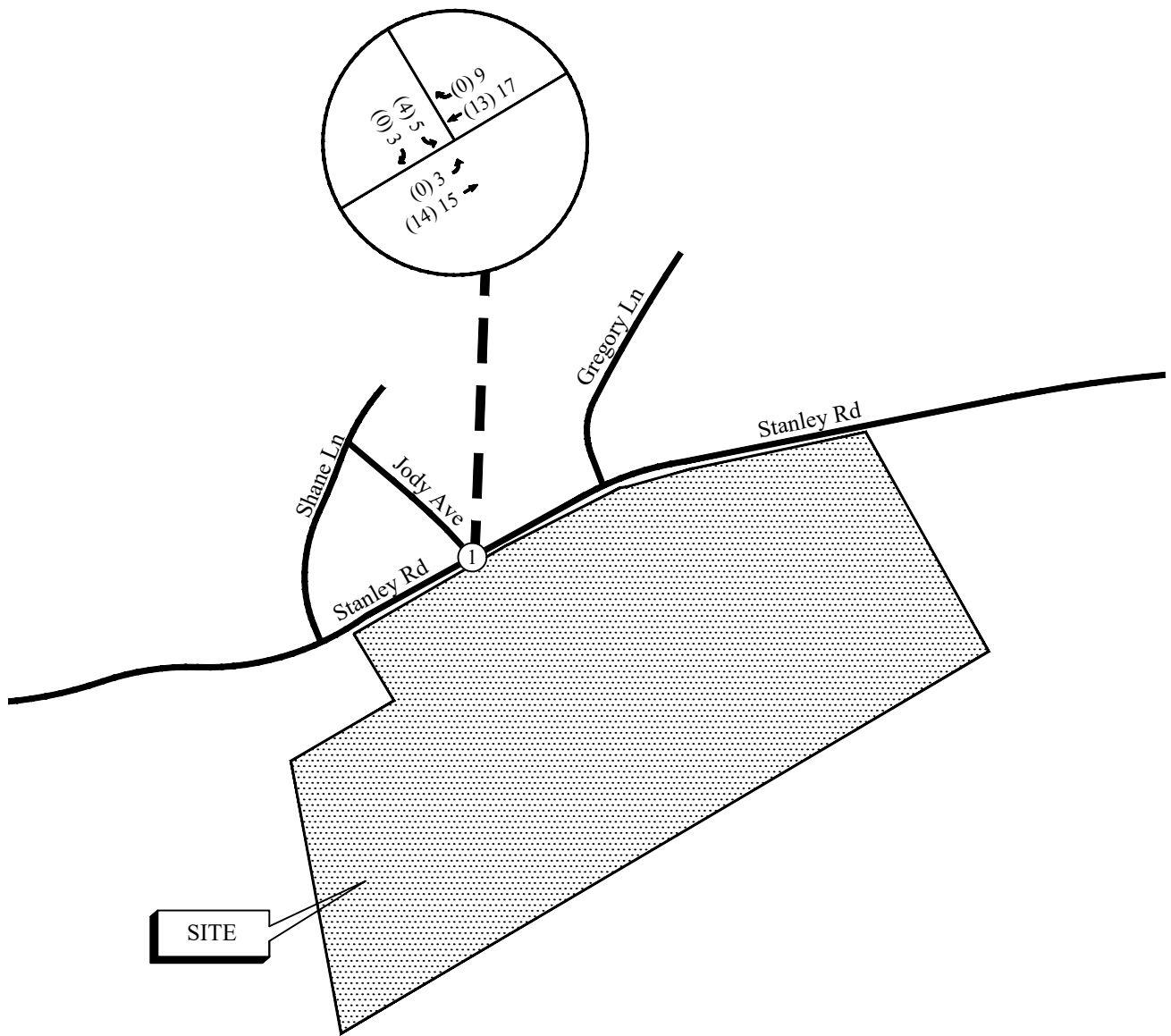
The “No-Build” (or background) conditions provide an assessment of how traffic will operate in the study horizon year without the study site being developed as proposed, with projected increases in through traffic volumes due to normal annual growth. The Future “No-Build” volumes consist of the existing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

6.1.1 Annual Traffic Growth

In order to evaluate future traffic operations in this area, a projection of normal traffic growth was applied to the existing volumes. The Georgia Department of Transportation recorded average daily traffic volumes at several locations in the vicinity of the site. Reviewing the growth over the last three years revealed growth of approximately 1% in the area. This growth factor was applied to the existing traffic volumes between collector and arterial roadways in order to estimate the future year traffic volumes prior to the addition of site-generated traffic. The resulting Future “No-Build” volumes on the roadway are shown in Figure 6.

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. In order to evaluate future traffic operations in this area, the additional traffic volumes from the site (Figure 5) were added to base traffic volumes (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.

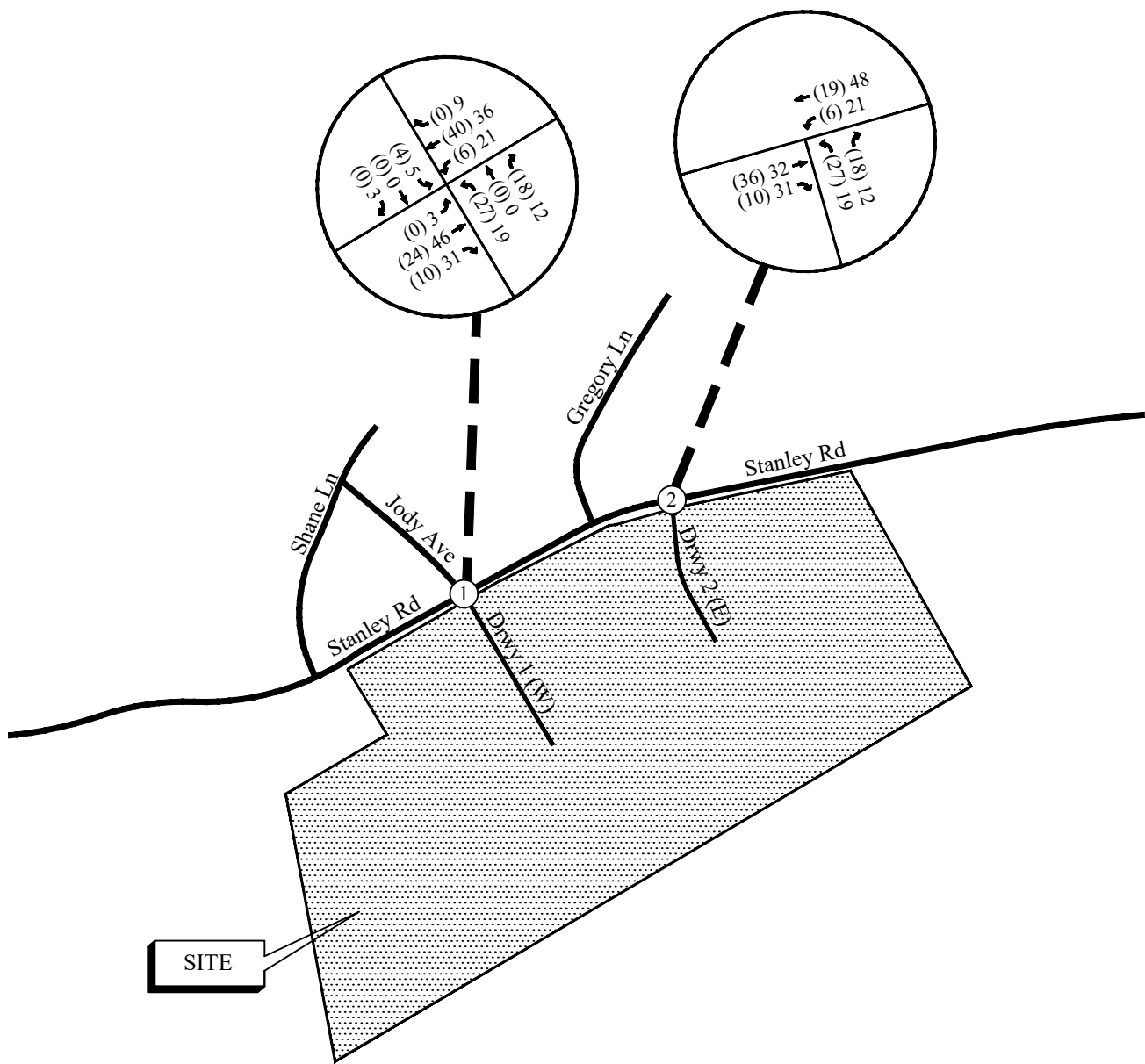


(AM) PM

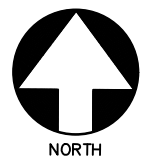


FUTURE (NO-BUILD) WEEKDAY PEAK HOUR VOLUMES

FIGURE 6
A&R Engineering Inc.



(AM) PM



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 of the site is 1,671 vehicles. A bi-directional count on Stanley Road collected on Tuesday, October 26, 2021, indicates that the ADT on Stanley Road is 478 vehicles.

6.3.1 Left Turn Lane Analysis

Gwinnett County Requirements for Left-Turn Lanes

According to https://www.gwinnettcounty.com/.../Left_Turn_Lanes.pdf the criteria and guidelines for a left turn lanes for multiple entry points of Gwinnett County Department of Transportation each entry point for a development shall be considered individually in the determination of the requirement for a left turn lane, based upon a reasonable distribution of entry volumes among the entry points. A left turn lane will be required at any entry point that meets the Gwinnett County thresholds for single-family residential development.

Gwinnett County – Residential Developments *
Left Turn Lane Criteria

TABLE I

Posted Speed Limit (mph)	2 Lane Routes -----ADT-----		More Than 2 Lanes on Main Road -----ADT-----	
	<6000	>=6000	<10,000	>=10,000
30 to 35	120 Lots	75 Lots	160 Lots	120 Lots
40 to 50	100 Lots	65 Lots	130 Lots	100 Lots
>= 55	75 lots	55 Lots	100 Lots	75 Lots

* Zoning Districts R-XX(X)

Stanley Road is a two-lane roadway with a posted speed limit of 25 mph and has a daily traffic of 478 trips. Based on this data, a left-turn lane will be warranted at any driveway that serves 120 lots or more per Gwinnett County standards. The proposed development, consisting of 173 single-family units has two full access driveways on Stanley Road. We have equally distributed the entry volumes at both the site driveways. Therefore, a total of 87 units ($173 \div 2 = 86.5$) will be assigned to each driveway. Since 87 lots is under the threshold of 120 lots, a left-turn lane is not required at any of the two site driveways per Gwinnett County standards.

GDOT Requirement for Left-Turn Lanes

Stanley Road is a two-lane roadway with a posted speed limit of 25 mph and has a daily traffic of 478 trips. For two lane roadways with AADT's less than 6,000 vehicles and a posted speed limit of 25 mph, the daily site generated traffic left-turn movements threshold to warrant a left-turn lane is 300 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 (veh/day)	Roadway Speed/ # lanes	GDOT Threshold (veh/day)
Stanley Road @ Jody Avenue/Site Driveway 1 (W)	20%	167 (Total trips) ÷ 2 × 0.2 = (1671) ÷ 2 × 0.2 = 167	25 mph / 2- lane / <6,000	300
Stanley Road @ Site Driveway 2 (E)	20%	167 (Total trips) ÷ 2 × 0.2 = (1671) ÷ 2 × 0.2 = 167	25 mph / 2- lane / <6,000	300

Since the projected number of left-turning vehicles at Site driveway 1 and Site driveway 2 does not exceed the threshold of 300 left turning vehicles, a left-turn lane is not warranted at both the Site Driveways per GDOT standards.

6.3.2 Deceleration Turn Lane Analysis

The development proposes to construct a deceleration lane at both the site driveways.

6.4 Future Traffic Operations

The future traffic operations were analyzed using the volumes in Figures 6 and 7 and the results are shown in Table 6 below. Recommendations on traffic control and lane geometry are shown graphically in Figure 8.

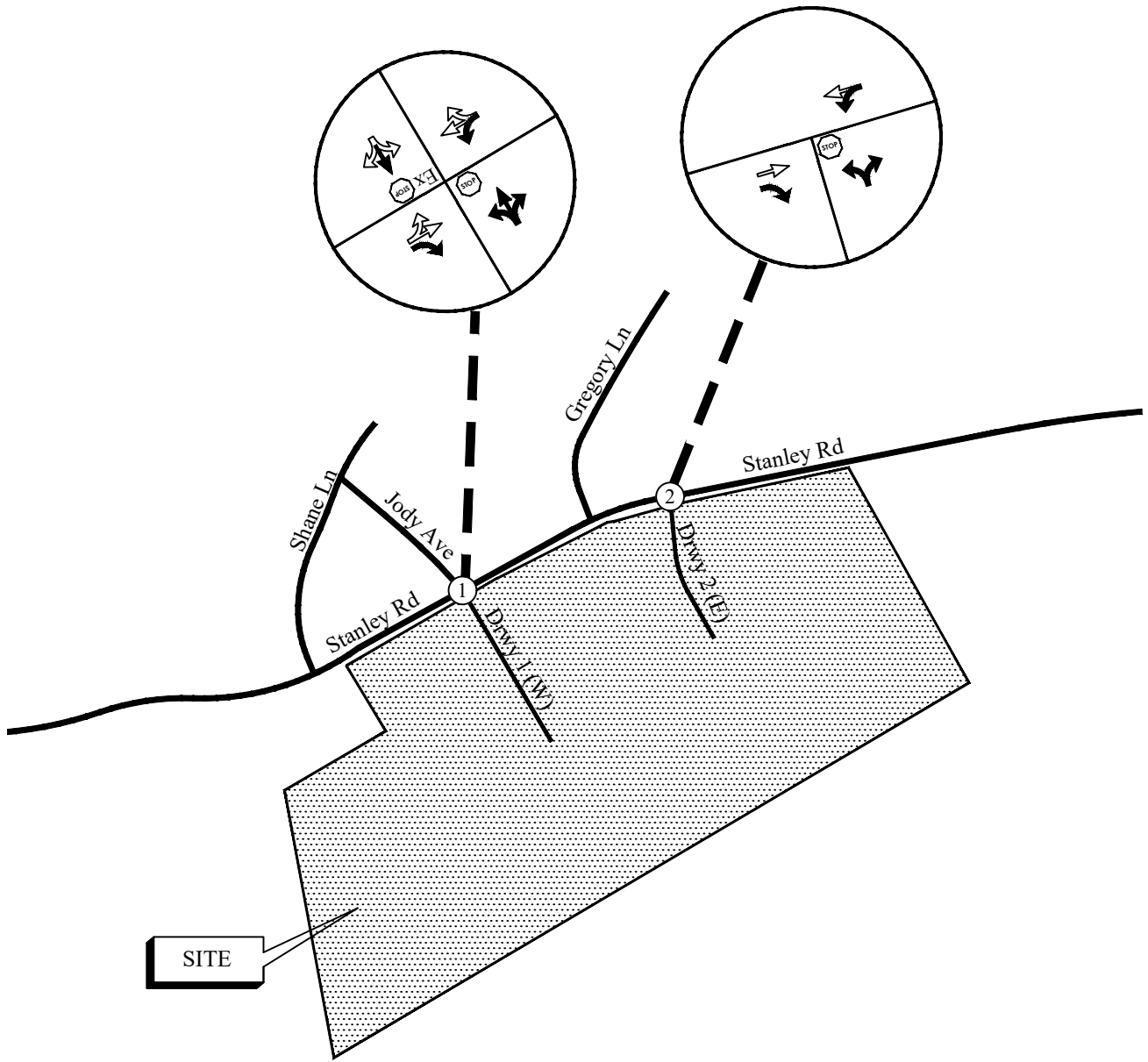
TABLE 6 – FUTURE INTERSECTION OPERATIONS

Intersection		No-Build Condition: LOS (Delay)			
		NO-BUILD		BUILD	
		AM Peak	PM Peak	AM Peak	PM Peak
1	Stanley Road @ Jody Avenue/Site Driveway 1 (W)				
	-Eastbound Left	A (0.0)	A (7.3)	A (0.0)	A (7.3)
	-Westbound Left	-	-	A (7.3)	A (7.4)
	-Northbound Approach	-	-	A (9.3)	A (9.3)
	-Southbound Approach	A (8.8)	A (8.7)	A (9.6)	A (9.3)
2	Stanley Road @ Site Driveway 2 (E)				
	-Westbound Left	-	-	A (7.3)	A (7.4)
	-Northbound Approach			A (8.9)	A (9.1)

The results of future traffic operations analysis indicate that all the study intersections will continue to operate at satisfactory level of service “A” in both the AM and PM peak hours. The impact of site generated traffic is insignificant.

LEGEND

- Ex  Existing Signed Approach
-  Proposed Signed Approach
-  Existing Lane Geometry
-  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 was to determine the traffic impact that will result from the proposed residential development that will be located on Stanley Road in City of Dacula, Georgia. The development will consist of 173 units of single-family homes.

The development proposes access at the following locations:

- Site Driveway 1: Full-access western driveway on Stanley Road aligned with Jody Avenue
- Site Driveway 2: Full-access eastern driveway on Stanley Road

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

- Stanley Road at Jody Avenue/Site Driveway 1 (W)
- Stanley Road at Site Driveway 2 (E)

The analysis included the evaluation of Future operations for “No-Build” and “Build” conditions, both of which account for increases in annual growth of through traffic.

7.1 Site Access Configuration

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

- Site Driveway 1: Full access western driveway on Stanley Road aligned with Jody Avenue
 - This driveway to consist of one entering and one exiting lane. The northbound (driveway) approach is to have a shared through/ left / right-turn lane for exiting traffic.
 - The intersection to be unsignalized with STOP signs on the northbound and southbound approaches.
 - Entering left-turn movements to be made from the westbound through lane. A left-turn lane is not warranted as per Gwinnett County and GDOT standards. (See Section 6.3)
 - A deceleration lane to be constructed for entering traffic.
- Site Driveway 2: Full access eastern driveway on Stanley Road
 - This driveway to consist of one entering and one exiting lane. The northbound (driveway) approach is to have a shared left / right-turn lane for exiting traffic.
 - The intersection to be unsignalized with a STOP sign on the northbound approach.
 - Entering left-turn movements to be made from the westbound through lane. A left-turn lane is not warranted as per Gwinnett County and GDOT standards. (See Section 6.3)
 - A deceleration lane to be constructed for entering traffic.

The results of future traffic operations analysis indicate that all the study intersections will continue to operate at satisfactory level of service “A” in both the AM and PM peak hours. The impact of site generated traffic is insignificant. Left-turn lanes are not warranted at both driveways based on both Gwinnett County and GDOT 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
Stanley Rd @ Jody Ave
7-9 am | 4-6 pm

File Name : 20210347
Site Code : 20210347
Start Date : 10/26/2021
Page No : 1

Groups Printed- Cars, Buses & Trucks

Start Time	Northbound				Jody Ave Southbound				Stanley Rd Eastbound				Stanley 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	0	0	0	0	0	0	2	2	0	2	0	2	0	3	1	4	8
07:15 AM	0	0	0	0	0	0	0	0	0	2	0	2	0	2	0	2	4
07:30 AM	0	0	0	0	1	0	0	1	0	6	0	6	0	1	0	1	8
07:45 AM	0	0	0	0	0	0	0	0	0	3	0	3	0	3	0	3	6
Total	0	0	0	0	1	0	2	3	0	13	0	13	0	9	1	10	26
08:00 AM	0	0	0	0	3	0	0	3	0	3	0	3	0	7	0	7	13
08:15 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2
08:30 AM	0	0	0	0	1	0	0	1	0	1	0	1	0	1	0	1	3
08:45 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
Total	0	0	0	0	4	0	0	4	0	6	0	6	0	9	0	9	19
*** BREAK ***																	
04:00 PM	0	0	0	0	2	0	0	2	2	5	0	7	0	5	1	6	15
04:15 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	1	1	2	4
04:30 PM	0	0	0	0	1	0	1	2	0	6	0	6	0	2	0	2	10
04:45 PM	0	0	0	0	2	0	0	2	0	5	0	5	0	5	2	7	14
Total	0	0	0	0	5	0	1	6	2	18	0	20	0	13	4	17	43
05:00 PM	0	0	0	0	2	0	0	2	0	3	0	3	0	5	2	7	12
05:15 PM	0	0	0	0	1	0	1	2	1	3	0	4	0	5	2	7	13
05:30 PM	0	0	0	0	0	0	2	2	2	4	0	6	0	2	3	5	13
05:45 PM	0	0	0	0	2	0	1	3	0	3	0	3	0	1	1	2	8
Total	0	0	0	0	5	0	4	9	3	13	0	16	0	13	8	21	46
Grand Total	0	0	0	0	15	0	7	22	5	50	0	55	0	44	13	57	134
Apprch %	0	0	0	0	68.2	0	31.8		9.1	90.9	0		0	77.2	22.8		
Total %	0	0	0	0	11.2	0	5.2	16.4	3.7	37.3	0	41	0	32.8	9.7	42.5	

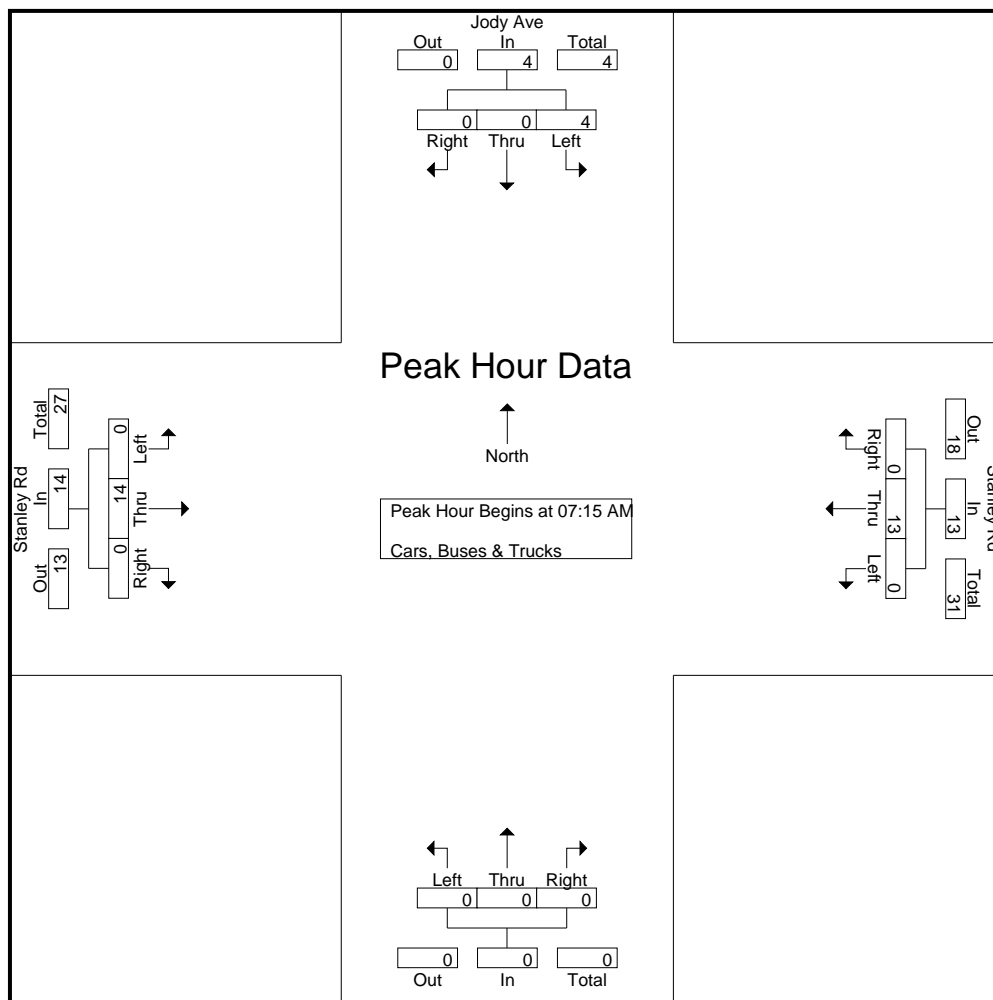
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Start Time	Northbound				Jody Ave Southbound				Stanley Rd Eastbound				Stanley Rd Westbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	0	0	0	0	0	2	0	2	0	2	0	2	4
07:30 AM	0	0	0	0	1	0	0	1	0	6	0	6	0	1	0	1	8
07:45 AM	0	0	0	0	0	0	0	0	0	3	0	3	0	3	0	3	6
08:00 AM	0	0	0	0	3	0	0	3	0	3	0	3	0	7	0	7	13
Total Volume	0	0	0	0	4	0	0	4	0	14	0	14	0	13	0	13	31
% App. Total	0	0	0	0	100	0	0	100	0	100	0	100	0	100	0	100	
PHF	.000	.000	.000	.000	.333	.000	.000	.333	.000	.583	.000	.583	.000	.464	.000	.464	.596



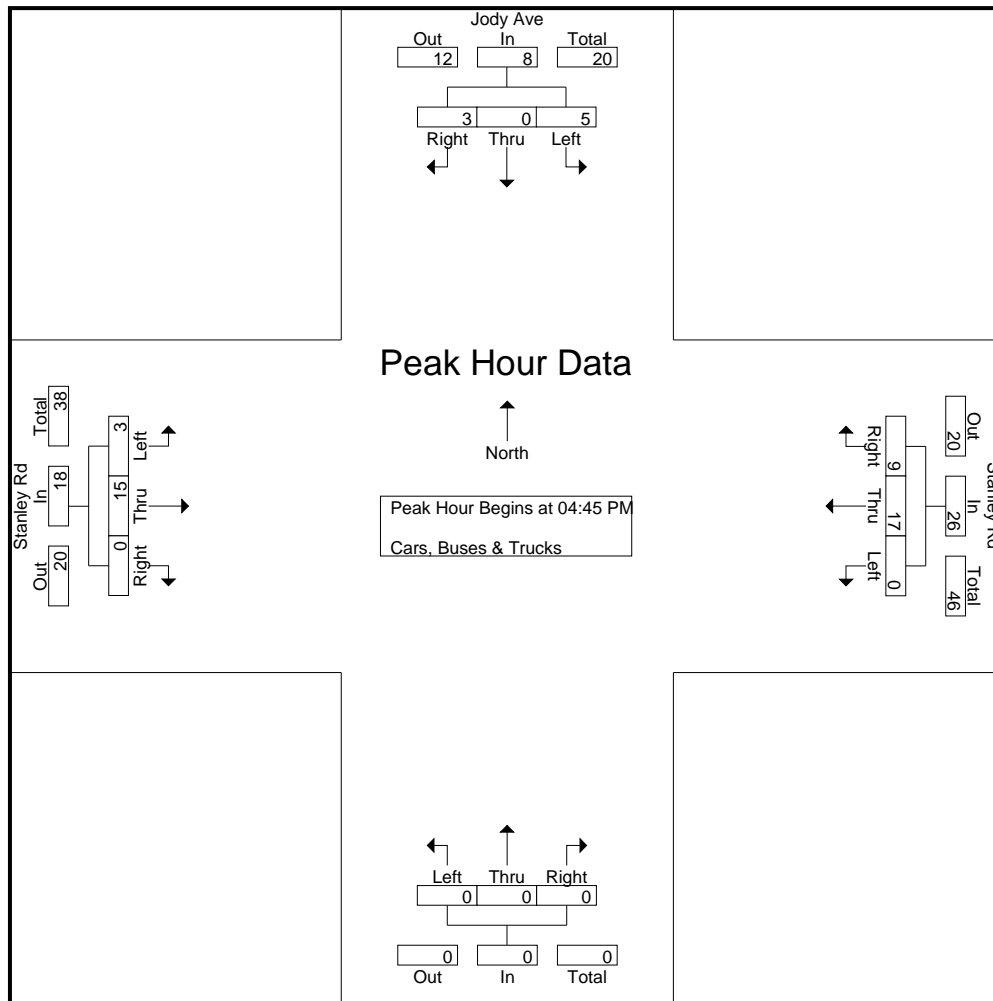
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Stanley Rd @ Jody Ave
7-9 am | 4-6 pm

File Name : 20210347
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Start Time	Northbound				Jody Ave Southbound				Stanley Rd Eastbound				Stanley 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 04:45 PM																	
04:45 PM	0	0	0	0	2	0	0	2	0	5	0	5	0	5	2	7	14
05:00 PM	0	0	0	0	2	0	0	2	0	3	0	3	0	5	2	7	12
05:15 PM	0	0	0	0	1	0	1	2	1	3	0	4	0	5	2	7	13
05:30 PM	0	0	0	0	0	0	2	2	2	4	0	6	0	2	3	5	13
Total Volume	0	0	0	0	5	0	3	8	3	15	0	18	0	17	9	26	52
% App. Total	0	0	0		62.5	0	37.5		16.7	83.3	0		0	65.4	34.6		
PHF	.000	.000	.000	.000	.625	.000	.375	1.00	.375	.750	.000	.750	.000	.850	.750	.929	.929



A&R Engineering, Inc.

2160 Kingston Court, Suite O
Marietta, GA 30067

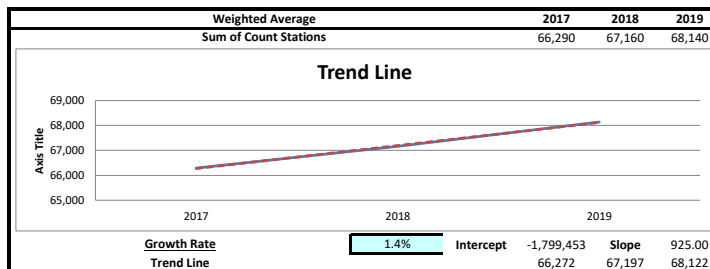
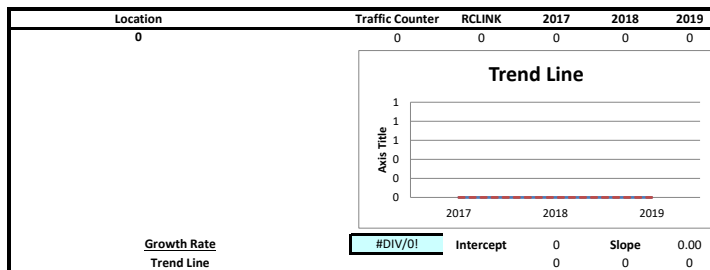
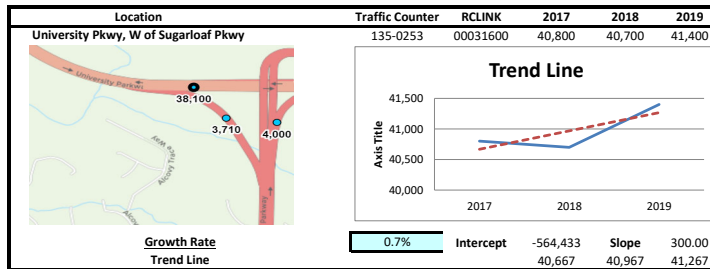
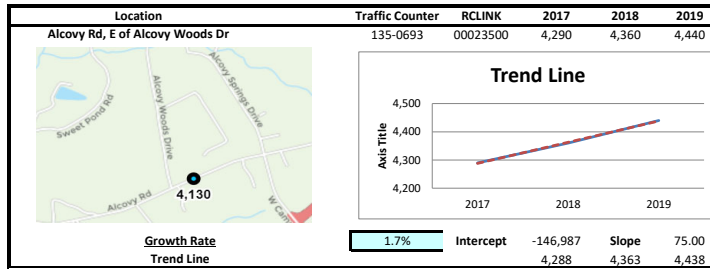
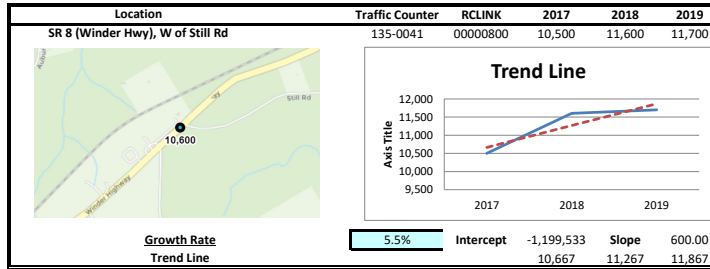
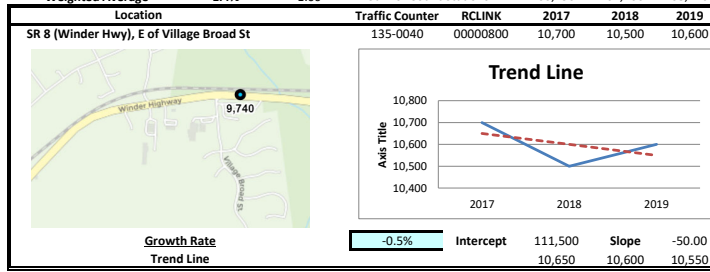
24-Hour Bi-Directional Volume Count on
Stanley Road West of Gregory Lane
Site Code: 20210350
Date Start: 26-Oct-21
Date End: 26-Oct-21

Start Time	26-Oct-21 Tue	Eastbound	Westbound							Total
12:00 AM		1	1							2
01:00		3	3							6
02:00		1	0							1
03:00		2	0							2
04:00		7	4							11
05:00		10	10							20
06:00		11	15							26
07:00		14	10							24
08:00		10	9							19
09:00		10	9							19
10:00		8	10							18
11:00		9	10							19
12:00 PM		14	11							25
01:00		18	14							32
02:00		19	22							41
03:00		22	21							43
04:00		24	18							42
05:00		18	21							39
06:00		9	15							24
07:00		11	9							20
08:00		12	8							20
09:00		6	5							11
10:00		3	6							9
11:00		1	4							5
Total		243	235							478
Percent		50.8%	49.2%							
AM Peak	-	07:00	06:00	-	-	-	-	-	-	06:00
Vol.	-	14	15	-	-	-	-	-	-	26
PM Peak	-	16:00	14:00	-	-	-	-	-	-	15:00
Vol.	-	24	22	-	-	-	-	-	-	43
Grand Total		243	235							478
Percent		50.8%	49.2%							
ADT		ADT 478	ADT 478							AADT 478

LINEAR REGRESSION OF DAILY TRAFFIC

Location	Growth Rate	R Squared	Station ID	Route	2017	2018	2019
SR 8 (Winder Hwy), E of Village	-0.5%	0.25	135-0040	00000800	10,700	10,500	10,600
SR 8 (Winder Hwy), W of Still Rc	5.5%	0.81	135-0041	00000800	10,500	11,600	11,700
Alcovy Rd, E of Alcovy Woods D	1.7%	1.00	135-0693	00023500	4,290	4,360	4,440
University Pkwy, W of Sugarloaf	0.7%	0.63	135-0253	00031600	40,800	40,700	41,400

Weighted Average	1.4%	1.00	Sum of Count Stations =	66,290	67,160	68,140
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EXISTING INTERSECTION ANALYSIS

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	
Traffic Vol, veh/h	0	14	13	0	4	0
Future Vol, veh/h	0	14	13	0	4	0
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	60	60	60	60	60	60
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	23	22	0	7	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	22	0	-	0	45 22
Stage 1	-	-	-	-	22 -
Stage 2	-	-	-	-	23 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1593	-	-	-	965 1055
Stage 1	-	-	-	-	1001 -
Stage 2	-	-	-	-	1000 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1593	-	-	-	965 1055
Mov Cap-2 Maneuver	-	-	-	-	965 -
Stage 1	-	-	-	-	1001 -
Stage 2	-	-	-	-	1000 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1593	-	-	-	965
HCM Lane V/C Ratio	-	-	-	-	0.007
HCM Control Delay (s)	0	-	-	-	8.8
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection						
Int Delay, s/veh	1.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	3	15	17	9	5	3
Future Vol, veh/h	3	15	17	9	5	3
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	3	16	18	10	5	3

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	28	0	-	0	45 23
Stage 1	-	-	-	-	23 -
Stage 2	-	-	-	-	22 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1585	-	-	-	965 1054
Stage 1	-	-	-	-	1000 -
Stage 2	-	-	-	-	1001 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1585	-	-	-	963 1054
Mov Cap-2 Maneuver	-	-	-	-	963 -
Stage 1	-	-	-	-	998 -
Stage 2	-	-	-	-	1001 -

Approach	EB	WB	SB
HCM Control Delay, s	1.2	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1585	-	-	-	995
HCM Lane V/C Ratio	0.002	-	-	-	0.009
HCM Control Delay (s)	7.3	0	-	-	8.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

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

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	
Traffic Vol, veh/h	0	14	13	0	4	0
Future Vol, veh/h	0	14	13	0	4	0
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	60	60	60	60	60	60
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	23	22	0	7	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	22	0	-	0	45 22
Stage 1	-	-	-	-	22 -
Stage 2	-	-	-	-	23 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1593	-	-	-	965 1055
Stage 1	-	-	-	-	1001 -
Stage 2	-	-	-	-	1000 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1593	-	-	-	965 1055
Mov Cap-2 Maneuver	-	-	-	-	965 -
Stage 1	-	-	-	-	1001 -
Stage 2	-	-	-	-	1000 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1593	-	-	-	965
HCM Lane V/C Ratio	-	-	-	-	0.007
HCM Control Delay (s)	0	-	-	-	8.8
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection						
Int Delay, s/veh	1.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	3	15	17	9	5	3
Future Vol, veh/h	3	15	17	9	5	3
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	3	16	18	10	5	3

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	28	0	-	0	45 23
Stage 1	-	-	-	-	23 -
Stage 2	-	-	-	-	22 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1585	-	-	-	965 1054
Stage 1	-	-	-	-	1000 -
Stage 2	-	-	-	-	1001 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1585	-	-	-	963 1054
Mov Cap-2 Maneuver	-	-	-	-	963 -
Stage 1	-	-	-	-	998 -
Stage 2	-	-	-	-	1001 -

Approach	EB	WB	SB
HCM Control Delay, s	1.2	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1585	-	-	-	995
HCM Lane V/C Ratio	0.002	-	-	-	0.009
HCM Control Delay (s)	7.3	0	-	-	8.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

FUTURE "BUILD" INTERSECTION ANALYSIS

Intersection												
Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕			↕			↕	
Traffic Vol, veh/h	0	24	10	6	40	0	27	0	18	4	0	0
Future Vol, veh/h	0	24	10	6	40	0	27	0	18	4	0	0
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	-	-	75	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	60	60	60	60	60	60	60	60	60	60	60	60
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	40	17	10	67	0	45	0	30	7	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	67	0	0	57	0	0	127	127	40	151	144	67
Stage 1	-	-	-	-	-	-	40	40	-	87	87	-
Stage 2	-	-	-	-	-	-	87	87	-	64	57	-
Critical Hdwy	4.12	-	-	4.12	-	-	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	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1535	-	-	1547	-	-	846	764	1031	816	747	997
Stage 1	-	-	-	-	-	-	975	862	-	921	823	-
Stage 2	-	-	-	-	-	-	921	823	-	947	847	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1535	-	-	1547	-	-	842	759	1031	788	742	997
Mov Cap-2 Maneuver	-	-	-	-	-	-	842	759	-	788	742	-
Stage 1	-	-	-	-	-	-	975	862	-	921	817	-
Stage 2	-	-	-	-	-	-	915	817	-	919	847	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1	9.3	9.6
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	909	1535	-	-	1547	-	-	788
HCM Lane V/C Ratio	0.083	-	-	-	0.006	-	-	0.008
HCM Control Delay (s)	9.3	0	-	-	7.3	0	-	9.6
HCM Lane LOS	A	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0

Intersection						
Int Delay, s/veh	3.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑		↑	↑	
Traffic Vol, veh/h	36	10	6	19	27	18
Future Vol, veh/h	36	10	6	19	27	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	75	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	39	11	7	21	29	20

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	50	0	74
Stage 1	-	-	-	-	39
Stage 2	-	-	-	-	35
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1557	-	930
Stage 1	-	-	-	-	983
Stage 2	-	-	-	-	987
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1557	-	925
Mov Cap-2 Maneuver	-	-	-	-	925
Stage 1	-	-	-	-	983
Stage 2	-	-	-	-	982

Approach	EB	WB	NB
HCM Control Delay, s	0	1.8	8.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	965	-	-	1557	-
HCM Lane V/C Ratio	0.051	-	-	0.004	-
HCM Control Delay (s)	8.9	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

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	3	46	31	21	36	9	19	0	12	5	0	3
Future Vol, veh/h	3	46	31	21	36	9	19	0	12	5	0	3
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	-	-	75	-	-	-	-	-	-	-	-	-
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	3	49	33	23	39	10	20	0	13	5	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	49	0	0	82	0	0	147	150	49	168	178	44
Stage 1	-	-	-	-	-	-	55	55	-	90	90	-
Stage 2	-	-	-	-	-	-	92	95	-	78	88	-
Critical Hdwy	4.12	-	-	4.12	-	-	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	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1558	-	-	1515	-	-	821	742	1020	796	716	1026
Stage 1	-	-	-	-	-	-	957	849	-	917	820	-
Stage 2	-	-	-	-	-	-	915	816	-	931	822	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1558	-	-	1515	-	-	807	729	1020	775	703	1026
Mov Cap-2 Maneuver	-	-	-	-	-	-	807	729	-	775	703	-
Stage 1	-	-	-	-	-	-	955	847	-	915	807	-
Stage 2	-	-	-	-	-	-	898	803	-	917	820	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			2.4			9.3			9.3		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	878	1558	-	-	1515	-	-	853
HCM Lane V/C Ratio	0.038	0.002	-	-	0.015	-	-	0.01
HCM Control Delay (s)	9.3	7.3	0	-	7.4	0	-	9.3
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Intersection						
Int Delay, s/veh	2.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑		↑	↑	
Traffic Vol, veh/h	32	31	21	48	19	12
Future Vol, veh/h	32	31	21	48	19	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	75	-	-	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	35	34	23	52	21	13
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	69	0	133	35
Stage 1	-	-	-	-	35	-
Stage 2	-	-	-	-	98	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1532	-	861	1038
Stage 1	-	-	-	-	987	-
Stage 2	-	-	-	-	926	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1532	-	848	1038
Mov Cap-2 Maneuver	-	-	-	-	848	-
Stage 1	-	-	-	-	987	-
Stage 2	-	-	-	-	912	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	2.2	9.1			
HCM LOS			A			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	913	-	-	1532	-	
HCM Lane V/C Ratio	0.037	-	-	0.015	-	
HCM Control Delay (s)	9.1	-	-	7.4	0	
HCM Lane LOS	A	-	-	A	A	
HCM 95th %tile Q(veh)	0.1	-	-	0	-	

TRAFFIC VOLUME WORKSHEETS

21-173 - Residential Development on Stanley Road, City of Dacula
Traffic Volumes

A&R Engineering
 November 2021

1. Stanley Rd @ Drwy 1 (W)
A.M. Peak Hour

Condition	Site Driveway 1 (W) Northbound			Jody Avenue Southbound			Stanley Road Eastbound			Stanley Road Westbound			
	L	T	R	L	T	R	L	T	R	L	T	R	Tot
Existing 2021 Counts:	0	0	0	4	0	0	0	14	0	0	13	0	13
Growth Factor (%):	1	1	1	1	1	1	1	1	1	1	1	1	1
No-Build 2023 Volumes:	0	0	0	4	0	0	0	14	0	0	13	0	13
Total New Trips:	27	0	18	45	0	0	0	10	10	20	6	27	33
Future 2023 Traffic Volumes:	27	0	18	45	4	0	0	24	10	34	6	40	46

P.M. Peak Hour

Condition	Site Driveway 1 (W) Northbound			Jody Avenue Southbound			Stanley Road Eastbound			Stanley Road Westbound			
	L	T	R	L	T	R	L	T	R	L	T	R	Tot
Existing 2021 Counts:	0	0	0	5	0	3	3	15	0	18	17	9	26
Growth Factor (%):	1	1	1	1	1	1	1	1	1	1	1	1	1
No-Build 2023 Volumes:	0	0	0	5	0	3	3	15	0	18	17	9	26
Total New Trips:	19	0	12	31	0	0	0	31	31	62	21	19	40
Future 2023 Traffic Volumes:	19	0	12	31	5	0	3	46	31	80	21	36	66

21-173 - Residential Development on Stanley Road, City of Dacula
Traffic Volumes

A&R Engineering
 November 2021

2. Stanley Rd @ Drwy 2 (E)
A.M. Peak Hour

Condition	Site Driveway 2 (E) Northbound			-			Southbound			Stanley Road Eastbound			Stanley Road Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R	L	T	R
	Tot			Tot			Tot			Tot			Tot		
Existing 2021 Counts:	0	0	0	0	0	0	0	0	0	0	18	0	18	0	13
Growth Factor (%):	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
No-Build 2023 Volumes:	0	0	0	0	0	0	0	0	0	0	18	0	18	0	13
Total New Trips:	27	0	18	45	0	0	0	0	0	0	18	10	28	6	6
Future 2023 Traffic Volumes:	27	0	18	45	0	0	0	0	0	0	36	10	46	6	19

P.M. Peak Hour

Condition	Site Driveway 2 (E) Northbound			-			Southbound			Stanley Road Eastbound			Stanley Road Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R	L	T	R
	Tot			Tot			Tot			Tot			Tot		
Existing 2021 Counts:	0	0	0	0	0	0	0	0	0	0	20	0	20	0	26
Growth Factor (%):	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
No-Build 2023 Volumes:	0	0	0	0	0	0	0	0	0	0	20	0	20	0	27
Total New Trips:	19	0	12	31	0	0	0	0	0	0	12	31	43	21	21
Future 2023 Traffic Volumes:	19	0	12	31	0	0	0	0	0	0	32	31	63	21	48