

**TRAFFIC IMPACT ANALYSIS**

**FOR**

**GLADIOLUS PARK  
APARTMENTS**

**JONESBORO, ARKANSAS**

Prepared for:

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**DRAFT**

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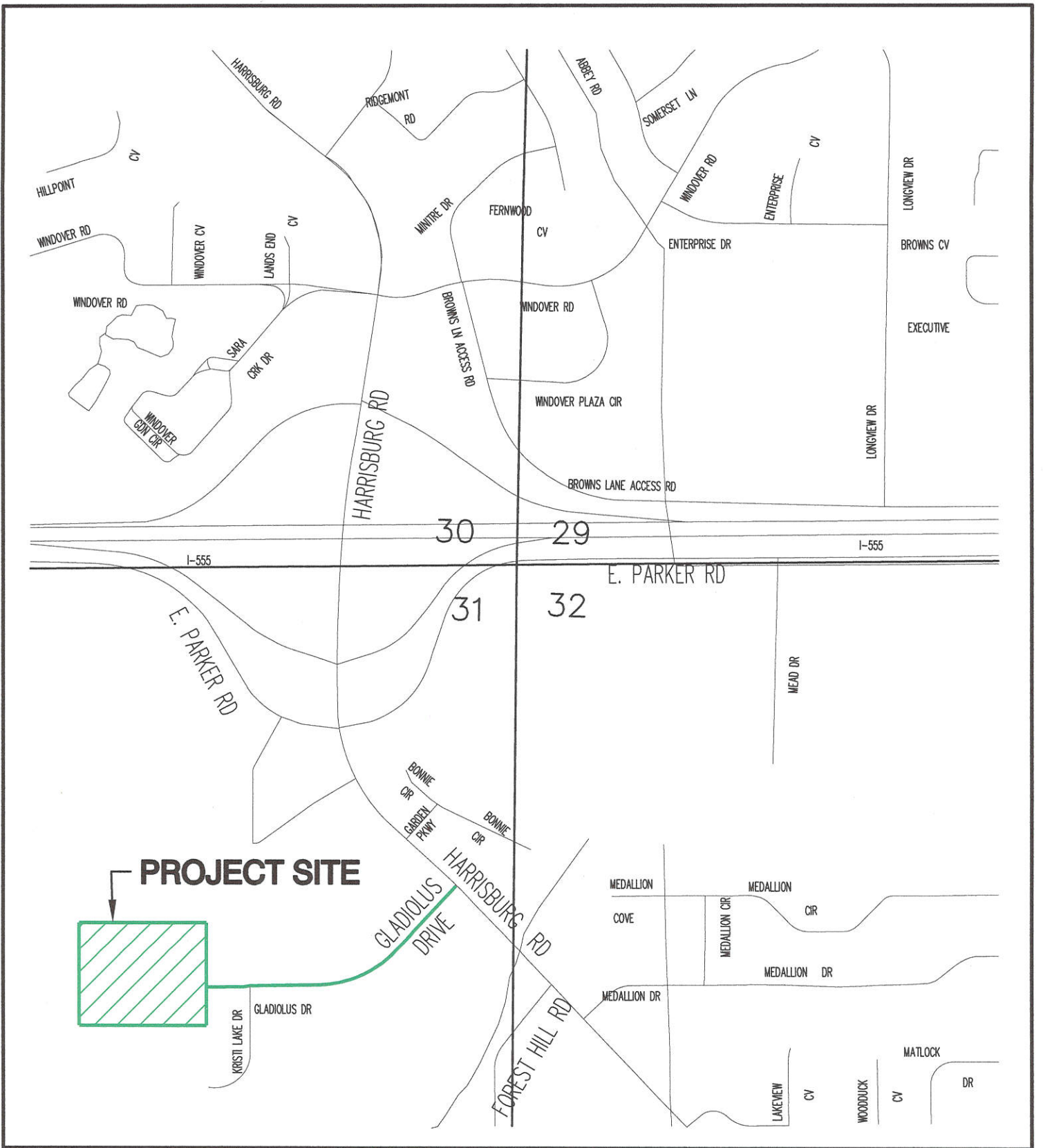
**June 2017**

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## **PURPOSE**

The purpose of this study is to evaluate the impact to traffic from a requested rezoning of property to include an apartment complex located at the west terminus of Gladiolus Drive in Jonesboro, Arkansas. This study includes determining if the intersection of Gladiolus Drive and Harrisburg Road meets any warrants for a traffic signal with the proposed traffic volumes. This study further evaluates the Level-of-Service of the unsignalized intersection that will provide access into the site off of Gladiolus Drive. Figure 1 shows the location of the proposed development.



**FIGURE 1**  
VICINITY MAP

## **EXISTING CONDITIONS**

Gladiolus Drive is a two-lane collector roadway that serves mainly residential development including both single-family and multi-family. This road begins to the east of at the intersection with Harrisburg Road and extends back to the west where it terminates at this subject property.

Harrisburg Road is a north – south highway (Highway 1B) that begins well south of the City Limits of Jonesboro and terminates to the north at Highway 18, or Highland Drive just prior to downtown Jonesboro. Harrisburg Road is currently a two-lane roadway south of East Parker Road in the study area.

Existing traffic counts were taken at the intersection of Gladiolus Drive and Harrisburg Road from a previous Traffic Study performed for the City of Jonesboro in June of 2017. These counts from that study were taken during the school year on a weekday. This 14-hour count reflects a period when traffic volumes are expected to be at their peak.

The results of this 14-hour count are shown in the appendix. The AM and PM Peak Hour volumes are shown in Figure 2. Figure 3 shows the existing lane configuration at the Gladiolus Drive and Harrisburg Road Intersection.

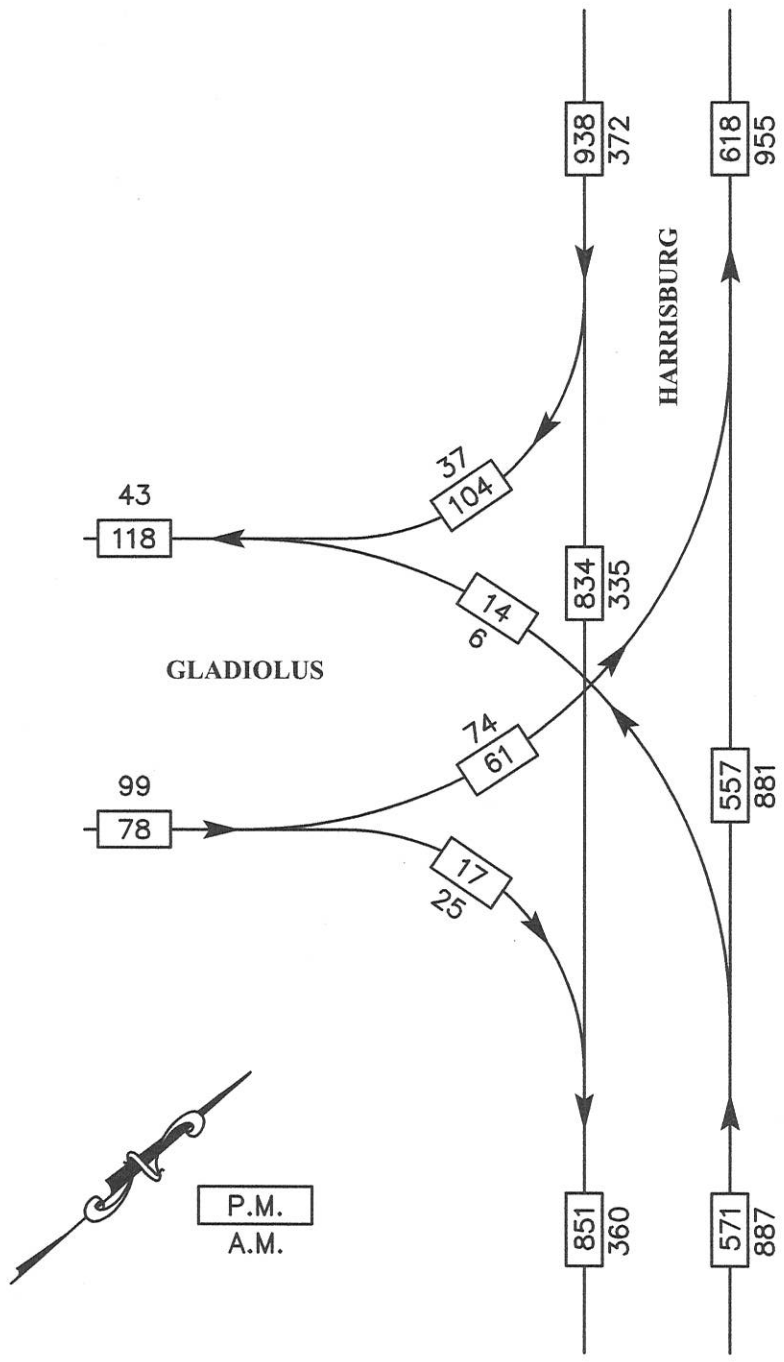
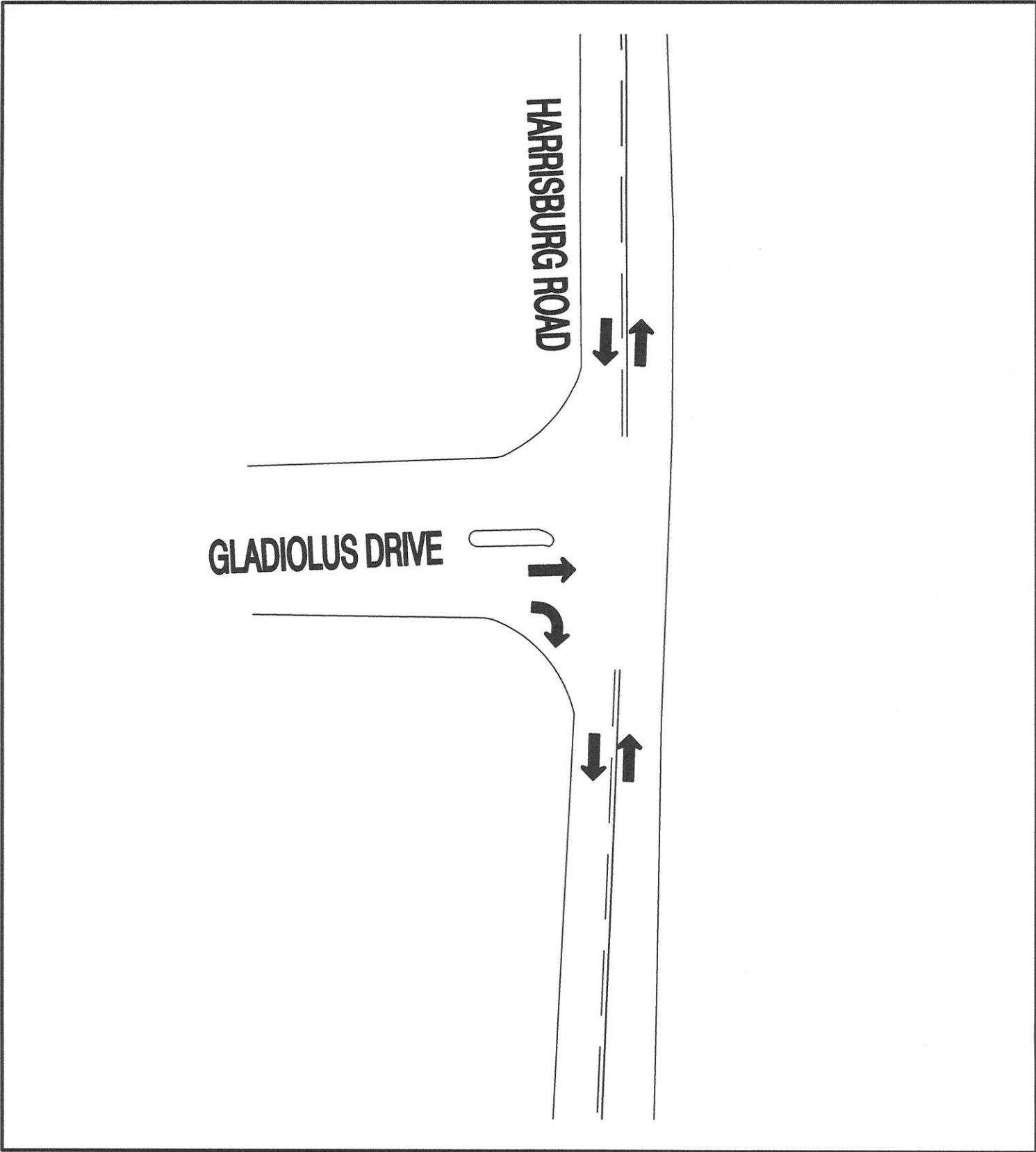


Figure 2  
 Existing Peak Hour Volumes  
 Harrisburg Road/Gladiolus Drive



**FIGURE 3**

EXISTING HARRISBURG AND GLADIOLUS INTERSECTION

## **PROPOSED DEVELOPMENT**

It is the intent to have this property rezoned to include a multi-family residential apartment complex with a total of 320 dwelling units. For the purpose of this study, the estimated traffic generated from the development will be for a total build-out of these 320 units. See Figure 4 for the location of the proposed property to be considered for rezoning.

Since no specific site plan has been developed as of yet, some conservative assumptions had to be made in order to evaluate the impact to traffic from a future multi-family development. The initial assumption is that all traffic generated from this proposed site will access Gladiolus Drive at one single intersection from the proposed development. This would place all the traffic on Gladiolus Drive thus impacting the existing intersection of Gladiolus Drive and Harrisburg Road. This would represent the worst possible case scenario that all traffic from the site would travel through the existing intersection of Gladiolus Drive and Harrisburg Road.

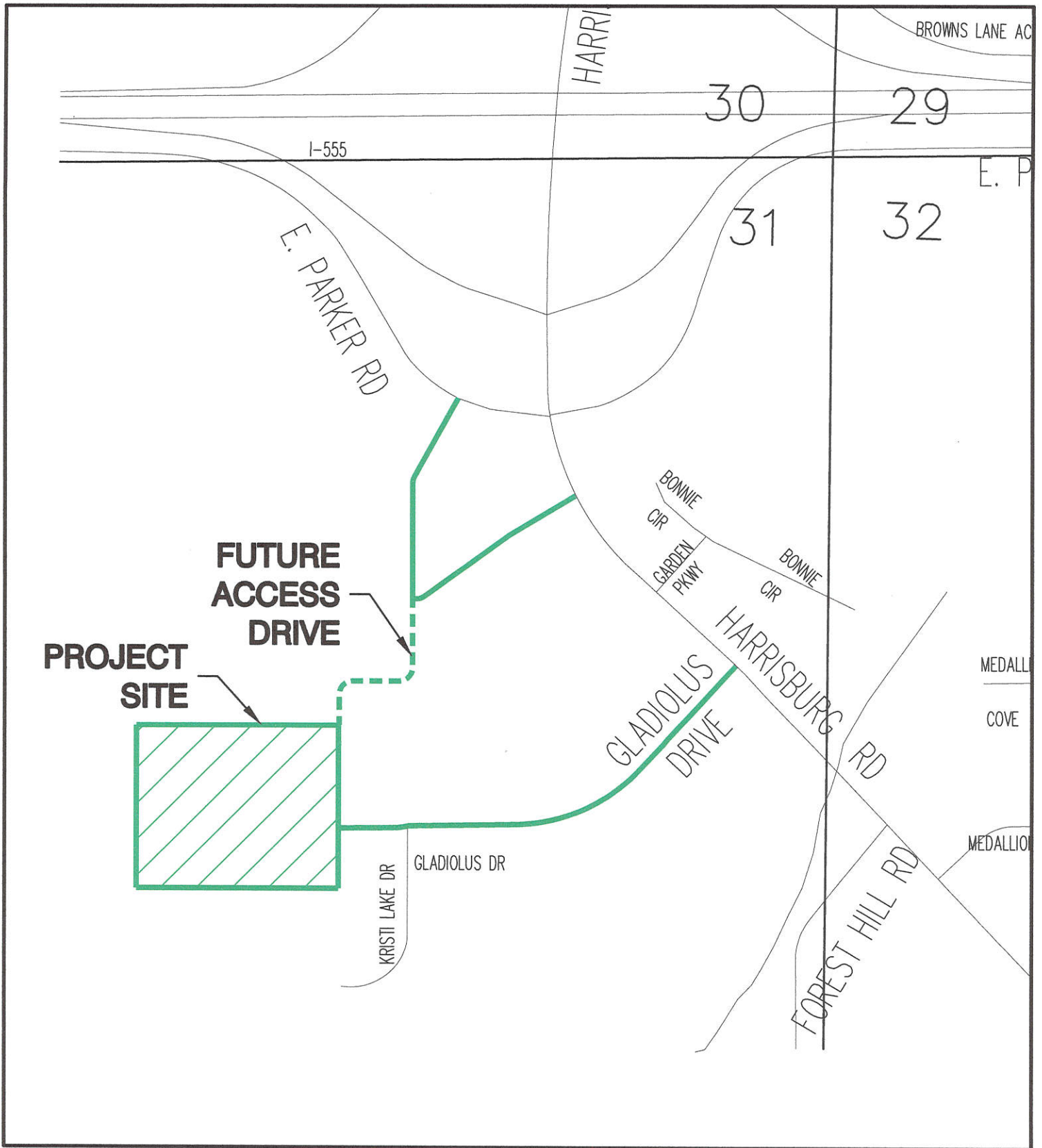
It should be pointed out however, that there exists a thirty (30) foot access easement across adjacent property north and east of the subject property that could be utilized as additional access. This potential future access drive would connect to two existing drives that provide access directly to both East Parker Road and Harrisburg Road. This would be a favorable alternative to traffic desiring to travel north on Harrisburg Road for the future site traffic. In the event that this access drive could be connected to Gladiolus Drive as well, it would help alleviate traffic at the existing intersection of Gladiolus Drive and Harrisburg Road.



Figure 5 displays a possible location for this 30-foot access drive and how it would connect to the two existing drives.

In addition to this potential future access drive, the City of Jonesboro is planning to improve Harrisburg Road in the area of this study to a five-lane section. This would provide for two lanes in each direction with a continuous center turn lane. These improvements are expected to be in place in the year 2020.





**FIGURE 5**



**TRAFFIC PROJECTIONS**

Traffic generated from the proposed site was estimated from the Institute of Transportation Engineers Trip Generation Manual 9<sup>th</sup> Edition. Volumes were generated for both the A.M. Peak Hour and the P.M. Peak Hour during a weekday when traffic volumes are greater. Below are the volumes anticipated for both A.M. and P.M. Peak Hours. Table 1 displays the anticipated traffic generated from the site.

**320 Dwelling Units**

**A.M. PEAK HOURS**

$$T = 0.49 (X) + 3.73$$

$$T = 0.49 (320) + 3.73 = 160$$

$$80\% \text{ Exiting } 0.8 \times 160 = 128$$

$$20\% \text{ Entering } 0.2 \times 160 = 32$$

**P.M. PEAK HOUR**

$$T = 0.55 (X) + 17.65$$

$$T = 0.55 (320) + 17.65 = 194$$

$$35\% \text{ Exiting } .35 \times 194 = 68$$

$$65\% \text{ Entering } .65 \times 194 = 126$$

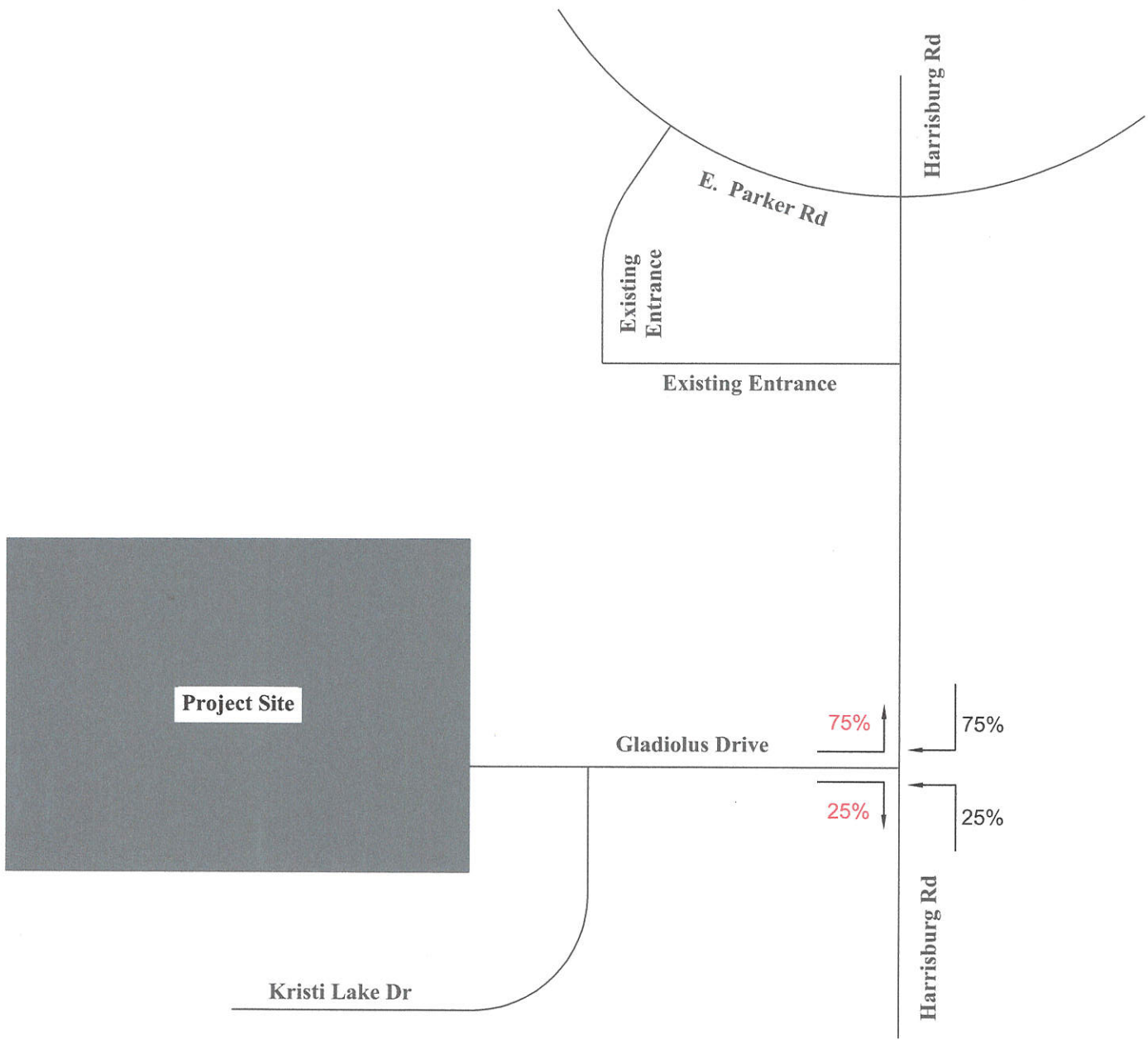
X = Number of Dwelling Units  
T = Total Trip Ends

<b>TABLE 1</b>			
<b>TRIP GENERATION</b>			
<b>A.M. Peak Hour</b>		<b>P.M. Peak Hour</b>	
<b>Enter</b>	<b>Exit</b>	<b>Enter</b>	<b>Exit</b>
32	128	126	68

## **TRAFFIC DISTRIBUTION AND ASSIGNMENT**

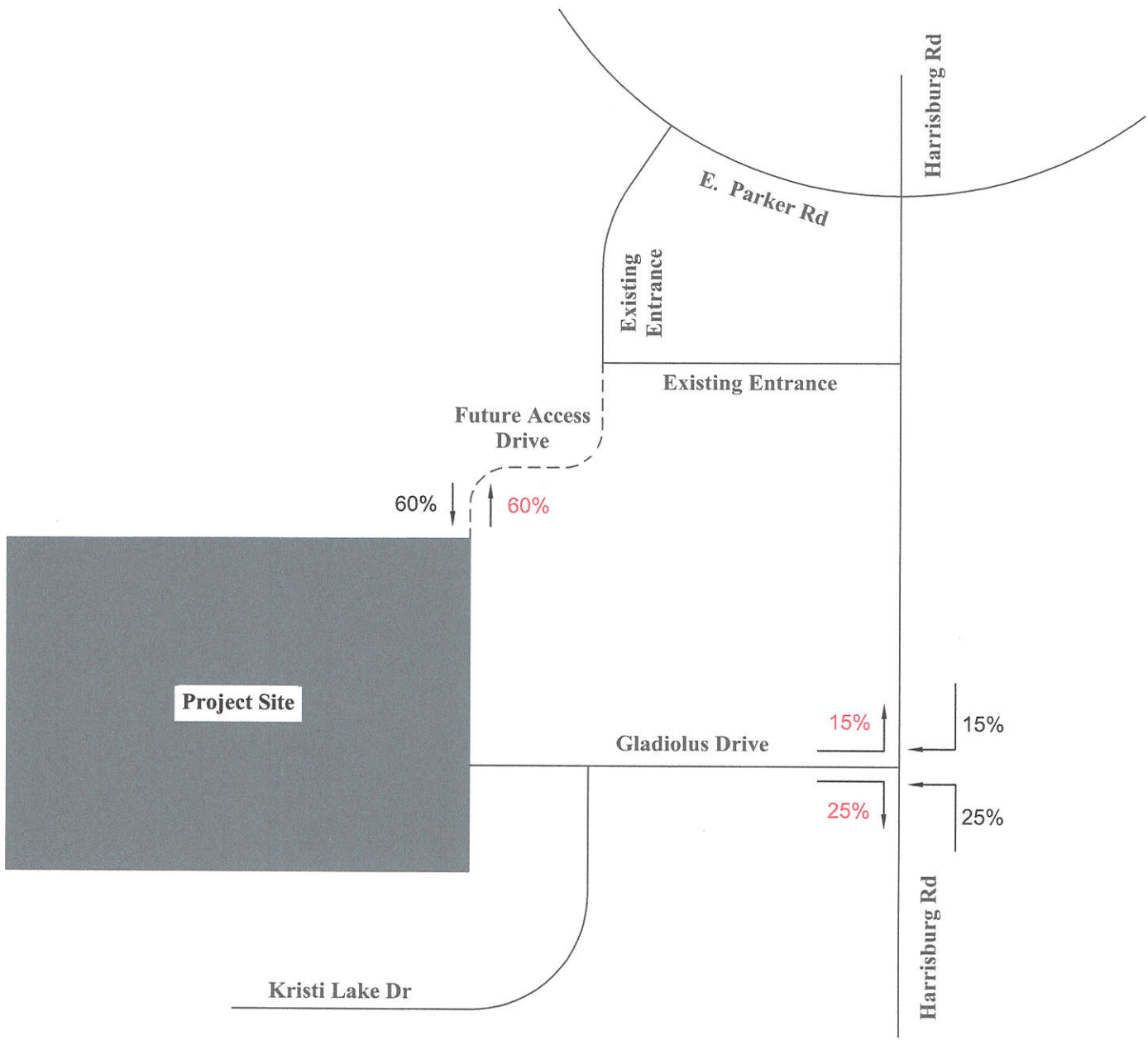
The anticipated trips generated by the development were assigned to the roadway network using the trip distributions shown in Figure 6. Figure 6 shows the trip distribution pattern for both the AM and the PM Peak Hour at the intersection of Gladiolus Drive and Harrisburg Road without the aforementioned future access drive. As stated earlier, this represents the worst case scenario for impact to the Gladiolus Drive and Harrisburg Road intersection. In the event of construction of this access drive, distribution out of the site will change significantly. Figure 7 show the anticipated distribution with the future access drive.

Trip distribution was based upon observed traffic patterns in the area. It is estimated that 75 percent of the AM and PM traffic generated from the site will desire to travel north towards I-555. It is estimated that 75% of the projected traffic will come from this same direction during both the AM and PM Peak Hour back towards the site. In the case of no future access drive, 75% of the anticipated projected traffic will turn left at the intersection of Gladiolus Drive and Harrisburg Road. In the event that this access drive is constructed, it is anticipated that 80% of the traffic from the development desiring to go north towards I-555, will utilize this new access drive. It further assumed that traffic desiring to travel south on Harrisburg Road will continue to utilize Gladiolus Drive. The traffic assignment for these peak hour volumes without the future access drive is shown in Figure 8. Figure 9 displays the volumes with the future access drive.



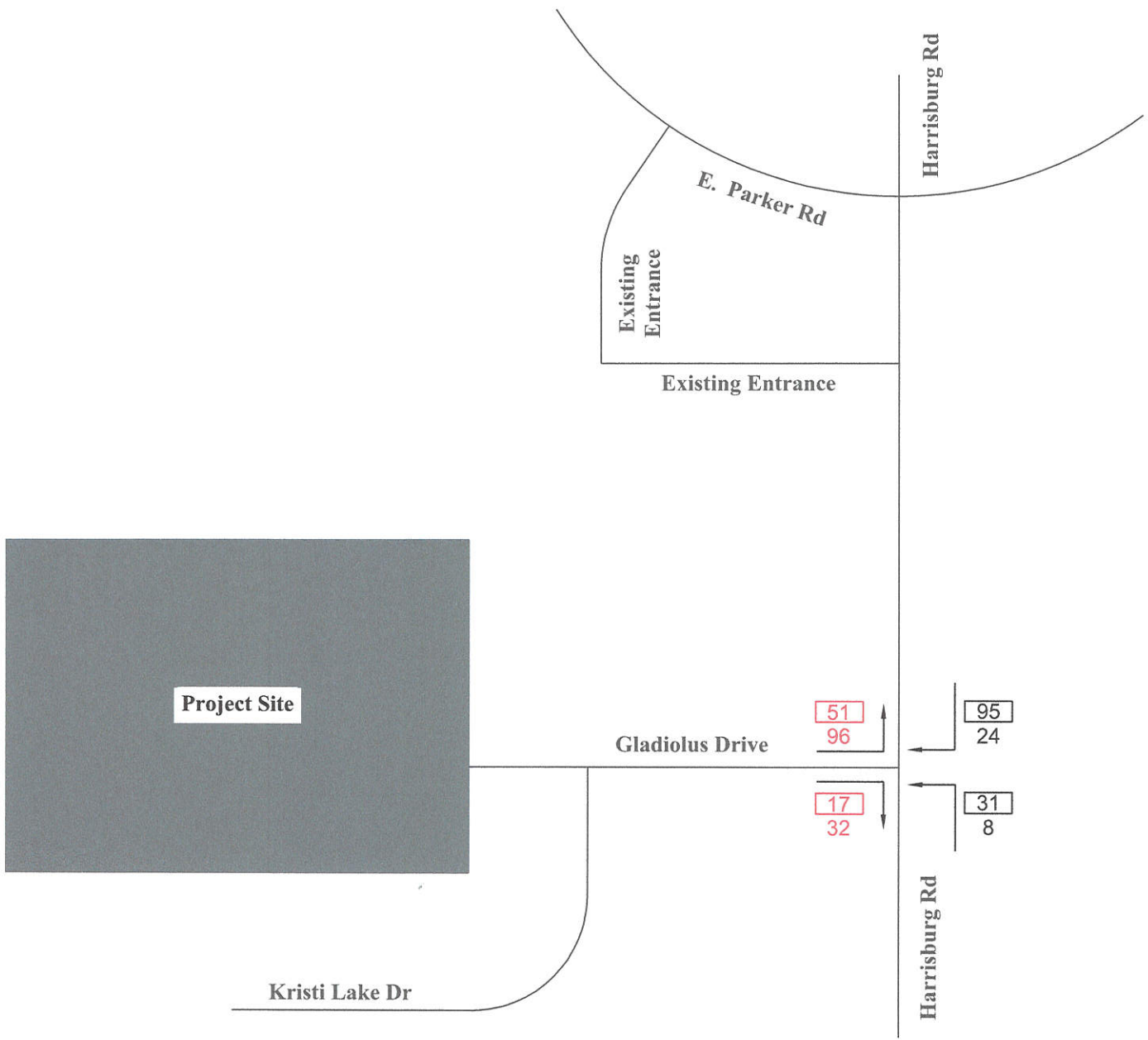
XX% - ENTERING  
 XX% - EXITING

**Figure 6**  
**Distribution of Peak Hour Traffic Volumes**  
 Generated by the Project Site With No Future Access Drive (AM/PM Peak Hour)  
 (Not to Scale)



XX% - ENTERING  
 XX% - EXITING

**Figure 7**  
**Distribution of Peak Hour Traffic Volumes**  
**Generated by the Project Site With Future Access Drive (AM/PM Peak Hour)**  
 (Not to Scale)



126	ENTERING
68	EXITING

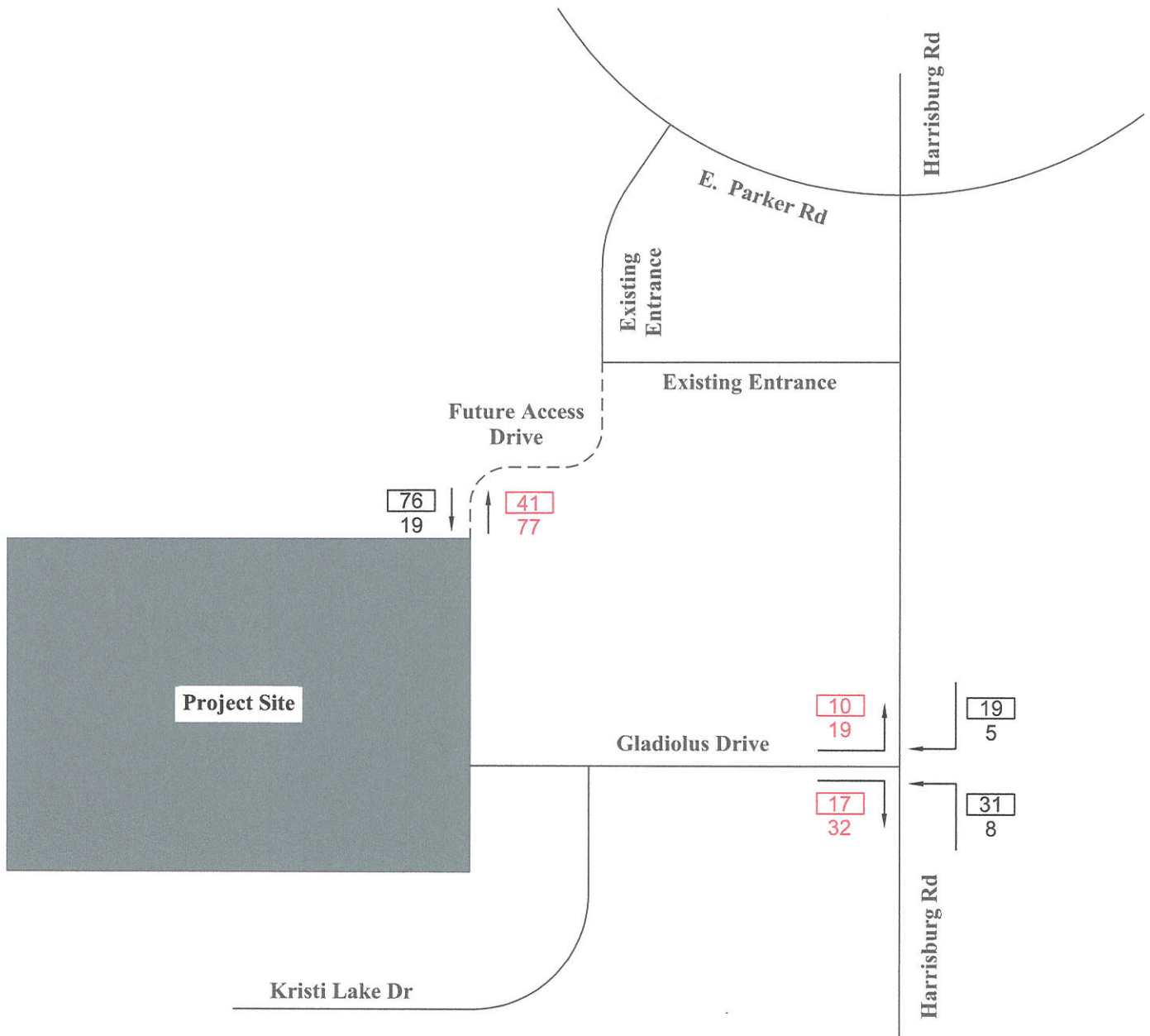
32	ENTERING
128	EXITING

P.M.  
A.M.



**Figure 8**  
**Assignment of Peak Hour Traffic Volumes**  
**Generated by the Project Site With No Future Access Drive (AM/PM Peak Hour)**  
 (Not to Scale)





126	ENTERING
68	EXITING

32	ENTERING
128	EXITING

P.M.
A.M.

**Figure 9**  
**Assignment of Peak Hour Traffic Volumes**  
**Generated by the Project Site With Future Access Drive (AM/PM Peak Hour)**  
 (Not to Scale)

## LEVEL-OF-SERVICE ANALYSIS

In order to determine the Level-of-Service (LOS) for the site's access point with Gladiolus Drive and at the existing intersection of Gladiolus Drive and Harrisburg Road a capacity analysis was performed at these intersections. Synchro Software Version 10 was used to perform the LOS calculations.

Level-of-Service for an intersection is defined in the Highway Capacity Manual in terms of delay, which is a measure of driver discomfort, frustration, fuel consumption and lost travel time. Six LOS are defined with letters designating each level from A to F, with LOS "A" representing the best operating conditions and LOS "F" representing the worst operating conditions. Table 2 shows the LOS for unsignalized intersections and the associated delay in seconds.

<b>TABLE 2</b>	
<b>LEVEL-OF-SERVICE</b>	
<b>Level-of-Service</b>	<b>Average Total Delay (SEC/VEH)</b>
	<b>Unsignalized</b>
A	≤10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	>50

The LOS Analysis included the future intersection of the Site Access Drive with Gladiolus Drive and four different scenarios for Gladiolus Drive and Harrisburg Road. The LOS analyses for the four scenarios at Gladiolus Drive and Harrisburg Road include an existing conditions analysis, a “no-build” analysis where no new traffic from the site is added but non-site traffic volumes are increased, and a “build” analysis where both non-site background growth and projected traffic volumes from the site are included. The “build” option includes an analysis with and without the previously mentioned future access drive. The “no-build” and “build” analyses both include the 5 lane Harrisburg Road improvements as described earlier in this study. The Harrisburg Road improvements are included in the analyses due to the fact that a 2020 horizon year is anticipated for a full-buildout of the apartment complex, which correlates to the completion date of the Harrisburg Road improvements.

Traffic volumes used for the analysis included the volumes acquired from the traffic counts at the intersection of Gladiolus Drive and Harrisburg Road from the aforementioned traffic study. Since the development is not anticipated to be completed until 2020, a 1.5 % growth factor per year was used for Harrisburg Road through traffic only. No increase in volume was calculated for Gladiolus Drive due to the fact that the area is built out with the exception of this property. The existing peak hour volumes are shown in Figure 2, and the 2020 volumes without the development (No build) are shown in Figure 10. Volumes projected from the proposed site were added to the 2020 traffic volumes at this intersection. Figure 11 displays the anticipated volumes without the future access drive and Figure 12 displays the volumes with the future access drive.

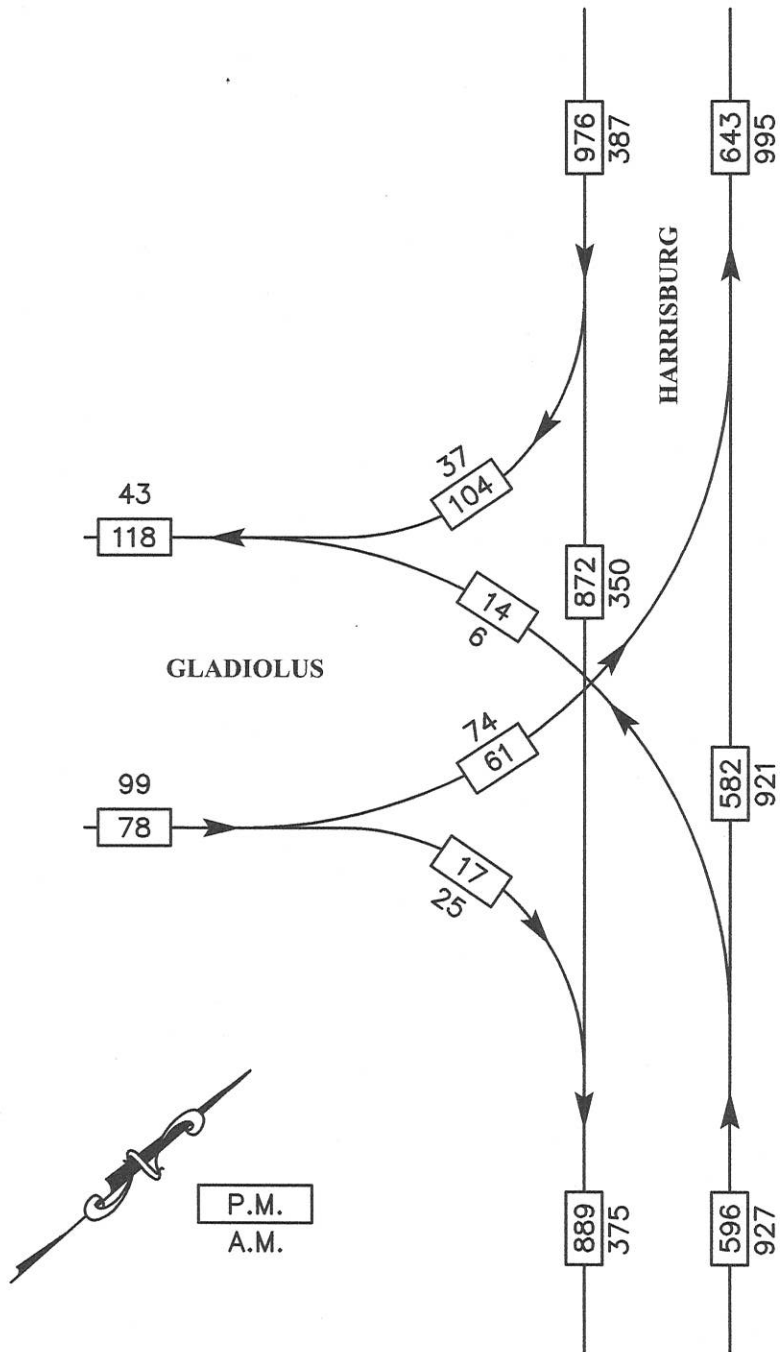


Figure 10  
 2020 Peak Hour Volumes  
 Harrisburg Road/Gladiolus Drive (No-Build)

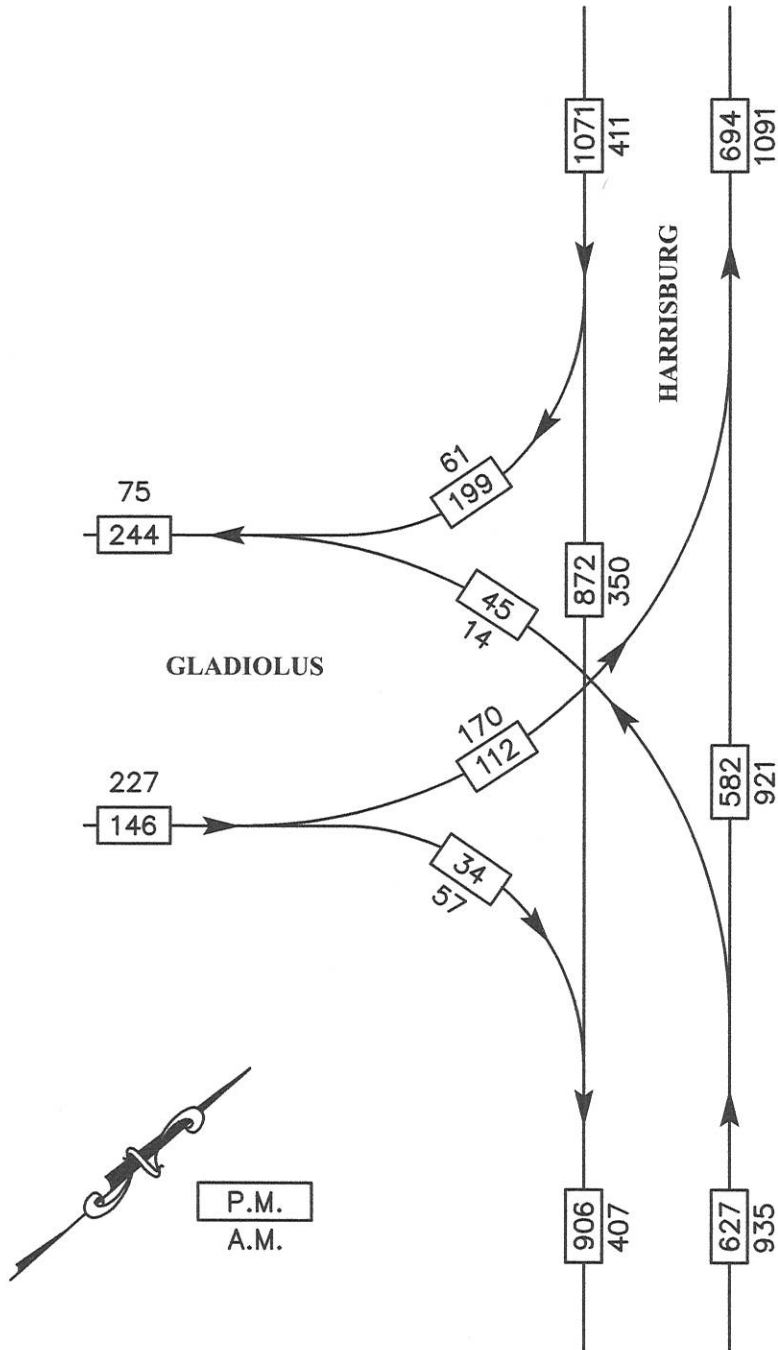


Figure 11  
 2020 Peak Hour Volumes  
 Harrisburg Road/Gladiolus Drive (Build no Future Access Drive)

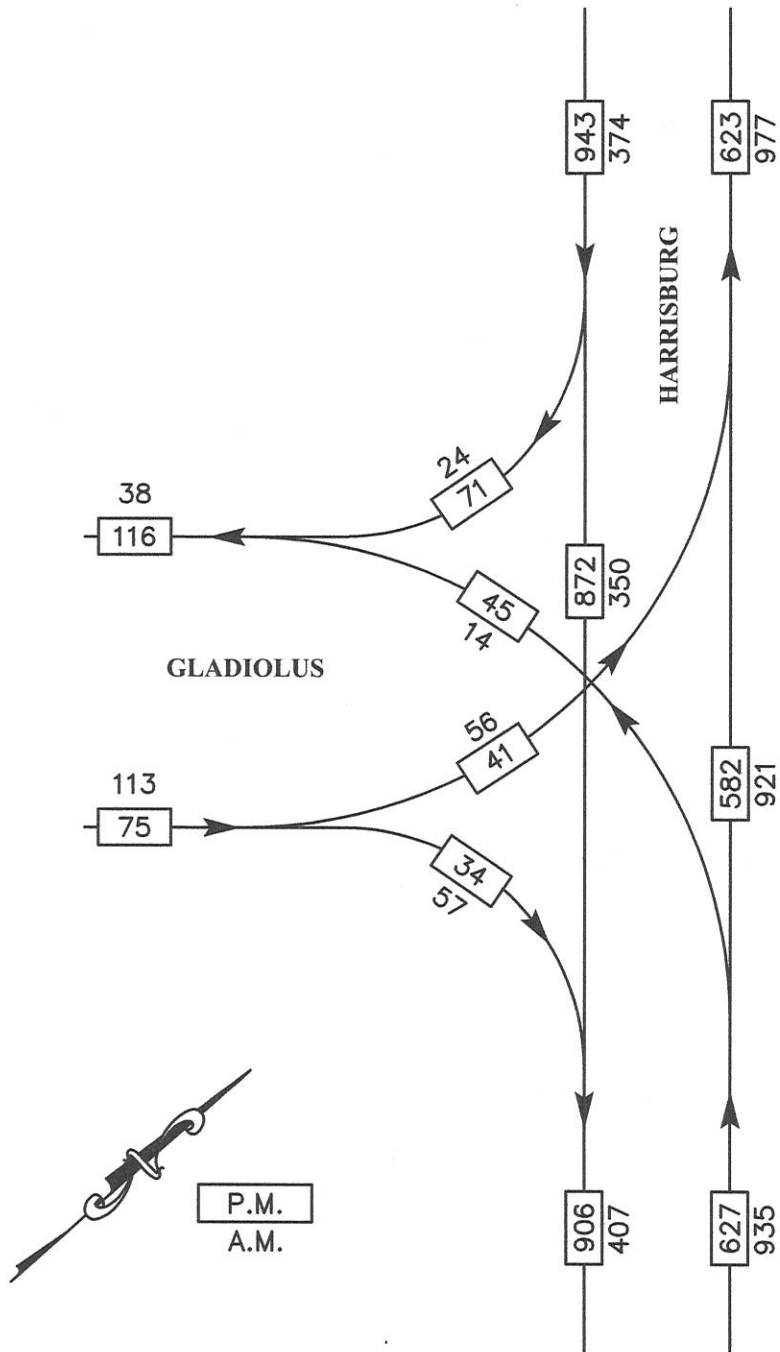


Figure 12  
 2020 Peak Hour Volumes  
 Harrisburg Road/Gladiolus Drive (Build with Future Access Drive)

- **Future Site Access Drive with Gladiolus Drive**

Although traffic volumes are unknown on Gladiolus Drive at the west end of this roadway, in order to run an analysis at this future intersection, the full amount of traffic on Gladiolus Drive at the Harrisburg Road Intersection was used. Traffic to and from the site was added to these existing volumes and an analysis was performed. Figure 13 shows the traffic volumes used in this analysis. The results show that even with this conservative estimate of vehicles for the Gladiolus Drive traffic volumes, this Site Access Drive will operate at a LOS "B". In reality, the delays should be much less due to reduced traffic volumes of the west end of Gladiolus Drive. The results are shown in Table 3.

TABLE 3					
GLADIOLUS DRIVE AND SITE ACCESS DRIVE					
Approach	Movement	LEVEL OF SERVICE			
		AM Peak Hour (LOS)	Average Delay (sec/veh)	PM Peak Hour (LOS)	Average Delay (sec/veh)
Eastbound	Left	A	0	A	0
Westbound	Through/Right	*	*	*	*
Southbound	Left	B	10.5	B	10.6

\*No Delay

- **Gladiolus Drive and Harrisburg Road (Existing Conditions)**

The analysis for existing conditions at Gladiolus Drive and Harrisburg Road included the existing traffic volumes taken from the previously mentioned study with no improvements to Harrisburg Road. The analysis for the existing conditions show that the stop condition for the critical eastbound left turn at Gladiolus Drive currently operates at a LOS "F" for both AM and PM Peak

Hours. All other movements operate at a LOS “B” or better with the exception of the eastbound right turn in the PM Peak which operates at a LOS “C”. The results are shown in Table 4.

TABLE 4					
Harrisburg Road and Gladiolus Drive Existing Conditions					
Approach	Movement	AM PEAK HOUR		PM PEAK HOUR	
		LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)
Eastbound	Left	F	60.1	F	67.7
	Right	B	10.9	C	17.0
Northbound	Left	A	8.2	B	10.3
	Through	A	0	A	0
Southbound	Through	*	*	*	*
	Right	*	*	*	*

\*No Delay

- **Gladiolus Drive and Harrisburg Road (2020 “No-Build”)**

The intersection was analyzed again without the development and the future access drive. With the additional traffic projected from 2020 traffic without the development (no build), and with the improvements to Harrisburg Road, the LOS improves to a “C” or better for all movements. The critical eastbound left turn movements come in at a “C” for both AM and PM Peak Hours while all other movements are LOS “B” or better. The results are shown in Table 5.

TABLE 5					
Harrisburg Road and Gladiolus Drive 2020 “No-Build” with Harrisburg Road Improvements					
Approach	Movement	AM PEAK HOUR		PM PEAK HOUR	
		LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)
Eastbound	Left	C	17.3	C	24.4
	Right	A	9.8	B	12.5
Northbound	Left	A	8.3	B	10.8
	Through	*	*	*	*
Southbound	Through	*	*	*	*
	Right	*	*	*	*

\*No Delay



- **Gladiolus Drive and Harrisburg Road (2020 “Build” without Future Access Drive)**

Gladiolus Drive and Harrisburg Road was analyzed for the “Build” Scenarios without the future access drive. This would require all traffic generated from the site to travel to this existing intersection. The analysis includes 2020 traffic projections and improvements to Harrisburg Road. The results show that the critical eastbound left turn movement will operate at a LOS “D” for the AM Peak, and LOS “E” for the PM Peak. All other movement operate at a LOS “B” or better. The results are shown in Table 6.

TABLE 6					
Harrisburg Road and Gladiolus Drive 2020 “Build” with Harrisburg Road Improvements					
Approach	Movement	AM PEAK HOUR		PM PEAK HOUR	
		LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)
Eastbound	Left	D	26.0	E	40.1
	Right	B	10.1	B	13.4
Northbound	Left	A	4	B	11.4
	Through	*	*	*	*
Southbound	Through	*	*	*	*
	Right	*	*	*	*

\*No Delay

- **Gladiolus Drive and Harrisburg Road (2020 “Build” with Future Access Drive)**

This analysis included the “build” option with the construction of the future access drive. The following assumptions were made to develop the traffic volumes at the existing intersection of Gladiolus Drive and Harrisburg Road under this scenario.

1. Existing traffic on Gladiolus Drive will be able to utilize the future access drive.
2. All “site” and “non-site” traffic desiring to proceed south on Harrisburg Road will utilize Gladiolus Drive to access Harrisburg Road and not the future access drive.

3. During the peak hours 50% of the existing left turn volumes (non-site) at Gladiolus Drive and Harrisburg Road will utilize the future access drive and not this existing intersection.
4. During the peak hours 80% of the proposed site development traffic desiring to proceed in a northerly direction will use the future access drive. 20% will utilize the existing intersection of Gladiolus Drive and Harrisburg Road.
5. Harrisburg Road is improved to a five-lane section.

The following assumptions described above produce adjusted AM and PM Peak Hour Volumes at the Gladiolus Drive and Harrisburg Road intersection. These adjusted volumes include the increased “non-site” traffic described earlier to be expected in 2020. These adjusted volumes were shown in Figure 12.

The analysis shows that with the future access drive the LOS for the critical eastbound left turn movement improves to a LOS “C” for both the AM and PM Peak Hours. There is a significant decrease in delay for the eastbound left turn movement with the future access drive. An average delay per vehicle of 9.8 seconds in the AM Peak hour and 16.2 seconds in the PM Peak Hour. The results of this analysis are shown in Table 7. A comparison of the “Build” Options – One without the future access drive, and one with the future access drive are shown in Table 8.

TABLE 7					
Harrisburg Road and Gladiolus Drive 2020 "Build" with Future Access Drive and Harrisburg Road Improvements					
Approach	Movement	AM PEAK HOUR		PM PEAK HOUR	
		LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)
Eastbound	Left	C	16.8	C	23.9
	Right	B	10.0	B	12.5
Northbound	Left	A	8.2	B	10.6
	Through	*	*	*	*
Southbound	Through	*	*	*	*
	Right	*	*	*	*

\*No Delay

TABLE 8									
Harrisburg Road and Gladiolus Drive "Build" Comparison (With and Without Future Access Drive)									
Approach	Movement	AM PEAK HOUR				PM PEAK HOUR			
		Without Future Access Drive		With Future Access Drive		Without Future Access Drive		With Future Access Drive	
		LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)
Eastbound	Left	D	26.0	C	16.8	E	40.1	C	23.9
	Right	B	10.1	B	10.0	B	13.4	B	12.5
Northbound	Left	A	8.4	A	8.2	B	11.4	B	10.6
	Through	*	*	*	*	*	*	*	*
Southbound	Through	*	*	*	*	*	*	*	*
	Right	*	*	*	*	*	*	*	*

\*No Delay

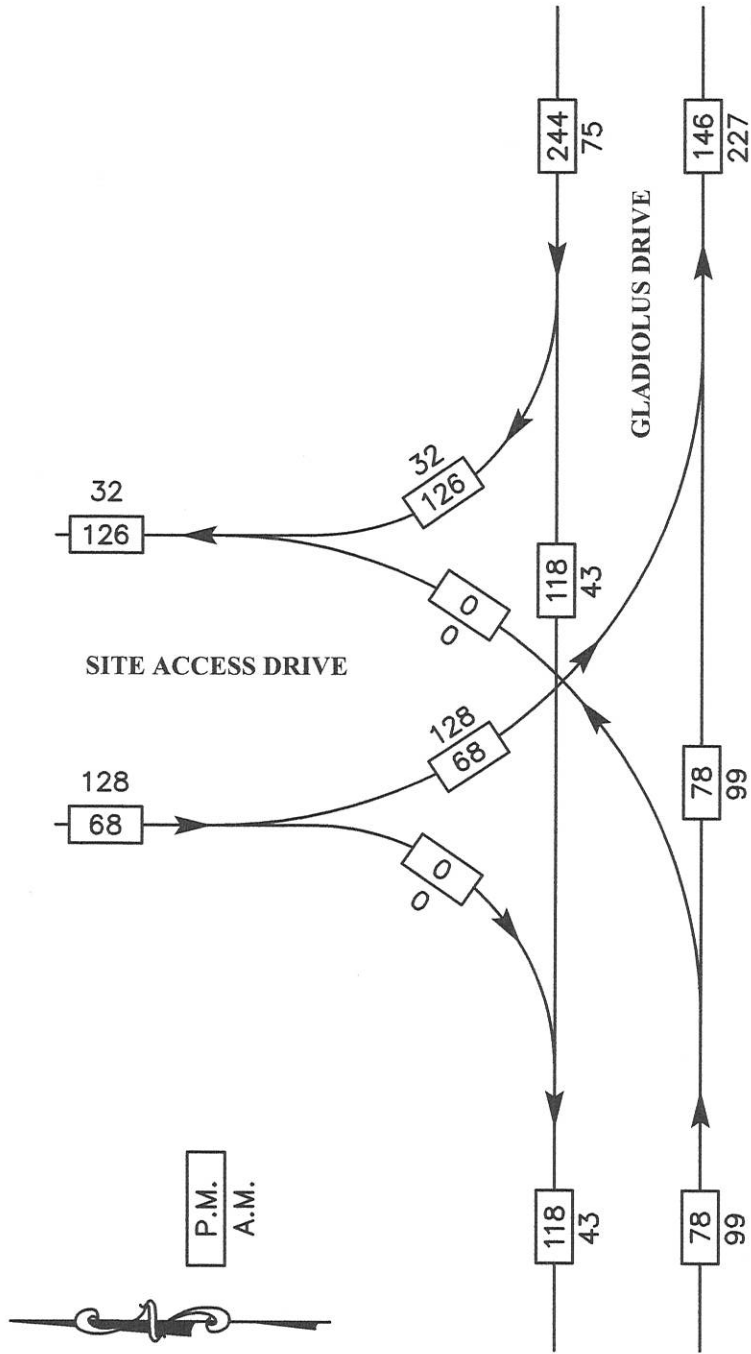


Figure 13  
 2020 Peak Hour Volumes  
 Gladiolus Drive/Site Access Drive

## **SIGNAL WARRANT ANALYSIS**

The Manual on Uniform Traffic Control Devices (MUTCD) outlines 8 different warrants to justify the installation of a traffic signal. The traffic signal should not be installed unless one or more of these warrants are satisfied. After reviewing the volumes from the existing traffic counts, Warrant 1, Eight-Hour Vehicular Volume and Warrant 2, Four-Hour Vehicular Volume were considered. No other warrant appeared to apply.

### **Warrant 1, Eight-Hour Vehicular Volume**

The MUTCD states the following for Warrant 1:

*The need for a traffic control signal shall be considered if an engineering study finds that one of the following conditions exist for each of any 8 hours of an average day:*

- A. *The vehicles per hour given in both of the 100 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; or*
- B. *The vehicles per hour given in both of the 100 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.*

*In applying each condition, the major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of these 8 hours.*

**Table 4C-1. Warrant 1, Eight-Hour Vehicular Volume**

**Condition A—Minimum Vehicular Volume**

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

**Condition B—Interruption of Continuous Traffic**

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

With the traffic conditions encountered at this intersection, it was determined that Condition “B” – “Interruption of Continuous Traffic”, was more likely to be met than Condition “A” of Warrant No. 1.

Since Harrisburg Road is the main street, both approaches, northbound and southbound volumes were added together. A growth factor of 1.046 for the horizon year was then applied to the through traffic only. Since the horizon year was assumed to be 2020, Harrisburg Road was considered to have two lanes in each direction.

For Gladiolus Drive, since only the AM and PM Peak Hours were known from the ITE Trip Generation Manual, assumptions had to be made in order to determine “non-peak” hour volumes from the site. Since this is a proposed residential development and Gladiolus Drive serves mainly residential development, it was assumed that this same traffic pattern will occur with the proposed development as occurs with the traffic on Gladiolus Drive. Percentages of this

total traffic for each hour were calculated on Gladiolus Drive for the eastbound traffic. These same percentages were used to predict the exiting or eastbound traffic from the development that would be on Gladiolus Drive in the event the future access drive is not constructed.

Since the ITE Trip Generator Manual does provide a “daily” or 24-hour count for this particular Land Use, this volume was calculated as shown below.

$$T = 6.06 (X) + 123.56$$

$$T = 6.06 (320) + 123.56$$

$$T = 2,062$$

$$X = \text{Dwelling Units} = 320$$

$$T = \text{Total Trips}$$

Of the 2,062 total trips generated, 50% would enter and 50% exit over a 24-hour period. Therefore, a total of 50%, or 1,031 would exit during the day to travel eastbound. Of the 1,031 total trips exiting, it was assumed that 75% of these trips would occur between the hours of 6:00 AM through 7:00 PM. Therefore, a total volume to be applied to the percentages calculated would be  $0.75 \times 1,031$ , or 774 vehicles. These added hourly volumes were calculated and shown for each hour. The only exception is the two peak hours which show the previously calculated volumes from the ITE Trip Generation Manual. These percentages and calculations are shown in the Appendix.

These projected hourly volumes from the site were then added to the existing eastbound traffic. Due to high left turn volumes, the right turn volumes were included in these counts for eastbound

Gladiolus Drive. The analysis for the Eight-Hour Vehicular Volumes Condition “B” show that 8 of the required 8 hours were satisfied at the intersection of Harrisburg Road and Gladiolus Drive. Therefore, this warrant is satisfied and consideration should be given for a traffic signal in the future. The results are shown in Table 9.

TABLE 9							
Eight -Hour Vehicular Volume Warrant Harrisburg Road and Gladiolus Drive							
Start/Ending	Harrisburg Road (Major Street) (2020 Volumes)				Gladiolus Drive (Minor Street) Volumes		Warrant Met
	SB	NB	Total Approach	Minimum Requirements	Total Approach	Minimum Requirements	Y/N
6:00 AM / 7:00 AM	270	350	620	900	116	75	N
7:00 AM / 8:00 AM	389	929	1318	900	227	75	Y
8:00 AM / 9:00 AM	334	513	847	900	139	75	N
9:00 AM / 10:00 AM	352	410	762	900	103	75	N
10:00 AM / 11:00 AM	332	415	747	900	93	75	N
11:00 AM / 12:00 PM	434	440	874	900	118	75	N
12:00 PM / 1:00 PM	516	467	983	900	139	75	Y
1:00 PM / 2:00 PM	521	473	994	900	137	75	Y
2:00 PM. / 3:00 PM	612	560	1172	900	194	75	Y
3:00 PM. / 4:00 PM	720	589	1309	900	132	75	Y
4:00 PM / 5:00 PM	821	582	1403	900	166	75	Y
5:00 PM /6:00 PM	927	592	1519	900	116	75	Y
6:00 PM / 7:00 PM	641	520	1161	900	141	75	Y

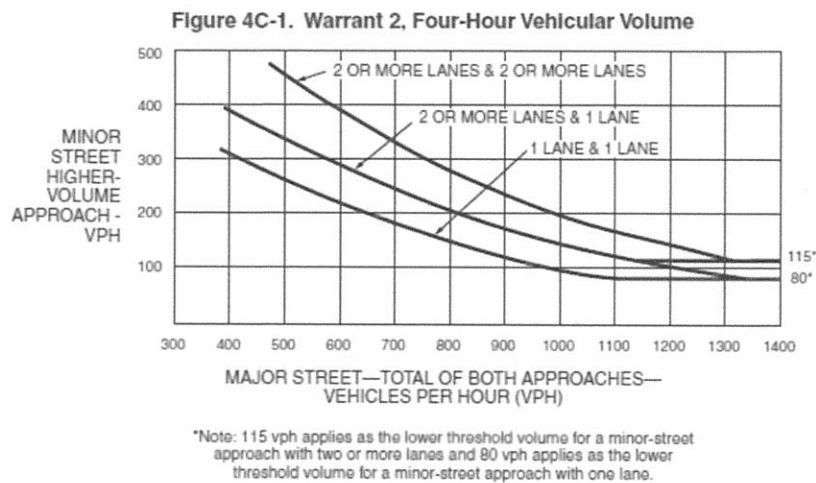
- Major Street met minimum requirement.
- Minor Street met minimum requirement.
- Hour satisfied minimum requirement.



**Warrant 2, Four-Hour Vehicular Volume**

The MUTCD states the following for Warrant 2:

*The need for a traffic control signal shall be considered if an engineering study finds that, for each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) all fall above the applicable curve in Figure 4C-1 for the existing combination of approach lanes. On the minor street, the higher volumes shall not be required to be on the same approach during each of these 4 hours.*



As stated previously, the existing counts for both approaches on Harrisburg Road were added together along with the growth factor for the through movements. The projected traffic volumes from the site were then added to the existing eastbound traffic on Gladiolus Drive. Again, due to the high volume of left turns, no right turns were excluded. The analysis for the Four -Hour Vehicular Volume Warrant show that eight of the minimum four hours required were satisfied for the intersection of Harrisburg Road and Gladiolus Drive. Therefore, this warrant was also satisfied. The results of the analysis are shown in Table 10.

**TABLE 10**

**Four-Hour Vehicular Volume Warrant  
Harrisburg Road and Gladiolus Drive**

Start/Ending	Harrisburg Road (Major Street) (2020 Volumes)			Gladiolus Drive (Minor Street) Volumes	Warrant Met
	Southbound	Northbound	Total Approach	Eastbound	Y/N
6:00 AM / 7:00 AM	270	350	620	116	N
7:00 AM / 8:00 AM	389	929	1318	227	Y
8:00 AM / 9:00 AM	334	513	847	139	N
9:00 AM / 10:00 AM	352	410	762	103	N
10:00 AM / 11:00 AM	332	415	747	93	N
11:00 AM / 12:00 PM	434	440	874	118	N
12:00 PM / 1:00 PM	516	467	983	139	Y
1:00 PM / 2:00 PM	521	473	994	137	Y
2:00 PM. / 3:00 PM	612	560	1172	194	Y
3:00 PM. / 4:00 PM	720	589	1309	132	Y
4:00 PM / 5:00 PM	821	582	1403	166	Y
5:00 PM /6:00 PM	927	592	1519	116	Y
6:00 PM / 7:00 PM	641	520	1161	141	Y

 Hour satisfied.

The Signal Warrant Analysis does show that if the Future Access Drive is not constructed in the year 2020, this intersection will meet two different signal warrants. However, if the future Access Drive is constructed, and Gladiolus Drive is able to utilize this new access drive, traffic volumes will decrease at the Gladiolus Drive and Harrisburg Road intersection. This is due to the anticipated reduction of eastbound traffic on Gladiolus Drive turning left onto Harrisburg Road at the intersection. The eastbound left turn movement should experience a 25 to 30% decrease in traffic over current volumes. This being the case, if the future Access Drive is constructed, due to a significant drop in eastbound left turns at Gladiolus Drive and Harrisburg Road signal, warrants would not be expected to be met. This assumption is based upon the fact that current existing conditions do not warrant a signal at this location from the previously mentioned traffic study. If left turns decrease compared to existing, the need for signalization would also decrease.

## **SUMMARY**

The purpose of this study was to evaluate the impact to traffic if the undeveloped property at the west end of Gladiolus Drive is rezoned to allow multi-family. The particular impact studied was the existing intersection of Gladiolus Drive and Harrisburg Road. The study included a horizon year of 2020 traffic volumes and included both “with a future access drive”, and “without a future access drive”. The purpose further included an evaluation of this intersection to determine if any signal warrants would be met with the added vehicles from the proposed development.

Information including traffic counts at the intersection of Gladiolus Drive and Harrisburg Road was obtained from a recent traffic study for the City of Jonesboro along Harrisburg Road. Using this existing data and projected traffic volumes from the proposed development, LOS analysis was performed at this intersection. This analysis included existing conditions, 2020 traffic volumes without the development (no-build), 2020 traffic volumes with the development (build) without the future access drive, and 2020 traffic volumes with the development (build) with the future access drive. All the LOS analysis for the year 2020 included improvements to Harrisburg Road to a five-lane typical section. The results of the LOS analysis showed that currently with the existing lane configuration and volumes, the intersection operates at a LOS “F” for the critical eastbound left turn movement. With improvements in 2020 and “no-build” this movement will improve to a LOS “C”. With the development in 2020 and without the future access drive, the LOS slips to a “D” in the AM Peak Hour and an “E” in the PM Peak Hour. If the future access drive is constructed under these same conditions there is a significant decrease in delay improving this eastbound left turn movement to a LOS “C”.

The results of the signal warrant analysis concluded that in 2020 with the development, and without construction of the future access drive, a signal is warranted at this intersection. However, if the future access drive is constructed and Gladiolus Drive traffic are allowed to access this drive, traffic volumes for this left turn movement will significantly decrease. Therefore, with the construction of the future access drive, the intersection of Gladiolus Drive and Harrisburg Road would most likely not meet warrants for signalization.

In conclusion, the development of this property to include multi-family residential will significantly increase traffic at the Gladiolus Drive and Harrisburg Road intersection without the construction of future access drive. Warrants for signalization will also be met without the construction of this access drive. However, if the future access drive is constructed, eastbound left turning traffic will decrease and this intersection will operate at an acceptable LOS. It is recommended that strong consideration be given to the construction of this future access drive with the development of this property.

## **APPENDIX**

**Title EXISTING TRAFFIC COUNTS**  
**Study Name Gladiolus Dr @ Harrisburg Rd TMC (Tues)**  
**Start Date 04/11/2017**  
**Start Time 5:30 AM**

Start Time	Harrisburg Rd			Harrisburg Rd			Gladiolus Dr			Int. Total
	Southbound			Northbound			Eastbound			
	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	
5:30 AM	1	13	14	36	0	36	0	7	7	57
5:45 AM	2	35	37	55	1	56	0	14	14	107
Hourly Total	3	48	51	91	1	92	0	21	21	164
6:00 AM	6	32	38	43	1	44	0	13	13	95
6:15 AM	5	71	76	63	0	63	0	10	10	149
6:30 AM	7	51	58	105	3	108	0	24	24	190
6:45 AM	15	70	85	113	6	119	3	15	18	222
Hourly Total	33	224	257	324	10	334	3	62	65	656
7:00 AM	9	58	67	152	0	152	1	20	21	240
7:15 AM	7	74	81	234	1	235	10	19	29	345
7:30 AM	9	83	92	263	4	267	8	16	24	383
7:45 AM	12	120	132	232	1	233	6	19	25	390
Hourly Total	37	335	372	881	6	887	25	74	99	1358
8:00 AM	10	69	79	140	4	144	2	12	14	237
8:15 AM	7	83	90	108	2	110	5	22	27	227
8:30 AM	6	58	64	113	2	115	2	16	18	197
8:45 AM	12	74	86	119	1	120	2	17	19	225
Hourly Total	35	284	319	480	9	489	11	67	78	886
9:00 AM	8	80	88	93	1	94	2	14	16	198
9:15 AM	4	69	73	126	0	126	3	11	14	213
9:30 AM	13	74	87	90	1	91	3	11	14	192
9:45 AM	6	82	88	79	0	79	0	14	14	181
Hourly Total	31	305	336	388	2	390	8	50	58	784
10:00 AM	6	72	78	98	2	100	2	12	14	192
10:15 AM	6	76	82	92	3	95	2	6	8	185
10:30 AM	11	54	65	114	0	114	0	17	17	196
10:45 AM	8	84	92	85	1	86	1	12	13	191
Hourly Total	31	286	317	389	6	395	5	47	52	764
11:00 AM	15	78	93	112	1	113	1	10	11	217
11:15 AM	7	88	95	92	2	94	2	11	13	202
11:30 AM	18	89	107	103	2	105	2	17	19	231
11:45 AM	12	108	120	102	5	107	6	17	23	250
Hourly Total	52	363	415	409	10	419	11	55	66	900
12:00 PM	23	112	135	106	2	108	4	12	16	259
12:15 PM	10	125	135	94	2	96	2	13	15	246
12:30 PM	17	91	108	95	3	98	2	17	19	225
12:45 PM	17	99	116	140	3	143	6	22	28	287
Hourly Total	67	427	494	435	10	445	14	64	78	1017
1:00 PM	12	121	133	98	1	99	2	12	14	246
1:15 PM	12	96	108	116	0	116	2	24	26	250
1:30 PM	14	119	133	112	3	115	0	19	19	267
1:45 PM	10	114	124	118	2	120	0	18	18	262
Hourly Total	48	450	498	444	6	450	4	73	77	1025

2:00 PM	15	142	157	115	4	119	5	24	29	305
2:15 PM	13	127	140	137	4	141	7	22	29	310
2:30 PM	20	131	151	148	4	152	5	21	26	329
2:45 PM	20	119	139	117	5	122	4	21	25	286
Hourly Total	68	519	587	517	17	534	21	88	109	1230
3:00 PM	16	132	148	128	7	135	4	15	19	302
3:15 PM	22	134	156	134	7	141	1	20	21	318
3:30 PM	20	167	187	136	2	138	3	19	22	347
3:45 PM	30	169	199	146	2	148	2	10	12	359
Hourly Total	88	602	690	544	18	562	10	64	74	1326
4:00 PM	28	161	189	140	1	141	5	19	24	354
4:15 PM	25	159	184	116	4	120	5	23	28	332
4:30 PM	23	176	199	146	4	150	8	13	21	370
4:45 PM	27	188	215	139	5	144	6	19	25	384
Hourly Total	103	684	787	541	14	555	24	74	98	1440
5:00 PM	22	205	227	130	1	131	4	17	21	379
5:15 PM	27	236	263	146	3	149	1	7	8	420
5:30 PM	28	205	233	142	5	147	6	18	24	404
5:45 PM	15	151	166	133	5	138	2	10	12	316
Hourly Total	92	797	889	551	14	565	13	52	65	1519
6:00 PM	23	154	177	123	3	126	3	15	18	321
6:15 PM	20	153	173	128	4	132	4	12	16	321
6:30 PM	14	123	137	132	5	137	8	12	20	294
6:45 PM	20	108	128	95	6	101	5	20	25	254
Hourly Total	77	538	615	478	18	496	20	59	79	1190
7:00 PM	20	137	157	85	5	90	1	20	21	268
7:15 PM	19	107	126	72	6	78	6	14	20	224
Grand Total	804	6106	6910	6629	152	6781	176	884	1060	14751



**Title 2020 Projected Traffic Volumes**  
**Study Name Gladiolus Dr @ Harrisburg Rd TMC (Tues)**  
**Start Date 04/11/2017**  
**Start Time 5:30 AM**

Start Time	Harrisburg Rd				Harrisburg Rd				Gladiolus Dr			Int. Total
	Southbound				Northbound				Eastbound			
	Right	Thru	Thru Adjusted <sup>1</sup>	App. Total	Thru	Thru Adjusted <sup>1</sup>	Left	App. Total	Right	Left	App. Total	
5:30 AM	1	13	14	15	36	38	0	38	0	7	7	60
5:45 AM	2	35	37	39	55	58	1	59	0	14	14	112
Hourly Total	3	48	51	54	91	96	1	97	0	21	21	172
6:00 AM	6	32	34	40	43	45	1	46	0	13	13	99
6:15 AM	5	71	75	80	63	66	0	66	0	10	10	156
6:30 AM	7	51	54	61	105	110	3	113	0	24	24	198
6:45 AM	15	70	74	89	113	119	6	125	3	15	18	232
Hourly Total	33	224	237	270	324	340	10	350	3	62	65	685
7:00 AM	9	58	61	70	152	159	0	159	1	20	21	250
7:15 AM	7	74	78	85	234	245	1	246	10	19	29	360
7:30 AM	9	83	87	96	263	276	4	280	8	16	24	400
7:45 AM	12	120	126	138	232	243	1	244	6	19	25	407
Hourly Total	37	335	352	389	881	923	6	929	25	74	99	1417
8:00 AM	10	69	73	83	140	147	4	151	2	12	14	248
8:15 AM	7	83	87	94	108	113	2	115	5	22	27	236
8:30 AM	6	58	61	67	113	119	2	121	2	16	18	206
8:45 AM	12	74	78	90	119	125	1	126	2	17	19	235
Hourly Total	35	284	299	334	480	504	9	513	11	67	78	925
9:00 AM	8	80	84	92	93	98	1	99	2	14	16	207
9:15 AM	4	69	73	77	126	132	0	132	3	11	14	223
9:30 AM	13	74	78	91	90	95	1	96	3	11	14	201
9:45 AM	6	82	86	92	79	83	0	83	0	14	14	189
Hourly Total	31	305	321	352	388	408	2	410	8	50	58	820
10:00 AM	6	72	76	82	98	103	2	105	2	12	14	201
10:15 AM	6	76	80	86	92	97	3	100	2	6	8	194
10:30 AM	11	54	57	68	114	120	0	120	0	17	17	205
10:45 AM	8	84	88	96	85	89	1	90	1	12	13	199
Hourly Total	31	286	301	332	389	409	6	415	5	47	52	799
11:00 AM	15	78	82	97	112	118	1	119	1	10	11	227
11:15 AM	7	88	93	100	92	97	2	99	2	11	13	212
11:30 AM	18	89	94	112	103	108	2	110	2	17	19	241
11:45 AM	12	108	113	125	102	107	5	112	6	17	23	260
Hourly Total	52	363	382	434	409	430	10	440	11	55	66	940
12:00 PM	23	112	118	141	106	111	2	113	4	12	16	270
12:15 PM	10	125	131	141	94	99	2	101	2	13	15	257
12:30 PM	17	91	96	113	95	100	3	103	2	17	19	235
12:45 PM	17	99	104	121	140	147	3	150	6	22	28	299
Hourly Total	67	427	449	516	435	457	10	467	14	64	78	1061
1:00 PM	12	121	127	139	98	103	1	104	2	12	14	257
1:15 PM	12	96	101	113	116	122	0	122	2	24	26	261
1:30 PM	14	119	125	139	112	118	3	121	0	19	19	279
1:45 PM	10	114	120	130	118	124	2	126	0	18	18	274
Hourly Total	48	450	473	521	444	467	6	473	4	73	77	1071
2:00 PM	15	142	149	164	115	121	4	125	5	24	29	318
2:15 PM	13	127	133	146	137	144	4	148	7	22	29	323
2:30 PM	20	131	137	157	148	155	4	159	5	21	26	342
2:45 PM	20	119	125	145	117	123	5	128	4	21	25	298
Hourly Total	68	519	544	612	517	543	17	560	21	88	109	1281
3:00 PM	16	132	139	155	128	134	7	141	4	15	19	315
3:15 PM	22	134	141	163	134	141	7	148	1	20	21	332
3:30 PM	20	167	175	195	136	143	2	145	3	19	22	362
3:45 PM	30	169	177	207	146	153	2	155	2	10	12	374
Hourly Total	88	602	632	720	544	571	18	589	10	64	74	1383

1. Calculated by increasing the Thru column by a factor of 1.015^3 (1.5% growth for a period of 3 years)

4:00 PM	28	161	169	197	140	147	1	148	5	19	24	369
4:15 PM	25	159	167	192	116	122	4	126	5	23	28	346
4:30 PM	23	176	185	208	146	153	4	157	8	13	21	386
4:45 PM	27	188	197	224	139	146	5	151	6	19	25	400
Hourly Total	103	684	718	821	541	568	14	582	24	74	98	1501
5:00 PM	22	205	215	237	130	136	1	137	4	17	21	395
5:15 PM	27	236	247	274	146	153	3	156	1	7	8	438
5:30 PM	28	205	215	243	142	149	5	154	6	18	24	421
5:45 PM	15	151	158	173	133	140	5	145	2	10	12	330
Hourly Total	92	797	373	927	551	578	14	592	13	52	65	1122
6:00 PM	23	154	162	185	123	129	3	132	3	15	18	335
6:15 PM	20	153	160	180	128	134	4	138	4	12	16	334
6:30 PM	14	123	129	143	132	139	5	144	8	12	20	307
6:45 PM	20	108	113	133	95	100	6	106	5	20	25	264
Hourly Total	77	538	564	641	478	502	18	520	20	59	79	1240
7:00 PM	20	137	144	164	85	89	5	94	1	20	21	279
7:15 PM	19	107	112	131	72	76	6	82	6	14	20	233
Grand Total	804	6106	6414	7218	6629	6961	152	7113	176	884	1060	21712

1. Calculated by increasing the Thru column by a factor of  $1.015^3$  (1.5% growth for a period of 3 years)

**Calculations for Signal Warrants along Gladiolus and Harrisburg Rd  
2020 Traffic Volumes**

Starting/Ending	Harrisburg Road (Major Street) 2020 Volumes			Gladiolus Drive (Minor Street) 2020 Volumes			
	SB <sup>1</sup>	NB <sup>1</sup>	Total Approach	EB Existing	EB Existing %	EB Apartment <sup>2</sup>	Total Revised EB Approach
6:00 AM - 7:00 AM	270	350	620	65	6.51%	51	116
7:00 AM - 8:00 AM	389	929	1318	99	9.92%	128	227
8:00 AM - 9:00 AM	334	513	847	78	7.82%	61	139
9:00 AM - 10:00 AM	352	410	762	58	5.81%	45	103
10:00 AM - 11:00 AM	332	415	747	52	5.21%	41	93
11:00 AM - 12:00 PM	434	440	874	66	6.61%	52	118
12:00 PM - 1:00 PM	516	467	983	78	7.82%	61	139
1:00 PM - 2:00 PM	521	473	994	77	7.72%	60	137
2:00 PM - 3:00 PM	612	560	1172	109	10.92%	85	194
3:00 PM - 4:00 PM	720	589	1309	74	7.41%	58	132
4:00 PM - 5:00 PM	821	582	1403	98	9.82%	68	166
5:00 PM - 6:00 PM	927	592	1519	65	6.51%	51	116
6:00 PM - 7:00 PM	641	520	1161	79	7.92%	62	141
<b>TOTAL</b>				998	100.00%	823	

**Trip Generation Calculations**

$$T_{24\text{ Hour}} = 6.06 * (X) + 123.56$$

$$T_{24\text{ Hour}} = 6.06 * (320) + 123.56$$

$$T_{24\text{ Hour}} = 2062 \quad \text{Entering \& Exiting Site}$$

**Distribution**

Entering = 50%

Exiting = 50%

**Time of Day Distribution**

6AM to 7PM = 75%

7PM to 6AM = 25%

$$T_{\text{Exiting}} = 0.5 * T_{24\text{Hour}}$$

$$T_{\text{Exiting}} = 0.5 * 2062$$

$$T_{\text{Exiting}} = 1031$$

$$T_{6\text{AM}-7\text{PM}} = 0.75 * T_{\text{Exiting}}$$

$$T_{6\text{AM}-7\text{PM}} = 0.75 * 1031$$

$$T_{6\text{AM}-7\text{PM}} = 774$$

1. The existing through movement volumes are increased by a factor of 1.046 to achieve 2020 volumes.
2. EB Apartment Volumes = 774 vehicles \* EB Existing %; Except for AM/PM Peak hours taken from Trip Gen.

**Intersection**

Int Delay, s/veh 3.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗		↖	↗	
Traffic Vol, veh/h	74	25	6	881	335	37
Future Vol, veh/h	74	25	6	881	335	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	85	29	7	1013	385	43

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1434	407	428 0
Stage 1	407	-	- -
Stage 2	1027	-	- -
Critical Hdwy	6.42	6.22	4.12 -
Critical Hdwy Stg 1	5.42	-	- -
Critical Hdwy Stg 2	5.42	-	- -
Follow-up Hdwy	3.518	3.318	2.218 -
Pot Cap-1 Maneuver	147	644	1131 -
Stage 1	672	-	- -
Stage 2	345	-	- -
Platoon blocked, %			- -
Mov Cap-1 Maneuver	145	644	1131 -
Mov Cap-2 Maneuver	145	-	- -
Stage 1	663	-	- -
Stage 2	345	-	- -

Approach	EB	NB	SB
HCM Control Delay, s	47.7	0.1	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1131	-	145	644	-	-
HCM Lane V/C Ratio	0.006	-	0.587	0.045	-	-
HCM Control Delay (s)	8.2	0	60.1	10.9	-	-
HCM Lane LOS	A	A	F	B	-	-
HCM 95th %tile Q(veh)	0	-	3	0.1	-	-

**Intersection**

Int Delay, s/veh 3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗	↘	↗	↗	↘
Traffic Vol, veh/h	112	34	45	582	872	199
Future Vol, veh/h	112	34	45	582	872	199
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	119	36	48	619	928	212

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1440	570	1140 0
Stage 1	1034	-	- -
Stage 2	406	-	- -
Critical Hdwy	6.84	6.94	4.14 -
Critical Hdwy Stg 1	5.84	-	- -
Critical Hdwy Stg 2	5.84	-	- -
Follow-up Hdwy	3.52	3.32	2.22 -
Pot Cap-1 Maneuver	124	465	609 -
Stage 1	304	-	- -
Stage 2	641	-	- -
Platoon blocked, %			- -
Mov Cap-1 Maneuver	~ 114	465	609 -
Mov Cap-2 Maneuver	217	-	- -
Stage 1	280	-	- -
Stage 2	641	-	- -

Approach	EB	NB	SB
HCM Control Delay, s	33.9	0.8	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	609	-	217	465	-	-
HCM Lane V/C Ratio	0.079	-	0.549	0.078	-	-
HCM Control Delay (s)	11.4	-	40.1	13.4	-	-
HCM Lane LOS	B	-	E	B	-	-
HCM 95th %tile Q(veh)	0.3	-	2.9	0.3	-	-

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

**Intersection**

Int Delay, s/veh 2.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗		↖	↗	
Traffic Vol, veh/h	61	17	14	557	834	104
Future Vol, veh/h	61	17	14	557	834	104
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	65	18	15	593	887	111

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1566	943	998 0
Stage 1	943	-	- -
Stage 2	623	-	- -
Critical Hdwy	6.42	6.22	4.12 -
Critical Hdwy Stg 1	5.42	-	- -
Critical Hdwy Stg 2	5.42	-	- -
Follow-up Hdwy	3.518	3.318	2.218 -
Pot Cap-1 Maneuver	122	318	693 -
Stage 1	379	-	- -
Stage 2	535	-	- -
Platoon blocked, %			- -
Mov Cap-1 Maneuver	118	318	693 -
Mov Cap-2 Maneuver	118	-	- -
Stage 1	367	-	- -
Stage 2	535	-	- -

Approach	EB	NB	SB
HCM Control Delay, s	56.7	0.3	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	693	-	118	318	-	-
HCM Lane V/C Ratio	0.021	-	0.55	0.057	-	-
HCM Control Delay (s)	10.3	0	67.7	17	-	-
HCM Lane LOS	B	A	F	C	-	-
HCM 95th %tile Q(veh)	0.1	-	2.6	0.2	-	-

**Intersection**

Int Delay, s/veh 1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗	↘	↗	↗	↘
Traffic Vol, veh/h	74	25	6	921	350	37
Future Vol, veh/h	74	25	6	921	350	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	85	29	7	1059	402	43

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	968	223	445 0
Stage 1	424	-	- -
Stage 2	544	-	- -
Critical Hdwy	6.84	6.94	4.14 -
Critical Hdwy Stg 1	5.84	-	- -
Critical Hdwy Stg 2	5.84	-	- -
Follow-up Hdwy	3.52	3.32	2.22 -
Pot Cap-1 Maneuver	251	780	1112 -
Stage 1	628	-	- -
Stage 2	546	-	- -
Platoon blocked, %			- -
Mov Cap-1 Maneuver	249	780	1112 -
Mov Cap-2 Maneuver	377	-	- -
Stage 1	624	-	- -
Stage 2	546	-	- -

Approach	EB	NB	SB
HCM Control Delay, s	15.4	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1112	-	377	780	-	-
HCM Lane V/C Ratio	0.006	-	0.226	0.037	-	-
HCM Control Delay (s)	8.3	-	17.3	9.8	-	-
HCM Lane LOS	A	-	C	A	-	-
HCM 95th %tile Q(veh)	0	-	0.9	0.1	-	-

**Intersection**

Int Delay, s/veh 1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗	↘	↗	↗	↘
Traffic Vol, veh/h	61	17	14	582	872	104
Future Vol, veh/h	61	17	14	582	872	104
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	65	18	15	619	928	111

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1324	520	1039
Stage 1	984	-	-
Stage 2	340	-	-
Critical Hdwy	6.84	6.94	4.14
Critical Hdwy Stg 1	5.84	-	-
Critical Hdwy Stg 2	5.84	-	-
Follow-up Hdwy	3.52	3.32	2.22
Pot Cap-1 Maneuver	147	501	665
Stage 1	323	-	-
Stage 2	692	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	144	501	665
Mov Cap-2 Maneuver	250	-	-
Stage 1	316	-	-
Stage 2	692	-	-

Approach	EB	NB	SB
HCM Control Delay, s	21.8	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	665	-	250	501	-	-
HCM Lane V/C Ratio	0.022	-	0.26	0.036	-	-
HCM Control Delay (s)	10.5	-	24.4	12.5	-	-
HCM Lane LOS	B	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1	0.1	-	-



**Intersection**

Int Delay, s/veh 2.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗		↖	↗	
Traffic Vol, veh/h	61	17	14	557	834	104
Future Vol, veh/h	61	17	14	557	834	104
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	65	18	15	593	887	111

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1566	943	998 0
Stage 1	943	-	- -
Stage 2	623	-	- -
Critical Hdwy	6.42	6.22	4.12 -
Critical Hdwy Stg 1	5.42	-	- -
Critical Hdwy Stg 2	5.42	-	- -
Follow-up Hdwy	3.518	3.318	2.218 -
Pot Cap-1 Maneuver	122	318	693 -
Stage 1	379	-	- -
Stage 2	535	-	- -
Platoon blocked, %			- -
Mov Cap-1 Maneuver	118	318	693 -
Mov Cap-2 Maneuver	118	-	- -
Stage 1	367	-	- -
Stage 2	535	-	- -

Approach	EB	NB	SB
HCM Control Delay, s	56.7	0.3	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	693	-	118	318	-	-
HCM Lane V/C Ratio	0.021	-	0.55	0.057	-	-
HCM Control Delay (s)	10.3	0	67.7	17	-	-
HCM Lane LOS	B	A	F	C	-	-
HCM 95th %tile Q(veh)	0.1	-	2.6	0.2	-	-

**Intersection**

Int Delay, s/veh 1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗	↘	↗	↗	↘
Traffic Vol, veh/h	74	25	6	921	350	37
Future Vol, veh/h	74	25	6	921	350	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	85	29	7	1059	402	43

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	968	223	445 0
Stage 1	424	-	- -
Stage 2	544	-	- -
Critical Hdwy	6.84	6.94	4.14 -
Critical Hdwy Stg 1	5.84	-	- -
Critical Hdwy Stg 2	5.84	-	- -
Follow-up Hdwy	3.52	3.32	2.22 -
Pot Cap-1 Maneuver	251	780	1112 -
Stage 1	628	-	- -
Stage 2	546	-	- -
Platoon blocked, %			- -
Mov Cap-1 Maneuver	249	780	1112 -
Mov Cap-2 Maneuver	377	-	- -
Stage 1	624	-	- -
Stage 2	546	-	- -

Approach	EB	NB	SB
HCM Control Delay, s	15.4	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1112	-	377	780	-	-
HCM Lane V/C Ratio	0.006	-	0.226	0.037	-	-
HCM Control Delay (s)	8.3	-	17.3	9.8	-	-
HCM Lane LOS	A	-	C	A	-	-
HCM 95th %tile Q(veh)	0	-	0.9	0.1	-	-

**Intersection**

Int Delay, s/veh 1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗	↘	↗	↗	↘
Traffic Vol, veh/h	61	17	14	582	872	104
Future Vol, veh/h	61	17	14	582	872	104
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	65	18	15	619	928	111

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1324	520	1039 0
Stage 1	984	-	- -
Stage 2	340	-	- -
Critical Hdwy	6.84	6.94	4.14 -
Critical Hdwy Stg 1	5.84	-	- -
Critical Hdwy Stg 2	5.84	-	- -
Follow-up Hdwy	3.52	3.32	2.22 -
Pot Cap-1 Maneuver	147	501	665 -
Stage 1	323	-	- -
Stage 2	692	-	- -
Platoon blocked, %			- -
Mov Cap-1 Maneuver	144	501	665 -
Mov Cap-2 Maneuver	250	-	- -
Stage 1	316	-	- -
Stage 2	692	-	- -

Approach	EB	NB	SB
HCM Control Delay, s	21.8	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	665	-	250	501	-	-
HCM Lane V/C Ratio	0.022	-	0.26	0.036	-	-
HCM Control Delay (s)	10.5	-	24.4	12.5	-	-
HCM Lane LOS	B	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1	0.1	-	-

**Intersection**

Int Delay, s/veh 3.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗	↘	↗	↗	↘
Traffic Vol, veh/h	170	57	14	921	350	61
Future Vol, veh/h	170	57	14	921	350	61
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	195	66	16	1059	402	70

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	999	236	472 0
Stage 1	437	-	- -
Stage 2	562	-	- -
Critical Hdwy	6.84	6.94	4.14 -
Critical Hdwy Stg 1	5.84	-	- -
Critical Hdwy Stg 2	5.84	-	- -
Follow-up Hdwy	3.52	3.32	2.22 -
Pot Cap-1 Maneuver	240	766	1086 -
Stage 1	619	-	- -
Stage 2	534	-	- -
Platoon blocked, %			- -
Mov Cap-1 Maneuver	236	766	1086 -
Mov Cap-2 Maneuver	362	-	- -
Stage 1	610	-	- -
Stage 2	534	-	- -

Approach	EB	NB	SB
HCM Control Delay, s	22	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1086	-	362	766	-	-
HCM Lane V/C Ratio	0.015	-	0.54	0.086	-	-
HCM Control Delay (s)	8.4	-	26	10.1	-	-
HCM Lane LOS	A	-	D	B	-	-
HCM 95th %tile Q(veh)	0	-	3.1	0.3	-	-

**Intersection**

Int Delay, s/veh 3.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗	↘	↗	↗	↘
Traffic Vol, veh/h	170	57	14	921	350	61
Future Vol, veh/h	170	57	14	921	350	61
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	195	66	16	1059	402	70

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	999	236	472 0
Stage 1	437	-	- -
Stage 2	562	-	- -
Critical Hdwy	6.84	6.94	4.14 -
Critical Hdwy Stg 1	5.84	-	- -
Critical Hdwy Stg 2	5.84	-	- -
Follow-up Hdwy	3.52	3.32	2.22 -
Pot Cap-1 Maneuver	240	766	1086 -
Stage 1	619	-	- -
Stage 2	534	-	- -
Platoon blocked, %			- -
Mov Cap-1 Maneuver	236	766	1086 -
Mov Cap-2 Maneuver	362	-	- -
Stage 1	610	-	- -
Stage 2	534	-	- -

Approach	EB	NB	SB
HCM Control Delay, s	22	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1086	-	362	766	-	-
HCM Lane V/C Ratio	0.015	-	0.54	0.086	-	-
HCM Control Delay (s)	8.4	-	26	10.1	-	-
HCM Lane LOS	A	-	D	B	-	-
HCM 95th %tile Q(veh)	0	-	3.1	0.3	-	-

**Intersection**

Int Delay, s/veh 1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗	↘	↗	↕	↕
Traffic Vol, veh/h	56	57	14	921	350	24
Future Vol, veh/h	56	57	14	921	350	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	64	66	16	1059	402	28

Major/Minor	Minor2	Major1		Major2
Conflicting Flow All	978	215	430	0
Stage 1	416	-	-	-
Stage 2	562	-	-	-
Critical Hdwy	6.84	6.94	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-
Pot Cap-1 Maneuver	248	790	1126	-
Stage 1	634	-	-	-
Stage 2	534	-	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	245	790	1126	-
Mov Cap-2 Maneuver	369	-	-	-
Stage 1	625	-	-	-
Stage 2	534	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.4	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1126	-	369	790	-	-
HCM Lane V/C Ratio	0.014	-	0.174	0.083	-	-
HCM Control Delay (s)	8.2	-	16.8	10	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0	-	0.6	0.3	-	-

**Intersection**

Int Delay, s/veh 1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗	↘	↗	↗	↘
Traffic Vol, veh/h	41	34	45	582	872	71
Future Vol, veh/h	41	34	45	582	872	71
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	44	36	48	619	928	76

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1372	502	1004
Stage 1	966	-	-
Stage 2	406	-	-
Critical Hdwy	6.84	6.94	4.14
Critical Hdwy Stg 1	5.84	-	-
Critical Hdwy Stg 2	5.84	-	-
Follow-up Hdwy	3.52	3.32	2.22
Pot Cap-1 Maneuver	137	515	686
Stage 1	330	-	-
Stage 2	641	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	127	515	686
Mov Cap-2 Maneuver	234	-	-
Stage 1	307	-	-
Stage 2	641	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.7	0.8	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	686	-	234	515	-	-
HCM Lane V/C Ratio	0.07	-	0.186	0.07	-	-
HCM Control Delay (s)	10.6	-	23.9	12.5	-	-
HCM Lane LOS	B	-	C	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.7	0.2	-	-

**Intersection**

Int Delay, s/veh 4.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Vol, veh/h	0	99	43	32	128	0
Future Vol, veh/h	0	99	43	32	128	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	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	114	49	37	147	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	86	0	68
Stage 1	-	-	68
Stage 2	-	-	114
Critical Hdwy	4.12	-	6.22
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.218	-	3.318
Pot Cap-1 Maneuver	1510	-	995
Stage 1	-	-	955
Stage 2	-	-	911
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1510	-	995
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	955
Stage 2	-	-	911

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1510	-	-	-	807	-
HCM Lane V/C Ratio	-	-	-	-	0.182	-
HCM Control Delay (s)	0	-	-	-	10.5	0
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.7	-



**Intersection**

Int Delay, s/veh 1.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Vol, veh/h	0	78	118	126	68	0
Future Vol, veh/h	0	78	118	126	68	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	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	83	126	134	72	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	260	0	193
Stage 1	-	-	193
Stage 2	-	-	83
Critical Hdwy	4.12	-	6.22
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.218	-	3.318
Pot Cap-1 Maneuver	1304	-	849
Stage 1	-	-	840
Stage 2	-	-	940
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1304	-	849
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	840
Stage 2	-	-	940

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1304	-	-	-	714	-
HCM Lane V/C Ratio	-	-	-	-	0.101	-
HCM Control Delay (s)	0	-	-	-	10.6	0
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.3	-

## **EXISTING CONDITIONS**

Gladiolus Drive is a two-lane collector roadway that serves mainly residential development including both single-family and multi-family. This road begins to the east of at the intersection with Harrisburg Road and extends back to the west where it terminates at this subject property.

Harrisburg Road is a north – south highway (Highway 1B) that begins well south of the City Limits of Jonesboro and terminates to the north at Highway 18, or Highland Drive just prior to downtown Jonesboro. Harrisburg Road is currently a two-lane roadway south of East Parker Road in the study area.

- **Existing Traffic Counts**

Existing traffic counts were taken at the intersection of Gladiolus Drive and Harrisburg Road from a previous Traffic Study performed for the City of Jonesboro in June of 2017. These counts from that study were taken during the school year on a weekday. This 14-hour count reflects a period when traffic volumes are expected to be at their peak.

The results of this 14-hour count are shown in the appendix. The AM and PM Peak Hour volumes are shown in Figure 2. Figure 3 shows the existing lane configuration at the Gladiolus Drive and Harrisburg Road Intersection.

- **Accidents**

Accident reports were provided by the City of Jonesboro at this existing intersection of Harrisburg Road and Gladiolus Drive. There reports indicated that a total of 34 accidents have occurred at or near this intersection since January of 2015. This is an average of a little more than 1 per month. Most of these accidents were “rear-end” collisions from vehicles following too close to the vehicle in front. Most of the remaining crashes were “side-impact” crashes from a vehicle either turning out from Gladiolus Drive onto Harrisburg Road or turning onto Gladiolus Drive from Harrisburg Road.

Only three of the 34 accidents involved any injury. Of these three one included a pedestrian that resulted in a fatality.