



TRAFFIC OPERATIONS ANALYSIS

PROPOSED RESIDENTIAL DEVELOPMENT

***RIVERVIEW
SHELBYVILLE, INDIANA***

PREPARED FOR



JUNE 2021

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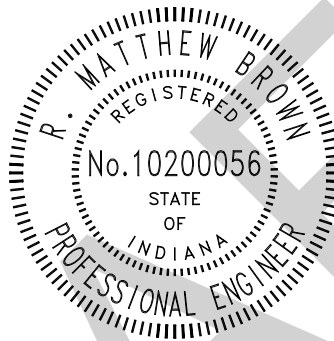
CERTIFICATION

I certify that this **TRAFFIC OPERATIONS ANALYSIS** has been prepared by me and under my immediate supervision and that I have experience and training in the field of traffic and transportation engineering.

A&F ENGINEERING Co., LLC



R. Matt Brown, P.E.
Indiana Registration 10200056



Sai Sharanya Velpula,
Traffic Engineer



Surya Kumaresan
Traffic Engineer

INTRODUCTION

This **TRAFFIC OPERATIONS ANALYSIS**, prepared at the request of the City of Shelbyville on behalf of Arbor Homes, is for a proposed residential development known as “Riverview” that will be located west of I-74 and north of Rushville Road in Shelbyville, Indiana.

PURPOSE

The purpose of this analysis is to determine what impact the traffic generated by the proposed development will have on the existing adjacent roadway system. This analysis will identify any existing roadway deficiencies or ones that may occur when this site is developed.

Conclusions will be reached that will determine if the roadway system can accommodate the anticipated traffic volumes or will determine the modifications that will be required to the system if there are identified deficiencies.

Recommendations will be made that will address the conclusions resulting from this analysis. These recommendations will address feasible roadway system improvements to provide safe ingress and egress, to and from the proposed development, with minimal interference to traffic on the public street system.

SCOPE OF WORK

The scope of work for this analysis is as follows:

First, conduct turning movement traffic volume counts during the hours of 6:30 AM – 8:30 AM and 4:00 PM – 6:30 PM at the intersection of Rushville Road and Lee Boulevard.

Second, estimate the number of peak hour trips that will be generated by the proposed development.

Third, assign and distribute the generated traffic volumes from the proposed development to the access drive intersections.

Fourth, calculate the sum of peak hour existing and generated traffic volumes at the access drive intersections.

Fifth, conduct a turn lane warrant analysis at the access drive intersections based on the sum of existing and generated traffic volumes.

Sixth, prepare a capacity analysis and level of service analysis at the access drive intersections based on the sum of existing and generated traffic volumes.

Seventh, prepare recommendations for the roadway geometrics that will be needed to accommodate the total traffic volumes once the proposed development is constructed.

Finally, prepare a **TRAFFIC OPERATIONS ANALYSIS** report documenting all data, analyses, conclusions and recommendations to provide for the safe and efficient movement of traffic.

DESCRIPTION OF THE PROPOSED DEVELOPMENT

The proposed development is located west of I-74 and north of Rushville Road, in Shelbyville Indiana. The proposed development will include 115 single-family homes and will be served by an access drive on Rushville Road aligned with Lee Boulevard and an access drive located approximately 950 feet west of Lee Boulevard. **Figure 1** is an area map showing the location and general layout of the site.

STUDY AREA

The study area for this analysis has been defined to include the following intersections:

- Rushville Road & Lee Boulevard/Proposed Access Drive
- Rushville Road & Proposed West Access Drive

DESCRIPTION OF ABUTTING STREET SYSTEM

The proposed development will be primarily served by the public roadway system that includes Rushville Road and Lee Boulevard.

TABLE 1 – DESCRIPTION OF THE ABUTTING STREET SYSTEM

STREET NAME	NUMBER OF LANES	SPEED LIMIT (MPH)	FUNCTIONAL CLASSIFICATION
Rushville Road	2	40	Principal Arterial
Lee Boulevard	2	40	Major Collector

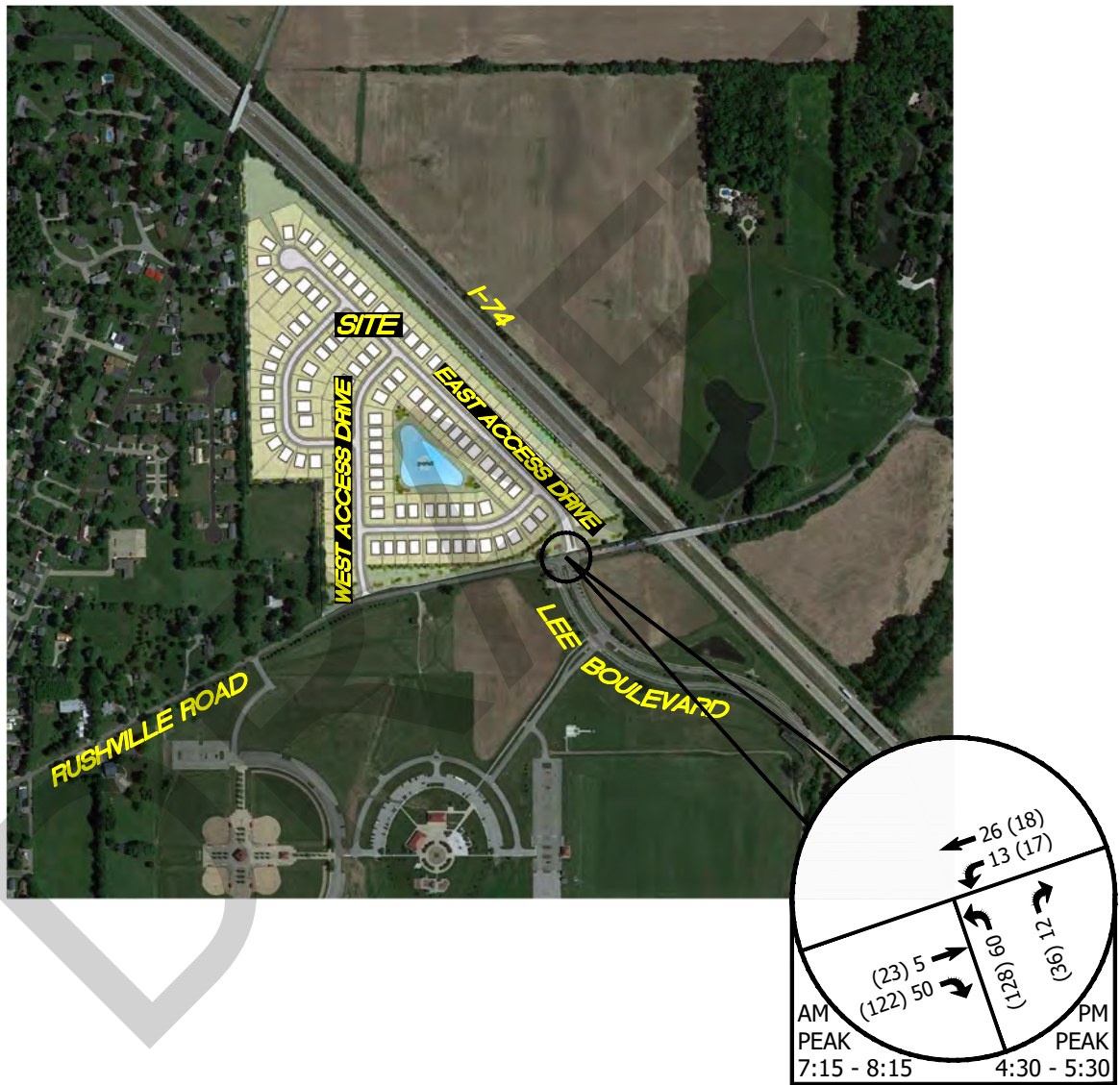
EXISTING TRAFFIC VOLUMES & PEAK HOURS

Turning movement traffic volume counts were collected by A&F Engineering at the intersection of Rushville Road and Lee Boulevard between the hours of 6:30 AM - 8:30 AM and 4:00 PM - 6:30 PM during a typical weekday in May 2021 under good weather conditions. **Figure 2** shows the peak hour counts and the intersection count output summary sheets are included in the **Appendix**.



FIGURE 1
AREA MAP

TRAFFIC OPERATIONS ANALYSIS
ARBOR HOMES
SHELBYVILLE, INDIANA



LEGEND
XX = A.M. PEAK HOUR
(XX) = P.M. PEAK HOUR
* = NEGLIGIBLE

FIGURE 2
EXISTING TRAFFIC VOLUMES

TRAFFIC OPERATIONS ANALYSIS
ARBOR HOMES
SHELBYVILLE, INDIANA

GENERATED TRAFFIC VOLUMES FOR PROPOSED DEVELOPMENT

The estimate of newly generated traffic is a function of the development size and of the character of the land use. The *ITE Trip Generation Manual*¹ was used to calculate the number of trips that will be generated by the proposed development. This report is a compilation of trip data for various land uses as collected by transportation professionals throughout the United States in order to establish the average number of trips generated by those land uses. **Table 2** is a summary of the total trips that will be generated by the proposed development.

TABLE 2 – TOTAL GENERATED TRIPS FOR PROPOSED DEVELOPMENT

DEVELOPMENT INFORMATION			GENERATED TRIPS			
LAND USE	ITE CODE	SIZE	AM PEAK HOUR		PM PEAK HOUR	
			ENTER	EXIT	ENTER	EXIT
Single-Family Housing	210	115 DU	22	64	73	43

PASS-BY & INTERNAL TRIPS

Pass-by trips are trips that are already in the existing traffic stream along the adjacent public roadway system that enter a site, utilize the site, and then return to the existing traffic stream. Residential developments do not typically attract a significant number of pass-by trips. Therefore, pass-by trip reductions are not included in this study.

An internal trip results when a trip is made between two or more land uses without traversing the external public roadway system. The proposed development is a single land use only. Hence, internal trip reductions are not considered in this study.

ASSIGNMENT AND DISTRIBUTION OF GENERATED TRIPS

The study methodology used to determine the traffic volumes from the site that will be added to the street system is defined as follows:

1. The volume of traffic that will enter and exit the proposed development must be assigned to the access points and to the public street system. Using the traffic volume data collected for this analysis, traffic to and from the site development has been assigned to the proposed driveways and to the public street system that will be serving the site.
2. To determine the volumes of traffic that will be added to the public roadway system, the generated traffic must be distributed by direction to the public roadways at their intersection

¹ *Trip Generation Manual*, Institute of Transportation Engineers, Tenth Edition, 2017.

with the access drives. For the proposed development, the trip distribution was based on the location of the development, the existing traffic patterns, and the assignment of generated traffic. **Figure 3** illustrates the assignment and distribution of generated traffic volumes for the proposed development.

GENERATED TRIPS ADDED TO THE STREET SYSTEM

The generated traffic volumes that can be expected from the proposed development have been assigned to each of the study intersections. These volumes were determined based on the previously discussed trip generation data, assignment of generated traffic and distribution of generated traffic. The total peak hour generated traffic volumes from the proposed development are shown in **Figure 4**.

TOTAL TRAFFIC VOLUMES

The generated traffic volumes that can be expected from the proposed development were added to the existing traffic volumes to yield the total traffic volumes shown in **Figure 5**.

TURN LANE WARRANT ANALYSIS

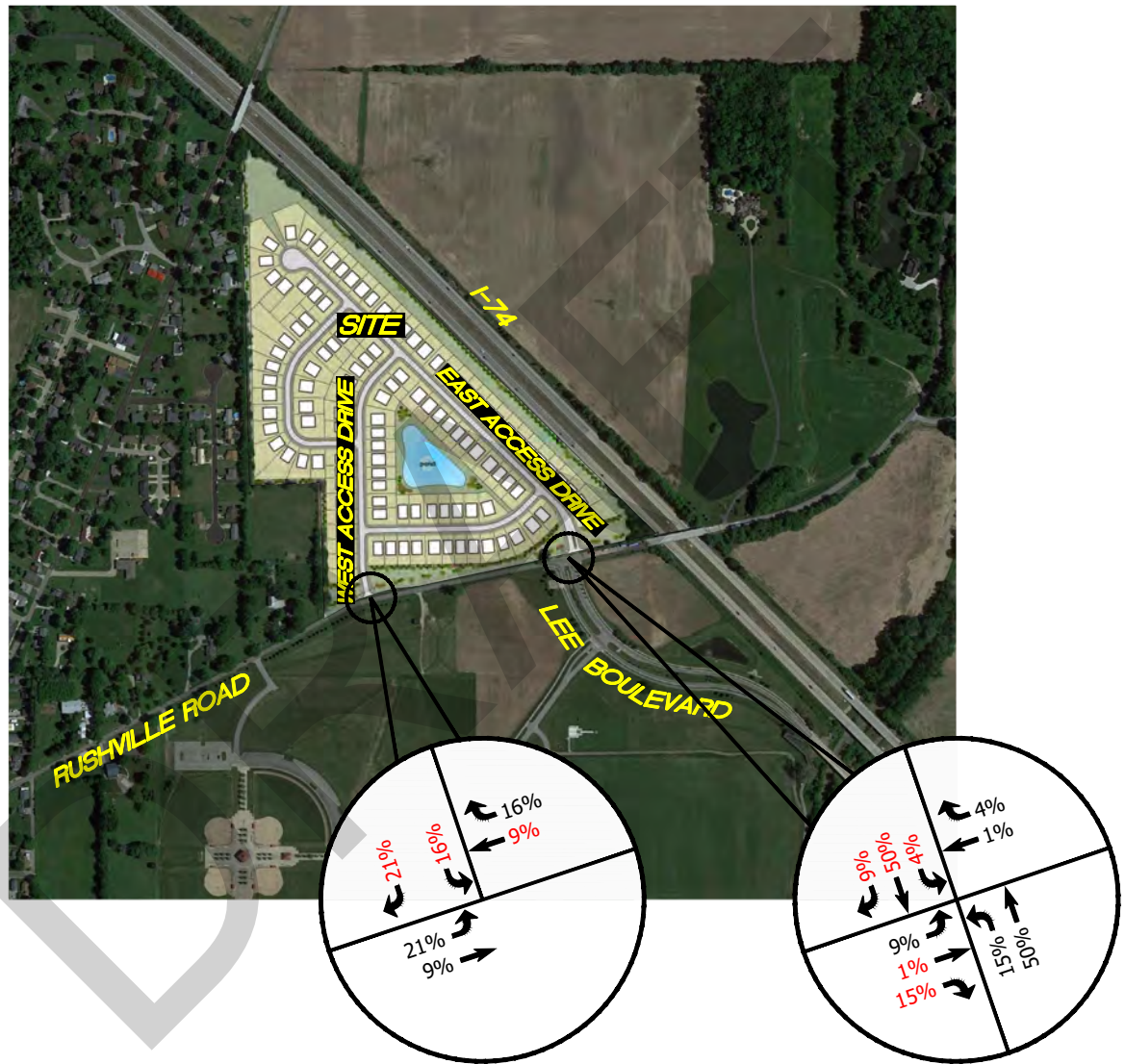
A turn lane analysis was conducted to determine if exclusive turn lanes would be warranted at the proposed access drives along Rushville Road when the proposed residential development is constructed. This analysis was done in accordance with the INDOT *Driveway Permit Manual*². The results are summarized in the following table.

RUSHVILLE ROAD & PROPOSED WEST ACCESS DRIVE		
SCENARIO	RIGHT-TURN LANE	LEFT-TURN LANE
Existing Traffic Volumes + Proposed Development Traffic Volumes	X	X
RUSHVILLE ROAD & PROPOSED EAST ACCESS DRIVE		
SCENARIO	RIGHT-TURN LANE	LEFT-TURN LANE
Existing Traffic Volumes + Proposed Development Traffic Volumes	X	X

✓ = Turn lane warranted; X = Turn lane not warranted

Where turn lanes are not shown to be warranted, it should be noted that the City of Shelbyville could require turn treatments at these locations based on local standards. The graphs that show the left-turn lane and right-turn lane warrant criteria for each intersection are shown in the **Appendix**.

² INDOT *Driveway Permit Manual*, Indiana Department of Transportation, 2018



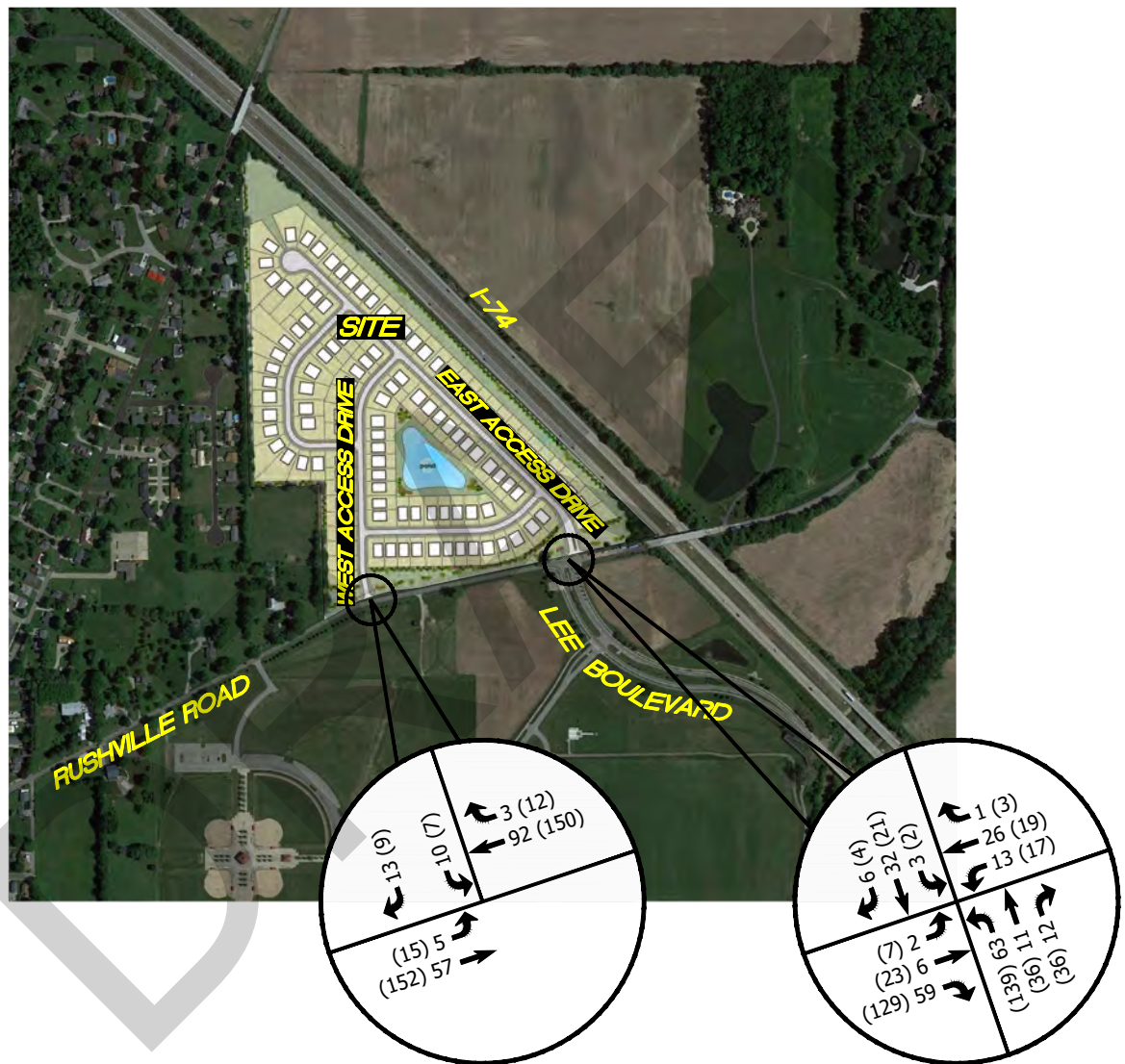
LEGEND

XX = INBOUND TRAFFIC
XX = OUTBOUND TRAFFIC
* = NEGLIGIBLE

TRAFFIC OPERATIONS ANALYSIS ARBOR HOMES SHELBYVILLE, INDIANA

FIGURE 3

**ASSIGNMENT & DISTRIBUTION OF
GENERATED TRAFFIC VOLUMES
FROM PROPOSED DEVELOPMENT**

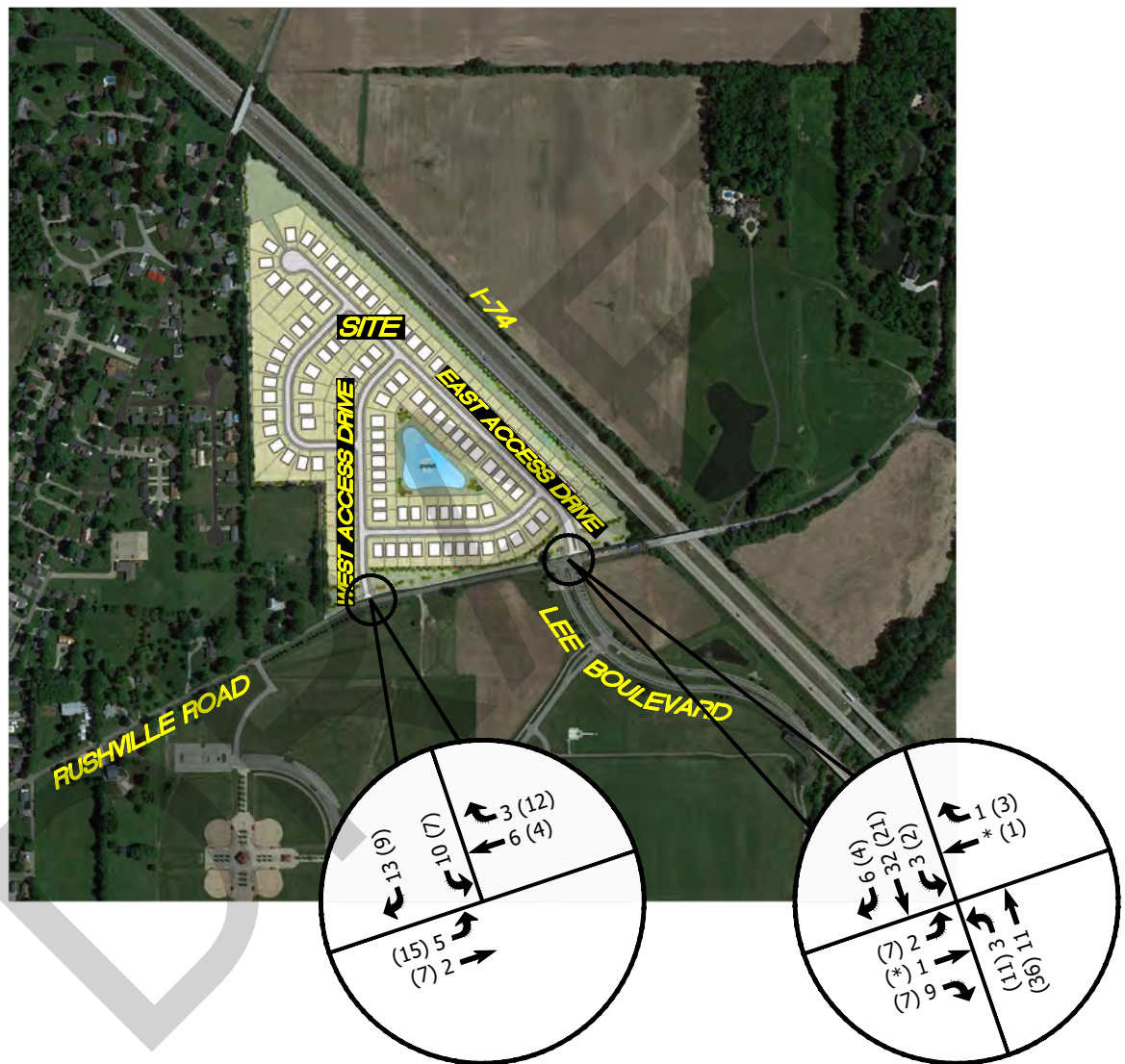


LEGEND

XX = A.M. PEAK HOUR
(XX) = P.M. PEAK HOUR
* = NEGLIGIBLE

FIGURE 5
TOTAL TRAFFIC VOLUMES

TRAFFIC OPERATIONS ANALYSIS
ARBOR HOMES
SHELBYVILLE, INDIANA



LEGEND

XX = A.M. PEAK HOUR
(XX) = P.M. PEAK HOUR
* = NEGLIGIBLE

FIGURE 4

**GENERATED TRAFFIC VOLUMES
FROM PROPOSED DEVELOPMENT**

**TRAFFIC OPERATIONS ANALYSIS
ARBOR HOMES
SHELBYVILLE, INDIANA**

CAPACITY ANALYSIS

The "efficiency" of an intersection is based on its ability to accommodate the traffic volumes that approach the intersection. It is defined by the Level-of-Service (LOS) of the intersection. The LOS is determined by a series of calculations commonly called a "capacity analysis". Input data into a capacity analysis include traffic volumes, intersection geometry, and number and use of lanes. To determine the LOS at each of the study intersections, a capacity analysis has been made using the recognized computer program *Synchro/SimTraffic*³. This program allows intersections to be analyzed and optimized using the capacity calculation methods outlined within the *Highway Capacity Manual (HCM 6th Edition)*⁴. The following list shows the delays related to the levels of service for unsignalized intersections:

<u>Level of Service</u>	<u>Control Delay (seconds/vehicle)</u> <u>UNSIGNALIZED</u>
A	Less than or equal to 10
B	Between 10.1 and 15
C	Between 15.1 and 25
D	Between 25.1 and 35
E	Between 35.1 and 50
F	greater than 50

To evaluate the proposed development's effect on the public street system, a series of traffic volume scenarios were analyzed to determine the adequacy of the existing roadway network. From this analysis, necessary recommendations can be made to improve the public street system so it will accommodate the future traffic volumes. An analysis has been made for the peak hours at each of the study intersections for the following traffic volume scenarios:

Scenario 1: Existing Traffic Volumes – Based on the existing peak hour traffic volumes. **Figure 3** is a summary of these volumes.

Scenario 2: Proposed Development Traffic Volumes – Based on the sum of existing peak hour traffic volumes and generated traffic volumes from the proposed development. **Figure 6** is a summary of these volumes.

³ *Synchro/SimTraffic 11*, Trafficware, 2020.

⁴ *Highway Capacity Manual (HCM), 6th Edition* Transportation Research Board, National Research Council, Washington, DC, 2016.

The following tables summarize the level of service results at each study intersection. The *Synchro* (HCM 6th Edition) intersection reports illustrating the capacity analysis results are included in the **Appendix**.

TABLE 3 – LEVEL OF SERVICE SUMMARY: RUSHVILLE RD. & LEE BLVD./PROPOSED ACCESS DRIVE

APPROACH / MOVEMENT	PEAK HOUR			
	AM PEAK		PM PEAK	
Northbound Approach	A	A	A	B
Southbound Approach	-	B	-	B
Eastbound Left-Turn	-	A	-	A
Westbound Left-Turn	A	A	A	A

Note: Analysis considers the southbound approach as a full access drive with one inbound and one outbound lane that will stop for Rushville Road.

TABLE 4 – LEVEL OF SERVICE SUMMARY: RUSHVILLE ROAD & PROPOSED WEST ACCESS DRIVE

APPROACH / MOVEMENT	PEAK HOUR	
	AM PEAK	PM PEAK
Southbound Approach	A	A
Eastbound Left-Turn	A	A

Note: Analysis considers the southbound approach as a full access drive with one inbound and one outbound lane that will stop for Rushville Road.

CONCLUSIONS & RECOMMENDATIONS

The conclusions that follow are based on the data and analyses presented in this study and a field review conducted at the site. Based on the analysis and the resulting conclusions of this study, recommendations are formulated to ensure that the roadway system will accommodate the future traffic volumes.

RUSHVILLE ROAD & LEE BOULEVARD / PROPOSED EAST ACCESS DRIVE

Capacity analyses have shown that all approaches to this intersection currently operate and will continue to operate at acceptable levels of service during the AM and PM peak hours with the following recommended intersection conditions:

- Construction of the southbound approach with at least one inbound lane and one outbound lane.
- The intersection should be stop controlled with the access drive stopping for Rushville Road.

RUSHVILLE ROAD & PROPOSED WEST ACCESS DRIVE

Capacity analyses have shown that all approaches to this intersection will operate at acceptable levels of service during the AM and PM peak hours with the following recommended intersection conditions:

- Construction of the southbound approach with at least one inbound lane and one outbound lane.
- The intersection should be stop controlled with the access drive stopping for Rushville Road.

TRAFFIC OPERATIONS ANALYSIS

APPENDIX

DRAFT



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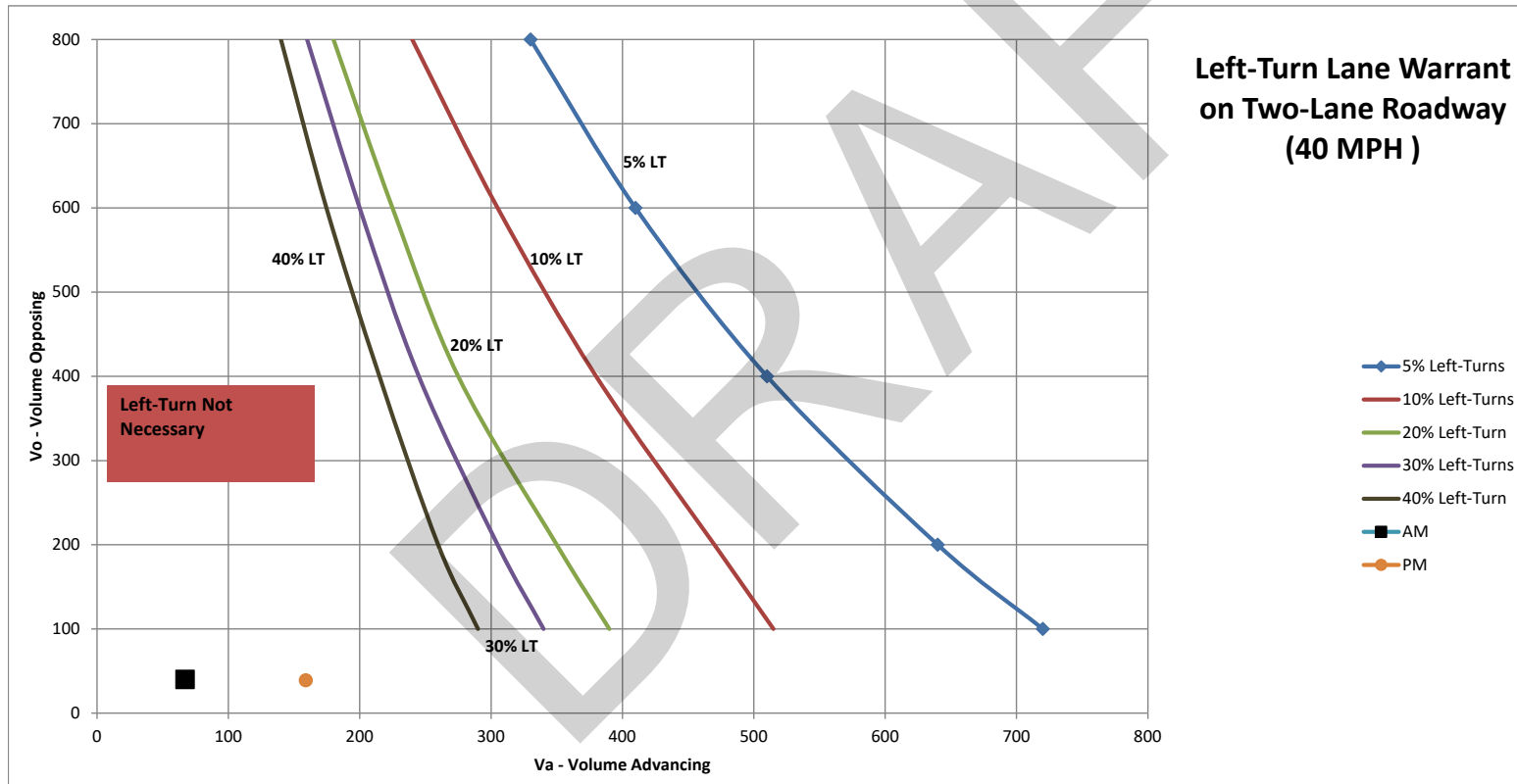
Phone: (317) 202-0864 Fax: (317) 202-0908

TURN-LANE WARRANT ANALYSIS

Rushville Road & East Access Drive - Existing + Proposed

Operating Speed (mph)	Opposing Volume (veh/h)	Advancing Volume (veh/h)							
		5% Left Turns	10% Left Turns	15% Left Turns	20% Left Turns	25% Left Turns	30% Left Turns	35% Left Turns	40% Left Turns
40	800	330	240	210	180	170	160	150	140
	600	410	305	265	225	213	200	187	175
	400	510	380	328	275	260	245	230	215
	200	640	470	410	350	328	305	282	260
	100	720	515	453	390	365	340	315	290

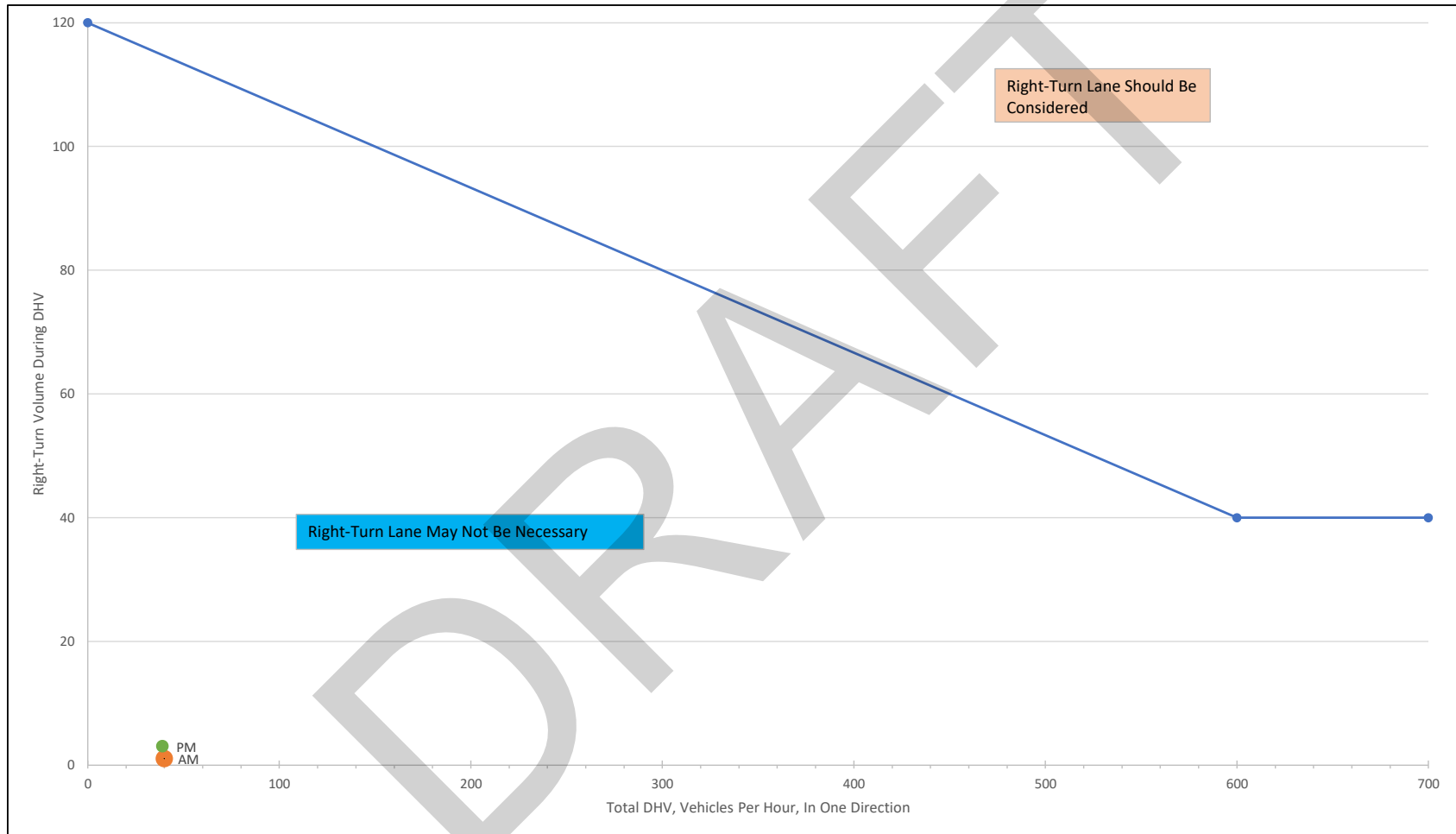
	INPUT	Warrant?
AM	Advancing Volume (Va)	67
	Opposing Volume (Vo)	40
	Left-turn Volume	2
	Left-turn %	3%
PM	Advancing Volume (Va)	159
	Opposing Volume (Vo)	39
	Left-turn Volume	7
	Left-turn %	4%



Rushville Road & East Access Drive - Existing + Proposed

Total Volume	RT Volume
0	120
600	40
700	40

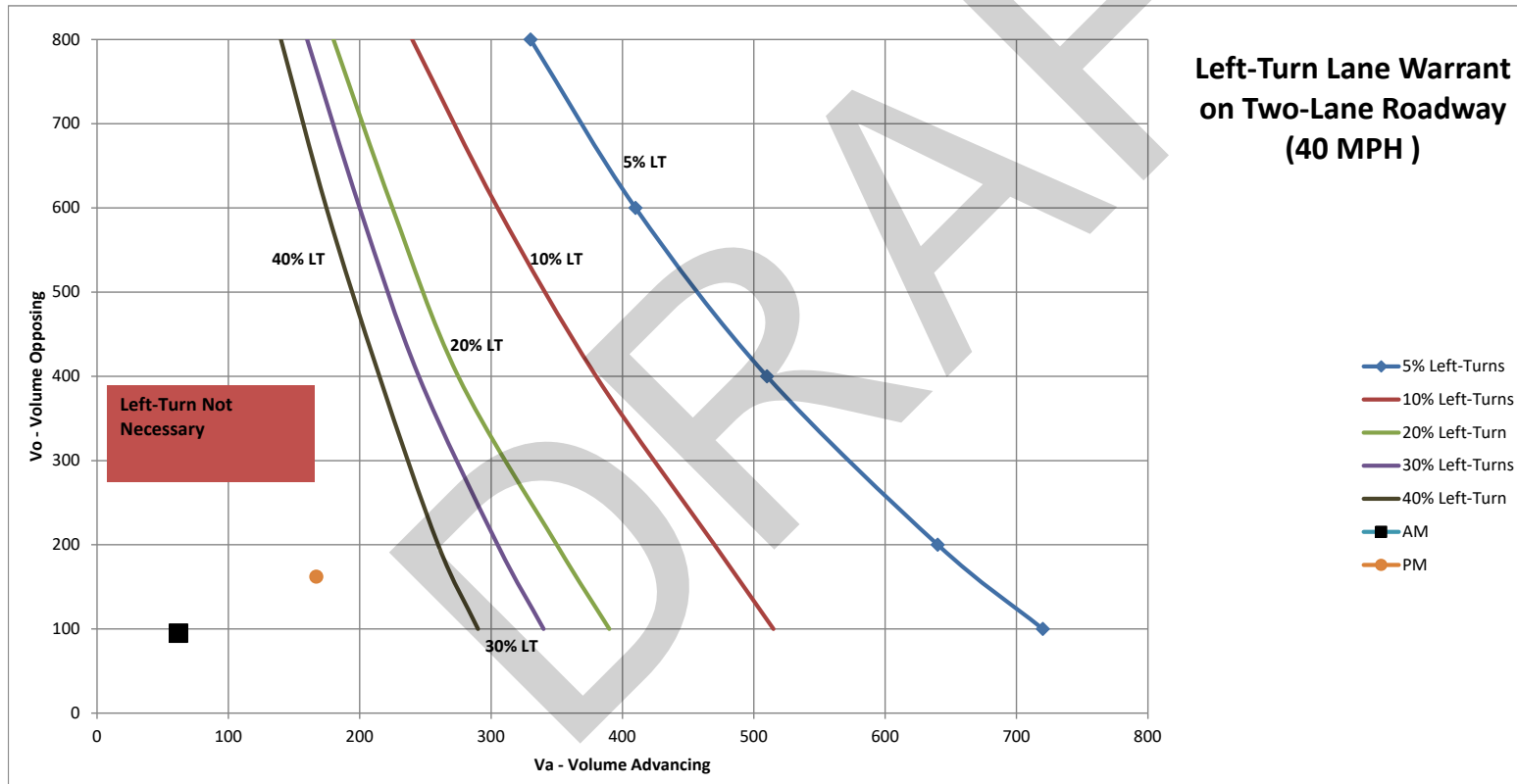
Time	Input		Met?
AM	RT Volume	1	NO
	Total Volume	40	
PM	RT Volume	3	NO
	Total Volume	39	



Rushville Road & East Access Drive - Existing + Proposed

Operating Speed (mph)	Opposing Volume (veh/h)	Advancing Volume (veh/h)							
		5% Left Turns	10% Left Turns	15% Left Turns	20% Left Turns	25% Left Turns	30% Left Turns	35% Left Turns	40% Left Turns
40	800	330	240	210	180	170	160	150	140
	600	410	305	265	225	213	200	187	175
	400	510	380	328	275	260	245	230	215
	200	640	470	410	350	328	305	282	260
	100	720	515	453	390	365	340	315	290

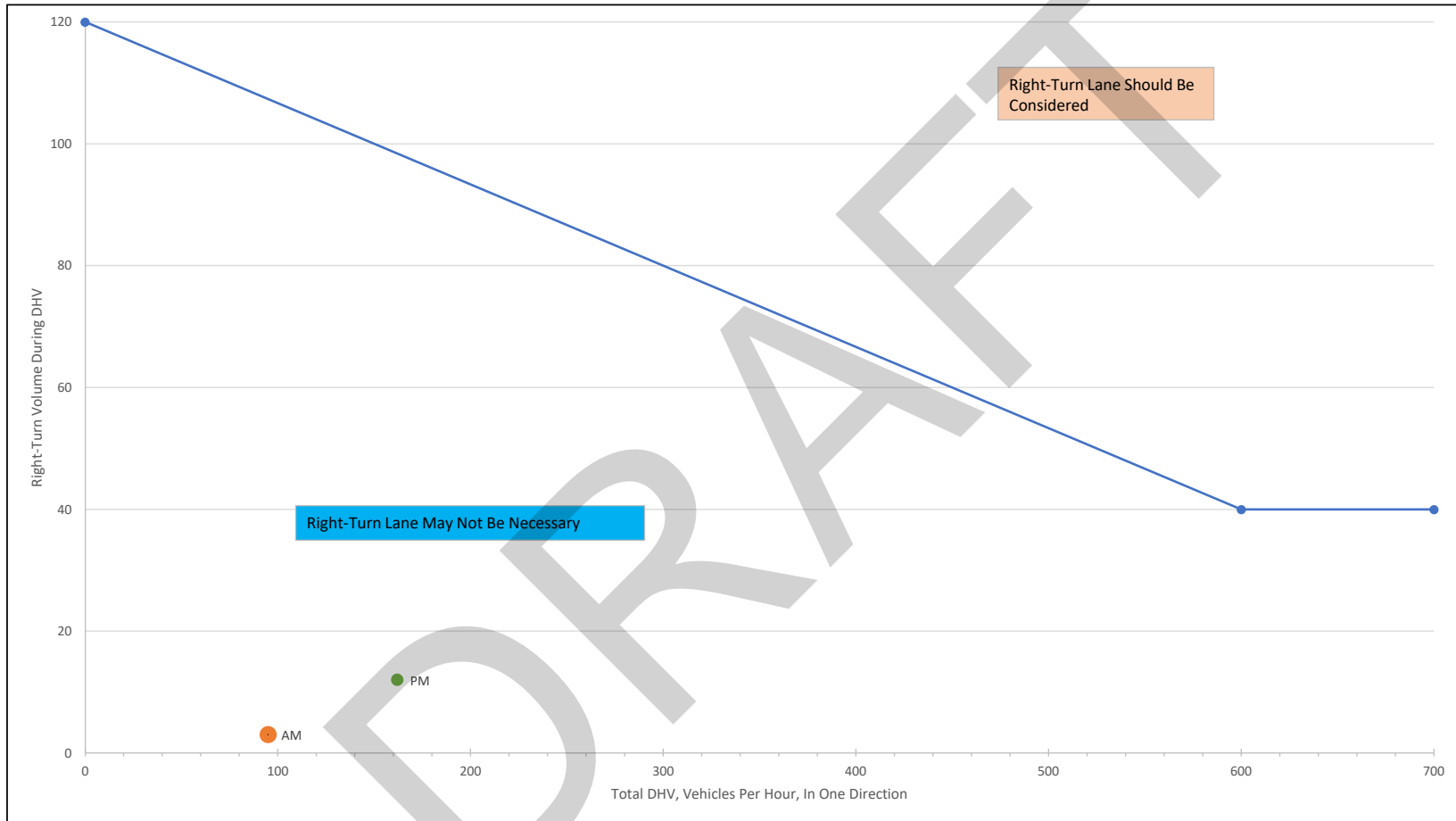
	INPUT		Warrant?
AM	Advancing Volume (Va)	62	NO
	Opposing Volume (Vo)	95	
	Left-turn Volume	5	
	Left-turn %	8%	
PM	Advancing Volume (Va)	167	NO
	Opposing Volume (Vo)	162	
	Left-turn Volume	15	
	Left-turn %	9%	



Rushville Road & West Access Drive - Existing + Proposed

Total Volume	RT Volume
0	120
600	40
700	40

Time	Input		Met?
AM	RT Volume	3	NO
	Total Volume	95	
PM	RT Volume	12	NO
	Total Volume	162	



***RUSHVILLE ROAD & LEE BOULEVARD/PROPOSED
EAST ACCESS DRIVE***

***TRAFFIC VOLUME COUNTS
CAPACITY ANALYSIS***

RUSHVILLE RD & LEE BLVD - TMC

Tue May 25, 2021

Full Length (4 PM-6:30 PM, 6:30 AM-8:30 AM)

All Classes (Lights and Motorcycles, Heavy)

All Movements

ID: 841852, Location: 39.534075, -85.750231



Provided by: A&F Engineering
8365 Keystone Crossing, Suite 201, Indianapolis, IN, 46240, US

Leg Direction	South Northbound				West Eastbound				East Westbound				
Time	L	R	U	App	T	R	U	App	L	T	U	App	Int
2021-05-25 4:00PM	26	2	0	28	9	25	0	34	12	5	0	17	79
4:15PM	37	7	0	44	9	24	0	33	3	6	0	9	86
4:30PM	38	5	0	43	10	29	0	39	7	3	0	10	92
4:45PM	34	7	0	41	9	22	0	31	2	5	0	7	79
Hourly Total	135	21	0	156	37	100	0	137	24	19	0	43	336
5:00PM	29	8	0	37	3	38	0	41	4	5	0	9	87
5:15PM	27	16	1	44	1	33	0	34	4	5	0	9	87
5:30PM	31	6	0	37	2	26	0	28	7	10	0	17	82
5:45PM	35	6	0	41	1	26	0	27	5	4	0	9	77
Hourly Total	122	36	1	159	7	123	0	130	20	24	0	44	333
6:00PM	24	6	0	30	4	22	0	26	1	2	0	3	59
6:15PM	29	4	0	33	6	25	0	31	8	1	0	9	73
6:30PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Hourly Total	53	10	0	63	10	47	0	57	9	3	0	12	132
2021-05-26 6:30AM	8	2	0	10	4	7	0	11	1	6	0	7	28
6:45AM	7	0	0	7	0	11	0	11	1	4	0	5	23
Hourly Total	15	2	0	17	4	18	0	22	2	10	0	12	51
7:00AM	11	0	0	11	0	12	0	12	4	2	0	6	29
7:15AM	22	3	0	25	2	16	0	18	3	7	0	10	53
7:30AM	14	5	0	19	2	11	0	13	1	7	0	8	40
7:45AM	11	1	0	12	1	14	0	15	3	6	0	9	36
Hourly Total	58	9	0	67	5	53	0	58	11	22	0	33	158
8:00AM	13	3	0	16	0	9	0	9	6	6	0	12	37
8:15AM	8	2	0	10	6	11	0	17	3	5	0	8	35
8:30AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Hourly Total	21	5	0	26	6	20	0	26	9	11	0	20	72
Total	404	83	1	488	69	361	0	430	75	89	0	164	1082
% Approach	82.8%	17.0%	0.2%	-	16.0%	84.0%	0%	-	45.7%	54.3%	0%	-	-
% Total	37.3%	7.7%	0.1%	45.1%	6.4%	33.4%	0%	39.7%	6.9%	8.2%	0%	15.2%	-
Lights and Motorcycles	403	80	1	484	69	360	0	429	73	86	0	159	1072
% Lights and Motorcycles	99.8%	96.4%	100%	99.2%	100%	99.7%	0%	99.8%	97.3%	96.6%	0%	97.0%	99.1%
Heavy	1	3	0	4	0	1	0	1	2	3	0	5	10
% Heavy	0.2%	3.6%	0%	0.8%	0%	0.3%	0%	0.2%	2.7%	3.4%	0%	3.0%	0.9%

* L: Left, R: Right, T: Thru, U: U-Turn

RUSHVILLE RD & LEE BLVD - TMC

Tue May 25, 2021

Full Length (4 PM-6:30 PM, 6:30 AM-8:30 AM)

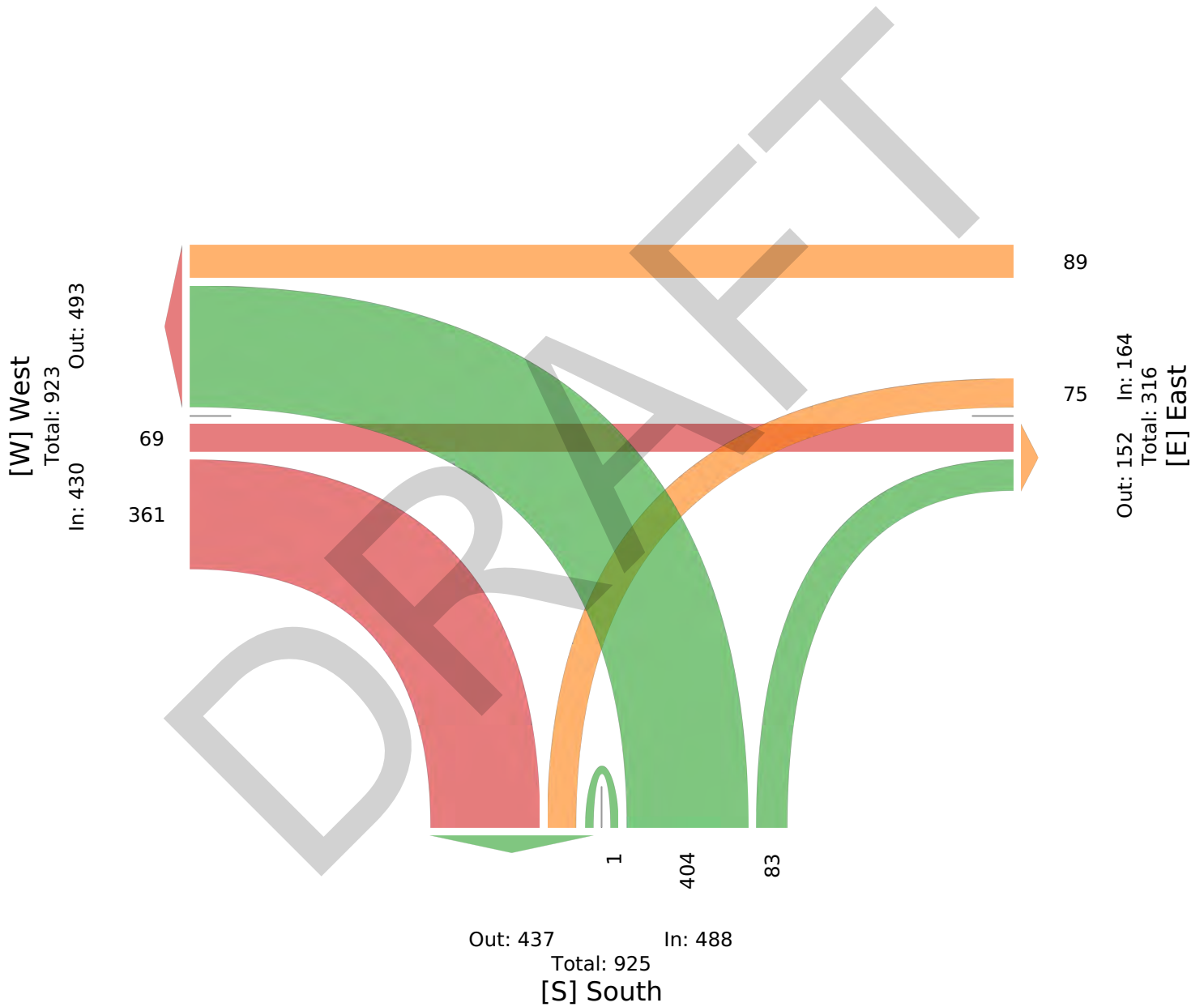
All Classes (Lights and Motorcycles, Heavy)

All Movements

ID: 841852, Location: 39.534075, -85.750231



Provided by: A&F Engineering
8365 Keystone Crossing, Suite 201, Indianapolis, IN, 46240, US



RUSHVILLE RD & LEE BLVD - TMC

Tue May 25, 2021

PM Peak (May 25 2021 4:30PM - 5:30 PM) - Overall Peak Hour

All Classes (Lights and Motorcycles, Heavy)

All Movements

ID: 841852, Location: 39.534075, -85.750231



Provided by: A&F Engineering

8365 Keystone Crossing, Suite 201, Indianapolis, IN, 46240, US

Leg Direction	South Northbound				West Eastbound				East Westbound				
Time	L	R	U	App	T	R	U	App	L	T	U	App	Int
2021-05-25 4:30PM	38	5	0	43	10	29	0	39	7	3	0	10	92
4:45PM	34	7	0	41	9	22	0	31	2	5	0	7	79
5:00PM	29	8	0	37	3	38	0	41	4	5	0	9	87
5:15PM	27	16	1	44	1	33	0	34	4	5	0	9	87
Total	128	36	1	165	23	122	0	145	17	18	0	35	345
% Approach	77.6%	21.8%	0.6%	-	15.9%	84.1%	0%	-	48.6%	51.4%	0%	-	-
% Total	37.1%	10.4%	0.3%	47.8%	6.7%	35.4%	0%	42.0%	4.9%	5.2%	0%	10.1%	-
PHF	0.842	0.563	0.250	0.938	0.575	0.803	-	0.884	0.607	0.900	-	0.875	0.938
Lights and Motorcycles	127	34	1	162	23	122	0	145	17	18	0	35	342
% Lights and Motorcycles	99.2%	94.4%	100%	98.2%	100%	100%	0%	100%	100%	100%	0%	100%	99.1%
Heavy	1	2	0	3	0	0	0	0	0	0	0	0	3
% Heavy	0.8%	5.6%	0%	1.8%	0%	0%	0%	0%	0%	0%	0%	0%	0.9%

* L: Left, R: Right, T: Thru, U: U-Turn

RUSHVILLE RD & LEE BLVD - TMC

Tue May 25, 2021

PM Peak (May 25 2021 4:30PM - 5:30 PM) - Overall Peak Hour

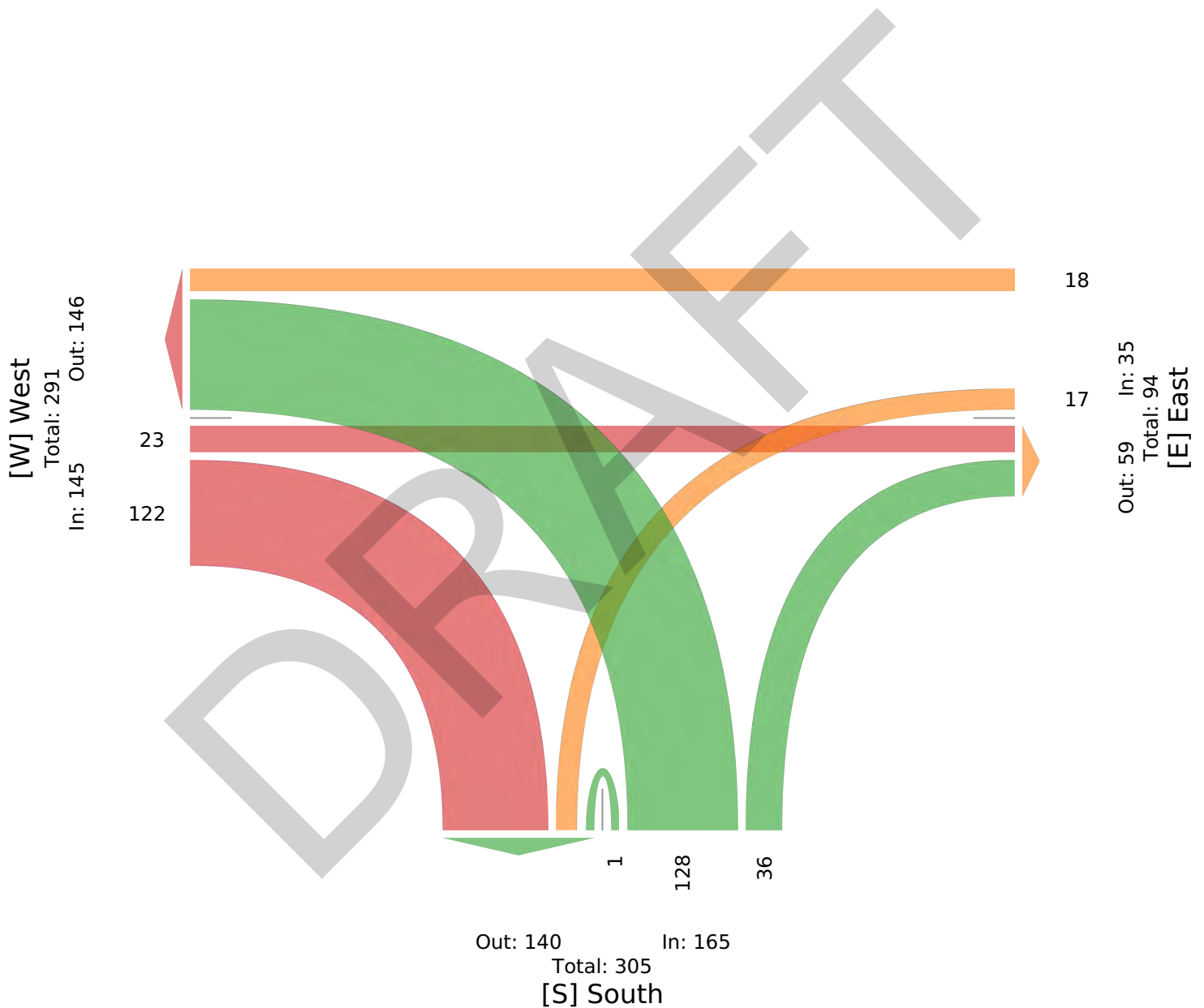
All Classes (Lights and Motorcycles, Heavy)

All Movements

ID: 841852, Location: 39.534075, -85.750231



Provided by: A&F Engineering
8365 Keystone Crossing, Suite 201, Indianapolis, IN, 46240, US



RUSHVILLE RD & LEE BLVD - TMC

Wed May 26, 2021

AM Peak (May 26 2021 7:15AM - 8:15 AM)

All Classes (Lights and Motorcycles, Heavy)

All Movements

ID: 841852, Location: 39.534075, -85.750231



Provided by: A&F Engineering

8365 Keystone Crossing, Suite 201, Indianapolis, IN, 46240, US

Leg Direction	South Northbound				West Eastbound				East Westbound				
Time	L	R	U	App	T	R	U	App	L	T	U	App	Int
2021-05-26 7:15AM	22	3	0	25	2	16	0	18	3	7	0	10	53
7:30AM	14	5	0	19	2	11	0	13	1	7	0	8	40
7:45AM	11	1	0	12	1	14	0	15	3	6	0	9	36
8:00AM	13	3	0	16	0	9	0	9	6	6	0	12	37
Total	60	12	0	72	5	50	0	55	13	26	0	39	166
% Approach	83.3%	16.7%	0%	-	9.1%	90.9%	0%	-	33.3%	66.7%	0%	-	-
% Total	36.1%	7.2%	0%	43.4%	3.0%	30.1%	0%	33.1%	7.8%	15.7%	0%	23.5%	-
PHF	0.682	0.600	-	0.720	0.625	0.781	-	0.764	0.542	0.929	-	0.813	0.783
Lights and Motorcycles	60	12	0	72	5	50	0	55	13	25	0	38	165
% Lights and Motorcycles	100%	100%	0%	100%	100%	100%	0%	100%	100%	96.2%	0%	97.4%	99.4%
Heavy	0	0	0	0	0	0	0	0	0	1	0	1	1
% Heavy	0%	0%	0%	0%	0%	0%	0%	0%	0%	3.8%	0%	2.6%	0.6%

* L: Left, R: Right, T: Thru, U: U-Turn

RUSHVILLE RD & LEE BLVD - TMC

Wed May 26, 2021

AM Peak (May 26 2021 7:15AM - 8:15 AM)

All Classes (Lights and Motorcycles, Heavy)

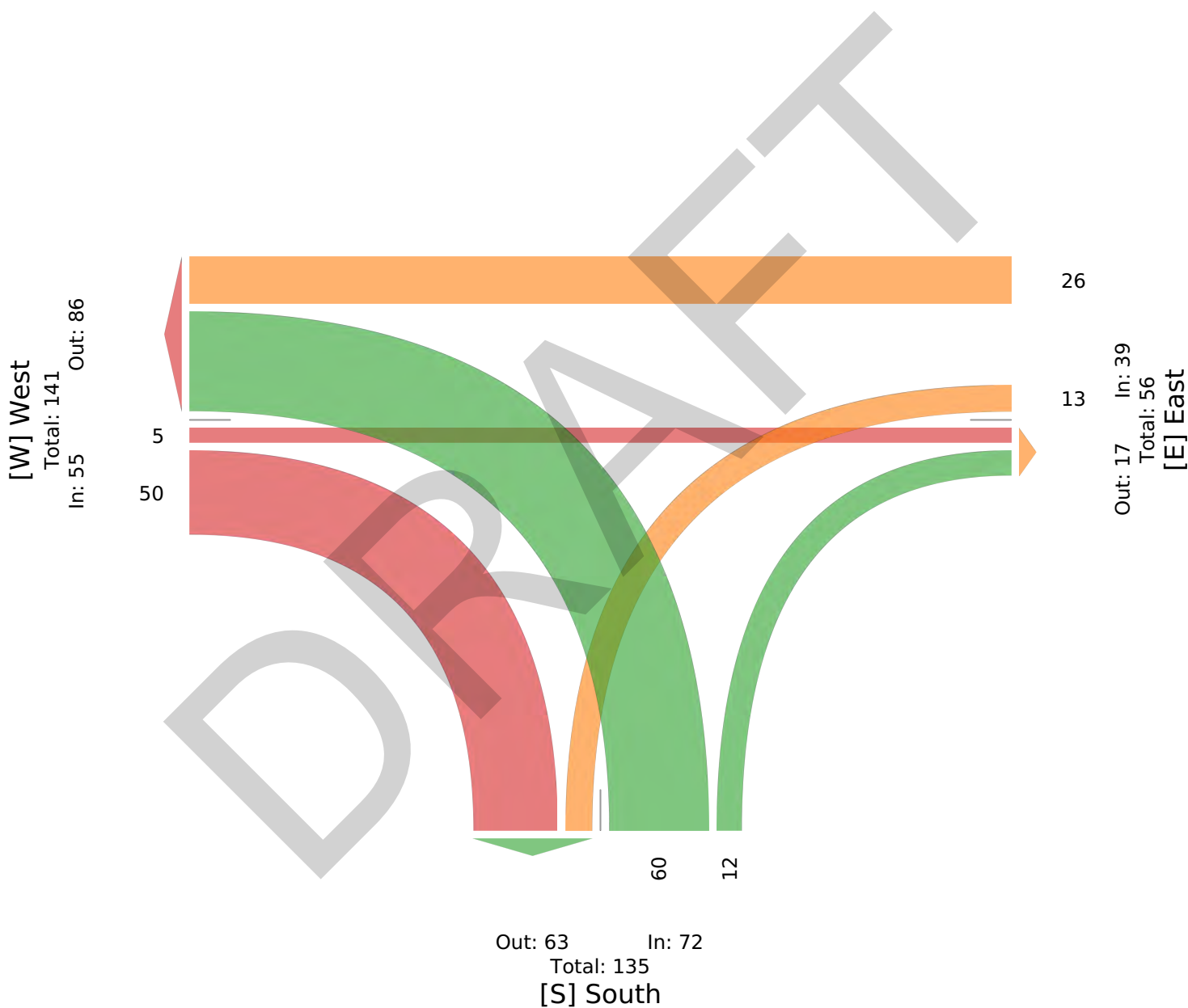
All Movements

ID: 841852, Location: 39.534075, -85.750231







Provided by: A&F Engineering

8365 Keystone Crossing, Suite 201, Indianapolis, IN, 46240, US



Intersection

Int Delay, s/veh 4.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	5	50	13	26	60	12
Future Vol, veh/h	5	50	13	26	60	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	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	0	0	0	4	0	0
Mvmt Flow	6	64	17	33	77	15

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	70
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	4.1	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	2.2	-
Pot Cap-1 Maneuver	-	1544	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	1544	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.5	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	888	1040	-	-	1544	-
HCM Lane V/C Ratio	0.087	0.015	-	-	0.011	-
HCM Control Delay (s)	9.4	8.5	-	-	7.4	0
HCM Lane LOS	A	A	-	-	A	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-

Intersection

Int Delay, s/veh 5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰			↱	↰	↱
Traffic Vol, veh/h	23	122	17	18	128	36
Future Vol, veh/h	23	122	17	18	128	36
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, %	0	0	0	0	1	6
Mvmt Flow	24	130	18	19	136	38

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	154
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.1
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.2
Pot Cap-1 Maneuver	-	-	1439
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1439
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.7	9.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	840	958	-	-	1439	-
HCM Lane V/C Ratio	0.162	0.04	-	-	0.013	-
HCM Control Delay (s)	10.1	8.9	-	-	7.5	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0	-

Intersection												
Int Delay, s/veh	5.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔			↔	
Traffic Vol, veh/h	2	6	59	13	26	1	63	11	12	3	32	6
Future Vol, veh/h	2	6	59	13	26	1	63	11	12	3	32	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	0	0	0	0	4	0	0	0	0	0	0	0
Mvmt Flow	3	8	76	17	33	1	81	14	15	4	41	8
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	34	0	0	84	0	0	144	120	46	135	158	34
Stage 1	-	-	-	-	-	-	52	52	-	68	68	-
Stage 2	-	-	-	-	-	-	92	68	-	67	90	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1591	-	-	1526	-	-	830	774	1029	841	738	1045
Stage 1	-	-	-	-	-	-	966	856	-	947	842	-
Stage 2	-	-	-	-	-	-	920	842	-	948	824	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1591	-	-	1526	-	-	781	764	1029	809	728	1045
Mov Cap-2 Maneuver	-	-	-	-	-	-	781	764	-	809	728	-
Stage 1	-	-	-	-	-	-	964	854	-	945	833	-
Stage 2	-	-	-	-	-	-	859	833	-	917	822	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			2.4			9.9			10		
HCM LOS							A			B		
Minor Lane/Major Mvmt	NBLn1 NBLn2		EBL	EBT	EBR	WBL	WBT	WBR	SBLn1			
Capacity (veh/h)	781	883	1591	-	-	1526	-	-	768			
HCM Lane V/C Ratio	0.103	0.033	0.002	-	-	0.011	-	-	0.068			
HCM Control Delay (s)	10.1	9.2	7.3	0	-	7.4	0	-	10			
HCM Lane LOS	B	A	A	A	-	A	A	-	B			
HCM 95th %tile Q(veh)	0.3	0.1	0	-	-	0	-	-	0.2			

Intersection

Int Delay, s/veh 6.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕			↕	
Traffic Vol, veh/h	7	23	129	17	19	3	139	36	36	2	21	4
Future Vol, veh/h	7	23	129	17	19	3	139	36	36	2	21	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0	1	0	6	0	0	0
Mvmt Flow	7	24	137	18	20	3	148	38	38	2	22	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	23	0	0	161	0	0	178	166	93	203	233	22
Stage 1	-	-	-	-	-	-	107	107	-	58	58	-
Stage 2	-	-	-	-	-	-	71	59	-	145	175	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.11	6.5	6.26	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.509	4	3.354	3.5	4	3.3
Pot Cap-1 Maneuver	1605	-	-	1430	-	-	786	730	953	759	671	1061
Stage 1	-	-	-	-	-	-	901	811	-	959	851	-
Stage 2	-	-	-	-	-	-	941	850	-	863	758	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1605	-	-	1430	-	-	752	717	953	689	659	1061
Mov Cap-2 Maneuver	-	-	-	-	-	-	752	717	-	689	659	-
Stage 1	-	-	-	-	-	-	896	807	-	954	840	-
Stage 2	-	-	-	-	-	-	900	839	-	785	754	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	3.3	10.6	10.4
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	752	818	1605	-	-	1430	-	-	701
HCM Lane V/C Ratio	0.197	0.094	0.005	-	-	0.013	-	-	0.041
HCM Control Delay (s)	11	9.9	7.3	0	-	7.5	0	-	10.4
HCM Lane LOS	B	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.7	0.3	0	-	-	0	-	-	0.1

***RUSHVILLE ROAD & PROPOSED WEST ACCESS
DRIVE***

CAPACITY ANALYSIS

HCM 6th TWSC

2: Rushville Road & Proposed West Access

Existing + Proposed AM

06/10/2021

Intersection

Int Delay, s/veh 1.4

Movement

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↰		↰	
Traffic Vol, veh/h	5	57	92	3	10	13
Future Vol, veh/h	5	57	92	3	10	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	62	100	3	11	14

Major/Minor

	Major1	Major2	Minor2
Conflicting Flow All	103	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.12	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.218	-	-
Pot Cap-1 Maneuver	1489	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1489	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach

	EB	WB	SB
HCM Control Delay, s	0.6	0	9.2
HCM LOS			A

Minor Lane/Major Mvmt

	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1489	-	-	-	887
HCM Lane V/C Ratio	0.004	-	-	-	0.028
HCM Control Delay (s)	7.4	0	-	-	9.2
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

HCM 6th TWSC

2: Rushville Road & Proposed West Access

Existing + Proposed PM

06/10/2021

Intersection

Int Delay, s/veh 0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↰		↰	
Traffic Vol, veh/h	15	152	150	12	7	9
Future Vol, veh/h	15	152	150	12	7	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	16	165	163	13	8	10

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	176	0	0 367 170
Stage 1	-	-	- 170 -
Stage 2	-	-	- 197 -
Critical Hdwy	4.1	-	- 6.4 6.2
Critical Hdwy Stg 1	-	-	- 5.4 -
Critical Hdwy Stg 2	-	-	- 5.4 -
Follow-up Hdwy	2.2	-	- 3.5 3.3
Pot Cap-1 Maneuver	1412	-	- 637 879
Stage 1	-	-	- 865 -
Stage 2	-	-	- 841 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1412	-	- 629 879
Mov Cap-2 Maneuver	-	-	- 629 -
Stage 1	-	-	- 855 -
Stage 2	-	-	- 841 -

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	9.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1412	-	-	-	749
HCM Lane V/C Ratio	0.012	-	-	-	0.023
HCM Control Delay (s)	7.6	0	-	-	9.9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1