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# ***TRAFFIC IMPACT STUDY***

## ***PROPOSED RESIDENTIAL DEVELOPMENT***

***US 40  
PLAINFIELD, INDIANA***

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***PREPARED FOR***

**LENNAR**

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***OCTOBER 2018***

*Plainfield*  
Planning & Zoning  
DP RZ PUD PP BZA ILP SP

OCT 31 2018

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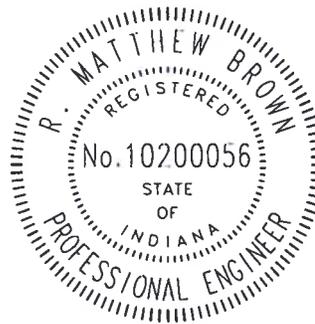
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**CERTIFICATION**

I certify that this **TRAFFIC IMPACT STUDY** 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.

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Traffic Engineer

## **INTRODUCTION**

This **TRAFFIC IMPACT STUDY**, prepared at the request of Plainfield on behalf of Lennar Group, is for a proposed residential development that will be located between US 40 and Hadley Road, west of Moon Road in Plainfield, 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, obtain turning movement traffic volume counts between the hours of 6:30 A.M. to 8:30 A.M. and 3:00 P.M. to 7:00 P.M. during a typical weekday at the following intersections:

- US 40 & CR 500 E
- US 40 & Moon Road
- US 40 & Center Street
- Hadley Road & Moon Road
- Hadley Road & Center Street
- Hadley Road & SR 267

Second, estimate year 2028 background traffic volumes by applying a 1.5% per year growth rate to the existing counts.

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

Fourth, assign and distribute the generated traffic volumes from the proposed development to the study intersections.

Fifth, prepare a capacity analysis and level of service analysis at the study intersections for each of the following scenarios:

*Scenario 1: Existing Traffic Volumes* – Based on existing peak hour traffic volumes and existing intersection conditions.

*Scenario 2: Proposed Development Traffic Volumes* – Based on the sum of existing peak hour traffic volumes and total generated traffic volumes from proposed development.

*Scenario 3: Year 2028 Background Traffic Volumes* – Based on applying a 1.5% per year annual growth rate to existing traffic volumes.

*Scenario 4: Year 2028 Proposed Development Traffic Volumes* – Based on the sum of year 2028 background traffic volumes and generated traffic volumes from proposed development.

Sixth, 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 IMPACT STUDY** report documenting all data, analyses, conclusions and recommendations to provide for the safe and efficient movement of traffic through the study area.

### *DESCRIPTION OF THE PROPOSED DEVELOPMENT*

The subject site is located between US 40 and Hadley Road, west of Moon Road in Plainfield, Indiana. The proposed development will consist of 280 single-family detached homes. As proposed, the site will be served by a right-in/right-out access drive along US 40 and a full access drive along Hadley Road. **Figure 1** is an area map showing the location and general layout of the proposed site.

### *STUDY AREA*

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

- US 40 & CR 500 E
- US 40 & Moon Road
- US 40 & Center Street
- Hadley Road & Moon Road
- Hadley Road & Center Street
- Hadley Road & SR 267
- US 40 & Proposed Access Drive
- Hadley Road & Proposed Access Drive

**Figures 2A** and **2B** shows the existing intersection geometrics at the existing study intersections.

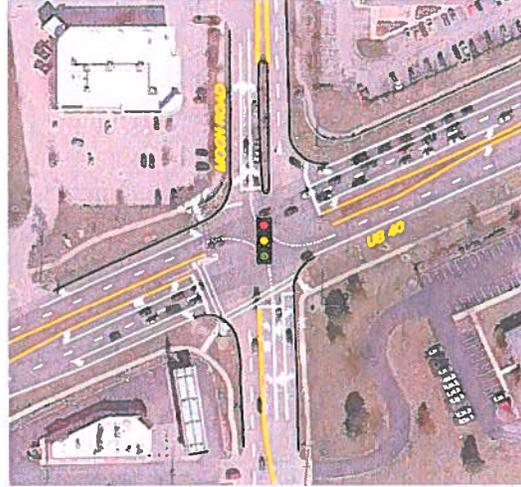


**FIGURE 1**  
**AREA MAP**

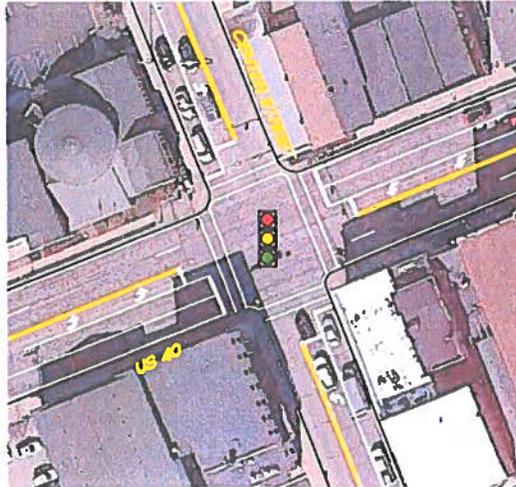
**TRAFFIC IMPACT STUDY**  
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**US 40 & CR 500 E**



**US 40 & MOON ROAD**



**US 40 & CENTER STREET**

**FIGURE 2A**

**EXISTING INTERSECTION  
GEOMETRICS - 1**

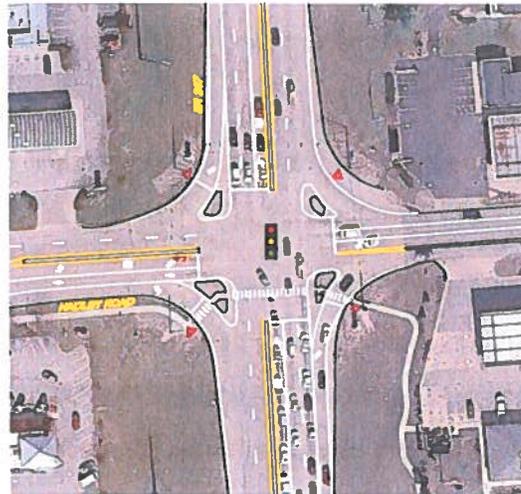
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***HADLEY ROAD & MOON ROAD***



***HADLEY ROAD & CENTER STREET***



***HADLEY ROAD & SR 267***

**FIGURE 2B**  
**EXISTING INTERSECTION**  
**GEOMETRICS - 2**

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**PLAINFIELD, IN**

## *DESCRIPTION OF ABUTTING STREET SYSTEM*

The proposed development will be primarily served by the public roadway system that included the following roadways:

US 40 – is an east/west, four-lane divided interstate with a posted speed limit of 45 mph in the study area. According to the Plainfield Comprehensive Plan, US 40 is classified as a Primary Arterial.

HADLEY ROAD – is an east/west, two-lane roadway with a posted speed limit of 40 mph in the study area. According to the Plainfield Comprehensive Plan, Hadley Road is classified as a Secondary Arterial.

CR 500 E – is a north/south, two-lane roadway in the study area. According to the Plainfield Comprehensive Plan, CR 500 E is classified as a Local Street.

MOON ROAD – is a north/south, two-lane roadway with a post speed limit of 50 mph in the study area. According to the Plainfield Comprehensive Plan, Moon Road is classified as a Secondary Arterial.

CENTER STREET – is a north/south, two-lane roadway with a post speed limit of 35 mph in the study area. According to the Plainfield Comprehensive Plan, Center Street is classified as a Secondary Arterial.

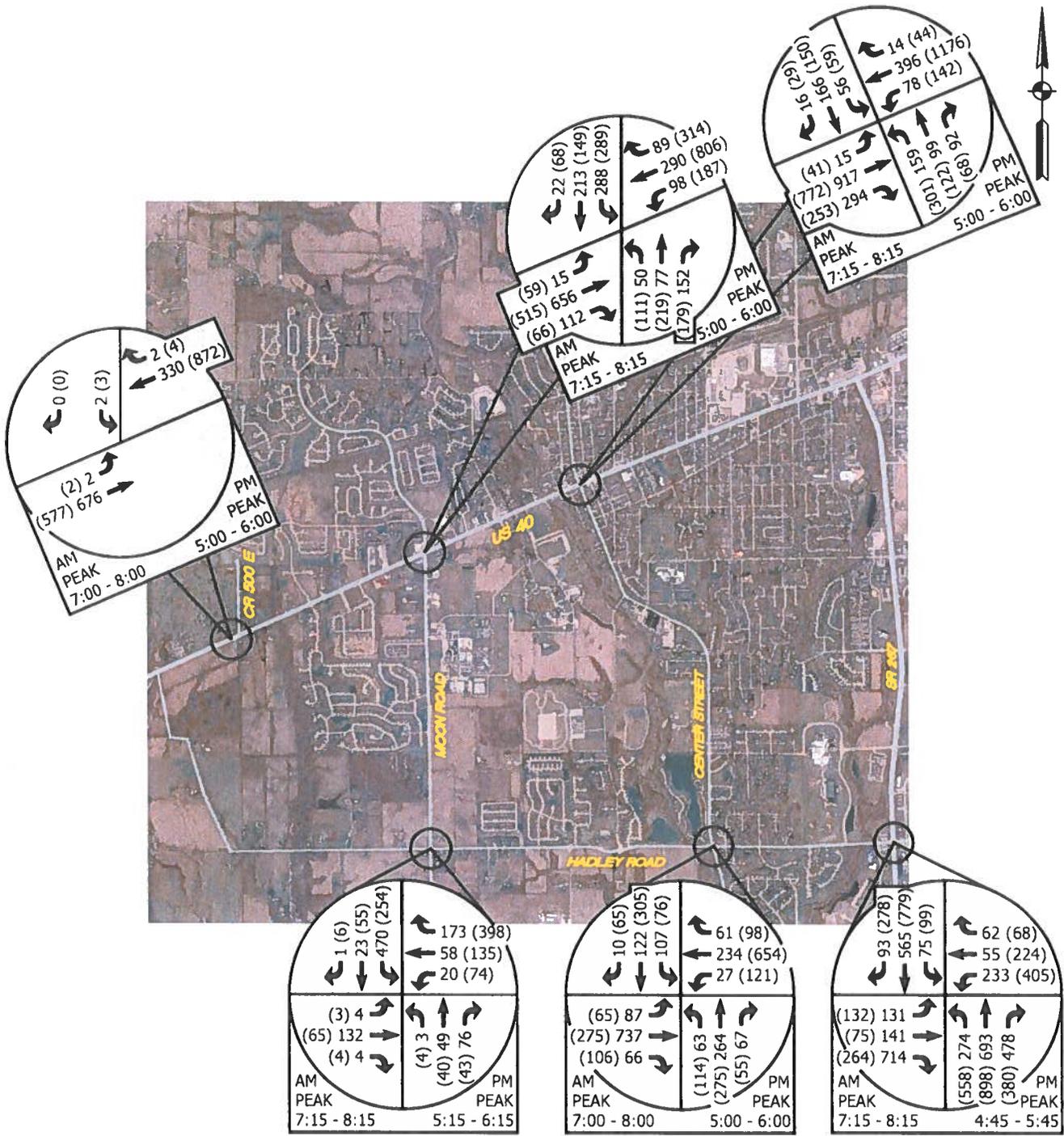
SR 267 – is a north/south, four-lane highway with a post speed limit of 55 mph in the study area. According to the Plainfield Comprehensive Plan, SR 267 is classified as a Divided Primary Arterial.

## *EXISTING TRAFFIC VOLUMES & PEAK HOURS*

Turning movement traffic volume counts were collected by A&F Engineering at the study intersections between the hours of 6:30 AM to 8:30 AM and 3:00 PM to 7:00 PM during a typical weekday in October 2018 under good weather conditions. According to the turning movement counts, the AM and PM peak hours vary slightly at each study intersection. Hence, the actual peak hours are used at each study intersection to create a “worse-case” scenario. The intersection count output summary sheets are included in the **Appendix** and the peak hour volumes are shown on **Figure 3**.

## *YEAR 2028 BACKGROUND TRAFFIC VOLUMES*

In order to account for annual growth in traffic that would occur due to future development outside of the study area, an annual growth rate is applied to the existing traffic volumes. A 1.5% per year non-compounded growth rate was used in this study. Therefore, a growth rate factor of 1.15 was applied to the existing traffic volumes to obtain year 2028 background traffic volumes. These traffic volumes are shown on **Figure 4**.



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

**FIGURE 3**  
**EXISTING TRAFFIC VOLUMES**

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

**FIGURE 4**  
**YEAR 2028 BACKGROUND**  
**TRAFFIC VOLUMES**

**TRAFFIC IMPACT STUDY**  
**LENNAR GROUP**  
**PLAINFIELD, IN**

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## GENERATED TRIPS 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*<sup>1</sup> was used to calculate the number of trips that will be generated by the site. 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 1** summarizes the total trips that will be generated by the site.

TABLE 1 – TOTAL GENERATED TRIPS FOR PROPOSED DEVELOPMENT

DEVELOPMENT INFORMATION			GENERATED TRIPS			
LAND USE	ITE CODE	SIZE	AM ENTER	AM EXIT	PM ENTER	PM EXIT
Single-Family Housing	210	280 DU	51	153	172	101

### 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 back 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 site 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 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 with the driveways. For the site, the trip distribution was based on the location of the development, the existing traffic patterns, and the assignment of generated traffic.

<sup>1</sup> *Trip Generation Manual*, Institute of Transportation Engineers, Tenth Edition, 2017.

Figure 5 illustrates the assignment and distribution of generated traffic volumes for the proposed development.

**GENERATED TRIPS ADDED TO THE STREET SYSTEM**

The total 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 6.

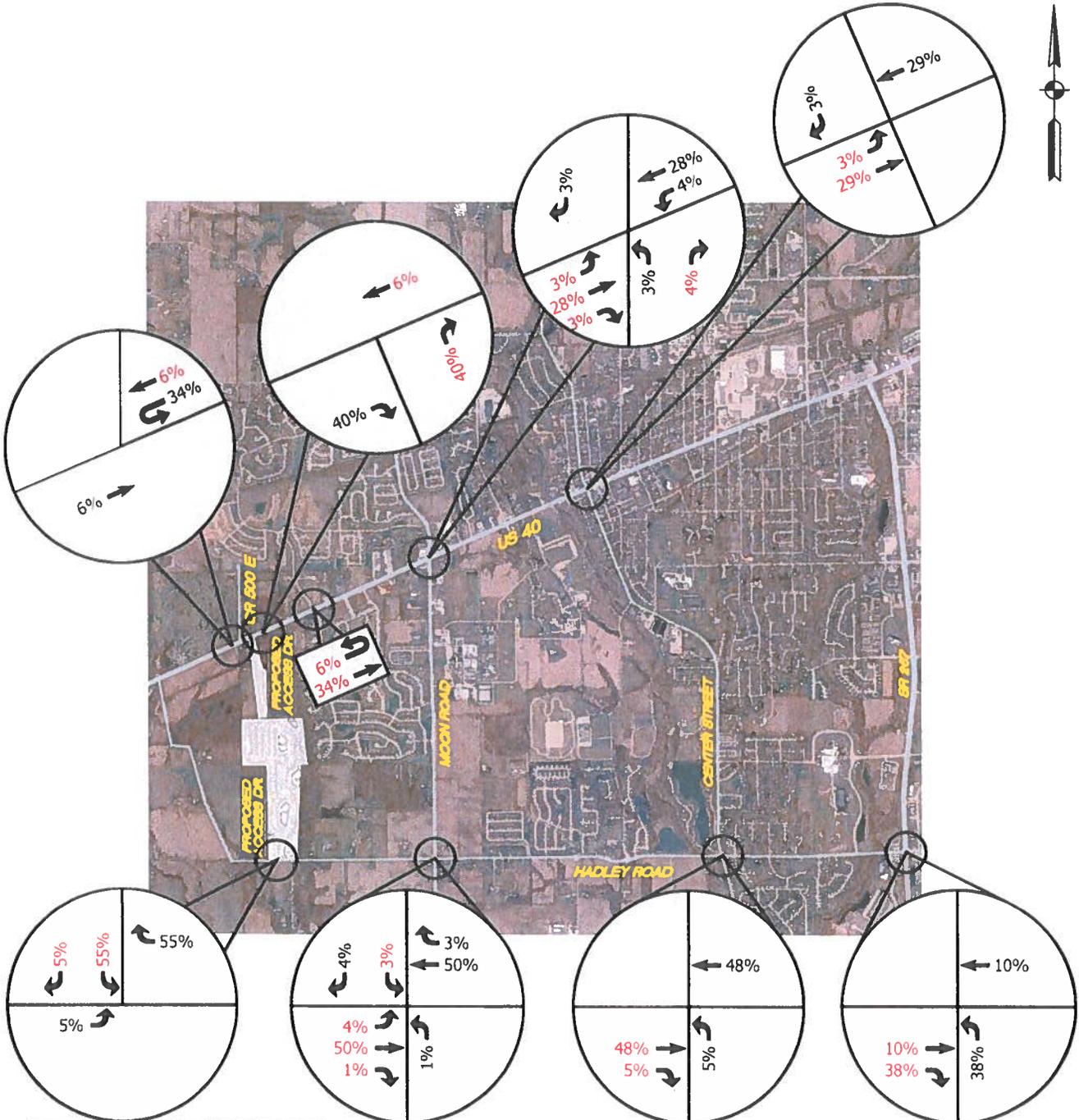
**TURN LANE ANALYSIS**

The generated peak hour traffic volumes were combined with the existing traffic volumes and year 2028 background traffic volumes to determine if exclusive turn lanes would be required along US 40 at the proposed access drive and CR 500 E and along Hadley Road at the proposed access drive. This analysis was done in accordance with Section 46-4.01 of the INDOT Design Manual<sup>2</sup>, the results are summarized in the following table.

US 40 & PROPOSED ACCESS DRIVE		
SCENARIO	RIGHT-TURN LANE	
Existing Traffic Volumes + Proposed Development Traffic Volumes	✓	
Year 2028 Background Traffic Volumes + Proposed Development Traffic Volumes	✓	
HADLEY ROAD & PROPOSED ACCESS DRIVE		
SCENARIO	RIGHT-TURN LANE	LEFT-TURN LANE
Existing Traffic Volumes + Proposed Development Traffic Volumes	✓	X
Year 2028 Background Traffic Volumes + Proposed Development Traffic Volumes	✓	X
US 40 & CR 500 E		
SCENARIO	LEFT-TURN LANE (U-TURN LANE)	
Existing Traffic Volumes + Proposed Development Traffic Volumes	✓	
Year 2028 Background Traffic Volumes + Proposed Development Traffic Volumes	✓	

The figures that depict the turn lane warrants are shown in the Appendix.

<sup>2</sup> Indiana Department of Transportation Design Manual, 2013

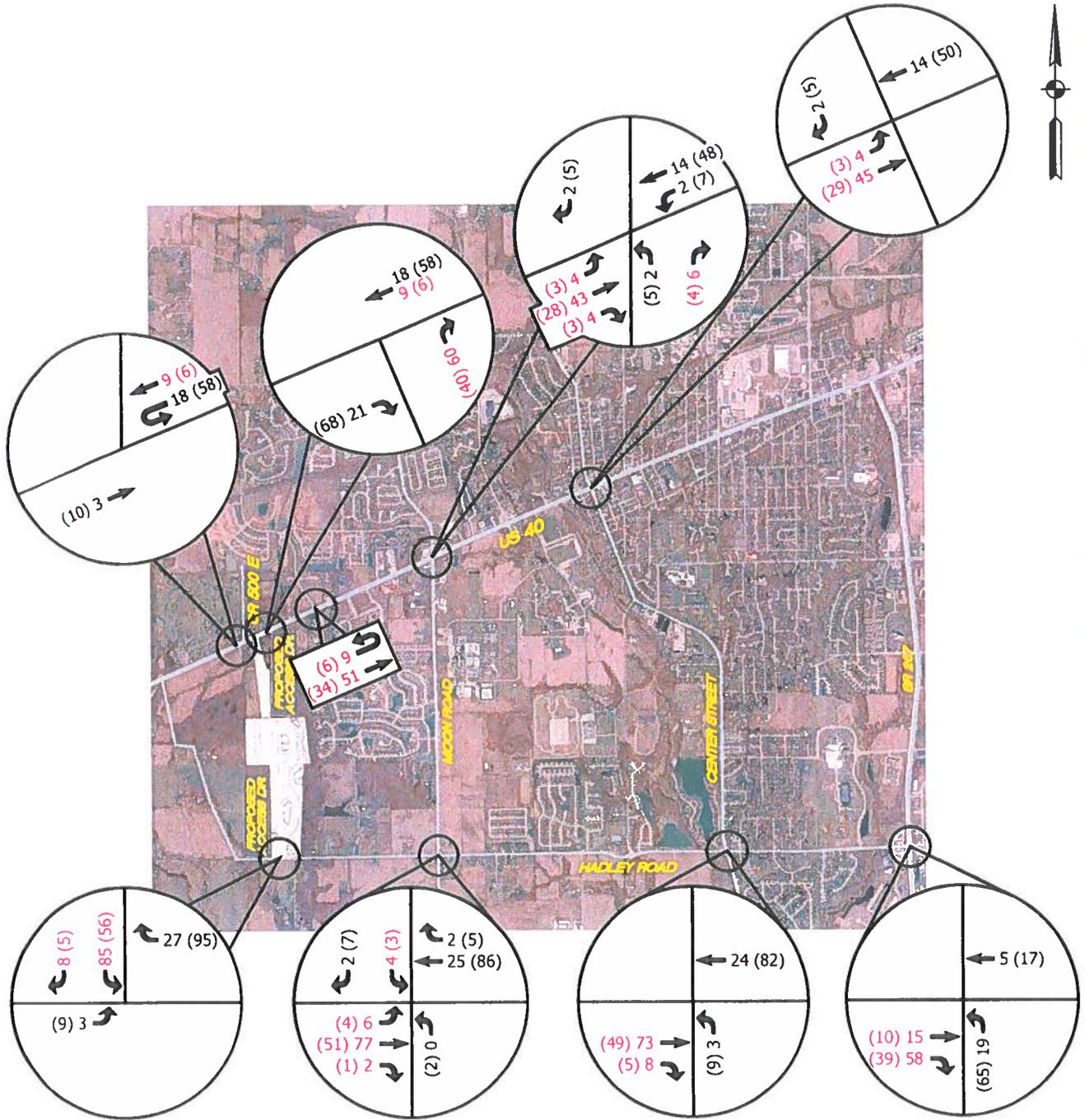


**LEGEND**  
 XX = A.M. INBOUND TRAFFIC  
 (XX) = P.M. INBOUND TRAFFIC  
 XX = A.M. OUTBOUND TRAFFIC  
 (XX) = P.M. OUTBOUND TRAFFIC  
 \* = NEGLIGIBLE

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 LENNAR GROUP  
 PLAINFIELD, IN**

**FIGURE 5  
 ASSIGNMENT & DISTRIBUTION  
 OF GENERATED TRAFFIC VOLUMES  
 FROM PROPOSED  
 DEVELOPMENT**

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**LEGEND**  
 XX = INBOUND TRAFFIC  
 XX = OUTBOUND TRAFFIC  
 \* = NEGLIGIBLE

**FIGURE 6**  
**GENERATED TRFFIC VOLUMES**  
**FROM PROPOSED**  
**DEVELOPMENT**

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### **TRAFFIC SIGNAL WARRANT**

A peak hour traffic signal warrant analysis has been conducted at the intersection of Hadley Road & Moon Road based on the existing traffic volumes scenario. The analysis was performed according to the procedures outlined in Section 4C.04 of the *IMUTCD*<sup>3</sup>. The proposed peak hour traffic volumes at the intersection of Hadley Road & Moon Road have been plotted and compared to the thresholds depicted in Figure 4C-4.

According to the figure shown in the **Appendix**, a traffic signal is warranted at the intersection of Hadley Road & Moon Road when the existing traffic volumes are considered. Therefore, it is assumed that the peak hour traffic signal warrant analysis for the remaining traffic volume scenarios at this intersection will be met as well.

### **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*<sup>4</sup>. This program allows intersections to be analyzed and optimized using the capacity calculation methods outlined within the *Highway Capacity Manual (HCM 6<sup>th</sup> Edition)*<sup>5</sup>. The following list shows the delays related to the levels of service for signalized, unsignalized, and roundabout intersections:

<u>Level of Service</u>	<u>Control Delay (seconds/vehicle)</u>	
	<u>UNSIGNALIZED/RAB</u>	<u>SIGNALIZED</u>
A	Less than or equal to 10	Less than or equal to 10
B	Between 10.1 and 15	Between 10.1 and 20
C	Between 15.1 and 25	Between 20.1 and 35
D	Between 25.1 and 35	Between 35.1 and 55
E	Between 35.1 and 50	Between 55.1 and 80
F	greater than 50	greater than 80

<sup>3</sup> *Indiana Manual on Uniform Traffic Control Devices for Streets and Highways (IMUTCD)*, Federal Highway Administration, 2011

<sup>4</sup> *Synchro/SimTraffic 10.2*, Trafficware, 2018.

<sup>5</sup> *Highway Capacity Manual (HCM), 6<sup>th</sup> Edition* Transportation Research Board, National Research Council, Washington, DC, 2016.

### CAPACITY ANALYSIS SCENARIOS

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 existing peak hour traffic volumes and existing intersection conditions. **Figure 3** is a summary of these traffic volumes.

*Scenario 2: Proposed Development Traffic Volumes* – Based on the sum of existing peak hour traffic volumes and generated traffic volumes from proposed development. **Figure 7** is a summary of these traffic volumes.

*Scenario 3: Year 2028 Background Traffic Volumes* – Based on applying a 1.5% per year annual growth rate to existing traffic volumes. **Figure 4** is a summary of these traffic volumes.

*Scenario 4: Year 2028 Proposed Development Traffic Volumes* – Based on the sum of year 2028 background traffic volumes and generated traffic volumes from proposed development. **Figure 8** is a summary of these traffic volumes.

The following table summarizes the level of service results at each study intersection. The *Synchro (HCM 6<sup>th</sup> Edition)* intersection reports illustrating the capacity analysis results are included in the **Appendix**.

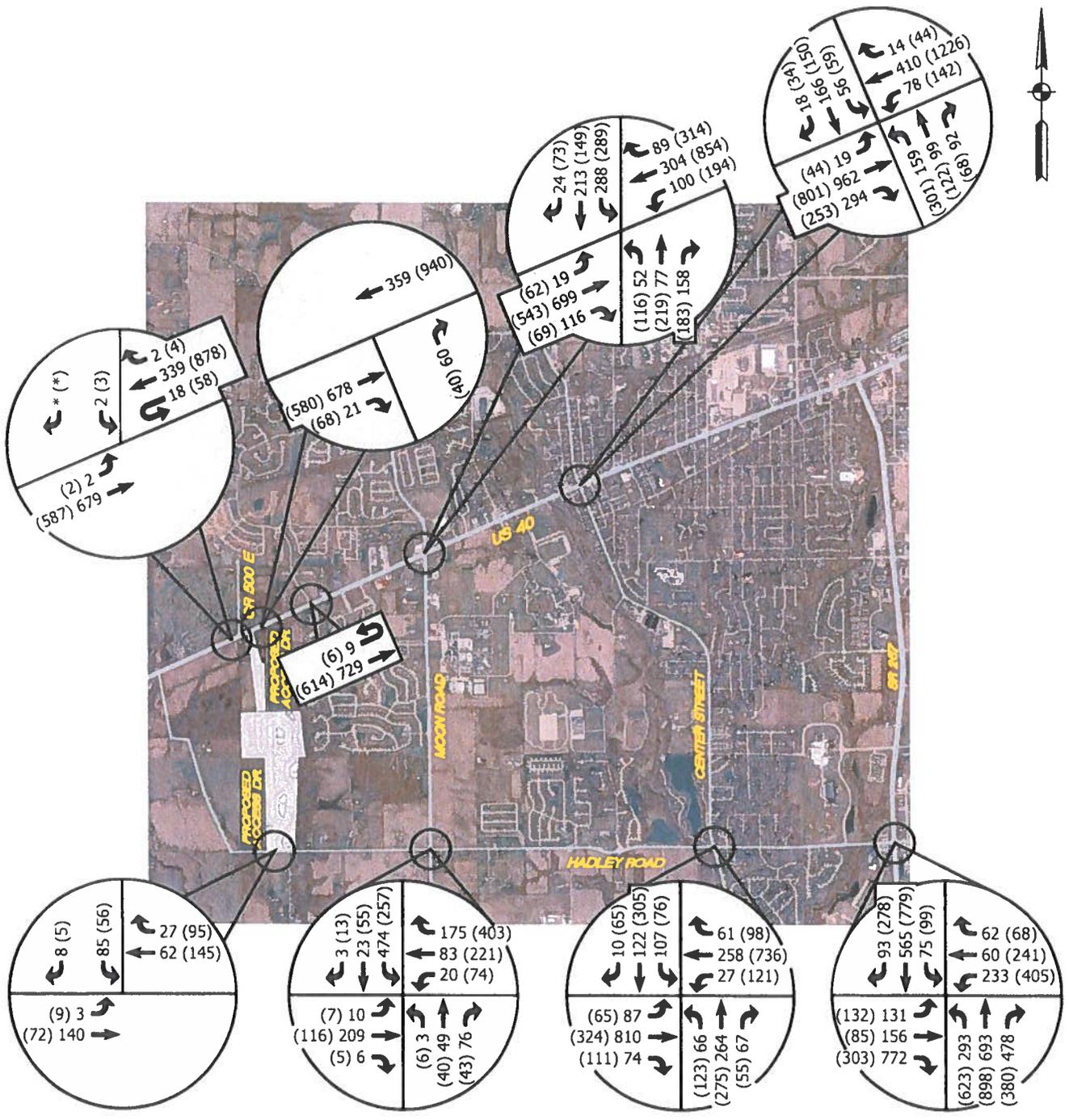
TABLE 2 – LEVEL OF SERVICE SUMMARY: US 40 & CR 500 E

APPROACH	AM PEAK				PM PEAK			
	Scenarios				Scenarios			
	1	2	3	4	1	2	3	4
Southbound Approach	B	C	C	C	C	C	C	C
Eastbound Left-Turn	A	A	A	A	A	A	B	B
Westbound Left-Turn	-	B	-	B	-	B	-	B

DESCRIPTION OF SCENARIOS:

- SCENARIO 1: Existing Traffic Volumes with Existing Intersection Conditions.
- SCENARIO 2: Sum of Existing Traffic Volumes and Generated Traffic Volumes from the Proposed Development with Proposed Intersection Conditions\*.
- SCENARIO 3: Year 2028 Background Traffic Volumes with Existing Intersection Conditions.
- SCENARIO 4: Sum of Year 2028 Background Traffic Volumes and Generated Traffic Volumes from the Proposed Development with Proposed Intersection Conditions\*.

\*The proposed intersection conditions include the addition of a westbound U-turn lane along US 40.

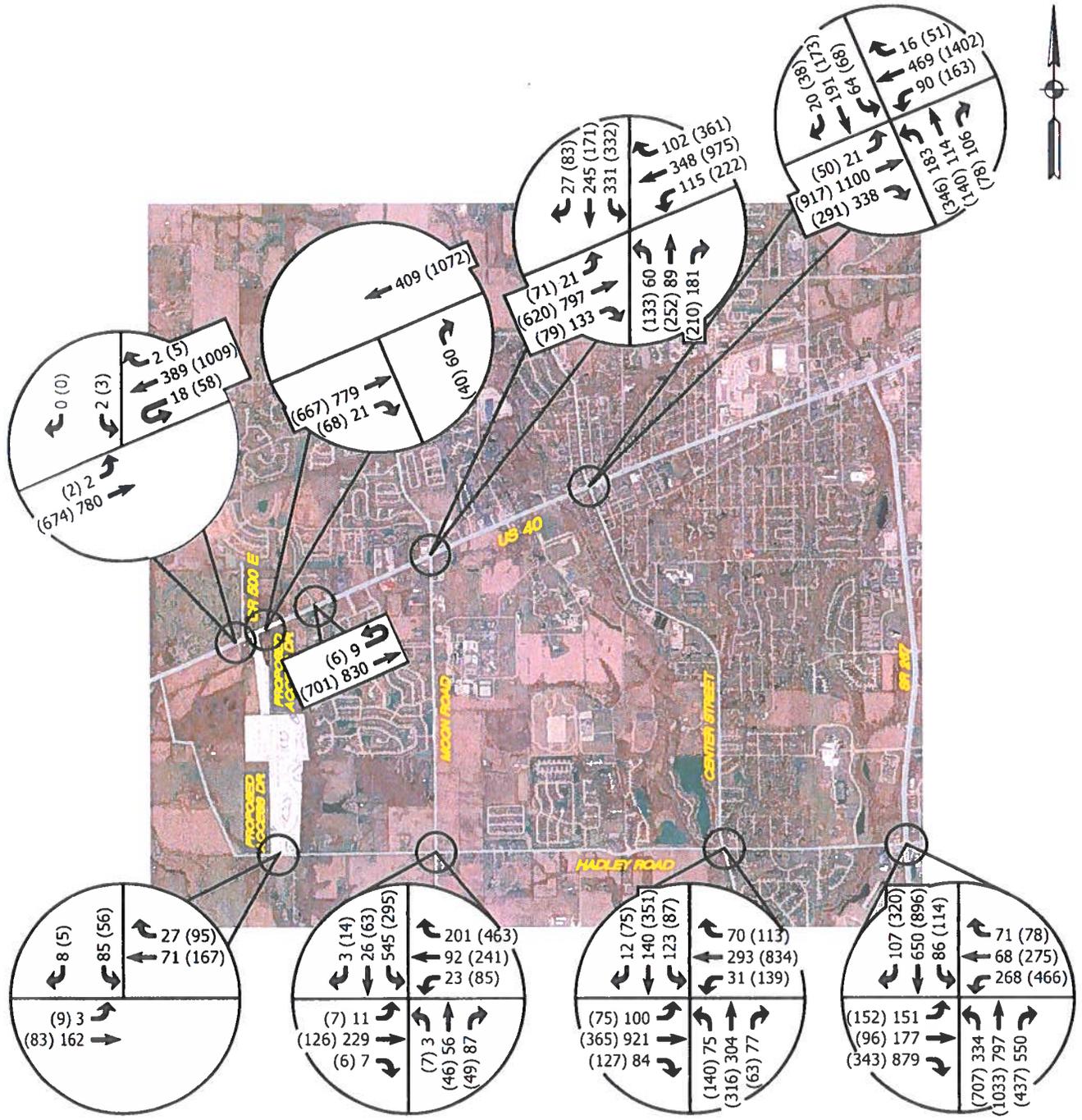


**LEGEND**  
 XX = A.M. PEAK HOUR  
 (XX) = P.M. PEAK HOUR  
 \* = NEGLIGIBLE

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**FIGURE 7**

**SUM OF EXISTING TRAFFIC  
 VOLUMES AND GENERATED  
 TRAFFIC VOLUMES FROM  
 PROPOSED DEVELOPMENT**



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

**TRAFFIC IMPACT STUDY  
 LENNAR GROUP  
 PLAINFIELD, IN**

**FIGURE 8**  
**SUM OF YEAR 2028 BACKGROUND  
 TRAFFIC VOLUMES AND GENERATED  
 TRAFFIC VOLUMES FROM  
 PROPOSED DEVELOPMENT**

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**TABLE 3 – LEVEL OF SERVICE SUMMARY: US 40 & MOON ROAD**

APPROACH	AM PEAK				PM PEAK			
	Scenarios				Scenarios			
	1	2	3	4	1	2	3	4
Northbound Approach	C	C	D	D	C	C	D	D
Southbound Approach	C	C	C	C	C	C	D	D
Eastbound Approach	C	C	C	C	C	C	C	D
Westbound Approach	C	C	C	C	C	C	C	C
<b>Intersection</b>	<b>C</b>	<b>C</b>	<b>C</b>	<b>C</b>	<b>C</b>	<b>C</b>	<b>D</b>	<b>D</b>

DESCRIPTION OF SCENARIOS:

- SCENARIO 1: Existing Traffic Volumes with Existing Intersection Conditions.
- SCENARIO 2: Sum of Existing Traffic Volumes and Generated Traffic Volumes from the Proposed Development with Existing Intersection Conditions.
- SCENARIO 3: Year 2028 Background Traffic Volumes with Existing Intersection Conditions.
- SCENARIO 4: Sum of Year 2028 Background Traffic Volumes and Generated Traffic Volumes from the Proposed Development with Existing Intersection Conditions.

**TABLE 4 – LEVEL OF SERVICE SUMMARY: US 40 & CENTER STREET**

APPROACH	AM PEAK				PM PEAK			
	Scenarios				Scenarios			
	1	2	3	4	1	2	3	4
Northbound Approach	C	C	D	D	C	C	D	D
Southbound Approach	C	C	D	D	C	D	D	D
Eastbound Approach	C	C	C	C	C	C	C	C
Westbound Approach	B	B	B	B	C	C	C	D
<b>Intersection</b>	<b>C</b>	<b>C</b>	<b>C</b>	<b>C</b>	<b>C</b>	<b>C</b>	<b>C</b>	<b>D</b>

DESCRIPTION OF SCENARIOS:

- SCENARIO 1: Existing Traffic Volumes with Existing Intersection Conditions.
- SCENARIO 2: Sum of Existing Traffic Volumes and Generated Traffic Volumes from the Proposed Development with Existing Intersection Conditions.
- SCENARIO 3: Year 2028 Background Traffic Volumes with Existing Intersection Conditions.
- SCENARIO 4: Sum of Year 2028 Background Traffic Volumes and Generated Traffic Volumes from the Proposed Development with Existing Intersection Conditions.

TABLE 5 – LEVEL OF SERVICE SUMMARY: HADLEY ROAD & MOON ROAD

APPROACH	AM PEAK											
	Scenarios											
	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	4C
Northbound Approach	B	C	A	B	C	A	B	C	A	B	D	B
Southbound Approach	D	C	A	E	C	A	F	C	A	F	D	A
Eastbound Approach	B	C	A	C	C	A	B	C	A	C	C	B
Westbound Approach	B	C	A	C	C	A	C	C	A	C	D	A
<b>Intersection</b>	<b>C</b>	<b>C</b>	<b>A</b>	<b>D</b>	<b>C</b>	<b>A</b>	<b>E</b>	<b>C</b>	<b>A</b>	<b>F</b>	<b>D</b>	<b>A</b>
APPROACH	PM PEAK											
	Scenarios											
	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	4C
Northbound Approach	B	C	A	B	C	A	B	C	A	B	D	A
Southbound Approach	C	C	A	C	C	A	C	C	A	D	D	A
Eastbound Approach	B	B	A	B	B	A	B	B	A	B	B	A
Westbound Approach	D	C	A	F	C	A	F	C	A	F	D	B
<b>Intersection</b>	<b>C</b>	<b>C</b>	<b>A</b>	<b>F</b>	<b>C</b>	<b>A</b>	<b>F</b>	<b>C</b>	<b>A</b>	<b>F</b>	<b>D</b>	<b>A</b>

DESCRIPTION OF SCENARIOS:

- SCENARIO 1A: Existing Traffic Volumes with Existing Intersection Conditions.
- SCENARIO 1B: Existing Traffic Volumes with Proposed Intersection Conditions\*.
- SCENARIO 1C: Existing Traffic Volumes with Proposed Intersection Conditions\*\*.
- SCENARIO 2A: Sum of Existing Traffic Volumes and Generated Traffic Volumes from the Proposed Development with Existing Intersection Conditions.
- SCENARIO 2B: Sum of Existing Traffic Volumes and Generated Traffic Volumes from the Proposed Development with Proposed Intersection Conditions\*.
- SCENARIO 2C: Sum of Existing Traffic Volumes and Generated Traffic Volumes from the Proposed Development with Proposed Intersection Conditions\*\*.
- SCENARIO 3A: Year 2028 Background Traffic Volumes with Existing Intersection Conditions.
- SCENARIO 3B: Year 2028 Background Traffic Volumes with Proposed Intersection Conditions\*.
- SCENARIO 3C: Year 2028 Background Traffic Volumes with Proposed Intersection Conditions\*\*.
- SCENARIO 4A: Sum of Year 2028 Background Traffic Volumes and Generated Traffic Volumes from the Proposed Development with Existing Intersection Conditions.
- SCENARIO 4B: Sum of Year 2028 Background Traffic Volumes and Generated Traffic Volumes from the Proposed Development with Proposed Intersection Conditions\*.
- SCENARIO 4C: Sum of Year 2028 Background Traffic Volumes and Generated Traffic Volumes from the Proposed Development with Proposed Intersection Conditions\*\*.

\*The proposed intersection conditions include the installation of a traffic signal and the addition of exclusive left-turn lanes along each approach at the intersection.

\*\*The proposed intersection conditions include the construction of a single-lane roundabout.

TABLE 6 – LEVEL OF SERVICE SUMMARY: HADLEY ROAD & CENTER STREET

APPROACH	AM PEAK					PM PEAK				
	Scenarios					Scenarios				
	1	2	3	4A	4B	1	2	3	4A	4B
Northbound Approach	D	D	F	F	F	A	B	B	B	B
Southbound Approach	A	A	A	A	A	C	D	F	F	F
Eastbound Approach	A	A	B	B	B	A	A	A	A	A
Westbound Approach	A	A	A	A	A	C	D	F	F	C
<b>Intersection</b>	<b>B</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>D</b>	<b>C</b>	<b>C</b>	<b>D</b>	<b>F</b>	<b>D</b>

DESCRIPTION OF SCENARIOS:

- SCENARIO 1: Existing Traffic Volumes with Existing Intersection Conditions.
- SCENARIO 2: Sum of Existing Traffic Volumes and Generated Traffic Volumes from the Proposed Development with Existing Intersection Conditions.
- SCENARIO 3: Year 2028 Background Traffic Volumes with Existing Intersection Conditions.
- SCENARIO 4A: Sum of Year 2028 Background Traffic Volumes and Generated Traffic Volumes from the Proposed Development with Existing Intersection Conditions.
- SCENARIO 4B: Sum of Year 2028 Background Traffic Volumes and Generated Traffic Volumes from the Proposed Development with Proposed Intersection Conditions.

\*The proposed intersection conditions include the restriping of the existing westbound left-turn lane to a shared through and left-turn lane.

TABLE 7 – LEVEL OF SERVICE SUMMARY: HADLEY ROAD & SR 267

APPROACH	AM PEAK						
	Scenarios						
	1	2A	2B	3A	3B	4A	4B
Northbound Approach	C	C	C	C	C	C	C
Southbound Approach	C	C	C	C	C	C	C
Eastbound Approach	C	C	C	C	C	C	C
Westbound Approach	C	C	C	C	C	C	C
<b>Intersection</b>	<b>C</b>	<b>C</b>	<b>C</b>	<b>C</b>	<b>C</b>	<b>C</b>	<b>C</b>
APPROACH	PM PEAK						
	Scenarios						
	1	2A	2B	3A	3B	4A	4B
Northbound Approach	E	E	C	E	D	F	D
Southbound Approach	D	E	C	F	D	F	D
Eastbound Approach	E	F	D	F	D	F	D
Westbound Approach	D	E	D	E	D	F	D
<b>Intersection</b>	<b>D</b>	<b>E</b>	<b>D</b>	<b>E</b>	<b>D</b>	<b>F</b>	<b>D</b>

DESCRIPTION OF SCENARIOS:

- SCENARIO 1: Existing Traffic Volumes with Existing Intersection Conditions.
- SCENARIO 2A: Sum of Existing Traffic Volumes and Generated Traffic Volumes from the Proposed Development with Existing Intersection Conditions.
- SCENARIO 2B: Sum of Existing Traffic Volumes and Generated Traffic Volumes from the Proposed Development with Proposed Intersection Conditions\*.
- SCENARIO 3A: Year 2028 Background Traffic Volumes with Existing Intersection Conditions.
- SCENARIO 3B: Year 2028 Background Traffic Volumes with Proposed Intersection Conditions\*.
- SCENARIO 4A: Sum of Year 2028 Background Traffic Volumes and Generated Traffic Volumes from the Proposed Development with Existing Intersection Conditions.
- SCENARIO 4B: Sum of Year 2028 Background Traffic Volumes and Generated Traffic Volumes from the Proposed Development with Proposed Intersection Conditions\*.

\*The proposed intersection conditions include construction of an additional northbound left-turn lane along SR 267.

TABLE 8 – LEVEL OF SERVICE SUMMARY: US 40 & PROPOSED ACCESS DRIVE

APPROACH	AM PEAK		PM PEAK	
	Scenario 2	Scenario 4	Scenario 2	Scenario 4
Northbound Approach	B	B	B	B

DESCRIPTION OF SCENARIOS:

SCENARIO 2: Sum of Existing Traffic Volumes and Generated Traffic Volumes from the Proposed Development with Proposed Intersection Conditions\*.

SCENARIO 4: Sum of Year 2028 Background Traffic Volumes and Generated Traffic Volumes from the Proposed Development with Proposed Intersection Conditions\*.

\*The proposed intersection conditions include construction of a right-in/right-out northbound access drive with one inbound lane and one outbound lane; and the addition of an eastbound right-turn lane along US 40.

TABLE 9 – LEVEL OF SERVICE SUMMARY: HADLEY ROAD & PROPOSED ACCESS DRIVE

APPROACH	AM PEAK		PM PEAK	
	Scenario 2	Scenario 4	Scenario 2	Scenario 4
Southbound Approach	B	B	B	B
Eastbound Left-Turn	A	A	A	A

DESCRIPTION OF SCENARIOS:

SCENARIO 2: Sum of Existing Traffic Volumes and Generated Traffic Volumes from the Proposed Development with Proposed Intersection Conditions\*.

SCENARIO 4: Sum of Year 2028 Background Traffic Volumes and Generated Traffic Volumes from the Proposed Development with Proposed Intersection Conditions\*.

\*The proposed intersection conditions include construction of a full southbound access drive with one inbound lane and two outbound lanes; and the addition of a westbound right-turn lane along Hadley Road.

**CONCLUSIONS & RECOMMENDATIONS**

The conclusions that follow are based on existing traffic volume data, trip generation, assignment and distribution of generated traffic, capacity analyses/level of service results, turn lane analysis and a field review conducted at the site. Based on the analysis and the resulting conclusions of this study, the following recommendations are formulated to ensure that the roadway system will accommodate the increased traffic volumes from the site.

US 40 & CR 500 E

When the proposed development is constructed, the proposed access drive will be east of this intersection. Therefore, an exclusive westbound U-turn lane should be constructed along US 40 at this intersection to serve westbound vehicles wishing to enter the site.

#### US 40 & MOON ROAD

A capacity analysis has shown that this intersection operates and will continue to operate at acceptable levels of service during both AM and PM peak hours. Therefore, no improvements are recommended at this location.

#### US 40 & CENTER STREET

A capacity analysis has shown that this intersection operates and will continue to operate at acceptable levels of service during both AM and PM peak hours. Therefore, no improvements are recommended at this location.

#### HADLEY ROAD & MOON ROAD

A peak hour traffic signal warrant analysis has shown that the warrant criteria is met under the existing traffic volume scenario. Therefore, it is likely that a traffic signal or a roundabout will be needed in the future at this intersection. For the purpose of this study, this intersection was analyzed with traffic signal control and roundabout control. A capacity analysis has shown that this intersection will operate at acceptable levels of service during the peak hours with either option.

#### HADLEY ROAD & CENTER STREET

The analysis of future traffic volume scenarios shows that delays can be reduced at this intersection by restriping the existing westbound left-turn lane to a shared through/left-turn lane.

#### HADLEY ROAD & SR 267

Capacity analysis results show that this intersection will operate at level of service E during the PM peak hour when the proposed development traffic is added to the roadway network. In addition, a review of the existing northbound left-turn volume shows traffic levels that typically warrant dual left-turn lanes. Thus, the addition of a second left-turn lane should be considered at this location to reduce current and future delays.

### US 40 & PROPOSED ACCESS DRIVE

Due to the proposed access drive proximity to County Road 500 East, INDOT requested that the driveway be constructed as a right-in/right-out drive. Under this alternative the following should be constructed:

- Construction of the northbound approach with one inbound lane and one outbound lane.
- Addition of an eastbound right-turn lane along US 40 at the proposed access drive.
- Addition of a westbound U-turn lane along US 40 at CR 500 East.

A review of the CR 500 East traffic volumes shows that few vehicles use this roadway due to the fact it dead ends approximately 2100 feet north of US 40 and serves roughly 10 homes. Thus, it might be beneficial from a traffic flow standpoint to construct the proposed access drive as a full movement intersection with two outbound lanes, one inbound lane, a westbound left-turn lane along US 40 and an eastbound right-turn lane along US 40. This option would eliminate the need for U-turns while providing the needed turn lanes for entry from US 40 into the site.

### HADLEY ROAD & PROPOSED ACCESS DRIVE

The following proposed intersection conditions are recommended at this intersection:

- Construction of the southbound approach with at least one inbound lane and two outbound lanes.
- Addition of a westbound right-turn lane along Hadley Road at the proposed access drive.
- Stop Controlled intersection with the driveway stopping for Hadley Road.