

# Minneola Development

City of Minneola, Florida

## TRAFFIC IMPACT STUDY

**Prepared for:**

Skorman Development Corp.  
6000 Metrowest Boulevard, Suite 111  
Orlando, FL 32835

**Prepared by:**

TRIDENT Engineering LLC.  
33 E. Robinson Street,  
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Orlando, FL 32801

**August 29, 2016**

## EXECUTIVE SUMMARY

This traffic analysis is being conducted to assess the impact of the proposed Minneola Development residential project. The proposed project comprises 297 apartments units and is located on the northeast quadrant of the Hancock Road and Fosgate Road intersection in the City of Minneola, Lake County, Florida. The analysis included a determination of project trip generation, a review of existing and projected roadway and intersection capacity and a review of access operations.

The results of the traffic analysis are summarized as follows:

- The proposed development will generate a total of 1,925 daily trips of which 149 and 181 will occur during the AM and PM peak hour, respectively.
- Access to the development will be provided to Hancock Road via Gatewood Avenue.
- An analysis of the study intersections indicates that the study intersections currently operate adequately within their adopted Level of Service standard and are projected to continue to do so upon buildout of the proposed development.
- An analysis of the study roadway segments indicate that the study roadway segments currently operate adequately within their adopted Level of Service standard and are projected to continue to do so upon buildout of the proposed development.

**Based on the analyses conducted, approval of the proposed project is requested from a transportation perspective since the project does not adversely impact any of the study roadway segments or intersections.**

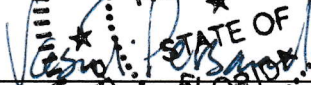
## PROFESSIONAL ENGINEERING CERTIFICATION

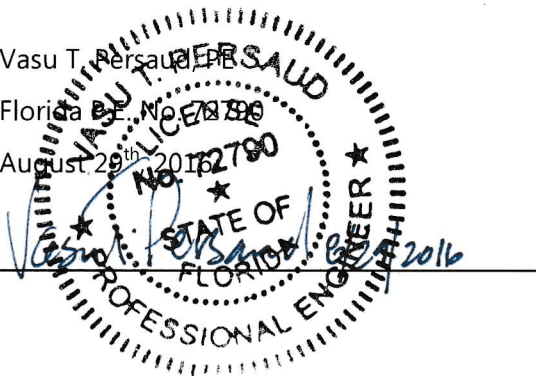
I hereby certify that I am a Professional Engineer properly registered in the State of Florida practicing with TRIDENT Engineering LLC. and that I have supervised the preparation and approve the evaluation, findings, opinions, conclusions, and technical advice hereby reported for:

**PROJECT:** Minneola Development

**LOCATION:** City of Minneola Development, Florida

I acknowledge that the procedures and references used to develop the results contained in these computations are standard to the professional practice of Transportation Engineering as applied through professional judgment and experience.

**NAME:** Vasu T. PERSAUD  
**P.E. #:** Florida P.E. No. 70890  
**DATE:** August 29<sup>th</sup> 2016  
**SIGNATURE:**  \_\_\_\_\_



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## 1.0 INTRODUCTION

This traffic analysis is being conducted to assess the impact of the proposed Minneola Development residential project. The proposed project comprises 297 apartments units and is located on the northeast quadrant of the Hancock Road and Fosgate Road intersection in the City of Minneola, Lake County, Florida. **Figure 1** depicts the site location and the surrounding transportation network. Access to the site will be provided to Hancock Road via a full access median opening at Gatewood Avenue. A preliminary concept plan is included in **Appendix A**.

### 1.1 Data and Methodology

Data used in the analysis consisted of site plan/development information provided by the Project Engineers, PM peak hour intersection traffic counts obtained by TRIDENT Engineering LLC. and roadway segment traffic volumes obtained from Lake County and the Florida Department of Transportation (FDOT).

The analysis was conducted in accordance with the Traffic Impact Analysis (TIA) Methodology prepared for the project. A copy of the methodology coordination is provided in **Appendix B**.

### 1.2 Study Area

The study facilities considered in the analysis are:

#### *Study Segments:*

Per the Lake County Traffic Impact Study Methodology Guidelines, the study segments will include those segments listed in the *Lake County Transportation Management Spreadsheet* which are one half (1/2) the total trip length (7.19 miles) associated with the land use of the proposed development, based upon the *Lake County Transportation Impact Fee Update Study Final Report*.

#### *Study Intersections:*

- Hancock Road and Fosgate Road
- Hancock Road and Gatewood Avenue

### 1.3 Planned and Programmed Improvements

Based on discussions with the Lake-Sumter Metropolitan Planning Organization (LSMPO) and Lake County, the following roadway improvements were considered to be "in-place" upon project buildout:

- The Florida's Turnpike and Hancock Road interchange (i.e. the Minneola Interchange)
- A full median opening at Hancock Road and Gatewood Avenue



## 2.0 EXISTING TRAFFIC CONDITIONS

Existing conditions in the vicinity of the site were analyzed to establish a baseline for the traffic conditions prevailing in the vicinity of the proposed development. The analysis included a review of the existing roadway segment capacities and an analysis of the intersection operations at the study intersections.

### 2.1 Roadway Segment Analysis

**Table 1** summarizes the existing roadway segment capacity analysis for study segment within a four (4) mile radius of the proposed development. The existing roadway segment conditions were analyzed by comparing the existing traffic volumes observed on the study roadway segments to the service volumes at the adopted Level of Service (LOS) standard for the roadway segments. The LOS data was obtained from the latest *Lake County Transportation Management System Spreadsheet*, excerpts of which are included in **Appendix C**.

**Table 1: Existing Roadway Segment Capacity Analysis**

Seg ID	Roadway	Segment	Lanes	LOS Stnd	PH Dir Capacity	Dir	Existing Vol	Existing LOS
1290	C.R. 50	US 27 to HANCOCK ROAD	2	D	792	NB/EB	674	<b>C</b>
						SB/WB	533	<b>C</b>
1295	C.R. 50	HANCOCK ROAD to BLACKSTILL LAKE ROAD	2	D	792	NB/EB	284	<b>C</b>
						SB/WB	412	<b>C</b>
1300	C.R. 50	BLACKSTILL LAKE ROAD to CR 455	2	D	792	NB/EB	592	<b>C</b>
						SB/WB	746	<b>C</b>
2060	N. HANCOCK ROAD	CR 50 to N RIDGE BOULEVARD	4	D	1,800	NB/EB	1071	<b>C</b>
						SB/WB	891	<b>C</b>
2070	N. HANCOCK ROAD	N RIDGE BOULEVARD to SR 50	4	D	1,800	NB/EB	1301	<b>C</b>
						SB/WB	1090	<b>C</b>
3860	US 27/SR 25	CR 561/ MAIN AVENUE to CR 50	4	C	1,910	NB/EB	1298	<b>C</b>
						SB/WB	1444	<b>C</b>
3870	US 27/SR 25	CR 50 to GRAND HIGHWAY	6	C	2,940	NB/EB	1320	<b>C</b>
						SB/WB	1131	<b>C</b>

The analysis indicates that all the study roadway segments currently operate adequately within their adopted Level of Service (LOS) standard.

### 2.2 Intersection Capacity Analysis

**Table 2** summarizes the results of the existing intersection capacity analysis. The existing intersection capacity analysis was conducted for the PM peak hour using the *HCS 2010* software and the methods of the *Highway Capacity Manual (HCM) 2010*. The existing AM and PM peak hour Turning Movement Volumes are displayed in **Figure 2** and the raw turning movement counts are included in **Appendix C**. It should be noted that the raw turning movement counts

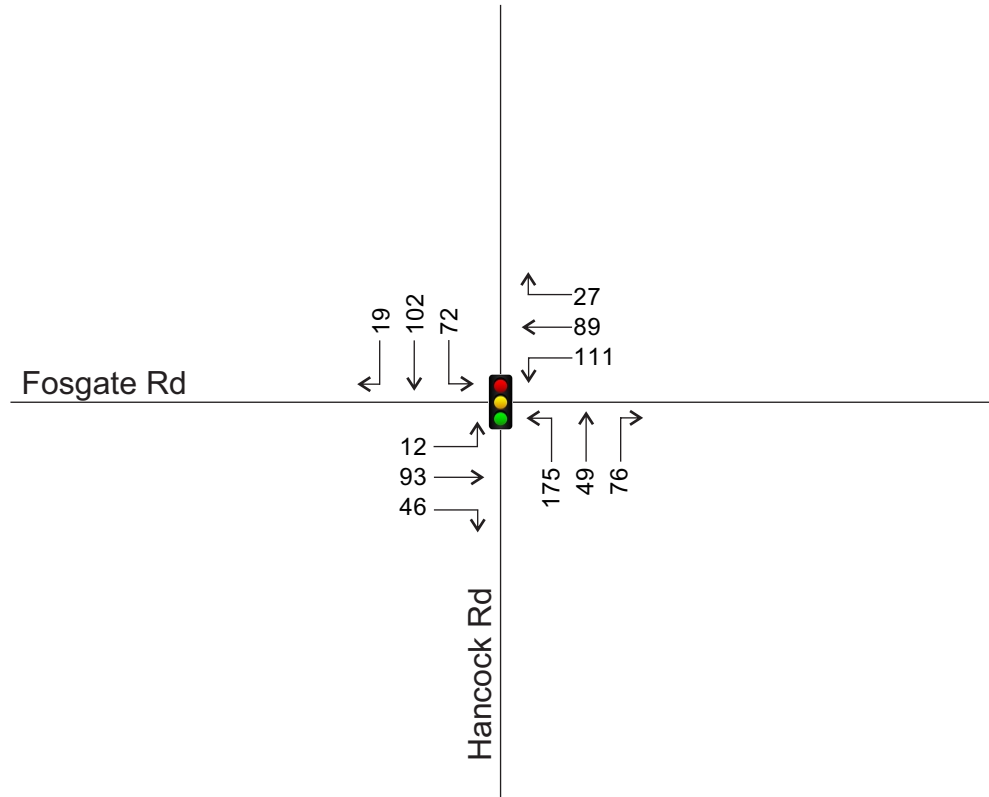


were adjusted to peak season volumes using a seasonal adjustment factor (1.09) obtained from the *FDOT Traffic Online (2015)* website.

**Table 2: Existing Intersection Capacity Analysis**

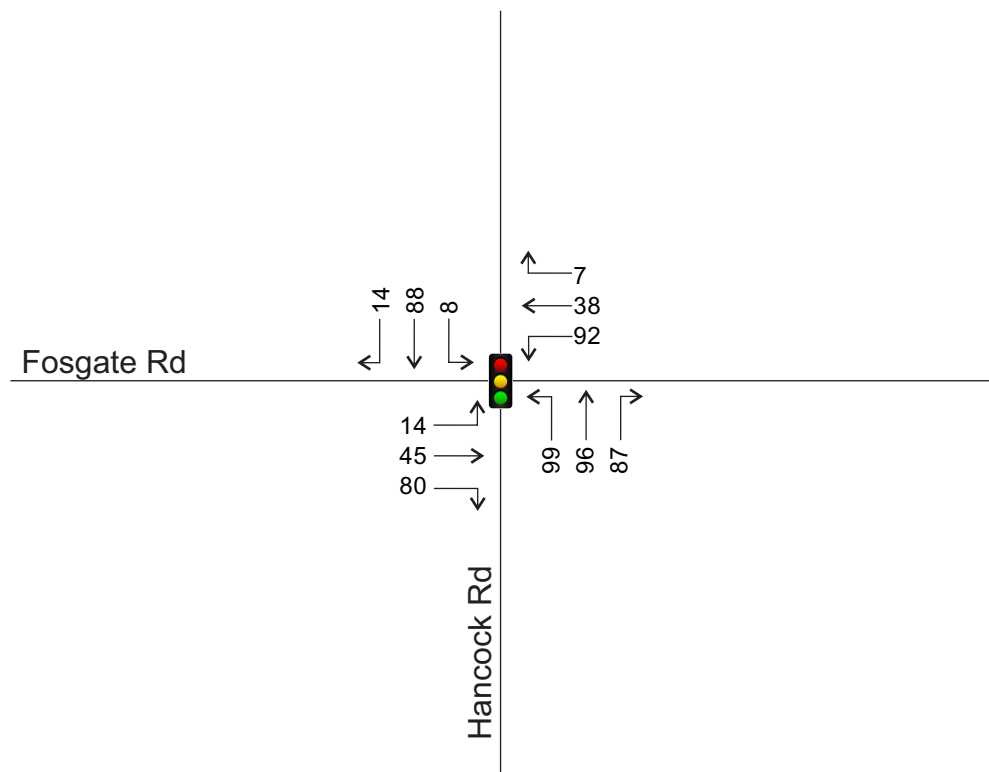
Intersection	Control	Time	EB		WB		NB		SB		Overall	
		Period	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Hancock Rd & Fosgate Rd	Signal	AM	59.5	E	46.3	D	44.6	D	36.9	D	45.6	D
		PM	61.2	E	48.6	D	30.9	C	16.3	B	37.7	D

The analysis indicates that the study intersections operate adequately during the AM and PM peak hour periods. The detailed HCS worksheets are included in **Appendix D**.



AM Peak Hour

PM Peak Hour



Schematic Drawing; Not To Scale



**Existing Traffic Volumes**

**Minneola Development**



Figure:

**2**

### 3.0 TRIP GENERATION

The proposed project comprises 297 apartments units. To determine the impact of this development, an analysis of its trip generation characteristics was conducted. This included a determination of the trips to be generated as well as their distribution and assignment to the surrounding roadways. The estimated project buildout is 2018.

#### 3.1 Trip Generation

**Table 3** summarizes the trip generation analysis conducted using information published by the Institute of Transportation Engineers (ITE) in the *Trip Generation Manual, 9th Edition*. The calculation indicated that the proposed development will generate a total of 1,925 daily trips of which 149 and 181 will occur during the AM and PM peak hour, respectively. The ITE Trip Generation graphs are included as part of the *Methodology Memorandum* in **Appendix B**.

**Table 3: Trip Generation**

ITE Code	Land Use	Size	Daily		AM Peak Hour			PM Peak Hour				
			Rate	Trips	Rate	Total	Enter	Exit	Rate	Total	Enter	Exit
220	Apartment	297 DU	6.48	1,925	0.50	149	30	119	0.61	181	118	63

*The ITE equations were used as the R-squared correlation coefficient was greater than 0.75*

#### 3.2 Trip Distribution/Assignment

The distribution of the project trips onto the study area roadways was determined using the currently adopted *Orlando Urban Area Transportation Study (OUATS)* model and knowledge of the study area, prevailing traffic flow patterns and existing traffic counts. A select zone analysis (SZA) was conducted by modifying the 2020 interim year model network to include a Traffic Analysis Zone representing the proposed project and associated access driveway(s) points and updating the model socio-economic data to reflect the project buildout. A model plot showing the trip distribution pattern is provided in **Appendix E**. Based on the resulting distribution, project trips were assigned to the corresponding study area roadway segments and intersections.

## 4.0 PROJECTED TRAFFIC CONDITIONS

An analysis of projected conditions was conducted to determine the proposed development's impact on the roadway segment capacities and to evaluate the operations of the study intersections. The project buildout year for the analysis is 2018.

### 4.1 Background Traffic Projection

Projected traffic volumes consist of background traffic combined with site generated traffic. Typically, background traffic volumes are determined by expanding existing peak hour traffic volumes to the buildout year using an annual growth rate. A historical trend analysis was conducted based on the Annual Average Daily Traffic (AADT) data obtained from the *FDOT Traffic Online (2015)* website in the vicinity of the project (see **Appendix C**). Based on this historical trend analysis, an annual growth rate of 1.57% was calculated; therefore, to be conservative, a 2% annual growth rate was used for the analysis. This growth rate was applied to the existing traffic volumes as appropriate in order to determine the projected background volumes in the project buildout year. In addition, reserved/committed trips documented in the *Lake County Transportation Management Spreadsheet* were also applied so as to account for an increase in traffic along Hancock Road due to the construction of the Minneola Interchange.

### 4.2 Roadway Segment Analysis

**Table 4** summarizes the results of the projected study roadway segment capacity analysis. The Projected roadway segment conditions were analyzed by comparing the projected traffic volumes on the study segments to their respective service volumes at the adopted Level of Service (LOS) standard. The total projected traffic volume is composed of background traffic and project trips. Projected background traffic was estimated using the annual growth rate discussed in the previous section.

**Table 4: Projected Roadway Segment Capacity Analysis**

Seg ID	Roadway	Segment	LOS Stnd	Dir	Backg'd Vol	Trip Dist	Project Vol	Total Vol	Projected LOS
1290	C.R. 50	US 27 to HANCOCK ROAD	D	NB/EB	701	3%	4	705	C
				SB/WB	554		2	556	C
1295	C.R. 50	HANCOCK ROAD to BLACKSTILL LAKE ROAD	D	NB/EB	295	3%	2	297	C
				SB/WB	428		4	432	C
1300	C.R. 50	BLACKSTILL LAKE ROAD to CR 455	D	NB/EB	616	3%	2	618	C
				SB/WB	776		4	780	D
2060	N. HANCOCK ROAD	CR 50 to N RIDGE BOULEVARD	D	NB/EB	1114	54%	64	1178	C
				SB/WB	927		34	961	C
2070	N. HANCOCK ROAD	N RIDGE BOULEVARD to SR 50	D	NB/EB	1353	54%	64	1417	C
				SB/WB	1134		34	1168	C
3860	US 27/SR 25	CR 561/ MAIN AVENUE to CR 50	C	NB/EB	1350	1%	1	1351	C
				SB/WB	1502		1	1503	C
3870	US 27/SR 25	CR 50 to GRAND HIGHWAY	C	NB/EB	1373	1%	1	1374	C
				SB/WB	1176		1	1177	C

The analysis indicates that all the study roadway segments currently operate adequately within their adopted Level of Service (LOS).

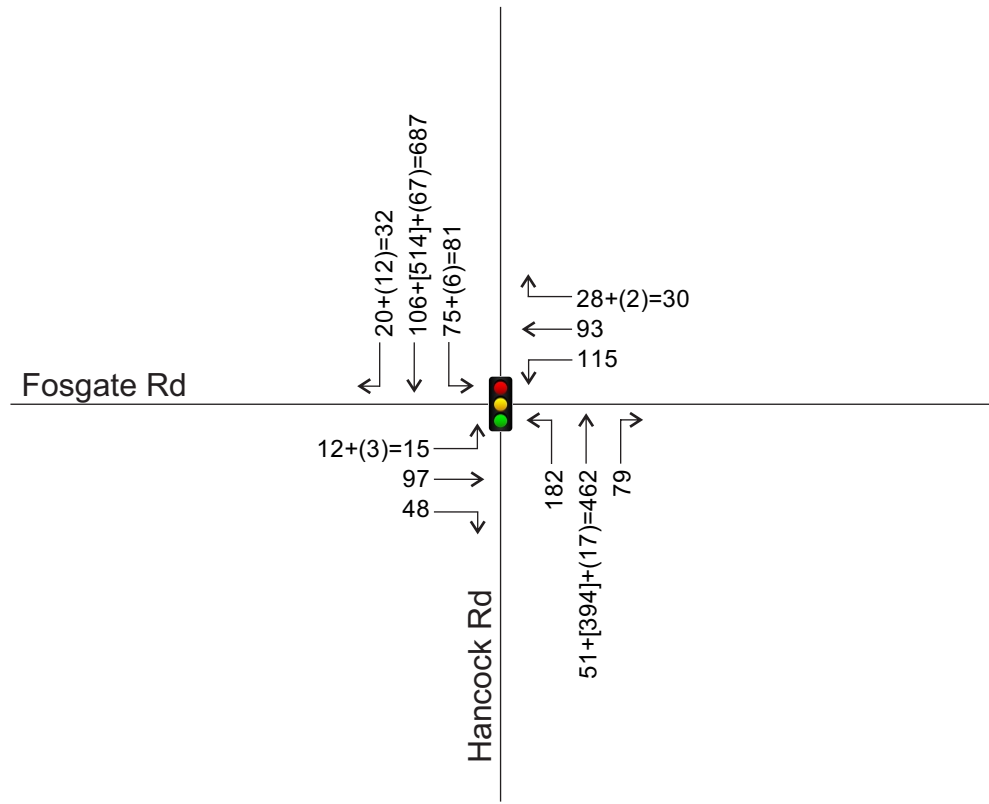
### 4.3 Intersection Capacity Analysis

**Table 5** summarizes the results of the projected intersection capacity analysis. The projected intersection capacity and operational analysis was conducted using the *HCS 2010* software and the methods of the *Highway Capacity Manual (HCM) 2010* and was performed for the AM and PM peak hours. The projected volumes for the intersection capacity and operations analysis were calculated by assigning primary project trips to the project driveways and adding those volumes to the background volumes at the study intersections. Projected background traffic was estimated using the annual growth rate and reserved/committed trips discussed previously. The projected peak hour volumes are illustrated in **Figure 3** and **Figure 4**.

**Table 5: Projected Intersection Capacity Analysis**

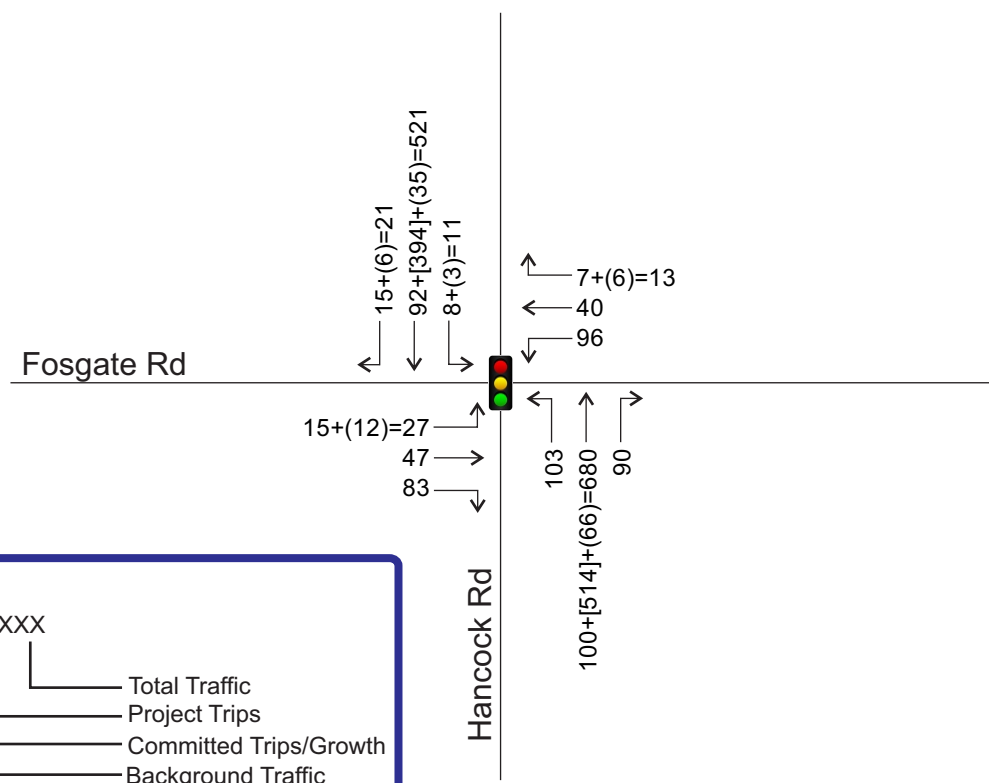
Intersection	Control	Time	EB		WB		NB		SB		Overall	
		Period	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Hancock Rd & Fosgate Rd	Signal	AM	59.0	E	46.2	D	27.6	C	27.5	C	32.1	C
		PM	59.4	E	48.6	D	18.9	B	16.6	B	23.7	C
Hancock Rd & Gatewood Ave	Stop	AM	12.6	B	27.8	D	8.9	A	8.2	A	--	--
		PM	9.9	A	21.8	C	8.5	A	8.9	A	--	--

The analysis indicates that the study intersections are projected to continue to operate adequately during the both the AM and PM peak hour period. The analysis worksheets are included in **Appendix F**. (Note: The Hancock Road and Fosgate Road intersection northbound and southbound movement delay per vehicle show in the table decreased in the projected conditions as compare to the existing conditions because there are substantially more vehicles on these movements in the projected conditions due to the inclusion of the reserved/committed trips).



AM Peak Hour

PM Peak Hour



**Legend:**

$XX+[XX]+(XX)=XXX$

- Total Traffic
- Project Trips
- Committed Trips/Growth
- Background Traffic

Schematic Drawing; Not To Scale



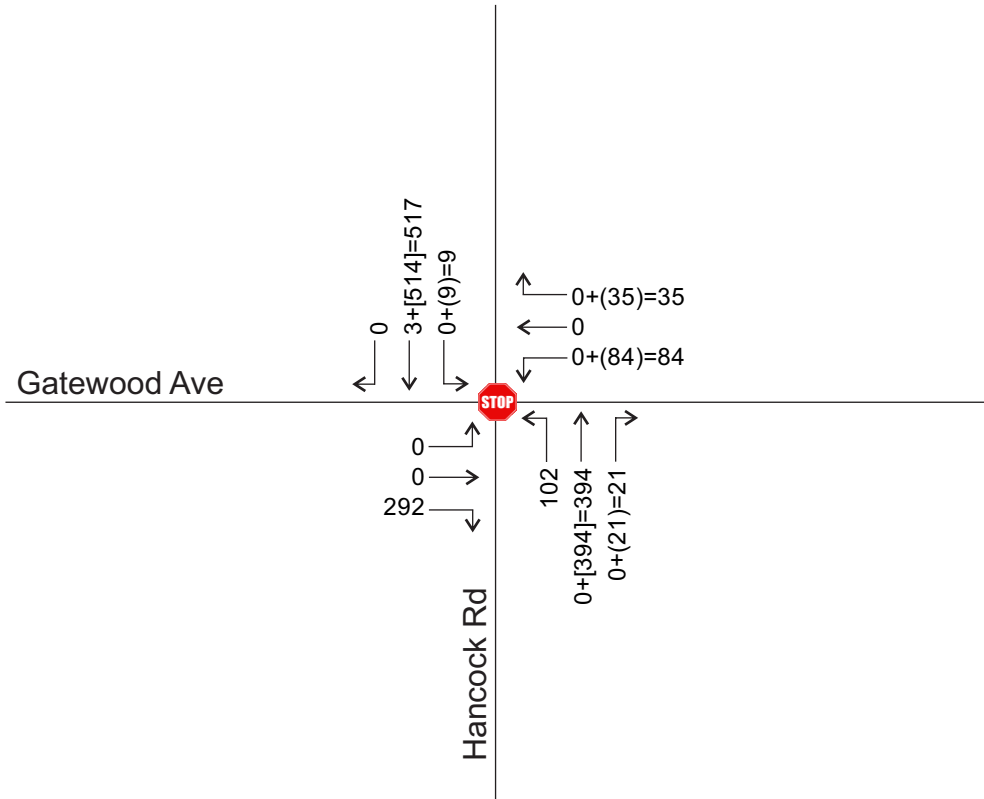
# Projected Traffic Volumes

## Minneola Development



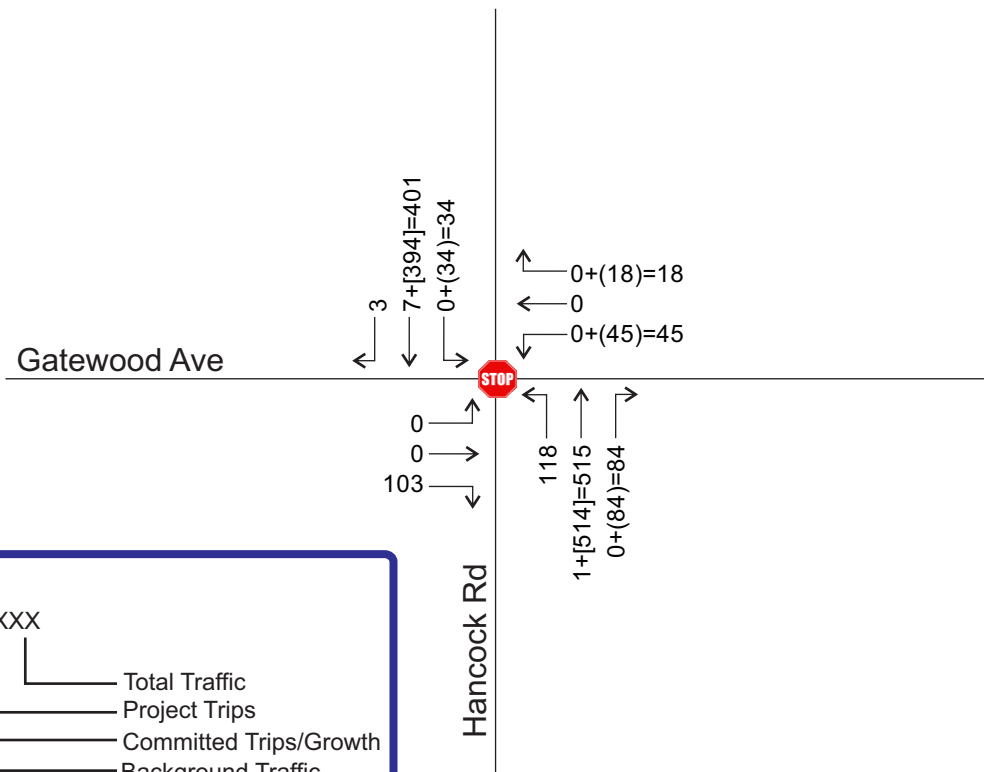
Figure:

**3**



AM Peak Hour

PM Peak Hour



Legend:

$XX + [XX] + (XX) = XXX$

- Total Traffic
- Project Trips
- Committed Trips/Growth
- Background Traffic

Schematic Drawing; Not To Scale



**Projected Traffic Volumes (Cont'd)**

**Minneola Development**



Figure:

**4**

## 5.0 STUDY CONCLUSIONS

This traffic analysis is being conducted to assess the impact of the proposed Minneola Development residential project. The proposed project comprises 297 apartment units and is located on the northeast quadrant of the Hancock Road and Fosgate Road intersection in the City of Minneola, Lake County, Florida. The analysis included a determination of project trip generation, a review of existing and projected roadway and intersection capacity and a review of access operations.

The results of the traffic analysis are summarized as follows:

- The proposed development will generate a total of 1,925 daily trips of which 149 and 181 will occur during the AM and PM peak hour, respectively.
- Access to the development will be provided to Hancock Road via Gatewood Avenue.
- An analysis of the study intersections indicates that the study intersections currently operate adequately within their adopted Level of Service standard and are projected to continue to do so upon buildout of the proposed development.
- An analysis of the study roadway segments indicate that the study roadway segments currently operate adequately within their adopted Level of Service standard and are projected to continue to do so upon buildout of the proposed development.

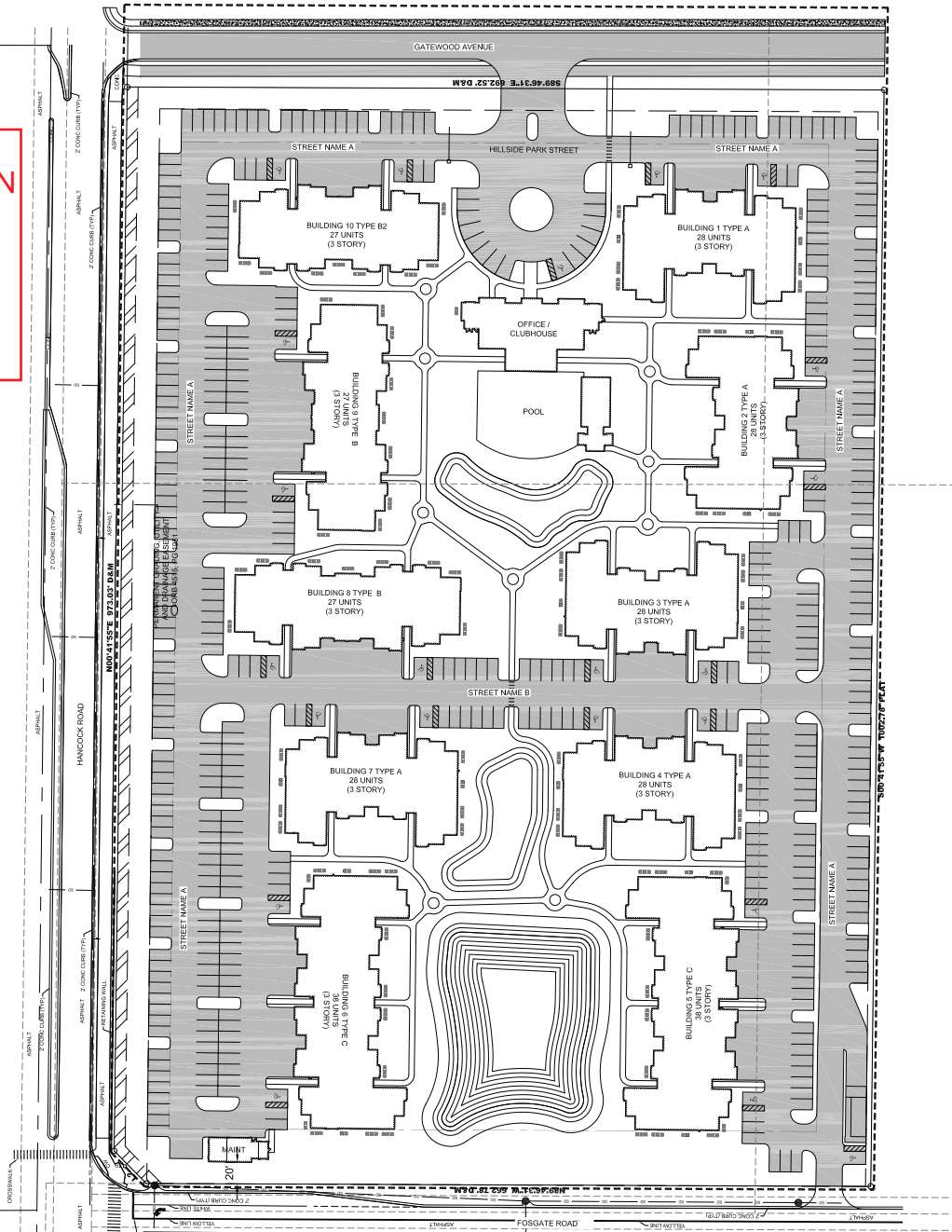
**Based on the analyses conducted, approval of the proposed project is requested from a transportation perspective since the project does not adversely impact any of the study roadway segments or intersections.**



## **APPENDIX**

## **Appendix A: Preliminary Concept Plan**

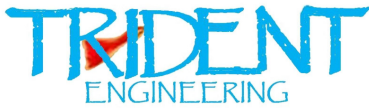
**NOTE: MEDIAN RECONSTRUCTION TO PROVIDE A FULL MEDIAN OPENING TO BE DONE BY OTHERS**



NOTE: STORMWATER RUNOFF TO BE TREATED USING DRY DETENTION PONDS. POST-DEVELOPMENT OFFSITE RUNOFF SHALL BE OF EQUAL OR LESSER AMOUNT THAN THE EXISTING CONDITION.

<p><b>DRMP</b> ENGINEERS-ARCHITECTS-PLANNERS-SCIENTISTS</p> <p>941 Lake Baldwin Lane - Orlando, Florida 32814 Phone: (407) 225-8284 Fax: (407) 225-8283 www.drmp.com</p>		<p>PRELIMINARY SUBDIVISION PLAT FOR <b>MINNEOLA HILLS</b> LAKE COUNTY, FLORIDA</p>		<p><b>OVERALL SITE PLAN</b></p>		<p>DESIGNED BY: JAC DRAWN BY: DMH CHECKED BY: ECL APPROVED BY: JAC</p>	
<p>Jose A. Chaves, P.E. State of Florida # 78518</p>		<p>PROJECT NO: 15-0234-000</p>		<p>SCALE: 1" = 50'</p>		<p>DATE: JULY, 2016</p>	
<p>DRMP, Inc.</p>		<p>DO NOT SCALE THIS DRAWING - DIMENSIONS AND NOTES TAKE PRECEDENCE</p>		<p>DATE: [ ] [ ] [ ]</p>		<p>DESCRIPTION</p>	

## **Appendix B: Methodology Coordination**



## METHODOLOGY MEMORANDUM

**RE: Minneola Development, Lake County, FL**  
Traffic Impact Analysis Methodology  
Job No. 16112  
08/05/2016

The following is a methodology outline for the Traffic Impact Analysis (TIA) for the above referenced project. In general, the TIA will conform to the methodology requirements and guidelines documented by the City of Minneola, Lake County and the Florida Department of Transportation (FDOT).

### **Project Description**

This traffic analysis is being conducted to assess the impact of the proposed Minneola residential development. The proposed project comprises 297 apartments units and is located on the northeast quadrant of the Hancock Road and Fosgate Road intersection in the City of Minneola, Lake County, Florida. **Figure 1** depicts the site location and the surrounding transportation network.

### **Site Access**

Access to the site will be provided via a full access driveway connection onto Hancock Road. **Attachment A** provides the preliminary site plan.

### **Trip Generation**

**Table 1** summarizes the trip generation analysis conducted using information published by the Institute of Transportation Engineers (ITE) in the *Trip Generation Manual, 9th Edition*. The calculation revealed that the proposed development will generate a total of 1,925 daily trips of which 149 and 181 will occur during the AM and PM peak hour, respectively. The ITE Trip Generation graphs are included for reference in **Attachment B**.

**Table 1: Trip Generation**

ITE Code	Land Use	Size	Daily		AM Peak Hour				PM Peak Hour			
			Rate	Trips	Rate	Total	Enter	Exit	Rate	Total	Enter	Exit
220	Apartment	297 DU	6.48	1,925	0.50	149	30	119	0.61	181	118	63

*The ITE equations were used as the R-squared correlation coefficient was greater than 0.75*

### **Trip Distribution**

The trip distribution pattern will be derived using the adopted travel demand model for this area, in this case the *Orlando Urban Area Transportation Study (OUATS)* model. The model derived distribution will be compared to observations of the study area traffic patterns, existing traffic counts and engineering/planning reasonable checks to ensure applicability of the proposed distribution and assignment of project traffic.



Source: Google Earth



### *Project Location Map*

## **Minneola Development**



Figure:

**1**

### **Study Area**

The study facilities to be considered in the analysis are:

#### *Study Intersections*

- Hancock Road and Fosgate Road
- Hancock Road and Project Access

#### *Study Segments*

- Per the Lake County Traffic Impact Study Methodology Guidelines, the study segments will include those segments listed in the *Lake County Transportation Management Spreadsheet* which are one half (1/2) the total trip length associated with the land use of the proposed development, based upon the *Lake County Transportation Impact Fee Update Study Final Report*.

### **Projected Conditions Analysis**

The projected conditions analysis will be conducted within the following framework:

- Study intersection counts will be collected during the AM and PM peak period
- Growth factors, derived from historical traffic volume data, will be applied to existing traffic counts to develop future background traffic volumes
- Project traffic volumes will be added to the future background traffic volumes to obtain total future traffic volumes
- Intersection capacity analyses will be performed using the latest operational analysis procedures documented in the *Highway Capacity Manual 2010*
- The buildout year of the project is 2018

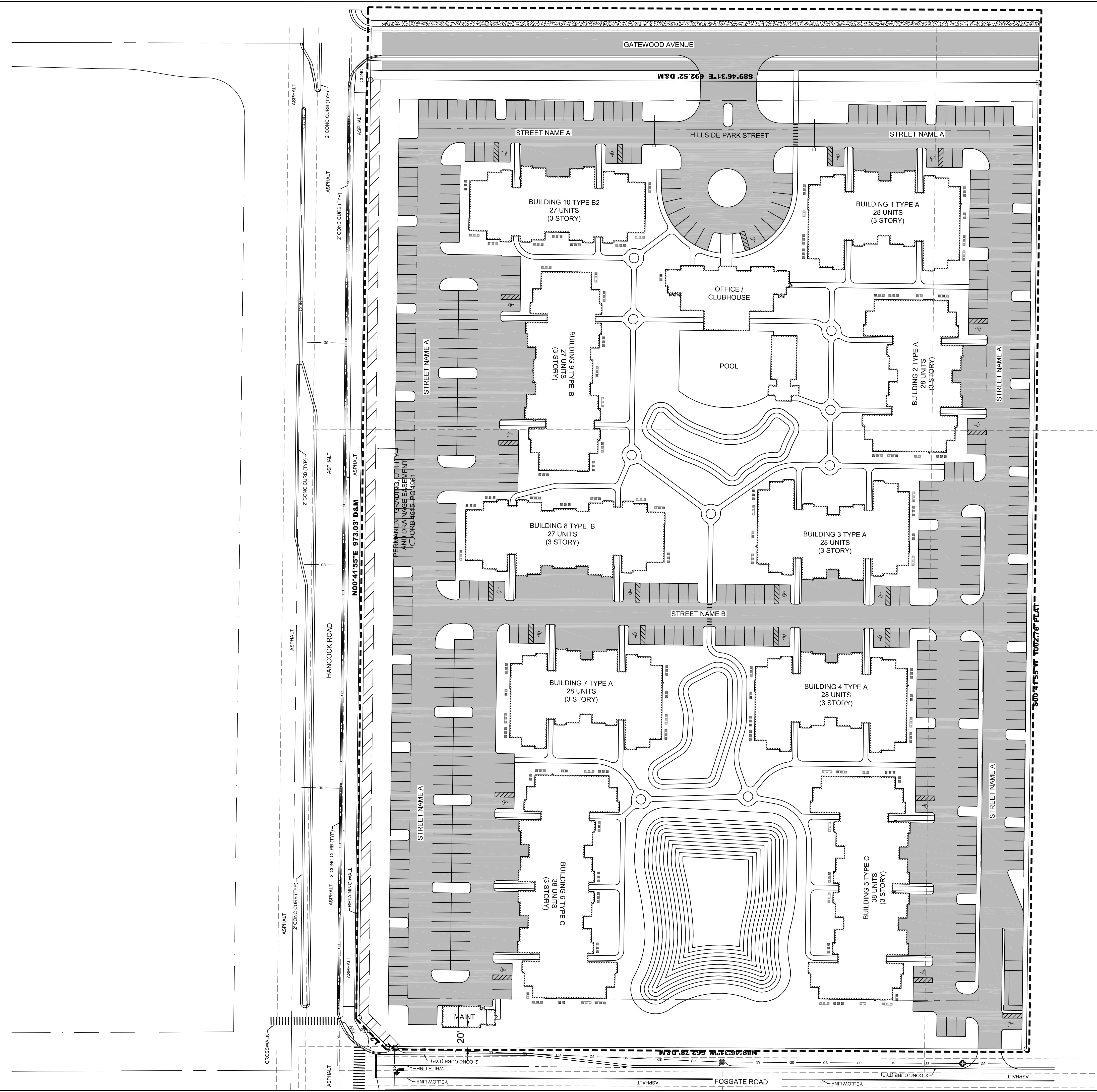
### **Traffic Impact Study Report**

The traffic report prepared will summarize the study procedures, analyses and recommendations.

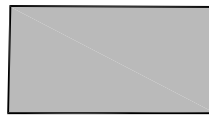
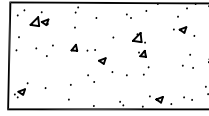


It should be noted that certain specifics such as trip generation and trip distribution may change as the study proceeds to reflect changes in the development program, preliminary site plan, etc.

**Attachment A**  
***Preliminary Site Plan***

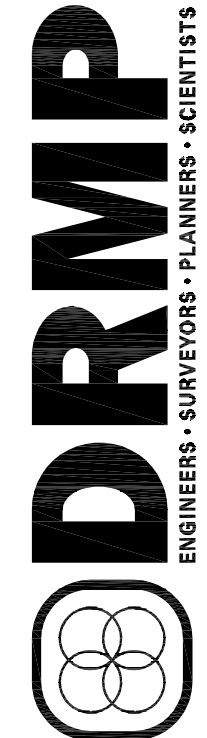




**LEGEND**

-  ASPHALT PAVEMENT
-  CONCRETE
-  LIMITS OF WORK
-  PROPERTY LINE

NOTE: STORMWATER RUNOFF TO BE TREATED USING DRY DETENTION PONDS. POST-DEVELOPMENT OFFSITE RUNOFF SHALL BE OF EQUAL OR LESSER AMOUNT THAN THE EXISTING CONDITION.

<b>OVERALL SITE PLAN</b>		PRELIMINARY SUBDIVISION PLAN FOR <b>MINNEOLA HILLS</b> LAKE COUNTY, FLORIDA	
DESIGNED BY	JAC	DRAWN BY	CMH
DATE		CHECKED BY	DCL
NO.		APPROVED BY	JAC
DO NOT SCALE THIS DRAWING - DIMENSIONS AND NOTES TAKE PREFERENCE			
 <b>DRMP, Inc.</b> ENGINEERS - SURVEYORS - PLANNERS - SCIENTISTS Certificate of Authorization No. 2648 941 Lake Baldwin Lane - Orlando, Florida 32814 Phone: 407.896.0584 Fax: 407.896.4836 www.drmp.com			
Jose A. Chaves, P.E. State of Florida # 78518			
PROJECT NO.: 16-0234-000			
SCALE: 1" = 50'			
DATE: JULY, 2016			
DRAWING: C3.0			

**Attachment B**  
***Trip Generation Information***

## Apartment (220)

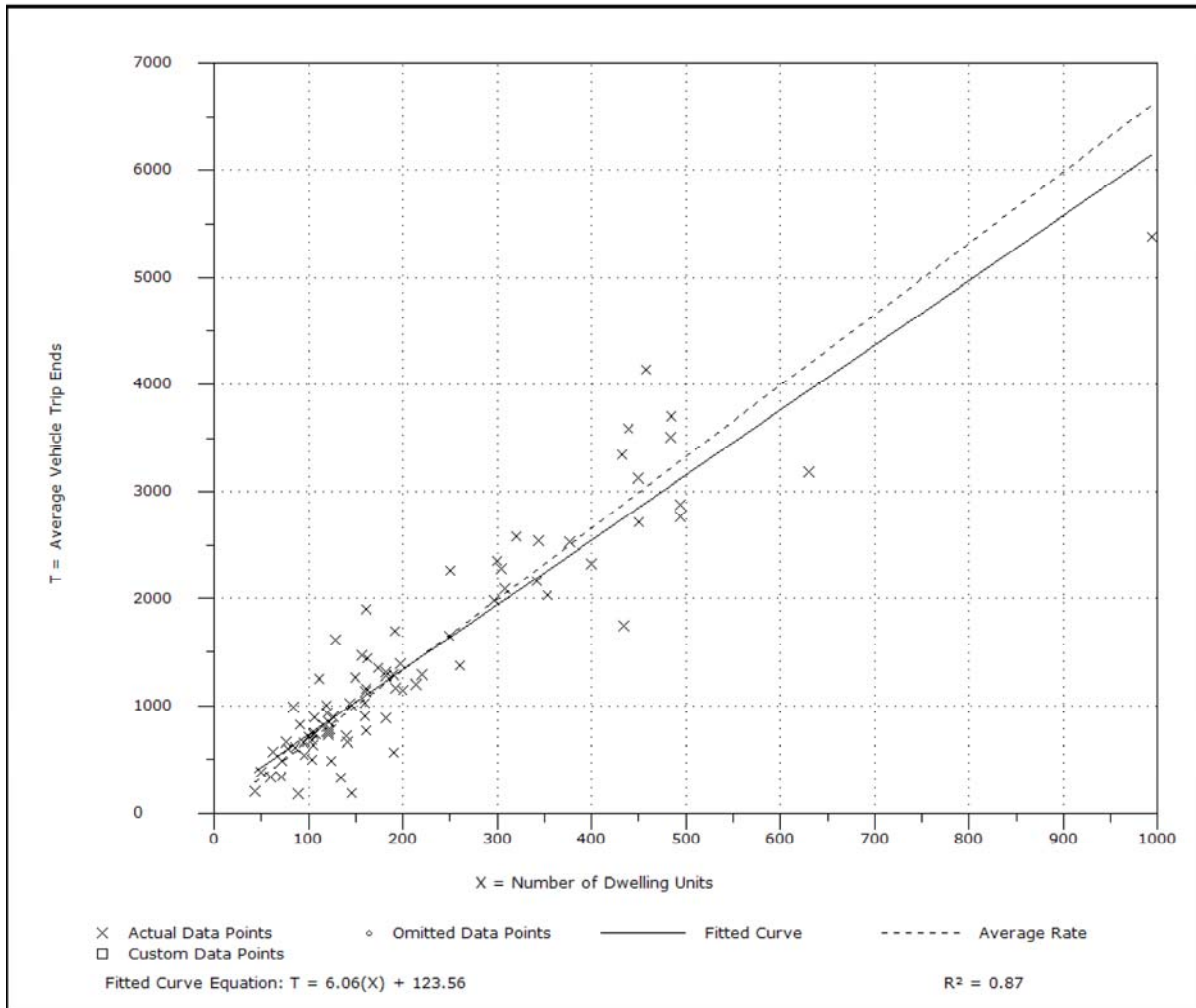
**Average Vehicle Trip Ends vs: Dwelling Units**  
**On a: Weekday**

Number of Studies: 88  
Avg. Number of Dwelling Units: 210  
Directional Distribution: 50% entering, 50% exiting

### Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
6.65	1.27 - 12.50	3.07

### Data Plot and Equation



Trip Generation, 9th Edition

## Apartment (220)

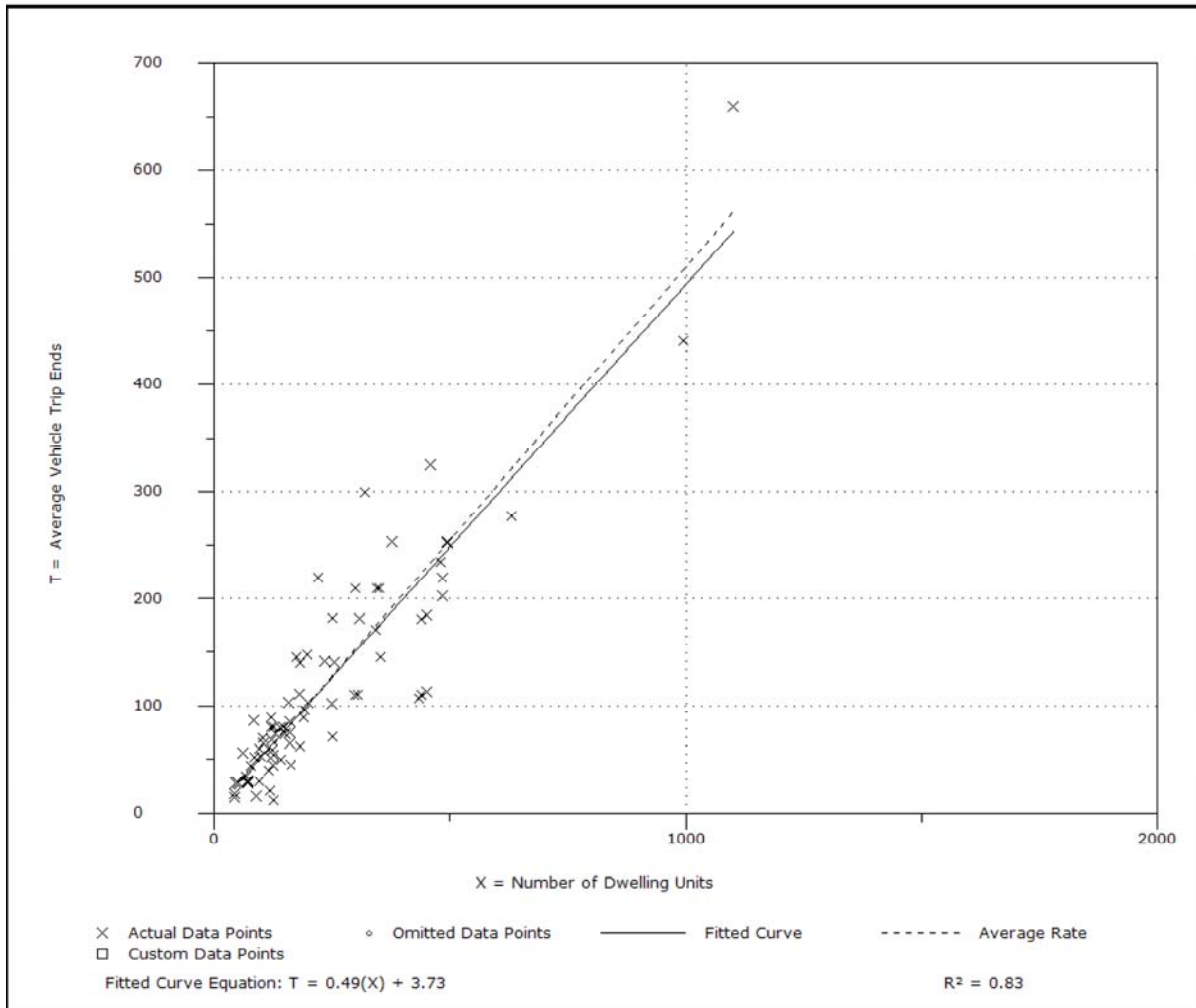
**Average Vehicle Trip Ends vs: Dwelling Units**  
**On a: Weekday**  
**Peak Hour of Adjacent Street Traffic**  
**One Hour Between 7 and 9 a.m.**

Number of Studies: 78  
 Avg. Number of Dwelling Units: 235  
 Directional Distribution: 20% entering, 80% exiting

### Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.51	0.10 - 1.02	0.73

### Data Plot and Equation



Trip Generation, 9th Edition

## Apartment (220)

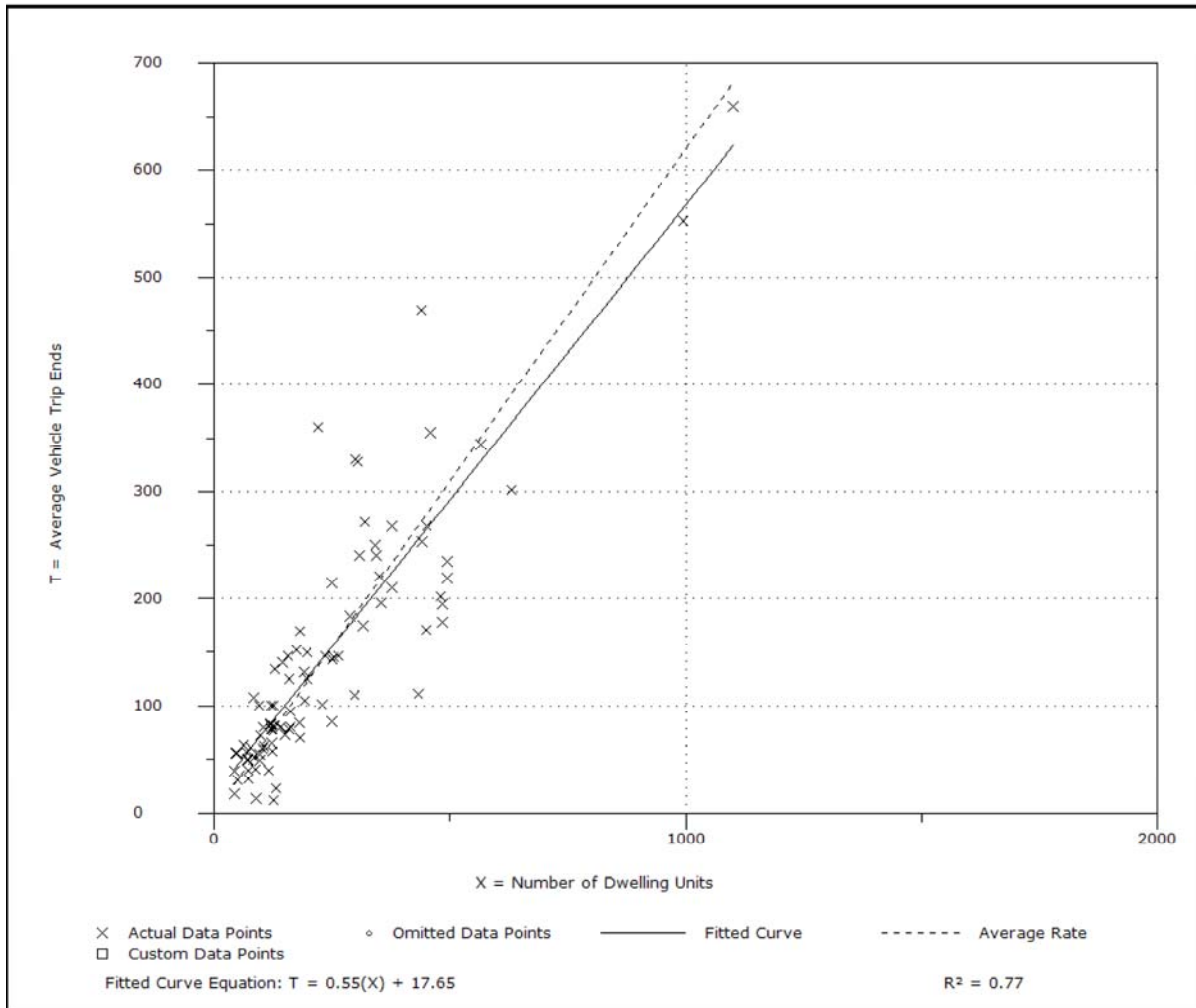
**Average Vehicle Trip Ends vs: Dwelling Units**  
**On a: Weekday**  
**Peak Hour of Adjacent Street Traffic**  
**One Hour Between 4 and 6 p.m.**

Number of Studies: 90  
 Avg. Number of Dwelling Units: 233  
 Directional Distribution: 65% entering, 35% exiting

### Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.62	0.10 - 1.64	0.82

### Data Plot and Equation



Trip Generation, 9th Edition

## Vasu Persaud

---

**From:** Joyce Heffington [jheffington@minneola.us]  
**Sent:** Friday, August 12, 2016 12:45 PM  
**To:** Vasu Persaud; 'Lewis, Sharon'; mwoods@lakesumtermpo.com  
**Subject:** RE: Minneola Apartments TIA - Methodology

Please copy the City on all comments so that we can add them to our files.

Thank You,  
Joyce Heffington, AICP  
City of Minneola Planning  
PO Box 678  
Minneola, FL 34755  
Office: (352) 394-3598 Ext. 2200  
Fax: (352) 394-5278

---

**From:** Vasu Persaud [mailto:vtp@tridentengllc.com]  
**Sent:** Friday, August 12, 2016 12:17 PM  
**To:** 'Lewis, Sharon'; mwoods@lakesumtermpo.com; Joyce Heffington  
**Subject:** RE: Minneola Apartments TIA - Methodology

Good day Everyone,

Thank you for your time in discussing the subject TIA methodology.

Here is a synopsis of our discussion(s) so we have it in writing. Feel free to comment if I left something out:

1. The TIA will follow the standard Lake County TIA guidelines.
2. The latest 01/2016 Lake County TCMS will be used. Sharon just sent this. Thank you Sharon.
3. Intersection to be studied are Hancock Rd & Fosgate Rd; Hancock Rd & Gatewood Ave; and, Hancock & Old Hwy 50 if Hancock segment is significant.
4. AM and PM peak period intersection analysis will be done.
5. Sharon, I spoke with Sans Lassiter about the planned school (on Old 50 and Hancock) and will take this into account as needed.

In addition, I will mention to the Site Engineers that pedestrian connection to the Trail along Hancock Rd and bike racks is encouraged. The City also mentioned that the School Board would not allow a connection onto Fosgate Rd although, I assume a emergency access is ok. I will convey this to Site Engineers also

Thank you very much. We will plan to schedule counts early next week.

Best regards,  
V

**Vasu T. Persaud, PE, AICP, PTOE**  
Senior Transportation Engineer | Orlando Office Lead

**TRIDENT Engineering LLC.**

Transportation | Engineering | Planning | Design

33 E. Robinson Street, Suite 107, Orlando, FL 32801 | (321) 948-9594 | [vtp@tridentengllc.com](mailto:vtp@tridentengllc.com) | [www.TridentEngLLC.com](http://www.TridentEngLLC.com)

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**From:** Lewis, Sharon [<mailto:slewis@lakecountyfl.gov>]  
**Sent:** Friday, August 12, 2016 11:29 AM  
**To:** 'Vasu Persaud'  
**Subject:** RE: Minneola Apartments TIA - Methodology

This is the latest one I have

*Sharon E. Lewis, M.S*

*Engineer III/Sr. Transportation Planner  
Lake County Public Works Department  
Engineering Division  
350 N Sinclair Ave  
Tavares, FL 32778  
Phone: 352 253-9050  
[slewis@lakecountyfl.gov](mailto:slewis@lakecountyfl.gov)*

Please note: Florida has a very broad public records law. Most written communication to or from government officials regarding government/public business is public record available to the public and media upon request. Your e-mail communications may be subject to public disclosure.

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**From:** Vasu Persaud [<mailto:vtp@tridentengllc.com>]  
**Sent:** Friday, August 12, 2016 11:20 AM  
**To:** Lewis, Sharon <[slewis@lakecountyfl.gov](mailto:slewis@lakecountyfl.gov)>  
**Subject:** FW: Minneola Apartments TIA - Methodology

Fyi.

---

**From:** Vasu Persaud [<mailto:vtp@tridentengllc.com>]  
**Sent:** Wednesday, August 10, 2016 1:21 PM  
**To:** [mwoods@lakesumtermo.com](mailto:mwoods@lakesumtermo.com); 'Sharon Lewis'  
**Cc:** 'Joyce Heffington'  
**Subject:** FW: Minneola Apartments TIA - Methodology

Mike and Sharon,

We have submitted the attached methodology to the City of Minneola for review. Please let me know if you have any feedback. Thank you very much for your time. I know it is very busy these days.

Best regards,  
V

**Vasu T. Persaud, PE, AICP, PTOE**

Senior Transportation Engineer | Orlando Office Lead

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---

**From:** Vasu Persaud [<mailto:vtp@tridentengllc.com>]

**Sent:** Monday, August 08, 2016 6:14 PM

**To:** 'Joyce Heffington'

**Subject:** Minneola Apartments TIA

Joyce,

It was good speak with you late last week regarding the traffic study for the apartment development near to the Lake Minneola High School.

Please find attached a quick methodology. We were hoping to at least document our assumptions. I can give you a call and provide an overview if that will save you time Were you going to review or does it have to go to your consultant - I can give them a call if it would take you out the middle.

Basically, we are were planning to do an AM and PM peak hour analysis (as the school is next door) and we were only going to take turning movement traffic counts at the Hancock Road and Fosgate Road intersection. We were going to follow the Lake County Traffic Impact study guidelines which I wrote a year ago.

Thank you very much in advance.

Best regards,

V

**Vasu T. Persaud, PE, AICP, PTOE**

Senior Transportation Engineer | Orlando Office Lead

**TRIDENT Engineering LLC.**

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## **Appendix C: Traffic Data**

### Turning Movement Count Report

Count Name	Notes	U = U Turn    L = Left Turn    T = Thru    R = Right Turn P1 = Pedestrian Direction 1    P2 = Pedestrian Direction 2 Veh = Total Vehicles for Approach																		Vehicle Volume	
Traffic Impact Analysis																				800	
Location																				% Bank 1    % Bank 2	
Hancock Rd & Fosgate Rd																				95.8%    3.4%	
Performed By																				% Bank 3    % Bank 4	
VP																				0.9%    0.0%	
Date	Pedestrians Volume																				
08/18/2016	33																				

### Breakdown by Movement and Time Period

Period	NB							SB							WB							EB							Total Vehicles	Total Pedestrians
	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh		
07:00 AM	21	17	14	53	10	0	105	0	60	16	2	0	3	78	0	39	36	11	0	4	86	0	5	68	2	7	0	75	344	24
07:15 AM	13	22	19	10	2	0	64	0	4	21	7	0	0	32	0	60	46	11	1	3	117	0	1	11	6	1	0	18	231	7
07:30 AM	2	21	6	3	0	0	32	0	0	30	3	0	0	33	0	2	0	3	0	1	5	0	3	2	3	1	0	8	78	2
07:45 AM	1	64	6	4	0	0	75	0	2	27	5	0	0	34	0	1	0	0	0	0	1	0	2	4	31	0	0	37	147	0

### Breakdown by Movement

Movement / Details	NB							SB							WB							EB							Entire Intersection	
	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh	Vehicles	Pedestrians
Volume	37	124	45	70	12	0	276	0	66	94	17	0	3	177	0	102	82	25	1	8	209	0	11	85	42	9	0	138	800	33
PHF	0.44	0.48	0.59	0.33	0.30	-	0.66	-	0.28	0.78	0.61	-	0.25	0.57	-	0.43	0.45	0.57	0.25	0.50	0.45	-	0.55	0.31	0.34	0.32	-	0.46	0.58	0.34
% Bank 1	100.0%	87.1%	91.1%	100.0%								-	95.5%	98.9%	82.4%								-	81.8%	98.8%	95.2%	Need a custom report?  Contact: support@portablestudie s.com			
% Bank 2	0.0%	9.7%	8.9%	0.0%								-	0.0%	1.1%	17.6%								-	18.2%	1.2%	4.8%				
% Bank 3	0.0%	3.2%	0.0%	0.0%								-	4.5%	0.0%	0.0%								-	0.0%	0.0%	0.0%				
% Bank 4	0.0%	0.0%	0.0%	0.0%								-	0.0%	0.0%	0.0%								-	0.0%	0.0%	0.0%				

## Turning Movement Count Report

<b>Count Name</b>	<b>Notes</b>	U = U Turn    L = Left Turn    T = Thru    R = Right Turn P1 = Pedestrian Direction 1    P2 = Pedestrian Direction 2 Veh = Total Vehicles for Approach	<b>Vehicle Volume</b>	
Traffic Impact Analysis			612	
<b>Location</b>			<b>% Bank 1</b>	<b>% Bank 2</b>
Hancock Rd & Fosgate Rd			96.4%	3.6%
<b>Performed By</b>			<b>% Bank 3</b>	<b>% Bank 4</b>
VP			0.0%	0.0%
<b>Date</b>	<b>Pedestrians Volume</b>			
08/18/2016	2			

### Breakdown by Movement and Time Period

Period	NB							SB							WB							EB							Total Vehicles	Total Pedestrians
	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh		
04:45 PM	0	22	20	15	0	0	57	0	1	19	1	0	0	21	0	17	2	0	0	0	19	0	2	3	14	0	0	19	116	0
05:00 PM	0	24	21	23	0	0	68	0	4	21	1	0	0	26	0	27	13	2	0	0	42	0	3	14	21	0	0	38	174	0
05:15 PM	0	27	27	32	0	0	86	0	2	16	2	0	0	20	0	29	15	2	0	1	46	0	6	22	23	0	0	51	203	1
05:30 PM	0	18	20	10	1	0	48	0	0	25	9	0	0	34	0	11	5	2	0	0	18	0	2	2	15	0	0	19	119	1

### Breakdown by Movement

Movement / Details	NB							SB							WB							EB							Entire Intersection	
	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh	Vehicles	Pedestrians
Volume	0	91	88	80	1	0	259	0	7	81	13	0	0	101	0	84	35	6	0	1	125	0	13	41	73	0	0	127	612	2
PHF	-	0.84	0.81	0.63	0.25	-	0.75	-	0.44	0.81	0.36	-	-	0.74	-	0.72	0.58	0.75	-	0.25	0.68	-	0.54	0.47	0.79	-	-	0.62	0.75	0.50
% Bank 1	-	94.5%	98.9%	100.0%				-	100.0%	91.4%	100.0%				-	98.8%	100.0%	100.0%				-	84.6%	92.7%	93.2%	Need a custom report?  Contact: <a href="mailto:support@portablestudies.com">support@portablestudies.com</a>				
% Bank 2	-	5.5%	1.1%	0.0%				-	0.0%	8.6%	0.0%				-	0.0%	0.0%	0.0%				-	7.7%	7.3%	6.8%					
% Bank 3	-	0.0%	0.0%	0.0%				-	0.0%	0.0%	0.0%				-	0.0%	0.0%	0.0%				-	0.0%	0.0%	0.0%					
% Bank 4	-	0.0%	0.0%	0.0%				-	0.0%	0.0%	0.0%				-	0.0%	0.0%	0.0%				-	0.0%	0.0%	0.0%					

## Turning Movement Count Report

Count Name	Notes  U = U Turn   L = Left Turn   T = Thru   R = Right Turn P1 = Pedestrian Direction 1   P2 = Pedestrian Direction 2 Veh = Total Vehicles for Approach	Vehicle Volume	351			
Traffic Impact Analysis		% Bank 1	95.2%	% Bank 2	4.8%	
Location		Hancock Rd & Gatewood Ave	% Bank 3	0.0%	% Bank 4	0.0%
Performed By		JJ	Pedestrians Volume		12	
Date		08/18/2016				

### Breakdown by Movement and Time Period

Period	NB							SB							WB							EB							Total Vehicles	Total Pedestrians
	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh		
07:30 AM	0	40	0	0	0	0	40	0	0	1	0	0	3	1	0	0	0	0	0	0	0	0	0	7	164	5	4	171	212	12
07:45 AM	0	8	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	33	0	0	35	43	0
08:00 AM	0	17	0	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	21	0	0	22	39	0
08:15 AM	0	25	0	0	0	0	25	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	30	0	0	30	57	0

### Breakdown by Movement

Movement / Details	NB							SB							WB							EB							Entire Intersection	
	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh	Vehicles	Pedestrians
Volume	0	90	0	0	0	0	90	0	0	3	0	0	3	3	0	0	0	0	0	0	0	0	0	10	248	5	4	258	351	12
PHF	-	0.56	-	-	-	-	0.56	-	-	0.38	-	-	0.25	0.38	-	-	-	-	-	-	-	-	-	0.36	0.38	0.25	0.25	0.38	0.41	0.25
% Bank 1	-	80.0%	-	-	-	-	-	-	-	33.3%	-	-	-	-	-	-	-	-	-	-	-	-	-	70.0%	97.6%	-	-	-	Need a custom report?  Contact: <a href="mailto:support@portablestudies.com">support@portablestudies.com</a>	
% Bank 2	-	6.7%	-	-	-	-	-	-	-	66.7%	-	-	-	-	-	-	-	-	-	-	-	-	-	30.0%	2.4%	-	-	-		
% Bank 3	-	0.0%	-	-	-	-	-	-	-	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	-	-	-		
% Bank 4	-	0.0%	-	-	-	-	-	-	-	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	-	-	-		

## Turning Movement Count Report

Count Name	<b>Notes</b>  U = U Turn    L = Left Turn    T = Thru    R = Right Turn P1 = Pedestrian Direction 1    P2 = Pedestrian Direction 2 Veh = Total Vehicles for Approach	Vehicle Volume		
Traffic Impact Analysis PM		205	% Bank 1	% Bank 2
Location		97.6%	2.9%	
Hancock Rd & Gatewood Ave		% Bank 3	% Bank 4	
Performed By		0.0%	0.0%	
JJ		<b>Pedestrians Volume</b>		
Date	2			
08/18/2016				

### Breakdown by Movement and Time Period

Period	NB							SB							WB							EB							Total Vehicles	Total Pedestrians
	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh		
04:45 PM	0	21	1	0	0	0	22	0	0	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	18	1	0	18	43	1
05:00 PM	0	25	0	0	0	0	25	0	0	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	26	0	0	26	54	0
05:15 PM	0	34	0	0	0	0	34	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	16	0	0	16	51	1
05:30 PM	0	24	0	0	0	0	24	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	31	0	0	31	57	0

### Breakdown by Movement

Movement / Details	NB							SB							WB							EB							Entire Intersection	
	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh	U	L	T	R	P1	P2	Veh	Vehicles	Pedestrians
Volume	0	104	1	0	0	0	105	0	0	6	3	0	0	9	0	0	0	0	1	0	0	0	0	0	91	1	0	91	205	2
PHF	-	0.76	0.25	-	-	-	0.77	-	-	0.50	0.38	-	-	0.75	-	-	-	-	0.25	-	-	-	-	-	0.73	0.25	-	0.73	0.90	0.50
% Bank 1	-	98.1%	100.0%	-				-	-	#####	0.0%				-	-	-	-				-	-	-	97.8%				<b>Need a custom report?</b>  <b>Contact:</b> <a href="mailto:support@portablestudies.com">support@portablestudies.com</a>	
% Bank 2	-	1.9%	0.0%	-				-	-	33.3%	0.0%				-	-	-	-				-	-	-	2.2%					
% Bank 3	-	0.0%	0.0%	-				-	-	0.0%	0.0%				-	-	-	-				-	-	-	0.0%					
% Bank 4	-	0.0%	0.0%	-				-	-	0.0%	0.0%				-	-	-	-				-	-	-	0.0%					

FLORIDA DEPARTMENT OF TRANSPORTATION  
 TRANSPORTATION STATISTICS OFFICE  
 2015 HISTORICAL AADT REPORT

COUNTY: 11 - LAKE

SITE: 8053 - WASHINGTON/OLD SR-50 (RE-ALIGN), 200 FT N OF OLD CR-50 - OFF SYSTEM

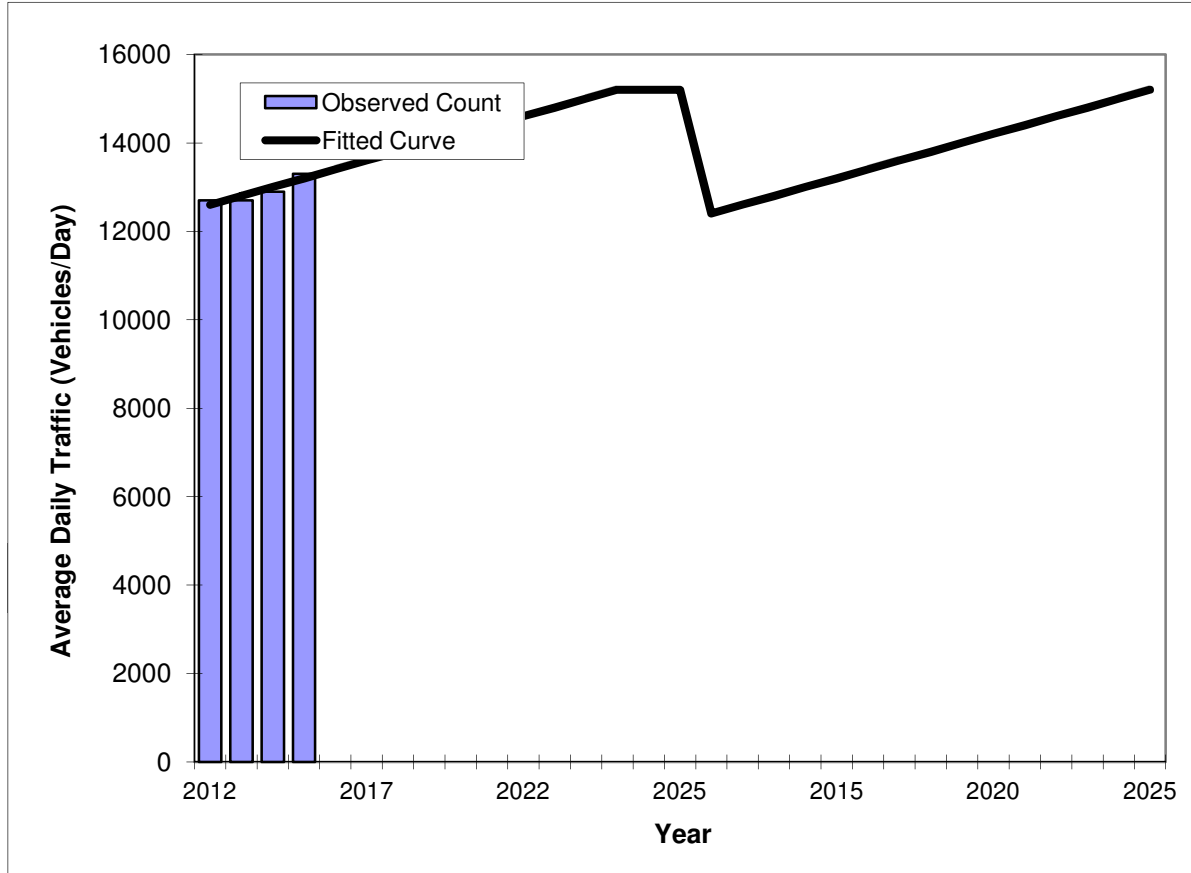
YEAR	AADT	DIRECTION 1	DIRECTION 2	*K FACTOR	D FACTOR	T FACTOR
2015	13300 T	E 6600	W 6700	9.00	54.60	12.60
2014	12900 S	E 6400	W 6500	9.00	54.50	11.30
2013	12700 F	E 6300	W 6400	9.00	54.70	10.90
2012	12700 C	E 6300	W 6400	9.00	55.10	11.00
2011	10000 C	E 0	W 0	9.00	54.20	10.20

AADT FLAGS: C = COMPUTED; E = MANUAL ESTIMATE; F = FIRST YEAR ESTIMATE  
 S = SECOND YEAR ESTIMATE; T = THIRD YEAR ESTIMATE; F = FOURTH YEAR ESTIMATE  
 V = FIFTH YEAR ESTIMATE; 6 = SIXTH YEAR ESTIMATE; X = UNKNOWN  
 \*K FACTOR: STARTING WITH YEAR 2011 IS STANDARDK, PRIOR YEARS ARE K30 VALUES

# TRAFFIC TRENDS

## CR 50 -- east of Hancock Rd

<b>County:</b>	Lake County
<b>Station #:</b>	11 8053
<b>Highway:</b>	CR 50



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2012	12700	12600
2013	12700	12800
2014	12900	13000
2015	13300	13200
<b>2016 Opening Year Trend</b>		
2016	N/A	13400
<b>2017 Mid-Year Trend</b>		
2017	N/A	13600
<b>2018 Design Year Trend</b>		
2018	N/A	13800
<b>TRANPLAN Forecasts/Trends</b>		

**\*\* Annual Trend Increase:** 200  
**Trend R-squared:** 83.3%  
**Trend Annual Historic Growth Rate:** 1.57%  
**Trend Growth Rate (2015 to Design Year):** 1.25%  
**Printed:** 22-Aug-16

**Straight Line Growth Option**

\*Axle-Adjusted

2015 PEAK SEASON FACTOR CATEGORY REPORT - REPORT TYPE: ALL  
 CATEGORY: 1100 LAKE COUNTYWIDE

MOCF: 0.96  
 PSCF

WEEK	DATES	SF	PSCF
1	01/01/2015 - 01/03/2015	0.98	1.02
2	01/04/2015 - 01/10/2015	1.00	1.04
3	01/11/2015 - 01/17/2015	1.03	1.07
4	01/18/2015 - 01/24/2015	1.01	1.05
* 5	01/25/2015 - 01/31/2015	0.99	1.03
* 6	02/01/2015 - 02/07/2015	0.97	1.01
* 7	02/08/2015 - 02/14/2015	0.95	0.99
* 8	02/15/2015 - 02/21/2015	0.95	0.99
* 9	02/22/2015 - 02/28/2015	0.94	0.98
*10	03/01/2015 - 03/07/2015	0.94	0.98
*11	03/08/2015 - 03/14/2015	0.93	0.97
*12	03/15/2015 - 03/21/2015	0.94	0.98
*13	03/22/2015 - 03/28/2015	0.95	0.99
*14	03/29/2015 - 04/04/2015	0.96	1.00
*15	04/05/2015 - 04/11/2015	0.97	1.01
*16	04/12/2015 - 04/18/2015	0.98	1.02
*17	04/19/2015 - 04/25/2015	0.99	1.03
18	04/26/2015 - 05/02/2015	1.00	1.04
19	05/03/2015 - 05/09/2015	1.01	1.05
20	05/10/2015 - 05/16/2015	1.02	1.06
21	05/17/2015 - 05/23/2015	1.03	1.07
22	05/24/2015 - 05/30/2015	1.04	1.08
23	05/31/2015 - 06/06/2015	1.05	1.09
24	06/07/2015 - 06/13/2015	1.06	1.10
25	06/14/2015 - 06/20/2015	1.07	1.11
26	06/21/2015 - 06/27/2015	1.08	1.13
27	06/28/2015 - 07/04/2015	1.08	1.13
28	07/05/2015 - 07/11/2015	1.09	1.14
29	07/12/2015 - 07/18/2015	1.09	1.14
30	07/19/2015 - 07/25/2015	1.08	1.13
31	07/26/2015 - 08/01/2015	1.07	1.11
32	08/02/2015 - 08/08/2015	1.06	1.10
33	08/09/2015 - 08/15/2015	1.06	1.10
34	08/16/2015 - 08/22/2015	1.05	1.09
35	08/23/2015 - 08/29/2015	1.05	1.09
36	08/30/2015 - 09/05/2015	1.04	1.08
37	09/06/2015 - 09/12/2015	1.04	1.08
38	09/13/2015 - 09/19/2015	1.02	1.06
39	09/20/2015 - 09/26/2015	1.01	1.05
40	09/27/2015 - 10/03/2015	1.00	1.04
41	10/04/2015 - 10/10/2015	0.99	1.03
42	10/11/2015 - 10/17/2015	0.98	1.02
43	10/18/2015 - 10/24/2015	0.98	1.02
44	10/25/2015 - 10/31/2015	0.99	1.03
45	11/01/2015 - 11/07/2015	0.99	1.03
46	11/08/2015 - 11/14/2015	0.99	1.03
47	11/15/2015 - 11/21/2015	0.99	1.03
48	11/22/2015 - 11/28/2015	0.99	1.03
49	11/29/2015 - 12/05/2015	0.98	1.02
50	12/06/2015 - 12/12/2015	0.98	1.02
51	12/13/2015 - 12/19/2015	0.99	1.03
52	12/20/2015 - 12/26/2015	1.01	1.05
53	12/27/2015 - 12/31/2015	1.03	1.07

\* PEAK SEASON

03-MAR-2016 11:19:21

830UPD

5\_1100\_PKSEASON.TXT





Table with columns: ROAD NAME, FROM, TO, NUMBER OF LANES, AREA TYPE, MAINTAINING AGENCY, JURISDICTION, FUNCTIONAL CLASSIFICATION, LOS CAPACITY, LOS, LOS CODE, LOS + LOS, PEAK HOUR DIRECTION CAPACITIES (A-E), 2015 EBNB, 2014 EBNB, 2015 WRSB, 2014 WRSB, 2015 LOS, 2014 LOS, LOS RATIO, LOS + LOS, LOS RATIO. The table contains a comprehensive list of road segments with their respective metrics and performance indicators.



COUNTY TRANSPORTATION MANAGEMENT SYSTEM
LAKE COUNTY TMS SEGMENT REPORT - 2015/16 Level of Service

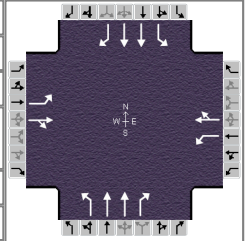
Posted on January 1, 2016

Table with columns for Road Name, From, To, Number of Lanes, Area Type, Maintaining Agency, Jurisdiction, Functional Classification, LOS Capacity, LOS SIS, LOS Code, LOS+, Peak Hour Direction Capacities (A-E), 2015/16 Level of Service (RESERVED, TOTAL, V/C RATIO, LOS).

## **Appendix D: Existing Conditions Intersection Analysis**

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Trident			Duration, h	0.25
Analyst	Trident	Analysis Date	8/24/2016	Area Type	Other
Jurisdiction	City of Minneola/Lake County	Time Period	AM Peak	PHF	0.92
Intersection	Hancock Road & Fosgate A	Analysis Year	Existing	Analysis Period	1 > 7:00
File Name	1_Ext AM.xus				
Project Description	Traffic Impact Analysis				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	12	93	46	111	89	27	175	49	76	72	102	19

Signal Information													
Cycle, s	120.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	6.9	1.3	56.4	2.5	6.9	11.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	5.0	5.0	5.0	5.0	0.0	5.0			
				Red	2.0	2.0	2.0	2.0	0.0	2.0			

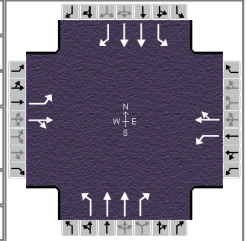
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	9.5	18.0	16.3	24.9	22.2	71.7	13.9	63.4
Change Period, (Y+R <sub>c</sub> ), s	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Max Allow Headway (MAH), s	4.3	4.2	4.3	4.2	4.3	0.0	4.3	0.0
Queue Clearance Time (g <sub>s</sub> ), s	2.8	10.3	9.2	8.8	14.7		7.3	
Green Extension Time (g <sub>e</sub> ), s	0.0	0.7	0.3	0.8	0.5	0.0	0.2	0.0
Phase Call Probability	0.35	1.00	0.98	1.00	1.00		0.93	
Max Out Probability	0.00	0.00	0.00	0.00	0.00		0.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	13	126		121	112		190	53	41	78	111	12
Adjusted Saturation Flow Rate (s), veh/h/ln	1757	1781		1757	1801		1757	1756	1563	1757	1756	1563
Queue Service Time (g <sub>s</sub> ), s	0.8	8.3		7.2	6.8		12.7	0.9	1.5	5.3	2.1	0.5
Cycle Queue Clearance Time (g <sub>c</sub> ), s	0.8	8.3		7.2	6.8		12.7	0.9	1.5	5.3	2.1	0.5
Green Ratio (g/C)	0.11	0.09		0.19	0.15		0.13	0.54	0.54	0.06	0.47	0.47
Capacity (c), veh/h	192	164		225	268		223	1894	843	101	1651	735
Volume-to-Capacity Ratio (X)	0.068	0.770		0.536	0.417		0.853	0.028	0.049	0.772	0.067	0.016
Available Capacity (c <sub>a</sub> ), veh/h	493	396		425	503		419	1894	843	419	1651	735
Back of Queue (Q), veh/ln (50th percentile)	0.4	4.1		3.3	3.1		6.2	0.4	0.6	2.7	0.9	0.2
Queue Storage Ratio (RQ) (50th percentile)	0.04	0.00		0.00	0.32		0.44	0.00	0.04	0.14	0.00	0.02
Uniform Delay (d <sub>1</sub> ), s/veh	47.6	53.3		43.3	46.3		51.3	12.9	13.1	55.8	17.4	17.0
Incremental Delay (d <sub>2</sub> ), s/veh	0.1	7.4		2.0	1.0		8.9	0.0	0.1	11.6	0.1	0.0
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	47.8	60.7		45.2	47.4		60.2	13.0	13.2	67.4	17.5	17.0
Level of Service (LOS)	D	E		D	D		E	B	B	E	B	B
Approach Delay, s/veh / LOS	59.5	E		46.3	D		44.6	D		36.9	D	
Intersection Delay, s/veh / LOS	45.6						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.0	C	3.0	C	2.3	B	2.3	B
Bicycle LOS Score / LOS	0.7	A	0.9	A	0.7	A	0.7	A

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Trident			Duration, h	0.25
Analyst	Trident	Analysis Date	8/24/2016	Area Type	Other
Jurisdiction	City of Minneola/Lake County	Time Period	PM Peak	PHF	0.92
Intersection	Hancock Road & Fosgate A	Analysis Year	Existing	Analysis Period	1 > 7:00
File Name	1_Ext PM.xus				
Project Description	Traffic Impact Analysis				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	14	45	80	92	38	7	88	97	87	8	88	14

Signal Information													
Cycle, s	120.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	1.8	6.6	66.8	2.8	5.4	8.8			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	5.0	0.0	5.0	5.0	0.0	5.0			
				Red	2.0	0.0	2.0	2.0	0.0	2.0			

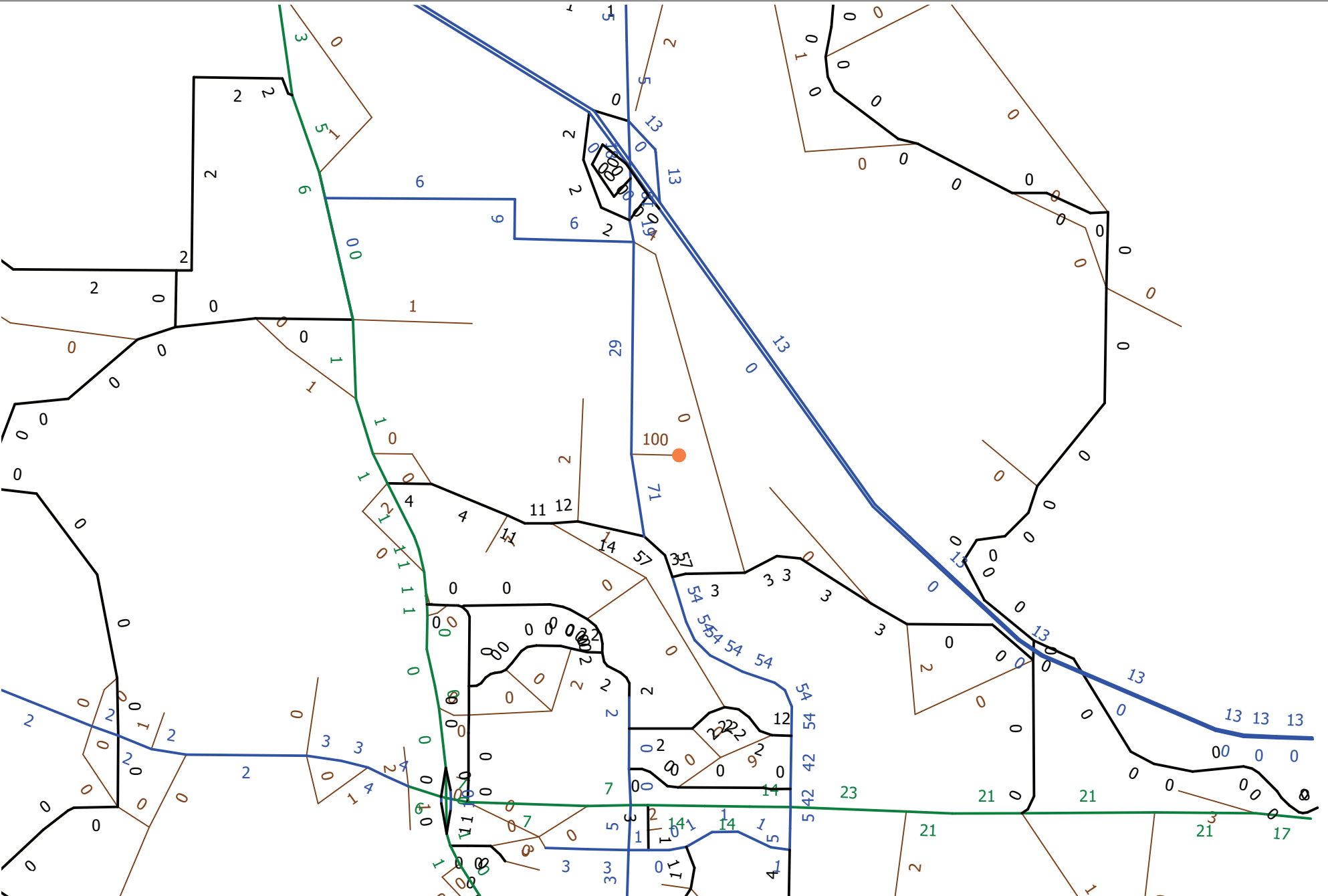
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	9.8	15.8	15.1	21.1	15.4	80.4	8.8	73.8
Change Period, (Y+R <sub>c</sub> ), s	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Max Allow Headway (MAH), s	4.3	4.3	4.3	4.3	4.3	0.0	4.3	0.0
Queue Clearance Time (g <sub>s</sub> ), s	2.9	8.4	8.2	4.7	8.4		2.6	
Green Extension Time (g <sub>e</sub> ), s	0.0	0.4	0.2	0.5	0.3	0.0	0.0	0.0
Phase Call Probability	0.40	0.99	0.96	1.00	0.96		0.25	
Max Out Probability	0.00	0.00	0.00	0.00	0.00		0.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	15	92		100	46		96	105	48	9	96	8
Adjusted Saturation Flow Rate (s), veh/h/ln	1757	1701		1757	1814		1757	1756	1563	1757	1756	1563
Queue Service Time (g <sub>s</sub> ), s	0.9	6.4		6.2	2.7		6.4	1.4	1.5	0.6	1.5	0.3
Cycle Queue Clearance Time (g <sub>c</sub> ), s	0.9	6.4		6.2	2.7		6.4	1.4	1.5	0.6	1.5	0.3
Green Ratio (g/C)	0.10	0.07		0.14	0.12		0.07	0.61	0.61	0.01	0.56	0.56
Capacity (c), veh/h	199	124		204	213		122	2147	956	26	1954	870
Volume-to-Capacity Ratio (X)	0.077	0.745		0.489	0.214		0.782	0.049	0.050	0.337	0.049	0.009
Available Capacity (c <sub>a</sub> ), veh/h	495	395		422	502		470	2147	956	470	1954	870
Back of Queue (Q), veh/ln (50th percentile)	0.4	3.1		2.8	1.3		3.2	0.6	0.5	0.3	0.6	0.1
Queue Storage Ratio (RQ) (50th percentile)	0.04	0.00		0.00	0.13		0.23	0.00	0.04	0.02	0.00	0.01
Uniform Delay (d <sub>1</sub> ), s/veh	49.4	54.5		46.9	47.9		54.9	9.3	9.4	58.5	12.1	11.9
Incremental Delay (d <sub>2</sub> ), s/veh	0.2	8.5		1.8	0.5		10.3	0.0	0.1	7.5	0.0	0.0
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	49.6	63.1		48.7	48.4		65.3	9.4	9.5	66.0	12.2	11.9
Level of Service (LOS)	D	E		D	D		E	A	A	E	B	B
Approach Delay, s/veh / LOS	61.2	E		48.6	D		30.9	C		16.3	B	
Intersection Delay, s/veh / LOS	37.7						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.0	C	3.0	C	2.2	B	2.3	B
Bicycle LOS Score / LOS	0.7	A	0.7	A	0.7	A	0.6	A

## **Appendix E: Model Trip Distribution Plot**

2020 Model Run  
Trip Distribution

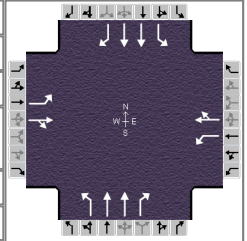




## **Appendix F: Projected Conditions Intersection Analysis**

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Trident			Duration, h	0.25
Analyst	Trident	Analysis Date	8/24/2016	Area Type	Other
Jurisdiction	City of Minneola/Lake County	Time Period	AM Peak	PHF	0.92
Intersection	Hancock Road & Fosgate A	Analysis Year	Projected	Analysis Period	1 > 7:00
File Name	1_Proj AM.xus				
Project Description	Traffic Impact Analysis				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	15	97	48	115	93	30	182	462	79	81	687	32

Signal Information													
Cycle, s	120.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	7.7	1.0	55.2	2.9	6.7	11.4			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	5.0	5.0	5.0	5.0	0.0	5.0			
				Red	2.0	2.0	2.0	2.0	0.0	2.0			

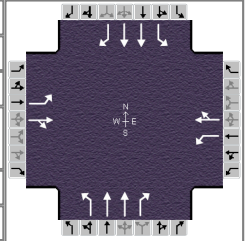
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	9.9	18.4	16.6	25.1	22.7	70.3	14.7	62.2
Change Period, (Y+R <sub>c</sub> ), s	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Max Allow Headway (MAH), s	4.3	4.2	4.3	4.2	4.3	0.0	4.3	0.0
Queue Clearance Time (g <sub>s</sub> ), s	3.0	10.7	9.5	9.1	15.2		7.9	
Green Extension Time (g <sub>e</sub> ), s	0.0	0.8	0.3	0.9	0.5	0.0	0.2	0.0
Phase Call Probability	0.42	1.00	0.98	1.00	1.00		0.95	
Max Out Probability	0.00	0.00	0.00	0.00	0.00		0.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	16	132		125	117		198	502	45	88	747	17
Adjusted Saturation Flow Rate (s), veh/h/ln	1757	1781		1757	1800		1757	1756	1563	1757	1756	1563
Queue Service Time (g <sub>s</sub> ), s	1.0	8.7		7.5	7.1		13.2	9.5	1.7	5.9	17.5	0.7
Cycle Queue Clearance Time (g <sub>c</sub> ), s	1.0	8.7		7.5	7.1		13.2	9.5	1.7	5.9	17.5	0.7
Green Ratio (g/C)	0.12	0.10		0.19	0.15		0.13	0.53	0.53	0.06	0.46	0.46
Capacity (c), veh/h	197	169		229	271		231	1852	824	113	1617	720
Volume-to-Capacity Ratio (X)	0.083	0.777		0.546	0.433		0.858	0.271	0.054	0.779	0.462	0.024
Available Capacity (c <sub>a</sub> ), veh/h	491	392		425	496		410	1852	824	410	1617	720
Back of Queue (Q), veh/ln (50th percentile)	0.4	4.3		3.4	3.3		6.4	3.9	0.6	3.0	7.5	0.3
Queue Storage Ratio (RQ) (50th percentile)	0.05	0.00		0.00	0.34		0.46	0.00	0.04	0.16	0.00	0.03
Uniform Delay (d <sub>1</sub> ), s/veh	47.0	53.0		43.0	46.3		51.0	15.7	13.8	55.3	22.2	17.7
Incremental Delay (d <sub>2</sub> ), s/veh	0.2	7.4		2.0	1.1		9.0	0.4	0.1	10.9	1.0	0.1
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	47.2	60.5		45.0	47.4		60.0	16.0	13.9	66.2	23.1	17.7
Level of Service (LOS)	D	E		D	D		E	B	B	E	C	B
Approach Delay, s/veh / LOS	59.0	E		46.2	D		27.6	C		27.5	C	
Intersection Delay, s/veh / LOS	32.1						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.0	C	3.0	C	2.3	B	2.3	B
Bicycle LOS Score / LOS	0.7	A	0.9	A	1.1	A	1.2	A

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Trident			Duration, h	0.25
Analyst	Trident	Analysis Date	8/24/2016	Area Type	Other
Jurisdiction	City of Minneola/Lake County	Time Period	PM Peak	PHF	0.92
Intersection	Hancock Road & Fosgate A	Analysis Year	Projected	Analysis Period	1 > 7:00
File Name	1_Proj PM.xus				
Project Description	Traffic Impact Analysis				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	27	47	83	96	40	13	103	680	90	11	521	21

Signal Information													
Cycle, s	120.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	2.3	0.3	64.5	4.4	4.1	9.5			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	5.0	5.0	5.0	5.0	0.0	5.0			
				Red	2.0	2.0	2.0	2.0	0.0	2.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	2.0	3.0	2.0	3.0
Phase Duration, s	11.4	16.5	15.4	20.5	16.6	78.8	9.3	71.5
Change Period, (Y+R <sub>c</sub> ), s	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Max Allow Headway (MAH), s	4.3	4.3	4.3	4.3	4.3	0.0	4.3	0.0
Queue Clearance Time (g <sub>s</sub> ), s	3.8	9.0	8.4	5.1	9.5		2.8	
Green Extension Time (g <sub>e</sub> ), s	0.0	0.5	0.2	0.5	0.3	0.0	0.0	0.0
Phase Call Probability	0.62	1.00	0.97	1.00	0.98		0.33	
Max Out Probability	0.00	0.00	0.00	0.00	0.00		0.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	29	100		104	51		112	739	53	12	566	12
Adjusted Saturation Flow Rate (s), veh/h/ln	1730	1670		1757	1796		1757	1756	1563	1757	1756	1563
Queue Service Time (g <sub>s</sub> ), s	1.8	7.0		6.4	3.1		7.5	12.8	1.7	0.8	10.7	0.4
Cycle Queue Clearance Time (g <sub>c</sub> ), s	1.8	7.0		6.4	3.1		7.5	12.8	1.7	0.8	10.7	0.4
Green Ratio (g/C)	0.12	0.08		0.15	0.11		0.08	0.60	0.60	0.02	0.54	0.54
Capacity (c), veh/h	215	132		209	203		141	2102	935	34	1888	840
Volume-to-Capacity Ratio (X)	0.136	0.759		0.499	0.252		0.796	0.352	0.057	0.355	0.300	0.014
Available Capacity (c <sub>a</sub> ), veh/h	484	384		423	474		455	2102	935	455	1888	840
Back of Queue (Q), veh/ln (50th percentile)	0.8	3.3		3.0	1.5		3.7	5.1	0.6	0.4	4.4	0.2
Queue Storage Ratio (RQ) (50th percentile)	0.08	0.00		0.00	0.15		0.27	0.00	0.04	0.02	0.00	0.01
Uniform Delay (d <sub>1</sub> ), s/veh	47.8	54.1		46.4	48.6		54.2	12.3	10.0	58.1	15.3	12.9
Incremental Delay (d <sub>2</sub> ), s/veh	0.3	8.6		1.8	0.6		9.7	0.5	0.1	6.2	0.4	0.0
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	48.1	62.7		48.2	49.3		64.0	12.7	10.1	64.3	15.7	13.0
Level of Service (LOS)	D	E		D	D		E	B	B	E	B	B
Approach Delay, s/veh / LOS	59.4	E		48.6	D		18.9	B		16.6	B	
Intersection Delay, s/veh / LOS	23.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.0	C	3.0	C	2.3	B	2.3	B
Bicycle LOS Score / LOS	0.7	A	0.7	A	1.2	A	1.0	A

TWO-WAY STOP CONTROL SUMMARY								
<b>General Information</b>				<b>Site Information</b>				
Analyst	Trident			Intersection	Hancock Rd & Gatewood Ave			
Agency/Co.	Trident			Jurisdiction	City of Minneola/Lake County			
Date Performed	8/24/2016			Analysis Year	Projected			
Analysis Time Period	AM Peak							
Project Description <i>Traffic Impact Analysis</i>								
East/West Street: <i>Gatewood Ave</i>				North/South Street: <i>Hancock Rd</i>				
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>				
<b>Vehicle Volumes and Adjustments</b>								
<b>Major Street</b>	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	102	394	21	9	517	0		
Peak-Hour Factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96		
Hourly Flow Rate, HFR (veh/h)	106	410	21	9	538	0		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Raised curb							
RT Channelized			0			0		
Lanes	1	2	0	1	2	0		
Configuration	L	T	TR	L	T	TR		
Upstream Signal		0			0			
<b>Minor Street</b>	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	0	0	292	84	0	35		
Peak-Hour Factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96		
Hourly Flow Rate, HFR (veh/h)	0	0	304	87	0	36		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
<b>Delay, Queue Length, and Level of Service</b>								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L		LTR			LTR	
v (veh/h)	106	9		123			304	
C (m) (veh/h)	1040	1139		278			775	
v/c	0.10	0.01		0.44			0.39	
95% queue length	0.34	0.02		2.14			1.88	
Control Delay (s/veh)	8.9	8.2		27.8			12.6	
LOS	A	A		D			B	
Approach Delay (s/veh)	--	--	27.8			12.6		
Approach LOS	--	--	D			B		

TWO-WAY STOP CONTROL SUMMARY								
<b>General Information</b>				<b>Site Information</b>				
Analyst	Trident			Intersection	Hancock Rd & Gatewood Ave			
Agency/Co.	Trident			Jurisdiction	City of Minneola/Lake County			
Date Performed	8/24/2016			Analysis Year	Projected			
Analysis Time Period	PM Peak							
Project Description <i>Traffic Impact Analysis</i>								
East/West Street: <i>Gatewood Ave</i>				North/South Street: <i>Hancock Rd</i>				
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>				
<b>Vehicle Volumes and Adjustments</b>								
<b>Major Street</b>	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	118	515	84	34	401	3		
Peak-Hour Factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96		
Hourly Flow Rate, HFR (veh/h)	122	536	87	35	417	3		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Raised curb							
RT Channelized			0				0	
Lanes	1	2	0	1	2	0		
Configuration	L	T	TR	L	T	TR		
Upstream Signal		0			0			
<b>Minor Street</b>	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	0	0	103	45	0	18		
Peak-Hour Factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96		
Hourly Flow Rate, HFR (veh/h)	0	0	107	46	0	18		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
<b>Delay, Queue Length, and Level of Service</b>								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L		LTR			LTR	
v (veh/h)	122	35		64			107	
C (m) (veh/h)	1150	968		278			835	
v/c	0.11	0.04		0.23			0.13	
95% queue length	0.36	0.11		0.87			0.44	
Control Delay (s/veh)	8.5	8.9		21.8			9.9	
LOS	A	A		C			A	
Approach Delay (s/veh)	--	--		21.8			9.9	
Approach LOS	--	--		C			A	