

TIER 2 TRAFFIC IMPACT STUDY

THE RESERVE AT LAKE RIDGE
CITY OF MINNEOLA, FLORIDA



Prepared for:

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May 2016

TPD No 4774

PROFESSIONAL ENGINEERING CERTIFICATION

I hereby certify that I am a Professional Engineer properly registered in the State of Florida practicing with Traffic Planning & Design, Inc., a corporation authorized to operate as an engineering business, EB-3702, by the State of Florida Department of Professional Regulation, Board of Professional Engineers, and that I have prepared or approved the evaluations, findings, opinions, conclusions, or technical advice attached hereto for:

PROJECT: The Reserve at Lake Ridge
LOCATION: City of Minneola, Florida
CLIENT: Hibiscus Land Developments, Inc.

I hereby 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: Turgut Dervish, P.E.
P.E. No.: 40200
DATE: May 25, 2016
SIGNATURE: _____

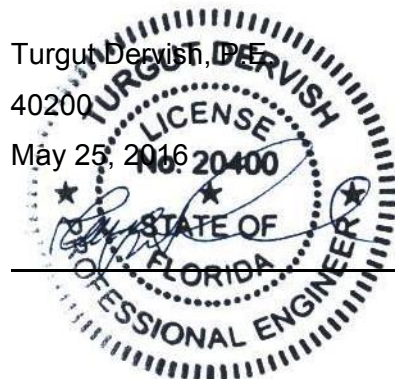


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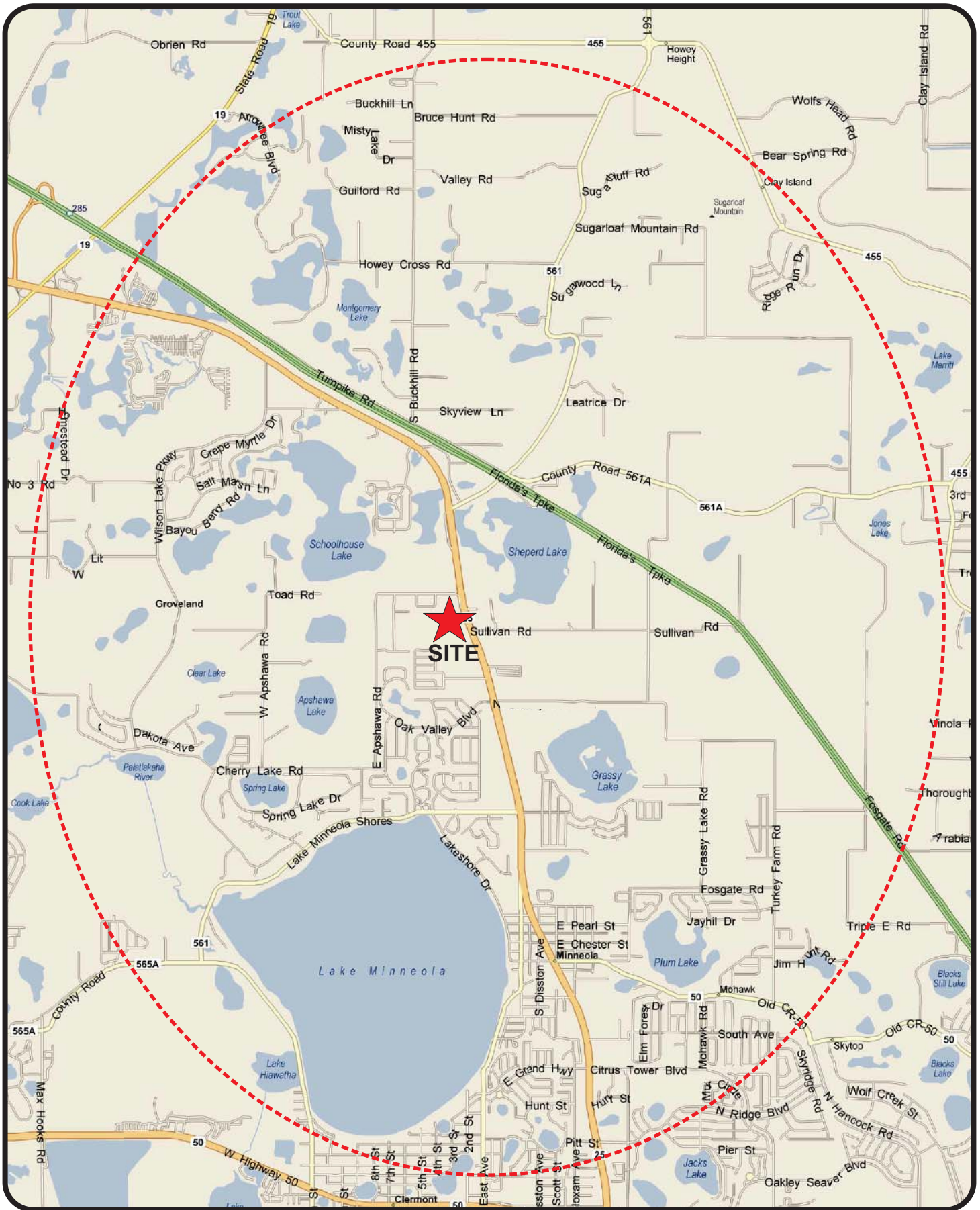
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INTRODUCTION

This study was prepared in support of the proposed development of the Reserve at Lake Ridge, a residential development in Minneola, Lake County. Located on US 27 opposite Sullivan Road, the development will consist of 87 single family units. **Figure 1** depicts the site location. As will be documented herein, the proposed development is estimated to generate 87 new P.M. peak hour trips requiring a Tier 2 Traffic Impact Study (TIS) as per Lake-Sumter MPO requirements. In the vicinity of the proposed development, US 27 is a four-lane divided arterial which carries a daily traffic volume of 29,500 vehicles and has a posted speed limit is 55 mph. Access to the site will be provided from US 27 at a full median opening opposite Sullivan Road.

The study was conducted at per Tier 2 TIS guidelines of the Lake-Sumter MPO. Data used in the study consisted of site plan/development information by Project Engineers, roadway segment data and traffic information obtained from the Lake County TMS Segment report, 20015/16 Level of Service and P.M. peak hour traffic data collected by Traffic Planning and Design, Inc. (TPD) personnel.





The Reserve at Lake Ridge
 Project № 4774
Figure 1

Site Location



EXISTING CONDITIONS ANALYSIS

Existing conditions on the area roadways were evaluated within an area of influence of 4.3 miles. This represents one-half of the total trip length contained in the Lake County Transportation Impact Fee Update Study for single family developments. Classified roadways within this influence area were included in the analysis. Additionally, the following signalized intersections were included in the analysis:

- US 27 and CR 561
- US 27 and Oak Valley Boulevard/Citrus Grove Road
- US 27 and Lake Minneola Shores (CR 561A)

The analysis of the study roadways and intersections was accomplished for the P.M. peak hour traffic conditions.

Roadway Segment Analysis

A capacity analysis was conducted for the classified roadways as summarized in **Table 1**. The table shows the roadways by segment along with their number of lanes, functional classification, adopted LOS/capacities, P.M. peak hour volumes and resultant Levels of Service. As can be seen, all impacted roadway segments currently operate satisfactorily within their adopted Levels of Service.

Intersection Analysis

The study intersections were analyzed in accordance with the procedures of the *2010 Highway Capacity Manual (HCM)* and Highway Capacity Software HCS. In the analysis, existing P.M. peak hour traffic volumes, intersection geometry and signal timing data were used. The intersection volumes determined from 4 - 6 P.M. turning movement counts and seasonally adjusted counts are depicted in **Figure 2**. Detailed traffic counts are included in **Appendix A** along with seasonal factors and signal timings.

The results of the intersection capacity analysis are summarized in **Table 2**. This table shows that the study intersections are currently operating at satisfactory Levels of Service. The HCS capacity analysis worksheets are included in **Appendix B**.



**Table 1
Existing P.M. Peak Hour Roadway Capacity Analysis**

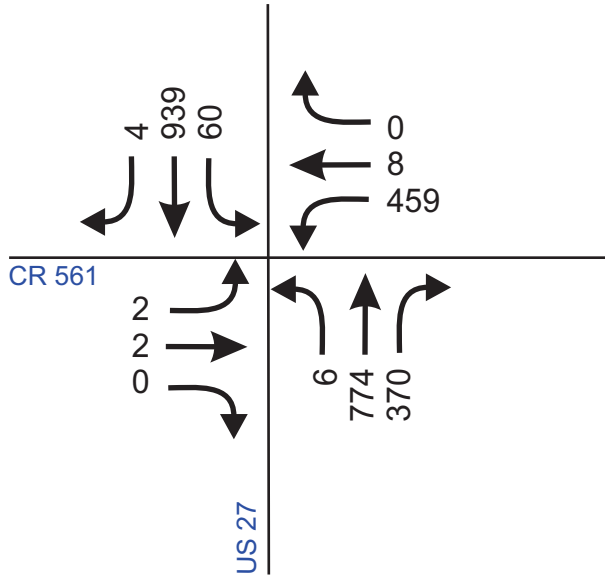
Roadway Segment	# of Lanes	Function Class	LOS		Peak Hour/ Peak Direction		V/C Ratio	LOS
			Standard	Peak Hour Capacity	Direction	Volume		
US 27								
SR 19 to CR 561	4	Art 1	C	1,740	SB	808	0.46	C
CR 561 to CR 561A	4	Art 1	C	1,910	SB	1,057	0.55	C
CR 561A to CR 561 (Main Ave)	4	Art 1	C	1,910	SB	1,287	0.67	C
CR 561 (Main Ave) to CR 50	4	Art 1	C	1,910	SB	1,287	0.67	C
CR 50 to Grand Highway	6	Art 1	C	2,940	NB	1,147	0.39	C
Grand Highway to SR 50	6	Art 1	C	2,940	NB	788	0.27	C
CR 561								
CR 455 to Howey Cross Rd	2	Maj Coll	D	720	NB	486	0.64	C
Howey Cross Rd to CR 561A	2	Maj Coll	D	720	NB	335	0.47	C
CR 561A to US 27	2	Maj Coll	D	792	NB	439	0.55	C
US 27 to East Ave	2	Maj Coll	D	675	NB	132	0.20	C
East Ave to Minneola Ave	2	Collector	D	675	NB	132	0.20	C
CR 561A								
CR 565A to Jalarmy Rd	2	Maj. Coll	D	675	WB	275	0.41	C
Jalarmy Rd to US 27	2	Maj. Coll	D	675	WB	427	0.63	D
CR 561 to Scrub Jay Ln	2	Min. Coll	C	675	WB	85	0.13	C
Scrub Jay Ln to Triple E Rd	2	Min. Coll	D	675	WB	78	0.13	C
Sullivan Road								
US 27 to Eastern Terminus	2	Collector	D	675	WB	10	0.01	C
N. Grassy Road								
US 27 to Turkey Farm Rd	2	Collector	D	675	EB	66	0.10	D
Grand Highway								
SR 50 to Citrus Tower Blvd	2	Min. Coll	D	675	EB	184	0.27	C
Citrus Tower Boulevard								
US 27 to Oakley Seaver Dr	2	Maj. Coll	D	792	WB	555	0.70	C



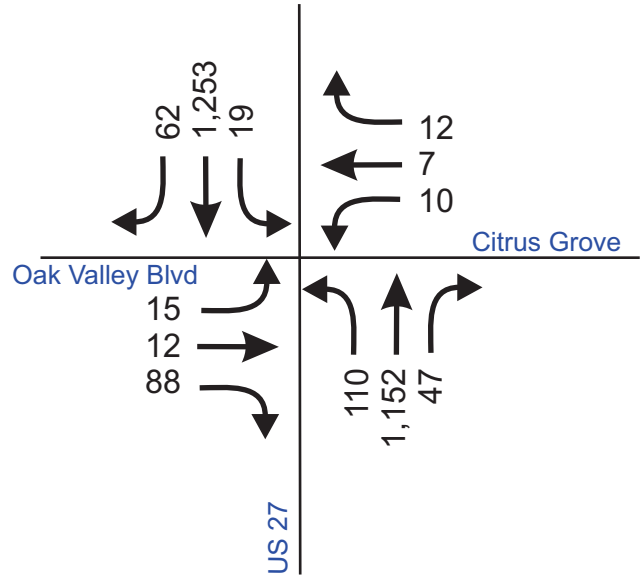
**Table 2
Existing Intersection Capacity Analysis**

Intersection	Control	EB		WB		NB		SB		Overall	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
US 27 & CR 561	Signal	18.7	B	46.0	D	22.3	C	22.3	C	26.5	C
U 27 & Lake Minneola Shores (CR 561A)	Signal	59.4	E	51.5	D	44.1	D	41.2	D	45.0	D
US 27 & Oak Valley Boulevard / Citrus Grove Road	Signal	47.2	D	42.8	D	18.0	B	21.6	C	21.2	C

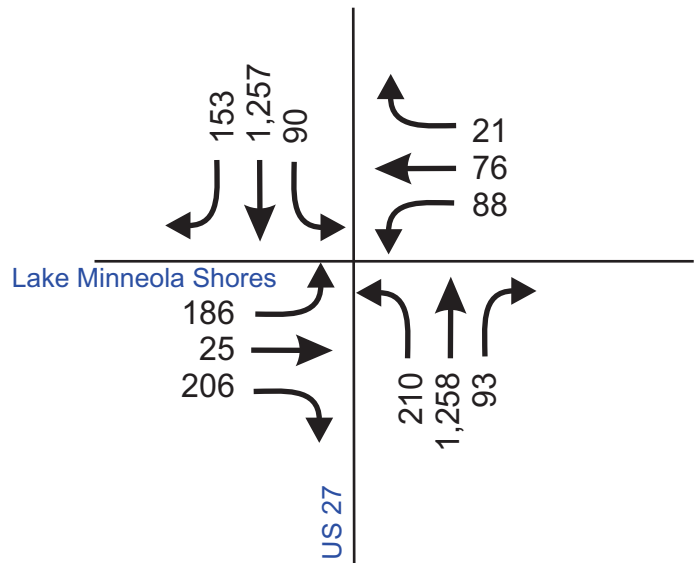




CR 561 & US 27



Oak Valley Boulevard/Citrus Grove & US 27



Lake Minneola Shores & US 27



PROPOSED DEVELOPMENT AND TRIP GENERATION

The proposed development is for an 87 single-family unit residential project. **Figure 3** depicts the site plan and its access configuration. To determine the impact of this development on the area roadways, an analysis of its trip generation characteristics was made. This included the determination of the number of trips generated and their distribution onto the surrounding roadways.

Trip Generation

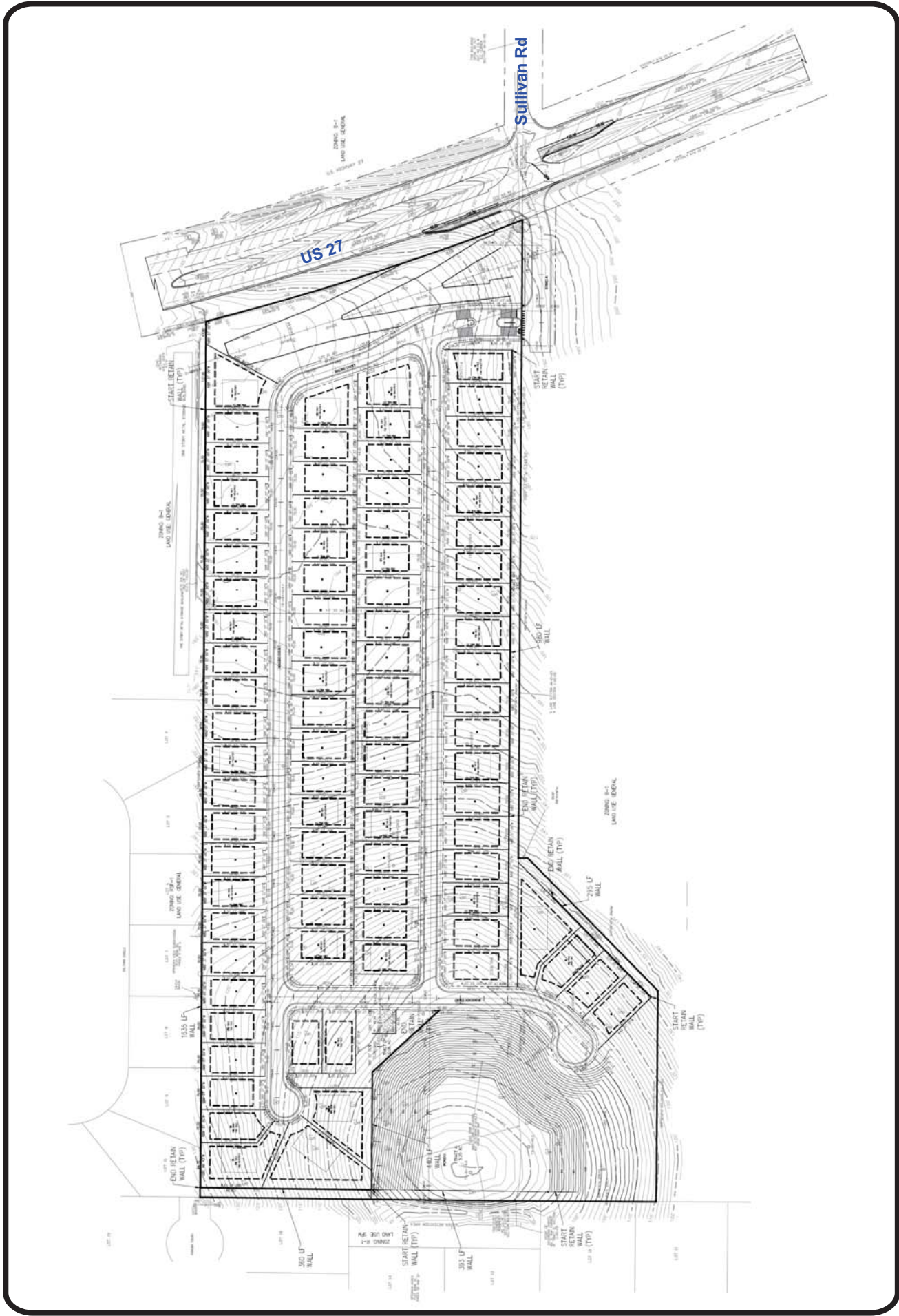
The trip generation of the proposed development was calculated using rates obtained from the Institute of *Transportation Engineers (ITE) Trip Generation Manual, 9th Edition*. This calculation is summarized in **Table 3** which shows the project's daily and P.M. peak hour generation. The trip generation sheets are included in **Appendix C**.

**Table 3
Trip Generation Summary**

ITE Code	Land Use	Quantity (DU)	Daily		PM Peak Hour			
			Rate	Trips	Rate	Enter	Exit	Total
210	Single Family Residential	87	9.52	828	1.00	55	32	87
			--	828	--	55	32	87

The proposed development is estimated to generate 828 daily trips and 87 P.M. peak hour trips, 55 entering and 32 exiting.





The Reserve at Lake Ridge
 Project No 4774
 Figure 3



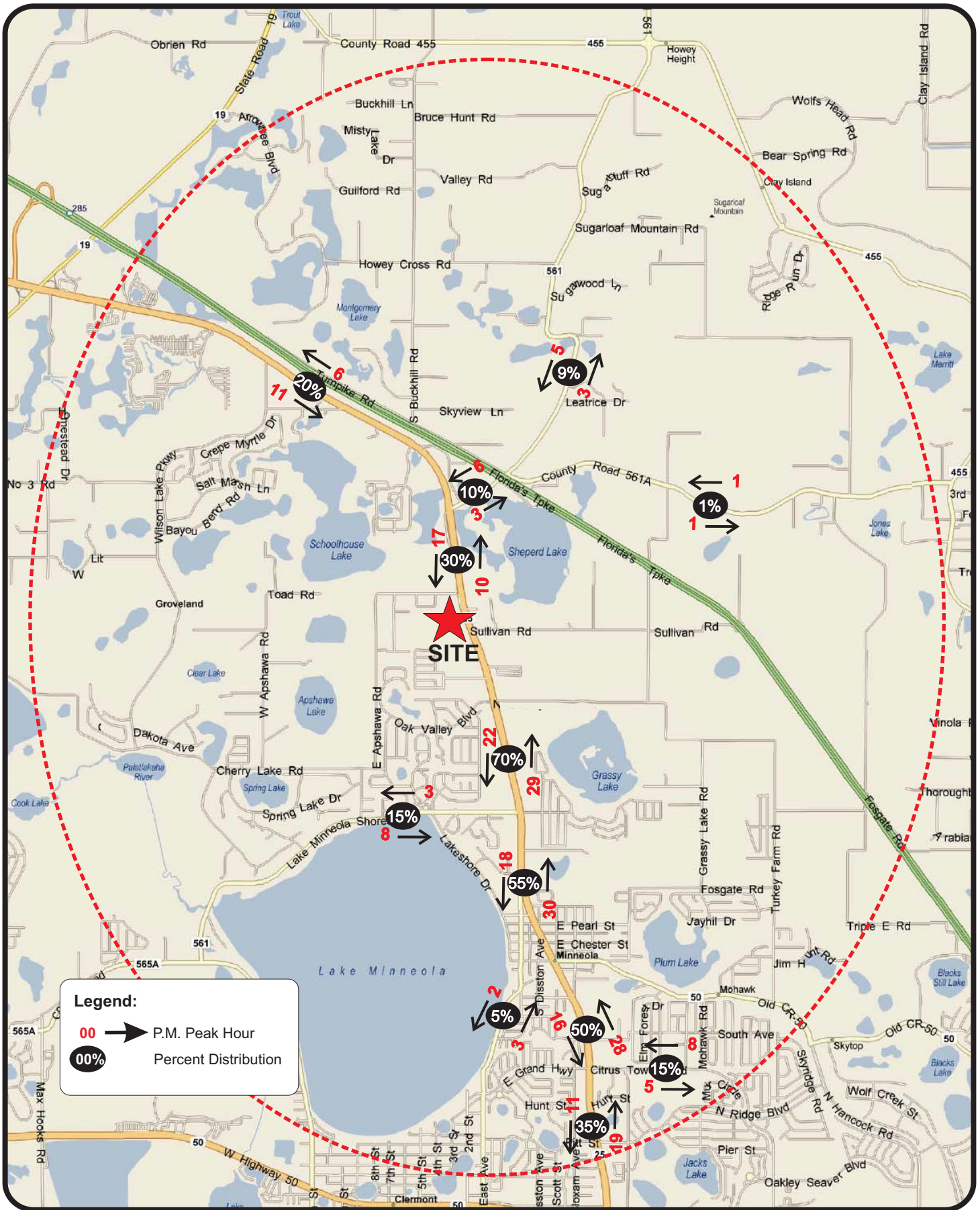
Site Plan



Trip Distribution / Trip Assignment

The distribution of the generated trips on US 27 in the general vicinity of the project was determined from intersection counts made at US 27 and Oak Valley Boulevard/Citrus Grove Road serving residential developments on both sides of US 27. The distribution of the generated trip away from the project vicinity was based upon existing intersection/roadway counts. The distribution pattern thus determined is shown in **Figure 4**. Utilizing this distribution pattern, the development's P.M. peak hour trips were assigned to the area roadways also shown in Figure 4.





The Reserve at Lake Ridge
Project No 4774
Figure 4

Project Distribution/Assignment



PROJECTED TRAFFIC CONDITIONS

Projected traffic conditions were assessed in order to evaluate the impact of the proposed development within its area of influence. The projected conditions were estimated by combining the P.M. peak hour project trips on each road segment with background traffic volumes. Background traffic volumes were determined by adding reserved trips obtained from the County's TMS data for each roadway segment to the existing traffic volumes of the segment.

Roadway Segment Analysis

Table 4 is an analysis of the projected traffic conditions. This table lists the roadway segments along with their number of lanes, functional classification, existing/projected traffic volumes, LOS capacities and resultant Levels of Service. The table reveals that the study roadway segments are projected to continue to operate satisfactorily within their adopted LOS standards.

Intersection Analysis

The projected traffic volumes at the study intersections are depicted in **Figure 5**. The figure shows the existing P.M. peak hour volumes combined with reserved trips and project trips. The intersections were analyzed similar to the existing conditions analysis utilizing HCS software in accordance with the *2010 Highway Capacity Manual (HCM)*. This analysis as summarized in **Table 5** indicates that the study intersection and site access driveways will operate satisfactorily when project trips are added. The HCS capacity analysis worksheets are included in **Appendix D**.

Site Access/Turn Lane Analysis

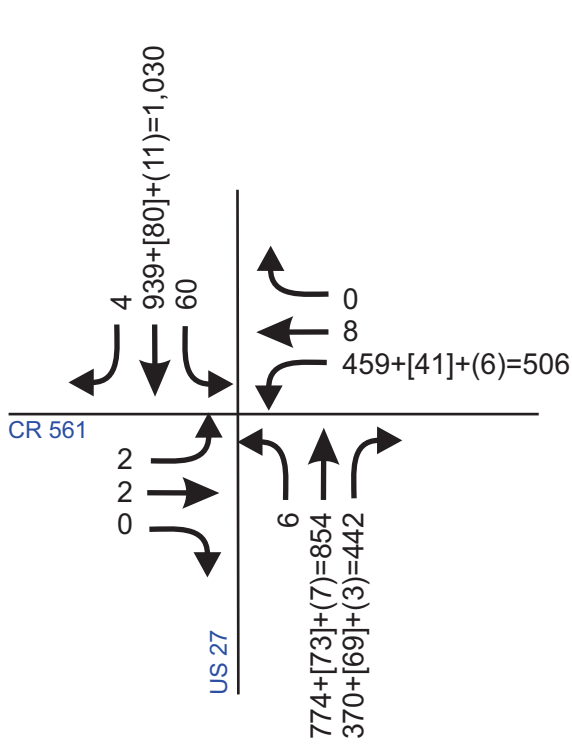
The site is proposed to be served by an access connection from US 27 opposite Sullivan Road. Separate right and left turns are proposed on US 27 in the southbound and northbound directions. The access will require an FDOT connection permit and adherence to the applicable standards/specifications.



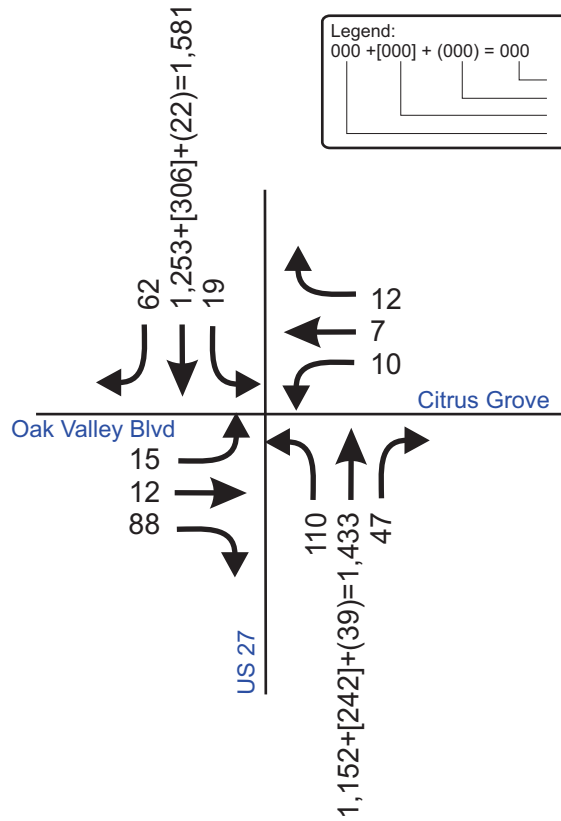
**Table 4
Projected P.M. Peak Hour Roadway Analysis**

Roadway Segment	# of Lanes	Function Class	Adopted		Direction	Peak Hour Traffic Volumes			V/C Ratio	LOS	
			LOS	Capacity		Existing	Reserved	Project			Total
US 27											
SR 19 to CR 561	4	Art 1	C	1,740	SB	808	80	11	899	0.52	C
CR 561 to CR 561A	4	Art 1	C	1,910	SB	1,057	306	22	1,385	0.73	C
CR 561A to CR 561 (Main Ave)	4	Art 1	C	1,910	SB	1,287	180	18	1,485	0.78	C
CR 561 (Main Ave) to CR 50	4	Art 1	C	1,910	SB	1,147	157	18	1,462	0.77	C
CR 50 to Grand Highway	6	Art 1	C	2,940	NB	1,147	173	16	1,336	0.45	C
Grand Highway to SR 50	6	Art 1	C	2,940	NB	788	191	11	990	0.34	C
CR 561											
CR 455 to Howey Cross Rd	2	Maj Coll	D	720	NB	486	42	3	531	0.74	C
Howey Cross Rd to CR 561A	2	Maj Coll	D	720	NB	335	68	3	406	0.56	C
CR 561A to US 27	2	Maj Coll	D	792	NB	439	69	3	511	0.65	C
US 27 to East Ave	2	Maj Coll	D	675	NB	132	0	3	135	0.20	C
East Ave to Minneola Ave	2	Collector	D	675	NB	132	0	3	135	0.20	C
CR 561A											
CR 565A to Jalarmy Rd	2	Maj. Coll	D	675	WB	275	0	5	280	0.42	C
Jalarmy Rd to US 27	2	Maj. Coll	D	675	WB	427	0	5	432	0.64	D
CR 561 to Scrub Jay Ln	2	Min. Coll	C	675	WB	85	97	1	183	0.27	C
Scrub Jay Ln to Triple E Rd	2	Min. Coll	D	675	WB	78	97	1	176	0.26	C
Sullivan Road											
US 27 to Eastern Terminus	2	Collector	D	675	WB	10	0	0	10	0.02	C
N. Grassy Road											
US 27 to Turkey Farm Rd	2	Collector	D	675	EB	66	275	0	341	0.51	D
Grand Highway											
SR 50 to Citrus Tower Blvd	2	Min. Coll	D	675	EB	184	5	0	189	0.28	C
Citrus Tower Boulevard											
US 27 to Oakley Seaver Dr	2	Maj. Coll	D	792	WB	555	6	8	569	0.72	C

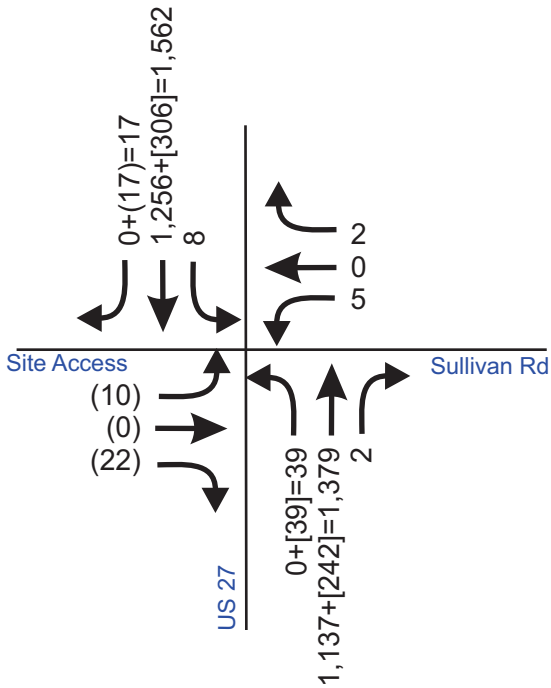




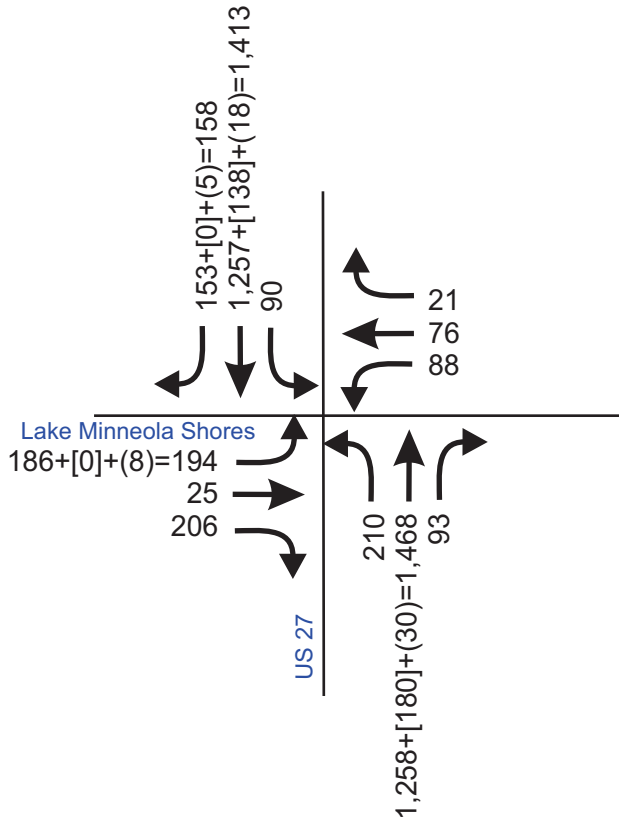
CR 561 & US 27



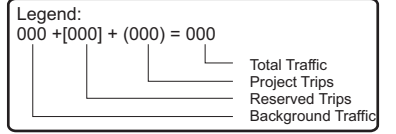
Oak Valley Boulevard/Citrus Grove & US 27



Sullivan Rd & US 27



Lake Minneola Shores & US 27



**Table 5
Projected Intersection Capacity Analysis**

Intersection	Control	EB		WB		NB		SB		Overall	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
US 27 & CR 561	Signal	20.9	C	66.5	E	25.6	C	24.7	C	32.5	C
U 27 & Lake Minneola Shores (CR 561A)	Signal	59.2	E	53.0	D	57.2	E	42.1	D	51.0	D
US 27 & Oak Valley Blvd/ Citrus Grove Rd	Signal	50.4	D	45.9	D	22.5	C	33.7	C	29.1	C
US 27 & Site Access/Sullivan Rd	STOP	33.0	D	42.1	E	16.8	C	13.6	B	-	-



STUDY CONCLUSIONS

This traffic analysis was conducted in order to assess the traffic impact of an 87-unit single-family residential project. The site is located on US 27 opposite Sullivan Road in the City of Minneola, Lake County. The analysis assessed the impacts on the roadway network of the additional traffic that would result from the proposed development within a 4.30 mile impact area. The findings of this analysis are as follows:

- The proposed development will generate 828 daily trips and 87 P.M. peak hour trips, 55 entering and 32 exiting.
- The analysis of existing conditions indicated that all roadways within the project's impact area and the study intersections currently operate at satisfactory Levels of Service.
- The analysis of projected traffic conditions revealed that the study roadways and intersections will continue to operate at satisfactory Levels of Service with the addition of reserved trips and project trips.
- The development is proposed to be served by an access roadway located opposite Sullivan Road at an existing median opening. Separate right and left turn Lanes on US 27 will be provided at this location to serve the proposed development.



APPENDICES

APPENDIX A

Intersection Counts, Seasonal Factors and Signal Timings

Date: 26-May-2016 City: Minneola
 E/W Street Name: CR 561 County: Lake
 N/S Street Name: US 27 Study Period: PM

		US 27			
0%	4	0%	5%	15%	
	↳		↘	↘	
	921		921	59	
		CR 561			
0%	2	0%	2	0	
	↖		→	↘	
	0		0	0	

		US 27			
0%	6	0%	759	12%	363
	↖		↖	↖	
	0		0	5%	
		CR 561			
0%	0	0%	8	0%	
	↳		↳	↳	
	450		450	4%	

% = Percentage of Trucks / Total

Peak Hour Traffic

	Southbound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Cars	50	871	4	433	8	0	6	668	344	2	2	0	2388
Trucks	9	50	0	17	0	0	0	91	19	0	0	0	186
Total	59	921	4	450	8	0	6	759	363	2	2	0	2574
Peak Hour Factor	0.992												
Peak Hour	05:00 PM to 06:00 PM												

Total Vehicle Traffic

Interval Starts	Southbound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00:00 PM	11	199	0	70	0	0	0	178	68	0	0	0	526
4:15:00 PM	9	232	0	77	0	0	0	188	66	0	1	0	573
4:30:00 PM	9	186	0	86	0	0	1	170	72	0	0	0	524
4:45:00 PM	10	200	0	84	2	0	0	182	78	1	0	0	557
5:00:00 PM	13	231	0	115	1	0	1	188	90	0	1	0	640
5:15:00 PM	21	229	1	104	0	0	2	189	103	0	0	0	648
5:30:00 PM	9	232	2	127	6	0	0	178	94	0	0	0	648
5:45:00 PM	16	229	1	104	1	0	3	204	76	2	1	0	637

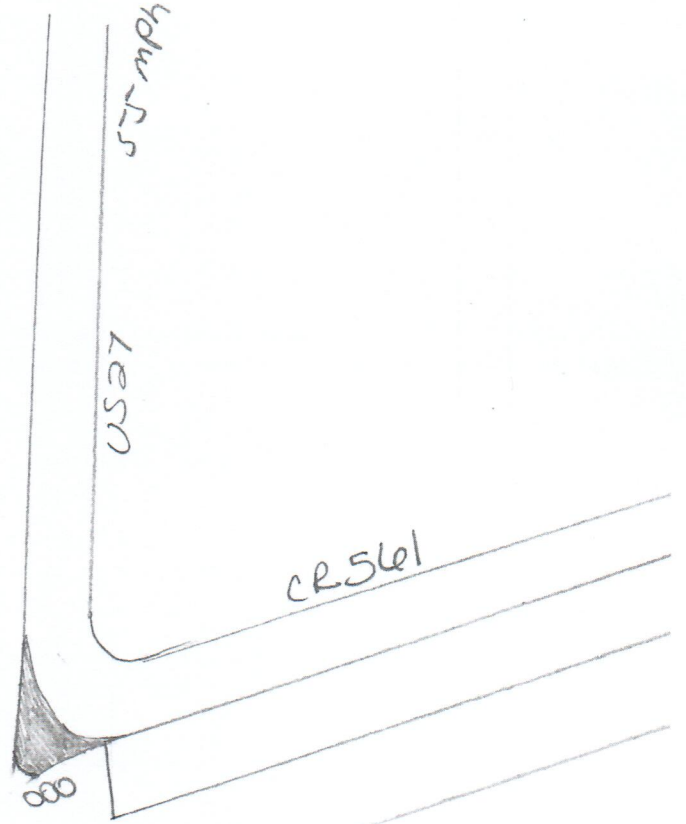
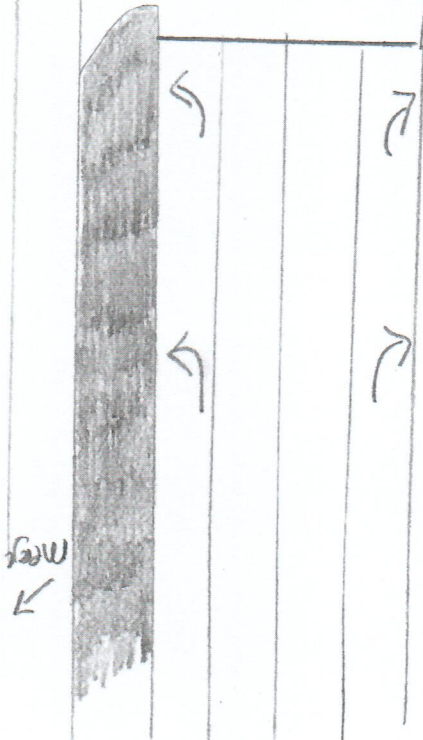
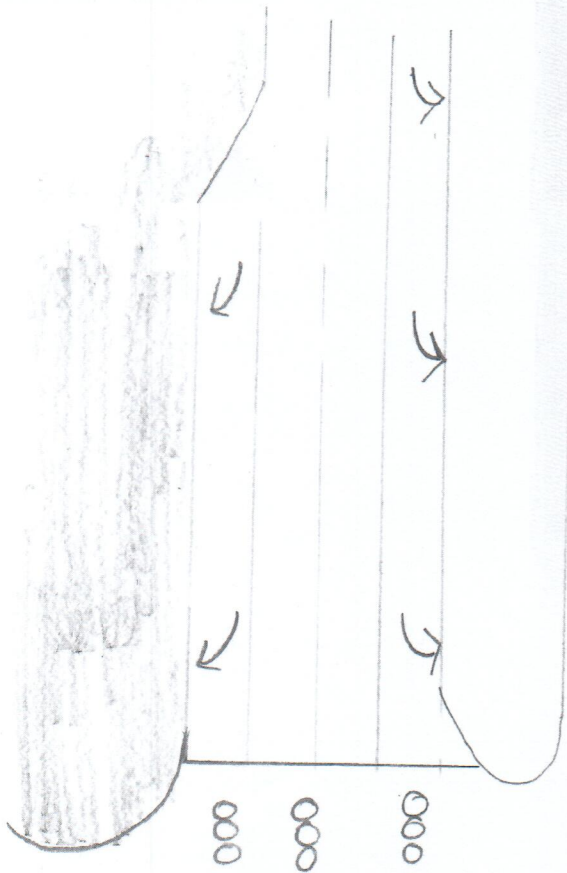
Date: 26-May-2016
E/W Street Name: CR 561
N/S Street Name: US 27
City: Minneola
County: Lake
Study Period: PM

Total Vehicle Traffic													
Interval Starts	Southbound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00:00 PM	11	199	0	70	0	0	0	178	68	0	0	0	526
4:15:00 PM	9	232	0	77	0	0	0	188	66	0	1	0	573
4:30:00 PM	9	186	0	86	0	0	1	170	72	0	0	0	524
4:45:00 PM	10	200	0	84	2	0	0	182	78	1	0	0	557
5:00:00 PM	13	231	0	115	1	0	1	188	90	0	1	0	640
5:15:00 PM	21	229	1	104	0	0	2	189	103	0	0	0	649
5:30:00 PM	9	232	2	127	6	0	0	178	94	0	0	0	648
5:45:00 PM	16	229	1	104	1	0	3	204	76	2	1	0	637

Car Traffic													
Interval Starts	Southbound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00:00 PM	11	177	0	69	0	0	0	160	59	0	0	0	476
4:15:00 PM	9	203	0	77	0	0	0	165	61	0	1	0	516
4:30:00 PM	9	176	0	85	0	0	1	146	71	0	0	0	488
4:45:00 PM	10	194	0	81	2	0	0	154	76	1	0	0	518
5:00:00 PM	10	219	0	109	1	0	1	164	83	0	1	0	588
5:15:00 PM	18	213	1	97	0	0	2	161	100	0	0	0	592
5:30:00 PM	7	217	2	124	6	0	0	159	91	0	0	0	606
5:45:00 PM	15	222	1	103	1	0	3	184	70	2	1	0	602

Truck Traffic													
Interval Starts	Southbound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00:00 PM	0	22	0	1	0	0	0	18	9	0	0	0	50
4:15:00 PM	0	29	0	0	0	0	0	23	5	0	0	0	57
4:30:00 PM	0	10	0	1	0	0	0	24	1	0	0	0	36
4:45:00 PM	0	6	0	3	0	0	0	28	2	0	0	0	39
5:00:00 PM	3	12	0	6	0	0	0	24	7	0	0	0	52
5:15:00 PM	3	16	0	7	0	0	0	28	3	0	0	0	57
5:30:00 PM	2	15	0	3	0	0	0	19	3	0	0	0	42
5:45:00 PM	1	7	0	1	0	0	0	20	6	0	0	0	35

car lot



N ↑

Date: 17-May-16 City: Minneola
 E/W Street Name: Citrus Grove County: Lake
 N/S Street Name: US 27 Study Period: PM

Citrus Grove		US 27	
0%	15	↗	
0%	12	→	
6%	88	↘	
5%	62	↙	
4%	1253	↓	
5%	19	↘	

Citrus Grove		US 27	
↖	12	↗	8%
←	7	→	0%
↙	10	↘	0%
↖	110	↗	0%
←	1152	→	6%
↙	47	↘	9%

% = Percentage of Trucks / Total

Peak Hour Traffic

	Southbound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Cars	18	1204	59	10	7	11	110	1079	43	15	12	83	2651
Trucks	1	49	3	0	0	1	0	73	4	0	0	5	136
Total	19	1252.8	62	10	7	12	110	1152	47	15	12	88	2786.8
Peak Hour Factor	0.951												
Peak Hour	05:00 PM to 06:00 PM												

Total Vehicle Traffic

Interval Starts	Southbound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00:00 PM	6	239	2	4	1	7	29	264	2	3	1	10	568
4:15:00 PM	7	272	11	7	1	8	32	268	6	6	1	7	626
4:30:00 PM	7	268	4	5	2	3	35	305	7	6	1	19	662
4:45:00 PM	7	283	8	3	5	1	28	259	10	12	2	17	635
5:00:00 PM	2	273	14	2	2	6	19	342	7	5	4	15	691
5:15:00 PM	4	314	18	0	3	3	34	315	24	3	0	15	733
5:30:00 PM	8	330	14	4	1	1	20	274	10	5	1	22	690
5:45:00 PM	5	336	16	4	1	2	37	221	6	2	7	36	673

Date: 17-May-16
E/W Street Name: Citrus Grove
N/S Street Name: US 27
City: Minneola
County: Lake
Study Period: PM

Total Vehicle Traffic													
Interval Starts	Southbound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00:00 PM	6	239	2	4	1	7	29	264	2	3	1	10	568
4:15:00 PM	7	272	11	7	1	8	32	268	6	6	1	7	626
4:30:00 PM	7	268	4	5	2	3	35	305	7	6	1	19	662
4:45:00 PM	7	283	8	3	5	1	28	259	10	12	2	17	635
5:00:00 PM	2	273	14	2	2	6	19	342	7	5	4	15	691
5:15:00 PM	4	314	18	0	3	3	34	315	24	3	0	15	733
5:30:00 PM	8	330	14	4	1	1	20	274	10	5	1	22	690
5:45:00 PM	5	336	16	4	1	2	37	221	6	2	7	36	673

Car Traffic													
Interval Starts	Southbound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00:00 PM	6	218	2	4	1	7	28	245	2	2	1	9	525
4:15:00 PM	7	229	11	7	1	7	31	242	6	5	1	5	552
4:30:00 PM	7	243	4	5	2	2	34	284	7	4	1	15	608
4:45:00 PM	6	249	7	3	5	1	27	237	10	11	2	14	572
5:00:00 PM	2	255	12	2	2	5	19	318	7	5	4	14	645
5:15:00 PM	4	297	17	0	3	3	34	295	20	3	0	14	690
5:30:00 PM	8	322	14	4	1	1	20	252	10	5	1	19	657
5:45:00 PM	4	330	16	4	1	2	37	214	6	2	7	36	659

Truck Traffic													
Interval Starts	Southbound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00:00 PM	0	21	0	0	0	0	1	19	0	1	0	1	43
4:15:00 PM	0	43	0	0	0	1	1	26	0	1	0	2	74
4:30:00 PM	0	25	0	0	0	1	1	21	0	2	0	4	54
4:45:00 PM	1	34	1	0	0	0	1	22	0	1	0	3	63
5:00:00 PM	0	18	2	0	0	1	0	24	0	0	0	1	46
5:15:00 PM	0	17	1	0	0	0	0	20	4	0	0	1	43
5:30:00 PM	0	8	0	0	0	0	0	22	0	0	0	3	33
5:45:00 PM	1	6	0	0	0	0	0	7	0	0	0	0	14



55 mph

Citrus Grove Rd

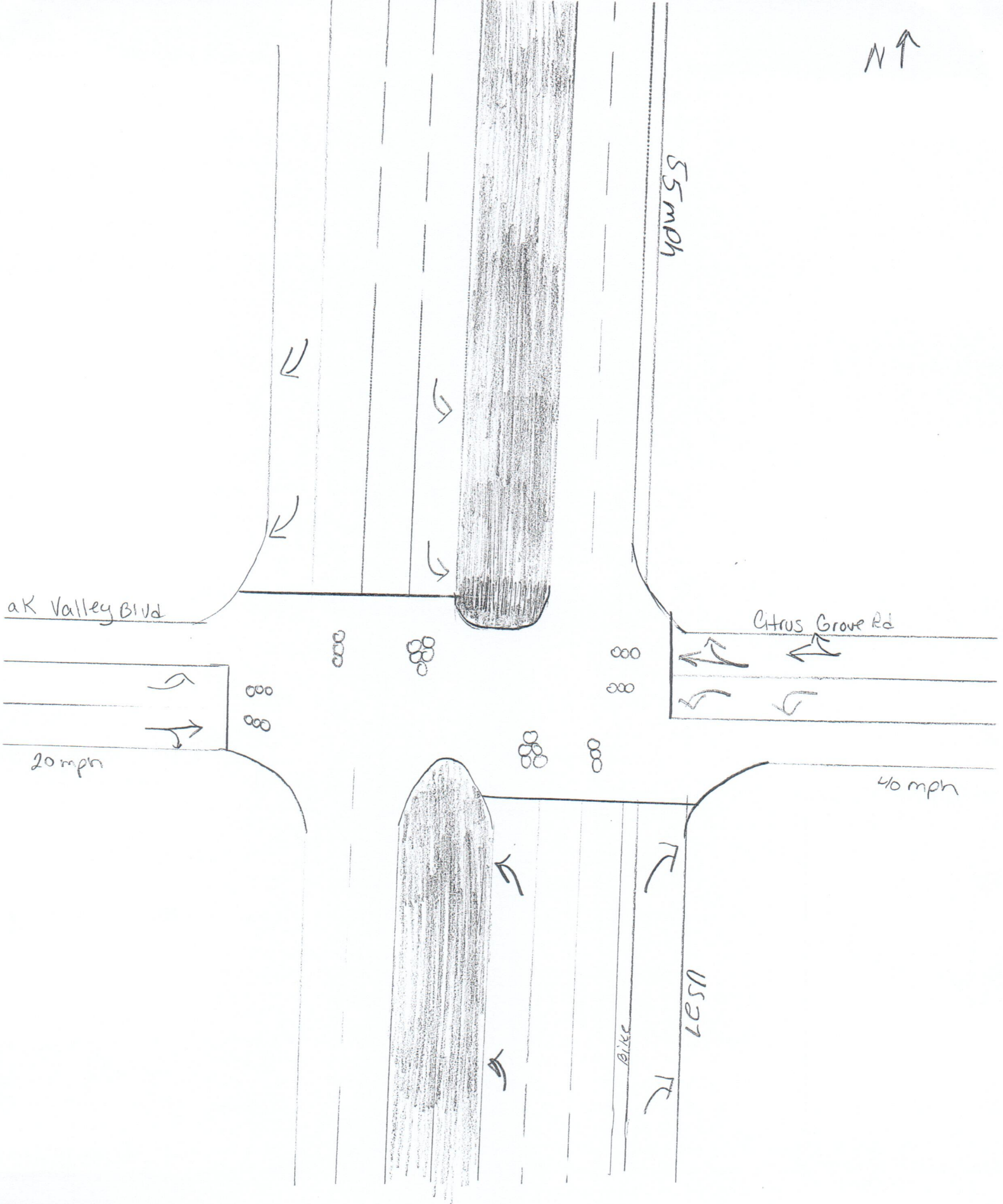
40 mph

aK Valley Blvd

20 mph

US 37

bike



Date: 17-May-16 City: Minneola
 E/W Street Name: Sullivan County: Lake
 N/S Street Name: US 27 Study Period: PM

US 27	
4% 1256 ↓	0% 8 ↘
Sullivan	
↙	↗
2	0%
5	0%

US 27	
↑	↗
1137 12%	2 0%

% = Percentage of Trucks / Total

Peak Hour Traffic

	Southbound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Cars	8	1211	0	5	0	2	0	1004	3	0	0	0	2233
Trucks	0	45	0	0	0	0	0	133	0	0	0	0	178
Total	8	1256	0	5	0	2	0	1137	2	0	0	0	2410
Peak Hour Factor	0.876												
Peak Hour	04:45 PM to 05:45 PM												

Total Vehicle Traffic

Interval Starts	Southbound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00:00 PM	0	285	0	0	0	0	0	255	1	0	0	0	541
4:15:00 PM	0	303	0	1	0	1	0	293	0	0	0	0	598
4:30:00 PM	1	237	0	0	0	0	0	319	0	0	0	0	557
4:45:00 PM	3	273	0	0	0	0	0	292	0	0	0	0	568
5:00:00 PM	2	296	0	1	0	1	0	285	0	0	0	0	585
5:15:00 PM	1	361	0	2	0	0	0	323	1	0	0	0	688
5:30:00 PM	2	326	0	2	0	1	0	237	1	0	0	0	569
5:45:00 PM	5	303	0	1	0	0	0	253	0	0	0	0	562

Date: 17-May-16
E/W Street Name: Sullivan
N/S Street Name: US 27
City: Minneola
County: Lake
Study Period: PM

Total Vehicle Traffic

Interval Starts	Southbound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00:00 PM	0	285	0	0	0	0	0	255	1	0	0	0	541
4:15:00 PM	0	303	0	1	0	1	0	293	0	0	0	0	598
4:30:00 PM	1	237	0	0	0	0	0	319	0	0	0	0	557
4:45:00 PM	3	273	0	0	0	0	0	292	0	0	0	0	568
5:00:00 PM	2	296	0	1	0	1	0	285	0	0	0	0	585
5:15:00 PM	1	361	0	2	0	0	0	323	1	0	0	0	688
5:30:00 PM	2	326	0	2	0	1	0	237	1	0	0	0	569
5:45:00 PM	5	303	0	1	0	0	0	253	0	0	0	0	562

Car Traffic

Interval Starts	Southbound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00:00 PM	0	260	0	0	0	0	0	234	1	0	0	0	495
4:15:00 PM	0	264	0	1	0	1	0	264	2	0	0	0	532
4:30:00 PM	1	215	0	0	0	0	0	297	0	0	0	0	513
4:45:00 PM	3	258	0	0	0	0	0	262	1	0	0	0	524
5:00:00 PM	2	283	0	1	0	1	0	240	0	0	0	0	527
5:15:00 PM	1	349	0	2	0	0	0	290	1	0	0	0	643
5:30:00 PM	2	321	0	2	0	1	0	212	1	0	0	0	539
5:45:00 PM	5	296	0	1	0	0	0	230	0	0	0	0	532

Truck Traffic

Interval Starts	Southbound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00:00 PM	0	25	0	0	0	0	0	21	0	0	0	0	46
4:15:00 PM	0	39	0	0	0	0	0	29	0	0	0	0	68
4:30:00 PM	0	22	0	0	0	0	0	22	0	0	0	0	44
4:45:00 PM	0	15	0	0	0	0	0	30	0	0	0	0	45
5:00:00 PM	0	13	0	0	0	0	0	45	0	0	0	0	58
5:15:00 PM	0	12	0	0	0	0	0	33	0	0	0	0	45
5:30:00 PM	0	5	0	0	0	0	0	25	0	0	0	0	30
5:45:00 PM	0	7	0	0	0	0	0	23	0	0	0	0	30

NA

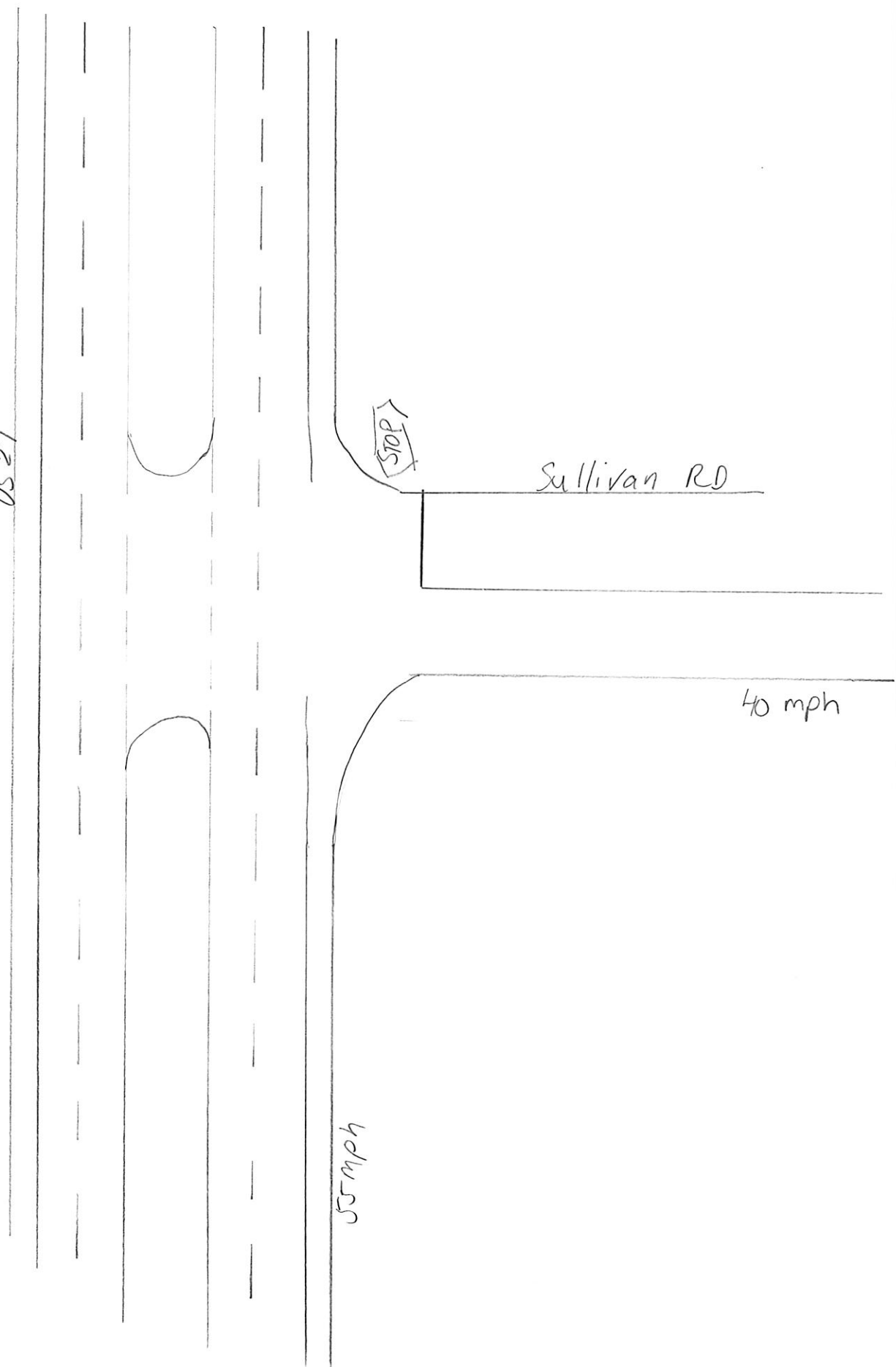
US 27

STOP

Sullivan RD

40 mph

55 mph



Date: 26-May-2016 City: Minneola
 E/W Street Name: Lake Minneola Shores County: Lake
 N/S Street Name: US 27 Study Period: PM

US 27		US 27		US 27		US 27	
1%	150	4%	1232	1%	88	10%	20
4%	24					0%	74
0%	202					2%	86

Lake Minneola Shores		US 27		Lake Minneola Shores			
1%	182	1%	206	7%	1233	7%	91
4%	24						
0%	202						

% = Percentage of Trucks / Total

Peak Hour Traffic

	Southbound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Cars	87	1183	148	84	74	18	204	1150	89	181	23	202	3443
Trucks	1	49	2	2	0	2	2	83	2	1	1	0	145
Total	88	1232	150	86	74	20	206	1233	91	182	24	202	3588
Peak Hour Factor	0.912												
Peak Hour	04:45 PM to 05:45 PM												

Total Vehicle Traffic

Interval Starts	Southbound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00:00 PM	10	222	20	9	5	1	29	244	19	28	1	33	621
4:15:00 PM	15	260	25	15	8	1	22	269	15	35	3	38	706
4:30:00 PM	11	218	24	6	6	2	35	304	20	40	2	46	714
4:45:00 PM	17	289	35	12	10	14	36	306	10	41	5	57	832
5:00:00 PM	27	300	47	20	9	0	53	324	31	53	8	46	918
5:15:00 PM	20	319	38	28	44	5	49	332	32	52	5	60	984
5:30:00 PM	24	324	30	26	11	1	68	271	18	36	6	39	854
5:45:00 PM	5	260	29	34	8	2	65	250	29	48	8	70	808

Date: 26-May-2016
E/W Street Name: Lake Minneola Shores
N/S Street Name: US 27
City: Minneola
County: Lake
Study Period: PM

Total Vehicle Traffic

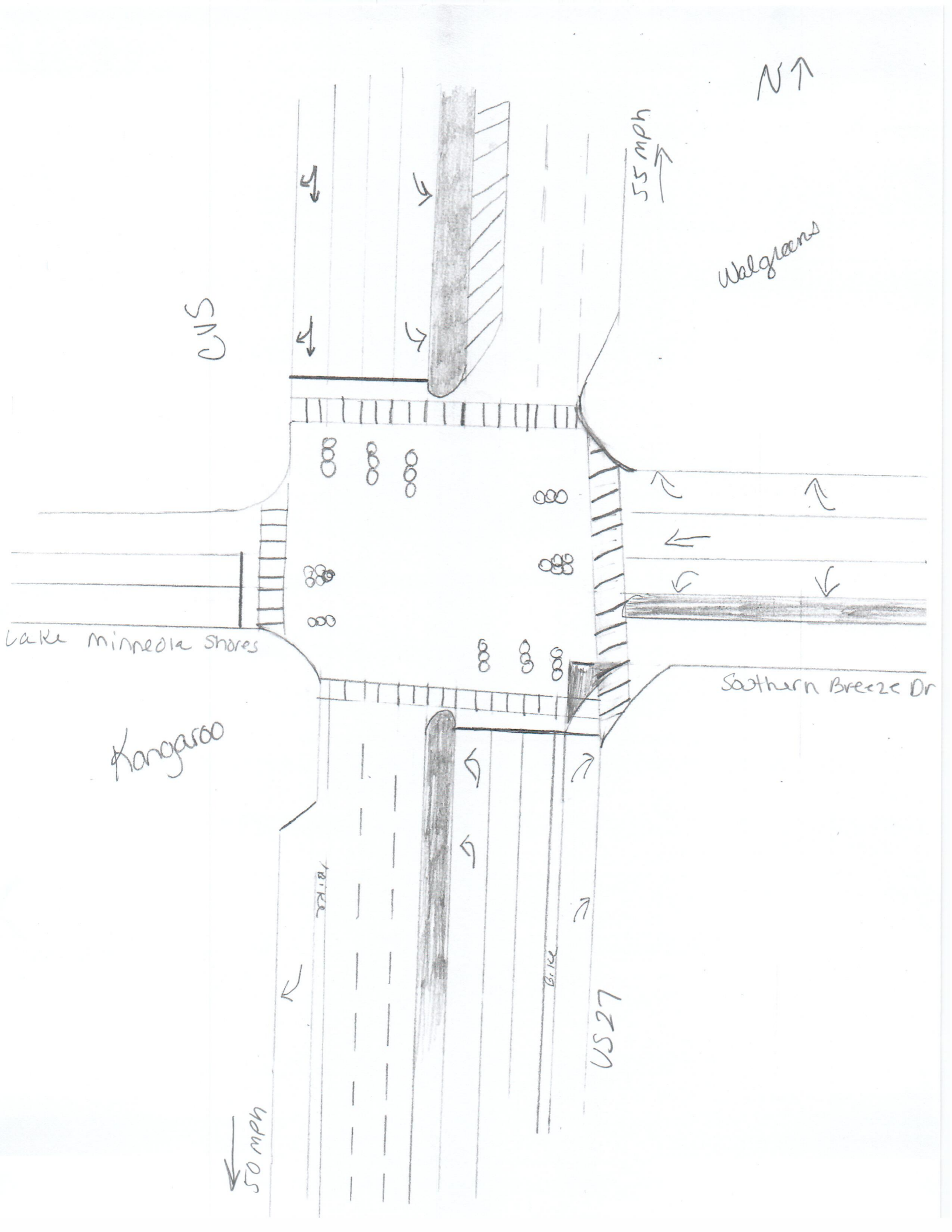
Interval Starts	Southbound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00:00 PM	10	222	20	9	5	1	29	244	19	28	1	33	621
4:15:00 PM	15	260	25	15	8	1	22	269	15	35	3	38	706
4:30:00 PM	11	218	24	6	6	2	35	304	20	40	2	46	714
4:45:00 PM	17	289	35	12	10	14	36	306	10	41	5	57	832
5:00:00 PM	27	300	47	20	9	0	53	324	31	53	8	46	918
5:15:00 PM	20	319	38	28	44	5	49	332	32	52	5	60	984
5:30:00 PM	24	324	30	26	11	1	68	271	18	36	6	39	854
5:45:00 PM	5	260	29	34	8	2	65	250	29	48	8	70	808

Car Traffic

Interval Starts	Southbound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00:00 PM	10	207	20	9	5	1	29	229	19	28	1	33	591
4:15:00 PM	15	238	25	15	8	1	22	244	15	35	3	38	659
4:30:00 PM	11	188	24	6	5	2	35	293	19	40	2	46	671
4:45:00 PM	17	265	34	12	10	12	34	284	10	40	5	57	780
5:00:00 PM	26	287	46	20	9	0	53	308	29	53	8	46	885
5:15:00 PM	20	309	38	28	44	5	49	313	32	52	4	60	954
5:30:00 PM	24	322	30	24	11	1	68	245	18	36	6	39	824
5:45:00 PM	5	258	29	34	8	2	65	242	29	47	8	70	797

Truck Traffic

Interval Starts	Southbound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00:00 PM	0	15	0	0	0	0	0	15	0	0	0	0	30
4:15:00 PM	0	22	0	0	0	0	0	25	0	0	0	0	47
4:30:00 PM	0	30	0	0	1	0	0	11	1	0	0	0	43
4:45:00 PM	0	24	1	0	0	2	2	22	0	1	0	0	52
5:00:00 PM	1	13	1	0	0	0	0	16	2	0	0	0	33
5:15:00 PM	0	10	0	0	0	0	0	19	0	0	1	0	30
5:30:00 PM	0	2	0	2	0	0	0	26	0	0	0	0	30
5:45:00 PM	0	2	0	0	0	0	0	8	0	1	0	0	11



2014 PEAK SEASON FACTOR CATEGORY REPORT - REPORT TYPE: ALL
 CATEGORY: 1100 LAKE COUNTYWIDE

WEEK	DATES	SF	MOCF: 0.95 PSCF
1	01/01/2014 - 01/04/2014	0.99	1.04
2	01/05/2014 - 01/11/2014	1.01	1.06
3	01/12/2014 - 01/18/2014	1.03	1.08
4	01/19/2014 - 01/25/2014	1.01	1.06
5	01/26/2014 - 02/01/2014	1.00	1.05
* 6	02/02/2014 - 02/08/2014	0.98	1.03
* 7	02/09/2014 - 02/15/2014	0.96	1.01
* 8	02/16/2014 - 02/22/2014	0.94	0.99
* 9	02/23/2014 - 03/01/2014	0.94	0.99
*10	03/02/2014 - 03/08/2014	0.93	0.98
*11	03/09/2014 - 03/15/2014	0.93	0.98
*12	03/16/2014 - 03/22/2014	0.93	0.98
*13	03/23/2014 - 03/29/2014	0.93	0.98
*14	03/30/2014 - 04/05/2014	0.94	0.99
*15	04/06/2014 - 04/12/2014	0.95	1.00
*16	04/13/2014 - 04/19/2014	0.95	1.00
*17	04/20/2014 - 04/26/2014	0.96	1.01
*18	04/27/2014 - 05/03/2014	0.98	1.03
19	05/04/2014 - 05/10/2014	0.99	1.04
20	05/11/2014 - 05/17/2014	1.00	1.05
21	05/18/2014 - 05/24/2014	1.01	1.06
22	05/25/2014 - 05/31/2014	1.02	1.07
23	06/01/2014 - 06/07/2014	1.03	1.08
24	06/08/2014 - 06/14/2014	1.04	1.09
25	06/15/2014 - 06/21/2014	1.05	1.11
26	06/22/2014 - 06/28/2014	1.06	1.12
27	06/29/2014 - 07/05/2014	1.07	1.13
28	07/06/2014 - 07/12/2014	1.08	1.14
29	07/13/2014 - 07/19/2014	1.09	1.15
30	07/20/2014 - 07/26/2014	1.08	1.14
31	07/27/2014 - 08/02/2014	1.07	1.13
32	08/03/2014 - 08/09/2014	1.06	1.12
33	08/10/2014 - 08/16/2014	1.06	1.12
34	08/17/2014 - 08/23/2014	1.05	1.11
35	08/24/2014 - 08/30/2014	1.05	1.11
36	08/31/2014 - 09/06/2014	1.04	1.09
37	09/07/2014 - 09/13/2014	1.04	1.09
38	09/14/2014 - 09/20/2014	1.04	1.09
39	09/21/2014 - 09/27/2014	1.02	1.07
40	09/28/2014 - 10/04/2014	1.01	1.06
41	10/05/2014 - 10/11/2014	0.99	1.04
42	10/12/2014 - 10/18/2014	0.98	1.03
43	10/19/2014 - 10/25/2014	0.98	1.03
44	10/26/2014 - 11/01/2014	0.99	1.04
45	11/02/2014 - 11/08/2014	0.99	1.04
46	11/09/2014 - 11/15/2014	1.00	1.05
47	11/16/2014 - 11/22/2014	1.00	1.05
48	11/23/2014 - 11/29/2014	1.00	1.05
49	11/30/2014 - 12/06/2014	1.00	1.05
50	12/07/2014 - 12/13/2014	0.99	1.04
51	12/14/2014 - 12/20/2014	0.99	1.04
52	12/21/2014 - 12/27/2014	1.01	1.06
53	12/28/2014 - 12/31/2014	1.03	1.08

* PEAK SEASON

09-MAR-2015 16:07:54

830UPD

5_1100_PKSEASON.TXT

LAKE COUNTY - TRAFFIC SIGNAL OPERATIONS

CARTEGRAPH ID: LC-S-059

DATE: 05/15/2015

INTERSECTION NAME AND ID#: US 27 & CR 561N 045

PHASE	1	2	3	4	5	6	7	8
	NBL	SB		EB	SBL	NB		WB
INITIAL	5	17		8	5	17		8
PASSAGE	3	3		3	3	3		3
YELLOW	5.5	5.5		4.8	5.5	5.5		4.8
RED CLEAR	2	2.0		2.0	2.0	2.0		2
MAX 1	15	45		25	15	45		25
MAX 2								
WALK								
DON'T WALK								
RECALL		Min				Min		
DET. FUNC.		L				L		

SYSTEM TIMING

PATTERN	CYCLE	OFFSET	COORDINATED		BASE DAY 1	BASE DAY 2
	Sec.	Sec.	Phase	Sequence	Mon.- Fri	Sat.- Sun

SPLIT ALLOCATION - Sec.

PHASE	1	2	3	4	5	6	7	8

NOTES: Naztec TS-2

Qseq

1	2	3	4	7	8
5	6				

LAKE COUNTY - TRAFFIC SIGNAL OPERATIONS

CARTEGRAPH ID: MI-S-282

DATE: 05/18/2015

INTERSECTION NAME AND ID#: US 27 & Citrus Grove Rd(Oak Valley Blvd) 029

PHASE	1	2	3	4	5	6	7	8
	NBL	SB		WB	SBL	NB		EB
INITIAL	5	17		8	5	17		8
PASSAGE	3	3		3	3	3		3
YELLOW	5.5	5.8		4.4	5.8	5.5		3.4
RED CLEAR	2.2	2.0		2.7	2.1	2.0		4.5
MAX 1	25	50		30	25	50		30
MAX 2								
WALK								
DON'T WALK								
RECALL		Min				Min		
DET. FUNC.		L				L		

PREEMPTION TIMING

	COORD.+ PREEMPT.	DELAY (Sec.)	MIN. DURATION (Sec.)	MAX. PRESENCE (Sec.)	MIN. GREEN (Sec.)	TRACK GREEN (Sec.)	MIN. DWELL (Sec.)	
	OFF		10	60	10		10	

SYSTEM TIMING

	CYCLE Sec.	OFFSET Sec.	COORDINATION		BASE DAY 1		BASE DAY 2	
PATTERN			Phase	Sequence	Mon.- Fri.		Sat.- Sun.	

SPLIT ALLOCATION - Sec.

PHASE	1	2	3	4	5	6	7	8

NOTES: Naztec 980

LAKE COUNTY - TRAFFIC SIGNAL OPERATIONS

CARTEGRAPH ID: LC-S-060

DATE: 05/15/2015

INTERSECTION NAME AND ID#: US 27 & CR 561S 064

PHASE	1	2	3	4	5	6	7	8	9
	NBL	SB	WBL	EB	SBL	NB	EBL	WB	NBL/Ovl
INITIAL	5	17	5	8	5	17	5	8	4
PASSAGE	3	3	3	3	3	3	3	3	3
YELLOW	5.1	5.1	4.4	4.4	5.1	5.1	4.4	4.4	5.1
RED CLEAR	3.9	2.0	3.0	2.9	3.5	2.1	3.4	2.0	2.0
MAX 1	20	50	20	30	20	50	20	30	20
MAX 2									
WALK		7		7		7		7	
DON'T WALK		28		28		28		28	
RECALL		Min				Min			
DET. FUNC.	L	L			L	L			

SYSTEM TIMING

PATTERN	CYCLE	OFFSET	COORDINATED		BASE DAY 1		BASE DAY 2	
	Sec.	Sec.	Phase	Sequence	Mon.-Fri		Sat.- Sun	
	130	115	2	1	0:00	99	0:00	99
	130	13	2	1	6:00	C1O1S1	10:00	C5O5S5
	160	71	2	1	10:00	C2O2S2	19:00	99
	130	13	2	1	14:30	C3O3S3		
	130	13	2	1	19:00	C4O4S4		
	130	13	2	1	21:00	99		

SPLIT ALLOCATION - Sec.

PHASE	1	2	3	4	5	6	7	8	9
	23	51	26	30	21	53	26	30	
	21	56	20	33	18	59	22	31	
	25	55	20	40	21	79	20	40	20
	21	56	20	33	18	59	22	31	
	21	56	20	33	18	59	22	31	

NOTES: Naztec 980

Phase 3 Ring sequence

Ring 1	1 2 9	10 3 4
Ring 2	5 6 13	14 7 8

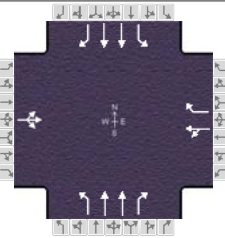
1) Stop in Walk feature activated.

2) Twice per cycle activated on NBL

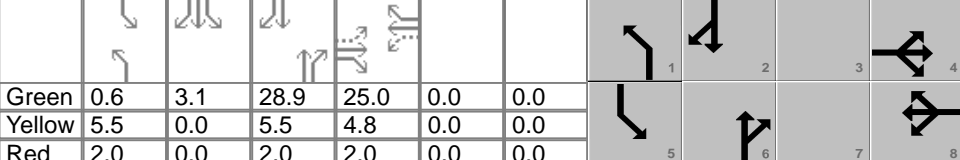
APPENDIX B

Existing HCS Capacity Analysis Worksheets

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information		
Agency	TPD, Inc.			Duration, h	0.25	
Analyst	MJA	Analysis Date	May 31, 2016	Area Type	Other	
Jurisdiction	Lake County	Time Period	P.M. Peak Hour	PHF	0.99	
Urban Street	US 27	Analysis Year	2016	Analysis Period	1 > 17:00	
Intersection	CR 561	File Name	4774 - US 27 & CR 561 - Existing.xus			
Project Description	P.M. Peak Hour - Existing					

Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	2	2	0	459	8	0	6	774	370	60	939	4

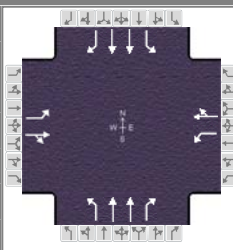
Signal Information														
Cycle, s	79.4	Reference Phase	2	Green	0.6	3.1	28.9	25.0	0.0	0.0				
Offset, s	0	Reference Point	End	Yellow	5.5	0.0	5.5	4.8	0.0	0.0				
Uncoordinated	Yes	Simult. Gap E/W	On	Red	2.0	0.0	2.0	2.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On											

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	1	6	5	2
Case Number		8.0		7.0	2.0	3.0	2.0	3.0
Phase Duration, s		31.8		31.8	8.1	36.4	11.3	39.5
Change Period, ($Y+R_c$), s		6.8		6.8	7.5	7.5	7.5	7.5
Max Allow Headway (MAH), s		3.9		3.9	3.9	3.9	3.9	3.9
Queue Clearance Time (g_s), s		2.1		27.0	2.3	18.3	5.0	20.0
Green Extension Time (g_e), s		1.6		0.0	0.0	10.6	0.1	10.3
Phase Call Probability		1.00		1.00	0.13	1.00	0.74	1.00
Max Out Probability		0.00		1.00	0.00	0.19	0.00	0.21

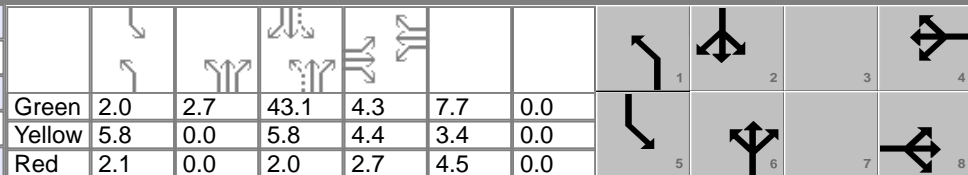
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	1	6	16	5	2	12
Adjusted Flow Rate (v), veh/h	4			472			0			61		
Adjusted Saturation Flow Rate (s), veh/h/ln	1653			1388			1610			1573		
Queue Service Time (g_s), s	0.0			24.9			0.0			3.0		
Cycle Queue Clearance Time (g_c), s	0.1			25.0			0.0			3.0		
Green Ratio (g/C)	0.31			0.31			0.01			0.05		
Capacity (c), veh/h	588			527			507			75		
Volume-to-Capacity Ratio (X)	0.007			0.896			0.000			0.812		
Back of Queue (Q), ft/ln (95 th percentile)	2.1			401.7			0			65.4		
Back of Queue (Q), veh/ln (95 th percentile)	0.1			16.1			0.0			2.6		
Queue Storage Ratio (RQ) (95 th percentile)	0.00			0.00			0.00			0.00		
Uniform Delay (d_1), s/veh	18.7			28.2			0.0			37.5		
Incremental Delay (d_2), s/veh	0.0			17.8			0.0			18.5		
Initial Queue Delay (d_3), s/veh	0.0			0.0			0.0			0.0		
Control Delay (d), s/veh	18.7			46.0			0.0			56.0		
Level of Service (LOS)	B			D			E			C		
Approach Delay, s/veh / LOS	18.7	B		46.0	D		22.3	C		22.3	C	
Intersection Delay, s/veh / LOS	26.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	2.9	C	2.3	B	2.1	B
Bicycle LOS Score / LOS	0.5	A	1.3	A	1.4	A	1.3	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information		
Agency	TPD, Inc.			Duration, h	0.25	
Analyst	MJA	Analysis Date	May 31, 2016	Area Type	Other	
Jurisdiction	Lake County	Time Period	P.M. Peak Hour	PHF	0.95	
Urban Street	US 27	Analysis Year	2016	Analysis Period	1 > 17:00	
Intersection	Citrus Grove Rd/Oak Va...	File Name	4774 - US 27 & Citrus Grove Rd - Existing.xus			
Project Description	P.M. Peak Hour - Existing					

Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	15	12	88	10	7	12	110	1152	47	19	1253	62

Signal Information																								
Cycle, s	90.5	Reference Phase	2	Green	2.0	2.7	43.1	4.3	7.7	0.0	Yellow	5.8	0.0	5.8	4.4	3.4	0.0	Red	2.1	0.0	2.0	2.7	4.5	0.0
Offset, s	0	Reference Point	End																					
Uncoordinated	Yes	Simult. Gap E/W	On																					
Force Mode	Fixed	Simult. Gap N/S	On																					

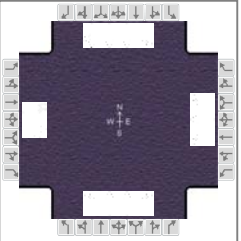
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		8		4	1	6	5	2
Case Number		10.0		10.0	1.1	3.0	1.1	3.0
Phase Duration, s		15.6		11.4	12.6	53.6	9.9	50.9
Change Period, ($Y+R_c$), s		7.9		7.1	7.7	7.8	7.9	7.8
Max Allow Headway (MAH), s		4.2		4.1	3.9	3.9	3.9	3.9
Queue Clearance Time (g_s), s		7.7		3.1	4.9	26.6	2.5	31.0
Green Extension Time (g_e), s		0.4		0.1	0.3	13.7	0.0	12.1
Phase Call Probability		0.95		0.54	0.95	1.00	0.40	1.00
Max Out Probability		0.00		0.00	0.00	0.44	0.00	0.53

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	3	8	18	7	4	14	1	6	16	5	2	12
Adjusted Flow Rate (v), veh/h	16	105		11	20		116	1213	49	20	1319	65
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1640		1810	1625		1810	1706	1477	1723	1739	1533
Queue Service Time (g_s), s	0.8	5.7		0.5	1.1		2.9	24.6	1.5	0.5	29.0	2.1
Cycle Queue Clearance Time (g_c), s	0.8	5.7		0.5	1.1		2.9	24.6	1.5	0.5	29.0	2.1
Green Ratio (g/C)	0.08	0.08		0.05	0.05		0.53	0.51	0.51	0.50	0.48	0.48
Capacity (c), veh/h	146	139		86	77		244	1728	748	212	1657	730
Volume-to-Capacity Ratio (X)	0.108	0.755		0.122	0.259		0.475	0.702	0.066	0.094	0.796	0.089
Back of Queue (Q), ft/ln (95 th percentile)	15.3	113.5		10.9	20.5		49.4	321	19.6	8.6	386.9	28.5
Back of Queue (Q), veh/ln (95 th percentile)	0.6	4.5		0.4	0.8		1.9	12.8	0.8	0.3	15.5	1.1
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	38.2	40.5		41.3	41.6		17.0	17.1	11.4	14.8	20.0	13.0
Incremental Delay (d_2), s/veh	0.3	8.0		0.6	1.8		1.4	1.1	0.0	0.2	2.1	0.1
Initial Queue Delay (d_3), 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	38.6	48.5		41.9	43.3		18.5	18.2	11.4	15.0	22.1	13.0
Level of Service (LOS)	D	D		D	D		B	B	B	B	C	B
Approach Delay, s/veh / LOS	47.2		D	42.8		D	18.0		B	21.6		C
Intersection Delay, s/veh / LOS	21.2						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	0.5	A	1.6	A	1.6	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	TPD, Inc.			Duration, h	0.25
Analyst	MJA	Analysis Date	May 31, 2016	Area Type	Other
Jurisdiction	Lake County	Time Period	P.M. Peak Hour	PHF	0.91
Urban Street	US 27	Analysis Year	2016	Analysis Period	1 > 16:45
Intersection	Lake Minneola Shores (...)	File Name	4774 - US 27 & Lake Minneola Shores - Existing....		
Project Description	P.M. Peak Hour - Existing				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	186	25	206	88	76	21	210	1258	93	90	1257	153

Signal Information				Phase Diagram								
Cycle, s	130.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
		Green	9.2	0.6	50.3	7.8	6.8	16.7				
		Yellow	5.1	5.1	5.1	4.4	0.0	4.4				
		Red	3.5	3.9	2.0	3.0	0.0	2.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	1	6	5	2
Case Number	1.1	4.0	1.1	3.0	2.0	3.0	2.0	4.0
Phase Duration, s	22.0	29.9	15.2	23.1	27.4	67.0	17.8	57.4
Change Period, (Y+R _c), s	7.8	7.3	7.4	7.3	9.0	7.2	8.6	7.2
Max Allow Headway (MAH), s	4.1	4.2	4.1	4.2	3.9	0.0	3.9	0.0
Queue Clearance Time (g _s), s	15.3	21.7	8.0	7.5	18.3		9.4	
Green Extension Time (g _e), s	0.0	0.9	0.1	1.2	0.1	0.0	0.1	0.0
Phase Call Probability	1.00	1.00	0.97	1.00	1.00		0.97	
Max Out Probability	1.00	0.11	0.59	0.00	1.00		0.02	

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	7	4	14	3	8	18	1	6	16	5	2	12
Adjusted Flow Rate (v), veh/h	204	254		97	84	23	231	1382	102	99	1053	496
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1637		1810	1810	1610	1810	1706	1477	1723	1827	1722
Queue Service Time (g _s), s	13.3	19.7		6.0	5.5	1.7	16.3	47.8	5.2	7.4	32.3	32.3
Cycle Queue Clearance Time (g _c), s	13.3	19.7		6.0	5.5	1.7	16.3	47.8	5.2	7.4	32.3	32.3
Green Ratio (g/C)	0.24	0.17		0.18	0.12	0.12	0.52	0.46	0.46	0.46	0.39	0.39
Capacity (c), veh/h	345	285		172	221	196	256	1571	680	122	1412	665
Volume-to-Capacity Ratio (X)	0.593	0.892		0.561	0.379	0.118	0.900	0.880	0.150	0.810	0.746	0.746
Back of Queue (Q), ft/ln (95 th percentile)	255.1	359.9		131.5	114.7	30.5	367.9	671.6	80.4	163.8	507.6	504.5
Back of Queue (Q), veh/ln (95 th percentile)	9.8	14.4		5.1	4.6	1.2	14.2	26.9	3.2	6.3	20.3	20.2
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d ₁), s/veh	43.0	52.5		46.9	52.5	50.8	54.9	31.8	20.3	59.5	34.4	34.4
Incremental Delay (d ₂), s/veh	2.7	17.9		2.8	1.1	0.3	28.7	7.4	0.5	11.9	3.6	7.5
Initial Queue Delay (d ₃), s/veh	0.0	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	45.7	70.4		49.7	53.6	51.1	83.5	39.2	20.8	71.4	38.0	41.8
Level of Service (LOS)	D	E		D	D	D	F	D	C	E	D	D
Approach Delay, s/veh / LOS	59.4		E	51.5		D	44.1		D	41.2		D
Intersection Delay, s/veh / LOS	45.0						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.3	C	3.0	C	2.4	B	2.3	B
Bicycle LOS Score / LOS	1.2	A	0.8	A	1.9	A	1.4	A

APPENDIX C

ITE Trip Generation Sheets

Single-Family Detached Housing (210)

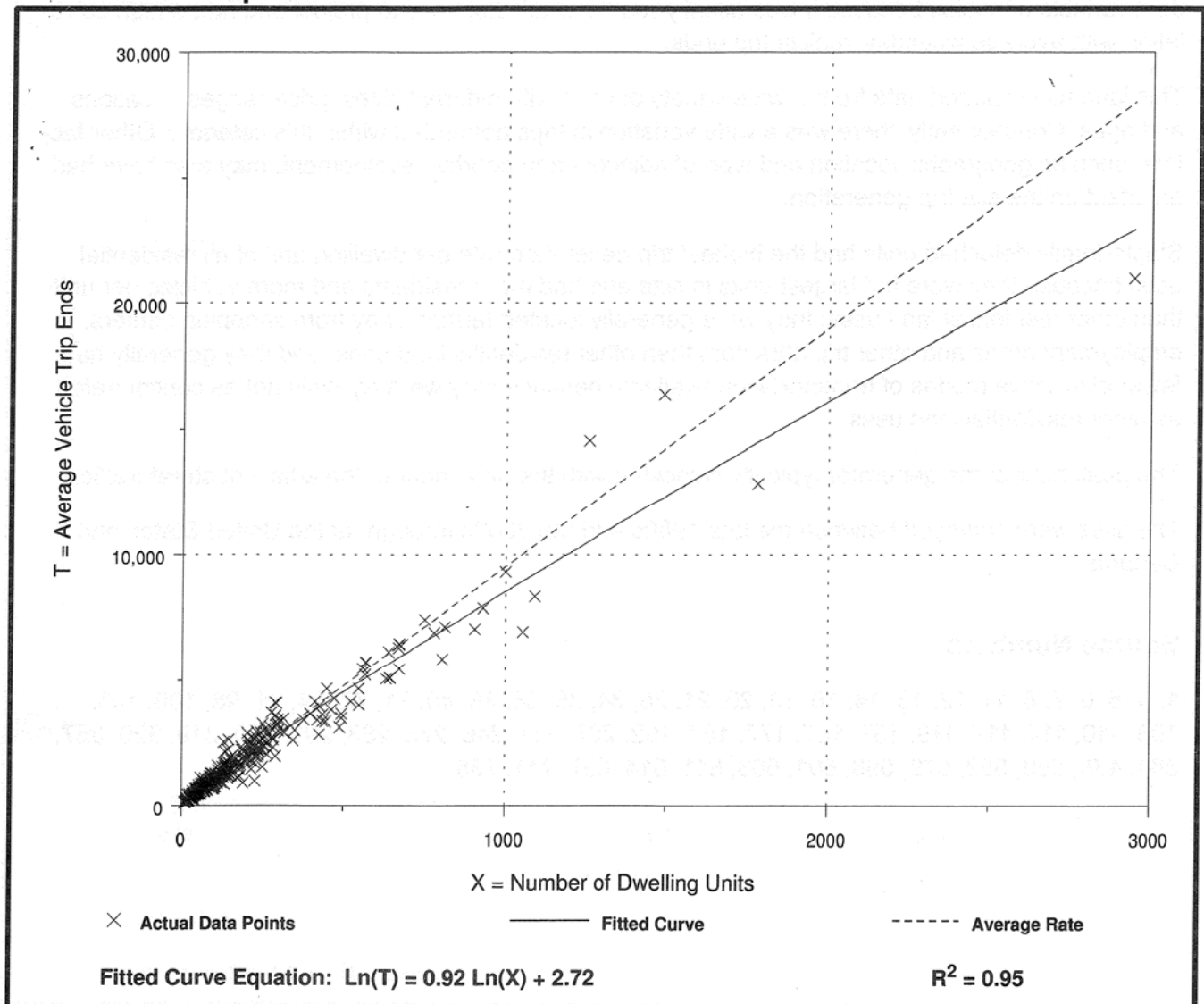
Average Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Number of Studies: 355
Avg. Number of Dwelling Units: 198
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.52	4.31 - 21.85	3.70

Data Plot and Equation



Single-Family Detached Housing (210)

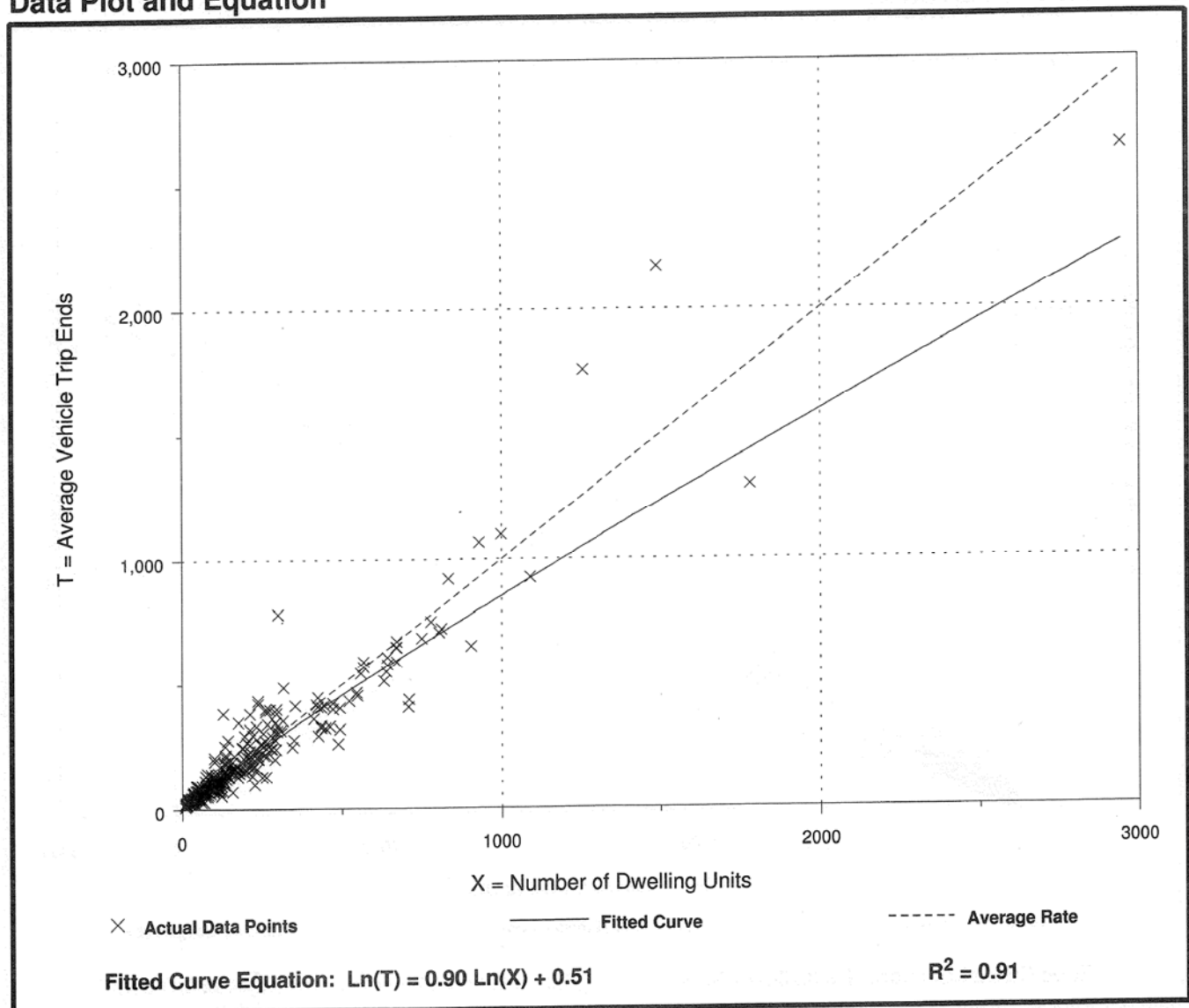
Average Vehicle Trip Ends vs: Dwelling Units
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 4 and 6 p.m.

Number of Studies: 321
 Avg. Number of Dwelling Units: 207
 Directional Distribution: 63% entering, 37% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
1.00	0.42 - 2.98	1.05

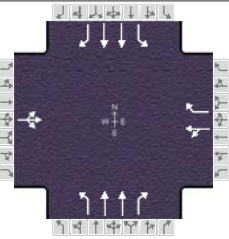
Data Plot and Equation



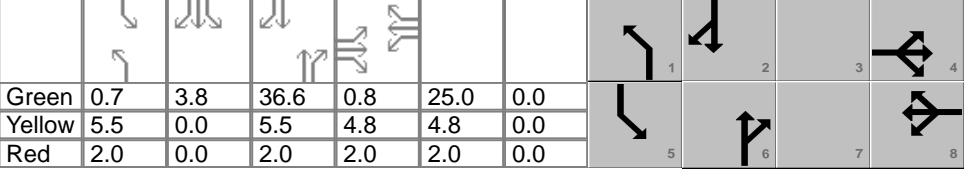
APPENDIX D

Projected HCS Capacity Analysis Worksheets

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information		
Agency	TPD, Inc.			Duration, h	0.25	
Analyst	MJA	Analysis Date	May 31, 2016	Area Type	Other	
Jurisdiction	Lake County	Time Period	P.M. Peak Hour	PHF	0.99	
Urban Street	US 27	Analysis Year		Analysis Period	1 > 17:00	
Intersection	CR 561	File Name	4774 - US 27 & CR 561 - Projected.xus			
Project Description	P.M. Peak Hour - Projected					

Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	2	2	0	506	8	0	6	854	442	60	1030	4

Signal Information																								
Cycle, s	95.5	Reference Phase	2	Green	0.7	3.8	36.6	0.8	25.0	0.0	Yellow	5.5	0.0	5.5	4.8	4.8	0.0	Red	2.0	0.0	2.0	2.0	2.0	0.0
Offset, s	0	Reference Point	End																					
Uncoordinated	Yes	Simult. Gap E/W	On																					
Force Mode	Fixed	Simult. Gap N/S	On																					

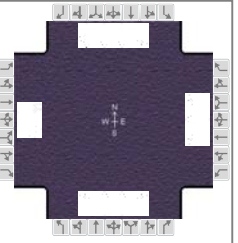
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	1	6	5	2
Case Number		12.0		11.0	2.0	3.0	2.0	3.0
Phase Duration, s		7.6		31.8	8.2	44.1	12.1	47.9
Change Period, ($Y+R_c$), s		6.8		6.8	7.5	7.5	7.5	7.5
Max Allow Headway (MAH), s		4.0		4.0	3.9	3.9	3.9	3.9
Queue Clearance Time (g_s), s		2.2		27.0	2.3	26.2	5.6	25.9
Green Extension Time (g_e), s		0.0		0.0	0.0	10.3	0.1	10.4
Phase Call Probability		0.10		1.00	0.15	1.00	0.80	1.00
Max Out Probability		0.00		1.00	0.00	0.43	0.00	0.42

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	7	4	14	3	8	18	1	6	16	5	2	12
Adjusted Flow Rate (v), veh/h	4			519			6			61		
Adjusted Saturation Flow Rate (s), veh/h/ln	1854			1741			1810			1573		
Queue Service Time (g_s), s	0.2			25.0			0.3			3.6		
Cycle Queue Clearance Time (g_c), s	0.2			25.0			0.3			3.6		
Green Ratio (g/C)	0.01			0.26			0.01			0.05		
Capacity (c), veh/h	16			456			14			75		
Volume-to-Capacity Ratio (X)	0.255			1.140			0.430			0.804		
Back of Queue (Q), ft/ln (95 th percentile)	5.8			762.3			9.5			76.9		
Back of Queue (Q), veh/ln (95 th percentile)	0.2			30.5			0.4			3.1		
Queue Storage Ratio (RQ) (95 th percentile)	0.00			0.00			0.00			0.00		
Uniform Delay (d_1), s/veh	47.1			35.3			47.2			45.0		
Incremental Delay (d_2), s/veh	8.2			86.3			19.3			17.7		
Initial Queue Delay (d_3), s/veh	0.0			0.0			0.0			0.0		
Control Delay (d), s/veh	55.3			121.6			66.5			62.7		
Level of Service (LOS)	E			F			E			C		
Approach Delay, s/veh / LOS	55.3	E		121.6	F		27.3	C		26.2	C	
Intersection Delay, s/veh / LOS	43.6						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.0	C	3.0	C	2.3	B	2.1	B
Bicycle LOS Score / LOS	0.5	A	1.3	A	1.6	A	1.4	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	TPD, Inc.			Duration, h	0.25
Analyst	MJA	Analysis Date	May 31, 2016	Area Type	Other
Jurisdiction	Lake County	Time Period	P.M. Peak Hour	PHF	0.91
Urban Street	US 27	Analysis Year		Analysis Period	1 > 16:45
Intersection	Lake Minneola Shores (...)	File Name	4774 - US 27 & Lake Minneola Shores - Projecte...		
Project Description	P.M. Peak Hour - Projected				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	194	25	206	88	76	21	210	1468	93	90	1413	158

Signal Information													
Cycle, s	130.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	9.2	0.7	52.0	7.9	6.7	15.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	5.1	5.1	5.1	4.4	0.0	4.4			
				Red	3.5	3.9	2.0	3.0	0.0	2.0			

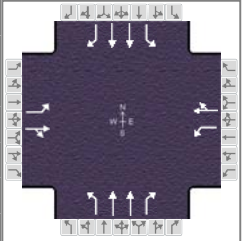
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	1	6	5	2
Case Number	1.1	4.0	1.1	3.0	2.0	3.0	2.0	4.0
Phase Duration, s	22.0	28.1	15.3	21.4	27.5	68.8	17.8	59.1
Change Period, ($Y+R_c$), s	7.8	7.3	7.4	7.3	9.0	7.2	8.6	7.2
Max Allow Headway (MAH), s	4.1	4.2	4.1	4.2	3.9	0.0	3.9	0.0
Queue Clearance Time (g_s), s	16.2	19.9	8.1	7.6	18.3		9.4	
Green Extension Time (g_e), s	0.0	0.9	0.1	1.1	0.2	0.0	0.1	0.0
Phase Call Probability	1.00	1.00	0.97	1.00	1.00		0.97	
Max Out Probability	1.00	0.04	0.65	0.00	1.00		0.00	

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	1	6	16	5	2	12
Adjusted Flow Rate (v), veh/h	213	231		97	84	21	231	1613	92	99	1157	551
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1640		1810	1810	1610	1810	1706	1477	1723	1827	1738
Queue Service Time (g_s), s	14.2	17.9		6.1	5.6	1.5	16.3	61.4	4.6	7.4	36.2	36.3
Cycle Queue Clearance Time (g_c), s	14.2	17.9		6.1	5.6	1.5	16.3	61.4	4.6	7.4	36.2	36.3
Green Ratio (g/C)	0.22	0.16		0.17	0.11	0.11	0.14	0.47	0.47	0.07	0.40	0.40
Capacity (c), veh/h	327	262		174	196	175	258	1616	699	122	1458	694
Volume-to-Capacity Ratio (X)	0.652	0.880		0.556	0.425	0.119	0.896	0.998	0.132	0.808	0.794	0.795
Back of Queue (Q), ft/ln (95 th percentile)	274.5	326.9		133.5	117.2	28.1	359	914.1	69.9	163.6	561.4	566.1
Back of Queue (Q), veh/ln (95 th percentile)	10.6	13.1		5.1	4.7	1.1	13.8	36.6	2.8	6.3	22.5	22.6
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	44.8	53.4		48.1	54.2	52.3	54.8	34.2	19.2	59.5	34.4	34.4
Incremental Delay (d_2), s/veh	4.6	14.9		2.8	1.5	0.3	24.9	22.0	0.4	11.8	4.5	9.2
Initial Queue Delay (d_3), s/veh	0.0	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	49.4	68.3		50.9	55.6	52.6	79.7	56.2	19.6	71.3	38.9	43.5
Level of Service (LOS)	D	E		D	E	D	E	E	B	E	D	D
Approach Delay, s/veh / LOS	59.2		E	53.0		D	57.2		E	42.1		D
Intersection Delay, s/veh / LOS	51.0						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.3	C	3.0	C	2.4	B	2.3	B
Bicycle LOS Score / LOS	1.2	A	0.8	A	2.1	B	1.5	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	TPD, Inc.			Duration, h	0.25
Analyst	MJA	Analysis Date	May 31, 2016	Area Type	Other
Jurisdiction	Lake County	Time Period	P.M. Peak Hour	PHF	0.95
Urban Street	US 27	Analysis Year		Analysis Period	1 > 17:00
Intersection	Citrus Grove Rd/Oak Va...	File Name	4774 - US 27 & Citrus Grove Rd - Projected.xus		
Project Description	P.M. Peak Hour - Projected				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	15	12	88	10	7	12	110	1433	47	19	1581	62

Signal Information				Signal Phases													
Cycle, s	96.7	Reference Phase	2														
Offset, s	0	Reference Point	End	Green	2.1	2.7	48.6	4.5	8.1	0.0	Yellow	5.8	0.0	5.8	4.4	3.4	0.0
Uncoordinated	Yes	Simult. Gap E/W	On	Red	2.1	0.0	2.0	2.7	4.5	0.0	Red	2.1	0.0	2.0	2.7	4.5	0.0
Force Mode	Fixed	Simult. Gap N/S	On														

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		8		4	1	6	5	2
Case Number		10.0		10.0	1.1	3.0	1.1	3.0
Phase Duration, s		16.0		11.6	12.7	59.1	10.0	56.4
Change Period, (Y+R _c), s		7.9		7.1	7.7	7.8	7.9	7.8
Max Allow Headway (MAH), s		4.2		4.1	3.9	3.8	3.9	3.8
Queue Clearance Time (g _s), s		8.1		3.1	4.9	38.0	2.5	46.1
Green Extension Time (g _e), s		0.4		0.1	0.3	10.2	0.0	2.4
Phase Call Probability		0.96		0.56	0.96	1.00	0.42	1.00
Max Out Probability		0.00		0.00	0.00	0.84	0.00	1.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	3	8	18	7	4	14	1	6	16	5	2	12
Adjusted Flow Rate (v), veh/h	16	105		11	20		116	1508	49	20	1664	65
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1640		1810	1625		1810	1706	1477	1723	1739	1533
Queue Service Time (g _s), s	0.8	6.1		0.5	1.1		2.9	36.0	1.6	0.5	44.1	2.1
Cycle Queue Clearance Time (g _c), s	0.8	6.1		0.5	1.1		2.9	36.0	1.6	0.5	44.1	2.1
Green Ratio (g/C)	0.08	0.08		0.05	0.05		0.55	0.53	0.53	0.52	0.50	0.50
Capacity (c), veh/h	145	138		84	75		182	1811	784	158	1748	770
Volume-to-Capacity Ratio (X)	0.109	0.764		0.125	0.265		0.637	0.833	0.063	0.127	0.952	0.085
Back of Queue (Q), ft/ln (95 th percentile)	16.5	122.2		11.8	22.1		60.1	457.6	20.1	9	618.7	29.2
Back of Queue (Q), veh/ln (95 th percentile)	0.6	4.9		0.5	0.9		2.3	18.3	0.8	0.3	24.7	1.2
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d ₁), s/veh	40.9	43.3		44.2	44.5		22.2	19.1	11.0	17.9	23.0	12.5
Incremental Delay (d ₂), s/veh	0.3	8.4		0.7	1.9		3.7	3.5	0.0	0.4	11.7	0.0
Initial Queue Delay (d ₃), 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	41.3	51.8		44.9	46.4		25.9	22.6	11.1	18.3	34.7	12.5
Level of Service (LOS)	D	D		D	D		C	C	B	B	C	B
Approach Delay, s/veh / LOS	50.4	D		45.9	D		22.5	C		33.7	C	
Intersection Delay, s/veh / LOS	29.1						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	0.5	A	1.9	A	1.9	A

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	MJA			Intersection	US 27 & Sullivan Rd/Site Acces		
Agency/Co.	TPD, Inc.			Jurisdiction	Lake County		
Date Performed	06/06/2016			Analysis Year			
Analysis Time Period	PM Peak (Projected)						
Project Description 4774 - The Reserve at Lake Ridge							
East/West Street: Sullivan Rd/Site Access				North/South Street: US 27			
Intersection Orientation: North-South				Study Period (hrs): 0.25			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)	39	1379	2	8	1562	17	
Peak-Hour Factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	
Hourly Flow Rate, HFR (veh/h)	44	1567	2	9	1775	19	
Percent Heavy Vehicles	0	--	--	0	--	--	
Median Type	Raised curb						
RT Channelized			0				0
Lanes	1	2	0	0	2		1
Configuration	L	T	TR	LT	T		R
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	10	0	22	5	0	2	
Peak-Hour Factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	
Hourly Flow Rate, HFR (veh/h)	11	0	25	5	0	2	
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		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration	L	LT		LTR			LTR
v (veh/h)	44	9		7			36
C (m) (veh/h)	349	426		104			164
v/c	0.13	0.02		0.07			0.22
95% queue length	0.43	0.06		0.21			0.80
Control Delay (s/veh)	16.8	13.6		42.1			33.0
LOS	C	B		E			D
Approach Delay (s/veh)	--	--		42.1			33.0
Approach LOS	--	--		E			D