Oakbrook Village Plaza
City of Laguna Hills

Traffic Impact Analysis

Prepared by:

HDR Engineering

3230 El Camino Real, Suite 200

Irvine, CA 92602

October 2012

Revision 3

TABLE OF CONTENTS

Page

LIST OF FIGURES

Page

LIST OF TABLES

Page

APPENDICES

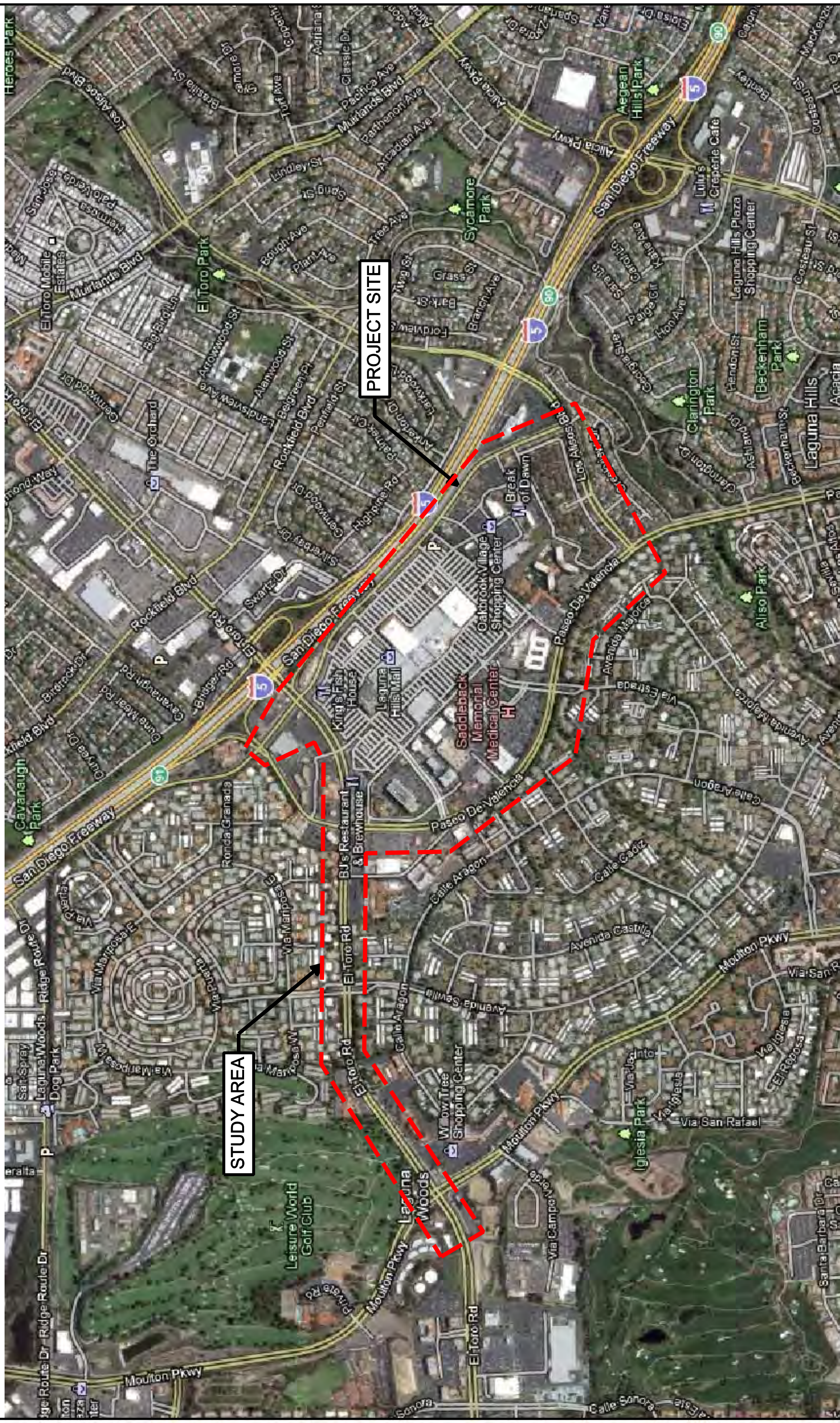
INTRODUCTION

This report summarizes the results of a Traffic Impact Study completed for the purpose of analyzing a redevelopment of the Oakbrook Village Plaza (the "**Redevelopment Project**.") The project is located in the City of Laguna Hills adjacent to the Laguna Hills Mall and Avenida de la Carlota. The existing site location is shown in Figure 1.

The purpose of this traffic study is to determine the traffic conditions for the two proposed Phases of the Redevelopment Project and predict any roadway mitigation measures that will be required in response to the proposed changes to this site. The study will also compare intersection operating conditions as a result of the Redevelopment Project to General Plan Update EIR. The criteria and guidelines for this study were derived from City of Laguna Hills Traffic Study Guidelines dated August 31, 2010 and through discussion with staff at the City of Laguna Hills and the Fritz Duda Company.

Traffic conditions are evaluated for each of the following scenarios:

1. Existing Conditions (2011)
2. Project Buildout Without Project Conditions - Phase I (2013)
3. Project Buildout With Project Conditions - Phase I (2013)
4. Project Buildout Without Project Conditions - Phase II (2016)
5. Project Buildout With Project Conditions - Phase II (2016)



HDR Engineering, Inc. ONE COMPANY *Many Solutions*
3230 El Camino Real, Suite 200
Irvine, CA 92602

FRITZ DUDA COMPANY

OAKBROOK VILLAGE TRAFFIC STUDY

FIGURE 1
LOCATION MAP

...\Figure 01_Area Map.dgn

EXISTING CONDITIONS

Avenida de la Carlota

Avenida de la Carlota is a secondary arterial that runs north south along the eastern boundary of the Redevelopment Project. It has 2 lanes in each direction and has a painted median with breaks to serve adjacent properties including the Laguna Hills Mall and Oakbrook Village Plaza. This road provides the primary access to the Redevelopment Project site. Avenida de la Carlota begins at El Toro Road to the north and terminates at Los Alisos Boulevard to the south where it lets into a residential neighborhood.

El Toro Road

El Toro Road is a major arterial that runs east west to the northwest of Oakbrook Village Project site. It is a six lane divided roadway that serves as a highly trafficked connection to the I-5 Freeway. It shares intersections with Paseo De Valencia, Regional Center Drive, and Avenida de la Carlota in the vicinity of the Redevelopment Project site.

Los Alisos Boulevard

Los Alisos Boulevard is a major arterial that runs east west to the south of the project site. It is a six lane divided roadway and terminates to west at Paseo de Valencia. Traffic exiting the site and heading south on Avenida de la Carlota will use this roadway on their routes.

Paseo De Valencia

Paseo De Valencia is a major arterial that runs north south west of the Redevelopment Project site. It is a six lane divided roadway. This roadway serves as connection between the Village Commercial zoned areas around the Redevelopment Project to residential zoned areas to the south.

Existing Redevelopment Project Site

The existing Oakbrook Village Plaza contains retail and restaurant land uses. It is located adjacent to the Laguna Hills Mall and adjacent to Avenida de la Carlota and the I-5 Freeway. Currently there is 185,956 square feet of retail space including a Trader Joe's grocery store, Marshall's, and Break of Dawn Restaurant. There are three entrances to the site along its eastern boundary from Avenida de la Carlota. Additionally, there are two connectors to the Laguna Hills Mall located on the northern boundary of the site. The site is zoned as Village Commercial according to the City of Laguna Hills General Plan. The site is also subject to the Urban Village Specific Plan. Typical uses for this zoning classification include those associated with large regional

malls, as well as a medical center, financial institutions, institutional and government uses, auto-related services, community facilities, professional offices, and high density residential uses.

EXISTING CIRCULATION

To determine existing circulation conditions, turning movement counts were collected in November 2011during the AM peak period (7:00-9:00 AM) and PM peak period (4:00-6:00 PM) at the following fourteen intersections:

1. El Toro Road and Moulton Parkway
2. El Toro Road and Avenida Sevilla
3. El Toro Road and Paseo De Valencia
4. El Toro Road and Regional Center Drive
5. El Toro Road and Avenida de la Carlota
6. Mall Entrance and Avenida de la Carlota
7. Oak Brook Plaza and West Mall Connector
8. Oak Brook Plaza and East Mall Connector
9. North Site Entrance and Avenida de la Carlota
10. Main Site Entrance and Avenida de la Carlota
11. South Site Entrance and Avenida de la Carlota
12. Los Alisos Boulevard and Paseo De Valencia
13. Los Alisos Boulevard and Avenida de la Carlota
14. I-5 Southbound Ramps and Avenida de la Carlota

Intersection turning movement counts at the intersection of El Toro Road and Avenida de la Carlota were re-collected in May 2012 to include changes to the northbound striping on Avenida de la Carlota that was completed in the spring of 2012. The striping in the northbound direction changed from a left, through, and right turn lane to a left-through lane and two right turn lanes. The existing conditions analysis of this intersection will reflect this change in striping and these counts collected in May 2012. Counts at the intersection of the I-5 Southbound Ramps and Avenida de la Carlota were added to the study after the first report revision and were also collected in May 2012. It should also be noted that counts were collected during periods when public school was in session.

Existing intersection configurations of the studied intersections listed above are provided in Figure 2. The existing AM and PM peak period turning movement counts are shown on Figure 3 and are also included in their full form in Appendix A. Additionally, existing signal timings were obtained through the City of Laguna Hills for the nine signalized intersections that were analyzed as part of this study.

HDR Engineering, Inc.
ONE COMPANY
Many Solutions
3230 El Camino Road, Suite 200
Irvine, CA 92602

FRITZ DUDA COMPANY

OAKBROOK VILLAGE TRAFFIC STUDY

FIGURE 2

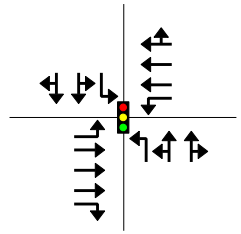
EXISTING INTERSECTION CONFIGURATIONS

D-8

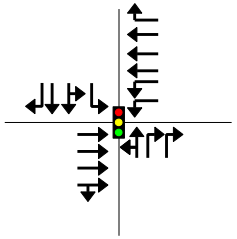
1 El Toro Road and Moulton Parkway

4 El Toro Road and Regional Center Drive

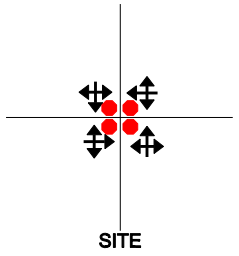
2 El Toro Road and Avenida Sevilla



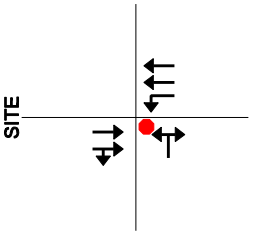
5 El Toro Road and Avenida De La Carlota



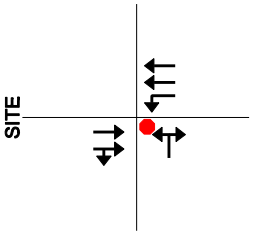
7 Oakbrook Plaza and West Mall Connector



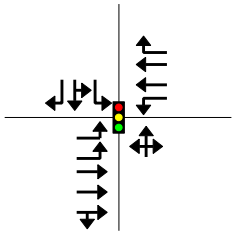
9 North Site Entrance and Avenida De La Carlota



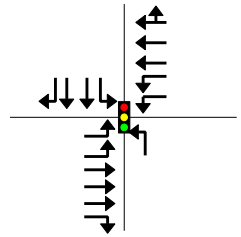
11 South Site Entrance and Avenida De La Carlota



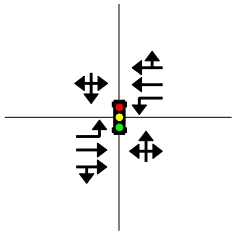
13 Los Alisos Boulevard and Avenida De La Carlota



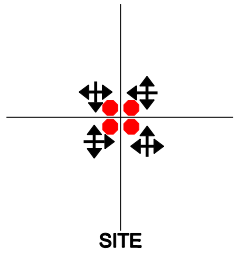
3 El Toro Road and Paseo De Valencia



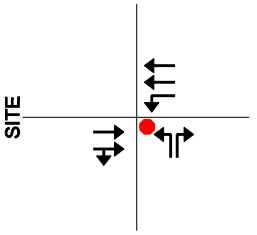
6 Mall Entrance and Avenida De La Carlota



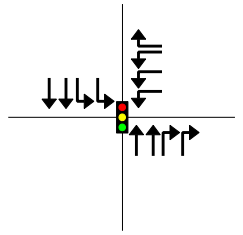
8 Oakbrook Plaza and East Mall Connector



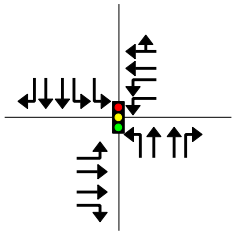
10 Main Site Entrance and Avenida De La Carlota



12 Los Alisos Boulevard and Paseo De Valencia



14 I-5 Southbound Ramps and Avenida De La Carlota



1 El Toro Road and Moulton Parkway

2 El Toro Road and Avenida Sevilla

3 El Toro Road and Paseo De Valencia

4 El Toro Road and Regional Center Drive

5 El Toro Road and Avenida De La Carlota

6 Mall Entrance and Avenida De La Carlota

7 Oakbrook Plaza and West Mall Connector

8 Oakbrook Plaza and East Mall Connector

9 North Site Entrance and Avenida De La Carlota

10 Main Site Entrance and Avenida De La Carlota

11 South Site Entrance and Avenida De La Carlota

12 Los Alisos Boulevard and Paseo De Valencia

13 Los Alisos Boulevard and Avenida De La Carlota

14 I-5 Southbound Ramps and Avenida De La Carlota

HDR Engineering, Inc.
ONE COMPANY
Many Solutions
3230 El Camino Real, Suite 200
Irvine, CA 92602

FRITZ DUDA COMPANY

OAKBROOK VILLAGE TRAFFIC STUDY

FIGURE 3

EXISTING INTERSECTION CONDITIONS

...\Figure 03 - Existing TMC.dgn

To measure the current operating conditions of the intersections included in the project study area, the Level of Service (LOS) was calculated for each of the identified intersections. LOS provides an insight into how an intersection is functioning and how much extra capacity is available.

For signalized intersections, Synchro Modeling Software was used to determine the intersection LOS based on Intersection Capacity Utilization Methodology (ICU). The ICU LOS reports on the amount of reserve capacity or capacity deficit. LOS for signalized intersections is defined as follows using ICU methodology:

Table 1: Intersection Capacity Utilization (ICU) Level of Service Methodology

Level of Service	Volume to Capacity Ratio	Description
A	0.00 - 0.60	Excellent operation. All approaches to the intersection appear quite open, turning movements are easily made, and nearly all drivers find freedom of operation.
B	0.61 - 0.70	Very good operation. An occasional approach phase is fully utilized. Many drivers feel somewhat restricted within platoons of vehicles.
C	0.71 - 0.80	Good operation. Major approach phases fully utilized. Most drivers feel somewhat restricted.
D	0.81 - 0.90	Fair operation. Drivers may have to wait through more than one red signal indication. Queues may develop but dissipate rapidly, without excessive delays.
E	0.91 - 1.00	Poor operation. Volumes at or near capacity. Vehicle may wait through several signal cycles. Long queues from upstream intersections.
F	$\geq$ 1.00	Forced flow. Represents jammed conditions. Intersection operates below capacity with low volumes. Queues may block upstream intersections.

Source: City of Laguna Hills Traffic Study Guidelines

For stop-controlled intersections, Highway Capacity Software Version 5.5 (HCS) was used to determine intersection LOS based on Highway Capacity Manual 2000 Methodology (HCM 2000.) HCM is a delay based LOS measure that reports on the average delay experienced by motorists. LOS is defined as follows using HCM 2000 methodology:

Table 2: Highway Capacity Manual 2000 Methodology (HCM 2000)

LOS	Description	Control Delay per Vehicle (s/veh)
A	Primarily free flow operations.	≤ 10
B	Reasonably unimpeded operations, ability to maneuver only slightly restricted by other vehicles in traffic stream.	>10-20
C	Stable operations, ability to maneuver and select operating speeds affected by other vehicles in traffic stream.	>20-35
D	Unstable traffic flow, speed and ability to maneuver restricted.	>35-55
E	Substantial delays, traffic flow is quite unstable.	>55-80
F	Extremely slow speeds, with stop and go operations.	> 80

Source: Transportation Research Board, Highway Capacity Manual, Special Report No. 209, Washington, D.C., 2000.

Both modeling methodologies are consistent with requirements set forth in the City of Laguna Hills Traffic Study Guidelines.

Existing Intersection Operating Conditions

The peak hour turning movement counts and existing signal timing information provided by the City of Laguna Hills were entered into the appropriate modeling platform to establish baseline LOS values for all of the study intersections. The City of Laguna Hills Traffic Study Guidelines states that a LOS of D is its goal for intersection performance. The intersection of Avenida de la Carlota and El Toro Road is part of Orange County's Congestion Management Program (CMP) which specifies a LOS of E as its goal for intersection performance. The results of the existing conditions intersection analysis are summarized below in Table 3. The complete model output files are included in Appendix B.

Table 3: Existing Intersection Operating Conditions

	Intersection Name	Control	AM PEAK HOUR		PM PEAK HOUR	
			LOS	ICU	LOS	ICU
1	El Toro Road and Moulton Parkway	Signal	D	0.900	E	0.915
2	El Toro Road and Avenida Sevilla	Signal	A	0.573	B	0.684
3	El Toro Road and Paseo De Valencia	Signal	B	0.686	C	0.785
4	El Toro Road and Regional Center Drive	Signal	A	0.463	C	0.733
5	El Toro Road and Avenida de la Carlota	Signal	B	0.662	F	102.6
6	Mall Entrance and Avenida de la Carlota	Signal	A	0.292	B	0.606
12	Los Alisos Boulevard and Paseo De Valencia	Signal	B	0.558	B	0.611
13	Los Alisos Boulevard and Avenida de la Carlota	Signal	A	0.549	B	0.695
14	I-5 Southbound Ramps and Avenida de la Carlota	Signal	B	0.684	C	0.797

	Intersection Name	Control	AM PEAK HOUR		PM PEAK HOUR	
			LOS	Delay (Sec.)	LOS	Delay (Sec.)
7	Oak Brook Plaza and West Mall Connector	AWSC	A	6.9	A	7.6
8	Oak Brook Plaza and East Mall Connector	AWSC	A	6.9	A	7.3
9	North Site Entrance and Avenida de la Carlota	1WSC	B	11.8	C	22.5
10	Main Site Entrance and Avenida de la Carlota	1WSC	A	9.8	C	15.3
11	South Site Entrance and Avenida de la Carlota	1WSC	B	12.2	C	20.0

As shown in Table 3, the intersection of El Toro Road and Moulton Parkway operates at a LOS of E during the PM peak period in the existing condition. Also, the intersection of El Toro Road and Avenida de la Carlota operates at a LOS of F in during the PM peak period in the existing condition. All other intersections studied in the existing condition operate at or better then the LOS standard of D in the existing condition during both the AM and PM peak periods.

Existing Intersection Operating Conditions – Comparison to Laguna Hills General Plan Mobility Update

The City of Laguna Hills General Plan Mobility Update Traffic Study dated December 8, 2008 uses a different method of ICU capacity utilization to determine intersection LOS. The ICU procedure measures the capacity of an intersection by calculating the amount of capacity utilized by each critical movement at an intersection. The ICU does not predict delay, but can be used to predict how often an intersection will experience congestion. A capacity of 1,700 Vehicles per Hour per Lane (vphpl) and a clearance interval of 0.05 were assumed. The methodology includes a check for right-turn capacity utilization. If insufficient capacity is available, then an adjustment is made to the total capacity utilization value. The ICU capacity utilization methodology uses volume over capacity for each critical movement whereas the Synchro ICU procedure uses cycle length, lost time for each critical movement, and minimum green time for critical movement.

The intersection of El Toro Road and Avenida de la Carlota was identified as an intersection of vital importance to local roadway network and for this reason this intersection was analyzed using the ICU capacity utilization procedure to provide an "apples to apples" comparison of the intersection operations to the LOS values in the General Plan. Using this methodology for the collected existing turning movement volumes at the intersection El Toro Road and Avenida de la Carlota, a V/C of 0.651 (LOS B) was obtained for the AM peak hour and a V/C of 0.728 (LOS C) was obtained for the PM peak hour as shown in Table 4. According to the General Plan Mobility Update Traffic Study the existing (2008) V/C values at the intersection of El Toro Road and Avenida de la Carlota is 0.65 in the AM peak hour (LOS B) and 0.87 in the PM peak hour (LOS D.) These V/C values vary between this study and the General Plan Study due to the fact that the turning movement counts collected as part of this study varies from the volumes assumed in the General Plan analysis and due to different lane configurations assumed in the general plan.

Table 4: Existing Intersection Operating Conditions
El Toro Road and Avenida de la Carlota
ICU Procedure

Existing El Toro Road & Avenida de la Carlota			AM PK HOUR			PM PK HOUR		
	LANES	CAPACITY	VOL	V/C		VOL	V/C	
NBL	0.5		14			46		
NBT	0.5	1700	94	0.064	*	91	0.081	*
NBR	2	3400	409	0.120		517	0.152	
SBL	1.5		607			789		
SBT	1.5	5100	219	0.162	*	577	0.268	*
SBR	1	1700	132	0.078		145	0.085	
EBL	0	0	0			0		
EBT	4	6800	1045	0.154	*	1567	0.230	*
EBR	d	1700	22	0.013		45	0.026	
WBL	2	3400	129	0.038	*	338	0.099	*
WBT	3	5100	816	0.160		887	0.174	
WBR	1	1700	731	0.430		692	0.407	
Right Turn Adjustment			Multi	0.183	*	NBR		*
Clearance Interval				0.050	*		0.050	*
Assumes N/S Split Phasing & RT overlap for WBR NBR								
TOTAL CAPACITY UTILIZATION				**0.651**	**B**		**0.728**	**C**
Indicates Critical Approach								

FUTURE REDEVELOPMENT AND RECOMMENDED TRAFFIC IMPROVEMENTS

This section of the study documents the projected traffic impacts and the operational conditions associated with the proposed improvements at the Redevelopment Project site. These conditions were evaluated for two phased build-out scenarios of the Redevelopment Project, Phase I and Phase II. These two phases are described below.

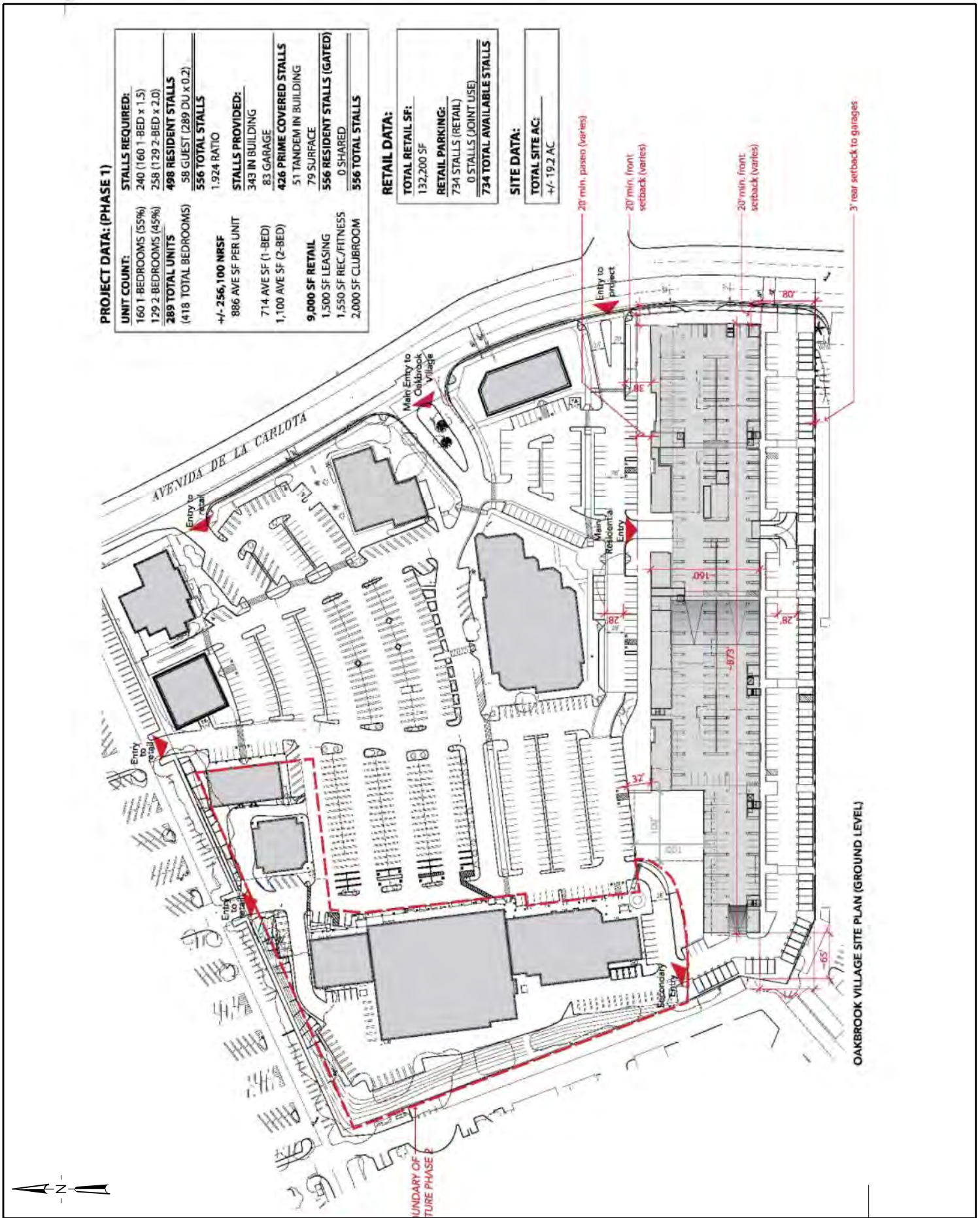
Proposed Redevelopment Project

Phase I

Phase I of the Redevelopment Project would include a decrease in the gross leasable area (GLA) for the retail land use to 132,000 ft^2 and construction of 289 new residential apartment units along the southern boundary of the property. The Phase I improvements are expected to be completed and the site operational by the end of 2013. Additionally, the main site entrance located in the middle of the site will be converted from a one-way stop controlled intersection to a signalized intersection. A signal warrant analysis was performed for this intersection and it meets the 8 hour signal warrant as described in the Manual for Uniform Traffic Control Devices (MUTCD.) The calculations for this warrant are included in Appendix C. Figure 4 shows the site plan for Phase I of the Redevelopment Project.

Phase II – Full Build Out

Phase II of the Redevelopment Project further reduces the GLA of retail land use to 125,000 ft^2 and increases the number of residential apartment units to 489 on the site. The Phase II improvements are expected to be completed and the site operational by the end of 2016. As mentioned above, the main site entrance located in the middle of the site will have already been converted from a one-way stop controlled intersection to a signalized intersection.



HDR Engineering, Inc.
ONE COMPANY
Many Solutions
3230 El Camino Real, Suite 200
Irvine, CA 92602

FRITZ DUDA COMPANY

OAKBROOK VILLAGE TRAFFIC STUDY

FIGURE 4
SITE PLAN PHASE 1

$REQUEST

Project Trip Generation

The Institute of Transportation Engineers (ITE) Trip Generation Manual 8th Edition was used to develop trip generation values for the existing condition and Phase I and Phase II of the Redevelopment Project. ITE Code 220 was used for the proposed apartment development on the site and ITE Code 820 was used for the retail land use on the site. The trip generation calculations are included in Table 5.

Phase I
For Phase I the changes in land use on the proposed redevelopment site will cause an additional 102 net trip ends during the AM Peak Hour, 2 entering and 100 exiting, and reduce the net number of trip ends by 37 during the PM Peak Hour, 10 entering and -47 exiting. The overall daily weekday change in total trip ends (ADT) for Phase I is a reduction by 325 trip ends when compared to the existing condition.

Phase II
For Phase II the changes in land use on the proposed redevelopment site will cause an additional 194 trip ends during the AM Peak Hour compared to the existing condition, 18 entering and 186 exiting and increase the number of trip ends by 44 during the PM Peak Hour compared to the existing condition, 67 entering and -23 exiting. The overall daily weekday change in total trip ends (ADT) for Phase II is an increase by 596 trip ends when compared to the existing condition.

Project Trip Distribution and Assignment

Based on observations of existing circulation patterns obtained by collecting entering and exiting vehicle turning movement counts at the five access to points to the Redevelopment Project Site, a trip distribution was developed for the AM and PM peak hour distribution of new project trips. Based on the installation of a signalized intersection at the main site entrance some project trips were routed from the mall access points on the north of the site to main site entrance. The same distribution assumption was used for both Phase I and Phase II of the Redevelopment Project. This distribution is illustrated in Figure 5. Based on this distribution, the AM and PM peak hour Redevelopment Project trips shown in Table 5 were assigned to the roadway network as shown in Figure 6 for Phase I and Figure 7 for Phase II of the Redevelopment Project. A 1% annual background growth rate was applied to existing turning movement counts to grow existing volumes to anticipated 2013 volumes for the Phase I analysis and 2016 volumes for the Phase II analysis. As mentioned in the introduction, four future scenarios are analyzed. The projected intersection traffic volumes are shown in Figure 8 for Phase I – No Project, Figure 9 for Phase I – With Project, Figure 10 for Phase II – No Project, and Figure 11 for Phase II – With Project.

Table 5: Proposed Redevelopment Project Trip Generation

Trip Generation

Land Use Type	Equation	ITE CODE
Residential Fitted Trip Gen Curve Equation AM	T= .49(X) + 3.73 [X= # dwelling units]	220
Residential Fitted Trip Gen Curve Equation PM	T= .55(X) + 17.65 [X= # dwelling units]	220
Residential Fitted Trip Gen Curve Weekday	T= 6.06(X) + 123.56 [X= # dwelling units]	220
Retail Fitted Trip Gen Curve Equation AM	Ln(T)= .59Ln(X) + 2.32 [X= 1000 ft2 GLA]	820
Retail Fitted Trip Gen Curve Equation PM	Ln(T)= .67Ln(X) + 3.37 [X= 1000 ft2 GLA]	820
Retail Fitted Trip Gen Curve Equation Weekday	Ln(T)= .65Ln(X) + 5.83 [X= 1000 ft2 GLA]	820
Restaurant Fitted Trip Gen Curve Equation AM	T= 11.52(X)	932
Restaurant Fitted Trip Gen Curve Equation PM	T= 11.15 (X)	932
Restaurant Fitted Trip Gen Curve Weekday	T= 127.15(X)	932
Bank Fitted Trip Gen Curve Equation AM	T= 12.35(X)	912
Bank Fitted Trip Gen Curve Equation PM	T= 25.82(X)	912
Bank Fitted Trip Gen Curve Equation Weekday	T= 148.15(X)	912

Existing (2008 Gen Plan)		Period Analyzed	Residential Trip Gen	Retail Trip Gen	Total Existing		Total Entering	Total Exiting
0	Residential Units	AM Peak Hour Adjacent Street Traffic	0	226	226	AM Peak	138	88
191,000	ft2 retail	PM Peak Hour Adjacent Street Traffic	0	982	982	PM Peak	481	501
0	ft2 restaurant	Weekday ADT	0	10343	10343			
0	ft2 bank							

Future (2030 Gen Plan)		Period Analyzed	Residential Trip Gen	Retail Trip Gen	Total Future		Total Entering	Total Exiting
0	Residential Units	AM Peak Hour Adjacent Street Traffic	0	228	228	AM Peak	139	89
193,000	ft2 retail	PM Peak Hour Adjacent Street Traffic	0	989	989	PM Peak	485	504
0	ft2 restaurant	Weekday ADT	0	10413	10413			
0	ft2 bank							

Phase I		Period Analyzed	Residential Trip Gen	Retail Trip Gen	Total Phase I	Δ Existing	Δ Future (Gen Plan)	Δ Exist Resident	Δ Exist Retail	Δ Exist Entering	Δ Exist Exiting
289	Residential Units	AM Peak Hour Adjacent Street Traffic	146	182	328	102	100	146	-44	2	100
132,200	ft2 retail	PM Peak Hour Adjacent Street Traffic	177	768	945	-37	-44	177	-214	10	-47
0	ft2 restaurant	Weekday ADT	1875	8143	10018	-325	-395				
0	ft2 bank										

Phase II		Period Analyzed	Residential Trip Gen	Retail Trip Gen	Total Phase II	Δ Existing	Δ Future (Gen Plan)	Δ Exist Resident	Δ Exist Retail	Δ Exist Entering	Δ Exist Exiting
489	Residential Units	AM Peak Hour Adjacent Street Traffic	244	176	420	194	192	244	-50	18	176
125,000	ft2 retail	PM Peak Hour Adjacent Street Traffic	287	739	1026	44	37	287	-243	67	-23
0	ft2 restaurant	Weekday ADT	3087	7852	10939	596	526				
0	ft2 bank										

Notes:
AM Peak Hour Adjacent Street Traffic Between 7am - 9am
PM Peak Hour Adjacent Street Traffic Between 4pm - 6pm

Source: ITE Trip Generation Manual 8th Edition

HDR Engineering, Inc.
ONE COMPANY *Many Solutions*
3230 El Camino Road, Suite 200
Irvine, CA 92602

FRITZ DUDA COMPANY

OAKBROOK VILLAGE TRAFFIC STUDY

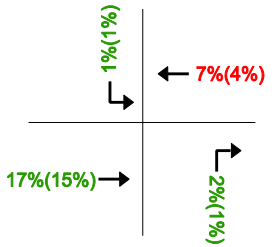
FIGURE 5

TRIP DISTRIBUTION

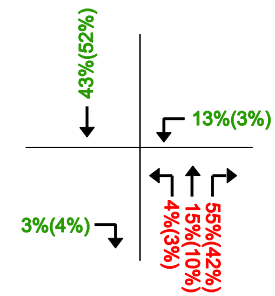
1 El Toro Road and Moulton Parkway

4 El Toro Road and Regional Center Drive

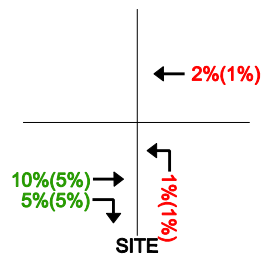
2 El Toro Road and Avenida Sevilla



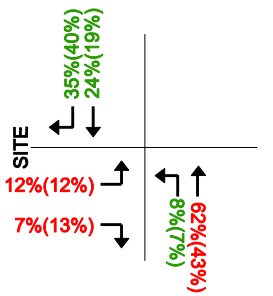
5 El Toro Road and Avenida De La Carlota



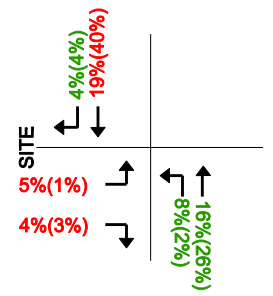
7 Oakbrook Plaza and West Mall Connector



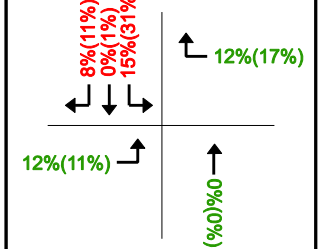
9 North Site Entrance and Avenida De La Carlota



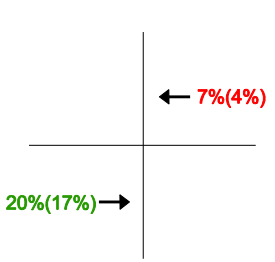
11 South Site Entrance and Avenida De La Carlota



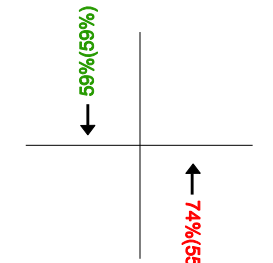
13 Los Alisos Boulevard and Avenida De La Carlota



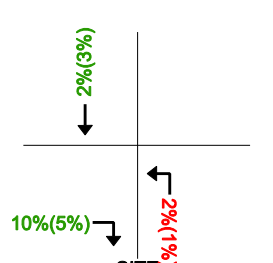
3 El Toro Road and Paseo De Valencia



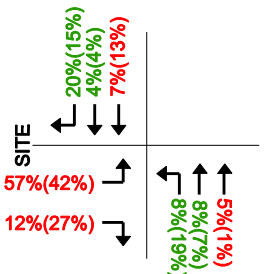
6 Mall Entrance and Avenida De La Carlota



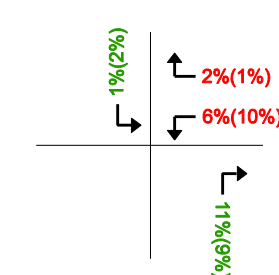
8 Oakbrook Plaza and East Mall Connector



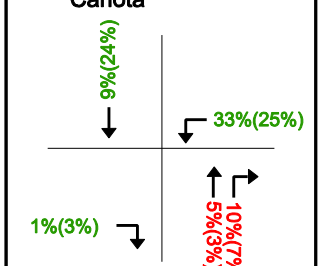
10 Main Site Entrance and Avenida De La Carlota

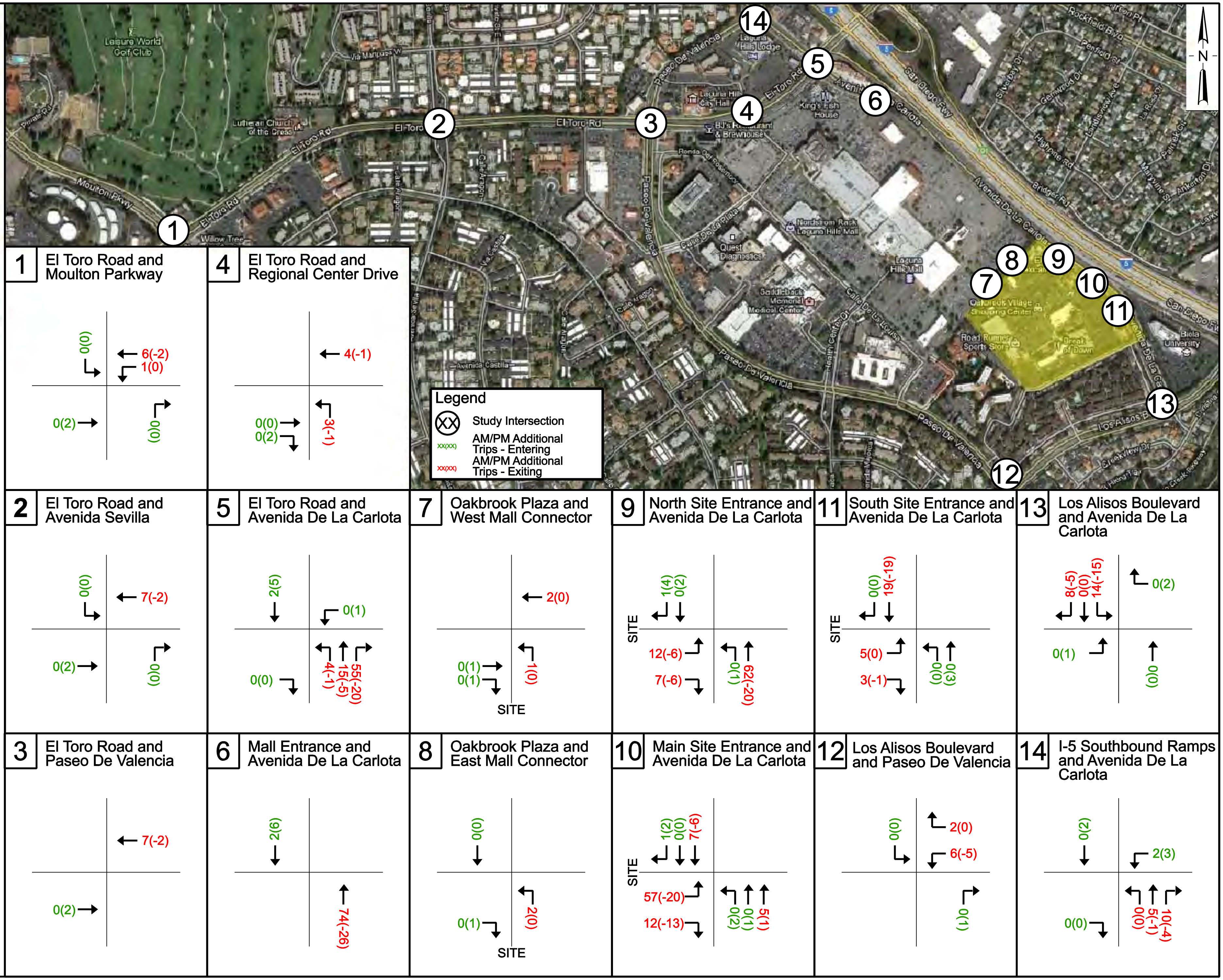


12 Los Alisos Boulevard and Paseo De Valencia



14 I-5 Southbound Ramps and Avenida De La Carlota





1 El Toro Road and Moulton Parkway
6(-2)
1(0)
0(0)
0(2)
0(0)
2 El Toro Road and Avenida Sevilla
7(-2)
0(0)
0(2)
0(0)
3 El Toro Road and Paseo De Valencia
7(-2)
0(2)
4 El Toro Road and Regional Center Drive
4(-1)
3(-1)
0(0)
0(2)
5 El Toro Road and Avenida De La Carlota
2(5)
0(1)
0(0)
4(-1)
15(-5)
55(-20)
6 Mall Entrance and Avenida De La Carlota
2(6)
74(-26)
7 Oakbrook Plaza and West Mall Connector
2(0)
1(0)
0(1)
0(1)
SITE
8 Oakbrook Plaza and East Mall Connector
0(0)
2(0)
0(1)
SITE
9 North Site Entrance and Avenida De La Carlota
1(4)
0(2)
SITE
12(-6)
7(-6)
0(1)
62(-20)
10 Main Site Entrance and Avenida De La Carlota
1(2)
0(0)
7(-6)
SITE
57(-20)
12(-13)
0(2)
0(1)
5(1)
11 South Site Entrance and Avenida De La Carlota
0(0)
19(-19)
SITE
5(0)
3(-1)
0(0)
0(3)
12 Los Alisos Boulevard and Paseo De Valencia
0(0)
2(0)
6(-5)
0(1)
13 Los Alisos Boulevard and Avenida De La Carlota
8(-5)
0(0)
14(-15)
0(2)
0(1)
0(0)
14 I-5 Southbound Ramps and Avenida De La Carlota
0(2)
2(3)
0(0)
0(0)
5(-1)
10(-4)
Legend
XX Study Intersection
xx(xx) AM/PM Additional Trips - Entering
xx(xx) AM/PM Additional Trips - Exiting
N

HDR Engineering, Inc.
ONE COMPANY *Many Solutions*
3230 El Camino Real, Suite 200 Irvine, CA 92602

FRITZ DUDA COMPANY

OAKBROOK VILLAGE TRAFFIC STUDY
FIGURE 6
PROJECT GENERATED TRIPS - PHASE I (2013)

...\Figure 06 - Add Trips Phase 1.dgn

HDR Engineering, Inc.
ONE COMPANY *Many Solutions*
3230 El Camino Road, Suite 200
Irvine, CA 92602

FRITZ DUDA COMPANY

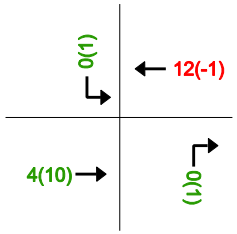
OAKBROOK VILLAGE TRAFFIC STUDY

FIGURE 7

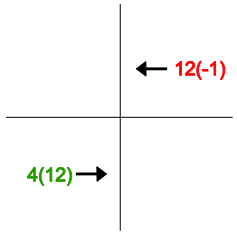
D-PROJECT GENERATED TRIPS - PHASE II (2016)

1 El Toro Road and Moulton Parkway

2 El Toro Road and Avenida Sevilla

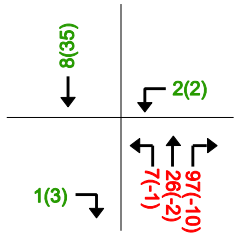


3 El Toro Road and Paseo De Valencia

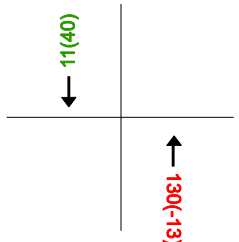


4 El Toro Road and Regional Center Drive

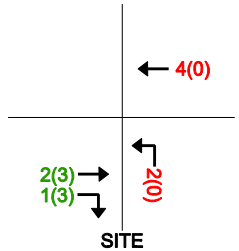
5 El Toro Road and Avenida De La Carlota



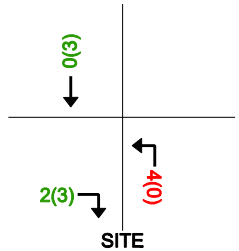
6 Mall Entrance and Avenida De La Carlota



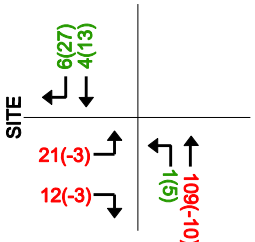
7 Oakbrook Plaza and West Mall Connector



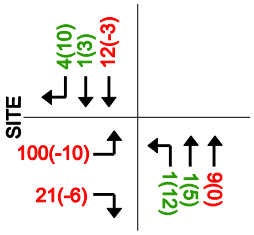
8 Oakbrook Plaza and East Mall Connector



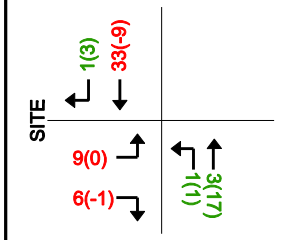
9 North Site Entrance and Avenida De La Carlota



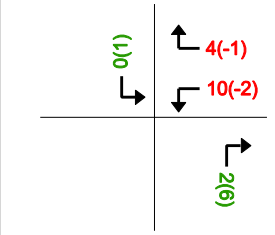
10 Main Site Entrance and Avenida De La Carlota



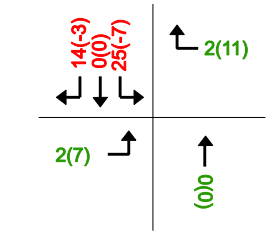
11 South Site Entrance and Avenida De La Carlota



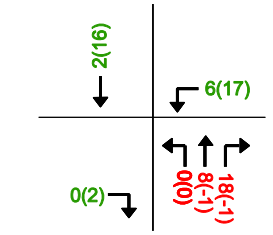
12 Los Alisos Boulevard and Paseo De Valencia



13 Los Alisos Boulevard and Avenida De La Carlota



14 I-5 Southbound Ramps and Avenida De La Carlota



...*Figure 07 - Add Trips Phase 2.dgn

HDR Engineering, Inc.
ONE COMPANY
Many Solutions
3230 El Camino Real, Suite 200
Irvine, CA 92602

FRITZ DUDA COMPANY

OAKBROOK VILLAGE TRAFFIC STUDY

FIGURE 8

PEAK HOUR VOLUMES PHASE I - NO PROJECT (2013)

...\Figure 08 - Phase 1 No Proj Trips.dgn

HDR Engineering, Inc.
ONE COMPANY
Many Solutions
3230 El Camino Real, Suite 200
Irvine, CA 92602

FRITZ DUDA COMPANY

OAKBROOK VILLAGE TRAFFIC STUDY

FIGURE 9

PEAK HOUR VOLUMES PHASE I - WITH PROJECT (2013)

...\Figure 09 - Phase 1 with Project Trips.dgn

HDR Engineering, Inc.
ONE COMPANY
Many Solutions
3230 El Camino Real, Suite 200
Irvine, CA 92602

FRITZ DUDA COMPANY

OAKBROOK VILLAGE TRAFFIC STUDY

...\Figure 10 - Phase 2 No Proj Trips.dgn

HDR Engineering, Inc.
ONE COMPANY
Many Solutions
3230 El Camino Real, Suite 200
Irvine, CA 92602

FRITZ DUDA COMPANY

OAKBROOK VILLAGE TRAFFIC STUDY

FIGURE 11

PEAK HOUR VOLUMES PHASE II - WITH PROJECT (2016)

...\Figure 11 - Phase 2 With Proj Trips.dgn

Project Intersection Analysis

Phase I

The existing turning movement counts were grown to 2013 volumes using an assumed background growth rate and the project generated trips were added for the Phase I – Project Scenario as shown in Figures 8 and 9. These scenarios were analyzed using Synchro Traffic Analysis Software for the signalized intersections and HCS Traffic Modeling for the stop controlled intersections. It was assumed in the Phase I Project Scenario that the main site entrance located in the middle of the site would be converted from a one-way stop controlled intersection to a signalized intersection. Also, in conjunction with planned improvements at the intersection of El Toro Road and Avenida de la Carlota, an additional left turn lane was added for southbound movements. Existing signal timings were used at the studied intersections except for the new signalized intersection at the main site entrance where standard signal timing and phasing was assumed and for the modified intersection of El Toro Road and Avenida de la Carlota where an additional protected left turn phase was added and the signal timings were optimized. The results for the Phase I intersection analysis without and with the Redevelopment Project are provided below in Tables 6 and 7 and included as Appendix D and Appendix E.

Table 6: Future Intersection Operating Conditions
Phase I - No Project

Intersection Name		Control	AM PEAK HOUR		PM PEAK HOUR	
			LOS	V/C	LOS	V/C
1	El Toro Road and Moulton Parkway	Signal	E	0.914	E	0.928
2	El Toro Road and Avenida Sevilla	Signal	A	0.581	C	0.700
3	El Toro Road and Paseo De Valencia	Signal	B	0.696	C	0.796
4	El Toro Road and Regional Center Drive	Signal	A	0.466	C	0.743
5	El Toro Road and Avenida de la Carlota	Signal	B	0.616	E	0.971
6	Mall Entrance and Avenida de la Carlota	Signal	A	0.295	B	0.616
12	Los Alisos Boulevard and Paseo De Valencia	Signal	A	0.566	B	0.622
13	Los Alisos Boulevard and Avenida de la Carlota	Signal	A	0.557	C	0.704
14	I-5 Southbound Ramps and Avenida de la Carlota	Signal	B	0.695	B	0.684

Table 6 (*continued)*: Future Intersection Operating Conditions Phase I - No Project

Intersection Name		Control	AM PEAK HOUR		PM PEAK HOUR	
			LOS	Delay (Sec.)	LOS	Delay (Sec.)
7	Oak Brook Plaza and West Mall Connector	AWSC	A	6.9	A	7.6
8	Oak Brook Plaza and East Mall Connector	AWSC	A	6.9	A	7.3
9	North Site Entrance and Avenida de la Carlota	1WSC	B	11.9	C	23.6
10	Main Site Entrance and Avenida de la Carlota	1WSC	A	9.8	C	15.6
11	South Site Entrance and Avenida de la Carlota	1WSC	B	12.9	C	20.6

Table 7: Future Intersection Operating Conditions Phase I - With Project

Intersection Name		Control	AM PEAK HOUR		PM PEAK HOUR	
			LOS	V/C	LOS	V/C
1	El Toro Road and Moulton Parkway	Signal	E	0.915	E	0.929
2	El Toro Road and Avenida Sevilla	Signal	A	0.581	B	0.693
3	El Toro Road and Paseo De Valencia	Signal	B	0.696	C	0.797
4	El Toro Road and Regional Center Drive	Signal	A	0.467	C	0.743
5	El Toro Road and Avenida de la Carlota	Signal	B	0.638	E	0.970
6	Mall Entrance and Avenida de la Carlota	Signal	A	0.318	B	0.618
10	Main Site Entrance and Avenida de la Carlota	Signal	A	0.304	A	0.507
12	Los Alisos Boulevard and Paseo De Valencia	Signal	A	0.567	B	0.621
13	Los Alisos Boulevard and Avenida de la Carlota	Signal	A	0.567	C	0.700
14	I-5 Southbound Ramps and Avenida de la Carlota	Signal	B	0.696	B	0.685

Table 7 *(continued)*: Future Intersection Operating Conditions Phase I - With Project

	Intersection Name	Control	AM PEAK HOUR		PM PEAK HOUR	
			LOS	Delay (Sec.)	LOS	Delay (Sec.)
7	Oak Brook Plaza and West Mall Connector	AWSC	A	6.9	A	7.6
8	Oak Brook Plaza and East Mall Connector	AWSC	A	7.0	A	7.3
9	North Site Entrance and Avenida de la Carlota	1WSC	B	12.4	C	22.8
11	South Site Entrance and Avenida de la Carlota	1WSC	B	12.6	C	20.4

The Phase I intersections analyzed in both the AM and PM peak periods experience a very minor increase in volume over capacity ratio (V/C) and average delay as a result of the project trips in the Phase I – With Project Scenario when compared to the Phase I - No Project Scenario. The PM peak period V/C for the intersection of El Toro Road and Avenida de la Carlota for the project option is 0.001 less when compared to the no project option due to the reduction in the number of generated trips entering the proposed site for the Phase I improvements. Also, due to the assumption that an additional left turn lane will be added in the southbound direction of Avenida de la Carlota the LOS improves in both the Phase I – With Project Scenario and no project scenarios when compared to the existing condition. This assumption also allowed queuing on southbound Avenida de la Carlota between the I-5 Ramps and El Toro Road to clear which improved the operation of the intersection of Avenida de la Carlota and the I-5 Southbound Ramps during the PM peak period when compared to the existing condition.

As discussed in the existing conditions that due to importance of the intersection of El Toro Road and Avenida de la Carlota on the local circulation network, the ICU capacity utilization procedure was used to compare the intersection conditions as a result of the construction of the Redevelopment Project to those values in the City of Laguna Hills General Plan Mobility Update Traffic Study. Results of the ICU capacity utilization analysis procedure for Phase I with and without the project are shown in Table 8. This analysis also shows a very minor impact on the operation of the intersection of El Toro Road and Avenida de la Carlota given the Phase I improvements at Oakbrook Village.

According to the General Plan Mobility Update Traffic Study the future year (2030) ICU values at the intersection of El Toro Road and Avenida de la Carlota is 0.67 in the AM peak hour (LOS B) and 0.96 in the PM peak hour (LOS E).

Table 8: Future Intersection Operating Conditions Phase I El Toro Road and Avenida de la Carlota ICU Procedure

Phase 1 No Project El Toro & Avenida de La Carlota						
			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0.5		14		46	
NBT	0.5	1700	94	0.064 *	91	0.081 *
NBR	2	3400	409	0.120	517	0.152
SBL	1.5		607		789	
SBT	1.5	5100	219	0.162 *	577	0.268 *
SBR	1	1700	132	0.078	145	0.085
EBL	0	0	0		0	
EBT	4	6800	1045	0.154 *	1567	0.230 *
EBR	d	1700	22	0.013	45	0.026
WBL	2	3400	129	0.038 *	338	0.099 *
WBT	3	5100	816	0.160	887	0.174
WBR	1	1700	731	0.430	692	0.407
Right Turn Adjustment			Multi	0.183 *		
Clearance Interval				0.050 *		0.050 *
Assumes N/S Split Phasing & RT overlap for WBR NBR						
TOTAL CAPACITY UTILIZATION				**0.651**		**0.728**
LEVEL OF SERVICE				**B**		**C**

Phase 1 With Project El Toro & Avenida de La Carlota						
			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0.5		18		44	
NBT	0.5	1700	109	0.075 *	86	0.076 *
NBR	2	3400	464	0.136	497	0.146
SBL	1.5		607		789	
SBT	1.5	5100	220	0.162 *	583	0.269 *
SBR	1	1700	132	0.078	145	0.085
EBL	0	0	0		0	
EBT	4	6800	1045	0.154 *	1567	0.230 *
EBR	d	1700	23	0.014	45	0.026
WBL	2	3400	129	0.038 *	338	0.099 *
WBT	3	5100	816	0.160	887	0.174
WBR	1	1700	731	0.430	692	0.407
Right Turn Adjustment			Multi	0.196 *		
Clearance Interval				0.050 *		0.050 *
Assumes N/S Split Phasing & RT overlap for WBR NBR						
TOTAL CAPACITY UTILIZATION				**0.675**		**0.724**
LEVEL OF SERVICE				**B**		**C**

* indicates critical approach

Phase II – Full Build Out

The existing turning movement counts were grown to 2016 volumes using an assumed background growth rate and the project generated trips were added for the Phase II – Project Scenario as shown in Figures 10 and 11. These scenarios were analyzed using Synchro Traffic Analysis Software for the signalized intersection and HCS Traffic Modeling for the stop controlled intersections. It was also assumed in the Phase II Project Scenario, that the main site entrance located in the middle would be converted from a one-way stop controlled intersection to a signalized intersection. Also, in conjunction with planned improvements at the intersection of El Toro Road and Avenida de la Carlota, an additional left turn lane is was added for southbound movements. Existing signal timings were used at the studied intersections except for the new signalized intersection at the main site entrance where a standard signal timing and phasing were assumed and for the modified intersection of El Toro Road and Avenida de la Carlota where an additional protected left turn phase was added and the signal timings were optimized. The results for the Phase II intersection analysis without and with the Redevelopment Project are provided below in Tables 9 and 10 and included as Appendix F and Appendix G.

Table 9: Future Intersection Operating Conditions Phase II – No Project

Intersection Name		Control	AM PEAK HOUR		PM PEAK HOUR	
			LOS	V/C	LOS	V/C
1	El Toro Road and Moulton Parkway	Signal	E	0.936	E	0.950
2	El Toro Road and Avenida Sevilla	Signal	A	0.592	C	0.715
3	El Toro Road and Paseo De Valencia	Signal	C	0.711	D	0.815
4	El Toro Road and Regional Center Drive	Signal	A	0.470	C	0.758
5	El Toro Road and Avenida de la Carlota	Signal	B	0.629	E	0.994
6	Mall Entrance and Avenida de la Carlota	Signal	A	0.299	B	0.630
12	Los Alisos Boulevard and Paseo De Valencia	Signal	A	0.577	B	0.637
13	Los Alisos Boulevard and Avenida de la Carlota	Signal	A	0.570	C	0.718
14	I-5 Southbound Ramps and Avenida de la Carlota	Signal	C	0.710	B	0.637

Table 9: Future Intersection Operating Conditions Phase II – No Project *(continued)*

Intersection Name		Control	AM PEAK HOUR		PM PEAK HOUR	
			LOS	Delay (Sec.)	LOS	Delay (Sec.)
7	Oak Brook Plaza and West Mall Connector	AWSC	A	6.9	A	7.6
8	Oak Brook Plaza and East Mall Connector	AWSC	A	6.9	A	7.3
9	North Site Entrance and Avenida de la Carlota	1WSC	B	12.1	D	25.3
10	Main Site Entrance and Avenida de la Carlota	1WSC	A	9.9	B	15.0
11	South Site Entrance and Avenida de la Carlota	1WSC	B	12.1	C	21.5

Table 10: Future Intersection Operating Conditions Phase II – With Project

Intersection Name		Control	AM PEAK HOUR		PM PEAK HOUR	
			LOS	V/C	LOS	V/C
1	El Toro Road and Moulton Parkway	Signal	E	0.937	E	0.952
2	El Toro Road and Avenida Sevilla	Signal	A	0.593	C	0.709
3	El Toro Road and Paseo De Valencia	Signal	C	0.712	D	0.817
4	El Toro Road and Regional Center Drive	Signal	A	0.472	C	0.759
5	El Toro Road and Avenida de la Carlota	Signal	B	0.686	E	0.999
6	Mall Entrance and Avenida de la Carlota	Signal	A	0.339	B	0.642
10	Main Site Entrance and Avenida de la Carlota	Signal	A	0.334	A	0.527
12	Los Alisos Boulevard and Paseo De Valencia	Signal	A	0.580	B	0.637
13	Los Alisos Boulevard and Avenida de la Carlota	Signal	A	0.592	C	0.718
14	I-5 Southbound Ramps and Avenida de la Carlota	Signal	C	0.713	B	0.708

Table 10: Future Intersection Operating Conditions Phase II – With Project *(continued)*

Intersection Name		Control	AM PEAK HOUR		PM PEAK HOUR	
			LOS	Delay (Sec.)	LOS	Delay (Sec.)
7	Oak Brook Plaza and West Mall Connector	AWSC	A	6.9	A	7.7
8	Oak Brook Plaza and East Mall Connector	AWSC	A	7.0	A	7.3
9	North Site Entrance and Avenida de la Carlota	1WSC	B	13.1	D	26.7
11	South Site Entrance and Avenida de la Carlota	1WSC	B	12.8	C	21.6

Similar to the Phase I analysis, the Phase II intersections analyzed in both the AM and PM peak periods experience a very minor increase in V/C and average delay as a result of the project trips in the Phase II – With Project Scenario when compared to the Phase II - No Project Scenario. Also, due to the assumption that an additional left turn lane will be added in the southbound direction of Avenida de la Carlota the LOS improves in both Phase II – With Project and Phase II - No Project Scenarios when compared to the existing condition.

As discussed in the existing conditions that due to importance of the intersection of El Toro Road and Avenida de la Carlota on the local circulation network, the ICU capacity utilization procedure was used to compare the intersection conditions with the construction of the Redevelopment Project to those values in the City of Laguna Hills General Plan Mobility Update Traffic Study. Results of the ICU capacity utilization analysis procedure for Phase I with and without the project are shown in Table 11. According to the General Plan Mobility Update Traffic Study the future year (2030) ICU values at the intersection of El Toro Road and Avenida de la Carlota is 0.67 in the AM peak hour (LOS B) and 0.96 in the PM peak hour (LOS E).

Table 11: Future Intersection Operating Conditions
Phase II El Toro Road and Avenida de la Carlota
ICU Procedure

Phase 2 No Project El Toro & Avenida de La Carlota

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0.5		15		47	
NBT	1.5	3400	97	0.033 *	94	0.041 *
NBR	2	3400	421	0.124	533	0.157
SBL	2.5		625		812	
SBT	1.5	6800	226	0.125 *	595	0.207 *
SBR	1	1700	136	0.080	149	0.088
EBL	0	0	0		0	
EBT	4	6800	1076	0.158 *	1614	0.237 *
EBR	d	1700	23	0.014	46	0.027
WBL	2	3400	132	0.039 *	348	0.102 *
WBT	3	5100	841	0.165	914	0.179
WBR	1	1700	754	0.444	713	0.419
Right Turn Adjustment			Multi	0.230 *		
Clearance Interval				0.050 *		0.050 *
Assumes N/S Split Phasing & RT overlap for WBR NBR						
TOTAL CAPACITY UTILIZATION				**0.635**		**0.637**
LEVEL OF SERVICE				**B**		**B**

Phase 2 With Project El Toro & Avenida de La Carlota

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0.5		22		47	
NBT	1.5	3400	123	0.043 *	91	0.041 *
NBR	2	3400	518	0.152	523	0.154
SBL	2.5		625		812	
SBT	1.5	6800	234	0.126 *	630	0.212 *
SBR	1	1700	136	0.080	149	0.088
EBL	0	0	0		0	
EBT	4	6800	1076	0.158 *	1614	0.237 *
EBR	d	1700	24	0.014	49	0.029
WBL	2	3400	135	0.040 *	350	0.103 *
WBT	3	5100	841	0.165	914	0.179
WBR	1	1700	754	0.444	713	0.419
Right Turn Adjustment			WBR	0.253 *		0.010 *
Clearance Interval				0.050 *		0.050 *
Assumes N/S Split Phasing & RT overlap for WBR NBR						
TOTAL CAPACITY UTILIZATION				**0.670**		**0.653**
LEVEL OF SERVICE				**B**		**B**

* indicates critical approach

Determination of Significant Impact to Studied Intersections

The City of Laguna Hills Traffic Study Guidelines defines a significant impact as when an existing intersection is already operating at an ICU or V/C ratio at or below 0.90 and the project causes the level to exceed 0.90 by an impact equal to or greater than 0.01. Furthermore, if an intersection is already operating at a LOS of E or F, any increase in ICU or V/C ratio equal to or greater than 0.01 would be considered a significant impact by the project. The intersection of Avenida de la Carlota and El Toro Road is part of the Orange County's Congestion Management Program (CMP) which specifies a LOS of E as its goal for intersection performance.

Phase I

The year 2013 Phase I – No Project LOS and V/C values were compared to the Phase I – With Project LOS and V/C values. For all of the fourteen of the intersections studied, none of the intersections change from a V/C value less than or equal to 0.90 to a V/C of greater than 0.90 in either the AM or PM peak hour. For the intersection of El Toro Road and Moulton Parkway, which operates at a LOS of E in both the AM and PM peak hours, the change in V/C in the AM peak hour with the addition of the project trips to the intersection is 0.001 and for the PM peak hour the change in V/C is 0. Likewise, for the intersection of El Toro Road and Avenida de la Carlota which operates at a LOS of E during the PM peak hour, the change in V/C with the addition of the project trips was an improvement in the V/C by 0.001. For both intersections mentioned, the increase in V/C values is less than the 0.01 V/C change stipulated in the City of Laguna Hills Traffic Study Guidelines for it to be considered a significant impact.

Using the ICU capacity utilization procedure consistent with the General Plan Mobility Update the V/C values at the intersection of El Toro Road and Avenida de la Carlota are below the 0.90 threshold for significant impacts in both the Phase I – With Project and Phase I – No Project scenarios. Therefore, the changes in the V/C values between the project and no project scenarios do not qualify as significant impacts to the operation of the intersection.

Using the City of Laguna Hills Traffic Study definition of significant impacts, none of the studied intersections would be subject to any significant impacts caused by the project traffic generated trips as a result of the Phase I improvements.

Phase II

The year 2016 Phase II – No Project Scenario LOS and V/C values were compared to the Phase II – With Project LOS and V/C values. For all of the fourteen intersections studied, none of the intersections change from a V/C value less than or equal to 0.90 to a V/C of greater than 0.90 in either the AM or PM peak hour. For the intersection of El

Toro Road and Moulton Parkway, which operates at a LOS of E in both the AM and PM peak hours, the change in V/C in the AM peak hour with the addition of the project trips to the intersection is 0.001 and for the PM peak hour the change in V/C is 0.002. Likewise, for the intersection of El Toro Road and Avenida de la Carlota which operates at a LOS of E during the PM peak hour, the change in V/C with the addition of the project trips to the intersection is 0.005. All of these values are less than the 0.01 V/C change stipulated in the City of Laguna Hills Traffic Study Guidelines for it to be considered a significant impact.

Using the ICU capacity utilization procedure consistent with the General Plan Mobility Update the V/C values at the intersection of El Toro Road and Avenida de la Carlota are below the 0.90 threshold for significant impacts in both the Phase II – With Project and Phase II – No Project scenarios. Therefore, the changes in the V/C values between the project and no project scenarios do not qualify as significant impacts to the operation of the intersection.

Using the City of Laguna Hills Traffic Study Guidelines definition of significant impacts, none of the studied intersections would be subject to any significant impacts caused by the project traffic generated as a result of the Phase II improvements.

Shared Parking Analysis

With the mixed use nature of the Proposed Redevelopment project, a shared parking analysis was performed to establish the number of parking spaces required for Phase I of the Redevelopment Project based on the land use types. In accordance with The City of Laguna Hills Traffic Study Guidelines, the Urban Land Institute (ULI) Shared Parking Manual was used to perform a shared parking analysis. This methodology analyzes the parking demand for each individual land use type on the property against a parking demand profile based on the time of day to establish the parking requirements. Parking demand requirements were taken from the City of Laguna Hills Urban Village Specific Plan. It was also assumed that parking space requirements for the Break of Dawn Restaurant, which closes at 1:30 PM during the week, would be credited back to the overall site availability after 3:00 PM. The parking requirements were analyzed on Redevelopment Project site from 6:00 AM – 12:00 AM.

For Phase I of the Redevelopment Project there will be 734 spaces designated to serve the retail land use on the site. In addition, the Redevelopment Project will include 498 residential and 58 guest parking spaces that would be gated off from the retail area and therefore only available to serve the residential land use. The total number of parking spaces for Phase I of the redevelopment project is 1,296. Square footages for each of the individual land uses for Phase I were provided by The Fritz Duda Company. Using the ULI temporal parking demand rates and Urban Village Specific Plan parking

requirements, the number of available parking spaces was adequate for all analyzed hours. A worksheet showing the Shared Use Parking Calculations is available in Appendix H.

Using the parking codes specified in the Laguna Hills Urban Village Specific Plan and no temporal distribution of parking spaces a parking demand of 1,041 spaces would be required the site. A breakdown of this analysis is also included in Appendix H.

CONCLUSION

The two Phases of the proposed Redevelopment Project at the Oakbrook Village Plaza were analyzed and were determined to not cause significant impacts to the operating conditions of the fourteen intersections analyzed as part of this study. Redevelopment Project generated trips will not cause any intersections to change from a V/C value less than or equal to 0.90 to a V/C of greater than 0.90 in either the AM or PM peak hour in either Phase I or Phase II. For the intersections of El Toro Road and Moulton Parkway and El Toro Road and Avenida de la Carlota which experience a V/C greater then 0.90 in the existing condition, Phase I – No Project, and Phase II – No Project, the change in V/C caused by the addition of Redevelopment project trips is less then the standard 0.01 and therefore impacts to these intersections are not considered significant. As a result, no mitigations to the intersections studied are recommended as a result of the improvements to the Redevelopment Project site.

Additionally, a ULI shared use parking analysis was performed for Phase 1 of the Redevelopment Project. The analysis shows adequate parking on site to serve the land uses on the proposed site during Phase I of the Redevelopment Project.

Appendix A

Intersection Turning Movement Counts

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: MOULTON PARKWAY
E-W Direction: EL TORO ROAD

File Name : H1111023
Site Code : 00005053
Start Date : 11/10/2011
Page No : 1

Groups Printed- Turning Movements

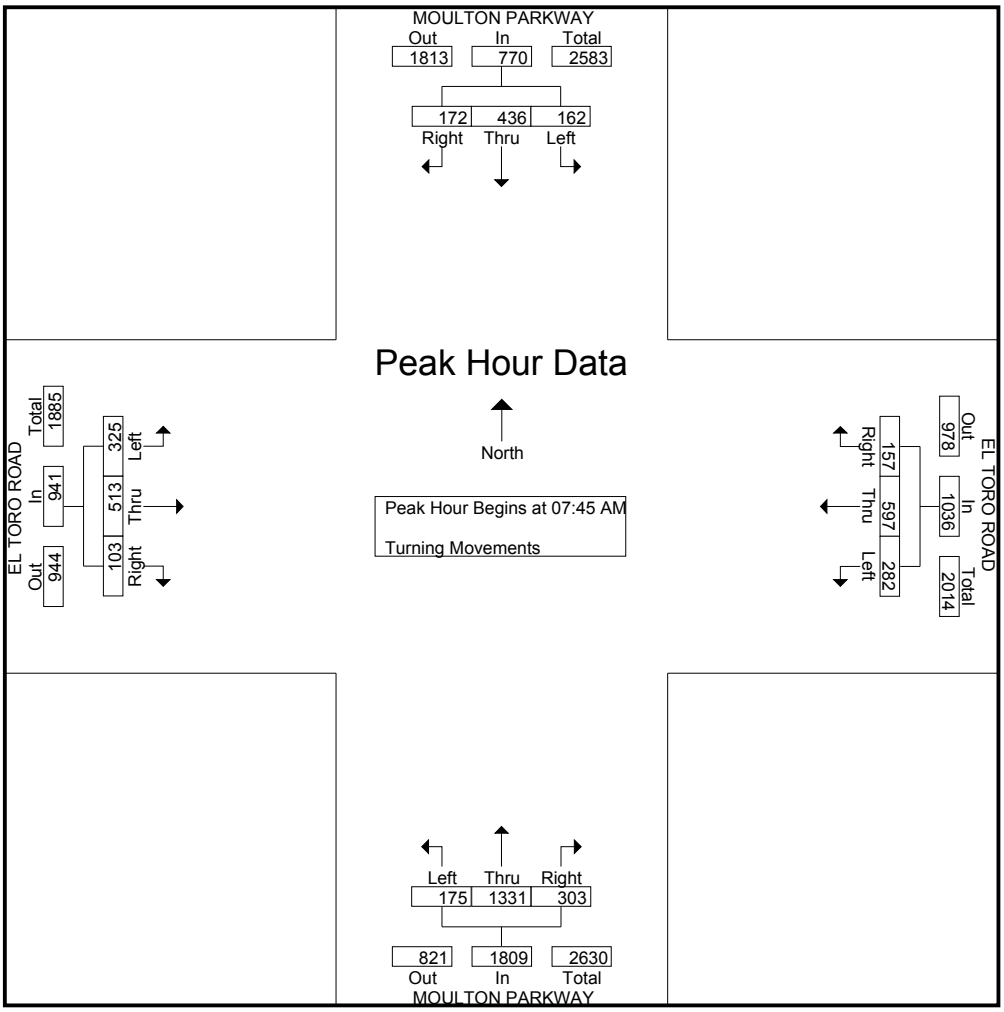
	MOULTON PARKWAY Southbound			EL TORO ROAD Westbound			MOULTON PARKWAY Northbound			EL TORO ROAD Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00 AM	28	74	16	23	96	59	49	199	25	9	69	38	685
07:15 AM	31	100	11	20	103	51	61	259	26	28	84	48	822
07:30 AM	34	114	22	35	102	67	59	314	28	16	116	77	984
07:45 AM	40	116	31	57	145	84	96	385	54	20	110	90	1228
Total	133	404	80	135	446	261	265	1157	133	73	379	253	3719
08:00 AM	47	109	46	26	153	77	65	383	51	17	128	77	1179
08:15 AM	46	120	43	45	143	64	70	289	30	30	131	92	1103
08:30 AM	39	91	42	29	156	57	72	274	40	36	144	66	1046
08:45 AM	46	86	56	50	159	67	62	245	45	29	159	82	1086
Total	178	406	187	150	611	265	269	1191	166	112	562	317	4414
*** BREAK ***													
04:00 PM	85	244	64	41	162	50	77	133	58	67	208	78	1267
04:15 PM	67	297	88	41	163	52	73	135	44	62	189	53	1264
04:30 PM	71	273	62	44	145	61	64	129	41	50	177	40	1157
04:45 PM	60	369	64	44	165	67	71	121	36	55	179	45	1276
Total	283	1183	278	170	635	230	285	518	179	234	753	216	4964
05:00 PM	84	343	72	41	130	42	69	149	54	63	182	61	1290
05:15 PM	98	474	71	32	128	71	67	154	43	50	184	48	1420
05:30 PM	85	436	80	32	132	61	84	143	49	49	182	43	1376
05:45 PM	80	363	58	38	128	60	79	146	38	31	181	39	1241
Total	347	1616	281	143	518	234	299	592	184	193	729	191	5327
Grand Total	941	3609	826	598	2210	990	1118	3458	662	612	2423	977	18424
Apprch %	17.5	67.1	15.4	15.7	58.2	26.1	21.3	66	12.6	15.3	60.4	24.4	
Total %	5.1	19.6	4.5	3.2	12	5.4	6.1	18.8	3.6	3.3	13.2	5.3	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: MOULTON PARKWAY
E-W Direction: EL TORO ROAD

File Name : H1111023
Site Code : 00005053
Start Date : 11/10/2011
Page No : 2

	MOULTON PARKWAY Southbound				EL TORO ROAD Westbound				MOULTON PARKWAY Northbound				EL TORO ROAD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	40	116	31	187	**57**	145	**84**	**286**	**96**	**385**	**54**	**535**	20	110	90	220	**1228**
08:00 AM	**47**	109	**46**	202	26	153	77	256	65	383	51	499	17	128	77	222	1179
08:15 AM	46	**120**	43	**209**	45	143	64	252	70	289	30	389	30	131	**92**	**253**	1103
08:30 AM	39	91	42	172	29	**156**	57	242	72	274	40	386	**36**	**144**	66	246	1046
Total Volume	172	436	162	770	157	597	282	1036	303	1331	175	1809	103	513	325	941	4556
% App. Total	22.3	56.6	21		15.2	57.6	27.2		16.7	73.6	9.7		10.9	54.5	34.5		
PHF	.915	.908	.880	.921	.689	.957	.839	.906	.789	.864	.810	.845	.715	.891	.883	.930	.928

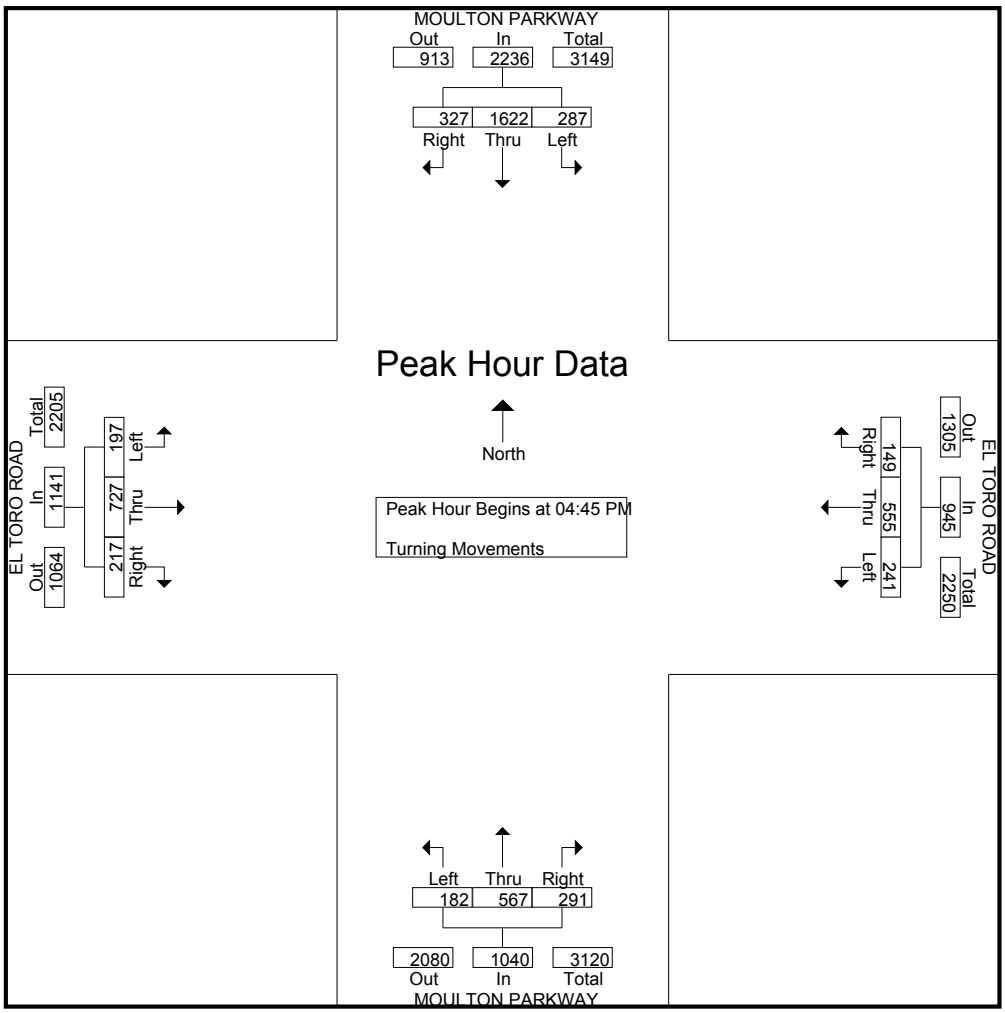


Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: MOULTON PARKWAY
E-W Direction: EL TORO ROAD

File Name : H1111023
Site Code : 00005053
Start Date : 11/10/2011
Page No : 3

	MOULTON PARKWAY Southbound				EL TORO ROAD Westbound				MOULTON PARKWAY Northbound				EL TORO ROAD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	60	369	64	493	**44**	**165**	67	**276**	71	121	36	228	55	179	45	279	1276
05:00 PM	84	343	72	499	41	130	42	213	69	149	**54**	272	**63**	182	**61**	**306**	1290
05:15 PM	**98**	**474**	71	**643**	32	128	**71**	231	67	**154**	43	264	50	**184**	48	282	**1420**
05:30 PM	85	436	**80**	601	32	132	61	225	**84**	143	49	**276**	49	182	43	274	1376
Total Volume	327	1622	287	2236	149	555	241	945	291	567	182	1040	217	727	197	1141	5362
% App. Total	14.6	72.5	12.8		15.8	58.7	25.5		28	54.5	17.5		19	63.7	17.3		
PHF	.834	.855	.897	.869	.847	.841	.849	.856	.866	.920	.843	.942	.861	.988	.807	.932	.944



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: AVENIDA SEVILLA
E-W Direction: EL TORO ROAD

File Name : H1111022
Site Code : 00005700
Start Date : 11/8/2011
Page No : 1

Groups Printed- Turning Movements

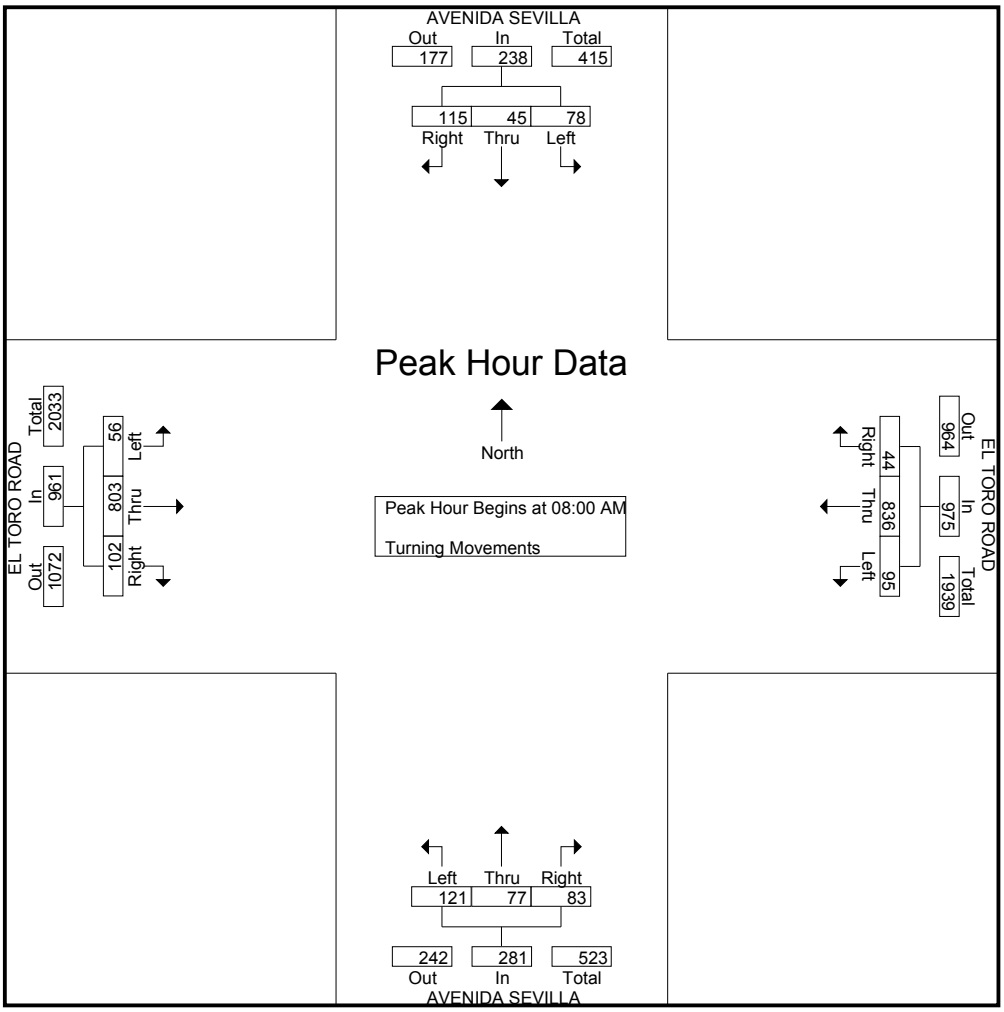
	AVENIDA SEVILLA Southbound			EL TORO ROAD Westbound			AVENIDA SEVILLA Northbound			EL TORO ROAD Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00 AM	9	4	17	2	171	9	19	8	15	6	90	45	395
07:15 AM	12	5	9	7	170	10	30	18	11	10	127	4	413
07:30 AM	21	5	8	7	165	4	21	8	12	12	175	18	456
07:45 AM	17	11	7	6	202	14	30	16	16	21	212	15	567
Total	59	25	41	22	708	37	100	50	54	49	604	82	1831
08:00 AM	19	9	21	8	211	19	20	9	20	21	214	15	586
08:15 AM	26	9	21	9	209	15	24	14	22	12	218	7	586
08:30 AM	28	16	19	11	216	25	16	20	30	19	183	9	592
08:45 AM	42	11	17	16	200	36	23	34	49	50	188	25	691
Total	115	45	78	44	836	95	83	77	121	102	803	56	2455
*** BREAK ***													
04:00 PM	26	13	18	21	213	42	20	26	36	40	260	26	741
04:15 PM	26	10	19	67	192	35	40	21	27	29	184	129	779
04:30 PM	19	14	16	30	207	34	21	13	15	42	216	74	701
04:45 PM	26	15	18	26	209	40	15	11	30	47	280	30	747
Total	97	52	71	144	821	151	96	71	108	158	940	259	2968
05:00 PM	18	21	21	18	173	28	33	26	28	34	246	40	686
05:15 PM	23	18	16	18	203	24	33	17	15	32	315	34	748
05:30 PM	19	15	12	23	205	30	16	9	3	32	253	32	649
05:45 PM	11	15	20	29	219	44	13	7	15	54	269	23	719
Total	71	69	69	88	800	126	95	59	61	152	1083	129	2802
Grand Total	342	191	259	298	3165	409	374	257	344	461	3430	526	10056
Apprch %	43.2	24.1	32.7	7.7	81.7	10.6	38.4	26.4	35.3	10.4	77.7	11.9	
Total %	3.4	1.9	2.6	3	31.5	4.1	3.7	2.6	3.4	4.6	34.1	5.2	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: AVENIDA SEVILLA
E-W Direction: EL TORO ROAD

File Name : H1111022
Site Code : 00005700
Start Date : 11/8/2011

	AVENIDA SEVILLA Southbound				EL TORO ROAD Westbound				AVENIDA SEVILLA Northbound				EL TORO ROAD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	19	9	**21**	49	8	211	19	238	20	9	20	49	21	214	15	250	586
08:15 AM	26	9	21	56	9	209	15	233	**24**	14	22	60	12	**218**	7	237	586
08:30 AM	28	**16**	19	63	11	**216**	25	**252**	16	20	30	66	19	183	9	211	592
08:45 AM	**42**	11	17	**70**	**16**	200	**36**	252	23	**34**	**49**	**106**	**50**	188	**25**	**263**	**691**
Total Volume	115	45	78	238	44	836	95	975	83	77	121	281	102	803	56	961	2455
% App. Total	48.3	18.9	32.8		4.5	85.7	9.7		29.5	27.4	43.1		10.6	83.6	5.8		
PHF	.685	.703	.929	.850	.688	.968	.660	.967	.865	.566	.617	.663	.510	.921	.560	.913	.888

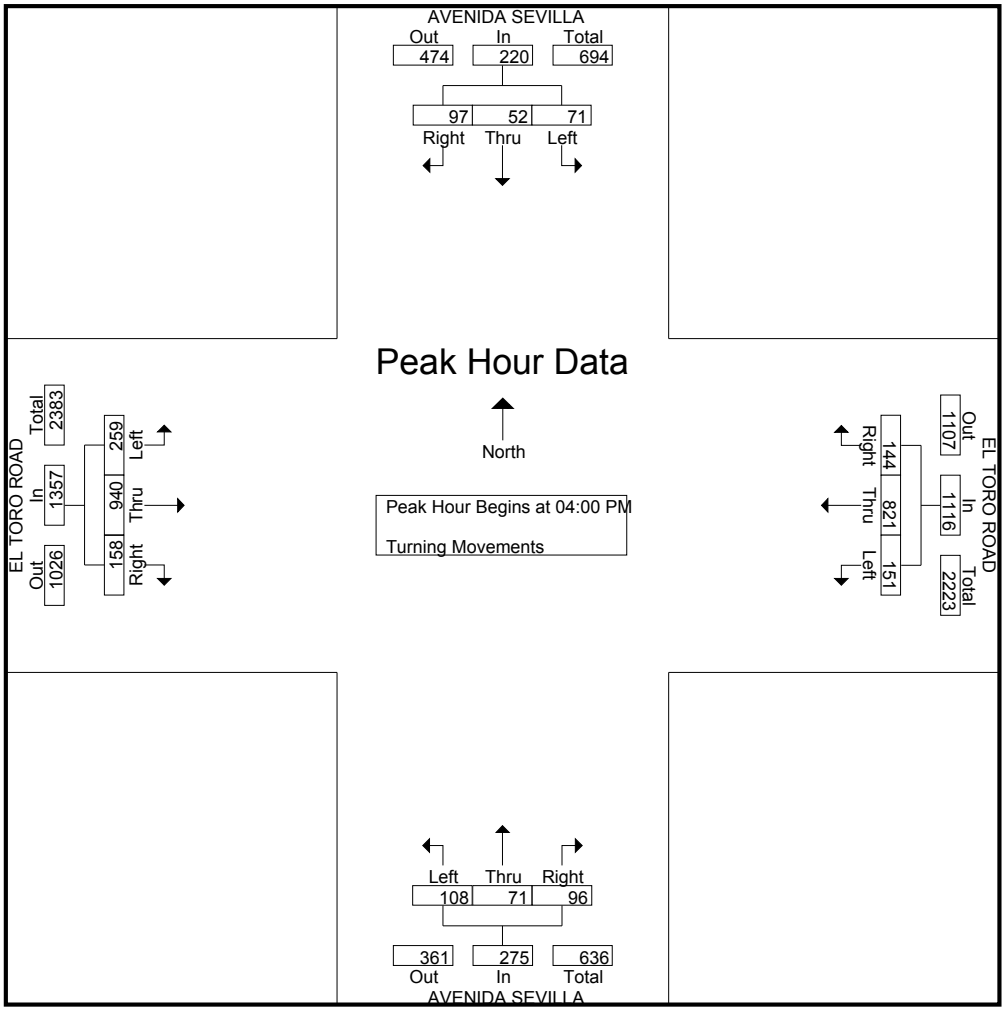


Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: AVENIDA SEVILLA
E-W Direction: EL TORO ROAD

File Name : H1111022
Site Code : 00005700
Start Date : 11/8/2011

	AVENIDA SEVILLA Southbound				EL TORO ROAD Westbound				AVENIDA SEVILLA Northbound				EL TORO ROAD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	**26**	13	18	57	21	**213**	**42**	276	20	**26**	**36**	82	40	260	26	326	741
04:15 PM	26	10	**19**	55	**67**	192	35	**294**	**40**	21	27	**88**	29	184	**129**	342	**779**
04:30 PM	19	14	16	49	30	207	34	271	21	13	15	49	42	216	74	332	701
04:45 PM	26	**15**	18	**59**	26	209	40	275	15	11	30	56	**47**	**280**	30	**357**	747
Total Volume	97	52	71	220	144	821	151	1116	96	71	108	275	158	940	259	1357	2968
% App. Total	44.1	23.6	32.3		12.9	73.6	13.5		34.9	25.8	39.3		11.6	69.3	19.1		
PHF	.933	.867	.934	.932	.537	.964	.899	.949	.600	.683	.750	.781	.840	.839	.502	.950	.953



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: PASEO DE VALENCIA
E-W Direction: EL TORO ROAD

File Name : H1111021
Site Code : 00005057
Start Date : 11/10/2011
Page No : 1

Groups Printed- Turning Movements

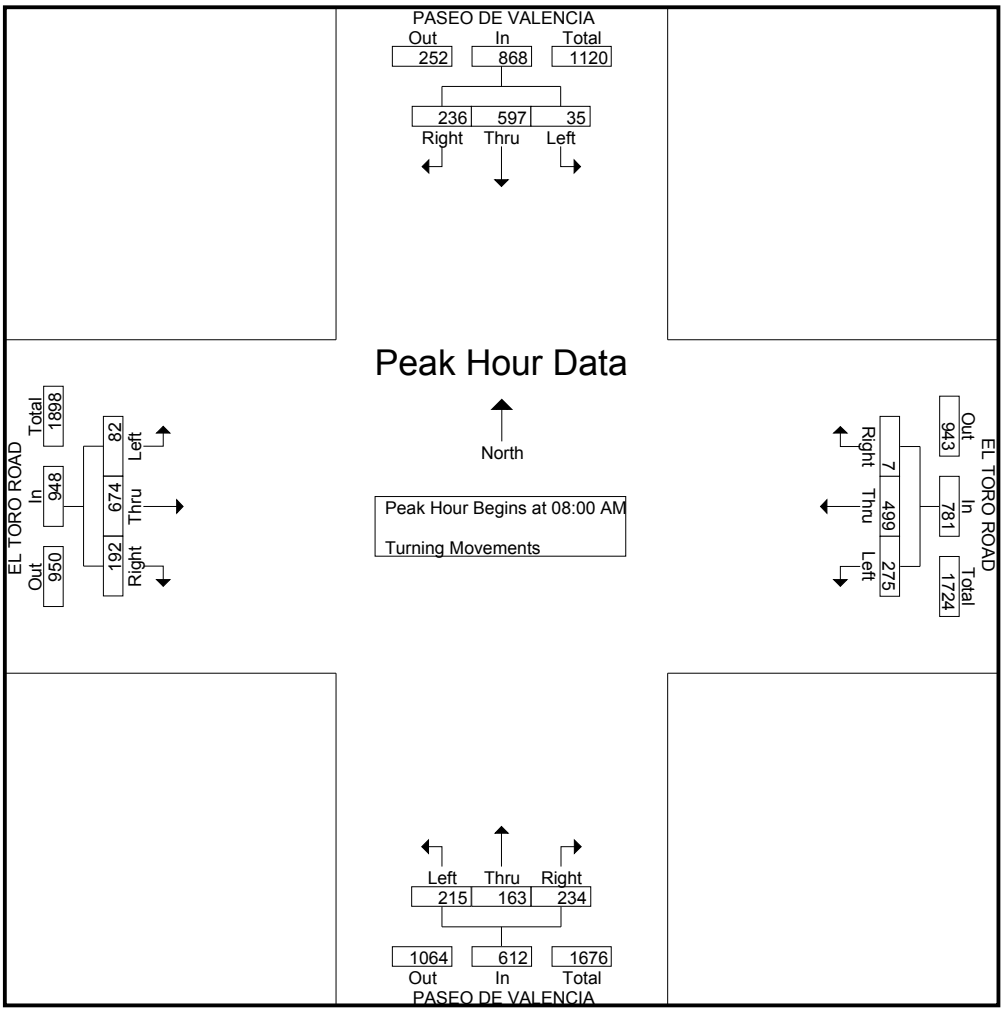
	PASEO DE VALENCIA Southbound			EL TORO ROAD Westbound			PASEO DE VALENCIA Northbound			EL TORO ROAD Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00 AM	59	94	2	2	76	20	33	26	25	38	107	11	493
07:15 AM	60	127	7	0	105	28	43	32	32	25	146	10	615
07:30 AM	60	100	10	3	101	35	56	39	52	46	194	18	714
07:45 AM	72	129	8	4	116	55	47	43	75	41	181	18	789
Total	251	450	27	9	398	138	179	140	184	150	628	57	2611
08:00 AM	63	142	8	0	98	66	74	41	40	43	180	23	778
08:15 AM	58	169	8	2	133	57	38	31	43	49	156	19	763
08:30 AM	62	160	9	1	129	81	58	49	56	48	167	21	841
08:45 AM	53	126	10	4	139	71	64	42	76	52	171	19	827
Total	236	597	35	7	499	275	234	163	215	192	674	82	3209
*** BREAK ***													
04:00 PM	35	139	17	3	141	53	98	53	109	55	222	17	942
04:15 PM	31	140	3	6	152	53	55	42	81	49	206	34	852
04:30 PM	23	161	11	9	147	56	67	52	79	47	208	22	882
04:45 PM	39	173	12	3	153	54	91	53	108	48	219	30	983
Total	128	613	43	21	593	216	311	200	377	199	855	103	3659
05:00 PM	18	161	12	5	136	60	77	48	73	52	253	18	913
05:15 PM	16	142	15	6	161	46	49	53	84	41	243	26	882
05:30 PM	29	147	9	3	121	64	85	50	86	45	252	25	916
05:45 PM	19	144	11	3	129	58	53	43	71	50	235	23	839
Total	82	594	47	17	547	228	264	194	314	188	983	92	3550
Grand Total	697	2254	152	54	2037	857	988	697	1090	729	3140	334	13029
Apprch %	22.5	72.6	4.9	1.8	69.1	29.1	35.6	25.1	39.3	17.3	74.7	7.9	
Total %	5.3	17.3	1.2	0.4	15.6	6.6	7.6	5.3	8.4	5.6	24.1	2.6	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: PASEO DE VALENCIA
E-W Direction: EL TORO ROAD

File Name : H1111021
Site Code : 00005057
Start Date : 11/10/2011
Page No : 2

	PASEO DE VALENCIA Southbound				EL TORO ROAD Westbound				PASEO DE VALENCIA Northbound				EL TORO ROAD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	**63**	142	8	213	0	98	66	164	**74**	41	40	155	43	**180**	**23**	**246**	778
08:15 AM	58	**169**	8	**235**	2	133	57	192	38	31	43	112	49	156	19	224	763
08:30 AM	62	160	9	231	1	129	**81**	211	58	**49**	56	163	48	167	21	236	**841**
08:45 AM	53	126	**10**	189	**4**	**139**	71	**214**	64	42	**76**	**182**	**52**	171	19	242	827
Total Volume	236	597	35	868	7	499	275	781	234	163	215	612	192	674	82	948	3209
% App. Total	27.2	68.8	4		0.9	63.9	35.2		38.2	26.6	35.1		20.3	71.1	8.6		
PHF	.937	.883	.875	.923	.438	.897	.849	.912	.791	.832	.707	.841	.923	.936	.891	.963	.954

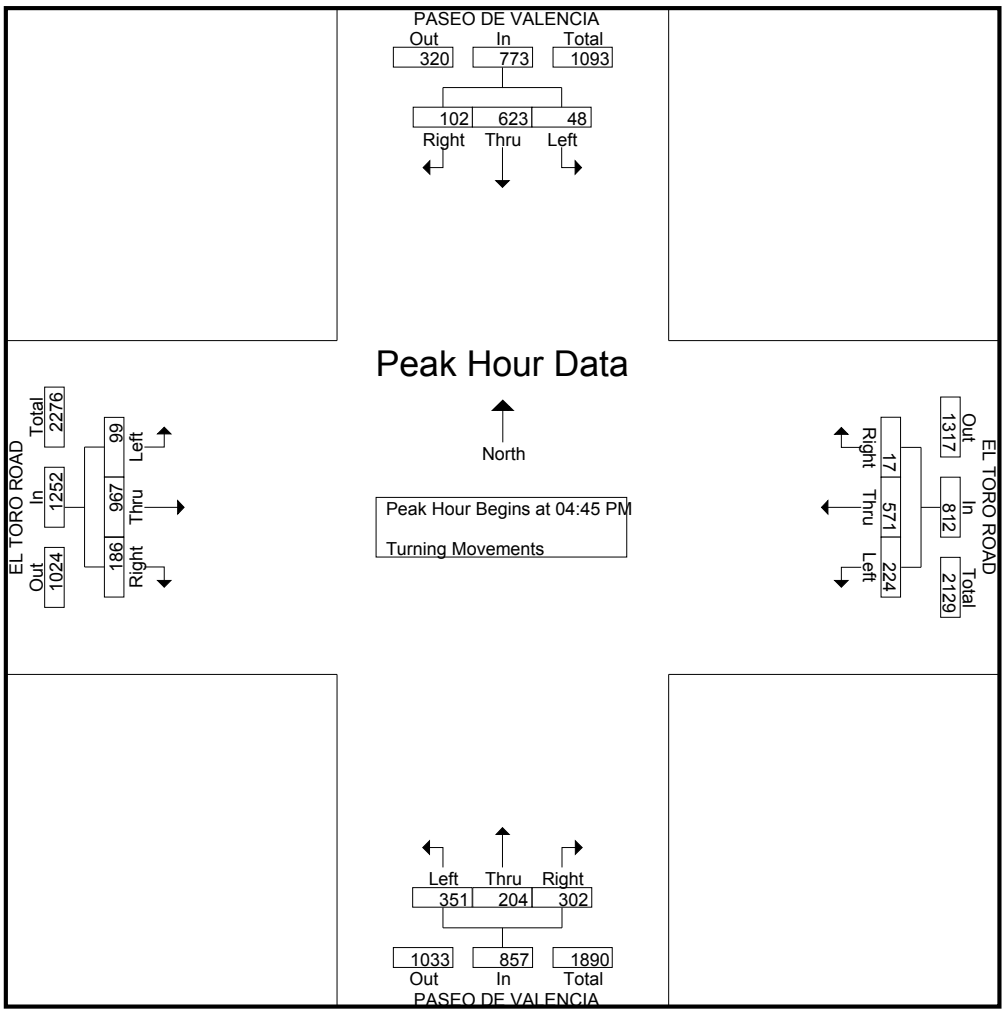


Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: PASEO DE VALENCIA
E-W Direction: EL TORO ROAD

File Name : H1111021
Site Code : 00005057
Start Date : 11/10/2011
Page No : 3

	PASEO DE VALENCIA Southbound				EL TORO ROAD Westbound				PASEO DE VALENCIA Northbound				EL TORO ROAD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	**39**	**173**	12	**224**	3	153	54	210	**91**	**53**	**108**	**252**	48	219	**30**	297	**983**
05:00 PM	18	161	12	191	5	136	60	201	77	48	73	198	**52**	**253**	18	**323**	913
05:15 PM	16	142	**15**	173	**6**	**161**	46	**213**	49	53	84	186	41	243	26	310	882
05:30 PM	29	147	9	185	3	121	**64**	188	85	50	86	221	45	252	25	322	916
Total Volume	102	623	48	773	17	571	224	812	302	204	351	857	186	967	99	1252	3694
% App. Total	13.2	80.6	6.2		2.1	70.3	27.6		35.2	23.8	41		14.9	77.2	7.9		
PHF	.654	.900	.800	.863	.708	.887	.875	.953	.830	.962	.813	.850	.894	.956	.825	.969	.939



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: REGIONAL CENTER DRIVE
E-W Direction: EL TORO ROAD

File Name : H1111020
Site Code : 00005700
Start Date : 11/9/2011
Page No : 1

Groups Printed- Turning Movements

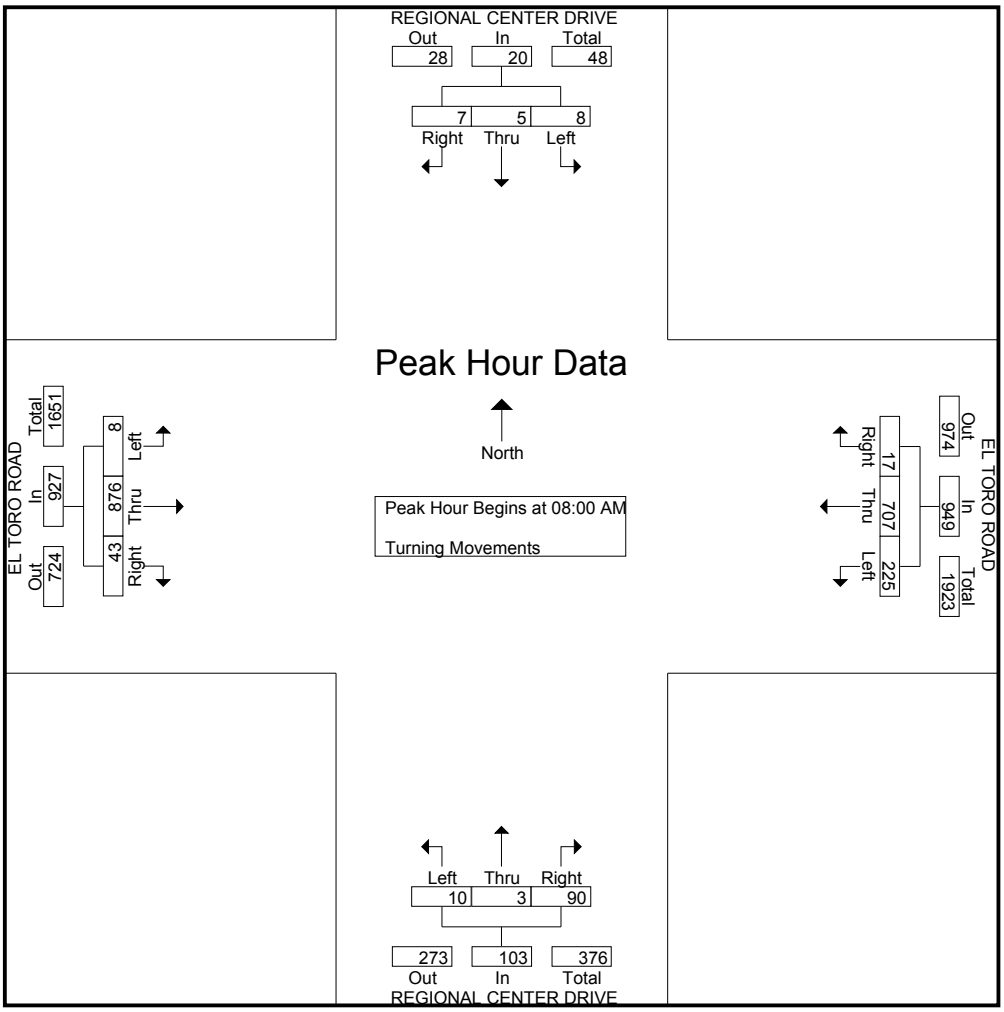
	REGIONAL CENTER DRIVE Southbound			EL TORO ROAD Westbound			REGIONAL CENTER DRIVE Northbound			EL TORO ROAD Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00 AM	1	0	0	2	120	33	18	0	0	10	163	1	348
07:15 AM	0	0	0	2	114	22	22	0	1	5	202	0	368
07:30 AM	0	1	2	4	120	26	25	0	0	11	223	2	414
07:45 AM	2	0	1	2	142	36	29	0	2	9	258	2	483
Total	3	1	3	10	496	117	94	0	3	35	846	5	1613
08:00 AM	1	1	2	1	154	53	21	0	1	9	218	0	461
08:15 AM	1	2	1	4	189	43	16	1	1	14	218	4	494
08:30 AM	4	0	0	5	181	65	28	2	3	9	221	3	521
08:45 AM	1	2	5	7	183	64	25	0	5	11	219	1	523
Total	7	5	8	17	707	225	90	3	10	43	876	8	1999
*** BREAK ***													
04:00 PM	8	1	7	2	162	64	95	5	13	43	279	1	680
04:15 PM	5	3	4	3	191	66	89	5	12	30	322	1	731
04:30 PM	2	3	4	1	160	67	93	4	14	23	263	2	636
04:45 PM	4	2	3	0	180	74	92	2	11	46	329	0	743
Total	19	9	18	6	693	271	369	16	50	142	1193	4	2790
05:00 PM	3	4	6	3	184	37	104	3	16	34	329	4	727
05:15 PM	1	0	3	0	170	70	119	4	22	50	322	3	764
05:30 PM	3	1	2	3	174	80	112	5	24	79	300	1	784
05:45 PM	3	4	3	1	174	57	123	3	15	49	269	1	702
Total	10	9	14	7	702	244	458	15	77	212	1220	9	2977
Grand Total	39	24	43	40	2598	857	1011	34	140	432	4135	26	9379
Apprch %	36.8	22.6	40.6	1.1	74.3	24.5	85.3	2.9	11.8	9.4	90	0.6	
Total %	0.4	0.3	0.5	0.4	27.7	9.1	10.8	0.4	1.5	4.6	44.1	0.3	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: REGIONAL CENTER DRIVE
E-W Direction: EL TORO ROAD

File Name : H1111020
Site Code : 00005700
Start Date : 11/9/2011

	REGIONAL CENTER DRIVE Southbound				EL TORO ROAD Westbound				REGIONAL CENTER DRIVE Northbound				EL TORO ROAD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	1	1	2	4	1	154	53	208	21	0	1	22	9	218	0	227	461
08:15 AM	1	**2**	1	4	4	**189**	43	236	16	1	1	18	**14**	218	**4**	**236**	494
08:30 AM	**4**	0	0	4	5	181	**65**	251	**28**	**2**	3	**33**	9	**221**	3	233	521
08:45 AM	1	2	**5**	**8**	**7**	183	64	**254**	25	0	**5**	30	11	219	1	231	**523**
Total Volume	7	5	8	20	17	707	225	949	90	3	10	103	43	876	8	927	1999
% App. Total	35	25	40		1.8	74.5	23.7		87.4	2.9	9.7		4.6	94.5	0.9		
PHF	.438	.625	.400	.625	.607	.935	.865	.934	.804	.375	.500	.780	.768	.991	.500	.982	.956

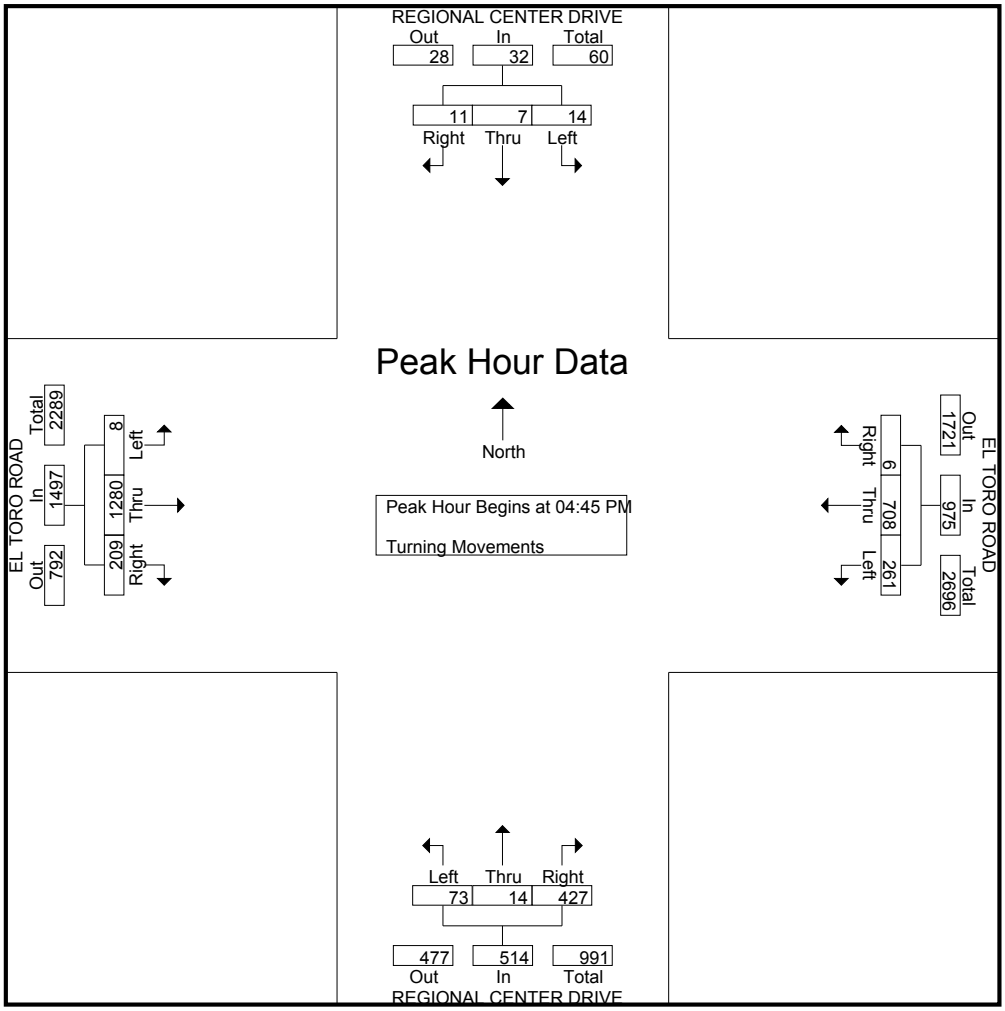


Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: REGIONAL CENTER DRIVE
E-W Direction: EL TORO ROAD

File Name : H1111020
Site Code : 00005700
Start Date : 11/9/2011
Page No : 3

	REGIONAL CENTER DRIVE Southbound				EL TORO ROAD Westbound				REGIONAL CENTER DRIVE Northbound				EL TORO ROAD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	**4**	2	3	9	0	180	74	254	92	2	11	105	46	**329**	0	375	743
05:00 PM	3	**4**	**6**	**13**	**3**	**184**	37	224	104	3	16	123	34	329	**4**	367	727
05:15 PM	1	0	3	4	0	170	70	240	**119**	4	22	**145**	50	322	3	375	764
05:30 PM	3	1	2	6	3	174	**80**	**257**	112	**5**	**24**	141	**79**	300	1	**380**	**784**
Total Volume	11	7	14	32	6	708	261	975	427	14	73	514	209	1280	8	1497	3018
% App. Total	34.4	21.9	43.8		0.6	72.6	26.8		83.1	2.7	14.2		14	85.5	0.5		
PHF	.688	.438	.583	.615	.500	.962	.816	.948	.897	.700	.760	.886	.661	.973	.500	.985	.962



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: EL TORO ROAD
E-W Direction: AVENIDA DE LA CARLOTA

File Name : H1205027
Site Code : 00005062
Start Date : 5/9/2012
Page No : 1

Groups Printed- Turning Movements

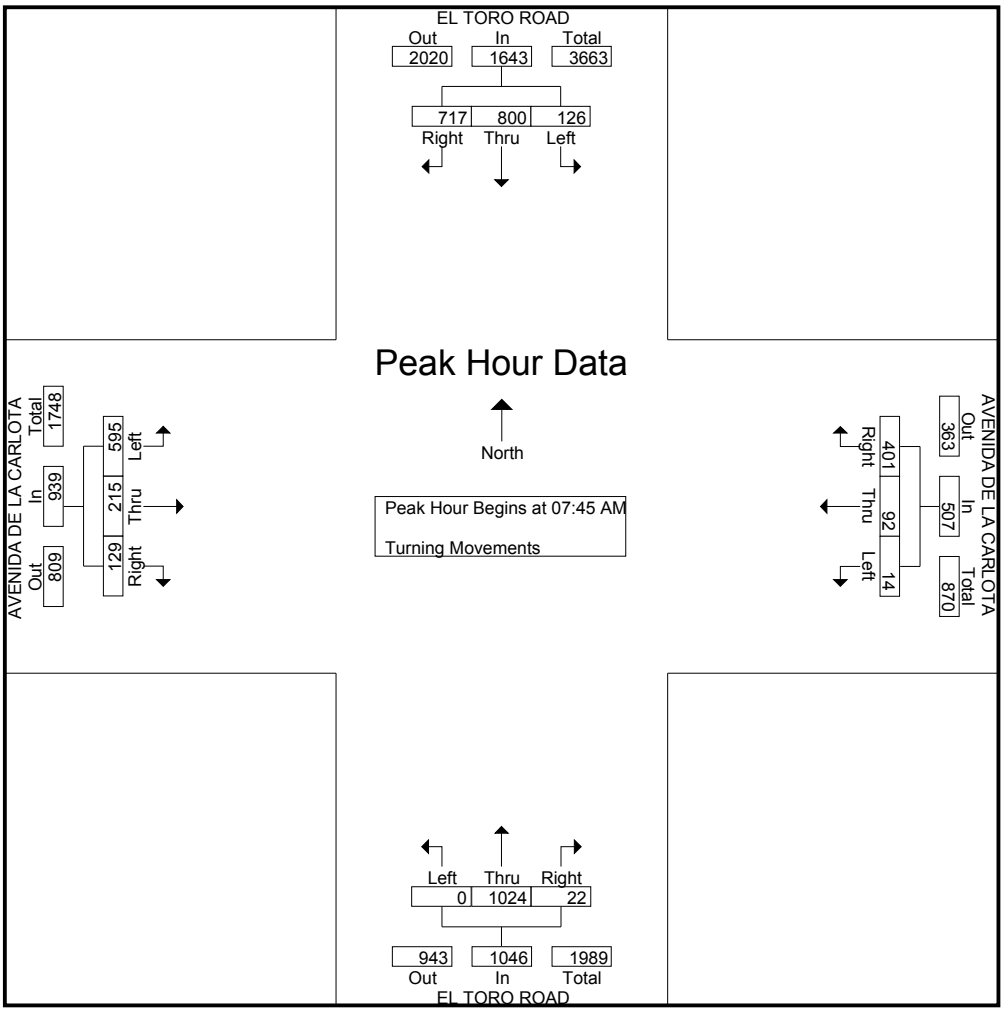
	EL TORO ROAD Southbound			AVENIDA DE LA CARLOTA Westbound			EL TORO ROAD Northbound			AVENIDA DE LA CARLOTA Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00 AM	132	118	17	90	18	0	2	162	0	18	34	117	708
07:15 AM	135	137	24	100	15	10	1	183	0	13	36	139	793
07:30 AM	166	166	21	102	19	4	5	234	0	27	47	128	919
07:45 AM	158	164	26	121	23	4	2	257	0	48	66	158	1027
Total	591	585	88	413	75	18	10	836	0	106	183	542	3447
08:00 AM	166	184	30	93	27	3	4	277	0	23	51	128	986
08:15 AM	203	234	30	98	23	4	8	246	0	31	49	176	1102
08:30 AM	190	218	40	89	19	3	8	244	0	27	49	133	1020
08:45 AM	165	218	27	68	18	3	4	236	0	39	46	163	987
Total	724	854	127	348	87	13	24	1003	0	120	195	600	4095
*** BREAK ***													
04:00 PM	176	238	94	112	18	8	10	476	0	37	130	208	1507
04:15 PM	186	203	88	108	20	8	9	423	0	24	131	198	1398
04:30 PM	179	204	77	114	17	10	12	378	0	38	122	182	1333
04:45 PM	160	202	83	112	20	6	8	376	0	30	148	178	1323
Total	701	847	342	446	75	32	39	1653	0	129	531	766	5561
05:00 PM	176	202	82	131	21	13	9	371	0	31	152	200	1388
05:15 PM	172	232	67	136	16	17	12	424	0	33	122	196	1427
05:30 PM	168	212	93	130	26	8	14	376	0	42	139	186	1394
05:45 PM	162	224	89	110	26	7	9	365	0	36	153	191	1372
Total	678	870	331	507	89	45	44	1536	0	142	566	773	5581
Grand Total	2694	3156	888	1714	326	108	117	5028	0	497	1475	2681	18684
Apprch %	40	46.8	13.2	79.8	15.2	5	2.3	97.7	0	10.7	31.7	57.6	
Total %	14.4	16.9	4.8	9.2	1.7	0.6	0.6	26.9	0	2.7	7.9	14.3	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: EL TORO ROAD
E-W Direction: AVENIDA DE LA CARLOTA

File Name : H1205027
Site Code : 00005062
Start Date : 5/9/2012

	EL TORO ROAD Southbound				AVENIDA DE LA CARLOTA Westbound				EL TORO ROAD Northbound				AVENIDA DE LA CARLOTA Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	158	164	26	348	**121**	23	**4**	**148**	2	257	0	259	**48**	**66**	158	**272**	1027
08:00 AM	166	184	30	380	93	**27**	3	123	4	**277**	0	**281**	23	51	128	202	986
08:15 AM	**203**	**234**	30	**467**	98	23	4	125	**8**	246	0	254	31	49	**176**	256	**1102**
08:30 AM	190	218	**40**	448	89	19	3	111	8	244	0	252	27	49	133	209	1020
Total Volume	717	800	126	1643	401	92	14	507	22	1024	0	1046	129	215	595	939	4135
% App. Total	43.6	48.7	7.7		79.1	18.1	2.8		2.1	97.9	0		13.7	22.9	63.4		
PHF	.883	.855	.788	.880	.829	.852	.875	.856	.688	.924	.000	.931	.672	.814	.845	.863	.938

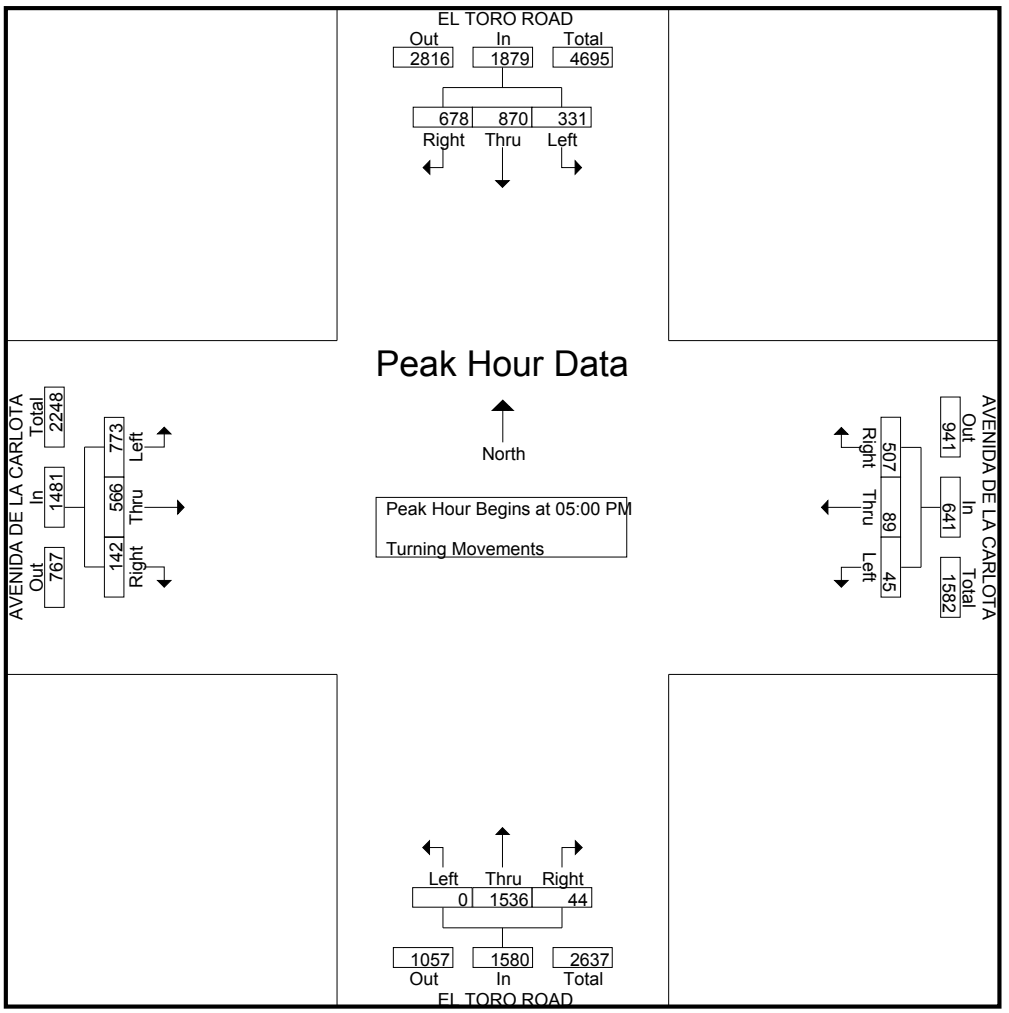


Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: EL TORO ROAD
E-W Direction: AVENIDA DE LA CARLOTA

File Name : H1205027
Site Code : 00005062
Start Date : 5/9/2012
Page No : 3

	EL TORO ROAD Southbound				AVENIDA DE LA CARLOTA Westbound				EL TORO ROAD Northbound				AVENIDA DE LA CARLOTA Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**176**	202	82	460	131	21	13	165	9	371	0	380	31	152	**200**	**383**	1388
05:15 PM	172	**232**	67	471	**136**	16	**17**	**169**	12	**424**	0	**436**	33	122	196	351	**1427**
05:30 PM	168	212	**93**	473	130	**26**	8	164	**14**	376	0	390	**42**	139	186	367	1394
05:45 PM	162	224	89	**475**	110	26	7	143	9	365	0	374	36	**153**	191	380	1372
Total Volume	678	870	331	1879	507	89	45	641	44	1536	0	1580	142	566	773	1481	5581
% App. Total	36.1	46.3	17.6		79.1	13.9	7		2.8	97.2	0		9.6	38.2	52.2		
PHF	.963	.938	.890	.989	.932	.856	.662	.948	.786	.906	.000	.906	.845	.925	.966	.967	.978



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: AVENIDA DE LA CARLOTTA
E-W Direction: 1ST MALL ENTRANCE

File Name : h1111019
Site Code : 00003874
Start Date : 11/10/2011

Groups Printed- Turning Movements

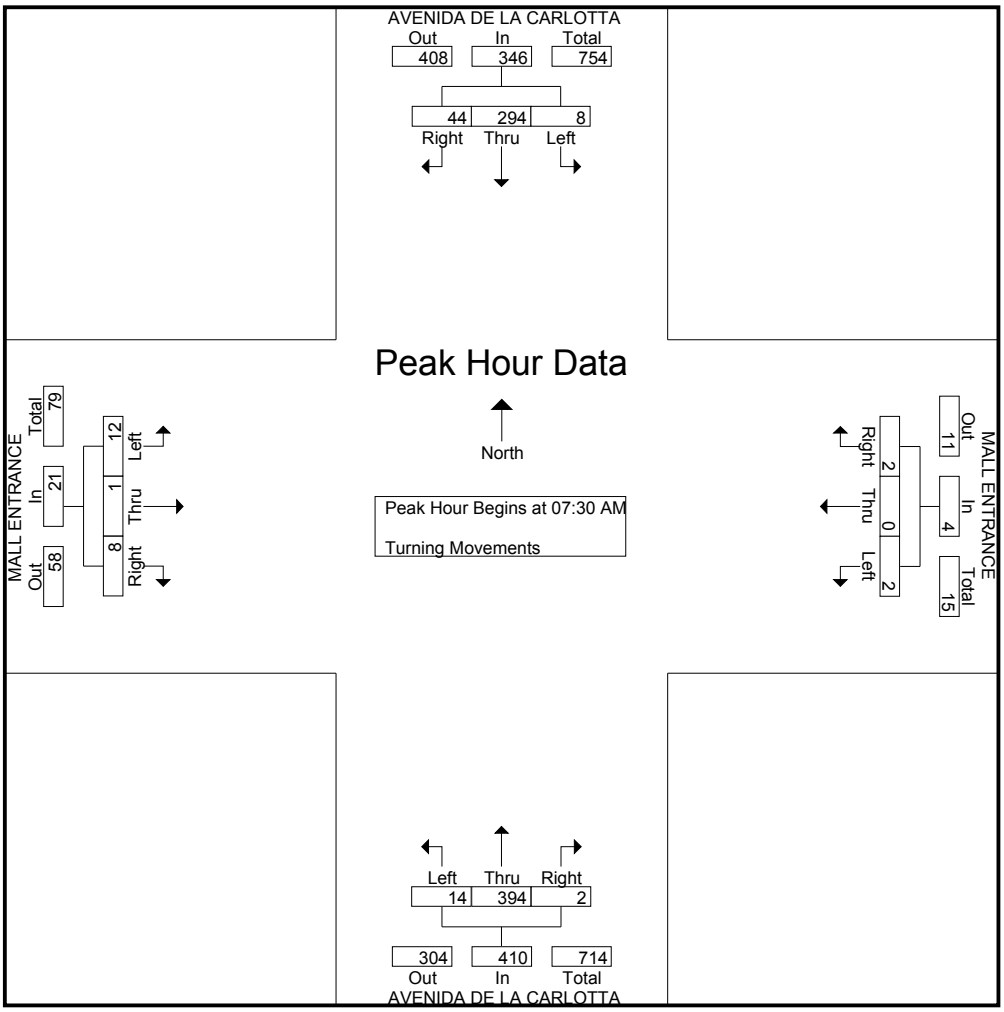
	AVENIDA DE LA CARLOTTA Southbound			MALL ENTRANCE Westbound			AVENIDA DE LA CARLOTTA Northbound			MALL ENTRANCE Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00 AM	3	53	2	0	0	0	0	94	0	0	0	4	156
07:15 AM	11	49	2	1	0	0	0	105	1	1	0	0	170
07:30 AM	10	55	0	2	0	1	1	98	2	0	1	3	173
07:45 AM	10	84	2	0	0	1	0	102	4	4	0	4	211
Total	34	241	6	3	0	2	1	399	7	5	1	11	710
08:00 AM	12	93	2	0	0	0	0	106	3	1	0	2	219
08:15 AM	12	62	4	0	0	0	1	88	5	3	0	3	178
08:30 AM	18	59	0	0	0	0	0	84	3	1	0	2	167
08:45 AM	12	80	4	0	0	0	1	86	1	3	0	4	191
Total	54	294	10	0	0	0	2	364	12	8	0	11	755
*** BREAK ***													
04:00 PM	43	118	4	2	0	1	1	85	5	20	0	44	323
04:15 PM	59	174	5	1	1	2	0	92	2	22	0	51	409
04:30 PM	50	144	8	1	2	3	0	98	15	14	0	49	384
04:45 PM	49	144	4	1	0	2	1	95	5	10	0	48	359
Total	201	580	21	5	3	8	2	370	27	66	0	192	1475
05:00 PM	50	168	8	1	0	0	1	121	7	12	1	44	413
05:15 PM	47	162	4	3	0	1	0	101	10	16	0	32	376
05:30 PM	48	168	8	1	0	1	0	99	5	19	0	37	386
05:45 PM	61	153	5	1	2	1	2	99	7	14	0	23	368
Total	206	651	25	6	2	3	3	420	29	61	1	136	1543
Grand Total	495	1766	62	14	5	13	8	1553	75	140	2	350	4483
Apprch %	21.3	76	2.7	43.8	15.6	40.6	0.5	94.9	4.6	28.5	0.4	71.1	
Total %	11	39.4	1.4	0.3	0.1	0.3	0.2	34.6	1.7	3.1	0	7.8	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: AVENIDA DE LA CARLOTTA
E-W Direction: 1ST MALL ENTRANCE

File Name : h1111019
Site Code : 00003874
Start Date : 11/10/2011
Page No : 2

	AVENIDA DE LA CARLOTTA Southbound				MALL ENTRANCE Westbound				AVENIDA DE LA CARLOTTA Northbound				MALL ENTRANCE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	10	55	0	65	**2**	0	**1**	**3**	**1**	98	2	101	0	**1**	3	4	173
07:45 AM	10	84	2	96	0	0	1	1	0	102	4	106	**4**	0	**4**	**8**	211
08:00 AM	**12**	**93**	2	**107**	0	0	0	0	0	**106**	3	**109**	1	0	2	3	**219**
08:15 AM	12	62	**4**	78	0	0	0	0	1	88	**5**	94	3	0	3	6	178
Total Volume	44	294	8	346	2	0	2	4	2	394	14	410	8	1	12	21	781
% App. Total	12.7	85	2.3		50	0	50		0.5	96.1	3.4		38.1	4.8	57.1		
PHF	.917	.790	.500	.808	.250	.000	.500	.333	.500	.929	.700	.940	.500	.250	.750	.656	.892

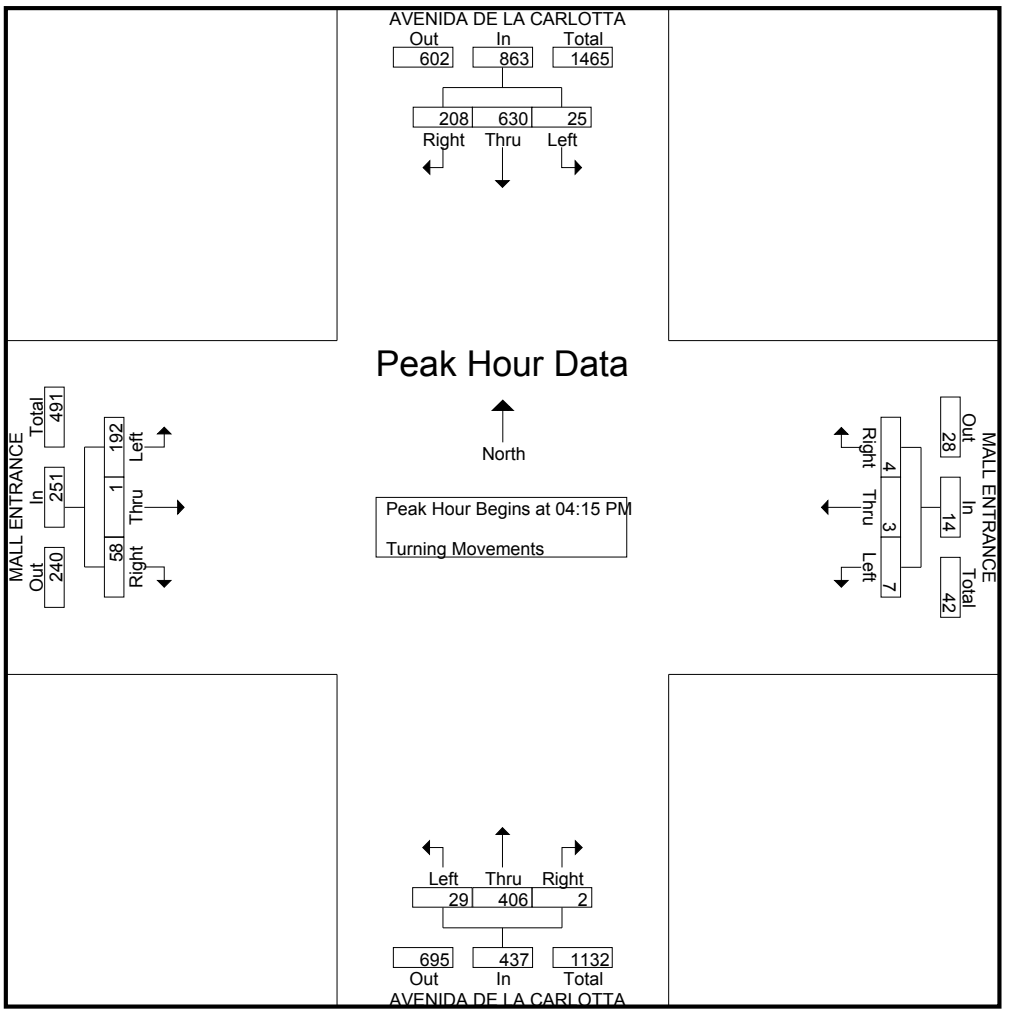


Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: AVENIDA DE LA CARLOTTA
E-W Direction: 1ST MALL ENTRANCE

File Name : h1111019
Site Code : 00003874
Start Date : 11/10/2011

	AVENIDA DE LA CARLOTTA Southbound				MALL ENTRANCE Westbound				AVENIDA DE LA CARLOTTA Northbound				MALL ENTRANCE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	**59**	**174**	5	**238**	**1**	1	2	4	0	92	2	94	**22**	0	**51**	**73**	409
04:30 PM	50	144	**8**	202	1	**2**	**3**	**6**	0	98	**15**	113	14	0	49	63	384
04:45 PM	49	144	4	197	1	0	2	3	**1**	95	5	101	10	0	48	58	359
05:00 PM	50	168	8	226	1	0	0	1	1	**121**	7	**129**	12	**1**	44	57	**413**
Total Volume	208	630	25	863	4	3	7	14	2	406	29	437	58	1	192	251	1565
% App. Total	24.1	73	2.9		28.6	21.4	50		0.5	92.9	6.6		23.1	0.4	76.5		
PHF	.881	.905	.781	.907	1.00	.375	.583	.583	.500	.839	.483	.847	.659	.250	.941	.860	.947



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: SHOPPING CENTER W/O
E-W Direction: MARSHALLS

File Name : H1111027
Site Code : 00004637
Start Date : 11/15/2011
Page No : 1

Groups Printed- Turning Movements

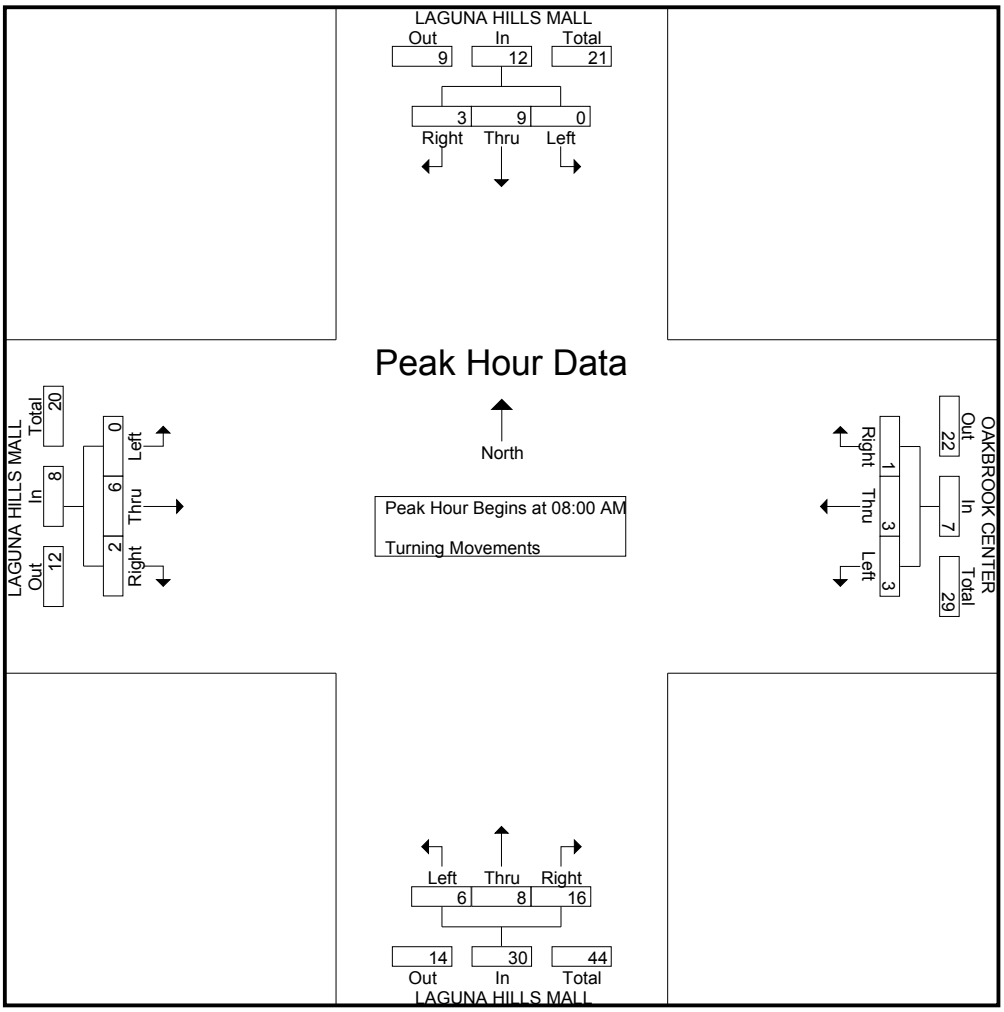
	LAGUNA HILLS MALL Southbound			OAKBROOK CENTER Westbound			LAGUNA HILLS MALL Northbound			LAGUNA HILLS MALL Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00 AM	0	3	0	0	0	1	1	5	5	1	0	0	16
07:15 AM	0	0	0	0	2	0	1	4	2	0	0	0	9
07:30 AM	0	0	0	0	0	1	2	4	1	0	0	0	8
07:45 AM	0	0	0	1	0	0	3	2	0	0	1	0	7
Total	0	3	0	1	2	2	7	15	8	1	1	0	40
08:00 AM	1	0	0	0	0	1	4	0	1	1	0	0	8
08:15 AM	0	2	0	0	0	1	3	3	0	0	2	0	11
08:30 AM	1	2	0	1	1	0	1	1	3	0	0	0	10
08:45 AM	1	5	0	0	2	1	8	4	2	1	4	0	28
Total	3	9	0	1	3	3	16	8	6	2	6	0	57
*** BREAK ***													
04:00 PM	0	6	0	0	3	6	26	4	1	0	4	0	50
04:15 PM	0	11	0	0	8	11	29	9	3	0	4	0	75
04:30 PM	0	6	0	0	7	4	29	12	2	1	7	0	68
04:45 PM	0	8	1	0	7	6	21	7	8	2	5	1	66
Total	0	31	1	0	25	27	105	32	14	3	20	1	259
05:00 PM	1	6	0	0	1	5	23	14	3	0	2	0	55
05:15 PM	0	10	0	1	1	4	15	18	3	0	2	0	54
05:30 PM	0	6	0	0	3	8	10	2	8	3	3	0	43
05:45 PM	0	4	0	0	3	3	12	12	6	1	1	0	42
Total	1	26	0	1	8	20	60	46	20	4	8	0	194
Grand Total	4	69	1	3	38	52	188	101	48	10	35	1	550
Apprch %	5.4	93.2	1.4	3.2	40.9	55.9	55.8	30	14.2	21.7	76.1	2.2	
Total %	0.7	12.5	0.2	0.5	6.9	9.5	34.2	18.4	8.7	1.8	6.4	0.2	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: SHOPPING CENTER W/O
E-W Direction: MARSHALLS

File Name : H1111027
Site Code : 00004637
Start Date : 11/15/2011
Page No : 2

	LAGUNA HILLS MALL Southbound				OAKBROOK CENTER Westbound				LAGUNA HILLS MALL Northbound				LAGUNA HILLS MALL Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	**1**	0	0	1	0	0	**1**	1	4	0	1	5	**1**	0	0	1	8
08:15 AM	0	2	0	2	0	0	1	1	3	3	0	6	0	2	0	2	11
08:30 AM	1	2	0	3	**1**	1	0	2	1	1	**3**	5	0	0	0	0	10
08:45 AM	1	**5**	0	**6**	0	**2**	1	**3**	**8**	**4**	2	**14**	1	**4**	0	**5**	**28**
Total Volume	3	9	0	12	1	3	3	7	16	8	6	30	2	6	0	8	57
% App. Total	25	75	0		14.3	42.9	42.9		53.3	26.7	20		25	75	0		
PHF	.750	.450	.000	.500	.250	.375	.750	.583	.500	.500	.500	.536	.500	.375	.000	.400	.509

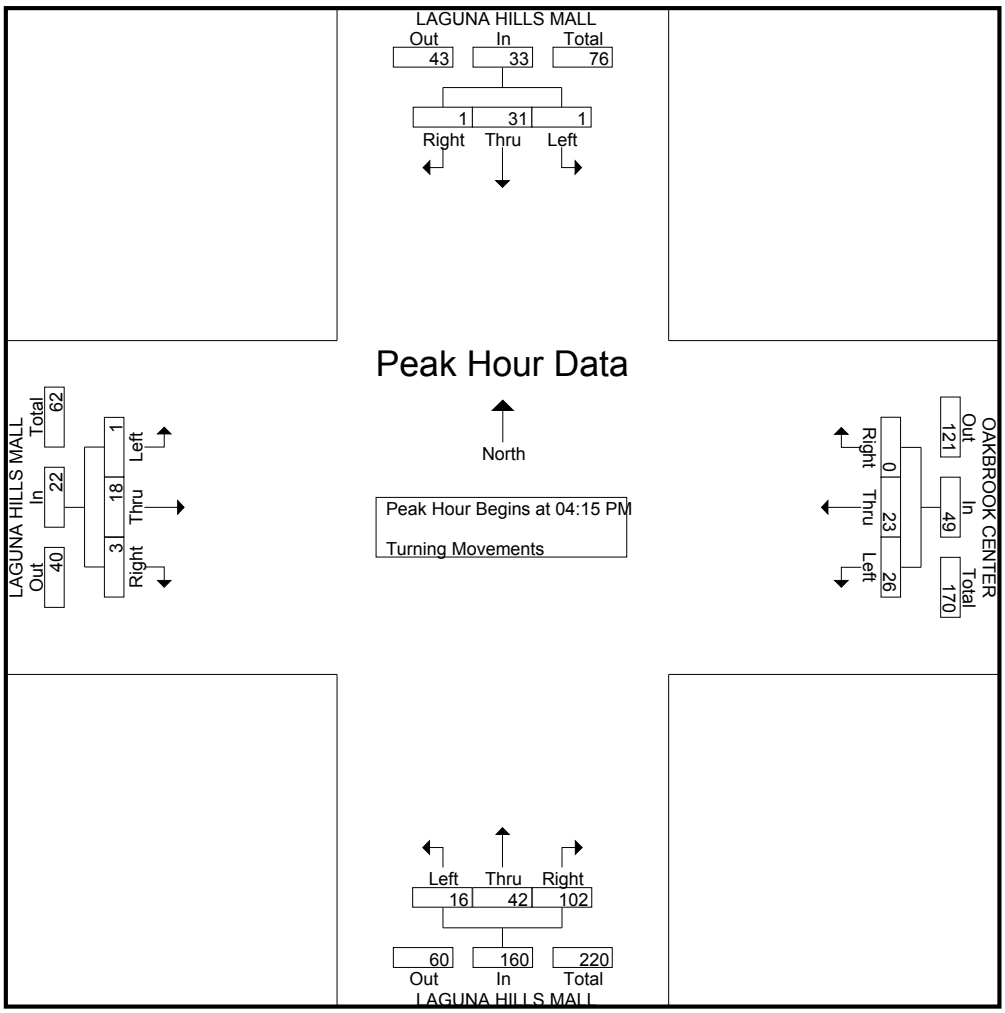


Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: SHOPPING CENTER W/O
E-W Direction: MARSHALLS

File Name : H1111027
Site Code : 00004637
Start Date : 11/15/2011
Page No : 3

	LAGUNA HILLS MALL Southbound				OAKBROOK CENTER Westbound				LAGUNA HILLS MALL Northbound				LAGUNA HILLS MALL Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	0	**11**	0	**11**	0	**8**	**11**	**19**	**29**	9	3	41	0	4	0	4	**75**
04:30 PM	0	6	0	6	0	7	4	11	29	12	2	**43**	1	**7**	0	**8**	68
04:45 PM	0	8	**1**	9	0	7	6	13	21	7	**8**	36	**2**	5	**1**	8	66
05:00 PM	**1**	6	0	7	0	1	5	6	23	**14**	3	40	0	2	0	2	55
Total Volume	1	31	1	33	0	23	26	49	102	42	16	160	3	18	1	22	264
% App. Total	3	93.9	3		0	46.9	53.1		63.8	26.2	10		13.6	81.8	4.5		
PHF	.250	.705	.250	.750	.000	.719	.591	.645	.879	.750	.500	.930	.375	.643	.250	.688	.880



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: LAGUNA HILLS MALL
E-W Direction: W/O LONE STAR

File Name : h1111024
Site Code : 00000554
Start Date : 11/15/2011
Page No : 1

Groups Printed- Turning Movements

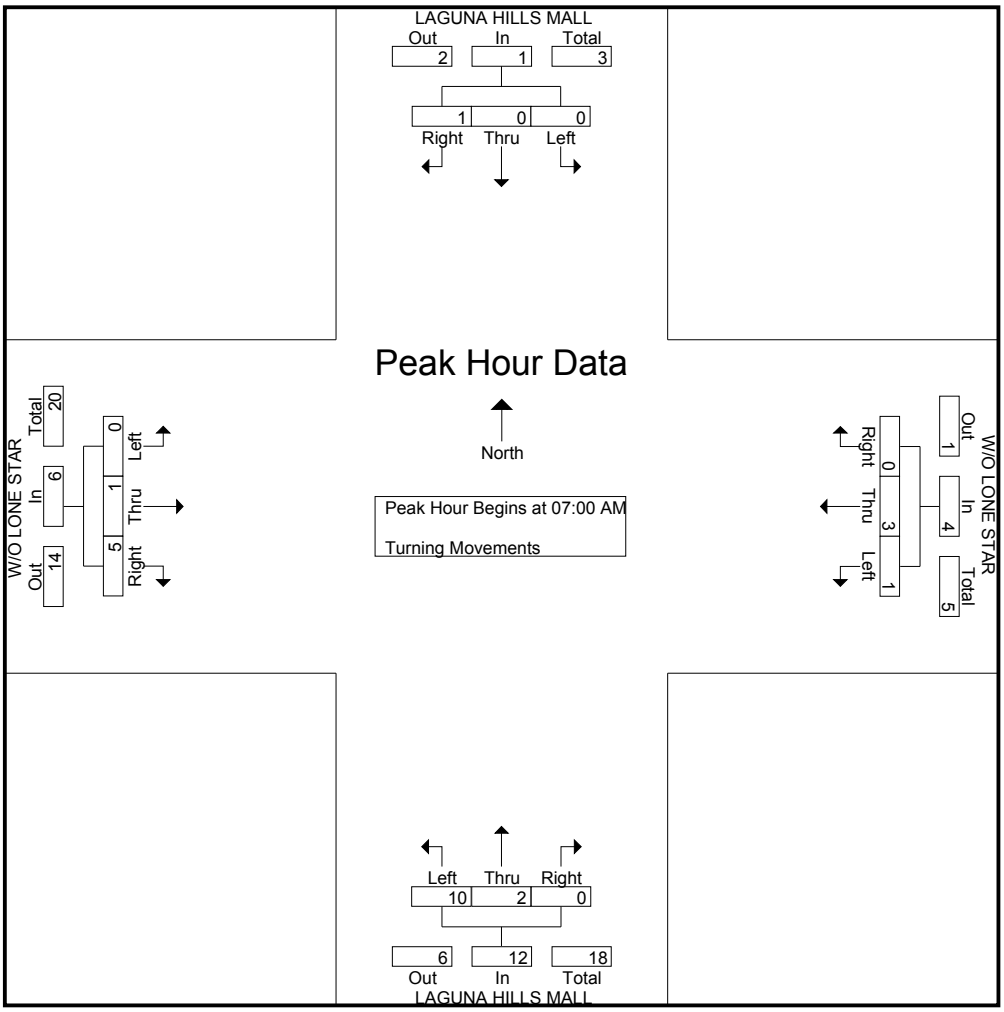
	LAGUNA HILLS MALL Southbound			W/O LONE STAR Westbound			LAGUNA HILLS MALL Northbound			W/O LONE STAR Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00 AM	0	0	0	0	0	1	0	2	3	4	0	0	10
07:15 AM	1	0	0	0	1	0	0	0	3	1	1	0	7
07:30 AM	0	0	0	0	2	0	0	0	2	0	0	0	4
07:45 AM	0	0	0	0	0	0	0	0	2	0	0	0	2
Total	1	0	0	0	3	1	0	2	10	5	1	0	23
08:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	1
08:15 AM	0	0	0	0	1	0	0	0	2	1	0	0	4
08:30 AM	1	0	0	0	1	1	2	0	0	1	2	0	8
08:45 AM	0	0	0	0	0	3	0	0	0	2	0	0	5
Total	1	0	0	0	2	4	2	0	2	5	2	0	18
*** BREAK ***													
04:00 PM	0	2	1	0	2	0	1	2	0	0	2	0	10
04:15 PM	2	4	5	0	5	7	4	1	1	2	5	1	37
04:30 PM	0	1	5	0	7	3	11	2	3	3	12	2	49
04:45 PM	0	0	2	0	3	9	5	0	5	2	5	0	31
Total	2	7	13	0	17	19	21	5	9	7	24	3	127
05:00 PM	2	2	3	0	3	6	7	0	9	1	14	2	49
05:15 PM	0	2	0	0	5	8	9	2	4	0	1	0	31
05:30 PM	4	1	1	0	2	5	3	0	3	1	8	1	29
05:45 PM	1	1	1	0	11	6	13	0	4	0	4	1	42
Total	7	6	5	0	21	25	32	2	20	2	27	4	151
Grand Total	11	13	18	0	43	49	55	9	41	19	54	7	319
Apprch %	26.2	31	42.9	0	46.7	53.3	52.4	8.6	39	23.8	67.5	8.8	
Total %	3.4	4.1	5.6	0	13.5	15.4	17.2	2.8	12.9	6	16.9	2.2	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: LAGUNA HILLS MALL
E-W Direction: W/O LONE STAR

File Name : h1111024
Site Code : 00000554
Start Date : 11/15/2011
Page No : 2

	LAGUNA HILLS MALL Southbound				W/O LONE STAR Westbound				LAGUNA HILLS MALL Northbound				W/O LONE STAR Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	**1**	1	0	**2**	**3**	**5**	**4**	0	0	**4**	**10**
07:15 AM	**1**	0	0	**1**	0	1	0	1	0	0	3	3	1	**1**	0	2	7
07:30 AM	0	0	0	0	0	**2**	0	**2**	0	0	2	2	0	0	0	0	4
07:45 AM	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	2
Total Volume	1	0	0	1	0	3	1	4	0	2	10	12	5	1	0	6	23
% App. Total	100	0	0		0	75	25		0	16.7	83.3		83.3	16.7	0		
PHF	.250	.000	.000	.250	.000	.375	.250	.500	.000	.250	.833	.600	.313	.250	.000	.375	.575

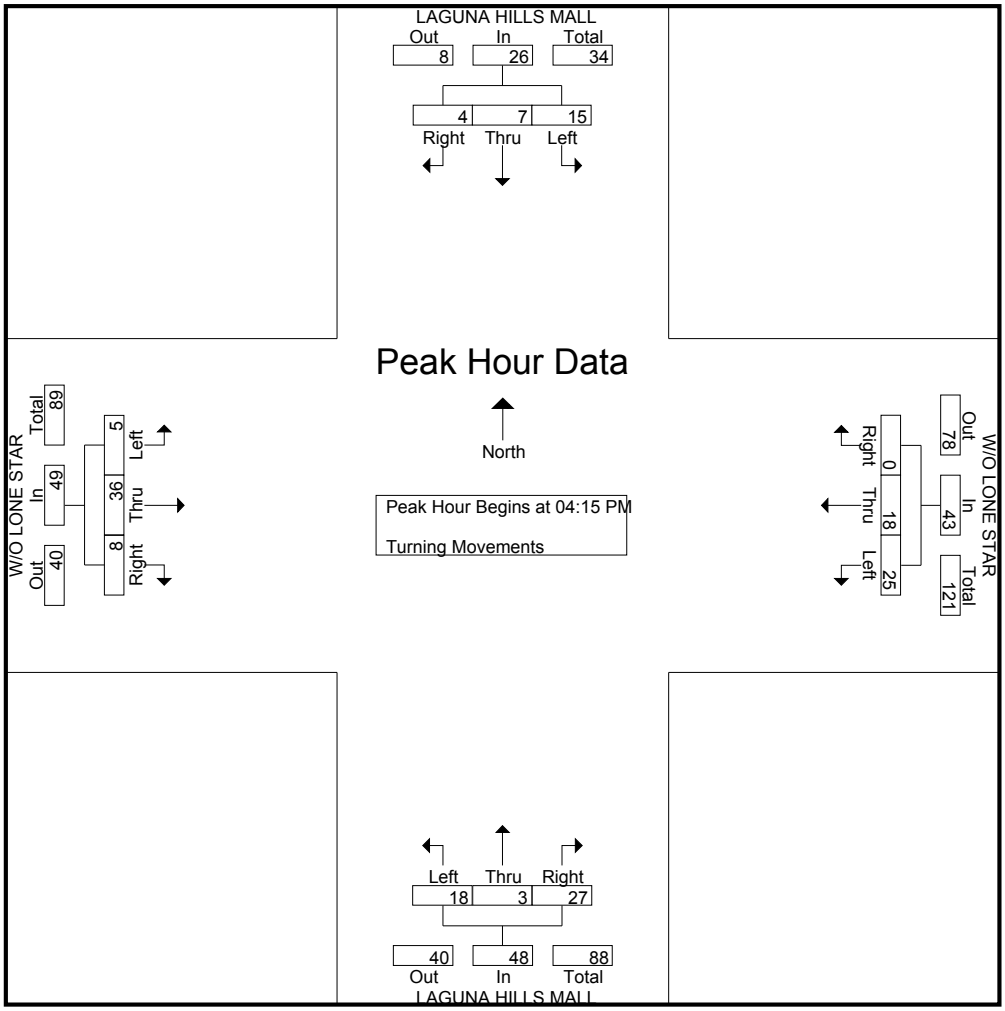


Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: LAGUNA HILLS MALL
E-W Direction: W/O LONE STAR

File Name : h1111024
Site Code : 00000554
Start Date : 11/15/2011
Page No : 3

	LAGUNA HILLS MALL Southbound				W/O LONE STAR Westbound				LAGUNA HILLS MALL Northbound				W/O LONE STAR Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	**2**	**4**	**5**	**11**	0	5	7	**12**	4	1	1	6	2	5	1	8	37
04:30 PM	0	1	5	6	0	**7**	3	10	**11**	**2**	3	**16**	**3**	12	**2**	**17**	**49**
04:45 PM	0	0	2	2	0	3	**9**	12	5	0	5	10	2	5	0	7	31
05:00 PM	2	2	3	7	0	3	6	9	7	0	**9**	16	1	**14**	2	17	49
Total Volume	4	7	15	26	0	18	25	43	27	3	18	48	8	36	5	49	166
% App. Total	15.4	26.9	57.7		0	41.9	58.1		56.2	6.2	37.5		16.3	73.5	10.2		
PHF	.500	.438	.750	.591	.000	.643	.694	.896	.614	.375	.500	.750	.667	.643	.625	.721	.847



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: OUTBACKSTEAK HOUSE DRIVE
E-W Direction: AVENIDA DE LA CARLOTTA

File Name : H1111025
Site Code : 00004637
Start Date : 11/15/2011
Page No : 1

Groups Printed- Turning Movements

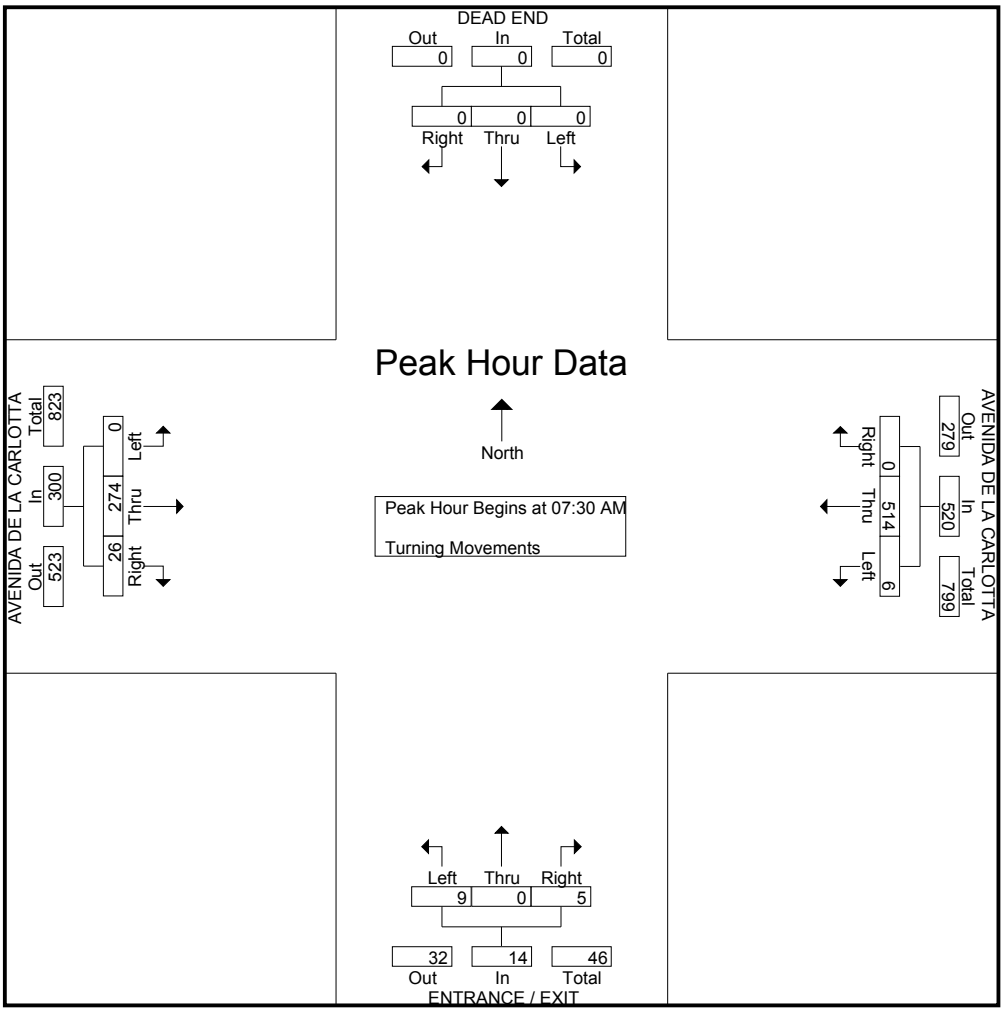
	DEAD END Southbound			AVENIDA DE LA CARLOTTA Westbound			ENTRANCE / EXIT Northbound			AVENIDA DE LA CARLOTTA Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00 AM	0	0	0	0	114	1	4	0	0	1	42	0	162
07:15 AM	0	0	0	0	121	1	1	0	1	2	51	0	177
07:30 AM	0	0	0	0	126	2	1	0	3	6	77	0	215
07:45 AM	0	0	0	0	148	0	4	0	1	5	72	0	230
Total	0	0	0	0	509	4	10	0	5	14	242	0	784
08:00 AM	0	0	0	0	113	3	0	0	3	9	70	0	198
08:15 AM	0	0	0	0	127	1	0	0	2	6	55	0	191
08:30 AM	0	0	0	0	104	0	4	0	5	10	56	0	179
08:45 AM	0	0	0	0	96	1	1	0	2	10	59	0	169
Total	0	0	0	0	440	5	5	0	12	35	240	0	737
*** BREAK ***													
04:00 PM	0	0	0	0	49	1	8	0	5	17	187	0	267
04:15 PM	0	0	0	0	68	7	13	0	22	42	171	0	323
04:30 PM	0	0	0	0	89	6	27	0	19	44	173	0	358
04:45 PM	0	0	0	0	101	13	22	0	21	37	186	0	380
Total	0	0	0	0	307	27	70	0	67	140	717	0	1328
05:00 PM	0	0	0	0	105	5	18	0	15	47	188	0	378
05:15 PM	0	0	0	0	97	4	14	0	8	44	177	0	344
05:30 PM	0	0	0	0	94	7	19	0	20	50	180	0	370
05:45 PM	0	0	0	0	84	4	15	0	13	49	173	0	338
Total	0	0	0	0	380	20	66	0	56	190	718	0	1430
Grand Total	0	0	0	0	1636	56	151	0	140	379	1917	0	4279
Apprch %	0	0	0	0	96.7	3.3	51.9	0	48.1	16.5	83.5	0	
Total %	0	0	0	0	38.2	1.3	3.5	0	3.3	8.9	44.8	0	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: OUTBACKSTEAK HOUSE DRIVE
E-W Direction: AVENIDA DE LA CARLOTTA

File Name : H1111025
Site Code : 00004637
Start Date : 11/15/2011

	DEAD END Southbound				AVENIDA DE LA CARLOTTA Westbound				ENTRANCE / EXIT Northbound				AVENIDA DE LA CARLOTTA Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	0	126	2	128	1	0	**3**	4	6	**77**	0	**83**	215
07:45 AM	0	0	0	0	0	**148**	0	**148**	**4**	0	1	**5**	5	72	0	77	**230**
08:00 AM	0	0	0	0	0	113	**3**	116	0	0	3	3	**9**	70	0	79	198
08:15 AM	0	0	0	0	0	127	1	128	0	0	2	2	6	55	0	61	191
Total Volume	0	0	0	0	0	514	6	520	5	0	9	14	26	274	0	300	834
% App. Total	0	0	0		0	98.8	1.2		35.7	0	64.3		8.7	91.3	0		
PHF	.000	.000	.000	.000	.000	.868	.500	.878	.313	.000	.750	.700	.722	.890	.000	.904	.907

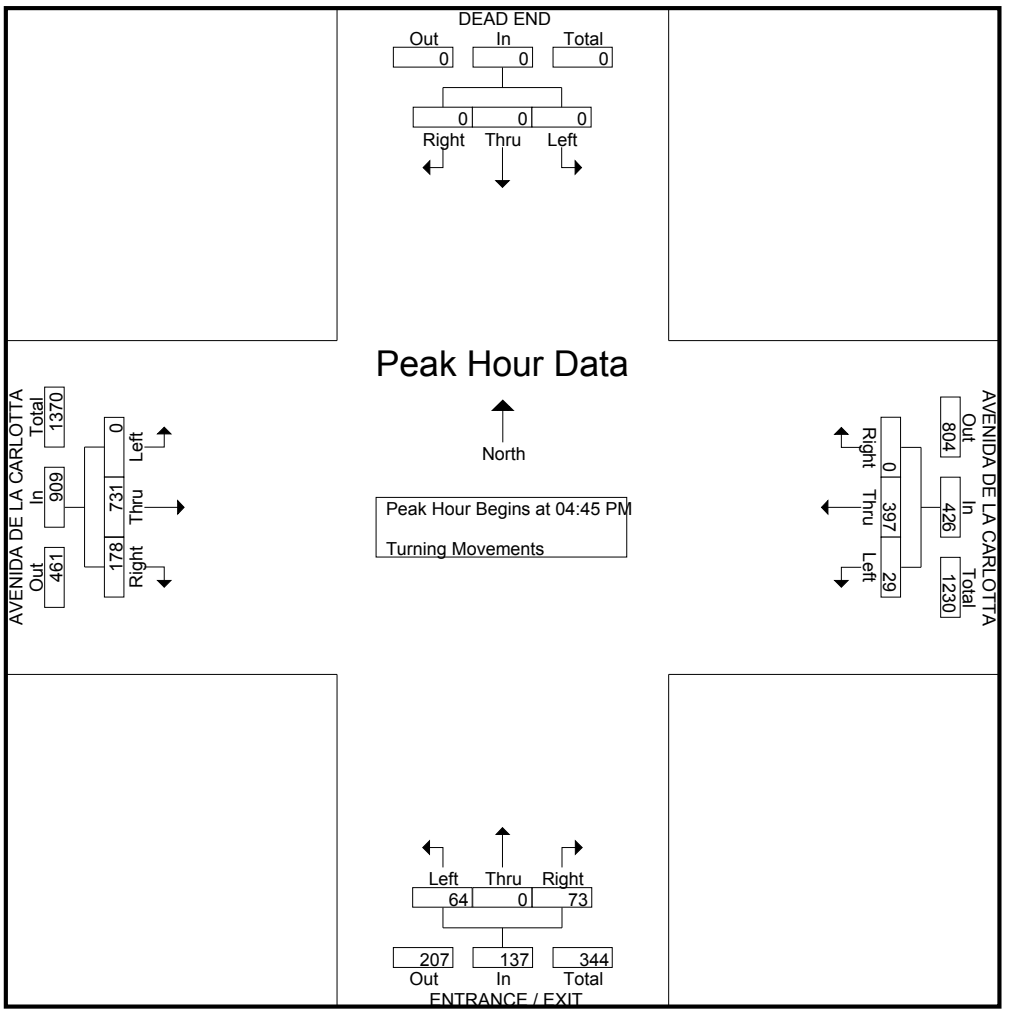


Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: OUTBACKSTEAK HOUSE DRIVE
E-W Direction: AVENIDA DE LA CARLOTTA

File Name : H1111025
Site Code : 00004637
Start Date : 11/15/2011

	DEAD END Southbound				AVENIDA DE LA CARLOTTA Westbound				ENTRANCE / EXIT Northbound				AVENIDA DE LA CARLOTTA Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	0	101	**13**	**114**	**22**	0	**21**	**43**	37	186	0	223	**380**
05:00 PM	0	0	0	0	0	**105**	5	110	18	0	15	33	47	**188**	0	**235**	378
05:15 PM	0	0	0	0	0	97	4	101	14	0	8	22	44	177	0	221	344
05:30 PM	0	0	0	0	0	94	7	101	19	0	20	39	**50**	180	0	230	370
Total Volume	0	0	0	0	0	397	29	426	73	0	64	137	178	731	0	909	1472
% App. Total	0	0	0		0	93.2	6.8		53.3	0	46.7		19.6	80.4	0		
PHF	.000	.000	.000	.000	.000	.945	.558	.934	.830	.000	.762	.797	.890	.972	.000	.967	.968



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: TRADER JOE'S ENTRANCE
E-W Direction: AVENIDA DE LA CARLOTTA

File Name : H1111026
Site Code : 00000554
Start Date : 11/15/2011
Page No : 1

Groups Printed- Turning Movements

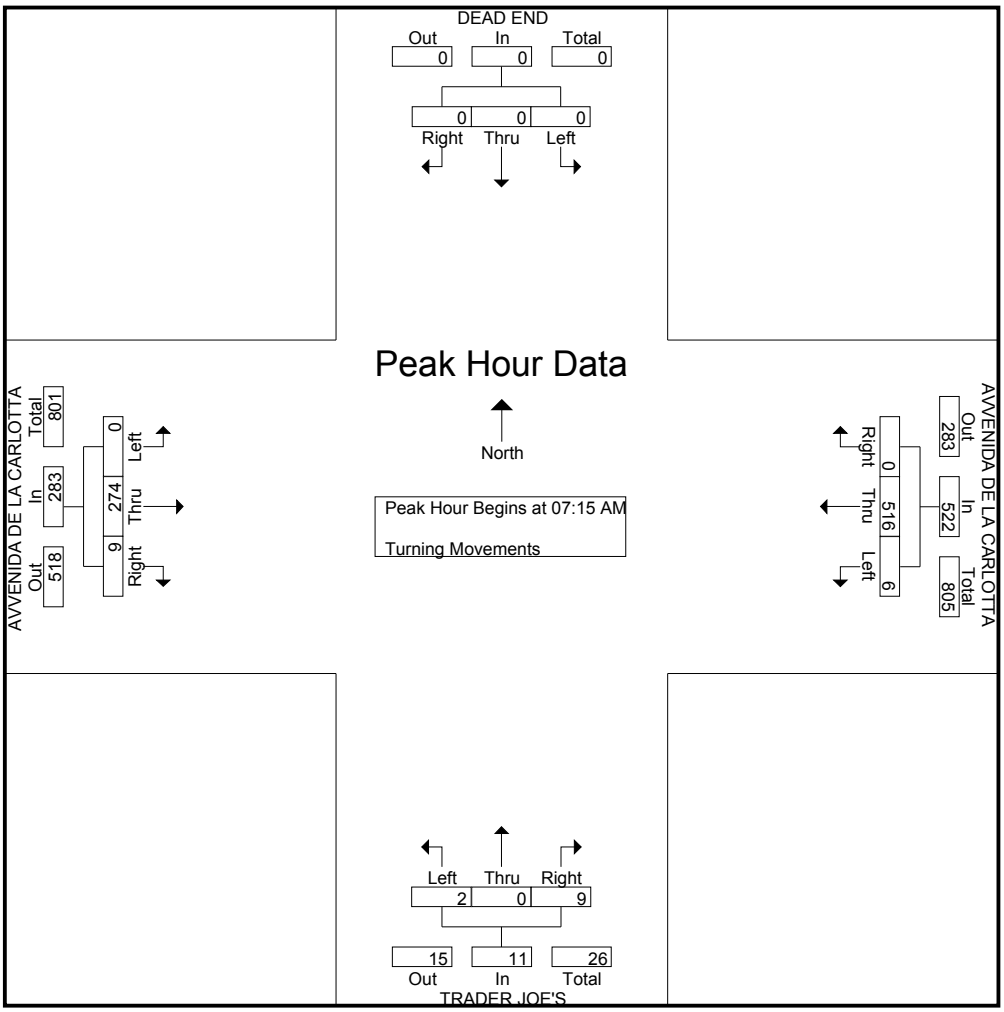
	DEAD END Southbound			AVVENIDA DE LA CARLOTTA Westbound			TRADER JOE'S Northbound			AVVENIDA DE LA CARLOTTA Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00 AM	0	0	0	0	119	3	0	0	0	2	45	0	169
07:15 AM	0	0	0	0	128	2	2	0	0	3	51	0	186
07:30 AM	0	0	0	0	135	0	5	0	1	0	75	0	216
07:45 AM	0	0	0	0	133	3	1	0	0	1	77	0	215
Total	0	0	0	0	515	8	8	0	1	6	248	0	786
08:00 AM	0	0	0	0	120	1	1	0	1	5	71	0	199
08:15 AM	0	0	0	0	112	12	2	0	1	1	54	0	182
08:30 AM	0	0	0	0	107	7	7	0	4	5	52	0	182
08:45 AM	0	0	0	0	105	6	5	0	1	1	53	0	171
Total	0	0	0	0	444	26	15	0	7	12	230	0	734
*** BREAK ***													
04:00 PM	0	0	0	0	63	18	35	0	3	2	157	0	278
04:15 PM	0	0	0	0	79	14	40	0	5	10	181	0	329
04:30 PM	0	0	0	0	89	18	36	0	5	5	210	0	363
04:45 PM	0	0	0	0	83	16	48	0	8	3	216	0	374
Total	0	0	0	0	314	66	159	0	21	20	764	0	1344
05:00 PM	0	0	0	0	104	17	29	0	4	7	223	0	384
05:15 PM	0	0	0	0	92	30	43	0	6	4	160	0	335
05:30 PM	0	0	0	0	93	27	38	0	3	6	202	0	369
05:45 PM	0	0	0	0	93	17	26	0	12	3	173	0	324
Total	0	0	0	0	382	91	136	0	25	20	758	0	1412
Grand Total	0	0	0	0	1655	191	318	0	54	58	2000	0	4276
Apprch %	0	0	0	0	89.7	10.3	85.5	0	14.5	2.8	97.2	0	
Total %	0	0	0	0	38.7	4.5	7.4	0	1.3	1.4	46.8	0	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: TRADER JOE'S ENTRANCE
E-W Direction: AVENIDA DE LA CARLOTTA

File Name : H1111026
Site Code : 00000554
Start Date : 11/15/2011
Page No : 2

	DEAD END Southbound				AVVENIDA DE LA CARLOTTA Westbound				TRADER JOE'S Northbound				AVVENIDA DE LA CARLOTTA Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	0	128	2	130	2	0	0	2	3	51	0	54	186
07:30 AM	0	0	0	0	0	**135**	0	135	**5**	0	**1**	**6**	0	75	0	75	**216**
07:45 AM	0	0	0	0	0	133	**3**	**136**	1	0	0	1	1	**77**	0	**78**	215
08:00 AM	0	0	0	0	0	120	1	121	1	0	1	2	**5**	71	0	76	199
Total Volume	0	0	0	0	0	516	6	522	9	0	2	11	9	274	0	283	816
% App. Total	0	0	0		0	98.9	1.1		81.8	0	18.2		3.2	96.8	0		
PHF	.000	.000	.000	.000	.000	.956	.500	.960	.450	.000	.500	.458	.450	.890	.000	.907	.944

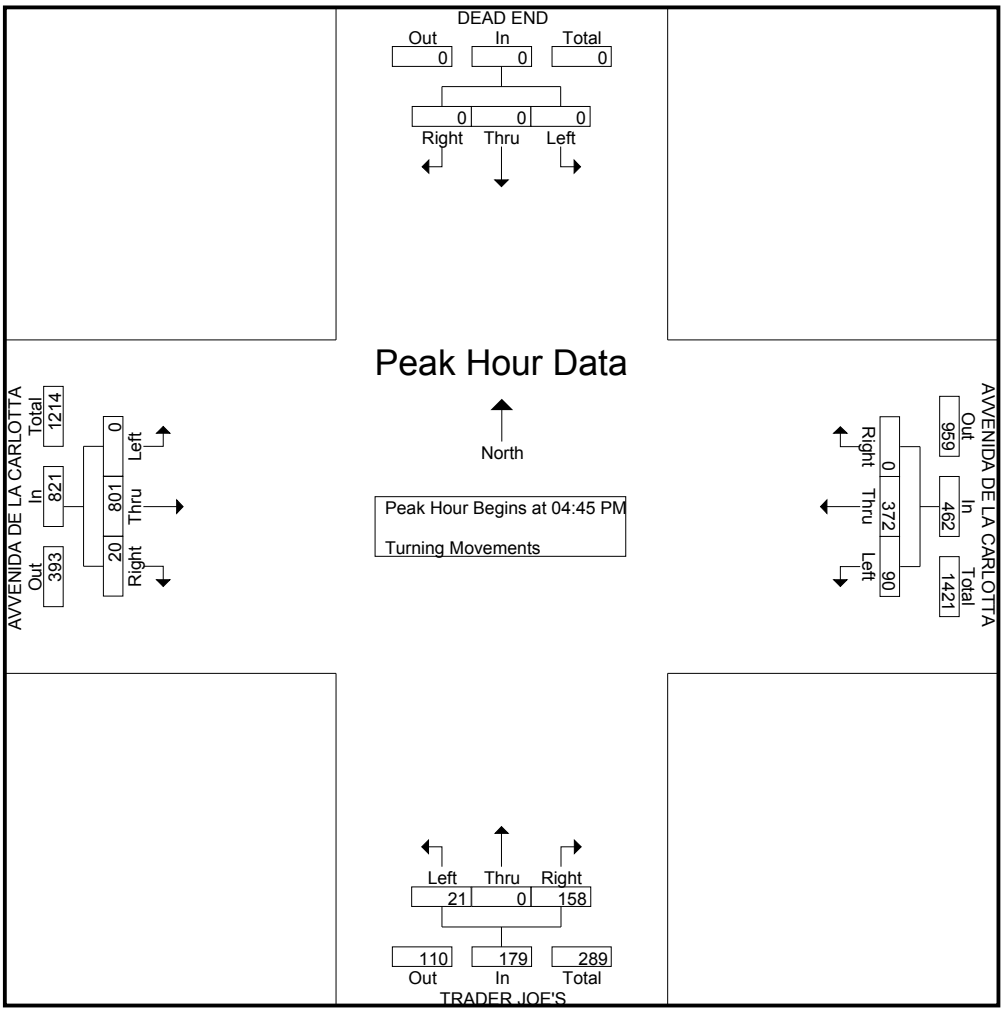


Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: TRADER JOE'S ENTRANCE
E-W Direction: AVENIDA DE LA CARLOTTA

File Name : H1111026
Site Code : 00000554
Start Date : 11/15/2011

	DEAD END Southbound				AVVENIDA DE LA CARLOTTA Westbound				TRADER JOE'S Northbound				AVVENIDA DE LA CARLOTTA Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	0	83	16	99	**48**	0	**8**	**56**	3	216	0	219	374
05:00 PM	0	0	0	0	0	**104**	17	121	29	0	4	33	**7**	**223**	0	**230**	**384**
05:15 PM	0	0	0	0	0	92	**30**	**122**	43	0	6	49	4	160	0	164	335
05:30 PM	0	0	0	0	0	93	27	120	38	0	3	41	6	202	0	208	369
Total Volume	0	0	0	0	0	372	90	462	158	0	21	179	20	801	0	821	1462
% App. Total	0	0	0		0	80.5	19.5		88.3	0	11.7		2.4	97.6	0		
PHF	.000	.000	.000	.000	.000	.894	.750	.947	.823	.000	.656	.799	.714	.898	.000	.892	.952



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: 1ST FEDERAL BANK ENTER
E-W Direction: AVENIDA DE LA CARLOTTA

File Name : H1111028
Site Code : 00005701
Start Date : 11/17/2011

Groups Printed- Turning Movements

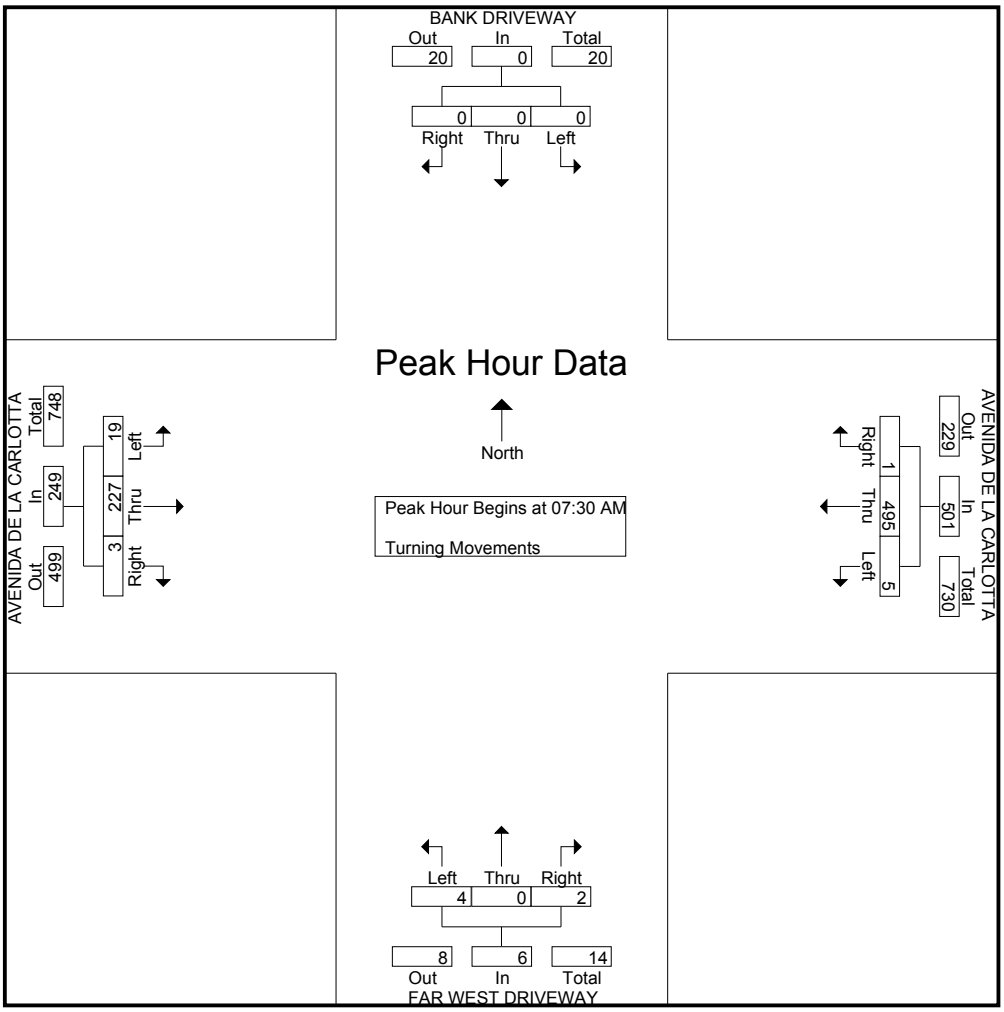
	BANK DRIVEWAY Southbound			AVENIDA DE LA CARLOTTA Westbound			FAR WEST DRIVEWAY Northbound			AVENIDA DE LA CARLOTTA Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00 AM	4	0	0	1	114	2	1	0	1	0	37	2	162
07:15 AM	0	0	0	0	120	1	0	0	0	0	42	9	172
07:30 AM	0	0	0	0	123	1	0	0	2	1	50	2	179
07:45 AM	0	0	0	0	147	1	0	0	0	0	59	5	212
Total	4	0	0	1	504	5	1	0	3	1	188	18	725
08:00 AM	0	0	0	1	111	2	2	0	1	1	64	5	187
08:15 AM	0	0	0	0	114	1	0	0	1	1	54	7	178
08:30 AM	1	0	0	3	118	0	0	0	0	0	49	6	177
08:45 AM	0	0	1	1	99	0	1	0	1	0	49	3	155
Total	1	0	1	5	442	3	3	0	3	2	216	21	697
*** BREAK ***													
04:00 PM	0	0	0	0	79	2	12	0	2	1	192	1	289
04:15 PM	3	0	1	0	69	0	3	0	1	0	202	1	280
04:30 PM	2	0	1	1	101	4	5	0	2	1	234	3	354
04:45 PM	0	0	0	0	100	0	5	0	0	1	249	2	357
Total	5	0	2	1	349	6	25	0	5	3	877	7	1280
05:00 PM	2	0	0	0	131	2	3	0	2	15	252	1	408
05:15 PM	3	0	0	1	137	1	2	0	2	1	250	0	397
05:30 PM	0	0	0	0	113	0	3	0	4	0	207	0	327
05:45 PM	1	0	0	0	66	1	0	0	2	2	154	2	228
Total	6	0	0	1	447	4	8	0	10	18	863	3	1360
Grand Total	16	0	3	8	1742	18	37	0	21	24	2144	49	4062
Apprch %	84.2	0	15.8	0.5	98.5	1	63.8	0	36.2	1.1	96.7	2.2	
Total %	0.4	0	0.1	0.2	42.9	0.4	0.9	0	0.5	0.6	52.8	1.2	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: 1ST FEDERAL BANK ENTER
E-W Direction: AVENIDA DE LA CARLOTTA

File Name : H1111028
Site Code : 00005701
Start Date : 11/17/2011

	BANK DRIVEWAY Southbound				AVENIDA DE LA CARLOTTA Westbound				FAR WEST DRIVEWAY Northbound				AVENIDA DE LA CARLOTTA Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	0	123	1	124	0	0	**2**	2	**1**	50	2	53	179
07:45 AM	0	0	0	0	0	**147**	1	**148**	0	0	0	0	0	59	5	64	**212**
08:00 AM	0	0	0	0	**1**	111	**2**	114	**2**	0	1	**3**	1	**64**	5	**70**	187
08:15 AM	0	0	0	0	0	114	1	115	0	0	1	1	1	54	**7**	62	178
Total Volume	0	0	0	0	1	495	5	501	2	0	4	6	3	227	19	249	756
% App. Total	0	0	0		0.2	98.8	1		33.3	0	66.7		1.2	91.2	7.6		
PHF	.000	.000	.000	.000	.250	.842	.625	.846	.250	.000	.500	.500	.750	.887	.679	.889	.892

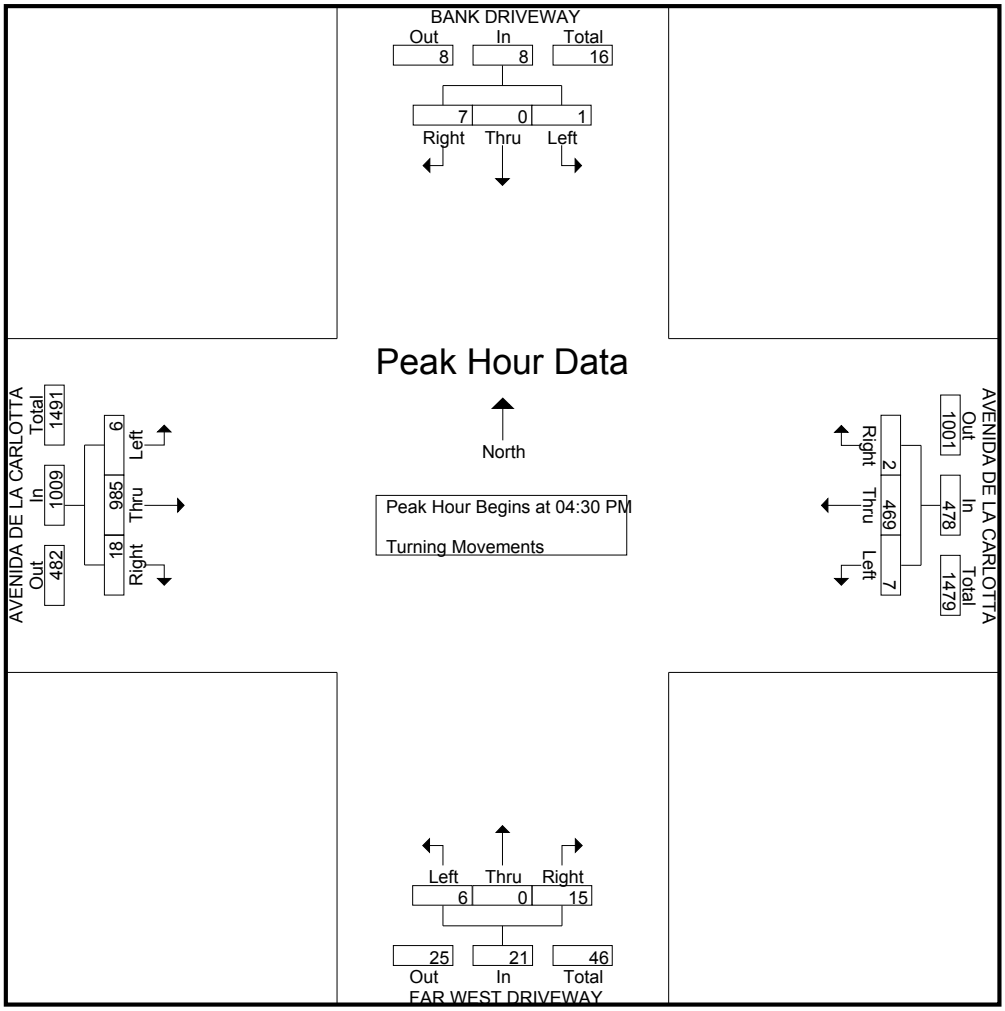


Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: 1ST FEDERAL BANK ENTER
E-W Direction: AVENIDA DE LA CARLOTTA

File Name : H1111028
Site Code : 00005701
Start Date : 11/17/2011

	BANK DRIVEWAY Southbound				AVENIDA DE LA CARLOTTA Westbound				FAR WEST DRIVEWAY Northbound				AVENIDA DE LA CARLOTTA Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	2	0	**1**	**3**	**1**	101	**4**	106	**5**	0	**2**	**7**	1	234	**3**	238	354
04:45 PM	0	0	0	0	0	100	0	100	5	0	0	5	1	249	2	252	357
05:00 PM	2	0	0	2	0	131	2	133	3	0	2	5	**15**	**252**	1	**268**	**408**
05:15 PM	**3**	0	0	3	1	**137**	1	**139**	2	0	2	4	1	250	0	251	397
Total Volume	7	0	1	8	2	469	7	478	15	0	6	21	18	985	6	1009	1516
% App. Total	87.5	0	12.5		0.4	98.1	1.5		71.4	0	28.6		1.8	97.6	0.6		
PHF	.583	.000	.250	.667	.500	.856	.438	.860	.750	.000	.750	.750	.300	.977	.500	.941	.929



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: PASEO DE VALENCIA
E-W Direction: LOS ALISOS BOULEVARD

File Name : H1111017
Site Code : 00005700
Start Date : 11/10/2011
Page No : 1

Groups Printed- Turning Movements

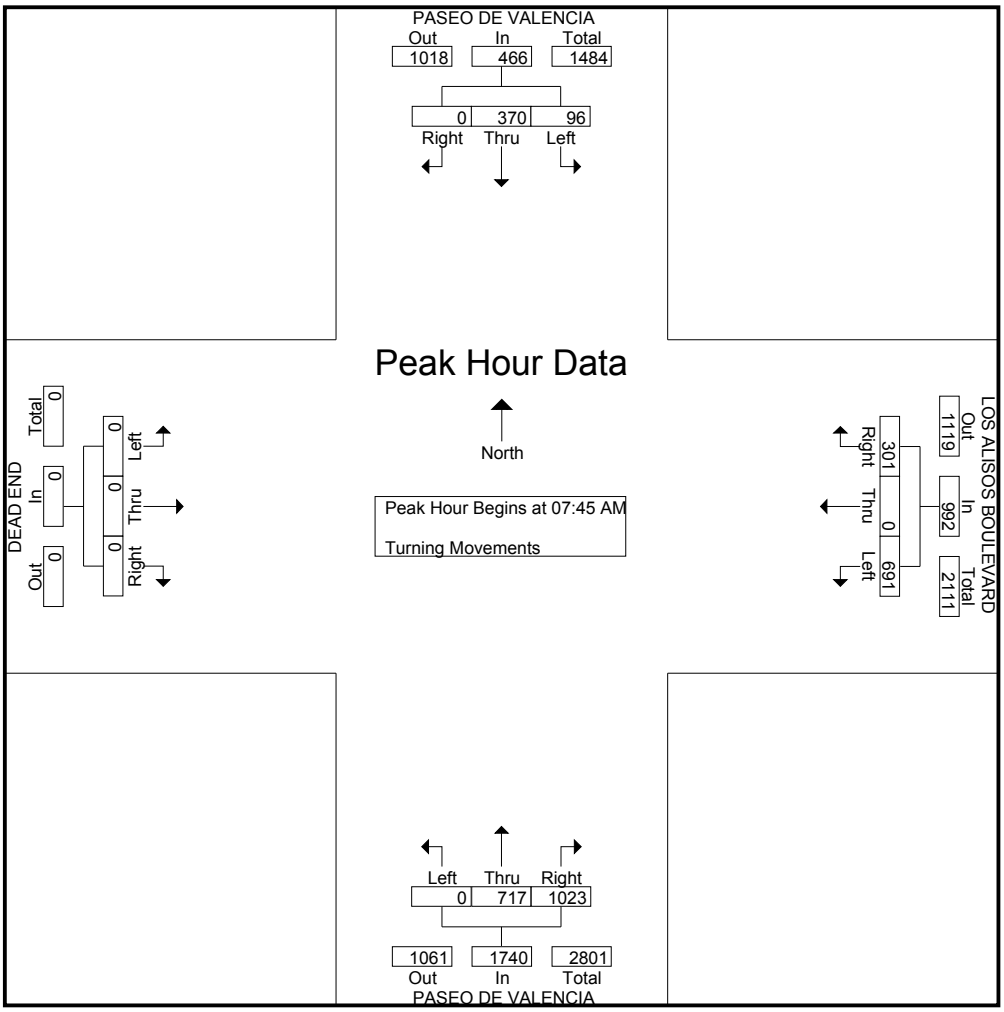
	PASEO DE VALENCIA Southbound			LOS ALISOS BOULEVARD Westbound			PASEO DE VALENCIA Northbound			DEAD END Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00 AM	0	76	16	63	0	101	169	123	0	0	0	0	548
07:15 AM	0	65	10	42	0	145	138	119	0	0	0	0	519
07:30 AM	0	81	25	51	0	134	207	134	0	0	0	0	632
07:45 AM	0	88	23	71	0	206	344	172	0	0	0	0	904
Total	0	310	74	227	0	586	858	548	0	0	0	0	2603
08:00 AM	0	78	26	93	0	190	299	198	0	0	0	0	884
08:15 AM	0	88	20	74	0	159	197	170	0	0	0	0	708
08:30 AM	0	116	27	63	0	136	183	177	0	0	0	0	702
08:45 AM	0	99	24	58	0	133	122	188	0	0	0	0	624
Total	0	381	97	288	0	618	801	733	0	0	0	0	2918
*** BREAK ***													
04:00 PM	0	207	59	53	0	196	175	140	0	0	0	0	830
04:15 PM	0	239	58	47	0	199	172	153	0	0	0	0	868
04:30 PM	0	224	45	47	0	240	222	119	0	0	0	0	897
04:45 PM	0	238	42	39	0	237	238	129	0	0	0	0	923
Total	0	908	204	186	0	872	807	541	0	0	0	0	3518
05:00 PM	0	256	88	39	0	210	239	134	0	0	0	0	966
05:15 PM	0	265	90	37	0	262	214	129	0	0	0	0	997
05:30 PM	0	247	38	37	0	235	292	124	0	0	0	0	973
05:45 PM	0	169	43	23	0	249	216	104	0	0	0	0	804
Total	0	937	259	136	0	956	961	491	0	0	0	0	3740
Grand Total	0	2536	634	837	0	3032	3427	2313	0	0	0	0	12779
Apprch %	0	80	20	21.6	0	78.4	59.7	40.3	0	0	0	0	
Total %	0	19.8	5	6.5	0	23.7	26.8	18.1	0	0	0	0	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: PASEO DE VALENCIA
E-W Direction: LOS ALISOS BOULEVARD

File Name : H1111017
Site Code : 00005700
Start Date : 11/10/2011
Page No : 2

	PASEO DE VALENCIA Southbound				LOS ALISOS BOULEVARD Westbound				PASEO DE VALENCIA Northbound				DEAD END Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	88	23	111	71	0	**206**	277	**344**	172	0	**516**	0	0	0	0	**904**
08:00 AM	0	78	26	104	**93**	0	190	**283**	299	**198**	0	497	0	0	0	0	884
08:15 AM	0	88	20	108	74	0	159	233	197	170	0	367	0	0	0	0	708
08:30 AM	0	**116**	**27**	**143**	63	0	136	199	183	177	0	360	0	0	0	0	702
Total Volume	0	370	96	466	301	0	691	992	1023	717	0	1740	0	0	0	0	3198
% App. Total	0	79.4	20.6		30.3	0	69.7		58.8	41.2	0		0	0	0		
PHF	.000	.797	.889	.815	.809	.000	.839	.876	.743	.905	.000	.843	.000	.000	.000	.000	.884

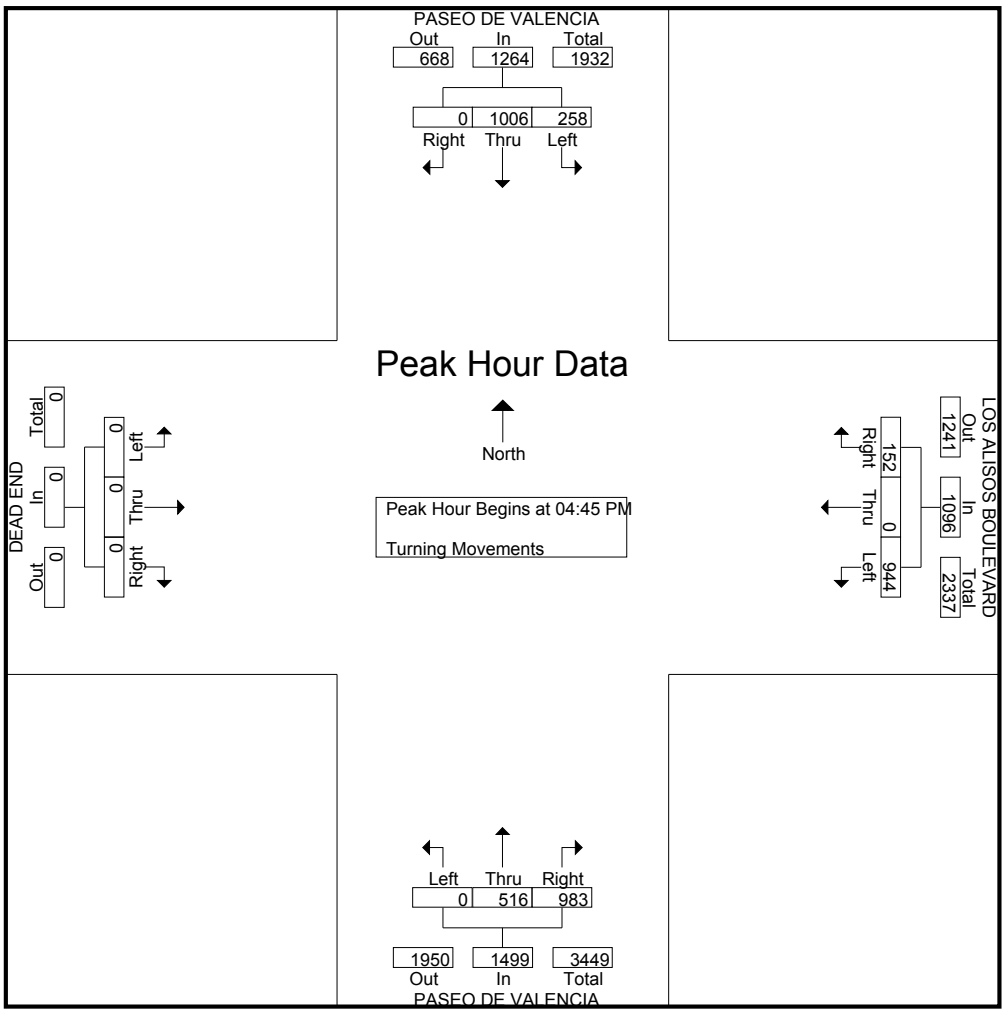


Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: PASEO DE VALENCIA
E-W Direction: LOS ALISOS BOULEVARD

File Name : H1111017
Site Code : 00005700
Start Date : 11/10/2011

	PASEO DE VALENCIA Southbound				LOS ALISOS BOULEVARD Westbound				PASEO DE VALENCIA Northbound				DEAD END Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	238	42	280	**39**	0	237	276	238	129	0	367	0	0	0	0	923
05:00 PM	0	256	88	344	39	0	210	249	239	**134**	0	373	0	0	0	0	966
05:15 PM	0	**265**	**90**	**355**	37	0	**262**	**299**	214	129	0	343	0	0	0	0	**997**
05:30 PM	0	247	38	285	37	0	235	272	**292**	124	0	**416**	0	0	0	0	973
Total Volume	0	1006	258	1264	152	0	944	1096	983	516	0	1499	0	0	0	0	3859
% App. Total	0	79.6	20.4		13.9	0	86.1		65.6	34.4	0		0	0	0		
PHF	.000	.949	.717	.890	.974	.000	.901	.916	.842	.963	.000	.901	.000	.000	.000	.000	.968



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: AVENIDA DE LA CARLOTA
E-W Direction: LOS ALISOS BOULEVARD

File Name : h1111016
Site Code : 00003874
Start Date : 11/9/2011

Groups Printed- Turning Movements

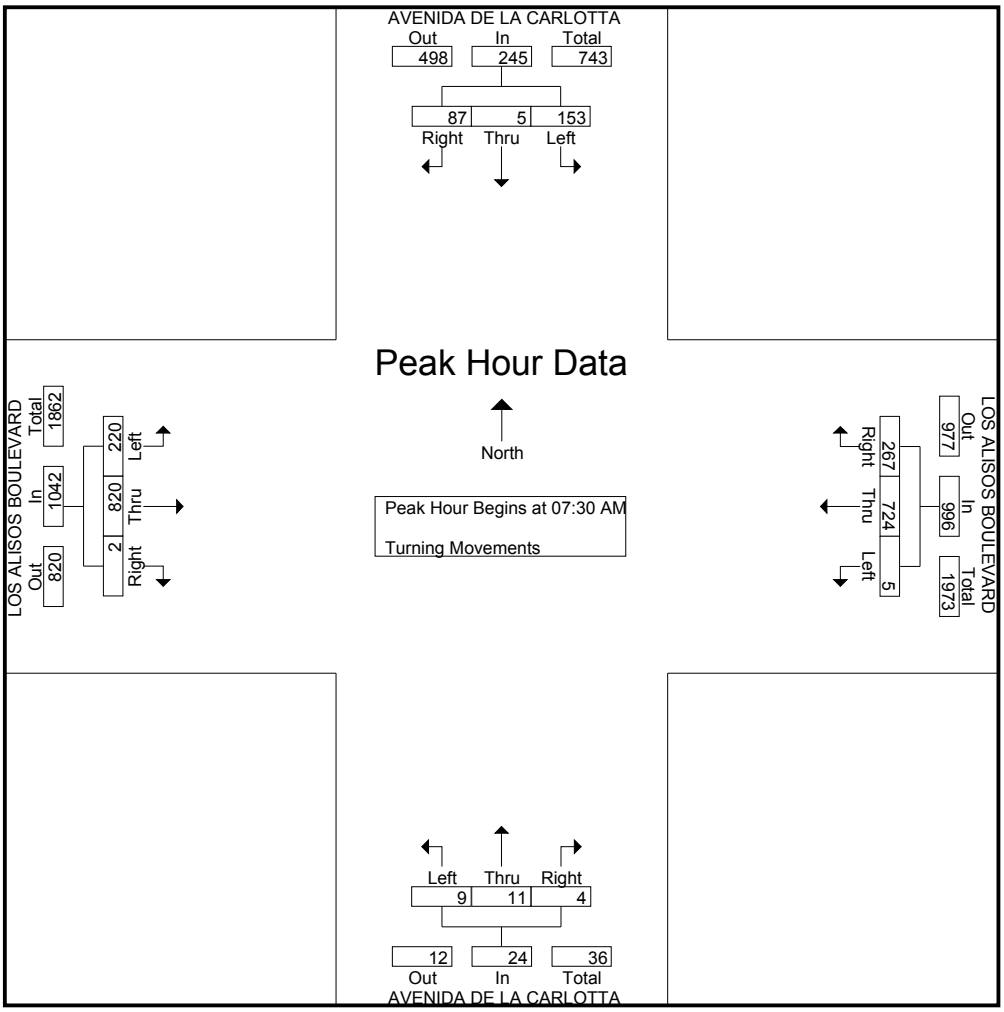
	AVENIDA DE LA CARLOTTA Southbound			LOS ALISOS BOULEVARD Westbound			AVENIDA DE LA CARLOTTA Northbound			LOS ALISOS BOULEVARD Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00 AM	17	1	30	44	130	1	0	5	0	0	107	71	406
07:15 AM	13	0	28	57	177	1	0	2	0	1	129	75	483
07:30 AM	18	1	32	49	184	1	1	2	2	1	194	68	553
07:45 AM	27	1	56	83	190	1	2	1	5	0	250	57	673
Total	75	3	146	233	681	4	3	10	7	2	680	271	2115
08:00 AM	20	0	38	65	191	1	0	6	1	0	198	41	561
08:15 AM	22	3	27	70	159	2	1	2	1	1	178	54	520
08:30 AM	12	0	33	49	171	4	3	4	3	0	160	51	490
08:45 AM	13	0	25	57	164	0	3	1	0	0	144	44	451
Total	67	3	123	241	685	7	7	13	5	1	680	190	2022
*** BREAK ***													
04:00 PM	51	2	129	50	170	2	3	1	0	1	179	31	619
04:15 PM	73	7	135	47	147	3	1	3	1	0	210	40	667
04:30 PM	62	5	146	68	180	3	3	2	1	0	187	51	708
04:45 PM	51	5	150	50	147	1	1	1	2	1	196	27	632
Total	237	19	560	215	644	9	8	7	4	2	772	149	2626
05:00 PM	60	3	168	56	173	3	2	2	3	4	206	39	719
05:15 PM	51	1	160	54	202	3	0	3	1	7	251	41	774
05:30 PM	50	4	136	51	154	1	1	0	2	0	212	32	643
05:45 PM	44	2	117	31	170	4	2	1	1	1	181	52	606
Total	205	10	581	192	699	11	5	6	7	12	850	164	2742
Grand Total	584	35	1410	881	2709	31	23	36	23	17	2982	774	9505
Apprch %	28.8	1.7	69.5	24.3	74.8	0.9	28	43.9	28	0.5	79	20.5	
Total %	6.1	0.4	14.8	9.3	28.5	0.3	0.2	0.4	0.2	0.2	31.4	8.1	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: AVENIDA DE LA CARLOTA
E-W Direction: LOS ALISOS BOULEVARD

File Name : h1111016
Site Code : 00003874
Start Date : 11/9/2011

	AVENIDA DE LA CARLOTTA Southbound				LOS ALISOS BOULEVARD Westbound				AVENIDA DE LA CARLOTTA Northbound				LOS ALISOS BOULEVARD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	18	1	32	51	49	184	1	234	1	2	2	5	**1**	194	**68**	263	553
07:45 AM	**27**	1	**56**	**84**	**83**	190	1	**274**	**2**	1	**5**	**8**	0	**250**	57	**307**	**673**
08:00 AM	20	0	38	58	65	**191**	1	257	0	**6**	1	7	0	198	41	239	561
08:15 AM	22	**3**	27	52	70	159	**2**	231	1	2	1	4	1	178	54	233	520
Total Volume	87	5	153	245	267	724	5	996	4	11	9	24	2	820	220	1042	2307
% App. Total	35.5	2	62.4		26.8	72.7	0.5		16.7	45.8	37.5		0.2	78.7	21.1		
PHF	.806	.417	.683	.729	.804	.948	.625	.909	.500	.458	.450	.750	.500	.820	.809	.849	.857

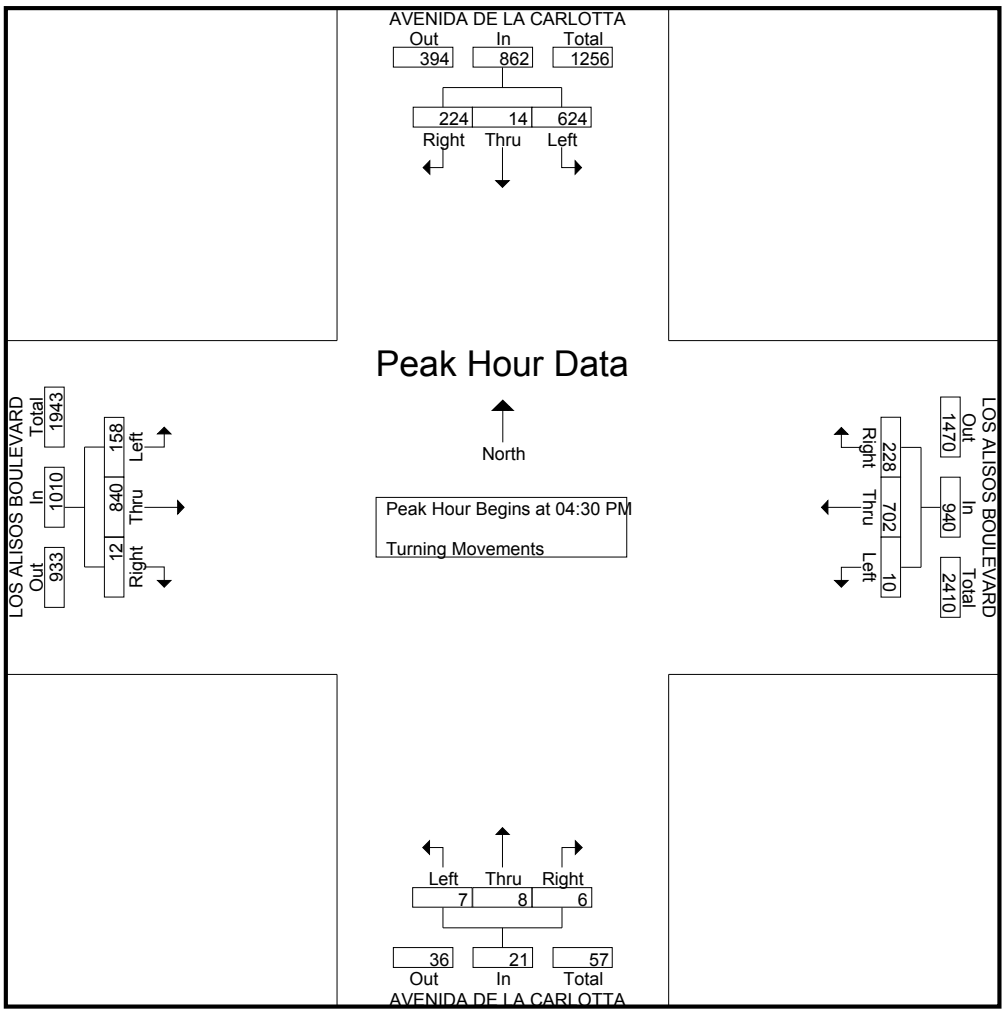


Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: AVENIDA DE LA CARLOTA
E-W Direction: LOS ALISOS BOULEVARD

File Name : h1111016
Site Code : 00003874
Start Date : 11/9/2011

	AVENIDA DE LA CARLOTTA Southbound				LOS ALISOS BOULEVARD Westbound				AVENIDA DE LA CARLOTTA Northbound				LOS ALISOS BOULEVARD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	**62**	**5**	146	213	**68**	180	**3**	251	**3**	2	1	6	0	187	**51**	238	708
04:45 PM	51	5	150	206	50	147	1	198	1	1	2	4	1	196	27	224	632
05:00 PM	60	3	**168**	**231**	56	173	3	232	2	2	**3**	**7**	4	206	39	249	719
05:15 PM	51	1	160	212	54	**202**	3	**259**	0	**3**	1	4	**7**	**251**	41	**299**	**774**
Total Volume	224	14	624	862	228	702	10	940	6	8	7	21	12	840	158	1010	2833
% App. Total	26	1.6	72.4		24.3	74.7	1.1		28.6	38.1	33.3		1.2	83.2	15.6		
PHF	.903	.700	.929	.933	.838	.869	.833	.907	.500	.667	.583	.750	.429	.837	.775	.844	.915



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: I-5 SB RAMPS
E-W Direction: AVENIDA DE LA CARLOTA

File Name : H1205028
Site Code : 00005053
Start Date : 5/10/2012

Groups Printed- Turning Movements

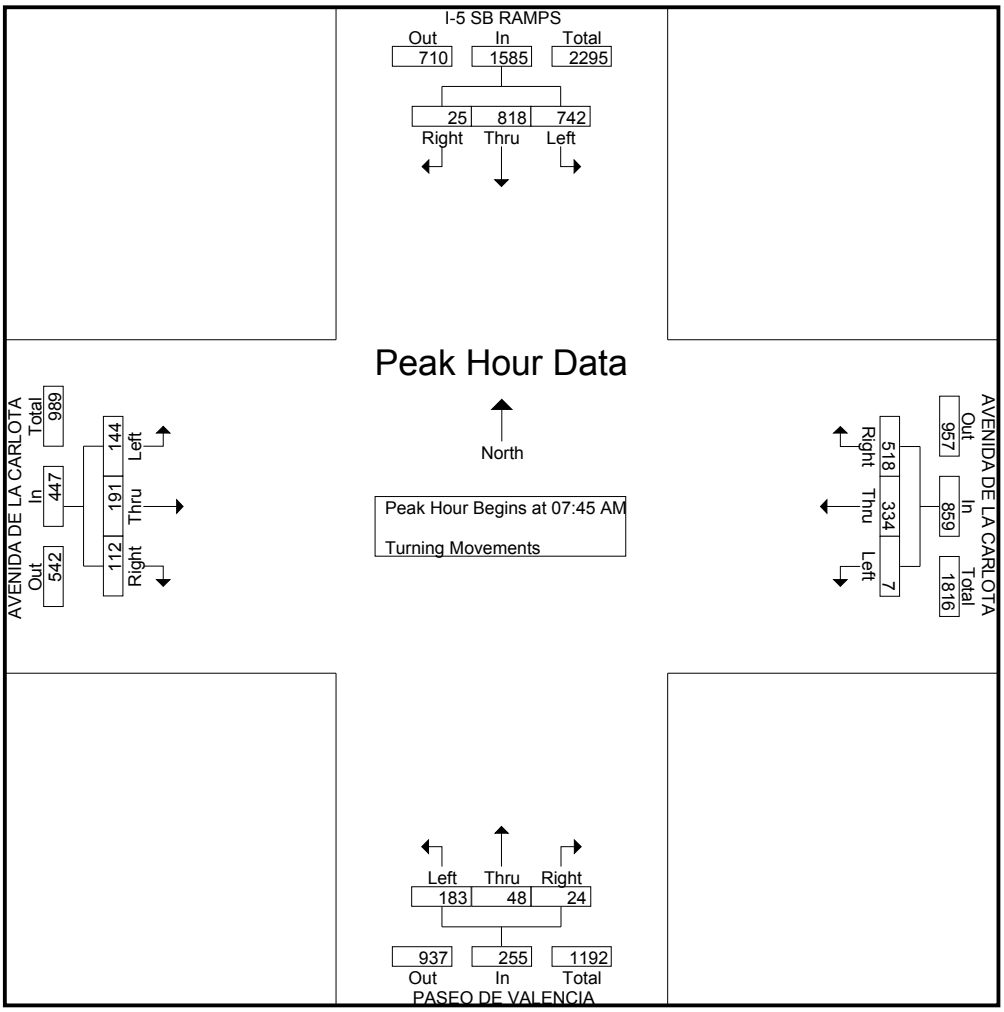
	I-5 SB RAMPS Southbound			AVENIDA DE LA CARLOTA Westbound			PASEO DE VALENCIA Northbound			AVENIDA DE LA CARLOTA Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00 AM	6	126	149	95	45	0	3	4	19	11	23	10	491
07:15 AM	6	149	144	122	52	1	6	5	27	10	35	27	584
07:30 AM	2	132	159	102	48	0	3	8	28	20	29	16	547
07:45 AM	4	203	209	143	68	1	7	10	37	32	43	32	789
Total	18	610	661	462	213	2	19	27	111	73	130	85	2411
08:00 AM	1	201	171	116	90	2	2	15	72	27	53	34	784
08:15 AM	7	225	186	142	76	1	8	12	36	22	49	40	804
08:30 AM	13	189	176	117	100	3	7	11	38	31	46	38	769
08:45 AM	6	184	179	110	47	0	6	11	35	24	53	31	686
Total	27	799	712	485	313	6	23	49	181	104	201	143	3043
*** BREAK ***													
04:00 PM	4	109	250	122	72	4	17	31	39	46	78	38	810
04:15 PM	14	105	231	137	58	2	11	24	40	62	83	47	814
04:30 PM	16	95	251	132	60	3	27	19	37	53	104	38	835
04:45 PM	7	90	215	127	47	3	21	18	38	71	121	56	814
Total	41	399	947	518	237	12	76	92	154	232	386	179	3273
05:00 PM	10	78	192	120	77	5	22	28	30	90	180	57	889
05:15 PM	3	103	162	125	65	3	27	24	41	110	215	94	972
05:30 PM	9	79	141	116	64	10	16	19	37	114	156	66	827
05:45 PM	10	92	172	110	60	9	14	26	41	99	169	81	883
Total	32	352	667	471	266	27	79	97	149	413	720	298	3571
Grand Total	118	2160	2987	1936	1029	47	197	265	595	822	1437	705	12298
Apprch %	2.2	41	56.7	64.3	34.2	1.6	18.6	25.1	56.3	27.7	48.5	23.8	
Total %	1	17.6	24.3	15.7	8.4	0.4	1.6	2.2	4.8	6.7	11.7	5.7	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: I-5 SB RAMPS
E-W Direction: AVENIDA DE LA CARLOTA

File Name : H1205028
Site Code : 00005053
Start Date : 5/10/2012
Page No : 2

	I-5 SB RAMPS Southbound				AVENIDA DE LA CARLOTA Westbound				PASEO DE VALENCIA Northbound				AVENIDA DE LA CARLOTA Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	4	203	**209**	416	**143**	68	1	212	7	10	37	54	**32**	43	32	107	789
08:00 AM	1	201	171	373	116	90	2	208	2	**15**	**72**	**89**	27	**53**	34	114	784
08:15 AM	7	**225**	186	**418**	142	76	1	219	**8**	12	36	56	22	49	**40**	111	**804**
08:30 AM	**13**	189	176	378	117	**100**	**3**	**220**	7	11	38	56	31	46	38	**115**	769
Total Volume	25	818	742	1585	518	334	7	859	24	48	183	255	112	191	144	447	3146
% App. Total	1.6	51.6	46.8		60.3	38.9	0.8		9.4	18.8	71.8		25.1	42.7	32.2		
PHF	.481	.909	.888	.948	.906	.835	.583	.976	.750	.800	.635	.716	.875	.901	.900	.972	.978

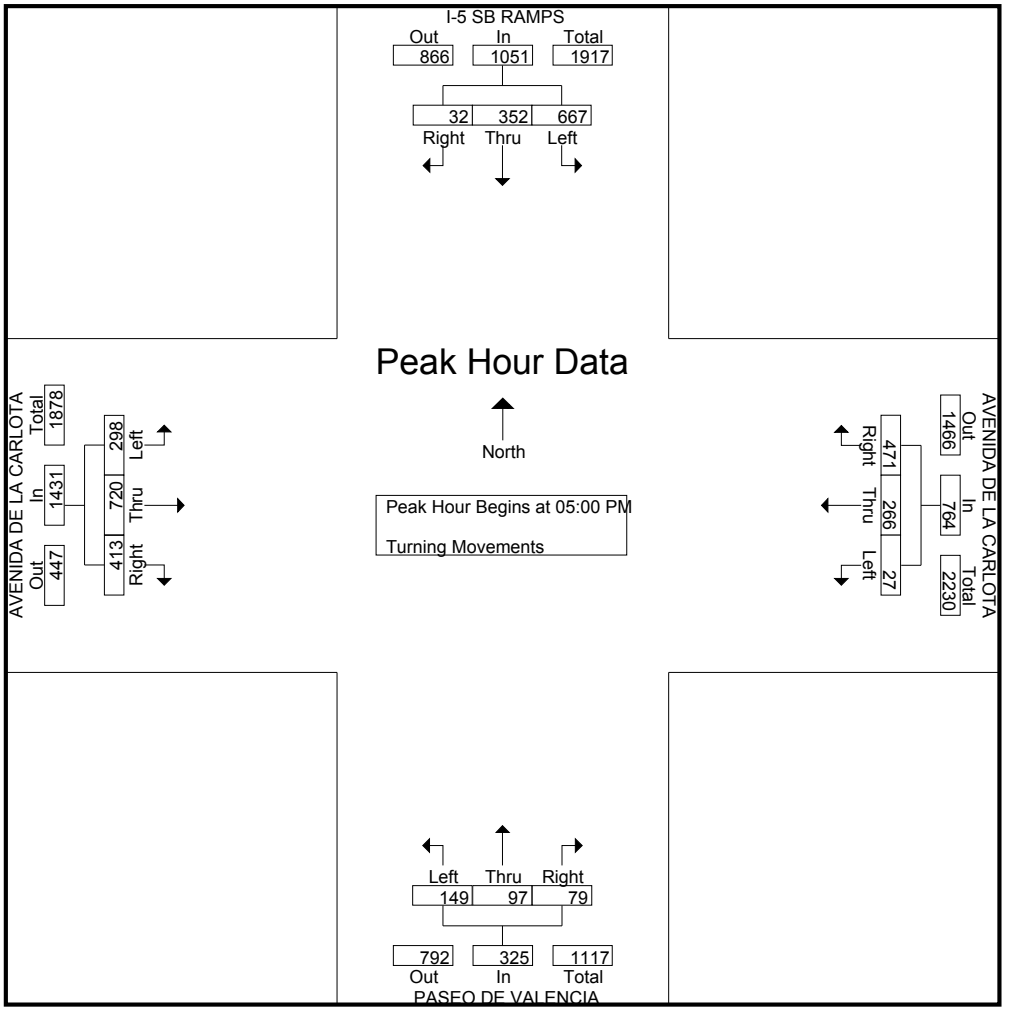


Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: LAGUNA HILLS
N-S Direction: I-5 SB RAMPS
E-W Direction: AVENIDA DE LA CARLOTA

File Name : H1205028
Site Code : 00005053
Start Date : 5/10/2012
Page No : 3

	I-5 SB RAMPS Southbound				AVENIDA DE LA CARLOTA Westbound				PASEO DE VALENCIA Northbound				AVENIDA DE LA CARLOTA Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**10**	78	**192**	**280**	120	**77**	5	**202**	22	**28**	30	80	90	180	57	327	889
05:15 PM	3	**103**	162	268	**125**	65	3	193	**27**	24	**41**	**92**	110	**215**	**94**	**419**	**972**
05:30 PM	9	79	141	229	116	64	**10**	190	16	19	37	72	**114**	156	66	336	827
05:45 PM	10	92	172	274	110	60	9	179	14	26	41	81	99	169	81	349	883
Total Volume	32	352	667	1051	471	266	27	764	79	97	149	325	413	720	298	1431	3571
% App. Total	3	33.5	63.5		61.6	34.8	3.5		24.3	29.8	45.8		28.9	50.3	20.8		
PHF	.800	.854	.868	.938	.942	.864	.675	.946	.731	.866	.909	.883	.906	.837	.793	.854	.918



Appendix B

Intersection Analysis: Existing Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	325	513	103	282	597	157	162	436	172	175	1331	303
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	10.0	10.0	4.0	10.0	4.0	4.0	10.0	10.0	4.0	10.0	4.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	325	513	103	282	754	0	162	436	172	175	1634	0
Lane Utilization Factor	0.97	0.91	1.00	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	0.97	0.85	0.95	1.00	0.85	0.95	0.97	0.85
Saturated Flow (vph)	3136	4631	1445	1615	4486	0	3136	4631	1445	3136	4502	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	10.4	11.1	7.1	17.5	16.8	0.0	5.2	9.4	11.9	5.6	36.3	0.0
Adj Reference Time (s)	15.4	16.1	15.0	22.5	21.8	0.0	10.2	15.0	16.9	10.6	41.3	0.0
Permitted Option												
Adj Saturation A (vph)	125	1544		129	1495		125	1544		125	1501	
Reference Time A (s)	129.5	11.1		218.3	16.8		64.6	9.4		69.7	36.3	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time (s)		129.5			218.3			64.6			69.7	
Adj Reference Time (s)		134.5			223.3			69.6			74.7	
Split Option												
Ref Time Combined (s)	10.4	11.1		17.5	16.8		5.2	9.4		5.6	36.3	
Ref Time Seperate (s)	10.4	11.1		17.5	13.3		5.2	9.4		5.6	29.6	
Reference Time (s)	11.1	11.1		17.5	17.5		9.4	9.4		36.3	36.3	
Adj Reference Time (s)	16.1	16.1		22.5	22.5		15.0	15.0		41.3	41.3	

Summary	EB WB	NW SE	Combined
Protected Option (s)	38.5	51.5	
Permitted Option (s)	223.3	74.7	
Split Option (s)	38.5	56.3	
Minimum (s)	38.5	51.5	90.0

Right Turns	EBR	SER
Adj Reference Time (s)	15.0	16.9
Cross Thru Ref Time (s)	15.0	21.8
Oncoming Left Ref Time (s)	22.5	10.6
Combined (s)	52.5	49.3

Intersection Summary			
Intersection Capacity Utilization	90.0%	ICU Level of Service	E

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	197	727	217	241	555	149	287	1622	237	182	567	291
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	10.0	10.0	4.0	10.0	4.0	4.0	10.0	10.0	4.0	10.0	4.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	197	727	217	241	704	0	287	1622	237	182	858	0
Lane Utilization Factor	0.97	0.91	1.00	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	0.97	0.85	0.95	1.00	0.85	0.95	0.95	0.85
Saturated Flow (vph)	3136	4631	1445	1615	4484	0	3136	4631	1445	3136	4395	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	6.3	15.7	15.0	14.9	15.7	0.0	9.2	35.0	16.4	5.8	19.5	0.0
Adj Reference Time (s)	11.3	20.7	20.0	19.9	20.7	0.0	14.2	40.0	21.4	10.8	24.5	0.0
Permitted Option												
Adj Saturation A (vph)	125	1544		129	1495		125	1544		125	1465	
Reference Time A (s)	78.5	15.7		186.5	15.7		114.4	35.0		72.5	19.5	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time (s)		78.5			186.5			114.4			72.5	
Adj Reference Time (s)		83.5			191.5			119.4			77.5	
Split Option												
Ref Time Combined (s)	6.3	15.7		14.9	15.7		9.2	35.0		5.8	19.5	
Ref Time Seperate (s)	6.3	15.7		14.9	12.4		9.2	35.0		5.8	12.9	
Reference Time (s)	15.7	15.7		15.7	15.7		35.0	35.0		19.5	19.5	
Adj Reference Time (s)	20.7	20.7		20.7	20.7		40.0	40.0		24.5	24.5	

Summary	EB WB	NW SE	Combined
Protected Option (s)	40.6	50.8	
Permitted Option (s)	191.5	119.4	
Split Option (s)	41.4	64.5	
Minimum (s)	40.6	50.8	91.5

Right Turns	EBR	SER
Adj Reference Time (s)	20.0	21.4
Cross Thru Ref Time (s)	40.0	20.7
Oncoming Left Ref Time (s)	19.9	10.8
Combined (s)	80.0	52.9

Intersection Summary			
Intersection Capacity Utilization	91.5%	ICU Level of Service	F

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	56	803	102	95	836	44	121	77	83	78	45	115
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	10.0	4.0	4.0	10.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	56	905	0	95	880	0	0	281	0	0	238	0
Lane Utilization Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Turning Factor (vph)	0.95	0.98	0.85	0.95	0.99	0.85	0.95	0.94	0.85	0.95	0.91	0.85
Saturated Flow (vph)	1615	4553	0	1615	4596	0	0	4540	0	0	4430	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	3.5	19.9	0.0	5.9	19.1	0.0			0.0			0.0
Adj Reference Time (s)	9.0	24.9	0.0	10.9	24.1	0.0			0.0			0.0
Permitted Option												
Adj Saturation A (vph)	129	1518		129	1532		0	182		0	177	
Reference Time A (s)	43.3	19.9		73.5	19.1		0.0	66.6		0.0	44.0	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time (s)		43.3			73.5			66.6			44.0	
Adj Reference Time (s)		48.3			78.5			71.6			49.0	
Split Option												
Ref Time Combined (s)	3.5	19.9		5.9	19.1		0.0	6.2		0.0	5.4	
Ref Time Seperate (s)	3.5	17.6		5.9	18.2		3.7	2.6		2.4	1.6	
Reference Time (s)	19.9	19.9		19.1	19.1		6.2	6.2		5.4	5.4	
Adj Reference Time (s)	24.9	24.9		24.1	24.1		11.2	11.2		10.4	10.4	

Summary	EB WB	NB SB	Combined
Protected Option (s)	35.8	NA	
Permitted Option (s)	78.5	71.6	
Split Option (s)	49.0	21.6	
Minimum (s)	35.8	21.6	57.3

Right Turns
Adj Reference Time (s)
Cross Thru Ref Time (s)
Oncoming Left Ref Time (s)
Combined (s)

Intersection Summary			
Intersection Capacity Utilization	57.3%	ICU Level of Service	B

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	259	940	158	151	821	144	108	71	96	71	52	97
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	10.0	4.0	4.0	10.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	259	1098	0	151	965	0	0	275	0	0	220	0
Lane Utilization Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Turning Factor (vph)	0.95	0.98	0.85	0.95	0.98	0.85	0.95	0.93	0.85	0.95	0.92	0.85
Saturated Flow (vph)	1615	4531	0	1615	4527	0	0	4511	0	0	4461	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	16.0	24.2	0.0	9.3	21.3	0.0			0.0			0.0
Adj Reference Time (s)	21.0	29.2	0.0	14.3	26.3	0.0			0.0			0.0
Permitted Option												
Adj Saturation A (vph)	129	1510		129	1509		0	180		0	178	
Reference Time A (s)	200.5	24.2		116.9	21.3		0.0	59.9		0.0	39.8	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time (s)		200.5			116.9			59.9			39.8	
Adj Reference Time (s)		205.5			121.9			64.9			44.8	
Split Option												
Ref Time Combined (s)	16.0	24.2		9.3	21.3		0.0	6.1		0.0	4.9	
Ref Time Seperate (s)	16.0	20.7		9.3	18.1		3.3	2.4		2.2	1.8	
Reference Time (s)	24.2	24.2		21.3	21.3		6.1	6.1		4.9	4.9	
Adj Reference Time (s)	29.2	29.2		26.3	26.3		11.1	11.1		9.9	9.9	

Summary	EB WB	NB SB	Combined
Protected Option (s)	47.4	NA	
Permitted Option (s)	205.5	64.9	
Split Option (s)	55.5	21.0	
Minimum (s)	47.4	21.0	68.4

Right Turns
Adj Reference Time (s)
Cross Thru Ref Time (s)
Oncoming Left Ref Time (s)
Combined (s)

Intersection Summary			
Intersection Capacity Utilization	68.4%	ICU Level of Service	C

Reference Times and Phasing Options do not represent an optimized timing plan.

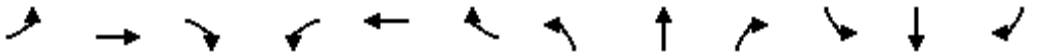
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	82	674	192	275	499	7	215	163	234	35	597	236
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	8.0	8.0	4.0	8.0	4.0	4.0	8.0	8.0	4.0	8.0	8.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	82	674	192	275	506	0	215	163	234	35	597	236
Lane Utilization Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85
Saturated Flow (vph)	3136	4631	1445	3136	4621	0	3136	3237	1445	1615	3237	1445
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	2.6	14.6	13.3	8.8	10.9	0.0	6.9	5.0	16.2	2.2	18.4	16.3
Adj Reference Time (s)	9.0	19.6	18.3	13.8	15.9	0.0	11.9	13.0	21.2	9.0	23.4	21.3
Permitted Option												
Adj Saturation A (vph)	125	1544		125	1540		125	1618		129	1618	
Reference Time A (s)	32.7	14.6		109.6	10.9		85.7	5.0		27.1	18.4	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time (s)		32.7			109.6			85.7			27.1	
Adj Reference Time (s)		37.7			114.6			90.7			32.1	
Split Option												
Ref Time Combined (s)	2.6	14.6		8.8	10.9		6.9	5.0		2.2	18.4	
Ref Time Seperate (s)	2.6	14.6		8.8	10.8		6.9	5.0		2.2	18.4	
Reference Time (s)	14.6	14.6		10.9	10.9		6.9	6.9		18.4	18.4	
Adj Reference Time (s)	19.6	19.6		15.9	15.9		13.0	13.0		23.4	23.4	

Summary	EB WB	NB SB	Combined
Protected Option (s)	33.3	35.3	
Permitted Option (s)	114.6	90.7	
Split Option (s)	35.5	36.4	
Minimum (s)	33.3	35.3	68.6

Right Turns	EBR	NBR	SBR
Adj Reference Time (s)	18.3	21.2	21.3
Cross Thru Ref Time (s)	23.4	19.6	15.9
Oncoming Left Ref Time (s)	13.8	9.0	11.9
Combined (s)	55.5	49.7	49.1

Intersection Summary			
Intersection Capacity Utilization	68.6%	ICU Level of Service	C

Reference Times and Phasing Options do not represent an optimized timing plan.



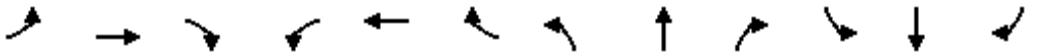
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	99	967	186	224	571	17	351	204	302	48	623	102
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	8.0	8.0	4.0	8.0	4.0	4.0	8.0	8.0	4.0	8.0	8.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	99	967	186	224	588	0	351	204	302	48	623	102
Lane Utilization Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85
Saturated Flow (vph)	3136	4631	1445	3136	4611	0	3136	3237	1445	1615	3237	1445
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	3.2	20.9	12.9	7.1	12.8	0.0	11.2	6.3	20.9	3.0	19.2	7.1
Adj Reference Time (s)	9.0	25.9	17.9	12.1	17.8	0.0	16.2	13.0	25.9	9.0	24.2	13.0
Permitted Option												
Adj Saturation A (vph)	125	1544		125	1537		125	1618		129	1618	
Reference Time A (s)	39.5	20.9		89.3	12.8		139.9	6.3		37.2	19.2	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time (s)		39.5			89.3			139.9			37.2	
Adj Reference Time (s)		44.5			94.3			144.9			42.2	
Split Option												
Ref Time Combined (s)	3.2	20.9		7.1	12.8		11.2	6.3		3.0	19.2	
Ref Time Seperate (s)	3.2	20.9		7.1	12.4		11.2	6.3		3.0	19.2	
Reference Time (s)	20.9	20.9		12.8	12.8		11.2	11.2		19.2	19.2	
Adj Reference Time (s)	25.9	25.9		17.8	17.8		16.2	16.2		24.2	24.2	

Summary	EB WB	NB SB	Combined
Protected Option (s)	38.0	40.4	
Permitted Option (s)	94.3	144.9	
Split Option (s)	43.6	40.4	
Minimum (s)	38.0	40.4	78.5

Right Turns	EBR	NBR	SBR
Adj Reference Time (s)	17.9	25.9	13.0
Cross Thru Ref Time (s)	24.2	25.9	17.8
Oncoming Left Ref Time (s)	12.1	9.0	16.2
Combined (s)	54.3	60.8	46.9

Intersection Summary			
Intersection Capacity Utilization	78.5%	ICU Level of Service	D

Reference Times and Phasing Options do not represent an optimized timing plan.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	876	43	225	707	17	10	3	90	8	5	7
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	10.0	10.0	4.0	10.0	10.0	8.0	8.0	8.0	8.0	8.0	8.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	8	876	43	225	707	17	10	3	90	0	13	7
Lane Utilization Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85	0.95	0.97	0.85
Saturated Flow (vph)	3136	6174	1445	3136	4631	1445	1615	1700	1445	0	1648	1445
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	0.3	14.2	3.0	7.2	15.3	1.2			6.2			0.5
Adj Reference Time (s)	9.0	19.2	15.0	12.2	20.3	15.0			13.0			13.0
Permitted Option												
Adj Saturation A (vph)	125	1544		125	1544		129	1700		0	188	
Reference Time A (s)	3.2	14.2		89.7	15.3		7.7	0.2		0.0	6.9	
Adj Saturation B (vph	NA	NA		NA	NA		0	1700		0	0	
Reference Time B (s)	NA	NA		NA	NA		8.6	0.2		8.5	8.8	
Reference Time (s)		14.2			89.7			7.7			6.9	
Adj Reference Time (s)		19.2			94.7			13.0			13.0	
Split Option												
Ref Time Combined (s)	0.3	14.2		7.2	15.3		0.6	0.2		0.0	0.8	
Ref Time Seperate (s)	0.3	14.2		7.2	15.3		0.6	0.2		0.5	0.3	
Reference Time (s)	14.2	14.2		15.3	15.3		0.6	0.6		0.8	0.8	
Adj Reference Time (s)	19.2	19.2		20.3	20.3		13.0	13.0		13.0	13.0	

Summary	EB WB	NB SB	Combined
Protected Option (s)	31.4	NA	
Permitted Option (s)	94.7	13.0	
Split Option (s)	39.5	26.0	
Minimum (s)	31.4	13.0	44.4

Right Turns	EBR	WBR	NBR	SBR
Adj Reference Time (s)	15.0	15.0	13.0	13.0
Cross Thru Ref Time (s)	13.0	13.0	19.2	20.3
Oncoming Left Ref Time (s)	12.2	9.0	13.0	13.0
Combined (s)	40.2	37.0	45.2	46.3

Intersection Summary			
Intersection Capacity Utilization	46.3%	ICU Level of Service	A

Reference Times and Phasing Options do not represent an optimized timing plan.

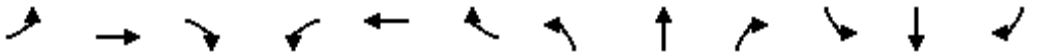
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	1280	209	261	708	6	73	14	427	14	7	11
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	10.0	10.0	4.0	10.0	10.0	8.0	8.0	8.0	8.0	8.0	8.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	8	1280	209	261	708	6	73	14	427	0	21	11
Lane Utilization Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85	0.95	0.97	0.85
Saturated Flow (vph)	3136	6174	1445	3136	4631	1445	1615	1700	1445	0	1643	1445
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	0.3	20.7	14.5	8.3	15.3	0.4			29.6			0.8
Adj Reference Time (s)	9.0	25.7	19.5	13.3	20.3	15.0			34.6			13.0
Permitted Option												
Adj Saturation A (vph)	125	1544		125	1544		129	1700		0	176	
Reference Time A (s)	3.2	20.7		104.0	15.3		56.5	0.8		0.0	11.9	
Adj Saturation B (vph	NA	NA		NA	NA		0	1700		0	0	
Reference Time B (s)	NA	NA		NA	NA		12.5	0.8		8.9	9.3	
Reference Time (s)		20.7			104.0			12.5			9.3	
Adj Reference Time (s)		25.7			109.0			17.5			14.3	
Split Option												
Ref Time Combined (s)	0.3	20.7		8.3	15.3		4.5	0.8		0.0	1.3	
Ref Time Seperate (s)	0.3	20.7		8.3	15.3		4.5	0.8		0.9	0.4	
Reference Time (s)	20.7	20.7		15.3	15.3		4.5	4.5		1.3	1.3	
Adj Reference Time (s)	25.7	25.7		20.3	20.3		13.0	13.0		13.0	13.0	

Summary	EB WB	NB SB	Combined
Protected Option (s)	39.1	NA	
Permitted Option (s)	109.0	17.5	
Split Option (s)	46.0	26.0	
Minimum (s)	39.1	17.5	56.6

Right Turns	EBR	WBR	NBR	SBR
Adj Reference Time (s)	19.5	15.0	34.6	13.0
Cross Thru Ref Time (s)	13.0	13.0	25.7	20.3
Oncoming Left Ref Time (s)	13.3	9.0	13.0	13.0
Combined (s)	45.8	37.0	73.3	46.3

Intersection Summary			
Intersection Capacity Utilization	73.3%	ICU Level of Service	D

Reference Times and Phasing Options do not represent an optimized timing plan.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1536	44	331	870	678	45	89	507	773	566	142
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lost Time (s)	5.0	3.0	3.0	3.0	3.0	3.0	3.5	3.0	3.0	3.0	3.0	3.0
Minimum Green (s)	4.0	8.0	8.0	4.0	6.0	8.0	8.0	8.0	4.0	8.0	8.0	8.0
Refr Cycle Length (s)	100	100	100	100	100	100	100	100	100	100	100	100
Volume Combined (vph)	0	1536	44	331	870	678	0	134	507	0	1339	142
Lane Utilization Factor	1.00	0.91	1.00	0.97	0.91	1.00	1.00	1.00	0.89	1.00	0.95	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	0.98	0.85	0.95	0.97	0.85
Saturated Flow (vph)	0	6901	1615	3505	5176	1615	0	1868	2859	0	5270	1615
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	0.0	22.3	2.7	9.4	16.8	42.0			17.7			8.8
Adj Reference Time (s)	0.0	26.3	12.0	13.4	20.8	46.0			21.7			12.8
Permitted Option												
Adj Saturation A (vph)	0	1725		140	1725		0	354		0	211	
Reference Time A (s)	0.0	22.3		118.0	16.8		0.0	37.9		0.0	366.7	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		0	1809	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		29.4	30.7	
Reference Time (s)		22.3			118.0			37.9			30.7	
Adj Reference Time (s)		26.3			122.0			41.9			34.7	
Split Option												
Ref Time Combined (s)	0.0	22.3		9.4	16.8		0.0	7.2		0.0	25.4	
Ref Time Seperate (s)	0.0	22.3		9.4	16.8		2.5	4.7		21.4	15.6	
Reference Time (s)	22.3	22.3		16.8	16.8		7.2	7.2		25.4	25.4	
Adj Reference Time (s)	26.3	26.3		20.8	20.8		12.0	12.0		29.4	29.4	

Summary	EB WB	NB SB	Combined
Protected Option (s)	39.7	NA	
Permitted Option (s)	122.0	41.9	
Split Option (s)	47.1	41.4	
Minimum (s)	39.7	41.4	81.1

Right Turns	EBR	WBR	NBR	SBR
Adj Reference Time (s)	12.0	46.0	21.7	12.8
Cross Thru Ref Time (s)	29.4	12.0	26.3	20.8
Oncoming Left Ref Time (s)	13.4	0.0	29.4	12.0
Combined (s)	54.9	58.0	77.4	45.6

Intersection Summary			
Intersection Capacity Utilization	81.1%	ICU Level of Service	D

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	773	566	142	45	89	507	0	1536	44	331	870	678
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	6.0	6.0	6.0	8.0	8.0	8.0	4.0	8.0	4.0	4.0	8.0	8.0
Refr Cycle Length (s)	100	100	100	100	100	100	100	100	100	100	100	100
Volume Combined (vph)	0	1339	142	0	134	507	0	1580	0	331	870	678
Lane Utilization Factor	1.00	0.95	1.00	1.00	1.00	0.89	1.00	0.91	1.00	1.00	0.91	0.89
Turning Factor (vph)	0.95	0.97	0.85	0.95	0.98	0.85	0.95	1.00	0.85	0.95	1.00	0.85
Saturated Flow (vph)	0	4715	1445	0	1671	2558	0	6149	0	1615	4631	2558
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		No			No			Yes			Yes	
Reference Time (s)			9.8			19.8	0.0	25.7	0.0	20.5	18.8	26.5
Adj Reference Time (s)			14.8			24.8	0.0	30.7	0.0	25.5	23.8	31.5
Permitted Option												
Adj Saturation A (vph)	0	189		0	316		0	1537		129	1544	
Reference Time A (s)	0.0	409.9		0.0	42.3		0.0	25.7		256.2	18.8	
Adj Saturation B (vph	0	1618		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	31.9	33.7		NA	NA		NA	NA		NA	NA	
Reference Time (s)		33.7			42.3			25.7			256.2	
Adj Reference Time (s)		38.7			47.3			30.7			261.2	
Split Option												
Ref Time Combined (s)	0.0	28.4		0.0	8.0		0.0	25.7		20.5	18.8	
Ref Time Seperate (s)	23.9	17.5		2.8	5.2		0.0	25.0		20.5	18.8	
Reference Time (s)	28.4	28.4		8.0	8.0		25.7	25.7		20.5	20.5	
Adj Reference Time (s)	33.4	33.4		13.0	13.0		30.7	30.7		25.5	25.5	

Summary	NW SE	NE SW	Combined
Protected Option (s)	NA	56.2	
Permitted Option (s)	47.3	261.2	
Split Option (s)	46.4	56.2	
Minimum (s)	46.4	56.2	102.6

Right Turns	SER	NWR	SWR
Adj Reference Time (s)	14.8	24.8	31.5
Cross Thru Ref Time (s)	23.8	30.7	13.0
Oncoming Left Ref Time (s)	13.0	33.4	0.0
Combined (s)	51.6	88.9	44.5

Intersection Summary			
Intersection Capacity Utilization	102.6%	ICU Level of Service	G

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	294	44	14	394	2	12	1	8	2	0	2
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	6.0	4.0	4.0	6.0	4.0	4.0	4.0	4.0	7.0	7.0	4.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	8	338	0	14	396	0	0	21	0	0	4	0
Lane Utilization Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.98	0.85	0.95	1.00	0.85	0.95	0.92	0.85	0.95	0.90	0.85
Saturated Flow (vph)	1615	3174	0	1615	3234	0	0	1557	0	0	1533	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	0.5	10.7	0.0	0.9	12.2	0.0			0.0			0.0
Adj Reference Time (s)	9.0	15.7	0.0	9.0	17.2	0.0			0.0			0.0
Permitted Option												
Adj Saturation A (vph)	129	1587		129	1617		0	1197		0	1329	
Reference Time A (s)	6.2	10.7		10.8	12.2		0.0	1.8		0.0	0.3	
Adj Saturation B (vph	NA	NA		NA	NA		0	0		0	0	
Reference Time B (s)	NA	NA		NA	NA		8.7	9.3		8.1	8.3	
Reference Time (s)		10.7			12.2			1.8			0.3	
Adj Reference Time (s)		15.7			17.2			9.0			12.0	
Split Option												
Ref Time Combined (s)	0.5	10.7		0.9	12.2		0.0	1.3		0.0	0.3	
Ref Time Seperate (s)	0.5	9.3		0.9	12.2		0.7	0.1		0.1	0.0	
Reference Time (s)	10.7	10.7		12.2	12.2		1.3	1.3		0.3	0.3	
Adj Reference Time (s)	15.7	15.7		17.2	17.2		9.0	9.0		12.0	12.0	

Summary	EB WB	NB SB	Combined
Protected Option (s)	26.2	NA	
Permitted Option (s)	17.2	12.0	
Split Option (s)	32.9	21.0	
Minimum (s)	17.2	12.0	29.2

Right Turns
Adj Reference Time (s)
Cross Thru Ref Time (s)
Oncoming Left Ref Time (s)
Combined (s)

Intersection Summary			
Intersection Capacity Utilization	29.2%	ICU Level of Service	A

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	630	208	29	406	2	192	1	58	7	3	4
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	6.0	4.0	4.0	6.0	4.0	4.0	4.0	4.0	7.0	7.0	4.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	25	838	0	29	408	0	0	251	0	0	14	0
Lane Utilization Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.96	0.85	0.95	1.00	0.85	0.95	0.93	0.85	0.95	0.93	0.85
Saturated Flow (vph)	1615	3116	0	1615	3234	0	0	1578	0	0	1586	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	1.5	26.9	0.0	1.8	12.6	0.0			0.0			0.0
Adj Reference Time (s)	9.0	31.9	0.0	9.0	17.6	0.0			0.0			0.0
Permitted Option												
Adj Saturation A (vph)	129	1558		129	1617		0	1059		0	1586	
Reference Time A (s)	19.3	26.9		22.4	12.6		0.0	23.7		0.0	0.9	
Adj Saturation B (vph	NA	NA		NA	NA		0	0		0	0	
Reference Time B (s)	NA	NA		NA	NA		19.9	23.9		8.4	8.9	
Reference Time (s)		26.9			22.4			23.7			0.9	
Adj Reference Time (s)		31.9			27.4			28.7			12.0	
Split Option												
Ref Time Combined (s)	1.5	26.9		1.8	12.6		0.0	15.9		0.0	0.9	
Ref Time Seperate (s)	1.5	20.2		1.8	12.6		11.9	0.1		0.4	0.2	
Reference Time (s)	26.9	26.9		12.6	12.6		15.9	15.9		0.9	0.9	
Adj Reference Time (s)	31.9	31.9		17.6	17.6		20.9	20.9		12.0	12.0	

Summary	EB WB	NB SB	Combined
Protected Option (s)	40.9	NA	
Permitted Option (s)	31.9	28.7	
Split Option (s)	49.5	32.9	
Minimum (s)	31.9	28.7	60.6

Right Turns
Adj Reference Time (s)
Cross Thru Ref Time (s)
Oncoming Left Ref Time (s)
Combined (s)

Intersection Summary			
Intersection Capacity Utilization	60.6%	ICU Level of Service	B

Reference Times and Phasing Options do not represent an optimized timing plan.

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*West Mall Connector*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2011*

Project ID *Oakbrook Village Traffic Impact Studies*

East/West Street: *Oakbrook Village Internal Circ* North/South Street: *Call De Los Caballeros*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*0*	*6*	*2*	*3*	*3*	*1*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*6*	*8*	*16*	*0*	*9*	*3*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.95*		*0.95*		*0.95*		*0.95*	
Flow Rate (veh/h)	*8*		*7*		*30*		*12*	
% Heavy Vehicles	*2*		*2*		*2*		*2*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.0*		*0.4*		*0.2*		*0.0*	
Prop. Right-Turns	*0.3*		*0.1*		*0.5*		*0.3*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.1*		*0.0*		*-0.2*		*-0.1*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.01*		*0.01*		*0.03*		*0.01*	
hd, final value (s)	*3.87*		*4.03*		*3.70*		*3.84*	
x, final value	*0.01*		*0.01*		*0.03*		*0.01*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*1.9*		*2.0*		*1.7*		*1.8*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*258*		*257*		*280*		*262*	
Delay (s/veh)	*6.91*		*7.06*		*6.81*		*6.89*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*6.91*		*7.06*		*6.81*		*6.89*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*6.87*							
Intersection LOS	*A*							

 HCS+™ Version 5.5 Generated: 11/21/2011 5:12 PM

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*West Mall Connector*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2011*

Project ID *Oakbrook Village Traffic Impact Studies*

East/West Street: *Oakbrook Village Internal Circ* North/South Street: *Call De Los Caballeros*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*1*	*18*	*3*	*26*	*23*	*0*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*16*	*42*	*102*	*1*	*31*	*1*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.95*		*0.95*		*0.95*		*0.95*	
Flow Rate (veh/h)	*22*		*51*		*167*		*34*	
% Heavy Vehicles	*2*		*2*		*2*		*2*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.0*		*0.5*		*0.1*		*0.0*	
Prop. Right-Turns	*0.1*		*0.0*		*0.6*		*0.0*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.0*		*0.1*		*-0.3*		*0.0*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.02*		*0.05*		*0.15*		*0.03*	
hd, final value (s)	*4.33*		*4.48*		*3.78*		*4.25*	
x, final value	*0.03*		*0.06*		*0.18*		*0.04*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*2.3*		*2.5*		*1.8*		*2.2*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*272*		*301*		*417*		*284*	
Delay (s/veh)	*7.45*		*7.78*		*7.58*		*7.42*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*7.45*		*7.78*		*7.58*		*7.42*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*7.59*							
Intersection LOS	*A*							

 HCS+™ Version 5.5 Generated: 11/21/2011 5:15 PM

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*East Mall Connector*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2011*

Project ID *Oakbrook Village Traffic Impact Studies*

East/West Street: *Oakbrook Vill Internal Circ* North/South Street: *Call De Los Caballeros*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*0*	*1*	*5*	*1*	*3*	*0*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*10*	*2*	*0*	*0*	*0*	*1*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.95*		*0.95*		*0.95*		*0.95*	
Flow Rate (veh/h)	*6*		*4*		*12*		*1*	
% Heavy Vehicles	*2*		*2*		*2*		*2*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.0*		*0.3*		*0.8*		*0.0*	
Prop. Right-Turns	*0.8*		*0.0*		*0.0*		*1.0*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.5*		*0.1*		*0.2*		*-0.6*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.01*		*0.00*		*0.01*		*0.00*	
hd, final value (s)	*3.47*		*4.02*		*4.12*		*3.37*	
x, final value	*0.01*		*0.00*		*0.01*		*0.00*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*1.5*		*2.0*		*2.1*		*1.4*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*256*		*254*		*262*		*251*	
Delay (s/veh)	*6.49*		*7.04*		*7.18*		*6.37*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*6.49*		*7.04*		*7.18*		*6.37*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*6.94*							
Intersection LOS	*A*							

 HCS+™ Version 5.5 Generated: 11/21/2011 5:10 PM

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*East Mall Connector*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2011*

Project ID *Oakbrook Village Traffic Impact Studies*

East/West Street: *Oakbrook Village Internal Circ* | North/South Street: *Call De Los Caballeros*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*5*	*36*	*8*	*25*	*18*	*0*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*18*	*3*	*27*	*15*	*7*	*4*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.95*		*0.95*		*0.95*		*0.95*	
Flow Rate (veh/h)	*50*		*44*		*49*		*26*	
% Heavy Vehicles	*2*		*2*		*2*		*2*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.1*		*0.6*		*0.4*		*0.6*	
Prop. Right-Turns	*0.2*		*0.0*		*0.6*		*0.2*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.0*		*0.2*		*-0.2*		*0.1*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.04*		*0.04*		*0.04*		*0.02*	
hd, final value (s)	*4.06*		*4.26*		*3.90*		*4.21*	
x, final value	*0.06*		*0.05*		*0.05*		*0.03*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*2.1*		*2.3*		*1.9*		*2.2*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*300*		*294*		*299*		*276*	
Delay (s/veh)	*7.31*		*7.50*		*7.12*		*7.34*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*7.31*		*7.50*		*7.12*		*7.34*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*7.31*							
Intersection LOS	*A*							

 HCS+™ Version 5.5 Generated: 11/21/2011 5:10 PM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Lonestar Ent & Ave De La Carlo*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2011*

Project Description *Oakbrook Village Traffic Impact Study*

East/West Street: *Avenida De La Carlotta* | North/South Street: *Lonestar Entrance*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*274*	*26*	*6*	*514*	
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*288*	*27*	*6*	*541*	*0*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*9*		*5*			
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*9*	*0*	*5*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*6*	*9*		*5*			
C (m) (veh/h)		*1242*	*441*		*886*			
v/c		*0.00*	*0.02*		*0.01*			
95% queue length		*0.01*	*0.06*		*0.02*			
Control Delay (s/veh)		*7.9*	*13.3*		*9.1*			
LOS		*A*	*B*		*A*			
Approach Delay (s/veh)	--	--	*11.8*					
Approach LOS	--	--	*B*					

HCS+™ Version 5.5 Generated: 12/15/2011 4:46 PM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Lonestar Ent & Ave De La Carlo*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2011*

Project Description *Oakbrook Village Traffic Impact Study*

East/West Street: *Avenida De La Carlotta* | North/South Street: *Lonestar Entrance*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*731*	*178*	*29*	*397*	
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*769*	*187*	*30*	*417*	*0*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*64*		*73*			
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*67*	*0*	*76*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*30*	*67*		*76*			
C (m) (veh/h)		*715*	*189*		*586*			
v/c		*0.04*	*0.35*		*0.13*			
95% queue length		*0.13*	*1.61*		*0.45*			
Control Delay (s/veh)		*10.3*	*34.4*		*12.1*			
LOS		*B*	*D*		*B*			
Approach Delay (s/veh)	--	--	*22.5*					
Approach LOS	--	--	*C*					

HCS+™ Version 5.5 Generated: 11/21/2011 5:28 PM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Trad Joe Ent & Ave De La Carlo*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2011*

Project Description *Oakbrook Village Traffic Impact Study*

East/West Street: *Avenida De La Carlotta* | North/South Street: *Trader Joe's Entrance*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*274*	*9*	*6*	*516*	
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*288*	*9*	*6*	*543*	*0*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*2*		*9*			
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*2*	*0*	*9*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*6*	*2*		*9*			
C (m) (veh/h)		*1261*	*446*		*898*			
v/c		*0.00*	*0.00*		*0.01*			
95% queue length		*0.01*	*0.01*		*0.03*			
Control Delay (s/veh)		*7.9*	*13.1*		*9.0*			
LOS		*A*	*B*		*A*			
Approach Delay (s/veh)	--	--	*9.8*					
Approach LOS	--	--	*A*					

HCS+™ Version 5.5

Generated: 11/21/2011 5:31 PM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Trad Joe Ent & Ave De La Carlo*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2011*

Project Description *Oakbrook Village Traffic Impact Study*

East/West Street: *Avenida De La Carlotta* | North/South Street: *Trader Joe's Entrance*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*801*	*20*	*90*	*372*	
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*843*	*21*	*94*	*391*	*0*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*21*		*158*			
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*22*	*0*	*166*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*94*	*22*		*166*			
C (m) (veh/h)		*774*	*148*		*622*			
v/c		*0.12*	*0.15*		*0.27*			
95% queue length		*0.41*	*0.52*		*1.09*			
Control Delay (s/veh)		*10.3*	*33.6*		*12.9*			
LOS		*B*	*D*		*B*			
Approach Delay (s/veh)	--	--	*15.3*					
Approach LOS	--	--	*C*					

HCS+™ Version 5.5 Generated: 11/21/2011 5:35 PM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*1st Fed Ent & Ave De La Carlo*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2011*

Project Description *Oakbrook Village Traffic Impact Study*

East/West Street: *Avenida De La Carlotta* | North/South Street: *1st Federal Bank Entrance*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*6*	*985*	*18*	*7*	*469*	*2*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*6*	*1036*	*18*	*7*	*493*	*2*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*1*	*2*	*0*
Configuration	*L*	*T*	*TR*	*L*	*T*	*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*6*		*15*	*1*		*7*
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*0.95*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*6*	*0*	*15*	*1*	*0*	*7*
Percent Heavy Vehicles	*2*	*0*	*2*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*			*LR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*	*L*		*LR*			*LR*	
v (veh/h)	*6*	*7*		*21*			*8*	
C (m) (veh/h)	*1065*	*656*		*261*			*552*	
v/c	*0.01*	*0.01*		*0.08*			*0.01*	
95% queue length	*0.02*	*0.03*		*0.26*			*0.04*	
Control Delay (s/veh)	*8.4*	*10.5*		*20.0*			*11.6*	
LOS	*A*	*B*		*C*			*B*	
Approach Delay (s/veh)	--	--	*20.0*			*11.6*		
Approach LOS	--	--	*C*			*B*		

HCS+™ Version 5.5 Generated: 11/21/2011 5:44 PM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	AM *Peak*

Site Information

Intersection	*1st Fed Ent & Ave De La Carlo*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2011*

Project Description *Oakbrook Village Traffic Impact Study*

East/West Street: *Avenida De La Carlotta* | North/South Street: *1st Federal Bank Entrance*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*19*	*227*	*3*	*5*	*495*	*1*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*20*	*238*	*3*	*5*	*521*	*1*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*1*	*2*	*0*
Configuration	*L*	*T*	*TR*	*L*	*T*	*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*4*		*2*	*0*		*0*
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*0.95*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*4*	*0*	*2*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*			*LR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*	*L*		*LR*			*LR*	
v (veh/h)	*20*	*5*		*6*			*0*	
C (m) (veh/h)	*1041*	*1323*		*505*				
v/c	*0.02*	*0.00*		*0.01*				
95% queue length	*0.06*	*0.01*		*0.04*				
Control Delay (s/veh)	*8.5*	*7.7*		*12.2*				
LOS	*A*	*A*		*B*				
Approach Delay (s/veh)	--	--	*12.2*					
Approach LOS	--	--	*B*					

HCS+™ Version 5.5

Generated: 11/21/2011 5:43 PM

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (vph)	96	370	717	1023	691	301
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right				No		No
Ideal Flow	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	8.0	6.0	6.0	4.0	4.0
Refr Cycle Length (s)	100					
Volume Combined (vph)	96	370	717	1023	691	301
Lane Utilization Factor	0.97	0.95	0.95	0.89	0.97	1.00
Turning Factor (vph)	0.95	1.00	1.00	0.85	0.95	0.85
Saturated Flow (vph)	3136	3237	3237	2558	4704	1445
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00	0.00		0.00	
Protected Option Allowed		Yes	Yes		No	
Reference Time (s)	3.1	11.4	22.2	40.0		20.8
Adj Reference Time (s)	9.0	16.4	27.2	45.0		25.8
Permitted Option						
Adj Saturation A (vph)	125	1618	1618		125	
Reference Time A (s)	38.3	11.4	22.2		183.6	
Adj Saturation B (vph	NA	NA	NA		NA	
Reference Time B (s)	NA	NA	NA		NA	
Reference Time (s)		38.3	22.2			
Adj Reference Time (s)		43.3	27.2			
Split Option						
Ref Time Combined (s)	3.1	11.4	22.2		14.7	
Ref Time Seperate (s)	3.1	11.4	22.2		14.7	
Reference Time (s)	11.4	11.4	22.2		14.7	
Adj Reference Time (s)	16.4	16.4	27.2		19.7	

Summary	NW SE	SW	Combined
Protected Option (s)	36.2	NA	
Permitted Option (s)	43.3	Err	
Split Option (s)	43.6	19.7	
Minimum (s)	36.2	19.7	55.8

Right Turns	NWR	SWR
Adj Reference Time (s)	45.0	25.8
Cross Thru Ref Time (s)	0.0	27.2
Oncoming Left Ref Time (s)	9.0	0.0
Combined (s)	54.0	53.0

Intersection Summary			
Intersection Capacity Utilization	55.8%	ICU Level of Service	B

Reference Times and Phasing Options do not represent an optimized timing plan.

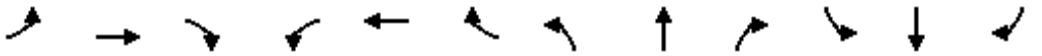
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (vph)	258	1006	516	983	944	152
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right				No		No
Ideal Flow	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	8.0	6.0	6.0	4.0	4.0
Refr Cycle Length (s)	100					
Volume Combined (vph)	258	1006	516	983	944	152
Lane Utilization Factor	0.97	0.95	0.95	0.89	0.97	1.00
Turning Factor (vph)	0.95	1.00	1.00	0.85	0.95	0.85
Saturated Flow (vph)	3136	3237	3237	2558	4704	1445
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00	0.00		0.00	
Protected Option Allowed		Yes	Yes		No	
Reference Time (s)	8.2	31.1	15.9	38.4		10.5
Adj Reference Time (s)	13.2	36.1	20.9	43.4		15.5
Permitted Option						
Adj Saturation A (vph)	125	1618	1618		125	
Reference Time A (s)	102.8	31.1	15.9		250.8	
Adj Saturation B (vph	NA	NA	NA		NA	
Reference Time B (s)	NA	NA	NA		NA	
Reference Time (s)		102.8	15.9			
Adj Reference Time (s)		107.8	20.9			
Split Option						
Ref Time Combined (s)	8.2	31.1	15.9		20.1	
Ref Time Seperate (s)	8.2	31.1	15.9		20.1	
Reference Time (s)	31.1	31.1	15.9		20.1	
Adj Reference Time (s)	36.1	36.1	20.9		25.1	

Summary	NW SE	SW	Combined
Protected Option (s)	36.1	NA	
Permitted Option (s)	107.8	Err	
Split Option (s)	57.0	25.1	
Minimum (s)	36.1	25.1	61.1

Right Turns	NWR	SWR
Adj Reference Time (s)	43.4	15.5
Cross Thru Ref Time (s)	0.0	20.9
Oncoming Left Ref Time (s)	13.2	0.0
Combined (s)	56.7	36.5

Intersection Summary			
Intersection Capacity Utilization	61.1%	ICU Level of Service	B

Reference Times and Phasing Options do not represent an optimized timing plan.



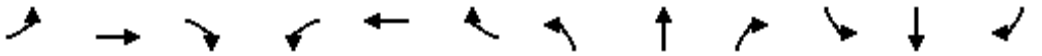
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	220	820	2	5	724	267	9	11	4	153	5	87
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	8.0	4.0	4.0	8.0	8.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	220	822	0	5	724	267	0	24	0	0	158	87
Lane Utilization Factor	0.97	0.91	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	0.96	0.85	0.95	0.95	0.85
Saturated Flow (vph)	3136	4629	0	1615	3237	1445	0	1626	0	0	3235	1445
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	7.0	17.8	0.0	0.3	22.4	18.5			0.0			6.0
Adj Reference Time (s)	12.0	22.8	0.0	9.0	27.4	23.5			0.0			11.0
Permitted Option												
Adj Saturation A (vph)	125	1543		129	1618		0	281		0	1504	
Reference Time A (s)	87.7	17.8		3.9	22.4		0.0	8.5		0.0	10.5	
Adj Saturation B (vph	NA	NA		NA	NA		0	0		0	0	
Reference Time B (s)	NA	NA		NA	NA		8.6	9.5		12.7	12.9	
Reference Time (s)		87.7			22.4			8.5			10.5	
Adj Reference Time (s)		92.7			27.4			13.5			15.5	
Split Option												
Ref Time Combined (s)	7.0	17.8		0.3	22.4		0.0	1.5		0.0	4.9	
Ref Time Seperate (s)	7.0	17.7		0.3	22.4		0.6	0.7		4.7	0.3	
Reference Time (s)	17.8	17.8		22.4	22.4		1.5	1.5		4.9	4.9	
Adj Reference Time (s)	22.8	22.8		27.4	27.4		9.0	9.0		9.9	9.9	

Summary	EB WB	NB SB	Combined
Protected Option (s)	39.4	NA	
Permitted Option (s)	92.7	15.5	
Split Option (s)	50.1	18.9	
Minimum (s)	39.4	15.5	54.9

Right Turns	WBR	SBR
Adj Reference Time (s)	23.5	11.0
Cross Thru Ref Time (s)	9.0	27.4
Oncoming Left Ref Time (s)	12.0	9.0
Combined (s)	44.5	47.4

Intersection Summary			
Intersection Capacity Utilization	54.9%	ICU Level of Service	A

Reference Times and Phasing Options do not represent an optimized timing plan.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	158	840	12	10	702	228	7	8	6	624	14	224
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	8.0	4.0	4.0	8.0	8.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	158	852	0	10	702	228	0	21	0	0	638	224
Lane Utilization Factor	0.97	0.91	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	0.94	0.85	0.95	0.95	0.85
Saturated Flow (vph)	3136	4621	0	1615	3237	1445	0	1600	0	0	3234	1445
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	5.0	18.4	0.0	0.6	21.7	15.8			0.0			15.5
Adj Reference Time (s)	10.0	23.4	0.0	9.0	26.7	20.8			0.0			20.5
Permitted Option												
Adj Saturation A (vph)	125	1540		129	1618		0	305		0	1357	
Reference Time A (s)	63.0	18.4		7.7	21.7		0.0	6.9		0.0	47.0	
Adj Saturation B (vph	NA	NA		NA	NA		0	0		0	0	
Reference Time B (s)	NA	NA		NA	NA		8.4	9.3		27.3	27.7	
Reference Time (s)		63.0			21.7			6.9			27.7	
Adj Reference Time (s)		68.0			26.7			11.9			32.7	
Split Option												
Ref Time Combined (s)	5.0	18.4		0.6	21.7		0.0	1.3		0.0	19.7	
Ref Time Seperate (s)	5.0	18.2		0.6	21.7		0.4	0.5		19.3	0.8	
Reference Time (s)	18.4	18.4		21.7	21.7		1.3	1.3		19.7	19.7	
Adj Reference Time (s)	23.4	23.4		26.7	26.7		9.0	9.0		24.7	24.7	

Summary	EB WB	NB SB	Combined
Protected Option (s)	36.7	NA	
Permitted Option (s)	68.0	32.7	
Split Option (s)	50.1	33.7	
Minimum (s)	36.7	32.7	69.5

Right Turns	WBR	SBR
Adj Reference Time (s)	20.8	20.5
Cross Thru Ref Time (s)	9.0	26.7
Oncoming Left Ref Time (s)	10.0	9.0
Combined (s)	39.8	56.2

Intersection Summary			
Intersection Capacity Utilization	69.5%	ICU Level of Service	C

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	144	191	112	7	334	518	183	48	24	742	818	25
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	100	100	100	100	100	100	100	100	100	100	100	100
Volume Combined (vph)	144	191	112	7	334	518	183	48	24	742	843	0
Lane Utilization Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85
Saturated Flow (vph)	3136	3237	1445	1615	3237	1445	1615	3237	1445	3136	3222	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	4.6	5.9	7.8	0.4	10.3	35.8	11.3	1.5	1.7	23.7	26.2	0.0
Adj Reference Time (s)	8.6	9.9	11.8	8.0	14.3	39.8	15.3	8.0	8.0	27.7	30.2	0.0
Permitted Option												
Adj Saturation A (vph)	125	1618		129	1618		129	1618		125	1611	
Reference Time A (s)	57.4	5.9		5.4	10.3		141.6	1.5		295.7	26.2	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		0	3222	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		31.7	26.2	
Reference Time (s)		57.4			10.3			141.6			31.7	
Adj Reference Time (s)		61.4			14.3			145.6			35.7	
Split Option												
Ref Time Combined (s)	4.6	5.9		0.4	10.3		11.3	1.5		23.7	26.2	
Ref Time Seperate (s)	4.6	5.9		0.4	10.3		11.3	1.5		23.7	25.4	
Reference Time (s)	5.9	5.9		10.3	10.3		11.3	11.3		26.2	26.2	
Adj Reference Time (s)	9.9	9.9		14.3	14.3		15.3	15.3		30.2	30.2	

Summary	NW SE	NE SW	Combined
Protected Option (s)	22.9	45.5	
Permitted Option (s)	61.4	145.6	
Split Option (s)	24.2	45.5	
Minimum (s)	22.9	45.5	68.4

Right Turns	SER	NWR	NER
Adj Reference Time (s)	11.8	39.8	8.0
Cross Thru Ref Time (s)	30.2	8.0	9.9
Oncoming Left Ref Time (s)	8.0	8.6	27.7
Combined (s)	49.9	56.4	45.6

Intersection Summary			
Intersection Capacity Utilization	68.4%	ICU Level of Service	C

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	298	720	413	27	266	471	183	48	24	742	818	25
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	100	100	100	100	100	100	100	100	100	100	100	100
Volume Combined (vph)	298	720	413	27	266	471	183	48	24	742	843	0
Lane Utilization Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85
Saturated Flow (vph)	3136	3237	1445	1615	3237	1445	1615	3237	1445	3136	3222	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	9.5	22.2	28.6	1.7	8.2	32.6	11.3	1.5	1.7	23.7	26.2	0.0
Adj Reference Time (s)	13.5	26.2	32.6	8.0	12.2	36.6	15.3	8.0	8.0	27.7	30.2	0.0
Permitted Option												
Adj Saturation A (vph)	125	1618		129	1618		129	1618		125	1611	
Reference Time A (s)	118.8	22.2		20.9	8.2		141.6	1.5		295.7	26.2	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		0	3222	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		31.7	26.2	
Reference Time (s)		118.8			20.9			141.6			31.7	
Adj Reference Time (s)		122.8			24.9			145.6			35.7	
Split Option												
Ref Time Combined (s)	9.5	22.2		1.7	8.2		11.3	1.5		23.7	26.2	
Ref Time Seperate (s)	9.5	22.2		1.7	8.2		11.3	1.5		23.7	25.4	
Reference Time (s)	22.2	22.2		8.2	8.2		11.3	11.3		26.2	26.2	
Adj Reference Time (s)	26.2	26.2		12.2	12.2		15.3	15.3		30.2	30.2	

Summary	NW SE	NE SW	Combined
Protected Option (s)	34.2	45.5	
Permitted Option (s)	122.8	145.6	
Split Option (s)	38.5	45.5	
Minimum (s)	34.2	45.5	79.7

Right Turns	SER	NWR	NER
Adj Reference Time (s)	32.6	36.6	8.0
Cross Thru Ref Time (s)	30.2	8.0	26.2
Oncoming Left Ref Time (s)	8.0	13.5	27.7
Combined (s)	70.7	58.1	61.9

Intersection Summary			
Intersection Capacity Utilization	79.7%	ICU Level of Service	D

Reference Times and Phasing Options do not represent an optimized timing plan.

Appendix C

Signal Warrant Analysis: Main Site Entrance

Signal Warrant Analysis

Main Site Entrance

Warrant Met Between 10:45 - 6:45

						Hourly Total		Condition A		Condition B		Condition A		Condition B	
								Major	Minor	Major	Minor	Major	Minor	Major	Minor
								100%	100%	100%	100%	80%	80%	80%	80%
Time	NB	EB	WB	Major Total	Minor Total	Major	Minor	<= 600	<=200	<=900	<=100	<= 480	<=160	<=720	<=80
12:00	0	15	6	21	0	-	-	-	-	-	-	-	-	-	-
12:15	4	15	6	21	4	-	-	-	-	-	-	-	-	-	-
12:30	2	14	4	18	2	-	-	-	-	-	-	-	-	-	-
12:45	2	6	2	8	2	68	8	68	8	68	8	68	8	68	8
1:00	0	8	0	8	0	55	8	55	8	55	8	55	8	55	8
1:15	0	4	0	4	0	38	4	38	4	38	4	38	4	38	4
1:30	0	2	0	2	0	22	2	22	2	22	2	22	2	22	2
1:45	0	4	1	5	0	19	0	19	0	19	0	19	0	19	0
2:00	2	10	0	10	2	21	2	21	2	21	2	21	2	21	2
2:15	0	4	2	6	0	23	2	23	2	23	2	23	2	23	2
2:30	0	3	3	6	0	27	2	27	2	27	2	27	2	27	2
2:45	0	3	1	4	0	26	2	26	2	26	2	26	2	26	2
3:00	0	1	0	1	0	17	0	17	0	17	0	17	0	17	0
3:15	2	2	1	3	2	14	2	14	2	14	2	14	2	14	2
3:30	0	2	6	8	0	16	2	16	2	16	2	16	2	16	2
3:45	0	5	4	9	0	21	2	21	2	21	2	21	2	21	2
4:00	0	2	6	8	0	28	2	28	2	28	2	28	2	28	2
4:15	0	2	7	9	0	34	0	34	0	34	0	34	0	34	0
4:30	6	5	10	15	6	41	6	41	6	41	6	41	6	41	6
4:45	0	4	22	26	0	58	6	58	6	58	6	58	6	58	6
5:00	0	6	32	38	0	88	6	88	6	88	6	88	6	88	6
5:15	2	8	20	28	2	107	8	107	8	107	8	107	8	107	8
5:30	0	5	43	48	0	140	2	140	2	140	2	140	2	140	2
5:45	0	15	43	58	0	172	2	172	2	172	2	172	2	172	2
6:00	0	14	47	61	0	195	2	195	2	195	2	195	2	195	2
6:15	2	22	63	85	2	252	2	252	2	252	2	252	2	252	2
6:30	0	31	75	106	0	310	2	310	2	310	2	310	2	310	2
6:45	1	60	116	176	1	428	3	428	3	428	3	428	3	428	3
7:00	2	46	116	162	2	529	5	529	5	529	5	529	5	529	5
7:15	2	48	114	162	2	606	5	606	5	606	5	606	5	606	5
7:30	6	58	140	198	6	698	11	698	11	698	11	698	11	698	11
7:45	2	74	140	214	2	736	12	736	12	736	12	736	12	736	12
8:00	2	65	102	167	2	741	12	741	12	741	12	741	12	741	12
8:15	6	47	122	169	6	748	16	748	16	748	16	748	16	748	16
8:30	16	54	117	171	16	721	26	721	26	721	26	721	26	721	26
8:45	9	54	106	160	9	667	33	667	33	667	33	667	33	667	33
9:00	6	43	80	123	6	623	37	623	37	623	37	623	37	623	37
9:15	12	38	109	147	12	601	43	601	43	601	43	601	43	601	43
9:30	14	45	88	133	14	563	41	563	41	563	41	563	41	563	41
9:45	16	38	89	127	16	530	48	530	48	530	48	530	48	530	48
10:00	22	58	67	125	22	532	64	532	64	532	64	532	64	532	64
10:15	30	76	98	174	30	559	82	559	82	559	82	559	82	559	82
10:30	34	76	101	177	34	603	102	603	102	603	102	603	102	603	102
10:45	20	71	118	189	20	665	106	665	106	665	106	665	106	665	106
11:00	24	88	86	174	24	714	108	714	108	714	108	714	108	714	108
11:15	46	89	98	187	46	727	124	727	124	727	124	727	124	727	124
11:30	40	98	114	212	40	762	130	762	130	762	130	762	130	762	130
11:45	54	105	101	206	54	779	164	779	164	779	164	779	164	779	164
12:00	66	108	106	214	66	819	206	819	206	819	206	819	206	819	206
12:15	39	110	100	210	39	842	199	842	199	842	199	842	199	842	199
12:30	70	106	86	192	70	822	229	822	229	822	229	822	229	822	229
12:45	37	134	104	238	37	854	212	854	212	854	212	854	212	854	212
13:00	43	134	99	233	43	873	189	873	189	873	189	873	189	873	189
13:15	38	100	86	186	38	849	188	849	188	849	188	849	188	849	188

Signal Warrant Analysis

Main Site Entrance

Warrant Met Between 10:45 - 6:45

						Hourly Total		Condition A		Condition B		Condition A		Condition B	
								Major	Minor	Major	Minor	Major	Minor	Major	Minor
								100%	100%	100%	100%	80%	80%	80%	80%
Time	NB	EB	WB	Major Total	Minor Total	Major	Minor	<= 600	<=200	<=900	<=100	<= 480	<=160	<=720	<=80
13:30	41	111	90	201	41	858	159	858	159	858	159	858	159	858	159
13:45	38	119	81	200	38	820	160	820	160	820	160	820	160	820	160
14:00	37	144	66	210	37	797	154	797	154	797	154	797	154	797	154
14:15	55	110	89	199	55	810	171	810	171	810	171	810	171	810	171
14:30	39	117	78	195	39	804	169	804	169	804	169	804	169	804	169
14:45	31	146	72	218	31	822	162	822	162	822	162	822	162	822	162
15:00	40	120	106	226	40	838	165	838	165	838	165	838	165	838	165
15:15	50	130	62	192	50	831	160	831	160	831	160	831	160	831	160
15:30	44	146	84	230	44	866	165	866	165	866	165	866	165	866	165
15:45	45	150	88	238	45	886	179	886	179	886	179	886	179	886	179
16:00	46	156	100	256	46	916	185	916	185	916	185	916	185	916	185
16:15	58	184	78	262	58	986	193	986	193	986	193	986	193	986	193
16:30	62	177	79	256	62	1012	211	1012	211	1012	211	1012	211	1012	211
16:45	58	194	120	314	58	1088	224	1088	224	1088	224	1088	224	1088	224
17:00	74	188	115	303	74	1135	252	1135	252	1135	252	1135	252	1135	252
17:15	50	206	106	312	50	1185	244	1185	244	1185	244	1185	244	1185	244
17:30	63	189	83	272	63	1201	245	1201	245	1201	245	1201	245	1201	245
17:45	68	175	80	255	68	1142	255	1142	255	1142	255	1142	255	1142	255
18:00	70	170	74	244	70	1083	251	1083	251	1083	251	1083	251	1083	251
18:15	51	173	70	243	51	1014	252	1014	252	1014	252	1014	252	1014	252
18:30	48	135	91	226	48	968	237	968	237	968	237	968	237	968	237
18:45	50	118	80	198	50	911	219	911	219	911	219	911	219	911	219
19:00	65	132	55	187	65	854	214	854	214	854	214	854	214	854	214
19:15	39	132	53	185	39	796	202	796	202	796	202	796	202	796	202
19:30	57	118	50	168	57	738	211	738	211	738	211	738	211	738	211
19:45	34	104	44	148	34	688	195	688	195	688	195	688	195	688	195
20:00	38	98	48	146	38	647	168	647	168	647	168	647	168	647	168
20:15	42	86	33	119	42	581	171	581	171	581	171	581	171	581	171
20:30	33	86	44	130	33	543	147	543	147	543	147	543	147	543	147
20:45	42	77	35	112	42	507	155	507	155	507	155	507	155	507	155
21:00	26	98	23	121	26	482	143	482	143	482	143	482	143	482	143
21:15	10	91	26	117	10	480	111	480	111	480	111	480	111	480	111
21:30	9	68	14	82	9	432	87	432	87	432	87	432	87	432	87
21:45	12	59	25	84	12	404	57	404	57	404	57	404	57	404	57
22:00	8	64	15	79	8	362	39	362	39	362	39	362	39	362	39
22:15	7	44	13	57	7	302	36	302	36	302	36	302	36	302	36
22:30	0	49	10	59	0	279	27	279	27	279	27	279	27	279	27
22:45	0	43	5	48	0	243	15	243	15	243	15	243	15	243	15
23:00	2	37	10	47	2	211	9	211	9	211	9	211	9	211	9
23:15	0	26	3	29	0	183	2	183	2	183	2	183	2	183	2
23:30	4	23	6	29	4	153	6	153	6	153	6	153	6	153	6
23:45	0	19	6	25	0	130	6	130	6	130	6	130	6	130	6

Signal Warrant Analysis
Apartment Entrance

								Condition A		Condition B		Condition A		Condition B	
								Major	Minor	Major	Minor	Major	Minor	Major	Minor
						Hourly Total		100%	100%	100%	100%	80%	80%	80%	80%
Time	NB	EB	WB	Major Total	Minor Total	Major	Minor	<= 600	<=200	<=900	<=100	<= 480	<=160	<=720	<=80
12:00	6	15	5	20	6	-	-	-	-	-	-	-	-	-	-
12:15	3	13	5	18	3	-	-	-	-	-	-	-	-	-	-
12:30	0	15	4	19	0	-	-	-	-	-	-	-	-	-	-
12:45	1	6	1	7	1	64	10	64	10	64	10	64	10	64	10
1:00	0	8	0	8	0	52	4	52	4	52	4	52	4	52	4
1:15	0	4	0	4	0	38	1	38	1	38	1	38	1	38	1
1:30	0	1	0	1	0	20	1	20	1	20	1	20	1	20	1
1:45	2	5	0	5	2	18	2	18	2	18	2	18	2	18	2
2:00	0	10	0	10	0	20	2	20	2	20	2	20	2	20	2
2:15	0	4	2	6	0	22	2	22	2	22	2	22	2	22	2
2:30	0	3	3	6	0	27	2	27	2	27	2	27	2	27	2
2:45	0	3	1	4	0	26	0	26	0	26	0	26	0	26	0
3:00	0	1	0	1	0	17	0	17	0	17	0	17	0	17	0
3:15	2	0	0	0	2	11	2	11	2	11	2	11	2	11	2
3:30	1	2	6	8	1	13	3	13	3	13	3	13	3	13	3
3:45	0	4	6	10	0	19	3	19	3	19	3	19	3	19	3
4:00	0	3	7	10	0	28	3	28	3	28	3	28	3	28	3
4:15	0	2	6	8	0	36	1	36	1	36	1	36	1	36	1
4:30	1	4	10	14	1	42	1	42	1	42	1	42	1	42	1
4:45	4	4	20	24	4	56	5	56	5	56	5	56	5	56	5
5:00	4	5	33	38	4	84	9	84	9	84	9	84	9	84	9
5:15	3	10	22	32	3	108	12	108	12	108	12	108	12	108	12
5:30	10	5	30	35	10	129	21	129	21	129	21	129	21	129	21
5:45	11	14	46	60	11	165	28	165	28	165	28	165	28	165	28
6:00	10	14	45	59	10	186	34	186	34	186	34	186	34	186	34
6:15	12	18	54	72	12	226	43	226	43	226	43	226	43	226	43
6:30	16	25	82	107	16	298	49	298	49	298	49	298	49	298	49
6:45	22	54	108	162	22	400	60	400	60	400	60	400	60	400	60
7:00	21	39	106	145	21	486	71	486	71	486	71	486	71	486	71
7:15	16	42	114	156	16	570	75	570	75	570	75	570	75	570	75
7:30	32	56	132	188	32	651	91	651	91	651	91	651	91	651	91
7:45	48	64	140	204	48	693	117	693	117	693	117	693	117	693	117
8:00	28	60	89	149	28	697	124	697	124	697	124	697	124	697	124
8:15	23	54	120	174	23	715	131	715	131	715	131	715	131	715	131
8:30	15	45	116	161	15	688	114	688	114	688	114	688	114	688	114
8:45	22	54	99	153	22	637	88	637	88	637	88	637	88	637	88
9:00	21	41	84	125	21	613	81	613	81	613	81	613	81	613	81
9:15	11	36	104	140	11	579	69	579	69	579	69	579	69	579	69
9:30	9	52	90	142	9	560	63	560	63	560	63	560	63	560	63
9:45	7	32	90	122	7	529	48	529	48	529	48	529	48	529	48
10:00	6	52	74	126	6	530	33	530	33	530	33	530	33	530	33
10:15	4	80	104	184	4	574	26	574	26	574	26	574	26	574	26
10:30	24	84	92	176	24	608	41	608	41	608	41	608	41	608	41
10:45	9	76	117	193	9	679	43	679	43	679	43	679	43	679	43
11:00	12	95	85	180	12	733	49	733	49	733	49	733	49	733	49
11:15	14	96	98	194	14	743	59	743	59	743	59	743	59	743	59
11:30	10	108	122	230	10	797	45	797	45	797	45	797	45	797	45
11:45	1	116	100	216	1	820	37	820	37	820	37	820	37	820	37
12:00	7	120	102	222	7	862	32	862	32	862	32	862	32	862	32
12:15	4	131	108	239	4	907	22	907	22	907	22	907	22	907	22
12:30	12	122	92	214	12	891	24	891	24	891	24	891	24	891	24
12:45	8	143	108	251	8	926	31	926	31	926	31	926	31	926	31
13:00	6	146	97	243	6	947	30	947	30	947	30	947	30	947	30
13:15	6	124	92	216	6	924	32	924	32	924	32	924	32	924	32

13:30	9	112	88	200	9	910	29	910	29	910	29	910	29	910	29
13:45	4	143	92	235	4	894	25	894	25	894	25	894	25	894	25
14:00	8	153	70	223	8	874	27	874	27	874	27	874	27	874	27
14:15	15	138	86	224	15	882	36	882	36	882	36	882	36	882	36
14:30	14	134	77	211	14	893	41	893	41	893	41	893	41	893	41
14:45	12	168	77	245	12	903	49	903	49	903	49	903	49	903	49
15:00	8	132	104	236	8	916	49	916	49	916	49	916	49	916	49
15:15	3	148	64	212	3	904	37	904	37	904	37	904	37	904	37
15:30	10	162	84	246	10	939	33	939	33	939	33	939	33	939	33
15:45	6	162	81	243	6	937	27	937	27	937	27	937	27	937	27
16:00	13	174	107	281	13	982	32	982	32	982	32	982	32	982	32
16:15	19	202	82	284	19	1054	48	1054	48	1054	48	1054	48	1054	48
16:30	8	205	136	341	8	1149	46	1149	46	1149	46	1149	46	1149	46
16:45	5	208	136	344	5	1250	45	1250	45	1250	45	1250	45	1250	45
17:00	20	215	112	327	20	1296	52	1296	52	1296	52	1296	52	1296	52
17:15	14	236	102	338	14	1350	47	1350	47	1350	47	1350	47	1350	47
17:30	12	212	72	284	12	1293	51	1293	51	1293	51	1293	51	1293	51
17:45	12	206	86	292	12	1241	58	1241	58	1241	58	1241	58	1241	58
18:00	14	200	81	281	14	1195	52	1195	52	1195	52	1195	52	1195	52
18:15	12	196	64	260	12	1117	50	1117	50	1117	50	1117	50	1117	50
18:30	16	160	84	244	16	1077	54	1077	54	1077	54	1077	54	1077	54
18:45	17	138	80	218	17	1003	59	1003	59	1003	59	1003	59	1003	59
19:00	16	154	58	212	16	934	61	934	61	934	61	934	61	934	61
19:15	6	140	48	188	6	862	55	862	55	862	55	862	55	862	55
19:30	7	129	46	175	7	793	46	793	46	793	46	793	46	793	46
19:45	11	116	43	159	11	734	40	734	40	734	40	734	40	734	40
20:00	12	108	42	150	12	672	36	672	36	672	36	672	36	672	36
20:15	10	106	40	146	10	630	40	630	40	630	40	630	40	630	40
20:30	7	96	46	142	7	597	40	597	40	597	40	597	40	597	40
20:45	5	92	24	116	5	554	34	554	34	554	34	554	34	554	34
21:00	8	111	19	130	8	534	30	534	30	534	30	534	30	534	30
21:15	8	93	25	118	8	506	28	506	28	506	28	506	28	506	28
21:30	5	70	15	85	5	449	26	449	26	449	26	449	26	449	26
21:45	9	72	19	91	9	424	30	424	30	424	30	424	30	424	30
22:00	6	64	15	79	6	373	28	373	28	373	28	373	28	373	28
22:15	5	50	11	61	5	316	25	316	25	316	25	316	25	316	25
22:30	0	49	9	58	0	289	20	289	20	289	20	289	20	289	20
22:45	3	42	4	46	3	244	14	244	14	244	14	244	14	244	14
23:00	2	37	9	46	2	211	10	211	10	211	10	211	10	211	10
23:15	3	26	1	27	3	177	8	177	8	177	8	177	8	177	8
23:30	1	22	4	26	1	145	9	145	9	145	9	145	9	145	9
23:45	2	17	4	21	2	120	8	120	8	120	8	120	8	120	8

Signal Warrant Analysis

Apartment Entrance - Office Leg

						Hourly Total		Condition A		Condition B		Condition A		Condition B	
								Major	Minor	Major	Minor	Major	Minor	Major	Minor
								100%	100%	100%	100%	80%	80%	80%	80%
Time	NB	EB	EB	Major Total	Minor Total	Major	Minor	<= 600	<=200	<=900	<=100	<= 480	<=160	<=720	<=80
12:00	1	16	6	22	1	-	-	-	-	-	-	-	-	-	-
12:15	0	16	7	23	0	-	-	-	-	-	-	-	-	-	-
12:30	4	15	3	18	4	-	-	-	-	-	-	-	-	-	-
12:45	0	7	2	9	0	72	5	72	5	72	5	72	5	72	5
1:00	0	6	0	6	0	56	4	56	4	56	4	56	4	56	4
1:15	0	4	0	4	0	37	4	37	4	37	4	37	4	37	4
1:30	0	3	0	3	0	22	0	22	0	22	0	22	0	22	0
1:45	0	3	1	4	0	17	0	17	0	17	0	17	0	17	0
2:00	0	9	0	9	0	20	0	20	0	20	0	20	0	20	0
2:15	4	4	2	6	4	22	4	22	4	22	4	22	4	22	4
2:30	0	2	3	5	0	24	4	24	4	24	4	24	4	24	4
2:45	0	3	1	4	0	24	4	24	4	24	4	24	4	24	4
3:00	0	1	0	1	0	16	4	16	4	16	4	16	4	16	4
3:15	0	0	1	1	0	11	0	11	0	11	0	11	0	11	0
3:30	0	2	6	8	0	14	0	14	0	14	0	14	0	14	0
3:45	0	5	6	11	0	21	0	21	0	21	0	21	0	21	0
4:00	4	2	7	9	4	29	4	29	4	29	4	29	4	29	4
4:15	0	2	7	9	0	37	4	37	4	37	4	37	4	37	4
4:30	0	5	10	15	0	44	4	44	4	44	4	44	4	44	4
4:45	0	6	23	29	0	62	4	62	4	62	4	62	4	62	4
5:00	0	8	31	39	0	92	0	92	0	92	0	92	0	92	0
5:15	0	9	23	32	0	115	0	115	0	115	0	115	0	115	0
5:30	0	5	37	42	0	142	0	142	0	142	0	142	0	142	0
5:45	0	15	45	60	0	173	0	173	0	173	0	173	0	173	0
6:00	0	17	51	68	0	202	0	202	0	202	0	202	0	202	0
6:15	0	24	56	80	0	250	0	250	0	250	0	250	0	250	0
6:30	2	35	79	114	2	322	2	322	2	322	2	322	2	322	2
6:45	7	60	111	171	7	433	9	433	9	433	9	433	9	433	9
7:00	0	40	113	153	0	518	9	518	9	518	9	518	9	518	9
7:15	0	47	113	160	0	598	9	598	9	598	9	598	9	598	9
7:30	12	67	138	205	12	689	19	689	19	689	19	689	19	689	19
7:45	3	80	143	223	3	741	15	741	15	741	15	741	15	741	15
8:00	8	67	102	169	8	757	23	757	23	757	23	757	23	757	23
8:15	8	51	126	177	8	774	31	774	31	774	31	774	31	774	31
8:30	0	51	122	173	0	742	19	742	19	742	19	742	19	742	19
8:45	2	55	100	155	2	674	18	674	18	674	18	674	18	674	18
9:00	5	45	84	129	5	634	15	634	15	634	15	634	15	634	15
9:15	6	36	107	143	6	600	13	600	13	600	13	600	13	600	13
9:30	21	50	87	137	21	564	34	564	34	564	34	564	34	564	34
9:45	15	37	95	132	15	541	47	541	47	541	47	541	47	541	47
10:00	24	56	70	126	24	538	66	538	66	538	66	538	66	538	66
10:15	35	81	98	179	35	574	95	574	95	574	95	574	95	574	95
10:30	10	90	103	193	10	630	84	630	84	630	84	630	84	630	84
10:45	30	77	112	189	30	687	99	687	99	687	99	687	99	687	99
11:00	21	100	83	183	21	744	96	744	96	744	96	744	96	744	96
11:15	25	98	98	196	25	761	86	761	86	761	86	761	86	761	86
11:30	46	113	113	226	46	794	122	794	122	794	122	**794**	**122**	**794**	**122**
11:45	50	109	98	207	50	812	142	812	142	812	142	812	142	812	142
12:00	53	126	98	224	53	853	174	853	174	853	174	853	174	853	174
12:15	43	128	100	228	43	885	192	885	192	885	192	885	192	885	192
12:30	60	128	85	213	60	872	206	872	206	872	206	**872**	**206**	**872**	**206**
12:45	33	145	105	250	33	915	189	915	189	915	189	915	189	915	189
13:00	54	795	90	885	54	1576	190	1576	190	1576	190	1576	190	1576	190
13:15	42	112	89	201	42	1549	189	1549	189	1549	189	1549	189	1549	189

Signal Warrant Analysis

Apartment Entrance - Office Leg

								Condition A		Condition B		Condition A		Condition B	
								Major	Minor	Major	Minor	Major	Minor	Major	Minor
						Hourly Total		100%	100%	100%	100%	80%	80%	80%	80%
Time	NB	EB	EB	Major Total	Minor Total	Major	Minor	<= 600	<=200	<=900	<=100	<= 480	<=160	<=720	<=80
13:30	38	128	84	212	38	1548	167	1548	167	1548	167	**1548**	**167**	**1548**	**167**
13:45	35	139	88	227	35	1525	169	1525	169	1525	169	1525	169	1525	169
14:00	30	164	69	233	30	873	145	873	145	873	145	873	145	873	145
14:15	31	129	90	219	31	891	134	891	134	891	134	891	134	891	134
14:30	36	142	71	213	36	892	132	892	132	892	132	**892**	**132**	**892**	**132**
14:45	44	159	76	235	44	900	141	900	141	900	141	900	141	900	141
15:00	55	136	100	236	55	903	166	903	166	903	166	903	166	903	166
15:15	14	151	63	214	14	898	149	898	149	898	149	898	149	898	149
15:30	28	163	82	245	28	930	141	930	141	930	141	**930**	**141**	**930**	**141**
15:45	22	168	82	250	22	945	119	945	119	945	119	945	119	945	119
16:00	42	175	105	280	42	989	106	989	106	989	106	989	106	989	106
16:15	37	213	75	288	37	1063	129	1063	129	1063	129	1063	129	1063	129
16:30	45	200	84	284	45	1102	146	1102	146	1102	146	**1102**	**146**	**1102**	**146**
16:45	46	212	128	340	46	1192	170	1192	170	1192	170	1192	170	1192	170
17:00	62	227	107	334	62	1246	190	1246	190	1246	190	1246	190	1246	190
17:15	62	228	103	331	62	1289	215	1289	215	1289	215	1289	215	1289	215
17:30	18	213	75	288	18	1293	188	1293	188	1293	188	**1293**	**188**	**1293**	**188**
17:45	18	204	88	292	18	1245	160	1245	160	1245	160	1245	160	1245	160
18:00	23	184	73	257	23	1168	121	1168	121	1168	121	1168	121	1168	121
18:15	11	204	70	274	11	1111	70	1111	70	1111	70	1111	70	1111	70
18:30	13	149	88	237	13	1060	65	1060	65	1060	65	1060	65	**1060**	**65**
18:45	7	143	78	221	7	989	54	989	54	989	54	989	54	989	54
19:00	14	161	60	221	14	953	45	953	45	953	45	953	45	953	45
19:15	9	141	46	187	9	866	43	866	43	866	43	866	43	866	43
19:30	1	131	49	180	1	809	31	809	31	809	31	809	31	809	31
19:45	0	115	45	160	0	748	24	748	24	748	24	748	24	748	24
20:00	0	111	45	156	0	683	10	683	10	683	10	683	10	683	10
20:15	4	105	40	145	4	641	5	641	5	641	5	641	5	641	5
20:30	2	99	46	145	2	606	6	606	6	606	6	606	6	606	6
20:45	2	94	31	125	2	571	8	571	8	571	8	571	8	571	8
21:00	0	111	23	134	0	549	8	549	8	549	8	549	8	549	8
21:15	4	88	26	114	4	518	8	518	8	518	8	518	8	518	8
21:30	0	79	18	97	0	470	6	470	6	470	6	470	6	470	6
21:45	0	63	19	82	0	427	4	427	4	427	4	427	4	427	4
22:00	0	66	18	84	0	377	4	377	4	377	4	377	4	377	4
22:15	0	48	12	60	0	323	0	323	0	323	0	323	0	323	0
22:30	1	46	9	55	1	281	1	281	1	281	1	281	1	281	1
22:45	0	43	5	48	0	247	1	247	1	247	1	247	1	247	1
23:00	0	36	10	46	0	209	1	209	1	209	1	209	1	209	1
23:15	0	28	2	30	0	179	1	179	1	179	1	179	1	179	1
23:30	0	18	6	24	0	148	0	148	0	148	0	148	0	148	0
23:45	0	18	5	23	0	123	0	123	0	123	0	123	0	123	0

Appendix D

Intersection Analysis: Phase I – No Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	331	523	105	288	609	161	165	444	176	179	1357	309
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	10.0	10.0	4.0	10.0	4.0	4.0	10.0	10.0	4.0	10.0	4.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	331	523	105	288	770	0	165	444	176	179	1666	0
Lane Utilization Factor	0.97	0.91	1.00	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	0.97	0.85	0.95	1.00	0.85	0.95	0.97	0.85
Saturated Flow (vph)	3136	4631	1445	1615	4486	0	3136	4631	1445	3136	4502	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	10.6	11.3	7.3	17.8	17.2	0.0	5.3	9.6	12.2	5.7	37.0	0.0
Adj Reference Time (s)	15.6	16.3	15.0	22.8	22.2	0.0	10.3	15.0	17.2	10.7	42.0	0.0
Permitted Option												
Adj Saturation A (vph)	125	1544		129	1495		125	1544		125	1501	
Reference Time A (s)	131.9	11.3		222.9	17.2		65.8	9.6		71.3	37.0	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time (s)		131.9			222.9			65.8			71.3	
Adj Reference Time (s)		136.9			227.9			70.8			76.3	
Split Option												
Ref Time Combined (s)	10.6	11.3		17.8	17.2		5.3	9.6		5.7	37.0	
Ref Time Seperate (s)	10.6	11.3		17.8	13.6		5.3	9.6		5.7	30.1	
Reference Time (s)	11.3	11.3		17.8	17.8		9.6	9.6		37.0	37.0	
Adj Reference Time (s)	16.3	16.3		22.8	22.8		15.0	15.0		42.0	42.0	

Summary	EB WB	NW SE	Combined
Protected Option (s)	39.1	52.3	
Permitted Option (s)	227.9	76.3	
Split Option (s)	39.1	57.0	
Minimum (s)	39.1	52.3	91.4

Right Turns	EBR	SER
Adj Reference Time (s)	15.0	17.2
Cross Thru Ref Time (s)	15.0	22.2
Oncoming Left Ref Time (s)	22.8	10.7
Combined (s)	52.8	50.1

Intersection Summary			
Intersection Capacity Utilization	91.4%	ICU Level of Service	F

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	201	741	221	245	567	152	293	1654	333	186	579	297
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	10.0	10.0	4.0	10.0	4.0	4.0	10.0	10.0	4.0	10.0	4.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	201	741	221	245	719	0	293	1654	333	186	876	0
Lane Utilization Factor	0.97	0.91	1.00	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	0.97	0.85	0.95	1.00	0.85	0.95	0.95	0.85
Saturated Flow (vph)	3136	4631	1445	1615	4484	0	3136	4631	1445	3136	4395	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	6.4	16.0	15.3	15.2	16.0	0.0	9.3	35.7	23.0	5.9	19.9	0.0
Adj Reference Time (s)	11.4	21.0	20.3	20.2	21.0	0.0	14.3	40.7	28.0	10.9	24.9	0.0
Permitted Option												
Adj Saturation A (vph)	125	1544		129	1495		125	1544		125	1465	
Reference Time A (s)	80.1	16.0		189.6	16.0		116.8	35.7		74.1	19.9	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time (s)		80.1			189.6			116.8			74.1	
Adj Reference Time (s)		85.1			194.6			121.8			79.1	
Split Option												
Ref Time Combined (s)	6.4	16.0		15.2	16.0		9.3	35.7		5.9	19.9	
Ref Time Seperate (s)	6.4	16.0		15.2	12.6		9.3	35.7		5.9	13.2	
Reference Time (s)	16.0	16.0		16.0	16.0		35.7	35.7		19.9	19.9	
Adj Reference Time (s)	21.0	21.0		21.0	21.0		40.7	40.7		24.9	24.9	

Summary	EB WB	NW SE	Combined
Protected Option (s)	41.2	51.6	
Permitted Option (s)	194.6	121.8	
Split Option (s)	42.0	65.6	
Minimum (s)	41.2	51.6	92.8

Right Turns	EBR	SER
Adj Reference Time (s)	20.3	28.0
Cross Thru Ref Time (s)	40.7	21.0
Oncoming Left Ref Time (s)	20.2	10.9
Combined (s)	81.2	60.0

Intersection Summary			
Intersection Capacity Utilization	92.8%	ICU Level of Service	F

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	819	104	97	852	44	123	79	85	80	45	117
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	10.0	4.0	4.0	10.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	58	923	0	97	896	0	0	287	0	0	242	0
Lane Utilization Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Turning Factor (vph)	0.95	0.98	0.85	0.95	0.99	0.85	0.95	0.94	0.85	0.95	0.91	0.85
Saturated Flow (vph)	1615	4553	0	1615	4597	0	0	4540	0	0	4429	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	3.6	20.3	0.0	6.0	19.5	0.0			0.0			0.0
Adj Reference Time (s)	9.0	25.3	0.0	11.0	24.5	0.0			0.0			0.0
Permitted Option												
Adj Saturation A (vph)	129	1518		129	1532		0	182		0	177	
Reference Time A (s)	44.9	20.3		75.1	19.5		0.0	67.7		0.0	45.2	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time (s)		44.9			75.1			67.7			45.2	
Adj Reference Time (s)		49.9			80.1			72.7			50.2	
Split Option												
Ref Time Combined (s)	3.6	20.3		6.0	19.5		0.0	6.3		0.0	5.5	
Ref Time Seperate (s)	3.6	18.0		6.0	18.5		3.8	2.6		2.5	1.6	
Reference Time (s)	20.3	20.3		19.5	19.5		6.3	6.3		5.5	5.5	
Adj Reference Time (s)	25.3	25.3		24.5	24.5		11.3	11.3		10.5	10.5	

Summary	EB WB	NB SB	Combined
Protected Option (s)	36.3	NA	
Permitted Option (s)	80.1	72.7	
Split Option (s)	49.8	21.8	
Minimum (s)	36.3	21.8	58.1

Right Turns
Adj Reference Time (s)
Cross Thru Ref Time (s)
Oncoming Left Ref Time (s)
Combined (s)

Intersection Summary			
Intersection Capacity Utilization	58.1%	ICU Level of Service	B

Reference Times and Phasing Options do not represent an optimized timing plan.

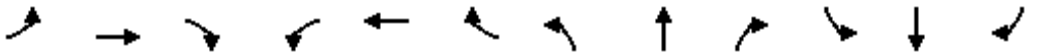
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	265	958	162	155	837	146	110	73	98	99	54	99
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	10.0	4.0	4.0	10.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	265	1120	0	155	983	0	0	281	0	0	252	0
Lane Utilization Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Turning Factor (vph)	0.95	0.98	0.85	0.95	0.98	0.85	0.95	0.93	0.85	0.95	0.92	0.85
Saturated Flow (vph)	1615	4530	0	1615	4528	0	0	4511	0	0	4479	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	16.4	24.7	0.0	9.6	21.7	0.0			0.0			0.0
Adj Reference Time (s)	21.4	29.7	0.0	14.6	26.7	0.0			0.0			0.0
Permitted Option												
Adj Saturation A (vph)	129	1510		129	1509		0	180		0	179	
Reference Time A (s)	205.1	24.7		120.0	21.7		0.0	61.0		0.0	55.3	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time (s)		205.1			120.0			61.0			55.3	
Adj Reference Time (s)		210.1			125.0			66.0			60.3	
Split Option												
Ref Time Combined (s)	16.4	24.7		9.6	21.7		0.0	6.2		0.0	5.6	
Ref Time Seperate (s)	16.4	21.1		9.6	18.5		3.4	2.5		3.1	1.8	
Reference Time (s)	24.7	24.7		21.7	21.7		6.2	6.2		5.6	5.6	
Adj Reference Time (s)	29.7	29.7		26.7	26.7		11.2	11.2		10.6	10.6	

Summary	EB WB	NB SB	Combined
Protected Option (s)	48.1	NA	
Permitted Option (s)	210.1	66.0	
Split Option (s)	56.4	21.9	
Minimum (s)	48.1	21.9	70.0

Right Turns
Adj Reference Time (s)
Cross Thru Ref Time (s)
Oncoming Left Ref Time (s)
Combined (s)

Intersection Summary			
Intersection Capacity Utilization	70.0%	ICU Level of Service	C

Reference Times and Phasing Options do not represent an optimized timing plan.



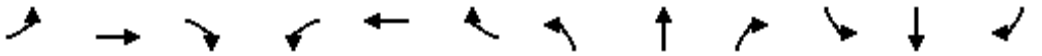
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	84	688	196	281	509	7	219	167	238	35	609	240
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	8.0	8.0	4.0	8.0	4.0	4.0	8.0	8.0	4.0	8.0	8.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	84	688	196	281	516	0	219	167	238	35	609	240
Lane Utilization Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85
Saturated Flow (vph)	3136	4631	1445	3136	4621	0	3136	3237	1445	1615	3237	1445
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	2.7	14.9	13.6	9.0	11.2	0.0	7.0	5.2	16.5	2.2	18.8	16.6
Adj Reference Time (s)	9.0	19.9	18.6	14.0	16.2	0.0	12.0	13.0	21.5	9.0	23.8	21.6
Permitted Option												
Adj Saturation A (vph)	125	1544		125	1540		125	1618		129	1618	
Reference Time A (s)	33.5	14.9		112.0	11.2		87.3	5.2		27.1	18.8	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time (s)		33.5			112.0			87.3			27.1	
Adj Reference Time (s)		38.5			117.0			92.3			32.1	
Split Option												
Ref Time Combined (s)	2.7	14.9		9.0	11.2		7.0	5.2		2.2	18.8	
Ref Time Seperate (s)	2.7	14.9		9.0	11.0		7.0	5.2		2.2	18.8	
Reference Time (s)	14.9	14.9		11.2	11.2		7.0	7.0		18.8	18.8	
Adj Reference Time (s)	19.9	19.9		16.2	16.2		13.0	13.0		23.8	23.8	

Summary	EB WB	NB SB	Combined
Protected Option (s)	33.8	35.8	
Permitted Option (s)	117.0	92.3	
Split Option (s)	36.0	36.8	
Minimum (s)	33.8	35.8	69.6

Right Turns	EBR	NBR	SBR
Adj Reference Time (s)	18.6	21.5	21.6
Cross Thru Ref Time (s)	23.8	19.9	16.2
Oncoming Left Ref Time (s)	14.0	9.0	12.0
Combined (s)	56.3	50.3	49.8

Intersection Summary			
Intersection Capacity Utilization	69.6%	ICU Level of Service	C

Reference Times and Phasing Options do not represent an optimized timing plan.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	101	987	190	228	583	17	359	208	308	48	635	104
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	8.0	8.0	4.0	8.0	4.0	4.0	8.0	8.0	4.0	8.0	8.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	101	987	190	228	600	0	359	208	308	48	635	104
Lane Utilization Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85
Saturated Flow (vph)	3136	4631	1445	3136	4611	0	3136	3237	1445	1615	3237	1445
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	3.2	21.3	13.1	7.3	13.0	0.0	11.4	6.4	21.3	3.0	19.6	7.2
Adj Reference Time (s)	9.0	26.3	18.1	12.3	18.0	0.0	16.4	13.0	26.3	9.0	24.6	13.0
Permitted Option												
Adj Saturation A (vph)	125	1544		125	1537		125	1618		129	1618	
Reference Time A (s)	40.3	21.3		90.9	13.0		143.1	6.4		37.2	19.6	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time (s)		40.3			90.9			143.1			37.2	
Adj Reference Time (s)		45.3			95.9			148.1			42.2	
Split Option												
Ref Time Combined (s)	3.2	21.3		7.3	13.0		11.4	6.4		3.0	19.6	
Ref Time Seperate (s)	3.2	21.3		7.3	12.6		11.4	6.4		3.0	19.6	
Reference Time (s)	21.3	21.3		13.0	13.0		11.4	11.4		19.6	19.6	
Adj Reference Time (s)	26.3	26.3		18.0	18.0		16.4	16.4		24.6	24.6	

Summary	EB WB	NB SB	Combined
Protected Option (s)	38.6	41.1	
Permitted Option (s)	95.9	148.1	
Split Option (s)	44.3	41.1	
Minimum (s)	38.6	41.1	79.6

Right Turns	EBR	NBR	SBR
Adj Reference Time (s)	18.1	26.3	13.0
Cross Thru Ref Time (s)	24.6	26.3	18.0
Oncoming Left Ref Time (s)	12.3	9.0	16.4
Combined (s)	55.0	61.6	47.5

Intersection Summary			
Intersection Capacity Utilization	79.6%	ICU Level of Service	D

Reference Times and Phasing Options do not represent an optimized timing plan.

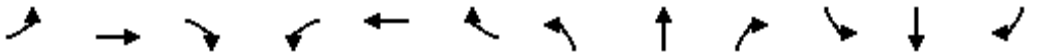
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	894	43	229	721	17	10	3	92	8	5	7
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	10.0	10.0	4.0	10.0	10.0	8.0	8.0	8.0	8.0	8.0	8.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	8	894	43	229	721	17	10	3	92	0	13	7
Lane Utilization Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85	0.95	0.97	0.85
Saturated Flow (vph)	3136	6174	1445	3136	4631	1445	1615	1700	1445	0	1648	1445
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	0.3	14.5	3.0	7.3	15.6	1.2			6.4			0.5
Adj Reference Time (s)	9.0	19.5	15.0	12.3	20.6	15.0			13.0			13.0
Permitted Option												
Adj Saturation A (vph)	125	1544		125	1544		129	1700		0	188	
Reference Time A (s)	3.2	14.5		91.3	15.6		7.7	0.2		0.0	6.9	
Adj Saturation B (vph	NA	NA		NA	NA		0	1700		0	0	
Reference Time B (s)	NA	NA		NA	NA		8.6	0.2		8.5	8.8	
Reference Time (s)		14.5			91.3			7.7			6.9	
Adj Reference Time (s)		19.5			96.3			13.0			13.0	
Split Option												
Ref Time Combined (s)	0.3	14.5		7.3	15.6		0.6	0.2		0.0	0.8	
Ref Time Seperate (s)	0.3	14.5		7.3	15.6		0.6	0.2		0.5	0.3	
Reference Time (s)	14.5	14.5		15.6	15.6		0.6	0.6		0.8	0.8	
Adj Reference Time (s)	19.5	19.5		20.6	20.6		13.0	13.0		13.0	13.0	

Summary	EB WB	NB SB	Combined
Protected Option (s)	31.8	NA	
Permitted Option (s)	96.3	13.0	
Split Option (s)	40.0	26.0	
Minimum (s)	31.8	13.0	44.8

Right Turns	EBR	WBR	NBR	SBR
Adj Reference Time (s)	15.0	15.0	13.0	13.0
Cross Thru Ref Time (s)	13.0	13.0	19.5	20.6
Oncoming Left Ref Time (s)	12.3	9.0	13.0	13.0
Combined (s)	40.3	37.0	45.5	46.6

Intersection Summary			
Intersection Capacity Utilization	46.6%	ICU Level of Service	A

Reference Times and Phasing Options do not represent an optimized timing plan.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	1306	213	267	722	6	75	14	435	14	7	11
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	10.0	10.0	4.0	10.0	10.0	8.0	8.0	8.0	8.0	8.0	8.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	8	1306	213	267	722	6	75	14	435	0	21	11
Lane Utilization Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85	0.95	0.97	0.85
Saturated Flow (vph)	3136	6174	1445	3136	4631	1445	1615	1700	1445	0	1643	1445
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	0.3	21.2	14.7	8.5	15.6	0.4			30.1			0.8
Adj Reference Time (s)	9.0	26.2	19.7	13.5	20.6	15.0			35.1			13.0
Permitted Option												
Adj Saturation A (vph)	125	1544		125	1544		129	1700		0	176	
Reference Time A (s)	3.2	21.2		106.4	15.6		58.0	0.8		0.0	11.9	
Adj Saturation B (vph	NA	NA		NA	NA		0	1700		0	0	
Reference Time B (s)	NA	NA		NA	NA		12.6	0.8		8.9	9.3	
Reference Time (s)		21.2			106.4			12.6			9.3	
Adj Reference Time (s)		26.2			111.4			17.6			14.3	
Split Option												
Ref Time Combined (s)	0.3	21.2		8.5	15.6		4.6	0.8		0.0	1.3	
Ref Time Seperate (s)	0.3	21.2		8.5	15.6		4.6	0.8		0.9	0.4	
Reference Time (s)	21.2	21.2		15.6	15.6		4.6	4.6		1.3	1.3	
Adj Reference Time (s)	26.2	26.2		20.6	20.6		13.0	13.0		13.0	13.0	

Summary	EB WB	NB SB	Combined
Protected Option (s)	39.7	NA	
Permitted Option (s)	111.4	17.6	
Split Option (s)	46.7	26.0	
Minimum (s)	39.7	17.6	57.3

Right Turns	EBR	WBR	NBR	SBR
Adj Reference Time (s)	19.7	15.0	35.1	13.0
Cross Thru Ref Time (s)	13.0	13.0	26.2	20.6
Oncoming Left Ref Time (s)	13.5	9.0	13.0	13.0
Combined (s)	46.3	37.0	74.3	46.6

Intersection Summary			
Intersection Capacity Utilization	74.3%	ICU Level of Service	D

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	607	219	132	14	94	409	0	1045	22	129	816	731
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	6.0	6.0	6.0	8.0	8.0	8.0	4.0	8.0	4.0	4.0	8.0	8.0
Refr Cycle Length (s)	100	100	100	100	100	100	100	100	100	100	100	100
Volume Combined (vph)	0	826	132	0	108	409	0	1067	0	129	816	731
Lane Utilization Factor	0.97	0.95	1.00	1.00	1.00	0.89	1.00	0.91	1.00	1.00	0.91	0.89
Turning Factor (vph)	0.95	0.96	0.85	0.95	0.99	0.85	0.95	1.00	0.85	0.95	1.00	0.85
Saturated Flow (vph)	0	6236	1445	0	1689	2558	0	6155	0	1615	4631	2558
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		No			No			Yes			Yes	
Reference Time (s)			9.1			16.0	0.0	17.3	0.0	8.0	17.6	28.6
Adj Reference Time (s)			14.1			21.0	0.0	22.3	0.0	13.0	22.6	33.6
Permitted Option												
Adj Saturation A (vph)	0	249		0	653		0	1539		129	1544	
Reference Time A (s)	0.0	243.4		0.0	16.5		0.0	17.3		99.8	17.6	
Adj Saturation B (vph	0	1618		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	20.9	19.2		NA	NA		NA	NA		NA	NA	
Reference Time (s)		20.9			16.5			17.3			99.8	
Adj Reference Time (s)		25.9			21.5			22.3			104.8	
Split Option												
Ref Time Combined (s)	0.0	13.2		0.0	6.4		0.0	17.3		8.0	17.6	
Ref Time Seperate (s)	12.9	6.8		0.9	5.5		0.0	17.0		8.0	17.6	
Reference Time (s)	13.2	13.2		6.4	6.4		17.3	17.3		17.6	17.6	
Adj Reference Time (s)	18.2	18.2		13.0	13.0		22.3	22.3		22.6	22.6	

Summary	NW SE	NE SW	Combined
Protected Option (s)	NA	35.3	
Permitted Option (s)	25.9	104.8	
Split Option (s)	31.2	45.0	
Minimum (s)	25.9	35.3	61.2

Right Turns	SER	NWR	SWR
Adj Reference Time (s)	14.1	21.0	33.6
Cross Thru Ref Time (s)	22.6	22.3	13.0
Oncoming Left Ref Time (s)	13.0	18.2	0.0
Combined (s)	49.8	61.6	46.6

Intersection Summary			
Intersection Capacity Utilization	61.6%	ICU Level of Service	B

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	789	577	145	46	91	517	0	1567	45	338	887	692
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	6.0	6.0	6.0	8.0	8.0	8.0	4.0	8.0	4.0	4.0	8.0	8.0
Refr Cycle Length (s)	100	100	100	100	100	100	100	100	100	100	100	100
Volume Combined (vph)	0	1366	145	0	137	517	0	1612	0	338	887	692
Lane Utilization Factor	0.97	0.95	1.00	1.00	1.00	0.89	1.00	0.91	1.00	1.00	0.91	0.89
Turning Factor (vph)	0.95	0.97	0.85	0.95	0.98	0.85	0.95	1.00	0.85	0.95	1.00	0.85
Saturated Flow (vph)	0	6287	1445	0	1671	2558	0	6149	0	1615	4631	2558
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		No			No			Yes			Yes	
Reference Time (s)			10.0			20.2	0.0	26.2	0.0	20.9	19.2	27.1
Adj Reference Time (s)			15.0			25.2	0.0	31.2	0.0	25.9	24.2	32.1
Permitted Option												
Adj Saturation A (vph)	0	251		0	316		0	1537		129	1544	
Reference Time A (s)	0.0	313.8		0.0	43.3		0.0	26.2		261.6	19.2	
Adj Saturation B (vph	0	1618		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	24.8	27.7		NA	NA		NA	NA		NA	NA	
Reference Time (s)		27.7			43.3			26.2			261.6	
Adj Reference Time (s)		32.7			48.3			31.2			266.6	
Split Option												
Ref Time Combined (s)	0.0	21.7		0.0	8.2		0.0	26.2		20.9	19.2	
Ref Time Seperate (s)	16.8	17.8		2.8	5.4		0.0	25.5		20.9	19.2	
Reference Time (s)	21.7	21.7		8.2	8.2		26.2	26.2		20.9	20.9	
Adj Reference Time (s)	26.7	26.7		13.2	13.2		31.2	31.2		25.9	25.9	

Summary	NW SE	NE SW	Combined
Protected Option (s)	NA	57.1	
Permitted Option (s)	48.3	266.6	
Split Option (s)	39.9	57.1	
Minimum (s)	39.9	57.1	97.1

Right Turns	SER	NWR	SWR
Adj Reference Time (s)	15.0	25.2	32.1
Cross Thru Ref Time (s)	24.2	31.2	13.2
Oncoming Left Ref Time (s)	13.2	26.7	0.0
Combined (s)	52.4	83.2	45.3

Intersection Summary			
Intersection Capacity Utilization	97.1%	ICU Level of Service	F

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	300	44	14	402	2	12	1	8	2	0	2
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	6.0	4.0	4.0	6.0	4.0	4.0	4.0	4.0	7.0	7.0	4.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	8	344	0	14	404	0	0	21	0	0	4	0
Lane Utilization Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.98	0.85	0.95	1.00	0.85	0.95	0.92	0.85	0.95	0.90	0.85
Saturated Flow (vph)	1615	3175	0	1615	3234	0	0	1557	0	0	1533	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	0.5	10.8	0.0	0.9	12.5	0.0			0.0			0.0
Adj Reference Time (s)	9.0	15.8	0.0	9.0	17.5	0.0			0.0			0.0
Permitted Option												
Adj Saturation A (vph)	129	1587		129	1617		0	1197		0	1329	
Reference Time A (s)	6.2	10.8		10.8	12.5		0.0	1.8		0.0	0.3	
Adj Saturation B (vph	NA	NA		NA	NA		0	0		0	0	
Reference Time B (s)	NA	NA		NA	NA		8.7	9.3		8.1	8.3	
Reference Time (s)		10.8			12.5			1.8			0.3	
Adj Reference Time (s)		15.8			17.5			9.0			12.0	
Split Option												
Ref Time Combined (s)	0.5	10.8		0.9	12.5		0.0	1.3		0.0	0.3	
Ref Time Seperate (s)	0.5	9.4		0.9	12.4		0.7	0.1		0.1	0.0	
Reference Time (s)	10.8	10.8		12.5	12.5		1.3	1.3		0.3	0.3	
Adj Reference Time (s)	15.8	15.8		17.5	17.5		9.0	9.0		12.0	12.0	

Summary	EB WB	NB SB	Combined
Protected Option (s)	26.5	NA	
Permitted Option (s)	17.5	12.0	
Split Option (s)	33.3	21.0	
Minimum (s)	17.5	12.0	29.5

Right Turns
Adj Reference Time (s)
Cross Thru Ref Time (s)
Oncoming Left Ref Time (s)
Combined (s)

Intersection Summary			
Intersection Capacity Utilization	29.5%	ICU Level of Service	A

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	642	212	29	414	2	196	1	60	7	3	4
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	6.0	4.0	4.0	6.0	4.0	4.0	4.0	4.0	7.0	7.0	4.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	25	854	0	29	416	0	0	257	0	0	14	0
Lane Utilization Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.96	0.85	0.95	1.00	0.85	0.95	0.93	0.85	0.95	0.93	0.85
Saturated Flow (vph)	1615	3116	0	1615	3234	0	0	1578	0	0	1586	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	1.5	27.4	0.0	1.8	12.9	0.0			0.0			0.0
Adj Reference Time (s)	9.0	32.4	0.0	9.0	17.9	0.0			0.0			0.0
Permitted Option												
Adj Saturation A (vph)	129	1558		129	1617		0	1060		0	1584	
Reference Time A (s)	19.3	27.4		22.4	12.9		0.0	24.2		0.0	0.9	
Adj Saturation B (vph	NA	NA		NA	NA		0	0		0	0	
Reference Time B (s)	NA	NA		NA	NA		20.1	24.3		8.4	8.9	
Reference Time (s)		27.4			22.4			24.2			0.9	
Adj Reference Time (s)		32.4			27.4			29.2			12.0	
Split Option												
Ref Time Combined (s)	1.5	27.4		1.8	12.9		0.0	16.3		0.0	0.9	
Ref Time Seperate (s)	1.5	20.6		1.8	12.8		12.1	0.1		0.4	0.2	
Reference Time (s)	27.4	27.4		12.9	12.9		16.3	16.3		0.9	0.9	
Adj Reference Time (s)	32.4	32.4		17.9	17.9		21.3	21.3		12.0	12.0	

Summary	EB WB	NB SB	Combined
Protected Option (s)	41.4	NA	
Permitted Option (s)	32.4	29.2	
Split Option (s)	50.3	33.3	
Minimum (s)	32.4	29.2	61.6

Right Turns
Adj Reference Time (s)
Cross Thru Ref Time (s)
Oncoming Left Ref Time (s)
Combined (s)

Intersection Summary			
Intersection Capacity Utilization	61.6%	ICU Level of Service	B

Reference Times and Phasing Options do not represent an optimized timing plan.

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*West Mall Connector*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2013*

Project ID *Oakbrook Village Traffic Impact Studies - Phase 1 No Project*

East/West Street: *Oakbrook Village Internal Circ* North/South Street: *Call De Los Caballeros*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*0*	*6*	*2*	*3*	*3*	*1*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*6*	*8*	*16*	*0*	*9*	*3*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.95*		*0.95*		*0.95*		*0.95*	
Flow Rate (veh/h)	*8*		*7*		*30*		*12*	
% Heavy Vehicles	*2*		*2*		*2*		*2*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.0*		*0.4*		*0.2*		*0.0*	
Prop. Right-Turns	*0.3*		*0.1*		*0.5*		*0.3*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.1*		*0.0*		*-0.2*		*-0.1*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.01*		*0.01*		*0.03*		*0.01*	
hd, final value (s)	*3.87*		*4.03*		*3.70*		*3.84*	
x, final value	*0.01*		*0.01*		*0.03*		*0.01*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*1.9*		*2.0*		*1.7*		*1.8*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*258*		*257*		*280*		*262*	
Delay (s/veh)	*6.91*		*7.06*		*6.81*		*6.89*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*6.91*		*7.06*		*6.81*		*6.89*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*6.87*							
Intersection LOS	*A*							

 HCS+™ Version 5.5 Generated: 11/28/2011 10:41 AM

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*West Mall Connector*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2013*

Project ID *Oakbrook Village Traffic Impact Studies - Phase 1 No Project*

East/West Street: *Oakbrook Village Internal Circ* North/South Street: *Call De Los Caballeros*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*1*	*18*	*3*	*27*	*23*	*0*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*16*	*43*	*104*	*1*	*32*	*1*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.95*		*0.95*		*0.95*		*0.95*	
Flow Rate (veh/h)	*22*		*52*		*170*		*35*	
% Heavy Vehicles	*2*		*2*		*2*		*2*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.0*		*0.5*		*0.1*		*0.0*	
Prop. Right-Turns	*0.1*		*0.0*		*0.6*		*0.0*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.0*		*0.1*		*-0.3*		*0.0*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.02*		*0.05*		*0.15*		*0.03*	
hd, final value (s)	*4.34*		*4.49*		*3.78*		*4.25*	
x, final value	*0.03*		*0.06*		*0.18*		*0.04*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*2.3*		*2.5*		*1.8*		*2.3*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*272*		*302*		*420*		*285*	
Delay (s/veh)	*7.46*		*7.80*		*7.60*		*7.44*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*7.46*		*7.80*		*7.60*		*7.44*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*7.60*							
Intersection LOS	*A*							

 HCS+™ Version 5.5 Generated: 11/28/2011 10:45 AM

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*East Mall Connector*
Jurisdiction	*City of Laguna Hills*
Analysis Year	

Project ID *Oakbrook Village Traffic Impact Studies - Phase 1 No Project*

East/West Street: *Oakbrook Vill Internal Circ* North/South Street: *Calle De Los Caballeros*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*0*	*1*	*5*	*1*	*3*	*0*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*10*	*2*	*0*	*0*	*0*	*1*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.95*		*0.95*		*0.95*		*0.95*	
Flow Rate (veh/h)	*6*		*4*		*12*		*1*	
% Heavy Vehicles	*2*		*2*		*2*		*2*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.0*		*0.3*		*0.8*		*0.0*	
Prop. Right-Turns	*0.8*		*0.0*		*0.0*		*1.0*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.5*		*0.1*		*0.2*		*-0.6*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.01*		*0.00*		*0.01*		*0.00*	
hd, final value (s)	*3.47*		*4.02*		*4.12*		*3.37*	
x, final value	*0.01*		*0.00*		*0.01*		*0.00*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*1.5*		*2.0*		*2.1*		*1.4*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*256*		*254*		*262*		*251*	
Delay (s/veh)	*6.49*		*7.04*		*7.18*		*6.37*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*6.49*		*7.04*		*7.18*		*6.37*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*6.94*							
Intersection LOS	*A*							

 HCS+™ Version 5.5 Generated: 11/28/2011 10:26 AM

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*East Mall Connector*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2011*

Project ID *Oakbrook Village Traffic Impact Studies*

East/West Street: *Oakbrook Village Internal Circ* | North/South Street: *Call De Los Caballeros*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*5*	*37*	*8*	*26*	*18*	*0*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*18*	*3*	*28*	*15*	*7*	*4*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.95*		*0.95*		*0.95*		*0.95*	
Flow Rate (veh/h)	*51*		*45*		*50*		*26*	
% Heavy Vehicles	*0*		*0*		*0*		*0*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.1*		*0.6*		*0.4*		*0.6*	
Prop. Right-Turns	*0.2*		*0.0*		*0.6*		*0.2*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.1*		*0.1*		*-0.3*		*0.0*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.05*		*0.04*		*0.04*		*0.02*	
hd, final value (s)	*4.03*		*4.23*		*3.86*		*4.18*	
x, final value	*0.06*		*0.05*		*0.05*		*0.03*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*2.0*		*2.2*		*1.9*		*2.2*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*301*		*295*		*300*		*276*	
Delay (s/veh)	*7.28*		*7.47*		*7.08*		*7.31*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*7.28*		*7.47*		*7.08*		*7.31*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*7.27*							
Intersection LOS	*A*							

 HCS+™ Version 5.5 Generated: 11/28/2011 10:32 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Lonestar Ent & Ave De La Carlo*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2013*

Project Description *Oakbrook Village Traffic Impact Study - Phase 1 No Project*

East/West Street: *Avenida De La Carlotta* | North/South Street: *Lonestar Entrance*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*280*	*24*	*6*	*524*	
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*294*	*25*	*6*	*551*	*0*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*9*		*5*			
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*9*	*0*	*5*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*6*	*9*		*5*			
C (m) (veh/h)		*1238*	*435*		*884*			
v/c		*0.00*	*0.02*		*0.01*			
95% queue length		*0.01*	*0.06*		*0.02*			
Control Delay (s/veh)		*7.9*	*13.5*		*9.1*			
LOS		*A*	*B*		*A*			
Approach Delay (s/veh)	--	--	*11.9*					
Approach LOS	--	--	*B*					

HCS+™ Version 5.5 Generated: 11/27/2011 9:45 PM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	PM Peak

Site Information

Intersection	*Lonestar Ent & Ave De La Carlo*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2013*

Project Description *Oakbrook Village Traffic Impact Study - Phase 1 No Project*

East/West Street: *Avenida De La Carlotta* | North/South Street: *Lonestar Entrance*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*745*	*182*	*29*	*405*	
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*784*	*191*	*30*	*426*	*0*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*66*		*75*			
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*69*	*0*	*78*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*30*	*69*		*78*			
C (m) (veh/h)		*703*	*183*		*578*			
v/c		*0.04*	*0.38*		*0.13*			
95% queue length		*0.13*	*1.76*		*0.47*			
Control Delay (s/veh)		*10.3*	*36.5*		*12.2*			
LOS		*B*	*E*		*B*			
Approach Delay (s/veh)	--	--	*23.6*					
Approach LOS	--	--	*C*					

HCS+™ Version 5.5 Generated: 11/27/2011 9:48 PM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Trad Joe Ent & Ave De La Carlo*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2013*

Project Description *Oakbrook Village Traffic Impact Study - Phase 1 No Project*

East/West Street: *Avenida De La Carlotta* | North/South Street: *Trader Joe's Entrance*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*280*	*9*	*6*	*526*	
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*294*	*9*	*6*	*553*	*0*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*2*		*9*			
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*2*	*0*	*9*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*6*	*2*		*9*			
C (m) (veh/h)		*1255*	*439*		*893*			
v/c		*0.00*	*0.00*		*0.01*			
95% queue length		*0.01*	*0.01*		*0.03*			
Control Delay (s/veh)		*7.9*	*13.2*		*9.1*			
LOS		*A*	*B*		*A*			
Approach Delay (s/veh)	--	--	*9.8*					
Approach LOS	--	--	*A*					

HCS+™ Version 5.5

Generated: 11/28/2011 10:57 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Trad Joe Ent & Ave De La Carlo*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2013*

Project Description *Oakbrook Village Traffic Impact Study - Phase 1 No Project*

East/West Street: *Avenida De La Carlotta* | North/South Street: *Trader Joe's Entrance*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*817*	*20*	*91*	*380*	
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*860*	*21*	*95*	*400*	*0*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*21*		*162*			
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*22*	*0*	*170*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*95*	*22*		*170*			
C (m) (veh/h)		*763*	*142*		*615*			
v/c		*0.12*	*0.15*		*0.28*			
95% queue length		*0.43*	*0.55*		*1.14*			
Control Delay (s/veh)		*10.4*	*35.0*		*13.1*			
LOS		*B*	*D*		*B*			
Approach Delay (s/veh)	--	--	*15.6*					
Approach LOS	--	--	*C*					

HCS+™ Version 5.5 Generated: 12/7/2011 11:33 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	

Site Information

Intersection	*1st Fed Ent & Ave De La Carlo*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2011*

Project Description *Oakbrook Village Traffic Impact Study*

East/West Street: *Avenida De La Carlotta* | North/South Street: *1st Federal Bank Entrance*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*21*	*252*	*3*	*5*	*550*	*1*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*22*	*265*	*3*	*5*	*578*	*1*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*1*	*2*	*0*
Configuration	*L*	*T*	*TR*	*L*	*T*	*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*4*		*2*	*0*		*0*
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*0.95*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*4*	*0*	*2*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*			*LR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*	*L*		*LR*			*LR*	
v (veh/h)	*22*	*5*		*6*			*0*	
C (m) (veh/h)	*991*	*1293*		*463*				
v/c	*0.02*	*0.00*		*0.01*				
95% queue length	*0.07*	*0.01*		*0.04*				
Control Delay (s/veh)	*8.7*	*7.8*		*12.9*				
LOS	*A*	*A*		*B*				
Approach Delay (s/veh)	--	--	*12.9*					
Approach LOS	--	--	*B*					

HCS+™ Version 5.5

Generated: 11/27/2011 9:07 PM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*1st Fed Ent & Ave De La Carlo*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2013*

Project Description *Oakbrook Village Traffic Impact Study*

East/West Street: *Avenida De La Carlotta* | North/South Street: *1st Federal Bank Entrance*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*6*	*1005*	*18*	*7*	*479*	*2*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*6*	*1057*	*18*	*7*	*504*	*2*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*1*	*2*	*0*
Configuration	*L*	*T*	*TR*	*L*	*T*	*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*6*		*15*	*1*		*7*
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*0.95*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*6*	*0*	*15*	*1*	*0*	*7*
Percent Heavy Vehicles	*2*	*0*	*2*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*			*LR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*	*L*		*LR*			*LR*	
v (veh/h)	*6*	*7*		*21*			*8*	
C (m) (veh/h)	*1055*	*644*		*252*			*543*	
v/c	*0.01*	*0.01*		*0.08*			*0.01*	
95% queue length	*0.02*	*0.03*		*0.27*			*0.04*	
Control Delay (s/veh)	*8.4*	*10.7*		*20.6*			*11.7*	
LOS	*A*	*B*		*C*			*B*	
Approach Delay (s/veh)	--	--	*20.6*			*11.7*		
Approach LOS	--	--	*C*			*B*		

HCS+™ Version 5.5 Generated: 11/27/2011 9:09 PM

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (vph)	98	378	731	1043	705	307
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right				No		No
Ideal Flow	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	8.0	6.0	6.0	4.0	4.0
Refr Cycle Length (s)	100					
Volume Combined (vph)	98	378	731	1043	705	307
Lane Utilization Factor	0.97	0.95	0.95	0.89	0.97	1.00
Turning Factor (vph)	0.95	1.00	1.00	0.85	0.95	0.85
Saturated Flow (vph)	3136	3237	3237	2558	4704	1445
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00	0.00		0.00	
Protected Option Allowed		Yes	Yes		No	
Reference Time (s)	3.1	11.7	22.6	40.8		21.2
Adj Reference Time (s)	9.0	16.7	27.6	45.8		26.2
Permitted Option						
Adj Saturation A (vph)	125	1618	1618		125	
Reference Time A (s)	39.1	11.7	22.6		187.3	
Adj Saturation B (vph	NA	NA	NA		NA	
Reference Time B (s)	NA	NA	NA		NA	
Reference Time (s)		39.1	22.6			
Adj Reference Time (s)		44.1	27.6			
Split Option						
Ref Time Combined (s)	3.1	11.7	22.6		15.0	
Ref Time Seperate (s)	3.1	11.7	22.6		15.0	
Reference Time (s)	11.7	11.7	22.6		15.0	
Adj Reference Time (s)	16.7	16.7	27.6		20.0	

Summary	NW SE	SW	Combined
Protected Option (s)	36.6	NA	
Permitted Option (s)	44.1	Err	
Split Option (s)	44.3	20.0	
Minimum (s)	36.6	20.0	56.6

Right Turns	NWR	SWR
Adj Reference Time (s)	45.8	26.2
Cross Thru Ref Time (s)	0.0	27.6
Oncoming Left Ref Time (s)	9.0	0.0
Combined (s)	54.8	53.8

Intersection Summary			
Intersection Capacity Utilization	56.6%	ICU Level of Service	B

Reference Times and Phasing Options do not represent an optimized timing plan.

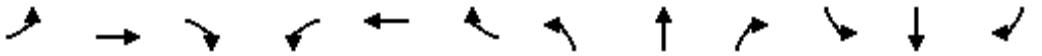
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (vph)	264	1026	526	1003	963	156
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right				No		No
Ideal Flow	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	8.0	6.0	6.0	4.0	4.0
Refr Cycle Length (s)	100					
Volume Combined (vph)	264	1026	526	1003	963	156
Lane Utilization Factor	0.97	0.95	0.95	0.89	0.97	1.00
Turning Factor (vph)	0.95	1.00	1.00	0.85	0.95	0.85
Saturated Flow (vph)	3136	3237	3237	2558	4704	1445
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00	0.00		0.00	
Protected Option Allowed		Yes	Yes		No	
Reference Time (s)	8.4	31.7	16.3	39.2		10.8
Adj Reference Time (s)	13.4	36.7	21.3	44.2		15.8
Permitted Option						
Adj Saturation A (vph)	125	1618	1618		125	
Reference Time A (s)	105.2	31.7	16.3		255.9	
Adj Saturation B (vph	NA	NA	NA		NA	
Reference Time B (s)	NA	NA	NA		NA	
Reference Time (s)		105.2	16.3			
Adj Reference Time (s)		110.2	21.3			
Split Option						
Ref Time Combined (s)	8.4	31.7	16.3		20.5	
Ref Time Seperate (s)	8.4	31.7	16.3		20.5	
Reference Time (s)	31.7	31.7	16.3		20.5	
Adj Reference Time (s)	36.7	36.7	21.3		25.5	

Summary	NW SE	SW	Combined
Protected Option (s)	36.7	NA	
Permitted Option (s)	110.2	Err	
Split Option (s)	57.9	25.5	
Minimum (s)	36.7	25.5	62.2

Right Turns	NWR	SWR
Adj Reference Time (s)	44.2	15.8
Cross Thru Ref Time (s)	0.0	21.3
Oncoming Left Ref Time (s)	13.4	0.0
Combined (s)	57.6	37.0

Intersection Summary			
Intersection Capacity Utilization	62.2%	ICU Level of Service	B

Reference Times and Phasing Options do not represent an optimized timing plan.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	224	836	2	5	738	273	9	11	4	157	5	89
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	8.0	4.0	4.0	8.0	8.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	224	838	0	5	738	273	0	24	0	0	162	89
Lane Utilization Factor	0.97	0.91	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	0.96	0.85	0.95	0.95	0.85
Saturated Flow (vph)	3136	4629	0	1615	3237	1445	0	1626	0	0	3235	1445
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	7.1	18.1	0.0	0.3	22.8	18.9			0.0			6.2
Adj Reference Time (s)	12.1	23.1	0.0	9.0	27.8	23.9			0.0			11.2
Permitted Option												
Adj Saturation A (vph)	125	1543		129	1618		0	281		0	1503	
Reference Time A (s)	89.3	18.1		3.9	22.8		0.0	8.5		0.0	10.8	
Adj Saturation B (vph	NA	NA		NA	NA		0	0		0	0	
Reference Time B (s)	NA	NA		NA	NA		8.6	9.5		12.9	13.0	
Reference Time (s)		89.3			22.8			8.5			10.8	
Adj Reference Time (s)		94.3			27.8			13.5			15.8	
Split Option												
Ref Time Combined (s)	7.1	18.1		0.3	22.8		0.0	1.5		0.0	5.0	
Ref Time Seperate (s)	7.1	18.1		0.3	22.8		0.6	0.7		4.9	0.3	
Reference Time (s)	18.1	18.1		22.8	22.8		1.5	1.5		5.0	5.0	
Adj Reference Time (s)	23.1	23.1		27.8	27.8		9.0	9.0		10.0	10.0	

Summary	EB WB	NB SB	Combined
Protected Option (s)	39.9	NA	
Permitted Option (s)	94.3	15.8	
Split Option (s)	50.9	19.0	
Minimum (s)	39.9	15.8	55.7

Right Turns	WBR	SBR
Adj Reference Time (s)	23.9	11.2
Cross Thru Ref Time (s)	9.0	27.8
Oncoming Left Ref Time (s)	12.1	9.0
Combined (s)	45.0	48.0

Intersection Summary			
Intersection Capacity Utilization	55.7%	ICU Level of Service	B

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	162	856	12	10	716	232	7	8	6	636	14	228
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	8.0	4.0	4.0	8.0	8.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	162	868	0	10	716	232	0	21	0	0	650	228
Lane Utilization Factor	0.97	0.91	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	0.94	0.85	0.95	0.95	0.85
Saturated Flow (vph)	3136	4621	0	1615	3237	1445	0	1600	0	0	3234	1445
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	5.2	18.8	0.0	0.6	22.1	16.1			0.0			15.8
Adj Reference Time (s)	10.2	23.8	0.0	9.0	27.1	21.1			0.0			20.8
Permitted Option												
Adj Saturation A (vph)	125	1540		129	1618		0	305		0	1357	
Reference Time A (s)	64.6	18.8		7.7	22.1		0.0	6.9		0.0	47.9	
Adj Saturation B (vph	NA	NA		NA	NA		0	0		0	0	
Reference Time B (s)	NA	NA		NA	NA		8.4	9.3		27.7	28.1	
Reference Time (s)		64.6			22.1			6.9			28.1	
Adj Reference Time (s)		69.6			27.1			11.9			33.1	
Split Option												
Ref Time Combined (s)	5.2	18.8		0.6	22.1		0.0	1.3		0.0	20.1	
Ref Time Seperate (s)	5.2	18.5		0.6	22.1		0.4	0.5		19.7	0.8	
Reference Time (s)	18.8	18.8		22.1	22.1		1.3	1.3		20.1	20.1	
Adj Reference Time (s)	23.8	23.8		27.1	27.1		9.0	9.0		25.1	25.1	

Summary	EB WB	NB SB	Combined
Protected Option (s)	37.3	NA	
Permitted Option (s)	69.6	33.1	
Split Option (s)	50.9	34.1	
Minimum (s)	37.3	33.1	70.4

Right Turns	WBR	SBR
Adj Reference Time (s)	21.1	20.8
Cross Thru Ref Time (s)	9.0	27.1
Oncoming Left Ref Time (s)	10.2	9.0
Combined (s)	40.2	56.9

Intersection Summary			
Intersection Capacity Utilization	70.4%	ICU Level of Service	C

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	147	195	114	7	341	528	187	49	24	757	834	26
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	100	100	100	100	100	100	100	100	100	100	100	100
Volume Combined (vph)	147	195	114	7	341	528	187	49	24	757	860	0
Lane Utilization Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85
Saturated Flow (vph)	3136	3237	1445	1615	3237	1445	1615	3237	1445	3136	3222	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	4.7	6.0	7.9	0.4	10.5	36.5	11.6	1.5	1.7	24.1	26.7	0.0
Adj Reference Time (s)	8.7	10.0	11.9	8.0	14.5	40.5	15.6	8.0	8.0	28.1	30.7	0.0
Permitted Option												
Adj Saturation A (vph)	125	1618		129	1618		129	1618		125	1611	
Reference Time A (s)	58.6	6.0		5.4	10.5		144.7	1.5		301.7	26.7	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		0	3222	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		32.1	26.7	
Reference Time (s)		58.6			10.5			144.7			32.1	
Adj Reference Time (s)		62.6			14.5			148.7			36.1	
Split Option												
Ref Time Combined (s)	4.7	6.0		0.4	10.5		11.6	1.5		24.1	26.7	
Ref Time Seperate (s)	4.7	6.0		0.4	10.5		11.6	1.5		24.1	25.9	
Reference Time (s)	6.0	6.0		10.5	10.5		11.6	11.6		26.7	26.7	
Adj Reference Time (s)	10.0	10.0		14.5	14.5		15.6	15.6		30.7	30.7	

Summary	NW SE	NE SW	Combined
Protected Option (s)	23.2	46.3	
Permitted Option (s)	62.6	148.7	
Split Option (s)	24.6	46.3	
Minimum (s)	23.2	46.3	69.5

Right Turns	SER	NWR	NER
Adj Reference Time (s)	11.9	40.5	8.0
Cross Thru Ref Time (s)	30.7	8.0	10.0
Oncoming Left Ref Time (s)	8.0	8.7	28.1
Combined (s)	50.6	57.2	46.2

Intersection Summary			
Intersection Capacity Utilization	69.5%	ICU Level of Service	C

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	304	734	421	28	271	480	152	99	81	680	359	33
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	100	100	100	100	100	100	100	100	100	100	100	100
Volume Combined (vph)	304	734	421	28	271	480	152	99	81	680	392	0
Lane Utilization Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85	0.95	0.99	0.85
Saturated Flow (vph)	3136	3237	1445	1615	3237	1445	1615	3237	1445	3136	3196	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	9.7	22.7	29.1	1.7	8.4	33.2	9.4	3.1	5.6	21.7	12.3	0.0
Adj Reference Time (s)	13.7	26.7	33.1	8.0	12.4	37.2	13.4	8.0	9.6	25.7	16.3	0.0
Permitted Option												
Adj Saturation A (vph)	125	1618		129	1618		129	1618		125	1598	
Reference Time A (s)	121.2	22.7		21.7	8.4		117.6	3.1		271.0	12.3	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		0	3196	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		29.7	12.3	
Reference Time (s)		121.2			21.7			117.6			29.7	
Adj Reference Time (s)		125.2			25.7			121.6			33.7	
Split Option												
Ref Time Combined (s)	9.7	22.7		1.7	8.4		9.4	3.1		21.7	12.3	
Ref Time Seperate (s)	9.7	22.7		1.7	8.4		9.4	3.1		21.7	11.2	
Reference Time (s)	22.7	22.7		8.4	8.4		9.4	9.4		21.7	21.7	
Adj Reference Time (s)	26.7	26.7		12.4	12.4		13.4	13.4		25.7	25.7	

Summary	NW SE	NE SW	Combined
Protected Option (s)	34.7	33.7	
Permitted Option (s)	125.2	121.6	
Split Option (s)	39.0	39.1	
Minimum (s)	34.7	33.7	68.4

Right Turns	SER	NWR	NER
Adj Reference Time (s)	33.1	37.2	9.6
Cross Thru Ref Time (s)	16.3	8.0	26.7
Oncoming Left Ref Time (s)	8.0	13.7	25.7
Combined (s)	57.4	58.9	62.0

Intersection Summary			
Intersection Capacity Utilization	68.4%	ICU Level of Service	C

Reference Times and Phasing Options do not represent an optimized timing plan.

Appendix E

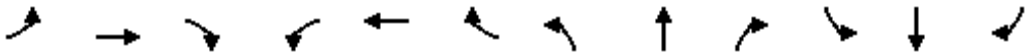
Intersection Analysis: Phase I – With Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	332	523	105	289	615	160	165	445	175	179	1358	309
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91		0.97	0.91	1.00	0.97	0.91	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3072	4550	1417	1583	4409		3072	4550	1417	3072	4423	
Flt Permitted	0.95	1.00	1.00	0.24	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3072	4550	1417	406	4409		3072	4550	1417	3072	4423	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	361	568	114	314	668	174	179	484	190	195	1476	336
RTOR Reduction (vph)	0	0	92	0	36	0	0	0	113	0	28	0
Lane Group Flow (vph)	361	568	22	314	806	0	179	484	77	195	1784	0
Turn Type	Prot		Perm	pm+pt			Prot		Perm	Prot		
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases			6	2					8			
Actuated Green, G (s)	15.0	23.1	23.1	44.1	26.1		10.3	50.6	50.6	11.7	52.0	
Effective Green, g (s)	16.0	25.4	25.4	46.1	28.4		11.3	52.9	52.9	12.7	54.3	
Actuated g/C Ratio	0.12	0.20	0.20	0.35	0.22		0.09	0.41	0.41	0.10	0.42	
Clearance Time (s)	6.0	7.3	7.3	6.0	7.3		6.0	7.3	7.3	6.0	7.3	
Vehicle Extension (s)	2.0	4.0	4.0	3.0	4.0		2.0	5.0	5.0	2.0	5.0	
Lane Grp Cap (vph)	378	889	277	316	963		267	1852	577	300	1847	
v/s Ratio Prot	0.12	0.12		c0.15	0.18		0.06	0.11		c0.06	c0.40	
v/s Ratio Perm			0.02	c0.21					0.05			
v/c Ratio	0.96	0.64	0.08	0.99	0.84		0.67	0.26	0.13	0.65	0.97	
Uniform Delay, d1	56.6	48.1	42.8	35.9	48.6		57.5	25.6	24.2	56.5	36.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	34.2	3.5	0.6	48.7	8.6		5.1	0.2	0.2	3.8	13.9	
Delay (s)	90.8	51.6	43.3	84.6	57.2		62.7	25.7	24.4	60.3	50.9	
Level of Service	F	D	D	F	E		E	C	C	E	D	
Approach Delay (s)		64.3			64.6			33.2			51.8	
Approach LOS		E			E			C			D	

Intersection Summary			
HCM Average Control Delay	54.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

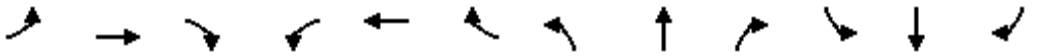
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	201	742	221	246	564	152	293	1655	334	186	578	297
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91		0.97	0.91	1.00	0.97	0.91	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3072	4550	1417	1583	4405		3072	4550	1417	3072	4318	
Flt Permitted	0.95	1.00	1.00	0.13	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3072	4550	1417	224	4405		3072	4550	1417	3072	4318	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	218	807	240	267	613	165	318	1799	363	202	628	323
RTOR Reduction (vph)	0	0	165	0	38	0	0	0	184	0	69	0
Lane Group Flow (vph)	218	807	75	267	741	0	318	1799	179	202	882	0
Turn Type	Prot		Perm	pm+pt			Prot		Perm	Prot		
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases			6	2					8			
Actuated Green, G (s)	11.5	23.7	23.7	47.7	30.2		16.8	51.1	51.1	10.6	44.9	
Effective Green, g (s)	12.5	26.0	26.0	48.7	32.5		17.8	53.4	53.4	11.6	47.2	
Actuated g/C Ratio	0.10	0.20	0.20	0.37	0.25		0.14	0.41	0.41	0.09	0.36	
Clearance Time (s)	6.0	7.3	7.3	6.0	7.3		6.0	7.3	7.3	6.0	7.3	
Vehicle Extension (s)	2.0	4.0	4.0	3.0	4.0		2.0	5.0	5.0	2.0	5.0	
Lane Grp Cap (vph)	295	910	283	283	1101		421	1869	582	274	1568	
v/s Ratio Prot	0.07	0.18		c0.14	0.17		c0.10	c0.40		0.07	0.20	
v/s Ratio Perm			0.05	c0.22					0.13			
v/c Ratio	0.74	0.89	0.27	0.94	0.67		0.76	0.96	0.31	0.74	0.56	
Uniform Delay, d1	57.2	50.6	43.9	36.7	44.0		54.0	37.3	25.8	57.7	33.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	8.1	12.5	2.3	38.3	3.3		6.7	13.3	0.6	8.6	0.8	
Delay (s)	65.2	63.0	46.2	75.0	47.2		60.7	50.6	26.5	66.3	33.9	
Level of Service	E	E	D	E	D		E	D	C	E	C	
Approach Delay (s)		60.2			54.3			48.4			39.6	
Approach LOS		E			D			D			D	

Intersection Summary			
HCM Average Control Delay	50.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	92.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	57	819	104	97	860	45	123	79	85	80	46	117
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		0.91	0.91		0.91	0.91	
Frt	1.00	0.98		1.00	0.99		1.00	0.93		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.99		0.95	1.00	
Satd. Flow (prot)	1583	4473		1583	4516		1441	2812		1441	2716	
Flt Permitted	0.20	1.00		0.16	1.00		0.63	0.87		0.12	0.71	
Satd. Flow (perm)	339	4473		270	4516		955	2475		178	1943	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	62	890	113	105	935	49	134	86	92	87	50	127
RTOR Reduction (vph)	0	10	0	0	3	0	0	78	0	0	94	0
Lane Group Flow (vph)	62	993	0	105	981	0	103	131	0	78	92	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	7	4		3	8			2			1	
Permitted Phases	4			8			2			1		
Actuated Green, G (s)	51.0	44.5		57.2	47.6		19.4	19.4		33.5	33.5	
Effective Green, g (s)	52.0	46.0		58.2	49.1		19.9	19.9		34.0	34.0	
Actuated g/C Ratio	0.40	0.35		0.45	0.38		0.15	0.15		0.26	0.26	
Clearance Time (s)	5.5	6.5		5.5	6.5		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	203	1583		223	1706		146	379		47	508	
v/s Ratio Prot	0.02	c0.22		c0.04	c0.22							
v/s Ratio Perm	0.11			0.17			c0.11	0.05		c0.44	0.05	
v/c Ratio	0.31	0.63		0.47	0.57		0.71	0.35		1.66	0.18	
Uniform Delay, d1	25.0	34.9		23.2	32.2		52.3	49.2		48.0	37.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	1.9		0.6	1.4		14.4	0.6		373.4	0.2	
Delay (s)	25.3	36.8		23.7	33.6		66.7	49.8		421.4	37.4	
Level of Service	C	D		C	C		E	D		F	D	
Approach Delay (s)		36.1			32.6			55.4			150.8	
Approach LOS		D			C			E			F	

Intersection Summary			
HCM Average Control Delay	48.0	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

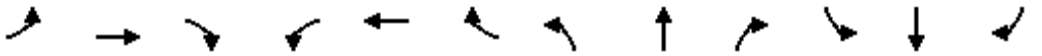


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	264	960	161	154	836	147	110	72	98	73	53	99
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		0.91	0.91		0.91	0.91	
Frt	1.00	0.98		1.00	0.98		1.00	0.92		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	4452		1583	4448		1441	2782		1441	2745	
Flt Permitted	0.11	1.00		0.13	1.00		0.64	0.91		0.09	0.74	
Satd. Flow (perm)	190	4452		222	4448		967	2536		141	2038	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	287	1043	175	167	909	160	120	78	107	79	58	108
RTOR Reduction (vph)	0	17	0	0	19	0	0	94	0	0	72	0
Lane Group Flow (vph)	287	1201	0	167	1050	0	101	110	0	71	102	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	7	4		3	8			2			1	
Permitted Phases	4			8			2			1		
Actuated Green, G (s)	54.4	38.0		40.4	29.5		15.6	15.6		42.5	42.5	
Effective Green, g (s)	54.9	39.5		41.4	31.0		16.1	16.1		43.0	43.0	
Actuated g/C Ratio	0.42	0.30		0.32	0.24		0.12	0.12		0.33	0.33	
Clearance Time (s)	5.5	6.5		5.5	6.5		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	293	1353		190	1061		120	314		47	674	
v/s Ratio Prot	c0.15	0.27		0.08	0.24							
v/s Ratio Perm	c0.26			0.20			c0.10	0.04		c0.50	0.05	
v/c Ratio	0.98	0.89		0.88	0.99		0.84	0.35		1.51	0.15	
Uniform Delay, d1	39.0	43.1		35.3	49.3		55.7	52.2		43.5	30.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	46.2	8.9		32.9	25.2		38.5	0.7		313.0	0.1	
Delay (s)	85.2	52.0		68.2	74.6		94.2	52.8		356.5	30.7	
Level of Service	F	D		E	E		F	D		F	C	
Approach Delay (s)		58.4			73.7			66.5			125.1	
Approach LOS		E			E			E			F	

Intersection Summary			
HCM Average Control Delay	69.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

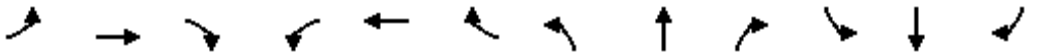
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	84	688	196	281	516	7	219	166	239	36	609	241
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91		0.97	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3072	4550	1417	3072	4540		3072	3167	1417	1583	3167	1417
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.64	1.00	1.00
Satd. Flow (perm)	3072	4550	1417	3072	4540		3072	3167	1417	1064	3167	1417
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	748	213	305	561	8	238	180	260	39	662	262
RTOR Reduction (vph)	0	0	140	0	1	0	0	0	167	0	0	188
Lane Group Flow (vph)	91	748	73	305	568	0	238	180	93	39	662	74
Turn Type	Prot		Perm	Prot			Prot		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2						8	4		4
Actuated Green, G (s)	7.6	44.2	44.2	16.9	53.5		14.0	46.1	46.1	37.7	34.9	34.9
Effective Green, g (s)	7.1	44.7	44.7	16.4	54.0		13.5	46.6	46.6	36.7	35.4	35.4
Actuated g/C Ratio	0.05	0.34	0.34	0.13	0.42		0.10	0.36	0.36	0.28	0.27	0.27
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5		4.5	5.5	5.5	4.5	5.5	5.5
Vehicle Extension (s)	2.0	4.0	4.0	2.0	4.0		2.0	4.0	4.0	2.0	4.0	4.0
Lane Grp Cap (vph)	168	1565	487	388	1886		319	1135	508	310	862	386
v/s Ratio Prot	0.03	c0.16		c0.10	0.13		c0.08	0.06		0.00	c0.21	
v/s Ratio Perm			0.05						0.07	0.03		0.05
v/c Ratio	0.54	0.48	0.15	0.79	0.30		0.75	0.16	0.18	0.13	0.77	0.19
Uniform Delay, d1	59.9	33.5	29.5	55.1	25.4		56.6	28.4	28.6	34.3	43.5	36.3
Progression Factor	1.00	1.00	1.00	0.86	1.35		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	1.0	0.7	9.3	0.4		8.1	0.1	0.2	0.1	4.4	0.3
Delay (s)	61.8	34.5	30.2	56.7	34.6		64.6	28.5	28.9	34.4	47.9	36.6
Level of Service	E	C	C	E	C		E	C	C	C	D	D
Approach Delay (s)		36.0			42.3			41.3			44.3	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	40.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	101	988	190	229	581	17	358	208	308	49	636	104
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91		0.97	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3072	4550	1417	3072	4531		3072	3167	1417	1583	3167	1417
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.61	1.00	1.00
Satd. Flow (perm)	3072	4550	1417	3072	4531		3072	3167	1417	1018	3167	1417
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	110	1074	207	249	632	18	389	226	335	53	691	113
RTOR Reduction (vph)	0	0	123	0	2	0	0	0	175	0	0	78
Lane Group Flow (vph)	110	1074	84	249	648	0	389	226	160	53	691	35
Turn Type	Prot		Perm	Prot			Prot		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2						8	4		4
Actuated Green, G (s)	8.4	42.8	42.8	13.8	48.2		19.9	50.6	50.6	36.3	33.5	33.5
Effective Green, g (s)	7.9	43.3	43.3	13.3	48.7		19.4	51.1	51.1	35.3	34.0	34.0
Actuated g/C Ratio	0.06	0.33	0.33	0.10	0.37		0.15	0.39	0.39	0.27	0.26	0.26
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5		4.5	5.5	5.5	4.5	5.5	5.5
Vehicle Extension (s)	2.0	4.0	4.0	2.0	4.0		2.0	4.0	4.0	2.0	4.0	4.0
Lane Grp Cap (vph)	187	1516	472	314	1697		458	1245	557	286	828	371
v/s Ratio Prot	0.04	c0.24		c0.08	0.14		c0.13	0.07		0.00	c0.22	
v/s Ratio Perm			0.06						0.11	0.05		0.02
v/c Ratio	0.59	0.71	0.18	0.79	0.38		0.85	0.18	0.29	0.19	0.83	0.09
Uniform Delay, d1	59.5	37.8	30.7	57.0	29.7		53.9	25.8	27.0	35.7	45.3	36.3
Progression Factor	1.00	1.00	1.00	0.89	0.65		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.0	2.8	0.8	11.9	0.6		13.2	0.1	0.4	0.1	7.6	0.2
Delay (s)	62.5	40.7	31.5	62.6	19.8		67.1	25.9	27.4	35.9	52.9	36.5
Level of Service	E	D	C	E	B		E	C	C	D	D	D
Approach Delay (s)		41.0			31.6			43.3			49.7	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	41.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

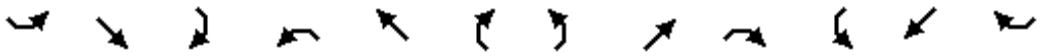


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	894	44	230	725	17	13	3	92	8	5	7
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	0.97	0.86	1.00	0.97	0.91	1.00	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)	3072	5733	1417	3072	4550	1417	1583	1667	1417		1615	1417
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.75	1.00	1.00		0.82	1.00
Satd. Flow (perm)	3072	5733	1417	3072	4550	1417	1247	1667	1417		1361	1417
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	972	48	250	788	18	14	3	100	9	5	8
RTOR Reduction (vph)	0	0	14	0	0	3	0	0	93	0	0	7
Lane Group Flow (vph)	9	972	34	250	788	15	14	3	7	0	14	1
Turn Type	Prot		Perm	Prot		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			4			4	
Permitted Phases			6			2	4		4	4		4
Actuated Green, G (s)	1.0	92.1	92.1	14.4	105.5	105.5	8.5	8.5	8.5		8.5	8.5
Effective Green, g (s)	0.5	92.6	92.6	13.9	106.0	106.0	8.5	8.5	8.5		8.5	8.5
Actuated g/C Ratio	0.00	0.71	0.71	0.11	0.82	0.82	0.07	0.07	0.07		0.07	0.07
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5	5.5	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	1.5	4.0	4.0	1.5	4.0	4.0	1.5	1.5	1.5		1.5	1.5
Lane Grp Cap (vph)	12	4084	1009	328	3710	1155	82	109	93		89	93
v/s Ratio Prot	0.00	c0.17		c0.08	0.17			0.00				
v/s Ratio Perm			0.02			0.01	c0.01		0.00		0.01	0.00
v/c Ratio	0.75	0.24	0.03	0.76	0.21	0.01	0.17	0.03	0.07		0.16	0.01
Uniform Delay, d1	64.7	6.5	5.5	56.4	2.7	2.2	57.4	56.9	57.0		57.4	56.8
Progression Factor	0.82	0.38	0.10	1.04	0.19	0.02	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	112.0	0.1	0.1	8.4	0.1	0.0	0.4	0.0	0.1		0.3	0.0
Delay (s)	165.0	2.6	0.6	67.0	0.6	0.1	57.8	56.9	57.2		57.7	56.8
Level of Service	F	A	A	E	A	A	E	E	E		E	E
Approach Delay (s)		3.9			16.3			57.2			57.4	
Approach LOS		A			B			E			E	

Intersection Summary			
HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

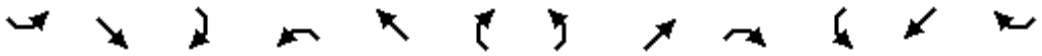
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	1306	215	266	721	6	74	14	436	14	7	11
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	0.97	0.86	1.00	0.97	0.91	1.00	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)	3072	5733	1417	3072	4550	1417	1583	1667	1417		1614	1417
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.74	1.00	1.00		0.87	1.00
Satd. Flow (perm)	3072	5733	1417	3072	4550	1417	1237	1667	1417		1450	1417
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	1420	234	289	784	7	80	15	474	15	8	12
RTOR Reduction (vph)	0	0	102	0	0	2	0	0	229	0	0	10
Lane Group Flow (vph)	9	1420	132	289	784	5	80	15	245	0	23	2
Turn Type	Prot		Perm	Prot		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			4			4	
Permitted Phases			6			2	4		4	4		4
Actuated Green, G (s)	1.0	72.6	72.6	16.1	87.7	87.7	26.3	26.3	26.3		26.3	26.3
Effective Green, g (s)	0.5	73.1	73.1	15.6	88.2	88.2	26.3	26.3	26.3		26.3	26.3
Actuated g/C Ratio	0.00	0.56	0.56	0.12	0.68	0.68	0.20	0.20	0.20		0.20	0.20
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5	5.5	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	1.5	4.0	4.0	1.5	4.0	4.0	1.5	1.5	1.5		1.5	1.5
Lane Grp Cap (vph)	12	3224	797	369	3087	961	250	337	287		293	287
v/s Ratio Prot	0.00	c0.25		c0.09	0.17			0.01				
v/s Ratio Perm			0.09			0.00	0.06		c0.17		0.02	0.00
v/c Ratio	0.75	0.44	0.17	0.78	0.25	0.01	0.32	0.04	0.85		0.08	0.01
Uniform Delay, d1	64.7	16.6	13.7	55.6	8.1	6.7	44.2	41.7	50.0		42.0	41.4
Progression Factor	0.95	0.64	0.52	0.73	2.14	2.32	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	106.1	0.4	0.4	9.0	0.2	0.0	0.3	0.0	20.4		0.0	0.0
Delay (s)	167.5	11.0	7.6	49.6	17.6	15.7	44.5	41.8	70.4		42.1	41.4
Level of Service	F	B	A	D	B	B	D	D	E		D	D
Approach Delay (s)		11.4			26.1			66.0			41.9	
Approach LOS		B			C			E			D	

Intersection Summary			
HCM Average Control Delay	25.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



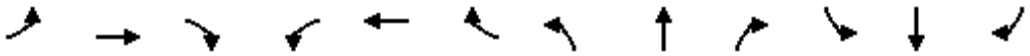
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	607	220	132	18	109	464	0	1045	23	129	816	731
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0		5.0		5.0	5.0	5.0
Lane Util. Factor	0.86	0.86	1.00		1.00	0.88		0.86		1.00	0.91	0.88
Frt	1.00	1.00	0.85		1.00	0.85		1.00		1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00		0.99	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)	2723	2800	1417		1655	2493		5715		1583	4550	2493
Flt Permitted	0.95	0.65	1.00		0.84	1.00		1.00		0.18	1.00	1.00
Satd. Flow (perm)	2723	1856	1417		1406	2493		5715		307	4550	2493
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	660	239	143	20	118	504	0	1136	25	140	887	795
RTOR Reduction (vph)	0	0	32	0	0	294	0	4	0	0	0	465
Lane Group Flow (vph)	442	457	111	0	138	210	0	1157	0	140	887	330
Turn Type	Prot		Perm	Perm		Perm				pm+pt		Perm
Protected Phases	3	8			4			2		1	6	
Permitted Phases			8	4		4				6		6
Actuated Green, G (s)	13.3	27.5	27.5		8.7	8.7		17.2		26.5	26.5	26.5
Effective Green, g (s)	13.8	28.0	28.0		9.2	9.2		17.7		26.0	27.0	27.0
Actuated g/C Ratio	0.21	0.43	0.43		0.14	0.14		0.27		0.40	0.42	0.42
Clearance Time (s)	5.5	5.5	5.5		5.5	5.5		5.5		4.5	5.5	5.5
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0		2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	578	1000	610		199	353		1556		207	1890	1036
v/s Ratio Prot	c0.16	0.10						c0.20		c0.04	0.19	
v/s Ratio Perm		0.10	0.08		c0.10	0.08				0.23		0.13
v/c Ratio	0.76	0.46	0.18		0.69	0.59		0.74		0.68	0.47	0.32
Uniform Delay, d1	24.1	13.1	11.4		26.6	26.1		21.6		14.0	13.8	12.8
Progression Factor	1.00	1.00	1.00		1.00	1.00		1.48		1.00	1.00	1.00
Incremental Delay, d2	5.4	0.1	0.1		8.2	1.8		3.2		6.7	0.8	0.8
Delay (s)	29.5	13.2	11.5		34.7	27.9		35.2		20.7	14.6	13.6
Level of Service	C	B	B		C	C		D		C	B	B
Approach Delay (s)		19.9			29.4			35.2			14.7	
Approach LOS		B			C			D			B	

Intersection Summary			
HCM Average Control Delay	23.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



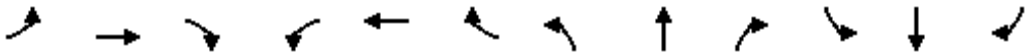
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	789	583	145	44	86	497	0	1567	45	338	887	692
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0		5.0		5.0	5.0	5.0
Lane Util. Factor	0.86	0.86	1.00		1.00	0.88		0.86		1.00	0.91	0.88
Frt	1.00	1.00	0.85		1.00	0.85		1.00		1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00		0.98	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)	2723	2843	1417		1639	2493		5709		1583	4550	2493
Flt Permitted	0.95	0.69	1.00		0.57	1.00		1.00		0.09	1.00	1.00
Satd. Flow (perm)	2723	1983	1417		945	2493		5709		155	4550	2493
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	858	634	158	48	93	540	0	1703	49	367	964	752
RTOR Reduction (vph)	0	0	51	0	0	412	0	3	0	0	0	370
Lane Group Flow (vph)	729	763	107	0	141	128	0	1749	0	367	964	382
Turn Type	Prot		Perm	Perm		Perm				pm+pt		Perm
Protected Phases	3	8			4			2		1	6	
Permitted Phases			8	4		4				6		6
Actuated Green, G (s)	29.5	53.5	53.5		18.5	18.5		38.5		65.5	65.5	65.5
Effective Green, g (s)	30.0	54.0	54.0		19.0	19.0		39.0		65.0	66.0	66.0
Actuated g/C Ratio	0.23	0.42	0.42		0.15	0.15		0.30		0.50	0.51	0.51
Clearance Time (s)	5.5	5.5	5.5		5.5	5.5		5.5		4.5	5.5	5.5
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0		2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	628	1022	589		138	364		1713		319	2310	1266
v/s Ratio Prot	c0.27	0.17						0.31		c0.19	0.21	
v/s Ratio Perm		0.14	0.08		c0.15	0.05				c0.38		0.15
v/c Ratio	1.16	0.75	0.18		1.02	0.35		1.02		1.15	0.42	0.30
Uniform Delay, d1	50.0	32.2	24.0		55.5	50.0		45.5		41.2	20.0	18.6
Progression Factor	1.00	1.00	1.00		1.00	1.00		1.11		1.00	1.00	1.00
Incremental Delay, d2	89.2	2.6	0.1		82.5	0.2		26.0		97.6	0.6	0.6
Delay (s)	139.2	34.8	24.1		138.0	50.2		76.5		138.8	20.5	19.2
Level of Service	F	C	C		F	D		E		F	C	B
Approach Delay (s)		79.9			68.4			76.5			40.9	
Approach LOS		E			E			E			D	

Intersection Summary			
HCM Average Control Delay	64.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	97.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	301	45	14	476	2	12	1	8	2	0	2
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.98		1.00	1.00			0.95			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.98	
Satd. Flow (prot)	1583	3105		1583	3165			1535			1516	
Flt Permitted	0.46	1.00		0.53	1.00			1.00			1.00	
Satd. Flow (perm)	767	3105		881	3165			1579			1554	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	327	49	15	517	2	13	1	9	2	0	2
RTOR Reduction (vph)	0	5	0	0	0	0	0	9	0	0	2	0
Lane Group Flow (vph)	9	371	0	15	519	0	0	14	0	0	2	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	48.5	47.7		48.5	47.7			1.3			1.3	
Effective Green, g (s)	47.5	48.2		47.5	48.2			1.3			1.3	
Actuated g/C Ratio	0.73	0.74		0.73	0.74			0.02			0.02	
Clearance Time (s)	4.5	5.5		4.5	5.5			5.0			5.0	
Vehicle Extension (s)	2.0	4.0		2.0	4.0			3.0			3.0	
Lane Grp Cap (vph)	566	2310		649	2354			32			31	
v/s Ratio Prot	0.00	0.12		c0.00	c0.16							
v/s Ratio Perm	0.01			0.02				c0.01			0.00	
v/c Ratio	0.02	0.16		0.02	0.22			0.44			0.07	
Uniform Delay, d1	2.3	2.4		2.3	2.5			31.4			31.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	0.1		0.0	0.2			9.5			0.9	
Delay (s)	2.3	2.6		2.3	2.8			40.9			32.1	
Level of Service	A	A		A	A			D			C	
Approach Delay (s)		2.6			2.7			40.9			32.1	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM Average Control Delay	3.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	64.8	Sum of lost time (s)	15.0
Intersection Capacity Utilization	31.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	26	649	212	30	388	2	196	1	59	7	3	4
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.96		1.00	1.00			0.97			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.97	
Satd. Flow (prot)	1583	3050		1583	3164			1555			1565	
Flt Permitted	0.50	1.00		0.23	1.00			0.77			0.85	
Satd. Flow (perm)	841	3050		391	3164			1238			1366	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	28	705	230	33	422	2	213	1	64	8	3	4
RTOR Reduction (vph)	0	26	0	0	0	0	0	13	0	0	3	0
Lane Group Flow (vph)	28	909	0	33	424	0	0	265	0	0	12	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	44.4	43.2		45.8	43.9			21.9			21.9	
Effective Green, g (s)	43.4	43.7		44.8	44.4			21.9			21.9	
Actuated g/C Ratio	0.53	0.53		0.55	0.54			0.27			0.27	
Clearance Time (s)	4.5	5.5		4.5	5.5			5.0			5.0	
Vehicle Extension (s)	2.0	4.0		2.0	4.0			3.0			3.0	
Lane Grp Cap (vph)	451	1625		234	1713			331			365	
v/s Ratio Prot	0.00	c0.30		c0.00	0.13							
v/s Ratio Perm	0.03			0.07				c0.21			0.01	
v/c Ratio	0.06	0.56		0.14	0.25			0.80			0.03	
Uniform Delay, d1	9.2	12.7		9.3	10.0			28.0			22.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	1.4		0.1	0.3			12.9			0.0	
Delay (s)	9.3	14.1		9.4	10.3			40.9			22.3	
Level of Service	A	B		A	B			D			C	
Approach Delay (s)		14.0			10.2			40.9			22.3	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	82.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*10/03/2012*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*West Mall Connector*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2013*

Project ID *Oakbrook Village Traffic Impact Studies - Phase 1 No Project*

East/West Street: *Oakbrook Village Internal Circ* | North/South Street: *Call De Los Caballeros*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*0*	*6*	*2*	*3*	*5*	*1*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*7*	*8*	*16*	*0*	*9*	*3*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.95*		*0.95*		*0.95*		*0.95*	
Flow Rate (veh/h)	*8*		*9*		*31*		*12*	
% Heavy Vehicles	*2*		*2*		*2*		*2*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.0*		*0.3*		*0.2*		*0.0*	
Prop. Right-Turns	*0.3*		*0.1*		*0.5*		*0.3*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.1*		*0.0*		*-0.2*		*-0.1*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.01*		*0.01*		*0.03*		*0.01*	
hd, final value (s)	*3.88*		*4.03*		*3.72*		*3.85*	
x, final value	*0.01*		*0.01*		*0.03*		*0.01*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*1.9*		*2.0*		*1.7*		*1.8*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*258*		*259*		*281*		*262*	
Delay (s/veh)	*6.91*		*7.07*		*6.84*		*6.90*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*6.91*		*7.07*		*6.84*		*6.90*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*6.89*							
Intersection LOS	*A*							

HCS+™ Version 5.5 Generated: 10/3/2012 6:55 AM

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*08/27/2012*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*West Mall Connector*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2013*

Project ID *Oakbrook Village Traffic Impact Studies - Phase 1 With Proj*

East/West Street: *Oakbrook Village Internal Circ* | North/South Street: *Call De Los Caballeros*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*1*	*19*	*4*	*27*	*23*	*0*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*16*	*43*	*104*	*1*	*32*	*1*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.95*		*0.95*		*0.95*		*0.95*	
Flow Rate (veh/h)	*25*		*52*		*170*		*35*	
% Heavy Vehicles	*2*		*2*		*2*		*2*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.0*		*0.5*		*0.1*		*0.0*	
Prop. Right-Turns	*0.2*		*0.0*		*0.6*		*0.0*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.1*		*0.1*		*-0.3*		*0.0*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.02*		*0.05*		*0.15*		*0.03*	
hd, final value (s)	*4.33*		*4.49*		*3.79*		*4.26*	
x, final value	*0.03*		*0.06*		*0.18*		*0.04*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*2.3*		*2.5*		*1.8*		*2.3*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*275*		*302*		*420*		*285*	
Delay (s/veh)	*7.46*		*7.80*		*7.61*		*7.44*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*7.46*		*7.80*		*7.61*		*7.44*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*7.61*							
Intersection LOS	*A*							

HCS+™ Version 5.5 Generated: 10/3/2012 12:35 PM

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*10/03/2012*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*East Mall Connector*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2013*

Project ID *Oakbrook Village Traffic Impact Studie - Phase 1 WithProject*

East/West Street: *Oakbrook Vill Internal Circ* | North/South Street: *Calle De Los Caballeros*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*0*	*1*	*5*	*1*	*3*	*0*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*12*	*2*	*0*	*0*	*0*	*1*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.95*		*0.95*		*0.95*		*0.95*	
Flow Rate (veh/h)	*6*		*4*		*14*		*1*	
% Heavy Vehicles	*2*		*2*		*2*		*2*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.0*		*0.3*		*0.9*		*0.0*	
Prop. Right-Turns	*0.8*		*0.0*		*0.0*		*1.0*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.5*		*0.1*		*0.2*		*-0.6*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.01*		*0.00*		*0.01*		*0.00*	
hd, final value (s)	*3.47*		*4.02*		*4.13*		*3.37*	
x, final value	*0.01*		*0.00*		*0.02*		*0.00*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*1.5*		*2.0*		*2.1*		*1.4*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*256*		*254*		*264*		*251*	
Delay (s/veh)	*6.49*		*7.04*		*7.19*		*6.37*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*6.49*		*7.04*		*7.19*		*6.37*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*6.97*							
Intersection LOS	*A*							

HCS+™ Version 5.5 Generated: 10/3/2012 7:03 AM

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*10/03/2012*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*East Mall Connector*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2013*

Project ID *Oakbrook Village Traffic Impact Studies*

East/West Street: *Oakbrook Village Internal Circ* | North/South Street: *Call De Los Caballeros*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*5*	*37*	*9*	*26*	*18*	*0*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*18*	*3*	*28*	*15*	*7*	*4*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.95*		*0.95*		*0.95*		*0.95*	
Flow Rate (veh/h)	*52*		*45*		*50*		*26*	
% Heavy Vehicles	*0*		*0*		*0*		*0*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.1*		*0.6*		*0.4*		*0.6*	
Prop. Right-Turns	*0.2*		*0.0*		*0.6*		*0.2*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.1*		*0.1*		*-0.3*		*0.0*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.05*		*0.04*		*0.04*		*0.02*	
hd, final value (s)	*4.02*		*4.23*		*3.86*		*4.18*	
x, final value	*0.06*		*0.05*		*0.05*		*0.03*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*2.0*		*2.2*		*1.9*		*2.2*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*302*		*295*		*300*		*276*	
Delay (s/veh)	*7.27*		*7.47*		*7.08*		*7.31*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*7.27*		*7.47*		*7.08*		*7.31*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*7.27*							
Intersection LOS	*A*							

HCS+™ Version 5.5 Generated: 10/3/2012 1:31 PM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*10/03/2012*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*North Ent & Ave De La Carlota*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2013*

Project Description *Oakbrook Village Traffic Impact Study - Phase 1 With Project*

East/West Street: *Avenida De La Carlota* | North/South Street: *Lonestar Entrance (North Ent)*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*748*	*186*	*30*	*385*	
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*787*	*195*	*31*	*405*	*0*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*60*		*68*			
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*63*	*0*	*71*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*31*	*63*		*71*			
C (m) (veh/h)		*699*	*183*		*576*			
v/c		*0.04*	*0.34*		*0.12*			
95% queue length		*0.14*	*1.54*		*0.42*			
Control Delay (s/veh)		*10.4*	*34.9*		*12.1*			
LOS		*B*	*D*		*B*			
Approach Delay (s/veh)	--	--	*22.8*					
Approach LOS	--	--	*C*					

HCS+™ Version 5.5 Generated: 10/3/2012 1:34 PM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*10/03/2012*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*North Ent & Ave De La Carlota*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2013*

Project Description *Oakbrook Village Traffic Impact Study - Phase 1 With Project*

East/West Street: *Avenida De La Carlotta* | North/South Street: *Lonestar Entrance (North Ent)*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*280*	*27*	*6*	*586*	
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*294*	*28*	*6*	*616*	*0*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*21*		*12*			
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*22*	*0*	*12*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*6*	*22*		*12*			
C (m) (veh/h)		*1235*	*413*		*883*			
v/c		*0.00*	*0.05*		*0.01*			
95% queue length		*0.01*	*0.17*		*0.04*			
Control Delay (s/veh)		*7.9*	*14.2*		*9.1*			
LOS		*A*	*B*		*A*			
Approach Delay (s/veh)	--	--	*12.4*					
Approach LOS	--	--	*B*					

HCS+™ Version 5.5 Generated: 10/3/2012 10:12 AM

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Volume (vph)	59	21	287	10	6	532
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1583	1417	3150		1583	3167
Flt Permitted	0.95	1.00	1.00		0.50	1.00
Satd. Flow (perm)	1583	1417	3150		829	3167
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	23	312	11	7	578
RTOR Reduction (vph)	0	21	2	0	0	0
Lane Group Flow (vph)	64	2	321	0	7	578
Turn Type		Perm			pm+pt	
Protected Phases	4		2		1	6
Permitted Phases		4			6	
Actuated Green, G (s)	5.9	5.9	42.1		48.1	48.1
Effective Green, g (s)	5.9	5.9	42.1		48.1	48.1
Actuated g/C Ratio	0.09	0.09	0.66		0.75	0.75
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	4.0	4.0	4.0		2.0	4.0
Lane Grp Cap (vph)	146	131	2072		635	2380
v/s Ratio Prot	c0.04		0.10		0.00	c0.18
v/s Ratio Perm		0.00			0.01	
v/c Ratio	0.44	0.02	0.15		0.01	0.24
Uniform Delay, d1	27.5	26.4	4.2		2.2	2.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.9	0.1	0.2		0.0	0.2
Delay (s)	30.3	26.5	4.3		2.2	2.7
Level of Service	C	C	A		A	A
Approach Delay (s)	29.3		4.3			2.7
Approach LOS	C		A			A

Intersection Summary			
HCM Average Control Delay	5.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	64.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	30.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Volume (vph)	2	148	811	22	94	380
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	1.00		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1583	1417	3154		1583	3167
Flt Permitted	0.95	1.00	1.00		0.23	1.00
Satd. Flow (perm)	1583	1417	3154		390	3167
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	161	882	24	102	413
RTOR Reduction (vph)	0	143	2	0	0	0
Lane Group Flow (vph)	2	18	904	0	102	413
Turn Type		Perm			pm+pt	
Protected Phases	4		2		1	6
Permitted Phases		4			6	
Actuated Green, G (s)	6.6	6.6	32.1		41.9	41.9
Effective Green, g (s)	6.6	6.6	32.1		41.9	41.9
Actuated g/C Ratio	0.11	0.11	0.55		0.72	0.72
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	4.0	4.0	4.0		2.0	4.0
Lane Grp Cap (vph)	179	160	1731		377	2268
v/s Ratio Prot	0.00		c0.29		c0.02	0.13
v/s Ratio Perm		c0.01			0.17	
v/c Ratio	0.01	0.11	0.52		0.27	0.18
Uniform Delay, d1	23.1	23.3	8.3		3.5	2.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.4	1.1		0.1	0.2
Delay (s)	23.1	23.8	9.5		3.6	2.9
Level of Service	C	C	A		A	A
Approach Delay (s)	23.7		9.5			3.0
Approach LOS	C		A			A

Intersection Summary			
HCM Average Control Delay	8.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	58.5	Sum of lost time (s)	15.0
Intersection Capacity Utilization	50.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*08/27/2012*
Analysis Time Period	*AM Peak Period*

Site Information

Intersection	*1st Fed Ent & Ave De La Carlo*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2013*

Project Description *Oakbrook Village Traffic Impact Study - Phase 1 With Project*

East/West Street: *Avenida De La Carlotta* | North/South Street: *1st Federal Bank Entrance*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*19*	*251*	*3*	*5*	*505*	*1*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*20*	*264*	*3*	*5*	*531*	*1*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*1*	*2*	*0*
Configuration	*L*	*T*	*TR*	*L*	*T*	*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*9*			*0*		*0*
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*0.95*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*9*	*0*	*5*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*			*LR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*	*L*		*LR*			*LR*	
v (veh/h)	*20*	*5*		*14*			*0*	
C (m) (veh/h)	*1032*	*1294*		*490*				
v/c	*0.02*	*0.00*		*0.03*				
95% queue length	*0.06*	*0.01*		*0.09*				
Control Delay (s/veh)	*8.6*	*7.8*		*12.6*				
LOS	*A*	*A*		*B*				
Approach Delay (s/veh)	--	--	*12.6*					
Approach LOS	--	--	*B*					

HCS+™ Version 5.5 Generated: 10/3/2012 10:16 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*08/27/2012*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*1st Fed Ent & Ave De La Carlo*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2013*

Project Description *Oakbrook Village Traffic Impact Study - Phase 1 With Project*

East/West Street: *Avenida De La Carlotta* | North/South Street: *1st Federal Bank Entrance*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*6*	*986*	*19*	*7*	*481*	*2*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*6*	*1037*	*20*	*7*	*506*	*2*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*1*	*2*	*0*
Configuration	*L*	*T*	*TR*	*L*	*T*	*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*6*		*14*	*1*		*7*
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*0.95*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*6*	*0*	*14*	*1*	*0*	*7*
Percent Heavy Vehicles	*2*	*0*	*2*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*			*LR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*	*L*		*LR*			*LR*	
v (veh/h)	*6*	*7*		*20*			*8*	
C (m) (veh/h)	*1053*	*655*		*253*			*545*	
v/c	*0.01*	*0.01*		*0.08*			*0.01*	
95% queue length	*0.02*	*0.03*		*0.26*			*0.04*	
Control Delay (s/veh)	*8.4*	*10.6*		*20.4*			*11.7*	
LOS	*A*	*B*		*C*			*B*	
Approach Delay (s/veh)	--	--	*20.4*			*11.7*		
Approach LOS	--	--	*C*			*B*		

HCS+™ Version 5.5

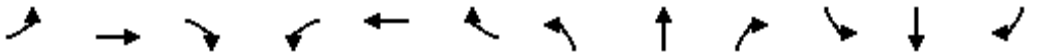
Generated: 10/3/2012 1:38 PM

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (vph)	98	377	731	1044	711	309
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.97	0.95	0.95	0.88	0.94	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3072	3167	3167	2493	4465	1417
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3072	3167	3167	2493	4465	1417
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	107	410	795	1135	773	336
RTOR Reduction (vph)	0	0	0	444	0	248
Lane Group Flow (vph)	107	410	795	691	773	88
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	8.4	91.1	78.7	78.7	27.9	27.9
Effective Green, g (s)	7.4	91.6	79.2	79.2	28.4	28.4
Actuated g/C Ratio	0.06	0.70	0.61	0.61	0.22	0.22
Clearance Time (s)	4.0	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	1.5	5.0	5.0	5.0	2.0	2.0
Lane Grp Cap (vph)	175	2232	1929	1519	975	310
v/s Ratio Prot	c0.03	0.13	0.25		c0.17	
v/s Ratio Perm				c0.28		0.06
v/c Ratio	0.61	0.18	0.41	0.46	0.79	0.28
Uniform Delay, d1	59.9	6.5	13.3	13.7	48.0	42.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.4	0.2	0.7	1.0	4.2	0.2
Delay (s)	64.3	6.7	13.9	14.7	52.2	42.5
Level of Service	E	A	B	B	D	D
Approach Delay (s)		18.6	14.4		49.3	
Approach LOS		B	B		D	

Intersection Summary			
HCM Average Control Delay	25.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

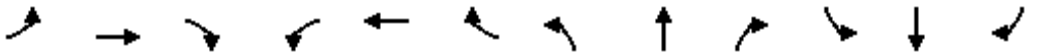
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (vph)	263	1026	526	1004	958	155
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.97	0.95	0.95	0.88	0.94	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3072	3167	3167	2493	4465	1417
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3072	3167	3167	2493	4465	1417
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	286	1115	572	1091	1041	168
RTOR Reduction (vph)	0	0	0	561	0	121
Lane Group Flow (vph)	286	1115	572	530	1041	47
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	16.1	82.8	62.7	62.7	36.2	36.2
Effective Green, g (s)	15.1	83.3	63.2	63.2	36.7	36.7
Actuated g/C Ratio	0.12	0.64	0.49	0.49	0.28	0.28
Clearance Time (s)	4.0	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	1.5	5.0	5.0	5.0	2.0	2.0
Lane Grp Cap (vph)	357	2029	1540	1212	1261	400
v/s Ratio Prot	c0.09	c0.35	0.18		c0.23	
v/s Ratio Perm				0.21		0.03
v/c Ratio	0.80	0.55	0.37	0.44	0.83	0.12
Uniform Delay, d1	56.0	12.9	20.9	21.8	43.7	34.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.5	1.1	0.7	1.2	4.3	0.0
Delay (s)	67.5	14.0	21.6	23.0	48.0	34.7
Level of Service	E	B	C	C	D	C
Approach Delay (s)		24.9	22.5		46.1	
Approach LOS		C	C		D	

Intersection Summary			
HCM Average Control Delay	30.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	62.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	225	836	2	5	739	273	9	11	4	171	5	97
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.91		1.00	0.95	1.00		1.00		0.95	0.95	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98		0.95	0.95	1.00
Satd. Flow (prot)	3072	4549		1583	3167	1417		1601		1504	1512	1417
Flt Permitted	0.95	1.00		0.30	1.00	1.00		0.63		0.74	0.72	1.00
Satd. Flow (perm)	3072	4549		501	3167	1417		1027		1172	1137	1417
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	245	909	2	5	803	297	10	12	4	186	5	105
RTOR Reduction (vph)	0	0	0	0	0	158	0	4	0	0	0	88
Lane Group Flow (vph)	245	911	0	5	803	139	0	22	0	95	96	17
Turn Type	Prot			pm+pt		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			3			4	
Permitted Phases				6		6	3			4		4
Actuated Green, G (s)	12.0	55.6		45.2	44.4	44.4		4.4		14.5	14.5	14.5
Effective Green, g (s)	11.5	56.6		44.2	45.4	45.4		4.4		15.5	15.5	15.5
Actuated g/C Ratio	0.12	0.58		0.46	0.47	0.47		0.05		0.16	0.16	0.16
Clearance Time (s)	4.5	6.0		4.5	6.0	6.0		5.0		6.0	6.0	6.0
Vehicle Extension (s)	2.0	5.0		2.0	5.0	5.0		2.0		4.0	4.0	4.0
Lane Grp Cap (vph)	365	2660		232	1485	665		47		188	182	227
v/s Ratio Prot	c0.08	0.20		0.00	c0.25							
v/s Ratio Perm				0.01		0.10		c0.02		0.08	c0.08	0.01
v/c Ratio	0.67	0.34		0.02	0.54	0.21		0.47		0.51	0.53	0.07
Uniform Delay, d1	40.8	10.4		14.3	18.3	15.1		45.1		37.1	37.3	34.6
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	3.8	0.4		0.0	1.4	0.7		2.7		2.9	3.6	0.2
Delay (s)	44.6	10.8		14.4	19.7	15.8		47.8		40.0	40.9	34.7
Level of Service	D	B		B	B	B		D		D	D	C
Approach Delay (s)		18.0			18.6			47.8			38.4	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM Average Control Delay	20.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	96.8	Sum of lost time (s)	20.0
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	162	857	12	10	716	234	7	8	6	622	14	223
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.91		1.00	0.95	1.00		1.00		0.95	0.95	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98		0.95	0.95	1.00
Satd. Flow (prot)	3072	4541		1583	3167	1417		1575		1504	1511	1417
Flt Permitted	0.95	1.00		0.27	1.00	1.00		0.43		0.74	0.72	1.00
Satd. Flow (perm)	3072	4541		457	3167	1417		689		1174	1136	1417
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	176	932	13	11	778	254	8	9	7	676	15	242
RTOR Reduction (vph)	0	1	0	0	0	164	0	7	0	0	0	158
Lane Group Flow (vph)	176	944	0	11	778	90	0	17	0	345	346	84
Turn Type	Prot			pm+pt		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			3			4	
Permitted Phases				6		6	3			4		4
Actuated Green, G (s)	9.3	49.5		41.4	40.8	40.8		6.2		39.8	39.8	39.8
Effective Green, g (s)	8.8	50.5		40.4	41.8	41.8		6.2		40.8	40.8	40.8
Actuated g/C Ratio	0.07	0.43		0.34	0.36	0.36		0.05		0.35	0.35	0.35
Clearance Time (s)	4.5	6.0		4.5	6.0	6.0		5.0		6.0	6.0	6.0
Vehicle Extension (s)	2.0	5.0		2.0	5.0	5.0		2.0		4.0	4.0	4.0
Lane Grp Cap (vph)	230	1950		158	1126	504		36		407	394	492
v/s Ratio Prot	c0.06	0.21		0.00	c0.25							
v/s Ratio Perm				0.02		0.06		c0.03		0.29	c0.30	0.06
v/c Ratio	0.77	0.48		0.07	0.69	0.18		0.48		0.85	0.88	0.17
Uniform Delay, d1	53.4	24.2		27.1	32.4	26.1		54.1		35.5	36.1	26.7
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	12.7	0.9		0.1	3.5	0.8		3.7		15.6	19.8	0.2
Delay (s)	66.1	25.0		27.1	35.9	26.9		57.8		51.1	55.9	26.9
Level of Service	E	C		C	D	C		E		D	E	C
Approach Delay (s)		31.5			33.6			57.8			46.6	
Approach LOS		C			C			E			D	

Intersection Summary			
HCM Average Control Delay	36.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	117.6	Sum of lost time (s)	20.0
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	147	195	114	7	346	538	187	49	25	758	834	26
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3072	3167	1417	1583	3167	1417	1583	3167	1417	3072	3152	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3072	3167	1417	1583	3167	1417	1583	3167	1417	3072	3152	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	160	212	124	8	376	585	203	53	27	824	907	28
RTOR Reduction (vph)	0	0	89	0	0	453	0	0	22	0	3	0
Lane Group Flow (vph)	160	212	35	8	376	132	203	53	5	824	932	0
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		
Protected Phases	1	6		5	2		4	4		8	8	
Permitted Phases			6			2			4			
Actuated Green, G (s)	5.2	22.4	22.4	0.8	18.0	18.0	14.0	14.0	14.0	26.8	26.8	
Effective Green, g (s)	5.2	22.4	22.4	0.8	18.0	18.0	14.0	14.0	14.0	26.8	26.8	
Actuated g/C Ratio	0.07	0.28	0.28	0.01	0.22	0.22	0.18	0.18	0.18	0.34	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	200	887	397	16	713	319	277	554	248	1029	1056	
v/s Ratio Prot	c0.05	0.07		0.01	c0.12		c0.13	0.02		0.27	c0.30	
v/s Ratio Perm			0.02			0.09			0.00			
v/c Ratio	0.80	0.24	0.09	0.50	0.53	0.41	0.73	0.10	0.02	0.80	0.88	
Uniform Delay, d1	36.9	22.2	21.3	39.4	27.3	26.5	31.2	27.7	27.3	24.2	25.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	20.0	0.6	0.4	22.5	2.8	3.9	9.6	0.1	0.0	4.6	8.9	
Delay (s)	56.9	22.9	21.7	61.9	30.0	30.4	40.8	27.8	27.3	28.7	34.0	
Level of Service	E	C	C	E	C	C	D	C	C	C	C	
Approach Delay (s)		33.6			30.5			37.1			31.5	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM Average Control Delay	32.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	304	737	421	28	270	477	152	99	81	683	359	33
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3072	3167	1417	1583	3167	1417	1583	3167	1417	3072	3127	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3072	3167	1417	1583	3167	1417	1583	3167	1417	3072	3127	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	330	801	458	30	293	518	165	108	88	742	390	36
RTOR Reduction (vph)	0	0	198	0	0	408	0	0	73	0	9	0
Lane Group Flow (vph)	330	801	260	30	293	110	165	108	15	742	417	0
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		
Protected Phases	1	6		5	2		4	4		8	8	
Permitted Phases			6			2			4			
Actuated Green, G (s)	9.4	23.7	23.7	1.6	15.9	15.9	12.7	12.7	12.7	21.0	21.0	
Effective Green, g (s)	9.4	23.7	23.7	1.6	15.9	15.9	12.7	12.7	12.7	21.0	21.0	
Actuated g/C Ratio	0.13	0.32	0.32	0.02	0.21	0.21	0.17	0.17	0.17	0.28	0.28	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	385	1001	448	34	671	300	268	536	240	860	876	
v/s Ratio Prot	c0.11	c0.25		0.02	0.09		c0.10	0.03		c0.24	0.13	
v/s Ratio Perm			0.18			0.08			0.01			
v/c Ratio	0.86	0.80	0.58	0.88	0.44	0.37	0.62	0.20	0.06	0.86	0.48	
Uniform Delay, d1	32.1	23.5	21.5	36.6	25.7	25.2	28.9	26.8	26.2	25.6	22.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	16.9	6.7	5.4	106.5	2.1	3.4	4.2	0.2	0.1	8.9	0.4	
Delay (s)	49.0	30.2	26.9	143.1	27.7	28.7	33.0	27.0	26.3	34.6	22.8	
Level of Service	D	C	C	F	C	C	C	C	C	C	C	
Approach Delay (s)		33.2			32.4			29.6			30.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	31.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Appendix F

Intersection Analysis: Phase II – No Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	341	539	108	297	627	166	170	457	181	184	1398	318
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	10.0	10.0	4.0	10.0	4.0	4.0	10.0	10.0	4.0	10.0	4.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	341	539	108	297	793	0	170	457	181	184	1716	0
Lane Utilization Factor	0.97	0.91	1.00	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	0.97	0.85	0.95	1.00	0.85	0.95	0.97	0.85
Saturated Flow (vph)	3136	4631	1445	1615	4485	0	3136	4631	1445	3136	4502	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	10.9	11.6	7.5	18.4	17.7	0.0	5.4	9.9	12.5	5.9	38.1	0.0
Adj Reference Time (s)	15.9	16.6	15.0	23.4	22.7	0.0	10.4	15.0	17.5	10.9	43.1	0.0
Permitted Option												
Adj Saturation A (vph)	125	1544		129	1495		125	1544		125	1501	
Reference Time A (s)	135.9	11.6		229.9	17.7		67.8	9.9		73.3	38.1	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time (s)		135.9			229.9			67.8			73.3	
Adj Reference Time (s)		140.9			234.9			72.8			78.3	
Split Option												
Ref Time Combined (s)	10.9	11.6		18.4	17.7		5.4	9.9		5.9	38.1	
Ref Time Seperate (s)	10.9	11.6		18.4	14.0		5.4	9.9		5.9	31.1	
Reference Time (s)	11.6	11.6		18.4	18.4		9.9	9.9		38.1	38.1	
Adj Reference Time (s)	16.6	16.6		23.4	23.4		15.0	15.0		43.1	43.1	

Summary	EB WB	NW SE	Combined
Protected Option (s)	40.0	53.5	
Permitted Option (s)	234.9	78.3	
Split Option (s)	40.0	58.1	
Minimum (s)	40.0	53.5	93.6

Right Turns	EBR	SER
Adj Reference Time (s)	15.0	17.5
Cross Thru Ref Time (s)	15.0	22.7
Oncoming Left Ref Time (s)	23.4	10.9
Combined (s)	53.4	51.1

Intersection Summary			
Intersection Capacity Utilization	93.6%	ICU Level of Service	F

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	207	763	228	252	584	157	302	1704	343	192	597	306
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	10.0	10.0	4.0	10.0	4.0	4.0	10.0	10.0	4.0	10.0	4.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	207	763	228	252	741	0	302	1704	343	192	903	0
Lane Utilization Factor	0.97	0.91	1.00	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	0.97	0.85	0.95	1.00	0.85	0.95	0.95	0.85
Saturated Flow (vph)	3136	4631	1445	1615	4484	0	3136	4631	1445	3136	4395	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	6.6	16.5	15.8	15.6	16.5	0.0	9.6	36.8	23.7	6.1	20.5	0.0
Adj Reference Time (s)	11.6	21.5	20.8	20.6	21.5	0.0	14.6	41.8	28.7	11.1	25.5	0.0
Permitted Option												
Adj Saturation A (vph)	125	1544		129	1495		125	1544		125	1465	
Reference Time A (s)	82.5	16.5		195.0	16.5		120.4	36.8		76.5	20.5	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time (s)		82.5			195.0			120.4			76.5	
Adj Reference Time (s)		87.5			200.0			125.4			81.5	
Split Option												
Ref Time Combined (s)	6.6	16.5		15.6	16.5		9.6	36.8		6.1	20.5	
Ref Time Seperate (s)	6.6	16.5		15.6	13.0		9.6	36.8		6.1	13.6	
Reference Time (s)	16.5	16.5		16.5	16.5		36.8	36.8		20.5	20.5	
Adj Reference Time (s)	21.5	21.5		21.5	21.5		41.8	41.8		25.5	25.5	

Summary	EB WB	NW SE	Combined
Protected Option (s)	42.1	52.9	
Permitted Option (s)	200.0	125.4	
Split Option (s)	43.0	67.3	
Minimum (s)	42.1	52.9	95.0

Right Turns	EBR	SER
Adj Reference Time (s)	20.8	28.7
Cross Thru Ref Time (s)	41.8	21.5
Oncoming Left Ref Time (s)	20.6	11.1
Combined (s)	83.2	61.4

Intersection Summary			
Intersection Capacity Utilization	95.0%	ICU Level of Service	F

Reference Times and Phasing Options do not represent an optimized timing plan.

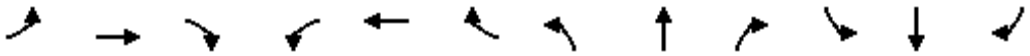
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	844	107	100	878	45	127	81	88	82	46	121
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	10.0	4.0	4.0	10.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	60	951	0	100	923	0	0	296	0	0	249	0
Lane Utilization Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Turning Factor (vph)	0.95	0.98	0.85	0.95	0.99	0.85	0.95	0.93	0.85	0.95	0.91	0.85
Saturated Flow (vph)	1615	4553	0	1615	4597	0	0	4539	0	0	4427	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	3.7	20.9	0.0	6.2	20.1	0.0			0.0			0.0
Adj Reference Time (s)	9.0	25.9	0.0	11.2	25.1	0.0			0.0			0.0
Permitted Option												
Adj Saturation A (vph)	129	1518		129	1532		0	182		0	177	
Reference Time A (s)	46.4	20.9		77.4	20.1		0.0	69.9		0.0	46.3	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time (s)		46.4			77.4			69.9			46.3	
Adj Reference Time (s)		51.4			82.4			74.9			51.3	
Split Option												
Ref Time Combined (s)	3.7	20.9		6.2	20.1		0.0	6.5		0.0	5.6	
Ref Time Seperate (s)	3.7	18.5		6.2	19.1		3.9	2.7		2.5	1.6	
Reference Time (s)	20.9	20.9		20.1	20.1		6.5	6.5		5.6	5.6	
Adj Reference Time (s)	25.9	25.9		25.1	25.1		11.5	11.5		10.6	10.6	

Summary	EB WB	NB SB	Combined
Protected Option (s)	37.1	NA	
Permitted Option (s)	82.4	74.9	
Split Option (s)	51.0	22.1	
Minimum (s)	37.1	22.1	59.2

Right Turns
Adj Reference Time (s)
Cross Thru Ref Time (s)
Oncoming Left Ref Time (s)
Combined (s)

Intersection Summary			
Intersection Capacity Utilization	59.2%	ICU Level of Service	B

Reference Times and Phasing Options do not represent an optimized timing plan.



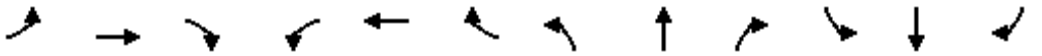
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	273	987	167	160	862	150	113	75	101	102	56	102
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	10.0	4.0	4.0	10.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	273	1154	0	160	1012	0	0	289	0	0	260	0
Lane Utilization Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Turning Factor (vph)	0.95	0.98	0.85	0.95	0.98	0.85	0.95	0.93	0.85	0.95	0.92	0.85
Saturated Flow (vph)	1615	4530	0	1615	4528	0	0	4511	0	0	4480	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	16.9	25.5	0.0	9.9	22.4	0.0			0.0			0.0
Adj Reference Time (s)	21.9	30.5	0.0	14.9	27.4	0.0			0.0			0.0
Permitted Option												
Adj Saturation A (vph)	129	1510		129	1509		0	180		0	179	
Reference Time A (s)	211.3	25.5		123.8	22.4		0.0	62.6		0.0	56.9	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time (s)		211.3			123.8			62.6			56.9	
Adj Reference Time (s)		216.3			128.8			67.6			61.9	
Split Option												
Ref Time Combined (s)	16.9	25.5		9.9	22.4		0.0	6.4		0.0	5.8	
Ref Time Seperate (s)	16.9	21.8		9.9	19.0		3.5	2.5		3.2	1.9	
Reference Time (s)	25.5	25.5		22.4	22.4		6.4	6.4		5.8	5.8	
Adj Reference Time (s)	30.5	30.5		27.4	27.4		11.4	11.4		10.8	10.8	

Summary	EB WB	NB SB	Combined
Protected Option (s)	49.3	NA	
Permitted Option (s)	216.3	67.6	
Split Option (s)	57.8	22.2	
Minimum (s)	49.3	22.2	71.5

Right Turns
Adj Reference Time (s)
Cross Thru Ref Time (s)
Oncoming Left Ref Time (s)
Combined (s)

Intersection Summary			
Intersection Capacity Utilization	71.5%	ICU Level of Service	C

Reference Times and Phasing Options do not represent an optimized timing plan.



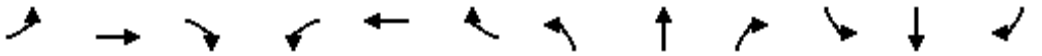
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	87	709	202	290	524	7	226	172	245	36	627	247
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	8.0	8.0	4.0	8.0	4.0	4.0	8.0	8.0	4.0	8.0	8.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	87	709	202	290	531	0	226	172	245	36	627	247
Lane Utilization Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85
Saturated Flow (vph)	3136	4631	1445	3136	4622	0	3136	3237	1445	1615	3237	1445
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	2.8	15.3	14.0	9.2	11.5	0.0	7.2	5.3	17.0	2.2	19.4	17.1
Adj Reference Time (s)	9.0	20.3	19.0	14.2	16.5	0.0	12.2	13.0	22.0	9.0	24.4	22.1
Permitted Option												
Adj Saturation A (vph)	125	1544		125	1541		125	1618		129	1618	
Reference Time A (s)	34.7	15.3		115.6	11.5		90.1	5.3		27.9	19.4	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time (s)		34.7			115.6			90.1			27.9	
Adj Reference Time (s)		39.7			120.6			95.1			32.9	
Split Option												
Ref Time Combined (s)	2.8	15.3		9.2	11.5		7.2	5.3		2.2	19.4	
Ref Time Seperate (s)	2.8	15.3		9.2	11.3		7.2	5.3		2.2	19.4	
Reference Time (s)	15.3	15.3		11.5	11.5		7.2	7.2		19.4	19.4	
Adj Reference Time (s)	20.3	20.3		16.5	16.5		13.0	13.0		24.4	24.4	

Summary	EB WB	NB SB	Combined
Protected Option (s)	34.6	36.6	
Permitted Option (s)	120.6	95.1	
Split Option (s)	36.8	37.4	
Minimum (s)	34.6	36.6	71.1

Right Turns	EBR	NBR	SBR
Adj Reference Time (s)	19.0	22.0	22.1
Cross Thru Ref Time (s)	24.4	20.3	16.5
Oncoming Left Ref Time (s)	14.2	9.0	12.2
Combined (s)	57.6	51.3	50.8

Intersection Summary			
Intersection Capacity Utilization	71.1%	ICU Level of Service	C

Reference Times and Phasing Options do not represent an optimized timing plan.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	104	1017	196	235	601	18	370	214	317	49	654	107
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	8.0	8.0	4.0	8.0	4.0	4.0	8.0	8.0	4.0	8.0	8.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	104	1017	196	235	619	0	370	214	317	49	654	107
Lane Utilization Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85
Saturated Flow (vph)	3136	4631	1445	3136	4611	0	3136	3237	1445	1615	3237	1445
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	3.3	22.0	13.6	7.5	13.4	0.0	11.8	6.6	21.9	3.0	20.2	7.4
Adj Reference Time (s)	9.0	27.0	18.6	12.5	18.4	0.0	16.8	13.0	26.9	9.0	25.2	13.0
Permitted Option												
Adj Saturation A (vph)	125	1544		125	1537		125	1618		129	1618	
Reference Time A (s)	41.4	22.0		93.7	13.4		147.5	6.6		37.9	20.2	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time (s)		41.4			93.7			147.5			37.9	
Adj Reference Time (s)		46.4			98.7			152.5			42.9	
Split Option												
Ref Time Combined (s)	3.3	22.0		7.5	13.4		11.8	6.6		3.0	20.2	
Ref Time Seperate (s)	3.3	22.0		7.5	13.0		11.8	6.6		3.0	20.2	
Reference Time (s)	22.0	22.0		13.4	13.4		11.8	11.8		20.2	20.2	
Adj Reference Time (s)	27.0	27.0		18.4	18.4		16.8	16.8		25.2	25.2	

Summary	EB WB	NB SB	Combined
Protected Option (s)	39.5	42.0	
Permitted Option (s)	98.7	152.5	
Split Option (s)	45.4	42.0	
Minimum (s)	39.5	42.0	81.5

Right Turns	EBR	NBR	SBR
Adj Reference Time (s)	18.6	26.9	13.0
Cross Thru Ref Time (s)	25.2	27.0	18.4
Oncoming Left Ref Time (s)	12.5	9.0	16.8
Combined (s)	56.3	62.9	48.2

Intersection Summary			
Intersection Capacity Utilization	81.5%	ICU Level of Service	D

Reference Times and Phasing Options do not represent an optimized timing plan.

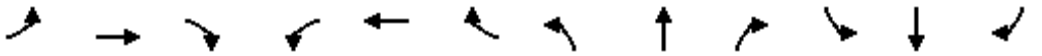
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	921	44	236	743	18	10	3	95	8	5	7
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	10.0	10.0	4.0	10.0	10.0	8.0	8.0	8.0	8.0	8.0	8.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	8	921	44	236	743	18	10	3	95	0	13	7
Lane Utilization Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85	0.95	0.97	0.85
Saturated Flow (vph)	3136	6174	1445	3136	4631	1445	1615	1700	1445	0	1648	1445
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	0.3	14.9	3.0	7.5	16.0	1.2			6.6			0.5
Adj Reference Time (s)	9.0	19.9	15.0	12.5	21.0	15.0			13.0			13.0
Permitted Option												
Adj Saturation A (vph)	125	1544		125	1544		129	1700		0	188	
Reference Time A (s)	3.2	14.9		94.1	16.0		7.7	0.2		0.0	6.9	
Adj Saturation B (vph	NA	NA		NA	NA		0	1700		0	0	
Reference Time B (s)	NA	NA		NA	NA		8.6	0.2		8.5	8.8	
Reference Time (s)		14.9			94.1			7.7			6.9	
Adj Reference Time (s)		19.9			99.1			13.0			13.0	
Split Option												
Ref Time Combined (s)	0.3	14.9		7.5	16.0		0.6	0.2		0.0	0.8	
Ref Time Seperate (s)	0.3	14.9		7.5	16.0		0.6	0.2		0.5	0.3	
Reference Time (s)	14.9	14.9		16.0	16.0		0.6	0.6		0.8	0.8	
Adj Reference Time (s)	19.9	19.9		21.0	21.0		13.0	13.0		13.0	13.0	

Summary	EB WB	NB SB	Combined
Protected Option (s)	32.4	NA	
Permitted Option (s)	99.1	13.0	
Split Option (s)	41.0	26.0	
Minimum (s)	32.4	13.0	45.4

Right Turns	EBR	WBR	NBR	SBR
Adj Reference Time (s)	15.0	15.0	13.0	13.0
Cross Thru Ref Time (s)	13.0	13.0	19.9	21.0
Oncoming Left Ref Time (s)	12.5	9.0	13.0	13.0
Combined (s)	40.5	37.0	45.9	47.0

Intersection Summary			
Intersection Capacity Utilization	47.0%	ICU Level of Service	A

Reference Times and Phasing Options do not represent an optimized timing plan.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	1346	219	275	744	6	77	14	448	14	7	11
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	10.0	10.0	4.0	10.0	10.0	8.0	8.0	8.0	8.0	8.0	8.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	8	1346	219	275	744	6	77	14	448	0	21	11
Lane Utilization Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85	0.95	0.97	0.85
Saturated Flow (vph)	3136	6174	1445	3136	4631	1445	1615	1700	1445	0	1643	1445
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	0.3	21.8	15.2	8.8	16.1	0.4			31.0			0.8
Adj Reference Time (s)	9.0	26.8	20.2	13.8	21.1	15.0			36.0			13.0
Permitted Option												
Adj Saturation A (vph)	125	1544		125	1544		129	1700		0	176	
Reference Time A (s)	3.2	21.8		109.6	16.1		59.6	0.8		0.0	11.9	
Adj Saturation B (vph	NA	NA		NA	NA		0	1700		0	0	
Reference Time B (s)	NA	NA		NA	NA		12.8	0.8		8.9	9.3	
Reference Time (s)		21.8			109.6			12.8			9.3	
Adj Reference Time (s)		26.8			114.6			17.8			14.3	
Split Option												
Ref Time Combined (s)	0.3	21.8		8.8	16.1		4.8	0.8		0.0	1.3	
Ref Time Seperate (s)	0.3	21.8		8.8	16.1		4.8	0.8		0.9	0.4	
Reference Time (s)	21.8	21.8		16.1	16.1		4.8	4.8		1.3	1.3	
Adj Reference Time (s)	26.8	26.8		21.1	21.1		13.0	13.0		13.0	13.0	

Summary	EB WB	NB SB	Combined
Protected Option (s)	40.6	NA	
Permitted Option (s)	114.6	17.8	
Split Option (s)	47.9	26.0	
Minimum (s)	40.6	17.8	58.3

Right Turns	EBR	WBR	NBR	SBR
Adj Reference Time (s)	20.2	15.0	36.0	13.0
Cross Thru Ref Time (s)	13.0	13.0	26.8	21.1
Oncoming Left Ref Time (s)	13.8	9.0	13.0	13.0
Combined (s)	46.9	37.0	75.8	47.1

Intersection Summary			
Intersection Capacity Utilization	75.8%	ICU Level of Service	D

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	625	223	136	15	97	421	0	1076	23	132	841	754
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	6.0	6.0	6.0	8.0	8.0	8.0	4.0	8.0	4.0	4.0	8.0	8.0
Refr Cycle Length (s)	100	100	100	100	100	100	100	100	100	100	100	100
Volume Combined (vph)	0	848	136	0	112	421	0	1099	0	132	841	754
Lane Utilization Factor	0.97	0.95	1.00	1.00	1.00	0.89	1.00	0.91	1.00	1.00	0.91	0.89
Turning Factor (vph)	0.95	0.96	0.85	0.95	0.99	0.85	0.95	1.00	0.85	0.95	1.00	0.85
Saturated Flow (vph)	0	6235	1445	0	1689	2558	0	6155	0	1615	4631	2558
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		No			No			Yes			Yes	
Reference Time (s)			9.4			16.5	0.0	17.9	0.0	8.2	18.2	29.5
Adj Reference Time (s)			14.4			21.5	0.0	22.9	0.0	13.2	23.2	34.5
Permitted Option												
Adj Saturation A (vph)	0	249		0	639		0	1539		129	1544	
Reference Time A (s)	0.0	250.6		0.0	17.5		0.0	17.9		102.2	18.2	
Adj Saturation B (vph	0	1618		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	21.3	19.5		NA	NA		NA	NA		NA	NA	
Reference Time (s)		21.3			17.5			17.9			102.2	
Adj Reference Time (s)		26.3			22.5			22.9			107.2	
Split Option												
Ref Time Combined (s)	0.0	13.6		0.0	6.6		0.0	17.9		8.2	18.2	
Ref Time Seperate (s)	13.3	6.9		0.9	5.7		0.0	17.5		8.2	18.2	
Reference Time (s)	13.6	13.6		6.6	6.6		17.9	17.9		18.2	18.2	
Adj Reference Time (s)	18.6	18.6		13.0	13.0		22.9	22.9		23.2	23.2	

Summary	NW SE	NE SW	Combined
Protected Option (s)	NA	36.0	
Permitted Option (s)	26.3	107.2	
Split Option (s)	31.6	46.0	
Minimum (s)	26.3	36.0	62.3

Right Turns	SER	NWR	SWR
Adj Reference Time (s)	14.4	21.5	34.5
Cross Thru Ref Time (s)	23.2	22.9	13.0
Oncoming Left Ref Time (s)	13.0	18.6	0.0
Combined (s)	50.6	62.9	47.5

Intersection Summary			
Intersection Capacity Utilization	62.9%	ICU Level of Service	B

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	812	595	149	47	94	533	0	1614	46	348	914	713
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	6.0	6.0	6.0	8.0	8.0	8.0	4.0	8.0	4.0	4.0	8.0	8.0
Refr Cycle Length (s)	100	100	100	100	100	100	100	100	100	100	100	100
Volume Combined (vph)	0	1407	149	0	141	533	0	1660	0	348	914	713
Lane Utilization Factor	0.97	0.95	1.00	1.00	1.00	0.89	1.00	0.91	1.00	1.00	0.91	0.89
Turning Factor (vph)	0.95	0.97	0.85	0.95	0.98	0.85	0.95	1.00	0.85	0.95	1.00	0.85
Saturated Flow (vph)	0	6287	1445	0	1672	2558	0	6149	0	1615	4631	2558
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		No			No			Yes			Yes	
Reference Time (s)			10.3			20.8	0.0	27.0	0.0	21.5	19.7	27.9
Adj Reference Time (s)			15.3			25.8	0.0	32.0	0.0	26.5	24.7	32.9
Permitted Option												
Adj Saturation A (vph)	0	251		0	318		0	1537		129	1544	
Reference Time A (s)	0.0	322.9		0.0	44.3		0.0	27.0		269.3	19.7	
Adj Saturation B (vph	0	1618		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	25.3	28.3		NA	NA		NA	NA		NA	NA	
Reference Time (s)		28.3			44.3			27.0			269.3	
Adj Reference Time (s)		33.3			49.3			32.0			274.3	
Split Option												
Ref Time Combined (s)	0.0	22.4		0.0	8.4		0.0	27.0		21.5	19.7	
Ref Time Seperate (s)	17.3	18.4		2.9	5.5		0.0	26.2		21.5	19.7	
Reference Time (s)	22.4	22.4		8.4	8.4		27.0	27.0		21.5	21.5	
Adj Reference Time (s)	27.4	27.4		13.4	13.4		32.0	32.0		26.5	26.5	

Summary	NW SE	NE SW	Combined
Protected Option (s)	NA	58.5	
Permitted Option (s)	49.3	274.3	
Split Option (s)	40.8	58.5	
Minimum (s)	40.8	58.5	99.4

Right Turns	SER	NWR	SWR
Adj Reference Time (s)	15.3	25.8	32.9
Cross Thru Ref Time (s)	24.7	32.0	13.4
Oncoming Left Ref Time (s)	13.4	27.4	0.0
Combined (s)	53.5	85.2	46.3

Intersection Summary			
Intersection Capacity Utilization	99.4%	ICU Level of Service	F

Reference Times and Phasing Options do not represent an optimized timing plan.

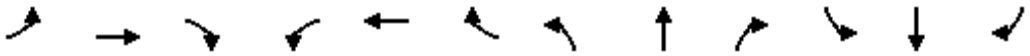
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	309	45	14	414	2	12	1	8	2	0	2
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	6.0	4.0	4.0	6.0	4.0	4.0	4.0	4.0	7.0	7.0	4.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	8	354	0	14	416	0	0	21	0	0	4	0
Lane Utilization Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.98	0.85	0.95	1.00	0.85	0.95	0.92	0.85	0.95	0.90	0.85
Saturated Flow (vph)	1615	3175	0	1615	3234	0	0	1557	0	0	1533	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	0.5	11.1	0.0	0.9	12.9	0.0			0.0			0.0
Adj Reference Time (s)	9.0	16.1	0.0	9.0	17.9	0.0			0.0			0.0
Permitted Option												
Adj Saturation A (vph)	129	1588		129	1617		0	1197		0	1329	
Reference Time A (s)	6.2	11.1		10.8	12.9		0.0	1.8		0.0	0.3	
Adj Saturation B (vph	NA	NA		NA	NA		0	0		0	0	
Reference Time B (s)	NA	NA		NA	NA		8.7	9.3		8.1	8.3	
Reference Time (s)		11.1			12.9			1.8			0.3	
Adj Reference Time (s)		16.1			17.9			9.0			12.0	
Split Option												
Ref Time Combined (s)	0.5	11.1		0.9	12.9		0.0	1.3		0.0	0.3	
Ref Time Seperate (s)	0.5	9.7		0.9	12.8		0.7	0.1		0.1	0.0	
Reference Time (s)	11.1	11.1		12.9	12.9		1.3	1.3		0.3	0.3	
Adj Reference Time (s)	16.1	16.1		17.9	17.9		9.0	9.0		12.0	12.0	

Summary	EB WB	NB SB	Combined
Protected Option (s)	26.9	NA	
Permitted Option (s)	17.9	12.0	
Split Option (s)	34.0	21.0	
Minimum (s)	17.9	12.0	29.9

Right Turns
Adj Reference Time (s)
Cross Thru Ref Time (s)
Oncoming Left Ref Time (s)
Combined (s)

Intersection Summary			
Intersection Capacity Utilization	29.9%	ICU Level of Service	A

Reference Times and Phasing Options do not represent an optimized timing plan.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	26	661	218	30	427	2	202	1	62	7	3	4
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	6.0	4.0	4.0	6.0	4.0	4.0	4.0	4.0	7.0	7.0	4.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	26	879	0	30	429	0	0	265	0	0	14	0
Lane Utilization Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.96	0.85	0.95	1.00	0.85	0.95	0.93	0.85	0.95	0.93	0.85
Saturated Flow (vph)	1615	3116	0	1615	3235	0	0	1578	0	0	1586	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	1.6	28.2	0.0	1.9	13.3	0.0			0.0			0.0
Adj Reference Time (s)	9.0	33.2	0.0	9.0	18.3	0.0			0.0			0.0
Permitted Option												
Adj Saturation A (vph)	129	1558		129	1617		0	1061		0	1584	
Reference Time A (s)	20.1	28.2		23.2	13.3		0.0	25.0		0.0	0.9	
Adj Saturation B (vph	NA	NA		NA	NA		0	0		0	0	
Reference Time B (s)	NA	NA		NA	NA		20.5	24.8		8.4	8.9	
Reference Time (s)		28.2			23.2			24.8			0.9	
Adj Reference Time (s)		33.2			28.2			29.8			12.0	
Split Option												
Ref Time Combined (s)	1.6	28.2		1.9	13.3		0.0	16.8		0.0	0.9	
Ref Time Seperate (s)	1.6	21.2		1.9	13.2		12.5	0.1		0.4	0.2	
Reference Time (s)	28.2	28.2		13.3	13.3		16.8	16.8		0.9	0.9	
Adj Reference Time (s)	33.2	33.2		18.3	18.3		21.8	21.8		12.0	12.0	

Summary	EB WB	NB SB	Combined
Protected Option (s)	42.2	NA	
Permitted Option (s)	33.2	29.8	
Split Option (s)	51.5	33.8	
Minimum (s)	33.2	29.8	63.0

Right Turns
Adj Reference Time (s)
Cross Thru Ref Time (s)
Oncoming Left Ref Time (s)
Combined (s)

Intersection Summary			
Intersection Capacity Utilization	63.0%	ICU Level of Service	B

Reference Times and Phasing Options do not represent an optimized timing plan.

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*West Mall Connector*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2016*

Project ID *Oakbrook Village Traffic Impact Studies - Phase 2 No Project*

East/West Street: *Oakbrook Village Internal Circ* North/South Street: *Call De Los Caballeros*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*0*	*6*	*2*	*3*	*3*	*1*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*6*	*8*	*16*	*0*	*9*	*3*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.95*		*0.95*		*0.95*		*0.95*	
Flow Rate (veh/h)	*8*		*7*		*30*		*12*	
% Heavy Vehicles	*2*		*2*		*2*		*2*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.0*		*0.4*		*0.2*		*0.0*	
Prop. Right-Turns	*0.3*		*0.1*		*0.5*		*0.3*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.1*		*0.0*		*-0.2*		*-0.1*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.01*		*0.01*		*0.03*		*0.01*	
hd, final value (s)	*3.87*		*4.03*		*3.70*		*3.84*	
x, final value	*0.01*		*0.01*		*0.03*		*0.01*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*1.9*		*2.0*		*1.7*		*1.8*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*258*		*257*		*280*		*262*	
Delay (s/veh)	*6.91*		*7.06*		*6.81*		*6.89*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*6.91*		*7.06*		*6.81*		*6.89*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*6.87*							
Intersection LOS	*A*							

 HCS+™ Version 5.5 Generated: 11/30/2011 10:21 AM

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*West Mall Connector*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2016*

Project ID *Oakbrook Village Traffic Impact Studies - Phase 2 No Project*

East/West Street: *Oakbrook Village Internal Circ* | North/South Street: *Call De Los Caballeros*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*1*	*19*	*3*	*28*	*24*	*0*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*16*	*44*	*107*	*1*	*33*	*1*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.95*		*0.95*		*0.95*		*0.95*	
Flow Rate (veh/h)	*24*		*54*		*174*		*36*	
% Heavy Vehicles	*2*		*2*		*2*		*2*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.0*		*0.5*		*0.1*		*0.0*	
Prop. Right-Turns	*0.1*		*0.0*		*0.6*		*0.0*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.0*		*0.1*		*-0.3*		*0.0*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.02*		*0.05*		*0.15*		*0.03*	
hd, final value (s)	*4.36*		*4.50*		*3.79*		*4.27*	
x, final value	*0.03*		*0.07*		*0.18*		*0.04*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*2.4*		*2.5*		*1.8*		*2.3*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*274*		*304*		*424*		*286*	
Delay (s/veh)	*7.49*		*7.83*		*7.64*		*7.46*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*7.49*		*7.83*		*7.64*		*7.46*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*7.64*							
Intersection LOS	*A*							

 HCS+™ Version 5.5 Generated: 11/30/2011 10:23 AM

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*East Mall Connector*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2016*

Project ID *Oakbrook Village Traffic Impact Studies - Phase 2 No Project*

East/West Street: *Oakbrook Vill Internal Circ* | North/South Street: *Calle De Los Caballeros*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*0*	*1*	*5*	*1*	*3*	*0*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*10*	*2*	*0*	*0*	*0*	*1*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.95*		*0.95*		*0.95*		*0.95*	
Flow Rate (veh/h)	*6*		*4*		*12*		*1*	
% Heavy Vehicles	*2*		*2*		*2*		*2*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.0*		*0.3*		*0.8*		*0.0*	
Prop. Right-Turns	*0.8*		*0.0*		*0.0*		*1.0*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.5*		*0.1*		*0.2*		*-0.6*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.01*		*0.00*		*0.01*		*0.00*	
hd, final value (s)	*3.47*		*4.02*		*4.12*		*3.37*	
x, final value	*0.01*		*0.00*		*0.01*		*0.00*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*1.5*		*2.0*		*2.1*		*1.4*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*256*		*254*		*262*		*251*	
Delay (s/veh)	*6.49*		*7.04*		*7.18*		*6.37*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*6.49*		*7.04*		*7.18*		*6.37*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*6.94*							
Intersection LOS	*A*							

HCS+™ Version 5.5 Generated: 11/30/2011 10:18 AM

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*East Mall Connector*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2016*

Project ID *Oakbrook Village Traffic Impact Studies - Phase 2 No Project*

East/West Street: *Oakbrook Village Internal Circ* | North/South Street: *Call De Los Caballeros*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*5*	*38*	*8*	*27*	*19*	*0*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*19*	*7*	*29*	*15*	*7*	*4*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.95*		*0.95*		*0.95*		*0.95*	
Flow Rate (veh/h)	*53*		*48*		*57*		*26*	
% Heavy Vehicles	*0*		*0*		*0*		*0*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.1*		*0.6*		*0.4*		*0.6*	
Prop. Right-Turns	*0.2*		*0.0*		*0.5*		*0.2*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.1*		*0.1*		*-0.2*		*0.0*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.05*		*0.04*		*0.05*		*0.02*	
hd, final value (s)	*4.05*		*4.25*		*3.90*		*4.20*	
x, final value	*0.06*		*0.06*		*0.06*		*0.03*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*2.1*		*2.2*		*1.9*		*2.2*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*303*		*298*		*307*		*276*	
Delay (s/veh)	*7.31*		*7.50*		*7.16*		*7.33*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*7.31*		*7.50*		*7.16*		*7.33*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*7.32*							
Intersection LOS	*A*							

 HCS+™ Version 5.5 Generated: 11/30/2011 10:19 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Lonestar Ent & Ave De La Carlo*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2016*

Project Description *Oakbrook Village Traffic Impact Study - Phase 2 No Project*

East/West Street: *Avenida De La Carlotta* | North/South Street: *Lonestar Entrance*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*288*	*25*	*6*	*540*	
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*303*	*26*	*6*	*568*	*0*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*9*		*5*			
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*9*	*0*	*5*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*6*	*9*		*5*			
C (m) (veh/h)		*1227*	*423*		*879*			
v/c		*0.00*	*0.02*		*0.01*			
95% queue length		*0.01*	*0.07*		*0.02*			
Control Delay (s/veh)		*7.9*	*13.7*		*9.1*			
LOS		*A*	*B*		*A*			
Approach Delay (s/veh)	--	--	*12.1*					
Approach LOS	--	--	*B*					

HCS+™ Version 5.5

Generated: 11/30/2011 10:51 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Lonestar Ent & Ave De La Carlo*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2016*

Project Description

East/West Street: *Avenida De La Carlotta* | North/South Street: *Lonestar Entrance*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*768*	*188*	*30*	*417*	
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*808*	*197*	*31*	*438*	*0*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*68*		*77*			
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*71*	*0*	*81*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*31*	*71*		*81*			
C (m) (veh/h)		*685*	*173*		*567*			
v/c		*0.05*	*0.41*		*0.14*			
95% queue length		*0.14*	*2.01*		*0.50*			
Control Delay (s/veh)		*10.5*	*40.1*		*12.4*			
LOS		*B*	*E*		*B*			
Approach Delay (s/veh)	--	--	*25.3*					
Approach LOS	--	--	*D*					

HCS+™ Version 5.5

Generated: 11/30/2011 10:16 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Trad Joe Ent & Ave De La Carlo*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2016*

Project Description *Oakbrook Village Traffic Impact Study - Phase 2 No Project*

East/West Street: *Avenida De La Carlotta* | North/South Street: *Trader Joe's Entrance*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*288*	*9*	*6*	*542*	
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*303*	*9*	*6*	*570*	*0*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*2*		*9*			
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*2*	*0*	*9*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*6*	*2*		*9*			
C (m) (veh/h)		*1245*	*427*		*888*			
v/c		*0.00*	*0.00*		*0.01*			
95% queue length		*0.01*	*0.01*		*0.03*			
Control Delay (s/veh)		*7.9*	*13.5*		*9.1*			
LOS		*A*	*B*		*A*			
Approach Delay (s/veh)	--	--	*9.9*					
Approach LOS	--	--	*A*					

HCS+™ Version 5.5

Generated: 11/30/2011 10:25 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Trad Joe Ent & Ave De La Carlo*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2016*

Project Description *Oakbrook Village Traffic Impact Study - Phase 2 No Project*

East/West Street: *Avenida De La Carlota* | North/South Street: *Trader Joe's Entrance*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*842*	*21*	*22*	*391*	
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*886*	*22*	*23*	*411*	*0*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*22*		*167*			
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*23*	*0*	*175*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*23*	*23*		*175*			
C (m) (veh/h)		*745*	*186*		*604*			
v/c		*0.03*	*0.12*		*0.29*			
95% queue length		*0.10*	*0.42*		*1.22*			
Control Delay (s/veh)		*10.0*	*27.1*		*13.4*			
LOS		*A*	*D*		*B*			
Approach Delay (s/veh)	--	--	*15.0*					
Approach LOS	--	--	*B*					

HCS+™ Version 5.5

Generated: 11/30/2011 10:35 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	

Site Information

Intersection	*1st Fed Ent & Ave De La Carlo*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2016*

Project Description *Oakbrook Village Traffic Impact Study - Phase 2 No Project*

East/West Street: *Avenida De La Carlotta* | North/South Street: *1st Federal Bank Entrance*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*22*	*260*	*3*	*5*	*567*	*1*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*23*	*273*	*3*	*5*	*596*	*1*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*1*	*2*	*0*
Configuration	*L*	*T*	*TR*	*L*	*T*	*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*4*		*2*	*0*		*0*
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*0.95*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*4*	*0*	*2*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*			*LR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*	*L*		*LR*			*LR*	
v (veh/h)	*23*	*5*		*6*			*0*	
C (m) (veh/h)	*976*	*1284*		*450*				
v/c	*0.02*	*0.00*		*0.01*				
95% queue length	*0.07*	*0.01*		*0.04*				
Control Delay (s/veh)	*8.8*	*7.8*		*13.1*				
LOS	*A*	*A*		*B*				
Approach Delay (s/veh)	--	--	*13.1*					
Approach LOS	--	--	*B*					

HCS+™ Version 5.5

Generated: 11/30/2011 10:05 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*11/21/2011*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*1st Fed Ent & Ave De La Carlo*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2016*

Project Description *Oakbrook Village Traffic Impact Study - Phase 2 No Project*

East/West Street: *Avenida De La Carlotta* | North/South Street: *1st Federal Bank Entrance*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*6*	*1035*	*19*	*7*	*494*	*2*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*6*	*1089*	*20*	*7*	*520*	*2*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*1*	*2*	*0*
Configuration	*L*	*T*	*TR*	*L*	*T*	*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*6*		*15*	*1*		*7*
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*0.95*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*6*	*0*	*15*	*1*	*0*	*7*
Percent Heavy Vehicles	*2*	*0*	*2*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*			*LR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*	*L*		*LR*			*LR*	
v (veh/h)	*6*	*7*		*21*			*8*	
C (m) (veh/h)	*1041*	*625*		*239*			*527*	
v/c	*0.01*	*0.01*		*0.09*			*0.02*	
95% queue length	*0.02*	*0.03*		*0.29*			*0.05*	
Control Delay (s/veh)	*8.5*	*10.8*		*21.5*			*11.9*	
LOS	*A*	*B*		*C*			*B*	
Approach Delay (s/veh)	--	--	*21.5*			*11.9*		
Approach LOS	--	--	*C*			*B*		

HCS+™ Version 5.5

Generated: 11/30/2011 10:07 AM

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (vph)	101	389	753	1075	726	316
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right				No		No
Ideal Flow	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	8.0	6.0	6.0	4.0	4.0
Refr Cycle Length (s)	100					
Volume Combined (vph)	101	389	753	1075	726	316
Lane Utilization Factor	0.97	0.95	0.95	0.89	0.97	1.00
Turning Factor (vph)	0.95	1.00	1.00	0.85	0.95	0.85
Saturated Flow (vph)	3136	3237	3237	2558	4704	1445
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00	0.00		0.00	
Protected Option Allowed		Yes	Yes		No	
Reference Time (s)	3.2	12.0	23.3	42.0		21.9
Adj Reference Time (s)	9.0	17.0	28.3	47.0		26.9
Permitted Option						
Adj Saturation A (vph)	125	1618	1618		125	
Reference Time A (s)	40.3	12.0	23.3		192.9	
Adj Saturation B (vph	NA	NA	NA		NA	
Reference Time B (s)	NA	NA	NA		NA	
Reference Time (s)		40.3	23.3			
Adj Reference Time (s)		45.3	28.3			
Split Option						
Ref Time Combined (s)	3.2	12.0	23.3		15.4	
Ref Time Seperate (s)	3.2	12.0	23.3		15.4	
Reference Time (s)	12.0	12.0	23.3		15.4	
Adj Reference Time (s)	17.0	17.0	28.3		20.4	

Summary	NW SE	SW	Combined
Protected Option (s)	37.3	NA	
Permitted Option (s)	45.3	Err	
Split Option (s)	45.3	20.4	
Minimum (s)	37.3	20.4	57.7

Right Turns	NWR	SWR
Adj Reference Time (s)	47.0	26.9
Cross Thru Ref Time (s)	0.0	28.3
Oncoming Left Ref Time (s)	9.0	0.0
Combined (s)	56.0	55.1

Intersection Summary			
Intersection Capacity Utilization	57.7%	ICU Level of Service	B

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (vph)	272	1057	542	1033	992	161
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right				No		No
Ideal Flow	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	8.0	6.0	6.0	4.0	4.0
Refr Cycle Length (s)	100					
Volume Combined (vph)	272	1057	542	1033	992	161
Lane Utilization Factor	0.97	0.95	0.95	0.89	0.97	1.00
Turning Factor (vph)	0.95	1.00	1.00	0.85	0.95	0.85
Saturated Flow (vph)	3136	3237	3237	2558	4704	1445
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00	0.00		0.00	
Protected Option Allowed		Yes	Yes		No	
Reference Time (s)	8.7	32.7	16.7	40.4		11.1
Adj Reference Time (s)	13.7	37.7	21.7	45.4		16.1
Permitted Option						
Adj Saturation A (vph)	125	1618	1618		125	
Reference Time A (s)	108.4	32.7	16.7		263.6	
Adj Saturation B (vph	NA	NA	NA		NA	
Reference Time B (s)	NA	NA	NA		NA	
Reference Time (s)		108.4	16.7			
Adj Reference Time (s)		113.4	21.7			
Split Option						
Ref Time Combined (s)	8.7	32.7	16.7		21.1	
Ref Time Seperate (s)	8.7	32.7	16.7		21.1	
Reference Time (s)	32.7	32.7	16.7		21.1	
Adj Reference Time (s)	37.7	37.7	21.7		26.1	

Summary	NW SE	SW	Combined
Protected Option (s)	37.7	NA	
Permitted Option (s)	113.4	Err	
Split Option (s)	59.4	26.1	
Minimum (s)	37.7	26.1	63.7

Right Turns	NWR	SWR
Adj Reference Time (s)	45.4	16.1
Cross Thru Ref Time (s)	0.0	21.7
Oncoming Left Ref Time (s)	13.7	0.0
Combined (s)	59.1	37.9

Intersection Summary			
Intersection Capacity Utilization	63.7%	ICU Level of Service	B

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	231	861	2	5	760	281	9	11	4	162	5	92
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	8.0	4.0	4.0	8.0	8.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	231	863	0	5	760	281	0	24	0	0	167	92
Lane Utilization Factor	0.97	0.91	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	0.96	0.85	0.95	0.95	0.85
Saturated Flow (vph)	3136	4629	0	1615	3237	1445	0	1626	0	0	3235	1445
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	7.4	18.6	0.0	0.3	23.5	19.4			0.0			6.4
Adj Reference Time (s)	12.4	23.6	0.0	9.0	28.5	24.4			0.0			11.4
Permitted Option												
Adj Saturation A (vph)	125	1543		129	1618		0	281		0	1502	
Reference Time A (s)	92.1	18.6		3.9	23.5		0.0	8.5		0.0	11.1	
Adj Saturation B (vph	NA	NA		NA	NA		0	0		0	0	
Reference Time B (s)	NA	NA		NA	NA		8.6	9.5		13.0	13.2	
Reference Time (s)		92.1			23.5			8.5			11.1	
Adj Reference Time (s)		97.1			28.5			13.5			16.1	
Split Option												
Ref Time Combined (s)	7.4	18.6		0.3	23.5		0.0	1.5		0.0	5.2	
Ref Time Seperate (s)	7.4	18.6		0.3	23.5		0.6	0.7		5.0	0.3	
Reference Time (s)	18.6	18.6		23.5	23.5		1.5	1.5		5.2	5.2	
Adj Reference Time (s)	23.6	23.6		28.5	28.5		9.0	9.0		10.2	10.2	

Summary	EB WB	NB SB	Combined
Protected Option (s)	40.8	NA	
Permitted Option (s)	97.1	16.1	
Split Option (s)	52.1	19.2	
Minimum (s)	40.8	16.1	57.0

Right Turns	WBR	SBR
Adj Reference Time (s)	24.4	11.4
Cross Thru Ref Time (s)	9.0	28.5
Oncoming Left Ref Time (s)	12.4	9.0
Combined (s)	45.8	48.8

Intersection Summary			
Intersection Capacity Utilization	57.0%	ICU Level of Service	B

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	167	882	12	10	738	239	7	8	6	655	14	235
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Green (s)	4.0	8.0	4.0	4.0	8.0	8.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	100											
Volume Combined (vph)	167	894	0	10	738	239	0	21	0	0	669	235
Lane Utilization Factor	0.97	0.91	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	0.94	0.85	0.95	0.95	0.85
Saturated Flow (vph)	3136	4621	0	1615	3237	1445	0	1600	0	0	3234	1445
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	5.3	19.3	0.0	0.6	22.8	16.5			0.0			16.3
Adj Reference Time (s)	10.3	24.3	0.0	9.0	27.8	21.5			0.0			21.3
Permitted Option												
Adj Saturation A (vph)	125	1540		129	1618		0	305		0	1356	
Reference Time A (s)	66.6	19.3		7.7	22.8		0.0	6.9		0.0	49.3	
Adj Saturation B (vph	NA	NA		NA	NA		0	0		0	0	
Reference Time B (s)	NA	NA		NA	NA		8.4	9.3		28.3	28.7	
Reference Time (s)		66.6			22.8			6.9			28.7	
Adj Reference Time (s)		71.6			27.8			11.9			33.7	
Split Option												
Ref Time Combined (s)	5.3	19.3		0.6	22.8		0.0	1.3		0.0	20.7	
Ref Time Seperate (s)	5.3	19.1		0.6	22.8		0.4	0.5		20.3	0.8	
Reference Time (s)	19.3	19.3		22.8	22.8		1.3	1.3		20.7	20.7	
Adj Reference Time (s)	24.3	24.3		27.8	27.8		9.0	9.0		25.7	25.7	

Summary	EB WB	NB SB	Combined
Protected Option (s)	38.1	NA	
Permitted Option (s)	71.6	33.7	
Split Option (s)	52.1	34.7	
Minimum (s)	38.1	33.7	71.8

Right Turns	WBR	SBR
Adj Reference Time (s)	21.5	21.3
Cross Thru Ref Time (s)	9.0	27.8
Oncoming Left Ref Time (s)	10.3	9.0
Combined (s)	40.9	58.1

Intersection Summary			
Intersection Capacity Utilization	71.8%	ICU Level of Service	C

Reference Times and Phasing Options do not represent an optimized timing plan.

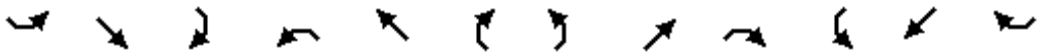
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	151	201	118	7	351	544	192	50	25	780	860	26
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	100	100	100	100	100	100	100	100	100	100	100	100
Volume Combined (vph)	151	201	118	7	351	544	192	50	25	780	886	0
Lane Utilization Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85
Saturated Flow (vph)	3136	3237	1445	1615	3237	1445	1615	3237	1445	3136	3223	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	4.8	6.2	8.2	0.4	10.8	37.6	11.9	1.5	1.7	24.9	27.5	0.0
Adj Reference Time (s)	8.8	10.2	12.2	8.0	14.8	41.6	15.9	8.0	8.0	28.9	31.5	0.0
Permitted Option												
Adj Saturation A (vph)	125	1618		129	1618		129	1618		125	1611	
Reference Time A (s)	60.2	6.2		5.4	10.8		148.6	1.5		310.9	27.5	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		0	3223	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		32.9	27.5	
Reference Time (s)		60.2			10.8			148.6			32.9	
Adj Reference Time (s)		64.2			14.8			152.6			36.9	
Split Option												
Ref Time Combined (s)	4.8	6.2		0.4	10.8		11.9	1.5		24.9	27.5	
Ref Time Seperate (s)	4.8	6.2		0.4	10.8		11.9	1.5		24.9	26.7	
Reference Time (s)	6.2	6.2		10.8	10.8		11.9	11.9		27.5	27.5	
Adj Reference Time (s)	10.2	10.2		14.8	14.8		15.9	15.9		31.5	31.5	

Summary	NW SE	NE SW	Combined
Protected Option (s)	23.7	47.4	
Permitted Option (s)	64.2	152.6	
Split Option (s)	25.1	47.4	
Minimum (s)	23.7	47.4	71.0

Right Turns	SER	NWR	NER
Adj Reference Time (s)	12.2	41.6	8.0
Cross Thru Ref Time (s)	31.5	8.0	10.2
Oncoming Left Ref Time (s)	8.0	8.8	28.9
Combined (s)	51.7	58.5	47.1

Intersection Summary			
Intersection Capacity Utilization	71.0%	ICU Level of Service	C

Reference Times and Phasing Options do not represent an optimized timing plan.



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	313	761	434	28	80	496	157	102	83	705	370	34
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	100	100	100	100	100	100	100	100	100	100	100	100
Volume Combined (vph)	313	761	434	28	80	496	157	102	83	705	404	0
Lane Utilization Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85	0.95	0.99	0.85
Saturated Flow (vph)	3136	3237	1445	1615	3237	1445	1615	3237	1445	3136	3196	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	10.0	23.5	30.0	1.7	2.5	34.3	9.7	3.2	5.7	22.5	12.6	0.0
Adj Reference Time (s)	14.0	27.5	34.0	8.0	8.0	38.3	13.7	8.0	9.7	26.5	16.6	0.0
Permitted Option												
Adj Saturation A (vph)	125	1618		129	1618		129	1618		125	1598	
Reference Time A (s)	124.7	23.5		21.7	2.5		121.5	3.2		281.0	12.6	
Adj Saturation B (vph	0	3237		NA	NA		NA	NA		0	3196	
Reference Time B (s)	18.0	23.5		NA	NA		NA	NA		30.5	12.6	
Reference Time (s)		23.5			21.7			121.5			30.5	
Adj Reference Time (s)		27.5			25.7			125.5			34.5	
Split Option												
Ref Time Combined (s)	10.0	23.5		1.7	2.5		9.7	3.2		22.5	12.6	
Ref Time Seperate (s)	10.0	23.5		1.7	2.5		9.7	3.2		22.5	11.6	
Reference Time (s)	23.5	23.5		2.5	2.5		9.7	9.7		22.5	22.5	
Adj Reference Time (s)	27.5	27.5		8.0	8.0		13.7	13.7		26.5	26.5	

Summary	NW SE	NE SW	Combined
Protected Option (s)	35.5	34.5	
Permitted Option (s)	27.5	125.5	
Split Option (s)	35.5	40.2	
Minimum (s)	27.5	34.5	62.0

Right Turns	SER	NWR	NER
Adj Reference Time (s)	34.0	38.3	9.7
Cross Thru Ref Time (s)	16.6	8.0	27.5
Oncoming Left Ref Time (s)	8.0	14.0	26.5
Combined (s)	58.7	60.3	63.7

Intersection Summary			
Intersection Capacity Utilization	63.7%	ICU Level of Service	B

Reference Times and Phasing Options do not represent an optimized timing plan.

Appendix G

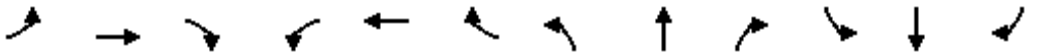
Intersection Analysis: Phase II – With Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	342	541	108	298	638	165	171	458	181	184	1399	319
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91		0.97	0.91	1.00	0.97	0.91	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3072	4550	1417	1583	4410		3072	4550	1417	3072	4423	
Flt Permitted	0.95	1.00	1.00	0.23	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3072	4550	1417	387	4410		3072	4550	1417	3072	4423	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	372	588	117	324	693	179	186	498	197	200	1521	347
RTOR Reduction (vph)	0	0	94	0	36	0	0	0	117	0	28	0
Lane Group Flow (vph)	372	588	23	324	836	0	186	498	80	200	1840	0
Turn Type	Prot		Perm	pm+pt			Prot		Perm	Prot		
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases			6	2					8			
Actuated Green, G (s)	15.0	23.3	23.3	44.3	26.3		10.4	50.3	50.3	11.8	51.7	
Effective Green, g (s)	16.0	25.6	25.6	46.3	28.6		11.4	52.6	52.6	12.8	54.0	
Actuated g/C Ratio	0.12	0.20	0.20	0.36	0.22		0.09	0.40	0.40	0.10	0.42	
Clearance Time (s)	6.0	7.3	7.3	6.0	7.3		6.0	7.3	7.3	6.0	7.3	
Vehicle Extension (s)	2.0	4.0	4.0	3.0	4.0		2.0	5.0	5.0	2.0	5.0	
Lane Grp Cap (vph)	378	896	279	313	970		269	1841	573	302	1837	
v/s Ratio Prot	0.12	0.13		c0.15	0.19		0.06	0.11		c0.07	c0.42	
v/s Ratio Perm			0.02	c0.22					0.06			
v/c Ratio	0.98	0.66	0.08	1.04	0.86		0.69	0.27	0.14	0.66	1.00	
Uniform Delay, d1	56.9	48.1	42.6	35.8	48.8		57.6	25.9	24.4	56.5	38.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	41.7	3.7	0.6	60.3	10.0		6.1	0.2	0.2	4.2	21.4	
Delay (s)	98.5	51.9	43.2	96.1	58.8		63.7	26.0	24.6	60.7	59.4	
Level of Service	F	D	D	F	E		E	C	C	E	E	
Approach Delay (s)		67.1			68.9			33.7			59.5	
Approach LOS		E			E			C			E	

Intersection Summary			
HCM Average Control Delay	58.9	HCM Level of Service	E
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	93.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

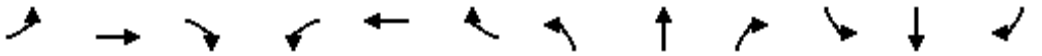
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	207	769	228	253	582	157	304	1705	344	191	596	309
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91		0.97	0.91	1.00	0.97	0.91	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3072	4550	1417	1583	4405		3072	4550	1417	3072	4317	
Flt Permitted	0.95	1.00	1.00	0.13	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3072	4550	1417	224	4405		3072	4550	1417	3072	4317	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	225	836	248	275	633	171	330	1853	374	208	648	336
RTOR Reduction (vph)	0	0	160	0	38	0	0	0	171	0	70	0
Lane Group Flow (vph)	225	836	88	275	766	0	330	1853	203	208	914	0
Turn Type	Prot		Perm	pm+pt			Prot		Perm	Prot		
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases			6	2					8			
Actuated Green, G (s)	10.8	23.7	23.7	46.7	29.9		17.5	52.0	52.0	10.7	45.2	
Effective Green, g (s)	11.8	26.0	26.0	47.7	32.2		18.5	54.3	54.3	11.7	47.5	
Actuated g/C Ratio	0.09	0.20	0.20	0.37	0.25		0.14	0.42	0.42	0.09	0.37	
Clearance Time (s)	6.0	7.3	7.3	6.0	7.3		6.0	7.3	7.3	6.0	7.3	
Vehicle Extension (s)	2.0	4.0	4.0	3.0	4.0		2.0	5.0	5.0	2.0	5.0	
Lane Grp Cap (vph)	279	910	283	270	1091		437	1901	592	276	1577	
v/s Ratio Prot	0.07	0.18		c0.14	0.17		c0.11	c0.41		0.07	0.21	
v/s Ratio Perm			0.06	c0.23					0.14			
v/c Ratio	0.81	0.92	0.31	1.02	0.70		0.76	0.97	0.34	0.75	0.58	
Uniform Delay, d1	58.0	51.0	44.4	37.8	44.5		53.6	37.2	25.7	57.7	33.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	14.7	15.7	2.8	59.6	3.8		6.5	15.2	0.7	9.9	0.8	
Delay (s)	72.7	66.6	47.2	97.4	48.3		60.1	52.4	26.5	67.6	34.0	
Level of Service	E	E	D	F	D		E	D	C	E	C	
Approach Delay (s)		64.0			60.8			49.6			39.9	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM Average Control Delay	52.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	95.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	847	107	100	891	46	127	81	88	82	47	121
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		0.91	0.91		0.91	0.91	
Frt	1.00	0.98		1.00	0.99		1.00	0.93		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.99		0.95	1.00	
Satd. Flow (prot)	1583	4474		1583	4516		1441	2810		1441	2714	
Flt Permitted	0.19	1.00		0.15	1.00		0.63	0.87		0.12	0.71	
Satd. Flow (perm)	316	4474		245	4516		949	2469		178	1942	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	921	116	109	968	50	138	88	96	89	51	132
RTOR Reduction (vph)	0	10	0	0	3	0	0	81	0	0	97	0
Lane Group Flow (vph)	64	1027	0	109	1015	0	106	135	0	80	95	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	7	4		3	8			2			1	
Permitted Phases	4			8			2			1		
Actuated Green, G (s)	50.2	43.6		56.8	46.9		20.0	20.0		33.5	33.5	
Effective Green, g (s)	51.2	45.1		57.8	48.4		20.5	20.5		34.0	34.0	
Actuated g/C Ratio	0.39	0.35		0.44	0.37		0.16	0.16		0.26	0.26	
Clearance Time (s)	5.5	6.5		5.5	6.5		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	194	1552		216	1681		150	389		47	508	
v/s Ratio Prot	0.02	c0.23		c0.04	c0.22							
v/s Ratio Perm	0.11			0.18			c0.11	0.05		c0.45	0.05	
v/c Ratio	0.33	0.66		0.50	0.60		0.71	0.35		1.70	0.19	
Uniform Delay, d1	25.6	36.0		23.8	33.0		51.9	48.8		48.0	37.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	2.2		0.7	1.6		14.1	0.5		391.0	0.2	
Delay (s)	26.0	38.2		24.5	34.7		66.0	49.3		439.0	37.4	
Level of Service	C	D		C	C		E	D		F	D	
Approach Delay (s)		37.5			33.7			54.8			155.5	
Approach LOS		D			C			D			F	

Intersection Summary			
HCM Average Control Delay	49.3	HCM Level of Service	D
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

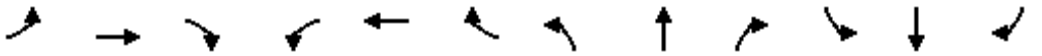


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	272	998	166	159	862	151	114	75	102	75	55	102
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		0.91	0.91		0.91	0.91	
Frt	1.00	0.98		1.00	0.98		1.00	0.92		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	4453		1583	4448		1441	2783		1441	2745	
Flt Permitted	0.12	1.00		0.14	1.00		0.63	0.91		0.09	0.74	
Satd. Flow (perm)	193	4453		226	4448		962	2532		132	2050	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	296	1085	180	173	937	164	124	82	111	82	60	111
RTOR Reduction (vph)	0	18	0	0	19	0	0	97	0	0	72	0
Lane Group Flow (vph)	296	1247	0	173	1082	0	104	116	0	74	107	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	7	4		3	8			2			1	
Permitted Phases	4			8			2			1		
Actuated Green, G (s)	51.6	36.0		39.1	29.0		15.4	15.4		45.5	45.5	
Effective Green, g (s)	52.1	37.5		40.1	30.5		15.9	15.9		46.0	46.0	
Actuated g/C Ratio	0.40	0.29		0.31	0.23		0.12	0.12		0.35	0.35	
Clearance Time (s)	5.5	6.5		5.5	6.5		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	266	1285		180	1044		118	310		47	725	
v/s Ratio Prot	c0.15	0.28		0.08	0.24							
v/s Ratio Perm	c0.30			0.22			c0.11	0.05		c0.56	0.05	
v/c Ratio	1.11	0.97		0.96	1.04		0.88	0.37		1.57	0.15	
Uniform Delay, d1	38.9	45.7		37.7	49.8		56.1	52.5		42.0	28.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	88.9	19.0		55.2	37.7		48.1	0.8		338.6	0.1	
Delay (s)	127.8	64.7		92.9	87.4		104.3	53.2		380.6	28.7	
Level of Service	F	E		F	F		F	D		F	C	
Approach Delay (s)		76.7			88.2			70.0			131.7	
Approach LOS		E			F			E			F	

Intersection Summary			
HCM Average Control Delay	84.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

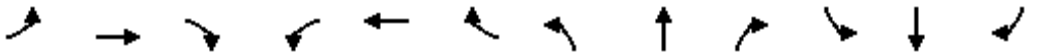
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	86	712	202	289	537	7	226	171	246	37	627	248
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91		0.97	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3072	4550	1417	3072	4541		3072	3167	1417	1583	3167	1417
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.63	1.00	1.00
Satd. Flow (perm)	3072	4550	1417	3072	4541		3072	3167	1417	1058	3167	1417
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	93	774	220	314	584	8	246	186	267	40	682	270
RTOR Reduction (vph)	0	0	147	0	1	0	0	0	169	0	0	179
Lane Group Flow (vph)	93	774	73	314	591	0	246	186	98	40	682	91
Turn Type	Prot		Perm	Prot			Prot		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2						8	4		4
Actuated Green, G (s)	7.6	42.9	42.9	17.2	52.5		14.4	47.1	47.1	38.3	35.5	35.5
Effective Green, g (s)	7.1	43.4	43.4	16.7	53.0		13.9	47.6	47.6	37.3	36.0	36.0
Actuated g/C Ratio	0.05	0.33	0.33	0.13	0.41		0.11	0.37	0.37	0.29	0.28	0.28
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5		4.5	5.5	5.5	4.5	5.5	5.5
Vehicle Extension (s)	2.0	4.0	4.0	2.0	4.0		2.0	4.0	4.0	2.0	4.0	4.0
Lane Grp Cap (vph)	168	1519	473	395	1851		328	1160	519	313	877	392
v/s Ratio Prot	0.03	c0.17		c0.10	0.13		c0.08	0.06		0.00	c0.22	
v/s Ratio Perm			0.05						0.07	0.03		0.06
v/c Ratio	0.55	0.51	0.16	0.79	0.32		0.75	0.16	0.19	0.13	0.78	0.23
Uniform Delay, d1	59.9	34.8	30.4	55.0	26.2		56.4	27.7	28.0	33.9	43.3	36.3
Progression Factor	1.00	1.00	1.00	0.63	0.60		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	1.2	0.7	9.8	0.5		8.3	0.1	0.2	0.1	4.7	0.4
Delay (s)	62.1	36.0	31.1	44.5	16.1		64.6	27.8	28.3	34.0	48.0	36.7
Level of Service	E	D	C	D	B		E	C	C	C	D	D
Approach Delay (s)		37.2			25.9			41.0			44.3	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	37.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



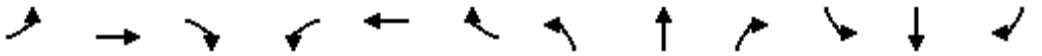
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	104	1028	195	235	599	18	369	214	317	50	655	107
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91		0.97	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3072	4550	1417	3072	4530		3072	3167	1417	1583	3167	1417
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.61	1.00	1.00
Satd. Flow (perm)	3072	4550	1417	3072	4530		3072	3167	1417	1011	3167	1417
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	113	1117	212	255	651	20	401	233	345	54	712	116
RTOR Reduction (vph)	0	0	125	0	3	0	0	0	160	0	0	78
Lane Group Flow (vph)	113	1117	87	255	668	0	401	233	185	54	712	38
Turn Type	Prot		Perm	Prot			Prot		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2						8	4		4
Actuated Green, G (s)	8.5	42.0	42.0	13.6	47.1		20.0	51.6	51.6	37.2	34.4	34.4
Effective Green, g (s)	8.0	42.5	42.5	13.1	47.6		19.5	52.1	52.1	36.2	34.9	34.9
Actuated g/C Ratio	0.06	0.33	0.33	0.10	0.37		0.15	0.40	0.40	0.28	0.27	0.27
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5		4.5	5.5	5.5	4.5	5.5	5.5
Vehicle Extension (s)	2.0	4.0	4.0	2.0	4.0		2.0	4.0	4.0	2.0	4.0	4.0
Lane Grp Cap (vph)	189	1488	463	310	1659		461	1269	568	292	850	380
v/s Ratio Prot	0.04	c0.25		c0.08	0.15		c0.13	0.07		0.00	c0.22	
v/s Ratio Perm			0.06						0.13	0.05		0.03
v/c Ratio	0.60	0.75	0.19	0.82	0.40		0.87	0.18	0.33	0.18	0.84	0.10
Uniform Delay, d1	59.4	39.0	31.4	57.3	30.6		54.0	25.2	26.8	35.1	44.9	35.7
Progression Factor	1.00	1.00	1.00	0.89	0.65		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.4	3.5	0.9	15.1	0.7		15.4	0.1	0.5	0.1	7.5	0.2
Delay (s)	62.8	42.6	32.3	65.8	20.7		69.5	25.3	27.3	35.2	52.4	35.9
Level of Service	E	D	C	E	C		E	C	C	D	D	D
Approach Delay (s)		42.6			33.1			44.1			49.2	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	42.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



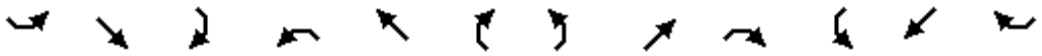
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	921	48	236	750	18	16	3	95	8	5	7
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	0.97	0.86	1.00	0.97	0.91	1.00	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)	3072	5733	1417	3072	4550	1417	1583	1667	1417		1615	1417
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.75	1.00	1.00		0.82	1.00
Satd. Flow (perm)	3072	5733	1417	3072	4550	1417	1247	1667	1417		1361	1417
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	1001	52	257	815	20	17	3	103	9	5	8
RTOR Reduction (vph)	0	0	15	0	0	4	0	0	96	0	0	7
Lane Group Flow (vph)	9	1001	37	257	815	16	17	3	7	0	14	1
Turn Type	Prot		Perm	Prot		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			4			4	
Permitted Phases			6			2	4		4	4		4
Actuated Green, G (s)	1.0	91.8	91.8	14.7	105.5	105.5	8.5	8.5	8.5		8.5	8.5
Effective Green, g (s)	0.5	92.3	92.3	14.2	106.0	106.0	8.5	8.5	8.5		8.5	8.5
Actuated g/C Ratio	0.00	0.71	0.71	0.11	0.82	0.82	0.07	0.07	0.07		0.07	0.07
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5	5.5	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	1.5	4.0	4.0	1.5	4.0	4.0	1.5	1.5	1.5		1.5	1.5
Lane Grp Cap (vph)	12	4070	1006	336	3710	1155	82	109	93		89	93
v/s Ratio Prot	0.00	c0.17		c0.08	0.18			0.00				
v/s Ratio Perm			0.03			0.01	c0.01		0.00		0.01	0.00
v/c Ratio	0.75	0.25	0.04	0.76	0.22	0.01	0.21	0.03	0.07		0.16	0.01
Uniform Delay, d1	64.7	6.6	5.6	56.3	2.7	2.2	57.6	56.9	57.0		57.4	56.8
Progression Factor	0.82	0.34	0.08	0.77	1.44	0.85	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	111.0	0.1	0.1	8.4	0.1	0.0	0.5	0.0	0.1		0.3	0.0
Delay (s)	164.0	2.4	0.5	51.9	4.0	1.9	58.0	56.9	57.2		57.7	56.8
Level of Service	F	A	A	D	A	A	E	E	E		E	E
Approach Delay (s)		3.6			15.2			57.3			57.4	
Approach LOS		A			B			E			E	

Intersection Summary			
HCM Average Control Delay	12.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



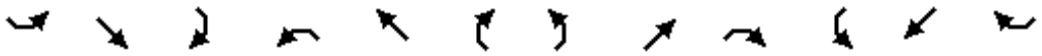
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	1348	228	274	743	6	76	15	449	15	7	12
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	0.97	0.86	1.00	0.97	0.91	1.00	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)	3072	5733	1417	3072	4550	1417	1583	1667	1417		1613	1417
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.74	1.00	1.00		0.87	1.00
Satd. Flow (perm)	3072	5733	1417	3072	4550	1417	1236	1667	1417		1444	1417
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	1465	248	298	808	7	83	16	488	16	8	13
RTOR Reduction (vph)	0	0	112	0	0	2	0	0	226	0	0	10
Lane Group Flow (vph)	9	1465	136	298	808	5	83	16	262	0	24	3
Turn Type	Prot		Perm	Prot		Perm	Perm		Perm	Perm		Perm
Protected Phases	1	6		5	2			4			4	
Permitted Phases			6			2	4		4	4		4
Actuated Green, G (s)	1.0	70.6	70.6	16.5	86.1	86.1	27.9	27.9	27.9		27.9	27.9
Effective Green, g (s)	0.5	71.1	71.1	16.0	86.6	86.6	27.9	27.9	27.9		27.9	27.9
Actuated g/C Ratio	0.00	0.55	0.55	0.12	0.67	0.67	0.21	0.21	0.21		0.21	0.21
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5	5.5	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	1.5	4.0	4.0	1.5	4.0	4.0	1.5	1.5	1.5		1.5	1.5
Lane Grp Cap (vph)	12	3136	775	378	3031	944	265	358	304		310	304
v/s Ratio Prot	0.00	c0.26		c0.10	0.18			0.01				
v/s Ratio Perm			0.10			0.00	0.07		c0.18		0.02	0.00
v/c Ratio	0.75	0.47	0.18	0.79	0.27	0.01	0.31	0.04	0.86		0.08	0.01
Uniform Delay, d1	64.7	17.9	14.8	55.4	8.8	7.3	43.0	40.5	49.2		40.8	40.2
Progression Factor	0.93	0.68	0.64	0.71	2.02	2.15	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	104.0	0.4	0.4	8.9	0.2	0.0	0.2	0.0	20.7		0.0	0.0
Delay (s)	164.2	12.7	9.9	48.4	18.0	15.6	43.2	40.5	69.8		40.8	40.2
Level of Service	F	B	A	D	B	B	D	D	E		D	D
Approach Delay (s)		13.1			26.1			65.3			40.6	
Approach LOS		B			C			E			D	

Intersection Summary			
HCM Average Control Delay	26.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	75.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



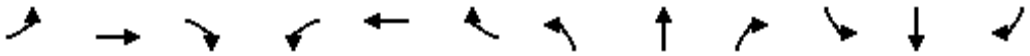
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	625	234	136	22	123	518	0	1076	24	135	841	754
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0		5.0		5.0	5.0	5.0
Lane Util. Factor	0.86	0.86	1.00		1.00	0.88		0.86		1.00	0.91	0.88
Frt	1.00	1.00	0.85		1.00	0.85		1.00		1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00		0.99	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)	2723	2802	1417		1654	2493		5715		1583	4550	2493
Flt Permitted	0.95	0.65	1.00		0.87	1.00		1.00		0.12	1.00	1.00
Satd. Flow (perm)	2723	1860	1417		1451	2493		5715		200	4550	2493
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	679	254	148	24	134	563	0	1170	26	147	914	820
RTOR Reduction (vph)	0	0	118	0	0	300	0	2	0	0	0	436
Lane Group Flow (vph)	462	471	30	0	158	263	0	1194	0	147	914	384
Turn Type	Prot		custom	Perm		Perm				pm+pt		Perm
Protected Phases	3	8			4			2		1	6	
Permitted Phases			3	4		4				6		6
Actuated Green, G (s)	26.0	58.7	26.0		27.2	27.2		44.0		60.3	60.3	60.3
Effective Green, g (s)	26.5	59.2	26.5		27.7	27.7		44.5		59.8	60.8	60.8
Actuated g/C Ratio	0.20	0.46	0.20		0.21	0.21		0.34		0.46	0.47	0.47
Clearance Time (s)	5.5	5.5	5.5		5.5	5.5		5.5		4.5	5.5	5.5
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0		2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	555	1039	289		309	531		1956		212	2128	1166
v/s Ratio Prot	c0.17	0.09						0.21		c0.06	0.20	
v/s Ratio Perm		0.11	0.02		c0.11	0.11				c0.26		0.15
v/c Ratio	0.83	0.45	0.10		0.51	0.50		0.61		0.69	0.43	0.33
Uniform Delay, d1	49.6	24.3	42.1		45.2	45.0		35.5		23.7	23.0	21.8
Progression Factor	1.00	1.00	1.00		1.00	1.00		1.14		1.00	1.00	1.00
Incremental Delay, d2	9.9	0.1	0.1		0.6	0.3		1.4		7.7	0.6	0.8
Delay (s)	59.5	24.4	42.2		45.8	45.3		42.1		31.4	23.7	22.5
Level of Service	E	C	D		D	D		D		C	C	C
Approach Delay (s)		41.8			45.4			42.1			23.8	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	35.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



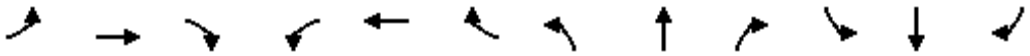
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	812	630	149	47	91	523	0	1614	49	350	914	713
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0		5.0		5.0	5.0	5.0
Lane Util. Factor	0.86	0.86	1.00		1.00	0.88		0.86		1.00	0.91	0.88
Frt	1.00	1.00	0.85		1.00	0.85		1.00		1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00		0.98	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)	2723	2846	1417		1639	2493		5708		1583	4550	2493
Flt Permitted	0.95	0.70	1.00		0.56	1.00		1.00		0.10	1.00	1.00
Satd. Flow (perm)	2723	2015	1417		931	2493		5708		159	4550	2493
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	883	685	162	51	99	568	0	1754	53	380	993	775
RTOR Reduction (vph)	0	0	40	0	0	377	0	3	0	0	0	399
Lane Group Flow (vph)	768	800	122	0	150	191	0	1804	0	380	993	376
Turn Type	Prot		Perm	Perm		Perm				pm+pt		Perm
Protected Phases	3	8			4			2		1	6	
Permitted Phases			8	4		4				6		6
Actuated Green, G (s)	30.5	56.5	56.5		20.5	20.5		37.5		62.5	62.5	62.5
Effective Green, g (s)	31.0	57.0	57.0		21.0	21.0		38.0		62.0	63.0	63.0
Actuated g/C Ratio	0.24	0.44	0.44		0.16	0.16		0.29		0.48	0.48	0.48
Clearance Time (s)	5.5	5.5	5.5		5.5	5.5		5.5		4.5	5.5	5.5
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0		2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	649	1082	621		150	403		1668		295	2205	1208
v/s Ratio Prot	c0.28	0.18						0.32		c0.20	0.22	
v/s Ratio Perm		0.15	0.09		c0.16	0.08				c0.42		0.15
v/c Ratio	1.18	0.74	0.20		1.00	0.47		1.08		1.29	0.45	0.31
Uniform Delay, d1	49.5	30.3	22.4		54.5	49.5		46.0		41.1	22.1	20.3
Progression Factor	1.00	1.00	1.00		1.00	1.00		1.07		1.00	1.00	1.00
Incremental Delay, d2	97.6	2.3	0.1		73.5	0.3		46.5		152.8	0.7	0.7
Delay (s)	147.1	32.6	22.5		128.0	49.8		95.8		193.9	22.8	21.0
Level of Service	F	C	C		F	D		F		F	C	C
Approach Delay (s)		82.5			66.1			95.8			52.4	
Approach LOS		F			E			F			D	

Intersection Summary			
HCM Average Control Delay	74.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	99.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	320	46	15	544	2	13	1	8	2	0	2
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.98		1.00	1.00			0.95			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.98	
Satd. Flow (prot)	1583	3107		1583	3165			1537			1516	
Flt Permitted	0.43	1.00		0.52	1.00			1.00			1.00	
Satd. Flow (perm)	713	3107		862	3165			1582			1554	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	348	50	16	591	2	14	1	9	2	0	2
RTOR Reduction (vph)	0	5	0	0	0	0	0	9	0	0	2	0
Lane Group Flow (vph)	9	393	0	16	593	0	0	15	0	0	2	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	48.1	47.3		48.1	47.3			1.3			1.3	
Effective Green, g (s)	47.1	47.8		47.1	47.8			1.3			1.3	
Actuated g/C Ratio	0.73	0.74		0.73	0.74			0.02			0.02	
Clearance Time (s)	4.5	5.5		4.5	5.5			5.0			5.0	
Vehicle Extension (s)	2.0	4.0		2.0	4.0			3.0			3.0	
Lane Grp Cap (vph)	526	2306		634	2349			32			31	
v/s Ratio Prot	0.00	0.13		c0.00	c0.19							
v/s Ratio Perm	0.01			0.02				c0.01			0.00	
v/c Ratio	0.02	0.17		0.03	0.25			0.47			0.07	
Uniform Delay, d1	2.3	2.4		2.3	2.6			31.2			31.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	0.2		0.0	0.3			10.7			0.9	
Delay (s)	2.3	2.6		2.4	2.9			41.9			31.9	
Level of Service	A	A		A	A			D			C	
Approach Delay (s)		2.6			2.9			41.9			31.9	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM Average Control Delay	3.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	64.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	33.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	26	702	219	30	414	2	202	1	61	7	3	4
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.96		1.00	1.00			0.97			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.97	
Satd. Flow (prot)	1583	3054		1583	3165			1555			1565	
Flt Permitted	0.49	1.00		0.20	1.00			0.77			0.85	
Satd. Flow (perm)	818	3054		334	3165			1238			1365	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	28	763	238	33	450	2	220	1	66	8	3	4
RTOR Reduction (vph)	0	25	0	0	0	0	0	11	0	0	3	0
Lane Group Flow (vph)	28	976	0	33	452	0	0	276	0	0	12	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	42.9	40.8		44.9	41.8			22.1			22.1	
Effective Green, g (s)	41.9	41.3		43.9	42.3			22.1			22.1	
Actuated g/C Ratio	0.52	0.51		0.54	0.52			0.27			0.27	
Clearance Time (s)	4.5	5.5		4.5	5.5			5.0			5.0	
Vehicle Extension (s)	2.0	4.0		2.0	4.0			3.0			3.0	
Lane Grp Cap (vph)	438	1557		221	1653			338			372	
v/s Ratio Prot	0.00	c0.32		c0.00	0.14							
v/s Ratio Perm	0.03			0.08				c0.22			0.01	
v/c Ratio	0.06	0.63		0.15	0.27			0.82			0.03	
Uniform Delay, d1	9.6	14.3		9.7	10.8			27.6			21.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	1.9		0.1	0.4			14.1			0.0	
Delay (s)	9.6	16.2		9.8	11.2			41.7			21.6	
Level of Service	A	B		A	B			D			C	
Approach Delay (s)		16.0			11.1			41.7			21.6	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM Average Control Delay	18.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	81.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*10/03/2012*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*West Mall Connector*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2016*

Project ID *Oakbrook Village Traffic Impact Study - Phase 2 With Project*

East/West Street: *Oakbrook Village Internal Circ* | North/South Street: *Call De Los Caballeros*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*0*	*8*	*3*	*3*	*7*	*1*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*8*	*8*	*17*	*0*	*9*	*3*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.95*		*0.95*		*0.95*		*0.95*	
Flow Rate (veh/h)	*11*		*11*		*33*		*12*	
% Heavy Vehicles	*2*		*2*		*2*		*2*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.0*		*0.3*		*0.2*		*0.0*	
Prop. Right-Turns	*0.3*		*0.1*		*0.5*		*0.3*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.1*		*0.0*		*-0.2*		*-0.1*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.01*		*0.01*		*0.03*		*0.01*	
hd, final value (s)	*3.87*		*4.03*		*3.73*		*3.86*	
x, final value	*0.01*		*0.01*		*0.03*		*0.01*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*1.9*		*2.0*		*1.7*		*1.9*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*261*		*261*		*283*		*262*	
Delay (s/veh)	*6.92*		*7.09*		*6.86*		*6.91*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*6.92*		*7.09*		*6.86*		*6.91*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*6.92*							
Intersection LOS	*A*							

HCS+™ Version 5.5 Generated: 10/3/2012 7:01 AM

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*10/03/2012*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*West Mall Connector*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2016*

Project ID *Oakbrook Village Traffic Impact Study - Phase 2 With Project*

East/West Street: *Oakbrook Village Internal Circ* | North/South Street: *Call De Los Caballeros*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*1*	*22*	*7*	*27*	*24*	*0*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*17*	*44*	*107*	*1*	*33*	*1*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.95*		*0.95*		*0.95*		*0.95*	
Flow Rate (veh/h)	*31*		*53*		*175*		*36*	
% Heavy Vehicles	*2*		*2*		*2*		*2*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.0*		*0.5*		*0.1*		*0.0*	
Prop. Right-Turns	*0.2*		*0.0*		*0.6*		*0.0*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.1*		*0.1*		*-0.3*		*0.0*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.03*		*0.05*		*0.16*		*0.03*	
hd, final value (s)	*4.30*		*4.51*		*3.80*		*4.28*	
x, final value	*0.04*		*0.07*		*0.18*		*0.04*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*2.3*		*2.5*		*1.8*		*2.3*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*281*		*303*		*425*		*286*	
Delay (s/veh)	*7.47*		*7.83*		*7.67*		*7.47*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*7.47*		*7.83*		*7.67*		*7.47*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*7.65*							
Intersection LOS	*A*							

HCS+™ Version 5.5 Generated: 10/3/2012 12:45 PM

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*10/02/2012*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*East Mall Connector*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2016*

Project ID *Oakbrook Village Traffic Impact Study - Phase 2 With Project*

East/West Street: *Oakbrook Vill Internal Circ* | North/South Street: *Calle De Los Caballeros*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*0*	*1*	*7*	*1*	*3*	*0*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*14*	*2*	*0*	*0*	*0*	*1*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.95*		*0.95*		*0.95*		*0.95*	
Flow Rate (veh/h)	*8*		*4*		*16*		*1*	
% Heavy Vehicles	*2*		*2*		*2*		*2*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.0*		*0.3*		*0.9*		*0.0*	
Prop. Right-Turns	*0.9*		*0.0*		*0.0*		*1.0*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.5*		*0.1*		*0.2*		*-0.6*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.01*		*0.00*		*0.01*		*0.00*	
hd, final value (s)	*3.45*		*4.03*		*4.13*		*3.37*	
x, final value	*0.01*		*0.00*		*0.02*		*0.00*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*1.4*		*2.0*		*2.1*		*1.4*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*258*		*254*		*266*		*251*	
Delay (s/veh)	*6.48*		*7.05*		*7.21*		*6.38*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*6.48*		*7.05*		*7.21*		*6.38*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*6.96*							
Intersection LOS	*A*							

HCS+™ Version 5.5 Generated: 10/3/2012 7:06 AM

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*10/20/2012*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*East Mall Connector*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2016*

Project ID *Oakbrook Village Traffic Impact Study - Phase 2 With Project*

East/West Street: *Oakbrook Village Internal Circ* | North/South Street: *Call De Los Caballeros*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*5*	*38*	*12*	*26*	*19*	*0*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*19*	*3*	*28*	*16*	*9*	*4*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.95*		*0.95*		*0.95*		*0.95*	
Flow Rate (veh/h)	*57*		*47*		*52*		*29*	
% Heavy Vehicles	*0*		*0*		*0*		*0*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.1*		*0.6*		*0.4*		*0.6*	
Prop. Right-Turns	*0.2*		*0.0*		*0.6*		*0.1*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.1*		*0.1*		*-0.3*		*0.0*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.05*		*0.04*		*0.05*		*0.03*	
hd, final value (s)	*4.01*		*4.24*		*3.90*		*4.21*	
x, final value	*0.06*		*0.06*		*0.06*		*0.03*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*2.0*		*2.2*		*1.9*		*2.2*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*307*		*297*		*302*		*279*	
Delay (s/veh)	*7.28*		*7.49*		*7.13*		*7.35*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*7.28*		*7.49*		*7.13*		*7.35*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*7.31*							
Intersection LOS	*A*							

HCS+™ Version 5.5 Generated: 10/3/2012 1:32 PM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*10/03/2012*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Lonestar Ent & Ave De La Carlo*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2016*

Project Description *Oakbrook Village Traffic Impact Study - Phase 2 With Project*

East/West Street: *Avenida De La Carlotta* | North/South Street: *Lonestar Entrance*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*292*	*34*	*8*	*649*	
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*307*	*35*	*8*	*683*	*0*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*31*		*18*			
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*32*	*0*	*18*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*8*	*32*		*18*			
C (m) (veh/h)		*1214*	*381*		*871*			
v/c		*0.01*	*0.08*		*0.02*			
95% queue length		*0.02*	*0.27*		*0.06*			
Control Delay (s/veh)		*8.0*	*15.3*		*9.2*			
LOS		*A*	*C*		*A*			
Approach Delay (s/veh)	--	--	*13.1*					
Approach LOS	--	--	*B*					

HCS+™ Version 5.5

Generated: 10/3/2012 7:12 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*10/03/2012*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Lonestar Ent & Ave De La Carlo*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2016*

Project Description *Oakbrook Village Traffic Study - Phase II with Proiect*

East/West Street: *Avenida De La Carlotta* | North/South Street: *Lonestar Entrance*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*781*	*214*	*35*	*407*	
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*822*	*225*	*36*	*428*	*0*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*65*		*74*			
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*68*	*0*	*77*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*36*	*68*		*77*			
C (m) (veh/h)		*660*	*163*		*551*			
v/c		*0.05*	*0.42*		*0.14*			
95% queue length		*0.17*	*2.06*		*0.49*			
Control Delay (s/veh)		*10.8*	*42.7*		*12.6*			
LOS		*B*	*E*		*B*			
Approach Delay (s/veh)	--	--	*26.7*					
Approach LOS	--	--	*D*					

HCS+™ Version 5.5

Generated: 10/3/2012 1:36 PM

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Volume (vph)	102	31	301	13	8	553
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1583	1417	3147		1583	3167
Flt Permitted	0.95	1.00	1.00		0.48	1.00
Satd. Flow (perm)	1583	1417	3147		808	3167
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	111	34	327	14	9	601
RTOR Reduction (vph)	0	29	3	0	0	0
Lane Group Flow (vph)	111	5	338	0	9	601
Turn Type		Perm			pm+pt	
Protected Phases	4		2		1	6
Permitted Phases		4			6	
Actuated Green, G (s)	9.0	9.0	39.2		45.1	45.1
Effective Green, g (s)	9.0	9.0	39.2		45.1	45.1
Actuated g/C Ratio	0.14	0.14	0.61		0.70	0.70
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	4.0	4.0	4.0		2.0	4.0
Lane Grp Cap (vph)	222	199	1925		579	2228
v/s Ratio Prot	c0.07		0.11		0.00	c0.19
v/s Ratio Perm		0.00			0.01	
v/c Ratio	0.50	0.02	0.18		0.02	0.27
Uniform Delay, d1	25.5	23.8	5.4		3.0	3.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.4	0.1	0.2		0.0	0.3
Delay (s)	27.9	23.8	5.6		3.0	3.8
Level of Service	C	C	A		A	A
Approach Delay (s)	26.9		5.6			3.8
Approach LOS	C		A			A

Intersection Summary			
HCM Average Control Delay	7.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	64.1	Sum of lost time (s)	10.0
Intersection Capacity Utilization	33.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Volume (vph)	12	160	842	31	107	395
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1583	1417	3150		1583	3167
Flt Permitted	0.95	1.00	1.00		0.22	1.00
Satd. Flow (perm)	1583	1417	3150		359	3167
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	174	915	34	116	429
RTOR Reduction (vph)	0	154	3	0	0	0
Lane Group Flow (vph)	13	20	946	0	116	429
Turn Type		Perm			pm+pt	
Protected Phases	4		2		1	6
Permitted Phases		4			6	
Actuated Green, G (s)	6.5	6.5	30.3		40.0	40.0
Effective Green, g (s)	6.5	6.5	30.3		40.0	40.0
Actuated g/C Ratio	0.12	0.12	0.54		0.71	0.71
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	4.0	4.0	4.0		2.0	4.0
Lane Grp Cap (vph)	182	163	1689		356	2242
v/s Ratio Prot	0.01		c0.30		c0.03	0.14
v/s Ratio Perm		c0.01			0.20	
v/c Ratio	0.07	0.12	0.56		0.33	0.19
Uniform Delay, d1	22.3	22.4	8.7		3.8	2.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.5	1.3		0.2	0.2
Delay (s)	22.5	22.9	10.0		4.0	3.0
Level of Service	C	C	B		A	A
Approach Delay (s)	22.9		10.0			3.2
Approach LOS	C		B			A

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	56.5	Sum of lost time (s)	15.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*08/27/20122*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*1st Fed Ent & Ave De La Carlo*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2016*

Project Description *Oakbrook Village Traffic Impact Study - Phase 2 With Project*

East/West Street: *Avenida De La Carlotta* | North/South Street: *1st Federal Bank Entrance*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*20*	*272*	*4*	*7*	*523*	*1*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*21*	*286*	*4*	*7*	*550*	*1*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*1*	*2*	*0*
Configuration	*L*	*T*	*TR*	*L*	*T*	*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*13*		*9*	*0*		*0*
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*0.95*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*13*	*0*	*9*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*			*LR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*	*L*		*LR*			*LR*	
v (veh/h)	*21*	*7*		*22*			*0*	
C (m) (veh/h)	*1015*	*1269*		*483*				
v/c	*0.02*	*0.01*		*0.05*				
95% queue length	*0.06*	*0.02*		*0.14*				
Control Delay (s/veh)	*8.6*	*7.9*		*12.8*				
LOS	*A*	*A*		*B*				
Approach Delay (s/veh)	--	--	*12.8*					
Approach LOS	--	--	*B*					

HCS+™ Version 5.5 Generated: 10/3/2012 10:19 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Joe Molinaro PE*
Agency/Co.	*HDR Engineering Inc*
Date Performed	*08/27/2012*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*1st Fed Ent & Ave De La Carlo*
Jurisdiction	*City of Laguna Hills*
Analysis Year	*2016*

Project Description *Oakbrook Village Traffic Impact Study - Phase 2 With Project*

East/West Street: *Avenida De La Carlotta* | North/South Street: *1st Federal Bank Entrance*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*6*	*1026*	*22*	*9*	*510*	*2*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*6*	*1080*	*23*	*9*	*536*	*2*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*1*	*2*	*0*
Configuration	*L*	*T*	*TR*	*L*	*T*	*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*6*		*15*	*1*		*7*
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*0.95*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*6*	*0*	*15*	*1*	*0*	*7*
Percent Heavy Vehicles	*2*	*0*	*2*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*			*LR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*	*L*		*LR*			*LR*	
v (veh/h)	*6*	*9*		*21*			*8*	
C (m) (veh/h)	*1026*	*629*		*238*			*518*	
v/c	*0.01*	*0.01*		*0.09*			*0.02*	
95% queue length	*0.02*	*0.04*		*0.29*			*0.05*	
Control Delay (s/veh)	*8.5*	*10.8*		*21.6*			*12.1*	
LOS	*A*	*B*		*C*			*B*	
Approach Delay (s/veh)	--	--	*21.6*			*12.1*		
Approach LOS	--	--	*C*			*B*		

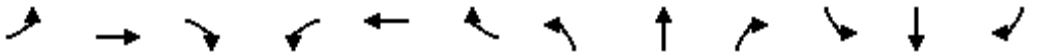
HCS+™ Version 5.5 Generated: 10/3/2012 1:39 PM

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (vph)	101	389	754	1077	737	320
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.97	0.95	0.95	0.88	0.94	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3072	3167	3167	2493	4465	1417
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3072	3167	3167	2493	4465	1417
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	110	423	820	1171	801	348
RTOR Reduction (vph)	0	0	0	470	0	241
Lane Group Flow (vph)	110	423	820	701	801	107
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	8.6	89.9	77.3	77.3	29.1	29.1
Effective Green, g (s)	7.6	90.4	77.8	77.8	29.6	29.6
Actuated g/C Ratio	0.06	0.70	0.60	0.60	0.23	0.23
Clearance Time (s)	4.0	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	1.5	5.0	5.0	5.0	2.0	2.0
Lane Grp Cap (vph)	180	2202	1895	1492	1017	323
v/s Ratio Prot	c0.04	0.13	0.26		c0.18	
v/s Ratio Perm				c0.28		0.08
v/c Ratio	0.61	0.19	0.43	0.47	0.79	0.33
Uniform Delay, d1	59.8	7.0	14.1	14.6	47.2	41.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.3	0.2	0.7	1.1	3.8	0.2
Delay (s)	64.0	7.2	14.9	15.6	51.0	42.2
Level of Service	E	A	B	B	D	D
Approach Delay (s)		18.9	15.3		48.3	
Approach LOS		B	B		D	

Intersection Summary			
HCM Average Control Delay	26.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

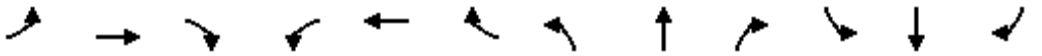
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (vph)	273	1057	542	1039	990	160
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.97	0.95	0.95	0.88	0.94	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3072	3167	3167	2493	4465	1417
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3072	3167	3167	2493	4465	1417
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	297	1149	589	1129	1076	174
RTOR Reduction (vph)	0	0	0	594	0	124
Lane Group Flow (vph)	297	1149	589	535	1076	50
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	16.7	81.8	61.1	61.1	37.2	37.2
Effective Green, g (s)	15.7	82.3	61.6	61.6	37.7	37.7
Actuated g/C Ratio	0.12	0.63	0.47	0.47	0.29	0.29
Clearance Time (s)	4.0	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	1.5	5.0	5.0	5.0	2.0	2.0
Lane Grp Cap (vph)	371	2005	1501	1181	1295	411
v/s Ratio Prot	c0.10	c0.36	0.19		c0.24	
v/s Ratio Perm				0.21		0.04
v/c Ratio	0.80	0.57	0.39	0.45	0.83	0.12
Uniform Delay, d1	55.6	13.7	22.1	22.9	43.2	34.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.1	1.2	0.8	1.3	4.5	0.0
Delay (s)	66.7	14.9	22.9	24.2	47.6	34.0
Level of Service	E	B	C	C	D	C
Approach Delay (s)		25.6	23.7		45.7	
Approach LOS		C	C		D	

Intersection Summary			
HCM Average Control Delay	30.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	233	862	2	5	761	283	9	12	4	187	5	106
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.91		1.00	0.95	1.00		1.00		0.95	0.95	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98		0.95	0.95	1.00
Satd. Flow (prot)	3072	4549		1583	3167	1417		1604		1504	1511	1417
Flt Permitted	0.95	1.00		0.29	1.00	1.00		0.43		0.74	0.72	1.00
Satd. Flow (perm)	3072	4549		487	3167	1417		699		1171	1135	1417
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	253	937	2	5	827	308	10	13	4	203	5	115
RTOR Reduction (vph)	0	0	0	0	0	169	0	4	0	0	0	96
Lane Group Flow (vph)	253	939	0	5	827	139	0	23	0	104	104	19
Turn Type	Prot			pm+pt		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			3			4	
Permitted Phases				6		6	3			4		4
Actuated Green, G (s)	12.4	56.0		45.2	44.4	44.4		6.4		15.7	15.7	15.7
Effective Green, g (s)	11.9	57.0		44.2	45.4	45.4		6.4		16.7	16.7	16.7
Actuated g/C Ratio	0.12	0.57		0.44	0.45	0.45		0.06		0.17	0.17	0.17
Clearance Time (s)	4.5	6.0		4.5	6.0	6.0		5.0		6.0	6.0	6.0
Vehicle Extension (s)	2.0	5.0		2.0	5.0	5.0		2.0		4.0	4.0	4.0
Lane Grp Cap (vph)	364	2583		218	1432	641		45		195	189	236
v/s Ratio Prot	c0.08	0.21		0.00	c0.26							
v/s Ratio Perm				0.01		0.10		c0.03		0.09	c0.09	0.01
v/c Ratio	0.70	0.36		0.02	0.58	0.22		0.52		0.53	0.55	0.08
Uniform Delay, d1	42.5	11.8		15.8	20.4	16.7		45.5		38.3	38.4	35.4
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	4.6	0.4		0.0	1.7	0.8		4.1		3.5	4.2	0.2
Delay (s)	47.1	12.2		15.8	22.1	17.5		49.6		41.8	42.6	35.6
Level of Service	D	B		B	C	B		D		D	D	D
Approach Delay (s)		19.6			20.8			49.6			39.9	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM Average Control Delay	22.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	100.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	173	883	13	11	738	251	7	8	6	649	14	233
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.91		1.00	0.95	1.00		1.00		0.95	0.95	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98		0.95	0.95	1.00
Satd. Flow (prot)	3072	4540		1583	3167	1417		1575		1504	1511	1417
Flt Permitted	0.95	1.00		0.25	1.00	1.00		0.43		0.74	0.72	1.00
Satd. Flow (perm)	3072	4540		424	3167	1417		689		1174	1136	1417
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	188	960	14	12	802	273	8	9	7	705	15	253
RTOR Reduction (vph)	0	1	0	0	0	178	0	7	0	0	0	163
Lane Group Flow (vph)	188	973	0	12	802	95	0	17	0	360	360	90
Turn Type	Prot			pm+pt		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			3			4	
Permitted Phases				6		6	3			4		4
Actuated Green, G (s)	9.4	48.0		41.0	39.8	39.8		6.2		40.9	40.9	40.9
Effective Green, g (s)	8.9	49.0		40.0	40.8	40.8		6.2		41.9	41.9	41.9
Actuated g/C Ratio	0.08	0.42		0.34	0.35	0.35		0.05		0.36	0.36	0.36
Clearance Time (s)	4.5	6.0		4.5	6.0	6.0		5.0		6.0	6.0	6.0
Vehicle Extension (s)	2.0	5.0		2.0	5.0	5.0		2.0		4.0	4.0	4.0
Lane Grp Cap (vph)	232	1888		151	1097	491		36		418	404	504
v/s Ratio Prot	c0.06	0.21		0.00	c0.25							
v/s Ratio Perm				0.03		0.07		c0.03		0.31	c0.32	0.06
v/c Ratio	0.81	0.52		0.08	0.73	0.19		0.48		0.86	0.89	0.18
Uniform Delay, d1	53.6	25.6		26.0	33.7	27.0		54.2		35.2	35.8	26.1
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	18.0	1.0		0.1	4.3	0.9		3.7		16.9	21.5	0.2
Delay (s)	71.6	26.6		26.0	38.0	27.8		57.9		52.2	57.2	26.3
Level of Service	E	C		C	D	C		E		D	E	C
Approach Delay (s)		33.9			35.3			57.9			47.3	
Approach LOS		C			D			E			D	

Intersection Summary			
HCM Average Control Delay	38.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	117.8	Sum of lost time (s)	20.0
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	151	202	118	7	360	562	192	50	25	786	860	26
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3072	3167	1417	1583	3167	1417	1583	3167	1417	3072	3153	
Flt Permitted	0.95	1.00	1.00	0.61	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3072	3167	1417	1024	3167	1417	1583	3167	1417	3072	3153	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	164	220	128	8	391	611	209	54	27	854	935	28
RTOR Reduction (vph)	0	0	93	0	0	482	0	0	22	0	3	0
Lane Group Flow (vph)	164	220	35	8	391	129	209	54	5	854	960	0
Turn Type	Prot		Perm	pm+pt		Perm	Split		Perm	Split		
Protected Phases	1	6		5	2		4	4		8	8	
Permitted Phases			6	2		2			4			
Actuated Green, G (s)	5.5	21.6	21.6	17.7	16.9	16.9	14.2	14.2	14.2	27.4	27.4	
Effective Green, g (s)	5.5	21.6	21.6	17.7	16.9	16.9	14.2	14.2	14.2	27.4	27.4	
Actuated g/C Ratio	0.07	0.27	0.27	0.22	0.21	0.21	0.18	0.18	0.18	0.34	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	211	855	383	232	669	299	281	562	252	1052	1080	
v/s Ratio Prot	c0.05	0.07		0.00	c0.12		c0.13	0.02		0.28	c0.30	
v/s Ratio Perm			0.02	0.01		0.09			0.00			
v/c Ratio	0.78	0.26	0.09	0.03	0.58	0.43	0.74	0.10	0.02	0.81	0.89	
Uniform Delay, d1	36.6	22.9	21.8	24.4	28.4	27.4	31.2	27.5	27.2	24.0	24.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	16.3	0.7	0.5	0.1	3.7	4.5	10.2	0.1	0.0	4.9	9.1	
Delay (s)	53.0	23.6	22.3	24.4	32.1	31.9	41.4	27.6	27.2	28.8	34.0	
Level of Service	D	C	C	C	C	C	D	C	C	C	C	
Approach Delay (s)		32.7			31.9			37.5			31.6	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM Average Control Delay	32.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	313	773	434	28	279	493	157	102	85	718	370	34
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3072	3167	1417	1583	3167	1417	1583	3167	1417	3072	3127	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3072	3167	1417	1583	3167	1417	1583	3167	1417	3072	3127	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	340	840	472	30	303	536	171	111	92	780	402	37
RTOR Reduction (vph)	0	0	182	0	0	416	0	0	77	0	9	0
Lane Group Flow (vph)	340	840	290	30	303	120	171	111	15	780	430	0
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		
Protected Phases	1	6		5	2		4	4		8	8	
Permitted Phases			6			2			4			
Actuated Green, G (s)	9.9	26.2	26.2	1.6	17.9	17.9	13.1	13.1	13.1	23.1	23.1	
Effective Green, g (s)	9.9	26.2	26.2	1.6	17.9	17.9	13.1	13.1	13.1	23.1	23.1	
Actuated g/C Ratio	0.12	0.33	0.33	0.02	0.22	0.22	0.16	0.16	0.16	0.29	0.29	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	380	1037	464	32	709	317	259	519	232	887	903	
v/s Ratio Prot	c0.11	c0.27		0.02	0.10		c0.11	0.04		c0.25	0.14	
v/s Ratio Perm			0.21			0.08			0.01			
v/c Ratio	0.89	0.81	0.63	0.94	0.43	0.38	0.66	0.21	0.06	0.88	0.48	
Uniform Delay, d1	34.5	24.6	22.8	39.2	26.7	26.3	31.4	29.0	28.3	27.1	23.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	22.5	6.9	6.3	131.8	1.9	3.4	6.2	0.2	0.1	9.9	0.4	
Delay (s)	57.0	31.5	29.0	170.9	28.5	29.7	37.5	29.2	28.4	37.0	23.9	
Level of Service	E	C	C	F	C	C	D	C	C	D	C	
Approach Delay (s)		36.0			34.2			32.8			32.3	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	34.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Appendix H

Shared Use Parking Calculation Tables

OAKBROOK VILLAGE SHARED PARKING ANALYSIS - TCA site plan -8/13/12 Site Plan with podium with 132 K retail, 493 units, restaurants

WEEKDAYS

Land Use	Retail		Fine/Casual Dining		Family Restaurant		Medical/Dental		TOTAL PARKING REQUIRED RETAIL	SURPLUS (DEFICIT)
Parking Ratio	4.5		12		12		6.67			
Total SF	89,219		32,097		8,668		2,216			
Parking Required for Land Use	401.5		385.2		104.0		14.8			734
Time Period										
6:00 AM	1%	4.0	0%	0.0	10%	10.4	21%	3.1	18	716
7:00 AM	5%	20.1	0%	0.0	25%	26.0	53%	7.8	54	680
8:00 AM	10%	40.1	0%	0.0	45%	46.8	77%	11.4	98	636
9:00 AM	30%	120.4	0%	0.0	70%	72.8	94%	13.9	207	527
10:00 AM	50%	200.7	0%	0.0	90%	93.6	99%	14.6	309	425
11:00 AM	67%	267.0	15%	57.8	90%	93.6	100%	14.8	433	301
12:00 AM	80%	321.2	50%	192.6	100%	104.0	97%	14.3	632	102
1:00 PM	90%	361.3	55%	211.8	85%	88.4	95%	14.0	676	58
2:00 PM	100%	401.5	45%	173.3	65%	67.6	97%	14.3	657	77
3:00 PM	100%	401.5	45%	162.4	40%	41.6	97%	14.3	620	114
4:00 PM	95%	381.4	45%	162.4	45%	46.8	88%	13.0	604	130
5:00 PM	90%	361.3	60%	216.6	60%	62.4	77%	11.4	652	82
6:00 PM	80%	321.2	90%	324.8	70%	72.8	58%	8.6	727	7
7:00 PM	75%	301.1	95%	342.9	70%	72.8	53%	7.8	725	9
8:00 PM	65%	261.0	100%	360.9	65%	67.6	47%	6.9	696	38
9:00 PM	50%	200.7	90%	324.8	30%	31.2	32%	4.7	562	172
10:00 PM	35%	140.5	90%	324.8	25%	26.0	26%	3.8	495	239
11:00 PM	15%	60.2	90%	324.8	15%	15.6	24%	3.5	404	330
12:00 AM	0%	0.0	50%	180.5	10%	10.4	17%	2.5	193	541

PARKING AVAILABLE

Assigned Residential	293
Unassigned Residential	212
Joint use	58
Retail	734
Total	1297

Residential Parking Requirement

Unassigned	# Assign	# Unassign
1 bd	162	81
2bd	131	131
3bd	0	0
TOTAL	293	212

RESTAURANT SQUARE FOOTAGES

Family Restaurants	
Woody's	5,053
Nani FI's	3,615
TOTAL	8,668
Fine/Casual Dining	
Lone Star	7,800
El Torito	9,500
Mandarin Terrace	3,000
Kotobuki	2,177
Break of Dawn	2,020
New restaurant	7,600
TOTAL	32,097

Retail	91,435
Total SF	132,200

Note Break of Dawn Closes
@ 3:00 pm parking credit of 24 spaces

Based on Shared Parking
Second Edition
Mary S. Smith. 2005
A joint study between ULI and ICSC

Table 2.5/2.6 - Recommended Time of Day Factors
for Weekdays/Weekends page 18-21