COUNTY OF SAN BERNARDINO
TRAFFIC IMPACT STUDY
FOR
ST GEORGE CATHOLIC CHURCH
17895 SAN BERNARDINO AVE FONTANA, CA.

Prepared

By

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Revised April 14, 2014

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INTRODUCTION

This traffic impact analysis (TIA) has been prepared to provide an assessment of potential traffic circulation impact associated with phased improvement to St George Catholic Church located on San Bernardino Avenue between Alder Avenue and Grace Street in the community of Bloomington in the unincorporated area of San Bernardino County. The project vicinity map is provided as exhibit 1 in this report.

This project, comprising the construction of church buildings and a parking lot is proposed in two phases. Phase 1 is the construction of 16,144SF sanctuary building and parking lot. The proposed sanctuary has a seating capacity of 1,200 and will replace the use of existing 273 seating sanctuary. Phase 2 is the construction of 18,126 SF church hall with classrooms and kitchen and will replace the existing parish hall. The existing sanctuary and hall facilities shall be converted to youth centers. The existing rectory shall remain as the home of the "Father". The project site plan is provided as exhibit 2.

This project falls within the regional Transportation Facilities Fee Plan (Rialto Sphere) area in San Bernardino County. The Church is classified as an institutional use on the fee plan. The Regional Transportation Impact Mitigation Fee shall therefore be assessed by the County.

This project is found to potentially generate 565 new trips in phase 1 and 126 new trips in phase 2, during the project peak hour. The project peak hour is found to occur on Sundays between the hours of 12:30pm to 2:30pm.

In a scoping discussion with staff of San Bernardino County Traffic Division, they required the study intersections be determined on the basis of 100 new trips added to an intersection by the project as a criteria to warrant intersection analysis. Exhibit 4 provides study intersection determination map showing the total new trips added to the intersection during the project peak hour at the completion of phase 2 project.

With the addition of traffic generated by the proposed project to the study area roadways, a minimum level of service standard must be maintained at study intersections consistent with San Bernardino County minimum level of service threshold requirement. This TIA analyzes existing traffic condition, project opening day conditions and general plan build-out condition and determines mitigation measures attributable to the project in order to provide the required minimum level of service standard at the study intersections.

This report is also prepared to assess and mitigate safety and other traffic off-site operational issues that may result from the development project. It is also prepared to satisfy the requirement for the disclosure of potential impacts and mitigation measures per the California Environmental Quality Act (CEQA)

PROJECT DISCRIPTION

The project is located on the south side of San Bernardino Avenue between Alder Avenue and Grace Street in the community of Bloomington within the unincorporated portion of San Bernardino County.

The proposed project is a two phase development of new church building and ancillary facilities on 9.42 acre parcel. Existing 3600 SF church building, 1778 SF residence building and 5,912 SF parish hall building shall remain.

Project Phase 1 is the construction of 16,144 SF sanctuary building and parking lot. Phase 2, is the construction of 18,126 SF church hall with classrooms and kitchen. The existing church and parish hall shall be converted to a youth center and the existing rectory shall remain as the residence of the "Father". The proposed youth center activities shall not be scheduled to occur concurrently with the church and main hall activities. The youth center will not therefore add new trips to the development.

There are three existing full driveway accesses on San Bernardino Avenue. The most easterly driveway will remain to serve the proposed improvements, the center driveway will continue to serve the existing rectory building, and the western driveway shall be proposed as an emergency access. A new full access driveway is proposed on Marygold Avenue.

ANALYSIS METHODOLOGY

This study presents an analysis of the study intersections operating conditions during the project peak hour for the following time frames:

- Year 2010
- Project phase 1 opening year 2015
- Project phase 2 opening year 2017
- Future forecast year 2035

The analysis scenarios are as follows:

- Year 2010 existing condition
- Project opening year 2015 with ambient traffic condition
- Project opening year 2015 with project condition
- Project opening year 2017 without project condition
- Project opening year 2017 with project condition
- General Plan build-out 2035 without project condition
- General Plan build-out 2035 with project condition

The Transportation Research Board –Highway Capacity Manual (HCM), 2000 Update, or most recent release is used for the operational analysis of intersections. Un-signalized intersections are analyzed using Chapter 17 of the Highway Capacity Manual. Signalized intersection is analyzed using operational methods as described in Chapter 16, Section 11.

This study is also prepared consistent with 'Level of Service Definition & Procedures" below.

Level of Service Definitions and Procedures

Roadway operations and relationship between capacity and traffic volumes are generally expressed in terms of level of service (which is defined using the letter grades A through F). These levels recognize that while an absolute limit exists as to the amount of traffic traveling through a given intersection (the absolute capacity); the conditions that motorists experience rapidly deteriorate as traffic approaches the absolute capacity. Under such conditions, congestion is experienced. There is general instability in the traffic flow, which means that relative small incidents (e.g., momentary engine stall) can cause considerable fluctuations in speeds and delays. This near-capacity situation is labeled Level of Service (LOS) 'E'. Beyond LOS E, capacity has been exceeded, and arriving traffic will exceed the ability of the intersection to accommodate it. Upstream queues will then form and continue to expand in length until demand again declines. A complete description of the meaning of level of service can be found in the Highway Research Board Special Report 209, Highway Capacity Manual. The manual establishes levels of service A through F. Table A provides brief descriptions of the six levels of service, as abstracted from the Manual.

TABLE A- Level of Service Definitions

LOS	Description
A	No approach phase is fully utilized by traffic and no vehicles waits longer than one red indication. Typically, the approach appears quite open, turns are made easily and nearly all drivers find freedom of operation.
B	This service level represents stable operation, where an occasional approach phase is fully utilized and a substantial number are approaching full use. Many drivers begin to feel restricted within platoons of vehicles.
C	This level still represents stable operation conditions. Occasionally drivers may have to wait through more than one red signal indication, and backups may develop behind turning vehicles. Most drivers fell somewhat restricted, but not objectionably so.
D	This level encompasses a zone of increasing restriction approaching instability at the intersection. Delays to approaching vehicles may be substantial during short peaks periods; however, enough cycles with lower demand occur to permit periodic clearance of developing queues, thus preventing excessive backups.
E	Capacity occurs at the upper end of this service level. It represents the most vehicles any that any particular intersections approach can accommodate. Full utilization of every signal is seldom attained no matter how great the demand.
F	This level describes forced flow operations at low speeds, where volumes exceed capacity. These conditions usually result from queues of vehicles backing up from a restriction downstream. Speeds are reduced substantially and stoppages may occur for short or long periods of time due to the congestions. In the extreme case, both

	speed and volume can drop to zero.

Table B shows the level of service criteria for un-signalized and signalized intersections.

Table B – Level of service Criteria for unsignalized and Signalized Intersections

Level of Service	Unsignalized Intersection Average Daily per Vehicle (sec)	Signalized Intersection Average Daily per Vehicle (sec)
A	≤ 10	≤ 10
B	>10 and ≤ 15	>10 and ≤ 20
C	>15 and ≤ 25	>20 and ≤ 35
D	>25 and ≤ 35	>35 and ≤ 55
E	> 35 and ≤ 50	> 55 and ≤ 80
F	>50	>80

Level of Service Threshold Criteria

Intersections under County of San Bernardino jurisdiction operating at LOS "E" or "F" are required to be mitigated to LOS "D" or better.

EXISTING STUDY AREA CONDITION

The project study area includes roads encompassing the recommended study intersections.

Existing Roadway Systems

The study intersections traffic controls and lane configurations are provided as exhibit 5. Major streets and highways in the site vicinity which are affected by the proposed project are Merrill Avenue, Randall Avenue, San Bernardino Avenue, Palmetto Avenue, Alder Avenue and Locust Avenue

Existing 2010 Traffic Volumes

The 2010 turning movement volumes counts were performed on Sunday June 20, 2010 at nine intersections determined to meet the CMP threshold of new traffic requirement. The study intersections are determined based on project trips expected at the end of phase 2. Traffic counts performed by Counts Unlimited Inc, represent the peak period project trips between the end of a church service and the beginning of another. The count sheets are contained in Appendix A. Exhibit 9 provides the intersection turning movement volumes at the study intersections.

FUTURE STUDY AREA CONDITION

Exhibits 10 and 12 provide study intersections turning movement volumes without the opening year project traffic. Exhibit 11 represents 2017 traffic that includes the 2015 project traffic. The volumes were generated, using County Expansion factor of 1% yearly growth projected to years 2015, 2017 and 2035.

PROJECT TRIP GENERATION

The Sunday peak hour of the generator represent the highest traffic volumes at project driveways when the church services are traditionally held on Sundays. The Sunday peak hour traffic was computed using average rates for 'Land Use 560' from the Institute of Transportation Engineers (ITE), Trip Generation (9th Edition). Table 1 summarizes the pm trip generation for phases 1 and 2. .

TRIP DISTRIBUTION & ASSIGNMENT

Trip distribution pattern for the project traffic was developed to reflect locations of population densities closest to the site. Exhibit 3 illustrates the trip distribution. Exhibits 7 and 8 represent the trip assignments for phases 1 and 2 respectively.

APPROVED AND PENDING PROJECTS

Bloomington Phase 1 project consisting of a housing development and a public library is located on the north side of Valley Boulevard west of locust Avenue. Impact of this project on the Sunday church project peak hour at analysis intersections is considered insignificant on the virtue of the use type.

TRAFFIC ANALYSIS

Appendix B provides the operational analysis worksheets of all the study intersections for all analysis scenarios identified in the methodology section of this report. Table 2, summarizes the analysis results. The results show that for all the analysis scenarios, all intersections examined are found to operate at satisfactory Level of Service.

CIRCULATION IMPROVEMENTS

No circulation improvements are recommended.

SUMMARY & CONCLUSIONS

This section of the report summarizes the results and conclusion of the traffic analysis for the two phased improvement to St George Catholic Church in Bloomington, California.

1. The study includes nine intersections and the project driveways on Marygold Avenue and San Bernardino Avenue.

2. The local intersections studied includes the examination of Sunday project PM peak hour traffic operations under the following conditions:
    - Year 2010 condition
    - Future 2015 opening year without project traffic condition
    - Future 2015 opening year with project traffic condition
    - Future 2017 opening year without project traffic condition
    - Future 2017 opening year traffic with project traffic condition.
    - General Plan build-out 2035 without project condition
    - General Plan build-out 2035 with project condition

3. As shown in Table 1, the project is expected to generate a total of 691 Sunday P.M peak hour trips.

4. In the project opening year 2015 and 2017, the project traffic will insignificantly impact all the study intersections.

5. In the project general plan build out year 2035, the project traffic will again insignificantly impact all the study intersections.

6. There is no apparent safety issues that will result off-site of the project as a consequence of the project.

7. No local traffic impact mitigation is recommended for the development of this project.

TABLES

TABLE 1

TRIP GENERATION

Phase 1

Land Use	Units	Sunday Peak Hr of Generator		
		In	Out	Total
Church Sanctuary (Land Use 560). Proposed 1200 seat sanctuary/existing 3600 SF (273 seats) sanctuary.	1200 seats minus 273 seat =927 seats.			
Trips/Unit		0.31	0.30	0.61
Trips		287	278	565

Phase 2

Land Use	Units	Sunday Peak Hr of Generator		
		In	Out	Total
Church (Land Use 560) Proposed Hall, Class rooms, Kitchen. Existing Hall to be removed.	18.126 T.S.F minus 5.912 T.S.F = 12.214 T.S.F			
Trips/Unit		5.90	6.14	12.04
Trips		72	75	147
Total Trips- Phases 1 & 2		359	353	712

TABLE 2: SUMMARY OF INTERSECTIONS OPERATIONAL ANALYSIS RESULTS

Intersection	DELAY LEVEL OF SERVICE VOLUME CAPACITY RATIO						
	Existing 2010	Phase 1 2015 without Project	Phase 1 2015 with Project	Proj Buildout Year 2017 w/o Proj. Traffic	Proj. Buildout Year 2017 with Proj. Traffic	2035 General Plan Build out w/o project Tra.	2035 General Plan Build out w project Tra.
Alder Ave @ Merrill Ave	18 B 0.27	17 B 0.29	18 B 0.31	18 B 0.31	19 B 0.32	18 B 0.31	19 B 0.33
Randall Ave @ Palmetto Ave	13.36 B 0.43	14.12 B 0.45	15.97 C 0.51	16.50 C 0.52	17.10 C 0.54	18.64 C 0.59	23.34 C 0.67
Randall Ave @ Alder Ave	18 B 0.22	18 B 0.23	18 B 0.27	18 B 0.27	18 B 0.28	18 B 0.24	18 B 0.29
Randall Ave @ Locust Ave	10.46 B 0.27	10.73 B 0.28	11.72 B 0.31	11.72 B 0.39	12.59 B 0.44	11.22 B 0.30	12.72 B 0.43
S.B Ave @ Alder Ave	18 B 0.30	19 B 0.31	22 C 0.40	22 C 0.41	23 C 0.42	18 B 0.29	23 C 0.39
S.B Ave @ Locust Ave	17 B 0.38	19 B 0.39	19 B 0.44	20 B 0.47	19 B 0.49	17 B 0.35	19 B 0.43
S.B Ave@ Linden Ave	14 B 0.28	17 B 0.29	16 B 0.33	16 B 0.34	18 B 0.35	15 B 0.26	16 B 0.33
Marygold Ave @ Alder Ave	14.14 B 0.51	15.12 C 0.55	17.69 C 0.59	20.85 C 0.65	22.72 C 0.67	18.82 C 0.64	24.91 C 0.72
Marygold Ave @ Locust Ave	9.24 A 0.21	9.40 A 0.23	11.08 B 0.30	11.20 B 0.31	11.76 B 0.33	10.28 B 0.30	12.66 B 0.38

Project Drwy @ Marygold Ave			11.9 B 0.24		13.20 B 0.33		13.90 B 0.34
Project Drwy @ San Bernardino Ave.			13.20 B 0.20		14.20 B 0.27		15.80 C 0.30

EXHIBITS

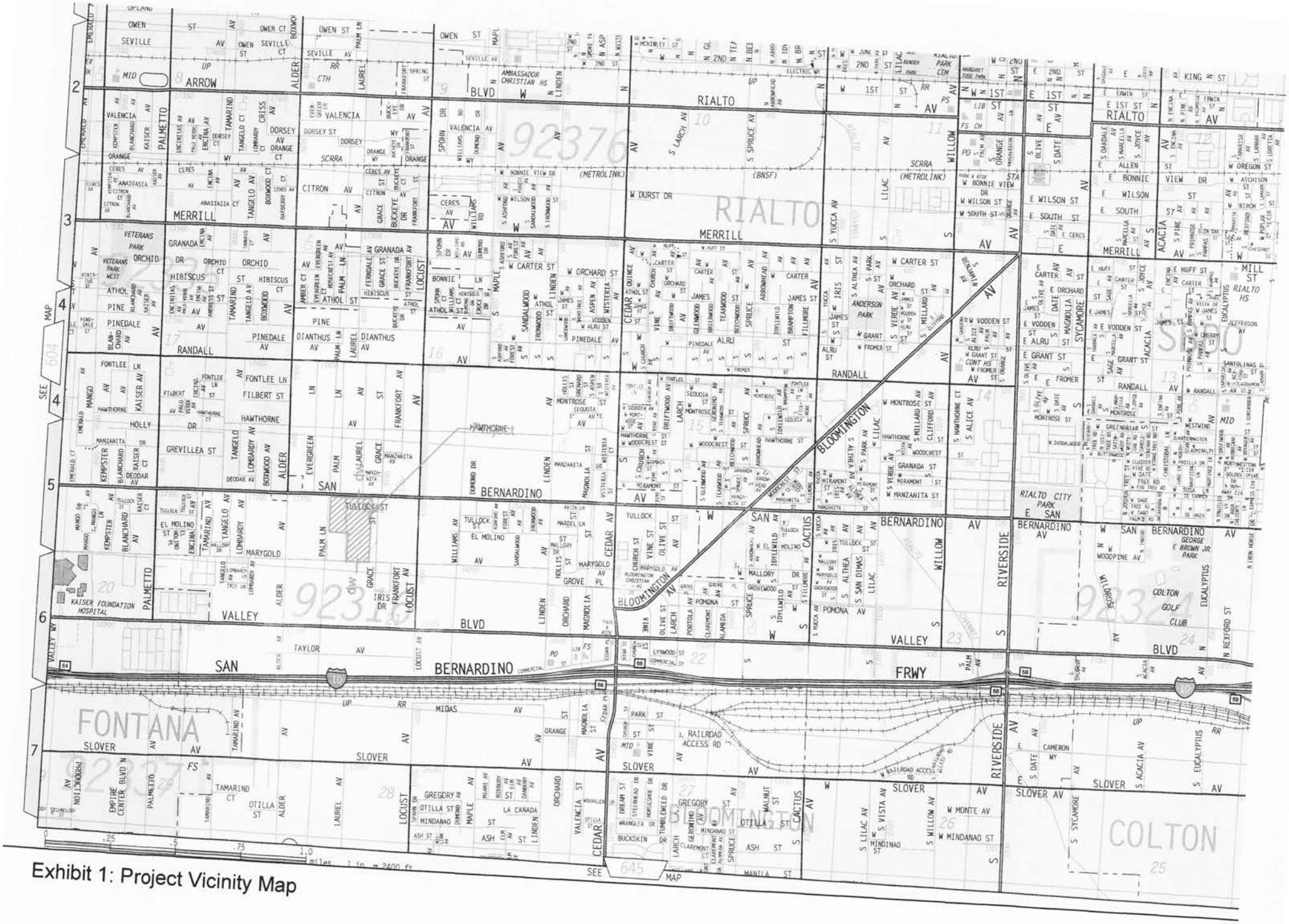

Exhibit 1: Project Vicinity Map

ST. GEORGE

PROPOSED CHURCH EXPANSION
SAN BERNARDINO COUNTY, CALIFORNIA

PORTIONS OF N.E. 1/4, SECTION 20 OF TOWNSHIP 1 SOUTH, RANGE 5 WEST, SAN BERNARDINO BASE MERIDIAN, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA

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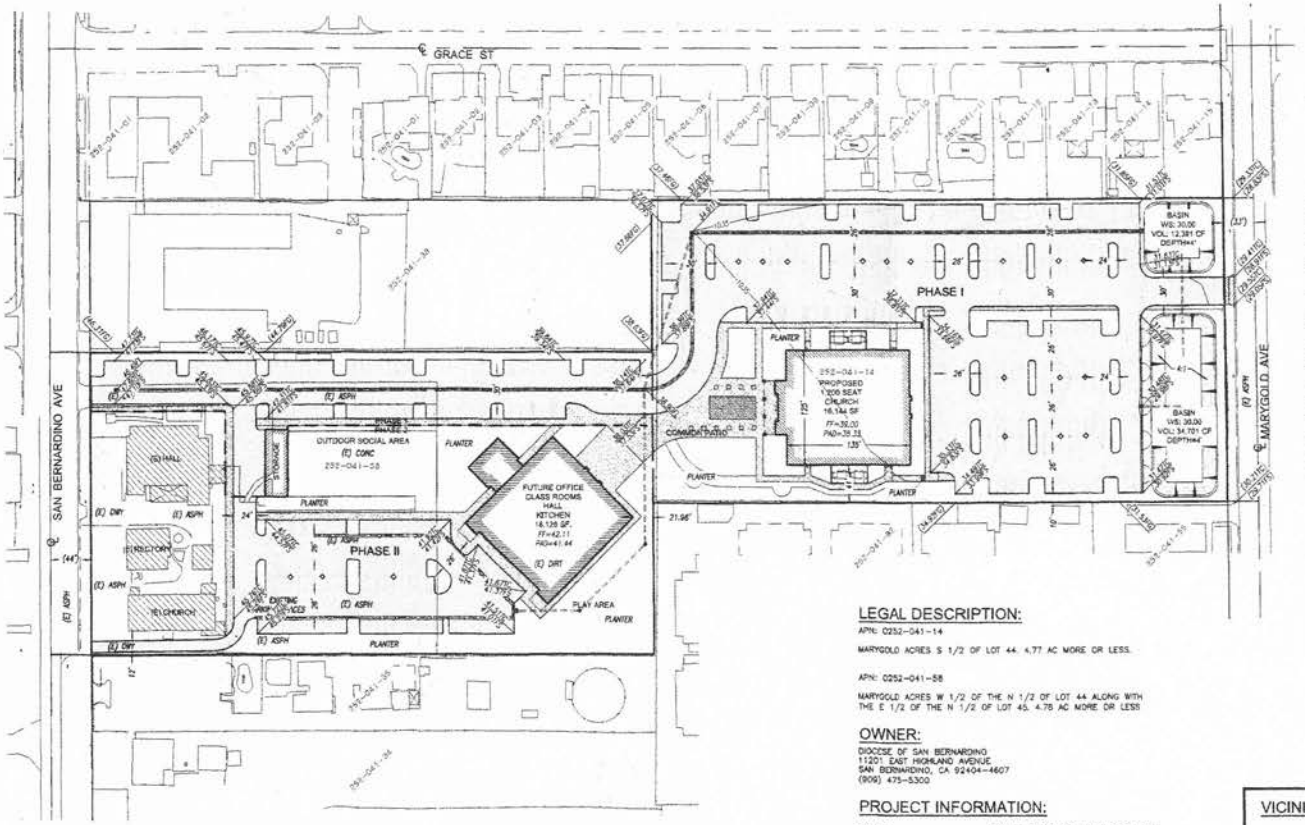
SCALE: 1" = 60'



UTILITY COMPANIES:

ELECTRIC:	SOUTHERN CALIFORNIA EDISON 287 TENNESSEE STREET REDLANDS, CA. 92373 (909) 307-6791
WATER:	MARYGOLD MUTAUL WATER COMPANY (909) 877-0516
GAS:	SOUTHERN CALIFORNIA GAS CO. 1981 WEST LUGONIA AVENUE REDLANDS, CA. 92373 (800) 427-2200
TELEPHONE:	VERIZON P.O. BOX 1090 HUNNINGTON BEACH, CA. 92647 (800) 483-5000
SEWER:	ON-SITE SEPTIC (EXISTING)

PARCEL COVERAGE:

SUBJECT	EXISTING	%	PROPOSED	%
BUILDING	14,650 S.F.	3.6%	46,920 S.F.	11.9%
A.C. PAVEMENT	65,438 S.F.	16.0%	178,850 S.F.	43.6%
CONCRETE	18,536 S.F.	4.5%	51,242 S.F.	12.5%
LANDSCAPE	12,382 S.F.	3.0%	131,162 S.F.	32.0%
UNDEVELOPED	299,167 S.F.	72.9%	0 S.F.	0%
TOTALS	410,174 S.F.	100% (9.42 AC.)		

PARKING CALC'S:

	REQUIRED
MAIN ASSEMBLY AREA (PHASE 1)	
1,200 SEATS/1 SPACE PER 3 FIXED SEATS	400 SPACES
MEETING ROOM (504 S.F.) NARTHEX (842 S.F.) AUDIO ROOM (98 S.F.) @ PER 400 S.F.	4 SPACES
TOTAL	404 SPACES
EXISTING HALL 6,498 S.F./1 PER 400 S.F.	16 SPACES
EXISTING CHAPEL 3,797 S.F./1 PER 400 S.F.	10 SPACES
TOTAL PROVIDED (PH1):	344 NEW SPACES 9 NEW H.C. SPACES (2 VAN + 7 STD.) 81 EXISTING SPACES 434 SPACES
FUTURE HALL (PHASE 2) 18,126 S.F./1 PER 400 S.F.	46 SPACES
TOTAL PROVIDED (PH2):	344 NEW SPACES (PH 1) 9 NEW H.C. SPACES (PH 1) 89 NEW SPACES (PH 2) 4 H.C. SPACES (1 VAN + 3 STD.) 446 SPACES

ALL SPACES SHALL BE A MIN. OF 9'-0" WIDE x 18'-0" DEEP

LEGAL DESCRIPTION:

APN: 0252-041-14

MARYGOLD ACRES S 1/2 OF LOT 44. 4.77 AC MORE OR LESS.

APN: 0252-041-58

MARYGOLD ACRES W 1/2 OF THE N 1/2 OF LOT 44 ALONG WITH THE E 1/2 OF THE N 1/2 OF LOT 45. 4.78 AC MORE OR LESS

OWNER:

DIOCESE OF SAN BERNARDINO
11201 EAST HIGHLAND AVENUE
SAN BERNARDINO, CA 92404-4607
(909) 475-5300

PROJECT INFORMATION:

ZONING:	BL/RM BLOOMINGTON MUTI-RESIDENTAL
SURROUNDING ZONING:	NORTH-BL/RS BLOOMINGTON RESIDENTIAL EAST-BL/RS BLOOMINGTON RESIDENTIAL SOUTH-BL/RS-20M BLOOMINGTON RESIDENTIAL WEST-BL/RM BLOOMINGTON MUTI-RESIDENTAL
SETBACK:	
FRONT:	25'
SIDE (STREET SIDE):	15' (LOCAL STREET) 25' (COLLECTOR OR WIDER)
SIDE (INTERIOR):	5' ON ONE SIDE, 10' ON OTHER
REAR:	15'
HEIGHT LIMIT:	45' MAX.
EARTH WORK:	8,500 CY CUT/8,500 FILL

NOTES:

1) THERE ARE NOT UTILITY OR DRAINAGE EASEMENTS AFFECTING THE PROJECT SITE.

2) THERE ARE NO PROTECTED OR ENDANGERED TREES WITHIN THE PROJECT SITE.

3) NO SIGNS PROPOSED.

PROJECT DESCRIPTION:

THE EXPANSION OF THE EXISTING CHURCH, CONSISTING OF TWO (2) PHASES. PHASE I WILL BE THE DEVELOPMENT OF THE SOUTH HALF OF THE PROJECT CONSISTING OF THE NEW CHURCH BUILDING, PARKING, LANDSCAPE, HARDSCAPE AND WQMP BASIN. SIZE FOR ULTIMATE BUILD OUT. PHASE II OF THE PROJECT WILL CONSIST OF THE NEW HALL BUILDING, STORAGE BUILDING PARKING, LANDSCAPE AND HARDSCAPE.

VICINITY MAP

OFFICIAL USE ONLY

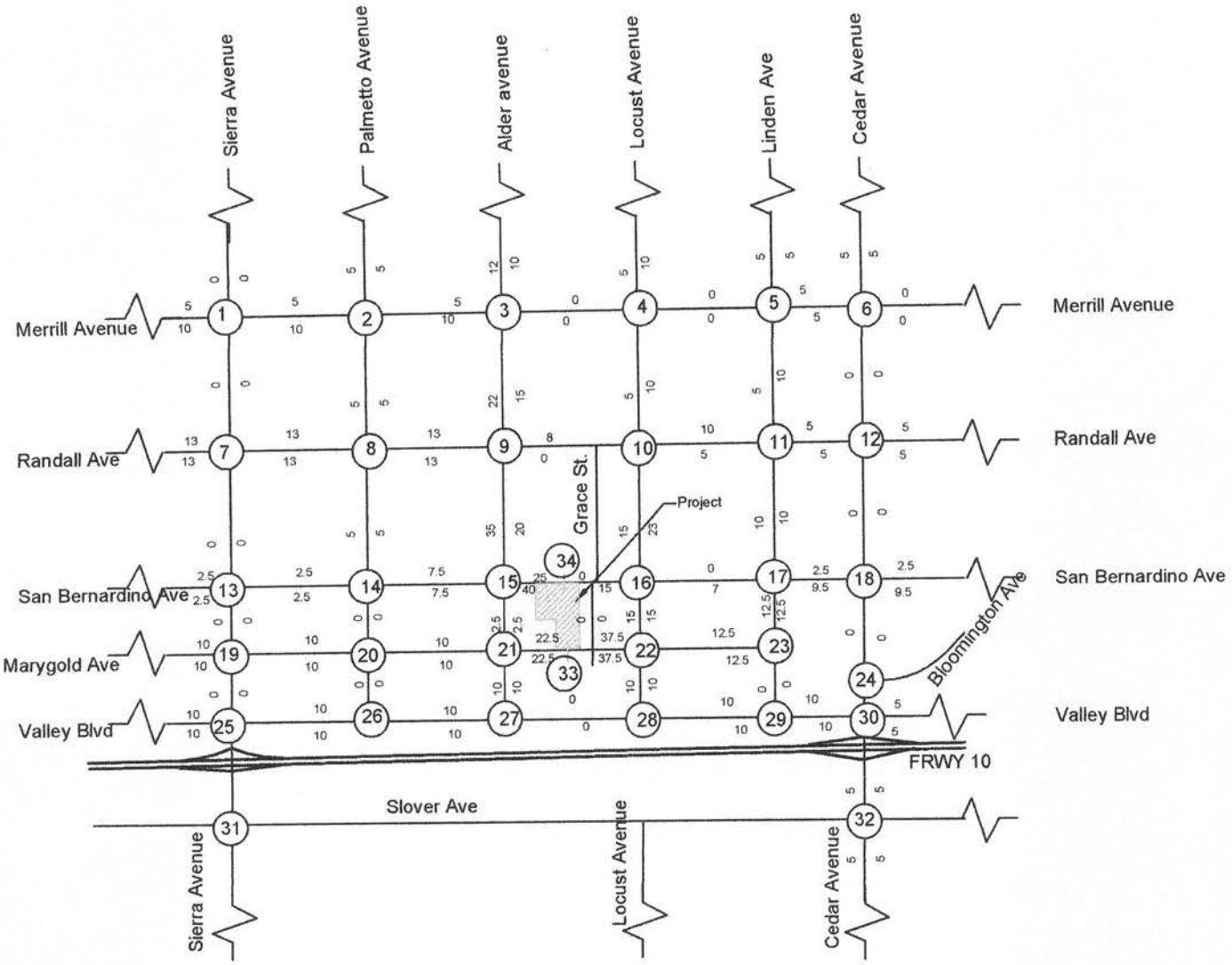
JOSEPH E. BONADIMAN & ASSOCIATES INC.
consulting engineers land surveyors
234 N. ARROWHEAD AVE., SAN BERNARDINO, CA 92408-1013
PHONE: (909) 885-3806 - FAX: (909) 381-1721

ST. GEORGE FONTANA
17895 SAN BERNARDINO AVE.
FONTANA, CA 92335
APN: 0252-041-58, 0252-041-14

REVISIONS			
NO	DESCRIPTION	BY	APPROVED	DATE

PREPARED FOR: DIOCESE OF SAN BERNARDINO

DRAWN BY:	J.T.S.	SCALE: 1" = 60'	SHEET: 1 OF 1
CHECKED BY:	J.T.S.	JOB NO: 123844	C1
DATE:		07-30-13	


Sierra Avenue
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Locust Avenue
Linden Ave
Cedar Avenue
Merrill Avenue
Randall Ave
San Bernardino Ave
Marygold Ave
Valley Blvd
Grace St.
Project
Bloomington Ave
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Slover Ave
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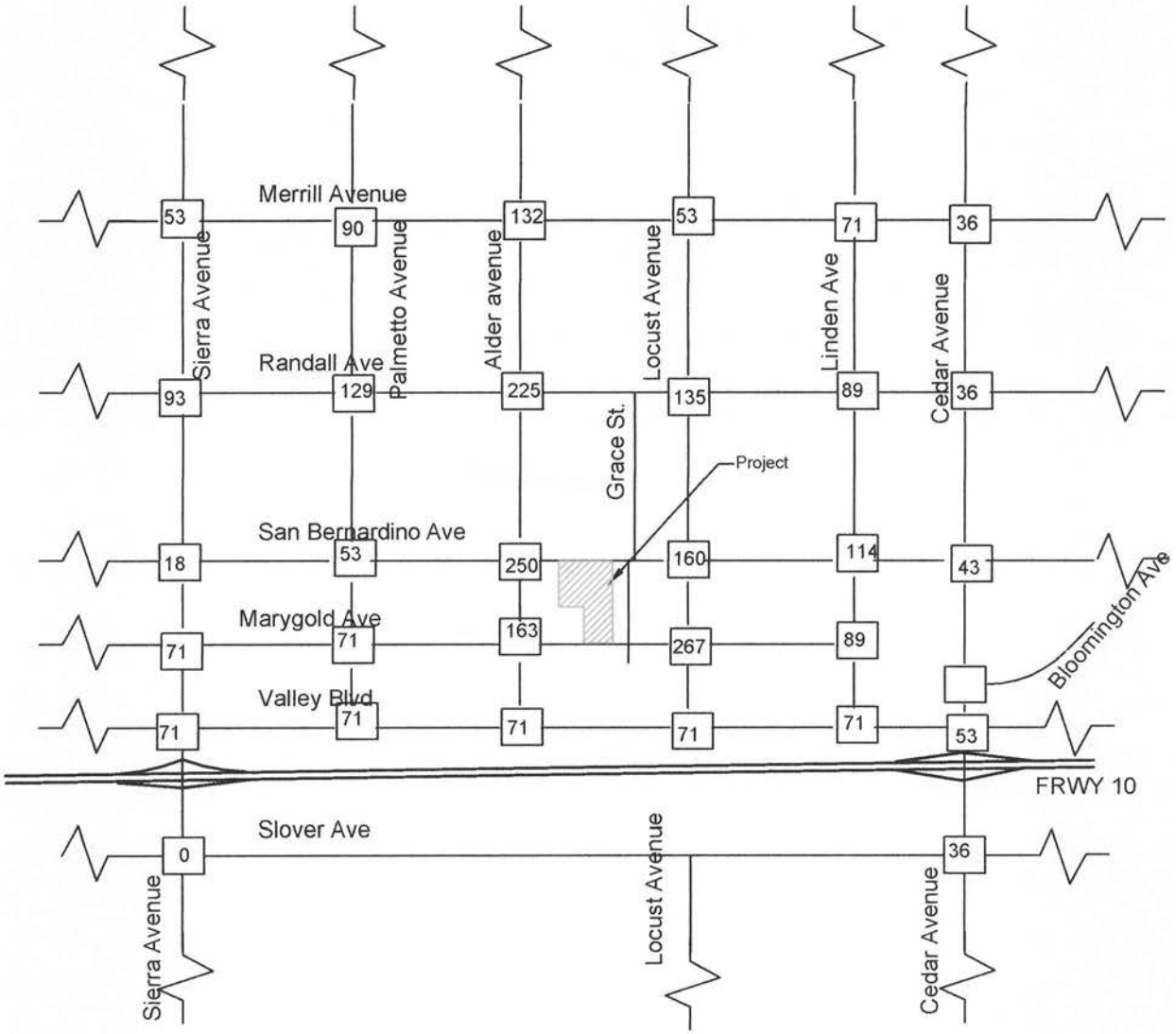
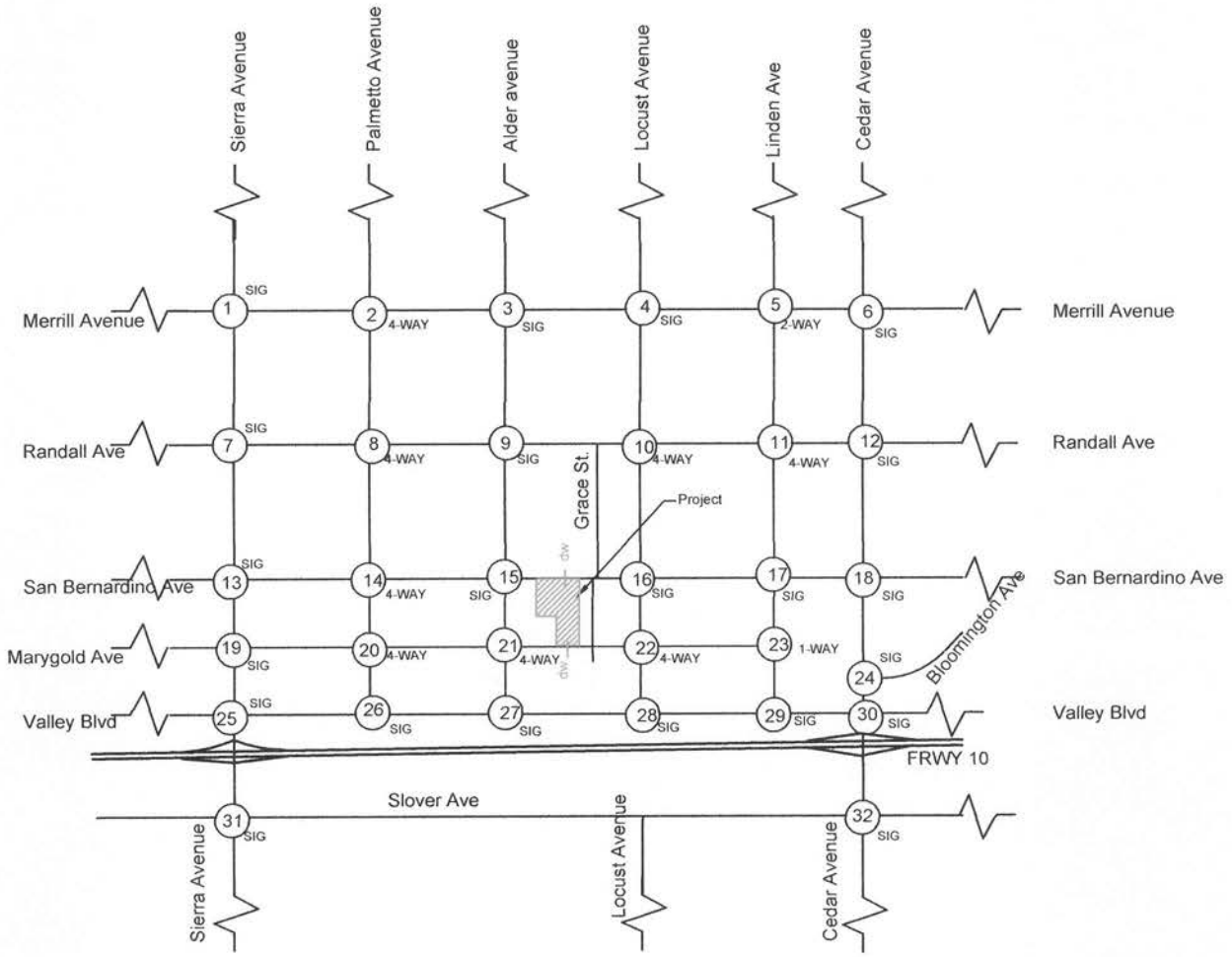


Legend:

[X] = Total New Project Trips

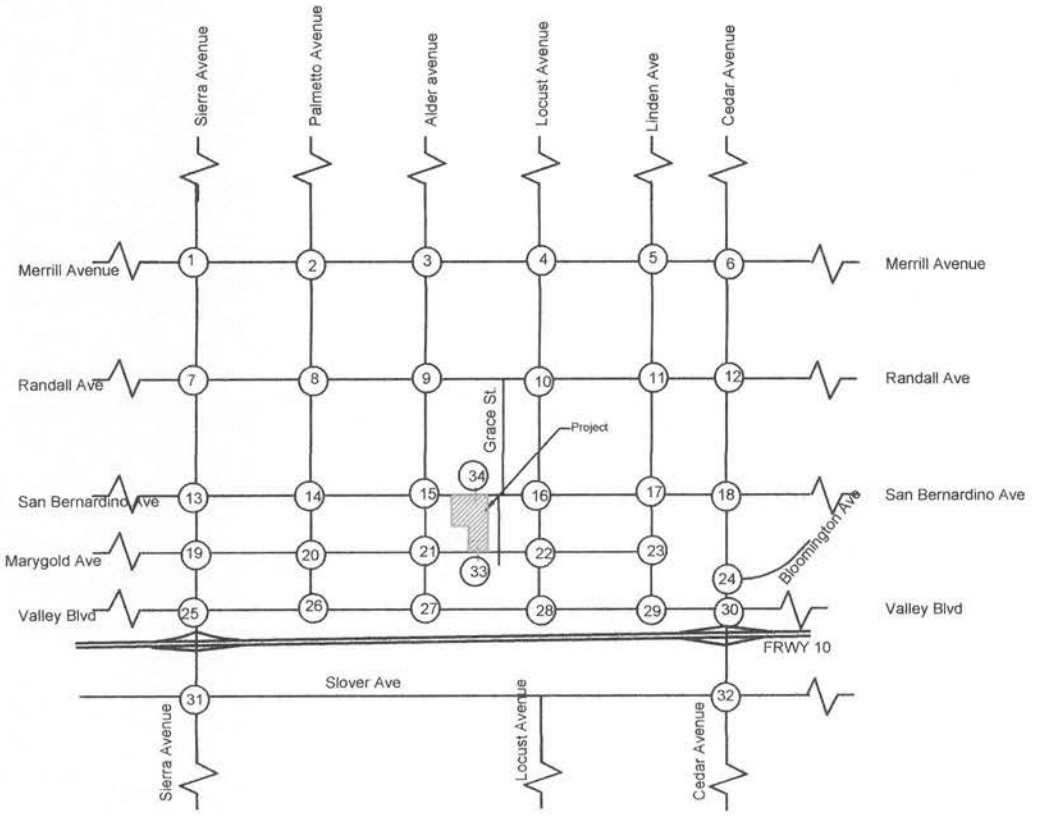
EXHIBIT 4: STUDY INTERSECTIONS DETERMINATION MAP



LEGEND:

Ⓧ = INTERSECTION NUMBER
SIG = TRAFFIC SIGNAL
4-WAY = 4-WAY STOP SIGN

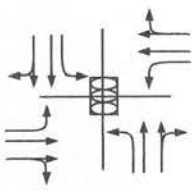
EXHIBIT 5: PROJECT AREA INTERSECTIONS CONTROLS



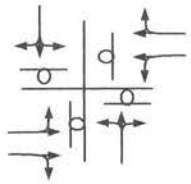
LEGEND:

STOP SIGN

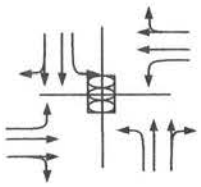
SIGNAL



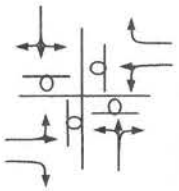
3 Merrill Ave @ Alder Ave



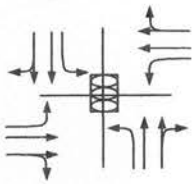
8 Randall Ave @ Palmetto Ave



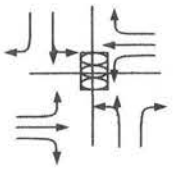
9 Randall Ave@ Alder Ave



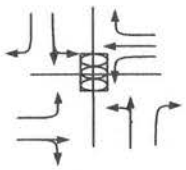
10 Randall Ave @ Locust Ave



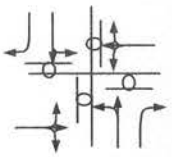
15 San Bernardino Ave @ Alder Ave



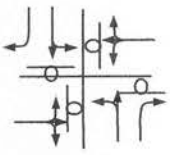
16 San Bernardino Ave @ Locust Ave



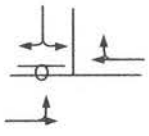
17 San Bernardino Ave @ Linden Ave



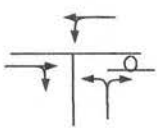
21 Marygold Ave @ Alder Ave



22 Marygold Ave @ Locust Ave

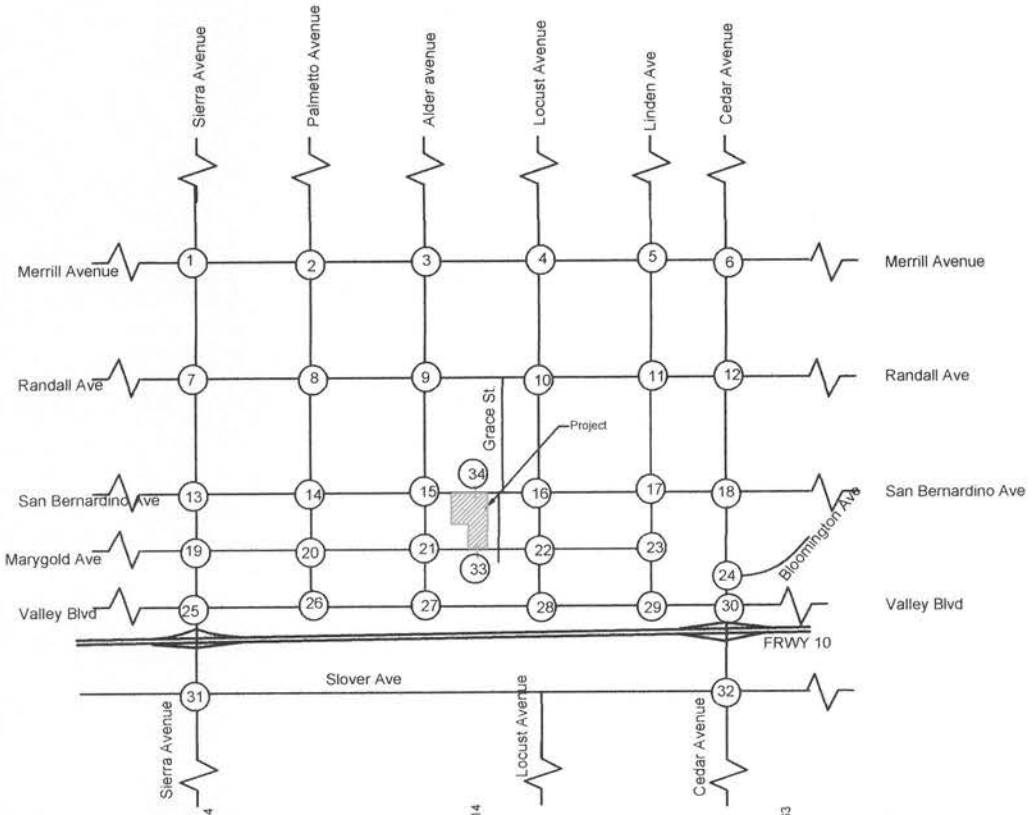


33 Project Drwy @ Marygold Ave.

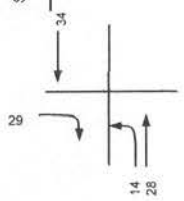


34 Project Drwy @ San Bernardino Ave.

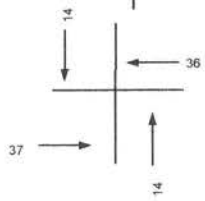
EXHIBIT 6: STUDY INTERSECTIONS GEOMETRY AND CONTROLS.



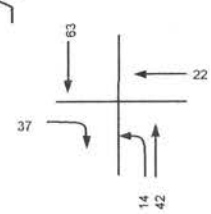
LEGEND:
( ) Minimum Volume.



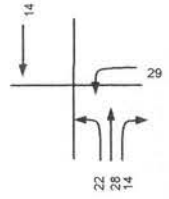
3 Merrill Ave @ Alder Ave



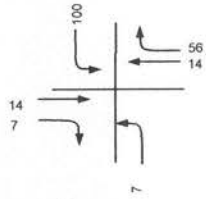
8 Randall Ave @ Palmetto Ave



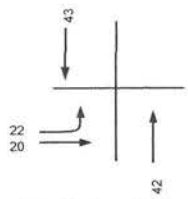
9 Randall Ave @ Alder Ave



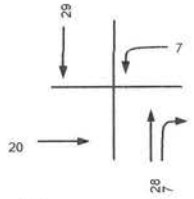
10 Randall Ave @ Locust Avenue



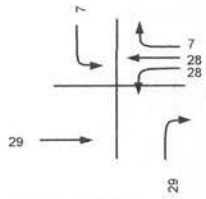
15 San Bernardino Avenue @ Alder Avenue



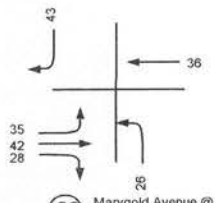
16 San Bernardino Avenue @ Locust Avenue



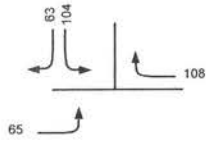
17 San Bernardino Avenue @ Linden Avenue



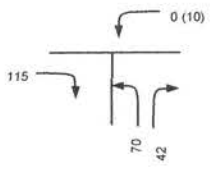
21 Marygold Avenue @ Alder Avenue



22 Marygold Avenue @ Locust Avenue

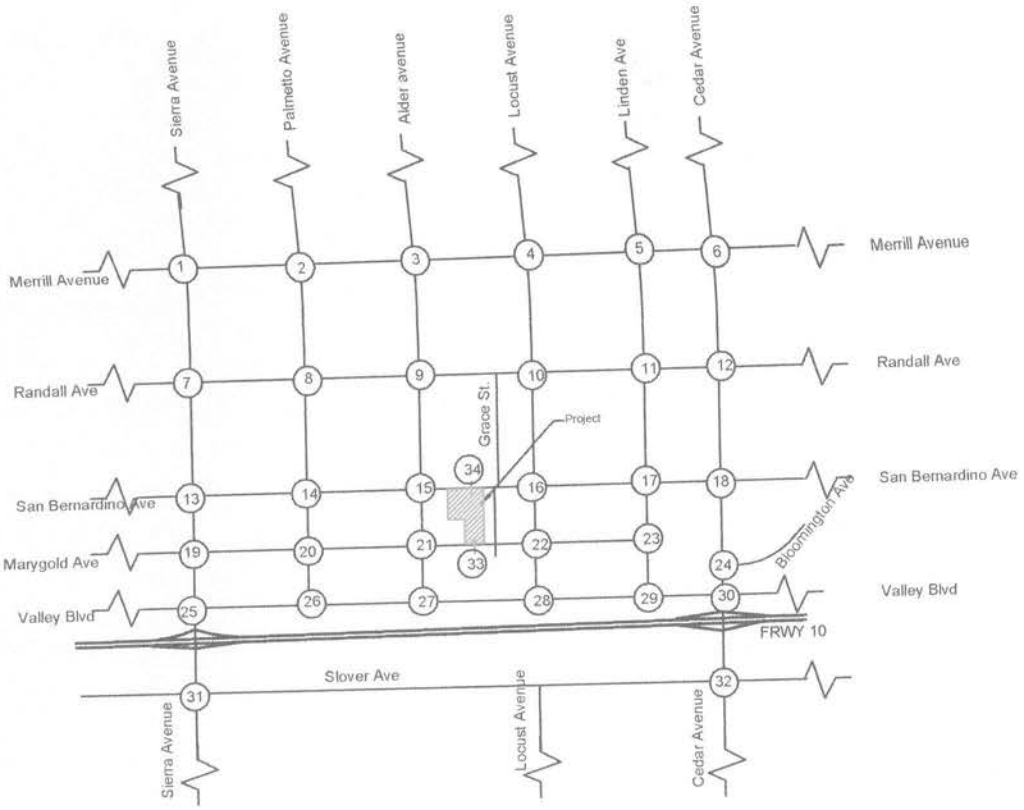


33 Project Drwy @ Marygold Ave.



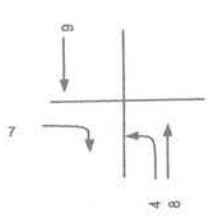
34 Project Drwy @ Ban Bernardino Ave.

Exhibit 7: Phase 1 2015 Peak Hr Project Trip Assignment

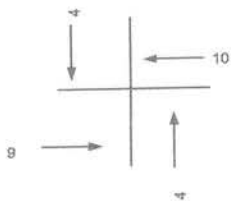


LEGEND:

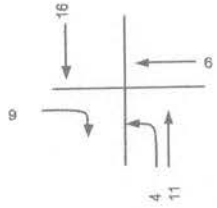
( ) Minimum Volume



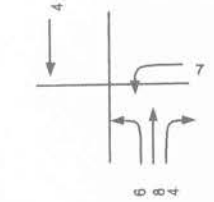
(3) Merrill Ave @ Alder Ave



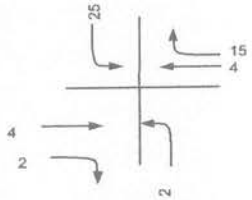
(8) Randall Ave @ Palmetto Ave



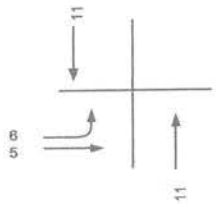
(9) Randall Ave @ Alder Ave



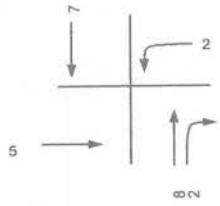
(10) Randall Ave @ Locust Avenue



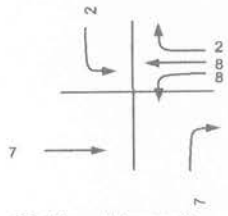
(15) San Bernardino Avenue @ Alder Avenue



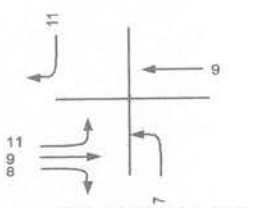
(16) San Bernardino Avenue @ Locust Avenue



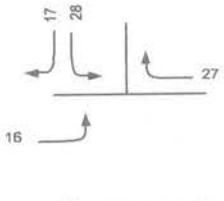
(17) San Bernardino Avenue @ Linden Avenue



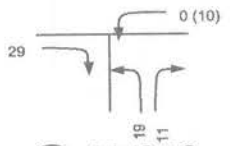
(21) Marygold Avenue @ Alder Avenue



(22) Marygold Avenue @ Locust Avenue

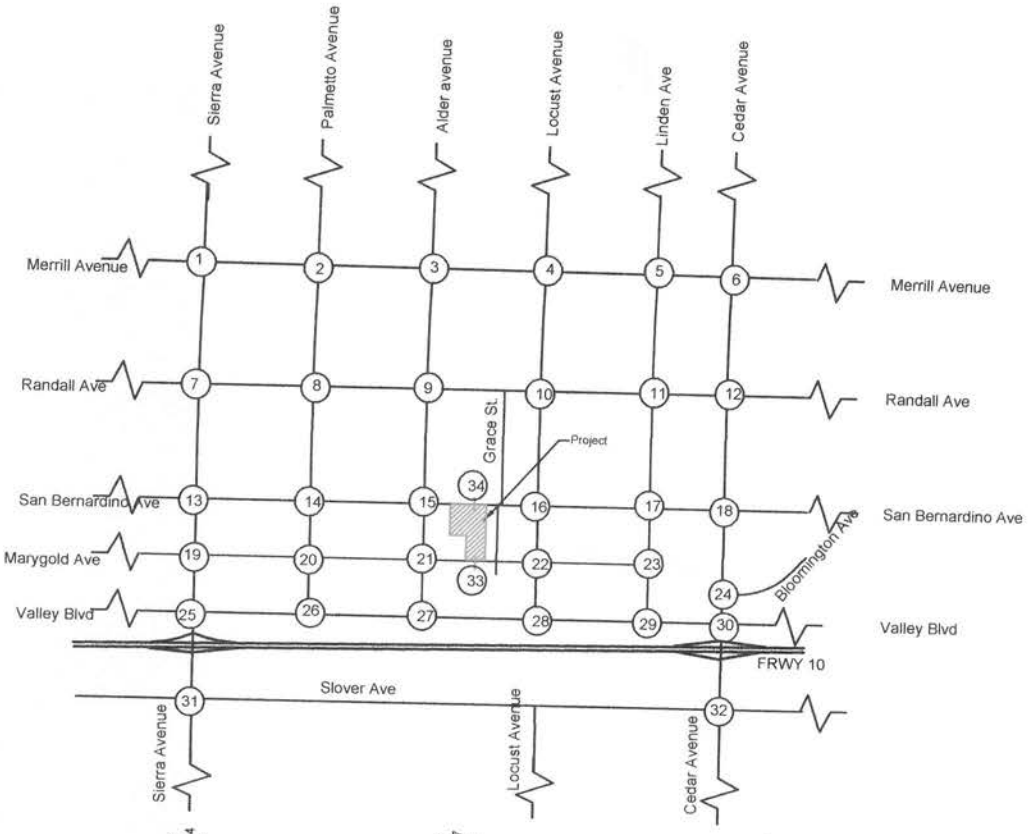


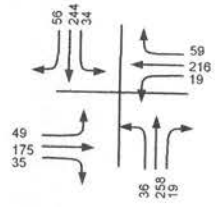
(33) Project Drwy @ Marygold Ave.



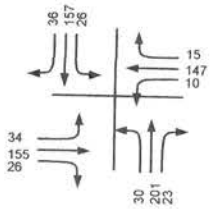
(34) Project Drwy @ San Bernardino Ave.

Exhibit 8: Phase II 2017 Pk Hr Project Trip Assignment

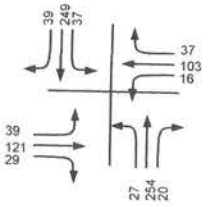




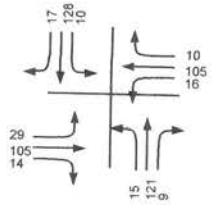
3 Merrill Ave @ Alder Ave



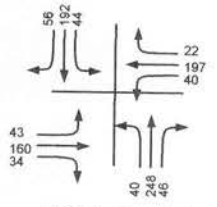
8 Randall Ave @ Palmetto Ave



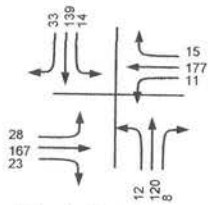
9 Randall Ave @ Alder Ave



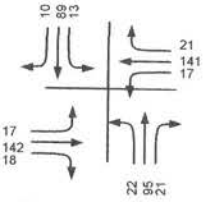
10 Randall Ave @ Locust Avenue



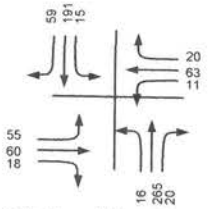
15 San Bernardino Avenue @ Alder Avenue



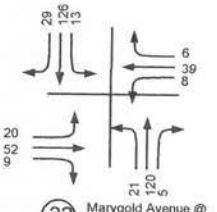
16 San Bernardino Avenue @ Locust Avenue



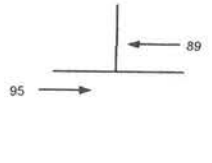
17 San Bernardino Avenue @ Linden Avenue



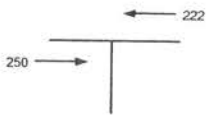
21 Marygold Avenue @ Alder Avenue



22 Marygold Avenue @ Locust Avenue

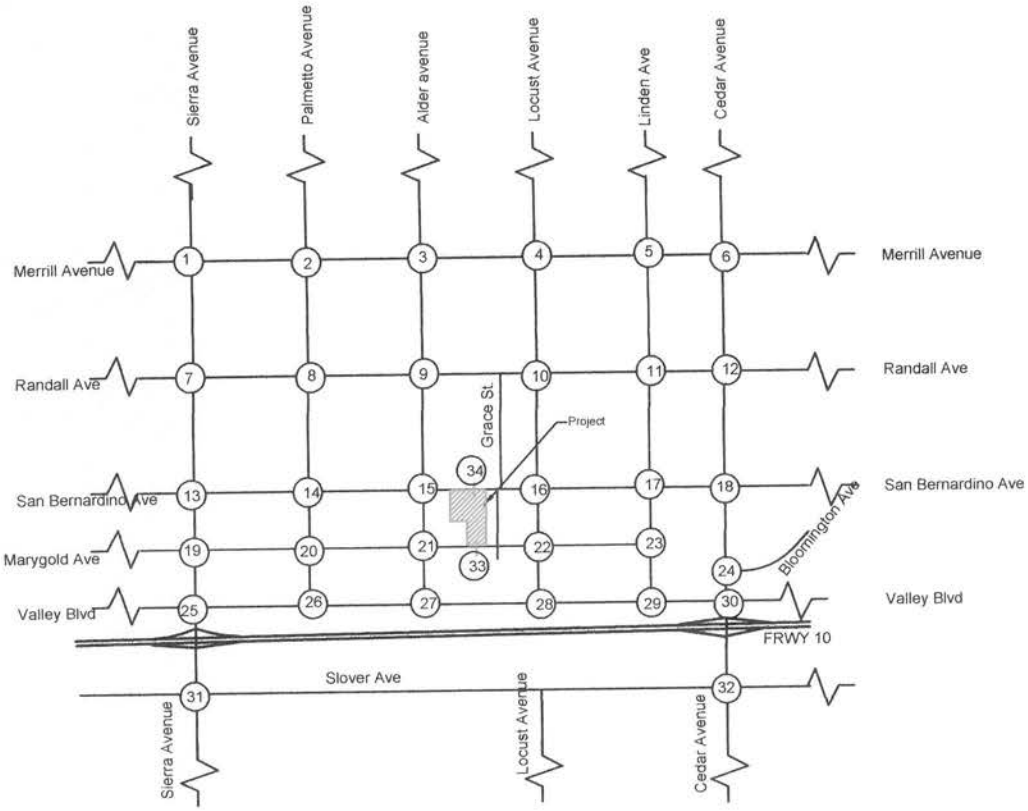


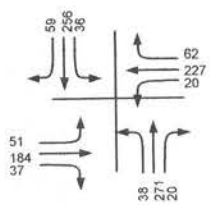
33 Project Drwy @ Marygold Ave



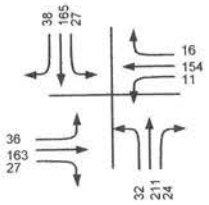
34 Project Drwy @ San Bernardino Ave.

EXHIBIT 9: EXISTING 2010 PEAK HR TRAFFIC VOLUMES

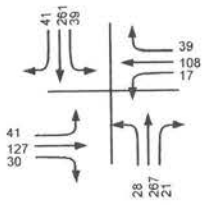




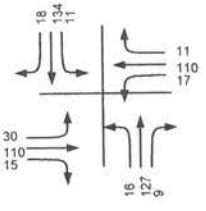
3 Merrill Ave @ Alder Ave



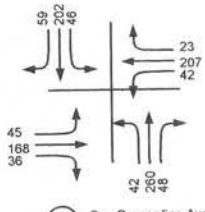
8 Randall Ave @ Palmetto Ave



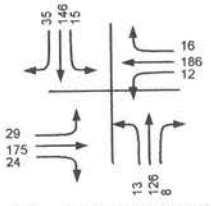
9 Randall Ave @ Alder Ave



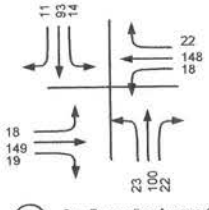
10 Randall Ave @ Locust Avenue



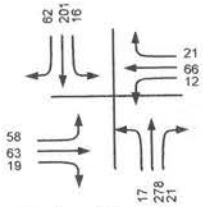
15 San Bernardino Avenue @ Alder Avenue



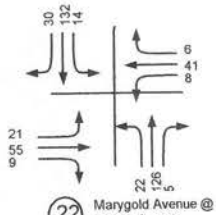
16 San Bernardino Avenue @ Locust Avenue



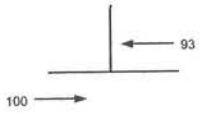
17 San Bernardino Avenue @ Linden Avenue



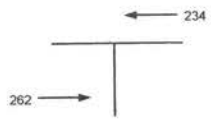
21 Marygold Avenue @ Alder Avenue



22 Marygold Avenue @ Locust Avenue



33 Project Drwy @ Marygold Ave.



34 Project Drwy @ San Bernardino Ave.

Exhibit 10: Projected Phase 1 2015 Opening Year W/O Proj.

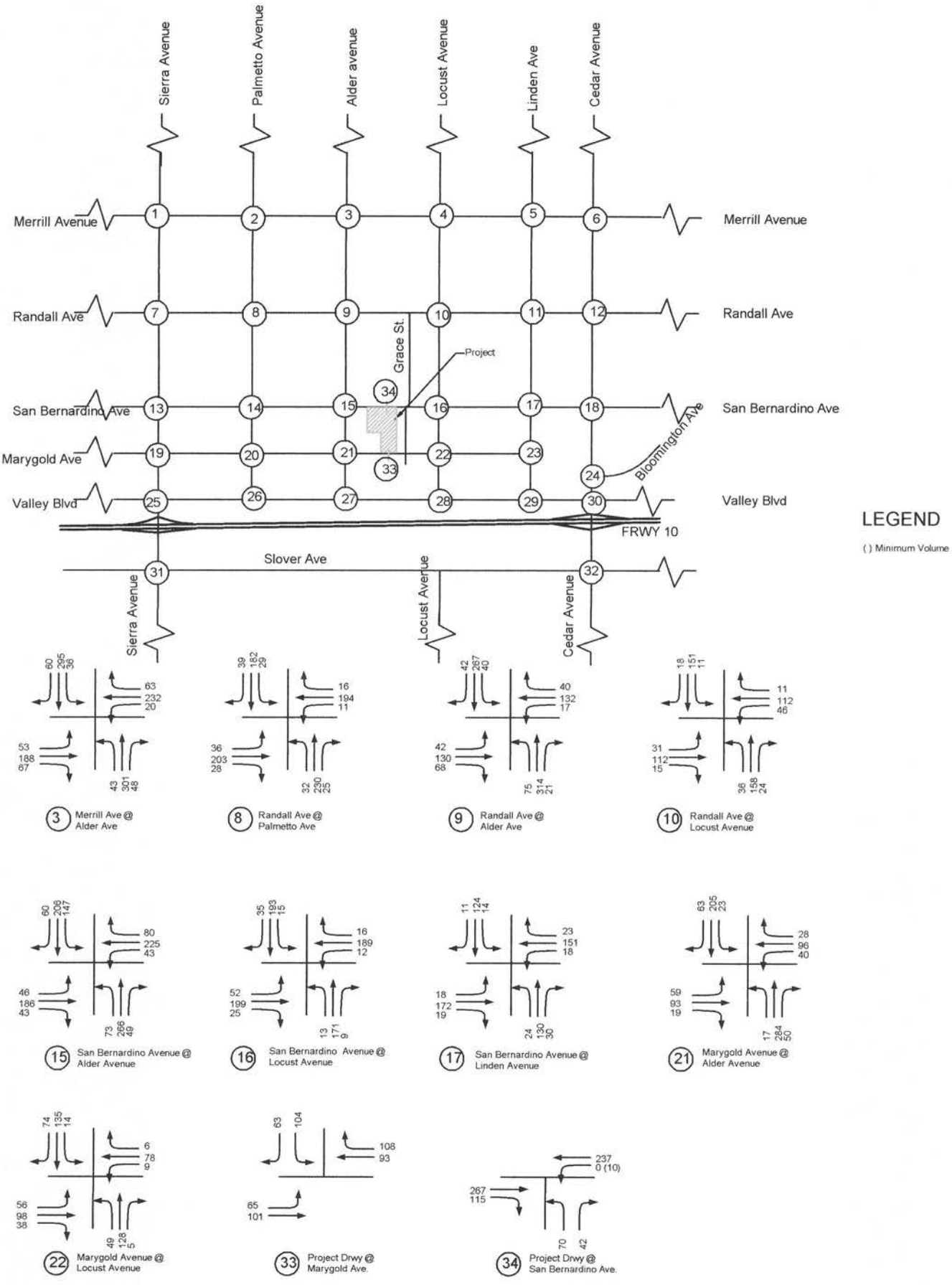
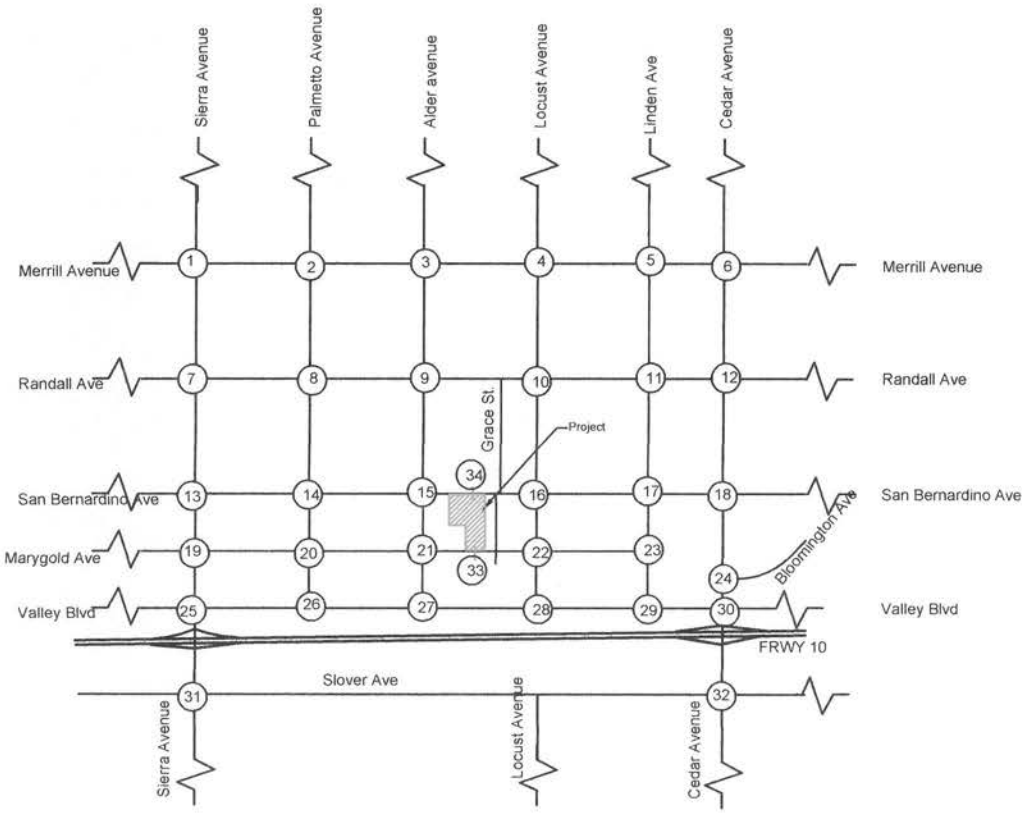
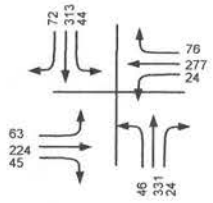
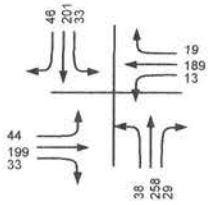


Exhibit 11: Phase 2 2017 Opening Year w/o Ph 2 Proj Traf

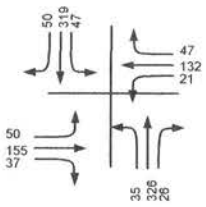




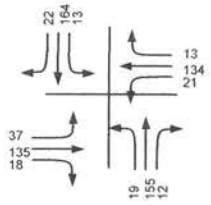
3 Merrill Ave @ Alder Ave



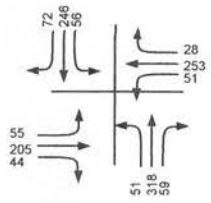
8 Randall Ave @ Palmetto Ave



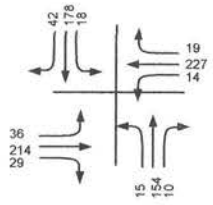
9 Randall Ave @ Alder Ave



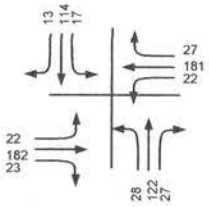
10 Randall Ave @ Locust Avenue



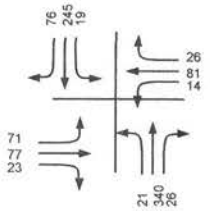
15 San Bernardino Avenue @ Alder Avenue



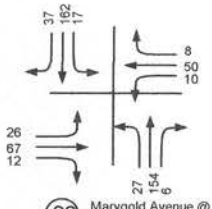
16 San Bernardino Avenue @ Locust Avenue



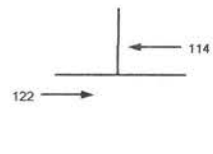
17 San Bernardino Avenue @ Linden Avenue



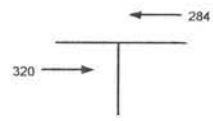
21 Marygold Avenue @ Alder Avenue



22 Marygold Avenue @ Locust Avenue



33 Project Drwy @ Marygold Ave



34 Project Drwy @ San Bernardino Ave

Exhibit 12: 2035 General Plan Buildout without Project Tra

APPENDIX A
TRAFFIC COUNTS

Counts Unlimited Inc.
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Fontana
N/S: Alder Avenue
E/W: Merrill Avenue
Weather: Sunny

File Name : FONALMESUN
Site Code : 10136051
Start Date : 6/20/2010
Page No : 1

Groups Printed- Total Volume

	Alder Avenue Southbound				Merrill Avenue Westbound				Alder Avenue Northbound				Merrill Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:30 PM	9	61	14	84	5	65	17	87	10	63	6	79	7	53	12	72	322
12:45 PM	7	67	13	87	9	43	15	67	6	78	6	90	13	33	8	54	298
Total	16	128	27	171	14	108	32	154	16	141	12	169	20	86	20	126	620
01:00 PM	10	55	14	79	1	55	17	73	10	58	4	72	20	55	4	79	303
01:15 PM	8	61	15	84	4	53	10	67	10	59	3	72	9	34	11	54	277
01:30 PM	13	75	16	104	4	41	7	52	6	55	3	64	9	37	10	56	276
01:45 PM	8	55	17	80	1	57	6	64	9	72	9	90	14	52	12	78	312
Total	39	246	62	347	10	206	40	256	35	244	19	298	52	178	37	267	1168
02:00 PM	5	68	15	88	6	40	7	53	9	58	5	72	19	36	10	65	278
02:15 PM	8	66	21	95	4	48	8	60	9	66	3	78	10	38	9	57	290
Grand Total	68	508	125	701	34	402	87	523	69	509	39	617	101	338	76	515	2356
Apprch %	9.7	72.5	17.8		6.5	76.9	16.6		11.2	82.5	6.3		19.6	65.6	14.8		
Total %	2.9	21.6	5.3	29.8	1.4	17.1	3.7	22.2	2.9	21.6	1.7	26.2	4.3	14.3	3.2	21.9	

	Alder Avenue Southbound				Merrill Avenue Westbound				Alder Avenue Northbound				Merrill Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:30 PM to 02:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:30 PM																	
12:30 PM	9	61	14	84	5	**65**	**17**	**87**	**10**	63	**6**	79	7	53	**12**	72	**322**
12:45 PM	7	**67**	13	**87**	**9**	43	15	67	6	**78**	6	**90**	13	33	8	54	298
01:00 PM	**10**	55	14	79	1	55	17	73	10	58	**4**	72	**20**	**55**	4	**79**	303
01:15 PM	8	61	**15**	84	4	53	10	67	10	59	3	72	9	34	11	54	277
Total Volume	34	244	56	334	19	216	59	294	36	258	19	313	49	175	35	259	1200
% App. Total	10.2	73.1	16.8		6.5	73.5	20.1		11.5	82.4	6.1		18.9	67.6	13.5		
PHF	.850	.910	.933	.960	.528	.831	.868	.845	.900	.827	.792	.869	.613	.795	.729	.820	.932

Counts Unlimited Inc.
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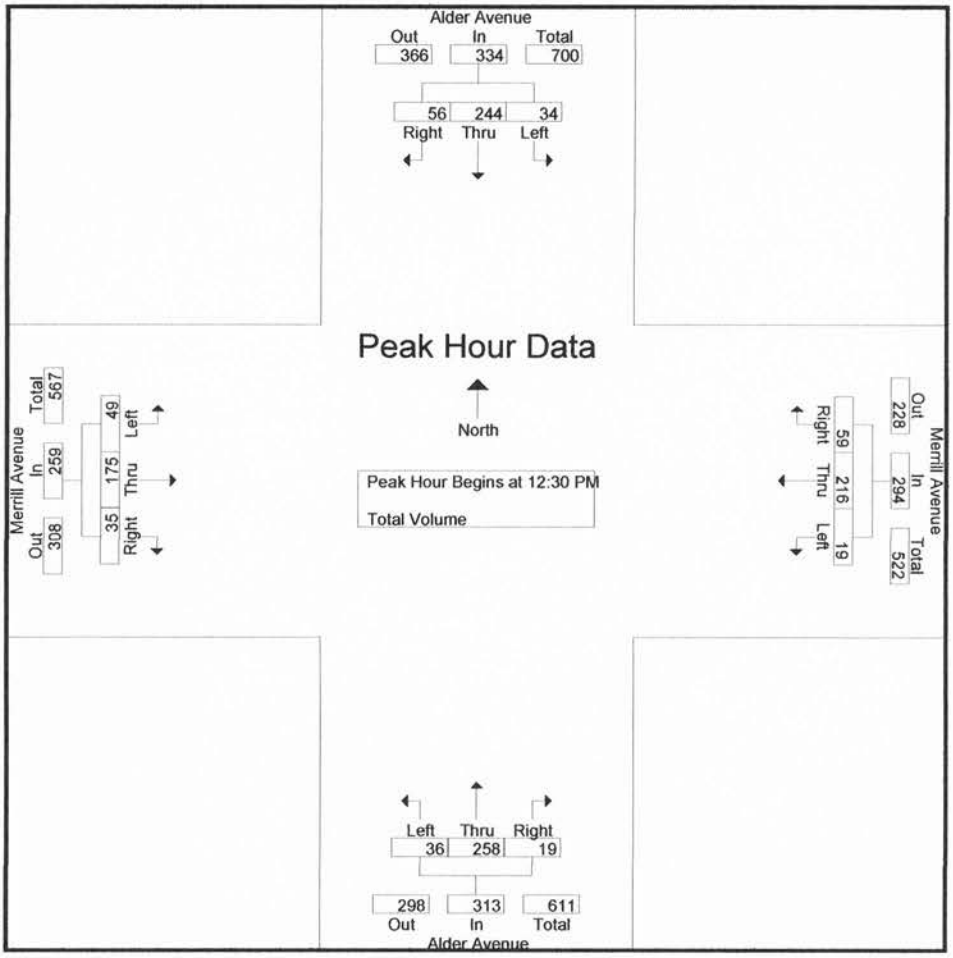
City of Fontana
N/S: Alder Avenue
E/W: Merrill Avenue
Weather: Sunny

File Name : FONALMESUN
Site Code : 10136051
Start Date : 6/20/2010
Page No : 2



Peak Hour Analysis From 12:30 PM to 02:15 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	01:30 PM				12:30 PM				12:30 PM				01:00 PM			
+0 mins.	**13**	**75**	16	**104**	5	**65**	**17**	**87**	**10**	63	**6**	79	**20**	**55**	4	**79**
+15 mins.	8	55	17	80	**9**	43	15	67	6	**78**	6	**90**	9	34	11	54
+30 mins.	5	68	15	88	1	55	17	73	10	58	4	72	9	37	10	56
+45 mins.	8	66	**21**	95	4	53	10	67	10	59	3	72	14	52	**12**	78
Total Volume	34	264	69	367	19	216	59	294	36	258	19	313	52	178	37	267
% App. Total	9.3	71.9	18.8		6.5	73.5	20.1		11.5	82.4	6.1		19.5	66.7	13.9	
PHF	.654	.880	.821	.882	.528	.831	.868	.845	.900	.827	.792	.869	.650	.809	.771	.845

Counts Unlimited Inc.
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Fontana
N/S: Palmetto Avenue
E/W: Randall Avenue
Weather: Sunny

File Name : FONPARASUN
Site Code : 10136661
Start Date : 6/20/2010
Page No : 1

Groups Printed- Total Volume

	Palmetto Avenue Southbound				Randall Avenue Westbound				Palmetto Avenue Northbound				Randall Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:30 PM	7	41	9	57	4	29	5	38	5	57	6	68	4	39	7	50	213
12:45 PM	2	43	12	57	3	35	4	42	4	43	4	51	11	45	1	57	207
Total	9	84	21	114	7	64	9	80	9	100	10	119	15	84	8	107	420
01:00 PM	4	43	5	52	5	33	1	39	5	55	4	64	7	36	7	50	205
01:15 PM	4	44	8	56	4	25	3	32	9	50	7	66	6	42	5	53	207
01:30 PM	6	39	10	55	1	38	5	44	12	47	2	61	6	29	7	42	202
01:45 PM	7	35	8	50	2	41	4	47	3	48	8	59	9	43	7	59	215
Total	21	161	31	213	12	137	13	162	29	200	21	250	28	150	26	204	829
02:00 PM	8	41	8	57	4	39	1	44	10	51	7	68	9	37	7	53	222
02:15 PM	5	42	10	57	3	29	5	37	5	55	6	66	10	46	5	61	221
Grand Total	43	328	70	441	26	269	28	323	53	406	44	503	62	317	46	425	1692
Apprch %	9.8	74.4	15.9		8	83.3	8.7		10.5	80.7	8.7		14.6	74.6	10.8		
Total %	2.5	19.4	4.1	26.1	1.5	15.9	1.7	19.1	3.1	24	2.6	29.7	3.7	18.7	2.7	25.1	

	Palmetto Avenue Southbound				Randall Avenue Westbound				Palmetto Avenue Northbound				Randall Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:30 PM to 02:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:30 PM																	
01:30 PM	6	39	**10**	55	1	38	**5**	44	**12**	47	2	61	6	29	**7**	42	202
01:45 PM	7	35	8	50	2	**41**	4	**47**	3	48	**8**	59	9	43	7	59	215
02:00 PM	**8**	41	8	**57**	**4**	39	1	44	10	51	7	**68**	9	37	7	53	**222**
02:15 PM	5	**42**	10	57	3	29	5	37	5	**55**	6	66	**10**	**46**	5	**61**	221
Total Volume	26	157	36	219	10	147	15	172	30	201	23	254	34	155	26	215	860
% App. Total	11.9	71.7	16.4		5.8	85.5	8.7		11.8	79.1	9.1		15.8	72.1	12.1		
PHF	.813	.935	.900	.961	.625	.896	.750	.915	.625	.914	.719	.934	.850	.842	.929	.881	.968

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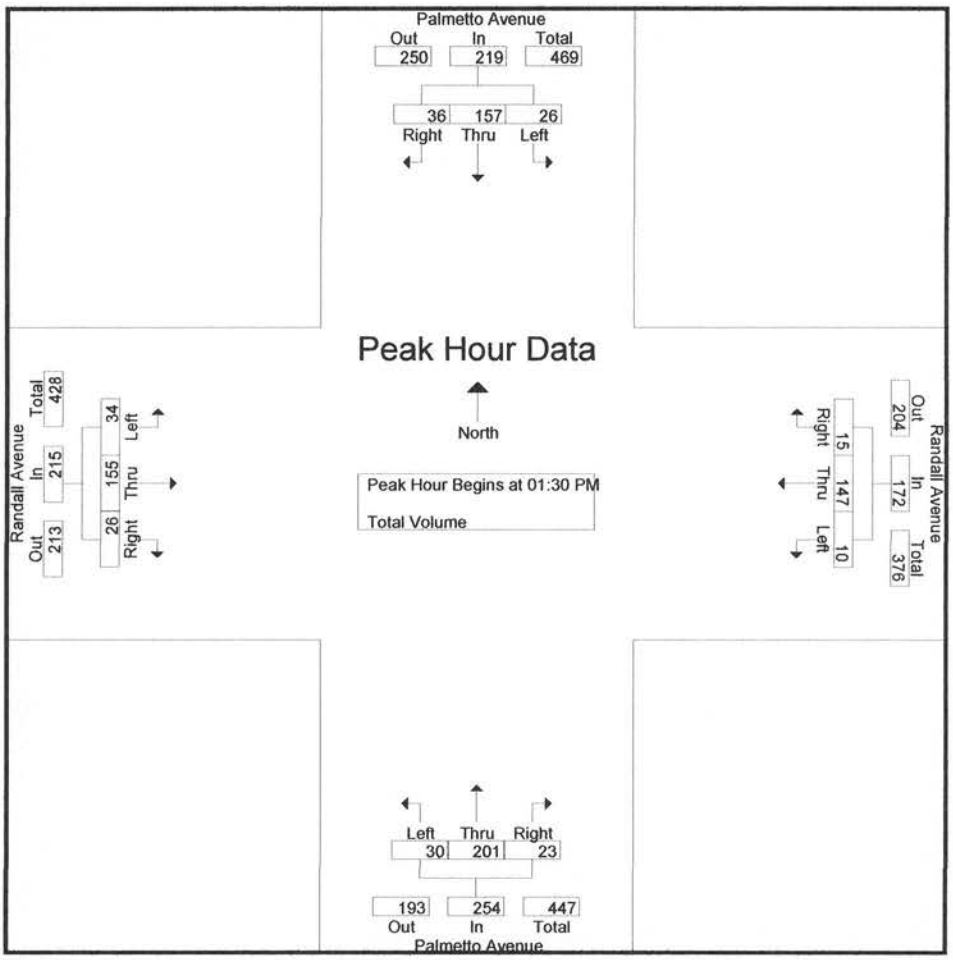
City of Fontana
N/S: Palmetto Avenue
E/W: Randall Avenue
Weather: Sunny

File Name : FONPARASUN
Site Code : 10136661
Start Date : 6/20/2010
Page No : 2



Peak Hour Analysis From 12:30 PM to 02:15 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	12:30 PM				01:30 PM				01:15 PM				01:30 PM			
+0 mins.	**7**	41	9	**57**	1	38	**5**	44	9	50	7	66	6	29	**7**	42
+15 mins.	2	43	**12**	57	2	**41**	4	**47**	**12**	47	2	61	9	43	7	59
+30 mins.	4	43	5	52	**4**	39	1	44	3	48	**8**	59	9	37	7	53
+45 mins.	4	**44**	8	56	3	29	5	37	10	**51**	7	**68**	**10**	**46**	5	**61**
Total Volume	17	171	34	222	10	147	15	172	34	196	24	254	34	155	26	215
% App. Total	7.7	77	15.3		5.8	85.5	8.7		13.4	77.2	9.4		15.8	72.1	12.1	
PHF	.607	.972	.708	.974	.625	.896	.750	.915	.708	.961	.750	.934	.850	.842	.929	.881

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City of Fontana
N/S: Alder Avenue
E/W: Randall Avenue
Weather: Sunny

File Name : FONALRASUN
Site Code : 10136035
Start Date : 6/20/2010
Page No : 1

Groups Printed- Total Volume

	Alder Avenue Southbound				Randall Avenue Westbound				Alder Avenue Northbound				Randall Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:30 PM	6	71	6	83	3	19	13	35	8	75	7	90	7	26	6	39	247
12:45 PM	6	67	4	77	5	33	8	46	1	57	8	66	15	34	8	57	246
Total	12	138	10	160	8	52	21	81	9	132	15	156	22	60	14	96	493
01:00 PM	1	69	9	79	2	19	7	28	10	58	8	76	5	35	7	47	230
01:15 PM	9	53	8	70	9	14	7	30	11	67	7	85	6	17	16	39	224
01:30 PM	9	61	8	78	6	30	8	44	10	47	3	60	7	25	7	39	221
01:45 PM	14	70	9	93	2	30	14	46	7	64	4	75	13	34	8	55	269
Total	33	253	34	320	19	93	36	148	38	236	22	296	31	111	38	180	944
02:00 PM	9	59	15	83	6	26	8	40	8	64	5	77	10	23	8	41	241
02:15 PM	5	59	7	71	2	17	7	26	2	79	8	89	9	39	6	54	240
Grand Total	59	509	66	634	35	188	72	295	57	511	50	618	72	233	66	371	1918
Apprch %	9.3	80.3	10.4		11.9	63.7	24.4		9.2	82.7	8.1		19.4	62.8	17.8		
Total %	3.1	26.5	3.4	33.1	1.8	9.8	3.8	15.4	3	26.6	2.6	32.2	3.8	12.1	3.4	19.3	

	Alder Avenue Southbound				Randall Avenue Westbound				Alder Avenue Northbound				Randall Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:30 PM to 02:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:30 PM																	
01:30 PM	9	61	8	78	**6**	**30**	8	44	**10**	47	3	60	7	25	7	39	221
01:45 PM	**14**	**70**	9	**93**	2	30	**14**	**46**	7	64	4	75	**13**	34	**8**	**55**	**269**
02:00 PM	9	59	**15**	83	6	26	8	40	8	64	5	77	10	23	8	41	241
02:15 PM	5	59	7	71	2	17	7	26	2	**79**	**8**	**89**	9	**39**	6	54	240
Total Volume	37	249	39	325	16	103	37	156	27	254	20	301	39	121	29	189	971
% App. Total	11.4	76.6	12		10.3	66	23.7		9	84.4	6.6		20.6	64	15.3		
PHF	.661	.889	.650	.874	.667	.858	.661	.848	.675	.804	.625	.846	.750	.776	.906	.859	.902

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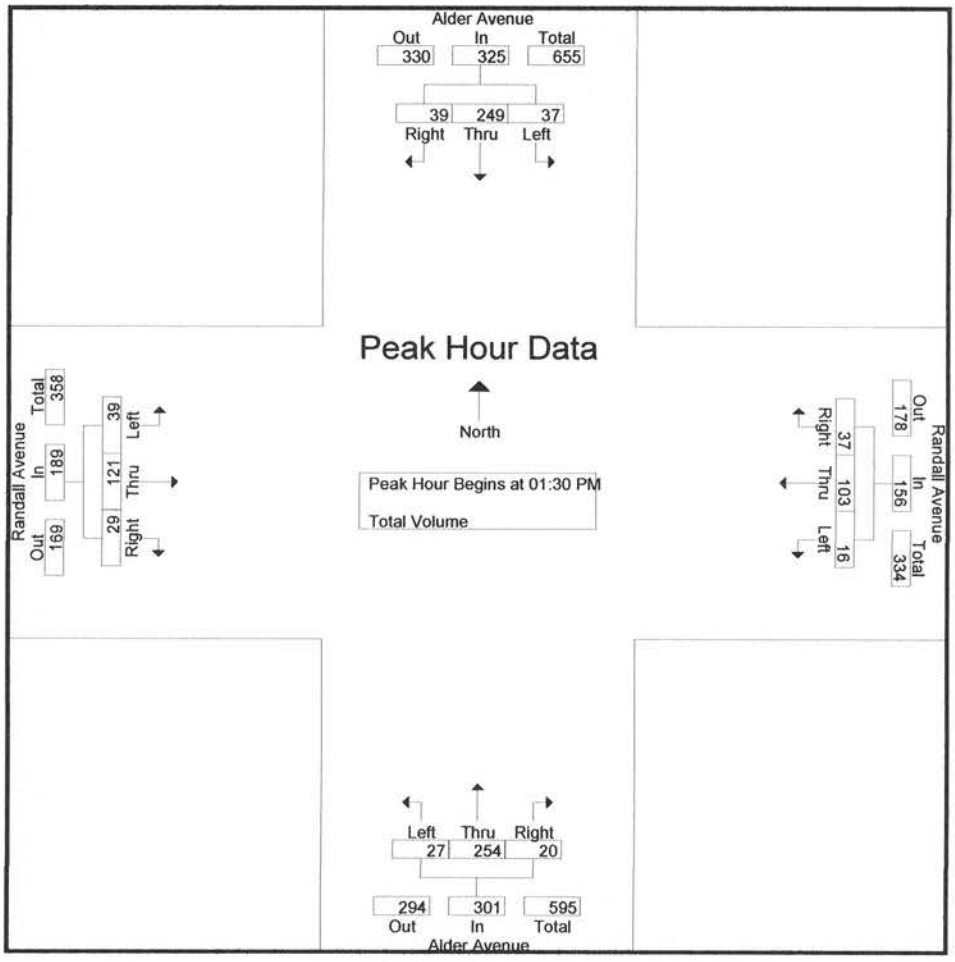
City of Fontana
N/S: Alder Avenue
E/W: Randall Avenue
Weather: Sunny

File Name : FONALRASUN
Site Code : 10136035
Start Date : 6/20/2010
Page No : 2



Peak Hour Analysis From 12:30 PM to 02:15 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	01:30 PM				01:15 PM				12:30 PM				01:30 PM			
+0 mins.	9	61	8	78	**9**	14	7	30	8	**75**	7	**90**	7	25	7	39
+15 mins.	**14**	**70**	9	**93**	6	**30**	8	44	1	57	**8**	66	**13**	34	**8**	**55**
+30 mins.	9	59	**15**	83	2	30	**14**	**46**	10	58	8	76	10	23	8	41
+45 mins.	5	59	7	71	6	26	8	40	**11**	67	7	85	9	**39**	6	54
Total Volume	37	249	39	325	23	100	37	160	30	257	30	317	39	121	29	189
% App. Total	11.4	76.6	12		14.4	62.5	23.1		9.5	81.1	9.5		20.6	64	15.3	
PHF	.661	.889	.650	.874	.639	.833	.661	.870	.682	.857	.938	.881	.750	.776	.906	.859

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City of Fontana
N/S: Locust Avenue
E/W: Randall Avenue
Weather: Sunny

File Name : FONLORASUN
Site Code : 10136063
Start Date : 6/20/2010
Page No : 1

Groups Printed- Total Volume

	Locust Avenue Southbound				Randall Avenue Westbound				Locust Avenue Northbound				Randall Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:30 PM	3	35	7	45	3	16	2	21	5	43	2	50	5	25	5	35	151
12:45 PM	5	27	4	36	3	24	2	29	5	28	3	36	10	13	6	29	130
Total	8	62	11	81	6	40	4	50	10	71	5	86	15	38	11	64	281
01:00 PM	6	30	2	38	3	17	3	23	2	39	4	45	8	32	4	44	150
01:15 PM	1	18	7	26	1	20	2	23	2	35	4	41	4	24	4	32	122
01:30 PM	3	32	5	40	5	30	2	37	7	21	1	29	4	23	4	31	137
01:45 PM	2	27	5	34	3	29	3	35	2	28	2	32	6	30	6	42	143
Total	12	107	19	138	12	96	10	118	13	123	11	147	22	109	18	149	552
02:00 PM	2	36	2	40	4	27	4	35	4	36	4	44	7	19	2	28	147
02:15 PM	3	33	5	41	4	19	1	24	2	36	2	40	12	33	2	47	152
Grand Total	25	238	37	300	26	182	19	227	29	266	22	317	56	199	33	288	1132
Apprch %	8.3	79.3	12.3		11.5	80.2	8.4		9.1	83.9	6.9		19.4	69.1	11.5		
Total %	2.2	21	3.3	26.5	2.3	16.1	1.7	20.1	2.6	23.5	1.9	28	4.9	17.6	2.9	25.4	

	Locust Avenue Southbound				Randall Avenue Westbound				Locust Avenue Northbound				Randall Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:30 PM to 02:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:30 PM																	
01:30 PM	**3**	32	**5**	40	**5**	**30**	2	**37**	**7**	21	1	29	4	23	4	31	137
01:45 PM	2	27	5	34	3	29	3	35	2	28	2	32	6	30	**6**	42	143
02:00 PM	2	**36**	2	40	4	27	**4**	35	**4**	**36**	**4**	**44**	7	19	2	28	147
02:15 PM	3	33	5	**41**	4	19	1	24	2	36	2	40	**12**	**33**	2	**47**	**152**
Total Volume	10	128	17	155	16	105	10	131	15	121	9	145	29	105	14	148	579
% App. Total	6.5	82.6	11		12.2	80.2	7.6		10.3	83.4	6.2		19.6	70.9	9.5		
PHF	.833	.889	.850	.945	.800	.875	.625	.885	.536	.840	.563	.824	.604	.795	.583	.787	.952

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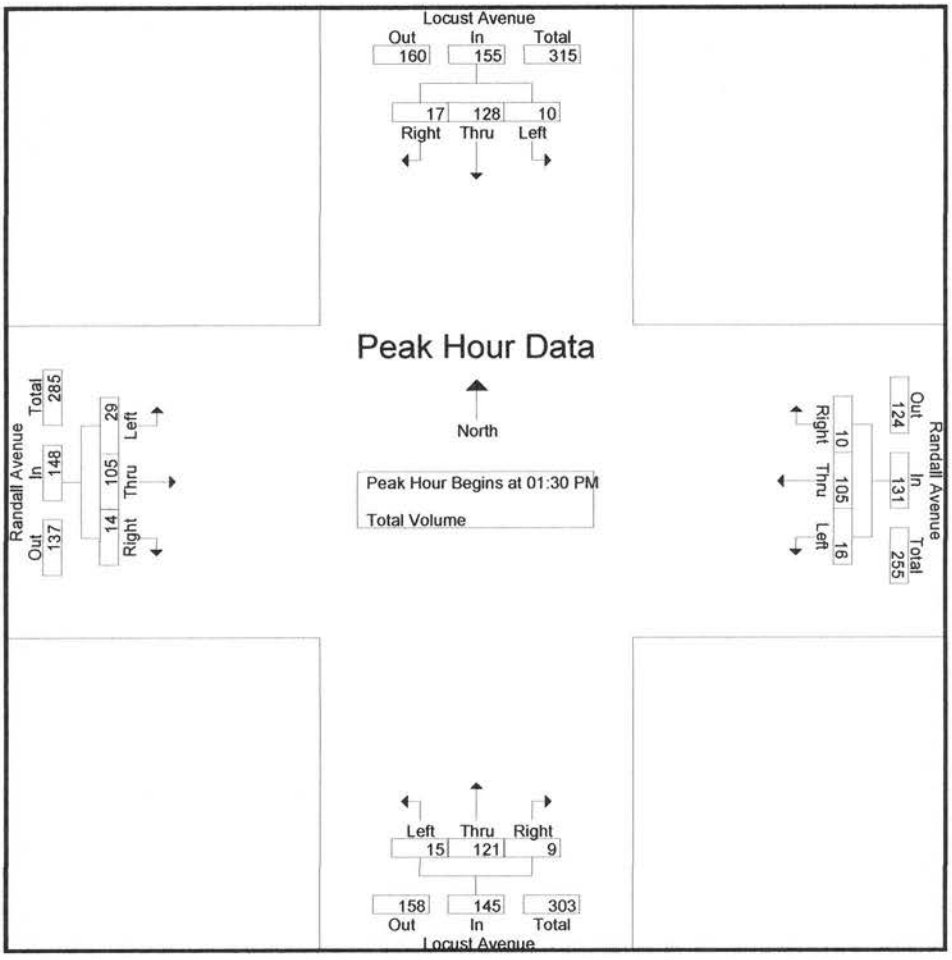
City of Fontana
N/S: Locust Avenue
E/W: Randall Avenue
Weather: Sunny

File Name : FONLORASUN
Site Code : 10136063
Start Date : 6/20/2010
Page No : 2



Peak Hour Analysis From 12:30 PM to 02:15 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	01:30 PM				01:30 PM				12:30 PM				01:00 PM			
+0 mins.	**3**	32	**5**	40	**5**	**30**	2	**37**	**5**	**43**	2	**50**	**8**	**32**	4	**44**
+15 mins.	2	27	5	34	3	29	3	35	5	28	3	36	4	24	4	32
+30 mins.	2	**36**	2	40	4	27	**4**	35	2	39	**4**	45	4	23	4	31
+45 mins.	3	33	5	**41**	4	19	1	24	2	35	4	41	6	30	**6**	42
Total Volume	10	128	17	155	16	105	10	131	14	145	13	172	22	109	18	149
% App. Total	6.5	82.6	11		12.2	80.2	7.6		8.1	84.3	7.6		14.8	73.2	12.1	
PHF	.833	.889	.850	.945	.800	.875	.625	.885	.700	.843	.813	.860	.688	.852	.750	.847

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City of Fontana
N/S: Alder Avenue
E/W: San Bernardino Avenue
Weather: Sunny

File Name : FONALSBSUN
Site Code : 10136066
Start Date : 6/20/2010

Groups Printed- Total Volume

	Alder Avenue Southbound				San Bernardino Avenue Westbound				Alder Avenue Northbound				San Bernardino Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:30 PM	14	64	18	96	9	62	19	90	6	58	9	73	12	43	12	67	326
12:45 PM	12	53	8	73	12	38	6	56	6	46	13	65	18	41	12	71	265
Total	26	117	26	169	21	100	25	146	12	104	22	138	30	84	24	138	591
01:00 PM	9	57	14	80	12	36	7	55	6	43	8	57	13	43	9	65	257
01:15 PM	3	54	11	68	8	31	4	43	5	64	13	82	14	41	6	61	254
01:30 PM	9	48	16	73	6	37	2	45	6	63	11	80	9	36	7	52	250
01:45 PM	5	53	14	72	7	46	2	55	9	63	8	80	11	31	7	49	256
Total	26	212	55	293	33	150	15	198	26	233	40	299	47	151	29	227	1017
02:00 PM	16	56	12	84	8	38	5	51	13	57	18	88	16	41	14	71	294
02:15 PM	14	35	14	63	19	76	13	108	12	65	9	86	7	52	6	65	322
Grand Total	82	420	107	609	81	364	58	503	63	459	89	611	100	328	73	501	2224
Apprch %	13.5	69	17.6		16.1	72.4	11.5		10.3	75.1	14.6		20	65.5	14.6		
Total %	3.7	18.9	4.8	27.4	3.6	16.4	2.6	22.6	2.8	20.6	4	27.5	4.5	14.7	3.3	22.5	

	Alder Avenue Southbound				San Bernardino Avenue Westbound				Alder Avenue Northbound				San Bernardino Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:30 PM to 02:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:30 PM																	
01:30 PM	9	48	**16**	73	6	37	2	45	6	63	11	80	9	36	7	52	250
01:45 PM	5	53	14	72	7	46	2	55	9	63	8	80	11	31	7	49	256
02:00 PM	**16**	**56**	12	**84**	8	38	5	51	**13**	57	**18**	**88**	**16**	41	**14**	**71**	294
02:15 PM	14	35	14	63	**19**	**76**	**13**	**108**	12	**65**	9	86	7	**52**	6	65	**322**
Total Volume	44	192	56	292	40	197	22	259	40	248	46	334	43	160	34	237	1122
% App. Total	15.1	65.8	19.2		15.4	76.1	8.5		12	74.3	13.8		18.1	67.5	14.3		
PHF	.688	.857	.875	.869	.526	.648	.423	.600	.769	.954	.639	.949	.672	.769	.607	.835	.871

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City of Fontana
N/S: Alder Avenue
E/W: San Bernardino Avenue
Weather: Sunny

File Name : FONALSBSUN
Site Code : 10136066
Start Date : 6/20/2010
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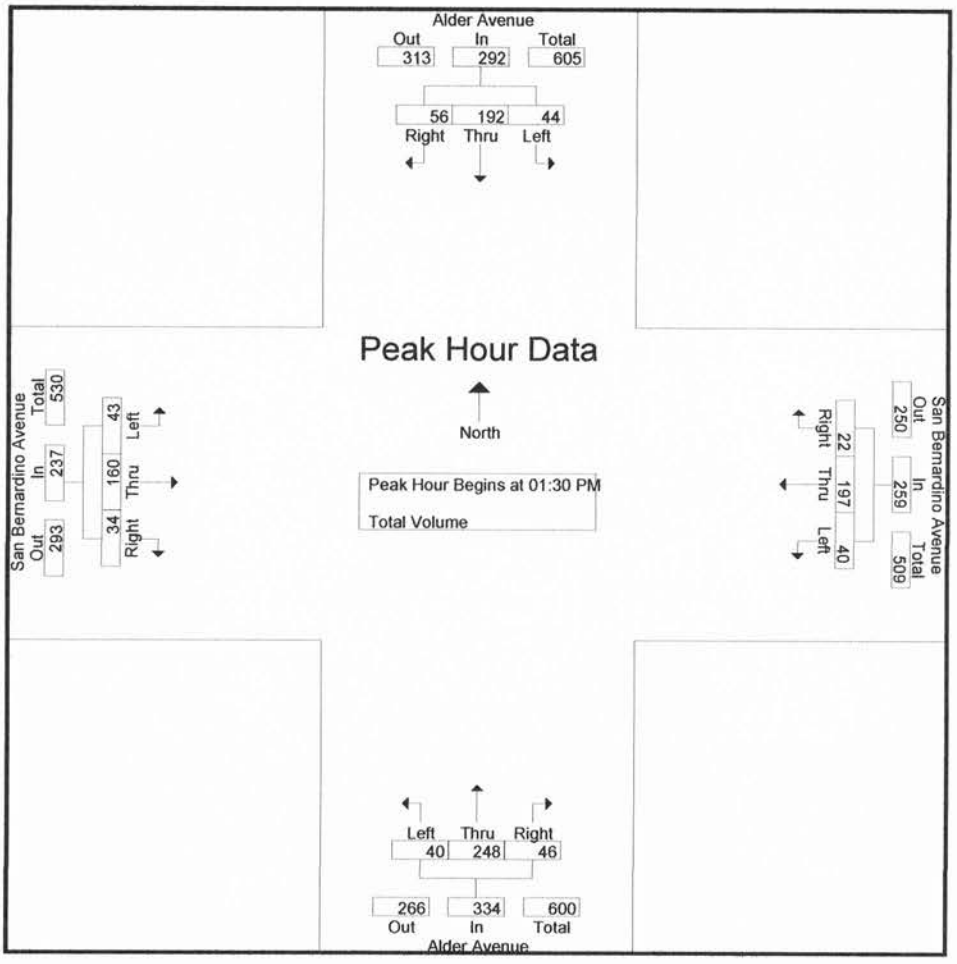

Peak Hour Analysis From 12:30 PM to 02:15 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	12:30 PM				01:30 PM				01:30 PM				12:30 PM			
+0 mins.	**14**	**64**	**18**	**96**	6	37	2	45	6	63	11	80	12	**43**	**12**	67
+15 mins.	12	53	8	73	7	46	2	55	9	63	8	80	**18**	41	12	**71**
+30 mins.	9	57	14	80	8	38	5	51	**13**	57	**18**	**88**	13	43	9	65
+45 mins.	3	54	11	68	**19**	**76**	**13**	**108**	12	**65**	9	86	14	41	6	61
Total Volume	38	228	51	317	40	197	22	259	40	248	46	334	57	168	39	264
% App. Total	12	71.9	16.1		15.4	76.1	8.5		12	74.3	13.8		21.6	63.6	14.8	
PHF	.679	.891	.708	.826	.526	.648	.423	.600	.769	.954	.639	.949	.792	.977	.813	.930

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City of Fontana
N/S: Locust Avenue
E/W: San Bernardino Avenue
Weather: Sunny

File Name : FONLOSBSUN
Site Code : 10136159
Start Date : 6/20/2010
Page No : 1

Groups Printed- Total Volume

	Locust Avenue Southbound				San Bernardino Avenue Westbound				Locust Avenue Northbound				San Bernardino Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:30 PM	8	31	13	52	2	51	5	58	12	42	3	57	10	42	11	63	230
12:45 PM	4	29	4	37	3	41	5	49	3	30	1	34	3	38	3	44	164
Total	12	60	17	89	5	92	10	107	15	72	4	91	13	80	14	107	394
01:00 PM	7	34	3	44	1	38	9	48	6	28	3	37	6	27	2	35	164
01:15 PM	4	20	2	26	2	19	3	24	4	31	2	37	10	34	4	48	135
01:30 PM	3	38	11	52	1	39	2	42	2	25	2	29	5	36	4	45	168
01:45 PM	3	30	4	37	2	46	7	55	1	29	1	31	5	30	5	40	163
Total	17	122	20	159	6	142	21	169	13	113	8	134	26	127	15	168	630
02:00 PM	5	44	6	55	4	48	5	57	5	37	0	42	3	33	3	39	193
02:15 PM	3	27	12	42	4	44	1	49	4	29	5	38	15	68	11	94	223
Grand Total	37	253	55	345	19	326	37	382	37	251	17	305	57	308	43	408	1440
Apprch %	10.7	73.3	15.9		5	85.3	9.7		12.1	82.3	5.6		14	75.5	10.5		
Total %	2.6	17.6	3.8	24	1.3	22.6	2.6	26.5	2.6	17.4	1.2	21.2	4	21.4	3	28.3	

	Locust Avenue Southbound				San Bernardino Avenue Westbound				Locust Avenue Northbound				San Bernardino Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:30 PM to 02:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:30 PM																	
01:30 PM	3	38	11	52	1	39	2	42	2	25	2	29	5	36	4	45	168
01:45 PM	3	30	4	37	2	46	**7**	55	1	29	1	31	5	30	5	40	163
02:00 PM	**5**	**44**	6	**55**	**4**	**48**	5	**57**	**5**	**37**	0	**42**	3	33	3	39	193
02:15 PM	3	27	**12**	42	4	44	1	49	4	29	**5**	38	**15**	**68**	**11**	**94**	**223**
Total Volume	14	139	33	186	11	177	15	203	12	120	8	140	28	167	23	218	747
% App. Total	7.5	74.7	17.7		5.4	87.2	7.4		8.6	85.7	5.7		12.8	76.6	10.6		
PHF	.700	.790	.688	.845	.688	.922	.536	.890	.600	.811	.400	.833	.467	.614	.523	.580	.837

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City of Fontana
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File Name : FONLOSBSUN
Site Code : 10136159
Start Date : 6/20/2010
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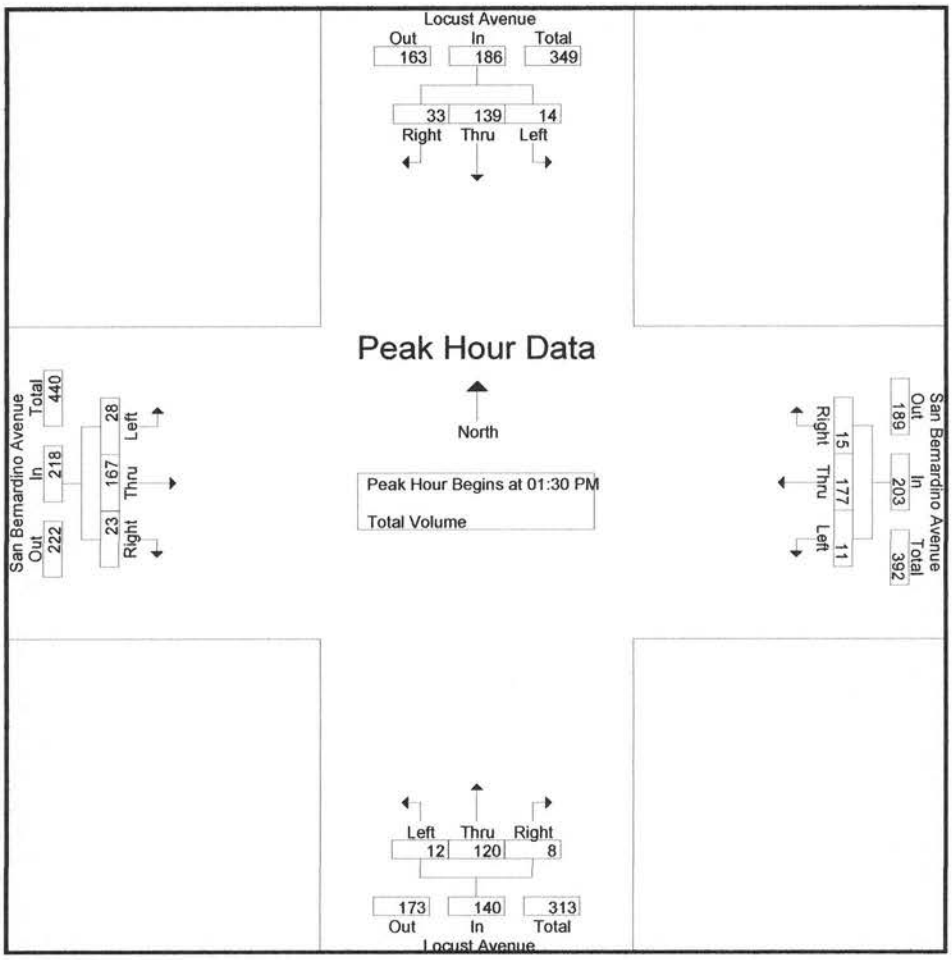

Peak Hour Analysis From 12:30 PM to 02:15 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	01:30 PM				01:30 PM				12:30 PM				01:30 PM			
+0 mins.	3	38	11	52	1	39	2	42	**12**	**42**	**3**	**57**	5	36	4	45
+15 mins.	3	30	4	37	2	46	**7**	55	3	30	1	34	5	30	5	40
+30 mins.	**5**	**44**	6	**55**	**4**	**48**	5	**57**	6	28	3	37	3	33	3	39
+45 mins.	3	27	**12**	42	4	44	1	49	4	31	2	37	**15**	**68**	**11**	**94**
Total Volume	14	139	33	186	11	177	15	203	25	131	9	165	28	167	23	218
% App. Total	7.5	74.7	17.7		5.4	87.2	7.4		15.2	79.4	5.5		12.8	76.6	10.6	
PHF	.700	.790	.688	.845	.688	.922	.536	.890	.521	.780	.750	.724	.467	.614	.523	.580

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City of Fontana
N/S: Linden Avenue
E/W: San Bernardino Avenue
Weather: Sunny

File Name : FONLISBSUN
Site Code : 10136066
Start Date : 6/20/2010

Groups Printed- Total Volume

	Linden Avenue Southbound				San Bernardino Avenue Westbound				Linden Avenue Northbound				San Bernardino Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:30 PM	6	18	4	28	3	45	7	55	3	19	11	33	3	36	4	43	159
12:45 PM	6	23	1	30	2	40	6	48	1	18	7	26	1	32	4	37	141
Total	12	41	5	58	5	85	13	103	4	37	18	59	4	68	8	80	300
01:00 PM	2	30	2	34	5	33	3	41	3	22	8	33	0	22	6	28	136
01:15 PM	4	20	3	27	5	21	4	30	1	28	7	36	1	29	4	34	127
01:30 PM	4	21	2	27	4	34	4	42	4	25	6	35	6	32	4	42	146
01:45 PM	4	23	5	32	4	37	9	50	5	24	4	33	0	22	3	25	140
Total	14	94	12	120	18	125	20	163	13	99	25	137	7	105	17	129	549
02:00 PM	4	20	0	24	3	29	5	37	9	19	6	34	2	29	4	35	130
02:15 PM	1	25	3	29	6	41	3	50	4	27	5	36	9	59	7	75	190
Grand Total	31	180	20	231	32	280	41	353	30	182	54	266	22	261	36	319	1169
Apprch %	13.4	77.9	8.7		9.1	79.3	11.6		11.3	68.4	20.3		6.9	81.8	11.3		
Total %	2.7	15.4	1.7	19.8	2.7	24	3.5	30.2	2.6	15.6	4.6	22.8	1.9	22.3	3.1	27.3	

	Linden Avenue Southbound				San Bernardino Avenue Westbound				Linden Avenue Northbound				San Bernardino Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:30 PM to 02:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:30 PM																	
01:30 PM	**4**	21	2	27	4	34	4	42	4	25	**6**	35	6	32	4	42	146
01:45 PM	4	23	**5**	**32**	4	37	**9**	**50**	5	24	4	33	0	22	3	25	140
02:00 PM	4	20	0	24	3	29	5	37	**9**	19	6	34	2	29	4	35	130
02:15 PM	1	**25**	3	29	**6**	**41**	3	50	**4**	**27**	5	**36**	**9**	**59**	**7**	**75**	**190**
Total Volume	13	89	10	112	17	141	21	179	22	95	21	138	17	142	18	177	606
% App. Total	11.6	79.5	8.9		9.5	78.8	11.7		15.9	68.8	15.2		9.6	80.2	10.2		
PHF	.813	.890	.500	.875	.708	.860	.583	.895	.611	.880	.875	.958	.472	.602	.643	.590	.797

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Site Code : 10136066
Start Date : 6/20/2010
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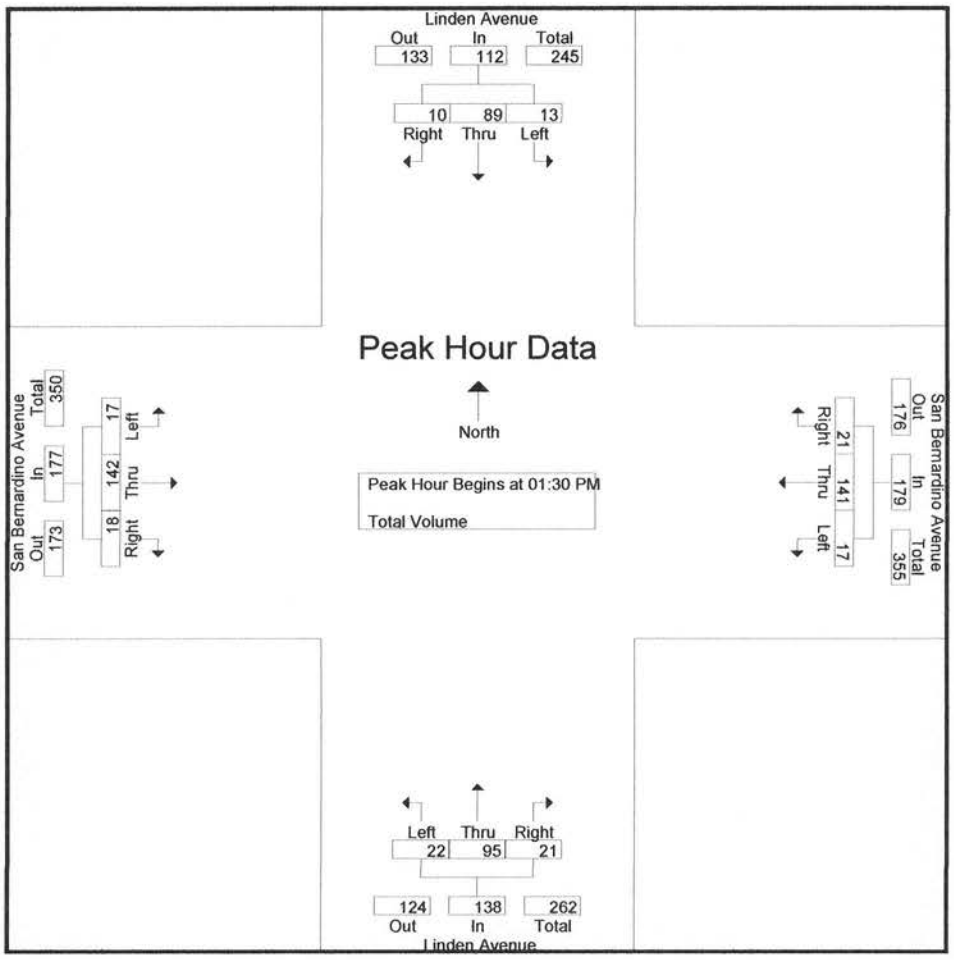

Peak Hour Analysis From 12:30 PM to 02:15 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	01:00 PM				01:30 PM				01:15 PM				01:30 PM			
+0 mins.	2	**30**	2	**34**	4	34	4	42	1	**28**	**7**	**36**	6	32	4	42
+15 mins.	**4**	20	3	27	4	37	**9**	**50**	4	25	6	35	0	22	3	25
+30 mins.	4	21	2	27	3	29	5	37	5	24	4	33	2	29	4	35
+45 mins.	4	23	**5**	32	**6**	**41**	3	50	**9**	19	6	34	**9**	**59**	**7**	**75**
Total Volume	14	94	12	120	17	141	21	179	19	96	23	138	17	142	18	177
% App. Total	11.7	78.3	10		9.5	78.8	11.7		13.8	69.6	16.7		9.6	80.2	10.2	
PHF	.875	.783	.600	.882	.708	.860	.583	.895	.528	.857	.821	.958	.472	.602	.643	.590

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City of Fontana
N/S: Alder Avenue
E/W: Marygold Avenue
Weather: Sunny

File Name : FONALMGSUN
Site Code : 10136139
Start Date : 6/20/2010
Page No : 1

Groups Printed- Total Volume

	Alder Avenue Southbound				Marygold Avenue Westbound				Alder Avenue Northbound				Marygold Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:30 PM	6	52	19	77	2	16	2	20	11	51	4	66	13	19	5	37	200
12:45 PM	8	60	11	79	0	25	3	28	11	52	3	66	8	10	4	22	195
Total	14	112	30	156	2	41	5	48	22	103	7	132	21	29	9	59	395
01:00 PM	5	58	18	81	4	16	4	24	4	50	3	57	12	21	2	35	197
01:15 PM	4	57	10	71	1	10	2	13	7	65	4	76	13	17	5	35	195
01:30 PM	3	47	19	69	0	14	3	17	3	61	2	66	12	12	3	27	179
01:45 PM	2	48	17	67	8	13	5	26	2	65	2	69	12	17	4	33	195
Total	14	210	64	288	13	53	14	80	16	241	11	268	49	67	14	130	766
02:00 PM	7	50	13	70	2	19	6	27	8	71	9	88	14	16	8	38	223
02:15 PM	3	46	10	59	1	17	6	24	3	68	7	78	17	15	3	35	196
Grand Total	38	418	117	573	18	130	31	179	49	483	34	566	101	127	34	262	1580
Apprch %	6.6	72.9	20.4		10.1	72.6	17.3		8.7	85.3	6		38.5	48.5	13		
Total %	2.4	26.5	7.4	36.3	1.1	8.2	2	11.3	3.1	30.6	2.2	35.8	6.4	8	2.2	16.6	

	Alder Avenue Southbound				Marygold Avenue Westbound				Alder Avenue Northbound				Marygold Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:30 PM to 02:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:30 PM																	
01:30 PM	3	47	**19**	69	0	14	3	17	3	61	2	66	12	12	3	27	179
01:45 PM	2	48	17	67	**8**	13	5	26	2	65	2	69	12	**17**	4	33	195
02:00 PM	**7**	**50**	13	**70**	2	**19**	**6**	**27**	**8**	**71**	**9**	**88**	**14**	16	**8**	**38**	**223**
02:15 PM	3	46	10	59	1	17	6	24	3	68	7	78	**17**	15	3	35	196
Total Volume	15	191	59	265	11	63	20	94	16	265	20	301	55	60	18	133	793
% App. Total	5.7	72.1	22.3		11.7	67	21.3		5.3	88	6.6		41.4	45.1	13.5		
PHF	.536	.955	.776	.946	.344	.829	.833	.870	.500	.933	.556	.855	.809	.882	.563	.875	.889

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City of Fontana
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File Name : FONALMGSUN
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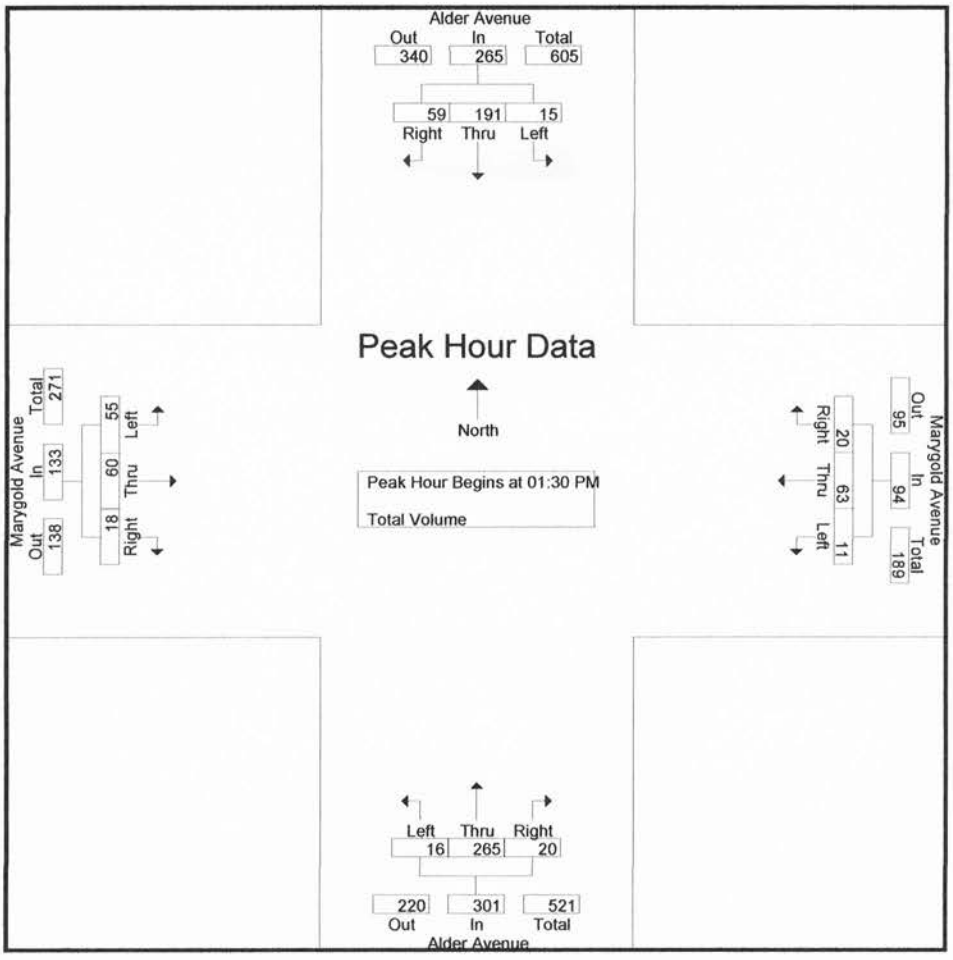

Peak Hour Analysis From 12:30 PM to 02:15 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	12:30 PM				01:30 PM				01:30 PM				01:15 PM			
+0 mins.	6	52	**19**	77	0	14	3	17	3	61	2	66	13	**17**	5	35
+15 mins.	**8**	**60**	11	79	**8**	13	5	26	2	65	2	69	12	12	3	27
+30 mins.	5	58	18	**81**	2	**19**	**6**	**27**	**8**	**71**	**9**	**88**	12	17	4	33
+45 mins.	4	57	10	71	1	17	6	24	3	68	7	78	**14**	16	**8**	**38**
Total Volume	23	227	58	308	11	63	20	94	16	265	20	301	51	62	20	133
% App. Total	7.5	73.7	18.8		11.7	67	21.3		5.3	88	6.6		38.3	46.6	15	
PHF	.719	.946	.763	.951	.344	.829	.833	.870	.500	.933	.556	.855	.911	.912	.625	.875

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City of Fontana
N/S: Locust Avenue
E/W: Marygold Avenue
Weather: Sunny

File Name : FONLOMGSUN
Site Code : 10136016
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Groups Printed- Total Volume

	Locust Avenue Southbound				Marygold Avenue Westbound				Locust Avenue Northbound				Marygold Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:30 PM	1	34	4	39	1	7	2	10	5	42	1	48	5	17	4	26	123
12:45 PM	2	27	5	34	0	11	1	12	4	30	0	34	2	10	3	15	95
Total	3	61	9	73	1	18	3	22	9	72	1	82	7	27	7	41	218
01:00 PM	0	32	4	36	1	11	2	14	8	34	0	42	6	14	4	24	116
01:15 PM	3	19	0	22	0	10	0	10	4	30	0	34	6	9	4	19	85
01:30 PM	4	39	5	48	1	7	1	9	6	29	0	35	4	13	2	19	111
01:45 PM	2	27	7	36	2	9	1	12	6	31	0	37	6	14	2	22	107
Total	9	117	16	142	4	37	4	45	24	124	0	148	22	50	12	84	419
02:00 PM	2	33	9	44	2	15	1	18	5	29	1	35	7	11	2	20	117
02:15 PM	5	27	8	40	3	8	3	14	4	31	4	39	3	14	3	20	113
Grand Total	19	238	42	299	10	78	11	99	42	256	6	304	39	102	24	165	867
Apprch %	6.4	79.6	14		10.1	78.8	11.1		13.8	84.2	2		23.6	61.8	14.5		
Total %	2.2	27.5	4.8	34.5	1.2	9	1.3	11.4	4.8	29.5	0.7	35.1	4.5	11.8	2.8	19	

	Locust Avenue Southbound				Marygold Avenue Westbound				Locust Avenue Northbound				Marygold Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:30 PM to 02:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:30 PM																	
01:30 PM	**4**	**39**	5	**48**	1	7	1	9	**6**	29	0	35	4	13	2	19	111
01:45 PM	2	27	7	36	2	9	1	12	6	**31**	0	37	6	**14**	2	**22**	107
02:00 PM	2	33	**9**	44	2	**15**	1	**18**	5	29	1	35	**7**	11	2	20	**117**
02:15 PM	**5**	27	8	40	**3**	8	**3**	14	4	31	**4**	**39**	3	14	**3**	20	113
Total Volume	13	126	29	168	8	39	6	53	21	120	5	146	20	52	9	81	448
% App. Total	7.7	75	17.3		15.1	73.6	11.3		14.4	82.2	3.4		24.7	64.2	11.1		
PHF	.650	.808	.806	.875	.667	.650	.500	.736	.875	.968	.313	.936	.714	.929	.750	.920	.957

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City of Fontana
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Start Date : 6/20/2010
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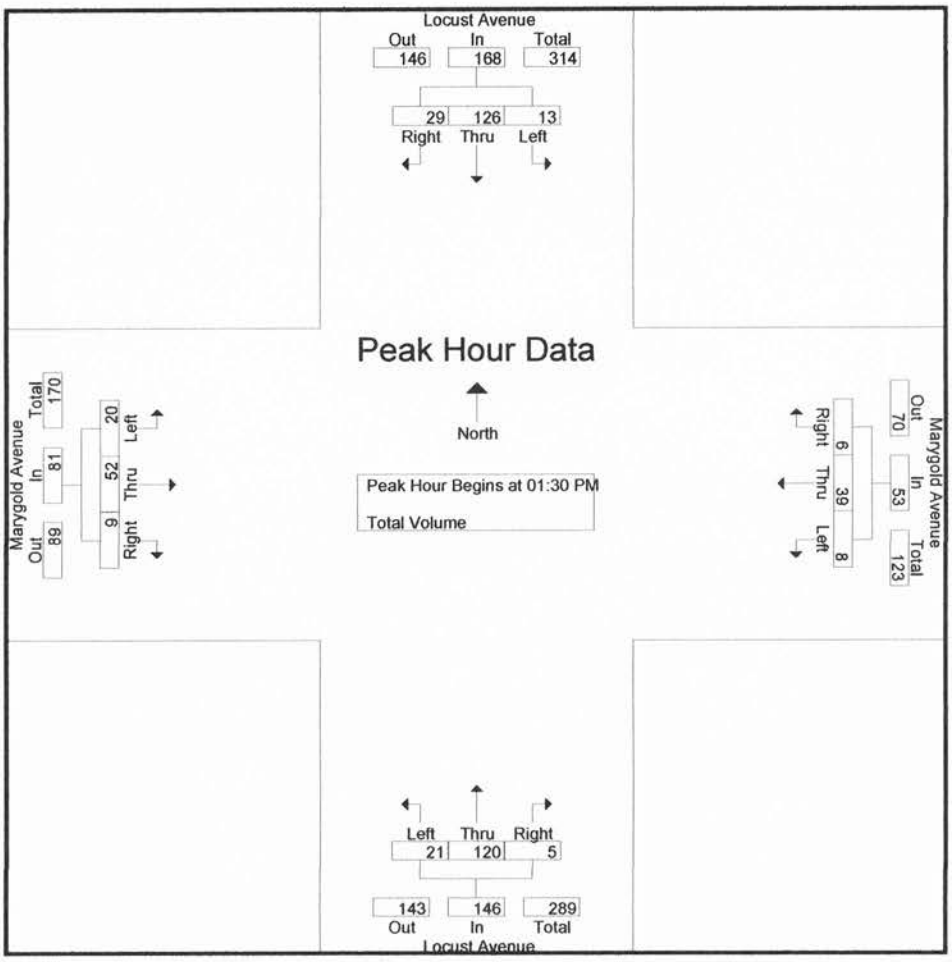

Peak Hour Analysis From 12:30 PM to 02:15 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	01:30 PM				01:30 PM				12:30 PM				12:30 PM			
+0 mins.	4	**39**	5	**48**	1	7	1	9	5	**42**	**1**	**48**	5	**17**	**4**	**26**
+15 mins.	2	27	7	36	2	9	1	12	4	30	0	34	2	10	3	15
+30 mins.	2	33	**9**	44	2	**15**	1	**18**	**8**	34	0	42	**6**	14	4	24
+45 mins.	**5**	27	8	40	**3**	8	**3**	14	4	30	0	34	6	9	4	19
Total Volume	13	126	29	168	8	39	6	53	21	136	1	158	19	50	15	84
% App. Total	7.7	75	17.3		15.1	73.6	11.3		13.3	86.1	0.6		22.6	59.5	17.9	
PHF	.650	.808	.806	.875	.667	.650	.500	.736	.656	.810	.250	.823	.792	.735	.938	.808

APPENDIX B
OPERATIONAL ANALYSIS

WEBSTER

WEbster Based Signal Timing Evaluation Routine

For Capacity and Level of Service Analysis Using HCM 2000 Control Delay

Existing Traffic with Existing Lane Geometrics

Alder Avenue @ Merrill Avenue | **Albert Wilson & Associate** | **PM Peak Hour**

Input

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	*L*	T	R	L	*T*	R	*L*	*T*	R	L	T	R
Movement 1: **10** secs	X			X								
Movement 2: **20** secs		X	X		X	X						
Movement 3: **10** secs							X			X		
Movement 4: **20** secs								X	X		X	X
Movement 5: **0** secs												
Movement 6: **0** secs												
# of Lanes (#, S, P)	**1**	2	S	1	**2**	S	**1**	**2**	S	1	2	S
Unadjusted Volume	**49**	175	35	19	**216**	59	**36**	**258**	19	34	244	56
Peak Hour Factor (PHF)	**0.82**	0.82	0.82	0.85	**0.85**	0.85	**0.87**	**0.87**	0.87	0.96	0.96	0.96
Growth Factor (%)												
Project Trip Volume (vph)												
Sat. Flow Override (vph)			Shrd			Shrd			Shrd			Shrd
Min. Time or Ped. Time	**10**	20	20	10	**20**	20	**10**	**20**	20	10	20	20
Permissive Veh/Cycle												
Progression Adj. Factor (PAF)	**1.00**	1.00	-	1.00	**1.00**	-	**1.00**	**1.00**	-	1.00	1.00	-

Parameter Values (using default set 'SANBAG (Existing)')

	Other	Default
Duration of Peak Period (min)		15
Lost Time (sec)		2
Min. Time (Left Turns, sec)		10
Min/Ped Time (Thru Lanes, sec)		20
Sat Flow (1 Left lane, vphg)	1700	1800
Sat Flow (2 Left lanes, vphg)	3200	3500
Sat Flow (1 Thru lane, vphg)	1800	1900
Sat Flow (1 Right lane, vphg)		1800
Vehicle Length (feet)		20

Output

	***				***		***	***				
Pk. Hr. Vol. (vph)	**60**	213	43	22	**254**	69	**41**	**297**	22	35	254	58
Saturation Flow (vph)	**1700**	3600	Shrd	1700	**3600**	Shrd	**1700**	**3600**	Shrd	1700	3600	Shrd
X or V/C	**0.26**	0.24	-	0.10	**0.30**	-	**0.18**	**0.30**	-	0.15	0.29	-
Effective green (sec)	**8**	18	-	8	**18**	-	**8**	**18**	-	8	18	-
Split Time (sec)	**10**	20	-	10	**20**	-	**10**	**20**	-	10	20	-
Min. Time or Ped. Time (sec)	**10**	20	-	10	**20**	-	**10**	**20**	-	10	20	-
Delay - 15 min pk (sec/veh)	**26**	16	-	24	**17**	-	**25**	**17**	-	24	17	-
Level of Service (LOS)	**C**	B	-	C+	**B**	-	**C+**	**B**	-	C+	B	-
Average 'Q' (veh/ln)	**1**	1	-	1	**2**	-	**1**	**2**	-	1	2	-
Design 'Q'- ft/ln	**40**	40	-	40	**60**	-	**40**	**60**	-	40	60	-
Do Vehicles Clear?	**YES**	YES	-	YES	**YES**	-	**YES**	**YES**	-	YES	YES	-

Summary

Whole Intersection

Weighted Avg Delay (sec) = 18
Level of Service - LOS = B

Critical Movements

Weighted Avg Delay (sec) = 18
Level of Service - LOS = B
Intersection Capacity Utilization - ICU = 0.27

Required Cycle Length is 60 sec

Min./Ped. Times Satisfied

WEBSTER

WEbster Based Signal Timing Evaluation Routine

For Capacity and Level of Service Analysis Using HCM 2000 Control Delay

Project Phase I 2015 Opening Day Conditions w/o Projec

Alder Avenue @ Merrill Avenue **Albert Wilson & Associate** **PM Peak Hour**

Input

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	*L*	T	R	L	*T*	R	*L*	*T*	R	L	T	R
Movement 1: **10** secs	X			X								
Movement 2: **22** secs		X	X		X	X						
Movement 3: **7** secs							X			X		
Movement 4: **21** secs								X	X		X	X
Movement 5: **0** secs												
Movement 6: **0** secs												
# of Lanes (#, S, P)	**1**	2	S	1	**2**	S	**1**	**2**	S	1	2	S
Unadjusted Volume	**49**	175	35	19	**216**	59	**36**	**258**	19	34	244	58
Peak Hour Factor (PHF)	**0.82**	0.82	0.82	0.85	**0.85**	0.85	**0.87**	**0.87**	0.87	0.96	0.96	0.96
Growth Factor (%)	**5**	5	5	5	**5**	5	**5**	**5**	5	5	5	5
Project Trip Volume (vph)												
Sat. Flow Override (vph)			Shrd			Shrd			Shrd			Shrd
Min. Time or Ped. Time	**10**	20	20	10	**20**	20	**10**	**20**	20	10	20	20
Permissive Veh/Cycle												
Progression Adj. Factor (PAF)	**1.00**	1.00	-	1.00	**1.00**	-	**1.00**	**1.00**	-	1.00	1.00	-

Parameter Values (using default set 'SANBAG (Existing)')

	Other	Default
Duration of Peak Period (min)		15
Lost Time (sec)		2
Min. Time (Left Turns, sec)		10
Min/Ped Time (Thru Lanes, sec)		20
Sat Flow (1 Left lane, vphg)	1700	1800
Sat Flow (2 Left lanes, vphg)	3200	3500
Sat Flow (1 Thru lane, vphg)	1800	1900
Sat Flow (1 Right lane, vphg)		1800
Vehicle Length (feet)		20

Output

	***				***		***	***				
Pk. Hr. Vol. (vph)	**63**	224	45	23	**267**	73	**43**	**311**	23	37	267	63
Saturation Flow (vph)	**1700**	3600	Shrd	1700	**3600**	Shrd	**1700**	**3600**	Shrd	1700	3600	Shrd
X or V/C	**0.28**	0.22	-	0.10	**0.28**	-	**0.30**	**0.29**	-	0.26	0.29	-
Effective green (sec)	**8**	20	-	8	**20**	-	**5**	**19**	-	5	19	-
Split Time (sec)	**10**	22	-	10	**22**	-	**7**	**21**	-	7	21	-
Min. Time or Ped. Time (sec)	**10**	20	-	10	**20**	-	**10**	**20**	-	10	20	-
Delay - 15 min pk (sec/veh)	**26**	15	-	24	**15**	-	**31**	**16**	-	30	16	-
Level of Service (LOS)	**C**	B	-	C+	**B**	-	**C-**	**B**	-	C-	B	-
Average 'Q' (veh/ln)	**1**	1	-	1	**2**	-	**1**	**2**	-	1	2	-
Design 'Q'- ft/ln	**40**	40	-	40	**60**	-	**40**	**60**	-	40	60	-
Do Vehicles Clear?	**YES**	YES	-	YES	**YES**	-	**YES**	**YES**	-	YES	YES	-

Summary

Whole Intersection

Weighted Avg Delay (sec) = 17
Level of Service - LOS = B

Critical Movements

Weighted Avg Delay (sec) = 17
Level of Service - LOS = B
Intersection Capacity Utilization - ICU = 0.29

Predetermined Cycle Length is 60 sec

Min./Ped. Times May Not Be Satisfied

WEBSTER

WEbster Based Signal Timing Evaluation Routine

For Capacity and Level of Service Analysis Using HCM 2000 Control Delay

Project Phase I 2015 Opening Day Conditions w Project

Alder Avenue @ Merrill Avenue | **Albert Wilson & Associate** | **PM Peak Hour**

Input

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	*L*	T	R	L	*T*	R	*L*	T	R	L	*T*	R
Movement 1: **10** secs	X			X								
Movement 2: **20** secs		X	X		X	X						
Movement 3: **10** secs							X			X		
Movement 4: **20** secs								X	X		X	X
Movement 5: **0** secs												
Movement 6: **0** secs												
# of Lanes (#, S, P)	**1**	2	S	1	**2**	S	**1**	2	S	1	**2**	S
Unadjusted Volume	**49**	175	35	19	**216**	59	**36**	258	20	35	**244**	58
Peak Hour Factor (PHF)	**0.82**	0.82	0.82	0.85	**0.85**	0.85	**0.87**	0.87	0.87	0.96	**0.96**	0.96
Growth Factor (%)	**5**	5	5	5	**5**	5	**5**	5	5	5	**5**	5
Project Trip Volume (vph)			29				**14**	28			**34**	
Sat. Flow Override (vph)			Shrd			Shrd			Shrd			Shrd
Min. Time or Ped. Time	**10**	20	20	10	**20**	20	**10**	20	20	10	**20**	20
Permissive Veh/Cycle												
Progression Adj. Factor (PAF)	**1.00**	1.00	-	1.00	**1.00**	-	**1.00**	1.00	-	1.00	**1.00**	-

Parameter Values (using default set 'SANBAG (Existing)')

	Other	Default
Duration of Peak Period (min)		15
Lost Time (sec)		2
Min. Time (Left Turns, sec)		10
Min/Ped Time (Thru Lanes, sec)		20
Sat Flow (1 Left lane, vphg)	1700	1800
Sat Flow (2 Left lanes, vphg)	3200	3500
Sat Flow (1 Thru lane, vphg)	1800	1900
Sat Flow (1 Right lane, vphg)		1800
Vehicle Length (feet)		20

Output

	***				***		***				***	
Pk. Hr. Vol. (vph)	**63**	224	74	23	**267**	73	**57**	339	24	38	**301**	63
Saturation Flow (vph)	**1700**	3600	Shrd	1700	**3600**	Shrd	**1700**	3600	Shrd	1700	**3600**	Shrd
X or V/C	**0.28**	0.28	-	0.10	**0.31**	-	**0.25**	0.34	-	0.17	**0.34**	-
Effective green (sec)	**8**	18	-	8	**18**	-	**8**	18	-	8	**18**	-
Split Time (sec)	**10**	20	-	10	**20**	-	**10**	20	-	10	**20**	-
Min. Time or Ped. Time (sec)	**10**	20	-	10	**20**	-	**10**	20	-	10	**20**	-
Delay - 15 min pk (sec/veh)	**26**	17	-	24	**17**	-	**26**	17	-	25	**17**	-
Level of Service (LOS)	**C**	B	-	C+	**B**	-	**C**	B	-	C+	**B**	-
Average 'Q' (veh/ln)	**1**	2	-	1	**2**	-	**1**	2	-	1	**2**	-
Design 'Q'- ft/ln	**40**	60	-	40	**60**	-	**40**	60	-	40	**60**	-
Do Vehicles Clear?	**YES**	YES	-	YES	**YES**	-	**YES**	YES	-	YES	**YES**	-

Summary

Whole Intersection

Weighted Avg Delay (sec) = 18
Level of Service - LOS = B

Critical Movements

Weighted Avg Delay (sec) = 18
Level of Service - LOS = B
Intersection Capacity Utilization - ICU = 0.31

Required Cycle Length is 60 sec

Min./Ped. Times Satisfied

WEBSTER

WEbster Based Signal Timing Evaluation Routine

For Capacity and Level of Service Analysis Using HCM 2000 Control Delay

Project Phase II 2017 Opening Day Conditions w/o Proj

Alder Avenue @ Merrill Avenue | **Albert Wilson & Associate** | **PM Peak Hour**

Input

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	*L*	T	R	L	*T*	R	*L*	T	R	L	*T*	R
Movement 1: **10** secs	X			X								
Movement 2: **20** secs		X	X		X	X						
Movement 3: **10** secs							X			X		
Movement 4: **20** secs								X	X		X	X
Movement 5: **0** secs												
Movement 6: **0** secs												
# of Lanes (#, S, P)	**1**	2	S	1	**2**	S	**1**	2	S	1	**2**	S
Unadjusted Volume	**49**	175	35	19	**216**	59	**36**	258	19	34	**244**	56
Peak Hour Factor (PHF)	**0.82**	0.82	0.82	0.85	**0.85**	0.85	**0.87**	0.87	0.87	0.96	**0.96**	0.96
Growth Factor (%)	**7**	7	7	7	**7**	7	**7**	7	7	7	**7**	7
Project Trip Volume (vph)			29				**14**	28			**34**	
Sat. Flow Override (vph)			Shrd			Shrd			Shrd			Shrd
Min. Time or Ped. Time	**10**	20	20	10	**20**	20	**10**	20	20	10	**20**	20
Permissive Veh/Cycle												
Progression Adj. Factor (PAF)	**1.00**	1.00	-	1.00	**1.00**	-	**1.00**	1.00	-	1.00	**1.00**	-

Parameter Values (using default set 'SANBAG (Existing)')

	Other	Default
Duration of Peak Period (min)		15
Lost Time (sec)		2
Min. Time (Left Turns, sec)		10
Min/Ped Time (Thru Lanes, sec)		20
Sat Flow (1 Left lane, vphg)	1700	1800
Sat Flow (2 Left lanes, vphg)	3200	3500
Sat Flow (1 Thru lane, vphg)	1800	1900
Sat Flow (1 Right lane, vphg)		1800
Vehicle Length (feet)		20

Output

	***				***		***				***	
Pk. Hr. Vol. (vph)	**64**	228	75	24	**272**	74	**58**	345	23	38	**306**	62
Saturation Flow (vph)	**1700**	3600	Shrd	1700	**3600**	Shrd	**1700**	3600	Shrd	1700	**3600**	Shrd
X or V/C	**0.28**	0.28	-	0.11	**0.32**	-	**0.26**	0.34	-	0.17	**0.34**	-
Effective green (sec)	**8**	18	-	8	**18**	-	**8**	18	-	8	**18**	-
Split Time (sec)	**10**	20	-	10	**20**	-	**10**	20	-	10	**20**	-
Min. Time or Ped. Time (sec)	**10**	20	-	10	**20**	-	**10**	20	-	10	**20**	-
Delay - 15 min pk (sec/veh)	**27**	17	-	24	**17**	-	**26**	17	-	25	**17**	-
Level of Service (LOS)	**C**	B	-	C+	**B**	-	**C**	B	-	C+	**B**	-
Average 'Q' (veh/ln)	**1**	2	-	1	**2**	-	**1**	2	-	1	**2**	-
Design 'Q'- ft/ln	**40**	60	-	40	**60**	-	**40**	60	-	40	**60**	-
Do Vehicles Clear?	**YES**	YES	-	YES	**YES**	-	**YES**	YES	-	YES	**YES**	-

Summary

Whole Intersection

Weighted Avg Delay (sec) = 18
Level of Service - LOS = B

Critical Movements

Weighted Avg Delay (sec) = 18
Level of Service - LOS = B
Intersection Capacity Utilization - ICU = 0.31

Required Cycle Length is 60 sec

Min./Ped. Times Satisfied

WEBSTER

WEbster Based Signal Timing Evaluation Routine

For Capacity and Level of Service Analysis Using HCM 2000 Control Delay

Project Phase II 2017 Opening Day Conditions w Proj Tr

Alder Avenue @ Merrill Avenue | **Albert Wilson & Associate** | **PM Peak Hour**

Input

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	*L*	T	R	L	*T*	R	*L*	T	R	L	*T*	R
Movement 1: **10** secs	X			X								
Movement 2: **20** secs		X	X		X	X						
Movement 3: **10** secs							X			X		
Movement 4: **21** secs								X	X		X	X
Movement 5: **0** secs												
Movement 6: **0** secs												
# of Lanes (#, S, P)	**1**	2	S	1	**2**	S	**1**	2	S	1	**2**	S
Unadjusted Volume	**49**	175	35	19	**216**	59	**36**	258	19	34	**244**	56
Peak Hour Factor (PHF)	**0.82**	0.82	0.82	0.85	**0.85**	0.85	**0.87**	0.87	0.87	0.96	**0.96**	0.96
Growth Factor (%)	**7**	7	7	7	**7**	7	**7**	7	7	7	**7**	7
Project Trip Volume (vph)			36				**18**	36			**43**	
Sat. Flow Override (vph)			Shrd			Shrd			Shrd			Shrd
Min. Time or Ped. Time	**10**	20	20	10	**20**	20	**10**	20	20	10	**20**	20
Permissive Veh/Cycle												
Progression Adj. Factor (PAF)	**1.00**	1.00	-	1.00	**1.00**	-	**1.00**	1.00	-	1.00	**1.00**	-

Parameter Values (using default set 'SANBAG (Existing)')

	Other	Default
Duration of Peak Period (min)		15
Lost Time (sec)		2
Min. Time (Left Turns, sec)		10
Min/Ped Time (Thru Lanes, sec)		20
Sat Flow (1 Left lane, vphg)	1700	1800
Sat Flow (2 Left lanes, vphg)	3200	3500
Sat Flow (1 Thru lane, vphg)	1800	1900
Sat Flow (1 Right lane, vphg)		1800
Vehicle Length (feet)		20

Output

	***				***		***				***	
Pk. Hr. Vol. (vph)	**64**	228	82	24	**272**	74	**62**	353	23	38	**315**	62
Saturation Flow (vph)	**1700**	3600	Shrd	1700	**3600**	Shrd	**1700**	3600	Shrd	1700	**3600**	Shrd
X or V/C	**0.29**	0.29	-	0.11	**0.33**	-	**0.28**	0.34	-	0.17	**0.34**	-
Effective green (sec)	**8**	18	-	8	**18**	-	**8**	19	-	8	**19**	-
Split Time (sec)	**10**	20	-	10	**20**	-	**10**	21	-	10	**21**	-
Min. Time or Ped. Time (sec)	**10**	20	-	10	**20**	-	**10**	20	-	10	**20**	-
Delay - 15 min pk (sec/veh)	**27**	17	-	24	**18**	-	**27**	17	-	25	**17**	-
Level of Service (LOS)	**C**	B	-	C+	**B**	-	**C**	B	-	C	**B**	-
Average 'Q' (veh/ln)	**1**	2	-	1	**2**	-	**1**	2	-	1	**2**	-
Design 'Q'- ft/ln	**40**	60	-	40	**60**	-	**40**	60	-	40	**60**	-
Do Vehicles Clear?	**YES**	YES	-	YES	**YES**	-	**YES**	YES	-	YES	**YES**	-

Summary

Whole Intersection

Weighted Avg Delay (sec) = 18
Level of Service - LOS = B

Critical Movements

Weighted Avg Delay (sec) = 19
Level of Service - LOS = B
Intersection Capacity Utilization - ICU = 0.32

Required Cycle Length is 61 sec

Min./Ped. Times Satisfied

WEBSTER

WEbster Based Signal Timing Evaluation Routine

For Capacity and Level of Service Analysis Using HCM 2000 Control Delay

General Plan Buildout Conditions w/o Proj Tr

Alder Avenue @ Merrill Avenue | **Albert Wilson & Associate** | **PM Peak Hour**

Input

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	*L*	T	R	L	*T*	R	*L*	T	R	L	*T*	R
Movement 1: **10** secs	X			X								
Movement 2: **20** secs		X	X		X	X						
Movement 3: **10** secs							X			X		
Movement 4: **20** secs								X	X		X	X
Movement 5: **0** secs												
Movement 6: **0** secs												
# of Lanes (#, S, P)	**1**	2	S	1	**2**	S	**1**	2	S	1	**2**	S
Unadjusted Volume	**63**	224	45	24	**277**	76	**46**	331	24	44	**313**	72
Peak Hour Factor (PHF)	**0.95**	0.95	0.95	0.95	**0.95**	0.95	**0.95**	0.95	0.95	0.95	**0.95**	0.95
Growth Factor (%)												
Project Trip Volume (vph)												
Sat. Flow Override (vph)			Shrd			Shrd			Shrd			Shrd
Min. Time or Ped. Time	**10**	20	20	10	**20**	20	**10**	20	20	10	**20**	20
Permissive Veh/Cycle												
Progression Adj. Factor (PAF)	**1.00**	1.00	-	1.00	**1.00**	-	**1.00**	1.00	-	1.00	**1.00**	-

Parameter Values (using default set 'SANBAG (Future)')

	Other	Default
Duration of Peak Period (min)		15
Lost Time (sec)		2
Min. Time (Left Turns, sec)		10
Min/Ped Time (Thru Lanes, sec)		20
Sat Flow (1 Left lane, vphg)		1800
Sat Flow (2 Left lanes, vphg)	3400	3500
Sat Flow (1 Thru lane, vphg)		1900
Sat Flow (1 Right lane, vphg)	1900	1800
Vehicle Length (feet)		20

Output

	***				***		***				***	
Pk. Hr. Vol. (vph)	**66**	236	47	25	**292**	80	**48**	348	25	46	**329**	76
Saturation Flow (vph)	**1800**	3800	Shrd	1800	**3800**	Shrd	**1800**	3800	Shrd	1800	**3800**	Shrd
X or V/C	**0.28**	0.25	-	0.10	**0.33**	-	**0.20**	0.33	-	0.19	**0.36**	-
Effective green (sec)	**8**	18	-	8	**18**	-	**8**	18	-	8	**18**	-
Split Time (sec)	**10**	20	-	10	**20**	-	**10**	20	-	10	**20**	-
Min. Time or Ped. Time (sec)	**10**	20	-	10	**20**	-	**10**	20	-	10	**20**	-
Delay - 15 min pk (sec/veh)	**26**	16	-	24	**17**	-	**25**	17	-	25	**17**	-
Level of Service (LOS)	**C**	B	-	C+	**B**	-	**C**	B	-	C+	**B**	-
Average 'Q' (veh/ln)	**1**	2	-	1	**2**	-	**1**	2	-	1	**2**	-
Design 'Q'- ft/ln	**40**	60	-	40	**60**	-	**40**	60	-	40	**60**	-
Do Vehicles Clear?	**YES**	YES	-	YES	**YES**	-	**YES**	YES	-	YES	**YES**	-

Summary

Whole Intersection

Weighted Avg Delay (sec) = 18
Level of Service - LOS = B

Critical Movements

Weighted Avg Delay (sec) = 18
Level of Service - LOS = B
Intersection Capacity Utilization - ICU = 0.31

Predetermined Cycle Length is 60 sec
Min./Ped. Times Satisfied
Analysis Based on User Selected Splits

WEBSTER

WEbster Based Signal Timing Evaluation Routine

For Capacity and Level of Service Analysis Using HCM 2000 Control Delay

General Plan Buildout Conditions w Proj Tr

Alder Avenue @ Merrill Avenue | **Albert Wilson & Associate** | **PM Peak Hour**

Input

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	*L*	T	R	L	*T*	R	*L*	T	R	L	*T*	R
Movement 1: **10** secs	X			X								
Movement 2: **20** secs		X	X		X	X						
Movement 3: **10** secs							X			X		
Movement 4: **20** secs								X	X		X	X
Movement 5: **0** secs												
Movement 6: **0** secs												
# of Lanes (#, S, P)	**1**	2	S	1	**2**	S	**1**	2	S	1	**2**	S
Unadjusted Volume	**63**	224	45	24	**277**	76	**46**	331	24	44	**313**	72
Peak Hour Factor (PHF)	**0.95**	0.95	0.95	0.95	**0.95**	0.95	**0.95**	0.95	0.95	0.95	**0.95**	0.95
Growth Factor (%)												
Project Trip Volume (vph)			36				**18**	36			**43**	
Sat. Flow Override (vph)			Shrd			Shrd			Shrd			Shrd
Min. Time or Ped. Time	**10**	20	20	10	**20**	20	**10**	20	20	10	**20**	20
Permissive Veh/Cycle												
Progression Adj. Factor (PAF)	**1.00**	1.00	-	1.00	**1.00**	-	**1.00**	1.00	-	1.00	**1.00**	-

Parameter Values (using default set 'SANBAG (Future)')

	Other	Default
Duration of Peak Period (min)		15
Lost Time (sec)		2
Min. Time (Left Turns, sec)		10
Min/Ped Time (Thru Lanes, sec)		20
Sat Flow (1 Left lane, vphg)		1800
Sat Flow (2 Left lanes, vphg)	3400	3500
Sat Flow (1 Thru lane, vphg)		1900
Sat Flow (1 Right lane, vphg)	1900	1800
Vehicle Length (feet)		20

Output

	***				***		***				***	
Pk. Hr. Vol. (vph)	**66**	236	83	25	**292**	80	**66**	384	25	46	**372**	76
Saturation Flow (vph)	**1800**	3800	Shrd	1800	**3800**	Shrd	**1800**	3800	Shrd	1800	**3800**	Shrd
X or V/C	**0.28**	0.28	-	0.10	**0.33**	-	**0.28**	0.36	-	0.19	**0.39**	-
Effective green (sec)	**8**	18	-	8	**18**	-	**8**	18	-	8	**18**	-
Split Time (sec)	**10**	20	-	10	**20**	-	**10**	20	-	10	**20**	-
Min. Time or Ped. Time (sec)	**10**	20	-	10	**20**	-	**10**	20	-	10	**20**	-
Delay - 15 min pk (sec/veh)	**26**	17	-	24	**17**	-	**26**	17	-	25	**18**	-
Level of Service (LOS)	**C**	B	-	C+	**B**	-	**C**	B	-	C+	**B**	-
Average 'Q' (veh/ln)	**1**	2	-	1	**2**	-	**1**	2	-	1	**3**	-
Design 'Q'- ft/ln	**40**	60	-	40	**60**	-	**40**	60	-	40	**100**	-
Do Vehicles Clear?	**YES**	YES	-	YES	**YES**	-	**YES**	YES	-	YES	**YES**	-

Summary

Whole Intersection

Weighted Avg Delay (sec) = 18
Level of Service - LOS = B

Critical Movements

Weighted Avg Delay (sec) = 19
Level of Service - LOS = B
Intersection Capacity Utilization - ICU = 0.33

Required Cycle Length is 60 sec

Min./Ped. Times Satisfied

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ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: Chidi Onumonu
Agency/Co.: Albert Wilson & Associates
Date Performed: 07/10/2013
Analysis Time Period: PM Peak Hour
Intersection: Randall Ave @ Palmetto Ave
Jurisdiction: County of San Bernardino
Units: U. S. Customary
Analysis Year: 2010- Existing Condition
Project ID: Intersection # 8
East/West Street: Randall Avenue
North/South Street: Palmetto Ave

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	34	155	26	10	147	15	30	201	23	26	157	36
% Thrus Left Lane		50			50							

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	TR	LT	TR	LT	R	LTR	
PHF	0.88	0.88	0.92	0.92	0.93	0.93	0.96	
Flow Rate	125	117	89	96	248	24	227	
% Heavy Veh	0	0	0	0	0	0	0	
No. Lanes	2		2		2		1	
Opposing-Lanes	2		2		1		2	
Conflicting-lanes	2		2		2		2	
Geometry group	5		5		5		4b	

Duration, T 0.25 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	125	117	89	96	248	24	227	
Left-Turn	38	0	10	0	32	0	27	
Right-Turn	0	29	0	16	0	24	37	
Prop. Left-Turns	0.3	0.0	0.1	0.0	0.1	0.0	0.1	
Prop. Right-Turns	0.0	0.2	0.0	0.2	0.0	1.0	0.2	
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Geometry Group	5		5		5		4b	
Adjustments Exhibit 17-33:								
hLT-adj	0.5		0.5		0.5		0.2	

hRT-adj		-0.7		-0.7		-0.7		-0.6
hHV-adj		1.7		1.7		1.7		1.7
hadj, computed	0.2	-0.2	0.1	-0.1	0.1	-0.7	-0.1	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	125	117	89	96	248	24	227	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.11	0.10	0.08	0.09	0.22	0.02	0.20	
hd, final value	6.49	6.16	6.49	6.31	6.17	5.40	6.09	
x, final value	0.23	0.20	0.16	0.17	0.43	0.04	0.38	
Move-up time, m	2.3		2.3		2.3		2.3	
Service Time	4.2	3.9	4.2	4.0	3.9	3.1	3.8	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	125	117	89	96	248	24	227	
Service Time	4.2	3.9	4.2	4.0	3.9	3.1	3.8	
Utilization, x	0.23	0.20	0.16	0.17	0.43	0.04	0.38	
Dep. headway, hd	6.49	6.16	6.49	6.31	6.17	5.40	6.09	
Capacity	375	367	339	346	498	274	477	
Delay	11.06	10.39	10.42	10.28	13.36	8.30	12.54	
LOS	B	B	B	B	B	A	B	
Approach:								
Delay	10.74		10.35		12.91		12.54	
LOS	B		B		B		B	

Intersection Delay 11.74 Intersection LOS B

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ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: Chidi Onumonu
Agency/Co.: Albert Wilson & Associates
Date Performed: 6/29/2010
Analysis Time Period: PM Peak Hour
Intersection: Randall Ave @ Palmetto Ave
Jurisdiction: County of San Bernardino
Units: U. S. Customary
Analysis Year: 2015 Opening Year w/o Proj
Project ID: Intersection # 8
East/West Street: Randall Avenue
North/South Street: Palmetto Ave

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	36	163	27	11	154	16	32	211	24	27	165	38
% Thrus Left Lane		50			50							

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	TR	LT	TR	LT	R	LTR	
PHF	0.88	0.88	0.92	0.92	0.93	0.93	0.96	
Flow Rate	132	123	94	100	260	25	238	
% Heavy Veh	0	0	0	0	0	0	0	
No. Lanes	2		2		2		1	
Opposing-Lanes	2		2		1		2	
Conflicting-lanes	2		2		2		2	
Geometry group	5		5		5		4b	

Duration, T 0.25 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	132	123	94	100	260	25	238	
Left-Turn	40	0	11	0	34	0	28	
Right-Turn	0	30	0	17	0	25	39	
Prop. Left-Turns	0.3	0.0	0.1	0.0	0.1	0.0	0.1	
Prop. Right-Turns	0.0	0.2	0.0	0.2	0.0	1.0	0.2	
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Geometry Group	5		5		5		4b	
Adjustments Exhibit 17-33:								
hLT-adj	0.5		0.5		0.5		0.2	

hRT-adj		-0.7		-0.7		-0.7		-0.6
hHV-adj		1.7		1.7		1.7		1.7
hadj, computed	0.2	-0.2	0.1	-0.1	0.1	-0.7	-0.1	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	132	123	94	100	260	25	238	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.12	0.11	0.08	0.09	0.23	0.02	0.21	
hd, final value	6.61	6.29	6.63	6.45	6.29	5.52	6.21	
x, final value	0.24	0.21	0.17	0.18	0.45	0.04	0.41	
Move-up time, m	2.3		2.3		2.3		2.3	
Service Time	4.3	4.0	4.3	4.1	4.0	3.2	3.9	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	132	123	94	100	260	25	238	
Service Time	4.3	4.0	4.3	4.1	4.0	3.2	3.9	
Utilization, x	0.24	0.21	0.17	0.18	0.45	0.04	0.41	
Dep. headway, hd	6.61	6.29	6.63	6.45	6.29	5.52	6.21	
Capacity	382	373	344	350	510	275	488	
Delay	11.42	10.70	10.71	10.55	14.12	8.44	13.16	
LOS	B	B	B	B	B	A	B	
Approach:								
Delay	11.07		10.63		13.62		13.16	
LOS	B		B		B		B	
Intersection Delay 12.24			Intersection LOS B					

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ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: Chidi Onumonu
Agency/Co.: Albert Wilson & Associates
Date Performed:
Analysis Time Period: PM Peak Hour
Intersection: Randall Ave @ Palmetto Ave
Jurisdiction: County of San Bernardino
Units: U. S. Customary
Analysis Year: 2015 Opening Year w Proj
Project ID: Intersection # 8
East/West Street: Randall Avenue
North/South Street: Palmetto Ave

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	36	200	27	11	190	16	32	225	24	27	179	38
% Thrus Left Lane		50			50							

	Eastbound		Westbound		Northbound		Southbound
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	TR	LT	TR	LT	R	LTR	
PHF	0.88	0.88	0.92	0.92	0.93	0.93	0.96	
Flow Rate	153	143	114	120	275	25	253	
% Heavy Veh	0	0	0	0	0	0	0	
No. Lanes	2		2		2		1	
Opposing-Lanes	2		2		1		2	
Conflicting-lanes	2		2		2		2	
Geometry group	5		5		5		4b	

Duration, T 0.25 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	153	143	114	120	275	25	253	
Left-Turn	40	0	11	0	34	0	28	
Right-Turn	0	30	0	17	0	25	39	
Prop. Left-Turns	0.3	0.0	0.1	0.0	0.1	0.0	0.1	
Prop. Right-Turns	0.0	0.2	0.0	0.1	0.0	1.0	0.2	
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Geometry Group	5		5		5		4b	
Adjustments Exhibit 17-33:								
hLT-adj	0.5		0.5		0.5		0.2	

hRT-adj		-0.7		-0.7		-0.7		-0.6
hHV-adj		1.7		1.7		1.7		1.7
hadj, computed	0.1	-0.1	0.0	-0.1	0.1	-0.7	-0.1	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	153	143	114	120	275	25	253	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.14	0.13	0.10	0.11	0.24	0.02	0.22	
hd, final value	6.88	6.60	6.91	6.76	6.64	5.87	6.55	
x, final value	0.29	0.26	0.22	0.23	0.51	0.04	0.46	
Move-up time, m		2.3		2.3		2.3		2.3
Service Time	4.6	4.3	4.6	4.5	4.3	3.6	4.2	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	153	143	114	120	275	25	253	
Service Time	4.6	4.3	4.6	4.5	4.3	3.6	4.2	
Utilization, x	0.29	0.26	0.22	0.23	0.51	0.04	0.46	
Dep. headway, hd	6.88	6.60	6.91	6.76	6.64	5.87	6.55	
Capacity	403	393	364	370	518	275	503	
Delay	12.40	11.63	11.54	11.42	15.97	8.82	14.70	
LOS	B	B	B	B	C	A	B	
Approach:								
Delay		12.02		11.48		15.37		14.70
LOS		B		B		C		B
Intersection Delay 13.46				Intersection LOS B				

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ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: Chidi Onumonu
Agency/Co.: Albert Wilson & Associates
Date Performed: 02/07/2014
Analysis Time Period: PM Peak Hour
Intersection: Randall Ave @ Palmetto Ave
Jurisdiction: County of San Bernardino
Units: U. S. Customary
Analysis Year: 2017 w/o proj. traffic
Project ID: Intersection # 8
East/West Street: Randall Avenue
North/South Street: Palmetto Ave

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	36	203	28	11	194	16	32	230	25	29	182	39
% Thrus Left Lane		50			50							

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	TR	LT	TR	LT	R	LTR	
PHF	0.88	0.88	0.92	0.92	0.93	0.93	0.96	
Flow Rate	154	146	116	122	281	26	259	
% Heavy Veh	0	0	0	0	0	0	0	
No. Lanes	2		2		2		1	
Opposing-Lanes	2		2		1		2	
Conflicting-lanes	2		2		2		2	
Geometry group	5		5		5		4b	

Duration, T 0.25 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	154	146	116	122	281	26	259	
Left-Turn	40	0	11	0	34	0	30	
Right-Turn	0	31	0	17	0	26	40	
Prop. Left-Turns	0.3	0.0	0.1	0.0	0.1	0.0	0.1	
Prop. Right-Turns	0.0	0.2	0.0	0.1	0.0	1.0	0.2	
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Geometry Group	5		5		5		4b	
Adjustments Exhibit 17-33:								
hLT-adj	0.5		0.5		0.5		0.2	

hRT-adj		-0.7		-0.7		-0.7		-0.6
hHV-adj		1.7		1.7		1.7		1.7
hadj, computed	0.1	-0.1	0.0	-0.1	0.1	-0.7	-0.1	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	154	146	116	122	281	26	259	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.14	0.13	0.10	0.11	0.25	0.02	0.23	
hd, final value	6.95	6.67	6.99	6.84	6.70	5.93	6.60	
x, final value	0.30	0.27	0.23	0.23	0.52	0.04	0.48	
Move-up time, m	2.3		2.3		2.3		2.3	
Service Time	4.7	4.4	4.7	4.5	4.4	3.6	4.3	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	154	146	116	122	281	26	259	
Service Time	4.7	4.4	4.7	4.5	4.4	3.6	4.3	
Utilization, x	0.30	0.27	0.23	0.23	0.52	0.04	0.48	
Dep. headway, hd	6.95	6.67	6.99	6.84	6.70	5.93	6.60	
Capacity	404	396	366	372	514	276	509	
Delay	12.57	11.83	11.71	11.59	16.50	8.90	15.14	
LOS	B	B	B	B	C	A	C	
Approach:								
Delay	12.21		11.65		15.85		15.14	
LOS	B		B		C		C	
Intersection Delay	13.79		Intersection LOS		B			

HCS+: Unsignalized Intersections Release 5.2

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ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: Chidi Onumonu
Agency/Co.: Albert Wilson & Associates
Date Performed: 4/10/14
Analysis Time Period: PM Peak Hour
Intersection: Randall Ave @ Palmetto Ave
Jurisdiction: County of San Bernardino
Units: U. S. Customary
Analysis Year: 2017 Opening Year w Proj
Project ID: Intersection # 8
East/West Street: Randall Avenue
North/South Street: Palmetto Ave

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	36	211	28	11	204	16	32	234	25	29	186	39
% Thrus Left Lane		50			50							

	Eastbound		Westbound		Northbound		Southbound
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	TR	LT	TR	LT	R	LTR	
PHF	0.88	0.88	0.92	0.92	0.93	0.93	0.96	
Flow Rate	159	151	121	127	285	26	263	
% Heavy Veh	0	0	0	0	0	0	0	
No. Lanes	2		2		2		1	
Opposing-Lanes	2		2		1		2	
Conflicting-lanes	2		2		2		2	
Geometry group	5		5		5		4b	

Duration, T 0.25 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	159	151	121	127	285	26	263	
Left-Turn	40	0	11	0	34	0	30	
Right-Turn	0	31	0	17	0	26	40	
Prop. Left-Turns	0.3	0.0	0.1	0.0	0.1	0.0	0.1	
Prop. Right-Turns	0.0	0.2	0.0	0.1	0.0	1.0	0.2	
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Geometry Group	5		5		5		4b	
Adjustments Exhibit 17-33:								
hLT-adj	0.5		0.5		0.5		0.2	

hRT-adj		-0.7		-0.7		-0.7		-0.6
hHV-adj		1.7		1.7		1.7		1.7
hadj, computed	0.1	-0.1	0.0	-0.1	0.1	-0.7	-0.1	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	159	151	121	127	285	26	263	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.14	0.13	0.11	0.11	0.25	0.02	0.23	
hd, final value	7.03	6.76	7.07	6.93	6.79	6.02	6.69	
x, final value	0.31	0.28	0.24	0.24	0.54	0.04	0.49	
Move-up time, m		2.3		2.3		2.3		2.3
Service Time	4.7	4.5	4.8	4.6	4.5	3.7	4.4	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	159	151	121	127	285	26	263	
Service Time	4.7	4.5	4.8	4.6	4.5	3.7	4.4	
Utilization, x	0.31	0.28	0.24	0.24	0.54	0.04	0.49	
Dep. headway, hd	7.03	6.76	7.07	6.93	6.79	6.02	6.69	
Capacity	409	401	371	377	507	276	512	
Delay	12.86	12.11	11.96	11.85	17.10	9.00	15.63	
LOS	B	B	B	B	C	A	C	
Approach:								
Delay		12.50		11.90		16.42		15.63
LOS		B		B		C		C
Intersection Delay	14.17		Intersection LOS		B			

HCS+: Unsignalized Intersections Release 5.2

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ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: Chidi Onumonu
Agency/Co.: Albert Wilson & Associates
Date Performed: 6/29/2010
Analysis Time Period: PM Peak Hour
Intersection: Randall Ave @ Palmetto Ave
Jurisdiction: County of San Bernardino
Units: U. S. Customary
Analysis Year: General Plan 2035 Buildout w/o
Project ID: Intersection # 8
East/West Street: Randall Avenue
North/South Street: Palmetto Ave

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	44	199	33	13	189	19	38	258	29	33	201	46
% Thrus Left Lane		50			50							

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	TR	LT	TR	LT	R	LTR	
PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Flow Rate	150	139	111	120	311	30	293	
% Heavy Veh	0	0	0	0	0	0	0	
No. Lanes	2		2		2		1	
Opposing-Lanes	2		2		1		2	
Conflicting-lanes	2		2		2		2	
Geometry group	5		5		5		4b	

Duration, T 0.25 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	150	139	111	120	311	30	293	
Left-Turn	46	0	13	0	40	0	34	
Right-Turn	0	34	0	20	0	30	48	
Prop. Left-Turns	0.3	0.0	0.1	0.0	0.1	0.0	0.1	
Prop. Right-Turns	0.0	0.2	0.0	0.2	0.0	1.0	0.2	
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Geometry Group	5		5		5		4b	
Adjustments Exhibit 17-33:								
hLT-adj	0.5		0.5		0.5		0.2	

hRT-adj		-0.7		-0.7		-0.7		-0.6
hHV-adj		1.7		1.7		1.7		1.7
hadj, computed	0.2	-0.2	0.1	-0.1	0.1	-0.7	-0.1	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	150	139	111	120	311	30	293	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.13	0.12	0.10	0.11	0.28	0.03	0.26	
hd, final value	7.23	6.90	7.25	7.07	6.78	6.01	6.68	
x, final value	0.30	0.27	0.22	0.24	0.59	0.05	0.54	
Move-up time, m		2.3		2.3		2.3		2.3
Service Time	4.9	4.6	5.0	4.8	4.5	3.7	4.4	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	150	139	111	120	311	30	293	
Service Time	4.9	4.6	5.0	4.8	4.5	3.7	4.4	
Utilization, x	0.30	0.27	0.22	0.24	0.59	0.05	0.54	
Dep. headway, hd	7.23	6.90	7.25	7.07	6.78	6.01	6.68	
Capacity	400	389	361	370	510	280	516	
Delay	13.01	12.08	12.03	11.94	18.64	9.03	17.05	
LOS	B	B	B	B	C	A	C	
Approach:								
Delay		12.57		11.99		17.79		17.05
LOS		B		B		C		C
Intersection Delay 15.13				Intersection LOS C				

HCS+: Unsignalized Intersections Release 5.2

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ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: Chidi Onumonu
Agency/Co.: Albert Wilson & Associates
Date Performed: 4/10/14
Analysis Time Period: PM Peak Hour
Intersection: Randall Ave @ Palmetto Ave
Jurisdiction: County of San Bernardino
Units: U. S. Customary
Analysis Year: General Plan 2035 Buildout w
Project ID: Intersection # 8
East/West Street: Randall Avenue
North/South Street: Palmetto Ave

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	44	244	33	13	235	19	38	276	29	33	219	46
% Thrus Left Lane		50			50							

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	TR	LT	TR	LT	R	LTR	
PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Flow Rate	174	162	136	144	330	30	312	
% Heavy Veh	0	0	0	0	0	0	0	
No. Lanes	2		2		2		1	
Opposing-Lanes	2		2		1		2	
Conflicting-lanes	2		2		2		2	
Geometry group	5		5		5		4b	

Duration, T 0.25 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	174	162	136	144	330	30	312	
Left-Turn	46	0	13	0	40	0	34	
Right-Turn	0	34	0	20	0	30	48	
Prop. Left-Turns	0.3	0.0	0.1	0.0	0.1	0.0	0.1	
Prop. Right-Turns	0.0	0.2	0.0	0.1	0.0	1.0	0.2	
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Geometry Group	5		5		5		4b	
Adjustments Exhibit 17-33:								
hLT-adj	0.5		0.5		0.5		0.2	

hRT-adj		-0.7		-0.7		-0.7		-0.6
hHV-adj		1.7		1.7		1.7		1.7
hadj, computed	0.1	-0.1	0.0	-0.1	0.1	-0.7	-0.1	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	174	162	136	144	330	30	312	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.15	0.14	0.12	0.13	0.29	0.03	0.28	
hd, final value	7.65	7.36	7.68	7.53	7.27	6.50	7.15	
x, final value	0.37	0.33	0.29	0.30	0.67	0.05	0.62	
Move-up time, m		2.3		2.3		2.3		2.3
Service Time	5.3	5.1	5.4	5.2	5.0	4.2	4.9	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	174	162	136	144	330	30	312	
Service Time	5.3	5.1	5.4	5.2	5.0	4.2	4.9	
Utilization, x	0.37	0.33	0.29	0.30	0.67	0.05	0.62	
Dep. headway, hd	7.65	7.36	7.68	7.53	7.27	6.50	7.15	
Capacity	424	412	386	394	478	280	483	
Delay	14.76	13.66	13.50	13.45	23.34	9.58	20.82	
LOS	B	B	B	B	C	A	C	
Approach:								
Delay		14.23		13.47		22.19		20.82
LOS		B		B		C		C
Intersection Delay 17.89				Intersection LOS C				

WEBSTER

WEbster Based Signal Timing Evaluation Routine

For Capacity and Level of Service Analysis Using HCM 2000 Control Delay

Existing Traffic with Existing Lane Geometrics

Randall Ave @ Alder Ave | **Albert Wilson & Associate** | **PM Peak Hour**

Input

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	*L*	*T*	R	L	T	R	L	T	R	*L*	*T*	R
Movement 1: 10 secs	X			X								
Movement 2: 20 secs		X	X		X	X						
Movement 3: 10 secs							X			X		
Movement 4: 20 secs								X	X		X	X
Movement 5: 0 secs												
Movement 6: 0 secs												
# of Lanes (#, S, P)	1	2	S	1	2	S	1	2	S	1	2	S
Unadjusted Volume	39	121	29	16	103	37	27	254	20	37	249	39
Peak Hour Factor (PHF)	0.86	0.86	0.86	0.85	0.85	0.85	0.85	0.85	0.85	0.87	0.87	0.87
Growth Factor (%)												
Project Trip Volume (vph)												
Sat. Flow Override (vph)			Shrd			Shrd			Shrd			Shrd
Min. Time or Ped. Time	10	20	20	10	20	20	10	20	20	10	20	20
Permissive Veh/Cycle												
Progression Adj. Factor (PAF)	1.00	1.00	-	1.00	1.00	-	1.00	1.00	-	1.00	1.00	-

Parameter Values (using default set 'SANBAG (Existing)')

	Other	Default
Duration of Peak Period (min)		15
Lost Time (sec)		2
Min. Time (Left Turns, sec)		10
Min/Ped Time (Thru Lanes, sec)		20
Sat Flow (1 Left lane, vphg)	1700	1800
Sat Flow (2 Left lanes, vphg)	3200	3500
Sat Flow (1 Thru lane, vphg)	1800	1900
Sat Flow (1 Right lane, vphg)		1800
Vehicle Length (feet)		20

Output

	***	***								***	***	
Pk. Hr. Vol. (vph)	45	141	34	19	121	44	32	299	24	43	286	45
Saturation Flow (vph)	1700	3600	Shrd	1700	3600	Shrd	1700	3600	Shrd	1700	3600	Shrd
X or V/C	0.20	0.16	-	0.08	0.15	-	0.14	0.30	-	0.19	0.31	-
Effective green (sec)	8	18	-	8	18	-	8	18	-	8	18	-
Split Time (sec)	10	20	-	10	20	-	10	20	-	10	20	-
Min. Time or Ped. Time (sec)	10	20	-	10	20	-	10	20	-	10	20	-
Delay - 15 min pk (sec/veh)	25	16	-	24	16	-	24	17	-	25	17	-
Level of Service (LOS)	C	B	-	C+	B	-	C+	B	-	C+	B	-
Average 'Q' (veh/ln)	1	1	-	1	1	-	1	2	-	1	2	-
Design 'Q'- ft/ln	40	40	-	40	40	-	40	60	-	40	60	-
Do Vehicles Clear?	YES	YES	-	YES	YES	-	YES	YES	-	YES	YES	-

Summary

Whole Intersection

Weighted Avg Delay (sec) = 17
Level of Service - LOS = B

Critical Movements

Weighted Avg Delay (sec) = 18
Level of Service - LOS = B
Intersection Capacity Utilization - ICU = 0.22

Required Cycle Length is 60 sec

Min./Ped. Times Satisfied

WEBSTER

WEbster Based Signal Timing Evaluation Routine

For Capacity and Level of Service Analysis Using HCM 2000 Control Delay

Project 2015 Opening Day Conditions w/o proj traffic

Randall Ave @ Alder Ave | **Albert Wilson & Associate** | **PM Peak Hour**

Input

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	*L*	*T*	R	L	T	R	L	T	R	*L*	*T*	R
Movement 1: **10** secs	X			X								
Movement 2: **20** secs		X	X		X	X						
Movement 3: **10** secs							X			X		
Movement 4: **20** secs								X	X		X	X
Movement 5: **0** secs												
Movement 6: **0** secs												
# of Lanes (#, S, P)	**1**	**2**	S	1	2	S	1	2	S	**1**	**2**	S
Unadjusted Volume	**39**	**121**	29	16	103	37	27	254	20	**37**	**249**	39
Peak Hour Factor (PHF)	**0.86**	**0.86**	0.86	0.85	0.85	0.85	0.85	0.85	0.85	**0.87**	**0.87**	0.87
Growth Factor (%)	**5**	**5**	5	5	5	5	5	5	5	**5**	**5**	5
Project Trip Volume (vph)												
Sat. Flow Override (vph)			Shrd			Shrd			Shrd			Shrd
Min. Time or Ped. Time	**10**	**20**	20	10	20	20	10	20	20	**10**	**20**	20
Permissive Veh/Cycle												
Progression Adj. Factor (PAF)	**1.00**	**1.00**	-	1.00	1.00	-	1.00	1.00	-	**1.00**	**1.00**	-

Parameter Values (using default set 'SANBAG (Existing)')

	Other	Default
Duration of Peak Period (min)		15
Lost Time (sec)		2
Min. Time (Left Turns, sec)		10
Min/Ped Time (Thru Lanes, sec)		20
Sat Flow (1 Left lane, vphg)	1700	1800
Sat Flow (2 Left lanes, vphg)	3200	3500
Sat Flow (1 Thru lane, vphg)	1800	1900
Sat Flow (1 Right lane, vphg)		1800
Vehicle Length (feet)		20

Output

	***	***								***	***	
Pk. Hr. Vol. (vph)	**48**	**148**	35	20	127	46	33	314	25	**45**	**301**	47
Saturation Flow (vph)	**1700**	**3600**	Shrd	1700	3600	Shrd	1700	3600	Shrd	**1700**	**3600**	Shrd
X or V/C	**0.21**	**0.17**	-	0.09	0.16	-	0.15	0.31	-	**0.20**	**0.32**	-
Effective green (sec)	**8**	**18**	-	8	18	-	8	18	-	**8**	**18**	-
Split Time (sec)	**10**	**20**	-	10	20	-	10	20	-	**10**	**20**	-
Min. Time or Ped. Time (sec)	**10**	**20**	-	10	20	-	10	20	-	**10**	**20**	-
Delay - 15 min pk (sec/veh)	**25**	**16**	-	24	16	-	24	17	-	**25**	**17**	-
Level of Service (LOS)	**C**	**B**	-	C+	B	-	C+	B	-	**C**	**B**	-
Average 'Q' (veh/ln)	**1**	**1**	-	1	1	-	1	2	-	**1**	**2**	-
Design 'Q'- ft/ln	**40**	**40**	-	40	40	-	40	60	-	**40**	**60**	-
Do Vehicles Clear?	**YES**	**YES**	-	YES	YES	-	YES	YES	-	**YES**	**YES**	-

Summary

Whole Intersection

Weighted Avg Delay (sec) = 18
Level of Service - LOS = B

Critical Movements

Weighted Avg Delay (sec) = 18
Level of Service - LOS = B
Intersection Capacity Utilization - ICU = 0.23

Required Cycle Length is 60 sec

Min./Ped. Times Satisfied

WEBSTER

WEbster Based Signal Timing Evaluation Routine

For Capacity and Level of Service Analysis Using HCM 2000 Control Delay

Project 2015 Opening Day Conditions w proj traffic

Randall Ave @ Alder Ave | **Albert Wilson & Associate** | **PM Peak Hour**

Input

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	*L*	*T*	R	L	T	R	*L*	T	R	L	*T*	R
Movement 1: **10** secs	X			X								
Movement 2: **20** secs		X	X		X	X						
Movement 3: **10** secs							X			X		
Movement 4: **20** secs								X	X		X	X
Movement 5: **0** secs												
Movement 6: **0** secs												
# of Lanes (#, S, P)	**1**	**2**	S	1	2	S	**1**	2	S	1	**2**	S
Unadjusted Volume	**39**	**121**	29	16	103	37	**27**	254	20	37	**249**	39
Peak Hour Factor (PHF)	**0.86**	**0.86**	0.86	0.85	0.85	0.85	**0.85**	0.85	0.85	0.87	**0.87**	0.87
Growth Factor (%)	**5**	**5**	5	5	5	5	**5**	5	5	5	**5**	5
Project Trip Volume (vph)			37		22		**14**	42			**63**	
Sat. Flow Override (vph)			Shrd			Shrd			Shrd			Shrd
Min. Time or Ped. Time	**10**	**20**	20	10	20	20	**10**	20	20	10	**20**	20
Permissive Veh/Cycle												
Progression Adj. Factor (PAF)	**1.00**	**1.00**	-	1.00	1.00	-	**1.00**	1.00	-	1.00	**1.00**	-

Parameter Values (using default set 'SANBAG (Existing)')

	Other	Default
Duration of Peak Period (min)		15
Lost Time (sec)		2
Min. Time (Left Turns, sec)		10
Min/Ped Time (Thru Lanes, sec)		20
Sat Flow (1 Left lane, vphg)	1700	1800
Sat Flow (2 Left lanes, vphg)	3200	3500
Sat Flow (1 Thru lane, vphg)	1800	1900
Sat Flow (1 Right lane, vphg)		1800
Vehicle Length (feet)		20

Output

	***	***					***				***	
Pk. Hr. Vol. (vph)	**48**	**148**	72	20	149	46	**47**	356	25	45	**364**	47
Saturation Flow (vph)	**1700**	**3600**	Shrd	1700	3600	Shrd	**1700**	3600	Shrd	1700	**3600**	Shrd
X or V/C	**0.21**	**0.20**	-	0.09	0.18	-	**0.21**	0.35	-	0.20	**0.38**	-
Effective green (sec)	**8**	**18**	-	8	18	-	**8**	18	-	8	**18**	-
Split Time (sec)	**10**	**20**	-	10	20	-	**10**	20	-	10	**20**	-
Min. Time or Ped. Time (sec)	**10**	**20**	-	10	20	-	**10**	20	-	10	**20**	-
Delay - 15 min pk (sec/veh)	**25**	**16**	-	24	16	-	**25**	17	-	25	**18**	-
Level of Service (LOS)	**C**	**B**	-	C+	B	-	**C**	B	-	C	**B**	-
Average 'Q' (veh/ln)	**1**	**1**	-	1	1	-	**1**	2	-	1	**2**	-
Design 'Q'- ft/ln	**40**	**40**	-	40	40	-	**40**	60	-	40	**60**	-
Do Vehicles Clear?	**YES**	**YES**	-	YES	YES	-	**YES**	YES	-	YES	**YES**	-

Summary

Whole Intersection

Weighted Avg Delay (sec) = 18
Level of Service - LOS = B

Critical Movements

Weighted Avg Delay (sec) = 18
Level of Service - LOS = B
Intersection Capacity Utilization - ICU = 0.27

Required Cycle Length is 60 sec

Min./Ped. Times Satisfied

WEBSTER

WEbster Based Signal Timing Evaluation Routine

For Capacity and Level of Service Analysis Using HCM 2000 Control Delay

Project Phase 2 2017 Opening Day Conditions w/o proj

Randall Ave @ Alder Ave | **Albert Wilson & Associate** | **PM Peak Hour**

Input

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	*L*	*T*	R	L	T	R	*L*	T	R	L	*T*	R
Movement 1: **10** secs	X			X								
Movement 2: **20** secs		X	X		X	X						
Movement 3: **10** secs							X			X		
Movement 4: **20** secs								X	X		X	X
Movement 5: **0** secs												
Movement 6: **0** secs												
# of Lanes (#, S, P)	**1**	**2**	S	1	2	S	**1**	2	S	1	**2**	S
Unadjusted Volume	**39**	**121**	29	16	103	37	**27**	254	20	37	**249**	39
Peak Hour Factor (PHF)	**0.86**	**0.86**	0.86	0.85	0.85	0.85	**0.85**	0.85	0.85	0.87	**0.87**	0.87
Growth Factor (%)	**7**	**7**	7	7	7	7	**7**	7	7	7	**7**	7
Project Trip Volume (vph)			37		22		**14**	42			**63**	
Sat. Flow Override (vph)			Shrd			Shrd			Shrd			Shrd
Min. Time or Ped. Time	**10**	**20**	20	10	20	20	**10**	20	20	10	**20**	20
Permissive Veh/Cycle												
Progression Adj. Factor (PAF)	**1.00**	**1.00**	-	1.00	1.00	-	**1.00**	1.00	-	1.00	**1.00**	-

Parameter Values (using default set 'SANBAG (Existing)')

	Other	Default
Duration of Peak Period (min)		15
Lost Time (sec)		2
Min. Time (Left Turns, sec)		10
Min/Ped Time (Thru Lanes, sec)		20
Sat Flow (1 Left lane, vphg)	1700	1800
Sat Flow (2 Left lanes, vphg)	3200	3500
Sat Flow (1 Thru lane, vphg)	1800	1900
Sat Flow (1 Right lane, vphg)		1800
Vehicle Length (feet)		20

Output

	***	***					***				***	
Pk. Hr. Vol. (vph)	**49**	**151**	73	20	152	47	**48**	362	25	46	**369**	48
Saturation Flow (vph)	**1700**	**3600**	Shrd	1700	3600	Shrd	**1700**	3600	Shrd	1700	**3600**	Shrd
X or V/C	**0.22**	**0.21**	-	0.09	0.18	-	**0.21**	0.36	-	0.20	**0.39**	-
Effective green (sec)	**8**	**18**	-	8	18	-	**8**	18	-	8	**18**	-
Split Time (sec)	**10**	**20**	-	10	20	-	**10**	20	-	10	**20**	-
Min. Time or Ped. Time (sec)	**10**	**20**	-	10	20	-	**10**	20	-	10	**20**	-
Delay - 15 min pk (sec/veh)	**25**	**16**	-	24	16	-	**25**	17	-	25	**18**	-
Level of Service (LOS)	**C**	**B**	-	C+	B	-	**C**	B	-	C	**B**	-
Average 'Q' (veh/ln)	**1**	**1**	-	1	1	-	**1**	2	-	1	**2**	-
Design 'Q'- ft/ln	**40**	**40**	-	40	40	-	**40**	60	-	40	**60**	-
Do Vehicles Clear?	**YES**	**YES**	-	YES	YES	-	**YES**	YES	-	YES	**YES**	-

Summary

Whole Intersection

Weighted Avg Delay (sec) = 18
Level of Service - LOS = B

Critical Movements

Weighted Avg Delay (sec) = 18
Level of Service - LOS = B
Intersection Capacity Utilization - ICU = 0.27

Required Cycle Length is 60 sec

Min./Ped. Times Satisfied

WEBSTER

WEbster Based Signal Timing Evaluation Routine

For Capacity and Level of Service Analysis Using HCM 2000 Control Delay

Project Phase 2 2017 Opening Day Conditions w proj tr

Randall Ave @ Alder Ave | **Albert Wilson & Associate** | **PM Peak Hour**

Input

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	*L*	*T*	R	L	T	R	*L*	T	R	L	*T*	R
Movement 1: **10** secs	X			X								
Movement 2: **20** secs		X	X		X	X						
Movement 3: **10** secs							X			X		
Movement 4: **20** secs								X	X		X	X
Movement 5: **0** secs												
Movement 6: **0** secs												
# of Lanes (#, S, P)	**1**	**2**	S	1	2	S	**1**	2	S	1	**2**	S
Unadjusted Volume	**39**	**121**	29	16	103	37	**27**	254	20	37	**249**	39
Peak Hour Factor (PHF)	**0.86**	**0.86**	0.86	0.85	0.85	0.85	**0.85**	0.85	0.85	0.87	**0.87**	0.87
Growth Factor (%)	**7**	**7**	7	7	7	7	**7**	7	7	7	**7**	7
Project Trip Volume (vph)			46		28		**18**	53			**79**	
Sat. Flow Override (vph)			Shrd			Shrd			Shrd			Shrd
Min. Time or Ped. Time	**10**	**20**	20	10	20	20	**10**	20	20	10	**20**	20
Permissive Veh/Cycle												
Progression Adj. Factor (PAF)	**1.00**	**1.00**	-	1.00	1.00	-	**1.00**	1.00	-	1.00	**1.00**	-

Parameter Values (using default set 'SANBAG (Existing)')

	Other	Default
Duration of Peak Period (min)		15
Lost Time (sec)		2
Min. Time (Left Turns, sec)		10
Min/Ped Time (Thru Lanes, sec)		20
Sat Flow (1 Left lane, vphg)	1700	1800
Sat Flow (2 Left lanes, vphg)	3200	3500
Sat Flow (1 Thru lane, vphg)	1800	1900
Sat Flow (1 Right lane, vphg)		1800
Vehicle Length (feet)		20

Output

	***	***					***				***	
Pk. Hr. Vol. (vph)	**49**	**151**	82	20	158	47	**52**	373	25	46	**385**	48
Saturation Flow (vph)	**1700**	**3600**	Shrd	1700	3600	Shrd	**1700**	3600	Shrd	1700	**3600**	Shrd
X or V/C	**0.22**	**0.22**	-	0.09	0.19	-	**0.23**	0.37	-	0.20	**0.40**	-
Effective green (sec)	**8**	**18**	-	8	18	-	**8**	18	-	8	**18**	-
Split Time (sec)	**10**	**20**	-	10	20	-	**10**	20	-	10	**20**	-
Min. Time or Ped. Time (sec)	**10**	**20**	-	10	20	-	**10**	20	-	10	**20**	-
Delay - 15 min pk (sec/veh)	**25**	**16**	-	24	16	-	**26**	17	-	25	**18**	-
Level of Service (LOS)	**C**	**B**	-	C+	B	-	**C**	B	-	C	**B**	-
Average 'Q' (veh/ln)	**1**	**1**	-	1	1	-	**1**	2	-	1	**3**	-
Design 'Q'- ft/ln	**40**	**40**	-	40	40	-	**40**	60	-	40	**100**	-
Do Vehicles Clear?	**YES**	**YES**	-	YES	YES	-	**YES**	YES	-	YES	**YES**	-

Summary

Whole Intersection

Weighted Avg Delay (sec) = 18
Level of Service - LOS = B

Critical Movements

Weighted Avg Delay (sec) = 18
Level of Service - LOS = B
Intersection Capacity Utilization - ICU = 0.28

Required Cycle Length is 60 sec

Min./Ped. Times Satisfied

WEBSTER

WEbster Based Signal Timing Evaluation Routine

For Capacity and Level of Service Analysis Using HCM 2000 Control Delay

Project Phase 2 2017 Opening Day Conditions w proj tr

Randall Ave @ Alder Ave | **Albert Wilson & Associate** | **PM Peak Hour**

Input

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	*L*	*T*	R	L	T	R	*L*	T	R	L	*T*	R
Movement 1: **10** secs	X			X								
Movement 2: **20** secs		X	X		X	X						
Movement 3: **10** secs							X			X		
Movement 4: **20** secs								X	X		X	X
Movement 5: **0** secs												
Movement 6: **0** secs												
# of Lanes (#, S, P)	**1**	**2**	S	1	2	S	**1**	2	S	1	**2**	S
Unadjusted Volume	**39**	**121**	29	16	103	37	**27**	254	20	37	**249**	39
Peak Hour Factor (PHF)	**0.86**	**0.86**	0.86	0.85	0.85	0.85	**0.85**	0.85	0.85	0.87	**0.87**	0.87
Growth Factor (%)	**7**	**7**	7	7	7	7	**7**	7	7	7	**7**	7
Project Trip Volume (vph)			46		27		**17**	51			**77**	
Sat. Flow Override (vph)			Shrd			Shrd			Shrd			Shrd
Min. Time or Ped. Time	**10**	**20**	20	10	20	20	**10**	20	20	10	**20**	20
Permissive Veh/Cycle												
Progression Adj. Factor (PAF)	**1.00**	**1.00**	-	1.00	1.00	-	**1.00**	1.00	-	1.00	**1.00**	-

Parameter Values (using default set 'SANBAG (Existing)')

	Other	Default
Duration of Peak Period (min)		15
Lost Time (sec)		2
Min. Time (Left Turns, sec)		10
Min/Ped Time (Thru Lanes, sec)		20
Sat Flow (1 Left lane, vphg)	1700	1800
Sat Flow (2 Left lanes, vphg)	3200	3500
Sat Flow (1 Thru lane, vphg)	1800	1900
Sat Flow (1 Right lane, vphg)		1800
Vehicle Length (feet)		20

Output

	***	***					***				***	
Pk. Hr. Vol. (vph)	**49**	**151**	82	20	157	47	**51**	371	25	46	**383**	48
Saturation Flow (vph)	**1700**	**3600**	Shrd	1700	3600	Shrd	**1700**	3600	Shrd	1700	**3600**	Shrd
X or V/C	**0.22**	**0.22**	-	0.09	0.19	-	**0.23**	0.37	-	0.20	**0.40**	-
Effective green (sec)	**8**	**18**	-	8	18	-	**8**	18	-	8	**18**	-
Split Time (sec)	**10**	**20**	-	10	20	-	**10**	20	-	10	**20**	-
Min. Time or Ped. Time (sec)	**10**	**20**	-	10	20	-	**10**	20	-	10	**20**	-
Delay - 15 min pk (sec/veh)	**25**	**16**	-	24	16	-	**26**	17	-	25	**18**	-
Level of Service (LOS)	**C**	**B**	-	C+	B	-	**C**	B	-	C	**B**	-
Average 'Q' (veh/ln)	**1**	**1**	-	1	1	-	**1**	2	-	1	**3**	-
Design 'Q'- ft/ln	**40**	**40**	-	40	40	-	**40**	60	-	40	**100**	-
Do Vehicles Clear?	**YES**	**YES**	-	YES	YES	-	**YES**	YES	-	YES	**YES**	-

Summary

Whole Intersection

Weighted Avg Delay (sec) = 18
Level of Service - LOS = B

Critical Movements

Weighted Avg Delay (sec) = 18
Level of Service - LOS = B
Intersection Capacity Utilization - ICU = 0.28

Required Cycle Length is 60 sec

Min./Ped. Times Satisfied

WEBSTER

WEbster Based Signal Timing Evaluation Routine

For Capacity and Level of Service Analysis Using HCM 2000 Control Delay

Future 2035 without Project Traffic

Randall Ave @ Alder Ave | **Albert Wilson & Associate** | **PM Peak Hour**

Input

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	*L*	*T*	R	L	T	R	L	T	R	*L*	*T*	R
Movement 1: **10** secs	X			X								
Movement 2: **20** secs		X	X		X	X						
Movement 3: **10** secs							X			X		
Movement 4: **20** secs								X	X		X	X
Movement 5: **0** secs												
Movement 6: **0** secs												
# of Lanes (#, S, P)	**1**	**2**	S	1	2	S	1	2	S	**1**	**2**	S
Unadjusted Volume	**50**	**155**	37	21	132	47	35	326	26	**47**	**319**	50
Peak Hour Factor (PHF)	**0.95**	**0.95**	0.95	0.95	0.95	0.95	0.95	0.95	0.95	**0.95**	**0.95**	0.95
Growth Factor (%)												
Project Trip Volume (vph)												
Sat. Flow Override (vph)			Shrd			Shrd			Shrd			Shrd
Min. Time or Ped. Time	**10**	**20**	20	10	20	20	10	20	20	**10**	**20**	20
Permissive Veh/Cycle												
Progression Adj. Factor (PAF)	**1.00**	**1.00**	-	1.00	1.00	-	1.00	1.00	-	**1.00**	**1.00**	-

Parameter Values (using default set 'SANBAG (Future)')

	Other	Default
Duration of Peak Period (min)		15
Lost Time (sec)		2
Min. Time (Left Turns, sec)		10
Min/Ped Time (Thru Lanes, sec)		20
Sat Flow (1 Left lane, vphg)		1800
Sat Flow (2 Left lanes, vphg)	3400	3500
Sat Flow (1 Thru lane, vphg)		1900
Sat Flow (1 Right lane, vphg)	1900	1800
Vehicle Length (feet)		20

Output

	***	***								***	***	
Pk. Hr. Vol. (vph)	**53**	**163**	39	22	139	49	37	343	27	**49**	**336**	53
Saturation Flow (vph)	**1800**	**3800**	Shrd	1800	3800	Shrd	1800	3800	Shrd	**1800**	**3800**	Shrd
X or V/C	**0.22**	**0.18**	-	0.09	0.16	-	0.15	0.32	-	**0.20**	**0.34**	-
Effective green (sec)	**8**	**18**	-	8	18	-	8	18	-	**8**	**18**	-
Split Time (sec)	**10**	**20**	-	10	20	-	10	20	-	**10**	**20**	-
Min. Time or Ped. Time (sec)	**10**	**20**	-	10	20	-	10	20	-	**10**	**20**	-
Delay - 15 min pk (sec/veh)	**25**	**16**	-	24	16	-	24	17	-	**25**	**17**	-
Level of Service (LOS)	**C**	**B**	-	C+	B	-	C+	B	-	**C**	**B**	-
Average 'Q' (veh/ln)	**1**	**1**	-	1	1	-	1	2	-	**1**	**2**	-
Design 'Q'- ft/ln	**40**	**40**	-	40	40	-	40	60	-	**40**	**60**	-
Do Vehicles Clear?	**YES**	**YES**	-	YES	YES	-	YES	YES	-	**YES**	**YES**	-

Summary

Whole Intersection

Weighted Avg Delay (sec) = 18
Level of Service - LOS = B

Critical Movements

Weighted Avg Delay (sec) = 18
Level of Service - LOS = B
Intersection Capacity Utilization - ICU = 0.24

Required Cycle Length is 60 sec

Min./Ped. Times Satisfied

WEBSTER

WEbster Based Signal Timing Evaluation Routine

For Capacity and Level of Service Analysis Using HCM 2000 Control Delay

Future with Project Traffic

Randall Ave @ Alder Ave | **Albert Wilson & Associate** | **PM Peak Hour**

Input

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	*L*	*T*	R	L	T	R	*L*	T	R	L	*T*	R
Movement 1: **10** secs	X			X								
Movement 2: **20** secs		X	X		X	X						
Movement 3: **10** secs							X			X		
Movement 4: **20** secs								X	X		X	X
Movement 5: **0** secs												
Movement 6: **0** secs												
# of Lanes (#, S, P)	**1**	**2**	S	1	2	S	**1**	2	S	1	**2**	S
Unadjusted Volume	**50**	**155**	37	21	132	47	**35**	326	26	47	**319**	50
Peak Hour Factor (PHF)	**0.95**	**0.95**	0.95	0.95	0.95	0.95	**0.95**	0.95	0.95	0.95	**0.95**	0.95
Growth Factor (%)												
Project Trip Volume (vph)			46		28		**18**	53			**79**	
Sat. Flow Override (vph)			Shrd			Shrd			Shrd			Shrd
Min. Time or Ped. Time	**10**	**20**	20	10	20	20	**10**	20	20	10	**20**	20
Permissive Veh/Cycle												
Progression Adj. Factor (PAF)	**1.00**	**1.00**	-	1.00	1.00	-	**1.00**	1.00	-	1.00	**1.00**	-

Parameter Values (using default set 'SANBAG (Future)')

	Other	Default
Duration of Peak Period (min)		15
Lost Time (sec)		2
Min. Time (Left Turns, sec)		10
Min/Ped Time (Thru Lanes, sec)		20
Sat Flow (1 Left lane, vphg)		1800
Sat Flow (2 Left lanes, vphg)	3400	3500
Sat Flow (1 Thru lane, vphg)		1900
Sat Flow (1 Right lane, vphg)	1900	1800
Vehicle Length (feet)		20

Output

	***	***					***				***	
Pk. Hr. Vol. (vph)	**53**	**163**	85	22	167	49	**55**	396	27	49	**415**	53
Saturation Flow (vph)	**1800**	**3800**	Shrd	1800	3800	Shrd	**1800**	3800	Shrd	1800	**3800**	Shrd
X or V/C	**0.22**	**0.22**	-	0.09	0.19	-	**0.23**	0.37	-	0.20	**0.41**	-
Effective green (sec)	**8**	**18**	-	8	18	-	**8**	18	-	8	**18**	-
Split Time (sec)	**10**	**20**	-	10	20	-	**10**	20	-	10	**20**	-
Min. Time or Ped. Time (sec)	**10**	**20**	-	10	20	-	**10**	20	-	10	**20**	-
Delay - 15 min pk (sec/veh)	**25**	**16**	-	24	16	-	**25**	17	-	25	**18**	-
Level of Service (LOS)	**C**	**B**	-	C+	B	-	**C**	B	-	C	**B**	-
Average 'Q' (veh/ln)	**1**	**1**	-	1	1	-	**1**	2	-	1	**3**	-
Design 'Q'- ft/ln	**40**	**40**	-	40	40	-	**40**	60	-	40	**100**	-
Do Vehicles Clear?	**YES**	**YES**	-	YES	YES	-	**YES**	YES	-	YES	**YES**	-

Summary

Whole Intersection

Weighted Avg Delay (sec) = 18
Level of Service - LOS = B

Critical Movements

Weighted Avg Delay (sec) = 18
Level of Service - LOS = B
Intersection Capacity Utilization - ICU = 0.29

Required Cycle Length is 60 sec

Min./Ped. Times Satisfied

HCS+: Unsignalized Intersections Release 5.2

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ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: Chidi Onumonu
Agency/Co.: Albert Wilson & Associates
Date Performed: 6/29/2010
Analysis Time Period: PM Peak Hr
Intersection: Randall Ave @ locust Ave
Jurisdiction: County of San Bernardino
Units: U. S. Customary
Analysis Year: 2010- Existing Condition
Project ID: Intersection # 10
East/West Street: Randall Ave
North/South Street: Locust Avenue

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	29	105	14	16	105	10	15	121	9	10	128	17
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT	R	LTR		LTR	
PHF	0.79	0.79	0.86	0.86	0.82		0.95	
Flow Rate	168	17	140	11	175		161	
% Heavy Veh	0	0	0	0	0		0	
No. Lanes	2		2		1		1	
Opposing-Lanes	2		2		1		1	
Conflicting-lanes	1		1		2		2	
Geometry group	5		5		2		2	

Duration, T 0.25 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	168	17	140	11	175		161	
Left-Turn	36	0	18	0	18		10	
Right-Turn	0	17	0	11	10		17	
Prop. Left-Turns	0.2	0.0	0.1	0.0	0.1		0.1	
Prop. Right-Turns	0.0	1.0	0.0	1.0	0.1		0.1	
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0		0.0	
Geometry Group	5		5		2		2	
Adjustments Exhibit 17-33:								
hLT-adj	0.5		0.5		0.2		0.2	

hRT-adj		-0.7		-0.7		-0.6		-0.6
hHV-adj		1.7		1.7		1.7		1.7
hadj, computed	0.1	-0.7	0.1	-0.7	-0.0		-0.1	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	168	17	140	11	175		161	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.15	0.02	0.12	0.01	0.16		0.14	
hd, final value	5.70	4.89	5.70	4.93	5.04		5.02	
x, final value	0.27	0.02	0.22	0.02	0.24		0.22	
Move-up time, m		2.3		2.3		2.0		2.0
Service Time	3.4	2.6	3.4	2.6	3.0		3.0	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	168	17	140	11	175		161	
Service Time	3.4	2.6	3.4	2.6	3.0		3.0	
Utilization, x	0.27	0.02	0.22	0.02	0.24		0.22	
Dep. headway, hd	5.70	4.89	5.70	4.93	5.04		5.02	
Capacity	418	267	390	261	425		411	
Delay	10.46	7.70	10.02	7.71	9.66		9.47	
LOS	B	A	B	A	A		A	
Approach:								
Delay		10.20		9.85		9.66		9.47
LOS		B		A		A		A
Intersection Delay 9.81				Intersection LOS A				

HCS+: Unsignalized Intersections Release 5.2

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ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: Chidi Onumonu
Agency/Co.: Albert Wilson & Associates
Date Performed: 7/11/13
Analysis Time Period: PM Peak Hr
Intersection: Randall Ave @ locust Ave
Jurisdiction: County of San Bernardino
Units: U. S. Customary
Analysis Year: 2015 Phase 1 w/o Proj Tr
Project ID: Intersection # 10
East/West Street: Randall Ave
North/South Street: Locust Avenue

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	30	110	15	17	110	11	16	127	9	11	134	18
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT	R	LTR		LTR	
PHF	0.79	0.79	0.86	0.86	0.82		0.95	
Flow Rate	176	18	146	12	183		170	
% Heavy Veh	0	0	0	0	0		0	
No. Lanes	2		2		1		1	
Opposing-Lanes	2		2		1		1	
Conflicting-lanes	1		1		2		2	
Geometry group	5		5		2		2	

Duration, T 0.25 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	176	18	146	12	183		170	
Left-Turn	37	0	19	0	19		11	
Right-Turn	0	18	0	12	10		18	
Prop. Left-Turns	0.2	0.0	0.1	0.0	0.1		0.1	
Prop. Right-Turns	0.0	1.0	0.0	1.0	0.1		0.1	
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0		0.0	
Geometry Group	5		5		2		2	
Adjustments Exhibit 17-33:								
hLT-adj	0.5		0.5		0.2		0.2	

hRT-adj		-0.7		-0.7		-0.6		-0.6
hHV-adj		1.7		1.7		1.7		1.7
hadj, computed	0.1	-0.7	0.1	-0.7	-0.0		-0.1	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	176	18	146	12	183		170	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.16	0.02	0.13	0.01	0.16		0.15	
hd, final value	5.78	4.96	5.78	5.01	5.11		5.10	
x, final value	0.28	0.02	0.23	0.02	0.26		0.24	
Move-up time, m		2.3		2.3		2.0		2.0
Service Time	3.5	2.7	3.5	2.7	3.1		3.1	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	176	18	146	12	183		170	
Service Time	3.5	2.7	3.5	2.7	3.1		3.1	
Utilization, x	0.28	0.02	0.23	0.02	0.26		0.24	
Dep. headway, hd	5.78	4.96	5.78	5.01	5.11		5.10	
Capacity	426	268	396	262	433		420	
Delay	10.73	7.79	10.25	7.79	9.90		9.70	
LOS	B	A	B	A	A		A	
Approach:								
Delay		10.46		10.06		9.90		9.70
LOS		B		B		A		A
Intersection Delay 10.04				Intersection LOS B				

HCS+: Unsignalized Intersections Release 5.2

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ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: Chidi Onumonu
Agency/Co.: Albert Wilson & Associates
Date Performed: 02/08/14
Analysis Time Period: PM Peak Hr
Intersection: Randall Ave @ locust Ave
Jurisdiction: County of San Bernardino
Units: U. S. Customary
Analysis Year: 2015 Phase 1 w Proj Tr
Project ID: Intersection # 10
East/West Street: Randall Ave
North/South Street: Locust Avenue

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	30	110	15	46	110	11	38	155	23	11	148	18
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT	R	LTR		LTR	
PHF	0.79	0.79	0.86	0.86	0.82		0.95	
Flow Rate	176	18	180	12	263		184	
% Heavy Veh	0	0	0	0	0		0	
No. Lanes	2		2		1		1	
Opposing-Lanes	2		2		1		1	
Conflicting-lanes	1		1		2		2	
Geometry group	5		5		2		2	

Duration, T 0.25 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	176	18	180	12	263		184	
Left-Turn	37	0	53	0	46		11	
Right-Turn	0	18	0	12	28		18	
Prop. Left-Turns	0.2	0.0	0.3	0.0	0.2		0.1	
Prop. Right-Turns	0.0	1.0	0.0	1.0	0.1		0.1	
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0		0.0	
Geometry Group	5		5		2		2	
Adjustments Exhibit 17-33:								
hLT-adj	0.5		0.5		0.2		0.2	