Darnell & ASSOCIATES, INC.
TRANSPORTATION PLANNING & TRAFFIC ENGINEERING

March 20, 2012

Mr. Joel Hamby
City of Imperial
420 South Imperial Avenue
Imperial, CA. 92251

D&A Ref. No: 120201

Subject: Traffic Signal Warrant Analysis for the Intersection of Dogwood Road and Aten Road.

Dear Mr. Hamby:

In accordance with your authorization Darnell & Associates, Inc has prepared this engineering study to determine the Dogwood Road and Aten Road intersection warrants signalization. Figure 1 is a vicinity map showing the general location of the intersection.

Existing Conditions

The intersection of Aten Road and Dogwood Road is presently controlled by stop signs on each approach. Aten Road is an east/west four-lane roadway with a left turn channelization at Dogwood Road. Aten Road is a major east/west roadway through the City of Imperial with connection to SR-111 to the east of Dogwood Road. Within the City of Imperial Aten Road is Master Planned as four-lane Major Arterial.

Dogwood Road is presently constructed as a two-lane north/south highway from the City of Brawley located to the north of Aten Road to Interstate 8 in the City of El Centro. Both roadways provide local and through traffic.

Existing daily traffic volumes were collected on February 23, 2012. The peak hour times identified the 7:30 AM to 8:30 AM and 4:00 PM to 5:00 PM as the peak hour morning and afternoon counts. Figure 2 presents the results of daily and peak hour turning volumes. A copy of the traffic count sheets are presented in Attachment A.

Signal Warrant Analysis

The need for traffic signal control at the Aten Road and Dogwood Road intersection was analyzed using the Criteria Chapter 4C Traffic Control Signal Needs Study" of the California MUTCD 2012 Edition (MUTCD). Review of the MUTCD Warrants found the following warrants applicable to the Aten Road and Dogwood Road intersection:

- Warrant 1 – Eight Hour Vehicular Volume;
  – Interruption of Continuous Traffic ;
- Warrant 2 – Four Hour Vehicular Volumes
- Warrant 7 – Crash Experience Warrant
- Warrant 8 - Roadway Network

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Warrants 3, 4, 5, 6, and 9 were determined to not be applicable.

Attachment B contains a copy of the Warrant Worksheets for Warrants 1, 2, 7, and 8. Each warrant was analyzed using the existing traffic volume data collected on February 22, 2012.

Review of Warrant 1 found Condition A – minimum vehicle volume to be satisfied 100%. The analysis also found Condition B to be satisfied 80% and the combination of Conditions A and B to be satisfied 100%.

Review of Warrant 2 - Four Hour Vehicular Volume analysis shows this warrant to be satisfied.

Review of Warrant 7 - Crash Experience Warrant was found to not be satisfied.
Review of accident history found a total of 11 accidents for the period January 2008 thru December 2011. Table 1 summarizes the accidents by year and presents the accident rate.

Table 1
Accident History
Aten Road at Dogwood Road

Year	Non-Injury Accidents	Injury Accidents	Total Accidents	Accident Rate Accidents/ Million Vehicles Entering
2011	3	-	3	0.54
2010	1	-	1	0.18
2009	2	1	3	0.54
2008	3	1	4	0.72

The calculated accident rate found the 2011 accident rate to be 0.54 Accidents per million vehicles entering with a high of 0.72 accidents per million vehicles entering in 2008.

Review of Warrant 8 - Roadway Network with 1298 vehicles per hour and satisfaction of one or more of Warrants 1, 2, and 3 to be satisfied.

The existing operating conditions at Aten Road/Dogwood Road intersection was analyzed using the Synchro 8 Highway Capacity Manual Software. The analysis used the AM/PM peak hour volumes presented on Figure 2. Due to the software limitations the east/west left and through volumes were added together and the approach lanes were changed to a left thru turn lane and a through right lane. The results of the analysis found the intersection to be operating at a LOS C in the AM peak hour and LOS B in the PM peak hour.

Table 2 summarizes the Intersection LOS by approach and total intersection.

Table 2
Aten Road/ Dogwood Road
Intersection Level of Service

Movement	AM Peak		PM Peak	
	Delay (sec)	LOS	Delay (sec)	LOS
Eastbound Aten Road	15.8	C	15.4	C
Westbound Aten Road	12.1	C	16.1	C
Northbound Dogwood Road	16.3	C	20.1	C
Southbound Dogwood Road	17.0	C	21.6	C
Intersection				
All Way Stop	15.5	C	18.0	B
Signalized	12.5	B	14.7	B

Also presented in Table 2 is the Signalized LOS at the intersection is LOS B in the AM Peak and LOS B in the PM Peak. A copy of the intersection worksheets are presented in Attachment C. The signalized intersection analysis assumed Aten Road left turns would be protected and Dogwood Road approaches are split phases.

Future 2025 conditions at the Aten Road and Dogwood Road was analyzed in the Traffic Study for the Victoria Ranch Development by Darnall & Associates, Inc. dated July 21, 2003. The 2025 conditions anticipate significant growth in traffic volumes on Aten Road and Dogwood Road. Existing and Future 2025 Daily Volumes on Aten Road and Dogwood Road are:

Aten Road:	Year 2012	Year 2025
West of Dogwood Road	9080 ADT	22,500 ADT
East of Dogwood	8641 ADT	26,200 ADT
Dogwood Road:		
North of Aten Road	5985 ADT	19,300 ADT
South of Aten Road	6832 ADT	18,240 ADT

This growth in traffic will significantly increase the need for signalization of the intersection.

In summary the intersection of Aten Road and Dogwood Road presently warrants the installation of Traffic Signal Control and would operate at LOS B in the AM and PM peak periods.

Please call if you have any questions or need additional information.

Sincerely,

DARNELL & ASSOCIATES, INC.

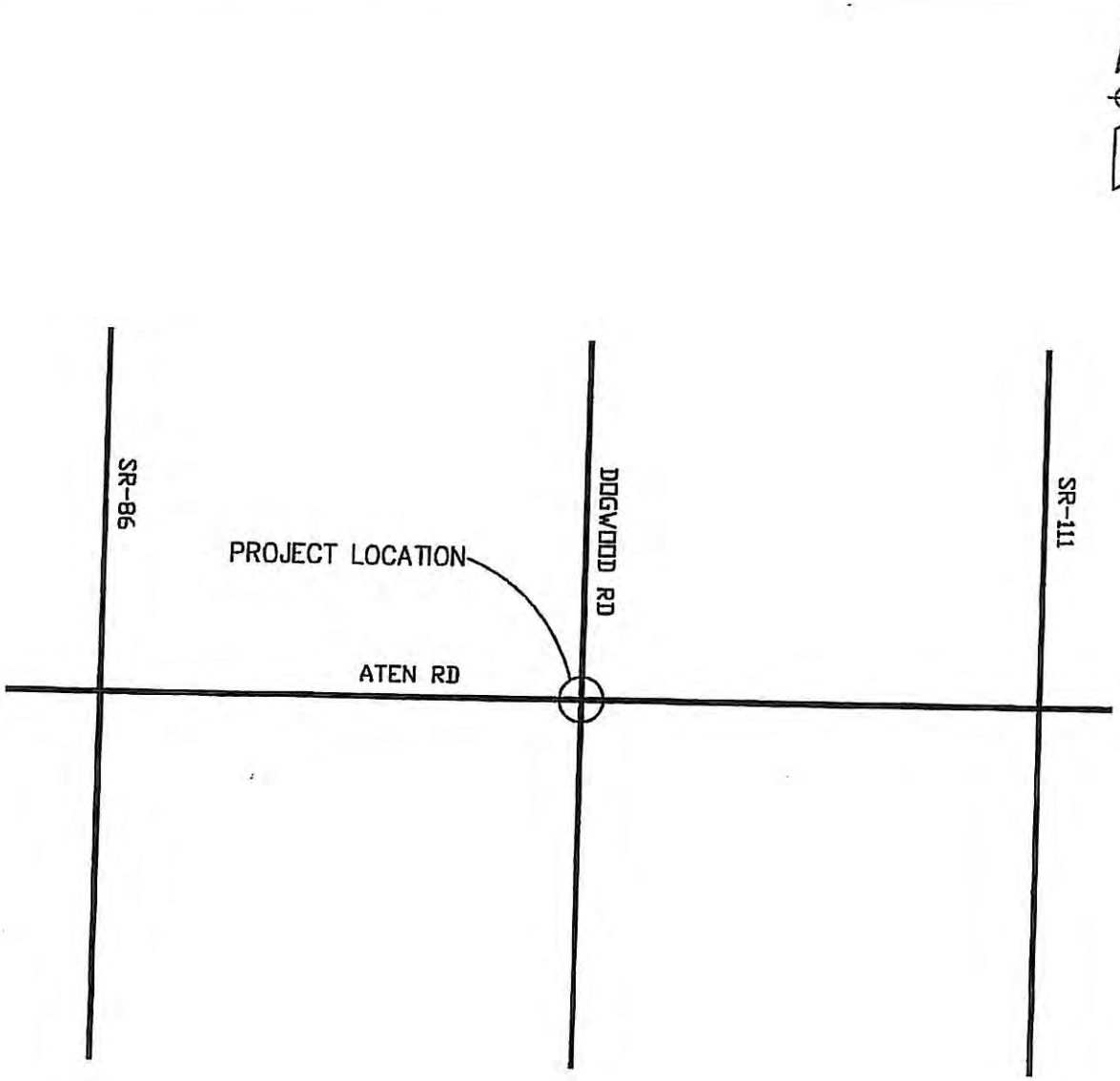
Bill E. Darnell

Bill E. Darnell, P.E.
RCE: 22338

REGISTERED PROFESSIONAL ENGINEER
BILL E. DARNELL
No. 22338
CIVIL
STATE OF CALIFORNIA

3/20/2011
(Date)

BED/jam
120201- Traffic Signal Warrant Analysis for Dogwood Road and Aten Road.doc/03/12



Darnell & ASSOCIATES, INC.

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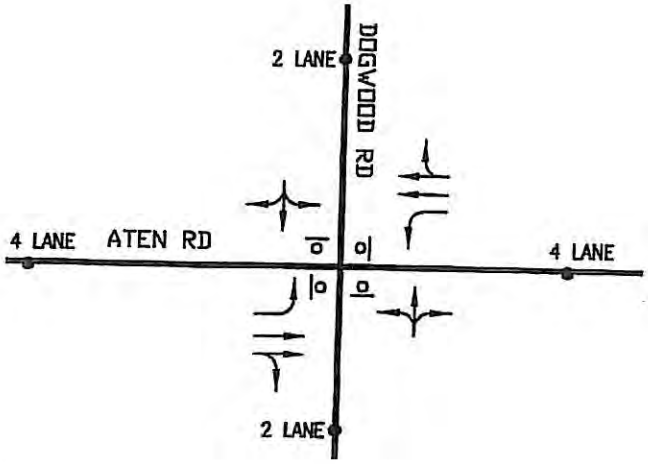
FIGURE 1

VICINITY MAP

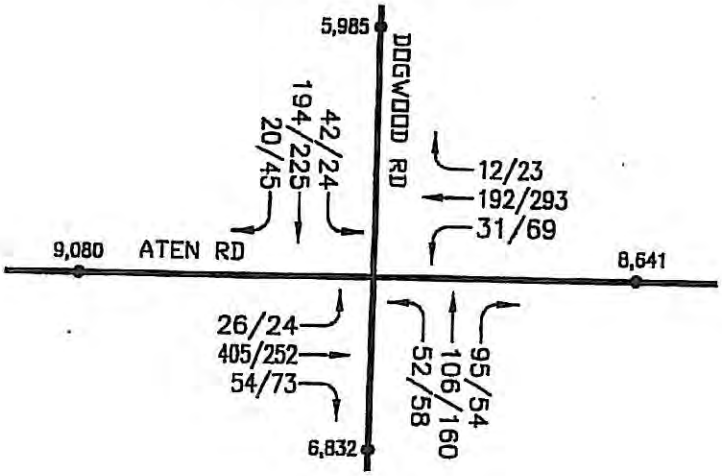


LEGEND

→ – TRAVEL LANE

o| – STOP SIGN

EXISTING CONDITIONS



LEGEND

XX/YY – AM/PM PEAK HOUR TURN VOLUMES

● Z,ZZZ – AVERAGE DAILY TRAFFIC

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FIGURE 2
EXISTING CONDITIONS
ATEN ROAD AT DOGWOOD

ATTACHMENT A

- February 22, 2012 Daily Counts
- February 23, 2012 Daily Counts
- February 22, 2012 AM/PM Turn Counts

WEDNESDAY - FEBRUARY 22, 2012 CITY: EL CENTRO PROJECT: CA12-0224-01

ATEN E-O DOGWOOD

AM Period	EB		T-EB		WB		T-WB		
00:00	3		0		16		2		
00:15	1		1		8		1		
00:30	8		0		4		1		
00:45	6	18	0	1	10	38	2	6	63
01:00	3		0		2		0		
01:15	0		0		1		1		
01:30	4		0		3		0		
01:45	0	7	0	0	3	9	0	1	17
02:00	2		0		6		0		
02:15	1		0		3		0		
02:30	0		1		8		0		
02:45	2	5	0	1	6	23	0	0	29
03:00	3		0		1		1		
03:15	3		0		0		0		
03:30	1		0		1		0		
03:45	2	9	0	0	0	2	0	1	12
04:00	1		0		9		0		
04:15	6		0		9		1		
04:30	9		1		2		0		
04:45	9	25	0	1	2	22	1	2	50
05:00	6		0		3		0		
05:15	6		0		13		0		
05:30	7		1		8		0		
05:45	14	33	2	3	9	33	1	1	70
06:00	24		4		11		0		
06:15	16		2		18		1		
06:30	13		2		14		1		
06:45	26	79	7	15	16	59	2	4	157
07:00	47		1		17		3		
07:15	47		4		24		3		
07:30	65		3		26		5		
07:45	70	229	2	10	43	110	1	12	361
08:00	108		1		57		2		
08:15	148		2		62		1		
08:30	139		1		52		0		
08:45	129	524	1	5	69	240	3	6	775
09:00	54		2		49		2		
09:15	35		1		44		1		
09:30	48		0		41		3		
09:45	47	184	1	4	50	184	1	7	379
10:00	63		2		50		0		
10:15	93		4		71		1		
10:30	91		1		116		2		
10:45	38	285	2	9	63	300	1	4	598
11:00	36		3		67		0		
11:15	47		1		49		2		
11:30	44		1		52		1		
11:45	82	209	3	8	64	232	3	6	455
Total Vol.	1607		57		1252		50		2966

PM Period	EB		T-EB		WB		T-WB		
12:00	107		7		107		7		
12:15	63		3		62		4		
12:30	61		4		62		3		
12:45	52	283	2	16	52	283	2	16	598
13:00	71		2		69		4		
13:15	64		3		65		2		
13:30	67		2		68		1		
13:45	73	275	3	10	72	274	4	11	570
14:00	51		4		52		3		
14:15	46		2		46		2		
14:30	48		2		49		1		
14:45	61	206	3	11	60	207	4	10	434
15:00	60		2		55		7		
15:15	82		3		84		1		
15:30	59		3		59		3		
15:45	74	275	4	12	78	276	0	11	574
16:00	55		2		53		4		
16:15	61		2		61		2		
16:30	83		1		83		1		
16:45	47	246	3	8	50	247	0	7	508
17:00	113		2		114		1		
17:15	71		0		69		2		
17:30	72		1		72		1		
17:45	55	311	0	3	54	309	1	5	628
18:00	70		1		68		3		
18:15	79		2		80		1		
18:30	125		3		126		2		
18:45	107	381	1	7	108	382	0	6	776
19:00	54		2		52		4		
19:15	29		1		28		2		
19:30	28		1		28		1		
19:45	25	136	0	4	25	133	0	7	280
20:00	31		1		32		0		
20:15	25		2		26		1		
20:30	21		0		21		0		
20:45	19	96	1	4	20	99	0	1	200
21:00	9		0		8		1		
21:15	28		0		28		0		
21:30	28		0		28		0		
21:45	13	78	1	1	14	78	0	1	158
22:00	20		0		19		1		
22:15	10		0		10		0		
22:30	6		0		5		1		
22:45	9	45	0	0	9	43	0	2	90
23:00	7		0		7		0		
23:15	12		0		12		0		
23:30	10		1		11		0		
23:45	10	39	0	1	10	40	0	0	80
	2371		77		2371		77		4896

Daily Totals

	NB	SB	EB	WB	Combined
	3978	134	3623	127	7862

	AM					PM				
Split %	54.2%	1.9%	42.2%	1.7%	37.7%	48.4%	1.6%	48.4%	1.6%	62.3%
Peak Hour	08:00	11:45	10:15	11:45	08:00	18:00	12:00	18:00	12:00	18:00
Volume	524	17	317	17	775	381	16	382	16	776
P.H.F.	0.89	0.61	0.68	0.61	0.91	0.80	0.57	0.76	0.57	0.76

PACIFIC TRAFFIC & TRANSIT DATA SERVICES

A-1

THURSDAY - FEBRUARY 23, 2012 CITY: EL CENTRO PROJECT: CA12-0224-01

ATEN E-O DOGWOOD

AM Period	EB		T-EB		WB		T-WB			PM Period	EB		T-EB		WB		T-WB		
00:00	7		0		11		0			12:00	116		4		156		4		
00:15	4		0		9		0			12:15	61		2		133		4		
00:30	7		1		8		1			12:30	58		3		97		5		
00:45	3	21	0	1	7	35	2	3	60	12:45	34	269	7	16	84	470	6	19	774
01:00	2		0		3		0			13:00	59		3		81		3		
01:15	2		0		3		0			13:15	55		4		77		2		
01:30	2		0		2		0			13:30	106		2		84		2		
01:45	4	10	0	0	4	12	1	1	23	13:45	94	314	1	10	136	378	1	8	710
02:00	2		1		4		0			14:00	66		2		93		3		
02:15	1		0		1		0			14:15	45		3		75		4		
02:30	1		0		4		1			14:30	52		6		76		2		
02:45	0	4	0	1	2	11	0	1	17	14:45	58	221	4	15	49	293	1	10	539
03:00	2		0		0		0			15:00	58		2		85		3		
03:15	2		0		5		0			15:15	52		3		115		3		
03:30	0		1		1		0			15:30	60		1		101		3		
03:45	3	7	0	1	4	10	0	0	18	15:45	70	240	3	9	109	410	2	11	670
04:00	3		0		10		0			16:00	65		2		85		4		
04:15	4		0		6		0			16:15	49		3		60		5		
04:30	3		0		2		0			16:30	61		1		72		1		
04:45	6	16	0	0	4	22	1	1	39	16:45	75	250	4	10	73	290	6	16	566
05:00	5		0		4		2			17:00	93		2		98		5		
05:15	9		0		10		0			17:15	77		2		73		2		
05:30	10		0		14		3			17:30	62		1		95		2		
05:45	14	38	2	2	8	36	1	6	82	17:45	78	310	0	5	50	316	2	11	642
06:00	23		0		20		0			18:00	79		1		62		1		
06:15	21		4		20		1			18:15	70		0		67		0		
06:30	8		2		21		1			18:30	117		2		72		0		
06:45	16	68	4	10	20	81	2	4	163	18:45	112	378	0	3	71	272	0	1	654
07:00	38		3		31		3			19:00	51		2		70		1		
07:15	39		4		32		3			19:15	41		0		69		2		
07:30	46		4		35		2			19:30	31		1		51		1		
07:45	76	199	5	16	44	142	2	10	367	19:45	27	150	0	3	64	254	2	6	413
08:00	100		2		67		1			20:00	28		1		35		3		
08:15	114		4		53		4			20:15	17		2		32		0		
08:30	163		4		47		5			20:30	13		1		50		1		
08:45	162	539	2	12	70	237	3	13	801	20:45	19	77	1	5	56	173	0	4	259
09:00	76		1		57		2			21:00	25		0		46		0		
09:15	54		3		54		2			21:15	26		0		57		0		
09:30	34		4		42		1			21:30	19		0		106		1		
09:45	46	210	0	8	44	197	1	6	421	21:45	16	86	1	1	49	258	0	1	346
10:00	59		1		46		4			22:00	21		0		43		0		
10:15	107		2		93		3			22:15	13		1		33		0		
10:30	106		0		135		2			22:30	11		0		32		0		
10:45	44	316	2	5	71	345	1	10	676	22:45	7	52	0	1	15	123	0	0	176
11:00	35		1		72		1			23:00	12		0		12		0		
11:15	43		2		77		0			23:15	10		0		11		0		
11:30	59		1		81		1			23:30	10		0		6		0		
11:45	61	198	2	6	93	323	1	3	530	23:45	11	43	0	0	11	40	0	0	83
Total Vol.		1626		62		1451		58	**3197**			2390		78		3277		87	**5832**

Daily Totals

NB	SB	EB	WB	Combined
4016	140	4728	145	9029

	AM					PM				
Split %	50.9%	1.9%	45.4%	1.8%	**35.4%**	41.0%	1.3%	56.2%	1.5%	**64.6%**
Peak Hour	08:00	07:00	11:45	08:15	**08:00**	18:00	12:30	12:00	12:00	**12:00**
Volume	539	16	479	14	**801**	378	17	470	19	**774**
P.H.F.	0.83	0.80	0.77	0.70	**0.84**	0.82	0.61	0.75	0.79	**0.69**

PACIFIC TRAFFIC & TRANSIT DATA SERVICES

A-2

WEDNESDAY - FEBRUARY 22, 2012 CITY: EL CENTRO PROJECT: CA12-0224-01

ATEN W-O DOGWOOD

AM Period	EB		T-EB		WB		T-WB			PM Period	EB		T-EB		WB		T-WB		
00:00	3		1		21		2			12:00	95		7		110		5		
00:15	4		2		12		0			12:15	56		6		88		2		
00:30	6		0		4		1			12:30	77		4		62		4		
00:45	6	19	1	4	11	48	1	4	75	12:45	68	296	2	19	67	327	1	12	654
01:00	8		0		4		0			13:00	73		4		71		3		
01:15	2		0		10		0			13:15	78		3		71		2		
01:30	7		0		2		2			13:30	80		4		97		6		
01:45	3	20	0	0	2	18	1	3	41	13:45	72	303	2	13	143	382	4	15	713
02:00	3		1		7		0			14:00	56		4		69		5		
02:15	1		0		4		0			14:15	54		2		70		3		
02:30	2		0		10		0			14:30	69		6		66		4		
02:45	3	9	0	1	6	27	0	0	37	14:45	68	247	3	15	61	266	3	15	543
03:00	3		1		3		0			15:00	68		5		79		8		
03:15	4		1		0		0			15:15	82		3		99		2		
03:30	0		0		1		0			15:30	71		3		99		3		
03:45	3	10	0	2	1	5	0	0	17	15:45	78	299	8	19	74	351	0	13	682
04:00	2		1		11		0			16:00	75		2		104		5		
04:15	7		0		10		1			16:15	84		3		65		2		
04:30	13		0		0		0			16:30	88		4		95		3		
04:45	6	28	1	2	4	25	0	1	56	16:45	57	304	2	11	98	362	1	11	688
05:00	18		0		3		2			17:00	98		6		96		2		
05:15	8		2		14		1			17:15	77		2		98		4		
05:30	12		1		14		0			17:30	96		1		80		1		
05:45	20	58	2	5	19	50	1	4	117	17:45	66	337	0	9	88	362	2	9	717
06:00	38		4		18		2			18:00	84		1		64		3		
06:15	15		1		22		2			18:15	75		2		74		2		
06:30	14		4		21		2			18:30	131		3		89		1		
06:45	16	83	8	17	28	89	2	8	197	18:45	74	364	1	7	81	308	2	8	687
07:00	25		3		30		3			19:00	58		1		60		4		
07:15	27		4		34		3			19:15	43		3		42		2		
07:30	39		4		39		4			19:30	42		0		61		0		
07:45	78	169	2	13	52	155	4	14	351	19:45	29	172	1	5	35	198	1	7	382
08:00	98		5		70		3			20:00	36		0		49		1		
08:15	116		4		76		1			20:15	31		1		37		2		
08:30	114		1		58		3			20:30	23		0		45		0		
08:45	98	426	1	11	73	277	2	9	723	20:45	21	111	0	1	28	159	0	3	274
09:00	62		3		44		3			21:00	14		0		51		0		
09:15	42		2		49		2			21:15	29		0		54		0		
09:30	52		2		44		2			21:30	32		0		88		1		
09:45	64	220	2	9	59	196	1	8	433	21:45	22	97	1	1	75	268	1	2	368
10:00	62		1		60		0			22:00	18		1		59		0		
10:15	87		3		77		2			22:15	12		0		19		0		
10:30	72		3		83		4			22:30	6		0		26		0		
10:45	44	265	3	10	55	275	2	8	558	22:45	13	49	0	1	21	125	1	1	176
11:00	44		1		68		1			23:00	7		0		9		0		
11:15	46		2		58		2			23:15	15		0		13		1		
11:30	57		2		59		3			23:30	10		1		9		0		
11:45	88	235	1	6	62	247	3	9	497	23:45	16	48	0	1	15	46	0	1	96
Total Vol.		1542		80		1412		68	**3102**			2627		102		3154		97	**5980**

Daily Totals

NB	SB	EB	WB	Combined
4169	182	4566	165	**9082**

	AM					PM				
Split %	49.7%	2.6%	45.5%	2.2%	**34.2%**	43.9%	1.7%	52.7%	1.6%	**65.8%**
Peak Hour	08:00	06:30	11:45	07:00	**08:00**	18:00	12:00	16:30	13:30	**16:30**
Volume	426	19	322	14	**723**	364	19	387	18	**731**
P.H.F.	0.92	0.59	0.73	0.88	**0.92**	0.80	0.68	0.99	0.75	**0.90**

PACIFIC TRAFFIC & TRANSIT DATA SERVICES

A-3

THURSDAY - FEBRUARY 23, 2012 CITY: EL CENTRO PROJECT: CA12-0224-01

ATEN W-O DOGWOOD

AM Period	EB		T-EB		WB		T-WB			PM Period	EB		T-EB		WB		T-WB		
00:00	6		0		14		0			12:00	78		5		140		4		
00:15	13		0		10		1			12:15	64		4		113		4		
00:30	8		1		12		0			12:30	53		3		85		5		
00:45	3	30	2	3	6	42	0	1	76	12:45	48	243	2	14	81	419	6	19	695
01:00	3		0		6		0			13:00	52		4		80		2		
01:15	3		0		5		0			13:15	73		2		69		2		
01:30	2		0		3		1			13:30	102		3		84		4		
01:45	4	12	0	0	5	19	0	1	32	13:45	86	313	2	11	99	332	2	10	666
02:00	8		0		5		0			14:00	75		1		78		4		
02:15	0		0		2		0			14:15	53		0		90		5		
02:30	1		0		2		0			14:30	58		4		84		4		
02:45	2	11	0	0	4	13	1	1	25	14:45	58	244	2	7	61	313	3	16	580
03:00	3		0		1		0			15:00	93		2		85		2		
03:15	4		1		5		0			15:15	66		1		111		2		
03:30	1		1		1		0			15:30	71		2		91		3		
03:45	3	11	1	3	4	11	2	2	27	15:45	87	317	5	10	107	394	2	9	730
04:00	4		0		7		0			16:00	76		6		90		1		
04:15	7		0		5		1			16:15	75		5		69		2		
04:30	6		0		2		0			16:30	71		4		83		5		
04:45	3	20	0	0	5	19	0	1	40	16:45	101	323	7	22	69	311	4	12	668
05:00	8		1		6		0			17:00	90		6		99		2		
05:15	12		0		9		1			17:15	82		5		71		4		
05:30	15		1		21		1			17:30	89		1		109		2		
05:45	21	56	2	4	13	49	2	4	113	17:45	80	341	4	16	78	357	0	8	722
06:00	31		3		26		3			18:00	82		5		74		3		
06:15	24		2		23		2			18:15	80		3		75		1		
06:30	17		2		27		2			18:30	129		2		67		0		
06:45	29	101	1	8	21	97	4	11	217	18:45	104	395	1	11	75	291	1	5	702
07:00	44		1		37		2			19:00	48		1		77		0		
07:15	49		5		36		5			19:15	55		1		72		2		
07:30	61		6		38		1			19:30	33		4		48		1		
07:45	82	236	6	18	53	164	4	12	430	19:45	36	172	1	7	57	254	1	4	437
08:00	96		5		74		5			20:00	30		0		40		1		
08:15	113		5		74		3			20:15	27		1		33		0		
08:30	151		4		41		7			20:30	18		0		50		0		
08:45	103	463	5	19	60	249	2	17	748	20:45	19	94	1	2	56	179	0	1	276
09:00	64		1		60		1			21:00	28		0		53		1		
09:15	52		2		49		4			21:15	17		0		57		1		
09:30	45		3		48		5			21:30	21		0		90		0		
09:45	70	231	2	8	50	207	0	10	456	21:45	19	85	1	1	44	244	0	2	332
10:00	74		3		57		1			22:00	21		0		42		0		
10:15	98		1		88		1			22:15	21		0		35		0		
10:30	70		4		110		0			22:30	14		0		26		0		
10:45	54	296	1	9	70	325	1	3	633	22:45	12	68	0	0	18	121	1	1	190
11:00	45		2		62		0			23:00	12		1		15		0		
11:15	52		2		74		1			23:15	10		0		18		0		
11:30	68		2		65		0			23:30	11		0		5		0		
11:45	85	250	1	7	80	281	1	2	540	23:45	14	47	1	2	13	51	0	0	100
Total Vol.		1717		79		1476		65	**3337**			2642		103		3266		87	**6098**

Daily Totals

NB	SB	EB	WB	Combined
4359	182	4742	152	**9435**

	AM					PM				
Split %	51.5%	2.4%	44.2%	1.9%	**35.4%**	43.3%	1.7%	53.6%	1.4%	**64.6%**
Peak Hour	08:00	07:15	11:45	07:45	**08:00**	18:00	16:00	12:00	12:00	**16:45**
Volume	463	22	418	19	**748**	395	22	419	19	**741**
P.H.F.	0.77	0.92	0.75	0.68	**0.92**	0.81	0.79	0.75	0.79	**0.92**

PACIFIC TRAFFIC & TRANSIT DATA SERVICES

A-4

WEDNESDAY - FEBRUARY 22, 2012 CITY: EL CENTRO PROJECT: CA12-0224-01

DOGWOOD N-O ATEN

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	6		2					12:00	51		48				
00:15	5		4					12:15	50		55				
00:30	2		2					12:30	42		37				
00:45	1	14	1	9			23	12:45	35	178	41	181			359
01:00	0		0					13:00	41		59				
01:15	0		3					13:15	55		51				
01:30	0		2					13:30	40		55				
01:45	2	2	1	6			8	13:45	37	173	37	202			375
02:00	1		0					14:00	48		62				
02:15	0		2					14:15	42		58				
02:30	1		1					14:30	43		55				
02:45	2	4	0	3			7	14:45	52	185	60	235			420
03:00	3		0					15:00	51		66				
03:15	2		2					15:15	44		59				
03:30	4		3					15:30	56		88				
03:45	5	14	2	7			21	15:45	62	213	74	287			500
04:00	9		4					16:00	59		82				
04:15	6		5					16:15	62		65				
04:30	12		11					16:30	44		84				
04:45	18	45	9	29			74	16:45	48	213	81	312			525
05:00	15		6					17:00	68		59				
05:15	25		11					17:15	60		55				
05:30	30		16					17:30	51		49				
05:45	31	101	20	53			154	17:45	49	228	41	204			432
06:00	38		15					18:00	40		52				
06:15	33		33					18:15	44		50				
06:30	36		48					18:30	52		46				
06:45	28	135	68	164			299	18:45	48	184	59	207			391
07:00	35		51					19:00	37		40				
07:15	45		44					19:15	41		35				
07:30	51		68					19:30	32		42				
07:45	40	171	70	233			404	19:45	33	143	18	135			278
08:00	32		55					20:00	27		26				
08:15	33		61					20:15	18		13				
08:30	38		58					20:30	26		22				
08:45	27	130	54	228			358	20:45	20	91	9	70			161
09:00	33		51					21:00	16		19				
09:15	27		44					21:15	9		12				
09:30	28		65					21:30	12		16				
09:45	31	119	42	202			321	21:45	13	50	9	56			106
10:00	41		52					22:00	5		5				
10:15	44		44					22:15	9		4				
10:30	37		41					22:30	10		2				
10:45	33	155	51	188			343	22:45	5	29	5	16			45
11:00	42		50					23:00	4		4				
11:15	51		37					23:15	2		2				
11:30	44		52					23:30	3		3				
11:45	37	174	46	185			359	23:45	2	11	2	11			22
Total Vol.		1064		1307			**2371**			1698		1916			**3614**

Daily Totals

	NB	SB	EB	WB	Combined
	2762	3223			**5985**

	AM			PM		
Split %	44.9%	55.1%	**39.6%**	47.0%	53.0%	**60.4%**
Peak Hour	11:15	07:30	**07:30**	15:30	16:00	**15:30**
Volume	183	254	**410**	239	312	**548**
P.H.F.	0.90	0.91	**0.86**	0.95	0.93	**0.95**

PACIFIC TRAFFIC & TRANSIT DATA SERVICES

A-5

THURSDAY - FEBRUARY 23, 2012 CITY: EL CENTRO PROJECT: CA12-0224-01

DOGWOOD N-O ATEN

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	4		4					12:00	47		50				
00:15	3		3					12:15	51		40				
00:30	3		3					12:30	44		48				
00:45	2	12	5	15			27	12:45	40	182	44	182			364
01:00	1		4					13:00	52		52				
01:15	4		6					13:15	60		56				
01:30	2		1					13:30	49		50				
01:45	0	7	2	13			20	13:45	37	198	47	205			403
02:00	1		0					14:00	44		44				
02:15	0		1					14:15	52		42				
02:30	1		2					14:30	48		68				
02:45	3	5	3	6			11	14:45	37	181	66	220			401
03:00	2		0					15:00	49		52				
03:15	0		4					15:15	51		54				
03:30	0		5					15:30	50		62				
03:45	1	3	3	12			15	15:45	48	198	77	245			443
04:00	9		2					16:00	55		84				
04:15	6		1					16:15	56		88				
04:30	5		6					16:30	68		95				
04:45	20	40	7	16			56	16:45	49	228	54	321			549
05:00	22		9					17:00	66		76				
05:15	31		12					17:15	70		40				
05:30	32		18					17:30	59		54				
05:45	30	115	22	61			176	17:45	50	245	52	222			467
06:00	41		35					18:00	42		60				
06:15	44		33					18:15	50		43				
06:30	37		41					18:30	41		35				
06:45	42	164	50	159			323	18:45	37	170	41	179			349
07:00	44		48					19:00	30		55				
07:15	56		55					19:15	27		40				
07:30	60		62					19:30	26		28				
07:45	48	208	66	231			439	19:45	28	111	31	154			265
08:00	37		78					20:00	22		25				
08:15	44		77					20:15	23		33				
08:30	50		48					20:30	15		15				
08:45	48	179	52	255			434	20:45	9	69	9	82			151
09:00	52		62					21:00	12		12				
09:15	35		60					21:15	10		16				
09:30	41		45					21:30	5		11				
09:45	40	168	48	215			383	21:45	4	31	9	48			79
10:00	27		51					22:00	9		10				
10:15	37		50					22:15	5		7				
10:30	41		48					22:30	4		6				
10:45	33	138	62	211			349	22:45	4	22	5	28			50
11:00	38		35					23:00	4		4				
11:15	48		48					23:15	3		2				
11:30	51		55					23:30	6		2				
11:45	43	180	59	197			377	23:45	2	15	1	9			24
Total Vol.		1219		1391			**2610**			1650		1895			**3545**

Daily Totals

	NB	SB	EB	WB	Combined
	2869	3286			**6155**

	AM			PM		
Split %	46.7%	53.3%	**42.4%**	46.5%	53.5%	**57.6%**
Peak Hour	07:00	07:30	**07:30**	16:30	15:45	**15:45**
Volume	208	283	**472**	253	344	**571**
P.H.F.	0.87	0.91	**0.97**	0.92	0.91	**0.88**

PACIFIC TRAFFIC & TRANSIT DATA SERVICES

A-6

WEDNESDAY - FEBRUARY 22, 2012 CITY: EL CENTRO PROJECT: CA12-0224-01

DOGWOOD S-O ATEN

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	3		1					12:00	44		49				
00:15	2		2					12:15	41		62				
00:30	1		0					12:30	55		51				
00:45	0	6	2	5			11	12:45	48	188	44	206			394
01:00	0		0					13:00	62		42				
01:15	0		0					13:15	59		68				
01:30	1		1					13:30	42		51				
01:45	1	2	0	1			3	13:45	51	214	70	231			445
02:00	1		0					14:00	68		66				
02:15	0		1					14:15	66		68				
02:30	1		0					14:30	50		82				
02:45	2	4	1	2			6	14:45	62	246	80	296			542
03:00	3		0					15:00	60		88				
03:15	5		1					15:15	58		91				
03:30	4		4					15:30	68		105				
03:45	6	18	5	10			28	15:45	51	237	89	373			610
04:00	5		6					16:00	70		110				
04:15	9		4					16:15	79		84				
04:30	11		5					16:30	62		92				
04:45	20	45	9	24			69	16:45	58	269	85	371			640
05:00	15		11					17:00	99		88				
05:15	11		15					17:15	72		60				
05:30	16		12					17:30	68		62				
05:45	20	62	18	56			118	17:45	66	305	55	265			570
06:00	38		20					18:00	60		44				
06:15	44		28					18:15	51		42				
06:30	45		56					18:30	40		35				
06:45	36	163	77	181			344	18:45	55	206	41	162			368
07:00	42		51					19:00	68		40				
07:15	58		62					19:15	51		32				
07:30	66		77					19:30	44		28				
07:45	62	228	75	265			493	19:45	35	198	22	122			320
08:00	56		62					20:00	41		18				
08:15	88		70					20:15	16		23				
08:30	40		56					20:30	11		21				
08:45	42	226	56	244			470	20:45	20	88	15	77			165
09:00	40		44					21:00	12		9				
09:15	55		51					21:15	9		12				
09:30	51		65					21:30	12		5				
09:45	49	195	42	202			397	21:45	6	39	6	32			71
10:00	51		51					22:00	5		1				
10:15	68		48					22:15	4		2				
10:30	42		51					22:30	5		3				
10:45	35	196	41	191			387	22:45	1	15	2	8			23
11:00	44		44					23:00	2		1				
11:15	51		51					23:15	0		0				
11:30	42		40					23:30	1		2				
11:45	37	174	37	172			346	23:45	2	5	4	7			12
Total Vol.		1319		1353			**2672**			2010		2150			**4160**

Daily Totals	NB	SB	EB	WB	Combined
	3329	3503			6832

	AM			PM		
Split %	49.4%	50.6%	**39.1%**	48.3%	51.7%	**60.9%**
Peak Hour	07:30	07:30	**07:30**	17:00	15:15	**15:30**
Volume	272	284	**556**	305	395	**656**
P.H.F.	0.77	0.92	**0.88**	0.78	0.90	**0.91**

PACIFIC TRAFFIC & TRANSIT DATA SERVICES

A-7

THURSDAY - FEBRUARY 23, 2012 CITY: EL CENTRO PROJECT: CA12-0224-01

DOGWOOD S-O ATEN

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	4		0					12:00	40		55				
00:15	0		4					12:15	56		50				
00:30	1		4					12:30	60		42				
00:45	2	7	2	10			17	12:45	66	222	68	215			437
01:00	1		1					13:00	70		66				
01:15	0		3					13:15	51		62				
01:30	2		0					13:30	75		55				
01:45	3	6	1	5			11	13:45	65	261	62	245			506
02:00	0		0					14:00	44		70				
02:15	0		1					14:15	59		70				
02:30	0		0					14:30	52		75				
02:45	1	1	0	1			2	14:45	68	223	68	283			506
03:00	2		0					15:00	74		84				
03:15	3		1					15:15	59		88				
03:30	2		2					15:30	55		95				
03:45	1	8	3	6			14	15:45	62	250	103	370			620
04:00	4		5					16:00	67		97				
04:15	6		7					16:15	55		115				
04:30	9		6					16:30	54		103				
04:45	15	34	12	30			64	16:45	70	246	84	399			645
05:00	22		8					17:00	77		88				
05:15	26		20					17:15	81		95				
05:30	28		22					17:30	81		65				
05:45	33	109	26	76			185	17:45	67	306	66	314			620
06:00	41		35					18:00	59		58				
06:15	51		31					18:15	55		50				
06:30	40		44					18:30	65		42				
06:45	41	173	68	178			351	18:45	48	227	35	185			412
07:00	55		84					19:00	50		31				
07:15	68		70					19:15	42		40				
07:30	60		84					19:30	62		28				
07:45	75	258	59	297			555	19:45	33	187	22	121			308
08:00	66		54					20:00	30		15				
08:15	70		62					20:15	28		23				
08:30	51		44					20:30	20		15				
08:45	40	227	68	228			455	20:45	15	93	9	62			155
09:00	51		51					21:00	16		10				
09:15	40		54					21:15	11		10				
09:30	35		66					21:30	7		11				
09:45	48	174	60	231			405	21:45	9	43	9	40			83
10:00	62		44					22:00	6		5				
10:15	66		51					22:15	1		4				
10:30	59		54					22:30	2		5				
10:45	54	241	41	190			431	22:45	6	15	2	16			31
11:00	50		50					23:00	0		3				
11:15	44		52					23:15	1		2				
11:30	49		57					23:30	2		1				
11:45	48	191	43	202			393	23:45	3	6	4	10			16
Total Vol.		1429		1454			**2883**			2079		2260			**4339**

Daily Totals

	NB	SB	EB	WB	Combined
	3508	3714			**7222**

	AM			PM		
Split %	49.6%	50.4%	**39.9%**	47.9%	52.1%	**60.1%**
Peak Hour	07:30	06:45	**07:00**	16:45	15:45	**15:45**
Volume	271	306	**555**	309	418	**656**
P.H.F.	0.90	0.91	**0.96**	0.95	0.91	**0.96**

PACIFIC TRAFFIC & TRANSIT DATA SERVICES

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INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: PACIFIC TRAFFIC DATA SERVICES

DATE: 2/22/12 WEDNESDAY	LOCATION:	EL CENTRO	PROJECT #:	CA12-0224-01
	NORTH & SOUTH:	DOGWOOD	LOCATION #:	1
	EAST & WEST:	ATEN	CONTROL:	4-WAY STOP

NOTES:

AM		▲ N	
PM			
MD	◄ W		E ►
OTHER		S ▼	
OTHER			

		NORTHBOUND DOGWOOD			SOUTHBOUND DOGWOOD			EASTBOUND ATEN			WESTBOUND ATEN				U-TURN				
	LANES:	NL 0	NT 1	NR 0	SL 0	ST 1	SR 0	EL 1	ET 2	ER 0	WL 1	WT 2	WR 0	TOTAL	NB	SB	EB	WB	TTL
AM	6:00 AM	8	26	1	0	8	2	3	9	9	1	15	1	83					0
	6:15 AM	8	27	2	1	27	3	5	15	3	0	20	2	113					0
	6:30 AM	8	24	3	2	41	2	7	29	8	3	23	0	150					0
	6:45 AM	7	18	12	2	58	5	2	29	17	3	31	0	184					0
	7:00 AM	1	25	6	1	33	8	6	41	8	1	30	1	161					0
	7:15 AM	16	36	10	1	36	5	6	73	13	4	36	2	238					0
	7:30 AM	12	35	11	3	54	3	9	72	10	7	55	1	272					0
	7:45 AM	22	29	10	13	58	7	7	101	17	6	52	3	325					0
	8:00 AM	8	17	27	15	33	4	5	122	18	3	42	3	297					0
	8:15 AM	10	25	47	11	49	6	5	110	9	15	43	5	335					0
	8:30 AM	6	21	10	14	34	5	4	59	12	8	53	3	229					0
	8:45 AM	5	22	14	12	35	6	5	51	11	9	41	4	215					0
	9:00 AM													0					0
	9:15 AM													0					0
	9:30 AM													0					0
	9:45 AM													0					0
	10:00 AM													0					0
	10:15 AM													0					0
	10:30 AM													0					0
	10:45 AM													0					0
	VOLUMES	111	305	153	75	466	56	64	711	135	60	441	25	2,602	0	0	0	0	0
	APPROACH %	20%	54%	27%	13%	78%	9%	7%	78%	15%	11%	84%	5%						
	APP/DEPART	569	/	394	597	/	661	910	/	939	526	/	608	0					
	BEGIN PEAK HR		7:30 AM																
	VOLUMES	52	106	95	42	194	20	26	405	54	31	192	12	1,229					
	APPROACH %	21%	42%	38%	16%	76%	8%	5%	84%	11%	13%	82%	5%						
	PEAK HR FACTOR		0.771			0.821			0.836			0.933		0.917					
	APP/DEPART	253	/	144	256	/	279	485	/	542	235	/	264	0					
PM	3:00 PM	20	36	9	2	53	9	4	52	19	16	77	5	302					0
	3:15 PM	15	35	4	3	46	9	7	60	18	24	60	4	285					0
	3:30 PM	14	46	8	2	72	13	4	55	14	14	77	3	322					0
	3:45 PM	9	36	2	2	56	13	8	55	19	10	51	2	263					0
	4:00 PM	12	48	6	3	64	13	6	70	18	19	72	5	336					0
	4:15 PM	20	50	13	3	54	6	1	40	20	15	78	4	304					0
	4:30 PM	10	32	26	13	56	8	6	82	18	22	76	5	354					0
	4:45 PM	16	30	9	5	51	18	9	60	17	13	67	9	304					0
	5:00 PM	20	59	12	1	49	7	6	64	28	8	70	2	326					0
	5:15 PM	17	53	8	3	33	16	5	45	23	2	53	2	260					0
	5:30 PM	15	41	10	4	37	12	8	50	20	7	58	4	266					0
	5:45 PM	16	44	9	3	30	7	5	41	19	5	50	2	231					0
	6:00 PM													0					0
	6:15 PM													0					0
	6:30 PM													0					0
	6:45 PM													0					0
	7:00 PM													0					0
	7:15 PM													0					0
	7:30 PM													0					0
	7:45 PM													0					0
	VOLUMES	184	510	116	44	601	131	69	674	233	155	789	47	3,553	0	0	0	0	0
	APPROACH %	23%	63%	14%	6%	77%	17%	7%	69%	24%	16%	80%	5%						
	APP/DEPART	810	/	626	776	/	989	976	/	834	991	/	1,104	0					
	BEGIN PEAK HR		4:00 PM																
	VOLUMES	58	160	54	24	225	45	22	252	73	69	293	23	1,298					
	APPROACH %	21%	59%	20%	8%	77%	15%	6%	73%	21%	18%	76%	6%						
	PEAK HR FACTOR		0.819			0.919			0.818			0.934		0.917					
	APP/DEPART	272	/	205	294	/	367	347	/	330	385	/	396	0					

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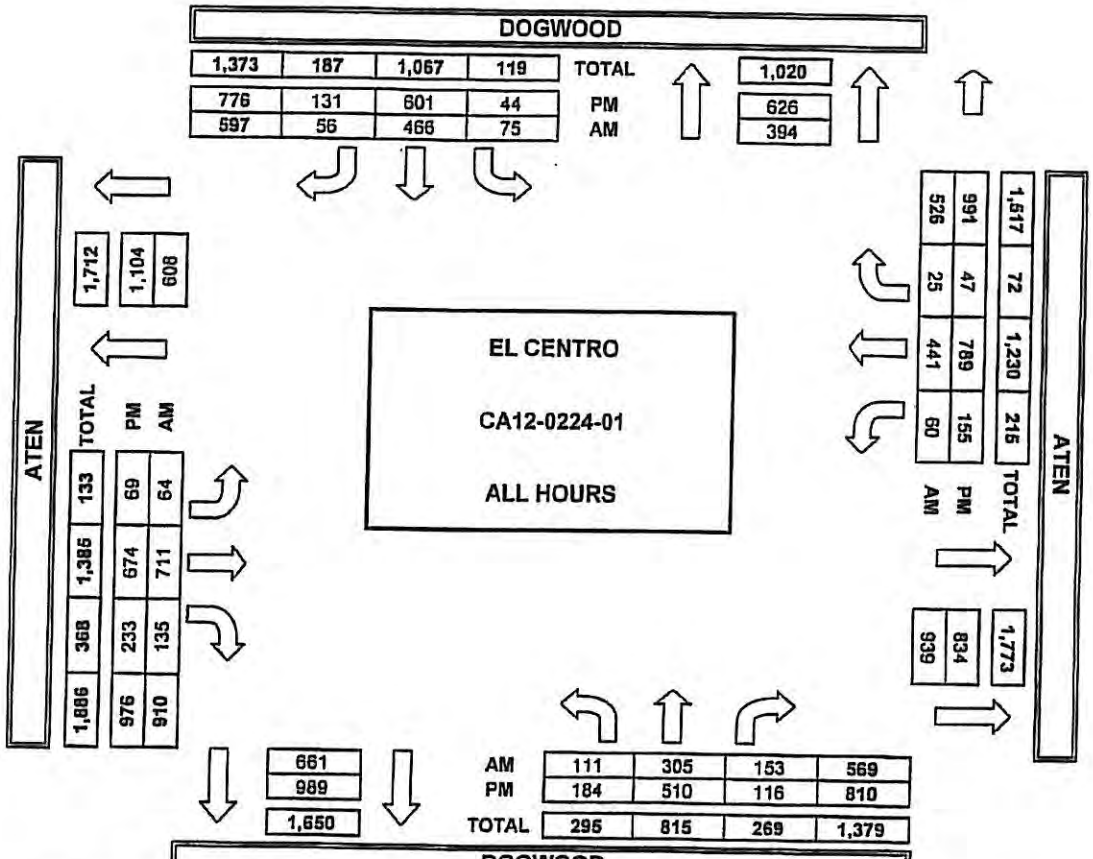
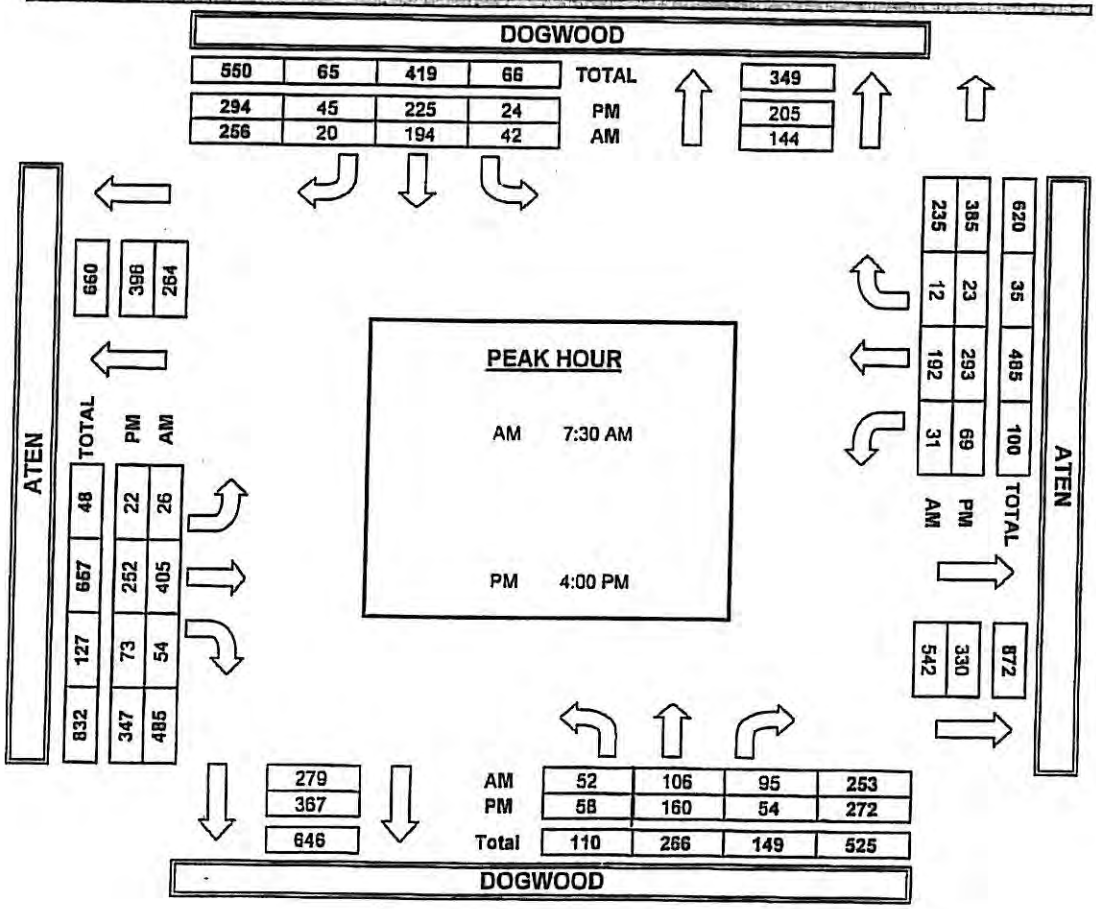
PACIFIC TRAFFIC DATA SERVICES

TURNING MOVEMENT COUNTS





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ATTACHMENT B

- MUTCD Signal Warrant Sheets
- Highway Capacity Worksheets for Aten Road at Dogwood Road

Figure 4C-101 (CA). Traffic Signal Warrants Worksheet (Sheet 1 of 5)

COUNT DATE February 22, 2012
CALC. BED DATE 3/6/2012
CHK BED DATE 3/15/2012

DIST ___ CO ___ RTE ___ PM ___

Major St: ATEN ROAD
Minor St: DOGWOOD ROAD

Critical Approach Speed 55 mph
Critical Approach Speed 55 mph

Speed limit or critical speed on major street traffic > 40 mph..... ☒ or
In built up area of isolated community of < 10,000 population..... ☐ } RURAL (R)
☐ URBAN (U)

WARRANT 1 - Eight Hour Vehicular Volume SATISFIED YES ☒ NO ☐
(Condition A or Condition B or combination of A and B must be satisfied)

Condition A - Minimum Vehicle Volume 100% SATISFIED YES ☒ NO ☐
80% SATISFIED YES ☐ NO ☐

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)				8-9 AM	10-11 AM	1-2 PM	2-3 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM
	U	R	U	R								
APPROACH LANES	1		2 or More									Hour
Both Approaches Major Street	500 (400)	350 (280)	600 (480)	420 (336)	683	529	787	526	687	654	671	692
Highest Approach Minor Street	150 (120)	105 (84)	200 (160)	140 (112)	228	188	214	246	237	269	305	206

Condition B - Interruption of Continuous Traffic 100% SATISFIED YES ☐ NO ☐
80% SATISFIED YES ☒ NO ☐

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)				8-9 AM	10-11 AM	1-2 PM	2-3 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM
	U	R	U	R								
APPROACH LANES	1		2 or More									Hour
Both Approaches Major Street	750 (600)	525 (420)	900 (720)	630 (504)	683	529	787	526	687	654	671	692
Highest Approach Minor Street	75 (60)	53 (42)	100 (80)	70 (56)	228	188	214	246	237	269	305	206

Combination of Conditions A & B SATISFIED YES ☒ NO ☐

REQUIREMENT	CONDITION	✓	FULFILLED
TWO CONDITIONS SATISFIED 80%	A. MINIMUM VEHICULAR VOLUME		Yes ☒ No ☐
	AND, B. INTERRUPTION OF CONTINUOUS TRAFFIC		
AND, AN ADEQUATE TRIAL OF OTHER ALTERNATIVES THAT COULD CAUSE LESS DELAY AND INCONVENIENCE TO TRAFFIC HAS FAILED TO SOLVE THE TRAFFIC PROBLEMS			Yes ☒ No ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-101 (CA). Traffic Signal Warrants Worksheet (Sheet 2 of 5)

WARRANT 2 - Four Hour Vehicular Volume SATISFIED* YES ☒ NO ☐

Record hourly vehicular volumes for any four hours of an average day.

APPROACH LANES	One	2 or More	8-9AM	1-2PM	3-4PM	5-6PM	Hour
Both Approaches - Major Street		X	683	737	687	671	
Higher Approach - Minor Street	X		228	214	237	305	

*All plotted points fall above the applicable curve in Figure 4C-1. (URBAN AREAS)	Yes ☐ No ☐
OR, All plotted points fall above the applicable curve in Figure 4C-2. (RURAL AREAS)	Yes ☒ No ☐

WARRANT 3 - Peak Hour
(Part A or Part B must be satisfied) SATISFIED YES ☐ NO ☐ Not Applicable

PART A SATISFIED YES ☐ NO ☐

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; AND	Yes ☐ No ☐
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; AND	Yes ☐ No ☐
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches.	Yes ☐ No ☐

PART B SATISFIED YES ☐ NO ☐

APPROACH LANES	One	2 or More	Hour
Both Approaches - Major Street			
Higher Approach - Minor Street			

The plotted point falls above the applicable curve in Figure 4C-3. (URBAN AREAS)	Yes ☐ No ☐
OR, The plotted point falls above the applicable curve in Figure 4C-4. (RURAL AREAS)	Yes ☐ No ☐

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

ATTACHMENT C

- Intersection Capacity Worksheets

Aten Road atr Dogwood Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	26	405	54	31	192	12	52	106	95	42	194	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	28	440	59	34	209	13	57	115	103	46	211	22

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	248	279	138	117	275	278
Volume Left (vph)	28	0	34	0	57	46
Volume Right (vph)	0	59	0	13	103	22
Hadj (s)	0.09	-0.11	0.16	-0.04	-0.15	0.02
Departure Headway (s)	7.1	6.9	7.6	7.4	6.6	6.8
Degree Utilization, x	0.49	0.53	0.29	0.24	0.51	0.52
Capacity (veh/h)	488	496	425	445	502	495
Control Delay (s)	15.4	16.2	12.5	11.5	16.3	17.0
Approach Delay (s)	15.8		12.1		16.3	17.0
Approach LOS	C		B		C	C

Intersection Summary			
Delay	15.5		
HCM Level of Service	C		
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		

Aten Road at Dogwood Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	73	252	22	69	293	23	58	160	54	24	225	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	79	274	24	75	318	25	63	174	59	26	245	49

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	216	161	234	184	296	320
Volume Left (vph)	79	0	75	0	63	26
Volume Right (vph)	0	24	0	25	59	49
Hadj (s)	0.22	-0.07	0.19	-0.06	-0.04	-0.04
Departure Headway (s)	8.0	7.7	7.9	7.6	7.2	7.1
Degree Utilization, x	0.48	0.34	0.51	0.39	0.59	0.63
Capacity (veh/h)	414	439	432	436	465	468
Control Delay (s)	16.8	13.4	17.6	14.1	20.1	21.6
Approach Delay (s)	15.4		16.1		20.1	21.6
Approach LOS	C		C		C	C

Intersection Summary			
Delay	18.0		
HCM Level of Service	C		
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		

Aten Road at Dogwood Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982			0.991			0.949			0.989	
Flt Protected	0.950			0.950				0.990			0.992	
Satd. Flow (prot)	1770	3476	0	1770	3507	0	0	1750	0	0	1828	0
Flt Permitted	0.950			0.950				0.891			0.911	
Satd. Flow (perm)	1770	3476	0	1770	3507	0	0	1575	0	0	1678	0
Satd. Flow (RTOR)		15			7			35			5	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Volume (vph)	26	405	54	31	192	12	52	106	95	42	194	20
Adj. Flow (vph)	28	440	59	34	209	13	57	115	103	46	211	22
Lane Group Flow (vph)	28	499	0	34	222	0	0	275	0	0	279	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases		6			2		4	4		8	8	
Total Split (s)	21.0	35.0	0.0	22.0	36.0	0.0	43.0	43.0	0.0	43.0	43.0	0.0
Act Effct Green (s)	7.0	19.7		6.7	10.0			11.6			11.7	
Actuated g/C Ratio	0.18	0.51		0.15	0.26			0.29			0.29	
v/c Ratio	0.09	0.28		0.13	0.24			0.58			0.57	
Control Delay	19.3	10.8		20.0	12.8			12.5			13.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	19.3	10.8		20.0	12.8			12.5			13.9	
LOS	B	B		C	B			B			B	
Approach Delay		11.2			13.8			12.5			13.9	
Approach LOS		B			B			B			B	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 38.7
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.58
Intersection Signal Delay: 12.5 — Intersection LOS: B
Intersection Capacity Utilization 46.9% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: Int

ø1	ø2	ø4
21 s	36 s	43 s
ø5	ø6	ø8
22 s	35 s	43 s

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.988			0.989			0.973			0.979	
Flt Protected	0.950			0.950				0.989			0.996	
Satd. Flow (prot)	1770	3497	0	1770	3500	0	0	1793	0	0	1816	0
Flt Permitted	0.950			0.950				0.868			0.960	
Satd. Flow (perm)	1770	3497	0	1770	3500	0	0	1573	0	0	1751	0
Satd. Flow (RTOR)		9			8			15			11	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Volume (vph)	73	252	22	69	293	23	58	160	54	24	225	45
Adj. Flow (vph)	79	274	24	75	318	25	63	174	59	26	245	49
Lane Group Flow (vph)	79	298	0	75	343	0	0	296	0	0	320	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases		6			2		4	4		8	8	
Total Split (s)	21.0	35.0	0.0	22.0	36.0	0.0	43.0	43.0	0.0	43.0	43.0	0.0
Act Effct Green (s)	7.5	14.5		7.4	9.4			12.7			12.7	
Actuated g/C Ratio	0.18	0.34		0.16	0.22			0.30			0.30	
v/c Ratio	0.25	0.25		0.26	0.44			0.61			0.60	
Control Delay	18.3	13.8		18.9	15.5			13.7			13.7	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	18.3	13.8		18.9	15.5			13.7			13.7	
LOS	B	B		B	B			B			B	
Approach Delay		14.7			16.1			13.7			13.7	
Approach LOS		B			B			B			B	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 42.3
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.61
Intersection Signal Delay: 14.7 — Intersection LOS: B
Intersection Capacity Utilization 51.7% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: Int

ø1	ø2	ø4
21 s	36 s	43 s
ø5	ø6	ø8
22 s	35 s	43 s