



Appendix D

























EXISTING (2008) INTERSECTION ANALYSIS WORKSHEETS



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






























HCM Signalized Intersection Capacity Analysis
 10: Pier B St & 9th St

2008 AM Existing_Long Beach Area
 12/7/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 		 				 			 	
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00		0.95	1.00		0.95	
Frt	1.00	0.96		1.00	1.00	0.85		1.00	0.85		0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96	1.00		0.97	
Satd. Flow (prot)	1013	1888		1675	1194	1023		1791	866		2667	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.96	1.00		0.97	
Satd. Flow (perm)	1013	1888		1675	1194	1023		1791	866		2667	
Volume (vph)	4	53	17	69	40	57	73	7	257	46	5	18
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	5	62	20	80	47	66	85	8	299	53	6	21
RTOR Reduction (vph)	0	16	0	0	0	38	0	0	0	0	17	0
Lane Group Flow (vph)	5	66	0	80	47	28	0	93	299	0	63	0
Heavy Vehicles (%)	50%	50%	71%	76%	34%	33%	68%	2%	57%	8%	2%	2%
Turn Type	Prot			Prot		Perm	Split		Free	Split		
Protected Phases	7	2		1	6		8	8		4	4	
Permitted Phases						6			Free			
Actuated Green, G (s)	6.0	20.0		18.0	42.0	42.0		18.0	100.0		18.0	
Effective Green, g (s)	6.0	20.0		18.0	42.0	42.0		18.0	100.0		18.0	
Actuated g/C Ratio	0.06	0.20		0.18	0.42	0.42		0.18	1.00		0.18	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	
Lane Grp Cap (vph)	61	378		302	501	430		322	866		480	
v/s Ratio Prot	0.00	0.03		0.05	0.04			0.05			0.02	
v/s Ratio Perm						0.03			c0.35			
v/c Ratio	0.08	0.17		0.26	0.09	0.06		0.29	0.35		0.13	
Uniform Delay, d1	44.4	33.2		35.3	17.5	17.3		35.5	0.0		34.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2	2.6	1.0		2.1	0.4	0.3		2.3	1.1		0.6	
Delay (s)	47.0	34.2		37.4	17.9	17.6		37.7	1.1		35.0	
Level of Service	D	C		D	B	B		D	A		C	
Approach Delay (s)		34.9			25.9			9.8			35.0	
Approach LOS		C			C			A			C	
Intersection Summary												
HCM Average Control Delay			19.5				HCM Level of Service				B	
HCM Volume to Capacity ratio			0.35									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)				0.0	
Intersection Capacity Utilization			27.1%				ICU Level of Service				A	
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
65: Florence Ave & Eastern Ave

2008 AM Peak Existing
1/23/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  			  		 	 		 	  	
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91		0.97	0.95		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	2782	4121	1283	1434	4085		2730	2789		2730	4044	1259
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	2782	4121	1283	1434	4085		2730	2789		2730	4044	1259
Volume (vph)	430	821	231	37	1210	75	360	587	38	59	264	405
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	473	902	254	41	1330	82	396	645	42	65	290	445
RTOR Reduction (vph)	0	0	78	0	6	0	0	4	0	0	0	8
Lane Group Flow (vph)	473	902	176	41	1406	0	396	683	0	65	290	437
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	8%	8%	8%	8%	8%	8%
Turn Type	Prot		pm+ov	Prot			Prot			Prot		pm+ov
Protected Phases	7	4	5	3	8		5	2		1	6	7
Permitted Phases			4									6
Actuated Green, G (s)	18.0	50.4	65.4	4.2	36.6		15.0	26.2		3.2	14.4	32.4
Effective Green, g (s)	18.0	50.4	65.4	4.2	36.6		15.0	26.2		3.2	14.4	32.4
Actuated g/C Ratio	0.18	0.50	0.65	0.04	0.37		0.15	0.26		0.03	0.14	0.32
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	501	2077	890	60	1495		410	731		87	582	458
v/s Ratio Prot	0.17	0.22	0.03	0.03	c0.34		c0.15	c0.24		0.02	0.07	c0.17
v/s Ratio Perm			0.11									0.18
v/c Ratio	0.94	0.43	0.20	0.68	0.94		0.97	0.93		0.75	0.50	0.95
Uniform Delay, d1	40.5	15.7	6.9	47.2	30.6		42.2	36.1		48.0	39.5	33.1
Progression Factor	1.24	0.42	0.00	1.15	0.90		0.86	0.60		0.81	0.73	1.09
Incremental Delay, d2	24.5	0.1	0.1	20.7	9.2		17.3	8.6		26.8	2.8	28.6
Delay (s)	74.6	6.7	0.1	74.9	36.6		53.9	30.4		65.6	31.7	64.7
Level of Service	E	A	A	E	D		D	C		E	C	E
Approach Delay (s)		25.4			37.7			38.9			52.8	
Approach LOS		C			D			D			D	





























Intersection Summary

HCM Average Control Delay	36.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
71: Slauson Ave & Eastern Ave

2008 AM Peak Existing
1/23/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1421	2841	1271	1421	2841	1271	1407	2815	1259	1407	2815	1259
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1421	2841	1271	1421	2841	1271	1407	2815	1259	1407	2815	1259
Volume (vph)	164	697	158	87	650	64	215	810	123	65	386	94
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	178	758	172	95	707	70	234	880	134	71	420	102
RTOR Reduction (vph)	0	0	80	0	0	47	0	0	48	0	0	63
Lane Group Flow (vph)	178	758	92	95	707	23	234	880	86	71	420	39
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	8%	8%	8%	8%	8%	8%
Turn Type	Prot	pm+ov		Prot	pm+ov		Prot	pm+ov		Prot	pm+ov	
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	7
Permitted Phases		4			8			2			6	
Actuated Green, G (s)	13.8	31.0	49.9	9.4	26.6	32.2	18.9	38.0	47.4	5.6	24.7	38.5
Effective Green, g (s)	13.8	31.0	49.9	9.4	26.6	32.2	18.9	38.0	47.4	5.6	24.7	38.5
Actuated g/C Ratio	0.14	0.31	0.50	0.09	0.27	0.32	0.19	0.38	0.47	0.06	0.25	0.38
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	196	881	685	134	756	460	266	1070	647	79	695	535
v/s Ratio Prot	c0.13	c0.27	0.03	0.07	0.25	0.00	c0.17	c0.31	0.01	0.05	0.15	0.01
v/s Ratio Perm			0.05			0.01			0.06			0.02
v/c Ratio	0.91	0.86	0.13	0.71	0.94	0.05	0.88	0.82	0.13	0.90	0.60	0.07
Uniform Delay, d1	42.5	32.5	13.5	44.0	35.9	23.4	39.4	28.0	14.8	46.9	33.3	19.5
Progression Factor	0.96	0.60	1.28	0.67	1.10	3.37	0.93	0.34	0.29	1.33	0.65	0.27
Incremental Delay, d2	35.7	7.6	0.1	1.6	2.5	0.0	14.6	3.5	0.0	58.0	3.1	0.0
Delay (s)	76.4	27.1	17.3	30.8	42.1	78.7	51.3	13.1	4.3	120.5	24.9	5.4
Level of Service	E	C	B	C	D	E	D	B	A	F	C	A
Approach Delay (s)		33.5			43.8			19.3			33.0	
Approach LOS		C			D			B			C	
Intersection Summary												
HCM Average Control Delay	31.1		HCM Level of Service				C					
HCM Volume to Capacity ratio	0.83											
Actuated Cycle Length (s)	100.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	76.3%		ICU Level of Service				D					
Analysis Period (min)	15											

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
74: Bandini Blvd & Atlantic Ave

2008 AM Peak Existing
1/23/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↙	↕↕↕		↙	↕	↗	↙	↕↕↕↕		↙	↕↕↕	↗
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.86	0.86		1.00	1.00	1.00	1.00	0.81		1.00	0.86	0.86
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.97		1.00	0.98	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1199	3645		1394	1468	1248	1394	5767		1394	3710	1073
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1199	3645		1394	1468	1248	1394	5767		1394	3710	1073
Volume (vph)	236	615	205	134	256	138	56	1315	327	58	670	812
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	259	676	225	147	281	152	62	1445	359	64	736	892
RTOR Reduction (vph)	0	41	0	0	0	104	0	29	0	0	12	0
Lane Group Flow (vph)	259	860	0	147	281	48	62	1775	0	64	839	777
Heavy Vehicles (%)	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
Turn Type	Split			Split		pm+ov	Prot			Prot		Free
Protected Phases	4	4		8	8	1	5	2		1	6	
Permitted Phases						8						Free
Actuated Green, G (s)	37.2	37.2		30.1	30.1	38.3	9.2	50.5		8.2	49.5	150.0
Effective Green, g (s)	39.2	39.2		32.1	32.1	42.3	11.2	52.5		10.2	51.5	150.0
Actuated g/C Ratio	0.26	0.26		0.21	0.21	0.28	0.07	0.35		0.07	0.34	1.00
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	313	953		298	314	385	104	2018		95	1274	1073
v/s Ratio Prot	0.22	c0.24		0.11	c0.19	0.01	0.04	c0.31		0.05	0.23	
v/s Ratio Perm						0.03						c0.72
v/c Ratio	0.83	0.90		0.49	0.89	0.12	0.60	0.88		0.67	0.66	0.72
Uniform Delay, d1	52.2	53.6		51.8	57.3	40.1	67.2	45.8		68.3	41.8	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	16.2	11.6		1.3	26.0	0.1	8.9	5.9		17.2	2.7	4.3
Delay (s)	68.5	65.2		53.1	83.3	40.2	76.1	51.7		85.5	44.5	4.3
Level of Service	E	E		D	F	D	E	D		F	D	A
Approach Delay (s)		65.9			64.3			52.5			27.5	
Approach LOS		E			E			D			C	

Intersection Summary

HCM Average Control Delay	48.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙↘		↑↑	↗	↙	↑↑
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		0.95	1.00	1.00	0.95
Frt	0.98		1.00	0.85	1.00	1.00
Flt Protected	0.96		1.00	1.00	0.95	1.00
Satd. Flow (prot)	2479		2895	1153	1288	2895
Flt Permitted	0.96		1.00	1.00	0.50	1.00
Satd. Flow (perm)	2479		2895	1153	680	2895
Volume (vph)	874	100	369	109	100	176
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	883	101	373	110	101	178
RTOR Reduction (vph)	15	0	0	0	0	0
Lane Group Flow (vph)	969	0	373	110	101	178
Heavy Vehicles (%)	18%	18%	5%	18%	18%	5%
Turn Type				Free	Perm	
Protected Phases	6		8			4
Permitted Phases				Free		4
Actuated Green, G (s)	33.0		19.0	60.0	19.0	19.0
Effective Green, g (s)	33.0		19.0	60.0	19.0	19.0
Actuated g/C Ratio	0.55		0.32	1.00	0.32	0.32
Clearance Time (s)	4.0		4.0		4.0	4.0
Lane Grp Cap (vph)	1363		917	1153	215	917
v/s Ratio Prot	c0.39		0.13			0.06
v/s Ratio Perm				0.10	c0.15	
v/c Ratio	0.71		0.41	0.10	0.47	0.19
Uniform Delay, d1	10.0		16.1	0.0	16.5	14.9
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	3.2		1.3	0.2	7.2	0.5
Delay (s)	13.1		17.4	0.2	23.7	15.4
Level of Service	B		B	A	C	B
Approach Delay (s)	13.1		13.5			18.4
Approach LOS	B		B			B

Intersection Summary

HCM Average Control Delay	14.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0		4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97		1.00					0.95	1.00	1.00	0.95	
Frt	1.00		0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	2808		1295					2764	1295	1448	2764	
Flt Permitted	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	2808		1295					2764	1295	1448	2764	
Volume (vph)	357	0	99	0	0	0	0	1287	501	80	865	0
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	384	0	106	0	0	0	0	1384	539	86	930	0
RTOR Reduction (vph)	0	0	78	0	0	0	0	0	287	0	0	0
Lane Group Flow (vph)	384	0	28	0	0	0	0	1384	252	86	930	0
Heavy Vehicles (%)	5%	10%	5%	5%	10%	5%	5%	10%	5%	5%	10%	5%
Turn Type	custom		custom						Perm		Prot	
Protected Phases									8		7 4	
Permitted Phases	2		2						8			
Actuated Green, G (s)	16.0		16.0						28.0 28.0		4.0 36.0	
Effective Green, g (s)	16.0		16.0						28.0 28.0		4.0 36.0	
Actuated g/C Ratio	0.27		0.27						0.47 0.47		0.07 0.60	
Clearance Time (s)	4.0		4.0						4.0 4.0		4.0 4.0	
Lane Grp Cap (vph)	749		345						1290 604		97 1658	
v/s Ratio Prot									c0.50		c0.06 0.34	
v/s Ratio Perm	c0.14		0.02						0.19			
v/c Ratio	0.51		0.08						1.07 0.42		0.89 0.56	
Uniform Delay, d1	18.7		16.5						16.0 10.6		27.8 7.2	
Progression Factor	1.00		1.00						1.00 1.00		1.13 0.72	
Incremental Delay, d2	2.5		0.5						47.1 2.1		53.3 1.0	
Delay (s)	21.2		17.0						63.1 12.7		84.7 6.3	
Level of Service	C		B						E B		F A	
Approach Delay (s)	20.3		0.0						49.0		12.9	
Approach LOS	C		A						D		B	
Intersection Summary												
HCM Average Control Delay	34.2		HCM Level of Service				C					
HCM Volume to Capacity ratio	0.87											
Actuated Cycle Length (s)	60.0		Sum of lost time (s)				12.0					
Intersection Capacity Utilization	69.6%		ICU Level of Service				C					
Analysis Period (min)	15											
c Critical Lane Group												



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗↗	↘	↗↗			↗↗	↗
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)			4.0			4.0	4.0	4.0			4.0	
Lane Util. Factor			1.00			0.88	1.00	0.95			0.95	
Frt			0.86			0.85	1.00	1.00			1.00	
Flt Protected			1.00			1.00	0.95	1.00			1.00	
Satd. Flow (prot)			1318			2280	1448	2764			2764	
Flt Permitted			1.00			1.00	0.95	1.00			1.00	
Satd. Flow (perm)			1318			2280	1448	2764			2764	
Volume (vph)	0	0	422	0	0	273	249	1371	0	0	672	0
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	464	0	0	300	274	1507	0	0	738	0
RTOR Reduction (vph)	0	0	0	0	0	48	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	464	0	0	252	274	1507	0	0	738	0
Heavy Vehicles (%)	5%	10%	5%	5%	10%	5%	5%	10%	5%	5%	10%	5%
Turn Type			Free			custom	Prot					Perm
Protected Phases							5	2			6	
Permitted Phases			Free			4						6
Actuated Green, G (s)			60.0			16.0	13.0	36.0			19.0	
Effective Green, g (s)			60.0			16.0	13.0	36.0			19.0	
Actuated g/C Ratio			1.00			0.27	0.22	0.60			0.32	
Clearance Time (s)						4.0	4.0	4.0			4.0	
Lane Grp Cap (vph)			1318			608	314	1658			875	
v/s Ratio Prot							0.19	c0.55			0.27	
v/s Ratio Perm			c0.35			0.11						
v/c Ratio			0.35			0.42	0.87	0.91			0.84	
Uniform Delay, d1			0.0			18.1	22.7	10.6			19.1	
Progression Factor			1.00			1.00	1.17	0.59			1.00	
Incremental Delay, d2			0.7			2.1	11.0	3.3			9.7	
Delay (s)			0.7			20.2	37.7	9.6			28.8	
Level of Service			A			C	D	A			C	
Approach Delay (s)		0.7			20.2			13.9			28.8	
Approach LOS		A			C			B			C	
Intersection Summary												
HCM Average Control Delay			16.0			HCM Level of Service					B	
HCM Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			60.0			Sum of lost time (s)					4.0	
Intersection Capacity Utilization			63.0%			ICU Level of Service					B	
Analysis Period (min)			15									
c Critical Lane Group												



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘	↗
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0			4.0	4.0	4.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	2764			2764	1448	1295
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	2764			2764	1448	1295
Volume (vph)	659	0	0	1670	129	202
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	757	0	0	1920	148	232
RTOR Reduction (vph)	0	0	0	0	0	153
Lane Group Flow (vph)	757	0	0	1920	148	79
Heavy Vehicles (%)	10%	5%	5%	10%	5%	5%
Turn Type						Prot
Protected Phases	4			8	2	2
Permitted Phases						
Actuated Green, G (s)	36.0			36.0	16.0	16.0
Effective Green, g (s)	36.0			36.0	16.0	16.0
Actuated g/C Ratio	0.60			0.60	0.27	0.27
Clearance Time (s)	4.0			4.0	4.0	4.0
Lane Grp Cap (vph)	1658			1658	386	345
v/s Ratio Prot	0.27			c0.69	c0.10	0.06
v/s Ratio Perm						
v/c Ratio	0.46			1.16	0.38	0.23
Uniform Delay, d1	6.6			12.0	18.0	17.2
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.9			78.3	2.9	1.5
Delay (s)	7.5			90.3	20.8	18.7
Level of Service	A			F	C	B
Approach Delay (s)	7.5			90.3	19.5	
Approach LOS	A			F	B	

Intersection Summary			
HCM Average Control Delay	61.0	HCM Level of Service	E
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			
























Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑		
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	650	136	382	1427	0	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	699	146	411	1534	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)				638		
pX, platoon unblocked					0.55	
vC, conflicting volume			845		2361	423
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			845		2657	423
tC, single (s)			4.2		6.9	7.0
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			47		100	100
cM capacity (veh/h)			768		4	571

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	466	379	411	767	767
Volume Left	0	0	411	0	0
Volume Right	0	146	0	0	0
cSH	1700	1700	768	1700	1700
Volume to Capacity	0.27	0.22	0.53	0.45	0.45
Queue Length 95th (ft)	0	0	80	0	0
Control Delay (s)	0.0	0.0	14.9	0.0	0.0
Lane LOS			B		
Approach Delay (s)	0.0		3.2		
Approach LOS					

Intersection Summary					
Average Delay			2.2		
Intersection Capacity Utilization			70.0%	ICU Level of Service	C
Analysis Period (min)			15		

HCM Signalized Intersection Capacity Analysis
 116: Alondra Blvd & I 710 NB Ramp

2008 AM Peak Existing
 1/23/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			 							
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0				
Lane Util. Factor	1.00	0.91			0.95	1.00	1.00	1.00				
Frt	1.00	1.00			1.00	0.85	1.00	0.85				
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00				
Satd. Flow (prot)	1357	3900			2714	1214	1333	1193				
Flt Permitted	0.95	1.00			1.00	1.00	0.95	1.00				
Satd. Flow (perm)	1357	3900			2714	1214	1333	1193				
Volume (vph)	268	621	0	0	673	361	174	0	215	0	0	0
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
Adj. Flow (vph)	282	654	0	0	708	380	183	0	226	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	155	0	0	0	0
Lane Group Flow (vph)	282	654	0	0	708	380	183	71	0	0	0	0
Heavy Vehicles (%)	12%	12%	12%	12%	12%	12%	14%	14%	14%	14%	14%	14%
Turn Type	Prot				Free			Perm				
Protected Phases	7	4			8			2				
Permitted Phases						Free		2				
Actuated Green, G (s)	23.7	60.6			32.9	100.0	31.4	31.4				
Effective Green, g (s)	23.7	60.6			32.9	100.0	31.4	31.4				
Actuated g/C Ratio	0.24	0.61			0.33	1.00	0.31	0.31				
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0				
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0				
Lane Grp Cap (vph)	322	2363			893	1214	419	375				
v/s Ratio Prot	c0.21	0.17			c0.26			0.06				
v/s Ratio Perm						0.31	c0.14					
v/c Ratio	0.88	0.28			0.79	0.31	0.44	0.19				
Uniform Delay, d1	36.7	9.3			30.5	0.0	27.3	25.0				
Progression Factor	0.81	0.86			0.58	1.00	1.00	1.00				
Incremental Delay, d2	17.1	0.0			2.6	0.3	3.3	1.1				
Delay (s)	46.8	8.1			20.3	0.3	30.6	26.1				
Level of Service	D	A			C	A	C	C				
Approach Delay (s)		19.8			13.3			28.1			0.0	
Approach LOS		B			B			C			A	
Intersection Summary												
HCM Average Control Delay			18.3		HCM Level of Service				B			
HCM Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			100.0		Sum of lost time (s)				12.0			
Intersection Capacity Utilization			65.5%		ICU Level of Service				C			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 117: Alondra Blvd & I 710 SB Ramp

2008 AM Peak Existing
 1/23/2009

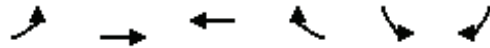
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑				↗			↗
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	595	299	197	645	0	0	0	280	0	0	389
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	640	322	212	694	0	0	0	301	0	0	418
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)		780			720							
pX, platoon unblocked	0.93						0.93	0.93		0.93	0.93	0.93
vC, conflicting volume	694			961			1828	1757	320	1738	2078	347
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	595			961			1816	1739	320	1718	2084	222
tC, single (s)	4.3			4.3			7.8	6.8	7.2	7.8	6.8	7.2
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.6	4.1	3.4
p0 queue free %	100			68			100	100	53	100	100	40
cM capacity (veh/h)	854			659			12	49	644	19	29	696
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	320	320	322	212	462	231	301	418				
Volume Left	0	0	0	212	0	0	0	0				
Volume Right	0	0	322	0	0	0	301	418				
cSH	1700	1700	1700	659	1700	1700	644	696				
Volume to Capacity	0.19	0.19	0.19	0.32	0.27	0.14	0.47	0.60				
Queue Length 95th (ft)	0	0	0	35	0	0	62	101				
Control Delay (s)	0.0	0.0	0.0	13.0	0.0	0.0	15.4	17.6				
Lane LOS				B			C	C				
Approach Delay (s)	0.0			3.0			15.4	17.6				
Approach LOS							C	C				
Intersection Summary												
Average Delay			5.7									
Intersection Capacity Utilization		56.4%		ICU Level of Service	B							
Analysis Period (min)		15										

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↑		↑↑↑	↘↘↘	↗
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.91	1.00		0.91	0.97	0.91
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	3971	1236		3971	2633	1105
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	3971	1236		3971	2633	1105
Volume (vph)	794	248	0	1033	584	183
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	882	276	0	1148	649	203
RTOR Reduction (vph)	0	0	0	0	0	41
Lane Group Flow (vph)	882	276	0	1148	649	162
Heavy Vehicles (%)	10%	10%	10%	10%	12%	12%
Turn Type		Free				Perm
Protected Phases	4			8	2	
Permitted Phases		Free				2
Actuated Green, G (s)	23.0	60.0		23.0	29.0	29.0
Effective Green, g (s)	23.0	60.0		23.0	29.0	29.0
Actuated g/C Ratio	0.38	1.00		0.38	0.48	0.48
Clearance Time (s)	4.0			4.0	4.0	4.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1522	1236		1522	1273	534
v/s Ratio Prot	0.22			c0.29	c0.25	
v/s Ratio Perm		0.22				0.15
v/c Ratio	0.58	0.22		0.75	0.51	0.30
Uniform Delay, d1	14.7	0.0		16.0	10.6	9.4
Progression Factor	0.78	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	0.4		2.2	1.5	1.5
Delay (s)	11.9	0.4		18.2	12.1	10.8
Level of Service	B	A		B	B	B
Approach Delay (s)	9.1			18.2	11.8	
Approach LOS	A			B	B	
Intersection Summary						
HCM Average Control Delay			13.2		HCM Level of Service	B
HCM Volume to Capacity ratio			0.62			
Actuated Cycle Length (s)			60.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			52.4%		ICU Level of Service	A
Analysis Period (min)			15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 119: Rosecrans Ave & I 710 SB Ramp

2008 AM Peak Existing
 1/23/2009



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑	↑	↑↑↑	↑
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.91	0.95	1.00	0.97	0.91
Frt		1.00	1.00	0.85	0.93	0.85
Flt Protected		1.00	1.00	1.00	0.97	1.00
Satd. Flow (prot)		3935	2739	1225	2495	1095
Flt Permitted		1.00	1.00	1.00	0.97	1.00
Satd. Flow (perm)		3935	2739	1225	2495	1095
Volume (vph)	0	864	1278	324	179	285
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	0	971	1436	364	201	320
RTOR Reduction (vph)	0	0	0	0	32	32
Lane Group Flow (vph)	0	971	1436	364	329	128
Heavy Vehicles (%)	11%	11%	11%	11%	13%	13%
Turn Type				Free		Perm
Protected Phases		4	8		6	
Permitted Phases				Free		6
Actuated Green, G (s)		35.0	35.0	60.0	17.0	17.0
Effective Green, g (s)		35.0	35.0	60.0	17.0	17.0
Actuated g/C Ratio		0.58	0.58	1.00	0.28	0.28
Clearance Time (s)		4.0	4.0		4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		2295	1598	1225	707	310
v/s Ratio Prot		0.25	c0.52		c0.13	
v/s Ratio Perm				0.30		0.12
v/c Ratio		0.42	0.90	0.30	0.47	0.41
Uniform Delay, d1		6.9	10.9	0.0	17.8	17.5
Progression Factor		1.00	0.79	1.00	1.00	1.00
Incremental Delay, d2		0.1	5.4	0.5	2.2	4.0
Delay (s)		7.0	14.1	0.5	20.0	21.5
Level of Service		A	B	A	B	C
Approach Delay (s)		7.0	11.3		20.4	
Approach LOS		A	B		C	

Intersection Summary

HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 120: I 710 SB & Wright Rd Off













2008 AM Peak Existing
 1/23/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0		4.0		4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00		1.00		0.95		1.00	0.95			0.95	
Frt	1.00		0.85		1.00		1.00	1.00			1.00	
Flt Protected	0.95		1.00		0.99		0.95	1.00			1.00	
Satd. Flow (prot)	1382		1236		2735		1369	2739			2727	
Flt Permitted	0.42		1.00		0.99		0.95	1.00			1.00	
Satd. Flow (perm)	612		1236		2735		1369	2739			2727	
Volume (vph)	1	0	376	41	320	12	300	556	0	0	387	11
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1	0	413	45	352	13	330	611	0	0	425	12
RTOR Reduction (vph)	0	0	295	0	4	0	0	0	0	0	4	0
Lane Group Flow (vph)	1	0	118	0	406	0	330	611	0	0	433	0
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	11%	11%	11%	11%	11%	11%
Turn Type	custom		Over	Perm			Prot					
Protected Phases			5		8		5	2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	13.3		17.2		13.3		17.2	38.7			17.5	
Effective Green, g (s)	13.3		17.2		13.3		17.2	38.7			17.5	
Actuated g/C Ratio	0.22		0.29		0.22		0.29	0.64			0.29	
Clearance Time (s)	4.0		4.0		4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0		3.0		3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	136		354		606		392	1767			795	
v/s Ratio Prot			0.10				c0.24	0.22			c0.16	
v/s Ratio Perm	0.00				0.15							
v/c Ratio	0.01		0.33		0.67		0.84	0.35			0.55	
Uniform Delay, d1	18.2		16.9		21.3		20.1	4.9			17.9	
Progression Factor	1.00		1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.0		0.6		2.9		15.0	0.5			2.7	
Delay (s)	18.2		17.4		24.3		35.1	5.4			20.6	
Level of Service	B		B		C		D	A			C	
Approach Delay (s)		17.4			24.3			15.8			20.6	
Approach LOS		B			C			B			C	
Intersection Summary												
HCM Average Control Delay			18.6				HCM Level of Service				B	
HCM Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			60.0				Sum of lost time (s)				12.0	
Intersection Capacity Utilization			63.1%				ICU Level of Service				B	
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 121: Firestone Blvd & I 710 NB













2008 AM Peak Existing
 1/23/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑		↑↑	↑	↑↑		↑↑			
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0		4.0			
Lane Util. Factor		0.86	0.86		0.91	0.91	0.97		0.88			
Frt		1.00	0.85		1.00	0.85	1.00		0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (prot)		3776	1073		2672	1135	2657		2156			
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (perm)		3776	1073		2672	1135	2657		2156			
Volume (vph)	0	1334	585	0	1422	654	386	0	330	0	0	0
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
Adj. Flow (vph)	0	1404	616	0	1497	688	406	0	347	0	0	0
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	98	0	0	0
Lane Group Flow (vph)	0	1430	588	0	1497	688	406	0	249	0	0	0
Heavy Vehicles (%)	9%	9%	9%	9%	9%	9%	11%	11%	11%	11%	11%	11%
Turn Type			Free			Free custom			custom			
Protected Phases		4			8							
Permitted Phases			Free			Free	2		2			
Actuated Green, G (s)		69.0	100.0		69.0	100.0	23.0		23.0			
Effective Green, g (s)		69.0	100.0		69.0	100.0	23.0		23.0			
Actuated g/C Ratio		0.69	1.00		0.69	1.00	0.23		0.23			
Clearance Time (s)		4.0			4.0		4.0		4.0			
Vehicle Extension (s)		3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)		2605	1073		1844	1135	611		496			
v/s Ratio Prot		0.38			c0.56							
v/s Ratio Perm			0.55			c0.61	0.15		0.12			
v/c Ratio		0.55	0.55		0.81	0.61	0.66		0.50			
Uniform Delay, d1		7.7	0.0		10.9	0.0	35.0		33.5			
Progression Factor		1.34	1.00		0.44	1.00	1.00		1.00			
Incremental Delay, d2		0.1	0.6		0.9	0.7	5.6		3.6			
Delay (s)		10.4	0.6		5.6	0.7	40.6		37.1			
Level of Service		B	A		A	A	D		D			
Approach Delay (s)		7.6			4.1			39.0			0.0	
Approach LOS		A			A			D			A	
Intersection Summary												
HCM Average Control Delay			10.8				HCM Level of Service		B			
HCM Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)		4.0			
Intersection Capacity Utilization			74.7%				ICU Level of Service		D			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 122: Firestone Blvd & I 710 SB

2008 AM Peak Existing
 1/23/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑	↑				↑↑		↑↑
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)		4.0			4.0	4.0				4.0		4.0
Lane Util. Factor		0.91			0.91	0.91				0.97		0.88
Frt		0.95			1.00	0.85				1.00		0.85
Flt Protected		1.00			1.00	1.00				0.95		1.00
Satd. Flow (prot)		3693			2600	1105				2657		2156
Flt Permitted		1.00			1.00	1.00				0.95		1.00
Satd. Flow (perm)		3693			2600	1105				2657		2156
Volume (vph)	0	1644	899	0	1353	487	0	0	0	247	0	552
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	1807	988	0	1487	535	0	0	0	271	0	607
RTOR Reduction (vph)	0	99	0	0	0	0	0	0	0	0	0	83
Lane Group Flow (vph)	0	2696	0	0	1487	535	0	0	0	271	0	524
Heavy Vehicles (%)	12%	12%	12%	12%	12%	12%	11%	11%	11%	11%	11%	11%
Turn Type						Free				custom		custom
Protected Phases		4			8							
Permitted Phases						Free				6		6
Actuated Green, G (s)		69.0			69.0	100.0				23.0		23.0
Effective Green, g (s)		69.0			69.0	100.0				23.0		23.0
Actuated g/C Ratio		0.69			0.69	1.00				0.23		0.23
Clearance Time (s)		4.0			4.0					4.0		4.0
Vehicle Extension (s)		3.0			3.0					3.0		3.0
Lane Grp Cap (vph)		2548			1794	1105				611		496
v/s Ratio Prot		c0.73			0.57							
v/s Ratio Perm						0.48				0.10		c0.24
v/c Ratio		1.06			0.83	0.48				0.44		1.06
Uniform Delay, d1		15.5			11.2	0.0				33.0		38.5
Progression Factor		0.21			0.62	1.00				1.00		1.00
Incremental Delay, d2		31.3			2.2	1.0				2.3		56.0
Delay (s)		34.5			9.2	1.0				35.3		94.5
Level of Service		C			A	A				D		F
Approach Delay (s)		34.5			7.0			0.0			76.3	
Approach LOS		C			A			A			E	
Intersection Summary												
HCM Average Control Delay			31.2				HCM Level of Service			C		
HCM Volume to Capacity ratio			1.06									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			80.2%				ICU Level of Service			D		
Analysis Period (min)			15									

c Critical Lane Group



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑↑	↑↑↑	
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	0.91			0.91	0.97	
Frt	1.00			1.00	0.92	
Flt Protected	1.00			1.00	0.98	
Satd. Flow (prot)	4007			4007	2556	
Flt Permitted	1.00			1.00	0.98	
Satd. Flow (perm)	4007			4007	2556	
Volume (vph)	659	0	0	1117	310	376
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	716	0	0	1214	337	409
RTOR Reduction (vph)	0	0	0	0	65	0
Lane Group Flow (vph)	716	0	0	1214	681	0
Heavy Vehicles (%)	9%	9%	9%	9%	9%	9%
Turn Type						
Protected Phases	4			8	2	
Permitted Phases						
Actuated Green, G (s)	23.7			23.7	28.3	
Effective Green, g (s)	23.7			23.7	28.3	
Actuated g/C Ratio	0.39			0.39	0.47	
Clearance Time (s)	4.0			4.0	4.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	1583			1583	1206	
v/s Ratio Prot	0.18			c0.30	c0.27	
v/s Ratio Perm						
v/c Ratio	0.45			0.77	0.56	
Uniform Delay, d1	13.4			15.8	11.4	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.2			2.3	1.9	
Delay (s)	13.6			18.0	13.3	
Level of Service	B			B	B	
Approach Delay (s)	13.6			18.0	13.3	
Approach LOS	B			B	B	
Intersection Summary						
HCM Average Control Delay			15.5		HCM Level of Service	B
HCM Volume to Capacity ratio			0.66			
Actuated Cycle Length (s)			60.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			56.9%		ICU Level of Service	B
Analysis Period (min)			15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 125: Washington Blvd & I 710 NB

2008 AM Peak Existing
 1/23/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	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		1.00	0.95	1.00		1.00		0.95	0.91	0.95
Frt	1.00	1.00		1.00	1.00	0.85		0.86		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00		0.95	0.95	1.00
Satd. Flow (prot)	1357	2714		1357	2714	1214		1214		1267	1213	1133
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00		0.76	0.76	1.00
Satd. Flow (perm)	1357	2714		1357	2714	1214		1214		1010	967	1133
Volume (vph)	105	636	0	1	792	279	0	0	1	249	0	188
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	112	677	0	1	843	297	0	0	1	265	0	200
RTOR Reduction (vph)	0	0	0	0	0	173	0	1	0	0	0	35
Lane Group Flow (vph)	112	677	0	1	843	124	0	0	0	133	132	165
Heavy Vehicles (%)	12%	12%	12%	12%	12%	12%	14%	14%	14%	14%	14%	14%
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		pm+ov
Protected Phases	7	4		3	8			2			6	7
Permitted Phases			4			8	2			6		6
Actuated Green, G (s)	7.6	31.9		0.8	25.1	25.1		15.3		15.3	15.3	22.9
Effective Green, g (s)	7.6	31.9		0.8	25.1	25.1		15.3		15.3	15.3	22.9
Actuated g/C Ratio	0.13	0.53		0.01	0.42	0.42		0.26		0.26	0.26	0.38
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	172	1443		18	1135	508		310		258	247	508
v/s Ratio Prot	c0.08	0.25		0.00	c0.31			0.00				c0.04
v/s Ratio Perm						0.10				0.13	c0.14	0.10
v/c Ratio	0.65	0.47		0.06	0.74	0.24		0.00		0.52	0.53	0.32
Uniform Delay, d1	24.9	8.8		29.2	14.7	11.3		16.7		19.2	19.3	13.1
Progression Factor	1.20	0.97		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	7.8	0.2		1.3	2.7	0.3		0.0		7.2	8.1	0.4
Delay (s)	37.7	8.8		30.5	17.4	11.6		16.7		26.4	27.3	13.5
Level of Service	D	A		C	B	B		B		C	C	B
Approach Delay (s)		12.9			15.9			16.7			21.1	
Approach LOS		B			B			B			C	

Intersection Summary

HCM Average Control Delay	15.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 126: Washington Blvd & I 710 SB

2008 AM Peak Existing
 1/23/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.91	0.95
Frt	1.00	1.00		1.00	0.97			1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.95		0.95	0.95	1.00
Satd. Flow (prot)	1369	2735		1369	2652			1345		1278	1224	1143
Flt Permitted	0.95	1.00		0.95	1.00			0.53		0.76	0.76	1.00
Satd. Flow (perm)	1369	2735		1369	2652			749		1018	975	1143
Volume (vph)	90	340	3	3	801	214	2	0	0	369	0	198
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	94	354	3	3	834	223	2	0	0	384	0	206
RTOR Reduction (vph)	0	1	0	0	35	0	0	0	0	0	0	159
Lane Group Flow (vph)	94	356	0	3	1022	0	0	2	0	192	192	47
Heavy Vehicles (%)	11%	11%	11%	11%	11%	11%	13%	13%	13%	13%	13%	13%
Turn Type	Prot			Prot			Perm			Perm		Perm
Protected Phases	7	4		3	8			2				6
Permitted Phases							2			6		6
Actuated Green, G (s)	4.8	33.4		0.8	29.4			13.8		13.8	13.8	13.8
Effective Green, g (s)	4.8	33.4		0.8	29.4			13.8		13.8	13.8	13.8
Actuated g/C Ratio	0.08	0.56		0.01	0.49			0.23		0.23	0.23	0.23
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	110	1522		18	1299			172		234	224	263
v/s Ratio Prot	c0.07	c0.13		0.00	c0.39							
v/s Ratio Perm								0.00		0.19	c0.20	0.04
v/c Ratio	0.85	0.23		0.17	0.79			0.01		0.82	0.86	0.18
Uniform Delay, d1	27.3	6.8		29.3	12.7			17.8		21.9	22.2	18.6
Progression Factor	1.00	1.00		1.25	0.28			1.00		1.00	1.00	1.00
Incremental Delay, d2	43.8	0.1		2.9	2.1			0.1		26.5	32.1	1.5
Delay (s)	71.0	6.9		39.6	5.6			18.0		48.4	54.3	20.1
Level of Service	E	A		D	A			B		D	D	C
Approach Delay (s)		20.2			5.7			18.0			40.4	
Approach LOS		C			A			B			D	





























Intersection Summary

HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 161: Del Amo Blvd & Susana Road

2008 AM Peak Existing
 1/29/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			 			 			 	  
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00		1.00		0.95	0.95	0.88
Frt	1.00	0.99		1.00	1.00	0.85		0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98		0.95	0.97	1.00
Satd. Flow (prot)	1394	3979		1394	2789	1248		1283		1224	1249	2028
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.85		0.95	0.81	1.00
Satd. Flow (perm)	1394	3979		1394	2789	1248		1111		1224	1040	2028
Volume (vph)	130	598	30	22	1339	188	24	19	15	168	40	680
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	143	657	33	24	1471	207	26	21	16	185	44	747
RTOR Reduction (vph)	0	5	0	0	0	82	0	13	0	0	0	20
Lane Group Flow (vph)	143	685	0	24	1471	125	0	50	0	111	118	727
Heavy Vehicles (%)	9%	9%	9%	9%	9%	9%	18%	18%	18%	18%	18%	18%
Turn Type	Prot			Prot		pm+ov		Perm		Prot		pm+ov
Protected Phases	7	4		3	8	1		2		1	6	7
Permitted Phases						8		2				6
Actuated Green, G (s)	10.0	59.0		2.4	51.4	60.4		13.6		9.0	26.6	36.6
Effective Green, g (s)	10.0	59.0		2.4	51.4	60.4		13.6		9.0	26.6	36.6
Actuated g/C Ratio	0.10	0.59		0.02	0.51	0.60		0.14		0.09	0.27	0.37
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	139	2348		33	1434	804		151		110	295	823
v/s Ratio Prot	c0.10	0.17		0.02	c0.53	0.01				0.09	0.04	c0.09
v/s Ratio Perm						0.09		0.05			0.07	0.27
v/c Ratio	1.03	0.29		0.73	1.03	0.16		0.33		1.01	0.40	0.88
Uniform Delay, d1	45.0	10.2		48.5	24.3	8.7		39.1		45.5	30.1	29.7
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	84.2	0.1		56.6	30.6	0.1		5.8		88.3	0.9	11.0
Delay (s)	129.2	10.2		105.0	54.9	8.7		44.9		133.8	31.0	40.7
Level of Service	F	B		F	D	A		D		F	C	D
Approach Delay (s)		30.6			50.0			44.9			50.1	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM Average Control Delay	45.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

86: E Olympic Blvd & I-710 NB (off)

1/18/2010



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗↗			↖↖		↖	↕			↕	
Volume (vph)	69	468	0	0	761	3	280	38	207	35	0	199
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95			0.95		0.95	0.95			1.00	
Fr _t	1.00	1.00			1.00		1.00	0.89			0.89	
Fl _t Protected	0.95	1.00			1.00		0.95	0.99			0.99	
Satd. Flow (prot)	1598	3195			3194		1518	1409			1478	
Fl _t Permitted	0.21	1.00			1.00		0.95	0.99			0.99	
Satd. Flow (perm)	349	3195			3194		1518	1409			1478	
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
Adj. Flow (vph)	73	493	0	0	801	3	295	40	218	37	0	209
RTOR Reduction (vph)	0	0	0	0	1	0	0	151	0	0	114	0
Lane Group Flow (vph)	73	493	0	0	803	0	265	137	0	0	132	0
Turn Type	Perm							Split		Split		
Protected Phases		4			8		2	2		6	6	
Permitted Phases	4											
Actuated Green, G (s)	19.3	19.3			19.3		18.4	18.4			10.3	
Effective Green, g (s)	19.3	19.3			19.3		18.4	18.4			10.3	
Actuated g/C Ratio	0.32	0.32			0.32		0.31	0.31			0.17	
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	112	1028			1027		466	432			254	
v/s Ratio Prot		0.15			c0.25		c0.17	0.10			c0.09	
v/s Ratio Perm	0.21											
v/c Ratio	0.65	0.48			0.78		0.57	0.32			0.52	
Uniform Delay, d ₁	17.5	16.3			18.4		17.5	16.0			22.6	
Progression Factor	0.72	0.70			0.69		1.00	1.00			1.33	
Incremental Delay, d ₂	12.4	0.3			3.6		5.0	1.9			1.8	
Delay (s)	25.0	11.8			16.4		22.4	17.9			31.9	
Level of Service	C	B			B		C	B			C	
Approach Delay (s)		13.5			16.4			20.1			31.9	
Approach LOS		B			B			C			C	

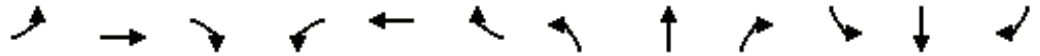
Intersection Summary

HCM Average Control Delay	18.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

135: Floral Dr & I-710 SB (off)

1/18/2010



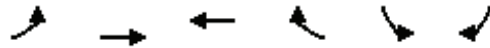
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↻			↻			↻		↻	↻	
Volume (vph)	0	519	21	18	411	0	6	0	49	181	36	74
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Fr _t		0.99			1.00			0.88		1.00	0.90	
Fl _t Protected		1.00			1.00			0.99		0.95	1.00	
Satd. Flow (prot)		1673			1678			1471		1598	1512	
Fl _t Permitted		1.00			0.83			0.99		0.95	1.00	
Satd. Flow (perm)		1673			1403			1471		1598	1512	
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
Adj. Flow (vph)	0	546	22	19	433	0	6	0	52	191	38	78
RTOR Reduction (vph)	0	2	0	0	0	0	0	38	0	0	64	0
Lane Group Flow (vph)	0	566	0	0	452	0	0	20	0	191	52	0
Turn Type				Perm			Split			Split		
Protected Phases		4			8		2	2		6	6	
Permitted Phases				8								
Actuated Green, G (s)		26.1			26.1			19.0		12.9	12.9	
Effective Green, g (s)		26.1			26.1			19.0		12.9	12.9	
Actuated g/C Ratio		0.37			0.37			0.27		0.18	0.18	
Clearance Time (s)		4.0			4.0			4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		624			523			399		294	279	
v/s Ratio Prot		c0.34						c0.01		c0.12	0.03	
v/s Ratio Perm					0.32							
v/c Ratio		0.91			0.86			0.05		0.65	0.19	
Uniform Delay, d ₁		20.8			20.3			18.8		26.5	24.1	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d ₂		16.9			13.9			0.2		4.9	0.3	
Delay (s)		37.7			34.2			19.1		31.3	24.5	
Level of Service		D			C			B		C	C	
Approach Delay (s)		37.7			34.2			19.1			28.7	
Approach LOS		D			C			B			C	

Intersection Summary

HCM Average Control Delay	33.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 137: Ramona Blvd & I-710 SB (on)

1/18/2010



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	96	185	1078	160	0	0
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	4.0	4.0	4.0			
Lane Util. Factor	1.00	0.95	0.95			
Frt	1.00	1.00	0.98			
Flt Protected	0.95	1.00	1.00			
Satd. Flow (prot)	1598	3195	3134			
Flt Permitted	0.95	1.00	1.00			
Satd. Flow (perm)	1598	3195	3134			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	101	195	1135	168	0	0
RTOR Reduction (vph)	0	0	16	0	0	0
Lane Group Flow (vph)	101	195	1287	0	0	0
Turn Type	Prot					
Protected Phases	7	4	8			
Permitted Phases						
Actuated Green, G (s)	7.6	60.0	44.4			
Effective Green, g (s)	7.6	60.0	44.4			
Actuated g/C Ratio	0.13	1.00	0.74			
Clearance Time (s)	4.0	4.0	4.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	202	3195	2319			
v/s Ratio Prot	c0.06	0.06	c0.41			
v/s Ratio Perm						
v/c Ratio	0.50	0.06	0.56			
Uniform Delay, d1	24.4	0.0	3.4			
Progression Factor	1.00	1.00	1.00			
Incremental Delay, d2	1.9	0.0	0.3			
Delay (s)	26.4	0.0	3.7			
Level of Service	C	A	A			
Approach Delay (s)		9.0	3.7		0.0	
Approach LOS		A	A		A	

Intersection Summary				
HCM Average Control Delay		4.7	HCM Level of Service	A
HCM Volume to Capacity ratio		0.55		
Actuated Cycle Length (s)		60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization		48.0%	ICU Level of Service	A
Analysis Period (min)		15		
c	Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 10: Pier B St & 9th St

2008 MD Existing_Long Beach Area
 12/7/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↕		↘	↕	↘		↕	↘		↕	
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00		0.95	1.00		0.95	
Frt	1.00	0.93		1.00	1.00	0.85		1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96	1.00		0.97	
Satd. Flow (prot)	1345	1744		1927	1111	965		1945	855		1838	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.96	1.00		0.97	
Satd. Flow (perm)	1345	1744		1927	1111	965		1945	855		1838	
Volume (vph)	4	55	44	201	59	128	101	34	176	27	10	7
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	5	63	51	231	68	147	116	39	202	31	11	8
RTOR Reduction (vph)	0	41	0	0	0	81	0	0	0	0	7	0
Lane Group Flow (vph)	5	73	0	231	68	66	0	155	202	0	43	0
Heavy Vehicles (%)	13%	81%	40%	53%	44%	41%	67%	2%	59%	67%	67%	2%
Turn Type	Prot			Prot		Perm	Split		Free	Split		
Protected Phases	7	2		1	6		8	8		4	4	
Permitted Phases						6			Free			
Actuated Green, G (s)	5.0	20.0		21.0	45.0	45.0		17.0	100.0		17.0	
Effective Green, g (s)	5.0	20.0		21.0	45.0	45.0		17.0	100.0		17.0	
Actuated g/C Ratio	0.05	0.20		0.21	0.45	0.45		0.17	1.00		0.17	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	
Lane Grp Cap (vph)	67	349		405	500	434		331	855		312	
v/s Ratio Prot	0.00	0.04		c0.12	0.06			c0.08			0.02	
v/s Ratio Perm						0.07			c0.24			
v/c Ratio	0.07	0.21		0.57	0.14	0.15		0.47	0.24		0.14	
Uniform Delay, d1	45.3	33.4		35.5	16.1	16.2		37.4	0.0		35.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2	2.2	1.4		5.7	0.6	0.7		4.7	0.7		0.9	
Delay (s)	47.4	34.8		41.2	16.7	17.0		42.1	0.7		36.2	
Level of Service	D	C		D	B	B		D	A		D	
Approach Delay (s)		35.3			29.5			18.7			36.2	
Approach LOS		D			C			B			D	

Intersection Summary

HCM Average Control Delay	26.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	33.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
65: Florence Ave & Eastern Ave

2008 MD Peak Existing
1/23/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↕↕↕	↖	↖	↕↕↕		↖↗	↕↕		↖↗	↕↕↕	↖
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91		0.97	0.95		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	2730	4044	1259	1407	3955		2633	2654		2633	3900	1214
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	2730	4044	1259	1407	3955		2633	2654		2633	3900	1214
Volume (vph)	347	889	463	86	925	161	270	433	75	186	419	380
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	373	956	498	92	995	173	290	466	81	200	451	409
RTOR Reduction (vph)	0	0	105	0	24	0	0	14	0	0	0	19
Lane Group Flow (vph)	373	956	393	92	1144	0	290	533	0	200	451	390
Heavy Vehicles (%)	8%	8%	8%	8%	8%	8%	12%	12%	12%	12%	12%	12%
Turn Type	Prot		pm+ov	Prot			Prot			Prot		pm+ov
Protected Phases	7	4	5	3	8		5	2		1	6	7
Permitted Phases			4									6
Actuated Green, G (s)	16.1	39.3	53.0	9.3	32.5		13.7	25.3		10.1	21.7	37.8
Effective Green, g (s)	16.1	39.3	53.0	9.3	32.5		13.7	25.3		10.1	21.7	37.8
Actuated g/C Ratio	0.16	0.39	0.53	0.09	0.32		0.14	0.25		0.10	0.22	0.38
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	440	1589	718	131	1285		361	671		266	846	507
v/s Ratio Prot	c0.14	0.24	0.07	0.07	c0.29		c0.11	c0.20		0.08	0.12	c0.12
v/s Ratio Perm			0.24									0.20
v/c Ratio	0.85	0.60	0.55	0.70	0.89		0.80	0.79		0.75	0.53	0.77
Uniform Delay, d1	40.8	24.1	15.6	44.0	32.1		41.8	34.9		43.7	34.7	27.3
Progression Factor	1.23	0.56	0.30	1.03	0.81		1.09	0.68		0.80	0.81	1.09
Incremental Delay, d2	12.2	0.5	0.7	14.1	7.2		8.8	6.7		10.5	2.2	6.4
Delay (s)	62.2	14.1	5.3	59.6	33.2		54.2	30.6		45.2	30.4	36.0
Level of Service	E	B	A	E	C		D	C		D	C	D
Approach Delay (s)		21.5			35.1			38.8			35.4	
Approach LOS		C			D			D			D	





























Intersection Summary

HCM Average Control Delay	30.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
71: Slauson Ave & Eastern Ave

2008 MD Peak Existing
1/23/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1407	2815	1259	1407	2815	1259	1357	2714	1214	1357	2714	1214
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1407	2815	1259	1407	2815	1259	1357	2714	1214	1357	2714	1214
Volume (vph)	129	460	163	123	413	45	219	526	129	65	506	133
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	134	479	170	128	430	47	228	548	134	68	527	139
RTOR Reduction (vph)	0	0	98	0	0	34	0	0	60	0	0	79
Lane Group Flow (vph)	134	479	72	128	430	13	228	548	74	68	527	60
Heavy Vehicles (%)	8%	8%	8%	8%	8%	8%	12%	12%	12%	12%	12%	12%
Turn Type	Prot	pm+ov		Prot	pm+ov		Prot	pm+ov		Prot	pm+ov	
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	7
Permitted Phases		4			8			2			6	
Actuated Green, G (s)	12.3	19.9	40.3	12.5	20.1	28.7	20.4	43.0	55.5	8.6	31.2	43.5
Effective Green, g (s)	12.3	19.9	40.3	12.5	20.1	28.7	20.4	43.0	55.5	8.6	31.2	43.5
Actuated g/C Ratio	0.12	0.20	0.40	0.12	0.20	0.29	0.20	0.43	0.56	0.09	0.31	0.44
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	173	560	558	176	566	412	277	1167	722	117	847	577
v/s Ratio Prot	c0.10	c0.17	0.03	0.09	0.15	0.00	c0.17	0.20	0.01	0.05	c0.19	0.01
v/s Ratio Perm			0.03			0.01			0.05			0.04
v/c Ratio	0.77	0.86	0.13	0.73	0.76	0.03	0.82	0.47	0.10	0.58	0.62	0.10
Uniform Delay, d1	42.5	38.7	18.8	42.1	37.7	25.7	38.1	20.4	10.5	44.0	29.4	16.7
Progression Factor	1.31	0.68	0.76	0.77	1.04	3.10	1.06	0.48	0.37	1.33	0.66	0.19
Incremental Delay, d2	17.1	10.9	0.1	9.4	3.8	0.0	10.3	0.7	0.0	6.4	3.1	0.1
Delay (s)	72.8	37.3	14.4	41.7	43.0	79.4	50.4	10.6	3.9	64.8	22.4	3.2
Level of Service	E	D	B	D	D	E	D	B	A	E	C	A
Approach Delay (s)		38.4			45.6			19.6			22.7	
Approach LOS		D			D			B			C	

Intersection Summary

HCM Average Control Delay	30.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
74: Bandini Blvd & Atlantic Ave

2008 MD Peak Existing
1/23/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↕↕↕		↘	↕	↗	↘	↕↕↕↕		↘	↕↕↕	↗
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.86	0.86		1.00	1.00	1.00	1.00	0.81		1.00	0.86	0.86
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1137	3374		1322	1391	1183	1322	5484		1322	3590	1017
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1137	3374		1322	1391	1183	1322	5484		1322	3590	1017
Volume (vph)	274	505	338	165	164	275	50	1053	229	79	640	367
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	291	537	360	176	174	293	53	1120	244	84	681	390
RTOR Reduction (vph)	0	84	0	0	0	138	0	24	0	0	0	0
Lane Group Flow (vph)	284	820	0	176	174	155	53	1340	0	84	681	390
Heavy Vehicles (%)	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Turn Type	Split			Split		pm+ov	Prot			Prot		Free
Protected Phases	4	4		8	8	1	5	2		1	6	
Permitted Phases						8						Free
Actuated Green, G (s)	42.1	42.1		22.7	22.7	35.1	8.5	48.8		12.4	52.7	150.0
Effective Green, g (s)	44.1	44.1		24.7	24.7	39.1	10.5	50.8		14.4	54.7	150.0
Actuated g/C Ratio	0.29	0.29		0.16	0.16	0.26	0.07	0.34		0.10	0.36	1.00
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	334	992		218	229	340	93	1857		127	1309	1017
v/s Ratio Prot	c0.25	0.24		c0.13	0.13	0.04	0.04	c0.24		c0.06	0.19	
v/s Ratio Perm						0.09						c0.38
v/c Ratio	0.85	0.87dr		0.81	0.76	0.46	0.57	0.72		0.66	0.52	0.38
Uniform Delay, d1	49.8	49.4		60.4	59.8	46.5	67.6	43.4		65.4	37.4	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	18.3	5.7		19.3	13.5	1.0	7.8	2.5		12.2	1.5	1.1
Delay (s)	68.1	55.1		79.6	73.3	47.5	75.4	45.9		77.6	38.8	1.1
Level of Service	E	E		E	E	D	E	D		E	D	A
Approach Delay (s)		58.2			63.3			47.0			28.9	
Approach LOS		E			E			D			C	

Intersection Summary

HCM Average Control Delay	47.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.























c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↰		↱↱	↰	↰	↱↱
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		0.95	1.00	1.00	0.95
Frt	0.98		1.00	0.85	1.00	1.00
Flt Protected	0.96		1.00	1.00	0.95	1.00
Satd. Flow (prot)	2265		2895	1054	1448	2357
Flt Permitted	0.96		1.00	1.00	0.53	1.00
Satd. Flow (perm)	2265		2895	1054	815	2357
Volume (vph)	508	64	328	131	73	291
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	540	68	349	139	78	310
RTOR Reduction (vph)	17	0	0	0	0	0
Lane Group Flow (vph)	592	0	349	139	78	310
Heavy Vehicles (%)	29%	29%	5%	29%	5%	29%
Turn Type				Free	Perm	
Protected Phases	6		8			4
Permitted Phases				Free	4	
Actuated Green, G (s)	30.0		22.0	60.0	22.0	22.0
Effective Green, g (s)	30.0		22.0	60.0	22.0	22.0
Actuated g/C Ratio	0.50		0.37	1.00	0.37	0.37
Clearance Time (s)	4.0		4.0		4.0	4.0
Lane Grp Cap (vph)	1133		1062	1054	299	864
v/s Ratio Prot	c0.26		0.12			c0.13
v/s Ratio Perm				0.13	0.10	
v/c Ratio	0.52		0.33	0.13	0.26	0.36
Uniform Delay, d1	10.1		13.7	0.0	13.3	13.9
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7		0.8	0.3	2.1	1.2
Delay (s)	11.9		14.5	0.3	15.4	15.0
Level of Service	B		B	A	B	B
Approach Delay (s)	11.9		10.5			15.1
Approach LOS	B		B			B

Intersection Summary

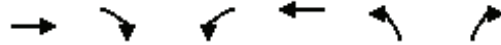
HCM Average Control Delay	12.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 							 		 	 	
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0		4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97		1.00					0.95	1.00	1.00	0.95	
Frt	1.00		0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	2808		1295					2764	1295	1448	2764	
Flt Permitted	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	2808		1295					2764	1295	1448	2764	
Volume (vph)	93	0	126	0	0	0	0	592	297	180	937	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	97	0	131	0	0	0	0	617	309	188	976	0
RTOR Reduction (vph)	0	0	86	0	0	0	0	0	216	0	0	0
Lane Group Flow (vph)	97	0	45	0	0	0	0	617	93	188	976	0
Heavy Vehicles (%)	5%	10%	5%	5%	10%	5%	5%	10%	5%	5%	10%	5%
Turn Type	custom		custom						Perm		Prot	
Protected Phases									8		7	4
Permitted Phases	2		2						8			
Actuated Green, G (s)	17.0		17.0						18.0	18.0	13.0	35.0
Effective Green, g (s)	17.0		17.0						18.0	18.0	13.0	35.0
Actuated g/C Ratio	0.28		0.28						0.30	0.30	0.22	0.58
Clearance Time (s)	4.0		4.0						4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	796		367						829	389	314	1612
v/s Ratio Prot									c0.22		0.13	c0.35
v/s Ratio Perm	0.03		c0.03						0.07			
v/c Ratio	0.12		0.12						0.74	0.24	0.60	0.61
Uniform Delay, d1	16.0		16.0						18.9	15.8	21.2	8.1
Progression Factor	1.00		1.00						1.00	1.00	0.66	0.63
Incremental Delay, d2	0.3		0.7						6.0	1.4	6.4	1.3
Delay (s)	16.3		16.6						24.9	17.3	20.4	6.4
Level of Service	B		B						C	B	C	A
Approach Delay (s)			16.5		0.0				22.4		8.6	
Approach LOS			B		A				C		A	
Intersection Summary												
HCM Average Control Delay			14.9		HCM Level of Service						B	
HCM Volume to Capacity ratio			0.51									
Actuated Cycle Length (s)			60.0		Sum of lost time (s)						12.0	
Intersection Capacity Utilization			46.7%		ICU Level of Service						A	
Analysis Period (min)			15									
c Critical Lane Group												



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗↗	↘	↕↕			↕↕	↗
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)			4.0			4.0	4.0	4.0			4.0	4.0
Lane Util. Factor			1.00			0.88	1.00	0.95			0.95	1.00
Frt			0.86			0.85	1.00	1.00			1.00	0.85
Flt Protected			1.00			1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)			1318			2280	1448	2764			2764	1295
Flt Permitted			1.00			1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)			1318			2280	1448	2764			2764	1295
Volume (vph)	0	0	320	0	0	189	103	630	0	0	816	197
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
Adj. Flow (vph)	0	0	337	0	0	199	108	663	0	0	859	207
RTOR Reduction (vph)	0	0	0	0	0	146	0	0	0	0	0	124
Lane Group Flow (vph)	0	0	337	0	0	53	108	663	0	0	859	83
Heavy Vehicles (%)	5%	10%	5%	5%	10%	5%	5%	10%	5%	5%	10%	5%
Turn Type			Free			custom	Prot					Perm
Protected Phases							5	2			6	
Permitted Phases			Free			4						6
Actuated Green, G (s)			60.0			16.0	8.0	36.0			24.0	24.0
Effective Green, g (s)			60.0			16.0	8.0	36.0			24.0	24.0
Actuated g/C Ratio			1.00			0.27	0.13	0.60			0.40	0.40
Clearance Time (s)						4.0	4.0	4.0			4.0	4.0
Lane Grp Cap (vph)			1318			608	193	1658			1106	518
v/s Ratio Prot							c0.07	0.24			c0.31	
v/s Ratio Perm			c0.26			0.02						0.06
v/c Ratio			0.26			0.09	0.56	0.40			0.78	0.16
Uniform Delay, d1			0.0			16.5	24.4	6.3			15.7	11.5
Progression Factor			1.00			1.00	1.72	0.13			1.00	1.00
Incremental Delay, d2			0.5			0.3	9.0	0.6			5.4	0.7
Delay (s)			0.5			16.8	50.9	1.4			21.0	12.2
Level of Service			A			B	D	A			C	B
Approach Delay (s)		0.5			16.8			8.3			19.3	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	12.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↵	↵
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0			4.0	4.0	4.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	2764			2764	1448	1295
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	2764			2764	1448	1295
Volume (vph)	496	0	0	574	66	193
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	533	0	0	617	71	208
RTOR Reduction (vph)	0	0	0	0	0	128
Lane Group Flow (vph)	533	0	0	617	71	80
Heavy Vehicles (%)	10%	5%	5%	10%	5%	5%
Turn Type						Prot
Protected Phases	4			8	2	2
Permitted Phases						
Actuated Green, G (s)	29.0			29.0	23.0	23.0
Effective Green, g (s)	29.0			29.0	23.0	23.0
Actuated g/C Ratio	0.48			0.48	0.38	0.38
Clearance Time (s)	4.0			4.0	4.0	4.0
Lane Grp Cap (vph)	1336			1336	555	496
v/s Ratio Prot	0.19			c0.22	0.05	c0.06
v/s Ratio Perm						
v/c Ratio	0.40			0.46	0.13	0.16
Uniform Delay, d1	9.9			10.3	12.0	12.2
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.9			1.2	0.5	0.7
Delay (s)	10.8			11.5	12.5	12.9
Level of Service	B			B	B	B
Approach Delay (s)	10.8			11.5	12.8	
Approach LOS	B			B	B	

Intersection Summary

HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↙	↑↑		
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	486	63	149	509	0	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	506	66	155	530	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)				638		
pX, platoon unblocked						
vC, conflicting volume			572		1115	286
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			572		1115	286
tC, single (s)			4.2		6.9	7.0
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			84		100	100
cM capacity (veh/h)			976		166	702

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	338	234	155	265	265
Volume Left	0	0	155	0	0
Volume Right	0	66	0	0	0
cSH	1700	1700	976	1700	1700
Volume to Capacity	0.20	0.14	0.16	0.16	0.16
Queue Length 95th (ft)	0	0	14	0	0
Control Delay (s)	0.0	0.0	9.4	0.0	0.0
Lane LOS			A		
Approach Delay (s)	0.0		2.1		
Approach LOS					

Intersection Summary					
Average Delay			1.2		
Intersection Capacity Utilization			37.1%	ICU Level of Service	A
Analysis Period (min)			15		

HCM Signalized Intersection Capacity Analysis
 116: Alondra Blvd & I 710 NB Ramp













2008 MD Peak Existing
 1/23/2009

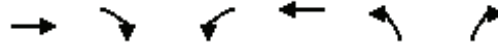
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0				
Lane Util. Factor	1.00	0.91			0.95	1.00	1.00	1.00				
Frt	1.00	1.00			1.00	0.85	1.00	0.85				
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00				
Satd. Flow (prot)	1256	3610			2512	1124	1256	1125				
Flt Permitted	0.95	1.00			1.00	1.00	0.95	1.00				
Satd. Flow (perm)	1256	3610			2512	1124	1256	1125				
Volume (vph)	273	579	0	0	548	318	219	1	197	0	0	0
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	294	623	0	0	589	342	235	1	212	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	144	0	0	0	0
Lane Group Flow (vph)	294	623	0	0	589	342	235	69	0	0	0	0
Heavy Vehicles (%)	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%
Turn Type	Prot			Free			Perm					
Protected Phases	7	4			8			2				
Permitted Phases						Free		2				
Actuated Green, G (s)	26.6	59.7			29.1	100.0	32.3	32.3				
Effective Green, g (s)	26.6	59.7			29.1	100.0	32.3	32.3				
Actuated g/C Ratio	0.27	0.60			0.29	1.00	0.32	0.32				
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0				
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0				
Lane Grp Cap (vph)	334	2155			731	1124	406	363				
v/s Ratio Prot	c0.23	0.17			c0.23			0.06				
v/s Ratio Perm						0.30	c0.19					
v/c Ratio	0.88	0.29			0.81	0.30	0.58	0.19				
Uniform Delay, d1	35.2	9.8			32.8	0.0	28.2	24.4				
Progression Factor	0.71	0.68			0.58	1.00	1.00	1.00				
Incremental Delay, d2	20.2	0.1			2.3	0.2	5.9	1.2				
Delay (s)	45.1	6.7			21.2	0.2	34.1	25.6				
Level of Service	D	A			C	A	C	C				
Approach Delay (s)		19.0			13.5			30.1			0.0	
Approach LOS		B			B			C			A	
Intersection Summary												
HCM Average Control Delay		19.0			HCM Level of Service			B				
HCM Volume to Capacity ratio		0.75										
Actuated Cycle Length (s)		100.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		60.5%			ICU Level of Service			B				
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 117: Alondra Blvd & I 710 SB Ramp

2008 MD Peak Existing
 1/23/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑				↗			↖
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	603	214	164	544	0	0	0	287	0	0	352
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	628	223	171	567	0	0	0	299	0	0	367
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)		780			720							
pX, platoon unblocked												
vC, conflicting volume	567			851			1620	1536	314	1521	1759	283
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	567			851			1620	1536	314	1521	1759	283
tC, single (s)	4.5			4.5			7.9	6.9	7.3	7.9	6.9	7.3
tC, 2 stage (s)												
tF (s)	2.4			2.4			3.7	4.2	3.5	3.7	4.2	3.5
p0 queue free %	100			75			100	100	52	100	100	44
cM capacity (veh/h)	881			673			20	72	629	29	51	660
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	314	314	223	171	378	189	299	367				
Volume Left	0	0	0	171	0	0	0	0				
Volume Right	0	0	223	0	0	0	299	367				
cSH	1700	1700	1700	673	1700	1700	629	660				
Volume to Capacity	0.18	0.18	0.13	0.25	0.22	0.11	0.48	0.56				
Queue Length 95th (ft)	0	0	0	25	0	0	64	86				
Control Delay (s)	0.0	0.0	0.0	12.2	0.0	0.0	15.8	17.1				
Lane LOS				B			C	C				
Approach Delay (s)	0.0			2.8			15.8	17.1				
Approach LOS							C	C				
Intersection Summary												
Average Delay			5.8									
Intersection Capacity Utilization		50.4%		ICU Level of Service	A							
Analysis Period (min)			15									



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↑		↑↑↑	↑↑↑	↑
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.91	1.00		0.91	0.97	0.91
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	3551	1106		3551	2397	1006
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	3551	1106		3551	2397	1006
Volume (vph)	622	193	0	577	333	138
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	641	199	0	595	343	142
RTOR Reduction (vph)	0	0	0	0	0	55
Lane Group Flow (vph)	641	199	0	595	343	87
Heavy Vehicles (%)	23%	23%	23%	23%	23%	23%
Turn Type		Free				Perm
Protected Phases	4			8	2	
Permitted Phases		Free				2
Actuated Green, G (s)	15.4	60.0		15.4	36.6	36.6
Effective Green, g (s)	15.4	60.0		15.4	36.6	36.6
Actuated g/C Ratio	0.26	1.00		0.26	0.61	0.61
Clearance Time (s)	4.0			4.0	4.0	4.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	911	1106		911	1462	614
v/s Ratio Prot	c0.18			0.17	c0.14	
v/s Ratio Perm		0.18				0.09
v/c Ratio	0.70	0.18		0.65	0.23	0.14
Uniform Delay, d1	20.2	0.0		19.9	5.3	5.0
Progression Factor	0.85	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.4	0.3		1.7	0.4	0.5
Delay (s)	19.5	0.3		21.6	5.7	5.5
Level of Service	B	A		C	A	A
Approach Delay (s)	15.0			21.6	5.6	
Approach LOS	B			C	A	

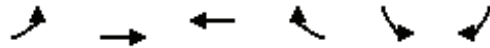
Intersection Summary

HCM Average Control Delay	14.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	33.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 119: Rosecrans Ave & I 710 SB Ramp

2008 MD Peak Existing
 1/23/2009



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑	↑	↓↓↓	↓
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.91	0.95	1.00	0.97	0.91
Frt		1.00	1.00	0.85	0.96	0.85
Flt Protected		1.00	1.00	1.00	0.97	1.00
Satd. Flow (prot)		3551	2472	1106	2332	1006
Flt Permitted		1.00	1.00	1.00	0.97	1.00
Satd. Flow (perm)		3551	2472	1106	2332	1006
Volume (vph)	0	685	811	111	147	158
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	729	863	118	156	168
RTOR Reduction (vph)	0	0	0	0	41	70
Lane Group Flow (vph)	0	729	863	118	177	36
Heavy Vehicles (%)	23%	23%	23%	23%	23%	23%
Turn Type				Free		Perm
Protected Phases		4	8		6	
Permitted Phases				Free		6
Actuated Green, G (s)		31.7	31.7	60.0	20.3	20.3
Effective Green, g (s)		31.7	31.7	60.0	20.3	20.3
Actuated g/C Ratio		0.53	0.53	1.00	0.34	0.34
Clearance Time (s)		4.0	4.0		4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1876	1306	1106	789	340
v/s Ratio Prot		0.21	c0.35		c0.08	
v/s Ratio Perm				0.11		0.04
v/c Ratio		0.39	0.66	0.11	0.22	0.11
Uniform Delay, d1		8.4	10.3	0.0	14.2	13.6
Progression Factor		1.00	0.60	1.00	1.00	1.00
Incremental Delay, d2		0.1	1.1	0.2	0.7	0.6
Delay (s)		8.5	7.3	0.2	14.9	14.2
Level of Service		A	A	A	B	B
Approach Delay (s)		8.5	6.5		14.7	
Approach LOS		A	A		B	

Intersection Summary

HCM Average Control Delay	8.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group













HCM Signalized Intersection Capacity Analysis
 120: I 710 SB & Wright Rd Off

2008 MD Peak Existing
 1/23/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0		4.0		4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00		1.00		0.95		1.00	0.95			0.95	
Frt	1.00		0.85		0.98		1.00	1.00			1.00	
Flt Protected	0.95		1.00		0.99		0.95	1.00			1.00	
Satd. Flow (prot)	1277		1143		2483		1277	2555			2553	
Flt Permitted	0.51		1.00		0.99		0.95	1.00			1.00	
Satd. Flow (perm)	683		1143		2483		1277	2555			2553	
Volume (vph)	9	0	185	64	186	32	192	339	0	0	326	2
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	10	0	213	74	214	37	221	390	0	0	375	2
RTOR Reduction (vph)	0	0	163	0	18	0	0	0	0	0	1	0
Lane Group Flow (vph)	10	0	50	0	307	0	221	390	0	0	376	0
Heavy Vehicles (%)	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%
Turn Type	custom		Over	Perm			Prot					
Protected Phases			5		8		5	2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	12.1		14.2		12.1		14.2	39.9			21.7	
Effective Green, g (s)	12.1		14.2		12.1		14.2	39.9			21.7	
Actuated g/C Ratio	0.20		0.24		0.20		0.24	0.66			0.36	
Clearance Time (s)	4.0		4.0		4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0		3.0		3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	138		271		501		302	1699			923	
v/s Ratio Prot			0.04				c0.17	0.15			c0.15	
v/s Ratio Perm	0.01				0.12							
v/c Ratio	0.07		0.19		0.61		0.73	0.23			0.41	
Uniform Delay, d1	19.4		18.3		21.8		21.1	4.0			14.3	
Progression Factor	1.00		1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.2		0.3		2.2		8.8	0.3			1.3	
Delay (s)	19.6		18.6		24.0		30.0	4.3			15.7	
Level of Service	B		B		C		C	A			B	
Approach Delay (s)		18.7			24.0			13.6			15.7	
Approach LOS		B			C			B			B	
Intersection Summary												
HCM Average Control Delay			17.0				HCM Level of Service				B	
HCM Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			60.0				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			46.2%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 121: Firestone Blvd & I 710 NB













2008 MD Peak Existing
 1/23/2009

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑↑↑	↑		↑↑	↑	↑↑		↑↑				
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0		4.0				
Lane Util. Factor		0.86	0.86		0.91	0.91	0.97		0.88				
Frt		1.00	0.85		1.00	0.85	1.00		0.85				
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00				
Satd. Flow (prot)		3469	983		2447	1040	2478		2011				
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00				
Satd. Flow (perm)		3469	983		2447	1040	2478		2011				
Volume (vph)	0	1608	452	0	1500	724	433	0	728	0	0	0	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	0	1675	471	0	1562	754	451	0	758	0	0	0	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	27	0	0	0	
Lane Group Flow (vph)	0	1675	471	0	1562	754	451	0	731	0	0	0	
Heavy Vehicles (%)	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	
Turn Type			Free			Free custom			custom				
Protected Phases		4			8								
Permitted Phases			Free			Free	2		2				
Actuated Green, G (s)		59.0	100.0		59.0	100.0	33.0		33.0				
Effective Green, g (s)		59.0	100.0		59.0	100.0	33.0		33.0				
Actuated g/C Ratio		0.59	1.00		0.59	1.00	0.33		0.33				
Clearance Time (s)		4.0			4.0		4.0		4.0				
Vehicle Extension (s)		3.0			3.0		3.0		3.0				
Lane Grp Cap (vph)		2047	983		1444	1040	818		664				
v/s Ratio Prot		0.48			c0.64								
v/s Ratio Perm			0.48			0.73	0.18		c0.36				
v/c Ratio		0.82	0.48		1.08	0.72	0.55		1.10				
Uniform Delay, d1		16.3	0.0		20.5	0.0	27.4		33.5				
Progression Factor		1.24	1.00		0.69	1.00	1.00		1.00				
Incremental Delay, d2		0.6	0.4		47.2	3.6	2.7		65.6				
Delay (s)		20.8	0.4		61.4	3.6	30.1		99.1				
Level of Service		C	A		E	A	C		F				
Approach Delay (s)		16.4			42.6			73.3			0.0		
Approach LOS		B			D			E			A		
Intersection Summary													
HCM Average Control Delay			39.2									HCM Level of Service	D
HCM Volume to Capacity ratio			1.09										
Actuated Cycle Length (s)			100.0									Sum of lost time (s)	8.0
Intersection Capacity Utilization			79.7%									ICU Level of Service	D
Analysis Period (min)			15										

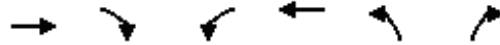
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 122: Firestone Blvd & I 710 SB

2008 MD Peak Existing
 1/23/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑	↑				↑↑		↑↑
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)		4.0			4.0	4.0				4.0		4.0
Lane Util. Factor		0.91			0.91	0.91				0.97		0.88
Frt		0.96			1.00	0.85				1.00		0.85
Flt Protected		1.00			1.00	1.00				0.95		1.00
Satd. Flow (prot)		3509			2447	1040				2478		2011
Flt Permitted		1.00			1.00	1.00				0.95		1.00
Satd. Flow (perm)		3509			2447	1040				2478		2011
Volume (vph)	0	1655	690	0	1508	430	0	0	0	413	0	628
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1761	734	0	1604	457	0	0	0	439	0	668
RTOR Reduction (vph)	0	75	0	0	0	0	0	0	0	0	0	44
Lane Group Flow (vph)	0	2420	0	0	1604	457	0	0	0	439	0	624
Heavy Vehicles (%)	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%
Turn Type						Free				custom		custom
Protected Phases		4			8							
Permitted Phases						Free				6		6
Actuated Green, G (s)		63.0			63.0	100.0				29.0		29.0
Effective Green, g (s)		63.0			63.0	100.0				29.0		29.0
Actuated g/C Ratio		0.63			0.63	1.00				0.29		0.29
Clearance Time (s)		4.0			4.0					4.0		4.0
Vehicle Extension (s)		3.0			3.0					3.0		3.0
Lane Grp Cap (vph)		2211			1542	1040				719		583
v/s Ratio Prot		c0.69			0.66							
v/s Ratio Perm						0.44				0.18		c0.31
v/c Ratio		1.09			1.04	0.44				0.61		1.07
Uniform Delay, d1		18.5			18.5	0.0				30.6		35.5
Progression Factor		0.42			0.63	1.00				1.00		1.00
Incremental Delay, d2		47.7			25.4	0.5				3.8		57.5
Delay (s)		55.4			37.0	0.5				34.5		93.0
Level of Service		E			D	A				C		F
Approach Delay (s)		55.4			28.9			0.0			69.8	
Approach LOS		E			C			A			E	
Intersection Summary												
HCM Average Control Delay			48.6				HCM Level of Service			D		
HCM Volume to Capacity ratio			1.09									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			87.7%				ICU Level of Service			E		
Analysis Period (min)			15									

c Critical Lane Group



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑↑	↑↑↑	
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	0.91			0.91	0.97	
Frt	1.00			1.00	0.92	
Flt Protected	1.00			1.00	0.98	
Satd. Flow (prot)	3798			3798	2432	
Flt Permitted	1.00			1.00	0.98	
Satd. Flow (perm)	3798			3798	2432	
Volume (vph)	914	0	0	570	201	212
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	923	0	0	576	203	214
RTOR Reduction (vph)	0	0	0	0	40	0
Lane Group Flow (vph)	923	0	0	576	377	0
Heavy Vehicles (%)	15%	15%	15%	15%	15%	15%
Turn Type						
Protected Phases	4			8	2	
Permitted Phases						
Actuated Green, G (s)	19.8			19.8	32.2	
Effective Green, g (s)	19.8			19.8	32.2	
Actuated g/C Ratio	0.33			0.33	0.54	
Clearance Time (s)	4.0			4.0	4.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	1253			1253	1305	
v/s Ratio Prot	c0.24			0.15	c0.16	
v/s Ratio Perm						
v/c Ratio	0.74			0.46	0.29	
Uniform Delay, d1	17.8			15.9	7.6	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	2.3			0.3	0.6	
Delay (s)	20.1			16.1	8.2	
Level of Service	C			B	A	
Approach Delay (s)	20.1			16.1	8.2	
Approach LOS	C			B	A	
Intersection Summary						
HCM Average Control Delay		16.3		HCM Level of Service		B
HCM Volume to Capacity ratio		0.46				
Actuated Cycle Length (s)		60.0		Sum of lost time (s)		8.0
Intersection Capacity Utilization		42.4%		ICU Level of Service		A
Analysis Period (min)		15				

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 125: Washington Blvd & I 710 NB





















2008 MD Peak Existing
 1/23/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	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	1.00	1.00	0.95	1.00		1.00		0.95	0.91	0.95
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.86		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	0.95	1.00
Satd. Flow (prot)	1246	2492	1115	1246	2492	1115		1134		1184	1134	1059
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.75	0.75	1.00
Satd. Flow (perm)	1246	2492	1115	1246	2492	1115		1134		938	899	1059
Volume (vph)	129	635	3	2	580	261	0	0	6	221	0	197
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	140	690	3	2	630	284	0	0	7	240	0	214
RTOR Reduction (vph)	0	0	1	0	0	182	0	5	0	0	0	50
Lane Group Flow (vph)	140	690	2	2	630	102	0	2	0	120	120	164
Heavy Vehicles (%)	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		pm+ov
Protected Phases	7	4		3	8			2			6	7
Permitted Phases			4			8	2			6		6
Actuated Green, G (s)	10.0	30.8	30.8	0.8	21.6	21.6		16.4		16.4	16.4	26.4
Effective Green, g (s)	10.0	30.8	30.8	0.8	21.6	21.6		16.4		16.4	16.4	26.4
Actuated g/C Ratio	0.17	0.51	0.51	0.01	0.36	0.36		0.27		0.27	0.27	0.44
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	208	1279	572	17	897	401		310		256	246	537
v/s Ratio Prot	c0.11	0.28		0.00	c0.25			0.00				0.05
v/s Ratio Perm			0.00			0.09				0.13	c0.13	0.10
v/c Ratio	0.67	0.54	0.00	0.12	0.70	0.25		0.01		0.47	0.49	0.31
Uniform Delay, d1	23.5	9.8	7.1	29.3	16.4	13.5		15.9		18.2	18.3	10.9
Progression Factor	1.17	1.24	1.33	1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	7.8	0.4	0.0	3.1	2.5	0.3		0.0		6.1	6.8	0.3
Delay (s)	35.3	12.6	9.5	32.3	19.0	13.9		15.9		24.2	25.0	11.2
Level of Service	D	B	A	C	B	B		B		C	C	B
Approach Delay (s)		16.4			17.4			15.9			18.3	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM Average Control Delay			17.2	HCM Level of Service				B				
HCM Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			60.0	Sum of lost time (s)				12.0				
Intersection Capacity Utilization			53.8%	ICU Level of Service				A				
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 126: Washington Blvd & I 710 SB



























2008 MD Peak Existing
 1/23/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.91	0.95
Frt	1.00	1.00		1.00	0.95			0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97		0.95	0.95	1.00
Satd. Flow (prot)	1246	2489		1246	2373			1211		1184	1137	1059
Flt Permitted	0.95	1.00		0.95	1.00			0.85		0.74	0.71	1.00
Satd. Flow (perm)	1246	2489		1246	2373			1060		926	849	1059
Volume (vph)	185	471	3	6	543	251	13	1	8	283	1	143
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	187	476	3	6	548	254	13	1	8	286	1	144
RTOR Reduction (vph)	0	0	0	0	84	0	0	6	0	0	0	109
Lane Group Flow (vph)	187	479	0	6	718	0	0	16	0	143	144	35
Heavy Vehicles (%)	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%
Turn Type	Prot			Prot			Perm			Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		6
Actuated Green, G (s)	10.7	32.7		0.8	22.8			14.5		14.5	14.5	14.5
Effective Green, g (s)	10.7	32.7		0.8	22.8			14.5		14.5	14.5	14.5
Actuated g/C Ratio	0.18	0.55		0.01	0.38			0.24		0.24	0.24	0.24
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	222	1357		17	902			256		224	205	256
v/s Ratio Prot	c0.15	0.19		0.00	c0.30							
v/s Ratio Perm								0.02		0.15	c0.17	0.03
v/c Ratio	0.84	0.35		0.35	0.80			0.06		0.64	0.70	0.14
Uniform Delay, d1	23.8	7.7		29.3	16.5			17.5		20.4	20.8	17.8
Progression Factor	1.00	1.00		1.18	0.29			1.00		1.00	1.00	1.00
Incremental Delay, d2	24.1	0.2		8.7	3.5			0.5		13.1	18.2	1.1
Delay (s)	47.9	7.8		43.3	8.3			18.0		33.5	39.0	18.9
Level of Service	D	A		D	A			B		C	D	B
Approach Delay (s)		19.1			8.6			18.0			30.5	
Approach LOS		B			A			B			C	
Intersection Summary												
HCM Average Control Delay	17.2			HCM Level of Service				B				
HCM Volume to Capacity ratio	0.78											
Actuated Cycle Length (s)	60.0			Sum of lost time (s)				12.0				
Intersection Capacity Utilization	65.1%			ICU Level of Service				C				
Analysis Period (min)	15											

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
161: Del Amo Blvd & Susana Road

2008 MD Peak Existing
1/29/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	 
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00		1.00		0.95	0.95	0.88
Frt	1.00	0.99		1.00	1.00	0.85		0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98		0.95	0.96	1.00
Satd. Flow (prot)	1288	3663		1288	2576	1153		1198		1155	1170	1915
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.83		0.95	0.63	1.00
Satd. Flow (perm)	1288	3663		1288	2576	1153		1016		1155	763	1915
Volume (vph)	152	907	68	43	553	116	55	45	54	291	37	300
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	162	965	72	46	588	123	59	48	57	310	39	319
RTOR Reduction (vph)	0	9	0	0	0	69	0	18	0	0	0	40
Lane Group Flow (vph)	162	1028	0	46	588	54	0	146	0	170	179	279
Heavy Vehicles (%)	18%	18%	18%	18%	18%	18%	25%	25%	25%	25%	25%	25%
Turn Type	Prot			Prot	pm+ov	Perm				Prot	pm+ov	
Protected Phases	7	4		3	8	1		2		1	6	7
Permitted Phases					8		2					6
Actuated Green, G (s)	15.4	36.8		4.8	26.2	43.9		24.7		17.7	46.4	61.8
Effective Green, g (s)	15.4	36.8		4.8	26.2	43.9		24.7		17.7	46.4	61.8
Actuated g/C Ratio	0.15	0.37		0.05	0.26	0.44		0.25		0.18	0.46	0.62
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	198	1348		62	675	552		251		204	426	1260
v/s Ratio Prot	c0.13	0.28		0.04	c0.23	0.02				c0.15	0.07	0.03
v/s Ratio Perm					0.03		c0.14				0.12	0.11
v/c Ratio	0.82	0.76		0.74	0.87	0.10		0.58		0.83	0.42	0.22
Uniform Delay, d1	40.9	27.8		47.0	35.3	16.4		33.1		39.7	17.8	8.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	22.4	2.6		37.6	11.9	0.1		9.5		24.3	0.7	0.1
Delay (s)	63.3	30.4		84.6	47.1	16.5		42.6		64.0	18.5	8.5
Level of Service	E	C		F	D	B		D		E	B	A
Approach Delay (s)		34.8			44.4			42.6			25.3	
Approach LOS		C			D			D			C	

Intersection Summary

HCM Average Control Delay	35.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

86: E Olympic Blvd & I-710 NB (off)

1/18/2010



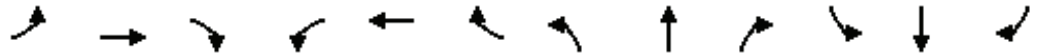
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	571	0	0	759	3	143	45	218	25	0	73
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95			0.95		0.95	0.95			1.00	
Fr _t	1.00	1.00			1.00		1.00	0.88			0.90	
Fl _t Protected	0.95	1.00			1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1598	3195			3194		1518	1406			1493	
Fl _t Permitted	0.22	1.00			1.00		0.95	1.00			0.99	
Satd. Flow (perm)	366	3195			3194		1518	1406			1493	
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
Adj. Flow (vph)	40	601	0	0	799	3	151	47	229	26	0	77
RTOR Reduction (vph)	0	0	0	0	1	0	0	154	0	0	68	0
Lane Group Flow (vph)	40	601	0	0	801	0	136	137	0	0	35	0
Turn Type	Perm							Split		Split		
Protected Phases		4			8		2	2		6	6	
Permitted Phases	4											
Actuated Green, G (s)	21.1	21.1			21.1		19.6	19.6			7.3	
Effective Green, g (s)	21.1	21.1			21.1		19.6	19.6			7.3	
Actuated g/C Ratio	0.35	0.35			0.35		0.33	0.33			0.12	
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	129	1124			1123		496	459			182	
v/s Ratio Prot		0.19			c0.25		0.09	c0.10			c0.02	
v/s Ratio Perm	0.11											
v/c Ratio	0.31	0.53			0.71		0.27	0.30			0.19	
Uniform Delay, d ₁	14.2	15.5			16.8		14.9	15.1			23.7	
Progression Factor	0.95	1.02			0.72		1.00	1.00			1.09	
Incremental Delay, d ₂	1.3	0.5			2.0		1.4	1.7			0.5	
Delay (s)	14.8	16.3			14.1		16.3	16.7			26.3	
Level of Service	B	B			B		B	B			C	
Approach Delay (s)		16.2			14.1			16.6			26.3	
Approach LOS		B			B			B			C	

Intersection Summary

HCM Average Control Delay	16.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 135: Floral Dr & I-710 SB (off)

1/18/2010



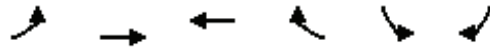
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↻			↻			↻		↻	↻	
Volume (vph)	0	465	25	27	402	0	5	0	57	191	39	73
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Fr _t		0.99			1.00			0.88		1.00	0.90	
Fl _t Protected		1.00			1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1670			1677			1467		1598	1517	
Fl _t Permitted		1.00			0.80			1.00		0.95	1.00	
Satd. Flow (perm)		1670			1348			1467		1598	1517	
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
Adj. Flow (vph)	0	489	26	28	423	0	5	0	60	201	41	77
RTOR Reduction (vph)	0	3	0	0	0	0	0	43	0	0	62	0
Lane Group Flow (vph)	0	512	0	0	451	0	0	22	0	201	56	0
Turn Type				Perm			Split			Split		
Protected Phases		4			8		2	2		6	6	
Permitted Phases				8								
Actuated Green, G (s)		25.0			25.0			19.8		13.2	13.2	
Effective Green, g (s)		25.0			25.0			19.8		13.2	13.2	
Actuated g/C Ratio		0.36			0.36			0.28		0.19	0.19	
Clearance Time (s)		4.0			4.0			4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		596			481			415		301	286	
v/s Ratio Prot		0.31						c0.01		c0.13	0.04	
v/s Ratio Perm					c0.33							
v/c Ratio		0.86			0.94			0.05		0.67	0.19	
Uniform Delay, d ₁		20.9			21.7			18.3		26.4	23.9	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d ₂		11.8			26.0			0.2		5.5	0.3	
Delay (s)		32.7			47.7			18.5		31.9	24.3	
Level of Service		C			D			B		C	C	
Approach Delay (s)		32.7			47.7			18.5			29.1	
Approach LOS		C			D			B			C	

Intersection Summary

HCM Average Control Delay	36.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 137: Ramona Blvd & I-710 SB (on)

1/18/2010
























Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶			
Volume (vph)	149	247	512	80	0	0
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	4.0	4.0	4.0			
Lane Util. Factor	1.00	0.95	0.95			
Frt	1.00	1.00	0.98			
Flt Protected	0.95	1.00	1.00			
Satd. Flow (prot)	1598	3195	3131			
Flt Permitted	0.95	1.00	1.00			
Satd. Flow (perm)	1598	3195	3131			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	157	260	539	84	0	0
RTOR Reduction (vph)	0	0	19	0	0	0
Lane Group Flow (vph)	157	260	604	0	0	0
Turn Type	Prot					
Protected Phases	7	4	8			
Permitted Phases						
Actuated Green, G (s)	9.7	60.0	42.3			
Effective Green, g (s)	9.7	60.0	42.3			
Actuated g/C Ratio	0.16	1.00	0.70			
Clearance Time (s)	4.0	4.0	4.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	258	3195	2207			
v/s Ratio Prot	c0.10	0.08	c0.19			
v/s Ratio Perm						
v/c Ratio	0.61	0.08	0.27			
Uniform Delay, d1	23.4	0.0	3.2			
Progression Factor	1.00	1.00	1.00			
Incremental Delay, d2	4.0	0.0	0.1			
Delay (s)	27.4	0.0	3.3			
Level of Service	C	A	A			
Approach Delay (s)		10.3	3.3		0.0	
Approach LOS		B	A		A	

Intersection Summary			
HCM Average Control Delay		6.1	HCM Level of Service A
HCM Volume to Capacity ratio		0.34	
Actuated Cycle Length (s)		60.0	Sum of lost time (s) 8.0
Intersection Capacity Utilization		32.3%	ICU Level of Service A
Analysis Period (min)		15	
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
10: Pier B St & 9th St

2008 PM Existing_Long Beach Area
12/7/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00		0.95	1.00		0.95	
Frt	1.00	0.88		1.00	1.00	0.85		1.00	0.85		1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96	1.00		0.96	
Satd. Flow (prot)	1369	1995		1878	1250	889		1807	866		2181	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.96	1.00		0.96	
Satd. Flow (perm)	1369	1995		1878	1250	889		1807	866		2181	
Volume (vph)	5	26	120	257	59	193	71	11	156	7	2	0
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	5	29	132	282	65	212	78	12	171	8	2	0
RTOR Reduction (vph)	0	106	0	0	0	110	0	0	0	0	0	0
Lane Group Flow (vph)	5	55	0	282	65	102	0	90	171	0	10	0
Heavy Vehicles (%)	11%	32%	34%	57%	28%	53%	63%	50%	57%	42%	2%	100%
Turn Type	Prot			Prot		Perm	Split		Free	Split		
Protected Phases	7	2		1	6		8	8		4	4	
Permitted Phases						6			Free			
Actuated Green, G (s)	4.0	20.0		24.0	48.0	48.0		16.0	100.0		16.0	
Effective Green, g (s)	4.0	20.0		24.0	48.0	48.0		16.0	100.0		16.0	
Actuated g/C Ratio	0.04	0.20		0.24	0.48	0.48		0.16	1.00		0.16	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	
Lane Grp Cap (vph)	55	399		451	600	427		289	866		349	
v/s Ratio Prot	0.00	0.03		c0.15	0.05			c0.05			0.00	
v/s Ratio Perm						c0.11			c0.20			
v/c Ratio	0.09	0.14		0.63	0.11	0.24		0.31	0.20		0.03	
Uniform Delay, d1	46.2	32.9		34.0	14.3	15.3		37.1	0.0		35.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2	3.2	0.7		6.4	0.4	1.3		2.8	0.5		0.2	
Delay (s)	49.5	33.6		40.4	14.6	16.6		39.9	0.5		35.6	
Level of Service	D	C		D	B	B		D	A		D	
Approach Delay (s)		34.1			28.4			14.1			35.6	
Approach LOS		C			C			B			D	
Intersection Summary												
HCM Average Control Delay			25.7				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.34									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			35.5%				ICU Level of Service			A		
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
65: Florence Ave & Eastern Ave

2008 PM Peak Existing
1/23/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↖↖↗	↖	↖	↖↖↗		↖↗	↖↗		↖↗	↖↖↗	↖
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91		0.97	0.95		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	2782	4121	1283	1434	4059		2730	2757		2730	4044	1259
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	2782	4121	1283	1434	4059		2730	2757		2730	4044	1259
Volume (vph)	364	1229	473	99	999	110	298	465	74	188	573	535
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	379	1280	493	103	1041	115	310	484	77	196	597	557
RTOR Reduction (vph)	0	0	48	0	13	0	0	13	0	0	0	8
Lane Group Flow (vph)	379	1280	445	103	1143	0	310	548	0	196	597	549
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	8%	8%	8%	8%	8%	8%
Turn Type	Prot		pm+ov	Prot			Prot			Prot		pm+ov
Protected Phases	7	4	5	3	8		5	2		1	6	7
Permitted Phases			4									6
Actuated Green, G (s)	23.2	42.9	55.3	9.6	29.3		12.4	23.1		8.4	19.1	42.3
Effective Green, g (s)	23.2	42.9	55.3	9.6	29.3		12.4	23.1		8.4	19.1	42.3
Actuated g/C Ratio	0.23	0.43	0.55	0.10	0.29		0.12	0.23		0.08	0.19	0.42
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	645	1768	761	138	1189		339	637		229	772	583
v/s Ratio Prot	0.14	0.31	0.07	0.07	c0.28		c0.11	c0.20		0.07	0.15	c0.22
v/s Ratio Perm			0.27									0.22
v/c Ratio	0.59	0.72	0.58	0.75	0.96		0.91	0.86		0.86	0.77	0.94
Uniform Delay, d1	34.1	23.6	14.8	44.0	34.8		43.3	36.9		45.2	38.4	27.7
Progression Factor	1.18	0.51	0.43	0.95	0.93		1.03	0.68		1.11	0.68	0.89
Incremental Delay, d2	1.1	1.2	0.9	12.5	12.4		16.3	7.4		18.4	5.1	18.0
Delay (s)	41.3	13.3	7.2	54.2	44.8		60.9	32.5		68.5	31.2	42.6
Level of Service	D	B	A	D	D		E	C		E	C	D
Approach Delay (s)		16.8			45.5			42.6			41.4	
Approach LOS		B			D			D			D	

























Intersection Summary

HCM Average Control Delay	33.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
71: Slauson Ave & Eastern Ave

2008 PM Peak Existing
1/23/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	859	2841	1271	1421	2841	1271	1407	2815	1259	1407	2815	1259
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	859	2841	1271	1421	2841	1271	1407	2815	1259	1407	2815	1259
Volume (vph)	134	962	257	124	628	45	212	447	121	151	684	85
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	144	1034	276	133	675	48	228	481	130	162	735	91
RTOR Reduction (vph)	0	0	30	0	0	29	0	0	64	0	0	43
Lane Group Flow (vph)	144	1034	246	133	675	19	228	481	66	162	735	48
Heavy Vehicles (%)	77%	7%	7%	7%	7%	7%	8%	8%	8%	8%	8%	8%
Turn Type	Prot	pm+ov		Prot	pm+ov		Prot	pm+ov		Prot	pm+ov	
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	7
Permitted Phases		4			8			2			6	
Actuated Green, G (s)	17.0	34.0	49.0	9.0	26.0	39.8	15.0	27.2	36.2	13.8	26.0	43.0
Effective Green, g (s)	17.0	34.0	49.0	9.0	26.0	39.8	15.0	27.2	36.2	13.8	26.0	43.0
Actuated g/C Ratio	0.17	0.34	0.49	0.09	0.26	0.40	0.15	0.27	0.36	0.14	0.26	0.43
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	146	966	674	128	739	557	211	766	506	194	732	592
v/s Ratio Prot	c0.17	c0.36	0.05	0.09	0.24	0.00	c0.16	0.17	0.01	0.12	c0.26	0.01
v/s Ratio Perm			0.14			0.01			0.04			0.02
v/c Ratio	0.99	1.07	0.37	1.04	0.91	0.03	1.08	0.63	0.13	0.84	1.00	0.08
Uniform Delay, d1	41.4	33.0	15.8	45.5	35.9	18.4	42.5	32.0	21.4	42.0	37.0	16.8
Progression Factor	1.23	0.63	0.22	0.81	0.99	2.80	0.94	0.75	1.37	1.33	0.54	0.30
Incremental Delay, d2	64.7	47.9	0.3	78.5	12.2	0.0	71.9	2.4	0.1	17.7	27.6	0.0
Delay (s)	115.5	68.8	3.8	115.5	47.7	51.5	111.8	26.3	29.3	73.4	47.6	5.1
Level of Service	F	E	A	F	D	D	F	C	C	E	D	A
Approach Delay (s)		61.1			58.4			50.0			47.9	
Approach LOS		E			E			D			D	

Intersection Summary

HCM Average Control Delay	55.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
74: Bandini Blvd & Atlantic Ave

2008 PM Peak Existing
1/23/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.86	0.86		1.00	1.00	1.00	1.00	0.81		1.00	0.86	0.86
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1210	3575		1407	1481	1259	1407	5826		1407	3822	1083
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1210	3575		1407	1481	1259	1407	5826		1407	3822	1083
Volume (vph)	349	679	514	242	172	440	27	1231	295	60	1048	335
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	364	707	535	252	179	458	28	1282	307	62	1092	349
RTOR Reduction (vph)	0	86	0	0	0	99	0	29	0	0	0	0
Lane Group Flow (vph)	364	1156	0	252	179	359	28	1560	0	62	1092	349
Heavy Vehicles (%)	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
Turn Type	Split			Split		pm+ov	Prot			Prot		Free
Protected Phases	4	4		8	8	1	5	2		1	6	
Permitted Phases						8						Free
Actuated Green, G (s)	47.0	47.0		25.0	25.0	38.9	2.4	40.1		13.9	51.6	150.0
Effective Green, g (s)	49.0	49.0		27.0	27.0	42.9	4.4	42.1		15.9	53.6	150.0
Actuated g/C Ratio	0.33	0.33		0.18	0.18	0.29	0.03	0.28		0.11	0.36	1.00
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	395	1168		253	267	394	41	1635		149	1366	1083
v/s Ratio Prot	0.30	c0.32		c0.18	0.12	c0.10	0.02	c0.27		0.04	0.29	
v/s Ratio Perm						0.19						0.32
v/c Ratio	0.92	1.12dr		1.00	0.67	0.91	0.68	0.95		0.42	0.80	0.32
Uniform Delay, d1	48.6	50.2		61.4	57.4	51.7	72.1	53.0		62.7	43.4	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	26.6	23.5		55.1	6.5	24.7	37.9	13.8		1.9	5.0	0.8
Delay (s)	75.3	73.8		116.6	63.8	76.4	110.1	66.8		64.6	48.3	0.8
Level of Service	E	E		F	E	E	F	E		E	D	A
Approach Delay (s)		74.1			85.2			67.5			38.0	
Approach LOS		E			F			E			D	
Intersection Summary												
HCM Average Control Delay			64.3									HCM Level of Service E
HCM Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			150.0									Sum of lost time (s) 12.0
Intersection Capacity Utilization			92.2%									ICU Level of Service F
Analysis Period (min)			15									
dr Defacto Right Lane. Recode with 1 though lane as a right lane.												
c Critical Lane Group												



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙↘		↕↕	↘	↙	↕↕
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		0.95	1.00	1.00	0.95
Frt	0.99		1.00	0.85	1.00	1.00
Flt Protected	0.96		1.00	1.00	0.95	1.00
Satd. Flow (prot)	2531		2895	1172	1310	2895
Flt Permitted	0.96		1.00	1.00	0.67	1.00
Satd. Flow (perm)	2531		2895	1172	924	2895
Volume (vph)	526	39	128	170	176	273
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	531	39	129	172	178	276
RTOR Reduction (vph)	9	0	0	0	0	0
Lane Group Flow (vph)	561	0	129	172	178	276
Heavy Vehicles (%)	16%	16%	5%	16%	16%	5%
Turn Type				Free	Perm	
Protected Phases	6		8			4
Permitted Phases				Free	4	
Actuated Green, G (s)	25.0		27.0	60.0	27.0	27.0
Effective Green, g (s)	25.0		27.0	60.0	27.0	27.0
Actuated g/C Ratio	0.42		0.45	1.00	0.45	0.45
Clearance Time (s)	4.0		4.0		4.0	4.0
Lane Grp Cap (vph)	1055		1303	1172	416	1303
v/s Ratio Prot	c0.22		0.04			0.10
v/s Ratio Perm				0.15	c0.19	
v/c Ratio	0.53		0.10	0.15	0.43	0.21
Uniform Delay, d1	13.1		9.5	0.0	11.2	10.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9		0.2	0.3	3.2	0.4
Delay (s)	15.0		9.6	0.3	14.4	10.4
Level of Service	B		A	A	B	B
Approach Delay (s)	15.0		4.3			12.0
Approach LOS	B		A			B

Intersection Summary			
HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0		4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97		1.00					0.95	1.00	1.00	0.95	
Frt	1.00		0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	2808		1295					2764	1295	1448	2764	
Flt Permitted	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	2808		1295					2764	1295	1448	2764	
Volume (vph)	151	0	175	0	0	0	0	646	348	287	1481	0
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	161	0	186	0	0	0	0	687	370	305	1576	0
RTOR Reduction (vph)	0	0	23	0	0	0	0	0	259	0	0	0
Lane Group Flow (vph)	161	0	163	0	0	0	0	687	111	305	1576	0
Heavy Vehicles (%)	5%	10%	5%	5%	10%	5%	5%	10%	5%	5%	10%	5%
Turn Type	custom		custom						Perm		Prot	
Protected Phases									8		7 4	
Permitted Phases	2		2						8			
Actuated Green, G (s)	16.0		16.0						18.0 18.0		14.0 36.0	
Effective Green, g (s)	16.0		16.0						18.0 18.0		14.0 36.0	
Actuated g/C Ratio	0.27		0.27						0.30 0.30		0.23 0.60	
Clearance Time (s)	4.0		4.0						4.0 4.0		4.0 4.0	
Lane Grp Cap (vph)	749		345						829 389		338 1658	
v/s Ratio Prot									0.25		0.21 c0.57	
v/s Ratio Perm	0.06		c0.13						0.09			
v/c Ratio	0.21		0.47						0.83 0.29		0.90 0.95	
Uniform Delay, d1	17.1		18.5						19.6 16.1		22.3 11.2	
Progression Factor	1.00		1.00						1.00 1.00		0.86 0.71	
Incremental Delay, d2	0.7		4.6						9.4 1.8		24.4 10.8	
Delay (s)	17.8		23.1						28.9 17.9		43.6 18.7	
Level of Service	B		C						C B		D B	
Approach Delay (s)			20.6		0.0				25.1		22.8	
Approach LOS			C		A				C		C	
Intersection Summary												
HCM Average Control Delay			23.3		HCM Level of Service						C	
HCM Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			60.0		Sum of lost time (s)						8.0	
Intersection Capacity Utilization			68.1%		ICU Level of Service						C	
Analysis Period (min)			15									
c Critical Lane Group												



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗↗	↘	↕↕			↕↕	↗
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)			4.0			4.0	4.0	4.0			4.0	4.0
Lane Util. Factor			1.00			0.88	1.00	0.95			0.95	1.00
Frt			0.86			0.85	1.00	1.00			1.00	0.85
Flt Protected			1.00			1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)			1318			2280	1448	2764			2764	1295
Flt Permitted			1.00			1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)			1318			2280	1448	2764			2764	1295
Volume (vph)	0	0	155	0	0	535	110	760	0	0	1174	288
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	160	0	0	552	113	784	0	0	1210	297
RTOR Reduction (vph)	0	0	0	0	0	254	0	0	0	0	0	163
Lane Group Flow (vph)	0	0	160	0	0	298	113	784	0	0	1210	134
Heavy Vehicles (%)	5%	10%	5%	5%	10%	5%	5%	10%	5%	5%	10%	5%
Turn Type			Free			custom	Prot					Perm
Protected Phases							5	2			6	
Permitted Phases			Free			4						6
Actuated Green, G (s)			60.0			16.0	5.0	36.0			27.0	27.0
Effective Green, g (s)			60.0			16.0	5.0	36.0			27.0	27.0
Actuated g/C Ratio			1.00			0.27	0.08	0.60			0.45	0.45
Clearance Time (s)						4.0	4.0	4.0			4.0	4.0
Lane Grp Cap (vph)			1318			608	121	1658			1244	583
v/s Ratio Prot							c0.08	0.28			c0.44	
v/s Ratio Perm						c0.13						0.10
v/c Ratio			0.12			0.49	0.93	0.47			0.97	0.23
Uniform Delay, d1			0.0			18.6	27.3	6.7			16.1	10.1
Progression Factor			1.00			1.00	1.64	0.11			1.00	1.00
Incremental Delay, d2			0.2			2.8	54.3	0.7			19.8	0.9
Delay (s)			0.2			21.4	99.3	1.4			35.9	11.0
Level of Service			A			C	F	A			D	B
Approach Delay (s)		0.2			21.4			13.7			31.0	
Approach LOS		A			C			B			C	
Intersection Summary												
HCM Average Control Delay			22.7			HCM Level of Service		C				
HCM Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			60.0			Sum of lost time (s)		12.0				
Intersection Capacity Utilization			53.8%			ICU Level of Service		A				
Analysis Period (min)			15									
c Critical Lane Group												



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↵	↵
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0			4.0	4.0	4.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	2764			2764	1448	1295
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	2764			2764	1448	1295
Volume (vph)	1327	0	0	732	135	659
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1382	0	0	762	141	686
RTOR Reduction (vph)	0	0	0	0	0	8
Lane Group Flow (vph)	1382	0	0	762	141	678
Heavy Vehicles (%)	10%	5%	5%	10%	5%	5%
Turn Type						Prot
Protected Phases	4			8	2	2
Permitted Phases						
Actuated Green, G (s)	26.0			26.0	26.0	26.0
Effective Green, g (s)	26.0			26.0	26.0	26.0
Actuated g/C Ratio	0.43			0.43	0.43	0.43
Clearance Time (s)	4.0			4.0	4.0	4.0
Lane Grp Cap (vph)	1198			1198	627	561
v/s Ratio Prot	c0.50			0.28	0.10	c0.52
v/s Ratio Perm						
v/c Ratio	1.15			0.64	0.22	1.21
Uniform Delay, d1	17.0			13.3	10.7	17.0
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	79.0			2.6	0.8	109.8
Delay (s)	96.0			15.9	11.5	126.8
Level of Service	F			B	B	F
Approach Delay (s)	96.0			15.9	107.1	
Approach LOS	F			B	F	

Intersection Summary

HCM Average Control Delay	78.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	98.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

























Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑		
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1323	89	204	667	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	1407	95	217	710	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)				638		
pX, platoon unblocked						
vC, conflicting volume			1502		2244	751
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1502		2244	751
tC, single (s)			4.2		6.9	7.0
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			49		100	100
cM capacity (veh/h)			428		17	347

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	938	564	217	355	355
Volume Left	0	0	217	0	0
Volume Right	0	95	0	0	0
cSH	1700	1700	428	1700	1700
Volume to Capacity	0.55	0.33	0.51	0.21	0.21
Queue Length 95th (ft)	0	0	70	0	0
Control Delay (s)	0.0	0.0	21.8	0.0	0.0
Lane LOS			C		
Approach Delay (s)	0.0		5.1		
Approach LOS					

Intersection Summary					
Average Delay			1.9		
Intersection Capacity Utilization			98.7%	ICU Level of Service	F
Analysis Period (min)			15		

HCM Signalized Intersection Capacity Analysis
 116: Alondra Blvd & I 710 NB Ramp













2008 PM Peak Existing
 1/23/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			 							
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0				
Lane Util. Factor	1.00	0.91			0.95	1.00	1.00	1.00				
Frt	1.00	1.00			1.00	0.85	1.00	0.85				
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00				
Satd. Flow (prot)	1382	3971			2764	1236	1357	1215				
Flt Permitted	0.95	1.00			1.00	1.00	0.95	1.00				
Satd. Flow (perm)	1382	3971			2764	1236	1357	1215				
Volume (vph)	374	1048	0	0	754	325	304	1	363	0	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	386	1080	0	0	777	335	313	1	374	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	83	0	0	0	0
Lane Group Flow (vph)	386	1080	0	0	777	335	313	292	0	0	0	0
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	12%	12%	12%	12%	12%	12%
Turn Type	Prot				Free		Perm					
Protected Phases	7	4			8			2				
Permitted Phases						Free		2				
Actuated Green, G (s)	29.2	62.7			29.5	100.0	29.3	29.3				
Effective Green, g (s)	29.2	62.7			29.5	100.0	29.3	29.3				
Actuated g/C Ratio	0.29	0.63			0.30	1.00	0.29	0.29				
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0				
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0				
Lane Grp Cap (vph)	404	2490			815	1236	398	356				
v/s Ratio Prot	c0.28	0.27			c0.28			c0.24				
v/s Ratio Perm						0.27	0.23					
v/c Ratio	0.96	0.43			0.95	0.27	0.79	0.82				
Uniform Delay, d1	34.8	9.6			34.6	0.0	32.5	32.9				
Progression Factor	0.78	0.75			0.58	1.00	1.00	1.00				
Incremental Delay, d2	27.9	0.1			13.6	0.3	14.5	18.8				
Delay (s)	54.9	7.3			33.6	0.3	46.9	51.7				
Level of Service	D	A			C	A	D	D				
Approach Delay (s)		19.8			23.6			49.5			0.0	
Approach LOS		B			C			D			A	
Intersection Summary												
HCM Average Control Delay			27.4	HCM Level of Service		C						
HCM Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			100.0	Sum of lost time (s)		12.0						
Intersection Capacity Utilization			86.1%	ICU Level of Service		E						
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 117: Alondra Blvd & I 710 SB Ramp

2008 PM Peak Existing
 1/23/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑				↗			↗
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1055	242	242	794	0	0	0	356	0	0	364
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	0	1066	244	244	802	0	0	0	360	0	0	368
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)		780			720							
pX, platoon unblocked	0.93			0.80			0.84	0.84	0.80	0.84	0.84	0.93
vC, conflicting volume	802			1310			2323	2357	533	2183	2601	401
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	719			1141			2153	2193	172	1985	2485	290
tC, single (s)	4.3			4.3			7.7	6.7	7.1	7.7	6.7	7.1
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.6	4.1	3.4
p0 queue free %	100			47			100	100	45	100	100	42
cM capacity (veh/h)	779			457			5	15	651	7	10	634
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	533	533	244	244	535	267	360	368				
Volume Left	0	0	0	244	0	0	0	0				
Volume Right	0	0	244	0	0	0	360	368				
cSH	1700	1700	1700	457	1700	1700	651	634				
Volume to Capacity	0.31	0.31	0.14	0.53	0.31	0.16	0.55	0.58				
Queue Length 95th (ft)	0	0	0	77	0	0	85	93				
Control Delay (s)	0.0	0.0	0.0	21.6	0.0	0.0	17.1	18.2				
Lane LOS				C			C	C				
Approach Delay (s)	0.0			5.0			17.1	18.2				
Approach LOS							C	C				
Intersection Summary												
Average Delay			5.9									
Intersection Capacity Utilization			67.5%		ICU Level of Service			C				
Analysis Period (min)			15									

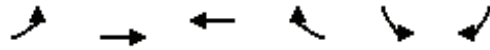
	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↑		↑↑↑	↘↘↘	↗
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.91	1.00		0.91	0.97	0.91
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	3971	1236		3971	2633	1105
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	3971	1236		3971	2633	1105
Volume (vph)	952	274	0	893	707	286
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	981	282	0	921	729	295
RTOR Reduction (vph)	0	0	0	0	0	18
Lane Group Flow (vph)	981	282	0	921	729	277
Heavy Vehicles (%)	10%	10%	10%	10%	12%	12%
Turn Type		Free				Perm
Protected Phases	4			8	2	
Permitted Phases		Free				2
Actuated Green, G (s)	19.6	60.0		19.6	32.4	32.4
Effective Green, g (s)	19.6	60.0		19.6	32.4	32.4
Actuated g/C Ratio	0.33	1.00		0.33	0.54	0.54
Clearance Time (s)	4.0			4.0	4.0	4.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1297	1236		1297	1422	597
v/s Ratio Prot	c0.25			0.23	c0.28	
v/s Ratio Perm		0.23				0.25
v/c Ratio	0.76	0.23		0.71	0.51	0.46
Uniform Delay, d1	18.1	0.0		17.7	8.8	8.5
Progression Factor	0.84	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.3	0.4		1.9	1.3	2.6
Delay (s)	17.5	0.4		19.6	10.1	11.0
Level of Service	B	A		B	B	B
Approach Delay (s)	13.7			19.6	10.4	
Approach LOS	B			B	B	

Intersection Summary			
HCM Average Control Delay	14.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 119: Rosecrans Ave & I 710 SB Ramp

2008 PM Peak Existing
 1/23/2009






















Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑	↑	↑↑↑	↑
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.91	0.95	1.00	0.97	0.91
Frt		1.00	1.00	0.85	0.93	0.85
Flt Protected		1.00	1.00	1.00	0.97	1.00
Satd. Flow (prot)		3935	2739	1225	2518	1105
Flt Permitted		1.00	1.00	1.00	0.97	1.00
Satd. Flow (perm)		3935	2739	1225	2518	1105
Volume (vph)	0	1000	1473	165	233	365
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1064	1567	176	248	388
RTOR Reduction (vph)	0	0	0	0	23	23
Lane Group Flow (vph)	0	1064	1567	176	419	171
Heavy Vehicles (%)	11%	11%	11%	11%	12%	12%
Turn Type				Free		Perm
Protected Phases		4	8		6	
Permitted Phases				Free		6
Actuated Green, G (s)		35.5	35.5	60.0	16.5	16.5
Effective Green, g (s)		35.5	35.5	60.0	16.5	16.5
Actuated g/C Ratio		0.59	0.59	1.00	0.28	0.28
Clearance Time (s)		4.0	4.0		4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		2328	1621	1225	692	304
v/s Ratio Prot		0.27	c0.57		c0.17	
v/s Ratio Perm				0.14		0.15
v/c Ratio		0.46	0.97	0.14	0.61	0.56
Uniform Delay, d1		6.9	11.7	0.0	18.9	18.7
Progression Factor		1.00	0.78	1.00	1.00	1.00
Incremental Delay, d2		0.1	13.1	0.2	3.9	7.3
Delay (s)		7.0	22.2	0.2	22.8	26.0
Level of Service		A	C	A	C	C
Approach Delay (s)		7.0	20.0		23.8	
Approach LOS		A	B		C	

Intersection Summary			
HCM Average Control Delay	16.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 120: I 710 SB & Wright Rd Off













2008 PM Peak Existing
 1/23/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0		4.0		4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00		1.00		0.95		1.00	0.95			0.95	
Frt	1.00		0.85		0.99		1.00	1.00			1.00	
Flt Protected	0.95		1.00		0.99		0.95	1.00			1.00	
Satd. Flow (prot)	1394		1248		2744		1382	2764			2758	
Flt Permitted	0.40		1.00		0.99		0.95	1.00			1.00	
Satd. Flow (perm)	590		1248		2744		1382	2764			2758	
Volume (vph)	8	0	280	52	330	27	415	689	0	0	416	6
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
Adj. Flow (vph)	8	0	295	55	347	28	437	725	0	0	438	6
RTOR Reduction (vph)	0	0	204	0	9	0	0	0	0	0	1	0
Lane Group Flow (vph)	8	0	91	0	421	0	437	725	0	0	443	0
Heavy Vehicles (%)	9%	9%	9%	9%	9%	9%	10%	10%	10%	10%	10%	10%
Turn Type	custom		Over	Perm			Prot					
Protected Phases			5		8		5	2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	13.5		18.5		13.5		18.5	38.5			16.0	
Effective Green, g (s)	13.5		18.5		13.5		18.5	38.5			16.0	
Actuated g/C Ratio	0.22		0.31		0.22		0.31	0.64			0.27	
Clearance Time (s)	4.0		4.0		4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0		3.0		3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	133		385		617		426	1774			735	
v/s Ratio Prot			0.07				c0.32	0.26			c0.16	
v/s Ratio Perm	0.01				0.15							
v/c Ratio	0.06		0.24		0.68		1.03	0.41			0.60	
Uniform Delay, d1	18.3		15.5		21.3		20.8	5.2			19.2	
Progression Factor	1.00		1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.2		0.3		3.1		50.4	0.7			3.6	
Delay (s)	18.5		15.8		24.4		71.1	5.9			22.9	
Level of Service	B		B		C		E	A			C	
Approach Delay (s)		15.9			24.4			30.4			22.9	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM Average Control Delay			26.0				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			60.0				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			68.1%				ICU Level of Service			C		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 121: Firestone Blvd & I 710 NB













2008 PM Peak Existing
 1/23/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑		↑↑	↑	↑↑		↑↑			
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0		4.0			
Lane Util. Factor		0.86	0.86		0.91	0.91	0.97		0.88			
Frt		1.00	0.85		1.00	0.85	1.00		0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (prot)		3719	1054		2623	1115	2681		2176			
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (perm)		3719	1054		2623	1115	2681		2176			
Volume (vph)	0	2058	475	0	1830	609	733	0	872	0	0	0
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
Adj. Flow (vph)	0	2166	500	0	1926	641	772	0	918	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	7	0	0	0
Lane Group Flow (vph)	0	2166	500	0	1926	641	772	0	911	0	0	0
Heavy Vehicles (%)	11%	11%	11%	11%	11%	11%	10%	10%	10%	10%	10%	10%
Turn Type			Free			Free custom			custom			
Protected Phases		4			8							
Permitted Phases			Free			Free	2		2			
Actuated Green, G (s)		58.0	100.0		58.0	100.0	34.0		34.0			
Effective Green, g (s)		58.0	100.0		58.0	100.0	34.0		34.0			
Actuated g/C Ratio		0.58	1.00		0.58	1.00	0.34		0.34			
Clearance Time (s)		4.0			4.0		4.0		4.0			
Vehicle Extension (s)		3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)		2157	1054		1521	1115	912		740			
v/s Ratio Prot		0.58			c0.73							
v/s Ratio Perm			0.47			0.57	0.29		c0.42			
v/c Ratio		1.00	0.47		1.27	0.57	0.85		1.23			
Uniform Delay, d1		21.0	0.0		21.0	0.0	30.6		33.0			
Progression Factor		1.05	1.00		0.82	1.00	1.00		1.00			
Incremental Delay, d2		6.8	0.1		123.7	1.5	9.6		115.5			
Delay (s)		29.0	0.1		140.9	1.5	40.1		148.5			
Level of Service		C	A		F	A	D		F			
Approach Delay (s)		23.6			106.1			99.0			0.0	
Approach LOS		C			F			F			A	
Intersection Summary												
HCM Average Control Delay			72.6				HCM Level of Service		E			
HCM Volume to Capacity ratio			1.25									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)		8.0			
Intersection Capacity Utilization			99.2%				ICU Level of Service		F			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 122: Firestone Blvd & I 710 SB

2008 PM Peak Existing
 1/23/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑	↑				↑↑		↑↑
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)		4.0			4.0	4.0				4.0		4.0
Lane Util. Factor		0.91			0.91	0.91				0.97		0.88
Frt		0.96			1.00	0.85				1.00		0.85
Flt Protected		1.00			1.00	1.00				0.95		1.00
Satd. Flow (prot)		3768			2623	1115				2681		2176
Flt Permitted		1.00			1.00	1.00				0.95		1.00
Satd. Flow (perm)		3768			2623	1115				2681		2176
Volume (vph)	0	1795	709	0	2051	459	0	0	0	708	0	675
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
Adj. Flow (vph)	0	1889	746	0	2159	483	0	0	0	745	0	711
RTOR Reduction (vph)	0	71	0	0	0	0	0	0	0	0	0	15
Lane Group Flow (vph)	0	2564	0	0	2159	483	0	0	0	745	0	696
Heavy Vehicles (%)	11%	11%	11%	11%	11%	11%	10%	10%	10%	10%	10%	10%
Turn Type						Free				custom		custom
Protected Phases		4			8							
Permitted Phases						Free				6		6
Actuated Green, G (s)		65.0			65.0	100.0				27.0		27.0
Effective Green, g (s)		65.0			65.0	100.0				27.0		27.0
Actuated g/C Ratio		0.65			0.65	1.00				0.27		0.27
Clearance Time (s)		4.0			4.0					4.0		4.0
Vehicle Extension (s)		3.0			3.0					3.0		3.0
Lane Grp Cap (vph)		2449			1705	1115				724		588
v/s Ratio Prot		0.68			c0.82							
v/s Ratio Perm						0.43				0.28		c0.32
v/c Ratio		1.05			1.27	0.43				1.03		1.18
Uniform Delay, d1		17.5			17.5	0.0				36.5		36.5
Progression Factor		0.17			0.68	1.00				1.00		1.00
Incremental Delay, d2		22.4			120.3	0.1				41.1		99.4
Delay (s)		25.4			132.1	0.1				77.6		135.9
Level of Service		C			F	A				E		F
Approach Delay (s)		25.4			108.0			0.0			106.0	
Approach LOS		C			F			A			F	
Intersection Summary												
HCM Average Control Delay			75.2				HCM Level of Service			E		
HCM Volume to Capacity ratio			1.24									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			107.8%				ICU Level of Service			G		
Analysis Period (min)			15									

c Critical Lane Group



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑↑	↑↑↑	
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	0.91			0.91	0.97	
Frt	1.00			1.00	0.90	
Flt Protected	1.00			1.00	0.98	
Satd. Flow (prot)	4044			4044	2536	
Flt Permitted	1.00			1.00	0.98	
Satd. Flow (perm)	4044			4044	2536	
Volume (vph)	1374	0	0	520	60	135
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1431	0	0	542	62	141
RTOR Reduction (vph)	0	0	0	0	19	0
Lane Group Flow (vph)	1431	0	0	542	184	0
Heavy Vehicles (%)	8%	8%	8%	8%	8%	8%
Turn Type						
Protected Phases	4			8	2	
Permitted Phases						
Actuated Green, G (s)	27.7			27.7	24.3	
Effective Green, g (s)	27.7			27.7	24.3	
Actuated g/C Ratio	0.46			0.46	0.40	
Clearance Time (s)	4.0			4.0	4.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	1867			1867	1027	
v/s Ratio Prot	c0.35			0.13	c0.07	
v/s Ratio Perm						
v/c Ratio	0.77			0.29	0.18	
Uniform Delay, d1	13.5			10.0	11.5	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	1.9			0.1	0.4	
Delay (s)	15.4			10.1	11.8	
Level of Service	B			B	B	
Approach Delay (s)	15.4			10.1	11.8	
Approach LOS	B			B	B	
Intersection Summary						
HCM Average Control Delay			13.7		HCM Level of Service	B
HCM Volume to Capacity ratio			0.49			
Actuated Cycle Length (s)			60.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			45.3%		ICU Level of Service	A
Analysis Period (min)			15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 125: Washington Blvd & I 710 NB

























2008 PM Peak Existing
 1/23/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	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	1.00		0.95	1.00		1.00		0.95	0.91	0.95
Frt	1.00	1.00	0.85		1.00	0.85		0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00	1.00		0.97		0.95	0.95	1.00
Satd. Flow (prot)	1394	2789	1248		2789	1248		1357		1325	1269	1185
Flt Permitted	0.95	1.00	1.00		1.00	1.00		0.92		0.76	0.76	1.00
Satd. Flow (perm)	1394	2789	1248		2789	1248		1283		1054	1010	1185
Volume (vph)	173	922	2	0	744	396	2	0	1	193	0	118
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
Adj. Flow (vph)	182	971	2	0	783	417	2	0	1	203	0	124
RTOR Reduction (vph)	0	0	1	0	0	282	0	1	0	0	0	25
Lane Group Flow (vph)	182	971	1	0	783	135	0	2	0	102	101	99
Heavy Vehicles (%)	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		pm+ov
Protected Phases	7	4		3	8			2			6	7
Permitted Phases			4			8	2			6		6
Actuated Green, G (s)	10.4	33.8	33.8		19.4	19.4		18.2		18.2	18.2	28.6
Effective Green, g (s)	10.4	33.8	33.8		19.4	19.4		18.2		18.2	18.2	28.6
Actuated g/C Ratio	0.17	0.56	0.56		0.32	0.32		0.30		0.30	0.30	0.48
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0		4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	242	1571	703		902	404		389		320	306	644
v/s Ratio Prot	c0.13	0.35			c0.28							0.03
v/s Ratio Perm			0.00			0.11		0.00		0.10	c0.10	0.06
v/c Ratio	0.75	0.62	0.00		0.87	0.33		0.01		0.32	0.33	0.15
Uniform Delay, d1	23.6	8.8	5.7		19.1	15.4		14.6		16.1	16.2	8.9
Progression Factor	0.97	1.86	2.01		1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	10.6	0.6	0.0		8.9	0.5		0.0		2.6	2.9	0.1
Delay (s)	33.6	16.9	11.5		28.0	15.9		14.6		18.7	19.1	9.0
Level of Service	C	B	B		C	B		B		B	B	A
Approach Delay (s)		19.5			23.8			14.6			15.1	
Approach LOS		B			C			B			B	
Intersection Summary												
HCM Average Control Delay			20.9									HCM Level of Service C
HCM Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			60.0									Sum of lost time (s) 12.0
Intersection Capacity Utilization			55.6%									ICU Level of Service B
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 126: Washington Blvd & I 710 SB






















2008 PM Peak Existing
 1/23/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	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	0.91	0.95
Frt	1.00	1.00			0.93			0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00			0.98		0.95	0.95	1.00
Satd. Flow (prot)	1394	2789			2606			1336		1325	1269	1185
Flt Permitted	0.95	1.00			1.00			0.94		0.75	0.75	1.00
Satd. Flow (perm)	1394	2789			2606			1277		1046	1002	1185
Volume (vph)	286	942	1	0	478	373	4	1	6	170	0	94
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	295	971	1	0	493	385	4	1	6	175	0	97
RTOR Reduction (vph)	0	0	0	0	236	0	0	4	0	0	0	70
Lane Group Flow (vph)	295	972	0	0	642	0	0	7	0	88	87	27
Heavy Vehicles (%)	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		6
Actuated Green, G (s)	14.0	35.0			17.0			17.0		17.0	17.0	17.0
Effective Green, g (s)	14.0	35.0			17.0			17.0		17.0	17.0	17.0
Actuated g/C Ratio	0.23	0.58			0.28			0.28		0.28	0.28	0.28
Clearance Time (s)	4.0	4.0			4.0			4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	325	1627			738			362		296	284	336
v/s Ratio Prot	c0.21	0.35			c0.25							
v/s Ratio Perm								0.01		0.08	c0.09	0.02
v/c Ratio	0.91	0.60			0.87			0.02		0.30	0.31	0.08
Uniform Delay, d1	22.4	8.0			20.5			15.5		16.8	16.9	15.8
Progression Factor	1.00	1.00			0.20			1.00		1.00	1.00	1.00
Incremental Delay, d2	27.5	0.6			7.0			0.1		2.6	2.8	0.5
Delay (s)	49.9	8.6			11.0			15.6		19.4	19.6	16.3
Level of Service	D	A			B			B		B	B	B
Approach Delay (s)		18.2			11.0			15.6			18.3	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM Average Control Delay			15.6			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			60.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			72.1%			ICU Level of Service				C		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 161: Del Amo Blvd & Susana Road

2008 PM Peak Existing
 1/29/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00		1.00		0.95	0.95	0.88
Frt	1.00	1.00		1.00	1.00	0.85		0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98		0.95	0.96	1.00
Satd. Flow (prot)	1421	4072		1421	2841	1271		1298		1278	1285	2118
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.82		0.95	0.52	1.00
Satd. Flow (perm)	1421	4072		1421	2841	1271		1084		1278	705	2118
Volume (vph)	177	2019	33	9	597	46	32	17	50	447	17	446
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	188	2148	35	10	635	49	34	18	53	476	18	474
RTOR Reduction (vph)	0	1	0	0	0	22	0	38	0	0	0	81
Lane Group Flow (vph)	188	2182	0	10	635	27	0	67	0	241	253	393
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	13%	13%	13%	13%	13%	13%
Turn Type	Prot			Prot		pm+ov	Perm			Prot		pm+ov
Protected Phases	7	4		3	8	1		2		1	6	7
Permitted Phases						8	2					6
Actuated Green, G (s)	15.8	53.4		0.8	38.4	54.4		13.8		16.0	33.8	49.6
Effective Green, g (s)	15.8	53.4		0.8	38.4	54.4		13.8		16.0	33.8	49.6
Actuated g/C Ratio	0.16	0.53		0.01	0.38	0.54		0.14		0.16	0.34	0.50
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	225	2174		11	1091	742		150		204	331	1135
v/s Ratio Prot	c0.13	c0.54		0.01	0.22	0.01				c0.19	0.12	0.05
v/s Ratio Perm						0.02		0.06			c0.14	0.13
v/c Ratio	0.84	1.00		0.91	0.58	0.04		0.45		1.18	0.76	0.35
Uniform Delay, d1	40.8	23.3		49.6	24.4	10.6		39.6		42.0	29.5	15.3
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	22.7	20.1		217.6	0.8	0.0		9.4		120.5	10.1	0.2
Delay (s)	63.5	43.4		267.1	25.2	10.6		48.9		162.5	39.6	15.5
Level of Service	E	D		F	C	B		D		F	D	B
Approach Delay (s)		45.0			27.7			48.9			58.4	
Approach LOS		D			C			D			E	

Intersection Summary			
HCM Average Control Delay	45.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 86: E Olympic Blvd & I-710 NB (off)

1/18/2010



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗↗			↖↖		↖	↕			↕	
Volume (vph)	51	923	0	0	787	1	176	106	351	97	0	87
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95			0.95		0.95	0.95			1.00	
Frt	1.00	1.00			1.00		1.00	0.89			0.94	
Flt Protected	0.95	1.00			1.00		0.95	1.00			0.97	
Satd. Flow (prot)	1598	3195			3195		1518	1418			1534	
Flt Permitted	0.22	1.00			1.00		0.95	1.00			0.97	
Satd. Flow (perm)	368	3195			3195		1518	1418			1534	
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
Adj. Flow (vph)	54	972	0	0	828	1	185	112	369	102	0	92
RTOR Reduction (vph)	0	0	0	0	0	0	0	172	0	0	61	0
Lane Group Flow (vph)	54	972	0	0	829	0	166	328	0	0	133	0
Turn Type	Perm							Split		Split		
Protected Phases		4			8		2	2		6	6	
Permitted Phases	4											
Actuated Green, G (s)	22.5	22.5			22.5		15.2	15.2			10.3	
Effective Green, g (s)	22.5	22.5			22.5		15.2	15.2			10.3	
Actuated g/C Ratio	0.38	0.38			0.38		0.25	0.25			0.17	
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	138	1198			1198		385	359			263	
v/s Ratio Prot		c0.30			0.26		0.11	c0.23			c0.09	
v/s Ratio Perm	0.15											
v/c Ratio	0.39	0.81			0.69		0.43	0.91			0.50	
Uniform Delay, d1	13.7	16.8			15.8		18.8	21.8			22.5	
Progression Factor	0.71	0.74			0.78		1.00	1.00			1.51	
Incremental Delay, d2	1.8	4.1			1.6		3.5	30.1			1.5	
Delay (s)	11.5	16.6			14.0		22.3	51.8			35.4	
Level of Service	B	B			B		C	D			D	
Approach Delay (s)		16.3			14.0			44.5			35.4	
Approach LOS		B			B			D			D	

Intersection Summary

HCM Average Control Delay	23.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 135: Floral Dr & I-710 SB (off)

1/18/2010



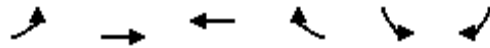
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↻			↻			↻		↻	↻	
Volume (vph)	0	574	19	26	490	0	4	0	48	148	54	71
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Frt		1.00			1.00			0.87		1.00	0.91	
Flt Protected		1.00			1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1675			1678			1466		1598	1538	
Flt Permitted		1.00			0.83			1.00		0.95	1.00	
Satd. Flow (perm)		1675			1394			1466		1598	1538	
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
Adj. Flow (vph)	0	604	20	27	516	0	4	0	51	156	57	75
RTOR Reduction (vph)	0	2	0	0	0	0	0	39	0	0	62	0
Lane Group Flow (vph)	0	622	0	0	543	0	0	16	0	156	70	0
Turn Type				Perm			Split			Split		
Protected Phases		4			8		2	2		6	6	
Permitted Phases				8								
Actuated Green, G (s)		30.1			30.1			16.0		11.9	11.9	
Effective Green, g (s)		30.1			30.1			16.0		11.9	11.9	
Actuated g/C Ratio		0.43			0.43			0.23		0.17	0.17	
Clearance Time (s)		4.0			4.0			4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		720			599			335		272	261	
v/s Ratio Prot		0.37						c0.01		c0.10	0.05	
v/s Ratio Perm					c0.39							
v/c Ratio		0.86			0.91			0.05		0.57	0.27	
Uniform Delay, d1		18.1			18.6			21.1		26.7	25.3	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		10.5			17.3			0.3		2.9	0.6	
Delay (s)		28.6			36.0			21.3		29.6	25.8	
Level of Service		C			D			C		C	C	
Approach Delay (s)		28.6			36.0			21.3			27.9	
Approach LOS		C			D			C			C	

Intersection Summary

HCM Average Control Delay	30.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 137: Ramona Blvd & I-710 SB (on)

1/18/2010



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗↗	↖↖			
Volume (vph)	302	388	697	94	0	0
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	4.0	4.0	4.0			
Lane Util. Factor	1.00	0.95	0.95			
Frt	1.00	1.00	0.98			
Flt Protected	0.95	1.00	1.00			
Satd. Flow (prot)	1598	3195	3138			
Flt Permitted	0.95	1.00	1.00			
Satd. Flow (perm)	1598	3195	3138			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	318	408	734	99	0	0
RTOR Reduction (vph)	0	0	26	0	0	0
Lane Group Flow (vph)	318	408	807	0	0	0
Turn Type	Prot					
Protected Phases	7	4	8			
Permitted Phases						
Actuated Green, G (s)	20.3	60.0	31.7			
Effective Green, g (s)	20.3	60.0	31.7			
Actuated g/C Ratio	0.34	1.00	0.53			
Clearance Time (s)	4.0	4.0	4.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	541	3195	1658			
v/s Ratio Prot	c0.20	0.13	c0.26			
v/s Ratio Perm						
v/c Ratio	0.59	0.13	0.49			
Uniform Delay, d1	16.4	0.0	9.0			
Progression Factor	1.00	1.00	1.00			
Incremental Delay, d2	1.6	0.0	0.2			
Delay (s)	18.0	0.0	9.2			
Level of Service	B	A	A			
Approach Delay (s)		7.9	9.2		0.0	
Approach LOS		A	A		A	

Intersection Summary

HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			