APPENDIX B

TRAFFIC ANALYSIS

PEAK HOUR TRAFFIC VOLUME SUMMARY

AM Peak Hour Existing Volumes		Northbound			Southbound			Eastbound			Westbound		
#	Intersection	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
1	San Marin Dr/Simmons Ln	101	5	281	18	12	5	7	562	104	185	403	2
2	San Marin Dr/W Campus Dr	0	0	3	3	0	4	18	894	0	1	610	67
3	San Marin Dr/E Campus Dr	0	0	0	9	0	2	25	901	0	0	683	266
4	Redwood Blvd/San Marin Dr	114	69	246	53	37	17	41	710	159	295	813	230
5	US 101 S/San Marin Dr	0	0	0	62	0	558	0	509	504	107	759	0
6	US 101 N/Atherton Ave	497	3	95	0	0	0	306	246	0	0	360	78
7	Redwood Blvd/Olive Ave	21	306	87	134	307	62	82	91	25	83	122	78
8	Redwood Blvd/Grant Ave	156	270	34	26	290	57	51	87	103	12	68	21
9	Novato Blvd/San Marin Dr-Sutro Ave	39	214	73	142	151	64	70	92	34	32	87	185
10	Wilson Ave/Novato Blvd	32	0	392	0	0	0	0	577	13	259	404	0
11	Simmons Ln/Novato Blvd	0	0	0	83	0	199	241	720	0	0	482	90
12	Grant Ave/Novato Blvd	1	0	0	29	0	177	249	686	3	0	372	50
13	7th St-Tamalpais Ave/Novato Blvd	45	95	36	102	74	55	88	571	63	47	374	93
14	Diablo Ave/Novato Blvd	26	291	171	351	359	21	14	187	5	184	226	264
15	Redwood Blvd/Diablo Ave-DeLong Ave	37	124	19	108	194	143	161	392	137	98	534	171
16	DeLong Ave/Reichert Ave	4	28	25	198	31	48	46	440	9	49	752	198
17	US 101 S/DeLong Ave	0	0	0	15	4	305	0	150	526	14	722	0
18	US 101 N/DeLong Ave	671	4	26	0	0	0	121	34	0	0	51	17
19	Redwood Blvd/Lamont Ave	15	201	46	37	331	24	5	0	10	64	2	38
20	Redwood Blvd/Landing Ct	1	253	15	10	387	1	2	0	1	15	0	4
21	S Novato Blvd/Center St	142	426	4	1	519	67	67	1	308	1	2	2
22	S Novato Blvd/Arthur St	207	413	0	19	713	140	194	0	184	0	0	0
23	S Novato Blvd/Rowland Blvd	32	271	119	369	497	63	33	182	13	215	166	307
24	Redwood Blvd/Rowland Blvd	78	30	73	200	18	162	113	594	37	20	515	188
25	US 101 S/Rowland Blvd	0	0	0	203	10	169	0	321	531	82	560	0
26	US 101 N/Rowland Blvd	469	3	356	0	0	0	100	413	0	0	170	95
27	Rowland Blvd/Rowland Way	0	0	0	18	0	105	421	350	0	0	171	23
28	Rowland Blvd/Vintage Way	132	0	1	3	2	1	8	62	292	3	44	1
29	S Novato Blvd/Sunset Pkwy	22	202	67	42	499	116	165	54	46	93	46	83
30	S Novato Blvd/Redwood Blvd	90	15	49	105	34	78	42	493	239	220	177	43
31	Ignacio Blvd/Alameda del Prado	76	2	218	2	2	2	2	645	423	333	335	0
32	US 101 S/Ignacio Blvd-Enfrente Rd	0	0	835	315	128	350	32	608	201	166	359	46
33	US 101 N/Bel Marin Keys Blvd-Nave Dr	363	501	530	0	0	0	0	672	1079	83	227	170
34	Bel Marin Keys Blvd/Commercial Blvd	25	1019	231	4	399	4	0	2	7	51	0	7
35	Bel Marin Keys Blvd/Digital Dr	104	500	389	1	281	7	0	1	45	79	1	4
36	US 101 N/Nave Dr	0	774	0	0	936	221	628	0	167	0	0	0
37	Nave Dr/Hamilton Center	0	594	112	98	759	0	0	0	0	55	0	24
38	Nave Dr/N Hamilton Pkwy	0	390	41	235	530	0	0	0	0	141	0	251
39	Nave Dr/Main Gate Dr	0	215	262	103	413	0	0	0	0	230	0	80
40	Nave Dr/Bolling Dr	0	354	78	87	493	0	0	0	0	307	0	95
41	Alameda del Prado/Nave Dr (Overpass)	5	112	53	76	26	8	43	10	0	37	36	712

PM Peak Hour Existing Volumes	Northbound			Southbound			Eastbound			Westbound		
# Intersection	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
1 San Marin Dr/Simmons Ln	82	14	136	23	18	7	5	417	53	306	609	18
2 San Marin Dr/W Campus Dr	3	0	1	68	1	14	1	581	2	3	988	6
3 San Marin Dr/E Campus Dr	0	0	0	196	0	25	0	657	0	0	1009	6
4 Redwood Blvd/San Marin Dr	197	40	433	253	65	45	19	707	150	229	704	45
5 US 101 S/San Marin Dr	0	0	0	61	2	262	0	718	580	107	771	0
6 US 101 N/Atherton Ave	591	147	149	0	0	0	499	290	0	0	289	86
7 Redwood Blvd/Olive Ave	67	658	140	86	302	104	115	67	27	121	99	81
8 Redwood Blvd/Grant Ave	246	487	53	38	357	88	71	123	169	26	155	55
9 Novato Blvd/San Marin Dr-Sutro Ave	39	146	56	113	200	181	58	96	20	80	145	144
10 Wilson Ave/Novato Blvd	32	0	244	0	0	0	0	389	28	358	697	0
11 Simmons Ln/Novato Blvd	0	0	0	95	0	221	146	473	0	0	850	100
12 Grant Ave/Novato Blvd	0	0	2	32	1	287	135	482	4	6	789	47
13 7th St-Tamalpais Ave/Novato Blvd	44	107	42	184	128	139	128	469	39	38	612	227
14 Diablo Ave/Novato Blvd	44	392	231	330	311	27	22	257	13	238	334	507
15 Redwood Blvd/Diablo Ave-DeLong Ave	112	257	64	177	212	219	256	481	86	82	818	223
16 DeLong Ave/Reichert Ave	9	25	27	204	26	73	85	612	13	59	1129	344
17 US 101 S/DeLong Ave	0	0	0	9	4	139	0	175	669	27	1457	0
18 US 101 N/DeLong Ave	1368	50	33	0	0	0	147	32	0	0	62	29
19 Redwood Blvd/Lamont Ave	26	406	66	63	365	21	31	4	32	55	4	50
20 Redwood Blvd/Landing Ct	1	482	17	9	443	1	0	0	3	13	0	11
21 S Novato Blvd/Center St	199	497	3	1	527	98	159	1	185	3	1	0
22 S Novato Blvd/Arthur St	204	727	0	2	595	114	112	0	142	0	0	0
23 S Novato Blvd/Rowland Blvd	27	343	151	355	334	51	32	120	5	199	233	540
24 Redwood Blvd/Rowland Blvd	26	33	68	276	47	179	118	494	46	100	864	300
25 US 101 S/Rowland Blvd	0	0	0	211	6	108	0	322	505	711	1145	0
26 US 101 N/Rowland Blvd	759	8	650	0	0	0	52	504	0	0	1060	443
27 Rowland Blvd/Rowland Way	0	0	0	57	0	408	183	959	0	0	1111	46
28 Rowland Blvd/Vintage Way	879	6	4	4	12	2	17	210	801	1	259	3
29 S Novato Blvd/Sunset Pkwy	46	301	52	38	298	148	152	19	27	29	12	44
30 S Novato Blvd/Redwood Blvd	102	27	115	85	6	46	51	219	51	45	309	138
31 Ignacio Blvd/Alameda del Prado	101	0	185	2	2	2	3	371	67	301	676	0
32 US 101 S/Ignacio Blvd-Enfrente Rd	0	0	478	172	85	182	34	341	250	524	657	114
33 US 101 N/Bel Marin Keys Blvd-Nave Dr	744	496	284	0	0	0	0	222	776	125	612	568
34 Bel Marin Keys Blvd/Commercial Blvd	45	407	55	11	1031	4	3	0	33	247	1	19
35 Bel Marin Keys Blvd/Digital Dr	52	310	95	10	498	4	5	5	130	380	1	3
36 US 101 N/Nave Dr	0	879	0	0	663	250	665	0	211	0	0	0
37 Nave Dr/Hamilton Center	0	532	143	151	439	0	0	0	0	100	0	48
38 Nave Dr/N Hamilton Pkwy	0	316	52	224	293	0	0	0	0	66	0	288
39 Nave Dr/Main Gate Dr	0	289	213	94	223	0	0	0	0	212	0	53
40 Nave Dr/Bolling Dr	0	447	295	56	362	0	0	0	0	158	0	52
41 Alameda del Prado/Nave Dr (Overpass)	0	59	42	172	87	11	7	10	0	110	9	585

INTERSECTION LEVEL OF SERVICE CALCULATIONS

Intersection	
Intersection Delay, s/veh	32.5
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	7	562	104	185	403	2	101	5	281	18	12	5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	7	598	111	197	429	2	107	5	299	19	13	5
Number of Lanes	1	2	0	1	2	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	3	3
HCM Control Delay	45.6	23	25.7	14.9
HCM LOS	E	C	D	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	95%	0%	100%	0%	0%	100%	0%	0%	51%
Vol Thru, %	5%	0%	0%	100%	64%	0%	100%	99%	34%
Vol Right, %	0%	100%	0%	0%	36%	0%	0%	1%	14%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	106	281	7	375	291	185	269	136	35
LT Vol	5	0	0	375	187	0	269	134	12
Through Vol	0	281	0	0	104	0	0	2	5
RT Vol	101	0	7	0	0	185	0	0	18
Lane Flow Rate	113	299	7	399	310	197	286	145	37
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.303	0.704	0.019	0.94	0.709	0.5	0.684	0.347	0.112
Departure Headway (Hd)	9.675	8.477	9.011	8.494	8.236	9.138	8.62	8.61	10.794
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	372	427	398	426	440	396	420	418	332
Service Time	7.429	6.231	6.759	6.242	5.984	6.886	6.368	6.357	8.565
HCM Lane V/C Ratio	0.304	0.7	0.018	0.937	0.705	0.497	0.681	0.347	0.111
HCM Control Delay	16.6	29.1	11.9	59.3	28.8	20.7	28.1	15.9	14.9
HCM Lane LOS	C	D	B	F	D	C	D	C	B
HCM 95th-tile Q	1.3	5.3	0.1	10.7	5.4	2.7	5	1.5	0.4

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	18	894	0	1	610	67	0	0	3	3	0	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.8		4.0	4.8	4.8		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	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
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)	1805	3574		1805	3539	1615		1644		1715	1715	1615
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00		1.00	1.00	1.00
Satd. Flow (perm)	1805	3574		1805	3539	1615		1644		1805	1805	1615
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)	20	972	0	1	663	73	0	0	3	3	0	4
RTOR Reduction (vph)	0	0	0	0	0	34	0	3	0	0	0	4
Lane Group Flow (vph)	20	972	0	1	663	39	0	0	0	1	2	0
Confl. Peds. (#/hr)			2									
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8			4		4
Actuated Green, G (s)	0.8	16.5		0.7	16.4	16.4		0.8		0.8	0.8	0.8
Effective Green, g (s)	0.8	16.5		0.7	16.4	16.4		0.8		0.8	0.8	0.8
Actuated g/C Ratio	0.03	0.54		0.02	0.53	0.53		0.03		0.03	0.03	0.03
Clearance Time (s)	4.0	4.8		4.0	4.8	4.8		4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0		2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	46	1914		41	1884	859		42		46	46	41
v/s Ratio Prot	c0.01	c0.27		0.00	0.19			0.00				
v/s Ratio Perm						0.02				0.00	c0.00	0.00
v/c Ratio	0.43	0.51		0.02	0.35	0.05		0.00		0.02	0.04	0.00
Uniform Delay, d1	14.8	4.6		14.7	4.1	3.4		14.6		14.6	14.6	14.6
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	2.4	0.3		0.1	0.2	0.0		0.0		0.1	0.1	0.0
Delay (s)	17.2	4.9		14.8	4.3	3.5		14.6		14.7	14.8	14.6
Level of Service	B	A		B	A	A		B		B	B	B
Approach Delay (s)		5.1			4.2			14.6			14.7	
Approach LOS		A			A			B			B	

Intersection Summary					
HCM 2000 Control Delay	4.8	HCM 2000 Level of Service		A	
HCM 2000 Volume to Capacity ratio	0.49				
Actuated Cycle Length (s)	30.8	Sum of lost time (s)		12.8	
Intersection Capacity Utilization	44.2%	ICU Level of Service		A	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
3: San Marin Dr & E Campus Drive

12/16/2013

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	25	901	683	266	9	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.3	4.3	4.3	3.0	3.0
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	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)	1805	3574	3574	1615	3502	1594
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1805	3574	3574	1615	3502	1594
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	979	742	289	10	2
RTOR Reduction (vph)	0	0	0	56	0	2
Lane Group Flow (vph)	27	979	742	233	10	0
Confl. Peds. (#/hr)						1
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Turn Type	Prot	NA	NA	Perm	NA	custom
Protected Phases	5	2	6			
Permitted Phases				6	4	4
Actuated Green, G (s)	7.2	115.1	104.9	104.9	7.6	7.6
Effective Green, g (s)	7.2	115.1	104.9	104.9	7.6	7.6
Actuated g/C Ratio	0.06	0.89	0.81	0.81	0.06	0.06
Clearance Time (s)	3.0	4.3	4.3	4.3	3.0	3.0
Vehicle Extension (s)	2.0	4.0	4.0	4.0	2.0	2.0
Lane Grp Cap (vph)	99	3164	2883	1303	204	93
v/s Ratio Prot	0.01	c0.27	0.21			
v/s Ratio Perm				0.14	c0.00	0.00
v/c Ratio	0.27	0.31	0.26	0.18	0.05	0.00
Uniform Delay, d1	58.9	1.2	3.1	2.8	57.8	57.6
Progression Factor	1.00	1.00	0.44	0.20	1.00	1.00
Incremental Delay, d2	0.5	0.3	0.1	0.1	0.0	0.0
Delay (s)	59.4	1.4	1.4	0.7	57.8	57.6
Level of Service	E	A	A	A	E	E
Approach Delay (s)		3.0	1.2		57.8	
Approach LOS		A	A		E	

Intersection Summary				
HCM 2000 Control Delay	2.4	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.30			
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.3	
Intersection Capacity Utilization	37.5%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
4: Redwood Blvd & San Marin Dr

12/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	710	159	295	813	230	114	69	246	53	37	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.6		3.0	4.0		4.3	4.3	4.3	4.3	4.3	
Lane Util. Factor	1.00	0.91		1.00	0.91		0.97	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	0.97		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	4980		1787	4977		3433	1900	1568	1770	1801	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1805	4980		1787	4977		3433	1900	1568	1770	1801	
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)	44	763	171	317	874	247	123	74	265	57	40	18
RTOR Reduction (vph)	0	25	0	0	24	0	0	0	242	0	15	0
Lane Group Flow (vph)	44	909	0	317	1097	0	123	74	23	57	43	0
Confl. Peds. (#/hr)			4									5
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	1%	1%	1%	1%	0%	2%	0%	3%	2%	0%	0%
Turn Type	Prot	NA		Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases					2				7			
Actuated Green, G (s)	8.0	53.1		36.8	81.5		11.3	11.3	11.3	13.6	13.6	
Effective Green, g (s)	8.0	53.1		36.8	81.5		11.3	11.3	11.3	13.6	13.6	
Actuated g/C Ratio	0.06	0.41		0.28	0.63		0.09	0.09	0.09	0.10	0.10	
Clearance Time (s)	3.0	3.6		3.0	4.0		4.3	4.3	4.3	4.3	4.3	
Vehicle Extension (s)	2.0	4.0		5.0	4.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	111	2034		505	3120		298	165	136	185	188	
v/s Ratio Prot	0.02	c0.18		c0.18	0.22		0.04	c0.04		c0.03	0.02	
v/s Ratio Perm									0.01			
v/c Ratio	0.40	0.45		0.63	0.35		0.41	0.45	0.17	0.31	0.23	
Uniform Delay, d1	58.7	27.8		40.6	11.6		56.2	56.4	55.0	53.8	53.4	
Progression Factor	1.18	0.91		1.08	1.07		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	0.7		3.2	0.3		0.3	0.7	0.2	0.3	0.2	
Delay (s)	70.2	26.1		46.9	12.7		56.5	57.1	55.2	54.2	53.6	
Level of Service	E	C		D	B		E	E	E	D	D	
Approach Delay (s)		28.1			20.3			55.9			53.9	
Approach LOS		C			C			E			D	

Intersection Summary				
HCM 2000 Control Delay	29.6	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.49			
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	15.6	
Intersection Capacity Utilization	76.9%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
5: US 101 SB Ramps & San Marin Dr

12/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	509	504	107	759	0	0	0	0	62	0	558
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	3.0	5.3						4.0	4.0
Lane Util. Factor		0.95	1.00	1.00	0.95						1.00	0.88
Frpb, ped/bikes		1.00	0.99	1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		3574	1575	1805	3574						1805	2814
Flt Permitted		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (perm)		3574	1575	1805	3574						1805	2814
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	541	536	114	807	0	0	0	0	66	0	594
RTOR Reduction (vph)	0	0	247	0	0	0	0	0	0	0	0	268
Lane Group Flow (vph)	0	541	289	114	807	0	0	0	0	0	66	326
Confl. Peds. (#/hr)			4									
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	0%	0%	0%	0%	0%	1%
Turn Type		NA	Perm	Prot	NA					Split	NA	Perm
Protected Phases		2		1	6					4	4	
Permitted Phases			2									4
Actuated Green, G (s)		35.0	35.0	6.7	44.3						11.4	11.4
Effective Green, g (s)		35.0	35.0	6.7	44.3						11.4	11.4
Actuated g/C Ratio		0.54	0.54	0.10	0.68						0.18	0.18
Clearance Time (s)		4.9	4.9	3.0	5.3						4.0	4.0
Vehicle Extension (s)		4.0	4.0	2.0	4.0						2.0	2.0
Lane Grp Cap (vph)		1924	848	186	2435						316	493
v/s Ratio Prot		0.15		c0.06	c0.23						0.04	
v/s Ratio Perm			0.18									c0.12
v/c Ratio		0.28	0.34	0.61	0.33						0.21	0.66
Uniform Delay, d1		8.2	8.5	27.9	4.3						22.9	25.0
Progression Factor		0.65	5.16	1.00	1.00						1.00	1.00
Incremental Delay, d2		0.3	1.0	4.2	0.4						0.1	2.6
Delay (s)		5.6	44.7	32.1	4.6						23.1	27.6
Level of Service		A	D	C	A						C	C
Approach Delay (s)		25.1			8.0			0.0			27.1	
Approach LOS		C			A			A			C	

Intersection Summary				
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.45			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	11.9	
Intersection Capacity Utilization	53.3%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
6: US 101 NB Ramps & San Marin Dr

12/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	306	246	0	0	360	78	497	3	95	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.6			4.9	4.9	3.5	3.5				
Lane Util. Factor	0.97	1.00			0.95	1.00	0.95	0.95				
Frpb, ped/bikes	1.00	1.00			1.00	0.99	1.00	0.99				
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00				
Frt	1.00	1.00			1.00	0.85	1.00	0.94				
Flt Protected	0.95	1.00			1.00	1.00	0.95	0.97				
Satd. Flow (prot)	3467	1881			3574	1594	1681	1600				
Flt Permitted	0.95	1.00			1.00	1.00	0.95	0.97				
Satd. Flow (perm)	3467	1881			3574	1594	1681	1600				
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.74	0.89	0.89	0.89
Adj. Flow (vph)	344	276	0	0	404	88	558	3	128	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	66	0	39	0	0	0	0
Lane Group Flow (vph)	344	276	0	0	404	22	352	298	0	0	0	0
Confl. Peds. (#/hr)			3			1			1	1		
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	2%	0%	3%	0%	0%	0%
Turn Type	Prot	NA			NA	Perm	Split	NA				
Protected Phases	5	2			6		8	8				
Permitted Phases						6						
Actuated Green, G (s)	9.6	25.8			12.4	12.4	15.4	15.4				
Effective Green, g (s)	9.6	25.8			12.4	12.4	15.4	15.4				
Actuated g/C Ratio	0.19	0.52			0.25	0.25	0.31	0.31				
Clearance Time (s)	3.5	4.6			4.9	4.9	3.5	3.5				
Vehicle Extension (s)	2.0	4.0			4.0	4.0	2.5	2.5				
Lane Grp Cap (vph)	675	984			898	400	525	499				
v/s Ratio Prot	c0.10	0.15			c0.11		c0.21	0.19				
v/s Ratio Perm						0.01						
v/c Ratio	0.51	0.28			0.45	0.06	0.67	0.60				
Uniform Delay, d1	17.7	6.6			15.6	14.0	14.7	14.3				
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00				
Incremental Delay, d2	0.2	0.2			0.5	0.1	3.0	1.6				
Delay (s)	18.0	6.8			16.1	14.1	17.8	15.9				
Level of Service	B	A			B	B	B	B				
Approach Delay (s)		13.0			15.7			16.9			0.0	
Approach LOS		B			B			B			A	

Intersection Summary				
HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.56			
Actuated Cycle Length (s)	49.3	Sum of lost time (s)	11.9	
Intersection Capacity Utilization	53.3%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Volume (vph)	82	91	25	83	122	78	21	306	87	71	63	307
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1			5.1		4.0	3.9	3.9		4.0	3.9
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	0.97			0.96		1.00	1.00	0.85		1.00	0.97
Flt Protected	0.95	1.00			0.99		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1802			1768		1770	3539	1583		1770	3450
Flt Permitted	0.51	1.00			0.86		0.95	1.00	1.00		0.24	1.00
Satd. Flow (perm)	954	1802			1545		1770	3539	1583		452	3450
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)	87	97	27	88	130	83	22	326	93	76	67	327
RTOR Reduction (vph)	0	13	0	0	18	0	0	0	72	0	0	18
Lane Group Flow (vph)	87	111	0	0	283	0	22	326	21	0	143	375
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	custom	Prot	NA
Protected Phases		4			8		5	2			1	6
Permitted Phases	4			8					2	1		
Actuated Green, G (s)	16.6	16.6			16.6		1.4	13.8	13.8		16.5	28.9
Effective Green, g (s)	16.6	16.6			16.6		1.4	13.8	13.8		16.5	28.9
Actuated g/C Ratio	0.28	0.28			0.28		0.02	0.23	0.23		0.28	0.48
Clearance Time (s)	5.1	5.1			5.1		4.0	3.9	3.9		4.0	3.9
Vehicle Extension (s)	1.0	1.0			1.0		1.0	1.0	1.0		1.0	1.0
Lane Grp Cap (vph)	264	499			428		41	815	364		124	1664
v/s Ratio Prot		0.06					0.01	c0.09				0.11
v/s Ratio Perm	0.09				c0.18				0.01		c0.32	
v/c Ratio	0.33	0.22			0.66		0.54	0.40	0.06		1.15	0.23
Uniform Delay, d1	17.2	16.7			19.2		28.9	19.5	18.0		21.7	9.0
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.1			3.0		6.6	0.1	0.0		127.9	0.0
Delay (s)	17.5	16.8			22.1		35.5	19.7	18.0		149.6	9.0
Level of Service	B	B			C		D	B	B		F	A
Approach Delay (s)		17.1			22.1			20.1				46.5
Approach LOS		B			C			C				D

Intersection Summary			
HCM 2000 Control Delay	29.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	59.9	Sum of lost time (s)	13.0
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: Redwood Blvd/Redwood Dr & Olive St 12/16/2013

Movement	SBR
Lane Configurations	
Volume (vph)	62
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.94
Adj. Flow (vph)	66
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Novato General Plan
AM Peak Hour Existing Conditions
Synchro 8 Report

HCM Signalized Intersection Capacity Analysis
8: Redwood Blvd & Grant Ave

12/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	51	87	103	12	68	21	156	270	34	26	290	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5		3.5	3.7	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1763	1900	1578	1804	1900	1588	1805	3475		1805	3445	
Flt Permitted	0.71	1.00	1.00	0.70	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1317	1900	1578	1322	1900	1588	1805	3475		1805	3445	
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)	55	94	111	13	73	23	168	290	37	28	312	61
RTOR Reduction (vph)	0	0	85	0	0	18	0	8	0	0	16	0
Lane Group Flow (vph)	55	94	26	13	73	5	168	319	0	28	357	0
Confl. Peds. (#/hr)	10		2	2		10			9			8
Confl. Bikes (#/hr)						1						3
Heavy Vehicles (%)	2%	0%	1%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8		8	4		4						
Actuated Green, G (s)	12.5	12.5	12.5	12.5	12.5	12.5	9.6	27.8		2.2	20.2	
Effective Green, g (s)	12.5	12.5	12.5	12.5	12.5	12.5	9.6	27.8		2.2	20.2	
Actuated g/C Ratio	0.23	0.23	0.23	0.23	0.23	0.23	0.18	0.52		0.04	0.38	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5		3.5	3.7	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.5	3.0		2.5	3.0	
Lane Grp Cap (vph)	307	443	368	308	443	371	323	1805		74	1300	
v/s Ratio Prot		c0.05			0.04		c0.09	0.09		0.02	c0.10	
v/s Ratio Perm	0.04		0.02	0.01		0.00						
v/c Ratio	0.18	0.21	0.07	0.04	0.16	0.01	0.52	0.18		0.38	0.27	
Uniform Delay, d1	16.4	16.5	16.0	15.9	16.3	15.8	19.9	6.8		25.0	11.6	
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	0.4	0.3	0.1	0.1	0.2	0.0	1.2	0.0		2.3	0.1	
Delay (s)	16.8	16.9	16.1	15.9	16.6	15.8	21.0	6.8		27.3	11.7	
Level of Service	B	B	B	B	B	B	C	A		C	B	
Approach Delay (s)		16.5			16.3			11.7			12.8	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM 2000 Control Delay	13.4	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.31			
Actuated Cycle Length (s)	53.5	Sum of lost time (s)	11.2	
Intersection Capacity Utilization	50.0%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM 2010 AWSC
9: San Marin Dr/Sutro Ave & Novato Blvd

12/16/2013

Intersection	
Intersection Delay, s/veh	28.8
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	70	92	34	32	87	185	39	214	73	142	151	64
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	86	114	42	40	107	228	48	264	90	175	186	79
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	2	2
HCM Control Delay	17.5	34.4	41.8	18.3
HCM LOS	C	D	E	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	75%	0%	73%	0%	32%	0%	100%	0%
Vol Right, %	0%	25%	0%	27%	0%	68%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	39	287	70	126	32	272	142	151	64
LT Vol	0	214	0	92	0	87	0	151	0
Through Vol	0	73	0	34	0	185	0	0	64
RT Vol	39	0	70	0	32	0	142	0	0
Lane Flow Rate	48	354	86	156	40	336	175	186	79
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.126	0.856	0.24	0.402	0.104	0.792	0.459	0.461	0.18
Departure Headway (Hd)	9.402	8.698	10.01	9.296	9.496	8.49	9.423	8.904	8.179
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	380	415	358	386	376	426	382	403	437
Service Time	7.183	6.478	7.803	7.088	7.277	6.27	7.206	6.688	5.961
HCM Lane V/C Ratio	0.126	0.853	0.24	0.404	0.106	0.789	0.458	0.462	0.181
HCM Control Delay	13.5	45.6	16	18.3	13.4	36.9	20	19.1	12.8
HCM Lane LOS	B	E	C	C	B	E	C	C	B
HCM 95th-tile Q	0.4	8.4	0.9	1.9	0.3	7	2.3	2.4	0.6

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM Signalized Intersection Capacity Analysis
10: Wilson Ave & Novato Blvd

12/16/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	577	13	259	404	32	392
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.9		3.0	3.6	3.6	3.6
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	1.00		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3561		1900	3610	1805	1593
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3561		1900	3610	1805	1593
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	695	16	312	487	39	472
RTOR Reduction (vph)	2	0	0	0	0	240
Lane Group Flow (vph)	709	0	312	487	39	232
Confl. Peds. (#/hr)		3			6	2
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%
Turn Type	NA		Prot	NA	NA	Perm
Protected Phases	2		1	6	4	
Permitted Phases						4
Actuated Green, G (s)	32.1		21.1	43.5	16.3	16.3
Effective Green, g (s)	32.1		21.1	43.5	16.3	16.3
Actuated g/C Ratio	0.40		0.26	0.54	0.20	0.20
Clearance Time (s)	3.9		3.0	3.6	3.6	3.6
Vehicle Extension (s)	3.0		2.0	3.0	2.0	2.0
Lane Grp Cap (vph)	1428		501	1962	367	324
v/s Ratio Prot	c0.20		c0.16	0.13	0.02	
v/s Ratio Perm						c0.15
v/c Ratio	0.50		0.62	0.25	0.11	0.71
Uniform Delay, d1	17.9		25.9	9.6	25.9	29.7
Progression Factor	1.00		0.79	0.37	1.00	1.00
Incremental Delay, d2	1.2		1.7	0.3	0.0	6.1
Delay (s)	19.1		22.2	3.8	26.0	35.8
Level of Service	B		C	A	C	D
Approach Delay (s)	19.1			11.0	35.0	
Approach LOS	B			B	D	

Intersection Summary				
HCM 2000 Control Delay	20.0	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.59			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.5	
Intersection Capacity Utilization	49.5%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
11: Novato Blvd & Simmons Ln

12/16/2013

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	241	720	482	90	83	199
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.9	3.6		3.0	3.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	3574	3513		1805	1599
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1805	3574	3513		1805	1599
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	298	889	595	111	102	246
RTOR Reduction (vph)	0	0	14	0	0	194
Lane Group Flow (vph)	298	889	692	0	102	52
Confl. Peds. (#/hr)					2	
Confl. Bikes (#/hr)				1		
Heavy Vehicles (%)	0%	1%	0%	0%	0%	1%
Turn Type	Prot	NA	NA		NA	Perm
Protected Phases	5	2	6		8	
Permitted Phases						8
Actuated Green, G (s)	10.0	32.1	43.5		16.9	16.9
Effective Green, g (s)	10.0	32.1	43.5		16.9	16.9
Actuated g/C Ratio	0.12	0.40	0.54		0.21	0.21
Clearance Time (s)	3.0	3.9	3.6		3.0	3.0
Vehicle Extension (s)	2.0	3.0	3.0		2.0	2.0
Lane Grp Cap (vph)	225	1434	1910		381	337
v/s Ratio Prot	c0.17	c0.25	c0.20		c0.06	
v/s Ratio Perm						0.03
v/c Ratio	1.32	0.62	0.36		0.27	0.15
Uniform Delay, d1	35.0	19.1	10.4		26.4	25.7
Progression Factor	0.79	0.62	1.25		1.00	1.00
Incremental Delay, d2	170.1	1.7	0.5		0.1	0.1
Delay (s)	197.6	13.5	13.5		26.5	25.8
Level of Service	F	B	B		C	C
Approach Delay (s)		59.7	13.5		26.0	
Approach LOS		E	B		C	

Intersection Summary				
HCM 2000 Control Delay	39.9	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.55			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.5	
Intersection Capacity Utilization	44.5%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
12: Novato Blvd & Grant Ave

12/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	249	686	3	0	372	50	1	0	0	29	0	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.5	4.5		4.9	4.9		4.0		3.5	3.5	
Lane Util. Factor	1.00	1.00	1.00		0.95	1.00		1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97		1.00	0.97		1.00		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00		0.99		0.99	1.00	
Frt	1.00	1.00	0.85		1.00	0.85		1.00		1.00	0.85	
Flt Protected	0.95	1.00	1.00		1.00	1.00		0.95		0.95	1.00	
Satd. Flow (prot)	1805	1881	1567		3610	1570		1792		1794	1576	
Flt Permitted	0.95	1.00	1.00		1.00	1.00		0.38		0.76	1.00	
Satd. Flow (perm)	1805	1881	1567		3610	1570		725		1430	1576	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	283	780	3	0	423	57	1	0	0	33	0	201
RTOR Reduction (vph)	0	0	1	0	0	28	0	0	0	0	174	0
Lane Group Flow (vph)	283	780	2	0	423	29	0	1	0	33	27	0
Confl. Peds. (#/hr)			5			4	12		4	4		12
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		
Actuated Green, G (s)	16.7	61.1	61.1		40.5	40.5		10.4		10.9	10.9	
Effective Green, g (s)	16.7	61.1	61.1		40.5	40.5		10.4		10.9	10.9	
Actuated g/C Ratio	0.21	0.76	0.76		0.51	0.51		0.13		0.14	0.14	
Clearance Time (s)	3.5	4.5	4.5		4.9	4.9		4.0		3.5	3.5	
Vehicle Extension (s)	2.0	3.0	3.0		3.0	3.0		2.0		2.0	2.0	
Lane Grp Cap (vph)	376	1436	1196		1827	794		94		194	214	
v/s Ratio Prot	c0.16	c0.41			0.12						0.02	
v/s Ratio Perm			0.00			0.02		0.00		c0.02		
v/c Ratio	0.75	0.54	0.00		0.23	0.04		0.01		0.17	0.13	
Uniform Delay, d1	29.7	3.8	2.2		11.0	9.9		30.3		30.6	30.4	
Progression Factor	0.56	2.55	1.00		0.88	1.79		1.00		1.00	1.00	
Incremental Delay, d2	6.4	1.3	0.0		0.3	0.1		0.0		0.2	0.1	
Delay (s)	23.0	11.0	2.2		10.0	17.8		30.3		30.7	30.5	
Level of Service	C	B	A		B	B		C		C	C	
Approach Delay (s)		14.2			11.0			30.3			30.5	
Approach LOS		B			B			C			C	

Intersection Summary				
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.56			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.4	
Intersection Capacity Utilization	67.1%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Tamalpais Ave/7th St & Novato Blvd

12/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	88	571	63	47	374	93	45	95	36	102	74	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.0		3.5	5.0	5.0	3.5	3.5		3.5	3.5	3.5
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		0.98	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.96		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)	1770	1867		1805	1900	1615	1790	1802		1776	1900	1533
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.70	1.00		0.54	1.00	1.00
Satd. Flow (perm)	1770	1867		1805	1900	1615	1325	1802		1018	1900	1533
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	99	642	71	53	420	104	51	107	40	115	83	62
RTOR Reduction (vph)	0	3	0	0	0	26	0	19	0	0	0	52
Lane Group Flow (vph)	99	710	0	53	420	78	51	128	0	115	83	10
Confl. Peds. (#/hr)			2				5		11	11		5
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8			4		4
Actuated Green, G (s)	8.3	49.0		5.5	46.2	46.2	13.5	13.5		13.5	13.5	13.5
Effective Green, g (s)	8.3	49.0		5.5	46.2	46.2	13.5	13.5		13.5	13.5	13.5
Actuated g/C Ratio	0.10	0.61		0.07	0.58	0.58	0.17	0.17		0.17	0.17	0.17
Clearance Time (s)	3.5	5.0		3.5	5.0	5.0	3.5	3.5		3.5	3.5	3.5
Vehicle Extension (s)	2.0	5.0		2.0	5.0	5.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	183	1143		124	1097	932	223	304		171	320	258
v/s Ratio Prot	c0.06	c0.38		0.03	0.22			0.07			0.04	
v/s Ratio Perm						0.05	0.04			c0.11		0.01
v/c Ratio	0.54	0.62		0.43	0.38	0.08	0.23	0.42		0.67	0.26	0.04
Uniform Delay, d1	34.0	9.7		35.7	9.2	7.5	28.7	29.8		31.2	28.9	27.8
Progression Factor	0.93	0.99		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.5	2.2		0.9	1.0	0.2	0.2	0.3		7.9	0.2	0.0
Delay (s)	33.0	11.8		36.6	10.2	7.7	28.9	30.1		39.1	29.1	27.9
Level of Service	C	B		D	B	A	C	C		D	C	C
Approach Delay (s)		14.3			12.2			29.8			33.2	
Approach LOS		B			B			C			C	

Intersection Summary				
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.63			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	72.8%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: Novato Blvd & Diablo Ave

12/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	14	187	5	184	226	264	26	291	171	351	359	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.7		4.1	4.1	4.1	4.4	4.4	4.4	4.1	4.1	
Lane Util. Factor		0.95		0.91	0.91	1.00	1.00	1.00	1.00	0.91	0.91	
Frpb, ped/bikes		1.00		1.00	1.00	0.96	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected		1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	0.99	
Satd. Flow (prot)		3582		1610	3413	1553	1805	1900	1577	1643	3600	
Flt Permitted		1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	0.99	
Satd. Flow (perm)		3582		1610	3413	1553	1805	1900	1577	1643	3389	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	16	210	6	207	254	297	29	327	192	394	403	24
RTOR Reduction (vph)	0	2	0	0	0	237	0	0	148	0	2	0
Lane Group Flow (vph)	0	230	0	149	312	60	29	327	44	268	551	0
Confl. Peds. (#/hr)			1			14			2	2		
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	0%	0%	1%	0%	0%	5%
Turn Type	Split	NA		Split	NA	Perm	Split	NA	Perm	Split	NA	
Protected Phases	3	3		4	4		1	1		2	2	
Permitted Phases						4			1		2	
Actuated Green, G (s)		12.8		13.5	13.5	13.5	17.1	17.1	17.1	14.4	14.4	
Effective Green, g (s)		12.8		13.5	13.5	13.5	17.1	17.1	17.1	14.4	14.4	
Actuated g/C Ratio		0.17		0.18	0.18	0.18	0.23	0.23	0.23	0.19	0.19	
Clearance Time (s)		3.7		4.1	4.1	4.1	4.4	4.4	4.4	4.1	4.1	
Vehicle Extension (s)		2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)		618		293	621	282	416	438	363	319	699	
v/s Ratio Prot		c0.06		c0.09	0.09		0.02	c0.17		c0.16	0.15	
v/s Ratio Perm						0.04			0.03			
v/c Ratio		0.37		0.51	0.50	0.21	0.07	0.75	0.12	0.84	0.79	
Uniform Delay, d1		27.1		27.3	27.3	25.8	22.3	26.5	22.6	28.7	28.4	
Progression Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.1		0.5	0.2	0.1	0.0	6.0	0.1	17.1	5.4	
Delay (s)		27.2		27.8	27.5	25.9	22.3	32.5	22.6	45.8	33.8	
Level of Service		C		C	C	C	C	C	C	D	C	
Approach Delay (s)		27.2			26.9			28.5			37.7	
Approach LOS		C			C			C			D	

Intersection Summary				
HCM 2000 Control Delay	31.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.63			
Actuated Cycle Length (s)	74.1	Sum of lost time (s)	16.3	
Intersection Capacity Utilization	65.7%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
15: Redwood Blvd & Diablo Ave/De Long Ave

12/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	161	392	137	98	534	171	37	124	19	108	194	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	9
Total Lost time (s)	5.0	4.0		5.0	4.1		4.0	4.8	4.8	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	0.95	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3467	3470		1805	3399		1805	3610	1508	3303	1900	1396
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3467	3470		1805	3399		1805	3610	1508	3303	1900	1396
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	181	440	154	110	600	192	42	139	21	121	218	161
RTOR Reduction (vph)	0	27	0	0	63	0	0	0	15	0	0	98
Lane Group Flow (vph)	181	567	0	110	729	0	42	139	6	121	218	63
Confl. Peds. (#/hr)						2			7			14
Confl. Bikes (#/hr)												3
Heavy Vehicles (%)	1%	0%	0%	0%	2%	2%	0%	0%	5%	6%	0%	1%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	17.0	48.2		17.0	48.1		10.4	36.0	36.0	11.0	37.4	37.4
Effective Green, g (s)	17.0	48.2		17.0	48.1		10.4	36.0	36.0	11.0	37.4	37.4
Actuated g/C Ratio	0.13	0.37		0.13	0.37		0.08	0.28	0.28	0.08	0.29	0.29
Clearance Time (s)	5.0	4.0		5.0	4.1		4.0	4.8	4.8	4.0	4.0	4.0
Vehicle Extension (s)	2.5	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	453	1286		236	1257		144	999	417	279	546	401
v/s Ratio Prot	0.05	0.16		c0.06	c0.21		0.02	0.04		c0.04	c0.11	
v/s Ratio Perm									0.00			0.04
v/c Ratio	0.40	0.44		0.47	0.58		0.29	0.14	0.01	0.43	0.40	0.16
Uniform Delay, d1	51.8	30.8		52.3	32.8		56.3	35.3	34.1	56.5	37.3	34.5
Progression Factor	1.00	1.00		1.18	0.76		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	1.1		0.5	1.8		0.4	0.3	0.1	0.4	2.2	0.8
Delay (s)	52.2	31.9		62.2	26.9		56.7	35.6	34.2	56.9	39.4	35.4
Level of Service	D	C		E	C		E	D	C	E	D	D
Approach Delay (s)		36.6			31.2			39.9			42.4	
Approach LOS		D			C			D			D	

Intersection Summary				
HCM 2000 Control Delay	36.1	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.49			
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.9	
Intersection Capacity Utilization	103.4%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
16: Richert Ave & De Long Ave

12/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	46	440	9	49	752	198	4	28	25	198	31	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.1		3.0	4.1		3.5	3.5	3.5	3.5	3.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	0.97		1.00	1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3527		1805	3446		1792	1900	1587	1778	1705	
Flt Permitted	0.95	1.00		0.95	1.00		0.66	1.00	1.00	0.74	1.00	
Satd. Flow (perm)	1805	3527		1805	3446		1237	1900	1587	1381	1705	
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)	49	468	10	52	800	211	4	30	27	211	33	51
RTOR Reduction (vph)	0	1	0	0	11	0	0	0	22	0	41	0
Lane Group Flow (vph)	49	477	0	52	1000	0	4	30	5	211	43	0
Confl. Peds. (#/hr)			6			1	6		4	4		6
Heavy Vehicles (%)	0%	2%	0%	0%	1%	1%	0%	0%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		
Actuated Green, G (s)	7.7	86.8		7.8	86.9		24.8	24.8	24.8	24.8	24.8	
Effective Green, g (s)	7.7	86.8		7.8	86.9		24.8	24.8	24.8	24.8	24.8	
Actuated g/C Ratio	0.06	0.67		0.06	0.67		0.19	0.19	0.19	0.19	0.19	
Clearance Time (s)	3.0	4.1		3.0	4.1		3.5	3.5	3.5	3.5	3.5	
Vehicle Extension (s)	2.0	3.0		2.0	3.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	106	2354		108	2303		235	362	302	263	325	
v/s Ratio Prot	0.03	0.14		c0.03	c0.29			0.02			0.03	
v/s Ratio Perm							0.00		0.00	c0.15		
v/c Ratio	0.46	0.20		0.48	0.43		0.02	0.08	0.02	0.80	0.13	
Uniform Delay, d1	59.1	8.3		59.1	10.1		42.7	43.2	42.7	50.3	43.7	
Progression Factor	1.08	0.96		1.04	0.87		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.1	0.2		1.2	0.6		0.0	0.0	0.0	15.2	0.1	
Delay (s)	65.0	8.2		62.6	9.3		42.7	43.3	42.7	65.4	43.7	
Level of Service	E	A		E	A		D	D	D	E	D	
Approach Delay (s)		13.5			11.9			43.0			59.3	
Approach LOS		B			B			D			E	

Intersection Summary				
HCM 2000 Control Delay	20.5	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.51			
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.6	
Intersection Capacity Utilization	63.2%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: US 101 SB Ramps & De Long Ave

12/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	150	526	14	722	0	0	0	0	15	4	305
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.6	3.6	3.0	3.6					4.0	4.0	
Lane Util. Factor		0.95	1.00	1.00	0.95					0.95	0.95	
Frt		1.00	0.85	1.00	1.00					1.00	0.85	
Flt Protected		1.00	1.00	0.95	1.00					0.95	1.00	
Satd. Flow (prot)		3574	1599	1770	3539					1681	1509	
Flt Permitted		1.00	1.00	0.95	1.00					0.95	1.00	
Satd. Flow (perm)		3574	1599	1770	3539					1681	1509	
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	160	560	15	768	0	0	0	0	16	4	324
RTOR Reduction (vph)	0	0	208	0	0	0	0	0	0	0	154	0
Lane Group Flow (vph)	0	160	352	15	768	0	0	0	0	14	176	0
Heavy Vehicles (%)	0%	1%	1%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type		NA	Perm	Prot	NA					Split	NA	
Protected Phases		6		5	2					4	4	
Permitted Phases			6									
Actuated Green, G (s)		40.9	40.9	1.3	45.2					12.2	12.2	
Effective Green, g (s)		40.9	40.9	1.3	45.2					12.2	12.2	
Actuated g/C Ratio		0.63	0.63	0.02	0.70					0.19	0.19	
Clearance Time (s)		3.6	3.6	3.0	3.6					4.0	4.0	
Vehicle Extension (s)		4.0	4.0	2.0	4.0					2.5	2.5	
Lane Grp Cap (vph)		2248	1006	35	2460					315	283	
v/s Ratio Prot		0.04		0.01	c0.22					0.01	c0.12	
v/s Ratio Perm			c0.22									
v/c Ratio		0.07	0.35	0.43	0.31					0.04	0.62	
Uniform Delay, d1		4.7	5.7	31.5	3.9					21.6	24.3	
Progression Factor		0.82	2.57	1.00	1.00					1.00	1.00	
Incremental Delay, d2		0.1	0.9	3.0	0.3					0.0	3.6	
Delay (s)		3.9	15.7	34.5	4.2					21.7	27.9	
Level of Service		A	B	C	A					C	C	
Approach Delay (s)		13.1			4.8			0.0			27.6	
Approach LOS		B			A			A			C	

Intersection Summary				
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.41			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	10.6	
Intersection Capacity Utilization	70.0%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: US 101 NB Ramps & De Long Ave

12/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	121	34	0	0	51	17	671	4	26	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.6			3.6		4.5	4.5				
Lane Util. Factor	1.00	0.95			0.95		0.95	0.95				
Frt	1.00	1.00			0.96		1.00	0.99				
Flt Protected	0.95	1.00			1.00		0.95	0.96				
Satd. Flow (prot)	1770	3610			3373		1698	1681				
Flt Permitted	0.95	1.00			1.00		0.95	0.96				
Satd. Flow (perm)	1770	3610			3373		1698	1681				
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	134	38	0	0	57	19	746	4	29	0	0	0
RTOR Reduction (vph)	0	0	0	0	17	0	0	4	0	0	0	0
Lane Group Flow (vph)	134	38	0	0	59	0	388	387	0	0	0	0
Heavy Vehicles (%)	2%	0%	0%	0%	0%	12%	1%	0%	8%	0%	0%	0%
Turn Type	Prot	NA			NA		Split	NA				
Protected Phases	1	6			2		4	4				
Permitted Phases												
Actuated Green, G (s)	8.7	16.4			4.2		17.4	17.4				
Effective Green, g (s)	8.7	16.4			4.2		17.4	17.4				
Actuated g/C Ratio	0.21	0.39			0.10		0.42	0.42				
Clearance Time (s)	3.5	3.6			3.6		4.5	4.5				
Vehicle Extension (s)	2.5	2.0			2.0		3.0	3.0				
Lane Grp Cap (vph)	367	1412			338		705	698				
v/s Ratio Prot	c0.08	0.01			c0.02		0.23	c0.23				
v/s Ratio Perm												
v/c Ratio	0.37	0.03			0.17		0.55	0.56				
Uniform Delay, d1	14.2	7.8			17.3		9.3	9.3				
Progression Factor	1.00	1.00			1.00		1.00	1.00				
Incremental Delay, d2	0.5	0.0			0.1		0.9	1.0				
Delay (s)	14.7	7.8			17.4		10.2	10.3				
Level of Service	B	A			B		B	B				
Approach Delay (s)		13.2			17.4			10.2			0.0	
Approach LOS		B			B			B			A	

Intersection Summary				
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.45			
Actuated Cycle Length (s)	41.9	Sum of lost time (s)	11.6	
Intersection Capacity Utilization	70.0%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Redwood Blvd & Lamont Ave

12/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	0	10	64	2	38	15	201	46	37	331	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5	3.5		3.5	3.5	3.5	4.8		3.5	4.8	4.8
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes		1.00	1.00		1.00	0.99	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected		0.95	1.00		0.95	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1804	1615		1812	1595	1805	3495		1805	3610	1615
Flt Permitted		0.71	1.00		0.75	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1352	1615		1419	1595	1805	3495		1805	3610	1615
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)	5	0	11	67	2	40	16	212	48	39	348	25
RTOR Reduction (vph)	0	0	9	0	0	34	0	11	0	0	0	8
Lane Group Flow (vph)	0	5	2	0	69	6	16	249	0	39	348	17
Confl. Peds. (#/hr)	1					1			2			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8		8	4		4						2
Actuated Green, G (s)		14.6	14.6		14.6	14.6	1.8	57.6		6.0	61.8	61.8
Effective Green, g (s)		14.6	14.6		14.6	14.6	1.8	57.6		6.0	61.8	61.8
Actuated g/C Ratio		0.16	0.16		0.16	0.16	0.02	0.64		0.07	0.69	0.69
Clearance Time (s)		3.5	3.5		3.5	3.5	3.5	4.8		3.5	4.8	4.8
Vehicle Extension (s)		2.0	2.0		2.0	2.0	2.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)		219	261		230	258	36	2236		120	2478	1108
v/s Ratio Prot							0.01	0.07		c0.02	c0.10	
v/s Ratio Perm		0.00	0.00		c0.05	0.00						0.01
v/c Ratio		0.02	0.01		0.30	0.03	0.44	0.11		0.33	0.14	0.02
Uniform Delay, d1		31.7	31.6		33.2	31.7	43.6	6.3		40.1	4.9	4.5
Progression Factor		1.00	1.00		1.00	1.00	0.66	0.82		1.00	1.00	1.00
Incremental Delay, d2		0.0	0.0		0.3	0.0	3.2	0.1		0.6	0.1	0.0
Delay (s)		31.7	31.6		33.5	31.7	31.8	5.3		40.6	5.0	4.5
Level of Service		C	C		C	C	C	A		D	A	A
Approach Delay (s)		31.7			32.8			6.8			8.4	
Approach LOS		C			C			A			A	

Intersection Summary				
HCM 2000 Control Delay	11.6	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.19			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.8	
Intersection Capacity Utilization	52.3%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: Redwood Blvd & Landing Ct

12/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	0	1	15	0	4	1	253	15	10	387	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5		3.5		4.0		4.8	4.8	3.5	4.8	4.0
Lane Util. Factor		1.00		1.00		1.00		0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes		1.00		1.00		1.00		1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes		1.00		1.00		1.00		1.00	1.00	1.00	1.00	1.00
Frt		0.95		1.00		0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97		0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1747		1800		1615		3609	1580	1805	3610	1615
Flt Permitted		0.97		0.76		1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1747		1432		1615		3446	1580	1805	3610	1615
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)	2	0	1	15	0	4	1	261	15	10	399	1
RTOR Reduction (vph)	0	3	0	0	0	4	0	0	4	0	0	1
Lane Group Flow (vph)	0	0	0	15	0	0	0	262	11	10	399	0
Confl. Peds. (#/hr)			4	4					3			6
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		custom		NA	Perm	NA	Perm	Prot	NA	NA
Protected Phases		4						2		1	6	
Permitted Phases	4			8			2		2			
Actuated Green, G (s)		8.2		8.2		0.0		67.4	67.4	2.6	73.5	0.0
Effective Green, g (s)		8.2		8.2		0.0		67.4	67.4	2.6	73.5	0.0
Actuated g/C Ratio		0.09		0.09		0.00		0.75	0.75	0.03	0.82	0.00
Clearance Time (s)		3.5		3.5				4.8	4.8	3.5	4.8	
Vehicle Extension (s)		3.0		2.0				4.0	4.0	2.0	4.0	
Lane Grp Cap (vph)		159		130		0		2580	1183	52	2948	0
v/s Ratio Prot										c0.01	c0.11	
v/s Ratio Perm		0.00		c0.01				0.08	0.01			
v/c Ratio		0.00		0.12		0.00		0.10	0.01	0.19	0.14	0.00
Uniform Delay, d1		37.2		37.6		45.0		3.1	2.9	42.7	1.7	45.0
Progression Factor		1.00		1.00		1.00		1.00	1.00	0.72	0.80	1.00
Incremental Delay, d2		0.0		0.1		0.0		0.1	0.0	0.7	0.1	0.0
Delay (s)		37.2		37.7		45.0		3.1	2.9	31.6	1.4	45.0
Level of Service		D		D		D		A	A	C	A	D
Approach Delay (s)		37.2			39.2			3.1			2.3	
Approach LOS		D			D			A			A	

Intersection Summary				
HCM 2000 Control Delay	3.8	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.14			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.8	
Intersection Capacity Utilization	43.3%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
21: Novato Blvd & Center Rd/Garden Ct

12/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	67	1	308	1	2	2	142	426	4	1	519	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.2	3.2			3.0		3.0	4.4		3.0	4.4	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.85			0.95		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1616			1780		1805	3604		1805	3504	
Flt Permitted	0.75	1.00			0.69		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1434	1616			1235		1805	3604		1805	3504	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	75	1	346	1	2	2	160	479	4	1	583	75
RTOR Reduction (vph)	0	303	0	0	2	0	0	0	0	0	6	0
Lane Group Flow (vph)	75	44	0	0	3	0	160	483	0	1	652	0
Confl. Peds. (#/hr)									9			6
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4								
Actuated Green, G (s)	12.3	12.3			12.5		13.6	74.9		2.2	63.5	
Effective Green, g (s)	12.3	12.3			12.5		13.6	74.9		2.2	63.5	
Actuated g/C Ratio	0.12	0.12			0.12		0.14	0.75		0.02	0.64	
Clearance Time (s)	3.2	3.2			3.0		3.0	4.4		3.0	4.4	
Vehicle Extension (s)	3.0	3.0			2.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	176	198			154		245	2699		39	2225	
v/s Ratio Prot		0.03					c0.09	0.13		0.00	c0.19	
v/s Ratio Perm	c0.05				0.00							
v/c Ratio	0.43	0.22			0.02		0.65	0.18		0.03	0.29	
Uniform Delay, d1	40.6	39.5			38.4		41.0	3.6		47.9	8.2	
Progression Factor	1.00	1.00			1.00		0.81	0.99		1.00	1.00	
Incremental Delay, d2	1.7	0.6			0.0		4.6	0.1		0.1	0.3	
Delay (s)	42.2	40.1			38.4		37.6	3.7		47.9	8.5	
Level of Service	D	D			D		D	A		D	A	
Approach Delay (s)		40.5			38.4			12.2			8.6	
Approach LOS		D			D			B			A	

Intersection Summary				
HCM 2000 Control Delay	17.8	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.37			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.6	
Intersection Capacity Utilization	57.0%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

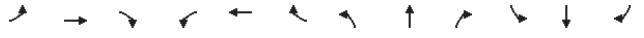
HCM Signalized Intersection Capacity Analysis
22: Novato Blvd & Arthur St 12/16/2013

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	194	184	207	413	19	713	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5	3.5	4.9	3.5	4.9	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	0.95	
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.99	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1785	1579	1805	3610	1805	3474	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	1785	1579	1805	3610	1805	3474	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	211	200	225	449	21	775	152
RTOR Reduction (vph)	0	166	0	0	0	12	0
Lane Group Flow (vph)	211	34	225	449	21	915	0
Confl. Peds. (#/hr)	10	8					5
Confl. Bikes (#/hr)		1					
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	0%
Turn Type	NA	custom	Prot	NA	Prot	NA	
Protected Phases			1	6	5	2	
Permitted Phases	4	4					
Actuated Green, G (s)	17.1	17.1	16.7	68.3	2.7	54.3	
Effective Green, g (s)	17.1	17.1	16.7	68.3	2.7	54.3	
Actuated g/C Ratio	0.17	0.17	0.17	0.68	0.03	0.54	
Clearance Time (s)	3.5	3.5	3.5	4.9	3.5	4.9	
Vehicle Extension (s)	2.0	2.0	2.0	4.0	2.0	4.0	
Lane Grp Cap (vph)	305	270	301	2465	48	1886	
v/s Ratio Prot			c0.12	0.12	0.01	c0.26	
v/s Ratio Perm	c0.12	0.02					
v/c Ratio	0.69	0.13	0.75	0.18	0.44	0.49	
Uniform Delay, d1	39.0	35.1	39.6	5.7	47.9	14.2	
Progression Factor	1.00	1.00	1.01	0.52	1.34	0.76	
Incremental Delay, d2	5.4	0.1	7.5	0.1	2.2	0.9	
Delay (s)	44.4	35.2	47.6	3.1	66.4	11.6	
Level of Service	D	D	D	A	E	B	
Approach Delay (s)	39.9			17.9		12.8	
Approach LOS	D			B		B	

Intersection Summary				
HCM 2000 Control Delay	20.0	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.57			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	11.9	
Intersection Capacity Utilization	60.0%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: Novato Blvd & Rowland Blvd 12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	33	182	13	215	166	307	32	271	119	369	497	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	4.1	4.1	3.5	4.1		3.5	4.4	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		0.97	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.95		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1873		1770	1900	1576	1805	1787		3502	1860	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	1873		1770	1900	1576	1805	1787		3502	1860	
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)	36	200	14	236	182	337	35	298	131	405	546	69
RTOR Reduction (vph)	0	2	0	0	0	243	0	15	0	0	4	0
Lane Group Flow (vph)	36	212	0	236	182	94	35	414	0	405	611	0
Confl. Peds. (#/hr)			24			2			13			10
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	0%	0%	0%	2%	0%	1%	0%	0%	2%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases						4						
Actuated Green, G (s)	5.4	19.1		14.9	28.0	28.0	6.0	36.9		14.5	45.1	
Effective Green, g (s)	5.4	19.1		14.9	28.0	28.0	6.0	36.9		14.5	45.1	
Actuated g/C Ratio	0.05	0.19		0.15	0.28	0.28	0.06	0.37		0.14	0.45	
Clearance Time (s)	3.5	3.5		3.5	4.1	4.1	3.5	4.1		3.5	4.4	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	3.0		2.0	2.0	
Lane Grp Cap (vph)	97	357		263	532	441	108	659		507	838	
v/s Ratio Prot	0.02	c0.11		c0.13	0.10		0.02	0.23		c0.12	c0.33	
v/s Ratio Perm						0.06						
v/c Ratio	0.37	0.59		0.90	0.34	0.21	0.32	0.63		0.80	0.73	
Uniform Delay, d1	45.7	36.9		41.8	28.7	27.6	45.1	25.9		41.3	22.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.99	0.60		0.89	0.66	
Incremental Delay, d2	0.9	1.8		29.3	0.1	0.1	0.5	3.8		7.4	5.1	
Delay (s)	46.5	38.7		71.1	28.8	27.7	45.1	19.5		44.0	19.9	
Level of Service	D	D		E	C	C	D	B		D	B	
Approach Delay (s)		39.8			41.5			21.4			29.5	
Approach LOS		D			D			C			C	

Intersection Summary				
HCM 2000 Control Delay	32.7	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.77			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.5	
Intersection Capacity Utilization	80.2%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: Redwood Blvd & Rowland Blvd

12/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	113	594	37	20	515	188	78	30	73	200	18	162
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.4	4.4	3.5	3.7	3.7	3.5	4.1		3.5	4.8	4.8
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1805	3574	1589	1805	3574	1578	1805	3192		3502	1900	1594
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1805	3574	1589	1805	3574	1578	1805	3192		3502	1900	1594
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)	124	653	41	22	566	207	86	33	80	220	20	178
RTOR Reduction (vph)	0	0	22	0	0	86	0	68	0	0	0	146
Lane Group Flow (vph)	124	653	19	22	566	121	86	45	0	220	20	32
Confl. Peds. (#/hr)			6			2			3			2
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	1%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	11.3	32.8	32.8	1.1	23.3	23.3	8.3	10.7		10.9	12.6	12.6
Effective Green, g (s)	11.3	32.8	32.8	1.1	23.3	23.3	8.3	10.7		10.9	12.6	12.6
Actuated g/C Ratio	0.16	0.46	0.46	0.02	0.33	0.33	0.12	0.15		0.15	0.18	0.18
Clearance Time (s)	3.5	4.4	4.4	3.5	3.7	3.7	3.5	4.1		3.5	4.8	4.8
Vehicle Extension (s)	2.0	4.0	4.0	2.0	4.0	4.0	2.0	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	287	1651	734	27	1172	517	211	481		537	337	282
v/s Ratio Prot	c0.07	0.18		0.01	c0.16		0.05	0.01		c0.06	0.01	
v/s Ratio Perm			0.01			0.08						c0.02
v/c Ratio	0.43	0.40	0.03	0.81	0.48	0.23	0.41	0.09		0.41	0.06	0.11
Uniform Delay, d1	27.0	12.6	10.4	34.8	19.0	17.4	29.1	26.0		27.1	24.3	24.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	0.2	0.0	91.8	0.4	0.3	0.5	0.1		0.4	0.1	0.1
Delay (s)	27.3	12.8	10.4	126.7	19.5	17.7	29.5	26.0		27.5	24.3	24.6
Level of Service	C	B	B	F	B	B	C	C		C	C	C
Approach Delay (s)		14.9			22.0			27.5			26.1	
Approach LOS		B			C			C			C	

Intersection Summary				
HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.39			
Actuated Cycle Length (s)	71.0	Sum of lost time (s)	16.2	
Intersection Capacity Utilization	50.3%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
25: US 101 SB Ramps & Rowland Blvd

12/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	321	531	82	560	0	0	0	0	203	10	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.6	3.6	3.0	3.6					3.0	3.0	
Lane Util. Factor		0.91	0.91	0.97	0.95					0.91	0.91	
Frpb, ped/bikes		0.99	0.99	1.00	1.00					1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	
Frt		0.93	0.85	1.00	1.00					1.00	0.90	
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.99	
Satd. Flow (prot)		3187	1450	3367	3574					1643	2966	
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.99	
Satd. Flow (perm)		3187	1450	3367	3574					1643	2966	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	328	542	84	571	0	0	0	0	207	10	172
RTOR Reduction (vph)	0	161	161	0	0	0	0	0	0	0	124	0
Lane Group Flow (vph)	0	438	110	84	571	0	0	0	0	137	128	0
Confl. Peds. (#/hr)			2									2
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	1%	0%	4%	1%	0%	0%	0%	0%	0%	40%	1%
Turn Type		NA	Perm	Prot	NA					Split	NA	
Protected Phases		2		1	6					4	4	
Permitted Phases			2									
Actuated Green, G (s)		15.7	15.7	2.7	21.4					10.8	10.8	
Effective Green, g (s)		15.7	15.7	2.7	21.4					10.8	10.8	
Actuated g/C Ratio		0.40	0.40	0.07	0.55					0.28	0.28	
Clearance Time (s)		3.6	3.6	3.0	3.6					3.0	3.0	
Vehicle Extension (s)		4.0	4.0	2.0	2.5					2.0	2.0	
Lane Grp Cap (vph)		1289	586	234	1971					457	825	
v/s Ratio Prot		c0.14		c0.02	0.16					c0.08	0.04	
v/s Ratio Perm			0.08									
v/c Ratio		0.34	0.19	0.36	0.29					0.30	0.16	
Uniform Delay, d1		8.0	7.4	17.2	4.6					11.0	10.6	
Progression Factor		1.00	1.00	1.00	1.00					1.00	1.00	
Incremental Delay, d2		0.2	0.2	0.3	0.1					0.1	0.0	
Delay (s)		8.2	7.7	17.6	4.7					11.2	10.6	
Level of Service		A	A	B	A					B	B	
Approach Delay (s)		8.0			6.4			0.0			10.8	
Approach LOS		A			A			A			B	

Intersection Summary				
HCM 2000 Control Delay	8.0	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.33			
Actuated Cycle Length (s)	38.8	Sum of lost time (s)	9.6	
Intersection Capacity Utilization	44.7%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
26: Park-n-Ride Lot & US 101 NB Ramps & Rowland Blvd 12/16/2013

Movement	EBL2	EBL	EBT	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	NEL2	NEL
Lane Configurations												
Volume (vph)	3	100	413	170	1	95	469	3	3	356	4	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0	3.6	3.6		3.6	3.5		3.5	3.0		3.5
Lane Util. Factor		1.00	0.95	0.86		0.86	0.95		0.95	0.88		1.00
Frpb, ped/bikes		1.00	1.00	1.00		1.00	1.00		1.00	1.00		1.00
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00		1.00	1.00		1.00
Frt		1.00	1.00	0.97		0.85	1.00		1.00	0.85		1.00
Flt Protected		0.95	1.00	1.00		1.00	0.95		0.95	1.00		0.95
Satd. Flow (prot)		1805	3574	4582		1323	1715		1707	2787		1805
Flt Permitted		0.14	1.00	1.00		1.00	0.95		0.95	1.00		0.95
Satd. Flow (perm)		261	3574	4582		1323	1715		1707	2787		1805
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	3	112	464	191	1	107	527	3	3	400	4	2
RTOR Reduction (vph)	0	0	0	27	0	55	0	0	0	0	0	0
Lane Group Flow (vph)	0	115	464	205	0	12	269	0	264	400	0	6
Confl. Peds. (#/hr)										2		
Heavy Vehicles (%)	0%	0%	1%	4%	0%	5%	0%	0%	67%	2%	0%	0%
Turn Type	custom	Prot	NA	NA		Perm	Split	Split	NA	custom	Perm	NA
Protected Phases		5	2	6			8	8	8	1 8		7
Permitted Phases	5					6					7	
Actuated Green, G (s)		29.1	30.7	13.0		13.0	16.9		16.9	31.8		1.5
Effective Green, g (s)		29.1	30.7	13.0		13.0	16.9		16.9	28.3		1.5
Actuated g/C Ratio		0.39	0.41	0.18		0.18	0.23		0.23	0.38		0.02
Clearance Time (s)		3.0	3.6	3.6		3.6	3.5		3.5			3.5
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0		2.0			2.0
Lane Grp Cap (vph)		102	1480	803		232	391		389	1064		36
v/s Ratio Prot			c0.13	0.04			c0.16		0.15	0.14		
v/s Ratio Perm		c0.44				0.01						0.00
v/c Ratio		1.13	0.31	0.26		0.05	0.69		0.68	0.38		0.17
Uniform Delay, d1		22.5	14.6	26.4		25.4	26.2		26.1	16.5		35.7
Progression Factor		1.00	1.00	1.00		1.00	1.00		1.00	1.00		1.00
Incremental Delay, d2		127.5	0.0	0.1		0.0	4.0		3.7	0.1		0.8
Delay (s)		150.0	14.7	26.4		25.4	30.2		29.8	16.6		36.5
Level of Service		F	B	C		C	C		C	B		D
Approach Delay (s)			41.5	26.2					24.3			36.5
Approach LOS			D	C					C			D

Intersection Summary				
HCM 2000 Control Delay	30.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.82			
Actuated Cycle Length (s)	74.1	Sum of lost time (s)	13.6	
Intersection Capacity Utilization	52.4%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
27: Rowland Blvd & Rowland Way 12/16/2013

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	421	350	171	23	18	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.6	3.2		3.2	3.2
Lane Util. Factor	0.97	0.91	0.95		1.00	0.95
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.98		0.89	0.85
Flt Protected	0.95	1.00	1.00		0.99	1.00
Satd. Flow (prot)	3467	5085	3356		1611	1490
Flt Permitted	0.95	1.00	1.00		0.99	1.00
Satd. Flow (perm)	3467	5085	3356		1611	1490
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	468	389	190	26	20	117
RTOR Reduction (vph)	0	0	14	0	40	56
Lane Group Flow (vph)	468	389	202	0	29	12
Confl. Peds. (#/hr)				1	2	
Heavy Vehicles (%)	1%	2%	5%	9%	6%	3%
Turn Type	Prot	NA	NA		NA	Perm
Protected Phases	5	2	6		4	
Permitted Phases						4
Actuated Green, G (s)	15.1	28.7	10.5		7.5	7.5
Effective Green, g (s)	15.1	28.7	10.5		7.5	7.5
Actuated g/C Ratio	0.35	0.67	0.24		0.17	0.17
Clearance Time (s)	3.5	3.6	3.2		3.2	3.2
Vehicle Extension (s)	2.0	4.0	4.0		2.0	2.0
Lane Grp Cap (vph)	1217	3393	819		280	259
v/s Ratio Prot	c0.13	0.08	c0.06		c0.02	
v/s Ratio Perm						0.01
v/c Ratio	0.38	0.11	0.25		0.10	0.05
Uniform Delay, d1	10.5	2.6	13.1		14.9	14.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.1	0.0	0.2		0.1	0.0
Delay (s)	10.5	2.6	13.3		15.0	14.8
Level of Service	B	A	B		B	B
Approach Delay (s)		6.9	13.3		14.9	
Approach LOS		A	B		B	

Intersection Summary				
HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.28			
Actuated Cycle Length (s)	43.0	Sum of lost time (s)	9.9	
Intersection Capacity Utilization	36.7%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
28: Vintage Way & Rowland Blvd

12/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	62	292	3	44	1	132	0	1	3	2	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.6	3.6	3.0	3.6		3.6	3.6			3.2	
Lane Util. Factor	1.00	0.95	0.88	1.00	0.95		0.97	1.00			1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	0.99			1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85			0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.97	
Satd. Flow (prot)	1805	3195	2814	1805	3248		3367	1595			1812	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.97	
Satd. Flow (perm)	1805	3195	2814	1805	3248		3367	1595			1812	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	10	77	360	4	54	1	163	0	1	4	2	1
RTOR Reduction (vph)	0	0	0	0	1	0	0	1	0	0	1	0
Lane Group Flow (vph)	10	77	360	4	54	0	163	0	0	0	6	0
Confl. Peds. (#/hr)			1			3			1			
Confl. Bikes (#/hr)			2			2						
Heavy Vehicles (%)	0%	13%	1%	0%	11%	0%	4%	0%	0%	0%	0%	0%
Turn Type	Prot	NA	pt+ov	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2	2 3	1	6		3	3		4	4	
Permitted Phases												
Actuated Green, G (s)	1.0	9.6	30.0	0.5	9.1		16.8	16.8			1.0	
Effective Green, g (s)	1.0	9.6	30.0	0.5	9.1		16.8	16.8			1.0	
Actuated g/C Ratio	0.02	0.23	0.73	0.01	0.22		0.41	0.41			0.02	
Clearance Time (s)	3.0	3.6		3.0	3.6		3.6	3.6			3.2	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		3.0	3.0			2.0	
Lane Grp Cap (vph)	43	742	2044	21	715		1369	648			43	
v/s Ratio Prot	c0.01	0.02	c0.13	0.00	0.02		0.05	0.00			c0.00	
v/s Ratio Perm												
v/c Ratio	0.23	0.10	0.18	0.19	0.08		0.12	0.00			0.14	
Uniform Delay, d1	19.8	12.5	1.8	20.2	12.8		7.6	7.3			19.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	1.0	0.0	0.0	1.6	0.0		0.0	0.0			0.5	
Delay (s)	20.8	12.5	1.8	21.8	12.8		7.7	7.3			20.3	
Level of Service	C	B	A	C	B		A	A			C	
Approach Delay (s)		4.1			13.4			7.7			20.3	
Approach LOS		A			B			A			C	

Intersection Summary				
HCM 2000 Control Delay	5.9	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.20			
Actuated Cycle Length (s)	41.3	Sum of lost time (s)	13.4	
Intersection Capacity Utilization	35.8%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
29: Novato Blvd & Sunset Pkwy

12/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	54	46	93	46	83	22	202	67	42	499	116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.0		3.5	3.5		3.5	4.9		3.5	4.6	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.96		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.90		1.00	0.96		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1746		1805	1650		1805	1817		1770	1815	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1746		1805	1650		1805	1817		1770	1815	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	196	64	55	111	55	99	26	240	80	50	594	138
RTOR Reduction (vph)	0	34	0	0	74	0	0	10	0	0	6	0
Lane Group Flow (vph)	196	85	0	111	80	0	26	310	0	50	726	0
Confl. Peds. (#/hr)			4			21			3			5
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	0%	0%	2%	1%	2%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	12.3	18.1		11.1	17.4		4.0	46.9		8.0	51.2	
Effective Green, g (s)	12.3	18.1		11.1	17.4		4.0	46.9		8.0	51.2	
Actuated g/C Ratio	0.12	0.18		0.11	0.17		0.04	0.47		0.08	0.51	
Clearance Time (s)	3.5	4.0		3.5	3.5		3.5	4.9		3.5	4.6	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	219	316		200	287		72	852		141	929	
v/s Ratio Prot	c0.11	0.05		0.06	c0.05		0.01	0.17		c0.03	c0.40	
v/s Ratio Perm												
v/c Ratio	0.89	0.27		0.56	0.28		0.36	0.36		0.35	0.78	
Uniform Delay, d1	43.2	35.2		42.1	35.9		46.8	17.0		43.6	19.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.14	0.45	
Incremental Delay, d2	33.1	0.2		1.9	0.2		1.1	1.2		0.4	4.4	
Delay (s)	76.3	35.4		44.0	36.1		47.9	18.2		50.2	13.3	
Level of Service	E	D		D	D		D	B		D	B	
Approach Delay (s)		60.8			39.4			20.4			15.7	
Approach LOS		E			D			C			B	

Intersection Summary				
HCM 2000 Control Delay	28.6	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.9	
Intersection Capacity Utilization	70.4%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM 2010 AWSC
30: Redwood Blvd & Novato Blvd 12/16/2013

Intersection	
Intersection Delay, s/veh	39.7
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	42	493	238	220	177	43	90	15	49	105	34	78
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
Heavy Vehicles, %	1	2	1	1	2	1	1	1	1	1	1	1
Mvmt Flow	42	498	240	222	179	43	91	15	49	106	34	79
Number of Lanes	1	1	0	1	1	0	1	1	1	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	2	2	2
HCM Control Delay	64.4	18	13.6	14.2
HCM LOS	F	C	B	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	67%	0%	80%	0%	30%
Vol Right, %	0%	0%	100%	0%	33%	0%	20%	0%	70%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	90	15	49	42	731	220	220	105	112
LT Vol	0	15	0	0	493	0	177	0	34
Through Vol	0	0	49	0	238	0	43	0	78
RT Vol	90	0	0	42	0	220	0	105	0
Lane Flow Rate	91	15	49	42	738	222	222	106	113
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.233	0.037	0.111	0.094	1	0.506	0.468	0.265	0.251
Departure Headway (Hd)	9.239	8.74	8.042	7.95	7.227	8.203	7.585	8.98	7.999
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	388	409	444	448	502	440	473	400	448
Service Time	7.013	6.514	5.816	5.747	5.023	5.965	5.346	6.748	5.767
HCM Lane V/C Ratio	0.235	0.037	0.11	0.094	1.47	0.505	0.469	0.265	0.252
HCM Control Delay	14.8	11.9	11.8	11.6	67.4	19.1	16.9	15	13.4
HCM Lane LOS	B	B	B	B	F	C	C	B	B
HCM 95th-tile Q	0.9	0.1	0.4	0.3	13.6	2.8	2.4	1.1	1

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM Signalized Intersection Capacity Analysis
31: Alameda Del Prado & Ignacio Blvd 12/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	645	423	333	335	0	76	2	218	2	2	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.6	3.6	3.0	3.6			3.5	3.5		3.7	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00			1.00	0.98		0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			0.99	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	
Satd. Flow (prot)	1770	3610	1573	1900	3610			1782	1589		1772	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.73	1.00		0.94	
Satd. Flow (perm)	1770	3610	1573	1805	3610			1360	1589		1696	
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)	2	672	441	347	349	0	79	2	227	2	2	2
RTOR Reduction (vph)	0	0	110	0	0	0	0	0	196	0	2	0
Lane Group Flow (vph)	2	672	331	347	349	0	0	81	31	0	4	0
Confl. Peds. (#/hr)			4				7		4	4		7
Heavy Vehicles (%)	2%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2				8		8	4		
Actuated Green, G (s)	1.2	49.0	49.0	27.4	75.2			13.5	13.5		13.3	
Effective Green, g (s)	1.2	49.0	49.0	27.4	75.2			13.5	13.5		13.3	
Actuated g/C Ratio	0.01	0.49	0.49	0.27	0.75			0.14	0.14		0.13	
Clearance Time (s)	3.0	3.6	3.6	3.0	3.6			3.5	3.5		3.7	
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0			2.0	2.0		2.0	
Lane Grp Cap (vph)	21	1768	770	520	2714			183	214		225	
v/s Ratio Prot	0.00	0.19		c0.18	0.10							
v/s Ratio Perm			c0.21					c0.06	0.02		0.00	
v/c Ratio	0.10	0.38	0.43	0.67	0.13			0.44	0.14		0.02	
Uniform Delay, d1	48.9	16.0	16.5	32.3	3.4			39.8	38.1		37.7	
Progression Factor	1.00	1.00	1.00	0.72	0.63			1.00	1.00		1.00	
Incremental Delay, d2	0.7	0.6	1.7	2.4	0.1			0.6	0.1		0.0	
Delay (s)	49.6	16.6	18.2	25.6	2.2			40.4	38.3		37.7	
Level of Service	D	B	B	C	A			D	D		D	
Approach Delay (s)		17.3			13.9			38.8			37.7	
Approach LOS		B			B			D			D	

Intersection Summary				
HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.50			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.3	
Intersection Capacity Utilization	68.4%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
32: US 101 SB Off Ramp/Enfrente Rd & Ignacio Blvd 12/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	32	608	201	166	359	46	0	0	835	315	128	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	8.0	8.0	3.0	4.0				3.0		3.5	3.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95				0.88		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	0.99				1.00		1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00				1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98				0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00				1.00		0.97	1.00
Satd. Flow (prot)	1805	3610	1550	1787	3528				2842		1809	1578
Flt Permitted	0.95	1.00	1.00	0.95	1.00				1.00		0.97	1.00
Satd. Flow (perm)	1805	3610	1550	1787	3528				2842		1809	1578
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)	34	654	216	178	386	49	0	0	898	339	138	376
RTOR Reduction (vph)	0	0	125	0	8	0	0	0	265	0	0	260
Lane Group Flow (vph)	34	654	91	178	427	0	0	0	633	0	477	116
Confl. Peds. (#/hr)			7			20						1
Confl. Bikes (#/hr)						3						
Heavy Vehicles (%)	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	5%	1%
Turn Type	Prot	NA	Perm	Prot	NA				Over	Split	NA	Perm
Protected Phases	5	2		1	6				1	7	7	
Permitted Phases			2									7
Actuated Green, G (s)	6.6	26.5	26.5	28.2	52.1				28.2		30.8	30.8
Effective Green, g (s)	6.6	26.5	26.5	28.2	52.1				28.2		30.8	30.8
Actuated g/C Ratio	0.07	0.26	0.26	0.28	0.52				0.28		0.31	0.31
Clearance Time (s)	3.0	8.0	8.0	3.0	4.0				3.0		3.5	3.5
Vehicle Extension (s)	2.0	2.5	2.5	3.0	4.0				3.0		2.5	2.5
Lane Grp Cap (vph)	119	956	410	503	1838				801		557	486
v/s Ratio Prot	0.02	c0.18		0.10	0.12				c0.22		c0.26	
v/s Ratio Perm			0.06									0.07
v/c Ratio	0.29	0.68	0.22	0.35	0.23				0.79		0.86	0.24
Uniform Delay, d1	44.5	33.0	28.7	28.6	13.1				33.2		32.5	25.8
Progression Factor	0.82	0.64	0.55	1.52	1.90				1.00		1.00	1.00
Incremental Delay, d2	0.5	3.8	1.2	0.4	0.3				5.3		12.2	0.2
Delay (s)	37.1	24.9	16.9	44.0	25.1				38.5		44.7	26.0
Level of Service	D	C	B	D	C				D		D	C
Approach Delay (s)		23.4			30.6			38.5			36.5	
Approach LOS		C			C			D			D	

Intersection Summary				
HCM 2000 Control Delay	32.3	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.78			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.5	
Intersection Capacity Utilization	83.6%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
33: Nave Dr/US 101 NB On Ramp & Ignacio Blvd/Bel Marin Keys Blvd 12/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	672	1079	83	227	170	363	501	530	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.6	3.0	4.0		4.6	4.6	3.0			
Lane Util. Factor		0.95	1.00	1.00	0.95		0.91	0.91	1.00			
Frpb, ped/bikes		1.00	0.99	1.00	0.99		1.00	1.00	0.99			
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00	1.00			
Frt		1.00	0.85	1.00	0.94		1.00	1.00	0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95	0.99	1.00			
Satd. Flow (prot)		3610	1605	1805	3330		1643	3404	1599			
Flt Permitted		1.00	1.00	0.95	1.00		0.95	0.99	1.00			
Satd. Flow (perm)		3610	1605	1805	3330		1643	3404	1599			
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	693	1112	86	234	175	374	516	546	0	0	0
RTOR Reduction (vph)	0	0	102	0	85	0	0	0	19	0	0	0
Lane Group Flow (vph)	0	693	1010	86	324	0	288	602	527	0	0	0
Confl. Peds. (#/hr)			1			1			1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	2%	0%	1%	0%	0%	0%	0%
Turn Type		NA	pm+ov	Prot	NA		Split	NA	pm+ov			
Protected Phases		2	3	1	6		3	3	1			
Permitted Phases			2						3			
Actuated Green, G (s)		36.5	76.4	12.0	51.5		39.9	39.9	51.9			
Effective Green, g (s)		36.5	76.4	12.0	51.5		39.9	39.9	51.9			
Actuated g/C Ratio		0.36	0.76	0.12	0.52		0.40	0.40	0.52			
Clearance Time (s)		4.0	4.6	3.0	4.0		4.6	4.6	3.0			
Vehicle Extension (s)		4.0	2.0	2.0	4.0		2.0	2.0	2.0			
Lane Grp Cap (vph)		1317	1226	216	1714		655	1358	829			
v/s Ratio Prot		0.19	c0.33	0.05	0.10		0.18	0.18	c0.08			
v/s Ratio Perm			0.30						0.25			
v/c Ratio		0.53	0.82	0.40	0.19		0.44	0.44	0.64			
Uniform Delay, d1		25.0	7.5	40.7	13.0		21.9	21.9	17.3			
Progression Factor		0.96	1.15	1.24	0.88		1.00	1.00	1.00			
Incremental Delay, d2		0.9	2.8	0.4	0.2		0.2	0.1	1.2			
Delay (s)		24.9	11.4	51.0	11.7		22.1	22.0	18.4			
Level of Service		C	B	D	B		C	C	B			
Approach Delay (s)		16.6			18.5			20.7			0.0	
Approach LOS		B			B			C			A	

Intersection Summary				
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.80			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	11.6	
Intersection Capacity Utilization	84.1%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
34: Bel Marin Keys Blvd & Commercial Blvd 12/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	2	7	51	0	7	25	1019	231	4	399	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	3.0	3.9		3.0	3.5	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.90			1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected		1.00			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1682			1801	1395	1805	3492		1805	3569	
Flt Permitted		1.00			0.75	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1682			1425	1395	1805	3492		1805	3569	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	2	7	52	0	7	26	1040	236	4	407	4
RTOR Reduction (vph)	0	6	0	0	0	6	0	10	0	0	0	0
Lane Group Flow (vph)	0	3	0	0	52	1	26	1266	0	4	411	0
Confl. Peds. (#/hr)	3		2	2		3			3			
Heavy Vehicles (%)	2%	0%	0%	0%	0%	14%	0%	0%	0%	0%	1%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		11.0			11.0	11.0	3.1	76.3		1.8	75.4	
Effective Green, g (s)		11.0			11.0	11.0	3.1	76.3		1.8	75.4	
Actuated g/C Ratio		0.11			0.11	0.11	0.03	0.76		0.02	0.75	
Clearance Time (s)		4.0			4.0	4.0	3.0	3.9		3.0	3.5	
Vehicle Extension (s)		3.0			3.0	3.0	2.5	3.0		2.5	4.0	
Lane Grp Cap (vph)		185			156	153	55	2664		32	2691	
v/s Ratio Prot		0.00					c0.01	c0.36		0.00	0.12	
v/s Ratio Perm					c0.04	0.00						
v/c Ratio		0.01			0.33	0.01	0.47	0.48		0.12	0.15	
Uniform Delay, d1		39.7			41.1	39.6	47.6	4.4		48.3	3.4	
Progression Factor		1.00			1.00	1.00	0.91	0.56		0.95	1.43	
Incremental Delay, d2		0.0			1.3	0.0	3.9	0.5		1.3	0.1	
Delay (s)		39.7			42.4	39.6	47.5	3.0		47.4	5.0	
Level of Service		D			D	D	D	A		D	A	
Approach Delay (s)		39.7			42.1			3.9			5.4	
Approach LOS		D			D			A			A	

Intersection Summary				
HCM 2000 Control Delay	5.7	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.46			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.9	
Intersection Capacity Utilization	58.5%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
35: Bel Marin Keys Blvd & Hamilton Dr/Digital Dr 12/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1	45	79	1	4	104	500	389	1	281	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5	3.5	3.5	3.5		3.0	4.0		3.0	4.0	
Lane Util. Factor		1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99	1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85	1.00	0.88		1.00	0.93		1.00	1.00	
Flt Protected		1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1900	1533	1803	1654		1770	3338		1805	3559	
Flt Permitted		1.00	1.00	0.76	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1900	1533	1437	1654		1770	3338		1805	3559	
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	1	47	83	1	4	109	526	409	1	296	7
RTOR Reduction (vph)	0	0	41	0	4	0	0	66	0	0	1	0
Lane Group Flow (vph)	0	1	6	83	1	0	109	869	0	1	302	0
Confl. Peds. (#/hr)	1		1	1		1			2			8
Heavy Vehicles (%)	0%	0%	4%	0%	0%	0%	2%	0%	0%	0%	1%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		12.3	12.3	12.3	12.3		11.2	75.4		1.8	66.0	
Effective Green, g (s)		12.3	12.3	12.3	12.3		11.2	75.4		1.8	66.0	
Actuated g/C Ratio		0.12	0.12	0.12	0.12		0.11	0.75		0.02	0.66	
Clearance Time (s)		3.5	3.5	3.5	3.5		3.0	4.0		3.0	4.0	
Vehicle Extension (s)		2.0	2.0	2.5	2.5		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)		233	188	176	203		198	2516		32	2348	
v/s Ratio Prot		0.00			0.00		c0.06	c0.26		0.00	0.08	
v/s Ratio Perm			0.00	c0.06								
v/c Ratio		0.00	0.03	0.47	0.01		0.55	0.35		0.03	0.13	
Uniform Delay, d1		38.5	38.6	40.8	38.5		42.0	4.1		48.2	6.3	
Progression Factor		1.00	1.00	1.00	1.00		1.12	1.24		1.00	1.00	
Incremental Delay, d2		0.0	0.0	1.5	0.0		1.7	0.3		0.1	0.1	
Delay (s)		38.5	38.6	42.3	38.5		48.9	5.4		48.4	6.4	
Level of Service		D	D	D	D		D	A		D	A	
Approach Delay (s)		38.6			42.1			10.0			6.6	
Approach LOS		D			D			A			A	

Intersection Summary				
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.40			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.5	
Intersection Capacity Utilization	55.3%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
36: Nave Dr & US 101 NB Off Ramp 12/16/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	628	167	0	774	936	221
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3467	1563		3574	3478	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3467	1563		3574	3478	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	668	178	0	823	996	235
RTOR Reduction (vph)	0	47	0	0	30	0
Lane Group Flow (vph)	668	131	0	823	1202	0
Confl. Peds. (#/hr)		1				
Heavy Vehicles (%)	1%	2%	0%	1%	1%	0%
Turn Type	NA	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	27.0	27.0		35.0	35.0	
Effective Green, g (s)	27.0	27.0		35.0	35.0	
Actuated g/C Ratio	0.39	0.39		0.50	0.50	
Clearance Time (s)	3.0	3.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	1337	602		1787	1739	
v/s Ratio Prot	c0.19			0.23	c0.35	
v/s Ratio Perm		0.08				
v/c Ratio	0.50	0.22		0.46	0.69	
Uniform Delay, d1	16.4	14.4		11.4	13.4	
Progression Factor	1.00	1.00		0.43	1.00	
Incremental Delay, d2	1.3	0.8		0.8	2.3	
Delay (s)	17.7	15.2		5.6	15.6	
Level of Service	B	B		A	B	
Approach Delay (s)	17.2			5.6	15.6	
Approach LOS	B			A	B	

Intersection Summary				
HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	62.9%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
37: Nave Dr & Hamilton Center 12/16/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	55	24	594	112	98	759
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.2	3.2	4.4		3.0	4.4
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	1615	1852		1770	1881
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1805	1615	1852		1770	1881
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	60	26	653	123	108	834
RTOR Reduction (vph)	0	25	8	0	0	0
Lane Group Flow (vph)	60	1	768	0	108	834
Confl. Peds. (#/hr)				2		
Heavy Vehicles (%)	0%	0%	0%	0%	2%	1%
Turn Type	NA	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	3.6	3.6	48.6		7.2	58.8
Effective Green, g (s)	3.6	3.6	48.6		7.2	58.8
Actuated g/C Ratio	0.05	0.05	0.69		0.10	0.84
Clearance Time (s)	3.2	3.2	4.4		3.0	4.4
Vehicle Extension (s)	1.0	1.0	1.0		1.0	1.0
Lane Grp Cap (vph)	92	83	1285		182	1580
v/s Ratio Prot	c0.03		c0.41		c0.06	0.44
v/s Ratio Perm		0.00				
v/c Ratio	0.65	0.02	0.60		0.59	0.53
Uniform Delay, d1	32.6	31.5	5.6		30.0	1.6
Progression Factor	1.00	1.00	0.58		1.24	0.88
Incremental Delay, d2	11.9	0.0	1.9		2.7	1.0
Delay (s)	44.5	31.5	5.1		39.8	2.4
Level of Service	D	C	A		D	A
Approach Delay (s)	40.6		5.1			6.7
Approach LOS	D		A			A

Intersection Summary				
HCM 2000 Control Delay	7.6	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.60			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.6	
Intersection Capacity Utilization	60.9%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
38: Nave Dr & Hamilton Pkwy

12/16/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	141	251	390	41	235	530
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.2	3.2	4.4	4.4	3.0	4.4
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
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)	1770	1599	1900	1578	1787	1850
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1599	1900	1578	1787	1900
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	164	292	453	48	273	616
RTOR Reduction (vph)	0	247	0	14	0	0
Lane Group Flow (vph)	164	45	453	34	273	616
Confl. Peds. (#/hr)				2		
Heavy Vehicles (%)	2%	1%	0%	0%	1%	0%
Turn Type	NA	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	10.9	10.9	31.7	31.7	16.8	51.5
Effective Green, g (s)	10.9	10.9	31.7	31.7	16.8	51.5
Actuated g/C Ratio	0.16	0.16	0.45	0.45	0.24	0.74
Clearance Time (s)	3.2	3.2	4.4	4.4	3.0	4.4
Vehicle Extension (s)	2.0	2.0	3.0	3.0	2.0	3.0
Lane Grp Cap (vph)	275	248	860	714	428	1361
v/s Ratio Prot	c0.09		c0.24		c0.15	0.33
v/s Ratio Perm		0.03		0.02		
v/c Ratio	0.60	0.18	0.53	0.05	0.64	0.45
Uniform Delay, d1	27.5	25.7	13.8	10.7	23.9	3.7
Progression Factor	1.00	1.00	1.00	1.00	1.33	0.33
Incremental Delay, d2	2.3	0.1	2.3	0.1	2.0	1.0
Delay (s)	29.8	25.8	16.1	10.8	33.7	2.2
Level of Service	C	C	B	B	C	A
Approach Delay (s)	27.3		15.6			11.9
Approach LOS	C		B			B

Intersection Summary				
HCM 2000 Control Delay	16.7	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.57			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.6	
Intersection Capacity Utilization	52.0%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
39: Nave Dr & Main Gate Dr

12/16/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	230	80	215	262	103	413
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	4.1	4.1	3.0	4.4
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
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)	1805	1615	1900	1615	1805	1881
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1805	1615	1900	1615	1805	1881
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	274	95	256	312	123	492
RTOR Reduction (vph)	0	70	0	222	0	0
Lane Group Flow (vph)	274	25	256	90	123	492
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%
Turn Type	NA	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	11.0	11.0	12.1	12.1	8.7	23.5
Effective Green, g (s)	11.0	11.0	12.1	12.1	8.7	23.5
Actuated g/C Ratio	0.26	0.26	0.29	0.29	0.21	0.56
Clearance Time (s)	3.0	3.0	4.1	4.1	3.0	4.4
Vehicle Extension (s)	2.0	2.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	473	423	548	466	374	1054
v/s Ratio Prot	c0.15		0.13		0.07	c0.26
v/s Ratio Perm		0.02		0.06		
v/c Ratio	0.58	0.06	0.47	0.19	0.33	0.47
Uniform Delay, d1	13.4	11.6	12.2	11.2	14.1	5.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	0.0	0.2	0.1	0.2	0.1
Delay (s)	14.5	11.6	12.5	11.3	14.3	5.6
Level of Service	B	B	B	B	B	A
Approach Delay (s)	13.8		11.8			7.3
Approach LOS	B		B			A

Intersection Summary				
HCM 2000 Control Delay	10.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.54			
Actuated Cycle Length (s)	41.9	Sum of lost time (s)	10.1	
Intersection Capacity Utilization	44.1%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	307	95	354	78	87	493
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	4.1		3.0	3.5
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.97	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1787	1573	1839		1805	1881
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1787	1573	1839		1805	1881
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	327	101	377	83	93	524
RTOR Reduction (vph)	0	68	11	0	0	0
Lane Group Flow (vph)	327	33	449	0	93	524
Confl. Peds. (#/hr)		6				
Heavy Vehicles (%)	1%	0%	1%	0%	0%	1%
Turn Type	NA	Perm	NA		Prot	NA
Protected Phases	4		6		5	2
Permitted Phases		4				
Actuated Green, G (s)	15.2	15.2	17.4		4.3	25.3
Effective Green, g (s)	15.2	15.2	17.4		4.3	25.3
Actuated g/C Ratio	0.32	0.32	0.37		0.09	0.54
Clearance Time (s)	3.0	3.0	4.1		3.0	3.5
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	577	508	680		165	1012
v/s Ratio Prot	c0.18		c0.24		0.05	c0.28
v/s Ratio Perm		0.02				
v/c Ratio	0.57	0.06	0.66		0.56	0.52
Uniform Delay, d1	13.2	11.0	12.3		20.5	6.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.8	0.0	1.8		2.6	0.2
Delay (s)	13.9	11.0	14.1		23.1	7.1
Level of Service	B	B	B		C	A
Approach Delay (s)	13.2		14.1			9.5
Approach LOS	B		B			A

Intersection Summary				
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	47.0	Sum of lost time (s)	10.1
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM 2010 AWSC
41: Alameda Del Prado & Clay Ct/Nave Dr 12/16/2013

Intersection	
Intersection Delay, s/veh	39.6
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	43	10	0	37	36	712	5	112	53	76	26	8
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	11	0	42	41	809	6	127	60	86	30	9
Number of Lanes	0	1	0	0	1	1	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	10.8	51.2	13.4	11.4
HCM LOS	B	F	B	B

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	3%	81%	51%	0%	100%	0%
Vol Thru, %	66%	19%	49%	0%	0%	76%
Vol Right, %	31%	0%	0%	100%	0%	24%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	170	53	73	712	76	34
LT Vol	112	10	36	0	0	26
Through Vol	53	0	0	712	0	8
RT Vol	5	43	37	0	76	0
Lane Flow Rate	193	60	83	809	86	39
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	0.361	0.115	0.139	1	0.183	0.074
Departure Headway (Hd)	6.733	6.848	6.031	5.068	7.617	6.938
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	541	522	598	720	475	520
Service Time	4.7	4.911	3.731	2.768	5.298	4.635
HCM Lane V/C Ratio	0.357	0.115	0.139	1.124	0.181	0.075
HCM Control Delay	13.4	10.8	9.7	55.5	12	10.2
HCM Lane LOS	B	B	A	F	B	B
HCM 95th-tile Q	1.6	0.4	0.5	16.3	0.7	0.2

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 AWSC
1: Simmons Ln & San Marin Dr 12/17/2013

Intersection	
Intersection Delay, s/veh	23.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	5	417	53	306	609	18	82	14	136	23	18	7
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	421	54	309	615	18	83	14	137	23	18	7
Number of Lanes	1	2	0	1	2	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	3	3
HCM Control Delay	20.8	27.9	15	14.1
HCM LOS	C	D	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	85%	0%	100%	0%	0%	100%	0%	0%	48%
Vol Thru, %	15%	0%	0%	100%	72%	0%	100%	92%	38%
Vol Right, %	0%	100%	0%	0%	28%	0%	0%	8%	15%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	96	136	5	278	192	306	406	221	48
LT Vol	14	0	0	278	139	0	406	203	18
Through Vol	0	136	0	0	53	0	0	18	7
RT Vol	82	0	5	0	0	306	0	0	23
Lane Flow Rate	97	137	5	281	194	309	410	223	48
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.252	0.314	0.012	0.632	0.426	0.67	0.83	0.448	0.133
Departure Headway (Hd)	9.365	8.221	8.613	8.102	7.904	7.798	7.287	7.229	9.851
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	382	435	414	444	454	464	496	498	366
Service Time	7.157	6.013	6.391	5.879	5.682	5.565	5.054	4.996	7.551
HCM Lane V/C Ratio	0.254	0.315	0.012	0.633	0.427	0.666	0.827	0.448	0.131
HCM Control Delay	15.3	14.8	11.5	23.9	16.5	25.1	36.7	15.8	14.1
HCM Lane LOS	C	B	B	C	C	D	E	C	B
HCM 95th-tile Q	1	1.3	0	4.3	2.1	4.8	8.2	2.3	0.5

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM Signalized Intersection Capacity Analysis
2: W Campus Dr & San Marin Dr

12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	581	2	3	988	6	3	0	1	68	1	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.8		4.0	4.8	4.8		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	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Frt	1.00	1.00		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		0.96		0.95	0.95	1.00
Satd. Flow (prot)	1805	3572		1805	3539	1615		1770		1715	1721	1615
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.77		0.85	0.84	1.00
Satd. Flow (perm)	1805	3572		1805	3539	1615		1411		1536	1515	1615
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)	1	612	2	3	1040	6	3	0	1	72	1	15
RTOR Reduction (vph)	0	0	0	0	0	3	0	4	0	0	0	13
Lane Group Flow (vph)	1	614	0	3	1040	3	0	0	0	37	36	2
Confl. Peds. (#/hr)			2									
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8			4		4
Actuated Green, G (s)	1.1	19.5		1.0	19.4	19.4		4.7		4.7	4.7	4.7
Effective Green, g (s)	1.1	19.5		1.0	19.4	19.4		4.7		4.7	4.7	4.7
Actuated g/C Ratio	0.03	0.51		0.03	0.51	0.51		0.12		0.12	0.12	0.12
Clearance Time (s)	4.0	4.8		4.0	4.8	4.8		4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0		2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	52	1833		47	1806	824		174		189	187	199
v/s Ratio Prot	0.00	0.17		c0.00	c0.29							
v/s Ratio Perm						0.00		0.00		c0.02	0.02	0.00
v/c Ratio	0.02	0.33		0.06	0.58	0.00		0.00		0.20	0.19	0.01
Uniform Delay, d1	17.9	5.4		18.0	6.4	4.6		14.6		15.0	14.9	14.6
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	0.1		0.2	0.5	0.0		0.0		0.2	0.2	0.0
Delay (s)	18.0	5.6		18.3	7.0	4.6		14.6		15.1	15.1	14.6
Level of Service	B	A		B	A	A		B		B	B	B
Approach Delay (s)		5.6			7.0			14.6			15.0	
Approach LOS		A			A			B			B	

Intersection Summary				
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.48			
Actuated Cycle Length (s)	38.0	Sum of lost time (s)	12.8	
Intersection Capacity Utilization	54.6%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
3: San Marin Dr & E Campus Drive

12/17/2013

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	657	1009	6	196	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.3	4.3	4.3	3.0	3.0
Lane Util. Factor		0.95	0.95	1.00	0.97	1.00
Frpb, ped/bikes		1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.85	1.00	0.85
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		3574	3574	1615	3502	1595
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		3574	3574	1615	3502	1595
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	684	1051	6	204	26
RTOR Reduction (vph)	0	0	0	3	0	19
Lane Group Flow (vph)	0	684	1051	3	204	7
Confl. Peds. (#/hr)						1
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Turn Type	Prot	NA	NA	Perm	NA	Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)		21.4	21.4	21.4	10.4	10.4
Effective Green, g (s)		21.4	21.4	21.4	10.4	10.4
Actuated g/C Ratio		0.55	0.55	0.55	0.27	0.27
Clearance Time (s)		4.3	4.3	4.3	3.0	3.0
Vehicle Extension (s)		4.0	4.0	4.0	2.0	2.0
Lane Grp Cap (vph)		1956	1956	883	931	424
v/s Ratio Prot		0.19	c0.29		c0.06	
v/s Ratio Perm				0.00		0.00
v/c Ratio		0.35	0.54	0.00	0.22	0.02
Uniform Delay, d1		5.0	5.7	4.0	11.2	10.6
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1	0.4	0.0	0.0	0.0
Delay (s)		5.1	6.0	4.0	11.2	10.6
Level of Service		A	A	A	B	B
Approach Delay (s)		5.1	6.0		11.2	
Approach LOS		A	A		B	

Intersection Summary			
HCM 2000 Control Delay	6.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	39.1	Sum of lost time (s)	10.3
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
4: Redwood Blvd & San Marin Dr

12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	19	707	150	229	704	45	197	40	433	253	65	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.6		3.0	4.0		4.3	4.3	4.3	4.3	4.3	
Lane Util. Factor	1.00	0.91		1.00	0.91		0.97	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	4987		1787	5092		3433	1900	1568	1770	1770	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1805	4987		1787	5092		3433	1900	1568	1770	1770	
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)	20	752	160	244	749	48	210	43	461	269	69	48
RTOR Reduction (vph)	0	22	0	0	4	0	0	0	295	0	21	0
Lane Group Flow (vph)	20	890	0	244	793	0	210	43	166	269	96	0
Confl. Peds. (#/hr)			4									5
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	1%	1%	1%	1%	0%	2%	0%	3%	2%	0%	0%
Turn Type	Prot	NA		Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases					2				7			
Actuated Green, G (s)	6.0	53.8		26.9	74.3		16.4	16.4	16.4	27.7	27.7	
Effective Green, g (s)	6.0	53.8		26.9	74.3		16.4	16.4	16.4	27.7	27.7	
Actuated g/C Ratio	0.04	0.38		0.19	0.53		0.12	0.12	0.12	0.20	0.20	
Clearance Time (s)	3.0	3.6		3.0	4.0		4.3	4.3	4.3	4.3	4.3	
Vehicle Extension (s)	2.0	4.0		5.0	4.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	77	1916		343	2702		402	222	183	350	350	
v/s Ratio Prot	0.01	c0.18		c0.14	0.16		0.06	0.02		c0.15	0.05	
v/s Ratio Perm									c0.11			
v/c Ratio	0.26	0.46		0.71	0.29		0.52	0.19	0.91	0.77	0.27	
Uniform Delay, d1	64.9	32.3		52.9	18.3		58.1	55.8	61.1	53.1	47.6	
Progression Factor	1.00	1.00		1.04	0.95		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.8		8.0	0.3		0.6	0.2	40.3	8.8	0.2	
Delay (s)	65.5	33.1		63.3	17.7		58.7	56.0	101.3	61.9	47.8	
Level of Service	E	C		E	B		E	E	F	E	D	
Approach Delay (s)		33.8			28.4			86.1			57.6	
Approach LOS		C			C			F			E	

Intersection Summary				
HCM 2000 Control Delay	47.1	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.64			
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	15.6	
Intersection Capacity Utilization	88.0%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: US 101 SB Ramps & San Marin Dr

12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	718	580	107	771	0	0	0	0	61	2	262
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	3.0	5.3						4.0	4.0
Lane Util. Factor		0.95	1.00	1.00	0.95						1.00	0.88
Frpb, ped/bikes		1.00	0.98	1.00	1.00						1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		3574	1575	1805	3574						1812	2814
Flt Permitted		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (perm)		3574	1575	1805	3574						1812	2814
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	756	611	113	812	0	0	0	0	64	2	276
RTOR Reduction (vph)	0	0	230	0	0	0	0	0	0	0	0	248
Lane Group Flow (vph)	0	756	381	113	812	0	0	0	0	0	66	28
Confl. Peds. (#/hr)			4									
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	0%	0%	0%	0%	0%	1%
Turn Type		NA	Perm	Prot	NA					Split	NA	Perm
Protected Phases		2		1	6					4	4	
Permitted Phases			2									4
Actuated Green, G (s)		43.7	43.7	7.2	53.5						7.2	7.2
Effective Green, g (s)		43.7	43.7	7.2	53.5						7.2	7.2
Actuated g/C Ratio		0.62	0.62	0.10	0.76						0.10	0.10
Clearance Time (s)		4.9	4.9	3.0	5.3						4.0	4.0
Vehicle Extension (s)		4.0	4.0	2.0	4.0						2.0	2.0
Lane Grp Cap (vph)		2231	983	185	2731						186	289
v/s Ratio Prot		0.21		c0.06	0.23						c0.04	
v/s Ratio Perm			c0.24									0.01
v/c Ratio		0.34	0.39	0.61	0.30						0.35	0.10
Uniform Delay, d1		6.3	6.5	30.1	2.5						29.2	28.5
Progression Factor		0.55	2.63	1.00	1.00						1.00	1.00
Incremental Delay, d2		0.3	0.9	4.1	0.3						0.4	0.1
Delay (s)		3.8	18.1	34.2	2.8						29.7	28.5
Level of Service		A	B	C	A						C	C
Approach Delay (s)		10.2			6.6			0.0			28.7	
Approach LOS		B			A			A			C	

Intersection Summary				
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.41			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	11.9	
Intersection Capacity Utilization	58.1%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: US 101 NB Ramps & San Marin Dr

12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	499	290	0	0	289	86	591	147	149	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.6			4.9	4.9	3.5	3.5				
Lane Util. Factor	0.97	1.00			0.95	1.00	0.95	0.95				
Frpb, ped/bikes	1.00	1.00			1.00	0.99	1.00	0.99				
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00				
Frt	1.00	1.00			1.00	0.85	1.00	0.95				
Flt Protected	0.95	1.00			1.00	1.00	0.95	0.98				
Satd. Flow (prot)	3467	1881			3574	1593	1681	1646				
Flt Permitted	0.95	1.00			1.00	1.00	0.95	0.98				
Satd. Flow (perm)	3467	1881			3574	1593	1681	1646				
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)	537	312	0	0	311	92	635	158	160	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	74	0	29	0	0	0	0
Lane Group Flow (vph)	537	312	0	0	311	18	483	441	0	0	0	0
Confl. Peds. (#/hr)			3			1			1	1		
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	2%	0%	3%	0%	0%	0%
Turn Type	Prot	NA			NA	Perm	Split	NA				
Protected Phases	5	2			6		8	8				
Permitted Phases						6						
Actuated Green, G (s)	13.0	28.3			11.5	11.5	21.0	21.0				
Effective Green, g (s)	13.0	28.3			11.5	11.5	21.0	21.0				
Actuated g/C Ratio	0.23	0.49			0.20	0.20	0.37	0.37				
Clearance Time (s)	3.5	4.6			4.9	4.9	3.5	3.5				
Vehicle Extension (s)	2.0	4.0			4.0	4.0	2.5	2.5				
Lane Grp Cap (vph)	785	927			716	319	615	602				
v/s Ratio Prot	c0.15	0.17			c0.09		c0.29	0.27				
v/s Ratio Perm						0.01						
v/c Ratio	0.68	0.34			0.43	0.06	0.79	0.73				
Uniform Delay, d1	20.3	8.8			20.1	18.6	16.2	15.8				
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00				
Incremental Delay, d2	2.0	0.3			0.6	0.1	6.3	4.3				
Delay (s)	22.3	9.1			20.7	18.7	22.5	20.1				
Level of Service	C	A			C	B	C	C				
Approach Delay (s)		17.5			20.2			21.3			0.0	
Approach LOS		B			C			C			A	

Intersection Summary				
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.67			
Actuated Cycle Length (s)	57.4	Sum of lost time (s)	11.9	
Intersection Capacity Utilization	58.1%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
7: Redwood Blvd/Redwood Dr & Olive St

12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Volume (vph)	115	67	27	121	99	81	24	43	658	140	32	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1			5.1			4.0	3.9	3.9		4.0
Lane Util. Factor	1.00	1.00			1.00			1.00	0.95	1.00		1.00
Frt	1.00	0.96			0.96			1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00			0.98			0.95	1.00	1.00		0.95
Satd. Flow (prot)	1770	1783			1760			1770	3539	1583		1770
Flt Permitted	0.53	1.00			0.82			0.36	1.00	1.00		0.33
Satd. Flow (perm)	993	1783			1479			671	3539	1583		616
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)	124	72	29	130	106	87	26	46	708	151	34	58
RTOR Reduction (vph)	0	20	0	0	21	0	0	0	0	94	0	0
Lane Group Flow (vph)	124	81	0	0	302	0	0	72	708	57	0	92
Turn Type	Perm	NA		Perm	NA		custom	Prot	NA	Perm	custom	Prot
Protected Phases		4			8			5	2			1
Permitted Phases	4			8			5			2	1	
Actuated Green, G (s)	17.6	17.6			17.6			11.1	16.1	16.1		12.1
Effective Green, g (s)	17.6	17.6			17.6			11.1	16.1	16.1		12.1
Actuated g/C Ratio	0.30	0.30			0.30			0.19	0.27	0.27		0.21
Clearance Time (s)	5.1	5.1			5.1			4.0	3.9	3.9		4.0
Vehicle Extension (s)	1.0	1.0			1.0			1.0	1.0	1.0		1.0
Lane Grp Cap (vph)	297	533			442			126	969	433		126
v/s Ratio Prot		0.05							c0.20			
v/s Ratio Perm	0.12				c0.20			0.11		0.04		c0.15
v/c Ratio	0.42	0.15			0.68			0.57	0.73	0.13		0.73
Uniform Delay, d1	16.5	15.1			18.1			21.7	19.4	16.1		21.8
Progression Factor	1.00	1.00			1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2	0.3	0.0			3.5			3.8	2.5	0.0		17.0
Delay (s)	16.8	15.2			21.6			25.5	21.9	16.1		38.8
Level of Service	B	B			C			C	C	B		D
Approach Delay (s)		16.1			21.6				21.2			
Approach LOS		B			C				C			

Intersection Summary				
HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.71			
Actuated Cycle Length (s)	58.8	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	61.8%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
7: Redwood Blvd/Redwood Dr & Olive St

12/17/2013

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	302	104
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	3.9	
Lane Util. Factor	0.95	
Frt	0.96	
Flt Protected	1.00	
Satd. Flow (prot)	3403	
Flt Permitted	1.00	
Satd. Flow (perm)	3403	
Peak-hour factor, PHF	0.93	0.93
Adj. Flow (vph)	325	112
RTOR Reduction (vph)	40	0
Lane Group Flow (vph)	397	0
Turn Type	NA	
Protected Phases	6	
Permitted Phases		
Actuated Green, G (s)	17.1	
Effective Green, g (s)	17.1	
Actuated g/C Ratio	0.29	
Clearance Time (s)	3.9	
Vehicle Extension (s)	1.0	
Lane Grp Cap (vph)	989	
v/s Ratio Prot	0.12	
v/s Ratio Perm		
v/c Ratio	0.40	
Uniform Delay, d1	16.7	
Progression Factor	1.00	
Incremental Delay, d2	0.1	
Delay (s)	16.8	
Level of Service	B	
Approach Delay (s)	20.7	
Approach LOS	C	

Intersection Summary					

HCM Signalized Intersection Capacity Analysis
8: Redwood Blvd & Grant Ave

12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	71	123	169	26	155	55	246	487	53	38	357	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5		3.5	3.7	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1763	1900	1578	1804	1900	1587	1805	3483		1805	3423	
Flt Permitted	0.64	1.00	1.00	0.67	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1196	1900	1578	1280	1900	1587	1805	3483		1805	3423	
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)	75	129	178	27	163	58	259	513	56	40	376	93
RTOR Reduction (vph)	0	0	127	0	0	41	0	7	0	0	24	0
Lane Group Flow (vph)	75	129	51	27	163	17	259	562	0	40	445	0
Confl. Peds. (#/hr)	10		2	2		10			9			8
Confl. Bikes (#/hr)						1						3
Heavy Vehicles (%)	2%	0%	1%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8		8	4		4						
Actuated Green, G (s)	17.1	17.1	17.1	17.1	17.1	17.1	14.3	27.1		4.6	17.2	
Effective Green, g (s)	17.1	17.1	17.1	17.1	17.1	17.1	14.3	27.1		4.6	17.2	
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29	0.29	0.24	0.45		0.08	0.29	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5		3.5	3.7	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.5	3.0		2.5	3.0	
Lane Grp Cap (vph)	342	543	451	366	543	453	431	1578		138	984	
v/s Ratio Prot		0.07			c0.09		c0.14	0.16		0.02	c0.13	
v/s Ratio Perm	0.06		0.03	0.02		0.01						
v/c Ratio	0.22	0.24	0.11	0.07	0.30	0.04	0.60	0.36		0.29	0.45	
Uniform Delay, d1	16.3	16.4	15.8	15.6	16.7	15.4	20.2	10.7		26.1	17.4	
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	0.4	0.3	0.2	0.1	0.4	0.0	2.0	0.1		0.8	0.3	
Delay (s)	16.7	16.7	15.9	15.7	17.1	15.5	22.2	10.8		26.9	17.8	
Level of Service	B	B	B	B	B	B	C	B		C	B	
Approach Delay (s)		16.3			16.6			14.4			18.5	
Approach LOS		B			B			B			B	

Intersection Summary					
HCM 2000 Control Delay	16.1	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.44				
Actuated Cycle Length (s)	59.8	Sum of lost time (s)	11.2		
Intersection Capacity Utilization	67.7%	ICU Level of Service	C		
Analysis Period (min)	15				

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	16.5
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	58	96	20	80	145	144	39	146	56	113	200	181
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	60	99	21	82	149	148	40	151	58	116	206	187
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	2	2
HCM Control Delay	14	19.9	16.8	14.7
HCM LOS	B	C	C	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	72%	0%	83%	0%	50%	0%	100%	0%
Vol Right, %	0%	28%	0%	17%	0%	50%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	39	202	58	116	80	289	113	200	181
LT Vol	0	146	0	96	0	145	0	200	0
Through Vol	0	56	0	20	0	144	0	0	181
RT Vol	39	0	58	0	80	0	113	0	0
Lane Flow Rate	40	208	60	120	82	298	116	206	187
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.097	0.463	0.149	0.276	0.191	0.619	0.264	0.437	0.358
Departure Headway (Hd)	8.725	8.01	8.946	8.31	8.342	7.478	8.144	7.632	6.916
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	409	448	399	431	429	480	439	470	519
Service Time	6.512	5.797	6.739	6.102	6.118	5.253	5.919	5.407	4.69
HCM Lane V/C Ratio	0.098	0.464	0.15	0.278	0.191	0.621	0.264	0.438	0.36
HCM Control Delay	12.5	17.6	13.3	14.3	13.1	21.8	13.8	16.3	13.5
HCM Lane LOS	B	C	B	B	B	C	B	C	B
HCM 95th-tile Q	0.3	2.4	0.5	1.1	0.7	4.1	1	2.2	1.6

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	389	28	358	697	32	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.9		3.0	3.6	3.6	3.6
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3534		1900	3610	1805	1592
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3534		1900	3610	1805	1592
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	427	31	393	766	35	268
RTOR Reduction (vph)	3	0	0	0	0	236
Lane Group Flow (vph)	455	0	393	766	35	32
Confl. Peds. (#/hr)		3			6	2
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%
Turn Type	NA		Prot	NA	NA	Perm
Protected Phases	2		1	6	4	
Permitted Phases						4
Actuated Green, G (s)	59.0		27.3	69.6	13.2	13.2
Effective Green, g (s)	59.0		27.3	69.6	13.2	13.2
Actuated g/C Ratio	0.54		0.25	0.63	0.12	0.12
Clearance Time (s)	3.9		3.0	3.6	3.6	3.6
Vehicle Extension (s)	3.0		2.0	3.0	2.0	2.0
Lane Grp Cap (vph)	1895		471	2284	216	191
v/s Ratio Prot	c0.13		c0.21	c0.21	0.02	
v/s Ratio Perm						c0.02
v/c Ratio	0.24		0.83	0.34	0.16	0.17
Uniform Delay, d1	13.6		39.2	9.4	43.4	43.5
Progression Factor	1.00		0.75	0.25	1.00	1.00
Incremental Delay, d2	0.3		10.7	0.4	0.1	0.2
Delay (s)	13.9		40.2	2.7	43.6	43.6
Level of Service	B		D	A	D	D
Approach Delay (s)	13.9			15.4	43.6	
Approach LOS	B			B	D	

Intersection Summary			
HCM 2000 Control Delay	19.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
11: Novato Blvd #1 & Simmons Ln 12/17/2013

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	146	473	850	100	95	221
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.9	3.6		3.0	3.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	3574	3545		1805	1599
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1805	3574	3545		1805	1599
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	155	503	904	106	101	235
RTOR Reduction (vph)	0	0	6	0	0	206
Lane Group Flow (vph)	155	503	1004	0	101	29
Confl. Peds. (#/hr)					2	
Confl. Bikes (#/hr)				1		
Heavy Vehicles (%)	0%	1%	0%	0%	0%	1%
Turn Type	Prot	NA	NA		NA	Perm
Protected Phases	5	2	6		8	
Permitted Phases						8
Actuated Green, G (s)	17.0	59.0	69.6		13.8	13.8
Effective Green, g (s)	17.0	59.0	69.6		13.8	13.8
Actuated g/C Ratio	0.15	0.54	0.63		0.13	0.13
Clearance Time (s)	3.0	3.9	3.6		3.0	3.0
Vehicle Extension (s)	2.0	3.0	3.0		2.0	2.0
Lane Grp Cap (vph)	278	1916	2243		226	200
v/s Ratio Prot	c0.09	0.14	c0.28		c0.06	
v/s Ratio Perm						0.02
v/c Ratio	0.56	0.26	0.45		0.45	0.15
Uniform Delay, d1	43.0	13.8	10.4		44.6	42.9
Progression Factor	0.80	0.56	1.47		1.00	1.00
Incremental Delay, d2	7.6	0.3	0.6		0.5	0.1
Delay (s)	42.0	8.0	15.8		45.1	43.0
Level of Service	D	A	B		D	D
Approach Delay (s)		16.0	15.8		43.6	
Approach LOS		B	B		D	

Intersection Summary				
HCM 2000 Control Delay	20.5	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.47			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.5	
Intersection Capacity Utilization	50.3%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Grant Ave & Novato Blvd #1 12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	135	482	4	6	789	47	0	0	2	32	1	287
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.5	4.5	3.5	4.9	4.9		4.0		3.5	3.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00		1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97		0.97		1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.86		1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1805	1881	1561	1805	3610	1565		1598		1790	1570	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.76	1.00	
Satd. Flow (perm)	1805	1881	1561	1805	3610	1565		1598		1426	1570	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	138	492	4	6	805	48	0	0	2	33	1	293
RTOR Reduction (vph)	0	0	1	0	0	16	0	2	0	0	263	0
Lane Group Flow (vph)	138	492	3	6	805	32	0	0	0	33	31	0
Confl. Peds. (#/hr)			5			4	12		4	4		12
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		
Actuated Green, G (s)	13.1	86.0	86.0	1.2	73.7	73.7		10.8		11.3	11.3	
Effective Green, g (s)	13.1	86.0	86.0	1.2	73.7	73.7		10.8		11.3	11.3	
Actuated g/C Ratio	0.12	0.78	0.78	0.01	0.67	0.67		0.10		0.10	0.10	
Clearance Time (s)	3.5	4.5	4.5	3.5	4.9	4.9		4.0		3.5	3.5	
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0	3.0		2.0		2.0	2.0	
Lane Grp Cap (vph)	214	1470	1220	19	2418	1048		156		146	161	
v/s Ratio Prot	c0.08	c0.26		0.00	0.22			0.00			0.02	
v/s Ratio Perm			0.00			0.02				c0.02		
v/c Ratio	0.64	0.33	0.00	0.32	0.33	0.03		0.00		0.23	0.19	
Uniform Delay, d1	46.2	3.5	2.6	54.0	7.7	6.1		44.7		45.3	45.2	
Progression Factor	0.86	1.68	1.00	1.42	0.35	0.41		1.00		1.00	1.00	
Incremental Delay, d2	4.8	0.6	0.0	3.0	0.3	0.0		0.0		0.3	0.2	
Delay (s)	44.6	6.6	2.6	79.9	3.0	2.5		44.7		45.6	45.4	
Level of Service	D	A	A	E	A	A		D		D	D	
Approach Delay (s)		14.8			3.5			44.7			45.4	
Approach LOS		B			A			D			D	

Intersection Summary				
HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.37			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.4	
Intersection Capacity Utilization	61.0%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Tamalpais Ave/7th St & Novato Blvd #1

12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	128	469	39	38	612	227	44	107	42	184	128	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.0		3.5	5.0	5.0	3.5	3.5		3.5	3.5	3.5
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		0.98	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.96		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)	1770	1874		1805	1900	1615	1787	1796		1768	1900	1529
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.57	1.00		0.53	1.00	1.00
Satd. Flow (perm)	1770	1874		1805	1900	1615	1077	1796		980	1900	1529
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)	135	494	41	40	644	239	46	113	44	194	135	146
RTOR Reduction (vph)	0	2	0	0	0	32	0	14	0	0	0	114
Lane Group Flow (vph)	135	533	0	40	644	207	46	143	0	194	135	32
Confl. Peds. (#/hr)			2				5		11	11		5
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8			4		4
Actuated Green, G (s)	12.5	68.8		5.4	61.7	61.7	23.8	23.8		23.8	23.8	23.8
Effective Green, g (s)	12.5	68.8		5.4	61.7	61.7	23.8	23.8		23.8	23.8	23.8
Actuated g/C Ratio	0.11	0.63		0.05	0.56	0.56	0.22	0.22		0.22	0.22	0.22
Clearance Time (s)	3.5	5.0		3.5	5.0	5.0	3.5	3.5		3.5	3.5	3.5
Vehicle Extension (s)	2.0	5.0		2.0	5.0	5.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	201	1172		88	1065	905	233	388		212	411	330
v/s Ratio Prot	c0.08	0.28		0.02	c0.34			0.08			0.07	
v/s Ratio Perm						0.13	0.04			c0.20		0.02
v/c Ratio	0.67	0.45		0.45	0.60	0.23	0.20	0.37		0.92	0.33	0.10
Uniform Delay, d1	46.8	10.8		50.9	16.0	12.2	35.3	36.7		42.1	36.4	34.5
Progression Factor	1.02	0.78		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.6	1.3		1.4	2.5	0.6	0.2	0.2		38.3	0.2	0.0
Delay (s)	54.1	9.7		52.2	18.6	12.7	35.4	36.9		80.4	36.5	34.5
Level of Service	D	A		D	B	B	D	D		F	D	C
Approach Delay (s)		18.6			18.5			36.6			53.8	
Approach LOS		B			B			D			D	

Intersection Summary				
HCM 2000 Control Delay	27.6	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.69			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	76.2%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: Novato Blvd #2/Novato Blvd #1 & Diablo Ave

12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	257	13	238	334	507	44	392	231	330	311	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.7		4.1	4.1	4.1	4.4	4.4	4.4	4.1	4.1	
Lane Util. Factor		0.95		0.91	0.91	1.00	1.00	1.00	1.00	0.91	0.91	
Frpb, ped/bikes		1.00		1.00	1.00	0.96	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected		1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	0.99	
Satd. Flow (prot)		3571		1610	3425	1550	1805	1900	1577	1643	3600	
Flt Permitted		1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	0.99	
Satd. Flow (perm)		3571		1610	3425	1550	1805	1900	1577	1643	3374	
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)	23	265	13	245	344	523	45	404	238	340	321	28
RTOR Reduction (vph)	0	3	0	0	0	318	0	0	174	0	4	0
Lane Group Flow (vph)	0	298	0	191	398	205	45	404	64	224	461	0
Confl. Peds. (#/hr)			1			14			2	2		
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	0%	0%	1%	0%	0%	5%
Turn Type	Split	NA		Split	NA	Perm	Split	NA	Perm	Split	NA	
Protected Phases	3	3		4	4		1	1		2	2	
Permitted Phases						4			1		2	
Actuated Green, G (s)		13.7		16.8	16.8	16.8	22.4	22.4	22.4	14.2	14.2	
Effective Green, g (s)		13.7		16.8	16.8	16.8	22.4	22.4	22.4	14.2	14.2	
Actuated g/C Ratio		0.16		0.20	0.20	0.20	0.27	0.27	0.27	0.17	0.17	
Clearance Time (s)		3.7		4.1	4.1	4.1	4.4	4.4	4.4	4.1	4.1	
Vehicle Extension (s)		2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)		586		324	689	312	484	510	423	279	612	
v/s Ratio Prot		c0.08		0.12	0.12		0.02	c0.21		c0.14	0.13	
v/s Ratio Perm						c0.13			0.04			
v/c Ratio		0.51		0.59	0.58	0.66	0.09	0.79	0.15	0.80	0.75	
Uniform Delay, d1		31.8		30.2	30.1	30.7	22.9	28.3	23.3	33.3	32.9	
Progression Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.3		1.8	0.7	3.8	0.0	7.7	0.1	14.5	4.6	
Delay (s)		32.0		31.9	30.8	34.4	22.9	36.0	23.3	47.7	37.6	
Level of Service		C		C	C	C	C	D	C	D	D	
Approach Delay (s)		32.0			32.7			30.8			40.9	
Approach LOS		C			C			C			D	

Intersection Summary				
HCM 2000 Control Delay	34.2	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	83.4	Sum of lost time (s)	16.3	
Intersection Capacity Utilization	72.7%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
15: Redwood Blvd & Diablo Ave/De Long Ave

12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	256	481	86	82	818	223	112	257	64	177	212	219
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	9
Total Lost time (s)	5.0	4.0		5.0	4.1		4.0	4.8	4.8	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	0.95	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3467	3528		1805	3416		1805	3610	1508	3303	1900	1396
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3467	3528		1805	3416		1805	3610	1508	3303	1900	1396
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)	278	523	93	89	889	242	122	279	70	192	230	238
RTOR Reduction (vph)	0	11	0	0	62	0	0	0	51	0	0	143
Lane Group Flow (vph)	278	605	0	89	1069	0	122	279	19	192	230	95
Confl. Peds. (#/hr)						2			7			14
Confl. Bikes (#/hr)												3
Heavy Vehicles (%)	1%	0%	0%	0%	2%	2%	0%	0%	5%	6%	0%	1%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	17.0	49.0		17.0	48.9		13.0	35.2	35.2	11.0	34.0	34.0
Effective Green, g (s)	17.0	49.0		17.0	48.9		13.0	35.2	35.2	11.0	34.0	34.0
Actuated g/C Ratio	0.13	0.38		0.13	0.38		0.10	0.27	0.27	0.08	0.26	0.26
Clearance Time (s)	5.0	4.0		5.0	4.1		4.0	4.8	4.8	4.0	4.0	4.0
Vehicle Extension (s)	2.5	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	453	1329		236	1284		180	977	408	279	496	365
v/s Ratio Prot	c0.08	0.17		0.05	c0.31		c0.07	0.08		0.06	c0.12	
v/s Ratio Perm									0.01			0.07
v/c Ratio	0.61	0.46		0.38	0.83		0.68	0.29	0.05	0.69	0.46	0.26
Uniform Delay, d1	53.4	30.5		51.7	36.8		56.5	37.5	35.0	57.8	40.3	38.0
Progression Factor	1.00	1.00		1.34	0.58		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	1.1		0.3	4.9		7.7	0.7	0.2	5.5	3.1	1.7
Delay (s)	55.5	31.6		69.7	26.2		64.2	38.2	35.2	63.4	43.4	39.7
Level of Service	E	C		E	C		E	D	D	E	D	D
Approach Delay (s)		39.0			29.4			44.5			47.9	
Approach LOS		D			C			D			D	

Intersection Summary				
HCM 2000 Control Delay	38.0	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.67			
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.9	
Intersection Capacity Utilization	103.4%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
16: Richert Ave & De Long Ave

12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	612	13	59	1129	344	9	25	27	204	26	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.1		3.0	4.1		3.5	3.5	3.5	3.5	3.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00	0.98	1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00	1.00	0.99	1.00	
Frt	1.00	1.00		1.00	0.96		1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3527		1805	3431		1792	1900	1587	1778	1664	
Flt Permitted	0.95	1.00		0.95	1.00		0.61	1.00	1.00	0.74	1.00	
Satd. Flow (perm)	1805	3527		1805	3431		1145	1900	1587	1386	1664	
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)	89	638	14	61	1176	358	9	26	28	212	27	76
RTOR Reduction (vph)	0	1	0	0	18	0	0	0	23	0	62	0
Lane Group Flow (vph)	89	651	0	61	1516	0	9	26	5	212	41	0
Confl. Peds. (#/hr)			6			1	6		4	4		6
Heavy Vehicles (%)	0%	2%	0%	0%	1%	1%	0%	0%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		
Actuated Green, G (s)	10.8	87.5		7.7	84.4		24.2	24.2	24.2	24.2	24.2	
Effective Green, g (s)	10.8	87.5		7.7	84.4		24.2	24.2	24.2	24.2	24.2	
Actuated g/C Ratio	0.08	0.67		0.06	0.65		0.19	0.19	0.19	0.19	0.19	
Clearance Time (s)	3.0	4.1		3.0	4.1		3.5	3.5	3.5	3.5	3.5	
Vehicle Extension (s)	2.0	3.0		2.0	3.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	149	2373		106	2227		213	353	295	258	309	
v/s Ratio Prot	c0.05	0.18		0.03	c0.44			0.01			0.02	
v/s Ratio Perm							0.01		0.00	c0.15		
v/c Ratio	0.60	0.27		0.58	0.68		0.04	0.07	0.02	0.82	0.13	
Uniform Delay, d1	57.5	8.5		59.6	14.3		43.4	43.7	43.2	50.8	44.1	
Progression Factor	0.67	1.15		0.95	0.90		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.8	0.3		3.9	1.4		0.0	0.0	0.0	17.8	0.1	
Delay (s)	42.2	10.1		60.3	14.3		43.4	43.7	43.2	68.6	44.2	
Level of Service	D	B		E	B		D	D	D	E	D	
Approach Delay (s)		13.9			16.1			43.4			60.6	
Approach LOS		B			B			D			E	

Intersection Summary				
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.6	
Intersection Capacity Utilization	78.6%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
17: US 101 SB Ramps & De Long Ave

12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	175	669	27	1457	0	0	0	0	9	4	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.6	3.6	3.0	3.6					4.0	4.0	
Lane Util. Factor		0.95	1.00	1.00	0.95					0.95	0.95	
Frt		1.00	0.85	1.00	1.00					1.00	0.85	
Flt Protected		1.00	1.00	0.95	1.00					0.95	1.00	
Satd. Flow (prot)		3574	1599	1770	3539					1681	1512	
Flt Permitted		1.00	1.00	0.95	1.00					0.95	1.00	
Satd. Flow (perm)		3574	1599	1770	3539					1681	1512	
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)	0	188	719	29	1567	0	0	0	0	10	4	149
RTOR Reduction (vph)	0	0	223	0	0	0	0	0	0	0	55	0
Lane Group Flow (vph)	0	188	496	29	1567	0	0	0	0	9	99	0
Heavy Vehicles (%)	0%	1%	1%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type		NA	Perm	Prot	NA					Split	NA	
Protected Phases		6		5	2					4	4	
Permitted Phases			6									
Actuated Green, G (s)		44.8	44.8	2.2	50.0					7.4	7.4	
Effective Green, g (s)		44.8	44.8	2.2	50.0					7.4	7.4	
Actuated g/C Ratio		0.69	0.69	0.03	0.77					0.11	0.11	
Clearance Time (s)		3.6	3.6	3.0	3.6					4.0	4.0	
Vehicle Extension (s)		4.0	4.0	2.0	4.0					2.5	2.5	
Lane Grp Cap (vph)		2463	1102	59	2722					191	172	
v/s Ratio Prot		0.05		0.02	c0.44					0.01	c0.07	
v/s Ratio Perm			0.31									
v/c Ratio		0.08	0.45	0.49	0.58					0.05	0.58	
Uniform Delay, d1		3.3	4.5	30.9	3.1					25.7	27.3	
Progression Factor		0.53	9.44	1.00	1.00					1.00	1.00	
Incremental Delay, d2		0.1	1.3	2.3	0.9					0.1	3.8	
Delay (s)		1.8	44.2	33.2	4.0					25.7	31.1	
Level of Service		A	D	C	A					C	C	
Approach Delay (s)		35.4			4.5			0.0			30.8	
Approach LOS		D			A			A			C	

Intersection Summary				
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	10.6	
Intersection Capacity Utilization	99.6%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: US 101 NB Ramps & De Long Ave

12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	147	32	0	0	62	29	1368	50	33	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5			3.5		4.5	4.5				
Lane Util. Factor	1.00	0.95			0.95		0.95	0.95				
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00				
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00				
Frt	1.00	1.00			0.95		1.00	0.99				
Flt Protected	0.95	1.00			1.00		0.95	0.96				
Satd. Flow (prot)	1770	3610			3346		1698	1697				
Flt Permitted	0.95	1.00			1.00		0.95	0.96				
Satd. Flow (perm)	1770	3610			3346		1698	1697				
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	165	36	0	0	70	33	1537	56	37	0	0	0
RTOR Reduction (vph)	0	0	0	0	30	0	0	2	0	0	0	0
Lane Group Flow (vph)	165	36	0	0	73	0	815	813	0	0	0	0
Confl. Peds. (#/hr)						1						
Heavy Vehicles (%)	2%	0%	0%	0%	0%	7%	1%	0%	6%	0%	0%	0%
Turn Type	Prot	NA			NA		Split	NA				
Protected Phases	1	6			2		4	4				
Permitted Phases												
Actuated Green, G (s)	12.0	22.0			6.5		44.6	44.6				
Effective Green, g (s)	12.0	22.0			6.5		44.6	44.6				
Actuated g/C Ratio	0.16	0.29			0.09		0.60	0.60				
Clearance Time (s)	3.5	3.5			3.5		4.5	4.5				
Vehicle Extension (s)	2.5	2.0			2.0		3.0	3.0				
Lane Grp Cap (vph)	284	1064			291		1015	1014				
v/s Ratio Prot	c0.09	0.01			c0.02		c0.48	0.48				
v/s Ratio Perm												
v/c Ratio	0.58	0.03			0.25		0.80	0.80				
Uniform Delay, d1	29.0	18.7			31.8		11.6	11.6				
Progression Factor	1.00	1.00			1.00		1.00	1.00				
Incremental Delay, d2	2.5	0.0			0.2		4.7	4.7				
Delay (s)	31.5	18.7			31.9		16.3	16.2				
Level of Service	C	B			C		B	B				
Approach Delay (s)		29.2			31.9			16.3			0.0	
Approach LOS		C			C			B			A	

Intersection Summary				
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	74.6	Sum of lost time (s)	11.5	
Intersection Capacity Utilization	99.6%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Redwood Blvd & Lamont Ave 12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	4	32	55	4	50	26	406	66	63	365	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5	3.5		3.5	3.5	3.5	4.8		3.5	4.8	4.8
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes		1.00	1.00		1.00	0.99	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected		0.96	1.00		0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1818	1615		1815	1595	1805	3523		1805	3610	1615
Flt Permitted		0.80	1.00		0.77	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1518	1615		1467	1595	1805	3523		1805	3610	1615
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)	34	4	35	60	4	55	29	446	73	69	401	23
RTOR Reduction (vph)	0	0	25	0	0	39	0	15	0	0	0	14
Lane Group Flow (vph)	0	38	10	0	64	16	29	504	0	69	401	9
Confl. Peds. (#/hr)	1					1			2			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8		8	4		4						2
Actuated Green, G (s)		11.5	11.5		11.5	11.5	0.9	11.7		4.9	15.7	15.7
Effective Green, g (s)		11.5	11.5		11.5	11.5	0.9	11.7		4.9	15.7	15.7
Actuated g/C Ratio		0.29	0.29		0.29	0.29	0.02	0.29		0.12	0.39	0.39
Clearance Time (s)		3.5	3.5		3.5	3.5	3.5	4.8		3.5	4.8	4.8
Vehicle Extension (s)		2.0	2.0		2.0	2.0	2.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)		437	465		422	459	40	1033		221	1420	635
v/s Ratio Prot							c0.02	c0.14		c0.04	0.11	
v/s Ratio Perm		0.03	0.01		c0.04	0.01						0.01
v/c Ratio		0.09	0.02		0.15	0.03	0.72	0.49		0.31	0.28	0.01
Uniform Delay, d1		10.4	10.2		10.6	10.2	19.4	11.6		16.0	8.3	7.4
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		0.0	0.0		0.1	0.0	42.4	0.4		0.3	0.1	0.0
Delay (s)		10.4	10.2		10.6	10.2	61.8	12.0		16.3	8.4	7.4
Level of Service		B	B		B	B	E	B		B	A	A
Approach Delay (s)		10.3			10.4			14.6			9.4	
Approach LOS		B			B			B			A	

Intersection Summary				
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.32			
Actuated Cycle Length (s)	39.9	Sum of lost time (s)	11.8	
Intersection Capacity Utilization	43.7%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
20: Redwood Boulevard/Redwood Blvd & Landing Ct 12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	3	13	0	11	1	482	17	9	443	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5		3.5		3.5		4.8	4.8	3.5	4.8	4.8
Lane Util. Factor		1.00		1.00		1.00		0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes		0.99		1.00		1.00		1.00	0.98	1.00	1.00	0.97
Flpb, ped/bikes		1.00		1.00		1.00		1.00	1.00	1.00	1.00	1.00
Frt		0.86		1.00		0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00		0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1621		1802		1615		3610	1579	1805	3610	1567
Flt Permitted		1.00		0.76		1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1621		1433		1615		3446	1579	1805	3610	1567
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	3	14	0	12	1	536	19	10	492	1
RTOR Reduction (vph)	0	3	0	0	0	11	0	0	6	0	0	0
Lane Group Flow (vph)	0	0	0	14	0	1	0	537	13	10	492	1
Confl. Peds. (#/hr)			4	4					3			6
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		custom		custom	Perm	NA	Perm	Prot	NA	Perm
Protected Phases		4						2		1	6	
Permitted Phases	4			8		8	2		2			6
Actuated Green, G (s)		5.8		5.8		5.8		46.9	46.9	1.9	52.3	52.3
Effective Green, g (s)		5.8		5.8		5.8		46.9	46.9	1.9	52.3	52.3
Actuated g/C Ratio		0.09		0.09		0.09		0.71	0.71	0.03	0.79	0.79
Clearance Time (s)		3.5		3.5		3.5		4.8	4.8	3.5	4.8	4.8
Vehicle Extension (s)		3.0		2.0		2.0		4.0	4.0	2.0	4.0	4.0
Lane Grp Cap (vph)		141		125		141		2433	1115	51	2843	1234
v/s Ratio Prot		0.00								0.01	c0.14	
v/s Ratio Perm				c0.01		0.00		c0.16	0.01			0.00
v/c Ratio		0.00		0.11		0.01		0.22	0.01	0.20	0.17	0.00
Uniform Delay, d1		27.7		27.9		27.7		3.4	2.9	31.5	1.7	1.5
Progression Factor		1.00		1.00		1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.0		0.1		0.0		0.2	0.0	0.7	0.1	0.0
Delay (s)		27.7		28.1		27.7		3.6	2.9	32.2	1.9	1.5
Level of Service		C		C		C		A	A	C	A	A
Approach Delay (s)		27.7			27.9			3.6			2.5	
Approach LOS		C			C			A			A	

Intersection Summary				
HCM 2000 Control Delay	3.7	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.21			
Actuated Cycle Length (s)	66.4	Sum of lost time (s)	11.8	
Intersection Capacity Utilization	43.3%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
21: Novato Blvd #2 & Center Rd/Garden Ct

12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	159	1	185	3	1	0	199	497	3	1	527	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.2	3.2			3.0		3.0	4.4		3.0	4.4	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.85			1.00		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00			0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1616			1831		1805	3606		1805	3478	
Flt Permitted	0.76	1.00			0.88		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1435	1616			1681		1805	3606		1805	3478	
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)	167	1	195	3	1	0	209	523	3	1	555	103
RTOR Reduction (vph)	0	162	0	0	0	0	0	0	0	0	10	0
Lane Group Flow (vph)	167	34	0	0	4	0	209	526	0	1	648	0
Confl. Peds. (#/hr)									9			6
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4								
Actuated Green, G (s)	17.1	17.1			17.3		15.9	70.1		2.2	56.4	
Effective Green, g (s)	17.1	17.1			17.3		15.9	70.1		2.2	56.4	
Actuated g/C Ratio	0.17	0.17			0.17		0.16	0.70		0.02	0.56	
Clearance Time (s)	3.2	3.2			3.0		3.0	4.4		3.0	4.4	
Vehicle Extension (s)	3.0	3.0			2.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	245	276			290		286	2527		39	1961	
v/s Ratio Prot		0.02					c0.12	0.15		0.00	c0.19	
v/s Ratio Perm	c0.12				0.00							
v/c Ratio	0.68	0.12			0.01		0.73	0.21		0.03	0.33	
Uniform Delay, d1	38.9	35.1			34.3		40.0	5.2		47.9	11.7	
Progression Factor	1.00	1.00			1.00		0.89	1.66		1.00	1.00	
Incremental Delay, d2	7.6	0.2			0.0		7.8	0.2		0.1	0.5	
Delay (s)	46.5	35.3			34.3		43.4	8.9		47.9	12.1	
Level of Service	D	D			C		D	A		D	B	
Approach Delay (s)		40.5			34.3			18.7			12.2	
Approach LOS		D			C			B			B	

Intersection Summary				
HCM 2000 Control Delay	20.8	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.47			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.6	
Intersection Capacity Utilization	52.0%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
22: Novato Blvd #2 & Arthur Street

12/17/2013

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (vph)	112	142	204	727	2	595	114
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5	3.5	4.9	3.5	4.9	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	0.95	
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1797	1589	1805	3574	1805	3523	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	1797	1589	1805	3574	1805	3523	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	118	149	215	765	2	626	120
RTOR Reduction (vph)	0	129	0	0	0	10	0
Lane Group Flow (vph)	118	20	215	765	2	736	0
Confl. Peds. (#/hr)	4	2					
Confl. Bikes (#/hr)		1					
Heavy Vehicles (%)	0%	0%	0%	1%	0%	0%	0%
Turn Type	NA	custom	Prot	NA	Prot	NA	
Protected Phases			1	6	5	2	
Permitted Phases	4	4					
Actuated Green, G (s)	13.3	13.3	16.2	73.6	1.2	58.6	
Effective Green, g (s)	13.3	13.3	16.2	73.6	1.2	58.6	
Actuated g/C Ratio	0.13	0.13	0.16	0.74	0.01	0.59	
Clearance Time (s)	3.5	3.5	3.5	4.9	3.5	4.9	
Vehicle Extension (s)	2.0	2.0	2.0	4.0	2.0	4.0	
Lane Grp Cap (vph)	239	211	292	2630	21	2064	
v/s Ratio Prot			c0.12	0.21	0.00	c0.21	
v/s Ratio Perm	c0.07	0.01					
v/c Ratio	0.49	0.09	0.74	0.29	0.10	0.36	
Uniform Delay, d1	40.2	38.1	39.9	4.4	48.9	10.8	
Progression Factor	1.00	1.00	0.99	0.74	0.90	0.79	
Incremental Delay, d2	0.6	0.1	5.7	0.2	0.7	0.5	
Delay (s)	40.8	38.1	45.4	3.5	44.9	9.0	
Level of Service	D	D	D	A	D	A	
Approach Delay (s)	39.3			12.7		9.1	
Approach LOS	D			B		A	

Intersection Summary				
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.45			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	11.9	
Intersection Capacity Utilization	52.0%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: Novato Blvd #2 & Rowland Boulevard

12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	32	120	5	199	233	540	27	343	151	355	334	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	4.1	4.1	3.5	4.1		3.5	4.4	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		0.97	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.95		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1886		1787	1900	1592	1805	1785		3502	1855	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	1886		1787	1900	1592	1805	1785		3502	1855	
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)	33	125	5	207	243	562	28	357	157	370	348	53
RTOR Reduction (vph)	0	2	0	0	0	377	0	16	0	0	4	0
Lane Group Flow (vph)	33	128	0	207	243	185	28	498	0	370	397	0
Confl. Peds. (#/hr)			13			2			5			6
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	0%	0%	0%	1%	0%	0%	0%	1%	1%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases						4						
Actuated Green, G (s)	5.4	15.3		14.1	23.4	23.4	6.0	31.8		24.2	49.7	
Effective Green, g (s)	5.4	15.3		14.1	23.4	23.4	6.0	31.8		24.2	49.7	
Actuated g/C Ratio	0.05	0.15		0.14	0.23	0.23	0.06	0.32		0.24	0.50	
Clearance Time (s)	3.5	3.5		3.5	4.1	4.1	3.5	4.1		3.5	4.4	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	3.0		2.0	2.0	
Lane Grp Cap (vph)	97	288		251	444	372	108	567		847	921	
v/s Ratio Prot	0.02	0.07		c0.12	c0.13		0.02	c0.28		c0.11	0.21	
v/s Ratio Perm						0.12						
v/c Ratio	0.34	0.45		0.82	0.55	0.50	0.26	0.88		0.44	0.43	
Uniform Delay, d1	45.6	38.5		41.7	33.6	33.2	44.9	32.3		32.1	16.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.98	0.69		1.19	0.71	
Incremental Delay, d2	0.8	0.4		18.5	0.7	0.4	0.4	16.0		1.6	1.4	
Delay (s)	46.3	38.9		60.2	34.4	33.6	44.6	38.2		39.8	12.8	
Level of Service	D	D		E	C	C	D	D		D	B	
Approach Delay (s)		40.4			39.2			38.5			25.8	
Approach LOS		D			D			D			C	

Intersection Summary				
HCM 2000 Control Delay	35.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.5	
Intersection Capacity Utilization	78.7%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: Rowland Boulevard & Redwood Boulevard

12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	118	494	46	100	864	300	26	33	68	276	47	179
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.5	4.5	3.5	4.5		3.5	4.1		3.5	4.8	4.8
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.99		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.90		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)	1805	3574	1590	1805	3457		1805	3209		3502	1900	1593
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)	1805	3574	1590	1805	3457		1805	3209		3502	1900	1593
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)	123	515	48	104	900	312	27	34	71	288	49	186
RTOR Reduction (vph)	0	0	27	0	27	0	0	60	0	0	0	138
Lane Group Flow (vph)	123	515	21	104	1185	0	27	45	0	288	49	48
Confl. Peds. (#/hr)			4			4			3			2
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2									4
Actuated Green, G (s)	11.9	41.8	41.8	9.7	39.6		4.1	15.4		14.4	25.0	25.0
Effective Green, g (s)	11.9	41.8	41.8	9.7	39.6		4.1	15.4		14.4	25.0	25.0
Actuated g/C Ratio	0.12	0.43	0.43	0.10	0.41		0.04	0.16		0.15	0.26	0.26
Clearance Time (s)	3.5	4.5	4.5	3.5	4.5		3.5	4.1		3.5	4.8	4.8
Vehicle Extension (s)	2.0	4.0	4.0	2.0	4.0		2.0	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	221	1541	685	180	1412		76	509		520	490	410
v/s Ratio Prot	c0.07	0.14		0.06	c0.34		c0.01	0.01		c0.08	0.03	
v/s Ratio Perm			0.01									c0.03
v/c Ratio	0.56	0.33	0.03	0.58	0.84		0.36	0.09		0.55	0.10	0.12
Uniform Delay, d1	40.0	18.3	15.9	41.6	25.8		45.1	34.8		38.3	27.4	27.5
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	1.7	0.2	0.0	2.8	4.8		1.0	0.1		1.0	0.1	0.1
Delay (s)	41.7	18.5	15.9	44.4	30.6		46.2	34.8		39.3	27.4	27.6
Level of Service	D	B	B	D	C		D	C		D	C	C
Approach Delay (s)		22.5			31.7			37.1			34.0	
Approach LOS		C			C			D			C	

Intersection Summary				
HCM 2000 Control Delay	30.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	96.9	Sum of lost time (s)	16.3	
Intersection Capacity Utilization	69.2%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
25: Highway 101 SB On Ramp/Highway 101 SB Off Ramp & Rowland Boulevard 12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	322	505	711	1145	0	0	0	0	211	6	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	3.0	4.0					3.0	3.0	
Lane Util. Factor		0.91	0.91	0.97	0.95					0.91	0.91	
Frpb, ped/bikes		0.99	0.99	1.00	1.00					1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	
Frt		0.93	0.85	1.00	1.00					1.00	0.92	
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.98	
Satd. Flow (prot)		3195	1450	3502	3610					1643	3069	
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.98	
Satd. Flow (perm)		3195	1450	3502	3610					1643	3069	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95
Adj. Flow (vph)	0	339	532	748	1205	0	0	0	0	222	6	114
RTOR Reduction (vph)	0	162	189	0	0	0	0	0	0	0	25	0
Lane Group Flow (vph)	0	438	82	748	1205	0	0	0	0	118	199	0
Confl. Peds. (#/hr)			2									7
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	33%	0%
Turn Type		NA	Perm	Prot	NA					Split	NA	
Protected Phases		2		1	6					4	4	
Permitted Phases			2									
Actuated Green, G (s)		15.1	15.1	13.9	32.0					11.2	11.2	
Effective Green, g (s)		15.1	15.1	13.9	32.0					11.2	11.2	
Actuated g/C Ratio		0.30	0.30	0.28	0.64					0.22	0.22	
Clearance Time (s)		4.0	4.0	3.0	4.0					3.0	3.0	
Vehicle Extension (s)		4.0	4.0	2.0	2.5					2.0	2.0	
Lane Grp Cap (vph)		961	436	969	2301					366	684	
v/s Ratio Prot		0.14		c0.21	c0.33					c0.07	0.06	
v/s Ratio Perm			0.06									
v/c Ratio		0.46	0.19	0.77	0.52					0.32	0.29	
Uniform Delay, d1		14.2	13.0	16.7	5.0					16.3	16.2	
Progression Factor		1.00	1.00	1.00	1.00					1.00	1.00	
Incremental Delay, d2		0.5	0.3	3.5	0.2					0.2	0.1	
Delay (s)		14.7	13.3	20.2	5.1					16.5	16.3	
Level of Service		B	B	C	A					B	B	
Approach Delay (s)		14.3			10.9			0.0			16.4	
Approach LOS		B			B			A			B	

Intersection Summary				
HCM 2000 Control Delay	12.4	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.59			
Actuated Cycle Length (s)	50.2	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	62.9%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
26: Highway 101 NB Off Ramp/Highway 101 NB On Ramp & Rowland Boulevard 12/17/2013

Movement	EBL2	EBL	EBT	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	NEL2	NEL
Lane Configurations												
Volume (vph)	4	48	504	1060	3	440	748	11	8	650	20	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0	4.0	4.0		4.0	3.5		3.5	3.0		3.5
Lane Util. Factor		1.00	0.95	0.86		0.86	0.95		0.95	0.88		1.00
Frpb, ped/bikes		1.00	1.00	1.00		1.00	1.00		1.00	1.00		1.00
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00		1.00	1.00		1.00
Frt		1.00	1.00	0.99		0.85	1.00		1.00	0.85		1.00
Flt Protected		0.95	1.00	1.00		1.00	0.95		0.95	1.00		0.95
Satd. Flow (prot)		1802	3574	4635		1323	1715		1715	2842		1776
Flt Permitted		0.16	1.00	1.00		1.00	0.95		0.95	1.00		0.95
Satd. Flow (perm)		301	3574	4635		1323	1715		1715	2842		1776
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)	4	49	520	1093	3	454	771	11	8	670	21	13
RTOR Reduction (vph)	0	0	0	9	0	230	0	0	0	0	0	0
Lane Group Flow (vph)	0	53	520	1196	0	115	393	0	397	670	0	35
Confl. Peds. (#/hr)					1					8		
Heavy Vehicles (%)	2%	0%	1%	4%	0%	5%	0%	2%	13%	0%	2%	0%
Turn Type		Prot	NA	NA		Perm	Split	Split	NA	custom	Perm	NA
Protected Phases		5	2	6			8	8	8	1 8		7
Permitted Phases						6					7	
Actuated Green, G (s)		25.2	54.3	40.1		40.1	34.1		34.1	45.1		6.6
Effective Green, g (s)		25.2	54.3	40.1		40.1	34.1		34.1	45.1		6.6
Actuated g/C Ratio		0.21	0.45	0.33		0.33	0.28		0.28	0.38		0.05
Clearance Time (s)		3.0	4.0	4.0		4.0	3.5		3.5			3.5
Vehicle Extension (s)		2.0	2.0	2.0		2.0	2.0		2.0			2.0
Lane Grp Cap (vph)		63	1617	1548		442	487		487	1068		97
v/s Ratio Prot			0.15	c0.26			0.23		c0.23	0.24		
v/s Ratio Perm		c0.18				0.09						0.02
v/c Ratio		0.84	0.32	0.77		0.26	0.81		0.82	0.63		0.36
Uniform Delay, d1		45.5	21.0	35.9		29.1	39.9		40.0	30.6		54.7
Progression Factor		1.00	1.00	0.73		1.05	1.00		1.00	1.00		1.00
Incremental Delay, d2		59.0	0.5	3.4		1.3	9.0		9.6	0.8		0.8
Delay (s)		104.5	21.6	29.4		31.7	48.9		49.6	31.4		55.5
Level of Service		F	C	C		C	D		D	C		E
Approach Delay (s)			29.2	29.9					41.1			55.5
Approach LOS			C	C					D			E

Intersection Summary				
HCM 2000 Control Delay	34.6	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.78			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0	
Intersection Capacity Utilization	74.5%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
26: Highway 101 NB Off Ramp/Highway 101 NB On Ramp & Rowland Boulevard 12/17/2013

Movement	NER
Lane Configurations	
Volume (vph)	1
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.97
Adj. Flow (vph)	1
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	
Heavy Vehicles (%)	15%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM Signalized Intersection Capacity Analysis
27: Rowland Boulevard & Rowland Way 12/17/2013

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	183	959	1111	46	57	408
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.0	4.0		3.2	3.2
Lane Util. Factor	0.97	0.91	0.95		1.00	0.95
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		0.89	0.85
Flt Protected	0.95	1.00	1.00		0.99	1.00
Satd. Flow (prot)	3467	5187	3575		1643	1519
Flt Permitted	0.95	1.00	1.00		0.99	1.00
Satd. Flow (perm)	3467	5187	3575		1643	1519
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	195	1020	1182	49	61	434
RTOR Reduction (vph)	0	0	2	0	118	210
Lane Group Flow (vph)	195	1020	1229	0	134	33
Confl. Peds. (#/hr)				12	2	
Heavy Vehicles (%)	1%	0%	0%	7%	2%	1%
Turn Type	Prot	NA	NA		NA	Perm
Protected Phases	5	2	6		4	
Permitted Phases						4
Actuated Green, G (s)	11.6	96.4	81.3		16.4	16.4
Effective Green, g (s)	11.6	96.4	81.3		16.4	16.4
Actuated g/C Ratio	0.10	0.80	0.68		0.14	0.14
Clearance Time (s)	3.5	4.0	4.0		3.2	3.2
Vehicle Extension (s)	2.0	4.0	4.0		2.0	2.0
Lane Grp Cap (vph)	335	4166	2422		224	207
v/s Ratio Prot	c0.06	0.20	c0.34		c0.08	
v/s Ratio Perm						0.02
v/c Ratio	0.58	0.24	0.51		0.60	0.16
Uniform Delay, d1	51.9	2.9	9.5		48.7	45.7
Progression Factor	1.06	1.37	0.76		1.00	1.00
Incremental Delay, d2	1.5	0.1	0.7		2.8	0.1
Delay (s)	56.7	4.1	7.9		51.5	45.9
Level of Service	E	A	A		D	D
Approach Delay (s)		12.5	7.9		48.7	
Approach LOS		B	A		D	

Intersection Summary				
HCM 2000 Control Delay	16.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.7
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
28: Rowland Boulevard & Vintage Way 12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	17	210	801	1	259	3	879	6	4	4	12	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	4.0	3.0	4.0		3.6	3.6			3.2	
Lane Util. Factor	1.00	0.95	0.88	1.00	0.95		0.97	1.00			1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	0.99			1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.94			0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1805	3539	2842	1805	3566		3502	1768			1851	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.99	
Satd. Flow (perm)	1805	3539	2842	1805	3566		3502	1768			1851	
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)	18	216	826	1	267	3	906	6	4	4	12	2
RTOR Reduction (vph)	0	0	0	0	1	0	0	2	0	0	2	0
Lane Group Flow (vph)	18	216	826	1	269	0	906	8	0	0	16	0
Confl. Peds. (#/hr)			9	9		13			11			
Confl. Bikes (#/hr)			2			2						
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA	pt+ov	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2	2 3	1	6		3	3		4	4	
Permitted Phases												
Actuated Green, G (s)	5.4	47.2	102.6	2.8	44.6		51.4	51.4			4.8	
Effective Green, g (s)	5.4	47.2	102.6	2.8	44.6		51.4	51.4			4.8	
Actuated g/C Ratio	0.05	0.39	0.85	0.02	0.37		0.43	0.43			0.04	
Clearance Time (s)	3.0	4.0		3.0	4.0		3.6	3.6			3.2	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		3.0	3.0			2.0	
Lane Grp Cap (vph)	81	1392	2429	42	1325		1500	757			74	
v/s Ratio Prot	0.01	0.06	c0.29	0.00	c0.08		c0.26	0.00			c0.01	
v/s Ratio Perm												
v/c Ratio	0.22	0.16	0.34	0.02	0.20		0.60	0.01			0.22	
Uniform Delay, d1	55.3	23.5	1.8	57.3	25.6		26.5	19.7			55.8	
Progression Factor	1.18	1.20	0.60	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.5	0.2	0.4	0.1	0.3		1.8	0.0			0.5	
Delay (s)	66.0	28.4	1.4	57.3	26.0		28.3	19.7			56.3	
Level of Service	E	C	A	E	C		C	B			E	
Approach Delay (s)		8.0			26.1			28.2			56.3	
Approach LOS		A			C			C			E	

Intersection Summary					
HCM 2000 Control Delay	18.7	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.46				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		13.8	
Intersection Capacity Utilization	61.7%	ICU Level of Service		B	
Analysis Period (min)	15				

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
29: Novato Blvd #2 & Sunset Parkway 12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	152	19	27	29	12	44	46	301	52	38	298	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.0		3.5	3.5		3.5	4.9		3.5	4.6	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.98		1.00	0.97		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	0.88		1.00	0.98		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1691		1805	1630		1805	1835		1805	1800	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1691		1805	1630		1805	1835		1805	1800	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	169	21	30	32	13	49	51	334	58	42	331	164
RTOR Reduction (vph)	0	24	0	0	43	0	0	4	0	0	13	0
Lane Group Flow (vph)	169	27	0	32	19	0	51	388	0	42	482	0
Confl. Peds. (#/hr)			11			6			3			
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	1%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	12.5	18.7		6.0	12.7		8.0	53.4		6.0	51.7	
Effective Green, g (s)	12.5	18.7		6.0	12.7		8.0	53.4		6.0	51.7	
Actuated g/C Ratio	0.12	0.19		0.06	0.13		0.08	0.53		0.06	0.52	
Clearance Time (s)	3.5	4.0		3.5	3.5		3.5	4.9		3.5	4.6	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	223	316		108	207		144	979		108	930	
v/s Ratio Prot	c0.09	c0.02		0.02	0.01		c0.03	0.21		0.02	c0.27	
v/s Ratio Perm												
v/c Ratio	0.76	0.08		0.30	0.09		0.35	0.40		0.39	0.52	
Uniform Delay, d1	42.3	33.6		45.0	38.6		43.6	13.8		45.2	15.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.04	0.38	
Incremental Delay, d2	12.3	0.0		0.6	0.1		0.5	1.2		0.7	1.8	
Delay (s)	54.5	33.6		45.5	38.6		44.1	15.0		47.9	7.7	
Level of Service	D	C		D	D		D	B		D	A	
Approach Delay (s)		49.7			41.0			18.3			10.9	
Approach LOS		D			D			B			B	

Intersection Summary					
HCM 2000 Control Delay	22.2	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.47				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		15.9	
Intersection Capacity Utilization	61.2%	ICU Level of Service		B	
Analysis Period (min)	15				

c Critical Lane Group

HCM 2010 AWSC
30: Redwood Blvd & Novato Blvd #2 12/17/2013

Intersection	
Intersection Delay, s/veh	34.6
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	51	219	51	45	309	138	102	27	115	85	6	46
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	1	2	1	1	2	1	1	1	1	1	1	1
Mvmt Flow	56	241	56	49	340	152	112	30	126	93	7	51
Number of Lanes	1	1	0	1	1	0	1	1	1	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	2	2	2
HCM Control Delay	21.9	58.7	14	14.1
HCM LOS	C	F	B	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	81%	0%	69%	0%	12%
Vol Right, %	0%	0%	100%	0%	19%	0%	31%	0%	88%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	102	27	115	51	270	45	447	85	52
LT Vol	0	27	0	0	219	0	309	0	6
Through Vol	0	0	115	0	51	0	138	0	46
RT Vol	102	0	0	51	0	45	0	85	0
Lane Flow Rate	112	30	126	56	297	49	491	93	57
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.282	0.069	0.271	0.131	0.642	0.109	0.984	0.245	0.132
Departure Headway (Hd)	9.049	8.541	7.818	8.526	7.897	7.92	7.209	9.453	8.287
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	399	422	463	423	460	450	501	382	435
Service Time	6.758	6.241	5.518	6.226	5.597	5.714	5.002	7.158	5.992
HCM Lane V/C Ratio	0.281	0.071	0.272	0.132	0.646	0.109	0.98	0.243	0.131
HCM Control Delay	15.3	11.9	13.4	12.5	23.7	11.7	63.4	15.2	12.2
HCM Lane LOS	C	B	B	B	C	B	F	C	B
HCM 95th-tile Q	1.1	0.2	1.1	0.4	4.4	0.4	13	0.9	0.5

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM Signalized Intersection Capacity Analysis
31: Alameda Del Prado & Ignacio Blvd 12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	371	67	301	676	0	101	0	185	2	2	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.6	3.6	3.0	3.6			3.5	3.5		3.7	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00			1.00	0.98		0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			0.99	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	
Satd. Flow (prot)	1770	3610	1573	1900	3610			1775	1589		1772	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.75	1.00		0.94	
Satd. Flow (perm)	1770	3610	1573	1805	3610			1409	1589		1695	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	3	412	74	334	751	0	112	0	206	2	2	2
RTOR Reduction (vph)	0	0	31	0	0	0	0	0	175	0	2	0
Lane Group Flow (vph)	3	412	43	334	751	0	0	112	31	0	4	0
Confl. Peds. (#/hr)			4				7		4	4		7
Heavy Vehicles (%)	2%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2				8		8	4		
Actuated Green, G (s)	1.2	47.5	47.5	27.4	73.7			15.0	15.0		14.8	
Effective Green, g (s)	1.2	47.5	47.5	27.4	73.7			15.0	15.0		14.8	
Actuated g/C Ratio	0.01	0.48	0.48	0.27	0.74			0.15	0.15		0.15	
Clearance Time (s)	3.0	3.6	3.6	3.0	3.6			3.5	3.5		3.7	
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0			2.0	2.0		2.0	
Lane Grp Cap (vph)	21	1714	747	520	2660			211	238		250	
v/s Ratio Prot	0.00	c0.11		c0.18	c0.21							
v/s Ratio Perm			0.03					c0.08	0.02		0.00	
v/c Ratio	0.14	0.24	0.06	0.64	0.28			0.53	0.13		0.02	
Uniform Delay, d1	48.9	15.6	14.2	32.0	4.4			39.3	36.8		36.4	
Progression Factor	1.00	1.00	1.00	0.72	0.74			1.00	1.00		1.00	
Incremental Delay, d2	1.1	0.3	0.1	2.0	0.3			1.3	0.1		0.0	
Delay (s)	50.0	15.9	14.3	25.1	3.5			40.5	36.9		36.4	
Level of Service	D	B	B	C	A			D	D		D	
Approach Delay (s)		15.9			10.1			38.2			36.4	
Approach LOS		B			B			D			D	

Intersection Summary				
HCM 2000 Control Delay	16.4	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.43			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.3	
Intersection Capacity Utilization	68.1%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
32: US 101 SB Off Ramp/Enfrente Rd & Ignacio Blvd 12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	341	250	524	657	114	0	0	478	172	85	182
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	8.0	8.0	3.0	4.0				3.0		3.5	3.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95				0.88		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	0.99				1.00		1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00				1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98				0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00				1.00		0.97	1.00
Satd. Flow (prot)	1805	3610	1550	1787	3502				2842		1809	1578
Flt Permitted	0.95	1.00	1.00	0.95	1.00				1.00		0.97	1.00
Satd. Flow (perm)	1805	3610	1550	1787	3502				2842		1809	1578
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)	36	363	266	557	699	121	0	0	509	183	90	194
RTOR Reduction (vph)	0	0	190	0	10	0	0	0	325	0	0	153
Lane Group Flow (vph)	36	363	76	557	810	0	0	0	184	0	273	41
Confl. Peds. (#/hr)			7			20						1
Confl. Bikes (#/hr)						3						
Heavy Vehicles (%)	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	5%	1%
Turn Type	Prot	NA	Perm	Prot	NA				Over	Split	NA	Perm
Protected Phases	5	2		1	6				1	7	7	
Permitted Phases			2									7
Actuated Green, G (s)	6.6	28.4	28.4	36.2	62.0				36.2		20.9	20.9
Effective Green, g (s)	6.6	28.4	28.4	36.2	62.0				36.2		20.9	20.9
Actuated g/C Ratio	0.07	0.28	0.28	0.36	0.62				0.36		0.21	0.21
Clearance Time (s)	3.0	8.0	8.0	3.0	4.0				3.0		3.5	3.5
Vehicle Extension (s)	2.0	2.5	2.5	3.0	4.0				3.0		2.5	2.5
Lane Grp Cap (vph)	119	1025	440	646	2171				1028		378	329
v/s Ratio Prot	0.02	c0.10		c0.31	c0.23				0.06		c0.15	
v/s Ratio Perm			0.05									0.03
v/c Ratio	0.30	0.35	0.17	0.86	0.37				0.18		0.72	0.12
Uniform Delay, d1	44.5	28.5	26.9	29.6	9.4				21.8		36.8	32.1
Progression Factor	1.00	0.66	0.23	0.80	0.76				1.00		1.00	1.00
Incremental Delay, d2	0.5	0.9	0.8	9.0	0.4				0.1		6.3	0.1
Delay (s)	44.9	19.8	7.1	32.6	7.5				21.8		43.1	32.2
Level of Service	D	B	A	C	A				C		D	C
Approach Delay (s)		16.0			17.6			21.8			38.6	
Approach LOS		B			B			C			D	

Intersection Summary				
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.5	
Intersection Capacity Utilization	73.0%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
33: Nave Dr/US 101 NB On Ramp & Ignacio Blvd/Bel Marin Keys Blvd 12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	222	776	125	612	568	744	496	284	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.6	3.0	4.0		4.6	4.6	3.0			
Lane Util. Factor		0.95	1.00	1.00	0.95		0.91	0.91	1.00			
Frpb, ped/bikes		1.00	0.99	1.00	0.99		1.00	1.00	0.99			
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00	1.00			
Frt		1.00	0.85	1.00	0.93		1.00	1.00	0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95	0.98	1.00			
Satd. Flow (prot)		3610	1604	1805	3296		1643	3370	1600			
Flt Permitted		1.00	1.00	0.95	1.00		0.95	0.98	1.00			
Satd. Flow (perm)		3610	1604	1805	3296		1643	3370	1600			
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	236	826	133	651	604	791	528	302	0	0	0
RTOR Reduction (vph)	0	0	77	0	89	0	0	0	158	0	0	0
Lane Group Flow (vph)	0	236	749	133	1166	0	435	884	144	0	0	0
Confl. Peds. (#/hr)			1			1			1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	2%	0%	1%	0%	0%	0%	0%
Turn Type		NA	pm+ov	Prot	NA		Split	NA	pm+ov			
Protected Phases		2	3	1	6		3	3	1			
Permitted Phases			2						3			
Actuated Green, G (s)		40.7	75.7	12.7	56.4		35.0	35.0	47.7			
Effective Green, g (s)		40.7	75.7	12.7	56.4		35.0	35.0	47.7			
Actuated g/C Ratio		0.41	0.76	0.13	0.56		0.35	0.35	0.48			
Clearance Time (s)		4.0	4.6	3.0	4.0		4.6	4.6	3.0			
Vehicle Extension (s)		4.0	2.0	2.0	4.0		2.0	2.0	2.0			
Lane Grp Cap (vph)		1469	1214	229	1858		575	1179	763			
v/s Ratio Prot		0.07	0.22	0.07	c0.35		c0.26	0.26	0.02			
v/s Ratio Perm			0.25						0.07			
v/c Ratio		0.16	0.62	0.58	0.63		0.76	0.75	0.19			
Uniform Delay, d1		18.8	5.5	41.1	14.7		28.7	28.6	15.0			
Progression Factor		1.10	1.13	1.00	1.00		1.00	1.00	1.00			
Incremental Delay, d2		0.2	0.6	2.4	1.6		5.0	2.3	0.0			
Delay (s)		20.9	6.9	43.5	16.3		33.8	31.0	15.1			
Level of Service		C	A	D	B		C	C	B			
Approach Delay (s)		10.0			18.9			28.8			0.0	
Approach LOS		A			B			C			A	

Intersection Summary				
HCM 2000 Control Delay	20.5	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	11.6	
Intersection Capacity Utilization	66.6%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
34: Bel Marin Keys Blvd & Commercial Blvd

12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	0	33	247	1	19	45	407	55	11	1031	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	3.0	3.9		3.0	3.5	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.87			1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected		1.00			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1633			1807	1396	1805	3535		1805	3572	
Flt Permitted		0.98			0.70	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1607			1322	1396	1805	3535		1805	3572	
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)	3	0	38	287	1	22	52	473	64	13	1199	5
RTOR Reduction (vph)	0	29	0	0	0	16	0	10	0	0	0	0
Lane Group Flow (vph)	0	12	0	0	288	6	52	527	0	13	1204	0
Confl. Peds. (#/hr)	3		2	2		3			3			
Heavy Vehicles (%)	2%	0%	0%	0%	0%	14%	0%	0%	0%	0%	1%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		21.2			21.2	21.2	4.2	41.1		1.8	39.1	
Effective Green, g (s)		21.2			21.2	21.2	4.2	41.1		1.8	39.1	
Actuated g/C Ratio		0.28			0.28	0.28	0.06	0.55		0.02	0.52	
Clearance Time (s)		4.0			4.0	4.0	3.0	3.9		3.0	3.5	
Vehicle Extension (s)		3.0			3.0	3.0	2.5	3.0		2.5	4.0	
Lane Grp Cap (vph)		454			373	394	101	1937		43	1862	
v/s Ratio Prot							c0.03	0.15		0.01	c0.34	
v/s Ratio Perm		0.01			c0.22	0.00						
v/c Ratio		0.03			0.77	0.02	0.51	0.27		0.30	0.65	
Uniform Delay, d1		19.4			24.7	19.4	34.4	9.0		36.0	13.0	
Progression Factor		1.00			1.00	1.00	1.00	1.00		0.91	0.76	
Incremental Delay, d2		0.0			9.5	0.0	3.3	0.3		2.5	1.5	
Delay (s)		19.5			34.2	19.4	37.7	9.4		35.3	11.4	
Level of Service		B			C	B	D	A		D	B	
Approach Delay (s)		19.5			33.2			11.9			11.7	
Approach LOS		B			C			B			B	

Intersection Summary				
HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.67			
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.9	
Intersection Capacity Utilization	64.3%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
35: Bel Marin Keys Blvd & Hamilton Dr/Digital Dr

12/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	5	130	380	1	3	52	310	95	10	498	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5	3.5	3.5	3.5		3.0	4.0		3.0	4.0	
Lane Util. Factor		1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99	1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85	1.00	0.88		1.00	0.96		1.00	1.00	
Flt Protected		0.98	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1853	1533	1804	1655		1770	3464		1805	3569	
Flt Permitted		0.95	1.00	0.75	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1797	1533	1423	1655		1770	3464		1805	3569	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	6	6	159	463	1	4	63	378	116	12	607	5
RTOR Reduction (vph)	0	0	101	0	3	0	0	31	0	0	1	0
Lane Group Flow (vph)	0	12	58	463	2	0	63	463	0	12	611	0
Confl. Peds. (#/hr)	1		1	1		1			2			8
Heavy Vehicles (%)	0%	0%	4%	0%	0%	0%	2%	0%	0%	0%	1%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		27.5	27.5	27.5	27.5		5.4	35.2		1.8	31.6	
Effective Green, g (s)		27.5	27.5	27.5	27.5		5.4	35.2		1.8	31.6	
Actuated g/C Ratio		0.37	0.37	0.37	0.37		0.07	0.47		0.02	0.42	
Clearance Time (s)		3.5	3.5	3.5	3.5		3.0	4.0		3.0	4.0	
Vehicle Extension (s)		2.0	2.0	2.5	2.5		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)		658	562	521	606		127	1625		43	1503	
v/s Ratio Prot					0.00		c0.04	0.13		0.01	c0.17	
v/s Ratio Perm		0.01	0.04	c0.33								
v/c Ratio		0.02	0.10	0.89	0.00		0.50	0.29		0.28	0.41	
Uniform Delay, d1		15.1	15.6	22.3	15.1		33.5	12.2		36.0	15.2	
Progression Factor		1.00	1.00	1.00	1.00		1.31	0.50		1.00	1.00	
Incremental Delay, d2		0.0	0.0	16.6	0.0		1.1	0.4		1.3	0.8	
Delay (s)		15.1	15.7	39.0	15.1		45.0	6.5		37.3	16.0	
Level of Service		B	B	D	B		D	A		D	B	
Approach Delay (s)		15.6			38.7			10.9			16.4	
Approach LOS		B			D			B			B	

Intersection Summary				
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.5	
Intersection Capacity Utilization	66.1%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
36: Nave Dr & US 101 NB Off Ramp 12/17/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	665	211	0	879	663	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.96	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3467	1563		3574	3437	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3467	1563		3574	3437	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	693	220	0	916	691	260
RTOR Reduction (vph)	0	78	0	0	56	0
Lane Group Flow (vph)	693	142	0	916	895	0
Confl. Peds. (#/hr)		1				
Heavy Vehicles (%)	1%	2%	0%	1%	1%	0%
Turn Type	NA	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	31.0	31.0		31.0	31.0	
Effective Green, g (s)	31.0	31.0		31.0	31.0	
Actuated g/C Ratio	0.44	0.44		0.44	0.44	
Clearance Time (s)	3.0	3.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	1535	692		1582	1522	
v/s Ratio Prot	c0.20			0.26	c0.26	
v/s Ratio Perm		0.09				
v/c Ratio	0.45	0.21		0.58	0.59	
Uniform Delay, d1	13.6	12.0		14.6	14.7	
Progression Factor	1.00	1.00		0.62	1.00	
Incremental Delay, d2	1.0	0.7		1.5	1.7	
Delay (s)	14.5	12.6		10.5	16.4	
Level of Service	B	B		B	B	
Approach Delay (s)	14.1			10.5	16.4	
Approach LOS	B			B	B	

Intersection Summary				
HCM 2000 Control Delay	13.7	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.52			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	56.3%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
37: Nave Dr & Hamilton Center 12/17/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	100	48	532	143	151	439
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.2	3.2	4.4		3.0	4.4
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.97		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	1615	1836		1770	1881
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1805	1615	1836		1770	1881
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	106	51	566	152	161	467
RTOR Reduction (vph)	0	46	12	0	0	0
Lane Group Flow (vph)	106	5	706	0	161	467
Confl. Peds. (#/hr)				2		
Heavy Vehicles (%)	0%	0%	0%	0%	2%	1%
Turn Type	NA	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	6.2	6.2	43.3		9.9	56.2
Effective Green, g (s)	6.2	6.2	43.3		9.9	56.2
Actuated g/C Ratio	0.09	0.09	0.62		0.14	0.80
Clearance Time (s)	3.2	3.2	4.4		3.0	4.4
Vehicle Extension (s)	1.0	1.0	1.0		1.0	1.0
Lane Grp Cap (vph)	159	143	1135		250	1510
v/s Ratio Prot	c0.06		c0.38		c0.09	0.25
v/s Ratio Perm		0.00				
v/c Ratio	0.67	0.03	0.62		0.64	0.31
Uniform Delay, d1	30.9	29.2	8.3		28.4	1.8
Progression Factor	1.00	1.00	0.67		0.94	0.43
Incremental Delay, d2	7.9	0.0	2.4		3.6	0.5
Delay (s)	38.8	29.2	8.0		30.3	1.2
Level of Service	D	C	A		C	A
Approach Delay (s)	35.7		8.0			8.7
Approach LOS	D		A			A

Intersection Summary				
HCM 2000 Control Delay	11.2	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.63			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.6	
Intersection Capacity Utilization	61.0%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
38: Nave Dr & Hamilton Pkwy

12/17/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	66	288	316	52	224	293
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.2	3.2	4.4	4.4	3.0	4.4
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
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)	1770	1599	1900	1578	1787	1850
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1599	1900	1578	1787	1900
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	73	316	347	57	246	322
RTOR Reduction (vph)	0	279	0	19	0	0
Lane Group Flow (vph)	73	37	347	38	246	322
Confl. Peds. (#/hr)				2		
Heavy Vehicles (%)	2%	1%	0%	0%	1%	0%
Turn Type	NA	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	8.2	8.2	36.2	36.2	15.0	54.2
Effective Green, g (s)	8.2	8.2	36.2	36.2	15.0	54.2
Actuated g/C Ratio	0.12	0.12	0.52	0.52	0.21	0.77
Clearance Time (s)	3.2	3.2	4.4	4.4	3.0	4.4
Vehicle Extension (s)	2.0	2.0	3.0	3.0	2.0	3.0
Lane Grp Cap (vph)	207	187	982	816	382	1432
v/s Ratio Prot	c0.04		c0.18		c0.14	0.17
v/s Ratio Perm		0.02		0.02		
v/c Ratio	0.35	0.20	0.35	0.05	0.64	0.22
Uniform Delay, d1	28.5	27.9	10.0	8.4	25.1	2.2
Progression Factor	1.00	1.00	1.00	1.00	0.97	0.30
Incremental Delay, d2	0.4	0.2	1.0	0.1	2.7	0.3
Delay (s)	28.8	28.1	11.0	8.5	27.1	1.0
Level of Service	C	C	B	A	C	A
Approach Delay (s)	28.3		10.6			12.3
Approach LOS	C		B			B

Intersection Summary				
HCM 2000 Control Delay	16.4	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.43			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.6	
Intersection Capacity Utilization	48.6%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
39: Nave Dr & Main Gate Dr

12/17/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	212	53	289	213	94	223
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	4.1	4.1	3.0	4.4
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
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)	1805	1615	1900	1615	1805	1881
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1805	1615	1900	1615	1805	1881
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	228	57	311	229	101	240
RTOR Reduction (vph)	0	45	0	143	0	0
Lane Group Flow (vph)	228	12	311	86	101	240
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%
Turn Type	NA	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	8.1	8.1	14.2	14.2	5.6	22.5
Effective Green, g (s)	8.1	8.1	14.2	14.2	5.6	22.5
Actuated g/C Ratio	0.21	0.21	0.37	0.37	0.15	0.59
Clearance Time (s)	3.0	3.0	4.1	4.1	3.0	4.4
Vehicle Extension (s)	2.0	2.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	384	344	710	603	266	1113
v/s Ratio Prot	c0.13		c0.16		c0.06	0.13
v/s Ratio Perm		0.01		0.05		
v/c Ratio	0.59	0.04	0.44	0.14	0.38	0.22
Uniform Delay, d1	13.5	11.9	8.9	7.9	14.6	3.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	0.0	0.2	0.0	0.3	0.0
Delay (s)	15.1	11.9	9.1	7.9	15.0	3.7
Level of Service	B	B	A	A	B	A
Approach Delay (s)	14.5		8.6			7.0
Approach LOS	B		A			A

Intersection Summary				
HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.47			
Actuated Cycle Length (s)	38.0	Sum of lost time (s)	10.1	
Intersection Capacity Utilization	47.0%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
40: Nave Dr & Bolling Dr 12/17/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	158	52	447	295	56	362
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	4.1		3.0	3.5
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.97	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.95		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1787	1572	1787		1805	1881
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1787	1572	1787		1805	1881
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	163	54	461	304	58	373
RTOR Reduction (vph)	0	45	24	0	0	0
Lane Group Flow (vph)	163	9	741	0	58	373
Confl. Peds. (#/hr)		6				
Heavy Vehicles (%)	1%	0%	1%	0%	0%	1%
Turn Type	NA	Perm	NA		Prot	NA
Protected Phases	4		6		5	2
Permitted Phases		4				
Actuated Green, G (s)	9.3	9.3	30.2		4.3	38.1
Effective Green, g (s)	9.3	9.3	30.2		4.3	38.1
Actuated g/C Ratio	0.17	0.17	0.56		0.08	0.71
Clearance Time (s)	3.0	3.0	4.1		3.0	3.5
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	308	271	1001		143	1329
v/s Ratio Prot	c0.09		c0.41		c0.03	0.20
v/s Ratio Perm		0.01				
v/c Ratio	0.53	0.03	0.74		0.41	0.28
Uniform Delay, d1	20.3	18.6	8.9		23.6	2.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.8	0.0	2.6		0.7	0.0
Delay (s)	21.1	18.6	11.5		24.3	2.9
Level of Service	C	B	B		C	A
Approach Delay (s)	20.4		11.5			5.8
Approach LOS	C		B			A

Intersection Summary				
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.66			
Actuated Cycle Length (s)	53.9	Sum of lost time (s)	10.1	
Intersection Capacity Utilization	64.0%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM 2010 AWSC
41: Alameda Del Prado & Clay Ct/Nave Dr 12/17/2013

Intersection	
Intersection Delay, s/veh	21.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	7	10	0	110	9	585	0	59	42	172	87	11
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	10	0	113	9	603	0	61	43	177	90	11
Number of Lanes	0	1	0	0	1	1	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	10.2	26.9	11.2	12.6
HCM LOS	B	D	B	B

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	0%	41%	92%	0%	100%	0%
Vol Thru, %	58%	59%	8%	0%	0%	89%
Vol Right, %	42%	0%	0%	100%	0%	11%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	101	17	119	585	172	98
LT Vol	59	10	9	0	0	87
Through Vol	42	0	0	585	0	11
RT Vol	0	7	110	0	172	0
Lane Flow Rate	104	18	123	603	177	101
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	0.191	0.033	0.214	0.854	0.351	0.183
Departure Headway (Hd)	6.612	6.872	6.269	5.096	7.122	6.535
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	542	520	573	712	505	549
Service Time	4.661	4.932	4.004	2.831	4.866	4.278
HCM Lane V/C Ratio	0.192	0.035	0.215	0.847	0.35	0.184
HCM Control Delay	11.2	10.2	10.7	30.2	13.7	10.7
HCM Lane LOS	B	B	B	D	B	B
HCM 95th-tile Q	0.7	0.1	0.8	9.9	1.6	0.7

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

ROADWAY SEGMENT LEVEL OF SERVICE
CALCULATIONS

Arterial Level of Service: EB Novato Blvd #1

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Simmons Ln	11	4.3	10.9	0.1	21
Grant Ave	12	7.1	45.7	0.4	32
Tamalpais Ave	13	17.0	44.7	0.3	23
Diablo Ave	14	40.8	70.3	0.4	19
Total		69.3	171.6	1.1	24

Arterial Level of Service: WB Novato Blvd #1

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
7th St	13	25.1	56.3	0.4	24
Grant Ave	12	8.3	34.9	0.3	29
Simmons Ln	11	12.9	49.7	0.4	30
Wilson Ave	10	2.9	10.4	0.1	22
Total		49.2	151.3	1.1	27

Arterial Level of Service: NB Novato Blvd #2

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Redwood Blvd	30	11.2	29.6	0.2	20
	92	4.6	71.9	0.5	26
Sunset Parkway	29	13.5	43.8	0.3	27
Rowland Boulevard	23	38.6	66.8	0.3	14
Arthur Street	22	4.2	33.5	0.3	36
Garden Ct	21	6.0	44.8	0.4	36
Diablo Ave	14	42.2	76.5	0.4	17
Total		120.3	366.8	2.4	24

Arterial Level of Service: SB Novato Blvd #2

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Center Rd	21	11.6	38.5	0.4	34
Arthur Street	22	12.2	50.2	0.4	32
	23	16.7	46.0	0.3	26
Sunset Parkway	29	10.4	34.7	0.3	27
	92	3.1	32.6	0.3	36
Redwood Blvd	30	12.1	60.0	0.5	32
Total		66.0	262.0	2.3	31

Arterial Level of Service: NB Bel Marin Keys Blvd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Commercial Blvd	34	7.6	21.5	0.1	25
Digital Dr	35	7.1	18.0	0.1	26
Total		14.6	39.6	0.3	25

Arterial Level of Service: SB Bel Marin Keys Blvd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Hamilton Dr	35	10.9	24.4	0.1	20
Commercial Blvd	34	7.7	20.4	0.1	23
US 101 NB On Ramp	33	15.5	29.6	0.1	18
Total		34.1	74.4	0.4	20

FREEWAY LEVEL OF SERVICE CALCULATIONS

HCS 2010 Freeway Facilities

Project Properties

Analyst	SL	**Freeway Name**	US 101	**Analysis Period**	PM Peak
Analysis Date	12/9/2013 11:24:36 AM	**From**	Nave Dr	**Version Date**	10/10/2012
Agency		**To**	Atherton Blvd		
Location	City of Novato	**Analysis Direction**	Northbound		
User Notes					
File Name	C:\Users\slam\AppData\Local\Temp\preview.xml				

Facility-wide Values

Jam Density (pc/h/ln)	190	**Time Period Duration (min)**	15	**Facility Length (mi)**	**8.23500**

Segment Input Data

Time Period 1

Mainline Data

Seg #	From	To	Type	Length	Terrain	Adj. Demand	% Trucks	% RVs	# Lanes	FFS
1	Novato S City Limits	Nave Dr	Basic Segment	1000	Rolling	6760	4.00	0.50	4	65
2	Nave Dr Off		Off Ramp	1500	Rolling	6760	4.00	0.50	3	65
3	Nave Dr Off	Nave Dr On	Basic Segment	2000	Rolling	5885	4.30	0.57	3	65
4	Nave Dr On		On Ramp	1500	Rolling	6075	4.23	0.56	3	65
5	Nave Dr	Ignacio Blvd	Basic Segment	1500	Level	6075	4.23	0.56	3	65
6	Ignacio Blvd Off		Off Ramp	1500	Level	6075	4.23	0.56	3	65
7	Ignacio Blvd Off	Ignacio Blvd On	Basic Segment	2000	Level	5275	4.56	0.64	3	65
8	Ignacio Blvd On		On Ramp	500	Level	5540	4.44	0.61	3	65
9	Bel Marin Keys On		On Ramp	1350	Level	6530	4.07	0.52	4	65
10	Bel Marin Keys Blvd	SR37	Ramp Overlap	200	Level	6530	4.07	0.52	4	65
11	SR37 Off		Off Ramp	1350	Level	6530	4.07	0.52	3	65
12	Novato Blvd Off		Off Ramp	1500	Level	4710	4.10	0.72	3	65
13	Novato Blvd Off	SR 37 On	Basic Segment	1800	Level	4345	4.27	0.78	3	65
14	SR37	Rowland Blvd	Weaving	2800	Level	4775	4.25	0.71	4	65
15	Rowland Blvd Off	Rowland Blvd On	Basic Segment	2900	Level	3455	5.11	0.98	3	65
16	Rowland Blvd On		On Ramp	1000	Level	3995	4.69	0.85	3	65
17	Rowland Blvd On	De Long Off	Ramp Overlap	500	Level	3995	4.69	0.85	3	65
18	De Long Off		Off Ramp	1000	Level	3995	4.69	0.85	3	65
19	De Long Off	De Long On	Basic Segment	2000	Level	2775	5.87	1.22	3	65
20	De Long Ave On		On Ramp	1500	Level	3060	5.51	1.10	3	65
21	De Long Ave	Atherton Ave	Ramp Overlap	500	Level	3060	5.51	1.10	3	65
22	Atherton Ave Off		Off Ramp	1500	Level	3060	5.51	1.10	3	65
23	Atherton Ave Off	Atherton Ave Over	Basic Segment	1300	Level	2280	6.71	1.48	3	65
24	Atherton Ave Over	Atherton Ave On	Basic Segment	900	Level	2280	6.71	1.48	3	65
25	Atherton Ave On		On Ramp	1500	Level	3040	5.53	1.11	3	65
26	Atherton Ave	1-mi N of Atherton	Basic Segment	3100	Level	3040	5.53	1.11	3	65
27	1-mi N of Atherton	Novato N City Limits	Basic Segment	5280	Level	3040	5.53	1.11	2	65

RampData

Seg #	Type	Adj. Demand	% Trucks	% RVs	Lanes	Accel/Decel Length	FFS
2	Off Ramp	875	2.00	0.00	1	1500	40
4	On Ramp	190	2.00	0.00	1	350	40
6	Off Ramp	800	2.00	0.00	1	100	40
8	On Ramp	265	2.00	0.00	1	500	40
9	On Ramp	990	2.00	0.00	1	200	40
11	Off Ramp	1820	4.00	0.00	1	1350	40
12	Off Ramp	365	2.00	0.00	1	450	40
16	On Ramp	540	2.00	0.00	1	1000	40
18	Off Ramp	1220	2.00	0.00	1	450	40
20	On Ramp	285	2.00	0.00	1	1000	40
22	Off Ramp	780	2.00	0.00	1	450	40
25	On Ramp	760	2.00	0.00	1	1500	40

Weaving Segment Data

Seg #	Ramp to Ramp Prop.	On-Ramp					Off-Ramp				
		Adj. Demand	% Trucks	% RVs	Lanes	FFS	Adj. Demand	% Trucks	% RVs	Lanes	FFS
14	0.050	430	4.00	0.00	1	40	1320	2.00	0.00	1	40

Time Period Independent Weaving Segment Data

Seg #	Configuration	Short Length	# Weaving Lanes	Min. Lane Changes Freeway-Ramp	Min. Lane Changes Ramp-Freeway	Min. Lane Changes Ramp-Ramp
14	2800	2	1	0	0	

Time Period Results

Time Period 1

Seg #	From	To	Type	Adj. Demand	Vol. Served	Capacity (pc/h)	Capacity (veh/h)	d/c Ratio	v/c ratio	Queue Length (ft)	Avg. Speed (mi/h)	Density (pc/mi/in)	Density (veh/mi/in)	Avg. Travel Time (min/veh)	Free-Flow Travel Time (min/veh)	Mainline Delay (min/veh)	System Delay (min/veh)	VMT Demand (veh-min)	VMT Volume (veh-min)	VHT (veh-hrs)	VHD (veh-hrs)
1	Novato S City Limits	Nave Dr	Basic Segment	6760	6760	9400	8826	0.77	0.77	0	62.7	28.7	26.9	0.18	0.17	0.0	0.0	320.1	320.1	5.1	0.2
2	Nave Dr Off		Off Ramp	6760	6760	7402	6951	0.97	0.97	0	58.1	41.3	38.8	0.29	0.26	0.0	0.0	480.1	480.1	8.3	0.9
3	Nave Dr Off	Nave Dr On	Basic Segment	5885	5885	7050	6588	0.89	0.89	0	58.1	36.2	33.8	0.39	0.35	0.0	0.0	557.3	557.3	9.6	1.0
4	Nave Dr On		On Ramp	6075	6075	7050	6595	0.92	0.92	0	54.9	39.4	36.8	0.31	0.26	0.0	0.0	431.5	431.5	7.9	1.2
5	Nave Dr	Ignacio Blvd	Basic Segment	6075	6075	7050	6897	0.88	0.88	0	58.6	35.3	34.5	0.29	0.26	0.0	0.0	431.5	431.5	7.4	0.7
6	Ignacio Blvd Off		Off Ramp	6075	6075	7050	6897	0.88	0.88	0	58.7	35.3	34.5	0.29	0.26	0.0	0.0	431.5	431.5	7.4	0.7
7	Ignacio Blvd Off	Ignacio Blvd On	Basic Segment	5275	5275	7050	6884	0.77	0.77	0	62.7	28.7	28.0	0.36	0.35	0.0	0.0	499.5	499.5	8.0	0.3
8	Ignacio Blvd On		On Ramp	5540	5540	7050	6889	0.80	0.80	0	56.9	33.2	32.5	0.10	0.09	0.0	0.0	131.2	131.2	2.3	0.3
9	Bel Marin Keys On		On Ramp	6530	6530	9400	9203	0.71	0.71	0	58.1	28.7	28.1	0.26	0.24	0.0	0.0	417.4	417.4	7.2	0.8
10	Bel Marin Keys Blvd	SR37	Ramp Overlap	6530	6530	9400	9203	0.71	0.71	0	56.8	39.1	38.3	0.04	0.03	0.0	0.0	61.8	61.8	1.1	0.1
11	SR37 Off		Off Ramp	6530	6530	7050	6902	0.95	0.95	0	56.8	39.1	38.3	0.27	0.24	0.0	0.0	417.4	417.4	7.3	0.9
12	Novato Blvd Off		Off Ramp	4710	4710	7050	6899	0.68	0.68	0	59.8	26.8	26.3	0.29	0.26	0.0	0.0	334.5	334.5	5.6	0.5
13	Novato Blvd Off	SR 37 On	Basic Segment	4345	4345	7050	6892	0.63	0.63	0	64.6	22.9	22.4	0.32	0.31	0.0	0.0	370.3	370.3	5.7	0.0
14	SR37	Rowland Blvd	Weaving	4775	4775	6785	6635	0.72	0.72	0	56.4	21.7	21.2	0.56	0.49	0.1	0.1	633.0	633.0	11.2	1.5
15	Rowland Blvd Off	Rowland Blvd On	Basic Segment	3455	3455	7050	6861	0.50	0.50	0	64.9	18.2	17.7	0.51	0.51	0.0	0.0	474.4	474.4	7.3	0.0
16	Rowland Blvd On		On Ramp	3995	3995	7050	6877	0.58	0.58	0	59.3	23.0	22.4	0.19	0.17	0.0	0.0	189.2	189.2	3.2	0.3
17	Rowland Blvd On	De Long Off	Ramp Overlap	3995	3995	7050	6877	0.58	0.58	0	57.7	23.7	23.1	0.10	0.09	0.0	0.0	94.6	94.6	1.6	0.2
18	De Long Off		Off Ramp	3995	3995	7050	6877	0.58	0.58	0	57.7	23.7	23.1	0.20	0.17	0.0	0.0	189.2	189.2	3.3	0.4
19	De Long Off	De Long On	Basic Segment	2775	2775	7050	6833	0.41	0.41	0	64.0	14.9	14.4	0.35	0.35	0.0	0.0	262.8	262.8	4.1	0.1
20	De Long Ave On		On Ramp	3060	3060	7050	6846	0.45	0.45	0	60.1	17.4	16.9	0.28	0.26	0.0	0.0	217.3	217.3	3.6	0.3
21	De Long Ave	Atherton Ave	Ramp Overlap	3060	3060	7050	6846	0.45	0.45	0	58.6	17.9	17.4	0.10	0.09	0.0	0.0	72.4	72.4	1.2	0.1
22	Atherton Ave Off		Off Ramp	3060	3060	7050	6846	0.45	0.45	0	58.6	17.9	17.4	0.29	0.26	0.0	0.0	217.3	217.3	3.7	0.4
23	Atherton Ave Off	Atherton Ave Over	Basic Segment	2280	2280	7050	6802	0.34	0.34	0	63.5	12.4	12.0	0.23	0.23	0.0	0.0	140.3	140.3	2.2	0.1
24	Atherton Ave Over	Atherton Ave On	Basic Segment	2280	2280	5640	5441	0.42	0.42	0	63.6	12.4	12.0	0.16	0.16	0.0	0.0	97.2	97.2	1.5	0.0
25	Atherton Ave On		On Ramp	3040	3040	7050	6845	0.44	0.44	0	60.6	17.2	16.7	0.28	0.26	0.0	0.0	215.9	215.9	3.6	0.2
26	Atherton Ave	1-mi N of Atherton	Basic Segment	3040	3040	7050	6845	0.44	0.44	0	64.9	16.1	15.6	0.54	0.54	0.0	0.0	446.2	446.2	6.9	0.0
27	1-mi N of Atherton	Novato N City Limits	Basic Segment	3040	3040	4700	4564	0.67	0.67	0	64.6	24.2	23.5	0.93	0.92	0.0	0.0	760.0	760.0	11.8	0.1

Overall Results

Segment	Segment Type	Maximum d/c Ratio	Avg. Speed (mi/h)	Density (pc/mi/in)	Density (veh/mi/in)	Avg. Travel Time (min/veh)	Free-Flow Travel Time (min/veh)	VMT Demand (veh-min)	VMT Volume (veh-min)	VHT (veh-hrs)	VHD (veh-hrs)
Novato S City Limits-Nave Dr	Basic	0.77	62.7	28.7	26.9	0.18	0.17	0,320.1	0,320.1	5.10	0.18
Nave Dr Off-	OffRamp	0.97	58.1	41.3	38.8	0.29	0.26	0,480.1	0,480.1	8.26	0.87
Nave Dr Off-Nave Dr On	Basic	0.89	58.1	36.2	33.8	0.39	0.35	0,557.3	0,557.3	9.60	1.02
Nave Dr On-	OnRamp	0.92	54.9	39.4	36.8	0.31	0.26	0,431.5	0,431.5	7.86	1.22
Nave Dr-Ignacio Blvd	Basic	0.88	58.6	35.3	34.5	0.29	0.26	0,431.5	0,431.5	7.36	0.72
Ignacio Blvd Off-	OffRamp	0.88	58.7	35.3	34.5	0.29	0.26	0,431.5	0,431.5	7.35	0.71
Ignacio Blvd Off-Ignacio Blvd On	Basic	0.77	62.7	28.7	28.0	0.36	0.35	0,499.5	0,499.5	7.96	0.28

Ignacio Blvd On-	OnRamp	0.80	56.9	33.2	32.5	0.10	0.09	0,131.2	0,131.2	2.31	0.29
Bel Marin Keys On-	OnRamp	0.71	58.1	28.7	28.1	0.26	0.24	0,417.4	0,417.4	7.18	0.76
Bel Marin Keys Blvd-SR37	RampOverlap	0.71	56.8	39.1	38.3	0.04	0.03	0,061.8	0,061.8	1.09	0.14
SR37 Off-	OffRamp	0.95	56.8	39.1	38.3	0.27	0.24	0,417.4	0,417.4	7.35	0.92
Novato Blvd Off-	OffRamp	0.68	59.8	26.8	26.3	0.29	0.26	0,334.5	0,334.5	5.60	0.45
Novato Blvd Off-SR 37 On	Basic	0.63	64.6	22.9	22.4	0.32	0.31	0,370.3	0,370.3	5.73	0.03
SR37-Rowland Blvd	Weaving	0.72	56.4	21.7	21.2	0.56	0.49	0,633.0	0,633.0	11.23	1.49
Rowland Blvd Off-Rowland Blvd On	Basic	0.50	64.9	18.2	17.7	0.51	0.51	0,474.4	0,474.4	7.31	0.01
Rowland Blvd On-	OnRamp	0.58	59.3	23.0	22.4	0.19	0.17	0,189.2	0,189.2	3.19	0.28
Rowland Blvd On-De Long Off	RampOverlap	0.58	57.7	23.7	23.1	0.10	0.09	0,094.6	0,094.6	1.64	0.18
De Long Off-	OffRamp	0.58	57.7	23.7	23.1	0.20	0.17	0,189.2	0,189.2	3.28	0.37
De Long Off-De Long On	Basic	0.41	64.0	14.9	14.4	0.35	0.35	0,262.8	0,262.8	4.10	0.06
De Long Ave On-	OnRamp	0.45	60.1	17.4	16.9	0.28	0.26	0,217.3	0,217.3	3.61	0.27
De Long Ave-Atherton Ave	RampOverlap	0.45	58.6	17.9	17.4	0.10	0.09	0,072.4	0,072.4	1.24	0.12
Atherton Ave Off-	OffRamp	0.45	58.6	17.9	17.4	0.29	0.26	0,217.3	0,217.3	3.71	0.37
Atherton Ave Off-Atherton Ave Over	Basic	0.34	63.5	12.4	12.0	0.23	0.23	0,140.3	0,140.3	2.21	0.05
Atherton Ave Over-Atherton Ave On	Basic	0.42	63.6	12.4	12.0	0.16	0.16	0,097.2	0,097.2	1.53	0.03
Atherton Ave On-	OnRamp	0.44	60.6	17.2	16.7	0.28	0.26	0,215.9	0,215.9	3.56	0.24
Atherton Ave-1-mi N of Atherton	Basic	0.44	64.9	16.1	15.6	0.54	0.54	0,446.2	0,446.2	6.88	0.01
1-mi N of Atherton-Novato N City Limits	Basic	0.67	64.6	24.2	23.5	0.93	0.92	0,760.0	0,760.0	11.76	0.07
Freeway			60.1	24.8	24.0	8.13	7.60	8,893.9	8,893.9	0,148.0	0,011.2

	Density-Based LOS by Segment														
Segment	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Time Step	Basic	Off Ramp	Basic	On Ramp	Basic	Off Ramp	Basic	On Ramp	On Ramp	Ramp Overlap	Off Ramp	Off Ramp	Basic	Weaving	Basic
1	D	E	E	E	E	E	D	D	D	E	E	C	C	C	C

	Density-Based LOS by Segment											
Segment	16	17	18	19	20	21	22	23	24	25	26	27
Time Step	On Ramp	Ramp Overlap	Off Ramp	Basic	On Ramp	Ramp Overlap	Off Ramp	Basic	Basic	On Ramp	Basic	Basic
1	C	C	C	B	B	B	B	B	B	B	B	C

	Demand-Based LOS by Segment														
Time Step	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

	Demand-Based LOS by Segment											
Time Step	16	17	18	19	20	21	22	23	24	25	26	27
1	.	.	.	.	.	.	.	.	.	.	.	.

HCS 2010 Freeway Facilities

Project Properties

Analyst	SL	**Freeway Name**	US 101	**Analysis Period**	PM Peak
Analysis Date	12/17/2013 4:56:48 PM	**From**	N. City Limits	**Version Date**	10/10/2012
Agency		**To**	S. City Limits		
Location	City of Novato	**Analysis Direction**	Southbound		
User Notes					
File Name	C:\Users\zmatley\AppData\Local\Temp\preview.xml				

Facility-wide Values

Jam Density (pc/h/ln)	190	**Time Period Duration (min)**	15	**Facility Length (mi)**	**6.63600**

Segment Input Data

Time Period 1

Mainline Data

Seg #	From	To	Type	Length	Terrain	Adj. Demand	% Trucks	% RVs	# Lanes	FFS
1	N Novato City Limits	San Marin Dr	Basic Segment	2540	Level	2805	4.00	0.50	3	65
2	San Marin Dr Off		Off Ramp	1500	Level	2805	4.00	0.50	3	65
3	San Marin Dr Off	San Marin Dr On	Basic Segment	2100	Level	2470	4.27	0.57	3	65
4	San Marin Dr On		On Ramp	825	Level	3155	3.78	0.44	3	65
5	San Marin Dr	De Long Ave	Ramp Overlap	675	Level	3155	3.78	0.44	3	65
6	De Long Ave Off		Off Ramp	825	Level	3155	3.78	0.44	3	65
7	De Long Ave Off	De Long Ave On	Basic Segment	1975	Level	2955	3.90	0.47	3	65
8	De Long Ave On		On Ramp	1000	Level	3755	3.49	0.37	3	65
9	De Long Ave	Rowland Blvd	Ramp Overlap	500	Level	3755	3.49	0.37	4	65
10	Rowland Blvd Off		Off Ramp	1000	Level	3755	3.49	0.37	4	65
11	Rowland Blvd Off	Rowland Blvd On	Basic Segment	3150	Level	3295	3.70	0.43	4	65
12	Rowland Blvd On		On Ramp	1500	Level	4700	3.19	0.30	4	65
13	Rowland Blvd	SR37-Novato Blvd	Basic Segment	150	Level	4700	3.19	0.30	4	65
14	SR37-Novato Blvd Off		Off Ramp	1500	Level	4700	3.19	0.30	4	65
15	SR37-Novato Blvd Off	SR37-Novato Blvd On	Basic Segment	3400	Level	4255	3.11	0.33	4	65
16	SR37-Novato Blvd On		On Ramp	500	Level	5420	3.30	0.26	4	65
17	SR37-Novato Blvd	Ignacio Blvd	Ramp Overlap	500	Level	5420	3.30	0.26	5	65
18	Ignacio-Enfrente Off		Off Ramp	500	Level	5420	3.30	0.26	4	65
19	BMK-Nave Off		Off Ramp	825	Level	4920	3.43	0.29	4	65
20	Ignacio Blvd Off	Ignacio Blvd On	Basic Segment	1425	Level	4395	3.60	0.32	4	65
21	Ignacio Blvd On		On Ramp	1500	Level	5200	3.36	0.27	4	65
22	Ignacio Blvd	Alameda Del Prado	Basic Segment	2250	Level	5200	3.36	0.27	4	65
23	ADP Off		Off Ramp	1500	Rolling	5200	3.36	0.27	4	65
24	ADP Off	ADP On	Basic Segment	1200	Rolling	4965	3.42	0.28	4	65
25	ADP On		On Ramp	1500	Rolling	5490	3.28	0.26	4	65
26	Alameda Del Prado	S Novato City Limits	Basic Segment	700	Rolling	5490	3.28	0.26	5	65

RampData

Seg #	Type	Adj. Demand	% Trucks	% RVs	Lanes	Accel/Decel Length	FFS
2	Off Ramp	335	2.00	0.00	1	150	40
4	On Ramp	685	2.00	0.00	1	300	40
6	Off Ramp	200	2.00	0.00	1	200	40
8	On Ramp	800	2.00	0.00	1	300	40
10	Off Ramp	460	2.00	0.00	1	100	40
12	On Ramp	1405	2.00	0.00	1	300	40
14	Off Ramp	445	4.00	0.00	1	100	40
16	On Ramp	1165	4.00	0.00	1	500	40
18	Off Ramp	500	2.00	0.00	1	500	40
19	Off Ramp	525	2.00	0.00	1	825	40
21	On Ramp	805	2.00	0.00	1	300	40
23	Off Ramp	235	2.00	0.00	1	450	40
25	On Ramp	525	2.00	0.00	1	1500	40

Weaving Segment Data

Seg #	Ramp to Ramp Prop.	On-Ramp					Off-Ramp				
		Adj. Demand	% Trucks	% RVs	Lanes	FFS	Adj. Demand	% Trucks	% RVs	Lanes	FFS

Time Period Independent Weaving Segment Data

Seg #	Configuration	Short Length	# Weaving Lanes	Min. Lane Changes	Min. Lane Changes Ramp-	Min. Lane Changes Ramp-

				Freeway-Ramp	Freeway	Ramp

Time Period Results

Time Period 1

Seg #	From	To	Type	Adj. Demand	Vol. Served	Capacity (pc/h)	Capacity (veh/h)	d/c Ratio	v/c ratio	Queue Length (ft)	Avg. Speed (mi/h)	Density (pc/mi/in)	Density (veh/mi/in)	Avg. Travel Time (min/veh)	Free-Flow Travel Time (min/veh)	Mainline Delay (min/veh)	System Delay (min/veh)	VMT Demand (veh-min)	VMT Volume (veh-min)	VHT (veh-hrs)	VHD (veh-hrs)
1	N Novato City Limits	San Marin Dr	Basic Segment	2805	2805	7050	6905	0.41	0.41	0	65.0	14.7	14.4	0.44	0.44	0.0	0.0	337.3	337.3	5.2	0.0
2	San Marin Dr Off		Off Ramp	2805	2805	7050	6905	0.41	0.41	0	59.7	16.0	15.7	0.29	0.26	0.0	0.0	199.2	199.2	3.3	0.3
3	San Marin Dr Off	San Marin Dr On	Basic Segment	2470	2470	7050	6895	0.36	0.36	0	64.7	13.0	12.7	0.37	0.37	0.0	0.0	245.6	245.6	3.8	0.0
4	San Marin Dr On		On Ramp	3155	3155	7050	6913	0.46	0.46	0	58.9	18.2	17.8	0.16	0.14	0.0	0.0	123.2	123.2	2.1	0.2
5	San Marin Dr	De Long Ave	Ramp Overlap	3155	3155	7050	6913	0.46	0.46	0	58.9	18.2	17.8	0.13	0.12	0.0	0.0	100.8	100.8	1.7	0.2
6	De Long Ave Off		Off Ramp	3155	3155	7050	6913	0.46	0.46	0	60.2	17.8	17.5	0.16	0.14	0.0	0.0	123.2	123.2	2.0	0.2
7	De Long Ave Off	De Long Ave On	Basic Segment	2955	2955	7050	6909	0.43	0.43	0	64.3	15.6	15.3	0.35	0.35	0.0	0.0	276.3	276.3	4.3	0.0
8	De Long Ave On		On Ramp	3755	3755	7050	6924	0.54	0.54	0	58.3	21.8	21.4	0.19	0.17	0.0	0.0	177.8	177.8	3.0	0.3
9	De Long Ave	Rowland Blvd	Ramp Overlap	3755	3755	7050	6924	0.54	0.54	0	58.3	21.8	21.4	0.10	0.09	0.0	0.0	88.9	88.9	1.5	0.2
10	Rowland Blvd Off		Off Ramp	3755	3755	9400	9232	0.41	0.41	0	62.5	15.3	15.0	0.18	0.17	0.0	0.0	177.8	177.8	2.8	0.1
11	Rowland Blvd Off	Rowland Blvd On	Basic Segment	3295	3295	9400	9221	0.36	0.36	0	64.7	13.0	12.7	0.55	0.55	0.0	0.0	491.4	491.4	7.6	0.0
12	Rowland Blvd On		On Ramp	4700	4700	9400	9247	0.51	0.51	0	59.3	20.1	19.8	0.29	0.26	0.0	0.0	333.8	333.8	5.6	0.5
13	Rowland Blvd	SR37-Novato Blvd	Basic Segment	4700	4700	9400	9247	0.51	0.51	0	63.5	18.8	18.5	0.03	0.03	0.0	0.0	33.4	33.4	0.5	0.0
14	SR37-Novato Blvd Off		Off Ramp	4700	4700	9400	9247	0.51	0.51	0	62.4	19.2	18.8	0.27	0.26	0.0	0.0	333.8	333.8	5.4	0.2
15	SR37-Novato Blvd Off	SR37-Novato Blvd On	Basic Segment	4255	4255	9400	9250	0.46	0.46	0	65.0	16.6	16.4	0.59	0.59	0.0	0.0	685.0	685.0	10.5	0.0
16	SR37-Novato Blvd On		On Ramp	5420	5420	9400	9243	0.59	0.59	0	59.3	23.2	22.8	0.10	0.09	0.0	0.0	128.3	128.3	2.2	0.2
17	SR37-Novato Blvd	Ignacio Blvd	Ramp Overlap	5420	5420	9400	9243	0.59	0.59	0	59.3	23.2	22.8	0.10	0.09	0.0	0.0	128.3	128.3	2.2	0.2
18	Ignacio-Enfrente Off		Off Ramp	5420	5420	9400	9243	0.59	0.59	0	62.0	22.2	21.8	0.09	0.09	0.0	0.0	128.3	128.3	2.1	0.1
19	BMK-Nave Off		Off Ramp	4920	4920	9400	9236	0.53	0.53	0	62.1	20.2	19.8	0.15	0.14	0.0	0.0	192.2	192.2	3.1	0.1
20	Ignacio Blvd Off	Ignacio Blvd On	Basic Segment	4395	4395	9400	9228	0.48	0.48	0	64.5	17.3	17.0	0.25	0.25	0.0	0.0	296.5	296.5	4.6	0.0
21	Ignacio Blvd On		On Ramp	5200	5200	9400	9240	0.56	0.56	0	59.4	22.2	21.9	0.29	0.26	0.0	0.0	369.3	369.3	6.2	0.5
22	Ignacio Blvd	Alameda Del Prado	Basic Segment	5200	5200	9400	9240	0.56	0.56	0	64.7	20.4	20.1	0.39	0.39	0.0	0.0	554.0	554.0	8.6	0.0
23	ADP Off		Off Ramp	5200	5200	9400	8927	0.58	0.58	0	62.6	21.9	20.8	0.27	0.26	0.0	0.0	369.3	369.3	5.9	0.2
24	ADP Off	ADP On	Basic Segment	4965	4965	9400	8917	0.56	0.56	0	64.7	20.2	19.2	0.21	0.21	0.0	0.0	282.1	282.1	4.4	0.0
25	ADP On		On Ramp	5490	5490	9400	8937	0.61	0.61	0	60.2	23.9	22.7	0.28	0.26	0.0	0.0	389.9	389.9	6.5	0.5
26	Alameda Del Prado	S Novato City Limits	Basic Segment	5490	5490	11750	11171	0.49	0.49	0	64.2	18.0	17.1	0.12	0.12	0.0	0.0	182.0	182.0	2.8	0.0

Overall Results

Segment	Segment Type	Maximum d/c Ratio	Avg. Speed (mi/h)	Density (pc/mi/in)	Density (veh/mi/in)	Avg. Travel Time (min/veh)	Free-Flow Travel Time (min/veh)	VMT Demand (veh-min)	VMT Volume (veh-min)	VHT (veh-hrs)	VHD (veh-hrs)
N Novato City Limits-San Marin Dr	Basic	0.41	65.0	14.7	14.4	0.44	0.44	0,337.3	0,337.3	5.19	0.00
San Marin Dr Off-	OffRamp	0.41	59.7	16.0	15.7	0.29	0.26	0,199.2	0,199.2	3.34	0.27
San Marin Dr Off-San Marin Dr On	Basic	0.36	64.7	13.0	12.7	0.37	0.37	0,245.6	0,245.6	3.80	0.02
San Marin Dr On-	OnRamp	0.46	58.9	18.2	17.8	0.16	0.14	0,123.2	0,123.2	2.09	0.20

San Marin Dr-De Long Ave	RampOverlap	0.46	58.9	18.2	17.8	0.13	0.12	0,100.8	0,100.8	1.71	0.16
De Long Ave Off-	OffRamp	0.46	60.2	17.8	17.5	0.16	0.14	0,123.2	0,123.2	2.05	0.15
De Long Ave Off-De Long Ave On	Basic	0.43	64.3	15.6	15.3	0.35	0.35	0,276.3	0,276.3	4.30	0.05
De Long Ave On-	OnRamp	0.54	58.3	21.8	21.4	0.19	0.17	0,177.8	0,177.8	3.05	0.31
De Long Ave-Rowland Blvd	RampOverlap	0.54	58.3	21.8	21.4	0.10	0.09	0,088.9	0,088.9	1.52	0.16
Rowland Blvd Off-	OffRamp	0.41	62.5	15.3	15.0	0.18	0.17	0,177.8	0,177.8	2.85	0.11
Rowland Blvd Off-Rowland Blvd On	Basic	0.36	64.7	13.0	12.7	0.55	0.55	0,491.4	0,491.4	7.60	0.04
Rowland Blvd On-	OnRamp	0.51	59.3	20.1	19.8	0.29	0.26	0,333.8	0,333.8	5.63	0.49
Rowland Blvd-SR37-Novato Blvd	Basic	0.51	63.5	18.8	18.5	0.03	0.03	0,033.4	0,033.4	0.53	0.01
SR37-Novato Blvd Off-	OffRamp	0.51	62.4	19.2	18.8	0.27	0.26	0,333.8	0,333.8	5.35	0.22
SR37-Novato Blvd Off-SR37-Novato Blvd On	Basic	0.46	65.0	16.6	16.4	0.59	0.59	0,685.0	0,685.0	10.55	0.01
SR37-Novato Blvd On-	OnRamp	0.59	59.3	23.2	22.8	0.10	0.09	0,128.3	0,128.3	2.17	0.19
SR37-Novato Blvd-Ignacio Blvd	RampOverlap	0.59	59.3	23.2	22.8	0.10	0.09	0,128.3	0,128.3	2.17	0.19
Ignacio-Enfrente Off-	OffRamp	0.59	62.0	22.2	21.8	0.09	0.09	0,128.3	0,128.3	2.07	0.09
BMK-Nave Off-	OffRamp	0.53	62.1	20.2	19.8	0.15	0.14	0,192.2	0,192.2	3.09	0.14
Ignacio Blvd Off-Ignacio Blvd On	Basic	0.48	64.5	17.3	17.0	0.25	0.25	0,296.5	0,296.5	4.60	0.03
Ignacio Blvd On-	OnRamp	0.56	59.4	22.2	21.9	0.29	0.26	0,369.3	0,369.3	6.22	0.54
Ignacio Blvd-Alameda Del Prado	Basic	0.56	64.7	20.4	20.1	0.39	0.39	0,554.0	0,554.0	8.56	0.04
ADP Off-	OffRamp	0.58	62.6	21.9	20.8	0.27	0.26	0,369.3	0,369.3	5.90	0.22
ADP Off-ADP On	Basic	0.56	64.7	20.2	19.2	0.21	0.21	0,282.1	0,282.1	4.36	0.02
ADP On-	OnRamp	0.61	60.2	23.9	22.7	0.28	0.26	0,389.9	0,389.9	6.47	0.48
Alameda Del Prado-S Novato City Limits	Basic	0.49	64.2	18.0	17.1	0.12	0.12	0,182.0	0,182.0	2.83	0.04
Freeway			62.5	18.1	17.7	6.36	6.13	6,748.0	6,748.0	0,108.0	0,004.2

	Density-Based LOS by Segment														
Segment	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Time Step	Basic	Off Ramp	Basic	On Ramp	Ramp Overlap	Off Ramp	Basic	On Ramp	Ramp Overlap	Off Ramp	Basic	On Ramp	Basic	Off Ramp	Basic
1	B	B	B	B	C	B	B	C	C	B	B	C	C	B	B

	Density-Based LOS by Segment										
Segment	16	17	18	19	20	21	22	23	24	25	26
Time Step	On Ramp	Ramp Overlap	Off Ramp	Off Ramp	Basic	On Ramp	Basic	Off Ramp	Basic	On Ramp	Basic
1	C	C	C	C	B	C	C	C	C	C	B

	Demand-Based LOS by Segment														
Time Step	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

	Demand-Based LOS by Segment										
Time Step	16	17	18	19	20	21	22	23	24	25	26
1	.	.	.	.	.	.	.	.	.	.	.

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*STL*
Agency or Company	*W-Trans*
Date Performed	*12/17/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Eastbound SR37*
From/To	*US101 to Eastern City Limit*
Jurisdiction	*Caltrans*
Analysis Year	*2011*

Project Description *Novato General Plan*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*1930*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*2*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*1*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.988*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.80*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.7*	mph
FFS	*72.7*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1028*	pc/h/ln
S	*75.0*	mph
D = v_p / S	*13.7*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*STL*
Agency or Company	*W-Trans*
Date Performed	*12/17/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*Westbound SR37*
From/To	*US101 to Eastern City Limit*
Jurisdiction	*Caltrans*
Analysis Year	*2011*

Project Description *Novato General Plan*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*1035*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*1*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.974*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.80*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.7*	mph
FFS	*72.7*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*559*	pc/h/ln
S	*75.0*	mph
D = v_p / S	*7.5*	pc/mi/ln
LOS	*A*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

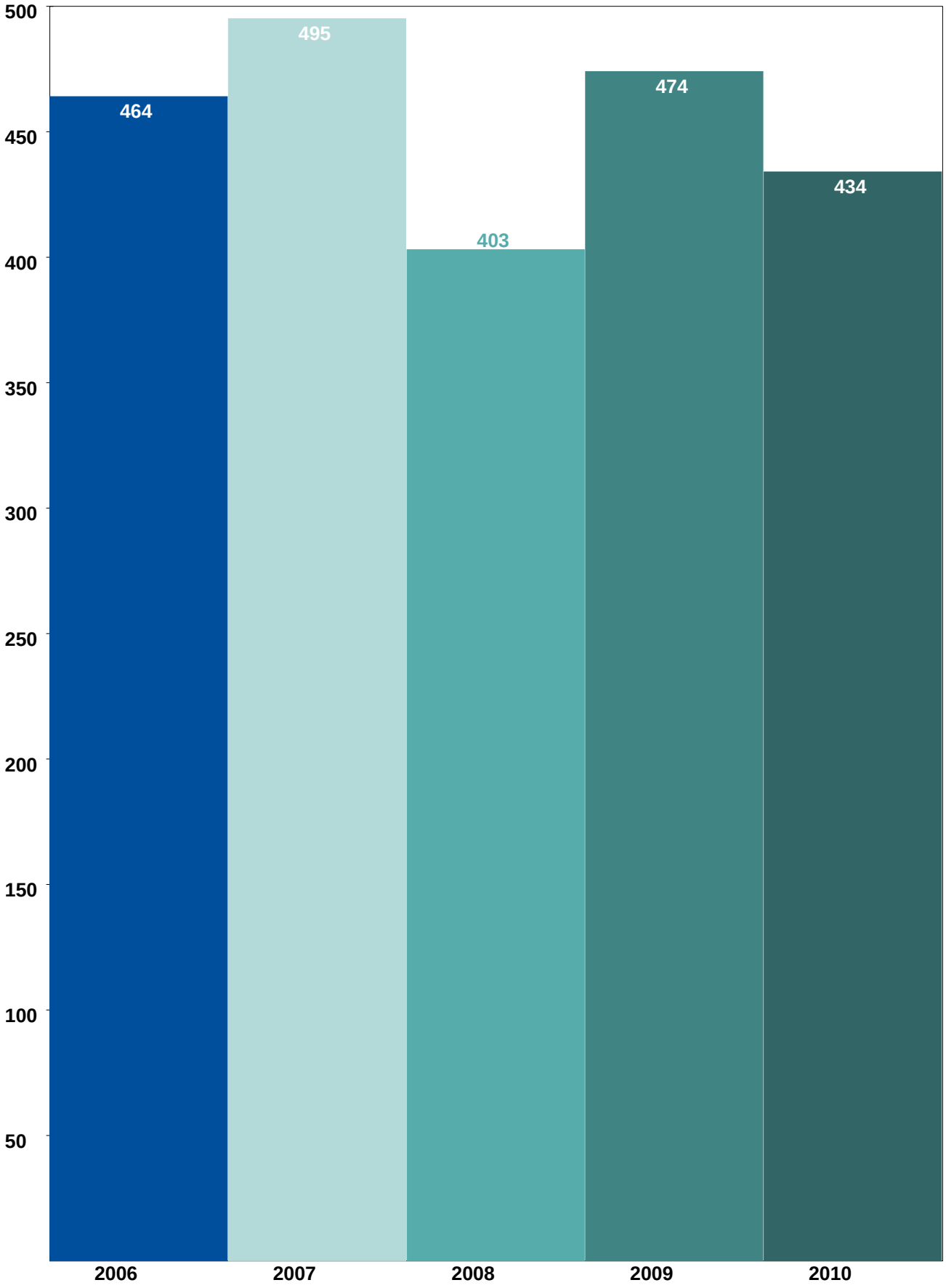
N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

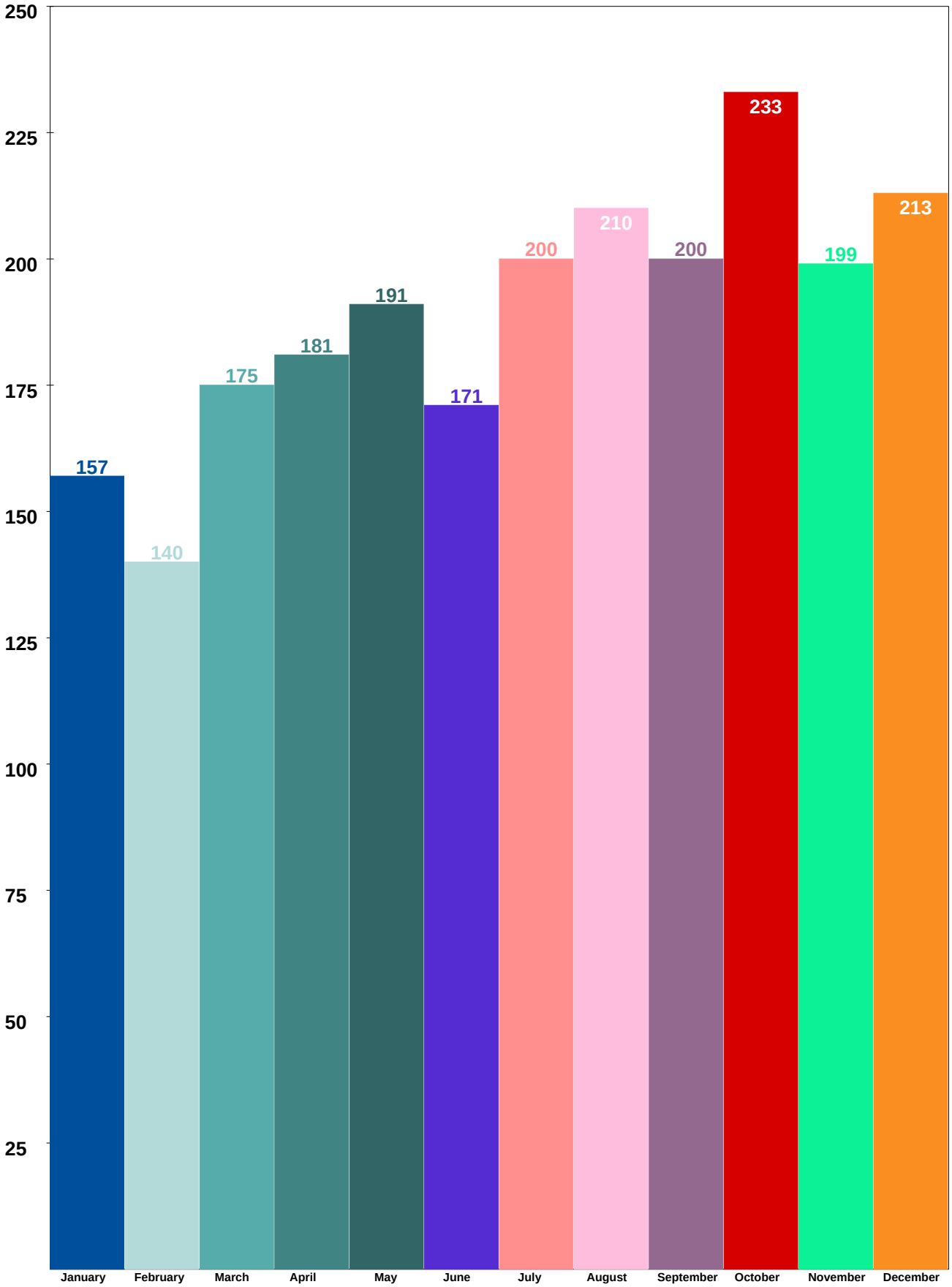
E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

COLLISION DATA

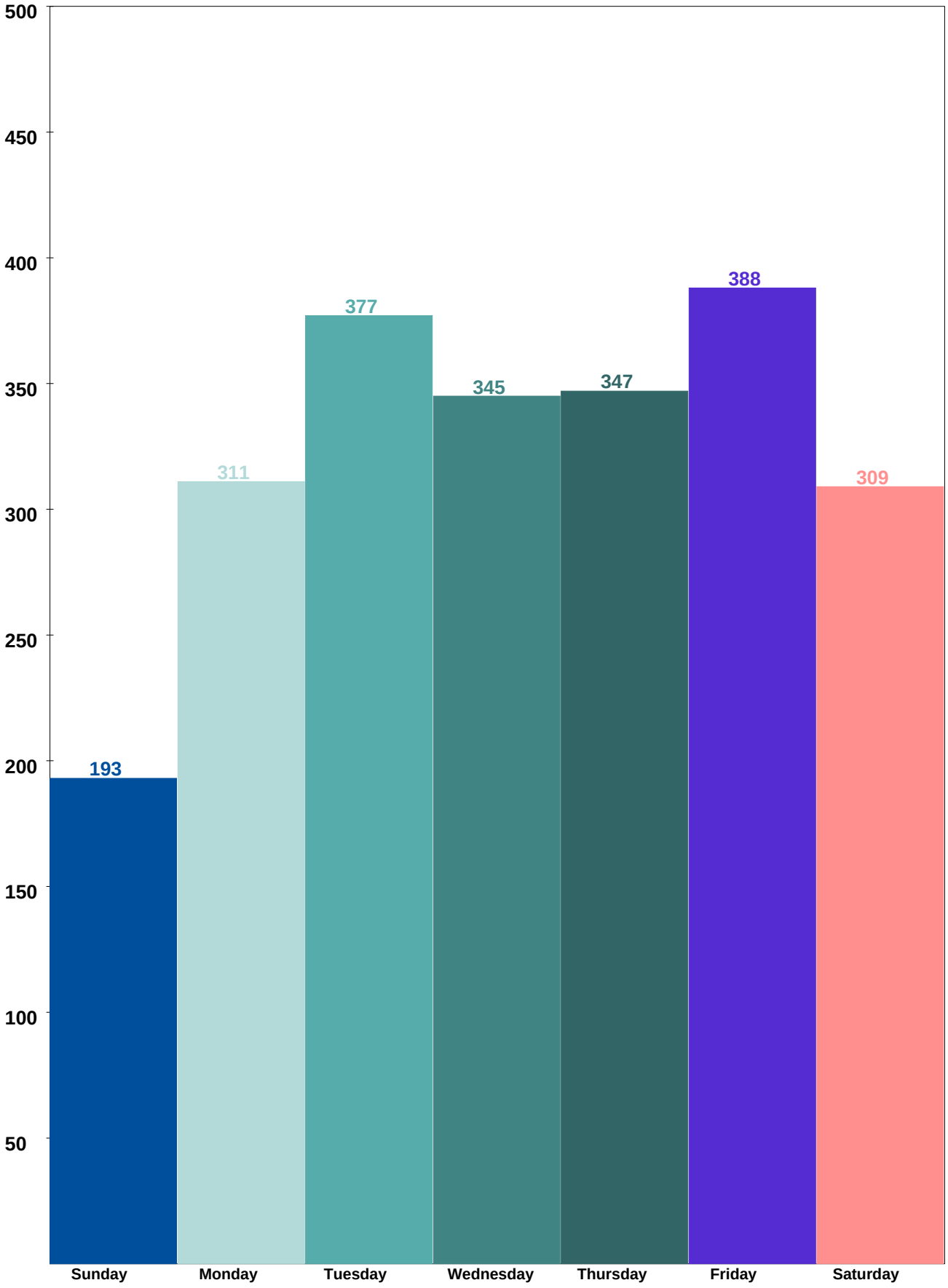
W-Trans
Novato General Plan Update
Collisions by Year 1/1/2006 to 12/31/2010 Total Collisions: 2270



W-Trans
Novato General Plan Update
Collisions by Month 1/1/2006 to 12/31/2010 Total Collisions: 2270



W-Trans
Novato General Plan Update
Collisions by Day of Week 1/1/2006 to 12/31/2010 Total Collisions: 2270



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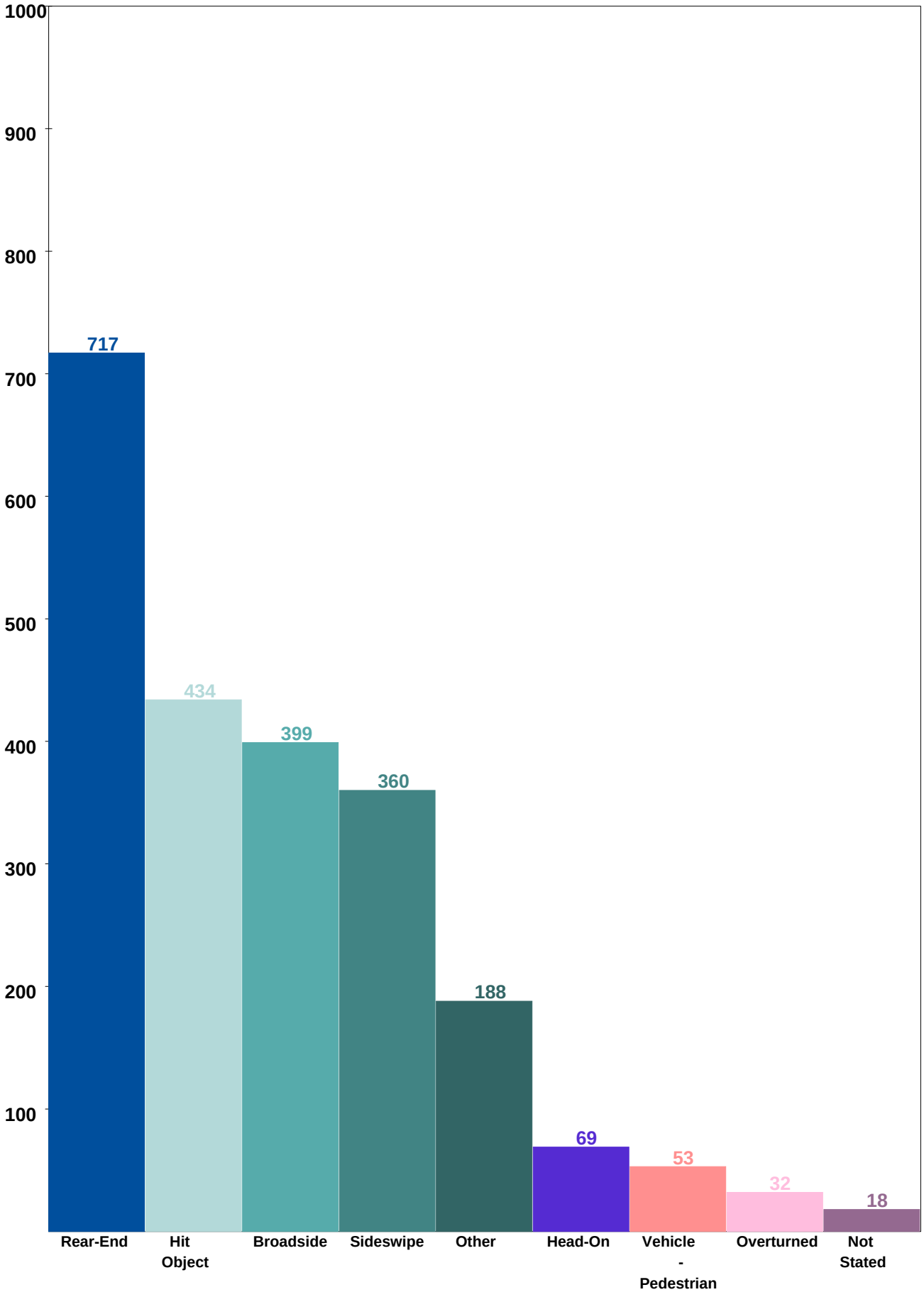
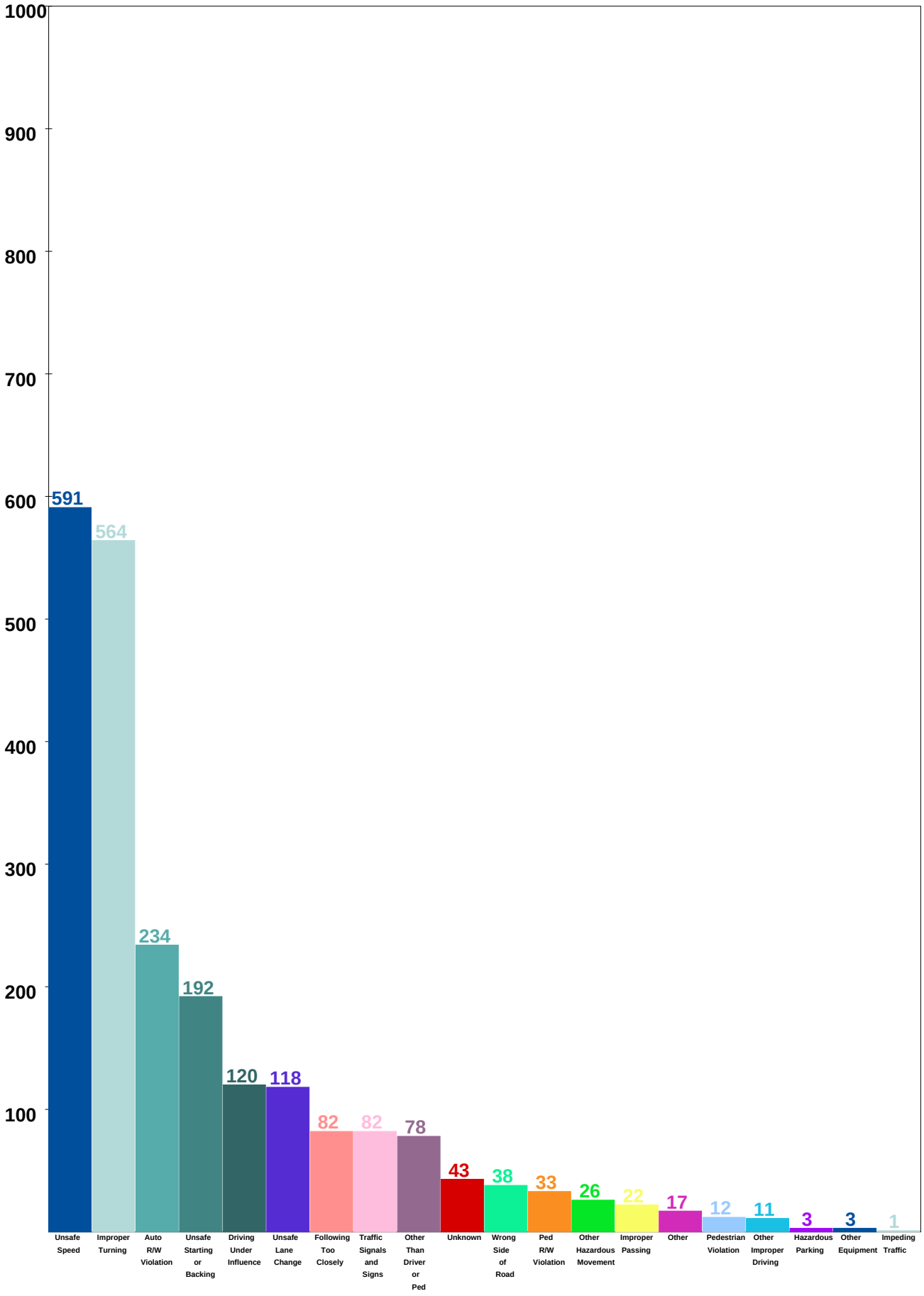
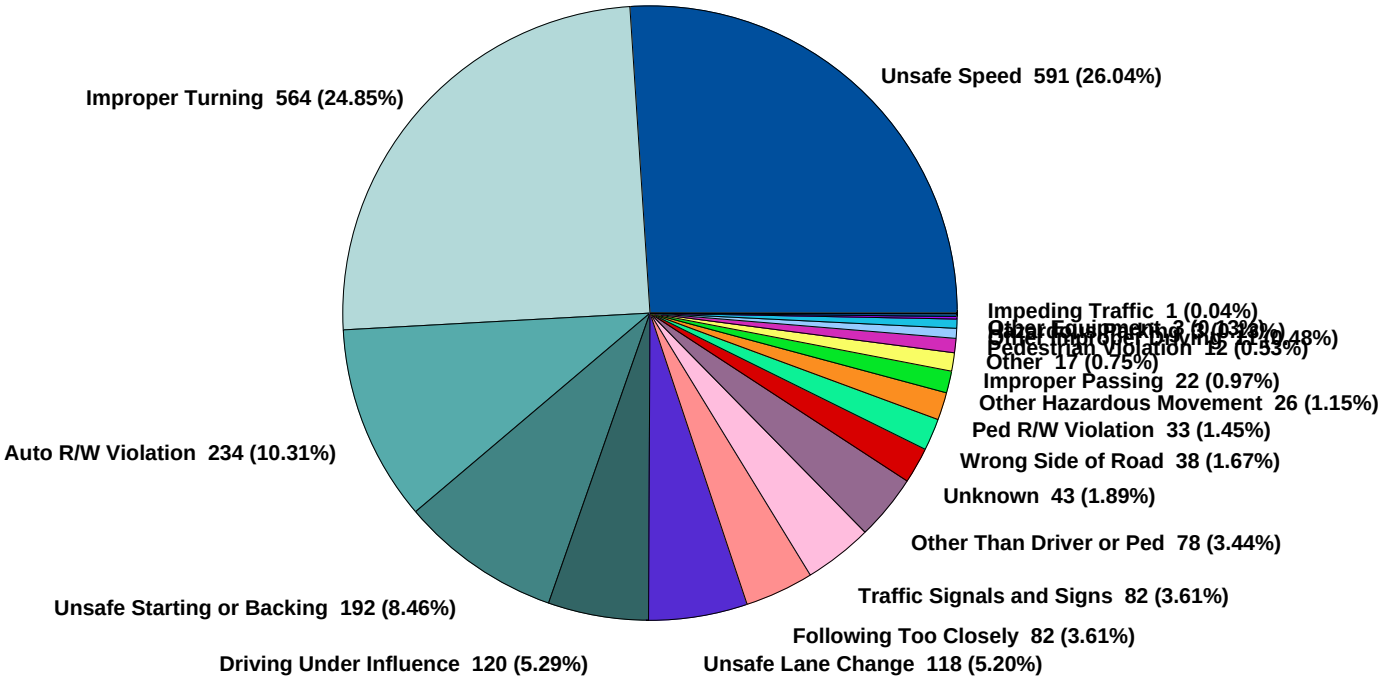
Novato General Plan Update
Collision Type 1/1/2006 to 12/31/2010 Total Collisions: 2270



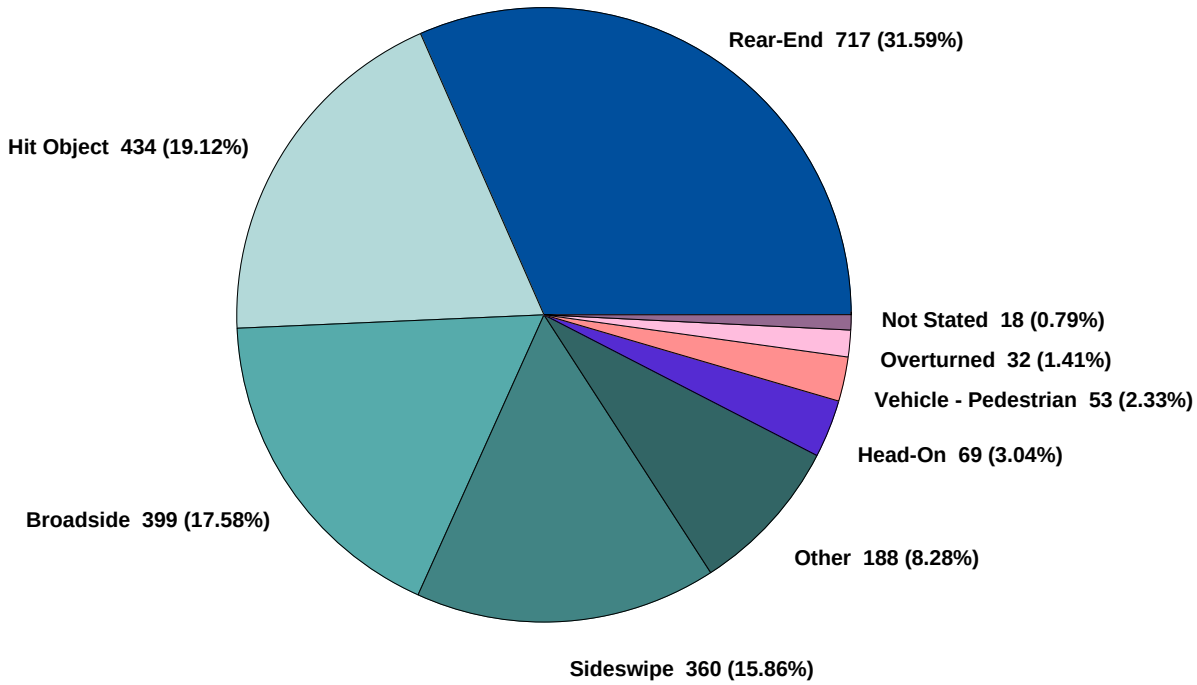
W-Trans
Novato General Plan Update
Primary Collision Factors 1/1/2006 to 12/31/2010 Total Collisions: 2270



W-Trans
Novato General Plan Update



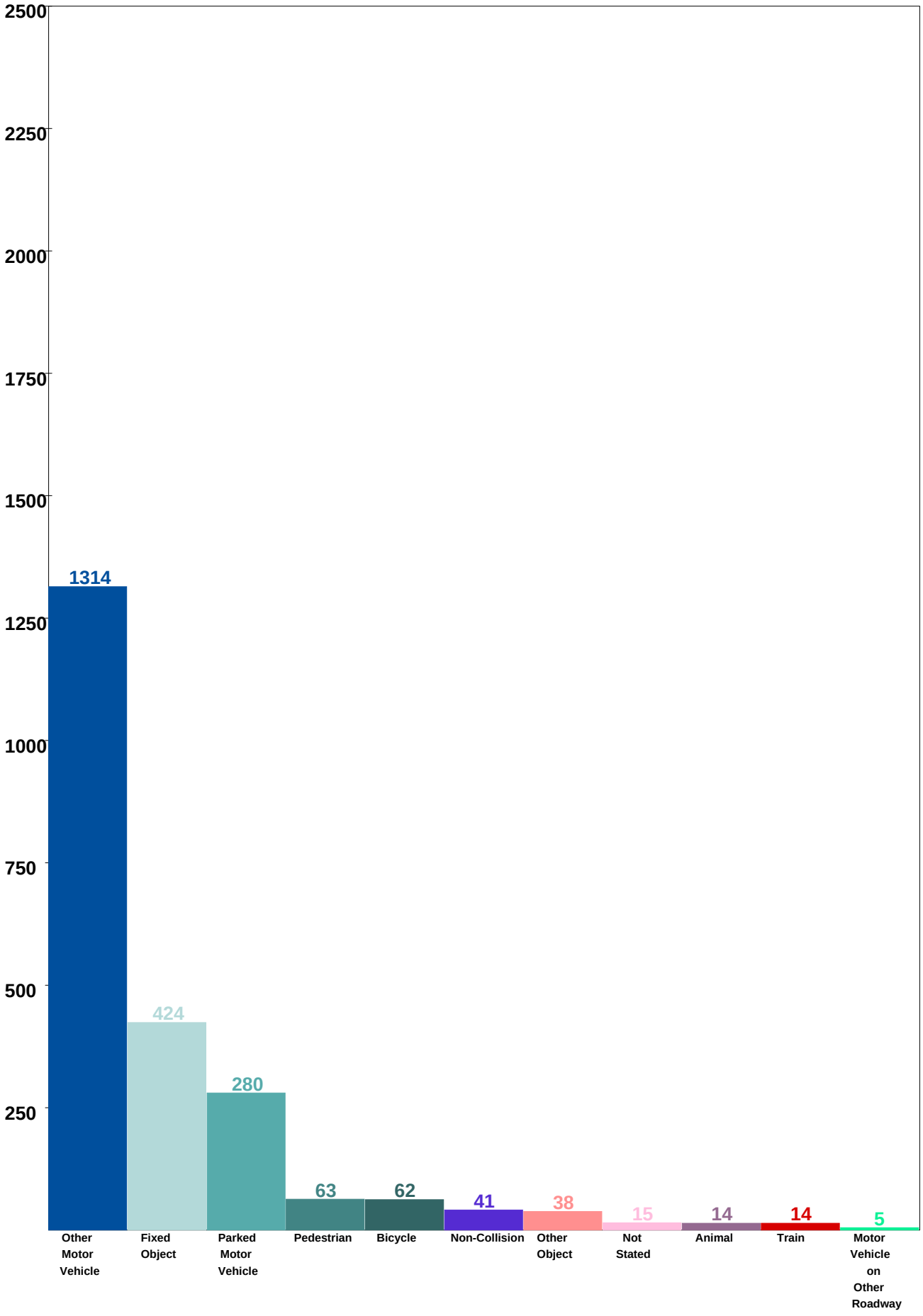
Primary Collision Factors



Collision Types

1/1/2006 to 12/31/2010 Total Collisions: 2270

W-Trans
Novato General Plan Update
Involved With 1/1/2006 to 12/31/2010 Total Collisions: 2270



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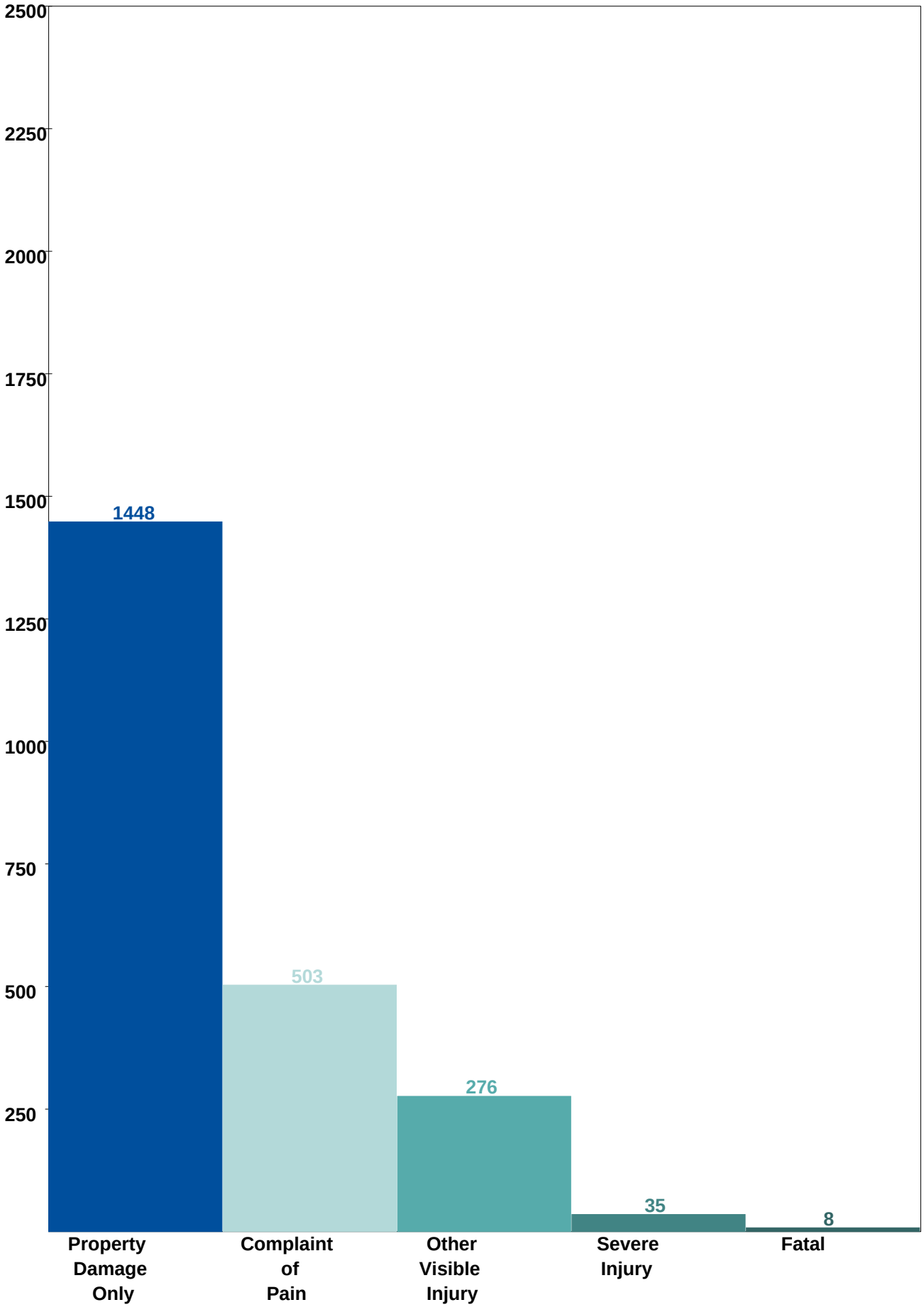
Novato General Plan Update
Extent of Injury 1/1/2006 to 12/31/2010 Total Collisions: 2270



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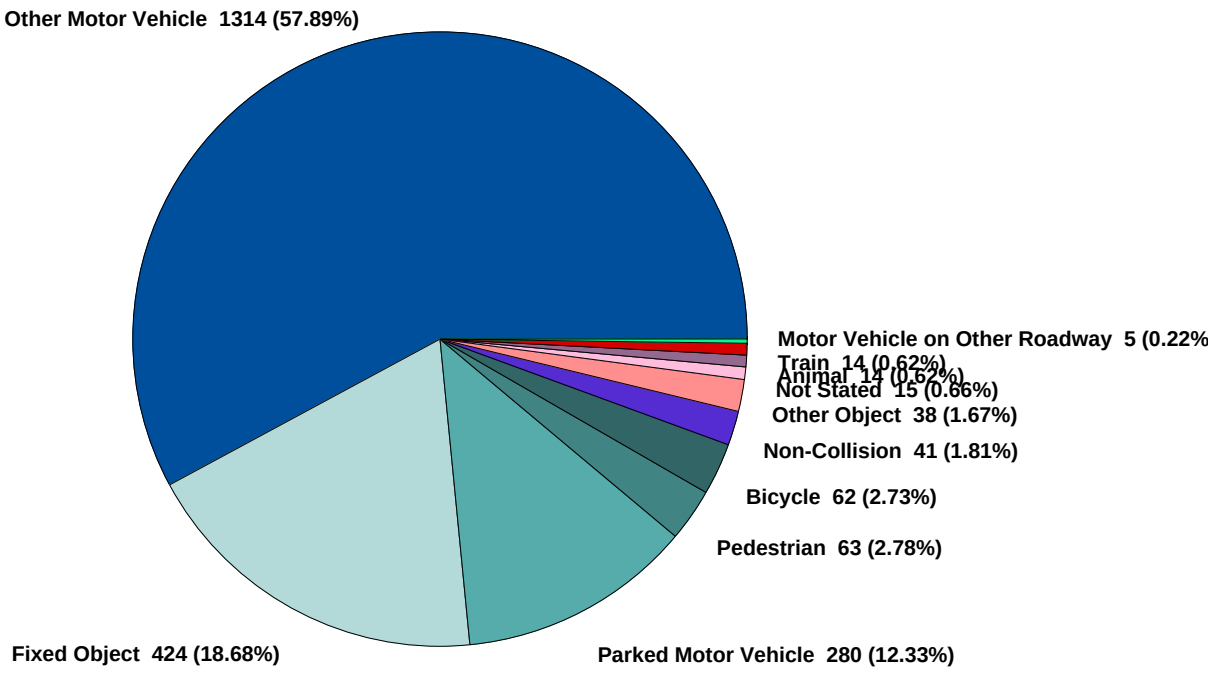
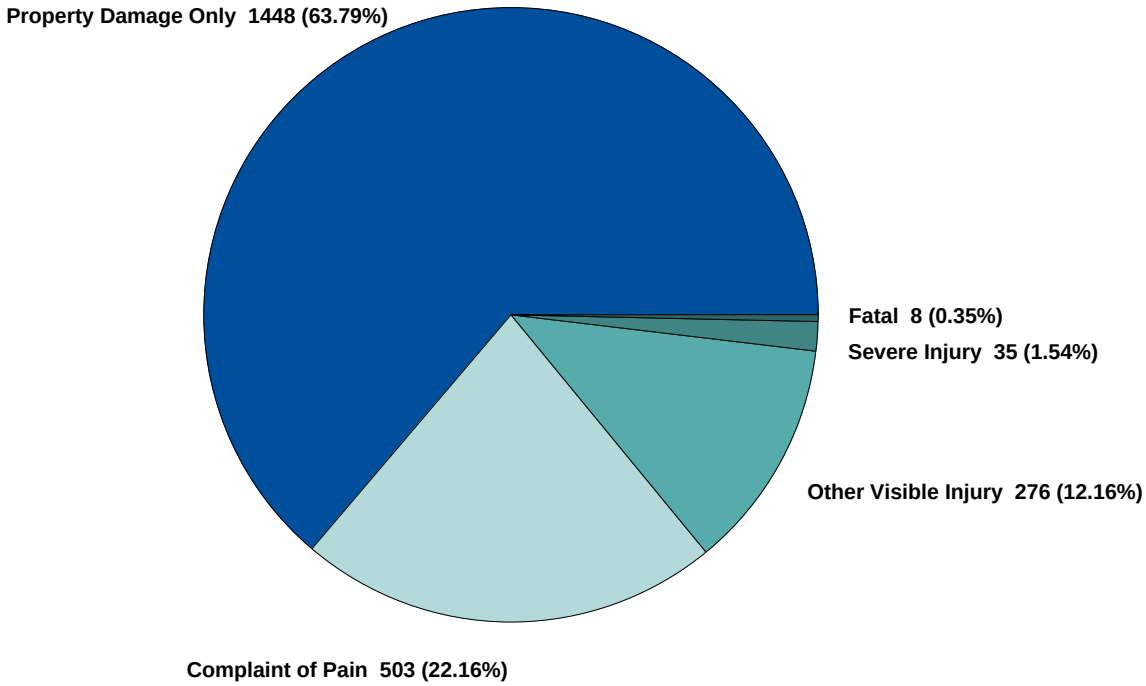


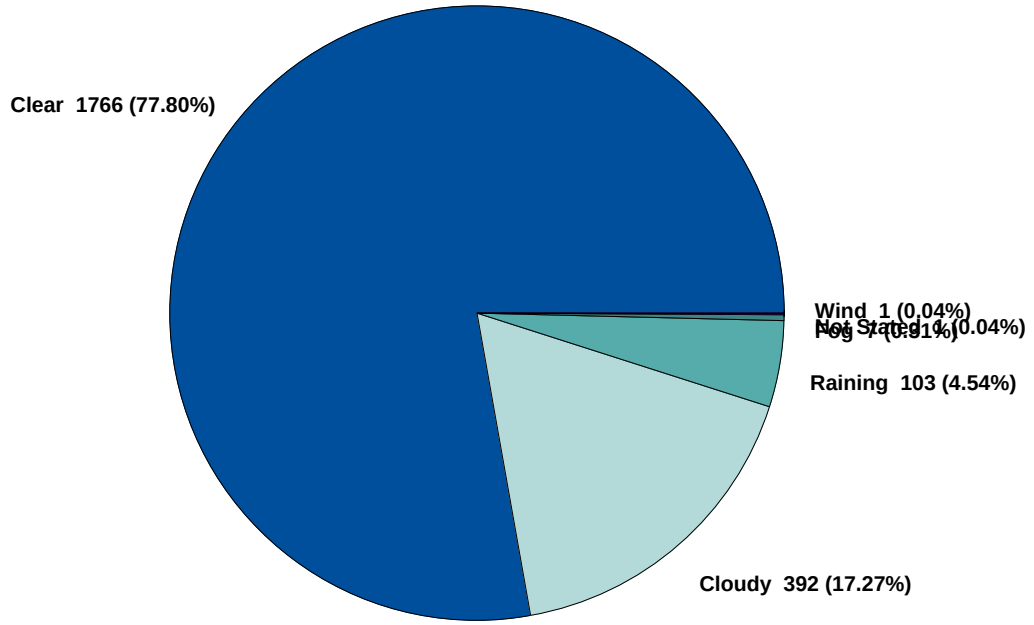
Involved With



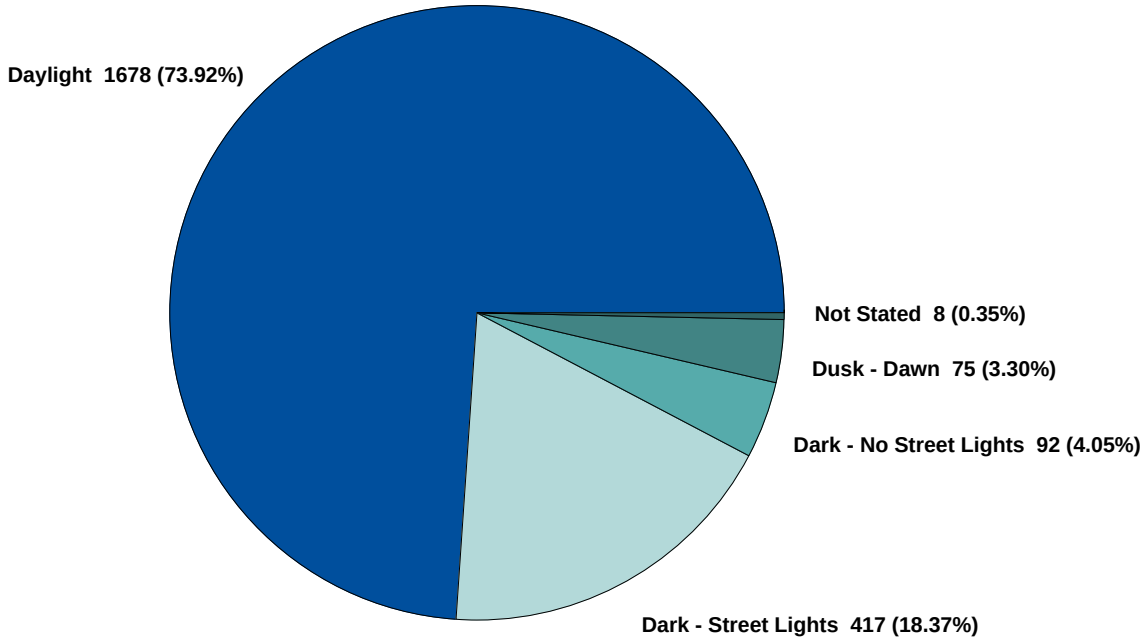
Extent of Injury

1/1/2006 to 12/31/2010 Total Collisions: 2270

W-Trans
Novato General Plan Update



Weather



Lighting Conditions

1/1/2006 to 12/31/2010 Total Collisions: 2270

CALIFORNIA OFFICE OF TRAFFIC SAFETY

2010 OTS RANKINGS

Rankings By Year: 2010 2009 2008 2007 2006

Select a City or County from one of the dropdown lists and click on the Show City or Show County button.

City: -- SELECT ONE -- SHOW CITY

County: -- SELECT ONE -- SHOW COUNTY

Agency	Year	County	Group	Population (Avg)	DVMT
Novato	2010	MARIN COUNTY	C	52,082	456,084

TYPE OF COLLISION	VICTIMS KILLED & INJURED	RANKING BY DAILY VEHICLE MILES TRAVELED	RANKING BY AVERAGE POPULATION
Total Fatal and Injury	134	75/103	83/103
Alcohol Involved	9	87/103	92/103
HBD Driver < 21	0	89/103	85/103
HBD Driver 21 - 34	1	95/103	94/103
Motorcycles	18	2/103	4/103
Pedestrians	14	45/103	54/103
Pedestrians < 15	0	98/103	98/103
Pedestrians 65+	2	30/103	32/103
Bicyclists	10	66/103	67/103
Bicyclists < 15	2	52/103	59/103
Composite		88/103	96/103

TYPE OF COLLISION	FATAL & INJURY COLLISIONS	RANKING BY DAILY VEHICLE MILES TRAVELED	RANKING BY AVERAGE POPULATION
Speed Related	27	57/103	62/103
Nighttime (9:00pm - 2:59am)	4	102/103	101/103
Hit and Run	6	74/103	83/103

DUI ARRESTS	120	0.38%	30/103

READING AND UNDERSTANDING THE OTS RANKINGS

What are the OTS Rankings?

The OTS Rankings were developed so that individual cities could compare their city's traffic safety statistics to those of other cities with similar-sized populations. Cities could use these comparisons to see what areas they may have problems in and which they were doing well in. The results helped both cities and OTS identify emerging or on-going traffic safety problem areas in order to help plan how to combat the problems and help with the possibility of facilitating grants. In recent years, media, researchers and the public have taken an interest in the OTS Rankings. It should be noted that OTS rankings are only indicators of potential problems; there are many factors that may either understate or overstate a city/county ranking that must be evaluated based on local circumstances.

NOTE: City rankings are for incorporated cities only. County Rankings include all roads – state, county and local – and all jurisdictions – CHP, Sheriff, Police and special.

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How are the OTS Rankings determined?

Victim and collision data for the rankings is taken from the latest available California Highway Patrol (CHP) Statewide Integrated Traffic Records System (SWITRS) data.

Victim and collision rankings are based on rates of victims killed and injured or fatal and injury collisions per "1,000 daily-vehicle-miles-of-travel" (Caltrans data) and per "1,000 average population" (Department of Finance data) figures. This more accurately ensures proper weighting and comparisons when populations and daily vehicle miles traveled vary.

DUI arrest totals and rankings are calculated for cities only and are based on rates of non-CHP DUI arrests (Department of Justice data). This is so that local jurisdictions can see how their own efforts are working.

Counties are assigned statewide rankings, while cities are assigned population group rankings.

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How to Read and Understand the OTS Rankings

Top Horizontal Bar:

Agency – local jurisdiction that the data applies to.

Year – the year the data represents. The rankings are updated once per year when all component statistics and data have been reported.

County – county in which the city is located.

Group – Cities are grouped by 2010 population:

- Group A – 13 cities, populations over 250,000
- Group B – 53 cities, population 100,001-250,000
- Group C – 103 cities, population 50,001-100,000
- Group D – 93 cities, population 25,001-50,000

Rankings for smaller cities are not included on-line, but are available through the OTS Public Affairs Office.

Population – estimates matched to "Year"

DVMT – Daily Vehicle Miles Traveled. Caltrans estimate of the total number of miles all vehicles traveled on that city's streets on an average day during that year.

The number of cities in each group varies by year.

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Center Table:

IMPORTANT NOTE #1: The figures in the two ranking columns show as two numbers divided by a slash. The first number is that city's ranking in that category. The second number is the total number of cities/counties within that "Group". For instance, if you see "22/53", that means that city ranks 22nd out of 53 cities of similar size.

IMPORTANT NOTE #2: OTS Rankings are calculated so that the higher the number of victims or collisions per 1000 residents in a population group, the higher the ranking. Number 1 in the rankings is the highest, or "worst." So, for Group B, a ranking of 1/53 is the highest or worst, 27/53 is average, and 53/53 is the lowest or best.

Type of Collision – This column delineates the different types of collisions OTS has chosen to show in the rankings. These represent the types with larger percentages of total killed and injured and areas of focus for the OTS grant program. Motorcycles were added in 2008.

Victims Killed and Injured – This column shows the number of fatalities and injuries aggregated. Damage-only or fender-bender collisions are not included.

Ranking by daily vehicle miles traveled – This column weighs this city against all others in the Group when looking at DVMT. Cities of like size may have widely varying rates of traffic, a factor which can be meaningful on a local basis. Significant differences between this and the population column must be evaluated based on local circumstances.

Ranking by population – This column weighs this city against all others in the Group based on population. Population can be a meaningful basis for comparison. Significant differences between this and the Daily Vehicle Miles Traveled column must be evaluated based on local circumstances.

Total Fatal and Injury – The total number of victims involved in all collisions where there were fatalities and/or injuries in that city/county.

Alcohol Involved – Collisions in which there were victims killed or injured where a party (driver, pedestrian, bicyclist) was classified as "Had Been Drinking."

HBD Driver <21 – Collisions in which there were victims killed or injured where a driver who was under the age of 21 had been drinking.

HBD Driver 21-34 – Collisions in which there were victims killed or injured where a driver who was between the ages of 21 and 34 had been drinking.

Motorcycles - Collisions in which there were victims killed or injured and a motorcycle was involved.

Pedestrians - Collisions in which there were victims killed or injured and a pedestrian was involved.

Pedestrians <15 - Collisions in which there were victims killed or injured and a pedestrian under the age of 15 was involved.

Pedestrians 65+ - Collisions in which there were victims killed or injured and a pedestrian age 65 and older was involved.

Bicycles - Collisions in which there were victims killed or injured and a bicyclist was involved.

Bicycles <15 - Collisions in which there were victims killed or injured and a bicyclist under age 15 was involved.

Composite – Figures which show rankings only, an aggregate of several of the other rankings (HBD 21-34, HBD Under21, Alcohol Involved victims plus Hit & Run, Nighttime and Speed collisions). These figures are a means to give an indication of over-all traffic safety.

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Bottom Table:

Speed Related – Collisions in which there were victims killed or injured where speed was the primary factor.

Nighttime (9:00pm - 2:59am) – Collisions in which there were victims killed or injured that occurred between those hours, which are prime hours for DUI, speeding and drowsy driving crashes.

Hit and Run – Collisions in which there were victims killed or injured and a driver left the scene.

DUI Arrests – DUI arrest figures are shown for cities only, not counties.

The first figure gives the total number of DUI arrests for the year on city streets. The second number shows the percentage of the city's estimated licensed drivers that was arrested for DUI during that year. The current statewide average is .90%. Local percentages shown give an indication of how cities compare against the average. Lower than .90% means lower than the state average and higher than .90% means higher that the state average. However, differences can be from many factors and must be evaluated based on local circumstances.

Cities often use this measure to determine how to adjust their DUI enforcement activity. When increased DUI enforcement is combined with education and public information campaigns, it can lead to a reduction of the incidence of DUI.

"0" Note: Cities reporting 0 victims and/or collisions for a category or 0 DUI arrests are ranked using the variable upon which the ranking is based. For example, if 10 of 93 cities in population group D reported 0 hit-and-run fatal and injury collisions when ranking by per "1,000 average population," the city with the highest population of these 10 cities would be ranked 93/93, and the city with the lowest population of these 10 cities would be ranked 84/93. The same methodology has been applied when ranking per "1,000 daily-vehicle-miles-of-travel" and per "estimated average number of licensed drivers."

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