

HCM 6th AWSC
4: Tavern Road & South Grade Road

Near-Term Year 2023 AM
AM Peak Hour

Intersection	
Intersection Delay, s/veh	13.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	78	38	11	21	30	147	26	104	25	90	49	93
Future Vol, veh/h	78	38	11	21	30	147	26	104	25	90	49	93
Peak Hour Factor	0.65	0.65	0.65	0.70	0.70	0.70	0.79	0.79	0.79	0.62	0.62	0.62
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	120	58	17	30	43	210	33	132	32	145	79	150
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	13.1	11.4	12	16.1
HCM LOS	B	B	B	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	17%	67%	0%	41%	0%	39%
Vol Thru, %	67%	33%	0%	59%	0%	21%
Vol Right, %	16%	0%	100%	0%	100%	40%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	155	116	11	51	147	232
LT Vol	26	78	0	21	0	90
Through Vol	104	38	0	30	0	49
RT Vol	25	0	11	0	147	93
Lane Flow Rate	196	178	17	73	210	374
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.326	0.347	0.028	0.137	0.342	0.578
Departure Headway (Hd)	5.988	7.007	5.947	6.78	5.855	5.563
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	594	510	597	525	609	644
Service Time	4.079	4.798	3.737	4.565	3.638	3.637
HCM Lane V/C Ratio	0.33	0.349	0.028	0.139	0.345	0.581
HCM Control Delay	12	13.5	8.9	10.7	11.7	16.1
HCM Lane LOS	B	B	A	B	B	C
HCM 95th-tile Q	1.4	1.5	0.1	0.5	1.5	3.7

HCM 6th Signalized Intersection Summary

Near-Term Year 2023 PM

1: South Grade Road/East Victoria Road & Alpine Boulevard

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	213	217	34	226	25	163	5	50	34	10	37
Future Volume (veh/h)	35	213	217	34	226	25	163	5	50	34	10	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	232	189	40	263	26	194	6	54	39	11	37
Peak Hour Factor	0.92	0.92	0.92	0.86	0.86	0.86	0.84	0.84	0.84	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	61	412	341	63	371	37	290	26	235	53	15	51
Arrive On Green	0.03	0.22	0.22	0.04	0.22	0.22	0.16	0.16	0.16	0.07	0.07	0.07
Sat Flow, veh/h	1781	1870	1547	1781	1671	165	1781	161	1449	761	215	722
Grp Volume(v), veh/h	38	232	189	40	0	289	194	0	60	87	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1547	1781	0	1836	1781	0	1610	1698	0	0
Q Serve(g_s), s	0.9	4.6	4.5	0.9	0.0	6.0	4.2	0.0	1.3	2.1	0.0	0.0
Cycle Q Clear(g_c), s	0.9	4.6	4.5	0.9	0.0	6.0	4.2	0.0	1.3	2.1	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.09	1.00		0.90	0.45		0.43
Lane Grp Cap(c), veh/h	61	412	341	63	0	407	290	0	262	119	0	0
V/C Ratio(X)	0.62	0.56	0.55	0.63	0.00	0.71	0.67	0.00	0.23	0.73	0.00	0.00
Avail Cap(c_a), veh/h	902	2075	1716	902	0	2037	1246	0	1126	1187	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	19.8	14.4	14.4	19.7	0.0	14.9	16.3	0.0	15.1	18.9	0.0	0.0
Incr Delay (d2), s/veh	3.8	0.5	0.5	3.8	0.0	0.9	2.7	0.0	0.4	3.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.7	1.4	0.4	0.0	2.2	1.7	0.0	0.5	0.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.6	14.8	14.9	23.5	0.0	15.8	19.0	0.0	15.5	22.1	0.0	0.0
LnGrp LOS	C	B	B	C	A	B	B	A	B	C	A	A
Approach Vol, veh/h		459			329			254			87	
Approach Delay, s/veh		15.6			16.7			18.2			22.1	
Approach LOS		B			B			B			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.1	14.9		8.3	6.0	15.0		12.1				
Change Period (Y+Rc), s	4.6	5.8		5.4	4.6	5.8		5.4				
Max Green Setting (Gmax), s	21.0	46.0		29.0	21.0	46.0		29.0				
Max Q Clear Time (g_c+I1), s	2.9	6.6		4.1	2.9	8.0		6.2				
Green Ext Time (p_c), s	0.0	1.2		0.3	0.0	1.2		0.9				

Intersection Summary

HCM 6th Ctrl Delay 17.0

HCM 6th LOS B

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th TWSC
2: South Grade Road & Calle De Compadres

Near-Term Year 2023 PM
PM Peak Hour

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	0	141	0	0	145
Future Vol, veh/h	2	0	141	0	0	145
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	25	25	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	0	158	0	0	163
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	321	158	0	0	158	0
Stage 1	158	-	-	-	-	-
Stage 2	163	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	673	887	-	-	1422	-
Stage 1	871	-	-	-	-	-
Stage 2	866	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	673	887	-	-	1422	-
Mov Cap-2 Maneuver	673	-	-	-	-	-
Stage 1	871	-	-	-	-	-
Stage 2	866	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	10.4	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	-	673	1422	-	
HCM Lane V/C Ratio	-	-	0.012	-	-	
HCM Control Delay (s)	-	-	10.4	0	-	
HCM Lane LOS	-	-	B	A	-	
HCM 95th %tile Q(veh)	-	-	0	0	-	

HCM 6th TWSC
3: South Grade Road & Via Viejas

Near-Term Year 2023 PM
PM Peak Hour

Intersection						
Int Delay, s/veh	2.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	35	35	105	83	45	98
Future Vol, veh/h	35	35	105	83	45	98
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	79	79	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	45	45	133	105	51	111
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	399	186	0	0	238	0
Stage 1	186	-	-	-	-	-
Stage 2	213	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	607	856	-	-	1329	-
Stage 1	846	-	-	-	-	-
Stage 2	823	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	582	856	-	-	1329	-
Mov Cap-2 Maneuver	582	-	-	-	-	-
Stage 1	846	-	-	-	-	-
Stage 2	789	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	11	0		2.5		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	-		693	1329	
HCM Lane V/C Ratio	-	-		0.13	0.038	
HCM Control Delay (s)	-	-		11	7.8	
HCM Lane LOS	-	-		B	A	
HCM 95th %tile Q(veh)	-	-		0.4	0.1	

HCM 6th AWSC
4: Tavern Road & South Grade Road

Near-Term Year 2023 PM
PM Peak Hour

Intersection	
Intersection Delay, s/veh	10.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	37	48	10	41	31	61	17	81	37	116	139	74
Future Vol, veh/h	37	48	10	41	31	61	17	81	37	116	139	74
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	46	59	12	51	38	75	18	84	39	121	145	77
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	10.2	9.4	9.4	12
HCM LOS	B	A	A	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	13%	44%	0%	57%	0%	35%
Vol Thru, %	60%	56%	0%	43%	0%	42%
Vol Right, %	27%	0%	100%	0%	100%	22%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	135	85	10	72	61	329
LT Vol	17	37	0	41	0	116
Through Vol	81	48	0	31	0	139
RT Vol	37	0	10	0	61	74
Lane Flow Rate	141	105	12	89	75	343
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.199	0.182	0.018	0.155	0.11	0.458
Departure Headway (Hd)	5.096	6.251	5.319	6.259	5.26	4.808
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	706	576	675	575	685	740
Service Time	3.111	3.963	3.031	3.97	2.97	2.905
HCM Lane V/C Ratio	0.2	0.182	0.018	0.155	0.109	0.464
HCM Control Delay	9.4	10.4	8.1	10.1	8.6	12
HCM Lane LOS	A	B	A	B	A	B
HCM 95th-tile Q	0.7	0.7	0.1	0.5	0.4	2.4

Appendix G

Arterial Level of Service Analysis Worksheets Near-Term Base with Project

HCM 6th Signalized Intersection Summary

1: South Grade Road/East Victoria Road & Alpine Boulevard

Near-Term AM with Project
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	133	107	34	96	9	167	11	57	9	12	32
Future Volume (veh/h)	14	133	107	34	96	9	167	11	57	9	12	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	18	168	108	42	119	10	229	15	71	13	18	43
Peak Hour Factor	0.79	0.79	0.79	0.81	0.81	0.81	0.73	0.73	0.73	0.68	0.68	0.68
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	60	382	317	95	380	32	403	64	304	29	40	95
Arrive On Green	0.03	0.20	0.20	0.05	0.22	0.18	0.23	0.23	0.19	0.10	0.10	0.06
Sat Flow, veh/h	1781	1870	1550	1781	1698	143	1781	284	1344	294	407	973
Grp Volume(v), veh/h	18	168	108	42	0	129	229	0	86	74	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1550	1781	0	1840	1781	0	1628	1675	0	0
Q Serve(g_s), s	0.4	3.0	2.3	0.9	0.0	2.2	4.4	0.0	1.7	1.6	0.0	0.0
Cycle Q Clear(g_c), s	0.4	3.0	2.3	0.9	0.0	2.2	4.4	0.0	1.7	1.6	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.08	1.00		0.83	0.18		0.58
Lane Grp Cap(c), veh/h	60	382	317	95	0	412	403	0	369	163	0	0
V/C Ratio(X)	0.30	0.44	0.34	0.44	0.00	0.31	0.57	0.00	0.23	0.45	0.00	0.00
Avail Cap(c_a), veh/h	1007	2340	1940	1007	0	2303	1417	0	1296	1333	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	18.0	13.3	13.0	17.5	0.0	12.4	13.1	0.0	12.6	16.7	0.0	0.0
Incr Delay (d2), s/veh	1.0	0.3	0.2	1.2	0.0	0.2	1.3	0.0	0.3	0.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.1	0.7	0.3	0.0	0.8	1.5	0.0	0.5	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.0	13.6	13.2	18.7	0.0	12.6	14.4	0.0	12.9	17.4	0.0	0.0
LnGrp LOS	B	B	B	B	A	B	B	A	B	B	A	A
Approach Vol, veh/h		294			171			315			74	
Approach Delay, s/veh		13.8			14.1			14.0			17.4	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.0	11.8		7.7	5.3	12.5		12.6				
Change Period (Y+Rc), s	4.6	5.8		5.4	4.6	5.8		5.4				
Max Green Setting (Gmax), s	21.0	46.0		29.0	21.0	46.0		29.0				
Max Q Clear Time (g_c+I1), s	2.9	5.0		3.6	2.4	4.2		6.4				
Green Ext Time (p_c), s	0.0	0.8		0.2	0.0	0.5		1.2				
Intersection Summary												
HCM 6th Ctrl Delay				14.2								
HCM 6th LOS				B								
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 6th AWSC
2: South Grade Road & Project Driveway #1/Calle de Compadres

Near-Term AM with Project
AM Peak Hour

Intersection

Intersection Delay, s/veh 7.6

Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	0	2	0	2	0	101	0	3	72	5
Future Vol, veh/h	5	0	0	2	0	2	0	101	0	3	72	5
Peak Hour Factor	0.92	0.92	0.92	0.50	0.50	0.50	0.92	0.92	0.92	0.73	0.73	0.73
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	0	0	4	0	4	0	110	0	4	99	7
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.6	7.2	7.6	7.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	100%	50%	4%
Vol Thru, %	100%	0%	0%	90%
Vol Right, %	0%	0%	50%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	101	5	4	80
LT Vol	0	5	2	3
Through Vol	101	0	0	72
RT Vol	0	0	2	5
Lane Flow Rate	110	5	8	110
Geometry Grp	1	1	1	1
Degree of Util (X)	0.123	0.007	0.009	0.122
Departure Headway (Hd)	4.039	4.517	4.114	4.01
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	887	780	855	893
Service Time	2.068	2.613	2.21	2.039
HCM Lane V/C Ratio	0.124	0.006	0.009	0.123
HCM Control Delay	7.6	7.6	7.2	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0	0	0.4

HCM 6th TWSC
3: South Grade Road & Via Viejas

Near-Term AM with Project
AM Peak Hour

Intersection						
Int Delay, s/veh	4.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	52	34	65	21	32	43
Future Vol, veh/h	52	34	65	21	32	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	76	76	86	86	69	69
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	68	45	76	24	46	62
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	242	88	0	0	100	0
Stage 1	88	-	-	-	-	-
Stage 2	154	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	746	970	-	-	1493	-
Stage 1	935	-	-	-	-	-
Stage 2	874	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	722	970	-	-	1493	-
Mov Cap-2 Maneuver	722	-	-	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	846	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	10.2	0		3.2		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	803		1493	-	
HCM Lane V/C Ratio	-	0.141		0.031	-	
HCM Control Delay (s)	-	10.2		7.5	0	
HCM Lane LOS	-	B		A	A	
HCM 95th %tile Q(veh)	-	0.5		0.1	-	

HCM 6th AWSC
4: Tavern Road & South Grade Road

Near-Term AM with Project
AM Peak Hour

Intersection	
Intersection Delay, s/veh	13.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	78	40	11	22	32	149	26	104	26	92	49	93
Future Vol, veh/h	78	40	11	22	32	149	26	104	26	92	49	93
Peak Hour Factor	0.65	0.65	0.65	0.70	0.70	0.70	0.79	0.79	0.79	0.62	0.62	0.62
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	120	62	17	31	46	213	33	132	33	148	79	150
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	13.3	11.5	12.1	16.4
HCM LOS	B	B	B	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	17%	66%	0%	41%	0%	39%
Vol Thru, %	67%	34%	0%	59%	0%	21%
Vol Right, %	17%	0%	100%	0%	100%	40%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	156	118	11	54	149	234
LT Vol	26	78	0	22	0	92
Through Vol	104	40	0	32	0	49
RT Vol	26	0	11	0	149	93
Lane Flow Rate	197	182	17	77	213	377
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.331	0.355	0.028	0.146	0.348	0.587
Departure Headway (Hd)	6.03	7.039	5.985	6.81	5.887	5.603
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	590	506	592	523	607	638
Service Time	4.129	4.836	3.78	4.6	3.675	3.684
HCM Lane V/C Ratio	0.334	0.36	0.029	0.147	0.351	0.591
HCM Control Delay	12.1	13.7	9	10.8	11.8	16.4
HCM Lane LOS	B	B	A	B	B	C
HCM 95th-tile Q	1.4	1.6	0.1	0.5	1.6	3.8

HCM 6th TWSC
5: South Grade Road & Project Driveway #2

Near-Term AM with Project
AM Peak Hour

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	91	97	0	0	5
Future Vol, veh/h	5	91	97	0	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	99	105	0	0	5
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	105	0	-	0	214	105
Stage 1	-	-	-	-	105	-
Stage 2	-	-	-	-	109	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1486	-	-	-	774	949
Stage 1	-	-	-	-	919	-
Stage 2	-	-	-	-	916	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1486	-	-	-	771	949
Mov Cap-2 Maneuver	-	-	-	-	771	-
Stage 1	-	-	-	-	915	-
Stage 2	-	-	-	-	916	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.4	0		8.8		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1486	-	-	-	-	949
HCM Lane V/C Ratio	0.004	-	-	-	-	0.006
HCM Control Delay (s)	7.4	0	-	-	-	8.8
HCM Lane LOS	A	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-	0

HCM 6th Signalized Intersection Summary

1: South Grade Road/East Victoria Road & Alpine Boulevard

Near-Term PM with Project
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	213	221	36	226	25	167	7	54	34	12	37
Future Volume (veh/h)	35	213	221	36	226	25	167	7	54	34	12	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	232	193	42	263	26	199	8	58	39	14	37
Peak Hour Factor	0.92	0.92	0.92	0.86	0.86	0.86	0.84	0.84	0.84	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	61	408	338	66	369	37	297	33	237	54	19	51
Arrive On Green	0.03	0.22	0.22	0.04	0.22	0.22	0.17	0.17	0.17	0.07	0.07	0.07
Sat Flow, veh/h	1781	1870	1547	1781	1671	165	1781	196	1419	738	265	700
Grp Volume(v), veh/h	38	232	193	42	0	289	199	0	66	90	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1547	1781	0	1836	1781	0	1615	1703	0	0
Q Serve(g_s), s	0.9	4.6	4.7	1.0	0.0	6.1	4.4	0.0	1.5	2.2	0.0	0.0
Cycle Q Clear(g_c), s	0.9	4.6	4.7	1.0	0.0	6.1	4.4	0.0	1.5	2.2	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.09	1.00		0.88	0.43		0.41
Lane Grp Cap(c), veh/h	61	408	338	66	0	406	297	0	269	124	0	0
V/C Ratio(X)	0.63	0.57	0.57	0.64	0.00	0.71	0.67	0.00	0.25	0.73	0.00	0.00
Avail Cap(c_a), veh/h	892	2051	1697	892	0	2014	1232	0	1117	1177	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	20.0	14.6	14.6	19.9	0.0	15.1	16.4	0.0	15.2	19.0	0.0	0.0
Incr Delay (d2), s/veh	3.9	0.5	0.6	3.8	0.0	0.9	2.6	0.0	0.5	3.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.7	1.4	0.4	0.0	2.2	1.7	0.0	0.5	0.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.9	15.1	15.2	23.7	0.0	16.0	19.0	0.0	15.7	22.1	0.0	0.0
LnGrp LOS	C	B	B	C	A	B	B	A	B	C	A	A
Approach Vol, veh/h		463			331			265			90	
Approach Delay, s/veh		15.9			17.0			18.2			22.1	
Approach LOS		B			B			B			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.1	15.0		8.5	6.0	15.1		12.4				
Change Period (Y+Rc), s	4.6	5.8		5.4	4.6	5.8		5.4				
Max Green Setting (Gmax), s	21.0	46.0		29.0	21.0	46.0		29.0				
Max Q Clear Time (g_c+I1), s	3.0	6.7		4.2	2.9	8.1		6.4				
Green Ext Time (p_c), s	0.0	1.2		0.3	0.0	1.2		0.9				
Intersection Summary												
HCM 6th Ctrl Delay				17.2								
HCM 6th LOS				B								
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 6th AWSC
2: South Grade Road & Project Driveway #1/Calle de Compadres

Near-Term PM with Project
PM Peak Hour

Intersection

Intersection Delay, s/veh 8.1

Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	0	0	2	0	0	0	141	0	0	145	10
Future Vol, veh/h	10	0	0	2	0	0	0	141	0	0	145	10
Peak Hour Factor	0.92	0.92	0.92	0.25	0.25	0.25	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	0	0	8	0	0	0	158	0	0	163	11
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.9	7.9	8.1	8.1
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	100%	100%	0%
Vol Thru, %	100%	0%	0%	94%
Vol Right, %	0%	0%	0%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	141	10	2	155
LT Vol	0	10	2	0
Through Vol	141	0	0	145
RT Vol	0	0	0	10
Lane Flow Rate	158	11	8	174
Geometry Grp	1	1	1	1
Degree of Util (X)	0.18	0.015	0.011	0.196
Departure Headway (Hd)	4.097	4.858	4.863	4.047
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	870	741	740	881
Service Time	2.15	2.859	2.864	2.098
HCM Lane V/C Ratio	0.182	0.015	0.011	0.198
HCM Control Delay	8.1	7.9	7.9	8.1
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	0	0	0.7

HCM 6th TWSC
3: South Grade Road & Via Viejas

Near-Term PM with Project
PM Peak Hour

Intersection						
Int Delay, s/veh	2.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	35	35	105	83	45	98
Future Vol, veh/h	35	35	105	83	45	98
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	79	79	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	45	45	133	105	51	111
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	399	186	0	0	238	0
Stage 1	186	-	-	-	-	-
Stage 2	213	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	607	856	-	-	1329	-
Stage 1	846	-	-	-	-	-
Stage 2	823	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	582	856	-	-	1329	-
Mov Cap-2 Maneuver	582	-	-	-	-	-
Stage 1	846	-	-	-	-	-
Stage 2	789	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	11	0		2.5		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	693	1329	-	
HCM Lane V/C Ratio	-	-	0.13	0.038	-	
HCM Control Delay (s)	-	-	11	7.8	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-	

HCM 6th AWSC
4: Tavern Road & South Grade Road

Near-Term PM with Project
PM Peak Hour

Intersection	
Intersection Delay, s/veh	10.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	37	52	10	43	34	65	17	81	39	120	139	74
Future Vol, veh/h	37	52	10	43	34	65	17	81	39	120	139	74
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	46	64	12	53	42	80	18	84	41	125	145	77
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	10.3	9.6	9.5	12.4
HCM LOS	B	A	A	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	12%	42%	0%	56%	0%	36%
Vol Thru, %	59%	58%	0%	44%	0%	42%
Vol Right, %	28%	0%	100%	0%	100%	22%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	137	89	10	77	65	333
LT Vol	17	37	0	43	0	120
Through Vol	81	52	0	34	0	139
RT Vol	39	0	10	0	65	74
Lane Flow Rate	143	110	12	95	80	347
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.204	0.192	0.018	0.166	0.118	0.478
Departure Headway (Hd)	5.151	6.289	5.366	6.292	5.298	4.964
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	696	571	667	570	676	732
Service Time	3.181	4.022	3.099	4.024	3.029	2.964
HCM Lane V/C Ratio	0.205	0.193	0.018	0.167	0.118	0.474
HCM Control Delay	9.5	10.5	8.2	10.3	8.7	12.4
HCM Lane LOS	A	B	A	B	A	B
HCM 95th-tile Q	0.8	0.7	0.1	0.6	0.4	2.6

HCM 6th TWSC
5: South Grade Road & Project Driveway #2

Near-Term PM with Project
PM Peak Hour

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	190	139	0	0	9
Future Vol, veh/h	10	190	139	0	0	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	207	151	0	0	10
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	151	0	-	0	380	151
Stage 1	-	-	-	-	151	-
Stage 2	-	-	-	-	229	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1430	-	-	-	622	895
Stage 1	-	-	-	-	877	-
Stage 2	-	-	-	-	809	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1430	-	-	-	616	895
Mov Cap-2 Maneuver	-	-	-	-	616	-
Stage 1	-	-	-	-	869	-
Stage 2	-	-	-	-	809	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.4	0		9.1		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1430	-	-	-	-	895
HCM Lane V/C Ratio	0.008	-	-	-	-	0.011
HCM Control Delay (s)	7.5	0	-	-	-	9.1
HCM Lane LOS	A	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-	0

Appendix H

Queuing Analysis Results

HCM 6th INTERSECTION					
Node #	3				
Zone:					
X East (ft):	-2231				
Y North (ft):	-4666				
Z Elevation (ft):	0				
Description					
Control Type	Unsig				
HCM Control Type	AWSC				
HCM Intersection Delay (s)	8				
HCM Intersection LOS	A				
Analysis Period (Hr)	0.25				
HCM 6th LANE	NBLn1	EBLn1	WBLn1	SBLn1	
Sign Control	Stop	Stop	Stop	Stop	
Traffic Volume by Lane (vph)	151	5	0	152	
Left Turning Volume (vph)	0	5	0	0	
Through Volume (vph)	151	0	0	147	
Right Turning Volume (vph)	0	0	0	5	
Lane Flow Rate (vph)	164	5	0	165	
Geometry Group	1	1	1	1	
Degree of Utilization, X	0.185	0.007	0	0.186	
Departure Headway, Hd	4.067	4.836	4.645	4.046	
Convergence (Y/N)	Yes	Yes	Yes	Yes	
Capacity (vph)	880	745	0	884	
Service Time (s)	2.103	2.836	2.645	2.083	
HCM Lane V/C Ratio	0.186	0.007	0	0.187	
HCM Control Delay (s)	8	7.9	7.6	8	
HCM Lane LOS	A	A	N	A	
HCM 95th Percentile Queue (veh)	0.7	0	0	0.7	

HCM 6th INTERSECTION							MOVEMENT S
Node #	4						Lanes and Sharing
Zone:							Traffic Volume (vph)
X East (ft):	-2850						Future Volume (vph)
Y North (ft):	-6115						Conflicting Peds. (#)
Z Elevation (ft):	0						Sign Control
Description							Storage Length (ft)
Control Type	Unsig						Vehicles in median
							Grade (%)
HCM Control Type	TWSC						Peak Hour Factor
HCM Intersection Delay (s)	0.2						Growth Factor
HCM Intersection LOS	—						Adjusted Flow (vph)
Analysis Period (Hr)	0.25						Heavy Vehicles (%)
Ped Walking Speed (ft/s)	3.5						Right Turn Channel
Include Upstream Signal?	No						Curb Radius (ft)
							Approach Data
							Major/Minor
							Conflicting Flow Ra
							Critical Headway
							Critical Headway S
							Critical Headway S
							Follow-up Headwa
HCM 6th LANE		EBL	EBT	WBT	WBR	SBLn1	
Capacity (vph)		1419	-	-	-	-	885
HCM Lane V/C Ratio		0.004	-	-	-	-	0.006
HCM Control Delay (s)		7.547	0	-	-	-	9.1
HCM Lane LOS		A	A	-	-	-	A
HCM 95th Percentile Queue (veh)		0	-	-	-	-	0