Appendix E

Traffic Modeling Data

E1 Existing Conditions Technical Calculations

E2 Existing Plus Project Conditions Technical Calculations

E3 Cumulative Conditions Technical Calculations

E4 Cumulative Plus Project Conditions Technical Calculations

E1

Existing Conditions
Technical Calculations

HCM 2010 Signalized Intersection Summary
1: SR 89 & Donner Pass Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	186	336	107	166	37	151	72	81	18	94	60
Future Volume (veh/h)	54	186	336	107	166	37	151	72	81	18	94	60
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1900
Adj Flow Rate, veh/h	59	202	365	122	189	42	162	77	87	20	103	66
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	0	2	0
Peak Hour Factor	0.92	0.92	0.92	0.88	0.88	0.88	0.93	0.93	0.93	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	74	458	647	159	562	478	290	304	258	57	297	194
Arrive On Green	0.04	0.25	0.25	0.09	0.30	0.30	0.16	0.16	0.16	0.17	0.16	0.16
Sat Flow, veh/h	1774	1863	1581	1774	1863	1583	1774	1863	1583	366	1891	1233
Grp Volume(v), veh/h	59	202	365	122	189	42	162	77	87	101	0	88
Grp Sat Flow(s),veh/h/ln	1774	1863	1581	1774	1863	1583	1774	1863	1583	1844	0	1645
Q Serve(g_s), s	2.0	5.6	10.8	4.1	4.8	1.2	5.1	2.2	3.0	3.0	0.0	2.9
Cycle Q Clear(g_c), s	2.0	5.6	10.8	4.1	4.8	1.2	5.1	2.2	3.0	3.0	0.0	2.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	0.20		0.75
Lane Grp Cap(c), veh/h	74	458	647	159	562	478	290	304	258	290	0	259
V/C Ratio(X)	0.79	0.44	0.56	0.77	0.34	0.09	0.56	0.25	0.34	0.35	0.00	0.34
Avail Cap(c_a), veh/h	436	1068	1165	1017	1068	908	872	916	778	756	0	674
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.0	19.5	13.8	27.2	16.6	15.3	23.5	22.3	22.6	22.8	0.0	22.9
Incr Delay (d2), s/veh	6.9	0.2	0.3	2.9	0.1	0.0	0.6	0.2	0.3	0.3	0.0	0.3
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	1.1	2.9	6.0	2.1	2.5	0.5	2.6	1.1	1.3	1.5	0.0	1.3
LnGrp Delay(d),s/veh	35.9	19.7	14.1	30.1	16.7	15.3	24.1	22.5	22.9	23.1	0.0	23.2
LnGrp LOS	D	B	B	C	B	B	C	C	C	C		C
Approach Vol, veh/h		626			353			326			189	
Approach Delay, s/veh		18.0			21.2			23.4			23.1	
Approach LOS		B			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.5	20.5		14.6	7.1	23.9		15.5
Change Period (Y+Rc), s	5.0	5.5		5.0	4.5	5.5		5.5
Max Green Setting (Gmax), s	35.0	35.0		25.0	15.0	35.0		30.0
Max Q Clear Time (g_c+I1), s	6.1	12.8		5.0	4.0	6.8		7.1
Green Ext Time (p_c), s	0.2	2.1		0.6	0.0	2.1		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	20.6
HCM 2010 LOS	C

MOVEMENT SUMMARY

Site: 2. Existing AM

SR 89 / I-80 WB Ramp
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: HWY 89											
3	L2	142	3.0	0.168	4.8	LOS A	0.0	0.0	0.00	0.00	25.5
8	T1	226	3.0	0.168	4.8	LOS A	0.0	0.0	0.00	0.00	25.9
Approach		368	3.0	0.168	4.8	LOS A	0.0	0.0	0.00	0.00	25.8
East: I-80 WB off-ramp											
1	L2	215	3.0	0.256	7.0	LOS A	0.7	19.1	0.37	0.34	23.5
6	T1	1	3.0	0.256	7.0	LOS A	0.7	19.1	0.37	0.34	25.7
16	R2	112	3.0	0.136	5.7	LOS A	0.4	9.6	0.35	0.30	23.6
Approach		328	3.0	0.256	6.6	LOS A	0.7	19.1	0.36	0.32	23.5
North: HWY 89											
4	T1	544	3.0	0.388	9.7	LOS A	1.7	42.9	0.54	0.51	23.5
14	R2	45	3.0	0.388	9.7	LOS A	1.7	42.9	0.54	0.51	22.9
Approach		589	3.0	0.388	9.7	LOS A	1.7	42.9	0.54	0.51	23.5
All Vehicles		1285	3.0	0.388	7.5	LOS A	1.7	42.9	0.34	0.32	24.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 3. Existing AM

SR 89 / I-80 EB Ramp
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: HWY 89											
8	T1	349	3.0	0.280	6.7	LOS A	1.2	30.4	0.32	0.21	24.2
18	R2	183	3.0	0.280	6.7	LOS A	1.2	30.4	0.32	0.21	23.4
Approach		532	3.0	0.280	6.7	LOS A	1.2	30.4	0.32	0.21	24.0
North: HWY 89											
7	L2	105	3.0	0.340	6.7	LOS A	0.0	0.0	0.00	0.00	26.3
4	T1	640	3.0	0.340	6.7	LOS A	0.0	0.0	0.00	0.00	28.0
Approach		746	3.0	0.340	6.7	LOS A	0.0	0.0	0.00	0.00	27.7
West: I-80 EB off-ramp											
5	L2	35	3.0	0.432	12.4	LOS B	1.6	40.1	0.59	0.62	25.8
12	R2	509	3.0	0.432	12.2	LOS B	1.6	40.1	0.57	0.61	28.1
Approach		544	3.0	0.432	12.2	LOS B	1.6	40.1	0.57	0.61	27.9
All Vehicles		1821	3.0	0.432	8.3	LOS A	1.6	40.1	0.27	0.24	26.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Volume (veh/h)	173	44	71	183	35	763	194
Future Volume (veh/h)	173	44	71	183	35	763	194
Number	3	18	1	6		2	12
Initial Q (Qb), veh	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00		1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863		1863	1863
Adj Flow Rate, veh/h	204	52	88	226		867	220
Adj No. of Lanes	2	1	1	2		2	1
Peak Hour Factor	0.85	0.85	0.81	0.81		0.88	0.88
Percent Heavy Veh, %	2	2	2	2		2	2
Cap, veh/h	268	222	111	2978		2142	1306
Arrive On Green	0.08	0.08	0.12	1.00		0.75	0.75
Sat Flow, veh/h	3442	1583	1774	3632		3297	1583
Grp Volume(v), veh/h	204	52	88	226		867	220
Grp Sat Flow(s),veh/h/ln	1721	1583	1774	1770		1434	1583
Q Serve(g_s), s	7.2	3.6	6.0	0.0		13.6	3.5
Cycle Q Clear(g_c), s	7.2	3.6	6.0	0.0		13.6	3.5
Prop In Lane	1.00	1.00	1.00				1.00
Lane Grp Cap(c), veh/h	268	222	111	2978		2142	1306
V/C Ratio(X)	0.76	0.23	0.79	0.08		0.40	0.17
Avail Cap(c_a), veh/h	971	546	358	2978		2142	1306
HCM Platoon Ratio	1.00	1.00	2.00	2.00		1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00		1.00	1.00
Uniform Delay (d), s/veh	56.0	47.4	53.5	0.0		5.7	2.2
Incr Delay (d2), s/veh	1.7	0.2	12.0	0.0		0.6	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	1.6	3.3	0.0		5.5	2.3
LnGrp Delay(d),s/veh	57.7	47.6	65.5	0.0		6.3	2.5
LnGrp LOS	E	D	E	A		A	A
Approach Vol, veh/h	256			314		1087	
Approach Delay, s/veh	55.7			18.4		5.5	
Approach LOS	E			B		A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	11.7	98.1				109.8		14.2
Change Period (Y+Rc), s	4.0	5.5				5.5		4.5
Max Green Setting (Gmax), s	25.0	50.0				50.0		35.0
Max Q Clear Time (g_c+I1), s	8.0	15.6				2.0		9.2
Green Ext Time (p_c), s	0.2	9.6				10.2		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	15.7
HCM 2010 LOS	B

Notes

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	271	50	204	32	25	783
Future Volume (veh/h)	271	50	204	32	25	783
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	366	68	296	46	28	870
Adj No. of Lanes	1	1	2	1	1	1
Peak Hour Factor	0.74	0.74	0.69	0.69	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	391	380	1844	1367	35	1287
Arrive On Green	0.22	0.22	0.64	0.64	0.04	1.00
Sat Flow, veh/h	1774	1583	3297	1583	1774	1863
Grp Volume(v), veh/h	366	68	296	46	28	870
Grp Sat Flow(s),veh/h/ln	1774	1583	1434	1583	1774	1863
Q Serve(g_s), s	25.1	4.2	5.1	0.5	1.9	0.0
Cycle Q Clear(g_c), s	25.1	4.2	5.1	0.5	1.9	0.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	391	380	1844	1367	35	1287
V/C Ratio(X)	0.94	0.18	0.16	0.03	0.79	0.68
Avail Cap(c_a), veh/h	415	402	1844	1367	429	1287
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.5	37.4	8.8	1.2	59.3	0.0
Incr Delay (d2), s/veh	27.3	0.1	0.2	0.0	13.5	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.3	1.9	2.1	0.6	1.1	1.0
LnGrp Delay(d),s/veh	74.8	37.5	9.0	1.2	72.7	2.9
LnGrp LOS	E	D	A	A	E	A
Approach Vol, veh/h	434		342			898
Approach Delay, s/veh	69.0		8.0			5.0
Approach LOS	E		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	6.0	85.7				91.7		32.3
Change Period (Y+Rc), s	3.5	6.0				6.0		5.0
Max Green Setting (Gmax), s	30.0	50.0				50.0		29.0
Max Q Clear Time (g_c+I1), s	3.9	7.1				2.0		27.1
Green Ext Time (p_c), s	0.0	5.6				5.6		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	22.2
HCM 2010 LOS	C

Intersection	
Intersection Delay, s/veh	7.3
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBU	SBL	SBR
Lane Configurations							
Traffic Vol, veh/h	37	1	0	1	2	35	40
Future Vol, veh/h	37	1	0	1	2	35	40
Peak Hour Factor	0.68	0.68	0.25	0.25	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	54	1	0	4	2	39	45
Number of Lanes	0	1	0	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	7.6	6.6	7.2
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	97%	0%	47%
Vol Thru, %	3%	0%	0%
Vol Right, %	0%	100%	53%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	38	1	77
LT Vol	37	0	36
Through Vol	1	0	0
RT Vol	0	1	41
Lane Flow Rate	56	4	87
Geometry Grp	1	1	1
Degree of Util (X)	0.066	0.004	0.092
Departure Headway (Hd)	4.284	3.528	3.813
Convergence, Y/N	Yes	Yes	Yes
Cap	835	1008	938
Service Time	2.314	1.572	1.844
HCM Lane V/C Ratio	0.067	0.004	0.093
HCM Control Delay	7.6	6.6	7.2
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.2	0	0.3

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Vol, veh/h	13	38	4	277	84	18	11
Future Vol, veh/h	13	38	4	277	84	18	11
Conflicting Peds, #/hr	0	0	0	0	0	0	8
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	None
Storage Length	-	-	-	-	0	0	-
Veh in Median Storage, #	-	0	-	0	-	0	-
Grade, %	-	0	-	0	-	0	-
Peak Hour Factor	72	72	89	89	89	87	87
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	18	53	4	311	94	21	13

Major/Minor	Major1		Major2			Minor2	
Conflicting Flow All	311	0	-	-	0	400	319
Stage 1	-	-	-	-	-	311	-
Stage 2	-	-	-	-	-	89	-
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	1249	-	-	-	-	606	722
Stage 1	-	-	-	-	-	743	-
Stage 2	-	-	-	-	-	934	-
Platoon blocked, %		-		-	-		
Mov Cap-1 Maneuver	1241	-	-	-	-	597	717
Mov Cap-2 Maneuver	-	-	-	-	-	597	-
Stage 1	-	-	-	-	-	743	-
Stage 2	-	-	-	-	-	920	-

Approach	EB	WB	SB
HCM Control Delay, s	2		11
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1241	-	-	-	637
HCM Lane V/C Ratio	0.015	-	-	-	0.052
HCM Control Delay (s)	7.9	0	-	-	11
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Vol, veh/h	55	9	2	541	392	12	54
Future Vol, veh/h	55	9	2	541	392	12	54
Conflicting Peds, #/hr	0	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	None
Storage Length	-	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	-	0	0	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	72	72	89	89	89	79	79
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	76	13	2	608	440	15	68

Major/Minor	Major1		Major2			Minor1	
Conflicting Flow All	0	0	-	89	0	1739	84
Stage 1	-	-	-	-	-	83	-
Stage 2	-	-	-	-	-	1656	-
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	-	-	-	1506	-	96	975
Stage 1	-	-	-	-	-	940	-
Stage 2	-	-	-	-	-	171	-
Platoon blocked, %	-	-			-		
Mov Cap-1 Maneuver	-	-	~ -331	~ -331	-	96	974
Mov Cap-2 Maneuver	-	-	-	-	-	96	-
Stage 1	-	-	-	-	-	940	-
Stage 2	-	-	-	-	-	171	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	16.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	96	974	-	-	+	-
HCM Lane V/C Ratio	0.158	0.07	-	-	-	-
HCM Control Delay (s)	49.4	9	-	-	1.1	-
HCM Lane LOS	E	A	-	-	A	-
HCM 95th %tile Q(veh)	0.5	0.2	-	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	16.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	101	6	411	905	8	4	3	49	6	13	31
Future Vol, veh/h	6	101	6	411	905	8	4	3	49	6	13	31
Conflicting Peds, #/hr	1	0	1	1	0	1	4	0	5	5	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	-	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	72	72	72	89	89	89	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	140	8	462	1017	9	4	3	53	6	14	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1027	0	0	150	0	0	1605	2112	150	2140	2112	518
Stage 1	-	-	-	-	-	-	162	162	-	1946	1946	-
Stage 2	-	-	-	-	-	-	1443	1950	-	194	166	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.33	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	674	-	-	1430	-	-	77	51	896	31	51	503
Stage 1	-	-	-	-	-	-	839	763	-	67	111	-
Stage 2	-	-	-	-	-	-	139	110	-	807	760	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	672	-	-	1424	-	-	-	12	892	9	~ 12	501
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	12	-	9	~ 12	-
Stage 1	-	-	-	-	-	-	828	753	-	66	27	-
Stage 2	-	-	-	-	-	-	15	27	-	744	750	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	3.9		$ 429.5
HCM LOS			-	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	-	672	-	-	1424	-	-	9	38
HCM Lane V/C Ratio	-	0.012	-	-	0.324	-	-	0.717	1.245
HCM Control Delay (s)	-	10.4	-	-	8.7	1.7	-	$ 706.1	$ 391.8
HCM Lane LOS	-	B	-	-	A	A	-	F	F
HCM 95th %tile Q(veh)	-	0	-	-	1.4	-	-	1.4	4.8

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	159	0	0	1302	6	0	0	0	11	0	7
Future Volume (veh/h)	2	159	0	0	1302	6	0	0	0	11	0	7
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	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
Adj Sat Flow, veh/h/ln	1900	1863	0	0	1863	1900				1900	1863	1900
Adj Flow Rate, veh/h	3	221	0	0	1463	7				12	0	8
Adj No. of Lanes	0	1	0	0	2	0				0	1	0
Peak Hour Factor	0.72	0.72	0.92	0.92	0.89	0.89				0.89	0.92	0.89
Percent Heavy Veh, %	2	2	0	0	2	2				0	2	0
Cap, veh/h	98	968	0	0	1901	9				267	0	178
Arrive On Green	0.53	0.53	0.00	0.00	0.53	0.53				0.26	0.00	0.26
Sat Flow, veh/h	5	1839	0	0	3705	17				1015	0	677
Grp Volume(v), veh/h	224	0	0	0	717	753				20	0	0
Grp Sat Flow(s),veh/h/ln	1844	0	0	0	1770	1860				1693	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	12.2	12.3				0.3	0.0	0.0
Cycle Q Clear(g_c), s	2.5	0.0	0.0	0.0	12.2	12.3				0.3	0.0	0.0
Prop In Lane	0.01		0.00	0.00		0.01				0.60		0.40
Lane Grp Cap(c), veh/h	1066	0	0	0	931	979				445	0	0
V/C Ratio(X)	0.21	0.00	0.00	0.00	0.77	0.77				0.04	0.00	0.00
Avail Cap(c_a), veh/h	1066	0	0	0	931	979				445	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	1.00	1.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	4.8	0.0	0.0	0.0	7.2	7.2				10.4	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.0	6.1	5.8				0.2	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
%ile BackOfQ(50%),veh/ln	1.4	0.0	0.0	0.0	7.3	7.7				0.2	0.0	0.0
LnGrp Delay(d),s/veh	5.3	0.0	0.0	0.0	13.3	13.0				10.6	0.0	0.0
LnGrp LOS	A				B	B				B		
Approach Vol, veh/h		224			1470						20	
Approach Delay, s/veh		5.3			13.1						10.6	
Approach LOS		A			B						B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		24.0		14.0		24.0		
Change Period (Y+Rc), s		4.0		4.0		4.0		
Max Green Setting (Gmax), s		20.0		10.0		20.0		
Max Q Clear Time (g_c+I1), s		4.5		2.3		14.3		
Green Ext Time (p_c), s		9.9		0.0		4.4		

Intersection Summary	
HCM 2010 Ctrl Delay	12.1
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	88	68	190	567	4	408	25	210	12	22	4
Future Volume (veh/h)	2	88	68	190	567	4	408	25	210	12	22	4
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1900	1863	1900
Adj Flow Rate, veh/h	3	122	0	221	659	5	453	0	0	19	35	6
Adj No. of Lanes	1	2	1	2	2	0	2	0	1	0	1	0
Peak Hour Factor	0.72	0.72	0.72	0.86	0.86	0.86	0.94	0.94	0.94	0.63	0.63	0.63
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	9	684	306	449	1147	9	707	0	315	54	100	17
Arrive On Green	0.00	0.19	0.00	0.13	0.32	0.32	0.20	0.00	0.00	0.10	0.10	0.10
Sat Flow, veh/h	1774	3539	1583	3442	3600	27	3548	0	1583	571	1051	180
Grp Volume(v), veh/h	3	122	0	221	324	340	453	0	0	60	0	0
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1721	1770	1858	1774	0	1583	1802	0	0
Q Serve(g_s), s	0.1	1.2	0.0	2.5	6.5	6.5	5.0	0.0	0.0	1.3	0.0	0.0
Cycle Q Clear(g_c), s	0.1	1.2	0.0	2.5	6.5	6.5	5.0	0.0	0.0	1.3	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	1.00		1.00	0.32		0.10
Lane Grp Cap(c), veh/h	9	684	306	449	564	592	707	0	315	172	0	0
V/C Ratio(X)	0.34	0.18	0.00	0.49	0.57	0.57	0.64	0.00	0.00	0.35	0.00	0.00
Avail Cap(c_a), veh/h	623	2487	1113	1209	1658	1741	2161	0	964	1098	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	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	21.2	14.4	0.0	17.3	12.1	12.1	15.7	0.0	0.0	18.1	0.0	0.0
Incr Delay (d2), s/veh	8.4	0.0	0.0	0.3	0.3	0.3	0.4	0.0	0.0	0.4	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	0.1	0.6	0.0	1.2	3.2	3.4	2.5	0.0	0.0	0.7	0.0	0.0
LnGrp Delay(d),s/veh	29.6	14.4	0.0	17.6	12.5	12.5	16.1	0.0	0.0	18.5	0.0	0.0
LnGrp LOS	C	B		B	B	B	B			B		
Approach Vol, veh/h		125			885			453			60	
Approach Delay, s/veh		14.8			13.7			16.1			18.5	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.3	12.9		8.1	3.9	18.2		12.5
Change Period (Y+Rc), s	* 3.7	4.6		4.0	* 3.7	* 4.6		4.0
Max Green Setting (Gmax), s	* 15	30.0		26.0	* 15	* 40		26.0
Max Q Clear Time (g_c+I1), s	4.5	3.2		3.3	2.1	8.5		7.0
Green Ext Time (p_c), s	0.1	1.9		0.1	0.0	2.0		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	14.7
HCM 2010 LOS	B

Notes

SimTraffic Post-Processor | **Squaw Alpine Gondola Phase 2**
Average Results from 10 Runs | **Existing Conditions**
Volume and Delay by Movement | **AM Peak Hour**

Intersection 11 **Squaw Valley Rd/Squaw Creek Rd** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	28	23	83.2%	14.2	6.5	B
	Through						
	Right Turn	22	20	90.0%	2.9	1.1	A
	Subtotal	50	43	86.2%	8.8	3.7	A
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	153	155	101.0%	1.7	0.6	A
	Right Turn	17	16	93.5%	1.9	2.0	A
	Subtotal	170	171	100.3%	1.8	0.6	A
WB	Left Turn	48	50	104.6%	4.3	1.1	A
	Through	1,260	1,266	100.5%	3.9	0.3	A
	Right Turn						
	Subtotal	1,308	1,316	100.6%	3.9	0.3	A
Total		1,528	1,530	100.1%	3.8	0.2	A

Intersection 12 **SR 89/Squaw Valley Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	577	584	101.2%	36.6	5.7	D
	Through	139	136	98.0%	3.3	0.8	A
	Right Turn						
	Subtotal	716	720	100.6%	30.0	4.3	C
SB	Left Turn						
	Through	342	333	97.3%	57.1	17.4	E
	Right Turn	712	713	100.2%	32.7	14.8	C
	Subtotal	1,054	1,046	99.2%	40.3	15.7	D
EB	Left Turn	97	97	99.7%	36.3	4.5	D
	Through						
	Right Turn	90	91	100.6%	2.4	0.5	A
	Subtotal	187	187	100.1%	19.7	2.0	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		1,957	1,953	99.8%	34.2	8.6	C

SimTraffic Post-Processor **Squaw Alpine Gondola Phase 2**
Average Results from 10 Runs **Existing Conditions**
Volume and Delay by Movement **AM Peak Hour**

Intersection 13 **SR 89/Alpine Meadows Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	328	336	102.3%	22.2	3.0	C
	Through	651	659	101.2%	18.7	5.3	B
	Right Turn						
	Subtotal	979	994	101.6%	19.9	3.5	B
SB	Left Turn						
	Through	124	124	100.1%	19.0	6.4	B
	Right Turn	308	300	97.5%	11.2	3.2	B
	Subtotal	432	425	98.3%	13.5	3.7	B
EB	Left Turn	65	58	88.6%	24.6	3.1	C
	Through						
	Right Turn	34	34	98.5%	2.4	1.2	A
	Subtotal	99	91	92.0%	15.8	2.9	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		1,510	1,510	100.0%	17.9	2.7	B

SimTraffic Post-Processor **Squaw Alpine Gondola Phase 2**
Average Results from 10 Runs **Existing Conditions**
Queue Length **AM Peak Hour**

Intersection 11 **Squaw Valley Rd/Squaw Creek Rd** **Side-street Stop**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Through/Right	2,125	25	0	25	2	25	5	0%	0%
NB	Left Turn	75	25	4	50	4	75	7	1%	0%
	Right Turn	1,425	25	3	50	5	50	11	0%	0%
WB	Left/Through	750	25	10	75	30	125	48	0%	0%
	Through	750	25	7	50	37	75	72	0%	0%
0										

SimTraffic Post-Processor **Squaw Alpine Gondola Phase 2**
Average Results from 10 Runs **Existing Conditions**
Queue Length **AM Peak Hour**

Intersection 12 **SR 89/Squaw Valley Rd** **Signal**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Left Turn	475	25	4	75	8	100	14	0%	0%
	Left/Through	1,600	75	2	100	5	100	12	0%	0%
NB	Left Turn	425	325	26	525	31	575	29	6%	0%
	Through	650	50	18	150	118	400	258	0%	0%
	Through/Right	75	25	2	25	11	50	25	0%	0%
SB	Through	150	150	12	225	4	225	7	15%	15%
	Right Turn	3,725	300	56	750	99	1,025	109	0%	0%
0										

Intersection 13 **SR 89/Alpine Meadows Rd** **Signal**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Left Turn	150	50	6	75	10	100	22	0%	0%
	Right Turn	1,825	25	4	50	9	50	19	0%	0%
NB	Left Turn	375	150	18	250	55	350	125	0%	0%
	Through	3,700	200	30	350	63	450	115	1%	0%
SB	Through	1,450	75	9	125	21	150	34	0%	0%
	Right Turn	625	100	6	175	13	200	34	0%	0%
0										

HCM 2010 Signalized Intersection Summary
1: SR 89 & Donner Pass Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	188	199	131	180	37	333	123	182	37	90	60
Future Volume (veh/h)	44	188	199	131	180	37	333	123	182	37	90	60
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1900
Adj Flow Rate, veh/h	54	232	246	147	202	42	370	137	202	44	107	71
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	0	2	0
Peak Hour Factor	0.81	0.81	0.81	0.89	0.89	0.89	0.90	0.90	0.90	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	68	345	684	188	485	402	438	460	391	100	246	168
Arrive On Green	0.04	0.19	0.19	0.11	0.26	0.26	0.25	0.25	0.25	0.15	0.15	0.15
Sat Flow, veh/h	1774	1863	1578	1774	1863	1541	1774	1863	1583	679	1672	1139
Grp Volume(v), veh/h	54	232	246	147	202	42	370	137	202	118	0	104
Grp Sat Flow(s),veh/h/ln	1774	1863	1578	1774	1863	1541	1774	1863	1583	1829	0	1662
Q Serve(g_s), s	2.0	7.7	7.0	5.4	6.0	1.4	13.3	4.0	7.4	3.9	0.0	3.8
Cycle Q Clear(g_c), s	2.0	7.7	7.0	5.4	6.0	1.4	13.3	4.0	7.4	3.9	0.0	3.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	0.37		0.69
Lane Grp Cap(c), veh/h	68	345	684	188	485	402	438	460	391	269	0	245
V/C Ratio(X)	0.79	0.67	0.36	0.78	0.42	0.10	0.84	0.30	0.52	0.44	0.00	0.42
Avail Cap(c_a), veh/h	398	976	1218	929	976	807	797	836	711	684	0	622
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.9	25.3	12.8	29.1	20.5	18.8	23.9	20.4	21.7	26.0	0.0	25.9
Incr Delay (d2), s/veh	7.6	0.9	0.1	2.7	0.2	0.0	1.7	0.1	0.4	0.4	0.0	0.4
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	1.1	4.1	4.4	2.8	3.1	0.6	6.7	2.1	3.3	2.0	0.0	1.8
LnGrp Delay(d),s/veh	39.4	26.2	12.9	31.8	20.7	18.8	25.7	20.6	22.1	26.4	0.0	26.3
LnGrp LOS	D	C	B	C	C	B	C	C	C	C		C
Approach Vol, veh/h		532			391			709			222	
Approach Delay, s/veh		21.4			24.7			23.7			26.4	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	12.1	17.9		14.8	7.1	22.9		22.0
Change Period (Y+Rc), s	5.0	5.5		5.0	4.5	5.5		5.5
Max Green Setting (Gmax), s	35.0	35.0		25.0	15.0	35.0		30.0
Max Q Clear Time (g_c+I1), s	7.4	9.7		5.9	4.0	8.0		15.3
Green Ext Time (p_c), s	0.2	2.0		0.8	0.0	2.0		1.2

Intersection Summary	
HCM 2010 Ctrl Delay	23.5
HCM 2010 LOS	C

MOVEMENT SUMMARY

Site: int_2_Existing_WinterPM

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: HWY 89											
3	L2	399	3.0	0.470	8.5	LOS A	0.0	0.0	0.00	0.00	25.5
8	T1	633	3.0	0.470	8.5	LOS A	0.0	0.0	0.00	0.00	25.9
Approach		1031	3.0	0.470	8.5	LOS A	0.0	0.0	0.00	0.00	25.8
East: I-80 WB off-ramp											
1	L2	245	3.0	0.469	15.2	LOS C	1.6	41.3	0.67	0.74	21.7
16	R2	149	3.0	0.302	11.9	LOS B	0.9	23.1	0.63	0.66	22.1
Approach		394	3.0	0.469	14.0	LOS B	1.6	41.3	0.66	0.71	21.8
North: HWY 89											
4	T1	422	3.0	0.446	13.6	LOS B	2.0	51.2	0.67	0.73	22.6
14	R2	83	3.0	0.446	13.6	LOS B	2.0	51.2	0.67	0.73	21.9
Approach		505	3.0	0.446	13.6	LOS B	2.0	51.2	0.67	0.73	22.5
All Vehicles		1930	3.0	0.470	11.0	LOS B	2.0	51.2	0.31	0.34	24.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: int_3_Existing_WinterPM

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: HWY 89											
8	T1	1020	3.0	0.875	28.7	LOS D	14.3	365.9	0.96	0.95	19.6
18	R2	573	3.0	0.875	28.7	LOS D	14.3	365.9	0.96	0.95	19.0
Approach		1593	3.0	0.875	28.7	LOS D	14.3	365.9	0.96	0.95	19.4
North: HWY 89											
7	L2	169	3.0	0.304	6.2	LOS A	0.0	0.0	0.00	0.00	25.9
4	T1	498	3.0	0.304	6.2	LOS A	0.0	0.0	0.00	0.00	27.9
Approach		666	3.0	0.304	6.2	LOS A	0.0	0.0	0.00	0.00	27.3
West: I-80 EB off-ramp											
5	L2	13	3.0	0.176	7.5	LOS A	0.5	12.5	0.47	0.47	27.4
12	R2	222	3.0	0.176	7.4	LOS A	0.5	12.5	0.46	0.46	29.9
Approach		235	3.0	0.176	7.4	LOS A	0.5	12.5	0.46	0.46	29.8
All Vehicles		2494	3.0	0.875	20.7	LOS C	14.3	365.9	0.65	0.65	21.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Volume (veh/h)	230	42	158	1126	62	358	166
Future Volume (veh/h)	230	42	158	1126	62	358	166
Number	3	18	1	6		2	12
Initial Q (Qb), veh	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00		1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863		1863	1863
Adj Flow Rate, veh/h	261	48	163	1161		398	184
Adj No. of Lanes	2	1	1	2		2	1
Peak Hour Factor	0.88	0.88	0.97	0.97		0.90	0.90
Percent Heavy Veh, %	2	2	2	2		2	2
Cap, veh/h	326	322	192	2918		1962	1233
Arrive On Green	0.09	0.09	0.11	0.82		0.68	0.68
Sat Flow, veh/h	3442	1583	1774	3632		3297	1583
Grp Volume(v), veh/h	261	48	163	1161		398	184
Grp Sat Flow(s),veh/h/ln	1721	1583	1774	1770		1434	1583
Q Serve(g_s), s	9.2	3.1	11.2	10.6		6.3	3.6
Cycle Q Clear(g_c), s	9.2	3.1	11.2	10.6		6.3	3.6
Prop In Lane	1.00	1.00	1.00				1.00
Lane Grp Cap(c), veh/h	326	322	192	2918		1962	1233
V/C Ratio(X)	0.80	0.15	0.85	0.40		0.20	0.15
Avail Cap(c_a), veh/h	971	619	358	2918		1962	1233
HCM Platoon Ratio	1.00	1.00	1.00	1.00		1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00		1.00	1.00
Uniform Delay (d), s/veh	55.0	40.6	54.3	2.8		7.2	3.4
Incr Delay (d2), s/veh	1.7	0.1	9.8	0.4		0.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	1.4	6.0	5.2		2.6	2.3
LnGrp Delay(d),s/veh	56.7	40.7	64.1	3.2		7.4	3.7
LnGrp LOS	E	D	E	A		A	A
Approach Vol, veh/h	309			1324		582	
Approach Delay, s/veh	54.2			10.7		6.2	
Approach LOS	D			B		A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	17.4	90.3				107.7		16.3
Change Period (Y+Rc), s	4.0	5.5				5.5		4.5
Max Green Setting (Gmax), s	25.0	50.0				50.0		35.0
Max Q Clear Time (g_c+I1), s	13.2	8.3				12.6		11.2
Green Ext Time (p_c), s	0.3	16.0				15.4		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	15.6
HCM 2010 LOS	B

Notes

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	45	72	1212	148	106	294
Future Volume (veh/h)	45	72	1212	148	106	294
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	57	91	1262	154	113	313
Adj No. of Lanes	1	1	2	1	1	1
Peak Hour Factor	0.79	0.79	0.96	0.96	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	123	232	2113	1276	137	1569
Arrive On Green	0.07	0.07	0.74	0.74	0.15	1.00
Sat Flow, veh/h	1774	1583	3297	1583	1774	1863
Grp Volume(v), veh/h	57	91	1262	154	113	313
Grp Sat Flow(s),veh/h/ln	1774	1583	1434	1583	1774	1863
Q Serve(g_s), s	3.8	6.5	25.7	2.6	7.7	0.0
Cycle Q Clear(g_c), s	3.8	6.5	25.7	2.6	7.7	0.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	123	232	2113	1276	137	1569
V/C Ratio(X)	0.46	0.39	0.60	0.12	0.83	0.20
Avail Cap(c_a), veh/h	415	493	2113	1276	429	1569
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.5	47.9	7.7	2.6	51.6	0.0
Incr Delay (d2), s/veh	1.0	0.4	1.3	0.2	4.7	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	2.9	10.4	1.6	3.9	0.1
LnGrp Delay(d),s/veh	56.5	48.3	8.9	2.8	56.3	0.3
LnGrp LOS	E	D	A	A	E	A
Approach Vol, veh/h	148		1416			426
Approach Delay, s/veh	51.5		8.3			15.1
Approach LOS	D		A			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	13.1	97.3				110.4		13.6
Change Period (Y+Rc), s	3.5	6.0				6.0		5.0
Max Green Setting (Gmax), s	30.0	50.0				50.0		29.0
Max Q Clear Time (g_c+I1), s	9.7	27.7				2.0		8.5
Green Ext Time (p_c), s	0.1	7.6				8.8		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	13.0
HCM 2010 LOS	B

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	61	6	0	0	23	28
Future Vol, veh/h	61	6	0	0	23	28
Peak Hour Factor	0.80	0.80	0.85	0.85	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	76	8	0	0	25	30
Number of Lanes	0	1	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	7.7	0	7.1
HCM LOS	A	-	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	91%	0%	45%
Vol Thru, %	9%	100%	0%
Vol Right, %	0%	0%	55%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	67	0	51
LT Vol	61	0	23
Through Vol	6	0	0
RT Vol	0	0	28
Lane Flow Rate	84	0	55
Geometry Grp	1	1	1
Degree of Util (X)	0.098	0	0.058
Departure Headway (Hd)	4.213	4.094	3.84
Convergence, Y/N	Yes	Yes	Yes
Cap	853	0	927
Service Time	2.23	2.132	1.887
HCM Lane V/C Ratio	0.098	0	0.059
HCM Control Delay	7.7	7.1	7.1
HCM Lane LOS	A	N	A
HCM 95th-tile Q	0.3	0	0.2

Intersection	
Int Delay, s/veh	10.4

Movement	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Vol, veh/h	19	305	5	133	40	210	74
Future Vol, veh/h	19	305	5	133	40	210	74
Conflicting Peds, #/hr	0	0	0	0	0	27	9
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	None
Storage Length	-	-	-	-	0	0	-
Veh in Median Storage, #	-	0	-	0	-	0	-
Grade, %	-	0	-	0	-	0	-
Peak Hour Factor	80	80	93	93	93	77	77
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	24	381	5	143	43	273	96

Major/Minor	Major1		Major2			Minor2	
Conflicting Flow All	143	0	-	-	0	599	152
Stage 1	-	-	-	-	-	143	-
Stage 2	-	-	-	-	-	456	-
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	1440	-	-	-	-	465	894
Stage 1	-	-	-	-	-	884	-
Stage 2	-	-	-	-	-	638	-
Platoon blocked, %		-		-	-		
Mov Cap-1 Maneuver	1429	-	-	-	-	455	887
Mov Cap-2 Maneuver	-	-	-	-	-	455	-
Stage 1	-	-	-	-	-	884	-
Stage 2	-	-	-	-	-	625	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4		26.9
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1429	-	-	-	521
HCM Lane V/C Ratio	0.017	-	-	-	0.708
HCM Control Delay (s)	7.6	0	-	-	26.9
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0.1	-	-	-	5.6

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Vol, veh/h	507	13	3	99	166	12	379
Future Vol, veh/h	507	13	3	99	166	12	379
Conflicting Peds, #/hr	0	8	0	8	0	3	5
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	Free
Storage Length	-	-	-	300	-	0	0
Veh in Median Storage, #	0	-	-	-	0	0	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	80	80	93	93	93	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	634	16	3	106	178	13	403

Major/Minor	Major1		Major2			Minor1	
Conflicting Flow All	0	0	-	658	0	1044	-
Stage 1	-	-	-	-	-	650	-
Stage 2	-	-	-	-	-	394	-
Critical Hdwy	-	-	-	4.12	-	6.42	-
Critical Hdwy Stg 1	-	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	2.218	-	3.518	-
Pot Cap-1 Maneuver	-	-	-	930	-	254	0
Stage 1	-	-	-	-	-	520	0
Stage 2	-	-	-	-	-	681	0
Platoon blocked, %	-	-			-		
Mov Cap-1 Maneuver	-	-	~ -35	~ -35	-	252	-
Mov Cap-2 Maneuver	-	-	-	-	-	252	-
Stage 1	-	-	-	-	-	517	-
Stage 2	-	-	-	-	-	679	-

Approach	EB	WB	NB
HCM Control Delay, s	0		20
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	252	-	-	-	+	-
HCM Lane V/C Ratio	0.051	-	-	-	-	-
HCM Control Delay (s)	20	0	-	-	-	-
HCM Lane LOS	C	A	-	-	-	-
HCM 95th %tile Q(veh)	0.2	-	-	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	23	866	0	0	260	6	0	0	0	18	0	8
Future Vol, veh/h	23	866	0	0	260	6	0	0	0	18	0	8
Conflicting Peds, #/hr	13	0	0	0	0	13	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	150	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	93	93	93	98	98	98	54	54	54
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	1083	0	0	280	6	0	0	0	33	0	15

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	299	0	0	1083	0	0	1430	1439	541	895	1436	296
Stage 1	-	-	-	-	-	-	1140	1140	-	296	296	-
Stage 2	-	-	-	-	-	-	290	299	-	599	1140	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1261	-	-	642	-	-	103	132	486	248	133	743
Stage 1	-	-	-	-	-	-	215	275	-	712	668	-
Stage 2	-	-	-	-	-	-	717	666	-	456	275	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1261	-	-	642	-	-	96	123	486	234	124	735
Mov Cap-2 Maneuver	-	-	-	-	-	-	96	123	-	234	124	-
Stage 1	-	-	-	-	-	-	203	259	-	663	661	-
Stage 2	-	-	-	-	-	-	703	659	-	430	259	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0	0	18.9
HCM LOS			A	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	-	1261	-	-	642	-	-	234	735
HCM Lane V/C Ratio	-	0.023	-	-	-	-	-	0.142	0.02
HCM Control Delay (s)	0	7.9	0.2	-	0	-	-	22.9	10
HCM Lane LOS	A	A	A	-	A	-	-	C	B
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	-	0.5	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	875	0	0	250	7	0	0	0	12	0	5
Future Volume (veh/h)	9	875	0	0	250	7	0	0	0	12	0	5
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	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
Adj Sat Flow, veh/h/ln	1900	1863	0	0	1863	1900				1900	1863	1900
Adj Flow Rate, veh/h	11	1094	0	0	269	8				14	0	6
Adj No. of Lanes	0	2	0	0	1	0				0	1	0
Peak Hour Factor	0.80	0.80	0.92	0.92	0.93	0.93				0.85	0.92	0.85
Percent Heavy Veh, %	2	2	0	0	2	2				0	2	0
Cap, veh/h	101	1820	0	0	947	28				315	0	135
Arrive On Green	0.53	0.53	0.00	0.00	0.53	0.53				0.26	0.00	0.26
Sat Flow, veh/h	9	3542	0	0	1800	54				1198	0	513
Grp Volume(v), veh/h	592	513	0	0	0	277				20	0	0
Grp Sat Flow(s),veh/h/ln	1856	1610	0	0	0	1853				1711	0	0
Q Serve(g_s), s	0.0	8.4	0.0	0.0	0.0	3.2				0.3	0.0	0.0
Cycle Q Clear(g_c), s	8.4	8.4	0.0	0.0	0.0	3.2				0.3	0.0	0.0
Prop In Lane	0.02		0.00	0.00		0.03				0.70		0.30
Lane Grp Cap(c), veh/h	1073	848	0	0	0	975				450	0	0
V/C Ratio(X)	0.55	0.61	0.00	0.00	0.00	0.28				0.04	0.00	0.00
Avail Cap(c_a), veh/h	1073	848	0	0	0	975				450	0	0
HCM Platoon Ratio	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	0.00	0.00	0.00	1.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	6.3	6.3	0.0	0.0	0.0	5.0				10.4	0.0	0.0
Incr Delay (d2), s/veh	2.0	3.2	0.0	0.0	0.0	0.7				0.2	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
%ile BackOfQ(50%),veh/ln	4.7	4.3	0.0	0.0	0.0	1.7				0.2	0.0	0.0
LnGrp Delay(d),s/veh	8.3	9.5	0.0	0.0	0.0	5.7				10.6	0.0	0.0
LnGrp LOS	A	A				A				B		
Approach Vol, veh/h		1105			277						20	
Approach Delay, s/veh		8.8			5.7						10.6	
Approach LOS		A			A						B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		24.0		14.0		24.0		
Change Period (Y+Rc), s		4.0		4.0		4.0		
Max Green Setting (Gmax), s		20.0		10.0		20.0		
Max Q Clear Time (g_c+I1), s		10.4		2.3		5.2		
Green Ext Time (p_c), s		5.7		0.0		7.6		

Intersection Summary	
HCM 2010 Ctrl Delay	8.2
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	449	262	152	173	8	167	37	194	15	48	8
Future Volume (veh/h)	4	449	262	152	173	8	167	37	194	15	48	8
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1900	1863	1900
Adj Flow Rate, veh/h	5	516	0	181	206	10	218	0	0	19	59	10
Adj No. of Lanes	1	2	1	2	2	0	2	0	1	0	1	0
Peak Hour Factor	0.87	0.87	0.87	0.84	0.84	0.84	0.89	0.89	0.89	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	14	803	359	411	1162	56	616	0	275	46	143	24
Arrive On Green	0.01	0.23	0.00	0.12	0.34	0.34	0.17	0.00	0.00	0.12	0.12	0.12
Sat Flow, veh/h	1774	3539	1583	3442	3436	166	3548	0	1583	390	1211	205
Grp Volume(v), veh/h	5	516	0	181	106	110	218	0	0	88	0	0
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1721	1770	1833	1774	0	1583	1806	0	0
Q Serve(g_s), s	0.1	5.9	0.0	2.2	1.9	1.9	2.4	0.0	0.0	2.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	5.9	0.0	2.2	1.9	1.9	2.4	0.0	0.0	2.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.09	1.00		1.00	0.22		0.11
Lane Grp Cap(c), veh/h	14	803	359	411	598	620	616	0	275	214	0	0
V/C Ratio(X)	0.35	0.64	0.00	0.44	0.18	0.18	0.35	0.00	0.00	0.41	0.00	0.00
Avail Cap(c_a), veh/h	590	2355	1054	1145	1570	1626	2361	0	1054	1041	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	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	22.2	15.8	0.0	18.5	10.5	10.5	16.4	0.0	0.0	18.4	0.0	0.0
Incr Delay (d2), s/veh	5.3	0.3	0.0	0.3	0.1	0.1	0.1	0.0	0.0	0.5	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	0.1	2.9	0.0	1.0	0.9	1.0	1.2	0.0	0.0	1.0	0.0	0.0
LnGrp Delay(d),s/veh	27.5	16.1	0.0	18.7	10.6	10.6	16.5	0.0	0.0	18.9	0.0	0.0
LnGrp LOS	C	B		B	B	B	B			B		
Approach Vol, veh/h		521			397			218			88	
Approach Delay, s/veh		16.2			14.3			16.5			18.9	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.1	14.8		9.3	4.1	19.8		11.8
Change Period (Y+Rc), s	* 3.7	4.6		4.0	* 3.7	* 4.6		4.0
Max Green Setting (Gmax), s	* 15	30.0		26.0	* 15	* 40		30.0
Max Q Clear Time (g_c+I1), s	4.2	7.9		4.0	2.1	3.9		4.4
Green Ext Time (p_c), s	0.1	2.0		0.2	0.0	2.0		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	15.8
HCM 2010 LOS	B

Notes

SimTraffic Post-Processor | **Squaw Alpine Gondola Phase 2**
Average Results from 10 Runs | **Existing Conditions**
Volume and Delay by Movement | **PM Peak Hour**

Intersection 11 **Squaw Valley Rd/Squaw Creek Rd** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	19	18	95.3%	29.8	15.8	D
	Through						
	Right Turn	56	54	96.1%	8.5	2.1	A
	Subtotal	75	72	95.9%	15.8	7.3	C
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	823	824	100.1%	2.4	0.2	A
	Right Turn	33	32	97.6%	2.0	0.9	A
	Subtotal	856	856	100.0%	2.4	0.2	A
WB	Left Turn	41	42	103.2%	12.0	4.4	B
	Through	252	255	101.0%	1.7	0.4	A
	Right Turn						
	Subtotal	293	297	101.3%	3.5	1.0	A
Total		1,224	1,224	100.0%	3.4	0.6	A

Intersection 12 **SR 89/Squaw Valley Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	151	149	98.8%	39.2	4.2	D
	Through	698	700	100.3%	41.4	11.4	D
	Right Turn						
	Subtotal	849	849	100.0%	41.0	9.8	D
SB	Left Turn						
	Through	196	202	102.8%	22.2	4.5	C
	Right Turn	142	146	103.1%	4.1	0.9	A
	Subtotal	338	348	102.9%	14.5	2.9	B
EB	Left Turn	662	659	99.5%	66.3	35.6	E
	Through						
	Right Turn	217	221	101.9%	2.6	0.8	A
	Subtotal	879	880	100.1%	52.4	28.1	D
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,066	2,077	100.5%	41.9	14.3	D

SimTraffic Post-Processor **Squaw Alpine Gondola Phase 2**
Average Results from 10 Runs **Existing Conditions**
Volume and Delay by Movement **PM Peak Hour**

Intersection 13 **SR 89/Alpine Meadows** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	41	41	100.0%	29.0	6.5	C
	Through	293	290	98.8%	14.5	3.3	B
	Right Turn						
	Subtotal	334	331	99.0%	16.4	2.6	B
SB	Left Turn						
	Through	354	366	103.3%	26.0	4.3	C
	Right Turn	59	60	101.4%	4.2	0.4	A
	Subtotal	413	425	103.0%	23.0	3.4	C
EB	Left Turn	556	565	101.6%	52.1	18.4	D
	Through						
	Right Turn	314	320	102.0%	28.0	13.1	C
	Subtotal	870	885	101.7%	43.4	16.4	D
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		1,617	1,641	101.5%	32.7	9.7	C

Intersection 11 **Squaw Valley Rd/Squaw Creek Rd** **Side-street Stop**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Through	1,925	25	1	25	7	25	20	0%	0%
	Through/Right	1,925	25	1	25	8	50	23	0%	0%
NB	Left Turn	75	25	3	50	5	75	11	1%	0%
	Right Turn	1,400	50	3	75	5	75	15	1%	0%
WB	Left Turn	100	25	3	75	3	75	10	0%	0%
0										

SimTraffic Post-Processor **Squaw Alpine Gondola Phase 2**
Average Results from 10 Runs **Existing Conditions**
Queue Length **PM Peak Hour**

Intersection 12 **SR 89/Squaw Valley Rd** **Signal**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Left Turn	825	175	32	350	90	400	89	0%	0%
	Left/Through	1,625	200	30	350	87	400	88	0%	0%
	Right Turn	1,625	25	3	25	29	50	84	0%	0%
NB	Left Turn	425	125	14	225	72	325	197	0%	0%
	Through	650	275	13	500	43	600	88	35%	1%
	Through/Right	75	75	2	100	3	100	0	21%	0%
SB	Through	3,450	100	7	175	12	175	14	2%	0%
	Right Turn	150	25	1	25	4	50	10	0%	0%
0										

Intersection 13 **SR 89/Alpine Meadows** **Signal**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Left Turn	325	250	17	375	16	325	0	11%	0%
	Right Turn	2,150	250	88	700	227	1,000	226	0%	0%
NB	Left Turn	375	50	7	75	11	100	19	0%	0%
	Through	3,775	100	11	200	30	250	69	0%	0%
SB	Through	1,450	175	18	275	25	325	45	0%	0%
	Right Turn	625	25	3	50	5	75	8	0%	0%
0										

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	3/4/2017
Analysis Time Period	Winter AM
Highway	SR-89 SB
From/To	Deerfield Dr to W River St
Jurisdiction	Nevada/Placer County
Analysis Year	Existing Conditions
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.89	
Shoulder width	4.7	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.2	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	0	/mi

Analysis direction volume, Vd 808 veh/h
Opposing direction volume, Vo 254 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0		1.4	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	1.000		0.992	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	908	pc/h	288	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	1.3	mi/h
Adj. for access point density,(note-3) fA	0.0	mi/h
Free-flow speed, FFSd	43.7	mi/h
Adjustment for no-passing zones, fnp	3.4	mi/h
Average travel speed, ATSd	31.0	mi/h
Percent Free Flow Speed, PFFS	70.9	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	0.998
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	908 pc/h	286 pc/h

Base percent time-spent-following,(note-4) BPTSFd	66.9	%
Adjustment for no-passing zones, fnp	29.6	
Percent time-spent-following, PTSFd	89.4	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.31	
Peak 15-min vehicle-miles of travel, VMT15	45	veh-mi
Peak-hour vehicle-miles of travel, VMT60	162	veh-mi
Peak 15-min total travel time, TT15	1.5	veh-h
Capacity from ATS, CdATS	1686	veh/h
Capacity from PTSF, CdPTSF	1697	veh/h
Directional Capacity	3907	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.2	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	31.0	mi/h
Percent time-spent-following, PTSFd (from above)	89.4	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	907.9
Effective width of outside lane, We	21.40
Effective speed factor, St	4.42
Bicycle LOS Score, BLOS	3.29
Bicycle LOS	C

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	3/4/2017
Analysis Time Period	Winter AM
Highway	SR-89 SB
From/To	W River St to Squaw Valley Rd
Jurisdiction	Placer County
Analysis Year	Existing Conditions
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.90	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	7.8	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	55	%
Up/down	-	%	Access point density	1	/mi

Analysis direction volume, Vd 1054 veh/h
Opposing direction volume, Vo 236 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.3		2.2	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.994		0.977	
Grade adj. factor,(note-1) fg	1.00		0.80	
Directional flow rate,(note-2) vi	1178	pc/h	335	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	0.3	mi/h
Free-flow speed, FFSd	59.8	mi/h
Adjustment for no-passing zones, fnp	2.7	mi/h
Average travel speed, ATSd	45.3	mi/h
Percent Free Flow Speed, PFFS	75.8	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.7
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	0.986
Grade adjustment factor,(note-1) fg	1.00	0.83
Directional flow rate,(note-2) vi	1171 pc/h	320 pc/h

Base percent time-spent-following,(note-4) BPTSFd	77.4	%
Adjustment for no-passing zones, fnp	13.9	
Percent time-spent-following, PTSFd	88.3	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.81	
Peak 15-min vehicle-miles of travel, VMT15	2284	veh-mi
Peak-hour vehicle-miles of travel, VMT60	8221	veh-mi
Peak 15-min total travel time, TT15	50.4	veh-h
Capacity from ATS, CdATS	1463	veh/h
Capacity from PTSF, CdPTSF	1445	veh/h
Directional Capacity	1839	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	7.8	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	45.3	mi/h
Percent time-spent-following, PTSFd (from above)	88.3	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1171.1
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	1.90
Bicycle LOS	B

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	3/4/2017
Analysis Time Period	Winter AM
Highway	SR-89 NB
From/To	A. Meadows Rd to S. Valley Rd
Jurisdiction	Placer County
Analysis Year	Existing Conditions
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.92	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.3	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	0	/mi

Analysis direction volume, Vd 716 veh/h
Opposing direction volume, Vo 432 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.4		1.9	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.992		0.982	
Grade adj. factor,(note-1) fg	0.99		0.94	
Directional flow rate,(note-2) vi	792	pc/h	509	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	0.0	mi/h
Free-flow speed, FFSd	50.0	mi/h
Adjustment for no-passing zones, fnp	2.3	mi/h
Average travel speed, ATSd	37.6	mi/h
Percent Free Flow Speed, PFFS	75.3	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.4
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	0.992
Grade adjustment factor,(note-1) fg	1.00	0.94
Directional flow rate,(note-2) vi	778 pc/h	504 pc/h

Base percent time-spent-following,(note-4) BPTSFd	66.1	%
Adjustment for no-passing zones, fnp	28.8	
Percent time-spent-following, PTSFd	83.6	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.50	
Peak 15-min vehicle-miles of travel, VMT15	253	veh-mi
Peak-hour vehicle-miles of travel, VMT60	931	veh-mi
Peak 15-min total travel time, TT15	6.7	veh-h
Capacity from ATS, CdATS	1589	veh/h
Capacity from PTSF, CdPTSF	1625	veh/h
Directional Capacity	2610	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.3	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	37.6	mi/h
Percent time-spent-following, PTSFd (from above)	83.6	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	778.3
Effective width of outside lane, We	28.00
Effective speed factor, St	4.42
Bicycle LOS Score, BLOS	1.58
Bicycle LOS	B

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	3/4/2017
Analysis Time Period	Winter AM
Highway	SR-89 NB
From/To	SR 28 to A. Meadows Rd
Jurisdiction	Placer County
Analysis Year	Existing Conditions
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.92	
Shoulder width	6.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	3.7	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	1	/mi

Analysis direction volume, Vd 979 veh/h
Opposing direction volume, Vo 158 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.3		2.4	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.994		0.973	
Grade adj. factor,(note-1) fg	1.00		0.73	
Directional flow rate,(note-2) vi	1071	pc/h	242	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	0.3	mi/h
Free-flow speed, FFSd	49.8	mi/h
Adjustment for no-passing zones, fnp	3.7	mi/h
Average travel speed, ATSd	35.8	mi/h
Percent Free Flow Speed, PFFS	72.0	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.8
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	0.984
Grade adjustment factor,(note-1) fg	1.00	0.78
Directional flow rate,(note-2) vi	1064 pc/h	224 pc/h

Base percent time-spent-following,(note-4) BPTSFd	71.9	%
Adjustment for no-passing zones, fnp	20.6	
Percent time-spent-following, PTSFd	88.9	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.84	
Peak 15-min vehicle-miles of travel, VMT15	984	veh-mi
Peak-hour vehicle-miles of travel, VMT60	3622	veh-mi
Peak 15-min total travel time, TT15	27.5	veh-h
Capacity from ATS, CdATS	1276	veh/h
Capacity from PTSF, CdPTSF	1358	veh/h
Directional Capacity	1564	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	3.7	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	35.8	mi/h
Percent time-spent-following, PTSFd (from above)	88.9	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1064.1
Effective width of outside lane, We	24.00
Effective speed factor, St	4.42
Bicycle LOS Score, BLOS	2.78
Bicycle LOS	C

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	3/4/2017
Analysis Time Period	Winter AM
Highway	SR89 NB
From/To	At Transit Center
Jurisdiction	Caltrans
Analysis Year	
Description	Squaw Valley Olympic Villlage

Input Data

Highway class	Class 2		Peak hour factor, PHF	0.94	
Shoulder width	2.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.3	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	64	%
Up/down	-	%	Access point density	11	/mi

Analysis direction volume, Vd 643 veh/h
Opposing direction volume, Vo 281 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.4	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.998		0.992	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	685	pc/h	301	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	2.6	mi/h
Adj. for access point density,(note-3) fA	2.8	mi/h
Free-flow speed, FFSd	39.7	mi/h
Adjustment for no-passing zones, fnp	2.7	mi/h
Average travel speed, ATSd	29.3	mi/h
Percent Free Flow Speed, PFFS	74.0	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	0.998
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	684 pc/h	300 pc/h

Base percent time-spent-following,(note-4) BPTSFd	58.4	%
Adjustment for no-passing zones, fnp	29.9	
Percent time-spent-following, PTSFd	79.2	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.40	
Peak 15-min vehicle-miles of travel, VMT15	51	veh-mi
Peak-hour vehicle-miles of travel, VMT60	193	veh-mi
Peak 15-min total travel time, TT15	1.7	veh-h
Capacity from ATS, CdATS	0	veh/h
Capacity from PTSF, CdPTSF	1697	veh/h
Directional Capacity	2440	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.3	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	29.3	mi/h
Percent time-spent-following, PTSFd (from above)	79.2	
Level of service, LOSd (from above)	D	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	684.0
Effective width of outside lane, We	14.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	4.57
Bicycle LOS	E

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	4/9/2017
Analysis Time Period	Winter PM
Highway	SR-89 NB
From/To	W River St to Deerfield Dr
Jurisdiction	Nevada/Placer County
Analysis Year	Existing Conditions
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.96	
Shoulder width	4.7	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.2	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	0	/mi

Analysis direction volume, Vd 1284 veh/h
Opposing direction volume, Vo 400 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0		1.3	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	1.000		0.994	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1338	pc/h	419	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	1.3	mi/h
Adj. for access point density,(note-3) fA	0.0	mi/h
Free-flow speed, FFSd	43.7	mi/h
Adjustment for no-passing zones, fnp	2.6	mi/h
Average travel speed, ATSd	27.5	mi/h
Percent Free Flow Speed, PFFS	62.8	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	1.000
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1338 pc/h	417 pc/h

Base percent time-spent-following,(note-4) BPTSFd	81.8	%
Adjustment for no-passing zones, fnp	18.8	
Percent time-spent-following, PTSFd	96.1	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.85	
Peak 15-min vehicle-miles of travel, VMT15	67	veh-mi
Peak-hour vehicle-miles of travel, VMT60	257	veh-mi
Peak 15-min total travel time, TT15	2.4	veh-h
Capacity from ATS, CdATS	1572	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	2063	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.2	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	27.5	mi/h
Percent time-spent-following, PTSFd (from above)	96.1	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1337.5
Effective width of outside lane, We	21.40
Effective speed factor, St	4.42
Bicycle LOS Score, BLOS	3.49
Bicycle LOS	C

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	4/9/2017
Analysis Time Period	Winter PM
Highway	SR-89 NB
From/To	Squaw Valley Rd to W River St
Jurisdiction	Placer County
Analysis Year	Existing Conditions
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.93	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	7.8	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	55	%
Up/down	-	%	Access point density	1	/mi

Analysis direction volume, Vd 1360 veh/h
Opposing direction volume, Vo 338 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.3		2.0	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.994		0.980	
Grade adj. factor,(note-1) fg	1.00		0.87	
Directional flow rate,(note-2) vi	1471	pc/h	426	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	0.3	mi/h
Free-flow speed, FFSd	59.8	mi/h
Adjustment for no-passing zones, fnp	2.3	mi/h
Average travel speed, ATSd	42.8	mi/h
Percent Free Flow Speed, PFFS	71.6	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.6
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	0.988
Grade adjustment factor,(note-1) fg	1.00	0.88
Directional flow rate,(note-2) vi	1462 pc/h	418 pc/h

Base percent time-spent-following,(note-4) BPTSFd	84.3	%
Adjustment for no-passing zones, fnp	10.9	
Percent time-spent-following, PTSFd	92.8	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.97	
Peak 15-min vehicle-miles of travel, VMT15	2852	veh-mi
Peak-hour vehicle-miles of travel, VMT60	10608	veh-mi
Peak 15-min total travel time, TT15	66.7	veh-h
Capacity from ATS, CdATS	1516	veh/h
Capacity from PTSF, CdPTSF	1535	veh/h
Directional Capacity	1955	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	7.8	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	42.8	mi/h
Percent time-spent-following, PTSFd (from above)	92.8	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1462.4
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.01
Bicycle LOS	B

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	4/9/2017
Analysis Time Period	Winter PM
Highway	SR-89 NB
From/To	A. Meadows Rd to S. Valley Rd
Jurisdiction	Placer County
Analysis Year	Existing Conditions
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.92	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.3	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	0	/mi

Analysis direction volume, Vd 849 veh/h
Opposing direction volume, Vo 413 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.3		1.9	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.994		0.982	
Grade adj. factor,(note-1) fg	1.00		0.92	
Directional flow rate,(note-2) vi	928	pc/h	497	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	0.0	mi/h
Free-flow speed, FFSd	50.0	mi/h
Adjustment for no-passing zones, fnp	2.3	mi/h
Average travel speed, ATSd	36.6	mi/h
Percent Free Flow Speed, PFFS	73.3	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.4
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	0.992
Grade adjustment factor,(note-1) fg	1.00	0.93
Directional flow rate,(note-2) vi	923 pc/h	487 pc/h

Base percent time-spent-following,(note-4) BPTSFd	71.6	%
Adjustment for no-passing zones, fnp	23.5	
Percent time-spent-following, PTSFd	87.0	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.59	
Peak 15-min vehicle-miles of travel, VMT15	300	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1104	veh-mi
Peak 15-min total travel time, TT15	8.2	veh-h
Capacity from ATS, CdATS	1572	veh/h
Capacity from PTSF, CdPTSF	1602	veh/h
Directional Capacity	2414	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.3	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	36.6	mi/h
Percent time-spent-following, PTSFd (from above)	87.0	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	922.8
Effective width of outside lane, We	28.00
Effective speed factor, St	4.42
Bicycle LOS Score, BLOS	1.67
Bicycle LOS	B

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	4/9/2017
Analysis Time Period	Winter PM
Highway	SR-89 SB
From/To	A. Meadows Rd to SR 28
Jurisdiction	Placer County
Analysis Year	Existing Conditions
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.87	
Shoulder width	5.5	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	3.7	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	1	/mi

Analysis direction volume, Vd 715 veh/h
Opposing direction volume, Vo 334 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.4		2.0	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.992		0.980	
Grade adj. factor,(note-1) fg	0.99		0.89	
Directional flow rate,(note-2) vi	837	pc/h	440	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	1.3	mi/h
Adj. for access point density,(note-3) fA	0.3	mi/h
Free-flow speed, FFSd	48.5	mi/h
Adjustment for no-passing zones, fnp	2.5	mi/h
Average travel speed, ATSd	36.0	mi/h
Percent Free Flow Speed, PFFS	74.3	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.6
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	0.988
Grade adjustment factor,(note-1) fg	1.00	0.89
Directional flow rate,(note-2) vi	822 pc/h	437 pc/h

Base percent time-spent-following,(note-4) BPTSFd	66.7	%
Adjustment for no-passing zones, fnp	26.4	
Percent time-spent-following, PTSFd	83.9	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.54	
Peak 15-min vehicle-miles of travel, VMT15	760	veh-mi
Peak-hour vehicle-miles of travel, VMT60	2646	veh-mi
Peak 15-min total travel time, TT15	21.1	veh-h
Capacity from ATS, CdATS	1536	veh/h
Capacity from PTSF, CdPTSF	1552	veh/h
Directional Capacity	2343	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	3.7	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	36.0	mi/h
Percent time-spent-following, PTSFd (from above)	83.9	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	821.8
Effective width of outside lane, We	23.00
Effective speed factor, St	4.42
Bicycle LOS Score, BLOS	2.89
Bicycle LOS	C

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	4/9/2017
Analysis Time Period	Winter PM
Highway	SR89 SB
From/To	At Transit Center
Jurisdiction	Caltrans
Analysis Year	
Description	Squaw Valley Olympic Villlage

Input Data

Highway class	Class 2		Peak hour factor, PHF	0.85	
Shoulder width	2.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.3	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	64	%
Up/down	-	%	Access point density	11	/mi

Analysis direction volume, Vd 462 veh/h
Opposing direction volume, Vo 398 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.2		1.2	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.996		0.996	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	546	pc/h	470	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	2.6	mi/h
Adj. for access point density,(note-3) fA	2.8	mi/h
Free-flow speed, FFSd	39.7	mi/h
Adjustment for no-passing zones, fnp	1.8	mi/h
Average travel speed, ATSd	29.9	mi/h
Percent Free Flow Speed, PFFS	75.5	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	1.000
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	544 pc/h	468 pc/h

Base percent time-spent-following,(note-4) BPTSFd	54.0	%
Adjustment for no-passing zones, fnp	36.5	
Percent time-spent-following, PTSFd	73.6	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.32	
Peak 15-min vehicle-miles of travel, VMT15	41	veh-mi
Peak-hour vehicle-miles of travel, VMT60	139	veh-mi
Peak 15-min total travel time, TT15	1.4	veh-h
Capacity from ATS, CdATS	0	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	3162	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.3	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	29.9	mi/h
Percent time-spent-following, PTSFd (from above)	73.6	
Level of service, LOSd (from above)	D	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	543.5
Effective width of outside lane, We	14.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	4.45
Bicycle LOS	D

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Squaw Valley Road West of SR 89

	Sun 2/26/17		Sun 1/29/17	
	EB	WB	EB	WB
12	54	50	54	50
1	51	34	51	34
2	37	32	37	32
3	27	20	27	20
4	27	25	27	25
5	32	47	32	47
6	49	270	49	270
7	132	1125	132	1354.502
8	228	988	228	1189.554
9	233	469	233	564.6768
10	286	370	286	445.4806
11	416	382	416	459.9287
12	695	289	836.7812	289
1	659	249	793.4371	249
2	815	306	879	293
3	862	226	978	211
4	622	174	911	193
5	399	128	480.3967	128
6	183	84	220.3323	84
7	102	67	102	67
8	90	61	90	61
9	38	28	38	28
10	45	20	45	20
11	40	20	40	20
SUM	6122	5464	6985.947	6135.142
	11586		13121.09	

Three Hour Sums				Three Hour Growth	
EB	EB	WB	WB	EB Inc	WB Inc
2299	2768	706	697	1.204002	0.987252

= volume same as 2/26 because hour/direction not materially affected by number of skiers

= volume increased by 20% based on 3-hour eb increase

= volume observed on 1/29

Prepared by NDS/ATD

VOLUME

Squaw Valley Road West-Of SR 89

Day: Sunday
Date: 2/26/2017

City: Squaw Valley
Project #: CA17_7164_001

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	6,122	5,464	11,586

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
0:00	0	0	11		11		22		12:00	0	0	178		77		255	
0:15	0	0	19		9		28		12:15	0	0	142		81		223	
0:30	0	0	12		15		27		12:30	0	0	196		68		264	
0:45	0	0	12	54	15	50	27	104	12:45	0	0	179	695	63	289	242	984
1:00	0	0	17		7		24		13:00	0	0	157		63		220	
1:15	0	0	15		11		26		13:15	0	0	169		44		213	
1:30	0	0	8		6		14		13:30	0	0	170		66		236	
1:45	0	0	11	51	10	34	21	85	13:45	0	0	163	659	76	249	239	908
2:00	0	0	9		7		16		14:00	0	0	179		57		236	
2:15	0	0	12		5		17		14:15	0	0	165		84		249	
2:30	0	0	9		9		18		14:30	0	0	205		84		289	
2:45	0	0	7	37	11	32	18	69	14:45	0	0	266	815	81	306	347	1121
3:00	0	0	9		5		14		15:00	0	0	237		45		282	
3:15	0	0	6		3		9		15:15	0	0	214		67		281	
3:30	0	0	4		7		11		15:30	0	0	221		58		279	
3:45	0	0	8	27	5	20	13	47	15:45	0	0	190	862	56	226	246	1088
4:00	0	0	9		7		16		16:00	0	0	186		37		223	
4:15	0	0	5		6		11		16:15	0	0	164		56		220	
4:30	0	0	8		7		15		16:30	0	0	170		47		217	
4:45	0	0	5	27	5	25	10	52	16:45	0	0	102	622	34	174	136	796
5:00	0	0	5		6		11		17:00	0	0	130		39		169	
5:15	0	0	10		8		18		17:15	0	0	112		25		137	
5:30	0	0	8		15		23		17:30	0	0	76		29		105	
5:45	0	0	9	32	18	47	27	79	17:45	0	0	81	399	35	128	116	527
6:00	0	0	8		24		32		18:00	0	0	78		25		103	
6:15	0	0	12		26		38		18:15	0	0	43		17		60	
6:30	0	0	14		67		81		18:30	0	0	42		20		62	
6:45	0	0	15	49	153	270	168	319	18:45	0	0	20	183	22	84	42	267
7:00	0	0	16		171		187		19:00	0	0	34		17		51	
7:15	0	0	29		282		311		19:15	0	0	28		11		39	
7:30	0	0	38		321		359		19:30	0	0	24		25		49	
7:45	0	0	49	132	351	1125	400	1257	19:45	0	0	16	102	14	67	30	169
8:00	0	0	43		332		375		20:00	0	0	28		18		46	
8:15	0	0	57		279		336		20:15	0	0	24		17		41	
8:30	0	0	53		192		245		20:30	0	0	20		11		31	
8:45	0	0	75	228	185	988	260	1216	20:45	0	0	18	90	15	61	33	151
9:00	0	0	55		161		216		21:00	0	0	5		9		14	
9:15	0	0	42		122		164		21:15	0	0	10		4		14	
9:30	0	0	60		98		158		21:30	0	0	12		3		15	
9:45	0	0	76	233	88	469	164	702	21:45	0	0	11	38	12	28	23	66
10:00	0	0	69		89		158		22:00	0	0	9		8		17	
10:15	0	0	86		103		189		22:15	0	0	9		7		16	
10:30	0	0	65		90		155		22:30	0	0	14		2		16	
10:45	0	0	66	286	88	370	154	656	22:45	0	0	13	45	3	20	16	65
11:00	0	0	97		86		183		23:00	0	0	12		4		16	
11:15	0	0	89		101		190		23:15	0	0	14		5		19	
11:30	0	0	119		117		236		23:30	0	0	9		3		12	
11:45	0	0	111	416	78	382	189	798	23:45	0	0	5	40	8	20	13	60
TOTALS				1572		3812		**5384**	**TOTALS**				4550		1652		**6202**
SPLIT %				29.2%		70.8%		**46.5%**	**SPLIT %**				73.4%		26.6%		**53.5%**

Hour Starting	Total EB	% Skiers	
12	54	0	0
1	51	0	0
2	37	0	0
3	27	0	0
4	27	0	0
5	32	0	0
6	49	0	0
7	132	0	0
8	228	0	0
9	233	0	0
10	286	0	0
11	416	0.1	41.6
12	695	0.1	69.5
1	659	0.63	415.17
2	815	1	815
3	862	0.63	543.06
4	622	0.63	391.86
5	399	0.25	99.75
6	183	0	0
7	102	0	0
8	90	0	0
9	38	0	0
10	45	0	0
11	40	0	0
	6122		2375.9

34.30%
Percent of all Skiers Exitir
During 2-3 PM Peak Hour

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	6,122	5,464	11,586

E2

Existing Plus Project Conditions Technical Calculations

HCM 2010 Signalized Intersection Summary
1: SR 89 & Donner Pass Rd

02/23/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	186	346	110	166	37	151	72	81	18	94	60
Future Volume (veh/h)	54	186	346	110	166	37	151	72	81	18	94	60
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1900
Adj Flow Rate, veh/h	59	202	376	125	189	42	162	77	87	20	103	66
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	0	2	0
Peak Hour Factor	0.92	0.92	0.92	0.88	0.88	0.88	0.93	0.93	0.93	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	74	468	653	163	576	489	286	301	255	57	294	192
Arrive On Green	0.04	0.25	0.25	0.09	0.31	0.31	0.16	0.16	0.16	0.17	0.16	0.16
Sat Flow, veh/h	1774	1863	1581	1774	1863	1583	1774	1863	1583	366	1891	1233
Grp Volume(v), veh/h	59	202	376	125	189	42	162	77	87	101	0	88
Grp Sat Flow(s),veh/h/ln	1774	1863	1581	1774	1863	1583	1774	1863	1583	1844	0	1645
Q Serve(g_s), s	2.0	5.6	11.3	4.3	4.8	1.2	5.2	2.2	3.0	3.0	0.0	2.9
Cycle Q Clear(g_c), s	2.0	5.6	11.3	4.3	4.8	1.2	5.2	2.2	3.0	3.0	0.0	2.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	0.20		0.75
Lane Grp Cap(c), veh/h	74	468	653	163	576	489	286	301	255	287	0	256
V/C Ratio(X)	0.79	0.43	0.58	0.77	0.33	0.09	0.57	0.26	0.34	0.35	0.00	0.34
Avail Cap(c_a), veh/h	431	1056	1152	1006	1056	897	862	905	769	747	0	666
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.3	19.4	14.0	27.4	16.4	15.1	23.9	22.7	23.0	23.2	0.0	23.3
Incr Delay (d2), s/veh	6.9	0.2	0.3	2.9	0.1	0.0	0.7	0.2	0.3	0.3	0.0	0.3
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	1.1	2.9	6.3	2.2	2.5	0.5	2.6	1.1	1.3	1.6	0.0	1.4
LnGrp Delay(d),s/veh	36.2	19.6	14.3	30.3	16.5	15.2	24.6	22.8	23.3	23.5	0.0	23.6
LnGrp LOS	D	B	B	C	B	B	C	C	C	C		C
Approach Vol, veh/h		637			356			326			189	
Approach Delay, s/veh		18.0			21.2			23.8			23.5	
Approach LOS		B			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.7	21.0		14.6	7.1	24.6		15.5
Change Period (Y+Rc), s	5.0	5.5		5.0	4.5	5.5		5.5
Max Green Setting (Gmax), s	35.0	35.0		25.0	15.0	35.0		30.0
Max Q Clear Time (g_c+I1), s	6.3	13.3		5.0	4.0	6.8		7.2
Green Ext Time (p_c), s	0.2	2.1		0.6	0.0	2.1		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	20.7
HCM 2010 LOS	C

MOVEMENT SUMMARY

Site: 2. E+P AM

SR 89 / I-80 WB Ramp
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: HWY 89											
3	L2	142	3.0	0.168	4.8	LOS A	0.0	0.0	0.00	0.00	25.5
8	T1	226	3.0	0.168	4.8	LOS A	0.0	0.0	0.00	0.00	25.9
Approach		368	3.0	0.168	4.8	LOS A	0.0	0.0	0.00	0.00	25.8
East: I-80 WB off-ramp											
1	L2	219	3.0	0.260	7.1	LOS A	0.8	19.4	0.37	0.34	23.4
6	T1	1	3.0	0.001	4.4	LOS A	0.0	0.1	0.32	0.17	32.5
16	R2	112	3.0	0.136	5.7	LOS A	0.4	9.6	0.35	0.30	23.5
Approach		333	3.0	0.260	6.6	LOS A	0.8	19.4	0.36	0.33	23.5
North: HWY 89											
4	T1	558	3.0	0.399	9.9	LOS A	1.8	45.1	0.55	0.53	23.5
14	R2	45	3.0	0.399	9.9	LOS A	1.8	45.1	0.55	0.53	22.8
Approach		603	3.0	0.399	9.9	LOS A	1.8	45.1	0.55	0.53	23.4
All Vehicles		1304	3.0	0.399	7.6	LOS A	1.8	45.1	0.35	0.33	24.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 3. E+P AM

SR 89 / I-80 EB Ramp
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: HWY 89											
8	T1	351	3.0	0.281	6.7	LOS A	1.2	30.5	0.32	0.21	24.2
18	R2	183	3.0	0.281	6.7	LOS A	1.2	30.5	0.32	0.21	23.4
Approach		533	3.0	0.281	6.7	LOS A	1.2	30.5	0.32	0.21	24.0
North: HWY 89											
7	L2	105	3.0	0.350	6.8	LOS A	0.0	0.0	0.00	0.00	26.3
4	T1	662	3.0	0.350	6.8	LOS A	0.0	0.0	0.00	0.00	28.0
Approach		767	3.0	0.350	6.8	LOS A	0.0	0.0	0.00	0.00	27.7
West: I-80 EB off-ramp											
5	L2	35	3.0	0.448	12.9	LOS B	1.6	42.2	0.60	0.64	25.7
12	R2	519	3.0	0.448	12.7	LOS B	1.6	42.2	0.59	0.63	27.9
Approach		554	3.0	0.448	12.7	LOS B	1.6	42.2	0.59	0.63	27.8
All Vehicles		1855	3.0	0.448	8.5	LOS A	1.6	42.2	0.27	0.25	26.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Volume (veh/h)	173	44	71	185	27	793	194
Future Volume (veh/h)	173	44	71	185	27	793	194
Number	3	18	1	6		2	12
Initial Q (Qb), veh	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00		1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863		1863	1863
Adj Flow Rate, veh/h	204	52	88	228		901	220
Adj No. of Lanes	2	1	1	2		2	1
Peak Hour Factor	0.85	0.85	0.81	0.81		0.88	0.88
Percent Heavy Veh, %	2	2	2	2		2	2
Cap, veh/h	268	222	111	2978		2142	1306
Arrive On Green	0.08	0.08	0.12	1.00		0.75	0.75
Sat Flow, veh/h	3442	1583	1774	3632		3297	1583
Grp Volume(v), veh/h	204	52	88	228		901	220
Grp Sat Flow(s),veh/h/ln	1721	1583	1774	1770		1434	1583
Q Serve(g_s), s	7.2	3.6	6.0	0.0		14.4	3.5
Cycle Q Clear(g_c), s	7.2	3.6	6.0	0.0		14.4	3.5
Prop In Lane	1.00	1.00	1.00				1.00
Lane Grp Cap(c), veh/h	268	222	111	2978		2142	1306
V/C Ratio(X)	0.76	0.23	0.79	0.08		0.42	0.17
Avail Cap(c_a), veh/h	971	546	358	2978		2142	1306
HCM Platoon Ratio	1.00	1.00	2.00	2.00		1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00		1.00	1.00
Uniform Delay (d), s/veh	56.0	47.4	53.5	0.0		5.8	2.2
Incr Delay (d2), s/veh	1.7	0.2	12.0	0.1		0.6	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	1.6	3.3	0.0		5.8	2.3
LnGrp Delay(d),s/veh	57.7	47.6	65.5	0.1		6.4	2.5
LnGrp LOS	E	D	E	A		A	A
Approach Vol, veh/h	256			316		1121	
Approach Delay, s/veh	55.7			18.3		5.6	
Approach LOS	E			B		A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	11.7	98.1				109.8		14.2
Change Period (Y+Rc), s	4.0	5.5				5.5		4.5
Max Green Setting (Gmax), s	25.0	50.0				50.0		35.0
Max Q Clear Time (g_c+I1), s	8.0	16.4				2.0		9.2
Green Ext Time (p_c), s	0.2	10.0				10.7		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	15.6
HCM 2010 LOS	B

Notes

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	278	50	206	32	25	813
Future Volume (veh/h)	278	50	206	32	25	813
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	376	68	299	46	28	903
Adj No. of Lanes	1	1	2	1	1	1
Peak Hour Factor	0.74	0.74	0.69	0.69	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	400	388	1829	1367	35	1278
Arrive On Green	0.23	0.23	0.64	0.64	0.04	1.00
Sat Flow, veh/h	1774	1583	3297	1583	1774	1863
Grp Volume(v), veh/h	376	68	299	46	28	903
Grp Sat Flow(s),veh/h/ln	1774	1583	1434	1583	1774	1863
Q Serve(g_s), s	25.8	4.2	5.2	0.5	1.9	0.0
Cycle Q Clear(g_c), s	25.8	4.2	5.2	0.5	1.9	0.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	400	388	1829	1367	35	1278
V/C Ratio(X)	0.94	0.18	0.16	0.03	0.79	0.71
Avail Cap(c_a), veh/h	415	402	1829	1367	429	1278
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.2	36.9	9.1	1.2	59.3	0.0
Incr Delay (d2), s/veh	28.5	0.1	0.2	0.0	13.5	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.8	1.9	2.1	0.6	1.1	1.2
LnGrp Delay(d),s/veh	75.7	37.0	9.3	1.2	72.7	3.3
LnGrp LOS	E	D	A	A	E	A
Approach Vol, veh/h	444		345			931
Approach Delay, s/veh	69.8		8.2			5.4
Approach LOS	E		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	6.0	85.1				91.1		32.9
Change Period (Y+Rc), s	3.5	6.0				6.0		5.0
Max Green Setting (Gmax), s	30.0	50.0				50.0		29.0
Max Q Clear Time (g_c+I1), s	3.9	7.2				2.0		27.8
Green Ext Time (p_c), s	0.0	5.9				5.9		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	22.6
HCM 2010 LOS	C

Intersection	
Intersection Delay, s/veh	7.3
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	37	1	0	1	35	40
Future Vol, veh/h	37	1	0	1	35	40
Peak Hour Factor	0.68	0.68	0.25	0.25	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	54	1	0	4	39	45
Number of Lanes	0	1	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	7.6	6.6	7.2
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	97%	0%	47%
Vol Thru, %	3%	0%	0%
Vol Right, %	0%	100%	53%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	38	1	75
LT Vol	37	0	35
Through Vol	1	0	0
RT Vol	0	1	40
Lane Flow Rate	56	4	84
Geometry Grp	1	1	1
Degree of Util (X)	0.066	0.004	0.089
Departure Headway (Hd)	4.28	3.524	3.813
Convergence, Y/N	Yes	Yes	Yes
Cap	837	1010	938
Service Time	2.308	1.566	1.844
HCM Lane V/C Ratio	0.067	0.004	0.09
HCM Control Delay	7.6	6.6	7.2
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.2	0	0.3

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	13	40	277	84	18	11
Future Vol, veh/h	13	40	277	84	18	11
Conflicting Peds, #/hr	0	0	0	0	0	8
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	72	72	89	89	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	18	56	311	94	21	13

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	311	0	-	0	403	319
Stage 1	-	-	-	-	311	-
Stage 2	-	-	-	-	92	-
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	1249	-	-	-	603	722
Stage 1	-	-	-	-	743	-
Stage 2	-	-	-	-	932	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1241	-	-	-	594	717
Mov Cap-2 Maneuver	-	-	-	-	594	-
Stage 1	-	-	-	-	743	-
Stage 2	-	-	-	-	918	-

Approach	EB	WB	SB
HCM Control Delay, s	1.9	0	11
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1241	-	-	-	635
HCM Lane V/C Ratio	0.015	-	-	-	0.052
HCM Control Delay (s)	7.9	0	-	-	11
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	6.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	55	9	541	392	12	55
Future Vol, veh/h	55	9	541	392	12	55
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	72	72	89	89	79	79
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	76	13	608	440	15	70

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	89	0	1739	84
Stage 1	-	-	-	-	83	-
Stage 2	-	-	-	-	1656	-
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	-	-	1506	-	96	975
Stage 1	-	-	-	-	940	-
Stage 2	-	-	-	-	171	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1505	-	57	974
Mov Cap-2 Maneuver	-	-	-	-	57	-
Stage 1	-	-	-	-	940	-
Stage 2	-	-	-	-	102	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.2	23.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	57	974	-	-	1505	-
HCM Lane V/C Ratio	0.266	0.071	-	-	0.404	-
HCM Control Delay (s)	89.7	9	-	-	9	-
HCM Lane LOS	F	A	-	-	A	-
HCM 95th %tile Q(veh)	0.9	0.2	-	-	2	-

Intersection	
Int Delay, s/veh	16.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	104	6	411	905	8	4	3	49	6	13	31
Future Vol, veh/h	6	104	6	411	905	8	4	3	49	6	13	31
Conflicting Peds, #/hr	1	0	1	1	0	1	4	0	5	5	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	-	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	72	72	72	89	89	89	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	144	8	462	1017	9	4	3	53	6	14	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1027	0	0	154	0	0	1609	2116	155	2144	2116	518
Stage 1	-	-	-	-	-	-	166	166	-	1946	1946	-
Stage 2	-	-	-	-	-	-	1443	1950	-	198	170	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.33	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	674	-	-	1425	-	-	77	50	890	31	50	503
Stage 1	-	-	-	-	-	-	835	760	-	67	111	-
Stage 2	-	-	-	-	-	-	139	110	-	803	757	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	672	-	-	1419	-	-	-	12	886	9	~ 12	501
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	12	-	9	~ 12	-
Stage 1	-	-	-	-	-	-	824	750	-	66	27	-
Stage 2	-	-	-	-	-	-	15	26	-	740	747	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	3.9		$ 429.5
HCM LOS			-	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	-	672	-	-	1419	-	-	9	38
HCM Lane V/C Ratio	-	0.012	-	-	0.325	-	-	0.717	1.245
HCM Control Delay (s)	-	10.4	-	-	8.8	1.7	-	$ 706.1	$ 391.8
HCM Lane LOS	-	B	-	-	A	A	-	F	F
HCM 95th %tile Q(veh)	-	0	-	-	1.4	-	-	1.4	4.8

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	162	0	0	1302	6	0	0	0	11	0	7
Future Volume (veh/h)	2	162	0	0	1302	6	0	0	0	11	0	7
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	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
Adj Sat Flow, veh/h/ln	1900	1863	0	0	1863	1900				1900	1863	1900
Adj Flow Rate, veh/h	3	225	0	0	1463	7				12	0	8
Adj No. of Lanes	0	1	0	0	2	0				0	1	0
Peak Hour Factor	0.72	0.72	0.72	0.89	0.89	0.89				0.89	0.89	0.89
Percent Heavy Veh, %	2	2	0	0	2	2				0	2	0
Cap, veh/h	98	968	0	0	1901	9				267	0	178
Arrive On Green	0.53	0.53	0.00	0.00	0.53	0.53				0.26	0.00	0.26
Sat Flow, veh/h	4	1839	0	0	3705	17				1015	0	677
Grp Volume(v), veh/h	228	0	0	0	717	753				20	0	0
Grp Sat Flow(s),veh/h/ln	1844	0	0	0	1770	1860				1693	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	12.2	12.3				0.3	0.0	0.0
Cycle Q Clear(g_c), s	2.5	0.0	0.0	0.0	12.2	12.3				0.3	0.0	0.0
Prop In Lane	0.01		0.00	0.00		0.01				0.60		0.40
Lane Grp Cap(c), veh/h	1066	0	0	0	931	979				445	0	0
V/C Ratio(X)	0.21	0.00	0.00	0.00	0.77	0.77				0.04	0.00	0.00
Avail Cap(c_a), veh/h	1066	0	0	0	931	979				445	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	1.00	1.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	4.9	0.0	0.0	0.0	7.2	7.2				10.4	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.0	6.1	5.8				0.2	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
%ile BackOfQ(50%),veh/ln	1.4	0.0	0.0	0.0	7.3	7.7				0.2	0.0	0.0
LnGrp Delay(d),s/veh	5.3	0.0	0.0	0.0	13.3	13.0				10.6	0.0	0.0
LnGrp LOS	A				B	B				B		
Approach Vol, veh/h		228			1470						20	
Approach Delay, s/veh		5.3			13.1						10.6	
Approach LOS		A			B						B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		24.0		14.0		24.0		
Change Period (Y+Rc), s		4.0		4.0		4.0		
Max Green Setting (Gmax), s		20.0		10.0		20.0		
Max Q Clear Time (g_c+I1), s		4.5		2.3		14.3		
Green Ext Time (p_c), s		9.9		0.0		4.4		

Intersection Summary	
HCM 2010 Ctrl Delay	12.1
HCM 2010 LOS	B

SimTraffic Post-Processor | **Squaw Alpine Gondola Phase 2**
Average Results from 10 Runs | **Existing + Project**
Volume and Delay by Movement | **AM Peak Hour**

Intersection 11 **Squaw Creek Rd/Squaw Valley Rd** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	28	29	102.7%	11.2	3.4	B
	Through						
	Right Turn	22	22	98.4%	2.8	0.6	A
	Subtotal	50	50	100.8%	6.8	1.8	A
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	156	160	102.5%	1.2	0.4	A
	Right Turn	17	16	95.9%	1.5	1.3	A
	Subtotal	173	176	101.8%	1.3	0.4	A
WB	Left Turn	48	46	95.9%	4.8	1.3	A
	Through	1,260	1,282	101.7%	3.8	0.3	A
	Right Turn						
	Subtotal	1,308	1,328	101.5%	3.9	0.3	A
Total		1,531	1,555	101.5%	3.6	0.3	A

Intersection 12 **SR 89/Squaw Valley Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	545	545	99.9%	35.8	8.8	D
	Through	139	144	103.7%	11.3	2.1	B
	Right Turn						
	Subtotal	684	689	100.7%	30.4	7.5	C
SB	Left Turn						
	Through	347	357	102.7%	63.6	24.7	E
	Right Turn	744	767	103.1%	43.0	24.8	D
	Subtotal	1,091	1,123	103.0%	49.3	24.5	D
EB	Left Turn	99	103	103.7%	36.7	16.0	D
	Through						
	Right Turn	91	92	100.6%	2.4	0.7	A
	Subtotal	190	194	102.2%	20.5	6.0	C
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		1,965	2,006	102.1%	40.0	15.7	D

SimTraffic Post-Processor **Squaw Alpine Gondola Phase 2**
Average Results from 10 Runs **Existing + Project**
Volume and Delay by Movement **AM Peak Hour**

Intersection 13 **SR 89/Alpine Meadows Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	394	388	98.5%	26.9	4.7	C
	Through	619	618	99.9%	19.8	5.1	B
	Right Turn						
	Subtotal	1,013	1,007	99.4%	22.6	4.1	C
SB	Left Turn						
	Through	125	132	105.7%	16.0	4.3	B
	Right Turn	313	311	99.5%	12.9	1.5	B
	Subtotal	438	443	101.2%	13.8	1.8	B
EB	Left Turn	65	65	100.1%	26.4	5.0	C
	Through						
	Right Turn	35	39	110.6%	2.3	1.1	A
	Subtotal	100	104	103.8%	17.1	3.1	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		1,551	1,554	100.2%	19.7	2.8	B

SimTraffic Post-Processor **Squaw Alpine Gondola Phase 2**
Average Results from 10 Runs **Existing + Project**
Queue Length **AM Peak Hour**

Intersection 11 **Squaw Creek Rd/Squaw Valley Rd** **Side-street Stop**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
NB	Left Turn	75	25	4	50	4	75	8	1%	0%
	Right Turn	1,425	25	4	50	5	50	11	0%	0%
WB	Left/Through	750	25	5	75	19	100	33	0%	0%
	Through	750	25	6	50	35	75	76	0%	0%
EB	Through	3,000	25	0	25	0	25	0	0%	0%
	Through/Right	2,000	25	0	25	0	25	0	0%	0%
0										

Intersection 12 **SR 89/Squaw Valley Rd** **Signal**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Left Turn	475	25	5	75	14	100	29	0%	0%
	Left/Through	1,600	75	5	100	9	125	23	0%	0%
	Right Turn	1,600	25	0	25	0	25	0	0%	0%
NB	Left Turn	3,150	300	40	475	69	500	92	5%	0%
	Through	650	100	56	375	159	600	90	0%	1%
	Through/Right	75	25	2	25	11	75	24	0%	0%
SB	Left Turn	150	25	0	25	0	25	0	0%	0%
	Through	150	175	8	225	6	200	1	18%	18%
	Right Turn	3,725	375	78	800	124	975	145	0%	0%
WB	Shared	1,675	25	0	25	0	25	0	0%	0%

SimTraffic Post-Processor **Squaw Alpine Gondola Phase 2**
Average Results from 10 Runs **Existing + Project**
Queue Length **AM Peak Hour**

Intersection 13 **SR 89/Alpine Meadows Rd** **Signal**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Left Turn	150	50	6	100	12	125	20	0%	0%
	Right Turn	1,825	25	3	50	4	50	13	0%	0%
NB	Left Turn	375	175	15	275	39	375	47	0%	0%
	Through	3,700	175	18	350	59	500	114	1%	0%
SB	Through	1,450	75	6	125	13	150	27	0%	0%
	Right Turn	625	125	15	200	18	250	29	0%	0%
0										

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	90	68	190	590	4	415	25	210	12	22	8
Future Volume (veh/h)	2	90	68	190	590	4	415	25	210	12	22	8
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1900	1863	1900
Adj Flow Rate, veh/h	3	125	0	221	686	5	460	0	0	19	35	13
Adj No. of Lanes	1	2	1	2	2	0	2	0	1	0	1	0
Peak Hour Factor	0.72	0.72	0.72	0.86	0.86	0.86	0.94	0.94	0.94	0.63	0.63	0.63
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	9	679	304	446	1139	8	701	0	313	52	95	35
Arrive On Green	0.00	0.19	0.00	0.13	0.32	0.32	0.20	0.00	0.00	0.10	0.10	0.10
Sat Flow, veh/h	1774	3539	1583	3442	3601	26	3548	0	1583	504	928	345
Grp Volume(v), veh/h	3	125	0	221	337	354	460	0	0	67	0	0
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1721	1770	1858	1774	0	1583	1777	0	0
Q Serve(g_s), s	0.1	1.3	0.0	2.6	6.9	6.9	5.1	0.0	0.0	1.5	0.0	0.0
Cycle Q Clear(g_c), s	0.1	1.3	0.0	2.6	6.9	6.9	5.1	0.0	0.0	1.5	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	1.00		1.00	0.28		0.19
Lane Grp Cap(c), veh/h	9	679	304	446	560	588	701	0	313	182	0	0
V/C Ratio(X)	0.34	0.18	0.00	0.50	0.60	0.60	0.66	0.00	0.00	0.37	0.00	0.00
Avail Cap(c_a), veh/h	618	2467	1103	1199	1644	1727	2143	0	956	1073	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	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	21.3	14.6	0.0	17.4	12.4	12.4	15.9	0.0	0.0	18.0	0.0	0.0
Incr Delay (d2), s/veh	8.4	0.0	0.0	0.3	0.4	0.4	0.4	0.0	0.0	0.5	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	0.1	0.6	0.0	1.2	3.4	3.6	2.5	0.0	0.0	0.8	0.0	0.0
LnGrp Delay(d),s/veh	29.8	14.6	0.0	17.7	12.8	12.8	16.3	0.0	0.0	18.5	0.0	0.0
LnGrp LOS	C	B		B	B	B	B			B		
Approach Vol, veh/h		128			912			460			67	
Approach Delay, s/veh		15.0			14.0			16.3			18.5	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.3	12.9		8.4	3.9	18.2		12.5
Change Period (Y+Rc), s	* 3.7	4.6		4.0	* 3.7	* 4.6		4.0
Max Green Setting (Gmax), s	* 15	30.0		26.0	* 15	* 40		26.0
Max Q Clear Time (g_c+I1), s	4.6	3.3		3.5	2.1	8.9		7.1
Green Ext Time (p_c), s	0.1	2.0		0.1	0.0	2.0		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	15.0
HCM 2010 LOS	B

Notes

HCM 2010 Signalized Intersection Summary
1: SR 89 & Donner Pass Rd

02/23/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	188	199	131	180	37	333	134	189	37	90	60
Future Volume (veh/h)	44	188	199	131	180	37	333	134	189	37	90	60
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1900
Adj Flow Rate, veh/h	54	232	246	147	202	42	370	149	210	44	107	71
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	0	2	0
Peak Hour Factor	0.81	0.81	0.81	0.89	0.89	0.89	0.90	0.90	0.90	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	81	384	747	213	523	433	472	496	422	112	275	187
Arrive On Green	0.05	0.21	0.21	0.12	0.28	0.28	0.27	0.27	0.27	0.16	0.16	0.15
Sat Flow, veh/h	1774	1863	1579	1774	1863	1542	1774	1863	1583	679	1672	1139
Grp Volume(v), veh/h	54	232	246	147	202	42	370	149	210	118	0	104
Grp Sat Flow(s),veh/h/ln	1774	1863	1579	1774	1863	1542	1774	1863	1583	1829	0	1662
Q Serve(g_s), s	2.0	7.4	6.4	5.2	5.8	1.3	12.7	4.2	7.4	3.8	0.0	3.7
Cycle Q Clear(g_c), s	2.0	7.4	6.4	5.2	5.8	1.3	12.7	4.2	7.4	3.8	0.0	3.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	0.37		0.69
Lane Grp Cap(c), veh/h	81	384	747	213	523	433	472	496	422	301	0	273
V/C Ratio(X)	0.67	0.60	0.33	0.69	0.39	0.10	0.78	0.30	0.50	0.39	0.00	0.38
Avail Cap(c_a), veh/h	417	1032	1296	969	1032	854	848	891	757	722	0	656
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	30.9	23.7	10.9	27.8	19.1	17.5	22.4	19.3	20.4	24.6	0.0	24.8
Incr Delay (d2), s/veh	3.5	0.6	0.1	1.5	0.2	0.0	1.1	0.1	0.3	0.3	0.0	0.3
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	1.0	3.9	4.2	2.7	3.0	0.6	6.3	2.2	3.3	1.9	0.0	1.7
LnGrp Delay(d),s/veh	34.4	24.3	10.9	29.3	19.3	17.6	23.5	19.4	20.8	24.9	0.0	25.2
LnGrp LOS	C	C	B	C	B	B	C	B	C	C		C
Approach Vol, veh/h		532			391			729			222	
Approach Delay, s/veh		19.1			22.9			21.9			25.0	
Approach LOS		B			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.9	17.6		14.8	7.0	22.5		21.5
Change Period (Y+Rc), s	5.0	5.5		5.0	4.5	5.5		5.5
Max Green Setting (Gmax), s	35.0	35.0		25.0	15.0	35.0		30.0
Max Q Clear Time (g_c+I1), s	7.2	9.4		5.8	4.0	7.8		14.7
Green Ext Time (p_c), s	0.2	2.0		0.8	0.0	2.1		1.3

Intersection Summary	
HCM 2010 Ctrl Delay	21.7
HCM 2010 LOS	C

MOVEMENT SUMMARY

Site: 2. E+P PM

SR 89 / I-80 WB Ramp
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: HWY 89											
3	L2	482	3.0	0.517	9.3	LOS A	0.0	0.0	0.00	0.00	25.4
8	T1	653	3.0	0.517	9.3	LOS A	0.0	0.0	0.00	0.00	26.0
Approach		1135	3.0	0.517	9.3	LOS A	0.0	0.0	0.00	0.00	25.7
East: I-80 WB off-ramp											
1	L2	245	3.0	0.505	17.3	LOS C	1.8	45.2	0.71	0.80	21.3
16	R2	149	3.0	0.327	13.3	LOS B	1.0	25.4	0.67	0.71	21.8
Approach		394	3.0	0.505	15.8	LOS C	1.8	45.2	0.70	0.77	21.5
North: HWY 89											
4	T1	422	3.0	0.486	15.8	LOS C	2.2	56.9	0.70	0.79	22.1
14	R2	83	3.0	0.486	15.8	LOS C	2.2	56.9	0.70	0.79	21.5
Approach		505	3.0	0.486	15.8	LOS C	2.2	56.9	0.70	0.79	22.0
All Vehicles		2034	3.0	0.517	12.2	LOS B	2.2	56.9	0.31	0.34	23.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 3. E+P PM

SR 89 / I-80 EB Ramp
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: HWY 89											
8	T1	1058	3.0	0.905	32.6	LOS D	17.1	436.9	1.00	1.04	19.0
18	R2	589	3.0	0.905	32.6	LOS D	17.1	436.9	1.00	1.04	18.4
Approach		1647	3.0	0.905	32.6	LOS D	17.1	436.9	1.00	1.04	18.8
North: HWY 89											
7	L2	169	3.0	0.304	6.2	LOS A	0.0	0.0	0.00	0.00	25.9
4	T1	499	3.0	0.304	6.2	LOS A	0.0	0.0	0.00	0.00	27.9
Approach		667	3.0	0.304	6.2	LOS A	0.0	0.0	0.00	0.00	27.3
West: I-80 EB off-ramp											
5	L2	13	3.0	0.176	7.5	LOS A	0.5	12.5	0.47	0.47	27.4
12	R2	222	3.0	0.176	7.4	LOS A	0.5	12.5	0.46	0.46	29.9
Approach		235	3.0	0.176	7.4	LOS A	0.5	12.5	0.46	0.46	29.8
All Vehicles		2549	3.0	0.905	23.4	LOS C	17.1	436.9	0.69	0.72	21.3

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Volume (veh/h)	230	42	158	1174	62	359	166
Future Volume (veh/h)	230	42	158	1174	62	359	166
Number	3	18	1	6		2	12
Initial Q (Qb), veh	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00		1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863		1863	1863
Adj Flow Rate, veh/h	261	48	163	1210		399	184
Adj No. of Lanes	2	1	1	2		2	1
Peak Hour Factor	0.88	0.88	0.97	0.97		0.90	0.90
Percent Heavy Veh, %	2	2	2	2		2	2
Cap, veh/h	339	321	192	2962		1997	1246
Arrive On Green	0.10	0.09	0.11	0.84		0.70	0.69
Sat Flow, veh/h	3442	1583	1774	3632		3297	1583
Grp Volume(v), veh/h	261	48	163	1210		399	184
Grp Sat Flow(s),veh/h/ln	1721	1583	1774	1770		1434	1583
Q Serve(g_s), s	9.2	3.1	11.2	10.5		6.1	3.5
Cycle Q Clear(g_c), s	9.2	3.1	11.2	10.5		6.1	3.5
Prop In Lane	1.00	1.00	1.00				1.00
Lane Grp Cap(c), veh/h	339	321	192	2962		1997	1246
V/C Ratio(X)	0.77	0.15	0.85	0.41		0.20	0.15
Avail Cap(c_a), veh/h	985	619	358	2962		1997	1246
HCM Platoon Ratio	1.00	1.00	1.00	1.00		1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00		1.00	1.00
Uniform Delay (d), s/veh	54.5	40.6	54.3	2.5		6.6	3.2
Incr Delay (d2), s/veh	1.4	0.1	9.8	0.4		0.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	1.4	6.0	5.2		2.4	2.3
LnGrp Delay(d),s/veh	55.9	40.7	64.1	2.9		6.9	3.4
LnGrp LOS	E	D	E	A		A	A
Approach Vol, veh/h	309			1373		583	
Approach Delay, s/veh	53.5			10.2		5.8	
Approach LOS	D			B		A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	17.4	90.3				107.8		16.2
Change Period (Y+Rc), s	4.0	5.5				5.5		4.5
Max Green Setting (Gmax), s	25.0	50.0				50.0		35.0
Max Q Clear Time (g_c+I1), s	13.2	8.1				12.5		11.2
Green Ext Time (p_c), s	0.3	16.8				16.1		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	15.0
HCM 2010 LOS	B

Notes

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	45	72	1260	156	106	295
Future Volume (veh/h)	45	72	1260	156	106	295
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	57	91	1312	162	113	314
Adj No. of Lanes	1	1	2	1	1	1
Peak Hour Factor	0.79	0.79	0.96	0.96	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	138	221	2157	1301	131	1598
Arrive On Green	0.08	0.07	0.75	0.74	0.15	1.00
Sat Flow, veh/h	1774	1583	3297	1583	1774	1863
Grp Volume(v), veh/h	57	91	1312	162	113	314
Grp Sat Flow(s),veh/h/ln	1774	1583	1434	1583	1774	1863
Q Serve(g_s), s	3.8	6.5	25.9	2.5	7.7	0.0
Cycle Q Clear(g_c), s	3.8	6.5	25.9	2.5	7.7	0.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	138	221	2157	1301	131	1598
V/C Ratio(X)	0.41	0.41	0.61	0.12	0.86	0.20
Avail Cap(c_a), veh/h	429	481	2157	1301	422	1598
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.5	48.7	7.0	2.2	52.3	0.0
Incr Delay (d2), s/veh	0.7	0.5	1.3	0.2	6.4	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	2.9	10.4	1.6	4.0	0.1
LnGrp Delay(d),s/veh	55.2	49.2	8.3	2.4	58.7	0.3
LnGrp LOS	E	D	A	A	E	A
Approach Vol, veh/h	148		1474			427
Approach Delay, s/veh	51.5		7.7			15.7
Approach LOS	D		A			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	13.1	97.2				110.4		13.6
Change Period (Y+Rc), s	3.5	6.0				6.0		5.0
Max Green Setting (Gmax), s	30.6	50.0				50.0		29.0
Max Q Clear Time (g_c+I1), s	9.7	27.9				2.0		8.5
Green Ext Time (p_c), s	0.1	8.0				9.3		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	12.5
HCM 2010 LOS	B

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	61	6	0	0	23	28
Future Vol, veh/h	61	6	0	0	23	28
Peak Hour Factor	0.80	0.80	0.85	0.85	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	76	8	0	0	25	30
Number of Lanes	0	1	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	7.7	0	7.1
HCM LOS	A	-	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	91%	0%	45%
Vol Thru, %	9%	100%	0%
Vol Right, %	0%	0%	55%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	67	0	51
LT Vol	61	0	23
Through Vol	6	0	0
RT Vol	0	0	28
Lane Flow Rate	84	0	55
Geometry Grp	1	1	1
Degree of Util (X)	0.098	0	0.058
Departure Headway (Hd)	4.213	4.094	3.84
Convergence, Y/N	Yes	Yes	Yes
Cap	853	0	927
Service Time	2.23	2.132	1.887
HCM Lane V/C Ratio	0.098	0	0.059
HCM Control Delay	7.7	7.1	7.1
HCM Lane LOS	A	N	A
HCM 95th-tile Q	0.3	0	0.2

Intersection	
Int Delay, s/veh	14.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	19	416	133	40	210	74
Future Vol, veh/h	19	416	133	40	210	74
Conflicting Peds, #/hr	0	0	0	0	27	9
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	80	80	93	93	77	77
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	520	143	43	273	96

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	143	0	-	0	738	152
Stage 1	-	-	-	-	143	-
Stage 2	-	-	-	-	595	-
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	1440	-	-	-	385	894
Stage 1	-	-	-	-	884	-
Stage 2	-	-	-	-	551	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1429	-	-	-	376	887
Mov Cap-2 Maneuver	-	-	-	-	376	-
Stage 1	-	-	-	-	884	-
Stage 2	-	-	-	-	538	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	42.6
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1429	-	-	-	442
HCM Lane V/C Ratio	0.017	-	-	-	0.834
HCM Control Delay (s)	7.6	0	-	-	42.6
HCM Lane LOS	A	A	-	-	E
HCM 95th %tile Q(veh)	0.1	-	-	-	8

Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	617	13	100	166	12	462
Future Vol, veh/h	617	13	100	166	12	462
Conflicting Peds, #/hr	0	8	8	0	3	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Free
Storage Length	-	-	300	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	93	93	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	771	16	108	178	13	491

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	796	0	1184	-
Stage 1	-	-	-	-	787	-
Stage 2	-	-	-	-	397	-
Critical Hdwy	-	-	4.12	-	6.42	-
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	-
Pot Cap-1 Maneuver	-	-	826	-	209	0
Stage 1	-	-	-	-	449	0
Stage 2	-	-	-	-	679	0
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	826	-	180	-
Mov Cap-2 Maneuver	-	-	-	-	180	-
Stage 1	-	-	-	-	446	-
Stage 2	-	-	-	-	589	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.8	26.5
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	180	-	-	-	826	-
HCM Lane V/C Ratio	0.071	-	-	-	0.13	-
HCM Control Delay (s)	26.5	0	-	-	10	-
HCM Lane LOS	D	A	-	-	B	-
HCM 95th %tile Q(veh)	0.2	-	-	-	0.4	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	23	1061	0	0	260	6	0	0	0	18	0	8
Future Vol, veh/h	23	1061	0	0	260	6	0	0	0	18	0	8
Conflicting Peds, #/hr	13	0	0	0	0	13	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	150	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	93	93	93	98	98	98	54	54	54
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	1326	0	0	280	6	0	0	0	33	0	15

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	299	0	0	1326	0	0	1674	1683	663	1017	1680	296
Stage 1	-	-	-	-	-	-	1384	1384	-	296	296	-
Stage 2	-	-	-	-	-	-	290	299	-	721	1384	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1261	-	-	519	-	-	69	94	405	204	94	743
Stage 1	-	-	-	-	-	-	152	210	-	712	668	-
Stage 2	-	-	-	-	-	-	717	666	-	385	210	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1261	-	-	519	-	-	63	85	405	188	85	735
Mov Cap-2 Maneuver	-	-	-	-	-	-	63	85	-	188	85	-
Stage 1	-	-	-	-	-	-	139	192	-	643	661	-
Stage 2	-	-	-	-	-	-	703	659	-	352	192	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0	0	22.6
HCM LOS			A	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	-	1261	-	-	519	-	-	188	735
HCM Lane V/C Ratio	-	0.023	-	-	-	-	-	0.177	0.02
HCM Control Delay (s)	0	7.9	0.3	-	0	-	-	28.2	10
HCM Lane LOS	A	A	A	-	A	-	-	D	B
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	-	0.6	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	1070	0	0	250	7	0	0	0	12	0	5
Future Volume (veh/h)	9	1070	0	0	250	7	0	0	0	12	0	5
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	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
Adj Sat Flow, veh/h/ln	1900	1863	0	0	1863	1900				1900	1863	1900
Adj Flow Rate, veh/h	11	1338	0	0	269	8				14	0	6
Adj No. of Lanes	0	2	0	0	1	0				0	1	0
Peak Hour Factor	0.80	0.80	0.92	0.92	0.93	0.93				0.85	0.92	0.85
Percent Heavy Veh, %	2	2	0	0	2	2				0	2	0
Cap, veh/h	100	1821	0	0	947	28				315	0	135
Arrive On Green	0.53	0.53	0.00	0.00	0.53	0.53				0.26	0.00	0.26
Sat Flow, veh/h	8	3545	0	0	1800	54				1198	0	513
Grp Volume(v), veh/h	723	626	0	0	0	277				20	0	0
Grp Sat Flow(s),veh/h/ln	1857	1610	0	0	0	1853				1711	0	0
Q Serve(g_s), s	0.0	11.4	0.0	0.0	0.0	3.2				0.3	0.0	0.0
Cycle Q Clear(g_c), s	11.4	11.4	0.0	0.0	0.0	3.2				0.3	0.0	0.0
Prop In Lane	0.02		0.00	0.00		0.03				0.70		0.30
Lane Grp Cap(c), veh/h	1074	848	0	0	0	975				450	0	0
V/C Ratio(X)	0.67	0.74	0.00	0.00	0.00	0.28				0.04	0.00	0.00
Avail Cap(c_a), veh/h	1074	848	0	0	0	975				450	0	0
HCM Platoon Ratio	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	0.00	0.00	0.00	1.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	7.0	7.0	0.0	0.0	0.0	5.0				10.4	0.0	0.0
Incr Delay (d2), s/veh	3.4	5.7	0.0	0.0	0.0	0.7				0.2	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
%ile BackOfQ(50%),veh/ln	6.6	6.2	0.0	0.0	0.0	1.7				0.2	0.0	0.0
LnGrp Delay(d),s/veh	10.3	12.7	0.0	0.0	0.0	5.7				10.6	0.0	0.0
LnGrp LOS	B	B				A				B		
Approach Vol, veh/h		1349			277						20	
Approach Delay, s/veh		11.4			5.7						10.6	
Approach LOS		B			A						B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		24.0		14.0		24.0		
Change Period (Y+Rc), s		4.0		4.0		4.0		
Max Green Setting (Gmax), s		20.0		10.0		20.0		
Max Q Clear Time (g_c+I1), s		13.4		2.3		5.2		
Green Ext Time (p_c), s		4.8		0.0		9.1		

Intersection Summary	
HCM 2010 Ctrl Delay	10.5
HCM 2010 LOS	B

SimTraffic Post-Processor | **Squaw Alpine Gondola Phase 2**
Average Results from 10 Runs | **Existing + Project**
Volume and Delay by Movement | **PM Peak Hour**

Intersection 11 **Squaw Creek Rd/Squaw Valley Rd** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	19	19	98.9%	41.9	13.7	E
	Through						
	Right Turn	56	56	100.5%	11.9	3.5	B
	Subtotal	75	75	100.1%	19.5	6.6	C
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	1,048	1,054	100.5%	2.9	0.1	A
	Right Turn	33	32	98.3%	3.4	0.9	A
	Subtotal	1,081	1,086	100.5%	2.9	0.1	A
WB	Left Turn	41	41	100.9%	24.3	7.8	C
	Through	254	258	101.7%	1.5	0.3	A
	Right Turn						
	Subtotal	295	300	101.6%	5.1	1.6	A
Total		1,451	1,461	100.7%	4.2	0.4	A

Intersection 12 **SR 89/Squaw Valley Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	149	146	98.2%	37.9	6.6	D
	Through	548	560	102.3%	26.4	3.6	C
	Right Turn						
	Subtotal	697	707	101.4%	28.8	3.5	C
SB	Left Turn						
	Through	196	196	100.2%	28.0	4.3	C
	Right Turn	143	148	103.7%	4.1	0.6	A
	Subtotal	339	345	101.7%	18.2	3.2	B
EB	Left Turn	868	850	97.9%	119.5	39.5	F
	Through						
	Right Turn	206	212	103.0%	3.1	0.5	A
	Subtotal	1,074	1,062	98.9%	96.7	31.1	F
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,110	2,114	100.2%	61.6	16.1	E

SimTraffic Post-Processor **Squaw Alpine Gondola Phase 2**
Average Results from 10 Runs **Existing + Project**
Volume and Delay by Movement **PM Peak Hour**

Intersection 13 **SR 89/Alpine Meadows Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	41	37	90.5%	27.9	4.1	C
	Through	294	293	99.8%	14.4	2.5	B
	Right Turn						
	Subtotal	335	331	98.7%	16.0	2.4	B
SB	Left Turn						
	Through	346	358	103.4%	23.9	3.7	C
	Right Turn	56	56	100.4%	4.1	0.8	A
	Subtotal	402	414	103.0%	21.2	3.7	C
EB	Left Turn	403	420	104.2%	27.6	8.3	C
	Through						
	Right Turn	344	354	102.8%	13.1	3.6	B
	Subtotal	747	774	103.5%	21.0	5.9	C
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		1,484	1,518	102.3%	20.0	3.2	C

Intersection 11 **Squaw Creek Rd/Squaw Valley Rd** **Side-street Stop**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Through	1,925	25	0	25	2	25	5	0%	0%
	Through/Right	1,925	25	1	25	6	25	14	0%	0%
NB	Left Turn	75	25	4	50	8	75	14	3%	0%
	Right Turn	1,400	50	3	75	6	100	13	3%	0%
WB	Left Turn	100	50	5	75	5	75	17	0%	0%
	Through	100	25	0	25	0	25	0	0%	0%
0										

SimTraffic Post-Processor **Squaw Alpine Gondola Phase 2**
Average Results from 10 Runs **Existing + Project**
Queue Length **PM Peak Hour**

Intersection 12 **SR 89/Squaw Valley Rd** **Signal**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Left Turn	825	325	49	675	101	725	103	0%	0%
	Left/Through	1,625	350	53	700	144	800	220	1%	0%
	Right Turn	1,625	25	24	100	168	275	358	0%	0%
NB	Left Turn	425	125	14	200	45	275	103	0%	0%
	Through	650	200	20	350	53	425	103	37%	0%
	Through/Right	75	75	3	100	6	100	0	22%	0%
SB	Left Turn	150	25	0	25	0	25	0	0%	0%
	Through	3,450	100	7	175	14	175	20	2%	0%
	Right Turn	150	25	2	50	11	75	24	0%	0%
WB	Shared	200	25	0	25	0	25	0	0%	0%

Intersection 13 **SR 89/Alpine Meadows Rd** **Signal**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Left Turn	325	175	16	300	36	325	35	2%	0%
	Right Turn	2,150	125	41	275	157	400	238	0%	0%
NB	Left Turn	375	50	2	75	5	75	13	0%	0%
	Through	3,775	100	6	175	14	225	27	0%	0%
SB	Through	1,450	150	21	250	44	300	51	0%	0%
	Right Turn	625	25	3	50	6	75	11	0%	0%
0										

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	465	268	152	174	8	167	37	194	15	48	8
Future Volume (veh/h)	4	465	268	152	174	8	167	37	194	15	48	8
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1900	1863	1900
Adj Flow Rate, veh/h	5	534	0	181	207	10	218	0	0	19	59	10
Adj No. of Lanes	1	2	1	2	2	0	2	0	1	0	1	0
Peak Hour Factor	0.87	0.87	0.87	0.84	0.84	0.84	0.89	0.89	0.89	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	4	862	386	386	1187	57	614	0	274	46	143	24
Arrive On Green	0.00	0.24	0.00	0.11	0.35	0.34	0.17	0.00	0.00	0.12	0.12	0.12
Sat Flow, veh/h	1774	3539	1583	3442	3437	165	3548	0	1583	390	1211	205
Grp Volume(v), veh/h	5	534	0	181	106	111	218	0	0	88	0	0
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1721	1770	1833	1774	0	1583	1806	0	0
Q Serve(g_s), s	0.1	6.1	0.0	2.2	1.9	1.9	2.5	0.0	0.0	2.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	6.1	0.0	2.2	1.9	1.9	2.5	0.0	0.0	2.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.09	1.00		1.00	0.22		0.11
Lane Grp Cap(c), veh/h	4	862	386	386	611	633	614	0	274	213	0	0
V/C Ratio(X)	1.28	0.62	0.00	0.47	0.17	0.18	0.36	0.00	0.00	0.41	0.00	0.00
Avail Cap(c_a), veh/h	575	2390	1069	1116	1570	1626	2349	0	1048	1036	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	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	22.6	15.3	0.0	18.8	10.3	10.3	16.5	0.0	0.0	18.5	0.0	0.0
Incr Delay (d2), s/veh	220.6	0.3	0.0	0.3	0.0	0.0	0.1	0.0	0.0	0.5	0.0	0.0
Initial Q Delay(d3),s/veh	29.8	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	0.3	3.0	0.0	1.1	0.9	1.0	1.2	0.0	0.0	1.0	0.0	0.0
LnGrp Delay(d),s/veh	273.0	15.5	0.0	19.2	10.4	10.4	16.6	0.0	0.0	19.0	0.0	0.0
LnGrp LOS	F	B		B	B	B	B			B		
Approach Vol, veh/h		539			398			218			88	
Approach Delay, s/veh		17.9			14.4			16.6			19.0	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.1	15.0		9.4	4.1	20.1		11.8
Change Period (Y+Rc), s	* 3.7	4.6		4.0	* 3.7	* 4.6		4.0
Max Green Setting (Gmax), s	* 15	30.0		26.0	* 15	* 40		30.0
Max Q Clear Time (g_c+I1), s	4.2	8.1		4.0	2.1	3.9		4.5
Green Ext Time (p_c), s	0.1	2.0		0.2	0.0	2.1		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	16.6
HCM 2010 LOS	B

Notes

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	3/4/2017
Analysis Time Period	Winter AM
Highway	SR-89 SB
From/To	Deerfield Dr to W River St
Jurisdiction	Nevada/Placer County
Analysis Year	Existing + Project
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.89	
Shoulder width	4.7	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.2	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	0	/mi

Analysis direction volume, Vd 838 veh/h
Opposing direction volume, Vo 256 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0		1.4	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	1.000		0.992	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	942	pc/h	290	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	1.3	mi/h
Adj. for access point density,(note-3) fA	0.0	mi/h
Free-flow speed, FFSd	43.7	mi/h
Adjustment for no-passing zones, fnp	3.4	mi/h
Average travel speed, ATSd	30.7	mi/h
Percent Free Flow Speed, PFFS	70.3	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	0.998
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	942 pc/h	288 pc/h

Base percent time-spent-following,(note-4) BPTSFd	70.2	%
Adjustment for no-passing zones, fnp	29.7	
Percent time-spent-following, PTSFd	92.9	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.32	
Peak 15-min vehicle-miles of travel, VMT15	47	veh-mi
Peak-hour vehicle-miles of travel, VMT60	168	veh-mi
Peak 15-min total travel time, TT15	1.5	veh-h
Capacity from ATS, CdATS	1686	veh/h
Capacity from PTSF, CdPTSF	1697	veh/h
Directional Capacity	3891	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.2	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	30.7	mi/h
Percent time-spent-following, PTSFd (from above)	92.9	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	941.6
Effective width of outside lane, We	21.40
Effective speed factor, St	4.42
Bicycle LOS Score, BLOS	3.31
Bicycle LOS	C

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	3/4/2017
Analysis Time Period	Winter AM
Highway	SR-89 SB
From/To	W River St to Squaw Valley Rd
Jurisdiction	Placer County
Analysis Year	Existing + Project
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.90	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	7.8	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	55	%
Up/down	-	%	Access point density	1	/mi

Analysis direction volume, Vd 1091 veh/h
Opposing direction volume, Vo 238 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.3		2.2	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.994		0.977	
Grade adj. factor,(note-1) fg	1.00		0.80	
Directional flow rate,(note-2) vi	1220	pc/h	338	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	0.3	mi/h
Free-flow speed, FFSd	59.8	mi/h
Adjustment for no-passing zones, fnp	2.7	mi/h
Average travel speed, ATSd	44.9	mi/h
Percent Free Flow Speed, PFFS	75.2	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.7
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	0.986
Grade adjustment factor,(note-1) fg	1.00	0.83
Directional flow rate,(note-2) vi	1212 pc/h	323 pc/h

Base percent time-spent-following,(note-4) BPTSFd	78.2	%
Adjustment for no-passing zones, fnp	13.4	
Percent time-spent-following, PTSFd	88.8	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.86	
Peak 15-min vehicle-miles of travel, VMT15	2364	veh-mi
Peak-hour vehicle-miles of travel, VMT60	8510	veh-mi
Peak 15-min total travel time, TT15	52.6	veh-h
Capacity from ATS, CdATS	1413	veh/h
Capacity from PTSF, CdPTSF	1445	veh/h
Directional Capacity	1804	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	7.8	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	44.9	mi/h
Percent time-spent-following, PTSFd (from above)	88.8	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1212.2
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	1.92
Bicycle LOS	B

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	3/4/2017
Analysis Time Period	Winter AM
Highway	SR-89 NB
From/To	A. Meadows Rd to S. Valley Rd
Jurisdiction	Placer County
Analysis Year	Existing + Project
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.92	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.3	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	0	/mi

Analysis direction volume, Vd 684 veh/h
Opposing direction volume, Vo 438 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.5		1.8	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.990		0.984	
Grade adj. factor,(note-1) fg	0.98		0.94	
Directional flow rate,(note-2) vi	766	pc/h	515	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	0.0	mi/h
Free-flow speed, FFSd	50.0	mi/h
Adjustment for no-passing zones, fnp	2.2	mi/h
Average travel speed, ATSd	37.8	mi/h
Percent Free Flow Speed, PFFS	75.6	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.4
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	0.992
Grade adjustment factor,(note-1) fg	0.99	0.95
Directional flow rate,(note-2) vi	751 pc/h	505 pc/h

Base percent time-spent-following,(note-4) BPTSFd	65.0	%
Adjustment for no-passing zones, fnp	30.2	
Percent time-spent-following, PTSFd	83.1	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.48	
Peak 15-min vehicle-miles of travel, VMT15	242	veh-mi
Peak-hour vehicle-miles of travel, VMT60	889	veh-mi
Peak 15-min total travel time, TT15	6.4	veh-h
Capacity from ATS, CdATS	1589	veh/h
Capacity from PTSF, CdPTSF	1625	veh/h
Directional Capacity	2657	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.3	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	37.8	mi/h
Percent time-spent-following, PTSFd (from above)	83.1	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	743.5
Effective width of outside lane, We	28.00
Effective speed factor, St	4.42
Bicycle LOS Score, BLOS	1.56
Bicycle LOS	B

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	3/4/2017
Analysis Time Period	Winter AM
Highway	SR-89 NB
From/To	SR 28 to A. Meadows Rd
Jurisdiction	Placer County
Analysis Year	Existing + Project
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.92	
Shoulder width	6.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	3.7	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	1	/mi

Analysis direction volume, Vd 1013 veh/h
Opposing direction volume, Vo 160 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.3		2.4	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.994		0.973	
Grade adj. factor,(note-1) fg	1.00		0.73	
Directional flow rate,(note-2) vi	1108	pc/h	245	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	0.3	mi/h
Free-flow speed, FFSd	49.8	mi/h
Adjustment for no-passing zones, fnp	3.7	mi/h
Average travel speed, ATSd	35.5	mi/h
Percent Free Flow Speed, PFFS	71.4	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.8
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	0.984
Grade adjustment factor,(note-1) fg	1.00	0.78
Directional flow rate,(note-2) vi	1101 pc/h	227 pc/h

Base percent time-spent-following,(note-4) BPTSFd	72.8	%
Adjustment for no-passing zones, fnp	19.9	
Percent time-spent-following, PTSFd	89.3	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.87	
Peak 15-min vehicle-miles of travel, VMT15	1019	veh-mi
Peak-hour vehicle-miles of travel, VMT60	3748	veh-mi
Peak 15-min total travel time, TT15	28.7	veh-h
Capacity from ATS, CdATS	1279	veh/h
Capacity from PTSF, CdPTSF	1358	veh/h
Directional Capacity	1561	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	3.7	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	35.5	mi/h
Percent time-spent-following, PTSFd (from above)	89.3	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1101.1
Effective width of outside lane, We	24.00
Effective speed factor, St	4.42
Bicycle LOS Score, BLOS	2.80
Bicycle LOS	C

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	3/4/2017
Analysis Time Period	Winter AM
Highway	SR89 NB
From/To	At Transit Center
Jurisdiction	Caltrans
Analysis Year	Existing + Project
Description	Squaw Valley Olympic Villlage

Input Data

Highway class	Class 2		Peak hour factor, PHF	0.94	
Shoulder width	2.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.3	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	64	%
Up/down	-	%	Access point density	11	/mi

Analysis direction volume, Vd 650 veh/h
Opposing direction volume, Vo 280 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.4	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.998		0.992	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	693	pc/h	300	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	2.6	mi/h
Adj. for access point density,(note-3) fA	2.8	mi/h
Free-flow speed, FFSd	39.7	mi/h
Adjustment for no-passing zones, fnp	2.7	mi/h
Average travel speed, ATSd	29.3	mi/h
Percent Free Flow Speed, PFFS	73.8	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	0.998
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	691 pc/h	298 pc/h

Base percent time-spent-following,(note-4) BPTSFd	58.7	%
Adjustment for no-passing zones, fnp	29.6	
Percent time-spent-following, PTSFd	79.4	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.41	
Peak 15-min vehicle-miles of travel, VMT15	52	veh-mi
Peak-hour vehicle-miles of travel, VMT60	195	veh-mi
Peak 15-min total travel time, TT15	1.8	veh-h
Capacity from ATS, CdATS	0	veh/h
Capacity from PTSF, CdPTSF	1697	veh/h
Directional Capacity	2428	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.3	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	29.3	mi/h
Percent time-spent-following, PTSFd (from above)	79.4	
Level of service, LOSd (from above)	D	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	691.5
Effective width of outside lane, We	14.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	4.57
Bicycle LOS	E

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	4/9/2017
Analysis Time Period	Winter PM
Highway	SR-89 NB
From/To	W River St to Deerfield Dr
Jurisdiction	Nevada/Placer County
Analysis Year	Existing + Project
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.96	
Shoulder width	4.7	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.2	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	0	/mi

Analysis direction volume, Vd 1364 veh/h
Opposing direction volume, Vo 401 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0		1.3	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	1.000		0.994	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1421	pc/h	420	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	1.3	mi/h
Adj. for access point density,(note-3) fA	0.0	mi/h
Free-flow speed, FFSd	43.7	mi/h
Adjustment for no-passing zones, fnp	2.6	mi/h
Average travel speed, ATSd	26.8	mi/h
Percent Free Flow Speed, PFFS	61.3	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	1.000
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1421 pc/h	418 pc/h

Base percent time-spent-following,(note-4) BPTSFd	83.5	%
Adjustment for no-passing zones, fnp	16.5	
Percent time-spent-following, PTSFd	96.2	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.47	
Peak 15-min vehicle-miles of travel, VMT15	71	veh-mi
Peak-hour vehicle-miles of travel, VMT60	273	veh-mi
Peak 15-min total travel time, TT15	2.6	veh-h
Capacity from ATS, CdATS	1690	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	3879	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.2	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	26.8	mi/h
Percent time-spent-following, PTSFd (from above)	96.2	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1420.8
Effective width of outside lane, We	21.40
Effective speed factor, St	4.42
Bicycle LOS Score, BLOS	3.52
Bicycle LOS	D

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	4/9/2017
Analysis Time Period	Winter PM
Highway	SR-89 NB
From/To	Squaw Valley Rd to W River St
Jurisdiction	Placer County
Analysis Year	Existing + Project
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.93	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	7.8	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	55	%
Up/down	-	%	Access point density	1	/mi

Analysis direction volume, Vd 1416 veh/h
Opposing direction volume, Vo 339 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.3		2.0	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.994		0.980	
Grade adj. factor,(note-1) fg	1.00		0.88	
Directional flow rate,(note-2) vi	1532	pc/h	423	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	0.3	mi/h
Free-flow speed, FFSd	59.8	mi/h
Adjustment for no-passing zones, fnp	2.3	mi/h
Average travel speed, ATSd	42.3	mi/h
Percent Free Flow Speed, PFFS	70.8	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.6
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	0.988
Grade adjustment factor,(note-1) fg	1.00	0.88
Directional flow rate,(note-2) vi	1523 pc/h	419 pc/h

Base percent time-spent-following,(note-4) BPTSFd	85.3	%
Adjustment for no-passing zones, fnp	10.3	
Percent time-spent-following, PTSFd	93.4	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	1.01	
Peak 15-min vehicle-miles of travel, VMT15	2969	veh-mi
Peak-hour vehicle-miles of travel, VMT60	11045	veh-mi
Peak 15-min total travel time, TT15	70.2	veh-h
Capacity from ATS, CdATS	1516	veh/h
Capacity from PTSF, CdPTSF	1535	veh/h
Directional Capacity	1934	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	7.8	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	42.3	mi/h
Percent time-spent-following, PTSFd (from above)	93.4	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1522.6
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.03
Bicycle LOS	B

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	4/9/2017
Analysis Time Period	Winter PM
Highway	SR-89 NB
From/To	A. Meadows Rd to S. Valley Rd
Jurisdiction	Placer County
Analysis Year	Existing + Project
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.92	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.3	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	0	/mi

Analysis direction volume, Vd 697 veh/h
Opposing direction volume, Vo 402 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.5		1.9	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.990		0.982	
Grade adj. factor,(note-1) fg	0.99		0.92	
Directional flow rate,(note-2) vi	773	pc/h	484	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	0.0	mi/h
Free-flow speed, FFSd	50.0	mi/h
Adjustment for no-passing zones, fnp	2.4	mi/h
Average travel speed, ATSd	37.9	mi/h
Percent Free Flow Speed, PFFS	75.8	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.4
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	0.992
Grade adjustment factor,(note-1) fg	1.00	0.92
Directional flow rate,(note-2) vi	758 pc/h	479 pc/h

Base percent time-spent-following,(note-4) BPTSFd	64.3	%
Adjustment for no-passing zones, fnp	29.3	
Percent time-spent-following, PTSFd	82.3	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.49	
Peak 15-min vehicle-miles of travel, VMT15	246	veh-mi
Peak-hour vehicle-miles of travel, VMT60	906	veh-mi
Peak 15-min total travel time, TT15	6.5	veh-h
Capacity from ATS, CdATS	1572	veh/h
Capacity from PTSF, CdPTSF	1602	veh/h
Directional Capacity	2556	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.3	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	37.9	mi/h
Percent time-spent-following, PTSFd (from above)	82.3	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	757.6
Effective width of outside lane, We	28.00
Effective speed factor, St	4.42
Bicycle LOS Score, BLOS	1.57
Bicycle LOS	B

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	4/9/2017
Analysis Time Period	Winter PM
Highway	SR-89 SB
From/To	A. Meadows Rd to SR 28
Jurisdiction	Placer County
Analysis Year	Existing + Project
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.87	
Shoulder width	5.5	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	3.7	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	1	/mi

Analysis direction volume, Vd 737 veh/h
Opposing direction volume, Vo 335 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.4		2.0	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.992		0.980	
Grade adj. factor,(note-1) fg	0.99		0.89	
Directional flow rate,(note-2) vi	863	pc/h	441	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	1.3	mi/h
Adj. for access point density,(note-3) fA	0.3	mi/h
Free-flow speed, FFSd	48.5	mi/h
Adjustment for no-passing zones, fnp	2.5	mi/h
Average travel speed, ATSd	35.8	mi/h
Percent Free Flow Speed, PFFS	73.9	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.6
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	0.988
Grade adjustment factor,(note-1) fg	1.00	0.89
Directional flow rate,(note-2) vi	847 pc/h	438 pc/h

Base percent time-spent-following,(note-4) BPTSFd	67.7	%
Adjustment for no-passing zones, fnp	25.5	
Percent time-spent-following, PTSFd	84.5	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.56	
Peak 15-min vehicle-miles of travel, VMT15	784	veh-mi
Peak-hour vehicle-miles of travel, VMT60	2727	veh-mi
Peak 15-min total travel time, TT15	21.9	veh-h
Capacity from ATS, CdATS	1536	veh/h
Capacity from PTSF, CdPTSF	1552	veh/h
Directional Capacity	2320	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	3.7	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	35.8	mi/h
Percent time-spent-following, PTSFd (from above)	84.5	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	847.1
Effective width of outside lane, We	23.00
Effective speed factor, St	4.42
Bicycle LOS Score, BLOS	2.90
Bicycle LOS	C

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	4/9/2017
Analysis Time Period	Winter PM
Highway	SR89 SB
From/To	At Transit Center
Jurisdiction	Caltrans
Analysis Year	Existing + Project
Description	Squaw Valley Olympic Villlage

Input Data

Highway class	Class 2		Peak hour factor, PHF	0.85	
Shoulder width	2.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.3	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	64	%
Up/down	-	%	Access point density	11	/mi

Analysis direction volume, Vd 468 veh/h
Opposing direction volume, Vo 398 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.2	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.998		0.996	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	552	pc/h	470	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	2.6	mi/h
Adj. for access point density,(note-3) fA	2.8	mi/h
Free-flow speed, FFSd	39.7	mi/h
Adjustment for no-passing zones, fnp	1.8	mi/h
Average travel speed, ATSd	29.9	mi/h
Percent Free Flow Speed, PFFS	75.3	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	1.000
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	551 pc/h	468 pc/h

Base percent time-spent-following,(note-4) BPTSFd	54.5	%
Adjustment for no-passing zones, fnp	36.2	
Percent time-spent-following, PTSFd	74.1	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.32	
Peak 15-min vehicle-miles of travel, VMT15	41	veh-mi
Peak-hour vehicle-miles of travel, VMT60	140	veh-mi
Peak 15-min total travel time, TT15	1.4	veh-h
Capacity from ATS, CdATS	0	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	3143	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.3	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	29.9	mi/h
Percent time-spent-following, PTSFd (from above)	74.1	
Level of service, LOSd (from above)	D	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	550.6
Effective width of outside lane, We	14.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	4.46
Bicycle LOS	D

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

VMT Estimates — Plus Project Conditions

Scenario 1 = 100% New Trips

Saturday VMT

Squaw Valley	%	ADT	Trip Length	VMT
		284		
Inbound Trips		142		
Truckee	31.0%	44.02	12	528.24
Reno	12.0%	17.04	44	749.76
Tahoe North Shore	28.0%	39.76	11	437.36
Bay Area	9.0%	12.78	185	2364.3
Tahoe South Shore	5.0%	7.1	39	276.9
Tahoe West Shore	7.0%	9.94	15	149.1
Sacramento/Central Valley	8.0%	11.36	130	1476.8
	100.0%	142	SUM	**5982.46**
		Average trip length	42.13	
Outbound Trips		142		
Truckee	31.0%	44.02	12	528.24
Reno	12.0%	17.04	44	749.76
Tahoe North Shore	28.0%	39.76	11	437.36
Bay Area	9.0%	12.78	185	2364.3
Tahoe South Shore	5.0%	7.1	39	276.9
Tahoe West Shore	7.0%	9.94	15	149.1
Sacramento/Central Valley	8.0%	11.36	130	1476.8
	100.0%	142	SUM	**5982.46**

Alpine Meadows	%	ADT	Trip Length	VMT
		122		
Inbound Trips		61		
Truckee	29.0%	17.69	14	247.66
Reno	11.0%	6.71	46	308.66
Tahoe North Shore	32.0%	19.52	10	195.2
Bay Area	8.0%	4.88	187	912.56
Tahoe South Shore	5.0%	3.05	38	115.9
Tahoe West Shore	8.0%	4.88	14	68.32
Sacramento/Central Valley	7.0%	4.27	132	563.64
	100.0%	61	SUM	**2411.94**
		Average trip length	39.54	
Outbound Trips		61		
Truckee	29.0%	17.69	14	247.66
Reno	11.0%	6.71	46	308.66
Tahoe North Shore	32.0%	19.52	10	195.2
Bay Area	8.0%	4.88	187	912.56
Tahoe South Shore	5.0%	3.05	38	115.9
Tahoe West Shore	8.0%	4.88	14	68.32
Sacramento/Central Valley	7.0%	4.27	132	563.64
	100.0%	61	SUM	**2411.94**

VMT Generated by New Skiers	16788.8				
VMT Chagne due to Skier Redistribution	-83				
Employee VMT	272	daily trips to both resorts=	16	Weighted Avg Trip length =	17
Reduced Shuttle VMT	-336	eliminated shuttle round trips =	-24	trip dist =	14
				shuttles run every 20 minutes from 8:30 am to 4:30 p.m.	
TOTAL CHANGE IN VMT on Saturday	16642				

Sunday VMT

Squaw Valley	%	ADT	Trip Length	VMT
		290		
Inbound Trips		145		
Truckee	31.0%	44.95	12	539.4
Reno	12.0%	17.4	44	765.6
Tahoe North Shore	28.0%	40.6	11	446.6
Bay Area	9.0%	13.05	185	2414.25
Tahoe South Shore	5.0%	7.25	39	282.75
Tahoe West Shore	7.0%	10.15	15	152.25
Sacramento/Central Valley	8.0%	11.6	130	1508
	100.0%	145	SUM	**6108.85**
Outbound Trips		145		
Truckee	33.0%	47.85	12	574.2
Reno	14.0%	20.3	44	893.2
Tahoe North Shore	22.0%	31.9	11	350.9
Bay Area	12.0%	17.4	185	3219
Tahoe South Shore	3.0%	4.35	39	169.65
Tahoe West Shore	5.0%	7.25	15	108.75
Sacramento/Central Valley	11.0%	15.95	130	2073.5
	100.0%	145	SUM	**7389.2**

Alpine Meadows	%	ADT	Trip Length	VMT
		126		
Inbound Trips		63		
Truckee	29.0%	18.27	14	255.78
Reno	11.0%	6.93	46	318.78
Tahoe North Shore	32.0%	20.16	10	201.6
Bay Area	8.0%	5.04	187	942.48
Tahoe South Shore	5.0%	3.15	38	119.7
Tahoe West Shore	8.0%	5.04	14	70.56
Sacramento/Central Valley	7.0%	4.41	132	582.12
	100.0%	63	SUM	**2491.02**
Outbound Trips		63		
Truckee	30.0%	18.9	14	264.6
Reno	12.0%	7.56	46	347.76
Tahoe North Shore	29.0%	18.27	10	182.7
Bay Area	9.0%	5.67	187	1060.29
Tahoe South Shore	4.0%	2.52	38	95.76
Tahoe West Shore	7.0%	4.41	14	61.74
Sacramento/Central Valley	9.0%	5.67	132	748.44
	100.0%	63	SUM	**2761.29**

VMT Generated by New Skiers	18750.36				
VMT Chagne due to Skier Redistribution	-1363	Greater than Saturday due to greater shifts to Squaw Valley.			
Employee VMT	272	daily trips to both resorts=	16	Weighted Avg Trip length =	17
Reduced Shuttle VMT	-336	eliminated shuttle round trips =	-24	trip dist =	14
TOTAL CHANGE IN VMT on Sunday	17323				

E3

Cumulative Conditions
Technical Calculations

HCM 2010 Signalized Intersection Summary
1: SR 89 & Donner Pass Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	215	408	139	188	37	181	72	110	18	94	60
Future Volume (veh/h)	54	215	408	139	188	37	181	72	110	18	94	60
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1900
Adj Flow Rate, veh/h	59	234	443	158	214	42	195	77	118	20	103	66
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	0	2	0
Peak Hour Factor	0.92	0.92	0.92	0.88	0.88	0.88	0.93	0.93	0.93	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	75	534	687	201	679	578	261	275	233	52	271	177
Arrive On Green	0.04	0.29	0.29	0.11	0.36	0.36	0.15	0.15	0.15	0.16	0.14	0.14
Sat Flow, veh/h	1774	1863	1582	1774	1863	1583	1774	1863	1583	366	1891	1233
Grp Volume(v), veh/h	59	234	443	158	214	42	195	77	118	101	0	88
Grp Sat Flow(s),veh/h/ln	1774	1863	1582	1774	1863	1583	1774	1863	1583	1844	0	1645
Q Serve(g_s), s	2.2	7.0	14.9	5.9	5.6	1.2	7.1	2.5	4.7	3.4	0.0	3.3
Cycle Q Clear(g_c), s	2.2	7.0	14.9	5.9	5.6	1.2	7.1	2.5	4.7	3.4	0.0	3.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	0.20		0.75
Lane Grp Cap(c), veh/h	75	534	687	201	679	578	261	275	233	264	0	236
V/C Ratio(X)	0.79	0.44	0.65	0.79	0.31	0.07	0.75	0.28	0.51	0.38	0.00	0.37
Avail Cap(c_a), veh/h	392	962	1050	916	962	817	785	824	701	680	0	607
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	32.2	19.7	15.1	29.3	15.5	14.1	27.7	25.7	26.6	26.2	0.0	26.3
Incr Delay (d2), s/veh	6.7	0.2	0.4	2.6	0.1	0.0	1.6	0.2	0.6	0.3	0.0	0.4
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	1.2	3.6	8.2	3.0	2.9	0.5	3.6	1.3	2.1	1.7	0.0	1.5
LnGrp Delay(d),s/veh	38.8	19.9	15.5	31.9	15.6	14.1	29.3	25.9	27.3	26.6	0.0	26.7
LnGrp LOS	D	B	B	C	B	B	C	C	C	C		C
Approach Vol, veh/h		736			414			390			189	
Approach Delay, s/veh		18.8			21.6			28.0			26.6	
Approach LOS		B			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	12.7	24.9		14.7	7.4	30.2		15.5
Change Period (Y+Rc), s	5.0	5.5		5.0	4.5	5.5		5.5
Max Green Setting (Gmax), s	35.0	35.0		25.0	15.0	35.0		30.0
Max Q Clear Time (g_c+I1), s	7.9	16.9		5.4	4.2	7.6		9.1
Green Ext Time (p_c), s	0.2	2.4		0.6	0.0	2.5		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	22.4
HCM 2010 LOS	C

MOVEMENT SUMMARY

Site: 2. C no P AM

SR 89 / I-80 WB Ramp
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: HWY 89											
3	L2	182	3.0	0.214	5.2	LOS A	0.0	0.0	0.00	0.00	25.5
8	T1	288	3.0	0.214	5.2	LOS A	0.0	0.0	0.00	0.00	25.9
Approach		470	3.0	0.214	5.2	LOS A	0.0	0.0	0.00	0.00	25.8
East: I-80 WB off-ramp											
1	L2	283	3.0	0.362	9.0	LOS A	1.2	29.8	0.45	0.46	23.0
6	T1	1	3.0	0.001	4.7	LOS A	0.0	0.1	0.36	0.21	32.4
16	R2	133	3.0	0.174	6.6	LOS A	0.5	12.6	0.41	0.39	23.3
Approach		417	3.0	0.362	8.2	LOS A	1.2	29.8	0.44	0.44	23.1
North: HWY 89											
4	T1	641	3.0	0.525	13.6	LOS B	2.8	72.1	0.66	0.73	22.6
14	R2	71	3.0	0.525	13.6	LOS B	2.8	72.1	0.66	0.73	22.0
Approach		712	3.0	0.525	13.6	LOS B	2.8	72.1	0.66	0.73	22.5
All Vehicles		1599	3.0	0.525	9.8	LOS A	2.8	72.1	0.41	0.44	23.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 3. C no P AM

SR 89 / I-80 EB Ramp
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: HWY 89											
8	T1	430	3.0	0.362	8.0	LOS A	1.6	42.1	0.40	0.30	23.9
18	R2	225	3.0	0.362	8.0	LOS A	1.6	42.1	0.40	0.30	23.1
Approach		655	3.0	0.362	8.0	LOS A	1.6	42.1	0.40	0.30	23.6
North: HWY 89											
7	L2	124	3.0	0.414	7.6	LOS A	0.0	0.0	0.00	0.00	26.3
4	T1	784	3.0	0.414	7.6	LOS A	0.0	0.0	0.00	0.00	28.0
Approach		908	3.0	0.414	7.6	LOS A	0.0	0.0	0.00	0.00	27.7
West: I-80 EB off-ramp											
5	L2	63	3.0	0.615	19.7	LOS C	2.7	69.3	0.72	0.81	23.8
12	R2	623	3.0	0.615	19.3	LOS C	2.7	69.3	0.71	0.79	25.8
Approach		686	3.0	0.615	19.3	LOS C	2.7	69.3	0.71	0.80	25.6
All Vehicles		2249	3.0	0.615	11.3	LOS B	2.7	69.3	0.33	0.33	25.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Volume (veh/h)	267	65	92	268	35	966	206
Future Volume (veh/h)	267	65	92	268	35	966	206
Number	3	18	1	6		2	12
Initial Q (Qb), veh	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00		1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863		1863	1863
Adj Flow Rate, veh/h	314	76	114	331		1098	234
Adj No. of Lanes	2	1	1	2		2	1
Peak Hour Factor	0.85	0.85	0.81	0.81		0.88	0.88
Percent Heavy Veh, %	2	2	2	2		2	2
Cap, veh/h	382	300	139	2861		2001	1280
Arrive On Green	0.11	0.11	0.16	1.00		0.70	0.70
Sat Flow, veh/h	3442	1583	1774	3632		3297	1583
Grp Volume(v), veh/h	314	76	114	331		1098	234
Grp Sat Flow(s),veh/h/ln	1721	1583	1774	1770		1434	1583
Q Serve(g_s), s	11.1	5.1	7.7	0.0		23.3	4.1
Cycle Q Clear(g_c), s	11.1	5.1	7.7	0.0		23.3	4.1
Prop In Lane	1.00	1.00	1.00				1.00
Lane Grp Cap(c), veh/h	382	300	139	2861		2001	1280
V/C Ratio(X)	0.82	0.25	0.82	0.12		0.55	0.18
Avail Cap(c_a), veh/h	971	571	358	2861		2001	1280
HCM Platoon Ratio	1.00	1.00	2.00	2.00		1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00		1.00	1.00
Uniform Delay (d), s/veh	53.9	42.8	51.4	0.0		9.2	2.7
Incr Delay (d2), s/veh	1.7	0.2	11.1	0.1		1.1	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	2.2	4.2	0.0		9.5	2.9
LnGrp Delay(d),s/veh	55.6	42.9	62.5	0.1		10.3	3.0
LnGrp LOS	E	D	E	A		B	A
Approach Vol, veh/h	390			445		1332	
Approach Delay, s/veh	53.1			16.1		9.0	
Approach LOS	D			B		A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	13.7	92.0				105.7		18.3
Change Period (Y+Rc), s	4.0	5.5				5.5		4.5
Max Green Setting (Gmax), s	25.0	50.0				50.0		35.0
Max Q Clear Time (g_c+I1), s	9.7	25.3				2.0		13.1
Green Ext Time (p_c), s	0.2	11.8				15.1		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	18.4
HCM 2010 LOS	B

Notes

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	319	77	283	44	27	1004
Future Volume (veh/h)	319	77	283	44	27	1004
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	431	104	410	64	30	1116
Adj No. of Lanes	1	1	2	1	1	1
Peak Hour Factor	0.74	0.74	0.69	0.69	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	415	404	1801	1364	38	1262
Arrive On Green	0.23	0.23	0.63	0.63	0.04	1.00
Sat Flow, veh/h	1774	1583	3297	1583	1774	1863
Grp Volume(v), veh/h	431	104	410	64	30	1116
Grp Sat Flow(s),veh/h/ln	1774	1583	1434	1583	1774	1863
Q Serve(g_s), s	29.0	6.5	7.7	0.7	2.1	0.0
Cycle Q Clear(g_c), s	29.0	6.5	7.7	0.7	2.1	0.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	415	404	1801	1364	38	1262
V/C Ratio(X)	1.04	0.26	0.23	0.05	0.79	0.88
Avail Cap(c_a), veh/h	415	404	1801	1364	429	1262
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.5	36.8	10.0	1.2	59.1	0.0
Incr Delay (d2), s/veh	54.6	0.1	0.3	0.1	12.9	9.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	20.5	2.9	3.1	0.9	1.2	3.2
LnGrp Delay(d),s/veh	102.1	36.9	10.3	1.3	72.0	9.3
LnGrp LOS	F	D	B	A	E	A
Approach Vol, veh/h	535		474			1146
Approach Delay, s/veh	89.4		9.1			10.9
Approach LOS	F		A			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	6.1	83.9				90.0		34.0
Change Period (Y+Rc), s	3.5	6.0				6.0		5.0
Max Green Setting (Gmax), s	30.0	50.0				50.0		29.0
Max Q Clear Time (g_c+I1), s	4.1	9.7				2.0		31.0
Green Ext Time (p_c), s	0.0	9.2				9.4		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	30.0
HCM 2010 LOS	C

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBU	SBL	SBR
Lane Configurations							
Traffic Vol, veh/h	37	1	0	1	2	35	60
Future Vol, veh/h	37	1	0	1	2	35	60
Peak Hour Factor	0.68	0.68	0.25	0.25	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	54	1	0	4	2	39	67
Number of Lanes	0	1	0	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	7.7	6.6	7.2
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	97%	0%	37%
Vol Thru, %	3%	0%	0%
Vol Right, %	0%	100%	63%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	38	1	97
LT Vol	37	0	36
Through Vol	1	0	0
RT Vol	0	1	61
Lane Flow Rate	56	4	109
Geometry Grp	1	1	1
Degree of Util (X)	0.067	0.004	0.113
Departure Headway (Hd)	4.324	3.568	3.734
Convergence, Y/N	Yes	Yes	Yes
Cap	827	996	957
Service Time	2.356	1.614	1.767
HCM Lane V/C Ratio	0.068	0.004	0.114
HCM Control Delay	7.7	6.6	7.2
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.2	0	0.4

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Vol, veh/h	13	58	4	403	105	18	11
Future Vol, veh/h	13	58	4	403	105	18	11
Conflicting Peds, #/hr	0	0	0	0	0	0	8
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	None
Storage Length	-	-	-	-	0	0	-
Veh in Median Storage, #	-	0	-	0	-	0	-
Grade, %	-	0	-	0	-	0	-
Peak Hour Factor	72	72	89	89	89	87	87
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	18	81	4	453	118	21	13

Major/Minor	Major1		Major2			Minor2	
Conflicting Flow All	453	0	-	-	0	570	461
Stage 1	-	-	-	-	-	453	-
Stage 2	-	-	-	-	-	117	-
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	1108	-	-	-	-	483	600
Stage 1	-	-	-	-	-	640	-
Stage 2	-	-	-	-	-	908	-
Platoon blocked, %		-		-	-		
Mov Cap-1 Maneuver	1101	-	-	-	-	475	596
Mov Cap-2 Maneuver	-	-	-	-	-	475	-
Stage 1	-	-	-	-	-	640	-
Stage 2	-	-	-	-	-	893	-

Approach	EB	WB	SB
HCM Control Delay, s	1.5		12.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1101	-	-	-	515
HCM Lane V/C Ratio	0.016	-	-	-	0.065
HCM Control Delay (s)	8.3	0	-	-	12.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Intersection	
Int Delay, s/veh	2.1

Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Vol, veh/h	85	9	2	595	500	12	84
Future Vol, veh/h	85	9	2	595	500	12	84
Conflicting Peds, #/hr	0	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	None
Storage Length	-	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	-	0	0	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	72	72	89	89	89	79	79
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	118	13	2	669	562	15	106

Major/Minor	Major1		Major2			Minor1	
Conflicting Flow All	0	0	-	131	0	2023	125
Stage 1	-	-	-	-	-	124	-
Stage 2	-	-	-	-	-	1899	-
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	-	-	-	1454	-	64	926
Stage 1	-	-	-	-	-	902	-
Stage 2	-	-	-	-	-	129	-
Platoon blocked, %	-	-			-		
Mov Cap-1 Maneuver	-	-	~ -375	~ -375	-	64	925
Mov Cap-2 Maneuver	-	-	-	-	-	64	-
Stage 1	-	-	-	-	-	902	-
Stage 2	-	-	-	-	-	129	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	18
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	64	925	-	-	+	-
HCM Lane V/C Ratio	0.237	0.115	-	-	-	-
HCM Control Delay (s)	77.9	9.4	-	-	1.5	-
HCM Lane LOS	F	A	-	-	A	-
HCM 95th %tile Q(veh)	0.8	0.4	-	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	161	6	550	1062	8	4	3	79	6	13	31
Future Vol, veh/h	6	161	6	550	1062	8	4	3	79	6	13	31
Conflicting Peds, #/hr	1	0	1	1	0	1	4	0	5	5	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	-	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	72	72	72	89	89	89	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	224	8	618	1193	9	4	3	85	6	14	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1203	0	0	233	0	0	2089	2684	234	2729	2685	606
Stage 1	-	-	-	-	-	-	245	245	-	2435	2435	-
Stage 2	-	-	-	-	-	-	1844	2439	-	294	250	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.33	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	578	-	-	1333	-	-	34	22	804	11	22	441
Stage 1	-	-	-	-	-	-	758	703	-	32	62	-
Stage 2	-	-	-	-	-	-	78	62	-	713	699	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	576	-	-	1327	-	-	-	0	800	-	0	439
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	0	-	-	0	-
Stage 1	-	-	-	-	-	-	747	693	-	32	0	-
Stage 2	-	-	-	-	-	-	-	0	-	623	689	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	5.1		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	-	576	-	-	1327	-	-	-	439
HCM Lane V/C Ratio	-	0.014	-	-	0.466	-	-	-	0.108
HCM Control Delay (s)	-	11.3	-	-	10.1	2.5	-	-	14.2
HCM Lane LOS	-	B	-	-	B	A	-	-	B
HCM 95th %tile Q(veh)	-	0	-	-	2.5	-	-	-	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	248	0	0	1613	6	0	0	0	11	0	7
Future Volume (veh/h)	2	248	0	0	1613	6	0	0	0	11	0	7
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	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
Adj Sat Flow, veh/h/ln	1900	1863	0	0	1863	1900				1900	1863	1900
Adj Flow Rate, veh/h	3	344	0	0	1812	7				12	0	8
Adj No. of Lanes	0	1	0	0	2	0				0	1	0
Peak Hour Factor	0.72	0.72	0.72	0.89	0.89	0.89				0.89	0.89	0.89
Percent Heavy Veh, %	2	2	0	0	2	2				0	2	0
Cap, veh/h	96	878	0	0	1903	7				267	0	178
Arrive On Green	0.53	0.53	0.00	0.00	0.53	0.53				0.26	0.00	0.26
Sat Flow, veh/h	1	1669	0	0	3709	14				1015	0	677
Grp Volume(v), veh/h	347	0	0	0	886	933				20	0	0
Grp Sat Flow(s),veh/h/ln	1671	0	0	0	1770	1860				1693	0	0
Q Serve(g_s), s	0.5	0.0	0.0	0.0	18.1	18.1				0.3	0.0	0.0
Cycle Q Clear(g_c), s	18.6	0.0	0.0	0.0	18.1	18.1				0.3	0.0	0.0
Prop In Lane	0.01		0.00	0.00		0.01				0.60		0.40
Lane Grp Cap(c), veh/h	975	0	0	0	931	979				445	0	0
V/C Ratio(X)	0.36	0.00	0.00	0.00	0.95	0.95				0.04	0.00	0.00
Avail Cap(c_a), veh/h	975	0	0	0	931	979				445	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	1.00	1.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	5.3	0.0	0.0	0.0	8.5	8.5				10.4	0.0	0.0
Incr Delay (d2), s/veh	1.0	0.0	0.0	0.0	19.9	19.4				0.2	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
%ile BackOfQ(50%),veh/ln	2.3	0.0	0.0	0.0	13.8	14.3				0.2	0.0	0.0
LnGrp Delay(d),s/veh	6.3	0.0	0.0	0.0	28.4	27.9				10.6	0.0	0.0
LnGrp LOS	A				C	C				B		
Approach Vol, veh/h		347			1819						20	
Approach Delay, s/veh		6.3			28.2						10.6	
Approach LOS		A			C						B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		24.0		14.0		24.0		
Change Period (Y+Rc), s		4.0		4.0		4.0		
Max Green Setting (Gmax), s		20.0		10.0		20.0		
Max Q Clear Time (g_c+I1), s		20.6		2.3		20.1		
Green Ext Time (p_c), s		0.0		0.0		0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	24.5
HCM 2010 LOS	C

SimTraffic Post-Processor | **Squaw Alpine Gondola Phase 2**
Average Results from 10 Runs | **Cumulative No Project**
Volume and Delay by Movement | **AM Peak Hour**

Intersection 11 **Squaw Valley Rd/Squaw Creek Rd** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	43	42	97.0%	16.4	6.6	C
	Through						
	Right Turn	35	37	106.0%	2.9	0.6	A
	Subtotal	78	79	101.0%	10.8	4.4	B
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	242	240	99.3%	1.8	0.6	A
	Right Turn	23	22	95.2%	1.8	1.6	A
	Subtotal	265	262	98.9%	1.8	0.6	A
WB	Left Turn	68	59	86.3%	4.3	0.9	A
	Through	1,571	1,371	87.3%	4.0	0.2	A
	Right Turn						
	Subtotal	1,639	1,430	87.2%	4.0	0.2	A
Total		1,982	1,771	89.3%	4.0	0.2	A

Intersection 12 **SR 89 /Squaw Valley Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	737	700	95.0%	229.0	62.2	F
	Through	164	153	93.0%	148.7	61.2	F
	Right Turn						
	Subtotal	901	853	94.7%	215.7	62.1	F
SB	Left Turn						
	Through	440	358	81.4%	288.7	15.7	F
	Right Turn	883	713	80.7%	255.5	11.1	F
	Subtotal	1,323	1,071	80.9%	266.5	12.4	F
EB	Left Turn	163	167	102.5%	42.8	5.5	D
	Through						
	Right Turn	126	122	96.4%	2.1	0.3	A
	Subtotal	289	289	99.8%	24.8	3.8	C
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,513	2,212	88.0%	215.0	25.3	F

SimTraffic Post-Processor **Squaw Alpine Gondola Phase 2**
Average Results from 10 Runs **Cumulative No Project**
Volume and Delay by Movement **AM Peak Hour**

Intersection 13 **SR 89/Alpine Meadows Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	344	342	99.5%	26.2	3.9	C
	Through	833	846	101.6%	20.6	3.2	C
	Right Turn						
	Subtotal	1,177	1,189	101.0%	22.2	2.9	C
SB	Left Turn						
	Through	246	204	82.9%	20.7	5.3	C
	Right Turn	320	273	85.4%	11.5	2.3	B
	Subtotal	566	477	84.3%	15.4	3.5	B
EB	Left Turn	68	69	100.9%	27.9	5.8	C
	Through						
	Right Turn	40	39	96.5%	2.8	1.4	A
	Subtotal	108	107	99.3%	18.9	4.1	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		1,851	1,773	95.8%	20.2	2.5	C

Intersection 11 **Squaw Valley Rd/Squaw Creek Rd** **Side-street Stop**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Through/Right	2,125	25	0	25	3	25	8	0%	0%
NB	Left Turn	75	50	2	75	4	75	8	3%	0%
	Right Turn	1,425	25	3	75	4	75	16	0%	0%
WB	Left/Through	750	50	7	100	22	175	58	0%	0%
	Through	750	25	9	100	49	225	127	0%	0%
0										

SimTraffic Post-Processor **Squaw Alpine Gondola Phase 2**
Average Results from 10 Runs **Cumulative No Project**
Queue Length **AM Peak Hour**

Intersection 12 **SR 89 /Squaw Valley Rd** **Signal**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Left Turn	475	75	7	125	13	150	26	0%	0%
	Left/Through	1,600	100	6	125	13	175	26	0%	0%
NB	Left Turn	3,150	1,225	279	2,175	446	2,250	429	53%	0%
	Through	650	600	89	925	113	725	12	0%	40%
	Through/Right	75	25	2	25	11	50	23	0%	0%
SB	Through	150	200	4	225	13	225	11	38%	38%
	Right Turn	3,725	3,400	250	4,575	229	3,825	47	0%	10%
0										

Intersection 13 **SR 89/Alpine Meadows Rd** **Signal**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Left Turn	150	50	5	100	10	125	24	0%	0%
	Right Turn	1,825	25	2	50	4	50	7	0%	0%
NB	Left Turn	375	175	17	300	48	425	102	0%	0%
	Through	3,700	225	17	425	45	600	148	3%	0%
SB	Through	1,450	100	11	200	23	225	35	0%	0%
	Right Turn	625	100	8	175	11	225	24	0%	0%
0										

MOVEMENT SUMMARY

Site: 14A C no P AM

SR 28/89
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
SouthEast: SR 89											
3x	L2	16	3.0	0.357	8.3	LOS A	1.6	40.2	0.45	0.37	23.8
8x	T1	27	3.0	0.357	8.3	LOS A	1.6	40.2	0.45	0.37	23.5
18x	R2	262	3.0	0.357	8.3	LOS A	1.6	40.2	0.45	0.37	22.9
Approach		304	3.0	0.357	8.3	LOS A	1.6	40.2	0.45	0.37	23.0
NorthEast: SR 28											
1x	L2	242	3.0	0.995	46.6	LOS E	48.5	1242.7	1.00	0.54	16.9
6x	T1	795	3.0	0.995	46.6	LOS E	48.5	1242.7	1.00	0.54	16.7
16x	R2	5	3.0	0.995	46.6	LOS E	48.5	1242.7	1.00	0.54	16.5
Approach		1042	3.0	0.995	46.6	LOS E	48.5	1242.7	1.00	0.54	16.8
NorthWest: SR 28											
7x	L2	19	3.0	0.163	12.4	LOS B	0.5	13.0	0.70	0.70	17.5
4x	T1	35	3.0	0.163	12.4	LOS B	0.5	13.0	0.70	0.70	17.2
14x	R2	6	3.0	0.163	12.4	LOS B	0.5	13.0	0.70	0.70	16.9
Approach		60	3.0	0.163	12.4	LOS B	0.5	13.0	0.70	0.70	17.3
SouthWest: SR 89											
5x	L2	3	3.0	0.297	7.8	LOS A	1.2	30.9	0.46	0.40	24.4
2x	T1	224	3.0	0.297	7.8	LOS A	1.2	30.9	0.46	0.40	23.9
12x	R2	14	3.0	0.297	7.8	LOS A	1.2	30.9	0.46	0.40	23.3
Approach		240	3.0	0.297	7.8	LOS A	1.2	30.9	0.46	0.40	23.9
All Vehicles		1647	3.0	0.995	32.6	LOS D	48.5	1242.7	0.81	0.49	18.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 14B C no P AM

SR 28/89 Western Intersection
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
SouthEast: SR 89											
3x	L2	524	3.0	0.616	13.6	LOS B	4.3	109.7	0.60	0.54	21.9
18x	R2	11	3.0	0.616	13.6	LOS B	4.3	109.7	0.60	0.54	21.1
Approach		535	3.0	0.616	13.6	LOS B	4.3	109.7	0.60	0.54	21.9
NorthEast: SR 28											
1x	L2	12	3.0	1.262	151.5	LOS F	66.1	1691.7	1.00	4.54	9.6
6x	T1	795	3.0	1.262	151.5	LOS F	66.1	1691.7	1.00	4.54	9.5
Approach		807	3.0	1.262	151.5	LOS F	66.1	1691.7	1.00	4.54	9.5
SouthWest: SR 89											
2x	T1	226	3.0	0.368	7.1	LOS A	1.9	47.7	0.08	0.02	25.4
12x	R2	174	3.0	0.368	7.1	LOS A	1.9	47.7	0.08	0.02	24.7
Approach		400	3.0	0.368	7.1	LOS A	1.9	47.7	0.08	0.02	25.1
All Vehicles		1742	3.0	1.262	76.0	LOS F	66.1	1691.7	0.67	2.27	14.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 14C C no P AM

SR 28/89 Eastern Intersection
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: SR 28											
3	L2	524	3.0	0.752	16.4	LOS C	8.8	224.0	0.23	0.07	24.2
8	T1	288	3.0	0.752	16.4	LOS C	8.8	224.0	0.23	0.07	23.7
Approach		813	3.0	0.752	16.4	LOS C	8.8	224.0	0.23	0.07	24.0
North: SR 28											
4	T1	267	3.0	0.446	12.3	LOS B	2.1	53.0	0.64	0.69	22.8
14	R2	17	3.0	0.446	12.3	LOS B	2.1	53.0	0.64	0.69	22.3
Approach		285	3.0	0.446	12.3	LOS B	2.1	53.0	0.64	0.69	22.8
West: SR 89											
5	L2	14	3.0	0.225	6.7	LOS A	0.9	22.2	0.41	0.33	24.4
12	R2	174	3.0	0.225	6.7	LOS A	0.9	22.2	0.41	0.33	23.3
Approach		188	3.0	0.225	6.7	LOS A	0.9	22.2	0.41	0.33	23.4
All Vehicles		1285	3.0	0.752	14.1	LOS B	8.8	224.0	0.35	0.24	23.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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HCM 2010 Signalized Intersection Summary
1: SR 89 & Donner Pass Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	229	277	217	240	37	492	123	242	37	90	60
Future Volume (veh/h)	44	229	277	217	240	37	492	123	242	37	90	60
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1900
Adj Flow Rate, veh/h	54	283	342	244	270	42	547	137	269	44	107	71
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	0	2	0
Peak Hour Factor	0.81	0.81	0.81	0.89	0.89	0.89	0.90	0.90	0.90	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	69	369	814	281	601	498	562	590	501	71	176	120
Arrive On Green	0.04	0.20	0.20	0.16	0.32	0.32	0.32	0.32	0.32	0.12	0.11	0.11
Sat Flow, veh/h	1774	1863	1579	1774	1863	1543	1774	1863	1583	679	1672	1139
Grp Volume(v), veh/h	54	283	342	244	270	42	547	137	269	118	0	104
Grp Sat Flow(s),veh/h/ln	1774	1863	1579	1774	1863	1543	1774	1863	1583	1829	0	1662
Q Serve(g_s), s	2.9	13.6	12.7	12.7	10.9	1.8	28.9	5.1	13.3	5.9	0.0	5.6
Cycle Q Clear(g_c), s	2.9	13.6	12.7	12.7	10.9	1.8	28.9	5.1	13.3	5.9	0.0	5.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	0.37		0.69
Lane Grp Cap(c), veh/h	69	369	814	281	601	498	562	590	501	192	0	175
V/C Ratio(X)	0.78	0.77	0.42	0.87	0.45	0.08	0.97	0.23	0.54	0.62	0.00	0.59
Avail Cap(c_a), veh/h	281	688	1084	655	688	570	562	590	501	483	0	438
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	45.1	35.9	14.2	38.9	25.4	22.3	32.0	23.9	26.7	40.4	0.0	40.4
Incr Delay (d2), s/veh	6.8	1.3	0.1	3.2	0.2	0.0	31.1	0.1	0.6	1.2	0.0	1.2
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	1.5	7.1	8.9	6.5	5.6	0.8	19.0	2.6	5.9	3.0	0.0	2.6
LnGrp Delay(d),s/veh	51.9	37.2	14.4	42.1	25.6	22.4	63.1	24.0	27.3	41.6	0.0	41.6
LnGrp LOS	D	D	B	D	C	C	E	C	C	D		D
Approach Vol, veh/h		679			556			953			222	
Approach Delay, s/veh		26.9			32.6			47.4			41.6	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	20.0	24.3		15.0	8.2	36.1		35.5
Change Period (Y+Rc), s	5.0	5.5		5.0	4.5	5.5		5.5
Max Green Setting (Gmax), s	35.0	35.0		25.0	15.0	35.0		30.0
Max Q Clear Time (g_c+I1), s	14.7	15.6		7.9	4.9	12.9		30.9
Green Ext Time (p_c), s	0.3	2.6		0.7	0.0	2.7		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	37.7
HCM 2010 LOS	D

MOVEMENT SUMMARY

Site: 2. C no P PM

SR 89 / I-80 WB Ramp
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: HWY 89											
3	L2	553	3.0	0.651	12.4	LOS B	0.0	0.0	0.00	0.00	25.5
8	T1	875	3.0	0.651	12.4	LOS B	0.0	0.0	0.00	0.00	25.9
Approach		1428	3.0	0.651	12.4	LOS B	0.0	0.0	0.00	0.00	25.8
East: I-80 WB off-ramp											
1	L2	311	3.0	0.793	40.4	LOS E	3.7	95.8	0.89	1.16	17.6
16	R2	180	3.0	0.493	21.6	LOS C	1.6	42.1	0.79	0.89	20.2
Approach		490	3.0	0.793	33.5	LOS D	3.7	95.8	0.85	1.06	18.4
North: HWY 89											
4	T1	600	3.0	0.805	37.5	LOS E	5.6	144.5	0.87	1.21	18.2
14	R2	125	3.0	0.805	37.5	LOS E	5.6	144.5	0.87	1.21	17.8
Approach		725	3.0	0.805	37.5	LOS E	5.6	144.5	0.87	1.21	18.2
All Vehicles		2644	3.0	0.805	23.2	LOS C	5.6	144.5	0.40	0.53	21.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 3. C no P PM

SR 89 / I-80 EB Ramp
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: HWY 89											
8	T1	1403	3.0	1.264	145.3	LOS F	96.2	2463.5	1.00	4.04	9.8
18	R2	787	3.0	1.264	145.3	LOS F	96.2	2463.5	1.00	4.04	9.6
Approach		2190	3.0	1.264	145.3	LOS F	96.2	2463.5	1.00	4.04	9.7
North: HWY 89											
7	L2	201	3.0	0.415	7.7	LOS A	0.0	0.0	0.00	0.00	26.0
4	T1	710	3.0	0.415	7.7	LOS A	0.0	0.0	0.00	0.00	27.9
Approach		911	3.0	0.415	7.7	LOS A	0.0	0.0	0.00	0.00	27.5
West: I-80 EB off-ramp											
5	L2	28	3.0	0.310	11.1	LOS B	0.9	24.2	0.59	0.61	26.2
12	R2	317	3.0	0.310	10.9	LOS B	0.9	24.2	0.58	0.60	28.5
Approach		345	3.0	0.310	10.9	LOS B	0.9	24.2	0.58	0.60	28.3
All Vehicles		3446	3.0	1.264	95.5	LOS F	96.2	2463.5	0.69	2.63	12.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Volume (veh/h)	466	64	217	1421	62	459	316
Future Volume (veh/h)	466	64	217	1421	62	459	316
Number	3	18	1	6		2	12
Initial Q (Qb), veh	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00		1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863		1863	1863
Adj Flow Rate, veh/h	530	73	224	1465		510	351
Adj No. of Lanes	2	1	1	2		2	1
Peak Hour Factor	0.88	0.88	0.97	0.97		0.90	0.90
Percent Heavy Veh, %	2	2	2	2		2	2
Cap, veh/h	602	506	256	2634		1628	1176
Arrive On Green	0.18	0.18	0.05	0.25		0.57	0.57
Sat Flow, veh/h	3442	1583	1774	3632		3297	1583
Grp Volume(v), veh/h	530	73	224	1465		510	351
Grp Sat Flow(s),veh/h/ln	1721	1583	1774	1770		1434	1583
Q Serve(g_s), s	18.6	4.1	15.6	44.8		11.6	9.1
Cycle Q Clear(g_c), s	18.6	4.1	15.6	44.8		11.6	9.1
Prop In Lane	1.00	1.00	1.00				1.00
Lane Grp Cap(c), veh/h	602	506	256	2634		1628	1176
V/C Ratio(X)	0.88	0.14	0.87	0.56		0.31	0.30
Avail Cap(c_a), veh/h	971	676	358	2634		1628	1176
HCM Platoon Ratio	1.00	1.00	0.33	0.33		1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00		1.00	1.00
Uniform Delay (d), s/veh	49.9	30.1	57.9	28.9		14.1	5.3
Incr Delay (d2), s/veh	3.4	0.0	15.8	0.9		0.5	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		0.0	0.0
%ile BackOfQ(50%),veh/ln	9.1	1.8	8.8	22.4		4.7	6.8
LnGrp Delay(d),s/veh	53.3	30.2	73.7	29.7		14.6	5.9
LnGrp LOS	D	C	E	C		B	A
Approach Vol, veh/h	603			1689		861	
Approach Delay, s/veh	50.5			35.6		11.1	
Approach LOS	D			D		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	21.9	75.9				97.8		26.2
Change Period (Y+Rc), s	4.0	5.5				5.5		4.5
Max Green Setting (Gmax), s	25.0	50.0				50.0		35.0
Max Q Clear Time (g_c+I1), s	17.6	13.6				46.8		20.6
Green Ext Time (p_c), s	0.4	22.1				2.8		1.1

Intersection Summary	
HCM 2010 Ctrl Delay	31.7
HCM 2010 LOS	C

Notes

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	57	92	1546	192	142	381
Future Volume (veh/h)	57	92	1546	192	142	381
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	72	116	1610	200	151	405
Adj No. of Lanes	1	1	2	1	1	1
Peak Hour Factor	0.79	0.79	0.96	0.96	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	147	288	2012	1241	176	1544
Arrive On Green	0.08	0.08	0.70	0.70	0.20	1.00
Sat Flow, veh/h	1774	1583	3297	1583	1774	1863
Grp Volume(v), veh/h	72	116	1610	200	151	405
Grp Sat Flow(s),veh/h/ln	1774	1583	1434	1583	1774	1863
Q Serve(g_s), s	4.8	8.0	47.4	3.9	10.2	0.0
Cycle Q Clear(g_c), s	4.8	8.0	47.4	3.9	10.2	0.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	147	288	2012	1241	176	1544
V/C Ratio(X)	0.49	0.40	0.80	0.16	0.86	0.26
Avail Cap(c_a), veh/h	415	527	2012	1241	429	1544
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.4	44.8	12.6	3.3	48.9	0.0
Incr Delay (d2), s/veh	0.9	0.3	3.5	0.3	4.7	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	3.5	19.5	2.4	5.2	0.2
LnGrp Delay(d),s/veh	55.3	45.1	16.1	3.6	53.5	0.4
LnGrp LOS	E	D	B	A	D	A
Approach Vol, veh/h	188		1810			556
Approach Delay, s/veh	49.0		14.7			14.8
Approach LOS	D		B			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	15.8	93.0				108.8		15.2
Change Period (Y+Rc), s	3.5	6.0				6.0		5.0
Max Green Setting (Gmax), s	30.0	50.0				50.0		29.0
Max Q Clear Time (g_c+I1), s	12.2	49.4				2.0		10.0
Green Ext Time (p_c), s	0.2	0.5				13.8		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	17.2
HCM 2010 LOS	B

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	61	6	0	0	23	42
Future Vol, veh/h	61	6	0	0	23	42
Peak Hour Factor	0.80	0.80	0.85	0.85	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	76	8	0	0	25	45
Number of Lanes	0	1	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	7.7	0	7.1
HCM LOS	A	-	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	91%	0%	35%
Vol Thru, %	9%	100%	0%
Vol Right, %	0%	0%	65%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	67	0	65
LT Vol	61	0	23
Through Vol	6	0	0
RT Vol	0	0	42
Lane Flow Rate	84	0	70
Geometry Grp	1	1	1
Degree of Util (X)	0.099	0	0.073
Departure Headway (Hd)	4.238	4.12	3.762
Convergence, Y/N	Yes	Yes	Yes
Cap	847	0	946
Service Time	2.26	2.164	1.811
HCM Lane V/C Ratio	0.099	0	0.074
HCM Control Delay	7.7	7.2	7.1
HCM Lane LOS	A	N	A
HCM 95th-tile Q	0.3	0	0.2

Intersection	
Int Delay, s/veh	19.2

Movement	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Vol, veh/h	19	421	5	154	50	224	74
Future Vol, veh/h	19	421	5	154	50	224	74
Conflicting Peds, #/hr	0	0	0	0	0	27	9
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	None
Storage Length	-	-	-	-	0	0	-
Veh in Median Storage, #	-	0	-	0	-	0	-
Grade, %	-	0	-	0	-	0	-
Peak Hour Factor	80	80	93	93	93	77	77
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	24	526	5	166	54	291	96

Major/Minor	Major1		Major2			Minor2	
Conflicting Flow All	166	0	-	-	0	767	175
Stage 1	-	-	-	-	-	166	-
Stage 2	-	-	-	-	-	601	-
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	1412	-	-	-	-	370	868
Stage 1	-	-	-	-	-	863	-
Stage 2	-	-	-	-	-	547	-
Platoon blocked, %		-		-	-		
Mov Cap-1 Maneuver	1401	-	-	-	-	361	861
Mov Cap-2 Maneuver	-	-	-	-	-	361	-
Stage 1	-	-	-	-	-	863	-
Stage 2	-	-	-	-	-	534	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3		57.1
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1401	-	-	-	422
HCM Lane V/C Ratio	0.017	-	-	-	0.917
HCM Control Delay (s)	7.6	0	-	-	57.1
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	10.1

Intersection	
Int Delay, s/veh	179.9

Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Vol, veh/h	632	13	3	120	209	12	692
Future Vol, veh/h	632	13	3	120	209	12	692
Conflicting Peds, #/hr	0	8	0	8	0	3	5
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	None
Storage Length	-	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	-	0	0	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	80	80	93	93	93	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	790	16	3	129	225	13	736

Major/Minor	Major1		Major2			Minor1	
Conflicting Flow All	0	0	-	814	0	1292	811
Stage 1	-	-	-	-	-	806	-
Stage 2	-	-	-	-	-	486	-
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	-	-	-	813	-	180	~ 379
Stage 1	-	-	-	-	-	439	-
Stage 2	-	-	-	-	-	618	-
Platoon blocked, %	-	-			-		
Mov Cap-1 Maneuver	-	-	~ -91	~ -91	-	178	~ 375
Mov Cap-2 Maneuver	-	-	-	-	-	178	-
Stage 1	-	-	-	-	-	436	-
Stage 2	-	-	-	-	-	616	-

Approach	EB	WB	NB
HCM Control Delay, s	0		$ 459.3
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	178	375	-	-	+	-
HCM Lane V/C Ratio	0.072	1.963	-	-	-	-
HCM Control Delay (s)	26.8	$ 466.8	-	-	-	-
HCM Lane LOS	D	F	-	-	-	-
HCM 95th %tile Q(veh)	0.2	50.6	-	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	23	1301	0	0	321	6	0	0	0	18	0	8
Future Vol, veh/h	23	1301	0	0	321	6	0	0	0	18	0	8
Conflicting Peds, #/hr	13	0	0	0	0	13	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	-	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	93	93	93	98	98	98	54	54	54
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	1626	0	0	345	6	0	0	0	33	0	15

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	365	0	0	1626	0	0	1857	2049	1626	2045	2045	189
Stage 1	-	-	-	-	-	-	1684	1684	-	361	361	-
Stage 2	-	-	-	-	-	-	173	365	-	1684	1684	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.33	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1192	-	-	398	-	-	51	55	126	37	56	821
Stage 1	-	-	-	-	-	-	119	150	-	631	625	-
Stage 2	-	-	-	-	-	-	812	623	-	119	150	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1192	-	-	398	-	-	49	53	126	36	54	812
Mov Cap-2 Maneuver	-	-	-	-	-	-	49	53	-	36	54	-
Stage 1	-	-	-	-	-	-	116	146	-	609	618	-
Stage 2	-	-	-	-	-	-	797	616	-	116	146	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	0	205.8
HCM LOS			A	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	-	1192	-	-	398	-	-	36	812
HCM Lane V/C Ratio	-	0.024	-	-	-	-	-	0.926	0.018
HCM Control Delay (s)	0	8.1	-	-	0	-	-	293.1	9.5
HCM Lane LOS	A	A	-	-	A	-	-	F	A
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	-	3.4	0.1

HCM 2010 Signalized Intersection Summary
10: Squaw Valley Rd & Wayne Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	1310	0	0	322	7	0	0	0	12	0	5
Future Volume (veh/h)	9	1310	0	0	322	7	0	0	0	12	0	5
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	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
Adj Sat Flow, veh/h/ln	1900	1863	0	0	1863	1900				1900	1863	1900
Adj Flow Rate, veh/h	11	1638	0	0	346	8				14	0	6
Adj No. of Lanes	0	1	0	0	2	0				0	1	0
Peak Hour Factor	0.80	0.80	0.80	0.93	0.93	0.93				0.85	0.85	0.85
Percent Heavy Veh, %	2	2	0	0	2	2				0	2	0
Cap, veh/h	54	1546	0	0	2947	68				66	0	28
Arrive On Green	0.83	0.83	0.00	0.00	0.83	0.83				0.06	0.00	0.06
Sat Flow, veh/h	4	1856	0	0	3629	82				1196	0	513
Grp Volume(v), veh/h	1649	0	0	0	173	181				20	0	0
Grp Sat Flow(s),veh/h/ln	1860	0	0	0	1770	1848				1709	0	0
Q Serve(g_s), s	18.9	0.0	0.0	0.0	1.3	1.3				0.8	0.0	0.0
Cycle Q Clear(g_c), s	60.0	0.0	0.0	0.0	1.3	1.3				0.8	0.0	0.0
Prop In Lane	0.01		0.00	0.00		0.04				0.70		0.30
Lane Grp Cap(c), veh/h	1600	0	0	0	1475	1540				95	0	0
V/C Ratio(X)	1.03	0.00	0.00	0.00	0.12	0.12				0.21	0.00	0.00
Avail Cap(c_a), veh/h	1600	0	0	0	1475	1540				95	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	1.00	1.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	6.9	0.0	0.0	0.0	1.1	1.1				32.5	0.0	0.0
Incr Delay (d2), s/veh	30.8	0.0	0.0	0.0	0.2	0.2				5.0	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
%ile BackOfQ(50%),veh/ln	45.2	0.0	0.0	0.0	0.7	0.7				0.5	0.0	0.0
LnGrp Delay(d),s/veh	37.7	0.0	0.0	0.0	1.3	1.3				37.5	0.0	0.0
LnGrp LOS	F				A	A				D		
Approach Vol, veh/h		1649			354						20	
Approach Delay, s/veh		37.7			1.3						37.5	
Approach LOS		D			A						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		64.0		8.0		64.0		
Change Period (Y+Rc), s		4.0		4.0		4.0		
Max Green Setting (Gmax), s		60.0		4.0		30.0		
Max Q Clear Time (g_c+I1), s		62.0		2.8		3.3		
Green Ext Time (p_c), s		0.0		0.0		23.9		

Intersection Summary	
HCM 2010 Ctrl Delay	31.3
HCM 2010 LOS	C

SimTraffic Post-Processor | **Squaw Alpine Gondola Phase 2**
Average Results from 10 Runs | **Cumulative No Project**
Volume and Delay by Movement | **PM Peak Hour**

Intersection 11 **Squaw Creek Rd/Squaw Valley Rd** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	34	22	65.6%	370.6	116.0	F
	Through						
	Right Turn	72	51	71.5%	407.4	105.8	F
	Subtotal	106	74	69.6%	268.6	211.9	F
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	1,278	1,103	86.3%	253.7	20.8	F
	Right Turn	42	33	78.7%	244.3	47.2	F
	Subtotal	1,320	1,136	86.1%	253.5	20.8	F
WB	Left Turn	61	59	96.7%	6.3	1.8	A
	Through	309	307	99.3%	1.5	0.2	A
	Right Turn						
	Subtotal	370	366	98.8%	2.2	0.4	A
Total		1,796	1,575	87.7%	188.6	10.7	F

Intersection 12 **SR 89/Squaw Valley Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	178	169	95.1%	83.4	15.3	F
	Through	771	716	92.8%	125.9	19.4	F
	Right Turn						
	Subtotal	949	885	93.2%	118.6	19.2	F
SB	Left Turn						
	Through	246	240	97.4%	33.6	3.8	C
	Right Turn	192	196	102.0%	1.1	0.4	A
	Subtotal	438	435	99.4%	18.9	2.4	B
EB	Left Turn	967	723	74.7%	306.8	10.1	F
	Through						
	Right Turn	353	279	79.1%	105.3	7.4	F
	Subtotal	1,320	1,002	75.9%	256.5	13.6	F
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,707	2,322	85.8%	156.0	10.0	F

SimTraffic Post-Processor **Squaw Alpine Gondola Phase 2**
Average Results from 10 Runs **Cumulative No Project**
Volume and Delay by Movement **PM Peak Hour**

Intersection 13 **SR 89/Alpine Meadows Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	51	50	98.6%	36.5	6.3	D
	Through	371	380	102.5%	14.1	1.9	B
	Right Turn						
	Subtotal	422	431	102.1%	16.8	2.1	B
SB	Left Turn						
	Through	535	463	86.6%	29.1	4.7	C
	Right Turn	64	54	85.0%	4.7	0.6	A
	Subtotal	599	517	86.4%	26.4	4.0	C
EB	Left Turn	578	577	99.8%	53.2	22.2	D
	Through						
	Right Turn	329	321	97.6%	29.4	16.1	C
	Subtotal	907	898	99.0%	44.6	20.6	D
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		1,928	1,846	95.8%	33.0	11.1	C

Intersection 11 **Squaw Creek Rd/Squaw Valley Rd** **Side-street Stop**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Through	1,925	725	114	2,025	226	1,950	39	0%	17%
	Through/Right	1,925	725	115	2,000	236	1,950	94	0%	16%
NB	Left Turn	75	50	9	75	13	75	2	13%	0%
	Right Turn	1,400	275	90	700	252	850	223	49%	0%
WB	Left Turn	100	50	4	75	12	100	17	1%	0%
	Through	725	25	5	50	45	75	120	0%	0%
0										

Intersection 12 **SR 89/Squaw Valley Rd** **Signal**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Left Turn	3,450	1,975	70	3,650	97	3,475	38	18%	0%
	Left/Through	4,250	2,650	85	4,325	101	4,250	59	57%	16%
	Right Turn	1,625	1,325	72	2,400	21	1,725	9	0%	59%
NB	Left Turn	425	275	36	500	38	425	0	0%	0%
	Through	650	550	80	825	65	725	14	32%	24%
	Through/Right	375	350	23	450	17	400	0	24%	0%
SB	Through	250	150	10	225	14	275	37	4%	0%
	Right Turn	250	25	5	50	18	75	25	0%	0%
0										

Intersection 13 **SR 89/Alpine Meadows Rd** **Signal**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Left Turn	325	300	22	400	9	325	0	22%	0%
	Right Turn	2,150	425	163	975	376	1,150	442	0%	0%
NB	Left Turn	375	50	7	100	29	125	94	0%	0%
	Through	3,775	125	14	225	46	300	105	0%	0%
SB	Through	1,450	250	15	425	39	500	60	0%	0%
	Right Turn	625	25	4	50	6	75	9	0%	0%
0										

MOVEMENT SUMMARY

Site: 14A C no P PM

SR 28/89
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
SouthEast: SR 89											
3x	L2	11	3.0	0.543	16.5	LOS C	2.8	70.6	0.71	0.82	21.9
8x	T1	42	3.0	0.543	16.5	LOS C	2.8	70.6	0.71	0.82	21.7
18x	R2	252	3.0	0.543	16.5	LOS C	2.8	70.6	0.71	0.82	21.2
Approach		304	3.0	0.543	16.5	LOS C	2.8	70.6	0.71	0.82	21.3
NorthEast: SR 28											
1x	L2	198	3.0	0.455	8.6	LOS A	2.5	65.0	0.25	0.12	23.4
6x	T1	263	3.0	0.455	8.6	LOS A	2.5	65.0	0.25	0.12	23.0
16x	R2	10	3.0	0.455	8.6	LOS A	2.5	65.0	0.25	0.12	22.6
Approach		470	3.0	0.455	8.6	LOS A	2.5	65.0	0.25	0.12	23.1
NorthWest: SR 28											
7x	L2	19	3.0	0.130	6.8	LOS A	0.4	11.4	0.49	0.46	18.3
4x	T1	59	3.0	0.130	6.8	LOS A	0.4	11.4	0.49	0.46	18.0
14x	R2	10	3.0	0.130	6.8	LOS A	0.4	11.4	0.49	0.46	17.6
Approach		88	3.0	0.130	6.8	LOS A	0.4	11.4	0.49	0.46	18.0
SouthWest: SR 89											
5x	L2	5	3.0	0.779	21.8	LOS C	8.2	209.0	0.82	0.90	21.2
2x	T1	628	3.0	0.779	21.8	LOS C	8.2	209.0	0.82	0.90	20.9
12x	R2	11	3.0	0.779	21.8	LOS C	8.2	209.0	0.82	0.90	20.4
Approach		644	3.0	0.779	21.8	LOS C	8.2	209.0	0.82	0.90	20.9
All Vehicles		1506	3.0	0.779	15.7	LOS C	8.2	209.0	0.60	0.62	21.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 14B C no P PM

SR 28/89 Western Intersection
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
SouthEast: SR 89											
3x	L2	226	3.0	0.424	13.0	LOS B	1.9	47.4	0.66	0.71	22.1
18x	R2	17	3.0	0.424	13.0	LOS B	1.9	47.4	0.66	0.71	21.2
Approach		243	3.0	0.424	13.0	LOS B	1.9	47.4	0.66	0.71	22.1
NorthEast: SR 28											
1x	L2	12	3.0	0.316	7.6	LOS A	1.3	34.5	0.42	0.33	24.1
6x	T1	263	3.0	0.316	7.6	LOS A	1.3	34.5	0.42	0.33	23.9
Approach		275	3.0	0.316	7.6	LOS A	1.3	34.5	0.42	0.33	23.9
SouthWest: SR 89											
2x	T1	632	3.0	0.921	31.2	LOS D	25.7	658.2	0.50	0.14	20.0
12x	R2	366	3.0	0.921	31.2	LOS D	25.7	658.2	0.50	0.14	19.5
Approach		998	3.0	0.921	31.2	LOS D	25.7	658.2	0.50	0.14	19.8
All Vehicles		1515	3.0	0.921	24.0	LOS C	25.7	658.2	0.51	0.26	20.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 14C C no P PM

SR 28/89 Eastern Intersection
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: SR 28											
3	L2	226	3.0	0.482	8.8	LOS A	2.9	74.5	0.13	0.04	26.6
8	T1	293	3.0	0.482	8.8	LOS A	2.9	74.5	0.13	0.04	26.0
Approach		519	3.0	0.482	8.8	LOS A	2.9	74.5	0.13	0.04	26.3
North: SR 28											
4	T1	198	3.0	0.241	6.7	LOS A	1.0	24.4	0.39	0.30	24.2
14	R2	12	3.0	0.241	6.7	LOS A	1.0	24.4	0.39	0.30	23.6
Approach		210	3.0	0.241	6.7	LOS A	1.0	24.4	0.39	0.30	24.2
West: SR 89											
5	L2	17	3.0	0.428	9.1	LOS A	2.1	53.4	0.45	0.34	23.8
12	R2	366	3.0	0.428	9.1	LOS A	2.1	53.4	0.45	0.34	22.7
Approach		383	3.0	0.428	9.1	LOS A	2.1	53.4	0.45	0.34	22.8
All Vehicles		1111	3.0	0.482	8.5	LOS A	2.9	74.5	0.29	0.19	24.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	3/4/2017
Analysis Time Period	Winter AM
Highway	SR-89 SB
From/To	Deerfield Dr to W River St
Jurisdiction	Nevada/Placer County
Analysis Year	Cumulative No Project
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.89	
Shoulder width	4.7	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.2	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	0	/mi

Analysis direction volume, Vd 1031 veh/h
Opposing direction volume, Vo 360 veh/h

Average Travel Speed

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.3
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adj. factor,(note-5) fHV	1.000	0.994
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1158 pc/h	407 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	1.3	mi/h
Adj. for access point density,(note-3) fA	0.0	mi/h
Free-flow speed, FFSd	43.7	mi/h
Adjustment for no-passing zones, fnp	2.7	mi/h
Average travel speed, ATSd	28.9	mi/h
Percent Free Flow Speed, PFFS	66.1	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	1.000
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1158 pc/h	404 pc/h

Base percent time-spent-following,(note-4) BPTSFd	77.0	%
Adjustment for no-passing zones, fnp	22.7	
Percent time-spent-following, PTSFd	93.8	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.39	
Peak 15-min vehicle-miles of travel, VMT15	58	veh-mi
Peak-hour vehicle-miles of travel, VMT60	206	veh-mi
Peak 15-min total travel time, TT15	2.0	veh-h
Capacity from ATS, CdATS	1690	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	3973	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.2	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	28.9	mi/h
Percent time-spent-following, PTSFd (from above)	93.8	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1158.4
Effective width of outside lane, We	21.40
Effective speed factor, St	4.42
Bicycle LOS Score, BLOS	3.42
Bicycle LOS	C

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	3/4/2017
Analysis Time Period	Winter AM
Highway	SR-89 SB
From/To	W River St to Squaw Valley Rd
Jurisdiction	Placer County
Analysis Year	Cumulative + Project
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.90	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	7.8	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	55	%
Up/down	-	%	Access point density	1	/mi

Analysis direction volume, Vd 1323 veh/h
Opposing direction volume, Vo 327 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.3		2.0	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.994		0.980	
Grade adj. factor,(note-1) fg	1.00		0.87	
Directional flow rate,(note-2) vi	1479	pc/h	426	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	0.3	mi/h
Free-flow speed, FFSd	59.8	mi/h
Adjustment for no-passing zones, fnp	2.3	mi/h
Average travel speed, ATSd	42.7	mi/h
Percent Free Flow Speed, PFFS	71.5	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.6
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	0.988
Grade adjustment factor,(note-1) fg	1.00	0.88
Directional flow rate,(note-2) vi	1470 pc/h	418 pc/h

Base percent time-spent-following,(note-4) BPTSFd	84.4	%
Adjustment for no-passing zones, fnp	10.8	
Percent time-spent-following, PTSFd	92.8	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.98	
Peak 15-min vehicle-miles of travel, VMT15	2867	veh-mi
Peak-hour vehicle-miles of travel, VMT60	10319	veh-mi
Peak 15-min total travel time, TT15	67.1	veh-h
Capacity from ATS, CdATS	1516	veh/h
Capacity from PTSF, CdPTSF	1535	veh/h
Directional Capacity	1952	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	7.8	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	42.7	mi/h
Percent time-spent-following, PTSFd (from above)	92.8	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1470.0
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.02
Bicycle LOS	B

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	3/4/2017
Analysis Time Period	Winter AM
Highway	SR-89 NB
From/To	A. Meadows Rd to S. Valley Rd
Jurisdiction	Placer County
Analysis Year	Cumulative + Project
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.92	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.3	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	0	/mi

Analysis direction volume, Vd 901 veh/h
Opposing direction volume, Vo 566 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.3		1.7	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.994		0.986	
Grade adj. factor,(note-1) fg	1.00		0.97	
Directional flow rate,(note-2) vi	985	pc/h	643	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	0.0	mi/h
Free-flow speed, FFSd	50.0	mi/h
Adjustment for no-passing zones, fnp	1.8	mi/h
Average travel speed, ATSd	35.6	mi/h
Percent Free Flow Speed, PFFS	71.2	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	1.000
Grade adjustment factor,(note-1) fg	1.00	0.97
Directional flow rate,(note-2) vi	979 pc/h	634 pc/h

Base percent time-spent-following,(note-4) BPTSFd	73.9	%
Adjustment for no-passing zones, fnp	23.2	
Percent time-spent-following, PTSFd	88.0	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.38	
Peak 15-min vehicle-miles of travel, VMT15	318	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1171	veh-mi
Peak 15-min total travel time, TT15	8.9	veh-h
Capacity from ATS, CdATS	1626	veh/h
Capacity from PTSF, CdPTSF	1666	veh/h
Directional Capacity	4313	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.3	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	35.6	mi/h
Percent time-spent-following, PTSFd (from above)	88.0	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	979.3
Effective width of outside lane, We	28.00
Effective speed factor, St	4.42
Bicycle LOS Score, BLOS	1.70
Bicycle LOS	B

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	3/4/2017
Analysis Time Period	Winter AM
Highway	SR-89 NB
From/To	SR 28 to A. Meadows Rd
Jurisdiction	Placer County
Analysis Year	Cumulative + Project
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.92	
Shoulder width	6.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	3.7	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	1	/mi

Analysis direction volume, Vd 1177 veh/h
Opposing direction volume, Vo 287 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.3		2.1	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.994		0.978	
Grade adj. factor,(note-1) fg	1.00		0.84	
Directional flow rate,(note-2) vi	1287	pc/h	380	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	0.3	mi/h
Free-flow speed, FFSd	49.8	mi/h
Adjustment for no-passing zones, fnp	2.8	mi/h
Average travel speed, ATSd	34.0	mi/h
Percent Free Flow Speed, PFFS	68.3	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.6
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	0.988
Grade adjustment factor,(note-1) fg	1.00	0.86
Directional flow rate,(note-2) vi	1279 pc/h	367 pc/h

Base percent time-spent-following,(note-4) BPTSFd	80.6	%
Adjustment for no-passing zones, fnp	22.9	
Percent time-spent-following, PTSFd	98.4	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.88	
Peak 15-min vehicle-miles of travel, VMT15	1183	veh-mi
Peak-hour vehicle-miles of travel, VMT60	4355	veh-mi
Peak 15-min total travel time, TT15	34.8	veh-h
Capacity from ATS, CdATS	1466	veh/h
Capacity from PTSF, CdPTSF	1478	veh/h
Directional Capacity	1898	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	3.7	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	34.0	mi/h
Percent time-spent-following, PTSFd (from above)	98.4	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1279.3
Effective width of outside lane, We	24.00
Effective speed factor, St	4.42
Bicycle LOS Score, BLOS	2.88
Bicycle LOS	C

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	3/4/2017
Analysis Time Period	Winter AM
Highway	SR89 NB
From/To	At Transit Center
Jurisdiction	Caltrans
Analysis Year	Cumulative + Project
Description	Squaw Valley Olympic Villlage

Input Data

Highway class	Class 2		Peak hour factor, PHF	0.94	
Shoulder width	2.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.3	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	64	%
Up/down	-	%	Access point density	11	/mi

Analysis direction volume, Vd 764 veh/h
Opposing direction volume, Vo 355 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.3	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.998		0.994	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	814	pc/h	380	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	2.6	mi/h
Adj. for access point density,(note-3) fA	2.8	mi/h
Free-flow speed, FFSd	39.7	mi/h
Adjustment for no-passing zones, fnp	2.2	mi/h
Average travel speed, ATSd	28.2	mi/h
Percent Free Flow Speed, PFFS	71.0	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	0.998
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	813 pc/h	378 pc/h

Base percent time-spent-following,(note-4) BPTSFd	65.1	%
Adjustment for no-passing zones, fnp	26.2	
Percent time-spent-following, PTSFd	83.0	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.48	
Peak 15-min vehicle-miles of travel, VMT15	61	veh-mi
Peak-hour vehicle-miles of travel, VMT60	229	veh-mi
Peak 15-min total travel time, TT15	2.2	veh-h
Capacity from ATS, CdATS	0	veh/h
Capacity from PTSF, CdPTSF	1697	veh/h
Directional Capacity	2485	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.3	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	28.2	mi/h
Percent time-spent-following, PTSFd (from above)	83.0	
Level of service, LOSd (from above)	D	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	812.8
Effective width of outside lane, We	14.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	4.66
Bicycle LOS	E

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	4/9/2017
Analysis Time Period	Winter PM
Highway	SR-89 NB
From/To	W River St to Deerfield Dr
Jurisdiction	Nevada/Placer County
Analysis Year	Cumulative No Project
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.96	
Shoulder width	4.7	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.2	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	0	/mi

Analysis direction volume, Vd 1638 veh/h
Opposing direction volume, Vo 523 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0		1.2	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	1.000		0.996	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1706	pc/h	547	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	1.3	mi/h
Adj. for access point density,(note-3) fA	0.0	mi/h
Free-flow speed, FFSd	43.7	mi/h
Adjustment for no-passing zones, fnp	2.0	mi/h
Average travel speed, ATSd	24.2	mi/h
Percent Free Flow Speed, PFFS	55.3	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	1.000
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1706 pc/h	545 pc/h

Base percent time-spent-following,(note-4) BPTSFd	88.6	%
Adjustment for no-passing zones, fnp	12.3	
Percent time-spent-following, PTSFd	97.9	%

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	0.57	
Peak 15-min vehicle-miles of travel, VMT15	85	veh-mi
Peak-hour vehicle-miles of travel, VMT60	328	veh-mi
Peak 15-min total travel time, TT15	3.5	veh-h
Capacity from ATS, CdATS	1693	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	3929	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.2	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	24.2	mi/h
Percent time-spent-following, PTSFd (from above)	97.9	
Level of service, LOSd (from above)	F	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1706.3
Effective width of outside lane, We	21.40
Effective speed factor, St	4.42
Bicycle LOS Score, BLOS	3.61
Bicycle LOS	D

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	4/9/2017
Analysis Time Period	Winter PM
Highway	SR-89 NB
From/To	Squaw Valley Rd to W River St
Jurisdiction	Placer County
Analysis Year	Cumulative No Project
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.93	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	7.8	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	55	%
Up/down	-	%	Access point density	1	/mi

Analysis direction volume, Vd 1738 veh/h
Opposing direction volume, Vo 438 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.3		1.9	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.994		0.982	
Grade adj. factor,(note-1) fg	1.00		0.94	
Directional flow rate,(note-2) vi	1880	pc/h	510	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	0.3	mi/h
Free-flow speed, FFSd	59.8	mi/h
Adjustment for no-passing zones, fnp	1.9	mi/h
Average travel speed, ATSd	39.3	mi/h
Percent Free Flow Speed, PFFS	65.8	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.4
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	0.992
Grade adjustment factor,(note-1) fg	1.00	0.94
Directional flow rate,(note-2) vi	1869 pc/h	505 pc/h

Base percent time-spent-following,(note-4) BPTSFd	90.7	%
Adjustment for no-passing zones, fnp	9.8	
Percent time-spent-following, PTSFd	98.4	%

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	1.18	
Peak 15-min vehicle-miles of travel, VMT15	3644	veh-mi
Peak-hour vehicle-miles of travel, VMT60	13556	veh-mi
Peak 15-min total travel time, TT15	92.7	veh-h
Capacity from ATS, CdATS	1589	veh/h
Capacity from PTSF, CdPTSF	1625	veh/h
Directional Capacity	2020	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	7.8	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	39.3	mi/h
Percent time-spent-following, PTSFd (from above)	98.4	
Level of service, LOSd (from above)	F	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1868.8
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.14
Bicycle LOS	B

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	4/9/2017
Analysis Time Period	Winter PM
Highway	SR-89 NB
From/To	A. Meadows Rd to S. Valley Rd
Jurisdiction	Placer County
Analysis Year	Cumulative No Project
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.92	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.3	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	0	/mi

Analysis direction volume, Vd 949 veh/h
Opposing direction volume, Vo 599 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.3		1.6	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.994		0.988	
Grade adj. factor,(note-1) fg	1.00		0.98	
Directional flow rate,(note-2) vi	1038	pc/h	672	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	0.0	mi/h
Free-flow speed, FFSd	50.0	mi/h
Adjustment for no-passing zones, fnp	1.7	mi/h
Average travel speed, ATSd	35.0	mi/h
Percent Free Flow Speed, PFFS	70.1	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	1.000
Grade adjustment factor,(note-1) fg	1.00	0.98
Directional flow rate,(note-2) vi	1032 pc/h	664 pc/h

Base percent time-spent-following,(note-4) BPTSFd	76.0	%
Adjustment for no-passing zones, fnp	21.9	
Percent time-spent-following, PTSFd	89.3	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.39	
Peak 15-min vehicle-miles of travel, VMT15	335	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1234	veh-mi
Peak 15-min total travel time, TT15	9.6	veh-h
Capacity from ATS, CdATS	1646	veh/h
Capacity from PTSF, CdPTSF	1666	veh/h
Directional Capacity	4357	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.3	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	35.0	mi/h
Percent time-spent-following, PTSFd (from above)	89.3	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1031.5
Effective width of outside lane, We	28.00
Effective speed factor, St	4.42
Bicycle LOS Score, BLOS	1.73
Bicycle LOS	B

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	4/9/2017
Analysis Time Period	Winter PM
Highway	SR-89 SB
From/To	A. Meadows Rd to SR 28
Jurisdiction	Placer County
Analysis Year	Cumulative No Project
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.87	
Shoulder width	5.5	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	3.7	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	1	/mi

Analysis direction volume, Vd 868 veh/h
Opposing direction volume, Vo 422 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.3		1.8	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.994		0.984	
Grade adj. factor,(note-1) fg	1.00		0.94	
Directional flow rate,(note-2) vi	1004	pc/h	524	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	1.3	mi/h
Adj. for access point density,(note-3) fA	0.3	mi/h
Free-flow speed, FFSd	48.5	mi/h
Adjustment for no-passing zones, fnp	2.2	mi/h
Average travel speed, ATSd	34.4	mi/h
Percent Free Flow Speed, PFFS	71.0	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.4
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	0.992
Grade adjustment factor,(note-1) fg	1.00	0.95
Directional flow rate,(note-2) vi	998 pc/h	515 pc/h

Base percent time-spent-following,(note-4) BPTSFd	73.7	%
Adjustment for no-passing zones, fnp	22.1	
Percent time-spent-following, PTSFd	88.3	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.63	
Peak 15-min vehicle-miles of travel, VMT15	923	veh-mi
Peak-hour vehicle-miles of travel, VMT60	3212	veh-mi
Peak 15-min total travel time, TT15	26.8	veh-h
Capacity from ATS, CdATS	1589	veh/h
Capacity from PTSF, CdPTSF	1625	veh/h
Directional Capacity	2418	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	3.7	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	34.4	mi/h
Percent time-spent-following, PTSFd (from above)	88.3	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	997.7
Effective width of outside lane, We	23.00
Effective speed factor, St	4.42
Bicycle LOS Score, BLOS	2.99
Bicycle LOS	C

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	4/9/2017
Analysis Time Period	Winter PM
Highway	SR89 SB
From/To	At Transit Center
Jurisdiction	Caltrans
Analysis Year	Cumulative No Project
Description	Squaw Valley Olympic Villlage

Input Data

Highway class	Class 2		Peak hour factor, PHF	0.85	
Shoulder width	2.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.3	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	64	%
Up/down	-	%	Access point density	11	/mi

Analysis direction volume, Vd 484 veh/h
Opposing direction volume, Vo 462 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.2	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.998		0.996	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	571	pc/h	546	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	2.6	mi/h
Adj. for access point density,(note-3) fA	2.8	mi/h
Free-flow speed, FFSd	39.7	mi/h
Adjustment for no-passing zones, fnp	1.6	mi/h
Average travel speed, ATSd	29.4	mi/h
Percent Free Flow Speed, PFFS	74.2	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	1.000
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	569 pc/h	544 pc/h

Base percent time-spent-following,(note-4) BPTSFd	56.1	%
Adjustment for no-passing zones, fnp	34.6	
Percent time-spent-following, PTSFd	73.8	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.36	
Peak 15-min vehicle-miles of travel, VMT15	43	veh-mi
Peak-hour vehicle-miles of travel, VMT60	145	veh-mi
Peak 15-min total travel time, TT15	1.5	veh-h
Capacity from ATS, CdATS	0	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	3129	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.3	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	29.4	mi/h
Percent time-spent-following, PTSFd (from above)	73.8	
Level of service, LOSd (from above)	D	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	569.4
Effective width of outside lane, We	14.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	4.48
Bicycle LOS	D

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

E4

Cumulative Plus Project Conditions Technical Calculations

HCM 2010 Signalized Intersection Summary
1: SR 89 & Donner Pass Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	215	418	142	188	37	181	72	110	18	94	60
Future Volume (veh/h)	54	215	418	142	188	37	181	72	110	18	94	60
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1900
Adj Flow Rate, veh/h	59	234	454	161	214	42	195	77	118	20	103	66
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	0	2	0
Peak Hour Factor	0.92	0.92	0.92	0.88	0.88	0.88	0.93	0.93	0.93	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	75	544	692	204	693	589	258	271	230	52	268	175
Arrive On Green	0.04	0.29	0.29	0.11	0.37	0.37	0.15	0.15	0.15	0.16	0.14	0.14
Sat Flow, veh/h	1774	1863	1582	1774	1863	1583	1774	1863	1583	366	1891	1233
Grp Volume(v), veh/h	59	234	454	161	214	42	195	77	118	101	0	88
Grp Sat Flow(s),veh/h/ln	1774	1863	1582	1774	1863	1583	1774	1863	1583	1844	0	1645
Q Serve(g_s), s	2.3	7.0	15.5	6.1	5.6	1.2	7.2	2.5	4.7	3.4	0.0	3.3
Cycle Q Clear(g_c), s	2.3	7.0	15.5	6.1	5.6	1.2	7.2	2.5	4.7	3.4	0.0	3.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	0.20		0.75
Lane Grp Cap(c), veh/h	75	544	692	204	693	589	258	271	230	261	0	233
V/C Ratio(X)	0.79	0.43	0.66	0.79	0.31	0.07	0.76	0.28	0.51	0.39	0.00	0.38
Avail Cap(c_a), veh/h	388	950	1037	904	950	807	775	814	692	672	0	599
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	32.6	19.7	15.2	29.6	15.3	13.9	28.2	26.1	27.1	26.7	0.0	26.7
Incr Delay (d2), s/veh	6.6	0.2	0.4	2.6	0.1	0.0	1.7	0.2	0.7	0.3	0.0	0.4
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	1.2	3.6	8.5	3.1	2.9	0.5	3.6	1.3	2.1	1.8	0.0	1.5
LnGrp Delay(d),s/veh	39.2	19.9	15.6	32.2	15.4	13.9	29.9	26.4	27.7	27.0	0.0	27.1
LnGrp LOS	D	B	B	C	B	B	C	C	C	C		C
Approach Vol, veh/h		747			417			390			189	
Approach Delay, s/veh		18.8			21.7			28.5			27.0	
Approach LOS		B			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	12.9	25.5		14.7	7.4	31.0		15.5
Change Period (Y+Rc), s	5.0	5.5		5.0	4.5	5.5		5.5
Max Green Setting (Gmax), s	35.0	35.0		25.0	15.0	35.0		30.0
Max Q Clear Time (g_c+I1), s	8.1	17.5		5.4	4.3	7.6		9.2
Green Ext Time (p_c), s	0.2	2.4		0.6	0.0	2.6		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	22.6
HCM 2010 LOS	C

MOVEMENT SUMMARY

Site: 2. C+P AM

SR 89 / I-80 WB Ramp
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: HWY 89											
3	L2	182	3.0	0.214	5.2	LOS A	0.0	0.0	0.00	0.00	25.5
8	T1	288	3.0	0.214	5.2	LOS A	0.0	0.0	0.00	0.00	25.9
Approach		470	3.0	0.214	5.2	LOS A	0.0	0.0	0.00	0.00	25.8
East: I-80 WB off-ramp											
1	L2	288	3.0	0.368	9.1	LOS A	1.2	30.6	0.46	0.46	23.0
6	T1	1	3.0	0.001	4.7	LOS A	0.0	0.1	0.36	0.21	32.4
16	R2	133	3.0	0.174	6.6	LOS A	0.5	12.6	0.41	0.39	23.3
Approach		421	3.0	0.368	8.3	LOS A	1.2	30.6	0.44	0.44	23.1
North: HWY 89											
4	T1	655	3.0	0.538	14.0	LOS B	2.9	75.3	0.67	0.75	22.5
14	R2	71	3.0	0.538	14.0	LOS B	2.9	75.3	0.67	0.75	21.9
Approach		726	3.0	0.538	14.0	LOS B	2.9	75.3	0.67	0.75	22.4
All Vehicles		1618	3.0	0.538	10.0	LOS A	2.9	75.3	0.42	0.45	23.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 3. C+P AM

SR 89 / I-80 EB Ramp
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: HWY 89											
8	T1	430	3.0	0.362	8.0	LOS A	1.6	42.1	0.40	0.30	23.9
18	R2	225	3.0	0.362	8.0	LOS A	1.6	42.1	0.40	0.30	23.1
Approach		655	3.0	0.362	8.0	LOS A	1.6	42.1	0.40	0.30	23.6
North: HWY 89											
7	L2	124	3.0	0.433	7.9	LOS A	0.0	0.0	0.00	0.00	26.3
4	T1	827	3.0	0.433	7.9	LOS A	0.0	0.0	0.00	0.00	28.0
Approach		951	3.0	0.433	7.9	LOS A	0.0	0.0	0.00	0.00	27.7
West: I-80 EB off-ramp											
5	L2	63	3.0	0.645	21.7	LOS C	2.9	74.6	0.74	0.85	23.3
12	R2	633	3.0	0.645	21.2	LOS C	2.9	74.6	0.73	0.83	25.2
Approach		696	3.0	0.645	21.2	LOS C	2.9	74.6	0.73	0.84	25.0
All Vehicles		2302	3.0	0.645	12.0	LOS B	2.9	74.6	0.34	0.34	25.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Volume (veh/h)	267	65	92	270	35	996	206
Future Volume (veh/h)	267	65	92	270	35	996	206
Number	3	18	1	6		2	12
Initial Q (Qb), veh	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00		1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863		1863	1863
Adj Flow Rate, veh/h	314	76	114	333		1132	234
Adj No. of Lanes	2	1	1	2		2	1
Peak Hour Factor	0.85	0.85	0.81	0.81		0.88	0.88
Percent Heavy Veh, %	2	2	2	2		2	2
Cap, veh/h	382	300	139	2861		2001	1280
Arrive On Green	0.11	0.11	0.16	1.00		0.70	0.70
Sat Flow, veh/h	3442	1583	1774	3632		3297	1583
Grp Volume(v), veh/h	314	76	114	333		1132	234
Grp Sat Flow(s),veh/h/ln	1721	1583	1774	1770		1434	1583
Q Serve(g_s), s	11.1	5.1	7.7	0.0		24.4	4.1
Cycle Q Clear(g_c), s	11.1	5.1	7.7	0.0		24.4	4.1
Prop In Lane	1.00	1.00	1.00				1.00
Lane Grp Cap(c), veh/h	382	300	139	2861		2001	1280
V/C Ratio(X)	0.82	0.25	0.82	0.12		0.57	0.18
Avail Cap(c_a), veh/h	971	571	358	2861		2001	1280
HCM Platoon Ratio	1.00	1.00	2.00	2.00		1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00		1.00	1.00
Uniform Delay (d), s/veh	53.9	42.8	51.4	0.0		9.4	2.7
Incr Delay (d2), s/veh	1.7	0.2	11.1	0.1		1.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	2.2	4.2	0.0		9.9	2.9
LnGrp Delay(d),s/veh	55.6	42.9	62.5	0.1		10.5	3.0
LnGrp LOS	E	D	E	A		B	A
Approach Vol, veh/h	390			447		1366	
Approach Delay, s/veh	53.1			16.0		9.2	
Approach LOS	D			B		A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	13.7	92.0				105.7		18.3
Change Period (Y+Rc), s	4.0	5.5				5.5		4.5
Max Green Setting (Gmax), s	25.0	50.0				50.0		35.0
Max Q Clear Time (g_c+I1), s	9.7	26.4				2.0		13.1
Green Ext Time (p_c), s	0.2	11.9				15.7		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	18.4
HCM 2010 LOS	B

Notes

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	326	77	285	44	27	1034
Future Volume (veh/h)	326	77	285	44	27	1034
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	441	104	413	64	30	1149
Adj No. of Lanes	1	1	2	1	1	1
Peak Hour Factor	0.74	0.74	0.69	0.69	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	415	404	1801	1364	38	1262
Arrive On Green	0.23	0.23	0.63	0.63	0.04	1.00
Sat Flow, veh/h	1774	1583	3297	1583	1774	1863
Grp Volume(v), veh/h	441	104	413	64	30	1149
Grp Sat Flow(s),veh/h/ln	1774	1583	1434	1583	1774	1863
Q Serve(g_s), s	29.0	6.5	7.8	0.7	2.1	0.0
Cycle Q Clear(g_c), s	29.0	6.5	7.8	0.7	2.1	0.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	415	404	1801	1364	38	1262
V/C Ratio(X)	1.06	0.26	0.23	0.05	0.79	0.91
Avail Cap(c_a), veh/h	415	404	1801	1364	429	1262
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.5	36.8	10.0	1.2	59.1	0.0
Incr Delay (d2), s/veh	61.9	0.1	0.3	0.1	12.9	11.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	21.3	2.9	3.1	0.9	1.2	4.0
LnGrp Delay(d),s/veh	109.4	36.9	10.3	1.3	72.0	11.3
LnGrp LOS	F	D	B	A	E	B
Approach Vol, veh/h	545		477			1179
Approach Delay, s/veh	95.5		9.1			12.9
Approach LOS	F		A			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	6.1	83.9				90.0		34.0
Change Period (Y+Rc), s	3.5	6.0				6.0		5.0
Max Green Setting (Gmax), s	30.0	50.0				50.0		29.0
Max Q Clear Time (g_c+I1), s	4.1	9.8				2.0		31.0
Green Ext Time (p_c), s	0.0	9.7				9.9		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	32.5
HCM 2010 LOS	C

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBU	SBL	SBR
Lane Configurations							
Traffic Vol, veh/h	37	1	0	1	2	35	60
Future Vol, veh/h	37	1	0	1	2	35	60
Peak Hour Factor	0.68	0.68	0.25	0.25	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	54	1	0	4	2	39	67
Number of Lanes	0	1	0	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	7.7	6.6	7.2
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	97%	0%	37%
Vol Thru, %	3%	0%	0%
Vol Right, %	0%	100%	63%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	38	1	97
LT Vol	37	0	36
Through Vol	1	0	0
RT Vol	0	1	61
Lane Flow Rate	56	4	109
Geometry Grp	1	1	1
Degree of Util (X)	0.067	0.004	0.113
Departure Headway (Hd)	4.324	3.568	3.734
Convergence, Y/N	Yes	Yes	Yes
Cap	827	996	957
Service Time	2.356	1.614	1.767
HCM Lane V/C Ratio	0.068	0.004	0.114
HCM Control Delay	7.7	6.6	7.2
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.2	0	0.4

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Vol, veh/h	13	60	4	403	105	18	11
Future Vol, veh/h	13	60	4	403	105	18	11
Conflicting Peds, #/hr	0	0	0	0	0	0	8
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	None
Storage Length	-	-	-	-	0	0	-
Veh in Median Storage, #	-	0	-	0	-	0	-
Grade, %	-	0	-	0	-	0	-
Peak Hour Factor	72	72	89	89	89	87	87
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	18	83	4	453	118	21	13

Major/Minor	Major1		Major2			Minor2	
Conflicting Flow All	453	0	-	-	0	572	461
Stage 1	-	-	-	-	-	453	-
Stage 2	-	-	-	-	-	119	-
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	1108	-	-	-	-	482	600
Stage 1	-	-	-	-	-	640	-
Stage 2	-	-	-	-	-	906	-
Platoon blocked, %		-		-	-		
Mov Cap-1 Maneuver	1101	-	-	-	-	474	596
Mov Cap-2 Maneuver	-	-	-	-	-	474	-
Stage 1	-	-	-	-	-	640	-
Stage 2	-	-	-	-	-	891	-

Approach	EB	WB	SB
HCM Control Delay, s	1.5		12.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1101	-	-	-	514
HCM Lane V/C Ratio	0.016	-	-	-	0.065
HCM Control Delay (s)	8.3	0	-	-	12.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Intersection	
Int Delay, s/veh	2.3

Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Vol, veh/h	87	9	2	606	500	12	85
Future Vol, veh/h	87	9	2	606	500	12	85
Conflicting Peds, #/hr	0	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	None
Storage Length	-	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	-	0	0	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	72	72	89	89	89	79	79
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	121	13	2	681	562	15	108

Major/Minor	Major1		Major2			Minor1	
Conflicting Flow All	0	0	-	133	0	2051	128
Stage 1	-	-	-	-	-	127	-
Stage 2	-	-	-	-	-	1924	-
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	-	-	-	1452	-	61	922
Stage 1	-	-	-	-	-	899	-
Stage 2	-	-	-	-	-	125	-
Platoon blocked, %	-	-			-		
Mov Cap-1 Maneuver	-	-	~ -384	~ -384	-	61	921
Mov Cap-2 Maneuver	-	-	-	-	-	61	-
Stage 1	-	-	-	-	-	899	-
Stage 2	-	-	-	-	-	125	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	18.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	61	921	-	-	+	-
HCM Lane V/C Ratio	0.249	0.117	-	-	-	-
HCM Control Delay (s)	82.6	9.4	-	-	1.6	-
HCM Lane LOS	F	A	-	-	A	-
HCM 95th %tile Q(veh)	0.9	0.4	-	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	164	6	554	1094	8	4	3	79	6	13	31
Future Vol, veh/h	6	164	6	554	1094	8	4	3	79	6	13	31
Conflicting Peds, #/hr	1	0	1	1	0	1	4	0	5	5	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	-	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	72	72	72	89	89	89	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	228	8	622	1229	9	4	3	85	6	14	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1239	0	0	237	0	0	2121	2734	238	2778	2734	624
Stage 1	-	-	-	-	-	-	250	250	-	2480	2480	-
Stage 2	-	-	-	-	-	-	1871	2484	-	298	254	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.33	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	560	-	-	1329	-	-	32	20	800	10	20	429
Stage 1	-	-	-	-	-	-	753	699	-	30	59	-
Stage 2	-	-	-	-	-	-	75	58	-	710	696	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	558	-	-	1323	-	-	-	0	796	-	0	427
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	0	-	-	0	-
Stage 1	-	-	-	-	-	-	742	688	-	30	0	-
Stage 2	-	-	-	-	-	-	-	0	-	620	685	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	5		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	-	558	-	-	1323	-	-	-	427
HCM Lane V/C Ratio	-	0.015	-	-	0.471	-	-	-	0.111
HCM Control Delay (s)	-	11.5	-	-	10.1	2.5	-	-	14.5
HCM Lane LOS	-	B	-	-	B	A	-	-	B
HCM 95th %tile Q(veh)	-	0	-	-	2.6	-	-	-	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	251	0	0	1613	6	0	0	0	11	0	7
Future Volume (veh/h)	2	251	0	0	1613	6	0	0	0	11	0	7
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	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
Adj Sat Flow, veh/h/ln	1900	1863	0	0	1863	1900				1900	1863	1900
Adj Flow Rate, veh/h	3	349	0	0	1812	7				12	0	8
Adj No. of Lanes	0	1	0	0	2	0				0	1	0
Peak Hour Factor	0.72	0.72	0.72	0.89	0.89	0.89				0.89	0.89	0.89
Percent Heavy Veh, %	2	2	0	0	2	2				0	2	0
Cap, veh/h	96	879	0	0	1903	7				267	0	178
Arrive On Green	0.53	0.53	0.00	0.00	0.53	0.53				0.26	0.00	0.26
Sat Flow, veh/h	1	1669	0	0	3709	14				1015	0	677
Grp Volume(v), veh/h	352	0	0	0	886	933				20	0	0
Grp Sat Flow(s),veh/h/ln	1671	0	0	0	1770	1860				1693	0	0
Q Serve(g_s), s	0.5	0.0	0.0	0.0	18.1	18.1				0.3	0.0	0.0
Cycle Q Clear(g_c), s	18.6	0.0	0.0	0.0	18.1	18.1				0.3	0.0	0.0
Prop In Lane	0.01		0.00	0.00		0.01				0.60		0.40
Lane Grp Cap(c), veh/h	975	0	0	0	931	979				445	0	0
V/C Ratio(X)	0.36	0.00	0.00	0.00	0.95	0.95				0.04	0.00	0.00
Avail Cap(c_a), veh/h	975	0	0	0	931	979				445	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	1.00	1.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	5.3	0.0	0.0	0.0	8.5	8.5				10.4	0.0	0.0
Incr Delay (d2), s/veh	1.0	0.0	0.0	0.0	19.9	19.4				0.2	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
%ile BackOfQ(50%),veh/ln	2.3	0.0	0.0	0.0	13.8	14.3				0.2	0.0	0.0
LnGrp Delay(d),s/veh	6.4	0.0	0.0	0.0	28.4	27.9				10.6	0.0	0.0
LnGrp LOS	A				C	C				B		
Approach Vol, veh/h		352			1819						20	
Approach Delay, s/veh		6.4			28.2						10.6	
Approach LOS		A			C						B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		24.0		14.0		24.0		
Change Period (Y+Rc), s		4.0		4.0		4.0		
Max Green Setting (Gmax), s		20.0		10.0		20.0		
Max Q Clear Time (g_c+I1), s		20.6		2.3		20.1		
Green Ext Time (p_c), s		0.0		0.0		0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	24.5
HCM 2010 LOS	C

SimTraffic Post-Processor | **Squaw Alpine Gondola Phase 2**
Average Results from 10 Runs | **Cumulative + Project**
Volume and Delay by Movement | **AM Peak Hour**

Intersection 11 **Squaw Valley Rd/Squaw Creek Rd** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	43	41	94.9%	16.1	5.8	C
	Through						
	Right Turn	35	34	96.3%	3.1	0.4	A
	Subtotal	78	75	95.5%	10.9	3.8	B
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	245	241	98.2%	1.4	0.4	A
	Right Turn	23	23	100.0%	1.6	1.1	A
	Subtotal	268	264	98.3%	1.4	0.4	A
WB	Left Turn	68	57	84.4%	4.4	1.0	A
	Through	1,571	1,372	87.3%	3.9	0.2	A
	Right Turn						
	Subtotal	1,639	1,429	87.2%	4.0	0.2	A
Total		1,985	1,767	89.0%	3.9	0.3	A

Intersection 12 **SR 89 /Squaw Valley Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	705	677	96.0%	152.1	76.7	F
	Through	164	161	98.2%	74.9	60.2	E
	Right Turn						
	Subtotal	869	838	96.4%	137.4	73.2	F
SB	Left Turn						
	Through	445	357	80.2%	273.2	18.4	F
	Right Turn	915	733	80.1%	244.5	16.4	F
	Subtotal	1,360	1,090	80.1%	254.0	17.4	F
EB	Left Turn	165	155	93.6%	47.6	6.0	D
	Through						
	Right Turn	127	129	101.9%	2.3	0.5	A
	Subtotal	292	284	97.2%	26.8	4.4	C
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,521	2,211	87.7%	181.9	26.1	F

SimTraffic Post-Processor **Squaw Alpine Gondola Phase 2**
Average Results from 10 Runs **Cumulative + Project**
Volume and Delay by Movement **AM Peak Hour**

Intersection 13 **SR 89/Alpine Meadows Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	400	397	99.3%	26.9	4.1	C
	Through	801	793	99.0%	19.8	6.2	B
	Right Turn						
	Subtotal	1,201	1,190	99.1%	22.2	5.0	C
SB	Left Turn						
	Through	247	207	83.9%	18.1	4.6	B
	Right Turn	325	276	84.9%	11.4	2.4	B
	Subtotal	572	483	84.5%	14.4	3.0	B
EB	Left Turn	68	66	97.5%	24.4	4.4	C
	Through						
	Right Turn	41	40	97.8%	3.6	1.8	A
	Subtotal	109	106	97.6%	17.3	3.8	B
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		1,882	1,779	94.5%	19.8	4.0	B

Intersection 11 **Squaw Valley Rd/Squaw Creek Rd** **Side-street Stop**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Through/Right	2,125	25	0	25	3	25	7	0%	0%
NB	Left Turn	75	50	4	75	6	75	8	2%	0%
	Right Turn	1,425	25	3	75	5	75	17	0%	0%
WB	Left/Through	750	50	10	125	41	200	121	0%	0%
	Through	750	25	9	125	42	225	106	0%	0%
0										

Intersection 12 **SR 89 /Squaw Valley Rd** **Signal**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Left Turn	475	50	7	125	8	125	17	0%	0%
	Left/Through	1,600	100	7	125	6	150	7	0%	0%
NB	Left Turn	3,150	900	259	1,475	369	1,600	367	47%	0%
	Through	650	525	152	925	75	725	14	0%	29%
	Through/Right	75	25	2	25	9	50	21	0%	0%
SB	Through	150	200	2	225	7	225	7	36%	36%
	Right Turn	3,725	3,475	221	4,475	244	3,825	48	0%	11%
0										

Intersection 13 **SR 89/Alpine Meadows Rd** **Signal**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Left Turn	150	50	5	100	11	100	15	0%	0%
	Right Turn	1,825	25	2	50	4	50	11	0%	0%
NB	Left Turn	375	175	12	300	31	375	25	0%	0%
	Through	3,700	175	30	400	97	600	252	1%	0%
SB	Through	1,450	100	12	200	26	250	42	0%	0%
	Right Turn	625	100	14	175	31	200	33	0%	0%
0										

MOVEMENT SUMMARY

Site: 14A C+P AM

SR 28/89
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
SouthEast: SR 89											
3x	L2	16	3.0	0.367	8.5	LOS A	1.6	41.7	0.46	0.38	23.8
8x	T1	34	3.0	0.367	8.5	LOS A	1.6	41.7	0.46	0.38	23.5
18x	R2	262	3.0	0.367	8.5	LOS A	1.6	41.7	0.46	0.38	22.9
Approach		312	3.0	0.367	8.5	LOS A	1.6	41.7	0.46	0.38	23.0
NorthEast: SR 28											
1x	L2	242	3.0	1.028	55.4	LOS F	78.8	2018.5	1.00	0.72	15.9
6x	T1	822	3.0	1.028	55.4	LOS F	78.8	2018.5	1.00	0.72	15.7
16x	R2	5	3.0	1.028	55.4	LOS F	78.8	2018.5	1.00	0.72	15.5
Approach		1069	3.0	1.028	55.4	LOS F	78.8	2018.5	1.00	0.72	15.7
NorthWest: SR 28											
7x	L2	19	3.0	0.162	12.4	LOS B	0.5	13.0	0.70	0.70	17.5
4x	T1	35	3.0	0.162	12.4	LOS B	0.5	13.0	0.70	0.70	17.2
14x	R2	6	3.0	0.162	12.4	LOS B	0.5	13.0	0.70	0.70	16.9
Approach		60	3.0	0.162	12.4	LOS B	0.5	13.0	0.70	0.70	17.3
SouthWest: SR 89											
5x	L2	3	3.0	0.298	7.8	LOS A	1.2	31.2	0.46	0.39	24.4
2x	T1	226	3.0	0.298	7.8	LOS A	1.2	31.2	0.46	0.39	23.9
12x	R2	14	3.0	0.298	7.8	LOS A	1.2	31.2	0.46	0.39	23.3
Approach		243	3.0	0.298	7.8	LOS A	1.2	31.2	0.46	0.39	23.9
All Vehicles		1684	3.0	1.028	38.3	LOS E	78.8	2018.5	0.81	0.61	17.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 14B C+P AM

SR 28/89 Western Intersection
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
SouthEast: SR 89											
3x	L2	524	3.0	0.618	13.7	LOS B	4.3	110.5	0.61	0.55	21.9
18x	R2	11	3.0	0.618	13.7	LOS B	4.3	110.5	0.61	0.55	21.1
Approach		535	3.0	0.618	13.7	LOS B	4.3	110.5	0.61	0.55	21.9
NorthEast: SR 28											
1x	L2	12	3.0	1.304	168.5	LOS F	74.4	1904.1	1.00	4.91	8.9
6x	T1	822	3.0	1.304	168.5	LOS F	74.4	1904.1	1.00	4.91	8.9
Approach		834	3.0	1.304	168.5	LOS F	74.4	1904.1	1.00	4.91	8.9
SouthWest: SR 89											
2x	T1	229	3.0	0.376	7.2	LOS A	1.9	49.2	0.08	0.02	25.4
12x	R2	179	3.0	0.376	7.2	LOS A	1.9	49.2	0.08	0.02	24.7
Approach		408	3.0	0.376	7.2	LOS A	1.9	49.2	0.08	0.02	25.1
All Vehicles		1777	3.0	1.304	84.8	LOS F	74.4	1904.1	0.67	2.47	13.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 14C C+P AM

SR 28/89 Eastern Intersection
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: SR 28											
3	L2	524	3.0	0.758	16.7	LOS C	9.0	231.5	0.23	0.07	24.1
8	T1	296	3.0	0.758	16.7	LOS C	9.0	231.5	0.23	0.07	23.7
Approach		820	3.0	0.758	16.7	LOS C	9.0	231.5	0.23	0.07	23.9
North: SR 28											
4	T1	267	3.0	0.446	12.3	LOS B	2.1	53.0	0.64	0.69	22.8
14	R2	17	3.0	0.446	12.3	LOS B	2.1	53.0	0.64	0.69	22.3
Approach		285	3.0	0.446	12.3	LOS B	2.1	53.0	0.64	0.69	22.8
West: SR 89											
5	L2	14	3.0	0.232	6.8	LOS A	0.9	23.0	0.42	0.34	24.4
12	R2	179	3.0	0.232	6.8	LOS A	0.9	23.0	0.42	0.34	23.3
Approach		193	3.0	0.232	6.8	LOS A	0.9	23.0	0.42	0.34	23.3
All Vehicles		1298	3.0	0.758	14.3	LOS B	9.0	231.5	0.35	0.24	23.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

HCM 2010 Signalized Intersection Summary
1: SR 89 & Donner Pass Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	229	277	217	240	37	492	134	249	37	90	60
Future Volume (veh/h)	44	229	277	217	240	37	492	134	249	37	90	60
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1900
Adj Flow Rate, veh/h	54	283	342	244	270	42	547	149	277	44	107	71
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	0	2	0
Peak Hour Factor	0.81	0.81	0.81	0.89	0.89	0.89	0.90	0.90	0.90	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	69	369	814	281	601	498	562	590	501	71	176	120
Arrive On Green	0.04	0.20	0.20	0.16	0.32	0.32	0.32	0.32	0.32	0.12	0.11	0.11
Sat Flow, veh/h	1774	1863	1579	1774	1863	1543	1774	1863	1583	679	1672	1139
Grp Volume(v), veh/h	54	283	342	244	270	42	547	149	277	118	0	104
Grp Sat Flow(s),veh/h/ln	1774	1863	1579	1774	1863	1543	1774	1863	1583	1829	0	1662
Q Serve(g_s), s	2.9	13.6	12.7	12.7	10.9	1.8	28.9	5.6	13.7	5.9	0.0	5.6
Cycle Q Clear(g_c), s	2.9	13.6	12.7	12.7	10.9	1.8	28.9	5.6	13.7	5.9	0.0	5.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	0.37		0.69
Lane Grp Cap(c), veh/h	69	369	814	281	601	498	562	590	501	192	0	175
V/C Ratio(X)	0.78	0.77	0.42	0.87	0.45	0.08	0.97	0.25	0.55	0.62	0.00	0.59
Avail Cap(c_a), veh/h	281	688	1084	655	688	570	562	590	501	483	0	438
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	45.1	35.9	14.2	38.9	25.4	22.3	32.0	24.0	26.8	40.4	0.0	40.4
Incr Delay (d2), s/veh	6.8	1.3	0.1	3.2	0.2	0.0	31.1	0.1	0.8	1.2	0.0	1.2
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	1.5	7.1	8.9	6.5	5.6	0.8	19.0	2.9	6.1	3.0	0.0	2.6
LnGrp Delay(d),s/veh	51.9	37.2	14.4	42.1	25.6	22.4	63.1	24.1	27.6	41.6	0.0	41.6
LnGrp LOS	D	D	B	D	C	C	E	C	C	D		D
Approach Vol, veh/h		679			556			973			222	
Approach Delay, s/veh		26.9			32.6			47.0			41.6	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	20.0	24.3		15.0	8.2	36.1		35.5
Change Period (Y+Rc), s	5.0	5.5		5.0	4.5	5.5		5.5
Max Green Setting (Gmax), s	35.0	35.0		25.0	15.0	35.0		30.0
Max Q Clear Time (g_c+I1), s	14.7	15.6		7.9	4.9	12.9		30.9
Green Ext Time (p_c), s	0.3	2.6		0.7	0.0	2.7		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	37.6
HCM 2010 LOS	D

MOVEMENT SUMMARY

Site: 2. C+P PM

SR 89 / I-80 WB Ramp
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: HWY 89											
3	L2	571	3.0	0.668	13.0	LOS B	0.0	0.0	0.00	0.00	25.5
8	T1	896	3.0	0.668	13.0	LOS B	0.0	0.0	0.00	0.00	25.9
Approach		1466	3.0	0.668	13.0	LOS B	0.0	0.0	0.00	0.00	25.8
East: I-80 WB off-ramp											
1	L2	311	3.0	0.816	44.0	LOS E	4.0	101.8	0.90	1.20	17.1
16	R2	180	3.0	0.508	22.8	LOS C	1.7	43.5	0.81	0.91	20.0
Approach		490	3.0	0.816	36.3	LOS E	4.0	101.8	0.87	1.09	18.0
North: HWY 89											
4	T1	601	3.0	0.821	40.0	LOS E	5.9	151.6	0.88	1.25	17.9
14	R2	125	3.0	0.821	40.0	LOS E	5.9	151.6	0.88	1.25	17.5
Approach		727	3.0	0.821	40.0	LOS E	5.9	151.6	0.88	1.25	17.8
All Vehicles		2683	3.0	0.821	24.5	LOS C	5.9	151.6	0.40	0.54	21.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 3. C+P PM

SR 89 / I-80 EB Ramp
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: HWY 89											
8	T1	1442	3.0	1.295	158.2	LOS F	104.8	2682.7	1.00	4.29	9.3
18	R2	802	3.0	1.295	158.2	LOS F	104.8	2682.7	1.00	4.29	9.1
Approach		2244	3.0	1.295	158.2	LOS F	104.8	2682.7	1.00	4.29	9.2
North: HWY 89											
7	L2	201	3.0	0.416	7.7	LOS A	0.0	0.0	0.00	0.00	26.0
4	T1	711	3.0	0.416	7.7	LOS A	0.0	0.0	0.00	0.00	27.9
Approach		912	3.0	0.416	7.7	LOS A	0.0	0.0	0.00	0.00	27.5
West: I-80 EB off-ramp											
5	L2	28	3.0	0.310	11.2	LOS B	0.9	24.3	0.59	0.61	26.2
12	R2	317	3.0	0.310	10.9	LOS B	0.9	24.3	0.58	0.60	28.5
Approach		345	3.0	0.310	10.9	LOS B	0.9	24.3	0.58	0.60	28.3
All Vehicles		3501	3.0	1.295	104.5	LOS F	104.8	2682.7	0.70	2.81	12.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Traffic Volume (veh/h)	466	64	217	1469	62	460	316
Future Volume (veh/h)	466	64	217	1469	62	460	316
Number	3	18	1	6		2	12
Initial Q (Qb), veh	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00		1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863		1863	1863
Adj Flow Rate, veh/h	530	73	224	1514		511	351
Adj No. of Lanes	2	1	1	2		2	1
Peak Hour Factor	0.88	0.88	0.97	0.97		0.90	0.90
Percent Heavy Veh, %	2	2	2	2		2	2
Cap, veh/h	602	506	256	2634		1628	1176
Arrive On Green	0.18	0.18	0.05	0.25		0.57	0.57
Sat Flow, veh/h	3442	1583	1774	3632		3297	1583
Grp Volume(v), veh/h	530	73	224	1514		511	351
Grp Sat Flow(s),veh/h/ln	1721	1583	1774	1770		1434	1583
Q Serve(g_s), s	18.6	4.1	15.6	46.6		11.6	9.1
Cycle Q Clear(g_c), s	18.6	4.1	15.6	46.6		11.6	9.1
Prop In Lane	1.00	1.00	1.00				1.00
Lane Grp Cap(c), veh/h	602	506	256	2634		1628	1176
V/C Ratio(X)	0.88	0.14	0.87	0.57		0.31	0.30
Avail Cap(c_a), veh/h	971	676	358	2634		1628	1176
HCM Platoon Ratio	1.00	1.00	0.33	0.33		1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00		1.00	1.00
Uniform Delay (d), s/veh	49.9	30.1	57.9	29.5		14.1	5.3
Incr Delay (d2), s/veh	3.4	0.0	15.8	0.9		0.5	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		0.0	0.0
%ile BackOfQ(50%),veh/ln	9.1	1.8	8.8	23.3		4.7	6.8
LnGrp Delay(d),s/veh	53.3	30.2	73.7	30.4		14.6	5.9
LnGrp LOS	D	C	E	C		B	A
Approach Vol, veh/h	603			1738		862	
Approach Delay, s/veh	50.5			36.0		11.1	
Approach LOS	D			D		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	21.9	75.9				97.8		26.2
Change Period (Y+Rc), s	4.0	5.5				5.5		4.5
Max Green Setting (Gmax), s	25.0	50.0				50.0		35.0
Max Q Clear Time (g_c+I1), s	17.6	13.6				48.6		20.6
Green Ext Time (p_c), s	0.4	22.7				1.3		1.1

Intersection Summary	
HCM 2010 Ctrl Delay	32.0
HCM 2010 LOS	C

Notes

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	57	92	1594	200	142	382
Future Volume (veh/h)	57	92	1594	200	142	382
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	72	116	1660	208	151	406
Adj No. of Lanes	1	1	2	1	1	1
Peak Hour Factor	0.79	0.79	0.96	0.96	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	147	288	2012	1241	176	1544
Arrive On Green	0.08	0.08	0.70	0.70	0.20	1.00
Sat Flow, veh/h	1774	1583	3297	1583	1774	1863
Grp Volume(v), veh/h	72	116	1660	208	151	406
Grp Sat Flow(s),veh/h/ln	1774	1583	1434	1583	1774	1863
Q Serve(g_s), s	4.8	8.0	50.9	4.1	10.2	0.0
Cycle Q Clear(g_c), s	4.8	8.0	50.9	4.1	10.2	0.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	147	288	2012	1241	176	1544
V/C Ratio(X)	0.49	0.40	0.83	0.17	0.86	0.26
Avail Cap(c_a), veh/h	415	527	2012	1241	429	1544
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.4	44.8	13.1	3.3	48.9	0.0
Incr Delay (d2), s/veh	0.9	0.3	4.0	0.3	4.7	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	3.5	21.0	2.5	5.2	0.2
LnGrp Delay(d),s/veh	55.3	45.1	17.1	3.6	53.5	0.4
LnGrp LOS	E	D	B	A	D	A
Approach Vol, veh/h	188		1868			557
Approach Delay, s/veh	49.0		15.6			14.8
Approach LOS	D		B			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	15.8	93.0				108.8		15.2
Change Period (Y+Rc), s	3.5	6.0				6.0		5.0
Max Green Setting (Gmax), s	30.0	50.0				50.0		29.0
Max Q Clear Time (g_c+I1), s	12.2	52.9				2.0		10.0
Green Ext Time (p_c), s	0.2	0.0				14.6		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	17.9
HCM 2010 LOS	B

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	61	6	0	0	23	42
Future Vol, veh/h	61	6	0	0	23	42
Peak Hour Factor	0.80	0.80	0.85	0.85	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	76	8	0	0	25	45
Number of Lanes	0	1	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	7.7	0	7.1
HCM LOS	A	-	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	91%	0%	35%
Vol Thru, %	9%	100%	0%
Vol Right, %	0%	0%	65%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	67	0	65
LT Vol	61	0	23
Through Vol	6	0	0
RT Vol	0	0	42
Lane Flow Rate	84	0	70
Geometry Grp	1	1	1
Degree of Util (X)	0.099	0	0.073
Departure Headway (Hd)	4.238	4.12	3.762
Convergence, Y/N	Yes	Yes	Yes
Cap	847	0	946
Service Time	2.26	2.164	1.811
HCM Lane V/C Ratio	0.099	0	0.074
HCM Control Delay	7.7	7.2	7.1
HCM Lane LOS	A	N	A
HCM 95th-tile Q	0.3	0	0.2

Intersection	
Int Delay, s/veh	22.2

Movement	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Vol, veh/h	19	452	5	154	50	224	74
Future Vol, veh/h	19	452	5	154	50	224	74
Conflicting Peds, #/hr	0	0	0	0	0	27	9
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	None
Storage Length	-	-	-	-	0	0	-
Veh in Median Storage, #	-	0	-	0	-	0	-
Grade, %	-	0	-	0	-	0	-
Peak Hour Factor	80	80	93	93	93	77	77
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	24	565	5	166	54	291	96

Major/Minor	Major1		Major2			Minor2	
Conflicting Flow All	166	0	-	-	0	806	175
Stage 1	-	-	-	-	-	166	-
Stage 2	-	-	-	-	-	640	-
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	1412	-	-	-	-	351	868
Stage 1	-	-	-	-	-	863	-
Stage 2	-	-	-	-	-	525	-
Platoon blocked, %		-		-	-		
Mov Cap-1 Maneuver	1401	-	-	-	-	342	861
Mov Cap-2 Maneuver	-	-	-	-	-	342	-
Stage 1	-	-	-	-	-	863	-
Stage 2	-	-	-	-	-	512	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3		68.4
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1401	-	-	-	402
HCM Lane V/C Ratio	0.017	-	-	-	0.963
HCM Control Delay (s)	7.6	0	-	-	68.4
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	11.1

Intersection	
Int Delay, s/veh	194.2

Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Vol, veh/h	663	13	3	121	209	12	692
Future Vol, veh/h	663	13	3	121	209	12	692
Conflicting Peds, #/hr	0	8	0	8	0	3	5
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	None
Storage Length	-	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	-	0	0	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	80	80	93	93	93	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	829	16	3	130	225	13	736

Major/Minor	Major1		Major2			Minor1	
Conflicting Flow All	0	0	-	853	0	1333	850
Stage 1	-	-	-	-	-	845	-
Stage 2	-	-	-	-	-	488	-
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	-	-	-	786	-	170	~ 360
Stage 1	-	-	-	-	-	421	-
Stage 2	-	-	-	-	-	617	-
Platoon blocked, %	-	-			-		
Mov Cap-1 Maneuver	-	-	~ -92	~ -92	-	168	~ 356
Mov Cap-2 Maneuver	-	-	-	-	-	168	-
Stage 1	-	-	-	-	-	418	-
Stage 2	-	-	-	-	-	615	-

Approach	EB	WB	NB
HCM Control Delay, s	0		$ 506.2
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	168	356	-	-	+	-
HCM Lane V/C Ratio	0.076	2.068	-	-	-	-
HCM Control Delay (s)	28.2	$ 514.5	-	-	-	-
HCM Lane LOS	D	F	-	-	-	-
HCM 95th %tile Q(veh)	0.2	52.8	-	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	23	1355	0	0	322	6	0	0	0	18	0	8
Future Vol, veh/h	23	1355	0	0	322	6	0	0	0	18	0	8
Conflicting Peds, #/hr	13	0	0	0	0	13	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	-	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	93	93	93	98	98	98	54	54	54
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	1694	0	0	346	6	0	0	0	33	0	15

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	366	0	0	1694	0	0	1924	2117	1694	2113	2113	189
Stage 1	-	-	-	-	-	-	1751	1751	-	362	362	-
Stage 2	-	-	-	-	-	-	173	366	-	1751	1751	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.33	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1191	-	-	374	-	-	45	50	114	~ 33	51	821
Stage 1	-	-	-	-	-	-	108	139	-	630	624	-
Stage 2	-	-	-	-	-	-	812	622	-	108	139	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1191	-	-	374	-	-	43	48	114	~ 32	49	812
Mov Cap-2 Maneuver	-	-	-	-	-	-	43	48	-	~ 32	49	-
Stage 1	-	-	-	-	-	-	105	136	-	608	617	-
Stage 2	-	-	-	-	-	-	797	615	-	105	136	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	0	249.9
HCM LOS			A	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	-	1191	-	-	374	-	-	32	812
HCM Lane V/C Ratio	-	0.024	-	-	-	-	-	1.042	0.018
HCM Control Delay (s)	0	8.1	-	-	0	-	-	$ 356.7	9.5
HCM Lane LOS	A	A	-	-	A	-	-	F	A
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	-	3.6	0.1

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 2010 Signalized Intersection Summary
10: Squaw Valley Rd & Wayne Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	1364	0	0	324	7	0	0	0	12	0	5
Future Volume (veh/h)	9	1364	0	0	324	7	0	0	0	12	0	5
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	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
Adj Sat Flow, veh/h/ln	1900	1863	0	0	1863	1900				1900	1863	1900
Adj Flow Rate, veh/h	11	1705	0	0	348	8				14	0	6
Adj No. of Lanes	0	1	0	0	2	0				0	1	0
Peak Hour Factor	0.80	0.80	0.80	0.93	0.93	0.93				0.85	0.85	0.85
Percent Heavy Veh, %	2	2	0	0	2	2				0	2	0
Cap, veh/h	55	1591	0	0	3032	70				34	0	15
Arrive On Green	0.86	0.86	0.00	0.00	0.86	0.86				0.03	0.00	0.03
Sat Flow, veh/h	4	1856	0	0	3630	81				1194	0	512
Grp Volume(v), veh/h	1716	0	0	0	174	182				20	0	0
Grp Sat Flow(s),veh/h/ln	1860	0	0	0	1770	1848				1706	0	0
Q Serve(g_s), s	18.7	0.0	0.0	0.0	1.1	1.1				0.8	0.0	0.0
Cycle Q Clear(g_c), s	60.0	0.0	0.0	0.0	1.1	1.1				0.8	0.0	0.0
Prop In Lane	0.01		0.00	0.00		0.04				0.70		0.30
Lane Grp Cap(c), veh/h	1646	0	0	0	1517	1584				49	0	0
V/C Ratio(X)	1.04	0.00	0.00	0.00	0.11	0.11				0.41	0.00	0.00
Avail Cap(c_a), veh/h	1646	0	0	0	1517	1584				49	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	1.00	1.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	5.9	0.0	0.0	0.0	0.8	0.8				33.4	0.0	0.0
Incr Delay (d2), s/veh	34.2	0.0	0.0	0.0	0.2	0.1				23.6	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
%ile BackOfQ(50%),veh/ln	47.2	0.0	0.0	0.0	0.5	0.6				0.7	0.0	0.0
LnGrp Delay(d),s/veh	40.1	0.0	0.0	0.0	0.9	0.9				57.0	0.0	0.0
LnGrp LOS	F				A	A				E		
Approach Vol, veh/h		1716			356						20	
Approach Delay, s/veh		40.1			0.9						57.0	
Approach LOS		D			A						E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		64.0		6.0		64.0		
Change Period (Y+Rc), s		4.0		4.0		4.0		
Max Green Setting (Gmax), s		60.0		2.0		30.0		
Max Q Clear Time (g_c+I1), s		62.0		2.8		3.1		
Green Ext Time (p_c), s		0.0		0.0		25.0		

Intersection Summary	
HCM 2010 Ctrl Delay	33.6
HCM 2010 LOS	C

SimTraffic Post-Processor | **Squaw Alpine Gondola Phase 2**
Average Results from 10 Runs | **Cumulative + Project**
Volume and Delay by Movement | **PM Peak Hour**

Intersection 11 **Squaw Creek Rd/Squaw Valley Rd** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	34	23	68.8%	342.1	171.5	F
	Through						
	Right Turn	72	52	72.8%	383.0	182.0	F
	Subtotal	106	76	71.5%	376.6	173.0	F
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	1,473	1,110	75.4%	294.6	20.6	F
	Right Turn	42	32	75.0%	311.1	66.0	F
	Subtotal	1,515	1,142	75.3%	294.8	20.6	F
WB	Left Turn	61	64	105.2%	8.1	3.0	A
	Through	309	311	100.7%	1.8	0.2	A
	Right Turn						
	Subtotal	370	375	101.5%	2.9	0.6	A
Total		1,991	1,593	80.0%	220.8	9.6	F

Intersection 12 **SR 89/Squaw Valley Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	176	183	103.9%	54.7	5.3	D
	Through	621	633	102.0%	41.8	8.9	D
	Right Turn						
	Subtotal	797	816	102.4%	44.5	7.3	D
SB	Left Turn						
	Through	246	254	103.2%	33.9	2.9	C
	Right Turn	193	191	98.8%	1.1	0.4	A
	Subtotal	439	445	101.3%	19.9	2.7	B
EB	Left Turn	1,173	805	68.7%	282.4	20.9	F
	Through						
	Right Turn	342	245	71.7%	99.8	12.1	F
	Subtotal	1,515	1,050	69.3%	242.9	22.2	F
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		2,751	2,311	84.0%	130.0	7.2	F

SimTraffic Post-Processor **Squaw Alpine Gondola Phase 2**
Average Results from 10 Runs **Cumulative + Project**
Volume and Delay by Movement **PM Peak Hour**

Intersection 13 **SR 89/Alpine Meadows Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	51	53	104.5%	29.4	9.1	C
	Through	372	376	101.2%	14.6	3.3	B
	Right Turn						
	Subtotal	423	430	101.6%	16.5	2.9	B
SB	Left Turn						
	Through	527	447	84.8%	22.1	5.6	C
	Right Turn	61	49	80.1%	4.1	1.1	A
	Subtotal	588	496	84.3%	20.1	4.9	C
EB	Left Turn	425	435	102.3%	27.4	5.8	C
	Through						
	Right Turn	359	354	98.6%	11.8	2.8	B
	Subtotal	784	789	100.6%	20.3	4.3	C
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		1,795	1,714	95.5%	19.3	3.1	B

Intersection 11 **Squaw Creek Rd/Squaw Valley Rd** **Side-street Stop**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Through	1,925	1,200	63	2,575	63	1,975	9	0%	44%
	Through/Right	1,925	1,200	65	2,575	69	1,975	9	0%	43%
NB	Left Turn	75	50	8	100	10	75	0	19%	0%
	Right Turn	1,400	350	186	775	390	825	361	66%	0%
WB	Left Turn	100	50	4	75	9	100	15	0%	0%
	Through	100	25	0	25	0	25	0	0%	0%
0										

SimTraffic Post-Processor **Squaw Alpine Gondola Phase 2**
Average Results from 10 Runs **Cumulative + Project**
Queue Length **PM Peak Hour**

Intersection 12 **SR 89/Squaw Valley Rd** **Signal**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Left Turn	3,450	2,600	56	4,125	57	3,525	23	20%	0%
	Left/Through	4,250	3,400	61	4,875	120	4,300	25	60%	22%
	Right Turn	1,625	1,600	63	2,025	214	1,725	9	0%	75%
NB	Left Turn	425	150	22	250	45	275	55	0%	0%
	Through	650	200	35	300	76	325	110	1%	0%
	Through/Right	375	200	28	300	45	325	50	1%	0%
SB	Left Turn	200	25	0	25	0	25	0	0%	0%
	Through	250	150	20	250	26	275	28	6%	1%
	Right Turn	250	25	3	50	9	75	20	0%	0%
WB	Shared	200	25	0	25	0	25	0	0%	0%

Intersection 13 **SR 89/Alpine Meadows Rd** **Signal**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	95th Queue (ft) Average	95th Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Left Turn	325	225	18	325	33	325	14	2%	0%
	Right Turn	2,150	125	24	275	91	400	176	0%	0%
NB	Left Turn	375	50	4	100	7	100	18	0%	0%
	Through	3,775	125	13	225	40	275	67	0%	0%
SB	Through	1,450	200	29	350	51	400	71	0%	0%
	Right Turn	625	25	3	50	3	50	10	0%	0%
0										

MOVEMENT SUMMARY

Site: 14A C+P PM

SR 28/89
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
SouthEast: SR 89											
3x	L2	11	3.0	0.553	17.1	LOS C	2.8	72.4	0.72	0.83	21.8
8x	T1	42	3.0	0.553	17.1	LOS C	2.8	72.4	0.72	0.83	21.6
18x	R2	252	3.0	0.553	17.1	LOS C	2.8	72.4	0.72	0.83	21.1
Approach		304	3.0	0.553	17.1	LOS C	2.8	72.4	0.72	0.83	21.2
NorthEast: SR 28											
1x	L2	198	3.0	0.456	8.6	LOS A	2.6	65.3	0.25	0.12	23.4
6x	T1	264	3.0	0.456	8.6	LOS A	2.6	65.3	0.25	0.12	23.0
16x	R2	10	3.0	0.456	8.6	LOS A	2.6	65.3	0.25	0.12	22.6
Approach		471	3.0	0.456	8.6	LOS A	2.6	65.3	0.25	0.12	23.1
NorthWest: SR 28											
7x	L2	19	3.0	0.130	6.8	LOS A	0.4	11.4	0.49	0.46	18.3
4x	T1	59	3.0	0.130	6.8	LOS A	0.4	11.4	0.49	0.46	18.0
14x	R2	10	3.0	0.130	6.8	LOS A	0.4	11.4	0.49	0.46	17.6
Approach		88	3.0	0.130	6.8	LOS A	0.4	11.4	0.49	0.46	18.0
SouthWest: SR 89											
5x	L2	5	3.0	0.801	23.4	LOS C	9.0	230.4	0.85	0.96	20.9
2x	T1	646	3.0	0.801	23.4	LOS C	9.0	230.4	0.85	0.96	20.6
12x	R2	11	3.0	0.801	23.4	LOS C	9.0	230.4	0.85	0.96	20.1
Approach		662	3.0	0.801	23.4	LOS C	9.0	230.4	0.85	0.96	20.5
All Vehicles		1526	3.0	0.801	16.6	LOS C	9.0	230.4	0.62	0.64	21.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 14B C+P PM

SR 28/89 Western Intersection
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
SouthEast: SR 89											
3x	L2	226	3.0	0.432	13.4	LOS B	1.9	48.5	0.66	0.72	22.0
18x	R2	17	3.0	0.432	13.4	LOS B	1.9	48.5	0.66	0.72	21.2
Approach		243	3.0	0.432	13.4	LOS B	1.9	48.5	0.66	0.72	22.0
NorthEast: SR 28											
1x	L2	12	3.0	0.318	7.6	LOS A	1.4	34.7	0.42	0.33	24.1
6x	T1	264	3.0	0.318	7.6	LOS A	1.4	34.7	0.42	0.33	23.9
Approach		276	3.0	0.318	7.6	LOS A	1.4	34.7	0.42	0.33	23.9
SouthWest: SR 89											
2x	T1	651	3.0	0.944	35.1	LOS E	32.6	834.3	0.61	0.17	19.3
12x	R2	372	3.0	0.944	35.1	LOS E	32.6	834.3	0.61	0.17	18.9
Approach		1023	3.0	0.944	35.1	LOS E	32.6	834.3	0.61	0.17	19.2
All Vehicles		1542	3.0	0.944	26.7	LOS D	32.6	834.3	0.59	0.29	20.3

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 14C C+P PM

SR 28/89 Eastern Intersection
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: SR 28											
3	L2	226	3.0	0.482	8.8	LOS A	2.9	74.5	0.13	0.04	26.6
8	T1	293	3.0	0.482	8.8	LOS A	2.9	74.5	0.13	0.04	26.0
Approach		519	3.0	0.482	8.8	LOS A	2.9	74.5	0.13	0.04	26.3
North: SR 28											
4	T1	198	3.0	0.241	6.7	LOS A	1.0	24.4	0.39	0.30	24.2
14	R2	12	3.0	0.241	6.7	LOS A	1.0	24.4	0.39	0.30	23.6
Approach		210	3.0	0.241	6.7	LOS A	1.0	24.4	0.39	0.30	24.2
West: SR 89											
5	L2	17	3.0	0.435	9.3	LOS A	2.1	54.9	0.45	0.35	23.8
12	R2	372	3.0	0.435	9.3	LOS A	2.1	54.9	0.45	0.35	22.7
Approach		390	3.0	0.435	9.3	LOS A	2.1	54.9	0.45	0.35	22.7
All Vehicles		1118	3.0	0.482	8.6	LOS A	2.9	74.5	0.29	0.20	24.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	3/4/2017
Analysis Time Period	Winter AM
Highway	SR-89 SB
From/To	Deerfield Dr to W River St
Jurisdiction	Nevada/Placer County
Analysis Year	Cumulative + Project
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.89	
Shoulder width	4.7	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.2	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	0	/mi

Analysis direction volume, Vd 1061 veh/h
Opposing direction volume, Vo 362 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0		1.3	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	1.000		0.994	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1192	pc/h	409	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	1.3	mi/h
Adj. for access point density,(note-3) fA	0.0	mi/h
Free-flow speed, FFSd	43.7	mi/h
Adjustment for no-passing zones, fnp	2.7	mi/h
Average travel speed, ATSd	28.6	mi/h
Percent Free Flow Speed, PFFS	65.5	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	1.000
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1192 pc/h	407 pc/h

Base percent time-spent-following,(note-4) BPTSFd	77.7	%
Adjustment for no-passing zones, fnp	22.2	
Percent time-spent-following, PTSFd	94.2	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.40	
Peak 15-min vehicle-miles of travel, VMT15	60	veh-mi
Peak-hour vehicle-miles of travel, VMT60	212	veh-mi
Peak 15-min total travel time, TT15	2.1	veh-h
Capacity from ATS, CdATS	1690	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	3959	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.2	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	28.6	mi/h
Percent time-spent-following, PTSFd (from above)	94.2	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1192.1
Effective width of outside lane, We	21.40
Effective speed factor, St	4.42
Bicycle LOS Score, BLOS	3.43
Bicycle LOS	C

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	3/4/2017
Analysis Time Period	Winter AM
Highway	SR-89 SB
From/To	W River St to Squaw Valley Rd
Jurisdiction	Placer County
Analysis Year	Cumulative + Project
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.90	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	7.8	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	55	%
Up/down	-	%	Access point density	1	/mi

Analysis direction volume, Vd 1360 veh/h
Opposing direction volume, Vo 329 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.3		2.0	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.994		0.980	
Grade adj. factor,(note-1) fg	1.00		0.88	
Directional flow rate,(note-2) vi	1520	pc/h	424	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	0.3	mi/h
Free-flow speed, FFSd	59.8	mi/h
Adjustment for no-passing zones, fnp	2.3	mi/h
Average travel speed, ATSd	42.4	mi/h
Percent Free Flow Speed, PFFS	71.0	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.6
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	0.988
Grade adjustment factor,(note-1) fg	1.00	0.88
Directional flow rate,(note-2) vi	1511 pc/h	420 pc/h

Base percent time-spent-following,(note-4) BPTSFd	85.1	%
Adjustment for no-passing zones, fnp	10.4	
Percent time-spent-following, PTSFd	93.2	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	1.00	
Peak 15-min vehicle-miles of travel, VMT15	2947	veh-mi
Peak-hour vehicle-miles of travel, VMT60	10608	veh-mi
Peak 15-min total travel time, TT15	69.5	veh-h
Capacity from ATS, CdATS	1516	veh/h
Capacity from PTSF, CdPTSF	1535	veh/h
Directional Capacity	1938	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	7.8	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	42.4	mi/h
Percent time-spent-following, PTSFd (from above)	93.2	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1511.1
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.03
Bicycle LOS	B

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	3/4/2017
Analysis Time Period	Winter AM
Highway	SR-89 NB
From/To	A. Meadows Rd to S. Valley Rd
Jurisdiction	Placer County
Analysis Year	Cumulative + Project
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.92	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.3	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	0	/mi

Analysis direction volume, Vd 869 veh/h
Opposing direction volume, Vo 572 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.3		1.7	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.994		0.986	
Grade adj. factor,(note-1) fg	1.00		0.97	
Directional flow rate,(note-2) vi	950	pc/h	650	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	0.0	mi/h
Free-flow speed, FFSd	50.0	mi/h
Adjustment for no-passing zones, fnp	1.8	mi/h
Average travel speed, ATSd	35.8	mi/h
Percent Free Flow Speed, PFFS	71.7	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	1.000
Grade adjustment factor,(note-1) fg	1.00	0.97
Directional flow rate,(note-2) vi	945 pc/h	641 pc/h

Base percent time-spent-following,(note-4) BPTSFd	72.3	%
Adjustment for no-passing zones, fnp	24.1	
Percent time-spent-following, PTSFd	86.7	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.37	
Peak 15-min vehicle-miles of travel, VMT15	307	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1130	veh-mi
Peak 15-min total travel time, TT15	8.6	veh-h
Capacity from ATS, CdATS	1626	veh/h
Capacity from PTSF, CdPTSF	1666	veh/h
Directional Capacity	4364	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.3	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	35.8	mi/h
Percent time-spent-following, PTSFd (from above)	86.7	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	944.6
Effective width of outside lane, We	28.00
Effective speed factor, St	4.42
Bicycle LOS Score, BLOS	1.68
Bicycle LOS	B

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	3/4/2017
Analysis Time Period	Winter AM
Highway	SR-89 NB
From/To	SR 28 to A. Meadows Rd
Jurisdiction	Placer County
Analysis Year	Cumulative + Project
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.92	
Shoulder width	6.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	3.7	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	1	/mi

Analysis direction volume, Vd 1201 veh/h
Opposing direction volume, Vo 572 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.3		1.7	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.994		0.986	
Grade adj. factor,(note-1) fg	1.00		0.97	
Directional flow rate,(note-2) vi	1313	pc/h	650	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	0.3	mi/h
Free-flow speed, FFSd	49.8	mi/h
Adjustment for no-passing zones, fnp	1.7	mi/h
Average travel speed, ATSd	32.8	mi/h
Percent Free Flow Speed, PFFS	65.9	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	1.000
Grade adjustment factor,(note-1) fg	1.00	0.97
Directional flow rate,(note-2) vi	1305 pc/h	641 pc/h

Base percent time-spent-following,(note-4) BPTSFd	81.7	%
Adjustment for no-passing zones, fnp	15.9	
Percent time-spent-following, PTSFd	92.4	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.48	
Peak 15-min vehicle-miles of travel, VMT15	1208	veh-mi
Peak-hour vehicle-miles of travel, VMT60	4444	veh-mi
Peak 15-min total travel time, TT15	36.9	veh-h
Capacity from ATS, CdATS	1626	veh/h
Capacity from PTSF, CdPTSF	1666	veh/h
Directional Capacity	4056	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	3.7	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	32.8	mi/h
Percent time-spent-following, PTSFd (from above)	92.4	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1305.4
Effective width of outside lane, We	24.00
Effective speed factor, St	4.42
Bicycle LOS Score, BLOS	2.89
Bicycle LOS	C

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	3/4/2017
Analysis Time Period	Winter AM
Highway	SR89 NB
From/To	At Transit Center
Jurisdiction	Caltrans
Analysis Year	Cumulative + Project
Description	Squaw Valley Olympic Villlage

Input Data

Highway class	Class 2		Peak hour factor, PHF	0.94	
Shoulder width	2.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.3	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	64	%
Up/down	-	%	Access point density	11	/mi

Analysis direction volume, Vd 771 veh/h
Opposing direction volume, Vo 359 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.3	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.998		0.994	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	822	pc/h	384	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	2.6	mi/h
Adj. for access point density,(note-3) fA	2.8	mi/h
Free-flow speed, FFSd	39.7	mi/h
Adjustment for no-passing zones, fnp	2.2	mi/h
Average travel speed, ATSd	28.1	mi/h
Percent Free Flow Speed, PFFS	70.9	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	0.998
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	820 pc/h	383 pc/h

Base percent time-spent-following,(note-4) BPTSFd	65.2	%
Adjustment for no-passing zones, fnp	26.0	
Percent time-spent-following, PTSFd	82.9	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.48	
Peak 15-min vehicle-miles of travel, VMT15	62	veh-mi
Peak-hour vehicle-miles of travel, VMT60	231	veh-mi
Peak 15-min total travel time, TT15	2.2	veh-h
Capacity from ATS, CdATS	0	veh/h
Capacity from PTSF, CdPTSF	1697	veh/h
Directional Capacity	2489	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.3	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	28.1	mi/h
Percent time-spent-following, PTSFd (from above)	82.9	
Level of service, LOSd (from above)	D	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	820.2
Effective width of outside lane, We	14.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	4.66
Bicycle LOS	E

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	4/9/2017
Analysis Time Period	Winter PM
Highway	SR-89 NB
From/To	W River St to Deerfield Dr
Jurisdiction	Nevada/Placer County
Analysis Year	
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.96	
Shoulder width	4.7	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.2	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	0	/mi

Analysis direction volume, Vd 1686 veh/h
Opposing direction volume, Vo 524 veh/h

Average Travel Speed

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.2
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adj. factor,(note-5) fHV	1.000	0.996
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1756 pc/h	548 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	1.3	mi/h
Adj. for access point density,(note-3) fA	0.0	mi/h
Free-flow speed, FFSd	43.7	mi/h
Adjustment for no-passing zones, fnp	2.0	mi/h
Average travel speed, ATSd	23.8	mi/h
Percent Free Flow Speed, PFFS	54.4	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	1.000
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1756 pc/h	546 pc/h

Base percent time-spent-following,(note-4) BPTSFd	89.1	%
Adjustment for no-passing zones, fnp	12.1	
Percent time-spent-following, PTSFd	98.3	%

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	0.59	
Peak 15-min vehicle-miles of travel, VMT15	88	veh-mi
Peak-hour vehicle-miles of travel, VMT60	337	veh-mi
Peak 15-min total travel time, TT15	3.7	veh-h
Capacity from ATS, CdATS	1693	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	3914	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.2	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	23.8	mi/h
Percent time-spent-following, PTSFd (from above)	98.3	
Level of service, LOSd (from above)	F	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1756.3
Effective width of outside lane, We	21.40
Effective speed factor, St	4.42
Bicycle LOS Score, BLOS	3.63
Bicycle LOS	D

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	4/9/2017
Analysis Time Period	Winter PM
Highway	SR-89 NB
From/To	Squaw Valley Rd to W River St
Jurisdiction	Placer County
Analysis Year	Existing + Project
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.93	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	7.8	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	55	%
Up/down	-	%	Access point density	1	/mi

Analysis direction volume, Vd 1794 veh/h
Opposing direction volume, Vo 43 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.3		2.7	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.994		0.967	
Grade adj. factor,(note-1) fg	1.00		0.67	
Directional flow rate,(note-2) vi	1941	pc/h	71	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	0.3	mi/h
Free-flow speed, FFSd	59.8	mi/h
Adjustment for no-passing zones, fnp	2.3	mi/h
Average travel speed, ATSd	41.9	mi/h
Percent Free Flow Speed, PFFS	70.0	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.9
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	0.982
Grade adjustment factor,(note-1) fg	1.00	0.73
Directional flow rate,(note-2) vi	1929 pc/h	64 pc/h

Base percent time-spent-following,(note-4) BPTSFd	88.9	%
Adjustment for no-passing zones, fnp	10.3	
Percent time-spent-following, PTSFd	98.9	%

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	1.76	
Peak 15-min vehicle-miles of travel, VMT15	3762	veh-mi
Peak-hour vehicle-miles of travel, VMT60	13993	veh-mi
Peak 15-min total travel time, TT15	89.9	veh-h
Capacity from ATS, CdATS	1101	veh/h
Capacity from PTSF, CdPTSF	1219	veh/h
Directional Capacity	1141	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	7.8	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	41.9	mi/h
Percent time-spent-following, PTSFd (from above)	98.9	
Level of service, LOSd (from above)	F	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1929.0
Effective width of outside lane, We	28.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.15
Bicycle LOS	B

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	4/9/2017
Analysis Time Period	Winter PM
Highway	SR-89 NB
From/To	A. Meadows Rd to S. Valley Rd
Jurisdiction	Placer County
Analysis Year	Cumulative + Project
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.92	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.3	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	0	/mi

Analysis direction volume, Vd 797 veh/h
Opposing direction volume, Vo 588 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.3		1.7	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.994		0.986	
Grade adj. factor,(note-1) fg	1.00		0.97	
Directional flow rate,(note-2) vi	872	pc/h	668	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	0.0	mi/h
Free-flow speed, FFSd	50.0	mi/h
Adjustment for no-passing zones, fnp	1.7	mi/h
Average travel speed, ATSd	36.4	mi/h
Percent Free Flow Speed, PFFS	72.7	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	1.000
Grade adjustment factor,(note-1) fg	1.00	0.98
Directional flow rate,(note-2) vi	866 pc/h	652 pc/h

Base percent time-spent-following,(note-4) BPTSFd	70.2	%
Adjustment for no-passing zones, fnp	25.7	
Percent time-spent-following, PTSFd	84.9	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.34	
Peak 15-min vehicle-miles of travel, VMT15	282	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1036	veh-mi
Peak 15-min total travel time, TT15	7.8	veh-h
Capacity from ATS, CdATS	1646	veh/h
Capacity from PTSF, CdPTSF	1666	veh/h
Directional Capacity	4552	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.3	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	36.4	mi/h
Percent time-spent-following, PTSFd (from above)	84.9	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	866.3
Effective width of outside lane, We	28.00
Effective speed factor, St	4.42
Bicycle LOS Score, BLOS	1.64
Bicycle LOS	B

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	4/9/2017
Analysis Time Period	Winter PM
Highway	SR-89 SB
From/To	A. Meadows Rd to SR 28
Jurisdiction	Placer County
Analysis Year	
Description	Squaw Valley Olympic Village

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.87	
Shoulder width	5.5	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	3.7	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	1	/mi

Analysis direction volume, Vd 868 veh/h
Opposing direction volume, Vo 423 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.3		1.8	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.994		0.984	
Grade adj. factor,(note-1) fg	1.00		0.94	
Directional flow rate,(note-2) vi	1004	pc/h	526	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	1.3	mi/h
Adj. for access point density,(note-3) fA	0.3	mi/h
Free-flow speed, FFSd	48.5	mi/h
Adjustment for no-passing zones, fnp	2.2	mi/h
Average travel speed, ATSd	34.4	mi/h
Percent Free Flow Speed, PFFS	71.0	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.4
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	0.992
Grade adjustment factor,(note-1) fg	1.00	0.95
Directional flow rate,(note-2) vi	998 pc/h	516 pc/h

Base percent time-spent-following,(note-4) BPTSFd	73.4	%
Adjustment for no-passing zones, fnp	22.1	
Percent time-spent-following, PTSFd	88.0	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.63	
Peak 15-min vehicle-miles of travel, VMT15	923	veh-mi
Peak-hour vehicle-miles of travel, VMT60	3212	veh-mi
Peak 15-min total travel time, TT15	26.8	veh-h
Capacity from ATS, CdATS	1589	veh/h
Capacity from PTSF, CdPTSF	1625	veh/h
Directional Capacity	2421	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	3.7	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	34.4	mi/h
Percent time-spent-following, PTSFd (from above)	88.0	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	45
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	997.7
Effective width of outside lane, We	23.00
Effective speed factor, St	4.42
Bicycle LOS Score, BLOS	2.99
Bicycle LOS	C

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Fehr & Peers
Agency/Co.	
Date Performed	4/9/2017
Analysis Time Period	Winter PM
Highway	SR89 SB
From/To	At Transit Center
Jurisdiction	Caltrans
Analysis Year	Cumulative + Project
Description	Squaw Valley Olympic Villlage

Input Data

Highway class	Class 2		Peak hour factor, PHF	0.85	
Shoulder width	2.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.3	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	64	%
Up/down	-	%	Access point density	11	/mi

Analysis direction volume, Vd 484 veh/h
Opposing direction volume, Vo 462 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.2	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.998		0.996	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	571	pc/h	546	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	2.6	mi/h
Adj. for access point density,(note-3) fA	2.8	mi/h
Free-flow speed, FFSd	39.7	mi/h
Adjustment for no-passing zones, fnp	1.6	mi/h
Average travel speed, ATSd	29.4	mi/h
Percent Free Flow Speed, PFFS	74.2	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	1.000
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	569 pc/h	544 pc/h

Base percent time-spent-following,(note-4) BPTSFd	56.1	%
Adjustment for no-passing zones, fnp	34.6	
Percent time-spent-following, PTSFd	73.8	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.36	
Peak 15-min vehicle-miles of travel, VMT15	43	veh-mi
Peak-hour vehicle-miles of travel, VMT60	145	veh-mi
Peak 15-min total travel time, TT15	1.5	veh-h
Capacity from ATS, CdATS	0	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	3129	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.3	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	29.4	mi/h
Percent time-spent-following, PTSFd (from above)	73.8	
Level of service, LOSd (from above)	D	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	569.4
Effective width of outside lane, We	14.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	4.48
Bicycle LOS	D

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.