Cumulative Plus Project Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0					4.0	4.0	4.0
Lane Util. Factor		0.91		1.00	0.91					0.95	0.91	0.95
Frt		0.98		1.00	1.00					1.00	0.91	0.85
Flt Protected		1.00		0.95	1.00					0.95	0.98	1.00
Satd. Flow (prot)		4968		1770	5085					1681	1511	1504
Flt Permitted		1.00		0.95	1.00					0.95	0.98	1.00
Satd. Flow (perm)		4968		1770	5085					1681	1511	1504
Volume (vph)	0	2110	385	506	1045	0	0	0	0	430	0	600
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2293	418	550	1136	0	0	0	0	467	0	652
RTOR Reduction (vph)	0	22	0	0	0	0	0	0	0	0	47	122
Lane Group Flow (vph)	0	2689	0	550	1136	0	0	0	0	319	332	299
Turn Type				Prot						Split		Perm
Protected Phases		2		1	6					4	4	
Permitted Phases												4
Actuated Green, G (s)		56.0		30.0	90.0					22.0	22.0	22.0
Effective Green, g (s)		56.0		30.0	90.0					22.0	22.0	22.0
Actuated g/C Ratio		0.47		0.25	0.75					0.18	0.18	0.18
Clearance Time (s)		4.0		4.0	4.0					4.0	4.0	4.0
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		2318		443	3814					308	277	276
v/s Ratio Prot		c0.54		c0.31	0.22					0.19	c0.22	
v/s Ratio Perm												0.20
v/c Ratio		1.16		1.24	0.30					1.04	1.20	1.08
Uniform Delay, d1		32.0		45.0	4.8					49.0	49.0	49.0
Progression Factor		1.00		0.25	0.36					1.00	1.00	1.00
Incremental Delay, d2		77.3		110.5	0.0					60.8	119.5	78.5
Delay (s)		109.3		121.8	1.7					109.8	168.5	127.5
Level of Service		F		F	A					F	F	F
Approach Delay (s)		109.3			40.9			0.0			136.4	
Approach LOS		F			D			A			F	

Intersection Summary			
HCM Average Control Delay	93.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	108.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0	4.0			
Lane Util. Factor	1.00	0.91			0.91		0.95	0.91	0.95			
Frt	1.00	1.00			0.96		1.00	0.91	0.85			
Flt Protected	0.95	1.00			1.00		0.95	0.98	1.00			
Satd. Flow (prot)	1770	5085			4857		1681	1508	1504			
Flt Permitted	0.95	1.00			1.00		0.95	0.98	1.00			
Satd. Flow (perm)	1770	5085			4857		1681	1508	1504			
Volume (vph)	900	1640	0	0	1216	520	335	0	436	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	978	1783	0	0	1322	565	364	0	474	0	0	0
RTOR Reduction (vph)	0	0	0	0	64	0	0	48	48	0	0	0
Lane Group Flow (vph)	978	1783	0	0	1823	0	248	262	232	0	0	0
Turn Type	Prot						Split		Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases									8			
Actuated Green, G (s)	50.0	96.0			42.0		16.0	16.0	16.0			
Effective Green, g (s)	50.0	96.0			42.0		16.0	16.0	16.0			
Actuated g/C Ratio	0.42	0.80			0.35		0.13	0.13	0.13			
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Lane Grp Cap (vph)	738	4068			1700		224	201	201			
v/s Ratio Prot	c0.55	0.35			c0.38		0.15	c0.17				
v/s Ratio Perm									0.15			
v/c Ratio	1.33	0.44			1.07		1.11	1.31	1.16			
Uniform Delay, d1	35.0	3.7			39.0		52.0	52.0	52.0			
Progression Factor	0.10	0.18			1.00		1.00	1.00	1.00			
Incremental Delay, d2	147.2	0.0			44.1		91.8	168.5	111.8			
Delay (s)	150.8	0.7			83.1		143.8	220.5	163.8			
Level of Service	F	A			F		F	F	F			
Approach Delay (s)		53.9			83.1			178.9			0.0	
Approach LOS		D			F			F			A	

Intersection Summary			
HCM Average Control Delay	83.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.22		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	108.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↱	↰	↑↑					↰		↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0		4.0
Lane Util. Factor		0.91	1.00	1.00	0.95					1.00		1.00
Frt		1.00	0.85	1.00	1.00					1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (prot)		5085	1583	1770	3539					1770		1583
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		5085	1583	1770	3539					1770		1583
Volume (vph)	0	1280	791	269	1181	0	0	0	0	160	0	640
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1391	860	292	1284	0	0	0	0	174	0	696
RTOR Reduction (vph)	0	0	566	0	0	0	0	0	0	0	0	21
Lane Group Flow (vph)	0	1391	294	292	1284	0	0	0	0	174	0	675
Turn Type			Perm	Prot						custom		custom
Protected Phases		2		1	6							
Permitted Phases			2							4		4
Actuated Green, G (s)		36.0	36.0	21.0	61.0					51.0		51.0
Effective Green, g (s)		36.0	36.0	21.0	61.0					51.0		51.0
Actuated g/C Ratio		0.30	0.30	0.18	0.51					0.42		0.42
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0		4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		1526	475	310	1799					752		673
v/s Ratio Prot		c0.27		c0.17	0.36							
v/s Ratio Perm			0.19							0.10		c0.43
v/c Ratio		0.91	0.62	0.94	0.71					0.23		1.00
Uniform Delay, d1		40.5	36.1	48.9	22.8					22.0		34.5
Progression Factor		1.00	1.00	1.56	1.33					1.00		1.00
Incremental Delay, d2		9.8	6.0	6.2	0.2					0.2		35.5
Delay (s)		50.2	42.1	82.4	30.5					22.2		70.0
Level of Service		D	D	F	C					C		E
Approach Delay (s)		47.1			40.1			0.0			60.5	
Approach LOS		D			D			A			E	

Intersection Summary			
HCM Average Control Delay	47.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	105.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	1.00	0.95			0.95	1.00	1.00		1.00			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	1770	3539			3539	1583	1770		1583			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	1770	3539			3539	1583	1770		1583			
Volume (vph)	700	740	0	0	869	290	581	0	239	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	761	804	0	0	945	315	632	0	260	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	133	0	0	148	0	0	0
Lane Group Flow (vph)	761	804	0	0	945	182	632	0	112	0	0	0
Turn Type	Prot					Perm	custom		custom			
Protected Phases	5	2			6							
Permitted Phases						6	8		8			
Actuated Green, G (s)	47.0	82.0			31.0	31.0	30.0		30.0			
Effective Green, g (s)	47.0	82.0			31.0	31.0	30.0		30.0			
Actuated g/C Ratio	0.39	0.68			0.26	0.26	0.25		0.25			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0		3.0			
Lane Grp Cap (vph)	693	2418			914	409	443		396			
v/s Ratio Prot	c0.43	0.23			c0.27							
v/s Ratio Perm						0.12	c0.36		0.07			
v/c Ratio	1.10	0.33			1.03	0.45	1.43		0.28			
Uniform Delay, d1	36.5	7.8			44.5	37.3	45.0		36.3			
Progression Factor	2.11	0.91			1.00	1.00	1.00		1.00			
Incremental Delay, d2	53.6	0.2			38.8	3.5	204.7		0.4			
Delay (s)	130.5	7.3			83.3	40.8	249.7		36.7			
Level of Service	F	A			F	D	F		D			
Approach Delay (s)		67.2			72.7			187.6			0.0	
Approach LOS		E			E			F			A	

Intersection Summary			
HCM Average Control Delay	98.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	105.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	500	187	177	75	75	560
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	543	203	192	82	82	609
Pedestrians			100			
Lane Width (ft)			12.0			
Walking Speed (ft/s)			4.0			
Percent Blockage			8			
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	274				1623	233
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	274				1623	233
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	58				0	24
cM capacity (veh/h)	1289				60	806

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	543	203	274	690
Volume Left	543	0	0	82
Volume Right	0	0	82	609
cSH	1289	1700	1700	326
Volume to Capacity	0.42	0.12	0.16	2.12
Queue Length 95th (ft)	53	0	0	1266
Control Delay (s)	9.8	0.0	0.0	539.0
Lane LOS	A			F
Approach Delay (s)	7.1		0.0	539.0
Approach LOS				F

Intersection Summary			
Average Delay	220.6		
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	10	19	19	212	232	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	21	21	230	252	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	535	263	274			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	535	263	274			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	97	98			
cM capacity (veh/h)	498	776	1289			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	32	251	274
Volume Left	11	21	0
Volume Right	21	0	22
cSH	651	1289	1700
Volume to Capacity	0.05	0.02	0.16
Queue Length 95th (ft)	4	1	0
Control Delay (s)	10.8	0.8	0.0
Lane LOS	B	A	
Approach Delay (s)	10.8	0.8	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	36.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.74	1.00	1.00	0.73	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1384	1863	1583	1358	1863	1583	1770	1863	1583	1770	1863	1583
Volume (vph)	180	40	215	20	20	20	185	350	20	60	720	150
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	196	43	234	22	22	22	201	380	22	65	783	163
RTOR Reduction (vph)	0	0	187	0	0	18	0	0	10	0	0	70
Lane Group Flow (vph)	196	43	47	22	22	4	201	380	12	65	783	93
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	13.5	13.5	13.5	13.5	13.5	13.5	9.3	38.2	38.2	3.7	32.6	32.6
Effective Green, g (s)	13.5	13.5	13.5	13.5	13.5	13.5	9.3	38.2	38.2	3.7	32.6	32.6
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.20	0.14	0.57	0.57	0.05	0.48	0.48
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	277	373	317	272	373	317	244	1056	897	97	901	766
v/s Ratio Prot		0.02			0.01		c0.11	0.20		0.04	c0.42	
v/s Ratio Perm	c0.14		0.03	0.02		0.00			0.01			0.06
v/c Ratio	0.71	0.12	0.15	0.08	0.06	0.01	0.82	0.36	0.01	0.67	0.87	0.12
Uniform Delay, d1	25.1	22.1	22.2	21.9	21.8	21.6	28.3	7.9	6.4	31.3	15.5	9.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.0	0.1	0.2	0.1	0.1	0.0	19.7	0.2	0.0	16.7	8.9	0.1
Delay (s)	33.1	22.2	22.4	22.0	21.9	21.6	47.9	8.2	6.4	47.9	24.4	9.6
Level of Service	C	C	C	C	C	C	D	A	A	D	C	A
Approach Delay (s)		26.8			21.8			21.3			23.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	23.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	67.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	1.00	1.00	0.95	1.00	0.95	
Satd. Flow (prot)	1863	1583	1770	1863	1765	
Flt Permitted	1.00	1.00	0.44	1.00	0.95	
Satd. Flow (perm)	1863	1583	818	1863	1765	
Volume (vph)	445	167	10	585	167	10
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	484	182	11	636	182	11
RTOR Reduction (vph)	0	70	0	0	6	0
Lane Group Flow (vph)	484	112	11	636	187	0
Turn Type		Perm	Perm			
Protected Phases	4			8	2	
Permitted Phases		4	8			
Actuated Green, G (s)	30.1	30.1	30.1	30.1	11.0	
Effective Green, g (s)	30.1	30.1	30.1	30.1	11.0	
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.22	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	1142	970	501	1142	395	
v/s Ratio Prot	0.26			c0.34	c0.11	
v/s Ratio Perm		0.07	0.01			
v/c Ratio	0.42	0.12	0.02	0.56	0.47	
Uniform Delay, d1	5.0	4.0	3.7	5.6	16.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.1	0.0	0.6	0.9	
Delay (s)	5.2	4.0	3.7	6.2	17.4	
Level of Service	A	A	A	A	B	
Approach Delay (s)	4.9			6.1	17.4	
Approach LOS	A			A	B	

Intersection Summary			
HCM Average Control Delay	7.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	49.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.97			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98			0.96	1.00
Satd. Flow (prot)	1770	1845	1615	1805	1863	1583		1203			1784	1583
Flt Permitted	0.95	1.00	1.00	0.55	1.00	1.00		0.84			0.71	1.00
Satd. Flow (perm)	1770	1845	1615	1052	1863	1583		1037			1328	1583
Volume (vph)	125	317	19	10	657	85	19	10	10	115	10	175
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	136	345	21	11	714	92	21	11	11	125	11	190
RTOR Reduction (vph)	0	0	7	0	0	22	0	9	0	0	0	152
Lane Group Flow (vph)	136	345	14	11	714	70	0	34	0	0	136	38
Heavy Vehicles (%)	2%	3%	0%	0%	2%	2%	100%	0%	0%	2%	0%	2%
Turn Type	Prot		Perm	Perm		Perm	Perm			Perm		Perm
Protected Phases	7	4			8			2			6	
Permitted Phases			4	8		8	2			6		6
Actuated Green, G (s)	4.9	36.6	36.6	27.7	27.7	27.7		11.0			11.0	11.0
Effective Green, g (s)	4.9	36.6	36.6	27.7	27.7	27.7		11.0			11.0	11.0
Actuated g/C Ratio	0.09	0.66	0.66	0.50	0.50	0.50		0.20			0.20	0.20
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	156	1215	1063	524	928	789		205			263	313
v/s Ratio Prot	c0.08	0.19			c0.38							
v/s Ratio Perm			0.01	0.01		0.04		0.03			c0.10	0.02
v/c Ratio	0.87	0.28	0.01	0.02	0.77	0.09		0.17			0.52	0.12
Uniform Delay, d1	25.0	4.0	3.3	7.1	11.4	7.3		18.5			19.9	18.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	37.6	0.1	0.0	0.0	3.9	0.0		0.4			1.7	0.2
Delay (s)	62.7	4.1	3.3	7.1	15.2	7.4		18.9			21.6	18.5
Level of Service	E	A	A	A	B	A		B			C	B
Approach Delay (s)		19.9			14.2			18.9			19.8	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	55.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		-4%			4%			0%			0%	
Volume (veh/h)	50	713	0	0	790	998	40	0	735	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	775	0	0	859	1085	43	0	799	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)					428							
pX, platoon unblocked	0.74						0.74	0.74		0.74	0.74	0.74
vC, conflicting volume	1943			775			2285	2827	775	3084	2285	1401
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2278			775			2741	3475	775	3823	2741	1543
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	67			100			0	100	0	0	100	100
cM capacity (veh/h)	164			850			7	3	400	0	10	105

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	829	1943	842
Volume Left	54	0	43
Volume Right	0	1085	799
cSH	164	1700	104
Volume to Capacity	0.33	1.14	8.08
Queue Length 95th (ft)	34	0	Err
Control Delay (s)	23.7	0.0	Err
Lane LOS	C		F
Approach Delay (s)	23.7	0.0	Err
Approach LOS			F

Intersection Summary			
Average Delay	2335.3		
Intersection Capacity Utilization	157.0%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		4%			-4%			0%			0%	
Volume (veh/h)	0	88	30	733	97	0	0	0	0	675	0	80
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	96	33	797	105	0	0	0	0	734	0	87
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	105			128			1898	1811	112	1811	1827	105
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	105			128			1898	1811	112	1811	1827	105
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.3
p0 queue free %	100			45			100	100	100	0	100	91
cM capacity (veh/h)	1498			1445			27	36	947	32	35	949

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	128	902	821
Volume Left	0	797	734
Volume Right	33	0	87
cSH	1700	1445	36
Volume to Capacity	0.08	0.55	22.70
Queue Length 95th (ft)	0	88	Err
Control Delay (s)	0.0	10.0	Err
Lane LOS		A	F
Approach Delay (s)	0.0	10.0	Err
Approach LOS			F

Intersection Summary			
Average Delay	4437.8		
Intersection Capacity Utilization	101.3%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	29	10	129	38	10	10	10	79	10	10	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	32	11	140	41	11	11	11	86	11	11	11

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	53	192	108	33
Volume Left (vph)	11	140	11	11
Volume Right (vph)	11	11	86	11
Hadj (s)	-0.05	0.14	-0.43	-0.12
Departure Headway (s)	4.4	4.4	4.1	4.5
Degree Utilization, x	0.06	0.24	0.12	0.04
Capacity (veh/h)	786	782	828	746
Control Delay (s)	7.7	8.8	7.6	7.7
Approach Delay (s)	7.7	8.8	7.6	7.7
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.2		
HCM Level of Service	A		
Intersection Capacity Utilization	29.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	538	180	470	400	0	0	0	0	129	0	368
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	585	196	511	435	0	0	0	0	140	0	400
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												6
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	435			585			2139	2139	683	2139	2041	435
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	435			585			2139	2139	683	2139	2041	435
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			48			100	100	100	0	100	36
cM capacity (veh/h)	1125			990			7	24	449	21	27	621

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	780	511	435	540
Volume Left	0	511	0	140
Volume Right	196	0	0	400
cSH	1700	990	1700	74
Volume to Capacity	0.46	0.52	0.26	7.27
Queue Length 95th (ft)	0	76	0	Err
Control Delay (s)	0.0	12.4	0.0	Err
Lane LOS		B		F
Approach Delay (s)	0.0	6.7		Err
Approach LOS				F

Intersection Summary			
Average Delay	2386.3		
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	339	328	89	730	140	240
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	368	357	97	793	152	261
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						6
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			368		1355	368
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			368		1355	368
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			92		0	61
cM capacity (veh/h)			1190		151	677

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	368	357	97	793	413
Volume Left	0	0	97	0	152
Volume Right	0	357	0	0	261
cSH	1700	1700	1190	1700	394
Volume to Capacity	0.22	0.21	0.08	0.47	1.05
Queue Length 95th (ft)	0	0	7	0	342
Control Delay (s)	0.0	0.0	8.3	0.0	91.3
Lane LOS			A		F
Approach Delay (s)	0.0		0.9		91.3
Approach LOS					F

Intersection Summary			
Average Delay	19.0		
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.90		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3934	1615	1805	3719	1583	1805	1710		1770	1863	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3934	1615	1805	3719	1583	1805	1710		1770	1863	2787
Volume (vph)	993	345	40	20	735	96	60	10	20	96	10	993
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1079	375	43	22	799	104	65	11	22	104	11	1079
RTOR Reduction (vph)	0	0	17	0	0	74	0	20	0	0	0	935
Lane Group Flow (vph)	1079	375	26	22	799	30	65	13	0	104	11	144
Heavy Vehicles (%)	2%	4%	0%	0%	10%	2%	0%	0%	0%	2%	2%	2%
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	34.5	60.0	60.0	2.7	28.2	28.2	6.8	10.2		9.7	13.1	13.1
Effective Green, g (s)	34.5	60.0	60.0	2.7	28.2	28.2	6.8	10.2		9.7	13.1	13.1
Actuated g/C Ratio	0.35	0.61	0.61	0.03	0.29	0.29	0.07	0.10		0.10	0.13	0.13
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	1201	2394	983	49	1064	453	124	177		174	248	370
v/s Ratio Prot	c0.31	0.10		0.01	c0.21		0.04	0.01		c0.06	0.01	
v/s Ratio Perm			0.02			0.02						c0.05
v/c Ratio	0.90	0.16	0.03	0.45	0.75	0.07	0.52	0.08		0.60	0.04	0.39
Uniform Delay, d1	30.4	8.4	7.7	47.2	32.0	25.6	44.3	39.9		42.6	37.3	39.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	9.1	0.0	0.0	6.4	3.0	0.1	4.0	0.2		5.4	0.1	0.7
Delay (s)	39.5	8.4	7.7	53.6	35.0	25.7	48.3	40.1		48.0	37.4	39.8
Level of Service	D	A	A	D	D	C	D	D		D	D	D
Approach Delay (s)		30.8			34.4			45.5			40.5	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	35.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	98.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	26	26	26	194	274	26
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	28	28	28	211	298	28
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				332		
pX, platoon unblocked						
vC, conflicting volume	579	163	326			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	579	163	326			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	97	98			
cM capacity (veh/h)	435	853	1230			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	28	28	28	211	199	128
Volume Left	28	0	28	0	0	0
Volume Right	0	28	0	0	0	28
cSH	435	853	1230	1700	1700	1700
Volume to Capacity	0.06	0.03	0.02	0.12	0.12	0.08
Queue Length 95th (ft)	5	3	2	0	0	0
Control Delay (s)	13.8	9.4	8.0	0.0	0.0	0.0
Lane LOS	B	A	A			
Approach Delay (s)	11.6		0.9		0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	25.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	17	18	18	202	282	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	20	20	220	307	18
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				542		
pX, platoon unblocked						
vC, conflicting volume	574	162	325			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	574	162	325			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	98	98			
cM capacity (veh/h)	442	854	1231			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	18	20	20	220	204	121
Volume Left	18	0	20	0	0	0
Volume Right	0	20	0	0	0	18
cSH	442	854	1231	1700	1700	1700
Volume to Capacity	0.04	0.02	0.02	0.13	0.12	0.07
Queue Length 95th (ft)	3	2	1	0	0	0
Control Delay (s)	13.5	9.3	8.0	0.0	0.0	0.0
Lane LOS	B	A	A			
Approach Delay (s)	11.4		0.7		0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	25.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	9	17	17	202	282	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	18	18	220	307	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				842		
pX, platoon unblocked						
vC, conflicting volume	568	311	316			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	568	311	316			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	97	99			
cM capacity (veh/h)	477	729	1244			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	10	18	238	316
Volume Left	10	0	18	0
Volume Right	0	18	0	10
cSH	477	729	1244	1700
Volume to Capacity	0.02	0.03	0.01	0.19
Queue Length 95th (ft)	2	2	1	0
Control Delay (s)	12.7	10.1	0.7	0.0
Lane LOS	B	B	A	
Approach Delay (s)	11.0		0.7	0.0
Approach LOS	B			

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	34.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	9	9	9	202	282	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	10	10	220	307	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				1052		
pX, platoon unblocked						
vC, conflicting volume	551	311	316			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	551	311	316			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	99			
cM capacity (veh/h)	492	729	1244			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	10	10	229	316
Volume Left	10	0	10	0
Volume Right	0	10	0	10
cSH	492	729	1244	1700
Volume to Capacity	0.02	0.01	0.01	0.19
Queue Length 95th (ft)	2	1	1	0
Control Delay (s)	12.5	10.0	0.4	0.0
Lane LOS	B	B	A	
Approach Delay (s)	11.2		0.4	0.0
Approach LOS	B			

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	27.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
1: Cypress Avenue & SB Ramps

6/9/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0					4.0	4.0	4.0
Lane Util. Factor		0.91		1.00	0.91					0.95	0.91	0.95
Frt		0.99		1.00	1.00					1.00	0.97	0.85
Flt Protected		1.00		0.95	1.00					0.95	0.96	1.00
Satd. Flow (prot)		5020		1770	5085					1681	1580	1504
Flt Permitted		1.00		0.95	1.00					0.95	0.96	1.00
Satd. Flow (perm)		5020		1770	5085					1681	1580	1504
Volume (vph)	0	1950	184	183	1583	0	0	0	0	440	0	290
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2120	200	199	1721	0	0	0	0	478	0	315
RTOR Reduction (vph)	0	8	0	0	0	0	0	0	0	0	8	30
Lane Group Flow (vph)	0	2312	0	199	1721	0	0	0	0	259	267	229
Turn Type				Prot						Split		Perm
Protected Phases		2		1	6					4	4	
Permitted Phases												4
Actuated Green, G (s)		68.2		15.5	87.7					24.3	24.3	24.3
Effective Green, g (s)		68.2		15.5	87.7					24.3	24.3	24.3
Actuated g/C Ratio		0.57		0.13	0.73					0.20	0.20	0.20
Clearance Time (s)		4.0		4.0	4.0					4.0	4.0	4.0
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		2853		229	3716					340	320	305
v/s Ratio Prot		c0.46		c0.11	0.34					0.15	c0.17	
v/s Ratio Perm												0.15
v/c Ratio		0.81		0.87	0.46					0.76	0.83	0.75
Uniform Delay, d1		20.7		51.3	6.6					45.1	45.9	45.0
Progression Factor		1.00		1.39	0.45					1.00	1.00	1.00
Incremental Delay, d2		2.6		3.4	0.0					9.7	16.8	9.7
Delay (s)		23.3		74.4	3.0					54.8	62.8	54.7
Level of Service		C		E	A					D	E	D
Approach Delay (s)		23.3			10.4			0.0			57.5	
Approach LOS		C			B			A			E	

Intersection Summary			
HCM Average Control Delay	23.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	107.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0	4.0			
Lane Util. Factor	1.00	0.91			0.91		0.95	0.91	0.95			
Frt	1.00	1.00			0.96		1.00	1.00	0.85			
Flt Protected	0.95	1.00			1.00		0.95	0.95	1.00			
Satd. Flow (prot)	1770	5085			4863		1681	1610	1504			
Flt Permitted	0.95	1.00			1.00		0.95	0.95	1.00			
Satd. Flow (perm)	1770	5085			4863		1681	1610	1504			
Volume (vph)	1090	1300	0	0	1363	560	403	0	63	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1185	1413	0	0	1482	609	438	0	68	0	0	0
RTOR Reduction (vph)	0	0	0	0	62	0	0	0	59	0	0	0
Lane Group Flow (vph)	1185	1413	0	0	2029	0	219	219	9	0	0	0
Turn Type	Prot						Split		Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases									8			
Actuated Green, G (s)	55.0	96.0			37.0		16.0	16.0	16.0			
Effective Green, g (s)	55.0	96.0			37.0		16.0	16.0	16.0			
Actuated g/C Ratio	0.46	0.80			0.31		0.13	0.13	0.13			
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Lane Grp Cap (vph)	811	4068			1499		224	215	201			
v/s Ratio Prot	c0.67	0.28			c0.42		0.13	c0.14				
v/s Ratio Perm									0.01			
v/c Ratio	1.46	0.35			1.35		0.98	1.02	0.05			
Uniform Delay, d1	32.5	3.3			41.5		51.8	52.0	45.3			
Progression Factor	1.76	1.03			1.00		1.00	1.00	1.00			
Incremental Delay, d2	211.4	0.1			163.7		53.2	66.3	0.1			
Delay (s)	268.6	3.6			205.2		105.0	118.3	45.4			
Level of Service	F	A			F		F	F	D			
Approach Delay (s)		124.4			205.2			102.8			0.0	
Approach LOS		F			F			F			A	

Intersection Summary			
HCM Average Control Delay	154.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.36		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	107.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0		4.0
Lane Util. Factor		0.91	1.00	1.00	0.95					1.00		1.00
Frt		1.00	0.85	1.00	1.00					1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (prot)		5085	1583	1770	3539					1770		1583
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		5085	1583	1770	3539					1770		1583
Volume (vph)	0	1300	514	301	1043	0	0	0	0	180	0	690
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1413	559	327	1134	0	0	0	0	196	0	750
RTOR Reduction (vph)	0	0	391	0	0	0	0	0	0	0	0	34
Lane Group Flow (vph)	0	1413	168	327	1134	0	0	0	0	196	0	716
Turn Type			Perm	Prot						custom		custom
Protected Phases		2		1	6							
Permitted Phases			2							4		4
Actuated Green, G (s)		33.0	33.0	20.0	57.0					45.0		45.0
Effective Green, g (s)		33.0	33.0	20.0	57.0					45.0		45.0
Actuated g/C Ratio		0.30	0.30	0.18	0.52					0.41		0.41
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0		4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		1526	475	322	1834					724		648
v/s Ratio Prot		c0.28		c0.18	0.32							
v/s Ratio Perm			0.11							0.11		c0.45
v/c Ratio		0.93	0.35	1.02	0.62					0.27		1.10
Uniform Delay, d1		37.3	30.1	45.0	18.8					21.6		32.5
Progression Factor		1.00	1.00	1.59	1.35					1.00		1.00
Incremental Delay, d2		11.1	2.1	32.0	0.1					0.2		67.5
Delay (s)		48.4	32.2	103.4	25.6					21.8		100.0
Level of Service		D	C	F	C					C		F
Approach Delay (s)		43.8			43.0			0.0			83.8	
Approach LOS		D			D			A			F	

Intersection Summary			
HCM Average Control Delay	52.2	HCM Level of Service	D
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	1.00	0.95			0.95	1.00	1.00		1.00			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	1770	3539			3539	1583	1770		1583			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	1770	3539			3539	1583	1770		1583			
Volume (vph)	690	790	0	0	851	220	493	0	341	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	750	859	0	0	925	239	536	0	371	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	113	0	0	187	0	0	0
Lane Group Flow (vph)	750	859	0	0	925	126	536	0	184	0	0	0
Turn Type	Prot					Perm	custom		custom			
Protected Phases	5	2			6							
Permitted Phases						6	8		8			
Actuated Green, G (s)	46.0	80.0			30.0	30.0	22.0		22.0			
Effective Green, g (s)	46.0	80.0			30.0	30.0	22.0		22.0			
Actuated g/C Ratio	0.42	0.73			0.27	0.27	0.20		0.20			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0		3.0			
Lane Grp Cap (vph)	740	2574			965	432	354		317			
v/s Ratio Prot	c0.42	0.24			c0.26							
v/s Ratio Perm						0.08	c0.30		0.12			
v/c Ratio	1.01	0.33			0.96	0.29	1.51		0.58			
Uniform Delay, d1	32.0	5.4			39.4	31.6	44.0		39.8			
Progression Factor	2.06	1.16			1.00	1.00	1.00		1.00			
Incremental Delay, d2	23.5	0.2			20.5	1.7	245.5		2.6			
Delay (s)	89.4	6.5			59.9	33.3	289.5		42.4			
Level of Service	F	A			E	C	F		D			
Approach Delay (s)		45.1			54.5			188.4			0.0	
Approach LOS		D			D			F			A	

Intersection Summary			
HCM Average Control Delay	83.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	290	252	252	53	74	320
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	315	274	274	58	80	348
Pedestrians			100			
Lane Width (ft)			12.0			
Walking Speed (ft/s)			4.0			
Percent Blockage			8			
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	332				1307	303
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	332				1307	303
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	74				33	53
cM capacity (veh/h)	1228				120	737

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	315	274	332	428
Volume Left	315	0	0	80
Volume Right	0	0	58	348
cSH	1228	1700	1700	375
Volume to Capacity	0.26	0.16	0.20	1.14
Queue Length 95th (ft)	26	0	0	411
Control Delay (s)	8.9	0.0	0.0	123.7
Lane LOS	A			F
Approach Delay (s)	4.8		0.0	123.7
Approach LOS				F

Intersection Summary			
Average Delay	41.4		
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	20	31	31	206	206	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	34	34	224	224	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	526	235	246			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	526	235	246			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	96	97			
cM capacity (veh/h)	499	804	1320			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	55	258	246
Volume Left	22	34	0
Volume Right	34	0	22
cSH	649	1320	1700
Volume to Capacity	0.09	0.03	0.14
Queue Length 95th (ft)	7	2	0
Control Delay (s)	11.1	1.2	0.0
Lane LOS	B	A	
Approach Delay (s)	11.1	1.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	37.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.74	1.00	1.00	0.74	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1370	1863	1583	1370	1863	1583	1770	1863	1583	1770	1863	1583
Volume (vph)	137	30	154	20	30	30	124	420	30	50	490	137
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	149	33	167	22	33	33	135	457	33	54	533	149
RTOR Reduction (vph)	0	0	137	0	0	27	0	0	14	0	0	73
Lane Group Flow (vph)	149	33	30	22	33	6	135	457	19	54	533	76
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	9.9	9.9	9.9	9.9	9.9	9.9	5.1	31.1	31.1	2.2	28.2	28.2
Effective Green, g (s)	9.9	9.9	9.9	9.9	9.9	9.9	5.1	31.1	31.1	2.2	28.2	28.2
Actuated g/C Ratio	0.18	0.18	0.18	0.18	0.18	0.18	0.09	0.56	0.56	0.04	0.51	0.51
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	246	334	284	246	334	284	164	1050	892	71	952	809
v/s Ratio Prot		0.02			0.02		c0.08	c0.25		0.03	c0.29	
v/s Ratio Perm	c0.11		0.02	0.02		0.00			0.01			0.05
v/c Ratio	0.61	0.10	0.11	0.09	0.10	0.02	0.82	0.44	0.02	0.76	0.56	0.09
Uniform Delay, d1	20.9	18.9	18.9	18.9	18.9	18.7	24.6	7.0	5.3	26.2	9.2	6.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.2	0.1	0.2	0.2	0.1	0.0	27.1	0.3	0.0	37.3	0.7	0.1
Delay (s)	25.0	19.1	19.1	19.0	19.1	18.7	51.7	7.3	5.3	63.6	10.0	7.0
Level of Service	C	B	B	B	B	B	D	A	A	E	A	A
Approach Delay (s)		21.6			18.9			16.8			13.3	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	16.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	55.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	1.00	1.00	0.95	1.00	0.96	
Satd. Flow (prot)	1863	1583	1770	1863	1761	
Flt Permitted	1.00	1.00	0.56	1.00	0.96	
Satd. Flow (perm)	1863	1583	1049	1863	1761	
Volume (vph)	301	172	10	281	222	20
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	327	187	11	305	241	22
RTOR Reduction (vph)	0	93	0	0	9	0
Lane Group Flow (vph)	327	94	11	305	254	0
Turn Type		Perm	Perm			
Protected Phases	4			8	2	
Permitted Phases		4	8			
Actuated Green, G (s)	17.7	17.7	17.7	17.7	9.5	
Effective Green, g (s)	17.7	17.7	17.7	17.7	9.5	
Actuated g/C Ratio	0.50	0.50	0.50	0.50	0.27	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	937	796	527	937	475	
v/s Ratio Prot	c0.18			0.16	c0.14	
v/s Ratio Perm		0.06	0.01			
v/c Ratio	0.35	0.12	0.02	0.33	0.53	
Uniform Delay, d1	5.3	4.6	4.4	5.2	11.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.1	0.0	0.2	1.2	
Delay (s)	5.5	4.7	4.4	5.4	12.1	
Level of Service	A	A	A	A	B	
Approach Delay (s)	5.2			5.4	12.1	
Approach LOS	A			A	B	

Intersection Summary			
HCM Average Control Delay	6.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	35.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.97			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98			0.96	1.00
Satd. Flow (prot)	1770	1845	1615	1805	1863	1583		1186			1783	1583
Flt Permitted	0.95	1.00	1.00	0.58	1.00	1.00		0.84			0.71	1.00
Satd. Flow (perm)	1770	1845	1615	1104	1863	1583		1017			1323	1583
Volume (vph)	83	269	21	10	439	74	21	10	10	124	10	103
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	90	292	23	11	477	80	23	11	11	135	11	112
RTOR Reduction (vph)	0	0	8	0	0	27	0	9	0	0	0	88
Lane Group Flow (vph)	90	292	15	11	477	53	0	36	0	0	146	24
Heavy Vehicles (%)	2%	3%	0%	0%	2%	2%	100%	0%	0%	2%	0%	2%
Turn Type	Prot		Perm	Perm		Perm	Perm			Perm		Perm
Protected Phases	7	4			8			2			6	
Permitted Phases			4	8		8	2			6		6
Actuated Green, G (s)	3.7	37.8	37.8	30.1	30.1	30.1		12.4			12.4	12.4
Effective Green, g (s)	3.7	37.8	37.8	30.1	30.1	30.1		12.4			12.4	12.4
Actuated g/C Ratio	0.06	0.65	0.65	0.52	0.52	0.52		0.21			0.21	0.21
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	113	1198	1049	571	964	819		217			282	337
v/s Ratio Prot	c0.05	0.16			c0.26							
v/s Ratio Perm			0.01	0.01		0.03		0.04			c0.11	0.02
v/c Ratio	0.80	0.24	0.01	0.02	0.49	0.07		0.17			0.52	0.07
Uniform Delay, d1	26.9	4.2	3.6	6.9	9.1	7.0		18.7			20.3	18.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	31.0	0.1	0.0	0.0	0.4	0.0		0.4			1.6	0.1
Delay (s)	57.9	4.4	3.6	6.9	9.5	7.1		19.1			21.9	18.4
Level of Service	E	A	A	A	A	A		B			C	B
Approach Delay (s)		16.2			9.1			19.1			20.4	
Approach LOS		B			A			B			C	

Intersection Summary			
HCM Average Control Delay	14.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	58.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		-4%			4%			0%			0%	
Volume (veh/h)	110	865	0	0	746	959	30	0	686	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	120	940	0	0	811	1042	33	0	746	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)					428							
pX, platoon unblocked	0.85						0.85	0.85		0.85	0.85	0.85
vC, conflicting volume	1853			940			2511	3033	940	3257	2511	1332
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2008			940			2785	3401	940	3666	2785	1392
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	50			100			0	100	0	0	100	100
cM capacity (veh/h)	241			737			6	3	320	0	8	149

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	1060	1853	778
Volume Left	120	0	33
Volume Right	0	1042	746
cSH	241	1700	103
Volume to Capacity	0.50	1.09	7.57
Queue Length 95th (ft)	63	0	Err
Control Delay (s)	37.2	0.0	Err
Lane LOS	E		F
Approach Delay (s)	37.2	0.0	Err
Approach LOS			F

Intersection Summary			
Average Delay	2118.8		
Intersection Capacity Utilization	188.6%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		4%			-4%			0%			0%	
Volume (veh/h)	0	122	20	634	142	0	0	0	0	853	0	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	133	22	689	154	0	0	0	0	927	0	65
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	154			154			1741	1676	143	1676	1687	154
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	154			154			1741	1676	143	1676	1687	154
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			51			100	100	100	0	100	93
cM capacity (veh/h)	1438			1414			39	49	909	46	49	892

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	154	843	992
Volume Left	0	689	927
Volume Right	22	0	65
cSH	1700	1414	49
Volume to Capacity	0.09	0.49	20.18
Queue Length 95th (ft)	0	69	Err
Control Delay (s)	0.0	9.1	Err
Lane LOS		A	F
Approach Delay (s)	0.0	9.1	Err
Approach LOS			F

Intersection Summary			
Average Delay	4989.7		
Intersection Capacity Utilization	111.1%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	31	0	141	51	10	0	0	101	10	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	34	0	153	55	11	0	0	110	11	0	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	34	220	110	11
Volume Left (vph)	0	153	0	11
Volume Right (vph)	0	11	110	0
Hadj (s)	0.03	0.14	-0.57	0.22
Departure Headway (s)	4.4	4.3	3.9	4.8
Degree Utilization, x	0.04	0.26	0.12	0.01
Capacity (veh/h)	778	809	859	693
Control Delay (s)	7.6	8.9	7.5	7.9
Approach Delay (s)	7.6	8.9	7.5	7.9
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.3		
HCM Level of Service	A		
Intersection Capacity Utilization	31.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	718	130	70	420	0	0	0	0	191	0	278
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	780	141	76	457	0	0	0	0	208	0	302
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												6
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	457			780			1460	1460	851	1460	1389	457
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	457			780			1460	1460	851	1460	1389	457
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			91			100	100	100	0	100	50
cM capacity (veh/h)	1104			837			50	117	360	100	130	604

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	922	76	457	510
Volume Left	0	76	0	208
Volume Right	141	0	0	302
cSH	1700	837	1700	205
Volume to Capacity	0.54	0.09	0.27	2.48
Queue Length 95th (ft)	0	7	0	1064
Control Delay (s)	0.0	9.7	0.0	717.6
Lane LOS		A		F
Approach Delay (s)	0.0	1.4		717.6
Approach LOS				F

Intersection Summary			
Average Delay	186.6		
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	351	558	131	340	150	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	382	607	142	370	163	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						6
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			382		1036	382
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			382		1036	382
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			88		28	97
cM capacity (veh/h)			1177		226	666

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	382	607	142	370	185
Volume Left	0	0	142	0	163
Volume Right	0	607	0	0	22
cSH	1700	1700	1177	1700	256
Volume to Capacity	0.22	0.36	0.12	0.22	0.72
Queue Length 95th (ft)	0	0	10	0	125
Control Delay (s)	0.0	0.0	8.5	0.0	48.8
Lane LOS			A		E
Approach Delay (s)	0.0		2.4		48.8
Approach LOS					E

Intersection Summary			
Average Delay	6.1		
Intersection Capacity Utilization	48.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	16	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3860	1615	1805	3326	1583	1805	1663		1770	1863	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3860	1615	1805	3326	1583	1805	1663		1770	1863	2787
Volume (vph)	1297	204	20	50	393	120	20	10	50	119	10	1292
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1410	222	22	54	427	130	22	11	54	129	11	1404
RTOR Reduction (vph)	0	0	10	0	0	105	0	47	0	0	0	969
Lane Group Flow (vph)	1410	222	12	54	427	25	22	18	0	129	11	435
Heavy Vehicles (%)	2%	6%	0%	0%	23%	2%	0%	0%	0%	2%	2%	2%
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	42.2	56.4	56.4	5.2	19.4	19.4	2.8	12.4		11.1	20.7	20.7
Effective Green, g (s)	42.2	56.4	56.4	5.2	19.4	19.4	2.8	12.4		11.1	20.7	20.7
Actuated g/C Ratio	0.42	0.56	0.56	0.05	0.19	0.19	0.03	0.12		0.11	0.20	0.20
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	1433	2153	901	93	638	304	50	204		194	381	571
v/s Ratio Prot	c0.41	0.06		0.03	c0.13		0.01	0.01		c0.07	0.01	
v/s Ratio Perm			0.01			0.02						c0.16
v/c Ratio	0.98	0.10	0.01	0.58	0.67	0.08	0.44	0.09		0.66	0.03	0.76
Uniform Delay, d1	29.1	10.5	10.0	46.9	37.9	33.5	48.4	39.3		43.2	32.2	37.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	19.9	0.0	0.0	8.9	2.7	0.1	6.1	0.2		8.3	0.0	5.9
Delay (s)	49.0	10.5	10.0	55.8	40.5	33.7	54.5	39.5		51.5	32.2	43.8
Level of Service	D	B	A	E	D	C	D	D		D	C	D
Approach Delay (s)		43.3			40.4			43.3			44.4	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	43.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	101.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	33	32	32	135	205	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	36	35	35	147	223	36
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				332		
pX, platoon unblocked						
vC, conflicting volume	457	129	259			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	457	129	259			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	96	97			
cM capacity (veh/h)	518	896	1303			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	36	35	35	147	149	110
Volume Left	36	0	35	0	0	0
Volume Right	0	35	0	0	0	36
cSH	518	896	1303	1700	1700	1700
Volume to Capacity	0.07	0.04	0.03	0.09	0.09	0.06
Queue Length 95th (ft)	6	3	2	0	0	0
Control Delay (s)	12.5	9.2	7.8	0.0	0.0	0.0
Lane LOS	B	A	A			
Approach Delay (s)	10.8		1.5		0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	23.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	22	22	22	146	216	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	24	24	159	235	24
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				542		
pX, platoon unblocked						
vC, conflicting volume	453	129	259			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	453	129	259			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	97	98			
cM capacity (veh/h)	525	896	1303			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	24	24	24	159	157	102
Volume Left	24	0	24	0	0	0
Volume Right	0	24	0	0	0	24
cSH	525	896	1303	1700	1700	1700
Volume to Capacity	0.05	0.03	0.02	0.09	0.09	0.06
Queue Length 95th (ft)	4	2	1	0	0	0
Control Delay (s)	12.2	9.1	7.8	0.0	0.0	0.0
Lane LOS	B	A	A			
Approach Delay (s)	10.7		1.0		0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	23.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	11	22	22	146	216	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	24	24	159	235	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				842		
pX, platoon unblocked						
vC, conflicting volume	447	241	247			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	447	241	247			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	97	98			
cM capacity (veh/h)	559	798	1319			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	12	24	183	247
Volume Left	12	0	24	0
Volume Right	0	24	0	12
cSH	559	798	1319	1700
Volume to Capacity	0.02	0.03	0.02	0.15
Queue Length 95th (ft)	2	2	1	0
Control Delay (s)	11.6	9.6	1.2	0.0
Lane LOS	B	A	A	
Approach Delay (s)	10.3		1.2	0.0
Approach LOS	B			

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	34.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	11	11	11	146	216	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	12	12	159	235	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				1052		
pX, platoon unblocked						
vC, conflicting volume	423	241	247			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	423	241	247			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	99			
cM capacity (veh/h)	582	798	1319			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	12	12	171	247
Volume Left	12	0	12	0
Volume Right	0	12	0	12
cSH	582	798	1319	1700
Volume to Capacity	0.02	0.01	0.01	0.15
Queue Length 95th (ft)	2	1	1	0
Control Delay (s)	11.3	9.6	0.6	0.0
Lane LOS	B	A	A	
Approach Delay (s)	10.4		0.6	0.0
Approach LOS	B			

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	26.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM 2000 **HCM 2000**
Basic Freeway Segr **Basic Freeway Segments**
Capacity Analysis **Capacity Analysis**

Jurisdiction CalTrans
Analysis Year
Analyst Fehr & Peers

Agency or Company
Date 6/12/2009
Project Description Knighton and Churn Creek Commons

General Information **Cumulative plus Project**

Flow Rate Calculation

	Freeway/ Direction	From/To	Analysis Time Period	Weekday Saturday % Distribution	Generation 2439 3155 No Project	Volume (vph)	PHF	Lanes	HOV Lane?	HOV Lane Volume	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_p	Flow Rate v_p (pcphpl)
1013	I-5 NB	North Street - Balls Ferry Road / Riverside Avenue	PM	0.125	3900	3,478	0.92	2	No	[illegible]	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	1,985
1011	I-5 NB	Riverside Avenue / Knighton Road	PM	0.175	2320	3,515	0.92	2	No	[illegible]	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	2,006
1009	I-5 NB	Knighton Road / S Bonneview Road	PM	0.205	2600	3,788	0.92	2	No	[illegible]	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	2,162
1007	I-5 NB	Bonnyview Road / Cypress Avenue	PM	0.125	4440	3,958	0.92	2	No	[illegible]	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	2,259
1005	I-5 NB	Cypress Avenue / CA Highway 44	PM	0.125	4300	4,607	0.92	2	No	[illegible]	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	2,629
1006	I-5 SB	CA Highway 44 / Cypress Avenue	PM	0.125	5210	4,586	0.92	2	No	[illegible]	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	2,617
1008	I-5 SB	Cypress Avenue / Bonnyview Road	PM	0.125	4820	4,447	0.92	2	No	[illegible]	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	2,538
1010	I-5 SB	S Bonneview Road / Knighton Road	PM	0.205	3610	4,707	0.92	2	No	[illegible]	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	2,686
1012	I-5 SB	Knighton Road / Riverside Avenue	PM	0.175	3740	4,715	0.92	2	No	[illegible]	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	2,691
1014	I-5 SB	Riverside Avenue / North Street-Balls Ferry Road	PM	0.125	5570	4,868	0.92	2	No	[illegible]	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	2,778
2013	I-5 NB	North Street - Balls Ferry Road / Riverside Avenue	Saturday	0.125	4200	3,533	0.92	2	No	[illegible]	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	2,016
2011	I-5 NB	Riverside Avenue / Knighton Road	Saturday	0.175	2450	4,052	0.92	2	No	[illegible]	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	2,312
2009	I-5 NB	Knighton Road / S Bonneview Road	Saturday	0.205	2770	4,405	0.92	2	No	[illegible]	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	2,514
2007	I-5 NB	Bonnyview Road / Cypress Avenue	Saturday	0.125	4900	4,481	0.92	2	No	[illegible]	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	2,557
2005	I-5 NB	Cypress Avenue / CA Highway 44	Saturday	0.125	4800	5,665	0.92	2	No	[illegible]	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	3,233
2006	I-5 SB	CA Highway 44 / Cypress Avenue	Saturday	0.125	3500	3,576	0.92	2	No	[illegible]	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	2,041
2008	I-5 SB	Cypress Avenue / Bonnyview Road	Saturday	0.125	3300	3,213	0.92	2	No	[illegible]	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	1,834
2010	I-5 SB	S Bonneview Road / Knighton Road	Saturday	0.205	2380	3,158	0.92	2	No	[illegible]	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	1,802
2012	I-5 SB	Knighton Road / Riverside Avenue	Saturday	0.175	2320	2,889	0.92	2	No	[illegible]	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	1,654
2014	I-5 SB	Riverside Avenue / North Street-Balls Ferry Road	Saturday	0.125	3500	2,630	0.92	2	No	[illegible]	Level	[illegible]	[illegible]	10.0%	0.0%	1.5	1.2	0.95	1.00	1,501

HCM 2000 **HCM 2000**
Basic Freeway Segı Basic Freeway Segments
Capacity Analysis Capacity Analysis

General Information **Cumulative plus Project** *Speed Calculation* *Results*

	Freeway/ Direction	From/To	Analysis Time Period	BFFS (mph)	Lane Width (ft)	f_{LW}	R. Shoulder Width (ft)	f_{LC}	f_N	IC Density (per mi)	f_{ID}	Calculated FFS (mph)	Measured FFS (mph)	FFS (mph)	S (mph)	Density, D (pcplpm)	Level of Service
1013	I-5 NB	North Street - Balls Ferry Road / Riverside Avenue	PM										65.0	65.0	61.7	32.2	D
1011	I-5 NB	Riverside Avenue / Knighton Road	PM										65.0	65.0	61.3	32.7	D
1009	I-5 NB	Knighton Road / S Bonneview Road	PM										65.0	65.0	58.1	37.2	E
1007	I-5 NB	Bonnyview Road / Cypress Avenue	PM										65.0	65.0	55.3	40.8	E
1005	I-5 NB	Cypress Avenue / CA Highway 44	PM										65.0	65.0	-	-	F
1006	I-5 SB	CA Highway 44 / Cypress Avenue	PM										65.0	65.0	-	-	F
1008	I-5 SB	Cypress Avenue / Bonnyview Road	PM										65.0	65.0	-	-	F
1010	I-5 SB	S Bonneview Road / Knighton Road	PM										65.0	65.0	-	-	F
1012	I-5 SB	Knighton Road / Riverside Avenue	PM										65.0	65.0	-	-	F
1014	I-5 SB	Riverside Avenue / North Street-Balls Ferry Road	PM										65.0	65.0	-	-	F
2013	I-5 NB	North Street - Balls Ferry Road / Riverside Avenue	Saturday										65.0	65.0	61.2	33.0	D
2011	I-5 NB	Riverside Avenue / Knighton Road	Saturday										65.0	65.0	53.6	43.2	E
2009	I-5 NB	Knighton Road / S Bonneview Road	Saturday										65.0	65.0	-	-	F
2007	I-5 NB	Bonnyview Road / Cypress Avenue	Saturday										65.0	65.0	-	-	F
2005	I-5 NB	Cypress Avenue / CA Highway 44	Saturday										65.0	65.0	-	-	F
2006	I-5 SB	CA Highway 44 / Cypress Avenue	Saturday										65.0	65.0	60.7	33.6	D
2008	I-5 SB	Cypress Avenue / Bonnyview Road	Saturday										65.0	65.0	63.6	28.8	D
2010	I-5 SB	S Bonneview Road / Knighton Road	Saturday										65.0	65.0	63.9	28.2	D
2012	I-5 SB	Knighton Road / Riverside Avenue	Saturday										65.0	65.0	64.7	25.6	C
2014	I-5 SB	Riverside Avenue / North Street-Balls Ferry Road	Saturday										65.0	65.0	65.0	23.1	C

HCM 2000 **HCM 2000**
Merge Ramp Junct Merge Ramp Junctions
Capacity Analysis Capacity Analysis

Jurisdiction CalTrans
Analysis Year 0
Analyst Fehr & Peers

Agency or Company 0
Date 6/12/2009
Project Description Knighton and Churn Creek Commons

General Information **Cumulative plus Project**

Freeway Data / *Freeway Volume Adjustment*

ID	Freeway/ Direction	On-ramp	Analysis Time Period	Lanes	S_{FF} (mph)	V (vph)	HOV Lane?	HOV Lane Volume	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1013	I-5 NB	Riverside Avenue	PM	2	0	3,098	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	3,536
1011	I-5 NB	Knighton Road	PM	2	0	2,740	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	3,127
1009	I-5 NB	Bonnyview Road	PM	2	0	2,968	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	3,387
1007	I-5 NB	Cypress Avenue	PM	2	0	3,187	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	3,637
1006	I-5 SB	Cypress Avenue	PM	2	0	3,556	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	4,058
1008	I-5 SB	Bonnyview Road	PM	2	0	3,647	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	4,162
1010	I-5 SB	Knighton Road	PM	2	0	3,952	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	4,510
1012	I-5 SB	Riverside Avenue	PM	2	0	4,218	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	4,814
2013	I-5 NB	Riverside Avenue	Saturday	2	0	3,363	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	3,838
2011	I-5 NB	Knighton Road	Saturday	2	0	3,336	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	3,807
2009	I-5 NB	Bonnyview Road	Saturday	2	0	3,571	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	4,076
2007	I-5 NB	Cypress Avenue	Saturday	2	0	4,015	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	4,582
2006	I-5 SB	Cypress Avenue	Saturday	2	0	2,846	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	3,248
2008	I-5 SB	Bonnyview Road	Saturday	2	0	2,343	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	2,674
2010	I-5 SB	Knighton Road	Saturday	2	0	2,245	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	2,562
2012	I-5 SB	Riverside Avenue	Saturday	2	0	2,430	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	2,773

General Information **Cumulative plus Project**

ID	Freeway/ Direction	On-ramp	Analysis Time Period	Type	Lanes	S_{FR} (mph)	V_R (vph)	Accel Lane (ft) L_{A1}	L_{A2}	L_{Aeff}	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1013	I-5 NB	Riverside Avenue	PM	Right	1	35.0	417	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	476
1011	I-5 NB	Knighton Road	PM	Right	1	35.0	848	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	968
1009	I-5 NB	Bonnyview Road	PM	Right	1	35.0	990	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,130
1007	I-5 NB	Cypress Avenue	PM	Right	1	35.0	1,420	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,621
1006	I-5 SB	Cypress Avenue	PM	Right	1	35.0	891	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,017
1008	I-5 SB	Bonnyview Road	PM	Right	1	35.0	1,060	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,210
1010	I-5 SB	Knighton Road	PM	Right	1	35.0	615	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	702
1012	I-5 SB	Riverside Avenue	PM	Right	1	35.0	650	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	742
2013	I-5 NB	Riverside Avenue	Saturday	Right	1	35.0	689	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	786
2011	I-5 NB	Knighton Road	Saturday	Right	1	35.0	785	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	896
2009	I-5 NB	Bonnyview Road	Saturday	Right	1	35.0	910	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,039
2007	I-5 NB	Cypress Avenue	Saturday	Right	1	35.0	1,650	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,883
2006	I-5 SB	Cypress Avenue	Saturday	Right	1	35.0	367	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	419
2008	I-5 SB	Bonnyview Road	Saturday	Right	1	35.0	815	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	930
2010	I-5 SB	Knighton Road	Saturday	Right	1	35.0	449	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	512
2012	I-5 SB	Riverside Avenue	Saturday	Right	1	35.0	200	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	228

On-Ramp Data

On-Ramp Volume Adjustment

HCM 2000 Merge Ramp Junct Capacity Analysis **HCM 2000 Merge Ramp Junctions Capacity Analysis**

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General Information **Cumulative plus Project**

Adjacent Upstream Ramp Data

ID	Freeway/ Direction	On-ramp	Analysis Time Period	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1013	I-5 NB	Riverside Avenue	PM	Off	600	380	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	434
1011	I-5 NB	Knighton Road	PM	Off	1,400	575	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	656
1009	I-5 NB	Bonnyview Road	PM	Off	1,450	820	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	936
1007	I-5 NB	Cypress Avenue	PM	Off	1,650	771	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	880
1006	I-5 SB	Cypress Avenue	PM	Off	1,650	1,030	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,176
1008	I-5 SB	Bonnyview Road	PM	Off	1,450	800	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	913
1010	I-5 SB	Knighton Road	PM	Off	1,400	607	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	693
1012	I-5 SB	Riverside Avenue	PM	Off	1,150	497	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	567
2013	I-5 NB	Riverside Avenue	Saturday	Off	600	170	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	194
2011	I-5 NB	Knighton Road	Saturday	Off	1,400	432	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	493
2009	I-5 NB	Bonnyview Road	Saturday	Off	1,450	834	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	952
2007	I-5 NB	Cypress Avenue	Saturday	Off	1,650	466	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	532
2006	I-5 SB	Cypress Avenue	Saturday	Off	1,650	730	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	833
2008	I-5 SB	Bonnyview Road	Saturday	Off	1,450	870	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	993
2010	I-5 SB	Knighton Road	Saturday	Off	1,400	708	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	808
2012	I-5 SB	Riverside Avenue	Saturday	Off	1,150	469	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	535
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HCM 2000 Merge Ramp Junct Capacity Analysis | **HCM 2000 Merge Ramp Junctions Capacity Analysis** | Juri Analys

General Information **Cumulative plus Project** | *Adjacent Downstream Ramp Data* | *v_{12} Estimation*

ID	Freeway/ Direction	On-ramp	Analysis Time Period	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)	L_{EQ} 25-2	L_{EQ} 25-3	P_{FM} Equations 1	P_{FM} Equations 2	P_{FM} Equations 3
1013	I-5 NB	Riverside Avenue	PM	No														331	9,487	0.580	0.709	
1011	I-5 NB	Knighton Road	PM	No														349	9,487	0.580	0.759	
1009	I-5 NB	Bonnyview Road	PM	No														439	9,487	0.580	0.756	
1007	I-5 NB	Cypress Avenue	PM	No														598	9,487	0.580	0.759	
1006	I-5 SB	Cypress Avenue	PM	No														559	9,487	0.580	0.761	
1008	I-5 SB	Bonnyview Road	PM	No														622	9,487	0.580	0.744	
1010	I-5 SB	Knighton Road	PM	No														588	9,487	0.580	0.743	
1012	I-5 SB	Riverside Avenue	PM	No														662	9,487	0.580	0.723	
2013	I-5 NB	Riverside Avenue	Saturday	No														462	9,487	0.580	0.701	
2011	I-5 NB	Knighton Road	Saturday	No														479	9,487	0.580	0.750	
2009	I-5 NB	Bonnyview Road	Saturday	No														567	9,487	0.580	0.748	
2007	I-5 NB	Cypress Avenue	Saturday	No														856	9,487	0.580	0.742	
2006	I-5 SB	Cypress Avenue	Saturday	No														257	9,487	0.580	0.780	
2008	I-5 SB	Bonnyview Road	Saturday	No														244	9,487	0.580	0.768	
2010	I-5 SB	Knighton Road	Saturday	No														131	9,487	0.580	0.772	
2012	I-5 SB	Riverside Avenue	Saturday	No														115	9,487	0.580	0.758	
				No																		
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General Information **Cumulative plus Project**

ID	Freeway/ Direction	On-ramp	Analysis Time Period	P_{FM}	v_{12} (pcph)
1013	I-5 NB	Riverside Avenue	PM	1.000	3,536
1011	I-5 NB	Knighton Road	PM	1.000	3,127
1009	I-5 NB	Bonnyview Road	PM	1.000	3,387
1007	I-5 NB	Cypress Avenue	PM	1.000	3,637
1006	I-5 SB	Cypress Avenue	PM	1.000	4,058
1008	I-5 SB	Bonnyview Road	PM	1.000	4,162
1010	I-5 SB	Knighton Road	PM	1.000	4,510
1012	I-5 SB	Riverside Avenue	PM	1.000	4,814
2013	I-5 NB	Riverside Avenue	Saturday	1.000	3,838
2011	I-5 NB	Knighton Road	Saturday	1.000	3,807
2009	I-5 NB	Bonnyview Road	Saturday	1.000	4,076
2007	I-5 NB	Cypress Avenue	Saturday	1.000	4,582
2006	I-5 SB	Cypress Avenue	Saturday	1.000	3,248
2008	I-5 SB	Bonnyview Road	Saturday	1.000	2,674
2010	I-5 SB	Knighton Road	Saturday	1.000	2,562
2012	I-5 SB	Riverside Avenue	Saturday	1.000	2,773

General Information **Cumulative plus Project** *Capacity Checks*

ID	Freeway/ Direction	On-ramp	Analysis Time Period	v_{Fi} (pcph)	Max v_{Fi} (pcph)	LOS F?	v_{FO} (pcph)	Max v_{FO} (pcph)	LOS F?	v_3, v_{av34} (pcphpl)	v_3, v_{av34} > 2,700?	v_3, v_{av34} >1.5*v_{12}/2?	v_{12a} (pcph)	v_{R12a} (pcph)	Max v_{R12a} (pcph)	LOS F?	v_R (pcph)	Max v_R (pcph)	LOS F?
1013	I-5 NB	Riverside Avenue	PM	3,536	4,500	No	4,012	4,500	No	0	No	No	3,536	4,012	4,600	No	476	2,000	No
1011	I-5 NB	Knighton Road	PM	3,127	4,500	No	4,095	4,500	No	0	No	No	3,127	4,095	4,600	No	968	2,000	No
1009	I-5 NB	Bonnyview Road	PM	3,387	4,500	No	4,517	4,500	Yes	0	No	No	3,387	4,517	4,600	No	1,130	2,000	No
1007	I-5 NB	Cypress Avenue	PM	3,637	4,500	No	5,258	4,500	Yes	0	No	No	3,637	5,258	4,600	Yes	1,621	2,000	No
1006	I-5 SB	Cypress Avenue	PM	4,058	4,500	No	5,075	4,500	Yes	0	No	No	4,058	5,075	4,600	Yes	1,017	2,000	No
1008	I-5 SB	Bonnyview Road	PM	4,162	4,500	No	5,372	4,500	Yes	0	No	No	4,162	5,372	4,600	Yes	1,210	2,000	No
1010	I-5 SB	Knighton Road	PM	4,510	4,500	Yes	5,212	4,500	Yes	0	No	No	4,510	5,212	4,600	Yes	702	2,000	No
1012	I-5 SB	Riverside Avenue	PM	4,814	4,500	Yes	5,556	4,500	Yes	0	No	No	4,814	5,556	4,600	Yes	742	2,000	No
2013	I-5 NB	Riverside Avenue	Saturday	3,838	4,500	No	4,625	4,500	Yes	0	No	No	3,838	4,625	4,600	Yes	786	2,000	No
2011	I-5 NB	Knighton Road	Saturday	3,807	4,500	No	4,703	4,500	Yes	0	No	No	3,807	4,703	4,600	Yes	896	2,000	No
2009	I-5 NB	Bonnyview Road	Saturday	4,076	4,500	No	5,114	4,500	Yes	0	No	No	4,076	5,114	4,600	Yes	1,039	2,000	No
2007	I-5 NB	Cypress Avenue	Saturday	4,582	4,500	Yes	6,465	4,500	Yes	0	No	No	4,582	6,465	4,600	Yes	1,883	2,000	No
2006	I-5 SB	Cypress Avenue	Saturday	3,248	4,500	No	3,667	4,500	No	0	No	No	3,248	3,667	4,600	No	419	2,000	No
2008	I-5 SB	Bonnyview Road	Saturday	2,674	4,500	No	3,604	4,500	No	0	No	No	2,674	3,604	4,600	No	930	2,000	No
2010	I-5 SB	Knighton Road	Saturday	2,562	4,500	No	3,075	4,500	No	0	No	No	2,562	3,075	4,600	No	512	2,000	No
2012	I-5 SB	Riverside Avenue	Saturday	2,773	4,500	No	3,002	4,500	No	0	No	No	2,773	3,002	4,600	No	228	2,000	No

HCM 2000 Merge Ramp Junct Capacity Analysis **HCM 2000 Merge Ramp Junctions Capacity Analysis** Juri Analys

General Information **Cumulative plus Project** *Results* *Speed Estimation*

ID	Freeway/ Direction	On-ramp	Analysis Time Period	Density, D (pcplpm)	Level of Service	Int. Var. M_S	Inf. Area S_R (mph)	Out Lns. S_O (mph)	All vehs. S (mph)
1013	I-5 NB	Riverside Avenue	PM	**35.9**	**E**	0.529	22.2	0.0	22.2
1011	I-5 NB	Knighton Road	PM	**36.3**	**E**	0.548	23.0	0.0	23.0
1009	I-5 NB	Bonnyview Road	PM	-	**F**	0.671	28.2	0.0	28.2
1007	I-5 NB	Cypress Avenue	PM	-	**F**	1.063	44.7	0.0	44.7
1006	I-5 SB	Cypress Avenue	PM	-	**F**	0.938	39.4	0.0	39.4
1008	I-5 SB	Bonnyview Road	PM	-	**F**	1.154	48.5	0.0	48.5
1010	I-5 SB	Knighton Road	PM	-	**F**	1.030	43.2	0.0	43.2
1012	I-5 SB	Riverside Avenue	PM	-	**F**	1.323	55.6	0.0	55.6
2013	I-5 NB	Riverside Avenue	Saturday	-	**F**	0.712	29.9	0.0	29.9
2011	I-5 NB	Knighton Road	Saturday	-	**F**	0.744	31.3	0.0	31.3
2009	I-5 NB	Bonnyview Road	Saturday	-	**F**	0.963	40.4	0.0	40.4
2007	I-5 NB	Cypress Avenue	Saturday	-	**F**	2.820	118.4	0.0	118.4
2006	I-5 SB	Cypress Avenue	Saturday	**33.3**	**D**	0.467	19.6	0.0	19.6
2008	I-5 SB	Bonnyview Road	Saturday	**32.5**	**D**	0.457	19.2	0.0	19.2
2010	I-5 SB	Knighton Road	Saturday	**28.6**	**D**	0.398	16.7	0.0	16.7
2012	I-5 SB	Riverside Avenue	Saturday	**28.2**	**D**	0.392	16.5	0.0	16.5

HCM 2000 Diverge Ramp Jun Capacity Analysis | **HCM 2000 Diverge Ramp Junctions Capacity Analysis**

Jurisdiction: CalTrans
Analysis Year: 0
Analyst: Fehr & Peers

Agency or Company: 0
Date: 6/12/2009
Project Description: Knighton and Churn Creek Commons

General Information **Cumulative plus Project**

Freeway Data | *Freeway Volume Adjustment*

ID	Freeway/ Direction	Off-ramp	Analysis Time Period	Lanes	S_{FF} (mph)	V (vph)	HOV Lane?	HOV Lane Volume	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1013	I-5 NB	Riverside Avenue	PM	2	0	3478	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	3,969
1011	I-5 NB	Knighton Road	PM	2	0	3515	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	4,012
1009	I-5 NB	Bonnyview Road	PM	2	0	3788	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	4,323
1007	I-5 NB	Cypress Avenue	PM	2	0	3958	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	4,517
1006	I-5 SB	Cypress Avenue	PM	2	0	4586	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	5,234
1008	I-5 SB	Bonnyview Road	PM	2	0	4447	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	5,075
1010	I-5 SB	Knighton Road	PM	2	0	4707	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	5,372
1012	I-5 SB	Riverside Avenue	PM	2	0	4715	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	5,381
2013	I-5 NB	Riverside Avenue	Saturday	2	0	3533	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	4,032
2011	I-5 NB	Knighton Road	Saturday	2	0	4052	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	4,625
2009	I-5 NB	Bonnyview Road	Saturday	2	0	4405	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	5,027
2007	I-5 NB	Cypress Avenue	Saturday	2	0	4481	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	5,114
2006	I-5 SB	Cypress Avenue	Saturday	2	0	3576	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	4,081
2008	I-5 SB	Bonnyview Road	Saturday	2	0	3213	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	3,667
2010	I-5 SB	Knighton Road	Saturday	2	0	3158	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	3,604
2012	I-5 SB	Riverside Avenue	Saturday	2	0	2899	No		0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1	3,309

General Information **Cumulative plus Project**

ID	Freeway/ Direction	Off-ramp	Analysis Time Period	Effective Flow Rate v_p (pcph)
1013	I-5 NB	Riverside Avenue	PM	3,969
1011	I-5 NB	Knighton Road	PM	4,012
1009	I-5 NB	Bonnyview Road	PM	4,323
1007	I-5 NB	Cypress Avenue	PM	4,517
1006	I-5 SB	Cypress Avenue	PM	5,234
1008	I-5 SB	Bonnyview Road	PM	5,075
1010	I-5 SB	Knighton Road	PM	5,372
1012	I-5 SB	Riverside Avenue	PM	5,381
2013	I-5 NB	Riverside Avenue	Saturday	4,032
2011	I-5 NB	Knighton Road	Saturday	4,625
2009	I-5 NB	Bonnyview Road	Saturday	5,027
2007	I-5 NB	Cypress Avenue	Saturday	5,114
2006	I-5 SB	Cypress Avenue	Saturday	4,081
2008	I-5 SB	Bonnyview Road	Saturday	3,667
2010	I-5 SB	Knighton Road	Saturday	3,604
2012	I-5 SB	Riverside Avenue	Saturday	3,309

General Information **Cumulative plus Project**

ID	Freeway/ Direction	Off-ramp	Analysis Time Period	Type	Lanes	S_{FR} (mph)	V_R (vph)	Decel Lane (ft) L_{D1}	L_{D2}	L_{Deff}	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1013	I-5 NB	Riverside Avenue	PM	Right	1	45.0	380	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	434
1011	I-5 NB	Knighton Road	PM	Right	1	45.0	575	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	656
1009	I-5 NB	Bonnyview Road	PM	Right	1	45.0	820	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	936
1007	I-5 NB	Cypress Avenue	PM	Right	1	45.0	771	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	880
1006	I-5 SB	Cypress Avenue	PM	Right	1	45.0	1,030	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,176
1008	I-5 SB	Bonnyview Road	PM	Right	1	45.0	800	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	913
1010	I-5 SB	Knighton Road	PM	Right	1	45.0	607	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	693
1012	I-5 SB	Riverside Avenue	PM	Right	1	45.0	497	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	567
2013	I-5 NB	Riverside Avenue	Saturday	Right	1	45.0	170	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	194
2011	I-5 NB	Knighton Road	Saturday	Right	1	45.0	432	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	493
2009	I-5 NB	Bonnyview Road	Saturday	Right	1	45.0	834	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	952
2007	I-5 NB	Cypress Avenue	Saturday	Right	1	45.0	466	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	532
2006	I-5 SB	Cypress Avenue	Saturday	Right	1	45.0	730	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	833
2008	I-5 SB	Bonnyview Road	Saturday	Right	1	45.0	870	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	993
2010	I-5 SB	Knighton Road	Saturday	Right	1	45.0	708	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	808
2012	I-5 SB	Riverside Avenue	Saturday	Right	1	45.0	469	100	0	100	0.92	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	535

Off-Ramp Data

Off-Ramp Volume Adjustment

HCM 2000 Diverge Ramp Jun Capacity Analysis **HCM 2000 Diverge Ramp Junctions Capacity Analysis**

Juri Analy

General Information **Cumulative plus Project**

Adjacent Upstream Ramp Data

ID	Freeway/ Direction	Off-ramp	Analysis Time Period	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1013	I-5 NB	Riverside Avenue	PM	No													
1011	I-5 NB	Knighton Road	PM	No													
1009	I-5 NB	Bonnyview Road	PM	No													
1007	I-5 NB	Cypress Avenue	PM	No													
1006	I-5 SB	Cypress Avenue	PM	No													
1008	I-5 SB	Bonnyview Road	PM	No													
1010	I-5 SB	Knighton Road	PM	No													
1012	I-5 SB	Riverside Avenue	PM	No													
2013	I-5 NB	Riverside Avenue	Saturday	No													
2011	I-5 NB	Knighton Road	Saturday	No													
2009	I-5 NB	Bonnyview Road	Saturday	No													
2007	I-5 NB	Cypress Avenue	Saturday	No													
2006	I-5 SB	Cypress Avenue	Saturday	No													
2008	I-5 SB	Bonnyview Road	Saturday	No													
2010	I-5 SB	Knighton Road	Saturday	No													
2012	I-5 SB	Riverside Avenue	Saturday	No													

General Information **Cumulative plus Project**

Adjacent Downstream Ramp Data

v_{12} Estimation

ID	Freeway/ Direction	Off-ramp	Analysis Time Period	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)	L_{EQ} 25-13	L_{EQ} 25-14	P_{FD}
1013	I-5 NB	Riverside Avenue	PM	On	600	417	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	4,412	1,323	1.000
1011	I-5 NB	Knighton Road	PM	On	1,400	848	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	5,032	1,464	1.000
1009	I-5 NB	Bonnyview Road	PM	On	1,450	990	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	5,746	1,713	1.000
1007	I-5 NB	Cypress Avenue	PM	On	1,650	1,420	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	5,283	1,677	1.000
1006	I-5 SB	Cypress Avenue	PM	On	1,650	891	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	5,592	2,080	1.000
1008	I-5 SB	Bonnyview Road	PM	On	1,450	1,060	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	4,822	1,754	1.000
1010	I-5 SB	Knighton Road	PM	On	1,400	615	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	4,021	1,580	1.000
1012	I-5 SB	Riverside Avenue	PM	On	1,150	650	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	3,763	1,485	1.000
2013	I-5 NB	Riverside Avenue	Saturday	On	600	689	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	3,830	1,202	1.000
2011	I-5 NB	Knighton Road	Saturday	On	1,400	785	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	4,079	1,392	1.000
2009	I-5 NB	Bonnyview Road	Saturday	On	1,450	910	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	4,993	1,789	1.000
2007	I-5 NB	Cypress Avenue	Saturday	On	1,650	1,650	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	3,850	1,445	1.000
2006	I-5 SB	Cypress Avenue	Saturday	On	1,650	367	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	5,619	1,603	1.000
2008	I-5 SB	Bonnyview Road	Saturday	On	1,450	815	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	7,144	1,713	1.000
2010	I-5 SB	Knighton Road	Saturday	On	1,400	449	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	6,170	1,550	1.000
2012	I-5 SB	Riverside Avenue	Saturday	On	1,150	200	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141	5,362	1,348	1.000

General Information **Cumulative plus Project**

ID	Freeway/ Direction	Off-ramp	Analysis Time Period	v_{12} (pcph)
1013	I-5 NB	Riverside Avenue	PM	3,969
1011	I-5 NB	Knighton Road	PM	4,012
1009	I-5 NB	Bonnyview Road	PM	4,323
1007	I-5 NB	Cypress Avenue	PM	4,517
1006	I-5 SB	Cypress Avenue	PM	5,234
1008	I-5 SB	Bonnyview Road	PM	5,075
1010	I-5 SB	Knighton Road	PM	5,372
1012	I-5 SB	Riverside Avenue	PM	5,381
2013	I-5 NB	Riverside Avenue	Saturday	4,032
2011	I-5 NB	Knighton Road	Saturday	4,625
2009	I-5 NB	Bonnyview Road	Saturday	5,027
2007	I-5 NB	Cypress Avenue	Saturday	5,114
2006	I-5 SB	Cypress Avenue	Saturday	4,081
2008	I-5 SB	Bonnyview Road	Saturday	3,667
2010	I-5 SB	Knighton Road	Saturday	3,604
2012	I-5 SB	Riverside Avenue	Saturday	3,309

HCM 2000 Diverge Ramp Jun Capacity Analysis | **HCM 2000 Diverge Ramp Junctions Capacity Analysis** | Juri Analy:

General Information **Cumulative plus Project**

Capacity Checks

ID	Freeway/ Direction	Off-ramp	Analysis Time Period	v_{Fi} (pcph)	Max v_{Fi} (pcph)	LOS F?	v_3, v_{av34} (pcphpl)	v_3, v_{av34} > 2,700?	v_3, v_{av34} >1.5*v_{12}/2?	v_{12a} (pcph)	Max v_{12} (pcph)	LOS F?	v_{FO} (pcph)	Max v_{FO} (pcph)	LOS F?	v_R (pcph)	Max v_R (pcph)	LOS F?
1013	I-5 NB	Riverside Avenue	PM	3,969	4,500	No	0	No	No	3,969	4,400	No	3,536	4,500	No	434	2,100	No
1011	I-5 NB	Knighton Road	PM	4,012	4,500	No	0	No	No	4,012	4,400	No	3,355	4,500	No	656	2,100	No
1009	I-5 NB	Bonnyview Road	PM	4,323	4,500	No	0	No	No	4,323	4,400	No	3,387	4,500	No	936	2,100	No
1007	I-5 NB	Cypress Avenue	PM	4,517	4,500	Yes	0	No	No	4,517	4,400	Yes	3,637	4,500	No	880	2,100	No
1006	I-5 SB	Cypress Avenue	PM	5,234	4,500	Yes	0	No	No	5,234	4,400	Yes	4,058	4,500	No	1,176	2,100	No
1008	I-5 SB	Bonnyview Road	PM	5,075	4,500	Yes	0	No	No	5,075	4,400	Yes	4,162	4,500	No	913	2,100	No
1010	I-5 SB	Knighton Road	PM	5,372	4,500	Yes	0	No	No	5,372	4,400	Yes	4,679	4,500	Yes	693	2,100	No
1012	I-5 SB	Riverside Avenue	PM	5,381	4,500	Yes	0	No	No	5,381	4,400	Yes	4,814	4,500	Yes	567	2,100	No
2013	I-5 NB	Riverside Avenue	Saturday	4,032	4,500	No	0	No	No	4,032	4,400	No	3,838	4,500	No	194	2,100	No
2011	I-5 NB	Knighton Road	Saturday	4,625	4,500	Yes	0	No	No	4,625	4,400	Yes	4,132	4,500	No	493	2,100	No
2009	I-5 NB	Bonnyview Road	Saturday	5,027	4,500	Yes	0	No	No	5,027	4,400	Yes	4,076	4,500	No	952	2,100	No
2007	I-5 NB	Cypress Avenue	Saturday	5,114	4,500	Yes	0	No	No	5,114	4,400	Yes	4,582	4,500	Yes	532	2,100	No
2006	I-5 SB	Cypress Avenue	Saturday	4,081	4,500	No	0	No	No	4,081	4,400	No	3,248	4,500	No	833	2,100	No
2008	I-5 SB	Bonnyview Road	Saturday	3,667	4,500	No	0	No	No	3,667	4,400	No	2,674	4,500	No	993	2,100	No
2010	I-5 SB	Knighton Road	Saturday	3,604	4,500	No	0	No	No	3,604	4,400	No	2,796	4,500	No	808	2,100	No
2012	I-5 SB	Riverside Avenue	Saturday	3,309	4,500	No	0	No	No	3,309	4,400	No	2,773	4,500	No	535	2,100	No

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Capacity Analysis **Capacity Analysis**

General Information **Cumulative plus Project**

ID	Freeway/ Direction	Off-ramp	Analysis Time Period	*Results* Density, D (pcplpm)	Level of Service	*Speed Estimation* Int. Var. D_S	Inf. Area S_R (mph)	Out Lns. S_O (mph)	All vehs. S (mph)
1013	I-5 NB	Riverside Avenue	PM	**37.5**	**E**	0.337	14.2	0.0	14.2
1011	I-5 NB	Knighton Road	PM	**37.9**	**E**	0.357	15.0	0.0	15.0
1009	I-5 NB	Bonnyview Road	PM	**40.5**	**E**	0.382	16.1	0.0	16.1
1007	I-5 NB	Cypress Avenue	PM	-	**F**	0.377	15.8	0.0	15.8
1006	I-5 SB	Cypress Avenue	PM	-	**F**	0.404	17.0	0.0	17.0
1008	I-5 SB	Bonnyview Road	PM	-	**F**	0.380	16.0	0.0	16.0
1010	I-5 SB	Knighton Road	PM	-	**F**	0.360	15.1	0.0	15.1
1012	I-5 SB	Riverside Avenue	PM	-	**F**	0.349	14.7	0.0	14.7
2013	I-5 NB	Riverside Avenue	Saturday	**38.0**	**E**	0.315	13.2	0.0	13.2
2011	I-5 NB	Knighton Road	Saturday	-	**F**	0.342	14.4	0.0	14.4
2009	I-5 NB	Bonnyview Road	Saturday	-	**F**	0.384	16.1	0.0	16.1
2007	I-5 NB	Cypress Avenue	Saturday	-	**F**	0.346	14.5	0.0	14.5
2006	I-5 SB	Cypress Avenue	Saturday	**38.5**	**E**	0.373	15.7	0.0	15.7
2008	I-5 SB	Bonnyview Road	Saturday	**34.9**	**D**	0.387	16.3	0.0	16.3
2010	I-5 SB	Knighton Road	Saturday	**34.3**	**D**	0.371	15.6	0.0	15.6
2012	I-5 SB	Riverside Avenue	Saturday	**31.8**	**D**	0.346	14.5	0.0	14.5

Leisch Method for Weaving Analysis

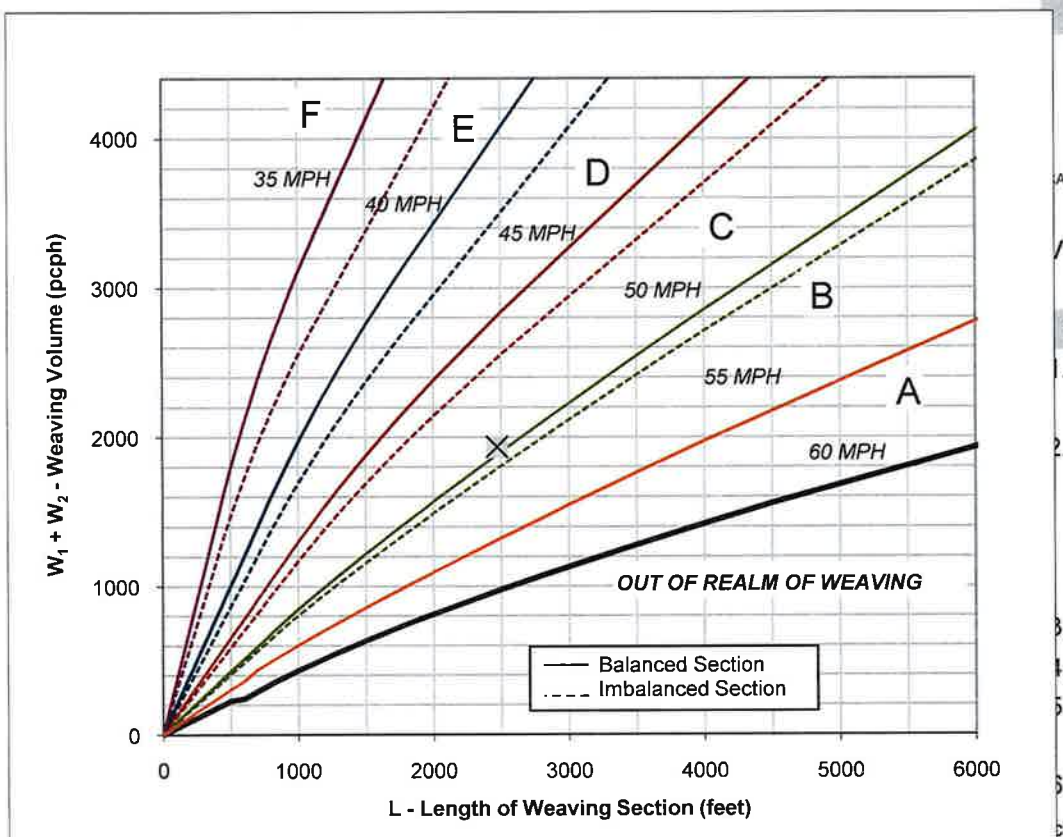
Data Input

Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	3
Length of Weaving Section (feet)	L	2,470

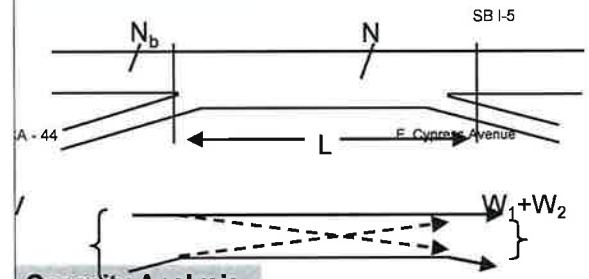
Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	4,586	Volume (vph)*	792	Volume (vph)*	1,030
Truck Percentage	20%	Truck Percentage	15%	Truck Percentage	10%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	5,045	Volume (pcph)	851	Volume (pcph)	1,082

Project Information

Project	Knighton & Churn Creek
Scenario	Cumulative PP Conditions - PM
Freeway	SB I-5
On-ramp	CA - 44
Off-ramp	E. Cypress Avenue



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **N**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   45 MPH and **50 MPH**
   If below the 55 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) **44.0**
4. Weaving Intensity Factor (k) **2.10**
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **1,993**
6. Level of Service (LOS) **E**

cluded.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983; *Highway Design Manual*, California Department of Transportation, July 24, 2009; and Freeway and Interchange Geometric Design Handbook, Institue of Transportation Engineers, 2005.

Leisch Method for Weaving Analysis

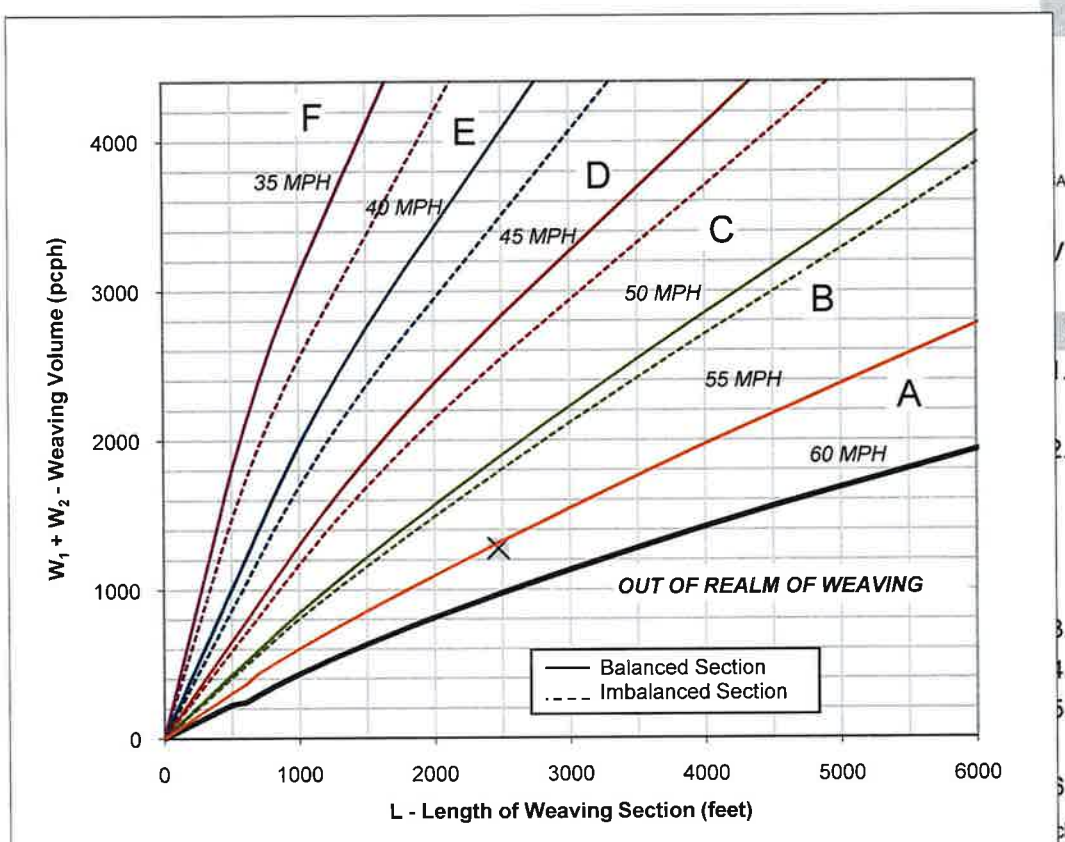
Data Input

Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	3
Length of Weaving Section (feet)	L	2,470

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	3,576	Volume (vph)*	472	Volume (vph)*	730
Truck Percentage	20%	Truck Percentage	15%	Truck Percentage	10%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	3,934	Volume (pcph)	507	Volume (pcph)	767

Project Information

Project	Knighton & Churn Creek
Scenario	Cumulative PP Conditions - SAT
Freeway	SB I-5
On-ramp	CA - 44
Off-ramp	E. Cypress Avenue



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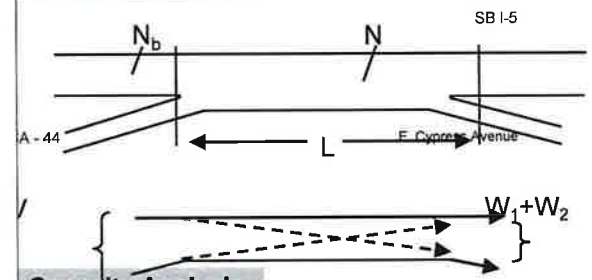

Capacity Analysis

1. Is the weaving section balanced (Y / N)? **N**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   55 MPH and **60 MPH**
   If below the 55 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) **50.5**
4. Weaving Intensity Factor (k) **1.00**
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **1,311**
6. Level of Service (LOS) **C**

cluded.

* Note: Do not adjust by a Peak Hour Factor (PHF). The methodology incorporates the PHF in the Service Volume tables.

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Leisch Method for Weaving Analysis

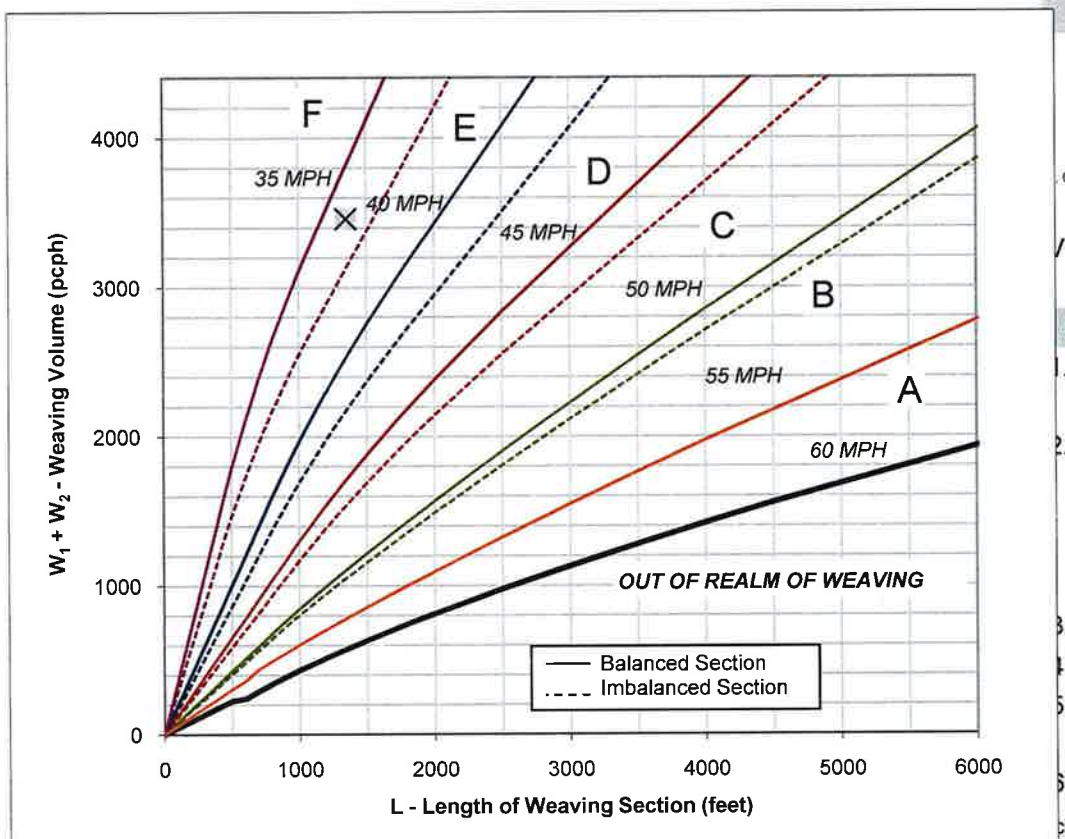
Data Input

Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	3
Length of Weaving Section (feet)	L	1,350

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	4,607	Volume (vph)*	1,420	Volume (vph)*	1,841
Truck Percentage	20%	Truck Percentage	15%	Truck Percentage	10%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	5,068	Volume (pcph)	1,527	Volume (pcph)	1,933

Project Information

Project	Knighton & Churn Creek
Scenario	Cumulative PP Conditions - PM
Freeway	NB I-5
On-ramp	E. Cypress Avenue
Off-ramp	CA - 44



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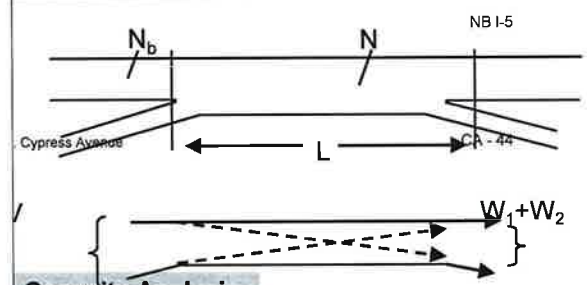


Capacity Analysis

1. Is the weaving section balanced (Y / N)? **N**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   30 MPH and **35 MPH** -
   If below the 55 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) -
4. Weaving Intensity Factor (k) -
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ -
6. Level of Service (LOS) F

* Note: Do not adjust by a Peak Hour Factor (PHF). The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983; *Highway Design Manual*, California Department of Transportation, July 24, 2009; and Freeway and Interchange Geometric Design Handbook, Institue of Transportation Engineers, 2005.

Leisch Method for Weaving Analysis

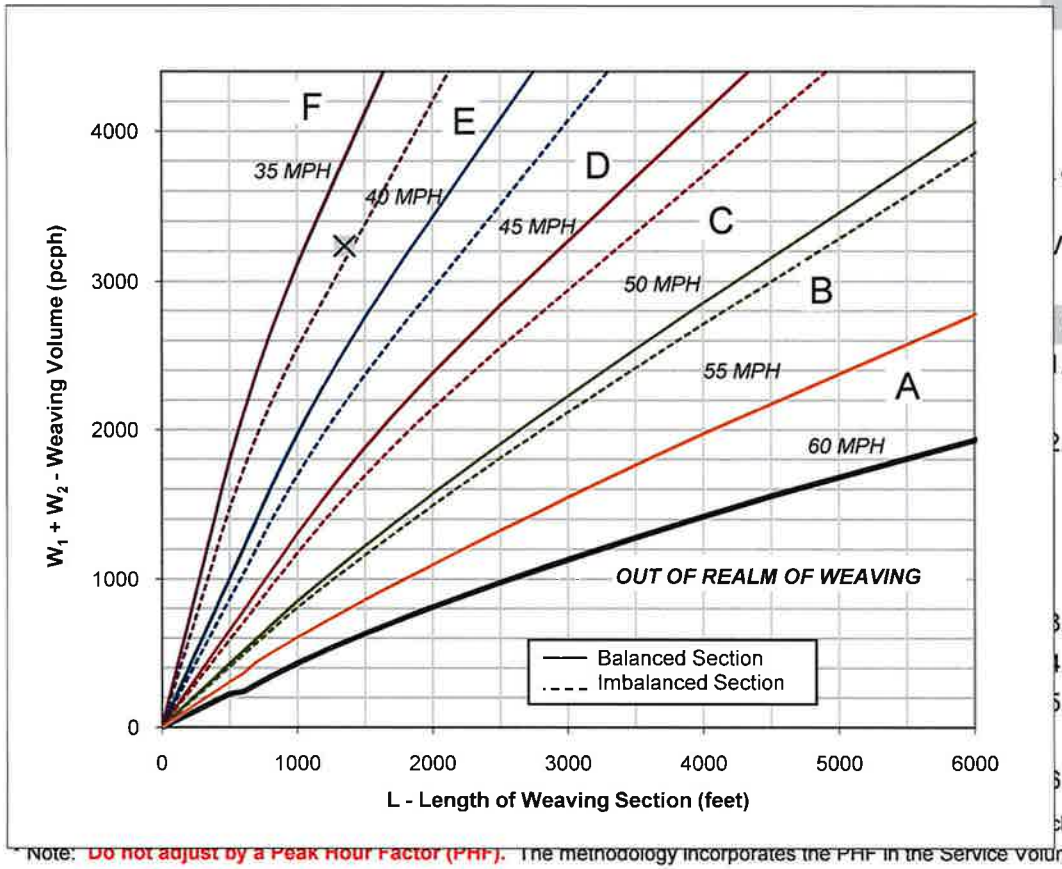
Data Input

Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	3
Length of Weaving Section (feet)	L	1,350

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	5,665	Volume (vph)*	1,650	Volume (vph)*	1,391
Truck Percentage	20%	Truck Percentage	15%	Truck Percentage	10%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	6,232	Volume (pcph)	1,774	Volume (pcph)	1,461

Project Information

Project	Knighton & Churn Creek
Scenario	Cumulative PP Conditions - SAT
Freeway	NB I-5
On-ramp	E. Cypress Avenue
Off-ramp	CA - 44



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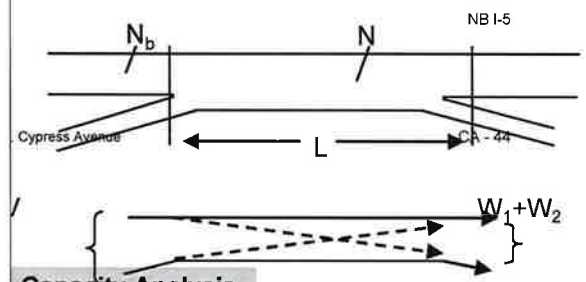

Capacity Analysis

1. Is the weaving section balanced (Y / N)? **N**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   30 MPH and **35 MPH** -
   If below the 55 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) -
4. Weaving Intensity Factor (k) -
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ -
6. Level of Service (LOS) F

cluded.

* Note: Do not adjust by a Peak Hour Factor (PHF). The methodology incorporates the PHF in the Service Volume tables.

Sources: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983; *Highway Design Manual*, California Department of Transportation, July 24, 2009; and Freeway and Interchange Geometric Design Handbook, Institue of Transportation Engineers, 2005.