2014 No Build Conditions
(with CALP)
Friday Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	951	26	14	794	93	42	14	46	108	11	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	13	12	12	15	12
Total Lost time (s)		5.7			5.6			5.5			5.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		1.00			0.98			0.94			0.95	
Flt Protected		1.00			1.00			0.98			0.97	
Satd. Flow (prot)		3516			3471			1755			1868	
Flt Permitted		0.87			0.93			0.79			0.79	
Satd. Flow (perm)		3065			3223			1414			1509	
Peak-hour factor, PHF	0.86	0.86	0.86	0.87	0.87	0.87	0.75	0.75	0.75	0.75	0.75	0.75
Adj. Flow (vph)	48	1106	30	16	913	107	56	19	61	144	15	109
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1184	0	0	1036	0	0	136	0	0	268	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		25.8			25.9			12.5			12.5	
Effective Green, g (s)		25.8			25.9			12.5			12.5	
Actuated g/C Ratio		0.52			0.52			0.25			0.25	
Clearance Time (s)		5.7			5.6			5.5			5.5	
Vehicle Extension (s)		2.5			2.5			2.5			2.5	
Lane Grp Cap (vph)		1598			1686			357			381	
v/s Ratio Prot												
v/s Ratio Perm		c0.39			0.32			0.10			c0.18	
v/c Ratio		0.74			0.61			0.38			0.70	
Uniform Delay, d1		9.2			8.3			15.3			16.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.8			0.6			0.5			5.4	
Delay (s)		11.0			8.9			15.8			22.2	
Level of Service		B			A			B			C	
Approach Delay (s)		11.0			8.9			15.8			22.2	
Approach LOS		B			A			B			C	

Intersection Summary			
HCM Average Control Delay	11.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	11.2
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	1184	1036	136	268
v/c Ratio	0.75	0.62	0.38	0.71
Control Delay	13.2	10.5	20.1	30.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	13.2	10.5	20.1	30.0
Queue Length 50th (ft)	136	107	35	75
Queue Length 95th (ft)	192	154	63	117
Internal Link Dist (ft)	880	2120	328	12725
Turn Bay Length (ft)				
Base Capacity (vph)	1892	1998	436	465
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.63	0.52	0.31	0.58

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	539	619	40	28	585	307	27	19	14	321	37	490
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	10	12	11	12	13	12	12	11	15
Total Lost time (s)	4.2	4.2		4.2	4.2	4.2		4.2	4.2		4.2	4.2
Lane Util. Factor	1.00	1.00		1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97		1.00	0.97		1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00		0.99	1.00
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00		0.96	1.00
Satd. Flow (prot)	1768	1965		1650	3539	1481		1867	1534		1707	1724
Flt Permitted	0.25	1.00		0.26	1.00	1.00		0.66	1.00		0.71	1.00
Satd. Flow (perm)	471	1965		453	3539	1481		1277	1534		1271	1724
Peak-hour factor, PHF	0.91	0.91	0.91	0.94	0.94	0.94	0.92	0.92	0.92	0.93	0.93	0.93
Adj. Flow (vph)	592	680	44	30	622	327	29	21	15	345	40	527
RTOR Reduction (vph)	0	3	0	0	0	153	0	0	11	0	0	74
Lane Group Flow (vph)	592	721	0	30	622	174	0	50	4	0	385	453
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	pm+pt			pm+pt		Perm	Perm		Perm	Perm		pm+ov
Protected Phases	5	2		1	6			4			8	5
Permitted Phases	2			6		6	4		4	8		8
Actuated Green, G (s)	42.3	35.2		25.9	23.0	23.0		20.2	20.2		20.2	35.3
Effective Green, g (s)	42.3	35.2		25.9	23.0	23.0		20.2	20.2		20.2	35.3
Actuated g/C Ratio	0.60	0.50		0.37	0.32	0.32		0.28	0.28		0.28	0.50
Clearance Time (s)	4.2	4.2		4.2	4.2	4.2		4.2	4.2		4.2	4.2
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5		2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	557	976		214	1148	480		364	437		362	960
v/s Ratio Prot	c0.23	0.37		0.01	0.18							0.10
v/s Ratio Perm	c0.41			0.05		0.12		0.04	0.00		c0.30	0.16
v/c Ratio	1.06	0.74		0.14	0.54	0.36		0.14	0.01		1.06	0.47
Uniform Delay, d1	13.5	14.2		15.0	19.6	18.3		18.9	18.2		25.4	11.7
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	55.9	2.8		0.2	0.4	0.3		0.1	0.0		65.1	0.3
Delay (s)	69.4	17.0		15.2	20.0	18.7		19.0	18.2		90.5	11.9
Level of Service	E	B		B	C	B		B	B		F	B
Approach Delay (s)		40.6			19.4			18.8			45.1	
Approach LOS		D			B			B			D	

Intersection Summary			
HCM Average Control Delay	35.1	HCM Level of Service	D
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	70.9	Sum of lost time (s)	8.4
Intersection Capacity Utilization	85.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	592	724	30	622	327	50	15	385	527
v/c Ratio	1.06	0.71	0.09	0.59	0.55	0.13	0.03	1.03	0.55
Control Delay	70.3	19.1	7.2	22.5	9.9	21.2	10.9	83.0	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.3	19.1	7.2	22.5	9.9	21.2	10.9	83.0	9.7
Queue Length 50th (ft)	~195	177	5	114	31	15	0	~156	71
Queue Length 95th (ft)	#405	#432	14	161	94	44	13	#377	189
Internal Link Dist (ft)		2120		980		249		1452	
Turn Bay Length (ft)			50		50				110
Base Capacity (vph)	561	1036	501	1832	875	378	464	375	963
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.06	0.70	0.06	0.34	0.37	0.13	0.03	1.03	0.55

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	658	1278	0	0	1312
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	14	11	11	12	12
Total Lost time (s)		5.7	4.9			4.9
Lane Util. Factor		0.88	0.95			1.00
Frpb, ped/bikes		0.97	1.00			1.00
Flpb, ped/bikes		1.00	1.00			1.00
Frt		0.85	1.00			1.00
Flt Protected		1.00	1.00			1.00
Satd. Flow (prot)		2877	3421			1863
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		2877	3421			1863
Peak-hour factor, PHF	0.88	0.88	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	748	1389	0	0	1426
RTOR Reduction (vph)	0	45	0	0	0	0
Lane Group Flow (vph)	0	703	1389	0	0	1426
Confl. Peds. (#/hr)	10	10		10	10	
Turn Type		custom				
Protected Phases			2			6
Permitted Phases		3				
Actuated Green, G (s)		21.1	39.0			70.7
Effective Green, g (s)		21.1	39.0			70.7
Actuated g/C Ratio		0.30	0.55			1.00
Clearance Time (s)		5.7	4.9			4.9
Vehicle Extension (s)		2.5	4.0			4.0
Lane Grp Cap (vph)		859	1887			1863
v/s Ratio Prot			0.41			c0.77
v/s Ratio Perm		0.24				
v/c Ratio		0.82	0.74			0.77
Uniform Delay, d1		23.0	12.0			0.0
Progression Factor		1.00	1.00			1.00
Incremental Delay, d2		6.0	1.6			2.1
Delay (s)		29.0	13.6			2.1
Level of Service		C	B			A
Approach Delay (s)	29.0		13.6			2.1
Approach LOS	C		B			A

Intersection Summary			
HCM Average Control Delay	12.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	70.7	Sum of lost time (s)	0.0
Intersection Capacity Utilization	95.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBR	NBT	SBT
Lane Group Flow (vph)	748	1389	1426
v/c Ratio	0.83	0.74	0.77
Control Delay	31.4	15.4	3.1
Queue Delay	0.0	0.0	0.0
Total Delay	31.4	15.4	3.1
Queue Length 50th (ft)	175	243	0
Queue Length 95th (ft)	245	332	0
Internal Link Dist (ft)		626	13
Turn Bay Length (ft)			
Base Capacity (vph)	1090	2249	1850
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.69	0.62	0.77

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	222	8	297	35	5	41	628	1274	33	31	1442	152
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	14	12	11	12	12	12	10	11	13	11
Total Lost time (s)	4.2	4.2	4.2	29.2	29.2		4.9	4.9		4.9	4.9	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.87		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1751	1801	1651	1751	1525		3433	3522		1711	3596	
Flt Permitted	0.72	1.00	1.00	0.75	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1324	1801	1651	1386	1525		3433	3522		1711	3596	
Peak-hour factor, PHF	0.91	0.91	0.91	0.77	0.77	0.77	0.98	0.98	0.98	0.95	0.95	0.95
Adj. Flow (vph)	244	9	326	45	6	53	641	1300	34	33	1518	160
RTOR Reduction (vph)	0	0	237	0	49	0	0	1	0	0	5	0
Lane Group Flow (vph)	244	9	89	45	10	0	641	1333	0	33	1673	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm		Perm	Perm			Prot			Prot		
Protected Phases		4			7		1	2		5	6	
Permitted Phases	4		4	7	7							
Actuated Green, G (s)	35.1	35.1	35.1	10.1	10.1		27.2	74.1		5.2	52.1	
Effective Green, g (s)	35.1	35.1	35.1	10.1	10.1		27.2	74.1		5.2	52.1	
Actuated g/C Ratio	0.27	0.27	0.27	0.08	0.08		0.21	0.58		0.04	0.41	
Clearance Time (s)	4.2	4.2	4.2	29.2	29.2		4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.5	4.0		2.5	4.0	
Lane Grp Cap (vph)	362	492	451	109	120		727	2033		69	1459	
v/s Ratio Prot		0.00			0.01		c0.19	0.38		0.02	c0.47	
v/s Ratio Perm	c0.18		0.05	0.03								
v/c Ratio	0.67	0.02	0.20	0.41	0.08		0.88	0.66		0.48	1.15	
Uniform Delay, d1	41.6	34.1	35.8	56.3	54.9		49.0	18.5		60.3	38.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.5	0.0	0.2	1.8	0.2		12.1	0.9		3.8	74.4	
Delay (s)	46.0	34.1	36.0	58.2	55.1		61.1	19.3		64.0	112.6	
Level of Service	D	C	D	E	E		E	B		E	F	
Approach Delay (s)		40.2			56.4			32.9			111.7	
Approach LOS		D			E			C			F	

Intersection Summary			
HCM Average Control Delay	65.3	HCM Level of Service	E
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	128.4	Sum of lost time (s)	14.0
Intersection Capacity Utilization	109.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	244	9	326	45	59	641	1334	33	1678
v/c Ratio	0.66	0.02	0.47	0.41	0.35	0.87	0.65	0.28	1.17
Control Delay	50.7	33.9	6.0	67.3	22.6	61.4	20.7	64.2	120.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0
Total Delay	50.7	33.9	6.0	67.3	22.6	61.4	21.4	64.2	120.6
Queue Length 50th (ft)	180	5	0	36	5	259	392	26	~868
Queue Length 95th (ft)	279	20	69	66	34	#351	544	63	#1098
Internal Link Dist (ft)		970			507		497		1026
Turn Bay Length (ft)	100		60			300		160	
Base Capacity (vph)	472	642	798	220	286	816	2065	203	1431
Starvation Cap Reductn	0	0	0	0	0	0	383	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.01	0.41	0.20	0.21	0.79	0.79	0.16	1.17

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	36	2	4	426	9	197	4	1274	88	120	1146	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	10	11	12	11	11	14	13	10	14
Total Lost time (s)		4.2		4.2	4.2		4.9	4.9		4.9	4.9	
Lane Util. Factor		1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.99		1.00	0.90		1.00	0.99		1.00	1.00	
Flt Protected		0.96		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1979		1569	1495		1711	3380		1829	3291	
Flt Permitted		0.52		0.86	0.95		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1065		1420	1444		1711	3380		1829	3291	
Peak-hour factor, PHF	0.83	0.83	0.83	0.79	0.79	0.79	0.95	0.95	0.95	0.91	0.91	0.91
Adj. Flow (vph)	43	2	5	539	11	249	4	1341	93	132	1259	24
RTOR Reduction (vph)	0	3	0	0	44	0	0	3	0	0	1	0
Lane Group Flow (vph)	0	47	0	415	340	0	4	1431	0	132	1282	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			3		1	2		5	6	
Permitted Phases	4			3								
Actuated Green, G (s)		8.8		35.3	35.3		1.4	49.4		13.5	61.5	
Effective Green, g (s)		8.8		35.3	35.3		1.4	49.4		13.5	61.5	
Actuated g/C Ratio		0.07		0.28	0.28		0.01	0.39		0.11	0.49	
Clearance Time (s)		4.2		4.2	4.2		4.9	4.9		4.9	4.9	
Vehicle Extension (s)		2.5		2.5	2.5		2.5	4.0		2.5	4.0	
Lane Grp Cap (vph)		75		400	407		19	1334		197	1617	
v/s Ratio Prot							0.00	c0.42		c0.07	c0.39	
v/s Ratio Perm		c0.04		c0.29	0.24							
v/c Ratio		0.63		1.04	0.84		0.21	1.07		0.67	0.79	
Uniform Delay, d1		56.6		45.0	42.2		61.4	37.9		53.7	26.5	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		13.4		55.0	13.6		4.0	46.7		7.9	2.9	
Delay (s)		70.0		100.0	55.8		65.3	84.6		61.6	29.5	
Level of Service		E		F	E		E	F		E	C	
Approach Delay (s)		70.0			78.8			84.5			32.5	
Approach LOS		E			E			F			C	

Intersection Summary			
HCM Average Control Delay	63.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	125.2	Sum of lost time (s)	23.1
Intersection Capacity Utilization	88.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	50	415	384	4	1434	132	1283
v/c Ratio	0.52	1.00	0.82	0.03	1.12	0.64	0.76
Control Delay	70.9	87.3	50.7	58.0	101.7	66.8	29.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	2.5
Total Delay	70.9	87.3	50.7	58.0	101.7	66.8	31.5
Queue Length 50th (ft)	36	~365	256	3	~699	101	403
Queue Length 95th (ft)	75	#523	#377	16	#954	174	#687
Internal Link Dist (ft)	165		514		1026		520
Turn Bay Length (ft)						100	
Base Capacity (vph)	136	417	466	430	1278	460	1683
Starvation Cap Reductn	0	0	0	0	0	0	273
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	1.00	0.82	0.01	1.12	0.29	0.91

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	12	9	473	18	17	118	965	419	15	867	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	12	11	12	12	12	12	12
Total Lost time (s)	4.5	4.5		4.5	4.5		4.9	4.9	4.0	4.9	4.9	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.94		1.00	0.99		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	0.96		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1652	1699		1681	1675		1708	1863	1544	1767	3482	
Flt Permitted	0.95	1.00		0.95	0.96		0.20	1.00	1.00	0.07	1.00	
Satd. Flow (perm)	1652	1699		1681	1675		368	1863	1544	123	3482	
Peak-hour factor, PHF	0.75	0.75	0.75	0.77	0.77	0.77	0.97	0.97	0.97	0.91	0.91	0.91
Adj. Flow (vph)	39	16	12	614	23	22	122	995	432	16	953	96
RTOR Reduction (vph)	0	11	0	0	2	0	0	0	0	0	6	0
Lane Group Flow (vph)	39	17	0	332	325	0	122	995	432	16	1043	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Split			Split			Perm		Free	Perm		
Protected Phases	4	4		8	8			1			5	
Permitted Phases							1		Free	5		
Actuated Green, G (s)	6.7	6.7		24.8	24.8		60.6	60.6	106.0	60.6	60.6	
Effective Green, g (s)	6.7	6.7		24.8	24.8		60.6	60.6	106.0	60.6	60.6	
Actuated g/C Ratio	0.06	0.06		0.23	0.23		0.57	0.57	1.00	0.57	0.57	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.9	4.9		4.9	4.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	104	107		393	392		210	1065	1544	70	1991	
v/s Ratio Prot	0.02	0.01		c0.20	0.19			c0.53			0.30	
v/s Ratio Perm							0.33		c0.28	0.13		
v/c Ratio	0.38	0.16		0.84	0.83		0.58	0.93	0.28	0.23	0.52	
Uniform Delay, d1	47.6	47.0		38.8	38.6		14.6	20.9	0.0	11.2	13.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.3	0.7		15.2	13.4		7.6	15.2	0.5	4.7	0.6	
Delay (s)	49.9	47.7		54.0	52.0		22.2	36.1	0.5	15.8	14.5	
Level of Service	D	D		D	D		C	D	A	B	B	
Approach Delay (s)		49.0			53.0			25.0			14.5	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	27.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	9.4
Intersection Capacity Utilization	108.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	39	28	332	327	122	995	432	16	1049
v/c Ratio	0.31	0.20	0.83	0.82	0.57	0.93	0.28	0.23	0.52
Control Delay	54.3	35.2	57.9	56.1	30.7	38.1	0.5	23.7	15.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	37.4	0.0	0.0	0.0
Total Delay	54.3	35.2	57.9	56.1	30.7	75.5	0.5	23.7	15.8
Queue Length 50th (ft)	27	11	229	224	55	644	0	6	234
Queue Length 95th (ft)	51	31	290	282	#158	#999	0	25	313
Internal Link Dist (ft)		538		2647		520			6088
Turn Bay Length (ft)			300		115			100	
Base Capacity (vph)	293	315	444	444	213	1075	1544	71	2013
Starvation Cap Reductn	0	0	0	0	0	154	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.09	0.75	0.74	0.57	1.08	0.28	0.23	0.52

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	79	24	27	361	35	22	35	578	303	14	503	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	10	12	12	11	12	12	12	12
Total Lost time (s)		5.0			5.0			7.5			5.8	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			0.99			1.00	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.97			0.99			0.96			0.98	
Flt Protected		0.97			0.96			1.00			1.00	
Satd. Flow (prot)		1967			1630			1696			1824	
Flt Permitted		0.75			0.66			0.96			0.97	
Satd. Flow (perm)		1511			1114			1628			1766	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.87	0.87	0.87	0.88	0.88	0.88
Adj. Flow (vph)	105	32	36	481	47	29	40	664	348	16	572	75
RTOR Reduction (vph)	0	0	0	0	3	0	0	22	0	0	5	0
Lane Group Flow (vph)	0	173	0	0	554	0	0	1030	0	0	658	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		30.0			30.0			40.0			41.7	
Effective Green, g (s)		30.0			30.0			40.0			41.7	
Actuated g/C Ratio		0.36			0.36			0.48			0.51	
Clearance Time (s)		5.0			5.0			7.5			5.8	
Vehicle Extension (s)		4.0			4.0			6.0			6.0	
Lane Grp Cap (vph)		549			405			789			893	
v/s Ratio Prot												
v/s Ratio Perm		0.11			c0.50			c0.63			0.37	
v/c Ratio		0.32			1.37			1.31			0.74	
Uniform Delay, d1		18.9			26.2			21.2			16.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.5			181.2			146.8			4.4	
Delay (s)		19.3			207.4			168.0			20.4	
Level of Service		B			F			F			C	
Approach Delay (s)		19.3			207.4			168.0			20.4	
Approach LOS		B			F			F			C	

Intersection Summary			
HCM Average Control Delay	126.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.33		
Actuated Cycle Length (s)	82.5	Sum of lost time (s)	12.5
Intersection Capacity Utilization	107.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	173	557	1052	663
v/c Ratio	0.32	1.37	1.30	0.74
Control Delay	20.9	205.4	166.2	21.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	20.9	205.4	166.2	21.9
Queue Length 50th (ft)	63	~388	~700	251
Queue Length 95th (ft)	91	#447	#889	372
Internal Link Dist (ft)	10998	2302	6088	1957
Turn Bay Length (ft)				
Base Capacity (vph)	549	408	810	899
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.32	1.37	1.30	0.74

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	179	91	39	26	19	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	15
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.95		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1652	1863	1763		1770	1742
Flt Permitted	0.46	1.00	1.00		0.95	1.00
Satd. Flow (perm)	792	1863	1763		1770	1742
Peak-hour factor, PHF	0.88	0.88	0.83	0.83	0.83	0.83
Adj. Flow (vph)	203	103	47	31	23	167
RTOR Reduction (vph)	0	0	21	0	0	137
Lane Group Flow (vph)	203	103	57	0	23	30
Turn Type	pm+pt					pm+ov
Protected Phases	1	6	2		4	1
Permitted Phases	6					4
Actuated Green, G (s)	18.4	18.4	9.1		1.0	5.3
Effective Green, g (s)	18.4	18.4	9.1		1.0	5.3
Actuated g/C Ratio	0.63	0.63	0.31		0.03	0.18
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	621	1166	546		60	610
v/s Ratio Prot	c0.05	0.06	0.03		c0.01	0.01
v/s Ratio Perm	c0.16					0.01
v/c Ratio	0.33	0.09	0.10		0.38	0.05
Uniform Delay, d1	2.9	2.2	7.2		13.9	10.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.0	0.1		4.0	0.0
Delay (s)	3.2	2.2	7.3		17.9	10.0
Level of Service	A	A	A		B	B
Approach Delay (s)		2.8	7.3		11.0	
Approach LOS		A	A		B	

Intersection Summary			
HCM Average Control Delay	6.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	29.4	Sum of lost time (s)	10.0
Intersection Capacity Utilization	28.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	203	103	78	23	167
v/c Ratio	0.28	0.06	0.12	0.05	0.31
Control Delay	3.5	2.1	6.1	8.7	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	3.5	2.1	6.1	8.7	3.0
Queue Length 50th (ft)	0	0	3	1	0
Queue Length 95th (ft)	36	20	22	12	13
Internal Link Dist (ft)		236	290	122	
Turn Bay Length (ft)					
Base Capacity (vph)	716	1768	1235	1582	540
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.28	0.06	0.06	0.01	0.31

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	14	86	256	32	73	32	215	165	39	47	150	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	11	12	12	11	12	12
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	0.95		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1711	1598		1711	1718		1711	1810		1711	1848	
Flt Permitted	0.68	1.00		0.31	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1231	1598		557	1718		1711	1810		1711	1848	
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)	15	93	278	35	79	35	234	179	42	51	163	9
RTOR Reduction (vph)	0	135	0	0	20	0	0	9	0	0	2	0
Lane Group Flow (vph)	15	236	0	35	94	0	234	212	0	51	170	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	14.0	14.0		14.0	14.0		13.8	23.7		4.5	14.4	
Effective Green, g (s)	14.0	14.0		14.0	14.0		13.8	23.7		4.5	14.4	
Actuated g/C Ratio	0.23	0.23		0.23	0.23		0.23	0.39		0.07	0.24	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	286	372		130	400		392	713		128	442	
v/s Ratio Prot		c0.15			0.05		c0.14	0.12		0.03	c0.09	
v/s Ratio Perm	0.01			0.06								
v/c Ratio	0.05	0.63		0.27	0.24		0.60	0.30		0.40	0.38	
Uniform Delay, d1	17.9	20.8		18.9	18.8		20.7	12.5		26.6	19.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	3.5		1.1	0.3		2.4	0.2		2.0	0.6	
Delay (s)	18.0	24.3		20.0	19.1		23.2	12.8		28.6	19.7	
Level of Service	B	C		C	B		C	B		C	B	
Approach Delay (s)		24.1			19.3			18.1			21.8	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM Average Control Delay	20.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	60.2	Sum of lost time (s)	18.0
Intersection Capacity Utilization	61.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	15	371	35	114	234	221	51	172
v/c Ratio	0.05	0.72	0.26	0.26	0.58	0.30	0.23	0.48
Control Delay	19.3	19.8	25.2	17.1	27.9	16.3	30.3	28.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.3	19.8	25.2	17.1	27.9	16.3	30.3	28.6
Queue Length 50th (ft)	4	55	9	23	68	52	15	50
Queue Length 95th (ft)	19	173	38	72	174	137	58	139
Internal Link Dist (ft)		193		1418		2763		1435
Turn Bay Length (ft)	125		125		150		100	
Base Capacity (vph)	657	935	296	929	818	1071	346	580
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.40	0.12	0.12	0.29	0.21	0.15	0.30

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	29	61	34	10	22	36
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.84	0.84	0.79	0.79	0.85	0.85
Hourly flow rate (vph)	35	73	43	13	26	42
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	143	49			56	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	143	49			56	
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	93			98	
cM capacity (veh/h)	835	1019			1549	

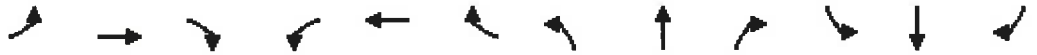
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	107	56	68
Volume Left	35	0	26
Volume Right	73	13	0
cSH	951	1700	1549
Volume to Capacity	0.11	0.03	0.02
Queue Length 95th (ft)	9	0	1
Control Delay (s)	9.3	0.0	2.9
Lane LOS	A		A
Approach Delay (s)	9.3	0.0	2.9
Approach LOS	A		

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	21.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	418	28	17	464	44	22
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.80	0.80	0.77	0.77
Hourly flow rate (vph)	498	33	21	580	57	29
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			531		1137	514
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			531		1137	514
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		74	95
cM capacity (veh/h)			1036		219	560

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	531	601	86
Volume Left	0	21	57
Volume Right	33	0	29
cSH	1700	1036	274
Volume to Capacity	0.31	0.02	0.31
Queue Length 95th (ft)	0	2	32
Control Delay (s)	0.0	0.6	24.0
Lane LOS		A	C
Approach Delay (s)	0.0	0.6	24.0
Approach LOS			C

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	48.6%	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		Stop			Stop			Stop			Stop	
Volume (vph)	0	28	0	16	32	10	1	56	12	6	38	1
Peak Hour Factor	0.75	0.75	0.75	0.84	0.84	0.84	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	0	37	0	19	38	12	1	75	16	8	51	1

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	37	69	92	60
Volume Left (vph)	0	19	1	8
Volume Right (vph)	0	12	16	1
Hadj (s)	0.03	-0.01	-0.07	0.05
Departure Headway (s)	4.3	4.3	4.1	4.3
Degree Utilization, x	0.04	0.08	0.11	0.07
Capacity (veh/h)	793	802	839	814
Control Delay (s)	7.5	7.6	7.6	7.6
Approach Delay (s)	7.5	7.6	7.6	7.6
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.6		
HCM Level of Service	A		
Intersection Capacity Utilization	22.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	23	105	59	27	103	74
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.78	0.78	0.89	0.89
Hourly flow rate (vph)	31	140	76	35	116	83
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			171		287	101
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			171		287	101
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		83	91
cM capacity (veh/h)			1407		666	955

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	171	76	35	199
Volume Left	0	76	0	116
Volume Right	140	0	0	83
cSH	1700	1407	1700	762
Volume to Capacity	0.10	0.05	0.02	0.26
Queue Length 95th (ft)	0	4	0	26
Control Delay (s)	0.0	7.7	0.0	11.4
Lane LOS		A		B
Approach Delay (s)	0.0	5.3		11.4
Approach LOS				B

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	31.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	0	79	18	12	60	0	26	0	35	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.75	0.75	0.79	0.79	0.79	0.87	0.87	0.87	0.75	0.75	0.75
Hourly flow rate (vph)	0	105	24	15	76	0	30	0	40	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)												
pX, platoon unblocked												
vC, conflicting volume	76			129			224	224	117	264	236	76
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	76			129			224	224	117	264	236	76
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			99			96	100	96	100	100	100
cM capacity (veh/h)	1523			1456			726	668	935	654	658	985

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	129	91	70	0
Volume Left	0	15	30	0
Volume Right	24	0	40	0
cSH	1523	1456	833	1700
Volume to Capacity	0.00	0.01	0.08	0.00
Queue Length 95th (ft)	0	1	7	0
Control Delay (s)	0.0	1.3	9.7	0.0
Lane LOS		A	A	A
Approach Delay (s)	0.0	1.3	9.7	0.0
Approach LOS			A	A

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	20.7%	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		Stop			Stop			Stop			Stop	
Volume (vph)	11	13	22	17	38	8	12	163	38	11	173	8
Peak Hour Factor	0.75	0.75	0.75	0.77	0.77	0.77	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	15	17	29	22	49	10	16	217	51	15	231	11

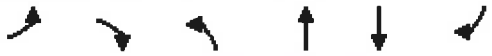
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	61	82	284	256
Volume Left (vph)	15	22	16	15
Volume Right (vph)	29	10	51	11
Hadj (s)	-0.21	0.01	-0.06	0.02
Departure Headway (s)	5.1	5.3	4.5	4.6
Degree Utilization, x	0.09	0.12	0.36	0.33
Capacity (veh/h)	625	611	764	742
Control Delay (s)	8.6	9.0	10.0	9.9
Approach Delay (s)	8.6	9.0	10.0	9.9
Approach LOS	A	A	B	A

Intersection Summary			
Delay	9.7		
HCM Level of Service	A		
Intersection Capacity Utilization	26.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	46	5	11	0	1	0	12	310	1	3	206	50
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.75	0.75	0.75	0.92	0.92	0.92	0.98	0.98	0.98
Hourly flow rate (vph)	55	6	13	0	1	0	13	337	1	3	210	51
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	606	606	236	622	631	338	261			338		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	606	606	236	622	631	338	261			338		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	86	99	98	100	100	100	99			100		
cM capacity (veh/h)	404	406	803	385	393	705	1303			1221		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	75	1	351	264
Volume Left	55	0	13	3
Volume Right	13	0	1	51
cSH	443	393	1303	1221
Volume to Capacity	0.17	0.00	0.01	0.00
Queue Length 95th (ft)	15	0	1	0
Control Delay (s)	14.8	14.2	0.4	0.1
Lane LOS	B	B	A	A
Approach Delay (s)	14.8	14.2	0.4	0.1
Approach LOS	B	B		

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	56	58	31	325	202	41
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.78	0.78	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	72	74	36	378	235	48
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	709	259	283			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	709	259	283			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	82	90	97			
cM capacity (veh/h)	389	780	1280			

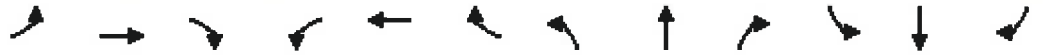
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	146	414	283
Volume Left	72	36	0
Volume Right	74	0	48
cSH	523	1280	1700
Volume to Capacity	0.28	0.03	0.17
Queue Length 95th (ft)	28	2	0
Control Delay (s)	14.5	0.9	0.0
Lane LOS	B	A	
Approach Delay (s)	14.5	0.9	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	48.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	67	52	157	169	20	191
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	89	69	209	225	27	255
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		875				
pX, platoon unblocked						
vC, conflicting volume	435				570	322
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	435				570	322
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				94	65
cM capacity (veh/h)	1125				445	719

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	159	435	281
Volume Left	89	0	27
Volume Right	0	225	255
cSH	1125	1700	679
Volume to Capacity	0.08	0.26	0.41
Queue Length 95th (ft)	6	0	51
Control Delay (s)	5.1	0.0	14.0
Lane LOS	A		B
Approach Delay (s)	5.1	0.0	14.0
Approach LOS			B

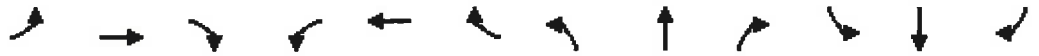
Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	20	52	13	39	2	284	1	25	0	1	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.95	0.95	0.95	0.75	0.75	0.75
Hourly flow rate (vph)	0	27	69	17	52	3	299	1	26	0	1	4
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	55			96			154	151	61	176	184	53
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	55			96			154	151	61	176	184	53
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			99			63	100	97	100	100	100
cM capacity (veh/h)	1550			1498			801	732	1004	758	702	1014

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	96	72	326	5
Volume Left	0	17	299	0
Volume Right	69	3	26	4
cSH	1550	1498	814	913
Volume to Capacity	0.00	0.01	0.40	0.01
Queue Length 95th (ft)	0	1	49	0
Control Delay (s)	0.0	1.9	12.3	9.0
Lane LOS		A	B	A
Approach Delay (s)	0.0	1.9	12.3	9.0
Approach LOS			B	A

Intersection Summary			
Average Delay	8.4		
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	12	0	17	0	0	0	0	107	98	207	141	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.95	0.95	0.95	0.83	0.83	0.83
Hourly flow rate (vph)	16	0	23	0	0	0	0	113	103	249	170	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)								202				
pX, platoon unblocked												
vC, conflicting volume	833	884	170	856	833	164	170			216		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	833	884	170	856	833	164	170			216		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	100	97	100	100	100	100			82		
cM capacity (veh/h)	247	232	874	232	248	880	1407			1354		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	39	216	419
Volume Left	16	0	249
Volume Right	23	103	0
cSH	427	1700	1354
Volume to Capacity	0.09	0.13	0.18
Queue Length 95th (ft)	7	0	17
Control Delay (s)	14.3	0.0	5.6
Lane LOS	B		A
Approach Delay (s)	14.3	0.0	5.6
Approach LOS	B		

Intersection Summary				
Average Delay	4.3			
Intersection Capacity Utilization	43.8%	ICU Level of Service		A
Analysis Period (min)	15			

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	MT
Agency/Co.:	AKRF, Inc.
Date performed:	11/6/2012
Analysis time period:	Friday (5:00-6:00PM)
Freeway/Dir of Travel:	Route 17 Eastbound
Junction:	Interchange 106
Jurisdiction:	New York State
Analysis Year:	2014 No Build
Description:	Concord Resort (Project No. 40376)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1583	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	305	vph
Length of first accel/decel lane	1462	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1583	305		vph
Peak-hour factor, PHF	0.96	0.92		
Peak 15-min volume, v15	412	83		v
Trucks and buses	2	2		%
Recreational vehicles	2	2		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.986	0.986	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1672	336	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1672 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2008	4700	No
$v_{3 \text{ or } av34}$	0 pc/h	(Equation 25-4 or 25-5)	
Is $v_{3 \text{ or } av34}$ > 2700 pc/h?		No	
Is $v_{3 \text{ or } av34}$ > 1.5 v_{12} /2		No	
If yes, v_{12A} = 1672		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2008	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 11.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.248	
Space mean speed in ramp influence area,	S_R = 59.3	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 59.3	mph

2014 No Build Conditions
(with CALP)
Sunday Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	391	4	10	377	19	30	12	6	37	9	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	13	12	12	15	12
Total Lost time (s)		5.7			5.6			5.5			5.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		1.00			0.99			0.98			0.95	
Flt Protected		1.00			1.00			0.97			0.98	
Satd. Flow (prot)		3529			3506			1828			1884	
Flt Permitted		0.94			0.94			1.00			0.97	
Satd. Flow (perm)		3333			3303			1884			1876	
Peak-hour factor, PHF	0.87	0.87	0.87	0.82	0.82	0.82	0.88	0.88	0.88	0.75	0.75	0.75
Adj. Flow (vph)	9	449	5	12	460	23	34	14	7	49	12	36
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	463	0	0	495	0	0	55	0	0	97	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		18.2			18.3			3.1			3.1	
Effective Green, g (s)		18.2			18.3			3.1			3.1	
Actuated g/C Ratio		0.56			0.56			0.10			0.10	
Clearance Time (s)		5.7			5.6			5.5			5.5	
Vehicle Extension (s)		2.5			2.5			2.5			2.5	
Lane Grp Cap (vph)		1866			1860			180			179	
v/s Ratio Prot												
v/s Ratio Perm		0.14			c0.15			0.03			c0.05	
v/c Ratio		0.25			0.27			0.31			0.54	
Uniform Delay, d1		3.7			3.6			13.7			14.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.1			0.1			0.7			2.6	
Delay (s)		3.7			3.7			14.4			16.7	
Level of Service		A			A			B			B	
Approach Delay (s)		3.7			3.7			14.4			16.7	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	5.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	32.5	Sum of lost time (s)	11.1
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	463	495	55	97
v/c Ratio	0.18	0.20	0.10	0.18
Control Delay	4.4	4.4	8.7	9.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	4.4	4.4	8.7	9.2
Queue Length 50th (ft)	0	0	3	5
Queue Length 95th (ft)	45	45	22	28
Internal Link Dist (ft)	880	2120	328	12725
Turn Bay Length (ft)				
Base Capacity (vph)	3224	3200	1000	995
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.14	0.15	0.06	0.10

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	328	172	17	113	128	6	22	16	14	178	18	318
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	10	12	11	12	13	12	12	11	15
Total Lost time (s)	4.2	4.2		4.2	4.2	4.2		4.2	4.2		4.2	4.2
Lane Util. Factor	1.00	1.00		1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97		1.00	0.97		1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00		0.99	1.00
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00		0.96	1.00
Satd. Flow (prot)	1764	1955		1645	3539	1486		1867	1539		1711	1726
Flt Permitted	0.47	1.00		0.62	1.00	1.00		0.80	1.00		0.71	1.00
Satd. Flow (perm)	880	1955		1070	3539	1486		1533	1539		1273	1726
Peak-hour factor, PHF	0.84	0.84	0.84	0.81	0.81	0.81	0.82	0.82	0.82	0.86	0.86	0.86
Adj. Flow (vph)	390	205	20	140	158	7	27	20	17	207	21	370
RTOR Reduction (vph)	0	5	0	0	0	5	0	0	12	0	0	173
Lane Group Flow (vph)	390	220	0	140	158	2	0	47	5	0	228	197
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	pm+pt			pm+pt		Perm	Perm		Perm	Perm		pm+ov
Protected Phases	5	2		1	6			4			8	5
Permitted Phases	2			6		6	4		4	8		8
Actuated Green, G (s)	28.4	17.6		17.8	11.2	11.2		14.1	14.1		14.1	27.1
Effective Green, g (s)	28.4	17.6		17.8	11.2	11.2		14.1	14.1		14.1	27.1
Actuated g/C Ratio	0.56	0.35		0.35	0.22	0.22		0.28	0.28		0.28	0.53
Clearance Time (s)	4.2	4.2		4.2	4.2	4.2		4.2	4.2		4.2	4.2
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5		2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	717	676		449	779	327		425	426		353	1061
v/s Ratio Prot	c0.14	0.11		0.04	0.04							0.05
v/s Ratio Perm	c0.16			0.07		0.00		0.03	0.00		c0.18	0.07
v/c Ratio	0.54	0.33		0.31	0.20	0.00		0.11	0.01		0.65	0.19
Uniform Delay, d1	6.6	12.3		11.8	16.2	15.5		13.7	13.3		16.2	6.2
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.7	0.2		0.3	0.1	0.0		0.1	0.0		3.6	0.1
Delay (s)	7.3	12.5		12.1	16.3	15.5		13.8	13.4		19.8	6.2
Level of Service	A	B		B	B	B		B	B		B	A
Approach Delay (s)		9.2			14.3			13.7			11.4	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	50.9	Sum of lost time (s)	8.4
Intersection Capacity Utilization	58.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	390	225	140	158	7	47	17	228	370
v/c Ratio	0.55	0.33	0.28	0.22	0.02	0.11	0.04	0.64	0.34
Control Delay	10.9	16.3	9.3	19.7	12.7	13.9	7.0	24.8	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.9	16.3	9.3	19.7	12.7	13.9	7.0	24.8	1.4
Queue Length 50th (ft)	58	49	18	21	0	10	0	60	0
Queue Length 95th (ft)	122	106	43	42	8	26	9	112	15
Internal Link Dist (ft)		2120		980		249		1452	
Turn Bay Length (ft)			50		50				110
Base Capacity (vph)	751	1391	713	2514	1052	622	632	515	1166
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.16	0.20	0.06	0.01	0.08	0.03	0.44	0.32

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	518	796	0	0	1165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	14	11	11	12	12
Total Lost time (s)		5.7	4.9			4.9
Lane Util. Factor		0.88	0.95			1.00
Frpb, ped/bikes		0.97	1.00			1.00
Flpb, ped/bikes		1.00	1.00			1.00
Frt		0.85	1.00			1.00
Flt Protected		1.00	1.00			1.00
Satd. Flow (prot)		2890	3421			1863
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		2890	3421			1863
Peak-hour factor, PHF	0.81	0.81	0.95	0.95	0.92	0.92
Adj. Flow (vph)	0	640	838	0	0	1266
RTOR Reduction (vph)	0	185	0	0	0	0
Lane Group Flow (vph)	0	455	838	0	0	1266
Confl. Peds. (#/hr)	10	10		10	10	
Turn Type		custom				
Protected Phases			2			6
Permitted Phases		3				
Actuated Green, G (s)		12.5	22.7			45.8
Effective Green, g (s)		12.5	22.7			45.8
Actuated g/C Ratio		0.27	0.50			1.00
Clearance Time (s)		5.7	4.9			4.9
Vehicle Extension (s)		2.5	4.0			4.0
Lane Grp Cap (vph)		789	1696			1863
v/s Ratio Prot			0.24			c0.68
v/s Ratio Perm		0.16				
v/c Ratio		0.58	0.49			0.68
Uniform Delay, d1		14.4	7.7			0.0
Progression Factor		1.00	1.00			1.00
Incremental Delay, d2		0.8	0.3			1.1
Delay (s)		15.2	8.0			1.1
Level of Service		B	A			A
Approach Delay (s)	15.2		8.0			1.1
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	6.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	45.8	Sum of lost time (s)	0.0
Intersection Capacity Utilization	75.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBR	NBT	SBT
Lane Group Flow (vph)	640	838	1266
v/c Ratio	0.66	0.51	0.68
Control Delay	13.5	9.4	2.0
Queue Delay	0.0	0.0	0.0
Total Delay	13.5	9.4	2.0
Queue Length 50th (ft)	42	64	0
Queue Length 95th (ft)	114	146	0
Internal Link Dist (ft)		626	13
Turn Bay Length (ft)			
Base Capacity (vph)	1796	3112	1863
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.36	0.27	0.68

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	183	22	330	61	14	34	285	989	40	59	1205	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	14	12	11	12	12	12	10	11	13	11
Total Lost time (s)	4.2	4.2	4.2	29.2	29.2		4.9	4.9		4.9	4.9	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.89		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1801	1652	1753	1585		3433	3513		1711	3592	
Flt Permitted	0.72	1.00	1.00	0.74	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1319	1801	1652	1367	1585		3433	3513		1711	3592	
Peak-hour factor, PHF	0.89	0.89	0.89	0.75	0.75	0.75	0.93	0.93	0.93	0.89	0.89	0.89
Adj. Flow (vph)	206	25	371	81	19	45	306	1063	43	66	1354	154
RTOR Reduction (vph)	0	0	253	0	40	0	0	2	0	0	6	0
Lane Group Flow (vph)	206	25	118	81	24	0	306	1104	0	66	1502	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm		Perm	Perm			Prot			Prot		
Protected Phases		4			7		1	2		5	6	
Permitted Phases	4		4	7	7							
Actuated Green, G (s)	37.3	37.3	37.3	12.3	12.3		15.4	59.4		8.3	52.3	
Effective Green, g (s)	37.3	37.3	37.3	12.3	12.3		15.4	59.4		8.3	52.3	
Actuated g/C Ratio	0.31	0.31	0.31	0.10	0.10		0.13	0.50		0.07	0.44	
Clearance Time (s)	4.2	4.2	4.2	29.2	29.2		4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.5	4.0		2.5	4.0	
Lane Grp Cap (vph)	413	565	518	141	164		444	1754		119	1579	
v/s Ratio Prot		0.01			0.01		c0.09	0.31		0.04	c0.42	
v/s Ratio Perm	c0.16		0.07	0.06								
v/c Ratio	0.50	0.04	0.23	0.57	0.14		0.69	0.63		0.55	0.95	
Uniform Delay, d1	33.2	28.4	30.2	50.9	48.6		49.5	21.8		53.6	32.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.0	0.2	4.6	0.3		4.1	0.8		4.4	13.0	
Delay (s)	33.9	28.5	30.4	55.4	48.9		53.6	22.6		58.0	45.2	
Level of Service	C	C	C	E	D		D	C		E	D	
Approach Delay (s)		31.5			52.5			29.3			45.7	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM Average Control Delay	37.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	119.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	100.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	206	25	371	81	64	306	1106	66	1508
v/c Ratio	0.50	0.04	0.48	0.57	0.31	0.68	0.62	0.46	0.96
Control Delay	38.2	29.5	5.5	67.8	25.4	57.8	24.6	63.4	48.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Total Delay	38.2	29.5	5.5	67.8	25.4	57.8	24.8	63.4	48.8
Queue Length 50th (ft)	124	13	2	59	13	113	318	48	563
Queue Length 95th (ft)	221	37	68	99	43	177	465	102	#851
Internal Link Dist (ft)		970			507		497		1026
Turn Bay Length (ft)	100		60			300		160	
Base Capacity (vph)	505	691	860	233	308	878	1953	219	1565
Starvation Cap Reductn	0	0	0	0	0	0	202	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.04	0.43	0.35	0.21	0.35	0.63	0.30	0.96

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	14	6	9	380	3	146	19	795	111	132	853	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	10	11	12	11	11	14	13	10	14
Total Lost time (s)		4.2		4.2	4.2		4.9	4.9		4.9	4.9	
Lane Util. Factor		1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.96		1.00	0.91		1.00	0.98		1.00	1.00	
Flt Protected		0.98		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1953		1569	1511		1711	3344		1829	3291	
Flt Permitted		0.70		0.49	0.70		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1404		805	1078		1711	3344		1829	3291	
Peak-hour factor, PHF	0.75	0.75	0.75	0.91	0.91	0.91	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	19	8	12	418	3	160	21	883	123	147	948	18
RTOR Reduction (vph)	0	11	0	0	31	0	0	7	0	0	1	0
Lane Group Flow (vph)	0	28	0	301	249	0	21	999	0	147	965	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			3		1	2		5	6	
Permitted Phases	4			3								
Actuated Green, G (s)		6.6		35.6	35.6		3.1	45.3		14.3	56.5	
Effective Green, g (s)		6.6		35.6	35.6		3.1	45.3		14.3	56.5	
Actuated g/C Ratio		0.05		0.30	0.30		0.03	0.38		0.12	0.47	
Clearance Time (s)		4.2		4.2	4.2		4.9	4.9		4.9	4.9	
Vehicle Extension (s)		2.5		2.5	2.5		2.5	4.0		2.5	4.0	
Lane Grp Cap (vph)		77		239	320		44	1262		218	1550	
v/s Ratio Prot							0.01	c0.30		c0.08	0.29	
v/s Ratio Perm		c0.02		c0.37	0.23							
v/c Ratio		0.36		1.26	0.78		0.48	0.79		0.67	0.62	
Uniform Delay, d1		54.7		42.2	38.6		57.7	33.2		50.6	23.8	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.1		146.0	10.9		5.8	3.7		7.3	0.9	
Delay (s)		56.7		188.2	49.5		63.5	36.8		57.9	24.7	
Level of Service		E		F	D		E	D		E	C	
Approach Delay (s)		56.7			121.3			37.4			29.1	
Approach LOS		E			F			D			C	

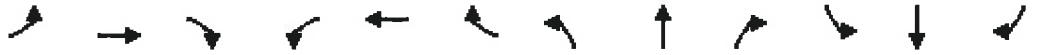
Intersection Summary			
HCM Average Control Delay	52.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.2
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	39	301	280	21	1006	147	966
v/c Ratio	0.34	1.22	0.78	0.17	0.83	0.65	0.60
Control Delay	49.9	167.4	49.5	58.8	40.9	64.0	25.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.8
Total Delay	49.9	167.4	49.5	58.8	40.9	64.0	25.8
Queue Length 50th (ft)	20	~314	183	16	361	111	251
Queue Length 95th (ft)	47	#547	#377	45	498	185	407
Internal Link Dist (ft)	165		514		1026		520
Turn Bay Length (ft)						100	
Base Capacity (vph)	195	247	361	450	1326	481	1603
Starvation Cap Reductn	0	0	0	0	0	0	334
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	1.22	0.78	0.05	0.76	0.31	0.76

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	7	1	393	14	1	7	540	396	4	632	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	12	11	12	12	12	12	12
Total Lost time (s)	4.5	4.5		4.5	4.5		4.9	4.9	4.0	4.9	4.9	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.96		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1652	1823		1681	1690		1705	1863	1544	1763	3519	
Flt Permitted	0.95	1.00		0.95	0.96		0.30	1.00	1.00	0.28	1.00	
Satd. Flow (perm)	1652	1823		1681	1690		543	1863	1544	516	3519	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.92	0.92	0.92	0.86	0.86	0.86
Adj. Flow (vph)	40	9	1	524	19	1	8	587	430	5	735	24
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	2	0
Lane Group Flow (vph)	40	9	0	272	272	0	8	587	430	5	757	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Split			Split			Perm		Free	Perm		
Protected Phases	4	4		8	8			1			5	
Permitted Phases							1		Free	5		
Actuated Green, G (s)	4.6	4.6		21.5	21.5		38.8	38.8	78.8	38.8	38.8	
Effective Green, g (s)	4.6	4.6		21.5	21.5		38.8	38.8	78.8	38.8	38.8	
Actuated g/C Ratio	0.06	0.06		0.27	0.27		0.49	0.49	1.00	0.49	0.49	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.9	4.9		4.9	4.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	96	106		459	461		267	917	1544	254	1733	
v/s Ratio Prot	0.02	0.00		c0.16	0.16			c0.32			0.22	
v/s Ratio Perm							0.01		c0.28	0.01		
v/c Ratio	0.42	0.09		0.59	0.59		0.03	0.64	0.28	0.02	0.44	
Uniform Delay, d1	35.8	35.1		24.9	24.8		10.3	14.8	0.0	10.3	12.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.9	0.3		2.1	2.0		0.1	2.5	0.4	0.1	0.5	
Delay (s)	38.7	35.5		26.9	26.9		10.4	17.3	0.4	10.3	13.4	
Level of Service	D	D		C	C		B	B	A	B	B	
Approach Delay (s)		38.1			26.9			10.2			13.4	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM Average Control Delay	15.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	78.8	Sum of lost time (s)	9.4
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	40	10	272	272	8	587	430	5	759
v/c Ratio	0.24	0.05	0.58	0.58	0.03	0.63	0.28	0.02	0.43
Control Delay	43.0	39.4	32.8	32.7	14.0	19.8	0.4	13.8	14.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.0	39.4	32.8	32.7	14.0	19.9	0.4	13.8	14.6
Queue Length 50th (ft)	17	4	116	116	2	206	0	1	121
Queue Length 95th (ft)	51	19	213	212	12	424	0	8	213
Internal Link Dist (ft)		538		2647		520			6088
Turn Bay Length (ft)			300		115			100	
Base Capacity (vph)	379	421	737	741	429	1470	1544	407	2776
Starvation Cap Reductn	0	0	0	0	0	53	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.02	0.37	0.37	0.02	0.41	0.28	0.01	0.27

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	11	15	24	309	52	8	27	256	300	9	269	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	10	12	12	11	12	12	12	12
Total Lost time (s)		5.0			5.0			7.5			5.8	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			1.00			0.98			1.00	
Flpb, ped/bikes		1.00			0.98			1.00			1.00	
Frt		0.94			1.00			0.93			0.99	
Flt Protected		0.99			0.96			1.00			1.00	
Satd. Flow (prot)		1913			1636			1640			1845	
Flt Permitted		0.89			0.71			0.97			0.98	
Satd. Flow (perm)		1714			1218			1596			1810	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.90	0.90	0.90	0.87	0.87	0.87
Adj. Flow (vph)	15	20	32	412	69	11	30	284	333	10	309	15
RTOR Reduction (vph)	0	0	0	0	1	0	0	49	0	0	2	0
Lane Group Flow (vph)	0	67	0	0	491	0	0	598	0	0	332	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		30.2			30.2			35.1			36.8	
Effective Green, g (s)		30.2			30.2			35.1			36.8	
Actuated g/C Ratio		0.39			0.39			0.45			0.47	
Clearance Time (s)		5.0			5.0			7.5			5.8	
Vehicle Extension (s)		4.0			4.0			6.0			6.0	
Lane Grp Cap (vph)		665			473			720			856	
v/s Ratio Prot												
v/s Ratio Perm		0.04			c0.40			c0.37			0.18	
v/c Ratio		0.10			1.04			0.83			0.39	
Uniform Delay, d1		15.2			23.8			18.7			13.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.1			51.4			9.3			0.8	
Delay (s)		15.2			75.2			28.0			14.1	
Level of Service		B			E			C			B	
Approach Delay (s)		15.2			75.2			28.0			14.1	
Approach LOS		B			E			C			B	

Intersection Summary			
HCM Average Control Delay	39.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	77.8	Sum of lost time (s)	12.5
Intersection Capacity Utilization	82.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	67	492	647	334
v/c Ratio	0.10	1.04	0.84	0.39
Control Delay	17.7	80.5	27.6	14.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	17.7	80.5	27.6	14.3
Queue Length 50th (ft)	22	~294	232	98
Queue Length 95th (ft)	41	#360	#398	150
Internal Link Dist (ft)	10998	2302	6088	1957
Turn Bay Length (ft)				
Base Capacity (vph)	665	473	869	977
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.10	1.04	0.74	0.34

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	175	83	48	18	9	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	12	12	15
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.96		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1652	1863	1794		1770	1742
Flt Permitted	0.46	1.00	1.00		0.95	1.00
Satd. Flow (perm)	800	1863	1794		1770	1742
Peak-hour factor, PHF	0.88	0.88	0.83	0.83	0.83	0.83
Adj. Flow (vph)	199	94	58	22	11	147
RTOR Reduction (vph)	0	0	15	0	0	121
Lane Group Flow (vph)	199	94	65	0	11	26
Turn Type	pm+pt					pm+ov
Protected Phases	1	6	2		4	1
Permitted Phases	6					4
Actuated Green, G (s)	18.7	18.7	9.4		1.0	5.3
Effective Green, g (s)	18.7	18.7	9.4		1.0	5.3
Actuated g/C Ratio	0.63	0.63	0.32		0.03	0.18
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	627	1173	568		60	604
v/s Ratio Prot	c0.05	0.05	0.04		c0.01	0.01
v/s Ratio Perm	c0.15					0.01
v/c Ratio	0.32	0.08	0.11		0.18	0.04
Uniform Delay, d1	2.8	2.1	7.2		14.0	10.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.0	0.1		1.5	0.0
Delay (s)	3.1	2.2	7.3		15.4	10.1
Level of Service	A	A	A		B	B
Approach Delay (s)		2.8	7.3		10.5	
Approach LOS		A	A		B	

Intersection Summary			
HCM Average Control Delay	5.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	29.7	Sum of lost time (s)	10.0
Intersection Capacity Utilization	28.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	199	94	80	11	147
v/c Ratio	0.28	0.06	0.12	0.03	0.28
Control Delay	3.3	2.0	6.5	8.8	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	3.3	2.0	6.5	8.8	3.0
Queue Length 50th (ft)	0	0	3	1	0
Queue Length 95th (ft)	34	17	24	8	12
Internal Link Dist (ft)		236	290	122	
Turn Bay Length (ft)					
Base Capacity (vph)	721	1771	1242	1585	519
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.28	0.05	0.06	0.01	0.28

Intersection Summary

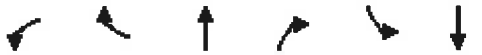
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	71	227	33	67	36	216	126	36	38	102	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	11	12	12	11	12	12
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	0.95		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1711	1595		1711	1707		1711	1801		1711	1842	
Flt Permitted	0.68	1.00		0.37	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1233	1595		673	1707		1711	1801		1711	1842	
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)	11	77	247	36	73	39	235	137	39	41	111	9
RTOR Reduction (vph)	0	151	0	0	26	0	0	10	0	0	3	0
Lane Group Flow (vph)	11	173	0	36	86	0	235	166	0	41	117	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	11.1	11.1		11.1	11.1		12.9	23.7		2.7	13.5	
Effective Green, g (s)	11.1	11.1		11.1	11.1		12.9	23.7		2.7	13.5	
Actuated g/C Ratio	0.20	0.20		0.20	0.20		0.23	0.43		0.05	0.24	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	247	319		135	341		398	769		83	448	
v/s Ratio Prot		c0.11			0.05		c0.14	0.09		0.02	c0.06	
v/s Ratio Perm	0.01			0.05								
v/c Ratio	0.04	0.54		0.27	0.25		0.59	0.22		0.49	0.26	
Uniform Delay, d1	17.9	19.9		18.8	18.7		18.9	10.0		25.7	17.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	1.9		1.1	0.4		2.3	0.1		4.6	0.3	
Delay (s)	18.0	21.8		19.8	19.1		21.3	10.2		30.3	17.3	
Level of Service	B	C		B	B		C	B		C	B	
Approach Delay (s)		21.7			19.3			16.5			20.6	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM Average Control Delay	19.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	55.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	11	324	36	112	235	176	41	120
v/c Ratio	0.04	0.66	0.25	0.29	0.56	0.21	0.17	0.37
Control Delay	18.3	16.0	23.4	16.0	24.2	12.5	26.3	24.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.3	16.0	23.4	16.0	24.2	12.5	26.3	24.8
Queue Length 50th (ft)	3	34	9	19	59	20	11	30
Queue Length 95th (ft)	15	122	36	65	154	97	45	92
Internal Link Dist (ft)		193		1393		2763		1435
Turn Bay Length (ft)	125		125		150		100	
Base Capacity (vph)	724	1014	395	1015	900	1173	381	636
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.32	0.09	0.11	0.26	0.15	0.11	0.19

Intersection Summary



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	7	17	10	10	10	9
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	9	23	13	13	13	12
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	59	20			27	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	59	20			27	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	98			99	
cM capacity (veh/h)	940	1058			1587	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	32	27	25
Volume Left	9	0	13
Volume Right	23	13	0
cSH	1021	1700	1587
Volume to Capacity	0.03	0.02	0.01
Queue Length 95th (ft)	2	0	1
Control Delay (s)	8.6	0.0	3.9
Lane LOS	A		A
Approach Delay (s)	8.6	0.0	3.9
Approach LOS	A		

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	17.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	399	8	2	401	7	3
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	505	10	3	535	9	4
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			515		1050	510
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			515		1050	510
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		96	99
cM capacity (veh/h)			1050		251	563

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	515	537	13
Volume Left	0	3	9
Volume Right	10	0	4
cSH	1700	1050	301
Volume to Capacity	0.30	0.00	0.04
Queue Length 95th (ft)	0	0	3
Control Delay (s)	0.0	0.1	17.5
Lane LOS		A	C
Approach Delay (s)	0.0	0.1	17.5
Approach LOS			C

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	32.7%	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		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	8	7	0	0	9	13	1	9	0
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.81	0.81	0.81	0.75	0.75	0.75
Hourly flow rate (vph)	0	0	0	11	9	0	0	11	16	1	12	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	0	20	27	13
Volume Left (vph)	0	11	0	1
Volume Right (vph)	0	0	16	0
Hadj (s)	0.00	0.14	-0.32	0.05
Departure Headway (s)	4.0	4.1	3.6	4.0
Degree Utilization, x	0.00	0.02	0.03	0.01
Capacity (veh/h)	900	860	980	885
Control Delay (s)	7.0	7.2	6.7	7.1
Approach Delay (s)	0.0	7.2	6.7	7.1
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.0		
HCM Level of Service	A		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	17	80	34	25	96	43
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	23	107	45	33	128	57
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			129		200	76
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			129		200	76
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		83	94
cM capacity (veh/h)			1456		764	985

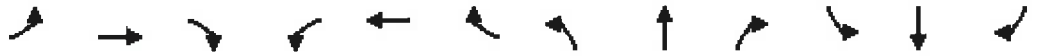
Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	129	45	33	185
Volume Left	0	45	0	128
Volume Right	107	0	0	57
cSH	1700	1456	1700	821
Volume to Capacity	0.08	0.03	0.02	0.23
Queue Length 95th (ft)	0	2	0	22
Control Delay (s)	0.0	7.6	0.0	10.7
Lane LOS		A		B
Approach Delay (s)	0.0	4.4		10.7
Approach LOS				B

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	23.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	0	60	0	2	55	0	4	0	2	1	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	0	74	0	3	73	0	5	0	3	1	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)												
pX, platoon unblocked												
vC, conflicting volume	73			74			153	153	74	155	153	73
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	73			74			153	153	74	155	153	73
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			100			99	100	100	100	100	100
cM capacity (veh/h)	1526			1525			813	738	988	808	738	989

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	74	76	8	1
Volume Left	0	3	5	1
Volume Right	0	0	3	0
cSH	1526	1525	864	808
Volume to Capacity	0.00	0.00	0.01	0.00
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	0.0	0.3	9.2	9.5
Lane LOS		A	A	A
Approach Delay (s)	0.0	0.3	9.2	9.5
Approach LOS			A	A

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	14.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	14	0	6	13	2	2	123	2	1	141	0
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	0	19	0	8	17	3	3	164	3	1	188	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	19	28	169	189
Volume Left (vph)	0	8	3	1
Volume Right (vph)	0	3	3	0
Hadj (s)	0.03	0.03	0.03	0.04
Departure Headway (s)	4.8	4.7	4.2	4.2
Degree Utilization, x	0.02	0.04	0.20	0.22
Capacity (veh/h)	691	694	828	837
Control Delay (s)	7.9	7.9	8.3	8.4
Approach Delay (s)	7.9	7.9	8.3	8.4
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.3		
HCM Level of Service	A		
Intersection Capacity Utilization	20.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	11	0	6	0	0	0	2	133	0	1	335	14
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.87	0.87	0.87	0.83	0.83	0.83
Hourly flow rate (vph)	15	0	8	0	0	0	2	153	0	1	404	17
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	572	572	412	580	580	153	420			153		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	572	572	412	580	580	153	420			153		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	100	99	100	100	100	100			100		
cM capacity (veh/h)	430	429	640	420	424	893	1139			1428		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	23	0	155	422
Volume Left	15	0	2	1
Volume Right	8	0	0	17
cSH	486	1700	1139	1428
Volume to Capacity	0.05	0.00	0.00	0.00
Queue Length 95th (ft)	4	0	0	0
Control Delay (s)	12.8	0.0	0.1	0.0
Lane LOS	B	A	A	A
Approach Delay (s)	12.8	0.0	0.1	0.0
Approach LOS	B	A		

Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	29.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	8	55	40	104	295	17
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.76	0.76	0.83	0.83
Hourly flow rate (vph)	9	62	53	137	355	20
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	608	366	376			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	608	366	376			
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	91	96			
cM capacity (veh/h)	439	679	1183			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	71	189	376
Volume Left	9	53	0
Volume Right	62	0	20
cSH	635	1183	1700
Volume to Capacity	0.11	0.04	0.22
Queue Length 95th (ft)	9	3	0
Control Delay (s)	11.4	2.6	0.0
Lane LOS	B	A	
Approach Delay (s)	11.4	2.6	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	38.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	8	136	127	129	15	151
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	11	181	169	172	20	201
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		875				
pX, platoon unblocked						
vC, conflicting volume	341				458	255
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	341				458	255
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				96	74
cM capacity (veh/h)	1218				556	783

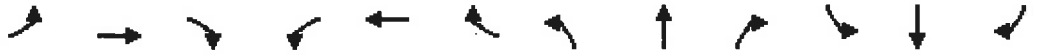
Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	192	341	221
Volume Left	11	0	20
Volume Right	0	172	201
cSH	1218	1700	755
Volume to Capacity	0.01	0.20	0.29
Queue Length 95th (ft)	1	0	31
Control Delay (s)	0.5	0.0	11.7
Lane LOS	A		B
Approach Delay (s)	0.5	0.0	11.7
Approach LOS			B

Intersection Summary			
Average Delay	3.6		
Intersection Capacity Utilization	31.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	0	68	83	16	47	0	207	3	14	2	2	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.95	0.95	0.95	0.75	0.75	0.75
Hourly flow rate (vph)	0	91	111	21	63	0	218	3	15	3	3	3
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	63			201			255	251	146	268	307	63
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	63			201			255	251	146	268	307	63
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			98			68	100	98	100	100	100
cM capacity (veh/h)	1540			1371			685	642	901	663	598	1002

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	201	84	236	8
Volume Left	0	21	218	3
Volume Right	111	0	15	3
cSH	1540	1371	695	718
Volume to Capacity	0.00	0.02	0.34	0.01
Queue Length 95th (ft)	0	1	38	1
Control Delay (s)	0.0	2.0	12.8	10.1
Lane LOS		A	B	B
Approach Delay (s)	0.0	2.0	12.8	10.1
Approach LOS			B	B

Intersection Summary			
Average Delay	6.2		
Intersection Capacity Utilization	41.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	17	0	24	0	0	0	0	127	66	171	107	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.95	0.95	0.95	0.83	0.83	0.83
Hourly flow rate (vph)	23	0	32	0	0	0	0	134	69	206	129	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)								202				
pX, platoon unblocked												
vC, conflicting volume	709	744	129	741	709	168	129			203		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	709	744	129	741	709	168	129			203		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	100	97	100	100	100	100			85		
cM capacity (veh/h)	308	291	921	283	305	876	1457			1369		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	55	203	335
Volume Left	23	0	206
Volume Right	32	69	0
cSH	505	1700	1369
Volume to Capacity	0.11	0.12	0.15
Queue Length 95th (ft)	9	0	13
Control Delay (s)	13.0	0.0	5.5
Lane LOS	B		A
Approach Delay (s)	13.0	0.0	5.5
Approach LOS	B		

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	39.1%	ICU Level of Service	A
Analysis Period (min)	15		

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	MT
Agency/Co.:	AKRF, Inc.
Date performed:	11/6/2012
Analysis time period:	Sunday (3:30-4:30PM)
Freeway/Dir of Travel:	Route 17 Eastbound
Junction:	Interchange 106
Jurisdiction:	New York State
Analysis Year:	2014 No Build
Description:	Concord Resort (Project No. 40376)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1934	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	237	vph
Length of first accel/decel lane	1462	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1934	237		vph
Peak-hour factor, PHF	0.95	0.92		
Peak 15-min volume, v15	509	64		v
Trucks and buses	2	2		%
Recreational vehicles	2	2		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.986	0.986	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2064	261	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2064 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2325	4700	No
v_3 or v_{av34}	0 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	
If yes, v_{12A} = 2064		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2325	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 14.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.259	
Space mean speed in ramp influence area,	S_R = 59.1	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 59.1	mph