2014 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	1021	26	14	849	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			0.99			0.94			0.95	
Flt Protected		1.00			1.00			0.98			0.97	
Satd. Flow (prot)		3517			3475			1755			1868	
Flt Permitted		0.87			0.93			0.79			0.79	
Satd. Flow (perm)		3060			3223			1408			1523	
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	1187	30	16	976	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	1265	0	0	1099	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)		27.2			27.3			12.6			12.6	
Effective Green, g (s)		27.2			27.3			12.6			12.6	
Actuated g/C Ratio		0.53			0.54			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)		1632			1725			348			376	
v/s Ratio Prot												
v/s Ratio Perm		c0.41			0.34			0.10			c0.18	
v/c Ratio		0.78			0.64			0.39			0.71	
Uniform Delay, d1		9.5			8.4			16.0			17.5	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.3			0.7			0.5			5.9	
Delay (s)		11.7			9.0			16.5			23.4	
Level of Service		B			A			B			C	
Approach Delay (s)		11.7			9.0			16.5			23.4	
Approach LOS		B			A			B			C	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	51.0	Sum of lost time (s)	11.2
Intersection Capacity Utilization	87.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	1265	1099	136	268
v/c Ratio	0.78	0.64	0.39	0.71
Control Delay	14.1	10.9	20.6	30.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.1	10.9	20.6	30.7
Queue Length 50th (ft)	156	120	37	80
Queue Length 95th (ft)	215	167	63	117
Internal Link Dist (ft)	880	2120	328	12725
Turn Bay Length (ft)				
Base Capacity (vph)	1824	1929	420	454
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	0.69	0.57	0.32	0.59

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	549	679	40	28	632	307	27	19	14	321	37	499
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	1967		1651	3539	1481		1867	1534		1707	1724
Flt Permitted	0.23	1.00		0.19	1.00	1.00		0.65	1.00		0.71	1.00
Satd. Flow (perm)	430	1967		330	3539	1481		1257	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)	603	746	44	30	672	327	29	21	15	345	40	537
RTOR Reduction (vph)	0	2	0	0	0	140	0	0	11	0	0	64
Lane Group Flow (vph)	603	788	0	30	672	187	0	50	4	0	385	473
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)	43.2	36.1		26.8	23.9	23.9		20.2	20.2		20.2	35.3
Effective Green, g (s)	43.2	36.1		26.8	23.9	23.9		20.2	20.2		20.2	35.3
Actuated g/C Ratio	0.60	0.50		0.37	0.33	0.33		0.28	0.28		0.28	0.49
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)	540	989		177	1178	493		354	432		358	948
v/s Ratio Prot	c0.23	0.40		0.01	0.19							0.10
v/s Ratio Perm	c0.44			0.06		0.13		0.04	0.00		c0.30	0.17
v/c Ratio	1.12	0.80		0.17	0.57	0.38		0.14	0.01		1.08	0.50
Uniform Delay, d1	14.5	14.8		15.3	19.7	18.3		19.3	18.6		25.8	12.3
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	74.9	4.4		0.3	0.6	0.4		0.1	0.0		69.1	0.3
Delay (s)	89.4	19.2		15.7	20.3	18.6		19.4	18.6		94.9	12.6
Level of Service	F	B		B	C	B		B	B		F	B
Approach Delay (s)		49.6			19.6			19.2			47.0	
Approach LOS		D			B			B			D	

Intersection Summary			
HCM Average Control Delay	39.3	HCM Level of Service	D
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	71.8	Sum of lost time (s)	8.4
Intersection Capacity Utilization	86.4%	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)	603	790	30	672	327	50	15	385	537
v/c Ratio	1.11	0.77	0.10	0.62	0.55	0.14	0.03	1.04	0.57
Control Delay	89.6	21.3	7.4	22.8	10.6	21.7	11.0	87.7	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	89.6	21.3	7.4	22.8	10.6	21.7	11.0	87.7	10.9
Queue Length 50th (ft)	~223	204	5	126	37	15	0	~178	88
Queue Length 95th (ft)	#438	#538	14	175	102	45	14	#382	210
Internal Link Dist (ft)		2120		980		249		1452	
Turn Bay Length (ft)			50		50				110
Base Capacity (vph)	544	1044	462	1806	857	366	457	370	941
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	1.11	0.76	0.06	0.37	0.38	0.14	0.03	1.04	0.57

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	678	1308	0	0	1336
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	770	1422	0	0	1452
RTOR Reduction (vph)	0	41	0	0	0	0
Lane Group Flow (vph)	0	729	1422	0	0	1452
Confl. Peds. (#/hr)	10	10		10	10	
Turn Type		custom				
Protected Phases			2			6
Permitted Phases		3				
Actuated Green, G (s)		21.8	40.1			72.5
Effective Green, g (s)		21.8	40.1			72.5
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)		865	1892			1863
v/s Ratio Prot			0.42			c0.78
v/s Ratio Perm		0.25				
v/c Ratio		0.84	0.75			0.78
Uniform Delay, d1		23.7	12.4			0.0
Progression Factor		1.00	1.00			1.00
Incremental Delay, d2		7.4	1.8			2.3
Delay (s)		31.1	14.2			2.3
Level of Service		C	B			A
Approach Delay (s)	31.1		14.2			2.3
Approach LOS	C		B			A

Intersection Summary			
HCM Average Control Delay	13.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	72.5	Sum of lost time (s)	0.0
Intersection Capacity Utilization	96.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBR	NBT	SBT
Lane Group Flow (vph)	770	1422	1452
v/c Ratio	0.85	0.76	0.78
Control Delay	33.3	16.1	3.3
Queue Delay	0.0	0.0	0.0
Total Delay	33.3	16.1	3.3
Queue Length 50th (ft)	188	263	0
Queue Length 95th (ft)	#263	346	0
Internal Link Dist (ft)		626	13
Turn Bay Length (ft)			
Base Capacity (vph)	1054	2176	1863
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.73	0.65	0.78

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)	222	8	297	35	5	41	628	1324	33	31	1481	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	3523		1711	3598	
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	3523		1711	3598	
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	1351	34	33	1559	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	1384	0	33	1714	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	1460	
v/s Ratio Prot		0.00			0.01		c0.19	0.39		0.02	c0.48	
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	0.68		0.48	1.17	
Uniform Delay, d1	41.6	34.1	35.8	56.3	54.9		49.0	18.9		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	1.0		3.8	85.8	
Delay (s)	46.0	34.1	36.0	58.2	55.1		61.1	19.9		64.0	123.9	
Level of Service	D	C	D	E	E		E	B		E	F	
Approach Delay (s)		40.2			56.4			33.0			122.8	
Approach LOS		D			E			C			F	

Intersection Summary			
HCM Average Control Delay	69.7	HCM Level of Service	E
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	128.4	Sum of lost time (s)	14.0
Intersection Capacity Utilization	110.3%	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	1385	33	1719
v/c Ratio	0.66	0.02	0.47	0.41	0.35	0.87	0.67	0.28	1.20
Control Delay	50.7	33.9	6.0	67.3	22.6	61.4	21.4	64.2	132.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0
Total Delay	50.7	33.9	6.0	67.3	22.6	61.4	22.2	64.2	132.2
Queue Length 50th (ft)	180	5	0	36	5	259	416	26	~906
Queue Length 95th (ft)	279	20	69	66	34	#351	578	63	#1138
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	2066	203	1431
Starvation Cap Reductn	0	0	0	0	0	0	374	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	0.82	0.16	1.20

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	1324	88	120	1185	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	3382		1829	3292	
Flt Permitted		0.52		0.86	0.95		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1065		1420	1444		1711	3382		1829	3292	
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	1394	93	132	1302	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	1484	0	132	1325	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	c0.44		c0.07	c0.40	
v/s Ratio Perm		c0.04		c0.29	0.24							
v/c Ratio		0.63		1.04	0.84		0.21	1.11		0.67	0.82	
Uniform Delay, d1		56.6		45.0	42.2		61.4	37.9		53.7	27.1	
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	61.6		7.9	3.6	
Delay (s)		70.0		100.0	55.8		65.3	99.5		61.6	30.7	
Level of Service		E		F	E		E	F		E	C	
Approach Delay (s)		70.0			78.8			99.4			33.5	
Approach LOS		E			E			F			C	

Intersection Summary			
HCM Average Control Delay	69.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	125.2	Sum of lost time (s)	23.1
Intersection Capacity Utilization	89.5%	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	1487	132	1326
v/c Ratio	0.52	1.00	0.82	0.03	1.16	0.64	0.79
Control Delay	70.9	87.3	50.7	58.0	117.3	66.8	29.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	3.6
Total Delay	70.9	87.3	50.7	58.0	117.3	66.8	33.5
Queue Length 50th (ft)	36	~365	256	3	~745	101	425
Queue Length 95th (ft)	75	#523	#377	16	#1004	174	#728
Internal Link Dist (ft)	165		514		1026		520
Turn Bay Length (ft)						100	
Base Capacity (vph)	136	417	466	430	1279	460	1683
Starvation Cap Reductn	0	0	0	0	0	0	266
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	1.16	0.29	0.94

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	512	18	17	118	965	469	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	1676		1708	1863	1544	1767	3481	
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	1676		362	1863	1544	123	3481	
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	665	23	22	122	995	484	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	359	349	0	122	995	484	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		26.2	26.2		60.5	60.5	107.3	60.5	60.5	
Effective Green, g (s)	6.7	6.7		26.2	26.2		60.5	60.5	107.3	60.5	60.5	
Actuated g/C Ratio	0.06	0.06		0.24	0.24		0.56	0.56	1.00	0.56	0.56	
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)	103	106		410	409		204	1050	1544	69	1963	
v/s Ratio Prot	0.02	0.01		c0.21	0.21			c0.53			0.30	
v/s Ratio Perm							0.34		c0.31	0.13		
v/c Ratio	0.38	0.16		0.88	0.85		0.60	0.95	0.31	0.23	0.53	
Uniform Delay, d1	48.3	47.6		39.0	38.7		15.4	21.9	0.0	11.7	14.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.3	0.7		18.4	15.7		8.5	17.3	0.5	4.8	0.7	
Delay (s)	50.6	48.3		57.4	54.4		23.9	39.2	0.5	16.6	15.2	
Level of Service	D	D		E	D		C	D	A	B	B	
Approach Delay (s)		49.7			55.9			26.3			15.3	
Approach LOS		D			E			C			B	

Intersection Summary			
HCM Average Control Delay	29.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	107.3	Sum of lost time (s)	9.4
Intersection Capacity Utilization	109.6%	ICU Level of Service	H
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	359	351	122	995	484	16	1049
v/c Ratio	0.31	0.20	0.87	0.85	0.59	0.94	0.31	0.23	0.53
Control Delay	54.6	35.3	61.1	58.2	32.1	40.4	0.5	23.9	16.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	43.7	0.0	0.0	0.0
Total Delay	54.6	35.3	61.1	58.2	32.1	84.1	0.5	23.9	16.2
Queue Length 50th (ft)	27	11	253	244	55	644	0	6	234
Queue Length 95th (ft)	51	31	#315	305	#160	#999	0	25	313
Internal Link Dist (ft)		538		2647		520			6088
Turn Bay Length (ft)			300		115			100	
Base Capacity (vph)	289	311	438	439	206	1060	1544	70	1985
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	0.82	0.80	0.59	1.10	0.31	0.23	0.53

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	34	27	361	43	62	35	578	303	64	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			0.98			0.96			0.99	
Flt Protected		0.97			0.96			1.00			0.99	
Satd. Flow (prot)		1978			1617			1696			1820	
Flt Permitted		0.74			0.67			0.95			0.78	
Satd. Flow (perm)		1497			1122			1622			1419	
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	45	36	481	57	83	40	664	348	73	572	75
RTOR Reduction (vph)	0	0	0	0	7	0	0	22	0	0	5	0
Lane Group Flow (vph)	0	186	0	0	614	0	0	1030	0	0	715	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)		544			408			786			717	
v/s Ratio Prot												
v/s Ratio Perm		0.12			c0.55			c0.64			0.50	
v/c Ratio		0.34			1.50			1.31			1.00	
Uniform Delay, d1		19.1			26.2			21.2			20.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.5			239.7			149.0			32.9	
Delay (s)		19.6			265.9			170.2			53.2	
Level of Service		B			F			F			D	
Approach Delay (s)		19.6			265.9			170.2			53.2	
Approach LOS		B			F			F			D	

Intersection Summary			
HCM Average Control Delay	149.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.39		
Actuated Cycle Length (s)	82.5	Sum of lost time (s)	12.5
Intersection Capacity Utilization	100.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	186	621	1052	720
v/c Ratio	0.34	1.50	1.30	1.00
Control Delay	21.3	260.5	168.3	55.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.3	260.5	168.3	55.3
Queue Length 50th (ft)	69	~453	~702	348
Queue Length 95th (ft)	97	#506	#891	#580
Internal Link Dist (ft)	10998	2302	6088	1957
Turn Bay Length (ft)				
Base Capacity (vph)	544	415	807	722
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	0.34	1.50	1.30	1.00

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)	239	91	39	26	19	186
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	0.42	1.00	1.00		0.95	1.00
Satd. Flow (perm)	729	1863	1763		1770	1742
Peak-hour factor, PHF	0.88	0.88	0.83	0.83	0.83	0.83
Adj. Flow (vph)	272	103	47	31	23	224
RTOR Reduction (vph)	0	0	23	0	0	182
Lane Group Flow (vph)	272	103	55	0	23	42
Turn Type	pm+pt					pm+ov
Protected Phases	1	6	2		4	1
Permitted Phases	6					4
Actuated Green, G (s)	16.5	16.5	7.3		0.9	5.1
Effective Green, g (s)	16.5	16.5	7.3		0.9	5.1
Actuated g/C Ratio	0.60	0.60	0.27		0.03	0.19
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)	580	1122	470		58	642
v/s Ratio Prot	c0.07	0.06	0.03		c0.01	0.01
v/s Ratio Perm	c0.21					0.01
v/c Ratio	0.47	0.09	0.12		0.40	0.06
Uniform Delay, d1	3.2	2.3	7.6		13.0	9.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.6	0.0	0.1		4.4	0.0
Delay (s)	3.8	2.3	7.7		17.4	9.2
Level of Service	A	A	A		B	A
Approach Delay (s)		3.4	7.7		10.0	
Approach LOS		A	A		A	

Intersection Summary			
HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	27.4	Sum of lost time (s)	10.0
Intersection Capacity Utilization	31.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	272	103	78	23	224
v/c Ratio	0.40	0.06	0.14	0.05	0.37
Control Delay	4.6	2.1	6.2	8.6	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.6	2.1	6.2	8.6	3.1
Queue Length 50th (ft)	0	0	3	1	0
Queue Length 95th (ft)	48	20	22	12	14
Internal Link Dist (ft)		236	290	122	
Turn Bay Length (ft)					
Base Capacity (vph)	680	1768	1265	1679	600
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	0.40	0.06	0.06	0.01	0.37

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	14	86	256	71	73	56	215	165	89	77	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	0.93		1.00	0.95		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	1683		1711	1765		1711	1848	
Flt Permitted	0.67	1.00		0.32	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1202	1598		584	1683		1711	1765		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	77	79	61	234	179	97	84	163	9
RTOR Reduction (vph)	0	134	0	0	35	0	0	22	0	0	2	0
Lane Group Flow (vph)	15	237	0	77	105	0	234	254	0	84	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	19.9		6.8	12.9	
Effective Green, g (s)	14.0	14.0		14.0	14.0		13.8	19.9		6.8	12.9	
Actuated g/C Ratio	0.24	0.24		0.24	0.24		0.24	0.34		0.12	0.22	
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)	287	381		139	401		402	598		198	406	
v/s Ratio Prot		c0.15			0.06		c0.14	c0.14		0.05	0.09	
v/s Ratio Perm	0.01			0.13								
v/c Ratio	0.05	0.62		0.55	0.26		0.58	0.42		0.42	0.42	
Uniform Delay, d1	17.2	20.0		19.6	18.2		19.9	15.0		24.1	19.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	3.1		4.7	0.3		2.1	0.5		1.5	0.7	
Delay (s)	17.3	23.1		24.3	18.5		22.0	15.5		25.6	20.4	
Level of Service	B	C		C	B		C	B		C	C	
Approach Delay (s)		22.9			20.6			18.5			22.1	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM Average Control Delay	20.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	58.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	15	371	77	140	234	276	84	172
v/c Ratio	0.05	0.72	0.55	0.32	0.58	0.44	0.34	0.48
Control Delay	19.3	19.8	37.0	16.0	27.9	18.6	31.0	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	37.0	16.0	27.9	18.6	31.0	28.6
Queue Length 50th (ft)	4	55	22	25	68	65	25	50
Queue Length 95th (ft)	19	173	76	79	174	166	85	139
Internal Link Dist (ft)		193		1418		2763		1435
Turn Bay Length (ft)	125		125		150		100	
Base Capacity (vph)	642	935	311	920	818	1052	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	0.25	0.15	0.29	0.26	0.24	0.30

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	29	69	34	10	33	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	82	43	13	39	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	169	49			56	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	169	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	92			97	
cM capacity (veh/h)	800	1019			1549	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	117	56	81
Volume Left	35	0	39
Volume Right	82	13	0
cSH	943	1700	1549
Volume to Capacity	0.12	0.03	0.03
Queue Length 95th (ft)	11	0	2
Control Delay (s)	9.4	0.0	3.6
Lane LOS	A		A
Approach Delay (s)	9.4	0.0	3.6
Approach LOS	A		

Intersection Summary			
Average Delay	5.5		
Intersection Capacity Utilization	22.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	468	28	17	503	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)	557	33	21	629	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			590		1245	574
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			590		1245	574
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		70	94
cM capacity (veh/h)			985		188	518

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	590	650	86
Volume Left	0	21	57
Volume Right	33	0	29
cSH	1700	985	239
Volume to Capacity	0.35	0.02	0.36
Queue Length 95th (ft)	0	2	39
Control Delay (s)	0.0	0.6	28.3
Lane LOS		A	D
Approach Delay (s)	0.0	0.6	28.3
Approach LOS			D

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	50.7%	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	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)	53	135	59	50	127	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)	71	180	76	64	143	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			251		376	161
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			251		376	161
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			94		76	91
cM capacity (veh/h)			1315		589	884

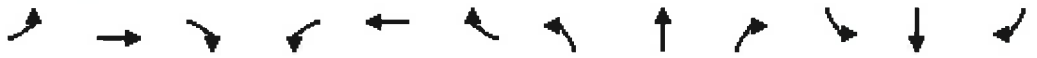
Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	251	76	64	226
Volume Left	0	76	0	143
Volume Right	180	0	0	83
cSH	1700	1315	1700	672
Volume to Capacity	0.15	0.06	0.04	0.34
Queue Length 95th (ft)	0	5	0	37
Control Delay (s)	0.0	7.9	0.0	13.0
Lane LOS		A		B
Approach Delay (s)	0.0	4.3		13.0
Approach LOS				B

Intersection Summary			
Average Delay	5.8		
Intersection Capacity Utilization	36.0%	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	79	48	27	60	0	49	0	46	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	64	34	76	0	56	0	53	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			169			282	282	137	335	314	76
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	76			169			282	282	137	335	314	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			98			91	100	94	100	100	100
cM capacity (veh/h)	1523			1408			658	612	911	572	587	985

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	169	110	109	0
Volume Left	0	34	56	0
Volume Right	64	0	53	0
cSH	1523	1408	760	1700
Volume to Capacity	0.00	0.02	0.14	0.00
Queue Length 95th (ft)	0	2	12	0
Control Delay (s)	0.0	2.5	10.5	0.0
Lane LOS		A	B	A
Approach Delay (s)	0.0	2.5	10.5	0.0
Approach LOS			B	A

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	27.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	11	13	22	32	38	8	12	261	50	11	300	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	42	49	10	16	348	67	15	400	11

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	61	101	364	67	425
Volume Left (vph)	15	42	16	0	15
Volume Right (vph)	29	10	0	67	11
Hadj (s)	-0.21	0.05	0.06	-0.67	0.03
Departure Headway (s)	6.0	6.2	5.5	4.8	5.1
Degree Utilization, x	0.10	0.17	0.56	0.09	0.60
Capacity (veh/h)	498	508	626	723	686
Control Delay (s)	9.7	10.5	14.1	7.1	15.6
Approach Delay (s)	9.7	10.5	13.0		15.6
Approach LOS	A	B	B		C

Intersection Summary			
Delay	13.6		
HCM Level of Service	B		
Intersection Capacity Utilization	39.1%	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)	58	5	11	0	1	0	12	310	1	3	206	65
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)	70	6	13	0	1	0	13	337	1	3	210	66
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	614	614	243	629	646	338	277			338		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	614	614	243	629	646	338	277			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 %	82	99	98	100	100	100	99			100		
cM capacity (veh/h)	399	402	795	380	385	705	1286			1221		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	89	1	351	280
Volume Left	70	0	13	3
Volume Right	13	0	1	66
cSH	431	385	1286	1221
Volume to Capacity	0.21	0.00	0.01	0.00
Queue Length 95th (ft)	19	0	1	0
Control Delay (s)	15.5	14.4	0.4	0.1
Lane LOS	C	B	A	A
Approach Delay (s)	15.5	14.4	0.4	0.1
Approach LOS	C	B		

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	41.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	67	58	31	337	217	56
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)	86	74	36	392	252	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	749	285	317			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	749	285	317			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	77	90	97			
cM capacity (veh/h)	369	754	1243			

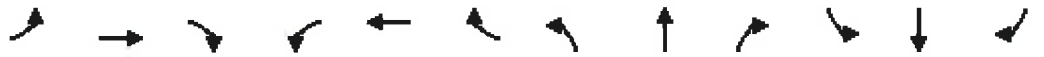
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	160	428	317
Volume Left	86	36	0
Volume Right	74	0	65
cSH	483	1243	1700
Volume to Capacity	0.33	0.03	0.19
Queue Length 95th (ft)	36	2	0
Control Delay (s)	16.1	0.9	0.0
Lane LOS	C	A	
Approach Delay (s)	16.1	0.9	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	51.5%	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	175	692	157	751	10	327	10	52	10	10	0
Peak Hour Factor	0.92	0.92	0.92	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	0	190	752	209	1001	13	436	13	69	13	13	0

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total (vph)	190	752	1224	519	27
Volume Left (vph)	0	0	209	436	13
Volume Right (vph)	0	752	13	69	0
Hadj (s)	0.03	-0.67	0.06	0.12	0.13
Departure Headway (s)	7.8	7.1	7.3	7.3	9.7
Degree Utilization, x	0.41	1.48	2.49	1.05	0.07
Capacity (veh/h)	455	513	504	501	367
Control Delay (s)	14.9	243.3	691.1	80.6	13.4
Approach Delay (s)	197.2		691.1	80.6	13.4
Approach LOS	F		F	F	B

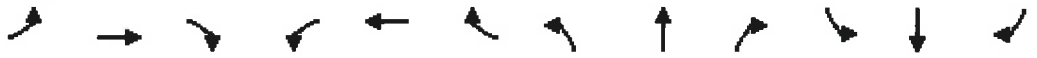
Intersection Summary			
Delay	396.0		
HCM Level of Service	F		
Intersection Capacity Utilization	105.0%	ICU Level of Service	G
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	20	217	13	39	2	876	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	289	17	52	3	922	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			316			264	261	171	286	404	53
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	55			316			264	261	171	286	404	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			0	100	97	100	100	100
cM capacity (veh/h)	1550			1244			677	635	872	638	528	1014

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	316	72	949	5
Volume Left	0	17	922	0
Volume Right	289	3	26	4
cSH	1550	1244	682	824
Volume to Capacity	0.00	0.01	1.39	0.01
Queue Length 95th (ft)	0	1	1049	0
Control Delay (s)	0.0	2.0	204.2	9.4
Lane LOS		A	F	A
Approach Delay (s)	0.0	2.0	204.2	9.4
Approach LOS			F	A

Intersection Summary			
Average Delay	144.5		
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	222	17	0	0	0	0	167	98	671	188	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	0.92	0.95	0.95	0.95	0.83	0.83	0.83
Hourly flow rate (vph)	0	296	23	0	0	0	0	176	103	808	227	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	2071	2122	227	2241	2071	227	227			279		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2071	2122	227	2241	2071	227	227			279		
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 %	100	0	97	0	100	100	100			37		
cM capacity (veh/h)	20	19	813	0	20	812	1342			1284		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	319	279	1035
Volume Left	0	0	808
Volume Right	23	103	0
cSH	20	1700	1284
Volume to Capacity	15.97	0.16	0.63
Queue Length 95th (ft)	Err	0	118
Control Delay (s)	Err	0.0	11.7
Lane LOS	F		B
Approach Delay (s)	Err	0.0	11.7
Approach LOS	F		

Intersection Summary			
Average Delay	1959.2		
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		

HCS+: Ramps and Ramp Junctions Release 5.5

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 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	1598	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	769	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)	1598	769		vph
Peak-hour factor, PHF	0.96	0.92		
Peak 15-min volume, v15	416	209		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	1688	848	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1688 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2536	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} = 1688		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2536	4600	No

Level of Service Determination (if not F)

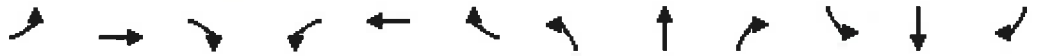
Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 15.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.268	
Space mean speed in ramp influence area,	S_R = 58.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.8	mph

2014 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	467	4	10	438	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)		3530			3510			1828			1884	
Flt Permitted		0.94			0.94			1.00			0.97	
Satd. Flow (perm)		3336			3306			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	537	5	12	534	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	551	0	0	569	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)		18.7			18.8			3.1			3.1	
Effective Green, g (s)		18.7			18.8			3.1			3.1	
Actuated g/C Ratio		0.57			0.57			0.09			0.09	
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)		1890			1883			177			176	
v/s Ratio Prot												
v/s Ratio Perm		0.17			c0.17			0.03			c0.05	
v/c Ratio		0.29			0.30			0.31			0.55	
Uniform Delay, d1		3.7			3.7			14.0			14.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.1			0.1			0.7			3.0	
Delay (s)		3.8			3.8			14.7			17.3	
Level of Service		A			A			B			B	
Approach Delay (s)		3.8			3.8			14.7			17.3	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	5.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	33.0	Sum of lost time (s)	11.1
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	551	569	55	97
v/c Ratio	0.22	0.23	0.10	0.18
Control Delay	4.4	4.4	9.1	9.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	4.4	4.4	9.1	9.6
Queue Length 50th (ft)	0	0	3	5
Queue Length 95th (ft)	54	52	23	29
Internal Link Dist (ft)	880	2120	328	12725
Turn Bay Length (ft)				
Base Capacity (vph)	3190	3169	986	981
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	0.17	0.18	0.06	0.10

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	339	237	17	113	180	6	22	16	14	178	18	327
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)	1765	1963		1646	3539	1486		1867	1539		1711	1726
Flt Permitted	0.45	1.00		0.58	1.00	1.00		0.80	1.00		0.71	1.00
Satd. Flow (perm)	838	1963		998	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)	404	282	20	140	222	7	27	20	17	207	21	380
RTOR Reduction (vph)	0	3	0	0	0	5	0	0	12	0	0	179
Lane Group Flow (vph)	404	299	0	140	222	2	0	47	5	0	228	201
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)	29.0	18.2		18.3	11.7	11.7		14.2	14.2		14.2	27.3
Effective Green, g (s)	29.0	18.2		18.3	11.7	11.7		14.2	14.2		14.2	27.3
Actuated g/C Ratio	0.56	0.35		0.35	0.23	0.23		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)	706	692		437	802	337		422	424		350	1054
v/s Ratio Prot	c0.15	0.15		0.04	0.06							0.05
v/s Ratio Perm	c0.18			0.07		0.00		0.03	0.00		c0.18	0.07
v/c Ratio	0.57	0.43		0.32	0.28	0.00		0.11	0.01		0.65	0.19
Uniform Delay, d1	6.7	12.8		11.7	16.5	15.4		14.0	13.6		16.5	6.4
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.9	0.3		0.3	0.1	0.0		0.1	0.0		3.8	0.1
Delay (s)	7.6	13.1		12.1	16.6	15.4		14.1	13.6		20.4	6.4
Level of Service	A	B		B	B	B		B	B		C	A
Approach Delay (s)		9.9			14.9			13.9			11.7	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	51.6	Sum of lost time (s)	8.4
Intersection Capacity Utilization	59.3%	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)	404	302	140	222	7	47	17	228	380
v/c Ratio	0.58	0.43	0.29	0.30	0.02	0.11	0.04	0.64	0.34
Control Delay	11.1	17.2	9.2	19.7	12.2	14.5	7.5	25.7	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.1	17.2	9.2	19.7	12.2	14.5	7.5	25.7	1.5
Queue Length 50th (ft)	61	70	18	30	0	10	0	59	0
Queue Length 95th (ft)	126	141	43	55	8	28	10	121	19
Internal Link Dist (ft)		2120		980		249		1452	
Turn Bay Length (ft)			50		50				110
Base Capacity (vph)	742	1380	702	2485	1040	614	625	509	1161
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	0.54	0.22	0.20	0.09	0.01	0.08	0.03	0.45	0.33

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	540	829	0	0	1191
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)		2889	3421			1863
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		2889	3421			1863
Peak-hour factor, PHF	0.81	0.81	0.95	0.95	0.92	0.92
Adj. Flow (vph)	0	667	873	0	0	1295
RTOR Reduction (vph)	0	167	0	0	0	0
Lane Group Flow (vph)	0	500	873	0	0	1295
Confl. Peds. (#/hr)	10	10		10	10	
Turn Type		custom				
Protected Phases			2			6
Permitted Phases		3				
Actuated Green, G (s)		13.7	24.3			48.6
Effective Green, g (s)		13.7	24.3			48.6
Actuated g/C Ratio		0.28	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)		814	1711			1863
v/s Ratio Prot			0.26			c0.70
v/s Ratio Perm		0.17				
v/c Ratio		0.61	0.51			0.70
Uniform Delay, d1		15.2	8.2			0.0
Progression Factor		1.00	1.00			1.00
Incremental Delay, d2		1.2	0.3			1.2
Delay (s)		16.3	8.5			1.2
Level of Service		B	A			A
Approach Delay (s)	16.3		8.5			1.2
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	7.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	48.6	Sum of lost time (s)	0.0
Intersection Capacity Utilization	76.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBR	NBT	SBT
Lane Group Flow (vph)	667	873	1295
v/c Ratio	0.69	0.53	0.70
Control Delay	15.2	10.0	2.2
Queue Delay	0.0	0.0	0.0
Total Delay	15.2	10.0	2.2
Queue Length 50th (ft)	51	72	0
Queue Length 95th (ft)	136	170	0
Internal Link Dist (ft)		626	13
Turn Bay Length (ft)			
Base Capacity (vph)	1717	3034	1863
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.39	0.29	0.70

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	1044	40	59	1249	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	0.99	
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	3515		1711	3594	
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	3515		1711	3594	
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	1123	43	66	1403	154
RTOR Reduction (vph)	0	0	253	0	40	0	0	2	0	0	5	0
Lane Group Flow (vph)	206	25	118	81	24	0	306	1164	0	66	1552	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)	37.4	37.4	37.4	12.4	12.4		15.4	59.9		8.3	52.8	
Effective Green, g (s)	37.4	37.4	37.4	12.4	12.4		15.4	59.9		8.3	52.8	
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)	412	563	517	142	164		442	1760		119	1587	
v/s Ratio Prot		0.01			0.01		c0.09	0.33		0.04	c0.43	
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	0.66		0.55	0.98	
Uniform Delay, d1	33.5	28.6	30.4	51.1	48.8		49.8	22.3		53.9	32.8	
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	4.5	0.3		4.3	1.0		4.4	17.5	
Delay (s)	34.2	28.7	30.6	55.5	49.1		54.1	23.3		58.3	50.3	
Level of Service	C	C	C	E	D		D	C		E	D	
Approach Delay (s)		31.7			52.7			29.7			50.6	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM Average Control Delay	39.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	119.6	Sum of lost time (s)	14.0
Intersection Capacity Utilization	101.5%	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	1166	66	1557
v/c Ratio	0.50	0.04	0.48	0.57	0.32	0.68	0.66	0.46	0.99
Control Delay	38.7	30.1	5.6	68.4	25.7	58.2	25.4	63.9	54.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Total Delay	38.7	30.1	5.6	68.4	25.7	58.2	25.6	63.9	54.6
Queue Length 50th (ft)	124	13	2	59	13	113	343	48	~597
Queue Length 95th (ft)	226	38	69	101	43	181	502	104	#898
Internal Link Dist (ft)		970			507		497		1026
Turn Bay Length (ft)	100		60			300		160	
Base Capacity (vph)	503	688	857	232	307	874	1945	218	1570
Starvation Cap Reductn	0	0	0	0	0	0	208	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	0.67	0.30	0.99

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)	14	6	9	380	3	146	19	850	111	132	897	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	3348		1829	3292	
Flt Permitted		0.70		0.49	0.70		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1404		805	1075		1711	3348		1829	3292	
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	944	123	147	997	18
RTOR Reduction (vph)	0	11	0	0	31	0	0	6	0	0	1	0
Lane Group Flow (vph)	0	28	0	301	249	0	21	1061	0	147	1014	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)		6.8		35.2	35.2		3.1	48.3		14.3	59.5	
Effective Green, g (s)		6.8		35.2	35.2		3.1	48.3		14.3	59.5	
Actuated g/C Ratio		0.06		0.29	0.29		0.03	0.39		0.12	0.48	
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)		78		231	308		43	1317		213	1595	
v/s Ratio Prot							0.01	c0.32		c0.08	0.31	
v/s Ratio Perm		c0.02		c0.37	0.23							
v/c Ratio		0.35		1.30	0.81		0.49	0.81		0.69	0.64	
Uniform Delay, d1		55.9		43.8	40.7		59.1	33.1		52.1	23.6	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.0		164.2	13.9		6.2	3.9		8.5	0.9	
Delay (s)		57.9		208.0	54.6		65.3	37.0		60.7	24.5	
Level of Service		E		F	D		E	D		E	C	
Approach Delay (s)		57.9			134.1			37.5			29.1	
Approach LOS		E			F			D			C	

Intersection Summary			
HCM Average Control Delay	53.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	122.8	Sum of lost time (s)	18.2
Intersection Capacity Utilization	70.3%	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	1067	147	1015
v/c Ratio	0.35	1.26	0.80	0.18	0.83	0.67	0.62
Control Delay	50.5	184.9	52.6	59.1	41.2	65.8	25.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.8
Total Delay	50.5	184.9	52.6	59.1	41.2	65.8	26.0
Queue Length 50th (ft)	20	~314	183	16	394	111	269
Queue Length 95th (ft)	47	#547	#377	45	#574	185	436
Internal Link Dist (ft)	165		514		1026		520
Turn Bay Length (ft)						100	
Base Capacity (vph)	188	238	349	435	1281	464	1649
Starvation Cap Reductn	0	0	0	0	0	0	327
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	1.26	0.80	0.05	0.83	0.32	0.77

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	437	14	1	7	540	451	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		541	1863	1544	511	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	583	19	1	8	587	490	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	303	300	0	8	587	490	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		22.4	22.4		39.4	39.4	80.3	39.4	39.4	
Effective Green, g (s)	4.6	4.6		22.4	22.4		39.4	39.4	80.3	39.4	39.4	
Actuated g/C Ratio	0.06	0.06		0.28	0.28		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)	95	104		469	471		265	914	1544	251	1727	
v/s Ratio Prot	0.02	0.00		c0.18	0.18			c0.32			0.22	
v/s Ratio Perm							0.01		c0.32	0.01		
v/c Ratio	0.42	0.09		0.65	0.64		0.03	0.64	0.32	0.02	0.44	
Uniform Delay, d1	36.6	35.9		25.5	25.4		10.6	15.2	0.0	10.5	13.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.0	0.4		3.1	2.8		0.1	2.5	0.5	0.1	0.5	
Delay (s)	39.6	36.2		28.5	28.2		10.7	17.7	0.5	10.6	13.8	
Level of Service	D	D		C	C		B	B	A	B	B	
Approach Delay (s)		38.9			28.4			9.9			13.8	
Approach LOS		D			C			A			B	

Intersection Summary			
HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	80.3	Sum of lost time (s)	9.4
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
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	303	300	8	587	490	5	759
v/c Ratio	0.24	0.05	0.64	0.63	0.03	0.63	0.32	0.02	0.43
Control Delay	44.0	40.1	34.5	34.1	14.4	20.3	0.5	14.2	15.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.0	40.1	34.5	34.1	14.4	20.3	0.5	14.2	15.0
Queue Length 50th (ft)	18	4	135	133	2	216	0	1	127
Queue Length 95th (ft)	51	19	238	235	12	424	0	8	213
Internal Link Dist (ft)		538		2647		520			6088
Turn Bay Length (ft)			300		115			100	
Base Capacity (vph)	374	415	727	730	420	1449	1544	398	2737
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	0.42	0.41	0.02	0.42	0.32	0.01	0.28

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	26	24	309	61	51	27	256	300	64	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			0.99			1.00			1.00	
Frt		0.95			0.98			0.93			0.99	
Flt Protected		0.99			0.96			1.00			0.99	
Satd. Flow (prot)		1949			1621			1640			1832	
Flt Permitted		0.89			0.73			0.97			0.80	
Satd. Flow (perm)		1757			1228			1590			1473	
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	35	32	412	81	68	30	284	333	74	309	15
RTOR Reduction (vph)	0	0	0	0	6	0	0	49	0	0	2	0
Lane Group Flow (vph)	0	82	0	0	555	0	0	598	0	0	396	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			35.2			36.9	
Effective Green, g (s)		30.2			30.2			35.2			36.9	
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)		681			476			718			698	
v/s Ratio Prot												
v/s Ratio Perm		0.05			c0.45			c0.38			0.27	
v/c Ratio		0.12			1.17			0.83			0.57	
Uniform Delay, d1		15.3			23.9			18.8			14.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.1			95.9			9.5			2.2	
Delay (s)		15.4			119.7			28.2			17.0	
Level of Service		B			F			C			B	
Approach Delay (s)		15.4			119.7			28.2			17.0	
Approach LOS		B			F			C			B	

Intersection Summary			
HCM Average Control Delay	55.4	HCM Level of Service	E
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	77.9	Sum of lost time (s)	12.5
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	82	561	647	398
v/c Ratio	0.12	1.17	0.84	0.57
Control Delay	17.9	121.9	27.7	18.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	17.9	121.9	27.7	18.1
Queue Length 50th (ft)	28	~365	232	131
Queue Length 95th (ft)	47	#424	#403	202
Internal Link Dist (ft)	10998	2302	6088	1957
Turn Bay Length (ft)				
Base Capacity (vph)	680	481	865	794
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	0.12	1.17	0.75	0.50

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)	240	83	48	18	9	174
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	0.42	1.00	1.00		0.95	1.00
Satd. Flow (perm)	735	1863	1794		1770	1742
Peak-hour factor, PHF	0.88	0.88	0.83	0.83	0.83	0.83
Adj. Flow (vph)	273	94	58	22	11	210
RTOR Reduction (vph)	0	0	16	0	0	171
Lane Group Flow (vph)	273	94	64	0	11	39
Turn Type	pm+pt					pm+ov
Protected Phases	1	6	2		4	1
Permitted Phases	6					4
Actuated Green, G (s)	16.7	16.7	7.5		0.9	5.1
Effective Green, g (s)	16.7	16.7	7.5		0.9	5.1
Actuated g/C Ratio	0.61	0.61	0.27		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)	584	1127	488		58	637
v/s Ratio Prot	c0.07	0.05	0.04		0.01	c0.01
v/s Ratio Perm	c0.21					0.01
v/c Ratio	0.47	0.08	0.13		0.19	0.06
Uniform Delay, d1	3.2	2.3	7.6		13.0	9.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.6	0.0	0.1		1.6	0.0
Delay (s)	3.8	2.3	7.7		14.6	9.3
Level of Service	A	A	A		B	A
Approach Delay (s)		3.4	7.7		9.6	
Approach LOS		A	A		A	

Intersection Summary			
HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	27.6	Sum of lost time (s)	10.0
Intersection Capacity Utilization	31.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	273	94	80	11	210
v/c Ratio	0.40	0.06	0.14	0.02	0.36
Control Delay	4.4	2.0	6.7	8.8	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.4	2.0	6.7	8.8	3.1
Queue Length 50th (ft)	0	0	3	1	0
Queue Length 95th (ft)	46	17	24	8	14
Internal Link Dist (ft)		236	290	122	
Turn Bay Length (ft)					
Base Capacity (vph)	685	1771	1277	1683	584
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	0.40	0.05	0.06	0.01	0.36

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	71	227	77	67	62	216	126	91	71	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	0.93		1.00	0.94		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	1671		1711	1746		1711	1842	
Flt Permitted	0.67	1.00		0.40	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1202	1595		715	1671		1711	1746		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	84	73	67	235	137	99	77	111	9
RTOR Reduction (vph)	0	149	0	0	42	0	0	28	0	0	3	0
Lane Group Flow (vph)	11	175	0	84	98	0	235	208	0	77	117	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	11.8	11.8		11.8	11.8		13.0	20.4		4.9	12.3	
Effective Green, g (s)	11.8	11.8		11.8	11.8		13.0	20.4		4.9	12.3	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.24	0.37		0.09	0.22	
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)	257	342		153	358		404	646		152	411	
v/s Ratio Prot		0.11			0.06		c0.14	c0.12		0.05	0.06	
v/s Ratio Perm	0.01			c0.12								
v/c Ratio	0.04	0.51		0.55	0.27		0.58	0.32		0.51	0.28	
Uniform Delay, d1	17.2	19.1		19.3	18.1		18.6	12.4		23.9	17.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	1.3		4.0	0.4		2.1	0.3		2.6	0.4	
Delay (s)	17.2	20.4		23.3	18.5		20.8	12.7		26.6	18.1	
Level of Service	B	C		C	B		C	B		C	B	
Approach Delay (s)		20.3			20.3			16.7			21.4	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM Average Control Delay	19.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	55.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.8%	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	84	140	235	236	77	120
v/c Ratio	0.04	0.65	0.53	0.34	0.56	0.34	0.29	0.37
Control Delay	18.2	15.4	32.7	14.8	24.6	14.7	26.7	25.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.2	15.4	32.7	14.8	24.6	14.7	26.7	25.2
Queue Length 50th (ft)	3	34	22	21	61	47	21	31
Queue Length 95th (ft)	15	122	72	71	154	125	69	92
Internal Link Dist (ft)		193		1393		2763		1435
Turn Bay Length (ft)	125		125		150		100	
Base Capacity (vph)	694	1000	413	987	885	1127	375	626
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	0.20	0.14	0.27	0.21	0.21	0.19

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	7	26	10	10	21	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	35	13	13	28	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	88	20			27	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	88	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	97			98	
cM capacity (veh/h)	897	1058			1587	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	44	27	40
Volume Left	9	0	28
Volume Right	35	13	0
cSH	1019	1700	1587
Volume to Capacity	0.04	0.02	0.02
Queue Length 95th (ft)	3	0	1
Control Delay (s)	8.7	0.0	5.2
Lane LOS	A		A
Approach Delay (s)	8.7	0.0	5.2
Approach LOS	A		

Intersection Summary			
Average Delay	5.3		
Intersection Capacity Utilization	18.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	454	8	2	445	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)	575	10	3	593	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			585		1178	580
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			585		1178	580
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)			990		210	514

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	585	596	13
Volume Left	0	3	9
Volume Right	10	0	4
cSH	1700	990	255
Volume to Capacity	0.34	0.00	0.05
Queue Length 95th (ft)	0	0	4
Control Delay (s)	0.0	0.1	19.9
Lane LOS		A	C
Approach Delay (s)	0.0	0.1	19.9
Approach LOS			C

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	35.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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

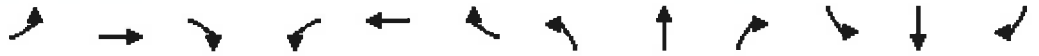
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	0	20	27	13
Volume Left (vph)	0	11	0	1
Volume Right (vph)	0	0	16	0
Hadj (s)	0.00	0.14	-0.32	0.05
Departure Headway (s)	4.0	4.1	3.6	4.0
Degree Utilization, x	0.00	0.02	0.03	0.01
Capacity (veh/h)	900	860	980	885
Control Delay (s)	7.0	7.2	6.7	7.1
Approach 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)	50	113	34	51	122	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)	67	151	45	68	163	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			217		301	142
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			217		301	142
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		76	94
cM capacity (veh/h)			1352		668	906

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	217	45	68	220
Volume Left	0	45	0	163
Volume Right	151	0	0	57
cSH	1700	1352	1700	717
Volume to Capacity	0.13	0.03	0.04	0.31
Queue Length 95th (ft)	0	3	0	33
Control Delay (s)	0.0	7.8	0.0	12.2
Lane LOS		A		B
Approach Delay (s)	0.0	3.1		12.2
Approach LOS				B

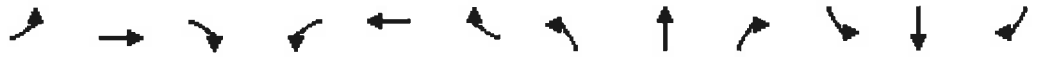
Intersection Summary			
Average Delay	5.5		
Intersection Capacity Utilization	32.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	60	33	19	55	0	30	0	14	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	41	25	73	0	40	0	19	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			115			218	218	94	237	239	73
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	73			115			218	218	94	237	239	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			98			95	100	98	100	100	100
cM capacity (veh/h)	1526			1474			728	668	962	694	651	989

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	115	99	59	1
Volume Left	0	25	40	1
Volume Right	41	0	19	0
cSH	1526	1474	789	694
Volume to Capacity	0.00	0.02	0.07	0.00
Queue Length 95th (ft)	0	1	6	0
Control Delay (s)	0.0	2.0	9.9	10.2
Lane LOS		A	A	B
Approach Delay (s)	0.0	2.0	9.9	10.2
Approach LOS			A	B

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	20.6%	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	14	0	22	13	2	2	233	15	1	281	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	29	17	3	3	311	20	1	375	0

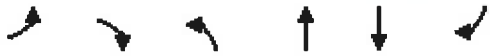
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	19	49	313	20	376
Volume Left (vph)	0	29	3	0	1
Volume Right (vph)	0	3	0	20	0
Hadj (s)	0.03	0.12	0.04	-0.67	0.03
Departure Headway (s)	5.7	5.7	5.0	4.3	4.6
Degree Utilization, x	0.03	0.08	0.44	0.02	0.48
Capacity (veh/h)	550	556	699	807	760
Control Delay (s)	8.8	9.2	10.7	6.2	11.9
Approach Delay (s)	8.8	9.2	10.4		11.9
Approach LOS	A	A	B		B

Intersection Summary			
Delay	11.0		
HCM Level of Service	B		
Intersection Capacity Utilization	31.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	24	0	6	0	0	0	2	133	0	1	335	30
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)	32	0	8	0	0	0	2	153	0	1	404	36
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	582	582	422	590	600	153	440			153		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	582	582	422	590	600	153	440			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 %	92	100	99	100	100	100	100			100		
cM capacity (veh/h)	424	424	632	413	414	893	1120			1428		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	40	0	155	441
Volume Left	32	0	2	1
Volume Right	8	0	0	36
cSH	454	1700	1120	1428
Volume to Capacity	0.09	0.00	0.00	0.00
Queue Length 95th (ft)	7	0	0	0
Control Delay (s)	13.7	0.0	0.1	0.0
Lane LOS	B	A	A	A
Approach Delay (s)	13.7	0.0	0.1	0.0
Approach LOS	B	A		

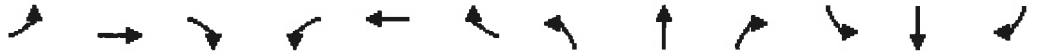
Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	30.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	20	55	40	117	311	34
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)	22	62	53	154	375	41
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	654	395	416			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	654	395	416			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	91	95			
cM capacity (veh/h)	411	654	1143			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	84	207	416
Volume Left	22	53	0
Volume Right	62	0	41
cSH	565	1143	1700
Volume to Capacity	0.15	0.05	0.24
Queue Length 95th (ft)	13	4	0
Control Delay (s)	12.5	2.4	0.0
Lane LOS	B	A	
Approach Delay (s)	12.5	2.4	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	187	703	127	766	10	299	5	136	10	10	0
Peak Hour Factor	0.92	0.92	0.92	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	0	203	764	169	1021	13	399	7	181	13	13	0

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total (vph)	203	764	1204	587	27
Volume Left (vph)	0	0	169	399	13
Volume Right (vph)	0	764	13	181	0
Hadj (s)	0.03	-0.67	0.06	-0.02	0.13
Departure Headway (s)	7.8	7.1	7.3	7.1	9.7
Degree Utilization, x	0.44	1.50	2.44	1.16	0.07
Capacity (veh/h)	455	513	504	510	367
Control Delay (s)	15.5	253.5	672.2	118.1	13.4
Approach Delay (s)	203.5		672.2	118.1	13.4
Approach LOS	F		F	F	B

Intersection Summary			
Delay	386.3		
HCM Level of Service	F		
Intersection Capacity Utilization	104.8%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	0	68	265	16	47	0	854	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	353	21	63	0	899	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			444			377	373	267	389	549	63
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	63			444			377	373	267	389	549	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			0	99	98	100	99	100
cM capacity (veh/h)	1540			1116			568	547	771	548	435	1002

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	444	84	917	8
Volume Left	0	21	899	3
Volume Right	353	0	15	3
cSH	1540	1116	570	586
Volume to Capacity	0.00	0.02	1.61	0.01
Queue Length 95th (ft)	0	1	1254	1
Control Delay (s)	0.0	2.2	300.4	11.2
Lane LOS		A	F	B
Approach Delay (s)	0.0	2.2	300.4	11.2
Approach LOS			F	B

Intersection Summary			
Average Delay	189.8		
Intersection Capacity Utilization	81.6%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	248	0	24	0	0	0	0	192	66	681	159	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.75	0.75	0.75	0.75	0.92	0.95	0.95	0.95	0.83	0.83	0.83
Hourly flow rate (vph)	270	0	32	0	0	0	0	202	69	820	192	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	2069	2104	192	2101	2069	237	192			272		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2069	2104	192	2101	2069	237	192			272		
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 %	0	100	96	100	100	100	100			36		
cM capacity (veh/h)	20	19	850	18	20	802	1382			1292		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	302	272	1012
Volume Left	270	0	820
Volume Right	32	69	0
cSH	22	1700	1292
Volume to Capacity	13.82	0.16	0.64
Queue Length 95th (ft)	Err	0	121
Control Delay (s)	Err	0.0	11.8
Lane LOS	F		B
Approach Delay (s)	Err	0.0	11.8
Approach LOS	F		

Intersection Summary			
Average Delay	1909.8		
Intersection Capacity Utilization	85.4%	ICU Level of Service	E
Analysis Period (min)	15		

HCS+: Ramps and Ramp Junctions Release 5.5

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 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	1951	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	747	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)	1951	747		vph
Peak-hour factor, PHF	0.95	0.92		
Peak 15-min volume, v15	513	203		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	2082	823	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2082 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2905	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} = 2082		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2905	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 18.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.290	
Space mean speed in ramp influence area,	S_R = 58.3	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 58.3	mph