2011 Existing Conditions
Friday Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	879	25	14	718	91	41	14	45	105	11	80
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			0.94	
Flt Protected		1.00			1.00			0.98			0.97	
Satd. Flow (prot)		3514			3466			1756			1868	
Flt Permitted		0.88			0.93			0.79			0.77	
Satd. Flow (perm)		3085			3220			1423			1485	
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)	47	1022	29	16	825	105	55	19	60	140	15	107
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1098	0	0	946	0	0	134	0	0	262	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)		24.5			24.6			12.1			12.1	
Effective Green, g (s)		24.5			24.6			12.1			12.1	
Actuated g/C Ratio		0.51			0.51			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)		1581			1657			360			376	
v/s Ratio Prot												
v/s Ratio Perm		c0.36			0.29			0.09			c0.18	
v/c Ratio		0.69			0.57			0.37			0.70	
Uniform Delay, d1		8.8			8.0			14.7			16.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.2			0.4			0.5			5.1	
Delay (s)		10.1			8.4			15.2			21.3	
Level of Service		B			A			B			C	
Approach Delay (s)		10.1			8.4			15.2			21.3	
Approach LOS		B			A			B			C	

Intersection Summary			
HCM Average Control Delay	10.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	47.8	Sum of lost time (s)	11.2
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	1098	946	134	262
v/c Ratio	0.70	0.58	0.37	0.70
Control Delay	12.1	10.0	19.4	29.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.1	10.0	19.4	29.1
Queue Length 50th (ft)	114	89	31	66
Queue Length 95th (ft)	170	136	62	115
Internal Link Dist (ft)	880	2120	328	12725
Turn Bay Length (ft)				
Base Capacity (vph)	1974	2065	455	475
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	0.56	0.46	0.29	0.55

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	467	603	39	27	569	298	26	19	14	312	36	410
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		1868	1535		1708	1724
Flt Permitted	0.26	1.00		0.28	1.00	1.00		0.69	1.00		0.71	1.00
Satd. Flow (perm)	487	1965		488	3539	1481		1333	1535		1272	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)	513	663	43	29	605	317	28	21	15	335	39	441
RTOR Reduction (vph)	0	3	0	0	0	153	0	0	11	0	0	79
Lane Group Flow (vph)	513	703	0	29	605	164	0	49	4	0	374	362
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)	42.1	35.0		25.7	22.8	22.8		20.2	20.2		20.2	35.3
Effective Green, g (s)	42.1	35.0		25.7	22.8	22.8		20.2	20.2		20.2	35.3
Actuated g/C Ratio	0.60	0.50		0.36	0.32	0.32		0.29	0.29		0.29	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)	564	973		225	1141	478		381	439		363	963
v/s Ratio Prot	c0.19	0.36		0.01	0.17							0.08
v/s Ratio Perm	c0.35			0.04		0.11		0.04	0.00		c0.29	0.13
v/c Ratio	0.91	0.72		0.13	0.53	0.34		0.13	0.01		1.03	0.38
Uniform Delay, d1	11.1	14.0		14.9	19.6	18.2		18.7	18.1		25.2	10.9
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	18.5	2.5		0.2	0.4	0.3		0.1	0.0		55.2	0.2
Delay (s)	29.6	16.6		15.1	19.9	18.6		18.8	18.1		80.5	11.1
Level of Service	C	B		B	B	B		B	B		F	B
Approach Delay (s)		22.0			19.3			18.7			42.9	
Approach LOS		C			B			B			D	

Intersection Summary			
HCM Average Control Delay	26.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	70.7	Sum of lost time (s)	8.4
Intersection Capacity Utilization	80.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	513	706	29	605	317	49	15	374	441
v/c Ratio	0.90	0.70	0.09	0.58	0.53	0.12	0.03	0.99	0.45
Control Delay	34.2	18.5	7.2	22.4	9.4	21.0	10.9	74.2	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.2	18.5	7.2	22.4	9.4	21.0	10.9	74.2	7.7
Queue Length 50th (ft)	119	170	5	111	28	14	0	147	49
Queue Length 95th (ft)	#307	403	13	156	88	43	13	#365	138
Internal Link Dist (ft)		2120		980		249		1452	
Turn Bay Length (ft)			50		50				110
Base Capacity (vph)	567	1038	511	1838	876	396	465	377	970
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	0.90	0.68	0.06	0.33	0.36	0.12	0.03	0.99	0.45

Intersection Summary

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	283	1105	0	0	765
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)		2888	3421			1863
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		2888	3421			1863
Peak-hour factor, PHF	0.88	0.88	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	322	1201	0	0	832
RTOR Reduction (vph)	0	82	0	0	0	0
Lane Group Flow (vph)	0	240	1201	0	0	832
Confl. Peds. (#/hr)	10	10		10	10	
Turn Type		custom				
Protected Phases			2			6
Permitted Phases		3				
Actuated Green, G (s)		10.0	28.4			49.0
Effective Green, g (s)		10.0	28.4			49.0
Actuated g/C Ratio		0.20	0.58			1.00
Clearance Time (s)		5.7	4.9			4.9
Vehicle Extension (s)		2.5	4.0			4.0
Lane Grp Cap (vph)		589	1983			1863
v/s Ratio Prot			c0.35			c0.45
v/s Ratio Perm		0.08				
v/c Ratio		0.41	0.61			0.45
Uniform Delay, d1		16.9	6.7			0.0
Progression Factor		1.00	1.00			1.00
Incremental Delay, d2		0.3	0.6			0.2
Delay (s)		17.3	7.3			0.2
Level of Service		B	A			A
Approach Delay (s)	17.3		7.3			0.2
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	49.0	Sum of lost time (s)	4.9
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBR	NBT	SBT
Lane Group Flow (vph)	322	1201	832
v/c Ratio	0.48	0.62	0.45
Control Delay	15.8	8.4	0.8
Queue Delay	0.0	0.0	0.0
Total Delay	15.8	8.4	0.8
Queue Length 50th (ft)	29	92	0
Queue Length 95th (ft)	79	172	0
Internal Link Dist (ft)		626	13
Turn Bay Length (ft)			
Base Capacity (vph)	1576	3050	1863
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.20	0.39	0.45

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	162	6	288	28	4	19	612	754	22	9	808	94
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	0.88		1.00	1.00		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	1546		3433	3521		1711	3591	
Flt Permitted	0.74	1.00	1.00	0.75	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1360	1801	1652	1389	1546		3433	3521		1711	3591	
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)	178	7	316	36	5	25	624	769	22	9	851	99
RTOR Reduction (vph)	0	0	223	0	23	0	0	1	0	0	6	0
Lane Group Flow (vph)	178	7	93	36	7	0	624	790	0	9	944	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)	34.4	34.4	34.4	9.4	9.4		25.3	67.2		1.4	43.3	
Effective Green, g (s)	34.4	34.4	34.4	9.4	9.4		25.3	67.2		1.4	43.3	
Actuated g/C Ratio	0.29	0.29	0.29	0.08	0.08		0.22	0.57		0.01	0.37	
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)	400	530	486	112	124		742	2022		20	1329	
v/s Ratio Prot		0.00			0.00		c0.18	0.22		0.01	c0.26	
v/s Ratio Perm	c0.13		0.06	0.03								
v/c Ratio	0.45	0.01	0.19	0.32	0.06		0.84	0.39		0.45	0.71	
Uniform Delay, d1	33.5	29.3	30.9	50.8	49.7		43.9	13.7		57.4	31.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.0	0.1	1.2	0.1		8.4	0.2		11.3	1.9	
Delay (s)	34.1	29.3	31.0	52.0	49.8		52.3	13.8		68.7	33.4	
Level of Service	C	C	C	D	D		D	B		E	C	
Approach Delay (s)		32.1			51.0			30.8			33.8	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	32.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	117.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	89.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	178	7	316	36	30	624	791	9	950
v/c Ratio	0.43	0.01	0.44	0.32	0.20	0.81	0.38	0.07	0.76
Control Delay	38.3	32.8	5.9	61.4	26.8	51.9	12.9	57.0	37.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.3	32.8	5.9	61.4	26.8	51.9	12.9	57.0	37.1
Queue Length 50th (ft)	105	4	0	25	4	220	134	6	314
Queue Length 95th (ft)	200	17	70	56	27	328	244	26	426
Internal Link Dist (ft)		970			507		497		1026
Turn Bay Length (ft)	100		60			300		160	
Base Capacity (vph)	548	727	854	249	298	924	2213	230	1615
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	0.32	0.01	0.37	0.14	0.10	0.68	0.36	0.04	0.59

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	2	4	414	9	127	4	680	85	52	444	14
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	0.99		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		0.98		1.00	0.93		1.00	0.98		1.00	1.00	
Flt Protected		0.96		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1977		1569	1534		1711	3352		1829	3285	
Flt Permitted		0.69		0.83	0.91		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1418		1363	1423		1711	3352		1829	3285	
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)	33	2	5	524	11	161	4	716	89	57	488	15
RTOR Reduction (vph)	0	4	0	0	19	0	0	7	0	0	1	0
Lane Group Flow (vph)	0	36	0	356	321	0	4	798	0	57	502	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)		5.3		37.0	37.0		1.3	35.2		7.0	40.9	
Effective Green, g (s)		5.3		37.0	37.0		1.3	35.2		7.0	40.9	
Actuated g/C Ratio		0.05		0.36	0.36		0.01	0.34		0.07	0.40	
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)		73		491	513		22	1149		125	1308	
v/s Ratio Prot							0.00	c0.24		c0.03	0.15	
v/s Ratio Perm		c0.03		c0.26	0.23							
v/c Ratio		0.50		0.73	0.63		0.18	0.69		0.46	0.38	
Uniform Delay, d1		47.4		28.4	27.1		50.2	29.1		46.0	21.9	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		3.8		4.9	2.1		2.9	2.0		1.9	0.3	
Delay (s)		51.2		33.4	29.2		53.1	31.1		47.9	22.2	
Level of Service		D		C	C		D	C		D	C	
Approach Delay (s)		51.2			31.3			31.2			24.8	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	29.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	102.7	Sum of lost time (s)	18.2
Intersection Capacity Utilization	67.9%	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)	40	356	340	4	805	57	503
v/c Ratio	0.28	0.69	0.61	0.03	0.72	0.32	0.36
Control Delay	49.0	39.6	33.5	51.2	33.1	52.6	20.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.0	39.6	33.5	51.2	33.1	52.6	20.5
Queue Length 50th (ft)	23	215	180	2	243	36	108
Queue Length 95th (ft)	58	#382	304	15	345	87	193
Internal Link Dist (ft)	165		514		1026		153
Turn Bay Length (ft)						100	
Base Capacity (vph)	234	519	559	559	1646	597	1680
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.69	0.61	0.01	0.49	0.10	0.30

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)	28	12	9	60	18	17	115	646	67	15	500	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	12	10	12	12	13	12	12	14	12
Total Lost time (s)		4.5			4.5			4.9			4.9	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			1.00			1.00	
Flpb, ped/bikes		0.99			0.99			1.00			1.00	
Frt		0.98			0.98			0.99			0.98	
Flt Protected		0.97			0.97			0.99			1.00	
Satd. Flow (prot)		1791			1609			1886			1939	
Flt Permitted		0.80			0.77			0.84			0.98	
Satd. Flow (perm)		1478			1277			1594			1897	
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)	37	16	12	78	23	22	119	666	69	16	549	93
RTOR Reduction (vph)	0	10	0	0	14	0	0	4	0	0	7	0
Lane Group Flow (vph)	0	55	0	0	109	0	0	850	0	0	651	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		3			3			1			5	
Permitted Phases	3			3			1			5		
Actuated Green, G (s)		12.4			12.4			37.8			37.8	
Effective Green, g (s)		12.4			12.4			37.8			37.8	
Actuated g/C Ratio		0.21			0.21			0.63			0.63	
Clearance Time (s)		4.5			4.5			4.9			4.9	
Vehicle Extension (s)		3.0			3.0			6.0			6.0	
Lane Grp Cap (vph)		308			266			1011			1203	
v/s Ratio Prot												
v/s Ratio Perm		0.04			c0.09			c0.53			0.34	
v/c Ratio		0.18			0.41			0.84			0.54	
Uniform Delay, d1		19.4			20.4			8.5			6.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.3			1.0			7.4			1.1	
Delay (s)		19.7			21.5			15.9			7.2	
Level of Service		B			C			B			A	
Approach Delay (s)		19.7			21.5			15.9			7.2	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	59.6	Sum of lost time (s)	9.4
Intersection Capacity Utilization	102.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	65	123	854	658
v/c Ratio	0.16	0.34	0.80	0.52
Control Delay	15.8	18.8	19.6	9.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	15.8	18.8	19.6	9.1
Queue Length 50th (ft)	15	31	245	130
Queue Length 95th (ft)	33	58	#504	218
Internal Link Dist (ft)	538	2647	287	6088
Turn Bay Length (ft)				
Base Capacity (vph)	515	451	1061	1265
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	0.13	0.27	0.80	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)	76	13	26	16	13	14	34	554	10	8	482	64
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			0.99			1.00			1.00	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.97			0.95			1.00			0.98	
Flt Protected		0.97			0.98			1.00			1.00	
Satd. Flow (prot)		1945			1599			1790			1825	
Flt Permitted		0.77			0.86			0.94			0.99	
Satd. Flow (perm)		1540			1399			1691			1809	
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)	101	17	35	21	17	19	39	637	11	9	548	73
RTOR Reduction (vph)	0	0	0	0	15	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	153	0	0	42	0	0	687	0	0	625	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)		12.4			12.4			35.4			37.1	
Effective Green, g (s)		12.4			12.4			35.4			37.1	
Actuated g/C Ratio		0.21			0.21			0.59			0.62	
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)		317			288			993			1113	
v/s Ratio Prot												
v/s Ratio Perm		c0.10			0.03			c0.41			0.35	
v/c Ratio		0.48			0.15			0.69			0.56	
Uniform Delay, d1		21.1			19.6			8.7			6.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.6			0.3			3.1			1.4	
Delay (s)		22.7			19.9			11.8			8.2	
Level of Service		C			B			B			A	
Approach Delay (s)		22.7			19.9			11.8			8.2	
Approach LOS		C			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	60.3	Sum of lost time (s)	12.5
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	153	57	687	630
v/c Ratio	0.49	0.19	0.69	0.57
Control Delay	27.4	16.9	13.9	9.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	27.4	16.9	13.9	9.7
Queue Length 50th (ft)	48	11	152	112
Queue Length 95th (ft)	85	31	294	224
Internal Link Dist (ft)	10998	2302	6088	1957
Turn Bay Length (ft)				
Base Capacity (vph)	771	715	1135	1268
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	0.20	0.08	0.61	0.50

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	174	89	38	25	19	134
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)	806	1863	1763		1770	1742
Peak-hour factor, PHF	0.97	0.97	0.83	0.83	0.88	0.88
Adj. Flow (vph)	179	92	46	30	22	152
RTOR Reduction (vph)	0	0	20	0	0	129
Lane Group Flow (vph)	179	92	56	0	22	23
Turn Type	pm+pt					pm+ov
Protected Phases	1	6	2		4	1
Permitted Phases	6					4
Actuated Green, G (s)	17.9	17.9	9.5		1.0	4.4
Effective Green, g (s)	17.9	17.9	9.5		1.0	4.4
Actuated g/C Ratio	0.62	0.62	0.33		0.03	0.15
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)	599	1154	580		61	567
v/s Ratio Prot	c0.04	0.05	0.03		c0.01	0.00
v/s Ratio Perm	c0.15					0.01
v/c Ratio	0.30	0.08	0.10		0.36	0.04
Uniform Delay, d1	2.9	2.2	6.7		13.6	10.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.0	0.1		3.6	0.0
Delay (s)	3.1	2.2	6.8		17.3	10.5
Level of Service	A	A	A		B	B
Approach Delay (s)		2.8	6.8		11.3	
Approach LOS		A	A		B	

Intersection Summary			
HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	28.9	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)	179	92	76	22	152
v/c Ratio	0.25	0.05	0.10	0.05	0.28
Control Delay	3.3	2.1	5.9	8.6	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	3.3	2.1	5.9	8.6	2.9
Queue Length 50th (ft)	0	0	3	1	0
Queue Length 95th (ft)	33	18	22	13	14
Internal Link Dist (ft)		236	290	122	
Turn Bay Length (ft)					
Base Capacity (vph)	722	1761	1361	1673	539
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	0.25	0.05	0.06	0.01	0.28

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	22	46	33	7	14	35
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)	26	55	42	9	16	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	120	46			51	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	120	46			51	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	95			99	
cM capacity (veh/h)	866	1023			1556	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	81	51	58
Volume Left	26	0	16
Volume Right	55	9	0
cSH	966	1700	1556
Volume to Capacity	0.08	0.03	0.01
Queue Length 95th (ft)	7	0	1
Control Delay (s)	9.1	0.0	2.2
Lane LOS	A		A
Approach Delay (s)	9.1	0.0	2.2
Approach LOS	A		

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	20.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	67	27	17	51	44	21
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)	80	32	21	64	57	27
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			112		202	96
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			112		202	96
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		93	97
cM capacity (veh/h)			1478		775	961

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	112	85	84
Volume Left	0	21	57
Volume Right	32	0	27
cSH	1700	1478	827
Volume to Capacity	0.07	0.01	0.10
Queue Length 95th (ft)	0	1	8
Control Delay (s)	0.0	2.0	9.8
Lane LOS		A	A
Approach Delay (s)	0.0	2.0	9.8
Approach LOS			A

Intersection Summary			
Average Delay	3.5		
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)	0	27	0	16	31	10	1	55	12	6	37	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	36	0	19	37	12	1	73	16	8	49	1

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	36	68	91	59
Volume Left (vph)	0	19	1	8
Volume Right (vph)	0	12	16	1
Hadj (s)	0.03	-0.02	-0.07	0.05
Departure Headway (s)	4.3	4.2	4.1	4.3
Degree Utilization, x	0.04	0.08	0.10	0.07
Capacity (veh/h)	795	814	841	816
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	22.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	19	12	56	23	20	68
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)	25	16	72	29	22	76
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			41		206	33
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			41		206	33
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		97	93
cM capacity (veh/h)			1568		746	1040

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	41	101	99
Volume Left	0	72	22
Volume Right	16	0	76
cSH	1700	1568	955
Volume to Capacity	0.02	0.05	0.10
Queue Length 95th (ft)	0	4	9
Control Delay (s)	0.0	5.4	9.2
Lane LOS		A	A
Approach Delay (s)	0.0	5.4	9.2
Approach LOS			A

Intersection Summary			
Average Delay	6.0		
Intersection Capacity Utilization	22.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	0	69	18	12	54	0	25	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	92	24	15	68	0	29	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	68			116			203	203	104	243	215	68
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	68			116			203	203	104	243	215	68
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)	1533			1473			749	686	951	676	676	995

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	116	84	69	0
Volume Left	0	15	29	0
Volume Right	24	0	40	0
cSH	1533	1473	855	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	1.4	9.6	0.0
Lane LOS		A	A	A
Approach Delay (s)	0.0	1.4	9.6	0.0
Approach LOS			A	A

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	20.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	11	13	21	17	37	8	12	41	36	11	11	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	28	22	48	10	16	55	48	15	15	11

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	60	81	119	40
Volume Left (vph)	15	22	16	15
Volume Right (vph)	28	10	48	11
Hadj (s)	-0.20	0.01	-0.18	-0.05
Departure Headway (s)	4.1	4.3	4.1	4.3
Degree Utilization, x	0.07	0.10	0.13	0.05
Capacity (veh/h)	831	799	848	805
Control Delay (s)	7.4	7.8	7.7	7.5
Approach Delay (s)	7.4	7.8	7.7	7.5
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.6		
HCM Level of Service	A		
Intersection Capacity Utilization	16.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	44	5	11	0	1	0	12	297	1	3	196	49
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)	53	6	13	0	1	0	13	323	1	3	200	50
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	581	581	225	597	606	323	250			324		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	581	581	225	597	606	323	250			324		
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 %	87	99	98	100	100	100	99			100		
cM capacity (veh/h)	420	420	814	400	407	718	1316			1236		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	72	1	337	253
Volume Left	53	0	13	3
Volume Right	13	0	1	50
cSH	461	407	1316	1236
Volume to Capacity	0.16	0.00	0.01	0.00
Queue Length 95th (ft)	14	0	1	0
Control Delay (s)	14.3	13.9	0.4	0.1
Lane LOS	B	B	A	A
Approach Delay (s)	14.3	13.9	0.4	0.1
Approach LOS	B	B		

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	39.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	47	57	30	311	191	36
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)	60	73	35	362	222	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	674	243	264			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	674	243	264			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	91	97			
cM capacity (veh/h)	408	796	1300			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	133	397	264
Volume Left	60	35	0
Volume Right	73	0	42
cSH	557	1300	1700
Volume to Capacity	0.24	0.03	0.16
Queue Length 95th (ft)	23	2	0
Control Delay (s)	13.5	0.9	0.0
Lane LOS	B	A	
Approach Delay (s)	13.5	0.9	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	64	50	151	47	19	29
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.85	0.85	0.93	0.93	0.86	0.86
Hourly flow rate (vph)	75	59	162	51	22	34
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	213				397	188
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	213				397	188
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				96	96
cM capacity (veh/h)	1357				574	854

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	134	213	56
Volume Left	75	0	22
Volume Right	0	51	34
cSH	1357	1700	716
Volume to Capacity	0.06	0.13	0.08
Queue Length 95th (ft)	4	0	6
Control Delay (s)	4.6	0.0	10.5
Lane LOS	A		B
Approach Delay (s)	4.6	0.0	10.5
Approach LOS			B

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	30.3%	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	19	50	13	36	2	159	1	24	0	1	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.91	0.91	0.91	0.88	0.88	0.88	0.33	0.33	0.33
Hourly flow rate (vph)	0	23	62	14	40	2	181	1	27	0	3	9
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	42			85			134	125	54	151	154	41
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	42			85			134	125	54	151	154	41
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			78	100	97	100	100	99
cM capacity (veh/h)	1567			1511			821	759	1013	787	730	1030

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	85	56	209	12
Volume Left	0	14	181	0
Volume Right	62	2	27	9
cSH	1567	1511	842	935
Volume to Capacity	0.00	0.01	0.25	0.01
Queue Length 95th (ft)	0	1	24	1
Control Delay (s)	0.0	1.9	10.7	8.9
Lane LOS		A	B	A
Approach Delay (s)	0.0	1.9	10.7	8.9
Approach LOS			B	A

Intersection Summary			
Average Delay	6.8		
Intersection Capacity Utilization	33.1%	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)	11	0	17	0	0	0	0	103	96	44	136	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.75	0.75	0.75	0.90	0.90	0.90	0.88	0.88	0.88
Hourly flow rate (vph)	14	0	22	0	0	0	0	114	107	50	155	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	422	476	155	444	422	168	155			221		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	422	476	155	444	422	168	155			221		
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	98	100	100	100	100			96		
cM capacity (veh/h)	526	470	891	497	504	876	1426			1348		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	36	221	205
Volume Left	14	0	50
Volume Right	22	107	0
cSH	701	1700	1348
Volume to Capacity	0.05	0.13	0.04
Queue Length 95th (ft)	4	0	3
Control Delay (s)	10.4	0.0	2.1
Lane LOS	B		A
Approach Delay (s)	10.4	0.0	2.1
Approach LOS	B		

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	34.2%	ICU Level of Service	A
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:	2011 Existing
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	1092	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	140	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)	1092	140		vph
Peak-hour factor, PHF	0.96	0.92		
Peak 15-min volume, v15	284	38		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	1153	154	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1153 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1307	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}	= 1153	(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1307	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 6.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.233	
Space mean speed in ramp influence area,	S_R = 59.6	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 59.6	mph

2011 Existing Conditions
Sunday Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	8	332	4	10	318	19	29	12	6	36	9	26
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)		3527			3500			1828			1885	
Flt Permitted		0.94			0.94			1.00			0.97	
Satd. Flow (perm)		3331			3297			1884			1877	
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	382	5	12	388	23	33	14	7	48	12	35
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	396	0	0	423	0	0	54	0	0	95	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)		17.5			17.6			3.1			3.1	
Effective Green, g (s)		17.5			17.6			3.1			3.1	
Actuated g/C Ratio		0.55			0.55			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)		1833			1825			184			183	
v/s Ratio Prot												
v/s Ratio Perm		0.12			c0.13			0.03			c0.05	
v/c Ratio		0.22			0.23			0.29			0.52	
Uniform Delay, d1		3.6			3.6			13.3			13.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.0			0.0			0.6			1.9	
Delay (s)		3.7			3.7			14.0			15.5	
Level of Service		A			A			B			B	
Approach Delay (s)		3.7			3.7			14.0			15.5	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	5.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	31.8	Sum of lost time (s)	11.1
Intersection Capacity Utilization	38.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	396	423	54	95
v/c Ratio	0.16	0.17	0.10	0.17
Control Delay	4.5	4.5	8.1	8.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	4.5	4.5	8.1	8.7
Queue Length 50th (ft)	0	0	3	5
Queue Length 95th (ft)	37	37	19	24
Internal Link Dist (ft)	880	2120	328	12725
Turn Bay Length (ft)				
Base Capacity (vph)	3267	3243	1015	1009
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	0.13	0.05	0.09

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	260	167	17	110	124	6	21	15	14	172	18	250
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	1487		1830	1510		1695	1708
Flt Permitted	0.48	1.00		0.62	1.00	1.00		0.80	1.00		0.71	1.00
Satd. Flow (perm)	885	1955		1076	3539	1487		1502	1510		1266	1708
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)	310	199	20	136	153	7	26	18	17	200	21	291
RTOR Reduction (vph)	0	5	0	0	0	5	0	0	12	0	0	143
Lane Group Flow (vph)	310	214	0	136	153	2	0	44	5	0	221	148
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	3%	3%	3%
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)	26.6	15.9		17.7	11.2	11.2		13.5	13.5		13.5	24.7
Effective Green, g (s)	26.6	15.9		17.7	11.2	11.2		13.5	13.5		13.5	24.7
Actuated g/C Ratio	0.55	0.33		0.36	0.23	0.23		0.28	0.28		0.28	0.51
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)	688	641		469	817	343		418	420		352	1018
v/s Ratio Prot	c0.10	0.11		0.04	0.04							0.03
v/s Ratio Perm	c0.14			0.07		0.00		0.03	0.00		c0.17	0.05
v/c Ratio	0.45	0.33		0.29	0.19	0.00		0.11	0.01		0.63	0.15
Uniform Delay, d1	6.2	12.3		10.7	15.0	14.4		13.0	12.7		15.3	6.3
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.2		0.3	0.1	0.0		0.1	0.0		3.0	0.0
Delay (s)	6.6	12.5		10.9	15.1	14.4		13.1	12.7		18.3	6.4
Level of Service	A	B		B	B	B		B	B		B	A
Approach Delay (s)		9.0			13.1			13.0			11.5	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	48.5	Sum of lost time (s)	8.4
Intersection Capacity Utilization	54.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	310	219	136	153	7	44	17	221	291
v/c Ratio	0.47	0.33	0.26	0.20	0.02	0.10	0.04	0.62	0.28
Control Delay	9.6	16.4	8.8	18.7	12.5	13.4	6.9	23.5	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.6	16.4	8.8	18.7	12.5	13.4	6.9	23.5	1.3
Queue Length 50th (ft)	42	46	16	18	0	9	0	52	0
Queue Length 95th (ft)	95	103	42	41	8	25	9	109	14
Internal Link Dist (ft)		2120		980		249		1452	
Turn Bay Length (ft)			50		50				110
Base Capacity (vph)	757	1458	733	2639	1104	639	650	537	1146
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	0.41	0.15	0.19	0.06	0.01	0.07	0.03	0.41	0.25

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	153	638	0	0	704
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)		2895	3355			1845
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		2895	3355			1845
Peak-hour factor, PHF	0.81	0.81	0.95	0.95	0.92	0.92
Adj. Flow (vph)	0	189	672	0	0	765
RTOR Reduction (vph)	0	146	0	0	0	0
Lane Group Flow (vph)	0	43	672	0	0	765
Confl. Peds. (#/hr)	10	10		10	10	
Heavy Vehicles (%)	2%	2%	4%	4%	3%	3%
Turn Type		custom				
Protected Phases			2			6
Permitted Phases		3				
Actuated Green, G (s)		8.1	17.1			35.8
Effective Green, g (s)		8.1	17.1			35.8
Actuated g/C Ratio		0.23	0.48			1.00
Clearance Time (s)		5.7	4.9			4.9
Vehicle Extension (s)		2.5	4.0			4.0
Lane Grp Cap (vph)		655	1603			1845
v/s Ratio Prot			0.20			c0.41
v/s Ratio Perm		0.01				
v/c Ratio		0.07	0.42			0.41
Uniform Delay, d1		10.9	6.1			0.0
Progression Factor		1.00	1.00			1.00
Incremental Delay, d2		0.0	0.2			0.2
Delay (s)		10.9	6.3			0.2
Level of Service		B	A			A
Approach Delay (s)	10.9		6.3			0.2
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	4.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	35.8	Sum of lost time (s)	0.0
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBR	NBT	SBT
Lane Group Flow (vph)	189	672	765
v/c Ratio	0.20	0.42	0.41
Control Delay	0.5	7.2	0.7
Queue Delay	0.0	0.0	0.0
Total Delay	0.5	7.2	0.7
Queue Length 50th (ft)	0	38	0
Queue Length 95th (ft)	0	62	0
Internal Link Dist (ft)		626	13
Turn Bay Length (ft)			
Base Capacity (vph)	2141	3355	1845
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.09	0.20	0.41

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	124	17	321	46	11	12	277	485	29	29	673	72
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	0.99		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	0.92		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)	1755	1801	1655	1756	1644		3367	3435		1694	3562	
Flt Permitted	0.74	1.00	1.00	0.75	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1361	1801	1655	1377	1644		3367	3435		1694	3562	
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)	139	19	361	61	15	16	298	522	31	33	756	81
RTOR Reduction (vph)	0	0	228	0	14	0	0	3	0	0	6	0
Lane Group Flow (vph)	139	19	133	61	17	0	298	550	0	33	831	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	3%	3%	3%
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)	35.7	35.7	35.7	10.7	10.7		13.9	42.7		4.8	33.6	
Effective Green, g (s)	35.7	35.7	35.7	10.7	10.7		13.9	42.7		4.8	33.6	
Actuated g/C Ratio	0.37	0.37	0.37	0.11	0.11		0.14	0.44		0.05	0.35	
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)	500	661	608	152	181		481	1509		84	1231	
v/s Ratio Prot		0.01			0.01		c0.09	0.16		0.02	c0.23	
v/s Ratio Perm	c0.10		0.08	0.04								
v/c Ratio	0.28	0.03	0.22	0.40	0.09		0.62	0.36		0.39	0.68	
Uniform Delay, d1	21.7	19.7	21.2	40.3	38.9		39.2	18.2		44.8	27.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.0	0.1	1.3	0.2		2.0	0.2		2.2	1.6	
Delay (s)	21.9	19.7	21.3	41.5	39.0		41.2	18.4		47.0	28.8	
Level of Service	C	B	C	D	D		D	B		D	C	
Approach Delay (s)		21.4			40.7			26.4			29.5	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	27.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	97.2	Sum of lost time (s)	14.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	139	19	361	61	31	298	553	33	837
v/c Ratio	0.27	0.03	0.43	0.41	0.16	0.60	0.36	0.22	0.71
Control Delay	25.2	23.1	4.5	52.0	29.1	44.9	18.8	49.0	31.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.2	23.1	4.5	52.0	29.1	44.9	18.8	49.0	31.6
Queue Length 50th (ft)	57	7	0	34	8	86	120	19	221
Queue Length 95th (ft)	130	27	61	72	32	153	180	56	331
Internal Link Dist (ft)		970			507		497		1026
Turn Bay Length (ft)	100		60			300		160	
Base Capacity (vph)	654	869	982	294	365	1083	2396	273	1912
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	0.21	0.02	0.37	0.21	0.08	0.28	0.23	0.12	0.44

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	6	9	370	3	77	19	220	107	56	241	8
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	0.99		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.94		1.00	0.95		1.00	0.95		1.00	1.00	
Flt Protected		0.99		0.95	0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1941		1569	1560		1678	3159		1811	3252	
Flt Permitted		0.95		0.29	0.41		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1875		473	659		1678	3159		1811	3252	
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)	8	8	12	407	3	85	21	244	119	62	268	9
RTOR Reduction (vph)	0	12	0	0	10	0	0	49	0	0	1	0
Lane Group Flow (vph)	0	16	0	252	233	0	21	314	0	62	276	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	3%	3%	3%
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			3		1	2		5	6	
Permitted Phases	4			3								
Actuated Green, G (s)		2.7		36.2	36.2		2.7	16.3		6.7	20.3	
Effective Green, g (s)		2.7		36.2	36.2		2.7	16.3		6.7	20.3	
Actuated g/C Ratio		0.03		0.45	0.45		0.03	0.20		0.08	0.25	
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)		63		214	298		57	643		151	824	
v/s Ratio Prot							0.01	c0.10		c0.03	c0.08	
v/s Ratio Perm		c0.01		c0.53	0.35							
v/c Ratio		0.26		1.18	0.78		0.37	0.49		0.41	0.33	
Uniform Delay, d1		37.7		21.9	18.6		37.9	28.2		34.8	24.4	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.6		117.8	12.1		2.9	0.8		1.3	0.3	
Delay (s)		39.3		139.7	30.7		40.8	29.0		36.1	24.7	
Level of Service		D		F	C		D	C		D	C	
Approach Delay (s)		39.3			86.2			29.7			26.8	
Approach LOS		D			F			C			C	

Intersection Summary			
HCM Average Control Delay	51.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	80.1	Sum of lost time (s)	23.1
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	28	252	243	21	363	62	277
v/c Ratio	0.13	1.10	0.74	0.11	0.56	0.29	0.31
Control Delay	27.4	115.6	36.2	37.4	27.4	38.0	24.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.4	115.6	36.2	37.4	27.4	38.0	24.6
Queue Length 50th (ft)	6	~133	77	9	62	26	42
Queue Length 95th (ft)	28	#364	#294	34	125	72	106
Internal Link Dist (ft)	165		514		1026		153
Turn Bay Length (ft)						100	
Base Capacity (vph)	399	230	329	701	1996	756	2036
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	1.10	0.74	0.03	0.18	0.08	0.14

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	7	1	23	13	1	7	233	51	4	303	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	12	10	12	12	13	12	12	14	12
Total Lost time (s)		4.5			4.5			4.9			4.9	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		0.98			0.98			1.00			1.00	
Frt		1.00			1.00			0.98			0.99	
Flt Protected		0.96			0.97			1.00			1.00	
Satd. Flow (prot)		1803			1649			1832			1947	
Flt Permitted		0.75			0.80			0.99			1.00	
Satd. Flow (perm)		1405			1361			1818			1941	
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)	39	9	1	31	17	1	8	253	55	5	352	23
RTOR Reduction (vph)	0	1	0	0	1	0	0	9	0	0	3	0
Lane Group Flow (vph)	0	48	0	0	48	0	0	307	0	0	377	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	3%	3%	3%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		3			3			1			5	
Permitted Phases	3			3			1			5		
Actuated Green, G (s)		9.2			9.2			36.5			36.5	
Effective Green, g (s)		9.2			9.2			36.5			36.5	
Actuated g/C Ratio		0.17			0.17			0.66			0.66	
Clearance Time (s)		4.5			4.5			4.9			4.9	
Vehicle Extension (s)		3.0			3.0			6.0			6.0	
Lane Grp Cap (vph)		235			227			1204			1286	
v/s Ratio Prot												
v/s Ratio Perm		0.03			c0.04			0.17			c0.19	
v/c Ratio		0.20			0.21			0.26			0.29	
Uniform Delay, d1		19.8			19.8			3.8			3.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.4			0.5			0.3			0.4	
Delay (s)		20.2			20.3			4.1			4.3	
Level of Service		C			C			A			A	
Approach Delay (s)		20.2			20.3			4.1			4.3	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	55.1	Sum of lost time (s)	9.4
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	49	49	316	380
v/c Ratio	0.11	0.12	0.24	0.27
Control Delay	15.1	15.2	5.8	6.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	15.1	15.2	5.8	6.2
Queue Length 50th (ft)	12	12	47	62
Queue Length 95th (ft)	27	27	86	101
Internal Link Dist (ft)	538	2647	287	6088
Turn Bay Length (ft)				
Base Capacity (vph)	535	518	1422	1515
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	0.09	0.09	0.22	0.25

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	4	23	3	35	2	26	240	9	3	248	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			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.92			0.99			1.00			0.99	
Flt Protected		0.99			1.00			1.00			1.00	
Satd. Flow (prot)		1870			1710			1747			1829	
Flt Permitted		0.88			0.97			0.95			1.00	
Satd. Flow (perm)		1673			1661			1665			1824	
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	5	31	4	47	3	29	267	10	3	285	15
RTOR Reduction (vph)	0	0	0	0	3	0	0	1	0	0	2	0
Lane Group Flow (vph)	0	51	0	0	51	0	0	305	0	0	301	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	3%	3%	3%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		3.2			3.2			22.8			24.5	
Effective Green, g (s)		3.2			3.2			22.8			24.5	
Actuated g/C Ratio		0.08			0.08			0.59			0.64	
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)		139			138			986			1161	
v/s Ratio Prot												
v/s Ratio Perm		0.03			c0.03			c0.18			0.17	
v/c Ratio		0.37			0.37			0.31			0.26	
Uniform Delay, d1		16.7			16.7			3.9			3.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.2			2.3			0.5			0.3	
Delay (s)		18.9			19.0			4.4			3.4	
Level of Service		B			B			A			A	
Approach Delay (s)		18.9			19.0			4.4			3.4	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	38.5	Sum of lost time (s)	12.5
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	51	54	306	303
v/c Ratio	0.13	0.14	0.23	0.21
Control Delay	12.8	12.4	5.1	4.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.8	12.4	5.1	4.2
Queue Length 50th (ft)	7	7	0	0
Queue Length 95th (ft)	24	24	83	66
Internal Link Dist (ft)	10998	2302	6088	1957
Turn Bay Length (ft)				
Base Capacity (vph)	1423	1431	1649	1821
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	0.04	0.04	0.19	0.17

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	170	81	47	18	9	118
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	1793		1770	1742
Flt Permitted	0.46	1.00	1.00		0.95	1.00
Satd. Flow (perm)	806	1863	1793		1770	1742
Peak-hour factor, PHF	0.91	0.91	0.86	0.86	0.78	0.78
Adj. Flow (vph)	187	89	55	21	12	151
RTOR Reduction (vph)	0	0	14	0	0	128
Lane Group Flow (vph)	187	89	62	0	12	23
Turn Type	pm+pt					pm+ov
Protected Phases	1	6	2		4	1
Permitted Phases	6					4
Actuated Green, G (s)	17.9	17.9	9.5		0.9	4.3
Effective Green, g (s)	17.9	17.9	9.5		0.9	4.3
Actuated g/C Ratio	0.62	0.62	0.33		0.03	0.15
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)	601	1158	591		55	563
v/s Ratio Prot	c0.04	0.05	0.03		c0.01	0.00
v/s Ratio Perm	c0.16					0.01
v/c Ratio	0.31	0.08	0.10		0.22	0.04
Uniform Delay, d1	2.8	2.2	6.7		13.6	10.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.0	0.1		2.0	0.0
Delay (s)	3.1	2.2	6.8		15.6	10.5
Level of Service	A	A	A		B	B
Approach Delay (s)		2.8	6.8		10.9	
Approach LOS		A	A		B	

Intersection Summary			
HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	28.8	Sum of lost time (s)	10.0
Intersection Capacity Utilization	27.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	187	89	76	12	151
v/c Ratio	0.26	0.05	0.10	0.03	0.28
Control Delay	3.2	2.0	6.4	8.8	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	3.2	2.0	6.4	8.8	2.9
Queue Length 50th (ft)	0	0	3	1	0
Queue Length 95th (ft)	33	17	24	8	10
Internal Link Dist (ft)		236	290	122	
Turn Bay Length (ft)					
Base Capacity (vph)	724	1764	1382	1676	535
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	0.26	0.05	0.05	0.01	0.28

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	2	5	10	7	9	2
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)	3	7	13	9	12	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	45	18			23	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	45	18			23	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			99	
cM capacity (veh/h)	958	1061			1593	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	9	23	15
Volume Left	3	0	12
Volume Right	7	9	0
cSH	1029	1700	1593
Volume to Capacity	0.01	0.01	0.01
Queue Length 95th (ft)	1	0	1
Control Delay (s)	8.5	0.0	6.0
Lane LOS	A		A
Approach Delay (s)	8.5	0.0	6.0
Approach LOS	A		

Intersection Summary			
Average Delay	3.6		
Intersection Capacity Utilization	17.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	54	8	2	31	6	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)	68	10	3	41	8	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			78		120	73
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			78		120	73
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		99	100
cM capacity (veh/h)			1520		874	988

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	78	44	12
Volume Left	0	3	8
Volume Right	10	0	4
cSH	1700	1520	909
Volume to Capacity	0.05	0.00	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.5	9.0
Lane LOS		A	A
Approach Delay (s)	0.0	0.5	9.0
Approach LOS			A

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	13.3%	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	0	0	1	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	1	9	0	0	11	16	1	12	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	0	11	27	13
Volume Left (vph)	0	1	0	1
Volume Right (vph)	0	0	16	0
Hadj (s)	0.00	0.06	-0.32	0.05
Departure Headway (s)	4.0	4.0	3.6	4.0
Degree Utilization, x	0.00	0.01	0.03	0.01
Capacity (veh/h)	900	877	989	891
Control Delay (s)	7.0	7.1	6.7	7.1
Approach Delay (s)	0.0	7.1	6.7	7.1
Approach LOS	A	A	A	A

Intersection Summary			
Delay	6.9		
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)	14	2	31	22	18	39
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)	19	3	41	29	24	52
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			21		132	20
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			21		132	20
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		97	95
cM capacity (veh/h)			1594		840	1058

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	21	71	76
Volume Left	0	41	24
Volume Right	3	0	52
cSH	1700	1594	978
Volume to Capacity	0.01	0.03	0.08
Queue Length 95th (ft)	0	2	6
Control Delay (s)	0.0	4.4	9.0
Lane LOS		A	A
Approach Delay (s)	0.0	4.4	9.0
Approach LOS			A

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	19.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	53	0	2	49	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	65	0	3	65	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	65			65			136	136	65	139	136	65
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	65			65			136	136	65	139	136	65
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)	1537			1537			834	753	999	828	753	999

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	65	68	8	1
Volume Left	0	3	5	1
Volume Right	0	0	3	0
cSH	1537	1537	882	828
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	9.1	9.4
Lane LOS		A	A	A
Approach Delay (s)	0.0	0.3	9.1	9.4
Approach LOS			A	A

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	14.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	14	0	6	13	2	2	4	2	1	6	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	5	3	1	8	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	19	28	11	9
Volume Left (vph)	0	8	3	1
Volume Right (vph)	0	3	3	0
Hadj (s)	0.03	0.03	-0.07	0.06
Departure Headway (s)	4.0	4.0	3.9	4.1
Degree Utilization, x	0.02	0.03	0.01	0.01
Capacity (veh/h)	887	891	889	869
Control Delay (s)	7.1	7.1	7.0	7.1
Approach Delay (s)	7.1	7.1	7.0	7.1
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.1		
HCM Level of Service	A		
Intersection Capacity Utilization	16.2%	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)	11	0	6	0	0	0	2	124	0	1	321	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	143	0	1	387	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	545	545	395	553	553	143	404			143		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	545	545	395	553	553	143	404			143		
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)	448	445	654	438	440	905	1155			1440		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	23	0	145	405
Volume Left	15	0	2	1
Volume Right	8	0	0	17
cSH	504	1700	1155	1440
Volume to Capacity	0.04	0.00	0.00	0.00
Queue Length 95th (ft)	4	0	0	0
Control Delay (s)	12.5	0.0	0.1	0.0
Lane LOS	B	A	A	A
Approach Delay (s)	12.5	0.0	0.1	0.0
Approach LOS	B	A		

Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	28.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	2	54	39	96	282	12
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)	2	61	51	126	340	14
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	576	347	354			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	576	347	354			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	91	96			
cM capacity (veh/h)	459	696	1205			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	63	178	354
Volume Left	2	51	0
Volume Right	61	0	14
cSH	683	1205	1700
Volume to Capacity	0.09	0.04	0.21
Queue Length 95th (ft)	8	3	0
Control Delay (s)	10.8	2.6	0.0
Lane LOS	B	A	
Approach Delay (s)	10.8	2.6	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	36.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	8	133	123	10	14	17
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.95	0.95	0.86	0.86
Hourly flow rate (vph)	9	151	129	11	16	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)		875				
pX, platoon unblocked						
vC, conflicting volume	140				304	135
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	140				304	135
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				98	98
cM capacity (veh/h)	1443				683	914

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	160	140	36
Volume Left	9	0	16
Volume Right	0	11	20
cSH	1443	1700	793
Volume to Capacity	0.01	0.08	0.05
Queue Length 95th (ft)	0	0	4
Control Delay (s)	0.5	0.0	9.8
Lane LOS	A		A
Approach Delay (s)	0.5	0.0	9.8
Approach LOS			A

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	23.5%	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)	0	66	81	16	45	0	86	3	14	2	2	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.89	0.89	0.89	0.90	0.90	0.90	0.92	0.92	0.92	0.75	0.75	0.75
Hourly flow rate (vph)	0	74	91	18	50	0	93	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	50			165			209	205	120	222	251	50
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	50			165			209	205	120	222	251	50
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			87	100	98	100	100	100
cM capacity (veh/h)	1557			1413			737	683	932	712	644	1018

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	165	68	112	8
Volume Left	0	18	93	3
Volume Right	91	0	15	3
cSH	1557	1413	756	762
Volume to Capacity	0.00	0.01	0.15	0.01
Queue Length 95th (ft)	0	1	13	1
Control Delay (s)	0.0	2.1	10.6	9.8
Lane LOS		A	B	A
Approach Delay (s)	0.0	2.1	10.6	9.8
Approach LOS			B	A

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	34.2%	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	23	0	0	0	0	124	64	36	104	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.75	0.75	0.75	0.94	0.94	0.94	0.86	0.86	0.86
Hourly flow rate (vph)	22	0	30	0	0	0	0	132	68	42	121	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	371	405	121	400	371	166	121			200		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	371	405	121	400	371	166	121			200		
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 %	96	100	97	100	100	100	100			97		
cM capacity (veh/h)	572	519	930	529	542	878	1467			1372		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	52	200	163
Volume Left	22	0	42
Volume Right	30	68	0
cSH	735	1700	1372
Volume to Capacity	0.07	0.12	0.03
Queue Length 95th (ft)	6	0	2
Control Delay (s)	10.3	0.0	2.2
Lane LOS	B		A
Approach Delay (s)	10.3	0.0	2.2
Approach LOS	B		

Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	31.2%	ICU Level of Service	A	
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:	2011 Existing
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	1507	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	100	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)	1507	100		vph
Peak-hour factor, PHF	0.95	0.92		
Peak 15-min volume, v15	397	27		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	1609	110	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1609 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1719	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} = 1609		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1719	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 9.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.240	
Space mean speed in ramp influence area,	S_R = 59.5	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 59.5	mph