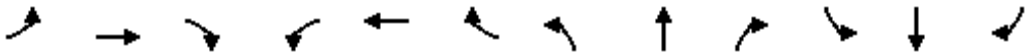
Appendix B
Synchro Operational Worksheets

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	212	216	119	139	207	454	130	441
v/c Ratio	0.22	0.24	0.07	0.16	0.57	0.56	0.58	0.48
Control Delay	16.0	3.4	14.8	3.2	44.7	32.4	21.4	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.1
Total Delay	16.0	3.4	14.8	3.2	44.7	32.4	23.8	4.2
Queue Length 50th (ft)	65	0	17	0	58	120	52	4
Queue Length 95th (ft)	138	44	41	31	93	144	126	6
Internal Link Dist (ft)	547		899			763		85
Turn Bay Length (ft)				225	400			
Base Capacity (vph)	943	911	1771	870	387	1163	262	1331
Starvation Cap Reductn	0	0	0	0	0	0	56	115
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	0.22	0.24	0.07	0.16	0.53	0.39	0.63	0.36

Intersection Summary



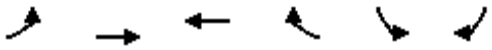
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	212	216	0	119	139	207	422	32	130	441	0
Future Volume (vph)	0	212	216	0	119	139	207	422	32	130	441	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)		4.0	4.0		4.5	4.5	4.5	6.0		4.5	5.0	
Lane Util. Factor		1.00	1.00		0.95	1.00	0.97	0.95		1.00	0.95	
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1912	1625		3632	1625	3523	3594		1816	3632	
Flt Permitted		1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1912	1625		3632	1625	3523	3594		1816	3632	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	212	216	0	119	139	207	422	32	130	441	0
RTOR Reduction (vph)	0	0	109	0	0	71	0	7	0	0	0	0
Lane Group Flow (vph)	0	212	107	0	119	68	207	447	0	130	441	0
Turn Type		NA	Perm		NA	Perm	Prot	NA		Prot	NA	
Protected Phases		1			2		3	8		7	4	
Permitted Phases			1			2						
Actuated Green, G (s)		44.4	44.4		43.9	43.9	9.4	20.0		11.1	22.7	
Effective Green, g (s)		44.4	44.4		43.9	43.9	9.4	20.0		11.1	22.7	
Actuated g/C Ratio		0.49	0.49		0.49	0.49	0.10	0.22		0.12	0.25	
Clearance Time (s)		4.0	4.0		4.5	4.5	4.5	6.0		4.5	5.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		943	801		1771	792	367	798		223	916	
v/s Ratio Prot		c0.11			0.03		0.06	c0.12		c0.07	0.12	
v/s Ratio Perm			0.07			0.04						
v/c Ratio		0.22	0.13		0.07	0.09	0.56	0.56		0.58	0.48	
Uniform Delay, d1		13.0	12.4		12.2	12.3	38.4	31.1		37.3	28.6	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		0.30	0.09	
Incremental Delay, d2		0.1	0.1		0.1	0.2	2.0	0.9		3.7	0.4	
Delay (s)		13.1	12.4		12.3	12.5	40.3	32.0		14.8	2.9	
Level of Service		B	B		B	B	D	C		B	A	
Approach Delay (s)		12.8			12.4			34.6			5.6	
Approach LOS		B			B			C			A	

Intersection Summary			
HCM 2000 Control Delay	18.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	SBR
Lane Group Flow (vph)	855	428	326	440
v/c Ratio	0.70	0.12	0.17	0.34
Control Delay	28.2	0.1	2.3	1.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	28.2	0.1	2.3	1.6
Queue Length 50th (ft)	213	0	22	0
Queue Length 95th (ft)	237	0	37	18
Internal Link Dist (ft)		1207	547	
Turn Bay Length (ft)	250			
Base Capacity (vph)	2035	3632	1971	1859
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	0.42	0.12	0.17	0.24

Intersection Summary



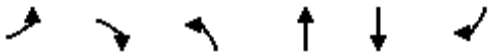
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	855	428	326	0	0	440
Future Volume (vph)	855	428	326	0	0	440
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	5.0	4.0	5.0			5.0
Lane Util. Factor	0.97	0.95	0.95			0.88
Frt	1.00	1.00	1.00			0.85
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3523	3632	3632			2860
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3523	3632	3632			2860
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	855	428	326	0	0	440
RTOR Reduction (vph)	0	0	0	0	0	288
Lane Group Flow (vph)	855	428	326	0	0	152
Turn Type	Prot	NA	NA			Over
Protected Phases	1	Free	2			1
Permitted Phases						
Actuated Green, G (s)	31.1	90.0	48.9			31.1
Effective Green, g (s)	31.1	90.0	48.9			31.1
Actuated g/C Ratio	0.35	1.00	0.54			0.35
Clearance Time (s)	5.0		5.0			5.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	1217	3632	1973			988
v/s Ratio Prot	c0.24	0.12	c0.09			0.05
v/s Ratio Perm						
v/c Ratio	0.70	0.12	0.17			0.15
Uniform Delay, d1	25.5	0.0	10.3			20.4
Progression Factor	1.00	1.00	0.18			1.00
Incremental Delay, d2	1.9	0.1	0.2			0.1
Delay (s)	27.3	0.1	2.1			20.4
Level of Service	C	A	A			C
Approach Delay (s)		18.2	2.1		20.4	
Approach LOS		B	A		C	

Intersection Summary			
HCM 2000 Control Delay	16.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	NBT	SBT	SBR
Lane Group Flow (vph)	855	561	571	440
v/c Ratio	0.50	0.20	0.43	0.27
Control Delay	2.4	0.8	28.3	0.4
Queue Delay	0.0	0.1	0.0	0.0
Total Delay	2.4	1.0	28.3	0.4
Queue Length 50th (ft)	0	9	101	0
Queue Length 95th (ft)	102	8	111	0
Internal Link Dist (ft)	417	85	659	
Turn Bay Length (ft)				200
Base Capacity (vph)	1718	3203	1913	1625
Starvation Cap Reductn	0	1613	0	0
Spillback Cap Reductn	0	0	124	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.50	0.35	0.32	0.27

Intersection Summary



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	855	0	0	561	571	440
Future Volume (vph)	855	0	0	561	571	440
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	4.5			4.0	5.0	4.0
Lane Util. Factor	0.97			0.95	0.91	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	0.95			1.00	1.00	1.00
Satd. Flow (prot)	3523			3632	5219	1625
Flt Permitted	0.95			1.00	1.00	1.00
Satd. Flow (perm)	3523			3632	5219	1625
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	855	0	0	561	571	440
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	855	0	0	561	571	440
Turn Type	Prot			NA	NA	Free
Protected Phases	2!			1 8!	4	
Permitted Phases						Free
Actuated Green, G (s)	43.9			68.4	22.7	90.0
Effective Green, g (s)	43.9			68.4	22.7	90.0
Actuated g/C Ratio	0.49			0.76	0.25	1.00
Clearance Time (s)	4.5				5.0	
Vehicle Extension (s)	3.0				3.0	
Lane Grp Cap (vph)	1718			2760	1316	1625
v/s Ratio Prot	c0.24			0.15	c0.11	
v/s Ratio Perm						c0.27
v/c Ratio	0.50			0.20	0.43	0.27
Uniform Delay, d1	15.6			3.1	28.3	0.0
Progression Factor	0.09			0.25	1.00	1.00
Incremental Delay, d2	1.0			0.0	0.2	0.4
Delay (s)	2.3			0.8	28.5	0.4
Level of Service	A			A	C	A
Approach Delay (s)	2.3			0.8	16.3	
Approach LOS	A			A	B	

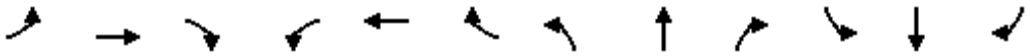
Intersection Summary			
HCM 2000 Control Delay	7.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	46.0%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	140	91	372	227	404	733	146	803
v/c Ratio	0.21	0.14	0.30	0.32	0.69	0.63	0.49	0.66
Control Delay	23.2	1.2	23.9	4.8	41.4	27.8	15.1	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.0
Total Delay	23.2	1.2	23.9	4.8	41.4	27.8	18.9	5.7
Queue Length 50th (ft)	59	0	86	0	111	174	75	24
Queue Length 95th (ft)	105	8	125	51	155	231	135	35
Internal Link Dist (ft)	547		899			763		85
Turn Bay Length (ft)				225	400			
Base Capacity (vph)	668	667	1230	700	685	1286	313	1270
Starvation Cap Reductn	0	0	0	0	0	0	100	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	0.21	0.14	0.30	0.32	0.59	0.57	0.69	0.63

Intersection Summary



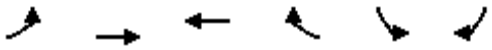
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	140	91	0	372	227	404	701	32	146	803	0
Future Volume (vph)	0	140	91	0	372	227	404	701	32	146	803	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)		4.0	4.0		5.0	5.0	4.5	6.0		4.5	5.0	
Lane Util. Factor		1.00	1.00		0.95	1.00	0.97	0.95		1.00	0.95	
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1912	1625		3632	1625	3523	3609		1816	3632	
Flt Permitted		1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1912	1625		3632	1625	3523	3609		1816	3632	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	140	91	0	372	227	404	701	32	146	803	0
RTOR Reduction (vph)	0	0	59	0	0	150	0	4	0	0	0	0
Lane Group Flow (vph)	0	140	32	0	372	77	404	729	0	146	803	0
Turn Type		NA	Perm		NA	Perm	Prot	NA		Prot	NA	
Protected Phases		1			2		3	8		7	4	
Permitted Phases			1			2						
Actuated Green, G (s)		31.5	31.5		30.5	30.5	15.1	29.1		14.9	29.9	
Effective Green, g (s)		31.5	31.5		30.5	30.5	15.1	29.1		14.9	29.9	
Actuated g/C Ratio		0.35	0.35		0.34	0.34	0.17	0.32		0.17	0.33	
Clearance Time (s)		4.0	4.0		5.0	5.0	4.5	6.0		4.5	5.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		669	568		1230	550	591	1166		300	1206	
v/s Ratio Prot		0.07			c0.10		0.11	c0.20		0.08	c0.22	
v/s Ratio Perm			0.02			0.05						
v/c Ratio		0.21	0.06		0.30	0.14	0.68	0.63		0.49	0.67	
Uniform Delay, d1		20.5	19.4		21.9	20.6	35.2	25.8		34.1	25.8	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		0.30	0.12	
Incremental Delay, d2		0.2	0.0		0.6	0.5	3.3	1.1		1.1	1.2	
Delay (s)		20.7	19.4		22.5	21.2	38.5	26.9		11.2	4.4	
Level of Service		C	B		C	C	D	C		B	A	
Approach Delay (s)		20.2			22.0			31.0			5.4	
Approach LOS		C			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	20.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	SBR
Lane Group Flow (vph)	657	231	776	1139
v/c Ratio	0.39	0.06	0.52	0.80
Control Delay	15.0	0.0	8.1	20.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	15.0	0.0	8.1	20.9
Queue Length 50th (ft)	113	0	104	266
Queue Length 95th (ft)	136	0	145	320
Internal Link Dist (ft)		1207	547	
Turn Bay Length (ft)	250			
Base Capacity (vph)	1918	3632	1479	1599
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	0.06	0.52	0.71

Intersection Summary



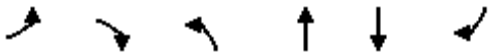
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	657	231	776	0	0	1139
Future Volume (vph)	657	231	776	0	0	1139
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	5.0	4.0	5.0			5.0
Lane Util. Factor	0.97	0.95	0.95			0.88
Frt	1.00	1.00	1.00			0.85
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3523	3632	3632			2860
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3523	3632	3632			2860
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	657	231	776	0	0	1139
RTOR Reduction (vph)	0	0	0	0	0	49
Lane Group Flow (vph)	657	231	776	0	0	1090
Turn Type	Prot	NA	NA			Over
Protected Phases	1	Free	2			1
Permitted Phases						
Actuated Green, G (s)	43.3	90.0	36.7			43.3
Effective Green, g (s)	43.3	90.0	36.7			43.3
Actuated g/C Ratio	0.48	1.00	0.41			0.48
Clearance Time (s)	5.0		5.0			5.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	1694	3632	1481			1375
v/s Ratio Prot	0.19	0.06	c0.21			c0.38
v/s Ratio Perm						
v/c Ratio	0.39	0.06	0.52			0.79
Uniform Delay, d1	14.9	0.0	20.1			19.6
Progression Factor	1.00	1.00	0.32			1.00
Incremental Delay, d2	0.1	0.0	1.2			2.3
Delay (s)	15.0	0.0	7.6			21.9
Level of Service	B	A	A			C
Approach Delay (s)		11.1	7.6		21.9	
Approach LOS		B	A		C	

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	NBT	SBT	SBR
Lane Group Flow (vph)	657	928	949	1139
v/c Ratio	0.55	0.35	0.55	0.70
Control Delay	14.1	1.2	25.6	2.5
Queue Delay	0.0	0.2	0.1	0.0
Total Delay	14.1	1.4	25.7	2.5
Queue Length 50th (ft)	164	18	150	0
Queue Length 95th (ft)	222	15	197	0
Internal Link Dist (ft)	417	85	659	
Turn Bay Length (ft)				200
Base Capacity (vph)	1193	2804	1825	1625
Starvation Cap Reductn	0	892	0	0
Spillback Cap Reductn	0	0	140	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.55	0.49	0.56	0.70

Intersection Summary



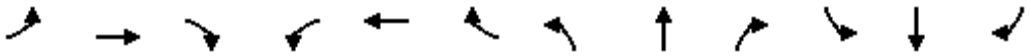
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	657	0	0	928	949	1139
Future Volume (vph)	657	0	0	928	949	1139
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	5.0			4.0	5.0	4.0
Lane Util. Factor	0.97			0.95	0.91	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	0.95			1.00	1.00	1.00
Satd. Flow (prot)	3523			3632	5219	1625
Flt Permitted	0.95			1.00	1.00	1.00
Satd. Flow (perm)	3523			3632	5219	1625
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	657	0	0	928	949	1139
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	657	0	0	928	949	1139
Turn Type	Prot			NA	NA	Free
Protected Phases	2!			1 8!	4	
Permitted Phases						Free
Actuated Green, G (s)	30.5			64.6	29.9	90.0
Effective Green, g (s)	30.5			64.6	29.9	90.0
Actuated g/C Ratio	0.34			0.72	0.33	1.00
Clearance Time (s)	5.0				5.0	
Vehicle Extension (s)	3.0				3.0	
Lane Grp Cap (vph)	1193			2606	1733	1625
v/s Ratio Prot	0.19			0.26	0.18	
v/s Ratio Perm						c0.70
v/c Ratio	0.55			0.36	0.55	0.70
Uniform Delay, d1	24.2			4.8	24.5	0.0
Progression Factor	0.48			0.22	1.00	1.00
Incremental Delay, d2	1.8			0.1	0.4	2.5
Delay (s)	13.4			1.1	24.9	2.5
Level of Service	B			A	C	A
Approach Delay (s)	13.4			1.1	12.7	
Approach LOS	B			A	B	

Intersection Summary			
HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	140	189	168	242	265	657	220	682
v/c Ratio	0.19	0.26	0.13	0.32	0.61	0.62	0.73	0.54
Control Delay	21.7	4.5	21.0	4.5	43.7	29.7	26.3	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0
Total Delay	21.7	4.5	21.0	4.5	43.7	29.7	29.8	3.8
Queue Length 50th (ft)	56	0	34	0	73	161	118	7
Queue Length 95th (ft)	104	45	60	51	113	216	191	10
Internal Link Dist (ft)	547		899			763		85
Turn Bay Length (ft)				225	400			
Base Capacity (vph)	725	733	1337	751	469	1167	353	1432
Starvation Cap Reductn	0	0	0	0	0	0	67	7
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	0.19	0.26	0.13	0.32	0.57	0.56	0.77	0.48

Intersection Summary



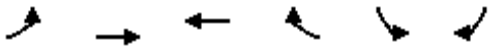
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	140	189	0	168	242	265	637	20	220	682	0
Future Volume (vph)	0	140	189	0	168	242	265	637	20	220	682	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)		4.0	4.0		5.0	5.0	4.5	6.0		4.5	5.0	
Lane Util. Factor		1.00	1.00		0.95	1.00	0.97	0.95		1.00	0.95	
Frt		1.00	0.85		1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected		1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1912	1625		3632	1625	3523	3616		1816	3632	
Flt Permitted		1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1912	1625		3632	1625	3523	3616		1816	3632	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	140	189	0	168	242	265	637	20	220	682	0
RTOR Reduction (vph)	0	0	117	0	0	153	0	3	0	0	0	0
Lane Group Flow (vph)	0	140	72	0	168	89	265	654	0	220	682	0
Turn Type		NA	Perm		NA	Perm	Prot	NA		Prot	NA	
Protected Phases		1			2		3	8		7	4	
Permitted Phases			1			2						
Actuated Green, G (s)		34.1	34.1		33.1	33.1	11.1	26.3		15.1	31.3	
Effective Green, g (s)		34.1	34.1		33.1	33.1	11.1	26.3		15.1	31.3	
Actuated g/C Ratio		0.38	0.38		0.37	0.37	0.12	0.29		0.17	0.35	
Clearance Time (s)		4.0	4.0		5.0	5.0	4.5	6.0		4.5	5.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		724	615		1335	597	434	1056		304	1263	
v/s Ratio Prot		c0.07			0.05		0.08	c0.18		c0.12	0.19	
v/s Ratio Perm			0.04			0.05						
v/c Ratio		0.19	0.12		0.13	0.15	0.61	0.62		0.72	0.54	
Uniform Delay, d1		18.7	18.2		18.9	19.0	37.4	27.5		35.5	23.6	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		0.37	0.10	
Incremental Delay, d2		0.1	0.1		0.2	0.5	2.5	1.1		7.6	0.4	
Delay (s)		18.9	18.2		19.1	19.6	39.9	28.6		20.8	2.7	
Level of Service		B	B		B	B	D	C		C	A	
Approach Delay (s)		18.5			19.4			31.9			7.1	
Approach LOS		B			B			C			A	

Intersection Summary			
HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	SBR
Lane Group Flow (vph)	804	329	433	1178
v/c Ratio	0.44	0.09	0.32	0.75
Control Delay	13.9	0.0	6.3	15.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	13.9	0.0	6.3	15.4
Queue Length 50th (ft)	136	0	44	232
Queue Length 95th (ft)	136	0	68	239
Internal Link Dist (ft)		1207	547	
Turn Bay Length (ft)	250			
Base Capacity (vph)	2231	3632	1356	1886
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	0.36	0.09	0.32	0.62

Intersection Summary



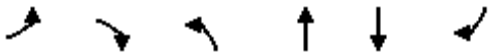
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	804	329	433	0	0	1178
Future Volume (vph)	804	329	433	0	0	1178
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	5.0	4.0	5.0			5.0
Lane Util. Factor	0.97	0.95	0.95			0.88
Frt	1.00	1.00	1.00			0.85
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3523	3632	3632			2860
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3523	3632	3632			2860
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	804	329	433	0	0	1178
RTOR Reduction (vph)	0	0	0	0	0	99
Lane Group Flow (vph)	804	329	433	0	0	1079
Turn Type	Prot	NA	NA			Over
Protected Phases	1	Free	2			1
Permitted Phases						
Actuated Green, G (s)	46.4	90.0	33.6			46.4
Effective Green, g (s)	46.4	90.0	33.6			46.4
Actuated g/C Ratio	0.52	1.00	0.37			0.52
Clearance Time (s)	5.0		5.0			5.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	1816	3632	1355			1474
v/s Ratio Prot	0.23	0.09	c0.12			c0.38
v/s Ratio Perm						
v/c Ratio	0.44	0.09	0.32			0.73
Uniform Delay, d1	13.7	0.0	20.1			17.0
Progression Factor	1.00	1.00	0.26			1.00
Incremental Delay, d2	0.2	0.0	0.6			1.3
Delay (s)	13.9	0.0	5.8			18.3
Level of Service	B	A	A			B
Approach Delay (s)		9.8	5.8		18.3	
Approach LOS		A	A		B	

Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	NBT	SBT	SBR
Lane Group Flow (vph)	804	879	902	1178
v/c Ratio	0.62	0.33	0.50	0.72
Control Delay	15.4	1.4	23.7	2.9
Queue Delay	0.0	0.2	0.1	0.0
Total Delay	15.4	1.6	23.8	2.9
Queue Length 50th (ft)	201	20	139	0
Queue Length 95th (ft)	275	17	170	0
Internal Link Dist (ft)	417	85	659	
Turn Bay Length (ft)				200
Base Capacity (vph)	1298	2790	2058	1625
Starvation Cap Reductn	0	945	0	0
Spillback Cap Reductn	0	0	267	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.62	0.48	0.50	0.72

Intersection Summary



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	804	0	0	879	902	1178
Future Volume (vph)	804	0	0	879	902	1178
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	5.0			4.0	5.0	4.0
Lane Util. Factor	0.97			0.95	0.91	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	0.95			1.00	1.00	1.00
Satd. Flow (prot)	3523			3632	5219	1625
Flt Permitted	0.95			1.00	1.00	1.00
Satd. Flow (perm)	3523			3632	5219	1625
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	804	0	0	879	902	1178
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	804	0	0	879	902	1178
Turn Type	Prot			NA	NA	Free
Protected Phases	2!			1 8!	4	
Permitted Phases						Free
Actuated Green, G (s)	33.1			64.4	31.3	90.0
Effective Green, g (s)	33.1			64.4	31.3	90.0
Actuated g/C Ratio	0.37			0.72	0.35	1.00
Clearance Time (s)	5.0				5.0	
Vehicle Extension (s)	3.0				3.0	
Lane Grp Cap (vph)	1295			2598	1815	1625
v/s Ratio Prot	0.23			0.24	0.17	
v/s Ratio Perm						c0.72
v/c Ratio	0.62			0.34	0.50	0.72
Uniform Delay, d1	23.3			4.8	23.1	0.0
Progression Factor	0.53			0.25	1.00	1.00
Incremental Delay, d2	2.1			0.1	0.2	2.9
Delay (s)	14.6			1.3	23.4	2.9
Level of Service	B			A	C	A
Approach Delay (s)	14.6			1.3	11.7	
Approach LOS	B			A	B	

Intersection Summary			
HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	53.5%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group