

Appendix A.

Intersection Analysis Worksheets, Alternative A. Decoupled with 5-Lane Woodstock Cross Section

HCM Unsignalized Intersection Capacity Analysis

6: SE Foster Road & SE 91st Street

2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	345	15	5	400	15	10	10	10	15	40	20
Sign Control		Free				Free			Stop		Stop	
Grade		0%				0%			0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	25	436	19	6	505	19	13	13	13	19	51	25
Pedestrians		5			5			5			5	
Lane Width (ft)		12.0				12.0			12.0		12.0	
Walking Speed (ft/s)		3.5				3.5			3.5		3.5	
Percent Blockage		0				0			0		0	
Right turn flare (veh)												
Median type		None				None						
Median storage (veh)												
Upstream signal (ft)		303				282						
pX, platoon unblocked	0.74						0.74	0.74		0.74	0.74	0.74
vC, conflicting volume	529			460			1074	1043	455	1043	1043	525
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	190			460			925	883	455	883	883	184
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 %	98			99			91	94	98	89	75	96
cM capacity (veh/h)	1016			1091			137	202	597	176	202	628

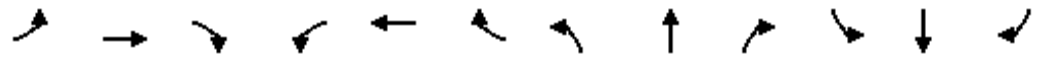
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	25	455	6	524	38	95
Volume Left	25	0	6	0	13	19
Volume Right	0	19	0	19	13	25
cSH	1016	1700	1091	1700	215	238
Volume to Capacity	0.02	0.27	0.01	0.31	0.18	0.40
Queue Length 95th (ft)	2	0	0	0	16	45
Control Delay (s)	8.6	0.0	8.3	0.0	25.2	29.8
Lane LOS	A		A		D	D
Approach Delay (s)	0.5		0.1		25.2	29.8
Approach LOS					D	D

Intersection Summary

Average Delay	3.5
Intersection Capacity Utilization	40.0%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 10: SE Woodstock Boulevard & SE 91st Street

2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	1035	15	30	620	10	5	10	10	30	20	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	13	1307	19	38	783	13	6	13	13	38	25	6
Pedestrians		5			5			5			5	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					284							
pX, platoon unblocked	0.82						0.82	0.82		0.82	0.82	0.82
vC, conflicting volume	801			1331			1838	2224	673	1573	2227	408
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	317			1331			1583	2053	673	1260	2057	0
tC, single (s)	4.2			4.2			7.6	6.6	7.0	7.6	6.6	7.0
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 %	99			93			77	69	97	46	37	99
cM capacity (veh/h)	1005			507			27	40	391	70	40	878

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1
Volume Total	13	872	455	429	404	32	69
Volume Left	13	0	0	38	0	6	38
Volume Right	0	0	19	0	13	13	6
cSH	1005	1700	1700	507	1700	54	59
Volume to Capacity	0.01	0.51	0.27	0.07	0.24	0.58	1.18
Queue Length 95th (ft)	1	0	0	6	0	58	145
Control Delay (s)	8.6	0.0	0.0	2.2	0.0	138.9	292.5
Lane LOS	A			A		F	F
Approach Delay (s)	0.1			1.2		138.9	292.5
Approach LOS						F	F

Intersection Summary

Average Delay	11.3
Intersection Capacity Utilization	63.4%
ICU Level of Service	B
Analysis Period (min)	15

HCM Signalized Intersection Capacity Analysis

12: SE Foster Road & SE 92 Avenue

2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	25	305	30	100	350	59	5	590	165	65	365	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		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	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1748	1817		1749	1797		1782	1808		1787	1831	
Flt Permitted	0.18	1.00		0.27	1.00		0.36	1.00		0.10	1.00	
Satd. Flow (perm)	338	1817		495	1797		669	1808		193	1831	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	32	385	38	126	442	75	6	745	208	82	461	82
RTOR Reduction (vph)	0	5	0	0	9	0	0	14	0	0	9	0
Lane Group Flow (vph)	32	418	0	126	508	0	6	939	0	82	534	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	1%	1%	1%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	21.8	21.8		21.8	21.8		39.0	39.0		39.0	39.0	
Effective Green, g (s)	21.8	21.8		21.8	21.8		39.0	39.0		39.0	39.0	
Actuated g/C Ratio	0.32	0.32		0.32	0.32		0.57	0.57		0.57	0.57	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	107	576		157	569		379	1025		109	1038	
v/s Ratio Prot		0.23			c0.28			c0.52			0.29	
v/s Ratio Perm	0.09			0.25			0.01			0.42		
v/c Ratio	0.30	0.72		0.80	0.89		0.02	0.92		0.75	0.51	
Uniform Delay, d1	17.7	20.8		21.5	22.4		6.5	13.4		11.3	9.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	4.5		24.8	16.3		0.1	14.0		25.0	0.4	
Delay (s)	19.3	25.4		46.3	38.7		6.6	27.4		36.2	9.5	
Level of Service	B	C		D	D		A	C		D	A	
Approach Delay (s)		24.9			40.2			27.3			13.0	
Approach LOS		C			D			C			B	

Intersection Summary

HCM Average Control Delay	26.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	68.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	96.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

13: SE Woodstock Boulevard & SE 92nd Avenue

2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	910	85	160	540	90	75	590	190	50	395	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3505	1522	1752	3421		1784	1881	1571	1787	1849	
Flt Permitted	0.21	1.00	1.00	0.15	1.00		0.24	1.00	1.00	0.12	1.00	
Satd. Flow (perm)	385	3505	1522	277	3421		453	1881	1571	221	1849	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	101	1149	107	202	682	114	95	745	240	63	499	57
RTOR Reduction (vph)	0	0	57	0	17	0	0	0	136	0	5	0
Lane Group Flow (vph)	101	1149	50	202	779	0	95	745	104	63	551	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt		Perm	pm+pt		Perm		Perm	Perm	Perm		
Protected Phases	7	4		3	8			2				6
Permitted Phases	4		4	8		2		2	6			
Actuated Green, G (s)	31.0	24.8	24.8	34.6	26.6		34.0	34.0	34.0	34.0	34.0	
Effective Green, g (s)	31.0	24.8	24.8	34.6	26.6		34.0	34.0	34.0	34.0	34.0	
Actuated g/C Ratio	0.39	0.31	0.31	0.44	0.34		0.43	0.43	0.43	0.43	0.43	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	259	1103	479	271	1155		195	812	678	95	798	
v/s Ratio Prot	0.03	c0.33		c0.08	0.23			c0.40			0.30	
v/s Ratio Perm	0.12		0.03	0.25		0.21		0.07	0.28			
v/c Ratio	0.39	1.04	0.10	0.75	0.67		0.49	0.92	0.15	0.66	0.69	
Uniform Delay, d1	16.1	27.0	19.1	17.7	22.4		16.1	21.1	13.6	17.8	18.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.0	38.6	0.1	10.6	1.6		8.5	16.9	0.5	31.0	4.9	
Delay (s)	17.1	65.6	19.2	28.3	24.0		24.6	38.0	14.1	48.8	23.0	
Level of Service	B	E	B	C	C		C	D	B	D	C	
Approach Delay (s)		58.3			24.8			31.5			25.6	
Approach LOS		E			C			C			C	

Intersection Summary

HCM Average Control Delay	37.9	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	78.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	94.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

16: SE Foster Road & I-205 SB Off-Ramp

2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↗		↖	↑						↖↗	↖↗
Volume (vph)	0	415	120	130	254	0	0	0	0	185	535	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0						4.0	4.0
Lane Util. Factor		1.00		1.00	1.00						0.95	1.00
Frbp, ped/bikes		1.00		1.00	1.00						1.00	0.97
Flpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Frt		0.97		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.99	1.00
Satd. Flow (prot)		1782		1752	1845						3453	1524
Flt Permitted		1.00		0.14	1.00						0.99	1.00
Satd. Flow (perm)		1782		254	1845						3453	1524
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	0	524	152	164	321	0	0	0	0	234	676	322
RTOR Reduction (vph)	0	15	0	0	0	0	0	0	0	0	0	206
Lane Group Flow (vph)	0	661	0	164	321	0	0	0	0	0	910	116
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Turn Type				pm+pt						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases				8						6		6
Actuated Green, G (s)		25.0		36.6	36.6						25.0	25.0
Effective Green, g (s)		25.0		36.6	36.6						25.0	25.0
Actuated g/C Ratio		0.36		0.53	0.53						0.36	0.36
Clearance Time (s)		4.0		4.0	4.0						4.0	4.0
Vehicle Extension (s)		3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		640		297	970						1240	547
v/s Ratio Prot		c0.37		c0.06	0.17							
v/s Ratio Perm				0.23							0.26	0.08
v/c Ratio		1.03		0.55	0.33						0.73	0.21
Uniform Delay, d1		22.3		13.6	9.5						19.4	15.5
Progression Factor		1.00		1.00	1.00						1.00	1.00
Incremental Delay, d2		44.4		2.2	0.2						3.9	0.9
Delay (s)		66.7		15.8	9.7						23.3	16.3
Level of Service		E		B	A						C	B
Approach Delay (s)		66.7			11.7			0.0			21.5	
Approach LOS		E			B			A			C	
Intersection Summary												
HCM Average Control Delay			32.3			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			69.6			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			77.9%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

17: SE Woodstock Boulevard & I-205 SB Ramp

2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑					↑	↑↑	
Volume (vph)	0	895	255	260	515	0	0	0	0	235	275	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Lane Util. Factor		0.95	1.00	1.00	0.95					0.91	0.91	
Frbp, ped/bikes		1.00	0.98	1.00	1.00					1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	
Frt		1.00	0.85	1.00	1.00					1.00	0.93	
Flt Protected		1.00	1.00	0.95	1.00					0.95	1.00	
Satd. Flow (prot)		3505	1542	1752	3505					1587	3086	
Flt Permitted		1.00	1.00	0.14	1.00					0.95	1.00	
Satd. Flow (perm)		3505	1542	264	3505					1587	3086	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	0	1131	322	328	651	0	0	0	0	297	347	341
RTOR Reduction (vph)	0	0	139	0	0	0	0	0	0	0	165	0
Lane Group Flow (vph)	0	1131	183	328	651	0	0	0	0	267	553	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Turn Type			Perm	pm+pt						Perm		
Protected Phases		4		3	8						6	
Permitted Phases			4	8						6		
Actuated Green, G (s)		24.0	24.0	39.5	39.5					22.0	22.0	
Effective Green, g (s)		24.0	24.0	39.5	39.5					22.0	22.0	
Actuated g/C Ratio		0.35	0.35	0.57	0.57					0.32	0.32	
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		1210	532	396	1992					502	977	
v/s Ratio Prot		c0.32		c0.14	0.19							
v/s Ratio Perm			0.12	0.33						0.17	0.18	
v/c Ratio		0.93	0.34	0.83	0.33					0.53	0.57	
Uniform Delay, d1		22.0	16.9	15.7	8.0					19.5	19.8	
Progression Factor		1.00	1.00	1.00	1.00					1.00	1.00	
Incremental Delay, d2		13.1	0.4	13.3	0.1					4.0	2.4	
Delay (s)		35.1	17.3	29.0	8.0					23.5	22.2	
Level of Service		D	B	C	A					C	C	
Approach Delay (s)		31.1			15.1			0.0			22.5	
Approach LOS		C			B			A			C	
Intersection Summary												
HCM Average Control Delay			24.1		HCM Level of Service					C		
HCM Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			69.5		Sum of lost time (s)				12.0			
Intersection Capacity Utilization			75.6%		ICU Level of Service					D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

20: SE Foster Road & SE 90th Avenue

2/12/2009



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	150	270	625	5	356	640
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frbp, ped/bikes	1.00	0.98	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	1.00		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1752	1540	3500		1752	3505
Flt Permitted	0.95	1.00	1.00		0.22	1.00
Satd. Flow (perm)	1752	1540	3500		400	3505
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	189	341	789	6	450	808
RTOR Reduction (vph)	0	278	1	0	0	0
Lane Group Flow (vph)	189	63	794	0	450	808
Confl. Peds. (#/hr)	5	5		5	5	
Turn Type		Perm			pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Actuated Green, G (s)	12.2	12.2	27.1		46.1	46.1
Effective Green, g (s)	12.2	12.2	27.1		46.1	46.1
Actuated g/C Ratio	0.18	0.18	0.41		0.70	0.70
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	322	283	1431		584	2437
v/s Ratio Prot	c0.11		0.23		c0.17	0.23
v/s Ratio Perm		0.04			c0.36	
v/c Ratio	0.59	0.22	0.56		0.77	0.33
Uniform Delay, d1	24.7	23.0	15.0		8.9	4.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.7	0.4	1.6		6.2	0.4
Delay (s)	27.5	23.4	16.5		15.1	4.4
Level of Service	C	C	B		B	A
Approach Delay (s)	24.9		16.5			8.2
Approach LOS	C		B			A

Intersection Summary

HCM Average Control Delay	14.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	66.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

29: SE Woodstock Boulevard & I-205 NB Ramp

2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑			↑↑			↔	↗			
Volume (vph)	220	910	0	0	545	200	230	130	390	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0	4.0			
Lane Util. Factor	1.00	0.95			0.95			0.91	0.91			
Frbp, ped/bikes	1.00	1.00			1.00			0.99	0.98			
Flpb, ped/bikes	1.00	1.00			1.00			1.00	1.00			
Frt	1.00	1.00			0.96			0.95	0.85			
Flt Protected	0.95	1.00			1.00			0.98	1.00			
Satd. Flow (prot)	1752	3505			3348			3113	1403			
Flt Permitted	0.16	1.00			1.00			0.98	1.00			
Satd. Flow (perm)	292	3505			3348			3113	1403			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	278	1149	0	0	688	253	291	164	493	0	0	0
RTOR Reduction (vph)	0	0	0	0	55	0	0	45	45	0	0	0
Lane Group Flow (vph)	278	1149	0	0	886	0	0	607	251	0	0	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Turn Type	pm+pt						Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases	4						2		2			
Actuated Green, G (s)	36.7	36.7			21.3			23.1	23.1			
Effective Green, g (s)	36.7	36.7			21.3			23.1	23.1			
Actuated g/C Ratio	0.54	0.54			0.31			0.34	0.34			
Clearance Time (s)	4.0	4.0			4.0			4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)	404	1897			1052			1061	478			
v/s Ratio Prot	c0.12	0.33			c0.26							
v/s Ratio Perm	0.26							0.20	0.18			
v/c Ratio	0.69	0.61			0.84			0.57	0.53			
Uniform Delay, d1	11.7	10.6			21.7			18.3	17.9			
Progression Factor	1.00	1.00			1.00			1.00	1.00			
Incremental Delay, d2	4.8	0.6			6.3			2.2	4.1			
Delay (s)	16.5	11.2			27.9			20.5	22.0			
Level of Service	B	B			C			C	C			
Approach Delay (s)		12.2			27.9			21.0			0.0	
Approach LOS		B			C			C			A	

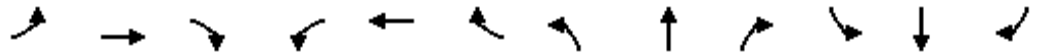
Intersection Summary

HCM Average Control Delay	19.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	67.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

31: SE Foster Road & I-205 NB On-Ramp

2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑			↑	↗	↖	↑↔				
Volume (vph)	115	480	0	0	365	135	20	425	105	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0				
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	0.95				
Frbp, ped/bikes	1.00	1.00			1.00	0.98	1.00	0.99				
Flpb, ped/bikes	1.00	1.00			1.00	1.00	0.99	1.00				
Frt	1.00	1.00			1.00	0.85	1.00	0.97				
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00				
Satd. Flow (prot)	1749	1845			1845	1543	1740	3382				
Flt Permitted	0.34	1.00			1.00	1.00	0.95	1.00				
Satd. Flow (perm)	624	1845			1845	1543	1740	3382				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	145	606	0	0	461	171	25	537	133	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	69	0	27	0	0	0	0
Lane Group Flow (vph)	145	606	0	0	461	102	25	643	0	0	0	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Turn Type	Perm					Perm	Perm					
Protected Phases		4			8			2				
Permitted Phases	4					8	2					
Actuated Green, G (s)	24.6	24.6			24.6	24.6	26.4	26.4				
Effective Green, g (s)	24.6	24.6			24.6	24.6	26.4	26.4				
Actuated g/C Ratio	0.42	0.42			0.42	0.42	0.45	0.45				
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0	4.0				
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0				
Lane Grp Cap (vph)	260	769			769	643	779	1513				
v/s Ratio Prot		c0.33			0.25			c0.19				
v/s Ratio Perm	0.23					0.07	0.01					
v/c Ratio	0.56	0.79			0.60	0.16	0.03	0.42				
Uniform Delay, d1	13.1	14.9			13.4	10.7	9.1	11.1				
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00				
Incremental Delay, d2	2.6	5.4			1.3	0.1	0.1	0.9				
Delay (s)	15.7	20.3			14.6	10.9	9.2	12.0				
Level of Service	B	C			B	B	A	B				
Approach Delay (s)		19.4			13.6			11.9			0.0	
Approach LOS		B			B			B			A	

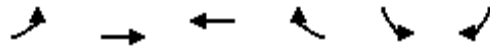
Intersection Summary

HCM Average Control Delay	15.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

35: SE Woodstock Boulevard & SE Foster Road

2/12/2009



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑↑	↑↑		↘↘	
Volume (vph)	5	1295	740	495	580	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	0.95		0.97	
Frbp, ped/bikes	1.00	1.00	0.99		1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.94		1.00	
Flt Protected	0.95	1.00	1.00		0.95	
Satd. Flow (prot)	1752	3505	3257		3405	
Flt Permitted	0.11	1.00	1.00		0.95	
Satd. Flow (perm)	204	3505	3257		3405	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	6	1636	935	625	733	6
RTOR Reduction (vph)	0	0	169	0	1	0
Lane Group Flow (vph)	6	1636	1391	0	738	0
Confl. Peds. (#/hr)	5			5	5	5
Turn Type	Perm					
Protected Phases		4	8		6	
Permitted Phases	4					
Actuated Green, G (s)	36.2	36.2	36.2		24.1	
Effective Green, g (s)	36.2	36.2	36.2		24.1	
Actuated g/C Ratio	0.53	0.53	0.53		0.35	
Clearance Time (s)	4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	108	1858	1726		1201	
v/s Ratio Prot		c0.47	0.43		c0.22	
v/s Ratio Perm	0.03					
v/c Ratio	0.06	0.88	0.81		0.61	
Uniform Delay, d1	7.8	14.1	13.2		18.3	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.2	5.3	2.9		2.4	
Delay (s)	8.0	19.4	16.0		20.6	
Level of Service	A	B	B		C	
Approach Delay (s)		19.4	16.0		20.6	
Approach LOS		B	B		C	

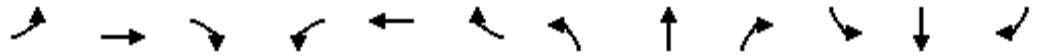
Intersection Summary

HCM Average Control Delay	18.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	68.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

36: SE Foster Road & SE 101st Avenue

2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	1835	20	10	1185	10	40	10	10	10	5	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00			1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.92			0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1752	3498		1752	3499		1743	1691			1693	
Flt Permitted	0.95	1.00		0.95	1.00		0.74	1.00			0.93	
Satd. Flow (perm)	1752	3498		1752	3499		1351	1691			1600	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	25	2318	25	13	1497	13	51	13	13	13	6	13
RTOR Reduction (vph)	0	1	0	0	1	0	0	10	0	0	10	0
Lane Group Flow (vph)	25	2342	0	13	1509	0	51	16	0	0	22	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	2.8	44.4		1.4	43.0		21.1	21.1			21.1	
Effective Green, g (s)	2.8	44.4		1.4	43.0		21.1	21.1			21.1	
Actuated g/C Ratio	0.04	0.56		0.02	0.54		0.27	0.27			0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	62	1968		31	1907		361	452			428	
v/s Ratio Prot	c0.01	c0.67		0.01	0.43			0.01				
v/s Ratio Perm							c0.04				0.01	
v/c Ratio	0.40	1.19		0.42	0.79		0.14	0.04			0.05	
Uniform Delay, d1	37.2	17.3		38.3	14.4		22.0	21.4			21.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	4.2	90.8		8.9	2.3		0.8	0.2			0.2	
Delay (s)	41.5	108.1		47.3	16.7		22.8	21.5			21.7	
Level of Service	D	F		D	B		C	C			C	
Approach Delay (s)		107.4			16.9			22.4			21.7	
Approach LOS		F			B			C			C	

Intersection Summary

HCM Average Control Delay	70.6	HCM Level of Service	E
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	78.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

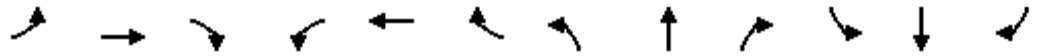
Appendix B.

Intersection Analysis Worksheets, Alternative B. Enhanced Couplet

HCM Signalized Intersection Capacity Analysis

6: SE Foster Road & SE 91st Avenue

2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					←↑↑			↑			↑	
Volume (vph)	0	0	0	25	895	75	10	15	0	0	55	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.5			4.5			4.5	
Lane Util. Factor					0.91			1.00			1.00	
Frbp, ped/bikes					1.00			1.00			1.00	
Flpb, ped/bikes					1.00			1.00			1.00	
Frt					0.99			1.00			0.96	
Flt Protected					1.00			0.98			1.00	
Satd. Flow (prot)					4961			1805			1770	
Flt Permitted					1.00			0.91			1.00	
Satd. Flow (perm)					4961			1680			1770	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	0	0	0	32	1131	95	13	19	0	0	69	25
RTOR Reduction (vph)	0	0	0	0	14	0	0	0	0	0	17	0
Lane Group Flow (vph)	0	0	0	0	1245	0	0	32	0	0	77	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Turn Type				Split			Perm					
Protected Phases				8	8			2			6	
Permitted Phases							2					
Actuated Green, G (s)					38.5			22.5			22.5	
Effective Green, g (s)					38.5			22.5			22.5	
Actuated g/C Ratio					0.55			0.32			0.32	
Clearance Time (s)					4.5			4.5			4.5	
Vehicle Extension (s)					3.0			3.0			3.0	
Lane Grp Cap (vph)					2729			540			569	
v/s Ratio Prot					c0.25						c0.04	
v/s Ratio Perm								0.02				
v/c Ratio					0.46			0.06			0.14	
Uniform Delay, d1					9.5			16.4			16.8	
Progression Factor					1.00			0.80			1.00	
Incremental Delay, d2					0.6			0.2			0.1	
Delay (s)					10.0			13.3			17.0	
Level of Service					B			B			B	
Approach Delay (s)		0.0			10.0			13.3			17.0	
Approach LOS		A			B			B			B	
Intersection Summary												
HCM Average Control Delay			10.6								HCM Level of Service	B
HCM Volume to Capacity ratio			0.34									
Actuated Cycle Length (s)			70.0								Sum of lost time (s)	9.0
Intersection Capacity Utilization			50.6%								ICU Level of Service	A
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: SE Woodstock Boulevard & SE 91st Avenue

2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑						↑			↑	
Volume (vph)	10	1405	15	0	0	0	0	15	10	10	70	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5			4.5	
Lane Util. Factor		0.91						1.00			1.00	
Frbp, ped/bikes		1.00						0.99			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		1.00						0.95			1.00	
Flt Protected		1.00						1.00			0.99	
Satd. Flow (prot)		5024						1732			1832	
Flt Permitted		1.00						1.00			0.97	
Satd. Flow (perm)		5024						1732			1794	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	13	1775	19	0	0	0	0	19	13	13	88	0
RTOR Reduction (vph)	0	2	0	0	0	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	1805	0	0	0	0	0	23	0	0	101	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Turn Type	Perm						Perm					
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)		39.7						21.3			21.3	
Effective Green, g (s)		39.7						21.3			21.3	
Actuated g/C Ratio		0.57						0.30			0.30	
Clearance Time (s)		4.5						4.5			4.5	
Vehicle Extension (s)		3.0						3.0			3.0	
Lane Grp Cap (vph)		2849						527			546	
v/s Ratio Prot								0.01				
v/s Ratio Perm		0.36									c0.06	
v/c Ratio		0.63						0.04			0.18	
Uniform Delay, d1		10.2						17.2			18.0	
Progression Factor		1.00						1.00			0.72	
Incremental Delay, d2		1.1						0.2			0.7	
Delay (s)		11.3						17.3			13.7	
Level of Service		B						B			B	
Approach Delay (s)		11.3			0.0			17.3			13.7	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM Average Control Delay			11.5					HCM Level of Service			B	
HCM Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			70.0					Sum of lost time (s)		9.0		
Intersection Capacity Utilization			60.4%					ICU Level of Service		B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: SE Foster Road & SE 92 Avenue

2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					←↑↑↑		↑	↑			↑	↑
Volume (vph)	0	0	0	260	885	150	80	525	0	0	380	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.5		4.5	4.5			4.5	4.5
Lane Util. Factor					0.91		1.00	1.00			1.00	1.00
Frbp, ped/bikes					1.00		1.00	1.00			1.00	0.98
Flpb, ped/bikes					1.00		1.00	1.00			1.00	1.00
Frt					0.98		1.00	1.00			1.00	0.85
Flt Protected					0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)					4876		1787	1881			1881	1570
Flt Permitted					0.99		0.17	1.00			1.00	1.00
Satd. Flow (perm)					4876		327	1881			1881	1570
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	0	0	0	328	1118	189	101	663	0	0	480	139
RTOR Reduction (vph)	0	0	0	0	24	0	0	0	0	0	0	102
Lane Group Flow (vph)	0	0	0	0	1611	0	101	663	0	0	480	37
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	1%	1%	1%	1%	1%	1%
Turn Type				Perm			pm+pt					Perm
Protected Phases					8		5	2			6	
Permitted Phases				8			2					6
Actuated Green, G (s)					22.0		39.0	39.0			18.5	18.5
Effective Green, g (s)					22.0		39.0	39.0			18.5	18.5
Actuated g/C Ratio					0.31		0.56	0.56			0.26	0.26
Clearance Time (s)					4.5		4.5	4.5			4.5	4.5
Vehicle Extension (s)					3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)					1532		516	1048			497	415
v/s Ratio Prot							0.04	c0.35			c0.26	
v/s Ratio Perm					0.33		0.06					0.02
v/c Ratio					1.05		0.20	0.63			0.97	0.09
Uniform Delay, d1					24.0		9.9	10.6			25.4	19.4
Progression Factor					1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2					37.9		0.8	2.9			31.5	0.1
Delay (s)					61.9		10.8	13.5			56.9	19.5
Level of Service					E		B	B			E	B
Approach Delay (s)		0.0			61.9			13.1			48.5	
Approach LOS		A			E			B			D	

Intersection Summary

HCM Average Control Delay	46.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	121.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

13: SE Woodstock Boulevard & SE 92nd Avenue

2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑↑↑	↑					↑	↑	↑	↑		
Volume (vph)	105	1210	110	0	0	0	0	500	350	115	525	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Lane Util. Factor		0.91	1.00					1.00	1.00	1.00	1.00		
Frbp, ped/bikes		1.00	0.97					1.00	0.98	1.00	1.00		
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		5014	1524					1881	1572	1787	1881		
Flt Permitted		1.00	1.00					1.00	1.00	0.13	1.00		
Satd. Flow (perm)		5014	1524					1881	1572	248	1881		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	
Adj. Flow (vph)	133	1528	139	0	0	0	0	632	442	145	663	0	
RTOR Reduction (vph)	0	0	83	0	0	0	0	0	45	0	0	0	
Lane Group Flow (vph)	0	1661	56	0	0	0	0	632	397	145	663	0	
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5	
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	1%	1%	1%	1%	1%	1%	
Turn Type	Perm		Perm						Perm	pm+pt			
Protected Phases		4						2		1	6		
Permitted Phases	4		4						2	6			
Actuated Green, G (s)		25.5	25.5					25.9	25.9	36.4	36.4		
Effective Green, g (s)		25.5	25.5					25.9	25.9	36.4	36.4		
Actuated g/C Ratio		0.36	0.36					0.37	0.37	0.51	0.51		
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)		1803	548					687	574	258	966		
v/s Ratio Prot								c0.34		0.05	c0.35		
v/s Ratio Perm		0.33	0.04						0.25	0.24			
v/c Ratio		0.92	0.10					0.92	0.69	0.56	0.69		
Uniform Delay, d1		21.7	15.1					21.5	19.1	13.9	13.0		
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2		8.3	0.1					19.5	6.7	2.8	4.0		
Delay (s)		30.0	15.2					41.0	25.8	16.7	16.9		
Level of Service		C	B					D	C	B	B		
Approach Delay (s)		28.9			0.0			34.8			16.9		
Approach LOS		C			A			C			B		
Intersection Summary													
HCM Average Control Delay			28.0									HCM Level of Service	C
HCM Volume to Capacity ratio			0.92										
Actuated Cycle Length (s)			70.9									Sum of lost time (s)	13.5
Intersection Capacity Utilization			121.8%									ICU Level of Service	H
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

16: SE Foster Road & I-205 SB Off-Ramp

2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations				↖	↖↖↖						↗↗	↗		
Volume (vph)	0	0	0	390	770	0	0	0	0	0	450	525		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Total Lost time (s)				4.5	4.5						4.5	4.5		
Lane Util. Factor				0.86	0.86						0.95	1.00		
Frbp, ped/bikes				1.00	1.00						1.00	0.98		
Flpb, ped/bikes				1.00	1.00						1.00	1.00		
Frt				1.00	1.00						1.00	0.85		
Flt Protected				0.95	0.99						1.00	1.00		
Satd. Flow (prot)				1500	4727						3505	1542		
Flt Permitted				0.95	0.99						1.00	1.00		
Satd. Flow (perm)				1500	4727						3505	1542		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95		
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%		
Adj. Flow (vph)	0	0	0	493	973	0	0	0	0	0	568	663		
RTOR Reduction (vph)	0	0	0	183	25	0	0	0	0	0	0	9		
Lane Group Flow (vph)	0	0	0	172	1086	0	0	0	0	0	568	654		
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5		
Turn Type				Perm								Perm		
Protected Phases					8							6		
Permitted Phases				8								6		
Actuated Green, G (s)				21.8	21.8						37.6	37.6		
Effective Green, g (s)				21.8	21.8						37.6	37.6		
Actuated g/C Ratio				0.32	0.32						0.55	0.55		
Clearance Time (s)				4.5	4.5						4.5	4.5		
Vehicle Extension (s)				3.0	3.0						3.0	3.0		
Lane Grp Cap (vph)				478	1507						1927	848		
v/s Ratio Prot											0.16			
v/s Ratio Perm				0.11	0.23							c0.42		
v/c Ratio				0.36	0.72						0.29	0.77		
Uniform Delay, d1				17.9	20.6						8.3	12.0		
Progression Factor				1.00	1.00						1.00	1.00		
Incremental Delay, d2				0.5	1.7						0.4	6.7		
Delay (s)				18.4	22.3						8.7	18.8		
Level of Service				B	C						A	B		
Approach Delay (s)		0.0			21.4			0.0			14.1			
Approach LOS		A			C			A			B			
Intersection Summary														
HCM Average Control Delay			18.1									HCM Level of Service	B	
HCM Volume to Capacity ratio			0.75											
Actuated Cycle Length (s)			68.4								9.0		Sum of lost time (s)	
Intersection Capacity Utilization			67.6%										ICU Level of Service	C
Analysis Period (min)			15											
c Critical Lane Group														

HCM Signalized Intersection Capacity Analysis

17: SE Woodstock Boulevard & I-205 SB Ramp

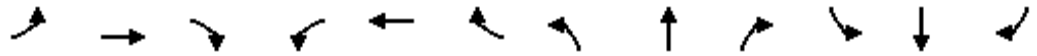
2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑							↑	↑↑	
Volume (vph)	0	1305	370	0	0	0	0	0	0	420	420	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5							4.5	4.5	
Lane Util. Factor		0.91	1.00							0.91	0.91	
Frbp, ped/bikes		1.00	0.98							1.00	1.00	
Flpb, ped/bikes		1.00	1.00							1.00	1.00	
Frt		1.00	0.85							1.00	1.00	
Flt Protected		1.00	1.00							0.95	0.99	
Satd. Flow (prot)		5036	1542							1587	3310	
Flt Permitted		1.00	1.00							0.95	0.99	
Satd. Flow (perm)		5036	1542							1587	3310	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	0	1648	467	0	0	0	0	0	0	531	531	0
RTOR Reduction (vph)	0	0	80	0	0	0	0	0	0	7	7	0
Lane Group Flow (vph)	0	1648	387	0	0	0	0	0	0	338	710	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Turn Type			Perm								Perm	
Protected Phases		4										6
Permitted Phases			4								6	
Actuated Green, G (s)		32.4	32.4							25.6	25.6	
Effective Green, g (s)		32.4	32.4							25.6	25.6	
Actuated g/C Ratio		0.48	0.48							0.38	0.38	
Clearance Time (s)		4.5	4.5							4.5	4.5	
Vehicle Extension (s)		3.0	3.0							3.0	3.0	
Lane Grp Cap (vph)		2435	746							606	1265	
v/s Ratio Prot		c0.33										
v/s Ratio Perm			0.25							0.21	0.21	
v/c Ratio		0.68	0.52							0.56	0.56	
Uniform Delay, d1		13.3	11.9							16.2	16.3	
Progression Factor		1.00	1.00							1.00	1.00	
Incremental Delay, d2		0.8	0.6							3.7	1.8	
Delay (s)		14.0	12.5							19.9	18.1	
Level of Service		B	B							B	B	
Approach Delay (s)		13.7			0.0			0.0			18.7	
Approach LOS		B			A			A			B	
Intersection Summary												
HCM Average Control Delay			15.4								HCM Level of Service	B
HCM Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			67.0							9.0	Sum of lost time (s)	
Intersection Capacity Utilization			101.6%								ICU Level of Service	G
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 29: SE Woodstock Boulevard & I-205 NB Ramp

2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	335	1390	0	0	0	0	0	255	490	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.5	4.5						4.5	4.5				
Lane Util. Factor	0.86	0.86						0.91	0.91				
Frbp, ped/bikes	1.00	1.00						0.99	0.98				
Flpb, ped/bikes	1.00	1.00						1.00	1.00				
Frt	1.00	1.00						0.93	0.85				
Flt Protected	0.95	1.00						1.00	1.00				
Satd. Flow (prot)	1500	4753						3085	1403				
Flt Permitted	0.95	1.00						1.00	1.00				
Satd. Flow (perm)	1500	4753						3085	1403				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	
Adj. Flow (vph)	423	1756	0	0	0	0	0	322	619	0	0	0	
RTOR Reduction (vph)	181	4	0	0	0	0	0	5	5	0	0	0	
Lane Group Flow (vph)	200	1794	0	0	0	0	0	627	304	0	0	0	
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5	
Turn Type	Perm						Perm						
Protected Phases	4						2						
Permitted Phases	4						2						
Actuated Green, G (s)	33.2						26.5						
Effective Green, g (s)	33.2						26.5						
Actuated g/C Ratio	0.48						0.39						
Clearance Time (s)	4.5						4.5						
Vehicle Extension (s)	3.0						3.0						
Lane Grp Cap (vph)	725						1190						
v/s Ratio Prot							0.20						
v/s Ratio Perm	0.13						c0.22						
v/c Ratio	0.28						0.53						
Uniform Delay, d1	10.6						16.3						
Progression Factor	1.00						1.00						
Incremental Delay, d2	0.2						1.7						
Delay (s)	10.8						17.9						
Level of Service	B						C						
Approach Delay (s)	15.5						18.9						
Approach LOS	B						A						
Intersection Summary													
HCM Average Control Delay	16.5						HCM Level of Service						B
HCM Volume to Capacity ratio	0.68												
Actuated Cycle Length (s)	68.7						Sum of lost time (s)						9.0
Intersection Capacity Utilization	80.9%						ICU Level of Service						D
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis

31: SE Foster Road & I-205 NB On-Ramp

2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations					↑↑↑	↑	↑	↑↑					
Volume (vph)	0	0	0	0	910	335	250	340	0	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)					4.5	4.5	4.5	4.5					
Lane Util. Factor					0.91	1.00	0.91	0.91					
Frbp, ped/bikes					1.00	0.98	1.00	1.00					
Flpb, ped/bikes					1.00	1.00	1.00	1.00					
Frt					1.00	0.85	1.00	1.00					
Flt Protected					1.00	1.00	0.95	0.99					
Satd. Flow (prot)					5036	1543	1588	3330					
Flt Permitted					1.00	1.00	0.95	0.99					
Satd. Flow (perm)					5036	1543	1588	3330					
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	
Adj. Flow (vph)	0	0	0	0	1149	423	316	429	0	0	0	0	
RTOR Reduction (vph)	0	0	0	0	0	145	25	17	0	0	0	0	
Lane Group Flow (vph)	0	0	0	0	1149	278	215	488	0	0	0	0	
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5	
Turn Type						Perm	Perm						
Protected Phases					8			2					
Permitted Phases						8	2						
Actuated Green, G (s)					23.9	23.9	26.8	26.8					
Effective Green, g (s)					23.9	23.9	26.8	26.8					
Actuated g/C Ratio					0.40	0.40	0.45	0.45					
Clearance Time (s)					4.5	4.5	4.5	4.5					
Vehicle Extension (s)					3.0	3.0	3.0	3.0					
Lane Grp Cap (vph)					2016	618	713	1495					
v/s Ratio Prot					c0.23								
v/s Ratio Perm						0.18	0.14	0.15					
v/c Ratio					0.57	0.45	0.30	0.33					
Uniform Delay, d1					13.9	13.1	10.5	10.6					
Progression Factor					1.00	1.00	1.00	1.00					
Incremental Delay, d2					0.4	0.5	1.1	0.6					
Delay (s)					14.3	13.6	11.6	11.2					
Level of Service					B	B	B	B					
Approach Delay (s)		0.0			14.1			11.3			0.0		
Approach LOS		A			B			B			A		
Intersection Summary													
HCM Average Control Delay			13.2		HCM Level of Service				B				
HCM Volume to Capacity ratio			0.44										
Actuated Cycle Length (s)			59.7		Sum of lost time (s)				9.0				
Intersection Capacity Utilization			67.6%		ICU Level of Service				C				
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis

36: SE Foster Road & SE 101st Avenue

2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	1835	20	10	1185	10	40	10	10	10	5	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00			1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.92			0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1752	3498		1752	3499		1743	1691			1693	
Flt Permitted	0.95	1.00		0.95	1.00		0.74	1.00			0.93	
Satd. Flow (perm)	1752	3498		1752	3499		1351	1691			1600	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	25	2318	25	13	1497	13	51	13	13	13	6	13
RTOR Reduction (vph)	0	1	0	0	1	0	0	10	0	0	10	0
Lane Group Flow (vph)	25	2342	0	13	1509	0	51	16	0	0	22	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	2.8	44.4		1.4	43.0		21.1	21.1			21.1	
Effective Green, g (s)	2.8	44.4		1.4	43.0		21.1	21.1			21.1	
Actuated g/C Ratio	0.04	0.56		0.02	0.54		0.27	0.27			0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	62	1968		31	1907		361	452			428	
v/s Ratio Prot	c0.01	c0.67		0.01	0.43			0.01				
v/s Ratio Perm							c0.04				0.01	
v/c Ratio	0.40	1.19		0.42	0.79		0.14	0.04			0.05	
Uniform Delay, d1	37.2	17.3		38.3	14.4		22.0	21.4			21.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	4.2	90.8		8.9	2.3		0.8	0.2			0.2	
Delay (s)	41.5	108.1		47.3	16.7		22.8	21.5			21.7	
Level of Service	D	F		D	B		C	C			C	
Approach Delay (s)		107.4			16.9			22.4			21.7	
Approach LOS		F			B			C			C	

Intersection Summary

HCM Average Control Delay	70.6	HCM Level of Service	E
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	78.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Appendix C.

**Intersection Analysis Worksheets, Decoupled with 3-Lane Woodstock
Cross Section**

HCM Unsignalized Intersection Capacity Analysis

6: SE Foster Road & SE 91st Street

2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	345	15	5	400	15	10	10	10	15	40	20
Sign Control		Free				Free		Stop			Stop	
Grade		0%				0%		0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	25	436	19	6	505	19	13	13	13	19	51	25
Pedestrians		5			5			5			5	
Lane Width (ft)		12.0				12.0		12.0			12.0	
Walking Speed (ft/s)		3.5				3.5		3.5			3.5	
Percent Blockage		0				0		0			0	
Right turn flare (veh)												
Median type		None				None						
Median storage (veh)												
Upstream signal (ft)		303				282						
pX, platoon unblocked	0.74						0.74	0.74		0.74	0.74	0.74
vC, conflicting volume	529			460			1074	1043	455	1043	1043	525
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	190			460			925	883	455	883	883	184
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 %	98			99			91	94	98	89	75	96
cM capacity (veh/h)	1016			1091			137	202	597	176	202	628

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	25	455	6	524	38	95
Volume Left	25	0	6	0	13	19
Volume Right	0	19	0	19	13	25
cSH	1016	1700	1091	1700	215	238
Volume to Capacity	0.02	0.27	0.01	0.31	0.18	0.40
Queue Length 95th (ft)	2	0	0	0	16	45
Control Delay (s)	8.6	0.0	8.3	0.0	25.2	29.8
Lane LOS	A		A		D	D
Approach Delay (s)	0.5		0.1		25.2	29.8
Approach LOS					D	D

Intersection Summary

Average Delay	3.5
Intersection Capacity Utilization	40.0%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 10: SE Woodstock Boulevard & SE 91st Street

2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	1035	15	30	620	10	5	10	10	30	20	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	13	1307	19	38	783	13	6	13	13	38	25	6
Pedestrians		5			5			5			5	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					284							
pX, platoon unblocked	0.66						0.66	0.66		0.66	0.66	0.66
vC, conflicting volume	801			1331			2236	2224	1327	2227	2227	799
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	448			1331			2608	2589	1327	2593	2593	446
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 %	98			93			0	16	93	0	0	98
cM capacity (veh/h)	732			513			0	15	187	3	15	402

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total	13	1326	834	32	69
Volume Left	13	0	38	6	38
Volume Right	0	19	13	13	6
cSH	732	1700	513	0	5
Volume to Capacity	0.02	0.78	0.07	Err	15.33
Queue Length 95th (ft)	1	0	6	Err	Err
Control Delay (s)	10.0	0.0	2.2	Err	Err
Lane LOS	B		A	F	F
Approach Delay (s)	0.1		2.2	Err	Err
Approach LOS				F	F

Intersection Summary

Average Delay			Err		
Intersection Capacity Utilization			85.0%	ICU Level of Service	E
Analysis Period (min)			15		

HCM Signalized Intersection Capacity Analysis

12: SE Foster Road & SE 92 Avenue

2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	25	305	30	100	350	59	5	590	165	65	365	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		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	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1748	1817		1749	1797		1782	1808		1787	1831	
Flt Permitted	0.18	1.00		0.27	1.00		0.36	1.00		0.10	1.00	
Satd. Flow (perm)	338	1817		495	1797		669	1808		193	1831	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	32	385	38	126	442	75	6	745	208	82	461	82
RTOR Reduction (vph)	0	5	0	0	9	0	0	14	0	0	9	0
Lane Group Flow (vph)	32	418	0	126	508	0	6	939	0	82	534	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	1%	1%	1%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	21.8	21.8		21.8	21.8		39.0	39.0		39.0	39.0	
Effective Green, g (s)	21.8	21.8		21.8	21.8		39.0	39.0		39.0	39.0	
Actuated g/C Ratio	0.32	0.32		0.32	0.32		0.57	0.57		0.57	0.57	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	107	576		157	569		379	1025		109	1038	
v/s Ratio Prot		0.23			c0.28			c0.52			0.29	
v/s Ratio Perm	0.09			0.25			0.01			0.42		
v/c Ratio	0.30	0.72		0.80	0.89		0.02	0.92		0.75	0.51	
Uniform Delay, d1	17.7	20.8		21.5	22.4		6.5	13.4		11.3	9.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	4.5		24.8	16.3		0.1	14.0		25.0	0.4	
Delay (s)	19.3	25.4		46.3	38.7		6.6	27.4		36.2	9.5	
Level of Service	B	C		D	D		A	C		D	A	
Approach Delay (s)		24.9			40.2			27.3			13.0	
Approach LOS		C			D			C			B	

Intersection Summary

HCM Average Control Delay	26.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	68.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	96.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

13: SE Woodstock Boulevard & SE 92nd Avenue

2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	910	85	160	540	90	75	590	190	50	395	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	1845	1522	1752	1801		1782	1881	1552	1787	1847	
Flt Permitted	0.16	1.00	1.00	0.15	1.00		0.24	1.00	1.00	0.12	1.00	
Satd. Flow (perm)	298	1845	1522	277	1801		452	1881	1552	221	1847	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	101	1149	107	202	682	114	95	745	240	63	499	57
RTOR Reduction (vph)	0	0	29	0	7	0	0	0	136	0	5	0
Lane Group Flow (vph)	101	1149	78	202	789	0	95	745	104	63	551	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt		Perm	pm+pt		Perm		Perm	Perm	Perm		
Protected Phases	7	4		3	8			2				6
Permitted Phases	4		4	8		2		2	6			
Actuated Green, G (s)	31.0	24.8	24.8	34.6	26.6		34.0	34.0	34.0	34.0	34.0	
Effective Green, g (s)	31.0	24.8	24.8	34.6	26.6		34.0	34.0	34.0	34.0	34.0	
Actuated g/C Ratio	0.39	0.31	0.31	0.44	0.34		0.43	0.43	0.43	0.43	0.43	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	232	581	479	271	608		195	812	670	95	797	
v/s Ratio Prot	0.03	c0.62		c0.08	0.44			c0.40			0.30	
v/s Ratio Perm	0.14		0.05	0.25		0.21		0.07	0.28			
v/c Ratio	0.44	1.98	0.16	0.75	1.30		0.49	0.92	0.15	0.66	0.69	
Uniform Delay, d1	18.3	27.0	19.5	17.7	26.1		16.1	21.1	13.6	17.8	18.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.3	446.1	0.2	10.6	145.6		8.5	16.9	0.5	31.0	4.9	
Delay (s)	19.6	473.1	19.7	28.3	171.7		24.6	38.0	14.1	48.8	23.0	
Level of Service	B	F	B	C	F		C	D	B	D	C	
Approach Delay (s)		403.6			142.7			31.5			25.7	
Approach LOS		F			F			C			C	

Intersection Summary

HCM Average Control Delay	182.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.37		
Actuated Cycle Length (s)	78.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	122.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

16: SE Foster Road & I-205 SB Off-Ramp

2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↗		↖	↑						↖↗	↖
Volume (vph)	0	415	120	130	254	0	0	0	0	185	535	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0						4.0	4.0
Lane Util. Factor		1.00		1.00	1.00						0.95	1.00
Frbp, ped/bikes		1.00		1.00	1.00						1.00	0.97
Flpb, ped/bikes		1.00		1.00	1.00						1.00	1.00
Frt		0.97		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.99	1.00
Satd. Flow (prot)		1782		1752	1845						3453	1524
Flt Permitted		1.00		0.14	1.00						0.99	1.00
Satd. Flow (perm)		1782		254	1845						3453	1524
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	0	524	152	164	321	0	0	0	0	234	676	322
RTOR Reduction (vph)	0	15	0	0	0	0	0	0	0	0	0	206
Lane Group Flow (vph)	0	661	0	164	321	0	0	0	0	0	910	116
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Turn Type				pm+pt						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases				8						6		6
Actuated Green, G (s)		25.0		36.6	36.6						25.0	25.0
Effective Green, g (s)		25.0		36.6	36.6						25.0	25.0
Actuated g/C Ratio		0.36		0.53	0.53						0.36	0.36
Clearance Time (s)		4.0		4.0	4.0						4.0	4.0
Vehicle Extension (s)		3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		640		297	970						1240	547
v/s Ratio Prot		c0.37		c0.06	0.17							
v/s Ratio Perm				0.23							0.26	0.08
v/c Ratio		1.03		0.55	0.33						0.73	0.21
Uniform Delay, d1		22.3		13.6	9.5						19.4	15.5
Progression Factor		1.00		1.00	1.00						1.00	1.00
Incremental Delay, d2		44.4		2.2	0.2						3.9	0.9
Delay (s)		66.7		15.8	9.7						23.3	16.3
Level of Service		E		B	A						C	B
Approach Delay (s)		66.7			11.7			0.0			21.5	
Approach LOS		E			B			A			C	
Intersection Summary												
HCM Average Control Delay			32.3			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			69.6			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			77.9%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

17: SE Woodstock Boulevard & I-205 SB Ramp

2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗	↖	↑					↖	↗	
Volume (vph)	0	895	255	260	515	0	0	0	0	235	275	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Lane Util. Factor		1.00	1.00	1.00	1.00					0.91	0.91	
Frbp, ped/bikes		1.00	0.98	1.00	1.00					1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	1.00					0.99	1.00	
Frt		1.00	0.85	1.00	1.00					1.00	0.93	
Flt Protected		1.00	1.00	0.95	1.00					0.95	1.00	
Satd. Flow (prot)		1845	1542	1752	1845					1582	3069	
Flt Permitted		1.00	1.00	0.14	1.00					0.95	1.00	
Satd. Flow (perm)		1845	1542	264	1845					1582	3069	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	0	1131	322	328	651	0	0	0	0	297	347	341
RTOR Reduction (vph)	0	0	73	0	0	0	0	0	0	0	165	0
Lane Group Flow (vph)	0	1131	249	328	651	0	0	0	0	267	553	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Turn Type			Perm	pm+pt						Perm		
Protected Phases		4		3	8						6	
Permitted Phases			4	8						6		
Actuated Green, G (s)		24.0	24.0	39.5	39.5					22.0	22.0	
Effective Green, g (s)		24.0	24.0	39.5	39.5					22.0	22.0	
Actuated g/C Ratio		0.35	0.35	0.57	0.57					0.32	0.32	
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		637	532	396	1049					501	971	
v/s Ratio Prot		c0.61		c0.14	0.35							
v/s Ratio Perm			0.16	0.33						0.17	0.18	
v/c Ratio		1.78	0.47	0.83	0.62					0.53	0.57	
Uniform Delay, d1		22.7	17.8	15.9	10.0					19.5	19.8	
Progression Factor		1.00	1.00	1.00	1.00					1.00	1.00	
Incremental Delay, d2		355.3	0.7	13.3	1.1					4.0	2.4	
Delay (s)		378.1	18.4	29.2	11.2					23.5	22.2	
Level of Service		F	B	C	B					C	C	
Approach Delay (s)		298.4			17.2			0.0			22.6	
Approach LOS		F			B			A			C	
Intersection Summary												
HCM Average Control Delay			138.3			HCM Level of Service				F		
HCM Volume to Capacity ratio			1.13									
Actuated Cycle Length (s)			69.5			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			102.5%			ICU Level of Service				G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

20: SE Foster Road & SE 90th Avenue

2/12/2009



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	150	270	625	5	356	640
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frbp, ped/bikes	1.00	0.97	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	1.00		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1752	1521	1842		1752	1845
Flt Permitted	0.95	1.00	1.00		0.13	1.00
Satd. Flow (perm)	1752	1521	1842		240	1845
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	189	341	789	6	450	808
RTOR Reduction (vph)	0	278	1	0	0	0
Lane Group Flow (vph)	189	63	794	0	450	808
Confl. Peds. (#/hr)	5	5		5	5	
Turn Type		Perm			pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Actuated Green, G (s)	12.2	12.2	26.7		46.1	46.1
Effective Green, g (s)	12.2	12.2	26.7		46.1	46.1
Actuated g/C Ratio	0.18	0.18	0.40		0.70	0.70
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	322	280	742		518	1283
v/s Ratio Prot	c0.11		c0.43		c0.20	0.44
v/s Ratio Perm		0.04			0.40	
v/c Ratio	0.59	0.22	1.07		0.87	0.63
Uniform Delay, d1	24.7	23.0	19.8		17.2	5.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.7	0.4	53.6		14.4	2.4
Delay (s)	27.5	23.4	73.4		31.5	7.8
Level of Service	C	C	E		C	A
Approach Delay (s)	24.9		73.4			16.3
Approach LOS	C		E			B

Intersection Summary

HCM Average Control Delay	35.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	66.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

29: SE Woodstock Boulevard & I-205 NB Ramp

2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑			↗			↖↗	↗			
Volume (vph)	220	910	0	0	545	200	230	130	390	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0	4.0			
Lane Util. Factor	1.00	1.00			1.00			0.91	0.91			
Frbp, ped/bikes	1.00	1.00			1.00			0.99	0.97			
Flpb, ped/bikes	1.00	1.00			1.00			1.00	1.00			
Frt	1.00	1.00			0.96			0.95	0.85			
Flt Protected	0.95	1.00			1.00			0.98	1.00			
Satd. Flow (prot)	1752	1845			1770			3097	1387			
Flt Permitted	0.14	1.00			1.00			0.98	1.00			
Satd. Flow (perm)	262	1845			1770			3097	1387			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	278	1149	0	0	688	253	291	164	493	0	0	0
RTOR Reduction (vph)	0	0	0	0	18	0	0	46	46	0	0	0
Lane Group Flow (vph)	278	1149	0	0	923	0	0	606	250	0	0	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Turn Type	pm+pt						Perm		Perm			
Protected Phases	7	4			8			2	2			
Permitted Phases	4						2		2			
Actuated Green, G (s)	39.0	39.0			24.2			23.0	23.0			
Effective Green, g (s)	39.0	39.0			24.2			23.0	23.0			
Actuated g/C Ratio	0.56	0.56			0.35			0.33	0.33			
Clearance Time (s)	4.0	4.0			4.0			4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)	376	1028			612			1018	456			
v/s Ratio Prot	0.11	c0.62			c0.52							
v/s Ratio Perm	0.30							0.20	0.18			
v/c Ratio	0.74	1.12			1.51			0.60	0.55			
Uniform Delay, d1	14.0	15.5			22.9			19.6	19.3			
Progression Factor	1.00	1.00			1.00			1.00	1.00			
Incremental Delay, d2	7.4	66.3			236.9			2.6	4.7			
Delay (s)	21.4	81.8			259.8			22.2	23.9			
Level of Service	C	F			F			C	C			
Approach Delay (s)		70.0			259.8			22.7			0.0	
Approach LOS		E			F			C			A	

Intersection Summary

HCM Average Control Delay	110.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	102.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

31: SE Foster Road & I-205 NB On-Ramp

2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑			↑	↗	↖	↑↔				
Volume (vph)	115	480	0	0	365	135	20	425	105	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0				
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	0.95				
Frbp, ped/bikes	1.00	1.00			1.00	0.98	1.00	0.99				
Flpb, ped/bikes	1.00	1.00			1.00	1.00	0.99	1.00				
Frt	1.00	1.00			1.00	0.85	1.00	0.97				
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00				
Satd. Flow (prot)	1749	1845			1845	1543	1740	3382				
Flt Permitted	0.34	1.00			1.00	1.00	0.95	1.00				
Satd. Flow (perm)	624	1845			1845	1543	1740	3382				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	145	606	0	0	461	171	25	537	133	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	69	0	27	0	0	0	0
Lane Group Flow (vph)	145	606	0	0	461	102	25	643	0	0	0	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Turn Type	Perm					Perm	Perm					
Protected Phases		4			8			2				
Permitted Phases	4					8	2					
Actuated Green, G (s)	24.6	24.6			24.6	24.6	26.4	26.4				
Effective Green, g (s)	24.6	24.6			24.6	24.6	26.4	26.4				
Actuated g/C Ratio	0.42	0.42			0.42	0.42	0.45	0.45				
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0	4.0				
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0				
Lane Grp Cap (vph)	260	769			769	643	779	1513				
v/s Ratio Prot		c0.33			0.25			c0.19				
v/s Ratio Perm	0.23					0.07	0.01					
v/c Ratio	0.56	0.79			0.60	0.16	0.03	0.42				
Uniform Delay, d1	13.1	14.9			13.4	10.7	9.1	11.1				
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00				
Incremental Delay, d2	2.6	5.4			1.3	0.1	0.1	0.9				
Delay (s)	15.7	20.3			14.6	10.9	9.2	12.0				
Level of Service	B	C			B	B	A	B				
Approach Delay (s)		19.4			13.6			11.9			0.0	
Approach LOS		B			B			B			A	

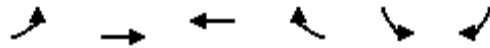
Intersection Summary

HCM Average Control Delay	15.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

35: SE Woodstock Boulevard & SE Foster Road

2/12/2009



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↗	↑	↖		↗↘	↘
Volume (vph)	5	1295	740	495	580	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	1.00	1.00		0.97	
Frpb, ped/bikes	1.00	1.00	0.99		1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.95		1.00	
Flt Protected	0.95	1.00	1.00		0.95	
Satd. Flow (prot)	1752	1845	1725		3405	
Flt Permitted	0.11	1.00	1.00		0.95	
Satd. Flow (perm)	194	1845	1725		3405	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	6	1636	935	625	733	6
RTOR Reduction (vph)	0	0	34	0	1	0
Lane Group Flow (vph)	6	1636	1526	0	738	0
Confl. Peds. (#/hr)	5			5	5	5
Turn Type	Perm					
Protected Phases		4	8		6	
Permitted Phases	4					
Actuated Green, G (s)	38.0	38.0	38.0		24.0	
Effective Green, g (s)	38.0	38.0	38.0		24.0	
Actuated g/C Ratio	0.54	0.54	0.54		0.34	
Clearance Time (s)	4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	105	1002	936		1167	
v/s Ratio Prot		c0.89	0.88		c0.22	
v/s Ratio Perm	0.03					
v/c Ratio	0.06	1.63	1.63		0.63	
Uniform Delay, d1	7.5	16.0	16.0		19.3	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.2	289.3	288.4		2.6	
Delay (s)	7.8	305.3	304.4		21.9	
Level of Service	A	F	F		C	
Approach Delay (s)		304.2	304.4		21.9	
Approach LOS		F	F		C	

Intersection Summary

HCM Average Control Delay	251.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.25		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	109.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

36: SE Foster Road & SE 101st Avenue

2/12/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗			↕	
Volume (vph)	20	1835	20	10	1185	10	40	10	10	10	5	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00			1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.92			0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1752	3498		1752	3499		1737	1691			1685	
Flt Permitted	0.95	1.00		0.95	1.00		0.74	1.00			0.93	
Satd. Flow (perm)	1752	3498		1752	3499		1346	1691			1592	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	25	2318	25	13	1497	13	51	13	13	13	6	13
RTOR Reduction (vph)	0	1	0	0	1	0	0	10	0	0	10	0
Lane Group Flow (vph)	25	2342	0	13	1509	0	51	16	0	0	22	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	2.8	44.4		1.4	43.0		21.1	21.1			21.1	
Effective Green, g (s)	2.8	44.4		1.4	43.0		21.1	21.1			21.1	
Actuated g/C Ratio	0.04	0.56		0.02	0.54		0.27	0.27			0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	62	1968		31	1907		360	452			426	
v/s Ratio Prot	c0.01	c0.67		0.01	0.43			0.01				
v/s Ratio Perm							c0.04				0.01	
v/c Ratio	0.40	1.19		0.42	0.79		0.14	0.04			0.05	
Uniform Delay, d1	37.2	17.3		38.3	14.4		22.0	21.4			21.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	4.2	90.8		8.9	2.3		0.8	0.2			0.2	
Delay (s)	41.5	108.1		47.3	16.7		22.8	21.5			21.7	
Level of Service	D	F		D	B		C	C			C	
Approach Delay (s)		107.4			16.9			22.4			21.7	
Approach LOS		F			B			C			C	

Intersection Summary

HCM Average Control Delay	70.6	HCM Level of Service	E
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	78.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			