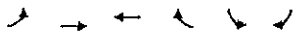
HCM Unsignalized Intersection Capacity Analysis
55: Roberts Ave & McMichael Street

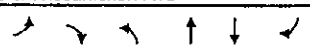


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑↑			↱
Volume (veh/h)	0	415	643	45	0	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.77	0.77	0.87	0.87	0.70	0.70
Hourly flow rate (vph)	0	539	739	52	0	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		123	419			
pX, platoon unblocked					0.89	
vC, conflicting volume	791				1304	395
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	791				1280	395
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	825				140	604

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	539	493	298	7
Volume Left	0	0	0	0
Volume Right	0	0	52	7
cSH	1700	1700	1700	604
Volume to Capacity	0.32	0.29	0.18	0.01
Queue Length 95th (ft)	0	0	0	1
Control Delay (s)	0.0	0.0	0.0	11.0
Lane LOS				B
Approach Delay (s)	0.0	0.0		11.0
Approach LOS				B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	29.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
180: Abbottsford Ave & Wissahickon Ave



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↑↑	
Volume (veh/h)	0	65	0	1025	429	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.88	0.88	0.83	0.83
Hourly flow rate (vph)	0	75	0	1165	517	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1046		
pX, platoon unblocked	0.89					
vC, conflicting volume	1099	258	517			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	861	258	517			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	90	100			
cM capacity (veh/h)	265	747	1059			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	75	582	582	258	258
Volume Left	0	0	0	0	0
Volume Right	75	0	0	0	0
cSH	747	1700	1700	1700	1700
Volume to Capacity	0.10	0.34	0.34	0.15	0.15
Queue Length 95th (ft)	8	0	0	0	0
Control Delay (s)	10.4	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.4	0.0		0.0	
Approach LOS	B				

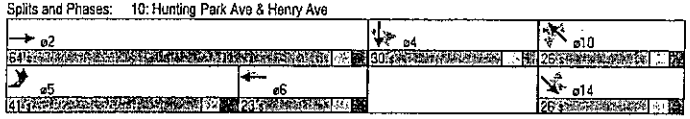
Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	31.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBT	SBR	SEL2	SEL	SET	NWL2	NWL
Lane Configurations												
Volume (vph)	869	641	405	62	115	125	412	83	95	185	6	73
Lane Group Flow (vph)	916	745	440	113	193	136	490	0	193	231	0	86
Turn Type	Prot			Perm	Perm		Perm	Perm	Perm		Perm	Perm
Protected Phases	5	2	6			4				14		
Permitted Phases		2		6	4		4	14	14		10	10
Minimum Split (s)	12.5	12.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
Total Split (s)	41.0	64.0	23.0	23.0	30.0	30.0	30.0	26.0	26.0	26.0	26.0	26.0
Total Split (%)	34.2%	53.3%	19.2%	19.2%	25.0%	25.0%	25.0%	21.7%	21.7%	21.7%	21.7%	21.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.4	2.3	2.3	2.3	0.4	1.4	1.4	1.4	1.4	1.4	0.0	1.4
Total Lost Time (s)	6.9	4.2	4.2	4.2	6.9	5.1	5.1	5.1	5.1	5.1	6.5	5.1
Lead/Lag	Lead		Lag	Lag								
Lead-Lag Optimize?	Yes											
v/c Ratio	1.06	0.92	0.94	0.49	0.61	0.38	0.93		1.04	0.72		0.92
Control Delay	88.7	45.8	78.6	44.2	53.5	44.5	72.0		126.5	59.8		124.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Delay	88.7	45.8	78.6	44.2	53.5	44.5	72.0		126.5	59.8		124.8
Queue Length 50th (ft)	401	517	179	63	138	91	210		162	169		66
Queue Length 95th (ft)	#529	#783	#280	125	219	154	#325		#312	#272		#172
Internal Link Dist (ft)		658	1979			1653				1387		
Turn Bay Length (ft)	450			250	150		415		135			115
Base Capacity (vph)	866	812	470	231	317	359	526		185	323		93
Starvation Cap Reductn	0	0	0	0	0	0	0		0	0		0
Spillback Cap Reductn	0	0	0	0	0	0	0		0	0		0
Storage Cap Reductn	0	0	0	0	0	0	0		0	0		0
Reduced v/c Ratio	1.06	0.92	0.94	0.49	0.61	0.38	0.93		1.04	0.72		0.92

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT, Start of Green
Natural Cycle: 120
Control Type: Pretimed
- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Hunting Park Ave & Henry Ave



Lane Group	NWL	NWR
Lane Configurations		
Volume (vph)	102	191
Lane Group Flow (vph)	111	211
Turn Type		Perm
Protected Phases	10	
Permitted Phases		10
Minimum Split (s)	11.5	11.5
Total Split (s)	26.0	26.0
Total Split (%)	21.7%	21.7%
Yellow Time (s)	3.5	3.5
All-Red Time (s)	3.0	3.0
Lost Time Adjust (s)	1.4	0.0
Total Lost Time (s)	5.1	6.5
Lead/Lag		
Lead-Lag Optimize?		
v/c Ratio	0.38	0.96
Control Delay	48.1	101.2
Queue Delay	0.0	0.0
Total Delay	48.1	101.2
Queue Length 50th (ft)	177	163
Queue Length 95th (ft)	134	#321
Internal Link Dist (ft)	698	
Turn Bay Length (ft)		100
Base Capacity (vph)	294	220
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.38	0.96

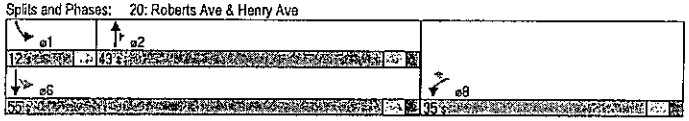
Intersection Summary

Lanes, Volumes, Timings
20: Roberts Ave & Henry Ave

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	251	247	922	263	170	467
Lane Group Flow (vph)	254	249	951	271	181	497
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Minimum Split (s)	33.0	33.0	10.3	10.3	8.0	10.3
Total Split (s)	35.0	35.0	43.0	43.0	12.0	55.0
Total Split (%)	38.9%	38.9%	47.8%	47.8%	13.3%	61.1%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	2.3	0.0	2.3	2.3	2.3	2.3
Total Lost Time (s)	2.7	5.0	2.7	2.7	0.7	2.7
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
v/c Ratio	0.37	0.36	0.57	0.31	0.48	0.24
Control Delay	23.3	4.6	20.2	3.0	27.8	18.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.3	4.6	20.2	3.0	27.8	18.9
Queue Length 50th (ft)	105	0	204	0	85	107
Queue Length 95th (ft)	169	50	265	42	156	164
Internal Link Dist (ft)	420		1653			767
Turn Bay Length (ft)		200		250	200	
Base Capacity (vph)	684	699	1654	866	378	2057
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.36	0.57	0.31	0.48	0.24

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 73 (81%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Pretimed

Splits and Phases: 20: Roberts Ave & Henry Ave

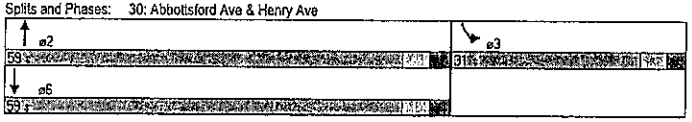


Lanes, Volumes, Timings
30: Abbottsford Ave & Henry Ave

Lane Group	NBT	SBL	SBT
Lane Configurations			
Volume (vph)	1119	308	637
Lane Group Flow (vph)	1270	318	657
Turn Type		custom	
Protected Phases	2	3	6
Permitted Phases		3	
Minimum Split (s)	22.3	10.3	22.3
Total Split (s)	59.0	31.0	59.0
Total Split (%)	65.6%	34.4%	65.6%
Yellow Time (s)	3.6	3.6	3.6
All-Red Time (s)	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3
Lead/Lag			
Lead-Lag Optimize?			
v/c Ratio	0.62	0.65	0.32
Control Delay	4.8	36.3	10.0
Queue Delay	0.0	0.0	0.0
Total Delay	4.8	36.3	10.0
Queue Length 50th (ft)	38	160	92
Queue Length 95th (ft)	41	251	124
Internal Link Dist (ft)	767		576
Turn Bay Length (ft)		200	
Base Capacity (vph)	2063	486	2072
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.62	0.65	0.32

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 50
Control Type: Pretimed

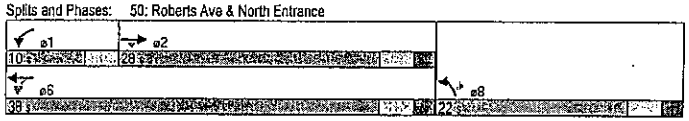
Splits and Phases: 30: Abbottsford Ave & Henry Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	256	50	64	585	115	169
Lane Group Flow (vph)	278	54	70	636	125	184
Turn Type		Perm	pm+pt			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Minimum Split (s)	21.0	21.0	21.0	21.0	21.0	21.0
Total Split (s)	28.0	28.0	10.0	38.0	22.0	22.0
Total Split (%)	46.7%	46.7%	16.7%	63.3%	36.7%	36.7%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	3.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?						
v/c Ratio	0.39	0.08	0.12	0.62	0.25	0.32
Control Delay	15.5	4.5	4.2	7.6	18.3	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.5	4.5	4.2	7.6	18.3	4.9
Queue Length 50th (ft)	70	0	7	91	35	0
Queue Length 95th (ft)	125	18	m10	m124	71	39
Internal Link Dist (ft)	347			43	255	
Turn Bay Length (ft)		150				
Base Capacity (vph)	714	640	604	1025	502	580
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.08	0.12	0.62	0.25	0.32

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 29 (48%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 65
Control Type: Pretimed
m Volume for 95th percentile queue is metered by upstream signal.

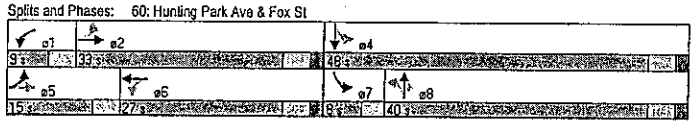
Splits and Phases: 50: Roberts Ave & North Entrance



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	144	925	140	531	2	474	188	99	294
Lane Group Flow (vph)	160	1039	146	672	2	515	204	110	516
Turn Type	pm+pt		pm+pt		Perm		Perm	pm+pt	
Protected Phases	5	2	1!	6		8		7	4
Permitted Phases	2		6		8		8	4	
Minimum Split (s)	7.6	9.4	8.0	9.4	20.0	20.0	20.0	8.0	20.0
Total Split (s)	15.0	33.0	9.0	27.0	40.0	40.0	40.0	8.0	48.0
Total Split (%)	16.7%	36.7%	10.0%	30.0%	44.4%	44.4%	44.4%	8.9%	53.3%
Yellow Time (s)	3.6	3.6	3.5	3.6	3.6	3.6	3.6	3.0	3.6
All-Red Time (s)	0.0	1.8	0.0	1.8	1.8	1.8	1.8	0.0	1.8
Lost Time Adjust (s)	0.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Total Lost Time (s)	4.0	4.0	2.1	4.0	4.0	4.0	4.0	1.6	4.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
v/c Ratio	0.54	0.72	0.60	0.78	0.01	0.60	0.29	0.34	0.58
Control Delay	23.9	25.1	27.7	39.6	16.5	25.0	10.0	14.4	18.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.9	25.1	27.7	39.6	16.5	25.0	10.0	14.4	18.4
Queue Length 50th (ft)	56	251	72	200	1	226	34	31	186
Queue Length 95th (ft)	99	325	m127	260	5	330	82	51	240
Internal Link Dist (ft)		1975		1584		899			540
Turn Bay Length (ft)	200		200		100		100	105	
Base Capacity (vph)	295	1442	244	863	292	853	704	320	896
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.72	0.60	0.78	0.01	0.60	0.29	0.34	0.58

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 60
Control Type: Pretimed
m Volume for 95th percentile queue is metered by upstream signal.
! Phase conflict between lane groups.

Splits and Phases: 60: Hunting Park Ave & Fox St

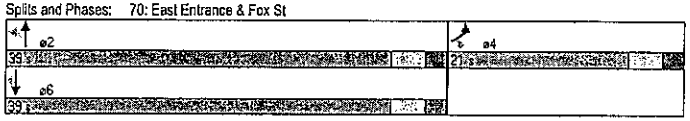


Lanes, Volumes, Timings
70: East Entrance & Fox St

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	140	85	94	636	421	171
Lane Group Flow (vph)	152	92	102	691	458	186
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Minimum Split (s)	21.0	21.0	21.0	21.0	21.0	21.0
Total Split (s)	21.0	21.0	39.0	39.0	39.0	39.0
Total Split (%)	35.0%	35.0%	65.0%	65.0%	65.0%	65.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
v/c Ratio	0.32	0.19	0.22	0.65	0.43	0.19
Control Delay	20.0	5.8	8.0	12.7	9.3	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.0	5.8	8.0	12.7	9.3	1.8
Queue Length 50th (ft)	44	11	16	153	73	3
Queue Length 95th (ft)	87	28	39	255	124	14
Internal Link Dist (ft)	304			540	1098	
Turn Bay Length (ft)			200			
Base Capacity (vph)	472	490	466	1056	1056	978
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.19	0.22	0.65	0.43	0.19

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 11 (18%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 55
Control Type: Pretimed

Splits and Phases: 70: East Entrance & Fox St

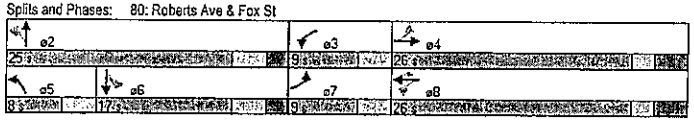


Lanes, Volumes, Timings
80: Roberts Ave & Fox St

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	173	202	202	455	15	133	466	7	311
Lane Group Flow (vph)	182	286	235	529	134	0	807	0	439
Turn Type	pm+pt		pm+pt		Perm	pm+pt		Perm	
Protected Phases	7	4	3	8		5	2		6
Permitted Phases	4		8		8	2		6	
Detector Phase	7	4	3	8	8	5	2	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	9.0	8.0	9.0	9.0	8.0	10.0	10.0	10.0
Total Split (s)	9.0	26.0	9.0	26.0	26.0	8.0	25.0	17.0	17.0
Total Split (%)	15.0%	43.3%	15.0%	43.3%	43.3%	13.3%	41.7%	28.3%	28.3%
Yellow Time (s)	3.0	2.0	3.0	2.0	2.0	3.0	3.0	3.0	3.0
All-Red Time (s)	0.0	3.0	0.0	3.0	3.0	0.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	0.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	2.0	4.0	2.0	4.0	5.0	1.0	3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead		Lag	Lag
Lead-Lag Optimize?						Yes		Yes	Yes
Recall Mode	None	Max	None	Max	Max	None	C-Max	C-Max	C-Max
v/c Ratio	0.50	0.42	0.40	0.71	0.21		0.76		0.36
Control Delay	18.9	25.0	6.7	17.4	2.9		14.3		15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	18.9	25.0	6.7	17.4	2.9		14.3		15.6
Queue Length 50th (ft)	49	89	25	112	0		87		43
Queue Length 95th (ft)	92	162	53	179	22		107		64
Internal Link Dist (ft)		339		455			1098		924
Turn Bay Length (ft)	200		200		100				
Base Capacity (vph)	367	677	591	743	641		1068		1220
Starvation Cap Reductn	0	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0	0		0		0
Reduced v/c Ratio	0.50	0.42	0.40	0.71	0.21		0.76		0.36

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 53 (88%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 80: Roberts Ave & Fox St

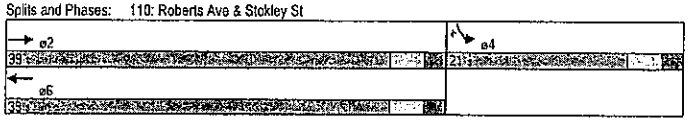


Lanes, Volumes, Timings
110: Roberts Ave & Stokley St

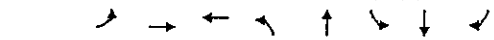
Lane Group	EBT	WBT	SBL	SBR
Lane Configurations	↑	↑	↰	↱
Volume (vph)	375	472	113	290
Lane Group Flow (vph)	457	492	188	483
Turn Type			Perm	
Protected Phases	2	6	4	
Permitted Phases				
Detector Phase	2	6	4	4
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	21.5	21.5	21.5	21.5
Total Split (s)	39.0	39.0	21.0	21.0
Total Split (%)	65.0%	65.0%	35.0%	35.0%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Min	C-Min
v/c Ratio	0.66	0.71	0.23	0.52
Control Delay	21.1	21.4	12.8	6.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.1	21.4	12.8	6.6
Queue Length 50th (ft)	173	148	38	25
Queue Length 95th (ft)	147	185	59	26
Internal Link Dist (ft)	455	1436	792	
Turn Bay Length (ft)				
Base Capacity (vph)	1056	1056	818	923
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	0.43	0.47	0.23	0.52

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 49 (82%), Referenced to phase 4:SBL and 8:Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 110: Roberts Ave & Stokley St



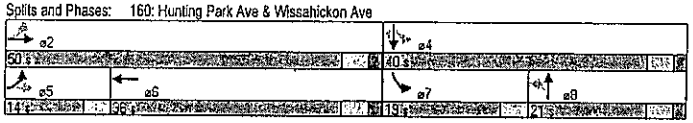
Lanes, Volumes, Timings
160: Hunting Park Ave & Wissahickon Ave



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↑↑		↑↑	↰	↑	↱
Volume (vph)	152	1027	619	39	284	332	255	111
Lane Group Flow (vph)	190	1315	805	0	395	349	269	117
Turn Type	pm+pt		Perm		pm+pt			Perm
Protected Phases	5	2	6		8	7	4	
Permitted Phases	2			6		4		4
Minimum Split (s)	7.6	9.4	9.4	9.4	9.4	7.6	9.4	9.4
Total Split (s)	14.0	50.0	36.0	21.0	21.0	19.0	40.0	40.0
Total Split (%)	15.6%	55.6%	40.0%	23.3%	23.3%	21.1%	44.4%	44.4%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	0.0	1.8	1.8	1.8	1.8	0.0	1.8	1.8
Lost Time Adjust (s)	0.4	1.4	1.4	1.4	1.4	0.4	1.4	1.4
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead		Lag	Lag	Lag	Lead		
Lead-Lag Optimize?								
v/c Ratio	0.60	0.74	0.58		0.69	0.87	0.37	0.17
Control Delay	29.2	14.0	24.3		41.0	46.3	21.0	6.5
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	29.2	14.0	24.3		41.0	46.3	21.0	6.5
Queue Length 50th (ft)	61	140	183		111	160	106	6
Queue Length 95th (ft)	m105	203	242		152	m#267	m154	m24
Internal Link Dist (ft)		1584	151		484		2048	
Turn Bay Length (ft)	85							275
Base Capacity (vph)	316	1779	1394		675	403	735	695
Starvation Cap Reductn	0	0	0		0	0	0	0
Spillback Cap Reductn	0	0	0		0	0	0	0
Storage Cap Reductn	0	0	0		0	0	0	0
Reduced v/c Ratio	0.60	0.74	0.58		0.69	0.87	0.37	0.17

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:EBTL Start of Green
Natural Cycle: 45
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 160: Hunting Park Ave & Wissahickon Ave



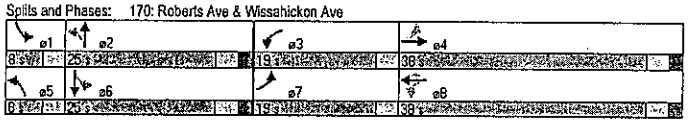
Lanes, Volumes, Timings
170: Roberts Ave & Wissahickon Ave

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	139	340	358	350	240	29	555	94	252
Lane Group Flow (vph)	154	516	389	380	261	31	681	107	352
Turn Type	pm+pt		pm+pt		Perm	pm+pt		pm+pt	
Protected Phases	7	4	3	8		5	2	1	6
Permitted Phases	4		8		8	2		6	
Minimum Split (s)	8.0	9.4	8.0	9.4	9.4	8.0	10.0	8.0	10.0
Total Split (s)	19.0	38.0	19.0	38.0	38.0	8.0	25.0	8.0	25.0
Total Split (%)	21.1%	42.2%	21.1%	42.2%	42.2%	8.9%	27.8%	8.9%	27.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	0.0	2.0	0.0	2.0	2.0	0.0	2.0	0.0	2.0
Lost Time Adjust (s)	-1.4	-1.4	-1.4	-1.4	-1.4	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	1.6	3.6	1.6	3.6	3.6	1.0	3.0	1.0	3.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
v/c Ratio	0.25	0.65	0.77	0.53	0.31	0.09	0.79	0.47	0.41
Control Delay	8.4	26.5	23.9	25.0	3.6	19.2	31.1	27.1	27.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.4	26.5	23.9	25.0	3.6	19.2	31.1	27.1	27.8
Queue Length 50th (ft)	34	226	101	165	0	10	113	41	81
Queue Length 95th (ft)	59	336	#238	252	46	m16	144	76	118
Internal Link Dist (ft)		1436		740			2048		966
Turn Bay Length (ft)	100		300			100		65	
Base Capacity (vph)	614	790	504	712	847	340	862	228	863
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.65	0.77	0.53	0.31	0.09	0.79	0.47	0.41

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 22 (24%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 170: Roberts Ave & Wissahickon Ave



2019 NO BUILD: PM PEAK

HCM Signalized Intersection Capacity Analysis
10: Hunting Park Ave & Henry Ave

Movement	EBL2	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR
Lane Configurations													
Volume (vph)	1	725	653	65	6	398	65	44	6	6	130	1	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	12	10	10	12	12	12	13	12	
Total Lost time (s)		3.9	5.2			5.2	5.2				5.1		
Lane Util. Factor		1.00	0.95			0.95	1.00				1.00		
Frt		1.00	0.99			1.00	0.85				0.99		
Flt Protected		0.95	1.00			1.00	1.00				1.00		
Satd. Flow (prot)		1745	3438			3336	1492				1859		
Flt Permitted		0.19	1.00			1.00	1.00				0.97		
Satd. Flow (perm)		350	3438			3336	1492				1805		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.90	0.90	0.90	0.92	0.77	0.77	0.77	
Adj. Flow (vph)	1	788	710	71	7	442	72	49	7	8	169	1	
RTOR Reduction (vph)	0	0	0	0	0	0	20	0	0	0	3	0	
Lane Group Flow (vph)	0	789	787	0	0	442	101	0	0	0	199	0	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	1%	1%	2%	4%	4%	4%	
Turn Type	pm+pt	pm+pt					Perm		Perm	Perm			
Protected Phases	5	5	2			6					8		
Permitted Phases	2	2	5				6		8	8			
Actuated Green, G (s)		45.5	45.5			17.5	17.5				16.5		
Effective Green, g (s)		45.1	47.8			19.8	19.8				17.9		
Actuated g/C Ratio		0.38	0.40			0.16	0.16				0.15		
Clearance Time (s)		3.5	7.5			7.5	7.5				6.5		
Lane Grp Cap (vph)		412	1369			550	246				269		
v/s Ratio Prot		c0.38	0.23			0.13							
v/s Ratio Perm		c0.34					0.07				0.11		
v/c Ratio		1.92	0.58			0.80	0.41				0.74		
Uniform Delay, d1		34.5	28.2			48.2	44.9				48.8		
Progression Factor		1.00	1.00			1.00	1.00				1.00		
Incremental Delay, d2		420.7	1.6			11.8	5.0				16.8		
Delay (s)		455.2	29.9			60.0	49.9				65.6		
Level of Service		F	C			E	D				E		
Approach Delay (s)			242.7				57.9				65.6		
Approach LOS			F				E				E		

Intersection Summary			
HCM Average Control Delay	154.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.53		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.9
Intersection Capacity Utilization	126.0%	ICU Level of Service	H
Analysis Period (min)	15		

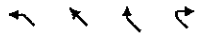
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Hunting Park Ave & Henry Ave

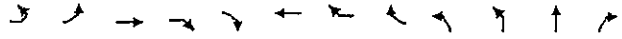
Movement	NBR2	SBL2	SBL	SBT	SBR	SBR2	SEL2	SEL	SET	SER	SER2	NWL2
Lane Configurations												
Volume (vph)	13	66	108	131	405	40	186	100	194	19	9	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	13	13	12	12	12	12	13	12	12	12
Total Lost time (s)			3.9	5.1	5.1			5.1	5.1			
Lane Util. Factor			1.00	1.00	0.88			1.00	1.00			
Frt			1.00	1.00	0.85			1.00	0.98			
Flt Protected			0.95	1.00	1.00			0.95	1.00			
Satd. Flow (prot)			1829	1925	2787			1752	1871			
Flt Permitted			0.24	1.00	1.00			0.26	1.00			
Satd. Flow (perm)			457	1925	2787			485	1871			
Peak-hour factor, PHF	0.77	0.89	0.89	0.89	0.89	0.92	0.88	0.88	0.88	0.88	0.92	0.92
Adj. Flow (vph)	17	74	121	147	455	43	100	114	220	22	10	8
RTOR Reduction (vph)	0	0	0	0	5	0	0	0	2	0	0	0
Lane Group Flow (vph)	0	0	195	147	493	0	0	214	250	0	0	0
Heavy Vehicles (%)	4%	2%	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%
Turn Type			pm+pt	pm+pt		Perm		Perm	Perm			Perm
Protected Phases			7	7	4				9			
Permitted Phases		4	4	4			9	9				13
Actuated Green, G (s)			28.5	28.5	28.5			25.5	25.5			
Effective Green, g (s)			28.1	29.9	29.9			26.9	26.9			
Actuated g/C Ratio			0.23	0.25	0.25			0.22	0.22			
Clearance Time (s)			3.5	6.5	6.5			6.5	6.5			
Lane Grp Cap (vph)			200	480	694			109	419			
v/s Ratio Prot			c0.07	0.08					0.13			
v/s Ratio Perm			c0.16		0.18			c0.44				
v/c Ratio			0.98	0.31	0.71			1.96	0.60			
Uniform Delay, d1			44.1	36.6	41.1			46.6	41.7			
Progression Factor			1.00	1.00	1.00			1.00	1.00			
Incremental Delay, d2			57.5	1.6	6.1			464.9	6.2			
Delay (s)			101.6	38.3	47.2			511.4	47.9			
Level of Service			F	D	D			F	D			
Approach Delay (s)				58.2					260.7			
Approach LOS				E					F			

Intersection Summary

HCM Signalized Intersection Capacity Analysis
10: Hunting Park Ave & Henry Ave



Movement	NWL	NWT	NWR	NWR2
Lane Configurations				
Volume (vph)	76	107	163	3
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width	12	13	12	12
Total Lost time (s)	5.1	5.1		
Lane Util. Factor	1.00	1.00		
Frt	1.00	0.91		
Flt Protected	0.95	1.00		
Satd. Flow (prot)	1679	1652		
Flt Permitted	0.38	1.00		
Satd. Flow (perm)	667	1652		
Peak-hour factor, PHF	0.87	0.87	0.87	0.87
Adj. Flow (vph)	87	123	187	3
RTOR Reduction (vph)	0	0	0	0
Lane Group Flow (vph)	95	313	0	0
Heavy Vehicles (%)	8%	8%	6%	8%
Turn Type	Perm			
Protected Phases		13		
Permitted Phases	13			
Actuated Green, G (s)	25.5	25.5		
Effective Green, g (s)	26.9	26.9		
Actuated g/C Ratio	0.22	0.22		
Clearance Time (s)	6.5	6.5		
Lane Grp Cap (vph)	150	370		
v/s Ratio Prot		0.19		
v/s Ratio Perm	0.14			
v/c Ratio	0.63	0.85		
Uniform Delay, d1	42.1	44.6		
Progression Factor	1.00	1.00		
Incremental Delay, d2	18.6	20.6		
Delay (s)	60.7	65.2		
Level of Service	E	E		
Approach Delay (s)		64.1		
Approach LOS		E		
Intersection Summary				



Movement	EBL2	EBL	EBT	EBR	EBR2	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	0	725	653	65	6	398	65	44	6	6	130	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	12	10	10	12	12	12	13	12
Total Lost time (s)		3.9	5.2			5.2	5.2				5.1	
Lane Util. Factor		0.91	0.91			0.95	1.00				1.00	
Frt		1.00	0.99			1.00	0.85				0.99	
Flt Protected		0.95	0.99			1.00	1.00				1.00	
Satd. Flow (prot)		1588	3260			3336	1492				1859	
Flt Permitted		0.19	0.46			1.00	1.00				0.96	
Satd. Flow (perm)		318	1505			3336	1492				1800	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.90	0.90	0.90	0.92	0.77	0.77	0.77
Adj. Flow (vph)	1	788	710	71	7	442	72	49	7	8	169	1
RTOR Reduction (vph)	0	0	1	0	0	0	20	0	0	0	3	0
Lane Group Flow (vph)	0	458	1118	0	0	442	101	0	0	0	199	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	1%	1%	2%	4%	4%	4%
Turn Type	pm+pt	pm+pt					Perm		Perm	Perm		
Protected Phases	5	5	2			6					8	
Permitted Phases	2	2					6		8	8		
Actuated Green, G (s)		45.5	45.5			17.5	17.5				13.5	
Effective Green, g (s)		45.1	47.8			19.8	19.8				14.9	
Actuated g/C Ratio		0.38	0.40			0.16	0.16				0.12	
Clearance Time (s)		3.5	7.5			7.5	7.5				6.5	
Lane Grp Cap (vph)		375	1299			550	246				224	
v/s Ratio Prot		c0.25	0.34			0.13						
v/s Ratio Perm		c0.21					0.07				c0.11	
v/c Ratio		1.22	0.86			0.80	0.41				0.89	
Uniform Delay, d1		34.5	33.1			48.2	44.9				51.7	
Progression Factor		1.00	1.00			1.00	1.00				1.00	
Incremental Delay, d2		121.3	7.6			11.8	5.0				37.2	
Delay (s)		155.8	40.7			60.0	49.9				88.9	
Level of Service		F	D			E	D				F	
Approach Delay (s)			74.1			57.9					88.9	
Approach LOS			E			E					F	

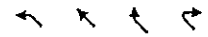
Intersection Summary			
HCM Average Control Delay	68.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.27		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	114.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBR2	SBL2	SBL	SBT	SBR	SBR2	SEL2	SEL	SET	SER	SER2	NWL2
Lane Configurations												
Volume (vph)	13	66	108	131	405	40	88	100	194	19	9	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	13	13	12	12	12	12	13	12	12	12
Total Lost time (s)			3.9	5.1	5.1			5.1	5.1			
Lane Util. Factor			1.00	1.00	0.88			1.00	1.00			
Frt			1.00	1.00	0.85			1.00	0.96			
Flt Protected			0.95	1.00	1.00			0.95	1.00			
Satd. Flow (prot)			1829	1925	2787			1752	1871			
Flt Permitted			0.24	1.00	1.00			0.26	1.00			
Satd. Flow (perm)			453	1925	2787			485	1871			
Peak-hour factor, PHF	0.77	0.89	0.89	0.89	0.89	0.92	0.88	0.88	0.88	0.88	0.92	0.92
Adj. Flow (vph)	17	74	121	147	455	43	100	114	220	22	10	8
RTOR Reduction (vph)	0	0	0	0	15	0	0	0	2	0	0	0
Lane Group Flow (vph)	0	0	195	147	493	0	0	214	250	0	0	0
Heavy Vehicles (%)	4%	2%	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%
Turn Type	pm+pt	pm+pt		Perm		Perm	Perm	Perm				Perm
Protected Phases	7	7	4						9			
Permitted Phases	4	4	4	4		9	9					13
Actuated Green, G (s)			28.5	28.5	28.5			25.5	25.5			
Effective Green, g (s)			28.1	29.9	29.9			26.9	26.9			
Actuated g/C Ratio			0.23	0.25	0.25			0.22	0.22			
Clearance Time (s)			3.5	6.5	6.5			6.5	6.5			
Lane Grp Cap (vph)			233	480	694			109	419			
v/s Ratio Prot			c0.08	0.08					0.13			
v/s Ratio Perm			0.12		0.18			c0.44				
v/c Ratio			0.84	0.31	0.71			1.96	0.60			
Uniform Delay, d1			55.3	36.6	41.1			46.6	41.7			
Progression Factor			1.00	1.00	1.00			1.00	1.00			
Incremental Delay, d2			28.5	1.6	6.1			464.9	6.2			
Delay (s)			83.9	38.3	47.2			511.4	47.9			
Level of Service			F	D	D			F	D			
Approach Delay (s)				54.1					260.7			
Approach LOS				D					F			

Intersection Summary

HCM Signalized Intersection Capacity Analysis
10: Hunting Park Ave & Henry Ave



Movement	NWL	NWT	NWR	NWR2
Lane Configurations				
Volume (vph)	76	107	163	3
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width	12	13	12	12
Total Lost time (s)	5.1	5.1		
Lane Util. Factor	1.00	1.00		
Frt	1.00	0.91		
Flt Protected	0.95	1.00		
Satd. Flow (prot)	1679	1652		
Flt Permitted	0.36	1.00		
Satd. Flow (perm)	667	1652		
Peak-hour factor, PHF	0.87	0.87	0.87	0.87
Adj. Flow (vph)	87	123	187	3
RTOR Reduction (vph)	0	0	0	0
Lane Group Flow (vph)	95	313	0	0
Heavy Vehicles (%)	6%	6%	6%	6%
Turn Type	Perm			
Protected Phases		13		
Permitted Phases	13			
Actuated Green, G (s)	25.5	25.5		
Effective Green, g (s)	26.9	26.9		
Actuated g/C Ratio	0.22	0.22		
Clearance Time (s)	6.5	6.5		
Lane Grp Cap (vph)	150	370		
v/s Ratio Prot		0.19		
v/s Ratio Perm	0.14			
v/c Ratio	0.63	0.85		
Uniform Delay, d1	42.1	44.6		
Progression Factor	1.00	1.00		
Incremental Delay, d2	18.6	20.6		
Delay (s)	60.7	65.2		
Level of Service	E	E		
Approach Delay (s)		64.1		
Approach LOS		E		

Intersection Summary			
HCM Average Control Delay		HCM Level of Service	
HCM Volume to Capacity ratio			
Actuated Cycle Length (s)		Sum of lost time (s)	
Intersection Capacity Utilization		ICU Level of Service	
Analysis Period (min)			

HCM Signalized Intersection Capacity Analysis
20: Roberts Ave & Henry Ave

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	223	178	967	182	65	489
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	14	12	13	12	12	12
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		0.95	1.00	1.00	0.95
Frt	0.94		1.00	0.85	1.00	1.00
Flt Protected	0.97		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1835		3693	1599	1770	3539
Flt Permitted	0.97		1.00	1.00	0.23	1.00
Satd. Flow (perm)	1835		3693	1599	420	3539
Peak-hour factor, PHF	0.99	0.99	0.97	0.97	0.94	0.94
Adj. Flow (vph)	225	180	997	188	69	520
RTOR Reduction (vph)	32	0	0	78	0	0
Lane Group Flow (vph)	373	0	997	110	69	520
Heavy Vehicles (%)	1%	1%	1%	1%	2%	2%
Turn Type				Perm	Perm	
Protected Phases	5		2			6
Permitted Phases				2	6	
Actuated Green, G (s)	27.0		50.4	50.4	50.4	50.4
Effective Green, g (s)	29.3		52.7	52.7	52.7	52.7
Actuated g/C Ratio	0.33		0.59	0.59	0.59	0.59
Clearance Time (s)	6.3		6.3	6.3	6.3	6.3
Lane Grp Cap (vph)	597		2192	936	246	2072
v/s Ratio Prot	c0.20		c0.27			0.15
v/s Ratio Perm				0.07	0.16	
v/c Ratio	0.63		0.46	0.12	0.28	0.25
Uniform Delay, d1	25.7		10.6	8.3	9.2	9.1
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	4.9		0.7	0.3	2.9	0.3
Delay (s)	30.6		11.3	8.6	12.1	9.4
Level of Service	C		B	A	B	A
Approach Delay (s)	30.6		10.9			9.7
Approach LOS	C		B			A

Intersection Summary			
HCM Average Control Delay	14.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

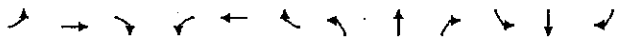
HCM Signalized Intersection Capacity Analysis
30: Abbottsford Ave & Henry Ave

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↱		↰	↑↑
Volume (vph)	0	0	1093	53	323	554
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.3		6.3	6.3
Lane Util. Factor			0.95		1.00	0.95
Frt			0.99		1.00	1.00
Flt Protected			1.00		0.95	1.00
Satd. Flow (prot)			3515		1770	3539
Flt Permitted			1.00		0.95	1.00
Satd. Flow (perm)			3515		1770	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.97	0.97
Adj. Flow (vph)	0	0	1189	58	333	571
RTOR Reduction (vph)	0	0	4	0	0	0
Lane Group Flow (vph)	0	0	1242	0	333	571
Turn Type					Prot	
Protected Phases			2		3	6
Permitted Phases						
Actuated Green, G (s)			53.7		23.4	53.7
Effective Green, g (s)			53.7		23.4	53.7
Actuated g/C Ratio			0.60		0.26	0.60
Clearance Time (s)			6.3		6.3	6.3
Lane Grp Cap (vph)			2104		462	2119
v/s Ratio Prot			c0.35		c0.19	0.16
v/s Ratio Perm						
v/c Ratio			0.59		0.72	0.27
Uniform Delay, d1			11.2		30.2	9.6
Progression Factor			1.00		1.00	1.00
Incremental Delay, d2			1.2		9.4	0.3
Delay (s)			12.4		39.5	8.9
Level of Service			B		D	A
Approach Delay (s)	0.0		12.4		20.2	
Approach LOS	A		B		C	

Intersection Summary			
HCM Average Control Delay	15.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	89.7	Sum of lost time (s)	12.6
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
60: Hunting Park Ave & Fox St

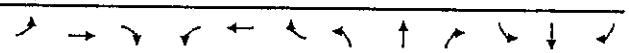


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱		↰	↑	↱	↰	↑↱	
Volume (vph)	132	970	10	147	557	44	2	460	198	40	282	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	12	16	12	12	12	12
Total Lost time (s)	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	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1711	3416		1694	3351		1787	2132	1599	1787	1813	
Flt Permitted	0.30	1.00		0.23	1.00		0.25	1.00	1.00	0.21	1.00	
Satd. Flow (perm)	549	3416		412	3351		463	2132	1599	387	1813	
Peak-hour factor, PHF	0.90	0.90	0.90	0.96	0.96	0.96	0.92	0.92	0.92	0.80	0.80	0.80
Adj. Flow (vph)	147	1078	11	153	580	46	2	500	215	50	352	112
RTOR Reduction (vph)	0	0	0	0	7	0	0	0	53	0	13	0
Lane Group Flow (vph)	147	1088	0	153	619	0	2	500	162	50	451	0
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt			Perm			Perm		Perm	Perm		
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	48.6	48.6		38.7	38.7		30.6	30.6	30.6	30.6	30.6	
Effective Green, g (s)	48.2	50.0		40.1	40.1		32.0	32.0	32.0	32.0	32.0	
Actuated g/C Ratio	0.54	0.56		0.45	0.45		0.36	0.36	0.36	0.36	0.36	
Clearance Time (s)	3.6	5.4		5.4	5.4		5.4	5.4	5.4	5.4	5.4	
Lane Grp Cap (vph)	370	1898		184	1493		165	758	569	138	645	
v/s Ratio Prot	0.03	c0.32			0.18			0.23			c0.25	
v/s Ratio Perm	0.19			c0.37			0.00		0.10	0.13		
v/c Ratio	0.40	0.57		0.83	0.41		0.01	0.66	0.28	0.36	0.70	
Uniform Delay, d1	11.5	13.0		22.0	17.0		16.8	24.4	20.9	21.5	24.9	
Progression Factor	1.00	1.00		1.19	1.16		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.2	1.3		30.4	0.8		0.1	4.5	1.2	7.2	6.2	
Delay (s)	14.7	14.3		56.6	20.4		18.9	28.9	22.0	28.7	31.1	
Level of Service	B	B		E	C		B	C	C	C	C	
Approach Delay (s)		14.3			27.5			26.8			30.8	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM Average Control Delay	22.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
80: Roberts Ave & Fox St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	96	211	43	146	279	95	107	368	158	8	213	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
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			1.00	
Frt	1.00	0.97		1.00	0.96			0.97			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			1.00	
Satd. Flow (prot)	1770	1815		1805	1949			2023			2042	
Flt Permitted	0.35	1.00		0.50	1.00			0.89			0.98	
Satd. Flow (perm)	659	1815		946	1949			1821			2005	
Peak-hour factor, PHF	0.86	0.86	0.86	0.89	0.89	0.89	0.96	0.96	0.96	0.94	0.94	0.94
Adj. Flow (vph)	42	245	50	164	313	107	111	383	165	9	227	71
RTOR Reduction (vph)	0	12	0	0	20	0	0	20	0	0	18	0
Lane Group Flow (vph)	42	283	0	164	400	0	0	639	0	0	289	0
Heavy Vehicles (%)	2%	2%	2%	0%	1%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	22.0	22.0		22.0	22.0			27.0			27.0	
Effective Green, g (s)	23.0	23.0		23.0	23.0			29.0			29.0	
Actuated g/C Ratio	0.36	0.36		0.36	0.36			0.46			0.46	
Clearance Time (s)	5.0	5.0		5.0	5.0			6.0			6.0	
Lane Grp Cap (vph)	253	696		363	747			860			969	
v/s Ratio Prot		0.16			c0.21							
v/s Ratio Perm	0.06			0.17				c0.35			0.14	
v/c Ratio	0.17	0.41		0.45	0.54			0.73			0.30	
Uniform Delay, d1	12.2	13.5		13.6	14.4			12.3			9.4	
Progression Factor	1.00	1.00		0.65	0.62			1.00			1.51	
Incremental Delay, d2	1.4	1.8		2.7	2.6			5.2			0.8	
Delay (s)	13.6	15.3		12.6	11.4			17.5			14.8	
Level of Service	B	B		B	B			B			B	
Approach Delay (s)		15.1			11.7			17.5			14.8	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM Average Control Delay	14.9	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.64			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	87.8%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

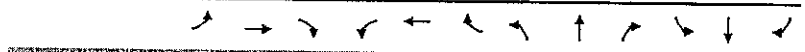
HCM Signalized Intersection Capacity Analysis
90: Abbottsford Ave & Fox St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	66	377	16	0	0	0	0	497	76	257	267	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		4.0						4.0		4.0	4.0	
Lane Util. Factor		0.95						0.95		1.00	1.00	
Frt		0.99						0.98		1.00	1.00	
Flt Protected		0.99						1.00		0.95	1.00	
Satd. Flow (prot)		3685						3385		1745	1837	
Flt Permitted		0.99						1.00		0.25	1.00	
Satd. Flow (perm)		3685						3385		453	1837	
Peak-hour factor, PHF	0.87	0.87	0.87	0.92	0.92	0.92	0.88	0.88	0.88	0.94	0.94	0.94
Adj. Flow (vph)	76	433	18	0	0	0	0	553	86	273	284	0
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	523	0	0	0	0	0	639	0	273	284	0
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	1%	1%	1%	0%	0%	0%
Turn Type	Perm									pm+pt		
Protected Phases		4						2		1	6	
Permitted Phases	4									6	1	
Actuated Green, G (s)		21.0						19.2		28.2	28.2	
Effective Green, g (s)		22.4						20.6		27.8	29.6	
Actuated g/C Ratio		0.37						0.34		0.46	0.49	
Clearance Time (s)		5.4						5.4		3.6	5.4	
Lane Grp Cap (vph)		1376						1162		318	906	
v/s Ratio Prot								0.19		c0.07	0.15	
v/s Ratio Perm		0.14								c0.33		
v/c Ratio		0.38						0.55		0.86	0.31	
Uniform Delay, d1		13.7						15.9		12.6	9.1	
Progression Factor		1.00						1.33		1.49	0.70	
Incremental Delay, d2		0.8						1.6		22.1	0.8	
Delay (s)		14.5						22.8		40.9	7.1	
Level of Service		B						C		D	A	
Approach Delay (s)		14.5			0.0			22.8			23.7	
Approach LOS		B			A			C			C	

Intersection Summary				
HCM Average Control Delay	20.6	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.60			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	79.6%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
100: SB Route 1 On Ramp & Fox St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	209	238	595	240	313	0	0	315	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	15	15	12	11	11	12	12	11	12
Total Lost time (s)					4.0		4.0	4.0			4.0	
Lane Util. Factor					0.95		1.00	1.00			0.95	
Frt					0.91		1.00	1.00			0.95	
Flt Protected					0.99		0.95	1.00			1.00	
Satd. Flow (prot)					3559		1711	1801			3264	
Flt Permitted					0.99		0.34	1.00			1.00	
Satd. Flow (perm)					3559		619	1801			3264	
Peak-hour factor, PHF	0.92	0.92	0.92	0.96	0.96	0.96	0.94	0.94	0.94	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	218	248	620	255	333	0	0	332	147
RTOR Reduction (vph)	0	0	0	0	286	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	800	0	255	333	0	0	479	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Turn Type				Perm			pm+pt					
Protected Phases					8		5	2			6	
Permitted Phases				8			2	5				
Actuated Green, G (s)					21.6		28.8	28.8			19.8	
Effective Green, g (s)					22.4		27.8	29.6			20.6	
Actuated g/C Ratio					0.37		0.46	0.49			0.34	
Clearance Time (s)					4.8		3.0	4.8			4.8	
Lane Grp Cap (vph)					1329		378	888			1121	
v/s Ratio Prot							c0.06	0.18			0.15	
v/s Ratio Perm					0.22		c0.26					
v/c Ratio					0.60		0.67	0.38			0.43	
Uniform Delay, d1					15.2		11.2	9.4			15.2	
Progression Factor					0.71		1.51	0.27			1.00	
Incremental Delay, d2					2.0		8.0	1.0			1.2	
Delay (s)					12.8		25.0	3.6			16.4	
Level of Service					B		C	A			B	
Approach Delay (s)	0.0				12.8			12.9			16.4	
Approach LOS	A				B			B			B	

Intersection Summary				
HCM Average Control Delay	13.6	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	79.6%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

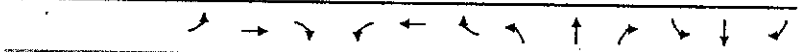
HCM Signalized Intersection Capacity Analysis
160: Hunting Park Ave & Wissahickon Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	159	1024	26	0	574	162	40	297	18	348	268	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	15	12	11	16	12	11	11	11
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			0.95			0.95		1.00	1.00	1.00
Frt	1.00	1.00			0.97			0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00			0.99		0.95	1.00	1.00
Satd. Flow (prot)	1745	3477			3840			4037		1745	1837	1561
Flt Permitted	0.18	1.00			1.00			0.88		0.22	1.00	1.00
Satd. Flow (perm)	324	3477			3840			3557		403	1837	1561
Peak-hour factor, PHF	0.94	0.94	0.94	0.86	0.86	0.86	0.79	0.79	0.79	0.96	0.96	0.96
Adj. Flow (vph)	169	1089	28	0	667	188	51	376	23	362	279	122
RTOR Reduction (vph)	0	2	0	0	29	0	0	0	0	0	0	75
Lane Group Flow (vph)	169	1115	0	0	826	0	0	450	0	362	279	47
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt				Perm					pm+pt		Perm
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2	5					8			4	7	4
Actuated Green, G (s)	45.6	45.6			34.8			16.2		33.6	33.6	33.6
Effective Green, g (s)	45.2	47.0			36.2			17.6		33.2	35.0	35.0
Actuated g/C Ratio	0.50	0.52			0.40			0.20		0.37	0.39	0.39
Clearance Time (s)	3.6	5.4			5.4			5.4		3.6	5.4	5.4
Lane Grp Cap (vph)	270	1816			1545			696		348	714	607
v/s Ratio Prot	0.05	c0.32			0.22					c0.15	0.15	
v/s Ratio Perm	0.27							0.13		0.23		0.03
v/c Ratio	0.63	0.61			0.53			0.65		1.04	0.39	0.08
Uniform Delay, d1	14.6	15.1			20.5			33.1		24.1	19.8	17.3
Progression Factor	1.31	0.56			1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	9.1	1.3			1.3			4.6		59.1	1.6	0.3
Delay (s)	28.6	9.7			21.8			37.9		83.2	21.4	17.6
Level of Service	C	A			C			D		F	C	B
Approach Delay (s)		12.2			21.8			37.9			50.1	
Approach LOS		B			C			D			D	

Intersection Summary				
HCM Average Control Delay	26.7	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.76			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	72.4%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

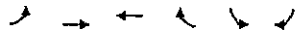
HCM Signalized Intersection Capacity Analysis
170: Roberts Ave & Wissahickon Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	119	300	47	127	329	251	30	562	197	129	596	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	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	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	2068		1770	1863	1583	1770	3464		1770	3443	
Flt Permitted	0.41	1.00		0.39	1.00	1.00	0.27	1.00		0.31	1.00	
Satd. Flow (perm)	764	2068		732	1863	1583	506	3464		584	3443	
Peak-hour factor, PHF	0.90	0.90	0.90	0.89	0.89	0.89	0.92	0.92	0.92	0.88	0.88	0.88
Adj. Flow (vph)	132	333	52	143	370	282	33	633	105	147	677	149
RTOR Reduction (vph)	0	9	0	0	0	121	0	22	0	0	32	0
Lane Group Flow (vph)	132	376	0	143	370	161	33	716	0	147	794	0
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	21.6	21.6		21.6	21.6	21.6	27.0	27.0		27.0	27.0	
Effective Green, g (s)	23.0	23.0		23.0	23.0	23.0	29.0	29.0		29.0	29.0	
Actuated g/C Ratio	0.38	0.38		0.38	0.38	0.38	0.48	0.48		0.48	0.48	
Clearance Time (s)	5.4	5.4		5.4	5.4	5.4	6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	293	793		281	714	607	245	1674		282	1664	
v/s Ratio Prot		0.18			c0.20			0.21			0.23	
v/s Ratio Perm	0.17			0.20		0.10	0.07			c0.25		
v/c Ratio	0.45	0.47		0.51	0.52	0.26	0.13	0.43		0.52	0.48	
Uniform Delay, d1	13.8	13.9		14.2	14.2	12.7	8.6	10.1		10.7	10.4	
Progression Factor	1.24	1.26		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.6	1.9		6.4	2.7	1.1	1.1	0.8		6.7	1.0	
Delay (s)	21.6	19.5		20.6	16.9	13.8	9.7	10.9		17.4	11.4	
Level of Service	C	B		C	B	B	A	B		B	B	
Approach Delay (s)		20.0			16.5			10.8			12.3	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	14.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
55: Roberts Ave & Abbottsford Home Dr

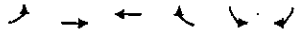


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↑	
Volume (veh/h)	10	258	406	47	17	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.72	0.72	0.92	0.92	0.70	0.70
Hourly flow rate (vph)	14	358	441	51	24	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		1050	419			
pX, platoon unblocked	0.88				0.88	0.88
vC, conflicting volume	492				853	467
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	356				765	327
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				92	99
cM capacity (veh/h)	1059				323	629

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	372	492	33
Volume Left	14	0	24
Volume Right	0	51	9
cSH	1059	1700	370
Volume to Capacity	0.01	0.29	0.09
Queue Length 95th (ft)	1	0	7
Control Delay (s)	0.5	0.0	15.7
Lane LOS	A		C
Approach Delay (s)	0.5	0.0	15.7
Approach LOS			C

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	34.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
110: Roberts Ave & Stokley St

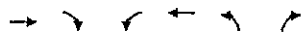


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↑	
Volume (veh/h)	27	341	503	27	6	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.82	0.82	0.95	0.96	0.60	0.60
Hourly flow rate (vph)	33	416	524	28	10	13
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		535				
pX, platoon unblocked				0.95		
vC, conflicting volume	552				1020	538
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	552			995	538	
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				96	98
cM capacity (veh/h)	1018				250	543

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	449	552	23
Volume Left	33	0	10
Volume Right	0	28	13
cSH	1018	1700	361
Volume to Capacity	0.03	0.32	0.06
Queue Length 95th (ft)	3	0	5
Control Delay (s)	1.0	0.0	15.7
Lane LOS	A		C
Approach Delay (s)	1.0	0.0	15.7
Approach LOS			C

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
120: Abbottsford Ave & Stokley St



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	749	2	0	0	0	55
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.92	0.92	0.56	0.56
Hourly flow rate (vph)	797	2	0	0	0	98
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage veh)						
Upstream signal (ft)	542					
pX, platoon unblocked			0.78		0.78	0.78
vC, conflicting volume			799		798	798
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			604		603	603
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	75
cM capacity (veh/h)			762		362	891

Direction, Lane #	EB 1	NB 1
Volume Total	799	98
Volume Left	0	0
Volume Right	2	98
cSH	1700	391
Volume to Capacity	0.47	0.25
Queue Length 95th (ft)	0	25
Control Delay (s)	0.0	17.3
Lane LOS		C
Approach Delay (s)	0.0	17.3
Approach LOS		C

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	49.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
180: Abbottsford Ave & Wissahickon Ave

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	538	0	1048	412	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.88	0.88	0.83	0.83
Hourly flow rate (vph)	0	618	0	1191	496	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1046		
pX, platoon unblocked						
vC, conflicting volume	1092	248	496			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1092	248	496			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	18	100			
cM capacity (veh/h)	212	758	1078			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	618	595	595	248	248
Volume Left	0	0	0	0	0
Volume Right	618	0	0	0	0
cSH	758	1700	1700	1700	1700
Volume to Capacity	0.82	0.35	0.35	0.15	0.15
Queue Length 95th (ft)	221	0	0	0	0
Control Delay (s)	27.1	0.0	0.0	0.0	0.0
Lane LOS	D				
Approach Delay (s)	27.1	0.0		0.0	
Approach LOS	D				

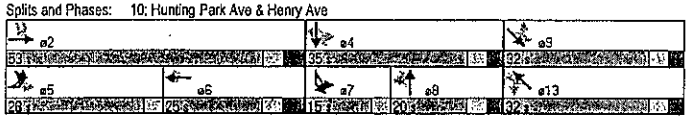
Intersection Summary			
Average Delay	7.3		
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL2	EBL	EBT	WBT	WBR	NBL2	NBL	NBT	SBL2	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	725	653	398	65	6	6	130	68	108	191	405
Lane Group Flow (vph)	0	458	1119	442	121	0	0	202	0	195	147	498
Turn Type	pm+pt	pm+pt			Perm	Perm	Perm		pm+pt	pm+pt		Perm
Protected Phases	5	5	2	6				8	7	7	4	
Permitted Phases	2	2			6	8	8		4	4	4	4
Minimum Split (s)	7.6	7.6	11.5	11.5	11.5	10.5	10.5	10.5	9.4	9.4	10.5	10.5
Total Split (s)	28.0	28.0	53.0	25.0	25.0	20.0	20.0	20.0	15.0	15.0	35.0	35.0
Total Split (%)	23.3%	23.3%	44.2%	20.8%	20.8%	16.7%	16.7%	16.7%	12.5%	12.5%	29.2%	29.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.0	0.0	4.0	4.0	4.0	3.0	3.0	3.0	0.0	0.0	3.0	3.0
Lost Time Adjust (s)	0.4	0.4	2.3	2.3	2.3	0.0	1.4	1.4	0.4	0.4	1.4	1.4
Total Lost Time (s)	3.9	3.9	5.2	5.2	5.2	6.5	5.1	5.1	3.9	3.9	5.1	5.1
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lead		
Lead-Lag Optimize?												
v/c Ratio	1.19	0.86	0.80	0.45				0.89		0.80	0.31	0.71
Control Delay	138.9	41.2	60.4	42.2				89.1		61.6	38.8	47.0
Queue Delay	0.0	0.0	0.0	0.0				0.0		0.0	0.0	0.0
Total Delay	138.9	41.2	60.4	42.2				89.1		61.6	38.8	47.0
Queue Length 50th (ft)	#412	430	175	68				154		126	93	198
Queue Length 95th (ft)	#641	530	#248	130				#226		#202	151	262
Internal Link Dist (ft)		658	1975					407			1653	
Turn Bay Length (ft)	450			250						150		415
Base Capacity (vph)	385	1299	550	266				229		245	480	700
Starvation Cap Reductn	0	0	0	0				0		0	0	0
Spillback Cap Reductn	0	0	0	0				0		0	0	0
Storage Cap Reductn	0	0	0	0				0		0	0	0
Reduced v/c Ratio	1.19	0.86	0.80	0.45				0.89		0.80	0.31	0.71

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green, Master Intersection
Natural Cycle: 110
Control Type: Pretimed
- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Hunting Park Ave & Henry Ave



Lane Group	SEL2	SEL	SET	NWL2	NWL	NWT
Lane Configurations						
Volume (vph)	89	100	194	7	76	107
Lane Group Flow (vph)	0	214	252	0	95	313
Turn Type	Perm	Perm		Perm	Perm	
Protected Phases			9			13
Permitted Phases	9	9		13	13	
Minimum Split (s)	10.5	10.5	10.5	10.5	10.5	10.5
Total Split (s)	32.0	32.0	32.0	32.0	32.0	32.0
Total Split (%)	26.7%	26.7%	26.7%	26.7%	26.7%	26.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.4	-1.4	-1.4	0.0	-1.4	-1.4
Total Lost Time (s)	5.1	5.1	5.1	6.5	5.1	5.1
Lead/Lag						
Lead-Lag Optimize?						
v/c Ratio	1.96	0.60		0.63	0.85	
Control Delay	492.0	48.2		62.7	65.9	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	492.0	48.2		62.7	65.9	
Queue Length 50th (ft)	~257	175		67	234	
Queue Length 95th (ft)	#402	257		#136	#364	
Internal Link Dist (ft)		1387			1698	
Turn Bay Length (ft)	105			105		
Base Capacity (vph)	109	421		150	370	
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	1.96	0.60		0.63	0.85	

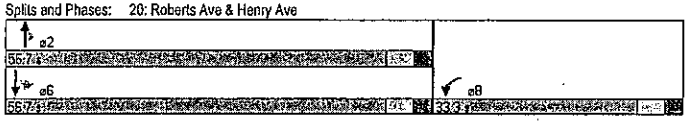
Intersection Summary

Lanes, Volumes, Timings
20: Roberts Ave & Henry Ave

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations					
Volume (vph)	223	997	182	65	489
Lane Group Flow (vph)	405	997	188	69	520
Turn Type			Perm	Perm	
Protected Phases	8	2		6	
Permitted Phases			2	6	
Minimum Split (s)	33.3	10.3	10.3	10.3	10.3
Total Split (s)	33.3	56.7	56.7	56.7	56.7
Total Split (%)	37.0%	63.0%	63.0%	63.0%	63.0%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7
Lost Time Adjust (s)	2.3	2.3	2.3	2.3	2.3
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag					
Lead-Lag Optimize?					
v/c Ratio	0.64	0.46	0.19	0.28	0.25
Control Delay	28.3	11.5	1.8	13.0	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	28.3	11.5	1.8	13.0	9.4
Queue Length 50th (ft)	172	156	0	18	70
Queue Length 95th (ft)	272	201	26	46	96
Internal Link Dist (ft)	970	1653			767
Turn Bay Length (ft)			250	130	
Base Capacity (vph)	629	2162	1014	247	2072
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.64	0.46	0.19	0.28	0.25

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Pretimed

Splits and Phases: 20: Roberts Ave & Henry Ave

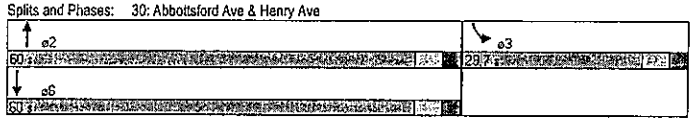


Lanes, Volumes, Timings
30: Abbottsford Ave & Henry Ave

Lane Group	NBT	SBL	SBT
Lane Configurations			
Volume (vph)	1093	323	554
Lane Group Flow (vph)	1246	333	571
Turn Type		Prot	
Protected Phases	2	3	6
Permitted Phases			
Minimum Split (s)	22.3	10.3	22.3
Total Split (s)	60.0	29.7	60.0
Total Split (%)	66.9%	33.1%	66.9%
Yellow Time (s)	3.6	3.6	3.6
All-Red Time (s)	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3
Lead/Lag			
Lead-Lag Optimize?			
v/c Ratio	0.59	0.72	0.27
Control Delay	12.5	40.5	9.0
Queue Delay	0.0	0.0	0.0
Total Delay	12.5	40.5	9.0
Queue Length 50th (ft)	210	172	74
Queue Length 95th (ft)	270	#276	102
Internal Link Dist (ft)	767		576
Turn Bay Length (ft)		200	
Base Capacity (vph)	2108	462	2119
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.59	0.72	0.27

Intersection Summary
Cycle Length: 89.7
Actuated Cycle Length: 89.7
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 55
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 30: Abbottsford Ave & Henry Ave

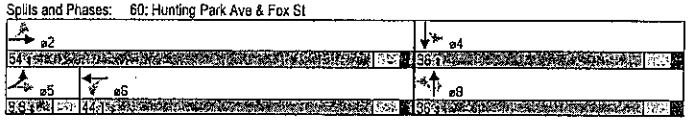


Lanes, Volumes, Timings
60: Hunting Park Ave & Fox St

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	132	970	147	557	2	460	198	40	282
Lane Group Flow (vph)	147	1089	153	626	2	500	215	50	464
Turn Type	pm+pt		Perm		Perm		Perm	Perm	
Protected Phases	5	2		6		8			4
Permitted Phases	2		6		8		8	4	
Minimum Split (s)	7.6	9.4	9.4	9.4	20.0	20.0	20.0	20.0	20.0
Total Split (s)	9.5	54.0	44.1	44.1	36.0	36.0	36.0	36.0	36.0
Total Split (%)	11.0%	60.0%	49.0%	49.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	0.0	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Lost Time Adjust (s)	0.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead		Lag	Lag					
Lead-Lag Optimize?	Yes		Yes	Yes					
v/c Ratio	0.39	0.57	0.83	0.42	0.01	0.66	0.35	0.36	0.71
Control Delay	12.9	14.5	60.8	20.2	19.5	29.5	14.6	31.0	30.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.9	14.5	60.8	20.2	19.5	29.5	14.6	31.0	30.8
Queue Length 50th (ft)	38	198	#89	176	1	236	52	21	214
Queue Length 95th (ft)	68	257	m#198	228	6	346	109	48	274
Internal Link Dist (ft)		1975		1584		899			1718
Turn Bay Length (ft)	100		100		100		100	105	
Base Capacity (vph)	381	1898	184	1500	165	758	622	137	658
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.57	0.83	0.42	0.01	0.66	0.35	0.36	0.71

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 50
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 60: Hunting Park Ave & Fox St

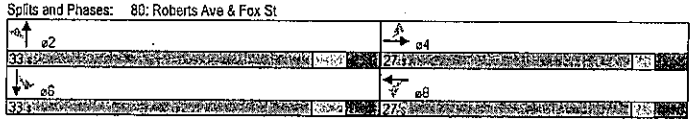


Lanes, Volumes, Timings
80: Roberts Ave & Fox St

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	36	211	146	279	107	368	8	213
Lane Group Flow (vph)	42	295	164	420	0	659	0	307
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Minimum Split (s)	9.0	9.0	9.0	9.0	10.0	10.0	10.0	10.0
Total Split (s)	27.0	27.0	27.0	27.0	33.0	33.0	33.0	33.0
Total Split (%)	45.0%	45.0%	45.0%	45.0%	55.0%	55.0%	55.0%	55.0%
Yellow Time (s)	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	1.0	1.0	1.0	1.0	2.0	2.0	2.0	2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag								
Lead-Lag Optimize?								
v/c Ratio	0.17	0.42	0.45	0.55	0.73		0.31	
Control Delay	14.3	14.8	13.2	11.0	17.7		13.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	
Total Delay	14.3	14.8	13.2	11.0	17.7		13.6	
Queue Length 50th (ft)	10	70	27	61	167		52	
Queue Length 95th (ft)	28	119	51	96	285		99	
Internal Link Dist (ft)		339		455	1718		932	
Turn Bay Length (ft)	105		105					
Base Capacity (vph)	253	708	363	768	900		987	
Starvation Cap Reductn	0	0	0	0	0		0	
Spillback Cap Reductn	0	0	0	0	0		0	
Storage Cap Reductn	0	0	0	0	0		0	
Reduced v/c Ratio	0.17	0.42	0.45	0.55	0.73		0.31	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 40
Control Type: Pretimed

Splits and Phases: 80: Roberts Ave & Fox St

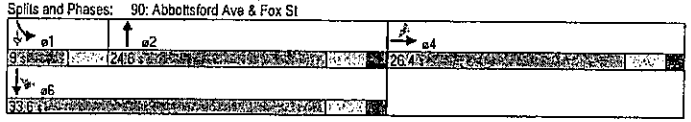


Lanes, Volumes, Timings
90: Abbottsford Ave & Fox St

Lane Group	EBT	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	377	487	257	267
Lane Group Flow (vph)	527	639	273	284
Turn Type			pm+pt	
Protected Phases	4	2	1	6
Permitted Phases			6	
Minimum Split (s)	9.4	9.4	7.6	9.4
Total Split (s)	26.4	24.6	9.0	33.6
Total Split (%)	44.0%	41.0%	15.0%	56.0%
Yellow Time (s)	3.6	3.6	3.6	3.6
All-Red Time (s)	1.8	1.8	0.0	1.8
Lost Time Adjust (s)	-1.4	-1.4	0.4	-1.4
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?				
v/c Ratio	0.38	0.55	0.82	0.31
Control Delay	14.6	23.2	36.6	7.4
Queue Delay	0.1	0.0	7.4	0.9
Total Delay	14.6	23.2	44.0	8.2
Queue Length 50th (ft)	70	117	57	40
Queue Length 95th (ft)	101	162	m#106	m68
Internal Link Dist (ft)	1415	932		519
Turn Bay Length (ft)				
Base Capacity (vph)	1380	1163	332	906
Starvation Cap Reductn	0	0	34	374
Spillback Cap Reductn	95	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.41	0.55	1.02	0.53

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 40
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 90: Abbottsford Ave & Fox St

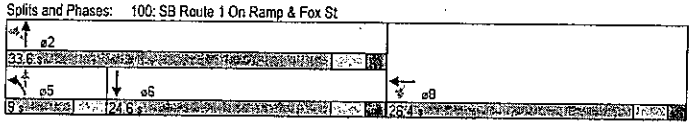


Lanes, Volumes, Timings
100: SB Route 1 On Ramp & Fox St

Lane Group	WBT	NBL	NBT	SBT
Lane Configurations				
Volume (vph)	238	240	313	315
Lane Group Flow (vph)	1086	255	333	479
Turn Type		pm+pt		
Protected Phases	8	5	2	6
Permitted Phases		2		6
Minimum Split (s)	8.8	7.0	8.8	8.8
Total Split (s)	26.4	9.0	33.6	24.6
Total Split (%)	44.0%	15.0%	56.0%	41.0%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.8	0.0	1.8	1.8
Lost Time Adjust (s)	-0.8	1.0	-0.8	-0.8
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag		Lead		Lag
Lead-Lag Optimize?				
v/c Ratio	0.67	0.64	0.38	0.43
Control Delay	8.6	22.8	3.7	16.6
Queue Delay	0.3	2.0	0.4	0.0
Total Delay	8.9	24.8	4.2	16.6
Queue Length 50th (ft)	49	36	8	68
Queue Length 95th (ft)	45	#109	30	105
Internal Link Dist (ft)	977		119	792
Turn Bay Length (ft)				
Base Capacity (vph)	1615	396	888	1121
Starvation Cap Reductn	0	53	217	0
Spillback Cap Reductn	127	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.73	0.74	0.50	0.43

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 50
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 100: SB Route 1 On Ramp & Fox St

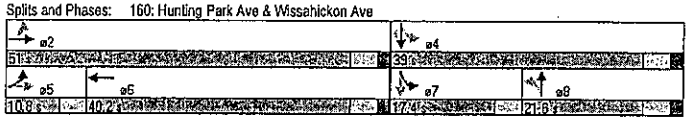


Lanes, Volumes, Timings
160: Hunting Park Ave & Wissahickon Ave

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations								
Volume (vph)	159	1024	574	140	297	348	268	117
Lane Group Flow (vph)	169	1117	855	0	450	362	279	122
Turn Type	pm+pt		Perm		pm+pt			Perm
Protected Phases	5	2	6		8	7	4	
Permitted Phases	2			8		4		4
Minimum Split (s)	7.6	9.4	9.4	9.4	9.4	7.6	9.4	9.4
Total Split (s)	10.8	51.0	40.2	21.6	21.6	17.4	39.0	39.0
Total Split (%)	12.0%	56.7%	44.7%	24.0%	24.0%	19.3%	43.3%	43.3%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	0.0	1.8	1.8	1.8	1.8	0.0	1.8	1.8
Lost Time Adjust (s)	0.4	1.4	1.4	1.4	1.4	0.4	1.4	1.4
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead		Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes		
v/c Ratio	0.61	0.61	0.54	0.65	1.02	0.39	0.18	
Control Delay	24.2	9.9	20.9	38.3	77.6	21.9	4.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	24.2	9.9	20.9	38.3	77.6	21.9	4.3	
Queue Length 50th (ft)	129	104	180	124	#160	112	0	
Queue Length 95th (ft)	88	129	222	151	#333	179	33	
Internal Link Dist (ft)		1584	1151	484		2048		
Turn Bay Length (ft)	85						275	
Base Capacity (vph)	270	1817	1573	695	356	714	682	
Starvation Cap Reductn	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.61	0.61	0.54	0.65	1.02	0.39	0.18	

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 16.7 (19%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 50
Control Type: Pretimed
- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 160: Hunting Park Ave & Wissahickon Ave

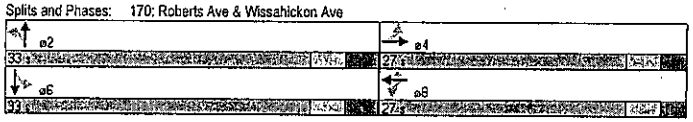


Lanes, Volumes, Timings
170: Roberts Ave & Wissahickon Ave

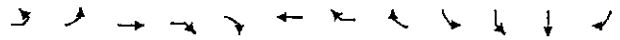
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	119	300	127	329	251	30	682	129	596
Lane Group Flow (vph)	132	385	143	370	282	33	738	147	826
Turn Type	Perm		Perm		Perm	Perm		Perm	
Protected Phases		4		8			2		6
Permitted Phases	4		8		8	2		6	
Minimum Split (s)	9.4	9.4	9.4	9.4	9.4	10.0	10.0	10.0	10.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	33.0	33.0	33.0	33.0
Total Split (%)	45.0%	45.0%	45.0%	45.0%	45.0%	55.0%	55.0%	55.0%	55.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.4	2.4	2.4	2.4	2.4	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	1.4	1.4	1.4	1.4	1.4	2.0	2.0	2.0	2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag									
Lead-Lag Optimize?									
v/c Ratio	0.45	0.48	0.51	0.52	0.39	0.13	0.43	0.52	0.49
Control Delay	23.2	19.4	22.0	17.5	6.3	10.4	10.5	19.0	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.2	19.4	22.0	17.5	6.3	10.4	10.5	19.0	10.8
Queue Length 50th (ft)	39	111	38	99	19	6	79	34	90
Queue Length 95th (ft)	m74	m170	89	167	62	20	117	84	127
Internal Link Dist (ft)		1436		740			2048		966
Turn Bay Length (ft)	100		150			100		65	
Base Capacity (vph)	293	802	281	714	728	245	1697	282	1699
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.48	0.51	0.52	0.39	0.13	0.43	0.52	0.49

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 20 (33%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 40
Control Type: Pretimed
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 170: Roberts Ave & Wissahickon Ave



2019 BUILD W/ MITIGATION: PM PEAK

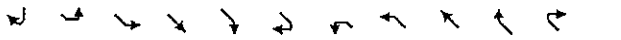


Movement	EBL2	EBL	EBT	EBR	EBR2	WBT	WBR	WBR2	SBL2	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	909	671	65	6	1424	65	44	66	120	131	431
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	12	10	10	12	12	13	13	12
Total Lost time (s)		6.9	4.2			4.2	4.2			6.9	5.1	5.1
Lane Util. Factor		0.97	1.00			0.95	1.00			1.00	1.00	0.88
Frt		1.00	0.99			1.00	0.85			1.00	1.00	0.85
Flt Protected		0.95	1.00			1.00	1.00			0.95	1.00	1.00
Satd. Flow (prot)		3046	1629			3002	1343			1646	1732	2508
Flt Permitted		0.95	1.00			1.00	1.00			0.95	1.00	1.00
Satd. Flow (perm)		3046	1629			3002	1343			1646	1732	2508
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	957	706	68	6	461	71	48	72	130	142	468
RTOR Reduction (vph)	0	0	0	0	0	0	20	0	0	0	0	6
Lane Group Flow (vph)	0	958	780	0	0	461	99	0	0	202	142	505
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	1%	1%	2%	2%	2%	2%
Turn Type	Prot	Prot					Perm		Perm	Perm		Perm
Protected Phases		5	2			6				4		
Permitted Phases							6		4	4	4	4
Actuated Green, G (s)		34.5	57.5			16.5	16.5			23.5	23.5	23.5
Effective Green, g (s)		34.1	59.8			18.8	18.8			23.1	24.9	24.9
Actuated g/C Ratio		0.28	0.50			0.16	0.16			0.19	0.21	0.21
Clearance Time (s)		6.5	6.5			6.5	6.5			6.5	6.5	6.5
Lane Grp Cap (vph)		866	812			470	210			317	359	520
v/s Ratio Prot		c0.31	c0.48			0.15					0.08	
v/s Ratio Perm							0.07			0.12		c0.20
v/c Ratio		1.11	0.96			0.98	0.47			0.64	0.40	0.97
Uniform Delay, d1		43.0	29.0			50.4	46.1			44.6	41.1	47.2
Progression Factor		1.00	1.00			1.00	1.00			1.00	1.00	1.00
Incremental Delay, d2		64.0	23.3			37.0	7.7			9.4	3.2	33.1
Delay (s)		106.9	52.3			87.5	53.4			54.0	44.3	80.3
Level of Service		F	D			F	D			D	D	F
Approach Delay (s)			82.4			80.5					68.1	
Approach LOS			F			F					E	

Intersection Summary				
HCM Average Control Delay	84.0	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.03			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.1	
Intersection Capacity Utilization	102.0%	ICU Level of Service	G	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Hunting Park Ave & Henry Ave



Movement	SBR2	SEL2	SEL	SET	SER	SER2	NWL2	NWL	NWT	NWR	NWR2
Lane Configurations											
Volume (vph)	40	88	100	194	19	9	7	78	107	199	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	16	12	12	12	12	14	12	12
Total Lost time (s)			5.1	5.1				5.1	5.1	6.5	
Lane Util. Factor			1.00	1.00				1.00	1.00	1.00	
Frt			1.00	0.98				1.00	1.00	0.85	
Flt Protected			0.95	1.00				0.95	1.00	1.00	
Satd. Flow (prot)			1577	1846				1512	1689	1346	
Flt Permitted			0.63	1.00				0.31	1.00	1.00	
Satd. Flow (perm)			1039	1846				491	1689	1346	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	96	109	211	21	10	8	85	116	216	3
RTOR Reduction (vph)	0	0	0	2	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	205	240	0	0	0	91	116	219	0
Heavy Vehicles (%)	2%	3%	3%	3%	3%	2%	2%	8%	8%	8%	8%
Turn Type			Perm	Perm			Perm	Perm		Perm	
Protected Phases				14					10		
Permitted Phases			14	14			10	10		10	
Actuated Green, G (s)			19.5	19.5				19.5	19.5	19.5	
Effective Green, g (s)			20.9	20.9				20.9	20.9	19.5	
Actuated g/C Ratio			0.17	0.17				0.17	0.17	0.16	
Clearance Time (s)			6.5	6.5				6.5	6.5	6.5	
Lane Grp Cap (vph)			181	322				86	294	219	
v/s Ratio Prot				0.13					0.07		
v/s Ratio Perm			c0.20					0.19		0.16	
v/c Ratio			1.13	0.75				1.06	0.39	1.00	
Uniform Delay, d1			49.5	47.0				49.5	43.9	50.2	
Progression Factor			1.00	1.00				1.00	1.00	1.00	
Incremental Delay, d2			107.0	14.5				113.8	3.9	50.8	
Delay (s)			156.6	61.6				163.3	47.9	111.1	
Level of Service			F	E				F	D	F	
Approach Delay (s)			105.2					105.0			
Approach LOS			F					F			

Intersection Summary

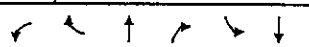
HCM Signalized Intersection Capacity Analysis
20: Roberts Ave & Henry Ave

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	262	255	967	272	173	489
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	14	12	13	12	12	12
Total Lost time (s)	2.7	5.0	2.7	2.7	0.7	2.7
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1906	1599	3693	1599	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.16	1.00
Satd. Flow (perm)	1906	1599	3693	1599	294	3539
Peak-hour factor, PHF	0.99	0.99	0.97	0.97	0.94	0.94
Adj. Flow (vph)	265	258	997	280	184	520
RTOR Reduction (vph)	0	169	0	155	0	0
Lane Group Flow (vph)	265	89	997	125	184	520
Heavy Vehicles (%)	1%	1%	1%	1%	2%	2%
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Actuated Green, G (s)	30.0	30.0	38.0	38.0	50.0	50.0
Effective Green, g (s)	32.3	30.0	40.3	40.3	52.3	52.3
Actuated g/C Ratio	0.36	0.33	0.45	0.45	0.58	0.58
Clearance Time (s)	5.0	5.0	5.0	5.0	3.0	5.0
Lane Grp Cap (vph)	684	533	1654	716	356	2057
v/s Ratio Prot	c0.14		c0.27		c0.06	0.15
v/s Ratio Perm		0.06		0.08	0.23	
v/c Ratio	0.39	0.17	0.60	0.18	0.52	0.25
Uniform Delay, d1	21.5	21.2	18.8	14.9	11.7	9.3
Progression Factor	1.00	1.00	1.00	1.00	3.02	2.05
Incremental Delay, d2	1.7	0.7	1.6	0.5	5.1	0.3
Delay (s)	23.1	21.8	20.4	15.4	40.4	19.2
Level of Service	C	C	C	B	D	B
Approach Delay (s)	22.5		19.3		24.8	
Approach LOS	C		B		C	

Intersection Summary			
HCM Average Control Delay	21.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	6.1
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Abbottsford Ave & Henry Ave



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	1169	53	323	662
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.3		6.3	6.3
Lane Util. Factor			0.95		1.00	0.95
Frt			0.99		1.00	1.00
Flt Protected			1.00		0.95	1.00
Satd. Flow (prot)			3516		1770	3539
Flt Permitted			1.00		0.95	1.00
Satd. Flow (perm)			3516		1770	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.97	0.97
Adj. Flow (vph)	0	0	1271	58	333	682
RTOR Reduction (vph)	0	0	4	0	0	0
Lane Group Flow (vph)	0	0	1325	0	333	682
Turn Type					custom	
Protected Phases			2		3	6
Permitted Phases					3	
Actuated Green, G (s)			52.7		24.7	52.7
Effective Green, g (s)			52.7		24.7	52.7
Actuated g/C Ratio			0.59		0.27	0.59
Clearance Time (s)			6.3		6.3	6.3
Lane Grp Cap (vph)			2059		486	2072
v/s Ratio Prot			c0.38		c0.19	0.19
v/s Ratio Perm						
v/c Ratio			0.64		0.69	0.33
Uniform Delay, d1			12.4		29.2	9.6
Progression Factor			0.30		1.00	1.00
Incremental Delay, d2			1.4		7.6	0.4
Delay (s)			5.1		36.8	10.0
Level of Service			A		D	B
Approach Delay (s)	0.0		5.1		18.8	
Approach LOS	A		A		B	

Intersection Summary			
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		

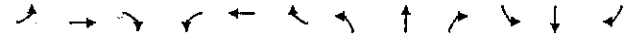
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
50: Roberts Ave & North Entrance

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↱	↰	↑	↰	↱
Volume (vph)	268	50	64	604	115	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	11	12	12	12
Total Lost time (s)	5.0	5.0	3.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1711	1863	1770	1583
Flt Permitted	1.00	1.00	0.47	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	841	1863	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	291	54	70	657	125	184
RTOR Reduction (vph)	0	33	0	0	0	132
Lane Group Flow (vph)	291	21	70	657	125	52
Turn Type		Perm	pm+pt			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	23.0	23.0	33.0	33.0	17.0	17.0
Effective Green, g (s)	23.0	23.0	33.0	33.0	17.0	17.0
Actuated g/C Ratio	0.38	0.38	0.55	0.55	0.28	0.28
Clearance Time (s)	5.0	5.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	714	607	564	1025	502	449
v/s Ratio Prot	0.16		0.01	c0.35	c0.07	
v/s Ratio Perm		0.01	0.05			0.03
v/c Ratio	0.41	0.03	0.12	0.64	0.25	0.12
Uniform Delay, d1	13.5	11.6	6.6	9.4	16.6	15.9
Progression Factor	1.00	1.00	0.70	0.56	1.00	1.00
Incremental Delay, d2	1.7	0.1	0.3	2.3	1.2	0.5
Delay (s)	15.2	11.7	4.9	7.5	17.8	16.5
Level of Service	B	B	A	A	B	B
Approach Delay (s)	14.7			7.9	17.0	
Approach LOS	B			A	B	

Intersection Summary			
HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
60: Hunting Park Ave & Fox St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑		↰	↑↑		↰	↑	↱	↰	↑↑	
Volume (vph)	150	970	10	147	557	116	12	495	198	91	307	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	12	16	12	12	12	12
Total Lost time (s)	4.0	4.0		2.1	4.0		4.0	4.0	4.0	1.6	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	0.97		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1711	3416		1694	3300		1787	2132	1599	1787	1798	
Flt Permitted	0.16	1.00		0.20	1.00		0.37	1.00	1.00	0.21	1.00	
Satd. Flow (perm)	286	3416		360	3300		690	2132	1599	394	1798	
Peak-hour factor, PHF	0.90	0.90	0.90	0.96	0.96	0.96	0.92	0.92	0.92	0.81	0.81	0.81
Adj. Flow (vph)	167	1078	11	153	580	121	2	538	215	112	379	158
RTOR Reduction (vph)	0	1	0	0	19	0	0	0	58	0	17	0
Lane Group Flow (vph)	167	1088	0	153	682	0	2	538	157	112	520	0
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt			pm+pt			Perm		Perm	pm+pt		
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	36.6	36.6		27.1	21.6		34.6	34.6	34.6	42.6	42.6	
Effective Green, g (s)	36.2	36.0		29.9	23.0		36.0	35.0	36.0	44.0	44.0	
Actuated g/C Ratio	0.40	0.40		0.33	0.26		0.40	0.40	0.40	0.49	0.49	
Clearance Time (s)	3.6	5.4		3.5	5.4		5.4	5.4	5.4	3.0	5.4	
Lane Grp Cap (vph)	289	1442		222	843		276	853	640	292	879	
v/s Ratio Prot	0.07	c0.24		0.05	0.21			0.25		0.03	c0.29	
v/s Ratio Perm	0.16	0.08		0.18			0.00		0.10	0.16		
v/c Ratio	0.58	0.75		0.69	0.81		0.01	0.63	0.25	0.38	0.59	
Uniform Delay, d1	18.9	22.0		22.3	31.4		16.2	21.7	18.0	15.3	16.5	
Progression Factor	1.00	1.00		1.09	1.10		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	8.25	3.7		13.9	7.1		0.0	3.5	0.9	3.8	2.9	
Delay (s)	28.0	25.8		38.2	41.8		16.3	25.2	18.9	19.0	19.5	
Level of Service	C	C		D	D		B	C	B	B	B	
Approach Delay (s)		26.1			41.2			23.4			19.4	
Approach LOS		C			D			C			B	

Intersection Summary			
HCM Average Control Delay	27.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		
! Phase conflict between lane groups.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
70: East Entrance & Fox St

Movement	EBL	EBT	EBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	140	65	94	666	441	171	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	1.00	0.85	
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	1863	1863	1583	
Flt Permitted	0.95	1.00	0.43	1.00	1.00	1.00	
Satd. Flow (perm)	1770	1583	793	1863	1863	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	152	92	102	723	479	186	
RTOR Reduction (vph)	0	67	0	0	0	81	
Lane Group Flow (vph)	152	25	102	723	479	105	
Turn Type		Perm	Perm			Perm	
Protected Phases	4			2	6		
Permitted Phases		4	2			6	
Actuated Green, G (s)	16.0	16.0	34.0	34.0	34.0	34.0	
Effective Green, g (s)	16.0	16.0	34.0	34.0	34.0	34.0	
Actuated g/C Ratio	0.27	0.27	0.57	0.57	0.57	0.57	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	472	422	449	1056	1056	897	
v/s Ratio Prot	c0.09			c0.39	0.26		
v/s Ratio Perm		0.02	0.13			0.07	
v/c Ratio	0.32	0.06	0.23	0.68	0.45	0.12	
Uniform Delay, d1	17.6	16.4	6.5	9.2	7.6	6.0	
Progression Factor	1.00	1.00	1.00	1.00	1.01	1.00	
Incremental Delay, d2	1.8	0.3	1.2	3.6	1.3	0.3	
Delay (s)	19.4	16.7	7.6	12.8	9.0	6.3	
Level of Service	B	B	A	B	A	A	
Approach Delay (s)	18.4			12.2	8.2		
Approach LOS	B			B	A		

Intersection Summary			
HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

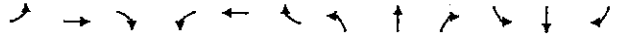
HCM Signalized Intersection Capacity Analysis
80: Roberts Ave & Fox St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	176	211	71	209	468	121	138	483	183	6	321	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	14	12	12	12	12	12	12	12
Total Lost time (s)	2.0	4.0		2.0	4.0	5.0		3.0			3.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		0.95			0.95	
Frt	1.00	0.96		1.00	1.00	0.85		0.97			0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			1.00	
Satd. Flow (prot)	1770	1792		1805	2027	1615		3389			3410	
Flt Permitted	0.20	1.00		0.49	1.00	1.00		0.75			0.94	
Satd. Flow (perm)	372	1792		924	2027	1615		2574			3205	
Peak-hour factor, PHF	0.95	0.95	0.95	0.86	0.86	0.86	0.96	0.96	0.96	0.95	0.95	0.95
Adj. Flow (vph)	185	222	75	243	544	141	144	503	191	8	338	108
RTOR Reduction (vph)	0	20	0	0	0	78	0	46	0	0	41	0
Lane Group Flow (vph)	185	277	0	243	544	63	0	792	0	0	413	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt			pm+pt		Perm	pm+pt			Perm		
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	27.0	21.0		27.0	21.0	21.0		20.0			20.0	
Effective Green, g (s)	29.0	22.0		29.0	22.0	21.0		22.0			22.0	
Actuated g/C Ratio	0.48	0.37		0.48	0.37	0.35		0.37			0.37	
Clearance Time (s)	3.0	5.0		3.0	5.0	5.0		5.0			5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	343	657		549	743	565		944			1175	
v/s Ratio Prot	c0.08	0.15		0.05	c0.27							
v/s Ratio Perm	0.20			0.16		0.04		c0.31			0.13	
v/c Ratio	0.54	0.42		0.44	0.73	0.11		0.84			0.35	
Uniform Delay, d1	10.6	14.2		9.4	16.4	13.2		17.4			13.8	
Progression Factor	2.14	1.83		0.67	0.71	0.53		0.65			1.23	
Incremental Delay, d2	1.6	1.9		0.5	5.5	0.3		5.3			0.8	
Delay (s)	24.3	28.0		6.8	17.1	7.3		16.6			17.7	
Level of Service	C	C		A	B	A		B			B	
Approach Delay (s)		26.6			12.9			16.6			17.7	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	17.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
90: Abbottsford Ave & Fox St

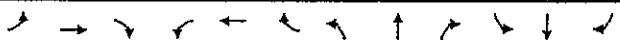


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Volume (vph)	69	377	16	0	0	0	0	614	230	257	411	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	12	12	12	12	11	12	11	11	12
Total Lost time (s)		3.4						3.4			3.4	
Lane Util. Factor		0.95						0.95			0.95	
Frt		0.99						0.96			1.00	
Flt Protected		0.99						1.00			0.98	
Satd. Flow (prot)		3685						3314			3424	
Flt Permitted		0.99						1.00			0.56	
Satd. Flow (perm)		3685						3314			1955	
Peak-hour factor, PHF	0.87	0.87	0.87	0.92	0.92	0.92	0.88	0.88	0.88	0.94	0.94	0.94
Adj. Flow (vph)	76	433	18	0	0	0	0	698	261	273	437	0
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	523	0	0	0	0	0	959	0	0	710	0
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	1%	1%	1%	0%	0%	0%
Turn Type	Perm									pm+pt		
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)		12.2						22.2			38.2	
Effective Green, g (s)		13.6						23.6			39.6	
Actuated g/C Ratio		0.23						0.39			0.66	
Clearance Time (s)		4.8						4.8			4.8	
Lane Grp Cap (vph)		835						1304			1643	
v/s Ratio Prot								c0.29			c0.10	
v/s Ratio Perm		0.14									0.18	
v/c Ratio		0.63						0.74			0.43	
Uniform Delay, d1		20.9						15.5			4.9	
Progression Factor		1.00						1.05			0.81	
Incremental Delay, d2		3.5						3.2			0.6	
Delay (s)		24.5						19.4			4.6	
Level of Service		C						B			A	
Approach Delay (s)		24.5		0.0				19.4			4.6	
Approach LOS		C		A				B			A	

Intersection Summary			
HCM Average Control Delay	15.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.2
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
100: SB Route 1 On Ramp & Fox St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↑	↱	↰	↑			↕	
Volume (vph)	0	0	0	353	238	595	367	313	0	0	315	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	12	12	11	12
Total Lost time (s)				4.0	4.0	4.8	4.0	4.0			4.0	
Lane Util. Factor				1.00	1.00	1.00	1.00	1.00			0.95	
Frt				1.00	1.00	0.85	1.00	1.00			0.95	
Flt Protected				0.95	1.00	1.00	0.96	1.00			1.00	
Satd. Flow (prot)				1787	1881	1599	1711	1801			3263	
Flt Permitted				0.95	1.00	1.00	0.25	1.00			1.00	
Satd. Flow (perm)				1787	1881	1599	456	1801			3263	
Peak-hour factor, PHF	0.92	0.92	0.92	0.96	0.96	0.96	0.95	0.95	0.95	0.94	0.94	0.94
Adj. Flow (vph)	0	0	0	368	248	620	386	329	0	0	335	149
RTOR Reduction (vph)	0	0	0	0	0	386	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	368	248	234	386	329	0	0	484	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Turn Type				Perm		Perm	pm+pt					
Protected Phases					8		5	2			4	
Permitted Phases				8		8	2	2				
Actuated Green, G (s)				16.2	16.2	16.2	34.2	34.2			13.2	
Effective Green, g (s)				17.0	17.0	16.2	33.2	35.0			14.0	
Actuated g/C Ratio				0.28	0.28	0.27	0.55	0.58			0.23	
Clearance Time (s)				4.8	4.8	4.8	3.0	4.8			4.8	
Lane Grp Cap (vph)				506	533	432	608	1051			761	
v/s Ratio Prot					0.13		c0.18	0.18			0.15	
v/s Ratio Perm				c0.21		0.15	c0.17					
v/c Ratio				0.73	0.47	0.54	0.63	0.31			0.64	
Uniform Delay, d1				19.4	17.7	18.7	8.6	6.4			20.7	
Progression Factor				1.00	0.99	1.02	0.41	0.37			1.00	
Incremental Delay, d2				8.8	2.9	4.8	3.4	0.5			4.0	
Delay (s)				28.3	20.4	24.0	6.9	2.9			24.7	
Level of Service				C	C	C	A	A			C	
Approach Delay (s)	0.0			24.6			5.0				24.7	
Approach LOS	A			C			A				C	

Intersection Summary			
HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		

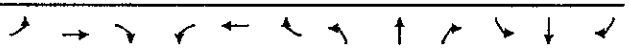
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
110: Roberts Ave & Stokley St

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↰	↱
Volume (vph)	0	391	492	0	19	296
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0	5.0
Lane Util. Factor		1.00	1.00		1.00	1.00
Frt		1.00	1.00		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		1863	1863		1770	1583
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		1863	1863		1770	1583
Peak-hour factor, PHF	0.82	0.82	0.96	0.96	0.60	0.60
Adj. Flow (vph)	0	477	512	0	198	493
RTOR Reduction (vph)	0	0	0	0	0	186
Lane Group Flow (vph)	0	477	512	0	198	307
Turn Type						Perm
Protected Phases		2	6		4	
Permitted Phases						4
Actuated Green, G (s)		23.0	23.0		27.0	27.0
Effective Green, g (s)		23.0	23.0		27.0	27.0
Actuated g/C Ratio		0.38	0.38		0.45	0.45
Clearance Time (s)		5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		714	714		797	712
v/s Ratio Prot		0.26	c0.27		0.11	
v/s Ratio Perm						c0.19
v/c Ratio		0.67	0.72		0.25	0.43
Uniform Delay, d1		15.3	15.7		10.2	11.3
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		2.0	3.4		0.7	1.9
Delay (s)		19.0	19.2		11.0	13.2
Level of Service		B	B		B	B
Approach Delay (s)		19.0	19.2		12.5	
Approach LOS		B	B		B	

Intersection Summary			
HCM Average Control Delay	16.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

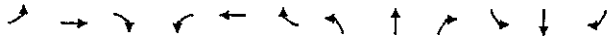
HCM Signalized Intersection Capacity Analysis
160: Hunting Park Ave & Wissahickon Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↑			↑↑	↱	↰	↑	↱
Volume (vph)	159	1074	26	0	645	162	40	297	18	348	269	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	15	12	11	11	12	11	11	11
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			0.95			0.95		1.00	1.00	1.00
Frt	1.00	1.00			0.97			0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00			0.99		0.95	1.00	1.00
Satd. Flow (prot)	1745	3477			3851			3443		1745	1837	1561
Flt Permitted	0.15	1.00			1.00			0.86		0.24	1.00	1.00
Satd. Flow (perm)	275	3477			3851			3037		447	1837	1561
Peak-hour factor, PHF	0.80	0.80	0.80	0.96	0.96	0.96	0.86	0.86	0.86	0.95	0.95	0.95
Adj. Flow (vph)	199	1342	32	0	672	169	47	345	21	366	282	123
RTOR Reduction (vph)	0	2	0	0	24	0	0	0	0	0	0	74
Lane Group Flow (vph)	199	1372	0	0	817	0	0	413	0	366	282	49
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt					Perm			pm+pt			Perm
Protected Phases	5	2			6			8		4		
Permitted Phases	2						8				4	4
Actuated Green, G (s)	44.6	44.6			30.6			15.6		34.6	34.6	34.6
Effective Green, g (s)	44.2	46.0			32.0			17.0		34.2	36.0	36.0
Actuated g/C Ratio	0.49	0.51			0.36			0.19		0.38	0.40	0.40
Clearance Time (s)	3.6	5.4			5.4			5.4		3.6	5.4	5.4
Lane Grp Cap (vph)	298	1777			1369			574		386	739	624
v/s Ratio Prot	0.07	c0.39			0.21					c0.16	0.15	
v/s Ratio Perm	0.25							0.14		0.20		0.03
v/c Ratio	0.67	0.77			0.60			0.72		0.95	0.38	0.08
Uniform Delay, d1	16.1	17.8			23.7			34.3		22.8	19.1	16.7
Progression Factor	1.86	0.69			1.00			1.00		1.38	1.03	1.79
Incremental Delay, d2	9.3	2.7			1.9			7.0		128.4	1.1	0.2
Delay (s)	39.2	15.0			25.6			41.9		59.8	20.9	30.2
Level of Service	D	B			C			D		E	C	C
Approach Delay (s)		18.1			25.6			41.9			40.9	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM Average Control Delay	27.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
170: Roberts Ave & Wissahickon Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	144	356	130	376	365	251	90	582	97	99	263	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	12	12	12	12	16
Total Lost time (s)	1.6	3.6		1.6	3.6	3.6	1.0	3.0		1.0	3.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	2027		1770	1863	1794	1770	3463		1770	3442	
Flt Permitted	0.94	1.00		0.19	1.00	1.00	0.41	1.00		0.18	1.00	
Satd. Flow (perm)	637	2027		355	1863	1794	761	3463		339	3442	
Peak-hour factor, PHF	0.90	0.90	0.90	0.92	0.92	0.92	0.95	0.95	0.95	0.88	0.88	0.88
Adj. Flow (vph)	160	396	144	409	397	273	32	613	102	112	299	67
RTOR Reduction (vph)	0	15	0	0	0	169	0	15	0	0	21	0
Lane Group Flow (vph)	160	525	0	409	397	104	32	700	0	112	345	0
Turn Type	pm+pt			pm+pt		Perm	pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	49.0	33.0		49.0	33.0	33.0	25.0	20.0		25.0	20.0	
Effective Green, g (s)	51.8	34.4		51.8	34.4	34.4	29.0	22.0		29.0	22.0	
Actuated g/C Ratio	0.58	0.38		0.58	0.38	0.38	0.32	0.24		0.32	0.24	
Clearance Time (s)	3.0	5.0		3.0	5.0	5.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	586	775		478	712	686	324	847		221	841	
v/s Ratio Prot	0.05	c0.26		c0.17	0.21		0.01	c0.20		c0.04	0.10	
v/s Ratio Perm	0.10			0.33		0.06	0.02			0.12		
v/c Ratio	0.27	0.68		0.86	0.56	0.15	0.10	0.83		0.51	0.41	
Uniform Delay, d1	9.9	23.2		17.3	21.8	18.2	21.2	32.2		23.5	28.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.99	0.81		1.00	1.00	
Incremental Delay, d2	1.1	4.7		17.6	3.1	0.5	0.5	7.1		8.1	1.5	
Delay (s)	11.0	27.9		34.9	25.0	18.7	21.4	33.2		31.5	30.0	
Level of Service	B	C		C	C	B	C	C		C	C	
Approach Delay (s)		24.1			27.1			32.7			30.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	28.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.2
Intersection Capacity Utilization	65.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
55: Roberts Ave & McMichael Street

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑↑			↱
Volume (veh/h)	0	427	862	47	0	9
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.77	0.77	0.87	0.87	0.70	0.70
Hourly flow rate (vph)	0	555	761	54	0	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		123	419			
pX, platoon unblocked					0.89	
vC, conflicting volume	815				1342	407
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	815				1322	407
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	808				131	593

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	555	507	306	9
Volume Left	0	0	0	0
Volume Right	0	0	54	9
cSH	1700	1700	1700	593
Volume to Capacity	0.33	0.30	0.18	0.01
Queue Length 95th (ft)	0	0	0	1
Control Delay (s)	0.0	0.0	0.0	11.2
Lane LOS				B
Approach Delay (s)	0.0	0.0		11.2
Approach LOS				B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	29.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
180: Abbottsford Ave & Wissahickon Ave

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↑↑	
Volume (veh/h)	0	66	0	1074	448	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.88	0.88	0.83	0.83
Hourly flow rate (vph)	0	76	0	1220	540	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1046		
pX, platoon unblocked	0.87					
vC, conflicting volume	1150	270	540			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	884	270	540			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	90	100			
cM capacity (veh/h)	252	734	939			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	76	610	610	270	270
Volume Left	0	0	0	0	0
Volume Right	76	0	0	0	0
cSH	734	1700	1700	1700	1700
Volume to Capacity	0.10	0.36	0.36	0.16	0.16
Queue Length 95th (ft)	9	0	0	0	0
Control Delay (s)	10.5	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.5	0.0		0.0	
Approach LOS	B				

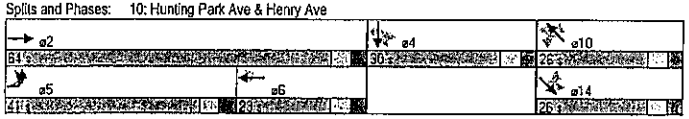
Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	33.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBT	SBR	SEL2	SEL	SET	NWL2	NWR
Lane Configurations												
Volume (vph)	909	671	424	99	120	131	431	68	100	194	7	76
Lane Group Flow (vph)	958	780	461	119	202	142	511	0	205	242	0	91
Turn Type	Prot			Perm	Perm		Perm	Perm	Perm		Perm	Perm
Protected Phases	5	2	6			4			14			
Permitted Phases				6	4		4	14			10	10
Minimum Split (s)	12.5	12.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
Total Split (s)	41.0	64.0	23.0	23.0	30.0	30.0	30.0	26.0	26.0	26.0	26.0	26.0
Total Split (%)	34.2%	53.3%	19.2%	19.2%	25.0%	25.0%	25.0%	21.7%	21.7%	21.7%	21.7%	21.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-0.4	-2.3	-2.3	-2.3	-0.4	-1.4	-1.4	-1.4	-1.4	-1.4	0.0	-1.4
Total Lost Time (s)	6.9	4.2	4.2	4.2	6.9	5.1	5.1	5.1	5.1	5.1	6.5	5.1
Lead/Lag	Lead		Lag	Lag								
Lead-Lag Optimize?	Yes											
v/c Ratio	1.11	0.96	0.98	0.52	0.64	0.40	0.97		1.13	0.75		1.06
Control Delay	104.4	53.2	87.7	45.6	54.8	44.9	79.7		152.2	62.1		152.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Delay	104.4	53.2	87.7	45.6	54.8	44.9	79.7		152.2	62.1		162.3
Queue Length 50th (ft)	#436	#563	#389	68	#145	96	#222		#185	179		#78
Queue Length 95th (ft)	#564	#843	#300	131	229	159	#348		#339	#293		#187
Internal Link Dist (ft)		658	1975			1653				1387		
Turn Bay Length (ft)	450			250	150		415		135			115
Base Capacity (vph)	886	812	470	231	317	359	526		181	323		86
Starvation Cap Reductn	0	0	0	0	0	0	0		0	0		0
Spillback Cap Reductn	0	0	0	0	0	0	0		0	0		0
Storage Cap Reductn	0	0	0	0	0	0	0		0	0		0
Reduced v/c Ratio	1.11	0.96	0.98	0.52	0.64	0.40	0.97		1.13	0.75		1.06

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT, Start of Green
Natural Cycle: 120
Control Type: Pretimed
- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Hunting Park Ave & Henry Ave



Lanes, Volumes, Timings
10: Hunting Park Ave & Henry Ave

Lane Group	NWL	NWR
Lane Configurations		
Volume (vph)	107	199
Lane Group Flow (vph)	116	219
Turn Type		Perm
Protected Phases	10	
Permitted Phases		10
Minimum Split (s)	11.5	11.5
Total Split (s)	26.0	26.0
Total Split (%)	21.7%	21.7%
Yellow Time (s)	3.5	3.5
All-Red Time (s)	3.0	3.0
Lost Time Adjust (s)	-1.4	0.0
Total Lost Time (s)	5.1	6.5
Lead/Lag		
Lead-Lag Optimize?		
v/c Ratio	0.39	1.00
Control Delay	48.6	111.6
Queue Delay	0.0	0.0
Total Delay	48.6	111.6
Queue Length 50th (ft)	81	#172
Queue Length 95th (ft)	140	#335
Internal Link Dist (ft)	1698	
Turn Bay Length (ft)		100
Base Capacity (vph)	294	219
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.39	1.00

Intersection Summary

2019 PM Build
Synchro 7 - Report

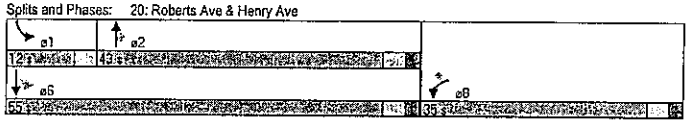
Lanes, Volumes, Timings
20: Roberts Ave & Henry Ave

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	262	255	997	272	173	489
Lane Group Flow (vph)	265	258	997	280	184	520
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Minimum Split (s)	33.0	33.0	10.3	10.3	8.0	10.3
Total Split (s)	35.0	35.0	43.0	43.0	12.0	55.0
Total Split (%)	38.9%	38.9%	47.8%	47.8%	13.3%	61.1%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	2.3	0.0	2.3	2.3	2.3	2.3
Total Lost Time (s)	2.7	5.0	2.7	2.7	0.7	2.7
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
v/c Ratio	0.39	0.37	0.60	0.32	0.51	0.25
Control Delay	23.6	4.8	20.7	3.0	29.2	19.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.6	4.8	20.7	3.0	29.2	19.4
Queue Length 50th (ft)	111	2	217	0	89	115
Queue Length 95th (ft)	177	53	282	43	160	173
Internal Link Dist (ft)	420		1653			767
Turn Bay Length (ft)		200		250	200	
Base Capacity (vph)	684	702	1654	871	363	2057
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.37	0.60	0.32	0.51	0.25

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 73 (81%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Pretimed

Splits and Phases: 20: Roberts Ave & Henry Ave



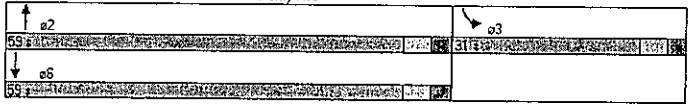
Lanes, Volumes, Timings
30: Abbottsford Ave & Henry Ave

Lane Group	NBT	SBL	SBT
Lane Configurations			
Volume (vph)	1169	323	662
Lane Group Flow (vph)	1329	333	682
Turn Type		custom	
Protected Phases	2	3	6
Permitted Phases		3	
Minimum Split (s)	22.3	10.3	22.3
Total Split (s)	59.0	31.0	59.0
Total Split (%)	65.6%	34.4%	65.6%
Yellow Time (s)	3.6	3.0	3.6
All-Red Time (s)	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3
Lead/Lag			
Lead-Lag Optimize?			
v/c Ratio	0.64	0.69	0.33
Control Delay	5.1	37.6	10.1
Queue Delay	0.0	0.0	0.0
Total Delay	5.1	37.6	10.1
Queue Length 50th (ft)	40	169	96
Queue Length 95th (ft)	43	264	130
Internal Link Dist (ft)	767		576
Turn Bay Length (ft)		200	
Base Capacity (vph)	2061	486	2072
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.64	0.69	0.33

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 55
Control Type: Pretimed

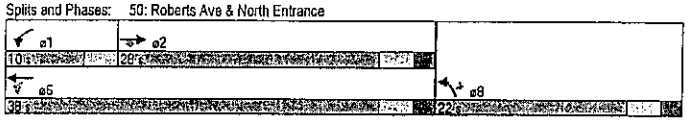
Splits and Phases: 30: Abbottsford Ave & Henry Ave



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	268	50	64	604	115	169
Lane Group Flow (vph)	291	54	70	657	125	184
Turn Type		Perm	pm+pt			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Minimum Split (s)	21.0	21.0	21.0	21.0	21.0	21.0
Total Split (s)	28.0	28.0	10.0	38.0	22.0	22.0
Total Split (%)	46.7%	46.7%	16.7%	63.3%	36.7%	36.7%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	3.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?						
v/c Ratio	0.41	0.08	0.12	0.64	0.25	0.32
Control Delay	15.7	4.5	4.2	7.8	18.3	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.7	4.5	4.2	7.8	18.3	4.9
Queue Length 50th (ft)	74	0	7	85	35	0
Queue Length 95th (ft)	131	16	m10	m127	71	39
Internal Link Dist (ft)	347			43	255	
Turn Bay Length (ft)		150				
Base Capacity (vph)	714	640	592	1025	502	580
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.08	0.12	0.64	0.25	0.32

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 29 (48%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 65
Control Type: Pretimed
m Volume for 95th percentile queue is metered by upstream signal.

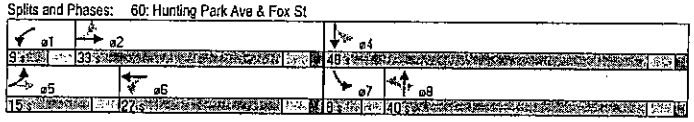
Splits and Phases: 50: Roberts Ave & North Entrance



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	150	970	147	557	2	495	198	91	307
Lane Group Flow (vph)	167	1089	153	701	2	538	215	112	537
Turn Type	pm+pt		pm+pt		Perm		Perm	pm+pt	
Protected Phases	5	2	1	6		8		7	4
Permitted Phases	2		6		8		8	4	
Minimum Split (s)	7.6	9.4	8.0	9.4	20.0	20.0	20.0	8.0	20.0
Total Split (s)	15.0	33.0	9.0	27.0	40.0	40.0	40.0	9.0	48.0
Total Split (%)	16.7%	36.7%	10.0%	30.0%	44.4%	44.4%	44.4%	8.9%	53.3%
Yellow Time (s)	3.6	3.6	3.5	3.6	3.6	3.6	3.6	3.0	3.6
All-Red Time (s)	0.0	1.8	0.0	1.8	1.8	1.8	1.8	0.0	1.8
Lost Time Adjust (s)	0.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Total Lost Time (s)	4.0	4.0	2.1	4.0	4.0	4.0	4.0	1.6	4.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
v/c Ratio	0.57	0.76	0.67	0.81	0.01	0.63	0.31	0.37	0.60
Control Delay	24.7	26.2	32.2	41.1	16.5	25.7	11.2	15.0	19.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.7	26.2	32.2	41.1	16.5	25.7	11.2	15.0	19.0
Queue Length 50th (ft)	59	268	76	210	1	240	43	31	199
Queue Length 95th (ft)	103	348	m#151	#277	5	348	93	52	254
Internal Link Dist (ft)		1975		1584		899			540
Turn Bay Length (ft)	200		200		100		100	105	
Base Capacity (vph)	295	1442	229	863	276	853	698	302	896
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.76	0.67	0.81	0.01	0.63	0.31	0.37	0.60

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 55
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.
! Phase conflict between lane groups.

Splits and Phases: 60: Hunting Park Ave & Fox St

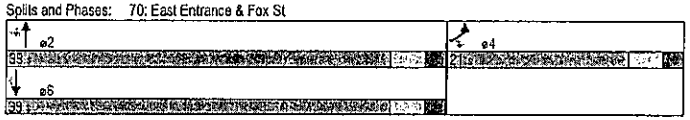


Lanes, Volumes, Timings
70: East Entrance & Fox St

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	140	85	94	665	441	171
Lane Group Flow (vph)	152	92	102	723	479	186
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Minimum Split (s)	21.0	21.0	21.0	21.0	21.0	21.0
Total Split (s)	21.0	21.0	39.0	39.0	39.0	39.0
Total Split (%)	35.0%	35.0%	65.0%	65.0%	65.0%	65.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
v/c Ratio	0.32	0.19	0.23	0.68	0.45	0.19
Control Delay	20.0	5.8	8.1	13.4	9.3	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.0	5.8	8.1	13.4	9.3	1.7
Queue Length 50th (ft)	44	0	16	164	77	4
Queue Length 95th (ft)	87	28	39	275	154	13
Internal Link Dist (ft)	304			540	1098	
Turn Bay Length (ft)			200			
Base Capacity (vph)	472	490	450	1056	1056	978
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.19	0.23	0.68	0.45	0.19

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 11 (18%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 55
Control Type: Pretimed

Splits and Phases: 70: East Entrance & Fox St

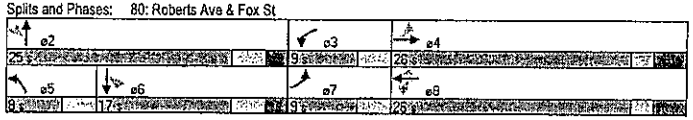


Lanes, Volumes, Timings
80: Roberts Ave & Fox St

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	176	211	209	468	121	136	483	8	321
Lane Group Flow (vph)	185	297	243	544	141	0	838	0	454
Turn Type	pm+pt		pm+pt		Perm	pm+pt		Perm	
Protected Phases	7	4	3	8		5	2		6
Permitted Phases	4		8		8	2		6	
Detector Phase	7	4	3	8	8	5	2	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	9.0	8.0	9.0	9.0	8.0	10.0	10.0	10.0
Total Split (s)	9.0	26.0	9.0	26.0	26.0	8.0	25.0	17.0	17.0
Total Split (%)	15.0%	43.3%	15.0%	43.3%	43.3%	13.3%	41.7%	28.3%	28.3%
Yellow Time (s)	3.0	2.0	3.0	2.0	2.0	3.0	3.0	3.0	3.0
All-Red Time (s)	0.0	3.0	0.0	3.0	3.0	0.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	0.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	2.0	4.0	2.0	4.0	5.0	1.0	3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes		Yes			Yes		Yes	Yes
Recall Mode	None	Max	None	Max	Max	None	C-Max	C-Max	C-Max
v/c Ratio	0.52	0.44	0.42	0.73	0.22		0.79		0.37
Control Delay	20.4	26.1	6.9	18.1	3.0		15.5		15.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	20.4	26.1	6.9	18.1	3.0		15.5		15.5
Queue Length 50th (ft)	52	95	27	110	0		#89		44
Queue Length 95th (ft)	98	170	52	192	21		#122		66
Internal Link Dist (ft)		439		455			1098		924
Turn Bay Length (ft)	200		200		100				
Base Capacity (vph)	356	677	580	743	643		1057		1216
Starvation Cap Reductn	0	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0	0		0		0
Reduced v/c Ratio	0.52	0.44	0.42	0.73	0.22		0.79		0.37

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 53 (88%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 80: Roberts Ave & Fox St

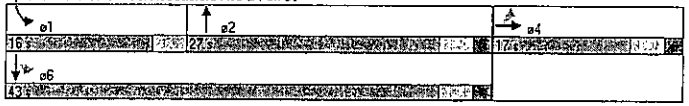


Lanes, Volumes, Timings
90: Abbottsford Ave & Fox St

Lane Group	EBT	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	377	614	257	411
Lane Group Flow (vph)	527	959	0	710
Turn Type			pm+pt	
Protected Phases	4	2	1	6
Permitted Phases			6	
Minimum Split (s)	9.4	9.4	7.6	9.4
Total Split (s)	17.0	27.0	16.0	43.0
Total Split (%)	28.3%	45.0%	26.7%	71.7%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.8	1.8	0.0	1.8
Lost Time Adjust (s)	1.4	1.4	0.4	1.4
Total Lost Time (s)	3.4	3.4	3.4	3.4
Lead/Lag			Lag	Lead
Lead-Lag Optimize?				
v/c Ratio	0.63	0.74		0.44
Control Delay	24.6	19.9		4.3
Queue Delay	0.0	0.7		2.7
Total Delay	24.6	20.6		7.0
Queue Length 50th (ft)	90	135		67
Queue Length 95th (ft)	129	193		68
Internal Link Dist (ft)	1388	924		775
Turn Bay Length (ft)				
Base Capacity (vph)	839	1303		1598
Starvation Cap Reductn	0	0		744
Spillback Cap Reductn	0	117		0
Storage Cap Reductn	0	0		0
Reduced v/c Ratio	0.63	0.81		0.83

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 52 (87%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 45
Control Type: Pretimed

Splits and Phases: 90: Abbottsford Ave & Fox St

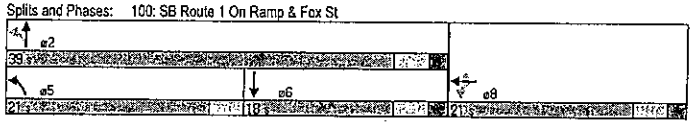


Lanes, Volumes, Timings
100: SB Route 1 On Ramp & Fox St

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Configurations						
Volume (vph)	353	238	595	367	313	315
Lane Group Flow (vph)	368	248	620	386	329	484
Turn Type	Perm		Perm	pm+pt		
Protected Phases		8		5	2	6
Permitted Phases	8		8	2		
Minimum Split (s)	8.8	8.8	8.8	8.8	8.8	8.8
Total Split (s)	21.0	21.0	21.0	21.0	39.0	18.0
Total Split (%)	35.0%	35.0%	35.0%	35.0%	65.0%	30.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.8	1.8	1.8	0.0	1.8	1.8
Lost Time Adjust (s)	0.8	0.8	0.0	0	0.8	0.8
Total Lost Time (s)	4.0	4.0	4.8	4.0	4.0	4.0
Lead/Lag				Lead		Lag
Lead-Lag Optimize?				Yes		
v/c Ratio	0.73	0.47	0.76	0.62	0.31	0.64
Control Delay	30.0	21.0	11.5	6.4	3.0	25.1
Queue Delay	0.0	0.0	0.0	33.8	3.5	0.6
Total Delay	30.0	21.0	11.5	10.2	6.5	25.7
Queue Length 50th (ft)	121	68	28	16	9	83
Queue Length 95th (ft)	#244	110	#197	m19	m10	127
Internal Link Dist (ft)		980			75	792
Turn Bay Length (ft)			300			
Base Capacity (vph)	506	533	818	622	1051	762
Starvation Cap Reductn	0	0	0	156	617	0
Spillback Cap Reductn	0	0	0	0	0	72
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.47	0.76	0.83	0.76	0.70

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 23 (38%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 45
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

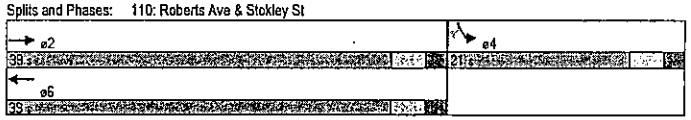
Splits and Phases: 100: SB Route 1 On Ramp & Fox St



Lane Group	EBT	WBT	SBL	SBR
Lane Configurations	↑	↑	↰	↱
Volume (vph)	391	492	119	296
Lane Group Flow (vph)	477	512	198	493
Turn Type				Perm
Protected Phases	2	6	4	
Permitted Phases				4
Detector Phase	2	6	4	4
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	21.5	21.5	21.5	21.5
Total Split (s)	39.0	39.0	21.0	21.0
Total Split (%)	65.0%	65.0%	35.0%	35.0%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Min	C-Min
v/c Ratio	0.67	0.72	0.25	0.55
Control Delay	20.3	21.0	13.4	7.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	20.3	21.0	13.4	7.6
Queue Length 50th (ft)	182	152	42	128
Queue Length 95th (ft)	m147	188	63	34
Internal Link Dist (ft)	1455	1436	792	
Turn Bay Length (ft)				
Base Capacity (vph)	1056	1056	798	900
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	0.45	0.48	0.25	0.55

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 49 (82%), Referenced to phase 4:SBL and 8:, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

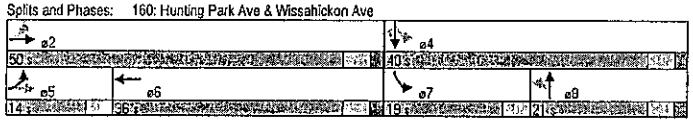
Splits and Phases: 110: Roberts Ave & Stokley St



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↑↑	↰	↑↑	↰	↑	↱
Volume (vph)	159	1074	645	40	297	348	266	117
Lane Group Flow (vph)	199	1374	841	0	413	356	282	123
Turn Type	pm+pt			Perm		pm+pt		Perm
Protected Phases	5	2	6		8	7	4	
Permitted Phases	2			8		4		4
Minimum Split (s)	7.6	9.4	9.4	9.4	9.4	7.6	9.4	9.4
Total Split (s)	14.0	50.0	36.0	21.0	21.0	19.0	40.0	40.0
Total Split (%)	15.6%	55.6%	40.0%	23.3%	23.3%	21.1%	44.4%	44.4%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	0.0	1.8	1.8	1.8	1.8	0.0	1.8	1.8
Lost Time Adjust (s)	0.4	1.4	1.4	1.4	1.4	0.4	1.4	1.4
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead		Lag	Lag	Lag	Lead		
Lead-Lag Optimize?								
v/c Ratio	0.65	0.77	0.60		0.72	0.93	0.38	0.18
Control Delay	33.4	15.3	24.8		42.4	55.3	21.4	6.7
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	33.4	15.3	24.8		42.4	55.3	21.4	6.7
Queue Length 50th (ft)	70	157	194		116	177	113	7
Queue Length 95th (ft)	m113	223	255		159	m#280	m154	m22
Internal Link Dist (ft)		1584	151		484		2046	
Turn Bay Length (ft)	85							275
Base Capacity (vph)	304	1780	1394		573	395	735	698
Starvation Cap Reductn	0	0	0		0	0	0	0
Spillback Cap Reductn	0	0	0		0	0	0	0
Storage Cap Reductn	0	0	0		0	0	0	0
Reduced v/c Ratio	0.65	0.77	0.60		0.72	0.93	0.38	0.18

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 55
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 160: Hunting Park Ave & Wissahickon Ave

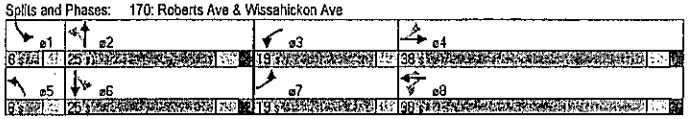


Lanes, Volumes, Timings
170: Roberts Ave & Wissahickon Ave

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	144	356	376	365	251	30	682	99	263
Lane Group Flow (vph)	160	540	409	397	273	32	715	112	366
Turn Type	pm+pt		pm+pt		Perm	pm+pt		pm+pt	
Protected Phases	7	4	3	8		5	2	1	6
Permitted Phases	4		8		8	2		6	
Minimum Split (s)	8.0	9.4	8.0	9.4	9.4	8.0	10.0	8.0	10.0
Total Split (s)	19.0	38.0	19.0	38.0	38.0	8.0	25.0	8.0	25.0
Total Split (%)	21.1%	42.2%	21.1%	42.2%	42.2%	8.9%	27.8%	8.9%	27.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	0.0	2.0	0.0	2.0	2.0	0.0	2.0	0.0	2.0
Lost Time Adjust (s)	-1.4	-1.4	-1.4	-1.4	-1.4	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	1.6	3.6	1.6	3.6	3.6	1.0	3.0	1.0	3.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
v/c Ratio	0.27	0.68	0.84	0.56	0.32	0.09	0.83	0.49	0.42
Control Delay	8.6	27.5	32.0	25.5	3.5	19.5	33.3	27.8	28.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.6	27.5	32.0	25.5	3.5	19.5	33.3	27.8	28.2
Queue Length 50th (ft)	35	241	129	174	0	10	119	43	95
Queue Length 95th (ft)	62	357	#287	265	48	m16	#200	79	123
Internal Link Dist (ft)		1436		1740			2048		966
Turn Bay Length (ft)	100		300			100		65	
Base Capacity (vph)	600	790	486	712	854	341	862	228	863
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.68	0.84	0.56	0.32	0.09	0.83	0.49	0.42

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 22 (24%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 170: Roberts Ave & Wissahickon Ave



2005 EXISTING: SAT PEAK

Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	NBR2
Lane Configurations													
Volume (vph)	22	223	208	27	190	41	40	71	8	59	9	15	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	12	11	11	12	10	10	12	12	12	13	12	12	
Total Lost time (s)		4.0	4.0		4.0	4.0				4.0			
Lane Util. Factor		0.91	0.91		0.95	1.00				1.00			
Frt		1.00	0.99		1.00	0.85				0.98			
Flt Protected		0.95	0.99		1.00	1.00				0.99			
Satd. Flow (prot)		1588	3255		3336	1492				1835			
Flt Permitted		0.51	0.46		1.00	1.00				0.97			
Satd. Flow (perm)		848	1503		3336	1492				1784			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.90	0.90	0.90	0.92	0.77	0.77	0.77	0.77	
Adj. Flow (vph)	24	242	226	29	211	46	44	1	10	77	12	6	
RTOR Reduction (vph)	0	0	0	0	0	33	0	0	0	3	0	0	
Lane Group Flow (vph)	0	162	359	0	211	57	0	0	0	103	0	0	
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%	1%	2%	4%	4%	4%	4%	
Turn Type	pm+pl	pm+pt				Perm		Perm	Perm				
Protected Phases	5	5	2		1	6				8			
Permitted Phases	2	2	5			6		8	8				
Actuated Green, G (s)		35.1	35.1		20.7	20.7				12.6			
Effective Green, g (s)		34.7	37.4		23.0	23.0				14.0			
Actuated g/C Ratio		0.39	0.42		0.26	0.26				0.16			
Clearance Time (s)		3.6	6.3		6.3	6.3				5.4			
Lane Grp Cap (vph)		412	353		853	381				278			
v/s Ratio Prot		c0.05	0.11		0.06								
v/s Ratio Perm		c0.11				0.04				c0.06			
v/c Ratio		0.39	0.27		0.25	0.15				0.37			
Uniform Delay, d1		19.0	17.3		26.6	25.9				34.1			
Progression Factor		1.00	1.00		1.70	2.31				1.00			
Incremental Delay, d2		2.8	0.5		0.7	0.8				3.8			
Delay (s)		21.8	17.8		45.8	60.7				37.8			
Level of Service		C	B		D	E				D			
Approach Delay (s)			19.0			50.3				37.8			
Approach LOS			B			D				D			

Intersection Summary			
HCM Average Control Delay	31.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	57.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBL2	SBL	SBT	SBR	SBR2	SEL2	SEL	SET	SER	SER2	NWL2	NWL
Lane Configurations												
Volume (vph)	20	69	27	174	37	17	41	98	42	18	5	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	13	12	12	12	12	13	12	12	12	12
Total Lost time (s)		4.0	4.0	4.0			4.0	4.0				4.0
Lane Util. Factor		1.00	1.00	0.88			1.00	1.00				1.00
Frt		1.00	1.00	0.85			1.00	0.95				1.00
Flt Protected		0.95	1.00	1.00			0.95	1.00				0.95
Satd. Flow (prot)		1829	1925	2787			1752	1810				1681
Flt Permitted		0.47	1.00	1.00			0.51	1.00				0.49
Satd. Flow (perm)		898	1925	2787			949	1810				864
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.92	0.86	0.86	0.86	0.88	0.92	0.92	0.87
Adj. Flow (vph)	22	78	30	196	40	19	47	111	48	9	5	41
RTOR Reduction (vph)	0	0	0	17	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	100	80	219	0	0	66	165	0	0	0	46
Heavy Vehicles (%)	2%	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	2%
Turn Type	pm+pt	pm+pt		Perm		custom	custom				custom	custom
Protected Phases	7	7	4									
Permitted Phases	4	4	4	4		9	9	9			13	13
Actuated Green, G (s)		24.3	24.3	24.3			13.5	13.5				13.5
Effective Green, g (s)		23.9	25.7	25.7			14.9	14.9				14.9
Actuated g/C Ratio		0.27	0.29	0.29			0.17	0.17				0.17
Clearance Time (s)		3.6	5.4	5.4			5.4	5.4				5.4
Lane Grp Cap (vph)		318	550	796			157	300				143
v/s Ratio Prot		c0.03	0.04									
v/s Ratio Perm		0.06		0.08			0.07	0.09				0.05
v/c Ratio		0.31	0.15	0.27			0.42	0.55				0.32
Uniform Delay, d1		26.1	24.0	24.9			33.7	34.5				33.1
Progression Factor		0.82	0.82	0.80			1.00	1.00				1.00
Incremental Delay, d2		2.6	0.6	0.8			8.1	7.1				5.9
Delay (s)		24.0	20.3	20.9			41.7	41.6				39.0
Level of Service		C	C	C			D	D				D
Approach Delay (s)			21.5					41.6				
Approach LOS			C					D				

Intersection Summary			

HCM Signalized Intersection Capacity Analysis
10: Hunting Park Ave & Henry Ave

Movement	NWL	NWR	NWR2
Lane Configurations			
Volume (vph)	77	59	4
Ideal Flow (vphpl)	1900	1900	1900
Lane Width	13	12	12
Total Lost time (s)	4.0		
Lane Util. Factor	1.00		
Frt	0.93		
Flt Protected	1.00		
Satd. Flow (prot)	1699		
Flt Permitted	1.00		
Satd. Flow (perm)	1699		
Peak-hour factor, PHF	0.87	0.87	0.87
Adj. Flow (vph)	89	64	5
RTOR Reduction (vph)	2	0	0
Lane Group Flow (vph)	156	0	0
Heavy Vehicles (%)	8%	8%	8%
Turn Type			
Protected Phases			
Permitted Phases	13		
Actuated Green, G (s)	13.5		
Effective Green, g (s)	14.9		
Actuated g/C Ratio	0.17		
Clearance Time (s)	5.4		
Lane Grp Cap (vph)	281		
v/s Ratio Prot			
v/s Ratio Perm	c0.09		
v/c Ratio	0.56		
Uniform Delay, d1	34.5		
Progression Factor	1.00		
Incremental Delay, d2	7.7		
Delay (s)	42.2		
Level of Service	D		
Approach Delay (s)	41.5		
Approach LOS	D		

Intersection Summary			
HCM Average Control Delay		HCM Level of Service	
HCM Volume to Capacity ratio			
Actuated Cycle Length (s)		Sum of lost time (s)	
Intersection Capacity Utilization		ICU Level of Service	
Analysis Period (min)			

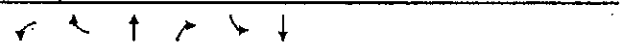
HCM Signalized Intersection Capacity Analysis
20: Roberts Ave & Henry Ave

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	126	46	309	17	27	259
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	14	12	13	12	12	12
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		0.95	1.00	1.00	0.95
Frt	0.96		1.00	0.85	1.00	1.00
Flt Protected	0.96		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1866		3693	1599	1770	3539
Flt Permitted	0.96		1.00	1.00	0.53	1.00
Satd. Flow (perm)	1866		3693	1599	994	3539
Peak-hour factor, PHF	0.88	0.88	0.86	0.86	0.92	0.92
Adj. Flow (vph)	143	52	359	136	29	277
RTOR Reduction (vph)	15	0	0	56	0	0
Lane Group Flow (vph)	180	0	359	80	29	277
Heavy Vehicles (%)	1%	1%	1%	1%	2%	2%
Turn Type				Perm	Perm	
Protected Phases	8		2			6
Permitted Phases				2	6	
Actuated Green, G (s)	27.0		50.4	50.4	50.4	50.4
Effective Green, g (s)	29.3		52.7	52.7	52.7	52.7
Actuated g/C Ratio	0.33		0.59	0.59	0.59	0.59
Clearance Time (s)	6.3		6.3	6.3	6.3	6.3
Lane Grp Cap (vph)	1607		2162	936	582	2072
v/s Ratio Prot	c0.10		c0.10			0.08
v/s Ratio Perm				0.05	0.03	
v/c Ratio	0.30		0.17	0.09	0.05	0.13
Uniform Delay, d1	22.7		8.6	8.1	8.0	8.4
Progression Factor	1.00		0.74	0.58	0.59	0.58
Incremental Delay, d2	1.2		0.2	0.2	0.2	0.1
Delay (s)	23.9		6.5	4.9	4.9	5.0
Level of Service	C		A	A	A	A
Approach Delay (s)	23.9		6.0			5.0
Approach LOS	C		A			A

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Abbottsford Ave & Henry Ave

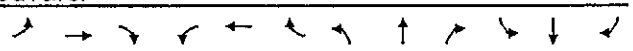


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑		↰	↑↑
Volume (vph)	0	0	252	31	178	226
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.3		6.3	6.3
Lane Util. Factor			0.95		1.00	0.95
Frt			0.98		1.00	1.00
Flt Protected			1.00		0.95	1.00
Satd. Flow (prot)			3482		1770	3539
Flt Permitted			1.00		0.95	1.00
Satd. Flow (perm)			3482		1770	3539
Peak-hour factor, PHF	0.92	0.92	0.85	0.85	0.95	0.95
Adj. Flow (vph)	0	0	296	36	187	240
RTOR Reduction (vph)	0	0	11	0	0	0
Lane Group Flow (vph)	0	0	321	0	187	240
Turn Type					custom	
Protected Phases			2		3	6
Permitted Phases					3	
Actuated Green, G (s)			44.7		32.7	44.7
Effective Green, g (s)			44.7		32.7	44.7
Actuated g/C Ratio			0.50		0.36	0.50
Clearance Time (s)			6.3		6.3	6.3
Lane Grp Cap (vph)			1729		643	1758
v/s Ratio Prot			c0.09		c0.11	0.07
v/s Ratio Perm						
v/c Ratio			0.19		0.29	0.14
Uniform Delay, d1			12.6		20.4	12.2
Progression Factor			1.17		1.00	1.00
Incremental Delay, d2			0.2		1.1	0.2
Delay (s)			14.9		21.5	12.4
Level of Service			B		C	B
Approach Delay (s)	0.0		14.9		16.4	
Approach LOS	A		B		B	

Intersection Summary			
HCM Average Control Delay	15.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	28.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
60: Hunting Park Ave & Fox St

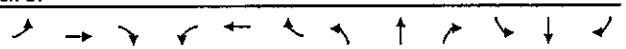


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑		↰	↑↑		↰	↑		↰	↑	
Volume (vph)	67	404	12	115	391	34	4	306	148	12	273	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	12	12	12	12	12	12
Total Lost time (s)	4.0	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	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1711	3419		1694	3348		1787	1881	1599	1787	1833	
Flt Permitted	0.37	1.00		0.49	1.00		0.35	1.00	1.00	0.40	1.00	
Satd. Flow (perm)	668	3419		868	3348		659	1881	1599	752	1833	
Peak-hour factor, PHF	0.89	0.89	0.89	0.84	0.84	0.84	0.92	0.92	0.92	0.88	0.88	0.88
Adj. Flow (vph)	76	459	2	138	465	40	4	333	161	14	310	64
RTOR Reduction (vph)	0	0	0	0	7	0	0	0	97	0	8	0
Lane Group Flow (vph)	76	461	0	138	498	0	4	333	64	14	366	0
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt			Perm			Perm		Perm	Perm		
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	48.6	48.6		38.7	38.7		30.6	30.6	30.6	30.6	30.6	
Effective Green, g (s)	48.2	50.0		40.1	40.1		32.0	32.0	32.0	32.0	32.0	
Actuated g/C Ratio	0.54	0.56		0.45	0.45		0.36	0.36	0.36	0.36	0.36	
Clearance Time (s)	3.6	5.4		5.4	5.4		5.4	5.4	5.4	5.4	5.4	
Lane Grp Cap (vph)	426	1899		387	1492		234	669	569	267	1652	
v/s Ratio Prot	0.01	c0.13			0.15			0.18			c0.20	
v/s Ratio Perm	0.08			c0.16			0.01		0.04	0.02		
v/c Ratio	0.18	0.24		0.36	0.33		0.02	0.50	0.11	0.05	0.56	
Uniform Delay, d1	10.6	10.3		16.4	16.2		18.9	22.7	19.5	19.0	23.3	
Progression Factor	1.56	1.59		1.11	1.10		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.9	0.3		2.5	0.6		0.1	2.6	0.4	0.4	3.5	
Delay (s)	17.5	16.7		20.7	18.5		18.9	25.3	19.9	19.4	26.8	
Level of Service	B	B		C	B		B	C	B	B	C	
Approach Delay (s)	16.8			19.0			23.5			26.5		
Approach LOS	B			B			C			C		

Intersection Summary			
HCM Average Control Delay	20.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
80: Roberts Ave & Fox St

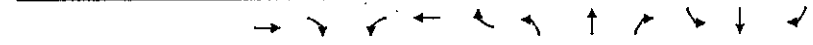


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	19	116	16	133	145	52	25	229	120	7	186	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	14	12	12	16	12	12	16	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.96			0.96			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1770	1829		1805	1946			2013			2060	
Flt Permitted	0.60	1.00		0.65	1.00			0.97			0.99	
Satd. Flow (perm)	1117	1829		1240	1946			1958			2034	
Peak-hour factor, PHF	0.80	0.80	0.80	0.93	0.93	0.93	0.86	0.86	0.86	0.89	0.89	0.89
Adj. Flow (vph)	24	145	20	143	156	56	29	266	140	8	209	44
RTOR Reduction (vph)	0	8	0	0	22	0	0	28	0	0	12	0
Lane Group Flow (vph)	24	157	0	143	190	0	0	407	0	0	249	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	22.0	22.0		22.0	22.0			27.0			27.0	
Effective Green, g (s)	23.0	23.0		23.0	23.0			29.0			29.0	
Actuated g/C Ratio	0.38	0.38		0.38	0.38			0.48			0.48	
Clearance Time (s)	5.0	5.0		5.0	5.0			6.0			6.0	
Lane Grp Cap (vph)	428	701		475	746			946			983	
v/s Ratio Prot		0.09			0.10							
v/s Ratio Perm	0.02			c0.12				c0.21			c0.12	
v/c Ratio	0.06	0.22		0.30	0.26			0.43			0.25	
Uniform Delay, d1	11.7	12.5		12.9	12.6			10.3			9.1	
Progression Factor	1.00	1.00		0.68	0.65			1.00			1.28	
Incremental Delay, d2	0.2	0.7		1.6	0.8			1.1			0.6	
Delay (s)	11.9	13.2		10.4	8.9			11.5			12.3	
Level of Service	B	B		B	A			B			B	
Approach Delay (s)		13.1			9.5			11.5			12.3	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
90: Abbottsford Ave & Fox St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	53	247	12	30	0	0	0	224	98	259	214	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	12	12	12	12	11	12	11	11	12
Total Lost time (s)		4.0						4.0		4.0	4.0	
Lane Util. Factor		0.95						0.95		1.00	1.00	
Frt		0.99						0.95		1.00	1.00	
Flt Protected		0.99						1.00		0.95	1.00	
Satd. Flow (prot)		3678						3297		1745	1837	
Flt Permitted		0.99						1.00		0.42	1.00	
Satd. Flow (perm)		3678						3297		766	1837	
Peak-hour factor, PHF	0.89	0.89	0.89	0.92	0.92	0.92	0.86	0.86	0.86	0.92	0.92	0.92
Adj. Flow (vph)	60	278	13	0	0	0	0	260	114	282	233	0
RTOR Reduction (vph)	0	14	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	0	347	0	0	0	0	0	374	0	282	233	0
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	1%	1%	1%	0%	0%	0%
Turn Type	Perm									pm+pt		
Protected Phases		4						2		6		
Permitted Phases	4									6	1	
Actuated Green, G (s)		21.0						19.2		28.2	28.2	
Effective Green, g (s)		22.4						20.6		27.8	29.6	
Actuated g/C Ratio		0.37						0.34		0.46	0.49	
Clearance Time (s)		5.4						5.4		3.6	5.4	
Lane Grp Cap (vph)		1373						1132		436	906	
v/s Ratio Prot								0.11		c0.05	0.13	
v/s Ratio Perm		0.09								c0.25		
v/c Ratio		0.25						0.33		0.65	0.26	
Uniform Delay, d1		13.0						14.6		11.4	8.9	
Progression Factor		1.00						1.53		0.96	0.86	
Incremental Delay, d2		0.4						0.7		6.9	0.7	
Delay (s)		13.4						23.1		18.0	8.3	
Level of Service		B						C		B	A	
Approach Delay (s)		13.4			0.0			23.1			13.6	
Approach LOS		B			A			C			B	

Intersection Summary			
HCM Average Control Delay	16.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

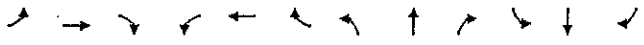
HCM Signalized Intersection Capacity Analysis
100: SB Route 1 On Ramp & Fox St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑			↑			↑↑	
Volume (vph)	0	0	0	215	201	252	195	21	0	0	251	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	15	12	12	11	12	12	11	12
Total Lost time (s)					4.0		4.0	4.0			4.0	
Lane Util. Factor					0.95		1.00	1.00			0.95	
Frt					0.94		1.00	1.00			0.95	
Flt Protected					0.98		0.95	1.00			1.00	
Satd. Flow (prot)					3650		1711	1801			3270	
Flt Permitted					0.98		0.44	1.00			1.00	
Satd. Flow (perm)					3650		745	1801			3270	
Peak-hour factor, PHF	0.92	0.92	0.92	0.98	0.98	0.98	0.74	0.74	0.74	0.94	0.94	0.94
Adj. Flow (vph)	0	0	0	219	205	257	180	166	0	0	267	112
RTOR Reduction (vph)	0	0	0	0	153	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	528	0	180	166	0	0	379	0	
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Turn Type				Perm		pm+pt						
Protected Phases					8		5	2			1 6	
Permitted Phases				8		2	5					
Actuated Green, G (s)					21.6		28.6	28.6			19.8	
Effective Green, g (s)					22.4		27.8	29.6			20.6	
Actuated g/C Ratio					0.37		0.46	0.49			0.34	
Clearance Time (s)					4.8		3.0	4.8			4.8	
Lane Grp Cap (vph)					1363		426	888			1123	
v/s Ratio Prot							c0.04	0.09			0.12	
v/s Ratio Perm					0.14		c0.16					
v/c Ratio					0.39		0.42	0.19			0.34	
Uniform Delay, d1					13.6		9.9	8.5			14.6	
Progression Factor					0.97		0.83	0.45			1.00	
Incremental Delay, d2					0.6		0.8	0.5			0.8	
Delay (s)					14.2		11.2	4.3			15.4	
Level of Service					B		B	A			B	
Approach Delay (s)		0.0			14.2			7.9			15.4	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	13.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
160: Hunting Park Ave & Wissahickon Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑			↑↑			↑	
Volume (vph)	90	431	0	0	434	161	21	125	12	224	204	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	15	12	11	11	12	11	11	11
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	4.0
Lane Util. Factor		0.95			0.95			0.95		1.00	1.00	1.00
Frt		1.00			0.96			0.99		1.00	1.00	0.85
Flt Protected		0.95			1.00			0.99		0.95	1.00	1.00
Satd. Flow (prot)		3490			3817			3426		1745	1837	1561
Flt Permitted		0.31			1.00			0.89		0.51	1.00	1.00
Satd. Flow (perm)		568	3490		3817			3080		934	1837	1561
Peak-hour factor, PHF	0.95	0.95	0.95	0.96	0.96	0.96	0.88	0.88	0.88	0.91	0.91	0.91
Adj. Flow (vph)	95	454	0	0	452	157	24	142	14	246	224	71
RTOR Reduction (vph)	0	0	0	0	38	0	0	0	0	0	0	46
Lane Group Flow (vph)	95	454	0	0	571	0	0	180	0	246	224	25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt					Perm				pm+pt		Perm
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2					8				4	7	4
Actuated Green, G (s)	48.6	48.6			37.8			16.2		30.6	30.6	30.6
Effective Green, g (s)	48.2	50.0			39.2			17.6		30.2	32.0	32.0
Actuated g/C Ratio	0.54	0.56			0.44			0.20		0.34	0.36	0.36
Clearance Time (s)	3.6	5.4			5.4			5.4		3.6	5.4	5.4
Lane Grp Cap (vph)	393	1939			1663			602		407	653	555
v/s Ratio Prot	0.02	c0.13			c0.15					c0.07	0.12	
v/s Ratio Perm	0.11							0.06		c0.13		0.02
v/c Ratio	0.24	0.23			0.34			0.30		0.60	0.34	0.05
Uniform Delay, d1	11.0	10.2			16.9			30.9		23.2	21.3	19.0
Progression Factor	0.72	0.63			1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	1.4	0.3			0.6			1.3		16.5	1.4	0.2
Delay (s)	9.4	6.7			17.4			32.2		29.8	22.7	19.2
Level of Service	A	A			B			C		C	C	B
Approach Delay (s)		7.1			17.4			32.2			25.5	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM Average Control Delay	18.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

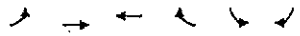
HCM Signalized Intersection Capacity Analysis
170: Roberts Ave & Wissahickon Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	182	21	169	231	124	17	340	42	29	396	124
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	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1834		1770	1863	1583	1770	3461		1770	3412	
Flt Permitted	0.54	1.00		0.60	1.00	1.00	0.43	1.00		0.50	1.00	
Satd. Flow (perm)	1001	1834		1113	1863	1583	797	3461		938	3412	
Peak-hour factor, PHF	0.95	0.95	0.95	0.88	0.88	0.88	0.92	0.92	0.92	0.98	0.98	0.98
Adj. Flow (vph)	63	192	22	192	262	141	18	370	46	30	404	127
RTOR Reduction (vph)	0	7	0	0	0	87	0	16	0	0	50	0
Lane Group Flow (vph)	169	207	0	378	262	54	18	400	0	30	481	0
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	21.6	21.6		21.6	21.6	21.6	27.0	27.0		27.0	27.0	
Effective Green, g (s)	23.0	23.0		23.0	23.0	23.0	29.0	29.0		29.0	29.0	
Actuated g/C Ratio	0.38	0.38		0.38	0.38	0.38	0.48	0.48		0.48	0.48	
Clearance Time (s)	5.4	5.4		5.4	5.4	5.4	6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	384	703		427	714	607	385	1682		453	1649	
v/s Ratio Prot		0.11			c0.14			0.11			c0.14	
v/s Ratio Perm	0.07			0.07		0.03	0.02			0.03		
v/c Ratio	0.18	0.29		0.18	0.37	0.09	0.05	0.24		0.07	0.29	
Uniform Delay, d1	12.3	12.9		12.3	13.3	11.8	8.2	9.0		8.9	9.3	
Progression Factor	1.24	1.27		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	1.0		0.9	1.5	0.3	0.2	0.3		0.3	0.4	
Delay (s)	16.2	17.3		13.2	14.7	12.1	8.4	9.4		8.6	9.8	
Level of Service	B	B		B	B	B	A	A		A	A	
Approach Delay (s)		17.0			13.7			9.3			9.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	11.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
55: Roberts Ave & McMichael Street

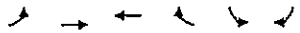


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	6	133	162	35	16	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.84	0.84	0.91	0.91	0.82	0.62
Hourly flow rate (vph)	6	158	178	38	20	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		1050	419			
pX, platoon unblocked						
vC, conflicting volume	216				367	197
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	216				367	197
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				97	99
cM capacity (veh/h)	1353				630	844

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	164	216	28
Volume Left	6	0	22
Volume Right	0	38	6
cSH	1353	1700	666
Volume to Capacity	0.00	0.13	0.04
Queue Length 95th (ft)	0	0	3
Control Delay (s)	0.3	0.0	10.6
Lane LOS	A		B
Approach Delay (s)	0.3	0.0	10.6
Approach LOS			B

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	21.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
110: Roberts Ave & Stokley St



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	3	240	325	3	2	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.90	0.90	0.80	0.80
Hourly flow rate (vph)	3	264	361	3	2	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		535				
pX, platoon unblocked						
vC, conflicting volume	376				639	368
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	376				639	368
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	99
cM capacity (veh/h)	1183				439	677

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	267	376	8
Volume Left	3	0	2
Volume Right	0	214	5
cSH	1183	1700	574
Volume to Capacity	0.00	0.22	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.1	0.0	11.4
Lane LOS	A		B
Approach Delay (s)	0.1	0.0	11.4
Approach LOS			B

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	27.9%	ICU Level of Service	A
Analysis Period (min)	15		

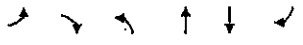
HCM Unsignalized Intersection Capacity Analysis
120: Abbottsford Ave & Stokley St

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	567	4	0	0	5	13
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.92	0.92	0.83	0.83
Hourly flow rate (vph)	644	5	0	0	6	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	542					
pX, platoon unblocked			0.87		0.87	0.87
vC, conflicting volume			649		647	647
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			524		521	521
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	97
cM capacity (veh/h)			909		449	484

Direction, Lane #	EB 1	NB 1
Volume Total	649	16
Volume Left	0	0
Volume Right	5	16
cSH	1700	484
Volume to Capacity	0.38	0.03
Queue Length 95th (ft)	0	3
Control Delay (s)	0.0	12.7
Lane LOS		B
Approach Delay (s)	0.0	12.7
Approach LOS		B

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
180: Abbottsford Ave & Wissahickon Ave



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	333	0	560	244	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.94	0.94	0.92	0.92
Hourly flow rate (vph)	0	358	0	596	265	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1046		
pX, platoon unblocked						
vC, conflicting volume	563	133	265			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	563	133	265			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	60	100			
cM capacity (veh/h)	461	899	1310			

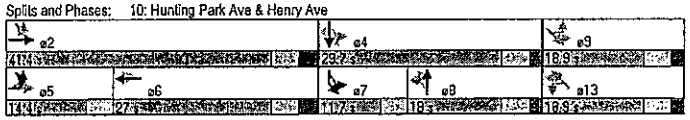
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	358	1298	298	133	133
Volume Left	0	0	0	0	0
Volume Right	358	0	0	0	0
cSH	899	1700	1700	1700	1700
Volume to Capacity	0.40	0.18	0.18	0.08	0.08
Queue Length 95th (ft)	48	0	0	0	0
Control Delay (s)	11.6	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.6	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	34.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL2	EBL	EBT	WBT	WBR	NBL2	NBL	NBT	SBL2	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	223	208	190	41	1	8	59	20	69	71	174
Lane Group Flow (vph)	0	162	359	211	90	0	0	106	0	100	80	235
Turn Type	pm+pt	pm+pt			Perm	Perm	Perm		pm+pt	pm+pt		Perm
Protected Phases	5	5	2	6				8	7	7	4	
Permitted Phases	2	2			6	8	8		4	4	4	4
Minimum Split (s)	7.6	7.6	10.3	10.3	10.3	9.4	9.4	9.4	9.4	9.4	9.4	9.4
Total Split (s)	14.4	14.4	41.4	27.0	27.0	18.0	18.0	18.0	11.7	11.7	29.7	29.7
Total Split (%)	16.0%	16.0%	46.0%	30.0%	30.0%	20.0%	20.0%	20.0%	13.0%	13.0%	33.0%	33.0%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	0.0	0.0	2.7	2.7	2.7	1.8	1.8	1.8	0.0	0.0	1.8	1.8
Lost Time Adjust (s)	0.4	0.4	2.3	2.3	2.3	0.0	1.4	1.4	0.4	0.4	1.4	1.4
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	5.4	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead			Lag	Lag	Lag	Lag	Lead	Lead		
Lead-Lag Optimize?												
v/c Ratio		0.37	0.27	0.25	0.22			0.38		0.30	0.15	0.29
Control Delay		19.9	18.0	46.2	36.8			37.6		22.6	20.6	19.1
Queue Delay		0.0	0.0	0.0	0.0			0.0		0.0	0.0	0.0
Total Delay		19.9	18.0	46.2	36.8			37.6		22.6	20.6	19.1
Queue Length 50th (ft)		63	71	66	37			53		32	26	36
Queue Length 95th (ft)		113	104	101	m81			86		69	50	58
Internal Link Dist (ft)		658	1975		250			407		1653		
Turn Bay Length (ft)		450			250					150		415
Base Capacity (vph)		438	1353	853	414			280		336	550	813
Starvation Cap Reductn		0	0	0	0			0		0	0	0
Spillback Cap Reductn		0	0	0	0			0		0	0	0
Storage Cap Reductn		0	0	0	0			0		0	0	0
Reduced v/c Ratio		0.37	0.27	0.25	0.22			0.38		0.30	0.15	0.29

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:EBT, Start of Green, Master Intersection
Natural Cycle: 50
Control Type: Pretimed
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Hunting Park Ave & Henry Ave



Lane Group	SEL2	SEL	SET	NWL2	NWL	NWT	SBR
Lane Configurations							
Volume (vph)	17	41	98	57	36	77	
Lane Group Flow (vph)	0	66	168	0	46	158	
Turn Type	custom	custom		custom	custom		custom
Protected Phases							
Permitted Phases	9	9	9	13	13	13	
Minimum Split (s)	9.4	9.4	9.4	9.4	9.4	9.4	
Total Split (s)	18.9	18.9	18.9	18.9	18.9	18.9	
Total Split (%)	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	
All-Red Time (s)	1.8	1.8	1.8	1.8	1.8	1.8	
Lost Time Adjust (s)	1.4	1.4	1.4	0.0	1.4	1.4	
Total Lost Time (s)	4.0	4.8	4.0	5.4	4.0	4.0	
Lead/Lag							
Lead-Lag Optimize?							
v/c Ratio		0.42	0.56		0.32	0.56	
Control Delay		43.0	41.8		40.1	42.6	
Queue Delay		0.0	0.0		0.0	0.0	
Total Delay		43.0	41.8		40.1	42.6	
Queue Length 50th (ft)		34	87		23	83	
Queue Length 95th (ft)		74	149		56	140	
Internal Link Dist (ft)			1387			1698	
Turn Bay Length (ft)		105			105		
Base Capacity (vph)		157	302		143	283	
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	0.56		0.32	0.56	

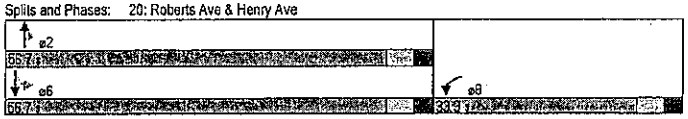
Intersection Summary

Lanes, Volumes, Timings
20: Roberts Ave & Henry Ave

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations					
Volume (vph)	126	309	117	27	255
Lane Group Flow (vph)	195	359	136	29	277
Turn Type			Perm	Perm	
Protected Phases	8	2			6
Permitted Phases			2	6	
Minimum Split (s)	33.3	10.3	10.3	10.3	10.3
Total Split (s)	33.3	56.7	56.7	56.7	56.7
Total Split (%)	37.0%	63.0%	63.0%	63.0%	63.0%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7
Lost Time Adjust (s)	-2.3	-2.3	-2.3	-2.3	-2.3
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag					
Lead-Lag Optimize?					
v/c Ratio	0.31	0.17	0.14	0.05	0.13
Control Delay	21.8	6.5	1.2	5.0	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	21.8	6.5	1.2	5.0	5.1
Queue Length 50th (ft)	72	27	0	3	16
Queue Length 95th (ft)	124	37	5	9	23
Internal Link Dist (ft)	970	1653			767
Turn Bay Length (ft)			250	130	
Base Capacity (vph)	623	2162	993	581	2072
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.31	0.17	0.14	0.05	0.13

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 45
Control Type: Pretimed

Splits and Phases: 20: Roberts Ave & Henry Ave

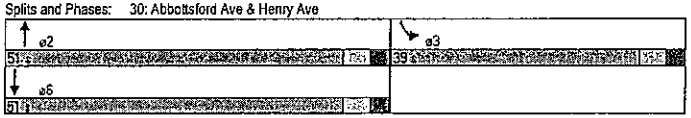


Lanes, Volumes, Timings
30: Abbottsford Ave & Henry Ave

Lane Group	NBT	SBL	SBT
Lane Configurations			
Volume (vph)	252	178	228
Lane Group Flow (vph)	332	187	240
Turn Type		Custom	
Protected Phases	2	3	6
Permitted Phases		3	
Minimum Split (s)	22.3	10.3	22.3
Total Split (s)	51.0	39.0	51.0
Total Split (%)	56.7%	43.3%	56.7%
Yellow Time (s)	3.6	3.6	3.6
All-Red Time (s)	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3
Lead/Lag			
Lead-Lag Optimize?			
v/c Ratio	0.19	0.29	0.14
Control Delay	14.1	22.0	12.5
Queue Delay	0.0	0.0	0.0
Total Delay	14.1	22.0	12.5
Queue Length 50th (ft)	52	74	36
Queue Length 95th (ft)	75	127	57
Internal Link Dist (ft)	767		576
Turn Bay Length (ft)		200	
Base Capacity (vph)	1740	643	1759
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.19	0.29	0.14

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 40
Control Type: Pretimed

Splits and Phases: 30: Abbottsford Ave & Henry Ave

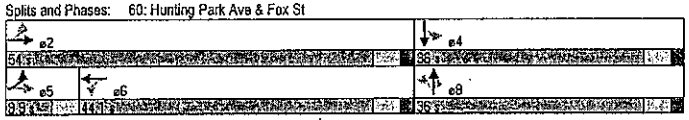


Lanes, Volumes, Timings
60: Hunting Park Ave & Fox St

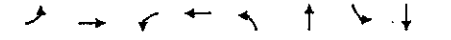
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	67	404	116	391	4	306	148	12	273
Lane Group Flow (vph)	76	461	138	505	4	333	161	14	374
Turn Type	pm+pt		Perm		Perm		Perm	Perm	
Protected Phases	5	2		6		8			4
Permitted Phases	2		6		8		8	4	
Minimum Split (s)	7.6	9.4	9.4	9.4	20.0	20.0	20.0	20.0	20.0
Total Split (s)	9.9	54.0	44.1	44.1	36.0	36.0	36.0	36.0	36.0
Total Split (%)	11.0%	60.0%	49.0%	49.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	0.0	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Lost Time Adjust (s)	0.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead		Lag	Lag					
Lead-Lag Optimize?	Yes		Yes	Yes					
v/c Ratio	0.17	0.24	0.36	0.34	0.02	0.50	0.24	0.05	0.57
Control Delay	15.6	16.8	21.6	18.2	19.2	25.9	5.3	19.9	26.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.6	16.8	21.6	18.2	19.2	25.9	5.3	19.9	26.6
Queue Length 50th (ft)	27	92	66	123	1	146	4	5	163
Queue Length 95th (ft)	53	125	113	154	9	227	44	18	245
Internal Link Dist (ft)		1975		1584		899			1718
Turn Bay Length (ft)	100		100		100		100	105	
Base Capacity (vph)	439	1899	387	1498	234	869	667	267	660
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.24	0.36	0.34	0.02	0.50	0.24	0.05	0.57

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 45
Control Type: Pretimed

Splits and Phases: 60: Hunting Park Ave & Fox St



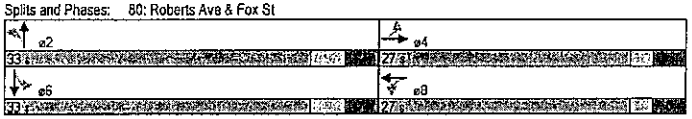
Lanes, Volumes, Timings
80: Roberts Ave & Fox St



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	19	116	133	145	25	229	7	186
Lane Group Flow (vph)	24	165	143	212	0	435	0	261
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Minimum Split (s)	9.0	9.0	9.0	9.0	10.0	10.0	10.0	10.0
Total Split (s)	27.0	27.0	27.0	27.0	33.0	33.0	33.0	33.0
Total Split (%)	45.0%	45.0%	45.0%	45.0%	55.0%	55.0%	55.0%	55.0%
Yellow Time (s)	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag								
Lead-Lag Optimize?								
v/c Ratio	0.06	0.23	0.30	0.28		0.45		0.26
Control Delay	12.2	12.6	10.8	7.9		10.6		11.5
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	12.2	12.6	10.8	7.9		10.6		11.5
Queue Length 50th (ft)	5	36	22	25		82		43
Queue Length 95th (ft)	16	62	44	49		134		76
Internal Link Dist (ft)		339		455		1718		932
Turn Bay Length (ft)	105		105					
Base Capacity (vph)	429	709	476	769		975		986
Starvation Cap Reductn	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0		0		0
Reduced v/c Ratio	0.06	0.23	0.30	0.28		0.45		0.26

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 40
Control Type: Pretimed

Splits and Phases: 80: Roberts Ave & Fox St

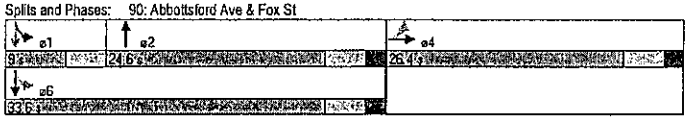


Lanes, Volumes, Timings
90: Abbottsford Ave & Fox St

Lane Group	EBT	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	247	224	259	214
Lane Group Flow (vph)	351	374	282	233
Turn Type			pm+pt	
Protected Phases	4	2	1	6
Permitted Phases			6	
Minimum Split (s)	9.4	9.4	7.6	9.4
Total Split (s)	26.4	24.6	9.0	33.6
Total Split (%)	44.0%	41.0%	15.0%	56.0%
Yellow Time (s)	3.6	3.6	3.6	3.6
All-Red Time (s)	1.8	1.8	0.0	1.8
Lost Time Adjust (s)	1.4	1.4	0.4	1.4
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?				
v/c Ratio	0.25	0.33	0.61	0.26
Control Delay	13.4	23.5	15.9	8.5
Queue Delay	0.0	0.0	1.4	1.1
Total Delay	13.4	23.5	17.3	9.6
Queue Length 50th (ft)	43	68	47	38
Queue Length 95th (ft)	69	100	94	69
Internal Link Dist (ft)	1415	932		119
Turn Bay Length (ft)				
Base Capacity (vph)	1378	1132	459	906
Starvation Cap Reductn	0	0	61	454
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.25	0.33	0.71	0.52

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 40
Control Type: Pretimed

Splits and Phases: 90: Abbottsford Ave & Fox St

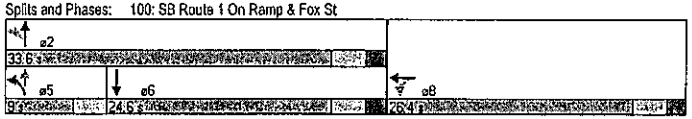


Lanes, Volumes, Timings
100: SB Route 1 On Ramp & Fox St

Lane Group	WBT	WBR	NBT	SBT
Lane Configurations				
Volume (vph)	201	133	123	25
Lane Group Flow (vph)	681	180	166	379
Turn Type		pm+pt		
Protected Phases	8	5	2	6
Permitted Phases		2		5
Minimum Split (s)	8.8	7.0	8.8	8.8
Total Split (s)	26.4	9.0	33.6	24.6
Total Split (%)	44.0%	15.0%	56.0%	41.0%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.8	0.0	1.8	1.8
Lost Time Adjust (s)	0.8	1.0	0.8	0.8
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag		Lead		Lag
Lead-Lag Optimize?				
v/c Ratio	0.45	0.40	0.19	0.34
Control Delay	9.6	10.0	4.4	15.7
Queue Delay	0.0	0.4	0.6	0.0
Total Delay	9.6	10.4	5.0	15.7
Queue Length 50th (ft)	54	16	14	52
Queue Length 95th (ft)	84	22	21	83
Internal Link Dist (ft)	377		119	792
Turn Bay Length (ft)				
Base Capacity (vph)	1515	448	868	1123
Starvation Cap Reductn	0	61	436	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.45	0.47	0.37	0.34

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 40
Control Type: Pretimed

Splits and Phases: 100: SB Route 1 On Ramp & Fox St



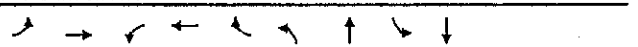
Lanes, Volumes, Timings
160: Hunting Park Ave & Wissahickon Ave

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations								
Volume (vph)	90	431	434	21	125	224	204	65
Lane Group Flow (vph)	95	454	609	0	180	246	224	71
Turn Type	pm+pt		Perm		pm+pt			Perm
Protected Phases	5	2	6		8	7	4	
Permitted Phases	2			8		4		4
Minimum Split (s)	7.6	9.4	9.4	9.4	9.4	7.6	9.4	9.4
Total Split (s)	10.8	54.0	43.2	21.6	21.6	14.4	36.0	36.0
Total Split (%)	12.0%	60.0%	48.0%	24.0%	24.0%	16.0%	40.0%	40.0%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	0.0	1.8	1.8	1.8	1.8	0.0	1.8	1.8
Lost Time Adjust (s)	1.0	1.4	1.4	1.4	1.4	1.0	1.4	1.4
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead		Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes		
v/c Ratio	0.24	0.23	0.36		0.30	0.56	0.34	0.12
Control Delay	8.2	6.7	15.6		32.5	28.2	23.2	5.6
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	8.2	6.7	15.6		32.5	28.2	23.2	5.6
Queue Length 50th (ft)	13	32	103		46	104	92	0
Queue Length 95th (ft)	30	54	144		75	169	152	27
Internal Link Dist (ft)		1584	1151		484		2048	
Turn Bay Length (ft)	85							275
Base Capacity (vph)	404	1939	1700		602	426	553	601
Starvation Cap Reductn	0	0	0		0	0	0	0
Spillback Cap Reductn	0	0	0		0	0	0	0
Storage Cap Reductn	0	0	0		0	0	0	0
Reduced v/c Ratio	0.24	0.23	0.36		0.30	0.58	0.34	0.12

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 16.7 (19%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 40
Control Type: Pretimed

Splits and Phases: 160: Hunting Park Ave & Wissahickon Ave

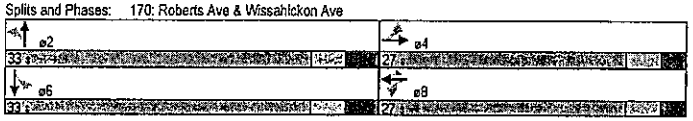
Lanes, Volumes, Timings
170: Roberts Ave & Wissahickon Ave



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	66	162	59	231	124	17	340	29	396
Lane Group Flow (vph)	69	214	78	262	141	18	416	30	531
Turn Type	Perm		Perm		Perm	Perm		Perm	
Protected Phases		4		8			2		6
Permitted Phases	4		8		8	2		6	
Minimum Split (s)	9.4	9.4	9.4	9.4	9.4	10.0	10.0	10.0	10.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	33.0	33.0	33.0	33.0
Total Split (%)	45.0%	45.0%	45.0%	45.0%	45.0%	55.0%	55.0%	55.0%	55.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.4	2.4	2.4	2.4	2.4	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	1.4	1.4	1.4	1.4	1.4	2.0	2.0	2.0	2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag									
Lead-Lag Optimize?									
v/c Ratio	0.18	0.30	0.18	0.37	0.20	0.05	0.24	0.07	0.31
Control Delay	17.0	17.0	13.8	15.2	3.5	8.7	8.8	8.9	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.0	17.0	13.8	15.2	3.5	8.7	8.8	8.9	8.2
Queue Length 50th (ft)	18	59	18	66	0	3	39	15	45
Queue Length 95th (ft)	m45	106	43	114	27	12	63	17	72
Internal Link Dist (ft)		1436		740			2049		986
Turn Bay Length (ft)	100		150			100		65	
Base Capacity (vph)	384	710	426	714	694	385	1696	453	1699
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.30	0.18	0.37	0.20	0.05	0.24	0.07	0.31

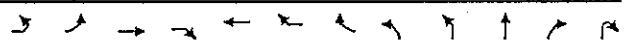
Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 20 (33%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 40
Control Type: Pretimed
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 170: Roberts Ave & Wissahickon Ave



2007 NO BUILD: SAT PEAK

VOLLMER

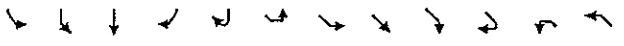


Movement	EBL2	EBL	EBT	EBR	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	NBR2
Lane Configurations												
Volume (vph)	23	236	220	29	201	43	42	1	8	63	10	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	10	10	12	12	12	13	12	12
Total Lost time (s)		4.0	4.0		4.0	4.0				4.0		
Lane Util. Factor		0.91	0.91		0.95	1.00				1.00		
Frt		1.00	0.99		1.00	0.85				0.98		
Flt Protected		0.95	0.99		1.00	1.00				1.00		
Satd. Flow (prot)		1588	3253		3336	1492				1835		
Flt Permitted		0.49	0.46		1.00	1.00				0.97		
Satd. Flow (perm)		827	1502		3336	1492				1786		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.90	0.90	0.90	0.92	0.77	0.77	0.77	0.77
Adj. Flow (vph)	25	257	239	32	223	48	47	1	10	82	13	6
RTOR Reduction (vph)	0	0	0	0	0	35	0	0	0	3	0	0
Lane Group Flow (vph)	0	171	382	0	223	60	0	0	0	109	0	0
Heavy Vehicles (%)	0%	0%	0%	0%	1%	11%	1%	2%	4%	4%	4%	4%
Turn Type	pm+pt	pm+pt				Perm		Perm	Perm			
Protected Phases	5	5	2		6					8		
Permitted Phases	2	2	5			6		8	8			
Actuated Green, G (s)		35.1	35.1		20.7	20.7				12.6		
Effective Green, g (s)		34.7	37.4		23.0	23.0				14.0		
Actuated g/C Ratio		0.39	0.42		0.26	0.26				0.16		
Clearance Time (s)		3.6	6.3		6.3	6.3				5.4		
Lane Grp Cap (vph)		407	1352		853	381				278		
v/s Ratio Prot		c0.05	0.12		0.07							
v/s Ratio Perm		c0.11				0.04				c0.06		
v/c Ratio		0.42	0.28		0.26	0.16				0.39		
Uniform Delay, d1		19.2	17.4		26.7	26.0				34.2		
Progression Factor		1.00	1.00		1.69	2.32				1.00		
Incremental Delay, d2		3.2	0.5		0.7	0.6				4.1		
Delay (s)		22.4	17.9		45.8	61.2				38.3		
Level of Service		C	B		D	E				D		
Approach Delay (s)			19.3			50.4				38.3		
Approach LOS			B			D				D		

Intersection Summary				
HCM Average Control Delay	32.1	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.43			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	59.8%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Hunting Park Ave & Henry Ave



Movement	SBL2	SBL	SBT	SBR	SBR2	SEL2	SEL	SET	SER	SER2	NWL2	NWL
Lane Configurations												
Volume (vph)	21	73	75	184	39	18	43	104	46	8	5	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	13	12	12	12	12	13	12	12	12	12
Total Lost time (s)		4.0	4.0	4.0			4.0	4.0				4.0
Lane Util. Factor		1.00	1.00	0.88			1.00	1.00				1.00
Frt		1.00	1.00	0.85			1.00	0.95				1.00
Flt Protected		0.95	1.00	1.00			0.95	1.00				0.95
Satd. Flow (prot)		1829	1925	2787			1752	1811				1681
Flt Permitted		0.45	1.00	1.00			0.49	1.00				0.46
Satd. Flow (perm)		864	1925	2787			905	1811				816
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.92	0.88	0.88	0.88	0.88	0.92	0.92	0.87
Adj. Flow (vph)	24	82	84	207	42	20	49	118	51	9	5	44
RTOR Reduction (vph)	0	0	0	17	0	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	106	84	232	0	0	69	175	0	0	0	49
Heavy Vehicles (%)	2%	2%	2%	2%	2%	33%	3%	3%	3%	2%	2%	8%
Turn Type	pm+pt	pm+pt		Perm		Perm	Perm				Perm	Perm
Protected Phases	7	7	4				9					
Permitted Phases	4	4	4	4		9	9				13	13
Actuated Green, G (s)		24.3	24.3	24.3			13.5	13.5				13.5
Effective Green, g (s)		23.9	25.7	25.7			14.9	14.9				14.9
Actuated g/C Ratio		0.27	0.29	0.29			0.17	0.17				0.17
Clearance Time (s)		3.6	5.4	5.4			5.4	5.4				5.4
Lane Grp Cap (vph)		312	550	796			150	300				135
v/s Ratio Prot		c0.03	0.04					0.10				
v/s Ratio Perm		0.05		0.08			0.08					0.06
v/c Ratio		0.34	0.15	0.29			0.46	0.58				0.36
Uniform Delay, d1		26.2	24.0	25.1			33.9	34.7				33.8
Progression Factor		0.82	0.82	0.80			1.00	1.00				1.00
Incremental Delay, d2		2.9	0.6	0.9			9.8	8.1				7.4
Delay (s)		24.4	20.3	21.0			43.7	42.8				40.7
Level of Service		C	C	C			D	D				D
Approach Delay (s)			21.7					43.1				
Approach LOS			C					D				

Intersection Summary

HCM Signalized Intersection Capacity Analysis
10: Hunting Park Ave & Henry Ave

Movement	NWL	NWR1	NWR2
Lane Configurations			
Volume (vph)	82	59	4
Ideal Flow (vphpl)	1900	1900	1900
Lane Width	13	12	12
Total Lost time (s)	4.0		
Lane Util. Factor	1.00		
Frt	0.93		
Flt Protected	1.00		
Satd. Flow (prot)	1699		
Flt Permitted	1.00		
Satd. Flow (perm)	1699		
Peak-hour factor, PHF	0.87	0.87	0.87
Adj. Flow (vph)	94	68	5
RTOR Reduction (vph)	21	0	0
Lane Group Flow (vph)	166	0	0
Heavy Vehicles (%)	8%	8%	8%
Turn Type			
Protected Phases	13		
Permitted Phases			
Actuated Green, G (s)	13.5		
Effective Green, g (s)	14.9		
Actuated g/C Ratio	0.17		
Clearance Time (s)	5.4		
Lane Grp Cap (vph)	281		
v/s Ratio Prot	c0.10		
v/s Ratio Perm			
v/c Ratio	0.59		
Uniform Delay, d1	34.7		
Progression Factor	1.00		
Incremental Delay, d2	8.8		
Delay (s)	43.6		
Level of Service	D		
Approach Delay (s)	42.9		
Approach LOS	D		

Intersection Summary			
HCM Average Control Delay		HCM Level of Service	
HCM Volume to Capacity ratio			
Actuated Cycle Length (s)		Sum of lost time (s)	
Intersection Capacity Utilization		ICU Level of Service	
Analysis Period (min)			

HCM Signalized Intersection Capacity Analysis
20: Roberts Ave & Henry Ave

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	134	49	328	124	29	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	14	12	13	12	12	12
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		0.95	1.00	1.00	0.95
Frt	0.96		1.00	0.85	1.00	1.00
Flt Protected	0.96		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1866		3693	1599	1770	3539
Flt Permitted	0.96		1.00	1.00	0.52	1.00
Satd. Flow (perm)	1866		3693	1599	967	3539
Peak-hour factor, PHF	0.88	0.88	0.86	0.86	0.92	0.92
Adj. Flow (vph)	152	56	381	144	32	293
RTOR Reduction (vph)	15	0	0	60	0	0
Lane Group Flow (vph)	193	0	381	84	32	293
Heavy Vehicles (%)	1%	1%	1%	1%	2%	2%
Turn Type				Perm	Perm	
Protected Phases	8		2			6
Permitted Phases				2	6	
Actuated Green, G (s)	27.0		50.4	50.4	50.4	50.4
Effective Green, g (s)	29.3		52.7	52.7	52.7	52.7
Actuated g/C Ratio	0.33		0.59	0.59	0.59	0.59
Clearance Time (s)	6.3		6.3	6.3	6.3	6.3
Lane Grp Cap (vph)	607		2162	936	568	2072
v/s Ratio Prot	c0.10		c0.10			0.08
v/s Ratio Perm				0.05	0.03	
v/c Ratio	0.32		0.18	0.09	0.06	0.14
Uniform Delay, d1	22.8		6.6	8.2	8.0	8.4
Progression Factor	1.00		0.73	0.56	0.59	0.58
Incremental Delay, d2	1.4		0.2	0.2	0.2	0.1
Delay (s)	24.2		6.4	4.8	4.9	5.0
Level of Service	C		A	A	A	A
Approach Delay (s)	24.2		6.0			5.0
Approach LOS	C		A			A

Intersection Summary			
HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

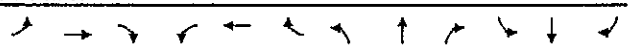
HCM Signalized Intersection Capacity Analysis
30: Abbottsford Ave & Henry Ave

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑		↰	↑↑
Volume (vph)	0	0	267	33	199	242
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.3		6.3	6.3
Lane Util. Factor			0.95		1.00	0.95
Frt			0.98		1.00	1.00
Flt Protected			1.00		0.95	1.00
Satd. Flow (prot)			3461		1770	3539
Flt Permitted			1.00		0.95	1.00
Satd. Flow (perm)			3461		1770	3539
Peak-hour factor, PHF	0.92	0.92	0.85	0.85	0.95	0.95
Adj. Flow (vph)	0	0	314	39	199	255
RTOR Reduction (vph)	0	0	11	0	0	0
Lane Group Flow (vph)	0	0	342	0	199	255
Turn Type					custom	
Protected Phases			2		3	6
Permitted Phases					3	
Actuated Green, G (s)			44.7		32.7	44.7
Effective Green, g (s)			44.7		32.7	44.7
Actuated g/C Ratio			0.50		0.36	0.50
Clearance Time (s)			6.3		6.3	6.3
Lane Grp Cap (vph)			1729		643	1758
v/s Ratio Prot			c0.10		c0.11	0.07
v/s Ratio Perm						
v/c Ratio			0.20		0.31	0.15
Uniform Delay, d1			12.6		20.6	12.3
Progression Factor			1.17		1.00	1.00
Incremental Delay, d2			0.3		1.2	0.2
Delay (s)			15.0		21.8	12.5
Level of Service			B		C	B
Approach Delay (s)	0.0		15.0			16.6
Approach LOS	A		B			B

Intersection Summary			
HCM Average Control Delay	15.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	29.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
60: Hunting Park Ave & Fox St

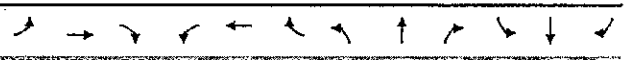


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑		↰	↑↑		↰	↑	↱	↰	↑	
Volume (vph)	71	428	2	123	414	36	14	324	157	13	289	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	12	12	12	12	12	12
Total Lost time (s)	4.0	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	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1711	3419		1694	3347		1787	1881	1599	1787	1833	
Flt Permitted	0.35	1.00		0.47	1.00		0.33	1.00	1.00	0.38	1.00	
Satd. Flow (perm)	636	3419		845	3347		612	1881	1599	708	1833	
Peak-hour factor, PHF	0.88	0.88	0.88	0.84	0.84	0.84	0.92	0.92	0.92	0.88	0.88	0.88
Adj. Flow (vph)	81	486	2	146	493	43	4	352	171	15	328	67
RTOR Reduction (vph)	0	0	0	0	7	0	0	0	97	0	6	0
Lane Group Flow (vph)	81	488	0	146	529	0	4	352	74	15	387	0
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt			Perm			Perm		Perm	Perm		
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	48.6	48.6		38.7	38.7		30.6	30.6	30.6	30.6	30.6	
Effective Green, g (s)	48.2	50.0		40.1	40.1		32.0	32.0	32.0	32.0	32.0	
Actuated g/C Ratio	0.54	0.56		0.45	0.45		0.36	0.36	0.36	0.36	0.36	
Clearance Time (s)	3.6	5.4		5.4	5.4		5.4	5.4	5.4	5.4	5.4	
Lane Grp Cap (vph)	411	1899		376	1491		218	669	569	252	652	
v/s Ratio Prot	0.01	c0.14			0.16			0.19			c0.21	
v/s Ratio Perm	0.09			c0.17			0.01		0.05	0.02		
v/c Ratio	0.20	0.26		0.39	0.35		0.02	0.53	0.13	0.06	0.59	
Uniform Delay, d1	10.7	10.4		16.7	16.4		18.8	23.0	19.6	19.1	23.7	
Progression Factor	1.57	1.58		1.14	1.14		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.1	0.3		2.9	0.5		0.2	2.9	0.5	0.5	3.9	
Delay (s)	17.9	16.7		22.1	19.3		19.0	25.9	20.1	19.5	27.6	
Level of Service	B	B		C	B		B	C	C	B	C	
Approach Delay (s)		16.8			19.9			24.0			27.3	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	21.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
80: Roberts Ave & Fox St

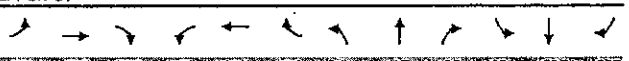


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	23	17	141	154	55	27	243	127	7	197	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.96			0.96			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1770	1829		1805	1947			2013			2060	
Flt Permitted	0.58	1.00		0.65	1.00			0.97			0.99	
Satd. Flow (perm)	1087	1829		1229	1947			1954			2035	
Peak-hour factor, PHF	0.80	0.80	0.80	0.93	0.93	0.93	0.86	0.86	0.86	0.89	0.89	0.89
Adj. Flow (vph)	25	154	21	152	166	59	31	283	148	8	221	46
RTOR Reduction (vph)	0	6	0	0	22	0	0	28	0	0	12	0
Lane Group Flow (vph)	25	167	0	152	203	0	0	434	0	0	263	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	22.0	22.0		22.0	22.0			27.0			27.0	
Effective Green, g (s)	23.0	23.0		23.0	23.0			29.0			29.0	
Actuated g/C Ratio	0.38	0.38		0.38	0.38			0.48			0.48	
Clearance Time (s)	5.0	5.0		5.0	5.0			6.0			6.0	
Lane Grp Cap (vph)	417	701		471	746			944			984	
v/s Ratio Prot		0.09			0.10							
v/s Ratio Perm	0.02			c0.12				c0.22			0.13	
v/c Ratio	0.06	0.24		0.32	0.27			0.46			0.27	
Uniform Delay, d1	11.7	12.6		13.0	12.7			10.3			9.2	
Progression Factor	1.00	1.00		0.68	0.65			1.00			1.28	
Incremental Delay, d2	0.3	0.8		1.7	0.9			1.6			0.7	
Delay (s)	12.0	13.4		10.6	9.1			11.9			12.4	
Level of Service	B	B		B	A			B			B	
Approach Delay (s)		13.2			9.7			11.9			12.4	
Approach LOS		B			A			B			B	

Intersection Summary				
HCM Average Control Delay	11.6	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.40			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	58.7%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
90: Abbottsford Ave & Fox St

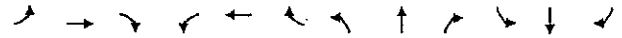


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	262	13	0	0	45	0	237	104	275	227	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	12	12	12	12	12	12	11	12	12
Total Lost time (s)		4.0						4.0		4.0	4.0	
Lane Util. Factor		0.95						0.95		1.00	1.00	
Frt		0.99						0.95		1.00	1.00	
Flt Protected		0.99						1.00		0.95	1.00	
Satd. Flow (prot)		3677						3297		1745	1837	
Flt Permitted		0.99						1.00		0.40	1.00	
Satd. Flow (perm)		3677						3297		735	1837	
Peak-hour factor, PHF	0.89	0.89	0.89	0.92	0.92	0.92	0.86	0.86	0.86	0.92	0.92	0.92
Adj. Flow (vph)	63	294	15	0	0	0	0	276	121	299	247	0
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	367	0	0	0	0	0	397	0	299	247	0
Heavy Vehicles (%)	0%	0%	2%	2%	2%	1%	1%	1%	1%	0%	0%	0%
Turn Type	Perm									pm+pt		
Protected Phases		4						2		1	6	
Permitted Phases	4									6	1	
Actuated Green, G (s)		21.0						19.2		28.2	28.2	
Effective Green, g (s)		22.4						20.6		27.8	29.6	
Actuated g/C Ratio		0.37						0.34		0.46	0.49	
Clearance Time (s)		5.4						5.4		3.6	5.4	
Lane Grp Cap (vph)		1373						1132		425	906	
v/s Ratio Prot								0.12		c0.06	0.13	
v/s Ratio Perm		0.10								0.27		
v/c Ratio		0.27						0.35		0.70	0.27	
Uniform Delay, d1		13.1						14.7		11.9	8.9	
Progression Factor		1.00						1.53		0.99	0.86	
Incremental Delay, d2		0.5						0.8		8.8	0.7	
Delay (s)		13.6						23.3		20.7	8.4	
Level of Service		B						C		C	A	
Approach Delay (s)		13.6			0.0			23.3			15.1	
Approach LOS		B			A			C			B	

Intersection Summary				
HCM Average Control Delay	17.2	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.48			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	57.0%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
100: SB Route 1 On Ramp & Fox St

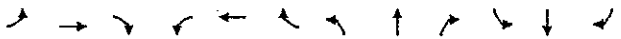


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↱		↰	↑			↑↑↱	
Volume (vph)	0	0	0	228	213	267	141	130	0	0	286	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	15	15	12	11	11	12	12	11	12
Total Lost time (s)					4.0		4.0	4.0			4.0	
Lane Util. Factor					0.95		1.00	1.00			0.95	
Frt					0.94		1.00	1.00			0.96	
Flt Protected					0.98		0.95	1.00			1.00	
Satd. Flow (prot)					3651		1711	1801			3270	
Flt Permitted					0.98		0.40	1.00			1.00	
Satd. Flow (perm)					3651		716	1801			3270	
Peak-hour factor, PHF	0.92	0.92	0.92	0.98	0.98	0.98	0.74	0.74	0.74	0.94	0.94	0.94
Adj. Flow (vph)	0	0	0	233	217	272	191	176	0	0	283	118
RTOR Reduction (vph)	0	0	0	0	151	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	571	0	191	176	0	0	401	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Turn Type				Perm			pm+pt					
Protected Phases					8		5	2			6	
Permitted Phases				8			2	5				
Actuated Green, G (s)					21.6		28.8	28.8			19.8	
Effective Green, g (s)					22.4		27.8	29.6			20.6	
Actuated g/C Ratio					0.37		0.46	0.49			0.34	
Clearance Time (s)					4.8		3.0	4.8			4.8	
Lane Grp Cap (vph)					1363		415	888			1123	
v/s Ratio Prot							c0.04	0.10			0.12	
v/s Ratio Perm					0.16		c0.18					
v/c Ratio					0.42		0.46	0.20			0.36	
Uniform Delay, d1					14.0		10.0	8.5			14.7	
Progression Factor					1.00		0.91	0.45			1.00	
Incremental Delay, d2					0.9		3.5	0.5			0.9	
Delay (s)					14.9		12.6	4.3			15.6	
Level of Service					B		B	A			B	
Approach Delay (s)		0.0			14.9			8.6			15.6	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
160: Hunting Park Ave & Wissahickon Ave

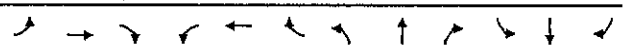


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱			↑↑↱		↰	↑↑↱		↰	↑	↱
Volume (vph)	95	457	0	0	460	160	22	133	13	237	216	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	15	12	11	11	12	11	11	11
Total Lost time (s)	4.0	4.0			4.0			4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			0.95			0.95		1.00	1.00	1.00
Frt	1.00	1.00			0.96			0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00			0.99		0.95	1.00	1.00
Satd. Flow (prot)	1745	3490			3817			3426		1745	1837	1561
Flt Permitted	0.27	1.00			1.00			0.89		0.49	1.00	1.00
Satd. Flow (perm)	503	3490			3817			3074		909	1837	1561
Peak-hour factor, PHF	0.95	0.95	0.95	0.96	0.96	0.96	0.88	0.88	0.88	0.91	0.91	0.91
Adj. Flow (vph)	100	481	0	0	479	167	25	151	15	260	237	76
RTOR Reduction (vph)	0	0	0	0	39	0	0	0	0	0	0	46
Lane Group Flow (vph)	100	481	0	0	607	0	0	191	0	260	237	30
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt				Perm			pm+pt				Perm
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2	5					8			4	7	4
Actuated Green, G (s)	45.6	45.6			34.6			16.2		33.6	33.6	33.6
Effective Green, g (s)	45.2	47.0			36.2			17.6		33.2	35.0	35.0
Actuated g/C Ratio	0.50	0.52			0.40			0.20		0.37	0.39	0.39
Clearance Time (s)	3.6	5.4			5.4			5.4		3.6	5.4	5.4
Lane Grp Cap (vph)	346	1823			1535			601		490	714	607
v/s Ratio Prot	0.02	c0.14			c0.16					c0.08	0.13	
v/s Ratio Perm	0.12							0.06		c0.12		0.02
v/c Ratio	0.29	0.26			0.40			0.32		0.57	0.33	0.05
Uniform Delay, d1	12.8	11.9			19.1			31.1		21.2	19.3	17.1
Progression Factor	0.76	0.66			1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	2.1	0.3			0.8			1.4		5.0	1.2	0.2
Delay (s)	11.8	8.3			19.9			32.4		26.2	20.5	17.3
Level of Service	B	A			B			C		C	C	B
Approach Delay (s)		8.9			19.9			32.4			22.7	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM Average Control Delay	18.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
170: Roberts Ave & Wissahickon Ave

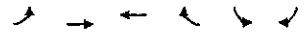


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	193	122	73	245	131	18	360	45	31	420	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1834		1770	1863	1583	1770	3480		1770	3413	
Flt Permitted	0.52	1.00		0.58	1.00	1.00	0.41	1.00		0.49	1.00	
Satd. Flow (perm)	965	1834		1084	1863	1583	761	3480		907	3413	
Peak-hour factor, PHF	0.95	0.95	0.95	0.88	0.88	0.88	0.92	0.92	0.92	0.98	0.98	0.98
Adj. Flow (vph)	74	203	128	83	278	149	20	391	49	32	429	134
RTOR Reduction (vph)	0	7	0	0	0	92	0	16	0	0	50	0
Lane Group Flow (vph)	74	324	0	83	278	57	20	424	0	32	513	0
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	21.6	21.6		21.6	21.6	21.6	27.0	27.0		27.0	27.0	
Effective Green, g (s)	23.0	23.0		23.0	23.0	23.0	29.0	29.0		29.0	29.0	
Actuated g/C Ratio	0.38	0.38		0.38	0.38	0.38	0.48	0.48		0.48	0.48	
Clearance Time (s)	5.4	5.4		5.4	5.4	5.4	6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	370	703		416	714	607	368	1682		438	1650	
v/s Ratio Prot		0.12			c0.15			0.12			c0.15	
v/s Ratio Perm	0.08			0.08		0.04	0.03			0.04		
v/c Ratio	0.20	0.31		0.20	0.39	0.09	0.05	0.25		0.07	0.31	
Uniform Delay, d1	12.4	13.0		12.4	13.4	11.8	8.2	9.1		8.3	9.4	
Progression Factor	1.24	1.26		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	1.1		1.1	1.6	0.3	0.3	0.4		0.3	0.5	
Delay (s)	16.5	17.5		13.4	15.0	12.1	8.5	9.5		8.6	9.9	
Level of Service	B	B		B	B	B	A	A		A	A	
Approach Delay (s)		17.2			13.9			9.4			9.8	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
55: Roberts Ave & McMichael Street



Movement	EBL	EBR	EBT	WBL	WBT	WBR	SBL	SBR
Lane Configurations								
Volume (veh/h)	6	41	172	37	23	6		
Sign Control			Free		Free		Stop	
Grade			0%		0%		0%	
Peak Hour Factor	0.84	0.84	0.91	0.91	0.82	0.82		
Hourly flow rate (vph)	6	48	189	41	28	6		
Pedestrians								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type			None		None			
Median storage veh)								
Upstream signal (ft)			1050		419			
pX, platoon unblocked								
vC, conflicting volume	230						389	209
vC1, stage 1 conf vol								
vC2, stage 2 conf vol								
vCu, unblocked vol	230						389	209
tC, single (s)	4.1						6.4	6.2
tC, 2 stage (s)								
tF (s)	2.2						3.5	3.3
p0 queue free %	100						96	99
cM capacity (veh/h)	1338						612	831

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	174	230	29
Volume Left	6	0	23
Volume Right	48	41	6
cSH	1338	1700	647
Volume to Capacity	0.00	0.14	0.05
Queue Length 95th (ft)	0	0	4
Control Delay (s)	0.3	0.0	10.8
Lane LOS	A		B
Approach Delay (s)	0.3	0.0	10.8
Approach LOS			B

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	21.5%	ICU Level of Service	A
Analysis Period (min)	15		

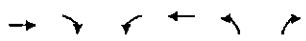
HCM Unsignalized Intersection Capacity Analysis
110: Roberts Ave & Stokley St

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	3	254	345	14	2	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.90	0.90	0.80	0.80
Hourly flow rate (vph)	3	279	383	16	2	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		535				
pX, platoon unblocked						
vC, conflicting volume	399				677	391
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	399				677	391
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	99
cM capacity (veh/h)	1160				417	657

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	282	399	8
Volume Left	3	0	2
Volume Right	0	16	5
cSH	1160	1700	552
Volume to Capacity	0.00	0.23	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.1	0.0	11.6
Lane LOS	A		B
Approach Delay (s)	0.1	0.0	11.6
Approach LOS			B

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	29.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
120: Abbottsford Ave & Stokley St



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	601	4	0	0	0	14
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.92	0.92	0.83	0.83
Hourly flow rate (vph)	683	5	0	0	0	17
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage veh)						
Upstream signal (ft)	542					
pX, platoon unblocked			0.85		0.85	0.85
vC, conflicting volume			688		685	685
vC1, stage 1 conf vol						
vC2, stage 2 conf vol			546		543	543
vCu, unblocked vol			546		543	543
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	96
cM capacity (veh/h)			871		426	459

Direction, Lane #	EB 1	NB 1
Volume Total	688	17
Volume Left	0	0
Volume Right	5	17
cSH	1700	459
Volume to Capacity	0.40	0.04
Queue Length 95th (ft)	0	3
Control Delay (s)	0.0	13.1
Lane LOS		B
Approach Delay (s)	0.0	13.1
Approach LOS		B

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	41.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
180: Abbottsford Ave & Wissahickon Ave

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	353	0	594	269	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.94	0.94	0.92	0.92
Hourly flow rate (vph)	0	380	0	632	292	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage veh)						
Upstream signal (ft)			1046			
pX, platoon unblocked						
vC, conflicting volume	597	141	282			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	597	141	282			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	57	100			
cM capacity (veh/h)	439	888	1293			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	380	316	316	141	141
Volume Left	0	0	0	0	0
Volume Right	380	0	0	0	0
cSH	888	1700	1700	1700	1700
Volume to Capacity	0.43	0.19	0.19	0.08	0.08
Queue Length 95th (ft)	54	0	0	0	0
Control Delay (s)	12.0	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	12.0	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	35.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL2	EBL	EBT	WBT	WBR	NBL2	NBL	NBT	SBL2	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	236	220	201	43	11	8	63	21	73	75	184
Lane Group Flow (vph)	0	171	382	223	95	0	0	112	0	106	84	249
Turn Type		pm+pt	pm+pt		Perm	Perm	Perm		pm+pt	pm+pt		Perm
Protected Phases	5	5	2	6				8	7	7	4	
Permitted Phases	2	2	5		6	8	8		4	4	4	4
Minimum Split (s)	7.6	7.6	10.3	10.3	10.3	9.4	9.4	9.4	9.4	9.4	9.4	9.4
Total Split (s)	14.4	14.4	41.4	27.0	27.0	18.0	18.0	18.0	11.7	11.7	29.7	29.7
Total Split (%)	16.0%	16.0%	46.0%	30.0%	30.0%	20.0%	20.0%	20.0%	13.0%	13.0%	33.0%	33.0%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	0.0	0.0	2.7	2.7	2.7	1.8	1.8	1.8	0.0	0.0	1.8	1.8
Lost Time Adjust (s)	0.4	0.4	-2.3	-2.3	-2.3	0.0	-1.4	-1.4	0.4	0.4	-1.4	-1.4
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	5.4	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead		Lag	Lag	Lead	Lag	Lag	Lead	Lead		
Lead-Lag Optimize?												
v/c Ratio	0.40	0.28	0.26	0.23			0.40		0.32	0.15	0.31	
Control Delay	20.3	18.1	46.3	36.5			38.1		22.9	20.6	19.3	
Queue Delay	0.0	0.0	0.0	0.0			0.0		0.0	0.0	0.0	
Total Delay	20.3	18.1	46.3	36.5			38.1		22.9	20.6	19.3	
Queue Length 50th (ft)	68	76	170	30			55		34	27	39	
Queue Length 95th (ft)	118	112	105	m84			90		76	51	61	
Internal Link Dist (ft)		658	1975				2407			653		
Turn Bay Length (ft)	450			250					150		415	
Base Capacity (vph)	432	1352	853	416			280		329	550	813	
Starvation Cap Reductn	0	0	0	0			0		0	0	0	
Spillback Cap Reductn	0	0	0	0			0		0	0	0	
Storage Cap Reductn	0	0	0	0			0		0	0	0	
Reduced v/c Ratio	0.40	0.28	0.26	0.23			0.40		0.32	0.15	0.31	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

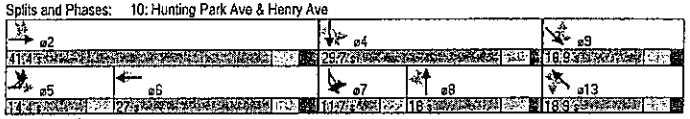
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green, Master Intersection

Natural Cycle: 50

Control Type: Pretimed

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Hunting Park Ave & Henry Ave



Lane Group	SEL2	SEL	SET	NWL2	NWL	NWT	NWR
Lane Configurations							
Volume (vph)	18	43	104	5	36	82	
Lane Group Flow (vph)	0	69	178	0	49	167	
Turn Type	Perm	Perm		Perm	Perm		
Protected Phases			9			13	
Permitted Phases	9	9		13	13		
Minimum Split (s)	9.4	9.4	9.4	9.4	9.4	9.4	
Total Split (s)	18.9	18.9	18.9	18.9	18.9	18.9	
Total Split (%)	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	
All-Red Time (s)	1.8	1.8	1.8	1.8	1.8	1.8	
Lost Time Adjust (s)	-1.4	-1.4	-1.4	0.0	-1.4	-1.4	
Total Lost Time (s)	4.0	4.0	4.0	5.4	4.0	4.0	
Lead/Lag							
Lead-Lag Optimize?							
v/c Ratio	0.46	0.59			0.36	0.59	
Control Delay	45.1	43.0			42.0	44.1	
Queue Delay	0.0	0.0			0.0	0.0	
Total Delay	45.1	43.0			42.0	44.1	
Queue Length 50th (ft)	36	93			25	88	
Queue Length 95th (ft)	77	156			59	148	
Internal Link Dist (ft)		1387				698	
Turn Bay Length (ft)	105				105		
Base Capacity (vph)	150	302			135	282	
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	0.46	0.59			0.36	0.59	

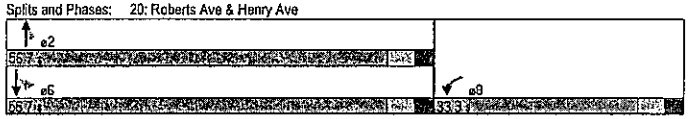
Intersection Summary

Lanes, Volumes, Timings
20: Roberts Ave & Henry Ave

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations					
Volume (vph)	134	328	124	29	270
Lane Group Flow (vph)	208	381	144	32	293
Turn Type			Perm	Perm	
Protected Phases	8	2			6
Permitted Phases			2	6	
Minimum Split (s)	33.3	10.3	10.3	10.3	10.3
Total Split (s)	33.3	56.7	56.7	56.7	56.7
Total Split (%)	37.0%	63.0%	63.0%	63.0%	63.0%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7
Lost Time Adjust (s)	2.3	2.3	2.3	2.3	2.3
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag					
Lead-Lag Optimize?					
v/c Ratio	0.33	0.18	0.14	0.06	0.14
Control Delay	22.3	7.5	2.2	5.1	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	22.3	7.5	2.2	5.1	5.1
Queue Length 50th (ft)	79	28	0	4	16
Queue Length 95th (ft)	133	54	19	9	24
Internal Link Dist (ft)	970	1653			767
Turn Bay Length (ft)			250	130	
Base Capacity (vph)	623	2162	996	566	2072
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.33	0.18	0.14	0.06	0.14

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 45
Control Type: Pretimed

Splits and Phases: 20: Roberts Ave & Henry Ave

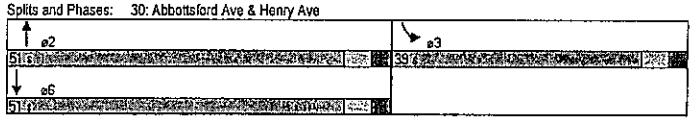


Lanes, Volumes, Timings
30: Abbottsford Ave & Henry Ave

Lane Group	NBT	SBL	SBT
Lane Configurations			
Volume (vph)	267	189	242
Lane Group Flow (vph)	353	199	255
Turn Type		Custom	
Protected Phases	2	3	6
Permitted Phases		3	
Minimum Split (s)	22.3	10.3	22.3
Total Split (s)	51.0	39.0	51.0
Total Split (%)	56.7%	43.3%	56.7%
Yellow Time (s)	3.6	3.6	3.6
All-Red Time (s)	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3
Lead/Lag			
Lead-Lag Optimize?			
v/c Ratio	0.20	0.31	0.15
Control Delay	13.2	22.2	12.6
Queue Delay	0.0	0.0	0.0
Total Delay	13.2	22.2	12.6
Queue Length 50th (ft)	55	80	39
Queue Length 95th (ft)	68	134	61
Internal Link Dist (ft)	767		576
Turn Bay Length (ft)		200	
Base Capacity (vph)	1738	643	1759
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.20	0.31	0.15

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 40
Control Type: Pretimed

Splits and Phases: 30: Abbottsford Ave & Henry Ave

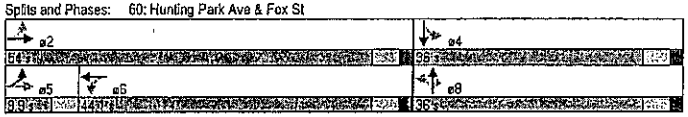


Lanes, Volumes, Timings
60: Hunting Park Ave & Fox St

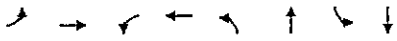
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	71	428	123	414	4	324	157	13	289
Lane Group Flow (vph)	81	488	146	536	4	352	171	15	395
Turn Type	Prot		Perm		Perm		Perm	Perm	
Protected Phases	5	2		6		8			4
Permitted Phases	2		6		8		8	4	
Minimum Split (s)	7.6	9.4	9.4	9.4	20.0	20.0	20.0	20.0	20.0
Total Split (s)	9.9	54.0	44.1	44.1	36.0	36.0	36.0	36.0	36.0
Total Split (%)	11.0%	60.0%	49.0%	49.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	0.0	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Lost Time Adjust (s)	0.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead		Lag	Lag					
Lead-Lag Optimize?	Yes		Yes	Yes					
v/c Ratio	0.19	0.25	0.39	0.36	0.02	0.53	0.25	0.06	0.60
Control Delay	16.3	17.2	23.1	19.1	19.2	26.5	5.8	20.1	27.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.3	17.2	23.1	19.1	19.2	26.5	5.8	20.1	27.5
Queue Length 50th (ft)	28	98	74	137	1	156	7	6	175
Queue Length 95th (ft)	57	133	120	170	9	241	49	19	262
Internal Link Dist (ft)		1975		1584		899			1718
Turn Bay Length (ft)	100		100		100		100	105	
Base Capacity (vph)	424	1999	376	1498	216	669	666	252	660
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.25	0.39	0.36	0.02	0.53	0.25	0.06	0.60

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 45
Control Type: Pretimed

Splits and Phases: 60: Hunting Park Ave & Fox St



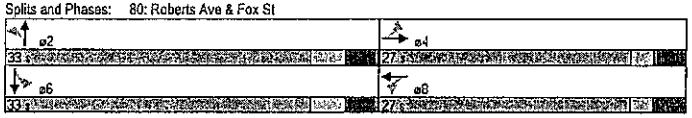
Lanes, Volumes, Timings
80: Roberts Ave & Fox St



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	20	123	141	154	27	243	7	197
Lane Group Flow (vph)	25	175	152	225	0	462	0	275
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Minimum Split (s)	9.0	9.0	9.0	9.0	10.0	10.0	10.0	10.0
Total Split (s)	27.0	27.0	27.0	27.0	33.0	33.0	33.0	33.0
Total Split (%)	45.0%	45.0%	45.0%	45.0%	55.0%	55.0%	55.0%	55.0%
Yellow Time (s)	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	1.0	1.0	1.0	1.0	2.0	2.0	2.0	2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag								
Lead-Lag Optimize?								
v/c Ratio	0.06	0.25	0.32	0.29		0.47		0.28
Control Delay	12.3	12.8	11.0	8.1		11.0		11.7
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	12.3	12.8	11.0	8.1		11.0		11.7
Queue Length 50th (ft)	6	38	24	27		90		46
Queue Length 95th (ft)	16	66	47	52		145		80
Internal Link Dist (ft)		1339		455		1718		932
Turn Bay Length (ft)	105		105					
Base Capacity (vph)	416	709	471	768		974		995
Starvation Cap Reductn	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0		0		0
Reduced v/c Ratio	0.06	0.25	0.32	0.29		0.47		0.28

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 40
Control Type: Pretimed

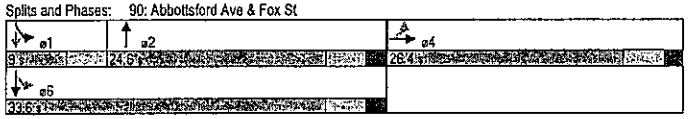
Splits and Phases: 80: Roberts Ave & Fox St



Lane Group	EBT	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	262	237	275	227
Lane Group Flow (vph)	372	397	299	247
Turn Type			pm+pt	
Protected Phases	4	2	1	6
Permitted Phases			6	
Minimum Split (s)	9.4	9.4	7.6	9.4
Total Split (s)	26.4	24.6	9.0	33.6
Total Split (%)	44.0%	41.0%	15.0%	56.0%
Yellow Time (s)	3.6	3.6	3.6	3.6
All-Red Time (s)	1.8	1.8	0.0	1.8
Lost Time Adjust (s)	1.4	1.4	0.4	1.4
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?				
v/c Ratio	0.27	0.35	0.67	0.27
Control Delay	13.5	23.7	18.6	8.6
Queue Delay	0.0	0.0	2.0	1.1
Total Delay	13.5	23.7	20.6	9.7
Queue Length 50th (ft)	46	72	50	41
Queue Length 95th (ft)	73	104	#116	73
Internal Link Dist (ft)	1415	932		119
Turn Bay Length (ft)				
Base Capacity (vph)	1378	1132	447	906
Starvation Cap Reductn	0	0	58	441
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.27	0.35	0.77	0.53

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 40
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

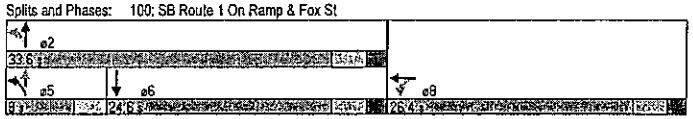
Splits and Phases: 90: Abbottsford Ave & Fox St



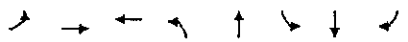
Lane Group	WBT	NBL	NBT	SBT
Lane Configurations				
Volume (vph)	213	141	130	266
Lane Group Flow (vph)	722	191	176	401
Turn Type		pm+pt		
Protected Phases	8	5	2	6
Permitted Phases		2		
Minimum Split (s)	8.8	7.0	8.8	8.8
Total Split (s)	26.4	9.0	53.6	24.6
Total Split (%)	44.0%	15.0%	56.0%	41.0%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.8	0.0	1.8	1.8
Lost Time Adjust (s)	0.8	1.0	0.8	0.8
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag		Lead		Lag
Lead-Lag Optimize?				
v/c Ratio	0.48	0.44	0.20	0.36
Control Delay	10.5	11.4	4.4	15.9
Queue Delay	0.0	0.5	0.6	0.0
Total Delay	10.5	11.9	5.0	15.9
Queue Length 50th (ft)	63	18	15	55
Queue Length 95th (ft)	105	30	22	87
Internal Link Dist (ft)	977	119		792
Turn Bay Length (ft)				
Base Capacity (vph)	1513	436	868	1123
Starvation Cap Reductn	0	59	423	0
Spillback Cap Reductn	51	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.49	0.51	0.38	0.36

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 40
Control Type: Pretimed

Splits and Phases: 100: SB Route 1 On Ramp & Fox St



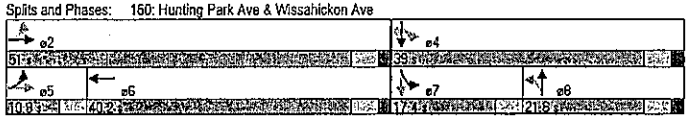
Lanes, Volumes, Timings
160: Hunting Park Ave & Wissahickon Ave



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations								
Volume (vph)	95	457	460	22	133	237	216	69
Lane Group Flow (vph)	100	481	646	0	191	260	237	76
Turn Type	pm+pt		Perm		pm+pt		Perm	
Protected Phases	5	2	6		8	7	4	
Permitted Phases	2			8		4		4
Minimum Split (s)	7.6	9.4	9.4	9.4	9.4	7.6	9.4	9.4
Total Split (s)	10.0	51.0	40.2	21.6	21.6	17.4	39.0	39.0
Total Split (%)	12.0%	56.7%	44.7%	24.0%	24.0%	19.3%	43.3%	43.3%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	0.0	1.8	1.8	1.8	1.8	0.0	1.8	1.8
Lost Time Adjust (s)	0.4	1.4	1.4	1.4	1.4	0.4	1.4	1.4
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead		Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes		
v/c Ratio	0.28	0.26	0.41		0.32	0.54	0.33	0.12
Control Delay	10.3	8.3	18.1		32.8	24.7	20.9	5.0
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	10.3	8.3	18.1		32.8	24.7	20.9	5.0
Queue Length 50th (ft)	15	40	120		49	104	93	0
Queue Length 95th (ft)	33	61	166		78	168	151	25
Internal Link Dist (ft)		1584	1151		484		2048	
Turn Bay Length (ft)	85							275
Base Capacity (vph)	357	1823	1574		601	478	714	654
Starvation Cap Reductn	0	0	0		0	0	0	0
Spillback Cap Reductn	0	0	0		0	0	0	0
Storage Cap Reductn	0	0	0		0	0	0	0
Reduced v/c Ratio	0.28	0.26	0.41		0.32	0.54	0.33	0.12

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 16.7 (19%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 40
Control Type: Pretimed

Splits and Phases: 160: Hunting Park Ave & Wissahickon Ave

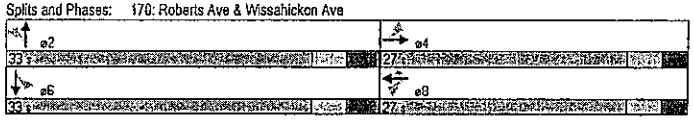


Lanes, Volumes, Timings
170: Roberts Ave & Wissahickon Ave

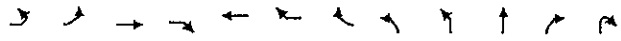
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	70	193	73	245	131	18	360	31	420
Lane Group Flow (vph)	74	226	83	278	149	20	440	32	563
Turn Type	Perm		Perm		Free	Perm		Perm	
Protected Phases		4		8			2		6
Permitted Phases	4		8		Free	2		6	
Minimum Split (s)	9.4	9.4	9.4	9.4		9.4	10.0	10.0	10.0
Total Split (s)	27.0	27.0	27.0	27.0		27.0	33.0	33.0	33.0
Total Split (%)	45.0%	45.0%	45.0%	45.0%		45.0%	55.0%	55.0%	55.0%
Yellow Time (s)	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0
All-Red Time (s)	2.4	2.4	2.4	2.4		2.4	3.0	3.0	3.0
Lost Time Adjust (s)	1.4	1.4	1.4	1.4		1.4	2.0	2.0	2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0
Lead/Lag									
Lead-Lag Optimize?									
v/c Ratio	0.20	0.32	0.20	0.39		0.21	0.05	0.26	0.07	0.33
Control Delay	17.2	17.2	14.0	15.5		3.5	8.8	9.0	8.9	8.4
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	17.2	17.2	14.0	15.5		3.5	8.8	9.0	8.9	8.4
Queue Length 50th (ft)	19	63	19	70		0	4	42	6	149
Queue Length 95th (ft)	m46	110	45	121		28	13	66	18	77
Internal Link Dist (ft)		1436		740			2048		966
Turn Bay Length (ft)	100		150				100	65	
Base Capacity (vph)	370	710	416	714		699	368	1698	438	1699
Starvation Cap Reductn	0	0	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0	0	0		0	0	0	0	0
Storage Cap Reductn	0	0	0	0		0	0	0	0	0
Reduced v/c Ratio	0.20	0.32	0.20	0.39		0.21	0.05	0.26	0.07	0.33

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 20 (33%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 40
Control Type: Pretimed
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 170: Roberts Ave & Wissahickon Ave



2007 BUILD W/ MITIGATION: SAT PEAK

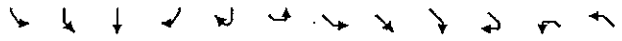


Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	NBR2
Lane Configurations													
Volume (vph)	29	239	245	29	15	223	143	42	1	8	63	10	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	10	10	12	12	12	12	13	12	12
Total Lost time (s)		4.0	4.0			4.0	4.0				4.0		
Lane Util. Factor		0.91	0.91			0.95	1.00				1.00		
Frt		1.00	0.99			1.00	0.85				0.98		
Flt Protected		0.95	0.99			1.00	1.00				1.00		
Satd. Flow (prot)		1588	3260			3336	1492				1836		
Flt Permitted		0.47	0.46			1.00	1.00				0.97		
Satd. Flow (perm)		784	1503			3336	1492				1786		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.90	0.90	0.90	0.92	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	25	257	266	32	248	48	47	1	10	82	13	6	
RTOR Reduction (vph)	0	0	0	0	0	35	0	0	0	10	0	0	
Lane Group Flow (vph)	0	177	403	0	248	60	0	0	0	109	0	0	
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%	1%	2%	4%	4%	4%	4%	
Turn Type	pm+pt	pm+pt					Perm		Perm	Perm			
Protected Phases	5	5	2			6					8		
Permitted Phases	2	2	5				6		8	8			
Actuated Green, G (s)		35.1	35.1			20.7	20.7				12.6		
Effective Green, g (s)		34.7	37.4			23.0	23.0				14.0		
Actuated g/C Ratio		0.39	0.42			0.26	0.26				0.16		
Clearance Time (s)		3.6	6.3			6.3	6.3				5.4		
Lane Grp Cap (vph)		395	1355			853	381				278		
v/s Ratio Prot		c0.05	0.12			0.07							
v/s Ratio Perm		c0.12					0.04				c0.06		
v/c Ratio		0.45	0.30			0.29	0.16				0.39		
Uniform Delay, d1		19.3	17.5			26.9	26.0				34.2		
Progression Factor		1.00	1.00			1.62	2.20				1.00		
Incremental Delay, d2		3.6	0.6			0.8	0.6				4.1		
Delay (s)		23.0	18.1			44.4	58.0				38.3		
Level of Service		C	B			D	E				D		
Approach Delay (s)			19.6			48.2					38.3		
Approach LOS			B			D					D		

Intersection Summary			
HCM Average Control Delay	31.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Hunting Park Ave & Henry Ave



Movement	SBL2	SBL	SBT	SBR	SBR2	SEL2	SEL	SET	SER	SER2	NWL2	NWL	NWT
Lane Configurations													
Volume (vph)	21	73	75	184	39	18	743	104	145	48	52	98	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	13	12	12	12	12	13	12	12	12	12	12
Total Lost time (s)		4.0	4.0	4.0			4.0	4.0					4.0
Lane Util. Factor		1.00	1.00	0.86			1.00	1.00					1.00
Frt		1.00	1.00	0.85			1.00	0.95					1.00
Flt Protected		0.95	1.00	1.00			0.95	1.00					0.95
Satd. Flow (prot)		1829	1925	2787			1752	1811					1681
Flt Permitted		0.46	1.00	1.00			0.46	1.00					0.46
Satd. Flow (perm)		864	1925	2787			905	1811					816
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.92	0.88	0.88	0.88	0.88	0.92	0.92	0.92	0.87
Adj. Flow (vph)	24	82	84	207	42	20	49	118	51	9	5	44	
RTOR Reduction (vph)	0	0	0	17	0	0	0	13	0	0	0	0	
Lane Group Flow (vph)	0	106	84	232	0	0	69	175	0	0	0	49	
Heavy Vehicles (%)	2%	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	3%	
Turn Type	pm+pt	pm+pt		Perm		Perm	Perm					Perm	Perm
Protected Phases		7	7					9					4
Permitted Phases	4	4	4	4		9	9					13	13
Actuated Green, G (s)		24.3	24.3	24.3			13.5	13.5					13.5
Effective Green, g (s)		23.9	25.7	25.7			14.9	14.9					14.9
Actuated g/C Ratio		0.27	0.29	0.29			0.17	0.17					0.17
Clearance Time (s)		3.6	5.4	5.4			5.4	5.4					5.4
Lane Grp Cap (vph)		312	550	796			150	300					135
v/s Ratio Prot		c0.03	0.04					0.10					
v/s Ratio Perm		0.06		0.08			0.08						0.06
v/c Ratio		0.34	0.15	0.29			0.46	0.58					0.36
Uniform Delay, d1		26.2	24.0	25.1			33.9	34.7					33.3
Progression Factor		0.83	0.83	0.81			1.00	1.00					1.00
Incremental Delay, d2		2.9	0.6	0.9			9.8	8.1					2.4
Delay (s)		24.6	20.4	21.2			43.7	42.8					40.7
Level of Service		C	C	C			D	D					D
Approach Delay (s)			21.8					43.1					
Approach LOS			C					D					

Intersection Summary

HCM Signalized Intersection Capacity Analysis
10: Hunting Park Ave & Henry Ave

Movement	NWL	NWR	NWR2
Lane Configurations			
Volume (vph)	82	59	4
Ideal Flow (vphpl)	1900	1900	1900
Lane Width	13	12	12
Total Lost time (s)	4.0		
Lane Util. Factor	1.00		
Frt	0.93		
Flt Protected	1.00		
Satd. Flow (prot)	1699		
Flt Permitted	1.00		
Satd. Flow (perm)	1699		
Peak-hour factor, PHF	0.87	0.87	0.87
Adj. Flow (vph)	94	68	5
RTOR Reduction (vph)		0	0
Lane Group Flow (vph)	165	0	0
Heavy Vehicles (%)	8%	8%	8%
Turn Type			
Protected Phases	13		
Permitted Phases			
Actuated Green, G (s)	13.5		
Effective Green, g (s)	14.9		
Actuated g/C Ratio	0.17		
Clearance Time (s)	5.4		
Lane Grp Cap (vph)	281		
v/s Ratio Prot	c0.10		
v/s Ratio Perm			
v/c Ratio	0.59		
Uniform Delay, d1	34.7		
Progression Factor	1.00		
Incremental Delay, d2	8.9		
Delay (s)	43.6		
Level of Service	D		
Approach Delay (s)	42.9		
Approach LOS	D		

Intersection Summary			
HCM Average Control Delay	10.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: Roberts Ave & Henry Ave

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	134	81	328	124	65	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	14	12	13	12	12	12
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		0.95	1.00	1.00	0.95
Frt	0.95		1.00	0.85	1.00	1.00
Flt Protected	0.97		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1847		3693	1599	1770	3539
Flt Permitted	0.97		1.00	1.00	0.52	1.00
Satd. Flow (perm)	1847		3693	1599	977	3539
Peak-hour factor, PHF	0.85	0.85	0.88	0.88	0.92	0.92
Adj. Flow (vph)	158	95	373	141	71	293
RTOR Reduction (vph)	24	0	0	58	0	0
Lane Group Flow (vph)	229	0	373	83	71	293
Heavy Vehicles (%)	1%	1%	1%	1%	2%	2%
Turn Type				Perm	Perm	
Protected Phases	8		2			6
Permitted Phases				2	6	
Actuated Green, G (s)	27.0		50.4	50.4	50.4	50.4
Effective Green, g (s)	29.3		52.7	52.7	52.7	52.7
Actuated g/C Ratio	0.33		0.59	0.59	0.59	0.59
Clearance Time (s)	6.3		6.3	6.3	6.3	6.3
Lane Grp Cap (vph)	601		2162	936	572	2072
v/s Ratio Prot	c0.12		c0.10			0.08
v/s Ratio Perm				0.05	0.07	
v/c Ratio	0.38		0.17	0.09	0.12	0.14
Uniform Delay, d1	23.4		8.6	8.2	8.3	8.4
Progression Factor	1.00		0.72	0.54	0.80	0.81
Incremental Delay, d2	1.8		0.2	0.2	0.4	0.1
Delay (s)	25.2		6.3	4.6	7.1	6.9
Level of Service	C		A	A	A	A
Approach Delay (s)	25.2		5.8		7.0	
Approach LOS	C		A		A	

Intersection Summary			
HCM Average Control Delay	10.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

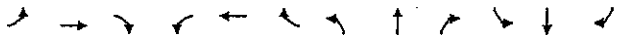
HCM Signalized Intersection Capacity Analysis
30: Abbottsford Ave & Henry Ave

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑		↰	↑↑
Volume (vph)	0	0	300	33	189	278
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.3		6.3	6.3
Lane Util. Factor			0.95		1.00	0.95
Frt			0.99		1.00	1.00
Flt Protected			1.00		0.95	1.00
Satd. Flow (prot)			3487		1770	3539
Flt Permitted			1.00		0.95	1.00
Satd. Flow (perm)			3487		1770	3539
Peak-hour factor, PHF	0.92	0.92	0.82	0.82	0.98	0.98
Adj. Flow (vph)	0	0	366	40	193	284
RTOR Reduction (vph)	0	0	9	0	0	0
Lane Group Flow (vph)	0	0	397	0	193	284
Turn Type					Prot	
Protected Phases			2		1	6
Permitted Phases						
Actuated Green, G (s)			54.0		23.4	54.0
Effective Green, g (s)			54.0		23.4	54.0
Actuated g/C Ratio			0.60		0.26	0.60
Clearance Time (s)			6.3		6.3	6.3
Lane Grp Cap (vph)			2092		460	2123
v/s Ratio Prot			c0.11		c0.11	0.08
v/s Ratio Perm						
v/c Ratio			0.19		0.42	0.13
Uniform Delay, d1			6.1		27.7	7.8
Progression Factor			1.27		1.00	1.00
Incremental Delay, d2			0.2		2.8	0.1
Delay (s)			10.5		30.5	8.0
Level of Service			B		C	A
Approach Delay (s)	0.0		10.5		17.1	
Approach LOS	A		B		B	

Intersection Summary			
HCM Average Control Delay	14.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	30.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
60: Hunting Park Ave & Fox St

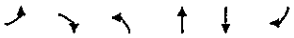


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑		↰	↑↑		↰	↑	↱	↰	↑	
Volume (vph)	95	1428	2	123	1414	61	1	349	157	34	311	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	12	12	12	12	12	12
Total Lost time (s)	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	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1711	3419		1694	3323		1787	1881	1599	1787	1823	
Flt Permitted	0.35	1.00		0.48	1.00		0.30	1.00	1.00	0.32	1.00	
Satd. Flow (perm)	626	3419		850	3323		564	1881	1599	599	1823	
Peak-hour factor, PHF	0.89	0.89	0.89	0.87	0.87	0.87	0.87	0.87	0.87	0.94	0.94	0.94
Adj. Flow (vph)	108	481	2	141	476	70	5	401	180	36	331	86
RTOR Reduction (vph)	0	0	0	0	13	0	0	0	90	0	10	0
Lane Group Flow (vph)	108	483	0	141	533	0	5	401	90	36	407	0
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt			Perm			Perm		Perm	Perm		
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	48.6	48.6		38.7	38.7		30.6	30.6	30.6	30.6	30.6	
Effective Green, g (s)	48.2	50.0		40.1	40.1		32.0	32.0	32.0	32.0	32.0	
Actuated g/C Ratio	0.54	0.56		0.45	0.45		0.36	0.36	0.36	0.36	0.36	
Clearance Time (s)	3.6	5.4		5.4	5.4		5.4	5.4	5.4	5.4	5.4	
Lane Grp Cap (vph)	406	1899		379	1481		201	669	569	213	648	
v/s Ratio Prot	0.02	c0.14			0.16			0.21			c0.22	
v/s Ratio Perm	0.12			c0.17			0.01		0.06	0.06		
v/c Ratio	0.27	0.25		0.37	0.36		0.02	0.60	0.16	0.17	0.63	
Uniform Delay, d1	10.9	10.4		16.6	16.5		16.9	23.9	19.8	19.9	24.1	
Progression Factor	1.66	1.66		1.15	1.14		1.00	1.00	1.00	0.89	0.86	
Incremental Delay, d2	1.6	0.3		2.7	0.7		0.2	3.9	0.6	1.6	4.3	
Delay (s)	19.7	17.5		21.7	19.5		19.1	27.7	20.4	19.2	25.1	
Level of Service	B	B		C	B		B	C	C	B	C	
Approach Delay (s)		17.9			19.9			25.4			24.7	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	21.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
65: Temp Exit Drive & Fox St

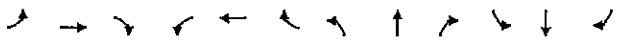


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	151	66	0	489	358	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1770	1583		1863	1863	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1770	1583		1863	1863	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	178	78	0	575	421	0
RTOR Reduction (vph)	0	61	0	0	0	0
Lane Group Flow (vph)	178	17	0	575	421	0
Turn Type		Perm				
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	10.0	10.0		25.0	25.0	
Effective Green, g (s)	10.0	10.0		25.0	25.0	
Actuated g/C Ratio	0.22	0.22		0.56	0.56	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	393	352		1035	1035	
v/s Ratio Prot	c0.10			c0.31	0.23	
v/s Ratio Perm		0.01				
v/c Ratio	0.45	0.05		0.56	0.41	
Uniform Delay, d1	15.1	13.8		6.4	5.7	
Progression Factor	1.00	1.00		0.48	1.00	
Incremental Delay, d2	3.7	0.3		1.9	1.2	
Delay (s)	18.9	14.0		5.0	6.9	
Level of Service	B	B		A	A	
Approach Delay (s)	17.4			5.0	6.9	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	8.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	42.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
80: Roberts Ave & Fox St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	123	54	225	154	55	59	338	149	246	141	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	14	12	12	16	12	12	16	12
Total Lost time (s)	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	
Frt	1.00	0.95		1.00	0.96		1.00	0.95			0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	1770	1778		1805	1947		1770	2014			2069	
Flt Permitted	0.59	1.00		0.61	1.00		0.53	1.00			0.99	
Satd. Flow (perm)	1096	1778		1153	1947		984	2014			2043	
Peak-hour factor, PHF	0.84	0.84	0.84	0.93	0.93	0.93	0.88	0.88	0.88	0.89	0.89	0.89
Adj. Flow (vph)	24	146	64	242	166	59	67	384	169	8	276	46
RTOR Reduction (vph)	0	26	0	0	22	0	0	27	0	0	10	0
Lane Group Flow (vph)	24	184	0	242	203	0	67	526	0	0	320	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	23.0	23.0		23.0	23.0		26.0	26.0			26.0	
Effective Green, g (s)	24.0	24.0		24.0	24.0		28.0	28.0			28.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.47	0.47			0.47	
Clearance Time (s)	5.0	5.0		5.0	5.0		6.0	6.0			6.0	
Lane Grp Cap (vph)	439	711		461	779		459	940			953	
v/s Ratio Prot		0.10			0.10			c0.26				
v/s Ratio Perm	0.02			c0.21			0.07				0.16	
v/c Ratio	0.05	0.26		0.52	0.26		0.15	0.56			0.34	
Uniform Delay, d1	11.0	12.0		13.7	12.1		9.2	11.6			10.1	
Progression Factor	1.00	1.00		0.67	0.68		1.00	1.00			1.35	
Incremental Delay, d2	0.2	0.9		4.0	0.8		0.7	2.4			0.9	
Delay (s)	11.3	12.9		13.1	8.9		9.8	14.0			14.6	
Level of Service	B	B		B	A		A	B			B	
Approach Delay (s)		12.8			11.1			13.5			14.6	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	12.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

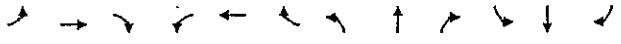
HCM Signalized Intersection Capacity Analysis
90: Abbottsford Ave & Fox St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑						↑↑	↱	↰	↑	
Volume (vph)	56	262	13	0	0	0	0	291	147	275	276	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	11	11	12
Total Lost time (s)		4.0						4.0		4.0	4.0	
Lane Util. Factor		0.95						0.95		1.00	1.00	
Frt		0.99						0.95		1.00	1.00	
Flt Protected		0.99						1.00		0.95	1.00	
Satd. Flow (prot)		3677						3281		1745	1837	
Flt Permitted		0.99						1.00		0.27	1.00	
Satd. Flow (perm)		3677						3281		493	1837	
Peak-hour factor, PHF	0.87	0.87	0.87	0.92	0.92	0.92	0.86	0.86	0.86	0.92	0.92	0.92
Adj. Flow (vph)	64	301	15	0	0	0	0	338	171	299	300	0
RTOR Reduction (vph)	0	5	5	0	0	0	0	50	0	0	0	0
Lane Group Flow (vph)	0	375	0	0	0	0	0	509	0	299	300	0
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	1%	1%	1%	0%	0%	0%
Turn Type	Perm									pm+pt		
Protected Phases		4						2		1	6	
Permitted Phases	4									6	1	
Actuated Green, G (s)		14.6						14.6		34.6	34.6	
Effective Green, g (s)		16.0						16.0		34.2	36.0	
Actuated g/C Ratio		0.27						0.27		0.57	0.60	
Clearance Time (s)		5.4						5.4		3.6	5.4	
Lane Grp Cap (vph)		981						875		615	1102	
v/s Ratio Prot								c0.16		c0.13	0.16	
v/s Ratio Perm		c0.10								0.15		
v/c Ratio		0.38						0.58		0.49	0.27	
Uniform Delay, d1		18.0						19.1		7.5	5.7	
Progression Factor		1.00						0.80		1.44	1.43	
Incremental Delay, d2		0.1						2.5		2.4	0.5	
Delay (s)		19.1						17.9		13.1	8.7	
Level of Service		B						B		B	A	
Approach Delay (s)		19.1		0.0				17.9			10.9	
Approach LOS		B		A				B			B	

Intersection Summary			
HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
100: SB Route 1 On Ramp & Fox St

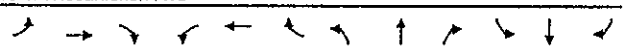


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↑			↑			↑↑	
Volume (vph)	0	0	0	277	213	267	194	191	0	0	266	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	15	15	12	11	11	12	12	11	12
Total Lost time (s)					4.0			4.0	4.0		4.0	
Lane Util. Factor					0.95			1.00	1.00		0.95	
Frt					0.95			1.00	1.00		0.96	
Flt Protected					0.98			0.95	1.00		1.00	
Satd. Flow (prot)					3557			1711	1801		3271	
Flt Permitted					0.98			0.34	1.00		1.00	
Satd. Flow (perm)					3657			605	1801		3271	
Peak-hour factor, PHF	0.92	0.92	0.92	0.98	0.98	0.98	0.74	0.74	0.74	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	283	217	272	262	176	0	0	296	123
RTOR Reduction (vph)	0	0	0	0	122	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	650	0	262	176	0	0	419	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Turn Type				Perm			pm+pt					
Protected Phases					8		5	2			6	
Permitted Phases				8			2	5				
Actuated Green, G (s)					21.2		29.2	29.2			15.2	
Effective Green, g (s)					22.0		28.2	30.0			16.0	
Actuated g/C Ratio					0.37		0.47	0.50			0.27	
Clearance Time (s)					4.8		3.0	4.8			4.8	
Lane Grp Cap (vph)					1341		469	901			872	
v/s Ratio Prot							c0.09	0.10			0.13	
v/s Ratio Perm					0.18		c0.17					
v/c Ratio					0.49		0.56	0.20			0.48	
Uniform Delay, d1					14.6		10.4	8.3			16.5	
Progression Factor					0.95		0.15	0.13			1.00	
Incremental Delay, d2					1.3		4.2	0.4			3.9	
Delay (s)					15.2		5.7	1.5			20.4	
Level of Service					B		A	A			C	
Approach Delay (s)		0.0			15.2			4.0			20.4	
Approach LOS		A			B			A			C	

Intersection Summary			
HCM Average Control Delay	13.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
160: Hunting Park Ave & Wissahickon Ave

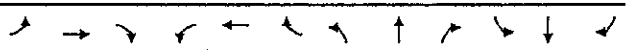


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	95	457	1	0	485	60	22	133	13	237	216	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	15	12	11	11	12	11	11	11
Total Lost time (s)	4.0	4.0			4.0			4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			0.95			0.95		1.00	1.00	1.00
Frt	1.00	1.00			0.96			0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00			0.99		0.95	1.00	1.00
Satd. Flow (prot)	1745	3490			3823			3426		1745	1837	1561
Flt Permitted	0.26	1.00			1.00			0.89		0.49	1.00	1.00
Satd. Flow (perm)	478	3490			3823			3074		909	1837	1561
Peak-hour factor, PHF	1.00	0.95	0.95	0.95	0.96	0.96	0.96	0.88	0.88	0.88	0.91	0.91	0.91
Adj. Flow (vph)	100	481	0	0	505	167	25	151	15	260	237	76
RTOR Reduction (vph)	0	0	0	0	36	0	0	0	0	0	0	46
Lane Group Flow (vph)	100	481	0	0	636	0	0	191	0	260	237	30
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt						Perm			pm+pt		Perm
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2	5					8			4	7	4
Actuated Green, G (s)	45.6	45.6			34.8			16.2		33.6	33.6	33.6
Effective Green, g (s)	45.2	47.0			36.2			17.6		33.2	35.0	35.0
Actuated g/C Ratio	0.50	0.52			0.40			0.20		0.37	0.39	0.39
Clearance Time (s)	3.6	5.4			5.4			5.4		3.6	5.4	5.4
Lane Grp Cap (vph)	339	1823			1538			601		460	714	607
v/s Ratio Prot	0.02	c0.14			c0.17					c0.08	0.13	
v/s Ratio Perm	0.13							0.06		c0.12		0.02
v/c Ratio	0.30	0.26			0.41			0.32		0.57	0.33	0.05
Uniform Delay, d1	12.9	11.9			19.3			31.1		21.2	19.3	17.1
Progression Factor	0.78	0.68			1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	2.2	0.3			0.8			1.4		5.0	1.2	0.2
Delay (s)	12.3	8.5			20.1			32.4		26.2	20.5	17.3
Level of Service	B	A			C			C		C	C	B
Approach Delay (s)		9.2			20.1			32.4			22.7	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM Average Control Delay	18.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
170: Roberts Ave & Wissahickon Ave

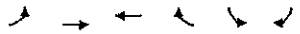


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	81	204	22	73	28	131	18	360	45	31	420	179
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.96		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1836		1770	1863	1583	1770	3480		1770	3380	
Flt Permitted	0.47	1.00		0.57	1.00	1.00	0.38	1.00		0.49	1.00	
Satd. Flow (perm)	874	1836		1057	1863	1583	706	3480		907	3380	
Peak-hour factor, PHF	0.95	0.95	0.95	0.88	0.88	0.88	0.92	0.92	0.92	0.98	0.98	0.98
Adj. Flow (vph)	85	215	23	83	319	149	20	391	49	32	429	183
RTOR Reduction (vph)	0	6	0	0	0	92	0	15	0	0	79	0
Lane Group Flow (vph)	85	232	0	83	319	57	20	424	0	32	533	0
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	21.6	21.6		21.6	21.6	21.6	27.0	27.0		27.0	27.0	
Effective Green, g (s)	23.0	23.0		23.0	23.0	23.0	29.0	29.0		29.0	29.0	
Actuated g/C Ratio	0.38	0.38		0.38	0.38	0.38	0.48	0.48		0.48	0.48	
Clearance Time (s)	5.4	5.4		5.4	5.4	5.4	6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	335	704		405	714	607	342	1682		438	1634	
v/s Ratio Prot		0.13			c0.17			0.12			c0.16	
v/s Ratio Perm	0.10			0.08		0.04	0.03			0.04		
v/c Ratio	0.25	0.33		0.20	0.45	0.09	0.06	0.25		0.07	0.33	
Uniform Delay, d1	12.6	13.1		12.4	13.8	11.8	8.2	9.1		8.3	9.5	
Progression Factor	1.09	1.08		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.7	1.2		1.4	2.0	0.3	0.3	0.4		0.3	0.5	
Delay (s)	15.4	15.3		13.5	15.8	12.1	8.6	9.5		8.6	10.0	
Level of Service	B	B		B	B	B	A	A		A	B	
Approach Delay (s)		15.3			14.5			9.4			10.0	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
55: Roberts Ave & Abbottsford Home Dr

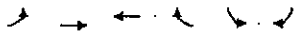


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Volume (veh/h)	6	178	204	37	19	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.84	0.84	0.91	0.91	0.82	0.82
Hourly flow rate (vph)	6	212	224	41	23	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		1050	419			
pX, platoon unblocked						
vC, conflicting volume	265				468	245
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	265				468	245
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				96	99
cM capacity (veh/h)	1299				551	794

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	219	265	29
Volume Left	6	0	23
Volume Right	0	41	6
cSH	1299	1700	588
Volume to Capacity	0.00	0.16	0.05
Queue Length 95th (ft)	0	0	4
Control Delay (s)	0.3	0.0	11.4
Lane LOS	A		B
Approach Delay (s)	0.3	0.0	11.4
Approach LOS			B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	23.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
110: Roberts Ave & Stokley St

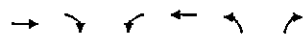


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Volume (veh/h)	3	276	428	4	2	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.90	0.90	0.50	0.50
Hourly flow rate (vph)	3	303	476	16	4	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		535				
pX, platoon unblocked						
vC, conflicting volume	491				793	483
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	491				793	483
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	99
cM capacity (veh/h)	1072				366	583

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	307	491	12
Volume Left	3	0	4
Volume Right	0	16	8
cSH	1072	1700	481
Volume to Capacity	0.00	0.29	0.02
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.1	0.0	12.7
Lane LOS	A		B
Approach Delay (s)	0.1	0.0	12.7
Approach LOS			B

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
120: Abbottsford Ave & Stokley St



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	644	4	0	0	0	14
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.92	0.92	0.65	0.65
Hourly flow rate (vph)	692	4	0	0	0	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	542					
pX, platoon unblocked			0.89		0.89	0.89
vC, conflicting volume			697		695	695
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			594		591	591
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	95
cM capacity (veh/h)			871		416	449

Direction, Lane #	EB 1	NB 1
Volume Total	697	22
Volume Left	0	0
Volume Right	4	22
cSH	1700	449
Volume to Capacity	0.41	0.05
Queue Length 95th (ft)	0	4
Control Delay (s)	0.0	13.4
Lane LOS		B
Approach Delay (s)	0.0	13.4
Approach LOS		B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	44.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
180: Abbottsford Ave & Wissahickon Ave

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	10	389	0	604	271	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.94	0.94	0.92	0.92
Hourly flow rate (vph)	10	418	0	643	295	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1046		
pX, platoon unblocked						
vC, conflicting volume	616	147	295			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	616	147	295			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	52	100			
cM capacity (veh/h)	427	879	1278			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	418	321	321	147	147
Volume Left	0	0	0	0	0
Volume Right	418	0	0	0	0
cSH	879	1700	1700	1700	1700
Volume to Capacity	0.48	0.19	0.19	0.09	0.09
Queue Length 95th (ft)	65	0	0	0	0
Control Delay (s)	12.8	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	12.8	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL2	EBL	EBT	WBT	WBR	NBL2	NBL	NBT	SBL2	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	236	245	223	43	18	8	63	21	73	75	184
Lane Group Flow (vph)	0	177	403	248	95	0	0	112	0	106	84	249
Turn Type		pm+pt	pm+pt	NA	Perm	Perm	Perm	NA	pm+pt	pm+pt	NA	Perm
Protected Phases		5	5	2				8	7	7	4	
Permitted Phases	2	2	2		2	8	8		4	4		4
Minimum Split (s)	7.6	7.6	10.3	10.3	10.3	9.4	9.4	9.4	9.4	9.4	9.4	9.4
Total Split (s)	14.4	14.4	41.4	27.0	27.0	18.0	18.0	18.0	11.7	11.7	29.7	29.7
Total Split (%)	16.0%	16.0%	46.0%	30.0%	30.0%	20.0%	20.0%	20.0%	13.0%	13.0%	33.0%	33.0%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	0.0	0.0	2.7	2.7	2.7	1.8	1.8	1.8	0.0	0.0	1.8	1.8
Lost Time Adjust (s)	0.4	0.4	2.3	2.3	2.3	0.0	1.4	1.4	0.4	0.4	1.4	1.4
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	5.4	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag		Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lead		
Lead-Lag Optimize?												
v/c Ratio		0.42	0.30	0.29	0.23			0.40		0.32	0.15	0.31
Control Delay		20.8	18.3	44.8	34.7			38.1		23.0	20.7	19.5
Queue Delay		0.0	0.0	0.0	0.0			0.0		0.0	0.0	0.0
Total Delay		20.8	18.3	44.8	34.7			38.1		23.0	20.7	19.5
Queue Length 50th (ft)		71	81	76	29			56		34	27	39
Queue Length 95th (ft)		123	118	113	m81			90		77	52	62
Internal Link Dist (ft)			658	1975				2407			1653	
Turn Bay Length (ft)		450			250					150		415
Base Capacity (vph)		419	1355	853	416			280		329	550	813
Starvation Cap Reductn		0	0	0	0			0		0	0	0
Spillback Cap Reductn		0	0	0	0			0		0	0	0
Storage Cap Reductn		0	0	0	0			0		0	0	0
Reduced v/c Ratio		0.42	0.30	0.29	0.23			0.40		0.32	0.15	0.31

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

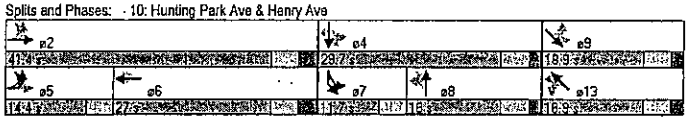
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green, Master Intersection

Natural Cycle: 50

Control Type: Pretimed

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Hunting Park Ave & Henry Ave



Lanes, Volumes, Timings
10: Hunting Park Ave & Henry Ave

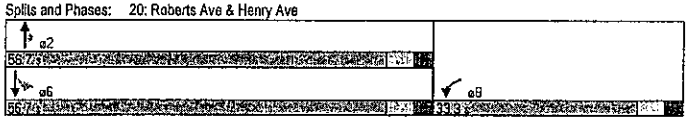
Lane Group	SEL2	SEL	SET	NWL2	NWL	NWT
Lane Configurations						
Volume (vph)	18	43	104	5	38	82
Lane Group Flow (vph)	0	69	176	0	49	167
Turn Type	Perm	Perm	NA	Perm	Perm	NA
Protected Phases			9			13
Permitted Phases	9	9		13	13	
Minimum Split (s)	9.4	9.4	9.4	9.4	9.4	9.4
Total Split (s)	18.9	18.9	18.9	18.9	18.9	18.9
Total Split (%)	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	1.8	1.8	1.8	1.8	1.8	1.8
Lost Time Adjust (s)	1.4	1.4	1.4	0.0	1.4	1.4
Total Lost Time (s)	4.0	4.0	4.0	5.4	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
v/c Ratio		0.46	0.59		0.36	0.59
Control Delay		45.1	43.0		42.0	44.1
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		45.1	43.0		42.0	44.1
Queue Length 50th (ft)		36	93		25	88
Queue Length 95th (ft)		77	156		59	148
Internal Link Dist (ft)			1387			698
Turn Bay Length (ft)		105			105	
Base Capacity (vph)		150	302		135	282
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		0.46	0.59		0.36	0.59

Intersection Summary

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations					
Volume (vph)	194	326	124	65	270
Lane Group Flow (vph)	253	373	141	71	293
Turn Type			Perm	Perm	
Protected Phases	8	2			6
Permitted Phases			2	6	
Minimum Split (s)	33.3	10.3	10.3	10.3	10.3
Total Split (s)	33.3	56.7	56.7	56.7	56.7
Total Split (%)	37.0%	63.0%	63.0%	63.0%	63.0%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7
Lost Time Adjust (s)	2.3	2.3	2.3	2.3	2.3
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag					
Lead-Lag Optimize?					
v/c Ratio	0.40	0.17	0.14	0.12	0.14
Control Delay	22.4	7.5	2.2	7.3	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	7.5	2.2	7.3	7.0
Queue Length 50th (ft)	94	27	0	12	25
Queue Length 95th (ft)	148	55	m23	23	36
Internal Link Dist (ft)	970	653			767
Turn Bay Length (ft)			250	130	
Base Capacity (vph)	626	2162	995	572	2072
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.40	0.17	0.14	0.12	0.14

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 45
Control Type: Pretimed
m Volume for 95th percentile queue is metered by upstream signal.

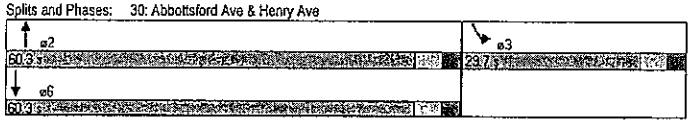
Splits and Phases: 20: Roberts Ave & Henry Ave



Lane Group	NBT	SBL	SBT
Lane Configurations			
Volume (vph)	300	189	278
Lane Group Flow (vph)	406	193	284
Turn Type		Prot	
Protected Phases	2	3	6
Permitted Phases			
Minimum Split (s)	22.3	10.3	22.3
Total Split (s)	60.3	29.7	60.3
Total Split (%)	67.0%	33.0%	67.0%
Yellow Time (s)	3.6	3.6	3.6
All-Red Time (s)	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3
Lead/Lag			
Lead-Lag Optimize?			
v/c Ratio	0.19	0.42	0.13
Control Delay	10.0	31.0	8.0
Queue Delay	0.0	0.0	0.0
Total Delay	10.0	31.0	8.0
Queue Length 50th (ft)	60	91	33
Queue Length 95th (ft)	56	155	51
Internal Link Dist (ft)	767		576
Turn Bay Length (ft)		200	
Base Capacity (vph)	2101	460	2123
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.19	0.42	0.13

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 40
Control Type: Pretimed

Splits and Phases: 30: Abbottsford Ave & Henry Ave

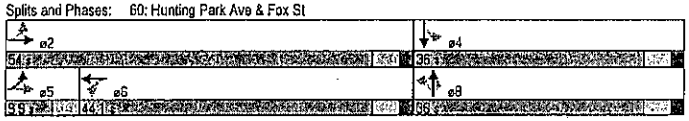


Lanes, Volumes, Timings
60: Hunting Park Ave & Fox St

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	99	428	123	414	4	349	157	34	311
Lane Group Flow (vph)	108	483	141	546	5	401	180	36	417
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases	5	2		6		8			4
Permitted Phases	2		6		8		8	4	
Minimum Split (s)	7.6	9.4	9.4	9.4	20.0	20.0	20.0	20.0	20.0
Total Split (s)	9.9	54.0	44.1	44.1	36.0	36.0	36.0	36.0	36.0
Total Split (%)	11.0%	60.0%	49.0%	49.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	0.0	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Lost Time Adjust (s)	0.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead		Lag	Lag					
Lead-Lag Optimize?	Yes		Yes	Yes					
v/c Ratio	0.26	0.25	0.37	0.37	0.02	0.60	0.27	0.17	0.63
Control Delay	17.5	17.7	22.7	18.9	19.5	28.3	7.3	20.1	24.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.5	17.7	22.7	18.9	19.5	28.3	7.3	20.1	24.9
Queue Length 50th (ft)	40	100	73	141	2	184	15	14	170
Queue Length 95th (ft)	74	137	124	182	9	267	55	37	249
Internal Link Dist (ft)		1975		1584		899			419
Turn Bay Length (ft)	100		100		100		100	105	
Base Capacity (vph)	419	1899	378	1464	201	669	658	213	658
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.25	0.37	0.37	0.02	0.60	0.27	0.17	0.63

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 45
Control Type: Pretimed

Splits and Phases: 60: Hunting Park Ave & Fox St

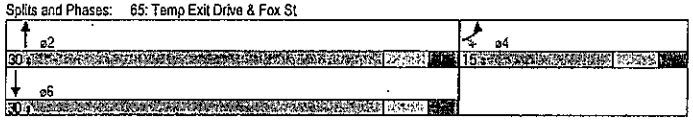


Lanes, Volumes, Timings
65: Temp Exit Drive & Fox St

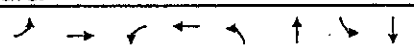
Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Volume (vph)	151	66	499	358
Lane Group Flow (vph)	178	78	575	421
Turn Type		Perm		
Protected Phases	4		2	6
Permitted Phases		4		
Minimum Split (s)	21.0	21.0	21.0	21.0
Total Split (s)	15.0	15.0	30.0	30.0
Total Split (%)	33.3%	33.3%	66.7%	66.7%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead/Lag				
Lead-Lag Optimize?				
v/c Ratio	0.45	0.19	0.56	0.41
Control Delay	19.5	6.0	5.1	7.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	19.5	6.0	5.1	7.2
Queue Length 50th (ft)	40	0	62	53
Queue Length 95th (ft)	78	21	79	89
Internal Link Dist (ft)	245		419	262
Turn Bay Length (ft)				
Base Capacity (vph)	393	412	1035	1035
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	0.45	0.19	0.56	0.41

Intersection Summary
Cycle Length: 45
Actuated Cycle Length: 45
Offset: 10 (22%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 45
Control Type: Pretimed

Splits and Phases: 65: Temp Exit Drive & Fox St



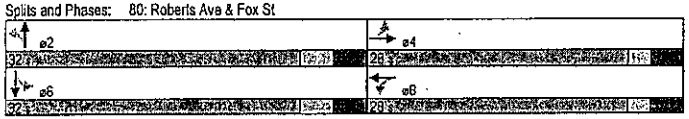
Lanes, Volumes, Timings
80: Roberts Ave & Fox St



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	20	123	225	154	59	338	0	246
Lane Group Flow (vph)	24	210	242	225	67	553	0	330
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Minimum Split (s)	9.0	9.0	9.0	9.0	10.0	10.0	10.0	10.0
Total Split (s)	28.0	28.0	28.0	28.0	32.0	32.0	32.0	32.0
Total Split (%)	46.7%	46.7%	46.7%	46.7%	53.3%	53.3%	53.3%	53.3%
Yellow Time (s)	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	1.0	1.0	1.0	1.0	2.0	2.0	2.0	2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag								
Lead-Lag Optimize?								
v/c Ratio	0.05	0.28	0.52	0.28	0.15	0.57		0.34
Control Delay	11.6	10.8	13.7	7.9	10.3	13.4		14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	11.6	10.8	13.7	7.9	10.3	13.4		14.2
Queue Length 50th (ft)	5	38	40	28	13	122		115
Queue Length 95th (ft)	16	72	72	54	32	199		190
Internal Link Dist (ft)		339		454		877		932
Turn Bay Length (ft)	105		200		150			
Base Capacity (vph)	439	737	461	801	459	967		963
Starvation Cap Reductn	0	0	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0	0	0		0
Storage Cap Reductn	0	0	0	0	0	0		0
Reduced v/c Ratio	0.05	0.28	0.52	0.28	0.15	0.57		0.34

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 40
Control Type: Pretimed

Splits and Phases: 80: Roberts Ave & Fox St

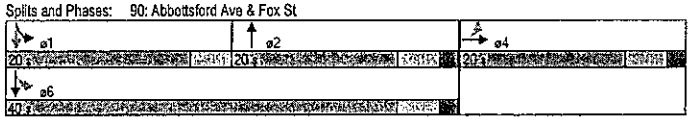


Lanes, Volumes, Timings
90: Abbottsford Ave & Fox St

Lane Group	EBT	NBL	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	262	291	275	276	
Lane Group Flow (vph)	380	509	299	300	
Turn Type		pm+pt			
Protected Phases	4	2	1	6	
Permitted Phases			6		
Minimum Split (s)	9.4	9.4	7.6	9.4	
Total Split (s)	20.0	20.0	20.0	40.0	
Total Split (%)	33.3%	33.3%	33.3%	66.7%	
Yellow Time (s)	3.6	3.6	3.6	3.6	
All-Red Time (s)	1.8	1.8	0.0	1.8	
Lost Time Adjust (s)	1.4	1.4	0.4	1.4	
Total Lost Time (s)	4.0	4.0	4.0	4.0	
Lead/Lag		Lead	Lead		
Lead-Lag Optimize?					
v/c Ratio	0.39	0.58	0.46	0.27	
Control Delay	19.0	18.2	10.9	9.0	
Queue Delay	0.0	0.0	2.3	2.0	
Total Delay	19.0	18.2	13.2	11.0	
Queue Length 50th (ft)	57	88	69	69	
Queue Length 95th (ft)	87	130	107	107	
Internal Link Dist (ft)	1415	932		19	
Turn Bay Length (ft)					
Base Capacity (vph)	986	875	629	1102	
Starvation Cap Reductn	0	0	209	642	
Spillback Cap Reductn	0	2	0	0	
Storage Cap Reductn	0	0	0	0	
Reduced v/c Ratio	0.39	0.58	0.71	0.65	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 41 (68%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 40
Control Type: Pretimed

Splits and Phases: 90: Abbottsford Ave & Fox St

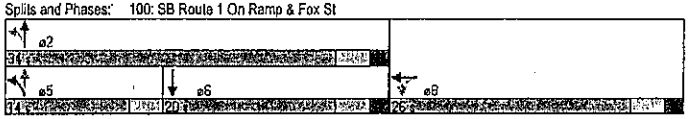


Lanes, Volumes, Timings
100: SB Route 1 On Ramp & Fox St

Lane Group	WBT	NBL	NBT	SBT
Lane Configurations				
Volume (vph)	213	194	130	266
Lane Group Flow (vph)	772	262	176	419
Turn Type		pm+pt		
Protected Phases	8	5	2	6
Permitted Phases		2		
Minimum Split (s)	8.8	7.0	8.8	8.8
Total Split (s)	26.0	14.0	34.0	20.0
Total Split (%)	43.3%	23.3%	56.7%	33.3%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.8	0.0	1.8	1.8
Lost Time Adjust (s)	0.8	1.0	0.8	0.8
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag		Lead		Lag
Lead-Lag Optimize?				
v/c Ratio	0.53	0.54	0.20	0.48
Control Delay	11.9	5.1	1.5	20.7
Queue Delay	0.0	1.5	0.9	0.1
Total Delay	12.0	6.6	2.4	20.8
Queue Length 50th (ft)	171	5	13	66
Queue Length 95th (ft)	95	7	5	104
Internal Link Dist (ft)	377		119	792
Turn Bay Length (ft)				
Base Capacity (vph)	1462	487	901	872
Starvation Cap Reductn	0	97	501	0
Spillback Cap Reductn	51	0	0	29
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.55	0.67	0.44	0.50

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 40
Control Type: Pretimed

Splits and Phases: 100: SB Route 1 On Ramp & Fox St

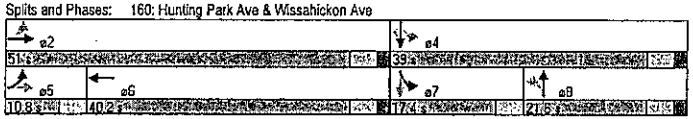


Lanes, Volumes, Timings
160: Hunting Park Ave & Wissahickon Ave

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations								
Volume (vph)	95	457	485	22	133	237	216	69
Lane Group Flow (vph)	100	481	672	0	191	260	237	76
Turn Type	pm+pt			Perm		pm+pt		Perm
Protected Phases	5	2	6		8	7	4	
Permitted Phases	2			8		4	7	4
Minimum Split (s)	7.6	9.4	9.4	9.4	9.4	7.6	9.4	9.4
Total Split (s)	10.8	51.0	40.2	21.6	21.6	17.4	39.0	39.0
Total Split (%)	12.0%	56.7%	44.7%	24.0%	24.0%	19.3%	43.3%	43.3%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	0.0	1.8	1.8	1.8	1.8	0.0	1.8	1.8
Lost Time Adjust (s)	0.4	1.4	1.4	1.4	1.4	0.4	1.4	1.4
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes		
v/c Ratio	0.29	0.26	0.43		0.32	0.54	0.33	0.12
Control Delay	10.7	8.6	18.6		32.8	24.7	20.9	5.0
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	10.7	8.6	18.6		32.8	24.7	20.9	5.0
Queue Length 50th (ft)	178	243	427		49	104	93	0
Queue Length 95th (ft)	35	66	175		78	168	151	26
Internal Link Dist (ft)		1584	1151		484		2048	
Turn Bay Length (ft)	85							275
Base Capacity (vph)	945	1823	1574		601	478	714	654
Starvation Cap Reductn	0	0	0		0	0	0	0
Spillback Cap Reductn	0	0	0		0	0	0	0
Storage Cap Reductn	0	0	0		0	0	0	0
Reduced v/c Ratio	0.29	0.26	0.43		0.32	0.54	0.33	0.12

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 16.7 (19%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 40
Control Type: Pretimed

Splits and Phases: 160: Hunting Park Ave & Wissahickon Ave

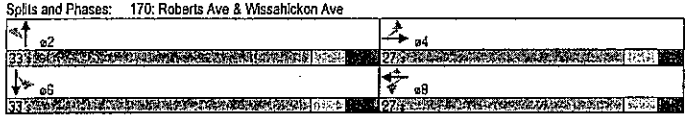


Lanes, Volumes, Timings
170: Roberts Ave & Wissahickon Ave

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	m81	204	73	281	131	18	360	31	420
Lane Group Flow (vph)	85	238	83	319	149	20	440	32	612
Turn Type	Perm		Perm		Perm	Perm		Perm	
Protected Phases		4		8			2		6
Permitted Phases	4		8		8	2		6	
Minimum Split (s)	9.4	9.4	9.4	9.4	9.4	10.0	10.0	10.0	10.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	33.0	33.0	33.0	33.0
Total Split (%)	45.0%	45.0%	45.0%	45.0%	45.0%	55.0%	55.0%	55.0%	55.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.4	2.4	2.4	2.4	2.4	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.4	-1.4	-1.4	-1.4	-1.4	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag									
Lead-Lag Optimize?									
v/c Ratio	0.25	0.34	0.20	0.45	0.21	0.06	0.26	0.07	0.36
Control Delay	16.3	15.1	14.1	16.3	3.5	8.9	9.0	8.9	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.3	15.1	14.1	16.3	3.5	8.9	9.0	8.9	7.8
Queue Length 50th (ft)	20	57	19	83	0	4	42	6	48
Queue Length 95th (ft)	m43	104	45	139	28	13	66	18	78
Internal Link Dist (ft)		1436		740			2048		986
Turn Bay Length (ft)	100		150			100		65	
Base Capacity (vph)	335	710	405	714	699	342	1698	438	713
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.34	0.20	0.45	0.21	0.06	0.26	0.07	0.36

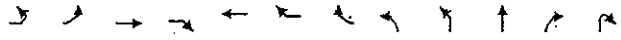
Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 20 (33%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 40
Control Type: Pretimed
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 170: Roberts Ave & Wissahickon Ave



2009 NO BUILD: SAT PEAK

HCM Signalized Intersection Capacity Analysis
10: Hunting Park Ave & Henry Ave



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	NBR2
Lane Configurations													
Volume (vph)	24	239	223	29	203	44	43	1	9	63	10	5	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	12	11	11	12	10	10	12	12	12	13	12	12	
Total Lost time (s)		3.9	5.2		5.2	5.2				5.1			
Lane Util. Factor		1.00	0.95		0.95	1.00				1.00			
Frt		1.00	0.98		1.00	0.85				0.98			
Flt Protected		0.95	1.00		1.00	1.00				0.99			
Satd. Flow (prot)		1745	3429		3336	1492				1835			
Flt Permitted		0.47	1.00		1.00	1.00				0.96			
Satd. Flow (perm)		861	3429		3336	1492				1765			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.90	0.90	0.90	0.92	0.77	0.77	0.77	0.77	
Adj. Flow (vph)	26	260	242	32	226	49	48	1	12	82	13	6	
RTOR Reduction (vph)	0	0	0	0	0	29	0	0	0	2	0	0	
Lane Group Flow (vph)	0	286	274	0	226	68	0	0	0	112	0	0	
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%	1%	2%	4%	4%	4%	4%	
Turn Type	pm+pt	pm+pt				Perm			Perm	Perm			
Protected Phases	5	5	2		6					8			
Permitted Phases	2	2	5			6			8	8			
Actuated Green, G (s)		45.5	45.5		20.5	20.5				13.5			
Effective Green, g (s)		45.1	47.8		22.8	22.8				14.9			
Actuated g/C Ratio		0.38	0.40		0.19	0.19				0.12			
Clearance Time (s)		3.5	7.5		7.5	7.5				6.5			
Lane Grp Cap (vph)		479	1366		634	283				219			
v/s Ratio Prot		c0.10	0.08		0.07								
v/s Ratio Perm		c0.12				0.05				c0.06			
v/c Ratio		0.60	0.20		0.36	0.24				0.51			
Uniform Delay, d1		28.1	23.6		42.2	41.2				49.2			
Progression Factor		1.00	1.00		1.00	1.00				1.00			
Incremental Delay, d2		5.4	0.3		1.6	2.0				8.3			
Delay (s)		33.5	23.9		43.8	43.2				57.5			
Level of Service		C	C		D	D				E			
Approach Delay (s)			28.8		43.6					57.5			
Approach LOS			C		D					E			

Intersection Summary			
HCM Average Control Delay	38.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Hunting Park Ave & Henry Ave

Movement	SBL2	SBL	SBT	SBR	SBR2	SEL2	SEL	SET	SER	SER2	NWL2	NWL
Lane Configurations												
Volume (vph)	21	74	376	186	40	18	44	105	45	19	5	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	13	12	12	12	12	13	12	12	12	12
Total Lost time (s)		3.9	5.1	5.1			5.1	5.1				5.1
Lane Util. Factor		1.00	1.00	0.88			1.00	1.00				1.00
Frt		1.00	1.00	0.85			1.00	0.95				1.00
Flt Protected		0.95	1.00	1.00			0.95	1.00				0.95
Satd. Flow (prot)		1829	1925	2787			1752	1810				1681
Flt Permitted		0.40	1.00	1.00			0.54	1.00				0.52
Satd. Flow (perm)		779	1925	2787			1001	1810				917
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.92	0.88	0.88	0.88	0.88	0.92	0.92	0.87
Adj. Flow (vph)	24	83	85	209	43	20	50	119	51	10	5	45
RTOR Reduction (vph)	0	0	0	13	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	107	85	239	0	0	70	178	0	0	0	50
Heavy Vehicles (%)	2%	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	8%
Turn Type	pm+pt	pm+pt		Perm		Perm	Perm				Perm	Perm
Protected Phases	7	7	4					8				
Permitted Phases	4	4	4	4		9	9				13	13
Actuated Green, G (s)		28.5	28.5	28.5			25.5	25.5				26.5
Effective Green, g (s)		28.1	29.9	29.9			26.9	26.9				26.9
Actuated g/C Ratio		0.23	0.25	0.25			0.22	0.22				0.22
Clearance Time (s)		3.5	6.5	6.5			6.5	6.5				6.5
Lane Grp Cap (vph)		280	480	694			224	406				206
v/s Ratio Prot		c0.04	0.04					c0.10				
v/s Ratio Perm		0.05		0.09			0.07					0.05
v/c Ratio		0.38	0.18	0.34			0.31	0.44				0.24
Uniform Delay, d1		37.9	35.4	37.0			38.8	40.1				38.2
Progression Factor		1.00	1.00	1.00			1.00	1.00				1.00
Incremental Delay, d2		3.9	0.8	1.4			3.6	3.4				2.8
Delay (s)		41.8	36.2	38.4			42.4	43.5				41.0
Level of Service		D	D	D			D	D				D
Approach Delay (s)			38.8					43.2				
Approach LOS			D					D				

Intersection Summary

HCM Signalized Intersection Capacity Analysis
10: Hunting Park Ave & Henry Ave

Movement	NWL	NWR	NWR2
Lane Configurations			
Volume (vph)	82	60	4
Ideal Flow (vphpl)	1900	1900	1900
Lane Width	13	12	12
Total Lost time (s)	5.1		
Lane Util. Factor	1.00		
Frt	0.93		
Flt Protected	1.00		
Satd. Flow (prot)	1698		
Flt Permitted	1.00		
Satd. Flow (perm)	1698		
Peak-hour factor, PHF	0.87	0.87	0.87
Adj. Flow (vph)	94	69	5
RTOR Reduction (vph)	1	0	0
Lane Group Flow (vph)	167	0	0
Heavy Vehicles (%)	8%	8%	8%
Turn Type			
Protected Phases	13		
Permitted Phases			
Actuated Green, G (s)	25.5		
Effective Green, g (s)	26.9		
Actuated g/C Ratio	0.22		
Clearance Time (s)	6.5		
Lane Grp Cap (vph)	381		
v/s Ratio Prot	0.10		
v/s Ratio Perm			
v/c Ratio	0.44		
Uniform Delay, d1	40.1		
Progression Factor	1.00		
Incremental Delay, d2	3.6		
Delay (s)	43.7		
Level of Service	D		
Approach Delay (s)	43.1		
Approach LOS	D		

Intersection Summary

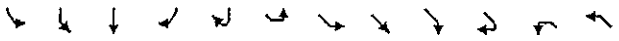
HCM Signalized Intersection Capacity Analysis
10: Hunting Park Ave & Henry Ave

Movement	EBL2	EBL	EBT	EBR	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	NBR2
Lane Configurations												
Volume (vph)	24	239	223	29	203	44	43	1	9	63	10	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	10	10	12	12	12	13	12	12
Total Lost time (s)		3.9	5.2		5.2	5.2				5.1		
Lane Util. Factor		0.91	0.91		0.95	1.00				1.00		
Frt		1.00	0.99		1.00	0.85				0.98		
Flt Protected		0.95	0.99		1.00	1.00				0.99		
Satd. Flow (prot)		1588	3254		3336	1492				1835		
Flt Permitted		0.47	0.46		1.00	1.00				0.96		
Satd. Flow (perm)		784	1502		3336	1492				1765		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.90	0.90	0.90	0.92	0.77	0.77	0.77	0.77
Adj. Flow (vph)	26	260	242	32	226	49	48	1	12	82	13	6
RTOR Reduction (vph)	0	0	0	0	0	29	0	0	0	2	0	0
Lane Group Flow (vph)	0	172	388	0	226	68	0	0	0	112	0	0
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%	1%	2%	4%	4%	4%	4%
Turn Type	pm+pt	pm+pt				Perm		Perm	Perm			
Protected Phases	5	5	2		6					8		
Permitted Phases	2	2	5			6		8	8			
Actuated Green, G (s)		45.5	45.5		20.5	20.5				13.5		
Effective Green, g (s)		45.1	47.8		22.8	22.8				14.9		
Actuated g/C Ratio		0.38	0.40		0.19	0.19				0.12		
Clearance Time (s)		3.5	7.5		7.5	7.5				6.5		
Lane Grp Cap (vph)		436	596		634	283				219		
v/s Ratio Prot		c0.07	0.12		0.07							
v/s Ratio Perm		c0.08				0.05				c0.06		
v/c Ratio		0.39	0.30		0.36	0.24				0.51		
Uniform Delay, d1		26.4	24.7		42.2	41.2				49.2		
Progression Factor		1.00	1.00		1.00	1.00				1.00		
Incremental Delay, d2		2.7	0.6		1.8	2.0				8.3		
Delay (s)		29.0	25.3		43.8	43.2				57.5		
Level of Service		C	C		D	D				E		
Approach Delay (s)			26.4		43.6					57.5		
Approach LOS			C		D					E		

Intersection Summary				
HCM Average Control Delay	38.2	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.41			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	65.9%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Hunting Park Ave & Henry Ave



Movement	SBL2	SBL	SBT	SBR	SBR2	SEL2	SEL	SET	SER	SER2	NWL2	NWL
Lane Configurations												
Volume (vph)	21	74	76	186	40	18	44	105	45	9	5	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	13	12	12	12	12	13	12	12	12	12
Total Lost time (s)		3.9	5.1	5.1			5.1	5.1				5.1
Lane Util. Factor		1.00	1.00	0.88			1.00	1.00				1.00
Frt		1.00	1.00	0.85			1.00	0.95				1.00
Flt Protected		0.95	1.00	1.00			0.95	1.00				0.95
Satd. Flow (prot)		1829	1925	2787			1752	1810				1681
Flt Permitted		0.40	1.00	1.00			0.54	1.00				0.52
Satd. Flow (perm)		779	1925	2787			1001	1810				917
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.92	0.88	0.88	0.88	0.88	0.92	0.92	0.87
Adj. Flow (vph)	24	83	85	209	43	20	50	119	51	10	5	45
RTOR Reduction (vph)	0	0	0	13	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	107	85	239	0	0	70	178	0	0	0	50
Heavy Vehicles (%)	2%	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	8%
Turn Type	pm+pt	pm+pt		Perm		Perm	Perm				Perm	Perm
Protected Phases	7	7	4					8				
Permitted Phases	4	4	4	4		9	9				13	13
Actuated Green, G (s)		28.5	28.5	28.5			25.5	25.5				25.5
Effective Green, g (s)		28.1	29.9	29.9			26.9	26.9				26.9
Actuated g/C Ratio		0.23	0.25	0.25			0.22	0.22				0.22
Clearance Time (s)		3.5	6.5	6.5			6.5	6.5				6.5
Lane Grp Cap (vph)		280	480	694			224	406				206
v/s Ratio Prot		c0.04	0.04					c0.10				
v/s Ratio Perm		0.05		0.09			0.07					0.05
v/c Ratio		0.38	0.18	0.34			0.31	0.44				0.24
Uniform Delay, d1		37.9	35.4	37.0			38.8	40.1				38.2
Progression Factor		1.00	1.00	1.00			1.00	1.00				1.00
Incremental Delay, d2		3.9	0.8	1.4			3.6	3.4				2.9
Delay (s)		41.8	36.2	38.4			42.4	43.5				41.0
Level of Service		D	D	D			D	D				D
Approach Delay (s)			38.8					43.2				
Approach LOS			D					D				

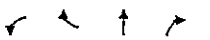
Intersection Summary

HCM Signalized Intersection Capacity Analysis
10: Hunting Park Ave & Henry Ave

Movement	NWL	NWR	NWR2
Lane Configurations			
Volume (vph)	82	60	4
Ideal Flow (vphpl)	1900	1900	1900
Lane Width	13	12	12
Total Lost time (s)	5.1		
Lane Util. Factor	1.00		
Frt	0.93		
Flt Protected	1.00		
Satd. Flow (prot)	1698		
Flt Permitted	1.00		
Satd. Flow (perm)	1698		
Peak-hour factor, PHF	0.87	0.87	0.87
Adj. Flow (vph)	94	69	5
RTOR Reduction (vph)	0	0	0
Lane Group Flow (vph)	167	0	0
Heavy Vehicles (%)	8%	8%	8%
Turn Type			
Protected Phases	13		
Permitted Phases			
Actuated Green, G (s)	25.5		
Effective Green, g (s)	26.9		
Actuated g/C Ratio	0.22		
Clearance Time (s)	6.5		
Lane Grp Cap (vph)	381		
v/s Ratio Prot	0.10		
v/s Ratio Perm			
v/c Ratio	0.44		
Uniform Delay, d1	40.1		
Progression Factor	1.00		
Incremental Delay, d2	3.6		
Delay (s)	43.7		
Level of Service	D		
Approach Delay (s)	43.1		
Approach LOS	D		

Intersection Summary			
HCM Average Control Delay		HCM Level of Service	
HCM Volume to Capacity ratio			
Actuated Cycle Length (s)		Sum of lost time (s)	
Intersection Capacity Utilization		ICU Level of Service	
Analysis Period (min)			

HCM Signalized Intersection Capacity Analysis
20: Roberts Ave & Henry Ave



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	135	49	331	25	29	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	14	12	13	12	12	12
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		0.95	1.00	1.00	0.95
Frt	0.96		1.00	0.85	1.00	1.00
Flt Protected	0.98		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1866		3693	1599	1770	3539
Flt Permitted	0.96		1.00	1.00	0.52	1.00
Satd. Flow (perm)	1866		3693	1599	962	3539
Peak-hour factor, PHF	0.88	0.88	0.86	0.86	0.92	0.92
Adj. Flow (vph)	153	56	385	145	32	297
RTOR Reduction (vph)	15	0	0	60	0	0
Lane Group Flow (vph)	194	0	385	85	32	297
Heavy Vehicles (%)	1%	1%	1%	1%	2%	2%
Turn Type				Perm	Perm	
Protected Phases	6		2			6
Permitted Phases				2	6	
Actuated Green, G (s)	27.0		50.4	50.4	50.4	50.4
Effective Green, g (s)	29.3		52.7	52.7	52.7	52.7
Actuated g/C Ratio	0.33		0.59	0.59	0.59	0.59
Clearance Time (s)	6.3		6.3	6.3	6.3	6.3
Lane Grp Cap (vph)	607		2162	936	563	2072
v/s Ratio Prot	c0.10		c0.10			0.08
v/s Ratio Perm				0.05	0.03	
v/c Ratio	0.32		0.18	0.09	0.06	0.14
Uniform Delay, d1	22.8		8.6	8.2	8.0	8.4
Progression Factor	1.00		1.00	1.00	0.59	0.58
Incremental Delay, d2	1.4		0.2	0.2	0.2	0.1
Delay (s)	24.2		8.8	8.4	4.9	5.1
Level of Service	C		A	A	A	A
Approach Delay (s)	24.2		8.7		5.1	
Approach LOS	C		A		A	

Intersection Summary			
HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

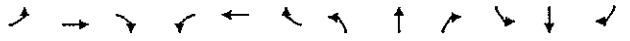
HCM Signalized Intersection Capacity Analysis
30: Abbottsford Ave & Henry Ave

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑		↰	↑↑
Volume (vph)	0	0	270	33	190	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.3		6.3	6.3
Lane Util. Factor			0.95		1.00	0.95
Frt			0.98		1.00	1.00
Flt Protected			1.00		0.95	1.00
Satd. Flow (prot)			3461		1770	3539
Flt Permitted			1.00		0.95	1.00
Satd. Flow (perm)			3461		1770	3539
Peak-hour factor, PHF	0.92	0.92	0.85	0.85	0.95	0.95
Adj. Flow (vph)	0	0	318	39	200	257
RTOR Reduction (vph)	0	0	11	0	0	0
Lane Group Flow (vph)	0	0	346	0	200	257
Turn Type					custom	
Protected Phases			2		3	6
Permitted Phases					3	
Actuated Green, G (s)			44.7		32.7	44.7
Effective Green, g (s)			44.7		32.7	44.7
Actuated g/C Ratio			0.50		0.36	0.50
Clearance Time (s)			6.3		6.3	6.3
Lane Grp Cap (vph)			1729		643	1758
v/s Ratio Prot			c0.10		c0.11	0.07
v/s Ratio Perm						
v/c Ratio			0.20		0.31	0.15
Uniform Delay, d1			12.7		20.6	12.3
Progression Factor			0.78		1.00	1.00
Incremental Delay, d2			0.3		1.3	0.2
Delay (s)			10.1		21.8	12.5
Level of Service			B		C	B
Approach Delay (s)	0.0		10.1		16.6	
Approach LOS	A		B		B	

Intersection Summary			
HCM Average Control Delay	13.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	29.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
60: Hunting Park Ave & Fox St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑		↰	↑↑		↰	↑	↱	↰	↑	
Volume (vph)	72	432	2	124	418	38	4	327	158	13	292	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	12	12	12	12	12	12
Total Lost time (s)	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	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1711	3419		1694	3348		1787	1881	1599	1787	1833	
Flt Permitted	0.35	1.00		0.47	1.00		0.32	1.00	1.00	0.37	1.00	
Satd. Flow (perm)	631	3419		841	3348		601	1881	1599	702	1833	
Peak-hour factor, PHF	0.88	0.88	0.88	0.84	0.84	0.84	0.92	0.92	0.92	0.88	0.88	0.88
Adj. Flow (vph)	82	491	2	148	498	43	4	355	172	15	332	68
RTOR Reduction (vph)	0	0	0	0	7	0	0	0	97	0	8	0
Lane Group Flow (vph)	82	493	0	148	534	0	4	355	75	15	392	0
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt			Perm			Perm		Perm	Perm		
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	48.6	48.6		38.7	38.7		30.6	30.6	30.6	30.6	30.6	
Effective Green, g (s)	48.2	50.0		40.1	40.1		32.0	32.0	32.0	32.0	32.0	
Actuated g/C Ratio	0.54	0.56		0.45	0.45		0.36	0.36	0.36	0.36	0.36	
Clearance Time (s)	3.6	5.4		5.4	5.4		5.4	5.4	5.4	5.4	5.4	
Lane Grp Cap (vph)	409	1899		375	1492		214	669	569	250	652	
v/s Ratio Prot	0.01	c0.14			0.16			0.19			c0.21	
v/s Ratio Perm	0.09			c0.18			0.01		0.05	0.02		
v/c Ratio	0.20	0.26		0.39	0.36		0.02	0.53	0.13	0.06	0.60	
Uniform Delay, d1	10.7	10.4		16.8	16.5		16.8	23.0	19.6	19.1	23.8	
Progression Factor	1.00	1.00		1.14	1.14		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.1	0.3		3.0	0.6		0.2	3.0	0.5	0.5	4.1	
Delay (s)	11.8	10.7		22.2	19.3		19.0	26.0	20.1	19.6	27.8	
Level of Service	B	B		C	B		B	C	C	B	C	
Approach Delay (s)		10.9			19.9			24.1			27.5	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	20.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

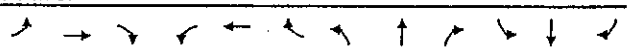
HCM Signalized Intersection Capacity Analysis
80: Roberts Ave & Fox St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	124	17	42	155	56	27	245	128	7	199	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	14	12	12	16	12	12	16	12
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			1.00	
Frt	1.00	0.98		1.00	0.96			0.96			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1770	1829		1805	1945			2013			2060	
Flt Permitted	0.58	1.00		0.65	1.00			0.97			0.99	
Satd. Flow (perm)	1082	1829		1227	1946			1954			2035	
Peak-hour factor, PHF	0.80	0.80	0.80	0.93	0.93	0.93	0.86	0.86	0.86	0.89	0.89	0.89
Adj. Flow (vph)	25	155	21	153	167	60	31	285	149	8	224	47
RTOR Reduction (vph)	0	8	0	0	22	0	0	28	0	0	12	0
Lane Group Flow (vph)	25	168	0	153	205	0	0	437	0	0	267	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	22.0	22.0		22.0	22.0			27.0			27.0	
Effective Green, g (s)	23.0	23.0		23.0	23.0			29.0			29.0	
Actuated g/C Ratio	0.38	0.38		0.38	0.38			0.48			0.48	
Clearance Time (s)	5.0	5.0		5.0	5.0			6.0			6.0	
Lane Grp Cap (vph)	415	701		470	746			944			984	
v/s Ratio Prot		0.09			0.11							
v/s Ratio Perm	0.02			c0.12				c0.22			0.13	
v/c Ratio	0.06	0.24		0.33	0.28			0.46			0.27	
Uniform Delay, d1	11.7	12.6		13.0	12.8			10.3			8.9	
Progression Factor	1.00	1.00		0.68	0.65			1.00			1.28	
Incremental Delay, d2	0.3	0.8		1.7	0.9			1.6			0.7	
Delay (s)	12.0	13.4		10.6	9.1			11.9			12.5	
Level of Service	B	B		B	A			B			B	
Approach Delay (s)		13.2			9.7			11.9			12.5	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	11.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
90: Abbottsford Ave & Fox St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	57	264	13	0	0	0	0	240	105	27	229	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	12	12	12	12	11	12	11	11	12
Total Lost time (s)		4.0						4.0		4.0	4.0	
Lane Util. Factor		0.95						0.95		1.00	1.00	
Frt		0.99						0.95		1.00	1.00	
Flt Protected		0.99						1.00		0.95	1.00	
Satd. Flow (prot)		3677						3297		1745	1837	
Flt Permitted		0.99						1.00		0.40	1.00	
Satd. Flow (perm)		3677						3297		730	1837	
Peak-hour factor, PHF	0.89	0.89	0.89	0.92	0.92	0.92	0.86	0.86	0.86	0.92	0.92	0.92
Adj. Flow (vph)	64	297	15	0	0	0	0	279	122	301	249	0
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	371	0	0	0	0	0	401	0	301	249	0
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	1%	1%	1%	0%	0%	0%
Turn Type	Perm									pm+pt		
Protected Phases		4						2		1	6	
Permitted Phases	4									6	1	
Actuated Green, G (s)		21.0						19.2		28.2	28.2	
Effective Green, g (s)		22.4						20.6		27.8	29.6	
Actuated g/C Ratio		0.37						0.34		0.46	0.49	
Clearance Time (s)		5.4						5.4		3.6	5.4	
Lane Grp Cap (vph)		1373						1132		423	906	
v/s Ratio Prot								0.12		c0.06	0.14	
v/s Ratio Perm		0.10								0.27		
v/c Ratio		0.27						0.35		0.71	0.27	
Uniform Delay, d1		13.1						14.7		12.0	8.9	
Progression Factor		1.00						1.53		1.00	0.86	
Incremental Delay, d2		0.5						0.6		9.2	0.7	
Delay (s)		13.6						23.3		21.1	8.4	
Level of Service		B						C		C	A	
Approach Delay (s)		13.6			0.0			23.3			15.3	
Approach LOS		B			A			C			B	

Intersection Summary			
HCM Average Control Delay	17.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

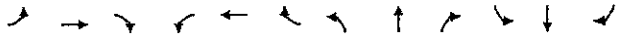
HCM Signalized Intersection Capacity Analysis
100: SB Route 1 On Ramp & Fox St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	230	215	270	42	132	0	0	269	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	15	15	12	11	11	12	12	11	12
Total Lost time (s)					4.0		4.0	4.0			4.0	
Lane Util. Factor					0.95		1.00	1.00			0.95	
Frt					0.94		1.00	1.00			0.96	
Flt Protected					0.98		0.95	1.00			1.00	
Satd. Flow (prot)					3650		1711	1801			3270	
Flt Permitted					0.98		0.39	1.00			1.00	
Satd. Flow (perm)					3650		711	1801			3270	
Peak-hour factor, PHF	0.92	0.92	0.92	0.98	0.98	0.98	0.74	0.74	0.74	0.94	0.94	0.94
Adj. Flow (vph)	0	0	0	235	219	276	192	178	0	0	286	119
RTOR Reduction (vph)	0	0	0	0	154	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	576	0	192	178	0	0	405	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Turn Type				Perm			pm+pt					
Protected Phases					8		5	2			6	
Permitted Phases				8			2	5				
Actuated Green, G (s)					21.6		28.6	28.6			19.8	
Effective Green, g (s)					22.4		27.8	29.5			20.6	
Actuated g/C Ratio					0.37		0.46	0.49			0.34	
Clearance Time (s)					4.8		3.0	4.8			4.8	
Lane Grp Cap (vph)					1363		413	888			1123	
v/s Ratio Prot							c0.04	0.10			0.12	
v/s Ratio Perm					0.16		c0.18					
v/c Ratio					0.42		0.46	0.20			0.36	
Uniform Delay, d1					14.0		8.0	8.5			14.8	
Progression Factor					1.00		0.92	0.45			1.00	
Incremental Delay, d2					1.0		3.6	0.7			0.9	
Delay (s)					15.0		12.8	4.3			15.7	
Level of Service					B		B	A			B	
Approach Delay (s)	0.0				15.0			8.7			15.7	
Approach LOS	A				B			A			B	

Intersection Summary			
HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
160: Hunting Park Ave & Wissahickon Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	96	461	0	0	464	162	22	134	13	240	218	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	15	12	11	11	12	11	11	11
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			0.95			0.95		1.00	1.00	1.00
Frt	1.00	1.00			0.96			0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00			0.99		0.95	1.00	1.00
Satd. Flow (prot)	1745	3490			3817			3426		1745	1837	1561
Flt Permitted	0.27	1.00			1.00			0.89		0.49	1.00	1.00
Satd. Flow (perm)	497	3490			3817			3074		907	1837	1561
Peak-hour factor, PHF	0.95	0.95	0.95	0.96	0.96	0.96	0.88	0.88	0.88	0.91	0.91	0.91
Adj. Flow (vph)	101	485	0	0	483	169	25	152	15	264	240	77
RTOR Reduction (vph)	0	0	0	0	39	0	0	0	0	0	0	47
Lane Group Flow (vph)	101	485	0	0	613	0	0	192	0	264	240	30
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt				Perm					pm+pt		Perm
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2	5						8		4	7	4
Actuated Green, G (s)	45.6	45.6			34.6			16.2		33.6	33.6	33.6
Effective Green, g (s)	45.2	47.0			36.2			17.6		33.2	35.0	35.0
Actuated g/C Ratio	0.50	0.52			0.40			0.20		0.37	0.39	0.39
Clearance Time (s)	3.6	5.4			5.4			5.4		3.6	5.4	5.4
Lane Grp Cap (vph)	344	1823			1535			601		459	714	607
v/s Ratio Prot	0.02	c0.14			c0.16					c0.09	0.13	
v/s Ratio Perm	0.13							0.06				0.02
v/c Ratio	0.29	0.27			0.40			0.32		0.58	0.34	0.05
Uniform Delay, d1	12.9	11.9			19.2			31.1		21.3	15.3	14.1
Progression Factor	0.75	0.67			1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	2.1	0.4			0.8			1.4		5.2	1.3	0.2
Delay (s)	11.8	8.4			19.9			32.5		26.4	20.6	17.3
Level of Service	B	A			B			C		C	C	B
Approach Delay (s)		9.0			19.9			32.5			22.8	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM Average Control Delay	18.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

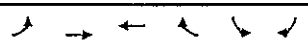
HCM Signalized Intersection Capacity Analysis
170: Roberts Ave & Wissahickon Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	71	195	22	74	247	133	18	364	45	31	424	133
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	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1835		1770	1863	1583	1770	3481		1770	3412	
Flt Permitted	0.51	1.00		0.58	1.00	1.00	0.41	1.00		0.48	1.00	
Satd. Flow (perm)	958	1835		1080	1863	1583	755	3481		901	3412	
Peak-hour factor, PHF	0.95	0.95	0.95	0.88	0.88	0.88	0.92	0.92	0.92	0.98	0.98	0.98
Adj. Flow (vph)	75	205	23	84	281	151	20	396	49	32	433	136
RTOR Reduction (vph)	0	7	0	0	0	93	0	16	0	0	50	0
Lane Group Flow (vph)	75	221	0	84	281	58	20	429	0	32	519	0
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	21.6	21.6		21.6	21.6	21.6	27.0	27.0		27.0	27.0	
Effective Green, g (s)	23.0	23.0		23.0	23.0	23.0	29.0	29.0		29.0	29.0	
Actuated g/C Ratio	0.38	0.38		0.38	0.38	0.38	0.48	0.48		0.48	0.48	
Clearance Time (s)	5.4	5.4		5.4	5.4	5.4	6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	367	703		414	714	607	365	1682		435	1649	
v/s Ratio Prot		0.12			c0.15			0.12			c0.15	
v/s Ratio Perm	0.08			0.08		0.04	0.03			0.04		
v/c Ratio	0.20	0.31		0.20	0.39	0.10	0.05	0.26		0.07	0.31	
Uniform Delay, d1	12.4	13.0		12.4	13.4	11.8	8.2	9.1		8.3	9.4	
Progression Factor	1.24	1.26		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.3	1.1		1.1	1.6	0.3	0.3	0.3		0.3	0.5	
Delay (s)	16.6	17.5		13.5	15.1	12.2	8.5	9.5		8.6	9.9	
Level of Service	B	B		B	B	B	A	A		A	A	
Approach Delay (s)		17.3			14.0			9.5			9.9	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	12.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
55: Roberts Ave & McMichael Street



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Volume (veh/h)	5	142	173	97	19	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.84	0.84	0.91	0.91	0.82	0.82
Hourly flow rate (vph)	6	169	190	41	23	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		1050	419			
pX, platoon unblocked						
vC, conflicting volume	231				391	210
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	231				391	210
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				96	99
cM capacity (veh/h)	1337				610	830

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	175	231	29
Volume Left	6	0	23
Volume Right	0	41	6
cSH	1337	1700	646
Volume to Capacity	0.00	0.14	0.05
Queue Length 95th (ft)	0	0	4
Control Delay (s)	0.3	0.0	10.8
Lane LOS	A		B
Approach Delay (s)	0.3	0.0	10.8
Approach LOS			B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	21.5%	ICU Level of Service	A
Analysis Period (min)	15		

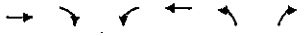
HCM Unsignalized Intersection Capacity Analysis
110: Roberts Ave & Stokley St

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Volume (veh/h)	3	257	348	4	2	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.90	0.90	0.80	0.80
Hourly flow rate (vph)	3	282	387	16	2	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		535				
pX, platoon unblocked						
vC, conflicting volume	402				683	394
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	402				683	394
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	99
cM capacity (veh/h)	1156				413	655

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	286	402	9
Volume Left	3	0	2
Volume Right	0	16	5
cSH	1156	1700	548
Volume to Capacity	0.00	0.24	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.1	0.0	11.7
Lane LOS	A		B
Approach Delay (s)	0.1	0.0	11.7
Approach LOS			B

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	29.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
120: Abbottsford Ave & Stokley St



Movement	EBL	EBR	NBL	NBT	NBR
Lane Configurations					
Volume (veh/h)	607	5	0	0	17
Sign Control	Free		Free	Stop	
Grade	0%		0%	0%	
Peak Hour Factor	0.88	0.88	0.92	0.92	0.83	0.83
Hourly flow rate (vph)	690	5	0	0	0	17
Pedestrians					
Lane Width (ft)					
Walking Speed (ft/s)					
Percent Blockage					
Right turn flare (veh)					
Median type	None		None		
Median storage veh)					
Upstream signal (ft)	542				
pX, platoon unblocked			0.85	0.85	0.85
vC, conflicting volume			694	692	692
vC1, stage 1 conf vol					
vC2, stage 2 conf vol					
vCu, unblocked vol			550	547	547
tC, single (s)			4.1	6.4	6.2
tC, 2 stage (s)					
tF (s)			2.2	3.5	3.3
p0 queue free %			100	100	96
cM capacity (veh/h)			865	422	455

Direction, Lane #	EB 1	NB 1
Volume Total	694	17
Volume Left	0	0
Volume Right	5	17
cSH	1700	455
Volume to Capacity	0.41	0.04
Queue Length 95th (ft)	0	3
Control Delay (s)	0.0	13.2
Lane LOS		B
Approach Delay (s)	0.0	13.2
Approach LOS		B

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
180: Abbottsford Ave & Wissahickon Ave

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	356	0	599	261	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.94	0.94	0.92	0.92
Hourly flow rate (vph)	0	383	0	637	284	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage veh)						
Upstream signal (ft)				1046		
pX, platoon unblocked						
vC, conflicting volume	602	142	284			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	602	142	284			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	57	100			
cM capacity (veh/h)	436	886	1290			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	383	319	319	142	142
Volume Left	0	0	0	0	0
Volume Right	383	0	0	0	0
cSH	886	1700	1700	1700	1700
Volume to Capacity	0.43	0.19	0.19	0.08	0.08
Queue Length 95th (ft)	55	0	0	0	0
Control Delay (s)	12.1	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	12.1	0.0		0.0	
Approach LOS	B				

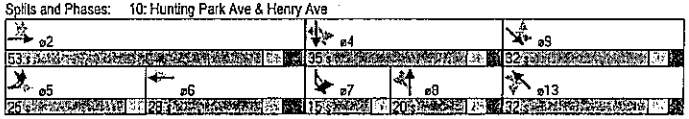
Intersection Summary			
Average Delay	3.6		
Intersection Capacity Utilization	35.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL2	EBL	EBT	WBT	WBR	NBL2	NBL	NBT	SBL2	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	24	239	223	203	44	19	63	121	74	76	186	
Lane Group Flow (vph)	0	172	388	226	97	0	0	114	0	107	85	252
Turn Type	pm+pt	pm+pt			Perm	Perm	Perm		pm+pt	pm+pt		Perm
Protected Phases	5	5	2	6				8	7	7	4	
Permitted Phases	2	2			6	8	8		4	4		4
Minimum Split (s)	7.6	7.6	11.5	11.5	11.5	10.5	10.5	10.5	9.4	9.4	10.5	10.5
Total Split (s)	25.0	25.0	53.0	28.0	28.0	20.0	20.0	20.0	15.0	15.0	35.0	35.0
Total Split (%)	20.8%	20.8%	44.2%	23.3%	23.3%	16.7%	16.7%	16.7%	12.5%	12.5%	29.2%	29.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.0	0.0	4.0	4.0	4.0	3.0	3.0	3.0	0.0	0.0	3.0	3.0
Lost Time Adjust (s)	1.4	1.4	2.3	2.3	2.3	0.0	1.4	1.4	1.4	1.4	1.4	1.4
Total Lost Time (s)	3.9	3.9	5.2	5.2	5.2	6.5	5.1	5.1	3.9	3.9	5.1	5.1
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lead		
Lead-Lag Optimize?												
v/c Ratio	0.37	0.30	0.36	0.31			0.52		0.36	0.18	0.36	
Control Delay	26.2	25.5	44.1	29.7			57.4		38.8	36.6	36.2	
Queue Delay	0.0	0.0	0.0	0.0			0.0		0.0	0.0	0.0	
Total Delay	26.2	25.5	44.1	29.7			57.4		38.8	36.6	36.2	
Queue Length 50th (ft)	95	111	81	40			82		65	52	85	
Queue Length 95th (ft)	154	152	120	92			121		114	95	126	
Internal Link Dist (ft)		659	1975		250		402			1653		
Turn Bay Length (ft)	450								150		415	
Base Capacity (vph)	462	441	1297	634	313		221		299	480	707	
Starvation Cap Reductn	0	0	0	0	0		0		0	0	0	
Spillback Cap Reductn	0	0	0	0	0		0		0	0	0	
Storage Cap Reductn	0	0	0	0			0		0	0	0	
Reduced v/c Ratio	0.37	0.30	0.36	0.31			0.52		0.36	0.18	0.36	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green, Master Intersection
Natural Cycle: 55
Control Type: Pretimed

Splits and Phases: 10: Hunting Park Ave & Henry Ave



Lanes, Volumes, Timings
10: Hunting Park Ave & Henry Ave

Lane Group	SEL2	SEL	SET	NWL2	NWL	NWT
Lane Configurations						
Volume (vph)	18	44	105	5	99	82
Lane Group Flow (vph)	0	70	180	0	50	168
Turn Type	Perm	Perm		Perm	Perm	
Protected Phases			9			13
Permitted Phases	9	9		13	13	
Minimum Split (s)	10.5	10.5	10.5	10.5	10.5	10.5
Total Split (s)	32.0	32.0	32.0	32.0	32.0	32.0
Total Split (%)	26.7%	26.7%	26.7%	26.7%	26.7%	26.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	1.4	1.4	1.4	0.0	1.4	1.4
Total Lost Time (s)	5.1	5.1	5.1	6.5	5.1	5.1
Lead/Lag						
Lead-Lag Optimize?						
v/c Ratio	0.31	0.44		0.24	0.44	
Control Delay	43.5	43.7		42.1	44.1	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	43.5	43.7		42.1	44.1	
Queue Length 50th (ft)	46	120		32	112	
Queue Length 95th (ft)	89	186		67	175	
Internal Link Dist (ft)		387			1698	
Turn Bay Length (ft)	105			105		
Base Capacity (vph)	224	407		205	381	
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	0.31	0.44		0.24	0.44	

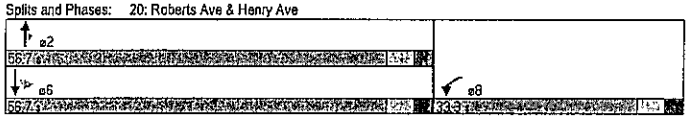
Intersection Summary

Lanes, Volumes, Timings
20: Roberts Ave & Henry Ave

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations					
Volume (vph)	135	331	125	29	273
Lane Group Flow (vph)	209	385	145	32	297
Turn Type			Perm	Perm	
Protected Phases	8	2			6
Permitted Phases			2	6	
Minimum Split (s)	33.3	10.3	10.3	10.3	10.3
Total Split (s)	33.3	56.7	56.7	56.7	56.7
Total Split (%)	37.0%	63.0%	63.0%	63.0%	63.0%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7
Lost Time Adjust (s)	2.3	2.3	2.3	2.3	2.3
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag					
Lead-Lag Optimize?					
v/c Ratio	0.34	0.18	0.15	0.06	0.14
Control Delay	22.3	8.9	1.9	5.1	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	22.3	8.9	1.9	5.1	5.1
Queue Length 50th (ft)	79	48	0	4	17
Queue Length 95th (ft)	134	67	20	9	25
Internal Link Dist (ft)	208	970	1653	250	130	767
Turn Bay Length (ft)					
Base Capacity (vph)	623	2162	996	564	2072
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.34	0.18	0.15	0.06	0.14

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 45
Control Type: Pretimed

Splits and Phases: 20: Roberts Ave & Henry Ave

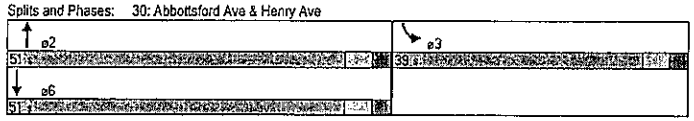


Lanes, Volumes, Timings
30: Abbottsford Ave & Henry Ave

Lane Group	NBT	SBL	SBT
Lane Configurations			
Volume (vph)	270	190	244
Lane Group Flow (vph)	357	200	257
Turn Type		Custom	
Protected Phases	2	3	6
Permitted Phases		2	
Minimum Split (s)	22.3	10.3	22.3
Total Split (s)	51.0	39.0	51.0
Total Split (%)	56.7%	43.3%	56.7%
Yellow Time (s)	3.6	3.6	3.6
All-Red Time (s)	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3
Lead/Lag			
Lead-Lag Optimize?			
v/c Ratio	0.21	0.31	0.15
Control Delay	9.6	22.3	12.6
Queue Delay	0.0	0.0	0.0
Total Delay	9.6	22.3	12.6
Queue Length 50th (ft)	39	80	40
Queue Length 95th (ft)	53	135	81
Internal Link Dist (ft)	767		576
Turn Bay Length (ft)		200	
Base Capacity (vph)	1740	643	1758
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.21	0.31	0.15

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 40
Control Type: Pretimed

Splits and Phases: 30: Abbottsford Ave & Henry Ave

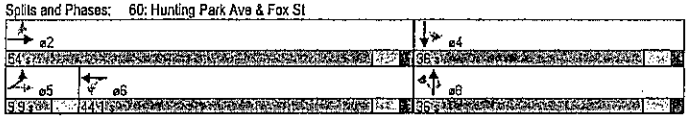


Lanes, Volumes, Timings
60: Hunting Park Ave & Fox St

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	72	432	124	418	4	327	158	13	292
Lane Group Flow (vph)	82	493	148	541	4	355	172	15	400
Turn Type	pm+pt		Perm		Perm		Perm	Perm	
Protected Phases	5	2		6		8			4
Permitted Phases	2		6		8		8	4	
Minimum Split (s)	7.6	9.4	9.4	9.4	20.0	20.0	20.0	20.0	20.0
Total Split (s)	9.9	54.0	44.1	44.1	36.0	36.0	36.0	36.0	36.0
Total Split (%)	11.0%	60.0%	49.0%	49.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	0.0	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Lost Time Adjust (s)	0.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead		Lag	Lag					
Lead-Lag Optimize?	Yes		Yes	Yes					
v/c Ratio	0.19	0.26	0.39	0.36	0.02	0.53	0.26	0.06	0.61
Control Delay	10.5	10.8	23.2	19.1	19.2	26.6	6.0	20.1	27.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.5	10.8	23.2	19.1	19.2	26.6	6.0	20.1	27.7
Queue Length 50th (ft)	20	71	75	139	1	158	8	6	178
Queue Length 95th (ft)	40	96	123	172	9	243	50	19	265
Internal Link Dist (ft)		1975		1584		899			1718
Turn Bay Length (ft)	100		100		100		100	105	
Base Capacity (vph)	421	1899	375	1498	214	669	665	250	660
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.26	0.39	0.36	0.02	0.53	0.26	0.06	0.61

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 45
Control Type: Pretimed

Splits and Phases: 60: Hunting Park Ave & Fox St

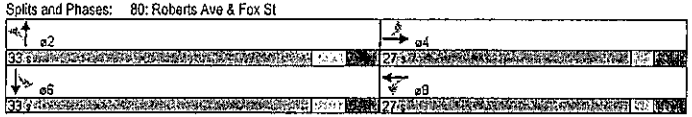


Lanes, Volumes, Timings
80: Roberts Ave & Fox St

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	20	124	142	155	27	245	7	199
Lane Group Flow (vph)	25	176	153	227	0	465	0	279
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Minimum Split (s)	9.0	9.0	9.0	9.0	10.0	10.0	10.0	10.0
Total Split (s)	27.0	27.0	27.0	27.0	33.0	33.0	33.0	33.0
Total Split (%)	45.0%	45.0%	45.0%	45.0%	55.0%	55.0%	55.0%	55.0%
Yellow Time (s)	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag								
Lead-Lag Optimize?								
v/c Ratio	0.06	0.25	0.33	0.30		0.48		0.28
Control Delay	12.3	12.8	11.0	8.1		11.1		11.8
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	12.3	12.8	11.0	8.1		11.1		11.8
Queue Length 50th (ft)	6	39	24	28		91		47
Queue Length 95th (ft)	16	66	47	53		146		82
Internal Link Dist (ft)		339		455		1718		932
Turn Bay Length (ft)	105		105					
Base Capacity (vph)	415	709	470	768		974		996
Starvation Cap Reductn	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0		0		0
Reduced v/c Ratio	0.06	0.25	0.33	0.30		0.48		0.28

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 40
Control Type: Pretimed

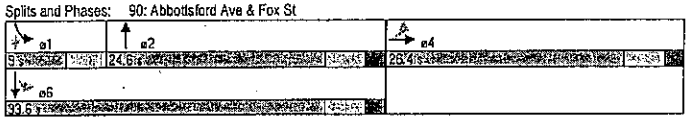
Splits and Phases: 80: Roberts Ave & Fox St



Lane Group	EBT	NBL	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	264	240	277	229	
Lane Group Flow (vph)	376	401	301	249	
Turn Type			pm+ov		
Protected Phases	4	2	1	6	
Permitted Phases			6		
Minimum Split (s)	9.4	9.4	7.6	9.4	
Total Split (s)	26.4	24.6	9.0	33.6	
Total Split (%)	44.0%	41.0%	15.0%	56.0%	
Yellow Time (s)	3.6	3.6	3.6	3.6	
All-Red Time (s)	1.8	1.8	0.0	1.8	
Lost Time Adjust (s)	1.4	1.4	0.4	1.4	
Total Lost Time (s)	4.0	4.0	4.0	4.0	
Lead/Lag		Lag	Lead		
Lead-Lag Optimize?					
v/c Ratio	0.27	0.35	0.66	0.27	
Control Delay	13.5	23.7	19.1	8.6	
Queue Delay	0.0	0.0	2.1	1.1	
Total Delay	13.5	23.7	21.3	9.7	
Queue Length 50th (ft)	147	173	51	41	
Queue Length 95th (ft)	74	105	#99	74	
Internal Link Dist (ft)	1415	932		119	
Turn Bay Length (ft)					
Base Capacity (vph)	1378	1132	444	1906	
Starvation Cap Reductn	0	0	57	440	
Spillback Cap Reductn	0	0	20	0	
Storage Cap Reductn	0	0	0	0	
Reduced v/c Ratio	0.27	0.35	0.76	0.53	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 40
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

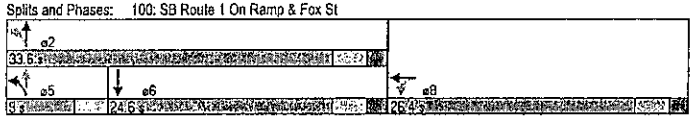
Splits and Phases: 90: Abbottsford Ave & Fox St



Lane Group	WBL	NBL	NBT	SBT
Lane Configurations				
Volume (vph)	215	142	132	269
Lane Group Flow (vph)	730	192	178	405
Turn Type		pm+pt		
Protected Phases	8	5	2	6
Permitted Phases		2		
Minimum Split (s)	8.8	7.0	8.8	8.8
Total Split (s)	26.4	9.0	33.6	24.6
Total Split (%)	44.0%	15.0%	56.0%	41.0%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	1.8	0.0	1.8	1.8
Lost Time Adjust (s)	0.8	1.0	0.8	0.8
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag		Lead		Lag
Lead-Lag Optimize?				
v/c Ratio	0.48	0.44	0.20	0.36
Control Delay	10.5	11.5	4.4	15.9
Queue Delay	0.0	0.5	0.6	0.0
Total Delay	10.5	12.0	5.0	15.9
Queue Length 50th (ft)	64	16	15	56
Queue Length 95th (ft)	106	31	22	88
Internal Link Dist (ft)	377		119	792
Turn Bay Length (ft)				
Base Capacity (vph)	1515	434	888	1123
Starvation Cap Reductn	0	58	420	0
Spillback Cap Reductn	63	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.50	0.51	0.36	0.36

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 40
Control Type: Pretimed

Splits and Phases: 100: SB Route 1 On Ramp & Fox St

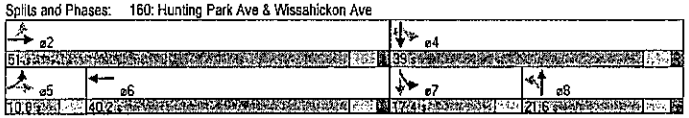


Lanes, Volumes, Timings
160: Hunting Park Ave & Wissahickon Ave

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations								
Volume (vph)	96	461	464	22	134	240	218	70
Lane Group Flow (vph)	101	485	652	0	192	264	240	77
Turn Type	pm+pt		Perm		pm+pt			Perm
Protected Phases	5	2	6		8	7	4	
Permitted Phases	2			8		4		4
Minimum Split (s)	7.6	9.4	9.4	9.4	9.4	7.6	9.4	9.4
Total Split (s)	10.8	51.0	40.2	21.6	21.6	17.4	39.0	39.0
Total Split (%)	12.0%	56.7%	44.7%	24.0%	24.0%	19.3%	43.3%	43.3%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	0.0	1.8	1.8	1.8	1.8	0.0	1.8	1.8
Lost Time Adjust (s)	0.4	1.4	1.4	1.4	1.4	0.4	1.4	1.4
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead		Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes		
v/c Ratio	0.29	0.27	0.41		0.32	0.55	0.34	0.12
Control Delay	10.4	8.5	18.2		32.8	24.9	21.0	4.9
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	10.4	8.5	18.2		32.8	24.9	21.0	4.9
Queue Length 50th (ft)	16	41	122		50	106	94	0
Queue Length 95th (ft)	34	64	167		79	171	153	26
Internal Link Dist (ft)		1584	1151		464		2048	
Turn Bay Length (ft)	85							275
Base Capacity (vph)	354	1823	1574		601	477	714	654
Starvation Cap Reductn	0	0	0		0	0	0	0
Spillback Cap Reductn	0	0	0		0	0	0	0
Storage Cap Reductn	0	0	0		0	0	0	0
Reduced v/c Ratio	0.29	0.27	0.41		0.32	0.55	0.34	0.12

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 16.7 (19%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 40
Control Type: Pretimed

Splits and Phases: 160: Hunting Park Ave & Wissahickon Ave



Lanes, Volumes, Timings
170: Roberts Ave & Wissahickon Ave

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	71	195	74	247	133	19	364	31	424
Lane Group Flow (vph)	75	228	84	281	151	20	445	32	569
Turn Type	Perm		Perm		Perm	Perm		Perm	
Protected Phases		4		8			2		6
Permitted Phases	4		8		8	2		6	
Minimum Split (s)	9.4	9.4	9.4	9.4	9.4	10.0	10.0	10.0	10.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	33.0	33.0	33.0	33.0
Total Split (%)	45.0%	45.0%	45.0%	45.0%	45.0%	55.0%	55.0%	55.0%	55.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.4	2.4	2.4	2.4	2.4	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	1.4	1.4	1.4	1.4	1.4	2.0	2.0	2.0	2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag									
Lead-Lag Optimize?									
v/c Ratio	0.20	0.32	0.20	0.39	0.22	0.05	0.26	0.07	0.33
Control Delay	17.3	17.2	14.1	15.5	3.5	8.8	9.0	9.0	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.3	17.2	14.1	15.5	3.5	8.8	9.0	9.0	8.4
Queue Length 50th (ft)	20	63	20	71	0	4	43	6	60
Queue Length 95th (ft)	m47	111	46	123	28	13	67	18	78
Internal Link Dist (ft)		1436		740			2048		966
Turn Bay Length (ft)	100		150			100		65	
Base Capacity (vph)	369	710	414	714	700	364	1698	435	699
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.32	0.20	0.39	0.22	0.05	0.26	0.07	0.33

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 20 (33%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 40
Control Type: Pretimed
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 170: Roberts Ave & Wissahickon Ave