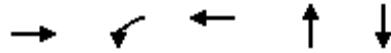


Queues

7: N. Delaware Ave & Shackamaxon Ave

05/18/2007



Lane Group	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	2388	12	572	40	91
v/c Ratio	0.69	0.16	0.17	0.14	0.23
Control Delay	6.9	10.0	4.7	27.0	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.9	10.0	4.7	27.0	16.6
Queue Length 50th (ft)	138	2	34	16	18
Queue Length 95th (ft)	138	2	45	43	58
Internal Link Dist (ft)	690		321	53	1237
Turn Bay Length (ft)		80			
Base Capacity (vph)	3455	77	3458	288	389
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	0.69	0.16	0.17	0.14	0.23

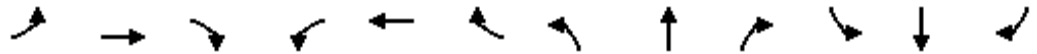
Intersection Summary

* In the Synchro Analysis for this intersection, Delaware Avenue is layed out as an east-west roadway.

HCM Signalized Intersection Capacity Analysis

7: N. Delaware Ave & Shackamaxon Ave

05/18/2007



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↔	↑↑↑			↔			↔	
Volume (vph)	0	2165	7	3	503	0	23	0	3	24	0	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	11	12	12	12	12	12	16	16	16
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		0.91		1.00	0.91			1.00			1.00	
Frt		1.00		1.00	1.00			0.98			0.92	
Flt Protected		1.00		0.95	1.00			0.96			0.98	
Satd. Flow (prot)		4937		1662	4940			1701			1853	
Flt Permitted		1.00		0.06	1.00			0.76			0.87	
Satd. Flow (perm)		4937		111	4940			1341			1647	
Peak-hour factor, PHF	0.92	0.91	0.75	0.25	0.88	0.92	0.67	0.92	0.50	0.61	0.92	0.65
Adj. Flow (vph)	0	2379	9	12	572	0	34	0	6	39	0	52
RTOR Reduction (vph)	0	0	0	0	0	0	0	5	0	0	41	0
Lane Group Flow (vph)	0	2388	0	12	572	0	0	35	0	0	50	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)			10			10				10		10
Turn Type				Perm			Perm			Perm		
Protected Phases					8			2			2	
Permitted Phases		4		8			2			2		
Actuated Green, G (s)		62.0		62.0	62.0			17.0			17.0	
Effective Green, g (s)		63.0		63.0	63.0			19.0			19.0	
Actuated g/C Ratio		0.70		0.70	0.70			0.21			0.21	
Clearance Time (s)		5.0		5.0	5.0			6.0			6.0	
Lane Grp Cap (vph)		3456		78	3458			283			348	
v/s Ratio Prot					0.12							
v/s Ratio Perm		c0.48		0.11				0.03			c0.03	
v/c Ratio		0.69		0.15	0.17			0.12			0.14	
Uniform Delay, d1		7.8		4.5	4.6			28.8			28.9	
Progression Factor		0.73		1.00	1.00			1.00			1.00	
Incremental Delay, d2		1.0		4.2	0.1			0.9			0.9	
Delay (s)		6.7		8.7	4.7			29.7			29.7	
Level of Service		A		A	A			C			C	
Approach Delay (s)		6.7			4.8			29.7			29.7	
Approach LOS		A			A			C			C	

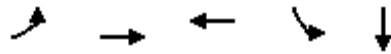
Intersection Summary

HCM Average Control Delay	7.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

8: N. Delaware Ave & Frankford Ave

05/18/2007



Lane Group	EBL	EBT	WBT	SBL	SBT
Lane Group Flow (vph)	393	1920	580	125	179
v/c Ratio	0.71	0.61	0.23	0.43	0.25
Control Delay	18.6	16.2	8.8	34.0	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	18.6	16.2	8.8	34.0	0.8
Queue Length 50th (ft)	144	320	40	60	0
Queue Length 95th (ft)	m170	375	55	114	0
Internal Link Dist (ft)		1382	690		19
Turn Bay Length (ft)	320				
Base Capacity (vph)	553	3129	2553	294	713
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	0.71	0.61	0.23	0.43	0.25

Intersection Summary

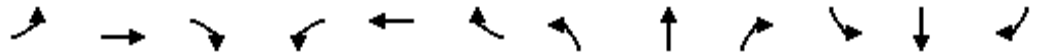
m Volume for 95th percentile queue is metered by upstream signal

* In the Synchro Analysis for this intersection, Delaware Avenue is layed out as an east-west roadway.

HCM Signalized Intersection Capacity Analysis

8: N. Delaware Ave & Frankford Ave

05/18/2007



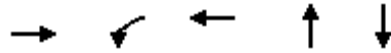
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑		↖	↑↑↑			↕		↖	↗	
Volume (vph)	362	1766	0	0	485	59	0	0	0	115	0	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	13	12	15
Total Lost time (s)	4.0	4.0			4.0					4.0	4.0	
Lane Util. Factor	1.00	0.91			0.91					1.00	1.00	
Frt	1.00	1.00			0.98					1.00	0.85	
Flt Protected	0.95	1.00			1.00					0.95	1.00	
Satd. Flow (prot)	1719	4693			4858					1510	1538	
Flt Permitted	0.37	1.00			1.00					0.76	1.00	
Satd. Flow (perm)	673	4693			4858					1203	1538	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.94	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	393	1920	0	0	516	64	0	0	0	125	0	179
RTOR Reduction (vph)	0	0	0	0	17	0	0	0	0	0	135	0
Lane Group Flow (vph)	393	1920	0	0	563	0	0	0	0	125	44	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)		10								10		10
Turn Type	pm+pt			Perm			Perm			Perm		
Protected Phases	7	4			8			2				6
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	58.0	58.0			45.0					20.0	20.0	
Effective Green, g (s)	57.0	60.0			47.0					22.0	22.0	
Actuated g/C Ratio	0.63	0.67			0.52					0.24	0.24	
Clearance Time (s)	3.0	6.0			6.0					6.0	6.0	
Lane Grp Cap (vph)	531	3129			2537					294	376	
v/s Ratio Prot	c0.07	0.41			0.12							0.03
v/s Ratio Perm	c0.39									c0.10		
v/c Ratio	0.74	0.61			0.22					0.43	0.12	
Uniform Delay, d1	8.6	8.5			11.6					28.7	26.4	
Progression Factor	1.97	1.82			0.79					1.00	1.00	
Incremental Delay, d2	4.5	0.4			0.2					4.5	0.6	
Delay (s)	21.4	15.9			9.4					33.1	27.1	
Level of Service	C	B			A					C	C	
Approach Delay (s)		16.8			9.4			0.0			29.6	
Approach LOS		B			A			A			C	

Intersection Summary		
HCM Average Control Delay	16.7	HCM Level of Service B
HCM Volume to Capacity ratio	0.62	
Actuated Cycle Length (s)	90.0	Sum of lost time (s) 8.0
Intersection Capacity Utilization	57.7%	ICU Level of Service B
Analysis Period (min)	15	
c Critical Lane Group		

Queues

9: N. Delaware Ave & Columbia Ave

05/18/2007



Lane Group	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	2088	16	663	119	216
v/c Ratio	0.98	0.20	0.31	0.32	0.56
Control Delay	24.6	14.6	8.5	25.6	30.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	24.6	14.6	8.5	25.6	30.9
Queue Length 50th (ft)	675	4	84	48	93
Queue Length 95th (ft)	#808	15	108	87	149
Internal Link Dist (ft)	288		550	50	623
Turn Bay Length (ft)		105			
Base Capacity (vph)	2139	80	2139	372	387
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	0.98	0.20	0.31	0.32	0.56

Intersection Summary

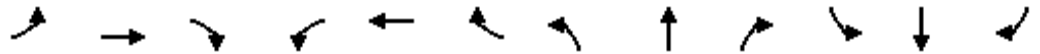
95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

* In the Synchro Analysis for this intersection, Delaware Avenue is layed out as an east-west roadway.

HCM Signalized Intersection Capacity Analysis

9: N. Delaware Ave & Columbia Ave

05/18/2007



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑			↕			↕	
Volume (vph)	0	1938	4	14	577	0	66	0	34	122	9	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		0.95		1.00	0.95			1.00			1.00	
Frt		1.00		1.00	1.00			0.95			0.96	
Flt Protected		1.00		0.95	1.00			0.97			0.97	
Satd. Flow (prot)		3437		1719	3438			1672			1687	
Flt Permitted		1.00		0.07	1.00			0.73			0.74	
Satd. Flow (perm)		3437		129	3438			1260			1287	
Peak-hour factor, PHF	0.93	0.93	0.93	0.87	0.87	0.87	0.84	0.84	0.84	0.83	0.83	0.83
Adj. Flow (vph)	0	2084	4	16	663	0	79	0	40	147	11	58
RTOR Reduction (vph)	0	0	0	0	0	0	0	8	0	0	15	0
Lane Group Flow (vph)	0	2088	0	16	663	0	0	111	0	0	201	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type				Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases				8			2			6		
Actuated Green, G (s)		55.0		55.0	55.0			24.0			24.0	
Effective Green, g (s)		56.0		56.0	56.0			26.0			26.0	
Actuated g/C Ratio		0.62		0.62	0.62			0.29			0.29	
Clearance Time (s)		5.0		5.0	5.0			6.0			6.0	
Lane Grp Cap (vph)		2139		80	2139			364			372	
v/s Ratio Prot		c0.61			0.19							
v/s Ratio Perm				0.12				0.09			c0.16	
v/c Ratio		0.98		0.20	0.31			0.31			0.54	
Uniform Delay, d1		16.4		7.3	8.0			25.0			27.0	
Progression Factor		0.68		1.00	1.00			1.00			1.00	
Incremental Delay, d2		11.9		5.5	0.4			2.2			5.5	
Delay (s)		23.0		12.9	8.4			27.1			32.5	
Level of Service		C		B	A			C			C	
Approach Delay (s)		23.0			8.5			27.1			32.5	
Approach LOS		C			A			C			C	

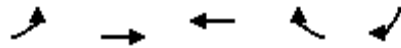
Intersection Summary

HCM Average Control Delay	20.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
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			

Queues

10: N. Delaware Ave & Aramingo Ave

05/18/2007



Lane Group	EBL	EBT	WBT	WBR	SBR
Lane Group Flow (vph)	119	1691	304	1077	296
v/c Ratio	0.08	0.69	0.14	0.75	0.19
Control Delay	6.2	20.3	8.1	4.6	0.3
Queue Delay	0.0	0.0	0.0	0.4	0.0
Total Delay	6.2	20.3	8.1	5.0	0.3
Queue Length 50th (ft)	13	518	36	27	0
Queue Length 95th (ft)	m14	m535	44	26	0
Internal Link Dist (ft)		566	626		
Turn Bay Length (ft)					
Base Capacity (vph)	1456	2438	2123	1437	1558
Starvation Cap Reductn	0	0	0	79	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.08	0.69	0.14	0.79	0.19

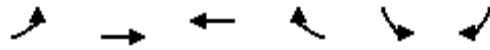
Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

10: N. Delaware Ave & Aramingo Ave

05/18/2007



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	117	1657	228	808	0	252
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	4.0	6.0		4.0
Lane Util. Factor	0.97	0.95	0.95	1.00		0.88
Frt	1.00	1.00	1.00	0.85		0.85
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	3539	3539	1583		2787
Flt Permitted	0.53	1.00	1.00	1.00		1.00
Satd. Flow (perm)	1904	3539	3539	1583		2787
Peak-hour factor, PHF	0.98	0.98	0.75	0.75	0.85	0.85
Adj. Flow (vph)	119	1691	304	1077	0	296
RTOR Reduction (vph)	0	0	0	187	0	220
Lane Group Flow (vph)	119	1691	304	890	0	76
Turn Type	pm+pt			pm+ov		pm+ov
Protected Phases	5	2	6	7	7	5
Permitted Phases	2			6		7
Actuated Green, G (s)	62.0	62.0	52.0	68.0		21.0
Effective Green, g (s)	63.0	62.0	54.0	68.0		23.0
Actuated g/C Ratio	0.70	0.69	0.60	0.76		0.26
Clearance Time (s)	5.0	6.0	6.0	6.0		5.0
Lane Grp Cap (vph)	1435	2438	2123	1302		712
v/s Ratio Prot	0.01	c0.48	0.09	c0.12		0.01
v/s Ratio Perm	0.05			0.44		0.02
v/c Ratio	0.08	0.69	0.14	0.68		0.11
Uniform Delay, d1	4.3	8.3	7.9	5.6		25.6
Progression Factor	1.56	2.29	1.00	1.00		1.00
Incremental Delay, d2	0.0	0.6	0.1	2.9		0.3
Delay (s)	6.7	19.7	8.0	8.5		25.9
Level of Service	A	B	A	A		C
Approach Delay (s)		18.8	8.4		25.9	
Approach LOS		B	A		C	

Intersection Summary

HCM Average Control Delay	15.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Queues

11: Penn St & N. Delaware Ave

05/18/2007



Lane Group	WBL	NBT	SBL	SBT
Lane Group Flow (vph)	243	2819	54	770
v/c Ratio	0.59	0.86	0.68	0.23
Control Delay	38.1	13.9	56.7	4.2
Queue Delay	0.0	3.4	0.0	0.0
Total Delay	38.1	17.3	56.7	4.2
Queue Length 50th (ft)	122	378	12	38
Queue Length 95th (ft)	85	462	#92	46
Internal Link Dist (ft)	171	483		1382
Turn Bay Length (ft)			95	
Base Capacity (vph)	409	3263	80	3285
Starvation Cap Reductn	0	355	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.59	0.97	0.68	0.23

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

11: Penn St & N. Delaware Ave

05/18/2007



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↑↑↑		↔	↑↑↑
Volume (vph)	84	23	2446	147	49	701
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		0.91		1.00	0.91
Frt	0.97		0.99		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	1916		4653		1719	4693
Flt Permitted	0.96		1.00		0.06	1.00
Satd. Flow (perm)	1916		4653		115	4693
Peak-hour factor, PHF	0.44	0.44	0.92	0.92	0.91	0.91
Adj. Flow (vph)	191	52	2659	160	54	770
RTOR Reduction (vph)	5	0	7	0	0	0
Lane Group Flow (vph)	238	0	2812	0	54	770
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Parking (#/hr)		10	10	10		10
Turn Type					Perm	
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	17.0		61.0		61.0	61.0
Effective Green, g (s)	19.0		63.0		63.0	63.0
Actuated g/C Ratio	0.21		0.70		0.70	0.70
Clearance Time (s)	6.0		6.0		6.0	6.0
Lane Grp Cap (vph)	404		3257		81	3285
v/s Ratio Prot	c0.12		c0.60			0.16
v/s Ratio Perm					0.47	
v/c Ratio	0.59		0.86		0.67	0.23
Uniform Delay, d1	32.0		10.2		7.6	4.8
Progression Factor	1.00		1.00		1.28	0.83
Incremental Delay, d2	6.2		3.3		35.6	0.2
Delay (s)	38.2		13.5		45.3	4.2
Level of Service	D		B		D	A
Approach Delay (s)	38.2		13.5			6.9
Approach LOS	D		B			A

Intersection Summary

HCM Average Control Delay	13.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

12: Spring Garden St. & N. Delaware Ave

05/18/2007



Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	1018	449	408	1899	876
v/c Ratio	0.82	0.43	1.03	0.69	0.63
Control Delay	30.7	7.6	88.0	15.4	24.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	30.7	7.6	88.0	15.4	24.1
Queue Length 50th (ft)	236	75	-229	247	121
Queue Length 95th (ft)	#376	162	#437	297	162
Internal Link Dist (ft)				1261	483
Turn Bay Length (ft)	160		215		
Base Capacity (vph)	1265	1046	396	2738	1720
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	0.80	0.43	1.03	0.69	0.51

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

12: Spring Garden St. & N. Delaware Ave

05/18/2007



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕↕		↕				↕	↕↕↕		↕	↕↕↕	
Volume (vph)	957	0	422	0	0	0	379	1766	0	0	557	249
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0				4.0	4.0			4.0	
Lane Util. Factor	0.97		1.00				1.00	0.91			0.91	
Frt	1.00		0.85				1.00	1.00			0.95	
Flt Protected	0.95		1.00				0.95	1.00			1.00	
Satd. Flow (prot)	3433		1583				1770	5085			4849	
Flt Permitted	0.95		1.00				0.95	1.00			1.00	
Satd. Flow (perm)	3433		1583				1770	5085			4849	
Peak-hour factor, PHF	0.94	0.94	0.94	0.92	0.92	0.92	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	1018	0	449	0	0	0	408	1899	0	0	605	271
RTOR Reduction (vph)	0	0	36	0	0	0	0	0	0	0	99	0
Lane Group Flow (vph)	1018	0	413	0	0	0	408	1899	0	0	777	0
Turn Type	custom		custom				Prot			Prot		
Protected Phases			4 5				5	2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)	27.3		49.4				16.1	41.5			19.4	
Effective Green, g (s)	29.3		51.4				18.1	43.5			21.4	
Actuated g/C Ratio	0.36		0.64				0.22	0.54			0.26	
Clearance Time (s)	6.0						6.0	6.0			6.0	
Vehicle Extension (s)	3.0						3.0	3.0			3.0	
Lane Grp Cap (vph)	1245		1007				396	2738			1284	
v/s Ratio Prot			0.26				c0.23	c0.37			0.16	
v/s Ratio Perm	c0.30											
v/c Ratio	0.82		0.41				1.03	0.69			0.61	
Uniform Delay, d1	23.3		7.2				31.3	13.7			26.0	
Progression Factor	1.00		1.00				1.00	1.00			1.00	
Incremental Delay, d2	4.3		0.3				53.2	1.5			0.8	
Delay (s)	27.6		7.5				84.6	15.2			26.8	
Level of Service	C		A				F	B			C	
Approach Delay (s)		21.5			0.0			27.5			26.8	
Approach LOS		C			A			C			C	

Intersection Summary

HCM Average Control Delay	25.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	80.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

13: Callowhill St. & Columbus Blvd

05/18/2007



Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	36	97	2804	1047
v/c Ratio	0.15	0.33	0.71	0.26
Control Delay	36.4	11.2	6.2	3.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	36.4	11.2	6.2	3.0
Queue Length 50th (ft)	18	0	223	46
Queue Length 95th (ft)	39	27	266	58
Internal Link Dist (ft)	147		1206	1261
Turn Bay Length (ft)				
Base Capacity (vph)	236	295	3955	3955
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	0.15	0.33	0.71	0.26

Intersection Summary

HCM Signalized Intersection Capacity Analysis

13: Callowhill St. & Columbus Blvd

05/18/2007



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	27	73	0	2580	974	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.91	0.91	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1770	1583		5085	5085	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1770	1583		5085	5085	
Peak-hour factor, PHF	0.75	0.75	0.92	0.92	0.93	0.93
Adj. Flow (vph)	36	97	0	2804	1047	0
RTOR Reduction (vph)	0	84	0	0	0	0
Lane Group Flow (vph)	36	13	0	2804	1047	0
Turn Type	Perm					
Protected Phases	4			2	6	
Permitted Phases	4					
Actuated Green, G (s)	10.0	10.0		68.0	68.0	
Effective Green, g (s)	12.0	12.0		70.0	70.0	
Actuated g/C Ratio	0.13	0.13		0.78	0.78	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	236	211		3955	3955	
v/s Ratio Prot	c0.02			c0.55	0.21	
v/s Ratio Perm	0.01					
v/c Ratio	0.15	0.06		0.71	0.26	
Uniform Delay, d1	34.5	34.1		5.0	2.8	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.4	0.6		1.1	0.2	
Delay (s)	35.9	34.6		6.1	3.0	
Level of Service	D	C		A	A	
Approach Delay (s)	35.0			6.1	3.0	
Approach LOS	C			A	A	

Intersection Summary

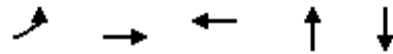
HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Queues

14: Race St & Columbus Blvd

05/18/2007



Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	297	200	2	2260	1127
v/c Ratio	0.80	0.44	0.02	0.66	0.33
Control Delay	51.6	8.7	42.5	10.2	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	51.6	8.7	42.5	10.2	6.7
Queue Length 50th (ft)	149	1	1	207	73
Queue Length 95th (ft)	#332	61	8	395	146
Internal Link Dist (ft)		497	85	1197	1206
Turn Bay Length (ft)					
Base Capacity (vph)	369	456	186	3420	3420
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	0.80	0.44	0.01	0.66	0.33

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

14: Race St & Columbus Blvd

05/18/2007



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	273	2	182	2	0	0	0	2079	0	0	1037	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0			6.0			4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00			0.91			0.91	
Frt	1.00	0.85			1.00			1.00			1.00	
Flt Protected	0.95	1.00			0.95			1.00			1.00	
Satd. Flow (prot)	1770	1586			1770			5085			5085	
Flt Permitted	0.95	1.00			1.00			1.00			1.00	
Satd. Flow (perm)	1770	1586			1863			5085			5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	297	2	198	2	0	0	0	2260	0	0	1127	0
RTOR Reduction (vph)	0	163	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	297	37	0	0	2	0	0	2260	0	0	1127	0
Turn Type	Split		Perm									
Protected Phases	4	4			8			2			6	
Permitted Phases				8								
Actuated Green, G (s)	16.0	16.0			1.2			56.2			56.2	
Effective Green, g (s)	18.0	16.0			1.2			58.2			58.2	
Actuated g/C Ratio	0.20	0.18			0.01			0.64			0.64	
Clearance Time (s)	6.0	6.0			6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	349	278			24			3238			3238	
v/s Ratio Prot	c0.17	0.02						c0.44			0.22	
v/s Ratio Perm					c0.00							
v/c Ratio	0.85	0.13			0.08			0.70			0.35	
Uniform Delay, d1	35.4	31.8			44.6			10.9			7.7	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	17.7	0.2			1.5			1.3			0.3	
Delay (s)	53.1	32.1			46.1			12.1			8.0	
Level of Service	D	C			D			B			A	
Approach Delay (s)		44.6			46.1			12.1			8.0	
Approach LOS		D			D			B			A	

Intersection Summary

HCM Average Control Delay	15.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	91.4	Sum of lost time (s)	14.0
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

15: Penn's Landing & Columbus Blvd

05/18/2007



Lane Group	WBL	NBT	SBL	SBT
Lane Group Flow (vph)	359	1923	9	1283
v/c Ratio	0.76	0.68	0.08	0.38
Control Delay	35.2	15.9	41.0	7.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	35.2	15.9	41.0	7.1
Queue Length 50th (ft)	142	267	5	105
Queue Length 95th (ft)	182	320	20	128
Internal Link Dist (ft)	281	402		1197
Turn Bay Length (ft)			200	
Base Capacity (vph)	472	2823	118	3390
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	0.76	0.68	0.08	0.38

Intersection Summary

HCM Signalized Intersection Capacity Analysis

15: Penn's Landing & Columbus Blvd

05/18/2007



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T		T	T
Volume (vph)	51	218	1724	6	8	1193
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		0.91		1.00	0.91
Frt	0.89		1.00		1.00	1.00
Flt Protected	0.99		1.00		0.95	1.00
Satd. Flow (prot)	1643		5083		1770	5085
Flt Permitted	0.99		1.00		0.95	1.00
Satd. Flow (perm)	1643		5083		1770	5085
Peak-hour factor, PHF	0.75	0.75	0.90	0.90	0.93	0.93
Adj. Flow (vph)	68	291	1916	7	9	1283
RTOR Reduction (vph)	70	0	0	0	0	0
Lane Group Flow (vph)	289	0	1923	0	9	1283
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	20.0		48.0		4.0	58.0
Effective Green, g (s)	22.0		50.0		6.0	60.0
Actuated g/C Ratio	0.24		0.56		0.07	0.67
Clearance Time (s)	6.0		6.0		6.0	6.0
Lane Grp Cap (vph)	402		2824		118	3390
v/s Ratio Prot	c0.18		c0.38		0.01	c0.25
v/s Ratio Perm						
v/c Ratio	0.72		0.68		0.08	0.38
Uniform Delay, d1	31.2		14.3		39.4	6.7
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	10.5		1.3		1.3	0.3
Delay (s)	41.7		15.6		40.7	7.0
Level of Service	D		B		D	A
Approach Delay (s)	41.7		15.6			7.2
Approach LOS	D		B			A

Intersection Summary

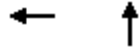
HCM Average Control Delay	15.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Queues

16: Callowhill St. & 3rd St.

05/18/2007



Lane Group	WBT	NBT
Lane Group Flow (vph)	2429	452
v/c Ratio	0.54	0.41
Control Delay	11.1	25.7
Queue Delay	0.0	0.0
Total Delay	11.1	25.7
Queue Length 50th (ft)	184	105
Queue Length 95th (ft)	210	143
Internal Link Dist (ft)	309	280
Turn Bay Length (ft)		
Base Capacity (vph)	4515	1093
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.54	0.41

Intersection Summary

HCM Signalized Intersection Capacity Analysis

16: Callowhill St. & 3rd St.

05/18/2007



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								↑↑				
Volume (vph)	0	0	0	0	2221	38	83	311	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0				
Lane Util. Factor					0.81			0.95				
Frt					1.00			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					7525			3502				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					7525			3502				
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.87	0.87	0.87	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	2388	41	95	357	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	3	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	2426	0	0	449	0	0	0	0
Turn Type								Perm				
Protected Phases					6			8				
Permitted Phases							8					
Actuated Green, G (s)					52.0			26.0				
Effective Green, g (s)					54.0			28.0				
Actuated g/C Ratio					0.60			0.31				
Clearance Time (s)					6.0			6.0				
Lane Grp Cap (vph)					4515			1090				
v/s Ratio Prot					0.32							
v/s Ratio Perm								0.13				
v/c Ratio					0.54			0.41				
Uniform Delay, d1					10.6			24.5				
Progression Factor					1.00			1.00				
Incremental Delay, d2					0.5			1.2				
Delay (s)					11.1			25.6				
Level of Service					B			C				
Approach Delay (s)		0.0			11.1			25.6			0.0	
Approach LOS		A			B			C			A	

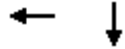
Intersection Summary

HCM Average Control Delay	13.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
17: 4th St &

05/18/2007

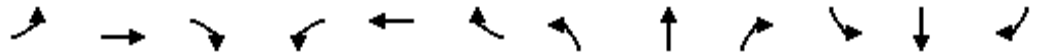


Lane Group	WBT	SBT
Lane Group Flow (vph)	2574	502
v/c Ratio	0.57	0.48
Control Delay	4.8	26.8
Queue Delay	0.0	0.0
Total Delay	4.8	26.8
Queue Length 50th (ft)	59	120
Queue Length 95th (ft)	64	140
Internal Link Dist (ft)	367	1136
Turn Bay Length (ft)		
Base Capacity (vph)	4525	1047
Starvation Cap Reductn	9	0
Spillback Cap Reductn	125	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.59	0.48
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

17: 4th St &

05/18/2007



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					←←←←						↑↑	
Volume (vph)	0	0	0	143	2251	0	0	0	0	0	257	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						4.0	
Lane Util. Factor					0.81						0.95	
Frt					1.00						0.95	
Flt Protected					1.00						1.00	
Satd. Flow (prot)					7522						3356	
Flt Permitted					1.00						1.00	
Satd. Flow (perm)					7522						3356	
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.92	0.92	0.92	0.78	0.78	0.78
Adj. Flow (vph)	0	0	0	154	2420	0	0	0	0	0	329	173
RTOR Reduction (vph)	0	0	0	0	13	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	0	0	0	2561	0	0	0	0	0	499	0
Turn Type					Perm							
Protected Phases						8						6
Permitted Phases					8							
Actuated Green, G (s)						52.0						26.0
Effective Green, g (s)						54.0						28.0
Actuated g/C Ratio						0.60						0.31
Clearance Time (s)						6.0						6.0
Lane Grp Cap (vph)						4513						1044
v/s Ratio Prot												c0.15
v/s Ratio Perm						0.34						
v/c Ratio						0.57						0.48
Uniform Delay, d1						10.9						25.1
Progression Factor						0.40						1.00
Incremental Delay, d2						0.5						1.6
Delay (s)						4.8						26.7
Level of Service						A						C
Approach Delay (s)		0.0				4.8		0.0				26.7
Approach LOS		A				A		A				C

Intersection Summary

HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

18: Callowhill St. & 5th St.

05/18/2007



Lane Group	WBT	NBL	NBT
Lane Group Flow (vph)	2754	87	960
v/c Ratio	0.62	0.16	0.87
Control Delay	14.8	22.1	39.6
Queue Delay	1.3	0.0	0.0
Total Delay	16.1	22.1	39.6
Queue Length 50th (ft)	347	34	269
Queue Length 95th (ft)	390	69	#379
Internal Link Dist (ft)	369		252
Turn Bay Length (ft)			
Base Capacity (vph)	4433	554	1101
Starvation Cap Reductn	1371	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.90	0.16	0.87

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

18: Callowhill St. & 5th St.

05/18/2007



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑↑		↖	↑↑				
Volume (vph)	0	0	0	0	2194	367	78	864	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0		4.0	4.0				
Lane Util. Factor					0.81		1.00	0.95				
Flt					0.98		1.00	1.00				
Flt Protected					1.00		0.95	1.00				
Satd. Flow (prot)					7382		1770	3539				
Flt Permitted					1.00		0.95	1.00				
Satd. Flow (perm)					7382		1770	3539				
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.90	0.90	0.90	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	2359	395	87	960	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	6	0	3	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	2748	0	84	960	0	0	0	0
Turn Type							Perm					
Protected Phases					8			2				
Permitted Phases							2					
Actuated Green, G (s)					52.0		26.0	26.0				
Effective Green, g (s)					54.0		28.0	28.0				
Actuated g/C Ratio					0.60		0.31	0.31				
Clearance Time (s)					6.0		6.0	6.0				
Lane Grp Cap (vph)					4429		551	1101				
v/s Ratio Prot					c0.37			c0.27				
v/s Ratio Perm							0.05					
v/c Ratio					0.62		0.15	0.87				
Uniform Delay, d1					11.5		22.4	29.3				
Progression Factor					1.23		1.00	1.00				
Incremental Delay, d2					0.6		0.6	9.5				
Delay (s)					14.7		23.0	38.9				
Level of Service					B		C	D				
Approach Delay (s)		0.0			14.7			37.5			0.0	
Approach LOS		A			B			D			A	

Intersection Summary

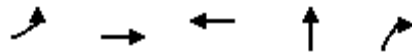
HCM Average Control Delay	21.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Queues

19: Spring Garden St. & 5th St

05/18/2007



Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Group Flow (vph)	162	1100	918	1134	329
v/c Ratio	0.72	0.58	0.60	0.97	0.63
Control Delay	31.4	11.1	5.6	42.7	20.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	31.4	11.1	5.6	42.7	20.4
Queue Length 50th (ft)	27	128	56	208	78
Queue Length 95th (ft)	#80	180	86	#337	155
Internal Link Dist (ft)		356	392	1122	
Turn Bay Length (ft)	155				30
Base Capacity (vph)	224	1887	1525	1166	524
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	0.72	0.58	0.60	0.97	0.63

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

19: Spring Garden St. & 5th St

05/18/2007



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑			↑↑			↑↑	↘			
Volume (vph)	159	1078	0	0	794	96	264	813	313	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0	6.0			
Lane Util. Factor	1.00	0.95			0.95			0.95	1.00			
Frt	1.00	1.00			0.98			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.99	1.00			
Satd. Flow (prot)	1770	3539			3482			3496	1583			
Flt Permitted	0.18	1.00			1.00			0.99	1.00			
Satd. Flow (perm)	330	3539			3482			3496	1583			
Peak-hour factor, PHF	0.98	0.98	0.98	0.97	0.97	0.97	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	162	1100	0	0	819	99	278	856	329	0	0	0
RTOR Reduction (vph)	0	0	0	0	15	0	0	0	49	0	0	0
Lane Group Flow (vph)	162	1100	0	0	903	0	0	1134	280	0	0	0
Turn Type	pm+pt							Split		Perm		
Protected Phases	7	4			8		2	2				
Permitted Phases	4								2			
Actuated Green, G (s)	30.0	30.0			24.0			18.0	18.0			
Effective Green, g (s)	31.0	32.0			26.0			20.0	18.0			
Actuated g/C Ratio	0.52	0.53			0.43			0.33	0.30			
Clearance Time (s)	5.0	6.0			6.0			6.0	6.0			
Lane Grp Cap (vph)	219	1887			1509			1165	475			
v/s Ratio Prot	0.02	c0.31			0.26			c0.32				
v/s Ratio Perm	c0.36								0.18			
v/c Ratio	0.74	0.58			0.60			0.97	0.59			
Uniform Delay, d1	12.4	9.5			13.0			19.7	17.9			
Progression Factor	1.00	1.00			0.31			1.00	1.00			
Incremental Delay, d2	20.0	1.3			1.6			20.7	5.3			
Delay (s)	32.3	10.8			5.6			40.4	23.1			
Level of Service	C	B			A			D	C			
Approach Delay (s)		13.6			5.6			36.6			0.0	
Approach LOS		B			A			D			A	

Intersection Summary

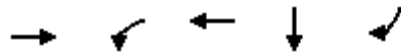
HCM Average Control Delay	20.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Queues

20: Spring Garden St. & 4th St

05/18/2007



Lane Group	EBT	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	1650	62	900	296	85
v/c Ratio	0.94	0.32	0.42	0.60	0.21
Control Delay	24.0	11.1	4.3	25.3	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	11.1	4.3	25.3	10.2
Queue Length 50th (ft)	203	6	45	93	8
Queue Length 95th (ft)	#416	m17	63	164	37
Internal Link Dist (ft)	392		378	276	
Turn Bay Length (ft)		170			40
Base Capacity (vph)	1761	191	2123	491	414
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	0.94	0.32	0.42	0.60	0.21

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

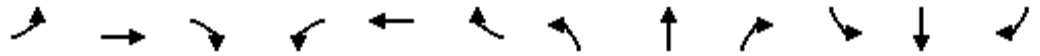
Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

20: Spring Garden St. & 4th St

05/18/2007



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↔	↑↑						↔	↔
Volume (vph)	0	1430	88	57	828	0	0	0	0	58	214	78
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	6.0
Lane Util. Factor		0.95		1.00	0.95						1.00	1.00
Frt		0.99		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.99	1.00
Satd. Flow (prot)		3508		1770	3539						1843	1583
Flt Permitted		1.00		0.12	1.00						0.99	1.00
Satd. Flow (perm)		3508		233	3539						1843	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1554	96	62	900	0	0	0	0	63	233	85
RTOR Reduction (vph)	0	8	0	0	0	0	0	0	0	0	0	44
Lane Group Flow (vph)	0	1643	0	62	900	0	0	0	0	0	296	41
Turn Type				pm+pt						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases				8						6		6
Actuated Green, G (s)		28.0		34.0	34.0						14.0	14.0
Effective Green, g (s)		30.0		34.0	36.0						16.0	14.0
Actuated g/C Ratio		0.50		0.57	0.60						0.27	0.23
Clearance Time (s)		6.0		4.0	6.0						6.0	6.0
Lane Grp Cap (vph)		1754		183	2123						491	369
v/s Ratio Prot		c0.47		0.01	c0.25							
v/s Ratio Perm				0.18							0.16	0.03
v/c Ratio		0.94		0.34	0.42						0.60	0.11
Uniform Delay, d1		14.1		12.6	6.4						19.2	18.1
Progression Factor		0.89		1.43	0.58						1.00	1.00
Incremental Delay, d2		9.8		4.3	0.5						5.4	0.6
Delay (s)		22.3		22.2	4.2						24.6	18.7
Level of Service		C		C	A						C	B
Approach Delay (s)		22.3			5.4			0.0			23.3	
Approach LOS		C			A			A			C	

Intersection Summary

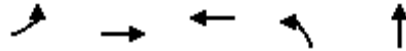
HCM Average Control Delay	17.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues

21: Spring Garden St. & 3rd St.

05/18/2007



Lane Group	EBL	EBT	WBT	NBL	NBT
Lane Group Flow (vph)	171	1318	936	112	443
v/c Ratio	0.71	0.66	0.57	0.21	0.79
Control Delay	21.9	10.2	8.5	17.0	29.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	21.9	10.2	8.5	17.0	29.9
Queue Length 50th (ft)	28	114	68	30	130
Queue Length 95th (ft)	m30	m115	89	64	#268
Internal Link Dist (ft)		378	448		1140
Turn Bay Length (ft)	126				
Base Capacity (vph)	241	2005	1640	531	561
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	0.71	0.66	0.57	0.21	0.79

Intersection Summary

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.

HCM Signalized Intersection Capacity Analysis

21: Spring Garden St. & 3rd St.

05/18/2007



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗↗			↖↖		↖	↗				
Volume (vph)	157	1213	0	0	771	90	103	256	152	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0				
Lane Util. Factor	1.00	0.95			0.95		1.00	1.00				
Frt	1.00	1.00			0.98		1.00	0.94				
Flt Protected	0.95	1.00			1.00		0.95	1.00				
Satd. Flow (prot)	1770	3539			3484		1770	1759				
Flt Permitted	0.18	1.00			1.00		0.95	1.00				
Satd. Flow (perm)	340	3539			3484		1770	1759				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	171	1318	0	0	838	98	112	278	165	0	0	0
RTOR Reduction (vph)	0	0	0	0	15	0	0	34	0	0	0	0
Lane Group Flow (vph)	171	1318	0	0	921	0	112	409	0	0	0	0
Turn Type	pm+pt						Split					
Protected Phases	7	4			8		2	2				
Permitted Phases	4											
Actuated Green, G (s)	32.0	32.0			26.0		16.0	16.0				
Effective Green, g (s)	32.0	34.0			28.0		18.0	18.0				
Actuated g/C Ratio	0.53	0.57			0.47		0.30	0.30				
Clearance Time (s)	4.0	6.0			6.0		6.0	6.0				
Lane Grp Cap (vph)	229	2005			1626		531	528				
v/s Ratio Prot	0.02	c0.37			0.26		0.06	c0.23				
v/s Ratio Perm	c0.37											
v/c Ratio	0.75	0.66			0.57		0.21	0.78				
Uniform Delay, d1	11.9	9.0			11.6		15.7	19.2				
Progression Factor	1.51	1.04			0.62		1.00	1.00				
Incremental Delay, d2	8.0	0.6			1.3		0.9	10.6				
Delay (s)	25.9	9.9			8.5		16.6	29.8				
Level of Service	C	A			A		B	C				
Approach Delay (s)		11.8			8.5		27.1				0.0	
Approach LOS		B			A		C				A	

Intersection Summary

HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues

22: Spring Garden St. & 2nd St.

05/18/2007



Lane Group	EBT	WBL	WBT	SBT
Lane Group Flow (vph)	1663	87	709	803
v/c Ratio	1.01	0.46	0.35	0.76
Control Delay	38.8	14.3	7.7	23.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	38.8	14.3	7.7	23.3
Queue Length 50th (ft)	~283	13	64	127
Queue Length 95th (ft)	#453	29	94	186
Internal Link Dist (ft)	448		1146	338
Turn Bay Length (ft)		67		
Base Capacity (vph)	1644	191	2005	1057
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	1.01	0.46	0.35	0.76

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

22: Spring Garden St. & 2nd St.

05/18/2007



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↔	↑↑						↑↑	
Volume (vph)	0	1430	100	80	652	0	0	0	0	167	414	157
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	
Lane Util. Factor		0.95		1.00	0.95						0.95	
Frt		0.99		1.00	1.00						0.97	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		3504		1770	3539						3388	
Flt Permitted		1.00		0.13	1.00						0.99	
Satd. Flow (perm)		3504		248	3539						3388	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1554	109	87	709	0	0	0	0	182	450	171
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	0	0	41	0
Lane Group Flow (vph)	0	1654	0	87	709	0	0	0	0	0	762	0
Turn Type				pm+pt						Split		
Protected Phases		4		3	8					6	6	
Permitted Phases				8								
Actuated Green, G (s)		26.0		32.0	32.0						16.0	
Effective Green, g (s)		28.0		32.0	34.0						18.0	
Actuated g/C Ratio		0.47		0.53	0.57						0.30	
Clearance Time (s)		6.0		4.0	6.0						6.0	
Lane Grp Cap (vph)		1635		183	2005						1016	
v/s Ratio Prot		c0.47		0.02	c0.20						c0.23	
v/s Ratio Perm				0.24								
v/c Ratio		1.01		0.48	0.35						0.75	
Uniform Delay, d1		16.0		29.5	7.0						19.0	
Progression Factor		0.83		1.00	1.00						1.00	
Incremental Delay, d2		22.9		8.6	0.5						5.1	
Delay (s)		36.3		38.1	7.5						24.1	
Level of Service		D		D	A						C	
Approach Delay (s)		36.3			10.9			0.0			24.1	
Approach LOS		D			B			A			C	

Intersection Summary

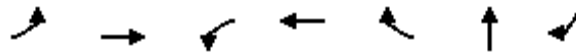
HCM Average Control Delay	27.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Queues

23: Richmond St & I95 Ramp

05/18/2007



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBR
Lane Group Flow (vph)	1026	1109	2	454	397	25	891
v/c Ratio	0.81	0.61	0.03	0.60	0.69	0.04	0.75
Control Delay	24.8	19.3	37.5	43.3	11.1	13.0	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.8	19.3	37.5	43.3	11.1	13.0	11.9
Queue Length 50th (ft)	229	253	1	100	0	5	263
Queue Length 95th (ft)	311	320	8	136	90	22	423
Internal Link Dist (ft)		626		336		135	
Turn Bay Length (ft)	450		95				
Base Capacity (vph)	1262	1804	75	763	575	632	1192
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	0.81	0.61	0.03	0.60	0.69	0.04	0.75

Intersection Summary

HCM Signalized Intersection Capacity Analysis

23: Richmond St & I95 Ramp

05/18/2007



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	944	1017	4	2	418	365	12	0	11	0	0	820
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		5.0				5.0
Lane Util. Factor	0.97	0.95		1.00	0.91	1.00		1.00				1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.94				0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97				1.00
Satd. Flow (prot)	3433	3537		1770	5085	1583		1698				1583
Flt Permitted	0.27	1.00		0.27	1.00	1.00		0.92				1.00
Satd. Flow (perm)	986	3537		497	5085	1583		1602				1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1026	1105	4	2	454	397	13	0	12	0	0	891
RTOR Reduction (vph)	0	0	0	0	0	337	0	7	0	0	0	5
Lane Group Flow (vph)	1026	1109	0	2	454	60	0	18	0	0	0	887
Turn Type	pm+pt			Perm		Perm	Perm			Perm		pt+ov
Protected Phases	5	2			6			8			4	4.5
Permitted Phases	2			6	6	6	8			4		
Actuated Green, G (s)	51.0	51.0		15.0	15.0	15.0		39.0				75.0
Effective Green, g (s)	51.0	51.0		15.0	15.0	15.0		39.0				75.0
Actuated g/C Ratio	0.51	0.51		0.15	0.15	0.15		0.39				0.75
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		5.0				5.0
Lane Grp Cap (vph)	1261	1804		75	763	237		625				1187
v/s Ratio Prot	c0.25	0.31			0.09							c0.56
v/s Ratio Perm	c0.16			0.00		0.04		0.01				
v/c Ratio	0.81	0.61		0.03	0.60	0.25		0.03				0.75
Uniform Delay, d1	18.6	17.5		36.3	39.7	37.5		18.8				7.1
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00				1.00
Incremental Delay, d2	5.8	1.6		0.7	3.4	2.5		0.1				4.3
Delay (s)	24.4	19.1		36.9	43.1	40.1		18.9				11.4
Level of Service	C	B		D	D	D		B				B
Approach Delay (s)		21.6			41.7			18.9			11.4	
Approach LOS		C			D			B			B	

Intersection Summary

HCM Average Control Delay	23.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	74.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

31: Laurel Ave & Frankford Ave

05/18/2007



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	7	71	0	420	280	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.42	0.85	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	84	0	457	304	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)				99		
pX, platoon unblocked	0.89					
vC, conflicting volume	761	152	304			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	672	152	304			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.2			
p0 queue free %	95	90	100			
cM capacity (veh/h)	341	857	1232			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	100	457	203	101
Volume Left	17	0	0	0
Volume Right	84	0	0	0
cSH	685	1232	1700	1700
Volume to Capacity	0.15	0.00	0.12	0.06
Queue Length 95th (ft)	13	0	0	0
Control Delay (s)	11.2	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	11.2	0.0	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay			1.3
Intersection Capacity Utilization	33.5%	ICU Level of Service	A
Analysis Period (min)			15