

HCM 2010 Signalized Intersection Capacity Analysis  
 1: Shafers School House Rd & SR 611

3/11/2015

									
Movement	SET	SER	NWL	NWT	NEL	NER			
Lane Configurations									
Volume (vph)	787	47	30	609	72	70			
Movement Number	2	12	1	6	3	18			
Initial Queue, veh	0	0	0	0	0	0			
Ped-Bike Adj. Factor (A_pbT)		1.00	1.00		1.00	1.00			
Parking, Bus Adj. Factors	1.00	1.00	1.00	1.00	1.00	1.00			
Adj. Sat. Flow Rate, veh/h/ln	1772	1772	1785	1819	1808	1827			
Lanes	1	0	1	1	1	1			
<b>Lane Assignment</b>									
Capacity, veh/h	1239	72	346	1358	193	174			
Proportion Arriving On Green	0.75	0.75	0.70	0.63	0.11	0.11			
Movement Delay, s/veh	0.0	8.4	15.1	8.1	38.1	39.3			
Movement LOS		A	B	A	D	D			
Approach Volume, veh/h	935			731	197				
Approach Delay, s/veh	8.4			8.5	38.7				
Approach LOS	A			A	D				
<b>Timer:</b>		1	2	3	4	5	6	7	8
Assigned Phase			2				6		8
Case No			8.0				6.0		9.0
Phase Duration (G+Y+Rc), s			69.40				69.40		15.51
Change Period (Y+Rc), s			6.00				6.00		6.00
Max. Allowable Headway (MAH), s			6.68				6.68		4.51
Maximum Green Setting (Gmax), s			63.40				63.40		9.60
Max. Queue Clearance Time (g_c+I1), s			26.53				30.00		6.96
Green Extension Time (g_e), s			26.56				24.67		0.18
Probability of Phase Call (p_c)			1.000				1.000		0.990
Probability of Max Out (p_x)			0.657				0.689		1.000
<b>Left-Turn Movement Data</b>									
Assigned Movement							1		3
Mvmt. Sat Flow, veh/h							571.23		1721.68
<b>Through Movement Data</b>									
Assigned Movement			2				6		
Mvmt. Sat Flow, veh/h			1659.60				1818.57		
<b>Right-Turn Movement Data</b>									
Assigned Movement			12				16		18
Mvmt. Sat Flow, veh/h			95.88				0.00		1552.84
<b>Left Lane Group Data</b>									
Assigned Movement		0	0	0	0	0	1	0	3
Lane Assignment							L		L
Lanes in Group		0	0	0	0	0	1	0	1
Group Volume (v), veh/h		0.0	0.0	0.0	0.0	0.0	38.5	0.0	101.4
Group Sat. Flow (s), veh/h/ln		0.0	0.0	0.0	0.0	0.0	571.2	0.0	1721.7
Queue Serve Time (g_s), s		0.0	0.0	0.0	0.0	0.0	3.5	0.0	4.7
Cycle Queue Clear Time (g_c), s		0.0	0.0	0.0	0.0	0.0	28.0	0.0	4.7

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 1: Shafers School House Rd & SR 611

3/11/2015

Perm LT Sat Flow Rate (s_l), veh/h/ln	0.0	0.0	0.0	0.0	0.0	571.2	0.0	1721.7
Shared LT Sat Flow (s_sh), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Eff. Green (g_p), s	0.0	0.0	0.0	0.0	0.0	63.4	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	38.9	0.0	0.0
Perm LT Que Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	3.5	0.0	0.0
Time to First Blk (g_f), s	0.0	63.4	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion LT Inside Lane (P_L)	0.000	0.000	0.000	0.000	0.000	1.000	0.000	1.000
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	0.0	0.0	346.3	0.0	192.8
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.000	0.000	0.111	0.000	0.526
Available Capacity (c_a), veh/h	0.0	0.0	0.0	0.0	0.0	346.3	0.0	194.7
Upstream Filter Factor (I)	0.000	0.000	0.000	0.000	0.000	0.922	0.000	1.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	14.8	0.0	35.6
Incremental Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.4	0.0	2.5
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	15.1	0.0	38.1
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	0.4	0.0	1.9
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	0.000	0.000	0.000	0.000	1.000	0.000	1.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	0.0	0.0	0.4	0.0	2.1
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.11
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Movement	0	2	0	0	0	6	0	0
Lane Assignment	T							
Lanes in Group	0	0	0	0	0	1	0	0
Group Volume (v), veh/h	0.0	0.0	0.0	0.0	0.0	692.0	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	0.0	0.0	0.0	0.0	1818.6	0.0	0.0
Queue Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	17.8	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	17.8	0.0	0.0
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	0.0	0.0	1357.9	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.000	0.000	0.510	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	0.0	0.0	0.0	1357.9	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	0.000	0.000	0.000	0.922	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	7.4	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	8.1	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	5.6	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	0.0	0.0	5.9	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00

HCM 2010 Signalized Intersection Capacity Analysis  
 1: Shafers School House Rd & SR 611

3/11/2015

Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**Right Lane Group Data**

Assigned Movement	0	12	0	0	0	16	0	18
Lane Assignment	T+R			R				
Lanes in Group	0	1	0	0	0	0	0	1
Group Volume (v), veh/h	0.0	935.4	0.0	0.0	0.0	0.0	0.0	95.9
Group Sat. Flow (s), veh/h/ln	0.0	1755.5	0.0	0.0	0.0	0.0	0.0	1552.8
Queue Serve Time (g_s), s	0.0	24.5	0.0	0.0	0.0	0.0	0.0	5.0
Cycle Queue Clear Time (g_c), s	0.0	24.5	0.0	0.0	0.0	0.0	0.0	5.0
Prot RT Sat Flow Rate (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff. Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion RT Outside Lane (P_R)	0.000	0.055	0.000	0.000	0.000	0.000	0.000	1.000
Lane Group Capacity (c), veh/h	0.0	1310.8	0.0	0.0	0.0	0.0	0.0	173.9
Volume-to-Capacity Ratio (X)	0.000	0.714	0.000	0.000	0.000	0.000	0.000	0.551
Available Capacity (c_a), veh/h	0.0	1310.8	0.0	0.0	0.0	0.0	0.0	175.6
Upstream Filter Factor (I)	0.000	1.000	0.000	0.000	0.000	0.000	0.000	1.000
Uniform Delay (d1), s/veh	0.0	5.8	0.0	0.0	0.0	0.0	0.0	35.7
Incremental Delay (d2), s/veh	0.0	2.6	0.0	0.0	0.0	0.0	0.0	3.6
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	8.4	0.0	0.0	0.0	0.0	0.0	39.3
First-Term Queue (Q1), veh/ln	0.0	4.8	0.0	0.0	0.0	0.0	0.0	1.8
Second-Term Queue (Q2), veh/ln	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.2
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	0.000	0.000	1.000	0.000	1.000
Percentile Back of Queue (Q%), veh/ln	0.0	5.8	0.0	0.0	0.0	0.0	0.0	2.0
Percentile Storage Ratio (RQ%)	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.32
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**Intersection Summary**

HCM Average Control Delay	11.7
HCM Level of Service	B

# HCM 2010 Signalized Intersection Capacity Analysis

## 2: Applegate Rd/Terrace Dr & SR 611

3/11/2015

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	17	693	25	14	472	6	16	1	21	16	3	19
Movement Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj. Factor (A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj. Factors	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Sat. Flow Rate, veh/h/ln	1783	1835	1835	1890	1786	1786	1881	1956	1956	1891	1891	1891
Lanes	1	1	0	1	1	0	1	1	0	0	1	0
Lane Assignment												
Capacity, veh/h	608	1308	67	303	1317	29	131	15	129	82	26	60
Proportion Arriving On Green	0.41	0.26	0.26	0.76	0.76	0.76	0.09	0.09	0.09	0.09	0.09	0.09
Movement Delay, s/veh	13.2	0.0	22.8	20.3	0.0	4.5	42.0	0.0	38.8	40.5	0.0	0.0
Movement LOS	B		C	C		A	D		D	D		
Approach Volume, veh/h		891			576			54			71	
Approach Delay, s/veh		22.4			5.1			39.8			40.5	
Approach LOS		C			A			D			D	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phase			2		4		6		8			
Case No			6.0		8.0		6.0		6.0			
Phase Duration (G+Y+Rc), s			73.50		15.04		73.50		15.04			
Change Period (Y+Rc), s			6.50		7.50		6.50		7.50			
Max. Allowable Headway (MAH), s			7.19		4.60		7.19		4.60			
Maximum Green Setting (Gmax), s			67.00		7.90		67.00		7.90			
Max. Queue Clearance Time (g_c+l1), s			38.88		6.23		40.88		7.33			
Green Extension Time (g_e), s			20.68		0.06		19.53		0.02			
Probability of Phase Call (p_c)			1.000		0.955		1.000		0.955			
Probability of Max Out (p_x)			0.705		1.000		0.729		1.000			
<b>Left-Turn Movement Data</b>												
Assigned Movement			5		7		1		3			
Mvmt. Sat Flow, veh/h			814.30		471.42		651.34		1336.60			
<b>Through Movement Data</b>												
Assigned Movement			2		4		6		8			
Mvmt. Sat Flow, veh/h			1728.42		146.55		1740.39		181.07			
<b>Right-Turn Movement Data</b>												
Assigned Movement			12		14		16		18			
Mvmt. Sat Flow, veh/h			88.33		705.36		38.50		1508.90			
<b>Left Lane Group Data</b>												
Assigned Movement		0	5	0	7	0	1	0	3			
Lane Assignment			L		L+T+R		L		L			
Lanes in Group		0	1	0	1	0	1	0	1			
Group Volume (v), veh/h		0.0	34.0	0.0	71.3	0.0	21.5	0.0	17.0			
Group Sat. Flow (s), veh/h/ln		0.0	814.3	0.0	1323.3	0.0	651.3	0.0	1336.6			
Queue Serve Time (g_s), s		0.0	2.4	0.0	2.3	0.0	2.0	0.0	1.1			
Cycle Queue Clear Time (g_c), s		0.0	12.2	0.0	4.2	0.0	38.9	0.0	5.3			

HCM 2010 Signalized Intersection Capacity Analysis  
 2: Applegate Rd/Terrace Dr & SR 611

3/11/2015

Perm LT Sat Flow Rate (s_l), veh/h/ln	0.0	814.3	0.0	781.5	0.0	651.3	0.0	1336.6
Shared LT Sat Flow (s_sh), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Eff. Green (g_p), s	0.0	67.0	0.0	7.5	0.0	67.0	0.0	7.5
Perm LT Serve Time (g_u), s	0.0	57.2	0.0	5.7	0.0	30.1	0.0	3.3
Perm LT Que Serve Time (g_ps), s	0.0	2.4	0.0	2.3	0.0	2.0	0.0	1.1
Time to First Blk (g_f), s	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
Proportion LT Inside Lane (P_L)	0.000	1.000	0.000	0.356	0.000	1.000	0.000	1.000
Lane Group Capacity (c), veh/h	0.0	607.8	0.0	167.8	0.0	302.9	0.0	131.3
Volume-to-Capacity Ratio (X)	0.000	0.056	0.000	0.425	0.000	0.071	0.000	0.130
Available Capacity (c_a), veh/h	0.0	607.8	0.0	172.6	0.0	302.9	0.0	136.7
Upstream Filter Factor (I)	0.000	0.650	0.000	1.000	0.000	1.000	0.000	1.000
Uniform Delay (d1), s/veh	0.0	13.1	0.0	38.8	0.0	19.9	0.0	41.6
Incremental Delay (d2), s/veh	0.0	0.1	0.0	1.7	0.0	0.4	0.0	0.4
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	13.2	0.0	40.5	0.0	20.3	0.0	42.0
First-Term Queue (Q1), veh/ln	0.0	0.5	0.0	1.5	0.0	0.3	0.0	0.4
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.5	0.0	1.6	0.0	0.3	0.0	0.4
Percentile Storage Ratio (RQ%)	0.00	0.17	0.00	0.08	0.00	0.10	0.00	0.13
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Movement	0	2	0	4	0	6	0	8
Lane Assignment								
Lanes in Group	0	0	0	0	0	0	0	0
Group Volume (v), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

HCM 2010 Signalized Intersection Capacity Analysis  
 2: Applegate Rd/Terrace Dr & SR 611

3/11/2015

Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Right Lane Group Data</b>								
Assigned Movement	0	12	0	14	0	16	0	18
Lane Assignment	T+R			T+R			T+R	
Lanes in Group	0	1	0	0	0	1	0	1
Group Volume (v), veh/h	0.0	857.0	0.0	0.0	0.0	554.5	0.0	37.3
Group Sat. Flow (s), veh/h/ln	0.0	1816.7	0.0	0.0	0.0	1778.9	0.0	1690.0
Queue Serve Time (g_s), s	0.0	36.9	0.0	0.0	0.0	9.8	0.0	1.8
Cycle Queue Clear Time (g_c), s	0.0	36.9	0.0	0.0	0.0	9.8	0.0	1.8
Prot RT Sat Flow Rate (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff. Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion RT Outside Lane (P_R)	0.000	0.049	0.000	0.533	0.000	0.022	0.000	0.893
Lane Group Capacity (c), veh/h	0.0	1374.8	0.0	0.0	0.0	1346.1	0.0	143.9
Volume-to-Capacity Ratio (X)	0.000	0.623	0.000	0.000	0.000	0.412	0.000	0.259
Available Capacity (c_a), veh/h	0.0	1374.8	0.0	0.0	0.0	1346.1	0.0	150.8
Upstream Filter Factor (I)	0.000	0.650	0.000	0.000	0.000	1.000	0.000	1.000
Uniform Delay (d1), s/veh	0.0	21.6	0.0	0.0	0.0	3.8	0.0	37.9
Incremental Delay (d2), s/veh	0.0	1.2	0.0	0.0	0.0	0.7	0.0	0.9
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	22.8	0.0	0.0	0.0	4.5	0.0	38.8
First-Term Queue (Q1), veh/ln	0.0	17.4	0.0	0.0	0.0	1.9	0.0	0.8
Second-Term Queue (Q2), veh/ln	0.0	0.4	0.0	0.0	0.0	0.3	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000
Percentile Back of Queue (Q%), veh/ln	0.0	17.8	0.0	0.0	0.0	2.2	0.0	0.8
Percentile Storage Ratio (RQ%)	0.00	0.31	0.00	0.00	0.00	0.07	0.00	0.04
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Intersection Summary</b>								
HCM Average Control Delay	17.6							
HCM Level of Service	B							

HCM 2010 Signalized Intersection Capacity Analysis  
 3: SR 611 & Pocono Commons Dr

3/25/2015



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔↔	↑	↑	↗	↔↔	↗
Volume (vph)	185	504	464	151	75	143
Movement Number	5	2	6	16	7	14
Initial Queue, veh	0	0	0	0	0	0
Ped-Bike Adj. Factor (A_pbT)	1.00			1.00	1.00	1.00
Parking, Bus Adj. Factors	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Sat. Flow Rate, veh/h/ln	1854	1768	1800	1947	1919	1901
Lanes	2	1	1	1	2	1
Lane Assignment						
Capacity, veh/h	373	1379	1074	987	275	301
Proportion Arriving On Green	0.11	0.78	0.60	0.60	0.08	0.08
Movement Delay, s/veh	38.4	3.6	11.0	8.4	38.7	33.2
Movement LOS	D	A	B	A	D	C
Approach Volume, veh/h		766	720		262	
Approach Delay, s/veh		13.3	10.3		35.3	
Approach LOS		B	B		D	

Timer:	1	2	3	4	5	6	7	8
Assigned Phase		2		4	5	6		
Case No		4.0		9.0	2.0	7.0		
Phase Duration (G+Y+Rc), s		74.84		12.80	16.05	58.80		
Change Period (Y+Rc), s		6.50		6.00	6.50	6.50		
Max. Allowable Headway (MAH), s		6.65		3.62	3.19	6.65		
Maximum Green Setting (Gmax), s		69.10		6.80	9.60	51.70		
Max. Queue Clearance Time (g_c+I1), s		10.80		8.80	7.17	16.41		
Green Extension Time (g_e), s		20.38		0.00	0.12	17.29		
Probability of Phase Call (p_c)		1.000		0.998	0.994	1.000		
Probability of Max Out (p_x)		0.149		1.000	1.000	0.348		

Left-Turn Movement Data								
Assigned Movement					7	5		
Mvmt. Sat Flow, veh/h					3545.58	3425.27		

Through Movement Data								
Assigned Movement		2				6		
Mvmt. Sat Flow, veh/h		1768.06				1800.48		

Right-Turn Movement Data								
Assigned Movement			12		14		16	
Mvmt. Sat Flow, veh/h			0.00		1615.62		1654.66	

Left Lane Group Data								
Assigned Movement		0	0	0	7	5	0	0
Lane Assignment					L	L (Prot)		
Lanes in Group		0	0	0	2	2	0	0
Group Volume (v), veh/h		0.0	0.0	0.0	101.4	212.6	0.0	0.0
Group Sat. Flow (s), veh/h/ln		0.0	0.0	0.0	1772.8	1712.6	0.0	0.0
Queue Serve Time (g_s), s		0.0	0.0	0.0	2.4	5.2	0.0	0.0
Cycle Queue Clear Time (g_c), s		0.0	0.0	0.0	2.4	5.2	0.0	0.0

# HCM 2010 Signalized Intersection Capacity Analysis

## 3: SR 611 & Pocono Commons Dr

3/25/2015

Perm LT Sat Flow Rate (s_l), veh/h/ln	0.0	0.0	0.0	1772.8	0.0	0.0	0.0	0.0
Shared LT Sat Flow (s_sh), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Eff. Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Que Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	52.3	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion LT Inside Lane (P_L)	0.000	0.000	0.000	1.000	1.000	0.000	0.000	0.000
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	275.1	373.1	0.0	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.368	0.570	0.000	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	0.0	275.1	375.2	0.0	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	0.000	1.000	1.000	0.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	38.4	37.1	0.0	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.0	0.3	1.3	0.0	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	38.7	38.4	0.0	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	1.0	2.1	0.0	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	0.000	0.000	1.000	1.000	0.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	1.0	2.1	0.0	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.06	0.31	0.00	0.00	0.00
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Movement	0	2	0	0	0	6	0	0
Lane Assignment	T			T				
Lanes in Group	0	1	0	0	0	1	0	0
Group Volume (v), veh/h	0.0	553.8	0.0	0.0	0.0	521.3	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	1768.1	0.0	0.0	0.0	1800.5	0.0	0.0
Queue Serve Time (g_s), s	0.0	8.8	0.0	0.0	0.0	14.4	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	8.8	0.0	0.0	0.0	14.4	0.0	0.0
Lane Group Capacity (c), veh/h	0.0	1378.7	0.0	0.0	0.0	1074.4	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.402	0.000	0.000	0.000	0.485	0.000	0.000
Available Capacity (c_a), veh/h	0.0	1394.0	0.0	0.0	0.0	1074.4	0.0	0.0
Upstream Filter Factor (I)	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	3.1	0.0	0.0	0.0	10.0	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.5	0.0	0.0	0.0	0.9	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	3.6	0.0	0.0	0.0	11.0	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	1.4	0.0	0.0	0.0	4.6	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.2	0.0	0.0	0.0	0.3	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	1.6	0.0	0.0	0.0	4.9	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.14	0.00	0.00	0.00	0.13	0.00	0.00

# HCM 2010 Signalized Intersection Capacity Analysis

## 3: SR 611 & Pocono Commons Dr

3/25/2015

Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Right Lane Group Data</b>								
Assigned Movement	0	12	0	14	0	16	0	0
Lane Assignment				R		R		
Lanes in Group	0	0	0	1	0	1	0	0
Group Volume (v), veh/h	0.0	0.0	0.0	160.7	0.0	198.7	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	0.0	0.0	1615.6	0.0	1654.7	0.0	0.0
Queue Serve Time (g_s), s	0.0	0.0	0.0	6.8	0.0	4.8	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	0.0	0.0	6.8	0.0	4.8	0.0	0.0
Prot RT Sat Flow Rate (s_R), veh/h/ln	0.0	0.0	0.0	1615.6	0.0	0.0	0.0	0.0
Prot RT Eff. Green (g_R), s	0.0	0.0	0.0	9.5	0.0	0.0	0.0	0.0
Proportion RT Outside Lane (P_R)	0.000	0.000	0.000	1.000	0.000	1.000	0.000	0.000
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	301.3	0.0	987.4	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.533	0.000	0.201	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	0.0	301.3	0.0	987.4	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	0.000	1.000	0.000	1.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	32.2	0.0	8.1	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.0	1.0	0.0	0.3	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	33.2	0.0	8.4	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	3.5	0.0	1.4	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	1.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	3.6	0.0	1.5	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.63	0.00	0.13	0.00	0.00
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Intersection Summary</b>								
HCM Average Control Delay	15.3							
HCM Level of Service	B							

HCM 2010 Signalized Intersection Capacity Analysis  
6: SR 611 & Connector Rd

3/11/2015



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	170	443	485	173	244	174
Movement Number	5	2	6	16	7	14
Initial Queue, veh	0	0	0	0	0	0
Ped-Bike Adj. Factor (A_pbT)	1.00			1.00	1.00	1.00
Parking, Bus Adj. Factors	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Sat. Flow Rate, veh/h/ln	1900	1900	1900	1900	1900	1900
Lanes	1	2	2	0	1	1
Lane Assignment						
Capacity, veh/h	369	3419	1849	657	0	0
Proportion Arriving On Green	0.20	0.95	0.69	0.69	0.00	0.00
Movement Delay, s/veh	27.8	0.1	5.1	5.2	0.0	0.0
Movement LOS	C	A	A	A		
Approach Volume, veh/h		681	731		0	
Approach Delay, s/veh		7.8	5.1		0.0	
Approach LOS		A	A			

Timer:	1	2	3	4	5	6	7	8
Assigned Phase		2		4	5	6		
Case No		4.0		0.0	2.0	8.0		
Phase Duration (G+Y+Rc), s		75.48		0.00	19.40	56.08		
Change Period (Y+Rc), s		4.00		4.00	4.00	4.00		
Max. Allowable Headway (MAH), s		5.21		0.00	3.80	5.21		
Maximum Green Setting (Gmax), s		71.60		20.40	15.70	52.00		
Max. Queue Clearance Time (g_c+I1), s		2.63		0.00	9.00	7.92		
Green Extension Time (g_e), s		10.49		0.00	0.27	10.19		
Probability of Phase Call (p_c)		1.000		0.000	0.981	1.000		
Probability of Max Out (p_x)		0.004		0.000	0.098	0.032		

Left-Turn Movement Data								
Assigned Movement					7	5		
Mvmt. Sat Flow, veh/h					0.00	1809.52		

Through Movement Data								
Assigned Movement		2				6		
Mvmt. Sat Flow, veh/h		3705.00				2679.79		

Right-Turn Movement Data								
Assigned Movement			12				16	
Mvmt. Sat Flow, veh/h			0.00				952.18	

Left Lane Group Data								
Assigned Movement		0	0	0	7	5	0	0
Lane Assignment						L (Prot)		
Lanes in Group		0	0	0	0	1	0	0
Group Volume (v), veh/h		0.0	0.0	0.0	0.0	188.9	0.0	0.0
Group Sat. Flow (s), veh/h/ln		0.0	0.0	0.0	0.0	1809.5	0.0	0.0
Queue Serve Time (g_s), s		0.0	0.0	0.0	0.0	7.0	0.0	0.0
Cycle Queue Clear Time (g_c), s		0.0	0.0	0.0	0.0	7.0	0.0	0.0

# HCM 2010 Signalized Intersection Capacity Analysis

## 6: SR 611 & Connector Rd

3/11/2015

Perm LT Sat Flow Rate (s_l), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shared LT Sat Flow (s_sh), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Eff. Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Que Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	52.1	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion LT Inside Lane (P_L)	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	0.0	369.2	0.0	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.000	0.512	0.000	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	0.0	0.0	376.4	0.0	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	26.7	0.0	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	27.8	0.0	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	0.0	2.9	0.0	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	0.000	0.000	1.000	1.000	0.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.00
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Movement	0	2	0	0	0	6	0	0
Lane Assignment	T			T				
Lanes in Group	0	2	0	0	0	1	0	0
Group Volume (v), veh/h	0.0	492.2	0.0	0.0	0.0	381.5	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	1805.0	0.0	0.0	0.0	1900.0	0.0	0.0
Queue Serve Time (g_s), s	0.0	0.6	0.0	0.0	0.0	5.9	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	0.6	0.0	0.0	0.0	5.9	0.0	0.0
Lane Group Capacity (c), veh/h	0.0	3418.7	0.0	0.0	0.0	1310.9	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.144	0.000	0.000	0.000	0.291	0.000	0.000
Available Capacity (c_a), veh/h	0.0	3424.5	0.0	0.0	0.0	1310.9	0.0	0.0
Upstream Filter Factor (I)	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.1	0.0	0.0	0.0	4.5	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.1	0.0	0.0	0.0	5.1	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	-0.4	0.0	0.0	0.0	1.6	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	-0.4	0.0	0.0	0.0	1.8	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	-0.01	0.00	0.00	0.00	0.06	0.00	0.00

# HCM 2010 Signalized Intersection Capacity Analysis

## 6: SR 611 & Connector Rd

3/11/2015

Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

### Right Lane Group Data

Assigned Movement	0	12	0	0	0	16	0	0
Lane Assignment	T+R							
Lanes in Group	0	0	0	0	0	1	0	0
Group Volume (v), veh/h	0.0	0.0	0.0	0.0	0.0	349.6	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	0.0	0.0	0.0	0.0	1732.0	0.0	0.0
Queue Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	5.9	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	5.9	0.0	0.0
Prot RT Sat Flow Rate (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff. Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion RT Outside Lane (P_R)	0.000	0.000	0.000	0.000	0.000	0.550	0.000	0.000
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	0.0	0.0	1195.0	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.000	0.000	0.293	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	0.0	0.0	0.0	1195.0	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	4.5	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	5.2	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

### Intersection Summary

HCM Average Control Delay	6.4
HCM Level of Service	A

**Intersection**

Intersection Delay (sec/veh): 2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	0	0	1	1	174	1	243	0	0	170	173
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	Yield	Yield	Yield	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		0			0			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles(%)	0	0	0	0	0	0	0	0	0	0	0	0
Movement Flow Rate	0	0	0	1	1	193	1	270	0	0	189	192
Number of Lanes	0	0	0	0	1	0	0	2	0	0	1	1

Major/Minor	Minor 1		Major 1			Major 2		
Conflicting Flow Rate - All	461	461	135	381	0	-	-	0
Stage 1	272	272	0	0	0	-	-	0
Stage 2	189	189	0	0	0	-	-	0
Follow-up Headway	3.5	4	3.3	2.2	-	-	-	0
Pot Capacity-1 Maneuver	501	500	893	1188	-	-	-	-
Stage 1	727	688	-	-	-	-	-	-
Stage 2	809	748	-	-	-	-	-	-
Mov Capacity-1 Maneuver	-	499.5	893	1188	-	-	-	-
Mov Capacity-2 Maneuver	-	499.5	-	-	-	-	-	-
Stage 1	727	687.3	-	-	-	-	-	-
Stage 2	809	# 0	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	10.1	0	0
HCM LOS	B	A	A

Lane	NBL	NBT	WBLn1	SBT	SBR
Capacity (vph)			903		
HCM Control Delay (s)	8.033	0	10.1	-	-
HCM Lane VC Ratio	0.001	-	0.217	0	-
HCM Lane LOS	A	-	B	-	-
HCM 95th Percentile Queue (veh)	0.003	-	0.822	0	-

**Intersection**

Intersection Delay (sec/veh): 0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Volume (vph)	243	1	0	0	170	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None
Storage Length	0			0	0	0
Median Width		0	0		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles(%)	0	0	0	0	0	0
Movement Flow Rate	270	1	0	0	189	0
Number of Lanes	0	1	0	0	1	0

**Major/Minor** Minor 1

Conflicting Flow Rate - All	0	378		0	-
Stage 1	0	378		0	-
Stage 2	0	0		0	-
Follow-up Headway	-	0		-	-
Pot Capacity-1 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Mov Capacity-1 Maneuver	-	# 0		-	-
Mov Capacity-2 Maneuver	-	# 0		-	-
Stage 1	-	# 0		-	-
Stage 2	-	# 0		-	-

**Approach** EB SB

HCM Control Delay (s)	-	0
HCM LOS	-	A

**Lane** EBLn1 SBL

Capacity (vph)	-	-
HCM Control Delay (s)	-	-
HCM Lane VC Ratio	-	-
HCM Lane LOS	-	-
HCM 95th Percentile Queue (veh)	-	-

HCM 2010 Signalized Intersection Capacity Analysis  
1: Bridge St & SR 611

3/26/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↘	↗
Volume (vph)	366	42	159	478	79	155
Movement Number	2	12	1	6	3	18
Initial Queue, veh	0	0	0	0	0	0
Ped-Bike Adj. Factor (A_pbT)		1.00	1.00		1.00	1.00
Parking, Bus Adj. Factors	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Sat. Flow Rate, veh/h/ln	1891	1872	1853	1908	1806	1771
Lanes	1	1	1	1	1	1
Lane Assignment						
Capacity, veh/h	1420	1195	0	1433	196	171
Proportion Arriving On Green	0.75	0.75	0.00	0.43	0.11	0.11
Movement Delay, s/veh	3.8	2.9	0.0	11.5	38.0	96.5
Movement LOS	A	A		B	D	F
Approach Volume, veh/h	434			514	248	
Approach Delay, s/veh	3.7			11.5	76.9	
Approach LOS	A			B	E	

Timer:	1	2	3	4	5	6	7	8
Assigned Phase		2				6		8
Case No		7.0				4.0		9.0
Phase Duration (G+Y+Rc), s		72.59				72.59		16.10
Change Period (Y+Rc), s		6.00				6.00		6.00
Max. Allowable Headway (MAH), s		7.23				7.23		4.47
Maximum Green Setting (Gmax), s		58.80				72.90		10.10
Max. Queue Clearance Time (g_c+I1), s		7.73				18.20		11.67
Green Extension Time (g_e), s		16.19				10.17		0.00
Probability of Phase Call (p_c)		1.000				1.000		0.998
Probability of Max Out (p_x)		0.098				0.081		1.000

Left-Turn Movement Data

Assigned Movement								3
Mvmt. Sat Flow, veh/h								1719.94

Through Movement Data

Assigned Movement		2				6		
Mvmt. Sat Flow, veh/h		1890.69				1908.20		

Right-Turn Movement Data

Assigned Movement		12				16		18
Mvmt. Sat Flow, veh/h		1591.48				0.00		1505.24

Left Lane Group Data

Assigned Movement		0	0	0	0	0	0	3
Lane Assignment								L
Lanes in Group		0	0	0	0	0	0	1
Group Volume (v), veh/h		0.0	0.0	0.0	0.0	0.0	0.0	83.2
Group Sat. Flow (s), veh/h/ln		0.0	0.0	0.0	0.0	0.0	0.0	1719.9
Queue Serve Time (g_s), s		0.0	0.0	0.0	0.0	0.0	0.0	4.0
Cycle Queue Clear Time (g_c), s		0.0	0.0	0.0	0.0	0.0	0.0	4.0

# HCM 2010 Signalized Intersection Capacity Analysis

## 1: Bridge St & SR 611

3/26/2015

Perm LT Sat Flow Rate (s_l), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1719.9
Shared LT Sat Flow (s_sh), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Eff. Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Que Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	66.6	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion LT Inside Lane (P_L)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	195.9
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.425
Available Capacity (c_a), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	195.9
Upstream Filter Factor (I)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.6
Incremental Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Movement	0	2	0	0	0	6	0	0
Lane Assignment		T				T		
Lanes in Group	0	1	0	0	0	1	0	0
Group Volume (v), veh/h	0.0	389.4	0.0	0.0	0.0	514.0	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	1890.7	0.0	0.0	0.0	1908.2	0.0	0.0
Queue Serve Time (g_s), s	0.0	5.7	0.0	0.0	0.0	16.2	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	5.7	0.0	0.0	0.0	16.2	0.0	0.0
Lane Group Capacity (c), veh/h	0.0	1419.5	0.0	0.0	0.0	1432.7	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.274	0.000	0.000	0.000	0.359	0.000	0.000
Available Capacity (c_a), veh/h	0.0	1419.5	0.0	0.0	0.0	1568.5	0.0	0.0
Upstream Filter Factor (I)	0.000	1.000	0.000	0.000	0.000	0.879	0.000	0.000
Uniform Delay (d1), s/veh	0.0	3.5	0.0	0.0	0.0	11.0	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.4	0.0	0.0	0.0	0.5	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	3.8	0.0	0.0	0.0	11.5	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	1.5	0.0	0.0	0.0	7.5	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	1.6	0.0	0.0	0.0	7.7	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.04	0.00	0.00	0.00	0.33	0.00	0.00

HCM 2010 Signalized Intersection Capacity Analysis  
 1: Bridge St & SR 611

3/26/2015

Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**Right Lane Group Data**

Assigned Movement	0	12	0	0	0	16	0	18
Lane Assignment		R						R
Lanes in Group	0	1	0	0	0	0	0	1
Group Volume (v), veh/h	0.0	44.2	0.0	0.0	0.0	0.0	0.0	164.9
Group Sat. Flow (s), veh/h/ln	0.0	1591.5	0.0	0.0	0.0	0.0	0.0	1505.2
Queue Serve Time (g_s), s	0.0	0.6	0.0	0.0	0.0	0.0	0.0	9.7
Cycle Queue Clear Time (g_c), s	0.0	0.6	0.0	0.0	0.0	0.0	0.0	9.7
Prot RT Sat Flow Rate (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff. Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion RT Outside Lane (P_R)	0.000	1.000	0.000	0.000	0.000	0.000	0.000	1.000
Lane Group Capacity (c), veh/h	0.0	1194.9	0.0	0.0	0.0	0.0	0.0	171.4
Volume-to-Capacity Ratio (X)	0.000	0.037	0.000	0.000	0.000	0.000	0.000	0.962
Available Capacity (c_a), veh/h	0.0	1194.9	0.0	0.0	0.0	0.0	0.0	171.4
Upstream Filter Factor (I)	0.000	1.000	0.000	0.000	0.000	0.000	0.000	1.000
Uniform Delay (d1), s/veh	0.0	2.8	0.0	0.0	0.0	0.0	0.0	39.1
Incremental Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	57.4
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	2.9	0.0	0.0	0.0	0.0	0.0	96.5
First-Term Queue (Q1), veh/ln	0.0	0.1	0.0	0.0	0.0	0.0	0.0	3.5
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	0.000	0.000	1.000	0.000	1.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.2	0.0	0.0	0.0	0.0	0.0	6.2
Percentile Storage Ratio (RQ%)	0.00	0.02	0.00	0.00	0.00	0.00	0.00	1.09
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**Intersection Summary**

HCM Average Control Delay	22.2
HCM Level of Service	C

HCM 2010 Signalized Intersection Capacity Analysis  
 2: Commercial Driveway/Stroud Mall Main Dr & SR 611

3/11/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	104	731	42	37	593	28	32	12	38	24	3	22
Movement Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj. Factor (A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj. Factors	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Sat. Flow Rate, veh/h/ln	1881	1882	1882	1900	1937	1976	1986	1986	1986	2025	2025	2005
Lanes	1	1	0	1	1	1	0	1	0	0	1	1
Lane Assignment												
Capacity, veh/h	0	1320	92	339	1472	1276	87	65	49	153	18	193
Proportion Arriving On Green	0.00	0.43	0.43	0.09	0.20	0.02	0.11	0.11	0.11	0.11	0.11	0.11
Movement Delay, s/veh	0.0	0.0	18.0	47.2	20.4	12.0	51.6	0.0	0.0	38.9	0.0	38.2
Movement LOS			B	D	C	B	D			D		D
Approach Volume, veh/h		859			712			140			57	
Approach Delay, s/veh		18.0			22.3			51.6			38.6	
Approach LOS		B			C			D			D	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phase			2		4		6		8			
Case No			4.0		7.0		5.3		8.0			
Phase Duration (G+Y+Rc), s			78.20		16.80		78.20		16.80			
Change Period (Y+Rc), s			6.00		6.00		6.00		6.00			
Max. Allowable Headway (MAH), s			1.53		4.56		1.53		4.56			
Maximum Green Setting (Gmax), s			72.20		10.80		58.90		10.80			
Max. Queue Clearance Time (g_c+l1), s			35.94		4.76		44.59		11.93			
Green Extension Time (g_e), s			0.39		0.37		0.39		0.00			
Probability of Phase Call (p_c)			1.000		0.995		1.000		0.995			
Probability of Max Out (p_x)			0.000		0.401		0.000		1.000			
<b>Left-Turn Movement Data</b>												
Assigned Movement					7		1		3			
Mvmt. Sat Flow, veh/h					768.55		652.88		438.61			
<b>Through Movement Data</b>												
Assigned Movement			2		4		6		8			
Mvmt. Sat Flow, veh/h			1736.70		114.00		1937.25		453.96			
<b>Right-Turn Movement Data</b>												
Assigned Movement			12		14		16		18			
Mvmt. Sat Flow, veh/h			121.07		1697.05		1679.60		432.99			
<b>Left Lane Group Data</b>												
Assigned Movement		0	0	0	7	0	1	0	3			
Lane Assignment					L+T		L		L+T+R			
Lanes in Group		0	0	0	1	0	1	0	1			
Group Volume (v), veh/h		0.0	0.0	0.0	31.0	0.0	61.7	0.0	140.2			
Group Sat. Flow (s), veh/h/ln		0.0	0.0	0.0	882.6	0.0	652.9	0.0	1325.6			
Queue Serve Time (g_s), s		0.0	0.0	0.0	0.0	0.0	8.7	0.0	7.2			
Cycle Queue Clear Time (g_c), s		0.0	0.0	0.0	2.8	0.0	42.6	0.0	9.9			

HCM 2010 Signalized Intersection Capacity Analysis  
 2: Commercial Driveway/Stroud Mall Main Dr & SR 611

3/11/2015

Perm LT Sat Flow Rate (s_l), veh/h/ln	0.0	0.0	0.0	732.0	0.0	652.9	0.0	781.7
Shared LT Sat Flow (s_sh), veh/h/ln	0.0	0.0	0.0	850.5	0.0	0.0	0.0	0.0
Perm LT Eff. Green (g_p), s	0.0	0.0	0.0	10.8	0.0	72.2	0.0	10.8
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.9	0.0	38.3	0.0	8.0
Perm LT Que Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	8.7	0.0	7.2
Time to First Blk (g_f), s	0.0	0.0	0.0	0.3	0.0	0.0	0.0	2.1
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.3	0.0	0.0	0.0	2.1
Proportion LT Inside Lane (P_L)	0.000	0.000	0.000	0.871	0.000	1.000	0.000	0.331
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	171.2	0.0	338.8	0.0	201.1
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.181	0.000	0.182	0.000	0.697
Available Capacity (c_a), veh/h	0.0	0.0	0.0	171.2	0.0	338.8	0.0	201.1
Upstream Filter Factor (I)	0.000	0.000	0.000	1.000	0.000	0.810	0.000	1.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	38.4	0.0	46.3	0.0	41.5
Incremental Delay (d2), s/veh	0.0	0.0	0.0	0.5	0.0	1.0	0.0	10.1
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	38.9	0.0	47.2	0.0	51.6
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	0.7	0.0	1.5	0.0	3.5
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.6
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	0.000	0.000	1.000	0.000	1.000	0.000	1.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	0.7	0.0	1.6	0.0	4.1
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.04	0.00	0.55	0.00	0.22
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Movement	0	2	0	4	0	6	0	8
Lane Assignment	T							
Lanes in Group	0	0	0	0	0	1	0	0
Group Volume (v), veh/h	0.0	0.0	0.0	0.0	0.0	617.7	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	0.0	0.0	0.0	0.0	1937.3	0.0	0.0
Queue Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	26.4	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	26.4	0.0	0.0
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	0.0	0.0	1472.3	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.000	0.000	0.420	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	0.0	0.0	0.0	1472.3	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	0.000	0.000	0.000	0.810	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	19.7	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	20.4	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	13.7	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	0.0	0.0	14.0	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	1.35	0.00	0.00

HCM 2010 Signalized Intersection Capacity Analysis  
 2: Commercial Driveway/Stroud Mall Main Dr & SR 611

3/11/2015

Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Movement	0	12	0	14	0	16	0	18
Lane Assignment		T+R		R		R		
Lanes in Group	0	1	0	1	0	1	0	0
Group Volume (v), veh/h	0.0	859.3	0.0	25.6	0.0	32.6	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	1857.8	0.0	1697.0	0.0	1679.6	0.0	0.0
Queue Serve Time (g_s), s	0.0	33.9	0.0	1.3	0.0	1.8	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	33.9	0.0	1.3	0.0	1.8	0.0	0.0
Prot RT Sat Flow Rate (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff. Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion RT Outside Lane (P_R)	0.000	0.065	0.000	1.000	0.000	1.000	0.000	0.327
Lane Group Capacity (c), veh/h	0.0	1411.9	0.0	192.9	0.0	1276.5	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.609	0.000	0.133	0.000	0.026	0.000	0.000
Available Capacity (c_a), veh/h	0.0	1411.9	0.0	192.9	0.0	1276.5	0.0	0.0
Upstream Filter Factor (I)	0.000	0.904	0.000	1.000	0.000	0.810	0.000	0.000
Uniform Delay (d1), s/veh	0.0	16.2	0.0	37.9	0.0	12.0	0.0	0.0
Incremental Delay (d2), s/veh	0.0	1.8	0.0	0.3	0.0	0.0	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	18.0	0.0	38.2	0.0	12.0	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	15.5	0.0	0.5	0.0	0.5	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000
Percentile Back of Queue (Q%), veh/ln	0.0	16.2	0.0	0.6	0.0	0.5	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.68	0.00	0.11	0.00	0.08	0.00	0.00
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM Average Control Delay	23.0
HCM Level of Service	C

HCM 2010 Signalized Intersection Capacity Analysis  
 3: SR 611 & Stroud Mall East Dr

3/11/2015



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶	↷	↶	↷
Volume (vph)	58	619	674	51	17	13
Movement Number	5	2	6	16	7	14
Initial Queue, veh	0	0	0	0	0	0
Ped-Bike Adj. Factor (A_pbT)	1.00			1.00	1.00	1.00
Parking, Bus Adj. Factors	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Sat. Flow Rate, veh/h/ln	1900	1863	1863	1900	1976	1937
Lanes	1	1	1	1	1	1
Lane Assignment						
Capacity, veh/h	0	1549	1549	1343	92	80
Proportion Arriving On Green	0.00	0.37	0.19	0.01	0.05	0.05
Movement Delay, s/veh	0.0	14.8	22.8	10.5	48.1	46.9
Movement LOS		B	C	B	D	D
Approach Volume, veh/h		688	845		46	
Approach Delay, s/veh		14.8	21.8		47.7	
Approach LOS		B	C		D	

Timer:	1	2	3	4	5	6	7	8
Assigned Phase		2		4		6		
Case No		4.0		9.0		7.0		
Phase Duration (G+Y+Rc), s		89.30		10.89		89.30		
Change Period (Y+Rc), s		6.00		6.00		6.00		
Max. Allowable Headway (MAH), s		1.43		4.54		1.43		
Maximum Green Setting (Gmax), s		83.30		6.80		72.20		
Max. Queue Clearance Time (g_c+I1), s		29.83		3.53		39.31		
Green Extension Time (g_e), s		0.28		0.02		0.28		
Probability of Phase Call (p_c)		1.000		0.720		1.000		
Probability of Max Out (p_x)		0.000		1.000		0.000		

**Left-Turn Movement Data**

Assigned Movement	7
Mvmt. Sat Flow, veh/h	1881.90

**Through Movement Data**

Assigned Movement	2	6
Mvmt. Sat Flow, veh/h	1862.75	1862.75

**Right-Turn Movement Data**

Assigned Movement	12	14	16
Mvmt. Sat Flow, veh/h	0.00	1646.67	1615.00

**Left Lane Group Data**

Assigned Movement	0	0	0	7	0	0	0	0
Lane Assignment				L				
Lanes in Group	0	0	0	1	0	0	0	0
Group Volume (v), veh/h	0.0	0.0	0.0	29.8	0.0	0.0	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	0.0	0.0	1881.9	0.0	0.0	0.0	0.0
Queue Serve Time (g_s), s	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0

# HCM 2010 Signalized Intersection Capacity Analysis

## 3: SR 611 & Stroud Mall East Dr

3/11/2015

Perm LT Sat Flow Rate (s_l), veh/h/ln	0.0	0.0	0.0	1881.9	0.0	0.0	0.0	0.0
Shared LT Sat Flow (s_sh), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Eff. Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Que Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	83.3	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion LT Inside Lane (P_L)	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	91.9	0.0	0.0	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.325	0.000	0.000	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	0.0	127.7	0.0	0.0	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	46.1	0.0	0.0	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	48.1	0.0	0.0	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Movement	0	2	0	0	0	6	0	0
Lane Assignment	T			T				
Lanes in Group	0	1	0	0	0	1	0	0
Group Volume (v), veh/h	0.0	687.8	0.0	0.0	0.0	774.7	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	1862.7	0.0	0.0	0.0	1862.7	0.0	0.0
Queue Serve Time (g_s), s	0.0	27.8	0.0	0.0	0.0	37.3	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	27.8	0.0	0.0	0.0	37.3	0.0	0.0
Lane Group Capacity (c), veh/h	0.0	1548.7	0.0	0.0	0.0	1548.7	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.444	0.000	0.000	0.000	0.500	0.000	0.000
Available Capacity (c_a), veh/h	0.0	1548.7	0.0	0.0	0.0	1548.7	0.0	0.0
Upstream Filter Factor (I)	0.000	0.762	0.000	0.000	0.000	0.756	0.000	0.000
Uniform Delay (d1), s/veh	0.0	14.0	0.0	0.0	0.0	22.0	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.7	0.0	0.0	0.0	0.9	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	14.8	0.0	0.0	0.0	22.8	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	13.3	0.0	0.0	0.0	18.7	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.3	0.0	0.0	0.0	0.4	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	13.6	0.0	0.0	0.0	19.1	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	1.31	0.00	0.00	0.00	0.29	0.00	0.00

# HCM 2010 Signalized Intersection Capacity Analysis

## 3: SR 611 & Stroud Mall East Dr

3/11/2015

Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

### Right Lane Group Data

Assigned Movement	0	12	0	14	0	16	0	0
Lane Assignment				R		R		
Lanes in Group	0	0	0	1	0	1	0	0
Group Volume (v), veh/h	0.0	0.0	0.0	15.9	0.0	69.9	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	0.0	0.0	1646.7	0.0	1615.0	0.0	0.0
Queue Serve Time (g_s), s	0.0	0.0	0.0	0.9	0.0	4.3	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	0.0	0.0	0.9	0.0	4.3	0.0	0.0
Prot RT Sat Flow Rate (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff. Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion RT Outside Lane (P_R)	0.000	0.000	0.000	1.000	0.000	1.000	0.000	0.000
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	80.4	0.0	1342.7	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.197	0.000	0.052	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	0.0	111.8	0.0	1342.7	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	0.000	1.000	0.000	0.756	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	45.8	0.0	10.5	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.0	1.2	0.0	0.1	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	46.9	0.0	10.5	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	0.4	0.0	0.9	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	1.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	0.5	0.0	0.9	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.08	0.00	0.09	0.00	0.00
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

### Intersection Summary

HCM Average Control Delay	19.5
HCM Level of Service	B

# HCM 2010 Signalized Intersection Capacity Analysis

## 4: Commercial Driveway/Chipperfield Dr & SR 611

3/25/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	93	528	2	7	585	91	14	4	7	206	4	138
Movement Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj. Factor (A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking, Bus Adj. Factors	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Sat. Flow Rate, veh/h/ln	1872	1891	1891	1890	1872	1928	1900	1900	1976	1855	1855	1947
Lanes	1	1	0	1	1	1	0	1	1	0	1	1
Lane Assignment												
Capacity, veh/h	0	1085	16	402	1092	954	62	15	70	304	10	294
Proportion Arriving On Green	0.00	0.48	0.48	0.58	0.58	0.58	0.04	0.04	0.04	0.18	0.18	0.18
Movement Delay, s/veh	0.0	0.0	16.0	18.2	13.5	8.6	44.7	0.0	43.4	50.3	0.0	35.2
Movement LOS			B	B	B	A	D		D	D		D
Approach Volume, veh/h		564			732			36			400	
Approach Delay, s/veh		16.0			13.0			44.3			44.8	
Approach LOS		B			B			D			D	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phase			2	8	4		6					
Case No			4.0	11.0	11.0		5.3					
Phase Duration (G+Y+Rc), s			59.23	9.83	22.20		59.23					
Change Period (Y+Rc), s			6.00	6.00	6.00		6.00					
Max. Allowable Headway (MAH), s			7.25	5.00	4.96		7.25					
Maximum Green Setting (Gmax), s			59.10	6.40	16.20		48.70					
Max. Queue Clearance Time (g_c+I1), s			20.78	3.16	14.54		21.91					
Green Extension Time (g_e), s			15.96	0.02	0.36		17.35					
Probability of Phase Call (p_c)			1.000	0.609	1.000		1.000					
Probability of Max Out (p_x)			0.450	1.000	1.000		0.605					
Left-Turn Movement Data												
Assigned Movement				3	7		1					
Mvmt. Sat Flow, veh/h				1480.01	1713.05		855.79					
Through Movement Data												
Assigned Movement		2	8	4			6					
Mvmt. Sat Flow, veh/h		1859.37	345.98	55.88			1871.78					
Right-Turn Movement Data												
Assigned Movement			12	18	14		16					
Mvmt. Sat Flow, veh/h			26.76	1655.65	1654.66		1635.62					
Left Lane Group Data												
Assigned Movement		0	0	3	7	0	1	0	0			
Lane Assignment				L+T	L+T		L					
Lanes in Group		0	0	1	1	0	1	0	0			
Group Volume (v), veh/h		0.0	0.0	24.0	253.2	0.0	16.7	0.0	0.0			
Group Sat. Flow (s), veh/h/ln		0.0	0.0	1826.0	1768.9	0.0	855.8	0.0	0.0			
Queue Serve Time (g_s), s		0.0	0.0	1.2	12.5	0.0	1.1	0.0	0.0			
Cycle Queue Clear Time (g_c), s		0.0	0.0	1.2	12.5	0.0	19.9	0.0	0.0			

HCM 2010 Signalized Intersection Capacity Analysis  
 4: Commercial Driveway/Chipperfield Dr & SR 611

3/25/2015

Perm LT Sat Flow Rate (s_l), veh/h/ln	0.0	0.0	0.0	0.0	0.0	855.8	0.0	0.0
Shared LT Sat Flow (s_sh), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Eff. Green (g_p), s	0.0	0.0	0.0	0.0	0.0	53.2	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	34.5	0.0	0.0
Perm LT Que Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion LT Inside Lane (P_L)	0.000	0.000	0.811	0.968	0.000	1.000	0.000	0.000
Lane Group Capacity (c), veh/h	0.0	0.0	76.7	314.0	0.0	401.9	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.313	0.807	0.000	0.041	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	128.0	314.0	0.0	401.9	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	1.000	1.000	0.000	1.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	42.4	36.0	0.0	18.0	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	2.3	14.3	0.0	0.2	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	44.7	50.3	0.0	18.2	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.5	5.2	0.0	0.2	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	0.000	1.000	1.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.6	6.5	0.0	0.2	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.03	0.35	0.00	0.03	0.00	0.00
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Movement	0	2	8	4	0	6	0	0
Lane Assignment	T							
Lanes in Group	0	0	0	0	0	1	0	0
Group Volume (v), veh/h	0.0	0.0	0.0	0.0	0.0	615.8	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	0.0	0.0	0.0	0.0	1871.8	0.0	0.0
Queue Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	18.6	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	18.6	0.0	0.0
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	0.0	0.0	1091.7	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.000	0.000	0.564	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	0.0	0.0	0.0	1091.7	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	11.8	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	13.5	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	6.8	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	1.000	1.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	0.0	0.0	7.4	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00

HCM 2010 Signalized Intersection Capacity Analysis  
 4: Commercial Driveway/Chipperfield Dr & SR 611

3/25/2015

Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**Right Lane Group Data**

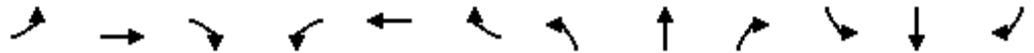
Assigned Movement	0	12	18	14	0	16	0	0
Lane Assignment		T+R	R	R		R		
Lanes in Group	0	1	1	1	0	1	0	0
Group Volume (v), veh/h	0.0	563.8	12.1	146.8	0.0	100.0	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	1886.1	1655.6	1654.7	0.0	1635.6	0.0	0.0
Queue Serve Time (g_s), s	0.0	18.8	0.6	7.3	0.0	2.5	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	18.8	0.6	7.3	0.0	2.5	0.0	0.0
Prot RT Sat Flow Rate (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff. Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion RT Outside Lane (P_R)	0.000	0.014	1.000	1.000	0.000	1.000	0.000	0.000
Lane Group Capacity (c), veh/h	0.0	1100.1	69.6	293.7	0.0	954.0	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.512	0.174	0.500	0.000	0.105	0.000	0.000
Available Capacity (c_a), veh/h	0.0	1221.4	116.1	293.7	0.0	954.0	0.0	0.0
Upstream Filter Factor (I)	0.000	0.915	1.000	1.000	0.000	1.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	14.7	42.2	33.9	0.0	8.4	0.0	0.0
Incremental Delay (d2), s/veh	0.0	1.2	1.2	1.3	0.0	0.2	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	16.0	43.4	35.2	0.0	8.6	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	7.9	0.3	2.9	0.0	0.8	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.4	0.0	0.1	0.0	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	1.000	1.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	8.3	0.3	3.0	0.0	0.8	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.13	0.08	0.38	0.00	0.10	0.00	0.00
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**Intersection Summary**

HCM Average Control Delay	21.9
HCM Level of Service	C

HCM Signalized Intersection Capacity Analysis  
 19: 209 NB Exit Ramp/209 NB On Ramp & W Main St

3/11/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗			↖↗			↕				
Volume (vph)	271	488	0	0	369	204	79	1	94	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				
Lane Util. Factor	1.00	1.00			0.95			1.00				
Frt	1.00	1.00			0.95			0.93				
Flt Protected	0.95	1.00			1.00			0.98				
Satd. Flow (prot)	1805	1900			3417			1723				
Flt Permitted	0.21	1.00			1.00			0.98				
Satd. Flow (perm)	403	1900			3417			1723				
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	301	542	0	0	410	227	88	1	104	0	0	0
RTOR Reduction (vph)	0	0	0	0	130	0	0	65	0	0	0	0
Lane Group Flow (vph)	301	542	0	0	507	0	0	128	0	0	0	0
Turn Type	pm+pt	NA			NA		Split	NA				
Protected Phases	7	4			8		2	2				
Permitted Phases	4											
Actuated Green, G (s)	29.6	29.6			16.6			22.4				
Effective Green, g (s)	29.6	29.6			16.6			22.4				
Actuated g/C Ratio	0.49	0.49			0.28			0.37				
Clearance Time (s)	4.0	4.0			4.0			4.0				
Vehicle Extension (s)	3.0	3.0			3.0			3.0				
Lane Grp Cap (vph)	409	937			945			643				
v/s Ratio Prot	c0.11	0.29			0.15			c0.07				
v/s Ratio Perm	c0.25											
v/c Ratio	0.74	0.58			0.54			0.20				
Uniform Delay, d1	10.6	10.8			18.4			12.7				
Progression Factor	0.88	0.80			1.00			1.00				
Incremental Delay, d2	6.4	0.8			0.6			0.7				
Delay (s)	15.8	9.4			19.0			13.4				
Level of Service	B	A			B			B				
Approach Delay (s)		11.7			19.0			13.4			0.0	
Approach LOS		B			B			B			A	

Intersection Summary

HCM Average Control Delay	14.7	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	62.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Signalized Intersection Capacity Analysis

## 16: 209 SB On Ramp/I-80EB / 209 SB Exit Ramp & W Main St

3/11/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑	↑						↑↓	
Volume (vph)	0	518	10	122	326	0	0	0	0	241	1	24
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	1.00						1.00	
Frt		1.00		1.00	1.00						0.99	
Flt Protected		1.00		0.95	1.00						0.96	
Satd. Flow (prot)		3600		1805	1900						1795	
Flt Permitted		1.00		0.43	1.00						0.96	
Satd. Flow (perm)		3600		818	1900						1795	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	576	11	136	362	0	0	0	0	268	1	27
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	6	0
Lane Group Flow (vph)	0	584	0	136	362	0	0	0	0	0	290	0
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		4			8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		29.6		16.6	16.6						22.4	
Effective Green, g (s)		29.6		16.6	16.6						22.4	
Actuated g/C Ratio		0.49		0.28	0.28						0.37	
Clearance Time (s)		4.0		4.0	4.0						4.0	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		1776		226	526						670	
v/s Ratio Prot		c0.16			c0.19							
v/s Ratio Perm				0.17							0.16	
v/c Ratio		0.33		0.60	0.69						0.43	
Uniform Delay, d1		9.2		18.8	19.4						14.1	
Progression Factor		1.00		0.53	0.53						1.00	
Incremental Delay, d2		0.1		3.9	3.3						2.0	
Delay (s)		9.3		13.8	13.5						16.1	
Level of Service		A		B	B						B	
Approach Delay (s)		9.3			13.6			0.0			16.1	
Approach LOS		A			B			A			B	

### Intersection Summary

HCM Average Control Delay	12.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM 2010 Signalized Intersection Capacity Analysis  
 22: 305 WB Exit Ramp/305 WB On Ramp & W Main St

6/17/2015

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	10	547	0	0	256	411	0	0	0	94	94	91
Number	7	4	14	3	8	18				5	2	12
Initial Q, veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900				1900	1900	1900
Adj Flow Rate, veh/h	11	608	0	0	284	0				104	104	0
Adj No. of Lanes	1	1	0	0	1	0				1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90				0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	0	0	0				0	0	0
Opposing Right Turn Influence	Yes			No						Yes		
Cap, veh/h	338	735	0	0	630	0				949	996	847
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Prop Arrive On Green	0.01	0.39	0.00	0.00	0.33	0.00				0.52	0.52	0.00
Ln Grp Delay, s/veh	19.2	26.3	0.0	0.0	24.1	0.0				11.0	11.0	0.0
Ln Grp LOS	B	C			C					B	B	
Approach Vol, veh/h		619			284						208	
Approach Delay, s/veh		26.2			24.1						11.0	
Approach LOS		C			C						B	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs			2		4			7	8			
Case No			9.0		4.0			1.2	8.0			
Phs Duration (G+Y+Rc), s			51.2		38.8			5.0	33.9			
Change Period (Y+Rc), s			4.0		4.0			4.0	4.0			
Max Green (Gmax), s			20.0		62.0			4.0	54.0			
Max Allow Headway (MAH), s			4.5		5.2			3.8	5.2			
Max Q Clear (g_c+I1), s			4.6		28.0			2.3	12.6			
Green Ext Time (g_e), s			0.7		6.9			0.0	7.1			
Prob of Phs Call (p_c)			1.00		1.00			0.24	1.00			
Prob of Max Out (p_x)			0.00		0.03			1.00	0.01			
<b>Left-Turn Movement Data</b>												
Assigned Mvmt			5					7	3			
Mvmt Sat Flow, veh/h			1810					1810	0			
<b>Through Movement Data</b>												
Assigned Mvmt			2		4				8			
Mvmt Sat Flow, veh/h			1900		1900				1900			
<b>Right-Turn Movement Data</b>												
Assigned Mvmt			12		14				18			
Mvmt Sat Flow, veh/h			1615		0				0			
<b>Left Lane Group Data</b>												
Assigned Mvmt		0	5	0	0	0	0	7	3			
Lane Assignment								(Pr/Pm)				
Lanes in Grp		0	1	0	0	0	0	1	0			

HCM 2010 Signalized Intersection Capacity Analysis  
 22: 305 WB Exit Ramp/305 WB On Ramp & W Main St

6/17/2015

Grp Vol (v), veh/h	0	104	0	0	0	0	11	0
Grp Sat Flow (s), veh/h/ln	0	1810	0	0	0	0	1810	0
Q Serve Time (g_s), s	0.0	2.6	0.0	0.0	0.0	0.0	0.3	0.0
Cycle Q Clear Time (g_c), s	0.0	2.6	0.0	0.0	0.0	0.0	0.3	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	1810	0	0	0	0	1113	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	31.9	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	19.3	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.9
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	0.00	0.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	949	0	0	0	0	338	0
V/C Ratio (X)	0.00	0.11	0.00	0.00	0.00	0.00	0.03	0.00
Avail Cap (c_a), veh/h	0	949	0	0	0	0	399	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	0.00	0.58	0.00
Uniform Delay (d1), s/veh	0.0	10.8	0.0	0.0	0.0	0.0	19.2	0.0
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	11.0	0.0	0.0	0.0	0.0	19.2	0.0
1st-Term Q (Q1), veh/ln	0.0	1.3	0.0	0.0	0.0	0.0	0.2	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00
%ile Back of Q (50%), veh/ln	0.0	1.4	0.0	0.0	0.0	0.0	0.2	0.0
%ile Storage Ratio (RQ%)	0.00	0.23	0.00	0.00	0.00	0.00	0.09	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Mvmt	0	2	0	4	0	0	0	8
Lane Assignment		T		T				T
Lanes in Grp	0	1	0	1	0	0	0	1
Grp Vol (v), veh/h	0	104	0	608	0	0	0	284
Grp Sat Flow (s), veh/h/ln	0	1900	0	1900	0	0	0	1900
Q Serve Time (g_s), s	0.0	2.5	0.0	26.0	0.0	0.0	0.0	10.6
Cycle Q Clear Time (g_c), s	0.0	2.5	0.0	26.0	0.0	0.0	0.0	10.6
Lane Grp Cap (c), veh/h	0	996	0	735	0	0	0	630
V/C Ratio (X)	0.00	0.10	0.00	0.83	0.00	0.00	0.00	0.45
Avail Cap (c_a), veh/h	0	996	0	1309	0	0	0	1140
Upstream Filter (I)	0.00	1.00	0.00	0.58	0.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	10.8	0.0	24.9	0.0	0.0	0.0	23.6
Incr Delay (d2), s/veh	0.0	0.2	0.0	1.4	0.0	0.0	0.0	0.5
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	11.0	0.0	26.3	0.0	0.0	0.0	24.1
1st-Term Q (Q1), veh/ln	0.0	1.3	0.0	13.5	0.0	0.0	0.0	5.5
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.3	0.0	0.0	0.0	0.1

HCM 2010 Signalized Intersection Capacity Analysis  
 22: 305 WB Exit Ramp/305 WB On Ramp & W Main St

6/17/2015

3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	1.4	0.0	13.8	0.0	0.0	0.0	5.6
%ile Storage Ratio (RQ%)	0.00	0.08	0.00	0.78	0.00	0.00	0.00	0.80
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	0	0	18
Lane Assignment	R							
Lanes in Grp	0	1	0	0	0	0	0	0
Grp Vol (v), veh/h	0	0	0	0	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1615	0	0	0	0	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Lane Grp Cap (c), veh/h	0	847	0	0	0	0	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	847	0	0	0	0	0	0
Upstream Filter (I)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 2010 Ctrl Delay	22.8
HCM 2010 LOS	C

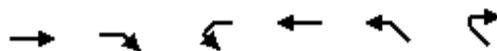
Notes

User approved volume balancing among the lanes for turning movement.

# HCM Signalized Intersection Capacity Analysis

## 33: Dreher Connector Rd & W Main St

3/11/2015



Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations	↑	↗		↖↑	↖	↗
Volume (vph)	547	35	45	399	174	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.95	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		0.99	0.95	1.00
Satd. Flow (prot)	1900	1615		3592	1805	1615
Flt Permitted	1.00	1.00		0.77	0.95	1.00
Satd. Flow (perm)	1900	1615		2788	1805	1615
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	608	39	50	443	193	11
RTOR Reduction (vph)	0	23	0	0	0	6
Lane Group Flow (vph)	608	16	0	493	193	5
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			8	2	
Permitted Phases		4	8			2
Actuated Green, G (s)	24.1	24.1		24.1	25.4	25.4
Effective Green, g (s)	24.1	24.1		24.1	25.4	25.4
Actuated g/C Ratio	0.42	0.42		0.42	0.44	0.44
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	796	677		1169	797	713
v/s Ratio Prot	c0.32				c0.11	
v/s Ratio Perm		0.01		0.18		0.00
v/c Ratio	0.76	0.02		0.42	0.24	0.01
Uniform Delay, d1	14.3	9.8		11.8	10.0	9.0
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.4	0.0		0.2	0.7	0.0
Delay (s)	18.7	9.8		12.0	10.8	9.0
Level of Service	B	A		B	B	A
Approach Delay (s)	18.1			12.0	10.7	
Approach LOS	B			B	B	

### Intersection Summary

HCM Average Control Delay	14.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	57.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

**Intersection**

Intersection Delay (sec/veh): 3.5

Movement	EBL	EBT	WBT	WBR	SEL	SER
Volume (vph)	149	202	134	25	10	80
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	150			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles(%)	0	0	0	0	0	0
Movement Flow Rate	166	224	149	28	11	89
Number of Lanes	1	1	1	0	1	0

**Major/Minor**

	Major 1	Major 2				
Conflicting Flow Rate - All	177	0	0	0	719	163
Stage 1	199	0	0	0	163	0
Stage 2	230	0	0	0	556	0
Follow-up Headway	2.2	-	0	0	3.5	3.3
Pot Capacity-1 Maneuver	1413	-	-	-	398	889
Stage 1	-	-	-	-	871	-
Stage 2	-	-	-	-	578	-
Mov Capacity-1 Maneuver	1413	-	-	-	351.4	889
Mov Capacity-2 Maneuver	-	-	-	-	351.4	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	510.4	-

**Approach**

	EB	WB	SE
HCM Control Delay (s)	3.3	0	10.5
HCM LOS	A	A	B

**Lane**

	EBL	EBT	WBT	WBR	SELn1
Capacity (vph)					760
HCM Control Delay (s)	7.886	-	-	-	10.5
HCM Lane VC Ratio	0.117	-	0	0	0.132
HCM Lane LOS	A	-	-	-	B
HCM 95th Percentile Queue (veh)	0.397	-	0	0	0.452

HCM 2010 Signalized Intersection Capacity Analysis  
 26: Seventh St & 307 EB Exit Ramp/307 EB On Ramp

3/17/2015

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	516	0	202	0	0	0	0	109	147	135	202	0
Movement Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj. Factor (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj. Factors	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Sat. Flow Rate, veh/h/ln	1863	1900	1863	1900	1900	1900	1900	1909	1909	1863	1863	1900
Lanes	1	0	1	0	0	0	0	1	1	1	1	0
Lane Assignment												
Capacity, veh/h	0	0	0	0	0	0	0	1656	1407	0	1615	0
Proportion Arriving On Green	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.87	0.87	0.00	0.76	0.00
Movement Delay, s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.5	0.0	0.8	0.0
Movement LOS								A	A		A	
Approach Volume, veh/h		0			0			278			220	
Approach Delay, s/veh		0.0			0.0			0.4			0.8	
Approach LOS								A			A	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phase			2				6					
Case No			7.0				4.0					
Phase Duration (G+Y+Rc), s			30.10				30.10					
Change Period (Y+Rc), s			4.00				4.00					
Max. Allowable Headway (MAH), s			4.88				4.88					
Maximum Green Setting (Gmax), s			19.10				26.10					
Max. Queue Clearance Time (g_c+I1), s			2.44				2.96					
Green Extension Time (g_e), s			2.30				2.53					
Probability of Phase Call (p_c)			1.000				1.000					
Probability of Max Out (p_x)			0.030				0.004					
<b>Left-Turn Movement Data</b>												
Assigned Movement												
Mvmt. Sat Flow, veh/h												
<b>Through Movement Data</b>												
Assigned Movement			2				6					
Mvmt. Sat Flow, veh/h			1909.31				1862.75					
<b>Right-Turn Movement Data</b>												
Assigned Movement			12				16					
Mvmt. Sat Flow, veh/h			1622.92				0.00					
<b>Left Lane Group Data</b>												
Assigned Movement		0	0	0	0	0	0	0	0			
Lane Assignment												
Lanes in Group		0	0	0	0	0	0	0	0			
Group Volume (v), veh/h		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Group Sat. Flow (s), veh/h/ln		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Queue Serve Time (g_s), s		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Cycle Queue Clear Time (g_c), s		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			

HCM 2010 Signalized Intersection Capacity Analysis  
 26: Seventh St & 307 EB Exit Ramp/307 EB On Ramp

3/17/2015

Perm LT Sat Flow Rate (s_l), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shared LT Sat Flow (s_sh), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Eff. Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Que Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	26.1	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion LT Inside Lane (P_L)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Movement	0	2	0	0	0	6	0	0
Lane Assignment	T		T					
Lanes in Group	0	1	0	0	0	1	0	0
Group Volume (v), veh/h	0.0	118.5	0.0	0.0	0.0	219.6	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	1909.3	0.0	0.0	0.0	1862.7	0.0	0.0
Queue Serve Time (g_s), s	0.0	0.3	0.0	0.0	0.0	1.0	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	0.3	0.0	0.0	0.0	1.0	0.0	0.0
Lane Group Capacity (c), veh/h	0.0	1655.6	0.0	0.0	0.0	1615.2	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.072	0.000	0.000	0.000	0.136	0.000	0.000
Available Capacity (c_a), veh/h	0.0	1655.6	0.0	0.0	0.0	1615.2	0.0	0.0
Upstream Filter Factor (I)	0.000	1.000	0.000	0.000	0.000	0.880	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.3	0.0	0.0	0.0	0.6	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.4	0.0	0.0	0.0	0.8	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	-0.2	0.0	0.0	0.0	-0.6	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	-0.2	0.0	0.0	0.0	-0.6	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	-0.04	0.00	0.00	0.00	-0.05	0.00	0.00

HCM 2010 Signalized Intersection Capacity Analysis  
 26: Seventh St & 307 EB Exit Ramp/307 EB On Ramp

3/17/2015

Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**Right Lane Group Data**

Assigned Movement	0	12	0	0	0	16	0	0
Lane Assignment	R							
Lanes in Group	0	1	0	0	0	0	0	0
Group Volume (v), veh/h	0.0	159.8	0.0	0.0	0.0	0.0	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	1622.9	0.0	0.0	0.0	0.0	0.0	0.0
Queue Serve Time (g_s), s	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Sat Flow Rate (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff. Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion RT Outside Lane (P_R)	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000
Lane Group Capacity (c), veh/h	0.0	1407.2	0.0	0.0	0.0	0.0	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.114	0.000	0.000	0.000	0.000	0.000	0.000
Available Capacity (c_a), veh/h	0.0	1407.2	0.0	0.0	0.0	0.0	0.0	0.0
Upstream Filter Factor (I)	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	-0.3	0.0	0.0	0.0	0.0	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	-0.3	0.0	0.0	0.0	0.0	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	-0.13	0.00	0.00	0.00	0.00	0.00	0.00
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**Intersection Summary**

HCM Average Control Delay	0.6
HCM Level of Service	A

HCM 2010 Signalized Intersection Capacity Analysis  
 3: Broad St & 307 WB On Ramp/307 WB Exit Ramp

3/17/2015

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	76	1	318	177	389	0	0	44	296
Movement Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj. Factor (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj. Factors	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Sat. Flow Rate, veh/h/ln	1900	1900	1900	1863	1863	1863	1872	1872	1900	1900	1863	1863
Lanes	0	0	0	0	1	1	1	1	0	0	1	1
Lane Assignment												
Capacity, veh/h	0	0	0	312	4	282	0	1239	0	0	1233	1048
Proportion Arriving On Green	0.00	0.00	0.00	0.18	0.18	0.18	0.00	0.66	0.00	0.00	0.66	0.66
Movement Delay, s/veh	0.0	0.0	0.0	18.2	0.0	113.9	0.0	4.4	0.0	0.0	3.0	4.3
Movement LOS				B		F		A			A	A
Approach Volume, veh/h		0			402			423			370	
Approach Delay, s/veh		0.0			93.9			4.4			4.2	
Approach LOS					F			A			A	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phase			2	8			6					
Case No			4.0	11.0			7.0					
Phase Duration (G+Y+Rc), s			37.10	12.90			37.10					
Change Period (Y+Rc), s			4.00	4.00			4.00					
Max. Allowable Headway (MAH), s			4.67	4.31			4.67					
Maximum Green Setting (Gmax), s			33.10	8.90			24.00					
Max. Queue Clearance Time (g_c+l1), s			6.93	10.90			6.31					
Green Extension Time (g_e), s			4.15	0.00			3.75					
Probability of Phase Call (p_c)			1.000	0.996			1.000					
Probability of Max Out (p_x)			0.014	1.000			0.077					
<b>Left-Turn Movement Data</b>												
Assigned Movement				3								
Mvmt. Sat Flow, veh/h				1752.09								
<b>Through Movement Data</b>												
Assigned Movement			2	8			6					
Mvmt. Sat Flow, veh/h			1872.06	23.06			1862.75					
<b>Right-Turn Movement Data</b>												
Assigned Movement			12	18			16					
Mvmt. Sat Flow, veh/h			0.00	1583.33			1583.33					
<b>Left Lane Group Data</b>												
Assigned Movement		0	0	3	0	0	0	0	0			
Lane Assignment				L+T								
Lanes in Group		0	0	1	0	0	0	0	0			
Group Volume (v), veh/h		0.0	0.0	83.7	0.0	0.0	0.0	0.0	0.0			
Group Sat. Flow (s), veh/h/ln		0.0	0.0	1775.1	0.0	0.0	0.0	0.0	0.0			
Queue Serve Time (g_s), s		0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0			
Cycle Queue Clear Time (g_c), s		0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0			

# HCM 2010 Signalized Intersection Capacity Analysis

## 3: Broad St & 307 WB On Ramp/307 WB Exit Ramp

3/17/2015

Perm LT Sat Flow Rate (s_l), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shared LT Sat Flow (s_sh), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Eff. Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Que Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	33.1	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion LT Inside Lane (P_L)	0.000	0.000	0.987	0.000	0.000	0.000	0.000	0.000
Lane Group Capacity (c), veh/h	0.0	0.0	316.0	0.0	0.0	0.0	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.265	0.000	0.000	0.000	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	316.0	0.0	0.0	0.0	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	17.7	0.0	0.0	0.0	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	18.2	0.0	0.0	0.0	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Movement	0	2	8	0	0	6	0	0
Lane Assignment	T					T		
Lanes in Group	0	1	0	0	0	1	0	0
Group Volume (v), veh/h	0.0	422.8	0.0	0.0	0.0	47.8	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	1872.1	0.0	0.0	0.0	1862.7	0.0	0.0
Queue Serve Time (g_s), s	0.0	4.9	0.0	0.0	0.0	0.4	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	4.9	0.0	0.0	0.0	0.4	0.0	0.0
Lane Group Capacity (c), veh/h	0.0	1239.3	0.0	0.0	0.0	1233.1	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.341	0.000	0.000	0.000	0.039	0.000	0.000
Available Capacity (c_a), veh/h	0.0	1239.3	0.0	0.0	0.0	1233.1	0.0	0.0
Upstream Filter Factor (I)	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	3.7	0.0	0.0	0.0	2.9	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.8	0.0	0.0	0.0	0.1	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	4.4	0.0	0.0	0.0	3.0	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.9	0.0	0.0	0.0	0.1	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	1.000	0.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	1.1	0.0	0.0	0.0	0.1	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.16	0.00	0.00	0.00	0.02	0.00	0.00

HCM 2010 Signalized Intersection Capacity Analysis  
 3: Broad St & 307 WB On Ramp/307 WB Exit Ramp

3/17/2015

Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Movement	0	12	18	0	0	16	0	0
Lane Assignment			R			R		
Lanes in Group	0	0	1	0	0	1	0	0
Group Volume (v), veh/h	0.0	0.0	318.5	0.0	0.0	321.7	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	0.0	1583.3	0.0	0.0	1583.3	0.0	0.0
Queue Serve Time (g_s), s	0.0	0.0	8.9	0.0	0.0	4.3	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	0.0	8.9	0.0	0.0	4.3	0.0	0.0
Prot RT Sat Flow Rate (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff. Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion RT Outside Lane (P_R)	0.000	0.000	1.000	0.000	0.000	1.000	0.000	0.000
Lane Group Capacity (c), veh/h	0.0	0.0	281.8	0.0	0.0	1048.2	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	1.130	0.000	0.000	0.307	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	281.8	0.0	0.0	1048.2	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	1.000	0.000	0.000	1.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	20.5	0.0	0.0	3.6	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	93.3	0.0	0.0	0.8	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	113.9	0.0	0.0	4.3	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	2.9	0.0	0.0	0.6	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	7.3	0.0	0.0	0.2	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	1.000	0.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	10.2	0.0	0.0	0.9	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	5.20	0.00	0.00	0.44	0.00	0.00
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	9.2	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM Average Control Delay	34.5
HCM Level of Service	C

# HCM Signalized Intersection Capacity Analysis

## 8: Dreher Ave/School Drive & Main Street

3/26/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	113	432	79	130	345	207	24	56	220	103	45	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	14	12	11	12	14	12	14	16	14	14	12
Grade (%)		-1%			0%			1%			1%	
Total Lost time (s)	5.0	5.0		5.0	5.0	7.0	4.0	4.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.88		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1337	1700		1525	1613	1397	1483	1526		1567	1515	
Flt Permitted	0.54	1.00		0.07	1.00	1.00	0.66	1.00		0.16	1.00	
Satd. Flow (perm)	758	1700		120	1613	1397	1028	1526		264	1515	
Peak-hour factor, PHF	0.92	0.86	0.92	0.91	0.92	0.92	0.81	0.92	0.77	0.92	0.92	0.92
Adj. Flow (vph)	123	502	86	143	375	225	30	61	286	112	49	59
RTOR Reduction (vph)	0	3	0	0	0	105	0	140	0	0	36	0
Lane Group Flow (vph)	123	585	0	143	375	120	30	207	0	112	72	0
Heavy Vehicles (%)	18%	4%	14%	3%	6%	11%	9%	10%	3%	10%	10%	10%
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	46.5	46.5		70.0	70.0	70.0	33.0	33.0		33.0	33.0	
Effective Green, g (s)	48.5	48.5		72.0	72.0	70.0	35.0	35.0		33.0	33.0	
Actuated g/C Ratio	0.32	0.32		0.48	0.48	0.47	0.23	0.23		0.22	0.22	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	245	550		231	774	652	240	356		58	333	
v/s Ratio Prot		c0.34		c0.08	0.23			0.14			0.05	
v/s Ratio Perm	0.16			0.22		0.09	0.03			c0.43		
v/c Ratio	0.50	1.06		0.62	0.48	0.18	0.12	0.58		1.93	0.22	
Uniform Delay, d1	41.0	50.8		36.2	26.4	23.3	45.4	51.0		58.5	47.9	
Progression Factor	1.00	1.00		1.48	0.97	1.32	1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.2	56.2		4.8	2.1	0.6	0.2	2.4		475.7	0.3	
Delay (s)	48.2	106.9		58.5	27.8	31.4	45.6	53.4		534.2	48.2	
Level of Service	D	F		E	C	C	D	D		F	D	
Approach Delay (s)		96.8			34.8			52.8			295.6	
Approach LOS		F			C			D			F	

### Intersection Summary

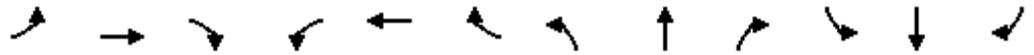
HCM Average Control Delay	87.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.27		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	50.0
Intersection Capacity Utilization	79.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

## 9: 9th St & Main Street

3/17/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕	↕		↕↕		↕	↕	
Volume (vph)	150	438	14	1	263	133	29	56	49	256	6	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	11	11	11	10	10	10
Grade (%)		4%			1%			5%			-2%	
Total Lost time (s)		4.0			4.0	4.0		4.0		4.0	4.0	
Lane Util. Factor		0.95			1.00	1.00		1.00		1.00	1.00	
Frt		0.99			1.00	0.85		0.95		1.00	0.86	
Flt Protected		0.98			1.00	1.00		0.99		0.95	1.00	
Satd. Flow (prot)		2726			1597	1252		1494		1516	1375	
Flt Permitted		0.66			1.00	1.00		0.93		0.55	1.00	
Satd. Flow (perm)		1822			1592	1252		1405		881	1375	
Peak-hour factor, PHF	0.57	0.85	0.35	0.50	0.81	0.77	0.77	0.64	0.72	0.91	1.00	0.55
Adj. Flow (vph)	263	515	40	2	325	173	38	88	68	281	6	75
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	818	0	0	327	173	0	194	0	281	81	0
Heavy Vehicles (%)	9%	3%	0%	0%	3%	4%	2%	3%	0%	1%	13%	0%
Parking (#/hr)		0	0			0						
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			8				4
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)		66.8			66.8	66.8		48.7		48.7	48.7	
Effective Green, g (s)		67.3			67.3	67.3		50.7		50.7	50.7	
Actuated g/C Ratio		0.45			0.45	0.45		0.34		0.34	0.34	
Clearance Time (s)		4.5			4.5	4.5		6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)		817			714	562		475		298	465	
v/s Ratio Prot												0.06
v/s Ratio Perm		c0.45			0.21	0.14		0.14		c0.32		
v/c Ratio		1.00			0.46	0.31		0.41		0.94	0.17	
Uniform Delay, d1		41.4			28.7	26.5		38.1		48.2	34.9	
Progression Factor		1.21			0.62	0.65		1.00		1.00	1.00	
Incremental Delay, d2		9.7			1.8	1.2		0.6		37.0	0.2	
Delay (s)		59.8			19.7	18.3		38.7		85.2	35.1	
Level of Service		E			B	B		D		F	D	
Approach Delay (s)		59.8			19.3			38.7			74.0	
Approach LOS		E			B			D			E	

### Intersection Summary

HCM Average Control Delay	49.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	32.0
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Signalized Intersection Capacity Analysis

## 10: 8th St & Main Street/Main Street

3/17/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕↕			↕↕	
Volume (vph)	45	640	39	8	326	14	65	47	40	56	19	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	13	13	13	10	10	10	10	10	10
Grade (%)		0%			0%			1%			-1%	
Total Lost time (s)		2.5			2.5			3.5			3.5	
Lane Util. Factor		0.95			1.00			1.00			1.00	
Frt		0.99			0.99			0.96			0.95	
Flt Protected		1.00			1.00			0.98			0.98	
Satd. Flow (prot)		3502			1772			1760			1624	
Flt Permitted		0.89			0.96			0.83			0.75	
Satd. Flow (perm)		3021			1733			1405			1397	
Peak-hour factor, PHF	0.73	0.93	0.69	0.50	0.86	0.67	0.90	0.79	0.67	0.77	0.68	0.77
Adj. Flow (vph)	62	688	57	16	379	21	72	59	60	73	28	52
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	807	0	0	416	0	0	191	0	0	153	0
Heavy Vehicles (%)	7%	2%	5%	0%	1%	0%	3%	0%	3%	2%	0%	2%
Parking (#/hr)		0	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		30.0			30.0			15.0			15.0	
Effective Green, g (s)		32.0			32.0			17.0			17.0	
Actuated g/C Ratio		0.43			0.43			0.23			0.23	
Clearance Time (s)		4.5			4.5			5.5			5.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1289			739			318			317	
v/s Ratio Prot												
v/s Ratio Perm		c0.27			0.24			c0.14			0.11	
v/c Ratio		0.63			0.56			0.60			0.48	
Uniform Delay, d1		16.8			16.2			26.0			25.2	
Progression Factor		0.85			1.19			1.00			1.00	
Incremental Delay, d2		0.9			0.3			3.2			1.2	
Delay (s)		15.2			19.5			29.1			26.3	
Level of Service		B			B			C			C	
Approach Delay (s)		15.2			19.5			29.1			26.3	
Approach LOS		B			B			C			C	

### Intersection Summary

HCM Average Control Delay	19.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	26.0
Intersection Capacity Utilization	60.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Signalized Intersection Capacity Analysis

## 11: Seventh St/7th St & Main Street /Main Street

3/26/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕↕			↕↕	
Volume (vph)	17	415	212	35	227	13	158	105	138	37	129	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	13	13	13	14	14	14	11	11	11
Grade (%)		-1%			2%			4%			-1%	
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		0.95			1.00			1.00			1.00	
Frt		0.95			0.99			0.96			0.97	
Flt Protected		1.00			0.99			0.98			0.99	
Satd. Flow (prot)		2786			1537			1617			1430	
Flt Permitted		0.94			0.63			0.67			0.75	
Satd. Flow (perm)		2614			967			1112			1094	
Peak-hour factor, PHF	0.82	0.79	0.81	0.75	0.74	0.46	0.59	0.72	0.79	0.48	0.86	0.58
Adj. Flow (vph)	21	525	262	47	307	28	268	146	175	77	150	53
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	808		0	0	382	0	0	589	0	0	280
Heavy Vehicles (%)	0%	3%	1%	0%	1%	0%	4%	3%	4%	0%	1%	0%
Parking (#/hr)		0	0	0	0	0				0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		54.0			54.0			64.0			64.0	
Effective Green, g (s)		56.0			56.0			66.0			66.0	
Actuated g/C Ratio		0.37			0.37			0.44			0.44	
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)		976			361			489			481	
v/s Ratio Prot												
v/s Ratio Perm		0.31			c0.40			c0.53			0.26	
v/c Ratio		0.83			1.06			1.20			0.58	
Uniform Delay, d1		42.6			47.0			42.0			31.6	
Progression Factor		0.76			0.85			0.58			1.00	
Incremental Delay, d2		6.6			63.0			102.3			1.8	
Delay (s)		39.2			103.0			126.8			33.4	
Level of Service		D			F			F			C	
Approach Delay (s)		39.2			103.0			126.8			33.4	
Approach LOS		D			F			F			C	

### Intersection Summary

HCM Average Control Delay	75.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	28.0
Intersection Capacity Utilization	87.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Signalized Intersection Capacity Analysis

## 12: Seventh St & Ann St

3/26/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations					↔			↔			↔		
Volume (vph)	0	0	0	13	167	21	155	469	0	0	376	42	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	12	12	12	16	16	16	16	16	16	10	10	10	
Grade (%)		0%			2%			-5%			0%		
Total Lost time (s)					4.0			4.5			4.5		
Lane Util. Factor					1.00			1.00			1.00		
Frt					0.98			1.00			0.98		
Flt Protected					1.00			0.99			1.00		
Satd. Flow (prot)					1861			2143			1556		
Flt Permitted					1.00			0.65			1.00		
Satd. Flow (perm)					1861			1417			1556		
Peak-hour factor, PHF	0.92	0.92	0.92	0.52	0.82	0.69	0.82	0.80	0.92	0.92	0.91	0.73	
Adj. Flow (vph)	0	0	0	25	204	30	189	586	0	0	413	58	
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	3	0	
Lane Group Flow (vph)	0	0	0	0	256	0	0	775	0	0	468	0	
Heavy Vehicles (%)	0%	0%	0%	2%	1%	0%	1%	2%	0%	0%	1%	0%	
Parking (#/hr)				0	0	0					0	0	
Turn Type				Perm	NA		pm+pt	NA			NA		
Protected Phases					6		3	8			4		
Permitted Phases				6			8						
Actuated Green, G (s)					44.0			95.5			95.5		
Effective Green, g (s)					45.0			96.5			96.5		
Actuated g/C Ratio					0.30			0.64			0.64		
Clearance Time (s)					5.0			5.5			5.5		
Vehicle Extension (s)					3.0			3.0			3.0		
Lane Grp Cap (vph)					558			912			1001		
v/s Ratio Prot											0.30		
v/s Ratio Perm					0.14			c0.55					
v/c Ratio					0.46			0.85			0.47		
Uniform Delay, d1					42.6			21.0			13.6		
Progression Factor					1.00			1.00			0.38		
Incremental Delay, d2					2.7			7.5			0.2		
Delay (s)					45.3			28.5			5.4		
Level of Service					D			C			A		
Approach Delay (s)		0.0			45.3			28.5			5.4		
Approach LOS		A			D			C			A		
<b>Intersection Summary</b>													
HCM Average Control Delay			24.2		HCM Level of Service						C		
HCM Volume to Capacity ratio			0.73										
Actuated Cycle Length (s)			150.0		Sum of lost time (s)						8.5		
Intersection Capacity Utilization			77.2%		ICU Level of Service						D		
Analysis Period (min)			15										
c Critical Lane Group													

# HCM Signalized Intersection Capacity Analysis

## 13: 6th St & Main Street

3/26/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕↕				
Volume (vph)	104	504	14	8	244	45	10	69	36	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	16	16	16	11	11	11	12	12	12
Grade (%)		-1%			2%			-1%			0%	
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		0.95			1.00			1.00				
Frt		1.00			0.98			0.96				
Flt Protected		0.99			1.00			1.00				
Satd. Flow (prot)		2931			1671			1571				
Flt Permitted		0.74			0.97			1.00				
Satd. Flow (perm)		2194			1619			1571				
Peak-hour factor, PHF	0.61	0.90	0.68	0.63	0.83	0.71	0.79	0.68	0.80	0.92	0.92	0.92
Adj. Flow (vph)	170	560	21	13	294	63	13	101	45	0	0	0
RTOR Reduction (vph)	0	1	0	0	3	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	750	0	0	367	0	0	159	0	0	0	0
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	2%	0%	0%	0%	0%
Parking (#/hr)		0	0	0	0	0						
Turn Type	Perm	NA		Perm	NA		Perm	NA				
Protected Phases		2			6			4				
Permitted Phases	2			6			4					
Actuated Green, G (s)		100.3			100.3			20.7				
Effective Green, g (s)		101.3			101.3			21.7				
Actuated g/C Ratio		0.68			0.68			0.14				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1482			1093			227				
v/s Ratio Prot												
v/s Ratio Perm		c0.34			0.23			0.10				
v/c Ratio		0.51			0.34			0.70				
Uniform Delay, d1		12.0			10.2			61.1				
Progression Factor		0.55			1.00			1.00				
Incremental Delay, d2		0.5			0.8			9.4				
Delay (s)		7.1			11.0			70.4				
Level of Service		A			B			E				
Approach Delay (s)		7.1			11.0			70.4			0.0	
Approach LOS		A			B			E			A	
<b>Intersection Summary</b>												
HCM Average Control Delay			16.1				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)		27.0			
Intersection Capacity Utilization			54.2%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

## 14: Ann St & Broad St/5th St & Main Street

3/17/2015



Movement	EBT	EBR	NBL2	NBR	SBL	SBT	SBR2
Lane Configurations	↑↑		↖	↗	↖	↑	↗
Volume (vph)	400	32	220	560	87	438	263
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	10	11	10	10	11
Grade (%)	-5%			2%			
Total Lost time (s)	4.5		6.5	4.0	4.0	4.0	6.5
Lane Util. Factor	0.95		1.00	1.00	1.00	1.00	1.00
Frt	0.99		1.00	0.85	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3372		1509	1398	1752	1793	1377
Flt Permitted	1.00		0.28	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3372		440	1398	1752	1792	1377
Peak-hour factor, PHF	0.92	0.91	0.91	0.96	0.81	0.95	0.91
Adj. Flow (vph)	435	35	242	583	107	461	289
RTOR Reduction (vph)	0	0	0	0	0	0	101
Lane Group Flow (vph)	470	0	242	583	107	461	188
Heavy Vehicles (%)	0%	0%	1%	1%	3%	2%	1%
Turn Type	NA		custom	custom	pm+pt	NA	custom
Protected Phases	8		1	6	5	2	
Permitted Phases			6		2		2 8
Actuated Green, G (s)	27.0		87.5	73.6	71.4	64.0	97.5
Effective Green, g (s)	29.5		87.5	76.1	76.4	66.5	97.5
Actuated g/C Ratio	0.20		0.58	0.51	0.51	0.44	0.65
Clearance Time (s)	7.0		6.5	6.5	6.5	6.5	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	663		378	709	892	795	895
v/s Ratio Prot	c0.14		c0.07	c0.42	0.01	0.26	
v/s Ratio Perm			0.30		0.05		0.14
v/c Ratio	0.71		0.64	0.82	0.12	0.58	0.21
Uniform Delay, d1	56.2		20.2	31.2	19.2	31.3	10.6
Progression Factor	0.91		1.00	1.00	1.00	1.03	2.39
Incremental Delay, d2	3.1		3.7	7.6	0.1	3.0	0.1
Delay (s)	54.1		23.9	38.9	19.2	35.2	25.5
Level of Service	D		C	D	B	D	C
Approach Delay (s)	54.1					29.9	
Approach LOS	D					C	

### Intersection Summary

HCM Average Control Delay	36.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	37.0
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM 2010 Signalized Intersection Capacity Analysis  
 24: 5th St & Sarah St

3/17/2015

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	62	34	72	2	243	99	27	53	1	18	303	93
Movement Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj. Factor (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj. Factors	1.00	1.00	0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Sat. Flow Rate, veh/h/ln	1832	1832	1832	1650	1650	1650	1590	1590	1590	1850	1850	1850
Lanes	0	1	0	0	1	1	0	1	0	0	1	0
Lane Assignment												
Capacity, veh/h	0	154	300	100	500	431	281	283	8	120	546	185
Proportion Arriving On Green	0.00	0.31	0.31	0.31	0.31	0.31	0.44	0.44	0.44	0.44	0.44	0.44
Movement Delay, s/veh	0.0	0.0	10.0	11.5	0.0	10.1	6.7	0.0	0.0	9.1	0.0	0.0
Movement LOS			B	B		B	A			A		
Approach Volume, veh/h		118			408			114			460	
Approach Delay, s/veh		10.0			11.1			6.7			9.1	
Approach LOS		B			B			A			A	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phase			2		4	5	6		8			
Case No			4.0		8.0	0.0	7.3		8.0			
Phase Duration (G+Y+Rc), s			15.48		21.85	0.00	15.48		21.85			
Change Period (Y+Rc), s			5.50		7.00	5.50	5.50		7.00			
Max. Allowable Headway (MAH), s			4.18		9.39	0.00	4.18		9.39			
Maximum Green Setting (Gmax), s			33.50		19.00	5.00	23.00		19.00			
Max. Queue Clearance Time (g_c+I1), s			4.25		9.35	0.00	7.59		3.63			
Green Extension Time (g_e), s			2.00		5.50	0.00	1.76		7.89			
Probability of Phase Call (p_c)			0.998		1.000	0.000	0.996		1.000			
Probability of Max Out (p_x)			0.000		0.984	0.000	0.016		0.692			
<b>Left-Turn Movement Data</b>												
Assigned Movement					7	5	1		3			
Mvmt. Sat Flow, veh/h					89.28	0.00	22.30		432.25			
<b>Through Movement Data</b>												
Assigned Movement			2		4		6		8			
Mvmt. Sat Flow, veh/h			499.30		1199.11		1613.02		539.04			
<b>Right-Turn Movement Data</b>												
Assigned Movement			12		14		16		18			
Mvmt. Sat Flow, veh/h			976.89		421.90		1402.63		17.29			
<b>Left Lane Group Data</b>												
Assigned Movement		0	0	0	7	5	1	0	3			
Lane Assignment					L+T+R		L+T		L+T+R			
Lanes in Group		0	0	0	1	0	1	0	1			
Group Volume (v), veh/h		0.0	0.0	0.0	459.8	0.0	293.3	0.0	114.4			
Group Sat. Flow (s), veh/h/ln		0.0	0.0	0.0	1710.3	0.0	1635.3	0.0	988.6			
Queue Serve Time (g_s), s		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Cycle Queue Clear Time (g_c), s		0.0	0.0	0.0	7.3	0.0	5.6	0.0	1.6			

HCM 2010 Signalized Intersection Capacity Analysis  
 24: 5th St & Sarah St

3/17/2015

Perm LT Sat Flow Rate (s_l), veh/h/ln	0.0	0.0	0.0	744.2	0.0	707.8	0.0	592.0
Shared LT Sat Flow (s_sh), veh/h/ln	0.0	0.0	0.0	1849.8	0.0	1650.2	0.0	1010.8
Perm LT Eff. Green (g_p), s	0.0	0.0	0.0	16.3	0.0	11.5	0.0	16.3
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	14.7	0.0	9.2	0.0	9.0
Perm LT Que Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	8.4	0.0	6.9	0.0	2.6
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	7.3	0.0	5.6	0.0	1.6
Proportion LT Inside Lane (P_L)	0.000	0.000	0.000	0.052	0.000	0.014	0.000	0.437
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	850.5	0.0	600.7	0.0	571.6
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.541	0.000	0.488	0.000	0.200
Available Capacity (c_a), veh/h	0.0	0.0	0.0	1033.5	0.0	1163.3	0.0	661.4
Upstream Filter Factor (I)	0.000	0.000	0.000	1.000	0.000	1.000	0.000	1.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	8.0	0.0	10.9	0.0	6.4
Incremental Delay (d2), s/veh	0.0	0.0	0.0	1.1	0.0	0.6	0.0	0.4
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	9.1	0.0	11.5	0.0	6.7
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	1.7	0.0	1.5	0.0	0.3
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.1
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	0.000	0.000	1.000	1.000	1.000	0.000	1.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	2.0	0.0	1.6	0.0	0.4
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.16	0.00	0.09	0.00	0.03
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Movement	0	2	0	4	0	6	0	8
Lane Assignment								
Lanes in Group	0	0	0	0	0	0	0	0
Group Volume (v), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

HCM 2010 Signalized Intersection Capacity Analysis  
 24: 5th St & Sarah St

3/17/2015

Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**Right Lane Group Data**

Assigned Movement	0	12	0	14	0	16	0	18
Lane Assignment	T+R			R				
Lanes in Group	0	1	0	0	0	1	0	0
Group Volume (v), veh/h	0.0	118.3	0.0	0.0	0.0	115.1	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	1476.2	0.0	0.0	0.0	1402.6	0.0	0.0
Queue Serve Time (g_s), s	0.0	2.3	0.0	0.0	0.0	2.3	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	2.3	0.0	0.0	0.0	2.3	0.0	0.0
Prot RT Sat Flow Rate (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff. Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion RT Outside Lane (P_R)	0.000	0.662	0.000	0.247	0.000	1.000	0.000	0.017
Lane Group Capacity (c), veh/h	0.0	454.0	0.0	0.0	0.0	431.4	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.260	0.000	0.000	0.000	0.267	0.000	0.000
Available Capacity (c_a), veh/h	0.0	1384.1	0.0	0.0	0.0	920.6	0.0	0.0
Upstream Filter Factor (I)	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	9.7	0.0	0.0	0.0	9.7	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.3	0.0	0.0	0.0	0.3	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	10.0	0.0	0.0	0.0	10.1	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.6	0.0	0.0	0.0	0.5	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.6	0.0	0.0	0.0	0.5	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.04	0.00	0.00	0.00	0.09	0.00	0.00
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**Intersection Summary**

HCM Average Control Delay	9.7
HCM Level of Service	A

# HCM Unsignalized Intersection Capacity Analysis

## 55: 5th St & McConnell St

3/17/2015



Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations			↑↑			↗
Volume (veh/h)	0	0	551	74	0	351
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	599	80	0	382
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		298	357			
pX, platoon unblocked						
vC, conflicting volume	599				639	340
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	599				639	340
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	42
cM capacity (veh/h)	974				408	656
<b>Direction, Lane #</b>	<b>SB 1</b>	<b>SB 2</b>	<b>SE 1</b>			
Volume Total	399	280	382			
Volume Left	0	0	0			
Volume Right	0	80	382			
cSH	1700	1700	656			
Volume to Capacity	0.23	0.16	0.58			
Queue Length 95th (ft)	0	0	94			
Control Delay (s)	0.0	0.0	17.8			
Lane LOS			C			
Approach Delay (s)	0.0		17.8			
Approach LOS			C			
<b>Intersection Summary</b>						
Average Delay			6.4			
Intersection Capacity Utilization			50.4%		ICU Level of Service	A
Analysis Period (min)			15			

**Intersection**

Intersection Delay (sec/veh): 6.4

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	0	0	551	74	0	351
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	Free	Free	None	None
Storage Length	0			0	0	0
Median Width		0	0		0	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles(%)	2	2	2	2	2	2
Movement Flow Rate	0	0	599	80	0	382
Number of Lanes	0	0	2	0	0	1

**Major/Minor Major 2**

Conflicting Flow Rate - All	0	0	-	340
Stage 1	0	0	-	0
Stage 2	0	0	-	0
Follow-up Headway	0	0	-	3.32
Pot Capacity-1 Maneuver	-	-	-	655
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Mov Capacity-1 Maneuver	-	-	-	655
Mov Capacity-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

**Approach SB SE**

HCM Control Delay (s)	0	17.9
HCM LOS	A	C

**Lane SELn1 SBT SBR**

Capacity (vph)	655		
HCM Control Delay (s)	17.9	-	-
HCM Lane VC Ratio	0.582	0	-
HCM Lane LOS	C	-	-
HCM 95th Percentile Queue (veh)	3.77	0	-

# HCM Signalized Intersection Capacity Analysis

## 20: McConnell St & 4th St

3/17/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖			↗						↖	↗
Volume (vph)	18	8	0	88	0	0	0	0	0	62	529	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	15	15	15	14	14	14	12	12	12	14	14	14
Grade (%)		1%			-1%			0%			1%	
Total Lost time (s)		4.0			5.0						4.0	
Lane Util. Factor		1.00			1.00						0.95	
Frt		1.00			1.00						1.00	
Flt Protected		0.97			0.95						0.99	
Satd. Flow (prot)		862			1724						1459	
Flt Permitted		0.87			0.78						0.99	
Satd. Flow (perm)		862			1419						1459	
Peak-hour factor, PHF	0.92	0.75	0.79	0.78	0.92	0.92	0.92	0.92	0.92	0.85	0.89	0.92
Adj. Flow (vph)	20	11	0	113	0	0	0	0	0	73	594	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	31	0	0	113	0	0	0	0	0	667	0
Heavy Vehicles (%)	0%	0%	0%	1%	0%	0%	0%	0%	0%	1%	1%	0%
Turn Type	Perm	NA		Perm	NA					Perm	NA	
Protected Phases		4			8						6	
Permitted Phases	4			8						6		
Actuated Green, G (s)		17.4			17.4						122.6	
Effective Green, g (s)		18.4			17.4						123.6	
Actuated g/C Ratio		0.12			0.12						0.82	
Clearance Time (s)		5.0			5.0						5.0	
Vehicle Extension (s)		3.0			3.0						3.0	
Lane Grp Cap (vph)		106			165						1202	
v/s Ratio Prot												
v/s Ratio Perm		0.04			0.08						0.46	
v/c Ratio		0.29			0.68						0.55	
Uniform Delay, d1		59.9			63.7						4.3	
Progression Factor		1.00			1.00						0.76	
Incremental Delay, d2		1.5			11.2						1.7	
Delay (s)		61.4			74.8						4.9	
Level of Service		E			E						A	
Approach Delay (s)		61.4			74.8			0.0			4.9	
Approach LOS		E			E			A			A	

### Intersection Summary

HCM Average Control Delay	16.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	32.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

## 21: McConnell St & 3rd St

3/17/2015



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	64	49	13	92	0	0	0	0	4	662	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	12	12	12	13	11	14
Grade (%)		1%			-2%			0%			-1%	
Total Lost time (s)		4.0			4.0						4.0	4.0
Lane Util. Factor		1.00			1.00						0.95	1.00
Frt		0.95			1.00						1.00	0.85
Flt Protected		1.00			0.99						1.00	1.00
Satd. Flow (prot)		1762			1857						1931	1558
Flt Permitted		1.00			0.92						1.00	1.00
Satd. Flow (perm)		1762			1857						1931	1558
Peak-hour factor, PHF	0.92	0.80	0.90	0.57	0.96	0.92	0.92	0.92	0.92	0.56	0.97	0.74
Adj. Flow (vph)	0	80	54	23	96	0	0	0	0	7	682	96
RTOR Reduction (vph)	0	41	0	0	0	0	0	0	0	0	0	25
Lane Group Flow (vph)	0	93	0	0	119	0	0	0	0	0	689	71
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Turn Type		NA		Perm	NA					Perm	NA	Perm
Protected Phases		4			8						6	
Permitted Phases				8						6		6
Actuated Green, G (s)		10.7			10.7						54.3	54.3
Effective Green, g (s)		11.7			11.7						55.3	55.3
Actuated g/C Ratio		0.16			0.16						0.74	0.74
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)		275			290						1424	1149
v/s Ratio Prot		0.05										
v/s Ratio Perm					0.06						0.36	0.05
v/c Ratio		0.34			0.41						0.48	0.06
Uniform Delay, d1		28.2			28.5						4.0	2.7
Progression Factor		1.00			1.00						1.00	1.00
Incremental Delay, d2		0.7			0.9						1.2	0.1
Delay (s)		28.9			29.5						5.2	2.8
Level of Service		C			C						A	A
Approach Delay (s)		28.9			29.5			0.0			4.9	
Approach LOS		C			C			A			A	

### Intersection Summary

HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group