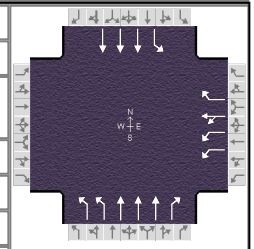
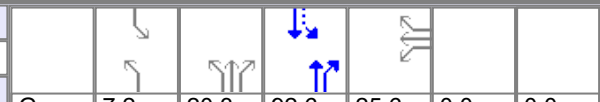
HCS7 Signalized Intersection Input Data

General Information				Intersection Information	
Agency	Group 4			Duration, h	0.250
Analyst	Jorge Ugan and Md Rakibul Alam	Analysis Date	10/18/2020	Area Type	Other
Jurisdiction	HCM	Time Period	4pm to 7pm	PHF	0.90
Urban Street	North Alafaya Trail	Analysis Year	2020	Analysis Period	1> 7:00
Intersection	North Alafaya Trail & 40…	File Name	Project1PlanB.xus		
Project Description	TTE6256 Project				

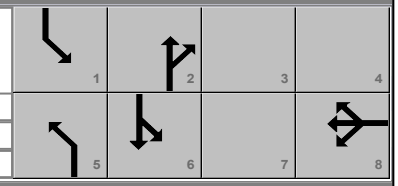


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				250	67	85	471	1628	570	53	1207	

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	7.2	20.3	92.6	25.6	0.0	0.0						
Yellow	3.8	3.8	4.1	2.6	0.0	0.0						
Red	0.0	0.0	0.0	0.0	0.0	0.0						



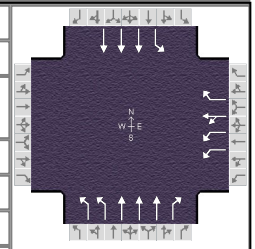
Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				250	67	85	471	1628	570	53	1207	
Initial Queue (Q_b), veh/h				0	0	0	0	0	0	0	0	
Base Saturation Flow Rate (s_o), veh/h				1900	1900	1900	1900	1900	1900	1900	1900	
Parking (N_m), man/h					None			None			None	
Heavy Vehicles (P_{HV}), %				0	0	0	0	0	0	0	0	
Ped / Bike / RTOR, /h	0	0		0	0	0	0	0	0	0	0	
Buses (N_b), buses/h				0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)				3	3	3	3	3	3	3	3	
Upstream Filtering (*I*)				1.00	1.00	1.00	0.89	0.89	0.89	1.00	1.00	
Lane Width (*W*), ft				12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	
Turn Bay Length, ft				75	0	0	225	0	0	361	0	
Grade (*Pg*), %		0			0			0			0	
Speed Limit, mi/h				35	35	35	35	35	35	35	35	

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s				28.2	35.1	120.8	11.0	96.7
Yellow Change Interval (*Y*), s				2.6	3.8	4.5	3.8	4.1
Red Clearance Interval (R_c), s				0.0	0.0	0.0	0.0	0.0
Minimum Green (G_{min}), s				6	6	6	6	6
Start-Up Lost Time (*l1*), s			2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s			2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s				2.0	2.0	2.0	2.0	2.0
Recall Mode				Off	Off	Min	Off	Min
Dual Entry				Yes	No	Yes	No	Yes
Walk (*Walk*), s		0.0		0.0		0.0		
Pedestrian Clearance Time (*PC*), s		0.0		0.0		0.0		

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25			
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0			
Street Width / Island / Curb		0		0	0	No	0	0	No	0		No
Width Outside / Bike Lane / Shoulder, ft				12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No			No	0.50		No	0.50			0.50	

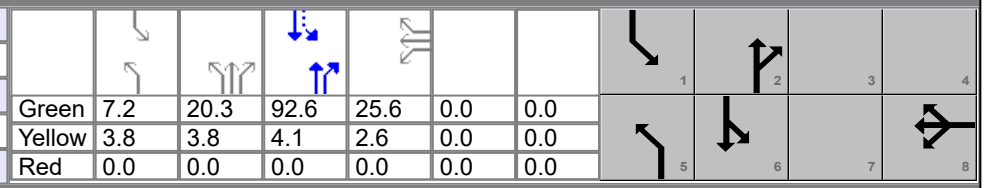
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Group 4			Duration, h	0.250
Analyst	Jorge Ugan and Md Rakibul Alam	Analysis Date	10/18/2020	Area Type	Other
Jurisdiction	HCM	Time Period	4pm to 7pm	PHF	0.90
Urban Street	North Alafaya Trail	Analysis Year	2020	Analysis Period	1> 7:00
Intersection	North Alafaya Trail & 40…	File Name	Project1PlanB.xus		
Project Description	TTE6256 Project				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				250	67	85	471	1628	570	53	1207	

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	7.2	20.3	92.6	25.6	0.0	0.0
Yellow	3.8	3.8	4.1	2.6	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0

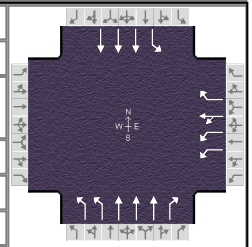
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8	5	2	1	6
Case Number				9.0	2.0	3.0	1.1	4.0
Phase Duration, s				28.2	35.1	120.8	11.0	96.7
Change Period, ($Y+R_c$), s				2.6	3.8	4.5	3.8	4.5
Max Allow Headway (*MAH*), s				3.2	3.1	0.0	3.1	0.0
Queue Clearance Time (g_s), s				13.2	12.9		4.0	
Green Extension Time (g_e), s				0.8	0.5	0.0	0.0	0.0
Phase Call Probability				1.00	1.00		1.00	
Max Out Probability				0.00	0.00		0.94	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3	8	18	5	2	12	1	6	
Adjusted Flow Rate (*v*), veh/h				278	74	94	252	872	305	59	1341	
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1810	1900	1610	1757	1725	1610	1810	1725	
Queue Service Time (g_s), s				11.2	5.5	8.4	10.9	7.4	6.9	2.0	23.7	
Cycle Queue Clearance Time (g_c), s				11.2	5.5	8.4	10.9	7.4	6.9	2.0	23.7	
Green Ratio (*g/C*)				0.16	0.16	0.16	0.20	0.73	0.73	0.62	0.58	
Capacity (*c*), veh/h				579	304	258	687	3762	1170	498	2982	
Volume-to-Capacity Ratio (*X*)				0.480	0.245	0.367	0.367	0.232	0.261	0.118	0.450	
Back of Queue (*Q*), ft/ln (50 th percentile)				129.2	66.7	86.4	129.1	64.2	55.6	21	240.3	
Back of Queue (*Q*), veh/ln (50 th percentile)				5.2	2.7	3.5	5.2	2.6	2.2	0.8	9.6	
Queue Storage Ratio (*RQ*) (50 th percentile)				1.72	0.00	0.00	0.57	0.00	0.00	0.06	0.00	
Uniform Delay (d_1), s/veh				61.1	58.7	60.0	64.5	5.8	4.5	11.9	19.4	
Incremental Delay (d_2), s/veh				0.2	0.2	0.3	0.1	0.1	0.5	0.0	0.5	
Initial Queue Delay (d_3), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh				61.4	58.9	60.3	64.6	5.9	5.0	11.9	19.9	
Level of Service (LOS)				E	E	E	E	A	A	B	B	
Approach Delay, s/veh / LOS	0.0			60.7		E	16.1		B	19.5		B
Intersection Delay, s/veh / LOS	23.6						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.88	C	2.63	C	2.23	B	1.68	B
Bicycle LOS Score / LOS			1.22	A	2.12	B	1.26	A

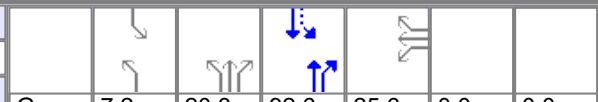
HCS7 Signalized Intersection Intermediate Values

General Information				Intersection Information	
Agency	Group 4			Duration, h	0.250
Analyst	Jorge Ugan and Md Rakibul Alam	Analysis Date	10/18/2020	Area Type	Other
Jurisdiction	HCM	Time Period	4pm to 7pm	PHF	0.90
Urban Street	North Alafaya Trail	Analysis Year	2020	Analysis Period	1> 7:00
Intersection	North Alafaya Trail & 40…	File Name	Project1PlanB.xus		
Project Description	TTE6256 Project				

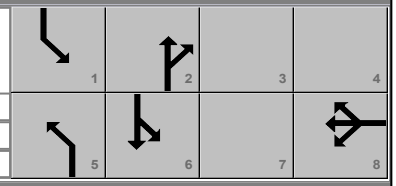


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				250	67	85	471	1628	570	53	1207	

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	7.2	20.3	92.6	25.6	0.0	0.0
Yellow	3.8	3.8	4.1	2.6	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



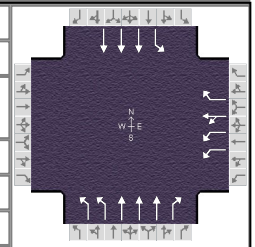
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)				1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles and Grade Factor (f_{HVg})				1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	0.000	0.000	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	0.000	0.000	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)				1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	0.971	0.908	1.000	1.000	0.908	1.000
Left-Turn Adjustment Factor (f_{LT})				0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})					0.000	0.847		0.000	0.847		1.000	1.000
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})				1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})						1.000			1.000			1.000
Work Zone Adjustment Factor (f_{wz})				1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
DDI Factor (f_{DDI})				1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Movement Saturation Flow Rate (s), veh/h				3619	1900	1610	3514	5176	1610	1810	5350	0
Proportion of Vehicles Arriving on Green (P)	0.00	0.00	0.00	0.16	0.16	0.16	0.08	0.77	0.82	0.04	0.58	0.00
Incremental Delay Factor (k)				0.04	0.04	0.04	0.04	0.50	0.50	0.04	0.50	

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)				4.0	3.8	4.5	3.8	4.5
Green Ratio (g/C)				0.16	0.20	0.73	0.62	0.58
Permitted Saturation Flow Rate (s_p), veh/h/ln				1810	0	0	645	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s				0.0	0.0	0.0	92.2	0.0
Permitted Service Time (g_u), s				0.0	0.0	0.0	92.2	0.0
Permitted Queue Service Time (g_{ps}), s							0.0	
Time to First Blockage (g_f), s				0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln				0		0		
Protected Right Effective Green Time (g_R), s				0.0		0.0		

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	2.107	0.000	1.852	0.000	1.557	0.000	0.972	0.000
Pedestrian F_s / F_{delay}	0.000	0.178	0.000	0.178	0.000	0.072	0.000	0.106
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	-62.50	85.08	-45.00	83.64	1453.75	5.97	1157.50	14.20
Bicycle F_w / F_v	-3.64		-3.64	0.74	-3.64	1.63	-3.64	0.77

HCS7 Signalized Intersection Results Graphical Summary

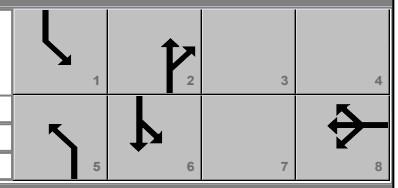
General Information				Intersection Information	
Agency	Group 4			Duration, h	0.250
Analyst	Jorge Ugan and Md Rakibul Alam	Analysis Date	10/18/2020	Area Type	Other
Jurisdiction	HCM	Time Period	4pm to 7pm	PHF	0.90
Urban Street	North Alafaya Trail	Analysis Year	2020	Analysis Period	1> 7:00
Intersection	North Alafaya Trail & 40…	File Name	Project1PlanB.xus		
Project Description	TTE6256 Project				



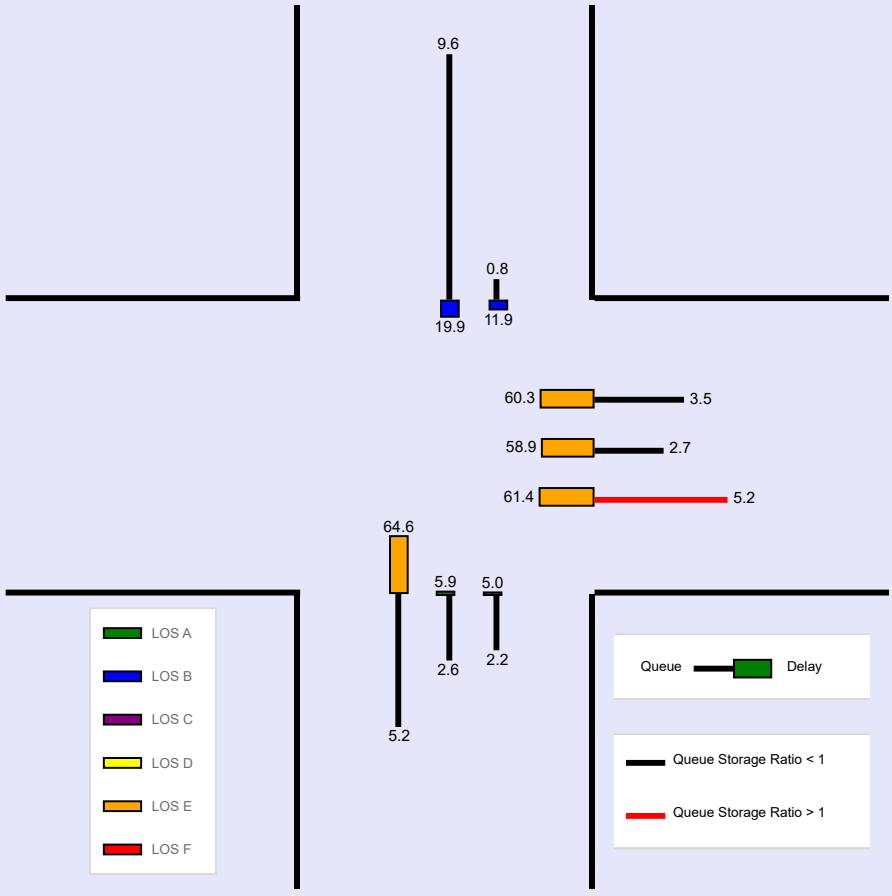
Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				250	67	85	471	1628	570	53	1207	

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	7.2	20.3	92.6	25.6	0.0	0.0						
Yellow	3.8	3.8	4.1	2.6	0.0	0.0						
Red	0.0	0.0	0.0	0.0	0.0	0.0						



Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Back of Queue (*Q*), ft/ln (50 th percentile)				129.2	66.7	86.4	129.1	64.2	55.6	21	240.3	
Back of Queue (*Q*), veh/ln (50 th percentile)				5.2	2.7	3.5	5.2	2.6	2.2	0.8	9.6	
Queue Storage Ratio (*RQ*) (50 th percentile)				1.72	0.00	0.00	0.57	0.00	0.00	0.06	0.00	
Control Delay (*d*), s/veh				61.4	58.9	60.3	64.6	5.9	5.0	11.9	19.9	
Level of Service (LOS)				E	E	E	E	A	A	B	B	
Approach Delay, s/veh / LOS	0.0			60.7		E	16.1		B	19.5		B
Intersection Delay, s/veh / LOS	23.6						C					



--- Messages ---

WARNING: Since queue spillover from turn lanes and spillback into upstream intersections is not accounted for in the HCM procedures, use of a simulation tool may be advised in situations where the Queue Storage Ratio exceeds 1.0.

WARNING: According to input data, upstream feeding volume is equal to 48% of downstream exit volume during time period #1, for thru movement #2.

WARNING: The shared-plus-exclusive turn lane solution is an approximation of the HCM method, because more than three lane groups cannot be accommodated. Input data for Percent Turns in Shared Lane are used to specify proportion of turning vehicles in the shared lane.

--- Comments ---

