

HCM Signalized Intersection Capacity Analysis 2: SH-9 & 36th Ave SE

2019 AM Peak
With Unsignalized Full Access at East St.

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	89	483	25	25	1156	16	60	5	15	15	1	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	9.0	9.0		9.0	9.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.89		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3513		1770	3532		1770	1650		1770	1585	
Flt Permitted	0.95	1.00		0.95	1.00		0.46	1.00		0.98	1.00	
Satd. Flow (perm)	1770	3513		1770	3532		856	1650		1817	1585	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	97	525	27	27	1257	17	65	5	16	16	1	154
RTOR Reduction (vph)	0	3	0	0	1	0	0	15	0	0	139	0
Lane Group Flow (vph)	97	549	0	27	1273	0	65	6	0	16	16	0
Turn Type	Prot			Prot			D.P+P			D.P+P		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases							8			4		
Actuated Green, G (s)	11.3	48.1		4.9	41.7		27.0	4.1		27.0	11.0	
Effective Green, g (s)	11.3	48.1		4.9	41.7		27.0	4.1		27.0	11.0	
Actuated g/C Ratio	0.10	0.44		0.04	0.38		0.25	0.04		0.25	0.10	
Clearance Time (s)	9.0	9.0		9.0	9.0		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	
Lane Grp Cap (vph)	182	1536		79	1339		343	62		436	159	
v/s Ratio Prot	c0.05	c0.16		0.02	c0.36		c0.03	0.00		0.01	0.01	
v/s Ratio Perm							c0.02			0.00		
v/c Ratio	0.53	0.36		0.34	0.95		0.19	0.09		0.04	0.10	
Uniform Delay, d1	46.8	20.6		51.0	33.2		32.6	51.1		31.6	45.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.0	0.7		2.6	15.4		0.3	0.6		0.0	0.3	
Delay (s)	49.8	21.3		53.6	48.6		32.8	51.8		31.6	45.3	
Level of Service	D	C		D	D		C	D		C	D	
Approach Delay (s)		25.6			48.6			37.5			44.0	
Approach LOS		C			D			D			D	

Intersection Summary

HCM Average Control Delay	41.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	39.0
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis 5: SH-9 & East St

2019 AM Peak
With Unsignalized Full Access at East St.

							
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Volume (veh/h)	83	430	991	37	19	206	
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)	90	467	1077	40	21	224	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None	None				
Median storage (veh)							
Upstream signal (ft)		1285					
pX, platoon unblocked					0.96		
vC, conflicting volume	1117				1511	559	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1117				1442	559	
tC, single (s)	4.1				6.8	6.9	
tC, 2 stage (s)							
tF (s)	2.2				3.5	3.3	
p0 queue free %	85				79	53	
cM capacity (veh/h)	621				101	473	
Section, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	90	234	234	718	399	21	224
Volume Left	90	0	0	0	0	21	0
Volume Right	0	0	0	0	40	0	224
cSH	621	1700	1700	1700	1700	101	473
Volume to Capacity	0.15	0.14	0.14	0.42	0.23	0.21	0.47
Queue Length 95th (ft)	13	0	0	0	0	18	63
Control Delay (s)	11.8	0.0	0.0	0.0	0.0	49.8	19.3
Lane LOS	B					E	C
Approach Delay (s)	1.9			0.0		21.9	
Approach LOS						C	
Intersection Summary							
Average Delay	3.3						
Intersection Capacity Utilization	48.0%			ICU Level of Service		A	
Analysis Period (min)	15						

HCM Signalized Intersection Capacity Analysis 2: SH-9 & 36th Ave SE

2019 PM Peak
With Unsignalized Full Access at East St.

												
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	157	1188	60	15	543	30	25	2	25	12	4	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	9.0	9.0		9.0	9.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.86		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3514		1770	3511		1770	1603		1770	1591	
Flt Permitted	0.95	1.00		0.95	1.00		0.45	1.00		0.75	1.00	
Satd. Flow (perm)	1770	3514		1770	3511		847	1603		1406	1591	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	171	1291	65	16	590	33	27	2	27	13	4	146
RTOR Reduction (vph)	0	3	0	0	3	0	0	26	0	0	133	0
Lane Group Flow (vph)	171	1353	0	16	620	0	27	3	0	13	17	0
Turn Type	Prot			Prot			D.P+P			D.P+P		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases							8			4		
Actuated Green, G (s)	15.8	51.0		3.1	38.3		25.9	5.3		25.9	9.9	
Effective Green, g (s)	15.8	51.0		3.1	38.3		25.9	5.3		25.9	9.9	
Actuated g/C Ratio	0.14	0.46		0.03	0.35		0.24	0.05		0.24	0.09	
Clearance Time (s)	9.0	9.0		9.0	9.0		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	
Lane Grp Cap (vph)	254	1629		50	1222		334	77		399	143	
v/s Ratio Prot	c0.10	c0.39		0.01	0.18		c0.01	0.00		0.01	c0.01	
v/s Ratio Perm							0.01			0.00		
v/c Ratio	0.67	0.83		0.32	0.51		0.08	0.04		0.03	0.12	
Uniform Delay, d1	44.7	25.7		52.4	28.4		32.7	49.9		32.4	46.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.9	5.1		3.7	1.5		0.1	0.2		0.0	0.4	
Delay (s)	51.5	30.8		56.1	29.9		32.8	50.2		32.4	46.4	
Level of Service	D	C		E	C		C	D		C	D	
Approach Delay (s)		33.1			30.5			41.8			45.3	
Approach LOS		C			C			D			D	

Intersection Summary

HCM Average Control Delay	33.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	30.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis 5: SH-9 & East St

2019 PM Peak
With Unsignalized Full Access at East St.

							
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Volume (veh/h)	238	987	445	24	35	143	
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)	259	1073	484	26	38	155	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None	None				
Median storage (veh)							
Upstream signal (ft)		1285					
pX, platoon unblocked					0.71		
vC, conflicting volume	510				1551	255	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	510				958	255	
tC, single (s)	4.1				6.8	6.9	
tC, 2 stage (s)							
tF (s)	2.2				3.5	3.3	
p0 queue free %	75				72	79	
cM capacity (veh/h)	1052				137	744	
Direction Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	259	536	536	322	187	38	155
Volume Left	259	0	0	0	0	38	0
Volume Right	0	0	0	0	26	0	155
cSH	1052	1700	1700	1700	1700	137	744
Volume to Capacity	0.25	0.32	0.32	0.19	0.11	0.28	0.21
Queue Length 95th (ft)	24	0	0	0	0	27	20
Control Delay (s)	9.5	0.0	0.0	0.0	0.0	41.2	11.1
Lane LOS	A					E	B
Approach Delay (s)	1.9			0.0		17.0	
Approach LOS						C	
Intersection Summary							
Average Delay			2.8				
Intersection Capacity Utilization			39.6%		ICU Level of Service		A
Analysis Period (min)			15				

HCM Signalized Intersection Capacity Analysis 2: SH-9 & 36th Ave SE

2019 AM Peak
With Signalized Full Access at East St.

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	89	483	25	25	1156	16	60	5	15	15	1	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	9.0	9.0		9.0	9.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.89		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3513		1770	3532		1770	1650		1770	1585	
Flt Permitted	0.95	1.00		0.95	1.00		0.46	1.00		0.98	1.00	
Satd. Flow (perm)	1770	3513		1770	3532		856	1650		1817	1585	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	97	525	27	27	1257	17	65	5	16	16	1	154
RTOR Reduction (vph)	0	3	0	0	1	0	0	15	0	0	139	0
Lane Group Flow (vph)	97	549	0	27	1273	0	65	6	0	16	16	0
Turn Type	Prot			Prot			D.P+P			D.P+P		
Protected Phases	1		6	5		2	7		4	3		8
Permitted Phases							8			4		
Actuated Green, G (s)	11.3		48.1	4.9		41.7	27.0		4.1	27.0		11.0
Effective Green, g (s)	11.3		48.1	4.9		41.7	27.0		4.1	27.0		11.0
Actuated g/C Ratio	0.10		0.44	0.04		0.38	0.25		0.04	0.25		0.10
Clearance Time (s)	9.0		9.0	9.0		9.0	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
Lane Grp Cap (vph)	182		1536	79		1339	343		62	436		159
v/s Ratio Prot	c0.05		c0.16	0.02		c0.36	c0.03		0.00	0.01		0.01
v/s Ratio Perm							c0.02			0.00		
v/c Ratio	0.53		0.36	0.34		0.95	0.19		0.09	0.04		0.10
Uniform Delay, d1	46.8		20.6	51.0		33.2	32.6		51.1	31.6		45.0
Progression Factor	1.00		1.00	0.92		0.91	1.00		1.00	1.00		1.00
Incremental Delay, d2	3.0		0.7	2.1		13.4	0.3		0.6	0.0		0.3
Delay (s)	49.8		21.3	49.0		43.6	32.8		51.8	31.6		45.3
Level of Service	D		C	D		D	C		D	C		D
Approach Delay (s)			25.6			43.7			37.5			44.0
Approach LOS			C			D			D			D

Intersection Summary

HCM Average Control Delay	38.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	39.0
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis 5: SH-9 & East St

2019 AM Peak
With Signalized Full Access at East St.

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	83	430	991	37	19	206
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	9.0	6.0	9.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3520		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3520		1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	90	467	1077	40	21	224
RTOR Reduction (vph)	0	0	2	0	0	185
Lane Group Flow (vph)	90	467	1115	0	21	39
Turn Type	Prot				Perm	
Protected Phases	1	6	2		8	
Permitted Phases						8
Actuated Green, G (s)	9.6	79.0	57.4		19.0	19.0
Effective Green, g (s)	9.6	79.0	57.4		19.0	19.0
Actuated g/C Ratio	0.09	0.72	0.52		0.17	0.17
Clearance Time (s)	9.0	6.0	9.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	154	2542	1837		306	273
v/s Ratio Prot	c0.05	0.13	c0.32		0.01	
v/s Ratio Perm						c0.02
v/c Ratio	0.58	0.18	0.61		0.07	0.14
Uniform Delay, d1	48.3	5.0	18.4		38.1	38.6
Progression Factor	1.49	0.13	1.00		1.00	1.00
Incremental Delay, d2	5.4	0.2	1.5		0.4	1.1
Delay (s)	77.1	0.8	19.9		38.5	39.7
Level of Service	E	A	B		D	D
Approach Delay (s)		13.2	19.9		39.6	
Approach LOS		B	B		D	
HCM Average Control Delay			20.5		HCM Level of Service	C
HCM Volume to Capacity ratio			0.50			
Actuated Cycle Length (s)			110.0		Sum of lost time (s)	24.0
Intersection Capacity Utilization			56.5%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis 2: SH-9 & 36th Ave SE

2019 PM Peak
With Signalized Full Access at East St.

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	157	1188	60	15	543	30	25	2	25	12	4	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	9.0	9.0		9.0	9.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.86		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3514		1770	3511		1770	1603		1770	1591	
Flt Permitted	0.95	1.00		0.95	1.00		0.45	1.00		0.75	1.00	
Satd. Flow (perm)	1770	3514		1770	3511		847	1603		1406	1591	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	171	1291	65	16	590	33	27	2	27	13	4	146
RTOR Reduction (vph)	0	3	0	0	3	0	0	26	0	0	133	0
Lane Group Flow (vph)	171	1353	0	16	620	0	27	3	0	13	17	0
Turn Type	Prot			Prot			D.P+P			D.P+P		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases							8			4		
Actuated Green, G (s)	15.8	51.0		3.1	38.3		25.9	5.3		25.9	9.9	
Effective Green, g (s)	15.8	51.0		3.1	38.3		25.9	5.3		25.9	9.9	
Actuated g/C Ratio	0.14	0.46		0.03	0.35		0.24	0.05		0.24	0.09	
Clearance Time (s)	9.0	9.0		9.0	9.0		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	
Lane Grp Cap (vph)	254	1629		50	1222		334	77		399	143	
v/s Ratio Prot	c0.10	c0.39		0.01	0.18		c0.01	0.00		0.01	c0.01	
v/s Ratio Perm							0.01			0.00		
v/c Ratio	0.67	0.83		0.32	0.51		0.08	0.04		0.03	0.12	
Uniform Delay, d1	44.7	25.7		52.4	28.4		32.7	49.9		32.4	46.0	
Progression Factor	1.00	1.00		1.09	0.54		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.9	5.1		3.5	1.4		0.1	0.2		0.0	0.4	
Delay (s)	51.5	30.8		60.4	16.8		32.8	50.2		32.4	46.4	
Level of Service	D	C		E	B		C	D		C	D	
Approach Delay (s)		33.1			17.9			41.8			45.3	
Approach LOS		C			B			D			D	

Intersection Summary

HCM Average Control Delay	30.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	30.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis 5: SH-9 & East St

2019 PM Peak
With Signalized Full Access at East St.

	EBL	EBT	WBT	WBR	SBL	SBR
Movement						
Lane Configurations						
Volume (vph)	238	987	445	24	35	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	9.0	6.0	9.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3512		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3512		1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	259	1073	484	26	38	155
RTOR Reduction (vph)	0	0	3	0	0	127
Lane Group Flow (vph)	259	1073	507	0	38	28
Turn Type	Prot					Perm
Protected Phases	1	6	2		8	
Permitted Phases						8
Actuated Green, G (s)	21.5	78.0	44.5		20.0	20.0
Effective Green, g (s)	21.5	78.0	44.5		20.0	20.0
Actuated g/C Ratio	0.20	0.71	0.40		0.18	0.18
Clearance Time (s)	9.0	6.0	9.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	346	2509	1421		322	288
v/s Ratio Prot	c0.15	c0.30	0.14		c0.02	
v/s Ratio Perm						0.02
v/c Ratio	0.75	0.43	0.36		0.12	0.10
Uniform Delay, d1	41.7	6.7	22.8		37.6	37.5
Progression Factor	1.46	0.79	1.00		1.00	1.00
Incremental Delay, d2	6.1	0.4	0.7		0.7	0.7
Delay (s)	66.9	5.6	23.5		38.4	38.2
Level of Service	E	A	C		D	D
Approach Delay (s)		17.5	23.5		38.2	
Approach LOS		B	C		D	
Intersection Summary						
HCM Average Control Delay			21.0		HCM Level of Service	C
HCM Volume to Capacity ratio			0.42			
Actuated Cycle Length (s)			110.0		Sum of lost time (s)	15.0
Intersection Capacity Utilization			49.6%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis 2: SH-9 & 36th Ave SE

2019 AM Peak
With Right-In/Right-Out Access at East St.

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SEB
Lane Configurations												
Volume (vph)	172	400	25	25	1156	16	60	5	15	34	1	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	9.0	9.0		9.0	9.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.89		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3508		1770	3532		1770	1650		1770	1585	
Flt Permitted	0.95	1.00		0.95	1.00		0.46	1.00		0.98	1.00	
Satd. Flow (perm)	1770	3508		1770	3532		856	1650		1817	1585	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	187	435	27	27	1257	17	65	5	16	37	1	154
RTOR Reduction (vph)	0	3	0	0	1	0	0	15	0	0	139	0
Lane Group Flow (vph)	187	459	0	27	1273	0	65	6	0	37	16	0
Turn Type	Prot			Prot			D.P+P			D.P+P		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases							8			4		
Actuated Green, G (s)	16.5	48.1		4.9	36.5		27.0	4.1		27.0	11.0	
Effective Green, g (s)	16.5	48.1		4.9	36.5		27.0	4.1		27.0	11.0	
Actuated g/C Ratio	0.15	0.44		0.04	0.33		0.25	0.04		0.25	0.10	
Clearance Time (s)	9.0	9.0		9.0	9.0		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	
Lane Grp Cap (vph)	266	1534		79	1172		343	62		436	159	
v/s Ratio Prot	c0.11	0.13		0.02	c0.36		c0.03	0.00		0.02	0.01	
v/s Ratio Perm							c0.02			0.00		
v/c Ratio	0.70	0.30		0.34	1.09		0.19	0.09		0.08	0.10	
Uniform Delay, d1	44.4	20.0		51.0	36.8		32.6	51.1		32.0	45.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.2	0.5		2.6	53.1		0.3	0.6		0.1	0.3	
Delay (s)	52.6	20.5		53.6	89.8		32.8	51.8		32.1	45.3	
Level of Service	D	C		D	F		C	D		C	D	
Approach Delay (s)		29.8			89.1			37.5			42.8	
Approach LOS		C			F			D			D	

Intersection Summary

HCM Average Control Delay	65.8	HCM Level of Service	E
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	30.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis 5: SH-9 & East St

2019 AM Peak
With Right-In/Right-Out Access at East St.

						
Movement	EBL	EBT	WBT	WBR	SEL	SBR
Lane Configurations		↑↑	↑↑			↑
Volume (veh/h)	0	449	991	37	0	206
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	488	1077	40	0	224
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		1285				
pX, platoon unblocked					0.95	
vC, conflicting volume	1117				1341	559
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1117				1255	559
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	53
cM capacity (veh/h)	621				155	473
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	244	244	718	399	224	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	40	224	
cSH	1700	1700	1700	1700	473	
Volume to Capacity	0.14	0.14	0.42	0.23	0.47	
Queue Length 95th (ft)	0	0	0	0	63	
Control Delay (s)	0.0	0.0	0.0	0.0	19.3	
Lane LOS					C	
Approach Delay (s)	0.0		0.0		19.3	
Approach LOS					C	
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization			48.0%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis 2: SH-9 & 36th Ave SE

2019 PM Peak
With Right-In/Right-Out Access at East St.

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	395	950	60	15	543	30	25	2	25	47	4	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	9.0	9.0		9.0	9.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.86		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3508		1770	3511		1770	1603		1770	1591	
Flt Permitted	0.95	1.00		0.95	1.00		0.45	1.00		0.75	1.00	
Satd. Flow (perm)	1770	3508		1770	3511		847	1603		1406	1591	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	429	1033	65	16	590	33	27	2	27	51	4	146
RTOR Reduction (vph)	0	3	0	0	4	0	0	26	0	0	133	0
Lane Group Flow (vph)	429	1095	0	16	619	0	27	3	0	51	17	0
Turn Type	Prot			Prot			D.P+P			D.P+P		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases							8			4		
Actuated Green, G (s)	32.8	51.0		3.1	21.3		25.9	5.3		25.9	9.9	
Effective Green, g (s)	32.8	51.0		3.1	21.3		25.9	5.3		25.9	9.9	
Actuated g/C Ratio	0.30	0.46		0.03	0.19		0.24	0.05		0.24	0.09	
Clearance Time (s)	9.0	9.0		9.0	9.0		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	
Lane Grp Cap (vph)	528	1626		50	680		334	77		399	143	
v/s Ratio Prot	c0.24	0.31		0.01	c0.18		0.01	0.00		c0.02	c0.01	
v/s Ratio Perm							0.01			0.01		
v/c Ratio	0.81	0.67		0.32	0.91		0.08	0.04		0.13	0.12	
Uniform Delay, d1	35.8	23.0		52.4	43.4		32.7	49.9		33.1	46.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.3	2.2		3.7	18.4		0.1	0.2		0.1	0.4	
Delay (s)	45.0	25.3		56.1	61.8		32.8	50.2		33.2	46.4	
Level of Service	D	C		E	E		C	D		C	D	
Approach Delay (s)		30.8			61.7			41.8			43.1	
Approach LOS		C			E			D			D	

Intersection Summary

HCM Average Control Delay	40.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	30.0
Intersection Capacity Utilization	74.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis 5: SH-9 & East St

2019 PM Peak
With Right-In/Right-Out Access at East St.

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑			↑
Volume (veh/h)	0	1022	445	24	0	143
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	1111	484	26	0	155
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		1285				
pX, platoon unblocked					0.76	
vC, conflicting volume	510				1052	255
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	510				442	255
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	79
cM capacity (veh/h)	1052				414	744
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	555	555	322	187	155	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	26	155	
cSH	1700	1700	1700	1700	744	
Volume to Capacity	0.33	0.33	0.19	0.11	0.21	
Queue Length 95th (ft)	0	0	0	0	20	
Control Delay (s)	0.0	0.0	0.0	0.0	11.1	
Lane LOS					B	
Approach Delay (s)	0.0		0.0		11.1	
Approach LOS					B	
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			31.6%		ICU Level of Service	A
Analysis Period (min)			15			