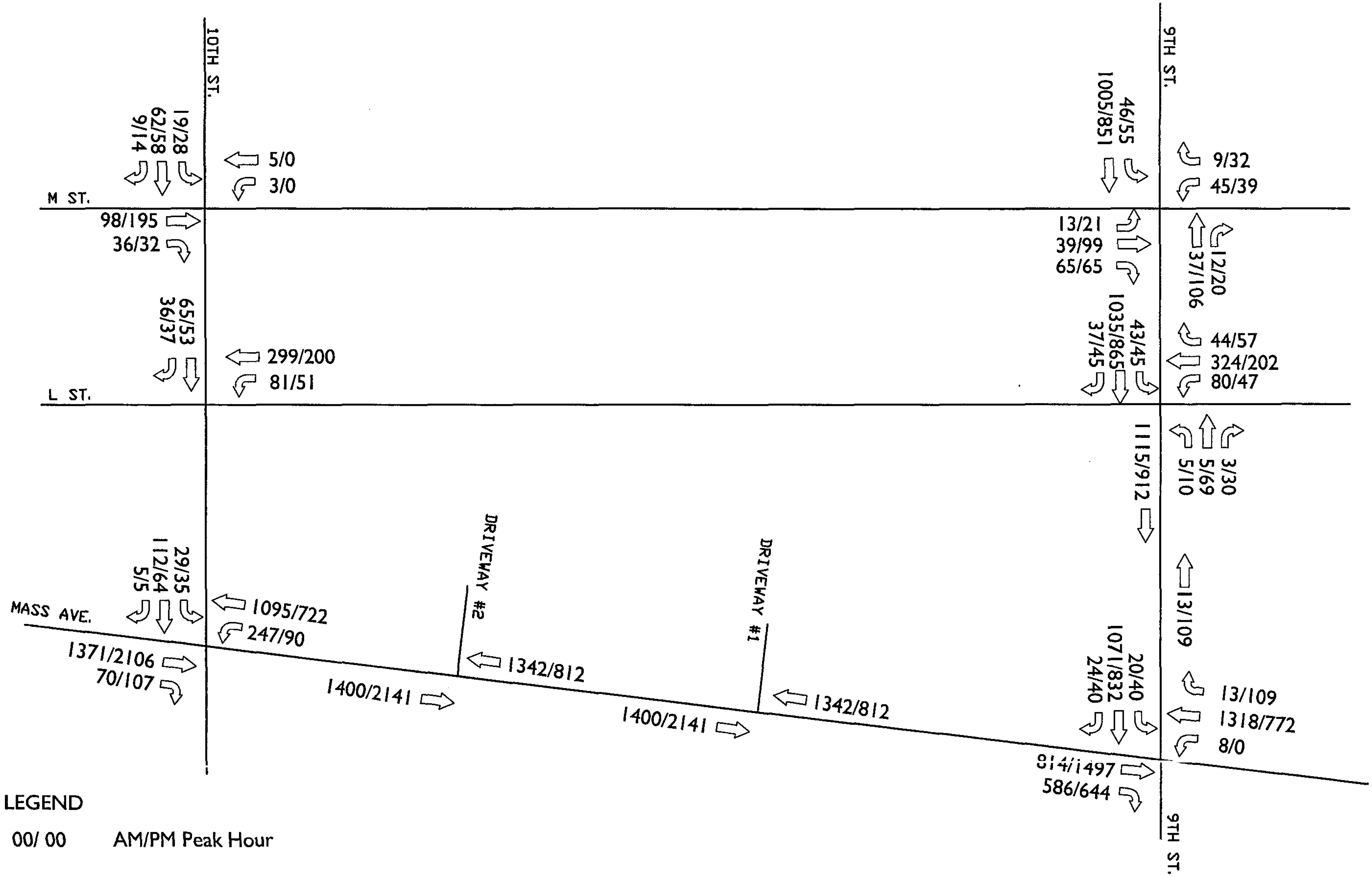
Appendix F

2030 Future Conditions Analyses



AMT — ENGINEERS - PLANNERS - SURVEYORS - LANDSCAPE ARCHITECTS

2 EAST READ STREET, BALTIMORE, MD 21202
P(410) 752-6552 F(410) 752-6553

RES.	SURV.	COMP.	DES.	DRN.	CHK.
AMT	AMT	AMT	AMT	ACAD	AMT

DATE	REVISION	BY	APPR.

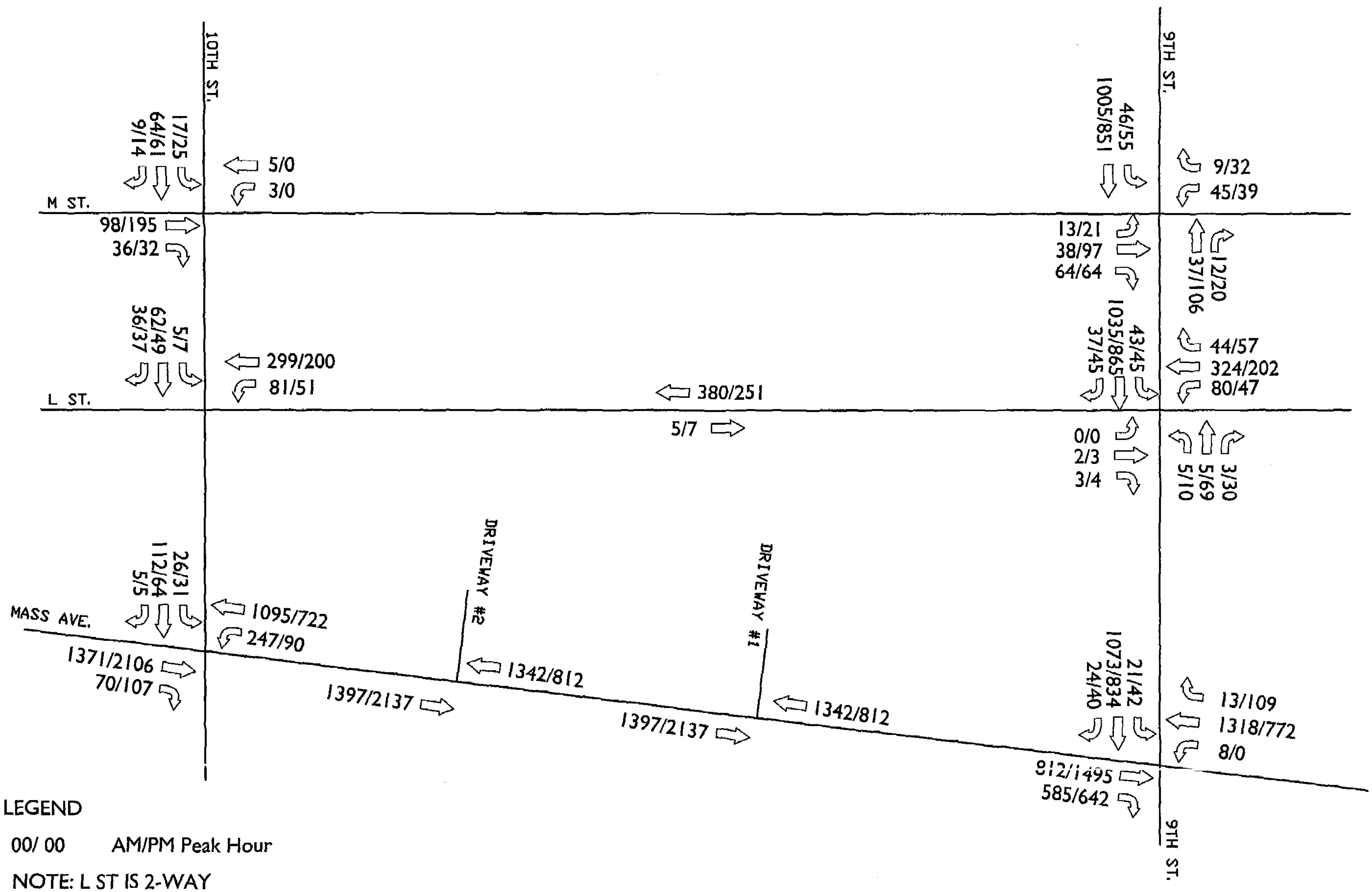
MARRIOT MARQUIS - TRAFFIC IMPACT STUDY

FIGURE F-1

EXISTING PEAK HOUR VOLUMES (MODIFIED)

SCENARIO 1

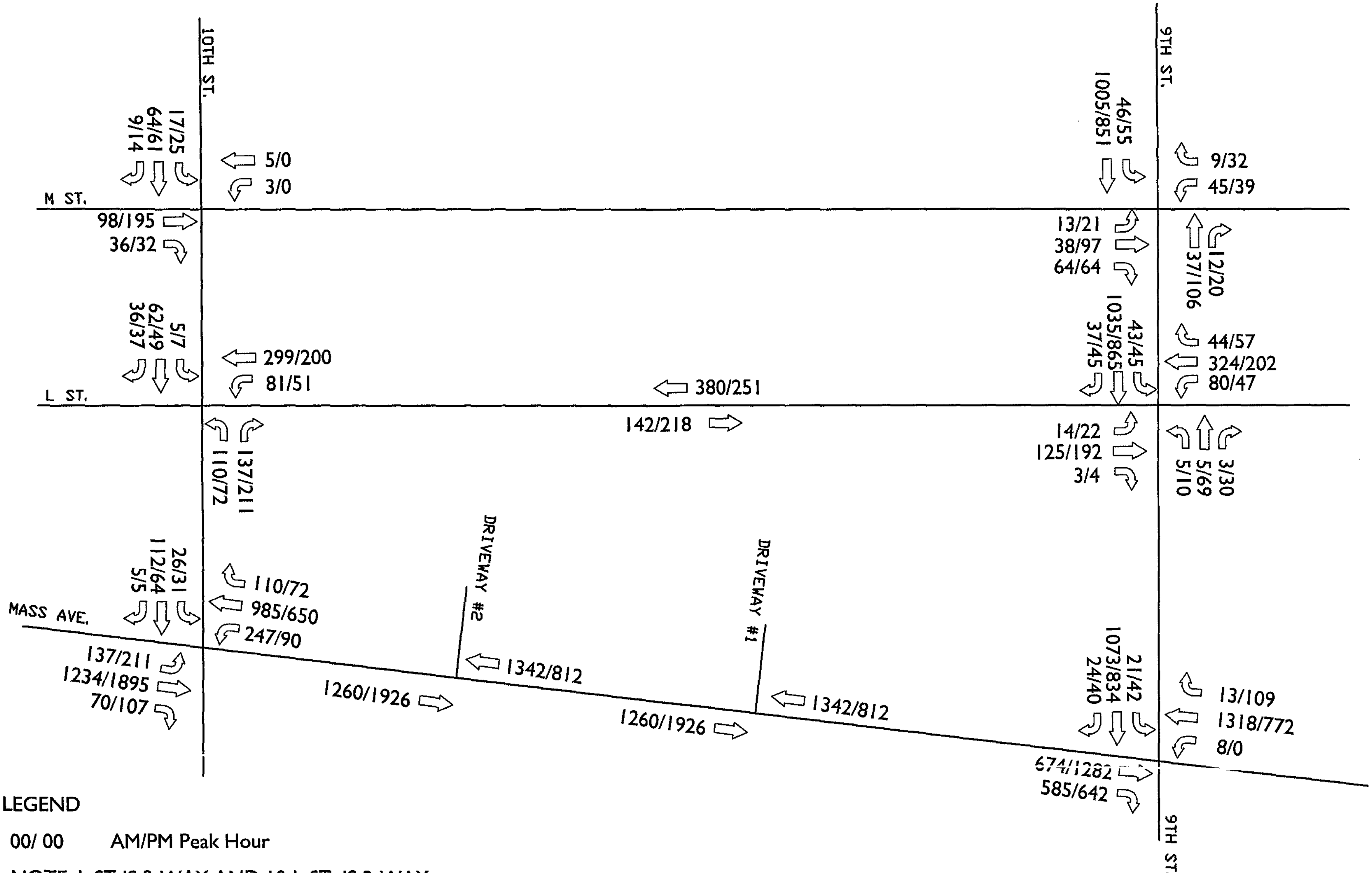
SCALE	CONTOUR INTERVAL	A.M.T. FILE No.
	N/A	108-029.01E
DATE	TAX MAP No.	SHEET
MAY 2008	N/A	



ENGINEERS - PLANNERS - SURVEYORS - LANDSCAPE ARCHITECTS	MARRIOT MARQUIS - TRAFFIC IMPACT STUDY	SCALE	CONTOUR INTERVAL	A.M.T. FILE No.
AMT, A. Morton Thomas and Associates, Inc. Consulting Engineers. 2 EAST READ STREET, BALTIMORE, MD 21202 P(410) 752-6552 F(410) 752-6553	FIGURE F-2		N/A	108-029.01E
RES. AMT / SURV. AMT / COMP. AMT / DES. AMT / DRN. ACAD / CHK. AMT	EXISTING PEAK HOUR VOLUMES (MODIFIED) SCENARIO 2 - L ST. 2-WAY	DATE MAY 2008	TAX MAP No. N/A	SHEET

DATE	REVISION	BY	APPR.

F-2



LEGEND

00/ 00 AM/PM Peak Hour

NOTE: L ST IS 2-WAY AND 10th ST. IS 2-WAY

AMT
A. Morton Thomas and Associates, Inc.
Consulting Engineers

ENGINEERS - PLANNERS - SURVEYORS - LANDSCAPE ARCHITECTS
2 EAST READ STREET, BALTIMORE, MD 21202
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RES. AMT	SURV. AMT	COMP. AMT	DES. AMT	DRN. ACAD	CHK. AMT

DATE	REVISION	BY	APPR.

MARRIOT MARQUIS - TRAFFIC IMPACT STUDY
FIGURE F-3
EXISTING PEAK HOUR VOLUMES (MODIFIED)
SCENARIO 3 - L ST. 2-WAY AND 10th ST. 2-WAY

SCALE	CONTOUR INTERVAL	A.M.T. FILE No.
	N/A	108-029.01E
DATE MAY 2008	TAX MAP No. N/A	SHEET

F-3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					0.95			0.95			0.95	
Frpb, ped/bikes					0.99			0.99			1.00	
Flpb, ped/bikes					0.99			1.00			1.00	
Frt					0.98			0.99			0.99	
Flt Protected					0.99			0.99			1.00	
Satd. Flow (prot)					2892			3082			3139	
Flt Permitted					0.99			0.70			0.94	
Satd. Flow (perm)					2892			2186			2960	
Volume (vph)	0	0	0	127	427	64	17	39	4	54	1512	70
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	138	464	70	18	42	4	59	1643	76
RTOR Reduction (vph)	0	0	0	0	9	0	0	2	0	0	3	0
Lane Group Flow (vph)	0	0	0	0	663	0	0	62	0	0	1775	0
Confl. Peds. (#/hr)	54		54	54		54	69		135	135		69
Parking (#/hr)				2	2							
Turn Type				Perm			Perm			Perm		
Protected Phases					2			4			8	
Permitted Phases				2			4			8		
Actuated Green, G (s)					39.0			49.0			49.0	
Effective Green, g (s)					41.0			51.0			51.0	
Actuated g/C Ratio					0.41			0.51			0.51	
Clearance Time (s)					6.0			6.0			6.0	
Lane Grp Cap (vph)					1186			1115			1510	
v/s Ratio Prot												
v/s Ratio Perm					0.23			0.03			c0.60	
v/c Ratio					0.56			0.06			1.18	
Uniform Delay, d1					22.6			12.4			24.5	
Progression Factor					1.00			0.97			1.67	
Incremental Delay, d2					1.9			0.0			79.7	
Delay (s)					24.5			12.0			120.6	
Level of Service					C			B			F	
Approach Delay (s)		0.0			24.5			12.0			120.6	
Approach LOS		A			C			B			F	

Intersection Summary				
HCM Average Control Delay	92.1	HCM Level of Service	F	
HCM Volume to Capacity ratio	0.91			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	93.4%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↕						↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0						4.0	
Lane Util. Factor				0.91	0.91						1.00	
Frpb, ped/bikes				1.00	1.00						0.99	
Flpb, ped/bikes				0.92	1.00						1.00	
Frt				1.00	1.00						0.97	
Flt Protected				0.95	1.00						1.00	
Satd. Flow (prot)				1335	3051						1435	
Flt Permitted				0.95	1.00						1.00	
Satd. Flow (perm)				1335	3051						1435	
Volume (vph)	0	0	0	157	372	0	0	0	0	0	188	45
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	171	404	0	0	0	0	0	204	49
RTOR Reduction (vph)	0	0	0	92	0	0	0	0	0	0	9	0
Lane Group Flow (vph)	0	0	0	79	404	0	0	0	0	0	244	0
Confl. Peds. (#/hr)	103		121	121		103	84		92	92		84
Parking (#/hr)											2	2
Turn Type				Perm								
Protected Phases					2						8	
Permitted Phases				2								
Actuated Green, G (s)				45.0	45.0						45.0	
Effective Green, g (s)				46.0	46.0						46.0	
Actuated g/C Ratio				0.46	0.46						0.46	
Clearance Time (s)				5.0	5.0						5.0	
Lane Grp Cap (vph)				614	1403						660	
v/s Ratio Prot					c0.13						c0.18	
v/s Ratio Perm				0.13								
v/c Ratio				0.13	0.29						0.37	
Uniform Delay, d1				15.5	16.8						17.6	
Progression Factor				0.05	0.53						1.76	
Incremental Delay, d2				0.3	0.4						1.6	
Delay (s)				1.1	9.3						32.5	
Level of Service				A	A						C	
Approach Delay (s)		0.0			6.9			0.0			32.5	
Approach LOS		A			A			A			C	

Intersection Summary				
HCM Average Control Delay	14.7	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.34			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	37.2%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

H-4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0						4.0	
Lane Util. Factor		0.95	1.00		0.95						0.91	
Frpb, ped/bikes		1.00	1.00		0.99						0.98	
Flpb, ped/bikes		1.00	1.00		1.00						1.00	
Frt		1.00	0.85		0.99						0.99	
Flt Protected		1.00	1.00		1.00						1.00	
Satd. Flow (prot)		3185	1425		3151						4457	
Flt Permitted		1.00	1.00		0.95						1.00	
Satd. Flow (perm)		3185	1425		2990						4457	
Volume (vph)	0	1086	938	8	1703	60	0	0	0	25	1531	83
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1180	1020	9	1851	65	0	0	0	27	1664	90
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	1180	1020	0	1923	0	0	0	0	0	1776	0
Confl. Peds. (#/hr)	359		140	140		359	205		134	134		205
Turn Type			custom	Perm						Perm		
Protected Phases		6	6		2						8	
Permitted Phases			6	2	2					8		
Actuated Green, G (s)		71.0	71.0		69.0						21.0	
Effective Green, g (s)		69.0	69.0		69.0						23.0	
Actuated g/C Ratio		0.69	0.69		0.69						0.23	
Clearance Time (s)		2.0	2.0		4.0						6.0	
Lane Grp Cap (vph)		2198	983		2063						1025	
v/s Ratio Prot		0.37	c0.72									
v/s Ratio Perm					0.64						0.40	
v/c Ratio		0.54	1.04		0.93						1.73	
Uniform Delay, d1		7.6	15.5		13.5						38.5	
Progression Factor		0.15	0.46		1.00						0.77	
Incremental Delay, d2		0.6	32.9		9.2						330.2	
Delay (s)		1.7	40.0		22.6						359.8	
Level of Service		A	D		C						F	
Approach Delay (s)		19.5			22.6			0.0			359.8	
Approach LOS		B			C			A			F	

Intersection Summary				
HCM Average Control Delay	123.1	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.21			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	174.8%	ICU Level of Service	H	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		0.91			0.95						0.95	
Frpb, ped/bikes		1.00			1.00						1.00	
Flpb, ped/bikes		1.00			1.00						0.99	
Frt		0.99			1.00						1.00	
Flt Protected		1.00			0.99						0.99	
Satd. Flow (prot)		4514			3154						3076	
Flt Permitted		1.00			0.51						0.99	
Satd. Flow (perm)		4514			1611						3076	
Volume (vph)	0	1938	159	337	1394	0	0	0	0	80	208	9
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2107	173	366	1515	0	0	0	0	87	226	10
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	2271	0	0	1881	0	0	0	0	0	321	0
Confl. Peds. (#/hr)	116		41	41		116	118		48	48		118
Turn Type				Perm						Perm		
Protected Phases		6			2						8	
Permitted Phases				2						8		
Actuated Green, G (s)		60.0			60.0						30.0	
Effective Green, g (s)		61.0			61.0						31.0	
Actuated g/C Ratio		0.61			0.61						0.31	
Clearance Time (s)		5.0			5.0						5.0	
Lane Grp Cap (vph)		2754			983						954	
v/s Ratio Prot		0.51										
v/s Ratio Perm					c1.17						0.11	
v/c Ratio		0.82			5.38dl						0.34	
Uniform Delay, d1		15.3			19.5						26.6	
Progression Factor		1.00			0.74						0.58	
Incremental Delay, d2		3.0			412.4						0.9	
Delay (s)		18.3			426.9						16.4	
Level of Service		B			F						B	
Approach Delay (s)		18.3			426.9			0.0			16.4	
Approach LOS		B			F			A			B	

Intersection Summary				
HCM Average Control Delay	189.5	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.38			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	138.7%	ICU Level of Service	H	
Analysis Period (min)	15			

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑			
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	92	2025	1670	115	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	100	2201	1815	125	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		350	274			
pX, platoon unblocked						
vC, conflicting volume	1940				2811	970
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1940				2811	970
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	67				100	100
cM capacity (veh/h)	299				10	253

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2
Volume Total	540	880	880	1210	730
Volume Left	100	0	0	0	0
Volume Right	0	0	0	0	125
cSH	299	1700	1700	1700	1700
Volume to Capacity	0.33	0.52	0.52	0.71	0.43
Queue Length (ft)	36	0	0	0	0
Control Delay (s)	12.7	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	3.0			0.0	
Approach LOS					

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	107.6%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑		↰	↱
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	2025	1670	0	91	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2201	1815	0	99	65
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		236	388			
pX, platoon unblocked						
vC, conflicting volume	1815				2549	908
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1815				2549	908
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				0	77
cM capacity (veh/h)	334				22	278

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	734	734	734	908	908	99	65
Volume Left	0	0	0	0	0	99	0
Volume Right	0	0	0	0	0	0	65
cSH	1700	1700	1700	1700	1700	22	278
Volume to Capacity	0.43	0.43	0.43	0.53	0.53	4.52	0.23
Queue Length (ft)	0	0	0	0	0	Err	22
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	Err	21.9
Lane LOS						F	C
Approach Delay (s)	0.0			0.0		6034.6	
Approach LOS						F	

Intersection Summary			
Average Delay	236.9		
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		

F-10

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0		4.0		4.0			4.0	
Lane Util. Factor		1.00		1.00		1.00		0.95			0.95	
Frt		0.93		1.00		0.85		0.98			1.00	
Flt Protected		0.99		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1717		1770		1583		3463			3533	
Flt Permitted		0.99		0.65		1.00		1.00			0.94	
Satd. Flow (perm)		1717		1203		1583		3463			3314	
Volume (vph)	25	49	81	93	0	20	0	88	15	57	1462	0
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)	27	53	88	101	0	22	0	96	16	62	1589	0
RTOR Reduction (vph)	0	3	0	0	0	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	165	0	101	0	22	0	103	0	0	1651	0
Turn Type	Perm			custom		Free				Perm		
Protected Phases		6						4			8	
Permitted Phases	6			2		Free				8		
Actuated Green, G (s)		50.0		50.0		100.0		41.0			41.0	
Effective Green, g (s)		50.0		50.0		100.0		42.0			42.0	
Actuated g/C Ratio		0.50		0.50		1.00		0.42			0.42	
Clearance Time (s)		4.0		4.0				5.0			5.0	
Lane Grp Cap (vph)		859		602		1583		1454			1392	
v/s Ratio Prot								0.03				
v/s Ratio Perm		0.10		0.08		0.01					c0.50	
v/c Ratio		0.19		0.17		0.01		0.07			1.19	
Uniform Delay, d1		13.8		13.6		0.0		17.3			29.0	
Progression Factor		0.59		1.00		1.00		1.00			1.00	
Incremental Delay, d2		0.5		0.6		0.0		0.1			91.3	
Delay (s)		8.7		14.2		0.0		17.4			120.3	
Level of Service		A		B		A		B			F	
Approach Delay (s)		8.7			11.7			17.4			120.3	
Approach LOS		A			B			B			F	

Intersection Summary				
HCM Average Control Delay	99.0	HCM Level of Service	F	
HCM Volume to Capacity ratio	0.65			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	69.5%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		1.00			1.00						1.00	
Frt		0.96			1.00						0.99	
Flt Protected		1.00			0.98						0.99	
Satd. Flow (prot)		1788			1829						1839	
Flt Permitted		1.00			0.94						0.99	
Satd. Flow (perm)		1788			1744						1839	
Volume (vph)	0	131	55	4	6	0	0	0	0	24	174	11
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	142	60	4	7	0	0	0	0	26	189	12
RTOR Reduction (vph)	0	15	0	0	0	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	187	0	0	11	0	0	0	0	0	225	0
Turn Type				Perm						Perm		
Protected Phases		6			2						8	
Permitted Phases				2						8		
Actuated Green, G (s)		45.0			45.0						44.0	
Effective Green, g (s)		47.0			47.0						45.0	
Actuated g/C Ratio		0.47			0.47						0.45	
Clearance Time (s)		6.0			6.0						5.0	
Lane Grp Cap (vph)		840			820						828	
v/s Ratio Prot		c0.11										
v/s Ratio Perm					0.01						0.12	
v/c Ratio		0.22			0.01						0.27	
Uniform Delay, d1		15.7			14.1						17.2	
Progression Factor		1.00			1.00						1.00	
Incremental Delay, d2		0.6			0.0						0.8	
Delay (s)		16.3			14.2						18.0	
Level of Service		B			B						B	
Approach Delay (s)		16.3			14.2			0.0			18.0	
Approach LOS		B			B			A			B	

Intersection Summary				
HCM Average Control Delay	17.1	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.26			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	28.1%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					0.95			0.95			0.95	
Frpb, ped/bikes					0.99			0.99			1.00	
Flpb, ped/bikes					1.00			1.00			1.00	
Frt					0.97			0.98			0.99	
Flt Protected					0.99			1.00			1.00	
Satd. Flow (prot)					2846			3069			3125	
Flt Permitted					0.99			0.71			0.93	
Satd. Flow (perm)					2846			2196			2899	
Volume (vph)	0	0	0	81	255	100	22	188	37	56	1313	121
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	88	277	109	24	204	40	61	1427	132
RTOR Reduction (vph)	0	0	0	0	28	0	0	14	0	0	7	0
Lane Group Flow (vph)	0	0	0	0	446	0	0	254	0	0	1613	0
Confl. Peds. (#/hr)	25		31	31		25	60		46	46		60
Parking (#/hr)				2	2							
Turn Type				Perm			Perm			Perm		
Protected Phases					2			4			8	
Permitted Phases				2			4			8		
Actuated Green, G (s)					38.0			50.0			50.0	
Effective Green, g (s)					40.0			52.0			52.0	
Actuated g/C Ratio					0.40			0.52			0.52	
Clearance Time (s)					6.0			6.0			6.0	
Lane Grp Cap (vph)					1138			1142			1507	
v/s Ratio Prot												
v/s Ratio Perm					0.17			0.12			c0.56	
v/c Ratio					0.39			0.22			1.07	
Uniform Delay, d1					21.3			13.0			24.0	
Progression Factor					1.00			1.72			0.44	
Incremental Delay, d2					1.0			0.3			38.5	
Delay (s)					22.4			22.7			49.1	
Level of Service					C			C			D	
Approach Delay (s)		0.0			22.4			22.7			49.1	
Approach LOS		A			C			C			D	

Intersection Summary			
HCM Average Control Delay	40.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	129.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0						4.0	
Lane Util. Factor				0.91	0.91						1.00	
Frpb, ped/bikes				1.00	1.00						0.98	
Flpb, ped/bikes				0.96	1.00						1.00	
Frt				1.00	1.00						0.96	
Flt Protected				0.95	1.00						0.99	
Satd. Flow (prot)				1386	3037						1397	
Flt Permitted				0.95	1.00						0.99	
Satd. Flow (perm)				1386	3037						1397	
Volume (vph)	0	0	0	132	249	0	0	0	0	19	105	46
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	143	271	0	0	0	0	21	114	50
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	14	0
Lane Group Flow (vph)	0	0	0	129	285	0	0	0	0	0	172	0
Confl. Peds. (#/hr)	71		67	67		71	87		37	37		87
Parking (#/hr)											2	2
Turn Type				Perm						Perm		
Protected Phases					2						8	
Permitted Phases				2						8		
Actuated Green, G (s)				45.0	45.0						45.0	
Effective Green, g (s)				46.0	46.0						46.0	
Actuated g/C Ratio				0.46	0.46						0.46	
Clearance Time (s)				5.0	5.0						5.0	
Lane Grp Cap (vph)				638	1397						643	
v/s Ratio Prot												
v/s Ratio Perm				0.09	0.09						0.13	
v/c Ratio				0.20	0.20						0.27	
Uniform Delay, d1				16.1	16.1						16.6	
Progression Factor				0.64	0.64						1.49	
Incremental Delay, d2				0.6	0.3						1.0	
Delay (s)				10.8	10.6						25.7	
Level of Service				B	B						C	
Approach Delay (s)		0.0			10.7			0.0			25.7	
Approach LOS		A			B			A			C	

Intersection Summary			
HCM Average Control Delay	15.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

11-8

2030 Future Conditions Scenario 1 — PM Peak Hour
3: Mass Ave. & 9th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↤↑↦						↤↑↦	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0						4.0	
Lane Util. Factor		0.95	1.00		0.95						0.91	
Frpb, ped/bikes		1.00	0.86		0.94						0.97	
Flpb, ped/bikes		1.00	1.00		1.00						0.99	
Frt		1.00	0.85		0.97						0.99	
Flt Protected		1.00	1.00		1.00						1.00	
Satd. Flow (prot)		3185	1226		2901						4381	
Flt Permitted		1.00	1.00		0.95						1.00	
Satd. Flow (perm)		3185	1226		2768						4381	
Volume (vph)	0	1954	934	1	1016	248	0	0	0	50	1248	96
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2124	1015	1	1104	270	0	0	0	54	1357	104
RTOR Reduction (vph)	0	0	0	0	21	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	2124	1015	0	1354	0	0	0	0	0	1511	0
Confl. Peds. (#/hr)	744		433	433		744	512		127	127		512
Turn Type			Free	Perm						Perm		
Protected Phases		6			2						8	
Permitted Phases			Free	2	2					8		
Actuated Green, G (s)		68.0	100.0		66.0						24.0	
Effective Green, g (s)		66.0	100.0		66.0						26.0	
Actuated g/C Ratio		0.66	1.00		0.66						0.26	
Clearance Time (s)		2.0			4.0						6.0	
Lane Grp Cap (vph)		2102	1226		1827						1139	
v/s Ratio Prot		c0.67										
v/s Ratio Perm			0.83		0.50						0.35	
v/c Ratio		1.01	0.83		0.74						1.33	
Uniform Delay, d1		17.0	0.0		11.3						37.0	
Progression Factor		0.79	1.00		1.00						1.31	
Incremental Delay, d2		8.7	0.6		2.8						147.7	
Delay (s)		22.1	0.6		14.1						196.0	
Level of Service		C	A		B						F	
Approach Delay (s)		15.2			14.1			0.0			196.0	
Approach LOS		B			B			A			F	

Intersection Summary				
HCM Average Control Delay	60.3	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.10			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	99.9%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

2030 Future Conditions Scenario 1 — PM Peak Hour
4: Mass Ave. & 10th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↦			↤↑↑						↤↑↦	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		0.91			0.95						0.95	
Frpb, ped/bikes		1.00			1.00						0.99	
Flpb, ped/bikes		1.00			1.00						0.97	
Frt		0.99			1.00						0.99	
Flt Protected		1.00			0.99						0.98	
Satd. Flow (prot)		4532			3163						2965	
Flt Permitted		1.00			0.51						0.98	
Satd. Flow (perm)		4532			1611						2965	
Volume (vph)	0	2773	146	150	937	0	0	0	0	73	81	10
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	3014	159	163	1018	0	0	0	0	79	88	11
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	3167	0	0	1181	0	0	0	0	0	173	0
Confl. Peds. (#/hr)	96		64	64		96	93		84	84		93
Turn Type				Perm						Perm		
Protected Phases		6			2						8	
Permitted Phases				2						8		
Actuated Green, G (s)		57.0			57.0						33.0	
Effective Green, g (s)		58.0			58.0						34.0	
Actuated g/C Ratio		0.58			0.58						0.34	
Clearance Time (s)		5.0			5.0						5.0	
Lane Grp Cap (vph)		2629			934						1008	
v/s Ratio Prot		0.70										
v/s Ratio Perm					c0.73						0.06	
v/c Ratio		1.20			2.43dl						0.17	
Uniform Delay, d1		21.0			21.0						23.1	
Progression Factor		1.00			0.63						0.83	
Incremental Delay, d2		96.0			124.8						0.4	
Delay (s)		117.0			138.0						19.5	
Level of Service		F			F						B	
Approach Delay (s)		117.0			138.0			0.0			19.5	
Approach LOS		F			F			A			B	

Intersection Summary				
HCM Average Control Delay	118.6	HCM Level of Service	F	
HCM Volume to Capacity ratio	0.86			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	148.4%	ICU Level of Service	H	
Analysis Period (min)	15			

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	82	2888	1011	101	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	89	3139	1099	110	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		350	274			
pX, platoon unblocked						
vC, conflicting volume	1209				2378	604
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1209				2378	604
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	84				100	100
cM capacity (veh/h)	573				24	441

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2
Volume Total	717	1256	1256	733	476
Volume Left	89	0	0	0	0
Volume Right	0	0	0	0	110
cSH	573	1700	1700	1700	1700
Volume to Capacity	0.16	0.74	0.74	0.43	0.28
Queue Length (ft)	14	0	0	0	0
Control Delay (s)	4.2	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	0.9			0.0	
Approach LOS					

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	105.1%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	2855	1011	0	115	76
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	3103	1099	0	125	83
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		236	388			
pX, platoon unblocked						
vC, conflicting volume	1099				2133	549
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1099				2133	549
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				0	83
cM capacity (veh/h)	631				42	479

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	1034	1034	1034	549	549	125	83
Volume Left	0	0	0	0	0	125	0
Volume Right	0	0	0	0	0	0	83
cSH	1700	1700	1700	1700	1700	42	479
Volume to Capacity	0.61	0.61	0.61	0.32	0.32	2.96	0.17
Queue Length (ft)	0	0	0	0	0	344	15
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	1083.9	14.1
Lane LOS						F	B
Approach Delay (s)	0.0			0.0		658.2	
Approach LOS						F	

Intersection Summary			
Average Delay	31.0		
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

F-10

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0		4.0		4.0			4.0	
Lane Util. Factor		1.00		1.00		1.00		0.95			0.95	
Frt		0.96		1.00		0.85		0.99			1.00	
Flt Protected		0.99		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1765		1770		1583		3493			3531	
Flt Permitted		0.99		0.53		1.00		1.00			0.91	
Satd. Flow (perm)		1765		981		1583		3493			3227	
Volume (vph)	55	123	81	73	0	69	0	263	25	68	1336	0
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)	60	134	88	79	0	75	0	286	27	74	1452	0
RTOR Reduction (vph)	0	12	0	0	0	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	270	0	79	0	75	0	306	0	0	1526	0
Turn Type	Perm			custom		Free				Perm		
Protected Phases		6						4			8	
Permitted Phases	6			2		Free				8		
Actuated Green, G (s)		41.0		41.0		100.0		50.0			50.0	
Effective Green, g (s)		42.0		42.0		100.0		50.0			50.0	
Actuated g/C Ratio		0.42		0.42		1.00		0.50			0.50	
Clearance Time (s)		5.0		5.0				4.0			4.0	
Lane Grp Cap (vph)		741		412		1583		1747			1614	
v/s Ratio Prot								0.09				
v/s Ratio Perm		0.16		0.08		0.05					c0.47	
v/c Ratio		0.36		0.19		0.05		0.18			0.95	
Uniform Delay, d1		19.9		18.3		0.0		13.7			23.7	
Progression Factor		1.77		1.00		1.00		1.14			1.00	
Incremental Delay, d2		1.3		1.0		0.1		0.2			12.7	
Delay (s)		36.5		19.3		0.1		15.8			36.4	
Level of Service		D		B		A		B			D	
Approach Delay (s)		36.5			9.9			15.8			36.4	
Approach LOS		D			A			B			D	

Intersection Summary				
HCM Average Control Delay	31.8	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.69			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	78.1%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		1.00			1.00						1.00	
Frt		0.98			1.00						0.99	
Flt Protected		1.00			0.98						0.99	
Satd. Flow (prot)		1825			1817						1816	
Flt Permitted		1.00			0.93						0.99	
Satd. Flow (perm)		1825			1734						1816	
Volume (vph)	0	272	49	1	1	0	0	0	0	35	107	17
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	296	53	1	1	0	0	0	0	38	116	18
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	343	0	0	2	0	0	0	0	0	168	0
Turn Type				Perm						Perm		
Protected Phases		6			2						8	
Permitted Phases				2						8		
Actuated Green, G (s)		45.0			45.0						44.0	
Effective Green, g (s)		47.0			47.0						45.0	
Actuated g/C Ratio		0.47			0.47						0.45	
Clearance Time (s)		6.0			6.0						5.0	
Lane Grp Cap (vph)		858			815						817	
v/s Ratio Prot		c0.19										
v/s Ratio Perm					0.00						0.09	
v/c Ratio		0.40			0.00						0.21	
Uniform Delay, d1		17.3			14.1						16.7	
Progression Factor		1.00			1.00						1.00	
Incremental Delay, d2		1.4			0.0						0.6	
Delay (s)		18.7			14.1						17.2	
Level of Service		B			B						B	
Approach Delay (s)		18.7			14.1			0.0			17.2	
Approach LOS		B			B			A			B	

Intersection Summary				
HCM Average Control Delay	18.2	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.31			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	32.6%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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			0.95			0.95			0.95	
Frpb, ped/bikes		0.97			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.91			0.98			0.99			0.99	
Flt Protected		0.99			0.99			0.99			1.00	
Satd. Flow (prot)		2799			2892			3107			3144	
Flt Permitted		0.92			0.88			0.79			0.94	
Satd. Flow (perm)		2591			2572			2462			2967	
Volume (vph)	1	2	4	127	427	64	6	39	4	54	1512	70
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)	1	2	4	138	464	70	7	42	4	59	1643	76
RTOR Reduction (vph)	0	4	0	0	9	0	0	2	0	0	3	0
Lane Group Flow (vph)	0	3	0	0	663	0	0	51	0	0	1775	0
Confl. Peds. (#/hr)	54		54	54		54	69		135	135		69
Parking (#/hr)				2	2							
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		39.0			39.0			49.0			49.0	
Effective Green, g (s)		41.0			41.0			51.0			51.0	
Actuated g/C Ratio		0.41			0.41			0.51			0.51	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		1062			1055			1256			1513	
v/s Ratio Prot												
v/s Ratio Perm		0.00			c0.26			0.02			c0.60	
v/c Ratio		0.00			0.63			0.04			1.17	
Uniform Delay, d1		17.4			23.4			12.3			24.5	
Progression Factor		2.86			1.00			0.97			1.67	
Incremental Delay, d2		0.0			2.8			0.0			78.7	
Delay (s)		49.9			26.3			11.9			119.5	
Level of Service		D			C			B			F	
Approach Delay (s)		49.9			26.3			11.9			119.5	
Approach LOS		D			C			B			F	

Intersection Summary			
HCM Average Control Delay	92.1	HCM Level of Service	F
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	93.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0						4.0	
Lane Util. Factor				0.91	0.91						1.00	
Frpb, ped/bikes				1.00	1.00						0.99	
Flpb, ped/bikes				0.92	1.00						1.00	
Frt				1.00	1.00						0.98	
Flt Protected				0.95	1.00						1.00	
Satd. Flow (prot)				1335	3051						1427	
Flt Permitted				0.95	1.00						1.00	
Satd. Flow (perm)				1335	3051						1427	
Volume (vph)	0	0	0	149	372	0	0	0	0	17	184	45
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	162	404	0	0	0	0	18	200	49
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	8	0
Lane Group Flow (vph)	0	0	0	162	404	0	0	0	0	0	259	0
Confl. Peds. (#/hr)	103		121	121		103	84		92	92		84
Parking (#/hr)											2	2
Turn Type				Perm						Perm		
Protected Phases					2						8	
Permitted Phases				2						8		
Actuated Green, G (s)				45.0	45.0						45.0	
Effective Green, g (s)				46.0	46.0						46.0	
Actuated g/C Ratio				0.46	0.46						0.46	
Clearance Time (s)				5.0	5.0						5.0	
Lane Grp Cap (vph)				614	1403						656	
v/s Ratio Prot					c0.13							
v/s Ratio Perm				0.12							0.19	
v/c Ratio				0.26	0.29						0.39	
Uniform Delay, d1				16.6	16.8						17.8	
Progression Factor				0.56	0.55						1.78	
Incremental Delay, d2				0.8	0.4						1.7	
Delay (s)				10.0	9.6						33.5	
Level of Service				B	A						C	
Approach Delay (s)		0.0			9.7			0.0			33.5	
Approach LOS		A			A			A			C	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↰↑↑						↰↑↑↑	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0						4.0	
Lane Util. Factor		0.95	1.00		0.95						0.91	
Frpb, ped/bikes		1.00	1.00		1.00						0.98	
Flpb, ped/bikes		1.00	1.00		1.00						1.00	
Frt		1.00	0.85		1.00						0.99	
Flt Protected		1.00	1.00		1.00						1.00	
Satd. Flow (prot)		3185	1425		3156						4456	
Flt Permitted		1.00	1.00		0.95						1.00	
Satd. Flow (perm)		3185	1425		2988						4456	
Volume (vph)	0	1079	937	10	1703	49	0	0	0	27	1540	84
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1173	1018	11	1851	53	0	0	0	29	1674	91
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	1173	1018	0	1913	0	0	0	0	0	1789	0
Confl. Peds. (#/hr)	359		140	140		359	205		134	134		205
Turn Type			custom	Perm						Perm		
Protected Phases		6	6		2						8	
Permitted Phases			6	2	2					8		
Actuated Green, G (s)		71.0	71.0		69.0						21.0	
Effective Green, g (s)		69.0	69.0		69.0						23.0	
Actuated g/C Ratio		0.69	0.69		0.69						0.23	
Clearance Time (s)		2.0	2.0		4.0						6.0	
Lane Grp Cap (vph)		2198	983		2062						1025	
v/s Ratio Prot		0.37	c0.71									
v/s Ratio Perm					0.64						0.40	
v/c Ratio		0.53	1.04		0.93						1.75	
Uniform Delay, d1		7.6	15.5		13.4						38.5	
Progression Factor		0.15	0.46		1.00						0.77	
Incremental Delay, d2		0.6	32.2		8.8						336.0	
Delay (s)		1.7	39.4		22.2						365.5	
Level of Service		A	D		C						F	
Approach Delay (s)		19.2			22.2			0.0			365.5	
Approach LOS		B			C			A			F	

Intersection Summary				
HCM Average Control Delay	125.5	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.21			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	175.0%	ICU Level of Service	H	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↰↑↑						↰↑↑	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		0.91			0.95						0.95	
Frpb, ped/bikes		1.00			1.00						1.00	
Flpb, ped/bikes		1.00			1.00						0.99	
Frt		0.99			1.00						1.00	
Flt Protected		1.00			0.99						0.99	
Satd. Flow (prot)		4514			3154						3092	
Flt Permitted		1.00			0.51						0.99	
Satd. Flow (perm)		4514			1611						3092	
Volume (vph)	0	1938	159	337	1394	0	0	0	0	79	235	6
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2107	173	366	1515	0	0	0	0	86	255	7
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	2271	0	0	1881	0	0	0	0	0	347	0
Confl. Peds. (#/hr)	116		41	41		116	118		48	48		118
Turn Type				Perm						Perm		
Protected Phases		6			2						8	
Permitted Phases				2						8		
Actuated Green, G (s)		60.0			60.0						30.0	
Effective Green, g (s)		61.0			61.0						31.0	
Actuated g/C Ratio		0.61			0.61						0.31	
Clearance Time (s)		5.0			5.0						5.0	
Lane Grp Cap (vph)		2754			983						959	
v/s Ratio Prot		0.51										
v/s Ratio Perm					c1.17						0.11	
v/c Ratio		0.82			5.38dl						0.36	
Uniform Delay, d1		15.3			19.5						26.8	
Progression Factor		1.00			0.74						0.76	
Incremental Delay, d2		3.0			412.4						1.0	
Delay (s)		18.3			426.9						21.4	
Level of Service		B			F						C	
Approach Delay (s)		18.3			426.9			0.0			21.4	
Approach LOS		B			F			A			C	

Intersection Summary				
HCM Average Control Delay	189.0	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.39			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	138.7%	ICU Level of Service	H	
Analysis Period (min)	15			

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑↑			
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	92	2016	1671	115	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	100	2191	1816	125	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		350	274			
pX, platoon unblocked						
vC, conflicting volume	1941				2809	971
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1941				2809	971
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	66				100	100
cM capacity (veh/h)	298				10	253

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2
Volume Total	538	877	877	1211	730
Volume Left	100	0	0	0	0
Volume Right	0	0	0	0	125
cSH	298	1700	1700	1700	1700
Volume to Capacity	0.34	0.52	0.52	0.71	0.43
Queue Length (ft)	36	0	0	0	0
Control Delay (s)	12.7	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	3.0			0.0	
Approach LOS					

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	107.4%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑		↰	↱
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	2017	1671	0	91	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2192	1816	0	99	65
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		236	388			
pX, platoon unblocked						
vC, conflicting volume	1816				2547	908
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1816				2547	908
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				0	77
cM capacity (veh/h)	334				22	278

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	731	731	731	908	908	99	65
Volume Left	0	0	0	0	0	99	0
Volume Right	0	0	0	0	0	0	65
cSH	1700	1700	1700	1700	1700	22	278
Volume to Capacity	0.43	0.43	0.43	0.53	0.53	4.50	0.23
Queue Length (ft)	0	0	0	0	0	Err	22
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	Err	21.9
Lane LOS						F	C
Approach Delay (s)	0.0			0.0		6034.6	
Approach LOS						F	

Intersection Summary			
Average Delay	237.4		
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		

T-4

2030 Future Conditions Scenario 2 — AM Peak Hour
9: M St. & 9th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0		4.0		4.0			4.0	
Lane Util. Factor		1.00		1.00		1.00		0.95			0.95	
Frt		0.93		1.00		0.85		0.98			1.00	
Flt Protected		0.99		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1716		1770		1583		3463			3533	
Flt Permitted		0.99		0.65		1.00		1.00			0.94	
Satd. Flow (perm)		1716		1209		1583		3463			3314	
Volume (vph)	25	47	80	93	0	20	0	88	15	57	1462	0
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)	27	51	87	101	0	22	0	96	16	62	1589	0
RTOR Reduction (vph)	0	3	0	0	0	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	162	0	101	0	22	0	103	0	0	1651	0
Turn Type	Perm			custom		Free				Perm		
Protected Phases		6						4			8	
Permitted Phases	6			2		Free				8		
Actuated Green, G (s)		50.0		50.0		100.0		41.0			41.0	
Effective Green, g (s)		50.0		50.0		100.0		42.0			42.0	
Actuated g/C Ratio		0.50		0.50		1.00		0.42			0.42	
Clearance Time (s)		4.0		4.0				5.0			5.0	
Lane Grp Cap (vph)		858		605		1583		1454			1392	
v/s Ratio Prot								0.03				
v/s Ratio Perm		0.10		0.08		0.01					c0.50	
v/c Ratio		0.19		0.17		0.01		0.07			1.19	
Uniform Delay, d1		13.8		13.6		0.0		17.3			29.0	
Progression Factor		0.57		1.00		1.00		1.07			1.00	
Incremental Delay, d2		0.5		0.6		0.0		0.1			91.3	
Delay (s)		8.3		14.2		0.0		18.7			120.3	
Level of Service		A		B		A		B			F	
Approach Delay (s)		8.3			11.7			18.7			120.3	
Approach LOS		A			B			B			F	

Intersection Summary				
HCM Average Control Delay	99.2	HCM Level of Service	F	
HCM Volume to Capacity ratio	0.65			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	69.3%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

2030 Future Conditions Scenario 2 — AM Peak Hour
10: M St. & 10th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		1.00			1.00						1.00	
Frt		0.96			1.00						0.99	
Flt Protected		1.00			0.98						1.00	
Satd. Flow (prot)		1788			1829						1841	
Flt Permitted		1.00			0.94						1.00	
Satd. Flow (perm)		1788			1744						1841	
Volume (vph)	0	131	55	4	6	0	0	0	0	21	188	11
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	142	60	4	7	0	0	0	0	23	204	12
RTOR Reduction (vph)	0	15	0	0	0	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	187	0	0	11	0	0	0	0	0	237	0
Turn Type				Perm						Perm		
Protected Phases		6			2						8	
Permitted Phases				2						8		
Actuated Green, G (s)		45.0			45.0						44.0	
Effective Green, g (s)		47.0			47.0						45.0	
Actuated g/C Ratio		0.47			0.47						0.45	
Clearance Time (s)		6.0			6.0						5.0	
Lane Grp Cap (vph)		840			820						828	
v/s Ratio Prot		c0.11										
v/s Ratio Perm					0.01						0.13	
v/c Ratio		0.22			0.01						0.29	
Uniform Delay, d1		15.7			14.1						17.4	
Progression Factor		1.00			1.00						1.00	
Incremental Delay, d2		0.6			0.0						0.9	
Delay (s)		16.3			14.2						18.2	
Level of Service		B			B						B	
Approach Delay (s)		16.3			14.2			0.0			18.2	
Approach LOS		B			B			A			B	

Intersection Summary				
HCM Average Control Delay	17.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.26			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	28.6%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
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			0.95			0.95			0.95	
Frpb, ped/bikes		0.98			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.92			0.97			0.98			0.99	
Flt Protected		1.00			0.99			1.00			1.00	
Satd. Flow (prot)		2885			2849			3084			3126	
Flt Permitted		0.93			0.89			0.80			0.93	
Satd. Flow (perm)		2705			2565			2472			2903	
Volume (vph)	1	4	5	81	255	100	12	188	37	56	1313	121
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)	1	4	5	88	277	109	13	204	40	61	1427	132
RTOR Reduction (vph)	0	3	0	0	28	0	0	15	0	0	7	0
Lane Group Flow (vph)	0	7	0	0	446	0	0	242	0	0	1613	0
Confl. Peds. (#/hr)	25		31	31		25	60		46	46		60
Parking (#/hr)				2	2							
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		38.0			38.0			50.0			50.0	
Effective Green, g (s)		40.0			40.0			52.0			52.0	
Actuated g/C Ratio		0.40			0.40			0.52			0.52	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		1082			1026			1285			1510	
v/s Ratio Prot												
v/s Ratio Perm		0.00			c0.18			0.10			c0.56	
v/c Ratio		0.01			0.43			0.19			1.07	
Uniform Delay, d1		18.0			21.8			12.8			24.0	
Progression Factor		1.00			1.00			1.73			0.97	
Incremental Delay, d2		0.0			1.3			0.2			43.8	
Delay (s)		18.1			23.1			22.3			67.2	
Level of Service		B			C			C			E	
Approach Delay (s)		18.1			23.1			22.3			67.2	
Approach LOS		B			C			C			E	

Intersection Summary			
HCM Average Control Delay	53.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	139.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↕						↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0						4.0	
Lane Util. Factor				0.91	0.91						1.00	
Frpb, ped/bikes				1.00	1.00						0.98	
Flpb, ped/bikes				0.96	1.00						1.00	
Frt				1.00	1.00						0.96	
Flt Protected				0.95	1.00						0.99	
Satd. Flow (prot)				1386	3037						1397	
Flt Permitted				0.95	1.00						0.99	
Satd. Flow (perm)				1386	3037						1397	
Volume (vph)	0	0	0	132	249	0	0	0	0	19	105	46
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	143	271	0	0	0	0	21	114	50
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	14	0
Lane Group Flow (vph)	0	0	0	129	285	0	0	0	0	0	172	0
Confl. Peds. (#/hr)	71		67	67		71	87		37	37		87
Parking (#/hr)											2	2
Turn Type				Perm						Perm		
Protected Phases					2						8	
Permitted Phases				2						8		
Actuated Green, G (s)				45.0	45.0						45.0	
Effective Green, g (s)				46.0	46.0						46.0	
Actuated g/C Ratio				0.46	0.46						0.46	
Clearance Time (s)				5.0	5.0						5.0	
Lane Grp Cap (vph)				638	1397						643	
v/s Ratio Prot												
v/s Ratio Perm				0.09	0.09						0.13	
v/c Ratio				0.20	0.20						0.27	
Uniform Delay, d1				16.1	16.1						16.6	
Progression Factor				0.75	0.75						1.60	
Incremental Delay, d2				0.7	0.3						1.0	
Delay (s)				12.7	12.4						27.5	
Level of Service				B	B						C	
Approach Delay (s)		0.0			12.5			0.0			27.5	
Approach LOS		A			B			A			C	

Intersection Summary			
HCM Average Control Delay	17.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

F.16

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↓↑						↓↑↑	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0						4.0	
Lane Util. Factor		0.95	1.00		0.95						0.91	
Frpb, ped/bikes		1.00	0.86		0.94						0.97	
Flpb, ped/bikes		1.00	1.00		1.00						0.99	
Frt		1.00	0.85		0.97						0.99	
Flt Protected		1.00	1.00		1.00						1.00	
Satd. Flow (prot)		3185	1226		2910						4375	
Flt Permitted		1.00	1.00		0.95						1.00	
Satd. Flow (perm)		3185	1226		2776						4375	
Volume (vph)	0	1947	931	1	1016	238	0	0	0	54	1256	98
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2116	1012	1	1104	259	0	0	0	59	1365	107
RTOR Reduction (vph)	0	0	0	0	20	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	2116	1012	0	1344	0	0	0	0	0	1527	0
Confl. Peds. (#/hr)	744		433	433		744	512		127	127		512
Turn Type			Free	Perm						Perm		
Protected Phases		6			2						8	
Permitted Phases			Free	2	2					8		
Actuated Green, G (s)		68.0	100.0		66.0						24.0	
Effective Green, g (s)		66.0	100.0		66.0						26.0	
Actuated g/C Ratio		0.66	1.00		0.66						0.26	
Clearance Time (s)		2.0			4.0						6.0	
Lane Grp Cap (vph)		2102	1226		1832						1138	
v/s Ratio Prot		c0.66										
v/s Ratio Perm			0.83		0.49						0.35	
v/c Ratio		1.01	0.83		0.73						1.34	
Uniform Delay, d1		17.0	0.0		11.2						37.0	
Progression Factor		0.79	1.00		1.00						1.27	
Incremental Delay, d2		7.6	0.6		2.6						154.5	
Delay (s)		21.0	0.6		13.8						201.6	
Level of Service		C	A		B						F	
Approach Delay (s)		14.4			13.8			0.0			201.6	
Approach LOS		B			B			A			F	

Intersection Summary			
HCM Average Control Delay	61.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	100.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↓↑						↓↑	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		0.91			0.95						0.95	
Frpb, ped/bikes		1.00			1.00						1.00	
Flpb, ped/bikes		1.00			1.00						0.97	
Frt		0.99			1.00						0.99	
Flt Protected		1.00			0.99						0.98	
Satd. Flow (prot)		4532			3164						2996	
Flt Permitted		1.00			0.51						0.98	
Satd. Flow (perm)		4532			1610						2996	
Volume (vph)	0	2773	146	150	939	0	0	0	0	72	97	6
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	3014	159	163	1021	0	0	0	0	78	105	7
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	3167	0	0	1184	0	0	0	0	0	187	0
Confl. Peds. (#/hr)	96		64	64		96	93		84	84		93
Turn Type				Perm						Perm		
Protected Phases		6			2						8	
Permitted Phases				2						8		
Actuated Green, G (s)		57.0			57.0						33.0	
Effective Green, g (s)		58.0			58.0						34.0	
Actuated g/C Ratio		0.58			0.58						0.34	
Clearance Time (s)		5.0			5.0						5.0	
Lane Grp Cap (vph)		2629			934						1019	
v/s Ratio Prot		0.70										
v/s Ratio Perm					c0.74						0.06	
v/c Ratio		1.20			2.43dl						0.18	
Uniform Delay, d1		21.0			21.0						23.2	
Progression Factor		1.00			0.64						0.84	
Incremental Delay, d2		96.0			126.2						0.4	
Delay (s)		117.0			139.6						20.0	
Level of Service		F			F						C	
Approach Delay (s)		117.0			139.6			0.0			20.0	
Approach LOS		F			F			A			C	

Intersection Summary			
HCM Average Control Delay	118.8	HCM Level of Service	F
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	148.4%	ICU Level of Service	H
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	82	2878	1013	101	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	89	3128	1101	110	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		350	274			
pX, platoon unblocked						
vC, conflicting volume	1211				2377	605
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1211				2377	605
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	84				100	100
cM capacity (veh/h)	572				24	440

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2
Volume Total	715	1251	1251	734	477
Volume Left	89	0	0	0	0
Volume Right	0	0	0	0	110
cSH	572	1700	1700	1700	1700
Volume to Capacity	0.16	0.74	0.74	0.43	0.28
Queue Length (ft)	14	0	0	0	0
Control Delay (s)	4.2	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	0.9			0.0	
Approach LOS					

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	105.0%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	2845	1013	0	115	76
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	3092	1101	0	125	83
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		236	388			
pX, platoon unblocked						
vC, conflicting volume	1101				2132	551
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1101				2132	551
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				0	83
cM capacity (veh/h)	630				42	478

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	1031	1031	1031	551	551	125	83
Volume Left	0	0	0	0	0	125	0
Volume Right	0	0	0	0	0	0	83
cSH	1700	1700	1700	1700	1700	42	478
Volume to Capacity	0.61	0.61	0.61	0.32	0.32	2.95	0.17
Queue Length (ft)	0	0	0	0	0	343	15
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	1080.5	14.1
Lane LOS						F	B
Approach Delay (s)	0.0			0.0		656.2	
Approach LOS						F	

Intersection Summary			
Average Delay	31.0		
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		

TT-88

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	0	0	2	249	6	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	2	271	7	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	280			305		
pX, platoon unblocked						
vC, conflicting volume			0		140	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		140	0
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		99	100
cM capacity (veh/h)			1622		838	1084

Direction, Lane #	WB 1	WB 2	NB 1
Volume Total	92	180	7
Volume Left	2	0	7
Volume Right	0	0	0
cSH	1622	1700	838
Volume to Capacity	0.00	0.11	0.01
Queue Length (ft)	0	0	1
Control Delay (s)	0.2	0.0	9.3
Lane LOS	A		A
Approach Delay (s)	0.1		9.3
Approach LOS			A

Intersection Summary			
Average Delay		0.3	
Intersection Capacity Utilization		17.7%	ICU Level of Service A
Analysis Period (min)		15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0		4.0		4.0			4.0	
Lane Util. Factor		1.00		1.00		1.00		0.95			0.95	
Frt		0.96		1.00		0.85		0.99			1.00	
Flt Protected		0.99		0.95		1.00		1.00			0.99	
Satd. Flow (prot)		1765		1770		1583		3493			3510	
Flt Permitted		0.99		0.53		1.00		1.00			0.83	
Satd. Flow (perm)		1765		986		1583		3493			2954	
Volume (vph)	55	121	80	73	0	69	0	263	25	68	336	0
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)	60	132	87	79	0	75	0	286	27	74	365	0
RTOR Reduction (vph)	0	16	0	0	0	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	263	0	79	0	75	0	306	0	0	439	0
Turn Type	Perm			custom		Free				Perm		
Protected Phases		6						4			8	
Permitted Phases	6			2		Free				8		
Actuated Green, G (s)		41.0		41.0		100.0		50.0			50.0	
Effective Green, g (s)		42.0		42.0		100.0		50.0			50.0	
Actuated g/C Ratio		0.42		0.42		1.00		0.50			0.50	
Clearance Time (s)		5.0		5.0				4.0			4.0	
Lane Grp Cap (vph)		741		414		1583		1747			1477	
v/s Ratio Prot								0.09				
v/s Ratio Perm		0.16		0.08		0.05					c0.15	
v/c Ratio		0.35		0.19		0.05		0.18			0.30	
Uniform Delay, d1		19.8		18.3		0.0		13.7			14.7	
Progression Factor		1.81		1.00		1.00		1.14			1.00	
Incremental Delay, d2		1.2		1.0		0.1		0.2			0.5	
Delay (s)		37.1		19.3		0.1		15.9			15.2	
Level of Service		D		B		A		B			B	
Approach Delay (s)		37.1			9.9			15.9			15.2	
Approach LOS		D			A			B			B	

Intersection Summary				
HCM Average Control Delay	19.8	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.33			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	50.3%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		1.00			1.00						1.00	
Frt		0.98			1.00						0.99	
Flt Protected		1.00			0.95						0.99	
Satd. Flow (prot)		1825			1770						1821	
Flt Permitted		1.00			0.45						0.99	
Satd. Flow (perm)		1825			836						1821	
Volume (vph)	0	272	49	1	0	0	0	0	0	31	121	17
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	296	53	1	0	0	0	0	0	34	132	18
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	343	0	0	1	0	0	0	0	0	180	0
Turn Type				Perm						Perm		
Protected Phases		6			2						8	
Permitted Phases				2						8		
Actuated Green, G (s)		45.0			45.0						44.0	
Effective Green, g (s)		47.0			47.0						45.0	
Actuated g/C Ratio		0.47			0.47						0.45	
Clearance Time (s)		6.0			6.0						5.0	
Lane Grp Cap (vph)		858			393						819	
v/s Ratio Prot		c0.19										
v/s Ratio Perm					0.00						0.10	
v/c Ratio		0.40			0.00						0.22	
Uniform Delay, d1		17.3			14.1						16.8	
Progression Factor		1.00			1.00						1.00	
Incremental Delay, d2		1.4			0.0						0.6	
Delay (s)		18.7			14.1						17.4	
Level of Service		B			B						B	
Approach Delay (s)		18.7			14.1			0.0			17.4	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	18.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
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			0.95			0.95			0.95	
Frpb, ped/bikes		1.00			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		1.00			0.98			0.99			0.99	
Flt Protected		1.00			0.99			0.99			1.00	
Satd. Flow (prot)		3153			2898			3106			3144	
Flt Permitted		0.88			0.83			0.77			0.94	
Satd. Flow (perm)		2790			2416			2416			2966	
Volume (vph)	17	156	4	127	427	64	6	39	4	54	1512	70
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)	18	170	4	138	464	70	7	42	4	59	1643	76
RTOR Reduction (vph)	0	2	0	0	9	0	0	2	0	0	3	0
Lane Group Flow (vph)	0	190	0	0	663	0	0	51	0	0	1775	0
Confl. Peds. (#/hr)	54		54	54		54	69		135	135		69
Parking (#/hr)				2	2							
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		46.0			46.0			42.0			42.0	
Effective Green, g (s)		48.0			48.0			44.0			44.0	
Actuated g/C Ratio		0.48			0.48			0.44			0.44	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		1339			1160			1063			1305	
v/s Ratio Prot												
v/s Ratio Perm		0.07			c0.27			0.02			c0.60	
v/c Ratio		0.14			0.57			0.05			1.36	
Uniform Delay, d1		14.5			18.6			16.0			28.0	
Progression Factor		1.13			1.00			0.74			1.35	
Incremental Delay, d2		0.2			2.0			0.0			162.4	
Delay (s)		16.6			20.7			12.0			200.3	
Level of Service		B			C			B			F	
Approach Delay (s)		16.6			20.7			12.0			200.3	
Approach LOS		B			C			B			F	

Intersection Summary				
HCM Average Control Delay	138.8	HCM Level of Service	F	
HCM Volume to Capacity ratio	0.95			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	129.2%	ICU Level of Service	H	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↕		↰		↱		↑	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0		4.0		4.0	
Lane Util. Factor				0.91	0.91		1.00		1.00		1.00	
Frpb, ped/bikes				1.00	1.00		1.00		0.92		0.99	
Flpb, ped/bikes				0.91	1.00		0.97		1.00		1.00	
Frt				1.00	1.00		1.00		0.85		0.97	
Flt Protected				0.95	1.00		0.95		1.00		1.00	
Satd. Flow (prot)				1321	3051		1539		1314		1435	
Flt Permitted				0.95	1.00		0.56		1.00		1.00	
Satd. Flow (perm)				1321	3051		905		1314		1435	
Volume (vph)	0	0	0	149	372	0	137	0	182	0	184	45
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	162	404	0	149	0	198	0	200	49
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	117	0	9	0
Lane Group Flow (vph)	0	0	0	162	404	0	149	0	81	0	240	0
Confl. Peds. (#/hr)	103		121	121		103	84		92	92		84
Parking (#/hr)											2	2
Turn Type				Perm			custom		custom			
Protected Phases					2						8	
Permitted Phases				2			4		2			
Actuated Green, G (s)				40.0	40.0		50.0		40.0		50.0	
Effective Green, g (s)				41.0	41.0		51.0		41.0		51.0	
Actuated g/C Ratio				0.41	0.41		0.51		0.41		0.51	
Clearance Time (s)				5.0	5.0		5.0		5.0		5.0	
Lane Grp Cap (vph)				542	1251		462		539		732	
v/s Ratio Prot											c0.17	
v/s Ratio Perm				0.12	0.13		0.16		0.06			
v/c Ratio				0.30	0.32		0.32		0.15		0.33	
Uniform Delay, d1				19.8	20.1		14.4		18.6		14.4	
Progression Factor				0.51	0.51		1.87		0.66		2.11	
Incremental Delay, d2				1.1	0.5		0.2		0.1		1.2	
Delay (s)				11.2	10.8		27.1		12.3		31.5	
Level of Service				B	B		C		B		C	
Approach Delay (s)		0.0			10.9			18.7			31.5	
Approach LOS		A			B			B			C	

Intersection Summary				
HCM Average Control Delay	17.6	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.33			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	48.5%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

2030 Future Conditions - Scenario 3 — AM Peak Hour
3: Mass Ave. & 9th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↔↑↑						↔↑↑	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0						4.0	
Lane Util. Factor		0.95	1.00		0.95						0.91	
Frpb, ped/bikes		1.00	0.89		1.00						0.98	
Flpb, ped/bikes		1.00	1.00		1.00						1.00	
Frt		1.00	0.85		1.00						0.99	
Flt Protected		1.00	1.00		1.00						1.00	
Satd. Flow (prot)		3185	1261		3156						4456	
Flt Permitted		1.00	1.00		0.95						1.00	
Satd. Flow (perm)		3185	1261		2994						4456	
Volume (vph)	0	907	938	10	1703	49	0	0	0	27	1540	84
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	986	1020	11	1851	53	0	0	0	29	1674	91
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	986	1020	0	1913	0	0	0	0	0	1789	0
Confl. Peds. (#/hr)	359		140	140		359	205		134	134		205
Turn Type			Perm	Perm						Perm		
Protected Phases		6			2						8	
Permitted Phases			6	2	2					8		
Actuated Green, G (s)		71.0	71.0		69.0						21.0	
Effective Green, g (s)		69.0	69.0		69.0						23.0	
Actuated g/C Ratio		0.69	0.69		0.69						0.23	
Clearance Time (s)		2.0	2.0		4.0						6.0	
Lane Grp Cap (vph)		2198	870		2066						1025	
v/s Ratio Prot		0.31										
v/s Ratio Perm			c0.81		0.64						0.40	
v/c Ratio		0.45	1.17		0.93						1.75	
Uniform Delay, d1		7.0	15.5		13.3						38.5	
Progression Factor		0.18	0.28		1.00						0.60	
Incremental Delay, d2		0.1	78.8		8.7						336.0	
Delay (s)		1.3	83.2		22.0						359.0	
Level of Service		A	F		C						F	
Approach Delay (s)		43.0			22.0			0.0			359.0	
Approach LOS		D			C			A			F	

Intersection Summary				
HCM Average Control Delay	135.1	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.32			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	175.1%	ICU Level of Service	H	
Analysis Period (min)	15			

c Critical Lane Group

2030 Future Conditions - Scenario 3 — AM Peak Hour
4: Mass Ave. & 10th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑↑			↔↑						↔↑	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		0.91			0.95						0.95	
Frpb, ped/bikes		1.00			0.99						1.00	
Flpb, ped/bikes		1.00			1.00						0.99	
Frt		0.99			0.99						1.00	
Flt Protected		1.00			0.99						0.99	
Satd. Flow (prot)		4494			3100						3092	
Flt Permitted		0.64			0.51						0.99	
Satd. Flow (perm)		2877			1584						3092	
Volume (vph)	182	1767	159	337	1257	137	0	0	0	79	235	6
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)	198	1921	173	366	1366	149	0	0	0	86	255	7
RTOR Reduction (vph)	0	9	0	0	6	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	2283	0	0	1875	0	0	0	0	0	347	0
Confl. Peds. (#/hr)	116		41	41		116	118		48	48		118
Turn Type	Perm			Perm						Perm		
Protected Phases		6			2						8	
Permitted Phases	6			2						8		
Actuated Green, G (s)		60.0			60.0						30.0	
Effective Green, g (s)		61.0			61.0						31.0	
Actuated g/C Ratio		0.61			0.61						0.31	
Clearance Time (s)		5.0			5.0						5.0	
Lane Grp Cap (vph)		1755			966						959	
v/s Ratio Prot												
v/s Ratio Perm		0.79			c1.18						0.11	
v/c Ratio		2.61dl			4.95dl						0.36	
Uniform Delay, d1		19.5			19.5						26.8	
Progression Factor		1.00			0.74						0.83	
Incremental Delay, d2		139.6			424.7						1.0	
Delay (s)		159.1			439.0						23.2	
Level of Service		F			F						C	
Approach Delay (s)		159.1			439.0			0.0			23.2	
Approach LOS		F			F			A			C	

Intersection Summary				
HCM Average Control Delay	265.1	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.41			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	139.8%	ICU Level of Service	H	
Analysis Period (min)	15			

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	92	1845	1671	115	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	100	2005	1816	125	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		350	274			
pX, platoon unblocked	0.50				0.68	0.50
vC, conflicting volume	1941				2747	971
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1882				914	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	36				100	100
cM capacity (veh/h)	156				67	539

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2
Volume Total	501	802	802	1211	730
Volume Left	100	0	0	0	0
Volume Right	0	0	0	0	125
cSH	156	1700	1700	1700	1700
Volume to Capacity	0.64	0.47	0.47	0.71	0.43
Queue Length 95th (ft)	89	0	0	0	0
Control Delay (s)	53.8	0.0	0.0	0.0	0.0
Lane LOS	F				
Approach Delay (s)	12.8			0.0	
Approach LOS					

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	103.7%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	1846	1671	0	91	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2007	1816	0	99	65
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		236	388			
pX, platoon unblocked	0.51				0.71	0.51
vC, conflicting volume	1816				2485	908
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1643				524	0
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				71	88
cM capacity (veh/h)	201				341	558

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	669	669	669	908	908	99	65
Volume Left	0	0	0	0	0	99	0
Volume Right	0	0	0	0	0	0	65
cSH	1700	1700	1700	1700	1700	341	558
Volume to Capacity	0.39	0.39	0.39	0.53	0.53	0.29	0.12
Queue Length 95th (ft)	0	0	0	0	0	30	10
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	19.8	12.3
Lane LOS						C	B
Approach Delay (s)	0.0			0.0		16.8	
Approach LOS						C	

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		

2030 Future Conditions - Scenario 3 AM Peak Hour
9: M St. & 9th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0		4.0		4.0			4.0	
Lane Util. Factor		1.00		1.00		1.00		0.95			0.95	
Frt		0.93		1.00		0.85		0.98			1.00	
Flt Protected		0.99		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1717		1770		1583		3474			3533	
Flt Permitted		0.99		0.65		1.00		1.00			0.94	
Satd. Flow (perm)		1717		1203		1583		3474			3310	
Volume (vph)	25	49	81	93	0	20	0	105	15	57	1462	0
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)	27	53	88	101	0	22	0	114	16	62	1589	0
RTOR Reduction (vph)	0	3	0	0	0	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	165	0	101	0	22	0	121	0	0	1651	0
Turn Type	Perm			custom		Free				Perm		
Protected Phases		6						4			8	
Permitted Phases	6			2		Free				8		
Actuated Green, G (s)		50.0		50.0		100.0		41.0			41.0	
Effective Green, g (s)		50.0		50.0		100.0		42.0			42.0	
Actuated g/C Ratio		0.50		0.50		1.00		0.42			0.42	
Clearance Time (s)		4.0		4.0				5.0			5.0	
Lane Grp Cap (vph)		859		602		1583		1459			1390	
v/s Ratio Prot								0.03				
v/s Ratio Perm		0.10		0.08		0.01					c0.50	
v/c Ratio		0.19		0.17		0.01		0.08			1.19	
Uniform Delay, d1		13.8		13.6		0.0		17.4			29.0	
Progression Factor		0.57		1.00		1.00		0.93			1.00	
Incremental Delay, d2		0.5		0.6		0.0		0.1			92.0	
Delay (s)		8.4		14.2		0.0		16.3			121.0	
Level of Service		A		B		A		B			F	
Approach Delay (s)		8.4			11.7			16.3			121.0	
Approach LOS		A			B			B			F	

Intersection Summary				
HCM Average Control Delay	98.8	HCM Level of Service		F
HCM Volume to Capacity ratio	0.65			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		8.0
Intersection Capacity Utilization	69.5%	ICU Level of Service		C
Analysis Period (min)	15			

c Critical Lane Group

2030 Future Conditions - Scenario 3 AM Peak Hour
10: M St. & 10th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		1.00			1.00						1.00	
Frt		0.96			1.00						0.99	
Flt Protected		1.00			0.98						0.99	
Satd. Flow (prot)		1788			1829						1840	
Flt Permitted		1.00			0.94						0.99	
Satd. Flow (perm)		1788			1744						1840	
Volume (vph)	0	131	55	4	6	0	0	0	0	21	177	11
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	142	60	4	7	0	0	0	0	23	192	12
RTOR Reduction (vph)	0	15	0	0	0	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	187	0	0	11	0	0	0	0	0	225	0
Turn Type				Perm						Perm		
Protected Phases		6			2						8	
Permitted Phases				2						8		
Actuated Green, G (s)		45.0			45.0						44.0	
Effective Green, g (s)		47.0			47.0						45.0	
Actuated g/C Ratio		0.47			0.47						0.45	
Clearance Time (s)		6.0			6.0						5.0	
Lane Grp Cap (vph)		840			820						828	
v/s Ratio Prot		c0.10										
v/s Ratio Perm					0.01						0.12	
v/c Ratio		0.22			0.01						0.27	
Uniform Delay, d1		15.7			14.1						17.2	
Progression Factor		1.00			1.00						1.00	
Incremental Delay, d2		0.6			0.0						0.8	
Delay (s)		16.3			14.2						18.0	
Level of Service		B			B						B	
Approach Delay (s)		16.3			14.2			0.0			18.0	
Approach LOS		B			B			A			B	

Intersection Summary				
HCM Average Control Delay	17.1	HCM Level of Service		B
HCM Volume to Capacity ratio	0.25			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		8.0
Intersection Capacity Utilization	28.1%	ICU Level of Service		A
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
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			0.95			0.95			0.95	
Frpb, ped/bikes		1.00			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		1.00			0.98			0.99			0.99	
Flt Protected		1.00			0.99			0.99			1.00	
Satd. Flow (prot)		3152			2894			3106			3144	
Flt Permitted		0.88			0.83			0.81			0.94	
Satd. Flow (perm)		2775			2414			2544			2967	
Volume (vph)	17	156	4	127	427	64	6	39	4	54	1512	70
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)	18	170	4	138	464	70	7	42	4	59	1643	76
RTOR Reduction (vph)	0	1	0	0	9	0	0	2	0	0	3	0
Lane Group Flow (vph)	0	191	0	0	663	0	0	51	0	0	1775	0
Confl. Peds. (#/hr)	54		54	54		54	69		135	135		69
Parking (#/hr)				2	2							
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		35.0			35.0			53.0			53.0	
Effective Green, g (s)		37.0			37.0			55.0			55.0	
Actuated g/C Ratio		0.37			0.37			0.55			0.55	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		1027			893			1399			1632	
v/s Ratio Prot												
v/s Ratio Perm		0.07			c0.27			0.02			c0.60	
v/c Ratio		0.19			0.74			0.04			1.09	
Uniform Delay, d1		21.3			27.4			10.3			22.5	
Progression Factor		0.75			1.00			1.01			0.32	
Incremental Delay, d2		0.4			5.6			0.0			44.2	
Delay (s)		16.4			32.9			10.5			51.4	
Level of Service		B			C			B			D	
Approach Delay (s)		16.4			32.9			10.5			51.4	
Approach LOS		B			C			B			D	

Intersection Summary			
HCM Average Control Delay	43.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	122.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↕		↰		↱		↳	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0		4.0		4.0	
Lane Util. Factor				0.91	0.91		1.00		1.00		1.00	
Frpb, ped/bikes				1.00	1.00		1.00		0.92		0.99	
Flpb, ped/bikes				0.91	1.00		0.97		1.00		1.00	
Frt				1.00	1.00		1.00		0.85		0.97	
Flt Protected				0.95	1.00		0.95		1.00		1.00	
Satd. Flow (prot)				1321	3051		1539		1314		1435	
Flt Permitted				0.95	1.00		0.56		1.00		1.00	
Satd. Flow (perm)				1321	3051		905		1314		1435	
Volume (vph)	0	0	0	149	372	0	137	0	182	0	184	45
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	162	404	0	149	0	198	0	200	49
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	117	0	9	0
Lane Group Flow (vph)	0	0	0	162	404	0	149	0	81	0	240	0
Confl. Peds. (#/hr)	103		121	121		103	84		92	92		84
Parking (#/hr)											2	2
Turn Type				Perm			custom		custom			
Protected Phases					2						8	
Permitted Phases				2			4		2			
Actuated Green, G (s)				40.0	40.0		50.0		40.0		50.0	
Effective Green, g (s)				41.0	41.0		51.0		41.0		51.0	
Actuated g/C Ratio				0.41	0.41		0.51		0.41		0.51	
Clearance Time (s)				5.0	5.0		5.0		5.0		5.0	
Lane Grp Cap (vph)				542	1251		462		539		732	
v/s Ratio Prot											c0.17	
v/s Ratio Perm				0.12	0.13		0.16		0.06			
v/c Ratio				0.30	0.32		0.32		0.15		0.33	
Uniform Delay, d1				19.8	20.1		14.4		18.6		14.4	
Progression Factor				0.73	0.71		1.43		1.00		2.11	
Incremental Delay, d2				0.9	0.4		0.2		0.1		1.2	
Delay (s)				15.4	14.6		20.7		18.6		31.5	
Level of Service				B	B		C		B		C	
Approach Delay (s)		0.0			14.8			19.5			31.5	
Approach LOS		A			B			B			C	

Intersection Summary			
HCM Average Control Delay	19.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

2030 Future Conditions - Scenario 3 (w/ impr.) AM Peak Hour
3: Mass Ave. & 9th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↔						↔↑	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0						4.0	
Lane Util. Factor		0.95	1.00		0.95						0.91	
Frpb, ped/bikes		1.00	0.89		1.00						0.98	
Flpb, ped/bikes		1.00	1.00		1.00						1.00	
Frt		1.00	0.85		1.00						0.99	
Flt Protected		1.00	1.00		1.00						1.00	
Satd. Flow (prot)		3185	1261		3156						4456	
Flt Permitted		1.00	1.00		0.95						1.00	
Satd. Flow (perm)		3185	1261		2993						4456	
Volume (vph)	0	907	938	10	1703	49	0	0	0	27	1540	84
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	986	1020	11	1851	53	0	0	0	29	1674	91
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	986	1020	0	1913	0	0	0	0	0	1790	0
Confl. Peds. (#/hr)	359		140	140		359	205		134	134		205
Turn Type			Perm	Perm						Perm		
Protected Phases		6			2						8	
Permitted Phases			6	2	2					8		
Actuated Green, G (s)		68.0	68.0		66.0						24.0	
Effective Green, g (s)		66.0	66.0		66.0						26.0	
Actuated g/C Ratio		0.66	0.66		0.66						0.26	
Clearance Time (s)		2.0	2.0		4.0						6.0	
Lane Grp Cap (vph)		2102	832		1975						1159	
v/s Ratio Prot		0.31										
v/s Ratio Perm			c0.81		0.64						0.40	
v/c Ratio		0.47	1.23		0.97						1.54	
Uniform Delay, d1		8.4	17.0		16.0						37.0	
Progression Factor		0.17	0.24		1.00						0.76	
Incremental Delay, d2		0.3	105.6		14.1						245.5	
Delay (s)		1.7	109.7		30.1						273.5	
Level of Service		A	F		C						F	
Approach Delay (s)		56.6			30.1			0.0			273.5	
Approach LOS		E			C			A			F	

Intersection Summary				
HCM Average Control Delay	115.8	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.32			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	172.6%	ICU Level of Service	H	
Analysis Period (min)	15			

c Critical Lane Group

2030 Future Conditions - Scenario 3 (w/ impr.) AM Peak Hour
4: Mass Ave. & 10th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↔↑						↔↑	
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	0.95			0.95						0.95	
Frpb, ped/bikes	1.00	1.00			0.99						1.00	
Flpb, ped/bikes	1.00	1.00			1.00						0.99	
Frt	1.00	0.99			0.99						1.00	
Flt Protected	0.95	1.00			0.99						0.99	
Satd. Flow (prot)	1593	3137			3098						3083	
Flt Permitted	0.07	1.00			0.51						0.99	
Satd. Flow (perm)	112	3137			1598						3083	
Volume (vph)	182	1767	159	337	1257	137	0	0	0	79	235	6
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)	198	1921	173	366	1366	149	0	0	0	86	255	7
RTOR Reduction (vph)	0	7	0	0	6	0	0	0	0	0	1	0
Lane Group Flow (vph)	198	2087	0	0	1875	0	0	0	0	0	347	0
Confl. Peds. (#/hr)	116		41	41		116	118		48	48		118
Turn Type	pm+pt			Perm						Perm		
Protected Phases	1	6			2						8	
Permitted Phases	6			2						8		
Actuated Green, G (s)	65.0	65.0			55.0						25.0	
Effective Green, g (s)	66.0	66.0			56.0						26.0	
Actuated g/C Ratio	0.66	0.66			0.56						0.26	
Clearance Time (s)	4.0	5.0			5.0						5.0	
Lane Grp Cap (vph)	163	2070			895						802	
v/s Ratio Prot	0.07	c0.67										
v/s Ratio Perm	0.73				c1.17						0.11	
v/c Ratio	1.21	1.01			5.01dl						0.43	
Uniform Delay, d1	30.5	17.0			22.0						30.8	
Progression Factor	1.00	1.00			0.79						0.68	
Incremental Delay, d2	139.8	21.8			493.8						1.6	
Delay (s)	170.3	38.8			511.1						22.5	
Level of Service	F	D			F						C	
Approach Delay (s)		50.2			511.1			0.0			22.5	
Approach LOS		D			F			A			C	

Intersection Summary				
HCM Average Control Delay	239.8	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.55			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	145.9%	ICU Level of Service	H	
Analysis Period (min)	15			

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑			
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	92	1845	1671	115	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	100	2005	1816	125	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		350	274			
pX, platoon unblocked	0.45				0.45	0.45
vC, conflicting volume	1941				2747	971
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1870				3660	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	30				100	100
cM capacity (veh/h)	143				0	488

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2
Volume Total	501	802	802	1211	730
Volume Left	100	0	0	0	0
Volume Right	0	0	0	0	125
cSH	143	1700	1700	1700	1700
Volume to Capacity	0.70	0.47	0.47	0.71	0.43
Queue Length 95th (ft)	100	0	0	0	0
Control Delay (s)	68.9	0.0	0.0	0.0	0.0
Lane LOS	F				
Approach Delay (s)	16.4			0.0	
Approach LOS					

Intersection Summary			
Average Delay	8.5		
Intersection Capacity Utilization	103.7%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑		↰	↱
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	1846	1671	0	91	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2007	1816	0	99	65
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		236	388			
pX, platoon unblocked	0.47				0.47	0.47
vC, conflicting volume	1816				2485	908
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1608				3036	0
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				0	87
cM capacity (veh/h)	188				5	508

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	669	669	669	908	908	99	65
Volume Left	0	0	0	0	0	99	0
Volume Right	0	0	0	0	0	0	65
cSH	1700	1700	1700	1700	1700	5	508
Volume to Capacity	0.39	0.39	0.39	0.53	0.53	21.13	0.13
Queue Length 95th (ft)	0	0	0	0	0	Err	11
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	Err	13.1
Lane LOS						F	B
Approach Delay (s)	0.0			0.0		6031.1	
Approach LOS						F	

Intersection Summary			
Average Delay	248.3		
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		

F.27

2030 Future Conditions - Scenario 3 (w/ impr.) AM Peak Hour
9: M St. & 9th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0		4.0		4.0			4.0	
Lane Util. Factor		1.00		1.00		1.00		0.95			0.95	
Frt		0.93		1.00		0.85		0.98			1.00	
Flt Protected		0.99		0.95		1.00		1.00			1.00	
Satd. Flow (prot)		1717		1770		1583		3474			3533	
Flt Permitted		0.99		0.95		1.00		1.00			0.94	
Satd. Flow (perm)		1717		1770		1583		3474			3311	
Volume (vph)	25	49	81	93	0	20	0	105	15	57	1462	0
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)	27	53	88	101	0	22	0	114	16	62	1589	0
RTOR Reduction (vph)	0	8	0	0	0	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	160	0	101	0	22	0	122	0	0	1651	0
Turn Type	Perm			Prot		custom				Perm		
Protected Phases		6!		2!		2		4			8	
Permitted Phases	6					Free				8		
Actuated Green, G (s)		41.0		41.0		100.0		49.0			49.0	
Effective Green, g (s)		42.0		42.0		100.0		50.0			50.0	
Actuated g/C Ratio		0.42		0.42		1.00		0.50			0.50	
Clearance Time (s)		5.0		5.0		5.0		5.0			5.0	
Lane Grp Cap (vph)		721		743		1583		1737			1656	
v/s Ratio Prot				0.06		0.01		0.04				
v/s Ratio Perm		0.09				0.01					c0.50	
v/c Ratio		0.22		0.14		0.01		0.07			1.00	
Uniform Delay, d1		18.5		17.8		0.0		13.0			24.9	
Progression Factor		1.41		1.00		1.00		0.42			1.00	
Incremental Delay, d2		0.7		0.4		0.0		0.1			21.4	
Delay (s)		26.8		18.2		0.0		5.5			46.3	
Level of Service		C		B		A		A			D	
Approach Delay (s)		26.8			15.0			5.5			46.3	
Approach LOS		C			B			A			D	

Intersection Summary				
HCM Average Control Delay	40.3	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.64			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	69.5%	ICU Level of Service	C	
Analysis Period (min)	15			

! Phase conflict between lane groups.
c Critical Lane Group

2030 Future Conditions - Scenario 3 (w/ impr.) AM Peak Hour
10: M St. & 10th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		1.00			1.00						1.00	
Frt		0.96			1.00						0.99	
Flt Protected		1.00			0.98						0.99	
Satd. Flow (prot)		1788			1829						1840	
Flt Permitted		1.00			0.94						0.99	
Satd. Flow (perm)		1788			1744						1840	
Volume (vph)	0	131	55	4	6	0	0	0	0	21	177	11
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	142	60	4	7	0	0	0	0	23	192	12
RTOR Reduction (vph)	0	15	0	0	0	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	187	0	0	11	0	0	0	0	0	225	0
Turn Type				Perm						Perm		
Protected Phases		6			2						8	
Permitted Phases				2						8		
Actuated Green, G (s)		45.0			45.0						44.0	
Effective Green, g (s)		47.0			47.0						45.0	
Actuated g/C Ratio		0.47			0.47						0.45	
Clearance Time (s)		6.0			6.0						5.0	
Lane Grp Cap (vph)		840			820						828	
v/s Ratio Prot		c0.10										
v/s Ratio Perm					0.01						0.12	
v/c Ratio		0.22			0.01						0.27	
Uniform Delay, d1		15.7			14.1						17.2	
Progression Factor		1.00			1.00						1.00	
Incremental Delay, d2		0.6			0.0						0.8	
Delay (s)		16.3			14.2						18.0	
Level of Service		B			B						B	
Approach Delay (s)		16.3			14.2			0.0			18.0	
Approach LOS		B			B			A			B	

Intersection Summary				
HCM Average Control Delay	17.1	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.25			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	28.1%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
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			0.95			0.95			0.95	
Frpb, ped/bikes		1.00			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		1.00			0.97			0.98			0.99	
Flt Protected		1.00			0.99			1.00			1.00	
Satd. Flow (prot)		3157			2852			3084			3126	
Flt Permitted		0.88			0.82			0.72			0.93	
Satd. Flow (perm)		2797			2365			2227			2901	
Volume (vph)	27	239	5	81	255	100	12	188	37	56	1313	121
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)	29	260	5	88	277	109	13	204	40	61	1427	132
RTOR Reduction (vph)	0	1	0	0	28	0	0	15	0	0	7	0
Lane Group Flow (vph)	0	293	0	0	446	0	0	242	0	0	1613	0
Confl. Peds. (#/hr)	25		31	31		25	60		46	46		60
Parking (#/hr)				2	2							
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		47.0			47.0			41.0			41.0	
Effective Green, g (s)		49.0			49.0			43.0			43.0	
Actuated g/C Ratio		0.49			0.49			0.43			0.43	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		1371			1159			958			1247	
v/s Ratio Prot												
v/s Ratio Perm		0.10			c0.19			0.11			c0.56	
v/c Ratio		0.21			0.38			0.25			1.29	
Uniform Delay, d1		14.5			16.0			18.2			28.5	
Progression Factor		1.04			1.00			1.85			0.95	
Incremental Delay, d2		0.3			1.0			0.4			138.2	
Delay (s)		15.5			17.0			34.1			165.3	
Level of Service		B			B			C			F	
Approach Delay (s)		15.5			17.0			34.1			165.3	
Approach LOS		B			B			C			F	

Intersection Summary			
HCM Average Control Delay	109.3	HCM Level of Service	F
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	174.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↕		↰		↱		↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0		4.0		4.0	
Lane Util. Factor				0.91	0.91		1.00		1.00		1.00	
Frpb, ped/bikes				1.00	1.00		1.00		0.96		0.98	
Flpb, ped/bikes				0.96	1.00		0.96		1.00		1.00	
Frt				1.00	1.00		1.00		0.85		0.96	
Flt Protected				0.95	1.00		0.95		1.00		1.00	
Satd. Flow (prot)				1386	3037		1522		1374		1401	
Flt Permitted				0.95	1.00		0.63		1.00		1.00	
Satd. Flow (perm)				1386	3037		1014		1374		1401	
Volume (vph)	0	0	0	132	249	0	90	0	273	0	105	46
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	143	271	0	98	0	297	0	114	50
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	160	0	16	0
Lane Group Flow (vph)	0	0	0	129	285	0	98	0	137	0	148	0
Confl. Peds. (#/hr)	71		67	67		71	87		37	37		87
Parking (#/hr)											2	2
Turn Type				Perm			custom		custom	Perm		
Protected Phases					2						8	
Permitted Phases				2			4		4	8		
Actuated Green, G (s)				45.0	45.0		45.0		45.0		45.0	
Effective Green, g (s)				46.0	46.0		46.0		46.0		46.0	
Actuated g/C Ratio				0.46	0.46		0.46		0.46		0.46	
Clearance Time (s)				5.0	5.0		5.0		5.0		5.0	
Lane Grp Cap (vph)				638	1397		466		632		644	
v/s Ratio Prot											c0.11	
v/s Ratio Perm				0.09	0.09		0.10		0.10			
v/c Ratio				0.20	0.20		0.21		0.22		0.23	
Uniform Delay, d1				16.1	16.1		16.1		16.2		16.3	
Progression Factor				0.70	0.70		1.21		2.15		1.49	
Incremental Delay, d2				0.5	0.2		0.1		0.1		0.8	
Delay (s)				11.7	11.5		19.6		34.8		25.0	
Level of Service				B	B		B		C		C	
Approach Delay (s)		0.0			11.6			31.1			25.0	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM Average Control Delay	21.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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2030 Future Conditions - Scenario 3 PM Peak Hour
3: Mass Ave. & 9th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↰↑↑↱						↰↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0						4.0	
Lane Util. Factor		0.95	1.00		0.95						0.91	
Frpb, ped/bikes		1.00	0.68		0.94						0.97	
Flpb, ped/bikes		1.00	1.00		1.00						0.99	
Frt		1.00	0.85		0.97						0.99	
Flt Protected		1.00	1.00		1.00						1.00	
Satd. Flow (prot)		3185	975		2910						4375	
Flt Permitted		1.00	1.00		0.95						1.00	
Satd. Flow (perm)		3185	975		2777						4375	
Volume (vph)	0	1682	934	1	1016	238	0	0	0	54	1256	98
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1828	1015	1	1104	259	0	0	0	59	1365	107
RTOR Reduction (vph)	0	0	0	0	20	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	1828	1015	0	1344	0	0	0	0	0	1527	0
Confl. Peds. (#/hr)	744		433	433		744	512		127	127		512
Turn Type			Perm	Perm						Perm		
Protected Phases		6			2						8	
Permitted Phases			6	2	2					8		
Actuated Green, G (s)		68.0	68.0		66.0						24.0	
Effective Green, g (s)		66.0	66.0		66.0						26.0	
Actuated g/C Ratio		0.66	0.66		0.66						0.26	
Clearance Time (s)		2.0	2.0		4.0						6.0	
Lane Grp Cap (vph)		2102	644		1833						1138	
v/s Ratio Prot		0.57										
v/s Ratio Perm			c1.04		0.48						0.35	
v/c Ratio		0.87	1.58		0.73						1.34	
Uniform Delay, d1		13.6	17.0		11.2						37.0	
Progression Factor		0.74	0.76		1.00						1.26	
Incremental Delay, d2		0.5	259.9		2.6						154.5	
Delay (s)		10.6	272.9		13.8						201.2	
Level of Service		B	F		B						F	
Approach Delay (s)		104.2			13.8			0.0			201.2	
Approach LOS		F			B			A			F	

Intersection Summary				
HCM Average Control Delay	108.6	HCM Level of Service		F
HCM Volume to Capacity ratio	1.51			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		8.0
Intersection Capacity Utilization	170.1%	ICU Level of Service		H
Analysis Period (min)	15			
c Critical Lane Group				

2030 Future Conditions - Scenario 3 PM Peak Hour
4: Mass Ave. & 10th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑↱			↰↑↑↱						↰↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		0.91			0.95						0.95	
Frpb, ped/bikes		1.00			0.99						1.00	
Flpb, ped/bikes		1.00			1.00						0.97	
Frt		0.99			0.99						0.99	
Flt Protected		1.00			0.99						0.98	
Satd. Flow (prot)		4507			3108						2996	
Flt Permitted		0.68			0.49						0.98	
Satd. Flow (perm)		3095			1522						2996	
Volume (vph)	273	2511	146	150	849	90	0	0	0	72	97	6
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	297	2729	159	163	923	98	0	0	0	78	105	7
RTOR Reduction (vph)	0	1	0	0	7	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	3184	0	0	1177	0	0	0	0	0	187	0
Confl. Peds. (#/hr)	96		64	64		96	93		84	84		93
Turn Type	Perm			Perm						Perm		
Protected Phases		6			2						8	
Permitted Phases	6			2						8		
Actuated Green, G (s)		83.0			83.0						7.0	
Effective Green, g (s)		84.0			84.0						8.0	
Actuated g/C Ratio		0.84			0.84						0.08	
Clearance Time (s)		5.0			5.0						5.0	
Lane Grp Cap (vph)		2600			1278						240	
v/s Ratio Prot												
v/s Ratio Perm		c1.03			0.77						0.06	
v/c Ratio		1.22			2.20dl						0.78	
Uniform Delay, d1		8.0			5.7						45.1	
Progression Factor		1.00			1.60						1.00	
Incremental Delay, d2		104.8			8.7						21.6	
Delay (s)		112.8			17.8						66.6	
Level of Service		F			B						E	
Approach Delay (s)		112.8			17.8			0.0			66.6	
Approach LOS		F			B			A			E	

Intersection Summary				
HCM Average Control Delay	86.2	HCM Level of Service		F
HCM Volume to Capacity ratio	1.19			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		8.0
Intersection Capacity Utilization	148.9%	ICU Level of Service		H
Analysis Period (min)	15			
dl Defacto Left Lane. Recode with 1 though lane as a left lane.				
c Critical Lane Group				