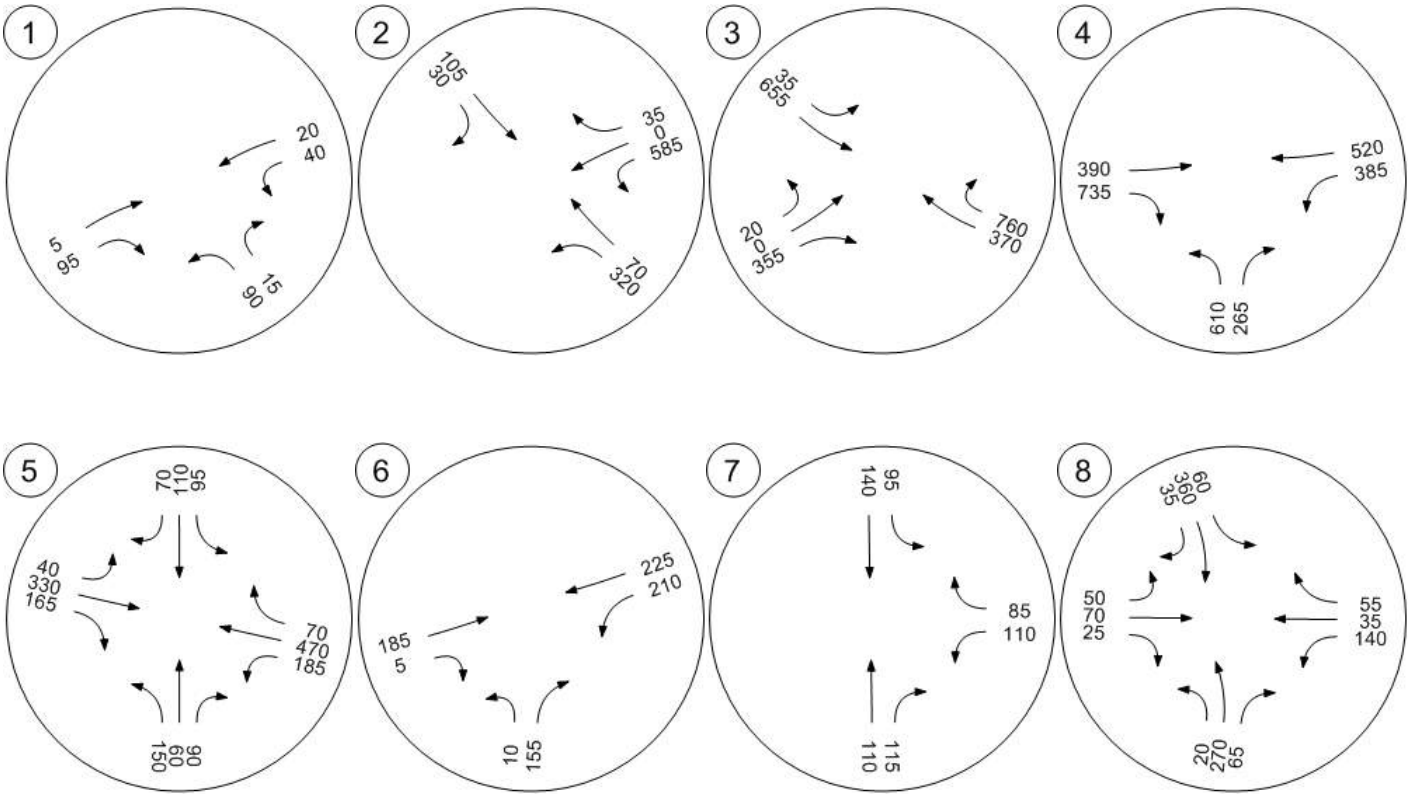
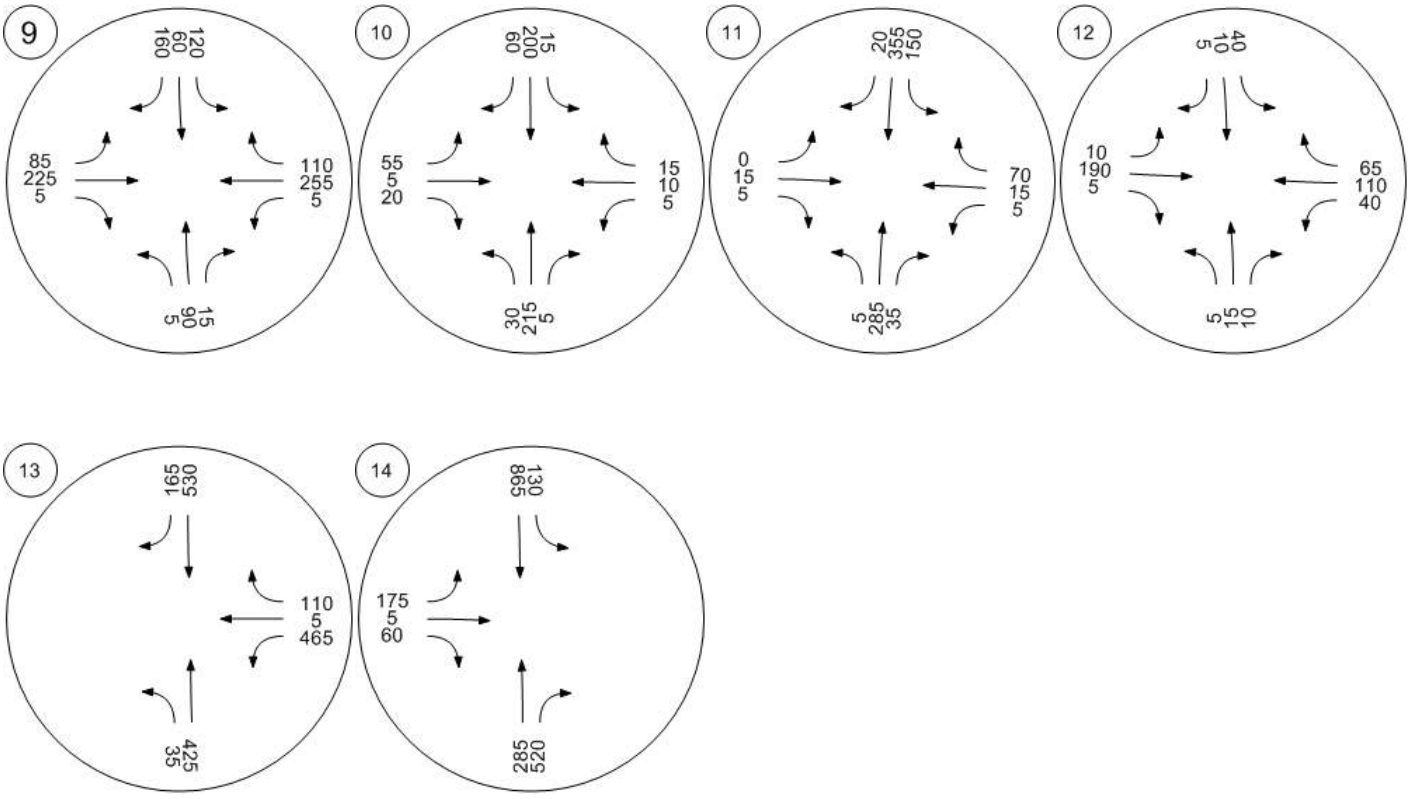
Appendix A – 2040 Traffic Volumes

Transportation Base Case Financially Constrained Volumes

Traffic Volume - Base Volume

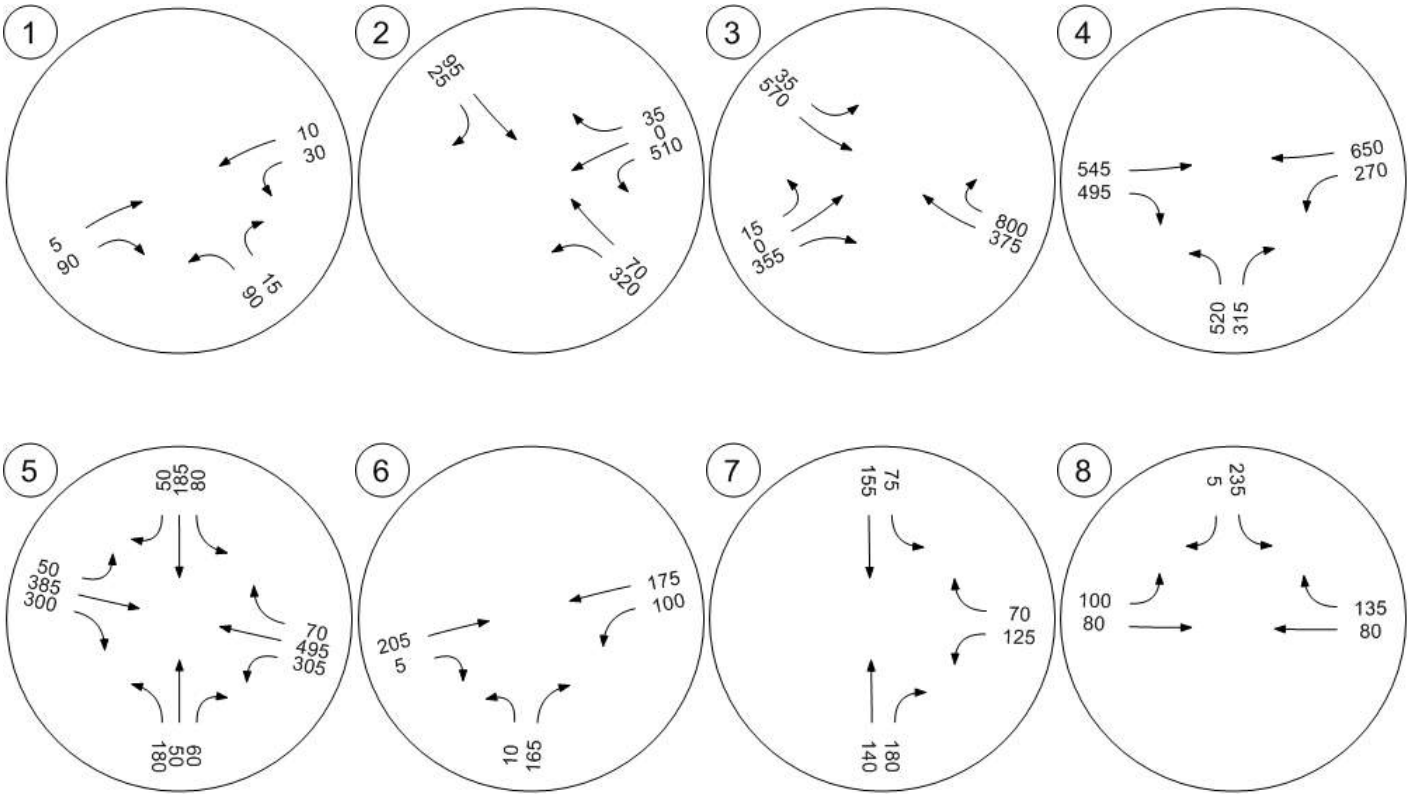


Traffic Volume - Base Volume

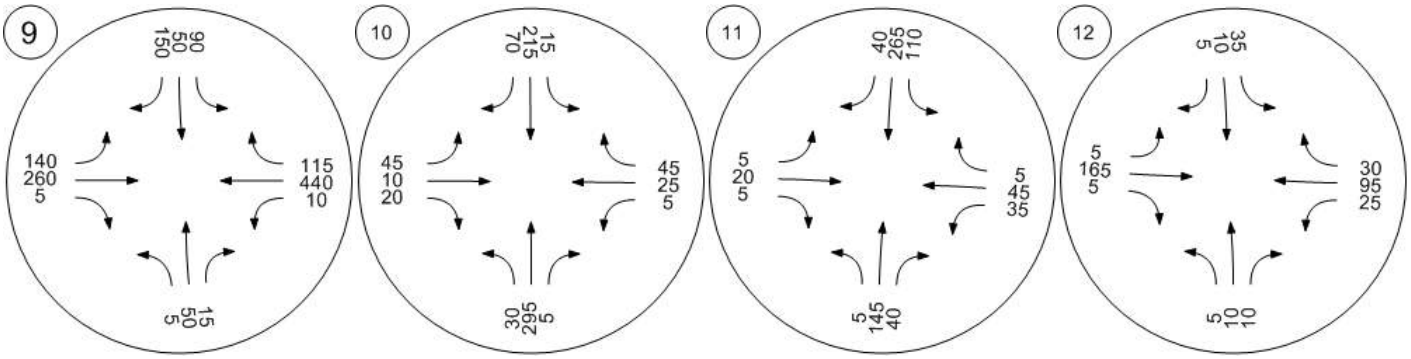


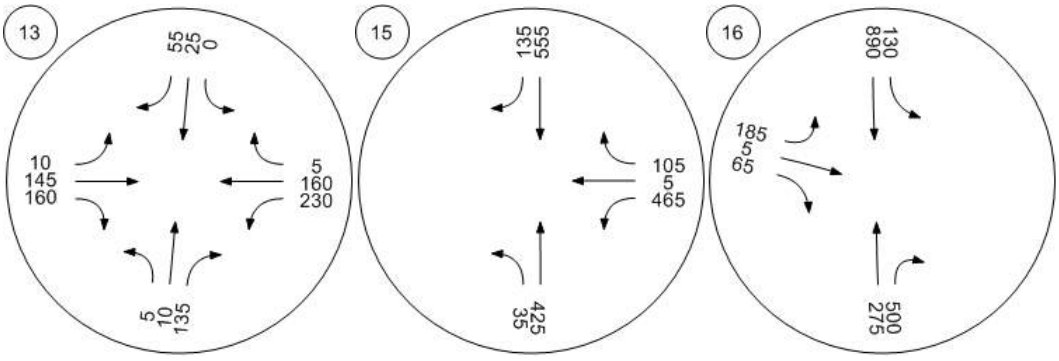
Revised Land Use Framework – July 2017 Financially Constrained Volumes

Traffic Volume - Base Volume



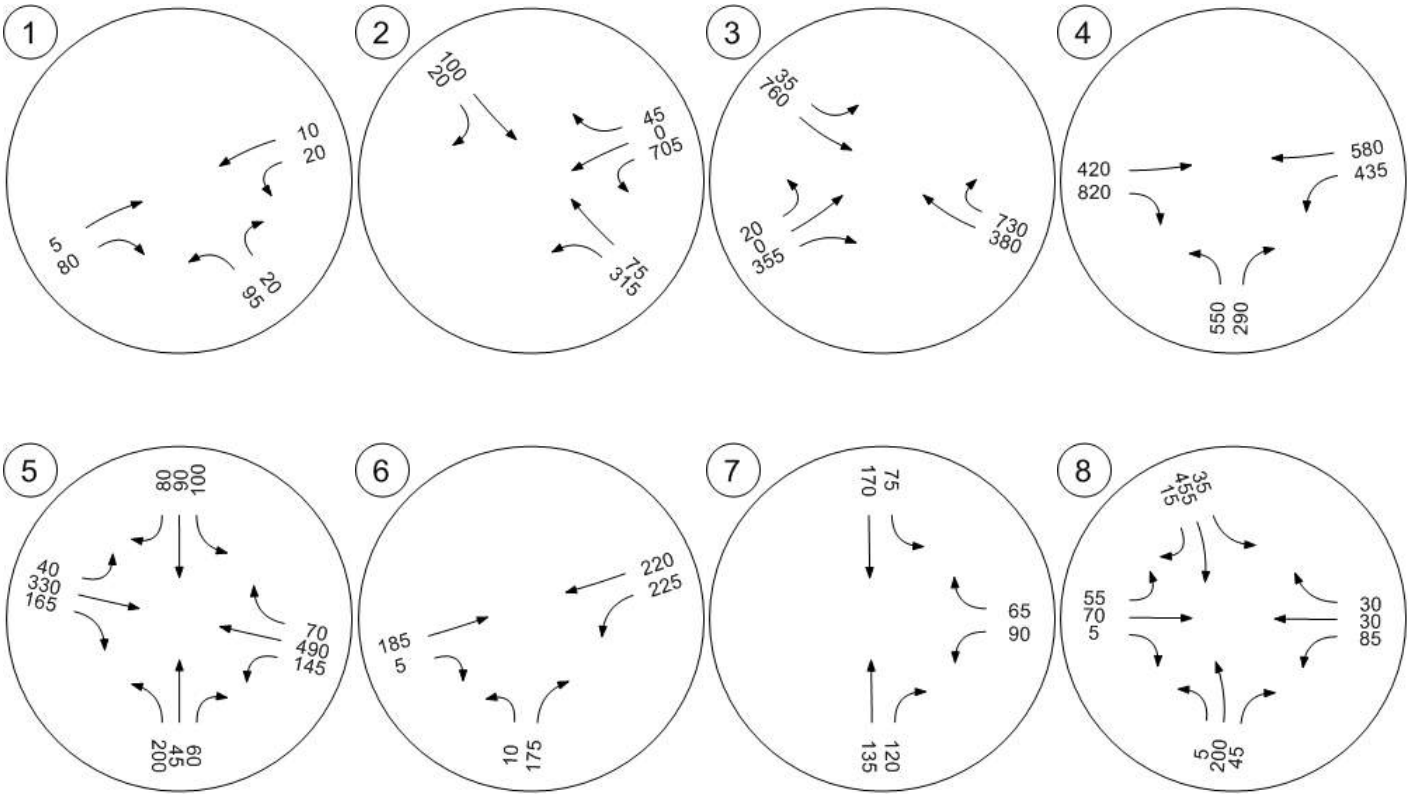
Traffic Volume - Base Volume



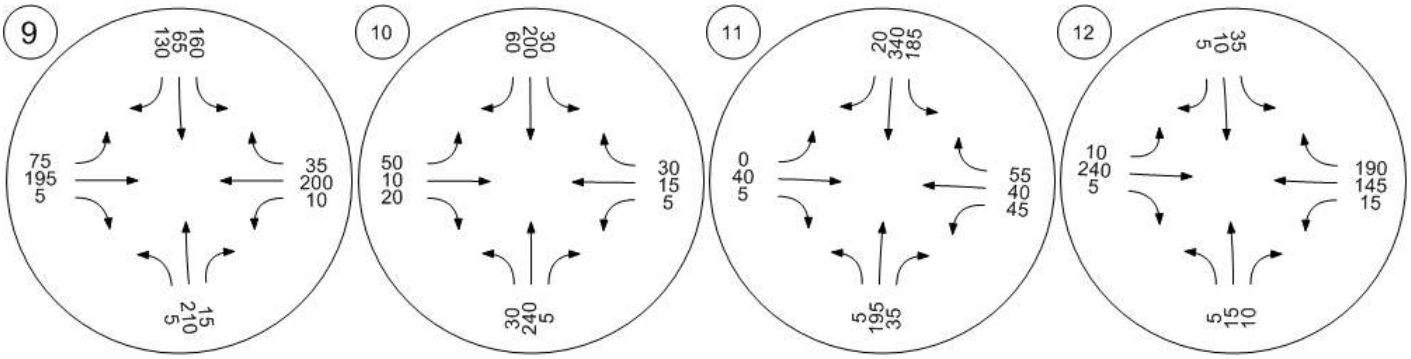


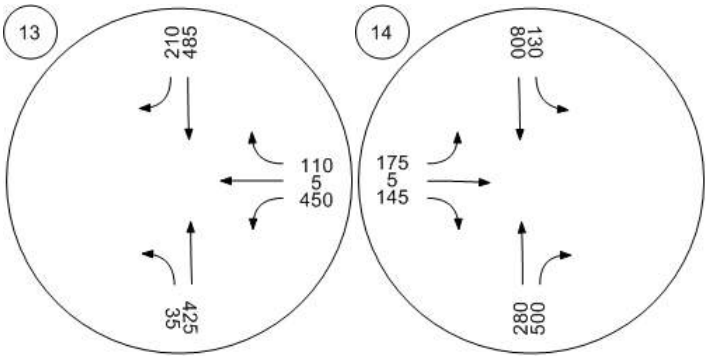
Transportation Base Case Mitigated Volumes

Traffic Volume - Base Volume



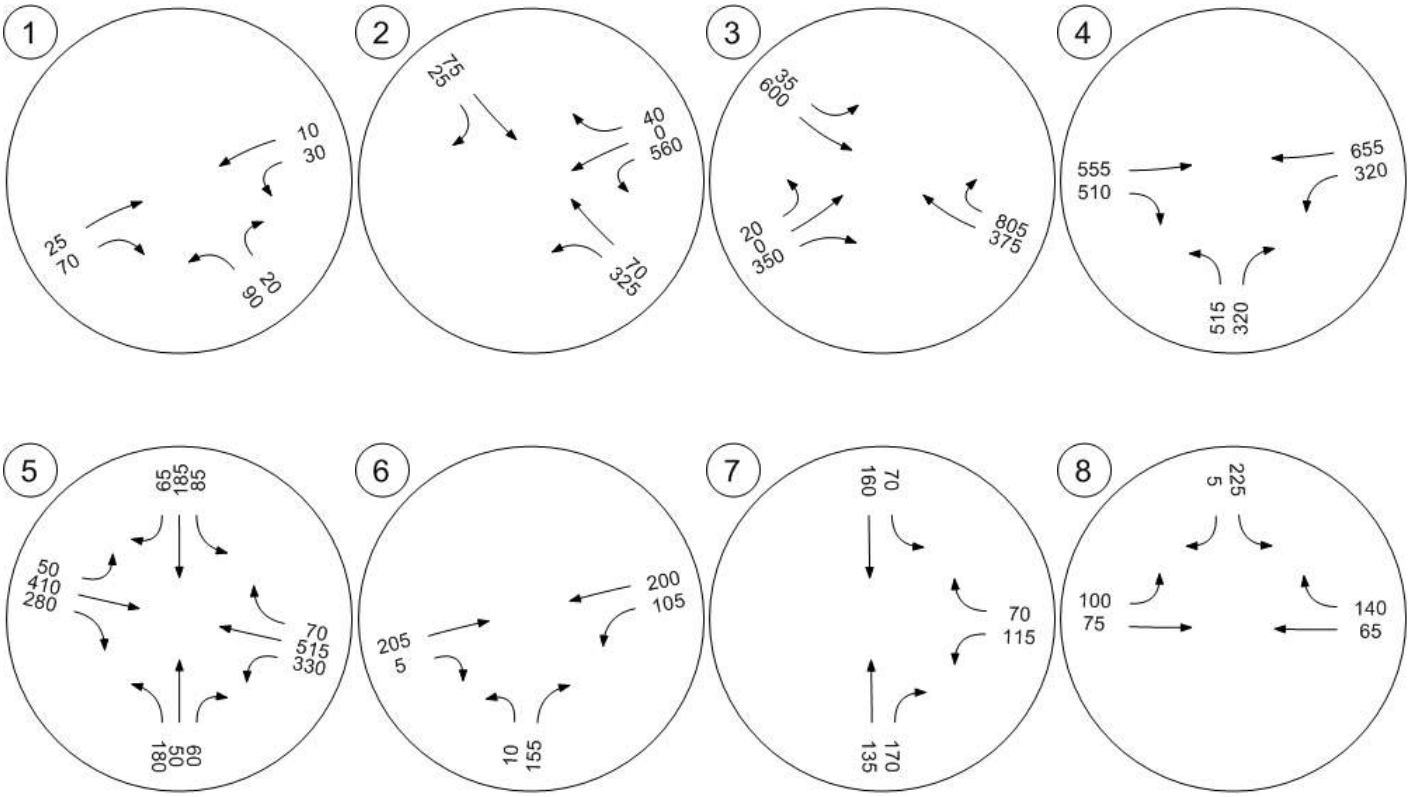
Traffic Volume - Base Volume



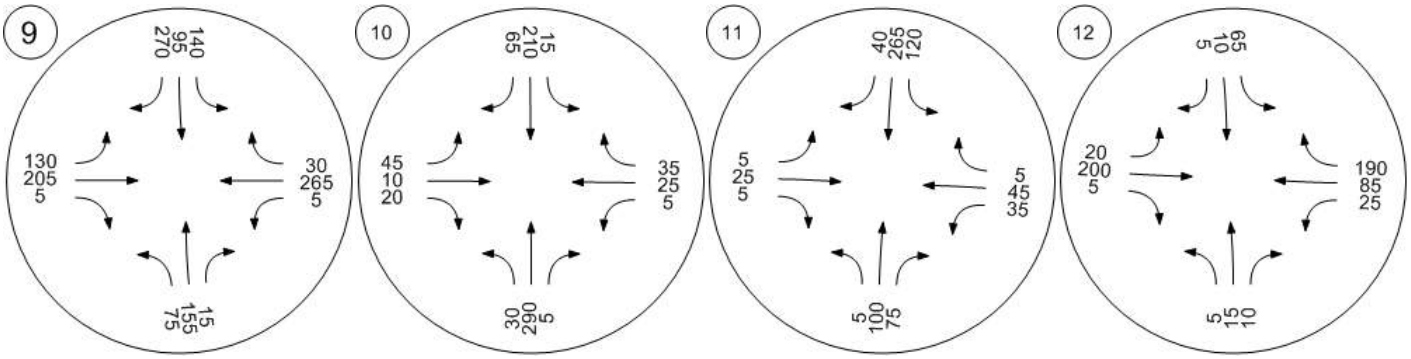


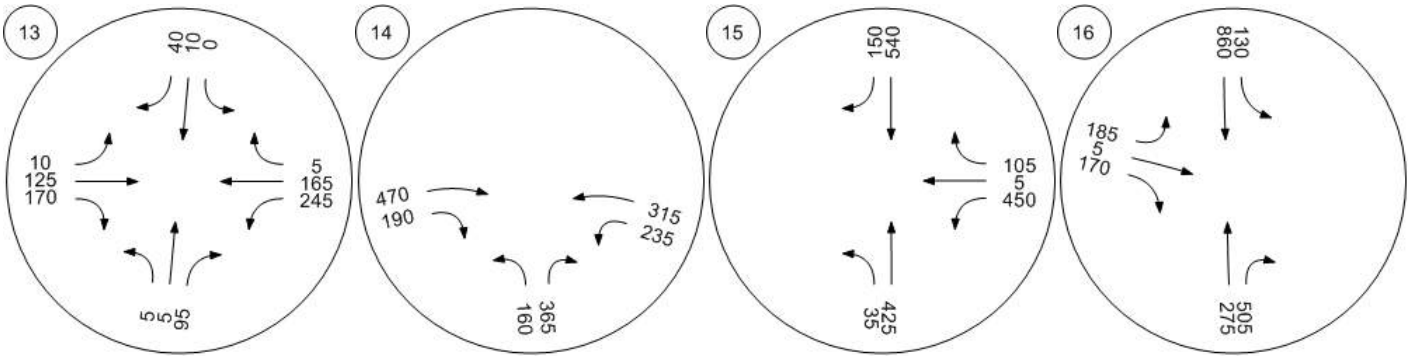
Revised Land Use Framework – July 2017 Mitigated Volumes

Traffic Volume - Base Volume



Traffic Volume - Base Volume





Appendix B – 2040 HCM Reports

- Transportation Base Case Financially Constrained HCM Reports
- Revised Land Use Framework – July 2017 Financially Constrained HCM Reports
- Transportation Base Case Mitigated HCM Reports
- Revised Land Use Framework – July 2017 Mitigated HCM Reports
- Transportation Base Case Interim Solution HCM Reports
- Revised Land Use Framework – July 2017 Interim Solution HCM Reports

Transportation Base Case Financially Constrained HCM Reports

Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Traffic Volume (veh/h)	5	95	40	20	90	15
Future Volume (Veh/h)	5	95	40	20	90	15
Sign Control	Yield			Stop	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	106	44	22	100	17
Pedestrians	10			10		
Lane Width (ft)	12.0			12.0		
Walking Speed (ft/s)	4.0			4.0		
Percent Blockage	1			1		
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	220	10	319	220	10	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	220	10	319	220	10	
tC, single (s)	6.5	6.2	7.2	6.6	4.1	
tC, 2 stage (s)						
tF (s)	4.0	3.3	3.6	4.1	2.2	
p0 queue free %	99	90	91	96	94	
cM capacity (veh/h)	625	1062	512	610	1596	

Direction, Lane #	EB 1	WB 1	NW 1	NW 2
Volume Total	112	66	100	17
Volume Left	0	44	100	0
Volume Right	106	0	0	17
cSH	1024	541	1596	1700
Volume to Capacity	0.11	0.12	0.06	0.01
Queue Length 95th (ft)	9	10	5	0
Control Delay (s)	8.9	12.6	7.4	0.0
Lane LOS	A	B	A	
Approach Delay (s)	8.9	12.6	6.3	
Approach LOS	A	B		

Intersection Summary				
Average Delay	8.7			
Intersection Capacity Utilization	24.5%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	390	735	385	520	610	265
Future Volume (vph)	390	735	385	520	610	265
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		0.98	0.95	1.00
Satd. Flow (prot)	1699	1421		1662	1630	1395
Flt Permitted	1.00	1.00		0.49	0.95	1.00
Satd. Flow (perm)	1699	1421		827	1630	1395
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	433	817	428	578	678	294
RTOR Reduction (vph)	0	0	0	0	0	182
Lane Group Flow (vph)	433	817	0	1006	678	112
Confl. Peds. (#/hr)		10	10			10
Confl. Bikes (#/hr)		5				5
Heavy Vehicles (%)	3%	3%	3%	3%	2%	2%
Turn Type	NA	Free	pm+pt	NA	Prot	pm+ov
Protected Phases	6		5	2	4	5
Permitted Phases		Free	2			4
Actuated Green, G (s)	46.4	90.0		56.0	26.0	31.6
Effective Green, g (s)	46.4	90.0		56.0	26.0	31.6
Actuated g/C Ratio	0.52	1.00		0.62	0.29	0.35
Clearance Time (s)	4.0			4.0	4.0	4.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	875	1421		566	470	551
v/s Ratio Prot	0.25			c0.11	c0.42	0.01
v/s Ratio Perm		0.57		c0.99		0.07
v/c Ratio	0.49	0.57		1.78	1.44	0.20
Uniform Delay, d1	14.2	0.0		17.0	32.0	20.4
Progression Factor	1.00	1.00		0.94	0.73	1.05
Incremental Delay, d2	0.4	1.7		356.2	206.9	0.1
Delay (s)	14.6	1.7		372.1	230.2	21.5
Level of Service	B	A		F	F	C
Approach Delay (s)	6.2			372.1	167.1	
Approach LOS	A			F	F	

Intersection Summary			
HCM 2000 Control Delay	168.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.74		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	121.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	55	5	20	5	10	15	30	215	5	15	200	60
Future Vol, veh/h	55	5	20	5	10	15	30	215	5	15	200	60
Conflicting Peds, #/hr	10	0	10	0	0	0	10	0	0	0	0	10
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	92	93	92	92	92	93	93	92	92	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	59	5	22	5	11	16	32	231	5	16	215	65

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	612	591	267	601	620	244	290	0	0	237	0	0
Stage 1	290	290	-	298	298	-	-	-	-	-	-	-
Stage 2	322	301	-	303	322	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	405	420	772	412	404	795	1272	-	-	1330	-	-
Stage 1	718	672	-	711	667	-	-	-	-	-	-	-
Stage 2	690	665	-	706	651	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	369	399	759	380	384	788	1261	-	-	1319	-	-
Mov Cap-2 Maneuver	369	399	-	380	384	-	-	-	-	-	-	-
Stage 1	691	657	-	690	648	-	-	-	-	-	-	-
Stage 2	640	646	-	665	637	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.6	12.5	1	0.4
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1261	-	-	426	515	1319	-	-
HCM Lane V/C Ratio	0.026	-	-	0.202	0.063	0.012	-	-
HCM Control Delay (s)	7.9	0	-	15.6	12.5	7.8	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.7	0.2	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	70	25	140	35	55	20	270	65	60	360	35
Future Volume (vph)	50	70	25	140	35	55	20	270	65	60	360	35
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.99			0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	
Frt		0.98			0.97		1.00	0.97		1.00	0.99	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1625			1572		1630	1649		1630	1685	
Flt Permitted		0.84			0.69		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1387			1117		1630	1649		1630	1685	
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)	54	76	27	152	38	60	22	293	71	65	391	38
RTOR Reduction (vph)	0	10	0	0	15	0	0	8	0	0	3	0
Lane Group Flow (vph)	0	147	0	0	235	0	22	356	0	65	426	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Confl. Bikes (#/hr)			5			5			5			5
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		23.1			23.1		2.5	47.7		7.2	52.4	
Effective Green, g (s)		23.1			23.1		2.5	47.7		7.2	52.4	
Actuated g/C Ratio		0.26			0.26		0.03	0.53		0.08	0.58	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		355			286		45	873		130	981	
v/s Ratio Prot							0.01	0.22		c0.04	c0.25	
v/s Ratio Perm		0.11			c0.21							
v/c Ratio		0.42			0.82		0.49	0.41		0.50	0.43	
Uniform Delay, d1		27.8			31.5		43.1	12.7		39.7	10.5	
Progression Factor		1.01			1.00		1.00	1.00		0.62	1.98	
Incremental Delay, d2		0.8			17.1		8.1	1.4		2.6	1.2	
Delay (s)		28.8			48.6		51.3	14.1		27.2	22.0	
Level of Service		C			D		D	B		C	C	
Approach Delay (s)		28.8			48.6			16.2			22.7	
Approach LOS		C			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	4.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	185	5	210	225	10	155
Future Vol, veh/h	185	5	210	225	10	155
Conflicting Peds, #/hr	0	10	10	0	10	10
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	4	4	5	5	5	5
Mvmt Flow	206	6	233	250	11	172

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	221	0	945	228
Stage 1	-	-	-	-	218	-
Stage 2	-	-	-	-	727	-
Critical Hdwy	-	-	4.15	-	6.45	6.25
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	2.245	-	3.545	3.345
Pot Cap-1 Maneuver	-	-	1331	-	287	804
Stage 1	-	-	-	-	811	-
Stage 2	-	-	-	-	473	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1320	-	224	791
Mov Cap-2 Maneuver	-	-	-	-	224	-
Stage 1	-	-	-	-	804	-
Stage 2	-	-	-	-	373	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4	12.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	686	-	-	1320	-
HCM Lane V/C Ratio	0.267	-	-	0.177	-
HCM Control Delay (s)	12.2	-	-	8.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1.1	-	-	0.6	-

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	15	5	5	15	70	5	285	35	150	355	20
Future Vol, veh/h	0	15	5	5	15	70	5	285	35	150	355	20
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	200	-	-	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	16	5	5	16	76	5	310	38	163	386	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1129	1102	417	1094	1094	349	418	0	0	358	0	0
Stage 1	733	733	-	350	350	-	-	-	-	-	-	-
Stage 2	396	369	-	744	744	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	181	212	636	191	214	694	1141	-	-	1201	-	-
Stage 1	412	426	-	666	633	-	-	-	-	-	-	-
Stage 2	629	621	-	407	421	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	132	179	625	155	181	682	1131	-	-	1191	-	-
Mov Cap-2 Maneuver	132	179	-	155	181	-	-	-	-	-	-	-
Stage 1	407	365	-	658	625	-	-	-	-	-	-	-
Stage 2	537	613	-	330	360	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	23.3	15.6	0.1	2.4
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1131	-	-	-	218	155	458	1191	-	-
HCM Lane V/C Ratio	0.005	-	-	-	0.1	0.035	0.202	0.137	-	-
HCM Control Delay (s)	8.2	-	-	0	23.3	29.1	14.8	8.5	-	-
HCM Lane LOS	A	-	-	A	C	D	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0.3	0.1	0.7	0.5	-	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	190	5	40	100	65	5	15	10	40	10	5
Future Vol, veh/h	10	190	5	40	100	65	5	15	10	40	10	5
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	207	5	43	109	71	5	16	11	43	11	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	189	0	0	222	0	0	490	517	229	496	485	164
Stage 1	-	-	-	-	-	-	241	241	-	241	241	-
Stage 2	-	-	-	-	-	-	249	276	-	255	244	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1385	-	-	1347	-	-	489	462	810	484	482	881
Stage 1	-	-	-	-	-	-	762	706	-	762	706	-
Stage 2	-	-	-	-	-	-	755	682	-	749	704	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1373	-	-	1336	-	-	453	434	797	441	453	866
Mov Cap-2 Maneuver	-	-	-	-	-	-	453	434	-	441	453	-
Stage 1	-	-	-	-	-	-	749	694	-	749	675	-
Stage 2	-	-	-	-	-	-	706	652	-	709	692	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	1.5	12.4	13.9
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	516	1373	-	-	1336	-	-	464
HCM Lane V/C Ratio	0.063	0.008	-	-	0.033	-	-	0.129
HCM Control Delay (s)	12.4	7.6	0	-	7.8	0	-	13.9
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.4

Intersection	
Int Delay, s/veh	5.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	110	85	100	115	95	140
Future Vol, veh/h	110	85	100	115	95	140
Conflicting Peds, #/hr	10	10	0	10	10	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	120	92	109	125	103	152

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	550	191	0	0	244	0
Stage 1	181	-	-	-	-	-
Stage 2	369	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	496	851	-	-	1322	-
Stage 1	850	-	-	-	-	-
Stage 2	699	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	446	837	-	-	1311	-
Mov Cap-2 Maneuver	446	-	-	-	-	-
Stage 1	843	-	-	-	-	-
Stage 2	634	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.3	0	3.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	560	1311	-
HCM Lane V/C Ratio	-	-	0.378	0.079	-
HCM Control Delay (s)	-	-	15.3	8	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.8	0.3	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	330	165	185	470	70	150	60	90	95	110	70
Future Volume (vph)	40	330	165	185	470	70	150	60	90	95	110	70
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	0.99		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.98	1.00		0.98	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.91		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1626	1716	1383	1608	1655		1599	1511		1596	1582	
Flt Permitted	0.33	1.00	1.00	0.40	1.00		0.54	1.00		0.59	1.00	
Satd. Flow (perm)	557	1716	1383	670	1655		912	1511		996	1582	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	44	367	183	206	522	78	167	67	100	106	122	78
RTOR Reduction (vph)	0	0	98	0	6	0	0	60	0	0	26	0
Lane Group Flow (vph)	44	367	85	206	594	0	167	108	0	106	174	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2			4			8		
Actuated Green, G (s)	44.7	41.7	41.7	55.0	48.0		27.0	27.0		27.0	27.0	
Effective Green, g (s)	44.7	41.7	41.7	55.0	48.0		27.0	27.0		27.0	27.0	
Actuated g/C Ratio	0.50	0.46	0.46	0.61	0.53		0.30	0.30		0.30	0.30	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	312	795	640	506	882		273	453		298	474	
v/s Ratio Prot	0.00	0.21		c0.04	c0.36			0.07			0.11	
v/s Ratio Perm	0.07		0.06	0.21			c0.18			0.11		
v/c Ratio	0.14	0.46	0.13	0.41	0.67		0.61	0.24		0.36	0.37	
Uniform Delay, d1	12.4	16.5	13.8	8.9	15.3		27.0	23.7		24.7	24.8	
Progression Factor	1.39	1.44	3.70	1.00	1.00		1.01	1.03		1.00	1.00	
Incremental Delay, d2	0.2	1.8	0.4	0.5	4.1		9.8	1.2		0.7	0.5	
Delay (s)	17.4	25.4	51.5	9.4	19.4		37.2	25.7		25.4	25.3	
Level of Service	B	C	D	A	B		D	C		C	C	
Approach Delay (s)		32.9			16.9			31.4			25.3	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	17

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	35	655	0	0	370	760	20	0	355	0	0	0
Future Vol, veh/h	35	655	0	0	370	760	20	0	355	0	0	0
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	-	-	-	-	-	50	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	3	3	3	2	2	2	3	3	3
Mvmt Flow	39	728	0	0	411	844	22	0	394	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	421	0	-	-	-	0	1227	1227	738
Stage 1	-	-	-	-	-	-	806	806	-
Stage 2	-	-	-	-	-	-	421	421	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1138	-	0	0	-	-	197	178	418
Stage 1	-	-	0	0	-	-	439	395	-
Stage 2	-	-	0	0	-	-	662	589	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1129	-	-	-	-	-	184	0	415
Mov Cap-2 Maneuver	-	-	-	-	-	-	184	0	-
Stage 1	-	-	-	-	-	-	414	0	-
Stage 2	-	-	-	-	-	-	656	0	-

Approach	SE	NW	NE
HCM Control Delay, s	0.4	0	98.9
HCM LOS			F

Minor Lane/Major Mvmt	NELn1	NWT	NWR	SEL	SET
Capacity (veh/h)	389	-	-	1129	-
HCM Lane V/C Ratio	1.071	-	-	0.034	-
HCM Control Delay (s)	98.9	-	-	8.3	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	14.3	-	-	0.1	-

Intersection	
Int Delay, s/veh	52.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	85	225	5	5	255	110	5	90	15	120	60	160
Future Vol, veh/h	85	225	5	5	255	110	5	90	15	120	60	160
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	20	20	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	3	3	3	2	2	2	8	8	8	2	2	2
Mvmt Flow	91	242	5	5	274	118	5	97	16	129	65	172

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	402	0	0	257	0	0	909	850	275	858	794	353
Stage 1	-	-	-	-	-	-	437	437	-	354	354	-
Stage 2	-	-	-	-	-	-	472	413	-	504	440	-
Critical Hdwy	4.13	-	-	4.12	-	-	7.18	6.58	6.28	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.18	5.58	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.18	5.58	-	6.12	5.52	-
Follow-up Hdwy	2.227	-	-	2.218	-	-	3.572	4.072	3.372	3.518	4.018	3.318
Pot Cap-1 Maneuver	1151	-	-	1308	-	-	250	291	750	277	321	691
Stage 1	-	-	-	-	-	-	587	569	-	663	630	-
Stage 2	-	-	-	-	-	-	561	583	-	550	578	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1141	-	-	1286	-	-	141	258	731	174	285	680
Mov Cap-2 Maneuver	-	-	-	-	-	-	141	258	-	174	285	-
Stage 1	-	-	-	-	-	-	528	512	-	596	622	-
Stage 2	-	-	-	-	-	-	371	575	-	389	520	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.3	0.1	28	162.7
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	272	1141	-	-	1286	-	-	299
HCM Lane V/C Ratio	0.435	0.08	-	-	0.004	-	-	1.223
HCM Control Delay (s)	28	8.4	0	-	7.8	0	-	162.7
HCM Lane LOS	D	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	2.1	0.3	-	-	0	-	-	16.6

Intersection	
Int Delay, s/veh	611.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	585	0	35	0	105	30	320	70	0
Future Vol, veh/h	0	0	0	585	0	35	0	105	30	320	70	0
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	5	5	5
Mvmt Flow	0	0	0	650	0	39	0	117	33	356	78	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	932	949	88	-	0	0	160	0	0
Stage 1	789	789	-	-	-	-	-	-	-
Stage 2	143	160	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	-	-	-	4.15	-	-
Critical Hdwy Stg 1	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	-	-	-	2.245	-	-
Pot Cap-1 Maneuver	~ 247	260	970	0	-	-	1401	-	0
Stage 1	~ 384	402	-	0	-	-	-	-	0
Stage 2	860	766	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	~ 194	190	962	-	-	-	1389	-	-
Mov Cap-2 Maneuver	~ 194	190	-	-	-	-	-	-	-
Stage 1	~ 384	294	-	-	-	-	-	-	-
Stage 2	853	766	-	-	-	-	-	-	-

Approach	WB	SE	NW
HCM Control Delay, s	$ 1124.4	0	7
HCM LOS	F		

Minor Lane/Major Mvmt	NWL	NWT	WBLn1	SET	SER
Capacity (veh/h)	1389	-	203	-	-
HCM Lane V/C Ratio	0.256	-	3.394	-	-
HCM Control Delay (s)	8.5	$	1124.4	-	-
HCM Lane LOS	A	A	F	-	-
HCM 95th %tile Q(veh)	1	-	64.7	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	465	5	110	35	425	0	0	530	165
Future Volume (vph)	0	0	0	465	5	110	35	425	0	0	530	165
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	3.5
Lane Util. Factor					1.00	1.00	1.00	1.00			1.00	1.00
Frpb, ped/bikes					1.00	1.00	1.00	1.00			1.00	0.99
Flpb, ped/bikes					1.00	1.00	1.00	1.00			1.00	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1651	1473	1599	1683			1683	1411
Flt Permitted					0.95	1.00	0.21	1.00			1.00	1.00
Satd. Flow (perm)					1651	1473	348	1683			1683	1411
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	0	0	495	5	117	37	452	0	0	564	176
RTOR Reduction (vph)	0	0	0	0	0	71	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	500	46	37	452	0	0	564	176
Confl. Peds. (#/hr)							5		12	12		5
Confl. Bikes (#/hr)									3			
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	4%	4%	4%	4%	4%	4%
Turn Type				Split	NA	Perm	pm+pt	NA			NA	Free
Protected Phases				4	4		1	6			2	
Permitted Phases						4	6					Free
Actuated Green, G (s)					34.6	34.6	46.4	46.4			38.7	90.0
Effective Green, g (s)					35.1	35.1	46.4	46.9			39.2	90.0
Actuated g/C Ratio					0.39	0.39	0.52	0.52			0.44	1.00
Clearance Time (s)					4.5	4.5	4.0	4.5			4.5	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					643	574	230	877			733	1411
v/s Ratio Prot					c0.30		0.01	c0.27			c0.34	
v/s Ratio Perm						0.03	0.08					0.12
v/c Ratio					0.78	0.08	0.16	0.52			0.77	0.12
Uniform Delay, d1					24.0	17.3	13.9	14.1			21.6	0.0
Progression Factor					1.00	1.00	1.01	1.02			1.00	1.00
Incremental Delay, d2					5.9	0.1	0.2	1.3			7.6	0.2
Delay (s)					29.9	17.3	14.3	15.7			29.2	0.2
Level of Service					C	B	B	B			C	A
Approach Delay (s)		0.0			27.5			15.6			22.3	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	22.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	120.4%	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												
Traffic Volume (vph)	175	5	60	0	0	0	0	285	520	130	865	0
Future Volume (vph)	175	5	60	0	0	0	0	285	520	130	865	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0	4.0					4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00					1.00		1.00	1.00	
Frpb, ped/bikes		1.00	1.00					0.96		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.91		1.00	1.00	
Flt Protected		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1531	1365					1502		1630	1716	
Flt Permitted		0.95	1.00					1.00		0.17	1.00	
Satd. Flow (perm)		1531	1365					1502		296	1716	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	188	5	65	0	0	0	0	306	559	140	930	0
RTOR Reduction (vph)	0	0	54	0	0	0	0	71	0	0	0	0
Lane Group Flow (vph)	0	193	11	0	0	0	0	794	0	140	930	0
Confl. Peds. (#/hr)							4		15	15		4
Confl. Bikes (#/hr)									4			4
Heavy Vehicles (%)	9%	9%	9%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Split	NA	Perm					NA		pm+pt	NA	
Protected Phases	8	8						6		5	2	
Permitted Phases			8							2		
Actuated Green, G (s)		14.6	14.6					56.9		66.4	66.4	
Effective Green, g (s)		15.1	15.1					57.4		66.4	66.9	
Actuated g/C Ratio		0.17	0.17					0.64		0.74	0.74	
Clearance Time (s)		4.5	4.5					4.5		4.0	4.5	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		256	229					957		299	1275	
v/s Ratio Prot		c0.13						c0.53		0.03	c0.54	
v/s Ratio Perm			0.01							0.32		
v/c Ratio		0.75	0.05					0.83		0.47	0.73	
Uniform Delay, d1		35.7	31.4					12.5		10.0	6.5	
Progression Factor		1.00	1.00					1.00		1.79	1.08	
Incremental Delay, d2		11.9	0.1					8.3		0.9	2.8	
Delay (s)		47.5	31.5					20.8		18.9	9.8	
Level of Service		D	C					C		B	A	
Approach Delay (s)		43.5			0.0			20.8			10.9	
Approach LOS		D			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	18.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	120.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Revised Land Use Framework – July 2017 Financially Constrained HCM Reports

HCM Unsignalized Intersection Capacity Analysis
26: Cascade Ave & Westcliff Dr

PM Peak Hour

Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Traffic Volume (veh/h)	5	90	30	10	90	15
Future Volume (Veh/h)	5	90	30	10	90	15
Sign Control	Yield			Stop	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	100	33	11	100	17
Pedestrians	10			10		
Lane Width (ft)	12.0			12.0		
Walking Speed (ft/s)	4.0			4.0		
Percent Blockage	1			1		
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	220	10	313	220	10	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	220	10	313	220	10	
tC, single (s)	6.5	6.2	7.2	6.6	4.1	
tC, 2 stage (s)						
tF (s)	4.0	3.3	3.6	4.1	2.2	
p0 queue free %	99	91	94	98	94	
cM capacity (veh/h)	625	1062	520	610	1596	

Direction, Lane #	EB 1	WB 1	NW 1	NW 2
Volume Total	106	44	100	17
Volume Left	0	33	100	0
Volume Right	100	0	0	17
cSH	1022	540	1596	1700
Volume to Capacity	0.10	0.08	0.06	0.01
Queue Length 95th (ft)	9	7	5	0
Control Delay (s)	8.9	12.3	7.4	0.0
Lane LOS	A	B	A	
Approach Delay (s)	8.9	12.3	6.3	
Approach LOS	A	B		

Intersection Summary			
Average Delay	8.3		
Intersection Capacity Utilization	23.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
3: Mt Adams Ave & Cascade Ave

PM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	545	495	270	650	520	315
Future Volume (vph)	545	495	270	650	520	315
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		0.99	0.95	1.00
Satd. Flow (prot)	1699	1425		1674	1630	1397
Flt Permitted	1.00	1.00		0.41	0.95	1.00
Satd. Flow (perm)	1699	1425		689	1630	1397
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	606	550	300	722	578	350
RTOR Reduction (vph)	0	0	0	0	0	144
Lane Group Flow (vph)	606	550	0	1022	578	206
Confl. Peds. (#/hr)			10			10
Confl. Bikes (#/hr)		5				5
Heavy Vehicles (%)	3%	3%	3%	3%	2%	2%
Turn Type	NA	Free	pm+pt	NA	Prot	pm+ov
Protected Phases	6		5	2	4	5
Permitted Phases		Free	2			4
Actuated Green, G (s)	48.0	90.0		58.0	24.0	30.0
Effective Green, g (s)	48.0	90.0		58.0	24.0	30.0
Actuated g/C Ratio	0.53	1.00		0.64	0.27	0.33
Clearance Time (s)	4.0			4.0	4.0	4.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	906	1425		509	434	527
v/s Ratio Prot	0.36			c0.13	c0.35	0.03
v/s Ratio Perm		0.39		c1.16		0.12
v/c Ratio	0.67	0.39		2.01	1.33	0.39
Uniform Delay, d1	15.2	0.0		16.0	33.0	23.0
Progression Factor	1.00	1.00		1.01	0.77	0.59
Incremental Delay, d2	1.9	0.8		459.2	162.2	0.4
Delay (s)	17.1	0.8		475.4	187.8	14.0
Level of Service	B	A		F	F	B
Approach Delay (s)	9.4			475.4	122.3	
Approach LOS	A			F	F	

Intersection Summary			
HCM 2000 Control Delay	196.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.88		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	125.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	45	10	20	5	25	45	30	295	5	15	215	70
Future Vol, veh/h	45	10	20	5	25	45	30	295	5	15	215	70
Conflicting Peds, #/hr	10	0	10	0	0	0	10	0	0	0	0	10
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	92	93	92	92	92	93	93	92	92	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	48	11	22	5	27	49	32	317	5	16	231	75

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	743	698	289	712	733	330	316	0	0	323	0	0
Stage 1	311	311	-	384	384	-	-	-	-	-	-	-
Stage 2	432	387	-	328	349	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	331	364	750	347	348	712	1244	-	-	1237	-	-
Stage 1	699	658	-	639	611	-	-	-	-	-	-	-
Stage 2	602	610	-	685	633	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	274	344	738	314	329	706	1234	-	-	1227	-	-
Mov Cap-2 Maneuver	274	344	-	314	329	-	-	-	-	-	-	-
Stage 1	671	642	-	619	591	-	-	-	-	-	-	-
Stage 2	513	590	-	638	618	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.9	14	0.7	0.4
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1234	-	-	340	482	1227	-	-
HCM Lane V/C Ratio	0.026	-	-	0.238	0.169	0.013	-	-
HCM Control Delay (s)	8	0	-	18.9	14	8	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.9	0.6	0	-	-

Intersection	
Int Delay, s/veh	4.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	205	5	100	175	10	165
Future Vol, veh/h	205	5	100	175	10	165
Conflicting Peds, #/hr	0	10	10	0	10	10
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	4	4	5	5	5	5
Mvmt Flow	228	6	111	194	11	183

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	243	0	668	251
Stage 1	-	-	-	-	241	-
Stage 2	-	-	-	-	427	-
Critical Hdwy	-	-	4.15	-	6.45	6.25
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	2.245	-	3.545	3.345
Pot Cap-1 Maneuver	-	-	1306	-	419	780
Stage 1	-	-	-	-	792	-
Stage 2	-	-	-	-	652	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1295	-	372	767
Mov Cap-2 Maneuver	-	-	-	-	372	-
Stage 1	-	-	-	-	785	-
Stage 2	-	-	-	-	584	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.9	11.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	723	-	-	1295	-
HCM Lane V/C Ratio	0.269	-	-	0.086	-
HCM Control Delay (s)	11.8	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1.1	-	-	0.3	-

HCM Signalized Intersection Capacity Analysis
10: May St. & Alignment D

PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	100	80	80	135	235	5
Future Volume (vph)	100	80	80	135	235	5
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0	4.0		4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00	0.97		1.00	0.95
Flpb, ped/bikes		0.99	1.00		1.00	1.00
Frt		1.00	0.92		1.00	0.85
Flt Protected		0.97	1.00		0.95	1.00
Satd. Flow (prot)		1654	1515		1630	1385
Flt Permitted		0.47	1.00		0.95	1.00
Satd. Flow (perm)		807	1515		1630	1385
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	109	87	87	147	255	5
RTOR Reduction (vph)	0	0	97	0	0	2
Lane Group Flow (vph)	0	196	137	0	255	3
Confl. Peds. (#/hr)	10			10	10	10
Confl. Bikes (#/hr)				5		5
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Actuated Green, G (s)		19.9	19.9		62.1	62.1
Effective Green, g (s)		19.9	19.9		62.1	62.1
Actuated g/C Ratio		0.22	0.22		0.69	0.69
Clearance Time (s)		4.0	4.0		4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		178	334		1124	955
v/s Ratio Prot			0.09		c0.16	
v/s Ratio Perm		c0.24				0.00
v/c Ratio		1.10	0.41		0.23	0.00
Uniform Delay, d1		35.0	30.0		5.1	4.3
Progression Factor		1.01	1.00		2.17	2.39
Incremental Delay, d2		97.1	0.8		0.4	0.0
Delay (s)		132.6	30.9		11.6	10.4
Level of Service		F	C		B	B
Approach Delay (s)		132.6	30.9		11.6	
Approach LOS		F	C		B	

Intersection Summary			
HCM 2000 Control Delay	52.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	20	5	35	45	5	5	145	40	110	265	40
Future Vol, veh/h	5	20	5	35	45	5	5	145	40	110	265	40
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	22	5	38	49	5	5	158	43	120	288	43

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	786	781	330	773	781	199	342	0	0	211	0	0
Stage 1	559	559	-	200	200	-	-	-	-	-	-	-
Stage 2	227	222	-	573	581	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	310	326	712	316	326	842	1217	-	-	1360	-	-
Stage 1	513	511	-	802	736	-	-	-	-	-	-	-
Stage 2	776	720	-	505	500	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	240	284	700	265	284	828	1207	-	-	1349	-	-
Mov Cap-2 Maneuver	240	284	-	265	284	-	-	-	-	-	-	-
Stage 1	506	451	-	791	726	-	-	-	-	-	-	-
Stage 2	709	710	-	421	441	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.2	23.4	0.2	2.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1207	-	-	305	287	1349	-	-
HCM Lane V/C Ratio	0.005	-	-	0.107	0.322	0.089	-	-
HCM Control Delay (s)	8	0	-	18.2	23.4	7.9	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.4	1.3	0.3	-	-

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	165	5	25	95	30	5	10	10	35	10	5
Future Vol, veh/h	5	165	5	25	95	30	5	10	10	35	10	5
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	179	5	27	103	33	5	11	11	38	11	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	146	0	0	195	0	0	395	403	202	398	390	140
Stage 1	-	-	-	-	-	-	203	203	-	184	184	-
Stage 2	-	-	-	-	-	-	192	200	-	214	206	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1436	-	-	1378	-	-	565	536	839	562	545	908
Stage 1	-	-	-	-	-	-	799	733	-	818	747	-
Stage 2	-	-	-	-	-	-	810	736	-	788	731	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1424	-	-	1367	-	-	533	514	825	526	523	893
Mov Cap-2 Maneuver	-	-	-	-	-	-	533	514	-	526	523	-
Stage 1	-	-	-	-	-	-	789	724	-	808	725	-
Stage 2	-	-	-	-	-	-	770	715	-	757	722	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	1.3	11.2	12.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	610	1424	-	-	1367	-	-	548
HCM Lane V/C Ratio	0.045	0.004	-	-	0.02	-	-	0.099
HCM Control Delay (s)	11.2	7.5	0	-	7.7	0	-	12.3
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0.3

Intersection	
Int Delay, s/veh	5.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	125	70	140	180	75	155
Future Vol, veh/h	125	70	140	180	75	155
Conflicting Peds, #/hr	10	10	0	10	10	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	136	76	152	196	82	168

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	602	270	0	0	358	0
Stage 1	260	-	-	-	-	-
Stage 2	342	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	463	769	-	-	1201	-
Stage 1	783	-	-	-	-	-
Stage 2	719	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	421	756	-	-	1191	-
Mov Cap-2 Maneuver	421	-	-	-	-	-
Stage 1	776	-	-	-	-	-
Stage 2	659	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	17.4	0	2.7
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	501	1191	-
HCM Lane V/C Ratio	-	-	0.423	0.068	-
HCM Control Delay (s)	-	-	17.4	8.2	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	2.1	0.2	-

HCM Signalized Intersection Capacity Analysis
15: Rand Rd & Cascade Ave

PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	385	300	305	495	70	180	50	60	80	185	50
Future Volume (vph)	50	385	300	305	495	70	180	50	60	80	185	50
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	0.99		1.00	0.97		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.98	1.00		0.98	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.92		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1627	1716	1382	1614	1657		1604	1530		1592	1642	
Flt Permitted	0.29	1.00	1.00	0.28	1.00		0.47	1.00		0.67	1.00	
Satd. Flow (perm)	493	1716	1382	481	1657		800	1530		1121	1642	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	56	428	333	339	550	78	200	56	67	89	206	56
RTOR Reduction (vph)	0	0	205	0	6	0	0	45	0	0	11	0
Lane Group Flow (vph)	56	428	128	339	622	0	200	78	0	89	251	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2			4			8		
Actuated Green, G (s)	38.6	34.6	34.6	52.0	44.0		30.0	30.0		30.0	30.0	
Effective Green, g (s)	38.6	34.6	34.6	52.0	44.0		30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.43	0.38	0.38	0.58	0.49		0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	261	659	531	446	810		266	510		373	547	
v/s Ratio Prot	0.01	0.25		c0.11	c0.38			0.05			0.15	
v/s Ratio Perm	0.08		0.09	0.33			c0.25			0.08		
v/c Ratio	0.21	0.65	0.24	0.76	0.77		0.75	0.15		0.24	0.46	
Uniform Delay, d1	16.0	22.7	18.8	12.9	18.8		26.7	21.1		21.7	23.6	
Progression Factor	0.92	1.12	3.19	1.00	1.00		0.96	0.86		1.00	1.00	
Incremental Delay, d2	0.3	3.9	0.8	7.5	6.9		17.7	0.6		0.3	0.6	
Delay (s)	15.0	29.2	60.9	20.3	25.7		43.3	18.7		22.1	24.2	
Level of Service	B	C	E	C	C		D	B		C	C	
Approach Delay (s)		41.2			23.8			34.0			23.7	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	9.8

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	35	570	0	0	375	800	15	0	355	0	0	0
Future Vol, veh/h	35	570	0	0	375	800	15	0	355	0	0	0
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	-	-	-	-	-	50	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	3	3	3	2	2	2	3	3	3
Mvmt Flow	39	633	0	0	417	889	17	0	394	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	427	0	-	-	-	0	1138	1138	643
Stage 1	-	-	-	-	-	-	711	711	-
Stage 2	-	-	-	-	-	-	427	427	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1132	-	0	0	-	-	223	201	473
Stage 1	-	-	0	0	-	-	487	436	-
Stage 2	-	-	0	0	-	-	658	585	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1123	-	-	-	-	-	209	0	469
Mov Cap-2 Maneuver	-	-	-	-	-	-	209	0	-
Stage 1	-	-	-	-	-	-	461	0	-
Stage 2	-	-	-	-	-	-	653	0	-

Approach	SE	NW	NE
HCM Control Delay, s	0.5	0	56
HCM LOS			F

Minor Lane/Major Mvmt	NELn1	NWT	NWR	SEL	SET
Capacity (veh/h)	446	-	-	1123	-
HCM Lane V/C Ratio	0.922	-	-	0.035	-
HCM Control Delay (s)	56	-	-	8.3	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	10.4	-	-	0.1	-

Intersection	
Int Delay, s/veh	88.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	140	260	5	10	440	115	5	50	15	90	50	150
Future Vol, veh/h	140	260	5	10	440	115	5	50	15	90	50	150
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	20	20	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	3	3	3	2	2	2	8	8	8	2	2	2
Mvmt Flow	151	280	5	11	473	124	5	54	16	97	54	161

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	607	0	0	295	0	0	1267	1221	312	1204	1162	555
Stage 1	-	-	-	-	-	-	593	593	-	566	566	-
Stage 2	-	-	-	-	-	-	674	628	-	638	596	-
Critical Hdwy	4.13	-	-	4.12	-	-	7.18	6.58	6.28	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.18	5.58	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.18	5.58	-	6.12	5.52	-
Follow-up Hdwy	2.227	-	-	2.218	-	-	3.572	4.072	3.372	3.518	4.018	3.318
Pot Cap-1 Maneuver	966	-	-	1266	-	-	141	175	714	161	195	531
Stage 1	-	-	-	-	-	-	482	484	-	509	507	-
Stage 2	-	-	-	-	-	-	435	467	-	465	492	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	958	-	-	1245	-	-	60	138	696	~ 92	154	522
Mov Cap-2 Maneuver	-	-	-	-	-	-	60	138	-	~ 92	154	-
Stage 1	-	-	-	-	-	-	389	390	-	410	496	-
Stage 2	-	-	-	-	-	-	262	457	-	313	397	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	3.3	0.1	51	$ 387.8
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	150	958	-	-	1245	-	-	182
HCM Lane V/C Ratio	0.502	0.157	-	-	0.009	-	-	1.713
HCM Control Delay (s)	51	9.5	0	-	7.9	0	-	$ 387.8
HCM Lane LOS	F	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	2.4	0.6	-	-	0	-	-	21.6

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	394.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	510	0	35	0	95	25	320	70	0
Future Vol, veh/h	0	0	0	510	0	35	0	95	25	320	70	0
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	5	5	5
Mvmt Flow	0	0	0	567	0	39	0	106	28	356	78	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	918	932	88	-	0	0	143	0	0
Stage 1	789	789	-	-	-	-	-	-	-
Stage 2	129	143	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	-	-	-	4.15	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	-	-	-	2.245	-	-
Pot Cap-1 Maneuver	~ 302	266	970	0	-	-	1421	-	0
Stage 1	~ 448	402	-	0	-	-	-	-	0
Stage 2	897	779	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	~ 222	0	962	-	-	-	1409	-	-
Mov Cap-2 Maneuver	~ 222	0	-	-	-	-	-	-	-
Stage 1	~ 330	0	-	-	-	-	-	-	-
Stage 2	897	0	-	-	-	-	-	-	-

Approach	WB	SE	NW
HCM Control Delay, s	$ 759.2	0	6.9
HCM LOS	F		

Minor Lane/Major Mvmt	NWL	NWT	WBLn1	SET	SER
Capacity (veh/h)	1409	-	234	-	-
HCM Lane V/C Ratio	0.252	-	2.588	-	-
HCM Control Delay (s)	8.4	0	$ 759.2	-	-
HCM Lane LOS	A	A	F	-	-
HCM 95th %tile Q(veh)	1	-	50.9	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	145	160	230	160	5	5	10	135	0	25	55
Future Vol, veh/h	10	145	160	230	160	5	5	10	135	0	25	55
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	158	174	250	174	5	5	11	147	0	27	60

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	189	0	0	342	0	0	1006	965	265	1042	1050	197
Stage 1	-	-	-	-	-	-	276	276	-	687	687	-
Stage 2	-	-	-	-	-	-	730	689	-	355	363	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1385	-	-	1217	-	-	220	255	774	208	227	844
Stage 1	-	-	-	-	-	-	730	682	-	437	447	-
Stage 2	-	-	-	-	-	-	414	446	-	662	625	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1373	-	-	1207	-	-	145	191	761	129	170	830
Mov Cap-2 Maneuver	-	-	-	-	-	-	145	191	-	129	170	-
Stage 1	-	-	-	-	-	-	717	670	-	429	341	-
Stage 2	-	-	-	-	-	-	270	341	-	516	614	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	5.1	13.9	17.5
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	568	1373	-	-	1207	-	-	375
HCM Lane V/C Ratio	0.287	0.008	-	-	0.207	-	-	0.232
HCM Control Delay (s)	13.9	7.6	0	-	8.8	0	-	17.5
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1.2	0	-	-	0.8	-	-	0.9

HCM Signalized Intersection Capacity Analysis
4: 2nd Street & I-84 WB Ramp

PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	465	5	105	35	425	0	0	555	135
Future Volume (vph)	0	0	0	465	5	105	35	425	0	0	555	135
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	3.5
Lane Util. Factor					1.00	1.00	1.00	1.00			1.00	1.00
Frpb, ped/bikes					1.00	1.00	1.00	1.00			1.00	0.99
Flpb, ped/bikes					1.00	1.00	1.00	1.00			1.00	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1651	1473	1599	1683			1683	1411
Flt Permitted					0.95	1.00	0.19	1.00			1.00	1.00
Satd. Flow (perm)					1651	1473	312	1683			1683	1411
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	0	0	495	5	112	37	452	0	0	590	144
RTOR Reduction (vph)	0	0	0	0	0	68	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	500	44	37	452	0	0	590	144
Confl. Peds. (#/hr)							5		12	12		5
Confl. Bikes (#/hr)									3			
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	4%	4%	4%	4%	4%	4%
Turn Type				Split	NA	Perm	pm+pt	NA			NA	Free
Protected Phases				4	4		1	6			2	
Permitted Phases						4	6					Free
Actuated Green, G (s)					34.6	34.6	46.4	46.4			38.7	90.0
Effective Green, g (s)					35.1	35.1	46.4	46.9			39.2	90.0
Actuated g/C Ratio					0.39	0.39	0.52	0.52			0.44	1.00
Clearance Time (s)					4.5	4.5	4.0	4.5			4.5	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					643	574	213	877			733	1411
v/s Ratio Prot					c0.30		0.01	c0.27			c0.35	
v/s Ratio Perm						0.03	0.08					0.10
v/c Ratio					0.78	0.08	0.17	0.52			0.80	0.10
Uniform Delay, d1					24.0	17.3	14.4	14.1			22.1	0.0
Progression Factor					1.00	1.00	0.98	1.00			1.00	1.00
Incremental Delay, d2					5.9	0.1	0.2	1.3			9.2	0.1
Delay (s)					29.9	17.3	14.3	15.4			31.2	0.1
Level of Service					C	B	B	B			C	A
Approach Delay (s)		0.0			27.6			15.3			25.1	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	23.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	120.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: 2nd Street & I-84 EB Ramp

PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	5	165	0	0	0	0	275	500	130	890	0
Future Volume (vph)	185	5	165	0	0	0	0	275	500	130	890	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0	4.0					4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00					1.00		1.00	1.00	
Frpb, ped/bikes		1.00	1.00					0.96		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.91		1.00	1.00	
Flt Protected		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1531	1365					1502		1630	1716	
Flt Permitted		0.95	1.00					1.00		0.19	1.00	
Satd. Flow (perm)		1531	1365					1502		324	1716	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	199	5	177	0	0	0	0	296	538	140	957	0
RTOR Reduction (vph)	0	0	147	0	0	0	0	71	0	0	0	0
Lane Group Flow (vph)	0	204	30	0	0	0	0	763	0	140	957	0
Confl. Peds. (#/hr)							4		15	15		4
Confl. Bikes (#/hr)									4			4
Heavy Vehicles (%)	9%	9%	9%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Split	NA	Perm					NA		pm+pt	NA	
Protected Phases	8	8						6		5	2	
Permitted Phases			8							2		
Actuated Green, G (s)		14.8	14.8					56.8		66.2	66.2	
Effective Green, g (s)		15.3	15.3					57.3		66.2	66.7	
Actuated g/C Ratio		0.17	0.17					0.64		0.74	0.74	
Clearance Time (s)		4.5	4.5					4.5		4.0	4.5	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		260	232					956		316	1271	
v/s Ratio Prot		c0.13						c0.51		0.03	c0.56	
v/s Ratio Perm			0.02							0.30		
v/c Ratio		0.78	0.13					0.80		0.44	0.75	
Uniform Delay, d1		35.8	31.7					12.1		9.2	6.8	
Progression Factor		1.00	1.00					1.00		1.58	1.06	
Incremental Delay, d2		14.3	0.3					6.9		0.7	3.0	
Delay (s)		50.1	32.0					19.0		15.2	10.3	
Level of Service		D	C					B		B	B	
Approach Delay (s)		41.7			0.0			19.0			10.9	
Approach LOS		D			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	120.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Transportation Base Case Mitigated HCM Reports

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	420	820	435	580	550	290
Future Volume (vph)	420	820	435	580	550	290
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1699	1421	1614	1699	3162	1420
Flt Permitted	1.00	1.00	0.28	1.00	0.95	1.00
Satd. Flow (perm)	1699	1421	475	1699	3162	1420
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	467	911	483	644	611	322
RTOR Reduction (vph)	0	0	0	0	0	112
Lane Group Flow (vph)	467	911	483	644	611	210
Confl. Peds. (#/hr)		10	10			10
Confl. Bikes (#/hr)		5				5
Heavy Vehicles (%)	3%	3%	3%	3%	2%	2%
Turn Type	NA	Free	pm+pt	NA	Prot	pm+ov
Protected Phases	6		5	2	4	5
Permitted Phases		Free	2			4
Actuated Green, G (s)	37.9	90.0	61.8	61.8	20.2	40.1
Effective Green, g (s)	37.9	90.0	61.8	61.8	20.2	40.1
Actuated g/C Ratio	0.42	1.00	0.69	0.69	0.22	0.45
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	715	1421	578	1166	709	695
v/s Ratio Prot	0.27		c0.18	0.38	c0.19	0.07
v/s Ratio Perm		0.64	c0.39			0.08
v/c Ratio	0.65	0.64	0.84	0.55	0.86	0.30
Uniform Delay, d1	20.8	0.0	11.0	7.1	33.6	16.0
Progression Factor	1.00	1.00	1.54	1.03	0.73	1.44
Incremental Delay, d2	2.0	2.0	9.0	1.6	7.1	0.2
Delay (s)	22.7	2.0	25.9	9.0	31.7	23.2
Level of Service	C	A	C	A	C	C
Approach Delay (s)	9.0			16.2	28.8	
Approach LOS	A			B	C	

Intersection Summary			
HCM 2000 Control Delay	16.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	50	10	20	5	15	30	30	240	5	30	200	60
Future Vol, veh/h	50	10	20	5	15	30	30	240	5	30	200	60
Conflicting Peds, #/hr	10	0	10	0	0	0	10	0	0	0	0	10
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	92	93	92	92	92	93	93	92	92	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	54	11	22	5	16	33	32	258	5	33	215	65

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	683	651	267	664	680	271	290	0	0	263	0	0
Stage 1	323	323	-	325	325	-	-	-	-	-	-	-
Stage 2	360	328	-	339	355	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	363	388	772	374	373	768	1272	-	-	1301	-	-
Stage 1	689	650	-	687	649	-	-	-	-	-	-	-
Stage 2	658	647	-	676	630	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	314	362	759	336	348	762	1261	-	-	1290	-	-
Mov Cap-2 Maneuver	314	362	-	336	348	-	-	-	-	-	-	-
Stage 1	663	625	-	666	630	-	-	-	-	-	-	-
Stage 2	590	628	-	620	605	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.4	12.8	0.9	0.8
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1261	-	-	375	514	1290	-	-
HCM Lane V/C Ratio	0.026	-	-	0.23	0.106	0.025	-	-
HCM Control Delay (s)	7.9	0	-	17.4	12.8	7.9	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.9	0.4	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	70	5	85	30	30	5	200	45	35	455	15
Future Volume (vph)	55	70	5	85	30	30	5	200	45	35	455	15
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		0.99			0.99		1.00	1.00		1.00	1.00	
Frt		1.00			0.97		1.00	0.97		1.00	1.00	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1656			1583		1630	1653		1630	1705	
Flt Permitted		0.81			0.70		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1365			1139		1630	1653		1630	1705	
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	76	5	92	33	33	5	217	49	38	495	16
RTOR Reduction (vph)	0	2	0	0	12	0	0	7	0	0	1	0
Lane Group Flow (vph)	0	139	0	0	146	0	5	259	0	38	510	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Confl. Bikes (#/hr)			5			5			5			5
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		15.6			15.6		1.2	57.6		4.8	61.2	
Effective Green, g (s)		15.6			15.6		1.2	57.6		4.8	61.2	
Actuated g/C Ratio		0.17			0.17		0.01	0.64		0.05	0.68	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		236			197		21	1057		86	1159	
v/s Ratio Prot							0.00	0.16		c0.02	c0.30	
v/s Ratio Perm		0.10			c0.13							
v/c Ratio		0.59			0.74		0.24	0.25		0.44	0.44	
Uniform Delay, d1		34.3			35.3		43.9	6.9		41.3	6.6	
Progression Factor		0.99			1.00		1.00	1.00		0.58	1.87	
Incremental Delay, d2		3.9			13.5		5.8	0.6		3.1	1.0	
Delay (s)		37.8			48.8		49.7	7.5		26.9	13.3	
Level of Service		D			D		D	A		C	B	
Approach Delay (s)		37.8			48.8			8.2			14.2	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	5.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	185	5	225	220	10	175
Future Vol, veh/h	185	5	225	220	10	175
Conflicting Peds, #/hr	0	10	10	0	10	10
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	4	4	5	5	5	5
Mvmt Flow	206	6	250	244	11	194

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	221	0	972	228
Stage 1	-	-	-	-	218	-
Stage 2	-	-	-	-	754	-
Critical Hdwy	-	-	4.15	-	7.15	6.25
Critical Hdwy Stg 1	-	-	-	-	6.15	-
Critical Hdwy Stg 2	-	-	-	-	6.15	-
Follow-up Hdwy	-	-	2.245	-	3.545	3.345
Pot Cap-1 Maneuver	-	-	1331	-	229	804
Stage 1	-	-	-	-	778	-
Stage 2	-	-	-	-	397	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1320	-	187	791
Mov Cap-2 Maneuver	-	-	-	-	187	-
Stage 1	-	-	-	-	778	-
Stage 2	-	-	-	-	307	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.2	12.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	673	-	-	1320	-
HCM Lane V/C Ratio	0.305	-	-	0.189	-
HCM Control Delay (s)	12.7	-	-	8.4	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1.3	-	-	0.7	-

Intersection	
Int Delay, s/veh	7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	40	5	45	40	55	5	195	35	185	340	20
Future Vol, veh/h	0	40	5	45	40	55	5	195	35	185	340	20
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	200	-	-	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	43	5	49	43	60	5	212	38	201	370	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1096	1064	400	1069	1055	251	401	0	0	260	0	0
Stage 1	793	793	-	252	252	-	-	-	-	-	-	-
Stage 2	303	271	-	817	803	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	191	223	650	199	226	788	1158	-	-	1304	-	-
Stage 1	382	400	-	752	698	-	-	-	-	-	-	-
Stage 2	706	685	-	370	396	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	126	184	639	140	187	775	1148	-	-	1293	-	-
Mov Cap-2 Maneuver	126	184	-	140	187	-	-	-	-	-	-	-
Stage 1	377	335	-	742	689	-	-	-	-	-	-	-
Stage 2	603	676	-	267	332	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	28.7	28.1	0.2	2.8
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1148	-	-	-	200	140	333	1293	-	-
HCM Lane V/C Ratio	0.005	-	-	-	0.245	0.349	0.31	0.156	-	-
HCM Control Delay (s)	8.2	-	-	0	28.7	43.9	20.6	8.3	-	-
HCM Lane LOS	A	-	-	A	D	E	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0.9	1.4	1.3	0.6	-	-

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	240	5	15	145	190	5	15	10	35	10	5
Future Vol, veh/h	10	240	5	15	145	190	5	15	10	35	10	5
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	261	5	16	158	207	5	16	11	38	11	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	374	0	0	276	0	0	607	702	284	612	601	281
Stage 1	-	-	-	-	-	-	295	295	-	303	303	-
Stage 2	-	-	-	-	-	-	312	407	-	309	298	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1184	-	-	1287	-	-	408	362	755	405	414	758
Stage 1	-	-	-	-	-	-	713	669	-	706	664	-
Stage 2	-	-	-	-	-	-	699	597	-	701	667	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1174	-	-	1276	-	-	382	346	742	371	396	745
Mov Cap-2 Maneuver	-	-	-	-	-	-	382	346	-	371	396	-
Stage 1	-	-	-	-	-	-	699	656	-	692	648	-
Stage 2	-	-	-	-	-	-	666	583	-	661	654	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.3	14.1	15.5
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	429	1174	-	-	1276	-	-	396
HCM Lane V/C Ratio	0.076	0.009	-	-	0.013	-	-	0.137
HCM Control Delay (s)	14.1	8.1	0	-	7.9	0	-	15.5
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.5

Intersection	
Int Delay, s/veh	4.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	90	65	135	120	75	170
Future Vol, veh/h	90	65	135	120	75	170
Conflicting Peds, #/hr	10	10	0	10	10	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	98	71	147	130	82	185

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	580	232	0	0	287	0
Stage 1	222	-	-	-	-	-
Stage 2	358	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	477	807	-	-	1275	-
Stage 1	815	-	-	-	-	-
Stage 2	707	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	435	794	-	-	1264	-
Mov Cap-2 Maneuver	435	-	-	-	-	-
Stage 1	808	-	-	-	-	-
Stage 2	651	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.7	0	2.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	537	1264	-
HCM Lane V/C Ratio	-	-	0.314	0.064	-
HCM Control Delay (s)	-	-	14.7	8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1.3	0.2	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	330	165	145	490	70	200	45	60	100	90	80
Future Volume (vph)	40	330	165	145	490	70	200	45	60	100	90	80
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	0.99		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.98	1.00		0.98	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.91		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1628	1716	1383	1608	1656		1598	1521		1591	1555	
Flt Permitted	0.27	1.00	1.00	0.39	1.00		0.57	1.00		0.68	1.00	
Satd. Flow (perm)	461	1716	1383	654	1656		965	1521		1135	1555	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	44	367	183	161	544	78	222	50	67	111	100	89
RTOR Reduction (vph)	0	0	101	0	6	0	0	45	0	0	35	0
Lane Group Flow (vph)	44	367	82	161	617	0	222	72	0	111	154	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2			4			8		
Actuated Green, G (s)	43.2	40.2	40.2	52.0	45.0		30.0	30.0		30.0	30.0	
Effective Green, g (s)	43.2	40.2	40.2	52.0	45.0		30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.48	0.45	0.45	0.58	0.50		0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	260	766	617	460	828		321	507		378	518	
v/s Ratio Prot	0.01	0.21		c0.03	c0.37			0.05			0.10	
v/s Ratio Perm	0.08		0.06	0.17			c0.23			0.10		
v/c Ratio	0.17	0.48	0.13	0.35	0.74		0.69	0.14		0.29	0.30	
Uniform Delay, d1	13.8	17.5	14.6	10.0	17.9		26.0	21.0		22.2	22.2	
Progression Factor	0.52	0.89	2.08	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	1.8	0.4	0.5	6.0		11.6	0.6		0.4	0.3	
Delay (s)	7.4	17.5	30.9	10.5	23.9		37.6	21.6		22.6	22.5	
Level of Service	A	B	C	B	C		D	C		C	C	
Approach Delay (s)		20.9			21.2			32.1			22.5	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	35	760	0	0	380	730	20	0	355	0	0	0
Future Volume (vph)	35	760	0	0	380	730	20	0	355	0	0	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0	4.0			
Lane Util. Factor	1.00	0.95			1.00	1.00		1.00	1.00			
Frpb, ped/bikes	1.00	1.00			1.00	0.95		1.00	0.97			
Flpb, ped/bikes	1.00	1.00			1.00	1.00		0.98	1.00			
Frt	1.00	1.00			1.00	0.85		1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (prot)	1630	3260			1699	1371		1602	1410			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	1630	3260			1699	1371		1602	1410			
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	39	844	0	0	422	811	22	0	394	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	317	0	0	137	0	0	0
Lane Group Flow (vph)	39	844	0	0	422	494	0	22	257	0	0	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	2%	2%	2%	3%	3%	3%
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	1	6			2			4				
Permitted Phases						2	4		4			
Actuated Green, G (s)	3.2	62.0			54.8	54.8		20.0	20.0			
Effective Green, g (s)	3.2	62.0			54.8	54.8		20.0	20.0			
Actuated g/C Ratio	0.04	0.69			0.61	0.61		0.22	0.22			
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	57	2245			1034	834		356	313			
v/s Ratio Prot	c0.02	0.26			0.25							
v/s Ratio Perm						c0.36		0.01	c0.18			
v/c Ratio	0.68	0.38			0.41	0.59		0.06	0.82			
Uniform Delay, d1	42.9	5.9			9.2	10.8		27.6	33.3			
Progression Factor	1.00	1.00			0.83	3.71		1.00	1.00			
Incremental Delay, d2	28.9	0.5			0.9	2.2		0.1	15.7			
Delay (s)	71.8	6.4			8.5	42.2		27.7	49.1			
Level of Service	E	A			A	D		C	D			
Approach Delay (s)		9.2			30.7			47.9			0.0	
Approach LOS		A			C			D			A	

Intersection Summary			
HCM 2000 Control Delay	26.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	101.9%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	195	5	10	200	35	5	210	15	160	65	130
Future Volume (vph)	75	195	5	10	200	35	5	210	15	160	65	130
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.99			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Frt		1.00			0.98			0.99			0.95	
Flt Protected		0.99			1.00			1.00			0.98	
Satd. Flow (prot)		1667			1669			1599			1560	
Flt Permitted		0.87			0.98			0.99			0.78	
Satd. Flow (perm)		1467			1645			1590			1244	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	81	210	5	11	215	38	5	226	16	172	70	140
RTOR Reduction (vph)	0	1	0	0	7	0	0	3	0	0	27	0
Lane Group Flow (vph)	0	295	0	0	257	0	0	244	0	0	355	0
Confl. Peds. (#/hr)	10		10	10		10	10		20	20		10
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	8%	8%	8%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		15.9			15.9			20.3			20.3	
Effective Green, g (s)		15.9			15.9			20.3			20.3	
Actuated g/C Ratio		0.36			0.36			0.46			0.46	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		527			591			730			571	
v/s Ratio Prot												
v/s Ratio Perm		c0.20			0.16			0.15			c0.29	
v/c Ratio		0.56			0.43			0.33			0.62	
Uniform Delay, d1		11.3			10.7			7.6			9.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.4			0.5			0.3			2.1	
Delay (s)		12.7			11.3			7.9			11.2	
Level of Service		B			B			A			B	
Approach Delay (s)		12.7			11.3			7.9			11.2	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM 2000 Control Delay	10.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	44.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	0	0	0	705	0	45	0	100	20	315	75	0
Future Volume (vph)	0	0	0	705	0	45	0	100	20	315	75	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)				4.0	4.0	4.0		4.0		4.0	4.0	
Lane Util. Factor				0.95	0.95	1.00		0.95		1.00	1.00	
Frpb, ped/bikes				1.00	1.00	0.97		1.00		1.00	1.00	
Flpb, ped/bikes				0.99	0.99	1.00		1.00		0.99	1.00	
Frt				1.00	1.00	0.85		0.98		1.00	1.00	
Flt Protected				0.95	0.95	1.00		1.00		0.95	1.00	
Satd. Flow (prot)				1527	1527	1416		3167		1575	1667	
Flt Permitted				0.95	0.95	1.00		1.00		0.56	1.00	
Satd. Flow (perm)				1527	1527	1416		3167		932	1667	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	783	0	50	0	111	22	350	83	0
RTOR Reduction (vph)	0	0	0	0	0	35	0	14	0	0	0	0
Lane Group Flow (vph)	0	0	0	391	392	15	0	119	0	350	83	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	5%	5%	5%
Turn Type				Perm	NA	Perm		NA		pm+pt	NA	
Protected Phases					8			7 6		5	2	
Permitted Phases				8		8				2		
Actuated Green, G (s)				22.0	22.0	22.0		27.7		36.6	36.6	
Effective Green, g (s)				22.0	22.0	22.0		27.7		36.6	36.6	
Actuated g/C Ratio				0.30	0.30	0.30		0.38		0.50	0.50	
Clearance Time (s)				4.0	4.0	4.0				4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0				3.0	3.0	
Lane Grp Cap (vph)				460	460	426		1201		566	835	
v/s Ratio Prot								c0.04		c0.10	0.05	
v/s Ratio Perm				0.26	0.26	0.01				c0.21		
v/c Ratio				0.85	0.85	0.04		0.10		0.62	0.10	
Uniform Delay, d1				24.0	24.0	18.0		14.6		11.8	9.6	
Progression Factor				1.00	1.00	1.00		1.20		1.00	1.00	
Incremental Delay, d2				13.7	14.1	0.0		0.0		2.0	0.2	
Delay (s)				37.7	38.1	18.0		17.6		13.8	9.8	
Level of Service				D	D	B		B		B	A	
Approach Delay (s)		0.0			36.7			17.6			13.1	
Approach LOS		A			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	27.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	5	80	20	10	95	20
Future Volume (vph)	5	80	20	10	95	20
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		0.97	0.95	1.00
Satd. Flow (prot)	1716	1456		1512	1630	1391
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	1716	1456		1562	1630	1391
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	89	22	11	106	22
RTOR Reduction (vph)	0	60	0	0	0	11
Lane Group Flow (vph)	6	29	0	33	106	11
Confl. Peds. (#/hr)					10	10
Confl. Bikes (#/hr)		5				5
Heavy Vehicles (%)	2%	2%	12%	12%	2%	2%
Turn Type	NA	custom	Perm	NA	Prot	Perm
Protected Phases	7	6		7	2 8	
Permitted Phases		7	7			2
Actuated Green, G (s)	2.4	23.7		2.4	62.6	36.6
Effective Green, g (s)	2.4	23.7		2.4	62.6	36.6
Actuated g/C Ratio	0.03	0.32		0.03	0.86	0.50
Clearance Time (s)	4.0	4.0		4.0		4.0
Vehicle Extension (s)	3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	56	552		51	1397	697
v/s Ratio Prot	0.00	0.02			c0.07	
v/s Ratio Perm		0.00		c0.02		0.01
v/c Ratio	0.11	0.05		0.65	0.08	0.02
Uniform Delay, d1	34.3	16.9		34.9	0.8	9.1
Progression Factor	1.00	1.00		1.00	0.70	0.18
Incremental Delay, d2	0.8	0.0		24.8	0.0	0.0
Delay (s)	35.1	17.0		59.7	0.6	1.7
Level of Service	D	B		E	A	A
Approach Delay (s)	18.1			59.7	0.8	
Approach LOS	B			E	A	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.11		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	28.4%	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												
Traffic Volume (vph)	0	0	0	450	5	110	35	425	0	0	485	210
Future Volume (vph)	0	0	0	450	5	110	35	425	0	0	485	210
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	3.5
Lane Util. Factor					1.00	1.00	1.00	1.00			1.00	1.00
Frpb, ped/bikes					1.00	1.00	1.00	1.00			1.00	0.99
Flpb, ped/bikes					1.00	1.00	1.00	1.00			1.00	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1651	1473	1599	1683			1683	1411
Flt Permitted					0.95	1.00	0.25	1.00			1.00	1.00
Satd. Flow (perm)					1651	1473	425	1683			1683	1411
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	0	0	479	5	117	37	452	0	0	516	223
RTOR Reduction (vph)	0	0	0	0	0	72	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	484	45	37	452	0	0	516	223
Confl. Peds. (#/hr)							5		12	12		5
Confl. Bikes (#/hr)									3			
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	4%	4%	4%	4%	4%	4%
Turn Type				Split	NA	Perm	pm+pt	NA			NA	Free
Protected Phases				4	4		1	6			2	
Permitted Phases						4	6					Free
Actuated Green, G (s)					33.8	33.8	47.2	47.2			39.3	90.0
Effective Green, g (s)					34.3	34.3	47.2	47.7			39.8	90.0
Actuated g/C Ratio					0.38	0.38	0.52	0.53			0.44	1.00
Clearance Time (s)					4.5	4.5	4.0	4.5			4.5	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					629	561	273	891			744	1411
v/s Ratio Prot					c0.29		0.01	c0.27			c0.31	
v/s Ratio Perm						0.03	0.06					0.16
v/c Ratio					0.77	0.08	0.14	0.51			0.69	0.16
Uniform Delay, d1					24.4	17.8	12.8	13.6			20.2	0.0
Progression Factor					1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2					5.7	0.1	0.1	1.3			5.3	0.2
Delay (s)					30.0	17.8	12.9	14.9			25.5	0.2
Level of Service					C	B	B	B			C	A
Approach Delay (s)		0.0			27.7			14.8			17.9	
Approach LOS		A			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	115.3%	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												
Traffic Volume (vph)	175	5	145	0	0	0	0	280	500	130	800	0
Future Volume (vph)	175	5	145	0	0	0	0	280	500	130	800	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0	4.0					4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00					1.00		1.00	1.00	
Frpb, ped/bikes		1.00	1.00					0.96		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.91		1.00	1.00	
Flt Protected		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1531	1365					1503		1630	1716	
Flt Permitted		0.95	1.00					1.00		0.19	1.00	
Satd. Flow (perm)		1531	1365					1503		320	1716	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	188	5	156	0	0	0	0	301	538	140	860	0
RTOR Reduction (vph)	0	0	130	0	0	0	0	70	0	0	0	0
Lane Group Flow (vph)	0	193	26	0	0	0	0	769	0	140	860	0
Confl. Peds. (#/hr)							4		15	15		4
Confl. Bikes (#/hr)									4			4
Heavy Vehicles (%)	9%	9%	9%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Split	NA	Perm					NA		pm+pt	NA	
Protected Phases	8	8						6		5	2	
Permitted Phases			8							2		
Actuated Green, G (s)		14.6	14.6					56.9		66.4	66.4	
Effective Green, g (s)		15.1	15.1					57.4		66.4	66.9	
Actuated g/C Ratio		0.17	0.17					0.64		0.74	0.74	
Clearance Time (s)		4.5	4.5					4.5		4.0	4.5	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		256	229					958		316	1275	
v/s Ratio Prot		c0.13						c0.51		0.03	c0.50	
v/s Ratio Perm			0.02							0.30		
v/c Ratio		0.75	0.11					0.80		0.44	0.67	
Uniform Delay, d1		35.7	31.8					12.1		9.3	5.9	
Progression Factor		1.00	1.00					1.00		1.60	1.17	
Incremental Delay, d2		11.9	0.2					7.1		0.8	2.3	
Delay (s)		47.5	32.0					19.2		15.6	9.2	
Level of Service		D	C					B		B	A	
Approach Delay (s)		40.6			0.0			19.2			10.1	
Approach LOS		D			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	115.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Revised Land Use Framework – July 2017 Mitigated HCM Reports

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	555	510	320	655	515	320
Future Volume (vph)	555	510	320	655	515	320
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1699	1421	1614	1699	3162	1413
Flt Permitted	1.00	1.00	0.24	1.00	0.95	1.00
Satd. Flow (perm)	1699	1421	403	1699	3162	1413
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	617	567	356	728	572	356
RTOR Reduction (vph)	0	0	0	0	0	124
Lane Group Flow (vph)	617	567	356	728	572	233
Confl. Peds. (#/hr)		10	10			10
Confl. Bikes (#/hr)		5				5
Heavy Vehicles (%)	3%	3%	3%	3%	2%	2%
Turn Type	NA	Free	pm+pt	NA	Prot	pm+ov
Protected Phases	6		5	2	4	5
Permitted Phases		Free	2			4
Actuated Green, G (s)	46.5	90.0	63.5	63.5	18.5	31.5
Effective Green, g (s)	46.5	90.0	63.5	63.5	18.5	31.5
Actuated g/C Ratio	0.52	1.00	0.71	0.71	0.21	0.35
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	877	1421	459	1198	649	557
v/s Ratio Prot	0.36		c0.11	0.43	c0.18	0.06
v/s Ratio Perm		0.40	c0.43			0.10
v/c Ratio	0.70	0.40	0.78	0.61	0.88	0.42
Uniform Delay, d1	16.5	0.0	10.6	6.8	34.7	22.3
Progression Factor	1.01	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.4	0.8	8.0	2.3	13.3	0.5
Delay (s)	19.2	0.8	18.6	9.1	48.0	22.8
Level of Service	B	A	B	A	D	C
Approach Delay (s)	10.4			12.2	38.3	
Approach LOS	B			B	D	

Intersection Summary			
HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	35	600	0	0	375	805	20	0	350	0	0	0
Future Volume (vph)	35	600	0	0	375	805	20	0	350	0	0	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0	4.0			
Lane Util. Factor	1.00	0.95			1.00	1.00		1.00	1.00			
Frpb, ped/bikes	1.00	1.00			1.00	0.95		1.00	0.96			
Flpb, ped/bikes	1.00	1.00			1.00	1.00		0.98	1.00			
Frt	1.00	1.00			1.00	0.85		1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (prot)	1630	3260			1699	1372		1602	1406			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	1630	3260			1699	1372		1602	1406			
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	39	667	0	0	417	894	22	0	389	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	286	0	0	242	0	0	0
Lane Group Flow (vph)	39	667	0	0	417	608	0	22	147	0	0	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	2%	2%	2%	3%	3%	3%
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	1	6			2			4				
Permitted Phases						2	4		4			
Actuated Green, G (s)	3.3	68.2			60.9	60.9		13.8	13.8			
Effective Green, g (s)	3.3	68.2			60.9	60.9		13.8	13.8			
Actuated g/C Ratio	0.04	0.76			0.68	0.68		0.15	0.15			
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	59	2470			1149	928		245	215			
v/s Ratio Prot	c0.02	0.20			0.25							
v/s Ratio Perm						c0.44		0.01	c0.10			
v/c Ratio	0.66	0.27			0.36	0.65		0.09	0.68			
Uniform Delay, d1	42.8	3.3			6.2	8.4		32.7	36.0			
Progression Factor	1.00	1.00			0.67	3.73		1.00	1.00			
Incremental Delay, d2	24.4	0.3			0.6	2.5		0.2	8.6			
Delay (s)	67.2	3.6			4.8	34.0		32.9	44.7			
Level of Service	E	A			A	C		C	D			
Approach Delay (s)		7.1			24.7			44.0			0.0	
Approach LOS		A			C			D			A	

Intersection Summary			
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	101.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	0	0	0	560	0	40	0	75	25	325	70	0
Future Volume (vph)	0	0	0	560	0	40	0	75	25	325	70	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)				4.0	4.0	4.0		4.0		4.0	4.0	
Lane Util. Factor				0.95	0.95	1.00		0.95		1.00	1.00	
Frpb, ped/bikes				1.00	1.00	0.97		0.99		1.00	1.00	
Flpb, ped/bikes				0.99	0.99	1.00		1.00		0.99	1.00	
Frt				1.00	1.00	0.85		0.96		1.00	1.00	
Flt Protected				0.95	0.95	1.00		1.00		0.95	1.00	
Satd. Flow (prot)				1527	1527	1415		3120		1574	1667	
Flt Permitted				0.95	0.95	1.00		1.00		0.59	1.00	
Satd. Flow (perm)				1527	1527	1415		3120		974	1667	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	622	0	44	0	83	28	361	78	0
RTOR Reduction (vph)	0	0	0	0	0	33	0	16	0	0	0	0
Lane Group Flow (vph)	0	0	0	311	311	11	0	95	0	361	78	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	5%	5%	5%
Turn Type				Perm	NA	Perm		NA		pm+pt	NA	
Protected Phases					8			7 6		5	2	
Permitted Phases				8		8				2		
Actuated Green, G (s)				17.8	17.8	17.8		32.0		40.2	40.2	
Effective Green, g (s)				17.8	17.8	17.8		32.0		40.2	40.2	
Actuated g/C Ratio				0.24	0.24	0.24		0.44		0.55	0.55	
Clearance Time (s)				4.0	4.0	4.0				4.0	4.0	
Vehicle Extension (s)				3.0	3.0	3.0				3.0	3.0	
Lane Grp Cap (vph)				372	372	345		1367		628	917	
v/s Ratio Prot								c0.03		c0.09	0.05	
v/s Ratio Perm				c0.20	0.20	0.01				c0.23		
v/c Ratio				0.84	0.84	0.03		0.07		0.57	0.09	
Uniform Delay, d1				26.2	26.2	21.0		11.9		9.7	7.7	
Progression Factor				1.00	1.00	1.00		1.26		1.00	1.00	
Incremental Delay, d2				14.9	14.9	0.0		0.0		1.3	0.2	
Delay (s)				41.2	41.2	21.1		15.0		11.0	7.9	
Level of Service				D	D	C		B		B	A	
Approach Delay (s)		0.0			39.8			15.0			10.5	
Approach LOS		A			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	27.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	56.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	25	70	30	10	90	20
Future Volume (vph)	25	70	30	10	90	20
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		0.96	0.95	1.00
Satd. Flow (prot)	1716	1456		1506	1630	1392
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	1716	1456		1562	1630	1392
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	28	78	33	11	100	22
RTOR Reduction (vph)	0	48	0	0	0	10
Lane Group Flow (vph)	28	30	0	44	100	12
Confl. Peds. (#/hr)					10	10
Confl. Bikes (#/hr)		5				5
Heavy Vehicles (%)	2%	2%	12%	12%	2%	2%
Turn Type	NA	custom	Perm	NA	Prot	Perm
Protected Phases	7	6		7	2 8	
Permitted Phases		7	7			2
Actuated Green, G (s)	3.0	28.0		3.0	62.0	40.2
Effective Green, g (s)	3.0	28.0		3.0	62.0	40.2
Actuated g/C Ratio	0.04	0.38		0.04	0.85	0.55
Clearance Time (s)	4.0	4.0		4.0		4.0
Vehicle Extension (s)	3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	70	638		64	1384	766
v/s Ratio Prot	0.02	0.02			c0.06	
v/s Ratio Perm		0.00		c0.03		0.01
v/c Ratio	0.40	0.05		0.69	0.07	0.02
Uniform Delay, d1	34.1	14.1		34.5	0.9	7.4
Progression Factor	1.00	1.00		1.00	0.67	0.17
Incremental Delay, d2	3.7	0.0		26.5	0.0	0.0
Delay (s)	37.8	14.2		61.0	0.6	1.3
Level of Service	D	B		E	A	A
Approach Delay (s)	20.4			61.0	0.7	
Approach LOS	C			E	A	

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.11		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	29.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	45	10	20	5	25	35	30	290	5	15	210	65
Future Vol, veh/h	45	10	20	5	25	35	30	290	5	15	210	65
Conflicting Peds, #/hr	10	0	10	0	0	0	10	0	0	0	0	10
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	92	93	92	92	92	93	93	92	92	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	48	11	22	5	27	38	32	312	5	16	226	70

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	725	685	281	699	717	325	306	0	0	317	0	0
Stage 1	303	303	-	379	379	-	-	-	-	-	-	-
Stage 2	422	382	-	320	338	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	340	371	758	354	355	716	1255	-	-	1243	-	-
Stage 1	706	664	-	643	615	-	-	-	-	-	-	-
Stage 2	609	613	-	692	641	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	286	351	745	321	336	710	1245	-	-	1233	-	-
Mov Cap-2 Maneuver	286	351	-	321	336	-	-	-	-	-	-	-
Stage 1	678	648	-	623	596	-	-	-	-	-	-	-
Stage 2	529	594	-	645	625	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.2	14.1	0.7	0.4
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1245	-	-	353	467	1233	-	-
HCM Lane V/C Ratio	0.026	-	-	0.229	0.151	0.013	-	-
HCM Control Delay (s)	8	0	-	18.2	14.1	8	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.9	0.5	0	-	-

Intersection	
Int Delay, s/veh	4.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	205	5	105	200	10	155
Future Vol, veh/h	205	5	105	200	10	155
Conflicting Peds, #/hr	0	10	10	0	10	10
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	4	4	5	5	5	5
Mvmt Flow	228	6	117	222	11	172

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	243	0	707	251
Stage 1	-	-	-	-	241	-
Stage 2	-	-	-	-	466	-
Critical Hdwy	-	-	4.15	-	6.45	6.25
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	2.245	-	3.545	3.345
Pot Cap-1 Maneuver	-	-	1306	-	397	780
Stage 1	-	-	-	-	792	-
Stage 2	-	-	-	-	625	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1295	-	350	767
Mov Cap-2 Maneuver	-	-	-	-	350	-
Stage 1	-	-	-	-	785	-
Stage 2	-	-	-	-	556	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.8	11.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	715	-	-	1295	-
HCM Lane V/C Ratio	0.256	-	-	0.09	-
HCM Control Delay (s)	11.8	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1	-	-	0.3	-

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	100	75	65	140	225	5
Future Volume (vph)	100	75	65	140	225	5
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0	4.0		4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00	0.96		1.00	0.95
Flpb, ped/bikes		0.99	1.00		1.00	1.00
Frt		1.00	0.91		1.00	0.85
Flt Protected		0.97	1.00		0.95	1.00
Satd. Flow (prot)		1652	1499		1630	1385
Flt Permitted		0.49	1.00		0.95	1.00
Satd. Flow (perm)		832	1499		1630	1385
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	109	82	71	152	245	5
RTOR Reduction (vph)	0	0	119	0	0	2
Lane Group Flow (vph)	0	191	104	0	245	3
Confl. Peds. (#/hr)	10			10	10	10
Confl. Bikes (#/hr)				5		5
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Actuated Green, G (s)		19.6	19.6		62.4	62.4
Effective Green, g (s)		19.6	19.6		62.4	62.4
Actuated g/C Ratio		0.22	0.22		0.69	0.69
Clearance Time (s)		4.0	4.0		4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		181	326		1130	960
v/s Ratio Prot			0.07		c0.15	
v/s Ratio Perm		c0.23				0.00
v/c Ratio		1.06	0.32		0.22	0.00
Uniform Delay, d1		35.2	29.6		5.0	4.2
Progression Factor		1.00	1.00		2.12	2.36
Incremental Delay, d2		82.3	0.6		0.4	0.0
Delay (s)		117.5	30.2		11.0	10.0
Level of Service		F	C		B	B
Approach Delay (s)		117.5	30.2		11.0	
Approach LOS		F	C		B	

Intersection Summary			
HCM 2000 Control Delay	48.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	25	5	35	45	5	5	100	75	120	265	40
Future Vol, veh/h	5	25	5	35	45	5	5	100	75	120	265	40
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	27	5	38	49	5	5	109	82	130	288	43

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	779	792	330	767	772	169	342	0	0	200	0	0
Stage 1	581	581	-	170	170	-	-	-	-	-	-	-
Stage 2	198	211	-	597	602	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	313	322	712	319	330	875	1217	-	-	1372	-	-
Stage 1	499	500	-	832	758	-	-	-	-	-	-	-
Stage 2	804	728	-	490	489	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	241	278	700	261	285	860	1207	-	-	1361	-	-
Mov Cap-2 Maneuver	241	278	-	261	285	-	-	-	-	-	-	-
Stage 1	492	437	-	821	748	-	-	-	-	-	-	-
Stage 2	737	718	-	399	428	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.9	23.6	0.2	2.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1207	-	-	297	285	1361	-	-
HCM Lane V/C Ratio	0.005	-	-	0.128	0.324	0.096	-	-
HCM Control Delay (s)	8	0	-	18.9	23.6	7.9	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.4	1.4	0.3	-	-

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	200	5	25	85	190	5	15	10	65	10	5
Future Vol, veh/h	20	200	5	25	85	190	5	15	10	65	10	5
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	217	5	27	92	207	5	16	11	71	11	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	309	0	0	233	0	0	542	637	240	547	536	216
Stage 1	-	-	-	-	-	-	274	274	-	260	260	-
Stage 2	-	-	-	-	-	-	268	363	-	287	276	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1252	-	-	1335	-	-	451	395	799	448	451	824
Stage 1	-	-	-	-	-	-	732	683	-	745	693	-
Stage 2	-	-	-	-	-	-	738	625	-	720	682	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1242	-	-	1324	-	-	417	371	786	406	424	810
Mov Cap-2 Maneuver	-	-	-	-	-	-	417	371	-	406	424	-
Stage 1	-	-	-	-	-	-	711	664	-	724	670	-
Stage 2	-	-	-	-	-	-	697	604	-	673	663	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.6	13.4	15.8
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	461	1242	-	-	1324	-	-	421
HCM Lane V/C Ratio	0.071	0.018	-	-	0.021	-	-	0.207
HCM Control Delay (s)	13.4	8	0	-	7.8	0	-	15.8
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0.1	-	-	0.8

Intersection	
Int Delay, s/veh	5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	115	70	135	170	70	160
Future Vol, veh/h	115	70	135	170	70	160
Conflicting Peds, #/hr	10	10	0	10	10	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	125	76	147	185	76	174

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	585	259	0	0	342	0
Stage 1	249	-	-	-	-	-
Stage 2	336	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	473	780	-	-	1217	-
Stage 1	792	-	-	-	-	-
Stage 2	724	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	433	767	-	-	1207	-
Mov Cap-2 Maneuver	433	-	-	-	-	-
Stage 1	785	-	-	-	-	-
Stage 2	668	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.3	0	2.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	518	1207	-
HCM Lane V/C Ratio	-	-	0.388	0.063	-
HCM Control Delay (s)	-	-	16.3	8.2	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.8	0.2	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	410	280	330	515	70	180	50	60	85	185	65
Future Volume (vph)	50	410	280	330	515	70	180	50	60	85	185	65
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	0.99		1.00	0.97		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00		0.98	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.92		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1627	1716	1382	1614	1658		1606	1530		1592	1626	
Flt Permitted	0.28	1.00	1.00	0.24	1.00		0.45	1.00		0.67	1.00	
Satd. Flow (perm)	481	1716	1382	400	1658		764	1530		1121	1626	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	56	456	311	367	572	78	200	56	67	94	206	72
RTOR Reduction (vph)	0	0	198	0	5	0	0	45	0	0	14	0
Lane Group Flow (vph)	56	456	113	367	645	0	200	78	0	94	264	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2			4			8		
Actuated Green, G (s)	36.7	32.7	32.7	52.0	44.0		30.0	30.0		30.0	30.0	
Effective Green, g (s)	36.7	32.7	32.7	52.0	44.0		30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.41	0.36	0.36	0.58	0.49		0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	247	623	502	437	810		254	510		373	542	
v/s Ratio Prot	0.01	0.27		c0.14	0.39			0.05			0.16	
v/s Ratio Perm	0.08		0.08	c0.34			c0.26			0.08		
v/c Ratio	0.23	0.73	0.23	0.84	0.80		0.79	0.15		0.25	0.49	
Uniform Delay, d1	17.0	24.8	19.9	14.1	19.2		27.1	21.1		21.8	23.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	7.4	1.0	13.3	8.0		21.4	0.6		0.4	0.7	
Delay (s)	17.5	32.3	20.9	27.4	27.2		48.6	21.7		22.2	24.6	
Level of Service	B	C	C	C	C		D	C		C	C	
Approach Delay (s)		27.0			27.3			38.3			24.0	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	28.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	205	5	5	265	30	75	155	15	140	95	270
Future Volume (vph)	130	205	5	5	265	30	75	155	15	140	95	270
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			0.98	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Frt		1.00			0.99			0.99			0.93	
Flt Protected		0.98			1.00			0.98			0.99	
Satd. Flow (prot)		1656			1684			1573			1522	
Flt Permitted		0.72			0.99			0.78			0.84	
Satd. Flow (perm)		1218			1676			1240			1295	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	140	220	5	5	285	32	81	167	16	151	102	290
RTOR Reduction (vph)	0	1	0	0	4	0	0	3	0	0	49	0
Lane Group Flow (vph)	0	364	0	0	318	0	0	261	0	0	494	0
Confl. Peds. (#/hr)	10		10	10		10	10		20	20		10
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	8%	8%	8%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		27.0			27.0			32.5			32.5	
Effective Green, g (s)		27.0			27.0			32.5			32.5	
Actuated g/C Ratio		0.40			0.40			0.48			0.48	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		487			670			597			623	
v/s Ratio Prot												
v/s Ratio Perm		c0.30			0.19			0.21			c0.38	
v/c Ratio		0.75			0.47			0.44			0.79	
Uniform Delay, d1		17.3			15.0			11.5			14.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		6.2			0.5			0.5			6.9	
Delay (s)		23.5			15.5			12.0			21.6	
Level of Service		C			B			B			C	
Approach Delay (s)		23.5			15.5			12.0			21.6	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	67.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	88.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	125	170	245	165	5	5	5	95	0	10	40
Future Vol, veh/h	10	125	170	245	165	5	5	5	95	0	10	40
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	136	185	266	179	5	5	5	103	0	11	43

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	195	0	0	331	0	0	1012	987	248	1039	1077	202
Stage 1	-	-	-	-	-	-	260	260	-	725	725	-
Stage 2	-	-	-	-	-	-	752	727	-	314	352	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1378	-	-	1228	-	-	218	247	791	209	219	839
Stage 1	-	-	-	-	-	-	745	693	-	416	430	-
Stage 2	-	-	-	-	-	-	402	429	-	697	632	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1367	-	-	1218	-	-	156	182	778	141	161	825
Mov Cap-2 Maneuver	-	-	-	-	-	-	156	182	-	141	161	-
Stage 1	-	-	-	-	-	-	731	680	-	408	322	-
Stage 2	-	-	-	-	-	-	276	322	-	589	620	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	5.2	12.8	14.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	578	1367	-	-	1218	-	-	452
HCM Lane V/C Ratio	0.197	0.008	-	-	0.219	-	-	0.12
HCM Control Delay (s)	12.8	7.7	0	-	8.8	0	-	14.1
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.7	0	-	-	0.8	-	-	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	450	5	105	35	425	0	0	540	150
Future Volume (vph)	0	0	0	450	5	105	35	425	0	0	540	150
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	3.5
Lane Util. Factor					1.00	1.00	1.00	1.00			1.00	1.00
Frpb, ped/bikes					1.00	1.00	1.00	1.00			1.00	0.99
Flpb, ped/bikes					1.00	1.00	1.00	1.00			1.00	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1651	1473	1599	1683			1683	1411
Flt Permitted					0.95	1.00	0.21	1.00			1.00	1.00
Satd. Flow (perm)					1651	1473	345	1683			1683	1411
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	0	0	479	5	112	37	452	0	0	574	160
RTOR Reduction (vph)	0	0	0	0	0	69	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	484	43	37	452	0	0	574	160
Confl. Peds. (#/hr)							5		12	12		5
Confl. Bikes (#/hr)									3			
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	4%	4%	4%	4%	4%	4%
Turn Type				Split	NA	Perm	pm+pt	NA			NA	Free
Protected Phases				4	4		1	6			2	
Permitted Phases						4	6					Free
Actuated Green, G (s)					33.8	33.8	47.2	47.2			39.3	90.0
Effective Green, g (s)					34.3	34.3	47.2	47.7			39.8	90.0
Actuated g/C Ratio					0.38	0.38	0.52	0.53			0.44	1.00
Clearance Time (s)					4.5	4.5	4.0	4.5			4.5	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					629	561	235	891			744	1411
v/s Ratio Prot					c0.29		0.01	c0.27			c0.34	
v/s Ratio Perm						0.03	0.08					0.11
v/c Ratio					0.77	0.08	0.16	0.51			0.77	0.11
Uniform Delay, d1					24.4	17.8	13.6	13.6			21.3	0.0
Progression Factor					1.00	1.00	0.97	1.00			1.00	1.00
Incremental Delay, d2					5.7	0.1	0.2	1.2			7.6	0.2
Delay (s)					30.0	17.8	13.5	14.8			28.9	0.2
Level of Service					C	B	B	B			C	A
Approach Delay (s)		0.0			27.7			14.7			22.6	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	22.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	118.6%	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												
Traffic Volume (vph)	185	5	170	0	0	0	0	275	505	130	860	0
Future Volume (vph)	185	5	170	0	0	0	0	275	505	130	860	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0	4.0					4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00					1.00		1.00	1.00	
Frpb, ped/bikes		1.00	1.00					0.96		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.91		1.00	1.00	
Flt Protected		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1531	1365					1501		1630	1716	
Flt Permitted		0.95	1.00					1.00		0.19	1.00	
Satd. Flow (perm)		1531	1365					1501		318	1716	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	199	5	183	0	0	0	0	296	543	140	925	0
RTOR Reduction (vph)	0	0	152	0	0	0	0	72	0	0	0	0
Lane Group Flow (vph)	0	204	31	0	0	0	0	767	0	140	925	0
Confl. Peds. (#/hr)							4		15	15		4
Confl. Bikes (#/hr)									4			4
Heavy Vehicles (%)	9%	9%	9%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Split	NA	Perm					NA		pm+pt	NA	
Protected Phases	8	8						6		5	2	
Permitted Phases			8							2		
Actuated Green, G (s)		14.9	14.9					56.7		66.1	66.1	
Effective Green, g (s)		15.4	15.4					57.2		66.1	66.6	
Actuated g/C Ratio		0.17	0.17					0.64		0.73	0.74	
Clearance Time (s)		4.5	4.5					4.5		4.0	4.5	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		261	233					953		312	1269	
v/s Ratio Prot		c0.13						c0.51		0.03	c0.54	
v/s Ratio Perm			0.02							0.30		
v/c Ratio		0.78	0.13					0.81		0.45	0.73	
Uniform Delay, d1		35.7	31.6					12.2		9.4	6.6	
Progression Factor		1.00	1.00					1.00		1.66	1.07	
Incremental Delay, d2		14.1	0.3					7.2		0.8	2.8	
Delay (s)		49.8	31.9					19.4		16.4	9.9	
Level of Service		D	C					B		B	A	
Approach Delay (s)		41.3			0.0			19.4			10.7	
Approach LOS		D			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	118.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	470	190	235	315	160	365
Future Volume (vph)	470	190	235	315	160	365
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0			4.0	4.0	4.0
Lane Util. Factor	1.00			1.00	1.00	1.00
Frpb, ped/bikes	0.98			1.00	1.00	0.93
Flpb, ped/bikes	1.00			1.00	0.97	1.00
Frt	0.96			1.00	1.00	0.85
Flt Protected	1.00			0.98	0.95	1.00
Satd. Flow (prot)	1622			1674	1574	1362
Flt Permitted	1.00			0.48	0.95	1.00
Satd. Flow (perm)	1622			823	1574	1362
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	511	207	255	342	174	397
RTOR Reduction (vph)	8	0	0	0	0	322
Lane Group Flow (vph)	710	0	0	597	174	75
Confl. Peds. (#/hr)		10	10		10	10
Confl. Bikes (#/hr)		5				5
Turn Type	NA		custom	NA	Perm	pm+ov
Protected Phases	6		5			5
Permitted Phases			2	2	8	8
Actuated Green, G (s)	86.0			86.0	16.0	16.0
Effective Green, g (s)	86.0			86.0	16.0	16.0
Actuated g/C Ratio	0.78			0.78	0.15	0.15
Clearance Time (s)	4.0			4.0	4.0	4.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1268			643	228	198
v/s Ratio Prot	0.44					
v/s Ratio Perm				c0.73	c0.11	0.05
v/c Ratio	0.56			0.93	0.76	0.38
Uniform Delay, d1	4.7			9.6	45.2	42.5
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.5			21.7	21.2	1.2
Delay (s)	5.2			31.3	66.4	43.7
Level of Service	A			C	E	D
Approach Delay (s)	5.2			31.3	50.6	
Approach LOS	A			C	D	

Intersection Summary			
HCM 2000 Control Delay	27.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	95.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Transportation Base Case Interim Solution HCM Reports

HCM Unsignalized Intersection Capacity Analysis
26: Cascade Ave & Westcliff Dr

Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Traffic Volume (veh/h)	5	80	20	10	95	20
Future Volume (Veh/h)	5	80	20	10	95	20
Sign Control	Stop			Stop	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	89	22	11	106	22
Pedestrians	10			10		
Lane Width (ft)	12.0			12.0		
Walking Speed (ft/s)	4.0			4.0		
Percent Blockage	1			1		
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)					185	
pX, platoon unblocked						
vC, conflicting volume	232	10	314	232	10	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	232	10	314	232	10	
tC, single (s)	6.5	6.2	7.2	6.6	4.1	
tC, 2 stage (s)						
tF (s)	4.0	3.3	3.6	4.1	2.2	
p0 queue free %	99	92	96	98	93	
cM capacity (veh/h)	613	1062	524	598	1596	

Direction, Lane #	EB 1	WB 1	NW 1	NW 2
Volume Total	95	33	106	22
Volume Left	0	22	106	0
Volume Right	89	0	0	22
cSH	1015	546	1596	1700
Volume to Capacity	0.09	0.06	0.07	0.01
Queue Length 95th (ft)	8	5	5	0
Control Delay (s)	8.9	12.0	7.4	0.0
Lane LOS	A	B	A	
Approach Delay (s)	8.9	12.0	6.1	
Approach LOS	A	B		

Intersection Summary			
Average Delay	7.9		
Intersection Capacity Utilization	23.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	420	820	435	580	550	290
Future Volume (vph)	420	820	435	580	550	290
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1699	1421	1614	1699	3162	1420
Flt Permitted	1.00	1.00	0.28	1.00	0.95	1.00
Satd. Flow (perm)	1699	1421	481	1699	3162	1420
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	467	911	483	644	611	322
RTOR Reduction (vph)	0	0	0	0	0	113
Lane Group Flow (vph)	467	911	483	644	611	209
Confl. Peds. (#/hr)		10	10			10
Confl. Bikes (#/hr)		5				5
Heavy Vehicles (%)	3%	3%	3%	3%	2%	2%
Turn Type	NA	Free	pm+pt	NA	Prot	pm+ov
Protected Phases	6		5	2	4	5
Permitted Phases		Free	2			4
Actuated Green, G (s)	38.3	90.0	61.8	61.8	20.2	39.7
Effective Green, g (s)	38.3	90.0	61.8	61.8	20.2	39.7
Actuated g/C Ratio	0.43	1.00	0.69	0.69	0.22	0.44
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	723	1421	575	1166	709	689
v/s Ratio Prot	0.27		c0.18	0.38	c0.19	0.07
v/s Ratio Perm		0.64	c0.39			0.08
v/c Ratio	0.65	0.64	0.84	0.55	0.86	0.30
Uniform Delay, d1	20.5	0.0	10.7	7.1	33.6	16.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.0	2.2	10.4	1.9	10.5	0.3
Delay (s)	22.5	2.2	21.1	9.0	44.1	16.5
Level of Service	C	A	C	A	D	B
Approach Delay (s)	9.1			14.2	34.5	
Approach LOS	A			B	C	

Intersection Summary			
HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	18.4

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	35	760	0	0	380	730	20	0	355	0	0	0
Future Vol, veh/h	35	760	0	0	380	730	20	0	355	0	0	0
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	300	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	3	3	3	2	2	2	3	3	3
Mvmt Flow	39	844	0	0	422	811	22	0	394	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	432	0	-	-	-	0	1354	1354	854
Stage 1	-	-	-	-	-	-	922	922	-
Stage 2	-	-	-	-	-	-	432	432	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1128	-	0	0	-	-	165	150	~ 358
Stage 1	-	-	0	0	-	-	387	349	-
Stage 2	-	-	0	0	-	-	655	582	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1119	-	-	-	-	-	153	0	~ 355
Mov Cap-2 Maneuver	-	-	-	-	-	-	153	0	-
Stage 1	-	-	-	-	-	-	361	0	-
Stage 2	-	-	-	-	-	-	650	0	-

Approach	SE	NW	NE
HCM Control Delay, s	0.4	0	111.2
HCM LOS			F

Minor Lane/Major Mvmt	NELn1	NELn2	NWT	NWR	SEL	SET
Capacity (veh/h)	153	355	-	-	1119	-
HCM Lane V/C Ratio	0.145	1.111	-	-	0.035	-
HCM Control Delay (s)	32.5	115.6	-	-	8.3	0
HCM Lane LOS	D	F	-	-	A	A
HCM 95th %tile Q(veh)	0.5	14.9	-	-	0.1	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	0	0	0	705	0	40	0	100	20	315	75	0
Future Volume (vph)	0	0	0	705	0	40	0	100	20	315	75	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					1.00			1.00			1.00	
Frpb, ped/bikes					1.00			0.99			1.00	
Flpb, ped/bikes					0.98			1.00			0.98	
Frt					0.99			0.98			1.00	
Flt Protected					0.95			1.00			0.96	
Satd. Flow (prot)					1584			1664			1575	
Flt Permitted					0.95			1.00			0.68	
Satd. Flow (perm)					1584			1664			1113	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	783	0	44	0	111	22	350	83	0
RTOR Reduction (vph)	0	0	0	0	33	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	794	0	0	126	0	0	433	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	5%	5%	5%
Turn Type				Perm	NA			NA		pm+pt	NA	
Protected Phases					8			6		5	2	
Permitted Phases				8						2		
Actuated Green, G (s)					41.0			31.0			31.0	
Effective Green, g (s)					41.0			31.0			31.0	
Actuated g/C Ratio					0.51			0.39			0.39	
Clearance Time (s)					4.0			4.0			4.0	
Vehicle Extension (s)					3.0			3.0			3.0	
Lane Grp Cap (vph)					811			644			431	
v/s Ratio Prot								0.08				
v/s Ratio Perm					0.50						c0.39	
v/c Ratio					0.98			0.20			1.00	
Uniform Delay, d1					19.1			16.2			24.5	
Progression Factor					1.00			1.00			1.00	
Incremental Delay, d2					26.1			0.7			44.5	
Delay (s)					45.2			16.9			69.0	
Level of Service					D			B			E	
Approach Delay (s)		0.0			45.2			16.9			69.0	
Approach LOS		A			D			B			E	

Intersection Summary			
HCM 2000 Control Delay	49.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Revised Land Use Framework – July 2017 Interim Solution HCM Reports

Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Traffic Volume (veh/h)	25	70	30	10	90	20
Future Volume (Veh/h)	25	70	30	10	90	20
Sign Control	Stop			Stop	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	28	78	33	11	100	22
Pedestrians	10			10		
Lane Width (ft)	12.0			12.0		
Walking Speed (ft/s)	4.0			4.0		
Percent Blockage	1			1		
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)					185	
pX, platoon unblocked						
vC, conflicting volume	220	10	302	220	10	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	220	10	302	220	10	
tC, single (s)	6.5	6.2	7.2	6.6	4.1	
tC, 2 stage (s)						
tF (s)	4.0	3.3	3.6	4.1	2.2	
p0 queue free %	96	93	94	98	94	
cM capacity (veh/h)	625	1062	527	610	1596	

Direction, Lane #	EB 1	WB 1	NW 1	NW 2
Volume Total	106	44	100	22
Volume Left	0	33	100	0
Volume Right	78	0	0	22
cSH	897	545	1596	1700
Volume to Capacity	0.12	0.08	0.06	0.01
Queue Length 95th (ft)	10	7	5	0
Control Delay (s)	9.6	12.2	7.4	0.0
Lane LOS	A	B	A	
Approach Delay (s)	9.6	12.2	6.1	
Approach LOS	A	B		

Intersection Summary			
Average Delay	8.4		
Intersection Capacity Utilization	23.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	555	510	320	655	515	320
Future Volume (vph)	555	510	320	655	515	320
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1699	1421	1614	1699	3162	1413
Flt Permitted	1.00	1.00	0.24	1.00	0.95	1.00
Satd. Flow (perm)	1699	1421	403	1699	3162	1413
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	617	567	356	728	572	356
RTOR Reduction (vph)	0	0	0	0	0	124
Lane Group Flow (vph)	617	567	356	728	572	233
Confl. Peds. (#/hr)		10	10			10
Confl. Bikes (#/hr)		5				5
Heavy Vehicles (%)	3%	3%	3%	3%	2%	2%
Turn Type	NA	Free	pm+pt	NA	Prot	pm+ov
Protected Phases	6		5	2	4	5
Permitted Phases		Free	2			4
Actuated Green, G (s)	46.5	90.0	63.5	63.5	18.5	31.5
Effective Green, g (s)	46.5	90.0	63.5	63.5	18.5	31.5
Actuated g/C Ratio	0.52	1.00	0.71	0.71	0.21	0.35
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	877	1421	459	1198	649	557
v/s Ratio Prot	0.36		c0.11	0.43	c0.18	0.06
v/s Ratio Perm		0.40	c0.43			0.10
v/c Ratio	0.70	0.40	0.78	0.61	0.88	0.42
Uniform Delay, d1	16.5	0.0	10.6	6.8	34.7	22.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.6	0.8	8.0	2.3	13.3	0.5
Delay (s)	19.1	0.8	18.6	9.1	48.0	22.8
Level of Service	B	A	B	A	D	C
Approach Delay (s)	10.4			12.2	38.3	
Approach LOS	B			B	D	

Intersection Summary			
HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	7.8

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↰			↑	↱		↰	↱			
Traffic Vol, veh/h	35	600	0	0	375	805	20	0	350	0	0	0
Future Vol, veh/h	35	600	0	0	375	805	20	0	350	0	0	0
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	300	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	3	3	3	2	2	2	3	3	3
Mvmt Flow	39	667	0	0	417	894	22	0	389	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	427	0	-	-	-	0	1171	1171	677
Stage 1	-	-	-	-	-	-	744	744	-
Stage 2	-	-	-	-	-	-	427	427	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1132	-	0	0	-	-	213	193	453
Stage 1	-	-	0	0	-	-	470	421	-
Stage 2	-	-	0	0	-	-	658	585	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1123	-	-	-	-	-	200	0	449
Mov Cap-2 Maneuver	-	-	-	-	-	-	200	0	-
Stage 1	-	-	-	-	-	-	444	0	-
Stage 2	-	-	-	-	-	-	653	0	-

Approach	SE	NW	NE
HCM Control Delay, s	0.5	0	45.3
HCM LOS			E

Minor Lane/Major Mvmt	NELn1	NELn2	NWT	NWR	SEL	SET
Capacity (veh/h)	200	449	-	-	1123	-
HCM Lane V/C Ratio	0.111	0.866	-	-	0.035	-
HCM Control Delay (s)	25.2	46.4	-	-	8.3	0
HCM Lane LOS	D	E	-	-	A	A
HCM 95th %tile Q(veh)	0.4	8.9	-	-	0.1	-

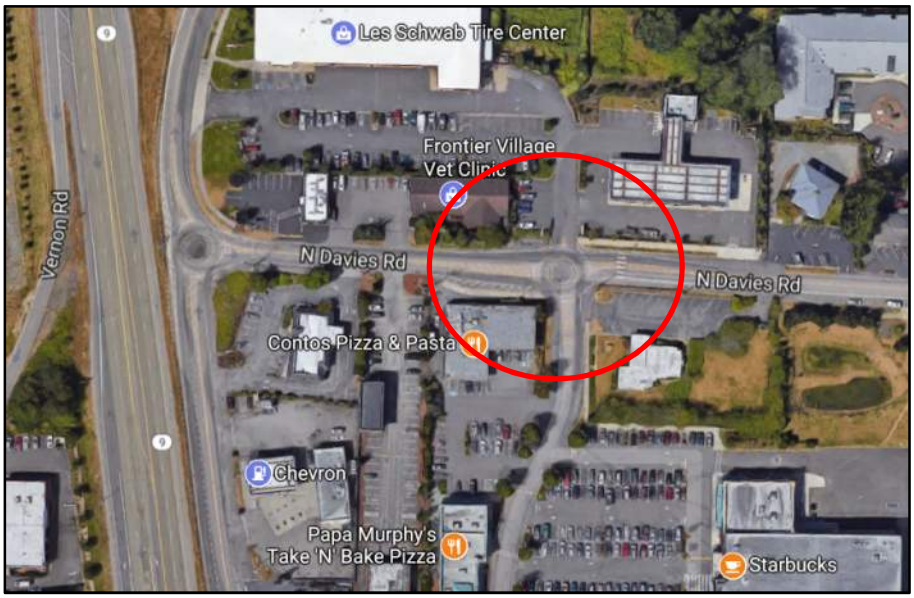
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	0	0	0	560	0	40	0	75	25	325	70	0
Future Volume (vph)	0	0	0	560	0	40	0	75	25	325	70	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					1.00			1.00			1.00	
Frpb, ped/bikes					1.00			0.99			1.00	
Flpb, ped/bikes					0.98			1.00			0.98	
Frt					0.99			0.97			1.00	
Flt Protected					0.96			1.00			0.96	
Satd. Flow (prot)					1582			1637			1573	
Flt Permitted					0.96			1.00			0.69	
Satd. Flow (perm)					1582			1637			1129	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	622	0	44	0	83	28	361	78	0
RTOR Reduction (vph)	0	0	0	0	34	0	0	11	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	632	0	0	100	0	0	439	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Confl. Bikes (#/hr)			5			5			5			5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	5%	5%	5%
Turn Type				Perm	NA			NA		pm+pt	NA	
Protected Phases					8			6		5	2	
Permitted Phases				8						2		
Actuated Green, G (s)					40.3			31.7			31.7	
Effective Green, g (s)					40.3			31.7			31.7	
Actuated g/C Ratio					0.50			0.40			0.40	
Clearance Time (s)					4.0			4.0			4.0	
Vehicle Extension (s)					3.0			3.0			3.0	
Lane Grp Cap (vph)					796			648			447	
v/s Ratio Prot								0.06				
v/s Ratio Perm					0.40						c0.39	
v/c Ratio					0.79			0.15			0.98	
Uniform Delay, d1					16.4			15.5			23.9	
Progression Factor					1.00			1.00			1.00	
Incremental Delay, d2					5.5			0.5			37.7	
Delay (s)					21.9			16.0			61.5	
Level of Service					C			B			E	
Approach Delay (s)		0.0			21.9			16.0			61.5	
Approach LOS		A			C			B			E	

Intersection Summary			
HCM 2000 Control Delay	35.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Appendix C – Mini-Roundabout Example

Lake Stevens, Washington- Davies Road Mini Roundabout

- Diameter: ~ 70 feet
- Center Island: ~ 28 feet
- Approaches: 30 – 45 feet



Appendix D – 2040 Queuing Reports

- Transportation Base Case Financially Constrained Queuing Reports
- Revised Land Use Framework – July 2017 Financially Constrained Queuing Reports
- Transportation Base Case Mitigated Queuing Reports
- Revised Land Use Framework – July 2017 Mitigated Queuing Reports
- Transportation Base Case Interim Solution Queuing Reports
- Revised Land Use Framework – July 2017 Interim Solution Queuing Reports

Transportation Base Case Financially Constrained Queuing Reports

Intersection: 3: Mt Adams Ave & Cascade Ave

Movement	EB	EB	WB	NB	NB
Directions Served	T	R	LT	L	R
Maximum Queue (ft)	744	205	10549	225	8903
Average Queue (ft)	211	65	6441	224	5681
95th Queue (ft)	523	222	11023	225	9391
Link Distance (ft)	764		15917		10342
Upstream Blk Time (%)	0				0
Queuing Penalty (veh)	3				0
Storage Bay Dist (ft)		180		200	
Storage Blk Time (%)	7	0		65	0
Queuing Penalty (veh)	54	1		172	2

Intersection: 18: I-84 EB Ramp & Cascade Ave

Movement	SE	NW	NE
Directions Served	LT	TR	LTR
Maximum Queue (ft)	312	184	876
Average Queue (ft)	98	35	488
95th Queue (ft)	266	121	1055
Link Distance (ft)	295	764	12080
Upstream Blk Time (%)	3		
Queuing Penalty (veh)	18		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 23: Cascade Ave & I-84 WB Ramp

Movement	WB	SE	NW
Directions Served	LTR	TR	LT
Maximum Queue (ft)	5205	79	109
Average Queue (ft)	3281	10	33
95th Queue (ft)	5616	47	80
Link Distance (ft)	11771	103	295
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: 2nd Street & I-84 WB Ramp

Movement	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	L	T	T	R
Maximum Queue (ft)	494	304	120	351	1280	90
Average Queue (ft)	242	65	34	201	625	48
95th Queue (ft)	422	210	89	337	1341	120
Link Distance (ft)	5318			346	3535	
Upstream Blk Time (%)				0		
Queuing Penalty (veh)				2		
Storage Bay Dist (ft)		300	100			65
Storage Blk Time (%)	6	0	0	18	44	0
Queuing Penalty (veh)	6	0	0	6	73	2

Intersection: 5: 2nd Street & I-84 EB Ramp

Movement	EB	EB	NB	SB	SB
Directions Served	LT	R	TR	L	T
Maximum Queue (ft)	276	128	911	124	358
Average Queue (ft)	151	35	386	88	269
95th Queue (ft)	255	89	790	146	406
Link Distance (ft)	1942		1985		346
Upstream Blk Time (%)					2
Queuing Penalty (veh)					18
Storage Bay Dist (ft)		325		100	
Storage Blk Time (%)	0	0		10	15
Queuing Penalty (veh)	0	0		84	20

Network Summary

Network wide Queuing Penalty: 213

Revised Land Use Framework – July 2017 Financially Constrained Queuing Reports

Intersection: 3: Mt Adams Ave & Cascade Ave

Movement	EB	EB	WB	NB	NB
Directions Served	T	R	LT	L	R
Maximum Queue (ft)	730	205	9324	225	6894
Average Queue (ft)	308	104	7725	224	4578
95th Queue (ft)	640	272	11296	224	7417
Link Distance (ft)	764		9262		8812
Upstream Blk Time (%)	1		49		0
Queuing Penalty (veh)	7		0		0
Storage Bay Dist (ft)		180		200	
Storage Blk Time (%)	13	0		63	4
Queuing Penalty (veh)	65	2		198	19

Intersection: 18: I-84 EB Ramp & Cascade Ave

Movement	SE	NW	NW	NE
Directions Served	LT	T	R	LTR
Maximum Queue (ft)	142	169	86	680
Average Queue (ft)	21	49	64	338
95th Queue (ft)	84	118	77	753
Link Distance (ft)	295	764		7862
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			50	
Storage Blk Time (%)		1	8	
Queuing Penalty (veh)		5	29	

Intersection: 23: Cascade Ave & I-84 WB Ramp

Movement	WB	SE	NW
Directions Served	LTR	TR	LT
Maximum Queue (ft)	2131	45	103
Average Queue (ft)	1468	5	28
95th Queue (ft)	2621	25	71
Link Distance (ft)	9688	103	295
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: 2nd Street & I-84 WB Ramp

Movement	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	L	T	T	R
Maximum Queue (ft)	542	325	117	354	1336	90
Average Queue (ft)	253	65	39	209	752	40
95th Queue (ft)	493	211	101	343	1831	113
Link Distance (ft)	4040			346	2714	
Upstream Blk Time (%)				0	2	
Queuing Penalty (veh)				2	0	
Storage Bay Dist (ft)		300	100			65
Storage Blk Time (%)	7	0	0	17	47	0
Queuing Penalty (veh)	8	0	0	6	64	1

Intersection: 5: 2nd Street & I-84 EB Ramp

Movement	EB	EB	NB	SB	SB
Directions Served	LT	R	TR	L	T
Maximum Queue (ft)	378	224	576	125	357
Average Queue (ft)	182	49	252	88	261
95th Queue (ft)	333	148	492	147	395
Link Distance (ft)	1942		1985		346
Upstream Blk Time (%)					2
Queuing Penalty (veh)					21
Storage Bay Dist (ft)		325		100	
Storage Blk Time (%)	3	0		8	16
Queuing Penalty (veh)	2	0		69	20

Network Summary

Network wide Queuing Penalty: 194

Transportation Base Case Mitigated Queuing Reports

Intersection: 18: I-84 EB Ramp & Cascade Ave

Movement	SE	SE	SE	NW	NW	NE	NE
Directions Served	L	T	T	T	R	LT	R
Maximum Queue (ft)	166	261	282	216	320	153	280
Average Queue (ft)	99	82	111	54	114	19	131
95th Queue (ft)	167	208	256	141	252	85	229
Link Distance (ft)		290	290	748	748	7548	
Upstream Blk Time (%)		0	0				
Queuing Penalty (veh)		0	1				
Storage Bay Dist (ft)	150						300
Storage Blk Time (%)	4	2					0
Queuing Penalty (veh)	14	1					0

Intersection: 23: Cascade Ave & I-84 WB Ramp

Movement	WB	WB	WB	SE	SE	NW	NW
Directions Served	L	LT	R	T	TR	L	T
Maximum Queue (ft)	274	432	231	86	95	279	108
Average Queue (ft)	168	200	27	26	36	139	31
95th Queue (ft)	268	326	115	62	76	246	82
Link Distance (ft)		8247		99	99	290	290
Upstream Blk Time (%)				0	0	0	
Queuing Penalty (veh)				0	0	1	
Storage Bay Dist (ft)	250		250				
Storage Blk Time (%)	1	2	0				
Queuing Penalty (veh)	3	9	0				

Zone Summary

Zone wide Queuing Penalty: 29

Intersection: 4: 2nd Street & I-84 WB Ramp

Movement	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	L	T	T	R
Maximum Queue (ft)	533	278	125	343	1151	90
Average Queue (ft)	239	62	38	194	505	56
95th Queue (ft)	414	205	98	322	1021	127
Link Distance (ft)	5318			346	3535	
Upstream Blk Time (%)				0		
Queuing Penalty (veh)				1		
Storage Bay Dist (ft)		300	100			65
Storage Blk Time (%)	6	0	0	18	43	0
Queuing Penalty (veh)	6	0	0	6	90	2

Intersection: 5: 2nd Street & I-84 EB Ramp

Movement	EB	EB	NB	SB	SB
Directions Served	LT	R	TR	L	T
Maximum Queue (ft)	277	201	694	125	357
Average Queue (ft)	144	68	298	88	258
95th Queue (ft)	244	147	604	144	395
Link Distance (ft)	1942		1985		346
Upstream Blk Time (%)					2
Queuing Penalty (veh)					18
Storage Bay Dist (ft)		325		100	
Storage Blk Time (%)	0	0		9	16
Queuing Penalty (veh)	0	0		76	20

Network Summary

Network wide Queuing Penalty: 220

Revised Land Use Framework – July 2017 Mitigated Queuing Reports

Intersection: 18: I-84 EB Ramp & Cascade Ave

Movement	SE	SE	SE	NW	NW	NE	NE
Directions Served	L	T	T	T	R	LT	R
Maximum Queue (ft)	172	248	233	218	487	138	247
Average Queue (ft)	101	68	61	47	131	23	116
95th Queue (ft)	173	195	179	151	317	103	206
Link Distance (ft)		290	290	748	748	7548	
Upstream Blk Time (%)		0	0		0		
Queuing Penalty (veh)		0	0		0		
Storage Bay Dist (ft)	150						300
Storage Blk Time (%)	6	1				0	1
Queuing Penalty (veh)	18	0				0	0

Intersection: 23: Cascade Ave & I-84 WB Ramp

Movement	WB	WB	WB	SE	SE	NW	NW
Directions Served	L	LT	R	T	TR	L	T
Maximum Queue (ft)	263	330	120	68	76	261	97
Average Queue (ft)	156	159	19	23	22	128	30
95th Queue (ft)	236	259	75	55	60	230	77
Link Distance (ft)		8247		99	99	290	290
Upstream Blk Time (%)				0	0	0	
Queuing Penalty (veh)				0	0	0	
Storage Bay Dist (ft)	250		250				
Storage Blk Time (%)	1	1	0				
Queuing Penalty (veh)	2	2	0				

Zone Summary

Zone wide Queuing Penalty: 24

Intersection: 4: 2nd Street & I-84 WB Ramp

Movement	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	L	T	T	R
Maximum Queue (ft)	444	253	124	345	1070	90
Average Queue (ft)	222	52	32	194	505	48
95th Queue (ft)	357	164	85	341	1075	121
Link Distance (ft)	5318			346	3535	
Upstream Blk Time (%)				0		
Queuing Penalty (veh)				2		
Storage Bay Dist (ft)		300	100			65
Storage Blk Time (%)	3	0	0	16	42	0
Queuing Penalty (veh)	3	0	0	6	64	2

Intersection: 5: 2nd Street & I-84 EB Ramp

Movement	EB	EB	NB	SB	SB
Directions Served	LT	R	TR	L	T
Maximum Queue (ft)	329	272	800	124	358
Average Queue (ft)	161	94	332	84	269
95th Queue (ft)	295	201	721	140	400
Link Distance (ft)	1942		1985		346
Upstream Blk Time (%)					1
Queuing Penalty (veh)					12
Storage Bay Dist (ft)		325		100	
Storage Blk Time (%)	1	0		8	17
Queuing Penalty (veh)	2	0		70	22

Network Summary

Network wide Queuing Penalty: 182

Transportation Base Case Interim Solution Queuing Reports

Intersection: 3: Mt Adams Ave & Cascade Ave

Movement	EB	EB	WB	WB	NB	NB	NB
Directions Served	T	R	L	T	L	L	R
Maximum Queue (ft)	528	276	418	535	275	573	228
Average Queue (ft)	262	7	234	170	196	260	92
95th Queue (ft)	468	117	394	378	299	494	180
Link Distance (ft)	747	747		10310		6991	6991
Upstream Blk Time (%)		0					
Queuing Penalty (veh)		0					
Storage Bay Dist (ft)			400		250		
Storage Blk Time (%)			2	0	6	11	
Queuing Penalty (veh)			14	0	17	30	

Intersection: 18: I-84 EB Ramp & Cascade Ave

Movement	SE	NW	NW	NE	NE
Directions Served	LT	T	R	LT	R
Maximum Queue (ft)	218	357	256	359	317
Average Queue (ft)	43	98	54	50	157
95th Queue (ft)	150	326	172	212	283
Link Distance (ft)	295	747	747	7559	
Upstream Blk Time (%)	0				
Queuing Penalty (veh)	1				
Storage Bay Dist (ft)					300
Storage Blk Time (%)				0	3
Queuing Penalty (veh)				0	1

Intersection: 23: Cascade Ave & I-84 WB Ramp

Movement	WB	SE	NW
Directions Served	LTR	TR	LT
Maximum Queue (ft)	1192	113	312
Average Queue (ft)	674	56	249
95th Queue (ft)	1302	106	366
Link Distance (ft)	8246	103	295
Upstream Blk Time (%)		2	19
Queuing Penalty (veh)		2	78
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

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Intersection: 3: Mt Adams Ave & Cascade Ave

Movement	EB	EB	WB	WB	NB	NB	NB
Directions Served	T	R	L	T	L	L	R
Maximum Queue (ft)	627	384	377	404	275	620	346
Average Queue (ft)	306	29	199	162	209	300	130
95th Queue (ft)	556	212	343	322	322	591	260
Link Distance (ft)	747	747		10310		6991	6991
Upstream Blk Time (%)	0	0					
Queuing Penalty (veh)	0	0					
Storage Bay Dist (ft)			400		250		
Storage Blk Time (%)			1	0	10	19	
Queuing Penalty (veh)			7	0	27	50	

Intersection: 18: I-84 EB Ramp & Cascade Ave

Movement	SE	NW	NW	NE	NE
Directions Served	LT	T	R	LT	R
Maximum Queue (ft)	178	416	285	149	283
Average Queue (ft)	30	112	63	28	127
95th Queue (ft)	109	359	200	141	232
Link Distance (ft)	295	747	747	7559	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					300
Storage Blk Time (%)				0	2
Queuing Penalty (veh)				0	0

Intersection: 23: Cascade Ave & I-84 WB Ramp

Movement	WB	SE	NW
Directions Served	LTR	TR	LT
Maximum Queue (ft)	450	112	314
Average Queue (ft)	234	52	257
95th Queue (ft)	379	98	370
Link Distance (ft)	8246	103	295
Upstream Blk Time (%)		1	23
Queuing Penalty (veh)		1	91
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			