APPENDIX

APPENDIX A

EXISTING CONDITIONS OPERATIONAL ANALYSIS

HCM 2010 - Intersection Delay and LOS
2016 Existing Conditions
North Winchester IAAR

	Intersection Number and Description	Type of Control	Lane Group	Northbound				Southbound				Eastbound				Westbound				Overall	
				AM		PM		AM		PM		AM		PM		AM		PM		AM	PM
				Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS		
1	US 11 at Pactiv Way/Crown Ln*			Pactiv Way				Crown Ln				US 11				US 11				Intersection	
		Signal	Left	59.3	E	62.8	E	56.3	E	60.3	E	55.4	E	60.6	E	41.5	D	54.3	D	Delay	Delay
			Through									21.3	C	24.4	C	5.6	A	7.1	A	16.2	20.3
			Right													10.5	B	11.7	B	LOS	LOS
			Approach	59.3	E	62.8	E	56.3	E	60.3	E	23.6	C	27.9	C	6.3	A	7.4	A	B	C
2	US 11 at Amoco Ln/ Welltown Rd			Amoco Ln				Welltown Rd				US 11				US 11				Intersection	
		Signal	Left	79.0	E	372.4	F	69.3	E	64.5	E	259.9	F	116.3	F	54.5	D	64.7	E	Delay	Delay
			Through									0.9	A	8.3	A	15.3	B	40.6	D	30.8	43.6
			Right					50.3	D	54.4	D					9.2	A	22.3	C	LOS	LOS
			Approach	79.0	E	372.4	F	67.2	E	63.7	E	38.7	D	20.3	C	15.4	B	38.9	D	C	D
3	US 11 at I-81 SB Off-Ramp			-				I-81 SB Off Ramp				US 11				US 11				Intersection	
		Signal	Left													5.1	A	18.8	B	Delay	Delay
			Through					58.5	E	71.5	E	0.5	A	29.3	C	0.4	A	0.3	A	3.8	16.9
			Right									0.0	A	0.0	A					LOS	LOS
			Approach					58.5	E	71.5	E	0.5	A	29.3	C	1.2	A	3.5	A	A	B
4	US 11 at I-81 NB Off-Ramp			I-81 NB Off Ramp				-				US 11				US 11				Intersection	
		Signal	Left	44.0	D	49.7	D													Delay	Delay
			Through									27.8	C	0.5	A	24.2	C	0.3	A	32.3	15.8
			Right	50.4	D	66.1	E													LOS	LOS
			Approach	46.4	D	55.6	E					27.8	C	0.5	A	24.2	C	0.3	A	C	B
5	US 11 at Redbud Rd/ I-81 NB On Ramp			Red Bud Rd				-				US 11				US 11				Intersection	
		Signal	Left	73.5	E	365.8	F					0.1	A	0.1	A	14.8	B	20.9	C	Delay	Delay
			Through									43.4	D	36.1	D	59.7	E	64.5	E	41.9	55.0
			Right	59.7	E	60.2	E					23.4	C	15.6	B	36.5	D	43.5	D	LOS	LOS
			Approach	67.7	E	316.0	F					30.6	C	24.8	C	57.6	E	60.6	E	D	D
6	US 11 at Snowden Bridge Boulevard/ Merchant Street			Snowden Bridge Boulevard				Merchant Street				US 11				US 11				Intersection	
		Signal	Left	65.7	E	63.6	E	57.8	E	62.5	E	12.0	B	0.0	A	59.9	E	73.0	E	Delay	Delay
			Through	51.4	D	64.9	E					4.0	A	0.2	A	65.0	E	69.0	E	32.6	26.0
			Right	51.4	D	72.8	E	9.9	A	6.7	A	2.3	A	0.0	A	27.4	C	26.5	C	LOS	LOS
			Approach	65.6	E	65.4	E	27.9	C	52.5	D	7.6	A	0.1	A	57.2	E	62.6	E	C	C
7	Welltown Rd at McGhee Rd			Welltown Rd				Welltown Rd				McGhee Rd				-				Intersection	
		Stop	Left	9.4	A	8.5	A					0.0	A	14.9	B					Delay	Delay
			Through	†	†	†	†	†	†	†	†									-	-
			Right									13.4	B	14.1	B					LOS	LOS
			Approach	6.8	A	2.1	A	†	†	†	†	0.0	A	14.1	B					-	-

Notes:

Shared lane results are shown as one value that corresponds to all movements in that lane.

† Delay for movements with no conflicting movements have not been included.

* Delay results are from HCM 2000 due to non-standard NEMA phasing

Synchro Capacity Analysis (HCM 2010) - 95th Percentile Queue Length
2016 Existing Conditions
North Winchester IAAR

Intersection Number and Description		Type of Control	Lane Group	Northbound			Southbound			Eastbound			Westbound		
				Storage Bay Length	AM Queue (ft)	PM Queue (ft)	Storage Bay Length	AM Queue (ft)	PM Queue (ft)	Storage Bay Length	AM Queue (ft)	PM Queue (ft)	Storage Bay Length	AM Queue (ft)	PM Queue (ft)
1	US 11 at Pactiv Way/Crown Ln*			Pactiv Way			Crown Ln			US 11			US 11		
		Signal	Left	-	27	79	-	0	0	550	0	0	300	m41	m16
			Through							-	496	645	-	47	512
			Right										370	m0	m0
2	US 11 at Amoco Ln/Welltown Rd			Amoco Ln			Welltown Rd			US 11			US 11		
		Signal	Left	-	145	465	250	195	223	-	703	458	325	70	58
			Through				-	0	0	-	10	263	-	338	500
			Right				250	40	38	-	20	283	-	180	240
3	US 11 at I-81 SB Off-Ramp			-			I-81 SB Off Ramp			US 11			US 11		
		Signal	Left										300	100	230
			Through				-	183	63	-	8	678	-	8	5
			Right							-	0	0			
4	US 11 at I-81 NB Off-Ramp			I-81 NB Off-Ramp			-			US 11			US 11		
		Signal	Left	575	310	358									
			Left												
			Through							-	505	8	-	423	5
			Right	485	383	455									
5	US 11 at Redbud Rd/I-81 NB On Ramp			Red Bud Rd			-			US 11			US 11		
		Signal	Left	-	85	513				125	0	3	150	15	30
			Through							-	498	673	-	468	500
			Right	100	103	93				75	103	53	250	33	120
6	US 11 at Snowden Bridge Boulevard/Merchant Street			Snowden Bridge Boulevard			Merchant Street			US 11			US 11		
		Signal	Left	300	150	18	200	33	123	450	120	0	350	8	0
			Left												
			Through	-	3	3	-	0	0	-	65	3	-	358	410
			Right	250	3	10	150	53	25	1,000	5	0	275	175	108
7	Welltown Rd at McGhee			Welltown Rd			Welltown Rd			McGhee Rd			-		
		One Way Stop	Left	360	35	8				-	40	5			
			Through	-	-	-	-	-	-						
			Right							-	0	73			

Notes:

HCM 2010 95th percentile queue length results, assuming an average vehicle length of 25 feet, reported for unsignalized and signalized intersections.

Shared lane results are shown as one value that corresponds to all movements in that lane.

† SYNCHRO does not provide queue length for movements with no conflicting volumes.

95th percentile volume exceeds capacity, queue may be longer.

m Volume for 95th percentile queue is metered by upstream signal

* Delay results are from HCM 2000 due to non-standard NEMA phasing

Movement	WBU	WBL2	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR2	NEL2	NEL
Lane Configurations												
Traffic Volume (vph)	19	10	1460	4	3	2	10	16	8	42	62	42
Future Volume (vph)	19	10	1460	4	3	2	10	16	8	42	62	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		10.9	5.7	5.7		11.1			11.2			10.8
Lane Util. Factor		1.00	0.91	1.00		1.00			1.00			1.00
Frt		1.00	1.00	0.85		0.91			0.91			1.00
Flt Protected		0.95	1.00	1.00		0.99			0.99			0.95
Satd. Flow (prot)		1782	4803	1077		1376			1660			1715
Flt Permitted		0.95	1.00	1.00		0.99			0.99			0.95
Satd. Flow (perm)		1782	4803	1077		1376			1660			1715
Peak-hour factor, PHF	0.92	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	21	11	1640	4	3	2	11	18	9	47	70	47
RTOR Reduction (vph)	0	0	0	2	0	11	0	0	72	0	0	112
Lane Group Flow (vph)	0	32	1640	2	0	5	0	0	2	0	0	5
Heavy Vehicles (%)	2%	0%	8%	50%	17%	2%	30%	9%	10%	0%	0%	13%
Turn Type	Prot	Prot	NA	Perm	Split	NA		Split	NA		Perm	Prot
Protected Phases	5	5	2		4	4		3	3			1
Permitted Phases				2							1	
Actuated Green, G (s)		4.1	69.9	69.9		2.3			4.0			5.0
Effective Green, g (s)		4.1	69.9	69.9		2.3			4.0			5.0
Actuated g/C Ratio		0.03	0.58	0.58		0.02			0.03			0.04
Clearance Time (s)		10.9	5.7	5.7		11.1			11.2			10.8
Vehicle Extension (s)		1.0	1.0	1.0		1.0			1.0			1.0
Lane Grp Cap (vph)		60	2797	627		26			55			71
v/s Ratio Prot		0.02	c0.34			c0.00			c0.00			
v/s Ratio Perm				0.00								0.00
v/c Ratio		0.53	0.59	0.00		0.20			0.04			0.07
Uniform Delay, d1		57.0	15.9	10.5		57.9			56.2			55.3
Progression Factor		0.67	0.31	1.00		1.00			1.00			1.00
Incremental Delay, d2		3.5	0.7	0.0		1.4			0.1			0.1
Delay (s)		41.5	5.6	10.5		59.3			56.3			55.4
Level of Service		D	A	B		E			E			E
Approach Delay (s)			6.3			59.3			56.3			23.6
Approach LOS			A			E			E			C

Intersection Summary			
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	38.8
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NER	NER2
Lane Configurations		
Traffic Volume (vph)	1425	28
Future Volume (vph)	1425	28
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.5	
Lane Util. Factor	0.76	
Frt	0.85	
Flt Protected	1.00	
Satd. Flow (prot)	3349	
Flt Permitted	1.00	
Satd. Flow (perm)	3349	
Peak-hour factor, PHF	0.89	0.89
Adj. Flow (vph)	1601	31
RTOR Reduction (vph)	113	0
Lane Group Flow (vph)	1519	0
Heavy Vehicles (%)	10%	7%
Turn Type	Prot	
Protected Phases	6	
Permitted Phases		
Actuated Green, G (s)	70.9	
Effective Green, g (s)	70.9	
Actuated g/C Ratio	0.59	
Clearance Time (s)	5.5	
Vehicle Extension (s)	1.0	
Lane Grp Cap (vph)	1978	
v/s Ratio Prot	c0.45	
v/s Ratio Perm		
v/c Ratio	0.77	
Uniform Delay, d1	18.4	
Progression Factor	1.00	
Incremental Delay, d2	2.9	
Delay (s)	21.3	
Level of Service	C	
Approach Delay (s)		
Approach LOS		

Intersection Summary

Lane Group	WBL2	WBT	WBR	NBT	SBT	NEL	NER
Lane Group Flow (vph)	32	1640	4	16	74	117	1632
v/c Ratio	0.36	0.52	0.00	0.23	0.20	0.31	0.66
Control Delay	44.9	4.5	0.0	40.6	1.2	2.1	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.9	4.5	0.0	40.6	1.2	2.1	14.2
Queue Length 50th (ft)	21	24	0	4	0	0	249
Queue Length 95th (ft)	m41	47	m0	27	0	0	496
Internal Link Dist (ft)		541		219	471	721	
Turn Bay Length (ft)	300		370			550	
Base Capacity (vph)	120	3155	801	89	396	419	2460
Starvation Cap Reductn	0	118	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.54	0.00	0.18	0.19	0.28	0.66

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	213	1198	59	7	42	1246	235	22	26	21	193	17
Future Volume (veh/h)	213	1198	59	7	42	1246	235	22	26	21	193	17
Number	1	6	16		5	2	12	3	8	18	7	4
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1743	1715	1900		1852	1759	1667	1900	1766	1900	1532	1523
Adj Flow Rate, veh/h	242	1361	67		48	1416	267	25	30	24	233	0
Adj No. of Lanes	1	3	0		1	3	1	0	1	0	2	0
Peak Hour Factor	0.88	0.88	0.88		0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	9	11	11		3	8	14	8	8	8	24	29
Cap, veh/h	170	2454	121		103	2342	826	31	37	30	278	0
Arrive On Green	0.20	1.00	1.00		0.08	0.65	0.65	0.06	0.06	0.06	0.10	0.00
Sat Flow, veh/h	1660	4570	225		1764	4803	1417	523	627	502	2919	0
Grp Volume(v), veh/h	242	929	499		48	1416	267	79	0	0	233	0
Grp Sat Flow(s),veh/h/ln	1660	1560	1675		1764	1601	1417	1651	0	0	1459	0
Q Serve(g_s), s	12.3	0.0	0.0		3.1	20.4	8.6	5.7	0.0	0.0	9.4	0.0
Cycle Q Clear(g_c), s	12.3	0.0	0.0		3.1	20.4	8.6	5.7	0.0	0.0	9.4	0.0
Prop In Lane	1.00		0.13		1.00		1.00	0.32		0.30	1.00	
Lane Grp Cap(c), veh/h	170	1675	899		103	2342	826	98	0	0	278	0
V/C Ratio(X)	1.42	0.55	0.55		0.47	0.60	0.32	0.81	0.00	0.00	0.84	0.00
Avail Cap(c_a), veh/h	170	1675	899		337	2342	826	118	0	0	302	0
HCM Platoon Ratio	2.00	2.00	2.00		1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.70	0.70	0.70		0.78	0.78	0.78	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	47.7	0.0	0.0		53.6	14.4	8.4	55.7	0.0	0.0	53.4	0.0
Incr Delay (d2), s/veh	212.2	0.9	1.7		1.0	0.9	0.8	23.3	0.0	0.0	15.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	28.1	0.4	0.8		2.8	13.5	7.2	5.8	0.0	0.0	7.8	0.0
LnGrp Delay(d),s/veh	259.9	0.9	1.7		54.5	15.3	9.2	79.0	0.0	0.0	69.3	0.0
LnGrp LOS	F	A	A		D	B	A	E			E	
Approach Vol, veh/h		1670				1731			79			262
Approach Delay, s/veh		38.7				15.4			79.0			67.2
Approach LOS		D				B			E			E

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	20.0	64.4		21.0	14.1	70.3		14.5
Change Period (Y+Rc), s	* 7.7	5.9		9.6	7.1	* 5.9		7.4
Max Green Setting (Gmax), s	* 12	56.1		12.4	22.9	* 46		8.6
Max Q Clear Time (g_c+I1), s	14.3	22.4		11.4	5.1	2.0		7.7
Green Ext Time (p_c), s	0.0	4.3		0.0	0.0	3.6		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	30.8
HCM 2010 LOS	C

Notes

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	225
Future Volume (veh/h)	225
Number	14
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Adj Sat Flow, veh/h/ln	1759
Adj Flow Rate, veh/h	29
Adj No. of Lanes	1
Peak Hour Factor	0.88
Percent Heavy Veh, %	8
Cap, veh/h	143
Arrive On Green	0.10
Sat Flow, veh/h	1495
Grp Volume(v), veh/h	29
Grp Sat Flow(s),veh/h/ln	1495
Q Serve(g_s), s	2.1
Cycle Q Clear(g_c), s	2.1
Prop In Lane	1.00
Lane Grp Cap(c), veh/h	143
V/C Ratio(X)	0.20
Avail Cap(c_a), veh/h	155
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	50.1
Incr Delay (d2), s/veh	0.3
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(95%),veh/ln	1.6
LnGrp Delay(d),s/veh	50.3
LnGrp LOS	D
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer	

User approved volume balancing among the lanes for turning movement.
User approved ignoring U-Turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	830	589	197	992	0	0	0	0	108	0	538
Future Volume (veh/h)	0	830	589	197	992	0	0	0	0	108	0	538
Number	1	6	16	5	2	12				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1667	1696	1759	0				1900	1781	1900
Adj Flow Rate, veh/h	0	912	0	216	1090	0				119	0	0
Adj No. of Lanes	0	2	1	1	2	0				0	1	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91				0.91	0.91	0.91
Percent Heavy Veh, %	0	10	14	12	8	0				0	2	0
Cap, veh/h	0	2146	927	520	2610	0				144	0	0
Arrive On Green	0.00	1.00	0.00	0.08	1.00	0.00				0.09	0.00	0.00
Sat Flow, veh/h	0	3368	1417	1616	3431	0				1696	0	0
Grp Volume(v), veh/h	0	912	0	216	1090	0				119	0	0
Grp Sat Flow(s),veh/h/ln	0	1641	1417	1616	1671	0				1696	0	0
Q Serve(g_s), s	0.0	0.0	0.0	5.1	0.0	0.0				8.3	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	5.1	0.0	0.0				8.3	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		0.00
Lane Grp Cap(c), veh/h	0	2146	927	520	2610	0				144	0	0
V/C Ratio(X)	0.00	0.42	0.00	0.42	0.42	0.00				0.83	0.00	0.00
Avail Cap(c_a), veh/h	0	2146	927	746	2610	0				253	0	0
HCM Platoon Ratio	1.00	2.00	2.00	1.33	1.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.77	0.00	0.87	0.87	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	5.0	0.0	0.0				54.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.0	0.2	0.4	0.0				4.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	0.3	0.0	4.0	0.3	0.0				7.3	0.0	0.0
LnGrp Delay(d),s/veh	0.0	0.5	0.0	5.1	0.4	0.0				58.5	0.0	0.0
LnGrp LOS		A		A	A					E		
Approach Vol, veh/h		912			1306						119	
Approach Delay, s/veh		0.5			1.2						58.5	
Approach LOS		A			A						E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		101.7		18.3	15.2	86.5		
Change Period (Y+Rc), s		* 8		* 8.1	* 8	* 8		
Max Green Setting (Gmax), s		* 86		* 18	* 24	* 54		
Max Q Clear Time (g_c+I1), s		2.0		10.3	7.1	2.0		
Green Ext Time (p_c), s		2.9		0.1	0.1	2.3		

Intersection Summary	
HCM 2010 Ctrl Delay	3.8
HCM 2010 LOS	A

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	938	0	0	736	453	268
Future Volume (veh/h)	938	0	0	736	453	268
Number	2	12	1	6	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1712	0	0	1792	1696	1727
Adj Flow Rate, veh/h	1042	0	0	818	503	298
Adj No. of Lanes	2	0	0	2	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	11	0	0	6	12	10
Cap, veh/h	2238	0	0	2343	691	323
Arrive On Green	0.23	0.00	0.00	0.23	0.22	0.22
Sat Flow, veh/h	3423	0	0	3585	3134	1468
Grp Volume(v), veh/h	1042	0	0	818	503	298
Grp Sat Flow(s),veh/h/ln	1626	0	0	1703	1567	1468
Q Serve(g_s), s	33.2	0.0	0.0	24.2	17.9	23.8
Cycle Q Clear(g_c), s	33.2	0.0	0.0	24.2	17.9	23.8
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	2238	0	0	2343	691	323
V/C Ratio(X)	0.47	0.00	0.00	0.35	0.73	0.92
Avail Cap(c_a), veh/h	2238	0	0	2343	1632	765
HCM Platoon Ratio	0.33	1.00	1.00	0.33	1.00	1.00
Upstream Filter(I)	0.64	0.00	0.00	0.92	1.00	1.00
Uniform Delay (d), s/veh	27.3	0.0	0.0	23.8	43.4	45.8
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.4	0.6	4.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	20.2	0.0	0.0	16.9	12.4	15.3
LnGrp Delay(d),s/veh	27.8	0.0	0.0	24.2	44.0	50.4
LnGrp LOS	C			C	D	D
Approach Vol, veh/h	1042			818	801	
Approach Delay, s/veh	27.8			24.2	46.4	
Approach LOS	C			C	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		88.1		31.9		88.1		
Change Period (Y+Rc), s		5.5		5.5		5.5		
Max Green Setting (Gmax), s		46.5		62.5		46.5		
Max Q Clear Time (g_c+I1), s		35.2		25.8		26.2		
Green Ext Time (p_c), s		2.3		0.6		2.0		

Intersection Summary		
HCM 2010 Ctrl Delay		32.3
HCM 2010 LOS		C

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (veh/h)	6	302	786	112	20	684	26	46	0	33	0	0	0
Future Volume (veh/h)	6	302	786	112	20	684	26	46	0	33	0	0	0
Number		5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh		0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)		1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln		1642	1743	1956	1900	1776	1727	1900	1845	1900			
Adj Flow Rate, veh/h		311	810	115	21	705	27	47	0	34			
Adj No. of Lanes		1	2	1	1	2	1	0	1	1			
Peak Hour Factor		0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97			
Percent Heavy Veh, %		16	9	1	0	7	10	0	0	0			
Cap, veh/h		874	867	435	947	781	340	71	0	65			
Arrive On Green		1.00	0.52	0.52	0.48	0.23	0.23	0.04	0.00	0.04			
Sat Flow, veh/h		1564	3312	1663	1810	3374	1468	1757	0	1615			
Grp Volume(v), veh/h		311	810	115	21	705	27	47	0	34			
Grp Sat Flow(s),veh/h/ln		1564	1656	1663	1810	1687	1468	1757	0	1615			
Q Serve(g_s), s		0.0	27.4	4.6	0.0	24.4	1.7	3.2	0.0	2.5			
Cycle Q Clear(g_c), s		0.0	27.4	4.6	0.0	24.4	1.7	3.2	0.0	2.5			
Prop In Lane		1.00		1.00	1.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h		874	867	435	947	781	340	71	0	65			
V/C Ratio(X)		0.36	0.93	0.26	0.02	0.90	0.08	0.67	0.00	0.52			
Avail Cap(c_a), veh/h		874	2219	1114	947	1052	458	72	0	66			
HCM Platoon Ratio		2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)		0.82	0.82	0.82	0.94	0.94	0.94	1.00	0.00	1.00			
Uniform Delay (d), s/veh		0.0	27.6	22.2	14.8	44.8	36.1	56.8	0.0	56.5			
Incr Delay (d2), s/veh		0.1	15.8	1.2	0.0	14.9	0.4	16.7	0.0	3.3			
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln		0.0	19.9	4.1	0.6	18.7	1.3	3.4	0.0	4.1			
LnGrp Delay(d),s/veh		0.1	43.4	23.4	14.8	59.7	36.5	73.5	0.0	59.7			
LnGrp LOS		A	D	C	B	E	D	E		E			
Approach Vol, veh/h			1236			753			81				
Approach Delay, s/veh			30.6			57.6			67.7				
Approach LOS			C			E			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		
Phs Duration (G+Y+Rc), s	6.1	40.0		13.9	69.7	36.4		
Change Period (Y+Rc), s	* 8.6	* 8.6		* 9.1	* 8.6	* 8.6		
Max Green Setting (Gmax), s	* 8.4	* 80		* 4.9	* 51	* 37		
Max Q Clear Time (g_c+I1), s	2.0	29.4		5.2	2.0	26.4		
Green Ext Time (p_c), s	0.0	2.0		0.0	0.1	1.4		

Intersection Summary	
HCM 2010 Ctrl Delay	41.9
HCM 2010 LOS	D

Notes

User approved ignoring U-Turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

User approved changes to right turn type.

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (veh/h)	9	369	421	20	10	476	125	176	1	1	42	1	69
Future Volume (veh/h)	9	369	421	20	10	476	125	176	1	1	42	1	69
Number		5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh		0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln		1846	1712	1863	1863	1810	1900	1863	1863	1863	1810	1845	1845
Adj Flow Rate, veh/h		384	439	21	10	496	130	183	1	1	44	0	73
Adj No. of Lanes		2	2	1	2	2	1	2	1	1	2	0	2
Peak Hour Factor		0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %		3	11	2	2	5	0	2	2	2	5	2	3
Cap, veh/h		1655	2059	1111	41	572	320	237	139	119	110	0	119
Arrive On Green		0.65	0.84	0.84	0.01	0.17	0.17	0.07	0.07	0.07	0.03	0.00	0.04
Sat Flow, veh/h		3411	3252	1583	3442	3438	1615	3442	1863	1583	3447	0	3136
Grp Volume(v), veh/h		384	439	21	10	496	130	183	1	1	44	0	73
Grp Sat Flow(s),veh/h/ln		1705	1626	1583	1721	1719	1615	1721	1863	1583	1723	0	1568
Q Serve(g_s), s		5.6	3.1	0.2	0.3	16.9	3.2	6.3	0.1	0.1	1.5	0.0	1.0
Cycle Q Clear(g_c), s		5.6	3.1	0.2	0.3	16.9	3.2	6.3	0.1	0.1	1.5	0.0	1.0
Prop In Lane		1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h		1655	2059	1111	41	572	320	237	139	119	110	0	119
V/C Ratio(X)		0.23	0.21	0.02	0.25	0.87	0.41	0.77	0.01	0.01	0.40	0.00	0.61
Avail Cap(c_a), veh/h		1655	2059	1111	229	997	520	258	139	119	316	0	253
HCM Platoon Ratio		1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)		0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh		12.0	3.7	2.3	58.8	48.7	23.6	54.9	51.4	51.4	56.9	0.0	8.0
Incr Delay (d2), s/veh		0.0	0.2	0.0	1.2	16.2	3.8	10.8	0.0	0.0	0.9	0.0	1.9
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln		4.8	2.6	0.2	0.3	14.3	7.0	6.0	0.1	0.1	1.3	0.0	2.1
LnGrp Delay(d),s/veh		12.0	4.0	2.3	59.9	65.0	27.4	65.7	51.4	51.4	57.8	0.0	9.9
LnGrp LOS		B	A	A	E	E	C	E	D	D	E		A
Approach Vol, veh/h			844			636			185			117	
Approach Delay, s/veh			7.6			57.2			65.6			27.9	
Approach LOS			A			E			E			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.4	83.5	12.8	15.3	65.7	26.1	17.3	10.9
Change Period (Y+Rc), s	7.0	* 7.5	9.0	* 6.3	* 7.5	6.2	9.0	6.3
Max Green Setting (Gmax), s	8.0	* 64	11.0	* 7.8	* 38	34.8	9.0	9.7
Max Q Clear Time (g_c+I1), s	2.3	5.1	3.5	2.1	7.6	18.9	8.3	3.0
Green Ext Time (p_c), s	0.0	1.0	0.0	0.0	0.2	1.1	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	32.6
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.
User approved ignoring U-Turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	206	343	130	228	24
Future Vol, veh/h	8	206	343	130	228	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	360	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	13	45	11	13	4	8
Mvmt Flow	9	240	399	151	265	28

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1228	279	293	0	-	0
Stage 1	279	-	-	-	-	-
Stage 2	949	-	-	-	-	-
Critical Hdwy	6.53	6.65	4.21	-	-	-
Critical Hdwy Stg 1	5.53	-	-	-	-	-
Critical Hdwy Stg 2	5.53	-	-	-	-	-
Follow-up Hdwy	3.617	3.705	2.299	-	-	-
Pot Cap-1 Maneuver	187	668	1219	-	-	-
Stage 1	743	-	-	-	-	-
Stage 2	359	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	126	668	1219	-	-	-
Mov Cap-2 Maneuver	~ -157	-	-	-	-	-
Stage 1	500	-	-	-	-	-
Stage 2	359	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s		6.8	0
HCM LOS	-		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1219	-	+	668	-	-
HCM Lane V/C Ratio	0.327	-	-	0.359	-	-
HCM Control Delay (s)	9.4	-	-	13.4	-	-
HCM Lane LOS	A	-	-	B	-	-
HCM 95th %tile Q(veh)	1.4	-	-	1.6	-	-

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

Movement	WBU	WBL2	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR2	NEL2	NEL
Lane Configurations												
Traffic Volume (vph)	10	1	1573	5	27	7	26	27	4	52	150	36
Future Volume (vph)	10	1	1573	5	27	7	26	27	4	52	150	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		10.9	5.7	5.7		11.1			11.2			10.8
Lane Util. Factor		1.00	0.91	1.00		1.00			1.00			1.00
Frt		1.00	1.00	0.85		0.94			0.92			1.00
Flt Protected		0.95	1.00	1.00		0.98			0.98			0.95
Satd. Flow (prot)		1776	4940	1346		1636			1688			1770
Flt Permitted		0.95	1.00	1.00		0.98			0.98			0.95
Satd. Flow (perm)		1776	4940	1346		1636			1688			1770
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	10	1	1639	5	28	7	27	28	4	54	156	38
RTOR Reduction (vph)	0	0	0	2	0	22	0	0	83	0	0	187
Lane Group Flow (vph)	0	11	1639	3	0	40	0	0	3	0	0	7
Heavy Vehicles (%)	0%	18%	5%	20%	3%	3%	12%	3%	8%	0%	2%	2%
Turn Type	Prot	Prot	NA	Perm	Split	NA		Split	NA		Perm	Prot
Protected Phases	5	5	2		4	4		3	3			1
Permitted Phases				2							1	
Actuated Green, G (s)		2.2	75.0	75.0		6.2			5.0			5.0
Effective Green, g (s)		2.2	75.0	75.0		6.2			5.0			5.0
Actuated g/C Ratio		0.02	0.58	0.58		0.05			0.04			0.04
Clearance Time (s)		10.9	5.7	5.7		11.1			11.2			10.8
Vehicle Extension (s)		1.0	1.0	1.0		1.0			1.0			1.0
Lane Grp Cap (vph)		30	2850	776		78			64			68
v/s Ratio Prot		0.01	c0.33			c0.02			c0.00			
v/s Ratio Perm				0.00								0.00
v/c Ratio		0.37	0.58	0.00		0.51			0.05			0.11
Uniform Delay, d1		63.2	17.4	11.7		60.4			60.2			60.4
Progression Factor		0.82	0.37	1.00		1.00			1.00			1.00
Incremental Delay, d2		2.3	0.7	0.0		2.4			0.1			0.3
Delay (s)		54.3	7.1	11.7		62.8			60.3			60.6
Level of Service		D	A	B		E			E			E
Approach Delay (s)			7.4			62.8			60.3			27.9
Approach LOS			A			E			E			C

Intersection Summary			
HCM 2000 Control Delay	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	38.8
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NER	NER2
Lane Configurations		
Traffic Volume (vph)	1742	13
Future Volume (vph)	1742	13
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.5	
Lane Util. Factor	0.76	
Frt	0.85	
Flt Protected	1.00	
Satd. Flow (prot)	3506	
Flt Permitted	1.00	
Satd. Flow (perm)	3506	
Peak-hour factor, PHF	0.96	0.96
Adj. Flow (vph)	1815	14
RTOR Reduction (vph)	101	0
Lane Group Flow (vph)	1728	0
Heavy Vehicles (%)	5%	8%
Turn Type	Prot	
Protected Phases	6	
Permitted Phases		
Actuated Green, G (s)	77.9	
Effective Green, g (s)	77.9	
Actuated g/C Ratio	0.60	
Clearance Time (s)	5.5	
Vehicle Extension (s)	1.0	
Lane Grp Cap (vph)	2100	
v/s Ratio Prot	c0.49	
v/s Ratio Perm		
v/c Ratio	0.82	
Uniform Delay, d1	20.6	
Progression Factor	1.00	
Incremental Delay, d2	3.8	
Delay (s)	24.4	
Level of Service	C	
Approach Delay (s)		
Approach LOS		

Intersection Summary

Lane Group	WBL2	WBT	WBR	NBT	SBT	NEL	NER
Lane Group Flow (vph)	11	1639	5	62	86	194	1829
v/c Ratio	0.16	0.56	0.01	0.55	0.25	0.54	0.76
Control Delay	53.6	6.9	0.0	57.9	1.7	5.9	17.7
Queue Delay	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Total Delay	53.6	7.1	0.0	57.9	1.7	5.9	17.7
Queue Length 50th (ft)	10	50	0	33	0	0	327
Queue Length 95th (ft)	m16	512	m0	79	0	0	645
Internal Link Dist (ft)		541		219	471	763	
Turn Bay Length (ft)	300		370			550	
Base Capacity (vph)	206	2934	902	122	368	392	2421
Starvation Cap Reductn	0	458	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.66	0.01	0.51	0.23	0.49	0.76

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (veh/h)	4	197	1521	83	9	34	1263	180	31	21	79	262
Future Volume (veh/h)	4	197	1521	83	9	34	1263	180	31	21	79	262
Number		1	6	16		5	2	12	3	8	18	7
Initial Q (Qb), veh		0	0	0		0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		1.00		1.00		1.00	1.00		1.00	1.00
Parking Bus, Adj		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln		1715	1847	1900		1900	1810	1681	1900	1866	1900	1827
Adj Flow Rate, veh/h		201	1552	85		35	1289	184	32	21	81	275
Adj No. of Lanes		1	3	0		1	3	1	0	1	0	2
Peak Hour Factor		0.98	0.98	0.98		0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %		11	3	3		0	5	13	0	0	0	4
Cap, veh/h		192	2866	157		70	2481	852	20	13	51	327
Arrive On Green		0.16	0.78	0.78		0.01	0.17	0.17	0.05	0.05	0.05	0.09
Sat Flow, veh/h		1633	4892	268		1810	4940	1429	398	261	1008	3480
Grp Volume(v), veh/h		201	1066	571		35	1289	184	134	0	0	275
Grp Sat Flow(s),veh/h/ln		1633	1680	1799		1810	1647	1429	1668	0	0	1740
Q Serve(g_s), s		15.3	15.8	15.8		2.5	31.0	11.8	6.6	0.0	0.0	10.1
Cycle Q Clear(g_c), s		15.3	15.8	15.8		2.5	31.0	11.8	6.6	0.0	0.0	10.1
Prop In Lane		1.00		0.15		1.00		1.00	0.24		0.60	1.00
Lane Grp Cap(c), veh/h		192	1969	1054		70	2481	852	85	0	0	327
V/C Ratio(X)		1.05	0.54	0.54		0.50	0.52	0.22	1.58	0.00	0.00	0.84
Avail Cap(c_a), veh/h		192	1969	1054		291	2481	852	85	0	0	466
HCM Platoon Ratio		1.33	1.33	1.33		0.33	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)		0.57	0.57	0.57		0.85	0.85	0.85	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh		54.8	7.7	7.7		62.9	39.9	21.8	61.7	0.0	0.0	57.9
Incr Delay (d2), s/veh		61.4	0.6	1.1		1.7	0.7	0.5	310.7	0.0	0.0	6.6
Initial Q Delay(d3),s/veh		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln		18.3	10.5	11.3		2.3	20.0	9.6	18.6	0.0	0.0	8.9
LnGrp Delay(d),s/veh		116.3	8.3	8.8		64.7	40.6	22.3	372.4	0.0	0.0	64.5
LnGrp LOS		F	A	A		E	D	C	F			E
Approach Vol, veh/h			1838				1508			134		
Approach Delay, s/veh			20.3				38.9			372.4		
Approach LOS			C				D			F		

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	23.0	71.2		21.8	12.1	82.1		14.0
Change Period (Y+Rc), s	* 7.7	5.9		9.6	7.1	* 5.9		7.4
Max Green Setting (Gmax), s	* 15	60.1		17.4	20.9	* 55		6.6
Max Q Clear Time (g_c+I1), s	17.3	33.0		12.1	4.5	17.8		8.6
Green Ext Time (p_c), s	0.0	3.7		0.1	0.0	4.3		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	43.6
HCM 2010 LOS	D

Notes

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (veh/h)	11	291
Future Volume (veh/h)	11	291
Number	4	14
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		1.00
Parking Bus, Adj	1.00	1.00
Adj Sat Flow, veh/h/ln	1833	1810
Adj Flow Rate, veh/h	0	25
Adj No. of Lanes	0	1
Peak Hour Factor	0.98	0.98
Percent Heavy Veh, %	0	5
Cap, veh/h	0	145
Arrive On Green	0.00	0.09
Sat Flow, veh/h	0	1538
Grp Volume(v), veh/h	0	25
Grp Sat Flow(s),veh/h/ln	0	1538
Q Serve(g_s), s	0.0	1.9
Cycle Q Clear(g_c), s	0.0	1.9
Prop In Lane		1.00
Lane Grp Cap(c), veh/h	0	145
V/C Ratio(X)	0.00	0.17
Avail Cap(c_a), veh/h	0	206
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	0.00	1.00
Uniform Delay (d), s/veh	0.0	54.2
Incr Delay (d2), s/veh	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	1.5
LnGrp Delay(d),s/veh	0.0	54.4
LnGrp LOS		D
Approach Vol, veh/h	300	
Approach Delay, s/veh	63.7	
Approach LOS	E	
Timer		

User approved volume balancing among the lanes for turning movement.
User approved ignoring U-Turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1290	581	227	1114	0	0	0	0	33	1	372
Future Volume (veh/h)	0	1290	581	227	1114	0	0	0	0	33	1	372
Number	1	6	16	5	2	12				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1845	1827	1881	1810	0				1900	1766	1900
Adj Flow Rate, veh/h	0	1316	0	232	1137	0				34	1	0
Adj No. of Lanes	0	2	1	1	2	0				0	1	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98				0.98	0.98	0.98
Percent Heavy Veh, %	0	3	4	1	5	0				0	100	0
Cap, veh/h	0	2587	1146	317	2917	0				45	1	0
Arrive On Green	0.00	0.24	0.00	0.10	1.00	0.00				0.03	0.03	0.00
Sat Flow, veh/h	0	3597	1553	1792	3529	0				1636	48	0
Grp Volume(v), veh/h	0	1316	0	232	1137	0				35	0	0
Grp Sat Flow(s),veh/h/ln	0	1752	1553	1792	1719	0				1685	0	0
Q Serve(g_s), s	0.0	42.1	0.0	4.3	0.0	0.0				2.7	0.0	0.0
Cycle Q Clear(g_c), s	0.0	42.1	0.0	4.3	0.0	0.0				2.7	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00				0.97		0.00
Lane Grp Cap(c), veh/h	0	2587	1146	317	2917	0				46	0	0
V/C Ratio(X)	0.00	0.51	0.00	0.73	0.39	0.00				0.75	0.00	0.00
Avail Cap(c_a), veh/h	0	2587	1146	643	2917	0				206	0	0
HCM Platoon Ratio	1.00	0.33	0.33	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.73	0.00	0.84	0.84	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	28.8	0.0	17.8	0.0	0.0				62.8	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.0	1.0	0.3	0.0				8.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	27.1	0.0	9.2	0.2	0.0				2.5	0.0	0.0
LnGrp Delay(d),s/veh	0.0	29.3	0.0	18.8	0.3	0.0				71.5	0.0	0.0
LnGrp LOS		C		B	A					E		
Approach Vol, veh/h		1316			1369						35	
Approach Delay, s/veh		29.3			3.5						71.5	
Approach LOS		C			A						E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		118.3		11.7	14.3	104.0		
Change Period (Y+Rc), s		* 8		* 8.1	* 8	* 8		
Max Green Setting (Gmax), s		* 98		* 16	* 30	* 60		
Max Q Clear Time (g_c+I1), s		2.0		4.7	6.3	44.1		
Green Ext Time (p_c), s		3.1		0.0	0.1	3.4		

Intersection Summary	
HCM 2010 Ctrl Delay	16.9
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1323	0	0	817	524	301
Future Volume (veh/h)	1323	0	0	817	524	301
Number	2	12	1	6	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	0	0	1881	1759	1845
Adj Flow Rate, veh/h	1364	0	0	842	540	310
Adj No. of Lanes	2	0	0	2	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	3	0	0	1	8	3
Cap, veh/h	2459	0	0	2508	695	335
Arrive On Green	1.00	0.00	0.00	1.00	0.21	0.21
Sat Flow, veh/h	3689	0	0	3762	3250	1568
Grp Volume(v), veh/h	1364	0	0	842	540	310
Grp Sat Flow(s),veh/h/ln	1752	0	0	1787	1625	1568
Q Serve(g_s), s	0.0	0.0	0.0	0.0	20.4	25.2
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	20.4	25.2
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	2459	0	0	2508	695	335
V/C Ratio(X)	0.55	0.00	0.00	0.34	0.78	0.92
Avail Cap(c_a), veh/h	2459	0	0	2508	988	476
HCM Platoon Ratio	2.00	1.00	1.00	2.00	1.00	1.00
Upstream Filter(I)	0.52	0.00	0.00	0.75	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	48.2	50.1
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.3	1.5	16.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.3	0.0	0.0	0.2	14.3	18.2
LnGrp Delay(d),s/veh	0.5	0.0	0.0	0.3	49.7	66.1
LnGrp LOS	A			A	D	E
Approach Vol, veh/h	1364			842	850	
Approach Delay, s/veh	0.5			0.3	55.6	
Approach LOS	A			A	E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		96.7		33.3		96.7		
Change Period (Y+Rc), s		5.5		5.5		5.5		
Max Green Setting (Gmax), s		79.5		39.5		79.5		
Max Q Clear Time (g_c+I1), s		2.0		27.2		2.0		
Green Ext Time (p_c), s		4.0		0.6		2.1		

Intersection Summary	
HCM 2010 Ctrl Delay	15.8
HCM 2010 LOS	B

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (veh/h)	5	464	1075	80	31	676	82	136	7	28	0	0	0
Future Volume (veh/h)	5	464	1075	80	31	676	82	136	7	28	0	0	0
Number		5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh		0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)		1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln		1793	1863	1976	1900	1881	1881	1900	1864	1900			
Adj Flow Rate, veh/h		483	1120	83	32	704	85	142	7	29			
Adj No. of Lanes		1	2	1	1	2	1	0	1	1			
Peak Hour Factor		0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %		6	2	0	0	1	1	0	0	0			
Cap, veh/h		972	1170	555	823	782	350	90	4	86			
Arrive On Green		1.00	0.66	0.66	0.41	0.22	0.22	0.05	0.05	0.05			
Sat Flow, veh/h		1708	3539	1680	1810	3574	1599	1696	84	1615			
Grp Volume(v), veh/h		483	1120	83	32	704	85	149	0	29			
Grp Sat Flow(s),veh/h/ln		1708	1770	1680	1810	1787	1599	1780	0	1615			
Q Serve(g_s), s		0.0	38.0	2.4	0.0	24.9	5.7	6.9	0.0	2.3			
Cycle Q Clear(g_c), s		0.0	38.0	2.4	0.0	24.9	5.7	6.9	0.0	2.3			
Prop In Lane		1.00		1.00	1.00		1.00	0.95		1.00			
Lane Grp Cap(c), veh/h		972	1170	555	823	782	350	94	0	86			
V/C Ratio(X)		0.50	0.96	0.15	0.04	0.90	0.24	1.58	0.00	0.34			
Avail Cap(c_a), veh/h		972	2407	1142	823	1111	497	94	0	86			
HCM Platoon Ratio		2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)		0.76	0.76	0.76	0.97	0.97	0.97	1.00	0.00	1.00			
Uniform Delay (d), s/veh		0.0	21.2	15.2	20.9	49.4	41.9	61.6	0.0	59.3			
Incr Delay (d2), s/veh		0.1	14.9	0.4	0.0	15.1	1.6	304.3	0.0	0.9			
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln		0.1	26.9	2.1	1.2	20.0	4.8	20.5	0.0	3.7			
LnGrp Delay(d),s/veh		0.1	36.1	15.6	20.9	64.5	43.5	365.8	0.0	60.2			
LnGrp LOS		A	D	B	C	E	D	F		E			
Approach Vol, veh/h			1686			821			178				
Approach Delay, s/veh			24.8			60.6			316.0				
Approach LOS			C			E			F				

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		
Phs Duration (G+Y+Rc), s	12.4	51.6		16.0	77.0	37.0		
Change Period (Y+Rc), s	* 8.6	* 8.6		* 9.1	* 8.6	* 8.6		
Max Green Setting (Gmax), s	* 8.4	* 88		* 6.9	* 56	* 40		
Max Q Clear Time (g_c+I1), s	12.0	40.0		8.9	2.0	26.9		
Green Ext Time (p_c), s	0.0	3.0		0.0	0.2	1.5		

Intersection Summary	
HCM 2010 Ctrl Delay	55.0
HCM 2010 LOS	E

Notes

User approved ignoring U-Turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

User approved changes to right turn type.

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (veh/h)	18	469	611	5	1	520	93	20	1	5	143	1	231
Future Volume (veh/h)	18	469	611	5	1	520	93	20	1	5	143	1	231
Number		5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh		0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln		1882	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h		494	643	5	1	547	98	21	1	5	151	0	33
Adj No. of Lanes		2	2	1	2	2	1	2	1	1	2	0	2
Peak Hour Factor		0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %		1	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h		1868	2494	1148	5	619	368	70	14	12	203	0	141
Arrive On Green		1.00	1.00	1.00	0.00	0.17	0.17	0.02	0.01	0.01	0.06	0.00	0.04
Sat Flow, veh/h		3477	3539	1583	3442	3539	1583	3442	1863	1583	3548	0	3167
Grp Volume(v), veh/h		494	643	5	1	547	98	21	1	5	151	0	33
Grp Sat Flow(s),veh/h/ln		1738	1770	1583	1721	1770	1583	1721	1863	1583	1774	0	1583
Q Serve(g_s), s		0.0	0.0	0.0	0.0	19.6	0.5	0.8	0.1	0.4	5.4	0.0	0.4
Cycle Q Clear(g_c), s		0.0	0.0	0.0	0.0	19.6	0.5	0.8	0.1	0.4	5.4	0.0	0.4
Prop In Lane		1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h		1868	2494	1148	5	619	368	70	14	12	203	0	141
V/C Ratio(X)		0.26	0.26	0.00	0.21	0.88	0.27	0.30	0.07	0.42	0.74	0.00	0.23
Avail Cap(c_a), veh/h		1868	2494	1148	212	947	515	556	255	217	300	0	188
HCM Platoon Ratio		2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)		0.80	0.80	0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh		0.0	0.0	0.0	64.8	52.3	24.7	62.8	64.1	64.2	60.3	0.0	6.4
Incr Delay (d2), s/veh		0.0	0.2	0.0	8.1	16.7	1.8	0.9	0.8	8.6	2.1	0.0	0.3
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln		0.0	0.1	0.0	0.0	16.4	4.3	0.7	0.1	0.4	4.9	0.0	1.0
LnGrp Delay(d),s/veh		0.0	0.2	0.0	73.0	69.0	26.5	63.6	64.9	72.8	62.5	0.0	6.7
LnGrp LOS		A	A	A	E	E	C	E	E	E	E		A
Approach Vol, veh/h			1142			646			27			184	
Approach Delay, s/veh			0.1			62.6			65.4			52.5	
Approach LOS			A			E			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.2	99.1	16.5	7.3	77.3	28.9	11.7	12.1
Change Period (Y+Rc), s	7.0	* 7.5	9.0	* 6.3	* 7.5	6.2	9.0	6.3
Max Green Setting (Gmax), s	8.0	* 64	11.0	* 18	* 38	34.8	21.0	7.7
Max Q Clear Time (g_c+I1), s	2.0	2.0	7.4	2.4	2.0	21.6	2.8	2.4
Green Ext Time (p_c), s	0.0	1.5	0.0	0.0	0.3	1.1	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	26.0
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.
User approved ignoring U-Turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	21	358	98	300	206	4
Future Vol, veh/h	21	358	98	300	206	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	360	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	5	7	40	3	4	0
Mvmt Flow	24	402	110	337	231	4

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	790	233	235	0	-	0
Stage 1	233	-	-	-	-	-
Stage 2	557	-	-	-	-	-
Critical Hdwy	6.45	6.27	4.5	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.363	2.56	-	-	-
Pot Cap-1 Maneuver	355	794	1138	-	-	-
Stage 1	799	-	-	-	-	-
Stage 2	568	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	321	794	1138	-	-	-
Mov Cap-2 Maneuver	386	-	-	-	-	-
Stage 1	721	-	-	-	-	-
Stage 2	568	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.1	2.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1138	-	386	794	-	-
HCM Lane V/C Ratio	0.097	-	0.061	0.507	-	-
HCM Control Delay (s)	8.5	-	14.9	14.1	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.2	2.9	-	-

APPENDIX B

METROQUEST SURVEY RESULTS

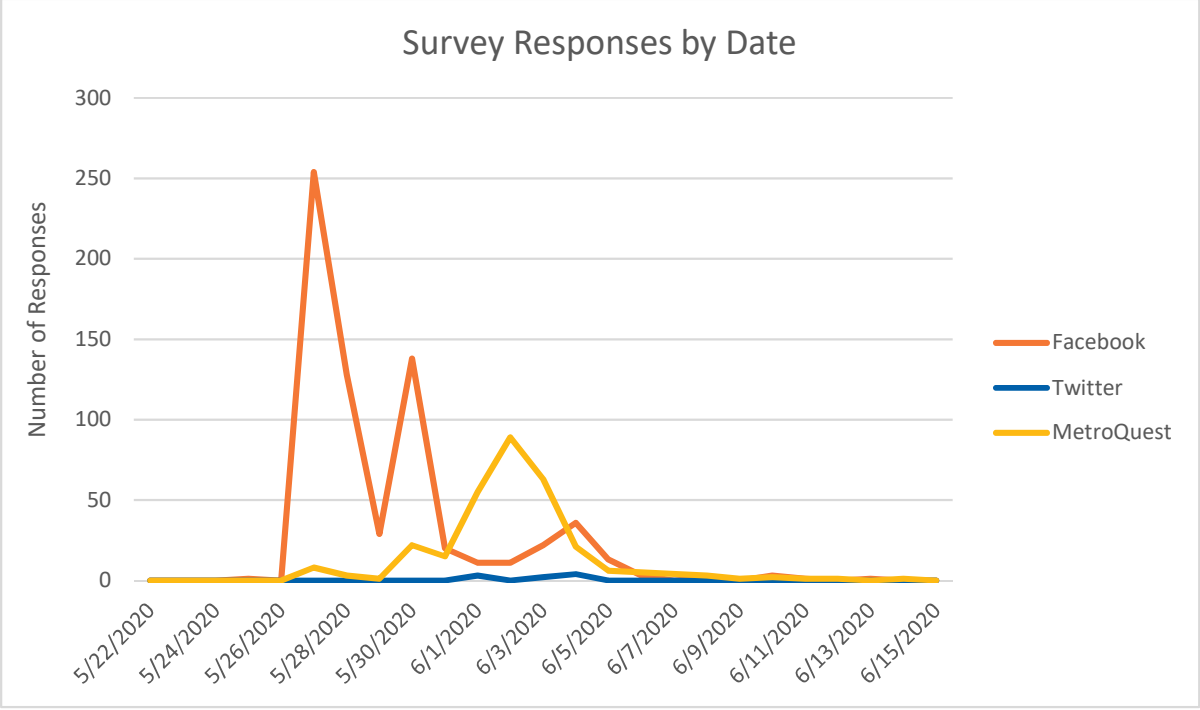
NORTH WINCHESTER INTERCHANGE ALTERNATIVES ANALYSIS METROQUEST SURVEY RESULTS

May 22, 2020 – June 15, 2020

Total Traffic

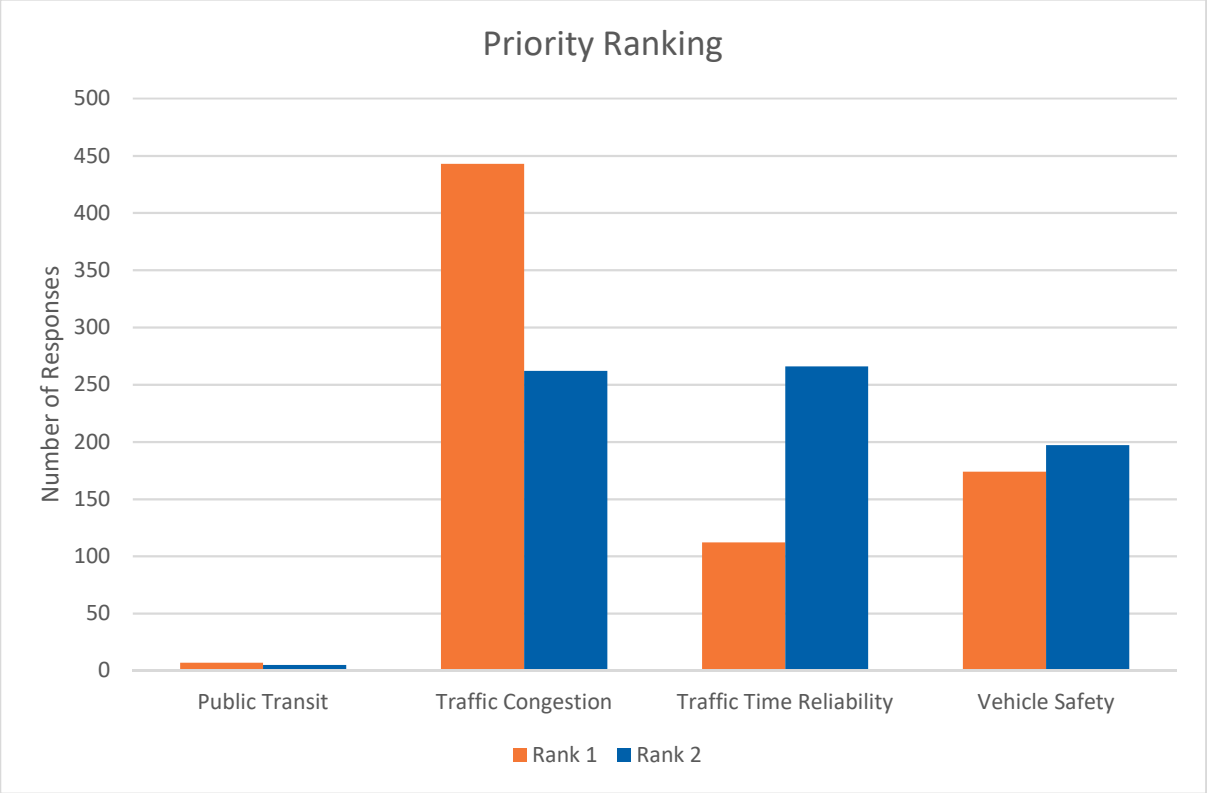
The table summarizes the number of visitors to the MetroQuest site and the number of visitors who participated in the survey by providing responses. Alternative links were used to promote the survey on different platforms such as Facebook and Twitter. 76 percent of the responses to the survey came from a mobile device. The chart below shows how much daily survey participation has occurred from each site since the survey began on May 22, 2020.

Site Visited	Visitors	Participants
MetroQuest Site	543	301
Facebook	1,180	673
Twitter	25	9
Total	**1,748**	**983**



Screen 2: Priority Rating

On Screen 2, participants were given a list of four design elements and asked to rank the two they felt were most important along this corridor. The chart below shows the results of how many times each design element was chosen and at what rank it was placed. Traffic congestion and traffic time reliability were identified as the top two priorities along the corridor by respondents.



Screen 3: Traveler Survey

On Screen 3, participates were given a series of questions to gather more information about drivers' experiences and purpose in the corridor. The following charts and tables show some of the information gathered from those questions.

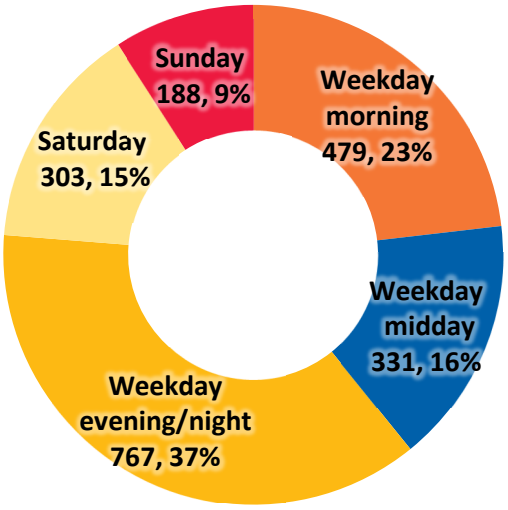
What safety issues do you typically experience?	Responses
Sudden stops and rear-end crashes	613
Aggressive or distracting driving	529
Vehicles running red lights	452
Sideswipes and weaving/merging crashes	317
Speeding	270
Limited sight distance	255
Lack of wayfinding or guide signs	112
Lack of pavement markings	77
Lack of pedestrian amenities	67
Other	53
Lack of bicycle amenities	44

What mobility issues do you typically experience?	Responses
Frequent congestion and long delays	824
Difficulty merging/changing lanes	556
Unreliable travel times	527
Vehicles blocking business entrances or other roads	426
Difficulty crossing Martinsburg Pike	375
Difficulty making left turns/U-turns	310
Frequent accidents restricting travel lanes	305
Challenges riding a bicycle in the corridor	35
Difficulty walking along the corridor	30
Other	11

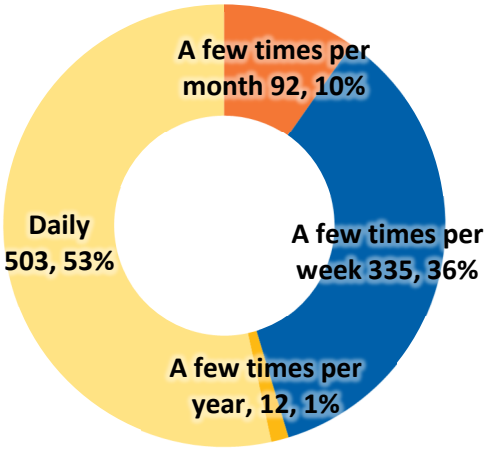
What mode(s) of travel do you use in the corridor?	Responses
Personal Vehicle	869
Truck or Commercial Vehicle	69
Taxi, Uber, Lyft	22
Bicycling	12
Walking	10
Other	10
Carpool, Vanpool	7
Bus	4

Where do your trips in the corridor take you?	Responses
Shopping / Errands / Entertainment	728
Access to I-81	723
Access to Winchester Bypass	576
Home	552
Work	497
Access to Winchester	486
Traveling to a destination outside the study area	308
School	83
Other	68

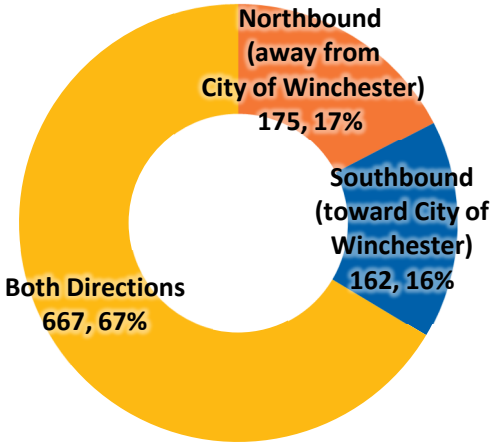
When do you experience safety issues?



How often do you travel the section of Martinsburg Pike?

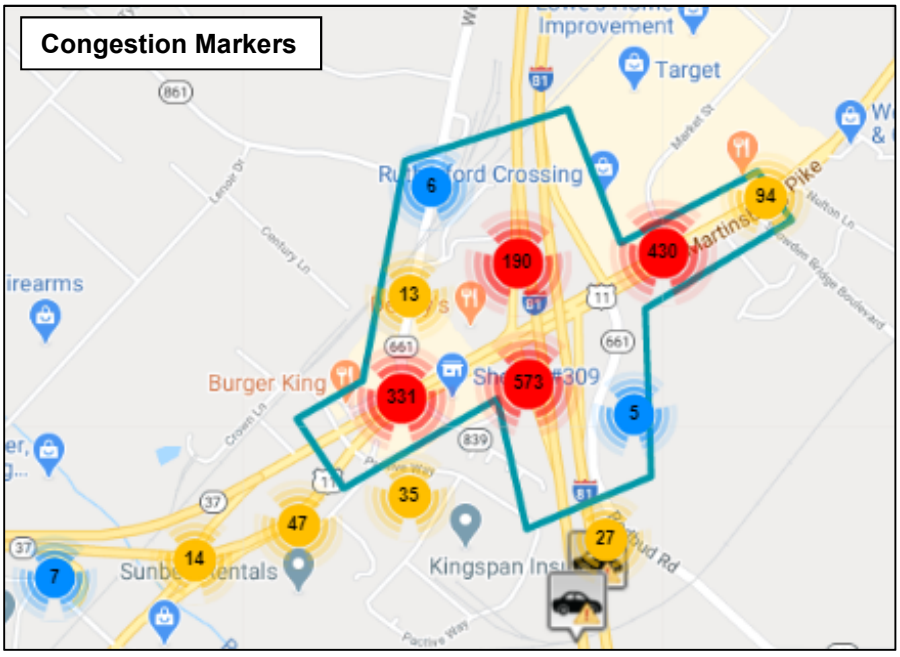


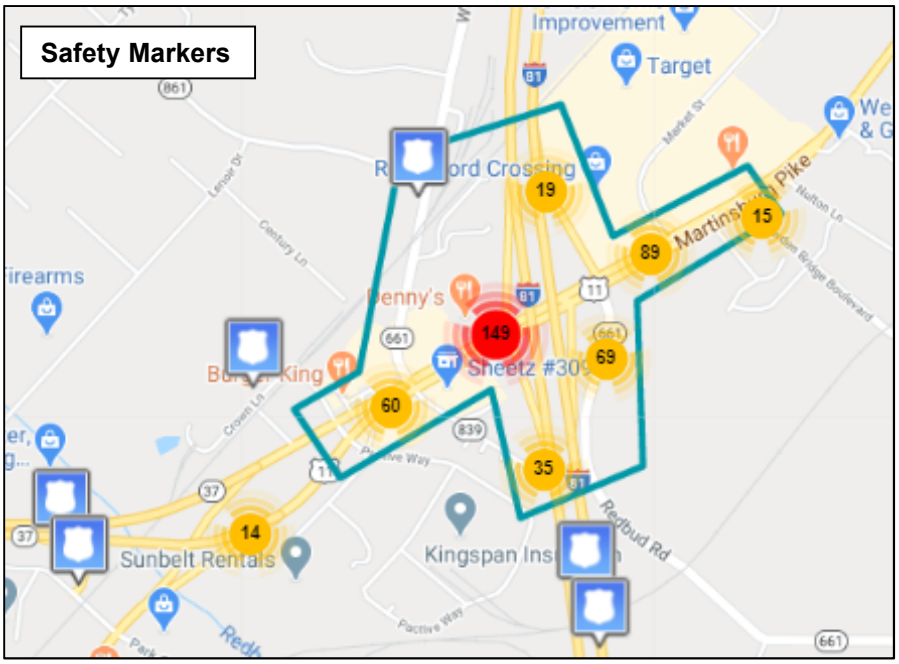
In which direction do you typically experience congestion?



Screen 4: Map Marker

On Screen 4, participants were given a marker to place on a map and bring attention to location-specific issues. The image below shows a summary heat map of the markers placed for congestion and safety issues.





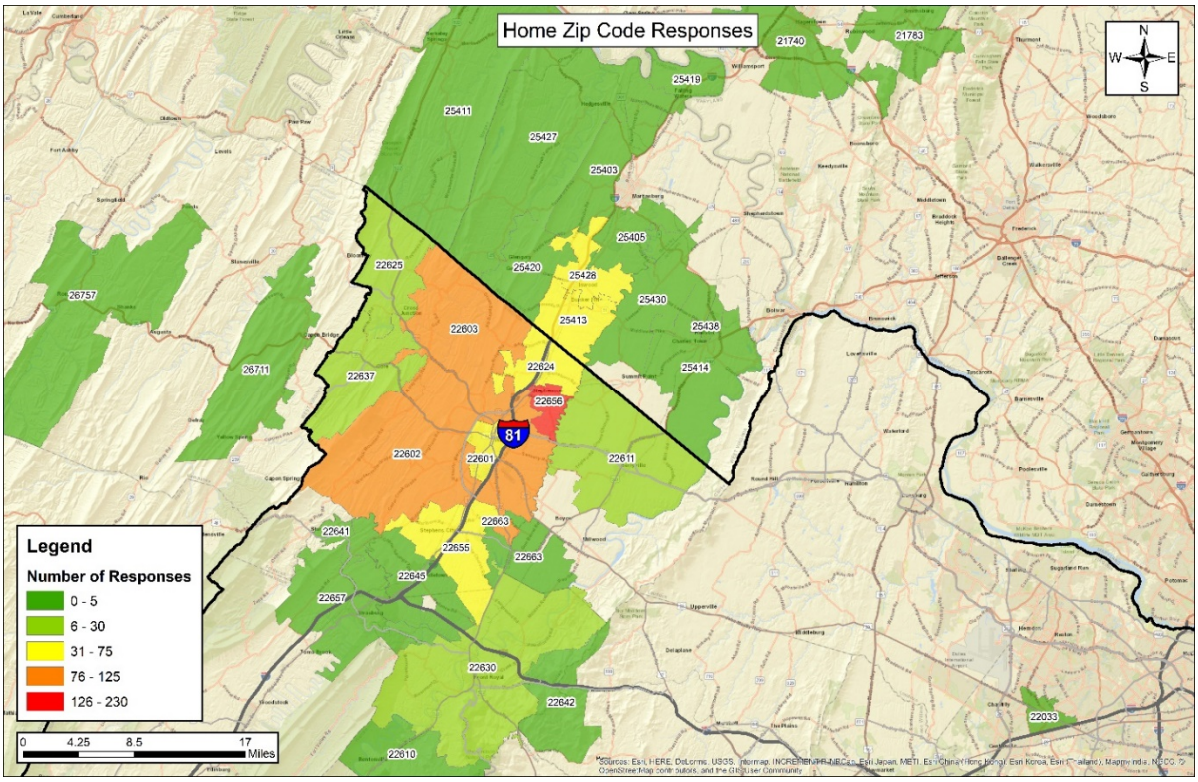
Participants indicated most congestion on US 11 between Welltown Road and Market Street, which aligns with our existing conditions analysis findings. The intersection at Welltown Road/Amoco Lane was also noted by participants as having congestion issues. After placing the marker, participants were asked when they experienced the congestion and in which direction it occurred. 67 percent of respondents stated that congestion is experienced in both directions of travel.

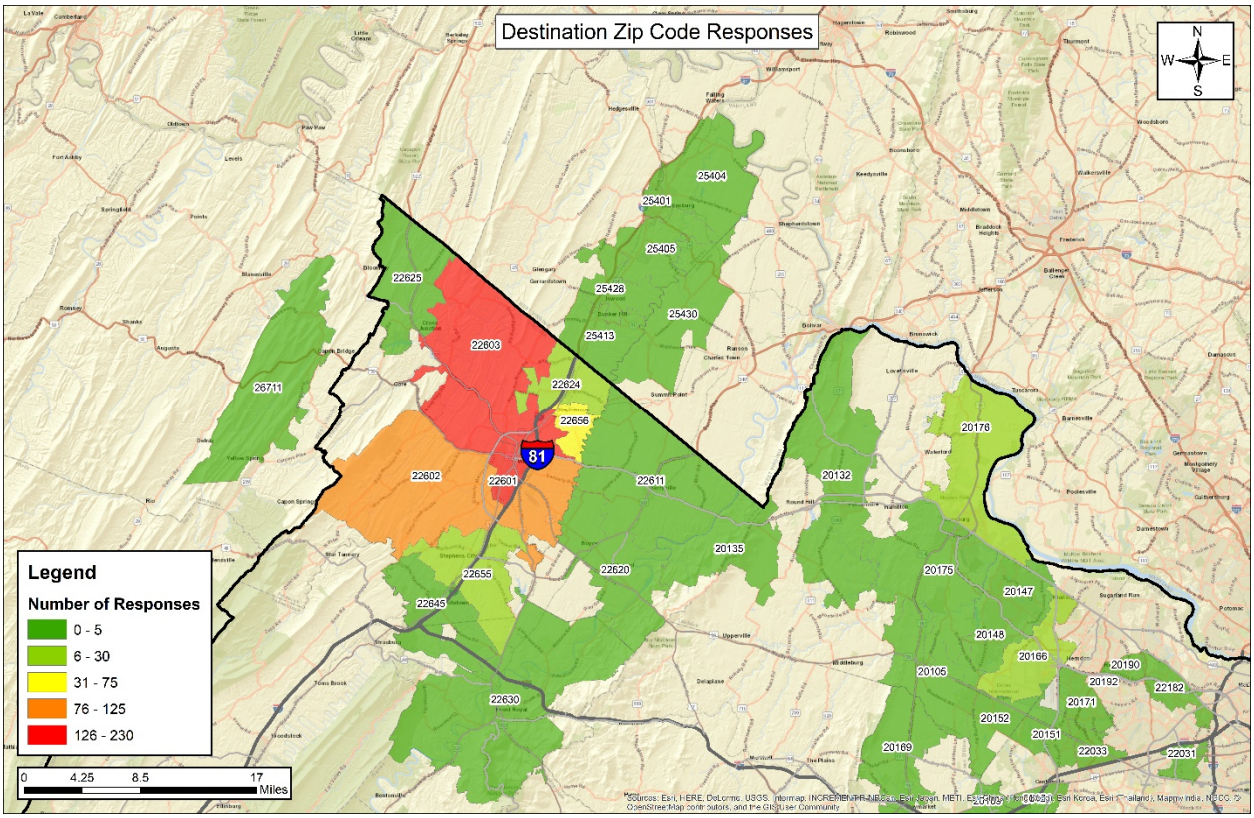
Safety markers were placed the second most frequently, highlighting most often concerns about intersection queues extending onto I-81. Most of the safety markers were placed by participants at the intersection of US 11 and I-81 Southbound Ramps. A summary of the number of markers placed by category is shown below.

Map Marker	Total Placed	Percent of Total Markers
Congestion	1,788	70%
Mobility	229	9%
Multimodal	23	1%
Safety	464	18%
Other Issues	49	2%
Total	**2,553**	

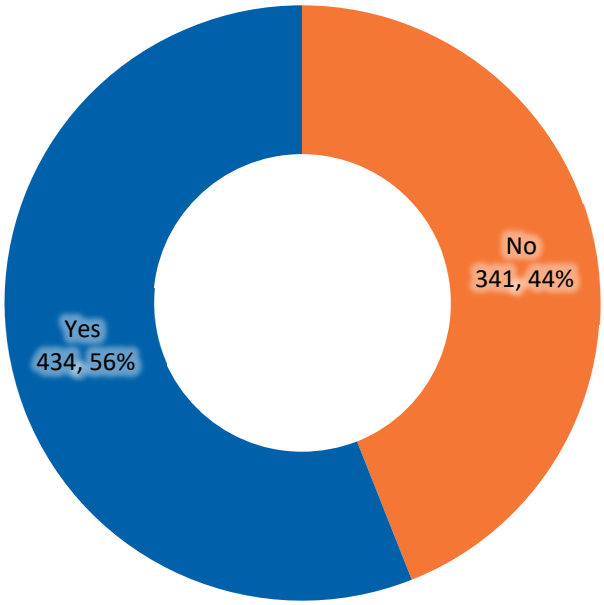
Screen 5: Thank You Screen

On Screen 5, the participants were asked to provide their home zip code and typical destination zip code. The images below show a summary of the user information provided from this screen.

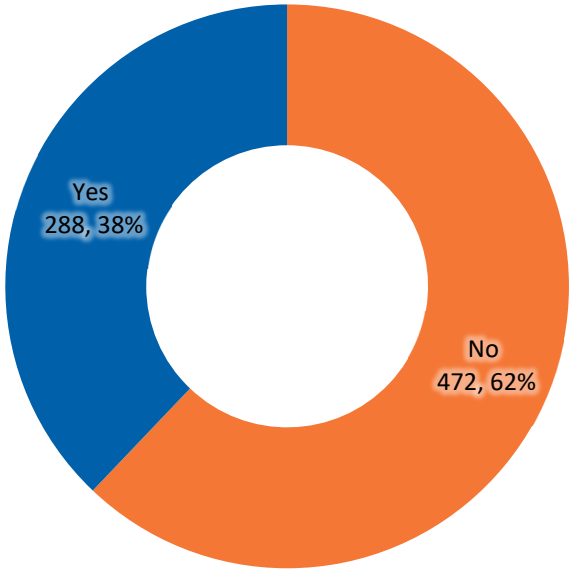



Destination Zip Code Responses
N
W
E
S
Legend
Number of Responses
0 - 5
6 - 30
31 - 75
76 - 125
126 - 230
0
4.25
8.5
17
Miles
81
25404
25401
25405
25428
25430
25413
22625
22603
22624
22656
26711
22602
22601
22611
20132
20176
20135
22620
22655
22645
20175
20147
20148
20166
20190
20192
22182
20105
20171
22630
20152
20151
20169
22033
22031

Do you live along or near the corridor?



Do you work along or near the corridor?



APPENDIX C

NO-BUILD CONDITIONS OPERATIONAL ANALYSIS

HCM 2010 - Intersection Delay and LOS
2030 No Build Conditions
North Winchester IAAR

	Intersection Number and Description	Type of Control	Lane Group	Northbound				Southbound				Eastbound				Westbound				Overall	
				AM		PM		AM		PM		AM		PM		AM		PM		AM	PM
				Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS		
1	US 11 at Pactiv Way/Crown Ln*			Pactiv Way				Crown Ln				US 11				US 11				Intersection	
		Signal	Left	59.1	E	71.9	E	55.4	E	60.4	E	55.4	E	60.2	E	33.9	C	48.8	D	Delay	Delay
			Through									87.0	F	131.0	F	7.1	A	12.2	B	47.3	74.7
			Right													11.0	B	11.7	B	LOS	LOS
			Approach	59.1	E	71.9	E	55.4	E	60.4	E	85.3	F	124.9	F	7.6	A	12.5	B	D	E
2	US 11 at Amoco Ln/ Welltown Rd			Amoco Ln				Welltown Rd				US 11				US 11				Intersection	
		Signal	Left	95.4	F	563.2	F	103.0	F	70.2	E	419.7	F	212.3	F	53.6	D	64.9	E	Delay	Delay
			Through									0.4	A	23.7	C	6.3	A	49.0	D	37.3	62.8
			Right					58.9	E	56.6	E					2.7	A	23.2	C	LOS	LOS
			Approach	95.4	F	563.2	F	92.0	F	67.0	E	56.9	E	42.4	D	7.1	A	46.2	D	D	E
3	US 11 at I-81 SB Off-Ramp			-				I-81 SB Off Ramp				US 11				US 11				Intersection	
		Signal	Left													10.0	A	55.0	D	Delay	Delay
			Through					75.1	E	68.6	E	1.0	A	41.8	D	1.2	A	0.6	A	6.1	26.8
			Right									0.0	A	0.0	A					LOS	LOS
			Approach					75.1	E	68.6	E	1.0	A	41.8	D	2.8	A	10.9	B	A	C
4	US 11 at I-81 NB Off-Ramp			I-81 NB Off Ramp				-				US 11				US 11				Intersection	
		Signal	Left	32.4	C	41.9	D													Delay	Delay
			Through									34.0	C	1.2	A	40.2	D	0.1	A	38.0	18.5
			Right	52.5	D	104.0	F													LOS	LOS
			Approach	41.0	D	68.1	E					34.0	C	1.2	A	40.2	D	0.1	A	D	B
5	US 11 at Redbud Rd/ I-81 NB On Ramp			Red Bud Rd				-				US 11				US 11				Intersection	
		Signal	Left	113.5	F	560.5	F					5.1	A	5.8	A	23.6	C	27.0	C	Delay	Delay
			Through									29.4	C	147.7	F	94.9	F	78.8	E	51.9	116.4
			Right	116.5	F	65.0	E					8.2	A	8.3	A	29.6	C	35.0	C	LOS	LOS
			Approach	114.9	F	461.4	F					22.6	C	107.5	F	90.8	F	71.6	E	D	F
6	US 11 at Snowden Bridge Boulevard/ Merchant Street			Snowden Bridge Boulevard				Merchant Street				US 11				US 11				Intersection	
		Signal	Left	161.2	F	63.0	E	58.0	E	74.7	E	9.3	A	7.1	A	59.0	E	69.0	E	Delay	Delay
			Through	51.0	D	64.0	E					0.4	A	0.3	A	59.5	E	66.8	E	39.6	28.9
			Right	51.0	D	71.4	E	23.2	C	44.3	D	0.0	A	0.0	A	21.7	C	17.9	B	LOS	LOS
			Approach	160.4	F	64.5	E	36.3	D	61.6	E	4.4	A	3.3	A	51.8	D	59.4	E	D	C
7	Welltown Rd at McGhee Rd			Welltown Rd				Welltown Rd				McGhee Rd				-				Intersection	
		Stop	Left	11.0	B	8.9	A					6.4	A	20.9	C					Delay	Delay
			Through	†	†	†	†	†	†	†	†									-	-
			Right									17.2	C	20.0	C					LOS	LOS
			Approach	8.0	A	2.2	A	†	†	†	†	16.8	C	20.8	C					-	-

Notes:

Shared lane results are shown as one value that corresponds to all movements in that lane.

† Delay for movements with no conflicting movements have not been included.

* Delay resluts are from HCM 2000 due to non-standard NEMA phasing

Synchro Capacity Analysis (HCM 2010) - 95th Percentile Queue Length
2030 No Build Conditions
North Winchester IAAR

Intersection Number and Description		Type of Control	Lane Group	Northbound			Southbound			Eastbound			Westbound		
				Storage Bay Length	AM Queue (ft)	PM Queue (ft)	Storage Bay Length	AM Queue (ft)	PM Queue (ft)	Storage Bay Length	AM Queue (ft)	PM Queue (ft)	Storage Bay Length	AM Queue (ft)	PM Queue (ft)
1	US 11 at Pactiv Way/Crown Ln*			Pactiv Way			Crown Ln			US 11			US 11		
		Signal	Left	-	29	#100	-	0	0	550	0	38	300	m33	m17
			Through							-	#990	#1342	-	72	m724
			Right										370	m0	m0
2	US 11 at Amoco Ln/Welltown Rd			Amoco Ln			Welltown Rd			US 11			US 11		
		Signal	Left	-	205	668	250	283	283	-	1010	675	325	98	80
			Through				-	0	0	-	5	613	-	263	683
			Right				250	158	170	-	8	670	-	78	315
3	US 11 at I-81 SB Off-Ramp			-			I-81 SB Off Ramp			US 11			US 11		
		Signal	Left				-	308	95				300	205	520
			Through							-	10	1,025	-	43	10
			Right							-	0	0			
4	US 11 at I-81 NB Off-Ramp			I-81 NB Off-Ramp			-			US 11			US 11		
		Signal	Left	575	343	418									
			Left												
			Through							-	695	18	-	653	3
			Right	485	615	1,118									
5	US 11 at Redbud Rd/I-81 NB On Ramp			Red Bud Rd			-			US 11			US 11		
		Signal	Left	-	140	743				125	80	153	150	33	58
			Through							-	1053	2,208	-	1135	1,128
			Right	100	208	158				75	58	38	250	48	173
6	US 11 at Snowden Bridge Boulevard/Merchant Street			Snowden Bridge Boulevard			Merchant Street			US 11			US 11		
		Signal	Left	300	363	28	200	53	215	450	160	170	350	13	3
			Left												
			Through	-	3	3	-	0	0	-	5	5	-	533	635
			Right	250	3	15	150	93	183	1,000	0	0	275	238	145
7	Welltown Rd at McGhee			Welltown Rd			Welltown Rd			McGhee Rd			-		
		One Way Stop	Left	360	65	13				-	0	10			
			Through	-	-	-	-	-	-						
			Right							-	73	148			

Notes:

HCM 2010 95th percentile queue length results, assuming an average vehicle length of 25 feet, reported for unsignalized and signalized intersections.

Shared lane results are shown as one value that corresponds to all movements in that lane.

† SYNCHRO does not provide queue length for movements with no conflicting volumes.

95th percentile volume exceeds capacity, queue may be longer.

m Volume for 95th percentile queue is metered by upstream signal

* Delay results are from HCM 2000 due to non-standard NEMA phasing

Movement	WBU	WBL2	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR2	NEL2	NEL
Lane Configurations												
Traffic Volume (vph)	25	12	2008	5	3	2	13	20	8	54	80	33
Future Volume (vph)	25	12	2008	5	3	2	13	20	8	54	80	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		10.9	5.7	5.7		11.1			11.2			10.8
Lane Util. Factor		1.00	0.91	1.00		1.00			1.00			1.00
Frt		1.00	1.00	0.85		0.90			0.91			1.00
Flt Protected		0.95	1.00	1.00		0.99			0.99			0.95
Satd. Flow (prot)		1781	4803	1077		1353			1658			1739
Flt Permitted		0.95	1.00	1.00		0.99			0.99			0.95
Satd. Flow (perm)		1781	4803	1077		1353			1658			1739
Peak-hour factor, PHF	0.92	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	27	13	2256	6	3	2	15	22	9	61	90	37
RTOR Reduction (vph)	0	0	0	3	0	15	0	0	88	0	0	122
Lane Group Flow (vph)	0	40	2256	3	0	5	0	0	4	0	0	5
Heavy Vehicles (%)	2%	0%	8%	50%	17%	2%	30%	9%	10%	0%	0%	13%
Turn Type	Prot	Prot	NA	Perm	Split	NA		Split	NA		Perm	Prot
Protected Phases	5	5	2		4	4		3	3			1
Permitted Phases				2							1	
Actuated Green, G (s)		5.5	68.8	68.8		2.4			5.0			5.0
Effective Green, g (s)		5.5	68.8	68.8		2.4			5.0			5.0
Actuated g/C Ratio		0.05	0.57	0.57		0.02			0.04			0.04
Clearance Time (s)		10.9	5.7	5.7		11.1			11.2			10.8
Vehicle Extension (s)		1.0	1.0	1.0		1.0			1.0			1.0
Lane Grp Cap (vph)		81	2753	617		27			69			72
v/s Ratio Prot		0.02	c0.47			c0.00			c0.00			
v/s Ratio Perm				0.00								0.00
v/c Ratio		0.49	0.82	0.01		0.20			0.06			0.07
Uniform Delay, d1		55.9	20.6	11.0		57.9			55.2			55.3
Progression Factor		0.59	0.28	1.00		1.00			1.00			1.00
Incremental Delay, d2		0.8	1.4	0.0		1.3			0.1			0.2
Delay (s)		33.9	7.1	11.0		59.1			55.4			55.4
Level of Service		C	A	B		E			E			E
Approach Delay (s)			7.6			59.1			55.4			85.3
Approach LOS			A			E			E			F

Intersection Summary			
HCM 2000 Control Delay	47.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	38.8
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NER	NER2
Lane Configurations		
Traffic Volume (vph)	1970	36
Future Volume (vph)	1970	36
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.5	
Lane Util. Factor	0.76	
Frt	0.85	
Flt Protected	1.00	
Satd. Flow (prot)	3349	
Flt Permitted	1.00	
Satd. Flow (perm)	3349	
Peak-hour factor, PHF	0.89	0.89
Adj. Flow (vph)	2213	40
RTOR Reduction (vph)	118	0
Lane Group Flow (vph)	2135	0
Heavy Vehicles (%)	10%	7%
Turn Type	Prot	
Protected Phases	6	
Permitted Phases		
Actuated Green, G (s)	68.4	
Effective Green, g (s)	68.4	
Actuated g/C Ratio	0.57	
Clearance Time (s)	5.5	
Vehicle Extension (s)	1.0	
Lane Grp Cap (vph)	1908	
v/s Ratio Prot	c0.64	
v/s Ratio Perm		
v/c Ratio	1.12	
Uniform Delay, d1	25.8	
Progression Factor	1.00	
Incremental Delay, d2	61.2	
Delay (s)	87.0	
Level of Service	F	
Approach Delay (s)		
Approach LOS		

Intersection Summary

Lane Group	WBL2	WBT	WBR	NBT	SBT	NEL	NER
Lane Group Flow (vph)	40	2256	6	20	92	127	2253
v/c Ratio	0.42	0.75	0.01	0.27	0.24	0.33	1.00
Control Delay	38.6	5.7	0.0	38.1	1.5	2.3	39.6
Queue Delay	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Total Delay	38.6	5.9	0.0	38.1	1.5	2.3	39.6
Queue Length 50th (ft)	30	49	0	4	0	0	587
Queue Length 95th (ft)	m33	72	m0	29	0	0	#990
Internal Link Dist (ft)		541		219	471	721	
Turn Bay Length (ft)	300		370			550	
Base Capacity (vph)	120	3022	779	91	396	421	2255
Starvation Cap Reductn	0	198	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.80	0.01	0.22	0.23	0.30	1.00

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	273	1679	76	9	59	1734	330	28	33	27	247	22
Future Volume (veh/h)	273	1679	76	9	59	1734	330	28	33	27	247	22
Number	1	6	16		5	2	12	3	8	18	7	4
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1743	1714	1900		1852	1759	1667	1900	1766	1900	1532	1522
Adj Flow Rate, veh/h	310	1908	86		67	1970	375	32	38	31	299	0
Adj No. of Lanes	1	3	0		1	3	1	0	1	0	2	0
Peak Hour Factor	0.88	0.88	0.88		0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	9	11	11		3	8	14	8	8	8	24	29
Cap, veh/h	170	2372	107		103	2245	809	37	44	36	302	0
Arrive On Green	0.20	1.00	1.00		0.12	0.94	0.94	0.07	0.07	0.07	0.10	0.00
Sat Flow, veh/h	1660	4592	207		1763	4803	1417	523	621	506	2919	0
Grp Volume(v), veh/h	310	1295	699		67	1970	375	101	0	0	299	0
Grp Sat Flow(s),veh/h/ln	1660	1560	1678		1763	1601	1417	1650	0	0	1459	0
Q Serve(g_s), s	12.3	0.0	0.0		4.4	17.8	3.5	7.3	0.0	0.0	12.3	0.0
Cycle Q Clear(g_c), s	12.3	0.0	0.0		4.4	17.8	3.5	7.3	0.0	0.0	12.3	0.0
Prop In Lane	1.00		0.12		1.00		1.00	0.32		0.31	1.00	
Lane Grp Cap(c), veh/h	170	1612	867		103	2245	809	118	0	0	302	0
V/C Ratio(X)	1.82	0.80	0.81		0.65	0.88	0.46	0.85	0.00	0.00	0.99	0.00
Avail Cap(c_a), veh/h	170	1612	867		337	2245	809	118	0	0	302	0
HCM Platoon Ratio	2.00	2.00	2.00		2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.09		0.68	0.68	0.68	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	47.7	0.0	0.0		51.8	2.7	1.4	55.1	0.0	0.0	53.7	0.0
Incr Delay (d2), s/veh	372.0	0.4	0.8		1.7	3.6	1.3	40.4	0.0	0.0	49.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	40.4	0.2	0.3		3.9	10.5	3.1	8.2	0.0	0.0	11.3	0.0
LnGrp Delay(d),s/veh	419.7	0.4	0.8		53.6	6.3	2.7	95.4	0.0	0.0	103.0	0.0
LnGrp LOS	F	A	A		D	A	A	F			F	
Approach Vol, veh/h		2304				2412			101			399
Approach Delay, s/veh		56.9				7.1			95.4			92.0
Approach LOS		E				A			F			F

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	20.0	62.0		22.0	14.1	67.9		16.0
Change Period (Y+Rc), s	* 7.7	5.9		9.6	7.1	* 5.9		7.4
Max Green Setting (Gmax), s	* 12	56.1		12.4	22.9	* 46		8.6
Max Q Clear Time (g_c+I1), s	14.3	19.8		14.3	6.4	2.0		9.3
Green Ext Time (p_c), s	0.0	7.2		0.0	0.0	6.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	37.3
HCM 2010 LOS	D

Notes

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	288
Future Volume (veh/h)	288
Number	14
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Adj Sat Flow, veh/h/ln	1759
Adj Flow Rate, veh/h	100
Adj No. of Lanes	1
Peak Hour Factor	0.88
Percent Heavy Veh, %	8
Cap, veh/h	155
Arrive On Green	0.10
Sat Flow, veh/h	1495
Grp Volume(v), veh/h	100
Grp Sat Flow(s),veh/h/ln	1495
Q Serve(g_s), s	7.7
Cycle Q Clear(g_c), s	7.7
Prop In Lane	1.00
Lane Grp Cap(c), veh/h	155
V/C Ratio(X)	0.65
Avail Cap(c_a), veh/h	155
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	51.7
Incr Delay (d2), s/veh	7.2
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(95%),veh/ln	6.3
LnGrp Delay(d),s/veh	58.9
LnGrp LOS	E
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer	

User approved volume balancing among the lanes for turning movement.
User approved ignoring U-Turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1208	754	321	1443	0	0	0	0	176	0	689
Future Volume (veh/h)	0	1208	754	321	1443	0	0	0	0	176	0	689
Number	1	6	16	5	2	12				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1667	1696	1759	0				1900	1782	1900
Adj Flow Rate, veh/h	0	1327	0	353	1586	0				193	0	0
Adj No. of Lanes	0	2	1	1	2	0				0	1	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91				0.91	0.91	0.91
Percent Heavy Veh, %	0	10	14	12	8	0				0	2	0
Cap, veh/h	0	1838	793	448	2463	0				219	0	0
Arrive On Green	0.00	1.00	0.00	0.15	0.98	0.00				0.13	0.00	0.00
Sat Flow, veh/h	0	3368	1417	1616	3431	0				1698	0	0
Grp Volume(v), veh/h	0	1327	0	353	1586	0				193	0	0
Grp Sat Flow(s),veh/h/ln	0	1641	1417	1616	1671	0				1698	0	0
Q Serve(g_s), s	0.0	0.0	0.0	11.1	3.1	0.0				13.4	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	11.1	3.1	0.0				13.4	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		0.00
Lane Grp Cap(c), veh/h	0	1838	793	448	2463	0				219	0	0
V/C Ratio(X)	0.00	0.72	0.00	0.79	0.64	0.00				0.88	0.00	0.00
Avail Cap(c_a), veh/h	0	1838	793	593	2463	0				253	0	0
HCM Platoon Ratio	1.00	2.00	2.00	1.33	1.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.38	0.00	0.68	0.68	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	7.5	0.3	0.0				51.4	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.0	0.0	2.5	0.9	0.0				23.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	0.4	0.0	8.2	1.7	0.0				12.3	0.0	0.0
LnGrp Delay(d),s/veh	0.0	1.0	0.0	10.0	1.2	0.0				75.1	0.0	0.0
LnGrp LOS		A		B	A					E		
Approach Vol, veh/h		1327			1939						193	
Approach Delay, s/veh		1.0			2.8						75.1	
Approach LOS		A			A						E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		96.4		23.6	21.2	75.2		
Change Period (Y+Rc), s		* 8		* 8.1	* 8	* 8		
Max Green Setting (Gmax), s		* 86		* 18	* 24	* 54		
Max Q Clear Time (g_c+I1), s		5.1		15.4	13.1	2.0		
Green Ext Time (p_c), s		5.1		0.1	0.1	3.9		

Intersection Summary	
HCM 2010 Ctrl Delay	6.1
HCM 2010 LOS	A

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1384	0	0	1184	580	437
Future Volume (veh/h)	1384	0	0	1184	580	437
Number	2	12	1	6	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1712	0	0	1792	1696	1727
Adj Flow Rate, veh/h	1538	0	0	1316	644	486
Adj No. of Lanes	2	0	0	2	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	11	0	0	6	12	10
Cap, veh/h	1825	0	0	1911	1088	510
Arrive On Green	0.38	0.00	0.00	0.19	0.35	0.35
Sat Flow, veh/h	3423	0	0	3585	3134	1468
Grp Volume(v), veh/h	1538	0	0	1316	644	486
Grp Sat Flow(s),veh/h/ln	1626	0	0	1703	1567	1468
Q Serve(g_s), s	51.8	0.0	0.0	43.3	20.3	38.8
Cycle Q Clear(g_c), s	51.8	0.0	0.0	43.3	20.3	38.8
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1825	0	0	1911	1088	510
V/C Ratio(X)	0.84	0.00	0.00	0.69	0.59	0.95
Avail Cap(c_a), veh/h	1825	0	0	1911	1632	765
HCM Platoon Ratio	0.67	1.00	1.00	0.33	1.00	1.00
Upstream Filter(I)	0.27	0.00	0.00	0.53	1.00	1.00
Uniform Delay (d), s/veh	32.6	0.0	0.0	39.1	32.2	38.2
Incr Delay (d2), s/veh	1.4	0.0	0.0	1.1	0.2	14.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	27.8	0.0	0.0	26.1	13.7	24.6
LnGrp Delay(d),s/veh	34.0	0.0	0.0	40.2	32.4	52.5
LnGrp LOS	C			D	C	D
Approach Vol, veh/h	1538			1316	1130	
Approach Delay, s/veh	34.0			40.2	41.0	
Approach LOS	C			D	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		72.8		47.2		72.8		
Change Period (Y+Rc), s		5.5		5.5		5.5		
Max Green Setting (Gmax), s		46.5		62.5		46.5		
Max Q Clear Time (g_c+I1), s		53.8		40.8		45.3		
Green Ext Time (p_c), s		0.0		0.9		0.6		

Intersection Summary	
HCM 2010 Ctrl Delay	38.0
HCM 2010 LOS	D

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (veh/h)	10	387	1281	143	33	1115	42	59	0	54	0	0	0
Future Volume (veh/h)	10	387	1281	143	33	1115	42	59	0	54	0	0	0
Number		5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh		0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)		1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln		1643	1743	1956	1900	1776	1727	1900	1845	1900			
Adj Flow Rate, veh/h		399	1321	147	34	1149	43	61	0	56			
Adj No. of Lanes		1	2	1	1	2	1	0	1	1			
Peak Hour Factor		0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97			
Percent Heavy Veh, %		16	9	1	0	7	10	0	0	0			
Cap, veh/h		730	1307	656	706	1052	458	72	0	66			
Arrive On Green		0.86	0.79	0.79	0.35	0.31	0.31	0.04	0.00	0.04			
Sat Flow, veh/h		1565	3312	1663	1810	3374	1468	1757	0	1615			
Grp Volume(v), veh/h		399	1321	147	34	1149	43	61	0	56			
Grp Sat Flow(s),veh/h/ln		1565	1656	1663	1810	1687	1468	1757	0	1615			
Q Serve(g_s), s		0.0	47.4	2.7	0.0	37.4	2.5	4.1	0.0	4.1			
Cycle Q Clear(g_c), s		0.0	47.4	2.7	0.0	37.4	2.5	4.1	0.0	4.1			
Prop In Lane		1.00		1.00	1.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h		730	1307	656	706	1052	458	72	0	66			
V/C Ratio(X)		0.55	1.01	0.22	0.05	1.09	0.09	0.85	0.00	0.85			
Avail Cap(c_a), veh/h		730	2219	1114	706	1052	458	72	0	66			
HCM Platoon Ratio		2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)		0.32	0.32	0.32	0.76	0.76	0.76	1.00	0.00	1.00			
Uniform Delay (d), s/veh		4.9	12.6	7.9	23.6	41.3	29.3	57.2	0.0	57.2			
Incr Delay (d2), s/veh		0.2	16.8	0.3	0.0	53.6	0.3	56.3	0.0	59.3			
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln		3.2	42.1	2.3	1.3	45.4	1.9	5.6	0.0	8.3			
LnGrp Delay(d),s/veh		5.1	29.4	8.2	23.6	94.9	29.6	113.5	0.0	116.5			
LnGrp LOS		A	F	A	C	F	C	F		F			
Approach Vol, veh/h			1867			1226			117				
Approach Delay, s/veh			22.6			90.6			114.9				
Approach LOS			C			F			F				

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		
Phs Duration (G+Y+Rc), s	17.1	58.9		14.0	60.0	46.0		
Change Period (Y+Rc), s	* 8.6	* 8.6		* 9.1	* 8.6	* 8.6		
Max Green Setting (Gmax), s	* 8.4	* 80		* 4.9	* 51	* 37		
Max Q Clear Time (g_c+I1), s	12.0	49.4		6.1	2.0	39.4		
Green Ext Time (p_c), s	0.0	3.8		0.0	0.2	0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	51.9
HCM 2010 LOS	D

Notes

User approved ignoring U-Turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (veh/h)	15	601	686	33	16	776	204	287	1	1	68	1	112
Future Volume (veh/h)	15	601	686	33	16	776	204	287	1	1	68	1	112
Number		5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh		0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln		1846	1712	1863	1863	1810	1900	1863	1863	1863	1810	1845	1845
Adj Flow Rate, veh/h		626	715	34	17	808	212	299	1	1	71	0	118
Adj No. of Lanes		2	2	1	2	2	1	2	1	1	2	0	2
Peak Hour Factor		0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %		3	11	2	2	5	0	2	2	2	5	2	3
Cap, veh/h		1319	2009	1097	62	880	474	258	145	124	130	0	128
Arrive On Green		0.77	1.00	1.00	0.02	0.26	0.26	0.08	0.08	0.08	0.04	0.00	0.04
Sat Flow, veh/h		3411	3252	1583	3442	3438	1615	3442	1863	1583	3447	0	3136
Grp Volume(v), veh/h		626	715	34	17	808	212	299	1	1	71	0	118
Grp Sat Flow(s),veh/h/ln		1705	1626	1583	1721	1719	1615	1721	1863	1583	1723	0	1568
Q Serve(g_s), s		7.9	0.0	0.0	0.6	27.4	6.0	9.0	0.1	0.1	2.4	0.0	2.1
Cycle Q Clear(g_c), s		7.9	0.0	0.0	0.6	27.4	6.0	9.0	0.1	0.1	2.4	0.0	2.1
Prop In Lane		1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h		1319	2009	1097	62	880	474	258	145	124	130	0	128
V/C Ratio(X)		0.47	0.36	0.03	0.27	0.92	0.45	1.16	0.01	0.01	0.55	0.00	0.92
Avail Cap(c_a), veh/h		1319	2009	1097	229	997	529	258	145	124	316	0	253
HCM Platoon Ratio		2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)		0.77	0.77	0.77	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh		9.2	0.0	0.0	58.1	43.4	18.7	55.5	51.0	51.0	56.7	0.0	13.0
Incr Delay (d2), s/veh		0.1	0.4	0.0	0.9	16.1	3.0	105.7	0.0	0.0	1.3	0.0	10.2
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln		6.4	0.2	0.0	0.5	21.3	9.5	14.5	0.1	0.1	2.1	0.0	3.7
LnGrp Delay(d),s/veh		9.3	0.4	0.0	59.0	59.5	21.7	161.2	51.0	51.0	58.0	0.0	23.2
LnGrp LOS		A	A	A	E	E	C	F	D	D	E		C
Approach Vol, veh/h			1375			1037			301			189	
Approach Delay, s/veh			4.4			51.8			160.4			36.3	
Approach LOS			A			D			F			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.2	81.6	13.5	15.7	53.9	36.9	18.0	11.2
Change Period (Y+Rc), s	7.0	* 7.5	9.0	* 6.3	* 7.5	6.2	9.0	6.3
Max Green Setting (Gmax), s	8.0	* 64	11.0	* 7.8	* 38	34.8	9.0	9.7
Max Q Clear Time (g_c+I1), s	2.6	2.0	4.4	2.1	9.9	29.4	11.0	4.1
Green Ext Time (p_c), s	0.0	1.7	0.0	0.0	0.4	1.3	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	39.6
HCM 2010 LOS	D

Notes

User approved volume balancing among the lanes for turning movement.
User approved ignoring U-Turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	7.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	264	461	175	293	31
Future Vol, veh/h	10	264	461	175	293	31
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	360	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	13	45	11	13	4	8
Mvmt Flow	12	307	536	203	341	36

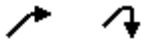
Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1634	359	377	0	-	0
Stage 1	359	-	-	-	-	-
Stage 2	1275	-	-	-	-	-
Critical Hdwy	6.53	6.65	4.21	-	-	-
Critical Hdwy Stg 1	5.53	-	-	-	-	-
Critical Hdwy Stg 2	5.53	-	-	-	-	-
Follow-up Hdwy	3.617	3.705	2.299	-	-	-
Pot Cap-1 Maneuver	105	599	1134	-	-	-
Stage 1	683	-	-	-	-	-
Stage 2	249	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	55	599	1134	-	-	-
Mov Cap-2 Maneuver	2629	-	-	-	-	-
Stage 1	360	-	-	-	-	-
Stage 2	249	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.8	8	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1134	-	2629	599	-	-
HCM Lane V/C Ratio	0.473	-	0.004	0.512	-	-
HCM Control Delay (s)	11	-	6.4	17.2	-	-
HCM Lane LOS	B	-	A	C	-	-
HCM 95th %tile Q(veh)	2.6	-	0	2.9	-	-

Movement	WBU	WBL2	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR2	NEL2	NEL
Lane Configurations												
Traffic Volume (vph)	15	1	2143	6	27	7	33	50	4	65	192	46
Future Volume (vph)	15	1	2143	6	27	7	33	50	4	65	192	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		10.9	5.7	5.7		11.1			11.2			10.8
Lane Util. Factor		1.00	0.91	1.00		1.00			1.00			1.00
Frt		1.00	1.00	0.85		0.93			0.93			1.00
Flt Protected		0.95	1.00	1.00		0.98			0.98			0.95
Satd. Flow (prot)		1786	4940	1346		1618			1697			1770
Flt Permitted		0.95	1.00	1.00		0.98			0.98			0.95
Satd. Flow (perm)		1786	4940	1346		1618			1697			1770
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	16	1	2232	6	28	7	34	52	4	68	200	48
RTOR Reduction (vph)	0	0	0	3	0	27	0	0	119	0	0	237
Lane Group Flow (vph)	0	17	2232	3	0	42	0	0	5	0	0	11
Heavy Vehicles (%)	0%	18%	5%	20%	3%	3%	12%	3%	8%	0%	2%	2%
Turn Type	Prot	Prot	NA	Perm	Split	NA		Split	NA		Perm	Prot
Protected Phases	5	5	2		4	4		3	3			1
Permitted Phases				2							1	
Actuated Green, G (s)		5.1	75.0	75.0		5.6			5.0			5.6
Effective Green, g (s)		5.1	75.0	75.0		5.6			5.0			5.6
Actuated g/C Ratio		0.04	0.58	0.58		0.04			0.04			0.04
Clearance Time (s)		10.9	5.7	5.7		11.1			11.2			10.8
Vehicle Extension (s)		1.0	1.0	1.0		1.0			1.0			1.0
Lane Grp Cap (vph)		70	2850	776		69			65			76
v/s Ratio Prot		0.01	c0.45			c0.03			c0.00			
v/s Ratio Perm				0.00								0.01
v/c Ratio		0.24	0.78	0.00		0.61			0.07			0.14
Uniform Delay, d1		60.6	21.2	11.7		61.1			60.3			59.9
Progression Factor		0.80	0.51	1.00		1.00			1.00			1.00
Incremental Delay, d2		0.4	1.3	0.0		10.8			0.2			0.3
Delay (s)		48.8	12.2	11.7		71.9			60.4			60.2
Level of Service		D	B	B		E			E			E
Approach Delay (s)			12.5			71.9			60.4			124.9
Approach LOS			B			E			E			F

Intersection Summary			
HCM 2000 Control Delay	74.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	38.8
Intersection Capacity Utilization	94.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	NER	NER2
Lane Configurations		
Traffic Volume (vph)	2472	17
Future Volume (vph)	2472	17
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.5	
Lane Util. Factor	0.76	
Frt	0.85	
Flt Protected	1.00	
Satd. Flow (prot)	3506	
Flt Permitted	1.00	
Satd. Flow (perm)	3506	
Peak-hour factor, PHF	0.96	0.96
Adj. Flow (vph)	2575	18
RTOR Reduction (vph)	106	0
Lane Group Flow (vph)	2487	0
Heavy Vehicles (%)	5%	8%
Turn Type	Prot	
Protected Phases	6	
Permitted Phases		
Actuated Green, G (s)	75.6	
Effective Green, g (s)	75.6	
Actuated g/C Ratio	0.58	
Clearance Time (s)	5.5	
Vehicle Extension (s)	1.0	
Lane Grp Cap (vph)	2038	
v/s Ratio Prot	c0.71	
v/s Ratio Perm		
v/c Ratio	1.22	
Uniform Delay, d1	27.2	
Progression Factor	1.00	
Incremental Delay, d2	103.8	
Delay (s)	131.0	
Level of Service	F	
Approach Delay (s)		
Approach LOS		

Intersection Summary

Lane Group	WBL2	WBT	WBR	NBT	SBT	NEL	NER
Lane Group Flow (vph)	17	2232	6	69	124	248	2593
v/c Ratio	0.15	0.76	0.01	0.64	0.36	0.68	1.10
Control Delay	45.9	11.9	0.0	63.7	2.8	12.6	73.2
Queue Delay	0.0	2.7	0.0	0.0	0.0	0.0	1.2
Total Delay	45.9	14.7	0.0	63.7	2.8	12.6	74.4
Queue Length 50th (ft)	14	495	0	34	0	0	~997
Queue Length 95th (ft)	m17	m724	m0	#100	0	38	#1342
Internal Link Dist (ft)		541		219	471	763	
Turn Bay Length (ft)	300		370			550	
Base Capacity (vph)	207	2932	901	117	369	392	2363
Starvation Cap Reductn	0	564	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	4	0	57
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.94	0.01	0.59	0.34	0.63	1.12

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (veh/h)	5	252	2207	106	12	48	1748	253	40	27	101	335
Future Volume (veh/h)	5	252	2207	106	12	48	1748	253	40	27	101	335
Number		1	6	16		5	2	12	3	8	18	7
Initial Q (Qb), veh		0	0	0		0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		1.00		1.00		1.00	1.00		1.00	1.00
Parking Bus, Adj		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln		1715	1846	1900		1900	1810	1681	1900	1866	1900	1827
Adj Flow Rate, veh/h		257	2252	108		49	1784	258	41	28	103	352
Adj No. of Lanes		1	3	0		1	3	1	0	1	0	2
Peak Hour Factor		0.98	0.98	0.98		0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %		11	3	3		0	5	13	0	0	0	4
Cap, veh/h		192	2751	131		81	2373	852	20	14	51	403
Arrive On Green		0.12	0.56	0.56		0.01	0.16	0.16	0.05	0.05	0.05	0.12
Sat Flow, veh/h		1633	4930	235		1810	4940	1429	398	272	1000	3480
Grp Volume(v), veh/h		257	1531	829		49	1784	258	172	0	0	352
Grp Sat Flow(s),veh/h/ln		1633	1680	1805		1810	1647	1429	1670	0	0	1740
Q Serve(g_s), s		15.3	48.1	48.8		3.5	44.9	16.3	6.6	0.0	0.0	12.9
Cycle Q Clear(g_c), s		15.3	48.1	48.8		3.5	44.9	16.3	6.6	0.0	0.0	12.9
Prop In Lane		1.00		0.13		1.00		1.00	0.24		0.60	1.00
Lane Grp Cap(c), veh/h		192	1875	1007		81	2373	852	85	0	0	403
V/C Ratio(X)		1.34	0.82	0.82		0.61	0.75	0.30	2.03	0.00	0.00	0.87
Avail Cap(c_a), veh/h		192	1875	1007		291	2373	852	85	0	0	466
HCM Platoon Ratio		1.00	1.00	1.00		0.33	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)		0.09	0.09	0.09		0.74	0.74	0.74	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh		57.3	23.3	23.5		62.9	47.3	22.5	61.7	0.0	0.0	56.5
Incr Delay (d2), s/veh		154.9	0.4	0.7		2.0	1.7	0.7	501.5	0.0	0.0	13.7
Initial Q Delay(d3),s/veh		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln		27.0	24.5	26.8		3.2	27.3	12.6	26.7	0.0	0.0	11.3
LnGrp Delay(d),s/veh		212.3	23.7	24.2		64.9	49.0	23.2	563.2	0.0	0.0	70.2
LnGrp LOS		F	C	C		E	D	C	F			E
Approach Vol, veh/h			2617				2091			172		
Approach Delay, s/veh			42.4				46.2			563.2		
Approach LOS			D				D			F		

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	23.0	68.3		24.7	12.9	78.4		14.0
Change Period (Y+Rc), s	* 7.7	5.9		9.6	7.1	* 5.9		7.4
Max Green Setting (Gmax), s	* 15	60.1		17.4	20.9	* 55		6.6
Max Q Clear Time (g_c+I1), s	17.3	46.9		14.9	5.5	50.8		8.6
Green Ext Time (p_c), s	0.0	4.8		0.1	0.0	2.8		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	62.8
HCM 2010 LOS	E

Notes

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (veh/h)	14	372
Future Volume (veh/h)	14	372
Number	4	14
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		1.00
Parking Bus, Adj	1.00	1.00
Adj Sat Flow, veh/h/ln	1832	1810
Adj Flow Rate, veh/h	0	108
Adj No. of Lanes	0	1
Peak Hour Factor	0.98	0.98
Percent Heavy Veh, %	0	5
Cap, veh/h	0	178
Arrive On Green	0.00	0.12
Sat Flow, veh/h	0	1538
Grp Volume(v), veh/h	0	108
Grp Sat Flow(s),veh/h/ln	0	1538
Q Serve(g_s), s	0.0	8.7
Cycle Q Clear(g_c), s	0.0	8.7
Prop In Lane		1.00
Lane Grp Cap(c), veh/h	0	178
V/C Ratio(X)	0.00	0.61
Avail Cap(c_a), veh/h	0	206
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	0.00	1.00
Uniform Delay (d), s/veh	0.0	54.7
Incr Delay (d2), s/veh	0.0	1.9
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	6.8
LnGrp Delay(d),s/veh	0.0	56.6
LnGrp LOS		E
Approach Vol, veh/h	460	
Approach Delay, s/veh	67.0	
Approach LOS	E	
Timer		

User approved volume balancing among the lanes for turning movement.
User approved ignoring U-Turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1911	744	370	1585	0	0	0	0	54	1	476
Future Volume (veh/h)	0	1911	744	370	1585	0	0	0	0	54	1	476
Number	1	6	16	5	2	12				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1845	1827	1881	1810	0				1900	1770	1900
Adj Flow Rate, veh/h	0	1950	0	378	1617	0				55	1	0
Adj No. of Lanes	0	2	1	1	2	0				0	1	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98				0.98	0.98	0.98
Percent Heavy Veh, %	0	3	4	1	5	0				0	100	0
Cap, veh/h	0	2067	916	395	2867	0				70	1	0
Arrive On Green	0.00	0.40	0.00	0.37	1.00	0.00				0.04	0.04	0.00
Sat Flow, veh/h	0	3597	1553	1792	3529	0				1657	30	0
Grp Volume(v), veh/h	0	1950	0	378	1617	0				56	0	0
Grp Sat Flow(s),veh/h/ln	0	1752	1553	1792	1719	0				1687	0	0
Q Serve(g_s), s	0.0	69.8	0.0	21.6	0.0	0.0				4.3	0.0	0.0
Cycle Q Clear(g_c), s	0.0	69.8	0.0	21.6	0.0	0.0				4.3	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00				0.98		0.00
Lane Grp Cap(c), veh/h	0	2067	916	395	2867	0				71	0	0
V/C Ratio(X)	0.00	0.94	0.00	0.96	0.56	0.00				0.79	0.00	0.00
Avail Cap(c_a), veh/h	0	2067	916	481	2867	0				206	0	0
HCM Platoon Ratio	1.00	0.67	0.67	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.37	0.00	0.73	0.73	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	37.2	0.0	33.6	0.0	0.0				61.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	4.6	0.0	21.4	0.6	0.0				6.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	41.0	0.0	20.8	0.4	0.0				3.8	0.0	0.0
LnGrp Delay(d),s/veh	0.0	41.8	0.0	55.0	0.6	0.0				68.6	0.0	0.0
LnGrp LOS		D		D	A					E		
Approach Vol, veh/h		1950			1995						56	
Approach Delay, s/veh		41.8			10.9						68.6	
Approach LOS		D			B						E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		116.4		13.6	31.8	84.7		
Change Period (Y+Rc), s		* 8		* 8.1	* 8	* 8		
Max Green Setting (Gmax), s		* 98		* 16	* 30	* 60		
Max Q Clear Time (g_c+I1), s		2.0		6.3	23.6	71.8		
Green Ext Time (p_c), s		5.2		0.1	0.1	0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	26.8
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1965	0	0	1284	671	491
Future Volume (veh/h)	1965	0	0	1284	671	491
Number	2	12	1	6	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	0	0	1881	1759	1845
Adj Flow Rate, veh/h	2026	0	0	1324	692	506
Adj No. of Lanes	2	0	0	2	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	3	0	0	1	8	3
Cap, veh/h	2143	0	0	2186	988	476
Arrive On Green	1.00	0.00	0.00	1.00	0.30	0.30
Sat Flow, veh/h	3689	0	0	3762	3250	1568
Grp Volume(v), veh/h	2026	0	0	1324	692	506
Grp Sat Flow(s),veh/h/ln	1752	0	0	1787	1625	1568
Q Serve(g_s), s	0.0	0.0	0.0	0.0	24.5	39.5
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	24.5	39.5
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	2143	0	0	2186	988	476
V/C Ratio(X)	0.95	0.00	0.00	0.61	0.70	1.06
Avail Cap(c_a), veh/h	2143	0	0	2186	988	476
HCM Platoon Ratio	2.00	1.00	1.00	2.00	1.00	1.00
Upstream Filter(I)	0.09	0.00	0.00	0.09	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	40.0	45.3
Incr Delay (d2), s/veh	1.2	0.0	0.0	0.1	1.9	58.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.7	0.0	0.0	0.1	16.7	44.7
LnGrp Delay(d),s/veh	1.2	0.0	0.0	0.1	41.9	104.0
LnGrp LOS	A			A	D	F
Approach Vol, veh/h	2026			1324	1198	
Approach Delay, s/veh	1.2			0.1	68.1	
Approach LOS	A			A	E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		85.0		45.0		85.0		
Change Period (Y+Rc), s		5.5		5.5		5.5		
Max Green Setting (Gmax), s		79.5		39.5		79.5		
Max Q Clear Time (g_c+I1), s		2.0		41.5		2.0		
Green Ext Time (p_c), s		8.0		0.0		3.8		

Intersection Summary	
HCM 2010 Ctrl Delay	18.5
HCM 2010 LOS	B

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (veh/h)	8	594	1752	102	51	1102	134	174	11	46	0	0	0
Future Volume (veh/h)	8	594	1752	102	51	1102	134	174	11	46	0	0	0
Number		5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh		0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)		1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln		1794	1863	1976	1900	1881	1881	1900	1865	1900			
Adj Flow Rate, veh/h		619	1825	106	53	1148	140	181	11	48			
Adj No. of Lanes		1	2	1	1	2	1	0	1	1			
Peak Hour Factor		0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %		6	2	0	0	1	1	0	0	0			
Cap, veh/h		797	1408	668	695	1111	497	89	5	86			
Arrive On Green		0.87	0.80	0.80	0.35	0.31	0.31	0.05	0.05	0.05			
Sat Flow, veh/h		1708	3539	1680	1810	3574	1599	1679	102	1615			
Grp Volume(v), veh/h		619	1825	106	53	1148	140	192	0	48			
Grp Sat Flow(s),veh/h/ln		1708	1770	1680	1810	1787	1599	1781	0	1615			
Q Serve(g_s), s		7.3	51.7	1.9	0.0	40.4	8.6	6.9	0.0	3.8			
Cycle Q Clear(g_c), s		7.3	51.7	1.9	0.0	40.4	8.6	6.9	0.0	3.8			
Prop In Lane		1.00		1.00	1.00		1.00	0.94		1.00			
Lane Grp Cap(c), veh/h		797	1408	668	695	1111	497	95	0	86			
V/C Ratio(X)		0.78	1.30	0.16	0.08	1.03	0.28	2.03	0.00	0.56			
Avail Cap(c_a), veh/h		797	2407	1142	695	1111	497	95	0	86			
HCM Platoon Ratio		2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)		0.17	0.17	0.17	0.81	0.81	0.81	1.00	0.00	1.00			
Uniform Delay (d), s/veh		5.0	13.3	8.2	27.0	44.8	33.8	61.6	0.0	60.1			
Incr Delay (d2), s/veh		0.8	134.4	0.1	0.0	33.4	1.1	498.9	0.0	5.0			
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln		6.1	88.3	1.5	2.3	45.1	6.9	29.7	0.0	6.3			
LnGrp Delay(d),s/veh		5.8	147.7	8.3	27.0	78.2	35.0	560.5	0.0	65.0			
LnGrp LOS		A	F	A	C	F	C	F		E			
Approach Vol, veh/h			2550			1341			240				
Approach Delay, s/veh			107.5			71.6			461.4				
Approach LOS			F			E			F				

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		
Phs Duration (G+Y+Rc), s	9.5	64.5		16.0	65.0	49.0		
Change Period (Y+Rc), s	* 8.6	* 8.6		* 9.1	* 8.6	* 8.6		
Max Green Setting (Gmax), s	* 8.4	* 88		* 6.9	* 56	* 40		
Max Q Clear Time (g_c+I1), s	2.0	53.7		8.9	9.3	42.4		
Green Ext Time (p_c), s	0.0	6.3		0.0	0.2	0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	116.4
HCM 2010 LOS	F

Notes

User approved ignoring U-Turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (veh/h)	29	764	997	8	2	848	152	33	1	8	233	1	377
Future Volume (veh/h)	29	764	997	8	2	848	152	33	1	8	233	1	377
Number		5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh		0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln		1882	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h		804	1049	8	2	893	160	35	1	8	245	0	187
Adj No. of Lanes		2	2	1	2	2	1	2	1	1	2	0	2
Peak Hour Factor		0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %		1	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h		1453	2386	1111	9	938	552	95	20	17	296	0	210
Arrive On Green		0.84	1.00	1.00	0.00	0.27	0.27	0.03	0.01	0.01	0.08	0.00	0.07
Sat Flow, veh/h		3477	3539	1583	3442	3539	1583	3442	1863	1583	3548	0	3167
Grp Volume(v), veh/h		804	1049	8	2	893	160	35	1	8	245	0	187
Grp Sat Flow(s),veh/h/ln		1738	1770	1583	1721	1770	1583	1721	1863	1583	1774	0	1583
Q Serve(g_s), s		9.2	0.0	0.0	0.1	32.2	0.9	1.3	0.1	0.7	8.8	0.0	3.3
Cycle Q Clear(g_c), s		9.2	0.0	0.0	0.1	32.2	0.9	1.3	0.1	0.7	8.8	0.0	3.3
Prop In Lane		1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h		1453	2386	1111	9	938	552	95	20	17	296	0	210
V/C Ratio(X)		0.55	0.44	0.01	0.22	0.95	0.29	0.37	0.05	0.47	0.83	0.00	0.89
Avail Cap(c_a), veh/h		1453	2386	1111	212	947	556	556	255	217	300	0	210
HCM Platoon Ratio		2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)		0.58	0.58	0.58	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh		7.0	0.0	0.0	64.7	47.0	16.6	62.1	63.7	63.9	58.7	0.0	11.6
Incr Delay (d2), s/veh		0.2	0.3	0.0	4.3	19.8	1.3	0.9	0.4	7.4	16.0	0.0	32.7
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln		6.8	0.2	0.0	0.1	25.4	5.8	1.1	0.1	0.6	8.6	0.0	7.3
LnGrp Delay(d),s/veh		7.1	0.3	0.0	69.0	66.8	17.9	63.0	64.0	71.4	74.7	0.0	44.3
LnGrp LOS		A	A	A	E	E	B	E	E	E	E		D
Approach Vol, veh/h			1861			1055			44			432	
Approach Delay, s/veh			3.3			59.4			64.5			61.6	
Approach LOS			A			E			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.3	95.1	19.8	7.7	61.8	40.7	12.6	14.9
Change Period (Y+Rc), s	7.0	* 7.5	9.0	* 6.3	* 7.5	6.2	9.0	6.3
Max Green Setting (Gmax), s	8.0	* 64	11.0	* 18	* 38	34.8	21.0	7.7
Max Q Clear Time (g_c+I1), s	12.1	2.0	10.8	2.7	11.2	34.2	3.3	5.3
Green Ext Time (p_c), s	0.0	2.7	0.0	0.0	0.5	0.2	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	28.9
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.
User approved ignoring U-Turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	8.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	27	458	132	400	263	5
Future Vol, veh/h	27	458	132	400	263	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	360	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	5	7	40	3	4	0
Mvmt Flow	30	515	148	449	296	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1044	299	302	0	-	0
Stage 1	299	-	-	-	-	-
Stage 2	745	-	-	-	-	-
Critical Hdwy	6.45	6.27	4.5	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.363	2.56	-	-	-
Pot Cap-1 Maneuver	250	729	1071	-	-	-
Stage 1	746	-	-	-	-	-
Stage 2	464	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	216	729	1071	-	-	-
Mov Cap-2 Maneuver	271	-	-	-	-	-
Stage 1	643	-	-	-	-	-
Stage 2	464	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.8	2.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1071	-	271	729	-	-
HCM Lane V/C Ratio	0.138	-	0.112	0.706	-	-
HCM Control Delay (s)	8.9	-	20	20.9	-	-
HCM Lane LOS	A	-	C	C	-	-
HCM 95th %tile Q(veh)	0.5	-	0.4	5.9	-	-

APPENDIX D

CONCEPT DEVELOPMENT AND SCREENING

North Winchester Area Plan Phase II

No-Build Conditions and Alternatives Screening

September 25, 2019

Kimley»Horn

0

Meeting Agenda

- North Winchester Interchange 2030 No-Build Conditions
  - Peak Hour Traffic Volumes
  - Traffic Operations
- Preferred Alternatives
- Additional Alternative Screening

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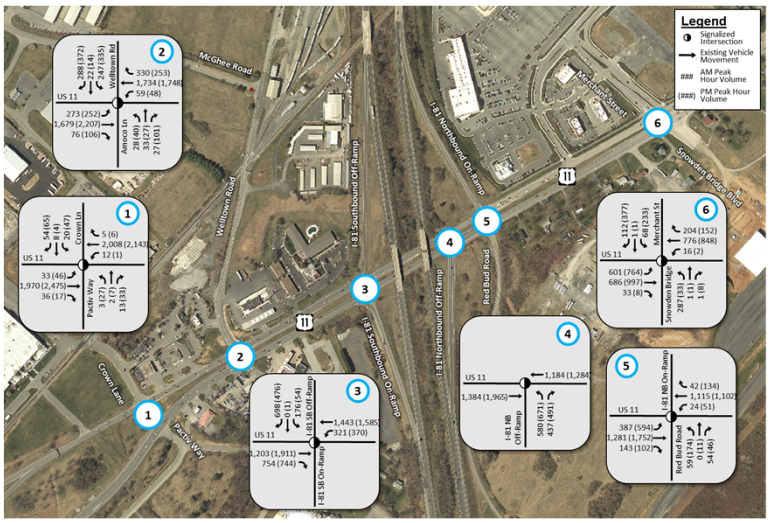
1

No-Build
2030 Conditions

2

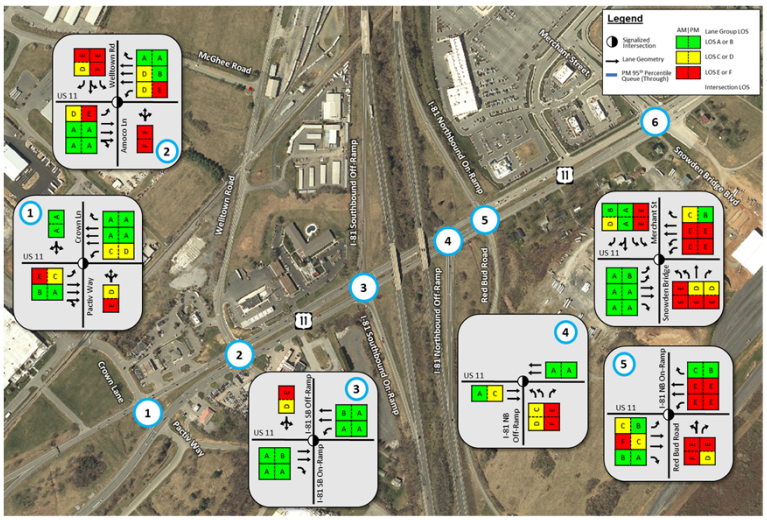
No-Build (2030) Peak Hour Traffic Volumes



- Approximately 700 NB left turns at I-81 NB Off-Ramp in the PM peak hour
- Approximately 600 NB left turns at I-81 NB On-Ramp in the PM peak hour
- Through volume over 2,000 vph in NB and SB direction on Rte 11 in the PM peak hour at the south end of corridor (near Welltown)

3

No-Build (2030) Conditions
Level of Service



- Key LOS and delay challenges:
  - EB Welltown Road
  - NBLT at Welltown Road
  - I-81 NB Off-Ramp
  - SB through and left at Red Bud Road
  - SB through and left at Snowden Bridge Boulevard

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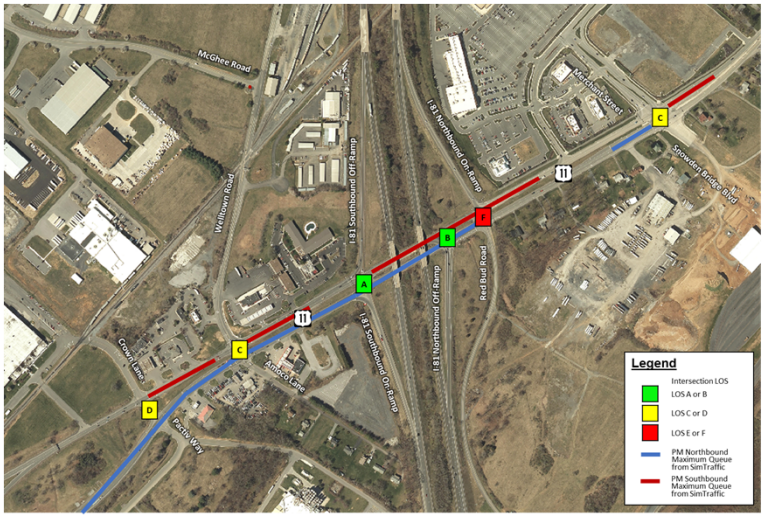
No-Build (2030) Conditions
PM Peak Hour



- Northbound queuing under No-Build conditions extends to Route 37
- Large factor in northbound queuing is poor lane utilization south of I-81 NB on-ramp due to heavy traffic volume destined for I-81 NB from Winchester
- South end of corridor is oversaturated, especially in the northbound direction (NB through volume at Crown Lane is ~2500 vph)

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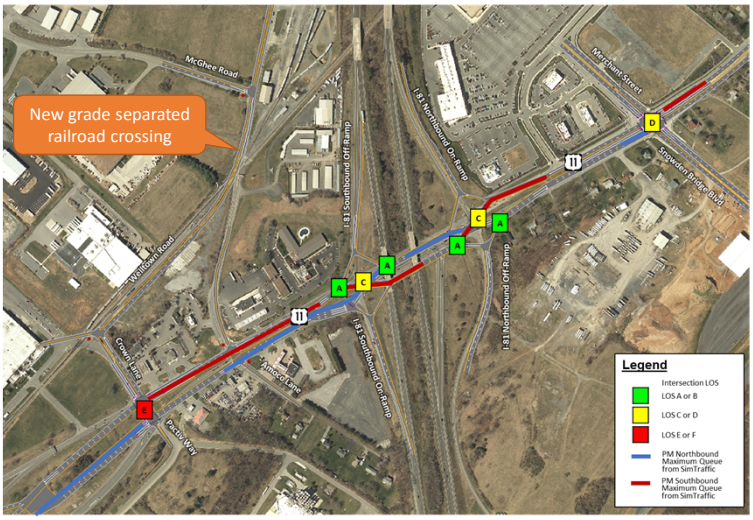
Alternatives Analysis
2030 Conditions

6

Preferred Alternative 1 – DDI

Arterial Improvements: Welltown Road realigned to Crown + Dual NBLT at Crown Lane



- 3 lanes in both directions under I-81 bridge
- Due to existing substandard vertical clearance, bridges will be reconstructed
- Realignment of Welltown would require new grade-separated railroad crossing
- Acceptable LOS at all DDI intersections
- Queuing is limited on Rte 11 through interchange; no intersection queues extend to adjacent intersections
- Conflict points: reduced to 20 vs. 28 in traditional diamond interchange

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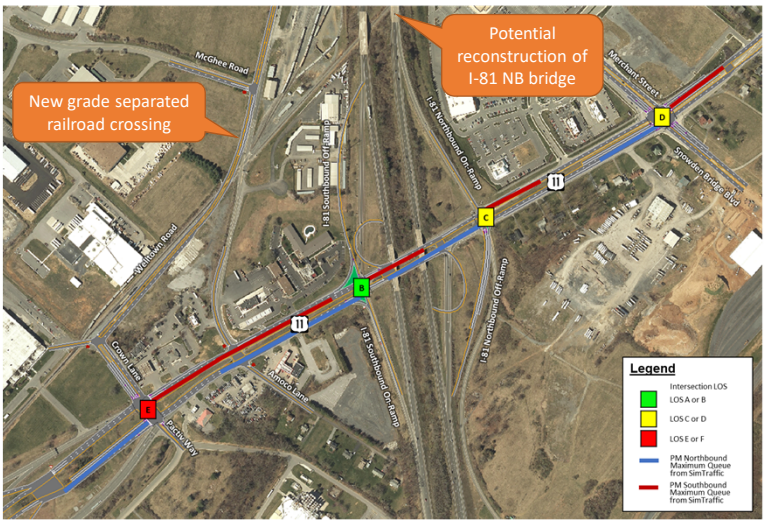
Preferred Alternative 2 – Parclo (NW + SE Quadrant)

Arterial Improvements: Welltown Road realigned to Crown + Dual NBLT at Crown Lane



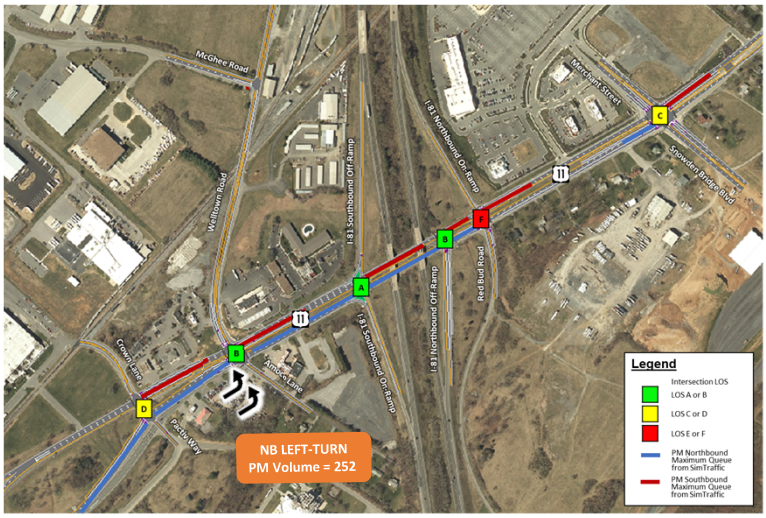
- Diverting left-turn movements onto NB and SB loop on-ramps alleviates NB and SB queuing along Rte 11
- Acceptable LOS at off-ramp movements and queuing is contained within off-ramp (does not extend to mainline I-81)
- Geometric challenges: ROW and bridge reconstructions
- Realignment of Welltown would require new grade-separated railroad crossing
- Conflict points: reduced to 20 vs. 28 in traditional diamond interchange

Alternatives Matrix
Arterial Improvements

Alternative	Intersection Improvements	Operations	Safety	Constructability
1	Dual NBLT on Rte 11 @ Welltown	+	0	0
2	Welltown Road – RCUT	-	+	+
3	Welltown Road – Realigned to Crown/Pactiv	+	+	-
4	Crown/Pactiv – Realigned to Welltown	+	+	-

\+ Generally positive effect or better alternative
0 Generally no effect of moderate alternative
\- Generally negative effect or worse alternative

Alternative 1 – Dual NBLT at Welltown/Amoco



- Limited improvement for NB queuing on Rte 11, but LOS improvement for Welltown intersection and reduction of NBLT queue
- Improvement would require widening of Welltown Road

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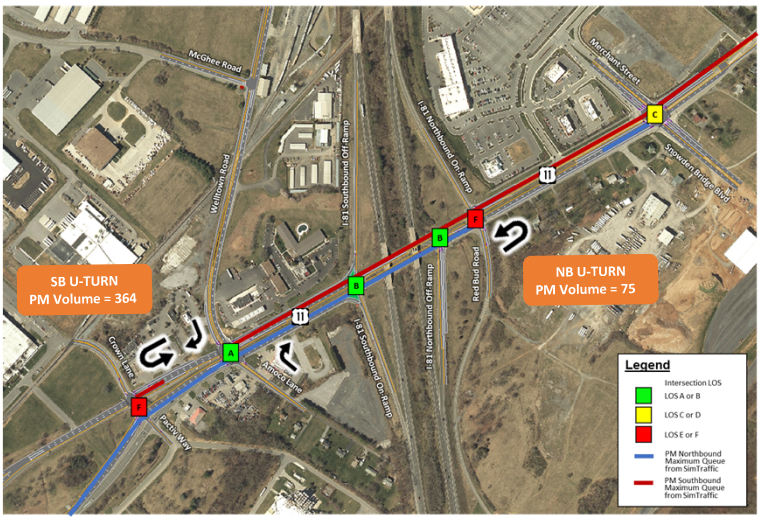
Alternative 2 – RCUT at Welltown/Amoco



- Prohibits EB and WB left-turns from Welltown/Amoco onto Rte 11
- Diverted traffic routed to U-turns at Crown/Pactiv and NB On-Ramp
- Addition of U-turning traffic results in gridlock on Rte 11
- LOS F overall at Crown Lane intersection

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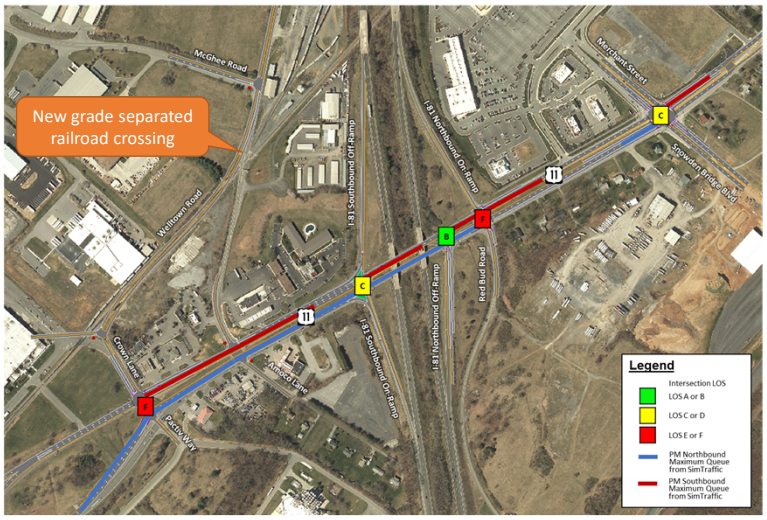
Alternative 3 – Welltown Road realigned to Crown Lane



- Realign Welltown Road to Crown Lane; all through and left-turning traffic to use Crown Lane/Pactiv way
- Welltown Road/Amoco Lane to remain open as right-in/right-out only
- No improvement of NB Rte 11 queuing at south end of corridor
- SB queuing at Crown Lane does not extend to I-81 SB ramps, but is similar to No Build conditions

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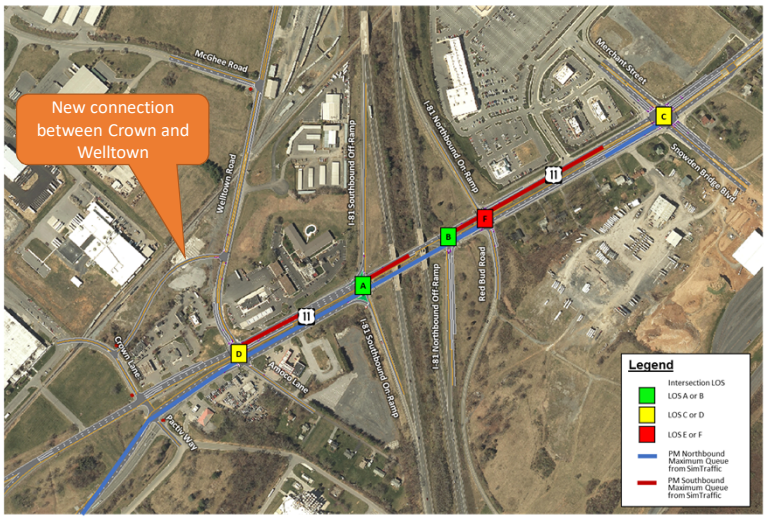
Alternative 4 – Crown Lane realigned to Welltown Road



- Provide connection between Crown Lane and Welltown Road; all through or left-turning traffic at Crown to use Welltown
- Crown Lane/Pactiv Way to remain open as right-in/right-out only
- No improvement to NB Rte 11 queuing
- SB queuing at Rte 11 does not extend to I-81 SB ramps

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Alternatives Matrix
Exit 317 Interchange

Alternative	Intersection Improvements	Operations	Safety	Constructability
5	Realigned I-81 NB Off-Ramp + 3 NB lanes on Rte 11 + Dual NBLT at NB Ramps (Previous Preferred Alternative)	0	0	+
6	DDI – 2 lanes NB + SB	0	+	+
7	DDI – 3 lanes NB + 2 lanes SB	0	+	-
8	DDI – 3 lanes NB + SB	+	+	-
9	Parclo – SE Quadrant	+	+	-
10	Parclo – NW + SE Quadrant	+	+	-

\+ Generally positive effect or better alternative
0 Generally no effect of moderate alternative
\- Generally negative effect or worse alternative

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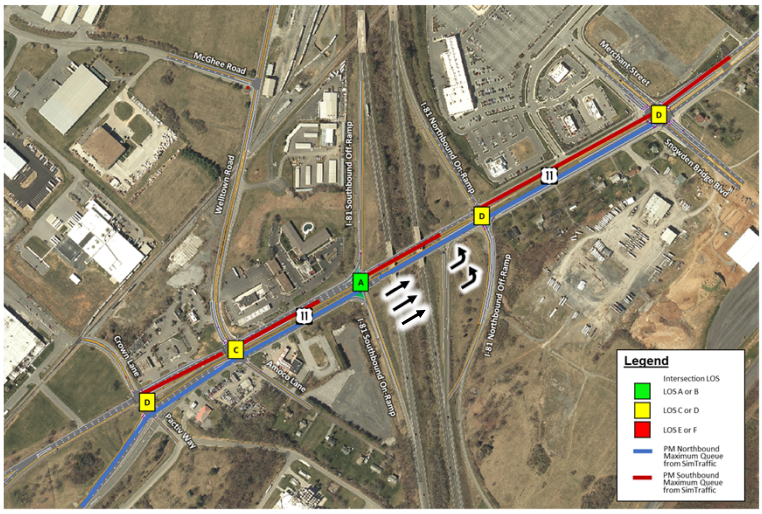
Alternative 5 – Relocated Red Bud Road + 3 NB lanes on Rte 11 + Dual NBLT at NB Ramps (Previous Preferred Alternative)



- Red Bud Road becomes a cul-de-sac and I-81 NB off-ramp is realigned with NB on-ramp
- Third through lane added NB between SB and NB ramps
- Second NBLT lane added at I-81 NB ramps intersection
- Traffic destined for NBLT at I-81 NB on-ramp causing congestion and queuing on NB Rte 11 due to poor lane utilization
- LOS improved at I-81 NB ramps from LOS F to LOS D, compared to No Build conditions

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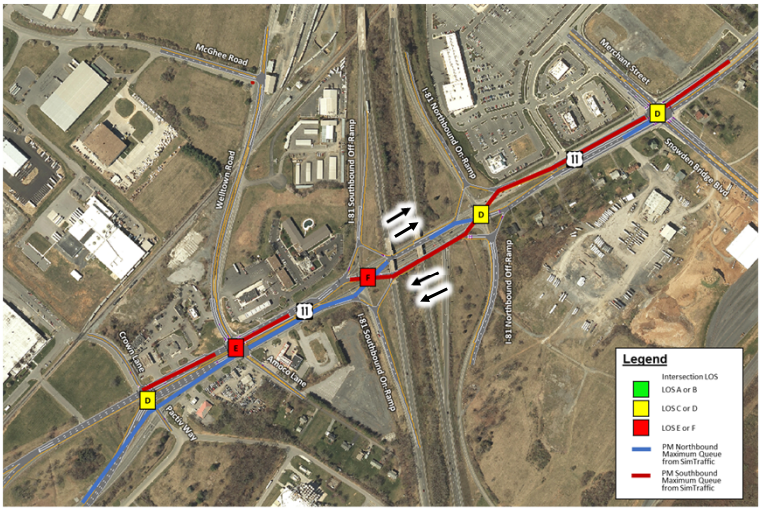
Alternative 6 – DDI (2 lanes NB + 2 lanes SB)



- Construction of DDI on existing Rte 11 footprint
- No bridge reconstruction (existing substandard vertical clearance for NB lanes to remain)
- DDI intersection spacing ~800'
- Heavy queuing in the SB direction through the interchange
- Heavy queuing in the NB direction near the south end of the corridor
- Poor LOS at Welltown and I-81 SB ramps intersections

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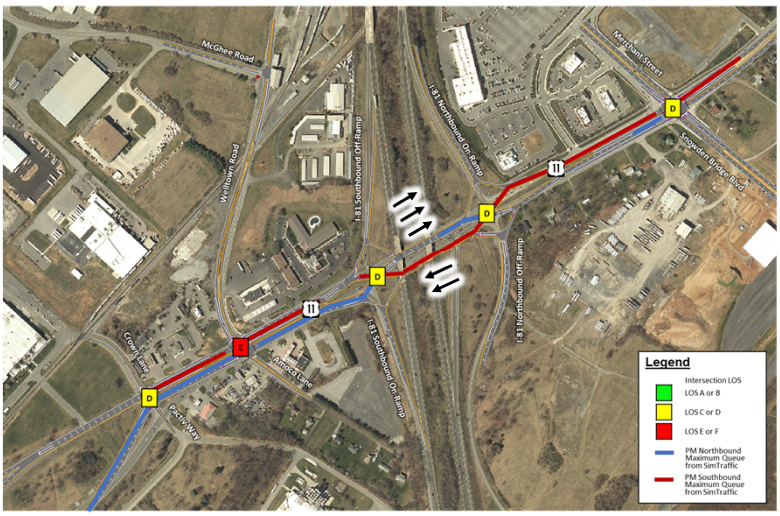
Alternative 7 – DDI (3 lanes NB + 2 lanes SB)



- Additional lane in the NB direction can be accommodated horizontally, but due to existing substandard vertical clearance, reconstruction of the I-81 NB and SB bridges over Rte 11 will potentially be required
- Improvement of LOS at I-81 SB ramps intersection from LOS F to LOS D (compared to Alt 6)
- Some NB queuing is alleviated through the interchange

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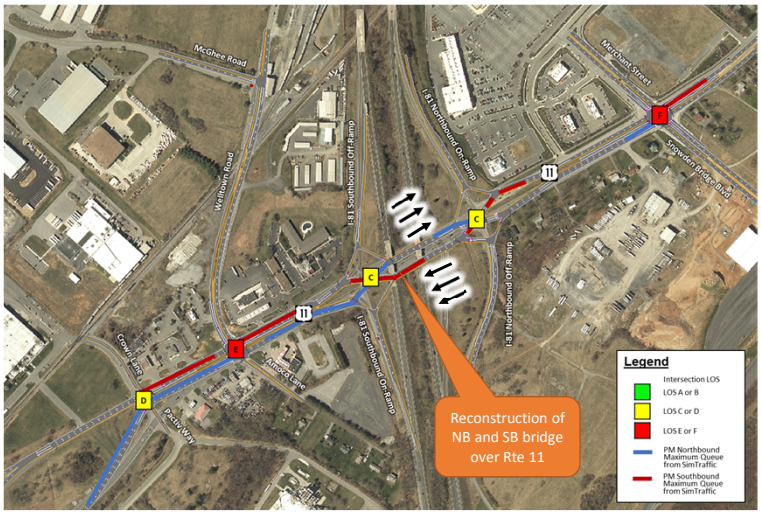
Alternative 8 – DDI (3 lanes NB + 3 lanes SB)



- To accommodate widening to three lanes in each direction, I-81 NB and SB bridges over Rte 11 will be reconstructed
- LOS improvement at I-81 SB ramps (LOS D vs LOS C compared to Alt 7)
- NB and SB queuing through interchange is further improved, over Alt 7
- Provides best DDI operations

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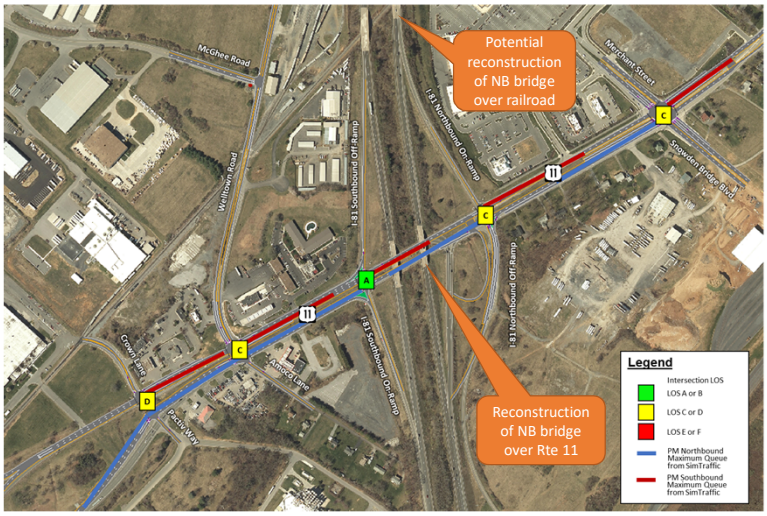
Alternative 9 – Parclo (SE quadrant)



- 30 mph loop ramp can be accommodated
- ROW required near Red Bud Road
- Requires reconstruction of I-81 NB bridge and potentially the I-81 NB bridge over railroad
- Compared to Alt 5 (relocated Red Bud), LOS and NB queuing at I-81 NB ramps intersection is improved
- SB queuing also slightly alleviated

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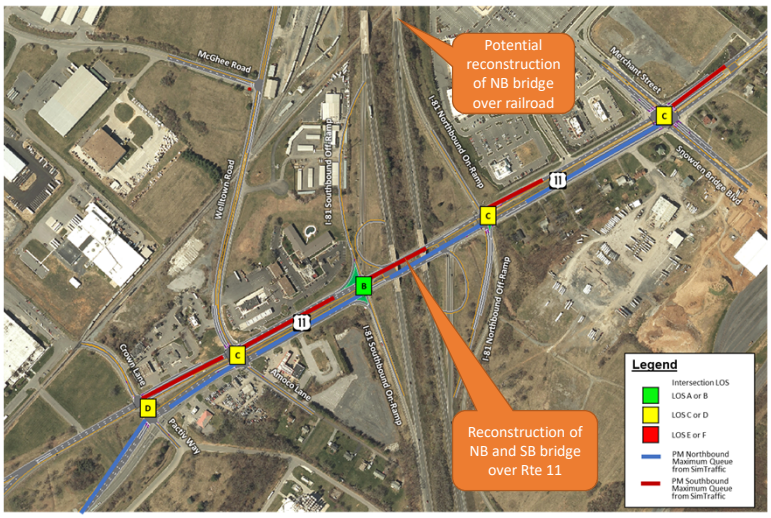
Alternative 10 – Parclo (SE + NW quadrant)



- 25 mph loop ramp in NW can be accommodated
- Significant business impact due to ROW acquisition required in NW quadrant
- Requires reconstruction of I-81 NB and SB bridges and potentially the I-81 NB bridge over railroad
- Provides best arterial operations along Route 11

Next Steps

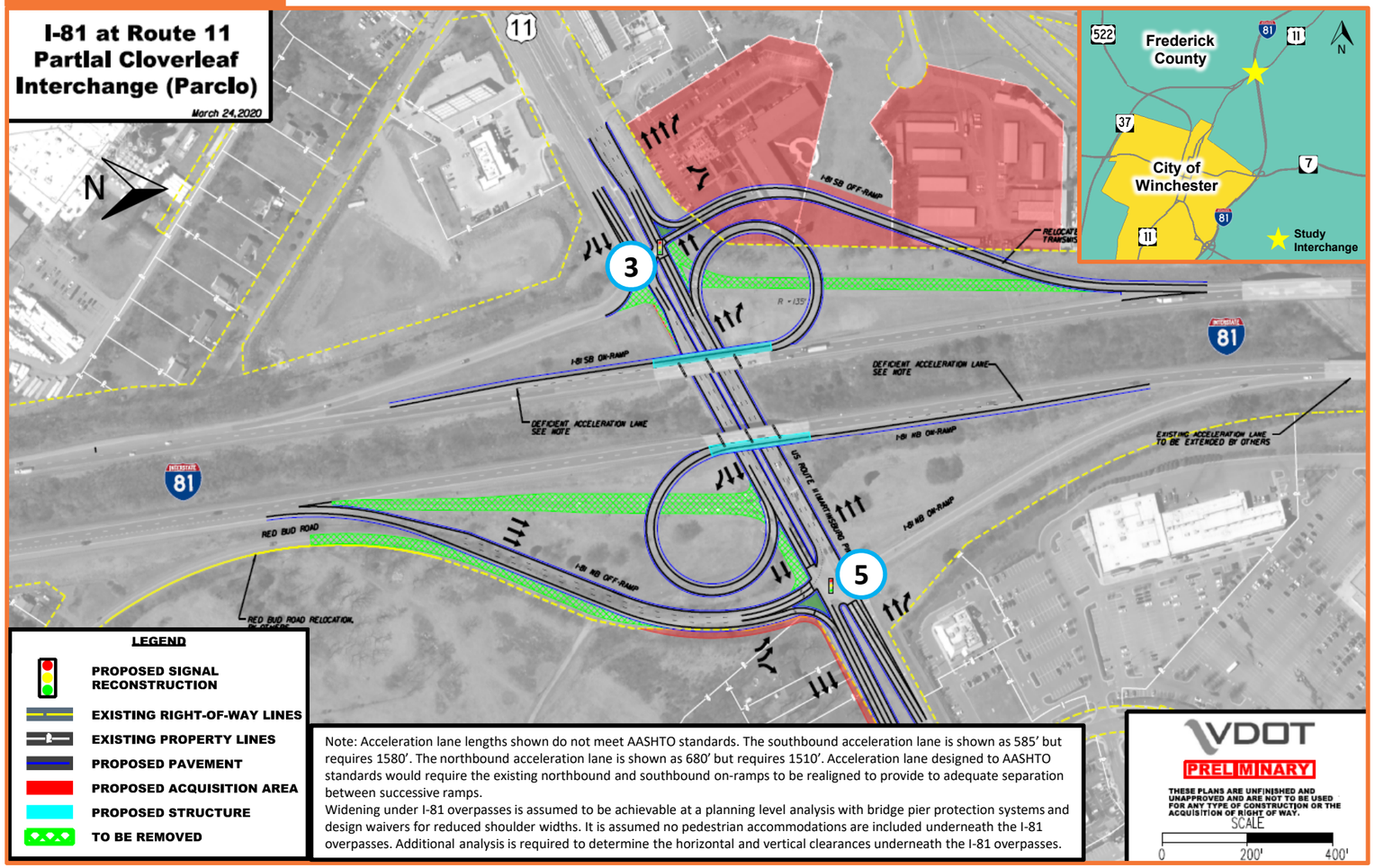
APPENDIX E

PROPOSED ALTERNATIVES

Alternative 1: I-81 at US 11 (Exit 317) Interchange

Partial Cloverleaf Interchange (Parclo)

Conceptual Design



Note: Acceleration lane lengths shown do not meet AASHTO standards. The southbound acceleration lane is shown as 585' but requires 1580'. The northbound acceleration lane is shown as 680' but requires 1510'. Acceleration lane designed to AASHTO standards would require the existing northbound and southbound on-ramps to be realigned to provide to adequate separation between successive ramps.
Widening under I-81 overpasses is assumed to be achievable at a planning level analysis with bridge pier protection systems and design waivers for reduced shoulder widths. It is assumed no pedestrian accommodations are included underneath the I-81 overpasses. Additional analysis is required to determine the horizontal and vertical clearances underneath the I-81 overpasses.

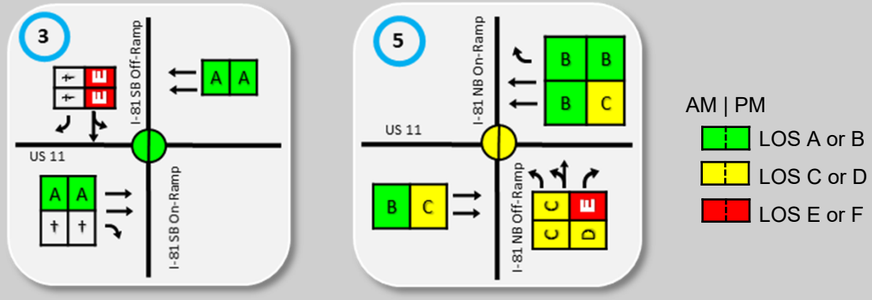
Operations and Safety Improvements

The following recommendations are projected to improve operations and/or safety along US 11.

I-81 at US 11 (Exit 317) Interchange

- Reconstructs the existing traditional diamond interchange with a partial cloverleaf interchange (parclo)
  - ✓ Reduces conflict points and the potential for angle crashes
  - ✓ Reduces through movement delays and queues on US 11 at the I-81 ramp intersections
  - ✓ Improves intersection from LOS C (PM) to LOS A (southbound I-81 ramps) and LOS D/F (AM/PM) to LOS C/C (northbound I-81 ramps)
- Relocates the existing northbound I-81 off-ramp to be opposite the northbound I-81 on-ramp

Traffic Operations Results



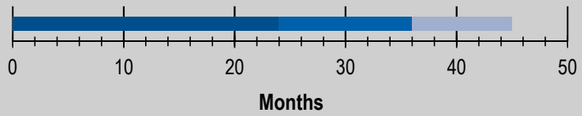
The following reductions in delay from No-build to Build conditions target the areas of biggest need along the corridor.

Movement	Peak Hour	No-Build LOS/Delay (sec)	Build LOS/Delay (sec)
Southbound I-81 off-ramp to northbound US 11	AM	E (75.1)	E (57.6)
Northbound US 11 at southbound I-81 ramps	PM	D (41.8)	A (4.5)
Northbound I-81 off-ramp to southbound US 11	PM	D (41.9)	C (33.5)
Southbound US 11 at northbound I-81 ramps	PM	E (78.8)	C (25.9)

Project Schedule and Preliminary Cost

Project schedule and cost estimate were developed based on information available at the time of study and should be reassessed prior to submitting funding applications.

Schedule:



Schedule is under development

Cost:

Phase	Cost Estimate (2020 Dollars)
Preliminary Engineering	$4,172,000
ROW and Utility Relocation	$16,850,000
Construction	$30,554,000
Total Cost	**$51,576,000**

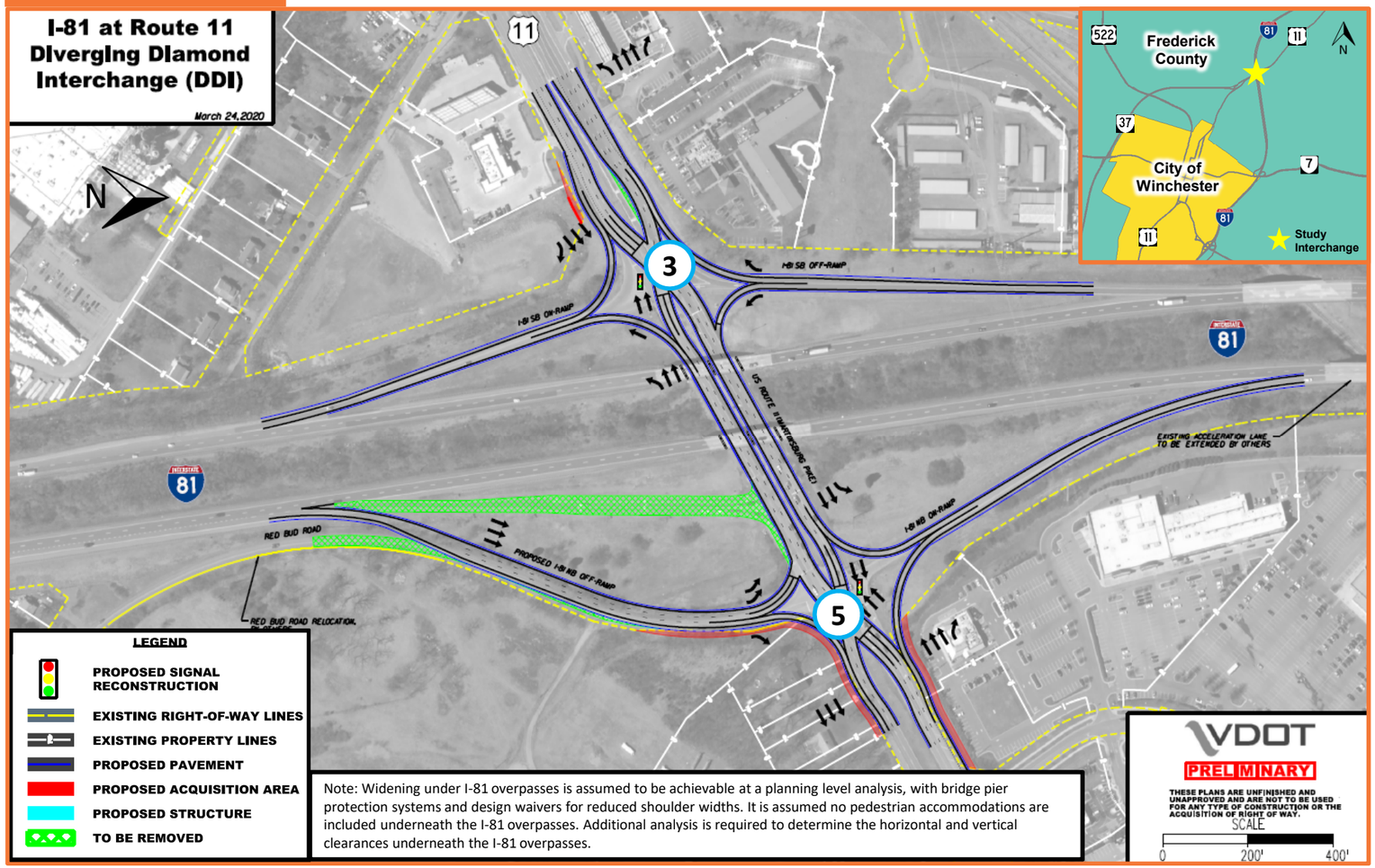
NORTH WINCHESTER INTERCHANGE ALTERNATIVES ANALYSIS

WinFred MPO VDOT

Alternative 2: I-81 at US 11 (Exit 317) Interchange

Diverging Diamond Interchange (DDI)

Conceptual Design



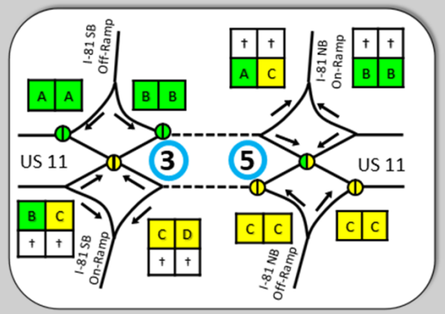
Operations and Safety Improvements

The following recommendations are projected to improve operations and/or safety along US 11.

I-81 at US 11 (Exit 317) Interchange

- Reconstructs the existing traditional diamond interchange with a diverging diamond interchange (DDI)
  - ✓ Reduces the number of points where vehicles may cross paths
  - ✓ Crossovers operate with two signal phases, allowing the interchange to handle a greater volume of traffic and reduced delays
  - ✓ Improves intersection from LOS A (AM) to LOS C (southbound I-81 ramps) and LOS D/F (AM/PM) to LOS B/C (northbound I-81 ramps)
- Relocates the existing northbound I-81 off-ramp to be opposite the northbound I-81 on-ramp

Traffic Operations Results



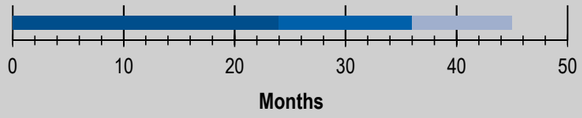
The following reductions in delay from No-build to Build conditions target the areas of biggest need along the corridor.

Movement	Peak Hour	No-Build LOS/Delay (sec)	Build LOS/Delay (sec)
Southbound I-81 off-ramp to northbound US 11	AM	E (75.1)	B (18.5)
Northbound US 11 at southbound I-81 ramps	PM	D (41.8)	C (27.7)
Northbound I-81 off-ramp to southbound US 11	PM	D (41.9)	C (25.2)
Southbound US 11 at northbound I-81 ramps	PM	E (78.8)	B (16.0)

Project Schedule and Preliminary Cost

Project schedule and cost estimate were developed based on information available at the time of study and should be reassessed prior to submitting funding applications.

Schedule:



Schedule is under development

Cost:

Phase	Cost Estimate (2020 Dollars)
Preliminary Engineering	$2,186,000
ROW and Utility Relocation	$7,654,000
Construction	$15,274,000
Total Cost	**$25,114,000**

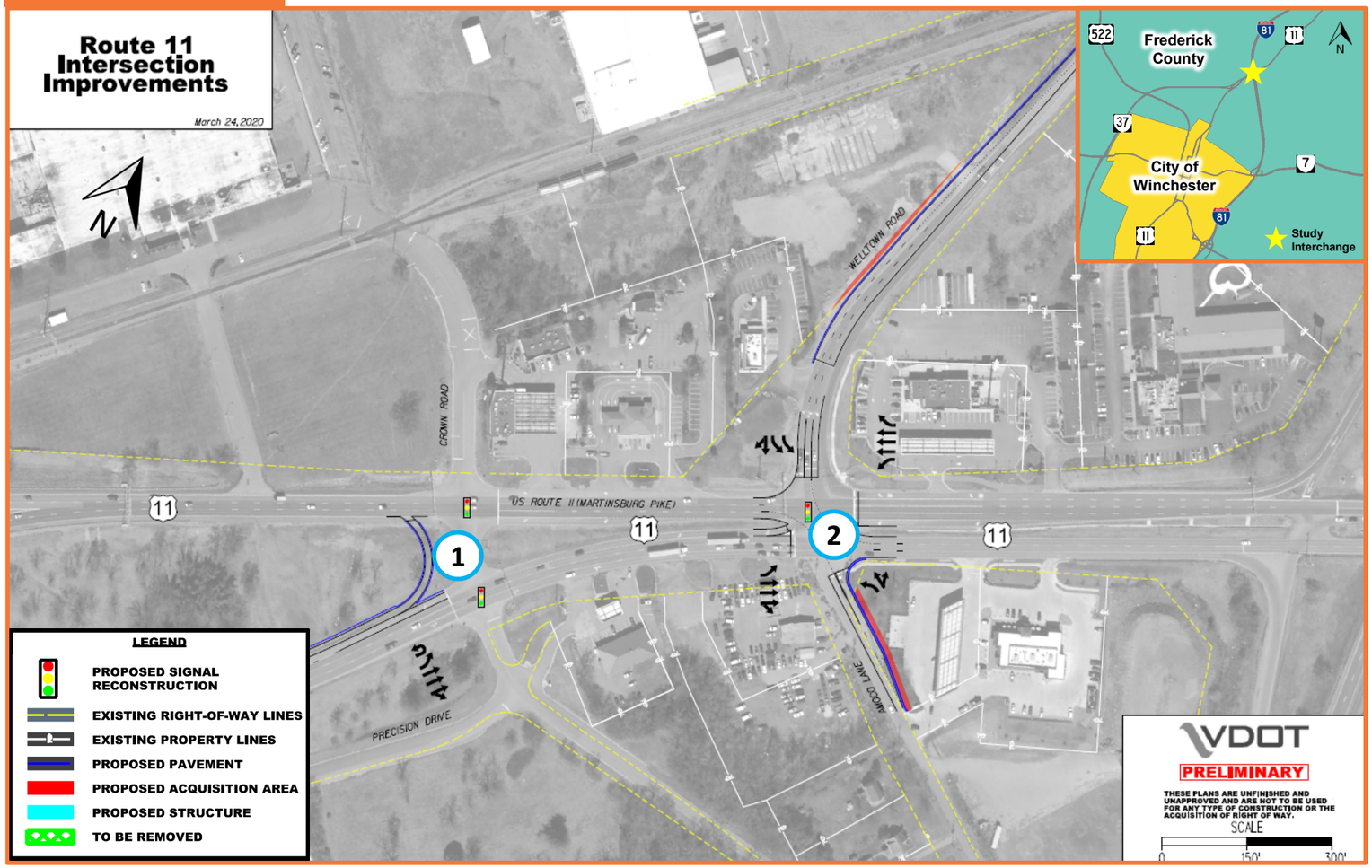
NORTH WINCHESTER INTERCHANGE ALTERNATIVES ANALYSIS

WinFred MPO VDOT

Intersection Improvements: US 11 at Crown Lane/Pactiv Way and US 11 at Welltown Road/Amoco Lane

Additional turn lanes, restriping, and removal of split phasing

Conceptual Design



Operations and Safety Improvements

The following recommendations are projected to improve operations and/or safety along US 11.

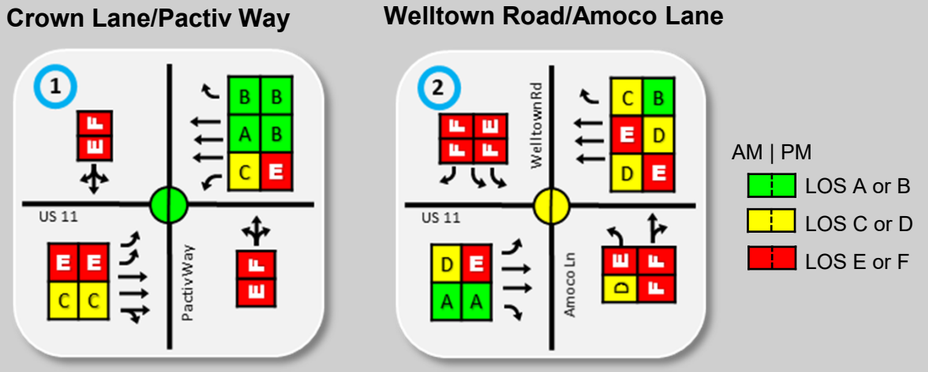
US 11 at Welltown Road/Amoco Lane

- Adds a dedicated left turn lane from Amoco Lane to US 11
- Restripes Welltown Road to have two dedicated left-turn lanes and a shared through-right lane
- Removes split phasing
  - ✓ Improves intersection from LOS E (PM) to LOS D
  - ✓ Reduces possibility of rear end crashes

US 11 at Crown Lane/Pactiv Way

- Adds a dedicated U-turn lane on northbound US 11
  - ✓ Alleviates long queues that occur due to vehicles trying to U-turn at this intersection
  - ✓ Improves intersection from LOS D/E (AM/PM) to LOS B/C
  - ✓ Reduces the possibility of angle crashes

Traffic Operations Results



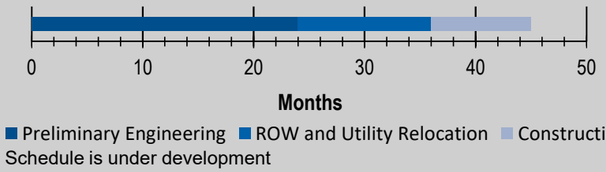
The following reductions in delay from No-build to Build conditions target the areas of biggest need along the corridor.

Movement	Peak Hour	No-Build LOS/Delay (sec)	Build LOS/Delay (sec)
Pactiv Way to Crown Lane	AM	F (131.0)	C (28.3)
Northbound US 11 to Welltown Road	AM	F (419.7)	D (38.3)
Northbound US 11 at Welltown Road/Amoco Road	PM	C (23.7)	A (6.4)

Project Schedule and Preliminary Cost

Project schedule and cost estimate were developed based on information available at the time of study and should be reassessed prior to submitting funding applications.

Schedule:



Schedule is under development

Cost:

Phase	Cost Estimate (2020 Dollars)
Preliminary Engineering	$572,000
ROW and Utility Relocation	$246,000
Construction	$3,319,000
Total Cost	**$4,137,000**

NORTH WINCHESTER INTERCHANGE ALTERNATIVES ANALYSIS

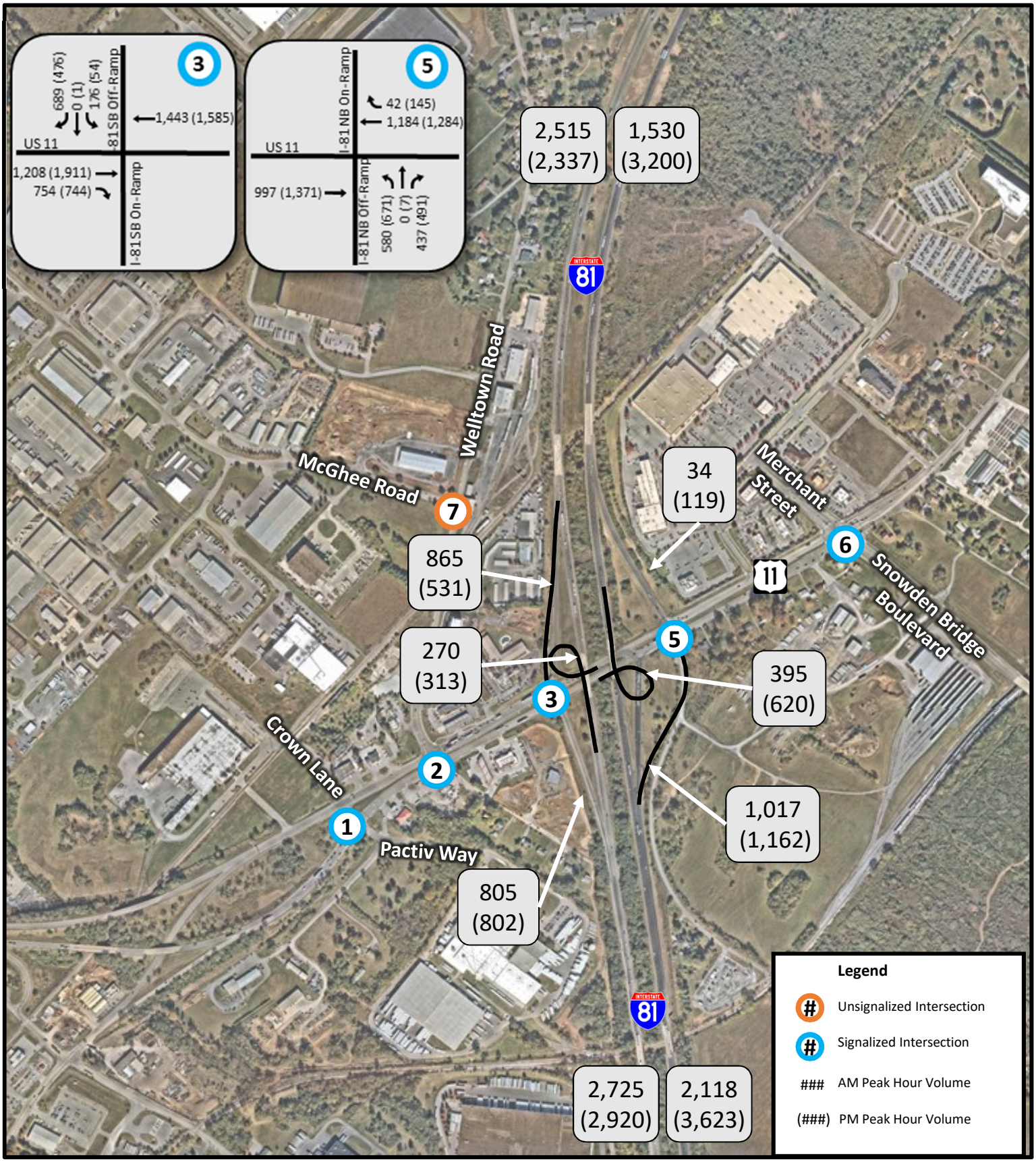
WinFred MPO

VDOT

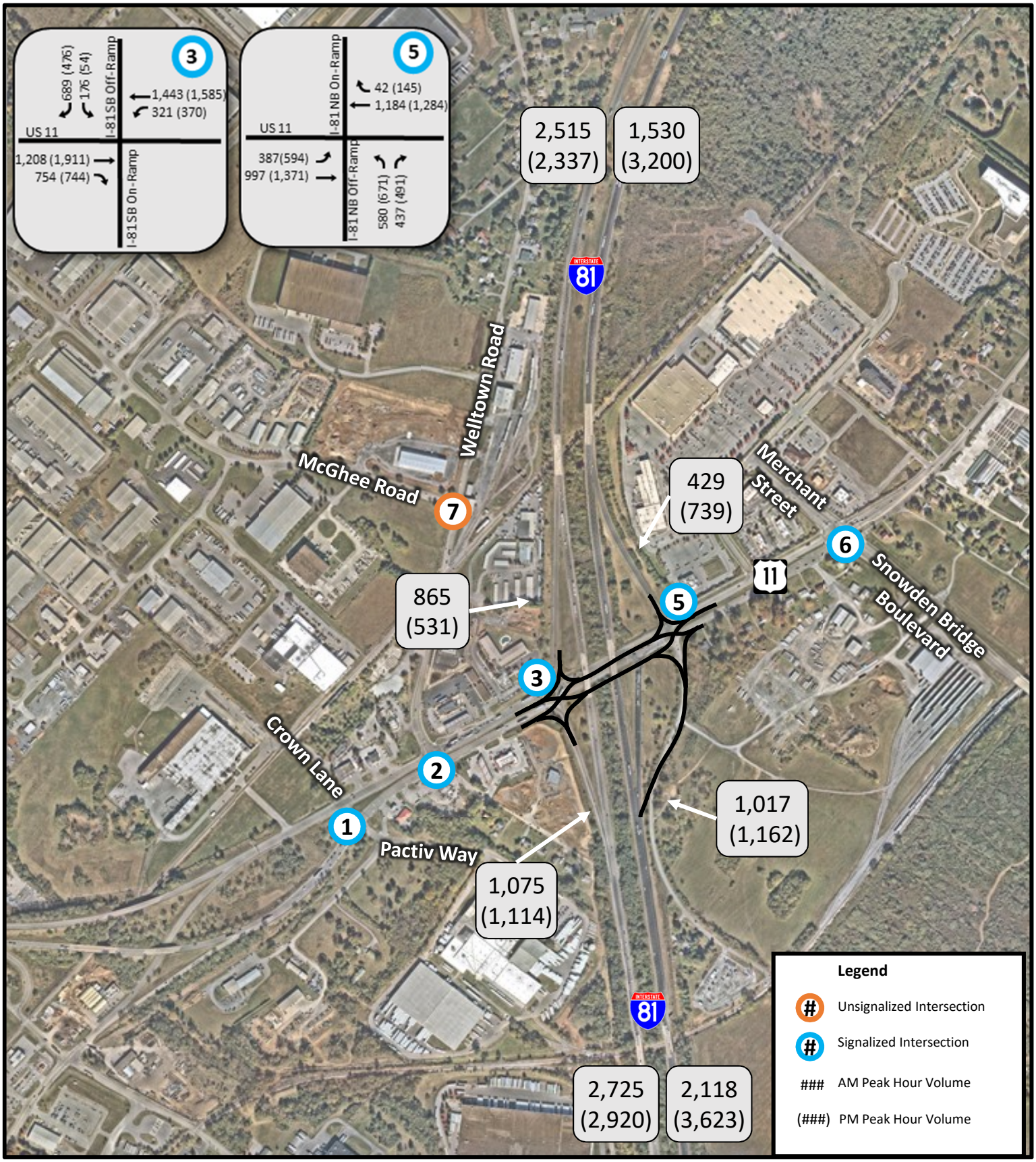
APPENDIX F

BUILD CONDITIONS OPERATIONAL ANALYSIS

Partial Cloverleaf Interchange (2030) Peak Hour Traffic Volumes



Diverging Diamond Interchange (2030) Peak Hour Traffic Volumes



HCM 2010 - Intersection Delay and LOS
2030 Partial Cloverleaf Interchange
North Winchester IAAR

	Intersection Number and Description	Type of Control	Lane Group	Northbound				Southbound				Eastbound				Westbound				Overall	
				AM		PM		AM		PM		AM		PM		AM		PM		AM	PM
				Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS		
1	US 11 at Pactiv Way/Crown Ln *			Pactiv Way				Crown Ln				US 11				US 11				Intersection	
		Signal	Left	61.4	E	97.9	F	59.5	E	112.1	F	56.5	E	50.0	D	33.5	C	67.6	E	Delay	Delay
			Through									88.1	F	28.3	C	5.5	A	14.9	B	47.0	27.8
			Right													12.2	B	18.5	B	LOS	LOS
			Approach	61.4	E	97.9	F	59.5	E	112.1	F	86.3	F	32.3	C	6.0	A	15.3	B	D	C
2	US 11 at Amoco Ln/ Welltown Rd			Amoco Ln				Welltown Rd				US 11				US 11				Intersection	
		Signal	Left	54.6	D	63.4	E	95.4	F	73.0	E	31.7	C	68.6	E	42.9	D	62.8	E	Delay	Delay
			Through	97.2	F	216.1	F	117.1	F	53.6	D	0.7	A	19.9	B	17.0	B	28.0	C	18.9	33.2
			Right													5.0	A	4.3	A	LOS	LOS
			Approach	83.7	F	179.7	F	102.1	F	67.9	E	4.7	A	23.2	C	15.8	B	25.9	C	B	C
3	US 11 at I-81 SB Off Ramp			-				I-81 SB Off Ramp				US 11				US 11				Intersection	
		Signal	Left					57.6	E	74.8	E									Delay	Delay
			Through									0.5	A	4.5	A	9.7	A	4.2	A	8.7	5.5
			Right					†		†		†		†						LOS	LOS
			Approach					57.6	E	74.8	E	0.5	A	4.5	A	9.7	A	4.2	A	A	A
5	US 11 at I-81 NB Off Ramp/ I-81 NB On Ramp			I-81 NB Off Ramp				-				US 11				US 11				Intersection	
		Signal	Left	30.1	C	33.5	C													Delay	Delay
			Through									17.5	B	29.0	C	18.9	B	25.9	C	24.8	31.8
			Right	51.4	D	56.0	E									11.6	B	17.1	B	LOS	LOS
			Approach	39.3	D	43.0	D					17.5	B	29.0	C	18.7	B	25.0	C	C	C
6	US 11 at Snowden Bridge Boulevard/ Merchant Street			Snowden Bridge Boulevard				Merchant Street				US 11				US 11				Intersection	
		Signal	Left	62.4	E	66.4	E	47.1	D	66.2	E	53.2	D	73.0	E	59.3	E	43.3	D	Delay	Delay
			Through	55.4	E	59.4	E					14.9	B	46.3	D	31.3	C	33.5	C	35.5	51.8
			Right	69.4	E	78.2	E	72.1	E	84.0	F	1.4	A	24.9	C	6.4	A	7.7	A	LOS	LOS
			Approach	63.4	E	68.7	E	62.7	E	73.9	E	29.6	C	56.2	E	27.6	C	30.1	C	D	D
7	Welltown Rd at McGhee Rd			Welltown Rd				Welltown Rd				McGhee Rd				-				Intersection	
		Stop	Left	11.0	B	8.9	A					29.6	D	16.6	C					Delay	Delay
			Through	†	†	†	†	†	†	†	†									-	-
			Right									17.2	C	20.9	C					LOS	LOS
			Approach	8.0	A	2.2	A	†	†	†	†	17.7	C	20.7	C					-	-

Notes:

Shared lane results are shown as one value that corresponds to all movements in that lane.

† Delay for movements with no conflicting movements have not been included.

* Delay results are from HCM 2000 due to non-standard NEMA phasing

Movement	WBU	WBL2	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR2	NEL2	NEL
Lane Configurations												
Traffic Volume (vph)	25	12	2008	5	3	2	13	20	8	54	80	33
Future Volume (vph)	25	12	2008	5	3	2	13	20	8	54	80	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		11.2	5.5	5.5		11.1			11.2		10.9	10.9
Lane Util. Factor		1.00	0.91	1.00		1.00			1.00		1.00	1.00
Frt		1.00	1.00	0.85		0.90			0.91		1.00	1.00
Flt Protected		0.95	1.00	1.00		0.99			0.99		0.95	0.95
Satd. Flow (prot)		1781	4803	1077		1353			1658		1805	1597
Flt Permitted		0.95	1.00	1.00		0.99			0.99		0.95	0.95
Satd. Flow (perm)		1781	4803	1077		1353			1658		1805	1597
Peak-hour factor, PHF	0.92	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	27	13	2256	6	3	2	15	22	9	61	90	37
RTOR Reduction (vph)	0	0	0	3	0	15	0	0	88	0	84	0
Lane Group Flow (vph)	0	40	2256	3	0	5	0	0	4	0	6	37
Heavy Vehicles (%)	2%	0%	8%	50%	17%	2%	30%	9%	10%	0%	0%	13%
Turn Type	Prot	Prot	NA	Perm	Split	NA		Split	NA		Perm	Prot
Protected Phases	5	5	2		4	4		3	3			1
Permitted Phases				2							1	
Actuated Green, G (s)		4.6	65.9	65.9		2.5			5.5		7.4	7.4
Effective Green, g (s)		4.6	65.9	65.9		2.5			5.5		7.4	7.4
Actuated g/C Ratio		0.04	0.55	0.55		0.02			0.05		0.06	0.06
Clearance Time (s)		11.2	5.5	5.5		11.1			11.2		10.9	10.9
Vehicle Extension (s)		3.0	3.0	3.0		3.0			3.0		3.0	3.0
Lane Grp Cap (vph)		68	2637	591		28			75		111	98
v/s Ratio Prot		0.02	c0.47			c0.00			c0.00			0.02
v/s Ratio Perm				0.00							0.00	
v/c Ratio		0.59	0.86	0.01		0.19			0.06		0.05	0.38
Uniform Delay, d1		56.8	23.0	12.2		57.8			54.8		53.0	54.1
Progression Factor		0.51	0.17	1.00		1.00			1.00		1.00	1.00
Incremental Delay, d2		4.8	1.5	0.0		3.3			0.3		0.2	2.4
Delay (s)		33.5	5.5	12.2		61.0			55.1		53.2	56.5
Level of Service		C	A	B		E			E		D	E
Approach Delay (s)			6.0			61.0			55.1			86.3
Approach LOS			A			E			E			F

Intersection Summary			
HCM 2000 Control Delay	47.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	39.2
Intersection Capacity Utilization	81.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NER	NER2
Lane Configurations		
Traffic Volume (vph)	1970	36
Future Volume (vph)	1970	36
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.7	
Lane Util. Factor	0.76	
Frt	0.85	
Flt Protected	1.00	
Satd. Flow (prot)	3349	
Flt Permitted	1.00	
Satd. Flow (perm)	3349	
Peak-hour factor, PHF	0.89	0.89
Adj. Flow (vph)	2213	40
RTOR Reduction (vph)	120	0
Lane Group Flow (vph)	2133	0
Heavy Vehicles (%)	10%	7%
Turn Type	Prot	
Protected Phases	6	
Permitted Phases		
Actuated Green, G (s)	68.2	
Effective Green, g (s)	68.2	
Actuated g/C Ratio	0.57	
Clearance Time (s)	5.7	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	1903	
v/s Ratio Prot	c0.64	
v/s Ratio Perm		
v/c Ratio	1.12	
Uniform Delay, d1	25.9	
Progression Factor	1.00	
Incremental Delay, d2	62.2	
Delay (s)	88.1	
Level of Service	F	
Approach Delay (s)		
Approach LOS		

Intersection Summary

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	273	1679	76	9	59	1734	330	28	33	27	247	22
Future Volume (veh/h)	273	1679	76	9	59	1734	330	28	33	27	247	22
Number	1	6	16		5	2	12	3	8	18	7	4
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1743	1714	1900		1852	1759	1667	1900	1709	1900	1532	1735
Adj Flow Rate, veh/h	310	1908	86		67	1970	375	32	38	31	281	25
Adj No. of Lanes	1	3	0		1	3	1	1	1	0	2	1
Peak Hour Factor	0.88	0.88	0.88		0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	9	11	11		3	8	14	0	8	8	24	29
Cap, veh/h	380	2414	109		198	1969	727	154	47	38	293	26
Arrive On Green	0.46	1.00	1.00		0.22	0.82	0.82	0.05	0.05	0.05	0.10	0.09
Sat Flow, veh/h	1660	4592	207		1763	4803	1417	1810	872	712	2831	304
Grp Volume(v), veh/h	310	1295	699		67	1970	375	32	0	69	281	0
Grp Sat Flow(s),veh/h/ln	1660	1560	1678		1763	1601	1417	1810	0	1584	1416	0
Q Serve(g_s), s	19.4	0.0	0.0		3.8	49.2	0.0	0.0	0.0	5.2	11.9	0.0
Cycle Q Clear(g_c), s	19.4	0.0	0.0		3.8	49.2	0.0	0.0	0.0	5.2	11.9	0.0
Prop In Lane	1.00		0.12		1.00		1.00	1.00		0.45	1.00	
Lane Grp Cap(c), veh/h	380	1641	882		198	1969	727	154	0	85	293	0
V/C Ratio(X)	0.82	0.79	0.79		0.34	1.00	0.52	0.21	0.00	0.81	0.96	0.00
Avail Cap(c_a), veh/h	380	1641	882		198	1969	727	190	0	87	293	0
HCM Platoon Ratio	2.00	2.00	2.00		2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.09		0.09	0.09	0.09	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.3	0.0	0.0		42.8	10.8	4.7	53.9	0.0	56.2	53.6	0.0
Incr Delay (d2), s/veh	1.3	0.4	0.7		0.1	6.2	0.2	0.7	0.0	41.1	41.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	10.4	0.2	0.3		2.5	37.8	2.7	1.9	0.0	5.8	10.5	0.0
LnGrp Delay(d),s/veh	31.7	0.4	0.7		42.9	17.0	5.0	54.6	0.0	97.2	95.4	0.0
LnGrp LOS	C	A	A		D	F	A	D		F	F	
Approach Vol, veh/h		2304				2412			101			406
Approach Delay, s/veh		4.7				15.8			83.7			102.1
Approach LOS		A				B			F			F

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	35.2	55.0	15.9	20.0	21.2	69.0	22.0	13.9
Change Period (Y+Rc), s	7.7	* 5.8	9.6	* 9.6	7.7	* 5.9	9.6	7.4
Max Green Setting (Gmax), s	21.9	* 49	8.6	* 10	7.3	* 63	12.4	6.6
Max Q Clear Time (g_c+I1), s	21.4	51.2	2.0	11.8	5.8	2.0	13.9	7.2
Green Ext Time (p_c), s	0.1	0.0	0.0	0.0	0.0	25.1	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	18.9
HCM 2010 LOS	B

Notes

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	288
Future Volume (veh/h)	288
Number	14
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Adj Sat Flow, veh/h/ln	1900
Adj Flow Rate, veh/h	100
Adj No. of Lanes	0
Peak Hour Factor	0.88
Percent Heavy Veh, %	29
Cap, veh/h	105
Arrive On Green	0.09
Sat Flow, veh/h	1216
Grp Volume(v), veh/h	125
Grp Sat Flow(s),veh/h/ln	1521
Q Serve(g_s), s	9.8
Cycle Q Clear(g_c), s	9.8
Prop In Lane	0.80
Lane Grp Cap(c), veh/h	132
V/C Ratio(X)	0.95
Avail Cap(c_a), veh/h	132
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	54.5
Incr Delay (d2), s/veh	62.5
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(95%),veh/ln	10.6
LnGrp Delay(d),s/veh	117.1
LnGrp LOS	F
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer	

User approved ignoring U-Turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

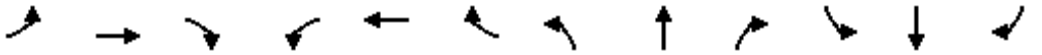
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↑↑						↰	↱
Traffic Volume (veh/h)	0	1208	754	0	1443	0	0	0	0	176	0	689
Future Volume (veh/h)	0	1208	754	0	1443	0	0	0	0	176	0	689
Number	1	6	16	5	2	12				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1727	1667	0	1759	0				1900	1810	1776
Adj Flow Rate, veh/h	0	1327	0	0	1586	0				193	0	0
Adj No. of Lanes	0	2	1	0	2	0				0	1	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91				0.91	0.91	0.91
Percent Heavy Veh, %	0	10	14	0	8	0				7	2	7
Cap, veh/h	0	2396	1034	0	2440	0				234	0	205
Arrive On Green	0.00	1.00	0.00	0.00	0.73	0.00				0.14	0.00	0.00
Sat Flow, veh/h	0	3368	1417	0	3519	0				1723	0	1509
Grp Volume(v), veh/h	0	1327	0	0	1586	0				193	0	0
Grp Sat Flow(s),veh/h/ln	0	1641	1417	0	1671	0				1723	0	1509
Q Serve(g_s), s	0.0	0.0	0.0	0.0	29.2	0.0				13.1	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	29.2	0.0				13.1	0.0	0.0
Prop In Lane	0.00		1.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2396	1034	0	2440	0				234	0	205
V/C Ratio(X)	0.00	0.55	0.00	0.00	0.65	0.00				0.82	0.00	0.00
Avail Cap(c_a), veh/h	0	2396	1034	0	2440	0				860	0	753
HCM Platoon Ratio	1.00	2.00	2.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.49	0.00	0.00	1.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	8.3	0.0				50.5	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.0	0.0	1.4	0.0				7.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	0.3	0.0	0.0	19.7	0.0				10.9	0.0	0.0
LnGrp Delay(d),s/veh	0.0	0.5	0.0	0.0	9.7	0.0				57.6	0.0	0.0
LnGrp LOS		A			A					E		
Approach Vol, veh/h		1327			1586						193	
Approach Delay, s/veh		0.5			9.7						57.6	
Approach LOS		A			A						E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		95.6		24.4		95.6		
Change Period (Y+Rc), s		* 8		* 8.1		* 8		
Max Green Setting (Gmax), s		* 44		* 60		* 44		
Max Q Clear Time (g_c+I1), s		31.2		15.1		2.0		
Green Ext Time (p_c), s		8.6		1.2		12.9		

Intersection Summary	
HCM 2010 Ctrl Delay	8.7
HCM 2010 LOS	A

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	997	0	0	1184	42	580	0	437	0	0	0
Future Volume (veh/h)	0	997	0	0	1184	42	580	0	437	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	0	1743	0	0	1776	1727	1845	1845	1900			
Adj Flow Rate, veh/h	0	1028	0	0	1221	43	598	0	451			
Adj No. of Lanes	0	2	0	0	2	1	2	0	1			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97			
Percent Heavy Veh, %	0	9	0	0	7	10	3	0	0			
Cap, veh/h	0	1772	0	0	1805	786	1084	0	498			
Arrive On Green	0.00	0.54	0.00	0.00	0.54	0.54	0.31	0.00	0.31			
Sat Flow, veh/h	0	3486	0	0	3463	1468	3514	0	1615			
Grp Volume(v), veh/h	0	1028	0	0	1221	43	598	0	451			
Grp Sat Flow(s),veh/h/ln	0	1656	0	0	1687	1468	1757	0	1615			
Q Serve(g_s), s	0.0	21.6	0.0	0.0	27.2	1.4	14.6	0.0	27.6			
Cycle Q Clear(g_c), s	0.0	21.6	0.0	0.0	27.2	1.4	14.6	0.0	27.6			
Prop In Lane	0.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	1772	0	0	1805	786	1084	0	498			
V/C Ratio(X)	0.00	0.58	0.00	0.00	0.68	0.05	0.55	0.00	0.91			
Avail Cap(c_a), veh/h	0	1772	0	0	1805	786	1211	0	557			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	0.73	0.73	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	16.1	0.0	0.0	17.4	11.5	29.7	0.0	34.2			
Incr Delay (d2), s/veh	0.0	1.4	0.0	0.0	1.5	0.1	0.4	0.0	17.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	0.0	15.4	0.0	0.0	18.0	1.1	11.5	0.0	20.9			
LnGrp Delay(d),s/veh	0.0	17.5	0.0	0.0	18.9	11.6	30.1	0.0	51.4			
LnGrp LOS		B			B	B	C		D			
Approach Vol, veh/h		1028			1264			1049				
Approach Delay, s/veh		17.5			18.7			39.3				
Approach LOS		B			B			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		60.7		42.3		60.7		
Change Period (Y+Rc), s		5.6		10.5		* 5.6		
Max Green Setting (Gmax), s		51.4		35.5		* 52		
Max Q Clear Time (g_c+I1), s		23.6		29.6		29.2		
Green Ext Time (p_c), s		8.0		2.2		9.4		

Intersection Summary	
HCM 2010 Ctrl Delay	24.8
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.
User approved ignoring U-Turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	25	601	632	176	49	743	204	346	1	55	68	1
Future Volume (veh/h)	25	601	632	176	49	743	204	346	1	55	68	1
Number		5	2	12	1	6	16	7	4	14	3	8
Initial Q (Qb), veh		0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln		1847	1712	1881	1881	1810	1900	1863	1863	1900	1810	1845
Adj Flow Rate, veh/h		626	658	183	51	774	212	360	1	57	71	0
Adj No. of Lanes		2	2	1	2	2	1	2	1	1	2	0
Peak Hour Factor		0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %		3	11	1	1	5	0	2	2	0	5	2
Cap, veh/h		706	1825	1094	118	1320	821	423	75	65	429	0
Arrive On Green		0.21	0.56	0.56	0.03	0.38	0.38	0.12	0.04	0.04	0.12	0.00
Sat Flow, veh/h		3412	3252	1599	3476	3438	1615	3442	1863	1615	3447	0
Grp Volume(v), veh/h		626	658	183	51	774	212	360	1	57	71	0
Grp Sat Flow(s),veh/h/ln		1706	1626	1599	1738	1719	1615	1721	1863	1615	1723	0
Q Serve(g_s), s		21.4	13.4	1.4	1.7	21.5	4.9	12.3	0.1	3.6	2.2	0.0
Cycle Q Clear(g_c), s		21.4	13.4	1.4	1.7	21.5	4.9	12.3	0.1	3.6	2.2	0.0
Prop In Lane		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h		706	1825	1094	118	1320	821	423	75	65	429	0
V/C Ratio(X)		0.89	0.36	0.17	0.43	0.59	0.26	0.85	0.01	0.88	0.17	0.00
Avail Cap(c_a), veh/h		867	1825	1094	145	1320	821	516	245	213	429	0
HCM Platoon Ratio		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)		0.71	0.71	0.71	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh		46.2	14.5	1.2	56.8	29.4	5.6	51.5	55.3	41.4	47.0	0.0
Incr Delay (d2), s/veh		7.0	0.4	0.2	2.5	1.9	0.8	10.9	0.1	28.1	0.2	0.0
Initial Q Delay(d3),s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln		15.3	9.4	2.4	1.6	15.9	5.2	10.7	0.1	4.2	1.9	0.0
LnGrp Delay(d),s/veh		53.2	14.9	1.4	59.3	31.3	6.4	62.4	55.4	69.4	47.1	0.0
LnGrp LOS		D	B	A	E	C	A	E	E	E	D	
Approach Vol, veh/h			1467			1037			418			189
Approach Delay, s/veh			29.6			27.6			63.4			62.7
Approach LOS			C			C			E			E

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.1	73.9	23.9	11.0	32.3	52.7	23.8	11.2
Change Period (Y+Rc), s	7.0	* 6.6	* 9	6.2	7.5	* 6.6	9.0	6.3
Max Green Setting (Gmax), s	5.0	* 62	* 8	15.8	30.5	* 37	18.0	5.7
Max Q Clear Time (g_c+I1), s	3.7	15.4	4.2	5.6	23.4	23.5	14.3	5.0
Green Ext Time (p_c), s	0.0	5.6	0.0	0.1	1.5	4.8	0.5	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	35.5
HCM 2010 LOS	D

Notes

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	112
Future Volume (veh/h)	112
Number	18
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Adj Sat Flow, veh/h/ln	1845
Adj Flow Rate, veh/h	118
Adj No. of Lanes	2
Peak Hour Factor	0.96
Percent Heavy Veh, %	3
Cap, veh/h	128
Arrive On Green	0.04
Sat Flow, veh/h	3136
Grp Volume(v), veh/h	118
Grp Sat Flow(s),veh/h/ln	1568
Q Serve(g_s), s	3.0
Cycle Q Clear(g_c), s	3.0
Prop In Lane	1.00
Lane Grp Cap(c), veh/h	128
V/C Ratio(X)	0.92
Avail Cap(c_a), veh/h	149
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	25.3
Incr Delay (d2), s/veh	46.8
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(95%),veh/ln	4.9
LnGrp Delay(d),s/veh	72.1
LnGrp LOS	E
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer	

User approved volume balancing among the lanes for turning movement.
User approved ignoring U-Turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

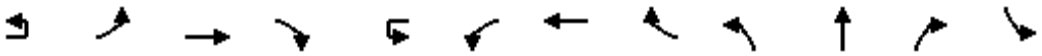
Intersection	
Int Delay, s/veh	8.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	264	461	175	293	31
Future Vol, veh/h	10	264	461	175	293	31
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	360	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	13	45	11	13	4	8
Mvmt Flow	12	307	536	203	341	36

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1634	359	377	0	-	0
Stage 1	359	-	-	-	-	-
Stage 2	1275	-	-	-	-	-
Critical Hdwy	6.53	6.65	4.21	-	-	-
Critical Hdwy Stg 1	5.53	-	-	-	-	-
Critical Hdwy Stg 2	5.53	-	-	-	-	-
Follow-up Hdwy	3.617	3.705	2.299	-	-	-
Pot Cap-1 Maneuver	105	599	1134	-	-	-
Stage 1	683	-	-	-	-	-
Stage 2	249	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	55	599	1134	-	-	-
Mov Cap-2 Maneuver	158	-	-	-	-	-
Stage 1	360	-	-	-	-	-
Stage 2	249	-	-	-	-	-

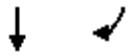
Approach	EB	NB	SB
HCM Control Delay, s	17.7	8	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1134	-	158	599	-	-
HCM Lane V/C Ratio	0.473	-	0.074	0.512	-	-
HCM Control Delay (s)	11	-	29.6	17.2	-	-
HCM Lane LOS	B	-	D	C	-	-
HCM 95th %tile Q(veh)	2.6	-	0.2	2.9	-	-



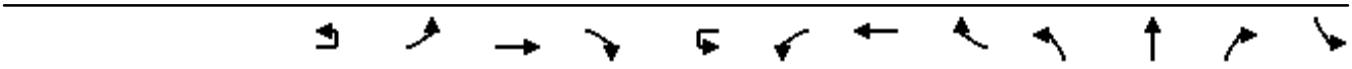
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	192	46	2475	17	15	1	2143	6	27	7	33	47
Future Volume (vph)	192	46	2475	17	15	1	2143	6	27	7	33	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	10.9	10.9	5.7			11.2	5.5	5.5		11.1		
Lane Util. Factor	1.00	1.00	0.91			1.00	0.91	1.00		1.00		
Frt	1.00	1.00	1.00			1.00	1.00	0.85		0.93		
Flt Protected	0.95	0.95	1.00			0.95	1.00	1.00		0.98		
Satd. Flow (prot)	1770	1770	4934			1786	4940	1346		1618		
Flt Permitted	0.95	0.95	1.00			0.95	1.00	1.00		0.98		
Satd. Flow (perm)	1770	1770	4934			1786	4940	1346		1618		
Peak-hour factor, PHF	0.92	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	209	48	2578	18	16	1	2232	6	28	7	34	49
RTOR Reduction (vph)	0	0	0	0	0	0	0	3	0	27	0	0
Lane Group Flow (vph)	209	48	2596	0	0	17	2232	3	0	42	0	0
Heavy Vehicles (%)	2%	2%	5%	8%	0%	18%	5%	20%	3%	3%	12%	3%
Turn Type	Prot	Prot	NA		Prot	Prot	NA	Perm	Split	NA		Split
Protected Phases	1	1	6		5	5	2		4	4		8
Permitted Phases								2				
Actuated Green, G (s)	18.0	18.0	76.3			1.9	60.7	60.7		4.7		
Effective Green, g (s)	18.0	18.0	76.3			1.9	60.7	60.7		4.7		
Actuated g/C Ratio	0.14	0.14	0.59			0.01	0.47	0.47		0.04		
Clearance Time (s)	10.9	10.9	5.7			11.2	5.5	5.5		11.1		
Vehicle Extension (s)	3.0	3.0	3.0			3.0	3.0	3.0		3.0		
Lane Grp Cap (vph)	245	245	2895			26	2306	628		58		
v/s Ratio Prot	0.12	0.03	c0.53			0.01	c0.45			c0.03		
v/s Ratio Perm								0.00				
v/c Ratio	0.85	0.20	0.90			0.65	0.97	0.00		0.72		
Uniform Delay, d1	54.7	49.6	23.4			63.7	33.7	18.5		62.0		
Progression Factor	1.00	1.00	1.00			0.65	0.21	1.00		1.00		
Incremental Delay, d2	23.8	0.4	4.9			25.9	7.7	0.0		35.9		
Delay (s)	78.5	50.0	28.3			67.6	14.9	18.5		97.9		
Level of Service	E	D	C			E	B	B		F		
Approach Delay (s)			32.3				15.3			97.9		
Approach LOS			C				B			F		

Intersection Summary			
HCM 2000 Control Delay	27.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	39.2
Intersection Capacity Utilization	84.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	4	65
Future Volume (vph)	4	65
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	11.2	
Lane Util. Factor	1.00	
Frt	0.92	
Flt Protected	0.98	
Satd. Flow (prot)	1641	
Flt Permitted	0.98	
Satd. Flow (perm)	1641	
Peak-hour factor, PHF	0.96	0.96
Adj. Flow (vph)	4	68
RTOR Reduction (vph)	35	0
Lane Group Flow (vph)	86	0
Heavy Vehicles (%)	8%	6%
Turn Type	NA	
Protected Phases	8	
Permitted Phases		
Actuated Green, G (s)	7.9	
Effective Green, g (s)	7.9	
Actuated g/C Ratio	0.06	
Clearance Time (s)	11.2	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	99	
v/s Ratio Prot	c0.05	
v/s Ratio Perm		
v/c Ratio	0.87	
Uniform Delay, d1	60.5	
Progression Factor	1.00	
Incremental Delay, d2	51.6	
Delay (s)	112.1	
Level of Service	F	
Approach Delay (s)	112.1	
Approach LOS	F	

Intersection Summary



Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (veh/h)	5	252	2207	106	12	48	1748	253	40	27	101	335
Future Volume (veh/h)	5	252	2207	106	12	48	1748	253	40	27	101	335
Number		1	6	16		5	2	12	3	8	18	7
Initial Q (Qb), veh		0	0	0		0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		1.00		1.00		1.00	1.00		1.00	1.00
Parking Bus, Adj		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln		1715	1846	1900		1900	1810	1681	1900	1856	1900	1827
Adj Flow Rate, veh/h		257	2252	108		49	1784	258	41	28	103	342
Adj No. of Lanes		1	3	0		1	3	1	1	1	0	2
Peak Hour Factor		0.98	0.98	0.98		0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %		11	3	3		0	5	13	0	0	0	4
Cap, veh/h		278	2649	126		81	2056	761	120	23	85	393
Arrive On Green		0.23	0.71	0.71		0.06	0.55	0.55	0.04	0.07	0.07	0.12
Sat Flow, veh/h		1633	4930	235		1810	4940	1429	1810	348	1282	3375
Grp Volume(v), veh/h		257	1531	829		49	1784	258	41	0	131	342
Grp Sat Flow(s),veh/h/ln		1633	1680	1805		1810	1647	1429	1810	0	1630	1688
Q Serve(g_s), s		20.0	42.9	43.8		3.4	40.3	5.3	2.9	0.0	8.6	12.9
Cycle Q Clear(g_c), s		20.0	42.9	43.8		3.4	40.3	5.3	2.9	0.0	8.6	12.9
Prop In Lane		1.00		0.13		1.00		1.00	1.00		0.79	1.00
Lane Grp Cap(c), veh/h		278	1806	970		81	2056	761	120	0	108	393
V/C Ratio(X)		0.92	0.85	0.86		0.61	0.87	0.34	0.34	0.00	1.21	0.87
Avail Cap(c_a), veh/h		300	1806	970		102	2056	761	147	0	108	426
HCM Platoon Ratio		1.33	1.33	1.33		1.33	1.33	1.33	1.00	1.00	1.00	1.00
Upstream Filter(I)		0.49	0.49	0.49		0.37	0.37	0.37	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh		49.4	14.7	14.8		60.0	25.9	3.8	61.8	0.0	60.7	56.5
Incr Delay (d2), s/veh		19.2	2.6	5.0		2.7	2.1	0.5	1.7	0.0	155.4	16.5
Initial Q Delay(d3),s/veh		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln		14.2	25.3	28.2		3.1	22.9	4.0	2.7	0.0	15.3	11.3
LnGrp Delay(d),s/veh		68.6	17.3	19.9		62.8	28.0	4.3	63.4	0.0	216.1	73.0
LnGrp LOS		E	B	B		E	C	A	E		F	E
Approach Vol, veh/h			2617				2091			172		
Approach Delay, s/veh			23.2				25.9			179.7		
Approach LOS			C				C			F		

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	29.3	60.0	12.0	28.7	13.5	75.8	24.7	16.0
Change Period (Y+Rc), s	7.1	* 5.9	7.4	9.6	* 7.7	5.9	9.6	7.4
Max Green Setting (Gmax), s	23.9	* 51	6.6	18.4	* 7.3	67.1	16.4	8.6
Max Q Clear Time (g_c+I1), s	22.0	42.3	4.9	11.4	5.4	45.8	14.9	10.6
Green Ext Time (p_c), s	0.1	7.1	0.0	0.3	0.0	16.6	0.2	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	33.2
HCM 2010 LOS	C

Notes

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (veh/h)	14	372
Future Volume (veh/h)	14	372
Number	4	14
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		1.00
Parking Bus, Adj	1.00	1.00
Adj Sat Flow, veh/h/ln	1813	1900
Adj Flow Rate, veh/h	14	108
Adj No. of Lanes	1	0
Peak Hour Factor	0.98	0.98
Percent Heavy Veh, %	0	0
Cap, veh/h	26	204
Arrive On Green	0.15	0.15
Sat Flow, veh/h	180	1388
Grp Volume(v), veh/h	0	122
Grp Sat Flow(s),veh/h/ln	0	1568
Q Serve(g_s), s	0.0	9.4
Cycle Q Clear(g_c), s	0.0	9.4
Prop In Lane		0.89
Lane Grp Cap(c), veh/h	0	230
V/C Ratio(X)	0.00	0.53
Avail Cap(c_a), veh/h	0	230
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	0.00	1.00
Uniform Delay (d), s/veh	0.0	51.3
Incr Delay (d2), s/veh	0.0	2.3
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	7.6
LnGrp Delay(d),s/veh	0.0	53.6
LnGrp LOS		D
Approach Vol, veh/h	464	
Approach Delay, s/veh	67.9	
Approach LOS	E	
Timer		

User approved ignoring U-Turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↑↑						↰	↱
Traffic Volume (veh/h)	0	1911	744	0	1585	0	0	0	0	54	1	476
Future Volume (veh/h)	0	1911	744	0	1585	0	0	0	0	54	1	476
Number	1	6	16	5	2	12				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1845	1827	0	1810	0				1900	1867	1759
Adj Flow Rate, veh/h	0	1950	0	0	1617	0				55	1	0
Adj No. of Lanes	0	2	1	0	2	0				0	1	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98				0.98	0.98	0.98
Percent Heavy Veh, %	0	3	4	0	5	0				8	100	8
Cap, veh/h	0	2922	1295	0	2866	0				74	1	63
Arrive On Green	0.00	0.83	0.00	0.00	0.83	0.00				0.04	0.04	0.00
Sat Flow, veh/h	0	3597	1553	0	3619	0				1748	32	1495
Grp Volume(v), veh/h	0	1950	0	0	1617	0				56	0	0
Grp Sat Flow(s),veh/h/ln	0	1752	1553	0	1719	0				1779	0	1495
Q Serve(g_s), s	0.0	27.1	0.0	0.0	19.2	0.0				4.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	27.1	0.0	0.0	19.2	0.0				4.0	0.0	0.0
Prop In Lane	0.00		1.00	0.00		0.00				0.98		1.00
Lane Grp Cap(c), veh/h	0	2922	1295	0	2866	0				76	0	63
V/C Ratio(X)	0.00	0.67	0.00	0.00	0.56	0.00				0.74	0.00	0.00
Avail Cap(c_a), veh/h	0	2922	1295	0	2866	0				573	0	482
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.40	0.00	0.00	1.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	4.1	0.0	0.0	3.4	0.0				61.5	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.0	0.0	0.8	0.0				13.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	16.7	0.0	0.0	14.3	0.0				4.1	0.0	0.0
LnGrp Delay(d),s/veh	0.0	4.5	0.0	0.0	4.2	0.0				74.8	0.0	0.0
LnGrp LOS		A			A					E		
Approach Vol, veh/h		1950			1617						56	
Approach Delay, s/veh		4.5			4.2						74.8	
Approach LOS		A			A						E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		116.4		13.6		116.4		
Change Period (Y+Rc), s		* 8		* 8.1		* 8		
Max Green Setting (Gmax), s		* 72		* 42		* 72		
Max Q Clear Time (g_c+I1), s		21.2		6.0		29.1		
Green Ext Time (p_c), s		18.8		0.3		24.0		

Intersection Summary	
HCM 2010 Ctrl Delay	5.5
HCM 2010 LOS	A

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1371	0	0	1284	145	671	0	491	0	0	0
Future Volume (veh/h)	0	1371	0	0	1284	145	671	0	491	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	0	1863	0	0	1881	1881	1863	0	1863			
Adj Flow Rate, veh/h	0	1428	0	0	1338	151	729	0	534			
Adj No. of Lanes	0	2	0	0	2	1	2	0	1			
Peak Hour Factor	0.96	0.96	0.92	0.92	0.96	0.96	0.92	0.92	0.92			
Percent Heavy Veh, %	0	2	0	0	1	1	2	0	2			
Cap, veh/h	0	1826	0	0	1844	825	1264	0	582			
Arrive On Green	0.00	0.52	0.00	0.00	0.52	0.52	0.37	0.00	0.37			
Sat Flow, veh/h	0	3725	0	0	3668	1599	3442	0	1583			
Grp Volume(v), veh/h	0	1428	0	0	1338	151	729	0	534			
Grp Sat Flow(s),veh/h/ln	0	1770	0	0	1787	1599	1721	0	1583			
Q Serve(g_s), s	0.0	42.6	0.0	0.0	37.7	6.6	22.1	0.0	41.9			
Cycle Q Clear(g_c), s	0.0	42.6	0.0	0.0	37.7	6.6	22.1	0.0	41.9			
Prop In Lane	0.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	1826	0	0	1844	825	1264	0	582			
V/C Ratio(X)	0.00	0.78	0.00	0.00	0.73	0.18	0.58	0.00	0.92			
Avail Cap(c_a), veh/h	0	1826	0	0	1844	825	1438	0	661			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	0.60	0.60	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	25.5	0.0	0.0	24.4	16.8	33.0	0.0	39.3			
Incr Delay (d2), s/veh	0.0	3.4	0.0	0.0	1.5	0.3	0.4	0.0	16.7			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	0.0	29.1	0.0	0.0	24.5	5.1	15.9	0.0	28.4			
LnGrp Delay(d),s/veh	0.0	29.0	0.0	0.0	25.9	17.1	33.5	0.0	56.0			
LnGrp LOS		C			C	B	C		E			
Approach Vol, veh/h		1428			1489			1263				
Approach Delay, s/veh		29.0			25.0			43.0				
Approach LOS		C			C			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		77.6				77.6		52.4
Change Period (Y+Rc), s		* 11				10.5		4.7
Max Green Setting (Gmax), s		* 65				60.5		54.3
Max Q Clear Time (g_c+I1), s		44.6				39.7		43.9
Green Ext Time (p_c), s		10.6				10.3		3.9

Intersection Summary	
HCM 2010 Ctrl Delay	31.8
HCM 2010 LOS	C

Notes

User approved ignoring U-Turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

User approved changes to right turn type.

HCM 2010 analysis supports red clearance in the range of 0 and 6 seconds

Intersection	
Int Delay, s/veh	8.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	27	458	132	400	263	5
Future Vol, veh/h	27	458	132	400	263	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	360	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	5	7	40	3	4	0
Mvmt Flow	30	515	148	449	296	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1044	299	302	0	-	0
Stage 1	299	-	-	-	-	-
Stage 2	745	-	-	-	-	-
Critical Hdwy	6.45	6.27	4.5	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.363	2.56	-	-	-
Pot Cap-1 Maneuver	250	729	1071	-	-	-
Stage 1	746	-	-	-	-	-
Stage 2	464	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	216	729	1071	-	-	-
Mov Cap-2 Maneuver	340	-	-	-	-	-
Stage 1	643	-	-	-	-	-
Stage 2	464	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.7	2.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1071	-	340	729	-	-
HCM Lane V/C Ratio	0.138	-	0.089	0.706	-	-
HCM Control Delay (s)	8.9	-	16.6	20.9	-	-
HCM Lane LOS	A	-	C	C	-	-
HCM 95th %tile Q(veh)	0.5	-	0.3	5.9	-	-

HCM 2000 - Intersection Delay and LOS
2030 Diverging Diamond Interchange
North Winchester IAAR

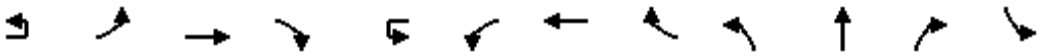
Intersection Number and Description		Type of Control	Lane Group	Northbound				Southbound				Eastbound				Westbound				Overall	
				AM		PM		AM		PM		AM		PM		AM		PM		AM	PM
				Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS		
1	US 11 at Pactiv Way/Crown Ln			Pactiv Way				Crown Ln				US 11				US 11				Intersection	
		Signal	Left	61.4	E	97.9	F	59.5	E	112.1	F	61.2	E	77.0	E	33.0	C	67.4	E	Delay	Delay
			Through									25.1	C	28.3	C	6.1	A	14.7	B	18.0	27.9
			Right													13.2	B	18.3	B	LOS	LOS
			Approach	61.4	E	97.9	F	59.5	E	112.1	F	27.0	C	32.7	C	6.6	A	15.1	B	B	C
2	US 11 at Amoco Ln/ Welltown Rd*			Amoco Ln				Welltown Rd				US 11				US 11				Intersection	
		Signal	Left	54.6	D	55.6	E	95.4	F	73.0	E	38.3	D	62.9	E	50.2	D	68.1	E	Delay	Delay
			Through	97.2	F	216.1	F	117.1	F	321.3	F	4.3	A	6.4	A	55.8	E	43.6	D	36.2	52.5
			Right													21.9	C	19.8	B	LOS	LOS
			Approach	83.7	F	177.8	F	102.1	F	205.9	F	7.8	A	10.2	B	50.4	D	41.3	D	D	D
3	US 11 at I-81 SB Off-Ramp			-				I-81 SB Off Ramp				US 11				US 11				Intersection	
		Signal	Left					18.5	B	18.9	B	†		†						Delay	Delay
			Through									18.8	B	27.7	C	33.3	C	42.7	D	21.2	30.3
			Right					0.9	A	0.5	A					†		†		LOS	LOS
			Approach					-		-		18.8	B	27.7	C	33.3	C	42.7	D	C	C
5	US 11 at I-81 NB Off-Ramp			I-81 NB Off Ramp				-				US 11				US 11				Intersection	
		Signal	Left	22.9	C	25.2	C					†		†						Delay	Delay
			Through									9.3	A	26.9	C	17.5	B	16.0	B	16.9	23.2
			Right	24.5	C	29.1	C									†		†		LOS	LOS
			Approach	-		-						9.3	A	26.9	C	17.5	B	16.0	B	B	C
6	US 11 at Snowden Bridge Boulevard/ Merchant Street			Snowden Bridge Boulevard				Merchant Street				US 11				US 11				Intersection	
		Signal	Left	58.8	E	54.7	D	45.6	D	50.1	D	49.2	D	45.4	D	59.7	E	66.6	E	Delay	Delay
			Through	55.7	E	60.7	E	56.1	E	57.8	E	6.4	A	8.9	A	35.1	D	51.5	D	33.1	37.7
			Right	55.9	E	60.9	E	55.9	E	57.7	E	0.4	A	0.1	A	16.6	B	21.1	C	LOS	LOS
			Approach	58.4	E	55.9	E	33.1	C	54.8	D	24.4	C	24.1	C	32.6	C	47.7	D	C	D
7	Welltown Rd at McGhee Rd			Welltown Rd				Welltown Rd				McGhee Rd				-				Intersection	
		Stop	Left	10.7	B	8.9	A					28.0	D	16.6	C					Delay	Delay
			Through	†	†	†	†	†	†	†	†									-	-
			Right									16.4	C	20.9	C					LOS	LOS
			Approach	7.8	A	2.2	A	†	†	†	†	16.8	C	20.7	C					-	-

Notes:

Shared lane results are shown as one value that corresponds to all movements in that lane.

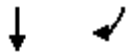
† Delay for movements with no conflicting movements have not been included.

* Delay results are from HCM 2010 due to standard NEMA phasing



Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	80	33	1970	36	25	12	2008	5	3	2	13	20
Future Volume (vph)	80	33	1970	36	25	12	2008	5	3	2	13	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	10.9	10.9	5.7			11.2	5.5	5.5		11.1		
Lane Util. Factor	1.00	1.00	0.91			1.00	0.91	1.00		1.00		
Frt	1.00	1.00	1.00			1.00	1.00	0.85		0.90		
Flt Protected	0.95	0.95	1.00			0.95	1.00	1.00		0.99		
Satd. Flow (prot)	1805	1597	4705			1781	4803	1077		1353		
Flt Permitted	0.95	0.95	1.00			0.95	1.00	1.00		0.99		
Satd. Flow (perm)	1805	1597	4705			1781	4803	1077		1353		
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.92	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	90	37	2213	40	27	13	2256	6	3	2	15	22
RTOR Reduction (vph)	0	0	1	0	0	0	0	3	0	15	0	0
Lane Group Flow (vph)	90	37	2252	0	0	40	2256	3	0	5	0	0
Heavy Vehicles (%)	0%	13%	10%	7%	2%	0%	8%	50%	17%	2%	30%	9%
Turn Type	Prot	Prot	NA		Prot	Prot	NA	Perm	Split	NA		Split
Protected Phases	1	1	6		5	5	2		4	4		3
Permitted Phases								2				
Actuated Green, G (s)	9.2	9.2	68.0			4.6	63.9	63.9		2.4		
Effective Green, g (s)	9.2	9.2	68.0			4.6	63.9	63.9		2.4		
Actuated g/C Ratio	0.08	0.08	0.57			0.04	0.53	0.53		0.02		
Clearance Time (s)	10.9	10.9	5.7			11.2	5.5	5.5		11.1		
Vehicle Extension (s)	3.0	3.0	3.0			3.0	3.0	3.0		3.0		
Lane Grp Cap (vph)	138	122	2666			68	2557	573		27		
v/s Ratio Prot	0.05	0.02	c0.48			0.02	c0.47			c0.00		
v/s Ratio Perm								0.00				
v/c Ratio	0.65	0.30	0.84			0.59	0.88	0.01		0.20		
Uniform Delay, d1	53.8	52.4	21.6			56.8	24.7	13.2		57.9		
Progression Factor	1.00	1.00	1.00			0.50	0.17	1.00		1.00		
Incremental Delay, d2	10.5	1.4	3.5			4.8	1.9	0.0		3.5		
Delay (s)	64.4	53.8	25.1			33.0	6.1	13.2		61.4		
Level of Service	E	D	C			C	A	B		E		
Approach Delay (s)			27.0				6.6			61.4		
Approach LOS			C				A			E		

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	39.2
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	8	54
Future Volume (vph)	8	54
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	11.2	
Lane Util. Factor	1.00	
Frt	0.91	
Flt Protected	0.99	
Satd. Flow (prot)	1606	
Flt Permitted	0.99	
Satd. Flow (perm)	1606	
Peak-hour factor, PHF	0.89	0.89
Adj. Flow (vph)	9	61
RTOR Reduction (vph)	58	0
Lane Group Flow (vph)	34	0
Heavy Vehicles (%)	10%	5%
Turn Type	NA	
Protected Phases	3	
Permitted Phases		
Actuated Green, G (s)	5.8	
Effective Green, g (s)	5.8	
Actuated g/C Ratio	0.05	
Clearance Time (s)	11.2	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	77	
v/s Ratio Prot	c0.02	
v/s Ratio Perm		
v/c Ratio	0.44	
Uniform Delay, d1	55.5	
Progression Factor	1.00	
Incremental Delay, d2	4.0	
Delay (s)	59.5	
Level of Service	E	
Approach Delay (s)	59.5	
Approach LOS	E	

Intersection Summary

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	273	1679	76	9	59	1734	330	28	33	27	247	22
Future Volume (veh/h)	273	1679	76	9	59	1734	330	28	33	27	247	22
Number	1	6	16		5	2	12	3	8	18	7	4
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1743	1714	1900		1852	1759	1667	1900	1709	1900	1532	1735
Adj Flow Rate, veh/h	310	1908	86		67	1970	375	32	38	31	281	25
Adj No. of Lanes	1	3	0		1	3	1	1	1	0	2	1
Peak Hour Factor	0.88	0.88	0.88		0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	9	11	11		3	8	14	0	8	8	24	29
Cap, veh/h	380	2414	109		198	1969	727	154	47	38	293	26
Arrive On Green	0.46	1.00	1.00		0.11	0.41	0.41	0.05	0.05	0.05	0.10	0.09
Sat Flow, veh/h	1660	4592	207		1763	4803	1417	1810	872	712	2831	304
Grp Volume(v), veh/h	310	1295	699		67	1970	375	32	0	69	281	0
Grp Sat Flow(s),veh/h/ln	1660	1560	1678		1763	1601	1417	1810	0	1584	1416	0
Q Serve(g_s), s	19.4	0.0	0.0		4.2	49.2	8.6	0.0	0.0	5.2	11.9	0.0
Cycle Q Clear(g_c), s	19.4	0.0	0.0		4.2	49.2	8.6	0.0	0.0	5.2	11.9	0.0
Prop In Lane	1.00		0.12		1.00		1.00	1.00		0.45	1.00	
Lane Grp Cap(c), veh/h	380	1641	882		198	1969	727	154	0	85	293	0
V/C Ratio(X)	0.82	0.79	0.79		0.34	1.00	0.52	0.21	0.00	0.81	0.96	0.00
Avail Cap(c_a), veh/h	380	1641	882		198	1969	727	190	0	87	293	0
HCM Platoon Ratio	2.00	2.00	2.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.58	0.58	0.58		1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.3	0.0	0.0		49.2	35.4	19.3	53.9	0.0	56.2	53.6	0.0
Incr Delay (d2), s/veh	7.9	2.3	4.3		1.0	20.4	2.6	0.7	0.0	41.1	41.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.6	0.5	1.1		2.1	25.4	7.7	1.0	0.0	3.2	6.3	0.0
LnGrp Delay(d),s/veh	38.3	2.3	4.3		50.2	55.8	21.9	54.6	0.0	97.2	95.4	0.0
LnGrp LOS	D	A	A		D	F	C	D		F	F	
Approach Vol, veh/h		2304				2412			101			406
Approach Delay, s/veh		7.8				50.4			83.7			102.1
Approach LOS		A				D			F			F

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	35.2	55.0	15.9	20.0	21.2	69.0	22.0	13.9
Change Period (Y+Rc), s	7.7	* 5.8	9.6	* 9.6	7.7	* 5.9	9.6	7.4
Max Green Setting (Gmax), s	21.9	* 49	8.6	* 10	7.3	* 63	12.4	6.6
Max Q Clear Time (g_c+I1), s	21.4	51.2	2.0	11.8	6.2	2.0	13.9	7.2
Green Ext Time (p_c), s	0.1	0.0	0.0	0.0	0.0	25.1	0.0	0.0

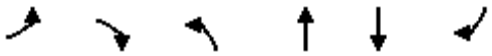
Intersection Summary	
HCM 2010 Ctrl Delay	36.2
HCM 2010 LOS	D

Notes

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	288
Future Volume (veh/h)	288
Number	14
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Adj Sat Flow, veh/h/ln	1900
Adj Flow Rate, veh/h	100
Adj No. of Lanes	0
Peak Hour Factor	0.88
Percent Heavy Veh, %	29
Cap, veh/h	105
Arrive On Green	0.09
Sat Flow, veh/h	1216
Grp Volume(v), veh/h	125
Grp Sat Flow(s),veh/h/ln	1521
Q Serve(g_s), s	9.8
Cycle Q Clear(g_c), s	9.8
Prop In Lane	0.80
Lane Grp Cap(c), veh/h	132
V/C Ratio(X)	0.95
Avail Cap(c_a), veh/h	132
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	54.5
Incr Delay (d2), s/veh	62.5
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	6.4
LnGrp Delay(d),s/veh	117.1
LnGrp LOS	F
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer	

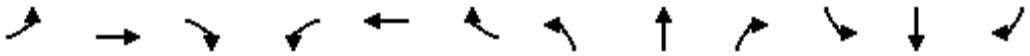
User approved ignoring U-Turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	689	0	0	1443	0
Future Volume (vph)	0	689	0	0	1443	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	
Lane Util. Factor		1.00			0.95	
Frt		0.86			1.00	
Flt Protected		1.00			1.00	
Satd. Flow (prot)		1611			3343	
Flt Permitted		1.00			1.00	
Satd. Flow (perm)		1611			3343	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	710	0	0	1488	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	710	0	0	1488	0
Heavy Vehicles (%)	2%	2%	2%	2%	8%	2%
Turn Type		Free			NA	
Protected Phases					Free	
Permitted Phases		Free				
Actuated Green, G (s)		120.0			120.0	
Effective Green, g (s)		120.0			120.0	
Actuated g/C Ratio		1.00			1.00	
Clearance Time (s)						
Vehicle Extension (s)						
Lane Grp Cap (vph)		1611			3343	
v/s Ratio Prot					0.45	
v/s Ratio Perm		0.44				
v/c Ratio		0.44			0.45	
Uniform Delay, d1		0.0			0.0	
Progression Factor		1.00			1.00	
Incremental Delay, d2		0.9			0.1	
Delay (s)		0.9			0.1	
Level of Service		A			A	
Approach Delay (s)	0.9			0.0	0.1	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	0.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑									↑↑↑	
Traffic Volume (vph)	0	997	0	0	0	0	0	0	0	0	1184	0
Future Volume (vph)	0	997	0	0	0	0	0	0	0	0	1184	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.5									6.5	
Lane Util. Factor		0.95									0.91	
Frt		1.00									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		3312									4988	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		3312									4988	
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)	0	1072	0	0	0	0	0	0	0	0	1273	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1072	0	0	0	0	0	0	0	0	1273	0
Heavy Vehicles (%)	2%	9%	2%	2%	2%	2%	2%	2%	2%	2%	4%	2%
Turn Type		NA									NA	
Protected Phases		6									2	
Permitted Phases												
Actuated Green, G (s)		51.5									55.5	
Effective Green, g (s)		51.5									55.5	
Actuated g/C Ratio		0.43									0.46	
Clearance Time (s)		6.5									6.5	
Vehicle Extension (s)		3.0									3.0	
Lane Grp Cap (vph)		1421									2306	
v/s Ratio Prot		c0.32									c0.26	
v/s Ratio Perm												
v/c Ratio		0.75									0.55	
Uniform Delay, d1		28.9									23.3	
Progression Factor		0.19									0.72	
Incremental Delay, d2		3.7									0.8	
Delay (s)		9.3									17.6	
Level of Service		A									B	
Approach Delay (s)		9.3			0.0			0.0			17.6	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	25	601	632	176	49	743	204	346	1	55	68	1
Future Volume (vph)	25	601	632	176	49	743	204	346	1	55	68	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.5	6.6	9.0	7.0	6.2	9.0	9.0	6.2	6.2	9.0	6.3
Lane Util. Factor		0.97	0.95	1.00	0.97	0.95	1.00	0.97	1.00	1.00	0.97	0.95
Frt		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)		3404	3252	1599	3467	3438	1615	3433	1863	1615	3433	1537
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)		3404	3252	1599	3467	3438	1615	3433	1863	1615	3433	1537
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	26	633	665	185	52	782	215	364	1	58	72	1
RTOR Reduction (vph)	0	0	0	58	0	0	109	0	0	56	0	57
Lane Group Flow (vph)	0	659	665	127	52	782	106	364	1	2	72	3
Heavy Vehicles (%)	0%	3%	11%	1%	1%	5%	0%	2%	2%	0%	2%	5%
Turn Type	Prot	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA
Protected Phases	5	5	2	7	1	6	3	7	4		3	8
Permitted Phases				2			6			4		
Actuated Green, G (s)		27.5	66.0	82.6	4.0	42.4	59.1	16.6	4.5	4.5	16.7	4.5
Effective Green, g (s)		27.5	66.0	82.6	4.0	42.4	59.1	16.6	4.5	4.5	16.7	4.5
Actuated g/C Ratio		0.23	0.55	0.69	0.03	0.35	0.49	0.14	0.04	0.04	0.14	0.04
Clearance Time (s)		7.5	6.6	9.0	7.0	6.2	9.0	9.0	6.2	6.2	9.0	6.3
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		780	1788	1220	115	1214	795	474	69	60	477	57
v/s Ratio Prot		c0.19	0.20	0.01	0.01	c0.23	0.02	c0.11	0.00		0.02	c0.00
v/s Ratio Perm				0.07			0.05			0.00		
v/c Ratio		0.84	0.37	0.10	0.45	0.64	0.13	0.77	0.01	0.04	0.15	0.06
Uniform Delay, d1		44.2	15.3	6.3	56.9	32.5	16.5	49.8	55.6	55.7	45.4	55.7
Progression Factor		0.94	0.38	0.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		7.9	0.6	0.0	2.8	2.6	0.1	7.3	0.1	0.2	0.1	0.4
Delay (s)		49.2	6.4	0.4	59.7	35.1	16.6	57.2	55.7	55.9	45.6	56.1
Level of Service		D	A	A	E	D	B	E	E	E	D	E
Approach Delay (s)			24.4			32.6			57.0			52.1
Approach LOS			C			C			E			D

Intersection Summary			
HCM 2000 Control Delay	33.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	29.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	112
Future Volume (vph)	112
Ideal Flow (vphpl)	1900
Total Lost time (s)	6.3
Lane Util. Factor	0.95
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1534
Flt Permitted	1.00
Satd. Flow (perm)	1534
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	118
RTOR Reduction (vph)	57
Lane Group Flow (vph)	2
Heavy Vehicles (%)	0%
Turn Type	Perm
Protected Phases	
Permitted Phases	8
Actuated Green, G (s)	4.5
Effective Green, g (s)	4.5
Actuated g/C Ratio	0.04
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	57
v/s Ratio Prot	
v/s Ratio Perm	0.00
v/c Ratio	0.04
Uniform Delay, d1	55.7
Progression Factor	1.00
Incremental Delay, d2	0.3
Delay (s)	55.9
Level of Service	E
Approach Delay (s)	
Approach LOS	

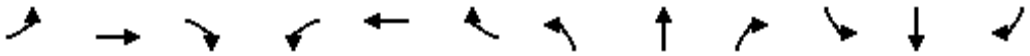
Intersection Summary

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	0	1208	0	0	176	0
Future Volume (vph)	0	1208	0	0	176	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			6.5	
Lane Util. Factor		0.91			1.00	
Frt		1.00			1.00	
Flt Protected		1.00			0.95	
Satd. Flow (prot)		4715			1719	
Flt Permitted		1.00			0.95	
Satd. Flow (perm)		4715			1719	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1245	0	0	181	0
RTOR Reduction (vph)	0	0	0	0	97	0
Lane Group Flow (vph)	0	1245	0	0	84	0
Heavy Vehicles (%)	2%	10%	2%	2%	5%	2%
Turn Type		NA			Prot	
Protected Phases		Free!			2!	
Permitted Phases						
Actuated Green, G (s)		120.0			55.5	
Effective Green, g (s)		120.0			55.5	
Actuated g/C Ratio		1.00			0.46	
Clearance Time (s)					6.5	
Vehicle Extension (s)					3.0	
Lane Grp Cap (vph)		4715			795	
v/s Ratio Prot		0.26			0.05	
v/s Ratio Perm						
v/c Ratio		0.26			0.11	
Uniform Delay, d1		0.0			18.2	
Progression Factor		1.00			1.00	
Incremental Delay, d2		0.1			0.3	
Delay (s)		0.1			18.5	
Level of Service		A			B	
Approach Delay (s)		0.1	0.0		18.5	
Approach LOS		A	A		B	

Intersection Summary			
HCM 2000 Control Delay	2.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	41.8%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.

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	0	1443	0	0	1208	0	0	0	0
Future Volume (vph)	0	0	0	0	1443	0	0	1208	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					6.5			6.5				
Lane Util. Factor					0.95			0.91				
Frt					1.00			1.00				
Flt Protected					1.00			1.00				
Satd. Flow (prot)					3343			4715				
Flt Permitted					1.00			1.00				
Satd. Flow (perm)					3343			4715				
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	0	1488	0	0	1245	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1488	0	0	1245	0	0	0	0
Heavy Vehicles (%)	2%	2%	2%	2%	8%	2%	2%	10%	2%	2%	2%	2%
Turn Type					NA			NA				
Protected Phases					2			6				
Permitted Phases												
Actuated Green, G (s)					55.5			51.5				
Effective Green, g (s)					55.5			51.5				
Actuated g/C Ratio					0.46			0.43				
Clearance Time (s)					6.5			6.5				
Vehicle Extension (s)					3.0			3.0				
Lane Grp Cap (vph)					1546			2023				
v/s Ratio Prot					c0.45			c0.26				
v/s Ratio Perm												
v/c Ratio					0.96			0.62				
Uniform Delay, d1					31.2			26.6				
Progression Factor					0.58			0.68				
Incremental Delay, d2					15.2			0.8				
Delay (s)					33.4			18.8				
Level of Service					C			B				
Approach Delay (s)		0.0			33.4			18.8			0.0	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	26.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	580	0	0	0	0	1184
Future Volume (vph)	580	0	0	0	0	1184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5					4.0
Lane Util. Factor	0.97					0.91
Frt	1.00					1.00
Flt Protected	0.95					1.00
Satd. Flow (prot)	3127					4988
Flt Permitted	0.95					1.00
Satd. Flow (perm)	3127					4988
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	624	0	0	0	0	1273
RTOR Reduction (vph)	228	0	0	0	0	0
Lane Group Flow (vph)	396	0	0	0	0	1273
Heavy Vehicles (%)	12%	2%	2%	2%	2%	4%
Turn Type	Prot					NA
Protected Phases	6!					Free!
Permitted Phases						
Actuated Green, G (s)	51.5					120.0
Effective Green, g (s)	51.5					120.0
Actuated g/C Ratio	0.43					1.00
Clearance Time (s)	6.5					
Vehicle Extension (s)	3.0					
Lane Grp Cap (vph)	1342					4988
v/s Ratio Prot	c0.13					0.26
v/s Ratio Perm						
v/c Ratio	0.29					0.26
Uniform Delay, d1	22.4					0.0
Progression Factor	1.00					1.00
Incremental Delay, d2	0.6					0.1
Delay (s)	22.9					0.1
Level of Service	C					A
Approach Delay (s)	22.9		0.0			0.1
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	7.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

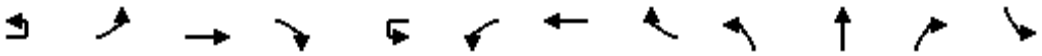
Intersection	
Int Delay, s/veh	7.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	264	461	175	293	31
Future Vol, veh/h	10	264	461	175	293	31
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	360	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	13	45	11	13	4	8
Mvmt Flow	11	297	518	197	329	35

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1580	347	364	0	-	0
Stage 1	347	-	-	-	-	-
Stage 2	1233	-	-	-	-	-
Critical Hdwy	6.53	6.65	4.21	-	-	-
Critical Hdwy Stg 1	5.53	-	-	-	-	-
Critical Hdwy Stg 2	5.53	-	-	-	-	-
Follow-up Hdwy	3.617	3.705	2.299	-	-	-
Pot Cap-1 Maneuver	113	609	1147	-	-	-
Stage 1	692	-	-	-	-	-
Stage 2	261	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	62	609	1147	-	-	-
Mov Cap-2 Maneuver	168	-	-	-	-	-
Stage 1	379	-	-	-	-	-
Stage 2	261	-	-	-	-	-

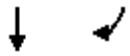
Approach	EB	NB	SB
HCM Control Delay, s	16.8	7.8	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1147	-	168	609	-	-
HCM Lane V/C Ratio	0.452	-	0.067	0.487	-	-
HCM Control Delay (s)	10.7	-	28	16.4	-	-
HCM Lane LOS	B	-	D	C	-	-
HCM 95th %tile Q(veh)	2.4	-	0.2	2.7	-	-



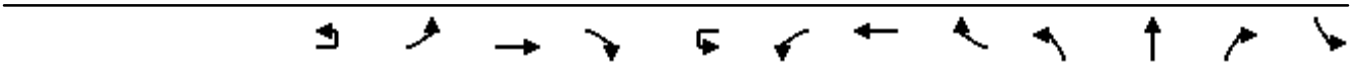
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	192	46	2475	17	15	1	2143	6	27	7	33	47
Future Volume (vph)	192	46	2475	17	15	1	2143	6	27	7	33	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	10.9	10.9	5.7			11.2	5.5	5.5		11.1		
Lane Util. Factor	1.00	1.00	0.91			1.00	0.91	1.00		1.00		
Frt	1.00	1.00	1.00			1.00	1.00	0.85		0.93		
Flt Protected	0.95	0.95	1.00			0.95	1.00	1.00		0.98		
Satd. Flow (prot)	1770	1770	4934			1786	4940	1346		1618		
Flt Permitted	0.95	0.95	1.00			0.95	1.00	1.00		0.98		
Satd. Flow (perm)	1770	1770	4934			1786	4940	1346		1618		
Peak-hour factor, PHF	0.92	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	209	48	2578	18	16	1	2232	6	28	7	34	49
RTOR Reduction (vph)	0	0	0	0	0	0	0	3	0	27	0	0
Lane Group Flow (vph)	209	48	2596	0	0	17	2232	3	0	42	0	0
Heavy Vehicles (%)	2%	2%	5%	8%	0%	18%	5%	20%	3%	3%	12%	3%
Turn Type	Prot	Prot	NA		Prot	Prot	NA	Perm	Split	NA		Split
Protected Phases	1	1	6		5	5	2		4	4		8
Permitted Phases								2				
Actuated Green, G (s)	17.5	17.5	76.3			1.9	61.2	61.2		4.7		
Effective Green, g (s)	17.5	17.5	76.3			1.9	61.2	61.2		4.7		
Actuated g/C Ratio	0.13	0.13	0.59			0.01	0.47	0.47		0.04		
Clearance Time (s)	10.9	10.9	5.7			11.2	5.5	5.5		11.1		
Vehicle Extension (s)	3.0	3.0	3.0			3.0	3.0	3.0		3.0		
Lane Grp Cap (vph)	238	238	2895			26	2325	633		58		
v/s Ratio Prot	0.12	0.03	c0.53			0.01	c0.45			c0.03		
v/s Ratio Perm								0.00				
v/c Ratio	0.88	0.20	0.90			0.65	0.96	0.00		0.72		
Uniform Delay, d1	55.2	50.0	23.4			63.7	33.2	18.2		62.0		
Progression Factor	1.00	1.00	1.00			0.64	0.23	1.00		1.00		
Incremental Delay, d2	28.4	0.4	4.9			26.3	6.9	0.0		35.9		
Delay (s)	83.6	50.5	28.3			67.4	14.7	18.3		97.9		
Level of Service	F	D	C			E	B	B		F		
Approach Delay (s)			32.7				15.1			97.9		
Approach LOS			C				B			F		

Intersection Summary			
HCM 2000 Control Delay	27.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	39.2
Intersection Capacity Utilization	84.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	4	65
Future Volume (vph)	4	65
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	11.2	
Lane Util. Factor	1.00	
Frt	0.92	
Flt Protected	0.98	
Satd. Flow (prot)	1641	
Flt Permitted	0.98	
Satd. Flow (perm)	1641	
Peak-hour factor, PHF	0.96	0.96
Adj. Flow (vph)	4	68
RTOR Reduction (vph)	35	0
Lane Group Flow (vph)	86	0
Heavy Vehicles (%)	8%	6%
Turn Type	NA	
Protected Phases	8	
Permitted Phases		
Actuated Green, G (s)	7.9	
Effective Green, g (s)	7.9	
Actuated g/C Ratio	0.06	
Clearance Time (s)	11.2	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	99	
v/s Ratio Prot	c0.05	
v/s Ratio Perm		
v/c Ratio	0.87	
Uniform Delay, d1	60.5	
Progression Factor	1.00	
Incremental Delay, d2	51.6	
Delay (s)	112.1	
Level of Service	F	
Approach Delay (s)	112.1	
Approach LOS	F	

Intersection Summary

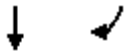


Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (veh/h)	5	252	2207	106	12	48	1748	253	40	27	101	335
Future Volume (veh/h)	5	252	2207	106	12	48	1748	253	40	27	101	335
Number		1	6	16		5	2	12	3	8	18	7
Initial Q (Qb), veh		0	0	0		0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		1.00		1.00		1.00	1.00		1.00	1.00
Parking Bus, Adj		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln		1715	1846	1900		1900	1810	1681	1900	1856	1900	1827
Adj Flow Rate, veh/h		257	2252	108		49	1784	258	41	28	103	342
Adj No. of Lanes		1	3	0		1	3	1	1	1	0	2
Peak Hour Factor		0.98	0.98	0.98		0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %		11	3	3		0	5	13	0	0	0	4
Cap, veh/h		276	2566	122		81	1981	739	120	23	85	393
Arrive On Green		0.34	1.00	1.00		0.04	0.40	0.40	0.04	0.07	0.07	0.12
Sat Flow, veh/h		1633	4930	235		1810	4940	1429	1810	348	1282	3375
Grp Volume(v), veh/h		257	1531	829		49	1784	258	41	0	131	342
Grp Sat Flow(s),veh/h/ln		1633	1680	1805		1810	1647	1429	1810	0	1630	1688
Q Serve(g_s), s		19.8	0.0	0.0		3.5	44.0	13.8	2.7	0.0	8.6	12.9
Cycle Q Clear(g_c), s		19.8	0.0	0.0		3.5	44.0	13.8	2.7	0.0	8.6	12.9
Prop In Lane		1.00		0.13		1.00		1.00	1.00		0.79	1.00
Lane Grp Cap(c), veh/h		276	1749	939		81	1981	739	120	0	108	393
V/C Ratio(X)		0.93	0.88	0.88		0.61	0.90	0.35	0.34	0.00	1.21	0.87
Avail Cap(c_a), veh/h		300	1749	939		102	1981	739	147	0	108	426
HCM Platoon Ratio		2.00	2.00	2.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)		0.49	0.49	0.49		1.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh		42.3	0.0	0.0		61.0	36.5	18.5	53.9	0.0	60.7	56.5
Incr Delay (d2), s/veh		20.6	3.4	6.4		7.1	7.1	1.3	1.7	0.0	155.4	16.5
Initial Q Delay(d3),s/veh		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln		10.4	0.8	1.7		1.9	21.3	5.7	1.4	0.0	8.5	6.9
LnGrp Delay(d),s/veh		62.9	3.4	6.4		68.1	43.6	19.8	55.6	0.0	216.1	73.0
LnGrp LOS		E	A	A		E	D	B	E		F	E
Approach Vol, veh/h			2617				2091			172		
Approach Delay, s/veh			10.2				41.3			177.8		
Approach LOS			B				D			F		

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	29.0	58.0	12.0	30.9	13.5	73.6	24.7	18.2
Change Period (Y+Rc), s	7.1	* 5.9	7.4	9.6	* 7.7	5.9	9.6	* 9.6
Max Green Setting (Gmax), s	23.9	* 51	6.6	18.4	* 7.3	67.1	16.4	* 8.6
Max Q Clear Time (g_c+I1), s	21.8	46.0	4.7	23.3	5.5	2.0	14.9	10.6
Green Ext Time (p_c), s	0.2	4.4	0.0	0.0	0.0	35.0	0.2	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	52.5
HCM 2010 LOS	D

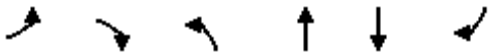
Notes



Movement	SBT	SBR
Lane Configurations		
Traffic Volume (veh/h)	14	372
Future Volume (veh/h)	14	372
Number	4	14
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		1.00
Parking Bus, Adj	1.00	1.00
Adj Sat Flow, veh/h/ln	1813	1900
Adj Flow Rate, veh/h	14	380
Adj No. of Lanes	1	0
Peak Hour Factor	0.98	0.98
Percent Heavy Veh, %	0	0
Cap, veh/h	9	245
Arrive On Green	0.16	0.16
Sat Flow, veh/h	55	1494
Grp Volume(v), veh/h	0	394
Grp Sat Flow(s),veh/h/ln	0	1549
Q Serve(g_s), s	0.0	21.3
Cycle Q Clear(g_c), s	0.0	21.3
Prop In Lane		0.96
Lane Grp Cap(c), veh/h	0	254
V/C Ratio(X)	0.00	1.55
Avail Cap(c_a), veh/h	0	254
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	0.00	1.00
Uniform Delay (d), s/veh	0.0	54.3
Incr Delay (d2), s/veh	0.0	267.0
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	27.9
LnGrp Delay(d),s/veh	0.0	321.3
LnGrp LOS		F
Approach Vol, veh/h	736	
Approach Delay, s/veh	205.9	
Approach LOS	F	
Timer		

User approved ignoring U-Turning movement.

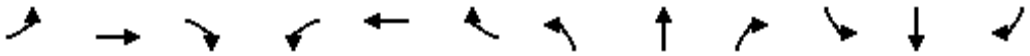
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	476	0	0	1585	0
Future Volume (vph)	0	476	0	0	1585	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	
Lane Util. Factor		1.00			0.95	
Frt		0.86			1.00	
Flt Protected		1.00			1.00	
Satd. Flow (prot)		1611			3539	
Flt Permitted		1.00			1.00	
Satd. Flow (perm)		1611			3539	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	491	0	0	1634	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	491	0	0	1634	0
Turn Type		Free			NA	
Protected Phases					Free	
Permitted Phases		Free				
Actuated Green, G (s)		130.0			130.0	
Effective Green, g (s)		130.0			130.0	
Actuated g/C Ratio		1.00			1.00	
Clearance Time (s)						
Vehicle Extension (s)						
Lane Grp Cap (vph)		1611			3539	
v/s Ratio Prot					0.46	
v/s Ratio Perm		0.30				
v/c Ratio		0.30			0.46	
Uniform Delay, d1		0.0			0.0	
Progression Factor		1.00			1.00	
Incremental Delay, d2		0.5			0.1	
Delay (s)		0.5			0.1	
Level of Service		A			A	
Approach Delay (s)	0.5			0.0	0.1	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	0.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	91.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑									↑↑↑	
Traffic Volume (vph)	0	1371	0	0	0	0	0	0	0	0	1284	0
Future Volume (vph)	0	1371	0	0	0	0	0	0	0	0	1284	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.5									6.5	
Lane Util. Factor		0.95									0.91	
Frt		1.00									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		3539									5136	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		3539									5136	
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)	0	1474	0	0	0	0	0	0	0	0	1381	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1474	0	0	0	0	0	0	0	0	1381	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	1%	2%
Turn Type		NA									NA	
Protected Phases		6									2	
Permitted Phases												
Actuated Green, G (s)		56.5									60.5	
Effective Green, g (s)		56.5									60.5	
Actuated g/C Ratio		0.43									0.47	
Clearance Time (s)		6.5									6.5	
Vehicle Extension (s)		3.0									3.0	
Lane Grp Cap (vph)		1538									2390	
v/s Ratio Prot		c0.42									c0.27	
v/s Ratio Perm												
v/c Ratio		0.96									0.58	
Uniform Delay, d1		35.6									25.4	
Progression Factor		0.35									0.60	
Incremental Delay, d2		14.4									0.8	
Delay (s)		26.9									16.0	
Level of Service		C									B	
Approach Delay (s)		26.9			0.0			0.0			16.0	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	37	764	951	110	53	797	152	218	1	54	233	1
Future Volume (vph)	37	764	951	110	53	797	152	218	1	54	233	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.5	6.6	9.9	7.0	6.2	9.7	9.9	6.2	6.2	9.7	6.3
Lane Util. Factor		0.97	0.95	1.00	0.97	0.95	1.00	0.97	1.00	1.00	0.97	0.95
Frt		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)		3469	3539	1615	3502	3539	1583	3433	1863	1615	3433	1505
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)		3469	3539	1615	3502	3539	1583	3433	1863	1615	3433	1505
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	39	804	1001	116	56	839	160	229	1	57	245	1
RTOR Reduction (vph)	0	0	0	38	0	0	89	0	0	55	0	186
Lane Group Flow (vph)	0	843	1001	78	56	839	71	229	1	2	245	14
Heavy Vehicles (%)	0%	1%	2%	0%	0%	2%	2%	2%	2%	0%	2%	2%
Turn Type	Prot	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA
Protected Phases	5	5	2	7	1	6	3	7	4		3	8
Permitted Phases				2			6			4		
Actuated Green, G (s)		38.1	71.3	87.5	4.0	37.1	57.8	16.2	4.5	4.5	20.7	8.7
Effective Green, g (s)		38.1	71.3	87.5	4.0	37.1	57.8	16.2	4.5	4.5	20.7	8.7
Actuated g/C Ratio		0.29	0.55	0.67	0.03	0.29	0.44	0.12	0.03	0.03	0.16	0.07
Clearance Time (s)		7.5	6.6	9.9	7.0	6.2	9.7	9.9	6.2	6.2	9.7	6.3
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		1016	1941	1210	107	1009	703	427	64	55	546	100
v/s Ratio Prot		c0.24	0.28	0.01	0.02	c0.24	0.02	c0.07	0.00		c0.07	c0.01
v/s Ratio Perm				0.04			0.03			0.00		
v/c Ratio		0.83	0.52	0.06	0.52	0.83	0.10	0.54	0.02	0.04	0.45	0.14
Uniform Delay, d1		42.9	18.5	7.3	62.1	43.5	21.0	53.4	60.6	60.7	49.5	57.1
Progression Factor		0.94	0.43	0.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		5.2	0.9	0.0	4.6	8.0	0.1	1.3	0.1	0.3	0.6	0.7
Delay (s)		45.4	8.9	0.1	66.6	51.5	21.1	54.7	60.7	60.9	50.1	57.8
Level of Service		D	A	A	E	D	C	D	E	E	D	E
Approach Delay (s)			24.1			47.7			55.9			54.8
Approach LOS			C			D			E			D

Intersection Summary			
HCM 2000 Control Delay	37.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	29.9
Intersection Capacity Utilization	88.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	377
Future Volume (vph)	377
Ideal Flow (vphpl)	1900
Total Lost time (s)	6.3
Lane Util. Factor	0.95
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1504
Flt Permitted	1.00
Satd. Flow (perm)	1504
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	397
RTOR Reduction (vph)	185
Lane Group Flow (vph)	13
Heavy Vehicles (%)	2%
Turn Type	Perm
Protected Phases	
Permitted Phases	8
Actuated Green, G (s)	8.7
Effective Green, g (s)	8.7
Actuated g/C Ratio	0.07
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	100
v/s Ratio Prot	
v/s Ratio Perm	0.01
v/c Ratio	0.13
Uniform Delay, d1	57.1
Progression Factor	1.00
Incremental Delay, d2	0.6
Delay (s)	57.7
Level of Service	E
Approach Delay (s)	
Approach LOS	

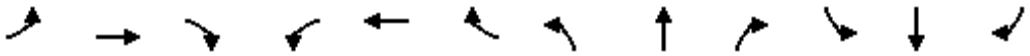
Intersection Summary

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	0	1911	0	0	54	0
Future Volume (vph)	0	1911	0	0	54	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			6.5	
Lane Util. Factor		0.91			1.00	
Frt		1.00			1.00	
Flt Protected		1.00			0.95	
Satd. Flow (prot)		5036			1805	
Flt Permitted		1.00			0.95	
Satd. Flow (perm)		5036			1805	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1970	0	0	56	0
RTOR Reduction (vph)	0	0	0	0	30	0
Lane Group Flow (vph)	0	1970	0	0	26	0
Heavy Vehicles (%)	2%	3%	2%	2%	0%	2%
Turn Type		NA			Prot	
Protected Phases		Free!			2!	
Permitted Phases						
Actuated Green, G (s)		130.0			60.5	
Effective Green, g (s)		130.0			60.5	
Actuated g/C Ratio		1.00			0.47	
Clearance Time (s)					6.5	
Vehicle Extension (s)					3.0	
Lane Grp Cap (vph)		5036			840	
v/s Ratio Prot		0.39			0.01	
v/s Ratio Perm						
v/c Ratio		0.39			0.03	
Uniform Delay, d1		0.0			18.9	
Progression Factor		1.00			1.00	
Incremental Delay, d2		0.1			0.1	
Delay (s)		0.1			18.9	
Level of Service		A			B	
Approach Delay (s)		0.1	0.0		18.9	
Approach LOS		A	A		B	

Intersection Summary			
HCM 2000 Control Delay	0.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

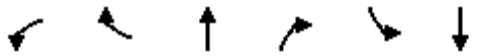
! Phase conflict between lane groups.

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	0	1585	0	0	1911	0	0	0	0
Future Volume (vph)	0	0	0	0	1585	0	0	1911	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					6.5			6.5				
Lane Util. Factor					0.95			0.91				
Frt					1.00			1.00				
Flt Protected					1.00			1.00				
Satd. Flow (prot)					3539			5036				
Flt Permitted					1.00			1.00				
Satd. Flow (perm)					3539			5036				
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	0	1634	0	0	1970	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1634	0	0	1970	0	0	0	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%
Turn Type					NA			NA				
Protected Phases					2			6				
Permitted Phases												
Actuated Green, G (s)					60.5			56.5				
Effective Green, g (s)					60.5			56.5				
Actuated g/C Ratio					0.47			0.43				
Clearance Time (s)					6.5			6.5				
Vehicle Extension (s)					3.0			3.0				
Lane Grp Cap (vph)					1646			2188				
v/s Ratio Prot					c0.46			c0.39				
v/s Ratio Perm												
v/c Ratio					0.99			0.90				
Uniform Delay, d1					34.5			34.1				
Progression Factor					0.65			0.71				
Incremental Delay, d2					20.1			3.6				
Delay (s)					42.7			27.7				
Level of Service					D			C				
Approach Delay (s)		0.0			42.7			27.7			0.0	
Approach LOS		A			D			C			A	

Intersection Summary			
HCM 2000 Control Delay	34.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	91.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	671	0	0	0	0	1284
Future Volume (vph)	671	0	0	0	0	1284
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5					4.0
Lane Util. Factor	0.97					0.91
Frt	1.00					1.00
Flt Protected	0.95					1.00
Satd. Flow (prot)	3433					5136
Flt Permitted	0.95					1.00
Satd. Flow (perm)	3433					5136
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	722	0	0	0	0	1381
RTOR Reduction (vph)	196	0	0	0	0	0
Lane Group Flow (vph)	526	0	0	0	0	1381
Heavy Vehicles (%)	2%	2%	2%	2%	2%	1%
Turn Type	Prot					NA
Protected Phases	6!					Free!
Permitted Phases						
Actuated Green, G (s)	56.5					130.0
Effective Green, g (s)	56.5					130.0
Actuated g/C Ratio	0.43					1.00
Clearance Time (s)	6.5					
Vehicle Extension (s)	3.0					
Lane Grp Cap (vph)	1492					5136
v/s Ratio Prot	c0.15					0.27
v/s Ratio Perm						
v/c Ratio	0.35					0.27
Uniform Delay, d1	24.5					0.0
Progression Factor	1.00					1.00
Incremental Delay, d2	0.7					0.1
Delay (s)	25.2					0.1
Level of Service	C					A
Approach Delay (s)	25.2		0.0			0.1
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	8.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Intersection	
Int Delay, s/veh	8.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	27	458	132	400	263	5
Future Vol, veh/h	27	458	132	400	263	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	360	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	5	7	40	3	4	0
Mvmt Flow	30	515	148	449	296	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1044	299	302	0	-	0
Stage 1	299	-	-	-	-	-
Stage 2	745	-	-	-	-	-
Critical Hdwy	6.45	6.27	4.5	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.363	2.56	-	-	-
Pot Cap-1 Maneuver	250	729	1071	-	-	-
Stage 1	746	-	-	-	-	-
Stage 2	464	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	216	729	1071	-	-	-
Mov Cap-2 Maneuver	340	-	-	-	-	-
Stage 1	643	-	-	-	-	-
Stage 2	464	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.7	2.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1071	-	340	729	-	-
HCM Lane V/C Ratio	0.138	-	0.089	0.706	-	-
HCM Control Delay (s)	8.9	-	16.6	20.9	-	-
HCM Lane LOS	A	-	C	C	-	-
HCM 95th %tile Q(veh)	0.5	-	0.3	5.9	-	-

SimTraffic Capacity Analysis - Maximum Queue Length
2030 Partial Cloverleaf Interchange
North Winchester IAAR

Intersection Number and Description		Type of Control	Lane Group	Eastbound			Westbound			Nothbound			Southbound		
				Storage Bay	AM	PM	Storage Bay	AM	PM	Storage Bay	AM	PM	Storage Bay	AM	PM
1	US 11 at Pactiv Way/Crown Ln			US 11			US 11			Pactiv Way			Crown Lane		
		Signalized	Left	550	75	380	300	95	**(1%)	0	85	180	0	165	310
			Through	0	415	495	0	255	505						
			Right	0	398	467	370	20	**(2%)						
2	US 11 at Amoco Ln/Welltown Rd			US 11			US 11			Amco Lane			Welltown Road		
		Signalized	Left	0	500	470	315	**(7%)	**(12%)	0	70	85	300	**(6%)	**(5%)
			Through	0	515	510	0	705	640	0	140	220	0	685	595
			Right	0	465	480	0	630	600						
3	US 11 at I-81 SB Off-Ramp			US 11			US 11						I-81 SB Off-Ramp		
		Signalized	Left	--	--	--	--	--	--				0	385	170
			Through	0	295	340	0	^	^						
			Right	0	--	--	--	--	--				250	*(2%)**(1%)	50
5	US 11 at I-81 NB Off-Ramp			US 11			US 11			I-81 NB Off-Ramp					
		Signalized	Left	--	--	--	--	--	--	575	345	415			
			Through	0	^	^	0	505	575						
			Right	--	--	--	--	--	--	485	240	410			
6	US 11 at Snowden Bridge Boulevard/Merchant Street			US 11			US 11			Snowden Bridge Boulevard			Merchant Street		
		Signalized	Left	450	312	*(2%)	350	110	**(13%)	300	315	225	200	130	220
			Through	0	245	490	0	330	^	0	15	10	0	94	**(1%)
			Right	1000	35	115	275	**(1%)	*(1%)**(22%)	250	75	70	150	72	147
7	Welltown Rd at McGhee Rd			McGhee Road						Welltown Road			Welltown Road		
		Unsignalized	Left	0	45	60				360	240	110	--	--	--
			Through	--	--	--				--	--	--	0	35	5
			Right	0	265	295				--	--	--			

NOTATION KEY

† No queue reported. Movement does not have conflicting volumes.

*(X%) - Maximum queue extends full length of storage bay for X% of the analysis period.

**(Y%) - Queue in lane adjacent to storage bay extends beyond end of storage bay for Y% of the analysis

^ - Maximum queue extends back to intersection Z for X% of the analysis period.

Intersection: 1: US 11 (Martinsburg Pike) & Pactive Way/Crown Ln

Movement	WB	WB	WB	WB	WB	NB	SB	NE	NE	NE	NE	NE
Directions Served	U<	T	T	T	R	LTR	LT>	<	L	R	R	R>
Maximum Queue (ft)	94	166	253	199	21	84	163	55	73	301	417	398
Average Queue (ft)	37	45	82	85	1	18	57	14	19	132	146	158
95th Queue (ft)	81	129	190	168	10	57	126	42	54	257	293	311
Link Distance (ft)		518	518	518		191	452			711	711	711
Upstream Blk Time (%)			0								0	0
Queuing Penalty (veh)			0								0	0
Storage Bay Dist (ft)	300				370			550	550			
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 2: Amoco Ln/Welltown Rd & US 11 (Martinsburg Pike)

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	T	TR	UL	T	T	T	R	L	TR	L
Maximum Queue (ft)	502	513	467	463	276	601	666	707	632	70	140	274
Average Queue (ft)	306	197	218	228	75	300	355	362	179	20	53	102
95th Queue (ft)	510	431	407	408	199	568	638	663	636	53	114	225
Link Distance (ft)	518	518	518	518		747	747	747	747	452	452	
Upstream Blk Time (%)	3	1	0	0		0	0	1	4			
Queuing Penalty (veh)	15	6	0	1		0	1	5	22			
Storage Bay Dist (ft)					315							300
Storage Blk Time (%)					0	7						0
Queuing Penalty (veh)					0	5						0

Intersection: 2: Amoco Ln/Welltown Rd & US 11 (Martinsburg Pike)

Movement	SB	SB
Directions Served	L	TR
Maximum Queue (ft)	300	684
Average Queue (ft)	185	241
95th Queue (ft)	313	569
Link Distance (ft)		1501
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	300	
Storage Blk Time (%)	2	6
Queuing Penalty (veh)	6	15

Intersection: 3: I-81 SB On Ramp/I-81 SB Off Ramp & US 11 (Martinsburg Pike)

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	T	T	R	T	T	LT	R
Maximum Queue (ft)	264	296	76	142	143	384	199
Average Queue (ft)	110	142	0	101	103	152	29
95th Queue (ft)	215	254	0	149	147	337	161
Link Distance (ft)	747	747	747	100	100	1170	
Upstream Blk Time (%)			0	11	13		
Queuing Penalty (veh)			0	79	93		
Storage Bay Dist (ft)							250
Storage Blk Time (%)						1	2
Queuing Penalty (veh)						7	3

Intersection: 5: I-81 NB Off-Ram/I-81 NB On Ramp & US 11 (Martinsburg Pike)

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	T	T	R	L	LT	R
Maximum Queue (ft)	247	249	373	505	248	291	346	238
Average Queue (ft)	182	155	176	217	33	152	204	100
95th Queue (ft)	271	255	323	434	151	256	293	190
Link Distance (ft)	223	223	1078	1078			1036	
Upstream Blk Time (%)	5	2		0				
Queuing Penalty (veh)	26	12		0				
Storage Bay Dist (ft)					250	575		485
Storage Blk Time (%)				5	0			
Queuing Penalty (veh)				2	1			

Intersection: 6: Snowden Bridge Boulevard/Merchant Street & US 11 (Martinsburg Pike)

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	B21	NB
Directions Served	UL	L	T	T	R	L	L	T	T	R	T	L
Maximum Queue (ft)	305	312	226	244	33	64	111	329	323	257	2	263
Average Queue (ft)	175	190	92	103	3	6	33	194	184	55	0	143
95th Queue (ft)	268	283	203	208	16	31	83	283	281	163	2	243
Link Distance (ft)			1078	1078				387	387		305	
Upstream Blk Time (%)								0	0			
Queuing Penalty (veh)								0	0			
Storage Bay Dist (ft)	450	450			1000	350	350			275		300
Storage Blk Time (%)								0	1	0		0
Queuing Penalty (veh)								0	2	0		0

Intersection: 6: Snowden Bridge Boulevard/Merchant Street & US 11 (Martinsburg Pike)

Movement	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	T	R	L	L	TR	R
Maximum Queue (ft)	314	14	77	56	131	94	72
Average Queue (ft)	196	2	28	3	47	43	25
95th Queue (ft)	277	12	54	32	98	79	58
Link Distance (ft)	562	562			396	396	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			250	200			150
Storage Blk Time (%)	0				0		
Queuing Penalty (veh)	1				0		

Intersection: 7: Welltown Rd & McGhee Rd

Movement	EB	EB	NB	SB
Directions Served	L	R	L	TR
Maximum Queue (ft)	47	266	238	35
Average Queue (ft)	8	103	100	3
95th Queue (ft)	32	188	185	19
Link Distance (ft)	509	509		574
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			360	
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Zone Summary

Zone wide Queuing Penalty: 302

Intersection: 100: Pactive Way/Crown Ln & US 11 (Martinsburg Pike)

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	SB
Directions Served	U	L	T	T	TR	UL	T	T	T	R	LTR	LTR
Maximum Queue (ft)	380	263	494	493	467	61	484	506	445	62	178	310
Average Queue (ft)	202	55	286	295	259	18	238	275	271	4	71	137
95th Queue (ft)	346	194	467	474	435	50	390	426	398	43	149	311
Link Distance (ft)			626	626	626		520	520	520		199	438
Upstream Blk Time (%)			0	0			0	0	0		2	5
Queuing Penalty (veh)			3	1			0	0	0		0	0
Storage Bay Dist (ft)	550	550				300				370		
Storage Blk Time (%)		0	1				1		2	0		
Queuing Penalty (veh)		0	1				0		0	0		

Intersection: 200: Amoco Ln/Welltown Rd & US 11 (Martinsburg Pike)

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	SB
Directions Served	UL	T	T	TR	UL	T	T	T	R	L	TR	L
Maximum Queue (ft)	468	477	508	481	314	556	634	638	602	87	222	285
Average Queue (ft)	314	181	214	202	86	368	426	436	162	25	95	138
95th Queue (ft)	534	395	434	416	247	567	636	654	582	65	187	254
Link Distance (ft)	520	520	520	520		747	747	747	747	452	452	
Upstream Blk Time (%)	8	0	0	0		0	0	1	3			
Queuing Penalty (veh)	54	1	1	0		0	1	5	15			
Storage Bay Dist (ft)					315							300
Storage Blk Time (%)					0	12						0
Queuing Penalty (veh)					0	7						0

Intersection: 200: Amoco Ln/Welltown Rd & US 11 (Martinsburg Pike)

Movement	SB	SB
Directions Served	L	TR
Maximum Queue (ft)	300	594
Average Queue (ft)	206	251
95th Queue (ft)	312	517
Link Distance (ft)		1501
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	300	
Storage Blk Time (%)	1	5
Queuing Penalty (veh)	3	16

Intersection: 300: I-81 SB On Ramp/I-81 SB Off Ramp & US 11 (Martinsburg Pike)

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	T	T	R	T	T	LT	R
Maximum Queue (ft)	298	340	184	192	203	172	50
Average Queue (ft)	126	156	9	84	103	50	7
95th Queue (ft)	292	332	117	177	205	129	71
Link Distance (ft)	747	747	747	94	94	1139	
Upstream Blk Time (%)				5	8		
Queuing Penalty (veh)				43	65		
Storage Bay Dist (ft)							250
Storage Blk Time (%)						0	0
Queuing Penalty (veh)						1	0

Intersection: 500: I-81 NB Off Ramp/I-81 NB On Ramp & US 11 (Martinsburg Pike)

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	T	T	R	L	L	R
Maximum Queue (ft)	295	292	286	577	230	344	417	408
Average Queue (ft)	235	199	157	201	53	182	243	198
95th Queue (ft)	321	310	257	405	178	292	358	381
Link Distance (ft)	215	215	1083	1083			979	
Upstream Blk Time (%)	16	8		0				
Queuing Penalty (veh)	113	54		0				
Storage Bay Dist (ft)					250	575		485
Storage Blk Time (%)				2	0	0	0	0
Queuing Penalty (veh)				3	1	0	1	1

Intersection: 600: Snowden Bridge Boulevard/Merchant Street & US 11 (Martinsburg Pike)

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	B21	B21
Directions Served	UL	L	T	T	R	L	L	T	T	R	T	T
Maximum Queue (ft)	409	417	487	488	114	72	323	452	447	275	146	166
Average Queue (ft)	254	266	219	218	4	8	76	323	322	152	25	29
95th Queue (ft)	402	408	562	552	103	38	251	480	485	352	130	148
Link Distance (ft)			1083	1083				387	387		305	305
Upstream Blk Time (%)			1	1				10	12		0	1
Queuing Penalty (veh)			7	7				0	0		0	0
Storage Bay Dist (ft)	450	450			1000	350	350			275		
Storage Blk Time (%)	0	2	2	0			0	13	22	1		
Queuing Penalty (veh)	1	10	14	0			0	7	33	3		

Intersection: 600: Snowden Bridge Boulevard/Merchant Street & US 11 (Martinsburg Pike)

Movement	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	L	T	R	L	L	TR	R
Maximum Queue (ft)	187	227	11	70	182	220	194	147
Average Queue (ft)	72	139	1	29	55	128	90	56
95th Queue (ft)	184	214	7	58	167	206	152	111
Link Distance (ft)		562	562			396	396	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	300			250	200			150
Storage Blk Time (%)					0	1	1	0
Queuing Penalty (veh)					0	1	1	0

Intersection: 700: Welltown Rd & McGhee Rd

Movement	EB	EB	NB	SB
Directions Served	L	R	L	TR
Maximum Queue (ft)	58	293	109	4
Average Queue (ft)	17	117	46	0
95th Queue (ft)	45	229	95	3
Link Distance (ft)	509	509		574
Upstream Blk Time (%)		0		
Queuing Penalty (veh)		0		
Storage Bay Dist (ft)			360	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 477

SimTraffic Capacity Analysis - Maximum Queue Length
2030 Diverging Diamond Interchange
North Winchester IAAR

Intersection Number and Description		Type of Control	Lane Group	Eastbound			Westbound			Nothbound			Southbound		
				Storage Bay	AM	PM	Storage Bay	AM	PM	Storage Bay	AM	PM	Storage Bay	AM	PM
1	US 11 at Pactiv Way/ Crown Ln			US 11			US 11			Pactiv Way			Crown Lane		
		Signalized	Left	550	180	*(2%)**(2%)	300	85	**(1%)	0	75	130	0	175	245
			Through	0	575	600	0	330	435						
			Right	0	628	605	370	20	**(1%)						
2	US 11 at Amoco Ln/Welltown Rd			US 11			US 11			Amoco Lane			Welltown Road		
		Signal	Left	0	480	380	315	187	195	150	90	**(8%)	300	**(7%)	**(10%)
			Through	0	460	^	0	430	385	0	145	255	0	665	765
			Right	0	^	^	0	220	185						
3	US 11 at I-81 SB Off-Ramp			US 11			US 11			-			I-81 SB Off-Ramp		
		Signal	Left	--	--	--	--	†	†				0	172	88
			Through	0	^	^	0	^	^						
			Right	--	†	†	--	--	--				0	38	9
5	US 11 at I-81 NB Off-Ramp			US 11			US 11			I-81 NB Off-Ramp			-		
		Signal	Left	--	†	†	--	--	--	--	200	190			
			Through	0	^	^	0	^	^						
			Right	--	--	--	--	†	†	--	190	170			
6	US 11 at Snowden Bridge Boulevard/Merchant Street			US 11			US 11			Snowden Bridge Road			Merchant Road		
		Signal	Left	450	280	390	350	110	**(22%)	300	255	200	200	95	220
			Through	0	145	210	0	410	905	0	10	15	0	61	172
			Right	0	25	10	275	**(3%)	*(1%)**(43%)	250	55	70	150	70	143
7	Welltown Rd at McGhee Rd			McGhee Road			-			Welltown Road			Welltown Road		
		Unsignalized	Left	0	45	50				360	225	115	--	--	--
			Through	--	--	--				--	--	--	0	50	35
			Right	0	235	280				--	--	--			

NOTATION KEY

† No queue reported. Movement does not have conflicting volumes.

*(X%) - Maximum queue extends full length of storage bay for X% of the analysis period.

**(Y%) - Queue in lane adjacent to storage bay extends beyond end of storage bay for Y% of the analysis period.

^ - Maximum queue extends back to next intersection.

Intersection: 4: US 11 (Martinsburg Pike) & I-81 SB Off-Ramp

Movement	EB	SB
Directions Served	R	T
Maximum Queue (ft)	68	98
Average Queue (ft)	6	10
95th Queue (ft)	38	57
Link Distance (ft)	188	69
Upstream Blk Time (%)	0	0
Queuing Penalty (veh)	0	3
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5:

Movement	EB	EB	SB	SB	SB
Directions Served	T	T	T	T	T
Maximum Queue (ft)	111	106	161	188	214
Average Queue (ft)	68	58	79	157	179
95th Queue (ft)	108	103	148	210	221
Link Distance (ft)	28	28	107	107	107
Upstream Blk Time (%)	40	38	6	29	41
Queuing Penalty (veh)	199	190	22	114	162
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 19: US 11 (Martinsburg Pike)

Movement	NE
Directions Served	L
Maximum Queue (ft)	172
Average Queue (ft)	81
95th Queue (ft)	151
Link Distance (ft)	140
Upstream Blk Time (%)	2
Queuing Penalty (veh)	3
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 41:

Movement	WB	WB	NB	NB	NB
Directions Served	T	T	T	T	T
Maximum Queue (ft)	149	149	165	171	160
Average Queue (ft)	116	116	119	135	104
95th Queue (ft)	135	137	166	166	169
Link Distance (ft)	42	42	75	75	75
Upstream Blk Time (%)	45	51	16	20	13
Queuing Penalty (veh)	324	371	64	81	54
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 44: US 11 (Martinsburg Pike)

Movement	WB	WB	SB	SB
Directions Served	L	L	T	T
Maximum Queue (ft)	157	201	42	46
Average Queue (ft)	95	158	5	8
95th Queue (ft)	151	205	27	34
Link Distance (ft)	88	88	24	24
Upstream Blk Time (%)	13	39	0	1
Queuing Penalty (veh)	37	114	1	3
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 100: Pactive Way/Crown Ln & US 11 (Martinsburg Pike)

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	SB
Directions Served	U	L	T	T	TR	UL	T	T	T	R	LTR	LTR
Maximum Queue (ft)	136	180	531	573	628	85	274	330	259	22	77	176
Average Queue (ft)	60	31	194	229	286	34	56	94	98	1	19	69
95th Queue (ft)	120	128	464	557	615	71	171	217	205	10	57	140
Link Distance (ft)			640	640	640		504	504	504		143	410
Upstream Blk Time (%)			1	2	6		0	0	0			
Queuing Penalty (veh)			4	11	44		0	0	0			
Storage Bay Dist (ft)	550	550				300				370		
Storage Blk Time (%)		0	1									
Queuing Penalty (veh)		0	1									

Intersection: 200: Amoco Ln/Welltown Rd & US 11 (Martinsburg Pike)

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	T	TR	UL	T	T	T	R	L	TR	L
Maximum Queue (ft)	479	335	460	524	187	403	429	395	221	90	145	282
Average Queue (ft)	278	133	187	327	49	156	194	179	47	19	51	109
95th Queue (ft)	475	289	397	577	119	321	360	327	147	58	108	229
Link Distance (ft)	504	504	504	504		434	434	434	434		400	
Upstream Blk Time (%)	3	0	1	3		0	1	0	0			
Queuing Penalty (veh)	15	0	3	14		1	3	1	0			
Storage Bay Dist (ft)					315					150		300
Storage Blk Time (%)						1				0	0	0
Queuing Penalty (veh)						1				0	0	0

Intersection: 200: Amoco Ln/Welltown Rd & US 11 (Martinsburg Pike)

Movement	SB	SB
Directions Served	L	TR
Maximum Queue (ft)	294	663
Average Queue (ft)	189	244
95th Queue (ft)	319	585
Link Distance (ft)		1517
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	300	
Storage Blk Time (%)	1	7
Queuing Penalty (veh)	4	18

Intersection: 600: Snowden Bridge Boulevard/Merchant Street & US 11 (Martinsburg Pike)

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	UL	L	T	T	R	L	L	T	T	R	L	L
Maximum Queue (ft)	275	280	129	143	24	38	108	341	409	274	222	255
Average Queue (ft)	171	187	48	57	2	4	30	175	226	62	115	162
95th Queue (ft)	244	260	105	118	12	23	74	294	356	213	212	242
Link Distance (ft)			600	600	600			1173	1173			729
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	450	450				350	350			275	300	
Storage Blk Time (%)								0	3	0	0	0
Queuing Penalty (veh)								0	6	1	0	0

Intersection: 600: Snowden Bridge Boulevard/Merchant Street & US 11 (Martinsburg Pike)

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	L	TR	R
Maximum Queue (ft)	10	57	32	97	61	70
Average Queue (ft)	0	27	3	39	22	34
95th Queue (ft)	6	52	17	79	50	60
Link Distance (ft)	729			633	633	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		250	200			150
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 700: Welltown Rd & McGhee Rd

Movement	EB	EB	NB	SB
Directions Served	L	R	L	TR
Maximum Queue (ft)	47	237	226	52
Average Queue (ft)	7	98	95	4
95th Queue (ft)	29	179	170	27
Link Distance (ft)	573	573		270
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			360	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 1871

Intersection: 4: US 11 (Martinsburg Pike) & I-81 SB Off-Ramp

Movement	EB	SB
Directions Served	R	T
Maximum Queue (ft)	9	37
Average Queue (ft)	0	2
95th Queue (ft)	9	19
Link Distance (ft)	188	69
Upstream Blk Time (%)		0
Queuing Penalty (veh)		0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5:

Movement	EB	EB	SB	SB	SB
Directions Served	T	T	T	T	T
Maximum Queue (ft)	101	98	172	188	206
Average Queue (ft)	81	75	103	176	183
95th Queue (ft)	99	99	171	201	204
Link Distance (ft)	28	28	107	107	107
Upstream Blk Time (%)	53	52	11	41	48
Queuing Penalty (veh)	363	360	49	177	207
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 19: US 11 (Martinsburg Pike)

Movement	NE
Directions Served	L
Maximum Queue (ft)	88
Average Queue (ft)	28
95th Queue (ft)	67
Link Distance (ft)	140
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 41:

Movement	WB	WB	NB	NB	NB
Directions Served	T	T	T	T	T
Maximum Queue (ft)	124	140	155	162	174
Average Queue (ft)	112	111	127	139	141
95th Queue (ft)	118	125	155	153	171
Link Distance (ft)	42	42	75	75	75
Upstream Blk Time (%)	46	51	34	43	34
Queuing Penalty (veh)	368	401	216	274	214
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 44: US 11 (Martinsburg Pike)

Movement	WB	WB	SB	SB
Directions Served	L	L	T	T
Maximum Queue (ft)	158	191	54	39
Average Queue (ft)	105	161	11	8
95th Queue (ft)	157	183	43	32
Link Distance (ft)	88	88	24	24
Upstream Blk Time (%)	17	42	1	1
Queuing Penalty (veh)	57	142	4	3
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 100: Pactive Way/Crown Ln & US 11 (Martinsburg Pike)

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	SB
Directions Served	U	L	T	T	TR	UL	T	T	T	R	LTR	LTR
Maximum Queue (ft)	452	433	586	600	607	63	428	435	429	69	132	243
Average Queue (ft)	300	115	277	288	323	16	219	257	260	3	63	120
95th Queue (ft)	515	409	546	540	554	51	358	395	384	42	120	225
Link Distance (ft)			640	640	640		502	502	502		143	413
Upstream Blk Time (%)			3	1	2		0	0	0		1	
Queuing Penalty (veh)			26	8	16		0	1	0		0	
Storage Bay Dist (ft)	550	550				300				370		
Storage Blk Time (%)	1	2	2				1		1	0		
Queuing Penalty (veh)	7	18	5				0		0	0		

Intersection: 200: Amoco Ln/Welltown Rd & US 11 (Martinsburg Pike)

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	SB
Directions Served	UL	T	T	TR	UL	T	T	T	R	L	TR	L
Maximum Queue (ft)	381	490	523	528	195	369	383	375	185	141	256	284
Average Queue (ft)	225	206	278	356	44	170	202	195	22	35	109	156
95th Queue (ft)	367	443	550	598	117	316	341	329	101	95	215	268
Link Distance (ft)	502	502	502	502		434	434	434	434		400	
Upstream Blk Time (%)	0	0	1	2		0	0	0	0		0	
Queuing Penalty (veh)	0	1	4	13		1	1	0	0		0	
Storage Bay Dist (ft)					315					150		300
Storage Blk Time (%)					0	1				0	8	0
Queuing Penalty (veh)					0	0				0	3	0

Intersection: 200: Amoco Ln/Welltown Rd & US 11 (Martinsburg Pike)

Movement	SB	SB
Directions Served	L	TR
Maximum Queue (ft)	300	767
Average Queue (ft)	224	316
95th Queue (ft)	336	745
Link Distance (ft)		1521
Upstream Blk Time (%)		0
Queuing Penalty (veh)		2
Storage Bay Dist (ft)	300	
Storage Blk Time (%)	2	10
Queuing Penalty (veh)	7	33

Intersection: 600: Snowden Bridge Boulevard/Merchant Street & US 11 (Martinsburg Pike)

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	UL	L	T	T	R	L	L	T	T	R	L	L
Maximum Queue (ft)	390	384	209	185	11	46	339	842	907	275	175	202
Average Queue (ft)	224	237	82	86	0	7	79	461	530	202	68	123
95th Queue (ft)	333	342	159	156	6	27	272	913	988	396	155	198
Link Distance (ft)			600	600	600			1173	1173			729
Upstream Blk Time (%)								1	3			
Queuing Penalty (veh)								0	0			
Storage Bay Dist (ft)	450	450				350	350			275	300	
Storage Blk Time (%)	0	0	0				0	22	43	1		
Queuing Penalty (veh)	0	0	0				0	12	66	5		

Intersection: 600: Snowden Bridge Boulevard/Merchant Street & US 11 (Martinsburg Pike)

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	L	TR	R
Maximum Queue (ft)	13	71	180	218	172	143
Average Queue (ft)	1	28	51	117	60	80
95th Queue (ft)	7	58	151	191	114	129
Link Distance (ft)	729			633	633	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		250	200			150
Storage Blk Time (%)			0	0	0	0
Queuing Penalty (veh)			0	0	0	0

Intersection: 700: Welltown Rd & McGhee Rd

Movement	EB	EB	NB	SB
Directions Served	L	R	L	TR
Maximum Queue (ft)	49	280	116	33
Average Queue (ft)	16	114	40	2
95th Queue (ft)	42	235	90	27
Link Distance (ft)	573	573		270
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			360	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 3068