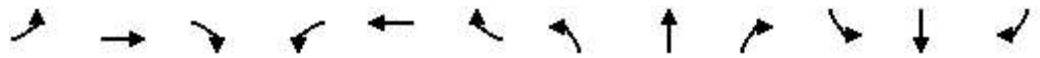


Appendix A
Existing Traffic Analysis

HCM 6th Signalized Intersection Summary
 1: Mer Bleue Rd & Innes Rd

Existing AM Peak Hour
 05/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘	↑↑	↗	↘↗	↑↘		↘↗	↑↘	
Traffic Volume (veh/h)	42	405	75	171	1307	638	248	426	72	166	143	78
Future Volume (veh/h)	42	405	75	171	1307	638	248	426	72	166	143	78
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1491	1688	1688	1758	1758	1772	1786	1744	1744	1744	1688	1688
Adj Flow Rate, veh/h	46	440	0	186	1421	0	270	463	0	180	155	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	22	8	8	3	3	2	1	4	4	4	8	8
Cap, veh/h	130	1215		478	1489		398	1080		303	959	
Arrive On Green	0.05	0.38	0.00	0.10	0.45	0.00	0.12	0.33	0.00	0.09	0.30	0.00
Sat Flow, veh/h	1420	3207	1430	1674	3340	1502	3300	3400	0	3222	3291	0
Grp Volume(v), veh/h	46	440	0	186	1421	0	270	463	0	180	155	0
Grp Sat Flow(s),veh/h/ln	1420	1603	1430	1674	1670	1502	1650	1657	0	1611	1603	0
Q Serve(g_s), s	2.5	12.8	0.0	8.3	53.3	0.0	10.2	14.2	0.0	7.0	4.6	0.0
Cycle Q Clear(g_c), s	2.5	12.8	0.0	8.3	53.3	0.0	10.2	14.2	0.0	7.0	4.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	130	1215		478	1489		398	1080		303	959	
V/C Ratio(X)	0.35	0.36		0.39	0.95		0.68	0.43		0.59	0.16	
Avail Cap(c_a), veh/h	231	1431		484	1490		541	1080		528	959	
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	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	31.2	29.1	0.0	20.2	34.7	0.0	54.7	34.3	0.0	56.5	33.5	0.0
Incr Delay (d2), s/veh	1.6	0.2	0.0	0.5	13.9	0.0	2.0	1.2	0.0	1.9	0.4	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	0.0
%ile BackOfQ(50%),veh/ln	0.5	2.9	0.0	1.6	13.7	0.0	3.1	3.7	0.0	2.1	1.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.8	29.3	0.0	20.8	48.6	0.0	56.8	35.6	0.0	58.4	33.9	0.0
LnGrp LOS	C	C		C	D		E	D		E	C	
Approach Vol, veh/h		486	A		1607	A		733	A		335	A
Approach Delay, s/veh		29.6			45.4			43.4			47.1	
Approach LOS		C			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.5	53.2	17.4	42.9	7.8	62.0	13.9	46.4				
Change Period (Y+Rc), s	* 6.1	6.4	4.0	* 6.2	4.0	6.4	4.0	* 6.2				
Max Green Setting (Gmax), s	* 11	55.6	19.0	* 22	13.0	55.6	19.0	* 22				
Max Q Clear Time (g_c+I1), s	10.3	14.8	12.2	6.6	4.5	55.3	9.0	16.2				
Green Ext Time (p_c), s	0.1	4.9	1.2	1.0	0.1	0.2	1.0	1.9				

Intersection Summary

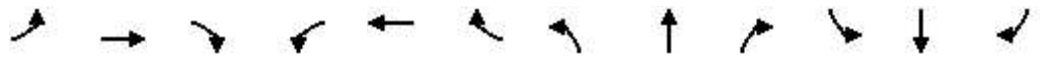
HCM 6th Ctrl Delay	42.7
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
3: Frank Bender & Innes Rd

Existing AM Peak Hour
05/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	381	21	28	1477	78	65	16	6	29	29	76
Future Volume (veh/h)	52	381	21	28	1477	78	65	16	6	29	29	76
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1688	1575	1800	1772	1772	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	57	414	23	30	1605	85	71	17	7	32	32	83
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	8	16	0	2	2	0	0	0	0	0	0
Cap, veh/h	197	1917	798	614	1952	103	344	502	426	439	124	321
Arrive On Green	0.05	0.60	0.60	0.03	0.60	0.58	0.28	0.28	0.28	0.28	0.28	0.26
Sat Flow, veh/h	1714	3207	1335	1714	3253	171	1298	1800	1525	1409	443	1150
Grp Volume(v), veh/h	57	414	23	30	827	863	71	17	7	32	0	115
Grp Sat Flow(s),veh/h/ln	1714	1603	1335	1714	1683	1741	1298	1800	1525	1409	0	1593
Q Serve(g_s), s	1.6	7.8	0.9	0.9	50.2	51.2	5.9	0.9	0.4	2.2	0.0	7.4
Cycle Q Clear(g_c), s	1.6	7.8	0.9	0.9	50.2	51.2	13.3	0.9	0.4	3.1	0.0	7.4
Prop In Lane	1.00		1.00	1.00		0.10	1.00		1.00	1.00		0.72
Lane Grp Cap(c), veh/h	197	1917	798	614	1010	1045	344	502	426	439	0	445
V/C Ratio(X)	0.29	0.22	0.03	0.05	0.82	0.83	0.21	0.03	0.02	0.07	0.00	0.26
Avail Cap(c_a), veh/h	204	2040	849	667	1123	1161	344	502	426	439	0	445
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	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.7	12.1	10.7	10.1	20.4	20.7	41.6	34.1	33.9	35.2	0.0	37.2
Incr Delay (d2), s/veh	0.8	0.1	0.0	0.0	4.5	4.6	1.4	0.1	0.1	0.3	0.0	1.4
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(50%),veh/ln	0.2	0.8	0.1	0.1	6.4	6.8	1.4	0.3	0.1	0.6	0.0	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.5	12.1	10.7	10.1	24.9	25.3	43.0	34.2	34.0	35.5	0.0	38.6
LnGrp LOS	C	B	B	B	C	C	D	C	C	D	A	D
Approach Vol, veh/h		494			1720			95			147	
Approach Delay, s/veh		13.2			24.9			40.7			38.0	
Approach LOS		B			C			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.0	81.7		40.3	7.5	82.2		40.3				
Change Period (Y+Rc), s	* 4.7	* 6.6		* 6.8	4.0	* 6.6		* 6.8				
Max Green Setting (Gmax), s	* 7.3	* 80		* 25	4.0	* 84		* 25				
Max Q Clear Time (g_c+I1), s	2.9	9.8		9.4	3.6	53.2		15.3				
Green Ext Time (p_c), s	0.0	5.1		0.9	0.0	22.4		0.4				

Intersection Summary

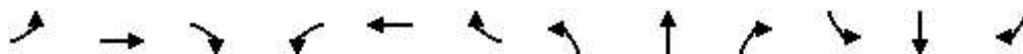
HCM 6th Ctrl Delay	23.9
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
4: Viseneau Dr & Innes Rd

Existing AM Peak Hour
05/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	369	37	59	1526	33	22	5	39	46	13	47
Future Volume (veh/h)	11	369	37	59	1526	33	22	5	39	46	13	47
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1463	1674	1674	1800	1758	1758	1744	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	12	401	40	64	1659	36	24	5	42	50	14	51
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	24	9	9	0	3	3	4	0	0	0	0	0
Cap, veh/h	115	1609	718	587	2013	44	489	585	496	241	76	216
Arrive On Green	0.51	0.51	0.51	0.06	0.60	0.58	0.32	0.32	0.32	0.32	0.32	0.30
Sat Flow, veh/h	239	3180	1418	1714	3342	72	1315	1800	1525	599	235	664
Grp Volume(v), veh/h	12	401	40	64	827	868	24	5	42	115	0	0
Grp Sat Flow(s),veh/h/ln	239	1590	1418	1714	1670	1745	1315	1800	1525	1498	0	0
Q Serve(g_s), s	4.6	7.8	1.6	1.8	42.9	43.3	0.0	0.2	2.1	3.4	0.0	0.0
Cycle Q Clear(g_c), s	37.3	7.8	1.6	1.8	42.9	43.3	1.5	0.2	2.1	6.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.04	1.00		1.00	0.43		0.44
Lane Grp Cap(c), veh/h	115	1609	718	587	1006	1051	489	585	496	534	0	0
V/C Ratio(X)	0.10	0.25	0.06	0.11	0.82	0.83	0.05	0.01	0.08	0.22	0.00	0.00
Avail Cap(c_a), veh/h	125	1734	774	609	1093	1142	489	585	496	534	0	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	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	36.3	15.4	13.8	10.4	17.2	17.3	25.6	25.1	25.8	27.5	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.1	0.0	0.1	4.8	4.8	0.2	0.0	0.3	0.9	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.9	0.2	0.1	2.8	2.9	0.3	0.1	0.5	1.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.7	15.4	13.8	10.4	22.1	22.1	25.8	25.2	26.1	28.4	0.0	0.0
LnGrp LOS	D	B	B	B	C	C	C	C	C	C	A	A
Approach Vol, veh/h		453			1759			71			115	
Approach Delay, s/veh		15.9			21.7			25.9			28.4	
Approach LOS		B			C			C			C	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	10.6	59.7		39.7		70.3		39.7				
Change Period (Y+Rc), s	* 6.3	* 6.3		* 6.7		* 6.3		* 6.7				
Max Green Setting (Gmax), s	* 5.7	* 58		* 27		* 70		* 27				
Max Q Clear Time (g_c+I1), s	3.8	39.3		8.0		45.3		4.1				
Green Ext Time (p_c), s	0.0	4.3		0.8		18.6		0.5				

Intersection Summary

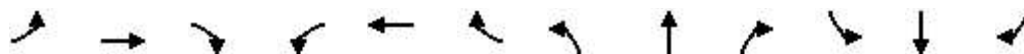
HCM 6th Ctrl Delay	21.0
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
6: Page Rd & Innes Rd

Existing AM Peak Hour
05/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖	↕			↕			↕	
Traffic Volume (veh/h)	46	398	16	32	1550	37	18	20	53	18	11	70
Future Volume (veh/h)	46	398	16	32	1550	37	18	20	53	18	11	70
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1632	1632	1730	1772	1772	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	50	433	17	35	1685	40	20	22	58	20	12	76
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	12	12	5	2	2	0	0	0	0	0	0
Cap, veh/h	129	1867	73	570	2063	49	113	130	283	105	76	338
Arrive On Green	0.61	0.61	0.59	0.61	0.61	0.59	0.31	0.31	0.29	0.31	0.31	0.29
Sat Flow, veh/h	286	3041	119	918	3361	80	237	416	901	211	244	1079
Grp Volume(v), veh/h	50	220	230	35	842	883	100	0	0	108	0	0
Grp Sat Flow(s),veh/h/ln	286	1550	1610	918	1683	1758	1554	0	0	1533	0	0
Q Serve(g_s), s	18.1	7.0	7.1	2.0	42.5	42.9	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	61.0	7.0	7.1	9.1	42.5	42.9	5.0	0.0	0.0	5.6	0.0	0.0
Prop In Lane	1.00		0.07	1.00		0.05	0.20		0.58	0.19		0.70
Lane Grp Cap(c), veh/h	129	951	988	570	1033	1079	526	0	0	519	0	0
V/C Ratio(X)	0.39	0.23	0.23	0.06	0.81	0.82	0.19	0.00	0.00	0.21	0.00	0.00
Avail Cap(c_a), veh/h	138	1000	1039	599	1087	1134	526	0	0	519	0	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	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	40.2	9.6	9.6	11.6	16.4	16.5	28.1	0.0	0.0	28.4	0.0	0.0
Incr Delay (d2), s/veh	1.9	0.1	0.1	0.0	4.7	4.7	0.8	0.0	0.0	0.9	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.2	0.2	0.1	2.2	2.3	1.2	0.0	0.0	1.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.1	9.7	9.7	11.7	21.1	21.2	28.9	0.0	0.0	29.3	0.0	0.0
LnGrp LOS	D	A	A	B	C	C	C	A	A	C	A	A
Approach Vol, veh/h		500			1760			100			108	
Approach Delay, s/veh		12.9			21.0			28.9			29.3	
Approach LOS		B			C			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		71.5		38.5		71.5		38.5				
Change Period (Y+Rc), s		* 6.1		* 6.2		* 6.1		* 6.2				
Max Green Setting (Gmax), s		* 69		* 29		* 69		* 29				
Max Q Clear Time (g_c+I1), s		63.0		7.6		44.9		7.0				
Green Ext Time (p_c), s		2.4		0.8		18.9		0.7				

Intersection Summary

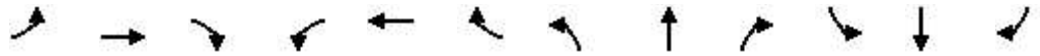
HCM 6th Ctrl Delay	20.0
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
 7: Orleans Blvd & Innes Rd

Existing AM Peak Hour
 05/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑	↖	↖	↑↑	↖	↖	↑↑	↖	↖	↑↑	↖
Traffic Volume (veh/h)	121	348	23	24	1465	149	203	259	44	68	100	459
Future Volume (veh/h)	121	348	23	24	1465	149	203	259	44	68	100	459
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1617	1589	1730	1800	1772	1674	1786	1730	1758	1688	1603	1786
Adj Flow Rate, veh/h	132	378	0	26	1592	0	221	282	0	74	109	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	13	15	5	0	2	9	1	5	3	8	14	1
Cap, veh/h	238	1231		77	1255		604	1441		349	828	
Arrive On Green	0.08	0.41	0.00	0.04	0.37	0.00	0.13	0.44	0.00	0.27	0.27	0.00
Sat Flow, veh/h	2988	3020	1466	1714	3367	1418	1701	3287	1490	1045	3047	1514
Grp Volume(v), veh/h	132	378	0	26	1592	0	221	282	0	74	109	0
Grp Sat Flow(s),veh/h/ln	1494	1510	1466	1714	1683	1418	1701	1643	1490	1045	1523	1514
Q Serve(g_s), s	4.7	9.3	0.0	1.6	41.0	0.0	9.5	5.8	0.0	6.1	3.0	0.0
Cycle Q Clear(g_c), s	4.7	9.3	0.0	1.6	41.0	0.0	9.5	5.8	0.0	6.1	3.0	0.0
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	238	1231		77	1255		604	1441		349	828	
V/C Ratio(X)	0.55	0.31		0.34	1.27		0.37	0.20		0.21	0.13	
Avail Cap(c_a), veh/h	245	1231		140	1255		614	1441		349	828	
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	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	48.7	22.1	0.0	50.9	34.5	0.0	21.4	19.0	0.0	31.4	30.3	0.0
Incr Delay (d2), s/veh	2.6	0.1	0.0	2.6	127.3	0.0	0.4	0.3	0.0	1.4	0.3	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	0.0
%ile BackOfQ(50%),veh/ln	1.2	1.5	0.0	0.5	30.1	0.0	1.9	1.1	0.0	1.1	0.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.3	22.2	0.0	53.5	161.8	0.0	21.8	19.3	0.0	32.8	30.6	0.0
LnGrp LOS	D	C		D	F		C	B		C	C	
Approach Vol, veh/h		510	A		1618	A		503	A		183	A
Approach Delay, s/veh		29.7			160.1			20.4			31.5	
Approach LOS		C			F			C			C	
Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	8.9	48.8	18.3	33.9	12.8	45.0		52.2				
Change Period (Y+Rc), s	* 6.2	* 6.2	* 6.7	* 6.7	* 6.2	* 6.2		* 6.7				
Max Green Setting (Gmax), s	* 6.8	* 39	* 12	* 26	* 6.8	* 39		* 45				
Max Q Clear Time (g_c+I1), s	3.6	11.3	11.5	8.1	6.7	43.0		7.8				
Green Ext Time (p_c), s	0.0	3.9	0.1	1.6	0.0	0.0		3.1				

Intersection Summary

HCM 6th Ctrl Delay	103.1
HCM 6th LOS	F

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
8: BHB/Innes Rd & Navan Rd

Existing AM Peak Hour
05/10/2018



Movement	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations	↔↔	↗	↕↕	↗	↖	↕↕
Traffic Volume (veh/h)	613	111	382	173	22	1736
Future Volume (veh/h)	613	111	382	173	22	1736
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
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1702	1744	1547	1477	1786	1786
Adj Flow Rate, veh/h	666	0	415	0	24	1887
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	7	4	18	23	1	1
Cap, veh/h	1231		1371		72	1838
Arrive On Green	0.39	0.00	0.47	0.00	0.04	0.54
Sat Flow, veh/h	3144	1478	3017	1252	1701	3483
Grp Volume(v), veh/h	666	0	415	0	24	1887
Grp Sat Flow(s),veh/h/ln	1572	1478	1470	1252	1701	1697
Q Serve(g_s), s	19.6	0.0	10.5	0.0	1.6	65.0
Cycle Q Clear(g_c), s	19.6	0.0	10.5	0.0	1.6	65.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	1231		1371		72	1838
V/C Ratio(X)	0.54		0.30		0.34	1.03
Avail Cap(c_a), veh/h	1231		1371		132	1838
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	28.2	0.0	19.9	0.0	55.8	27.5
Incr Delay (d2), s/veh	1.7	0.0	0.1	0.0	2.7	28.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	0.0	1.6	0.0	0.6	15.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	29.9	0.0	20.0	0.0	58.6	55.6
LnGrp LOS	C		C		E	F
Approach Vol, veh/h	666	A	415	A		1911
Approach Delay, s/veh	29.9		20.0			55.6
Approach LOS	C		C			E
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	9.1	59.9			69.0	51.0
Change Period (Y+Rc), s	* 6.3	* 5.9			* 5.9	5.8
Max Green Setting (Gmax), s	* 7	* 50			* 63	45.2
Max Q Clear Time (g_c+I1), s	3.6	12.5			67.0	21.6
Green Ext Time (p_c), s	0.0	4.7			0.0	7.0

Intersection Summary

HCM 6th Ctrl Delay	45.0
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NER, WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Intersection Delay, s/veh	10.1
Intersection LOS	B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			↑	↑	
Traffic Vol, veh/h	133	4	10	95	32	374
Future Vol, veh/h	133	4	10	95	32	374
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	145	4	11	103	35	407
Number of Lanes	1	0	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	9.8	8.7	10.5
HCM LOS	A	A	B

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	10%	97%	0%
Vol Thru, %	90%	0%	8%
Vol Right, %	0%	3%	92%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	105	137	406
LT Vol	10	133	0
Through Vol	95	0	32
RT Vol	0	4	374
Lane Flow Rate	114	149	441
Geometry Grp	1	1	1
Degree of Util (X)	0.152	0.217	0.481
Departure Headway (Hd)	4.787	5.243	3.924
Convergence, Y/N	Yes	Yes	Yes
Cap	748	682	918
Service Time	2.826	3.299	1.947
HCM Lane V/C Ratio	0.152	0.218	0.48
HCM Control Delay	8.7	9.8	10.5
HCM Lane LOS	A	A	B
HCM 95th-tile Q	0.5	0.8	2.7

HCM 6th Signalized Intersection Summary
13: Renaud Rd & Navan Rd

Existing AM Peak Hour
05/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	37	287	3	165	316	18	90	80	16	10	326	103
Future Volume (veh/h)	37	287	3	165	316	18	90	80	16	10	326	103
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1519	1519	1730	1758	1758	1632	1744	1716	1800	1786	1786
Adj Flow Rate, veh/h	40	312	3	179	343	0	98	87	17	11	354	112
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	20	20	5	3	3	12	4	6	0	1	1
Cap, veh/h	395	644	6	379	753		322	824	687	553	460	146
Arrive On Green	0.43	0.43	0.40	0.43	0.43	0.00	0.09	0.47	0.47	0.35	0.35	0.32
Sat Flow, veh/h	1054	1502	14	1039	1758	0	1554	1744	1454	1311	1300	411
Grp Volume(v), veh/h	40	0	315	179	343	0	98	87	17	11	0	466
Grp Sat Flow(s),veh/h/ln	1054	0	1517	1039	1758	0	1554	1744	1454	1311	0	1712
Q Serve(g_s), s	2.3	0.0	12.1	12.1	11.2	0.0	2.9	2.2	0.5	0.4	0.0	19.6
Cycle Q Clear(g_c), s	13.4	0.0	12.1	24.2	11.2	0.0	2.9	2.2	0.5	0.4	0.0	19.6
Prop In Lane	1.00		0.01	1.00		0.00	1.00		1.00	1.00		0.24
Lane Grp Cap(c), veh/h	395	0	650	379	753		322	824	687	553	0	606
V/C Ratio(X)	0.10	0.00	0.48	0.47	0.46		0.30	0.11	0.02	0.02	0.00	0.77
Avail Cap(c_a), veh/h	760	0	1175	739	1362		427	1244	1037	780	0	903
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	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.2	0.0	16.7	25.4	16.4	0.0	15.5	11.8	11.4	17.0	0.0	23.5
Incr Delay (d2), s/veh	0.1	0.0	0.6	0.9	0.4	0.0	0.5	0.1	0.0	0.0	0.0	2.3
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(50%),veh/ln	0.2	0.0	0.7	1.2	0.7	0.0	0.2	0.1	0.0	0.0	0.0	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.3	0.0	17.2	26.3	16.8	0.0	16.0	11.9	11.4	17.0	0.0	25.8
LnGrp LOS	C	A	B	C	B		B	B	B	B	A	C
Approach Vol, veh/h		355			522	A		202			477	
Approach Delay, s/veh		17.7			20.1			13.9			25.6	
Approach LOS		B			C			B			C	
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		38.7		42.0		38.7	9.6	32.5				
Change Period (Y+Rc), s		* 6.7		6.5		* 6.7	5.0	6.5				
Max Green Setting (Gmax), s		* 60		55.0		* 60	10.0	40.0				
Max Q Clear Time (g_c+I1), s		26.2		4.2		15.4	4.9	21.6				
Green Ext Time (p_c), s		5.8		1.0		3.9	0.2	4.4				

Intersection Summary

HCM 6th Ctrl Delay	20.4
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

MOVEMENT SUMMARY

 Site: Existing AM - BCB/Mer Bleue

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mer Bleue											
8	T1	161	3.0	0.111	4.7	LOS A	0.5	3.9	0.25	0.42	60.4
18	R2	87	3.0	0.111	4.6	LOS A	0.5	3.9	0.25	0.45	58.6
Approach		248	3.0	0.111	4.6	LOS A	0.5	3.9	0.25	0.43	59.8
East: Brian Coburn											
1	L2	287	3.0	0.971	27.0	LOS C	29.1	226.5	1.00	1.04	47.4
16	R2	592	3.0	0.971	21.0	LOS C	29.1	226.5	1.00	1.04	46.1
Approach		879	3.0	0.971	22.9	LOS C	29.1	226.5	1.00	1.04	46.5
North: Mer Bleue											
7	L2	97	3.0	0.137	11.3	LOS B	0.7	5.6	0.48	0.66	56.1
4	T1	154	3.0	0.137	5.6	LOS A	0.7	5.6	0.48	0.54	58.3
Approach		251	3.0	0.137	7.8	LOS A	0.7	5.6	0.48	0.59	57.5
All Vehicles		1378	3.0	0.971	16.9	LOS B	29.1	226.5	0.77	0.85	50.3

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.
























SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

HCM 6th Signalized Intersection Summary
 1: Mer Bleue Rd & Innes Rd

Existing PM Peak Hour
 05/10/2018

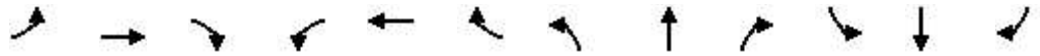
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	1491	205	164	840	374	144	254	260	429	342	92
Future Volume (veh/h)	140	1491	205	164	840	374	144	254	260	429	342	92
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1758	1758	1758	1772	1772	1800	1772	1772
Adj Flow Rate, veh/h	152	1621	0	178	913	0	157	276	0	466	372	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	3	3	3	2	2	0	2	2
Cap, veh/h	355	1526		226	1557		276	623		486	829	
Arrive On Green	0.08	0.45	0.00	0.10	0.47	0.00	0.08	0.18	0.00	0.15	0.25	0.00
Sat Flow, veh/h	1714	3420	1525	1714	3340	1490	3248	3455	0	3326	3455	0
Grp Volume(v), veh/h	152	1621	0	178	913	0	157	276	0	466	372	0
Grp Sat Flow(s),veh/h/ln	1714	1710	1525	1714	1670	1490	1624	1683	0	1663	1683	0
Q Serve(g_s), s	6.0	58.0	0.0	8.9	26.1	0.0	6.0	9.5	0.0	18.1	12.2	0.0
Cycle Q Clear(g_c), s	6.0	58.0	0.0	8.9	26.1	0.0	6.0	9.5	0.0	18.1	12.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	355	1526		226	1557		276	623		486	829	
V/C Ratio(X)	0.43	1.06		0.79	0.59		0.57	0.44		0.96	0.45	
Avail Cap(c_a), veh/h	390	1526		227	1557		475	623		486	829	
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	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	19.0	36.0	0.0	37.0	25.5	0.0	57.2	47.0	0.0	55.1	41.5	0.0
Incr Delay (d2), s/veh	0.8	41.6	0.0	16.6	0.6	0.0	1.8	2.3	0.0	30.5	1.8	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	0.0
%ile BackOfQ(50%),veh/ln	1.1	20.8	0.0	3.0	5.1	0.0	1.9	2.9	0.0	7.3	3.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.8	77.6	0.0	53.6	26.1	0.0	59.0	49.3	0.0	85.6	43.3	0.0
LnGrp LOS	B	F		D	C		E	D		F	D	
Approach Vol, veh/h		1773	A		1091	A		433	A		838	A
Approach Delay, s/veh		72.7			30.6			52.8			66.8	
Approach LOS		E			C			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.0	62.0	15.0	36.0	14.3	64.6	23.0	28.0				
Change Period (Y+Rc), s	* 6.1	6.4	* 6.3	* 6.2	* 6.1	6.4	* 6.3	* 6.2				
Max Green Setting (Gmax), s	* 11	55.6	* 17	* 22	* 11	55.6	* 17	* 22				
Max Q Clear Time (g_c+I1), s	10.9	60.0	8.0	14.2	8.0	28.1	20.1	11.5				
Green Ext Time (p_c), s	0.0	0.0	0.7	1.9	0.3	10.5	0.0	1.6				

Intersection Summary												
HCM 6th Ctrl Delay				58.3								
HCM 6th LOS				E								

Notes
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
3: Frank Bender & Innes Rd

Existing PM Peak Hour
05/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	136	1502	117	172	820	45	313	229	92	76	98	45
Future Volume (veh/h)	136	1502	117	172	820	45	313	229	92	76	98	45
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1786	1786	1730	1772	1772	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	148	1633	127	187	891	49	340	249	100	83	107	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	5	2	2	0	0	0	0	0	0
Cap, veh/h	371	1827	815	224	2128	117	318	508	431	231	330	151
Arrive On Green	0.54	0.54	0.54	0.09	0.66	0.64	0.28	0.28	0.28	0.28	0.28	0.26
Sat Flow, veh/h	601	3393	1514	1647	3245	178	1250	1800	1525	1048	1169	535
Grp Volume(v), veh/h	148	1633	127	187	462	478	340	249	100	83	0	156
Grp Sat Flow(s),veh/h/ln	601	1697	1514	1647	1683	1740	1250	1800	1525	1048	0	1704
Q Serve(g_s), s	20.2	55.7	5.5	8.0	16.9	17.0	27.3	15.0	6.5	9.3	0.0	9.5
Cycle Q Clear(g_c), s	21.9	55.7	5.5	8.0	16.9	17.0	36.7	15.0	6.5	24.3	0.0	9.5
Prop In Lane	1.00		1.00	1.00		0.10	1.00		1.00	1.00		0.31
Lane Grp Cap(c), veh/h	371	1827	815	224	1104	1141	318	508	431	231	0	481
V/C Ratio(X)	0.40	0.89	0.16	0.84	0.42	0.42	1.07	0.49	0.23	0.36	0.00	0.32
Avail Cap(c_a), veh/h	376	1853	827	284	1178	1218	318	508	431	231	0	481
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	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.5	26.7	15.1	34.3	10.6	10.7	53.7	38.8	35.8	48.9	0.0	37.2
Incr Delay (d2), s/veh	0.7	6.0	0.1	15.7	0.3	0.2	70.6	3.3	1.3	4.3	0.0	1.8
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(50%),veh/ln	1.2	10.0	0.8	2.5	0.8	0.8	13.9	4.9	1.8	2.0	0.0	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.1	32.7	15.2	50.0	10.9	10.9	124.3	42.2	37.1	53.3	0.0	39.0
LnGrp LOS	C	C	B	D	B	B	F	D	D	D	A	D
Approach Vol, veh/h		1908			1127			689				239
Approach Delay, s/veh		30.6			17.4			82.0				43.9
Approach LOS		C			B			F				D
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	15.3	74.0		40.7		89.3		40.7				
Change Period (Y+Rc), s	* 4.7	* 6.6		* 6.8		* 6.6		* 6.8				
Max Green Setting (Gmax), s	* 15	* 68		* 28		* 88		* 28				
Max Q Clear Time (g_c+I1), s	10.0	57.7		26.3		19.0		38.7				
Green Ext Time (p_c), s	0.6	9.7		0.4		12.7		0.0				

Intersection Summary

HCM 6th Ctrl Delay	36.6
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
4: Viseneau Dr & Innes Rd

Existing PM Peak Hour
05/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	1516	87	183	911	84	106	40	179	60	51	30
Future Volume (veh/h)	44	1516	87	183	911	84	106	40	179	60	51	30
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1772	1772	1800	1744	1744	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	48	1648	95	199	990	91	115	43	195	65	55	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	2	2	0	4	4	0	0	0	0	0	0
Cap, veh/h	327	1832	817	254	2066	190	371	472	400	186	152	82
Arrive On Green	0.54	0.54	0.54	0.10	0.67	0.66	0.26	0.26	0.26	0.27	0.27	0.24
Sat Flow, veh/h	526	3367	1502	1714	3068	282	1330	1800	1525	553	575	310
Grp Volume(v), veh/h	48	1648	95	199	535	546	115	43	195	153	0	0
Grp Sat Flow(s),veh/h/ln	526	1683	1502	1714	1657	1693	1330	1800	1525	1439	0	0
Q Serve(g_s), s	6.3	56.8	4.0	8.1	20.2	20.4	1.6	2.3	14.1	8.3	0.0	0.0
Cycle Q Clear(g_c), s	9.9	56.8	4.0	8.1	20.2	20.4	12.6	2.3	14.1	11.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.17	1.00		1.00	0.42		0.22
Lane Grp Cap(c), veh/h	327	1832	817	254	1115	1140	371	472	400	421	0	0
V/C Ratio(X)	0.15	0.90	0.12	0.78	0.48	0.48	0.31	0.09	0.49	0.36	0.00	0.00
Avail Cap(c_a), veh/h	332	1865	832	296	1172	1198	371	472	400	421	0	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	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	16.7	26.5	14.4	34.6	10.2	10.4	40.3	36.3	40.6	39.2	0.0	0.0
Incr Delay (d2), s/veh	0.2	6.3	0.1	11.1	0.3	0.3	2.2	0.4	4.2	2.4	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	10.0	0.5	2.6	0.5	0.5	2.3	0.8	4.1	3.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.9	32.8	14.5	45.7	10.6	10.7	42.5	36.6	44.8	41.6	0.0	0.0
LnGrp LOS	B	C	B	D	B	B	D	D	D	D	A	A
Approach Vol, veh/h		1791			1280			353				153
Approach Delay, s/veh		31.4			16.1			43.0				41.6
Approach LOS		C			B			D				D
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	16.8	74.7		38.5		91.5		38.5				
Change Period (Y+Rc), s	* 6.3	* 6.3		7.1		* 6.3		* 7.1				
Max Green Setting (Gmax), s	* 14	* 70		27.0		* 90		* 27				
Max Q Clear Time (g_c+I1), s	10.1	58.8		13.0		22.4		16.1				
Green Ext Time (p_c), s	0.5	9.6		1.0		16.2		2.3				

Intersection Summary

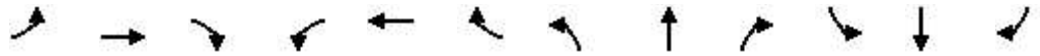
HCM 6th Ctrl Delay	27.5
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
6: Page Rd & Innes Rd

























Existing PM Peak Hour
05/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	94	1538	41	151	830	12	45	88	120	60	55	15
Future Volume (veh/h)	94	1538	41	151	830	12	45	88	120	60	55	15
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1786	1786	1800	1758	1758	1772	1772	1772	1800	1800	1800
Adj Flow Rate, veh/h	102	1672	45	164	902	13	49	96	130	65	60	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	1	1	0	3	3	2	2	2	0	0	0
Cap, veh/h	424	2332	63	177	2329	34	90	146	177	156	133	31
Arrive On Green	0.69	0.69	0.67	0.69	0.69	0.67	0.24	0.24	0.22	0.24	0.24	0.22
Sat Flow, veh/h	620	3376	91	288	3371	49	217	619	750	458	563	131
Grp Volume(v), veh/h	102	838	879	164	447	468	275	0	0	141	0	0
Grp Sat Flow(s),veh/h/ln	620	1697	1770	288	1670	1749	1586	0	0	1152	0	0
Q Serve(g_s), s	9.1	33.2	33.6	42.4	12.4	12.4	4.5	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	21.6	33.2	33.6	76.0	12.4	12.4	17.4	0.0	0.0	12.9	0.0	0.0
Prop In Lane	1.00		0.05	1.00		0.03	0.18		0.47	0.46		0.11
Lane Grp Cap(c), veh/h	424	1172	1223	177	1154	1208	414	0	0	320	0	0
V/C Ratio(X)	0.24	0.71	0.72	0.93	0.39	0.39	0.67	0.00	0.00	0.44	0.00	0.00
Avail Cap(c_a), veh/h	424	1172	1223	177	1154	1208	414	0	0	320	0	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	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	11.7	10.4	10.5	40.6	7.2	7.2	39.1	0.0	0.0	36.4	0.0	0.0
Incr Delay (d2), s/veh	1.3	3.7	3.7	51.2	1.0	0.9	8.2	0.0	0.0	4.4	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.2	1.2	5.4	0.3	0.3	5.2	0.0	0.0	2.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.1	14.1	14.1	91.9	8.2	8.1	47.3	0.0	0.0	40.8	0.0	0.0
LnGrp LOS	B	B	B	F	A	A	D	A	A	D	A	A
Approach Vol, veh/h		1819			1079			275			141	
Approach Delay, s/veh		14.1			20.9			47.3			40.8	
Approach LOS		B			C			D			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		80.0		30.0		80.0		30.0				
Change Period (Y+Rc), s		* 6.1		* 6.2		* 6.1		* 6.2				
Max Green Setting (Gmax), s		* 74		* 24		* 74		* 24				
Max Q Clear Time (g_c+I1), s		35.6		14.9		78.0		19.4				
Green Ext Time (p_c), s		28.5		0.7		0.0		0.9				
Intersection Summary												
HCM 6th Ctrl Delay				20.2								
HCM 6th LOS				C								
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary
7: Orleans Blvd & Innes Rd

Existing PM Peak Hour
05/10/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	579	1424	158	58	718	114	64	225	84	165	241	203
Future Volume (veh/h)	579	1424	158	58	718	114	64	225	84	165	241	203
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1786	1800	1800	1758	1772	1800	1772	1800	1800	1772	1786
Adj Flow Rate, veh/h	629	1548	0	63	780	0	70	245	0	179	262	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	1	0	0	3	2	0	2	0	0	2	1
Cap, veh/h	770	1470		114	896		437	1316		400	976	
Arrive On Green	0.23	0.43	0.00	0.07	0.27	0.00	0.06	0.39	0.00	0.29	0.29	0.00
Sat Flow, veh/h	3326	3393	1525	1714	3340	1502	1714	3367	1525	1153	3367	1514
Grp Volume(v), veh/h	629	1548	0	63	780	0	70	245	0	179	262	0
Grp Sat Flow(s),veh/h/ln	1663	1697	1525	1714	1670	1502	1714	1683	1525	1153	1683	1514
Q Serve(g_s), s	19.7	47.7	0.0	3.9	24.5	0.0	2.9	5.3	0.0	14.4	6.6	0.0
Cycle Q Clear(g_c), s	19.7	47.7	0.0	3.9	24.5	0.0	2.9	5.3	0.0	14.4	6.6	0.0
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	770	1470		114	896		437	1316		400	976	
V/C Ratio(X)	0.82	1.05		0.55	0.87		0.16	0.19		0.45	0.27	
Avail Cap(c_a), veh/h	816	1470		187	911		451	1316		400	976	
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	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	40.1	31.2	0.0	49.7	38.4	0.0	22.9	22.0	0.0	32.8	30.1	0.0
Incr Delay (d2), s/veh	6.2	38.8	0.0	4.1	9.0	0.0	0.2	0.3	0.0	3.6	0.7	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	0.0
%ile BackOfQ(50%),veh/ln	5.4	15.7	0.0	1.3	6.8	0.0	0.6	1.1	0.0	2.8	1.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.3	70.0	0.0	53.8	47.4	0.0	23.1	22.3	0.0	36.4	30.7	0.0
LnGrp LOS	D	F		D	D		C	C		D	C	
Approach Vol, veh/h		2177	A		843	A		315	A		441	A
Approach Delay, s/veh		63.1			47.9			22.5			33.0	
Approach LOS		E			D			C			C	
Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	11.3	51.7	11.1	35.9	29.5	33.5		47.0				
Change Period (Y+Rc), s	* 6.2	* 6.2	* 6.7	* 6.7	* 6.2	* 6.2		* 6.7				
Max Green Setting (Gmax), s	* 9.8	* 43	* 5.3	* 26	* 25	* 28		* 38				
Max Q Clear Time (g_c+I1), s	5.9	49.7	4.9	16.4	21.7	26.5		7.3				
Green Ext Time (p_c), s	0.1	0.0	0.0	2.8	1.5	0.8		2.5				

Intersection Summary												
HCM 6th Ctrl Delay											52.8	
HCM 6th LOS											D	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
 8: BHB/Innes Rd & Navan Rd

Existing PM Peak Hour
 05/10/2018



Movement	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations	↔↔	↔	↕↕	↔	↔	↕↕
Traffic Volume (veh/h)	196	53	1801	716	104	731
Future Volume (veh/h)	196	53	1801	716	104	731
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
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1617	1800	1786	1744	1800	1744
Adj Flow Rate, veh/h	213	58	1958	0	113	795
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	13	0	1	4	0	4
Cap, veh/h	732	374	1968		127	2278
Arrive On Green	0.24	0.24	0.58	0.00	0.07	0.69
Sat Flow, veh/h	2988	1525	3483	1478	1714	3400
Grp Volume(v), veh/h	213	58	1958	0	113	795
Grp Sat Flow(s),veh/h/ln	1494	1525	1697	1478	1714	1657
Q Serve(g_s), s	7.0	3.6	68.8	0.0	7.8	11.8
Cycle Q Clear(g_c), s	7.0	3.6	68.8	0.0	7.8	11.8
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	732	374	1968		127	2278
V/C Ratio(X)	0.29	0.16	0.99		0.89	0.35
Avail Cap(c_a), veh/h	732	374	1968		127	2278
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	36.8	35.6	25.0	0.0	55.1	7.7
Incr Delay (d2), s/veh	1.0	0.9	19.0	0.0	47.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.9	11.5	0.0	4.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	37.8	36.4	44.1	0.0	102.8	7.8
LnGrp LOS	D	D	D		F	A
Approach Vol, veh/h	271		1958	A		908
Approach Delay, s/veh	37.5		44.1			19.6
Approach LOS	D		D			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	12.9	74.0			86.9	33.5
Change Period (Y+Rc), s	* 6.3	* 6.3			* 6.3	5.9
Max Green Setting (Gmax), s	* 6.6	* 68			* 80	27.6
Max Q Clear Time (g_c+I1), s	9.8	70.8			13.8	9.0
Green Ext Time (p_c), s	0.0	0.0			10.9	2.3

Intersection Summary

HCM 6th Ctrl Delay	36.4
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [NER] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Intersection Delay, s/veh	21.8
Intersection LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			←	→	
Traffic Vol, veh/h	497	26	6	75	124	176
Future Vol, veh/h	497	26	6	75	124	176
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	1	10	11	0	1	2
Mvmt Flow	540	28	7	82	135	191
Number of Lanes	1	0	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	28.4	10.4	13.3
HCM LOS	D	B	B

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	7%	95%	0%
Vol Thru, %	93%	0%	41%
Vol Right, %	0%	5%	59%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	81	523	300
LT Vol	6	497	0
Through Vol	75	0	124
RT Vol	0	26	176
Lane Flow Rate	88	568	326
Geometry Grp	1	1	1
Degree of Util (X)	0.153	0.828	0.483
Departure Headway (Hd)	6.254	5.242	5.328
Convergence, Y/N	Yes	Yes	Yes
Cap	571	694	675
Service Time	4.312	3.271	3.373
HCM Lane V/C Ratio	0.154	0.818	0.483
HCM Control Delay	10.4	28.4	13.3
HCM Lane LOS	B	D	B
HCM 95th-tile Q	0.5	9	2.6

HCM 6th Signalized Intersection Summary
 13: Renaud Rd & Navan Rd

Existing PM Peak Hour
 05/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	131	420	1	17	118	20	147	357	159	19	69	37
Future Volume (veh/h)	131	420	1	17	118	20	147	357	159	19	69	37
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1744	1744	1393	1660	1660	1617	1786	1674	1800	1730	1730
Adj Flow Rate, veh/h	142	457	1	18	128	0	160	388	173	21	75	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	4	4	29	10	10	13	1	9	0	5	5
Cap, veh/h	609	733	2	292	699		570	768	610	337	249	133
Arrive On Green	0.42	0.42	0.37	0.42	0.42	0.00	0.15	0.43	0.43	0.23	0.23	0.19
Sat Flow, veh/h	1272	1739	4	734	1660	0	1540	1786	1418	862	1062	566
Grp Volume(v), veh/h	142	0	458	18	128	0	160	388	173	21	0	115
Grp Sat Flow(s),veh/h/ln	1272	0	1743	734	1660	0	1540	1786	1418	862	0	1628
Q Serve(g_s), s	4.2	0.0	11.1	1.1	2.6	0.0	3.6	8.5	4.3	1.0	0.0	3.2
Cycle Q Clear(g_c), s	6.8	0.0	11.1	12.1	2.6	0.0	3.6	8.5	4.3	1.0	0.0	3.2
Prop In Lane	1.00		0.00	1.00		0.00	1.00		1.00	1.00		0.35
Lane Grp Cap(c), veh/h	609	0	734	292	699		570	768	610	337	0	382
V/C Ratio(X)	0.23	0.00	0.62	0.06	0.18		0.28	0.51	0.28	0.06	0.00	0.30
Avail Cap(c_a), veh/h	1557	0	2033	839	1936		701	1917	1522	819	0	1292
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	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.9	0.0	12.2	17.0	9.7	0.0	10.3	11.1	9.9	16.1	0.0	17.3
Incr Delay (d2), s/veh	0.2	0.0	0.9	0.1	0.1	0.0	0.3	0.5	0.3	0.1	0.0	0.4
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(50%),veh/ln	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.1	0.0	13.1	17.0	9.9	0.0	10.5	11.7	10.2	16.2	0.0	17.7
LnGrp LOS	B	A	B	B	A		B	B	B	B	A	B
Approach Vol, veh/h		600			146	A		721				136
Approach Delay, s/veh		12.8			10.8			11.1				17.5
Approach LOS		B			B			B				B
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		26.7		27.0		26.7	10.5	16.5				
Change Period (Y+Rc), s		* 6.7		6.5		* 6.7	5.0	6.5				
Max Green Setting (Gmax), s		* 60		55.0		* 60	10.0	40.0				
Max Q Clear Time (g_c+I1), s		14.1		10.5		13.1	5.6	5.2				
Green Ext Time (p_c), s		1.5		6.6		6.9	0.4	1.4				

Intersection Summary

HCM 6th Ctrl Delay	12.2
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

MOVEMENT SUMMARY

 Site: Existing PM - BCB/Mer Bleue

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mer Bleue											
8	T1	291	3.0	0.352	7.1	LOS A	1.9	15.2	0.61	0.65	58.1
18	R2	330	3.0	0.391	7.1	LOS A	2.2	17.5	0.63	0.73	57.0
Approach		622	3.0	0.391	7.1	LOS A	2.2	17.5	0.62	0.69	57.5
East: Brian Coburn											
1	L2	118	3.0	0.505	12.9	LOS B	3.3	26.0	0.63	0.75	57.8
16	R2	277	3.0	0.505	6.9	LOS A	3.3	26.0	0.63	0.75	55.9
Approach		396	3.0	0.505	8.7	LOS A	3.3	26.0	0.63	0.75	56.5
North: Mer Bleue											
7	L2	452	3.0	0.414	10.8	LOS B	2.7	20.8	0.38	0.64	55.4
4	T1	208	3.0	0.234	5.1	LOS A	1.2	9.3	0.34	0.46	59.8
Approach		660	3.0	0.414	9.0	LOS A	2.7	20.8	0.37	0.58	56.7
All Vehicles		1677	3.0	0.505	8.2	LOS A	3.3	26.0	0.53	0.66	56.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix B
Site Traffic Mode Split

Trip Generation Rates - CDP Study Area

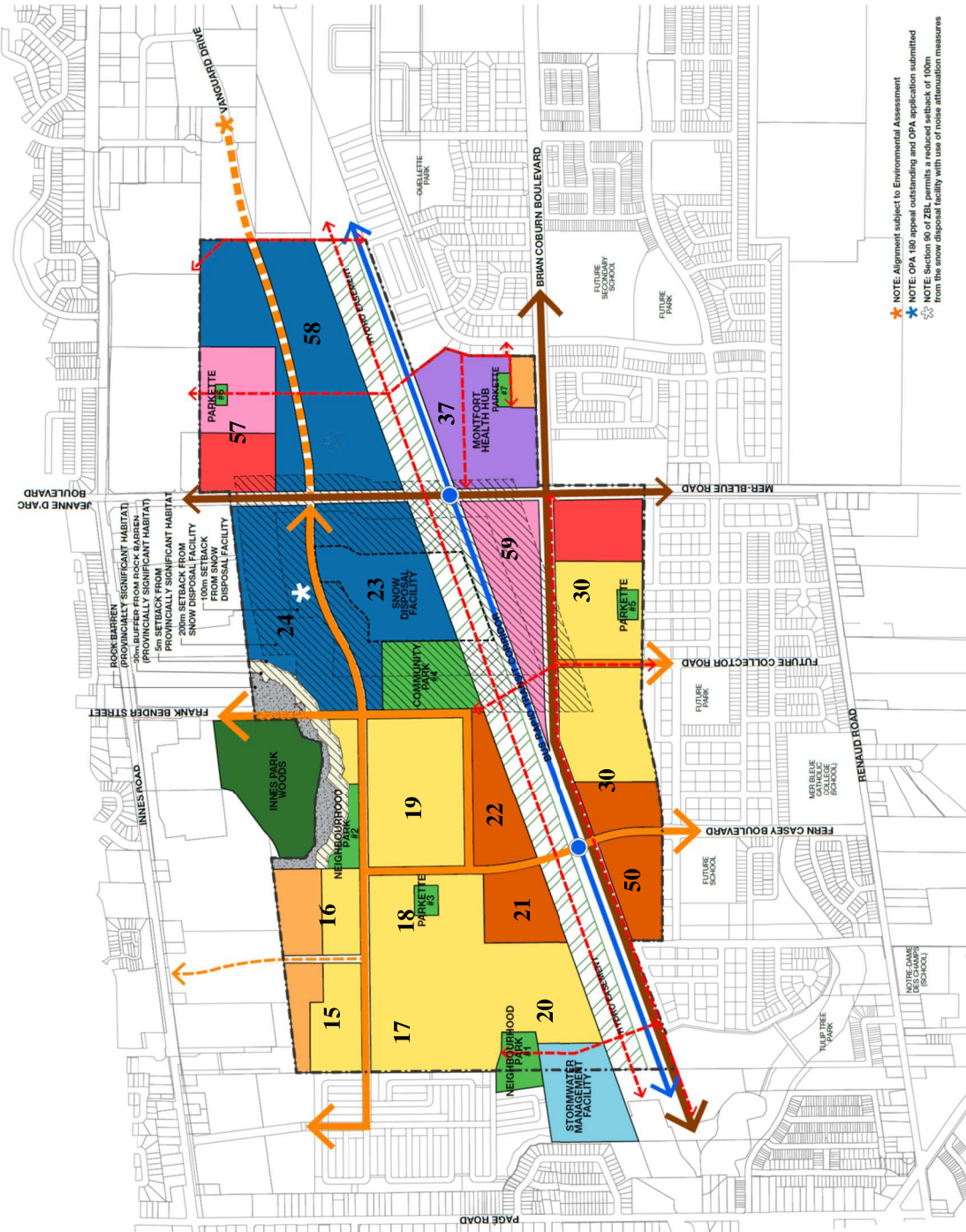
ITE Trip Rates					Modified Person Trips Rate				
Rate per unit	Pk Period	Rate	Split		Rate per unit	Pk Period	Rate	Split	
			IN	OUT				IN	OUT
			Single Family Homes - 210	AM				0.75	25%
	PM	1.01	63%	37%		PM	1.31	63%	37%
x 1.3									
Rate per unit	Pk Period	Rate	Split		Rate per unit	Pk Period	Rate	Split	
			IN	OUT				IN	OUT
			Townhomes - 230	AM				0.44	17%
	PM	0.52	67%	33%		PM	0.68	67%	33%
Rate per unit	Pk Period	Rate	Split		Rate per unit	Pk Period	Rate	Split	
			IN	OUT				IN	OUT
			Apartment - 220	AM				0.51	20%
	PM	0.62	65%	35%		PM	0.81	65%	35%

ITE Trip Rates					Modified Person Trips Rate				
Rate per unit	Pk Period	Rate	Split		Rate per unit	Pk Period	Rate	Split	
			IN	OUT				IN	OUT
			Office	AM				0.48	88%
	PM	0.46	17%	83%		PM	0.60	17%	83%
Rate per unit	Pk Period	Rate	Split		Rate per unit	Pk Period	Rate	Split	
			IN	OUT				IN	OUT
			Industrial	AM				0.47	86%
	PM	0.46	20%	80%		PM	0.60	20%	80%

EAST URBAN COMMUNITY MIXED-USE CENTRE PREFERRED LAND USE PLAN

PTV Vistro Traffic Zones

- LEGEND**
- Low Density Residential
 - Medium Density Residential
 - Medium-High Density Residential
 - Commercial
 - Mixed-Use
 - Employment
 - Institutional
 - Park
 - Innes Park Woods
 - Stormwater Management Facility
 - Rock Barren
 - Buffer from Rock Barren
 - Hydro Easement/Open Space
 - Snow Disposal Facility Setback
 - COP Boundary
 - Arterial
 - Collector
 - Potential Local Road
 - Future Vanguard Drive Extension
 - Off-Road Multi-Use Pathway
 - Bus Rapid Transit (BRT) Corridor
 - BRT Station



FOTENN
 Planning + Design
 OTTAWA

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- ★ NOTE: Alignment subject to Environmental Assessment
- ★ NOTE: OPA 180 appeal outstanding and OPA application submitted
- ★ NOTE: Section 80 of ZBL permits a reduced setback of 50m from the snow disposal facility with use of noise attenuation measures

21.	DRAFT	04.23.2018
20.	DRAFT	04.18.2018
19.	DRAFT	04.13.2018
18.	DRAFT	04.08.2018
17.	DRAFT	04.03.2018
16.	DRAFT	03.29.2018
15.	DRAFT	03.12.2018

Residential Mode Share Split - Zone 15							
<i>Travel Mode</i>	<i>Mode Share</i>	<i>AM</i>			<i>PM</i>		
		<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>
Auto Driver	60%	20	79	99	80	43	123
Auto Passenger	15%	5	20	25	20	11	31
Transit	20%	7	26	33	27	14	41
Non-Auto	5%	2	7	8	7	4	10
Total Person Trips	100%	33	131	165	133	71	205
Total "Residential" Auto Trips		20	79	99	80	43	123

Residential Mode Share Split - Zone 16							
<i>Travel Mode</i>	<i>Mode Share</i>	<i>AM</i>			<i>PM</i>		
		<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>
Auto Driver	60%	24	96	119	95	51	146
Auto Passenger	15%	6	24	30	24	13	37
Transit	20%	8	32	40	32	17	49
Non-Auto	5%	2	8	10	8	4	12
Total Person Trips	100%	39	159	199	159	85	243
Total "Residential" Auto Trips		24	96	119	95	51	146

Residential Mode Share Split - Zone 17							
<i>Travel Mode</i>	<i>Mode Share</i>	<i>AM</i>			<i>PM</i>		
		<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>
Auto Driver	60%	33	114	148	123	68	191
Auto Passenger	15%	8	29	37	31	17	48
Transit	20%	11	38	49	41	23	64
Non-Auto	5%	3	10	12	10	6	16
Total Person Trips	100%	55	191	246	204	114	318
Total "Residential" Auto Trips		33	114	148	123	68	191

Residential Mode Share Split - Zone 18							
<i>Travel Mode</i>	<i>Mode Share</i>	<i>AM</i>			<i>PM</i>		
		<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>
Auto Driver	60%	17	75	92	74	38	112
Auto Passenger	15%	4	19	23	18	9	28
Transit	20%	6	25	31	25	13	37
Non-Auto	5%	1	6	8	6	3	9
Total Person Trips	100%	28	125	153	123	63	186
Total "Residential" Auto Trips		17	75	92	74	38	112

Residential Mode Share Split - Zone 19							
<i>Travel Mode</i>	<i>Mode Share</i>	<i>AM</i>			<i>PM</i>		
		<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>
Auto Driver	60%	33	128	161	131	70	201
Auto Passenger	15%	8	32	40	33	18	50
Transit	20%	11	43	54	44	23	67
Non-Auto	5%	3	11	13	11	6	17
Total Person Trips	100%	55	213	268	219	117	336
Total "Residential" Auto Trips		33	128	161	131	70	201

Residential Mode Share Split - Zone 20							
<i>Travel Mode</i>	<i>Mode Share</i>	<i>AM</i>			<i>PM</i>		
		<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>
Auto Driver	60%	14	55	69	56	29	85
Auto Passenger	15%	3	14	17	14	7	21
Transit	20%	5	18	23	19	10	28
Non-Auto	5%	1	5	6	5	2	7
Total Person Trips	100%	23	92	115	93	49	142
Total "Residential" Auto Trips		14	55	69	56	29	85

Residential Mode Share Split - Zone 21							
<i>Travel Mode</i>	<i>Mode Share</i>	<i>AM</i>			<i>PM</i>		
		<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>
Auto Driver	60%	34	138	172	136	72	209
Auto Passenger	15%	8	35	43	34	18	52
Transit	20%	11	46	57	45	24	70
Non-Auto	5%	3	12	14	11	6	17
Total Person Trips	100%	56	231	286	227	120	348
Total "Residential" Auto Trips		34	138	172	136	72	209

Residential Mode Share Split - Zone 22							
<i>Travel Mode</i>	<i>Mode Share</i>	<i>AM</i>			<i>PM</i>		
		<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>
Auto Driver	60%	29	115	144	114	61	175
Auto Passenger	15%	7	29	36	28	15	44
Transit	20%	10	38	48	38	20	58
Non-Auto	5%	2	10	12	9	5	15
Total Person Trips	100%	48	192	240	190	102	292
Total "Residential" Auto Trips		29	115	144	114	61	175

Residential Mode Share Split - Zone 30							
<i>Travel Mode</i>	<i>Mode Share</i>	<i>AM</i>			<i>PM</i>		
		<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>
Auto Driver	60%	58	229	288	232	124	357
Auto Passenger	15%	15	57	72	58	31	89
Transit	20%	19	76	96	77	41	119
Non-Auto	5%	5	19	24	19	10	30
Total Person Trips	100%	97	382	479	387	207	595
Total "Residential" Auto Trips		58	229	288	232	124	357

Residential Mode Share Split - Zone 50							
<i>Travel Mode</i>	<i>Mode Share</i>	<i>AM</i>			<i>PM</i>		
		<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>
Auto Driver	60%	28	111	139	110	59	169
Auto Passenger	15%	7	28	35	28	15	42
Transit	20%	9	37	46	37	20	56
Non-Auto	5%	2	9	12	9	5	14
Total Person Trips	100%	46	186	232	183	99	282
Total "Residential" Auto Trips		28	111	139	110	59	169

Residential Mode Share Split - Zone 59							
<i>Travel Mode</i>	<i>Mode Share</i>	<i>AM</i>			<i>PM</i>		
		<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>
Auto Driver	60%	20	80	100	79	43	122
Auto Passenger	15%	5	20	25	20	11	30
Transit	20%	7	27	33	26	14	41
Non-Auto	5%	2	7	8	7	4	10
Total Person Trips	100%	33	134	167	132	71	203
Total "Residential" Auto Trips		20	80	100	79	43	122

Office/Comm Mode Share Split - Zone 59							
<i>Travel Mode</i>	<i>Mode Share</i>	<i>AM</i>			<i>PM</i>		
		<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>
Auto Driver	60%	87	12	99	16	79	95
Auto Passenger	15%	22	3	25	4	20	24
Transit	20%	29	4	33	5	26	32
Non-Auto	5%	7	1	8	1	7	8
Total Person Trips	100%	146	20	165	27	132	158
Total "Office/Comm" Auto Trips		87	12	99	16	79	95
Internal - 20 %		17	2	20	3	16	19
Pass-by - 30 %		26	4	30	5	24	29
Total Office/Commercial NEW Trips after deduction		44	6	50	8	39	48

70% Office - Zone 58							
<i>Travel Mode</i>	<i>Mode Share</i>	<i>AM</i>			<i>PM</i>		
		<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>
Auto Driver	60%	187	26	213	35	169	204
Auto Passenger	15%	47	6	53	9	42	51
Transit	20%	62	9	71	12	56	68
Non-Auto	5%	16	2	18	3	14	17
Total Person Trips	100%	312	43	355	58	282	340
Total Auto Trips		187	26	213	35	169	204
Internal - 10%		19	3	21	3	17	20
Pass-By - 15%		28	4	32	5	25	31
Trips After Reduction		140	19	160	26	127	153

30% Industrial - Zone58							
<i>Travel Mode</i>	<i>Mode Share</i>	<i>AM</i>			<i>PM</i>		
		<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>
Auto Driver	60%	77	13	89	17	70	87
Auto Passenger	15%	19	3	22	4	17	22
Transit	20%	26	4	30	6	23	29
Non-Auto	5%	6	1	7	1	6	7
Total Person Trips	100%	128	21	149	29	117	146
Total Auto Trips		77	13	89	17	70	87

Mode Share Split - Zone 23							
<i>Travel Mode</i>	<i>Mode Share</i>	<i>AM</i>			<i>PM</i>		
		<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>
Auto Driver	60%	356	49	405	66	324	390
Auto Passenger	15%	89	12	101	17	81	98
Transit	20%	119	16	135	22	108	130
Non-Auto	5%	30	4	34	6	27	33
Total Person Trips	100%	594	81	675	111	540	651
Total Auto Trips		356	49	405	66	324	390
Pass-by - 15%		53	7	61	10	49	59
Total Auto Trips After Deduction		303	41	344	56	275	332

Mode Share Split - Zone 24							
<i>Travel Mode</i>	<i>Mode Share</i>	<i>AM</i>			<i>PM</i>		
		<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>
Auto Driver	60%	112	15	128	21	102	123
Auto Passenger	15%	28	4	32	5	26	31
Transit	20%	37	5	43	7	34	41
Non-Auto	5%	9	1	11	2	9	10
Total Person Trips	100%	187	26	213	35	170	205
Total Auto Trips		112	15	128	21	102	123
Pass-by - 20%		22	3	26	4	20	25
Total Auto Trips After Deduction		90	12	102	17	82	98

Zones 23 and 24 are the main employment areas of the CDP area. It is assumed that those employment areas would attract internal trips from the CDP residential land uses. The above trips noted in Zones 23 and 24 do not reflect internal trips but for analysis purposes it was assumed that a 10% of the CDP residential land uses would work and be destined to/from the employment areas.

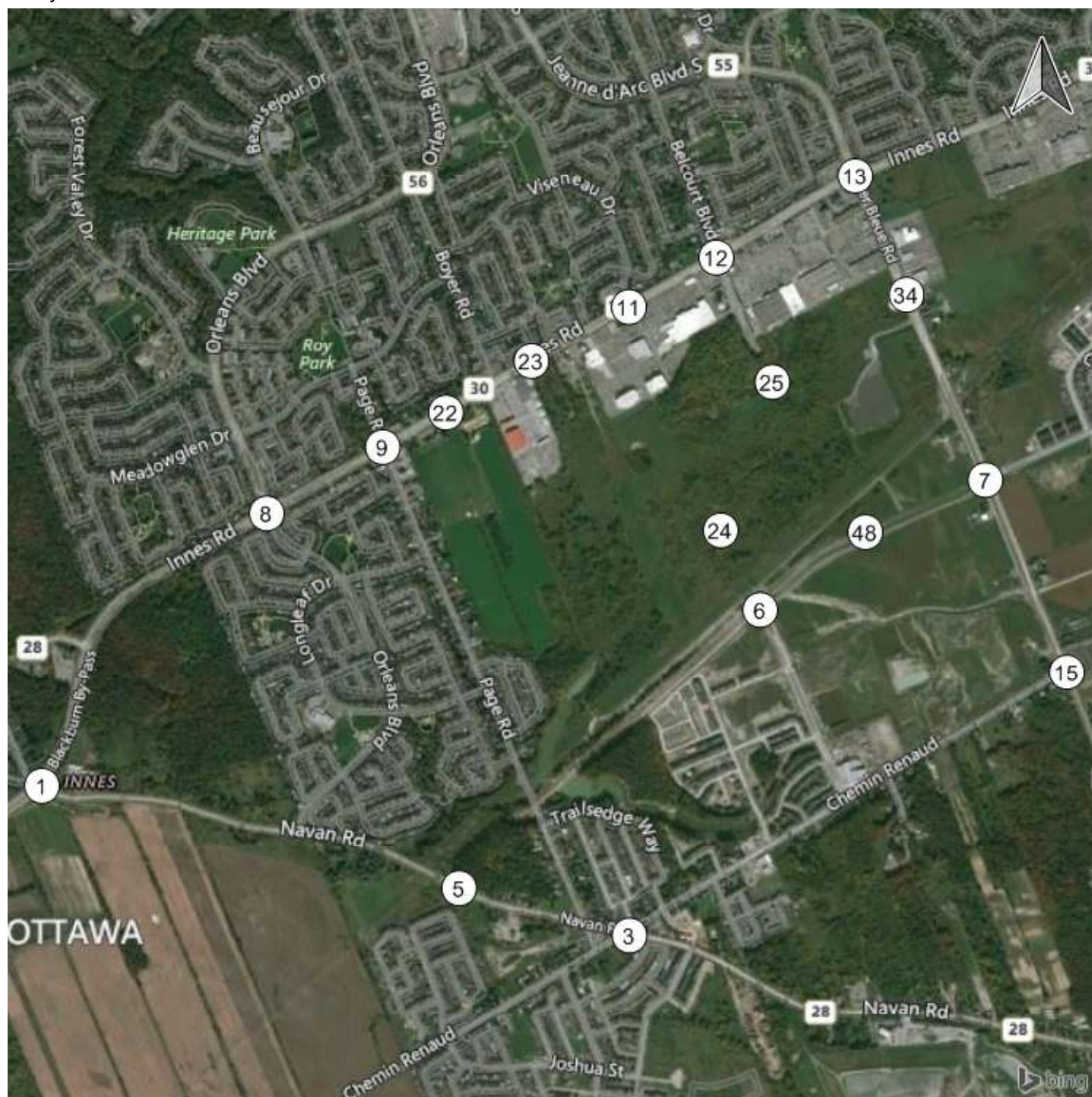
Zone 37 interim trip generations were referenced from “2225 Mer Bleue Road – Orleans Health Hub Transportation Impact Study” (March 2018). The ultimate build-out traffic volumes were referenced from “Orleans Family Health Hub – Community Transportation Study / Transportation Impact Study” (Oct. 2010).

Zone 57 trip generations were referenced from “2025 Mer Bleue Road – Community Transportation Study” (Jan. 2017).

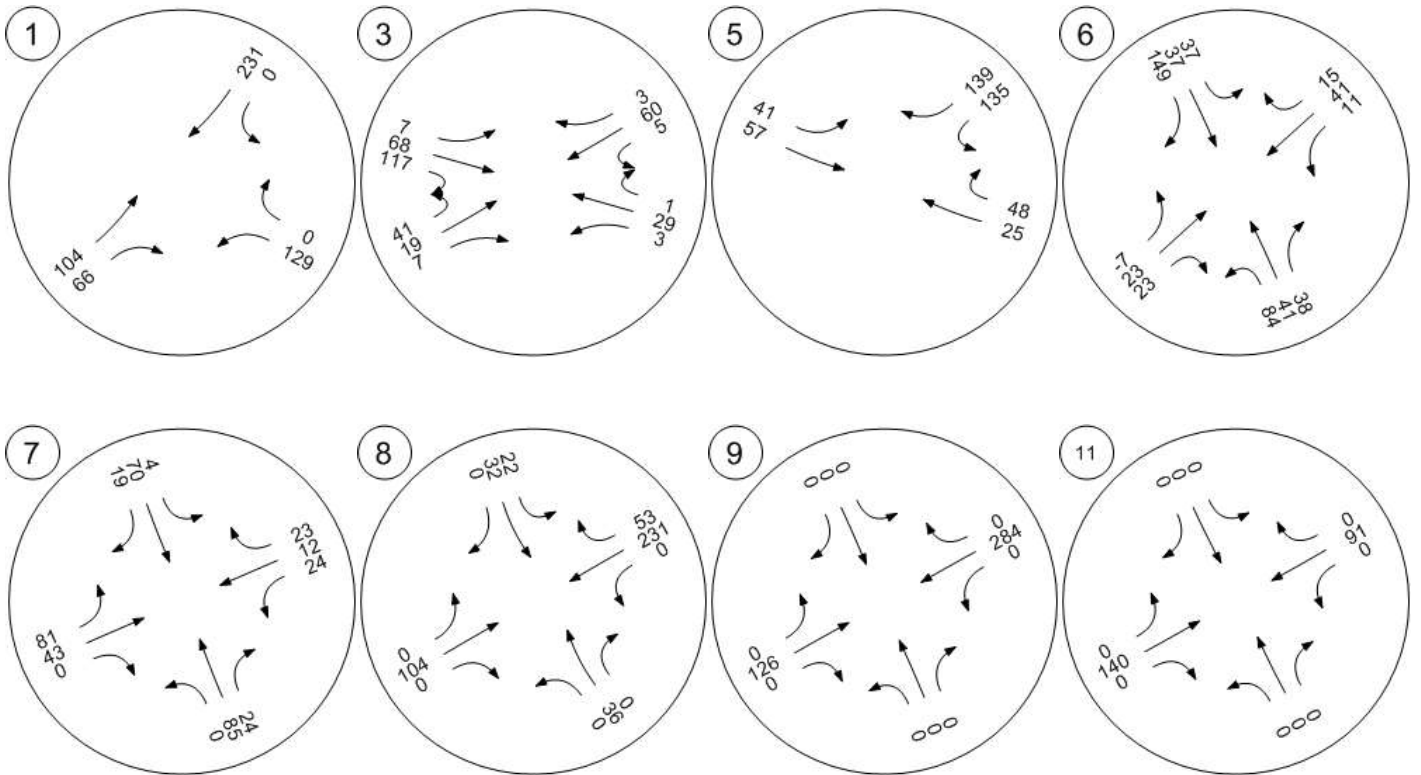
Appendix C

Site and Forecast Traffic Volumes

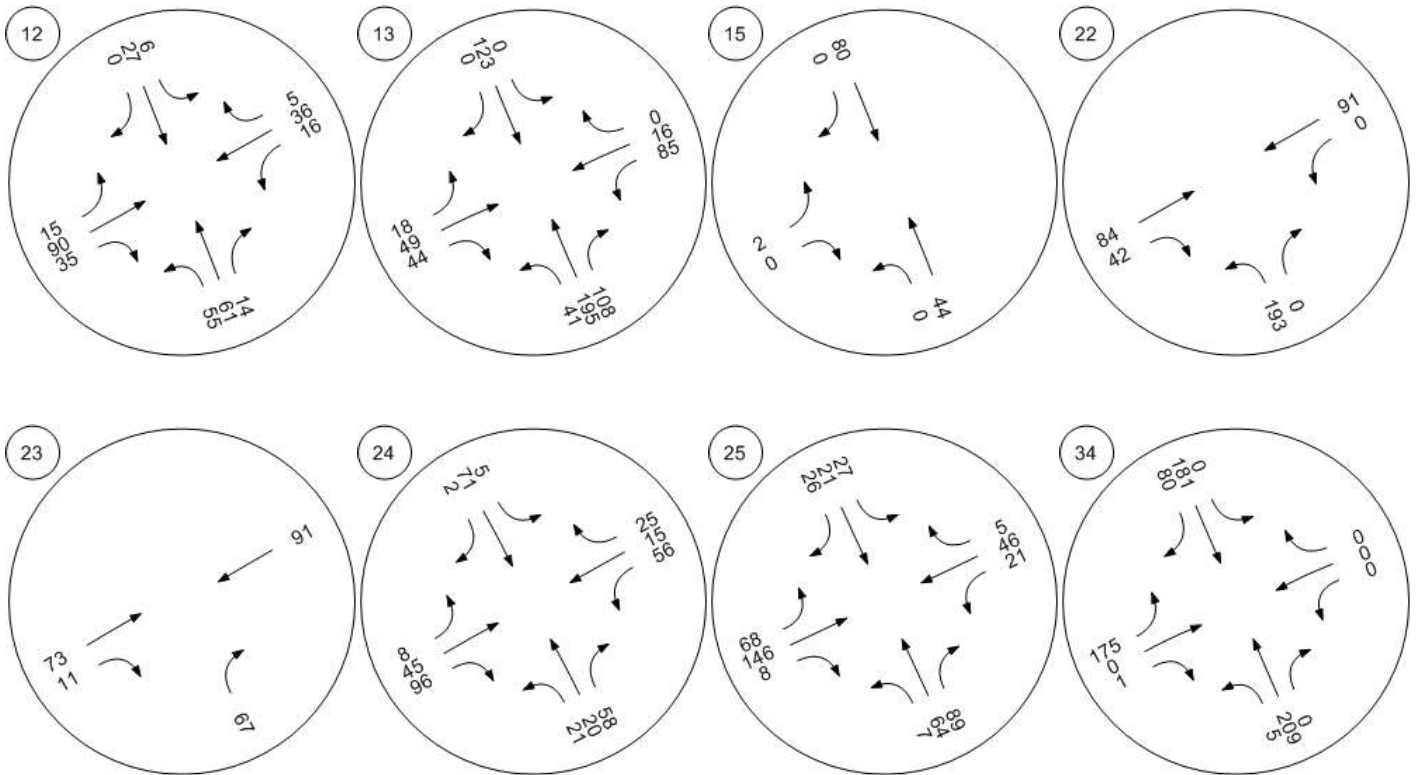
Study Intersections



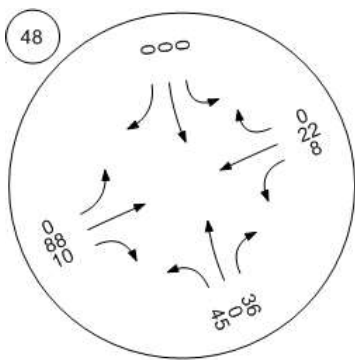
Traffic Volume - Net New Site Trips



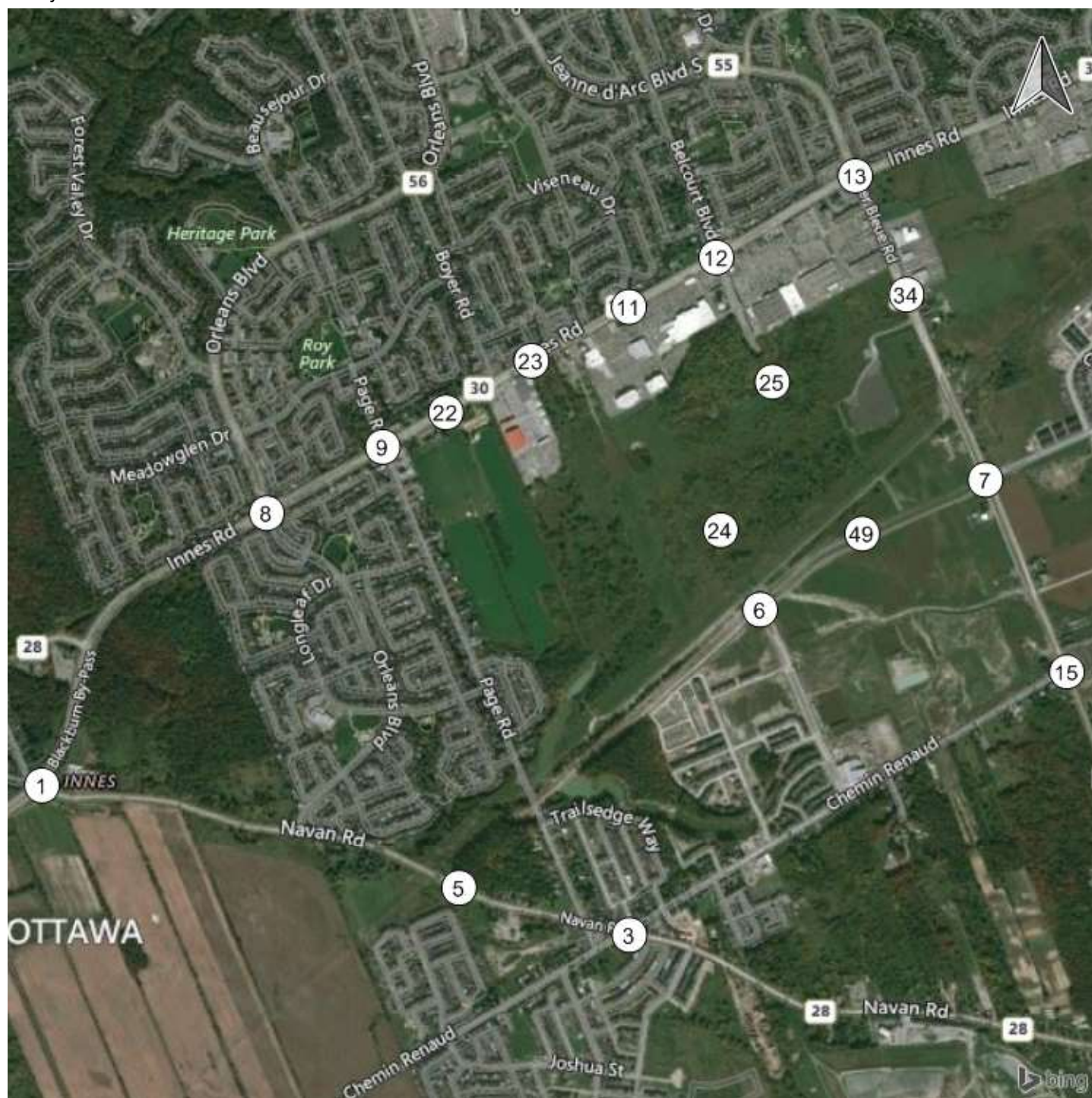
Traffic Volume - Net New Site Trips



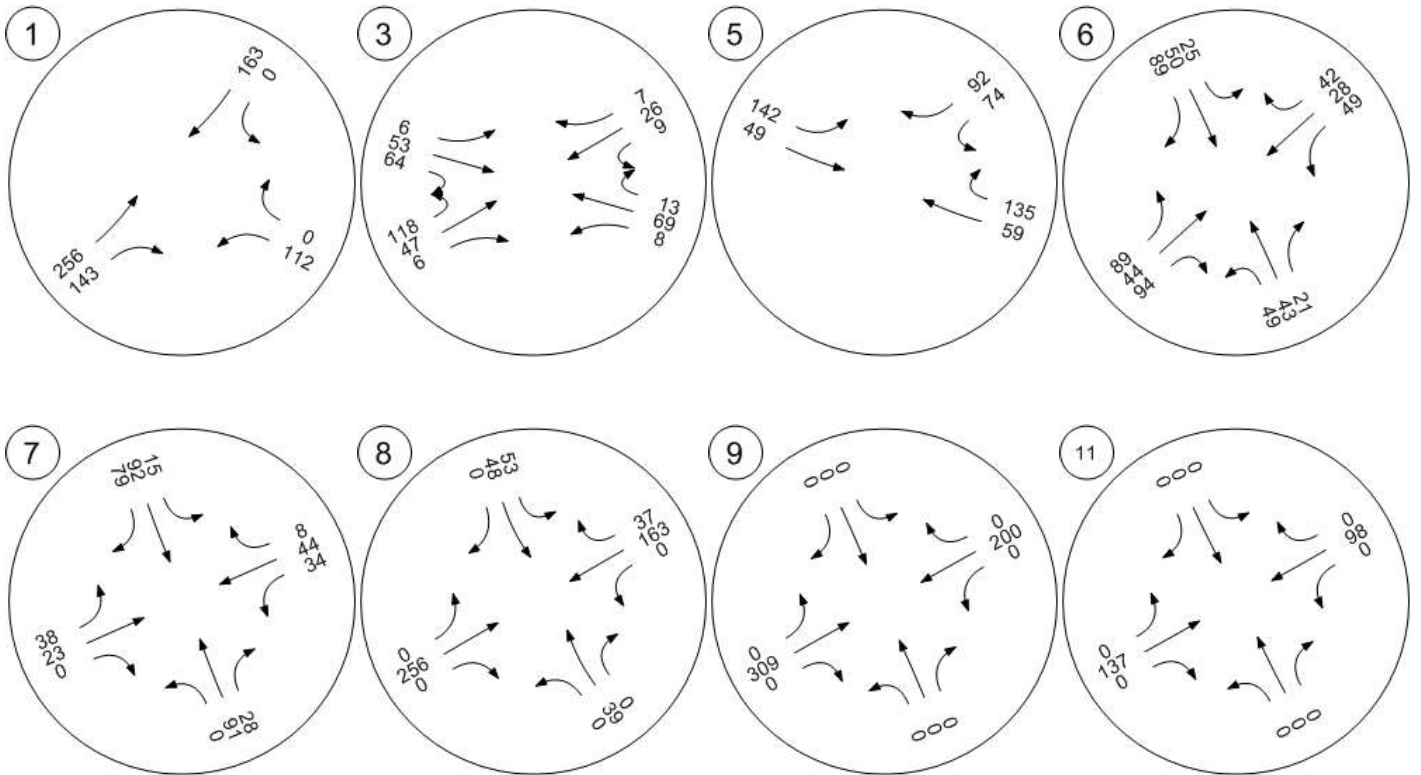
Traffic Volume - Net New Site Trips



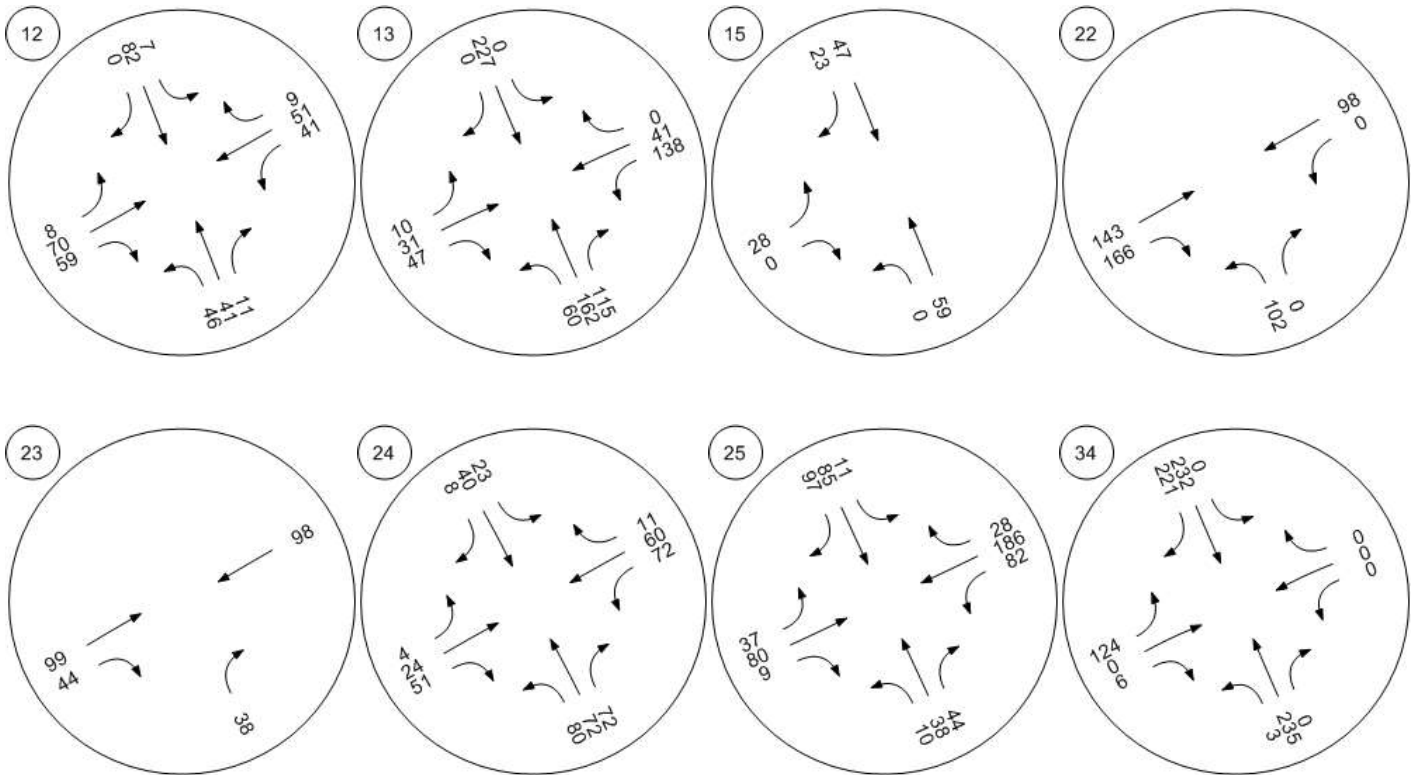
Study Intersections



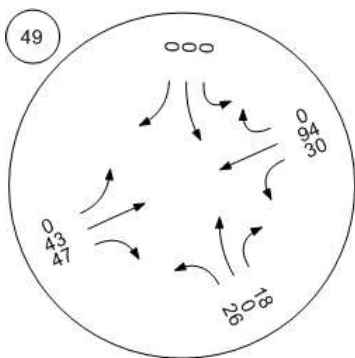
Traffic Volume - Net New Site Trips



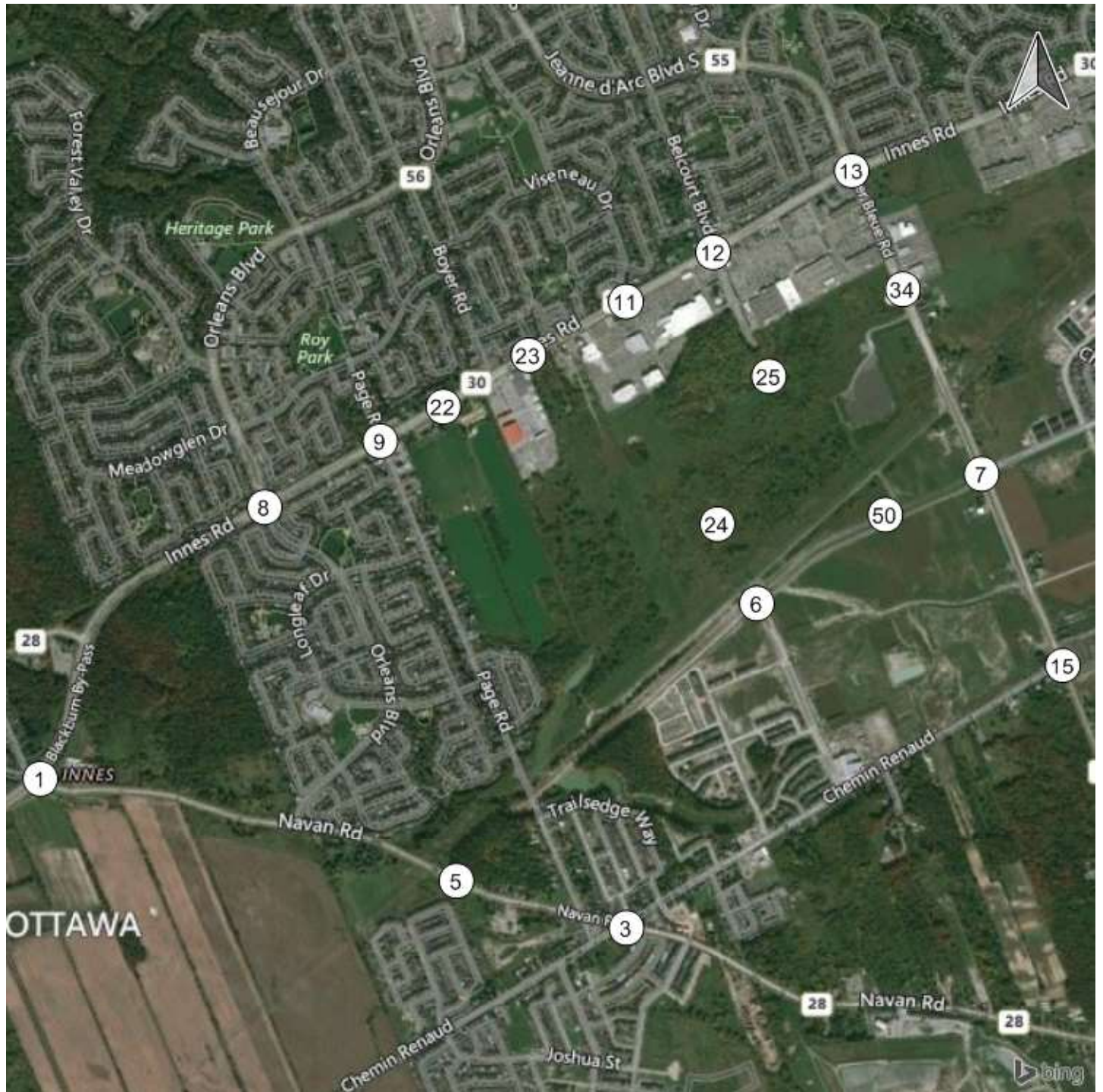
Traffic Volume - Net New Site Trips



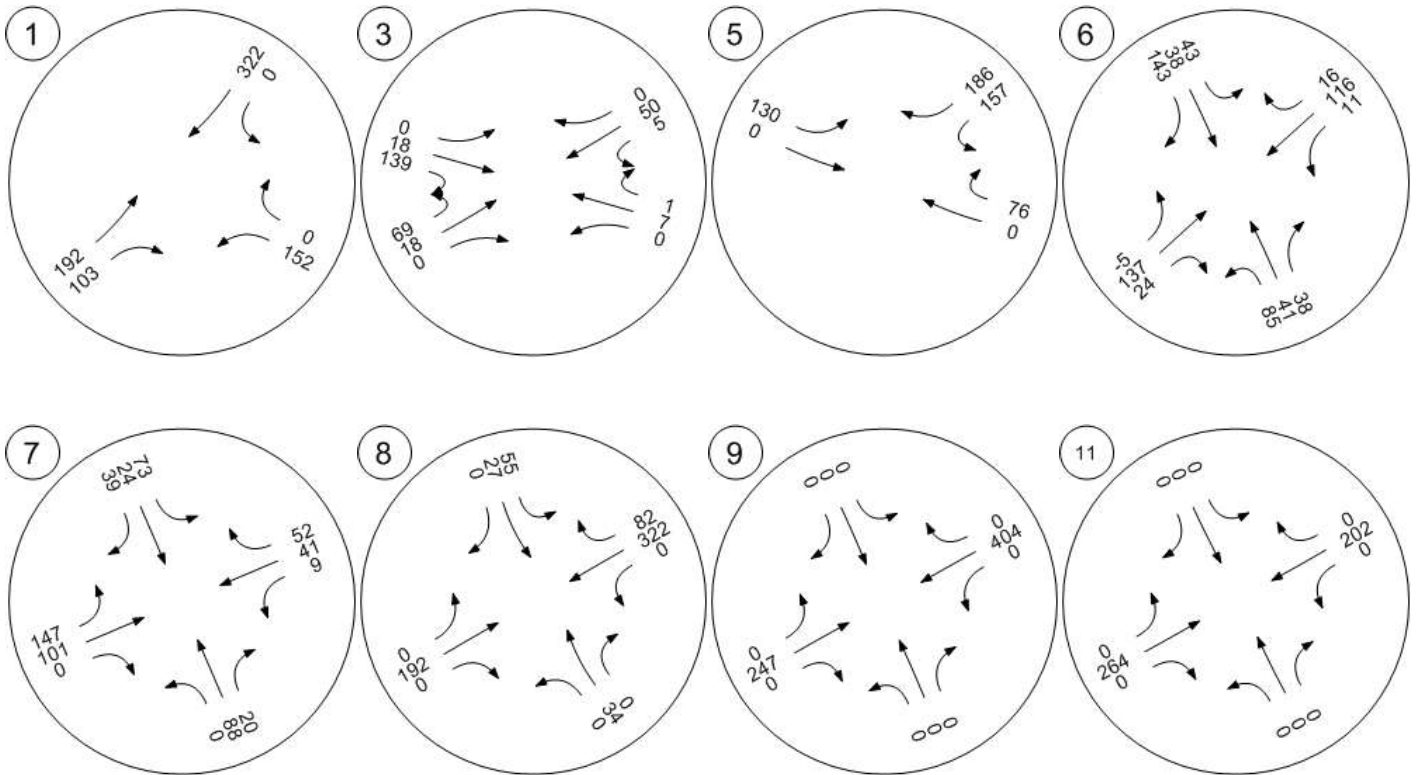
Traffic Volume - Net New Site Trips



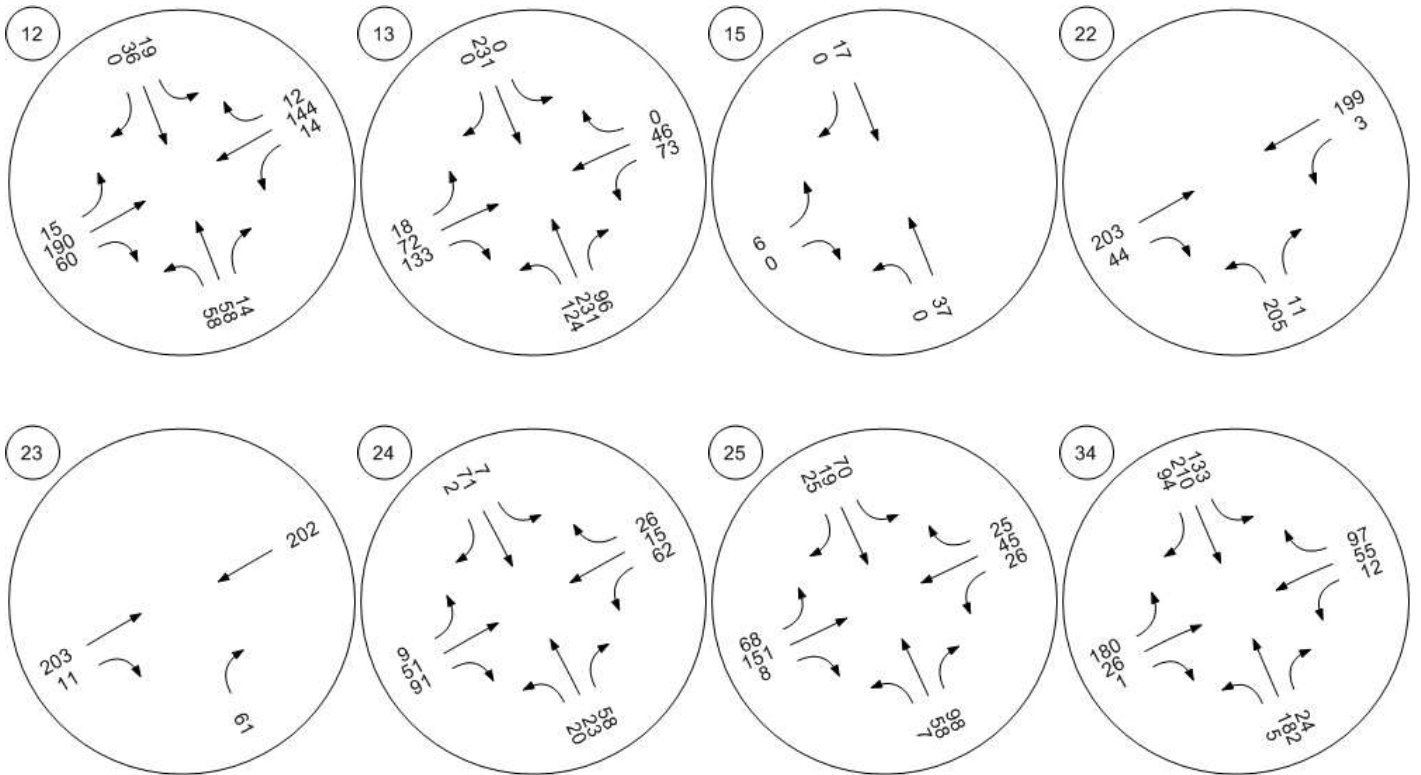
Study Intersections



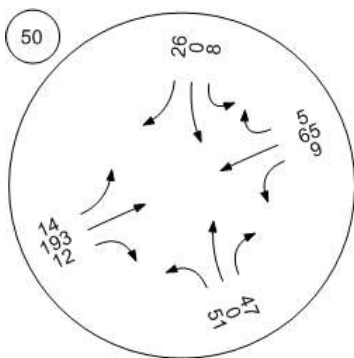
Traffic Volume - Net New Site Trips



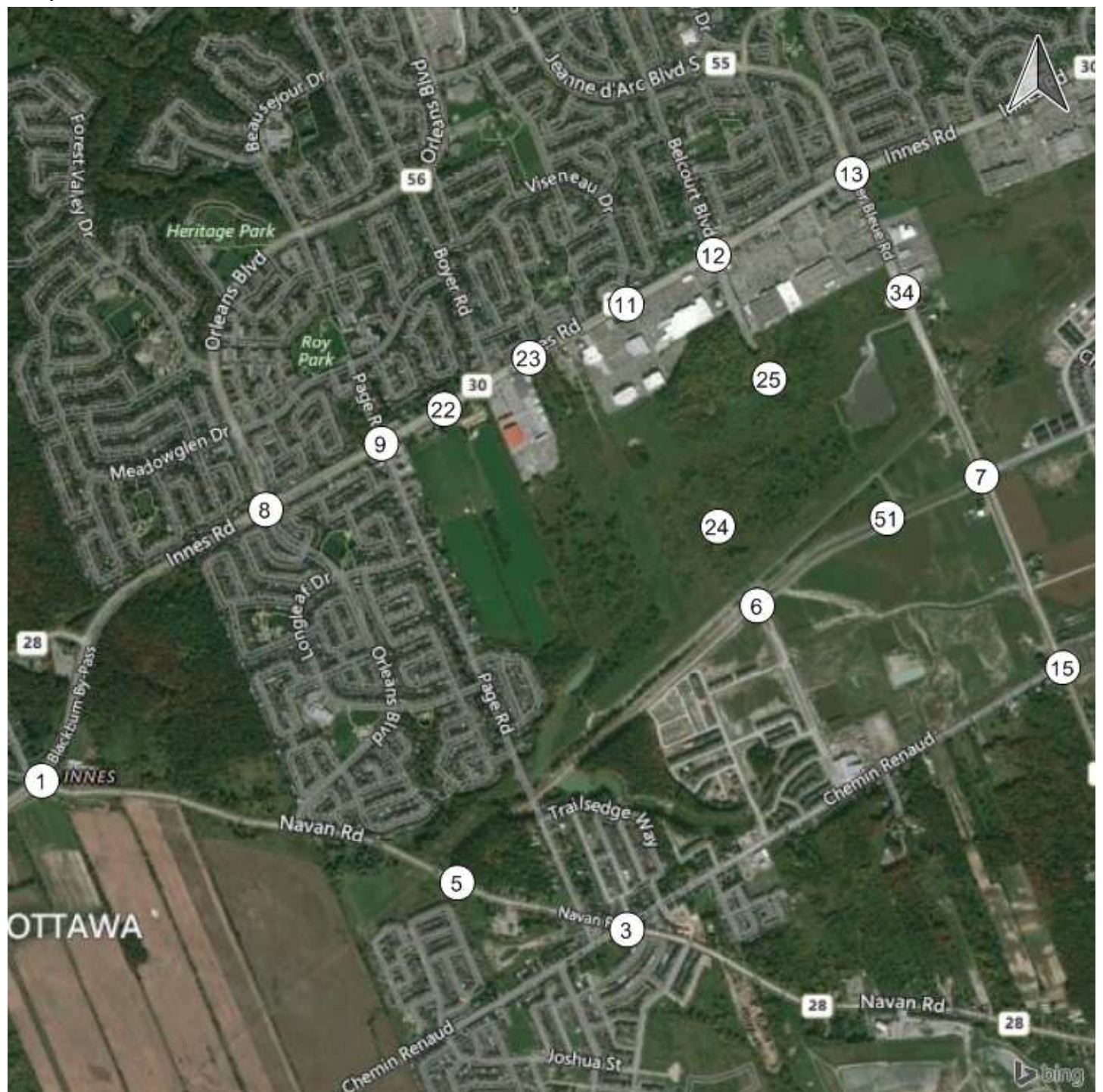
Traffic Volume - Net New Site Trips



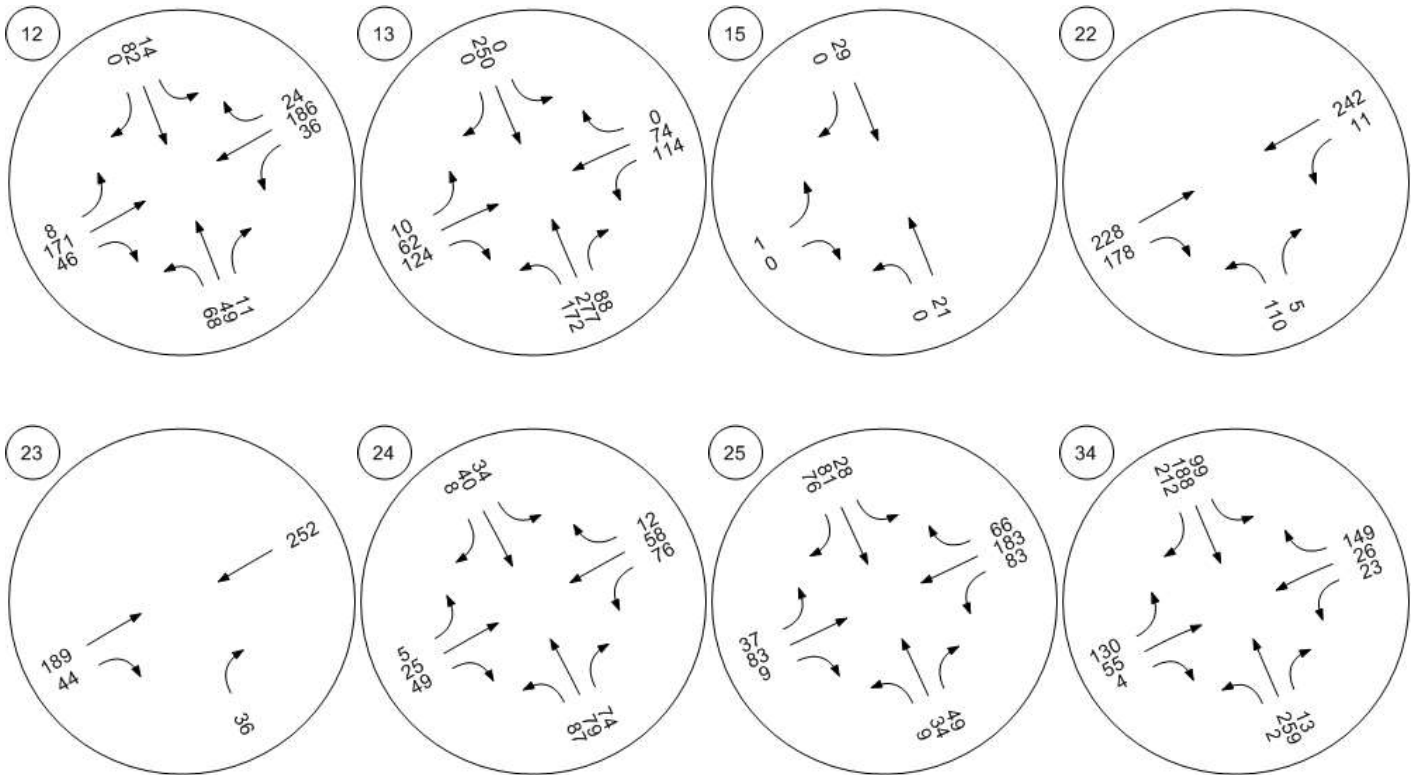
Traffic Volume - Net New Site Trips



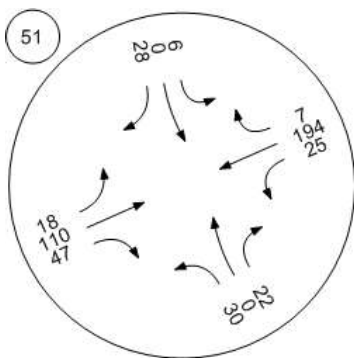
Study Intersections



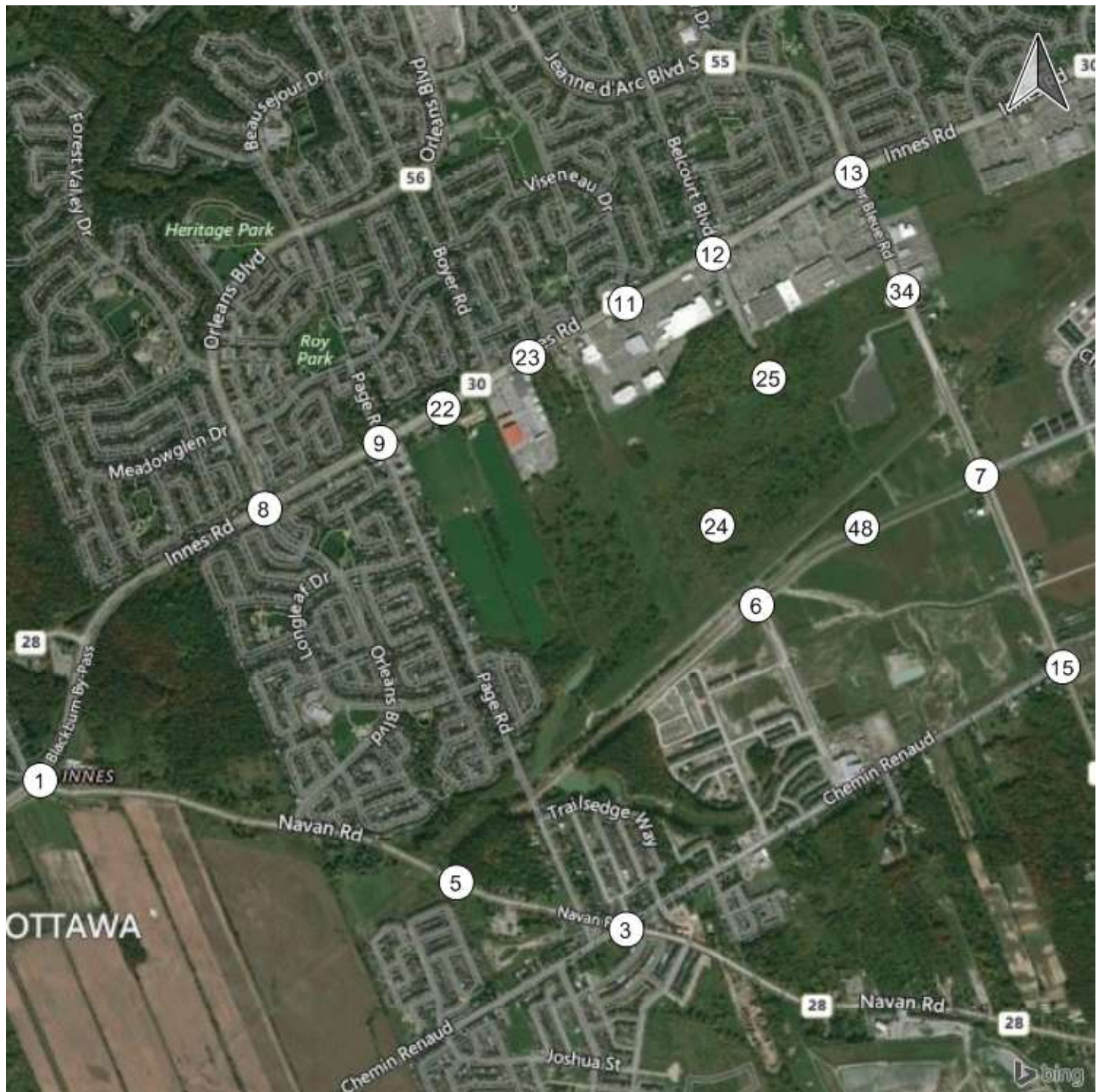
Traffic Volume - Net New Site Trips



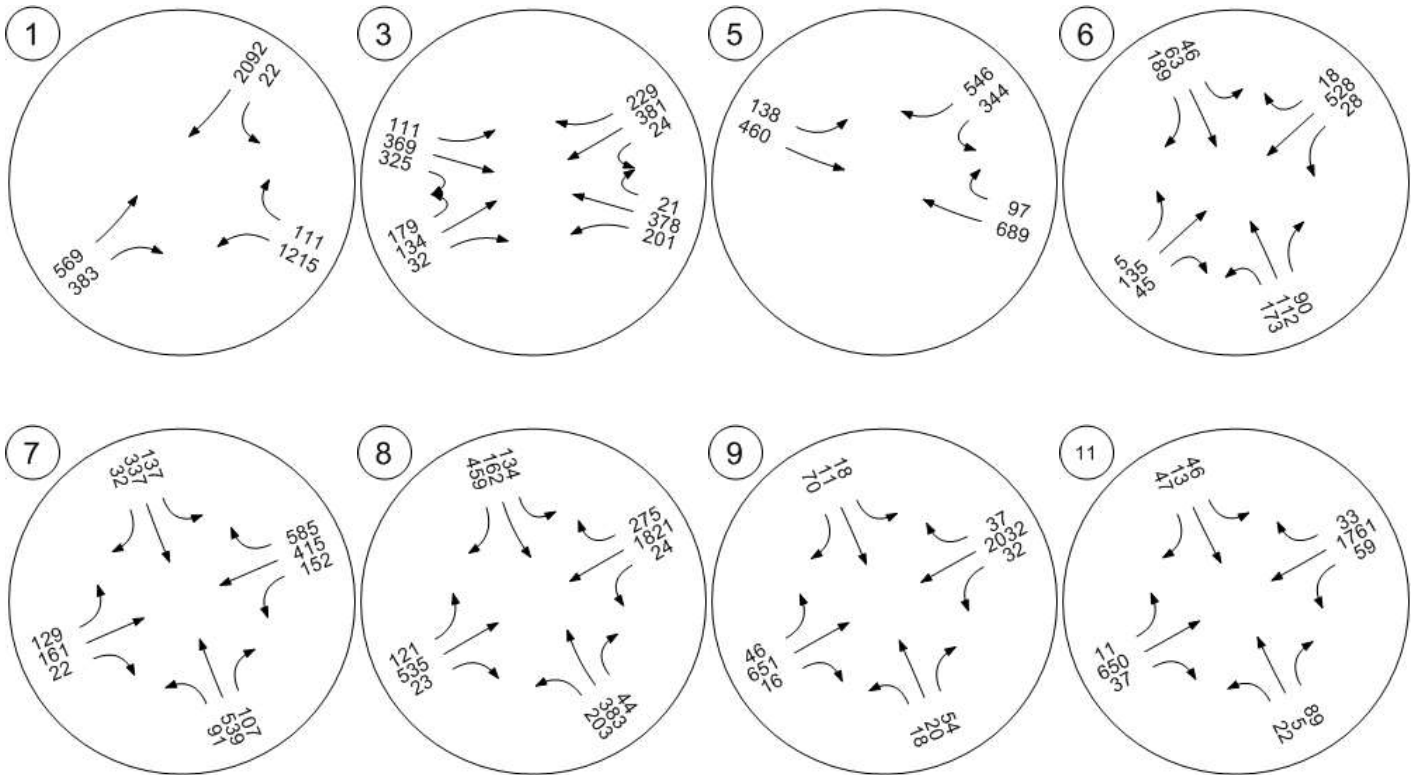
Traffic Volume - Net New Site Trips



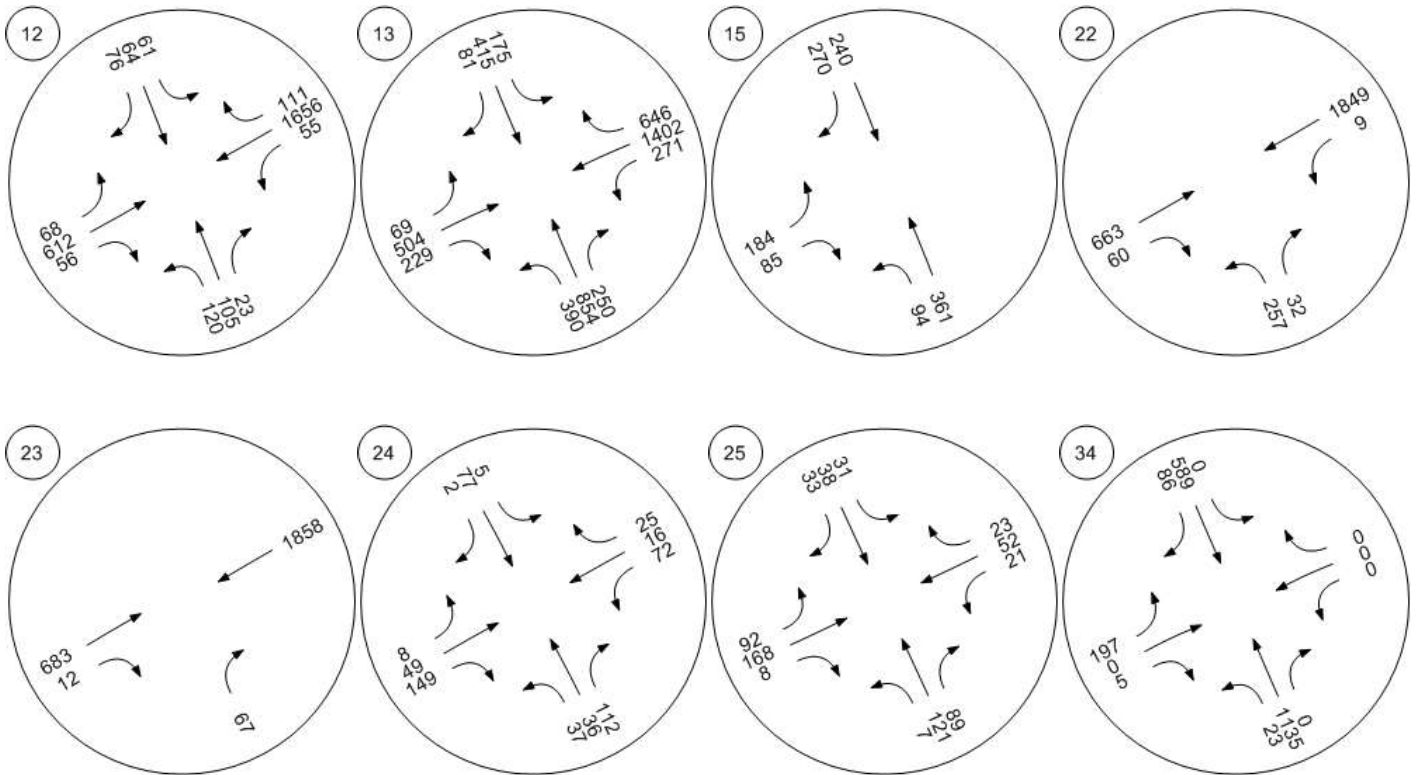
Study Intersections



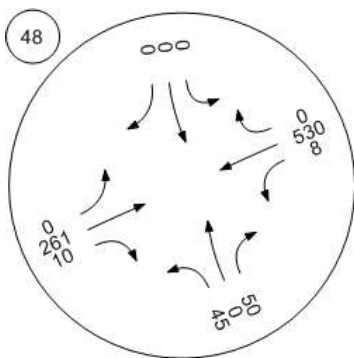
Traffic Volume - Future Total Volume



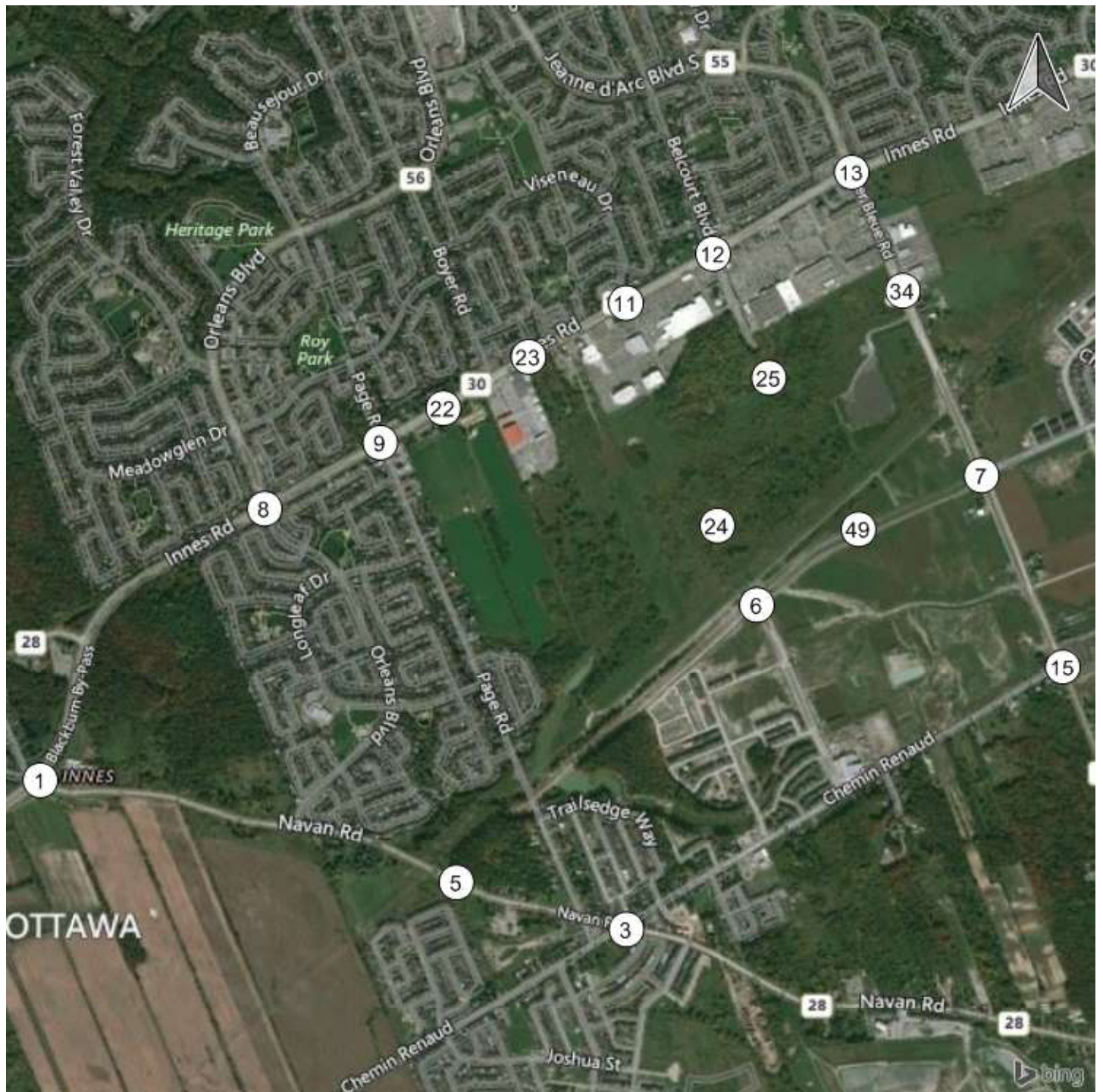
Traffic Volume - Future Total Volume



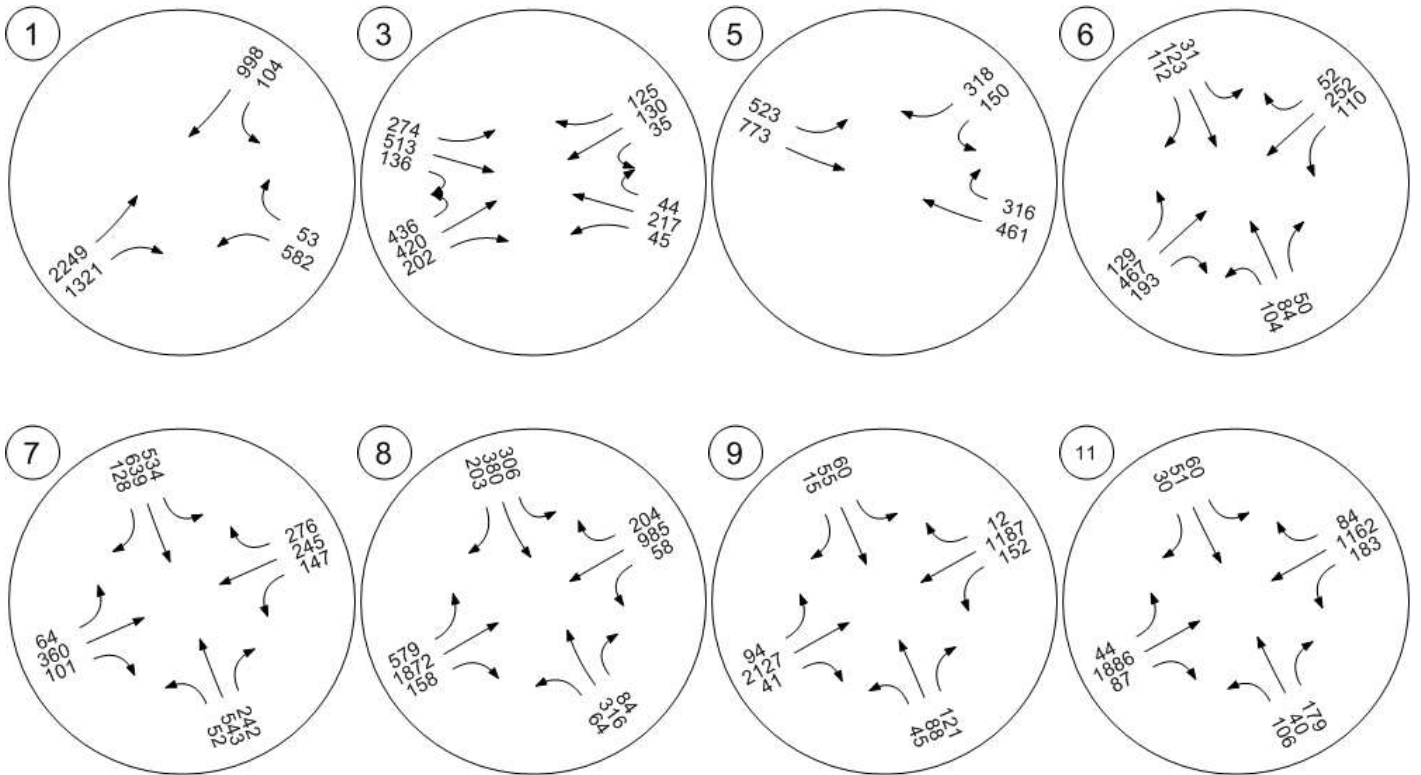
Traffic Volume - Future Total Volume



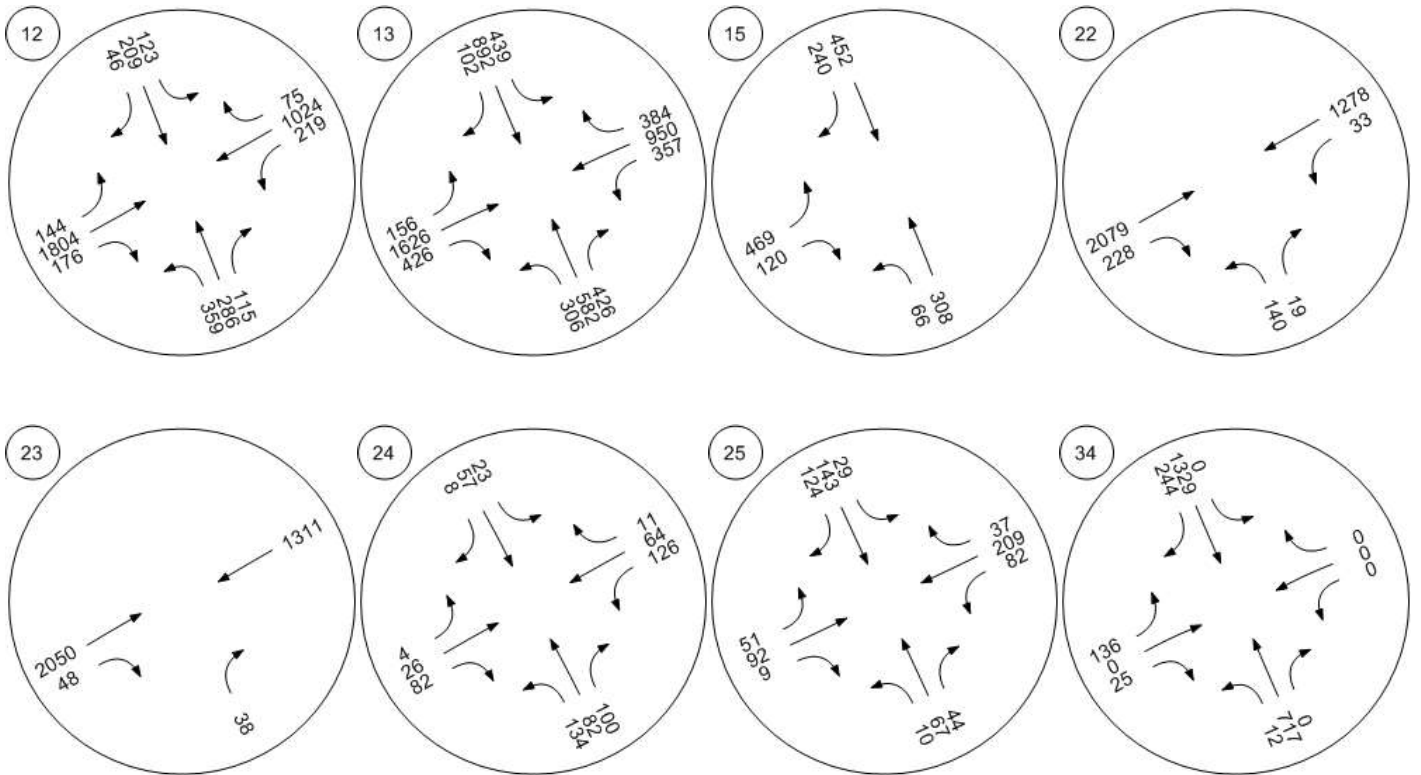
Study Intersections



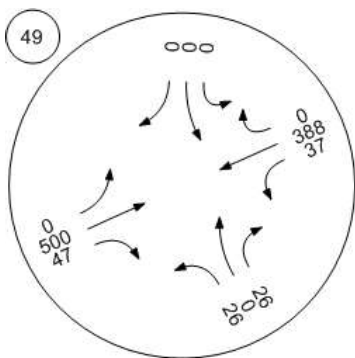
Traffic Volume - Future Total Volume



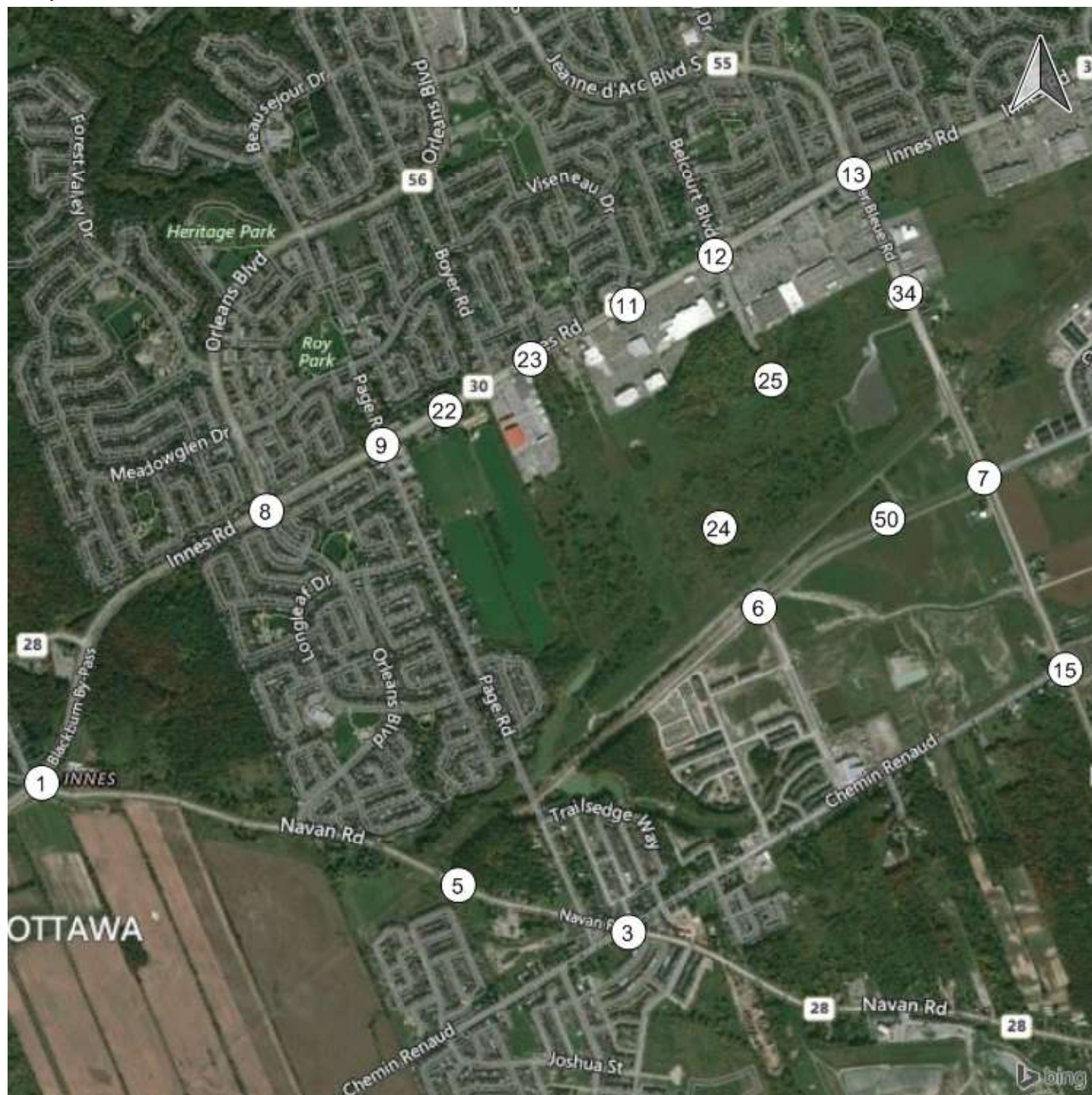
Traffic Volume - Future Total Volume



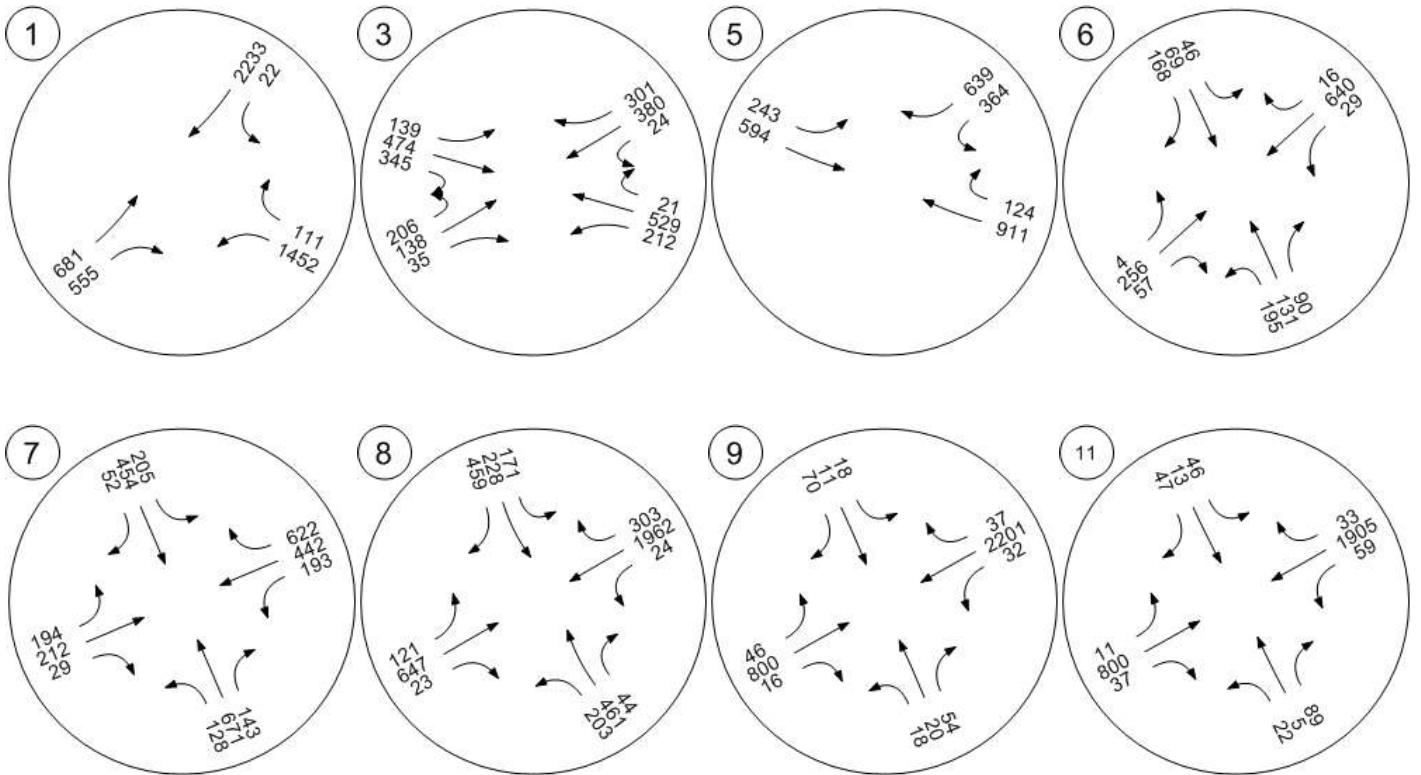
Traffic Volume - Future Total Volume



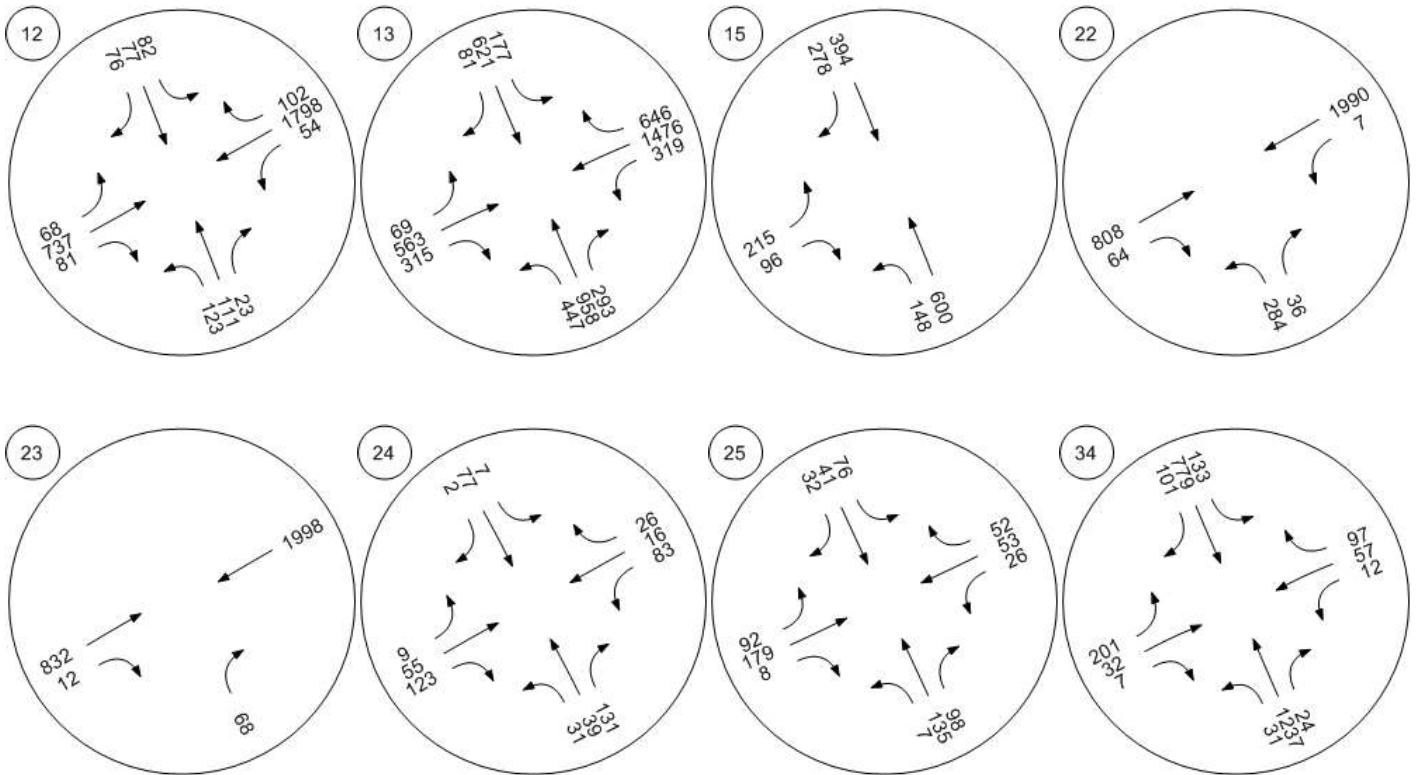
Study Intersections



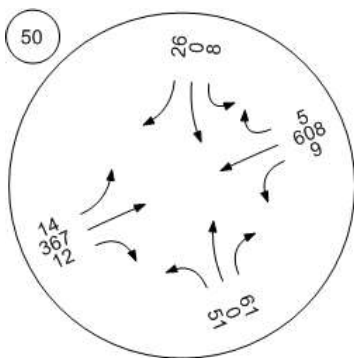
Traffic Volume - Future Total Volume



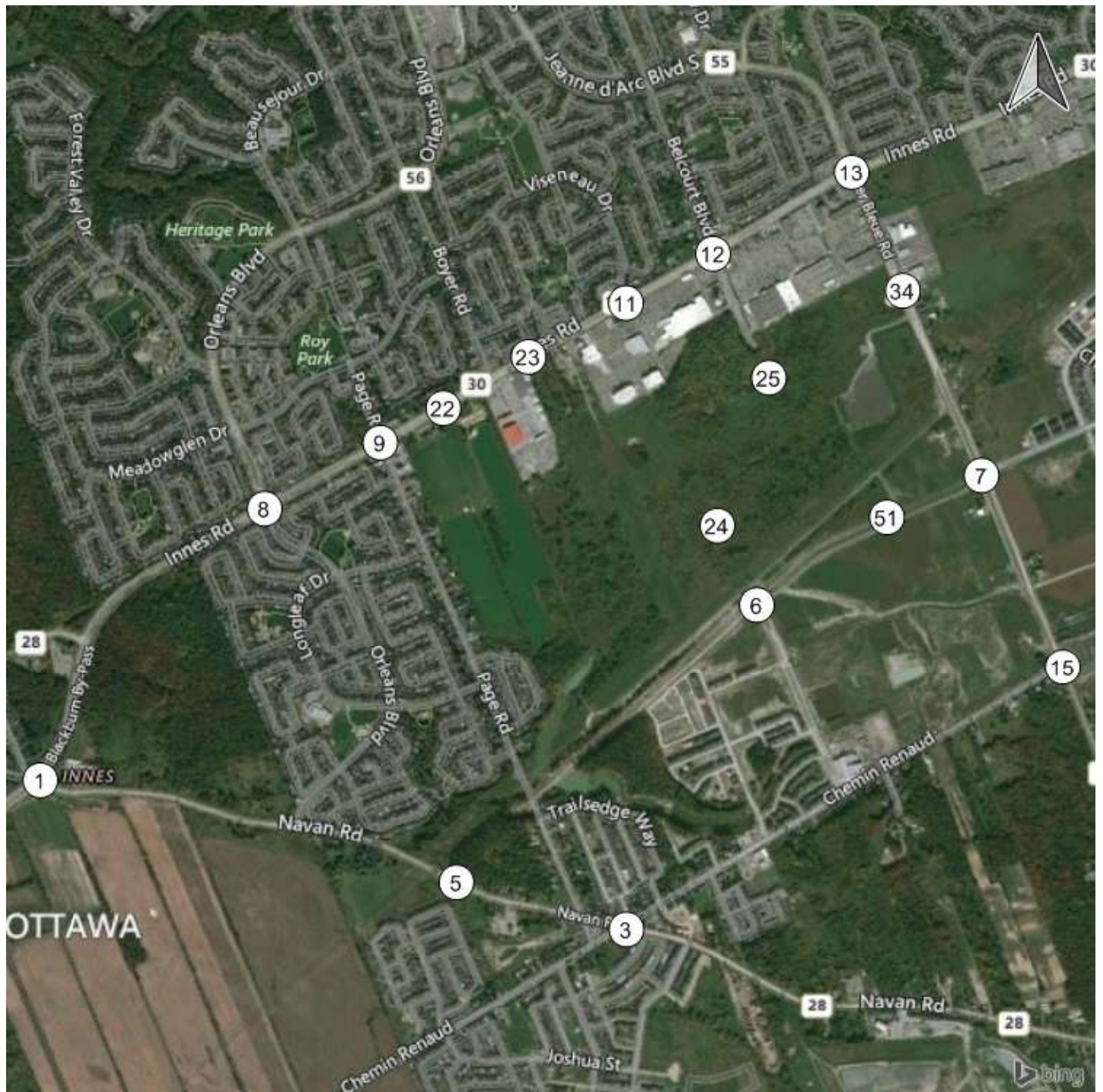
Traffic Volume - Future Total Volume



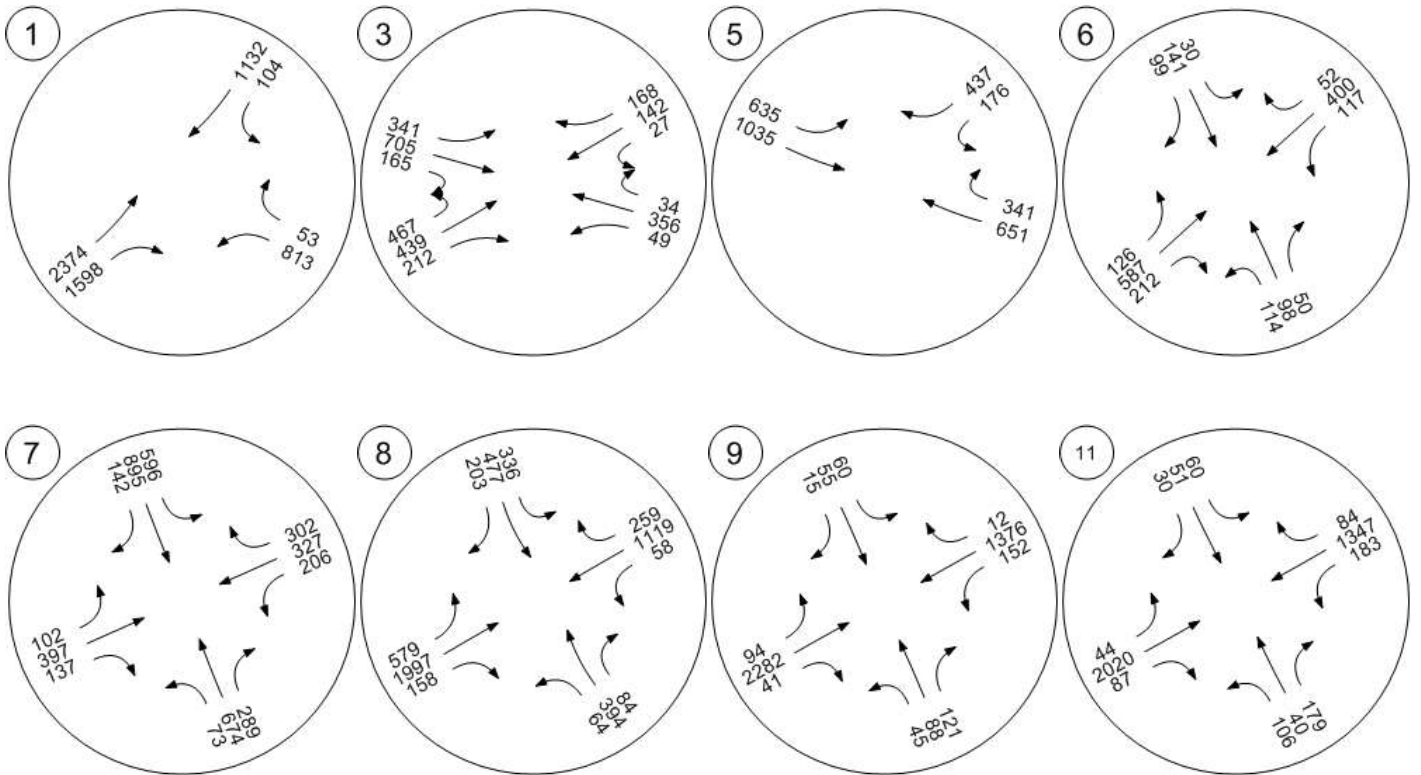
Traffic Volume - Future Total Volume



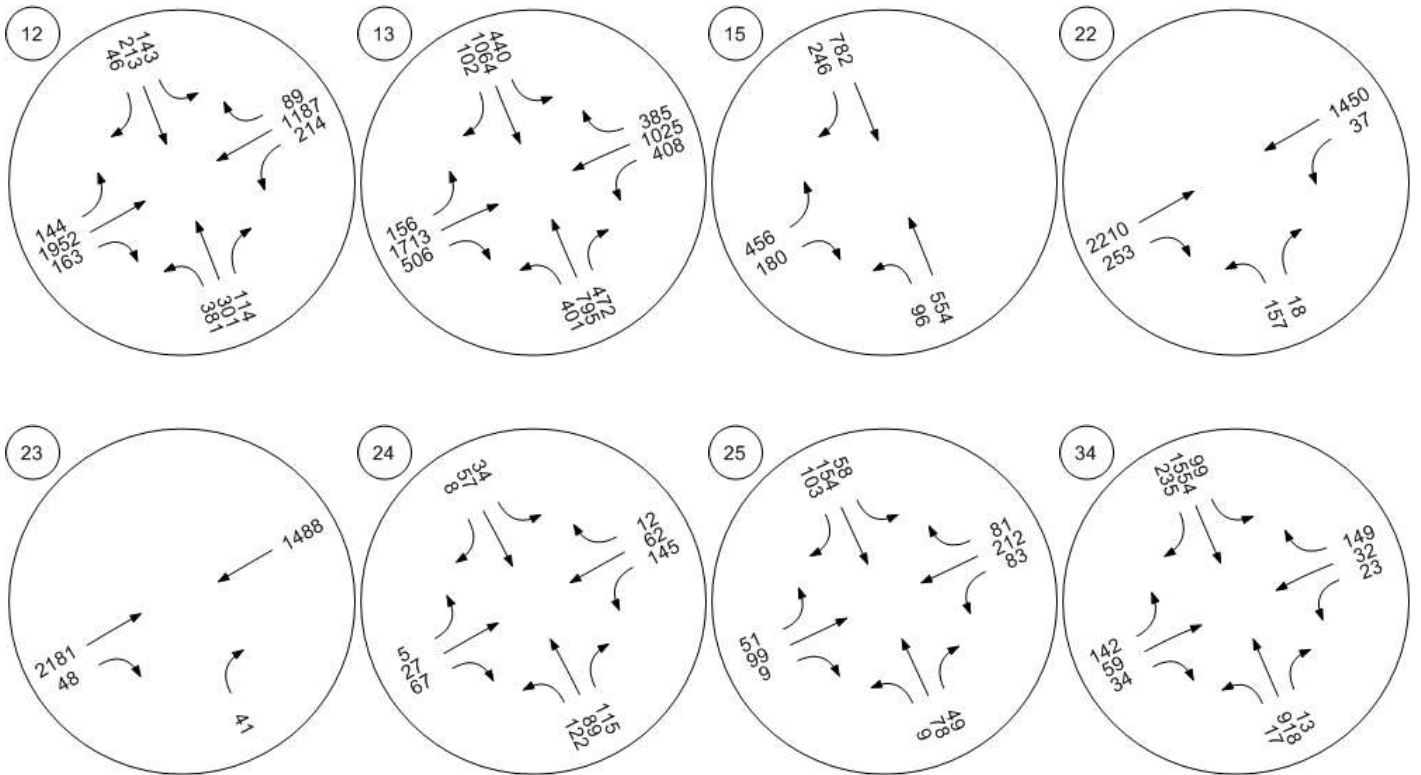
Study Intersections



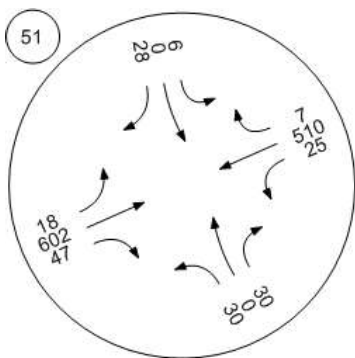
Traffic Volume - Future Total Volume



Traffic Volume - Future Total Volume



Traffic Volume - Future Total Volume



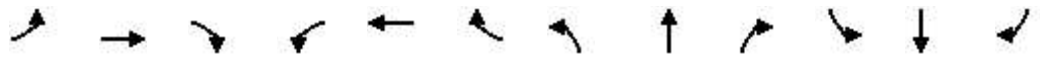
Appendix D
Forecast Traffic Analysis

Appendix D-1

Forecast 2026 Traffic Analysis

HCM 6th Signalized Intersection Summary
1: Mer Bleue Rd & Innes Rd

Build-out Analysis AM
05/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	69	504	229	270	1402	646	390	854	248	175	415	81
Future Volume (veh/h)	69	504	229	270	1402	646	390	854	248	175	415	81
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1491	1688	1688	1758	1758	1772	1786	1744	1744	1744	1688	1688
Adj Flow Rate, veh/h	69	504	0	270	1402	0	390	854	0	175	415	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	22	8	8	3	3	2	1	4	4	4	8	8
Cap, veh/h	133	1068		468	1387		480	1149		193	839	
Arrive On Green	0.05	0.33	0.00	0.14	0.42	0.00	0.15	0.35	0.00	0.06	0.26	0.00
Sat Flow, veh/h	1420	3207	1430	1674	3340	1502	3300	3400	0	3222	3291	0
Grp Volume(v), veh/h	69	504	0	270	1402	0	390	854	0	175	415	0
Grp Sat Flow(s),veh/h/ln	1420	1603	1430	1674	1670	1502	1650	1657	0	1611	1603	0
Q Serve(g_s), s	4.1	16.2	0.0	12.9	54.0	0.0	14.9	29.5	0.0	7.0	14.3	0.0
Cycle Q Clear(g_c), s	4.1	16.2	0.0	12.9	54.0	0.0	14.9	29.5	0.0	7.0	14.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	133	1068		468	1387		480	1149		193	839	
V/C Ratio(X)	0.52	0.47		0.58	1.01		0.81	0.74		0.91	0.49	
Avail Cap(c_a), veh/h	133	1068		512	1387		480	1149		193	839	
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	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	0.99	0.99	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.9	34.3	0.0	22.5	38.0	0.0	53.8	37.4	0.0	60.7	40.7	0.0
Incr Delay (d2), s/veh	3.5	0.3	0.0	1.4	26.8	0.0	10.2	4.3	0.0	39.4	2.1	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	0.0
%ile BackOfQ(50%),veh/ln	1.1	4.7	0.0	3.4	20.0	0.0	5.6	9.3	0.0	3.4	4.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.4	34.6	0.0	23.9	64.8	0.0	64.0	41.7	0.0	100.1	42.8	0.0
LnGrp LOS	D	C		C	F		E	D		F	D	
Approach Vol, veh/h		573	A		1672	A		1244	A		590	A
Approach Delay, s/veh		34.8			58.2			48.7			59.8	
Approach LOS		C			E			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	21.8	47.3	22.9	38.0	11.1	58.0	11.8	49.1				
Change Period (Y+Rc), s	* 6.1	6.4	* 6.3	* 6.2	* 6.1	6.4	* 6.3	* 6.2				
Max Green Setting (Gmax), s	* 19	37.5	* 17	* 32	* 5	51.6	* 5.5	* 43				
Max Q Clear Time (g_c+I1), s	14.9	18.2	16.9	16.3	6.1	56.0	9.0	31.5				
Green Ext Time (p_c), s	0.8	4.6	0.0	3.3	0.0	0.0	0.0	5.8				

Intersection Summary

HCM 6th Ctrl Delay	52.2
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
3: Belcourt Blvd & Innes Rd

Build-out Analysis AM
05/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	68	612	56	55	1656	111	118	105	23	61	64	76
Future Volume (veh/h)	68	612	56	55	1656	111	118	105	23	61	64	76
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
Work Zone On Approach		No		No		No		No		No		No
Adj Sat Flow, veh/h/ln	1800	1688	1575	1800	1772	1772	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	68	612	56	55	1656	111	118	105	23	61	64	76
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	8	16	0	2	2	0	0	0	0	0	0
Cap, veh/h	186	1910	795	501	1937	129	315	492	417	349	205	244
Arrive On Green	0.05	0.60	0.60	0.04	0.60	0.59	0.27	0.27	0.27	0.27	0.27	0.25
Sat Flow, veh/h	1714	3207	1335	1714	3204	213	1269	1800	1525	1282	750	890
Grp Volume(v), veh/h	68	612	56	55	864	903	118	105	23	61	0	140
Grp Sat Flow(s), veh/h/ln	1714	1603	1335	1714	1683	1734	1269	1800	1525	1282	0	1640
Q Serve(g_s), s	1.9	12.4	2.3	1.6	54.2	56.0	10.6	5.9	1.4	5.0	0.0	8.9
Cycle Q Clear(g_c), s	1.9	12.4	2.3	1.6	54.2	56.0	19.5	5.9	1.4	10.9	0.0	8.9
Prop In Lane	1.00		1.00	1.00		0.12	1.00		1.00	1.00		0.54
Lane Grp Cap(c), veh/h	186	1910	795	501	1017	1048	315	492	417	349	0	449
V/C Ratio(X)	0.37	0.32	0.07	0.11	0.85	0.86	0.37	0.21	0.06	0.18	0.00	0.31
Avail Cap(c_a), veh/h	217	1998	832	540	1075	1107	315	492	417	349	0	449
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	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.40	0.40	0.40	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.8	13.1	11.1	10.4	20.9	21.4	45.3	36.4	34.8	40.6	0.0	38.1
Incr Delay (d2), s/veh	1.2	0.1	0.0	0.0	2.7	2.9	3.4	1.0	0.3	1.1	0.0	1.8
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(50%),veh/ln	0.7	2.3	0.4	0.3	10.8	11.7	3.0	2.2	0.5	1.4	0.0	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.0	13.2	11.1	10.4	23.6	24.3	48.7	37.4	35.1	41.7	0.0	40.0
LnGrp LOS	C	B	B	B	C	C	D	D	D	D	A	D
Approach Vol, veh/h		736			1822			246			201	
Approach Delay, s/veh		14.2			23.5			42.6			40.5	
Approach LOS		B			C			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	81.4		39.6	7.7	82.8		39.6				
Change Period (Y+Rc), s	4.7	* 6.6		* 6.8	4.0	* 6.6		* 6.8				
Max Green Setting (Gmax), s	3	* 78		* 26	6.0	* 81		* 26				
Max Q Clear Time (g_c+1), s	13.6	14.4		12.9	3.9	58.0		21.5				
Green Ext Time (p_c), s	0.1	8.5		1.3	0.1	18.2		0.8				

Intersection Summary

HCM 6th Ctrl Delay	23.9
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
4: Viseneau Dr & Innes Rd

Build-out Analysis AM
05/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	650	37	59	1759	33	22	5	89	46	13	47
Future Volume (veh/h)	11	650	37	59	1759	33	22	5	89	46	13	47
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1463	1674	1674	1800	1758	1758	1744	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	11	650	37	59	1759	33	22	5	89	46	13	47
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	24	9	9	0	3	3	4	0	0	0	0	0
Cap, veh/h	103	1737	775	473	2108	39	456	558	473	223	70	202
Arrive On Green	0.55	0.55	0.55	0.05	0.63	0.61	0.31	0.31	0.31	0.31	0.31	0.29
Sat Flow, veh/h	218	3180	1418	1714	3354	63	1321	1800	1525	591	227	652
Grp Volume(v), veh/h	11	650	37	59	874	918	22	5	89	106	0	0
Grp Sat Flow(s),veh/h/ln	218	1590	1418	1714	1670	1747	1321	1800	1525	1469	0	0
Q Serve(g_s), s	5.4	15.2	1.6	1.8	53.0	53.5	0.0	0.2	5.6	4.1	0.0	0.0
Cycle Q Clear(g_c), s	48.2	15.2	1.6	1.8	53.0	53.5	1.7	0.2	5.6	6.7	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.04	1.00		1.00	0.43		0.44
Lane Grp Cap(c), veh/h	103	1737	775	473	1050	1098	456	558	473	495	0	0
V/C Ratio(X)	0.11	0.37	0.05	0.12	0.83	0.84	0.05	0.01	0.19	0.21	0.00	0.00
Avail Cap(c_a), veh/h	113	1883	840	491	1143	1196	456	558	473	495	0	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	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	42.0	16.8	13.7	11.3	18.8	18.9	31.6	31.0	32.9	33.6	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.1	0.0	0.1	5.0	5.0	0.2	0.0	0.9	1.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	3.2	0.3	0.3	10.3	10.8	0.4	0.1	1.7	2.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.4	17.0	13.8	11.4	23.8	23.9	31.8	31.1	33.8	34.6	0.0	0.0
LnGrp LOS	D	B	B	B	C	C	C	C	C	C	A	A
Approach Vol, veh/h		698			1851			116			106	
Approach Delay, s/veh		17.2			23.5			33.3			34.6	
Approach LOS		B			C			C			C	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	0.7	75.0		44.3		85.7		44.3				
Change Period (Y+Rc), s	6.3	* 6.3		* 6.7		* 6.3		* 6.7				
Max Green Setting (Gmax), s	5.3	* 75		* 30		* 87		* 30				
Max Q Clear Time (g_c+1), s	13.8	50.2		8.7		55.5		7.6				
Green Ext Time (p_c), s	0.0	7.7		0.8		23.9		0.9				

Intersection Summary

HCM 6th Ctrl Delay	22.7
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
6: Page Rd & Innes Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	651	16	32	2032	37	18	20	54	18	11	70
Future Volume (veh/h)	46	651	16	32	2032	37	18	20	54	18	11	70
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
Work Zone On Approach		No		No		No		No		No		No
Adj Sat Flow, veh/h/ln	1800	1632	1632	1730	1772	1772	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	46	651	16	32	2032	37	18	20	54	18	11	70
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	12	12	5	2	2	0	0	0	0	0	0
Cap, veh/h	118	2042	50	487	2234	41	98	114	250	91	68	297
Arrive On Green	0.66	0.66	0.64	0.88	0.88	0.85	0.27	0.27	0.25	0.27	0.27	0.25
Sat Flow, veh/h	204	3092	76	751	3383	61	227	416	914	203	247	1086
Grp Volume(v), veh/h	46	326	341	32	1008	1061	92	0	0	99	0	0
Grp Sat Flow(s),veh/h/ln	204	1550	1618	751	1683	1761	1557	0	0	1536	0	0
Q Serve(g_s), s	24.9	10.9	10.9	1.3	43.0	44.5	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	70.0	10.9	10.9	12.3	43.0	44.5	5.3	0.0	0.0	5.9	0.0	0.0
Prop In Lane	1.00		0.05	1.00		0.03	0.20		0.59	0.18		0.71
Lane Grp Cap(c), veh/h	118	1024	1068	487	1112	1163	461	0	0	455	0	0
V/C Ratio(X)	0.39	0.32	0.32	0.07	0.91	0.91	0.20	0.00	0.00	0.22	0.00	0.00
Avail Cap(c_a), veh/h	125	1072	1119	511	1164	1218	461	0	0	455	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.53	0.53	0.53	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	39.6	8.8	8.8	4.7	5.1	5.2	34.1	0.0	0.0	34.4	0.0	0.0
Incr Delay (d2), s/veh	2.1	0.2	0.2	0.0	5.8	5.9	1.0	0.0	0.0	1.1	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	1.2	1.2	0.1	3.0	3.2	1.8	0.0	0.0	2.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.7	8.9	9.0	4.7	10.9	11.2	35.1	0.0	0.0	35.5	0.0	0.0
LnGrp LOS	D	A	A	A	B	B	D	A	A	D	A	A
Approach Vol, veh/h		713			2101			92			99	
Approach Delay, s/veh		11.1			10.9			35.1			35.5	
Approach LOS		B			B			D			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		83.0		37.0		83.0		37.0				
Change Period (Y+Rc), s		* 6.1		* 6.2		* 6.1		* 6.2				
Max Green Setting (Gmax), s		* 81		* 27		* 81		* 27				
Max Q Clear Time (g_c+I1), s		72.0		7.9		46.5		7.3				
Green Ext Time (p_c), s		4.6		0.7		29.8		0.6				

Intersection Summary

HCM 6th Ctrl Delay	12.5
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
7: Orleans Blvd & Innes Rd

Build-out Analysis AM
05/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑	↖	↖	↑↑	↖	↖	↑↑	↖	↖	↑↑	↖
Traffic Volume (veh/h)	121	535	23	24	1821	275	203	383	44	134	162	459
Future Volume (veh/h)	121	535	23	24	1821	275	203	383	44	134	162	459
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
Work Zone On Approach		No		No		No		No		No		No
Adj Sat Flow, veh/h/ln	1617	1589	1730	1800	1772	1674	1786	1730	1758	1688	1603	1786
Adj Flow Rate, veh/h	121	535	0	24	1821	0	203	383	0	134	162	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	13	15	5	0	2	9	1	5	3	8	14	1
Cap, veh/h	175	1638		67	1761		395	1072		280	717	
Arrive On Green	0.06	0.54	0.00	0.04	0.52	0.00	0.06	0.33	0.00	0.24	0.24	0.00
Sat Flow, veh/h	2988	3020	1466	1714	3367	1418	1701	3287	1490	953	3047	1514
Grp Volume(v), veh/h	121	535	0	24	1821	0	203	383	0	134	162	0
Grp Sat Flow(s),veh/h/ln	1494	1510	1466	1714	1683	1418	1701	1643	1490	953	1523	1514
Q Serve(g_s), s	5.2	12.8	0.0	1.8	68.0	0.0	7.8	11.6	0.0	16.3	5.6	0.0
Cycle Q Clear(g_c), s	5.2	12.8	0.0	1.8	68.0	0.0	7.8	11.6	0.0	16.3	5.6	0.0
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	175	1638		67	1761		395	1072		280	717	
V/C Ratio(X)	0.69	0.33		0.36	1.03		0.51	0.36		0.48	0.23	
Avail Cap(c_a), veh/h	175	1638		95	1761		395	1072		280	717	
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	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	60.1	16.5	0.0	60.9	31.0	0.0	37.8	33.4	0.0	44.2	40.1	0.0
Incr Delay (d2), s/veh	11.1	0.1	0.0	3.2	30.8	0.0	1.1	0.9	0.0	5.8	0.7	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	0.0
%ile BackOfQ(50%),veh/ln	1.9	2.6	0.0	0.7	23.4	0.0	4.5	3.7	0.0	3.5	1.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	71.2	16.7	0.0	64.0	61.8	0.0	38.9	34.3	0.0	50.0	40.9	0.0
LnGrp LOS	E	B		E	F		D	C		D	D	
Approach Vol, veh/h		656	A		1845	A		586	A		296	A
Approach Delay, s/veh		26.7			61.8			35.9			45.0	
Approach LOS		C			E			D			D	
Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	9.1	74.5	11.8	34.6	11.6	72.0		46.4				
Change Period (Y+Rc), s	6.2	* 6.2	* 6.7	* 6.7	* 6.2	* 6.2		* 6.7				
Max Green Setting (Gmax), s	5	* 66	* 5.1	* 28	* 5.4	* 66		* 40				
Max Q Clear Time (g_c+13), s	14.8	14.8	9.8	18.3	7.2	70.0		13.6				
Green Ext Time (p_c), s	0.0	6.5	0.0	1.9	0.0	0.0		3.9				

Intersection Summary

HCM 6th Ctrl Delay	49.1
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
8: BHB/Innes Rd & Navan Rd

Build-out Analysis AM
05/10/2018



Movement	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations	↔↔	↔	↕↕	↔	↔	↕↕
Traffic Volume (veh/h)	1215	111	569	383	22	2092
Future Volume (veh/h)	1215	111	569	383	22	2092
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
Work Zone On Approach	No		No		No	
Adj Sat Flow, veh/h/ln	1702	1744	1547	1477	1786	1786
Adj Flow Rate, veh/h	1215	0	569	0	22	2092
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	7	4	18	23	1	1
Cap, veh/h	1161		1469		66	1932
Arrive On Green	0.37	0.00	0.50	0.00	0.04	0.57
Sat Flow, veh/h	3144	1478	3017	1252	1701	3483
Grp Volume(v), veh/h	1215	0	569	0	22	2092
Grp Sat Flow(s),veh/h/ln	1572	1478	1470	1252	1701	1697
Q Serve(g_s), s	48.0	0.0	15.6	0.0	1.6	74.0
Cycle Q Clear(g_c), s	48.0	0.0	15.6	0.0	1.6	74.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	1161		1469		66	1932
V/C Ratio(X)	1.05		0.39		0.33	1.08
Avail Cap(c_a), veh/h	1161		1469		96	1932
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	41.0	0.0	20.2	0.0	60.8	28.0
Incr Delay (d2), s/veh	39.5	0.0	0.2	0.0	2.9	47.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	3.4	0.0	0.6	28.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	80.5	0.0	20.3	0.0	63.8	75.0
LnGrp LOS	F		C		E	F
Approach Vol, veh/h	1215	A	569	A		2114
Approach Delay, s/veh	80.5		20.3			74.9
Approach LOS	F		C			E
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	9.0	69.0			78.0	52.0
Change Period (Y+Rc), s	6.3	* 5.9			* 5.9	5.8
Max Green Setting (Gmax), s	5	* 61			* 72	46.2
Max Q Clear Time (g_c+13), s	13.6	17.6			76.0	50.0
Green Ext Time (p_c), s	0.0	6.9			0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay		68.7	
HCM 6th LOS		E	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NER, WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection

Intersection Delay, s/veh 19.9
 Intersection LOS C

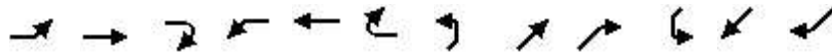
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	184	85	94	361	240	270
Future Vol, veh/h	184	85	94	361	240	270
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	184	85	94	361	240	270
Number of Lanes	1	0	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left SB		EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right NB			EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	14.8	21.2	21.5
HCM LOS	B	C	C

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	21%	68%	0%
Vol Thru, %	79%	0%	47%
Vol Right, %	0%	32%	53%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	455	269	510
LT Vol	94	184	0
Through Vol	361	0	240
RT Vol	0	85	270
Lane Flow Rate	455	269	510
Geometry Grp	1	1	1
Degree of Util (X)	0.708	0.469	0.737
Departure Headway (Hd)	5.599	6.276	5.205
Convergence, Y/N	Yes	Yes	Yes
Cap	642	570	689
Service Time	3.663	4.346	3.268
HCM Lane V/C Ratio	0.709	0.472	0.74
HCM Control Delay	21.2	14.8	21.5
HCM Lane LOS	C	B	C
HCM 95th-tile Q	5.8	2.5	6.5

HCM 6th Signalized Intersection Summary
13: Renaud Rd & Navan Rd

Build-out Analysis AM
05/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	111	369	325	201	378	21	179	134	32	24	381	229
Future Volume (veh/h)	111	369	325	201	378	21	179	134	32	24	381	229
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
Work Zone On Approach		No		No		No		No		No		No
Adj Sat Flow, veh/h/ln	1800	1519	1519	1730	1758	1758	1632	1744	1716	1800	1786	1786
Adj Flow Rate, veh/h	111	369	325	201	378	0	179	134	32	24	381	229
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	20	20	5	3	3	12	4	6	0	1	1
Cap, veh/h	471	393	346	111	927		176	698	582	426	304	183
Arrive On Green	0.53	0.53	0.50	0.53	0.53	0.00	0.07	0.40	0.40	0.29	0.29	0.27
Sat Flow, veh/h	1021	745	656	732	1758	0	1554	1744	1454	1239	1045	628
Grp Volume(v), veh/h	111	0	694	201	378	0	179	134	32	24	0	610
Grp Sat Flow(s),veh/h/ln	1021	0	1401	732	1758	0	1554	1744	1454	1239	0	1673
Q Serve(g_s), s	8.1	0.0	51.2	6.8	14.2	0.0	7.8	5.5	1.5	1.5	0.0	32.0
Cycle Q Clear(g_c), s	22.3	0.0	51.2	58.0	14.2	0.0	7.8	5.5	1.5	1.5	0.0	32.0
Prop In Lane	1.00		0.47	1.00		0.00	1.00		1.00	1.00		0.38
Lane Grp Cap(c), veh/h	471	0	739	111	927		176	698	582	426	0	487
V/C Ratio(X)	0.24	0.00	0.94	1.81	0.41		1.02	0.19	0.06	0.06	0.00	1.25
Avail Cap(c_a), veh/h	471	0	739	111	927		176	698	582	426	0	487
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	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.4	0.0	25.0	53.6	15.7	0.0	31.2	21.4	20.2	28.2	0.0	39.5
Incr Delay (d2), s/veh	0.3	0.0	19.8	398.9	0.3	0.0	73.0	0.1	0.0	0.1	0.0	130.1
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(50%),veh/ln	1.3	0.0	12.4	14.7	2.9	0.0	5.7	1.5	0.3	0.3	0.0	27.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.6	0.0	44.8	452.5	15.9	0.0	104.2	21.6	20.3	28.3	0.0	169.6
LnGrp LOS	C	A	D	F	B		F	C	C	C	A	F
Approach Vol, veh/h		805			579	A		345			634	
Approach Delay, s/veh		41.7			167.5			64.3			164.2	
Approach LOS		D			F			E			F	
Timer - Assigned Phs		2	3	4		6		8				
Phs Duration (G+Y+Rc), s		62.0	12.0	36.0		62.0		48.0				
Change Period (Y+Rc), s		6.6	* 6.8	6.6		6.6		6.6				
Max Green Setting (Gmax), s		55.4	* 5.2	29.4		55.4		41.4				
Max Q Clear Time (g_c+I1), s		53.2	9.8	34.0		60.0		7.5				
Green Ext Time (p_c), s		1.5	0.0	0.0		0.0		1.5				

Intersection Summary

HCM 6th Ctrl Delay	108.7
HCM 6th LOS	F

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
42: Mer Bleue Rd & Vanguard Extension

Build-out Analysis AM
05/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	197	0	5	0	0	0	23	1135	0	0	589	86
Future Volume (veh/h)	197	0	5	0	0	0	23	1135	0	0	589	86
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	197	0	5	0	0	0	23	1135	0	0	589	86
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	309	0	211	72	249	0	632	2624	0	72	2624	1171
Arrive On Green	0.14	0.00	0.14	0.00	0.00	0.00	0.78	0.78	0.00	0.00	0.78	0.78
Sat Flow, veh/h	1688	0	1502	1411	1772	0	764	3455	0	496	3367	1502
Grp Volume(v), veh/h	197	0	5	0	0	0	23	1135	0	0	589	86
Grp Sat Flow(s),veh/h/ln	1688	0	1502	1411	1772	0	764	1683	0	496	1683	1502
Q Serve(g_s), s	11.4	0.0	0.3	0.0	0.0	0.0	0.8	11.2	0.0	0.0	4.7	1.3
Cycle Q Clear(g_c), s	11.4	0.0	0.3	0.0	0.0	0.0	5.5	11.2	0.0	0.0	4.7	1.3
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	309	0	211	72	249	0	632	2624	0	72	2624	1171
V/C Ratio(X)	0.64	0.00	0.02	0.00	0.00	0.00	0.04	0.43	0.00	0.00	0.22	0.07
Avail Cap(c_a), veh/h	595	0	466	311	549	0	632	2624	0	72	2624	1171
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	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	41.8	0.0	37.1	0.0	0.0	0.0	3.7	3.7	0.0	0.0	2.9	2.6
Incr Delay (d2), s/veh	2.2	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.0	0.2	0.1
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(50%),veh/ln	3.7	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.0	0.0	37.1	0.0	0.0	0.0	3.8	4.2	0.0	0.0	3.1	2.7
LnGrp LOS	D	A	D	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		202			0			1158			675	
Approach Delay, s/veh		43.8			0.0			4.2			3.1	
Approach LOS		D						A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		82.0		18.0		82.0		18.0				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		61.0		31.0		61.0		31.0				
Max Q Clear Time (g_c+I1), s		13.2		13.4		6.7		0.0				
Green Ext Time (p_c), s		13.6		0.7		6.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				7.8								
HCM 6th LOS				A								

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↑
Traffic Vol, veh/h	683	11	0	1856	0	67
Future Vol, veh/h	683	11	0	1856	0	67
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	683	11	0	1856	0	67

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	-	-	-	347
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	649
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	649
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	649	-	-	-
HCM Lane V/C Ratio	0.103	-	-	-
HCM Control Delay (s)	11.2	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0.3	-	-	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↓	↑↑	↓	↑
Traffic Volume (vph)	663	59	9	1847	247	32
Future Volume (vph)	663	59	9	1847	247	32
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		50.0	35.1		85.0	0.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.6		7.6	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3390	1517	1695	3390	1695	1517
Flt Permitted			0.353		0.950	
Satd. Flow (perm)	3390	1517	630	3390	1695	1517
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		59				32
Link Speed (k/h)	60			60	50	
Link Distance (m)	236.0			246.2	531.0	
Travel Time (s)	14.2			14.8	38.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	663	59	9	1847	247	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	663	59	9	1847	247	32
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)		14	26		26	14
Number of Detectors	2	1	1	2	1	1
Detector Template	Thru	Right	Left	Thru	Left	Right
Leading Detector (m)	10.0	2.1	2.1	10.0	2.1	2.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	0.6	2.1	2.1	0.6	2.1	2.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	9.4			9.4		
Detector 2 Size(m)	0.6			0.6		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm	pm+pt	NA	Perm	Perm
Protected Phases	2		1	6		
Permitted Phases		2	6		8	8

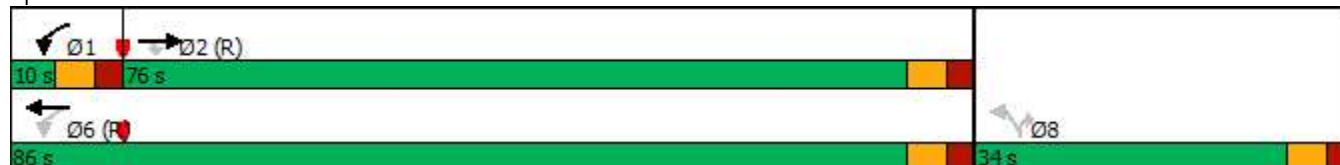


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	10.0	22.0	22.0	22.0
Total Split (s)	76.0	76.0	10.0	86.0	34.0	34.0
Total Split (%)	63.3%	63.3%	8.3%	71.7%	28.3%	28.3%
Maximum Green (s)	70.0	70.0	4.0	80.0	28.0	28.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Walk Time (s)	5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effect Green (s)	83.8	83.8	85.8	85.8	22.2	22.2
Actuated g/C Ratio	0.70	0.70	0.72	0.72	0.18	0.18
v/c Ratio	0.28	0.05	0.02	0.76	0.79	0.10
Control Delay	7.6	2.1	6.3	14.3	64.1	12.9
Queue Delay	0.0	0.0	0.0	7.8	0.0	0.0
Total Delay	7.6	2.1	6.3	22.1	64.1	12.9
LOS	A	A	A	C	E	B
Approach Delay	7.1			22.0	58.3	
Approach LOS	A			C	E	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 21.8
 Intersection LOS: C
 Intersection Capacity Utilization 78.3%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 45: Ciavan Access & Innes Rd



HCM 6th Signalized Intersection Summary
13: Renaud Rd & Navan Rd

Build-out AM Improvement
05/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	111	369	325	201	378	21	179	134	32	24	381	229
Future Volume (veh/h)	111	369	325	201	378	21	179	134	32	24	381	229
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1519	1337	1730	1758	1758	1632	1744	1716	1800	1786	1786
Adj Flow Rate, veh/h	111	369	325	201	378	0	179	134	32	24	381	229
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	20	33	5	3	3	12	4	6	0	1	1
Cap, veh/h	310	488	341	246	579		248	907	757	542	409	246
Arrive On Green	0.06	0.32	0.30	0.07	0.33	0.00	0.10	0.52	0.52	0.39	0.39	0.37
Sat Flow, veh/h	1714	1519	1133	1647	1758	0	1554	1744	1454	1239	1045	628
Grp Volume(v), veh/h	111	369	325	201	378	0	179	134	32	24	0	610
Grp Sat Flow(s),veh/h/ln	1714	1519	1133	1647	1758	0	1554	1744	1454	1239	0	1673
Q Serve(g_s), s	5.4	27.5	35.6	8.7	23.2	0.0	8.1	5.0	1.4	1.5	0.0	44.2
Cycle Q Clear(g_c), s	5.4	27.5	35.6	8.7	23.2	0.0	8.1	5.0	1.4	1.5	0.0	44.2
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	1.00		0.38
Lane Grp Cap(c), veh/h	310	488	341	246	579		248	907	757	542	0	655
V/C Ratio(X)	0.36	0.76	0.95	0.82	0.65		0.72	0.15	0.04	0.04	0.00	0.93
Avail Cap(c_a), veh/h	310	493	344	246	584		281	952	794	547	0	662
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	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.0	38.4	43.3	35.4	36.2	0.0	27.2	15.8	14.9	23.9	0.0	37.3
Incr Delay (d2), s/veh	0.7	6.5	36.2	18.8	2.6	0.0	7.7	0.1	0.0	0.0	0.0	20.0
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	0.0
%ile BackOfQ(50%),veh/ln	1.6	8.3	11.0	4.2	7.6	0.0	2.4	1.3	0.3	0.3	0.0	16.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.7	45.0	79.5	54.1	38.8	0.0	34.9	15.8	14.9	23.9	0.0	57.3
LnGrp LOS	C	D	E	D	D		C	B	B	C	A	E
Approach Vol, veh/h		805			579	A		345				634
Approach Delay, s/veh		56.6			44.1			25.6				56.0
Approach LOS		E			D			C				E
Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	12.0	44.7	16.3	53.5	11.0	45.7		69.8				
Change Period (Y+Rc), s	5.9	6.6	5.9	6.6	5.9	6.6		6.6				
Max Green Setting (Gmax), s	6.1	38.4	13.1	47.4	5.1	39.4		66.4				
Max Q Clear Time (g_c+I1), s	10.7	37.6	10.1	46.2	7.4	25.2		7.0				
Green Ext Time (p_c), s	0.0	0.5	0.4	0.7	0.0	2.7		1.7				

Intersection Summary

HCM 6th Ctrl Delay	48.9
HCM 6th LOS	D

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Lanes, Volumes, Timings
12: Mer Bleue Rd & Renaud Rd



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	184	85	94	361	240	270
Future Volume (vph)	184	85	94	361	240	270
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	50.0	45.0			80.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.6		20.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.850				0.850
Fl _t Protected	0.950		0.950			
Satd. Flow (prot)	1668	1517	1654	1749	1734	1511
Fl _t Permitted	0.950		0.610			
Satd. Flow (perm)	1668	1517	1062	1749	1734	1511
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		85				270
Link Speed (k/h)	50			60	60	
Link Distance (m)	951.6			937.0	170.0	
Travel Time (s)	68.5			56.2	10.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Bus Blockages (#/hr)	4	0	6	5	7	1
Adj. Flow (vph)	184	85	94	361	240	270
Shared Lane Traffic (%)						
Lane Group Flow (vph)	184	85	94	361	240	270
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	1.08	1.06	1.09	1.08	1.10	1.06
Turning Speed (k/h)	26	14	26			14
Number of Detectors	1	1	1	1	1	1
Detector Template						
Leading Detector (m)	14.9	14.9	14.9	14.9	14.9	14.9
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	14.9	14.9	14.9	14.9	14.9	14.9
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5

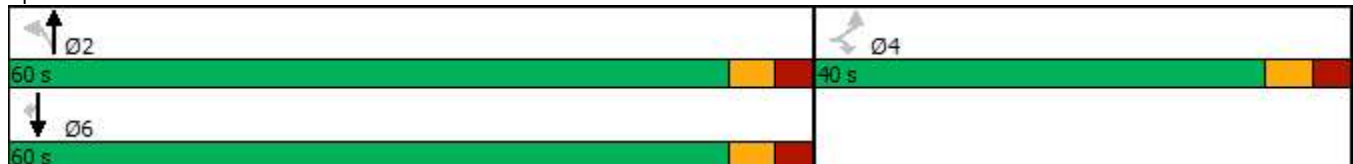


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Split (s)	40.0	40.0	60.0	60.0	60.0	60.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%
Maximum Green (s)	33.5	33.5	53.5	53.5	53.5	53.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effect Green (s)	11.1	11.1	15.7	15.7	15.7	15.7
Actuated g/C Ratio	0.28	0.28	0.39	0.39	0.39	0.39
v/c Ratio	0.40	0.18	0.23	0.53	0.35	0.36
Control Delay	15.0	4.9	10.0	12.8	10.5	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.0	4.9	10.0	12.8	10.5	3.0
LOS	B	A	B	B	B	A
Approach Delay	11.8			12.2	6.6	
Approach LOS	B			B	A	

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	40
Natural Cycle:	45
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.53
Intersection Signal Delay:	9.8
Intersection LOS:	A
Intersection Capacity Utilization	48.7%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 12: Mer Bleue Rd & Renaud Rd



MOVEMENT SUMMARY

 Site: 2026 AM - Brian Coburn / Fern Casey

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Belcourt											
3	L2	188	2.0	0.438	11.5	LOS A	3.0	23.2	0.55	0.66	54.0
8	T1	122	3.0	0.438	6.5	LOS A	3.0	23.2	0.55	0.66	54.3
18	R2	98	2.0	0.438	6.2	LOS A	3.0	23.2	0.55	0.66	56.2
Approach		408	2.3	0.438	8.7	LOS A	3.0	23.2	0.55	0.66	54.8
East: Brian Coburn											
1	L2	30	2.0	0.760	17.7	LOS C	10.1	78.2	0.92	0.96	54.4
6	T1	574	2.0	0.760	12.8	LOS C	10.1	78.2	0.92	0.96	56.1
16	R2	20	3.0	0.760	12.5	LOS C	10.1	78.2	0.92	0.96	55.2
Approach		624	2.0	0.760	13.0	LOS C	10.1	78.2	0.92	0.96	56.0
North: Fern Casey											
7	L2	50	3.0	0.738	29.6	LOS C	7.9	61.3	1.00	1.21	49.4
4	T1	68	3.0	0.738	24.6	LOS C	7.9	61.3	1.00	1.21	41.0
14	R2	205	3.0	0.738	24.4	LOS C	7.9	61.3	1.00	1.21	44.2
Approach		324	3.0	0.738	25.3	LOS C	7.9	61.3	1.00	1.21	44.6
West: Brian Coburn											
5	L2	5	3.0	0.208	10.8	LOS A	1.3	9.8	0.42	0.51	58.4
2	T1	147	2.0	0.208	5.6	LOS A	1.3	9.8	0.42	0.51	60.2
12	R2	49	2.0	0.208	5.3	LOS A	1.3	9.8	0.42	0.51	54.7
Approach		201	2.0	0.208	5.7	LOS A	1.3	9.8	0.42	0.51	59.3
All Vehicles		1557	2.3	0.760	13.5	LOS C	10.1	78.2	0.77	0.87	53.7

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on degree of saturation per movement

Intersection and Approach LOS values are based on worst degree of saturation for any vehicle movement.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: R:\CastleGlenn\Projects\Ontario Projects\Ottawa\Richcraft\7142 - Richcraft - Belcourt CDP\Traffic\Sidra Analysis\2021 Analysis\2026 AM Analysis.sip6

MOVEMENT SUMMARY

 Site: 2026 AM - Brian Coburn / Navan

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Navan											
8	T1	749	3.0	0.959	22.5	LOS C	31.0	241.8	1.00	0.97	46.3
18	R2	105	3.0	0.959	22.1	LOS C	31.0	241.8	1.00	0.97	45.5
Approach		854	3.0	0.959	22.4	LOS C	31.0	241.8	1.00	0.97	46.2
East: Brian Coburn											
1	L2	374	3.0	2.457	681.0	LOS F	201.4	1569.4	1.00	4.64	5.0
16	R2	593	3.0	2.457	676.7	LOS F	201.4	1569.4	1.00	4.64	5.0
Approach		967	3.0	2.457	678.4	LOS F	201.4	1569.4	1.00	4.64	5.0
North: Navan											
7	L2	150	3.0	0.737	12.8	LOS B	9.7	75.6	0.84	0.71	54.2
4	T1	500	3.0	0.737	9.0	LOS A	9.7	75.6	0.84	0.71	54.5
Approach		650	3.0	0.737	9.9	LOS A	9.7	75.6	0.84	0.71	54.4
All Vehicles		2472	3.0	2.457	275.8	LOS F	201.4	1569.4	0.96	2.34	11.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: 2026 AM - Fern Casey/Frank Bender

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fern Casey											
3	L2	40	3.0	0.198	9.7	LOS A	1.1	8.8	0.27	0.54	57.5
8	T1	39	3.0	0.198	5.5	LOS A	1.1	8.8	0.27	0.54	57.9
18	R2	122	3.0	0.198	5.2	LOS A	1.1	8.8	0.27	0.54	56.6
Approach		201	3.0	0.198	6.1	LOS A	1.1	8.8	0.27	0.54	57.0
East: Frank Bender											
1	L2	78	3.0	0.123	9.8	LOS A	0.6	4.9	0.28	0.60	55.9
6	T1	17	3.0	0.123	5.6	LOS A	0.6	4.9	0.28	0.60	56.2
16	R2	27	3.0	0.123	5.3	LOS A	0.6	4.9	0.28	0.60	55.0
Approach		123	3.0	0.123	8.2	LOS A	0.6	4.9	0.28	0.60	55.8
North: Frank Bender											
7	L2	5	3.0	0.097	10.1	LOS B	0.5	3.7	0.34	0.51	57.3
4	T1	84	3.0	0.097	6.0	LOS A	0.5	3.7	0.34	0.51	57.6
14	R2	2	3.0	0.097	5.6	LOS A	0.5	3.7	0.34	0.51	56.3
Approach		91	3.0	0.097	6.2	LOS A	0.5	3.7	0.34	0.51	57.5
West: RoadName											
5	L2	9	3.0	0.245	10.6	LOS B	1.4	10.6	0.42	0.58	57.5
2	T1	53	3.0	0.245	6.4	LOS A	1.4	10.6	0.42	0.58	57.8
12	R2	162	3.0	0.245	6.1	LOS A	1.4	10.6	0.42	0.58	56.5
Approach		224	3.0	0.245	6.3	LOS A	1.4	10.6	0.42	0.58	56.9
All Vehicles		639	3.0	0.245	6.6	LOS A	1.4	10.6	0.33	0.56	56.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

 Site: 2026 AM - Frank Bender/Vanguard

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Frank Bender											
3	L2	8	3.0	0.305	12.0	LOS B	1.8	13.7	0.58	0.68	56.3
8	T1	133	3.0	0.305	7.9	LOS A	1.8	13.7	0.58	0.68	56.6
18	R2	97	3.0	0.305	7.5	LOS A	1.8	13.7	0.58	0.68	55.4
Approach		237	3.0	0.305	7.8	LOS A	1.8	13.7	0.58	0.68	56.1
East: Vanguard											
1	L2	23	3.0	0.125	11.0	LOS B	0.6	5.0	0.46	0.61	56.4
6	T1	57	3.0	0.125	6.8	LOS A	0.6	5.0	0.46	0.61	56.7
16	R2	25	3.0	0.125	6.4	LOS A	0.6	5.0	0.46	0.61	55.4
Approach		104	3.0	0.125	7.6	LOS A	0.6	5.0	0.46	0.61	56.3
North: Frank Bender											
7	L2	34	3.0	0.112	9.8	LOS A	0.6	4.6	0.28	0.55	57.0
4	T1	41	3.0	0.112	5.6	LOS A	0.6	4.6	0.28	0.55	57.3
14	R2	36	3.0	0.112	5.2	LOS A	0.6	4.6	0.28	0.55	56.0
Approach		111	3.0	0.112	6.8	LOS A	0.6	4.6	0.28	0.55	56.8
West: Vanguard											
5	L2	100	3.0	0.296	10.1	LOS B	1.8	13.9	0.35	0.56	56.4
2	T1	183	3.0	0.296	5.9	LOS A	1.8	13.9	0.35	0.56	56.8
12	R2	9	3.0	0.296	5.5	LOS A	1.8	13.9	0.35	0.56	55.5
Approach		291	3.0	0.296	7.3	LOS A	1.8	13.9	0.35	0.56	56.6
All Vehicles		743	3.0	0.305	7.4	LOS A	1.8	13.9	0.43	0.61	56.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

 **Site: 2026 AM - Mer Bleue / Brian Coburn**

Roundabout with 1 & 2-lane approaches and circulating road
 MUTCD (FHWA 2009) example number: 3C-4
 Roundabout Guide (TRB 2010) example number: A-3
 Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mer Bleue											
3	L2	99	2.0	0.466	13.3	LOS A	3.0	23.5	0.68	0.74	59.0
8	T1	586	2.0	0.466	7.3	LOS A	3.0	23.5	0.68	0.73	57.2
18	R2	116	2.0	0.466	7.3	LOS A	3.0	23.5	0.68	0.71	56.0
Approach		801	2.0	0.466	8.0	LOS A	3.0	23.5	0.68	0.72	57.3
East: Brian Coburn											
1	L2	165	2.0	2.192	555.7	LOS F	228.6	1766.7	1.00	6.24	5.9
6	T1	451	2.0	2.192	549.7	LOS F	228.6	1766.7	1.00	6.24	8.2
16	R2	636	2.0	2.192	549.7	LOS F	228.6	1766.7	1.00	6.24	6.1
Approach		1252	2.0	2.192	550.5	LOS F	228.6	1766.7	1.00	6.24	6.9
North: Mer Bleue											
7	L2	149	2.0	0.307	12.1	LOS A	1.8	13.7	0.58	0.69	56.9
4	T1	366	2.0	0.307	6.1	LOS A	1.8	13.7	0.58	0.62	57.6
14	R2	35	2.0	0.307	6.1	LOS A	1.8	13.7	0.58	0.58	58.8
Approach		550	2.0	0.307	7.7	LOS A	1.8	13.7	0.58	0.63	57.5
West: Brian Coburn											
5	L2	140	2.0	0.508	14.7	LOS A	2.9	22.6	0.69	0.90	58.2
2	T1	175	2.0	0.508	8.8	LOS A	2.9	22.6	0.69	0.90	58.0
12	R2	24	2.0	0.508	8.7	LOS A	2.9	22.6	0.69	0.90	56.4
Approach		339	2.0	0.508	11.2	LOS A	2.9	22.6	0.69	0.90	58.0
All Vehicles		2942	2.0	2.192	239.2	LOS F	228.6	1766.7	0.80	3.08	13.7

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
 Roundabout LOS Method: Same as Signalised Intersections.
 Vehicle movement LOS values are based on degree of saturation per movement
 Intersection and Approach LOS values are based on worst degree of saturation for any vehicle movement.
 Roundabout Capacity Model: SIDRA Standard.
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: 2026 AM - Mer Bleue / Renaud Rd

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mer Bleue											
3	L2	102	2.0	0.579	11.7	LOS B	5.1	40.2	0.71	0.69	60.4
8	T1	392	5.0	0.579	8.2	LOS A	5.1	40.2	0.71	0.69	52.6
Approach		495	4.4	0.579	8.9	LOS A	5.1	40.2	0.71	0.69	55.8
North: Mer Bleue											
4	T1	261	2.0	0.568	6.8	LOS A	5.6	43.6	0.57	0.56	55.1
14	R2	293	2.0	0.568	6.4	LOS A	5.6	43.6	0.57	0.56	60.5
Approach		554	2.0	0.568	6.6	LOS A	5.6	43.6	0.57	0.56	59.1
West: Renaud Rd											
5	L2	200	2.0	0.361	11.6	LOS B	2.4	18.8	0.62	0.73	59.7
12	R2	92	2.0	0.361	7.5	LOS A	2.4	18.8	0.62	0.73	59.8
Approach		292	2.0	0.361	10.3	LOS B	2.4	18.8	0.62	0.73	59.7
All Vehicles		1341	2.9	0.579	8.3	LOS A	5.6	43.6	0.63	0.65	58.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: Brian Coburn / Fern Casey

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Belcourt											
3	L2	188	2.0	0.462	11.6	LOS A	2.6	20.0	0.48	0.65	55.5
8	T1	122	3.0	0.462	5.6	LOS A	2.6	20.0	0.48	0.65	55.8
18	R2	98	2.0	0.462	5.5	LOS A	2.6	20.0	0.48	0.65	57.0
Approach		408	2.3	0.462	8.3	LOS A	2.6	20.0	0.48	0.65	56.0
East: Brian Coburn											
1	L2	30	2.0	0.329	11.7	LOS A	1.8	14.0	0.52	0.59	58.9
6	T1	574	2.0	0.329	6.1	LOS A	1.8	14.0	0.52	0.58	59.9
16	R2	20	3.0	0.329	5.8	LOS A	1.8	14.0	0.52	0.58	58.9
Approach		624	2.0	0.329	6.4	LOS A	1.8	14.0	0.52	0.58	59.8
North: Fern Casey											
7	L2	50	3.0	0.633	19.0	LOS B	4.0	31.2	0.79	1.00	55.8
4	T1	68	3.0	0.633	13.4	LOS B	4.0	31.2	0.79	1.00	49.4
14	R2	205	3.0	0.633	13.5	LOS B	4.0	31.2	0.79	1.00	50.9
Approach		324	3.0	0.633	14.3	LOS B	4.0	31.2	0.79	1.00	51.6
West: Brian Coburn											
5	L2	5	3.0	0.093	10.7	LOS A	0.4	3.4	0.31	0.44	60.5
2	T1	147	2.0	0.093	4.5	LOS A	0.4	3.4	0.31	0.44	61.6
12	R2	49	2.0	0.093	4.6	LOS A	0.4	3.4	0.31	0.45	56.6
Approach		201	2.0	0.093	4.7	LOS A	0.4	3.4	0.31	0.45	60.8
All Vehicles		1557	2.3	0.633	8.3	LOS B	4.0	31.2	0.54	0.67	57.5

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
 Roundabout LOS Method: Same as Signalised Intersections.
 Vehicle movement LOS values are based on degree of saturation per movement
 Intersection and Approach LOS values are based on worst degree of saturation for any vehicle movement.
 Roundabout Capacity Model: SIDRA Standard.
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: Brian Coburn / Navan

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Navan											
8	T1	749	3.0	0.705	5.6	LOS A	7.0	54.5	0.65	0.53	58.4
18	R2	105	3.0	0.168	5.7	LOS A	0.8	5.9	0.39	0.55	58.3
Approach		854	3.0	0.705	5.6	LOS A	7.0	54.5	0.62	0.53	58.4
East: Brian Coburn											
1	L2	374	3.0	0.730	24.6	LOS C	7.3	56.8	0.96	1.16	47.1
16	R2	593	3.0	0.365	4.0	LOS A	0.0	0.0	0.00	0.46	60.0
Approach		967	3.0	0.730	12.0	LOS B	7.3	56.8	0.37	0.73	54.1
North: Navan											
7	L2	150	3.0	0.283	13.9	LOS B	1.4	11.2	0.63	0.83	54.1
4	T1	500	3.0	0.590	7.6	LOS A	5.0	39.3	0.77	0.76	57.7
Approach		650	3.0	0.590	9.1	LOS A	5.0	39.3	0.73	0.78	56.8
All Vehicles		2472	3.0	0.730	9.0	LOS A	7.3	56.8	0.55	0.67	56.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

 **Site: Mer Bleue / Brian Coburn**

Roundabout with 1 & 2-lane approaches and circulating road
 MUTCD (FHWA 2009) example number: 3C-4
 Roundabout Guide (TRB 2010) example number: A-3
 Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mer Bleue											
3	L2	99	2.0	0.444	12.5	LOS A	2.4	18.7	0.60	0.68	59.4
8	T1	586	2.0	0.444	6.5	LOS A	2.4	18.7	0.60	0.67	57.7
18	R2	116	2.0	0.444	6.5	LOS A	2.4	18.7	0.60	0.65	56.4
Approach		801	2.0	0.444	7.3	LOS A	2.4	18.7	0.60	0.67	57.8
East: Brian Coburn											
1	L2	165	2.0	0.885	24.6	LOS C	10.9	84.3	0.96	1.28	48.5
6	T1	451	2.0	0.885	18.7	LOS C	11.1	86.2	0.96	1.28	52.7
16	R2	636	2.0	0.885	18.1	LOS C	11.1	86.2	0.96	1.28	48.7
Approach		1252	2.0	0.885	19.2	LOS C	11.1	86.2	0.96	1.28	50.4
North: Mer Bleue											
7	L2	149	2.0	0.436	15.1	LOS A	2.9	22.7	0.82	0.93	55.0
4	T1	366	2.0	0.436	9.0	LOS A	3.0	23.0	0.82	0.89	55.9
14	R2	35	2.0	0.436	8.9	LOS A	3.0	23.0	0.82	0.86	57.7
Approach		550	2.0	0.436	10.7	LOS A	3.0	23.0	0.82	0.90	55.8
West: Brian Coburn											
5	L2	140	2.0	0.224	12.6	LOS A	1.0	7.9	0.61	0.82	57.8
2	T1	175	2.0	0.224	6.6	LOS A	1.0	7.9	0.61	0.66	59.7
12	R2	24	2.0	0.224	6.7	LOS A	1.0	7.9	0.61	0.63	58.4
Approach		339	2.0	0.224	9.1	LOS A	1.0	7.9	0.61	0.72	58.8
All Vehicles		2942	2.0	0.885	13.2	LOS C	11.1	86.2	0.80	0.98	54.2

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on degree of saturation per movement

Intersection and Approach LOS values are based on worst degree of saturation for any vehicle movement.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

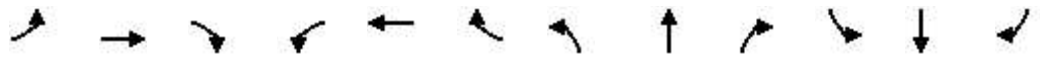
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Organisation: CASTLEGLENN CONSULTANTS | Processed: Thursday, May 10, 2018 9:19:33 AM

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HCM 6th Signalized Intersection Summary
1: Mer Bleue Rd & Innes Rd

Build-out Analysis PM
05/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑	↗	↖	↑↑	↗	↖↗	↑↘		↖↗	↑↘	
Traffic Volume (veh/h)	156	1626	426	357	950	384	306	582	425	439	892	102
Future Volume (veh/h)	156	1626	426	357	950	384	306	582	425	439	892	102
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1758	1758	1758	1772	1772	1800	1772	1772
Adj Flow Rate, veh/h	156	1626	0	357	950	0	306	582	0	439	892	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	0	0	0	3	3	3	2	2	0	2	2
Cap, veh/h	317	1315		266	1408		275	881		358	958	
Arrive On Green	0.09	0.38	0.00	0.12	0.42	0.00	0.08	0.26	0.00	0.11	0.28	0.00
Sat Flow, veh/h	1714	3420	1525	1714	3340	1490	3248	3455	0	3326	3455	0
Grp Volume(v), veh/h	156	1626	0	357	950	0	306	582	0	439	892	0
Grp Sat Flow(s),veh/h/ln	1714	1710	1525	1714	1670	1490	1624	1683	0	1663	1683	0
Q Serve(g_s), s	6.9	50.0	0.0	16.0	29.9	0.0	11.0	20.1	0.0	14.0	33.5	0.0
Cycle Q Clear(g_c), s	6.9	50.0	0.0	16.0	29.9	0.0	11.0	20.1	0.0	14.0	33.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	317	1315		266	1408		275	881		358	958	
V/C Ratio(X)	0.49	1.24		1.34	0.67		1.11	0.66		1.23	0.93	
Avail Cap(c_a), veh/h	347	1315		266	1408		275	881		358	958	
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	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	0.95	0.95	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	23.5	40.0	0.0	42.4	30.4	0.0	59.5	42.9	0.0	58.0	45.3	0.0
Incr Delay (d2), s/veh	1.2	113.0	0.0	176.2	1.3	0.0	86.9	3.7	0.0	123.9	16.5	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	0.0
%ile BackOfQ(50%),veh/ln	1.9	35.2	0.0	15.8	8.4	0.0	7.0	6.8	0.0	10.9	12.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.7	153.0	0.0	218.6	31.7	0.0	146.4	46.6	0.0	181.9	61.8	0.0
LnGrp LOS	C	F		F	C		F	D		F	E	
Approach Vol, veh/h		1782	A		1307	A		888	A		1331	A
Approach Delay, s/veh		141.8			82.8			81.0			101.4	
Approach LOS		F			F			F			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	20.0	54.0	15.0	41.0	15.2	58.8	18.0	38.0				
Change Period (Y+Rc), s	* 6.1	6.4	* 6.3	* 6.2	* 6.1	6.4	* 6.3	* 6.2				
Max Green Setting (Gmax), s	* 14	47.6	* 8.7	* 35	* 11	50.1	* 12	* 32				
Max Q Clear Time (g_c+I1), s	18.0	52.0	13.0	35.5	8.9	31.9	16.0	22.1				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.2	8.9	0.0	3.6				

Intersection Summary

HCM 6th Ctrl Delay	106.9
HCM 6th LOS	F

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
3: Belcourt Blvd & Innes Rd

Build-out Analysis PM
05/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	144	1804	176	219	1024	75	358	286	115	123	209	46
Future Volume (veh/h)	144	1804	176	219	1024	75	358	286	115	123	209	46
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1786	1786	1730	1772	1772	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	144	1804	176	219	1024	75	358	286	115	123	209	46
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	1	1	5	2	2	0	0	0	0	0	0
Cap, veh/h	290	1540	687	182	1786	131	363	678	575	314	539	119
Arrive On Green	0.45	0.45	0.45	0.15	1.00	1.00	0.38	0.38	0.38	0.38	0.38	0.36
Sat Flow, veh/h	517	3393	1514	1647	3180	233	1142	1800	1525	999	1429	314
Grp Volume(v), veh/h	144	1804	176	219	542	557	358	286	115	123	0	255
Grp Sat Flow(s),veh/h/ln	517	1697	1514	1647	1683	1730	1142	1800	1525	999	0	1743
Q Serve(g_s), s	27.4	59.0	9.3	10.0	0.0	0.0	35.1	15.3	6.6	13.5	0.0	13.9
Cycle Q Clear(g_c), s	27.4	59.0	9.3	10.0	0.0	0.0	49.0	15.3	6.6	28.8	0.0	13.9
Prop In Lane	1.00		1.00	1.00		0.13	1.00		1.00	1.00		0.18
Lane Grp Cap(c), veh/h	290	1540	687	182	945	971	363	678	575	314	0	657
V/C Ratio(X)	0.50	1.17	0.26	1.20	0.57	0.57	0.98	0.42	0.20	0.39	0.00	0.39
Avail Cap(c_a), veh/h	290	1540	687	182	945	971	363	678	575	314	0	657
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.81	0.81	0.81	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.9	35.5	21.9	35.0	0.0	0.0	49.9	30.0	27.3	40.7	0.0	29.8
Incr Delay (d2), s/veh	1.3	84.4	0.2	125.6	0.7	0.7	43.6	1.9	0.8	3.6	0.0	1.7
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(50%),veh/ln	2.3	33.7	2.2	8.7	0.2	0.2	14.0	5.3	1.9	3.0	0.0	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.2	119.9	22.1	160.6	0.7	0.7	93.5	31.9	28.1	44.3	0.0	31.5
LnGrp LOS	C	F	C	F	A	A	F	C	C	D	A	C
Approach Vol, veh/h		2124			1318			759			378	
Approach Delay, s/veh		105.6			27.2			60.4			35.7	
Approach LOS		F			C			E			D	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	4.0	63.0		53.0		77.0		53.0				
Change Period (Y+Rc), s	4.7	* 6.6		* 6.8		* 6.6		* 6.8				
Max Green Setting (Gmax), s	9.3	* 56		* 46		* 70		* 46				
Max Q Clear Time (g_c+1/2g), s	11.2	61.0		30.8		2.0		51.0				
Green Ext Time (p_c), s	0.0	0.0		3.2		16.5		0.0				

Intersection Summary

HCM 6th Ctrl Delay	69.8
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
4: Viseneau Dr & Innes Rd

Build-out Analysis PM
05/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	1885	87	183	1162	84	106	40	179	60	51	30
Future Volume (veh/h)	44	1885	87	183	1162	84	106	40	179	60	51	30
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
Work Zone On Approach		No		No		No		No		No		No
Adj Sat Flow, veh/h/ln	1786	1772	1772	1800	1744	1744	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	44	1885	87	183	1162	84	106	40	179	60	51	30
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	2	2	0	4	4	0	0	0	0	0	0
Cap, veh/h	284	1942	866	209	2169	157	491	617	523	237	196	106
Arrive On Green	0.58	0.58	0.58	0.08	0.69	0.67	0.34	0.34	0.34	0.35	0.35	0.32
Sat Flow, veh/h	450	3367	1502	1714	3133	226	1338	1800	1525	571	567	307
Grp Volume(v), veh/h	44	1885	87	183	614	632	106	40	179	141	0	0
Grp Sat Flow(s),veh/h/ln	450	1683	1502	1714	1657	1703	1338	1800	1525	1445	0	0
Q Serve(g_s), s	6.9	70.0	3.4	8.8	23.6	23.8	0.6	1.9	11.4	6.0	0.0	0.0
Cycle Q Clear(g_c), s	15.7	70.0	3.4	8.8	23.6	23.8	9.8	1.9	11.4	8.7	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.13	1.00		1.00	0.43		0.21
Lane Grp Cap(c), veh/h	284	1942	866	209	1147	1179	491	617	523	539	0	0
V/C Ratio(X)	0.15	0.97	0.10	0.88	0.54	0.54	0.22	0.06	0.34	0.26	0.00	0.00
Avail Cap(c_a), veh/h	285	1942	866	209	1147	1179	491	617	523	539	0	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	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	17.3	26.5	12.4	42.1	9.8	9.9	31.4	28.7	31.8	30.8	0.0	0.0
Incr Delay (d2), s/veh	0.2	14.1	0.1	31.2	0.5	0.5	1.0	0.2	1.8	1.2	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	18.1	0.6	6.5	2.6	2.7	2.0	0.7	3.5	2.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.6	40.6	12.4	73.4	10.3	10.4	32.4	28.9	33.6	32.0	0.0	0.0
LnGrp LOS	B	D	B	E	B	B	C	C	C	C	A	A
Approach Vol, veh/h		2016			1429			325			141	
Approach Delay, s/veh		38.9			18.4			32.6			32.0	
Approach LOS		D			B			C			C	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	5.0	79.0		49.3		94.0		49.3				
Change Period (Y+Rc), s	6.3	* 6.3		7.1		* 6.3		* 7.1				
Max Green Setting (Gmax), s	73	* 73		28.9		* 88		* 29				
Max Q Clear Time (g_c+110), s	72.0			10.7		25.8		13.4				
Green Ext Time (p_c), s	0.0	0.7		1.0		20.5		2.6				

Intersection Summary

HCM 6th Ctrl Delay	30.6
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
6: Page Rd & Innes Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	94	2127	41	152	1187	12	45	88	121	60	55	15
Future Volume (veh/h)	94	2127	41	152	1187	12	45	88	121	60	55	15
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
Work Zone On Approach		No		No		No		No		No		No
Adj Sat Flow, veh/h/ln	1800	1786	1786	1800	1758	1758	1772	1772	1772	1800	1800	1800
Adj Flow Rate, veh/h	94	2127	41	152	1187	12	45	88	121	60	55	15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	1	0	3	3	2	2	2	0	0	0
Cap, veh/h	332	2463	47	108	2450	25	81	129	158	137	116	27
Arrive On Green	0.72	0.72	0.71	0.72	0.72	0.71	0.21	0.21	0.19	0.21	0.21	0.19
Sat Flow, veh/h	474	3405	65	185	3387	34	216	612	754	443	551	130
Grp Volume(v), veh/h	94	1056	1112	152	585	614	254	0	0	130	0	0
Grp Sat Flow(s),veh/h/ln	474	1697	1774	185	1670	1752	1582	0	0	1124	0	0
Q Serve(g_s), s	12.6	54.8	55.8	31.0	17.9	17.9	4.4	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	30.6	54.8	55.8	86.8	17.9	17.9	18.0	0.0	0.0	13.6	0.0	0.0
Prop In Lane	1.00		0.04	1.00		0.02	0.18		0.48	0.46		0.12
Lane Grp Cap(c), veh/h	332	1227	1283	108	1208	1267	368	0	0	280	0	0
V/C Ratio(X)	0.28	0.86	0.87	1.41	0.48	0.48	0.69	0.00	0.00	0.46	0.00	0.00
Avail Cap(c_a), veh/h	332	1227	1283	108	1208	1267	368	0	0	280	0	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	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.85	0.85	0.85	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	13.6	12.2	12.3	53.1	7.1	7.1	45.0	0.0	0.0	42.2	0.0	0.0
Incr Delay (d2), s/veh	2.1	8.0	8.0	223.8	1.2	1.1	10.2	0.0	0.0	5.5	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	4.5	4.7	9.4	0.9	1.0	6.9	0.0	0.0	3.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.7	20.2	20.4	276.9	8.3	8.2	55.2	0.0	0.0	47.6	0.0	0.0
LnGrp LOS	B	C	C	F	A	A	E	A	A	D	A	A
Approach Vol, veh/h		2262			1351			254			130	
Approach Delay, s/veh		20.1			38.5			55.2			47.6	
Approach LOS		C			D			E			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		90.8		29.2		90.8		29.2				
Change Period (Y+Rc), s		* 6.1		* 6.2		* 6.1		* 6.2				
Max Green Setting (Gmax), s		* 85		* 23		* 85		* 23				
Max Q Clear Time (g_c+I1), s		57.8		15.6		88.8		20.0				
Green Ext Time (p_c), s		25.0		0.5		0.0		0.6				

Intersection Summary

HCM 6th Ctrl Delay	29.4
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
7: Orleans Blvd & Innes Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗	↑ ↑	↖	↖	↑ ↑	↖	↖	↑ ↑	↖	↖	↑ ↑	↖
Traffic Volume (veh/h)	579	1872	158	58	985	204	64	316	84	306	380	203
Future Volume (veh/h)	579	1872	158	58	985	204	64	316	84	306	380	203
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
Work Zone On Approach		No		No		No		No		No		No
Adj Sat Flow, veh/h/ln	1800	1786	1800	1800	1758	1772	1800	1772	1800	1800	1772	1786
Adj Flow Rate, veh/h	579	1872	0	58	985	0	64	316	0	306	380	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	0	0	3	2	0	2	0	0	2	1
Cap, veh/h	671	1644		95	1129		345	1238		358	942	
Arrive On Green	0.20	0.48	0.00	0.06	0.34	0.00	0.06	0.37	0.00	0.28	0.28	0.00
Sat Flow, veh/h	3326	3393	1525	1714	3340	1502	1714	3367	1525	1080	3367	1514
Grp Volume(v), veh/h	579	1872	0	58	985	0	64	316	0	306	380	0
Grp Sat Flow(s),veh/h/ln	1663	1697	1525	1714	1670	1502	1714	1683	1525	1080	1683	1514
Q Serve(g_s), s	21.9	63.0	0.0	4.3	36.0	0.0	3.3	8.5	0.0	36.4	11.9	0.0
Cycle Q Clear(g_c), s	21.9	63.0	0.0	4.3	36.0	0.0	3.3	8.5	0.0	36.4	11.9	0.0
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	671	1644		95	1129		345	1238		358	942	
V/C Ratio(X)	0.86	1.14		0.61	0.87		0.19	0.26		0.86	0.40	
Avail Cap(c_a), veh/h	675	1644		95	1129		348	1238		358	942	
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	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	50.1	33.5	0.0	60.0	40.4	0.0	29.1	28.7	0.0	47.0	38.0	0.0
Incr Delay (d2), s/veh	11.1	70.2	0.0	10.9	7.7	0.0	0.3	0.5	0.0	22.3	1.3	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	0.0
%ile BackOfQ(50%),veh/ln	8.1	32.0	0.0	1.8	11.9	0.0	1.0	2.7	0.0	9.9	4.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.2	103.7	0.0	71.0	48.0	0.0	29.4	29.2	0.0	69.3	39.3	0.0
LnGrp LOS	E	F		E	D		C	C		E	D	
Approach Vol, veh/h		2451	A		1043	A		380	A		686	A
Approach Delay, s/veh		93.7			49.3			29.2			52.7	
Approach LOS		F			D			C			D	
Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	1.2	67.0	11.4	40.4	30.2	48.0		51.8				
Change Period (Y+Rc), s	6.2	* 6.2	* 6.7	* 6.7	* 6.2	* 6.2		* 6.7				
Max Green Setting (Gmax), s	5	* 61	* 5	* 33	* 24	* 42		* 45				
Max Q Clear Time (g_c+11g), s	3	65.0	5.3	38.4	23.9	38.0		10.5				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.2	2.5		3.4				

Intersection Summary

HCM 6th Ctrl Delay	72.0
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
8: BHB/Innes Rd & Navan Rd

Build-out Analysis PM
05/10/2018



Movement	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations	↔↔	↔	↕↕	↔	↔	↕↕
Traffic Volume (veh/h)	582	53	2249	1321	104	998
Future Volume (veh/h)	582	53	2249	1321	104	998
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
Work Zone On Approach	No		No		No	
Adj Sat Flow, veh/h/ln	1617	1800	1786	1744	1800	1744
Adj Flow Rate, veh/h	582	0	2249	0	104	998
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	13	0	1	4	0	4
Cap, veh/h	639		2143		107	2401
Arrive On Green	0.21	0.00	0.63	0.00	0.06	0.72
Sat Flow, veh/h	2988	1525	3483	1478	1714	3400
Grp Volume(v), veh/h	582	0	2249	0	104	998
Grp Sat Flow(s),veh/h/ln	1494	1525	1697	1478	1714	1657
Q Serve(g_s), s	24.7	0.0	82.1	0.0	7.9	15.4
Cycle Q Clear(g_c), s	24.7	0.0	82.1	0.0	7.9	15.4
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	639		2143		107	2401
V/C Ratio(X)	0.91		1.05		0.97	0.42
Avail Cap(c_a), veh/h	639		2143		107	2401
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	49.9	0.0	23.9	0.0	60.8	7.1
Incr Delay (d2), s/veh	19.4	0.0	33.9	0.0	78.4	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.9	0.0	23.7	0.0	5.1	1.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	69.3	0.0	57.9	0.0	139.3	7.6
LnGrp LOS	E		F		F	A
Approach Vol, veh/h	582	A	2249	A		1102
Approach Delay, s/veh	69.3		57.9			20.0
Approach LOS	E		E			C
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		31.8	12.1	86.1		98.2
Change Period (Y+Rc), s		* 5.8	* 6.3	* 5.9		* 5.9
Max Green Setting (Gmax), s		* 26	* 5.8	* 80		* 92
Max Q Clear Time (g_c+I1), s		26.7	9.9	84.1		17.4
Green Ext Time (p_c), s		0.0	0.0	0.0		15.6

Intersection Summary

HCM 6th Ctrl Delay	49.0
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NER, WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection

Intersection Delay, s/veh 143

Intersection LOS F

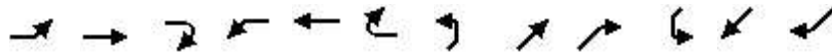
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	469	120	66	308	452	240
Future Vol, veh/h	469	120	66	308	452	240
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	1	10	11	0	1	2
Mvmt Flow	510	130	72	335	491	261
Number of Lanes	1	0	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB	EB	
Conflicting Lanes Right	1	0	1
HCM Control Delay	139	39.1	202.6
HCM LOS	F	E	F

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	18%	80%	0%
Vol Thru, %	82%	0%	65%
Vol Right, %	0%	20%	35%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	374	589	692
LT Vol	66	469	0
Through Vol	308	0	452
RT Vol	0	120	240
Lane Flow Rate	407	640	752
Geometry Grp	1	1	1
Degree of Util (X)	0.815	1.215	1.376
Departure Headway (Hd)	8.388	7.468	7.2
Convergence, Y/N	Yes	Yes	Yes
Cap	435	493	511
Service Time	6.388	5.468	5.2
HCM Lane V/C Ratio	0.936	1.298	1.472
HCM Control Delay	39.1	139	202.6
HCM Lane LOS	E	F	F
HCM 95th-tile Q	7.5	22.7	31.7

HCM 6th Signalized Intersection Summary
13: Renaud Rd & Navan Rd

Build-out Analysis PM
05/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	274	513	136	45	217	44	436	420	202	35	130	125
Future Volume (veh/h)	274	513	136	45	217	44	436	420	202	35	130	125
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
Work Zone On Approach		No		No		No		No		No		No
Adj Sat Flow, veh/h/ln	1786	1744	1744	1393	1660	1660	1617	1786	1674	1800	1730	1730
Adj Flow Rate, veh/h	274	513	136	45	217	0	436	420	202	35	130	125
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	4	4	29	10	10	13	1	9	0	5	5
Cap, veh/h	503	590	157	138	738		515	833	662	243	162	156
Arrive On Green	0.44	0.44	0.42	0.44	0.44	0.00	0.25	0.47	0.47	0.20	0.20	0.17
Sat Flow, veh/h	1173	1328	352	615	1660	0	1540	1786	1418	815	810	779
Grp Volume(v), veh/h	274	0	649	45	217	0	436	420	202	35	0	255
Grp Sat Flow(s),veh/h/ln	1173	0	1680	615	1660	0	1540	1786	1418	815	0	1590
Q Serve(g_s), s	17.5	0.0	31.5	6.4	7.5	0.0	18.7	14.8	8.0	3.2	0.0	13.8
Cycle Q Clear(g_c), s	25.0	0.0	31.5	38.0	7.5	0.0	18.7	14.8	8.0	3.2	0.0	13.8
Prop In Lane	1.00		0.21	1.00		0.00	1.00		1.00	1.00		0.49
Lane Grp Cap(c), veh/h	503	0	747	138	738		515	833	662	243	0	318
V/C Ratio(X)	0.54	0.00	0.87	0.33	0.29		0.85	0.50	0.31	0.14	0.00	0.80
Avail Cap(c_a), veh/h	503	0	747	138	738		515	833	662	243	0	318
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	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.0	0.0	22.9	39.8	16.0	0.0	19.4	16.7	14.9	30.1	0.0	34.9
Incr Delay (d2), s/veh	1.2	0.0	10.7	1.4	0.2	0.0	12.5	0.5	0.3	0.3	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	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	0.0	7.9	0.7	1.4	0.0	4.9	3.1	1.3	0.5	0.0	4.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.2	0.0	33.6	41.2	16.2	0.0	31.9	17.2	15.2	30.4	0.0	48.7
LnGrp LOS	C	A	C	D	B		C	B	B	C	A	D
Approach Vol, veh/h		923			262	A		1058			290	
Approach Delay, s/veh		31.1			20.5			22.9			46.4	
Approach LOS		C			C			C			D	
Timer - Assigned Phs		2	3	4		6		8				
Phs Duration (G+Y+Rc), s		44.0	24.0	22.0		44.0		46.0				
Change Period (Y+Rc), s		6.6	4.0	6.6		6.6		6.6				
Max Green Setting (Gmax), s		37.4	20.0	15.4		37.4		39.4				
Max Q Clear Time (g_c+I1), s		33.5	20.7	15.8		40.0		16.8				
Green Ext Time (p_c), s		2.6	0.0	0.0		0.0		6.3				

Intersection Summary

HCM 6th Ctrl Delay	28.3
HCM 6th LOS	C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
44: Mer Bleue Rd

Build-out Analysis PM
05/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	0	25	0	0	0	12	717	0	0	1329	244
Future Volume (veh/h)	135	0	25	0	0	0	12	717	0	0	1329	244
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
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	147	0	27	0	0	0	13	779	0	0	1445	265
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	257	0	165	72	195	0	248	2627	0	72	2627	1172
Arrive On Green	0.11	0.00	0.11	0.00	0.00	0.00	0.78	0.78	0.00	0.00	0.78	0.78
Sat Flow, veh/h	1688	0	1502	1383	1772	0	286	3455	0	693	3367	1502
Grp Volume(v), veh/h	147	0	27	0	0	0	13	779	0	0	1445	265
Grp Sat Flow(s),veh/h/ln	1688	0	1502	1383	1772	0	286	1683	0	693	1683	1502
Q Serve(g_s), s	8.5	0.0	1.6	0.0	0.0	0.0	1.8	6.6	0.0	0.0	16.5	4.7
Cycle Q Clear(g_c), s	8.5	0.0	1.6	0.0	0.0	0.0	18.4	6.6	0.0	0.0	16.5	4.7
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	257	0	165	72	195	0	248	2627	0	72	2627	1172
V/C Ratio(X)	0.57	0.00	0.16	0.00	0.00	0.00	0.05	0.30	0.00	0.00	0.55	0.23
Avail Cap(c_a), veh/h	469	0	353	245	416	0	248	2627	0	72	2627	1172
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	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	43.4	0.0	40.4	0.0	0.0	0.0	7.8	3.1	0.0	0.0	4.2	2.9
Incr Delay (d2), s/veh	2.0	0.0	0.5	0.0	0.0	0.0	0.4	0.3	0.0	0.0	0.8	0.4
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(50%),veh/ln	2.8	0.0	0.5	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.3	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.4	0.0	40.8	0.0	0.0	0.0	8.2	3.4	0.0	0.0	5.1	3.4
LnGrp LOS	D	A	D	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h	174			0			792			1710		
Approach Delay, s/veh	44.7			0.0			3.5			4.8		
Approach LOS	D						A			A		
Timer - Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	83.5		16.5		83.5		16.5					
Change Period (Y+Rc), s	5.5		5.5		5.5		5.5					
Max Green Setting (Gmax), s	65.5		23.5		65.5		23.5					
Max Q Clear Time (g_c+I1), s	20.4		10.5		18.5		0.0					
Green Ext Time (p_c), s	8.2		0.6		22.3		0.0					
Intersection Summary												
HCM 6th Ctrl Delay			7.0									
HCM 6th LOS			A									

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↑
Traffic Vol, veh/h	2049	45	0	1310	0	38
Future Vol, veh/h	2049	45	0	1310	0	38
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2049	45	0	1310	0	38

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	-	-	-	1047
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	225
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	225
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	24.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	225	-	-	-
HCM Lane V/C Ratio	0.169	-	-	-
HCM Control Delay (s)	24.2	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	0.6	-	-	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Volume (vph)	2075	222	33	1277	136	19
Future Volume (vph)	2075	222	33	1277	136	19
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		50.0	35.0		85.0	0.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Fr _t		0.850				0.850
Fl _t Protected			0.950		0.950	
Satd. Flow (prot)	3353	1500	1676	3353	1676	1500
Fl _t Permitted			0.061		0.950	
Satd. Flow (perm)	3353	1500	108	3353	1676	1500
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		158				19
Link Speed (k/h)	60			60	50	
Link Distance (m)	219.8			255.1	539.8	
Travel Time (s)	13.2			15.3	38.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	2075	222	33	1277	136	19
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2075	222	33	1277	136	19
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)		15	25		25	15
Number of Detectors	2	1	1	2	1	1
Detector Template	Thru	Right	Left	Thru	Left	Right
Leading Detector (m)	10.0	2.0	2.0	10.0	2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	0.6	2.0	2.0	0.6	2.0	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	9.4			9.4		
Detector 2 Size(m)	0.6			0.6		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8

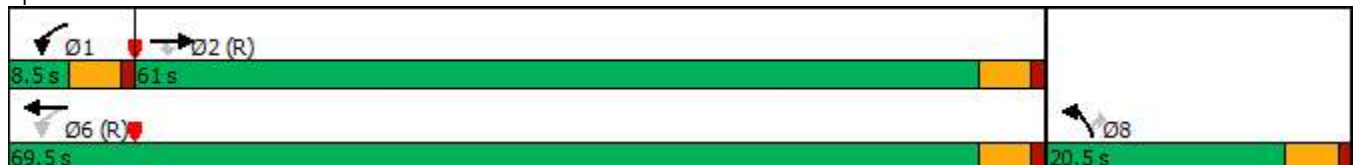


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	8.5	20.5	20.5	20.5
Total Split (s)	61.0	61.0	8.5	69.5	20.5	20.5
Total Split (%)	67.8%	67.8%	9.4%	77.2%	22.8%	22.8%
Maximum Green (s)	56.5	56.5	4.0	65.0	16.0	16.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Walk Time (s)	5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effect Green (s)	63.0	63.0	68.8	68.8	12.2	12.2
Actuated g/C Ratio	0.70	0.70	0.76	0.76	0.14	0.14
v/c Ratio	0.88	0.20	0.19	0.50	0.60	0.09
Control Delay	19.2	2.7	5.6	5.2	47.1	14.6
Queue Delay	0.7	0.0	0.0	0.0	0.0	0.0
Total Delay	19.9	2.7	5.6	5.2	47.1	14.6
LOS	B	A	A	A	D	B
Approach Delay	18.2			5.2	43.1	
Approach LOS	B			A	D	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	90
Offset:	0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.88
Intersection Signal Delay:	14.7
Intersection LOS:	B
Intersection Capacity Utilization	76.0%
ICU Level of Service	D
Analysis Period (min)	15

Splits and Phases: 48: Ciavan Access & Innes Rd



HCM 6th Signalized Intersection Summary
13: Renaud Rd & Navan Rd

Build-out PM Improvement
05/10/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	274	513	136	45	217	44	436	420	202	35	130	125
Future Volume (veh/h)	274	513	136	45	217	44	436	420	202	35	130	125
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1744	1800	1393	1660	1660	1617	1786	1674	1800	1730	1730
Adj Flow Rate, veh/h	274	513	136	45	217	0	436	420	202	35	130	125
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	4	0	29	10	10	13	1	9	0	5	5
Cap, veh/h	468	607	497	181	481		521	893	709	222	158	152
Arrive On Green	0.11	0.35	0.33	0.05	0.29	0.00	0.27	0.50	0.50	0.20	0.20	0.17
Sat Flow, veh/h	1701	1744	1525	1327	1660	0	1540	1786	1418	815	810	779
Grp Volume(v), veh/h	274	513	136	45	217	0	436	420	202	35	0	255
Grp Sat Flow(s),veh/h/ln	1701	1744	1525	1327	1660	0	1540	1786	1418	815	0	1590
Q Serve(g_s), s	12.8	31.3	7.6	2.7	12.3	0.0	23.5	17.7	9.6	4.2	0.0	17.7
Cycle Q Clear(g_c), s	12.8	31.3	7.6	2.7	12.3	0.0	23.5	17.7	9.6	4.2	0.0	17.7
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	1.00		0.49
Lane Grp Cap(c), veh/h	468	607	497	181	481		521	893	709	222	0	311
V/C Ratio(X)	0.59	0.84	0.27	0.25	0.45		0.84	0.47	0.28	0.16	0.00	0.82
Avail Cap(c_a), veh/h	468	706	583	187	582		619	1015	806	225	0	318
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	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.3	34.6	28.7	28.5	33.4	0.0	23.9	18.8	16.8	38.9	0.0	45.0
Incr Delay (d2), s/veh	1.9	8.2	0.3	0.7	0.7	0.0	8.6	0.4	0.2	0.3	0.0	15.4
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(50%),veh/ln	3.5	10.3	2.1	0.6	3.6	0.0	6.4	4.5	1.9	0.7	0.0	6.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.2	42.9	29.0	29.2	34.1	0.0	32.4	19.2	17.0	39.2	0.0	60.4
LnGrp LOS	C	D	C	C	C		C	B	B	D	A	E
Approach Vol, veh/h		923			262	A		1058				290
Approach Delay, s/veh		35.9			33.2			24.2				57.8
Approach LOS		D			C			C				E
Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	9.5	44.1	35.1	26.5	16.2	37.3		61.6				
Change Period (Y+Rc), s	5.9	6.6	6.6	6.6	5.9	6.6		6.6				
Max Green Setting (Gmax), s	4.1	44.0	35.8	20.4	10.3	37.8		62.8				
Max Q Clear Time (g_c+I1), s	4.7	33.3	25.5	19.7	14.8	14.3		19.7				
Green Ext Time (p_c), s	0.0	4.2	2.9	0.2	0.0	1.8		7.5				

Intersection Summary

HCM 6th Ctrl Delay	33.2
HCM 6th LOS	C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Lanes, Volumes, Timings
12: Mer Bleue Rd & Renaud Rd



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	469	120	66	308	452	240
Future Volume (vph)	469	120	66	308	452	240
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	50.0	45.0			80.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		20.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.850				0.850
Fl _t Protected	0.950		0.950			
Satd. Flow (prot)	1666	1391	1504	1764	1732	1494
Fl _t Permitted	0.950		0.323			
Satd. Flow (perm)	1666	1391	511	1764	1732	1494
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		120				261
Link Speed (k/h)	50			60	60	
Link Distance (m)	937.5			936.0	201.6	
Travel Time (s)	67.5			56.2	12.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	10%	11%	0%	1%	2%
Bus Blockages (#/hr)	4	0	6	5	7	1
Adj. Flow (vph)	510	130	72	335	491	261
Shared Lane Traffic (%)						
Lane Group Flow (vph)	510	130	72	335	491	261
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.07	1.11	1.10	1.11	1.08
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	1	1	1
Detector Template						
Leading Detector (m)	15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	15.0	15.0	15.0	15.0	15.0	15.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0

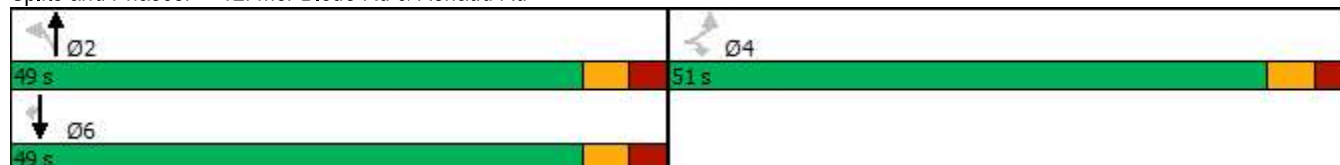


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	51.0	51.0	49.0	49.0	49.0	49.0
Total Split (%)	51.0%	51.0%	49.0%	49.0%	49.0%	49.0%
Maximum Green (s)	44.5	44.5	42.5	42.5	42.5	42.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	Min	Min	Min
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effect Green (s)	27.1	27.1	25.7	25.7	25.7	25.7
Actuated g/C Ratio	0.40	0.40	0.38	0.38	0.38	0.38
v/c Ratio	0.76	0.21	0.37	0.50	0.74	0.36
Control Delay	26.6	4.8	23.4	19.8	26.7	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.6	4.8	23.4	19.8	26.7	3.9
LOS	C	A	C	B	C	A
Approach Delay	22.2		20.4		18.8	
Approach LOS	C		C		B	

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 67.1
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 20.3 Intersection LOS: C
 Intersection Capacity Utilization 77.1% ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 12: Mer Bleue Rd & Renaud Rd



MOVEMENT SUMMARY

 Site: 2026 PM - Brian Coburn / Fern Casey

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Belcourt											
3	L2	113	2.0	0.518	18.3	LOS A	4.2	32.2	0.92	1.03	48.3
8	T1	91	3.0	0.518	13.4	LOS A	4.2	32.2	0.92	1.03	48.5
18	R2	54	2.0	0.518	13.0	LOS A	4.2	32.2	0.92	1.03	51.9
Approach		259	2.4	0.518	15.5	LOS A	4.2	32.2	0.92	1.03	49.4
East: Brian Coburn											
1	L2	120	2.0	0.565	14.2	LOS A	4.8	37.2	0.76	0.82	56.2
6	T1	274	2.0	0.565	9.2	LOS A	4.8	37.2	0.76	0.82	57.7
16	R2	57	3.0	0.565	8.9	LOS A	4.8	37.2	0.76	0.82	56.7
Approach		450	2.1	0.565	10.5	LOS A	4.8	37.2	0.76	0.82	57.2
North: Fern Casey											
7	L2	34	3.0	0.450	15.1	LOS A	3.1	24.5	0.78	0.87	57.5
4	T1	134	3.0	0.450	10.1	LOS A	3.1	24.5	0.78	0.87	52.3
14	R2	122	3.0	0.450	9.9	LOS A	3.1	24.5	0.78	0.87	53.6
Approach		289	3.0	0.450	10.6	LOS A	3.1	24.5	0.78	0.87	53.7
West: Brian Coburn											
5	L2	140	3.0	1.010	44.0	LOS F	35.9	278.0	1.00	1.51	38.7
2	T1	508	2.0	1.010	38.7	LOS F	35.9	278.0	1.00	1.51	43.6
12	R2	210	2.0	1.010	38.5	LOS F	35.9	278.0	1.00	1.51	33.5
Approach		858	2.2	1.010	39.5	LOS F	35.9	278.0	1.00	1.51	41.0
All Vehicles		1855	2.3	1.010	24.6	LOS F	35.9	278.0	0.90	1.18	47.1

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on degree of saturation per movement

Intersection and Approach LOS values are based on worst degree of saturation for any vehicle movement.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: 2026 PM - Brian Coburn / Navan

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Navan											
8	T1	501	3.0	1.223	121.9	LOS F	70.5	549.4	1.00	2.67	20.6
18	R2	343	3.0	1.223	121.5	LOS F	70.5	549.4	1.00	2.67	20.4
Approach		845	3.0	1.223	121.7	LOS F	70.5	549.4	1.00	2.67	20.5
East: Brian Coburn											
1	L2	163	3.0	0.791	21.6	LOS C	10.7	83.2	1.00	1.15	48.2
16	R2	346	3.0	0.791	17.3	LOS B	10.7	83.2	1.00	1.15	47.6
Approach		509	3.0	0.791	18.7	LOS B	10.7	83.2	1.00	1.15	47.8
North: Navan											
7	L2	568	3.0	1.619	296.0	LOS F	206.3	1607.7	1.00	3.34	10.6
4	T1	840	3.0	1.619	292.2	LOS F	206.3	1607.7	1.00	3.34	10.6
Approach		1409	3.0	1.619	293.7	LOS F	206.3	1607.7	1.00	3.34	10.6
All Vehicles		2762	3.0	1.619	190.5	LOS F	206.3	1607.7	1.00	2.73	14.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: 2026 PM - Fern Casey/Frank Bender

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fern Casey											
3	L2	146	3.0	0.333	9.7	LOS A	2.2	16.8	0.28	0.56	56.6
8	T1	89	3.0	0.333	5.5	LOS A	2.2	16.8	0.28	0.56	57.0
18	R2	109	3.0	0.333	5.2	LOS A	2.2	16.8	0.28	0.56	55.7
Approach		343	3.0	0.333	7.2	LOS A	2.2	16.8	0.28	0.56	56.4
East: Frank Bender											
1	L2	137	3.0	0.259	11.2	LOS B	1.5	11.3	0.50	0.68	54.9
6	T1	70	3.0	0.259	7.1	LOS A	1.5	11.3	0.50	0.68	55.2
16	R2	12	3.0	0.259	6.7	LOS A	1.5	11.3	0.50	0.68	54.0
Approach		218	3.0	0.259	9.7	LOS A	1.5	11.3	0.50	0.68	54.9
North: Frank Bender											
7	L2	25	3.0	0.127	11.9	LOS B	0.6	5.0	0.54	0.67	55.6
4	T1	62	3.0	0.127	7.7	LOS A	0.6	5.0	0.54	0.67	55.9
14	R2	9	3.0	0.127	7.3	LOS A	0.6	5.0	0.54	0.67	54.7
Approach		96	3.0	0.127	8.7	LOS A	0.6	5.0	0.54	0.67	55.7
West: RoadName											
5	L2	4	3.0	0.143	10.9	LOS B	0.7	5.7	0.45	0.60	57.4
2	T1	28	3.0	0.143	6.7	LOS A	0.7	5.7	0.45	0.60	57.7
12	R2	89	3.0	0.143	6.3	LOS A	0.7	5.7	0.45	0.60	56.4
Approach		122	3.0	0.143	6.6	LOS A	0.7	5.7	0.45	0.60	56.7
All Vehicles		779	3.0	0.333	8.0	LOS A	2.2	16.8	0.40	0.61	56.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

 Site: 2026 PM - Frank Bender/Vanguard

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Frank Bender											
3	L2	11	3.0	0.149	10.6	LOS B	0.8	6.2	0.43	0.57	57.0
8	T1	73	3.0	0.149	6.4	LOS A	0.8	6.2	0.43	0.57	57.4
18	R2	48	3.0	0.149	6.1	LOS A	0.8	6.2	0.43	0.57	56.1
Approach		132	3.0	0.149	6.6	LOS A	0.8	6.2	0.43	0.57	56.9
East: Vanguard											
1	L2	89	3.0	0.380	10.6	LOS B	2.5	19.3	0.45	0.59	56.3
6	T1	227	3.0	0.380	6.4	LOS A	2.5	19.3	0.45	0.59	56.6
16	R2	40	3.0	0.380	6.0	LOS A	2.5	19.3	0.45	0.59	55.4
Approach		357	3.0	0.380	7.4	LOS A	2.5	19.3	0.45	0.59	56.4
North: Frank Bender											
7	L2	32	3.0	0.423	12.5	LOS B	2.7	21.2	0.66	0.74	55.7
4	T1	155	3.0	0.423	8.3	LOS A	2.7	21.2	0.66	0.74	56.0
14	R2	135	3.0	0.423	7.9	LOS A	2.7	21.2	0.66	0.74	54.8
Approach		322	3.0	0.423	8.6	LOS A	2.7	21.2	0.66	0.74	55.5
West: Vanguard											
5	L2	55	3.0	0.206	11.4	LOS B	1.1	8.8	0.53	0.66	55.5
2	T1	100	3.0	0.206	7.3	LOS A	1.1	8.8	0.53	0.66	55.9
12	R2	10	3.0	0.206	6.9	LOS A	1.1	8.8	0.53	0.66	54.7
Approach		165	3.0	0.206	8.6	LOS A	1.1	8.8	0.53	0.66	55.7
All Vehicles		975	3.0	0.423	7.9	LOS A	2.7	21.2	0.53	0.65	56.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

 Site: 2026 PM - Mer Bleue / Brian Coburn

Roundabout with 1 & 2-lane approaches and circulating road
 MUTCD (FHWA 2009) example number: 3C-4
 Roundabout Guide (TRB 2010) example number: A-3
 Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mer Bleue											
3	L2	57	2.0	0.840	32.6	LOS C	11.4	87.8	1.00	1.32	48.9
8	T1	590	2.0	0.840	26.4	LOS C	11.7	90.6	1.00	1.32	44.5
18	R2	263	2.0	0.840	25.9	LOS C	11.7	90.6	1.00	1.32	43.7
Approach		910	2.0	0.840	26.6	LOS C	11.7	90.6	1.00	1.32	44.6
East: Brian Coburn											
1	L2	160	2.0	1.264	142.1	LOS F	60.7	469.2	1.00	3.05	18.7
6	T1	266	2.0	1.264	136.1	LOS F	60.7	469.2	1.00	3.05	24.1
16	R2	300	2.0	1.264	136.0	LOS F	60.7	469.2	1.00	3.05	19.2
Approach		726	2.0	1.264	137.4	LOS F	60.7	469.2	1.00	3.05	21.0
North: Mer Bleue											
7	L2	580	2.0	0.792	17.4	LOS C	10.6	81.7	0.94	1.01	52.2
4	T1	695	2.0	0.792	11.4	LOS C	10.6	81.9	0.94	1.00	54.4
14	R2	139	2.0	0.792	11.3	LOS C	10.6	81.9	0.94	1.00	56.5
Approach		1414	2.0	0.792	13.8	LOS C	10.6	81.9	0.94	1.00	53.8
West: Brian Coburn											
5	L2	70	2.0	1.742	358.7	LOS F	86.7	669.8	1.00	3.76	12.1
2	T1	391	2.0	1.742	352.7	LOS F	86.7	669.8	1.00	3.76	12.0
12	R2	110	2.0	1.742	352.6	LOS F	86.7	669.8	1.00	3.76	11.6
Approach		571	2.0	1.742	353.4	LOS F	86.7	669.8	1.00	3.76	12.0
All Vehicles		3621	2.0	1.742	95.4	LOS F	86.7	669.8	0.98	1.93	26.0

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on degree of saturation per movement

Intersection and Approach LOS values are based on worst degree of saturation for any vehicle movement.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: 2026 PM- Mer Bleue / Renaud Rd

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mer Bleue											
3	L2	66	2.0	0.647	18.9	LOS B	6.6	51.9	0.94	1.06	58.0
8	T1	308	5.0	0.647	15.4	LOS B	6.6	51.9	0.94	1.06	47.3
Approach		374	4.5	0.647	16.1	LOS B	6.6	51.9	0.94	1.06	51.0
North: Mer Bleue											
4	T1	491	2.0	0.737	6.8	LOS A	11.4	87.9	0.69	0.52	54.3
14	R2	261	2.0	0.737	6.4	LOS A	11.4	87.9	0.69	0.52	60.1
Approach		752	2.0	0.737	6.6	LOS A	11.4	87.9	0.69	0.52	57.7
West: Renaud Rd											
5	L2	510	2.0	1.039	63.0	LOS F	32.6	252.2	1.00	1.87	43.6
12	R2	130	2.0	1.039	58.9	LOS F	32.6	252.2	1.00	1.87	44.6
Approach		640	2.0	1.039	62.1	LOS E	32.6	252.2	1.00	1.87	43.8
All Vehicles		1766	2.5	1.039	28.7	LOS C	32.6	252.2	0.85	1.12	48.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: 2026 PM - Brian Coburn / Fern Casey

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Belcourt											
3	L2	113	2.0	0.427	14.9	LOS A	2.2	17.1	0.69	0.89	53.7
8	T1	91	3.0	0.427	8.7	LOS A	2.2	17.1	0.69	0.89	53.3
18	R2	54	2.0	0.427	8.6	LOS A	2.2	17.1	0.69	0.89	55.2
Approach		259	2.4	0.427	11.4	LOS A	2.2	17.1	0.69	0.89	54.0
East: Brian Coburn											
1	L2	120	2.0	0.242	11.9	LOS A	1.2	9.5	0.50	0.66	58.2
6	T1	274	2.0	0.242	5.7	LOS A	1.2	9.5	0.50	0.60	60.2
16	R2	57	3.0	0.242	5.9	LOS A	1.2	9.5	0.50	0.56	59.3
Approach		450	2.1	0.242	7.3	LOS A	1.2	9.5	0.50	0.61	59.6
North: Fern Casey											
7	L2	34	3.0	0.420	13.8	LOS A	2.1	16.6	0.63	0.79	60.0
4	T1	134	3.0	0.420	7.6	LOS A	2.1	16.6	0.63	0.79	55.8
14	R2	122	3.0	0.420	7.5	LOS A	2.1	16.6	0.63	0.79	56.2
Approach		289	3.0	0.420	8.3	LOS A	2.1	16.6	0.63	0.79	56.7
West: Brian Coburn											
5	L2	140	3.0	0.440	12.0	LOS A	2.6	20.4	0.54	0.62	58.0
2	T1	508	2.0	0.440	5.7	LOS A	2.6	20.4	0.54	0.61	60.1
12	R2	210	2.0	0.440	5.9	LOS A	2.6	20.4	0.54	0.59	55.1
Approach		858	2.2	0.440	6.8	LOS A	2.6	20.4	0.54	0.61	59.0
All Vehicles		1855	2.3	0.440	7.8	LOS A	2.6	20.4	0.57	0.67	58.3

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
 Roundabout LOS Method: Same as Signalised Intersections.
 Vehicle movement LOS values are based on degree of saturation per movement
 Intersection and Approach LOS values are based on worst degree of saturation for any vehicle movement.
 Roundabout Capacity Model: SIDRA Standard.
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: 2026 PM - Brian Coburn / Navan

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Navan											
8	T1	501	3.0	0.676	11.7	LOS B	6.6	51.6	0.87	1.02	55.4
18	R2	343	3.0	0.516	9.8	LOS A	3.7	28.8	0.78	0.92	54.8
Approach		845	3.0	0.676	10.9	LOS B	6.6	51.6	0.84	0.98	55.2
East: Brian Coburn											
1	L2	163	3.0	0.277	13.9	LOS B	1.5	11.6	0.68	0.85	54.1
16	R2	346	3.0	0.213	4.0	LOS A	0.0	0.0	0.00	0.46	60.0
Approach		509	3.0	0.277	7.2	LOS A	1.5	11.6	0.22	0.58	57.9
North: Navan											
7	L2	568	3.0	0.584	11.6	LOS B	4.6	35.6	0.57	0.68	54.9
4	T1	840	3.0	0.802	7.4	LOS A	11.2	87.5	0.82	0.68	57.4
Approach		1409	3.0	0.802	9.1	LOS A	11.2	87.5	0.71	0.68	56.3
All Vehicles		2762	3.0	0.802	9.3	LOS A	11.2	87.5	0.66	0.75	56.3

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

 **Site: 2026 PM - Mer Bleue / Brian Coburn**

Roundabout with 1 & 2-lane approaches and circulating road

MUTCD (FHWA 2009) example number: 3C-4

Roundabout Guide (TRB 2010) example number: A-3

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mer Bleue											
3	L2	57	2.0	0.809	25.7	LOS C	8.0	61.8	0.95	1.21	52.4
8	T1	590	2.0	0.809	19.4	LOS C	8.3	64.3	0.95	1.21	48.7
18	R2	263	2.0	0.809	18.7	LOS C	8.3	64.3	0.95	1.21	47.9
Approach		910	2.0	0.809	19.6	LOS C	8.3	64.3	0.95	1.21	48.8
East: Brian Coburn											
1	L2	160	2.0	0.515	14.5	LOS A	3.3	25.5	0.77	0.91	54.9
6	T1	266	2.0	0.515	8.5	LOS A	3.3	25.7	0.77	0.91	58.3
16	R2	300	2.0	0.515	8.5	LOS A	3.3	25.7	0.77	0.90	55.8
Approach		726	2.0	0.515	9.8	LOS A	3.3	25.7	0.77	0.90	56.7
North: Mer Bleue											
7	L2	580	2.0	0.817	18.2	LOS C	10.1	78.2	0.92	1.11	51.6
4	T1	695	2.0	0.817	12.2	LOS C	10.1	78.4	0.92	1.09	53.8
14	R2	139	2.0	0.817	12.1	LOS C	10.1	78.4	0.92	1.09	56.0
Approach		1414	2.0	0.817	14.7	LOS C	10.1	78.4	0.92	1.10	53.2
West: Brian Coburn											
5	L2	70	2.0	0.711	23.6	LOS C	4.7	36.7	0.91	1.08	53.4
2	T1	391	2.0	0.711	16.8	LOS C	5.1	39.2	0.92	1.09	54.1
12	R2	110	2.0	0.711	16.1	LOS C	5.1	39.2	0.93	1.09	53.3
Approach		571	2.0	0.711	17.5	LOS C	5.1	39.2	0.92	1.09	53.9
All Vehicles		3621	2.0	0.817	15.4	LOS C	10.1	78.4	0.90	1.09	52.9

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on degree of saturation per movement

Intersection and Approach LOS values are based on worst degree of saturation for any vehicle movement.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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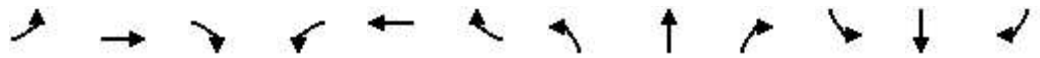
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Appendix D-2

Forecast 2031 Traffic Analysis

HCM 6th Signalized Intersection Summary
 1: Mer Bleue Rd & Innes Rd

2031 Analysis AM
 05/31/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	69	563	315	319	1476	646	447	958	293	177	621	81
Future Volume (veh/h)	69	563	315	319	1476	646	447	958	293	177	621	81
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1491	1688	1688	1758	1758	1772	1786	1744	1744	1744	1688	1688
Adj Flow Rate, veh/h	69	563	0	319	1476	0	447	958	0	177	621	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	22	8	8	3	3	2	1	4	4	4	8	8
Cap, veh/h	133	962		452	1362		472	1180		188	871	
Arrive On Green	0.05	0.30	0.00	0.16	0.41	0.00	0.14	0.36	0.00	0.06	0.27	0.00
Sat Flow, veh/h	1420	3207	1430	1674	3340	1502	3300	3400	0	3222	3291	0
Grp Volume(v), veh/h	69	563	0	319	1476	0	447	958	0	177	621	0
Grp Sat Flow(s),veh/h/ln	1420	1603	1430	1674	1670	1502	1650	1657	0	1611	1603	0
Q Serve(g_s), s	4.3	19.4	0.0	16.1	53.0	0.0	17.5	34.0	0.0	7.1	22.7	0.0
Cycle Q Clear(g_c), s	4.3	19.4	0.0	16.1	53.0	0.0	17.5	34.0	0.0	7.1	22.7	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	133	962		452	1362		472	1180		188	871	
V/C Ratio(X)	0.52	0.59		0.71	1.08		0.95	0.81		0.94	0.71	
Avail Cap(c_a), veh/h	133	962		493	1362		472	1180		188	871	
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	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	0.99	0.99	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	34.4	38.6	0.0	24.9	38.5	0.0	55.2	37.9	0.0	61.0	42.8	0.0
Incr Delay (d2), s/veh	3.5	0.9	0.0	4.1	50.5	0.0	28.2	6.1	0.0	48.4	5.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	5.8	0.0	4.6	24.2	0.0	7.6	10.9	0.0	3.6	7.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.0	39.5	0.0	29.1	89.0	0.0	83.5	44.0	0.0	109.4	47.7	0.0
LnGrp LOS	D	D		C	F		F	D		F	D	
Approach Vol, veh/h		632	A		1795	A		1405	A		798	A
Approach Delay, s/veh		39.4			78.4			56.5			61.4	
Approach LOS		D			E			E			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.1	43.0	22.6	39.3	11.1	57.0	11.6	50.3				
Change Period (Y+Rc), s	* 6.1	6.4	* 6.3	* 6.2	* 6.1	6.4	* 6.3	* 6.2				
Max Green Setting (Gmax), s	* 22	33.4	* 16	* 33	* 5	50.6	* 5.3	* 44				
Max Q Clear Time (g_c+I1), s	18.1	21.4	19.5	24.7	6.3	55.0	9.1	36.0				
Green Ext Time (p_c), s	0.9	4.0	0.0	3.5	0.0	0.0	0.0	5.0				

Intersection Summary

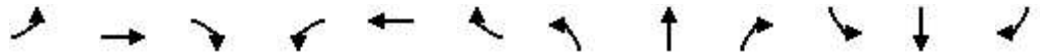
HCM 6th Ctrl Delay	63.5
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
 3: Belcourt Blvd & Innes Rd

2031 Analysis AM
 05/31/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	68	737	81	55	1798	102	123	111	23	82	77	76
Future Volume (veh/h)	68	737	81	55	1798	102	123	111	23	82	77	76
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1688	1575	1800	1772	1772	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	68	737	81	55	1798	102	123	111	23	82	77	76
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	8	16	0	2	2	0	0	0	0	0	0
Cap, veh/h	176	1986	827	455	2036	114	271	449	381	311	208	205
Arrive On Green	0.05	0.62	0.62	0.04	0.63	0.61	0.25	0.25	0.25	0.25	0.25	0.23
Sat Flow, veh/h	1714	3207	1335	1714	3240	182	1254	1800	1525	1275	832	821
Grp Volume(v), veh/h	68	737	81	55	926	974	123	111	23	82	0	153
Grp Sat Flow(s),veh/h/ln	1714	1603	1335	1714	1683	1739	1254	1800	1525	1275	0	1652
Q Serve(g_s), s	1.8	14.8	3.2	1.5	59.1	61.5	11.7	6.4	1.5	7.1	0.0	10.1
Cycle Q Clear(g_c), s	1.8	14.8	3.2	1.5	59.1	61.5	21.8	6.4	1.5	13.6	0.0	10.1
Prop In Lane	1.00		1.00	1.00		0.10	1.00		1.00	1.00		0.50
Lane Grp Cap(c), veh/h	176	1986	827	455	1058	1093	271	449	381	311	0	412
V/C Ratio(X)	0.39	0.37	0.10	0.12	0.88	0.89	0.45	0.25	0.06	0.26	0.00	0.37
Avail Cap(c_a), veh/h	180	1986	827	494	1088	1124	271	449	381	311	0	412
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	1.00
Upstream Filter(l)	1.00	1.00	1.00	0.40	0.40	0.40	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.8	12.2	10.0	9.5	20.0	20.5	49.4	39.0	37.2	44.4	0.0	40.9
Incr Delay (d2), s/veh	1.4	0.1	0.1	0.0	3.5	3.9	5.4	1.3	0.3	2.1	0.0	2.6
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	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	2.5	0.5	0.2	11.0	12.0	3.4	2.4	0.5	2.0	0.0	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.1	12.3	10.1	9.5	23.4	24.4	54.8	40.3	37.5	46.5	0.0	43.5
LnGrp LOS	C	B	B	A	C	C	D	D	D	D	A	D
Approach Vol, veh/h		886			1955			257				235
Approach Delay, s/veh		13.3			23.5			47.0				44.5
Approach LOS		B			C			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	84.5		36.5	7.7	85.9		36.5				
Change Period (Y+Rc), s	* 4.7	* 6.6		* 6.8	4.0	* 6.6		* 6.8				
Max Green Setting (Gmax), s	* 7.3	* 77		* 27	4.0	* 82		* 27				
Max Q Clear Time (g_c+I1), s	3.5	16.8		15.6	3.8	63.5		23.8				
Green Ext Time (p_c), s	0.1	11.0		1.5	0.0	15.8		0.6				

Intersection Summary

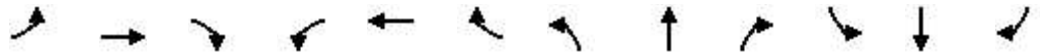
HCM 6th Ctrl Delay	24.1
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
4: Viseneau Dr & Innes Rd

2031 Analysis AM
05/31/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘		↕	
Traffic Volume (veh/h)	11	800	37	59	1905	33	22	5	89	46	13	47
Future Volume (veh/h)	11	800	37	59	1905	33	22	5	89	46	13	47
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1463	1674	1674	1800	1758	1758	1744	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	11	800	37	59	1905	33	22	5	89	46	13	47
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	24	9	9	0	3	3	4	0	0	0	0	0
Cap, veh/h	97	1847	824	437	2228	38	408	495	420	201	64	180
Arrive On Green	0.58	0.58	0.58	0.05	0.66	0.65	0.28	0.28	0.28	0.28	0.28	0.25
Sat Flow, veh/h	189	3180	1418	1714	3359	58	1321	1800	1525	586	233	652
Grp Volume(v), veh/h	11	800	37	59	944	994	22	5	89	106	0	0
Grp Sat Flow(s),veh/h/ln	189	1590	1418	1714	1670	1747	1321	1800	1525	1471	0	0
Q Serve(g_s), s	6.3	18.3	1.5	1.6	57.0	57.8	0.0	0.3	5.8	4.5	0.0	0.0
Cycle Q Clear(g_c), s	53.3	18.3	1.5	1.6	57.0	57.8	1.9	0.3	5.8	7.1	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.03	1.00		1.00	0.43		0.44
Lane Grp Cap(c), veh/h	97	1847	824	437	1108	1159	408	495	420	445	0	0
V/C Ratio(X)	0.11	0.43	0.04	0.13	0.85	0.86	0.05	0.01	0.21	0.24	0.00	0.00
Avail Cap(c_a), veh/h	102	1942	866	449	1169	1223	408	495	420	445	0	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	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	42.1	15.3	11.7	10.1	17.0	17.1	34.8	34.2	36.3	37.1	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.2	0.0	0.1	6.0	6.0	0.3	0.0	1.1	1.3	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	3.5	0.3	0.3	9.5	10.1	0.4	0.1	1.9	2.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.6	15.4	11.7	10.2	23.0	23.2	35.1	34.3	37.4	38.3	0.0	0.0
LnGrp LOS	D	B	B	B	C	C	D	C	D	D	A	A
Approach Vol, veh/h		848			1997			116			106	
Approach Delay, s/veh		15.6			22.7			36.8			38.3	
Approach LOS		B			C			D			D	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	10.7	79.5		39.8		90.2		39.8				
Change Period (Y+Rc), s	* 6.3	* 6.3		* 6.7		* 6.3		* 6.7				
Max Green Setting (Gmax), s	* 5.3	* 77		* 28		* 89		* 28				
Max Q Clear Time (g_c+I1), s	3.6	55.3		9.1		59.8		7.8				
Green Ext Time (p_c), s	0.0	9.0		0.7		24.1		0.9				

Intersection Summary

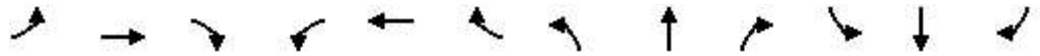
HCM 6th Ctrl Delay	21.8
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
6: Page Rd & Innes Rd

2031 Analysis AM
05/31/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖	↕			↕			↕	
Traffic Volume (veh/h)	46	800	16	32	2202	37	18	20	54	18	11	70
Future Volume (veh/h)	46	800	16	32	2202	37	18	20	54	18	11	70
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1632	1632	1730	1772	1772	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	46	800	16	32	2202	37	18	20	54	18	11	70
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	12	12	5	2	2	0	0	0	0	0	0
Cap, veh/h	87	2224	44	458	2424	41	82	95	204	76	57	243
Arrive On Green	0.72	0.72	0.70	0.72	0.72	0.70	0.22	0.22	0.21	0.22	0.22	0.21
Sat Flow, veh/h	173	3108	62	654	3388	57	219	426	916	195	256	1088
Grp Volume(v), veh/h	46	399	417	32	1091	1148	92	0	0	99	0	0
Grp Sat Flow(s),veh/h/ln	173	1550	1620	654	1683	1762	1560	0	0	1539	0	0
Q Serve(g_s), s	23.7	12.8	12.8	2.6	68.1	69.3	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	93.0	12.8	12.8	15.4	68.1	69.3	6.1	0.0	0.0	6.8	0.0	0.0
Prop In Lane	1.00		0.04	1.00		0.03	0.20		0.59	0.18		0.71
Lane Grp Cap(c), veh/h	87	1109	1159	458	1204	1260	381	0	0	376	0	0
V/C Ratio(X)	0.53	0.36	0.36	0.07	0.91	0.91	0.24	0.00	0.00	0.26	0.00	0.00
Avail Cap(c_a), veh/h	87	1109	1159	458	1204	1260	381	0	0	376	0	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	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.39	0.39	0.39	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	56.9	7.1	7.1	10.0	15.0	15.2	42.1	0.0	0.0	42.5	0.0	0.0
Incr Delay (d2), s/veh	5.9	0.2	0.2	0.0	4.3	4.4	1.5	0.0	0.0	1.7	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.9	1.0	0.2	6.6	7.0	2.2	0.0	0.0	2.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.8	7.3	7.3	10.1	19.3	19.6	43.6	0.0	0.0	44.2	0.0	0.0
LnGrp LOS	E	A	A	B	B	B	D	A	A	D	A	A
Approach Vol, veh/h		862			2271			92				99
Approach Delay, s/veh		10.3			19.3			43.6				44.2
Approach LOS		B			B			D				D
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		97.0		33.0		97.0		33.0				
Change Period (Y+Rc), s		* 6.1		* 6.2		* 6.1		* 6.2				
Max Green Setting (Gmax), s		* 91		* 27		* 91		* 27				
Max Q Clear Time (g_c+I1), s		95.0		8.8		71.3		8.1				
Green Ext Time (p_c), s		0.0		0.7		18.5		0.6				

Intersection Summary

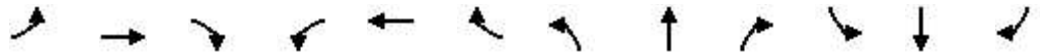
HCM 6th Ctrl Delay	18.4
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
7: Orleans Blvd & Innes Rd

2031 Analysis AM
05/31/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑	↖	↖	↑↑	↖	↖	↑↑	↖	↖	↑↑	↖
Traffic Volume (veh/h)	121	647	23	24	1962	303	203	461	44	171	228	459
Future Volume (veh/h)	121	647	23	24	1962	303	203	461	44	171	228	459
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1617	1589	1730	1800	1772	1674	1786	1730	1758	1688	1603	1786
Adj Flow Rate, veh/h	121	647	0	24	1962	0	203	461	0	171	228	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	13	15	5	0	2	9	1	5	3	8	14	1
Cap, veh/h	175	1661		67	1787		349	1047		239	694	
Arrive On Green	0.06	0.55	0.00	0.04	0.53	0.00	0.06	0.32	0.00	0.23	0.23	0.00
Sat Flow, veh/h	2988	3020	1466	1714	3367	1418	1701	3287	1490	887	3047	1514
Grp Volume(v), veh/h	121	647	0	24	1962	0	203	461	0	171	228	0
Grp Sat Flow(s),veh/h/ln	1494	1510	1466	1714	1683	1418	1701	1643	1490	887	1523	1514
Q Serve(g_s), s	5.2	16.0	0.0	1.8	69.0	0.0	7.8	14.5	0.0	24.6	8.1	0.0
Cycle Q Clear(g_c), s	5.2	16.0	0.0	1.8	69.0	0.0	7.8	14.5	0.0	27.3	8.1	0.0
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	175	1661		67	1787		349	1047		239	694	
V/C Ratio(X)	0.69	0.39		0.36	1.10		0.58	0.44		0.71	0.33	
Avail Cap(c_a), veh/h	175	1661		95	1787		349	1047		239	694	
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	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	60.1	16.8	0.0	60.9	30.5	0.0	39.8	35.1	0.0	50.6	41.9	0.0
Incr Delay (d2), s/veh	11.1	0.1	0.0	3.2	53.4	0.0	2.4	1.3	0.0	16.7	1.3	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	0.0
%ile BackOfQ(50%),veh/ln	1.9	3.2	0.0	0.7	29.1	0.0	4.9	4.7	0.0	5.5	2.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	71.2	16.9	0.0	64.0	83.9	0.0	42.2	36.5	0.0	67.3	43.2	0.0
LnGrp LOS	E	B		E	F		D	D		E	D	
Approach Vol, veh/h		768	A		1986	A		664	A		399	A
Approach Delay, s/veh		25.5			83.7			38.2			53.5	
Approach LOS		C			F			D			D	
Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	9.1	75.5	11.8	33.6	11.6	73.0		45.4				
Change Period (Y+Rc), s	* 6.2	* 6.2	* 6.7	* 6.7	* 6.2	* 6.2		* 6.7				
Max Green Setting (Gmax), s	* 5	* 67	* 5.1	* 27	* 5.4	* 67		* 39				
Max Q Clear Time (g_c+I1), s	3.8	18.0	9.8	29.3	7.2	71.0		16.5				
Green Ext Time (p_c), s	0.0	8.2	0.0	0.0	0.0	0.0		4.6				

Intersection Summary

HCM 6th Ctrl Delay	60.9
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
8: BHB/Innes Rd & Navan Rd

2031 Analysis AM
05/31/2018



Movement	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations	↔↔	↗	↕↕	↗	↖	↕↕
Traffic Volume (veh/h)	1452	111	681	555	22	2233
Future Volume (veh/h)	1452	111	681	555	22	2233
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
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1702	1744	1547	1477	1786	1786
Adj Flow Rate, veh/h	1452	0	681	0	22	2233
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	7	4	18	23	1	1
Cap, veh/h	1282		1356		66	1801
Arrive On Green	0.41	0.00	0.46	0.00	0.04	0.53
Sat Flow, veh/h	3144	1478	3017	1252	1701	3483
Grp Volume(v), veh/h	1452	0	681	0	22	2233
Grp Sat Flow(s),veh/h/ln	1572	1478	1470	1252	1701	1697
Q Serve(g_s), s	53.0	0.0	21.1	0.0	1.6	69.0
Cycle Q Clear(g_c), s	53.0	0.0	21.1	0.0	1.6	69.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	1282		1356		66	1801
V/C Ratio(X)	1.13		0.50		0.33	1.24
Avail Cap(c_a), veh/h	1282		1356		97	1801
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	38.5	0.0	24.6	0.0	60.8	30.5
Incr Delay (d2), s/veh	70.0	0.0	0.3	0.0	2.9	112.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	26.3	0.0	4.9	0.0	0.6	44.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	108.5	0.0	24.9	0.0	63.8	143.4
LnGrp LOS	F		C		E	F
Approach Vol, veh/h	1452	A	681	A		2255
Approach Delay, s/veh	108.5		24.9			142.6
Approach LOS	F		C			F
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	9.0	64.0			73.0	57.0
Change Period (Y+Rc), s	* 6.3	* 5.9			* 5.9	5.8
Max Green Setting (Gmax), s	* 5.1	* 56			* 67	51.2
Max Q Clear Time (g_c+I1), s	3.6	23.1			71.0	55.0
Green Ext Time (p_c), s	0.0	8.1			0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	113.0
HCM 6th LOS	F

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NER, WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
13: Renaud Rd & Navan Rd

2031 Analysis AM
05/31/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	139	474	345	212	529	21	206	138	35	24	380	301
Future Volume (veh/h)	139	474	345	212	529	21	206	138	35	24	380	301
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1519	1337	1730	1758	1758	1632	1744	1716	1800	1786	1786
Adj Flow Rate, veh/h	139	474	345	212	529	0	206	138	35	24	380	301
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	20	33	5	3	3	12	4	6	0	1	1
Cap, veh/h	200	503	352	182	608		232	926	772	529	355	281
Arrive On Green	0.05	0.33	0.31	0.07	0.35	0.00	0.11	0.53	0.53	0.38	0.38	0.36
Sat Flow, veh/h	1714	1519	1133	1647	1758	0	1554	1744	1454	1231	923	731
Grp Volume(v), veh/h	139	474	345	212	529	0	206	138	35	24	0	681
Grp Sat Flow(s),veh/h/ln	1714	1519	1133	1647	1758	0	1554	1744	1454	1231	0	1654
Q Serve(g_s), s	6.6	39.5	39.2	8.6	36.6	0.0	12.3	5.2	1.5	1.6	0.0	50.0
Cycle Q Clear(g_c), s	6.6	39.5	39.2	8.6	36.6	0.0	12.3	5.2	1.5	1.6	0.0	50.0
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	1.00		0.44
Lane Grp Cap(c), veh/h	200	503	352	182	608		232	926	772	529	0	636
V/C Ratio(X)	0.70	0.94	0.98	1.16	0.87		0.89	0.15	0.05	0.05	0.00	1.07
Avail Cap(c_a), veh/h	200	503	352	182	608		232	926	772	529	0	636
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	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	34.3	42.3	44.4	35.3	39.8	0.0	37.8	15.5	14.7	25.1	0.0	40.6
Incr Delay (d2), s/veh	10.0	26.6	42.5	117.7	12.8	0.0	31.0	0.1	0.0	0.0	0.0	56.0
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	0.0
%ile BackOfQ(50%),veh/ln	2.6	14.4	12.6	8.5	13.5	0.0	4.3	1.4	0.3	0.4	0.0	24.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.3	68.9	86.9	153.1	52.6	0.0	68.9	15.6	14.7	25.1	0.0	96.5
LnGrp LOS	D	E	F	F	D		E	B	B	C	A	F
Approach Vol, veh/h		958			741	A		379			705	
Approach Delay, s/veh		71.8			81.3			44.5			94.1	
Approach LOS		E			F			D			F	
Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	47.0	19.0	54.0	8.0	49.0		73.0				
Change Period (Y+Rc), s	4.0	6.6	* 6.8	6.6	4.0	6.6		6.6				
Max Green Setting (Gmax), s	6.0	40.4	* 12	47.4	4.0	42.4		66.4				
Max Q Clear Time (g_c+I1), s	10.6	41.5	14.3	52.0	8.6	38.6		7.2				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	1.6		1.8				

Intersection Summary

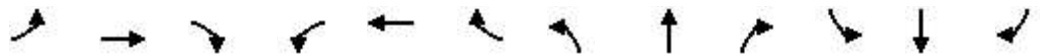
HCM 6th Ctrl Delay	76.3
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
42: Mer Bleue Rd & Vanguard Extension

2031 Analysis AM
05/31/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↕	↗	↖	↕	↗
Traffic Volume (veh/h)	201	32	7	12	57	97	31	1237	24	133	779	101
Future Volume (veh/h)	201	32	7	12	57	97	31	1237	24	133	779	101
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	201	32	7	12	57	97	31	1237	24	133	779	101
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	294	365	80	403	153	260	424	2232	43	276	2225	992
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.66	0.66	0.66	0.66	0.66	0.66
Sat Flow, veh/h	1233	1408	308	1368	589	1002	631	3378	66	440	3367	1502
Grp Volume(v), veh/h	201	0	39	12	0	154	31	616	645	133	779	101
Grp Sat Flow(s),veh/h/ln	1233	0	1716	1368	0	1591	631	1683	1760	440	1683	1502
Q Serve(g_s), s	16.0	0.0	1.7	0.7	0.0	7.9	2.3	19.6	19.6	23.2	10.2	2.4
Cycle Q Clear(g_c), s	23.9	0.0	1.7	2.4	0.0	7.9	12.5	19.6	19.6	42.8	10.2	2.4
Prop In Lane	1.00		0.18	1.00		0.63	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	294	0	445	403	0	413	424	1112	1163	276	2225	992
V/C Ratio(X)	0.68	0.00	0.09	0.03	0.00	0.37	0.07	0.55	0.55	0.48	0.35	0.10
Avail Cap(c_a), veh/h	295	0	446	404	0	414	424	1112	1163	276	2225	992
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	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.2	0.0	28.1	29.0	0.0	30.4	10.2	9.1	9.1	20.5	7.5	6.2
Incr Delay (d2), s/veh	6.4	0.0	0.1	0.0	0.0	0.6	0.3	2.0	1.9	5.9	0.4	0.2
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(50%),veh/ln	4.1	0.0	0.5	0.2	0.0	2.2	0.2	1.4	1.5	1.6	0.5	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.6	0.0	28.2	29.0	0.0	30.9	10.6	11.1	11.0	26.4	7.9	6.4
LnGrp LOS	D	A	C	C	A	C	B	B	B	C	A	A
Approach Vol, veh/h		240			166			1292			1013	
Approach Delay, s/veh		43.6			30.8			11.0			10.2	
Approach LOS		D			C			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		70.1		29.9		70.1		29.9				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		66.0		26.0		66.0		26.0				
Max Q Clear Time (g_c+I1), s		21.6		25.9		44.8		9.9				
Green Ext Time (p_c), s		14.6		0.0		9.2		0.9				
Intersection Summary												
HCM 6th Ctrl Delay				14.8								
HCM 6th LOS				B								

Lanes, Volumes, Timings
45: Ciavan Access & Innes Rd

2031 Analysis AM
10/22/2018



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Volume (vph)	808	64	7	1990	284	36
Future Volume (vph)	808	64	7	1990	284	36
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		50.0	35.1		85.0	0.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.6		7.6	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3390	1517	1695	3390	1695	1517
Flt Permitted			0.292		0.950	
Satd. Flow (perm)	3390	1517	521	3390	1695	1517
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		64				36
Link Speed (k/h)	60			60	50	
Link Distance (m)	236.0			246.2	531.0	
Travel Time (s)	14.2			14.8	38.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	808	64	7	1990	284	36
Shared Lane Traffic (%)						
Lane Group Flow (vph)	808	64	7	1990	284	36
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)		14	26		26	14
Number of Detectors	2	1	1	2	1	1
Detector Template	Thru	Right	Left	Thru	Left	Right
Leading Detector (m)	10.0	2.1	2.1	10.0	2.1	2.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	0.6	2.1	2.1	0.6	2.1	2.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	9.4			9.4		
Detector 2 Size(m)	0.6			0.6		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm	pm+pt	NA	Perm	Perm
Protected Phases	2		1	6		
Permitted Phases		2	6		8	8

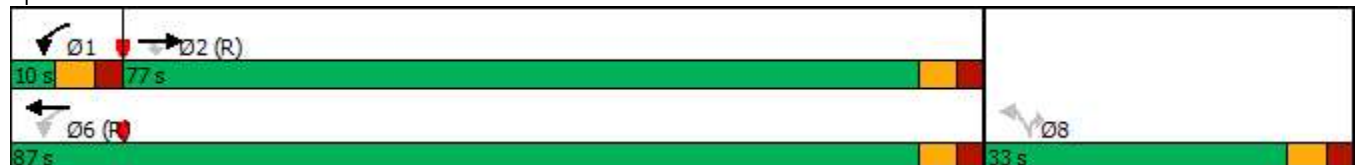


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	10.0	22.0	22.0	22.0
Total Split (s)	77.0	77.0	10.0	87.0	33.0	33.0
Total Split (%)	64.2%	64.2%	8.3%	72.5%	27.5%	27.5%
Maximum Green (s)	71.0	71.0	4.0	81.0	27.0	27.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Walk Time (s)	5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	82.2	82.2	84.2	84.2	23.8	23.8
Actuated g/C Ratio	0.68	0.68	0.70	0.70	0.20	0.20
v/c Ratio	0.35	0.06	0.02	0.84	0.85	0.11
Control Delay	9.2	2.4	6.4	17.9	68.2	12.4
Queue Delay	0.0	0.0	0.0	2.0	0.0	0.0
Total Delay	9.2	2.4	6.4	20.0	68.2	12.4
LOS	A	A	A	B	E	B
Approach Delay	8.7			19.9	62.0	
Approach LOS	A			B	E	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 21.1
 Intersection LOS: C
 Intersection Capacity Utilization 84.7%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 45: Ciavan Access & Innes Rd



HCM 6th Signalized Intersection Summary
13: Renaud Rd & Navan Rd

2031 Analysis AM Improvement
06/07/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	139	474	345	212	529	21	206	138	35	24	380	301
Future Volume (veh/h)	139	474	345	212	529	21	206	138	35	24	380	301
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1519	1337	1730	1758	1758	1632	1744	1716	1800	1786	1786
Adj Flow Rate, veh/h	139	474	0	212	529	0	206	138	35	24	380	301
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	20	33	5	3	3	12	4	6	0	1	1
Cap, veh/h	279	645		268	746		292	1059	883	630	424	336
Arrive On Green	0.09	0.22	0.00	0.09	0.22	0.00	0.11	0.61	0.61	0.46	0.46	0.44
Sat Flow, veh/h	1714	2886	1133	1647	3428	0	1554	1744	1454	1231	923	731
Grp Volume(v), veh/h	139	474	0	212	529	0	206	138	35	24	0	681
Grp Sat Flow(s),veh/h/ln	1714	1443	1133	1647	1670	0	1554	1744	1454	1231	0	1654
Q Serve(g_s), s	6.8	17.1	0.0	9.6	16.4	0.0	7.1	3.8	1.1	1.2	0.0	42.6
Cycle Q Clear(g_c), s	6.8	17.1	0.0	9.6	16.4	0.0	7.1	3.8	1.1	1.2	0.0	42.6
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	1.00		0.44
Lane Grp Cap(c), veh/h	279	645		268	746		292	1059	883	630	0	760
V/C Ratio(X)	0.50	0.74		0.79	0.71		0.71	0.13	0.04	0.04	0.00	0.90
Avail Cap(c_a), veh/h	279	856		268	990		362	1207	1006	678	0	825
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	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	30.3	40.5	0.0	34.7	40.2	0.0	22.6	9.4	8.9	16.7	0.0	28.4
Incr Delay (d2), s/veh	1.4	2.3	0.0	14.6	1.6	0.0	4.6	0.1	0.0	0.0	0.0	11.8
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(50%),veh/ln	2.0	4.6	0.0	4.2	5.1	0.0	1.7	0.7	0.2	0.2	0.0	13.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.6	42.8	0.0	49.3	41.8	0.0	27.2	9.5	8.9	16.8	0.0	40.3
LnGrp LOS	C	D		D	D		C	A	A	B	A	D
Approach Vol, veh/h		613	A		741	A		379			705	
Approach Delay, s/veh		40.3			44.0			19.0			39.5	
Approach LOS		D			D			B			D	
Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	11.0	29.1	16.6	55.6	11.0	29.1		72.2				
Change Period (Y+Rc), s	4.0	6.6	* 6.8	6.6	4.0	6.6		6.6				
Max Green Setting (Gmax), s	7.0	30.7	* 15	53.4	7.0	30.7		75.1				
Max Q Clear Time (g_c+I1), s	11.6	19.1	9.1	44.6	8.8	18.4		5.8				
Green Ext Time (p_c), s	0.0	3.3	0.8	4.4	0.0	3.8		1.8				

Intersection Summary

HCM 6th Ctrl Delay	37.9
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Lanes, Volumes, Timings
12: Mer Bleue Rd & Renaud Rd

2031 PM Analysis
06/27/2018



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	456	180	96	554	782	246
Future Volume (vph)	456	180	96	554	782	246
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	50.0	45.0			80.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		20.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.850				0.850
Fl _t Protected	0.950		0.950			
Satd. Flow (prot)	1666	1391	1504	1764	1732	1494
Fl _t Permitted	0.950		0.083			
Satd. Flow (perm)	1666	1391	131	1764	1732	1494
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		124				216
Link Speed (k/h)	50			60	60	
Link Distance (m)	937.5			936.0	201.6	
Travel Time (s)	67.5			56.2	12.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	10%	11%	0%	1%	2%
Bus Blockages (#/hr)	4	0	6	5	7	1
Adj. Flow (vph)	496	196	104	602	850	267
Shared Lane Traffic (%)						
Lane Group Flow (vph)	496	196	104	602	850	267
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.09	1.07	1.11	1.10	1.11	1.08
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	1	1	1
Detector Template						
Leading Detector (m)	15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	15.0	15.0	15.0	15.0	15.0	15.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	4.0	10.0	10.0	10.0

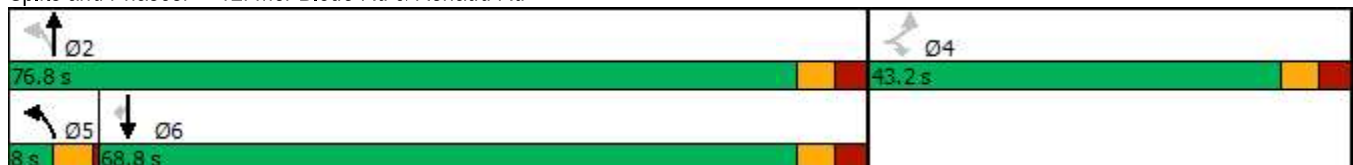


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Split (s)	22.5	22.5	8.0	22.5	22.5	22.5
Total Split (s)	43.2	43.2	8.0	76.8	68.8	68.8
Total Split (%)	36.0%	36.0%	6.7%	64.0%	57.3%	57.3%
Maximum Green (s)	36.7	36.7	4.0	70.3	62.3	62.3
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	3.0	3.0	0.5	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	4.0	6.5	6.5	6.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	Min
Walk Time (s)	5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effect Green (s)	36.1	36.1	70.2	67.7	59.7	59.7
Actuated g/C Ratio	0.31	0.31	0.60	0.58	0.51	0.51
v/c Ratio	0.96	0.38	0.83	0.59	0.96	0.31
Control Delay	72.7	14.9	60.1	18.6	50.4	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.7	14.9	60.1	18.6	50.4	4.6
LOS	E	B	E	B	D	A
Approach Delay	56.3			24.7	39.4	
Approach LOS	E			C	D	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 116.9
 Natural Cycle: 100
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 40.0
 Intersection LOS: D
 Intersection Capacity Utilization 89.9%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 12: Mer Bleue Rd & Renaud Rd



MOVEMENT SUMMARY

 Site: 2031 AM - Brian Coburn / Access Triangle Lands

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Belcourt											
3	L2	55	2.0	0.167	12.1	LOS A	0.6	4.9	0.46	0.71	55.6
8	T1	5	3.0	0.167	6.1	LOS A	0.6	4.9	0.46	0.71	55.9
18	R2	66	2.0	0.167	6.0	LOS A	0.6	4.9	0.46	0.71	57.0
Approach		127	2.0	0.167	8.7	LOS A	0.6	4.9	0.46	0.71	56.5
East: Brian Coburn											
1	L2	10	2.0	0.292	10.3	LOS A	1.6	12.1	0.25	0.43	60.5
6	T1	661	2.0	0.292	4.7	LOS A	1.6	12.1	0.25	0.43	61.2
16	R2	5	3.0	0.292	4.4	LOS A	1.6	12.1	0.25	0.42	60.1
Approach		676	2.0	0.292	4.8	LOS A	1.6	12.1	0.25	0.43	61.2
North: Fern Casey											
7	L2	9	3.0	0.074	13.7	LOS A	0.3	2.0	0.55	0.76	59.0
4	T1	5	3.0	0.074	8.1	LOS A	0.3	2.0	0.55	0.76	54.1
14	R2	27	3.0	0.074	8.2	LOS A	0.3	2.0	0.55	0.76	54.7
Approach		41	3.0	0.074	9.3	LOS A	0.3	2.0	0.55	0.76	55.8
West: Brian Coburn											
5	L2	15	3.0	0.176	10.2	LOS A	0.8	6.4	0.11	0.38	61.7
2	T1	399	2.0	0.176	4.0	LOS A	0.8	6.4	0.11	0.37	62.5
12	R2	13	2.0	0.176	4.1	LOS A	0.8	6.4	0.11	0.36	57.9
Approach		427	2.0	0.176	4.2	LOS A	0.8	6.4	0.11	0.37	62.4
All Vehicles		1272	2.1	0.292	5.1	LOS A	1.6	12.1	0.24	0.45	61.1

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on degree of saturation per movement

Intersection and Approach LOS values are based on worst degree of saturation for any vehicle movement.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

 Site: 2031 AM - Brian Coburn / Fern Casey

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Belcourt											
3	L2	212	2.0	0.570	13.6	LOS A	3.8	29.6	0.63	0.82	53.8
8	T1	142	3.0	0.570	7.6	LOS A	3.8	29.6	0.63	0.82	54.1
18	R2	98	2.0	0.570	7.5	LOS A	3.8	29.6	0.63	0.82	55.8
Approach		452	2.3	0.570	10.4	LOS A	3.8	29.6	0.63	0.82	54.4
East: Brian Coburn											
1	L2	32	2.0	0.413	12.1	LOS A	2.5	19.5	0.61	0.63	58.5
6	T1	696	2.0	0.413	6.5	LOS A	2.5	19.5	0.61	0.62	59.5
16	R2	17	3.0	0.413	6.3	LOS A	2.5	19.5	0.61	0.62	58.6
Approach		745	2.0	0.413	6.8	LOS A	2.5	19.5	0.61	0.62	59.4
North: Fern Casey											
7	L2	50	3.0	0.677	21.1	LOS B	4.4	34.1	0.83	1.04	54.5
4	T1	75	3.0	0.677	15.5	LOS B	4.4	34.1	0.83	1.04	47.6
14	R2	183	3.0	0.677	15.6	LOS B	4.4	34.1	0.83	1.04	49.5
Approach		308	3.0	0.677	16.5	LOS B	4.4	34.1	0.83	1.04	50.2
West: Brian Coburn											
5	L2	5	3.0	0.162	10.8	LOS A	0.8	6.2	0.34	0.44	60.4
2	T1	278	2.0	0.162	4.6	LOS A	0.8	6.2	0.34	0.45	61.5
12	R2	62	2.0	0.162	4.7	LOS A	0.8	6.2	0.34	0.46	56.3
Approach		346	2.0	0.162	4.7	LOS A	0.8	6.2	0.34	0.45	60.9
All Vehicles		1850	2.3	0.677	8.9	LOS B	4.4	34.1	0.60	0.71	57.3

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on degree of saturation per movement

Intersection and Approach LOS values are based on worst degree of saturation for any vehicle movement.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: 2031 AM - Brian Coburn / Navan

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Navan											
8	T1	990	3.0	1.027	36.1	LOS F	39.5	307.4	1.00	1.48	40.8
18	R2	135	3.0	0.245	7.2	LOS A	1.1	8.9	0.53	0.67	57.1
Approach		1125	3.0	1.027	32.7	LOS C	39.5	307.4	0.94	1.38	42.2
East: Brian Coburn											
1	L2	396	3.0	1.316	183.6	LOS F	43.0	334.7	1.00	2.37	16.1
16	R2	695	3.0	0.427	4.0	LOS A	0.0	0.0	0.00	0.46	60.0
Approach		1090	3.0	1.316	69.2	LOS E	43.0	334.7	0.36	1.15	29.6
North: Navan											
7	L2	264	3.0	0.389	12.8	LOS B	2.3	17.7	0.62	0.79	54.7
4	T1	646	3.0	0.712	8.4	LOS A	7.9	61.6	0.83	0.82	57.3
Approach		910	3.0	0.712	9.7	LOS A	7.9	61.6	0.77	0.81	56.5
All Vehicles		3125	3.0	1.316	38.7	LOS D	43.0	334.7	0.69	1.14	39.3

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

 Site: 2031 AM - Fern Casey/Frank Bender

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fern Casey											
3	L2	34	3.0	0.218	10.0	LOS A	1.3	9.8	0.29	0.53	58.1
8	T1	42	3.0	0.218	5.3	LOS A	1.3	9.8	0.29	0.53	58.4
18	R2	142	3.0	0.218	5.0	LOS A	1.3	9.8	0.29	0.53	57.0
Approach		218	3.0	0.218	5.8	LOS A	1.3	9.8	0.29	0.53	57.4
East: Frank Bender											
1	L2	90	3.0	0.136	10.0	LOS A	0.7	5.5	0.28	0.60	56.1
6	T1	17	3.0	0.136	5.3	LOS A	0.7	5.5	0.28	0.60	56.4
16	R2	28	3.0	0.136	5.0	LOS A	0.7	5.5	0.28	0.60	55.1
Approach		136	3.0	0.136	8.3	LOS A	0.7	5.5	0.28	0.60	55.9
North: Frank Bender											
7	L2	8	3.0	0.100	10.3	LOS B	0.5	3.8	0.34	0.51	57.8
4	T1	84	3.0	0.100	5.6	LOS A	0.5	3.8	0.34	0.51	58.0
14	R2	2	3.0	0.100	5.4	LOS A	0.5	3.8	0.34	0.51	56.6
Approach		93	3.0	0.100	6.0	LOS A	0.5	3.8	0.34	0.51	58.0
West: RoadName											
5	L2	10	3.0	0.226	10.8	LOS B	1.2	9.6	0.43	0.58	57.9
2	T1	60	3.0	0.226	6.1	LOS A	1.2	9.6	0.43	0.58	58.2
12	R2	134	3.0	0.226	5.9	LOS A	1.2	9.6	0.43	0.58	56.8
Approach		203	3.0	0.226	6.2	LOS A	1.2	9.6	0.43	0.58	57.2
All Vehicles		651	3.0	0.226	6.5	LOS A	1.3	9.8	0.34	0.55	57.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

 Site: 2031 AM - Frank Bender/Vanguard

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Frank Bender											
3	L2	8	3.0	0.358	12.9	LOS B	2.1	16.7	0.65	0.73	56.4
8	T1	147	3.0	0.358	8.2	LOS A	2.1	16.7	0.65	0.73	56.7
18	R2	107	3.0	0.358	8.0	LOS A	2.1	16.7	0.65	0.73	55.3
Approach		261	3.0	0.358	8.2	LOS A	2.1	16.7	0.65	0.73	56.1
East: Vanguard											
1	L2	28	3.0	0.173	11.3	LOS B	0.9	7.2	0.49	0.63	56.9
6	T1	58	3.0	0.173	6.6	LOS A	0.9	7.2	0.49	0.63	57.1
16	R2	57	3.0	0.173	6.4	LOS A	0.9	7.2	0.49	0.63	55.8
Approach		142	3.0	0.173	7.5	LOS A	0.9	7.2	0.49	0.63	56.5
North: Frank Bender											
7	L2	83	3.0	0.165	10.0	LOS B	0.9	7.1	0.31	0.58	56.6
4	T1	45	3.0	0.165	5.3	LOS A	0.9	7.1	0.31	0.58	56.8
14	R2	35	3.0	0.165	5.1	LOS A	0.9	7.1	0.31	0.58	55.5
Approach		162	3.0	0.165	7.7	LOS A	0.9	7.1	0.31	0.58	56.4
West: Vanguard											
5	L2	100	3.0	0.329	10.8	LOS B	2.0	15.7	0.45	0.60	56.5
2	T1	195	3.0	0.329	6.1	LOS A	2.0	15.7	0.45	0.60	56.7
12	R2	9	3.0	0.329	5.9	LOS A	2.0	15.7	0.45	0.60	55.4
Approach		303	3.0	0.329	7.6	LOS A	2.0	15.7	0.45	0.60	56.6
All Vehicles		868	3.0	0.358	7.8	LOS A	2.1	16.7	0.49	0.64	56.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

 **Site: 2031 AM - Mer Bleue / Brian Coburn**

Roundabout with 1 & 2-lane approaches and circulating road
 MUTCD (FHWA 2009) example number: 3C-4
 Roundabout Guide (TRB 2010) example number: A-3
 Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mer Bleue											
3	L2	139	2.0	0.654	15.8	LOS B	5.0	38.6	0.79	0.98	57.8
8	T1	729	2.0	0.654	9.7	LOS B	5.0	38.9	0.79	0.97	55.9
18	R2	155	2.0	0.654	9.6	LOS B	5.0	38.9	0.79	0.96	54.8
Approach		1024	2.0	0.654	10.5	LOS B	5.0	38.9	0.79	0.97	56.0
East: Brian Coburn											
1	L2	210	2.0	1.214	123.0	LOS F	47.9	370.4	1.00	2.84	20.9
6	T1	480	2.0	1.214	116.9	LOS F	51.9	401.3	1.00	2.85	26.5
16	R2	676	2.0	1.214	115.9	LOS F	51.9	401.3	1.00	2.95	21.2
Approach		1366	2.0	1.214	117.4	LOS F	51.9	401.3	1.00	2.90	23.2
North: Mer Bleue											
7	L2	223	2.0	0.568	16.3	LOS A	4.3	33.3	0.83	1.00	54.0
4	T1	493	2.0	0.568	10.2	LOS A	4.4	33.7	0.83	0.98	55.3
14	R2	57	2.0	0.568	10.0	LOS A	4.4	33.7	0.83	0.97	57.3
Approach		773	2.0	0.568	11.9	LOS A	4.4	33.7	0.83	0.98	55.1
West: Brian Coburn											
5	L2	211	2.0	0.366	14.0	LOS A	1.8	14.3	0.72	0.91	56.8
2	T1	230	2.0	0.366	7.7	LOS A	1.9	14.5	0.72	0.76	59.4
12	R2	32	2.0	0.366	7.8	LOS A	1.9	14.5	0.72	0.75	57.9
Approach		473	2.0	0.366	10.5	LOS A	1.9	14.5	0.72	0.83	58.1
All Vehicles		3636	2.0	1.214	51.0	LOS F	51.9	401.3	0.87	1.68	36.4

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
 Roundabout LOS Method: Same as Signalised Intersections.
 Vehicle movement LOS values are based on degree of saturation per movement
 Intersection and Approach LOS values are based on worst degree of saturation for any vehicle movement.
 Roundabout Capacity Model: SIDRA Standard.
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: 2031 AM - Mer Bleue / Renaud Rd

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mer Bleue											
3	L2	161	2.0	1.005	43.1	LOS F	37.0	291.8	1.00	1.39	50.6
8	T1	652	5.0	1.005	38.6	LOS F	37.0	291.8	1.00	1.39	34.7
Approach		813	4.4	1.005	39.5	LOS D	37.0	291.8	1.00	1.39	40.1
North: Mer Bleue											
4	T1	428	2.0	0.817	11.2	LOS B	14.7	113.9	1.00	0.79	52.3
14	R2	302	2.0	0.817	10.9	LOS B	14.7	113.9	1.00	0.79	59.2
Approach		730	2.0	0.817	11.1	LOS B	14.7	113.9	1.00	0.79	56.7
West: Renaud Rd											
5	L2	234	2.0	0.530	15.5	LOS B	4.5	34.9	0.85	0.93	58.5
12	R2	104	2.0	0.530	10.6	LOS B	4.5	34.9	0.85	0.93	58.5
Approach		338	2.0	0.530	14.0	LOS B	4.5	34.9	0.85	0.93	58.5
All Vehicles		1882	3.0	1.005	23.9	LOS C	37.0	291.8	0.97	1.08	50.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: 2031 AM - Brian Coburn / Navan - Improv

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Navan											
8	T1	990	3.0	0.588	6.3	LOS A	4.8	37.1	0.66	0.62	58.4
18	R2	135	3.0	0.588	6.5	LOS A	4.8	37.1	0.66	0.63	56.5
Approach		1125	3.0	0.588	6.4	LOS A	4.8	37.1	0.66	0.63	58.1
East: Brian Coburn											
1	L2	396	3.0	0.805	23.5	LOS C	6.5	50.9	0.90	1.16	47.7
16	R2	695	3.0	0.427	4.0	LOS A	0.0	0.0	0.00	0.46	60.0
Approach		1090	3.0	0.805	11.1	LOS B	6.5	50.9	0.33	0.71	54.7
North: Navan											
7	L2	264	3.0	0.544	13.6	LOS B	4.3	33.2	0.74	0.81	55.8
4	T1	646	3.0	0.544	7.4	LOS A	4.3	33.2	0.74	0.75	57.1
Approach		910	3.0	0.544	9.2	LOS A	4.3	33.2	0.74	0.77	56.7
All Vehicles		3125	3.0	0.805	8.8	LOS A	6.5	50.9	0.57	0.70	56.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 **Site: 2031 AM - Mer Bleue / Brian Coburn - Improv**

Roundabout with 1 & 2-lane approaches and circulating road

MUTCD (FHWA 2009) example number: 3C-4

Roundabout Guide (TRB 2010) example number: A-3

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mer Bleue											
3	L2	139	2.0	0.456	13.2	LOS A	2.6	20.0	0.67	0.78	58.7
8	T1	729	2.0	0.456	6.8	LOS A	2.7	20.6	0.66	0.68	57.2
18	R2	155	2.0	0.134	5.1	LOS A	0.6	4.3	0.44	0.59	57.9
Approach		1024	2.0	0.456	7.4	LOS A	2.7	20.6	0.63	0.68	57.6
East: Brian Coburn											
1	L2	210	2.0	0.457	14.8	LOS A	2.5	19.5	0.76	0.94	53.8
6	T1	480	2.0	0.457	7.8	LOS A	2.7	21.0	0.76	0.78	58.9
16	R2	676	2.0	0.735	9.8	LOS C	6.2	48.1	0.84	1.04	54.9
Approach		1366	2.0	0.735	9.9	LOS C	6.2	48.1	0.80	0.93	56.4
North: Mer Bleue											
7	L2	223	2.0	0.422	13.4	LOS A	2.3	17.5	0.71	0.87	55.5
4	T1	493	2.0	0.422	6.8	LOS A	2.4	18.4	0.70	0.68	56.9
14	R2	57	2.0	0.054	5.4	LOS A	0.2	1.8	0.51	0.61	59.7
Approach		773	2.0	0.422	8.6	LOS A	2.4	18.4	0.69	0.73	56.8
West: Brian Coburn											
5	L2	211	2.0	0.287	13.0	LOS A	1.3	10.4	0.68	0.87	56.9
2	T1	230	2.0	0.255	6.3	LOS A	1.3	9.7	0.66	0.59	59.8
12	R2	32	2.0	0.031	5.6	LOS A	0.1	1.0	0.52	0.61	59.4
Approach		473	2.0	0.287	9.3	LOS A	1.3	10.4	0.66	0.72	58.4
All Vehicles		3636	2.0	0.735	8.8	LOS C	6.2	48.1	0.71	0.79	57.1

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on degree of saturation per movement

Intersection and Approach LOS values are based on worst degree of saturation for any vehicle movement.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: 2031 AM - Mer Bleue / Renaud Rd - Improv

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mer Bleue											
3	L2	161	2.0	0.413	11.7	LOS B	2.7	21.2	0.54	0.61	61.9
8	T1	652	5.0	0.413	5.6	LOS A	2.7	21.2	0.54	0.56	56.4
Approach		813	4.4	0.413	6.8	LOS A	2.7	21.3	0.54	0.57	58.6
North: Mer Bleue											
4	T1	428	2.0	0.342	4.9	LOS A	2.1	16.4	0.42	0.47	58.8
14	R2	302	2.0	0.342	5.0	LOS A	2.1	16.4	0.42	0.52	61.8
Approach		730	2.0	0.342	5.0	LOS A	2.1	16.4	0.42	0.49	60.7
West: Renaud Rd											
5	L2	234	2.0	0.266	12.3	LOS B	1.4	10.5	0.56	0.77	60.0
12	R2	104	2.0	0.156	6.9	LOS A	0.7	5.4	0.55	0.68	61.7
Approach		338	2.0	0.266	10.7	LOS B	1.4	10.5	0.55	0.74	60.5
All Vehicles		1882	3.0	0.413	6.8	LOS A	2.7	21.3	0.50	0.57	59.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

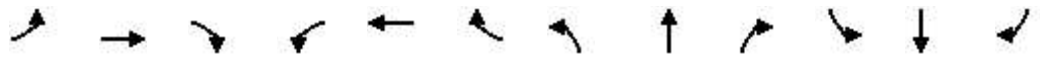
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

HCM 6th Signalized Intersection Summary
1: Mer Bleue Rd & Innes Rd

2031 PM Analysis
05/31/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	156	1713	506	408	1025	385	401	795	472	440	1064	102
Future Volume (veh/h)	156	1713	506	408	1025	385	401	795	472	440	1064	102
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1758	1758	1758	1772	1772	1800	1772	1772
Adj Flow Rate, veh/h	156	1713	0	408	1025	0	401	795	0	440	1064	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	0	0	0	3	3	3	2	2	0	2	2
Cap, veh/h	269	1236		266	1354		300	984		333	1010	
Arrive On Green	0.08	0.36	0.00	0.12	0.41	0.00	0.09	0.29	0.00	0.10	0.30	0.00
Sat Flow, veh/h	1714	3420	1525	1714	3340	1490	3248	3455	0	3326	3455	0
Grp Volume(v), veh/h	156	1713	0	408	1025	0	401	795	0	440	1064	0
Grp Sat Flow(s),veh/h/ln	1714	1710	1525	1714	1670	1490	1624	1683	0	1663	1683	0
Q Serve(g_s), s	7.3	47.0	0.0	16.0	34.2	0.0	12.0	28.4	0.0	13.0	39.0	0.0
Cycle Q Clear(g_c), s	7.3	47.0	0.0	16.0	34.2	0.0	12.0	28.4	0.0	13.0	39.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	269	1236		266	1354		300	984		333	1010	
V/C Ratio(X)	0.58	1.39		1.53	0.76		1.34	0.81		1.32	1.05	
Avail Cap(c_a), veh/h	269	1236		266	1354		300	984		333	1010	
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	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	0.95	0.95	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	26.9	41.5	0.0	41.8	33.2	0.0	59.0	42.6	0.0	58.5	45.5	0.0
Incr Delay (d2), s/veh	3.1	178.5	0.0	257.4	2.5	0.0	171.9	6.8	0.0	164.9	43.5	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	0.0
%ile BackOfQ(50%),veh/ln	2.2	44.6	0.0	22.0	10.0	0.0	11.1	9.7	0.0	12.0	18.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.0	220.0	0.0	299.1	35.7	0.0	230.9	49.4	0.0	223.4	89.0	0.0
LnGrp LOS	C	F		F	D		F	D		F	F	
Approach Vol, veh/h		1869	A		1433	A		1196	A		1504	A
Approach Delay, s/veh		204.2			110.7			110.2			128.3	
Approach LOS		F			F			F			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	20.0	51.0	16.0	43.0	14.3	56.7	17.0	42.0				
Change Period (Y+Rc), s	* 6.1	6.4	* 6.3	* 6.2	* 6.1	6.4	* 6.3	* 6.2				
Max Green Setting (Gmax), s	* 14	44.6	* 9.7	* 37	* 8.2	50.3	* 11	* 36				
Max Q Clear Time (g_c+I1), s	18.0	49.0	14.0	41.0	9.3	36.2	15.0	30.4				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	8.1	0.0	3.0				

Intersection Summary

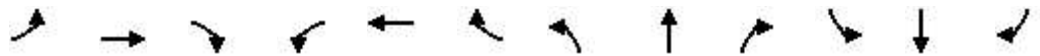
HCM 6th Ctrl Delay	144.1
HCM 6th LOS	F

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
 3: Belcourt Blvd & Innes Rd

2031 PM Analysis
 05/31/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	144	1952	163	214	1187	89	381	301	114	143	213	46
Future Volume (veh/h)	144	1952	163	214	1187	89	381	301	114	143	213	46
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1786	1786	1730	1772	1772	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	144	1952	163	214	1187	89	381	301	114	143	213	46
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	1	1	5	2	2	0	0	0	0	0	0
Cap, veh/h	191	1542	688	170	1761	132	365	671	569	309	535	115
Arrive On Green	0.45	0.45	0.45	0.06	0.55	0.53	0.37	0.37	0.37	0.37	0.37	0.35
Sat Flow, veh/h	437	3393	1514	1647	3175	238	1138	1800	1525	987	1434	310
Grp Volume(v), veh/h	144	1952	163	214	629	647	381	301	114	143	0	259
Grp Sat Flow(s),veh/h/ln	437	1697	1514	1647	1683	1729	1138	1800	1525	987	0	1744
Q Serve(g_s), s	31.6	50.0	7.2	7.0	29.2	29.4	28.9	13.9	5.6	14.0	0.0	12.1
Cycle Q Clear(g_c), s	50.0	50.0	7.2	7.0	29.2	29.4	41.0	13.9	5.6	27.9	0.0	12.1
Prop In Lane	1.00		1.00	1.00		0.14	1.00		1.00	1.00		0.18
Lane Grp Cap(c), veh/h	191	1542	688	170	933	959	365	671	569	309	0	650
V/C Ratio(X)	0.75	1.27	0.24	1.26	0.67	0.68	1.05	0.45	0.20	0.46	0.00	0.40
Avail Cap(c_a), veh/h	191	1542	688	170	933	959	365	671	569	309	0	650
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	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.81	0.81	0.81	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	41.2	30.0	18.3	29.8	17.4	17.6	43.1	26.0	23.4	36.5	0.0	25.6
Incr Delay (d2), s/veh	15.6	124.8	0.2	148.2	1.6	1.5	59.4	2.2	0.8	4.9	0.0	1.8
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(50%),veh/ln	3.7	38.1	1.5	8.6	5.4	5.6	13.8	4.5	1.5	2.9	0.0	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.8	154.8	18.5	178.0	19.0	19.1	102.5	28.2	24.2	41.4	0.0	27.4
LnGrp LOS	E	F	B	F	B	B	F	C	C	D	A	C
Approach Vol, veh/h		2259			1490			796				402
Approach Delay, s/veh		138.7			41.9			63.2				32.4
Approach LOS		F			D			E				C
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	11.0	54.0		45.0		65.0		45.0				
Change Period (Y+Rc), s	* 4.7	* 6.6		* 6.8		* 6.6		* 6.8				
Max Green Setting (Gmax), s	* 6.3	* 47		* 38		* 58		* 38				
Max Q Clear Time (g_c+I1), s	9.0	52.0		29.9		31.4		43.0				
Green Ext Time (p_c), s	0.0	0.0		2.3		14.8		0.0				

Intersection Summary

HCM 6th Ctrl Delay	88.8
HCM 6th LOS	F

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
4: Viseneau Dr & Innes Rd

2031 PM Analysis
05/31/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	2020	87	183	1347	84	106	40	179	60	51	30
Future Volume (veh/h)	44	2020	87	183	1347	84	106	40	179	60	51	30
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1772	1772	1800	1744	1744	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	44	2020	87	183	1347	84	106	40	179	60	51	30
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	2	2	0	4	4	0	0	0	0	0	0
Cap, veh/h	235	1994	889	187	2218	138	487	612	519	235	195	106
Arrive On Green	0.59	0.59	0.59	0.08	0.70	0.68	0.34	0.34	0.34	0.34	0.34	0.32
Sat Flow, veh/h	377	3367	1502	1714	3168	197	1338	1800	1525	570	567	308
Grp Volume(v), veh/h	44	2020	87	183	703	728	106	40	179	141	0	0
Grp Sat Flow(s),veh/h/ln	377	1683	1502	1714	1657	1708	1338	1800	1525	1445	0	0
Q Serve(g_s), s	9.0	77.0	3.3	9.6	28.7	29.1	0.6	2.0	11.4	6.1	0.0	0.0
Cycle Q Clear(g_c), s	24.1	77.0	3.3	9.6	28.7	29.1	9.9	2.0	11.4	8.8	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.12	1.00		1.00	0.43		0.21
Lane Grp Cap(c), veh/h	235	1994	889	187	1160	1196	487	612	519	535	0	0
V/C Ratio(X)	0.19	1.01	0.10	0.98	0.61	0.61	0.22	0.07	0.35	0.26	0.00	0.00
Avail Cap(c_a), veh/h	235	1994	889	187	1160	1196	487	612	519	535	0	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	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	20.2	26.5	11.5	46.0	10.2	10.3	31.6	29.0	32.1	31.0	0.0	0.0
Incr Delay (d2), s/veh	0.4	23.4	0.0	58.9	0.9	0.9	1.0	0.2	1.8	1.2	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	21.4	0.6	5.5	3.0	3.2	2.0	0.7	3.5	2.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.6	49.9	11.5	104.9	11.1	11.2	32.7	29.2	33.9	32.2	0.0	0.0
LnGrp LOS	C	F	B	F	B	B	C	C	C	C	A	A
Approach Vol, veh/h		2151			1614			325			141	
Approach Delay, s/veh		47.8			21.8			32.9			32.2	
Approach LOS		D			C			C			C	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	14.0	81.0		49.0		95.0		49.0				
Change Period (Y+Rc), s	* 6.3	* 6.3		7.1		* 6.3		* 7.1				
Max Green Setting (Gmax), s	* 7.7	* 75		27.9		* 89		* 28				
Max Q Clear Time (g_c+I1), s	11.6	79.0		10.8		31.1		13.4				
Green Ext Time (p_c), s	0.0	0.0		1.0		25.6		2.5				

Intersection Summary

HCM 6th Ctrl Delay	36.2
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
6: Page Rd & Innes Rd

2031 PM Analysis
05/31/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	94	2282	41	152	1376	12	45	88	121	60	55	15
Future Volume (veh/h)	94	2282	41	152	1376	12	45	88	121	60	55	15
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1786	1786	1800	1758	1758	1772	1772	1772	1800	1800	1800
Adj Flow Rate, veh/h	94	2282	41	152	1376	12	45	88	121	60	55	15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	1	0	3	3	2	2	2	0	0	0
Cap, veh/h	272	2467	44	85	2454	21	81	129	158	137	116	27
Arrive On Green	0.72	0.72	0.71	0.72	0.72	0.71	0.21	0.21	0.19	0.21	0.21	0.19
Sat Flow, veh/h	396	3411	61	159	3393	30	216	612	754	443	551	130
Grp Volume(v), veh/h	94	1132	1191	152	677	711	254	0	0	130	0	0
Grp Sat Flow(s),veh/h/ln	396	1697	1775	159	1670	1753	1582	0	0	1124	0	0
Q Serve(g_s), s	17.4	66.5	67.8	19.0	22.6	22.7	4.4	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	40.1	66.5	67.8	86.8	22.6	22.7	18.0	0.0	0.0	13.6	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.02	0.18		0.48	0.46		0.12
Lane Grp Cap(c), veh/h	272	1227	1284	85	1208	1268	368	0	0	280	0	0
V/C Ratio(X)	0.35	0.92	0.93	1.78	0.56	0.56	0.69	0.00	0.00	0.46	0.00	0.00
Avail Cap(c_a), veh/h	272	1227	1284	85	1208	1268	368	0	0	280	0	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	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.79	0.79	0.79	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	17.1	13.8	14.0	57.2	7.7	7.7	45.0	0.0	0.0	42.2	0.0	0.0
Incr Delay (d2), s/veh	3.5	12.7	12.9	387.5	1.5	1.4	10.2	0.0	0.0	5.5	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	6.5	6.9	11.3	1.2	1.2	6.9	0.0	0.0	3.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.5	26.5	26.9	444.7	9.2	9.2	55.2	0.0	0.0	47.6	0.0	0.0
LnGrp LOS	C	C	C	F	A	A	E	A	A	D	A	A
Approach Vol, veh/h		2417			1540			254				130
Approach Delay, s/veh		26.5			52.2			55.2				47.6
Approach LOS		C			D			E				D
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		90.8		29.2		90.8		29.2				
Change Period (Y+Rc), s		* 6.1		* 6.2		* 6.1		* 6.2				
Max Green Setting (Gmax), s		* 85		* 23		* 85		* 23				
Max Q Clear Time (g_c+I1), s		69.8		15.6		88.8		20.0				
Green Ext Time (p_c), s		14.5		0.5		0.0		0.6				

Intersection Summary

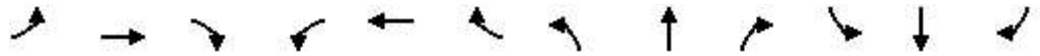
HCM 6th Ctrl Delay	37.9
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
7: Orleans Blvd & Innes Rd

2031 PM Analysis
05/31/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↗	↖	↑↑	↗	↖	↑↑	↗	↖	↑↑	↗
Traffic Volume (veh/h)	579	1997	158	58	1119	259	64	394	84	336	477	203
Future Volume (veh/h)	579	1997	158	58	1119	259	64	394	84	336	477	203
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1786	1800	1800	1758	1772	1800	1772	1800	1800	1772	1786
Adj Flow Rate, veh/h	579	1997	0	58	1119	0	64	394	0	336	477	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	0	0	3	2	0	2	0	0	2	1
Cap, veh/h	578	1540		95	1120		336	1341		369	1049	
Arrive On Green	0.17	0.45	0.00	0.06	0.34	0.00	0.06	0.40	0.00	0.31	0.31	0.00
Sat Flow, veh/h	3326	3393	1525	1714	3340	1502	1714	3367	1525	1006	3367	1514
Grp Volume(v), veh/h	579	1997	0	58	1119	0	64	394	0	336	477	0
Grp Sat Flow(s),veh/h/ln	1663	1697	1525	1714	1670	1502	1714	1683	1525	1006	1683	1514
Q Serve(g_s), s	22.6	59.0	0.0	4.3	43.5	0.0	3.1	10.4	0.0	40.5	14.8	0.0
Cycle Q Clear(g_c), s	22.6	59.0	0.0	4.3	43.5	0.0	3.1	10.4	0.0	40.5	14.8	0.0
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	578	1540		95	1120		336	1341		369	1049	
V/C Ratio(X)	1.00	1.30		0.61	1.00		0.19	0.29		0.91	0.45	
Avail Cap(c_a), veh/h	578	1540		95	1120		341	1341		369	1049	
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	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	53.7	35.5	0.0	60.0	43.2	0.0	26.9	26.6	0.0	46.1	35.9	0.0
Incr Delay (d2), s/veh	37.8	138.4	0.0	10.9	26.6	0.0	0.3	0.6	0.0	29.0	1.4	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	0.0
%ile BackOfQ(50%),veh/ln	10.4	45.2	0.0	1.8	17.1	0.0	1.0	3.2	0.0	11.5	4.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	91.5	173.9	0.0	71.0	69.8	0.0	27.1	27.2	0.0	75.1	37.3	0.0
LnGrp LOS	F	F		E	E		C	C		E	D	
Approach Vol, veh/h		2576	A		1177	A		458	A		813	A
Approach Delay, s/veh		155.4			69.9			27.2			53.0	
Approach LOS		F			E			C			D	
Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	11.2	63.0	11.3	44.5	26.6	47.6		55.8				
Change Period (Y+Rc), s	* 6.2	* 6.2	* 6.7	* 6.7	* 6.2	* 6.2		* 6.7				
Max Green Setting (Gmax), s	* 5	* 57	* 5	* 37	* 20	* 41		* 49				
Max Q Clear Time (g_c+I1), s	6.3	61.0	5.1	42.5	24.6	45.5		12.4				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0		4.4				

Intersection Summary

HCM 6th Ctrl Delay	107.1
HCM 6th LOS	F

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
 8: BHB/Innes Rd & Navan Rd

2031 PM Analysis
 05/31/2018



Movement	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (veh/h)	813	53	2374	1598	104	1132
Future Volume (veh/h)	813	53	2374	1598	104	1132
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
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1617	1800	1786	1744	1800	1744
Adj Flow Rate, veh/h	813	0	2374	0	104	1132
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	13	0	1	4	0	4
Cap, veh/h	736		2054		96	2294
Arrive On Green	0.25	0.00	0.61	0.00	0.06	0.69
Sat Flow, veh/h	2988	1525	3483	1478	1714	3400
Grp Volume(v), veh/h	813	0	2374	0	104	1132
Grp Sat Flow(s),veh/h/ln	1494	1525	1697	1478	1714	1657
Q Serve(g_s), s	32.0	0.0	78.7	0.0	7.3	20.8
Cycle Q Clear(g_c), s	32.0	0.0	78.7	0.0	7.3	20.8
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	736		2054		96	2294
V/C Ratio(X)	1.11		1.16		1.08	0.49
Avail Cap(c_a), veh/h	736		2054		96	2294
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	49.0	0.0	25.6	0.0	61.4	9.3
Incr Delay (d2), s/veh	65.8	0.0	76.0	0.0	115.1	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.8	0.0	36.3	0.0	5.7	2.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	114.8	0.0	101.7	0.0	176.5	10.1
LnGrp LOS	F		F		F	B
Approach Vol, veh/h	813	A	2374	A		1236
Approach Delay, s/veh	114.8		101.7			24.1
Approach LOS	F		F			C
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		36.0	11.3	82.7		94.0
Change Period (Y+Rc), s		* 5.8	* 6.3	* 5.9		* 5.9
Max Green Setting (Gmax), s		* 30	* 5	* 77		* 88
Max Q Clear Time (g_c+I1), s		34.0	9.3	80.7		22.8
Green Ext Time (p_c), s		0.0	0.0	0.0		18.8
Intersection Summary						
HCM 6th Ctrl Delay			82.4			
HCM 6th LOS			F			
Notes						
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.						
Unsignalized Delay for [NER, WBR] is excluded from calculations of the approach delay and intersection delay.						

HCM 6th Signalized Intersection Summary
13: Renaud Rd & Navan Rd

2031 PM Analysis
05/31/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	341	705	165	49	356	34	467	439	212	27	142	168
Future Volume (veh/h)	341	705	165	49	356	34	467	439	212	27	142	168
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1744	1800	1393	1660	1660	1617	1786	1674	1800	1730	1730
Adj Flow Rate, veh/h	341	705	165	49	356	0	467	439	212	27	142	168
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	4	0	29	10	10	13	1	9	0	5	5
Cap, veh/h	449	738	615	139	562		465	811	644	196	128	151
Arrive On Green	0.14	0.42	0.40	0.05	0.34	0.00	0.27	0.45	0.45	0.18	0.18	0.16
Sat Flow, veh/h	1701	1744	1525	1327	1660	0	1540	1786	1418	793	722	854
Grp Volume(v), veh/h	341	705	165	49	356	0	467	439	212	27	0	310
Grp Sat Flow(s),veh/h/ln	1701	1744	1525	1327	1660	0	1540	1786	1418	793	0	1576
Q Serve(g_s), s	16.6	50.9	9.4	3.0	23.5	0.0	34.6	23.1	12.5	3.8	0.0	23.0
Cycle Q Clear(g_c), s	16.6	50.9	9.4	3.0	23.5	0.0	34.6	23.1	12.5	3.8	0.0	23.0
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	1.00		0.54
Lane Grp Cap(c), veh/h	449	738	615	139	562		465	811	644	196	0	279
V/C Ratio(X)	0.76	0.96	0.27	0.35	0.63		1.00	0.54	0.33	0.14	0.00	1.11
Avail Cap(c_a), veh/h	449	738	615	139	562		465	811	644	196	0	279
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	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.9	36.3	26.0	32.0	36.2	0.0	37.3	25.7	22.8	45.6	0.0	54.2
Incr Delay (d2), s/veh	7.4	22.8	0.2	1.5	2.3	0.0	42.6	0.7	0.3	0.3	0.0	87.3
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(50%),veh/ln	5.1	19.1	2.6	0.7	7.3	0.0	15.0	7.0	3.0	0.6	0.0	14.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.3	59.1	26.2	33.5	38.5	0.0	79.8	26.4	23.1	45.9	0.0	141.5
LnGrp LOS	C	E	C	C	D		F	C	C	D	A	F
Approach Vol, veh/h		1211			405	A		1118				337
Approach Delay, s/veh		47.1			37.9			48.1				133.8
Approach LOS		D			D			D				F
Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	8.0	59.0	36.0	27.0	19.0	48.0		63.0				
Change Period (Y+Rc), s	4.0	6.6	4.0	6.6	4.0	6.6		6.6				
Max Green Setting (Gmax), s	4.0	52.4	32.0	20.4	15.0	41.4		56.4				
Max Q Clear Time (g_c+I1), s	5.0	52.9	36.6	25.0	18.6	25.5		25.1				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	2.8		7.4				

Intersection Summary

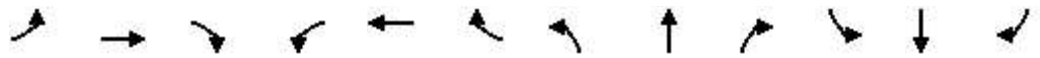
HCM 6th Ctrl Delay	55.8
HCM 6th LOS	E

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
44: Mer Bleue Rd

2031 PM Analysis
05/31/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	59	34	23	32	149	17	918	13	99	1554	235
Future Volume (veh/h)	142	59	34	23	32	149	17	918	13	99	1554	235
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	154	64	37	25	35	162	18	998	14	108	1689	255
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	245	269	155	340	70	324	133	2158	30	341	2138	954
Arrive On Green	0.25	0.25	0.25	0.25	0.25	0.25	0.63	0.63	0.63	0.63	0.63	0.63
Sat Flow, veh/h	1186	1053	609	1294	274	1269	227	3399	48	557	3367	1502
Grp Volume(v), veh/h	154	0	101	25	0	197	18	494	518	108	1689	255
Grp Sat Flow(s),veh/h/ln	1186	0	1662	1294	0	1543	227	1683	1763	557	1683	1502
Q Serve(g_s), s	12.7	0.0	4.8	1.6	0.0	10.9	6.3	15.2	15.2	12.4	36.7	7.5
Cycle Q Clear(g_c), s	23.6	0.0	4.8	6.4	0.0	10.9	43.0	15.2	15.2	27.6	36.7	7.5
Prop In Lane	1.00		0.37	1.00		0.82	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	245	0	424	340	0	394	133	1069	1120	341	2138	954
V/C Ratio(X)	0.63	0.00	0.24	0.07	0.00	0.50	0.14	0.46	0.46	0.32	0.79	0.27
Avail Cap(c_a), veh/h	245	0	424	340	0	394	133	1069	1120	341	2138	954
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	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.9	0.0	29.5	32.1	0.0	31.8	29.1	9.4	9.4	16.6	13.4	8.0
Incr Delay (d2), s/veh	5.0	0.0	0.3	0.1	0.0	1.0	2.1	1.4	1.4	2.4	3.1	0.7
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(50%),veh/ln	3.1	0.0	1.4	0.4	0.0	3.0	0.3	1.5	1.5	1.0	3.5	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.9	0.0	29.8	32.2	0.0	32.8	31.2	10.9	10.8	19.0	16.4	8.7
LnGrp LOS	D	A	C	C	A	C	C	B	B	B	B	A
Approach Vol, veh/h		255			222			1030			2052	
Approach Delay, s/veh		40.2			32.7			11.2			15.6	
Approach LOS		D			C			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		69.0		31.0		69.0		31.0				
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5				
Max Green Setting (Gmax), s		63.5		25.5		63.5		25.5				
Max Q Clear Time (g_c+I1), s		45.0		25.6		38.7		12.9				
Green Ext Time (p_c), s		7.9		0.0		19.0		1.2				
Intersection Summary												
HCM 6th Ctrl Delay				17.2								
HCM 6th LOS				B								

Lanes, Volumes, Timings
48: Ciavan Access & Innes Rd

2031 PM Analysis
10/22/2018



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Volume (vph)	2210	253	37	1451	157	18
Future Volume (vph)	2210	253	37	1451	157	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		50.0	35.0		85.0	0.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Fr _t		0.850				0.850
Fl _t Protected			0.950		0.950	
Satd. Flow (prot)	3353	1500	1676	3353	1676	1500
Fl _t Permitted			0.054		0.950	
Satd. Flow (perm)	3353	1500	95	3353	1676	1500
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		169				18
Link Speed (k/h)	60			60	50	
Link Distance (m)	219.8			255.1	539.8	
Travel Time (s)	13.2			15.3	38.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	2210	253	37	1451	157	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2210	253	37	1451	157	18
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)		15	25		25	15
Number of Detectors	2	1	1	2	1	1
Detector Template	Thru	Right	Left	Thru	Left	Right
Leading Detector (m)	10.0	2.0	2.0	10.0	2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	0.6	2.0	2.0	0.6	2.0	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	9.4			9.4		
Detector 2 Size(m)	0.6			0.6		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8

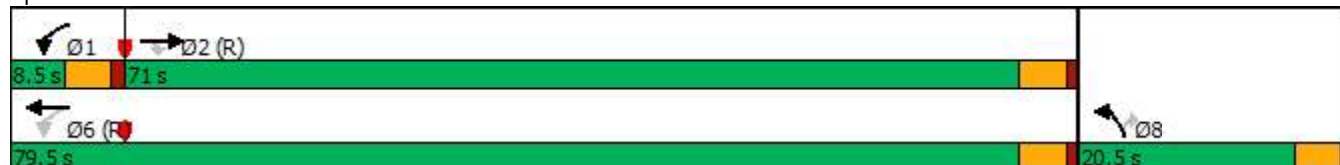


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	8.5	20.5	20.5	20.5
Total Split (s)	71.0	71.0	8.5	79.5	20.5	20.5
Total Split (%)	71.0%	71.0%	8.5%	79.5%	20.5%	20.5%
Maximum Green (s)	66.5	66.5	4.0	75.0	16.0	16.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Walk Time (s)	5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effect Green (s)	72.0	72.0	77.4	77.4	13.6	13.6
Actuated g/C Ratio	0.72	0.72	0.77	0.77	0.14	0.14
v/c Ratio	0.92	0.22	0.25	0.56	0.69	0.08
Control Delay	21.1	2.7	6.9	5.8	56.9	16.5
Queue Delay	4.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.2	2.7	6.9	5.8	56.9	16.5
LOS	C	A	A	A	E	B
Approach Delay	22.8			5.8	52.7	
Approach LOS	C			A	D	

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100
Offset:	0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle:	100
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.92
Intersection Signal Delay:	18.0
Intersection LOS:	B
Intersection Capacity Utilization	81.2%
ICU Level of Service	D
Analysis Period (min)	15

Splits and Phases: 48: Ciavan Access & Innes Rd



HCM 6th Signalized Intersection Summary
13: Renaud Rd & Navan Rd

2031 PM Analysis Improvement
06/07/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	341	705	165	49	356	34	467	439	212	27	142	168
Future Volume (veh/h)	341	705	165	49	356	34	467	439	212	27	142	168
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1744	1800	1393	1660	1660	1617	1786	1674	1800	1730	1730
Adj Flow Rate, veh/h	341	705	0	49	356	0	467	439	212	27	142	168
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	4	0	29	10	10	13	1	9	0	5	5
Cap, veh/h	438	1022		227	788		556	951	756	262	171	202
Arrive On Green	0.12	0.31	0.00	0.06	0.25	0.00	0.28	0.53	0.53	0.24	0.24	0.21
Sat Flow, veh/h	1701	3313	1525	1327	3236	0	1540	1786	1418	793	722	854
Grp Volume(v), veh/h	341	705	0	49	356	0	467	439	212	27	0	310
Grp Sat Flow(s),veh/h/ln	1701	1657	1525	1327	1577	0	1540	1786	1418	793	0	1576
Q Serve(g_s), s	11.6	18.0	0.0	2.6	9.2	0.0	19.4	14.7	7.9	2.6	0.0	18.1
Cycle Q Clear(g_c), s	11.6	18.0	0.0	2.6	9.2	0.0	19.4	14.7	7.9	2.6	0.0	18.1
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	1.00		0.54
Lane Grp Cap(c), veh/h	438	1022		227	788		556	951	756	262	0	372
V/C Ratio(X)	0.78	0.69		0.22	0.45		0.84	0.46	0.28	0.10	0.00	0.83
Avail Cap(c_a), veh/h	438	1544		236	1306		674	1091	867	263	0	375
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	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.8	29.3	0.0	24.7	30.6	0.0	17.7	14.0	12.4	29.2	0.0	35.8
Incr Delay (d2), s/veh	8.6	0.8	0.0	0.5	0.4	0.0	7.9	0.3	0.2	0.2	0.0	14.6
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	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	4.6	0.0	0.5	2.3	0.0	4.2	2.8	1.2	0.4	0.0	6.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.4	30.2	0.0	25.1	31.0	0.0	25.6	14.3	12.6	29.3	0.0	50.4
LnGrp LOS	C	C		C	C		C	B	B	C	A	D
Approach Vol, veh/h		1046	A		405	A		1118				337
Approach Delay, s/veh		31.5			30.3			18.7				48.7
Approach LOS		C			C			B				D
Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	7.3	33.8	28.6	26.8	13.0	28.1		55.4				
Change Period (Y+Rc), s	4.0	6.6	4.0	6.6	4.0	6.6		6.6				
Max Green Setting (Gmax), s	4.0	42.4	32.0	20.4	9.0	37.4		56.4				
Max Q Clear Time (g_c+I1), s	4.6	20.0	21.4	20.1	13.6	11.2		16.7				
Green Ext Time (p_c), s	0.0	7.1	3.3	0.1	0.0	3.5		7.9				

Intersection Summary

HCM 6th Ctrl Delay	28.4
HCM 6th LOS	C

Notes

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Lanes, Volumes, Timings
12: Mer Bleue Rd & Renaud Rd

2031 Analysis AM
06/27/2018



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	215	96	148	600	394	278
Future Volume (vph)	215	96	148	600	394	278
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	50.0	45.0			80.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.6		20.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.850				0.850
Fl _t Protected	0.950		0.950			
Satd. Flow (prot)	1668	1517	1654	1749	1734	1511
Fl _t Permitted	0.950		0.356			
Satd. Flow (perm)	1668	1517	620	1749	1734	1511
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		96				278
Link Speed (k/h)	50			60	60	
Link Distance (m)	951.6			937.0	170.0	
Travel Time (s)	68.5			56.2	10.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Bus Blockages (#/hr)	4	0	6	5	7	1
Adj. Flow (vph)	215	96	148	600	394	278
Shared Lane Traffic (%)						
Lane Group Flow (vph)	215	96	148	600	394	278
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	1.08	1.06	1.09	1.08	1.10	1.06
Turning Speed (k/h)	26	14	26			14
Number of Detectors	1	1	1	1	1	1
Detector Template						
Leading Detector (m)	14.9	14.9	14.9	14.9	14.9	14.9
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	14.9	14.9	14.9	14.9	14.9	14.9
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	4.0	10.0	10.0	10.0
Minimum Split (s)	22.5	22.5	8.0	22.5	22.5	22.5

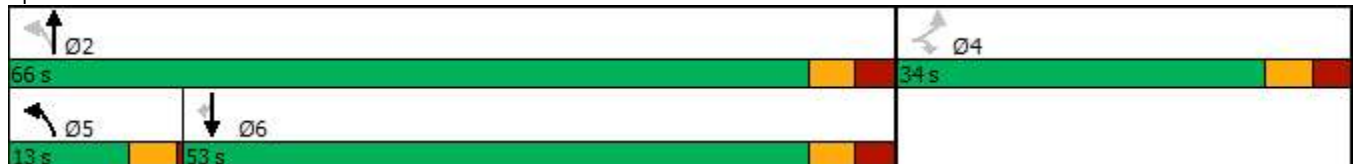


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Split (s)	34.0	34.0	13.0	66.0	53.0	53.0
Total Split (%)	34.0%	34.0%	13.0%	66.0%	53.0%	53.0%
Maximum Green (s)	27.5	27.5	9.0	59.5	46.5	46.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	3.0	3.0	0.5	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	4.0	6.5	6.5	6.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	Min
Walk Time (s)	5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effect Green (s)	14.0	14.0	32.7	30.1	20.5	20.5
Actuated g/C Ratio	0.24	0.24	0.56	0.52	0.35	0.35
v/c Ratio	0.53	0.22	0.29	0.66	0.64	0.39
Control Delay	27.2	6.9	7.6	14.1	22.5	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.2	6.9	7.6	14.1	22.5	4.0
LOS	C	A	A	B	C	A
Approach Delay	20.9			12.8	14.8	
Approach LOS	C			B	B	

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	58
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.66
Intersection Signal Delay:	15.1
Intersection LOS:	B
Intersection Capacity Utilization	57.3%
ICU Level of Service	B
Analysis Period (min)	15

Splits and Phases: 12: Mer Bleue Rd & Renaud Rd



MOVEMENT SUMMARY

 Site: 2031 PM - Brian Coburn - Triangle Land Access

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Frank Bender											
3	L2	33	3.0	0.134	15.2	LOS B	0.7	5.7	0.73	0.82	53.0
8	T1	5	3.0	0.134	10.5	LOS B	0.7	5.7	0.73	0.82	53.2
18	R2	33	3.0	0.134	10.3	LOS B	0.7	5.7	0.73	0.82	52.1
Approach		71	3.0	0.134	12.6	LOS B	0.7	5.7	0.73	0.82	52.6
East: Vanguard											
1	L2	27	3.0	0.574	10.2	LOS B	5.6	43.3	0.41	0.47	57.5
6	T1	554	3.0	0.574	5.5	LOS A	5.6	43.3	0.41	0.47	57.8
16	R2	8	3.0	0.574	5.2	LOS A	5.6	43.3	0.41	0.47	56.4
Approach		589	3.0	0.574	5.7	LOS A	5.6	43.3	0.41	0.47	57.8
North: Frank Bender											
7	L2	7	3.0	0.075	14.2	LOS B	0.4	3.0	0.67	0.74	54.9
4	T1	5	3.0	0.075	9.5	LOS A	0.4	3.0	0.67	0.74	55.1
14	R2	30	3.0	0.075	9.3	LOS A	0.4	3.0	0.67	0.74	53.9
Approach		42	3.0	0.075	10.1	LOS B	0.4	3.0	0.67	0.74	54.2
West: Vanguard											
5	L2	20	3.0	0.688	10.1	LOS B	8.4	65.8	0.42	0.45	57.6
2	T1	654	3.0	0.688	5.4	LOS A	8.4	65.8	0.42	0.45	57.9
12	R2	51	3.0	0.688	5.2	LOS A	8.4	65.8	0.42	0.45	56.5
Approach		725	3.0	0.688	5.5	LOS A	8.4	65.8	0.42	0.45	57.8
All Vehicles		1427	3.0	0.688	6.1	LOS A	8.4	65.8	0.44	0.48	57.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

 Site: 2031 PM - Brian Coburn / Fern Casey

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Belcourt											
3	L2	124	2.0	0.521	16.4	LOS A	3.0	23.2	0.76	0.95	51.4
8	T1	107	3.0	0.521	10.5	LOS A	3.0	23.2	0.76	0.95	51.7
18	R2	54	2.0	0.521	10.3	LOS A	3.0	23.2	0.76	0.95	54.0
Approach		285	2.4	0.521	13.0	LOS A	3.0	23.2	0.76	0.95	52.2
East: Brian Coburn											
1	L2	127	2.0	0.341	12.0	LOS A	1.9	14.7	0.56	0.68	57.7
6	T1	435	2.0	0.341	6.4	LOS A	1.9	14.7	0.56	0.64	59.4
16	R2	57	3.0	0.341	6.2	LOS A	1.9	14.7	0.56	0.62	58.9
Approach		618	2.1	0.341	7.6	LOS A	1.9	14.7	0.56	0.65	59.0
North: Fern Casey											
7	L2	33	3.0	0.539	16.7	LOS A	3.1	24.1	0.74	0.93	57.4
4	T1	153	3.0	0.539	11.1	LOS A	3.1	24.1	0.74	0.93	51.8
14	R2	108	3.0	0.539	11.2	LOS A	3.1	24.1	0.74	0.93	52.8
Approach		293	3.0	0.539	11.7	LOS A	3.1	24.1	0.74	0.93	53.1
West: Brian Coburn											
5	L2	137	3.0	0.529	12.6	LOS A	3.7	28.3	0.62	0.67	57.7
2	T1	638	2.0	0.529	6.3	LOS A	3.7	28.3	0.62	0.66	59.9
12	R2	230	2.0	0.529	6.5	LOS A	3.7	28.3	0.62	0.65	54.6
Approach		1005	2.1	0.529	7.2	LOS A	3.7	28.3	0.62	0.66	58.8
All Vehicles		2202	2.3	0.539	8.7	LOS A	3.7	28.3	0.64	0.73	57.5

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on degree of saturation per movement

Intersection and Approach LOS values are based on worst degree of saturation for any vehicle movement.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: 2031 PM - Brian Coburn / Navan

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Navan											
8	T1	708	3.0	1.158	96.8	LOS F	48.6	378.4	1.00	2.48	24.6
18	R2	371	3.0	0.753	18.7	LOS B	7.6	59.4	0.97	1.16	48.4
Approach		1078	3.0	1.158	70.0	LOS E	48.6	378.4	0.99	2.03	29.5
East: Brian Coburn											
1	L2	191	3.0	0.413	16.4	LOS B	2.5	19.8	0.80	0.96	52.3
16	R2	475	3.0	0.292	4.0	LOS A	0.0	0.0	0.00	0.46	60.0
Approach		666	3.0	0.413	7.6	LOS A	2.5	19.8	0.23	0.60	57.5
North: Navan											
7	L2	690	3.0	0.759	14.3	LOS B	9.4	72.9	0.80	0.79	53.9
4	T1	1125	3.0	1.108	63.6	LOS F	65.3	509.0	1.00	1.78	31.4
Approach		1815	3.0	1.108	44.8	LOS D	65.3	509.0	0.93	1.40	37.5
All Vehicles		3560	3.0	1.158	45.5	LOS D	65.3	509.0	0.81	1.44	36.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: 2031 PM - Fern Casey/Frank Bender

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fern Casey											
3	L2	133	3.0	0.350	10.0	LOS B	2.3	18.0	0.32	0.56	57.1
8	T1	97	3.0	0.350	5.3	LOS A	2.3	18.0	0.32	0.56	57.3
18	R2	125	3.0	0.350	5.1	LOS A	2.3	18.0	0.32	0.56	56.0
Approach		354	3.0	0.350	7.0	LOS A	2.3	18.0	0.32	0.56	56.8
East: Frank Bender											
1	L2	158	3.0	0.282	11.4	LOS B	1.6	12.7	0.51	0.69	55.1
6	T1	67	3.0	0.282	6.7	LOS A	1.6	12.7	0.51	0.69	55.3
16	R2	13	3.0	0.282	6.5	LOS A	1.6	12.7	0.51	0.69	54.1
Approach		238	3.0	0.282	9.8	LOS A	1.6	12.7	0.51	0.69	55.1
North: Frank Bender											
7	L2	37	3.0	0.144	12.1	LOS B	0.7	5.8	0.55	0.68	55.8
4	T1	62	3.0	0.144	7.4	LOS A	0.7	5.8	0.55	0.68	56.0
14	R2	9	3.0	0.144	7.2	LOS A	0.7	5.8	0.55	0.68	54.7
Approach		108	3.0	0.144	9.0	LOS A	0.7	5.8	0.55	0.68	55.8
West: RoadName											
5	L2	5	3.0	0.130	11.3	LOS B	0.7	5.2	0.47	0.60	57.7
2	T1	29	3.0	0.130	6.6	LOS A	0.7	5.2	0.47	0.60	57.9
12	R2	73	3.0	0.130	6.3	LOS A	0.7	5.2	0.47	0.60	56.5
Approach		108	3.0	0.130	6.6	LOS A	0.7	5.2	0.47	0.60	57.0
All Vehicles		808	3.0	0.350	8.1	LOS A	2.3	18.0	0.43	0.62	56.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

 Site: 2031 PM - Frank Bender/Vanguard

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Frank Bender											
3	L2	10	3.0	0.175	11.1	LOS B	0.9	7.3	0.47	0.59	57.4
8	T1	85	3.0	0.175	6.4	LOS A	0.9	7.3	0.47	0.59	57.7
18	R2	53	3.0	0.175	6.2	LOS A	0.9	7.3	0.47	0.59	56.3
Approach		148	3.0	0.175	6.6	LOS A	0.9	7.3	0.47	0.59	57.2
East: Vanguard											
1	L2	90	3.0	0.442	11.0	LOS B	3.1	24.1	0.50	0.60	56.7
6	T1	230	3.0	0.442	6.3	LOS A	3.1	24.1	0.50	0.60	57.0
16	R2	88	3.0	0.442	6.1	LOS A	3.1	24.1	0.50	0.60	55.7
Approach		409	3.0	0.442	7.3	LOS A	3.1	24.1	0.50	0.60	56.6
North: Frank Bender											
7	L2	63	3.0	0.454	12.8	LOS B	3.0	23.5	0.68	0.75	55.8
4	T1	167	3.0	0.454	8.1	LOS A	3.0	23.5	0.68	0.75	56.0
14	R2	112	3.0	0.454	7.8	LOS A	3.0	23.5	0.68	0.75	54.7
Approach		342	3.0	0.454	8.9	LOS A	3.0	23.5	0.68	0.75	55.6
West: Vanguard											
5	L2	55	3.0	0.227	12.0	LOS B	1.3	9.9	0.57	0.69	55.8
2	T1	108	3.0	0.227	7.3	LOS A	1.3	9.9	0.57	0.69	56.0
12	R2	10	3.0	0.227	7.1	LOS A	1.3	9.9	0.57	0.69	54.8
Approach		173	3.0	0.227	8.8	LOS A	1.3	9.9	0.57	0.69	55.9
All Vehicles		1072	3.0	0.454	7.9	LOS A	3.1	24.1	0.57	0.66	56.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

 Site: 2031 PM - Mer Bleue / Brian Coburn

Roundabout with 1 & 2-lane approaches and circulating road
 MUTCD (FHWA 2009) example number: 3C-4
 Roundabout Guide (TRB 2010) example number: A-3
 Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mer Bleue											
3	L2	79	2.0	1.005	51.2	LOS F	19.4	149.8	1.00	1.73	41.4
8	T1	733	2.0	1.005	44.7	LOS F	20.6	159.1	1.00	1.74	36.3
18	R2	314	2.0	1.005	43.6	LOS F	20.6	159.1	1.00	1.75	35.8
Approach		1126	2.0	1.005	44.8	LOS F	20.6	159.1	1.00	1.74	36.6
East: Brian Coburn											
1	L2	224	2.0	0.775	20.7	LOS C	6.8	52.6	0.93	1.13	50.2
6	T1	355	2.0	0.775	14.5	LOS C	7.0	54.1	0.93	1.13	54.8
16	R2	328	2.0	0.775	14.3	LOS C	7.0	54.1	0.93	1.12	51.5
Approach		908	2.0	0.775	16.0	LOS C	7.0	54.1	0.93	1.13	52.7
North: Mer Bleue											
7	L2	648	2.0	1.244	131.4	LOS F	70.8	547.2	1.00	3.23	20.6
4	T1	973	2.0	1.244	125.1	LOS F	72.9	563.3	1.00	3.26	20.0
14	R2	221	2.0	1.244	125.0	LOS F	72.9	563.3	1.00	3.27	25.2
Approach		1841	2.0	1.244	127.3	LOS F	72.9	563.3	1.00	3.25	20.9
West: Brian Coburn											
5	L2	111	2.0	0.977	52.8	LOS E	11.4	88.3	0.99	1.47	41.0
2	T1	432	2.0	0.977	45.1	LOS E	12.8	98.5	1.00	1.49	41.7
12	R2	149	2.0	0.977	43.7	LOS E	12.8	98.5	1.00	1.51	41.2
Approach		691	2.0	0.977	46.0	LOS E	12.8	98.5	1.00	1.49	41.5
All Vehicles		4566	2.0	1.244	72.5	LOS F	72.9	563.3	0.99	2.19	30.5

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on degree of saturation per movement

Intersection and Approach LOS values are based on worst degree of saturation for any vehicle movement.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: 2031 PM - Mer Bleue / Renaud Rd

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mer Bleue											
3	L2	104	2.0	0.952	34.3	LOS C	25.6	201.9	1.00	1.31	53.3
8	T1	602	5.0	0.952	29.8	LOS C	25.6	201.9	1.00	1.31	38.8
Approach		707	4.6	0.952	30.5	LOS C	25.6	201.9	1.00	1.31	42.8
North: Mer Bleue											
4	T1	850	2.0	1.159	87.0	LOS F	92.7	716.6	1.00	1.50	22.4
14	R2	267	2.0	1.159	86.7	LOS F	92.7	716.6	1.00	1.50	38.5
Approach		1117	2.0	1.159	86.9	LOS F	92.7	716.6	1.00	1.50	27.9
West: Renaud Rd											
5	L2	496	2.0	1.681	336.5	LOS F	105.5	815.1	1.00	3.60	18.1
12	R2	196	2.0	1.681	331.5	LOS F	105.5	815.1	1.00	3.60	19.1
Approach		691	2.0	1.681	335.1	LOS F	105.5	815.1	1.00	3.60	18.4
All Vehicles		2515	2.7	1.681	139.3	LOS F	105.5	815.1	1.00	2.02	24.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: 2031 PM - Brian Coburn / Navan - Improv

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Navan											
8	T1	708	3.0	0.941	32.2	LOS C	17.5	136.3	1.00	1.46	42.5
18	R2	371	3.0	0.941	32.2	LOS C	17.5	136.3	1.00	1.46	41.2
Approach		1078	3.0	0.941	32.2	LOS C	17.5	136.3	1.00	1.46	42.0
East: Brian Coburn											
1	L2	191	3.0	0.405	15.8	LOS B	2.1	16.5	0.75	0.94	52.7
16	R2	475	3.0	0.292	4.0	LOS A	0.0	0.0	0.00	0.46	60.0
Approach		666	3.0	0.405	7.4	LOS A	2.1	16.5	0.21	0.60	57.6
North: Navan											
7	L2	690	3.0	0.891	17.6	LOS B	18.0	140.2	1.00	0.87	52.5
4	T1	1125	3.0	0.891	11.3	LOS B	18.0	140.2	1.00	0.87	54.9
Approach		1815	3.0	0.891	13.7	LOS B	18.0	140.2	1.00	0.87	54.0
All Vehicles		3560	3.0	0.941	18.1	LOS B	18.0	140.2	0.85	1.00	50.3

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: 2031 PM - Mer Bleue / Brian Coburn - Improv

Roundabout with 1 & 2-lane approaches and circulating road

MUTCD (FHWA 2009) example number: 3C-4

Roundabout Guide (TRB 2010) example number: A-3

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mer Bleue											
3	L2	79	2.0	0.619	19.4	LOS B	4.5	34.9	0.88	1.05	55.7
8	T1	733	2.0	0.619	12.3	LOS B	5.1	39.2	0.89	1.05	54.0
18	R2	314	2.0	0.403	7.9	LOS A	2.5	19.2	0.80	0.91	56.2
Approach		1126	2.0	0.619	11.6	LOS B	5.1	39.2	0.86	1.01	54.7
East: Brian Coburn											
1	L2	224	2.0	0.374	13.3	LOS A	1.9	14.9	0.73	0.90	54.1
6	T1	355	2.0	0.374	6.5	LOS A	2.0	15.8	0.72	0.64	59.3
16	R2	328	2.0	0.367	6.4	LOS A	2.0	15.4	0.71	0.73	56.8
Approach		908	2.0	0.374	8.1	LOS A	2.0	15.8	0.72	0.73	57.4
North: Mer Bleue											
7	L2	648	2.0	0.785	17.1	LOS C	7.5	58.2	0.87	1.10	51.8
4	T1	973	2.0	0.951	17.8	LOS E	17.7	137.1	1.00	1.41	50.2
14	R2	154	2.0	0.136	5.1	LOS A	0.6	4.9	0.47	0.59	59.9
Approach		1775	2.0	0.951	16.4	LOS E	17.7	137.1	0.91	1.22	51.8
West: Brian Coburn											
5	L2	111	2.0	0.746	27.1	LOS C	5.1	39.1	0.94	1.12	51.1
2	T1	432	2.0	0.746	19.0	LOS C	5.1	39.1	0.94	1.13	52.9
12	R2	149	2.0	0.271	9.2	LOS A	1.8	13.7	0.90	0.93	57.5
Approach		691	2.0	0.746	18.2	LOS C	5.1	39.1	0.93	1.09	53.5
All Vehicles		4500	2.0	0.951	13.8	LOS E	17.7	137.1	0.86	1.05	53.9

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on degree of saturation per movement

Intersection and Approach LOS values are based on worst degree of saturation for any vehicle movement.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: 2031 PM - Mer Bleue / Renaud Rd - Improv

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mer Bleue											
3	L2	104	2.0	0.476	14.2	LOS B	3.5	27.7	0.78	0.82	61.2
8	T1	602	5.0	0.476	8.1	LOS A	3.5	27.7	0.78	0.80	54.8
Approach		707	4.6	0.476	9.0	LOS A	3.5	27.9	0.78	0.80	56.8
North: Mer Bleue											
4	T1	850	2.0	0.501	4.7	LOS A	4.1	31.7	0.45	0.46	58.6
14	R2	267	2.0	0.501	4.8	LOS A	4.1	31.7	0.45	0.48	61.7
Approach		1117	2.0	0.501	4.8	LOS A	4.1	31.7	0.45	0.46	60.0
West: Renaud Rd											
5	L2	496	2.0	0.955	35.7	LOS D	11.5	89.2	0.87	1.51	51.7
12	R2	196	2.0	0.423	11.6	LOS B	2.2	16.7	0.75	0.90	59.8
Approach		691	2.0	0.955	28.9	LOS C	11.5	89.2	0.84	1.34	53.8
All Vehicles		2515	2.7	0.955	12.6	LOS B	11.5	89.2	0.65	0.80	56.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix E

Adjacent Development Locations

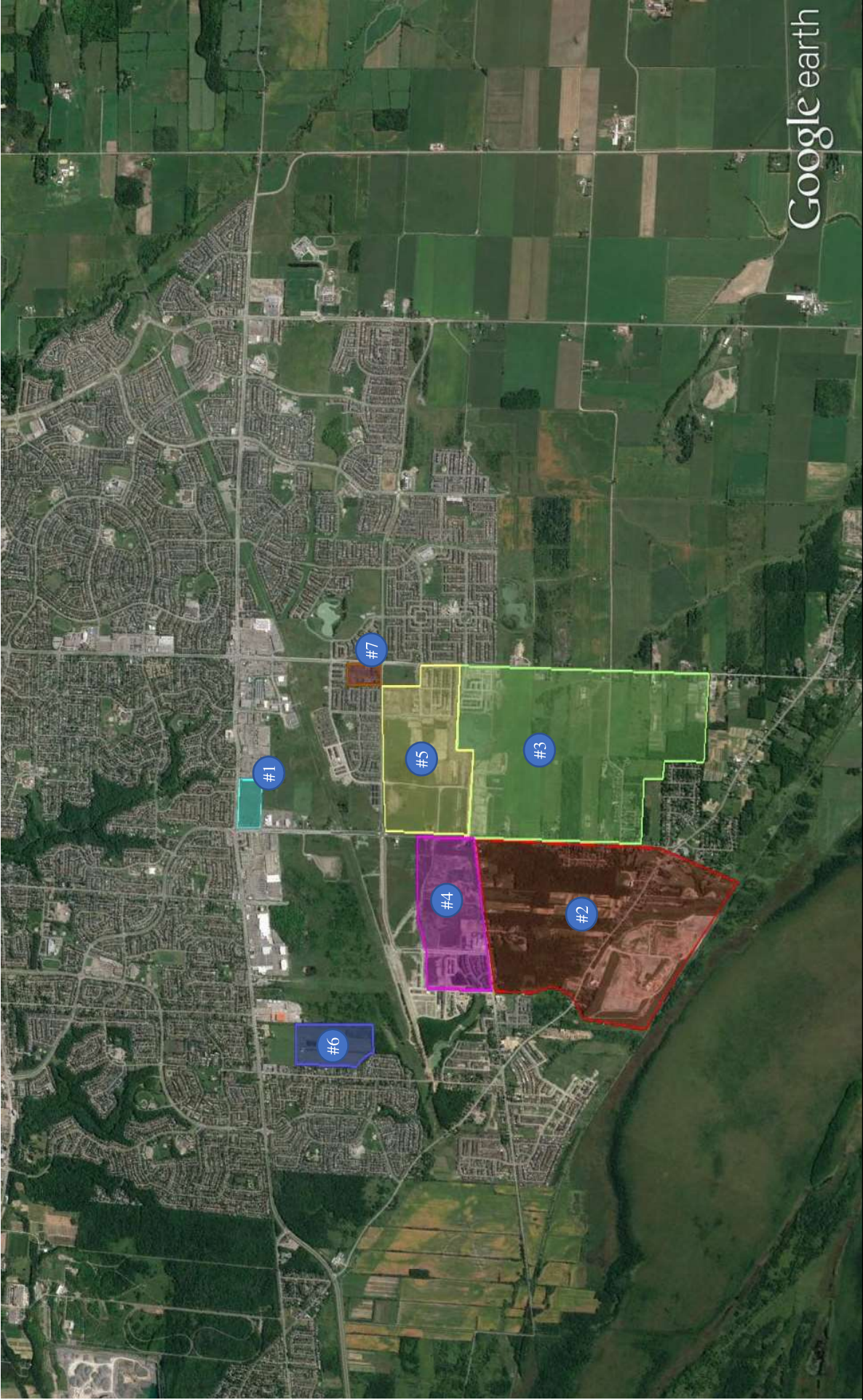


Exhibit E-1: Adjacent Development Locations

Appendix F

Cross-Sections – Not Recommended

