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# Memorandum

To/Attention	Project File	Date	October 15, 2013
From	A. Ortlieb	Project No	24RX12.0246.00
сс	S. Johnston (IBI Group)		
Subject	McLaughlin Road Class EA – Su McLaughlin / Bristol Road Interse	pplementary Tra	affic Analysis,

Following completion of the Transportation Assessment, the lane configuration of the McLaughlin Road – Bristol Road West intersection was revised to accommodate bike lanes along Bristol Road. The revised lane configuration is attached. This memo summarizes the results of the subsequent traffic analysis for the McLaughlin Road - Bristol Road intersection.

The AM and PM intersection operations were assessed based on existing traffic counts (predating the intersection reconfiguration) and current signal timing plan. The signal timing plan provides for a 100 sec cycle length (Total split time: NBL = 15 seconds, N/S = 43 seconds, E/W = 42 seconds during the critical p.m. peak period).

#### 1. Existing Conditions

The assessment indicates that with the recent lane revisions in place the eastbound left turn (EBL) and the westbound thru-right (WBTR) movements are expected to operate overcapacity during the existing PM peak hour (see comments below). Detailed synchro output calculations are attached.

- EBL is only 85 veh/hr and even though operating overcapacity (without a separate left turn phase) largely clears during the yellow amber.
- WBTR movement (749 veh/hr Thru + 104 veh/hr RT) is expected to operate overcapacity, v/c = 1.26, based on the current timing plan (100 sec).

Poor operations may lead traffic redistribution or infiltration.

In the future, it may be necessary increase the cycle length to accommodate a longer E/W phase or repaint the westbound approach to provide a WB RT (similar to the eastbound approach); and longer term, protect for reinstating four lanes along Bristol Road through the intersection.

Project File - October 15, 2013

McLaughlin Road & Bristol Road West	Overall Delay (sec)	Intersection Level of Service	Critical Movements (v/c > 0.9)	Phasing (N-S/ E-W)	Comments
Existing Conditio	ns				
AM Peak	25.6	С	SBL v/c = 0.93	58 / 42 sec	ОК
PM Peak	55.6	E	EBL v/c = 1.12 WBTR v/c = 1.26 NBL v/c = 0.91 8 NB Adv/ 50/ 42 sec		EBL and WBTR operate overcapacity
Future 2031 Cond	ditions				
AM Peak (w/120 sec cycle)	43.1	D	WBL v/c = 0.94 NBTR v/c = 0.96	8 Opp Lfts / 45 / 67 sec	OK - however Bristol Road requires > 50% available green time.
PM Peak (w/120 sec cycle)	69.9	E	EBL v/c = 1.34 WBTR v/c = 1.16 NBL v/c = 1.0 SBTR v/c = 1.06	9 NB Adv/ 55 / 56 sec	See Comment (a) below If add excl. SB RT, SBTR v/c = 0.94
PM Peak (w/ WB RT)	56.2	E	EBL v/c = 1.37 WBT v/c = 1.07 NBL v/c = 1.0 SBTR v/c = 1.0	9 NB Adv/ 58 / 53 sec	See Comment (b) below.
PM Peak (w/ WB RT & SB RT)	49.4	D	EBL v/c = 1.37 WBT v/c = 0.97 NBL v/c = 1.0 SBTR v/c = 0.97	9 NB Adv/ 53 / 58 sec	See Comment (c) below <u>Not recommended</u> due impacts of providing SB RT.
PM Peak (w/ 2 <sup>nd</sup> WB thru lane)	40.0	D	EBL v/c = 0.92 WBL v/c = 0.99 NBL v/c = 1.0	9 NB Adv/ 66/ 45 sec	Recommended protecting for this Option, if required in the future.

**Exhibit 1: Intersection Level of Service** 

Existing AM & PM = 100 sec cycle length Future AM & PM = 120 sec cycle length

#### 2. Future Conditions

This analysis indicates that the eastbound left (EBL), westbound thru-right (WBTR), and southbound thru-right (SBTR) movements operate overcapacity during the future PM peak.

- (a) Based on the existing lane configuration and 120 sec cycle length, the WBTR v/c = 1.16 and the SBTR v/c = 1.06. The EBL remains low (86 veh/hr) and largely clears during the yellow amber. The key concern continues to be the high WBTR (780 veh/hr Thru + 104 veh/hr RT).
- (b) If a separate WB RT is provided, the WBT would operate at v/c = 1.07 (SBTR v/c = 1.0).
- (c) If both a separate SB and WB right turn lanes are provided, they would operate at v/c = 0.97; however long queues on both approaches will limit the effectiveness of these lanes. With that said, an exclusive southbound right is not recommended since the benefits are significantly outweighed by the adjacent property and tree impacts.

Based on the above it is recommended that updated turning movement counts be obtained and intersections operations monitored. If significant operational concerns occur consideration should be given to providing an additional westbound through lane at the intersection (all movements operate under capacity).



**I HOTAM** 

# Phasings 8: Bristol Road & McLaughlin Road

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ľ	•	1	ľ	el el		1	<b>≜1</b> ≱		1	A1≱	
Volume (vph)	138	783	218	91	355	103	145	755	151	124	543	10
Satd. Flow (prot)	1807	1883	1633	1772	1800	0	1755	3493	0	1789	3567	0
Flt Permitted	0.386			0.113			0.396			0.191		
Satd. Flow (perm)	734	1883	1537	211	1800	0	729	3493	0	356	3567	0
Satd. Flow (RTOR)			170		16			33			3	
Lane Group Flow (vph)	138	783	218	91	458	0	145	906	0	124	553	0
Turn Type	Perm		Perm	Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Total Split (s)	42.0	42.0	42.0	42.0	42.0	0.0	58.0	58.0	0.0	58.0	58.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	4.0	8.0	8.0	4.0	8.0	8.0	4.0
Act Effct Green (s)	47.8	47.8	47.8	47.8	47.8		37.2	37.2		37.2	37.2	
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48		0.37	0.37		0.37	0.37	
v/c Ratio	0.39	0.87	0.26	0.90	0.53		0.54	0.69		0.93	0.42	
Control Delay	24.5	38.1	6.5	99.9	22.7		17.6	14.1		82.3	14.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	24.5	38.1	6.5	99.9	22.7		17.6	14.1		82.3	14.1	
LOS	С	D	А	F	С		В	В		F	В	
Approach Delay		30.4			35.5			14.5			26.6	
Approach LOS		С			D			В			С	
Queue Length 50th (m)	16.0	126.1	4.7	15.0	55.5		18.5	85.0		24.3	21.3	
Queue Length 95th (m)	41.5	#252.9	22.3	#52.8	109.3		39.3	87.2		#50.3	21.6	
Internal Link Dist (m)		900.0			816.0			458.1			81.7	
Turn Bay Length (m)	45.0			60.0			90.0			40.0		
Base Capacity (vph)	351	900	823	101	868		365	1763		178	1785	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.39	0.87	0.26	0.90	0.53		0.40	0.51		0.70	0.31	
Intersection Summary												
Cycle Length: 100												
Actuated Cycle Length: 100												
Offset: 75 (75%), Referenced	to phase	e 2:NBTL a	and 6:SB	TL, Start o	of Green							
Control Type: Actuated-Coord	linated											
Maximum v/c Ratio: 0.93												
Intersection Signal Delay: 25.	6			In	tersection	n LOS: C						
Intersection Capacity Utilization 112.3% ICU Level of Service H												

Analysis Period (min) 15
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

Splits and Phases: 8: Bristol Road & McLaughlin Road

![](_page_4_Figure_3.jpeg)

### Phasings 8: Bristol Road & McLaughlin Road

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	<b>†</b>	1	1	4		ሻ	A		۲	¢γ	
Volume (vph)	85	330	168	149	749	104	212	768	55	106	1105	166
Satd. Flow (prot)	1807	1883	1633	1825	1862	0	2401	3569	0	1825	3535	0
Flt Permitted	0.111			0.447			0.091			0.340		
Satd. Flow (perm)	211	1883	1596	854	1862	0	230	3569	0	652	3535	0
Satd. Flow (RTOR)			144		8			10			20	
Lane Group Flow (vph)	85	330	168	149	853	0	212	823	0	106	1271	0
Turn Type	Perm		Perm	Perm			pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		
Total Split (s)	42.0	42.0	42.0	42.0	42.0	0.0	8.0	58.0	0.0	50.0	50.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	4.0	3.0	8.0	4.0	8.0	8.0	4.0
Act Effct Green (s)	36.0	36.0	36.0	36.0	36.0		54.0	49.0		41.0	41.0	
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.36		0.54	0.49		0.41	0.41	
v/c Ratio	1.12	0.49	0.25	0.49	1.26		0.91	0.47		0.40	0.87	
Control Delay	175.0	28.3	6.6	32.0	160.5		59.5	6.0		22.7	27.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	175.0	28.3	6.6	32.0	160.5		59.5	6.0		22.7	27.8	
LOS	F	С	А	С	F		E	А		С	С	
Approach Delay		43.4			141.4			17.0			27.4	
Approach LOS		D			F			В			С	
Queue Length 50th (m)	~19.5	49.9	3.0	22.5	~213.3		9.9	7.1		9.8	82.1	
Queue Length 95th (m)	#49.1	75.4	16.5	42.1	#285.3		#35.8	21.7		m12.1	m86.8	
Internal Link Dist (m)		900.0			816.0			458.1			81.7	
Turn Bay Length (m)	45.0			60.0			90.0			40.0		
Base Capacity (vph)	76	677	666	307	675		233	1790		274	1496	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	1.12	0.49	0.25	0.49	1.26		0.91	0.46		0.39	0.85	
Intersection Summary												
Cycle Length: 100												
Actuated Cycle Length: 100					-							
Offset: 0 (0%), Referenced to	phase 2:	NBTL and	I 6:SBTL,	Start of	Green							
Control Type: Actuated-Coord	dinated											
Maximum v/c Ratio: 1.26												
Intersection Signal Delay: 55.	6	,		li	ntersection	1 LOS: E						
Intersection Capacity Utilization	on 122.2%	0		Į	CU Level	of Service	θH					
Analysis Period (min) 15	Analysis Period (min) 15											
<ul> <li>volume exceeds capacity</li> </ul>	, queue is	theoretic	ally infinit	le.								
Queue snown is maximum	i atter two	cycles.		halena	_							
# 95th percentile volume ex	ceeds cap	bacity, qu	eue may	be longe	ſ.							
Queue snown is maximum	i atter two	cycles.										

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

Splits and Phases: 8: Bristol Road & McLaughlin Road

![](_page_6_Figure_3.jpeg)

### Phasings 8: Bristol Road & McLaughlin Road

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	۲	•	1	۲	eî 👘		<u>۲</u>	A		۲	A1⊅	
Volume (vph)	138	815	218	91	490	103	145	898	151	124	738	10
Satd. Flow (prot)	1807	1883	1633	1772	1816	0	1755	3503	0	1789	3571	0
Flt Permitted	0.276			0.104			0.216			0.108		
Satd. Flow (perm)	525	1883	1521	194	1816	0	398	3503	0	202	3571	0
Satd. Flow (RTOR)			167		13			16			1	
Lane Group Flow (vph)	138	815	218	91	593	0	145	1049	0	124	748	0
Turn Type	Perm		Perm	Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Total Split (s)	67.0	67.0	67.0	67.0	67.0	0.0	8.0	45.0	0.0	8.0	45.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	4.0	3.0	8.0	4.0	3.0	8.0	4.0
Act Effct Green (s)	60.0	60.0	60.0	60.0	60.0		47.0	37.0		47.0	37.0	
Actuated g/C Ratio	0.50	0.50	0.50	0.50	0.50		0.39	0.31		0.39	0.31	
v/c Ratio	0.52	0.87	0.26	0.94	0.65		0.68	0.96		0.86	0.68	
Control Delay	29.3	37.8	5.4	109.0	25.8		42.9	59.9		71.5	40.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	29.3	37.8	5.4	109.0	25.8		42.9	59.9		71.5	40.0	
LOS	С	D	А	F	С		D	E		E	D	
Approach Delay		30.8			36.9			57.9			44.5	
Approach LOS		С			D			E			D	
Queue Length 50th (m)	21.3	163.9	6.0	19.6	98.0		21.4	126.1		18.0	80.8	
Queue Length 95th (m)	43.2	#242.2	18.9	#54.2	136.9		#39.5	#169.6		#46.0	102.1	
Internal Link Dist (m)		900.0			816.0			458.1			81.7	
Turn Bay Length (m)	45.0			60.0			90.0			40.0		
Base Capacity (vph)	263	942	844	97	915		212	1091		145	1102	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.52	0.87	0.26	0.94	0.65		0.68	0.96		0.86	0.68	
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to	Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green											
Control Type: Actuated-Coord	dinated											
Maximum v/c Ratio: 0.96												
Intersection Signal Delay: 43.	1			Ir	tersectior	n LOS: D						
Intersection Capacity Utilization	on 111.4	%		IC	CU Level of	of Service	θH					
Analysis Period (min) 15												

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

Queue shown is maximum after two cycles.

Splits and Phases: 8: Bristol Road & McLaughlin Road

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8 s –		45 s	67 s	
•	ø5	<b>↓</b> <sub>ø6</sub>	<b>₩</b> ø8	
8 s -		45 s	67 s	

### Phasings 8: Bristol Road & McLaughlin Road

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	۲	<b>†</b>	1	ኘ	ef 👘		۲	A		ኘ	A1⊅	
Volume (vph)	86	456	168	150	780	104	212	1045	55	106	1316	166
Satd. Flow (prot)	1807	1883	1633	1825	1862	0	2401	3579	0	1825	3547	0
FIt Permitted	0.082			0.326			0.085			0.113		
Satd. Flow (perm)	156	1883	1592	623	1862	0	215	3579	0	217	3547	0
Satd. Flow (RTOR)			133		7			5			13	
Lane Group Flow (vph)	86	456	168	150	884	0	212	1100	0	106	1482	0
Turn Type	Perm		Perm	Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Total Split (s)	56.0	56.0	56.0	56.0	56.0	0.0	9.0	55.0	0.0	9.0	55.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	4.0	3.0	8.0	4.0	3.0	8.0	4.0
Act Effct Green (s)	49.0	49.0	49.0	49.0	49.0		58.0	47.0		58.0	47.0	
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41		0.48	0.39		0.48	0.39	
v/c Ratio	1.34	0.59	0.23	0.59	1.16		1.00	0.78		0.57	1.06	
Control Delay	261.5	31.6	7.0	39.2	118.5		83.7	36.7		28.2	77.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	261.5	31.6	7.0	39.2	118.5		83.7	36.7		28.2	77.5	
LOS	F	С	А	D	F		F	D		С	E	
Approach Delay		53.6			107.0			44.3			74.2	
Approach LOS		D			F			D			E	
Queue Length 50th (m)	~26.5	82.6	4.9	27.1	~245.8		27.0	117.7		12.6	~201.3	
Queue Length 95th (m)	#59.4	115.9	18.5	51.5	#322.1		#76.4	144.0		22.2	#244.3	
Internal Link Dist (m)		900.0			816.0			458.1			81.7	
Turn Bay Length (m)	45.0			60.0			90.0			40.0		
Base Capacity (vph)	64	769	729	254	764		213	1405		185	1397	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	1.34	0.59	0.23	0.59	1.16		1.00	0.78		0.57	1.06	
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to	phase 2:	NBTL and	6:SBTL,	Start of	Green							
Control Type: Actuated-Coord	dinated											
Maximum v/c Ratio: 1.34												
Intersection Signal Delay: 69.	9			li	ntersectio	n LOS: E						
Intersection Capacity Utilization	ntersection Capacity Utilization 129.7% ICU Level of Service H											
Analysis Period (min) 15												
~ Volume exceeds capacity	, queue is	theoretic	ally infinit	te.								
Queue shown is maximum	after two	cycles.										
# 95th percentile volume ex	ceeds cap	pacity, qu	eue may	be longe	r.							

Queue shown is maximum after two cycles.

Splits and Phases: 8: Bristol Road & McLaughlin Road

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9 s –		55 s	56 s
•	ø5	₽	<b>€</b> ø8
9 s -		55 s	56 s

Phasings 8: Bristol Road & McLaughlin Road

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	٦	•	1	7	<b>†</b>	1	۲	A		۲	<b>≜1</b> ≱	
Volume (vph)	86	456	168	150	780	104	212	1045	55	106	1316	166
Satd. Flow (prot)	1807	1883	1633	1825	1902	1601	2401	3579	0	1825	3547	0
Flt Permitted	0.087			0.303			0.080			0.129		
Satd. Flow (perm)	165	1883	1592	579	1902	1576	202	3579	0	248	3547	0
Satd. Flow (RTOR)			130			71		5			14	
Lane Group Flow (vph)	86	456	168	150	780	104	212	1100	0	106	1482	0
Turn Type	Perm		Perm	Perm		Perm	pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Total Split (s)	53.0	53.0	53.0	53.0	53.0	53.0	9.0	58.0	0.0	9.0	58.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	3.0	8.0	4.0	3.0	8.0	4.0
Act Effct Green (s)	46.0	46.0	46.0	46.0	46.0	46.0	61.0	50.0		61.0	50.0	
Actuated g/C Ratio	0.38	0.38	0.38	0.38	0.38	0.38	0.51	0.42		0.51	0.42	
v/c Ratio	1.37	0.63	0.24	0.68	1.07	0.16	1.00	0.74		0.52	1.00	
Control Delay	270.9	34.9	7.9	48.3	89.8	10.0	83.9	33.0		23.2	57.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	270.9	34.9	7.9	48.3	89.8	10.0	83.9	33.0		23.2	57.6	
LOS	F	С	А	D	F	А	F	С		С	E	
Approach Delay		57.1			75.8			41.2			55.3	
Approach LOS		Е			E			D			Е	
Queue Length 50th (m)	~26.7	86.4	5.6	29.1	~203.6	4.9	27.3	112.4		11.9	179.3	
Queue Length 95th (m)	#59.5	121.2	19.8	#60.3	#276.6	16.2	#76.7	137.6		21.0	#232.4	
Internal Link Dist (m)		900.0			816.0			458.1			81.7	
Turn Bay Length (m)	45.0			60.0			90.0			40.0		
Base Capacity (vph)	63	722	690	222	729	648	213	1494		205	1486	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	1.37	0.63	0.24	0.68	1.07	0.16	1.00	0.74		0.52	1.00	
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to	phase 2:	NBTL and	6:SBTL,	Start of	Green							
Control Type: Actuated-Coord	dinated											
Maximum v/c Ratio: 1.37	Maximum v/c Ratio: 1.37											
Intersection Signal Delay: 56.	Intersection Signal Delay: 56.2 Intersection LOS: E											
Intersection Capacity Utilization	on 123.3%	6		l	CU Level	of Service	θH					
Analysis Period (min) 15												
<ul> <li>Volume exceeds capacity</li> </ul>	, queue is	theoretic	ally infini	te.								
Queue shown is maximum	after two	cycles.										

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

Splits and Phases: 8: Bristol Road & McLaughlin Road

![](_page_12_Figure_3.jpeg)

### Phasings 8: Bristol Road & McLaughlin Road

	٦	+	$\mathbf{F}$	4	+	•	•	†	1	1	Ļ	~
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	۲	•	1	1	•	1	۲	<b>≜1</b> }		5	<b>^</b>	1
Volume (vph)	86	456	168	150	780	104	212	1045	55	106	1316	166
Satd. Flow (prot)	1807	1883	1633	1825	1902	1601	2401	3579	0	1825	3614	1633
Flt Permitted	0.078			0.339			0.089			0.101		
Satd. Flow (perm)	148	1883	1592	648	1902	1576	225	3579	0	194	3614	1594
Satd. Flow (RTOR)			136			77		5				88
Lane Group Flow (vph)	86	456	168	150	780	104	212	1100	0	106	1316	166
Turn Type	Perm		Perm	Perm		Perm	pm+pt			pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		6
Total Split (s)	58.0	58.0	58.0	58.0	58.0	58.0	9.0	53.0	0.0	9.0	53.0	53.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	3.0	8.0	4.0	3.0	8.0	8.0
Act Effct Green (s)	51.0	51.0	51.0	51.0	51.0	51.0	56.0	45.0		56.0	45.0	45.0
Actuated g/C Ratio	0.42	0.42	0.42	0.42	0.42	0.42	0.47	0.38		0.47	0.38	0.38
v/c Ratio	1.37	0.57	0.22	0.55	0.97	0.15	0.99	0.82		0.62	0.97	0.25
Control Delay	269.7	29.7	6.3	35.0	58.6	7.7	82.3	39.7		33.1	55.7	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	269.7	29.7	6.3	35.0	58.6	7.7	82.3	39.7		33.1	55.7	13.3
LOS	F	С	A	С	E	A	F	D		С	E	В
Approach Delay		53.2			50.0			46.6			49.7	
Approach LOS		D			D			D			D	
Queue Length 50th (m)	~26.7	80.1	4.3	26.0	176.0	3.7	27.0	121.2		13.1	158.7	12.0
Queue Length 95th (m)	#45.6	112.3	17.4	48.8	#257.2	14.1	#76.1	148.3		#25.1	#206.6	27.4
Internal Link Dist (m)		900.0			816.0			458.1			81.7	
Turn Bay Length (m)	45.0			60.0			90.0			40.0		70.0
Base Capacity (vph)	63	800	755	275	808	714	214	1345		172	1355	653
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	1.37	0.57	0.22	0.55	0.97	0.15	0.99	0.82		0.62	0.97	0.25
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to	phase 2:	NBTL and	d 6:SBTL,	Start of	Green							
Control Type: Actuated-Coor	dinated											
Maximum v/c Ratio: 1.37												
Intersection Signal Delay: 49	.4			l	ntersectio	n LOS: D						
Intersection Capacity Utilizati	ion 118.0%	6	ICU Level of Service H									

Analysis Period (min) 15

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

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

Queue shown is maximum after two cycles.

Splits and Phases: 8: Bristol Road & McLaughlin Road

1	<b>o</b> 1	≪↑ ₀2	→ 04
9 s.		53 s	58 s
1	ø5	<b>↓</b> <sub>ø6</sub>	
9 s.		53 s	58 s

### Phasings 8: Bristol Road & McLaughlin Road

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	•	1	1	A		ľ	A		1	A1⊅	
Volume (vph)	86	456	168	150	780	104	212	1045	55	106	1316	166
Satd. Flow (prot)	1807	1883	1633	1825	3538	0	2401	3579	0	1825	3551	0
Flt Permitted	0.149			0.242			0.071			0.158		
Satd. Flow (perm)	283	1883	1592	463	3538	0	179	3579	0	303	3551	0
Satd. Flow (RTOR)			127		13			6			16	
Lane Group Flow (vph)	86	456	168	150	884	0	212	1100	0	106	1482	0
Turn Type	Perm		Perm	Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Total Split (s)	45.0	45.0	45.0	45.0	45.0	0.0	9.0	66.0	0.0	9.0	66.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	4.0	3.0	8.0	4.0	3.0	8.0	4.0
Act Effct Green (s)	39.4	39.4	39.4	39.4	39.4		67.6	56.6		67.6	56.6	
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33		0.56	0.47		0.56	0.47	
v/c Ratio	0.92	0.74	0.28	0.99	0.75		1.00	0.65		0.43	0.88	
Control Delay	116.8	44.6	10.2	111.3	40.7		85.6	26.0		16.0	35.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	116.8	44.6	10.2	111.3	40.7		85.6	26.0		16.0	35.6	
LOS	F	D	В	F	D		F	С		В	D	
Approach Delay		45.2			51.0			35.7			34.3	
Approach LOS		D			D			D			С	
Queue Length 50th (m)	19.8	96.6	6.8	~37.6	98.0		26.9	98.2		10.0	156.5	
Queue Length 95th (m)	#53.0	135.5	23.0	#78.8	122.1		#76.0	120.2		17.6	189.0	
Internal Link Dist (m)		900.0			816.0			458.1			81.7	
Turn Bay Length (m)	45.0			60.0			90.0			40.0		
Base Capacity (vph)	93	619	609	152	1172		212	1733		246	1725	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.92	0.74	0.28	0.99	0.75		1.00	0.63		0.43	0.86	
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to	phase 2:	NBTL and	6:SBTL,	Start of	Green							
Control Type: Actuated-Coord	dinated											
Maximum v/c Ratio: 1.00												
Intersection Signal Delay: 40.	.0			Ir	tersection	n LOS: D						
Intersection Capacity Utilization	on 107.3%	6		IC	CU Level of	of Service	e G					
Analysis Period (min) 15												
~ Volume exceeds capacity	, queue is	theoretic	ally infini	te.								
Queue shown is maximum	n after two	cycles.										

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

Splits and Phases: 8: Bristol Road & McLaughlin Road

<b>&gt;</b> <sub>@1</sub>	<↑ ₂2	↓ ø4
9s –	66 s	45 s
▲ ø5	₽ 26	<b>↓</b> <sub>Ø8</sub>
9s	66 s	45 s

TRANSPORTATION

![](_page_17_Picture_1.jpeg)

### **Transportation Assessment**

# Class EA for McLaughlin Road

Submitted to City of Mississauga by IBI Group

March 2013

# **Document Control**

Client:	City of Mississauga
Project Name:	Class EA for McLaughlin Road
Report Title:	Transportation Assessment Class EA for McLaughlin Road
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Version:	3.2
Digital Master:	J:\24RX12.0246_Miss-Class EA\5.0 Design (Work) Phase\03 - Traffic\Reports\TTR_Miss-Class EA_Traffic_Future_2013-03-20.docx
Originator:	Jason Do
Reviewer:	Scott Johnston, Allan Ortlieb
Authorization:	
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![](_page_19_Picture_0.jpeg)

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## 1. Introduction

This report was prepared in support of a Class Environmental Assessment (EA) for McLaughlin Road from Bristol Road to Britannia Road, and examines the need for road capacity and operational improvements along McLaughlin Road to accommodate traffic demands based on a 2031 horizon.

The assessment approach for this report included the following tasks:

- An examination of existing road network, traffic, and land use and travel characteristics along McLaughlin Road to illustrate the transportation context for the corridor;
- Forecasting analysis to determine 2031 traffic patterns and identify deficiencies in traffic operations based on the existing road network; and
- An assessment of traffic operation improvement alternatives to determine the merits of each in addressing the identified deficiencies.

Based on these tasks, a recommended road layout was determined and evaluated in the context of: providing optimal traffic operations; being conducive to transit and active transportation along the corridor; and accommodating potential for vehicle diversions arising from the implementation of the Hurontario Light Rail Transit (LRT) line.

The following overall road improvements were considered for McLaughlin Road:

- Widen McLaughlin Road to 4 through travel lanes throughout the study area (Bristol Road to Britannia Road);
- Widen McLaughlin Road to 4 through travel lanes between Matheson Road and Britannia Road, but maintain 2 lanes through the designated Scenic Route (between Bristol Road and Matheson Blvd) to minimize the land impacts within this section; or
- Widen McLaughlin Road to 4 through travel lanes between Matheson Road and Britannia Road, but maintain 3 lanes through the designated Scenic Route (between Bristol Road and Matheson Blvd) to balance the reduction of land impacts and provision of optimal traffic operations.

For the purpose of the transportation analysis, the study area extends along McLaughlin Road from Ceremonial Drive to Cantay Road. The study area consists of two levels of detail as illustrated in **Exhibit 1-1**.

- For planning purposes: a larger sub-area (bordered by Mavis Road to the west, Hurontario Street to the east, Eglinton Avenue to the south, and Britannia Road to the north) was used to capture the wider effects of the major arterials traffic on McLaughlin Road. The selected area was used at a strategic level to forecast traffic demands with consideration of demographics, land uses, travel mode and attributes of the road network.
- For detailed analysis: a localized study area, focusing on the McLaughlin Road corridor between Ceremonial Drive (to the south) and Cantay Road (to the north), was used to evaluate intersection traffic operations to feed into an overall traffic analysis of the corridor.

Exhibit 1-1: Study Area

![](_page_22_Figure_3.jpeg)

# 2. Existing Conditions

### 2.1 Road Network Review

The City's Official Plan designates McLaughlin Road as a major collector, except between Bristol Road and Matheson Boulevard where it is also designated as a "Scenic Route". It serves both commercial/commuter traffic, as well as local residential/community traffic. The character of the roadway changes substantially within study limits, with Matheson Boulevard serving as the primary divide between the two sections.

- Section 1 From Bristol Road to Matheson Boulevard: McLaughlin Road operates as a two lane roadway (one per direction) with turning lanes provided at Avonwick Avenue, Ceremonial Drive (north), and Faith Drive / Parkwood Place intersections. These roads provide local access to residential lands east and west of McLaughlin Road. The posted speed limit along this section of McLaughlin Road is 50km/h.
- Section 2 From Matheson Boulevard to Britannia Road: McLaughlin Road operates as a two-lane roadway (one per direction) plus a centre turn lane. It provides access to Heartland Town Centre, one of the largest retail nodes in Ontario, and generates significant demands during the PM peak hour and weekend traffic conditions. On the weekends, the retail demands within this segment are offset by the lower demands associated with business employment land uses which are located on the east side of McLaughlin Road is 60km/h.

South of the study limits, the Confederation Parkway Bridge was opened in August 2008 to connect McLaughlin Road and Confederation Parkway. This connection provides access to and from downtown Mississauga (City Centre).

Within the localized study area, the following east-west arterial and major collector roads intersect McLaughlin Road within the study and are included in the analysis:

- **Bristol Road** is an east-west collector which draws significant traffic due to its crossing of the Credit River and access to Streetsville. Bristol Road provides access to nearby residential communities but does not extend to employment lands east of Highway 403.
- **Matheson Boulevard** is a major east-west collector that provides a crossing of Highway 403. The crossing attracts large volumes of commuting traffic travelling eastbound in the AM peak hour and westbound in the PM peak. The intersection with McLaughlin Road is congested as is shown in the analysis herein.
- **Britannia Road** is an east-west arterial road under the jurisdiction of Peel Region. The posted speed limit along Britannia Road is 80km/h. It was recently widened to six lanes, including improvements at the McLaughlin Road intersection. The eastbound and westbound approaches at the intersection are painted to accommodate a dual left turn (if required) in the future.

The following east-west minor collectors intersect McLaughlin Road within the localized study area and are included in the analysis:

- Regal Drive: a connection south of Britannia Road and serves the Heartland Town Centre.
- Avonwick Avenue, Ceremonial Drive and Parkwood Place / Faith Drive: all three roads intersect at McLaughlin Road south of Matheson Boulevard and service the low to medium density residential development located on either side of McLaughlin Road. Only Ceremonial Drive is signalized at McLaughlin Road. These roads have a posted speed limit of 50km/h.

Within the larger study area, the following roads exist:

- Eglinton Avenue, located at the south boundary of the study area, is a sixlane east-west arterial which extends across the City of Mississauga, and serves both local and regional travel needs.
- **Mavis Road** is a six-lane north-south arterial in the City of Mississauga. Mavis Road connects to both Highway 401 and Highway 403, and serves significant employment lands and access to east-west roads including Britannia Road, Eglinton Avenue, Burnhamthorpe Road, and Dundas Street.
- Hurontario Street is a major north-south arterial that provides access to downtown Mississauga and extends from Port Credit to north of Brampton. A Light Rail Transit (LRT) is currently planned for Hurontario Street which would occupy the two centre lanes (leaving Hurontario Street as a four divided roadway). Further discussion of the LRT and impacts are provided in Section 3.6 of this report.

A summary of major road characteristics in the study area is provided in **Exhibit 2-1**. The lane configuration of McLaughlin Road is illustrated in **Exhibit 2-2**.

#### Exhibit 2-1: Summary of Major Road Characteristics within Sub-Area

ROAD	POSTED SPEED LANE CONFIGURATION (KM/H)		LAND USES SERVICED
Cantay Road	60	<ul> <li>East-west major collector</li> <li>Four through lanes; median two-way left turn lane</li> </ul>	Business employment
Britannia Road	Britannia       80       • East-west regional arterial       • Business er         Four through lanes; left and right turn bays       • Some dual left turns (e.g. at Mavis Road)       • Mixed-use of		<ul> <li>Business employment</li> <li>Mixed-use development</li> <li>Access to Heartland Town Centre</li> </ul>
Matheson Boulevard	60	<ul> <li>East-west major collector</li> <li>Four through lanes; median two-way left turn lane</li> <li>Some left turn bays (e.g. at McLaughlin Road)</li> </ul>	Business employment
Bristol Road	50	<ul> <li>East-west major collector</li> <li>Four through lanes; left turn bays</li> </ul>	<ul> <li>Few connections to medium density residential and convenience commercial developments</li> <li>Mixed-use development low density residential</li> </ul>
Eglinton Avenue	60	<ul> <li>East-west arterial</li> <li>Six through lanes; left and right turn bays</li> <li>Some dual left turn bays (e.g. at Hurontario Street)</li> <li>Connection to Highway 403 (east of study area)</li> </ul>	<ul> <li>General and convenience retail development</li> <li>Several density-types of residential development</li> </ul>
Hurontario Street	60	<ul> <li>North-south arterial</li> <li>Six through lanes; left and right turn bays</li> <li>Some dual left turn bays (e.g. at Britannia Road)</li> <li>Connections to Highway 401, 403, City Centre, Queen Elizabeth Way (south of study area)</li> </ul>	<ul> <li>Business employment</li> <li>Medium to high density residential development</li> </ul>
Mavis Road	60	<ul> <li>North-south arterial</li> <li>Six through lanes; left and right turn bays</li> <li>Some dual left turn bays (e.g. at Britannia Road)</li> <li>Connections to Highway 401 and 403</li> </ul>	<ul> <li>Business employment</li> <li>Mixed-use development</li> <li>Access to Heartland Town Centre</li> <li>Low to medium density residential development</li> </ul>

#### Exhibit 2-2: Existing Lane Configuration on McLaughlin Road

![](_page_26_Figure_3.jpeg)

### 2.2 Transit and Active Transportation Review

Mississauga Transit (MiWay) operates several routes along McLaughlin Road and the major roads within the study area. There are five routes that directly use or connect to McLaughlin Road, as summarized in **Exhibit 2-3**. **Exhibit 2-4** illustrates the location of these transit routes along McLaughlin Road.

Several other routes operate within the study area, including: route 19 Hurontario, route 34 Credit Valley, route 35 Eglinton, route 61 Mavis, route 68 Windsor Hill, route 87 Meadowvale Skymark, route 103 Hurontario Express, and Brampton Transit ZUM route 502 Hurontario.

MiWay has observed that, in particular, ridership on Route 66 has been steadily growing over the past years resulting in many improvements to the route's service frequency.

#### Exhibit 2-3: Transit along McLaughlin Road

ROUTE	SERVICE ROUTE / HUBS	HEADWAYS (MINUTES)
66 McLaughlin	<ul> <li>Mississauga City Centre Transit Terminal to Sheridan College (Brampton)</li> <li>Operations along McLaughlin Road</li> </ul>	• AM / PM – 13 • Afternoon – 16
43 Matheson- Argentina       • Skymark Hub to Meadowvale Town Centre         • AM – westbound only; PM – eastbound only; no afternoon service         • Operations between Britannia Road and Matheson Boulevard along McLaughlin Road		• AM / PM – 22
<ul> <li>Islington Subway Station to area (via Highway 401) bounded by Cantay Road, McLaughlin Road, Matheson Boulevard and Whittle Road (east of Hurontario Street)</li> <li>Operations between Cantay Road and Matheson Boulevard along McLaughlin Road</li> </ul>		• AM – 16-20 • PM – 19-30
10 Bristol-Britannia	<ul> <li>Meadowvale Town Centre and loops back at Hurontario Street</li> <li>Crosses McLaughlin Road at Bristol Road</li> </ul>	• AM / PM – 20 • Afternoon – 27
39 Britannia	<ul> <li>Meadowvale Town Centre and loops back near Kennedy Road and Britannia Road intersection</li> <li>Crosses McLaughlin Road at Britannia Road</li> </ul>	• AM / PM – 30

Along the corridor, pedestrians use sidewalks that are provided on both sides of McLaughlin Road. Between Britannia Road and Faith Drive, however, only a splash pad is provided on the east side. Depending on the location, the sidewalk may be directly adjacent to traffic or behind either a concrete or a grass boulevard. **Exhibit 2-4** illustrates the configuration of sidewalks with either good separation from traffic or directly adjacent to travel lanes.

In the AM peak hour, pedestrian activity is significant at Bristol Road with 50 peds/hr crossing east-west along the south approach and 25 peds/hr north-south along the east approach. In the PM peak hour, pedestrian activity is significant at Parkwood Place / Faith Drive with 30 peds/hr crossing north-south along the east approach.

Existing on-road bicycle lanes are found along Confederation Parkway (McLaughlin Road) south of Eglinton Avenue, connecting to the City Centre. Bicycle lanes are also provided north of the study area, between Cantay Road and Courtney Park Drive. Along Confederation Parkway, 35 northbound and 58 southbound bicycles were counted between 5:30AM and 8:30PM according to the Region of Peel's Cordon Count (2011). On McLaughlin Road south of Highway 401, the Region of Peel (2006) counted 1 northbound and 27 southbound cyclists between 5:30AM and 8:30PM.

McLaughlin Road crosses dedicated cycling routes at Cantay Road and at Ceremonial Drive. McLaughlin Road can be described as a gap in the city's cycling network. Accordingly, in the City's Cycling Master Plan, McLaughlin Road is proposed as a 'primary on-road cycling route'.

![](_page_28_Figure_3.jpeg)

![](_page_28_Figure_4.jpeg)

### 2.3 Vehicle Traffic Profile

Automated traffic recorder (ATR) counts as reflected in **Exhibit 2-5** were acquired from the City and the Region of Peel. Based on these counts the typical roadway AM and PM peak hour periods were found to be critical in terms of highest observed vehicle volume. The average off-peak hour and weekend counts reflect volumes well below the AM and PM peak hours. Current AM and PM peak hour traffic volumes are illustrated in **Exhibit 2-12** in Section 2.5.

#### **Exhibit 2-5: Intersection ATR Count Dates**

INTERSECTION	ATR COUNT DATE
McLaughlin Road and Cantay Road	Thursday, December 16,
	2010
McLaughlin Road and Britannia Road	Thursday, April 28, 2011
McLaughlin Road and Regal Drive	Tuesday, December 8, 2009
McLaughlin Road and Matheson Boulevard	Thursday December 9, 2010
McLaughlin Road and Avonwick Avenue	Thursday, February 11, 2010
McLaughlin Road and Ceremonial Drive (T-	Thursday, December 9, 2010
Intersection)	
McLaughlin Road and Parkwood Place / Faith Drive	Tuesday, December 6, 2011
McLaughlin Road and Bristol Road	Thursday, December 9, 2010
McLaughlin Road and Ceremonial Drive (4-way)	Thursday, December 9, 2010

An assessment of the existing traffic counts revealed the following:

- Traffic volumes from 2003 to 2011 (see **Exhibit 2-6**) have been relatively constant, although increasing slightly prior to 2007, and decreasing volumes since 2007 (most probably due to the economic trends of the time).
- Based on the most recent (April 2011) traffic counts at Britannia Road and McLaughlin Road (see **Exhibit 2-7**), traffic patterns on a daily basis experience three peak periods: AM peak hour, PM peak hour and midday peak hour. The PM peak hour volumes along McLaughlin Road are highest and cause the most critical operations.
- Traffic volumes along McLaughlin Road are highest at the south end of study area, and secondly within the Scenic Route segment between Bristol Road and Matheson Boulevard.
- Traffic volumes along McLaughlin Road are highest in the southbound direction (south of Matheson Blvd) during the PM peak hour.
- During the AM peak hour, traffic volumes are highest in the northbound direction (south of Matheson Blvd).

#### Exhibit 2-6: Historical Daily (7AM-6PM) Traffic Volumes, Britannia Road and McLaughlin Road

![](_page_30_Figure_3.jpeg)

Exhibit 2-7: Daily Traffic Profile, Britannia Road and McLaughlin Road (April 28, 2011)

![](_page_30_Figure_5.jpeg)

### 2.4 Transportation within the Larger Study Area

This analysis was undertaken using Marshall Macklin Monaghan's (MMM) EMME model that was developed for the Hurontario Study. Volume to capacity ratios (V/C) ratios were used as an indicator of congestion, with values greater than 0.80 indicating that the road was operating near capacity and vehicles were experiencing delay. V/C ratios greater than 1.00 indicate severe congestion. Assessment of the EMME model showed the following:

- The roads in the study area operate near capacity in the model. Britannia Road, Matheson Boulevard, Eglinton Avenue, Mavis Road, and Hurontario Street all had segments with V/C greater than 0.80. Exhibit 2-8 summarizes critical corridor operations. Exhibit 2-9 presents a V/C and flow schematic for the sub-area analysis. Although the schematic represents the 2016 horizon, this will not impact future growth assessments.
- The traffic volumes along McLaughlin Road appear to be under-represented in the EMME model (highest volumes was 500veh/h north of Matheson Boulevard; lowest was 60veh/h within the Scenic Route). Given that strategic models are more oriented towards arterials, this type of variation is normal. The detailed analysis in the following section provides a finer assessment of McLaughlin Road operations using count data.

The analysis indicated that there is a small amount of available capacity in the network, particularly for north-south roads parallel to McLaughlin Road.

ROAD	NOTABLE V/C / FLOW
Britannia Road	<ul> <li>Near-capacity (V/C &gt; 0.80)</li> </ul>
	• 2,200-2,500veh/h in both directions, from west of Mavis Road to
	east of Hurontario Street
Matheson	<ul> <li>Near-capacity (V/C &gt; 0.80) eastbound, just east of McLaughlin</li> </ul>
Boulevard	Road
Hurontario Street	<ul> <li>Near-capacity (V/C &gt; 0.80) south of Highway 401</li> </ul>
	<ul> <li>South of Britannia Road, V/C &lt; 0.80</li> </ul>
Mavis Road	<ul> <li>V/C between 0.60 and 0.79</li> </ul>
	<ul> <li>1,700veh/h approaching Eglinton Avenue, and Britannia Road</li> </ul>
Eglinton Avenue	<ul> <li>Near-capacity (V/C &gt; 0.80) around Mavis Road</li> </ul>

#### Exhibit 2-8: Notable Corridor Operations in EMME

Exhibit 2-9: V/C and Flow Plot from City EMME AM Peak Hour Model

![](_page_32_Figure_3.jpeg)

### 2.5 Traffic Operations along McLaughlin Road

A detailed operational analysis using Synchro and Highway Capacity Manual (HCM) methodology was undertaken for intersections along McLaughlin Road within the study area. Level-of-service (LOS), an alphabetical metric based on delays experienced by vehicles, was used an indicator of traffic performance. **Exhibit 2-10** relates LOS with delay. As with the previous analysis, V/C was also used to indicate performance of specific movements.

#### Exhibit 2-10: LOS Definitions

1.09	Stopped Vehicle Delay (seconds)			
L03	Signalized	Unsignalized		
Α	≤10	≤10		
В	>10, ≤20	>10, ≤15		
С	>20, ≤35	>15, ≤25		
D	>35, ≤55	>25, ≤35		
E	>55, ≤80	>35, ≤50		
F	>80	>50		

Traffic counts were normalized from counts (typically 2009 to 2011) to 2012 conditions. This was undertaken by applying a normalizing factor of 1%/year to all movements at all intersections, except for the eastbound and westbound movements at Regal Drive, Avonwick Avenue, Parkwood Place/Faith Drive and Ceremonial Drive since these roads are minor collectors to established residential areas. This growth rate is representative of the traffic growth trends from 2003-2011, as shown in **Exhibit 2-11**. Moreover, long-term traffic forecasts indicate a similar growth rate, as detailed in Section 3.1. Normalized 2012 volumes are shown in **Exhibit 2-12**.

Volume imbalances greater than 200veh/h between intersection along McLaughlin Road were noted at the following locations. However, to be consistent with count data, these midblock differences were not rebalanced by increasing and/or decreasing intersection count volumes in the Synchro analysis. This provided an accurate analysis of traffic operations.

- Southbound between Cantay Road and Britannia Road in the PM peak hour;
- Southbound between Regal Drive and Matheson Boulevard in the AM peak hour;
- Between Avonwick Avenue and Ceremonial Drive (T-intersection), northbound in the AM peak hour and southbound in the PM peak hour; and
- Southbound between Parkwood Place/Faith Drive and Bristol Road in the PM peak hour.

Data	EBT WB		BT N		BT	SE	SBT	
Date	Vol	%Diff	Vol	%Diff	Vol	%Diff	Vol	%Diff
AM Peak Hour								
Tuesday, April 29, 2003	1,639	-	333	-	339	-	658	-
Tuesday, February 24, 2004	1,635	0%	228	0%	324	0%	562	0%
Tuesday, April 18, 2006	1,558	0%	196	0%	351	8%	563	0%
Thursday, October 25, 2007	1,976	27%	273	39%	585	67%	922	64%
Thursday, May 28, 2009	1,577	0%	258	0%	384	0%	572	0%
Thursday, April 28, 2011	1,307	0%	215	0%	417	9%	594	4%
Average Difference % over 8 Years		5%		8%		17%		14%
Average Difference % per Year		1%		1%		2%		2%
PM Peak Hour								
Tuesday, April 29, 2003	482	-	1,366	-	571	-	641	-
Tuesday, February 24, 2004	384	0%	1,391	2%	536	0%	464	0%
Tuesday, April 18, 2006	419	9%	1,375	0%	548	2%	481	4%
Thursday, October 25, 2007	613	46%	1,208	0%	604	10%	1,127	134%
Thursday, May 28, 2009	493	0%	1,320	9%	555	0%	471	0%
Thursday, April 28, 2011	510	3%	1,637	24%	604	9%	638	35%
Average Difference % over 8 Years		12%		7%		4%		35%
Average Difference % per Year	]	1%		1%		1%		4%
NL 4								

#### Exhibit 2-11: Traffic Volume Trends at McLaughlin Road and Britannia Road

Notes:

Where Difference % (%Diff) would be negative, 0% is applied to be conservative

EBT = Eastbound-through, WBT = Westbound-Through, NBT = Northbound-Through, SBT = Southbound-Through

An assessment of the existing (2012) traffic counts showed the following:

• Two-way traffic volumes along McLaughlin Road were as shown below.

<u>McLaughlin Road (Segment)</u>		<u>AM Peak Hour</u>	PM Peak Hour
-	Britannia Rd to Cantay Rd	1,550veh/h	1,620veh/h
-	Matheson Blvd to Britannia Rd	1,700veh/h	1,770veh/h
-	Bristol Rd to Matheson Blvd	1,730veh/h	2,000veh/h
-	Eglinton Ave to Bristol Rd	1,900veh/h	2,400veh/h

 Within the Scenic Route, McLaughlin Road (Bristol Road to Matheson Blvd), traffic volumes were highest in the northbound direction during the AM peak hour (1,070veh/h) and in the southbound direction during the PM peak hour (1,100veh/h). Compared to the northern section (north of Matheson Boulevard), the southern section of McLaughlin Road experienced greater volumes on the order of 200veh/hr.

#### Exhibit 2-12: Existing (2012) Volumes, AM (PM)

![](_page_35_Figure_3.jpeg)

#### Exhibit 2-12 Continued: Existing (2012) Volumes, AM (PM)

![](_page_36_Figure_3.jpeg)

An operational analysis of existing traffic volumes revealed the following.

- Congestion is greatest during the PM peak hour. Significant congestion occurs in the northbound and westbound directions at Matheson Boulevard, during this period.
- The corridor generally operates with less than 1 minute of delay during the AM peak hour except for the eastbound approach at Matheson Boulevard where delays of 2 minutes were measured.
- Traffic along McLaughlin Road at Regal Drive, Avonwick Avenue and Parkwood Place/Faith Drive experience LOS F for movements turning onto McLaughlin Road. These operations indicate long delays but occur for a low number of vehicles (approximately 40veh/h). Traffic along McLaughlin Road that crosses these intersections operates at a near free-flow state, without signalization. Long delays experienced by motorists turning onto McLaughlin Road could lead drivers to turn into smaller gaps in traffic, potentially resulting in a safety problem.
- At Ceremonial Drive (T-intersection), southbound traffic experiences long delays, with significant queuing in the PM peak hour.
- Signals along McLaughlin Road were not coordinated with synchronized cycle lengths or offsets. Improvements to signal timing plans could benefit the corridor.

**Exhibit 2-13** on the following page summarizes the performance details for McLaughlin Road and offers possible mitigation strategies. **Exhibit 2-14** illustrates congested (LOS F) intersection operations within the study area.

#### Exhibit 2-13: Existing Conditions Critical Intersection Operations and Possible Mitigation(s)

INTERSECTION WITH MCLAUGHLIN ROAD	CRITICAL OPERATIONS	POSSIBLE MITIGATION(S)					
Major Congestion Points	Major Congestion Points						
Matheson Boulevard	<ul> <li>Overall LOS F in PM</li> <li>LOS F: eastbound (AM) and westbound (PM) approaches, NBL (PM)</li> <li>Long queues eastbound (AM) and westbound (PM)</li> </ul>	<ul> <li>Signal optimization</li> <li>Over- and near-capacity approaches indicate need for roadway improvements (additional through or turning lanes)</li> </ul>					
Minor Congestion Points							
Regal Drive	<ul> <li>Side-street approach at LOS F: EBTL, WBTL</li> <li>Low eastbound-westbound volumes (40veh/h)</li> </ul>	<ul><li>Signalization</li><li>Prohibit left turns</li></ul>					
Avonwick Avenue	<ul> <li>Side-street approach at LOS F: EBL</li> <li>Low eastbound volumes (40veh/h)</li> </ul>	<ul><li>Signalization</li><li>Prohibit left turns</li></ul>					
Ceremonial Drive	<ul> <li>Southbound approach LOS E with V/C = 1.04 (PM)</li> <li>Long queues southbound (PM)</li> </ul>	<ul><li>Signal optimization</li><li>Widening</li><li>Roundabout</li></ul>					
Parkwood Place/Faith Drive	<ul> <li>Side-street approach at LOS F: eastbound and westbound approach</li> <li>Low eastbound and westbound volumes (40veh/h)</li> </ul>	<ul><li>Signalization</li><li>Prohibit left turns</li></ul>					
Bristol Road	LOS F: NBL	Signal optimization					
Ceremonial Drive (4-way)	LOS F: NBL	Signal optimization					
Note(s): EBL = Eastbound left, EBTL = Eastbound Shared Through Left, WBTL = Westbound Shared Through Left, NBL = Northbound Left							

#### Exhibit 2-14: LOS F Operations along McLaughlin Road, Existing Conditions

![](_page_38_Figure_3.jpeg)

# 3. Future Conditions

Future traffic volumes were forecasted using MMM's EMME model, which accounts for planned changes in land use and densification according to the City's official plan, as well as planned changes to the transportation network. Although the traffic profile in Section 2.3 indicates flat growth towards 2012, it can be expected that, as the economy recovers and grows, long-term traffic growth will occur since: demographic and economic forecasts indicate positive growth for the sub-area (see *Mississauga Growth Forecast Population 2008-2031* prepared by Mississauga Data in 2010 and *Mississauga Office Strategy Report* prepared by Canadian Urban Institute in 2008); and Britannia Road has recently undergone major capacity augmentations (4 to 6 lanes along Britannia Road, and developed north and south approaches), which will attract traffic to the area.

Once forecast traffic growth was determined, effects on corridor operations were analyzed using the Synchro model of the corridor. A range of improvements were tested where traffic operations were congested. Potential improvements to active transportation and transit were also considered.

### 3.1 Traffic Growth

Traffic growth was determined for the future base network and a future 'sensitivity scenario' in consideration of the planned LRT on Hurontario Street.

Between 2006 and 2031 base networks, the modelled road network in EMME was adjusted as shown in **Exhibit 3-1** to account for planned road infrastructure improvements. Key changes were as follows.

- Highway 401, Mavis Road, Britannia Road had lanes added to the cross section, potentially attracting additional traffic to these roads.
- Hurontario Street was reduced from 6 to 4 lanes to account for the Hurontario LRT. This will reduce traffic volumes along Hurontario Street.

#### Exhibit 3-1: Road Network Cross-Sections Comparison

ROAD	2006	2031 BASE	НОТ
McLaughlin Road	<ul> <li>4 lanes from Cantay Road to Matheson Boulevard, and south of Bristol Road</li> <li>2 lanes between Matheson Boulevard and Bristol Road</li> <li>No Confederation Bridge connection</li> </ul>	No change from 2006	• Same as 2031 base
Hurontario Street	6 lanes	No change from 2006	4 lanes
Mavis Road	<ul> <li>4 lanes between Britannia Road and Eglinton Avenue</li> <li>6 lanes north of Britannia Road</li> </ul>	<ul> <li>6 lanes from north of Britannia Road to Eglinton Avenue</li> </ul>	• Same as 2031 base
Britannia Road	4 lanes	6 lanes	Same as 2031 base
Matheson Boulevard	4 lanes	No change from 2006	Same as 2031 base
Bristol Road	4 lanes	No change from 2006	Same as 2031 base
Ceremonial Drive	2 lanes	No change from 2006	Same as 2031 base
Eglinton Avenue	6 lanes	No change from 2006	Same as 2031 base
Highway 401	6 lanes (100km/h)	10 lanes (100km/h)	Same as 2031 base
Highway 403	6 lanes (100km/h)	6 lanes (100km/h)	Same as 2031 base

Note(s): Road free flow speeds were modelled as described in Section 2 where not indicated.

To determine growth rates, five northbound-southbound and four eastboundwestbound traffic screenlines were developed using the MMM EMME model as shown in **Exhibit 3-2**. Traffic using Mavis Road, McLaughlin Road and Hurontario Street were examined to establish north-south traffic trends for the sub-area. Traffic using Britannia Road, Matheson Boulevard and Bristol Road were examined to establish east-west traffic trends.

#### **Exhibit 3-2: Screenline Locations**

#### Northbound-Southbound Traffic

![](_page_41_Picture_4.jpeg)

**Eastbound-Westbound Traffic** 

![](_page_41_Picture_6.jpeg)

The traffic forecasts and diversions indicated here reflect MMM's Hurontario Study EMME model. More recent EMME modelling of the Hurontario LRT by Steer Davies Gleave (SDG) is currently underway. Forecasted diversions are not expected to differ greatly from those provided here.

Findings from the screenlines were as follows. Model results are provided in **Exhibit 3-3**.

#### 2031 Base Scenario

- The range of growth for north-south peak direction traffic was 21%-26% by 2031. The range for the off peak direction traffic was 33%-38%.
- The range of east-west peak direction traffic was 2%-5%. This range appears low due to near-capacity operations. The range of off peak direction traffic was 16%-57%.

#### 2031 Hurontario LRT Scenario

- Overall growth in the north-south direction is lower, as traffic capacity on Hurontario Street is limited and drivers either divert to alternative routes or switch to transit mode.
- The peak direction of traffic along McLaughlin Road experienced an increase of approximately 100veh/h north of Britannia Road and 50veh/h south of Britannia Road. This volume, while relatively low compared to background volume, accounts for drivers diverting from Hurontario due to the reduction in capacity, as the LRT will remove two travel lanes (one per direction).

To forecast future traffic volumes, traffic growth measured by the EMME model (summarized in **Exhibit 3-4**) was applied to existing volumes. Since the EMME model used 2006 and 2031 (25 years) as trend endpoints, traffic growth was proportioned to represent 2012 to 2031 (19 years).

Northbound and eastbound travels were found to be the peak directions during the AM peak hour. Since the EMME model was limited to modelling AM peak hour traffic, PM peak hour peak direction of travel was assumed to be opposite, i.e. southbound and westbound. The derived growth rates for peak and off-peak directions were applied accordingly to through movements at all intersections to be conservative. Application of the growth rates to only through movements limits the uncertainty associated with forecasting turning movements from EMME. **Exhibit 3-5** illustrates the forecasted volumes for the 2031 base scenario.

_														
	North Lange d. O could be sound			Volum	2006 to 2031 Scenario %Volume Growth									
	Traffic Screenline	20	06	2031	2031 Base		2031 HOT		ise	НОТ				
		NB	SB	NB	SB	NB	SB	NB	SB	NB	SB			
-	North of Britannia Road	3,958	3,658	4,111	3,639	3,790	3,104	4%	-1%	-4%	-15%			
2	2 North of Matheson Boluevard	2,861	1,941	3,454	2,573	3,161	2,298	21%	33%	10%	18%			
	North of Bristol Road	4,032	1,205	4,388	1,944	3,920	1,722	9%	61%	-3%	43%			
	North of Ceremonial Drive (4)	2,393	1,620	3,012	2,233	2,627	2,019	26%	38%	10%	25%			
	North of Eglinton Avenue	2,520	2,629	3,166	3,475	2,835	3,180	26%	32%	13%	21%			

#### Exhibit 3-3: EMME Model Screenline Evaluation

Easthound Westhound				Volum	e (vph)	2006 to 2031 Scenario %Volume Growth							
	Traffic Screenline	20	06	2031	2031 Base		2031 HOT		ise	HOT			
		EB	WB	EB	WB	EB	WB	EB	WB	EB	WB		
•	West of Mavis Road	3,595	435	3,683	580	3,639	548	2%	33%	1%	26%		
4	2 West of McLaughlin Road	3,703	211	3,873	332	3,812	306	5%	57%	3%	45%		
	B East of McLaughlin Road	4,699	168	4,433	195	4,330	164	-6%	16%	-8%	-2%		
	West of Hurontario Street	3 137	1 539	3 068	1 515	2 999	1 379	-2%	-2%	-4%	-10%		

#### Exhibit 3-4: Sub-Area Growth Application

PERIOD	DIRECTION (* = PEAK DIRECTION) <sup>1</sup>	SUB-AREA MODEL GROWTH (2006-2031)	APPLIED GROWTH FOR BASE SCENARIO (2012-2031) <sup>2</sup>			
	Northbound*	21-26%	19%			
0.04	Southbound	33-38%	27%			
Aivi	Eastbound*	2-5%	5%			
	Westbound	16-57%	38%			
	North	33-38%	27%			
	South*	21-26%	19%			
FIVI	East	16-57%	38%			
	West*	2-5%	5%			

Note(s): 1. PM peak directions assumed to be opposite AM peak; 2. Growth applied to through movements only. Application to through movements limits the uncertainty with forecasting turning movements via EMME.

Please continue onto next page.

#### Exhibit 3-5: 2031 Forecast Volumes, AM (PM)

![](_page_44_Figure_3.jpeg)

#### Exhibit 3-5 Continued: 2031 Base Volumes, AM (PM)

![](_page_45_Figure_3.jpeg)

### 3.2 Do-Nothing Scenario

The do-nothing scenario is represented by 2031 forecasts and existing intersection configurations. Analysis of this scenario indicated the following operations:

- Further deterioration of traffic operations along the McLaughlin Road corridor is expected with LOS F and several movements approaching and exceeding capacities from Cantay Road to Ceremonial Drive (T-intersection). At least an additional 2-5minutes of delay for north-south through movements is expected.
- Long queues extending at least 200m into the designated Scenic Route from Matheson Boulevard and Bristol Road would occur. Queues of at least 200m were estimated to occur for the southbound approach at Ceremonial Drive (T-intersection).
- Long queues of 200m are expected to occur at Cantay Road in the southbound direction, during the PM peak hour.
- Higher forecasted north-south volumes and longer east-west delays make it more likely that drivers turning onto McLaughlin Road will do so unsafely (i.e. accepting shorter gaps in traffic to do so) from Regal Drive, Avonwick Avenue and Parkwood Place/Faith Drive. Signal warrants analyses were undertaken at these unsignalized intersections and it was found that none warranted signalization (see Exhibit 3-6 below). Consideration may be given to mitigating this concern by prohibiting left turns from Regal Drive, Avonwick Avenue and Parkwood Place/Faith Drive onto McLaughlin Road.
- Diversions away from congested operations along McLaughlin Road are not expected since the corridor provides key access to business commercial areas north of Matheson Boulevard, the Heartland Town Centre, and residential areas south of Matheson Boulevard.

Details of congested operations are summarized in **Exhibit 3-7** with mitigation opportunities provided for the 2031 base scenario. **Exhibit 3-8** illustrates congested traffic operations (LOS F) for the corridor under the base do-nothing scenario.

INTERSECTION WITH MCLAUGHLIN ROAD	VOLUME WARRANT	DELAY WARRANT	COMBINATION WARRANT	SIGNAL WARRANTED
Regal Drive	No	No	No	No
Avonwick Ave	No	No	No	No
Parkwood PI / Faith Dr	No	No	No	No

#### Exhibit 3-6: Signal Warrant for McLaughlin Road Intersections

#### Exhibit 3-7: 2031 Base Scenario Intersection Operations and Possible Mitigation(s)

INTERSECTION WITH MCLAUGHLIN ROAD	CRITICAL OPERATIONS	POSSIBLE MITIGATION(S)					
Major Congestion Points							
Matheson Boulevard	<ul> <li>Overall LOS F in AM and PM peak hours</li> <li>LOS F: eastbound approach in AM; westbound, northbound, southbound approach PM in</li> <li>Longer queues than existing conditions</li> </ul>	<ul> <li>Over-capacity approaches indicate need for roadway improvements (additional through or turning lanes)</li> <li>Implement more advanced signal control</li> </ul>					
Ceremonial Drive (T- intersection)	<ul> <li>Overall LOS E in PM peak hour, C in AM peak hour</li> <li>LOS F: southbound approach with V/C 1.22 in PM peak hour</li> <li>1,300veh/h southbound in PM peak hour</li> <li>Longer queues than existing conditions</li> </ul>	<ul> <li>Over-capacity approach indicates a need for roadway improvements (additional through or turning lanes)</li> </ul>					
Minor Congestion Points							
Cantay Road	<ul> <li>Overall LOS D in AM and PM peak hours</li> <li>LOS F: southbound approach in PM</li> <li>400veh/h SBR (PM peak hour) in SBTR</li> </ul>	• Over-capacity approaches indicate need for right turn bays at southbound approach					
Bristol Road	<ul> <li>Overall LOS C in AM peak hour, D in PM peak hour</li> <li>LOS F: NBL in AM and PM peak hours</li> </ul>	<ul> <li>Implement more advanced signal control</li> </ul>					
Regal Drive	<ul> <li>Side-street approach at LOS F (EBTL, WBTL) in AM and PM peak hours</li> <li>Low eastbound-westbound left and through volumes (&lt;40veh/h per movement)</li> </ul>	<ul> <li>Consider restricting left turns during peak hours</li> </ul>					
Avonwick Avenue	<ul> <li>Side-street approach at LOS F (EBL) in AM and PM peak hours</li> <li>Low eastbound volumes (&lt;100veh/h)</li> </ul>	<ul> <li>Consider restricting left turns during peak hours</li> </ul>					
Parkwood Place / Faith Drive	<ul> <li>Side-street approach at LOS F (eastbound and westbound approach) in AM and PM peak hours</li> <li>Low eastbound and westbound volumes (&lt;50veh/h per movement)</li> </ul>	<ul> <li>Consider restricting left turns during peak hours</li> </ul>					
Ceremonial Drive (4-way)	LOS F: NBL in PM peak hour	<ul> <li>Implement more advanced signal control</li> </ul>					
Note(s): EBL = Eastbound Left, Left. SBTR = Southbound Share	EBTL = Eastbound Shared Through Left, WBTL = V ed Through-Right, SBR = Southbound Right	Vestbound Shared Through Left, NBL = Northbound					

![](_page_48_Figure_2.jpeg)

![](_page_48_Figure_3.jpeg)

### 3.3 Alternatives Analysis

To address poor traffic operations as found by the existing conditions analysis and the do-nothing scenario, three overall improvement alternatives were considered:

- Widen McLaughlin Road to 4 through travel lanes throughout the study area (Bristol Road to Britannia Road);
- Widen McLaughlin Road to 4 through travel lanes between Matheson Road and Britannia Road, but maintain 2 lanes through the designated Scenic Route (between Bristol Road and Matheson Blvd); or
- Widen McLaughlin Road to 4 through travel lanes between Matheson Road and Britannia Road, but maintain 3 lanes through the designated Scenic Route (between Bristol Road and Matheson Blvd).

Additional enhancements to the above strategic alternatives in consideration of a multimodal travel environment along McLaughlin Road, include:

- Optimized intersection controls;
- Roundabout treatments within the Scenic Route intersections;
- Additional turn lanes;
- Bicycle lanes;
- Bus queue jump lanes;
- Enhanced landscaping and design treatment such as a "Green Noise Wall" or "Green Street" in lieu of a standard concrete noise wall and no median landscaping;
- Road rehabilitation and capacity improvements through restriping and resurfacing the existing road; and
- Alternative traffic routing.

#### 3.3.1 McLaughlin Road North Section (North of Matheson Boulevard)

#### Britannia Road to Matheson Boulevard

By 2031, McLaughlin Road between Matheson Boulevard and Britannia Road will experience two-way traffic growth to approximately 2000veh/h with 1140 veh/hr in the peak direction of travel resulting in severe congestion if a two lane cross section is maintained. Widening McLaughlin Road to 4 through lanes and a centre left turn lane from Matheson Boulevard to Britannia Road was examined to improve corridor operations by providing safe storage areas and gaps for left turning vehicles.

Traffic operations for vehicles turning onto McLaughlin Road from Regal Drive significantly improved with widening. Even as an unsignalized intersection, the eastbound and westbound approaches (westbound approach is a private driveway) improved from LOS F to LOS E and better with V/C much less than 1.00, as vehicles found more gaps to turn into north-south traffic.

The intersections of Cantay Road and Britannia Road with McLaughlin Road were found to operate well at LOS D or better. Only the westbound right and northbound left movements in the PM peak hour at Cantay Road operated at LOS F and V/C slightly greater than 1.00, as detailed in **Exhibit 3-9** below. This indicates that maintaining the existing road layout at these intersections will be sufficient to accommodate future traffic volumes.

Exhibit 3-9: Operational Analysis at Cantay Road and Britannia Road, McLaughlin Road with Recommended Improvements

INTERSECTION WITH MCLAUGHLIN ROAD	LOS – AM (PM)	V/C – AM (PM)	CRITICAL – LOS F
Cantay Road	D (D)	0.93 (1.06)	AM: NBL [0.79] PM: WBR [1.03], NBL [1.08]
Regal Drive	-	-	None
Britannia Road	C (D)	0.61 (0.70)	None

#### **Matheson Boulevard**

Traffic operations were shown to severely deteriorate at this intersection by 2031. To improve operations, the southbound approach of the McLaughlin Road and Matheson Boulevard intersection was widened to accommodate 1 through and 1 through-right lane. Alternative northbound intersection approach lane configurations at McLaughlin Road and Matheson Boulevard were also examined to mitigate poor operations here, as listed below:

- Matheson Alternative 1: Northbound 1 left turn lane, 1 through lane, 1 right turn bay;
- Matheson Alternative 2: Northbound 1 left turn lane, 1 through lane and 1 through-right shared lane; and
- Matheson Alternative 3: Northbound 1 left turn lane, 2 through lanes and 1 right turn bay.

For these analyses, the intersection was provided with optimized signals with cycle lengths of 100s and 110s (in the AM and PM peak hours, respectively), and actuation along McLaughlin Road and in the left turn lanes. In the AM peak hour, only the southbound left was provided with permissive protected phasing. In the PM peak hour, the westbound, northbound and southbound left turns were provided with permissive protected phasing.

Analysis results for the alternative lane configurations at Matheson Boulevard are presented in **Exhibit 3-10** below and indicate the following:

- Widening McLaughlin Road improved the southbound approach to LOS D and better with significantly shorter queues and only the left turn experiencing LOS F (V/C greater than 1.00).
- Matheson Alternative 1 still experienced LOS F (V/C greater than 1.00) and significantly long queuing. The eastbound and westbound approach operations were similar to operations that the do-nothing approach provided.
- Matheson Alternative 2 relieved PM peak hour congestion but operated at LOS E (V/C equals 1.05) in the AM peak hour. Long northbound delays and queuing remained an issue.
- Matheson Alternative 3 further improved on the previous configuration's operations at the northbound approach. Overall, the intersection operated at LOS D. Poor operations were observed for the AM peak hour. The westbound left and northbound left operated at LOS F and V/C slightly greater than 1.00. More importantly, the additional right turn lane still operated at LOS F (V/C equals 1.20). The additional northbound through lane was underutilized (V/C equals 0.55). Although queuing along McLaughlin Road was reduced, the northbound right queue was still measured to be greater than 190m, which contributed to the underutilization of the additional through lane.

Based on the above analyses, widening McLaughlin Road to 4 through lanes between Matheson Boulevard and Britannia Road is recommended. At Matheson Boulevard, the northbound lane configuration that provided the best traffic operations was Matheson Alternative 3. Matheson Alternative 2 provided slightly worse operations; but, in light of other considerations such as land availability, this configuration could provide acceptable operations.

	0\	/ERALL			CRITICAL	
ALIERNATIVE	LOS	V/C	MOVEMENT	LOS	V/C	95 <sup>th</sup> % QUEUES (M)
			EBTR	F (C)	1.24 (0.56)	>265 (70)
			WBL	F (F)	1.08 (1.24)	>45 (>110)
			WBTR	C (F)	0.34 (1.28)	40 (>290)
Existing Lovout	E (E)	1 00 (1 22)	NBL	C (F)	0.31 (1.36)	15 (>70)
Existing Layout	г (г)	1.09 (1.22)	NBT	D (F)	0.84 (1.22)	135 (>265)
			NBR	E (C)	0.96 (0.13)	125 (15)
			SBL	E (E)	0.89 (0.92)	50 (45)
			SBTR	F (F)	0.75 (1.15)	145 (>240)
			EBTR	F (D)	1.10 (0.77)	>245 (20)
	E (E)		WBL	F (E)	1.08 (0.96)	>45 (95)
Matheson 1			WBTR	B (F)	0.30 (1.12)	40 (>285)
NB·11 1T 1R		1 06 (1 12)	NBL	C (C)	0.24 (0.72)	15 (45)
SB: 11 1T 1TR	- (-)	1.00 (1.12)	NBT	E (F)	0.95 (1.14)	140 (>270)
00.12, 11, 111			NBR	F (C)	1.10 (0.13)	>135 (20)
			SBL	F (F)	1.13 (1.01)	>75 (>55)
			SBTR	C (D)	0.44 (0.67)	60 (95)
			EBTR	D (C)	1.00 (0.55)	>230 (80)
			WBL	F(C)	1.10 (0.80)	>35 (40)
Matheson 2			WBTR	B (C)	0.27 (0.92)	35 (230)
NB: 1L, 1T, 1TR	E (D)	1.05 (0.88)	NBL	D (E)	0.27 (0.90)	15 (75)
SB: 1L, 1T, 1TR			NBTR	F (E)	1.13 (0.92)	>150 (130)
			SBL	F (F)	1.13 (0.92)	>75 (50)
			SBTR	C (F)	0.49 (0.94)	65 (120)
			EBTR	D (C)	0.95 (0.55)	235 (80)
			WBL	F (C)	1.20 (0.80)	>40 (60)
Matheson 3			WBTR	B (C)	0.26 (0.92)	35 (230)
NB: 1L, 2T, 1R	D (D)	1.19 (0.87)	NBL	C (E)	0.28 (0.90)	20 (75)
SB: 1L, 2T, 1R	- (-)		NBT	C (D)	0.55 (0.86)	70 (115)
			NBR	F (C)	1.20 (0.06)	>190 (10)
			SBL	E (E)	0.88 (0.83)	65 (45)
	1		I SBTR	I C (E)	0.51 (0.94)	75 (120)

#### Exhibit 3-10: 2031 Operational Analysis, McLaughlin Road at Matheson Boulevard, AM (PM)

### 3.3.2 McLaughlin Road South Section (Scenic Route)

The traffic volumes in the Scenic Route were notably higher than those in the north section of McLaughlin Road (see **Exhibit 3-5** previously). The two-way stop controls at the minor streets allowed north-south traffic to traverse with relatively high speeds and little delay. Minor street access onto McLaughlin Road however experienced very poor operations especially in the PM peak hour. At Ceremonial Drive, traffic operations significantly deteriorated to LOS F, V/C greater than 1.00 and southbound queues greater than 300m in the PM peak hour.

#### **Ceremonial Drive**

To address poor operations at Ceremonial Drive, the following alternative treatments were considered:

- Ceremonial Alternative 1: Signals and 1 additional southbound right turn lane;
- Ceremonial Alternative 2: Signals with a 3 through lane cross section 1 southbound through lane and 1 through-right lane; and 1 northbound left turn lane and 1 through lane
- Ceremonial Alternative 3: Signals with a 4 through lane cross section 1 southbound through lane and 1 through-right lane; and 1 northbound left turn lane and 2 through lanes;
- Ceremonial Alternative 4: 1 lane roundabout single entry and exit lanes; and a southbound right slip lane (see **Exhibit 3-11** below); and
- Ceremonial Alternative 5: 2 southbound lanes and 1 northbound lane roundabout single northbound and eastbound entry and exit; and double southbound entry and exit lanes (see **Exhibit 3-11** below).

When developing these alternative treatments, a step-wise approach was undertaken, which considered the number of lanes added, the complexity of the intersection from operational and geometric perspectives, and the traffic effects and lane considerations on McLaughlin Road upstream and downstream of Ceremonial Drive.

Roundabouts were considered at Ceremonial Drive to: reduce southbound delays and queuing with a continuous flow type intersection; preserve a narrower cross-section along McLaughlin Road; take advantage of the long north-south approach road geometries; provide an alternative lower delay access for vehicles from the west residential area to turn onto McLaughlin Road; and provide a traffic calming measure through the Scenic Route.

![](_page_53_Figure_2.jpeg)

![](_page_53_Figure_3.jpeg)

For the analyses when signals were considered at Ceremonial Drive, optimized 100 sec cycles and actuation for Ceremonial Drive were provided; in the PM peak hour, an actuated northbound left permissive protected phase was provided.

Results comparing the alternatives at Ceremonial Drive are presented in **Exhibit 3-12** and reflect the following findings:

- Ceremonial Alternative 1 improved LOS from E to C (V/C reduced from 0.98 to 0.89) in the PM peak hour. Queues in the southbound approach were still very long though (330m).
- Ceremonial Alternative 2 mitigated the southbound queuing effectively (queues were reduced to 85m). LOS and V/C were improved to LOS B and V/C less than 0.80, compared to the above alternative. Queues were managed and were shorter than 85m at all approaches.
- Ceremonial Alternative 3 allowed LOS A, V/C less than 0.60 and queues shorter than 85m at all approaches.
- Ceremonial Alternative 4 allowed LOS A but near capacity operations. Significant northbound queues of 190m were observed in the AM peak hour due to the high number of vehicles turning out from Ceremonial Drive onto McLaughlin Road. As a sensitivity test, eastbound left turning volumes from Avonwick Avenue were carried over to Ceremonial Drive to test a potential prohibition of left turns from Avonwick Avenue. LOS deteriorated to E in the AM peak hour with significantly long queues in the northbound direction (795m).
- Ceremonial Alternative 5 performed similarly to Alternative 4 with and without the additional volume from Avonwick Avenue.

The above findings for Ceremonial Drive suggest that at least a 3 through lane cross section should be provided approaching the intersection with the following considerations.

- Ceremonial Alternatives 4 and 5 performed similarly; however they were not however able to manage northbound queues in the AM peak hour when left turns from Avonwick Avenue were carried over. This is expected since the roundabout alternatives operated very near capacity (V/C equals 0.93) in the AM peak hour.
- For Ceremonial Alternatives 2 and 3, the carryover of left turn traffic from Avonwick Avenue did not significantly affect the intersection's operations.
- Signalization and roundabout treatments of Ceremonial Drive provided similar LOS but queues were better managed by signals. Roundabouts break down if any additional volume is added to Ceremonial Drive.
- The selection between a signal or a roundabout treatment should also consider other factors such as land requirements and traffic calming potential.
- Ceremonial Alternative 2 results in acceptable operations. It may also be considered as an intermediate stage to the ultimate configuration recommended later.
- Ceremonial Alternative 3 results in the best operations. In this case, providing signals is recommended since a 2 lane roundabout would be constrained by right-of-way and land requirements.

#### Exhibit 3-12: Operational Analysis, McLaughlin Road at Ceremonial Drive (T-intersection), AM (PM)

	0	/ERALL		C	RITICAL	
ALIERNATIVE	LOS	V/C	MOVEMENT	LOS	V/C	QUEUES (M)
			SBTR	C ( <u>F</u> )	0.59 ( <u>1.22</u> )	155 (> <u>310</u> )
Existing Layout (Signals)	C (E)	0.81 (0.98)	NBL	A (C)	0.18 (0.63)	5 (20)
			NBT	C (C)	0.92 (0.82)	300 (260)
			SBT	A (C)	0.52 (0.95)	30 ( <u>330</u> )
Ceremonial 1		0.91 (0.90)	SBR	A (A)	0.02 (0.10)	5 (15)
Signals + 1 SBR Lane, 1 NBL, 1 NBT	Б(С)	0.01 (0.09)	NBL	A (D)	0.14 (0.54)	5 (25)
			NBT	B (A)	0.85 (0.71)	125 (65)
Coromonial 2			SBTR	A (A)	0.29 (0.55)	15 (85)
Ceremonial Z Signala + 1 SPT 1 SPTD 1 NPL 1 NPT	B (B)	0.81 (0.67)	NBL	A (A)	0.13 (0.36)	5 (5)
Signais + 1 361, 1 361K, 1 NBL, 1 NBL			NBT	B (A)	0.85 (0.71)	125 (75)
Sonsitivity Coromonial 2			SBTR	A ( B)	0.30 (0.57)	15 (95)
(L) off Turns from Avonwick Avonuo)	B (B)	0.87 (0.70)	NBL	A (B)	0.14 (0.38)	5 (10)
(+ Leit Turns non Avonwick Avenue)			NBT	B (B)	0.88 (0.74)	125 (80)
Coromonial 2			SBTR	A (A)	0.29 (0.55)	15 (85)
		0.47 (0.53)	NBL	A (A)	0.13 (0.36)	5 (10)
Signais + 1 3B1, 1 3B1R, 1 NBL, 2 NB1			NBT	A (A)	0.45 (0.38)	25 (25)
Sensitivity Coromonial 3			SBTR	A (B)	0.31 (0.57)	15 (95)
(+ Left Turns from Avonwick Avenue)	A (B)	0.54 (0.56)	NBL	A (B)	0.15 (0.38)	5 (10)
(+ Leit Tullis Ilolii Avonwick Avenue)			NBT	A (A)	0.48 (0.39)	40 (30)
			SBT	A (A)	0.43 (0.75)	30 (70)
Ceremonial 4		0.03 (0.76)	SBR	A (A)	0.03 (0.10)	5 (5)
Roundabout, 1 Lane + SBR Slip Lane		0.33 (0.70)	NBL	B (A)	<u>0.93</u> (0.76)	<u>190 (</u> 90)
			NBT	A (A)	<u>0.93</u> (0.76)	<u>190</u> (90)
			SBT	A (A)	0.43 (0.75)	30 (75)
Sensitivity Ceremonial 4	Ε (Δ)	1 05 (0 81)	SBR	A (A)	0.03 (0.10)	5 (5)
(+ Left Turns from Avonwick Avenue)		1.00 (0.01)	NBL	<u>F</u> (A)	<u>1.05</u> (0.81)	<u>795</u> (100)
			NBT	<u>F</u> (A)	<u>1.05</u> (0.81)	<u>795</u> (100)
			SBT	A (A)	0.26 (0.47)	10 (25)
Ceremonial 5	Δ (Δ)	0.93 (0.76)	SBR	A (A)	0.26 (0.47)	10 (25)
Roundabout, 2 SB Lanes, 1 NB Lane		0.33 (0.70)	NBL	B (A)	<u>0.93</u> (0.76)	<u>190</u> (90)
			NBT	A (A)	<u>0.93</u> (0.76)	<u>190</u> (90)
			SBT	A (A)	0.26 (0.45)	10 (25)
Sensitivity Ceremonial 5	F (A)	1 05 (0 81)	SBR	A (A)	0.26 (0.45)	10 (25)
(+ Left Turns from Avonwick Avenue)		1.00 (0.01)	NBL	<u>F</u> (A)	<u>1.05 (</u> 0.81)	<u>785</u> (100)
			NBT	<u>F</u> (A)	<u>1.05</u> (0.81)	<u>785</u> (100)

#### **Other Intersections**

At the minor stop control intersections within the Scenic Route, keeping the existing layout for McLaughlin Road caused left turn operations onto McLaughlin to deteriorate as a result of difficulties in finding gaps in single lane high volume traffic. Signals were not warranted at any of these minor intersections (see **Exhibit 3-6** previously). However, it is desirable to extend the 4 through lanes through the Avonwick Avenue and Parkwood Place/Faith Drive intersections. As detailed in **Exhibit 3-13** below, although east/west movements at the Parkwood Place/Faith Drive intersection continue to operate at LOS F, they remain well under capacity. The 3 through lane cross-section did not provide adequate gaps for eastbound left turns onto McLaughlin Road (i.e. LOS F and V/C greater than 1.00 was experienced for these movements).

Bristol Road and Ceremonial Drive (4-way intersection) will operate at LOS D or better with only signal optimizations, as detailed in **Exhibit 3-13** below. For the PM peak hour, it is recommended that the Bristol Road intersection has a 110s cycle length, northbound left permissive protected phasing and actuation along Bristol Road. Maintaining the existing road layout is sufficient to accommodate forecasted traffic at these intersections.

Exhibit 3-13: Operational Analysis, McLaughlin Road with Recommended Road Configuration, South Section

INTERSECTION WITH MCLAUGHLIN ROAD	LOS – AM (PM)	V/C – AM (PM)	CRITICAL – LOS F
Avonwick Avenue	-	-	None
Ceremonial Drive (T- intersection)	A (A)	0.47 (0.53)	None
Parkwood Place/Faith Drive	-	-	AM: EBTL [0.04], WBTL [0.21] PM: EBTL [0.15], WBTL [0.15]
Bristol Road	C (D)	0.84 (0.97)	AM: SBL [0.98] PM: EBL [1.06]
Ceremonial Drive (4- way)	C (C)	0.52 (0.76)	PM: NBL [1.03]

### 3.4 Recommended Lane Configuration

Based on the analyses of alternatives, the following lane configuration is recommended (see **Exhibit 3-14** below for a schematic):

- Widening McLaughlin Road between Matheson Boulevard and Britannia Road to a 5 lane cross section (4 through lanes and a centre left turn lane);
- At Matheson Boulevard, providing 1 left, 1 through, and 1 through-right lane in the northbound and southbound directions;
- Widening the Scenic Route to a 4 through lane cross section;
- At Avonwick Avenue, providing 1 through and 1 through-right lane in the southbound direction; and 1 left-through and 1 through lane in the northbound direction;
- At Ceremonial Drive, providing 1 through and 1 through-right lane in the southbound direction; and 1 left and 2 through lanes in the southbound directions; and
- At Parkwood Place/Faith Drive, providing 1 left-through and 1 through-right lane in the northbound and southbound directions.

#### Exhibit 3-14: Recommended Ultimate Configuration

![](_page_57_Figure_3.jpeg)

### 3.5 Hurontario LRT Sensitivity Analysis

The analyses presented in Sections 3.2 and 3.3 were based on the future 2031 forecasts without implementation of the LRT on Hurontario Street. As detailed in Section 3.1, forecasts with the LRT on Hurontario Street were assessed to determine the impact on McLaughlin Road and if the recommended ultimate configuration required additional improvements. Overall, the implementation of LRT does not have a major effect on traffic volumes, with a minor increase of 50veh/h expected south of Britannia Road and 100veh/h north of Britannia in the northbound and southbound through directions. These volumes were derived from MMM's Hurontario Study EMME model; they are not expected to vary greatly given more recent modelling is currently being undertaken by SDG.

When assessed with the volumes forecasted with the LRT on Hurontario Street, the recommended configuration of McLaughlin Road as detailed in Section 3.4

operated similarly to base traffic forecasts (see **Exhibit 3-15** below). The minor diversions of vehicles to McLaughlin Road from Hurontario Street were not sufficient to change recommendations as developed in the alternatives analyses.

INTERSECTION WITH	LOS –	AM (PM)	V/C – A	M (PM)	CRITICAL -	LOS F [V/C]
MCLAUGHLIN ROAD	BASE	LRT	BASE	LRT	BASE	LRT
Cantay Road	D (D)	D (D)	0.93 (1.06)	0.94 (1.06)	AM: NBL [0.79] PM: WBR [1.03], NBL [1.08]	AM: NBL [0.77], NBTR [1.01] PM: WBR [1.03], NBL [1.08]
Britannia Road	C (D)	C (D)	0.61 (0.70)	0.61 (0.73)	None	None
Regal Drive	-	-	-	-	None	None
Matheson Boulevard	E (D)	E (D)	1.05 (0.88)	1.05 (0.88)	AM: WBL [1.10], NBTR [1.13], SBL [1.13] PM: SBL [0.92]	AM: WBL [1.10], NBTR [1.18], SBL [1.13] PM: SBL [0.92]
Avonwick Avenue	-	-	-	-	None	None
Ceremonial Drive (T- intersection)	A (A)	A (A)	0.47 (0.53)	0.49 (0.55)	None	None
Parkwood Place/Faith Drive	-	-	-	-	AM: EBTL [0.04], WBTL [0.21] PM: EBTL [0.15], WBTL [0.15]	AM: EBTL [0.04], WBTL [0.23] PM: EBTL [0.16], WBTL [0.16]
Bristol Road	C (D)	C (D)	0.84 (0.97)	0.90 (0.98)	AM: SBL [0.98] PM: EBL [1.06]	AM: SBL [1.02] PM: EBL [1.06]
Ceremonial Drive (4- way)	C (C)	C (C)	0.52 (0.76)	0.53 (0.78)	PM: NBL [1.03]	PM: NBL [1.02]

#### Exhibit 3-15: Operational Comparison of Recommended Configuration, 2031 Base Traffic Forecast versus LRT

### 3.6 Transit and Active Transportation

This EA is also considering improvements to transit and active transportation in the corridor.

Transit on McLaughlin Road was detailed in Section 2.2 of this report, and indicated that bus headways for routes that travel along portions of McLaughlin Road are generally longer than 15 minutes. These headways are not conducive to dedicated transit improvements as transit funds might be better allocated to busier corridors. However, MiWay has observed increased ridership for route 66, in particular. With ridership anticipated to increase due to residential and employment growth along the corridor as well as growing student demand, MiWay has allocated more service resources to route 66 (by providing more frequent bus services).

Buses travel in mixed traffic and are limited by any poor operations experienced by general traffic. Under the recommended configuration, improvements will allow traffic to operate at LOS D and higher at all intersections, except at Matheson Boulevard, which will minimize delay by buses as they travel along McLaughlin Road. These additional considerations could further improve bus operations along the corridor.

- At Matheson Boulevard, the above alternatives analyses tested but did not recommend right-turn bays. Right turn bays could be used as a transit queue jump for northbound and southbound buses, since queues approximately 150m along McLaughlin Road are expected with the recommended lane configuration. These queues could cause buses to wait in traffic before reaching the bus-stop, and then delays as the bus merges back into southbound traffic. Given that right-of-way might be available, a dedicated right-turn lane adjacent to the bus stop could improve service levels for transit users.
- At Britannia Road and McLaughlin, bus stop locations are not conducive to transfers between Route 66 and Route 39. While transferring volumes may

be low, consideration should be given to providing a bus stop closer to Britannia Road on McLaughlin Road. The transfer may become more desirable when the LRT is developed as passengers seek shortest-path routes to Hurontario Street. It may be possible to move bus stops to the near-side location today, as the recent widening of the intersection provided a dedicated northbound right turn lane. Mi-Way should review this possibility, however, because the current stop located near Regal Drive may be more attractive to passengers to and from Heartland Town Centre.

Cycling lanes have been identified along McLaughlin Road in the City's cycling master plan, as mentioned in Section 2.2. Given the on-road cycling lanes provided along McLaughlin Road south of Eglinton Avenue and north of Cantay Road, on-road cycling lanes would be more desirable from a continuity perspective for the study area.

Generally, cycling lanes and transit service improvements do not have a major effect on traffic operations (unless buses arrive more frequently than every 2-3 minutes). For this reason, no formal analysis of cycling lanes or transit operations was undertaken.

## 4. Summary and Recommendations

McLaughlin Road is a basic 4 lane cross section south of Bristol Road and north of Britannia Road. Between Bristol Road and Britannia Road, McLaughlin Road narrows to 2 through lanes, and is designated a Scenic Route between Matheson Boulevard and Bristol Road. Average peak hour volumes observed along McLaughlin Road within this section are 1,000-1,100veh/h in the peak direction (1500-2000veh/h two way), which nears the capacity limit of a 2 lane cross section. Vehicles travelling northbound and southbound experience LOS F at Matheson Boulevard, indicating severe congestion, with queuing that can extend 200m and longer. Additionally, significant queuing occurs in the southbound direction at Ceremonial Drive (T-intersection) during the PM peak hour.

Based on a screenline analysis of MMM's EMME model for the study area, traffic along McLaughlin Road is expected to increase by approximately 19% for the peak direction of travel along McLaughlin Road (northbound in the AM peak hour, southbound in the PM peak hour) by 2031. This translates to growth in traffic from approximately 1,000-1,100veh/ to 1,200-1,300veh/h for the peak direction. This increase will exacerbate existing congestion problems (long delays and extensive queuing) that occur between Bristol Road and Britannia Road. Specifically, without improvements along McLaughlin Road, operations at will severely break-down: Matheson Boulevard will operate at LOS F, V/C greater than 1.00 and significant queuing at all approaches; southbound traffic at Ceremonial Drive will operate at LOS F; and movements from minor roads will operate very poorly (Regal Drive, Avonwick Avenue and Faith Drive / Parkwood Place). At these minor roads, poor operations will likely be reflected in long delays and frustrated drivers on the approaches to McLaughlin Road, which can cause safety problems when drivers force turns into smaller gaps in traffic.

This transportation assessment evaluated three overall improvement alternatives to mitigate forecasted congestion:

- Widen McLaughlin Road to 4 through travel lanes throughout the study area (Bristol Road to Britannia Road);
- Widen McLaughlin Road to 4 through travel lanes between Matheson Road and Britannia Road, but maintain 2 lanes through the designated Scenic Route (between Bristol Road and Matheson Blvd); and

 Widen McLaughlin Road to 4 through travel lanes between Matheson Road and Britannia Road, but maintain 3 lanes through the designated Scenic Route (between Bristol Road and Matheson Blvd).

Sub-alternatives were evaluated including adding turn bays, and providing a roundabout at Ceremonial Drive to attempt to manage traffic without widening McLaughlin Road within the Scenic Route.

Between Britannia Road and Matheson Boulevard, McLaughlin Road will undoubtedly require widening to accommodate forecasted traffic volumes in either Base or Hurontario LRT traffic forecast scenarios. Within the Scenic Route, the roundabout alternatives at Ceremonial Drive did not sufficiently relieve long queues while maintaining a narrower cross section; a roundabout is therefore not recommended. The three (3) through travel lane configuration (2 SB + 1 NB) may be considered as an intermediate stage to an ultimate widening to four (4) through travels lanes, since acceptable operations were achieved with this slightly narrower configuration. The four (4) through travel lane configuration at Ceremonial Drive provided the best operations. Should left turns from Avonwick Avenue be prohibited during the peak hours, these improvements to Ceremonial Drive can accommodate diverted traffic and provide good operations.

# Widening McLaughlin Road to 4 through lanes is recommended to accommodate year 2031 travel demands.

Widening to four through lanes plus minor additional road and signal improvements can benefit traffic and transit and allow all intersections to operate at LOS D or better. These improvements include: a centre left turn lane between Britannia Road and Matheson Boulevard; and signal phase modifications optimization and corridor coordination. Even with these improvements, some minor movements will continue to experience LOS F, indicating that the corridor will still be near capacity. McLaughlin Road and Matheson Boulevard will continue operating near capacity but with improved LOS (reduced delays) and better managed queues.

Additional initiatives such as transit service improvements, implanting a cycling route to connect the existing cycling network on McLaughlin Road, and completing the missing sidewalk infrastructure can enhance the corridor and create a functional and safe multimodal environment for McLaughlin Road. Although travel demand initiatives (i.e. bike lanes, increased transit use, etc), traffic signal modifications, and isolated geometric improvements along McLaughlin Road can alleviate some of the traffic congestion, these measures on their own will not avoid the need to widen McLaughlin Road to four lanes.

## Attachment 1: Level of Service Results

Inte	rsection	trol	ш	all.	Movement											
ID	Description	Typ	MO	Dver	В	BT	BR	/BL	/BT	'BR	BL	BT	BR	B	BT	BR
	2000.ption	0	1	0		Ш	ш	<b>∧</b>	$\geq$	$\mathbb{N}$	N	N	Z	S	S	S
			Lanes			 	0		2				0		 	0
			LUS	U 47.2	E			U 46.0	U 41.2	U 41.2	E 77.4	E (4.2		E	10 12	
				47.2	0.69	0.75		40.9	41.3	41.3	0.64	00.2		04.4	0.42	
1	Cantay Road & McLaughlin Road	Signal	V/C	0.9	0.08	0.75		0.2	0.1	0.08	0.04	0.84		1016	0.4Z	
			O05th(m)		00 #02.7	00.4 112.6		4	9.5 17.1	14.0	18.Z #20.1	90.0		194.0 #201.2	28.9 60.2	
					#92.1	F		12	17.1 D	14.9	#30.1	F		#201.3	00.Z	
			Appr.203			 56			/1.8			67.3			35.6	
			Lanos		1	3	0	2	41.0	1	1	07.5	1	1	35.0	1
				C		 	0	F	D	D		 	C I	C I	 	B
			Delay(s)	31.9	27.6	40.3		66	38.8	37.2	22.1	23.2	20.9	21.2	21.3	15
_			V/C	0.53	0.53	0.72		0.31	0.16	0.03	0.12	0.26	0.07	0.26	0.36	0.06
2	Britannia Road & McLaughlin Road	Signal	O50th(m)	0.00	51.4	120		6.4	16.8	0	5.5	36.8	3.1	14.9	44.2	0
			Q95th(m)		64	125.7		12.9	22.3	8.5	14.3	54.6	13.6	m25.9	56.6	m6.6
			Appr.LOS			D			D			С			С	
			Appr.Delay			38.1			42.7			22.8			20.7	
			Lanes		0	<1	1	0	<1	1	1	1>	0	1	1>	0
			Directions	-		EB 1			WB 1		NB 1	NB 2		SB 1	SB 2	
			LOS	-		С			D		В			А		
Ş	Regal Drive & McLaughlin Poad	Ston	Delay(s)	-		24.3			28.2		10.2	0		9.1	0	
3	Regar Drive & Wichaughilli Ruau	Stop	V/C			0.45			0.03		0.05	0.39		0.02	0.5	
1			Q95th(m)			17			0.8		1.1	0		0.4	0	
1			Appr.LOS			С			D							
			Appr.Delay			24.3			28.2		0.5			0.1		
1			Lanes		1	2>	0	1	2>	0	1	1	1	1	1>	0
1			LOS	E	В	F		F	С		С	D	E	С	С	
			Delay(s)	77.3	20	123.5		160.1	21.1		29.6	40.9	68.2	30.9	21.6	
4	Matheson Boulevard & McLaughlin Road	Signal	V/C	1.04	0.11	1.19		1.08	0.25		0.18	0.71	0.94	0.7	0.56	
	5	5	Q50th(m)		5.3	~208.1		~17.3	20.3		9.6	95.6	95.2	22.1	65.4	
			095th(m)		12.6	#250.7		#46.1	30.7		m15.1	m127.4	m#152.2	36	95.7	
			Appr.LOS			F			D			D			0	
			Appr.Delay		1	120.9	1		46.7		1	53.4			24.4	0
			Lanes				I									0
			Directions	-	ER I						NB I	NB 2			2R I	
				-	27.6						A 0 /	0			0	
5	Avonwick Avenue & McLaughlin Road	Stop		-	37.0						0.4	0.46			0.26	
			005th(m)		21.7						0.00	0.40			0.20	
			$\Delta nnr I OS$		 						1.5	0			0	
			Appr.203		37.6						0.7				0	
			Lanes		1		1				1	1			1>	0
			LOS	В	D		C				A	B			B	0
			Delav(s)	19.4	35.1		31.1				3.3	16.7			18.6	
,	Commencial Drive & Mellowerklin Doord	Clausel	V/C	0.7	0.38		0.11				0.14	0.81			0.46	
6	Ceremonial Drive & McLaughlin Road	Signal	Q50th(m)		26.5		0				1.1	170.2			81.1	
			Q95th(m)		45.5		16				m3.9	214.2			m104.4	
			Appr.LOS		С							В			В	
			Appr.Delay		33.1							15.9			18.6	
			Lanes		0	<2>	0	0	<2>	0	1	1>	0	1	1>	0
1			Directions	-	EB 1	EB 2		WB1	WB 2		NB 1	NB 2		SB 1	SB 2	
1			LOS	-	F	В		F	С		A			В		
7	Parkwood Place & McLaughlin Road	Ston	Delay(s)	-	168.6	13.9		189	21		9.2	0		11.6	0	
´		Joiop	V/C		0.12	0.01		0.5	0.17		0	0.59		0.03	0.44	
1			Q95th(m)		2.8	0.2		12.7	4.7		0.1	0		0.6	0	
1			Appr.LOS		F			F								
<u> </u>		<b> </b>	Appr.Delay		80.2	-		65.6	-	_	0		-	0.2		-
1			Lanes	5	1	2>	0	1	2>	0	1	2>	0	1	2>	0
			LUS	B 10 7	B	<u> </u>		C	B		B	В		E CO	B	
1			Delay(s)	19.7	18	20.7		28.5	16		18.3	14.8		80	14.8	
8	Bristol Road & McLaughlin Road	Signal		0.74	0.32	0.6		0.52	0.27		0.53	0.68		0.93	0.41	
1		Ĩ			15.3	00./ 114		11.3 #11.7	23.4		18.3	84.8 05.4		24.3 #EQ 1	21.4	
					38.2	114		#41.6	44.3		39.3	85.4		#5U. I	21.6	
1			Appr.LUS						10 1			15.0			し 247	
<b> </b>			Appr.Delay		1	20.4	0	1	18.1 1.	0	1	15.3	0	1	20.7	0
1			Lanes	C		> D	U		>	U		>	U		_> 	U
1			LUS Dolov(c)	0 22 0	 1 Г. Г.	Б 16.0		В 14 г	Ы 14 г		し 22	ี วถา		0 000	し 22.2	
1				23.7 0 /F	10.0	0.22		0.10	0.01 0.0		22 0.2	20.Z		27.0 0.25	23.5 054	
9	Ceremonial Drive & McLaughlin Road	Signal	V/C	0.40	U. I 5.0	0.23 10 F		U. IŬ 10 0	0.Z		0.Z	0./  02/		0.30 K	0.00	
1			OQEth(m)		15.7	20.0		10.3 2/1 1	210		4.7 10.2	03.4 Q7 /		0 m1/4	00.7 Q6 7	
1					10.7	37.7 R	<u> </u>	∠4.1	54.0 R		10.3	07.4 C		1114.0	00.7 C	
1		Appr.LUS			16.6			ں 16 ج			20 20			72 K		
1		1	ruph. Delay			10.0			10.0			∠0			∠J.U	

Inte	ersection	<u>e</u> 2	ш	all				-		Move	ement			-	-	
חו	Description	T ont	0V	ver	Ы	ЗT	3R	ВГ	BT	BR	3L	ЗT	3R	Ч	31	3R
	Description	0 '	_	0	Ш	EI	EI	$^{\wedge}$	$\geq$	M	Z	N	N	S	SI	SI
			Lanes		1	2>	0	1	2	1	1	2>	0	1	2>	0
			LOS	С	С	В		В	С	D	F	С		С	D	
			Delay(s)	33.4	27.9	17.2		18	20.6	35.7	147.8	22.3		31.3	41.6	
1	Cantay Road & McLaughlin Road	Signal	V/C	0.93	0.53	0.11		0.15	0.41	0.8	1.05	0.53		0.54	0.95	
'	Cantay Road & McLaughin Road	Signal	Q50th(m)		20.8	8.5		9.2	43.7	71.8	~17.0	58.2		15.3	136.2	
			Q95th(m)		41.2	14.9		18.6	58	#131.3	#45.7	75.5		34.8	#186.0	
			Appr.LOS			С			С			С			D	
			Appr.Delay			22.1			26.8			33.6			40.9	
			Lanes		1	3>	0	2	3	1	1	2	1	1	2	1
			LOS	D	D	С		E	D	С	D	С	С	С	С	С
			Delay(s)	37	51.4	25.2		68.2	40.6	26.1	37.8	33.8	27.8	32.5	34.1	28.8
2	Dritemais Deed & Mel suchlin Deed	Circul	V/C	0.63	0.77	0.24		0.61	0.8	0.05	0.42	0.45	0.06	0.24	0.47	0.12
2	Britannia Road & MicLaughlin Road	Signal	Q50th(m)		32.2	32.6		19.6	143.6	1	19.4	68	4.1	10.5	72.4	0
			Q95th(m)		57.2	40		30.7	164.2	10.6	38.2	87.4	13.2	22.7	92.6	15.1
			Appr.LOS			С			D			С			С	
			Appr.Delay			31.9			42.1			33.9			33	
			Lanes		0	<1	1	0	<1	1	1	1>	0	1	1>	0
			Directions	-	0	FB 1			WB 1		NB 1	NB 2	0	SB 1	SB 2	
			105	-		F			F		B	ND 2		<u>А</u>	002	
_			Delav(s)	_		38.0			90.3		10	Ο		9.8	0	
3	Regal Drive & McLaughlin Road	Stop				0.72			0.3		0.2	0.47		0.01	0.38	
			0.000			<u>40</u> 2			<u>⊿</u> ∩ 2		5.5	0.47		0.01	0.30	
1						τυ.2 Ε			+0.2		5.5	0		0.3	0	
			Appr Dolou			20.0					10			0.1		
<u> </u>			Appi.Delay		1	30.7	0	1	90.3	0	1.Ŏ 1	1	1	U.I 1	1.	0
			Lanes	г		>	U		<u>ک&gt;</u>	U					> 	U
			LUS Delevi(=)	Г 100 1				E 70.0	F		Г 220	E		E (2.2		
			Delay(s)	100.1	25	25.2		19.2	143.6		239	59	36.8	63.2	61.8	
4	Matheson Boulevard & McLaughlin Road	Signal	V/C	1.19	0.23	0.42		1.01	1.24		1.35	0.89	0.12	0.88	0.97	
	5		Q50th(m)		2.9	35.7		41.2	~235.0		~41.2	117.5	9.1	15.7	118	
			095th(m)		7.5	50.7		#92.6	#277.7		#88.4	#1/1.4	m19.3	#41.3	#188.8	
			Appr.LOS			С			F			F			E	
			Appr.Delay			25.2			133.2			105			62.1	
			Lanes		1		1				1	1			1>	0
			Directions	-	EB 1						NB 1	NB 2			SB 1	
			LOS	-	F						В					
5	Avonwick Avenue & McLaughlin Road	Stop	Delay(s)	-	84.5						12	0			0	
5		otop	V/C		0.71						0.12	0.38			0.58	
			Q95th(m)		29.5						3.1	0			0	
			Appr.LOS		F											
			Appr.Delay		84.5						1.2				0	
			Lanes		1		1				1	1			1>	0
			LOS	D	С		С				С	В			E	
			Delay(s)	41.9	34		32.8				28.6	18.3			60.7	
,	O and a local second second second	C'	V/C	0.83	0.16		0.06				0.63	0.61			1.04	
6	Ceremonial Drive & McLaughlin Road	Signal	O50th(m)		8.7		0				7	131.2			~245.1	
			O95th(m)		19.1		12.1				m#21.0	171.1			m#285.9	
			Appr.LOS		С							В			E	
			Appr. Delay		33.3							19.7			60.7	
			Lanes		0	<2>	0	0	<2>	0	1	1>	0	1	1>	0
1			Directions	-	FR 1	FR 2	<u> </u>	WR 1	WR 2	Ŭ	NR 1	NR 2	, , , , , , , , , , , , , , , , , , ,	SB 1	SR 2	~
1			105	-	F	D		F	C.		R			R	552	
_		_	Delav(s)	-	250	26.9		279 7	17 9		11 1	Ο		11	Ο	
7	Parkwood Place & McLaughlin Road	Stop		_	0.28	0.05		0.33	0.07		0.01	0.54		0.04	0.62	
1			O95th(m)		6.1	1.00		7	17		0.01	0.04		11	0.00	
1					- 0.1 F	1.2		, F	1.7		0.5	0		1.1	0	
1			Appr.203		1114		76 1				0.1			03		
<u> </u>					114.0	<u>ک</u>	70.T	1	<u>ר</u>	0	0.1	<u>ک</u>	0	0.3	2-	0
1			Lanes			>	0		> 	0		> 	0		> 	0
1			LUS Delevi(=)									В 11.7				
1			Delay(s)	30.8 1.07	51.5	25.4		33.Z	30.8		216.9	11.6	ļ	27	32	
8	Bristol Road & McLaughlin Road	Signal		1.07	0.66	0.39		0.54	0.68		1.35	0.46		0.38	0./1	
1	Ĭ	ľ			13.8	33.5		22.9	72.1		~54./	29.2		17.4	114.8	
1			095th(m)		#38.0	47.3		43.4	93.2		#98.6	43.3		m21.2	m11/.5	
1			Appr.LOS			С			С		L	D			С	
L			Appr.Delay			29.2			31.1			53.6			31.6	
1			Lanes		1	1>	0	1	1>	0	1	2>	0	1	2>	0
1			LOS	С	С	С		С	С		F	В		С	С	
1			Delay(s)	28	20.8	21.6		22.3	21.9		92.2	18.9		28.3	30	
0	Ceremonial Drive & McLaughlin Dood	Signal	V/C	0.63	0.04	0.11		0.16	0.14		0.97	0.57		0.39	0.65	
7	Ceremoniai Drive & Michauyriiin Rudu	Signal	Q50th(m)		2.4	5		10.3	9.6		23.8	64.4		10	97.3	
1			Q95th(m)		8.1	19.4		23.6	25.2		#58.6	67.4		m13.4	94	
			Appr.LOS			С		-	С		-	С			С	
1			Appr.Delav			21.5		Ī	22.1			27.8			29.9	

### 2031 DO-NOTHING AM Base Forecast

Inte	rsection	e Io	Щ	all													
ID	Description	Typ	MO	Jver	BL	BT	BR	/BL	/BT	'BR	BL	BT	BR	BL	BT	BR	
<u> </u>				0	1	ш 2	Ш	S ₁	N N		Z	Z	Z	S 1	S	S	
1			Lanes			<u>_&gt;</u>	U		2			 	U		>	0	
			LUS	D 10.6	E 44 0	E 41.2		D	U 42.7	12		E 477		E 40.0	10.4		
1				40.0 0 02	00.Z	01.Z		0.07	43.7 015	40 0 02	70 0 70	07.7		07.0 1 01	12.0 0.52		
1	Cantay Road & McLaughlin Road	Signal	050th(m)	0.73	57.4	94.2		1.20	13 5	0.00	18.3	106		~203.8	83.5		
			O95th(m)		#05.1	#122 2		4.Z	22.2	1/1 9	#15.8	#135.3		~203.0 #202.3	00.0 00 /		
					#75.1	#122.2		12.5	 D	14.7	#45.0	F		#272.5	, ул. <del>ч</del> С		
			Appr.Delay			62.5			44.2			70.2			34.9		
			Lanes		1	3>	0	2	3	1	1	2	1	1	2	1	
			LOS	С	Ċ	D		Ē	D	D	C	C	C	Ċ	C	Ċ	
			Delay(s)	32.1	26.5	39.2		66	38	35.8	24.9	25	22	24.3	25.1	21.9	
2	Britannia Road & McLaughlin Road	Cianal	V/C	0.61	0.54	0.73		0.31	0.21	0.03	0.18	0.31	0.07	0.3	0.5	0.06	
2	Britannia Road & McLaughlin Road	Signal	Q50th(m)		49.9	123.4		6.4	23	0	5.8	46.3	4.6	15.2	62.3	0	
			Q95th(m)		61.8	128.5		12.9	29.1	8.3	15.6	66.9	15.7	m28.5	81.8	m8.7	
			Appr.LOS			D			D			С			С		
			Appr.Delay			37.1			41.1			24.7			24.8		
			Lanes		0	<1	1	0	<1	1	1	1>	0	1	1>	0	
			Directions	-		EB 1			WB 1		NB 1	NB 2		SB 1	SB 2		
			LOS	-		F			E		В			A			
3	Regal Drive & McLaughlin Road	Stop	Delay(s)	-		63.5			43.1		12.9	0		9.8	0		
<u>آ</u>	<u> </u>		V/C			0.77			0.06		0.07	0.46		0.02	0.68		
1			095th(m)			42.2			1.6		1.7	0		0.4	0		
1			Appr.LOS			F 42 F			L		0 5			0.1			
⊢		<u> </u>	Appr.Delay		1	03.5	0	1	43.1	0	0.5	1	1	U. I 1	1.	0	
1			Lanes	F		_> 	U		> 	U						0	
1	Matheson Boulevard & McLaughlin Road			Г 014	20.2	Г 1/2 2		Г 160 1	0 201		20.0	U 16.0	۲ ۲	С 55.4	0 27 0		
1		Signal		04.0	20.3 0.12	143.3		1 00.1	22.1 0.31		0.9	40.3 0.84	00	0.00	∠1.0 0.75		
4			0.50 (m)	1.09	5.4	1.24		-17.3	20.54		10.2	117.3	0.90	0.09	101 /		
			O95th(m)		12.4	#265.0		#46.1	<u>27.3</u> <u>41.8</u>		m13.9	m135.0	70.5 m#125.7	#52.1	146.5		
			ApprIOS		12.0	#203.0 F		# 40.1	- <del>-</del> 1.0		1110.7	F	111// 120.7	# 52.1	C		
			Appr.Delay			140.3			42.6			55.1			34.6		
			Lanes		1	11010	1		12.0		1	1			1>	0	
			Directions	-	EB 1		-				NB 1	NB 2			SB 1	-	
			LOS	-	F						А						
Б	Avonwick Avenue & McLaughlin Road	Stop	Delay(s)	-	145.8						9	0			0		
5			V/C		1.26						0.07	0.54			0.34		
			Q95th(m)		87.4						1.7	0			0		
			Appr.LOS		F												
			Appr.Delay		145.8						0.6				0		
			Lanes		1		1				1	1			1>	0	
			LOS	C	D		C				A	С			С		
			Delay(s)	24.3	38.7		33.4				3.7	25			20.3		
6	Ceremonial Drive & McLaughlin Road	Signal		0.81	0.43		0.11				0.18	0.92			0.59		
		Ũ	Q50th(m)		26.5 4 E E		0				.  0	209.9			122.3		
			095(n(m)		45.5		16				m3.8	#300.4			m152.9		
1			Appr.LUS		26.1							22.0			20.2		
⊢			l anes		0.1 0	<2>	Ω	Ο	<٢٢	Ο	1	23.7	Ο	1	15	Ο	
1			Directions	-	FR 1	FR 2	0	WR 1	WR 2	0	NR 1	NR 2	0	SR 1	SR 2	0	
1			LOS	-	F	C		F	D		B			B	552		
_			Delav(s)	-	1074.2	17.7		1445.1	31.9		10.3	0		14.1	0		
1	Parkwood Place & McLaughlin Road	Stop	V/C		0.59	0.01		2.17	0.26		0	0.7		0.04	0.59		
1			Q95th(m)		7.1	0.3		24	7.6		0.1	0		0.9	0		
1			Appr.LOS		F	_		F									
L			Appr.Delay		470.5			407.3			0			0.2			
			Lanes		1	2>	0	1	2>	0	1	2>	0	1	2>	0	
1			LOS	С	С	С		D	С		С	В		F	В		
1			Delay(s)	21.4	25	25.9		52	20.5		22.5	13.6		85.6	11.6		
Q	Bristol Road & McLaughlin Road	Signal	V/C	0.84	0.45	0.69		0.71	0.39		0.63	0.69		0.98	0.49		
	Bristor Road & McEadymin Road	Signal	Q50th(m)		19.2	83.7		14.7	40.1		0	94.7		18.6	22.1		
1			Q95th(m)		41.8	119		#46.4	60.3		43.9	100.3		m#55.7	26		
1			Appr.LOS			С			С			В			С		
L			Appr.Delay			25.8		-	24.7	_		14.7			22.2		
1			Lanes		1	1>	0	1	1>	0	1	2>	0	1	2>	0	
1			LOS	C	B	C		C	С		C	C		C	C		
1			Delay(s)	22.8	19.7	21.3		20.9	21.5		20.6	24.2		27	22	L	
9	Ceremonial Drive & McLaughlin Road	Signal	V/C	0.52	0.12	0.27		0.21	0.29		0.26	0.72		0.36	0.64		
1	5				6.8	21.9		11./	25.1		4.3	92.9		5.6	96.9		
					17.5	45.6		26.8	49.8		10	94.4		m13.0	105.2		
			Appr Dalay			し 21						し 2/1			し 22.2		
			Appi.Delay			21			Z1.4			Z4. I			ZZ.Z		

### 2031 DO-NOTHING PM Base Forecast

Inte	rsection	e Io	ш	erall	Movement												
п	Description	Cont Typ	MO	lver	ВГ	BT	BR	'BL	BT	BR	BL	BT	BR	BL	BT	BR	
Ľ		0 '		0	ш	Ш	Ē	$\geq$	N	N	Z	Z	Z	S	S	S	
			Lanes	L	1	2>	0	1	2	1	1	2>	0	1	2>	0	
			LOS	D	С	B		B	С	D	F	С		F	F		
			Delay(s)	51	29.2	17.6		18.2	20.8	40.7	151.9	26.3		108.8	81.6		
1	Cantay Road & McLaughlin Road	Signal	V/C	0.97	0.55	0.15		0.16	0.43	0.86	1.07	0.71		0.98	1.09		
	5 5	Ŭ	Q50th(m)		21.2	12.7		9.4	46	83.2	~17.4	87.8		20.3	~191.6		
			Q95th(m)		42.9	20.2		19	60.6	#145.3	#46.2	111.2		#55.0	#234.3		
			Appr.LOS			С			C			C					
			Appr.Delay			22.2		-	28.8	-		34.9			83.3		
			Lanes		1	3>	0	2	3	1	1	2	1	1	2	1	
			LOS	D	D	С		E	D	C	D	D	C	D	D	С	
	Britannia Road & McLaughlin Road		Delay(s)	38.1	53.2	25.7		68.2	40.4	25.4	48.8	38.5	28.7	42.1	37.1	29.6	
2		Signal	V/C	0.7	0.78	0.33		0.61	0.81	0.06	0.57	0.63	0.06	0.41	0.57	0.12	
	0	Ŭ	Q50th(m)		32.1	45.6		19.6	148.2	1.4	21.4	102.3	5.3	11.7	92.1	0	
			Q95th(m)		57.3	55.4		30.7	1/3.8	11.3	#44.9	124.7	14.4	26.7	113.2	15.1	
			Appr.LOS			C			D			D			D		
			Appr.Delay		0	31.2	1	0	41.8	1	1	39	0	1	36.2	0	
			Lanes		0	<	1	0	<				0			0	
			Directions	-		EBI			WBI		NBI	NB 2		SB1	SB 2		
			LUS	-							B	0		B	0		
3	Regal Drive & McLaughlin Road	Stop	Delay(s)	-		451.2			469.2		10.9	0		12	0		
	ů ů					1.81			1./1		0.22	0.63		0.02	0.45		
						140			81.9		0.4	U		0.4	U		
1			Appr.LOS								1 -			0.0			
┣─	<u> </u>		Appr.Delay		1	451.2	0	1	469.2	0	1.5	1	1	0.2	1	0	
1			Lanes	г		>	0			0					> 	U	
		Signal		F 100.0				Г 140 0	F 142.0			Г 150 /		E 77.0			
	Matheson Boulevard & McLaughlin Road		Delay(s)	132.2	25.1	27.5		103.2	102.9		233.5	150.0	29.0	11.2	11/		
4			V/U	1.22	0.23	0.50		1.24	1.28		1.30	1.22	0.13	0.92	1.15		
			Q50ln(m)		3	53.5 71.4		~54.7	~249.0		~48.4	~194.1	11.3	15.9	~109.2		
					1.1	/1.0		#109.9	#291.9		111#07.Z	П#200.3 Г	11114.Z	#40.0	#238.4 E		
			Appr.LUS						Г 142			Г 150.0			Г 110 Г		
					1	Z7.4	1		103		1	109.0			110.5	0	
			Directions				1				I ND 1				> CD 1	0	
				-								ND Z			3D I		
	Avonwick Avenue & McLaughlin Road	Stop		-	100.2						147	0			0		
5				-	490.3						0.16	0.51			0.67		
			005th(m)		Z.30 71.0						4.2	0.51			0.07		
					71.7 F						4.2	0			0		
			Appr.203		100.3						11				0		
			Lanes		1		1				1.1	1			1	0	
				F	C I						C I	C I			ı> F	0	
				 70.3	34		32.8				28.5	20.3			128.0		
				0.08	0.16		0.06				20.0	29.3			120.7		
6	Ceremonial Drive & McLaughlin Road	Signal	O50th(m)	0.70	87		0.00				8.6	216.7			~ 325 2		
			O95th(m)		10.7		12.1				m19.2	259.3			m#307.3		
			Annr LOS		C		12.1				11117.2	237.3 C			F	,	
			Appr. Delay		33.3							29.2			128.9		
$\vdash$	<u> </u>		Lanes		0	<2>	0	0	<2>	0	1	1>	0	1	1>	0	
1			Directions	-	EB 1	EB 2		WB 1	WB 2	Ŭ	NB 1	NB 2	Ť	SB 1	SB 2	Ŭ	
			LOS	-	F	F		F	D		В			С			
_	Derlaused Disco & Malay 111 Day	0	Delav(s)	-	Err	155.1		Err	34.6		12.4	0		16.5	0		
/	Parkwood Place & McLaughlin Road	Stop	V/C		4.53	0.27		7.59	0.15		0.02	0.73	1	0.08	0.75		
			Q95th(m)		Err	6.4		Err	3.8		0.4	0		2	0		
			Appr.LOS		F			F							-		
			Appr.Delav		4022.4			2248.9			0.1			0.4			
			Lanes		1	2>	0	1	2>	0	1	2>	0	1	2>	0	
1			LOS	D	E	С		D	С		F	В	Ī	С	С		
			Delay(s)	52.7	60.8	27.1		44.1	31.4		546.2	16.3		34	34.4		
0	Pristol Dood & Mal aughlin Dood	Signal	V/C	1.53	0.73	0.5		0.69	0.71		2.1	0.61		0.62	0.83		
Ø	DIISIOI KUAU & MICLAUGHIIN KOAU	Signal	Q50th(m)		14.4	47.3		24.6	75.7		~63.9	46.5		18.2	137.4		
1			Q95th(m)		#40.9	63.7		#54.7	97.5		<u>#108.3</u>	70		m19.8	m123.2		
1			Appr.LOS			С			С			F			С		
			Appr.Delay			31.2			33.3			102			34.3		
			Lanes		1	1>	0	1	1>	0	1	2>	0	1	2>	0	
			LOS	С	С	С		С	С		F	В		С	С		
1			Delay(s)	24.4	26.3	28.1		28.6	27.9		105.7	16		26.2	23.2		
0	Ceremonial Drive & McLaughlin Dood	Signal	V/C	0.76	0.05	0.2		0.21	0.18		1.03	0.66		0.52	0.66		
7	Ceremoniai Drive & Michaughiin Kudu	Signal	Q50th(m)		2.6	11.9		11.6	11.4		25	81.9		8.9	95.8		
			Q95th(m)		8.1	27.3		23.7	25.9		#65.7	102.5		m13.5	119		
			Appr.LOS			С			С			С			С		
			Appr.Delay			27.9			28.2			24.5			23.4		

### McLaughlin Road Class EA Traffic Operation Details

### RECOMMENDED ULTIMATE CONFIGURATION AM Base Forecast

IBI Group City of MIssissauga

Inte	rsection	e ol	ш	rall													
ID	Description	Typ	MOI	)ver	ВГ	BT	BR	/BL	'BT	'BR	BL	BT	BR	BL	BT	BR	
	· · p		lance	0	<u>Ш</u> 1	Ш 2、	Ш		ິ ງ	≥ 1	2 1	2 )、	Z ∩	い 1	S S	S	
				D	F	> F	0				F	> F	0	F	> 	0	
			Delay(s)	48.6	66.2	61.2		53.7	43.7	43	98	67.7		69.8	12.6		
1	Captor Dood & Mal oughlin Dood	Cianal	V/C	0.93	0.75	0.83		0.26	0.15	0.08	0.79	0.91		1.01	0.53		
	Cantay Road & McLaughlin Road	Signal	Q50th(m)		57.4	94.2		4.2	13.5	0	18.3	106		~203.8	83.5		
			Q95th(m)		#95.1	#122.2		12.5	22.2	14.9	#45.8	#135.3		#292.3	99.4		
			Appr.LOS			E			D			E			С		
			Appr.Delay			62.5			44.2			70.2			34.9		
			Lanes	0	1	3>	0	2	3	1	1	2	1	1	2	1	
			LUS	C 22.1	C 24 E	D 20.2		E ZZ	D 20	D 25.0	24.0	C 25	C 22	24.2	25.1	21.0	
			Delay(s)	32.1 0.61	20.5	39.Z		00	38	35.8	24.9	25 0.31	22	24.3	25.1	21.9	
2	Britannia Road & McLaughlin Road	Signal	050th(m)	0.01	49.9	123.4		6.4	23	0.03	5.8	46.3	4.6	15.2	62.3	0.00	
			095th(m)		61.8	128.5		12.9	29.1	8.3	15.6	66.9	15.7	m28.5	81.8	m8.7	
			Appr.LOS		0110	D			D	0.0	1010	C			C		
			Appr.Delay			37.1			41.1			24.7			24.8		
			Lanes		0	<1	1	0	<1	1	1	2>	0	1	2>	0	
			Directions	-		EB 1			WB 1		NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	
			LOS	-		С			E		В			A			
3	Regal Drive & McLaughlin Road	Stop	Delay(s)	-		18.1			44.9		10.5	0	0	9.4	0	0	
		'				0.28			0.07		0.05	0.3	0.16	0.02	0.45	0.23	
						0.0 C			1./ F		1.1	U	0	0.4	0	U	
			Appr.LOS			18.1			44.9		04			0.1			
			Lanes		1	2>	0	1	2>	0	1	2>	0	1	2>	0	
			LOS	E	B	D	5	F	B		С	F		F	C	~	
		Signal	Delay(s)	63.6	14.6	48.8		161.1	16		35	115.3		131.4	23.9		
1	Matheson Boulevard & McLaughlin Poad		V/C	1.05	0.1	1		1.1	0.27		0.27	1.13		1.13	0.49		
4	Matheson Boulevard & McLaughlin Road		Q50th(m)		4.5	~173.5		~17.5	24.3		9.3	~121.2		~29.3	50.3		
			Q95th(m)		10.6	#229.0		#32.9	34.5		20.7	#162.3		#74.1	66.5		
			Appr.LOS			D			D			F			D		
			Appr.Delay		1	48	1		37.6		0	111.2			50.1	0	
			Directions				1				U NR 1				 	0 58.2	
				-								IND Z			3D I	3D 2	
_	Avonwick Avenue & McLaughlin Road		Delay(s)	-	27.5						2.2	0			0	0	
5		Stop	V/C		0.53						0.07	0.36			0.22	0.12	
			Q95th(m)		22.7						1.6	0			0	0	
			Appr.LOS		D												
			Appr.Delay		27.5						0.8				0		
			Lanes		1		1				1	2			2>	0	
			LOS	A	D		D				A	A			A		
			Delay(s)	/.6	43.5		37.2				2.2	2.7			2.2		
6	Ceremonial Drive & McLaughlin Road	Signal	V/C	0.47	0.0		0.11				0.13	0.45			0.29		
			O95th(m)		26.7 15.9		16.1				1.Z m3./	15.7 26.6			0.0 m13 7		
			Appr.LOS		43.7 D		10.1				1113.4	20.0 A			A		
			Appr.Delav		40.4							2.7			2.2		
			Lanes		0	<2>	0	0	<2>	0	0	<2>	0	0	<2>	0	
			Directions	-	EB 1	EB 2		WB 1	WB 2		NB 1	NB 2		SB 1	SB 2		
			LOS	-	F	В		F	Α		A			Α			
7	Parkwood Place & McLaughlin Road	Stop	Delay(s)	-	51.1	12.2		62.2	9.5		0.1	0		0.6	0		
-	uug		V/C		0.04	0.01		0.21	0.06		0	0.35		0.02	0.3		
			Q95th(m)		0.9	0.2		5./	1.3		0.1	0		0.5	0		
			Appr.LUS		200			し 22 F			0.1			0.2			
			l anos		∠0.Ŏ 1	2~	Ο	23.3 1	2~	Λ	0.1	2~	Λ	0.3	2~	0	
			LOS	C.	C.	C.	0	D	C.	0	C.	R	0	F	_∠∕ B	U	
			Delay(s)	23.2	25	25.9		52	20.5		22.5	13.6		99.8	18.5		
0	Prictol Dood & Mal aughtin Dood	Cional	V/C	0.84	0.45	0.69		0.71	0.39		0.63	0.69		0.98	0.49		
ğ	DIISIOI KOAU & MICLAUGHIN KOAU	Signal	Q50th(m)		19.2	83.7		14.7	40.1		0	94.7		22.3	63		
			Q95th(m)		41.8	119		#46.4	60.3		43.9	100.3		#50.0	75.8		
			Appr.LOS			С			С			В			С		
			Appr.Delay			25.8	-		24.7			14.7	-		30.1		
			Lanes	~	1	1>	0	1	1>	0	1	2>	0	1	2>	0	
			LUS Dolou(a)	<u> </u>	B			C	C		C	C					
				 	19./ 0.10	21.3 0.27		20.9 0.21	21.5 0.20		20.0	24.Z		27.8 0.24	24.5		
9	Ceremonial Drive & McLaughlin Road	Signal	0.50th(m)	0.02	6.8	21.0		0.21 11 7	25.1		4.3	92.9		6.50	98 <u>/</u>		
			Q95th(m)		17.5	45.6		26.8	49.8		10	94.4		m13.6	109.5		
			Appr.LOS		17.0	C		20.0	С			С			C		
			Appr.Delav			21			21.4			24.1			24.7		

### McLaughlin Road Class EA Traffic Operation Details

### RECOMMENDED ULTIMATE CONFIGURATION PM Base Forecast

IBI Group City of Mississauga

Intersection			ш	all						Move	ement					
ID	Description	conti Typ	MOI	)ver	BL	ΒT	BR	'BL	BT	BR	BL	ΒT	BR	BL	BT	BR
	2000.0.00	0	Lanoc	0	Ш 1	Ш 2\	Ш			> 1	2 1	2 2	Z	S 1	S 2	S
				П	I F	 	0	I C	2	F	L L	> 	0		> 	0
			Delav(s)	35.5	58.6	23.6		24.6	28.5	82.3	152.5	18		33.6	29.7	
1	Captor Dood & Mal aughlin Dood	Cianal	V/C	1.06	0.8	0.18		0.21	0.54	1.03	1.08	0.59		0.63	0.9	
1	Cantay Road & McLaughinn Road	Siyilal	Q50th(m)		26.1	13.7		11	54.1	~98.1	~17.3	72.3		14.4	144.5	
			Q95th(m)		#60.8	22.3		22.4	71.3	#160.6	#32.1	91.5		#42.5	#186.8	
			Appr.LOS			D			D			C			C	
			Appr.Delay		1	37.5	0	2	20.4	1	1	27.3	1	1	29.9	1
				D	D		0	F	D	C	D	 D	C	D	D	C
			Delay(s)	38.1	53.2	25.7		68.2	40.4	25.4	48.8	38.5	28.7	42.1	37.1	29.6
2	Britannia Road & McLaughlin Road	Signal	V/C	0.7	0.78	0.33		0.61	0.81	0.06	0.57	0.63	0.06	0.41	0.57	0.12
2		Signal	Q50th(m)		32.1	45.6		19.6	148.2	1.4	21.4	102.3	5.3	11.7	92.1	0
			Q95th(m)		57.3	55.4		30.7	173.8	11.3	#44.9	124.7	14.4	26.7	113.2	15.1
			Appr.LUS			31.2			/1 8			20 20			26.2	
			Lanes		0	<1	1	0	<1	1	1	2>	0	1	2>	0
			Directions	-	0	EB 1		0	WB 1		NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
			LOS	-		В			D		А			А		
3	Regal Drive & McLaughlin Road	Stop	Delay(s)	-		13.5			26.9		9.4	0	0	9.6	0	0
			V/C			0.23			0.43		0.18	0.42	0.21	0.01	0.27	0.18
						0.0 R			19.9 D		4.ŏ	U	U	0.3	U	U
			Appr.Delav			13.5			26.9		1.3			0.1		
			Lanes		1	2>	0	1	2>	0	1	2>	0	1	2>	0
			LOS	D	D	С		С	С		Е	D		F	E	
			Delay(s)	42.4	45.6	29.2		27.5	32.6		60	52.7		83.6	60.9	
4	Matheson Boulevard & McLaughlin Road	Signal	V/C	0.88	0.44	0.55		0.8	0.92		0.9	0.92		0.92	0.94	
		Ű	Q50th(m)		4.8 #10.1	59.7		37.7	182.7 #227.5		35.9 #74 5	94.5		20.5 #17 0	82 #110.2	
			ApprIOS		#10.1	70.2 C		#09.0	#227.5 C		#74.0	#131.0		#47.0	#110.3	
			Appr.Delay			29.8			31.8			54.3			64.6	
			Lanes		1		1				0	<2			2>	0
			Directions	-	EB 1						NB 1	NB 2			SB 1	SB 2
	Avonwick Avenue & McLaughlin Road	Stop	LOS	-	D						A	0			0	0
5			Delay(s)	-	31.1						3.1	0 24			0 20	0 28
			0.095th(m)		11.8						2.5	0.34			0.39	0.28
			Appr.LOS		D						2.0				0	0
			Appr.Delay		31.1						1.2				0	
			Lanes		1		1				1	2			2>	0
			LOS	A	D		D				A	A			A	
			Delay(s)	0.53	43.3		41.3				5.4 0.36	3.7			9.1	
6	Ceremonial Drive & McLaughlin Road	Signal	050th(m)	0.55	9.7		0.00				4.3	30.2			66.1	
		1	Q95th(m)		21.1		13.4				7.7	38.2			86.3	
			Appr.LOS		D							А			A	
			Appr.Delay		42.1						-	3.9			9.1	
			Lanes		0 ED 1	<2>	0		<2>	0		<2>	0		<2>	0
				-	ED I F	C C		VVB I F				IND Z			30 Z	
7	Dorlawood Diego 9 Mail auchille Days	Char	Delav(s)	-	117.6	24.6	·	110.4	9.9		0.5	0		1.2	0	
/	Parkwood Place & MicLaughlin Road	Stop	V/C		0.15	0.04		0.15	0.03		0.02	0.37		0.04	0.38	
			Q95th(m)		3.5	1.1		3.6	0.6		0.4	0		1.1	0	
			Appr.LOS		F			D			0.0			0 (		
			Appr.Delay		61.1 1	<u>ک</u>	0	32.2	<u>ک</u>	0	0.2	<u>ک</u>	0	U.6 1	2	0
				D	F	> C.	U	F	> D	U	C	> 	U	C.	> D	U
			Delay(s)	37.1	155.9	32.3		68.6	39		29	16.8		31.4	44.4	
Q	Bristol Road & McLaughlin Poad	Signal	V/C	0.97	1.06	0.56		0.86	0.8		0.67	0.55		0.51	0.95	
0	DISTO I YOU & WICLAUSHIIIT RUAU	Signal	Q50th(m)		~20.5	54.2		30.3	90.1		20.2	75.2		16.1	156.1	
			Q95th(m)		#51.9	72.1		#68.1	114.1		43.7	93.5		37	#218.7	
			Appr.LOS			U 17 2			12.5 D			12 0			13 E	
			Lanes		1	47.3 1>	0	1	43.3 1>	0	1	2>	0	1	43.3	0
			LOS	С	С	С		C	С	5	F	B	5	Ċ	B	
			Delay(s)	21.5	26.3	28.1		28.6	27.9		105.7	16		26	16.1	
9	Ceremonial Drive & McLaughlin Road	Signal	V/C	0.76	0.05	0.2		0.21	0.18		1.03	0.66		0.52	0.66	
,		Signal	Q50th(m)		2.6	11.9		11.6	11.4		25	81.9		7.5	83	
					8. I	21.3		23.7	25.9 C		#65./	102.5		24.1	103.9 R	
			Appr.LOS			27 9			28.2			24.5			16.6	
		1	, ippi. Dolay			£1.7	I		20.2			27.J			10.0	

# RECOMMENDED ULTIMATE CONFIGURATION AM

Sensitivity - LRT Forecast

Inte	rsection	le el	Щ	rall													
п	Description	Typ	MO	)ver	ВГ	BT	BR	BL	BT	BR	ВГ	BT	BR	ВГ	BT	BR	
Ľ		0		0	Ш ·	Ē	Ш	N	N	N	Z	Z	Z	S	S	S	
			Lanes	-	1	2>	0	1	2	1	1	2>	0	1	2>	0	
			LOS	D	E	E		E	D	D	F	F		E	B		
			Delay(s)	52.9	69	63.9		56.8	44.4	43.7	91.7	84.2		70	12.1		
1	Cantay Road & McLaughlin Road	Signal	V/C	0.94	0.77	0.86		0.29	0.16	0.08	0.77	1.01		1.01	0.53		
ľ		Julia	Q50th(m)		57.4	94.2		4.2	13.5	0	18.3	~124.8		~205.4	83.5		
			Q95th(m)		#95.1	#122.2		12.6	22.2	14.9	#44.3	#167.9		#293.1	99.4		
			Appr.LOS			E			D			F			С		
			Appr.Delay			65.2			45.1			84.8			34.6		
1			Lanes		1	3>	0	2	3	1	1	2	1	1	2	1	
			LOS	С	С	D		E	D	D	С	С	С	С	С	С	
			Delay(s)	32.1	26.5	39.2		66	38	35.8	24.9	25.5	22.1	24.8	25.1	21.9	
2	Britannia Road & McLaughlin Road	C	V/C	0.61	0.54	0.73		0.31	0.21	0.03	0.18	0.34	0.08	0.33	0.5	0.06	
2		Signal	Q50th(m)		49.9	123.4		6.4	23	0	5.8	51.8	5.3	15.3	62.3	0	
			Q95th(m)		61.8	128.5		12.9	29.1	8.3	15.6	74.1	16.5	m28.4	81.8	m8.7	
			Appr.LOS			D			D			С			С		
			Appr.Delay			37.1			41.1			25.1			24.9		
			Lanes		0	<1	1	0	<1	1	1	2>	0	1	2>	0	
			Directions	-		EB 1			WB 1		NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	
			LOS	-		В			С		В			А			
~		Char	Delav(s)	-		13.1			23.9		10.5	0	0	9	0	0	
3	Regai Drive & McLaughlin Road	Stop	V/C			0.21		1	0.03		0.05	0.32	0.17	0.02	0.45	0.23	
			Q95th(m)			6			0.8		1.1	0	0	0.4	0	0	
1			ApprIOS			R			<u>с.</u>			Ŭ	Ť	0.1	Ű	~	
			Appr. Delay			13.1		1	23.9		04			01			
			lanes		1	2>	Ο	1	25.7	0	1	2>	Λ	1	2>	0	
	Matheson Boulevard & McLaughlin Road			F	R	<u> </u>	0	F	R	0	n	F	0	F	 (	0	
		Signal	Delav(s)	60 /	1/ 6	18.8		161 1	16		25.2	125.7		121 /	22.0		
1				1 05	Λ 1	1		11	0.27		0.27	1 1 2		1 12	0.10		
4			O50th(m)	1.00	1.5	۱ 172 F		~17 5	2/ 2		0.27	~121.4		~20.2	50.47		
			O95th(m)		10.6	#220 0		#22.0	24.3		20.7	#172.2		#7/1	66 F		
					10.0	π227.U		#32.7	54.5 N		20.7	π173.Z		<i>π1</i> 4.1	D0.5		
			Appr.LOS			10		<del> </del>	27.4			120.0		<u> </u>	50.1		
⊢					1	40	1	<del> </del>	37.0		0	130.ð 20		<u> </u>	- 00. I - 2≤	0	
1			Directions				1								2> CD 1	0	
				-								IND Z			201	3D Z	
				-	20 1	<u> </u>		<u> </u>			А 01	0		<u> </u>	0	0	
5	Avonwick Avenue & McLaughlin Road	Stop	Delay(S)	-	27.1			<u> </u>			2.1	0.20			0 0 0 0	0.10	
1					0.55						0.07	0.38			0.22	0.12	
1					24.2						1.6	0			0	0	
			Appr.LOS		D						0.0			<b> </b>	-		
┣_			Appr.Delay		29.1						0.8	<u>^</u>			0		
1			Lanes	^			1				1	2			2>	0	
			LOS	A	D	<b> </b>	D	<b> </b>			A	A			A		
			Delay(s)	7.5	43.5	<b> </b>	37.2	<b> </b>	ļ		2.3	2.8		<b> </b>	2.2		
6	Ceremonial Drive & McLaughlin Road	Signal	V/C	0.49	0.6	<b> </b>	0.11	<b> </b>	ļ		0.13	0.47		<b> </b>	0.29		
Ŭ		2.9.14	Q50th(m)		28.7	<b></b>	0				1	13.6		ļ	8.8		
			Q95th(m)		45.9		16.1	<u> </u>			m3.5	29.4			m13.7		
			Appr.LOS		D			<u> </u>				A			Α		
		L	Appr.Delay		40.4			<u> </u>				2.8			2.2		
			Lanes		0	<2>	0	0	<2>	0	0	<2>	0	0	<2>	0	
			Directions	-	EB 1	EB 2		WB 1	WB 2		NB 1	NB 2		SB 1	SB 2		
1			LOS	-	F	В		F	A		A			A			
7	Parkwood Place & McLaughlin Road	Ston	Delay(s)	-	52.3	12.2		68.3	9.6		0.1	0		0.6	0		
'		Jup	V/C		0.04	0.01		0.23	0.06		0	0.37		0.02	0.3		
			Q95th(m)		0.9	0.2		6.2	1.4		0.1	0		0.5	0		
			Appr.LOS		D			D									
			Appr.Delay		29.4			25.2			0.1			0.3			
			Lanes		1	2>	0	1	2>	0	1	2>	0	1	2>	0	
			LOS	С	С	С		E	С		В	В		F	В		
			Delay(s)	24	26.7	27.5		62.9	21.5		19.3	13.2		112.3	18		
~	Drietal Decid & Malaurahila David	Class -	V/C	0.9	0.47	0.71		0.77	0.41		0.59	0.7		1.02	0.48		
8	Bristoi Road & McLaughlin Road	Signal	Q50th(m)		20.6	89.8		16.1	43.1		15.3	94.2		22.7	61.6		
1			Q95th(m)		42.2	119		#47.5	60.3	•	41.7	103.2	1	#52.6	75.8		
			ApprIOS		<	C.			С.			B			. с.		
			Appr. Delay		<u> </u>	27.4	<u> </u>	1	27.1	<u> </u>	<u> </u>	13.9		1	31.4		
$\vdash$			anes		1	1>	0	1	1>	0	1	2>	0	1	2>	0	
				ſ	C C	C		Ċ	C C	5	R	 	0	Ċ	 		
			Delav(s)	22.5	20.0	22.7	i	22.5	22.0	i	18.6	22.2		20.0	22.7		
				20.0 0 52	<u>20.7</u> Ω 12	0.20		22.J 0.22	0.2		0.0	0.70		∠7.7 ∩ 27	0.62		
9	Ceremonial Drive & McLaughlin Road	Signal		0.03	0.13	0.∠ŏ 22.7		12.2	0.3		0.24 1 1	0.72		67	0.02		
1					17.0	ZZ.1		12.2	20.1		4.1	94.0		0./	77.0 107 7		
1					17.9	40.0		27.5	50.9		9.0	90.7		11113.3	107.7		
			Appr.LUS					<b> </b>									
	L		Appr.Delay			22.3			22.7			23			23.9		

# RECOMMENDED ULTIMATE CONFIGURATION PM

Sensitivity - LRT Forecast

Intersection		e o	Щ	all													
п	Description	Typ	MO	)ver	BL	BT	BR	'BL	BT	BR	BL	BT	BR	BL	BT	BR	
		0 '		0	ш	ш	Ц	$^{\wedge}$	$\geq$	$\geq$	Z	Z	Z	S	S	SI	
1			Lanes		1	2>	0	1	2	1	1	2>	0	1	2>	0	
1			LOS	D	E	С		С	С	F	F	В		С	D		
1			Delay(s)	37.9	58.6	23.6		24.6	28.5	82.3	152.5	18		33.6	36.3		
1	Cantay Road & McLaughlin Road	Signal	V/C	1.06	0.8	0.19		0.21	0.54	1.03	1.08	0.59		0.63	0.96		
1		Signal	Q50th(m)		26.1	14.3		11	54.1	~98.1	~17.3	72.3		14.4	162.4		
1			Q95th(m)		#60.8	23		22.4	71.3	#160.6	#32.1	91.5		#42.5	#221.1		
1			Appr.LOS			D			D			С			D		
			Appr.Delay			37.6			50.4			27.3			36.2		
1			Lanes		1	3>	0	2	3	1	1	2	1	1	2	1	
1			LOS	D	D	С		E	D	С	E	D	С	D	D	С	
1			Delay(s)	38.7	53.2	25.7		68.2	40.4	25.4	67.3	38.5	28.7	42.1	39.1	29.6	
n	Britannia Dood & Malauahlia Dood	Signal	V/C	0.73	0.78	0.33		0.61	0.81	0.06	0.72	0.63	0.06	0.41	0.65	0.12	
2	Dinannia Kuau & MicLaughlin Koad	Signal	Q50th(m)		32.1	45.6		19.6	148.2	1.4	23.1	102.3	5.3	11.7	107.9	0	
1			Q95th(m)		57.3	55.4		30.7	173.8	11.3	#55.6	124.7	14.4	26.7	131.2	15.1	
1			Appr.LOS		-	С			D	_		D			D		
			Appr.Delav			31.2			41.8			40.8			37.8		
		1	Lanes		0	<1	1	0	<1	1	1	2>	0	1	2>	0	
1			Directions	-		EB 1		-	WB 1	1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	
1			LOS	-		B			С		A			A			
-		<b>C</b>	Delav(s)	-		13.2			23.9		9.5	0	0	9.6	0	0	
3	Regal Drive & McLaughlin Road	Stop	V/C.			0.22			0.4		0.18	0.42	0.21	0.01	0.29	0.19	
			0.00			65			120		4 9	0.42	0.21	03	0.27	0	
1						0.5 R			13.7 C		ч.7	0	0	0.5	0	0	
			Appr.LOS			12.0			22.0		1 2			0.1			
<u> </u>					1	13.Z	0	1	23.7	0	1.3	<u></u> ک	0	0.1	<u>م</u>	0	
1	Matheson Boulevard & McLaughlin Road		Laries	П		> 	U		> 	0		> 	0		> 	U	
1		Signal									E 40.2	D		Г 02 (			
1			Delay(S)	45	45.6	29.2		27.5	32.0		00.3	0.02		83.0	/0.1		
4				0.88	0.44	0.55		0.8	0.92		0.9	0.92		0.92			
		ľ			4.8	59.7		31.1	182.7		35.9	94.5		20.5	~89.6		
			Q95th(m)		#18.1	/8.2		#59.5	#227.5		#/4.5	#131.0		#47.8	#130.8		
1			Appr.LOS			C			C			D			E		
L		L	Appr.Delay			29.8		ļ	31.8			54.4			77.2		
			Lanes		1		1				0	<2			2>	0	
1			Directions	-	EB 1						NB 1	NB 2			SB 1	SB 2	
1			LOS	-	D						A						
5	Avonwick Avenue & McLaughlin Road	Ston	Delay(s)	-	33.5						3.3	0			0	0	
5		Stop	V/C		0.38						0.1	0.34			0.41	0.29	
1			Q95th(m)		12.9						2.6	0			0	0	
1			Appr.LOS		D												
L			Appr.Delay		33.5						1.2				0		
			Lanes		1		1				1	2			2>	0	
1			LOS	Α	D		D				А	Α			А		
1			Delay(s)	8.6	43.3		41.3				5.9	3.7			9.4		
		. ·	V/C	0.55	0.33		0.06				0.38	0.38			0.57		
6	Ceremonial Drive & McLaughlin Road	Signal	Q50th(m)	5.00	9.7		0				4.3	30.2			70		
1			Q95th(m)		21.1		13.4				7.7	38.2			91.9		
			ApprIOS		D		1017					Α			Α		
1			Appr.200		42.1	ļ					ļ	20			9.4		
<u> </u>		<u> </u>	lanes		<u>- τ2.1</u> Ω	<2>	Ο	Ο	<2>	0	Ο	<u>د</u> ک	0	0	<pre>/.4</pre>	0	
1			Directions	-	FR 1	FR 2	5	WR 1	W/R 2	5	NR 1	NR 2	5	SR 1	SR 2	5	
				_	F			F	Δ		Δ			Δ	562		
1			Delay(c)		122.2	26.1		117.0	00		0.5	Ω		1 2	0		
7	Parkwood Place & McLaughlin Road	Stop		-	0.14	20.1		0.14	7.7		0.0	0 27		0.04	0.20		
1					0.10	0.00		0.10	0.03		0.02	0.37		0.04	0.39		
					3.Y	1.1		3.8	0.6		0.4	U		1.1	U		
			Appr.LUS								0.0			0.7			
<u> </u>			Appr.Delay		67.8	-		33.9	0		0.3	0	<u> </u>	0.6	<u>^</u>	-	
1			Lanes		1	2>	0	1	2>	0	1	2>	0	1	2>	0	
1			LOS	D	F	C		E	D		C	В		С	D		
1			Delay(s)	39.3	155.9	32.3		68.6	39		29.6	16.8		31.4	50.8		
8	Bristol Road & McLaughlin Road	Signal	V/C	0.98	1.06	0.56		0.86	0.8		0.67	0.55		0.51	0.99		
Ŭ	Energy Read a moleadynin road	Signul	Q50th(m)		~20.5	54.2		30.3	90.1		20.2	75.2		16.1	165.2		
			Q95th(m)		#51.9	72.1		#68.1	114.1		43.7	93.5		37	#230.7		
1			Appr.LOS			D			D			В			D		
			Appr.Delay			47.3			43.3			18.9			49.6		
			Lanes		1	1>	0	1	1>	0	1	2>	0	1	2>	0	
1			LOS	С	С	С		С	С		F	В		С	В		
1			Delay(s)	20.1	28.1	30.2		30.7	29.8		102.2	14.3		21.1	14.8		
_		<u> </u>	V/C	0.78	0.05	0.22		0.23	0.19		1.02	0.63		0.47	0.66		
9	Ceremonial Drive & McLaughlin Road	Signal	050th(m)	2.70	2.6	13		11.6	11.4		~27.7	81.9		7.3	88.2		
1			095th(m)		8.1	28.6		23.7	25.9		#40.0	102.5		22.5	110 1		
			ApprIOS		0.1	<u>20.0</u>	L	20.1	<u> </u>		" 10.0	C		22.0	R		
1			Appr Delay			30			30.1			22.6			15.1		
L		1	nppi.uciay			50	1	1	JU. I			22.0	1	1	10.1		