

TRANSPORTATION IMPACT BRIEF

186 MARGARET STREET

**TOWNSHIP OF WEST LINCOLN
NIAGARA REGION**

PREPARED FOR:

TOWNSHIP OF WEST LINCOLN

PREPARED BY:

**C.F. CROZIER & ASSOCIATES INC.
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JULY 2020

CFCA FILE NO. 0529-5575

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Attachment No. 3

Township of West Lincoln
186 Margaret Street

Transportation Impact Brief
July 2020

Revision Number	Date	Comments
Rev.1	July 2020	Draft Issued for Client Review

1.0 Executive Summary

C.F. Crozier & Associates Inc. (Crozier) was retained by The Township of West Lincoln to undertake a Transportation Impact Brief in support of the planning application for the site located at 186 Margaret Street, and adjacent Township owned lands, in the Town of West Lincoln.

The subject lands cover an area of approximately 1.983 ha and currently consists of St. Martin School. Five 3-storey stacked townhouses for a total of 90 units; one 6-storey apartment building for a total of 69 units are proposed on the site.

Under 2020 existing conditions, all study intersections are expected to operate at a Level of Service "C" or better during the weekday a.m. and p.m. peak hours. The highest average delay of 21.1 seconds during the weekday a.m. peak hour and 22.3 seconds during the p.m. peak hour per vehicle is observed for the intersection of Griffin Street at St Catharines Street. The maximum volume to capacity ratio is 0.84 during the weekday p.m. peak hour for the eastbound movement.

Under future background conditions, the study intersections are projected to operate similarly to existing conditions. The intersections are expected to operate at a Level of Service "D" or better during the weekday a.m. and p.m. peak period.

To forecast the trips generated by the proposed development, the Institute of Transportation Engineers (ITE) 10th edition data was used. The proposed development is expected to generate 68 new vehicular 2-way trips during the morning peak hour (17 trips in / 51 trips out), and 85 new vehicular 2-way trips during the afternoon peak hour (53 trips in / 32 trips out).

Traffic operations at the study intersections after the addition of site traffic is similar when compared to the future background conditions. The study intersections are expected to operate with a level of service D or better with no individual movement operating overcapacity.

The development application can be supported by a traffic operations perspective. The surrounding road network can accommodate the traffic generated from the residential development proposed for 186 Margaret Street.

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2.0 Introduction

C.F. Crozier & Associates Inc. (Crozier) was retained by The Township of West Lincoln to undertake a Transportation Impact Brief in support of the planning application for the site located at 186 Margaret Street, and adjacent Township owned lands, in the Town of West Lincoln.

3.0 Existing Conditions

3.1 Development Lands

The subject lands cover an area of approximately 1.983 ha and currently consists of St. Martin School. The subject lands are located in a mixed-use and commercial area. The site is bounded by Smithville United Church Cemetery to the north, Griffin Street to the east, Margaret Street to the west, and residential units to the south. Figure 1 shows the site location.

3.2 Boundary Road Network

With skewed directions, the directional orientation of the roadway system is ambiguous. To provide clarity throughout this report and in the supporting analysis, Griffin Street has been assigned a north-south orientation when it intersects with West Street and McMurchie Lane, and an east-west orientation when it intersects with St. Catharines Street.

West Street is an east-west roadway with a two-lane urban cross-section. West Street is under the jurisdiction of the Niagara Region and is classified as a regional road. The roadway has sidewalks available on both sides and has a posted speed limit of 50 km/h throughout the study area.

McMurchie Lane is an east-west laneway with a two-lane cross-section. The laneway currently provides access to commercial buildings adjacent to McMurchie Lane. There are no sidewalks along the laneway.

St. Catharines Street is an east-west regional road with a two-lane cross-section. There are sidewalks present along both sides of the roadway. St Catharines Street has a posted speed limit of 50 km/h

Griffin Street is a regional road with a two-lane cross-section with sidewalks on both sides, Griffin Street is named Station Street North of West Street and Griffin Street North between West Street and St Catharines Street. South of St Catharines Street, the roadway is named Griffin Street.

3.3 Traffic Data

Turning movement counts for the intersections Wade Road N at West Street (dated April 10, 2019) and Griffin Street at Griffin Street N/St Catharines Street (dated June 4, 2019) were received from the Region of Niagara. Given the current COVID-19 crisis, any counts done during the pandemic would not be representative of typical conditions. Therefore, an industry-standard growth rate of 2.0% per annum was applied to through volumes on West Street, Griffin Street and Catharines Street to grow the volumes to reflect the 2020 traffic volumes. Traffic along Wade Road, Edward Court, Margaret Street, Garden Drive and Leslie Court was estimated using the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition Traffic. Detailed calculations and traffic data contained in Appendix A provides a summary of the turning movement counts. Refer to Figure 2 for the existing 2020 traffic volumes.

3.4 Traffic Modeling

The assessment of intersections is based on the method outlined in the "Highway Capacity Manual, 2010" using Synchro 10 modelling software. Intersections are assessed using a Level of Service metric, with ranges of delay assigned a letter from "A" to "F". For stop-controlled intersections, a Level of Service "A" or "B" would typically be measured during off-peak hours when lesser traffic volumes are on the roadways. Levels of Service "C" through "F" would typically be measured in the commuter peak hours when higher vehicle volumes cause longer travel times. The Level of Service (LOS) definitions for signalized and un-signalized intersections are included in Appendix B.

Given the modelling limitations in Synchro, the intersection of Griffin Street N/Station Street & West Street is analyzed as a one-way stop control intersection(on West Street), with the northbound and southbound movements along Griffin Street and Station Street operating as free flow.

3.5 Intersection Operations

The traffic operations at the study intersection were analyzed based on the traffic volumes recorded in Figure 2. Detailed capacity analyses are included in Appendix C. The signal timings for the intersection of Griffin Street at St Catharines Street was provided by Niagara Region can be found in Appendix A. Table 1 outlines the existing traffic Levels of Service.

Table 1 Existing Levels of Service

Intersection	Peak Hour	Level of Service (Average Delay per Vehicle(s))	Maximum V/C & V/C Ratio(s) > 0.85 (Approach)
Wade Road N & West Street (Stop Control (NB))	Weekday A.M.	B (13.5 s)	0.10 (NB)
	Weekday P.M.	C (16.1 s)	0.09 (NB)
Griffin Street N/Station Street & West Street(Stop Control (EB))	Weekday A.M.	B (10.6 s)	0.28 (EB)
	Weekday P.M.	C (16.7 s)	0.62 (EB)
Griffin Street N & McMurchie Lane (Stop Control (EB))	Weekday A.M.	B (14.7 s)	0.04 (EB)
	Weekday P.M.	C (18.5 s)	0.03 (EB)
Griffin Street & Griffin Street N/St Catharines St (Signalized)	Weekday A.M.	C (21.1 s)	0.71 (EBT)
	Weekday P.M.	C (22.6 s)	0.84 (EBT)

Note1: The Level of Service of a signalized intersection is based on the average control delay per vehicle. The level of service of a stop-controlled intersection is based on the minor (stopped) approach control delay per vehicle.

Note2: The critical v/c ratio is considered to be the maximum v/c ratio at the intersection. All v/c ratios greater than 0.90 are outlined and highlighted.

As indicated in Table 1, all study intersections are expected to operate at a Level of Service "C" or better during the weekday a.m. and p.m. peak hours. The highest average delay of 21.1 seconds during the weekday a.m. peak hour and 22.3 seconds during the p.m. peak hour per vehicle is observed for the intersection of Griffin Street at St Catharines Street. The maximum volume to capacity ratio is 0.84 during the weekday p.m. peak hour for the eastbound movement. These

metrics indicate that the study intersections are operating efficiently with acceptable delays and reserve capacity to accommodate future increases in traffic volume.

4.0 Development Proposal

The project proposal is for the development of 186 Margaret Street. The subject lands cover an area of approximately 1.983 ha and currently consists of St. Martin School. The subject lands are located in a mixed-use and commercial area. The site is bounded by Smithville United Church Cemetery to the north, Griffin Street to the east, Margaret Street to the west, and residential units to the south.

As per the proposed concept plan dated January 23, 2020 (Figure 1), the site envisions five 3-storey stacked townhouses for a total of 90 units and one 6-storey apartment building for a total of 69 units.

There is one full movement access provided on Margaret Street and Smits Cove/Dove Lane each and an access onto McMurchie lane, which is recommended to operate as an ingress only access.

5.0 Future Background Conditions

5.1 Study Horizons

As per the Niagara Region guidelines for Traffic Impact Study, horizon years corresponding to the date of the study commission, as well as five years from the full build-out year is required. Considering the opening year of 2025, 2025 and 2030 horizon years were selected to assess the full operations of the boundary road network with and without the proposed development.

5.2 Traffic Growth Rates and Background Developments

Future background traffic volumes for the 2025 and 2030 horizon years consist of the following components:

- Background traffic growth from outside the study area; and,
- Traffic generated within the study area from other proposed developments.

An industry-standard growth rate of two percent was applied to all major movements along the study intersections.

A background development located at 132 College Street has been included as part of the background developments. The development is expected to generate 58 trips in the weekday a.m. peak hour and 70 trips in the weekday p.m. peak hour. 2025 and 2030, background volumes are illustrated in Figures 3 and 4.

5.3 Intersection Operations

The traffic operations at the study intersections were analyzed under future background conditions. Tables 2 outlines the 2025 and 2030 future background Levels of Service. Signal timings were optimized under future background conditions. Detailed capacity analyses are included in Appendix C.

Table 2: 2025 and 2030 Future Background Levels of Service

Intersection	Peak Hour	Level of Service (Average Delay per Vehicle(s))		Maximum V/C & V/C Ratio(s) > 0.85 (Approach)	
		2025 Background	2030 Background	2025 Background	2030 Background
Wade Road N & West Street (Stop Control (NB))	Weekday A.M.	B (14.5 s)	C (15.6 s)	0.11 (NB)	0.121 (NB)
	Weekday P.M.	C (17.8 s)	C (19.7 s)	0.10 (NB)	0.37 (NB)
Griffin Street N/Station Street & West Street (Stop Control (EB))	Weekday A.M.	C (18.1 s)	C (23.6 s)	0.40 (EBL)	0.55 (EBL)
	Weekday P.M.	C (20.6 s)	D (27.1 s)	0.65 (EBR)	0.75 (EBR)
Griffin Street N & McMurchie Lane (Stop Control (EB))	Weekday A.M.	C (16.7 s)	C (18.9 s)	0.05 (EB)	0.06 (EB)
	Weekday P.M.	C (23.0 s)	D (27.7 s)	0.03 (EB)	0.04 (EB)
Griffin Street & Griffin Street N/St Catharines St (Signalized)	Weekday A.M.	C (21.1 s)	C (21.1 s)	0.72 (EBT)	0.75 (EBT)
	Weekday P.M.	C (20.2 s)	C (22.1 s)	0.82 (EBT)	0.85 (EBT)

Note1: The Level of Service of a signalized intersection is based on the average control delay per vehicle. The level of service of a stop-controlled intersection is based on the minor (stopped) approach control delay per vehicle.

Note2: The critical v/c ratio is considered to be the maximum v/c ratio at the intersection. All v/c ratios greater than 0.90 are outlined and highlighted.

The study intersections are expected to operate at a level of service "D" or better during both weekday a.m. and p.m. peak hours, under 2025 and 2030 future background traffic conditions. Compared to existing conditions, the intersection of Griffin Street N/Station Street & West Street is expected to experience a maximum increase of 10.4 seconds of control delay. The intersection of Wade Road N & West Street is expected to experience an increase of the volume to capacity ratio of 0.28 under the weekday p.m. peak hour. All these metrics indicate that the intersections are expected to continue to operate at an efficient level of service, with reserve capacity to accommodate future increases in traffic volumes.

6.0 Site Generated Traffic

The proposed daycare center will result in additional vehicles on the boundary road network that previously did not exist. The proposed development will also cause additional turning movements at the study intersections.

The trip generation of the residential facility was forecasted using the fitted curve equations provided in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition, under the Land Use Category 220 "Multifamily Housing (Low Rise)" and Land Use Category 221 "Multifamily Housing (Mid Rise)". Trip generation estimates were based on the Concept Plan dated January 23, 2020, which proposes five 3-storey stacked townhouses for a total of 90 units and one 6-storey apartment building for a total of 69 units. According to the ITE Trip Generation Manual, the residential development is forecasted to generate 68 and 85 two-way trips in the weekday a.m. and

p.m. peak hours, respectively. The forecasted trips are tabulated in Table 3, and the distributed trips are illustrated in Figure 5.

Table 3: Trip Generation

Land Use	Units/GF A	Parameter	Weekday A.M.			Weekday P.M.		
			In	Out	2-Way	In	Out	2-Way
Residential Multifamily Housing (Low Rise) (220)	90	Gross Trips	10	33	43	34	20	54
Residential Multifamily Housing (Mid Rise) (221)	69	Gross Trips	7	18	25	19	12	31
Total Net Trips			17	51	68	53	32	85

The proposed development is expected to generate 68 new vehicular 2-way trips during the morning peak hour (17 trips in / 51 trips out), and 85 new vehicular 2-way trips during the afternoon peak hour (53 trips in / 32 trips out).

7.0 Total Traffic Conditions

7.1 Intersection Operations

The traffic operations at the study intersections were analyzed under future total conditions. Table 4 outlines 2025 and 2030 future total Levels of Service. Signal timings remain the same as future background conditions for each horizon year. Detailed capacity analyses are included in Appendix C. The 2025, and 2030 total traffic volumes are illustrated in Figures 6, and 7.

Table 4: 2025 and 2030 Future Total Levels of Service

Intersection	Peak Hour	Level of Service (Average Delay per Vehicle(s))		Maximum V/C & V/C Ratio(s) > 0.85 (Approach)	
		2025 Total	2030 Total	2025 Total	2030 Total
Wade Road N & West Street (Stop Control (NB))	Weekday A.M.	B (14.3 s)	C (15.3 s)	0.18 (NB)	0.19 (NB)
	Weekday P.M.	C (17.9 s)	C (19.9 s)	0.16 (NB)	0.18 (NB)
Griffin Street N/Station Street & West Street (Stop Control (EB))	Weekday A.M.	C (20.4 s)	D (32.4 s)	0.48 (EBL)	0.73 (EBL)
	Weekday P.M.	C (22.7 s)	D (31.3 s)	0.69 (EBL)	0.79 (EBL)
Griffin Street N & McMurchie Lane (Stop Control (EB))	Weekday A.M.	C (17.4 s)	C (19.8 s)	0.06 (EB)	0.07 (EB)
	Weekday P.M.	C (24.4 s)	D (29.3 s)	0.04 (EB)	0.05 (EB)
Griffin Street & Griffin Street N/St Catharines St (Signalized)	Weekday A.M.	C (21.0 s)	C (21.1 s)	0.73 (EBT)	0.75 (EBT)
	Weekday P.M.	C (20.4 s)	C (22.4 s)	0.82 (EBT)	0.86 (EBT)

Note1: The Level of Service of a signalized intersection is based on the average control delay per vehicle. The level of service of a stop-controlled intersection is based on the minor (stopped) approach control delay per vehicle.

Note2: The critical v/c ratio is considered to be the maximum v/c ratio at the intersection. All v/c ratios greater than 0.90 are outlined and highlighted.

The study intersections are expected to operate at an unchanged LOS "D" during both weekday a.m. and p.m. peak hours, under 2025 and 2030 future background traffic conditions. Compared to future background conditions, the intersection of Griffin Street N/Station Street & West Street is expected to experience a maximum increase of 8.8 seconds of control delay. The intersection of Griffin Street N/Station Street & West Street is expected to experience an increase of the volume to capacity ratio of 0.18 under the weekday a.m. peak hour. All these metrics indicate that the intersections are expected to continue to operate at an efficient level of service, with the addition of the site generated traffic.

8.0 Conclusion and Recommendations

Based on the analysis, our conclusions are as follows:

Development Proposal

The proposed site will consist of:

- Five 3-storey stacked townhouses for a total of 90 units
- One 6-storey apartment building for a total of 69 units
- Full movement access on Margaret Street and Dove Lane

Existing Conditions

- Turning movement counts for the intersections Wade Road N at West Street and Griffin Street at Griffin Street N/St Catharines Street were received from the Region of Niagara.
- An industry-standard growth rate of two percent was applied to traffic volumes to reflect 2020 volumes.
- Existing signal timings for the signalized intersection of Griffin Street at Griffin Street N/St Catharines Street in the study area were applied.
- Given the limitations in Synchro, the intersection of Griffin Street N/Station Street & West Street is analyzed as a one-way stop control intersection (on West Street), with the northbound and southbound movements along Griffin Street and Station Street operating as free flow.
- All intersections operate under capacity in both peak hours.

Background Conditions

- The industry-standard growth rate of two percent was applied to all movements along boundary roads in the study area that are not directly entering or exiting the site.
- Background developments included the site traffic generated by development located at 132 College Street in the vicinity of the site.
- All intersections operate with a level of service "D" or better under future background conditions with reserve capacity to accommodate future increases in traffic volumes.
- No trips were redistributed to incorporate the Smithville By-pass currently planned. This by-pass will lower volumes along Griffin Street and St. Catharines Street and ultimately improving traffic operations in the Smithville core.

Traffic Trip Generation

- The proposed development is expected to generate 68 new vehicular 2-way trips during the morning peak hour (17 trips in / 51 trips out), and 85 new vehicular 2-way trips during the afternoon peak hour (53 trips in / 32 trips out).

Future Conditions

- The intersection capacity analysis under the future total traffic conditions indicates that all the intersections will operate similarly to the future background conditions during both peak hours.

Recommendations

- Based on existing conditions it is recommended that McMurchie Lane operate as an ingress only access.
- Accordingly, development can be supported by traffic operations and safety perspectives. We trust that this review satisfies any access and transportation concerns associated with the site plan for this development. Please feel free to contact the undersigned for any further information required.

Respectfully submitted,

CF CROZIER & ASSOCIATES INC.



Aaron Wignall
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CF CROZIER & ASSOCIATES INC.



Kavleen Sachdeva E.I.T.
Transportation

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APPENDIX A

Traffic Data and, Signal Timing Plans

Peak Hour.. 07:00 AM — 08:00 AM





Turning Movement Count - Details Report (15 min)

Location..... Griffin Street North @ Station Street/West Street

Municipality..... WEST LINCOLN

Count Date..... Wednesday, April 10, 2019

Griffin Street North

Station Street/West Street

North Approach						South Approach					East Approach					West Approach				
Time Period	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT
07:00 07:15	0	27	15	0	42	72	37	0	0	109	0	0	0	0	0	11	0	48	0	59
07:15 07:30	0	23	11	0	34	91	54	0	0	145	0	0	0	0	0	8	0	38	0	46
07:30 07:45	0	39	15	0	54	85	57	0	0	142	0	0	0	0	0	5	0	44	0	49
07:45 08:00	0	40	24	0	64	66	60	0	0	126	0	0	0	0	0	20	0	45	0	65
Hourly Total	0	129	65	0	194	314	208	0	0	522	0	0	0	0	0	44	0	175	0	219
08:00 08:15	0	31	12	0	43	65	51	0	0	116	0	0	0	0	0	6	0	33	0	39
08:15 08:30	0	35	11	0	46	65	41	0	0	106	0	0	0	0	0	11	0	38	0	49
08:30 08:45	0	38	12	0	50	53	52	0	0	105	0	0	0	0	0	4	0	54	0	58
08:45 09:00	0	46	17	0	63	77	41	0	0	118	0	0	0	0	0	9	0	63	0	72
Hourly Total	0	150	52	0	202	260	185	0	0	445	0	0	0	0	0	30	0	188	0	218
11:00 11:15	0	27	8	0	35	64	34	0	0	98	0	0	0	0	0	9	0	56	0	65
11:15 11:30	0	29	12	0	41	61	37	0	0	98	0	0	0	0	0	8	0	46	0	54
11:30 11:45	0	28	8	0	36	41	27	0	0	68	0	0	0	0	0	5	0	63	0	68
11:45 12:00	0	30	10	0	40	55	34	0	0	89	0	0	0	0	0	9	0	57	0	66
Hourly Total	0	114	38	0	152	221	132	0	0	353	0	0	0	0	0	31	0	222	0	253
12:00 12:15	0	47	11	0	58	60	30	0	0	90	0	0	0	0	0	4	0	63	0	67
12:15 12:30	0	29	9	0	38	67	36	0	0	103	0	0	0	0	0	12	0	76	0	88
12:30 12:45	0	36	6	0	42	41	45	0	0	86	0	0	0	0	0	6	0	47	0	53
12:45 13:00	0	23	6	0	29	47	37	0	0	84	0	0	0	0	0	8	0	52	0	60
Hourly Total	0	135	32	0	167	215	148	0	0	363	0	0	0	0	0	30	0	238	0	268
13:00 13:15	0	35	4	0	39	53	26	0	0	79	0	0	0	0	0	9	0	53	0	62
13:15 13:30	0	15	8	0	23	42	32	0	0	74	0	0	0	0	0	6	0	54	0	60
13:30 13:45	0	25	6	0	31	46	25	0	0	71	0	0	0	0	0	5	0	52	0	57
13:45 14:00	0	30	5	0	35	53	21	0	0	74	0	0	0	0	0	7	0	67	0	74
Hourly Total	0	105	23	0	128	194	104	0	0	298	0	0	0	0	0	27	0	226	0	253
15:00 15:15	0	41	20	0	61	70	48	0	0	118	0	0	0	0	0	10	0	68	0	78
15:15 15:30	0	45	6	0	51	61	44	0	0	105	0	0	0	0	0	9	0	88	0	97
15:30 15:45	0	38	20	0	58	70	40	0	0	110	0	0	0	0	0	11	0	104	0	115
15:45 16:00	0	61	18	0	79	49	34	0	0	83	0	0	0	0	0	7	0	83	0	90
Hourly Total	0	185	64	0	249	250	166	0	0	416	0	0	0	0	0	37	0	343	0	380

Attachment No. 3

Griffin Street North

Station Street/West Street

North Approach

South Approach

East Approach

West Approach

Time Period	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT
16:00 16:15	0	52	9	0	61	51	45	0	0	96	0	0	0	0	0	12	0	112	0	124
16:15 16:30	0	48	8	0	56	66	46	0	0	112	0	0	0	0	0	11	0	99	0	110
16:30 16:45	0	59	8	0	67	81	56	0	0	137	0	0	0	0	0	10	0	90	0	100
16:45 17:00	0	43	5	0	48	63	49	0	0	112	0	0	0	0	0	9	0	95	0	104
Hourly Total	0	202	30	0	232	261	196	0	0	457	0	0	0	0	0	42	0	396	0	438
17:00 17:15	0	60	11	0	71	81	39	0	0	120	0	0	0	0	0	10	0	107	0	117
17:15 17:30	0	37	9	0	46	71	45	0	0	116	0	0	0	0	0	9	0	105	0	114
17:30 17:45	0	50	8	0	58	64	42	0	0	106	0	0	0	0	0	9	0	75	0	84
17:45 18:00	0	21	10	0	31	48	26	0	0	74	0	0	0	0	0	15	0	96	0	111
Hourly Total	0	168	38	0	206	264	152	0	0	416	0	0	0	0	0	43	0	383	0	426
Grand Total	0	1188	342	0	1530	1979	1291	0	0	3270	0	0	0	0	0	284	0	2171	0	2455
Truck %	0%	5%	9%	0%	6%	10%	6%	0%	0%	8%	0%	0%	0%	0%	0%	11%	0%	8%	0%	8%

Turning Movements Report - AM Period

Location..... Griffin Street @ RR20/St Catharines Street

GeoID..... 00094

Municipality. WEST LINCOLN

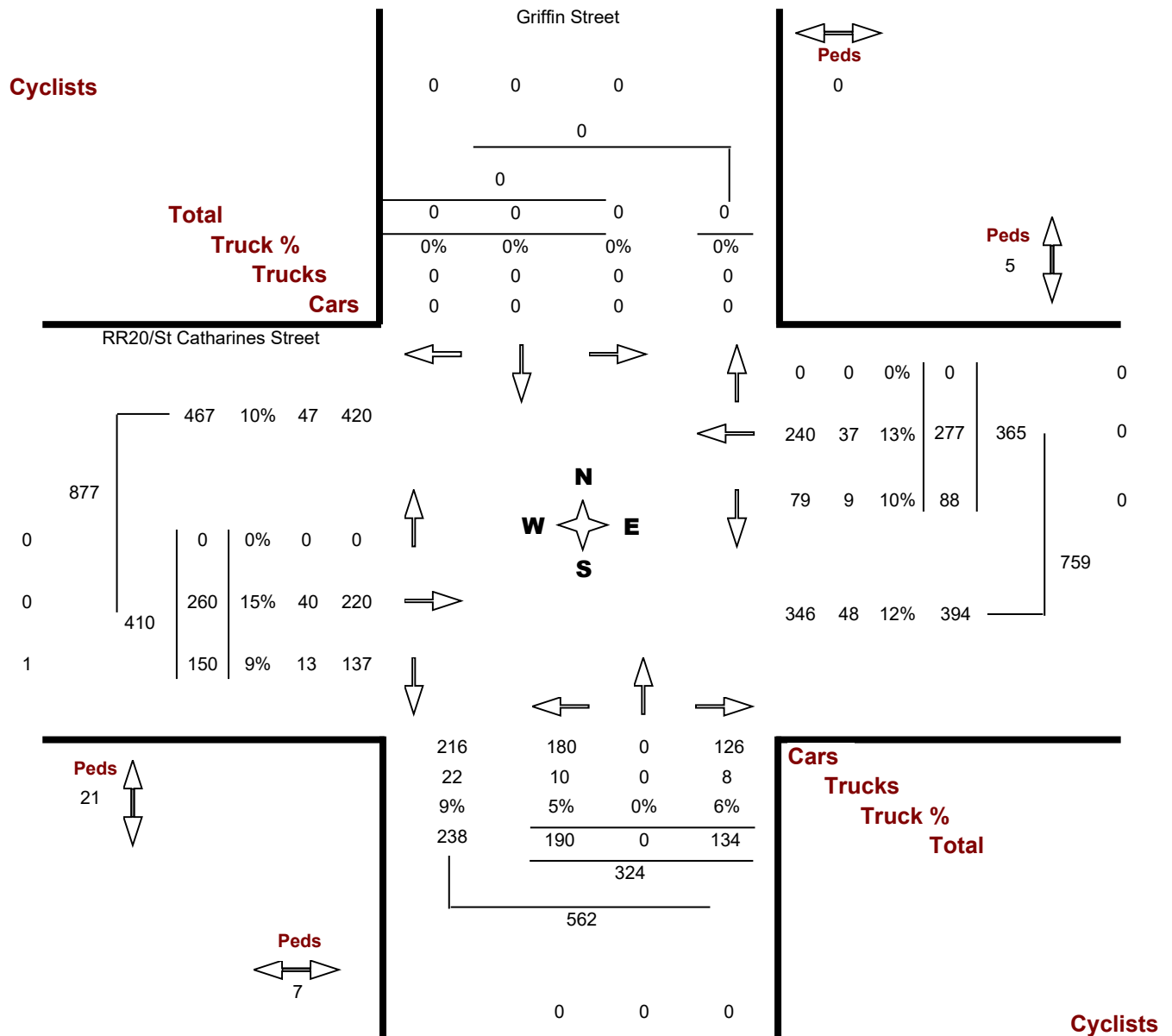
Count Date. Tuesday, 04 June, 2019

Traffic Cont. Traffic signal

Count Time. 07:00 AM — 09:00 AM

Major Dir..... East west

Peak Hour.. 08:00 AM — 09:00 AM



Turning Movements Report - PM Period

Location..... Griffin Street @ RR20/St Catharines Street

GeoID..... 00094

Municipality. WEST LINCOLN

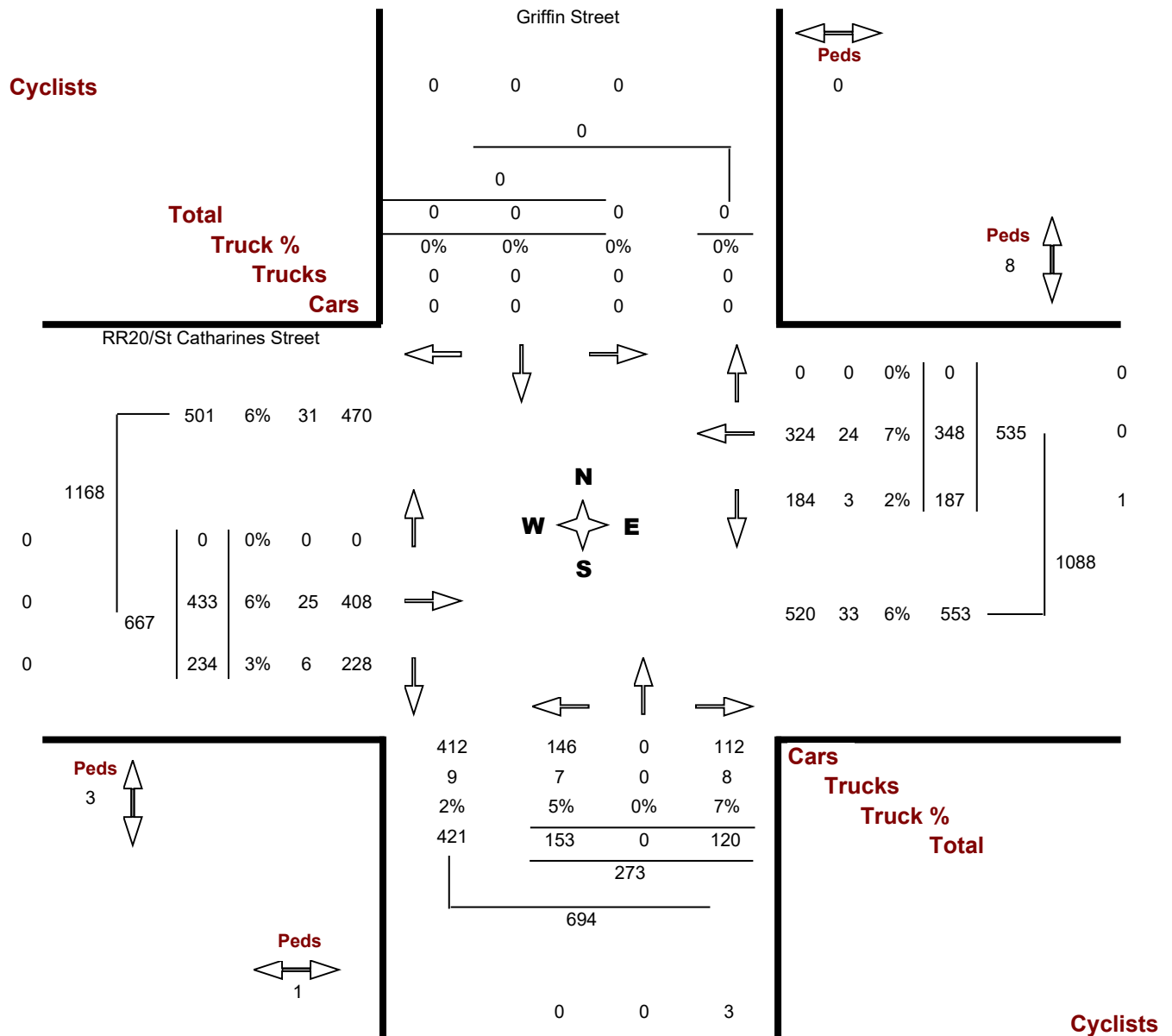
Count Date. Tuesday, 04 June, 2019

Traffic Cont. Traffic signal

Count Time. 03:00 PM — 06:00 PM

Major Dir..... East west

Peak Hour.. 04:15 PM — 05:15 PM





Turning Movement Count - Details Report (15 min)

Location..... Griffin Street @ RR20/St Catharines Street

Municipality..... WEST LINCOLN

Count Date..... Tuesday, June 04, 2019

Griffin Street											RR20/St Catharines Street									
North Approach						South Approach					East Approach					West Approach				
Time Period	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT
07:00 07:15	0	0	0	0	0	44	0	22	0	66	10	52	0	0	62	0	67	21	0	88
07:15 07:30	0	0	0	0	0	40	0	27	0	67	19	71	0	0	90	0	45	18	0	63
07:30 07:45	0	0	0	0	0	48	0	30	0	78	24	83	0	0	107	0	65	21	0	86
07:45 08:00	0	0	0	0	0	54	0	22	0	76	20	87	0	0	107	0	67	30	0	97
Hourly Total	0	0	0	0	0	186	0	101	0	287	73	293	0	0	366	0	244	90	0	334
08:00 08:15	0	0	0	0	0	42	0	27	0	69	21	57	0	0	78	0	60	22	0	82
08:15 08:30	0	0	0	0	0	41	0	21	0	62	16	65	0	0	81	0	65	40	0	105
08:30 08:45	0	0	0	0	0	57	0	40	0	97	21	76	0	0	97	0	57	46	0	103
08:45 09:00	0	0	0	0	0	50	0	46	0	96	30	79	0	0	109	0	78	42	0	120
Hourly Total	0	0	0	0	0	190	0	134	0	324	88	277	0	0	365	0	260	150	0	410
11:00 11:15	0	0	0	0	0	33	0	26	0	59	19	54	0	0	73	0	73	26	0	99
11:15 11:30	0	0	0	0	0	29	0	26	0	55	29	63	0	0	92	0	63	23	0	86
11:30 11:45	0	0	0	0	0	27	0	22	0	49	21	61	0	0	82	0	78	28	0	106
11:45 12:00	0	0	0	0	0	40	0	25	0	65	29	55	0	0	84	0	58	17	0	75
Hourly Total	0	0	0	0	0	129	0	99	0	228	98	233	0	0	331	0	272	94	0	366
12:00 12:15	0	0	0	0	0	33	0	27	0	60	36	53	0	0	89	0	79	32	0	111
12:15 12:30	0	0	0	0	0	28	0	24	0	52	31	69	0	0	100	0	78	34	0	112
12:30 12:45	0	0	0	0	0	30	0	28	0	58	39	79	0	0	118	0	81	30	0	111
12:45 13:00	0	0	0	0	0	49	0	34	0	83	41	74	0	0	115	0	70	26	0	96
Hourly Total	0	0	0	0	0	140	0	113	0	253	147	275	0	0	422	0	308	122	0	430
13:00 13:15	0	0	0	0	0	39	0	29	0	68	36	51	0	0	87	0	61	28	0	89
13:15 13:30	0	0	0	0	0	43	0	25	0	68	30	67	0	0	97	0	59	27	0	86
13:30 13:45	0	0	0	0	0	32	0	23	0	55	28	64	0	0	92	0	64	30	0	94
13:45 14:00	0	0	0	0	0	32	0	18	0	50	28	64	0	0	92	0	74	28	0	102
Hourly Total	0	0	0	0	0	146	0	95	0	241	122	246	0	0	368	0	258	113	0	371
15:00 15:15	0	0	0	0	0	40	0	26	0	66	42	69	0	0	111	0	68	42	0	110
15:15 15:30	0	0	0	0	0	36	0	17	0	53	39	76	0	0	115	0	80	42	0	122
15:30 15:45	0	0	0	0	0	54	0	32	0	86	33	63	0	0	96	0	89	64	0	153
15:45 16:00	0	0	0	0	0	40	0	30	0	70	42	81	0	0	123	0	100	51	0	151
Hourly Total	0	0	0	0	0	170	0	105	0	275	156	289	0	0	445	0	337	199	0	536

Attachment No. 3

Griffin Street

RR20/St Catharines Street

North Approach						South Approach					East Approach					West Approach				
Time Period	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT
16:00 16:15	0	0	0	0	0	36	0	32	0	68	34	63	0	0	97	0	110	63	0	173
16:15 16:30	0	0	0	0	0	34	0	42	0	76	40	94	0	0	134	0	126	55	0	181
16:30 16:45	0	0	0	0	0	36	0	25	0	61	51	86	0	0	137	0	95	57	0	152
16:45 17:00	0	0	0	0	0	27	0	25	0	52	55	81	0	0	136	0	94	63	0	157
Hourly Total	0	0	0	0	0	133	0	124	0	257	180	324	0	0	504	0	425	238	0	663
17:00 17:15	0	0	0	0	0	56	0	28	0	84	41	87	0	0	128	0	118	59	0	177
17:15 17:30	0	0	0	0	0	38	0	15	0	53	49	75	0	0	124	0	110	59	0	169
17:30 17:45	0	0	0	0	0	43	0	29	0	72	39	74	0	0	113	0	107	65	0	172
17:45 18:00	0	0	0	0	0	33	0	17	0	50	42	88	0	0	130	0	99	52	0	151
Hourly Total	0	0	0	0	0	170	0	89	0	259	171	324	0	0	495	0	434	235	0	669
Grand Total	0	0	0	0	0	1264	0	860	0	2124	1035	2261	0	0	3296	0	2538	1241	0	3779
Truck %	0%	0%	0%	0%	0%	5%	0%	5%	0%	5%	3%	10%	0%	0%	8%	0%	10%	5%	0%	8%

Signal Code: 014020						
Intersection: RR14 (GRIFFIN ST.) & RR20 (ST. CATHERINES ST.)						
Municipality: westlincoln						
Owner: Region						
Last Modified: 8/6/2015 8:29:39 AM						
Timing Parameters	WBD ADV HWY 20	EBD & WBD HWY 20	NBD GRIFFIN ST.	n/a	n/a	n/a
Min Green	6	10	8	0	0	0
Walk	0	10	8	0	0	0
Ped Clearance	0	16	12	0	0	0
Vehicle Ext.	2.5	5	3.5	0	0	0
Max Green	12	35	25	0	0	0
Yellow	3	4.1	4.1	0	0	0
All Red	0	2.7	2	0	0	0

		Offset
Minimum Cycle	30.9	0
Pedestrian Cycle	58.9	
Maximum Cycle	87.9	0
Operation	FA	

Installed On:

3/16/2010

Count Date:

11/12/2008

FA = Fully Actuated

SA = Semi Actuated

FT = Fixed Time

***Note: you need to change the paper orientation from Portrait to Landscape**

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APPENDIX B

Levels of Service Definitions

Level of Service Definitions

Signalized Intersections

Level of Service	Control Delay per Vehicle (seconds)	Interpretation
A	≤ 10	EXCELLENT. Extremely favourable progression with most vehicles arriving during the green phase. Most vehicles do not stop and short cycle lengths may contribute to low delay.
B	$> 10 \text{ and } \leq 20$	VERY GOOD. Very good progression and/or short cycle lengths with slightly more vehicles stopping than LOS "A" causing slightly higher levels of average delay.
C	$> 20 \text{ and } \leq 35$	GOOD. Fair progression and longer cycle lengths lead to a greater number of vehicles stopping than LOS "B".
D	$> 35 \text{ and } \leq 55$	FAIR. Congestion becomes noticeable with higher average delays resulting from a combination of long cycle lengths, high volume-to-capacity ratios and unfavourable progression.
E	$> 55 \text{ and } \leq 80$	POOR. Lengthy delays values are indicative of poor progression, long cycle lengths and high volume-to-capacity ratios. Individual cycle failures are common with individual movement failures also common.
F	> 80	UNSATISFACTORY. Indicative of oversaturated conditions with vehicular demand greater than the capacity of the intersection.

Adapted from Highway Capacity Manual 2000, Transportation Research Board

Attachment No. 3

Level of Service Definitions

Two-Way Stop Controlled Intersections

Level of Service	Control Delay per Vehicle (seconds)	Interpretation
A	≤ 10	EXCELLENT. Large and frequent gaps in traffic on the main roadway. Queuing on the minor street is rare.
B	> 10 and ≤ 15	VERY GOOD. Many gaps exist in traffic on the main roadway. Queuing on the minor street is minimal.
C	> 15 and ≤ 25	GOOD. Fewer gaps exist in traffic on the main roadway. Delay on minor approach becomes more noticeable.
D	> 25 and ≤ 35	FAIR. Infrequent and shorter gaps in traffic on the main roadway. Queue lengths develop on the minor street.
E	> 35 and ≤ 50	POOR. Very infrequent gaps in traffic on the main roadway. Queue lengths become noticeable.
F	> 50	UNSATISFACTORY. Very few gaps in traffic on the main roadway. Excessive delay with significant queue lengths on the minor street.

Adapted from Highway Capacity Manual 2000, Transportation Research Board

APPENDIX C

Detailed Capacity Analyses

HCM Unsignalized Intersection Capacity Analysis

Existing AM Peak Hour

1: Wade Road N & West Street

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	215	12	3	383	34	9
Future Volume (Veh/h)	215	12	3	383	34	9
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	234	13	3	416	37	10
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			247		662	240
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			247		662	240
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		91	99
cM capacity (veh/h)			1319		426	798
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	247	419	47			
Volume Left	0	3	37			
Volume Right	13	0	10			
cSH	1700	1319	472			
Volume to Capacity	0.15	0.00	0.10			
Queue Length 95th (m)	0.0	0.1	2.5			
Control Delay (s)	0.0	0.1	13.5			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.1	13.5			
Approach LOS			B			
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			34.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis2: Griffin Street N/Station Street & West Street

Existing AM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	45	179	320	212	132	66
Future Volume (Veh/h)	45	179	320	212	132	66
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	49	195	348	230	143	72
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		2				
Median type				None	None	
Median storage veh						
Upstream signal (m)				166		
pX, platoon unblocked						
vC, conflicting volume	1105	179	143			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1105	179	143			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	72	77	76			
cM capacity (veh/h)	177	864	1440			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	244	348	230	215		
Volume Left	49	348	0	0		
Volume Right	195	0	0	72		
cSH	881	1440	1700	1700		
Volume to Capacity	0.28	0.24	0.14	0.13		
Queue Length 95th (m)	8.6	7.2	0.0	0.0		
Control Delay (s)	14.9	8.3	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	14.9	5.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			6.3			
Intersection Capacity Utilization			44.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis3: Griffin Street N & Mcmurchie Lane

Existing AM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	7	3	505	365	2
Future Volume (Veh/h)	8	7	3	505	365	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	8	3	549	397	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				59		
pX, platoon unblocked	0.86					
vC, conflicting volume	953	398	399			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	866	398	399			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	100			
cM capacity (veh/h)	279	652	1160			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	17	552	399			
Volume Left	9	3	0			
Volume Right	8	0	2			
cSH	381	1160	1700			
Volume to Capacity	0.04	0.00	0.23			
Queue Length 95th (m)	1.1	0.1	0.0			
Control Delay (s)	14.9	0.1	0.0			
Lane LOS	B	A				
Approach Delay (s)	14.9	0.1	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			41.4%	ICU Level of Service		A
Analysis Period (min)			15			

4: Griffin Street & Griffin Street N/St Catharines St

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	265	153	90	283	194	137
Future Volume (vph)	265	153	90	283	194	137
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)		30.0	20.0		0.0	15.0
Storage Lanes		1	1		1	1
Taper Length (m)			15.0		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1735	1475	1648	1735	1648	1475
Flt Permitted			0.362		0.950	
Satd. Flow (perm)	1735	1475	628	1735	1648	1475
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		166				128
Link Speed (k/h)	50			50	50	
Link Distance (m)	59.2			69.0	143.2	
Travel Time (s)	4.3			5.0	10.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	288	166	98	308	211	149
Shared Lane Traffic (%)						
Lane Group Flow (vph)	288	166	98	308	211	149
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1	1	2	1	1
Detector Template	Thru	Right	Left	Thru	Left	Right
Leading Detector (m)	30.5	6.1	6.1	30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1	6.1	1.8	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4	8			2

4: Griffin Street & Griffin Street N/St Catharines St

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	6.0	10.0	8.0	8.0
Minimum Split (s)	32.8	32.8	9.0	32.8	26.1	26.1
Total Split (s)	40.0	40.0	13.0	53.0	34.9	34.9
Total Split (%)	45.5%	45.5%	14.8%	60.3%	39.7%	39.7%
Maximum Green (s)	33.2	33.2	10.0	46.2	28.8	28.8
Yellow Time (s)	4.1	4.1	3.0	4.1	4.1	4.1
All-Red Time (s)	2.7	2.7	0.0	2.7	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	3.0	6.8	6.1	6.1
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	C-Max	C-Max
Walk Time (s)	10.0	10.0		10.0	8.0	8.0
Flash Dont Walk (s)	16.0	16.0		16.0	12.0	12.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	20.7	20.7	34.2	30.4	44.6	44.6
Actuated g/C Ratio	0.24	0.24	0.39	0.35	0.51	0.51
v/c Ratio	0.71	0.35	0.28	0.51	0.25	0.18
Control Delay	39.9	6.1	16.7	24.3	16.0	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.9	6.1	16.7	24.3	16.0	5.0
LOS	D	A	B	C	B	A
Approach Delay	27.5			22.5	11.5	
Approach LOS	C			C	B	

Intersection Summary

Area Type: Other

Cycle Length: 87.9

Actuated Cycle Length: 87.9

Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 21.1

Intersection LOS: C

Intersection Capacity Utilization 46.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: Griffin Street & Griffin Street N/St Catharines St

 Ø2 (R)	 Ø3	 Ø4
34.9 s	13 s	40 s
	 Ø8	
	53 s	

HCM Unsignalized Intersection Capacity Analysis

1: Wade Road N & West Street

Existing PM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰			↰	↰	
Traffic Volume (veh/h)	434	39	10	320	22	6
Future Volume (Veh/h)	434	39	10	320	22	6
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	472	42	11	348	24	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			514		863	493
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			514		863	493
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		93	99
cM capacity (veh/h)			1052		322	576
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	514	359	31			
Volume Left	0	11	24			
Volume Right	42	0	7			
cSH	1700	1052	357			
Volume to Capacity	0.30	0.01	0.09			
Queue Length 95th (m)	0.0	0.2	2.2			
Control Delay (s)	0.0	0.4	16.0			
Lane LOS		A	C			
Approach Delay (s)	0.0	0.4	16.0			
Approach LOS			C			
Intersection Summary						
Average Delay		0.7				
Intersection Capacity Utilization		37.4%	ICU Level of Service	A		
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis2: Griffin Street N/Station Street & West Street

Existing PM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	41	399	297	194	214	33
Future Volume (Veh/h)	41	399	297	194	214	33
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	45	434	323	211	233	36
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)	2					
Median type				None	None	
Median storage veh						
Upstream signal (m)	166					
pX, platoon unblocked						
vC, conflicting volume	1108	251	233			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1108	251	233			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	74	45	76			
cM capacity (veh/h)	176	788	1335			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	479	323	211	269		
Volume Left	45	323	0	0		
Volume Right	434	0	0	36		
cSH	869	1335	1700	1700		
Volume to Capacity	0.55	0.24	0.12	0.16		
Queue Length 95th (m)	26.1	7.2	0.0	0.0		
Control Delay (s)	16.7	8.6	0.0	0.0		
Lane LOS	C	A				
Approach Delay (s)	16.7	5.2		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay	8.4					
Intersection Capacity Utilization	47.9%			ICU Level of Service	A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

3: Griffin Street N & Mcmurchie Lane

Existing PM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	4	6	501	647	7
Future Volume (Veh/h)	3	4	6	501	647	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	4	7	545	703	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				59		
pX, platoon unblocked	0.85					
vC, conflicting volume	1266	707	711			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1225	707	711			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	99			
cM capacity (veh/h)	167	435	888			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	7	552	711			
Volume Left	3	7	0			
Volume Right	4	0	8			
cSH	258	888	1700			
Volume to Capacity	0.03	0.01	0.42			
Queue Length 95th (m)	0.6	0.2	0.0			
Control Delay (s)	19.4	0.2	0.0			
Lane LOS	C	A				
Approach Delay (s)	19.4	0.2	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			47.4%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings

Existing PM Peak Hour

4: Griffin Street & Griffin Street N/St Catharines St

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	442	239	191	355	156	122
Future Volume (vph)	442	239	191	355	156	122
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)		30.0	20.0		0.0	15.0
Storage Lanes		1	1		1	1
Taper Length (m)			15.0		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1735	1475	1648	1735	1648	1475
Flt Permitted			0.220		0.950	
Satd. Flow (perm)	1735	1475	382	1735	1648	1475
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		176				133
Link Speed (k/h)	50			50	50	
Link Distance (m)	59.2			69.0	143.2	
Travel Time (s)	4.3			5.0	10.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	480	260	208	386	170	133
Shared Lane Traffic (%)						
Lane Group Flow (vph)	480	260	208	386	170	133
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1	1	2	1	1
Detector Template	Thru	Right	Left	Thru	Left	Right
Leading Detector (m)	30.5	6.1	6.1	30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1	6.1	1.8	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4	8			2

4: Griffin Street & Griffin Street N/St Catharines St

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	6.0	10.0	8.0	8.0
Minimum Split (s)	32.8	32.8	9.0	32.8	26.1	26.1
Total Split (s)	40.0	40.0	13.0	53.0	34.9	34.9
Total Split (%)	45.5%	45.5%	14.8%	60.3%	39.7%	39.7%
Maximum Green (s)	33.2	33.2	10.0	46.2	28.8	28.8
Yellow Time (s)	4.1	4.1	3.0	4.1	4.1	4.1
All-Red Time (s)	2.7	2.7	0.0	2.7	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	3.0	6.8	6.1	6.1
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	C-Max	C-Max
Walk Time (s)	10.0	10.0		10.0	8.0	8.0
Flash Dont Walk (s)	16.0	16.0		16.0	12.0	12.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	29.0	29.0	45.5	41.7	33.3	33.3
Actuated g/C Ratio	0.33	0.33	0.52	0.47	0.38	0.38
v/c Ratio	0.84	0.43	0.62	0.47	0.27	0.21
Control Delay	40.9	9.4	19.1	17.0	22.1	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.9	9.4	19.1	17.0	22.1	5.0
LOS	D	A	B	B	C	A
Approach Delay	29.8			17.7	14.6	
Approach LOS	C			B	B	

Intersection Summary

Area Type: Other

Cycle Length: 87.9

Actuated Cycle Length: 87.9

Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 22.6

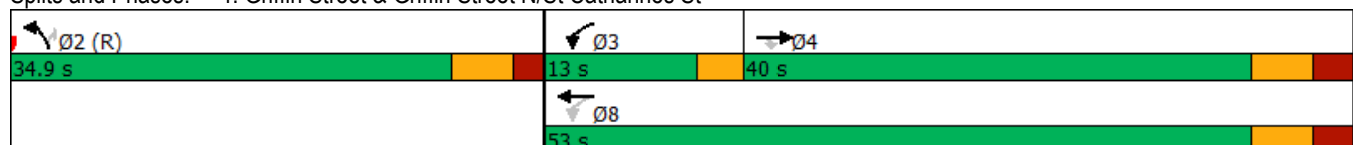
Intersection LOS: C

Intersection Capacity Utilization 60.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 4: Griffin Street & Griffin Street N/St Catharines St



HCM Unsignalized Intersection Capacity Analysis

1: Wade Road N & West Street

2025 Future Background AM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰			↰	↰	
Traffic Volume (veh/h)	240	12	3	433	34	9
Future Volume (Veh/h)	240	12	3	433	34	9
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	261	13	3	471	37	10
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			274		744	268
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			274		744	268
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		90	99
cM capacity (veh/h)			1289		381	771
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	274	474	47			
Volume Left	0	3	37			
Volume Right	13	0	10			
cSH	1700	1289	427			
Volume to Capacity	0.16	0.00	0.11			
Queue Length 95th (m)	0.0	0.1	2.8			
Control Delay (s)	0.0	0.1	14.5			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.1	14.5			
Approach LOS			B			
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			37.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis2: Griffin Street N/Station Street & West Street

2025 Future Background AM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	50	200	364	241	148	73
Future Volume (Veh/h)	50	200	364	241	148	73
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	217	396	262	161	79
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)	2					
Median type				None	None	
Median storage veh						
Upstream signal (m)	166					
pX, platoon unblocked						
vC, conflicting volume	1254	200	161			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1254	200	161			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	60	74	72			
cM capacity (veh/h)	137	840	1418			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	271	396	262	240		
Volume Left	54	396	0	0		
Volume Right	217	0	0	79		
cSH	686	1418	1700	1700		
Volume to Capacity	0.40	0.28	0.15	0.14		
Queue Length 95th (m)	14.4	8.8	0.0	0.0		
Control Delay (s)	18.1	8.5	0.0	0.0		
Lane LOS	C	A				
Approach Delay (s)	18.1	5.1	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay	7.1					
Intersection Capacity Utilization	48.5%			ICU Level of Service		A
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis3: Griffin Street N & Mcmurchie Lane

2025 Future Background AM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	7	3	575	407	2
Future Volume (Veh/h)	8	7	3	575	407	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	8	3	625	442	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				59		
pX, platoon unblocked	0.84					
vC, conflicting volume	1074	443	444			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	992	443	444			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	99	100			
cM capacity (veh/h)	228	615	1116			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	17	628	444			
Volume Left	9	3	0			
Volume Right	8	0	2			
cSH	324	1116	1700			
Volume to Capacity	0.05	0.00	0.26			
Queue Length 95th (m)	1.3	0.1	0.0			
Control Delay (s)	16.7	0.1	0.0			
Lane LOS	C	A				
Approach Delay (s)	16.7	0.1	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization		45.4%		ICU Level of Service		A
Analysis Period (min)		15				

4: Griffin Street & Griffin Street N/St Catharines St

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	298	168	107	331	213	156
Future Volume (vph)	298	168	107	331	213	156
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)		30.0	20.0		0.0	15.0
Storage Lanes		1	1		1	1
Taper Length (m)			15.0		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1735	1475	1648	1735	1648	1475
Flt Permitted			0.334		0.950	
Satd. Flow (perm)	1735	1475	579	1735	1648	1475
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		183				133
Link Speed (k/h)	50			50	50	
Link Distance (m)	59.2			69.0	143.2	
Travel Time (s)	4.3			5.0	10.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	324	183	116	360	232	170
Shared Lane Traffic (%)						
Lane Group Flow (vph)	324	183	116	360	232	170
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1	1	2	1	1
Detector Template	Thru	Right	Left	Thru	Left	Right
Leading Detector (m)	30.5	6.1	6.1	30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1	6.1	1.8	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4	8			2

4: Griffin Street & Griffin Street N/St Catharines St

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	6.0	10.0	8.0	8.0
Minimum Split (s)	32.8	32.8	9.0	32.8	26.1	26.1
Total Split (s)	40.0	40.0	13.0	53.0	34.9	34.9
Total Split (%)	45.5%	45.5%	14.8%	60.3%	39.7%	39.7%
Maximum Green (s)	33.2	33.2	10.0	46.2	28.8	28.8
Yellow Time (s)	4.1	4.1	3.0	4.1	4.1	4.1
All-Red Time (s)	2.7	2.7	0.0	2.7	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	3.0	6.8	6.1	6.1
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	C-Max	C-Max
Walk Time (s)	10.0	10.0		10.0	8.0	8.0
Flash Dont Walk (s)	16.0	16.0		16.0	12.0	12.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	22.7	22.7	36.5	32.7	42.3	42.3
Actuated g/C Ratio	0.26	0.26	0.42	0.37	0.48	0.48
v/c Ratio	0.72	0.35	0.33	0.56	0.29	0.22
Control Delay	38.6	5.5	16.3	23.8	17.9	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.6	5.5	16.3	23.8	17.9	6.2
LOS	D	A	B	C	B	A
Approach Delay	26.6			22.0	12.9	
Approach LOS	C			C	B	

Intersection Summary

Area Type: Other

Cycle Length: 87.9

Actuated Cycle Length: 87.9

Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 21.1

Intersection LOS: C

Intersection Capacity Utilization 50.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: Griffin Street & Griffin Street N/St Catharines St

 Ø2 (R)	 Ø3	 Ø4
34.9 s	13 s	40 s
	 Ø8	
	53 s	

HCM Unsignalized Intersection Capacity Analysis

1: Wade Road N & West Street

2025 Future Background PM Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	491	39	10	357	22	6
Future Volume (Veh/h)	491	39	10	357	22	6
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	534	42	11	388	24	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			576		965	555
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			576		965	555
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		91	99
cM capacity (veh/h)			997		280	531
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	576	399	31			
Volume Left	0	11	24			
Volume Right	42	0	7			
cSH	1700	997	313			
Volume to Capacity	0.34	0.01	0.10			
Queue Length 95th (m)	0.0	0.3	2.5			
Control Delay (s)	0.0	0.4	17.8			
Lane LOS		A	C			
Approach Delay (s)	0.0	0.4	17.8			
Approach LOS			C			
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			40.6%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis2: Griffin Street N/Station Street & West Street

2025 Future Background PM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	45	453	332	216	243	36
Future Volume (Veh/h)	45	453	332	216	243	36
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	49	492	361	235	264	39
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		2				
Median type				None	None	
Median storage veh						
Upstream signal (m)				166		
pX, platoon unblocked						
vC, conflicting volume	1240	284	264			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1240	284	264			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	65	35	72			
cM capacity (veh/h)	140	755	1300			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	541	361	235	303		
Volume Left	49	361	0	0		
Volume Right	492	0	0	39		
cSH	831	1300	1700	1700		
Volume to Capacity	0.65	0.28	0.14	0.18		
Queue Length 95th (m)	37.5	8.7	0.0	0.0		
Control Delay (s)	20.6	8.8	0.0	0.0		
Lane LOS	C	A				
Approach Delay (s)	20.6	5.3		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay			9.9			
Intersection Capacity Utilization			53.4%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis3: Griffin Street N & Mcmurchie Lane

2025 Future Background PM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	4	6	560	733	7
Future Volume (Veh/h)	3	4	6	560	733	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	4	7	609	797	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				59		
pX, platoon unblocked	0.85					
vC, conflicting volume	1424	801	805			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1410	801	805			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	99			
cM capacity (veh/h)	128	384	819			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	7	616	805			
Volume Left	3	7	0			
Volume Right	4	0	8			
cSH	207	819	1700			
Volume to Capacity	0.03	0.01	0.47			
Queue Length 95th (m)	0.8	0.2	0.0			
Control Delay (s)	23.0	0.2	0.0			
Lane LOS	C	A				
Approach Delay (s)	23.0	0.2	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization		52.3%		ICU Level of Service		A
Analysis Period (min)		15				

4: Griffin Street & Griffin Street N/St Catharines St

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	507	263	216	399	172	143
Future Volume (vph)	507	263	216	399	172	143
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)		30.0	20.0		0.0	15.0
Storage Lanes		1	1		1	1
Taper Length (m)			15.0		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1735	1475	1648	1735	1648	1475
Flt Permitted			0.214		0.950	
Satd. Flow (perm)	1735	1475	371	1735	1648	1475
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		194				134
Link Speed (k/h)	50			50	50	
Link Distance (m)	59.2			69.0	143.2	
Travel Time (s)	4.3			5.0	10.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	551	286	235	434	187	155
Shared Lane Traffic (%)						
Lane Group Flow (vph)	551	286	235	434	187	155
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1	1	2	1	1
Detector Template	Thru	Right	Left	Thru	Left	Right
Leading Detector (m)	30.5	6.1	6.1	30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1	6.1	1.8	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4	8			2

4: Griffin Street & Griffin Street N/St Catharines St

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	6.0	10.0	8.0	8.0
Minimum Split (s)	32.8	32.8	9.0	32.8	26.1	26.1
Total Split (s)	47.0	47.0	13.0	60.0	27.9	27.9
Total Split (%)	53.5%	53.5%	14.8%	68.3%	31.7%	31.7%
Maximum Green (s)	40.2	40.2	10.0	53.2	21.8	21.8
Yellow Time (s)	4.1	4.1	3.0	4.1	4.1	4.1
All-Red Time (s)	2.7	2.7	0.0	2.7	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	3.0	6.8	6.1	6.1
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	C-Max	C-Max
Walk Time (s)	10.0	10.0		10.0	8.0	8.0
Flash Dont Walk (s)	16.0	16.0		16.0	12.0	12.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	34.3	34.3	51.0	47.2	27.8	27.8
Actuated g/C Ratio	0.39	0.39	0.58	0.54	0.32	0.32
v/c Ratio	0.82	0.41	0.66	0.47	0.36	0.28
Control Delay	33.8	7.5	17.4	13.7	27.8	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.8	7.5	17.4	13.7	27.8	8.2
LOS	C	A	B	B	C	A
Approach Delay	24.8			15.0	18.9	
Approach LOS	C			B	B	

Intersection Summary

Area Type: Other

Cycle Length: 87.9

Actuated Cycle Length: 87.9

Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 20.2

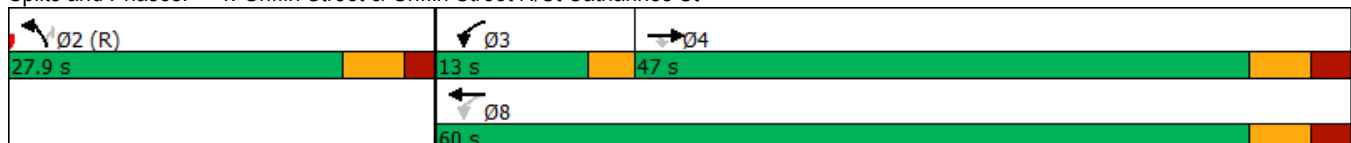
Intersection LOS: C

Intersection Capacity Utilization 66.4%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: Griffin Street & Griffin Street N/St Catharines St



HCM Unsignalized Intersection Capacity Analysis

1: Wade Road N & West Street

2025 Future Total AM Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	241	14	10	438	44	32
Future Volume (Veh/h)	241	14	10	438	44	32
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	262	15	11	476	48	35
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			277		768	270
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			277		768	270
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		87	95
cM capacity (veh/h)			1286		367	769
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	277	487	83			
Volume Left	0	11	48			
Volume Right	15	0	35			
cSH	1700	1286	471			
Volume to Capacity	0.16	0.01	0.18			
Queue Length 95th (m)	0.0	0.2	4.8			
Control Delay (s)	0.0	0.3	14.3			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.3	14.3			
Approach LOS			B			
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			45.2%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis2: Griffin Street N/Station Street & West Street

2025 Future Total AM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	57	218	375	245	150	74
Future Volume (Veh/h)	57	218	375	245	150	74
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	62	237	408	266	163	80
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		2				
Median type				None	None	
Median storage veh						
Upstream signal (m)				166		
pX, platoon unblocked						
vC, conflicting volume	1285	203	163			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1285	203	163			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	52	72	71			
cM capacity (veh/h)	129	838	1416			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	299	408	266	243		
Volume Left	62	408	0	0		
Volume Right	237	0	0	80		
cSH	624	1416	1700	1700		
Volume to Capacity	0.48	0.29	0.16	0.14		
Queue Length 95th (m)	19.7	9.1	0.0	0.0		
Control Delay (s)	20.4	8.6	0.0	0.0		
Lane LOS	C	A				
Approach Delay (s)	20.4	5.2		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay			7.9			
Intersection Capacity Utilization			49.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis3: Griffin Street N & McMurchie Lane

2025 Future Total AM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	7	3	590	427	3
Future Volume (Veh/h)	8	7	3	590	427	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	8	3	641	464	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				59		
pX, platoon unblocked	0.84					
vC, conflicting volume	1112	466	467			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1038	466	467			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	99	100			
cM capacity (veh/h)	214	597	1094			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	17	644	467			
Volume Left	9	3	0			
Volume Right	8	0	3			
cSH	307	1094	1700			
Volume to Capacity	0.06	0.00	0.27			
Queue Length 95th (m)	1.3	0.1	0.0			
Control Delay (s)	17.4	0.1	0.0			
Lane LOS	C	A				
Approach Delay (s)	17.4	0.1	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			46.3%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings

2025 Future Total AM Peak Hour

4: Griffin Street & Griffin Street N/St Catharines St

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	308	177	109	334	225	162
Future Volume (vph)	308	177	109	334	225	162
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)		30.0	20.0		0.0	15.0
Storage Lanes		1	1		1	1
Taper Length (m)			15.0		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1735	1475	1648	1735	1648	1475
Flt Permitted			0.326		0.950	
Satd. Flow (perm)	1735	1475	566	1735	1648	1475
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		187				130
Link Speed (k/h)	50			50	50	
Link Distance (m)	59.2			69.0	143.2	
Travel Time (s)	4.3			5.0	10.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	335	192	118	363	245	176
Shared Lane Traffic (%)						
Lane Group Flow (vph)	335	192	118	363	245	176
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1	1	2	1	1
Detector Template	Thru	Right	Left	Thru	Left	Right
Leading Detector (m)	30.5	6.1	6.1	30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1	6.1	1.8	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4	8			2

4: Griffin Street & Griffin Street N/St Catharines St

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	6.0	10.0	8.0	8.0
Minimum Split (s)	32.8	32.8	9.0	32.8	26.1	26.1
Total Split (s)	40.0	40.0	13.0	53.0	34.9	34.9
Total Split (%)	45.5%	45.5%	14.8%	60.3%	39.7%	39.7%
Maximum Green (s)	33.2	33.2	10.0	46.2	28.8	28.8
Yellow Time (s)	4.1	4.1	3.0	4.1	4.1	4.1
All-Red Time (s)	2.7	2.7	0.0	2.7	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	3.0	6.8	6.1	6.1
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	C-Max	C-Max
Walk Time (s)	10.0	10.0		10.0	8.0	8.0
Flash Dont Walk (s)	16.0	16.0		16.0	12.0	12.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	23.3	23.3	37.1	33.3	41.7	41.7
Actuated g/C Ratio	0.27	0.27	0.42	0.38	0.47	0.47
v/c Ratio	0.73	0.36	0.34	0.55	0.31	0.23
Control Delay	38.2	5.7	16.0	23.2	18.7	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.2	5.7	16.0	23.2	18.7	6.9
LOS	D	A	B	C	B	A
Approach Delay	26.4			21.4	13.8	
Approach LOS	C			C	B	

Intersection Summary

Area Type: Other

Cycle Length: 87.9

Actuated Cycle Length: 87.9

Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 21.0

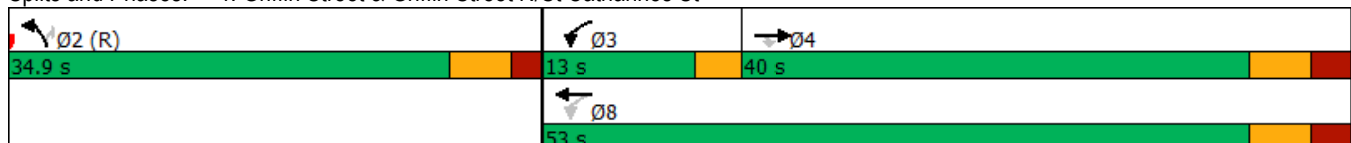
Intersection LOS: C

Intersection Capacity Utilization 51.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: Griffin Street & Griffin Street N/St Catharines St



HCM Unsignalized Intersection Capacity Analysis

1: Wade Road N & West Street

2025 Future Total PM Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	497	49	30	360	26	22
Future Volume (Veh/h)	497	49	30	360	26	22
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	540	53	33	391	28	24
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			593		1024	566
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			593		1024	566
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		89	95
cM capacity (veh/h)			983		252	523
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	593	424	52			
Volume Left	0	33	28			
Volume Right	53	0	24			
cSH	1700	983	331			
Volume to Capacity	0.35	0.03	0.16			
Queue Length 95th (m)	0.0	0.8	4.2			
Control Delay (s)	0.0	1.0	17.9			
Lane LOS		A	C			
Approach Delay (s)	0.0	1.0	17.9			
Approach LOS			C			
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			57.5%		ICU Level of Service	
					B	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis2: Griffin Street N/Station Street & West Street

2025 Future Total PM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	48	472	353	218	250	38
Future Volume (Veh/h)	48	472	353	218	250	38
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	52	513	384	237	272	41
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)	2					
Median type				None	None	
Median storage veh						
Upstream signal (m)	166					
pX, platoon unblocked						
vC, conflicting volume	1298	292	272			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1298	292	272			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	59	31	70			
cM capacity (veh/h)	125	747	1291			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	565	384	237	313		
Volume Left	52	384	0	0		
Volume Right	513	0	0	41		
cSH	822	1291	1700	1700		
Volume to Capacity	0.69	0.30	0.14	0.18		
Queue Length 95th (m)	42.6	9.5	0.0	0.0		
Control Delay (s)	22.7	9.0	0.0	0.0		
Lane LOS	C	A				
Approach Delay (s)	22.7	5.5		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay			10.9			
Intersection Capacity Utilization			55.2%	ICU Level of Service	B	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis3: Griffin Street N & McMurchie Lane

2025 Future Total PM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	4	6	582	755	11
Future Volume (Veh/h)	3	4	6	582	755	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	4	7	633	821	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				59		
pX, platoon unblocked	0.84					
vC, conflicting volume	1474	827	833			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1469	827	833			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	99			
cM capacity (veh/h)	117	371	800			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	7	640	833			
Volume Left	3	7	0			
Volume Right	4	0	12			
cSH	192	800	1700			
Volume to Capacity	0.04	0.01	0.49			
Queue Length 95th (m)	0.9	0.2	0.0			
Control Delay (s)	24.4	0.2	0.0			
Lane LOS	C	A				
Approach Delay (s)	24.4	0.2	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			53.9%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings

2025 Future Total PM Peak Hour

4: Griffin Street & Griffin Street N/St Catharines St

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	514	278	222	411	182	147
Future Volume (vph)	514	278	222	411	182	147
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)		30.0	20.0		0.0	15.0
Storage Lanes		1	1		1	1
Taper Length (m)			15.0		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1735	1475	1648	1735	1648	1475
Flt Permitted			0.210		0.950	
Satd. Flow (perm)	1735	1475	364	1735	1648	1475
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		202				131
Link Speed (k/h)	50			50	50	
Link Distance (m)	59.2			69.0	143.2	
Travel Time (s)	4.3			5.0	10.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	559	302	241	447	198	160
Shared Lane Traffic (%)						
Lane Group Flow (vph)	559	302	241	447	198	160
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1	1	2	1	1
Detector Template	Thru	Right	Left	Thru	Left	Right
Leading Detector (m)	30.5	6.1	6.1	30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1	6.1	1.8	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4	8			2

4: Griffin Street & Griffin Street N/St Catharines St

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	6.0	10.0	8.0	8.0
Minimum Split (s)	32.8	32.8	9.0	32.8	26.1	26.1
Total Split (s)	47.0	47.0	13.0	60.0	27.9	27.9
Total Split (%)	53.5%	53.5%	14.8%	68.3%	31.7%	31.7%
Maximum Green (s)	40.2	40.2	10.0	53.2	21.8	21.8
Yellow Time (s)	4.1	4.1	3.0	4.1	4.1	4.1
All-Red Time (s)	2.7	2.7	0.0	2.7	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	3.0	6.8	6.1	6.1
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	C-Max	C-Max
Walk Time (s)	10.0	10.0		10.0	8.0	8.0
Flash Dont Walk (s)	16.0	16.0		16.0	12.0	12.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	34.6	34.6	51.3	47.5	27.5	27.5
Actuated g/C Ratio	0.39	0.39	0.58	0.54	0.31	0.31
v/c Ratio	0.82	0.43	0.68	0.48	0.38	0.29
Control Delay	33.9	7.7	18.2	13.7	28.4	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.9	7.7	18.2	13.7	28.4	9.0
LOS	C	A	B	B	C	A
Approach Delay	24.7			15.3	19.7	
Approach LOS	C			B	B	

Intersection Summary

Area Type: Other

Cycle Length: 87.9

Actuated Cycle Length: 87.9

Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 20.4

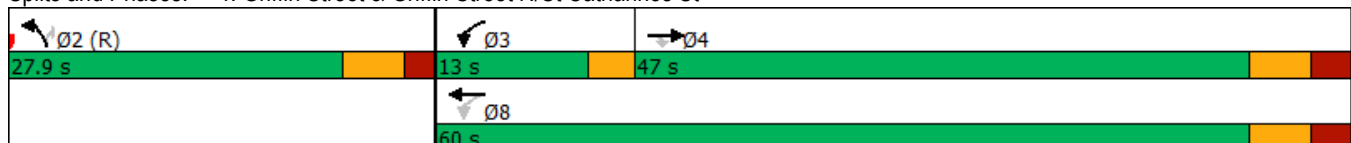
Intersection LOS: C

Intersection Capacity Utilization 67.8%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: Griffin Street & Griffin Street N/St Catharines St



HCM Unsignalized Intersection Capacity Analysis1: Wade Road N & West Street

2030 Future Background AM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰			↰	↰	
Traffic Volume (veh/h)	265	12	3	479	34	9
Future Volume (Veh/h)	265	12	3	479	34	9
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	288	13	3	521	37	10
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			301		822	294
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			301		822	294
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		89	99
cM capacity (veh/h)			1260		343	745
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	301	524	47			
Volume Left	0	3	37			
Volume Right	13	0	10			
cSH	1700	1260	388			
Volume to Capacity	0.18	0.00	0.12			
Queue Length 95th (m)	0.0	0.1	3.1			
Control Delay (s)	0.0	0.1	15.6			
Lane LOS		A	C			
Approach Delay (s)	0.0	0.1	15.6			
Approach LOS			C			
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			40.0%		ICU Level of Service	
					A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis2: Griffin Street N/Station Street & West Street

2030 Future Background AM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	55	221	402	267	164	81
Future Volume (Veh/h)	55	221	402	267	164	81
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	240	437	290	178	88
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)	2					
Median type				None	None	
Median storage veh						
Upstream signal (m)	166					
pX, platoon unblocked						
vC, conflicting volume	1386	222	178			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1386	222	178			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	45	71	69			
cM capacity (veh/h)	108	818	1398			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	300	437	290	266		
Volume Left	60	437	0	0		
Volume Right	240	0	0	88		
cSH	542	1398	1700	1700		
Volume to Capacity	0.55	0.31	0.17	0.16		
Queue Length 95th (m)	25.4	10.3	0.0	0.0		
Control Delay (s)	23.6	8.7	0.0	0.0		
Lane LOS	C	A				
Approach Delay (s)	23.6	5.3		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay			8.4			
Intersection Capacity Utilization			52.2%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis3: Griffin Street N & Mcmurchie Lane

2030 Future Background AM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	7	3	636	451	2
Future Volume (Veh/h)	8	7	3	636	451	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	8	3	691	490	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				59		
pX, platoon unblocked	0.83					
vC, conflicting volume	1188	491	492			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1123	491	492			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	99	100			
cM capacity (veh/h)	188	578	1071			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	17	694	492			
Volume Left	9	3	0			
Volume Right	8	0	2			
cSH	275	1071	1700			
Volume to Capacity	0.06	0.00	0.29			
Queue Length 95th (m)	1.5	0.1	0.0			
Control Delay (s)	18.9	0.1	0.0			
Lane LOS	C	A				
Approach Delay (s)	18.9	0.1	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			48.9%	ICU Level of Service		A
Analysis Period (min)			15			

4: Griffin Street & Griffin Street N/St Catharines St

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	329	187	118	365	237	172
Future Volume (vph)	329	187	118	365	237	172
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)		30.0	20.0		0.0	15.0
Storage Lanes		1	1		1	1
Taper Length (m)			15.0		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1735	1475	1648	1735	1648	1475
Flt Permitted			0.307		0.950	
Satd. Flow (perm)	1735	1475	533	1735	1648	1475
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		185				131
Link Speed (k/h)	50			50	50	
Link Distance (m)	59.2			69.0	143.2	
Travel Time (s)	4.3			5.0	10.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	358	203	128	397	258	187
Shared Lane Traffic (%)						
Lane Group Flow (vph)	358	203	128	397	258	187
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1	1	2	1	1
Detector Template	Thru	Right	Left	Thru	Left	Right
Leading Detector (m)	30.5	6.1	6.1	30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1	6.1	1.8	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4	8			2

4: Griffin Street & Griffin Street N/St Catharines St

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	6.0	10.0	8.0	8.0
Minimum Split (s)	32.8	32.8	9.0	32.8	26.1	26.1
Total Split (s)	40.0	40.0	13.0	53.0	34.9	34.9
Total Split (%)	45.5%	45.5%	14.8%	60.3%	39.7%	39.7%
Maximum Green (s)	33.2	33.2	10.0	46.2	28.8	28.8
Yellow Time (s)	4.1	4.1	3.0	4.1	4.1	4.1
All-Red Time (s)	2.7	2.7	0.0	2.7	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	3.0	6.8	6.1	6.1
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	C-Max	C-Max
Walk Time (s)	10.0	10.0		10.0	8.0	8.0
Flash Dont Walk (s)	16.0	16.0		16.0	12.0	12.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	24.3	24.3	40.2	36.4	38.6	38.6
Actuated g/C Ratio	0.28	0.28	0.46	0.41	0.44	0.44
v/c Ratio	0.75	0.38	0.36	0.55	0.36	0.26
Control Delay	38.2	6.3	15.2	21.7	20.4	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.2	6.3	15.2	21.7	20.4	7.9
LOS	D	A	B	C	C	A
Approach Delay	26.7			20.1	15.2	
Approach LOS	C			C	B	

Intersection Summary

Area Type: Other

Cycle Length: 87.9

Actuated Cycle Length: 87.9

Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 21.1

Intersection LOS: C

Intersection Capacity Utilization 54.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: Griffin Street & Griffin Street N/St Catharines St

 Ø2 (R)	 Ø3	 Ø4
34.9 s	13 s	40 s
	 Ø8	
	53 s	

HCM Unsignalized Intersection Capacity Analysis

1: Wade Road N & West Street

2030 Future Background PM Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	543	39	10	395	22	6
Future Volume (Veh/h)	543	39	10	395	22	6
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	590	42	11	429	24	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			632		1062	611
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			632		1062	611
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		90	99
cM capacity (veh/h)			951		245	494
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	632	440	31			
Volume Left	0	11	24			
Volume Right	42	0	7			
cSH	1700	951	276			
Volume to Capacity	0.37	0.01	0.11			
Queue Length 95th (m)	0.0	0.3	2.8			
Control Delay (s)	0.0	0.4	19.7			
Lane LOS		A	C			
Approach Delay (s)	0.0	0.4	19.7			
Approach LOS			C			
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			43.6%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis2: Griffin Street N/Station Street & West Street

2030 Future Background PM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	50	501	367	240	269	40
Future Volume (Veh/h)	50	501	367	240	269	40
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	545	399	261	292	43
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)	2					
Median type				None	None	
Median storage (veh)						
Upstream signal (m)	166					
pX, platoon unblocked						
vC, conflicting volume	1372	314	292			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1372	314	292			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	51	25	69			
cM capacity (veh/h)	110	727	1270			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	599	399	261	335		
Volume Left	54	399	0	0		
Volume Right	545	0	0	43		
cSH	799	1270	1700	1700		
Volume to Capacity	0.75	0.31	0.15	0.20		
Queue Length 95th (m)	53.4	10.3	0.0	0.0		
Control Delay (s)	27.1	9.1	0.0	0.0		
Lane LOS	D	A				
Approach Delay (s)	27.1	5.5		0.0		
Approach LOS	D					
Intersection Summary						
Average Delay			12.5			
Intersection Capacity Utilization			58.4%	ICU Level of Service	B	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis3: Griffin Street N & Mcmurchie Lane

2030 Future Background PM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	4	6	619	811	7
Future Volume (Veh/h)	3	4	6	619	811	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	4	7	673	882	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				59		
pX, platoon unblocked	0.83					
vC, conflicting volume	1573	886	890			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1588	886	890			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	99			
cM capacity (veh/h)	98	343	761			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	7	680	890			
Volume Left	3	7	0			
Volume Right	4	0	8			
cSH	165	761	1700			
Volume to Capacity	0.04	0.01	0.52			
Queue Length 95th (m)	1.0	0.2	0.0			
Control Delay (s)	27.7	0.2	0.0			
Lane LOS	D	A				
Approach Delay (s)	27.7	0.2	0.0			
Approach LOS	D					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization		56.8%		ICU Level of Service		B
Analysis Period (min)		15				

Lanes, Volumes, Timings

2030 Future Background PM Peak Hour

4: Griffin Street & Griffin Street N/St Catharines St

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	560	292	239	441	190	158
Future Volume (vph)	560	292	239	441	190	158
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)		30.0	20.0		0.0	15.0
Storage Lanes		1	1		1	1
Taper Length (m)			15.0		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1735	1475	1648	1735	1648	1475
Flt Permitted			0.183		0.950	
Satd. Flow (perm)	1735	1475	317	1735	1648	1475
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		194				135
Link Speed (k/h)	50			50	50	
Link Distance (m)	59.2			69.0	143.2	
Travel Time (s)	4.3			5.0	10.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	609	317	260	479	207	172
Shared Lane Traffic (%)						
Lane Group Flow (vph)	609	317	260	479	207	172
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1	1	2	1	1
Detector Template	Thru	Right	Left	Thru	Left	Right
Leading Detector (m)	30.5	6.1	6.1	30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1	6.1	1.8	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4	8			2

4: Griffin Street & Griffin Street N/St Catharines St

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	6.0	10.0	8.0	8.0
Minimum Split (s)	32.8	32.8	9.0	32.8	26.1	26.1
Total Split (s)	47.0	47.0	13.0	60.0	27.9	27.9
Total Split (%)	53.5%	53.5%	14.8%	68.3%	31.7%	31.7%
Maximum Green (s)	40.2	40.2	10.0	53.2	21.8	21.8
Yellow Time (s)	4.1	4.1	3.0	4.1	4.1	4.1
All-Red Time (s)	2.7	2.7	0.0	2.7	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	3.0	6.8	6.1	6.1
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	C-Max	C-Max
Walk Time (s)	10.0	10.0		10.0	8.0	8.0
Flash Dont Walk (s)	16.0	16.0		16.0	12.0	12.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	36.2	36.2	52.9	49.1	25.9	25.9
Actuated g/C Ratio	0.41	0.41	0.60	0.56	0.29	0.29
v/c Ratio	0.85	0.44	0.76	0.49	0.43	0.33
Control Delay	35.7	8.3	25.1	13.2	30.1	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.7	8.3	25.1	13.2	30.1	9.9
LOS	D	A	C	B	C	A
Approach Delay	26.3			17.4	20.9	
Approach LOS	C			B	C	

Intersection Summary

Area Type: Other

Cycle Length: 87.9

Actuated Cycle Length: 87.9

Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 22.1

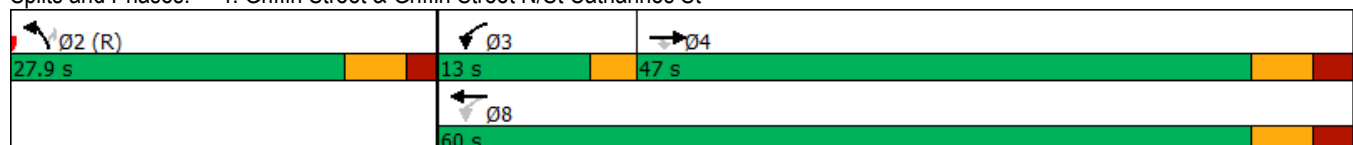
Intersection LOS: C

Intersection Capacity Utilization 71.9%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: Griffin Street & Griffin Street N/St Catharines St



HCM Unsignalized Intersection Capacity Analysis1: Wade Road N & West Street

2030 Future Total AM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰			↰	↰	
Traffic Volume (veh/h)	266	14	10	484	44	32
Future Volume (Veh/h)	266	14	10	484	44	32
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	289	15	11	526	48	35
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			304		844	296
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			304		844	296
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		85	95
cM capacity (veh/h)			1257		330	743
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	304	537	83			
Volume Left	0	11	48			
Volume Right	15	0	35			
cSH	1700	1257	431			
Volume to Capacity	0.18	0.01	0.19			
Queue Length 95th (m)	0.0	0.2	5.3			
Control Delay (s)	0.0	0.3	15.3			
Lane LOS		A	C			
Approach Delay (s)	0.0	0.3	15.3			
Approach LOS						
C						
Intersection Summary						
Average Delay						
			1.5			
Intersection Capacity Utilization			47.8%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis2: Griffin Street N/Station Street & West Street

2030 Future Total AM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	62	239	413	271	166	82
Future Volume (Veh/h)	62	239	413	271	166	82
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	67	260	449	295	180	89
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)	2					
Median type				None	None	
Median storage veh						
Upstream signal (m)	166					
pX, platoon unblocked						
vC, conflicting volume	1418	224	180			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1418	224	180			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	35	68	68			
cM capacity (veh/h)	102	815	1396			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	327	449	295	269		
Volume Left	67	449	0	0		
Volume Right	260	0	0	89		
cSH	445	1396	1700	1700		
Volume to Capacity	0.73	0.32	0.17	0.16		
Queue Length 95th (m)	45.1	10.7	0.0	0.0		
Control Delay (s)	32.4	8.8	0.0	0.0		
Lane LOS	D	A				
Approach Delay (s)	32.4	5.3		0.0		
Approach LOS	D					
Intersection Summary						
Average Delay			10.8			
Intersection Capacity Utilization			53.5%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis3: Griffin Street N & Mcmurchie Lane

2030 Future Total AM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	7	3	651	471	3
Future Volume (Veh/h)	8	7	3	651	471	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	8	3	708	512	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				59		
pX, platoon unblocked	0.83					
vC, conflicting volume	1228	514	515			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1171	514	515			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	99	100			
cM capacity (veh/h)	176	561	1051			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	17	711	515			
Volume Left	9	3	0			
Volume Right	8	0	3			
cSH	260	1051	1700			
Volume to Capacity	0.07	0.00	0.30			
Queue Length 95th (m)	1.6	0.1	0.0			
Control Delay (s)	19.8	0.1	0.0			
Lane LOS	C	A				
Approach Delay (s)	19.8	0.1	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization		49.8%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings

2030 Future Total AM Peak Hour

4: Griffin Street & Griffin Street N/St Catharines St

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	339	196	120	368	249	178
Future Volume (vph)	339	196	120	368	249	178
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)		30.0	20.0		0.0	15.0
Storage Lanes		1	1		1	1
Taper Length (m)			15.0		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1735	1475	1648	1735	1648	1475
Flt Permitted			0.300		0.950	
Satd. Flow (perm)	1735	1475	520	1735	1648	1475
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		188				129
Link Speed (k/h)	50			50	50	
Link Distance (m)	59.2			69.0	143.2	
Travel Time (s)	4.3			5.0	10.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	368	213	130	400	271	193
Shared Lane Traffic (%)						
Lane Group Flow (vph)	368	213	130	400	271	193
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1	1	2	1	1
Detector Template	Thru	Right	Left	Thru	Left	Right
Leading Detector (m)	30.5	6.1	6.1	30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1	6.1	1.8	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4	8			2

4: Griffin Street & Griffin Street N/St Catharines St

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	6.0	10.0	8.0	8.0
Minimum Split (s)	32.8	32.8	9.0	32.8	26.1	26.1
Total Split (s)	40.0	40.0	13.0	53.0	34.9	34.9
Total Split (%)	45.5%	45.5%	14.8%	60.3%	39.7%	39.7%
Maximum Green (s)	33.2	33.2	10.0	46.2	28.8	28.8
Yellow Time (s)	4.1	4.1	3.0	4.1	4.1	4.1
All-Red Time (s)	2.7	2.7	0.0	2.7	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	3.0	6.8	6.1	6.1
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	C-Max	C-Max
Walk Time (s)	10.0	10.0		10.0	8.0	8.0
Flash Dont Walk (s)	16.0	16.0		16.0	12.0	12.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	24.8	24.8	40.6	36.8	38.2	38.2
Actuated g/C Ratio	0.28	0.28	0.46	0.42	0.43	0.43
v/c Ratio	0.75	0.39	0.37	0.55	0.38	0.27
Control Delay	38.2	6.7	15.1	21.3	21.1	8.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.2	6.7	15.1	21.3	21.1	8.5
LOS	D	A	B	C	C	A
Approach Delay	26.6			19.8	15.8	
Approach LOS	C			B	B	

Intersection Summary

Area Type: Other

Cycle Length: 87.9

Actuated Cycle Length: 87.9

Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 21.1

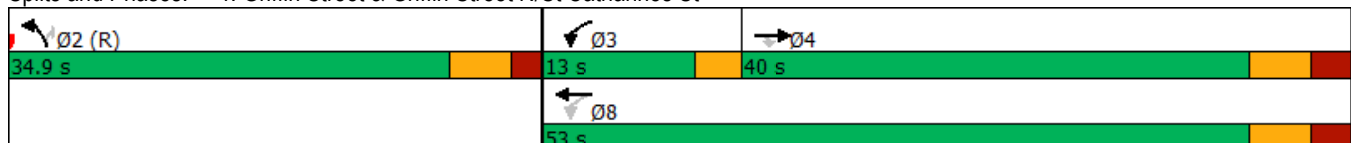
Intersection LOS: C

Intersection Capacity Utilization 55.7%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 4: Griffin Street & Griffin Street N/St Catharines St



HCM Unsignalized Intersection Capacity Analysis

1: Wade Road N & West Street

2030 Future Total PM Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	549	49	30	398	26	22
Future Volume (Veh/h)	549	49	30	398	26	22
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	597	53	33	433	28	24
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			650		1122	624
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			650		1122	624
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		87	95
cM capacity (veh/h)			936		220	486
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	650	466	52			
Volume Left	0	33	28			
Volume Right	53	0	24			
cSH	1700	936	294			
Volume to Capacity	0.38	0.04	0.18			
Queue Length 95th (m)	0.0	0.8	4.8			
Control Delay (s)	0.0	1.0	19.9			
Lane LOS		A	C			
Approach Delay (s)	0.0	1.0	19.9			
Approach LOS			C			
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			59.6%	ICU Level of Service		B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis2: Griffin Street N/Station Street & West Street

2030 Future Total PM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	53	520	388	242	276	42
Future Volume (Veh/h)	53	520	388	242	276	42
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	58	565	422	263	300	46
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		2				
Median type				None	None	
Median storage veh						
Upstream signal (m)				166		
pX, platoon unblocked						
vC, conflicting volume	1430	323	300			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1430	323	300			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	41	21	67			
cM capacity (veh/h)	99	718	1261			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	623	422	263	346		
Volume Left	58	422	0	0		
Volume Right	565	0	0	46		
cSH	792	1261	1700	1700		
Volume to Capacity	0.79	0.33	0.15	0.20		
Queue Length 95th (m)	61.0	11.3	0.0	0.0		
Control Delay (s)	31.3	9.3	0.0	0.0		
Lane LOS	D	A				
Approach Delay (s)	31.3	5.7		0.0		
Approach LOS	D					
Intersection Summary						
Average Delay		14.2				
Intersection Capacity Utilization		60.2%		ICU Level of Service		B
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis3: Griffin Street N & McMurchie Lane

2030 Future Total PM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	4	6	641	833	11
Future Volume (Veh/h)	3	4	6	641	833	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	4	7	697	905	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				59		
pX, platoon unblocked	0.83					
vC, conflicting volume	1622	911	917			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1648	911	917			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	99			
cM capacity (veh/h)	89	332	744			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	7	704	917			
Volume Left	3	7	0			
Volume Right	4	0	12			
cSH	153	744	1700			
Volume to Capacity	0.05	0.01	0.54			
Queue Length 95th (m)	1.1	0.2	0.0			
Control Delay (s)	29.6	0.3	0.0			
Lane LOS	D	A				
Approach Delay (s)	29.6	0.3	0.0			
Approach LOS	D					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			58.3%	ICU Level of Service		B
Analysis Period (min)			15			

Lanes, Volumes, Timings

2030 Future Total PM Peak Hour

4: Griffin Street & Griffin Street N/St Catharines St

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	567	307	245	453	200	162
Future Volume (vph)	567	307	245	453	200	162
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)		30.0	20.0		0.0	15.0
Storage Lanes		1	1		1	1
Taper Length (m)			15.0		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1735	1475	1648	1735	1648	1475
Flt Permitted			0.181		0.950	
Satd. Flow (perm)	1735	1475	314	1735	1648	1475
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		202				131
Link Speed (k/h)	50			50	50	
Link Distance (m)	59.2			69.0	143.2	
Travel Time (s)	4.3			5.0	10.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	616	334	266	492	217	176
Shared Lane Traffic (%)						
Lane Group Flow (vph)	616	334	266	492	217	176
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1	1	2	1	1
Detector Template	Thru	Right	Left	Thru	Left	Right
Leading Detector (m)	30.5	6.1	6.1	30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1	6.1	1.8	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4	8			2

4: Griffin Street & Griffin Street N/St Catharines St

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	6.0	10.0	8.0	8.0
Minimum Split (s)	32.8	32.8	9.0	32.8	26.1	26.1
Total Split (s)	47.0	47.0	13.0	60.0	27.9	27.9
Total Split (%)	53.5%	53.5%	14.8%	68.3%	31.7%	31.7%
Maximum Green (s)	40.2	40.2	10.0	53.2	21.8	21.8
Yellow Time (s)	4.1	4.1	3.0	4.1	4.1	4.1
All-Red Time (s)	2.7	2.7	0.0	2.7	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	3.0	6.8	6.1	6.1
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	C-Max	C-Max
Walk Time (s)	10.0	10.0		10.0	8.0	8.0
Flash Dont Walk (s)	16.0	16.0		16.0	12.0	12.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	36.5	36.5	53.3	49.5	25.5	25.5
Actuated g/C Ratio	0.42	0.42	0.61	0.56	0.29	0.29
v/c Ratio	0.86	0.46	0.78	0.50	0.45	0.34
Control Delay	35.7	8.5	26.6	13.2	30.8	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.7	8.5	26.6	13.2	30.8	10.7
LOS	D	A	C	B	C	B
Approach Delay	26.2			17.9	21.8	
Approach LOS	C			B	C	

Intersection Summary

Area Type: Other

Cycle Length: 87.9

Actuated Cycle Length: 87.9

Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 22.4

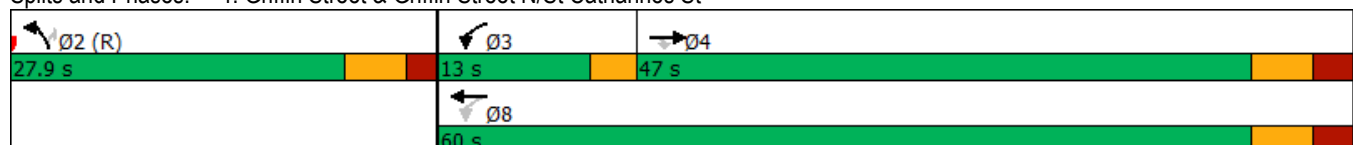
Intersection LOS: C

Intersection Capacity Utilization 73.3%

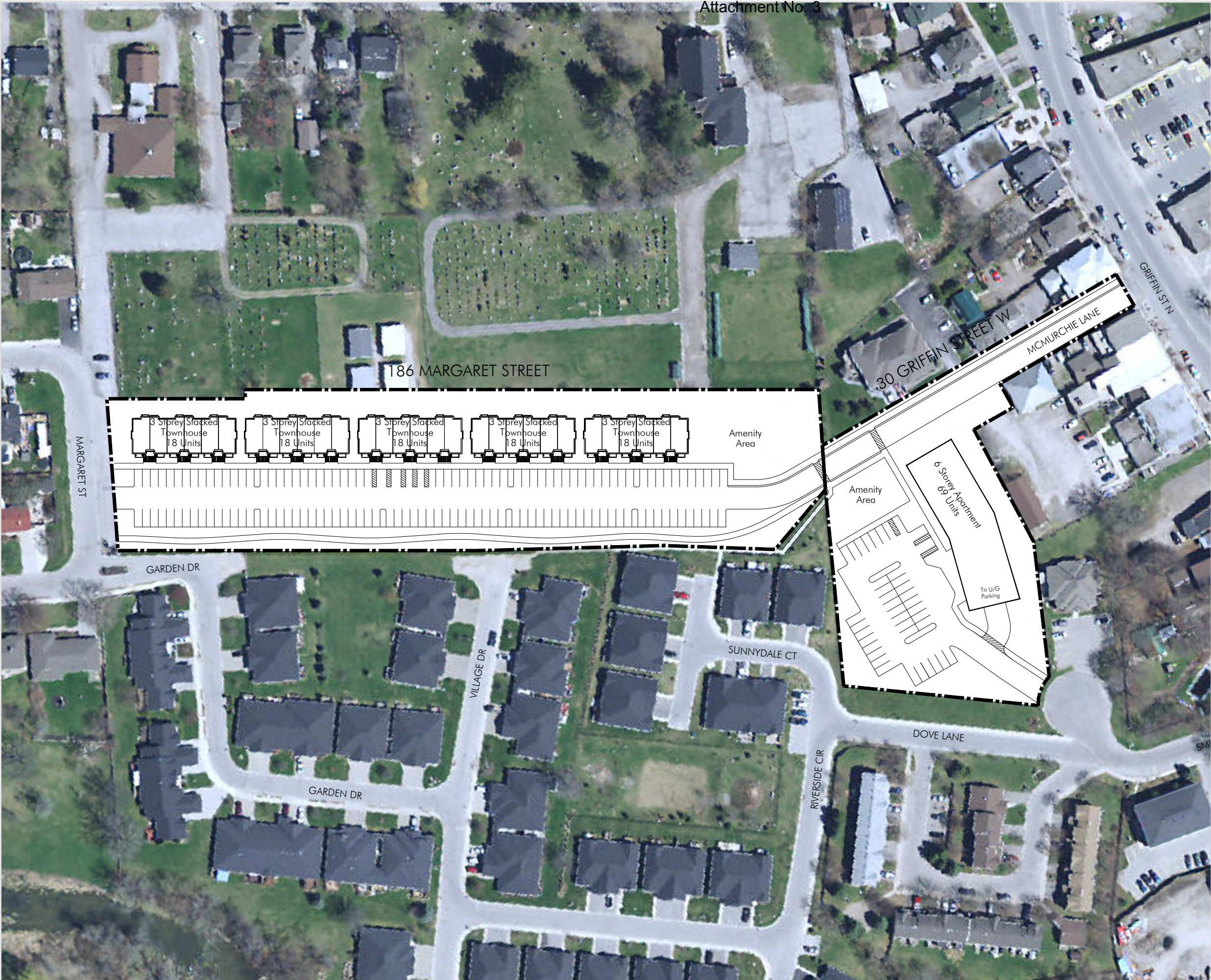
ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 4: Griffin Street & Griffin Street N/St Catharines St



FIGURES



Concept Plan

St. Martin School
186 Margaret St
Township of West Lincoln

Subject Lands

ZONING: RM3 & RH

186 Margaret Street

Area: ±1.264 ha
Units: 90
Density: 71.2 upha

Parking Required: 1.5 spaces/unit: 135
4% accessible spaces: 5

Parking Provided: 1.5 spaces/unit: 135
4% accessible spaces: 5

30 Griffin Street W

Area: ±0.719 ha
Units: 69
Density: 95.9 upha

Parking Required: 1.5 spaces/unit: 86
4% accessible spaces: 4

Parking Provided: 1.5 spaces/unit: 86
36 Surface
50 Underground
4% accessible spaces:
4 Surface

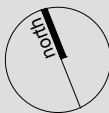
Notes:
SWOOP 2015 Aerial Imagery

Date: January 23, 2020

Scale: 1:1,250

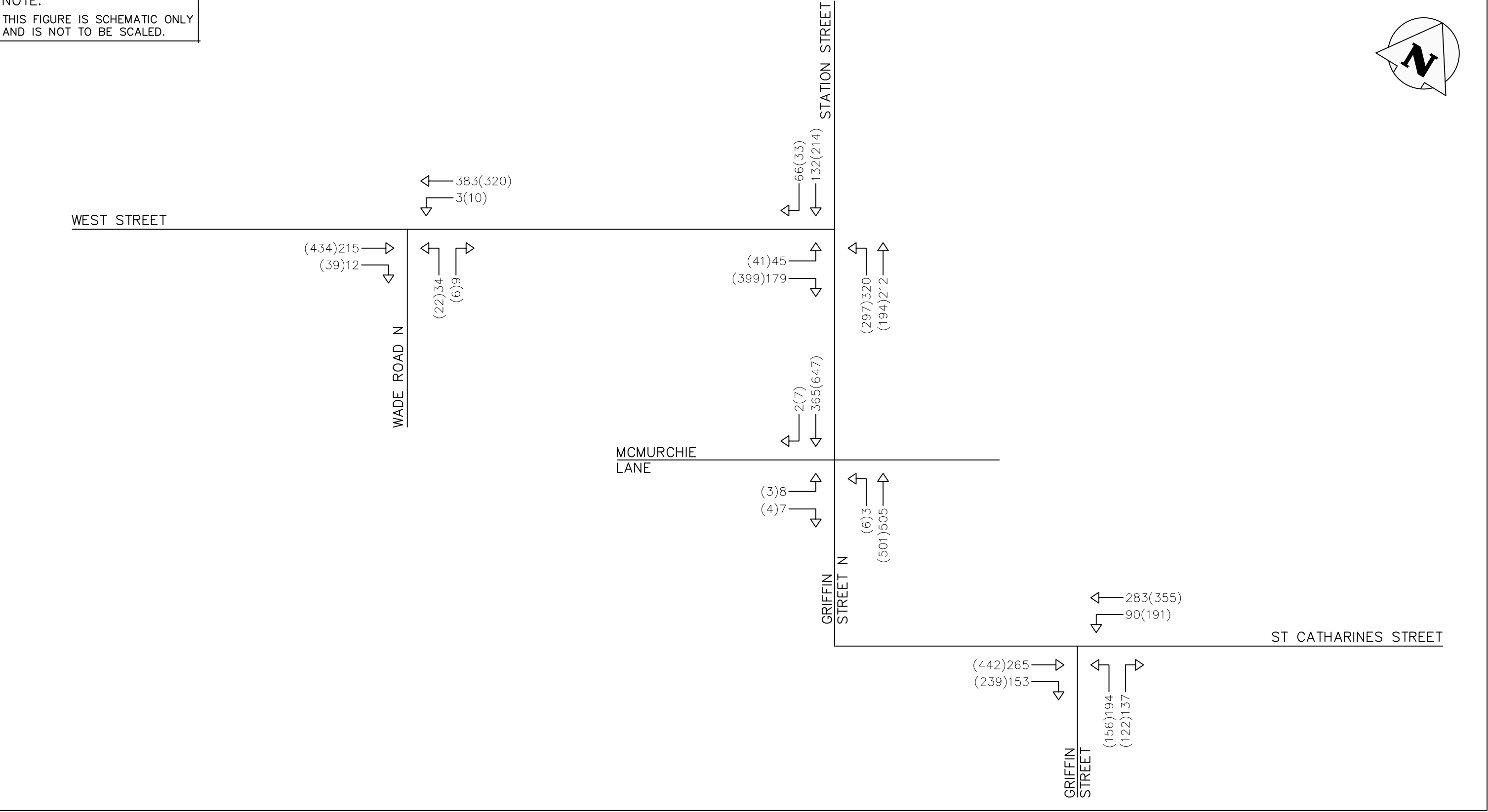
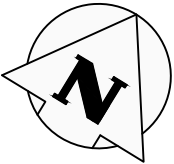
File: 08234V

Drawn: JB



K:\08234V - SCHOOL SITE CONCEPT PLANS\CP\186 MARGARET
ST\MARGARET_CP_23JAN2020.DWG

NOTE:
THIS FIGURE IS SCHEMATIC ONLY
AND IS NOT TO BE SCALED.



LEGEND:
AM(PM) WEEKDAY AM(PM)
TRIP DISTRIBUTION

186 MARGARET STREET
TOWNSHIP OF WEST LINCOLN

2020 EXISTING TRAFFIC VOLUMES

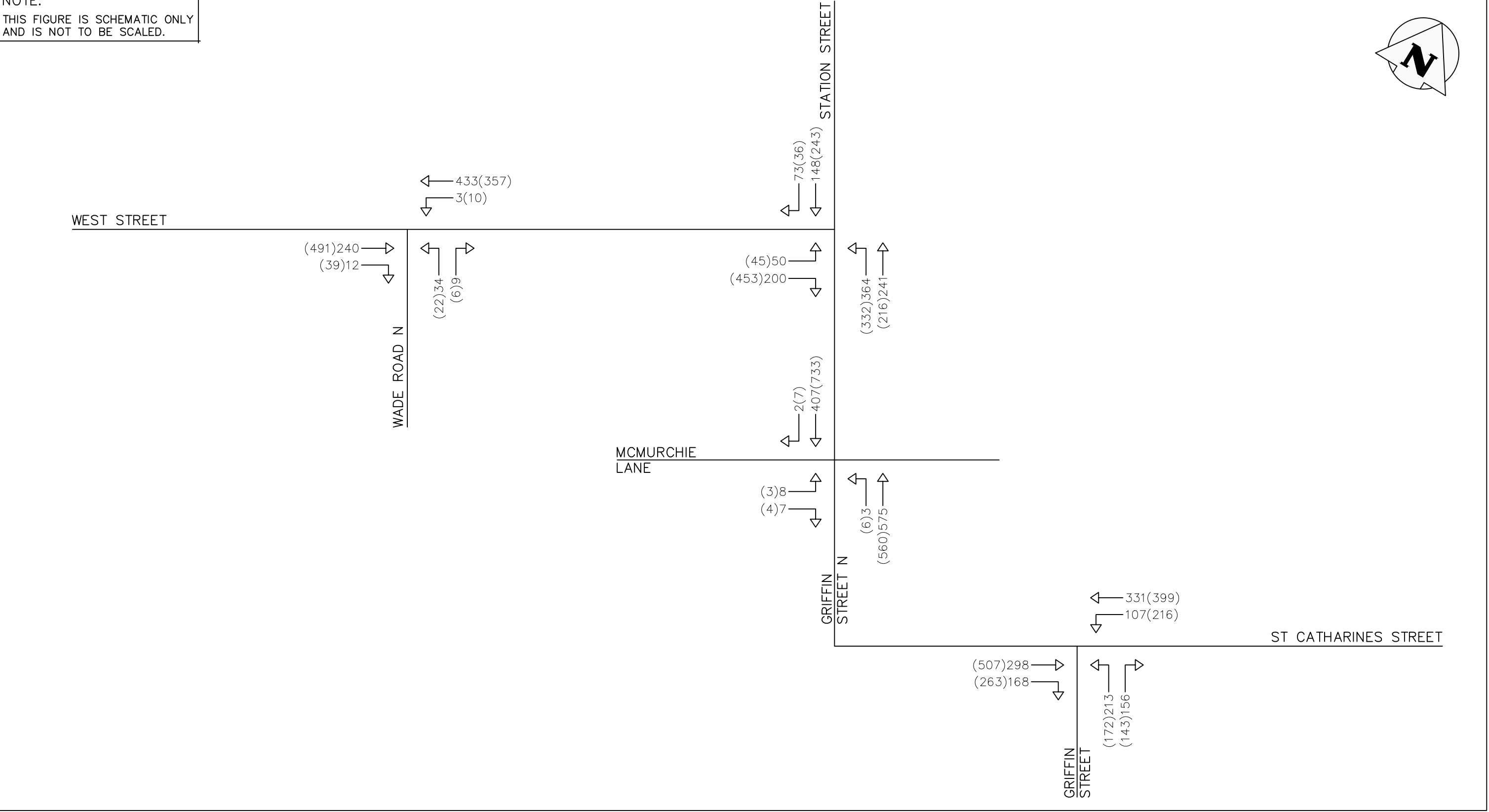
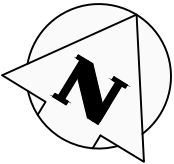


**CROZIER
& ASSOCIATES**
Consulting Engineers

2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON L9T 6P4
905 875-0026 T
905 875-4915 F
WWW.CFCROZIER.CA

Drawn	A.K.	Design	Project No.	529-5575
Check	K.S.	Check	Scale	N.T.S.
			Dwg.	FIG. 02

NOTE:
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AND IS NOT TO BE SCALED.



LEGEND:
AM(PM) WEEKDAY AM(PM)
TRIP DISTRIBUTION

186 MARGARET STREET
TOWNSHIP OF WEST LINCOLN

2025 FUTURE BACKGROUND
TRAFFIC VOLUMES

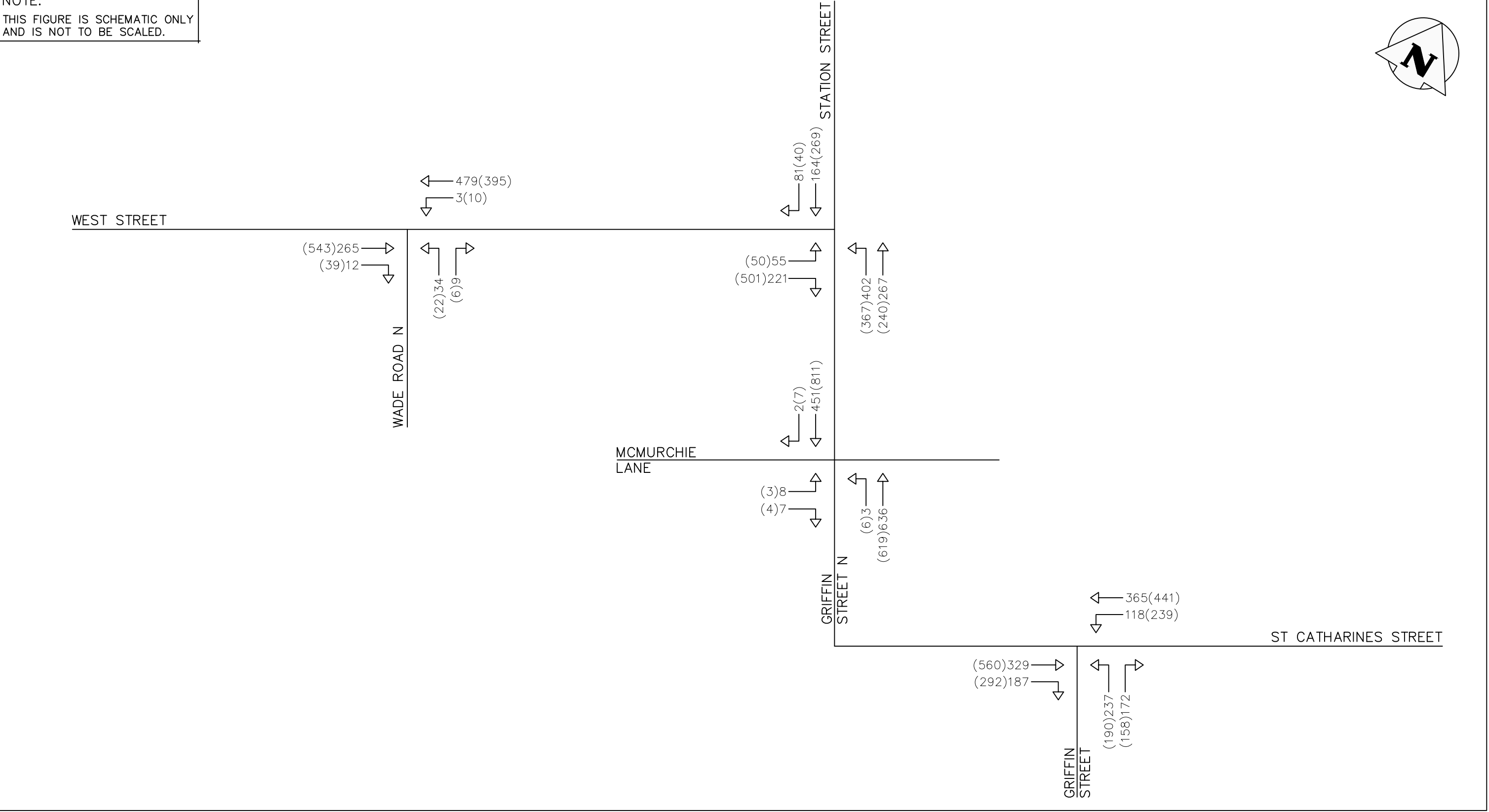
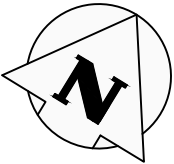


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905 875-4915 F
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Drawn	A.K.	Design	Project No.	529-5575
Check	K.S.	Check	Scale	N.T.S.
			Dwg.	FIG. 03

NOTE:
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LEGEND:
AM(PM) WEEKDAY AM(PM)
TRIP DISTRIBUTION

186 MARGARET STREET
TOWNSHIP OF WEST LINCOLN

2030 FUTURE BACKGROUND
TRAFFIC VOLUMES

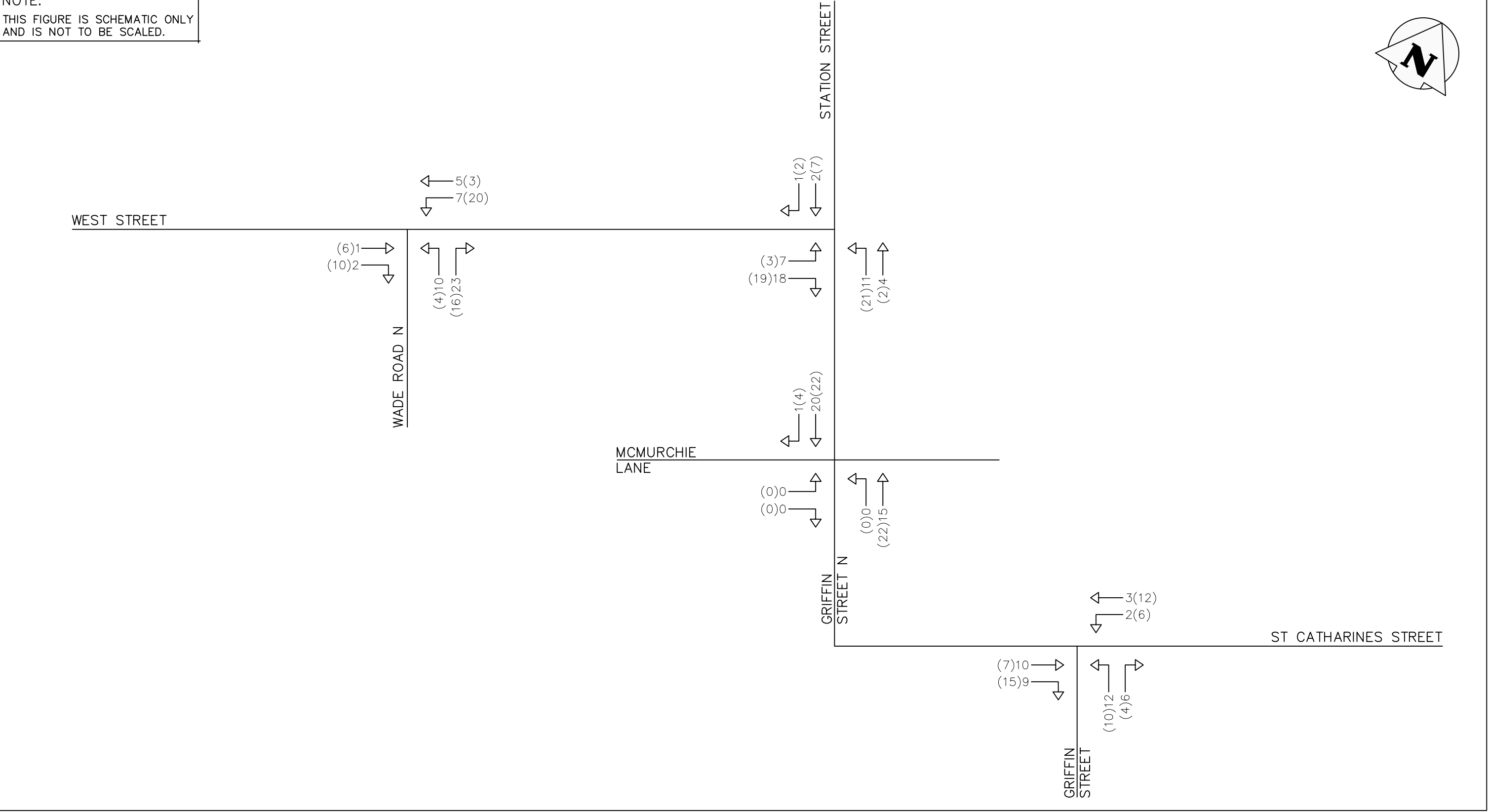
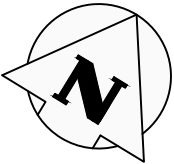


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Drawn	A.K.	Design	Project No.	529-5575
Check	K.S.	Check	Scale	N.T.S.
			Dwg.	FIG. 04

NOTE:
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LEGEND:
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186 MARGARET STREET
TOWNSHIP OF WEST LINCOLN

SITE GENERATED TRIPS

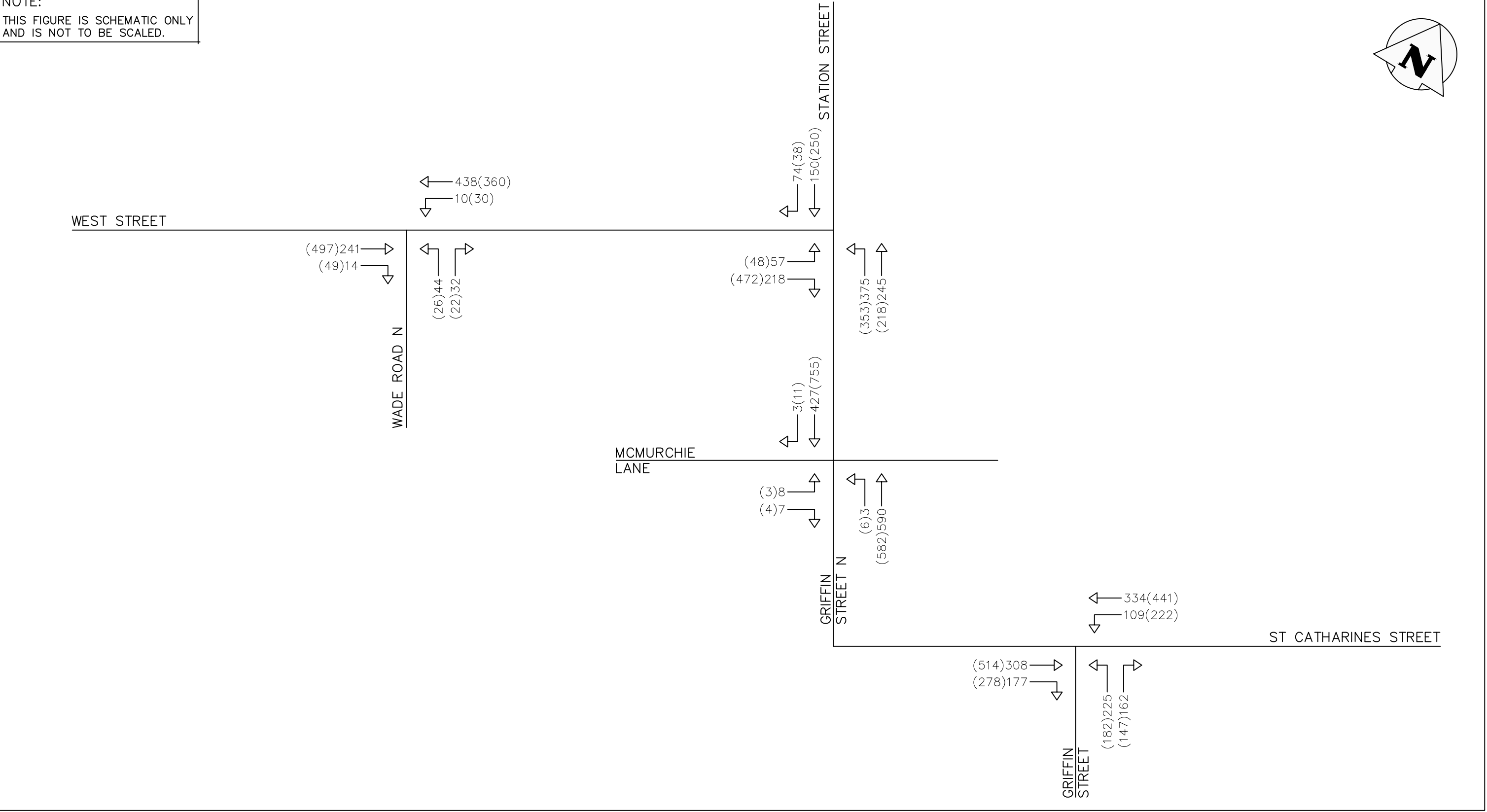
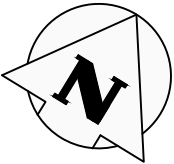


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Drawn	A.K.	Design	Project No.	529-5575
Check	K.S.	Check	Scale	N.T.S.
			Dwg.	FIG. 05

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TRIP DISTRIBUTION

186 MARGARET STREET
TOWNSHIP OF WEST LINCOLN

2025 FUTURE TOTAL
TRAFFIC VOLUMES

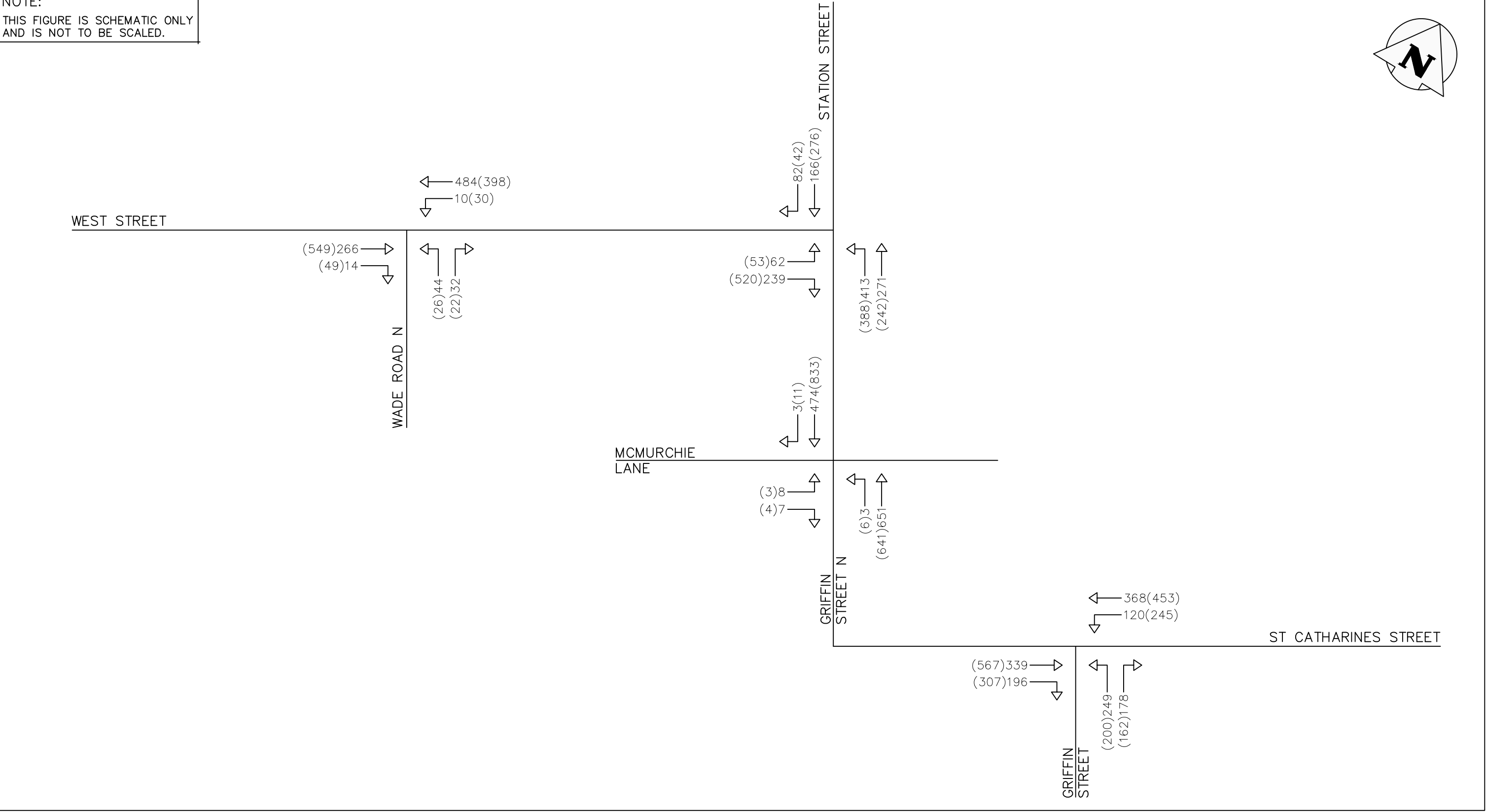
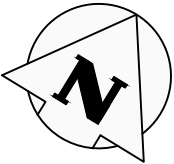


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Drawn	A.K.	Design	Project No.	529-5575
Check	K.S.	Check	Scale	N.T.S.
			Dwg.	FIG. 06

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186 MARGARET STREET
TOWNSHIP OF WEST LINCOLN

2030 FUTURE TOTAL
TRAFFIC VOLUMES



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Drawn	A.K.	Design	Project No.	529-5575
Check	K.S.	Check	Scale	N.T.S.
			Dwg.	FIG. 07