

**3930 SIXTH CONCESSION
ROAD TOWNHOMES
WINDSOR, ON
TRAFFIC IMPACT BRIEF**

Prepared by:



RC SPENCER ASSOCIATES INC.
Consulting Engineers

Windsor: 800 University Avenue W. - Windsor ON N9A 5R9

Leamington: 18 Talbot Street W. - Leamington ON N8H 1M4

Chatham-Kent: 49 Raleigh Street - Chatham ON N7M 2M6

3930 SIXTH CONCESSION ROAD TOWNHOMES, WINDSOR, ON
TRAFFIC IMPACT BRIEF (OCTOBER 2023)

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INTRODUCTION AND BACKGROUND

A residential townhome development is proposed for 3930 Sixth Concession Road, in Windsor, Ontario; the area plan is illustrated on Figure 1. Sixth Concession Road is a north / south residential collector roadway which runs south from Cabana Road East to North Talbot Road. Provincial Road is an east / west arterial roadway; it branches off from Division Road at the west and continues east, becoming County Road 46. Ducharme Street is an east / west residential collector roadway that begins at Howard Avenue and runs east to Walker Road (County Road 11). Holburn Street is a residential collector roadway that begins at Howard Avenue at the west and ends at Ducharme Street at the east. The study area requested by the City of Windsor, which includes the intersections of Provincial Road, Ducharme Street, and Holburn Street at Sixth Concession Road, is depicted on Figure 2. All other roads within the study area are local roads; they are tee intersections which are stop-controlled on the eastbound approach; no northbound left turns are permitted at any of these four intersections.

The proposed conceptual site plan is illustrated on Figure 3; it consists of 24 townhome units within four buildings. A single access at Ducharme Street is proposed to service the development. Garage and driveway parking spaces are provided for the sixteen stacked townhomes, and eight additional parallel parking spaces are provided for the eight attached townhome units.

The purpose of this traffic impact brief is to evaluate the development's potential impact on area traffic operations, particularly at Sixth Concession Road.

TRAFFIC DATA COLLECTION

As provided in Appendix A, turning movement counts were collected by RC Spencer Associates Inc. on 5 October 2023 for the intersections of Ducharme Street at Sixth Concession Road and Holburn Street at Sixth Concession Road. The City of Windsor provided turning movement counts for the intersection of Provincial Road at Sixth Concession Road; the counts were collected by Ontario Traffic Inc. on 23 March 2021.

METHODOLOGY

The baseline traffic data provided the basis for industry-standard traffic operations analysis; the software package utilized for the analysis (Synchro 11) calculates various parameters of intersection performance, such as level of service (LOS), intersection capacity utilization (ICU), control delay, and queue lengths on individual approaches. The traffic modelling was based on the Highway Capacity Manual (6th Edition).

Signalized level of service results are reported based on the following industry standard:

Level of Service	Average Control Delay (sec/veh)	General Description (Signalized Intersections)
A	≤10	Free Flow
B	>10 - 20	Stable Flow (slight delays)
C	>20 - 35	Stable flow (acceptable delays)
D	>35 - 55	Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	>55 - 80	Unstable flow (intolerable delay)
F	>80	Forced flow (jammed)

Unsignalized level of service results are reported based on the following industry standard:

Level of Service	Average Control Delay (sec/veh)
A	0 - 10
B	>10 - 15
C	>15 - 25
D	>25 - 35
E	>35 - 50
F	>50

TRIP GENERATION AND DISTRIBUTION

Trip generation for the proposed development was estimated from the Institute of Transportation Engineers (ITE) Trip Generation Manual (11th Edition). The dataset's average rate was used instead of the fitted curve because the value of the independent variable is in the lower range of the dataset; the fitted curve equation does not pass through the origin. As recommended by the ITE, only the weekday AM and PM peak hour were explored for the proposed residential land use.

ITE Land Use Code 215 (Single-Family Attached Housing) is the most appropriate and conservative code for the proposed 8 townhome units. Land Use Code 215 provides generation rates of 0.48 trips per unit in the AM peak hour, with 31% entering and 69% exiting, and 0.57 trips per unit in the PM peak hour, with 57% entering and 43% exiting.

ITE Land Use Code 220 Multifamily Housing (Low-Rise) is the most appropriate and conservative code for the proposed 16 stacked townhome units. Land Use Code 220 provides generation rates of 0.40 trips per unit in the AM peak hour, with 24% entering and 76% exiting, and 0.51 trips per unit in the PM peak hour, with 63% entering and 37% exiting.

The details of the trip generation analysis are provided in Appendix B. The total trips generated by the proposed residential uses are estimated to be 3 entering and 7 exiting during the AM peak hour, and 8 entering and 5 exiting during the PM peak hour. To be conservative, all site generated traffic was directed to and from Sixth Concession Road, where it was then distributed according to the percentages of the movements at Ducharme Street, as extracted from the collected turning movement counts.

CAPACITY AND LEVEL OF SERVICE ANALYSIS

Figures 4 to 6 illustrate the “Site Generated Traffic”, “Existing Traffic”, and “Existing + Site Generated Traffic” scenarios for the respective weekday peak hours. Detailed Synchro 11 analysis was carried out with respect to the “Existing Traffic” and “Existing + Site Generated Traffic” scenarios; the resulting reports are provided in Appendix C and are summarized below:

Provincial Road at Sixth Concession Road

The existing signalized intersection of Provincial Road at Sixth Concession Road is comprised of shared right / through lane and a dedicated left turn lane with centre medians on the eastbound and westbound approaches; the southbound approach is comprised of shared right / through lane and a dedicated left turn lane, while the northbound approach is comprised of a through lane, a dedicated left turn lane, and a channelized right-turn lane. Trucks are prohibited on Sixth Concession Road, and on-street parking is prohibited on all legs. The current signal timing plans were applied to all scenarios, but it is anticipated that the signal timings will be updated as part of the planned intersection reconstruction. As reported in Tables 1 and 2, under existing traffic volumes, all approaches operate at good levels of service, and even with the addition of site generated traffic, the corresponding levels of service remain satisfactory.

Table 1: Overall Signalized Intersection Level of Service – Provincial Road at Sixth Concession Road

Scenario	Provincial Road at Sixth Concession Road	
	AM Peak Hour	PM Peak Hour
Existing Traffic	B	C
Existing + Site Generated Traffic	B	C

Table 2: Level of Service by Approach – Provincial Road at Sixth Concession Road

Scenario	Provincial Road at Sixth Concession Road							
	AM Peak Hour				PM Peak Hour			
	E/B	W/B	N/B	S/B	E/B	W/B	N/B	S/B
Existing Traffic	A	A	D	D	B	A	D	D
Existing + Site Generated Traffic	A	A	D	D	B	A	D	D

Ducharme Street at Sixth Concession Road

The existing intersection of Ducharme Street at Sixth Concession Road is stop-controlled on the eastbound and westbound approaches. The eastbound approach consists of a shared left / through / right turn lane, while the westbound approach consists of a shared lane for left and right turning vehicles; however, through movements are prohibited. The northbound approach is comprised of a shared right / through lane; however, left turns are prohibited. The southbound approach is comprised of a shared left / through lane with a channelized right-turn lane. The Sixth Concession-North Talbot Environmental Assessment calls for a future mini roundabout at the intersection of Ducharme Street and Sixth Concession Road, but at the time of this report, it has not been implemented. On-street parking is permitted on both sides of the west leg and on Sixth Concession Road. Despite westbound through movements being prohibited, it was noted that 63 vehicles (including one truck and one bus) performed this maneuver during the eight-hour collection period; one vehicle performed an illegal northbound left turn maneuver during the same eight hours. These illegal movements were not included in the modelling; however, this behaviour confirms that a mini roundabout may be an appropriate traffic control at this location. As reported in Table 3, the addition of site generated traffic will not significantly impact traffic operations at this intersection.

Table 3: Level of Service by Approach – Ducharme Street at Sixth Concession Road

Scenario	Ducharme Street at Sixth Concession Road							
	AM Peak Hour				PM Peak Hour			
	E/B	W/B	N/B	S/B	E/B	W/B	N/B	S/B
Existing Traffic	B	B	A	A	B	B	A	A
Existing + Site Gen. Traffic	B	B	A	A	B	B	A	A

Site Access at Ducharme Street

The proposed tee intersection of the site access at Ducharme Street will be stop-controlled on the southbound approach; each respective approach will be comprised of a single shared lane. Sidewalks and bicycles lanes are provided on both sides of Ducharme Street, and on-street parking is prohibited at this location. As reported in Table 4, the addition of site generated traffic will not significantly impact traffic operations at this intersection.

Table 4: Level of Service by Approach – Site Access at Ducharme Street

Scenario	Site Access at Ducharme Street							
	AM Peak Hour				PM Peak Hour			
	E/B	W/B	N/B	S/B	E/B	W/B	N/B	S/B
Existing + Site Gen. Traffic	A	A	-	A	A	A	-	A

Holburn Street at Sixth Concession Road

The existing all-way stop-controlled intersection of Holburn Street at Sixth Concession Road is comprised of shared lanes on all approaches. Sidewalks are provided on both sides of both legs of Holburn Street; bicycle lanes are provided on both sides of the west leg. On-street parking is permitted on the north side of the east leg only. The levels of service reported in Table 5 suggest that, even with the addition of site generated traffic, the proposed development will not significantly impact traffic operations at this intersection.

Table 5: Level of Service by Approach – Holburn Street at Sixth Concession Road

Scenario	Holburn Street at Sixth Concession Road							
	AM Peak Hour				PM Peak Hour			
	E/B	W/B	N/B	S/B	E/B	W/B	N/B	S/B
Existing Traffic	A	B	B	A	A	B	B	B
Existing + Site Gen. Traffic	A	B	B	A	A	B	B	B

LEFT TURN LANE WARRANTS

Left turn lane warrants were considered for the eastbound approach to the intersection of the site access at Ducharme Street. The speed limit on Ducharme Street is 50 km/h; therefore, the design speed of 60 km/h was chosen to evaluate each traffic scenario. Based on the estimated turning movements in each scenario, left turns in the peak hours are expected to be approximately 2.1% and 5.1% of the eastbound approach volume; therefore, the evaluation referenced the guidelines for 5% left turns. According to the MTO’s references provided in Appendix D, the projected traffic volumes do not warrant a dedicated eastbound left turn lane.

Left turn lane warrants were not examined for the intersection of Ducharme Street at Sixth Concession Road because the Sixth Concession-North Talbot Environmental Assessment calls for a mini roundabout at the intersection of Ducharme Street at Sixth Concession Road.

SIGHT LINE ANALYSIS

As calculated in Appendix E, a sight line analysis was completed for the site access at Ducharme Street (in accordance with the TAC Geometric Design Guide for Canadian Roads – 2017). The speed limit on Ducharme Street is 50 km/h, so a 60 km/h design speed was applied; a passenger car was selected as the design vehicle. Per the TAC, sight lines should be evaluated at 4.4m from the edge of the nearest travelled lane. The minimum intersection sight distance is 125m for the worst-case left turn egress maneuver and 108m for the less-critical right turn egress maneuver.

Based on the sight lines illustrated on Figure 7, it is the engineers' opinion that there is sufficient sight distance for safe egress from the site access; no obstructions were observed within the defined sight triangles.

CONCLUSIONS AND RECOMMENDATIONS

A residential townhome development is proposed for 3930 Sixth Concession Road, in Windsor, Ontario. The development proposal consists of 24 townhome units within four buildings; a single site access (at Ducharme Street) is proposed to service the residential development.

Using recently obtained turning movement counts and applying the best available trip generation and distribution data and methodologies, an analysis was completed to quantify and qualify the potential impact of the proposed development on area traffic operations. Upon completion of the analysis, it was concluded that:

- The existing signalized intersection of Sixth Concession Road at Provincial Road is currently operating at a satisfactory level of service, and even with the addition of site generated traffic, the corresponding levels of service remain satisfactory; within the near future, the City will be implementing geometric and traffic control improvements as part of a planned reconstruction project;
- The existing intersection of Ducharme Street at Sixth Concession Road is expected to operate well, even with the addition of site generated traffic; however, a mini roundabout is proposed at this intersection as part of the already-completed Sixth Concession-North Talbot Environmental Assessment;
- The proposed southbound stop-controlled site access is expected to operate favourably;
- The existing intersection of Holburn Street at Sixth Concession Road is expected to continue operating a good level of service; the addition of site generated traffic will not significantly impact traffic operations at this intersection;
- A left turn lane is not warranted at the proposed site access on Ducharme Street;
- There is sufficient sight distance for safe egress from the Ducharme Street site access.

Therefore, based on the results of the technical work, it is the engineers' opinion that the proposed development will not adversely impact area traffic operations. Geometric / traffic control improvements are not required to accommodate the subject development proposal.

All of which is respectfully submitted,

RC Spencer Associates Inc.



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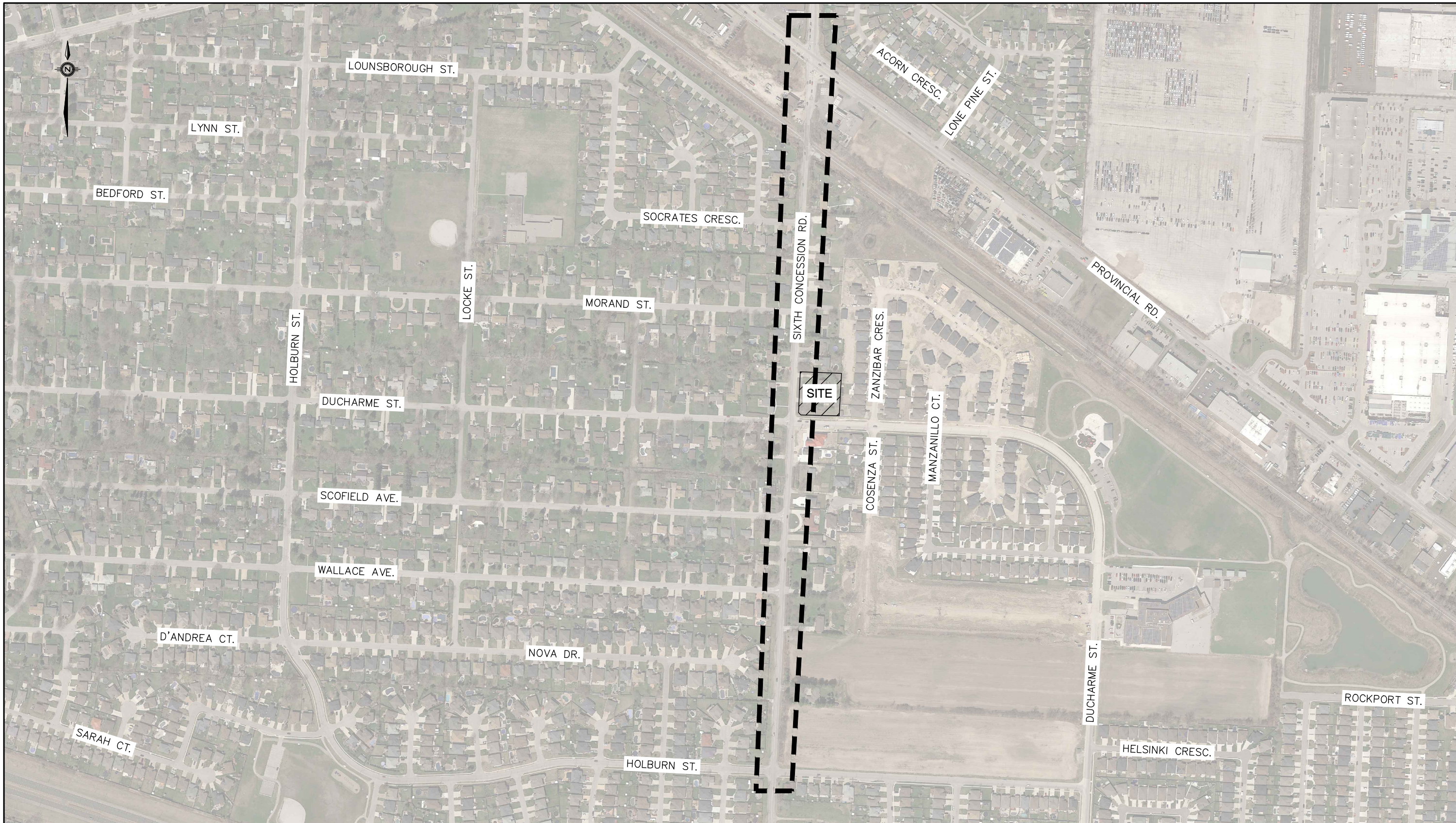


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		<p>Windsor: 200 University Avenue W. - Windsor ON N9A 5R9 Leamington: 18 Talbot Street W. - Leamington ON N8H 1M4 Chatham-Kent: 49 Raleigh Street - Chatham ON N7M 2M6</p>				DESIGN F.C. CHECKED A.D.B. DRAWN F.C.		3930 SIXTH CONCESSION, WINDSOR, ON – BRIEF		PROJECT NO. 23-1502	
				2. UPDATED REPORT FIGURES 20 OCT 2023 N.M. A.D.B.		CHECKED A.D.B.		<h1>AREA PLAN</h1>		FIGURE NO. 1	
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						CHECKED A.D.B.	STUDY AREA		FIGURE NO. 2
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LEGEND

3-Storey Townhouses	Private Amenity Space
3-Storey Townhouses with Additional Dwelling Unit	Landscaped Area
Principal Entrance	Private Amenity Space
Garage Entrance	Lot Boundary
Private Amenity Rooftop Space	

HIGHLIGHTS

Concept Data

Units	Townhouse 'A'	8
	Townhouse 'B'	8
	ADU	8
	TOTAL	24
Bedrooms (By Type)	Townhouse 'A'	3
	Townhouse 'B'	3
	ADU	1
Density		72uph
Height (Max.)		3- Storeys (12.0m)
Parking	Townhouse	2 per unit
	ADU	1 per unit
	Visitor	0
	TOTAL	40
Yard Depth(s)	Front	4.65m
	Interior Side Yard	2.65m
	Exterior Side Yard	3.0m
	Rear	16.5m
Lot Coverage		32%
Landscaped Open Space		42%



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3930 SIXTH CONCESSION, WINDSOR, ON – BRIEF

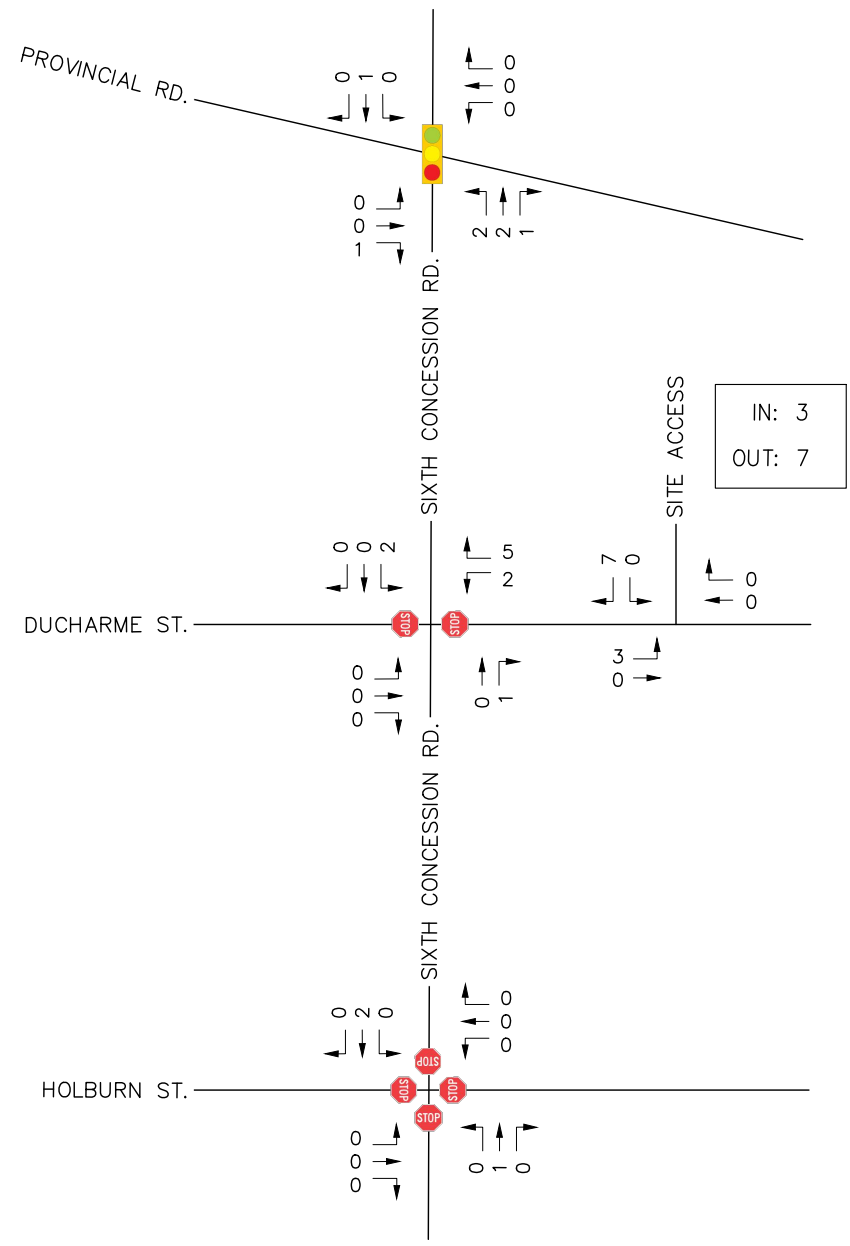
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CONCEPTUAL SITE PLAN

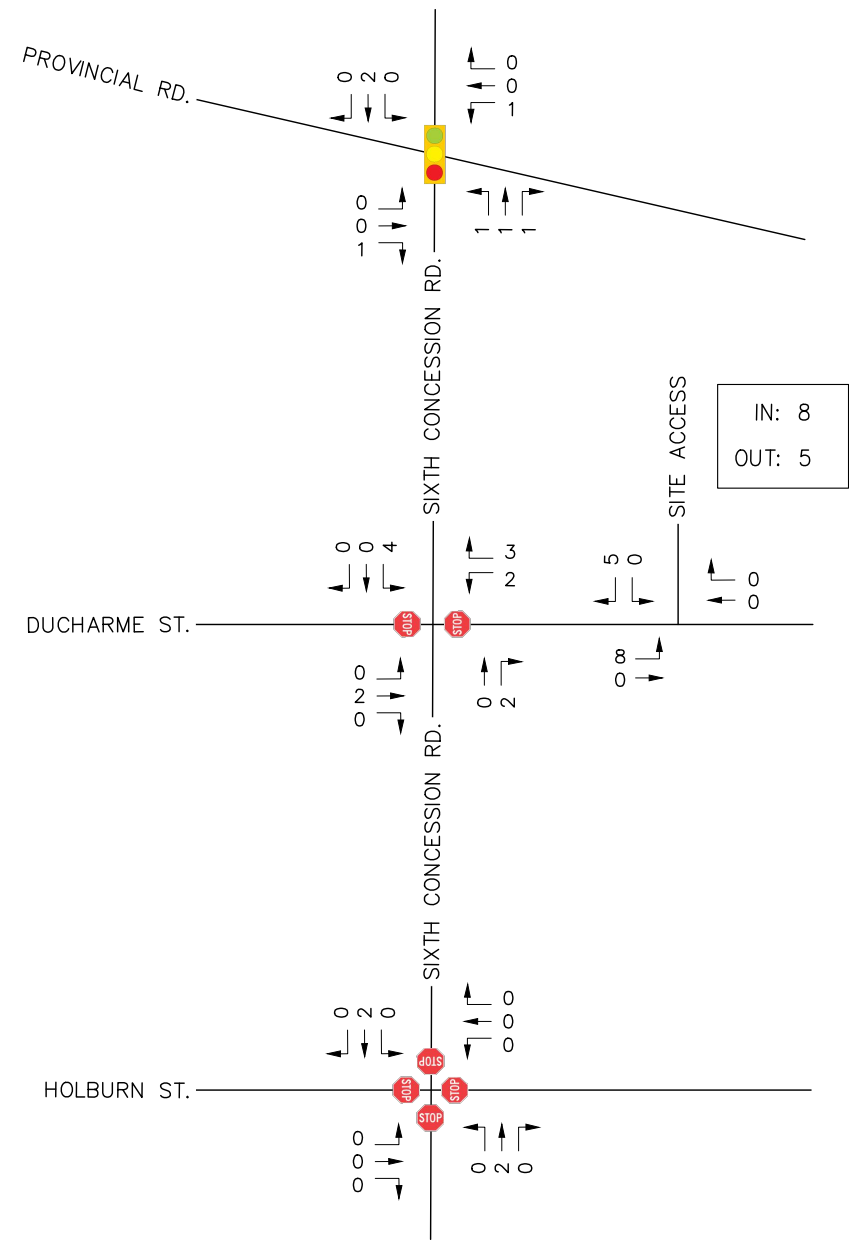
FIGURE NO.
3
OF
7



SITE GENERATED TRAFFIC
(AM PEAK HOUR)



SITE GENERATED TRAFFIC
(PM PEAK HOUR)



Windsor: 200 University Avenue W. - Windsor ON N9A 5R9
Leamington: 18 Talbot Street W. - Leamington ON N8H 1M4
Chatham-Kent: 49 Raleigh Street - Chatham ON N7M 2M6



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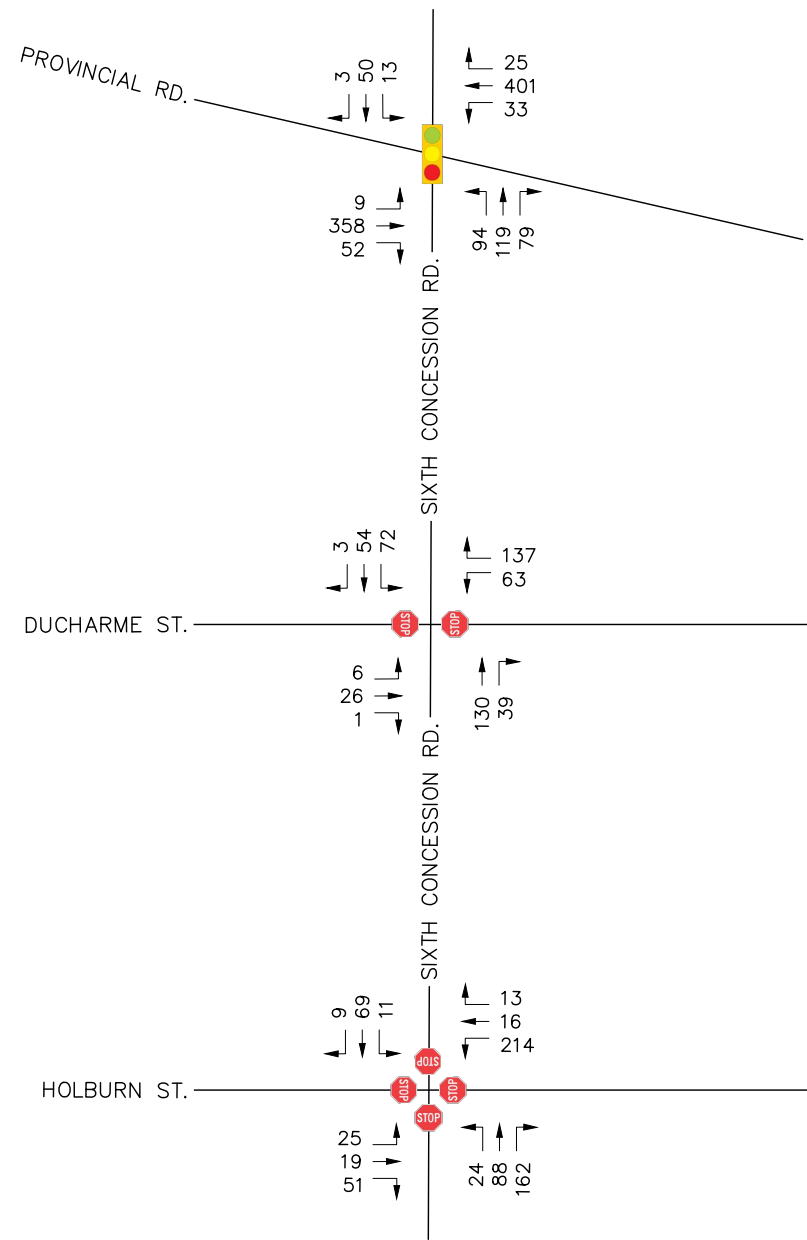
3930 SIXTH CONCESSION, WINDSOR, ON - BRIEF

SITE GENERATED TRAFFIC
(AM/PM PEAK HOUR)

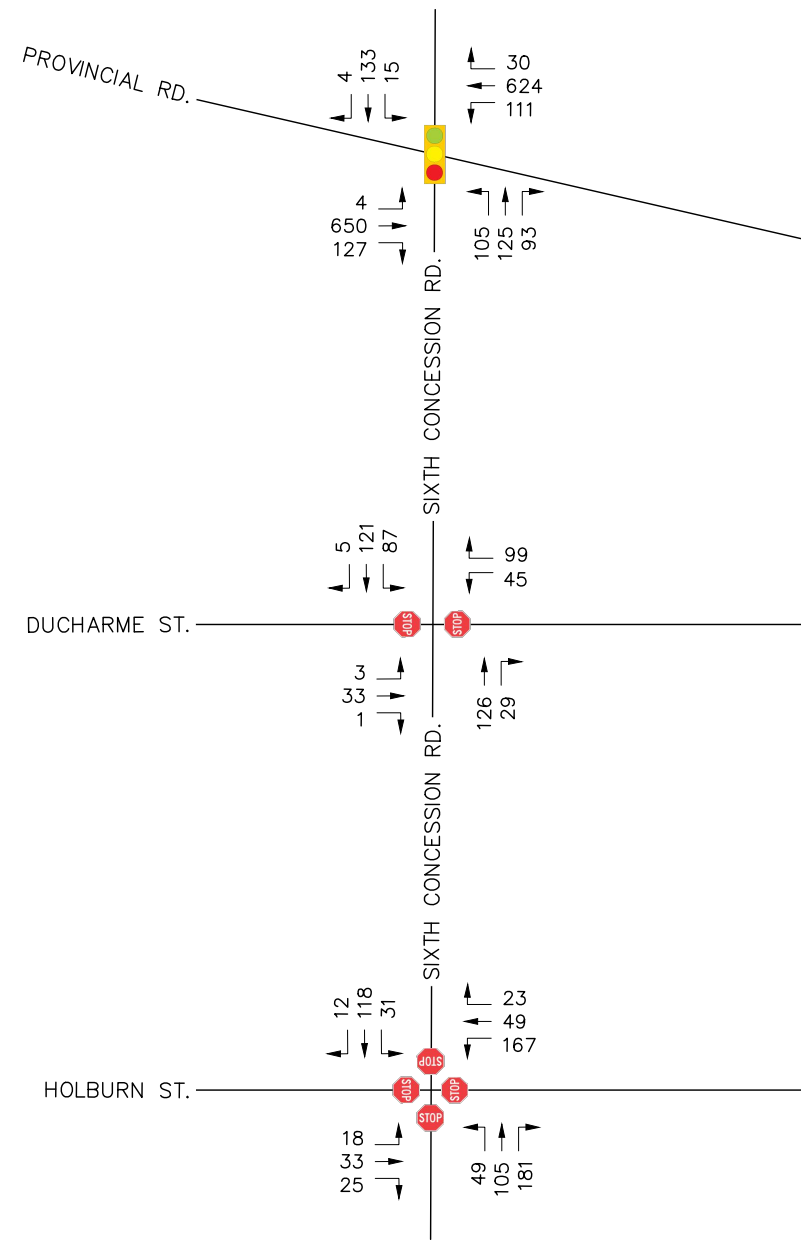
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FIGURE NO.	4
OF	7



EXISTING TRAFFIC
(AM PEAK HOUR)



EXISTING TRAFFIC
(PM PEAK HOUR)



Windsor: 200 University Avenue W. - Windsor ON N9A 5R9
Leamington: 18 Talbot Street W. - Leamington ON N8H 1M4
Chatham-Kent: 49 Raleigh Street - Chatham ON N7M 2M6



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2.	UPDATED REPORT FIGURES	20 OCT 2023	N.M.	A.D.B.						
1.	COMPLETED REPORT FIGURES	2 OCT 2023	F.C.	A.D.B.						

3930 SIXTH CONCESSION, WINDSOR, ON - BRIEF

EXISTING TRAFFIC
(AM/PM PEAK HOUR)

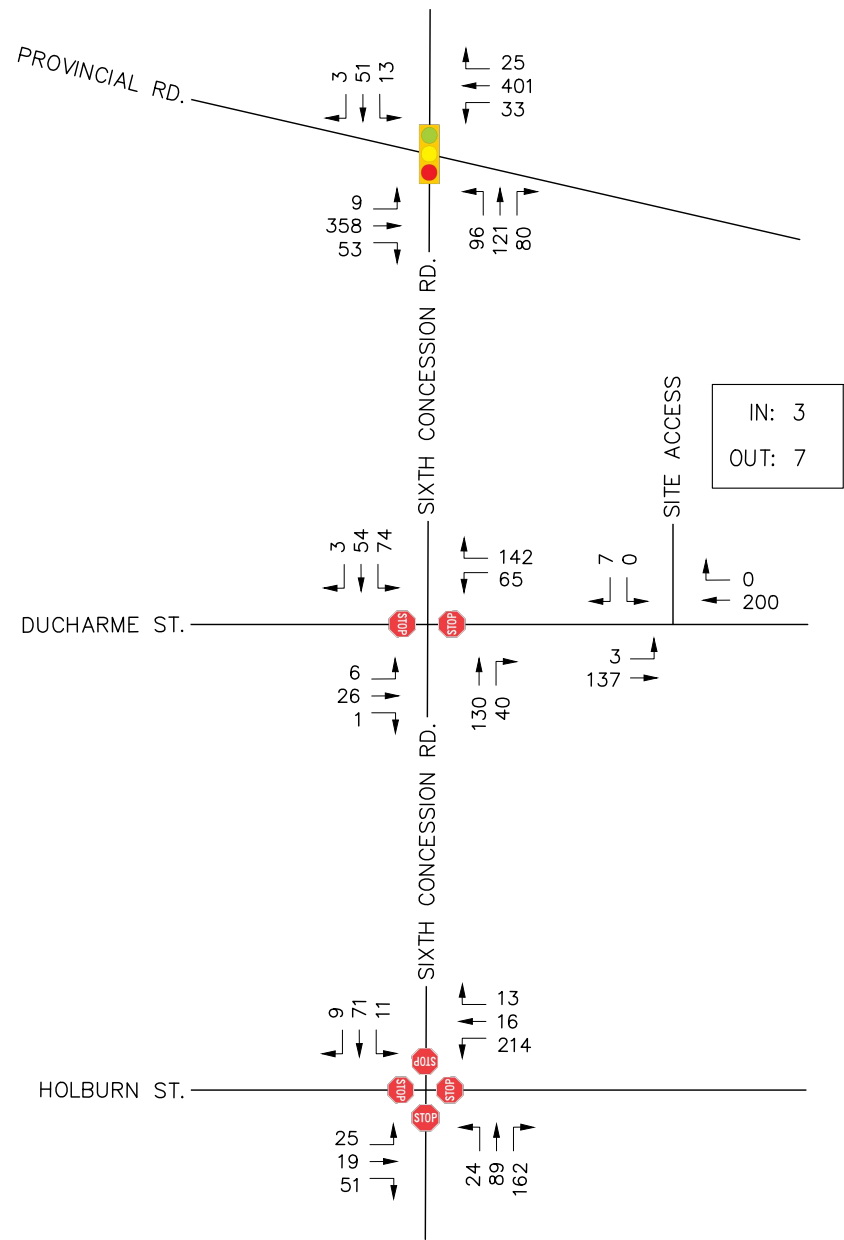
PROJECT NO.
23-1502

FIGURE NO.
5

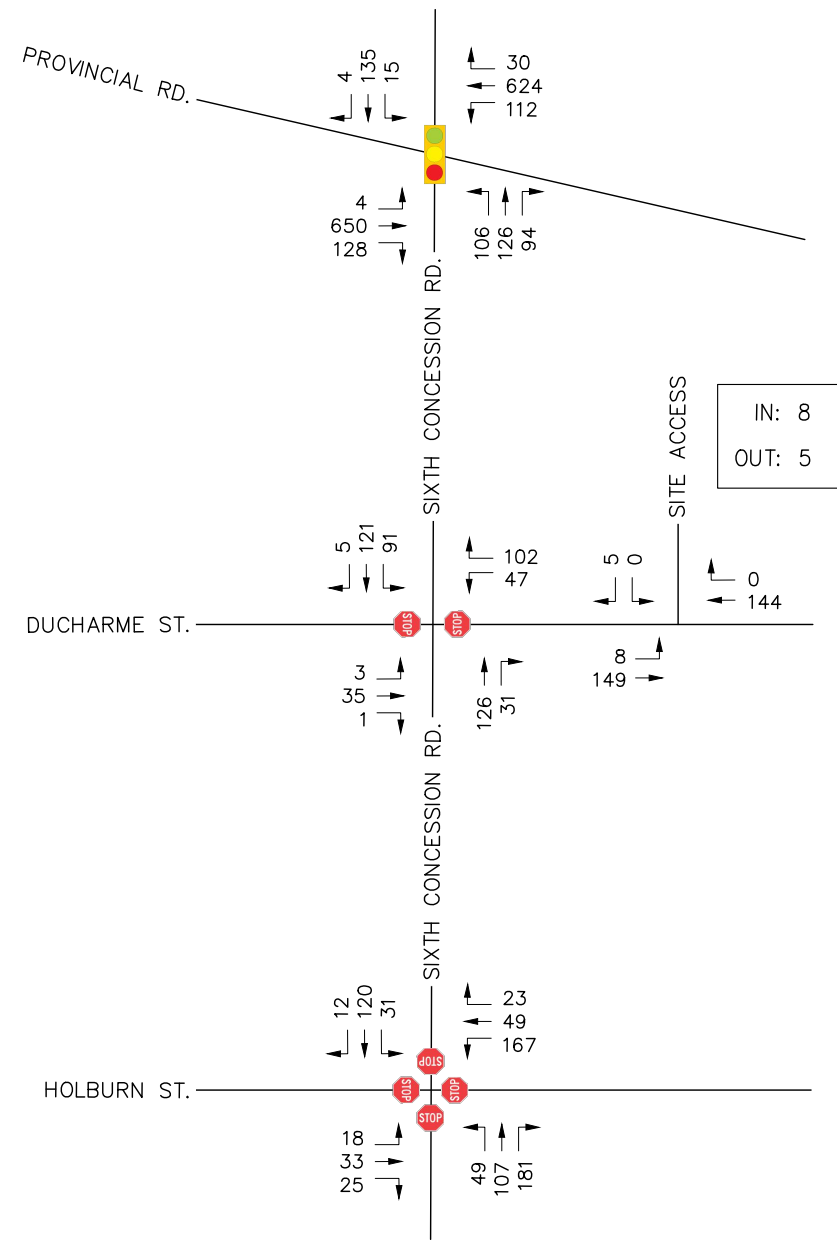
OF
7



EXISTING + SITE GENERATED TRAFFIC
(AM PEAK HOUR)



EXISTING + SITE GENERATED TRAFFIC
(AM PEAK HOUR)



Windsor: 200 University Avenue W. - Windsor ON N9A 5R9
Leamington: 18 Talbot Street W. - Leamington ON N8H 1M4
Chatham-Kent: 49 Raleigh Street - Chatham ON N7M 2M6



NO.	REVISION	DATE	BY	APP	DESIGN	F.C.
2.	UPDATED REPORT FIGURES	20 OCT 2023	N.M.	A.D.B.	CHECKED	A.D.B.
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					DATE	OCTOBER 2023
					SCALE	N.T.S.

3930 SIXTH CONCESSION, WINDSOR, ON - BRIEF

EXISTING + SITE GENERATED TRAFFIC
(AM/PM PEAK HOUR)

PROJECT NO.
23-1502

FIGURE NO.
6

OF
7

Appendix A

TRAFFIC DATA COLLECTION

Provincial Road at Sixth Concession Road

Ducharme Street at Sixth Concession Road

Holburn Street at Sixth Concession Road

Peak Hour Diagram

Specified Period

From: 07:00:00
To: 10:00:00

One Hour Peak

From: 08:15:00
To: 09:15:00

Intersection: PROVINCIAL RD & SIXTH CONCESSION RD
Site Code: 2103700085
Count Date: Mar 23, 2021

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: PROVINCIAL RD runs E/W

North Approach

	Out	In	Total
	63	144	207
MTB	3	9	12
HT	0	0	0
	0	0	0
Totals	66	153	219

SIXTH CONCESSION RD

	0	0	0	0
HT	0	0	0	0
MTB	0	2	1	0
	3	48	12	0
Totals	3	50	13	0

East Approach

	Out	In	Total
	417	405	822
MTB	19	16	35
HT	23	29	52
	0	0	0
Totals	459	450	909

PROVINCIAL RD

	HT	MTB		Totals
0	0	0	0	0
0	0	1	8	9
0	27	15	316	358
0	1	2	49	52

Peds: 0

Peds: 1



Peds: 0

Peds: 0

PROVINCIAL RD

Totals		MTB	HT	
0	0	0	0	0
25	22	3	0	0
401	362	16	23	0
33	33	0	0	0

West Approach

	Out	In	Total
	373	459	832
MTB	18	16	34
HT	28	23	51
	0	0	0
Totals	419	498	917

Totals				
94	119	79	0	
	94	114	77	0
MTB	0	5	0	0
HT	0	0	2	0
	0	0	0	0

SIXTH CONCESSION RD

South Approach

	Out	In	Total
	285	130	415
MTB	5	4	9
HT	2	1	3
	0	0	0
Totals	292	135	427

- Cars

MTB - Medium Trucks + Buses HT - Heavy Trucks

- Bicycles

Comments

Peak Hour Diagram

Specified Period

From: 15:00:00
To: 18:00:00

One Hour Peak

From: 15:00:00
To: 16:00:00

Intersection: PROVINCIAL RD & SIXTH CONCESSION RD
Site Code: 2103700085
Count Date: Mar 23, 2021

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: PROVINCIAL RD runs E/W

North Approach

	Out	In	Total
	147	156	303
MTB	3	3	6
HT	1	0	1
	1	0	1
Totals	152	159	311

SIXTH CONCESSION RD

	0	1	0	0
HT	0	1	0	0
MTB	0	3	0	0
	4	128	15	0
Totals	4	133	15	0

East Approach

	Out	In	Total
	734	726	1460
MTB	7	13	20
HT	24	19	43
	0	0	0
Totals	765	758	1523

PROVINCIAL RD

	HT	MTB		Totals
	0	0	0	0
	0	0	4	4
	19	12	619	650
	0	0	123	127

Peds: 0

Peds: 0



Peds: 0

Peds: 0

PROVINCIAL RD

Totals		MTB	HT	
0	0	0	0	0
30	30	0	0	0
624	594	7	23	0
111	110	0	1	0

West Approach

	Out	In	Total
	746	702	1448
MTB	16	8	24
HT	19	23	42
	0	0	0
Totals	781	733	1514

Totals	105	125	93	0
	104	122	92	0
MTB	1	3	1	0
HT	0	0	0	0
	0	0	0	0

SIXTH CONCESSION RD

South Approach

	Out	In	Total
	318	361	679
MTB	5	7	12
HT	0	2	2
	0	1	1
Totals	323	371	694

- Cars

MTB - Medium Trucks + Buses HT - Heavy Trucks

- Bicycles

Comments

Date: 5 October 2023
 Counted By: Nicholas M.
 Weather Conditions: Rainy
 Ducharme St. at Sixth Concession Rd.



Groups Printed- P. Veh. - Trucks - Buses

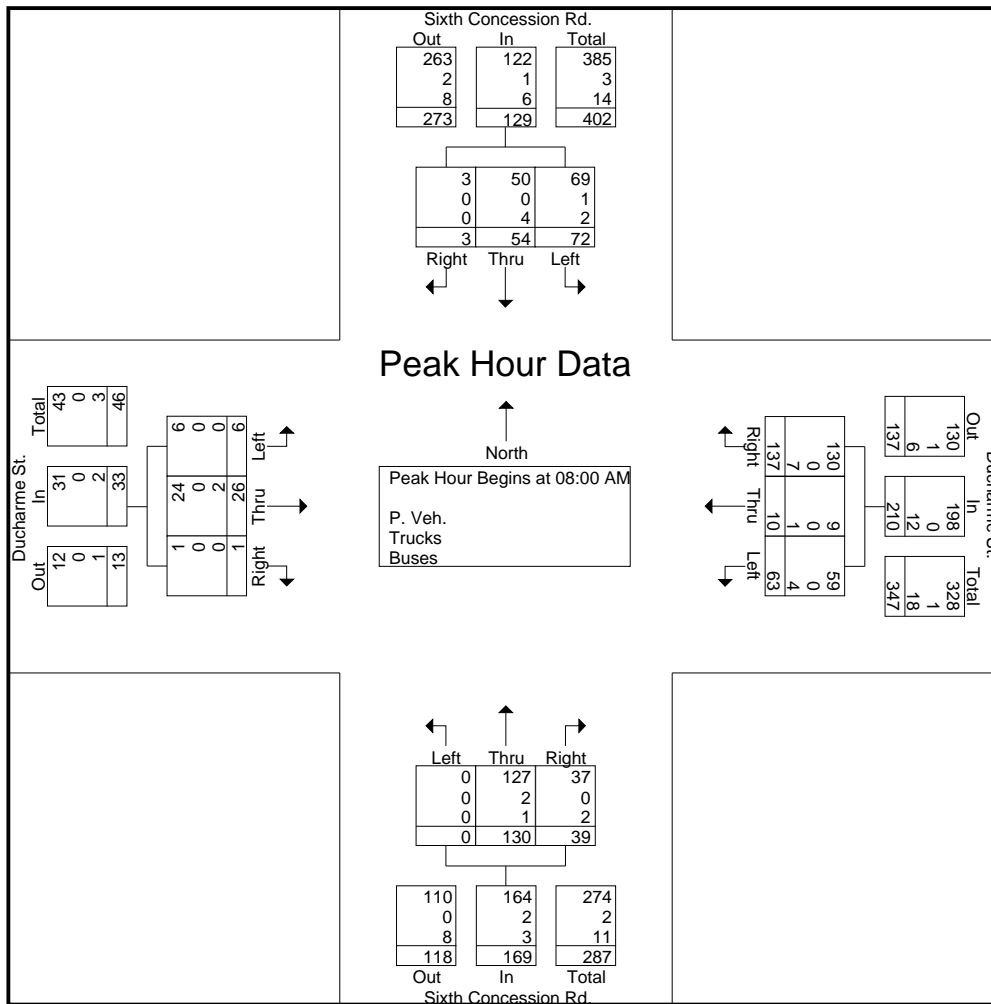
Start Time	Ducharme St. E/B					Ducharme St. W/B					Sixth Concession Rd. N/B					Sixth Concession Rd. S/B					Exclu. Total	Indu. Total	Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total			
07:00 AM	0	0	0	(0)	0	17	0	0	(1)	17	1	12	0	(0)	13	1	9	1	(0)	11	1	41	42
07:15 AM	1	2	1	(0)	4	15	1	6	(8)	22	1	20	0	(0)	21	0	12	7	(0)	19	8	66	74
07:30 AM	1	2	3	(0)	6	19	2	3	(1)	24	2	21	0	(0)	23	2	9	5	(0)	16	1	69	70
07:45 AM	0	2	0	(0)	2	30	3	5	(2)	38	1	30	0	(0)	31	2	8	7	(0)	17	2	88	90
Total	2	6	4	(0)	12	81	6	14	(12)	101	5	83	0	(0)	88	5	38	20	(0)	63	12	264	276
08:00 AM	0	1	2	(0)	3	25	0	4	(0)	29	4	24	0	(0)	28	0	11	14	(0)	25	0	85	85
08:15 AM	1	5	0	(1)	6	19	3	10	(2)	32	6	28	0	(0)	34	2	11	12	(0)	25	3	97	100
08:30 AM	0	4	2	(0)	6	22	1	22	(1)	45	7	31	0	(0)	38	0	12	13	(0)	25	1	114	115
08:45 AM	0	16	2	(4)	18	71	6	27	(1)	104	22	47	0	(0)	69	1	20	33	(0)	54	5	245	250
Total	1	26	6	(5)	33	137	10	63	(4)	210	39	130	0	(0)	169	3	54	72	(0)	129	9	541	550
*** BREAK ***																							
11:00 AM	2	2	0	(1)	4	24	2	5	(0)	31	2	13	0	(1)	15	1	17	12	(0)	30	2	80	82
11:15 AM	1	0	0	(0)	1	11	0	1	(0)	12	0	28	0	(1)	28	0	15	7	(0)	22	1	63	64
11:30 AM	0	1	0	(0)	1	15	1	4	(6)	20	1	21	0	(0)	22	0	24	9	(0)	33	6	76	82
11:45 AM	1	3	2	(0)	6	23	1	1	(0)	25	3	22	0	(2)	25	1	21	9	(0)	31	2	87	89
Total	4	6	2	(1)	12	73	4	11	(6)	88	6	84	0	(4)	90	2	77	37	(0)	116	11	306	317
12:00 PM	0	0	0	(0)	0	14	1	3	(1)	18	2	27	0	(0)	29	3	24	8	(0)	35	1	82	83
12:15 PM	1	2	1	(0)	4	8	0	4	(0)	12	1	21	0	(0)	22	2	26	6	(0)	34	0	72	72
12:30 PM	0	5	0	(5)	5	14	2	3	(1)	19	3	18	0	(0)	21	0	23	6	(0)	29	6	74	80
12:45 PM	1	2	2	(0)	5	15	4	0	(0)	19	2	29	0	(1)	31	0	17	11	(0)	28	1	83	84
Total	2	9	3	(5)	14	51	7	10	(2)	68	8	95	0	(1)	103	5	90	31	(0)	126	8	311	319
*** BREAK ***																							
02:00 PM	2	6	2	(0)	10	20	1	5	(1)	26	5	24	0	(0)	29	0	29	12	(0)	41	1	106	107
02:15 PM	0	1	0	(0)	1	16	1	5	(1)	22	0	17	0	(0)	17	2	23	17	(0)	42	1	82	83
02:30 PM	1	2	1	(3)	4	16	1	1	(0)	18	5	26	0	(0)	31	2	14	12	(0)	28	3	81	84
02:45 PM	2	2	1	(0)	5	13	2	2	(0)	17	4	24	0	(0)	28	0	26	21	(2)	47	2	97	99
Total	5	11	4	(3)	20	65	5	13	(2)	83	14	91	0	(0)	105	4	92	62	(2)	158	7	366	373
03:00 PM	0	6	2	(2)	8	11	2	3	(0)	16	9	16	0	(0)	25	3	38	24	(0)	65	2	114	116
03:15 PM	1	14	2	(1)	17	17	2	8	(0)	27	11	24	1	(0)	36	1	29	26	(0)	56	1	136	137
03:30 PM	0	6	1	(0)	7	33	4	25	(0)	62	10	35	0	(1)	45	2	31	23	(0)	56	1	170	171
03:45 PM	0	6	0	(1)	6	26	3	5	(0)	34	2	38	0	(0)	40	1	25	20	(0)	46	1	126	127
Total	1	32	5	(4)	38	87	11	41	(0)	139	32	113	1	(1)	146	7	123	93	(0)	223	5	546	551
04:00 PM	0	7	0	(0)	7	23	5	7	(0)	35	6	29	0	(0)	35	1	36	18	(0)	55	0	132	132
04:15 PM	1	6	1	(0)	8	21	0	4	(0)	25	5	31	0	(0)	36	1	30	26	(0)	57	0	126	126
04:30 PM	1	8	0	(0)	9	27	3	8	(0)	38	9	41	0	(0)	50	1	26	18	(0)	45	0	142	142
04:45 PM	0	6	0	(0)	6	15	5	7	(0)	27	2	32	0	(0)	34	1	25	25	(0)	51	0	118	118
Total	2	27	1	(0)	30	86	13	26	(0)	125	22	133	0	(0)	155	4	117	87	(0)	208	0	518	518
05:00 PM	1	7	2	(0)	10	19	1	5	(0)	25	4	37	0	(0)	41	0	39	16	(0)	55	0	131	131
05:15 PM	1	3	0	(0)	4	18	2	9	(0)	29	3	21	0	(0)	24	1	34	21	(0)	56	0	113	113
05:30 PM	1	3	1	(0)	5	22	3	1	(0)	26	5	23	0	(0)	28	2	29	23	(0)	54	0	113	113
05:45 PM	2	5	1	(0)	8	24	1	3	(0)	28	4	23	0	(0)	27	0	38	23	(0)	61	0	124	124
Total	5	18	4	(0)	27	83	7	18	(0)	108	16	104	0	(0)	120	3	140	83	(0)	226	0	481	481
Grand Total	22	135	29	(18)	186	663	63	196	(26)	922	142	833	1	(6)	976	33	731	485	(2)	1249	52	3333	3385
Apprch %	11.8	72.6	15.6			71.9	6.8	21.3			14.5	85.3	0.1			2.6	58.5	38.8					
Total %	0.7	4.1	0.9		5.6	19.9	1.9	5.9		27.7	4.3	25	0		29.3	1	21.9	14.6		37.5	1.5	98.5	
P. Veh.	20	126	29		193	632	61	187		906	132	816	1		955	30	710	470		1212	0	0	3266
% P. Veh.	90.9	93.3	100	100	94.6	95.3	96.8	95.4	100	95.6	93	98	100	100	97.3	90.9	97.1	96.9	100	96.9	0	0	96.5
Trucks	0	0	0		0	7	1	0		8	1	10	0		11	0	8	5		13	0	0	32
% Trucks	0	0	0		0	1.1	1.6	0	0	0.8	0.7	1.2	0	0	1.1	0	1.1	1	0	1	0	0	0.9

Groups Printed- P. Veh. - Trucks - Buses

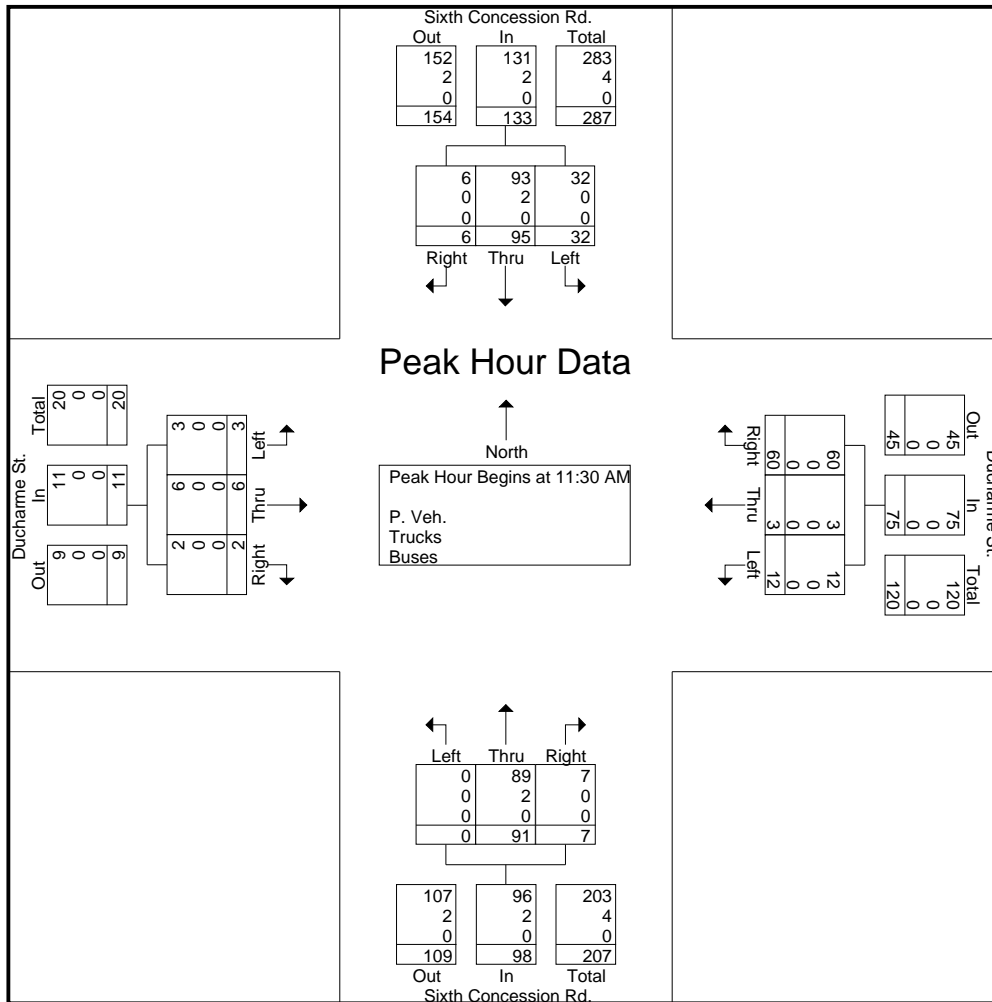
	Ducharme St. E/B					Ducharme St. W/B					Sixth Concession Rd. N/B					Sixth Concession Rd. S/B					Exclu. Total	Inclu. Total	Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total			
Buses	2	9	0		11	24	1	9		34	9	7	0		16	3	13	10		26	0	0	87
% Buses	9.1	6.7	0	0	5.4	3.6	1.6	4.6	0	3.6	6.3	0.8	0	0	1.6	9.1	1.8	2.1	0	2.1	0	0	2.6



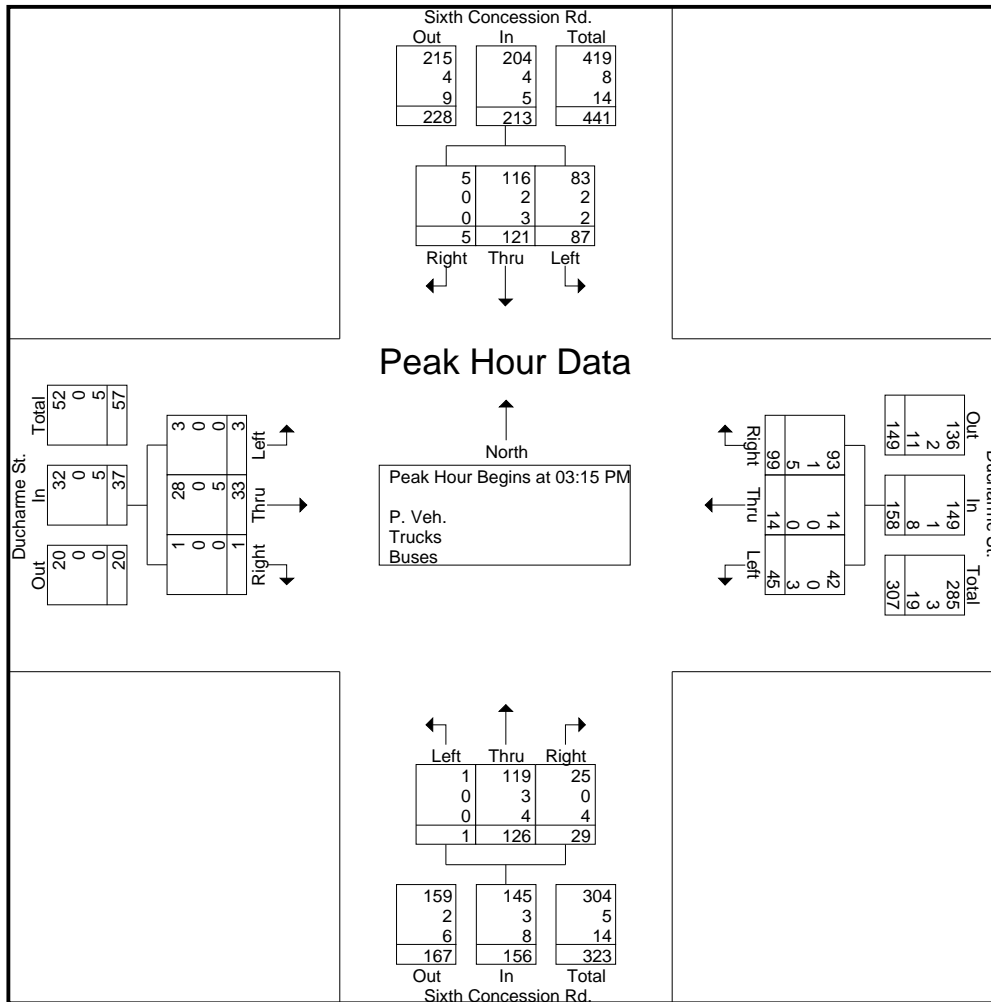
Start Time	Ducharme St. E/B				Ducharme St. W/B				Sixth Concession Rd. N/B				Sixth Concession Rd. S/B				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	1	2	3	25	0	4	29	4	24	0	28	0	11	14	25	85
08:15 AM	1	5	0	6	19	3	10	32	6	28	0	34	2	11	12	25	97
08:30 AM	0	4	2	6	22	1	22	45	7	31	0	38	0	12	13	25	114
08:45 AM	0	16	2	18	71	6	27	104	22	47	0	69	1	20	33	54	245
Total Volume	1	26	6	33	137	10	63	210	39	130	0	169	3	54	72	129	541
% App. Total	3	78.8	18.2		65.2	4.8	30		23.1	76.9	0		2.3	41.9	55.8		
PHF	.250	.406	.750	.458	.482	.417	.583	.505	.443	.691	.000	.612	.375	.675	.545	.597	.552
P. Veh.	1	24	6	31	130	9	59	198	37	127	0	164	3	50	69	122	515
% P. Veh.	100	92.3	100	93.9	94.9	90.0	93.7	94.3	94.9	97.7	0	97.0	100	92.6	95.8	94.6	95.2
Trucks	0	0	0	0	0	0	0	0	0	2	0	2	0	0	1	1	3
% Trucks	0	0	0	0	0	0	0	0	0	1.5	0	1.2	0	0	1.4	0.8	0.6
Buses	0	2	0	2	7	1	4	12	2	1	0	3	0	4	2	6	23
% Buses	0	7.7	0	6.1	5.1	10.0	6.3	5.7	5.1	0.8	0	1.8	0	7.4	2.8	4.7	4.3



Start Time	Ducharme St. E/B				Ducharme St. W/B				Sixth Concession Rd. N/B				Sixth Concession Rd. S/B				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:30 AM																	
11:30 AM	0	1	0	1	15	1	4	20	1	21	0	22	0	24	9	33	76
11:45 AM	1	3	2	6	23	1	1	25	3	22	0	25	1	21	9	31	87
12:00 PM	0	0	0	0	14	1	3	18	2	27	0	29	3	24	8	35	82
12:15 PM	1	2	1	4	8	0	4	12	1	21	0	22	2	26	6	34	72
Total Volume	2	6	3	11	60	3	12	75	7	91	0	98	6	95	32	133	317
% App. Total	18.2	54.5	27.3		80	4	16		7.1	92.9	0		4.5	71.4	24.1		
PHF	.500	.500	.375	.458	.652	.750	.750	.750	.583	.843	.000	.845	.500	.913	.889	.950	.911
P. Veh.	2	6	3	11	60	3	12	75	7	89	0	96	6	93	32	131	313
% P. Veh.	100	100	100	100	100	100	100	100	100	97.8	0	98.0	100	97.9	100	98.5	98.7
Trucks	0	0	0	0	0	0	0	0	0	2	0	2	0	2	0	2	4
% Trucks	0	0	0	0	0	0	0	0	0	2.2	0	2.0	0	2.1	0	1.5	1.3
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Start Time	Ducharme St. E/B				Ducharme St. W/B				Sixth Concession Rd. N/B				Sixth Concession Rd. S/B				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:15 PM																	
03:15 PM	1	14	2	17	17	2	8	27	11	24	1	36	1	29	26	56	136
03:30 PM	0	6	1	7	33	4	25	62	10	35	0	45	2	31	23	56	170
03:45 PM	0	6	0	6	26	3	5	34	2	38	0	40	1	25	20	46	126
04:00 PM	0	7	0	7	23	5	7	35	6	29	0	35	1	36	18	55	132
Total Volume	1	33	3	37	99	14	45	158	29	126	1	156	5	121	87	213	564
% App. Total	2.7	89.2	8.1		62.7	8.9	28.5		18.6	80.8	0.6		2.3	56.8	40.8		
PHF	.250	.589	.375	.544	.750	.700	.450	.637	.659	.829	.250	.867	.625	.840	.837	.951	.829
P. Veh.	1	28	3	32	93	14	42	149	25	119	1	145	5	116	83	204	530
% P. Veh.	100	84.8	100	86.5	93.9	100	93.3	94.3	86.2	94.4	100	92.9	100	95.9	95.4	95.8	94.0
Trucks	0	0	0	0	1	0	0	1	0	3	0	3	0	2	2	4	8
% Trucks	0	0	0	0	1.0	0	0	0.6	0	2.4	0	1.9	0	1.7	2.3	1.9	1.4
Buses	0	5	0	5	5	0	3	8	4	4	0	8	0	3	2	5	26
% Buses	0	15.2	0	13.5	5.1	0	6.7	5.1	13.8	3.2	0	5.1	0	2.5	2.3	2.3	4.6



Date: 5 October 2023
 Counted By: Nicholas M.
 Weather Conditions: Rainy
 Holburn St. at Sixth Concession Rd.

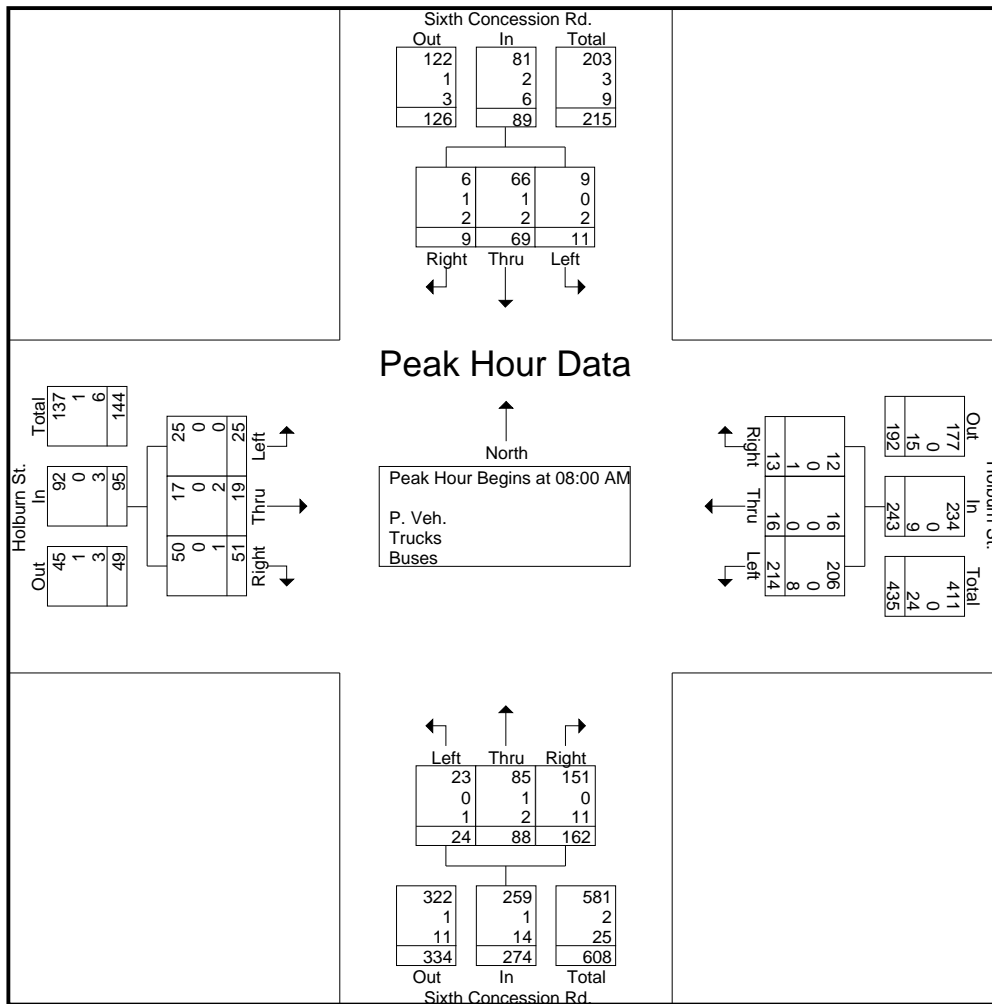


Groups Printed- P. Veh. - Trucks - Buses

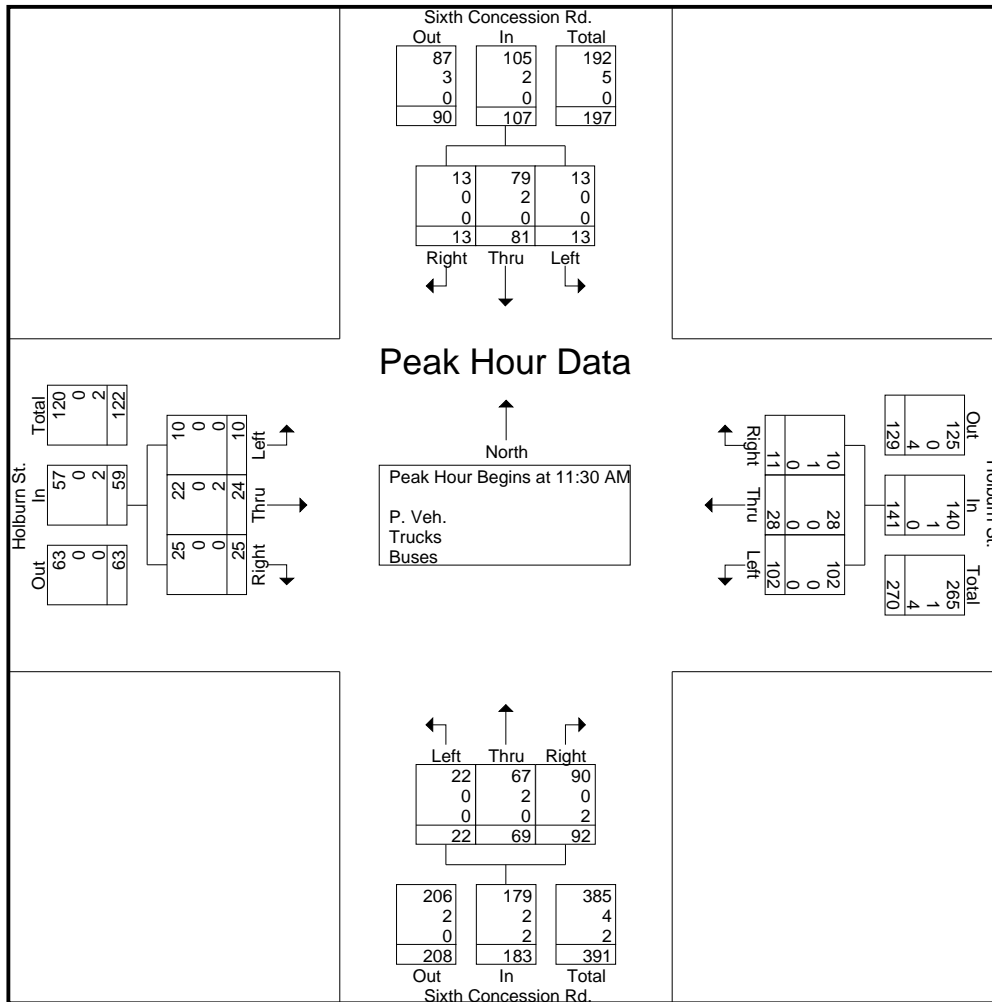
Start Time	Holburn St. E/B					Holburn St. W/B					Sixth Concession Rd. N/B					Sixth Concession Rd. S/B					Exclu. Total	Inclu. Total	Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total			
07:00 AM	8	2	1	(1)	11	3	2	22	(1)	27	8	4	3	(0)	15	1	8	0	(0)	9	2	62	64
07:15 AM	7	4	5	(0)	16	8	5	24	(1)	37	10	5	1	(0)	16	1	12	2	(0)	15	1	84	85
07:30 AM	9	3	4	(2)	16	5	5	49	(0)	59	6	10	2	(0)	18	1	11	2	(0)	14	2	107	109
07:45 AM	22	6	5	(1)	33	2	5	55	(1)	62	18	22	9	(0)	49	1	14	0	(0)	15	2	159	161
Total	46	15	15	(4)	76	18	17	150	(3)	185	42	41	15	(0)	98	4	45	4	(0)	53	7	412	419
08:00 AM	17	5	8	(0)	30	3	4	62	(0)	69	31	16	7	(0)	54	3	14	1	(0)	18	0	171	171
08:15 AM	11	3	7	(0)	21	3	4	60	(1)	67	38	21	4	(1)	63	1	15	3	(0)	19	2	170	172
08:30 AM	8	7	5	(1)	20	4	1	53	(2)	58	32	24	6	(0)	62	2	24	5	(0)	31	3	171	174
08:45 AM	15	4	5	(2)	24	3	7	39	(0)	49	61	27	7	(0)	95	3	16	2	(0)	21	2	189	191
Total	51	19	25	(3)	95	13	16	214	(3)	243	162	88	24	(1)	274	9	69	11	(0)	89	7	701	708
*** BREAK ***																							
11:00 AM	10	3	4	(1)	17	3	5	29	(0)	37	11	10	4	(1)	25	3	19	2	(1)	24	3	103	106
11:15 AM	1	2	3	(0)	6	2	2	11	(1)	15	10	16	2	(1)	28	2	8	3	(0)	13	2	62	64
11:30 AM	5	11	3	(2)	19	4	10	35	(1)	49	28	17	8	(1)	53	2	25	4	(0)	31	4	152	156
11:45 AM	8	2	1	(0)	11	1	4	18	(0)	23	27	18	6	(1)	51	4	15	4	(0)	23	1	108	109
Total	24	18	11	(3)	53	10	21	93	(2)	124	76	61	20	(4)	157	11	67	13	(1)	91	10	425	435
12:00 PM	6	8	3	(1)	17	4	11	23	(2)	38	24	18	5	(0)	47	5	14	3	(1)	22	4	124	128
12:15 PM	6	3	3	(1)	12	2	3	26	(0)	31	13	16	3	(0)	32	2	27	2	(0)	31	1	106	107
12:30 PM	7	4	4	(0)	15	1	8	15	(0)	24	21	14	6	(0)	41	2	19	3	(0)	24	0	104	104
12:45 PM	7	0	2	(0)	9	2	6	18	(0)	26	15	28	7	(0)	50	1	12	3	(0)	16	0	101	101
Total	26	15	12	(2)	53	9	28	82	(2)	119	73	76	21	(0)	170	10	72	11	(1)	93	5	435	440
*** BREAK ***																							
02:00 PM	6	6	5	(0)	17	3	4	30	(1)	37	33	19	9	(1)	61	3	28	3	(0)	34	2	149	151
02:15 PM	13	0	2	(1)	15	2	3	36	(0)	41	26	10	3	(0)	39	2	25	1	(0)	28	1	123	124
02:30 PM	6	8	5	(0)	19	5	3	29	(0)	37	29	24	14	(0)	67	4	16	4	(0)	24	0	147	147
02:45 PM	11	7	3	(4)	21	3	13	37	(0)	53	44	20	9	(0)	73	5	18	6	(0)	29	4	176	180
Total	36	21	15	(5)	72	13	23	132	(1)	168	132	73	35	(1)	240	14	87	14	(0)	115	7	595	602
03:00 PM	8	9	1	(1)	18	2	10	32	(2)	44	45	22	15	(0)	82	2	25	5	(0)	32	3	176	179
03:15 PM	10	14	3	(1)	27	6	7	28	(1)	41	60	23	6	(0)	89	1	28	8	(0)	37	2	194	196
03:30 PM	1	5	5	(0)	11	8	12	46	(0)	66	47	30	10	(1)	87	4	36	13	(0)	53	1	217	218
03:45 PM	6	9	6	(0)	21	6	12	47	(0)	65	46	27	14	(0)	87	3	24	5	(0)	32	0	205	205
Total	25	37	15	(2)	77	22	41	153	(3)	216	198	102	45	(1)	345	10	113	31	(0)	154	6	792	798
04:00 PM	8	5	4	(0)	17	3	18	46	(0)	67	28	25	19	(1)	72	4	30	5	(0)	39	1	195	196
04:15 PM	13	6	1	(1)	20	5	8	31	(0)	44	36	28	10	(0)	74	2	25	3	(0)	30	1	168	169
04:30 PM	7	6	0	(0)	13	8	3	44	(0)	55	51	34	9	(0)	94	5	21	6	(0)	32	0	194	194
04:45 PM	5	7	3	(0)	15	3	5	42	(1)	50	48	25	10	(0)	83	4	20	5	(0)	29	1	177	178
Total	33	24	8	(1)	65	19	34	163	(1)	216	163	112	48	(1)	323	15	96	19	(0)	130	3	734	737
05:00 PM	9	10	3	(0)	22	5	10	42	(0)	57	44	30	17	(0)	91	7	31	7	(0)	45	0	215	215
05:15 PM	10	3	0	(1)	13	1	6	36	(0)	43	41	20	10	(1)	71	2	34	6	(0)	42	2	169	171
05:30 PM	4	13	3	(0)	20	4	6	32	(1)	42	38	21	16	(0)	75	7	20	5	(0)	32	1	169	170
05:45 PM	6	9	3	(0)	18	4	3	28	(0)	35	38	17	10	(0)	65	6	25	3	(0)	34	0	152	152
Total	29	35	9	(1)	73	14	25	138	(1)	177	161	88	53	(1)	302	22	110	21	(0)	153	3	705	708
Grand Total	270	184	110	(21)	564	118	205	1125	(16)	1448	1007	641	261	(9)	1909	95	659	124	(2)	878	48	4799	4847
Apprch %	47.9	32.6	19.5			8.1	14.2	77.7			52.8	33.6	13.7			10.8	75.1	14.1					
Total %	5.6	3.8	2.3		11.8	2.5	4.3	23.4		30.2	21	13.4	5.4		39.8	2	13.7	2.6		18.3	1	99	
P. Veh.	266	165	106		558	110	198	1100		1424	973	626	256		1864	85	643	117		847	0	0	4693
% P. Veh.	98.5	89.7	96.4	100	95.4	93.2	96.6	97.8	100	97.3	96.6	97.7	98.1	100	97.2	89.5	97.6	94.4	100	96.2	0	0	96.8
Trucks	0	3	2		5	2	0	1		3	1	6	1		8	2	7	0		9	0	0	25
% Trucks	0	1.6	1.8	0	0.9	1.7	0	0.1	0	0.2	0.1	0.9	0.4	0	0.4	2.1	1.1	0	0	1	0	0	0.5
Buses	4	16	2		22	6	7	24		37	33	9	4		46	8	9	7		24	0	0	129
% Buses	1.5	8.7	1.8	0	3.8	5.1	3.4	2.1	0	2.5	3.3	1.4	1.5	0	2.4	8.4	1.4	5.6	0	2.7	0	0	2.7



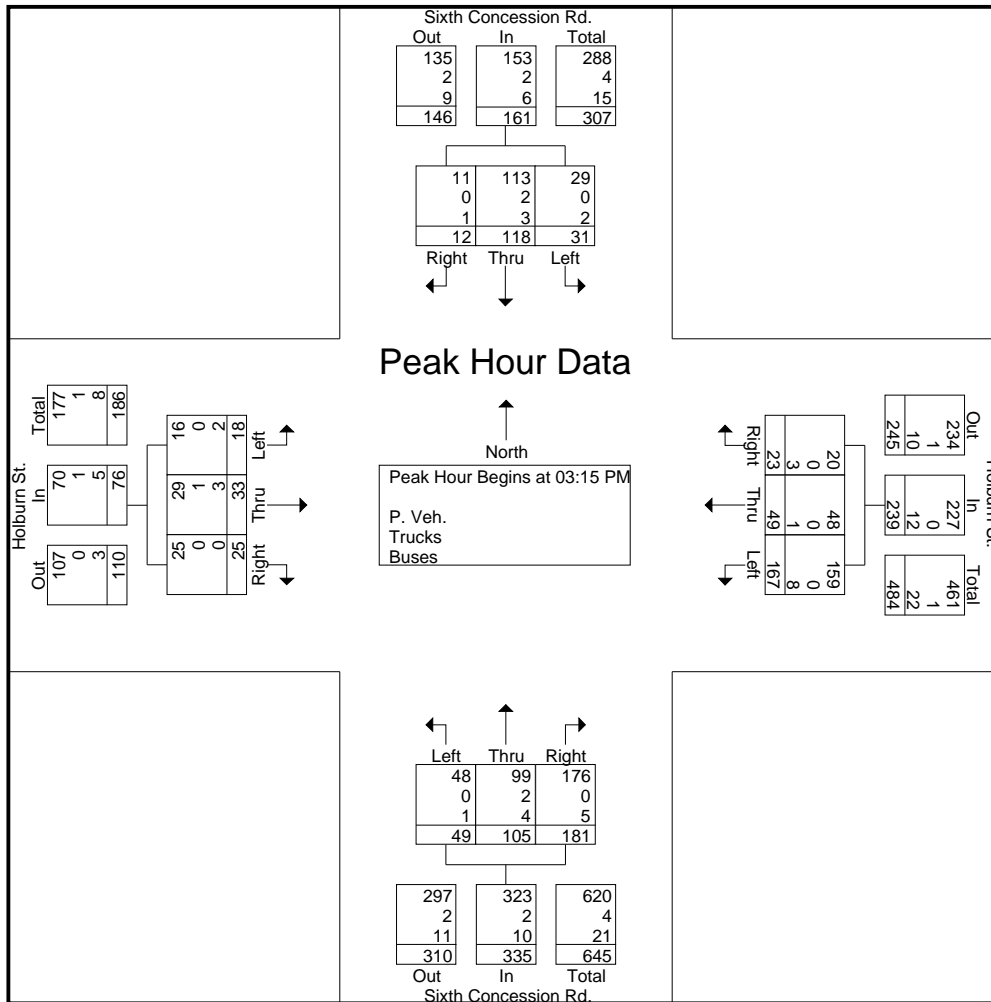
Start Time	Holburn St. E/B				Holburn St. W/B				Sixth Concession Rd. N/B				Sixth Concession Rd. S/B				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	17	5	8	30	3	4	62	69	31	16	7	54	3	14	1	18	171
08:15 AM	11	3	7	21	3	4	60	67	38	21	4	63	1	15	3	19	170
08:30 AM	8	7	5	20	4	1	53	58	32	24	6	62	2	24	5	31	171
08:45 AM	15	4	5	24	3	7	39	49	61	27	7	95	3	16	2	21	189
Total Volume	51	19	25	95	13	16	214	243	162	88	24	274	9	69	11	89	701
% App. Total	53.7	20	26.3		5.3	6.6	88.1		59.1	32.1	8.8		10.1	77.5	12.4		
PHF	.750	.679	.781	.792	.813	.571	.863	.880	.664	.815	.857	.721	.750	.719	.550	.718	.927
P. Veh.	50	17	25	92	12	16	206	234	151	85	23	259	6	66	9	81	666
% P. Veh.	98.0	89.5	100	96.8	92.3	100	96.3	96.3	93.2	96.6	95.8	94.5	66.7	95.7	81.8	91.0	95.0
Trucks	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	2	3
% Trucks	0	0	0	0	0	0	0	0	0	1.1	0	0.4	11.1	1.4	0	2.2	0.4
Buses	1	2	0	3	1	0	8	9	11	2	1	14	2	2	2	6	32
% Buses	2.0	10.5	0	3.2	7.7	0	3.7	3.7	6.8	2.3	4.2	5.1	22.2	2.9	18.2	6.7	4.6



Start Time	Holburn St. E/B				Holburn St. W/B				Sixth Concession Rd. N/B				Sixth Concession Rd. S/B				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:30 AM																	
11:30 AM	5	11	3	19	4	10	35	49	28	17	8	53	2	25	4	31	152
11:45 AM	8	2	1	11	1	4	18	23	27	18	6	51	4	15	4	23	108
12:00 PM	6	8	3	17	4	11	23	38	24	18	5	47	5	14	3	22	124
12:15 PM	6	3	3	12	2	3	26	31	13	16	3	32	2	27	2	31	106
Total Volume	25	24	10	59	11	28	102	141	92	69	22	183	13	81	13	107	490
% App. Total	42.4	40.7	16.9		7.8	19.9	72.3		50.3	37.7	12		12.1	75.7	12.1		
PHF	.781	.545	.833	.776	.688	.636	.729	.719	.821	.958	.688	.863	.650	.750	.813	.863	.806
P. Veh.	25	22	10	57	10	28	102	140	90	67	22	179	13	79	13	105	481
% P. Veh.	100	91.7	100	96.6	90.9	100	100	99.3	97.8	97.1	100	97.8	100	97.5	100	98.1	98.2
Trucks	0	0	0	0	1	0	0	1	0	2	0	2	0	2	0	2	5
% Trucks	0	0	0	0	9.1	0	0	0.7	0	2.9	0	1.1	0	2.5	0	1.9	1.0
Buses	0	2	0	2	0	0	0	0	2	0	0	2	0	0	0	0	4
% Buses	0	8.3	0	3.4	0	0	0	0	2.2	0	0	1.1	0	0	0	0	0.8



Start Time	Holburn St. E/B				Holburn St. W/B				Sixth Concession Rd. N/B				Sixth Concession Rd. S/B				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:15 PM																	
03:15 PM	10	14	3	27	6	7	28	41	60	23	6	89	1	28	8	37	194
03:30 PM	1	5	5	11	8	12	46	66	47	30	10	87	4	36	13	53	217
03:45 PM	6	9	6	21	6	12	47	65	46	27	14	87	3	24	5	32	205
04:00 PM	8	5	4	17	3	18	46	67	28	25	19	72	4	30	5	39	195
Total Volume	25	33	18	76	23	49	167	239	181	105	49	335	12	118	31	161	811
% App. Total	32.9	43.4	23.7		9.6	20.5	69.9		54	31.3	14.6		7.5	73.3	19.3		
PHF	.625	.589	.750	.704	.719	.681	.888	.892	.754	.875	.645	.941	.750	.819	.596	.759	.934
P. Veh.	25	29	16	70	20	48	159	227	176	99	48	323	11	113	29	153	773
% P. Veh.	100	87.9	88.9	92.1	87.0	98.0	95.2	95.0	97.2	94.3	98.0	96.4	91.7	95.8	93.5	95.0	95.3
Trucks	0	1	0	1	0	0	0	0	0	2	0	2	0	2	0	2	5
% Trucks	0	3.0	0	1.3	0	0	0	0	0	1.9	0	0.6	0	1.7	0	1.2	0.6
Buses	0	3	2	5	3	1	8	12	5	4	1	10	1	3	2	6	33
% Buses	0	9.1	11.1	6.6	13.0	2.0	4.8	5.0	2.8	3.8	2.0	3.0	8.3	2.5	6.5	3.7	4.1



Appendix B

ITE TRIP GENERATION MANUAL – 11TH EDITION REFERENCES

Single-Family Attached Housing (215)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 46

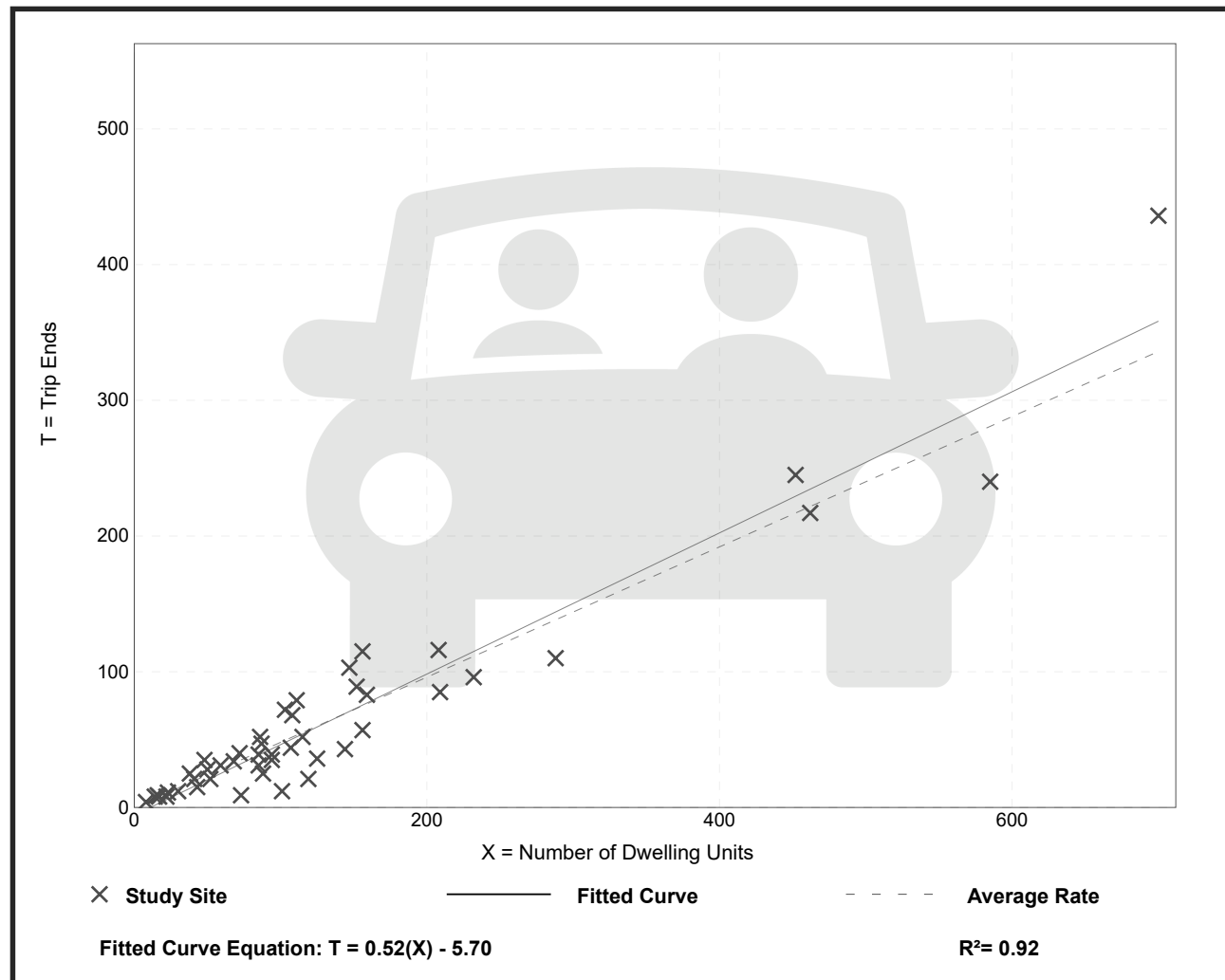
Avg. Num. of Dwelling Units: 135

Directional Distribution: 31% entering, 69% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.48	0.12 - 0.74	0.14

Data Plot and Equation



Single-Family Attached Housing (215)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 51

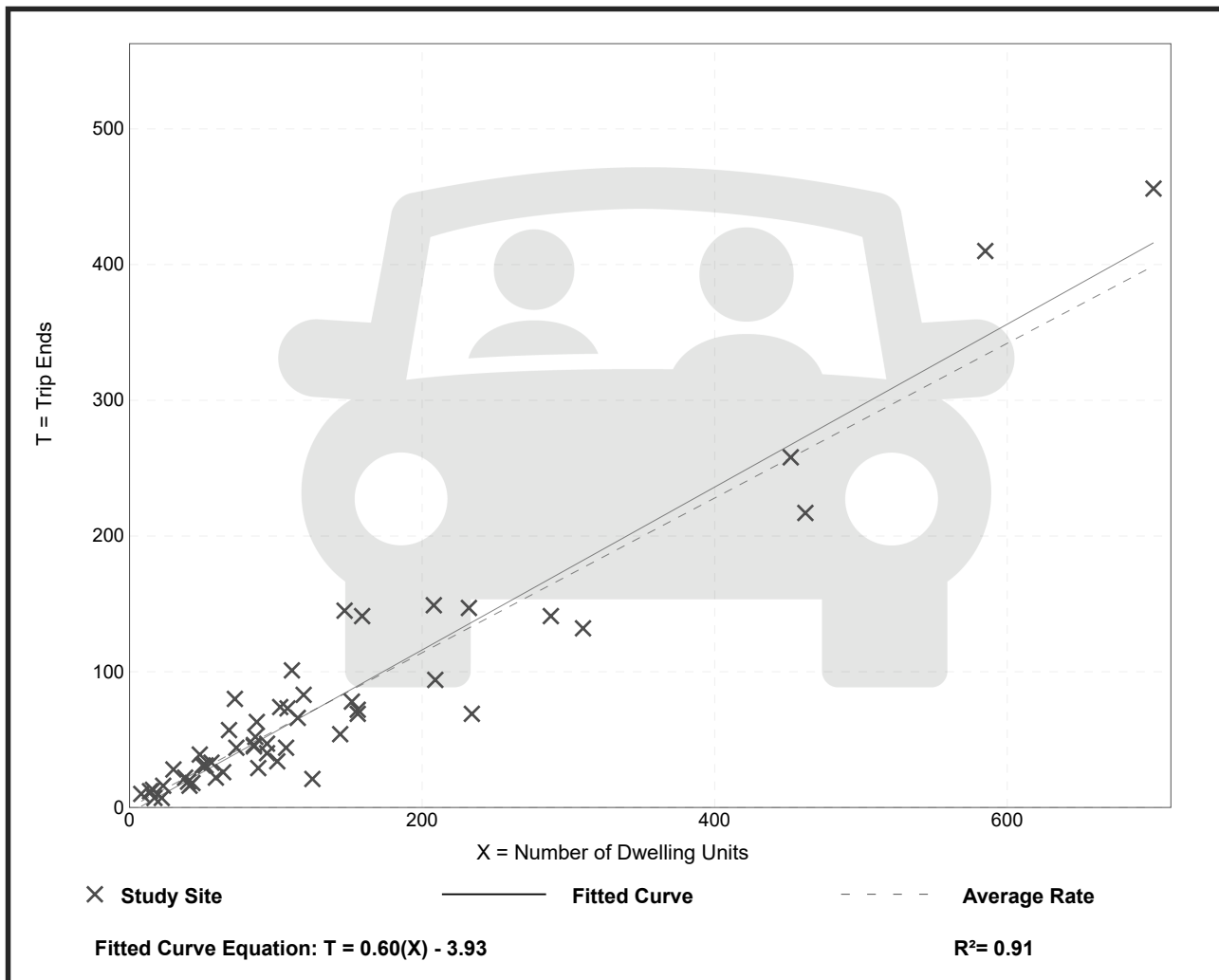
Avg. Num. of Dwelling Units: 136

Directional Distribution: 57% entering, 43% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.57	0.17 - 1.25	0.18

Data Plot and Equation



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 49

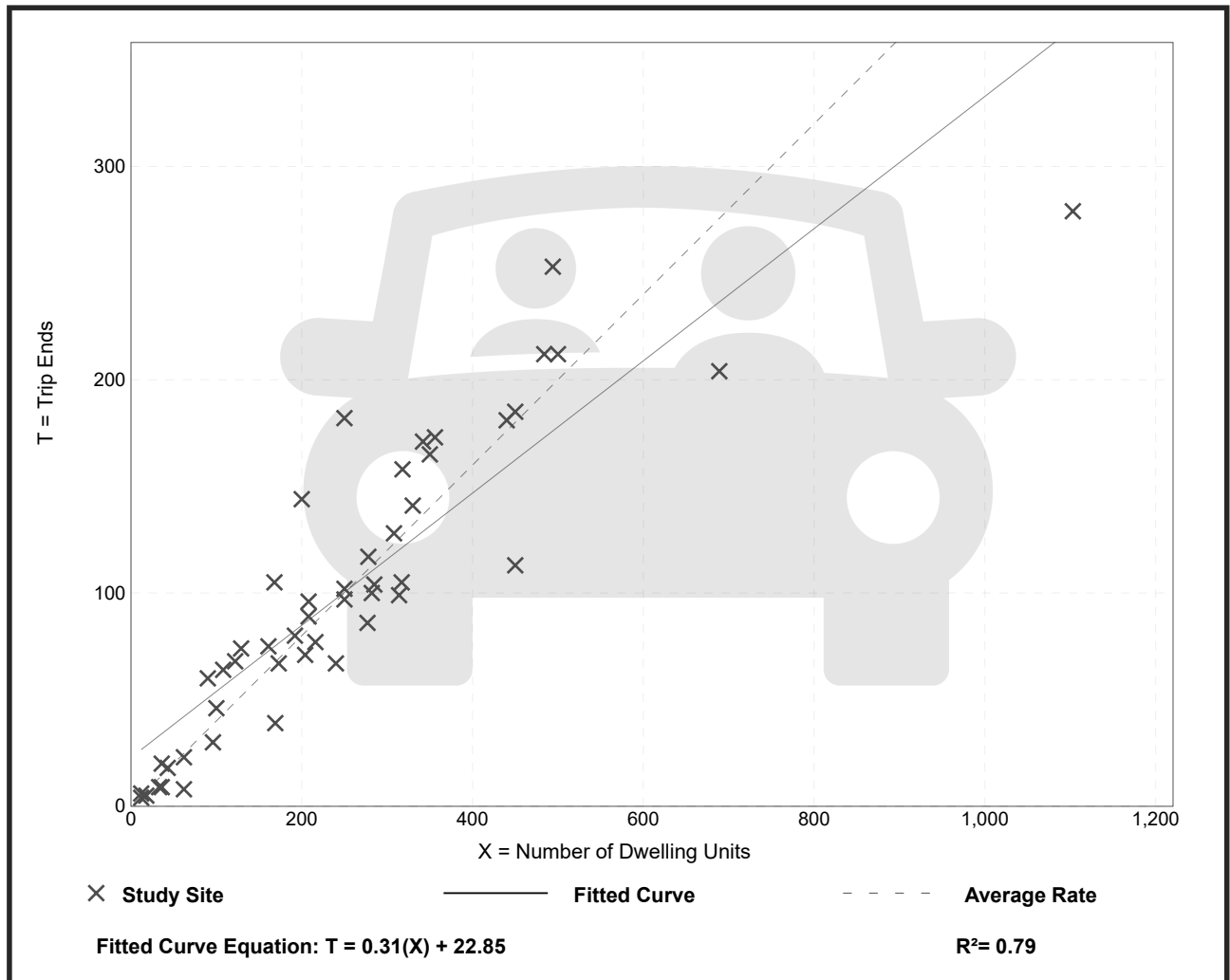
Avg. Num. of Dwelling Units: 249

Directional Distribution: 24% entering, 76% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.40	0.13 - 0.73	0.12

Data Plot and Equation



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 59

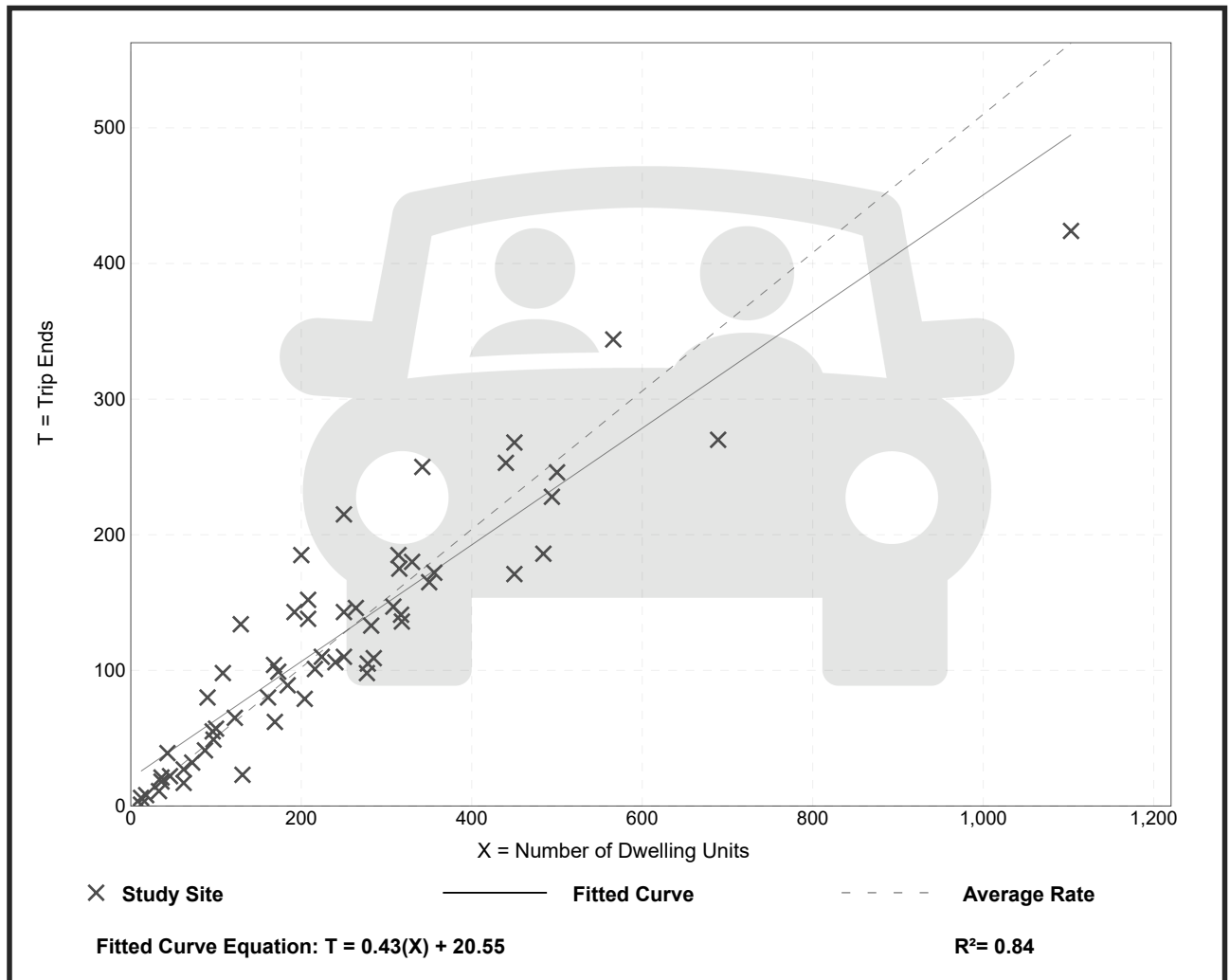
Avg. Num. of Dwelling Units: 241

Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.51	0.08 - 1.04	0.15

Data Plot and Equation



Proposed Site Development Trip Generation and Distribution

Project: 3930 Sixth Concession Road Townhomes

Site: Windsor, Ontario

Assumed Land Use (1): Single-Family Attached Housing - ITE No. 215

Average Vehicle Trip Ends vs.: Dwelling Units

ITE Trip Generation Data collected on a: Weekday

AM Peak Hour: = Average Rate

31	% Entering
69	% Exiting

PM Peak Hour: = Average Rate

57	% Entering
43	% Exiting

Assumed Land Use (1): Single-Family Attached Housing - ITE No. 215				
	Dwelling Units	Trips Generated	Trips Entering	Trips Exiting
AM Peak	8	4	1	3
PM Peak	8	5	3	2

Assumed Land Use (2): Multifamily Housing (Low-Rise) - ITE No. 220

Average Vehicle Trip Ends vs.: Dwelling Units

ITE Trip Generation Data collected on a: Weekday

AM Peak Hour: = Average Rate

24	% Entering
76	% Exiting

PM Peak Hour: = Average Rate

63	% Entering
37	% Exiting

Assumed Land Use (2): Multifamily Housing (Low-Rise) - ITE No. 220				
	Dwelling Units	Trips Generated	Trips Entering	Trips Exiting
AM Peak	16	6	2	4
PM Peak	16	8	5	3

Total Trips		
	Trips Entering	Trips Exiting
AM Peak	3	7
PM Peak	8	5

Appendix C

DETAILED SYNCHRO RESULTS

Provincial Road at Sixth Concession Road























Ducharme Street at Sixth Concession Road

Site Access at Ducharme Street

Holburn Street at Sixth Concession Road

Sixth Concession Road at Provincial Road
Windsor, Ontario

Existing Traffic AM Peak
Existing Geometric Configuration

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	358	52	33	401	25	94	119	79	13	50	3
Future Volume (vph)	9	358	52	33	401	25	94	119	79	13	50	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	57.0		0.0	150.0		0.0	15.0		10.0	28.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	55.0			100.0			28.0			52.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.981			0.991				0.850		0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1827	0	1770	1846	0	1770	1863	1583	1770	1848	0
Flt Permitted	0.497			0.436			0.719			0.585		
Satd. Flow (perm)	926	1827	0	814	1846	0	1341	1863	1583	1106	1848	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			5				75			3
Link Speed (k/h)		50			50			50				50
Link Distance (m)		335.3			326.1			502.6				219.6
Travel Time (s)		24.1			23.5			36.2				15.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	389	57	36	436	27	102	129	86	14	54	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	446	0	36	463	0	102	129	86	14	57	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2		1	6			4				4
Permitted Phases	2			6			4		4	4		
Detector Phase	2	2		1	6		4	4	4	4		4
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0		10.0	10.0	10.0	10.0		10.0
Minimum Split (s)	55.0	55.0		11.0	66.0		29.0	29.0	29.0	29.0		29.0
Total Split (s)	55.0	55.0		11.0	66.0		36.0	36.0	36.0	36.0		36.0
Total Split (%)	53.9%	53.9%		10.8%	64.7%		35.3%	35.3%	35.3%	35.3%		35.3%
Maximum Green (s)	50.0	50.0		7.0	61.0		31.0	31.0	31.0	31.0		31.0
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0		4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0		1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	5.0	5.0		4.0	5.0		5.0	5.0	5.0	5.0		5.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0		4.0
Recall Mode	C-Max	C-Max		None	C-Max		None	None	None	None		None
Walk Time (s)	7.0	7.0			7.0		7.0	7.0	7.0	7.0		7.0
Flash Dont Walk (s)	24.0	24.0			24.0		17.0	17.0	17.0	17.0		17.0
Pedestrian Calls (#/hr)	0	0			0		0	0	0	0		0
Act Effect Green (s)	70.8	70.8		78.4	77.4		14.6	14.6	14.6	14.6		14.6
Actuated g/C Ratio	0.69	0.69		0.77	0.76		0.14	0.14	0.14	0.14		0.14
v/c Ratio	0.02	0.35		0.05	0.33		0.53	0.49	0.30	0.09		0.21
Control Delay	7.9	8.6		3.7	5.1		50.0	45.6	13.5	36.7		37.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	7.9	8.6		3.7	5.1		50.0	45.6	13.5	36.7		37.2

Sixth Concession Road at Provincial Road
Windsor, Ontario

Existing Traffic AM Peak
Existing Geometric Configuration

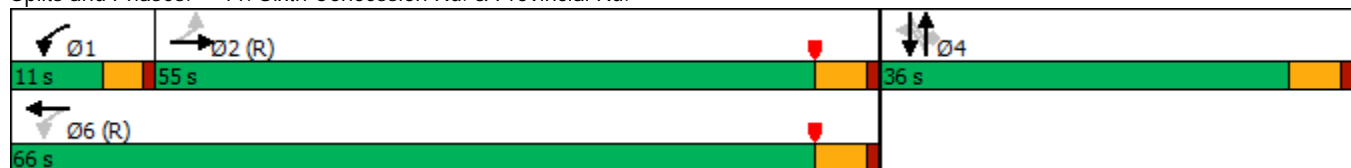


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	A	A		A	A		D	D	B	D	D	
Approach Delay		8.6			5.0			38.3			37.1	
Approach LOS		A			A			D			D	
Queue Length 50th (m)	0.7	37.0		1.4	24.4		20.1	25.3	2.0	2.6	10.2	
Queue Length 95th (m)	3.1	67.4		4.8	49.0		35.1	40.9	14.8	8.0	20.5	
Internal Link Dist (m)		311.3			302.1			478.6			195.6	
Turn Bay Length (m)	57.0			150.0			15.0		10.0	28.0		
Base Capacity (vph)	643	1271		690	1402		406	566	533	331	563	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.02	0.35		0.05	0.33		0.25	0.23	0.16	0.04	0.10	

Intersection Summary























Area Type:	Other
Cycle Length:	102
Actuated Cycle Length:	102
Offset:	0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Natural Cycle:	95
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.53
Intersection Signal Delay:	15.8
Intersection LOS:	B
Intersection Capacity Utilization:	51.2%
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 11: Sixth Concession Rd. & Provincial Rd.



Sixth Concession Road at Provincial Road
Windsor, Ontario

Existing Traffic PM Peak
Existing Geometric Configuration

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	650	127	111	624	30	105	125	93	15	133	4
Future Volume (vph)	4	650	127	111	624	30	105	125	93	15	133	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	57.0		0.0	150.0		0.0	15.0		10.0	28.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	55.0			100.0			28.0			52.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.976			0.993				0.850		0.996	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1818	0	1770	1850	0	1770	1863	1583	1770	1855	0
Flt Permitted	0.385			0.195			0.538			0.574		
Satd. Flow (perm)	717	1818	0	363	1850	0	1002	1863	1583	1069	1855	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			5				71			1
Link Speed (k/h)		50			50			50				50
Link Distance (m)		335.3			326.1			502.6				219.6
Travel Time (s)		24.1			23.5			36.2				15.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	707	138	121	678	33	114	136	101	16	145	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	845	0	121	711	0	114	136	101	16	149	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2		1	6			4				4
Permitted Phases	2			6			4		4	4		
Detector Phase	2	2		1	6		4	4	4	4		4
Switch Phase												
Minimum Initial (s)	10.0	10.0		8.0	10.0		10.0	10.0	10.0	10.0		10.0
Minimum Split (s)	68.0	68.0		12.0	80.0		29.0	29.0	29.0	29.0		29.0
Total Split (s)	68.0	68.0		12.0	80.0		30.0	30.0	30.0	30.0		30.0
Total Split (%)	61.8%	61.8%		10.9%	72.7%		27.3%	27.3%	27.3%	27.3%		27.3%
Maximum Green (s)	63.0	63.0		9.0	75.0		25.0	25.0	25.0	25.0		25.0
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0		4.0
All-Red Time (s)	1.0	1.0		0.0	1.0		1.0	1.0	1.0	1.0		1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	5.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0		5.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0		4.0
Recall Mode	C-Max	C-Max		None	C-Max		None	None	None	None		None
Walk Time (s)	7.0	7.0			7.0		7.0	7.0	7.0	7.0		7.0
Flash Dont Walk (s)	24.0	24.0			24.0		17.0	17.0	17.0	17.0		17.0
Pedestrian Calls (#/hr)	0	0			0		0	0	0	0		0
Act Effect Green (s)	71.1	71.1		84.3	82.3		17.7	17.7	17.7	17.7		17.7
Actuated g/C Ratio	0.65	0.65		0.77	0.75		0.16	0.16	0.16	0.16		0.16
v/c Ratio	0.01	0.72		0.32	0.51		0.71	0.45	0.32	0.09		0.50
Control Delay	9.2	18.4		6.2	8.0		65.9	45.3	16.7	37.3		46.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	9.2	18.4		6.2	8.0		65.9	45.3	16.7	37.3		46.3

Sixth Concession Road at Provincial Road
Windsor, Ontario

Existing Traffic PM Peak
Existing Geometric Configuration

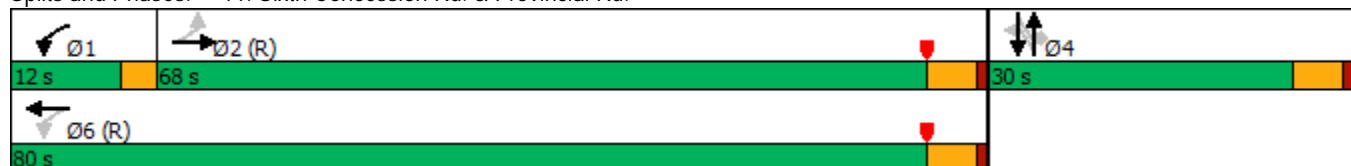


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	A	B		A	A		E	D	B	D	D	
Approach Delay		18.4			7.8			43.7			45.5	
Approach LOS		B			A			D			D	
Queue Length 50th (m)	0.3	111.7		5.6	54.8		24.7	28.2	5.9	3.1	30.9	
Queue Length 95th (m)	2.0	202.2		13.7	104.4		42.0	44.0	19.8	9.0	47.7	
Internal Link Dist (m)		311.3			302.1			478.6			195.6	
Turn Bay Length (m)	57.0			150.0			15.0		10.0	28.0		
Base Capacity (vph)	463	1179		393	1385		227	423	414	242	422	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.01	0.72		0.31	0.51		0.50	0.32	0.24	0.07	0.35	

Intersection Summary























Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	110
Offset:	105 (95%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Natural Cycle:	110
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.72
Intersection Signal Delay:	20.5
Intersection LOS:	C
Intersection Capacity Utilization	81.1%
ICU Level of Service	D
Analysis Period (min)	15

Splits and Phases: 11: Sixth Concession Rd. & Provincial Rd.



Sixth Concession Road at Provincial Road
Windsor, Ontario

Existing + Site Generated Traffic AM Peak
Existing Geometric Configuration

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	358	53	33	401	25	96	121	80	13	51	3
Future Volume (vph)	9	358	53	33	401	25	96	121	80	13	51	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	57.0		0.0	150.0		0.0	15.0		10.0	28.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	55.0			100.0			28.0			52.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.981			0.991				0.850		0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1827	0	1770	1846	0	1770	1863	1583	1770	1848	0
Flt Permitted	0.497			0.436			0.719			0.585		
Satd. Flow (perm)	926	1827	0	812	1846	0	1339	1863	1583	1090	1848	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			5				75			3
Link Speed (k/h)		50			50			50				50
Link Distance (m)		335.3			326.1			502.6				219.6
Travel Time (s)		24.1			23.5			36.2				15.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	389	58	36	436	27	104	132	87	14	55	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	447	0	36	463	0	104	132	87	14	58	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2		1	6			4				4
Permitted Phases	2			6			4		4	4		
Detector Phase	2	2		1	6		4	4	4	4		4
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0		10.0	10.0	10.0	10.0		10.0
Minimum Split (s)	55.0	55.0		11.0	66.0		29.0	29.0	29.0	29.0		29.0
Total Split (s)	55.0	55.0		11.0	66.0		36.0	36.0	36.0	36.0		36.0
Total Split (%)	53.9%	53.9%		10.8%	64.7%		35.3%	35.3%	35.3%	35.3%		35.3%
Maximum Green (s)	50.0	50.0		7.0	61.0		31.0	31.0	31.0	31.0		31.0
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0		4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0		1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	5.0	5.0		4.0	5.0		5.0	5.0	5.0	5.0		5.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0		4.0
Recall Mode	C-Max	C-Max		None	C-Max		None	None	None	None		None
Walk Time (s)	7.0	7.0			7.0		7.0	7.0	7.0	7.0		7.0
Flash Dont Walk (s)	24.0	24.0			24.0		17.0	17.0	17.0	17.0		17.0
Pedestrian Calls (#/hr)	0	0			0		0	0	0	0		0
Act Effect Green (s)	70.7	70.7		78.3	77.3		14.7	14.7	14.7	14.7		14.7
Actuated g/C Ratio	0.69	0.69		0.77	0.76		0.14	0.14	0.14	0.14		0.14
v/c Ratio	0.02	0.35		0.05	0.33		0.54	0.49	0.30	0.09		0.22
Control Delay	8.0	8.7		3.8	5.2		50.1	45.6	13.6	36.5		37.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	8.0	8.7		3.8	5.2		50.1	45.6	13.6	36.5		37.1

Sixth Concession Road at Provincial Road
Windsor, Ontario

Existing + Site Generated Traffic AM Peak
Existing Geometric Configuration

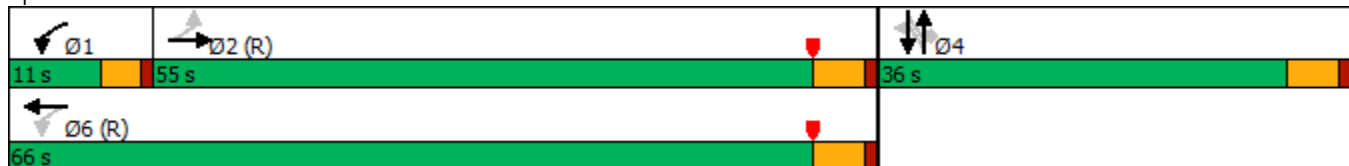


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	A	A		A	A		D	D	B	D	D	
Approach Delay		8.7			5.1			38.4			37.0	
Approach LOS		A			A			D			D	
Queue Length 50th (m)	0.7	37.4		1.4	24.7		20.5	25.8	2.2	2.6	10.3	
Queue Length 95th (m)	3.1	68.0		4.8	49.4		35.6	41.6	15.0	8.0	20.7	
Internal Link Dist (m)		311.3			302.1			478.6			195.6	
Turn Bay Length (m)	57.0			150.0			15.0		10.0	28.0		
Base Capacity (vph)	641	1269		689	1400		406	566	533	331	563	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.02	0.35		0.05	0.33		0.26	0.23	0.16	0.04	0.10	

Intersection Summary























Area Type:	Other
Cycle Length:	102
Actuated Cycle Length:	102
Offset:	0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Natural Cycle:	95
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.54
Intersection Signal Delay:	16.0
Intersection LOS:	B
Intersection Capacity Utilization:	51.2%
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 11: Sixth Concession Rd. & Provincial Rd.



Sixth Concession Road at Provincial Road
Windsor, Ontario

Existing + Site Generated Traffic PM Peak
Existing Geometric Configuration

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	650	128	112	624	30	106	126	94	15	135	4
Future Volume (vph)	4	650	128	112	624	30	106	126	94	15	135	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	57.0		0.0	150.0		0.0	15.0		10.0	28.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	55.0			100.0			28.0			52.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.975			0.993				0.850		0.996	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1816	0	1770	1850	0	1770	1863	1583	1770	1855	0
Flt Permitted	0.385			0.194			0.533			0.572		
Satd. Flow (perm)	717	1816	0	361	1850	0	993	1863	1583	1065	1855	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			5				71			1
Link Speed (k/h)		50			50			50				50
Link Distance (m)		335.3			326.1			502.6				219.6
Travel Time (s)		24.1			23.5			36.2				15.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	707	139	122	678	33	115	137	102	16	147	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	846	0	122	711	0	115	137	102	16	151	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2		1	6			4				4
Permitted Phases	2			6			4		4	4		
Detector Phase	2	2		1	6		4	4	4	4		4
Switch Phase												
Minimum Initial (s)	10.0	10.0		8.0	10.0		10.0	10.0	10.0	10.0		10.0
Minimum Split (s)	68.0	68.0		12.0	80.0		29.0	29.0	29.0	29.0		29.0
Total Split (s)	68.0	68.0		12.0	80.0		30.0	30.0	30.0	30.0		30.0
Total Split (%)	61.8%	61.8%		10.9%	72.7%		27.3%	27.3%	27.3%	27.3%		27.3%
Maximum Green (s)	63.0	63.0		9.0	75.0		25.0	25.0	25.0	25.0		25.0
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0		4.0
All-Red Time (s)	1.0	1.0		0.0	1.0		1.0	1.0	1.0	1.0		1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	5.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0		5.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0		4.0
Recall Mode	C-Max	C-Max		None	C-Max		None	None	None	None		None
Walk Time (s)	7.0	7.0			7.0		7.0	7.0	7.0	7.0		7.0
Flash Dont Walk (s)	24.0	24.0			24.0		17.0	17.0	17.0	17.0		17.0
Pedestrian Calls (#/hr)	0	0			0		0	0	0	0		0
Act Effect Green (s)	70.9	70.9		84.2	82.2		17.8	17.8	17.8	17.8		17.8
Actuated g/C Ratio	0.64	0.64		0.77	0.75		0.16	0.16	0.16	0.16		0.16
v/c Ratio	0.01	0.72		0.32	0.51		0.72	0.46	0.32	0.09		0.50
Control Delay	9.2	18.6		6.3	8.1		66.8	45.2	16.9	37.1		46.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	9.2	18.6		6.3	8.1		66.8	45.2	16.9	37.1		46.3

Sixth Concession Road at Provincial Road
Windsor, Ontario

Existing + Site Generated Traffic PM Peak
Existing Geometric Configuration



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	A	B		A	A		E	D	B	D	D	
Approach Delay		18.6			7.8			44.0			45.4	
Approach LOS		B			A			D			D	
Queue Length 50th (m)	0.3	112.7		5.8	55.2		24.9	28.4	6.1	3.1	31.3	
Queue Length 95th (m)	2.0	203.1		13.7	104.4		42.4	44.2	20.0	9.0	48.2	
Internal Link Dist (m)		311.3			302.1			478.6			195.6	
Turn Bay Length (m)	57.0			150.0			15.0		10.0	28.0		
Base Capacity (vph)	462	1176		391	1383		225	423	414	242	422	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.01	0.72		0.31	0.51		0.51	0.32	0.25	0.07	0.36	

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	110
Offset:	105 (95%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Natural Cycle:	110
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.72
Intersection Signal Delay:	20.6
Intersection LOS:	C
Intersection Capacity Utilization:	81.2%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 11: Sixth Concession Rd. & Provincial Rd.



Intersection												
Int Delay, s/veh	6.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Traffic Vol, veh/h	6	26	1	63	0	137	0	130	39	72	54	3
Future Vol, veh/h	6	26	1	63	0	137	0	130	39	72	54	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Free
Storage Length	-	-	-	-	-	-	-	-	-	-	-	5
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	28	1	68	0	149	0	141	42	78	59	3

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	452	398	59	392	377	162	-	0	0	183	0	0
Stage 1	215	215	-	162	162	-	-	-	-	-	-	-
Stage 2	237	183	-	230	215	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	518	540	1007	567	555	883	0	-	-	1392	-	0
Stage 1	787	725	-	840	764	-	0	-	-	-	-	0
Stage 2	766	748	-	773	725	-	0	-	-	-	-	0
Platoon blocked, %												
Mov Cap-1 Maneuver	412	509	1007	519	523	883	-	-	-	1392	-	-
Mov Cap-2 Maneuver	412	509	-	519	523	-	-	-	-	-	-	-
Stage 1	787	683	-	840	764	-	-	-	-	-	-	-
Stage 2	637	748	-	697	683	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	12.8		12.1		0		4.4	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	495	723	1392	-
HCM Lane V/C Ratio	-	-	0.072	0.301	0.056	-
HCM Control Delay (s)	-	-	12.8	12.1	7.7	0
HCM Lane LOS	-	-	B	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	1.3	0.2	-

Intersection												
Int Delay, s/veh	5.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↔			↕	↕
Traffic Vol, veh/h	3	33	1	45	0	99	0	126	29	87	121	5
Future Vol, veh/h	3	33	1	45	0	99	0	126	29	87	121	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Free
Storage Length	-	-	-	-	-	-	-	-	-	-	-	5
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	36	1	49	0	108	0	137	32	95	132	5

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	529	491	132	494	475	153	-	0	0	169	0	0
Stage 1	322	322	-	153	153	-	-	-	-	-	-	-
Stage 2	207	169	-	341	322	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	460	478	917	486	488	893	0	-	-	1409	-	0
Stage 1	690	651	-	849	771	-	0	-	-	-	-	0
Stage 2	795	759	-	674	651	-	0	-	-	-	-	0
Platoon blocked, %												
Mov Cap-1 Maneuver	382	443	917	430	452	893	-	-	-	1409	-	-
Mov Cap-2 Maneuver	382	443	-	430	452	-	-	-	-	-	-	-
Stage 1	690	603	-	849	771	-	-	-	-	-	-	-
Stage 2	699	759	-	587	603	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	13.9		12		0		3.2	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	443	668	1409	-
HCM Lane V/C Ratio	-	-	0.091	0.234	0.067	-
HCM Control Delay (s)	-	-	13.9	12	7.7	0
HCM Lane LOS	-	-	B	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0.9	0.2	-

Intersection												
Int Delay, s/veh	6.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↔			↕	↗
Traffic Vol, veh/h	6	26	1	65	0	142	0	130	40	74	54	3
Future Vol, veh/h	6	26	1	65	0	142	0	130	40	74	54	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Free
Storage Length	-	-	-	-	-	-	-	-	-	-	-	5
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	28	1	71	0	154	0	141	43	80	59	3

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	459	403	59	397	382	163	-	0	0	184	0	0
Stage 1	219	219	-	163	163	-	-	-	-	-	-	-
Stage 2	240	184	-	234	219	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	512	536	1007	563	551	882	0	-	-	1391	-	0
Stage 1	783	722	-	839	763	-	0	-	-	-	-	0
Stage 2	763	747	-	769	722	-	0	-	-	-	-	0
Platoon blocked, %												
Mov Cap-1 Maneuver	403	504	1007	514	518	882	-	-	-	1391	-	-
Mov Cap-2 Maneuver	403	504	-	514	518	-	-	-	-	-	-	-
Stage 1	783	679	-	839	763	-	-	-	-	-	-	-
Stage 2	629	747	-	693	679	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	12.9		12.3		0		4.5	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBT	NBR	EBLn1WBLn1	SBL	SBT
Capacity (veh/h)	-	-	489	720	1391
HCM Lane V/C Ratio	-	-	0.073	0.312	0.058
HCM Control Delay (s)	-	-	12.9	12.3	7.7
HCM Lane LOS	-	-	B	B	A
HCM 95th %tile Q(veh)	-	-	0.2	1.3	0.2

Intersection												
Int Delay, s/veh	5.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↔			↕	↗
Traffic Vol, veh/h	3	35	1	47	0	102	0	126	31	91	121	5
Future Vol, veh/h	3	35	1	47	0	102	0	126	31	91	121	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Free
Storage Length	-	-	-	-	-	-	-	-	-	-	-	5
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	38	1	51	0	111	0	137	34	99	132	5

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	540	501	132	504	484	154	-	0	0	171	0	0
Stage 1	330	330	-	154	154	-	-	-	-	-	-	-
Stage 2	210	171	-	350	330	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	453	472	917	478	483	892	0	-	-	1406	-	0
Stage 1	683	646	-	848	770	-	0	-	-	-	-	0
Stage 2	792	757	-	666	646	-	0	-	-	-	-	0
Platoon blocked, %								-	-	-		
Mov Cap-1 Maneuver	374	436	917	420	446	892	-	-	-	1406	-	-
Mov Cap-2 Maneuver	374	436	-	420	446	-	-	-	-	-	-	-
Stage 1	683	597	-	848	770	-	-	-	-	-	-	-
Stage 2	694	757	-	575	597	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	14.1		12.2		0		3.3	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	436	659	1406	-
HCM Lane V/C Ratio	-	-	0.097	0.246	0.07	-
HCM Control Delay (s)	-	-	14.1	12.2	7.8	0
HCM Lane LOS	-	-	B	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	1	0.2	-

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Vol, veh/h	3	137	200	0	0	7
Future Vol, veh/h	3	137	200	0	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	149	217	0	0	8

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	217	0	-	0	372
Stage 1	-	-	-	-	217
Stage 2	-	-	-	-	155
Critical Hdwy	4.12	-	-	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	2.218	-	-	-	3.518
Pot Cap-1 Maneuver	1353	-	-	-	629
Stage 1	-	-	-	-	819
Stage 2	-	-	-	-	873
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1353	-	-	-	628
Mov Cap-2 Maneuver	-	-	-	-	628
Stage 1	-	-	-	-	817
Stage 2	-	-	-	-	873

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1353	-	-	-	823
HCM Lane V/C Ratio	0.002	-	-	-	0.009
HCM Control Delay (s)	7.7	0	-	-	9.4
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Vol, veh/h	8	149	144	0	0	5
Future Vol, veh/h	8	149	144	0	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	162	157	0	0	5

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	157	0	-	0	337
Stage 1	-	-	-	-	157
Stage 2	-	-	-	-	180
Critical Hdwy	4.12	-	-	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	2.218	-	-	-	3.518
Pot Cap-1 Maneuver	1423	-	-	-	658
Stage 1	-	-	-	-	871
Stage 2	-	-	-	-	851
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1423	-	-	-	653
Mov Cap-2 Maneuver	-	-	-	-	653
Stage 1	-	-	-	-	865
Stage 2	-	-	-	-	851

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1423	-	-	-	889
HCM Lane V/C Ratio	0.006	-	-	-	0.006
HCM Control Delay (s)	7.5	0	-	-	9.1
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Intersection Delay, s/veh	10.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	19	51	214	16	13	24	88	162	11	69	9
Future Vol, veh/h	25	19	51	214	16	13	24	88	162	11	69	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	27	21	55	233	17	14	26	96	176	12	75	10
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.9	11.4	10.7	9.2
HCM LOS	A	B	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	9%	26%	88%	12%
Vol Thru, %	32%	20%	7%	78%
Vol Right, %	59%	54%	5%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	274	95	243	89
LT Vol	24	25	214	11
Through Vol	88	19	16	69
RT Vol	162	51	13	9
Lane Flow Rate	298	103	264	97
Geometry Grp	1	1	1	1
Degree of Util (X)	0.385	0.146	0.377	0.143
Departure Headway (Hd)	4.655	5.073	5.141	5.314
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	765	710	692	679
Service Time	2.74	3.079	3.24	3.314
HCM Lane V/C Ratio	0.39	0.145	0.382	0.143
HCM Control Delay	10.7	8.9	11.4	9.2
HCM Lane LOS	B	A	B	A
HCM 95th-tile Q	1.8	0.5	1.8	0.5

Intersection	
Intersection Delay, s/veh	11.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	18	33	25	167	49	23	49	105	181	31	118	12
Future Vol, veh/h	18	33	25	167	49	23	49	105	181	31	118	12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	36	27	182	53	25	53	114	197	34	128	13
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.5	12.3	12.7	10.4
HCM LOS	A	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	15%	24%	70%	19%
Vol Thru, %	31%	43%	21%	73%
Vol Right, %	54%	33%	10%	7%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	335	76	239	161
LT Vol	49	18	167	31
Through Vol	105	33	49	118
RT Vol	181	25	23	12
Lane Flow Rate	364	83	260	175
Geometry Grp	1	1	1	1
Degree of Util (X)	0.496	0.13	0.4	0.265
Departure Headway (Hd)	4.901	5.651	5.548	5.444
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	736	633	649	660
Service Time	2.934	3.699	3.586	3.484
HCM Lane V/C Ratio	0.495	0.131	0.401	0.265
HCM Control Delay	12.7	9.5	12.3	10.4
HCM Lane LOS	B	A	B	B
HCM 95th-tile Q	2.8	0.4	1.9	1.1

Intersection	
Intersection Delay, s/veh	10.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	19	51	214	16	13	24	89	162	11	71	9
Future Vol, veh/h	25	19	51	214	16	13	24	89	162	11	71	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	27	21	55	233	17	14	26	97	176	12	77	10
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9	11.4	10.7	9.2
HCM LOS	A	B	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	9%	26%	88%	12%
Vol Thru, %	32%	20%	7%	78%
Vol Right, %	59%	54%	5%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	275	95	243	91
LT Vol	24	25	214	11
Through Vol	89	19	16	71
RT Vol	162	51	13	9
Lane Flow Rate	299	103	264	99
Geometry Grp	1	1	1	1
Degree of Util (X)	0.387	0.146	0.378	0.146
Departure Headway (Hd)	4.661	5.084	5.151	5.313
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	762	708	689	679
Service Time	2.746	3.09	3.249	3.319
HCM Lane V/C Ratio	0.392	0.145	0.383	0.146
HCM Control Delay	10.7	9	11.4	9.2
HCM Lane LOS	B	A	B	A
HCM 95th-tile Q	1.8	0.5	1.8	0.5

Intersection	
Intersection Delay, s/veh	11.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	18	33	25	167	49	23	49	107	181	31	120	12
Future Vol, veh/h	18	33	25	167	49	23	49	107	181	31	120	12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	36	27	182	53	25	53	116	197	34	130	13
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.6	12.3	12.8	10.5
HCM LOS	A	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	15%	24%	70%	19%
Vol Thru, %	32%	43%	21%	74%
Vol Right, %	54%	33%	10%	7%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	337	76	239	163
LT Vol	49	18	167	31
Through Vol	107	33	49	120
RT Vol	181	25	23	12
Lane Flow Rate	366	83	260	177
Geometry Grp	1	1	1	1
Degree of Util (X)	0.499	0.13	0.401	0.268
Departure Headway (Hd)	4.906	5.663	5.559	5.447
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	733	631	647	659
Service Time	2.941	3.712	3.597	3.489
HCM Lane V/C Ratio	0.499	0.132	0.402	0.269
HCM Control Delay	12.8	9.6	12.3	10.5
HCM Lane LOS	B	A	B	B
HCM 95th-tile Q	2.8	0.4	1.9	1.1

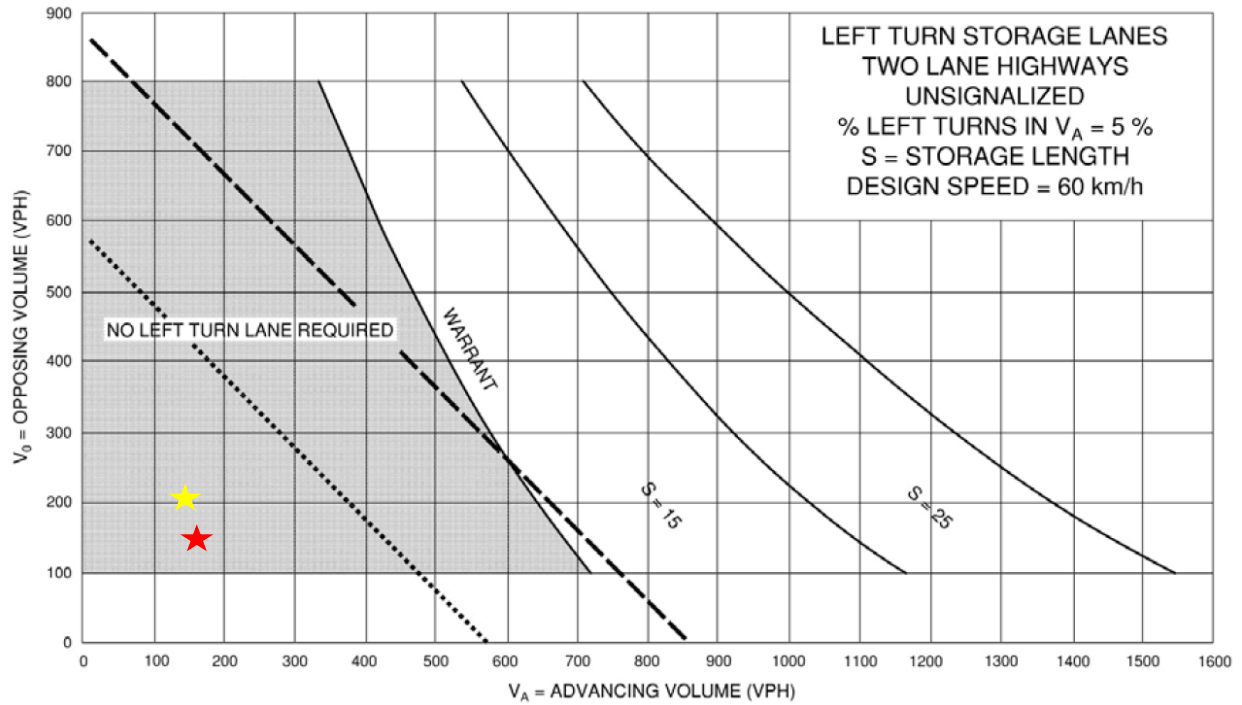
Appendix D

LEFT TURN LANE WARRANTS

Site Access at Ducharme Street

Site Access at Ducharme Street – Eastbound Left Turn Lane Warrants

Existing + Site Generated Traffic – AM & PM Peak Hours



----- TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

..... TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

★ AM Peak Hour

★ PM Peak Hour

Peak Period	Approaching Volume	Opposing Volume	# Left Turns	% Left Turns	Storage Required (m)
AM	140	200	3	2.1	0
PM	157	144	8	5.1	0

Appendix E

SIGHT LINE CALCULATIONS

Site Access at Ducharme Street

23-1502: 3930 Sixth Concession Road Townhomes, Windsor, Ontario - Sight Line Analysis

Design Intersection Sight Distance (TAC Geometric Design Guide for Canadian Roads)

Design Speed: 60km/h (Posted Speed Limit = 50 km/h)

Table 9.9.3: Time Gap for Case B1, Left Turn from Stop

Design Vehicle	Time Gap (t_g)(s) at Design Speed of Major Road
Passenger car	7.5
Single-unit truck	9.5
Combination truck (WB 19 and WB 20)	11.5
Longer truck	To be established by road authority

Intersection Stopping Distance (**ISD**) = $0.278 V_{\text{major}} t_g$

Where:

- ISD = intersection sight distance (m)
(length of the leg of sight triangle along the major road)
- V_{major} = design speed of the major road (km/h)
- t_g = time gap for minor road vehicle to enter the major road (s)

$ISD_{\text{passenger car}}$ (left turn from stop) = $0.278 \times 60 \times 7.5 = 125 \text{ m}$

Table 9.9.5: Time Gap for Case B2—Right Turn from Stop and Case B3—Crossing Maneuver

Design Vehicle	Time Gap (t_g)(s) at Design Speed of Major Road
Passenger car	6.5
Single-unit truck	8.5
Combination truck (WB 19 and WB 20)	10.5

$ISD_{\text{passenger car}}$ (right turn from stop) = $0.278 \times 60 \times 6.5 = 108 \text{ m}$