TRAFFIC IMPACT ASSESSMENT
RESIDENTIAL DEVELOPMENT
6TH CONCESSION ROAD
WINDSOR, ONTARIO

PROJECT NO. 21-150

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1. INTRODUCTION

Baird AE has been retained to prepare a Traffic Impact Assessment in support of the residential development in City of Windsor. The site is approximately 0.844 hectares (ha) in size and bounded by 6th Concession Road to the west, Holburn Street to the north, Spago Crescent to the south and residential development to the north and east.

The proposed development will consist of twenty-six single-family houses, a roadway and a landscape area. The site will generate an additional 248 daily, 20 morning and 26 evening peak traffic. Exhibit 1 shows the location.

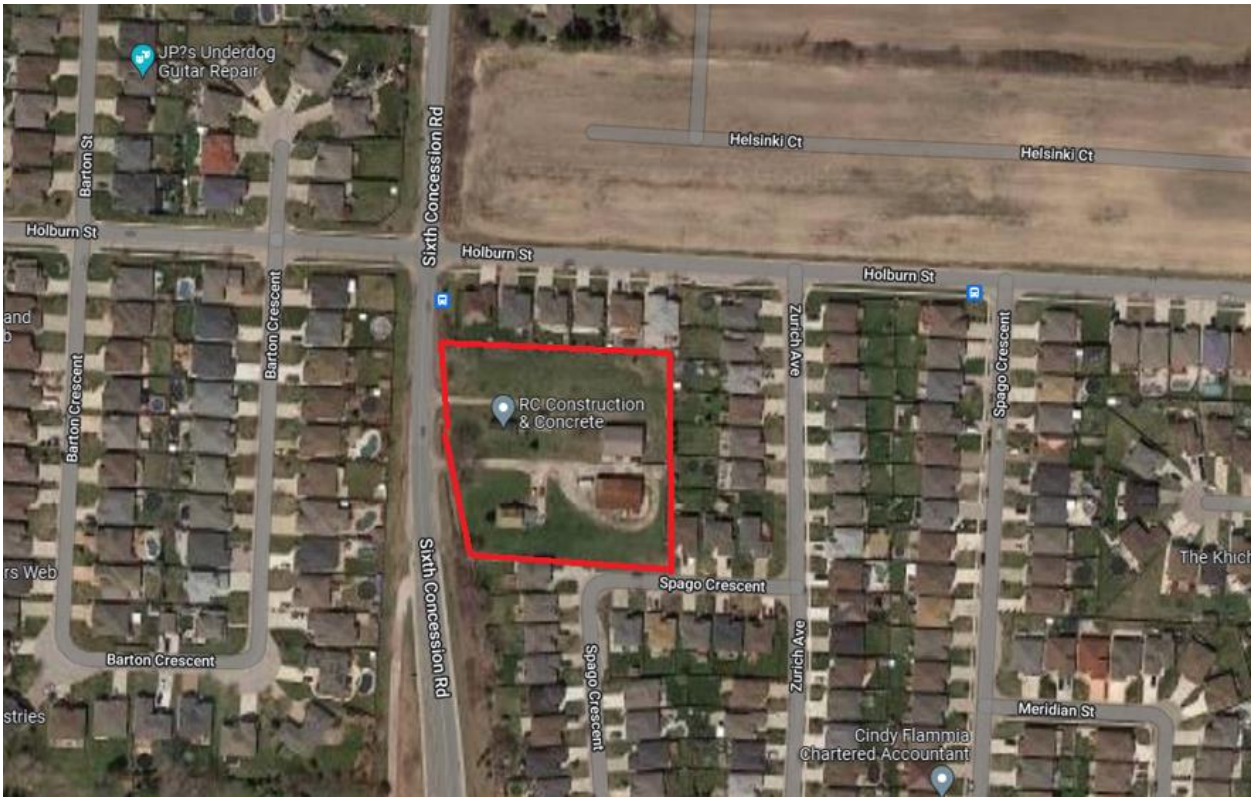

Exhibit 1 - Location Plan

1.1 Scope

The development currently has a house, shed and storage buildings. All existing buildings will be removed and replaced with townhouses, a new roadway and a landscape area. Access to the site will be provided from Spago Crescent. The development is projected to be built by 2025 and as a result, the following future horizon periods (conditions) were established as part of this study:

- 2025 Future Condition;
- 2030 Short Term Future Condition; and
- 2035 Long Term Future Condition.

The following intersection were included in the study in order to determine the impact of the proposed development:

- 6th Concession Road ad Holburn Street
- Holburn Street and Zurich Avenue

1.2 Analysis Methodology

A transportation analysis was completed to determine the existing and future operating conditions of intersection and individual turning movements. The operational analyses were primarily based on procedures set out in the Highway Capacity Manual (2010) with the assistance of Synchro 10. Several performance measures are used in the analysis of signalized and unsignalized intersections including the following:

- Level of Service (LOS) – a measure of the average vehicle delay experienced by the motorists attempting to travel through the intersection. LOS is measured from "A" to "F" with peak hour LOS in the "A" to "D" range being considered acceptable by most and a LOS of F representing unacceptable delays;
- Delay – the additional travel time experienced by a driver compared to free-flow conditions; and
- Queue Lengths – the Synchro Software measures both the 50th percentile and 95th percentile maximum queue lengths. The 50th percentile queue (the median) is the maximum back of queue length during a typical traffic cycle. The 95th percentile queue is the maximum back of queue length during a typical traffic cycle with 95th percentile traffic volumes. The 95th percentile queue measures the queue length that 95 percent of the sample lies below. The 95th percentile critical queue lengths were identified for movements where the queue surpassed the estimated length of the storage bay.

These measures provide an indication of delay and the number of vehicles that can be accommodated through an intersection.

2.0 EXISTING CONDITIONS

2.1 Existing Site

The existing development consists of three existing buildings. The total area of development is approximately 0.84ha.

2.2 Road Network Characteristics

The existing road network, lane configuration and existing traffic control for the study area are described below:

6th Concession Road is a local two-lane north-south roadway with a posted speed limit of 50 km/h. It has a gravel pathway on both sides.

Holburn Street is a local two-lane east-west roadway with a posted speed limit of 50 km/h. It has a sidewalk on both sides.

2.3 Key Intersections

Holburn Street with 6th Concession Road and Zurich Avenue are 4-leg and 3-leg unsignalized intersections. The intersections have the following configuration:

6th Concession Road and Holburn Street

- Northbound approach has one left-through shared lane.
- Southbound approach has one through-right shared lane.
- Eastbound approach has one through-right shared lane, and “Stop” Control.
- Westbound approach has one through-right shared lane, and “Stop” Control.

6th Concession Road and Zurich Avenue

- Northbound approach has one left-through shared lane, and “Stop” Control.
- Eastbound approach has one left-right shared lane.
- Westbound approach has one left-right shared lane.

2.4 Existing Traffic Volumes

Traffic counts were taken at the intersections of 6th Concession Road with Holburn Street on July 26, 2022. Counts were taken by our sub-consultant; Pyramid Traffic Inc. Counts were recorded in 15-minute increments from 8:00am to 5:30pm. The existing traffic volumes and other relevant data are included in Appendix A.

3.0 FUTURE CONDITIONS

3.1 Growth Rate

For this study, a conservative growth rate of 3% per year was assumed to reflect growth in background traffic volumes. The projected traffic volumes are provided in Appendix B.

3.2 Future Background Development

The surrounding users of 6th Concession Road and Holburn Street will continue to grow. At this time, no new future development is known within the vicinity of development except one to the north of Holburn Street, which is newly constructed. Hence, it is assumed that this new development's traffic is already accounted for in the traffic counts.

4.0 DEVELOPMENT TRAFFIC

This section will describe the development access, trip generation, trip distribution and ultimate peak hour traffic.

4.1 Development Access

Access to the development is provided from Spago Crescent. The developments' site plan is provided in Appendix A and new intersections have the following configuration:

<u>6th Concession Road and Access Road 1</u>

- Eastbound approach has left-right shared lane.
- Southbound approach has one left-through shared lane.
- Northbound approach has one through-right shared lane.

4.2 Trip Generation

The number of vehicle trips anticipated to be generated by the proposed development was calculated based on trip generation rates published by The Institution of Transportation Engineers (ITE) Trip Generation 9th Edition.

The development will consist of 26 townhouses. Based on ITE manual, ITE 210 single-family houses represent the worst case scenario and will be use to estimate development's trip.

Description of Land use, ITE codes, unit sizes, trip generation rate and trip generation for daily and peak hours are provided in Table 1. Appendix B provides detailed calculations and all relevant charts.

Table 1: Trip Generation

Use	ITE	UNITS	AADT	Trip Generated			
				AM Hour		PM Hour	
				In	Out	In	Out
Proposed Development							
Proposed Development Single Family House	210	26	248	5	15	16	10
		Total Trips	**885**	**5**	**15**	**16**	**10**

4.3 Trip Distribution and Assignment

The proposed development traffic trip is based on shortest route to reach major city i.e., City of Windsor. The proposed traffic distribution is shown below and in figures 1.2, 2.2 and 3.2 (see Appendix B).

Table 2: Trip Distribution

From/To	Distribution
6th Concession Road	80%
Zurich Ave	20%
Total	**100%**

Detailed travelled patterns and trip assignment at intersections are provided in Figures 1.1, 2.1 and 3.1 (see Appendix B).

4.4 Future Condition

Development traffic volumes were added to the forecasted (2025, 2030 and 2035) background traffic volumes to obtain corresponding total traffic volumes at intersections. The projected total future volumes are provided in Figures 1.3, 2.3, and 3.3 (see Appendix B).

5.0 INTERSECTION OPERATIONS

The forecasted 2025, 2030 and 2035 traffic volumes for the study intersections are evaluated using the Synchro/Sim Traffic software, which automates the procedures contained in the Highway Capacity Manual 2010.

The future peak hours analysis results are included in Table 3, 4 and 5, and corresponding worksheets in Appendix C.

Table 3: 2025 Traffic Condition – Level of Service

Intersection	A.M. Peak Hour			P.M. Peak Hour		
	LOS	v/c	Delay (sec)	LOS	v/c	Delay (sec)
Holburn Street and 6th Concession Rd (Unsignalized)						
EB LTR	B	0.10	10.8	C	0.21	16.6
WB LTR	c	0.34	15.3	D	0.57	29.4
NB LTR	A	0.01	0.4	A	0.04	1.4
SB LTR	A	0.01	0.7	A	0.03	1.4
Overall LOS	**A**			**A**		
Holburn Street and Zurich Avenue (Unsignalized)						
EB TR	A	0.04	0.0	A	0.13	0.0
WB LT	A	0.0	0.1	A	0.01	0.5
NB LR	A	0.06	9.9	A	0.05	11.0
Overall LOS	**A**			**A**		

Note: NB – Northbound SB – Southbound EB – Eastbound WB – Westbound; LTR – Left/Through/Right turn

Table 4: 2030 Traffic Condition – Level of Service

Intersection	A.M. Peak Hour			P.M. Peak Hour		
	LOS	v/c	Delay (sec)	LOS	v/c	Delay (sec)
Holburn Street and 6th Concession Rd (Unsignalized)						
EB LTR	B	0.11	11.0	C	0.27	19.6
WB LTR	C	0.37	15.0	**F**	**0.77**	**20.9**
NB LTR	A	0.01	0.4	A	0.05	1.5
SB LTR	A	0.01	0.7	A	0.04	1.5
Overall LOS	**A**			**A**		
Holburn Street and Zurich Avenue (Unsignalized)						
EB TR	A	0.05	0.0	A	0.15	0.0
WB LT	A	0.0	0.1	A	0.01	0.4
NB LR	A	0.06	10.1	A	0.05	11.5
Overall LOS	**A**			**A**		

Table 5: 2035 Traffic Condition – Level of Service

Intersection	A.M. Peak Hour			P.M. Peak Hour		
	LOS	v/c	Delay (sec)	LOS	v/c	Delay (sec)
Holburn Street and 6th Concession Rd (Unsignalized)						
EB LTR	B	0.13	11.5	C	0.36	24.4
WB LTR	C	0.43	17.0	**F**	**1.03**	**111.1**
NB LTR	A	0.01	0.4	A	0.05	1.6
SB LTR	A	0.01	0.7	A	0.05	1.5
Overall LOS	**A**			**B**		
Holburn Street and Zurich Avenue (Unsignalized)						
EB TR	A	0.06	0.0	A	0.17	0.0
WB LT	A	0.0	0.1	A	0.01	0.4
NB LR	A	0.06	10.3	B	0.05	12.0
Overall LOS	**A**			**A**		

Under 2025, 2030 and 2035 future conditions, the intersections are projected to operate at an acceptable LOS during peak hours. However, westbound turning traffic operates at LOS F during 2030 and 2035 evening conditions. Hence, mitigation measures are required. Warrant analysis was completed and details are provided in the section below.

6.0 WARRANT ANALYSIS

6.1 Left and Right Turn Lane Warrants

Left Turn Lane

An assessment for the requirement of a left turn lane was completed for westbound traffic at the intersection of 6th Concession Road with Holburn Street using the MTO Geometric Design Guide. The results of the assessment are summarized in the table below:

Table 6: 2035 Left Warrants – Intersection of 6th Concession Rd and Holburn St

Criteria	AM Peak Hour Traffic Volumes	PM Peak Hour Traffic Volumes
Westbound Left Turn (WBL)	175	162
Advancing WB Volumes; Va	192	224
% Left Turn in Va	90%	72%
Opposing Traffic Southbound (EB)	76	96
Requirement; Justification	Not Req'd	Not Req'd

Figures EA-2 and EA-3 (see Appendix D) show that a left turn late is not warranted on Bevel Line Road (CR33) and Torrey Pine Drive intersection. Results are provided in Appendix D.

Right Turn Lane

The right turn warrant analysis was carried out for the intersection of 6th Concession Road and Holburn Street. Based on MTO guidelines (Geometric Design Standards for Ontario Highways), if right-turning vehicles are more than 60vph or right turning vehicles create a hazard or reduce capacity at the intersection, right-turn lane warrants are needed.

Based on forecasted total traffic counts, an exclusive northbound right turn lane is needed for the 2025 condition.

6.2 Signal Warrant

Traffic signal warrant analysis was undertaken for the intersections of 6th Concession Road with Holburn Street. The analysis was based on the Transportation Association of Canada (TAC) traffic signal procedure which requires 100 warrant points to trigger a signal at the intersection.

Based on 2035 background traffic volumes, signals are warranted. Detailed calculations are provided in Appendix D.

6.3 Improved Intersection Analysis

As described in section 6.0, the improved intersection analysis was conducted and results are included in Table 7 and corresponding worksheets are included in Appendix C.

Table 7: Traffic Condition – Level of Service

Intersection	2030 PM PEAK TRAFFIC			2035 PM PEAK TRAFFIC		
	LOS	v/c	Delay (sec)	LOS	v/c	Delay (sec)
Holburn Street and 6th Concession Rd (Unsignalized)						
EB LTR	A	0.1	8.6	A	0.17	8.8
WB LTR	B	0.44	14.6	B	0.50	15.7
NB LTR	B	0.44	10.2	A	0.50	10.9
SB LTR	B	0.54	16.2	A	0.61	17.8
Overall LOS	**A**			**A**		

The intersection operates at an acceptable level of service during the 2030 and 2035 evening conditions.

7.0 CONCLUSION

Based on our review, we provide the following preliminary comments for the development:

- The existing site consists of three (3) buildings that be removed.

- The proposed development will have 26 townhouses, roadway and landscape areas in a 0.84ha area.

- The background growth rate of 2 percent was considered in the modelling as it represents the worst-case scenario.

- One full access road from Spago Crescent will be provided to serve the development. Spago Crescent forms the west-leg with Zurich Avenue within proximity of development.

- The proposed development is expected to generate 76 two-way trips during morning peak hours and 86 two-way trips during evening peak hours. It is anticipated that the development will be completed by 2023.

- The proposed access is a “3” leg intersection with a “Stop” control on the access road.

- Under future conditions, the intersections of Holburn Street with 6th Concession Road operates at an overall acceptable level of service during 2025, 2030 and 2035 morning and evening peak hours. However, westbound turning traffic operates at LOS F during 2030 evening conditions. Hence, improvement is required.

- Under future conditions, the intersections of 6th Concession Rd with Zuric Avenue operates at an overall acceptable level of service during 2025, 2030 and 2035 morning and evening peak hours.

- An exclusive right-turn lane is required for the 2025 condition.

- A traffic signal is warranted for the intersection of 6th Concession Road with Holburn Street under 2025 background and total traffic conditions.

- The improved Holburn Street with 6th Concession Road operates at an acceptable level of service.

- An adequate sight line distance is provided for a safe departure from the development.

In conclusion, upgrades are required for the existing intersection of 6th Concession Road with Holburn Street infrastructure in 2030 and 2035 background conditions. These upgrades are not due to the proposed development as the development's traffic will have minimum impact on the operation of existing intersections. Hence, we believe this conclusion is satisfactory for the City's.

All of which is respectfully submitted.

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Shurjeel Tunio, P.Eng.
Lead Engineer
Baird AE

Appendix A

BACKGROUND TRAFFIC DATA AND OTHER RELATED INFORMATION

DRAFT PLAN OF SUBDIVISION

OF PART OF

PART OF LOT 13, CONCESSION 6

(GEOGRAPHIC TOWNSHIP OF SANDWICH EAST)

IN THE

CITY OF WINDSOR

COUNTY OF ESSEX, ONTARIO

ADDITIONAL INFORMATION IN ACCORDANCE WITH SECTION 51(17) OF THE PLANNING ACT

A) BOUNDARIES OF THE LANDS PROPOSED TO BE SUBDIVIDED: AS SHOWN ON DRAFT PLAN
B) HIGHWAYS: AS SHOWN ON DRAFT PLAN
C) KEY PLAN: AS SHOWN ON DRAFT PLAN
D) PROPOSED USES: THE LAND IS TO BE USED ACCORDING TO SCHEDULE OF LAND USE
E) EXISTING USES OF ADJOINING LAND: AS SHOWN ON DRAFT PLAN
F) APPROXIMATE DIMENSIONS AND LAYOUT THE PROPOSED LOTS: AS SHOWN ON DRAFT PLAN
F1) AFFORDABLE HOUSING: NONE PROPOSED
G) NATURAL AND ARTIFICIAL FEATURES: AS SHOWN ON DRAFT PLAN
H) AVAILABILITY AND NATURE OF DOMESTIC WATER SUPPLIES: MUNICIPAL WATER SUPPLY AVAILABLE
I) SOIL TYPE: BROOKSTON CLAY LOAM
J) EXISTING CONTOURS: AS SHOWN ON DRAFT PLAN
K) MUNICIPAL SERVICES AVAILABLE OR TO BE AVAILABLE: ALL MUNICIPAL SERVICES AVAILABLE, INCLUDING SANITARY SERVICES
L) RESTRICTIONS AFFECTING THE LAND: AS SHOWN ON DRAFT PLAN

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY SHOWN ON THIS PLAN.

ONTARIO LAND SURVEYOR
ANDREW S. MANTHA, OLS
VERHAEGEN LAND SURVEYORS

DATE

OWNER'S CERTIFICATE

I AUTHORIZE STOREY SAMWAYS PLANNING LIMITED AND BAIRD AE INC TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION FOR APPROVAL.

PAWAN KHICHI - OWNER
HAVE THE AUTHORITY TO BIND THE CORPORATION

DATE

SCHEDULE OF LAND USE

LOTS/BLOCKS	LAND USE	UNITS	AREA	PERCENTAGE AREA
BLOCK 1-5	TOWNHOMES	27	5,926.31	70.34%
BLOCK 6	STORMWATER MANAGEMENT (TO BE DEDICATED TO THE CITY)		540.97	6.42%
BLOCK 7-8	ROAD RESERVE		34.03	0.40%
STREET A	ROAD		1,923.54	22.83%
TOTAL		27	8,424.850	100.00%

KEY PLAN
SCALE 1:5000

SITE

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Local 519.326.4161

PARTNER / CONSULTANTS

REVISIONS

Date	Revision
DEC 13, 2023	REVISED LAYOUT
FEB 01, 2024	REVISED PER CITY COMMENTS

DATE: JULY 27, 2023
SCALE: 1:250
DRAWN BY: M.R.
CHECKED BY: B.P.
APPROVED BY: ----
PRELIMINARY
CONSTRUCTION
RECORD

PROJECT TITLE
6TH CONCESSION DEVELOPMENT
4170 & 4190 6TH CONCESSION RD, CITY OF WINDSOR, COUNTY OF ESSEX, ONTARIO

SHEET TITLE
DRAFT PLAN OF SUBDIVISION

JOB NUMBER 21-150
SHEET NUMBER 01

February 29, 2024

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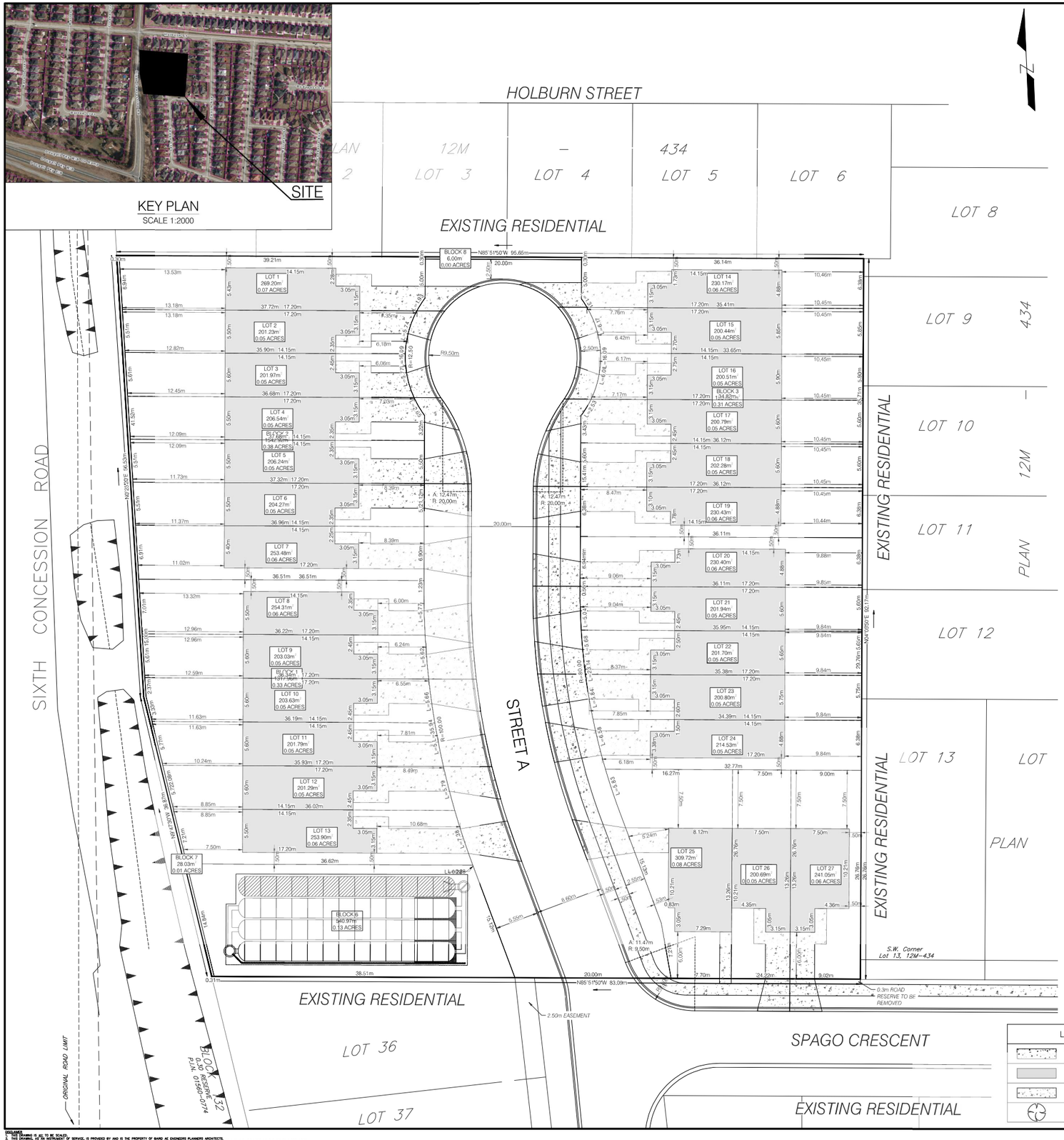
KEY PLAN
SCALE 1:2000



LEGEND	
	DRIVEWAY
	BUILDING ENVELOPE
	SIDEWALK
	EXISTING TREES

TOWNHOME DWELLING DETAILS

LOT NO.	PROPOSED							ZONING COMPLIES
	FRONT YARD (m)	REAR YARD (m)	SIDE YARD (m)	LOT WIDTH (m)	LOT COVERAGE	FRONT YARD PAVING		
						REQUIRED	PROPOSED	
LOT 1	7.46	13.06	1.50	6.93	86.43 m² (32.11%)	60.00%	48.55%	COMPLIES
LOT 2	6.30	12.70		5.50	87.43 m² (43.45%)	65.00%	66.28%	COMPLIES
LOT 3	6.17	12.34		5.60	88.85 m² (43.99%)	65.00%	64.81%	COMPLIES
LOT 4	7.14	11.98		5.50	87.43 m² (42.33%)	65.00%	60.70%	COMPLIES
LOT 5	6.00	14.12		5.50	87.43 m² (42.39%)	65.00%	62.17%	COMPLIES
LOT 6	6.00	13.76		5.50	87.43 m² (42.81%)	65.00%	62.11%	COMPLIES
LOT 7	6.00	13.41	1.50	6.90	86.02 m² (33.94%)	60.00%	49.56%	COMPLES
LOT 8	6.00	12.86	1.50	7.00	86.88 m² (34.16%)	60.00%	50.38%	COMPLIES
LOT 9	6.18	12.65		5.60	88.85 m² (43.76%)	65.00%	63.27%	COMPLIES
LOT 10	6.49	11.69		5.60	88.85 m² (43.63%)	65.00%	60.41%	COMPLIES
LOT 11	6.54	11.52		5.60	88.85 m² (44.03%)	65.00%	62.90%	COMPLIES
LOT 12	7.22	10.13		5.60	88.85 m² (44.14%)	65.00%	58.65%	COMPLIES
LOT 13	6.96	11.21	1.50	7.00	87.43 m² (34.43%)	60.00%	48.28%	COMPLIES
LOT 14	7.76	10.45	1.50	6.38	78.66 m² (34.17%)	60.00%	53.18%	COMPLIES
LOT 15	6.42	10.45		5.85	92.38 m² (46.09%)	65.00%	62.81%	COMPLIES
LOT 16	6.17	10.45		5.90	93.09 m² (46.43%)	65.00%	61.62%	COMPLIES
LOT 17	7.17	10.45		5.60	88.85 m² (44.25%)	65.00%	59.69%	COMPLIES
LOT 18	6.00	12.92		5.60	88.85 m² (43.92%)	65.00%	60.96%	COMPLIES
LOT 19	6.00	12.92	1.50	6.38	78.51 m² (34.07%)	60.00%	53.54%	COMPLIES
LOT 20	6.12	12.79	1.50	6.38	78.68 m2 (34.14%)	60.00%	53.24%	COMPLIES
LOT 21	6.10	12.79		5.60	88.85 m² (44.00%)	65.00%	60.91%	COMPLIES
LOT 22	6.97	11.25		5.65	88.55 m² (44.39%)	65.00%	59.54%	COMPLIES
LOT 23	6.45	11.24		5.75	90.97 m²(45.30%)	65.00%	61.33%	COMPLIES
LOT 24	6.18	9.84	1.50	6.38	79.36 m² (36.99%)	60.00%	55.00%	COMPLIES
LOT 25	6.00	7.50m	1.53	11.98	105.12 m² (33.94%)	50.00%	18.16%	COMPLIES
LOT 26	6.00	7.50m		7.50	86.17 m² (42.94%)	55.00%	47.00%	COMPLIES
LOT 27	6.00	7.50m	1.50	9.00	86.24 m² (35.78%)	50.00%	39.00%	COMPLIES

SITE PLAN			
EXISTING ZONING	RESIDENTIAL DISTRICT 1.2 (RD1.2) ZONE		
PROPOSED ZONING	RESIDENTIAL DISTRICT 2.3 (RD2.3) ZONE		
PERMITTED ZONING	TOWNHOME DWELLING, AMONG OTHER USES PERMITTED WITHIN THE RESIDENTIAL DISTRICT 2.3 ZONE		
PROPOSED USE	TOWNHOME DWELLING		
DESCRIPTION	REQUIRED	PROVIDED	ZONING COMPLIANCE
MIN. FRONTAGE WIDTH	20.00m (65.62 ft)	20.00m (65.62 ft)	COMPLIES
MIN. LOT AREA	200.00m²	≥ 200.00m² (2,152.78 sq ft)	COMPLIES
MIN. FRONT YARD	6.00m	SEE ABOVE TABLE	
MIN. REAR YARD	7.50m	SEE ABOVE TABLE	
MIN. SIDE YARD	1.50m	SEE ABOVE TABLE	
MIN. LOT WIDTH	EQUAL TO THE WIDTH OF THE DWELLING UNIT PLUS ANY EXTERIOR SIDE YARD AS EXISTING AT THE TIME OF THE LOT SEVERANCE	SEE ABOVE TABLE	
MAX. LOT COVERAGE (ZBL 5.23.5)	45% OF LOT AREA; AND 50% OF LOT AREA FOR TOWNHOME DWELLING SEVERED BY A COMMON INTERIOR LOT LINE THAT SEPARATES THE DWELLING UNITS	SEE ABOVE TABLE	
MAIN BUILDING HEIGHT	MAX 9.00m	9.00m	COMPLIES
FRONT YARD PAVING	50% OF THE REQUIRED FROM YARD AREA PLUS 5% PER METER DECREASE IN LOT WIDTH BELOW 9M TO A MAXIMUM OF 70% OF THE REQUIRED FRONT YARD AREA.	SEE ABOVE TABLE	
ACCESS AREA WIDTH	MIN 3.50m TO MAX 4.50m	3.50m	COMPLIES
PARKING FOR TOWNHOME DWELLING	1 SPACE FOR EACH DWELLING OF TOTAL 27 DWELLINGS = 27 SPACE	27 SPACES PROVIDED	COMPLIES
LOT BUILDING INFO			
TOTAL LOT AREA	5,977.53 m² (64,341.59 sq. ft) 0.597 ha (1.477ac)		
TOTAL BUILDING AREA	2,366.54 m² (25,473.22 sq. ft)		
TOTAL RESIDENTIAL DWELLING UNITS	27 UNITS		
HEIGHT OF BUILDING / NO. OF STOREYS	≤9.00m / 1.0 STOREY		
BUILDING USE & OCCUPANCY	RESIDENTIAL		

BAIRD|AE
architecture + engineering
info@bairdae.ca
www.bairdae.ca
Toll Free 1.844.442.9168
Local 519.326.4161

PARTNER / CONSULTANTS

REVISIONS

Date	Revision
DEC 13, 2023	REVISED LAYOUT
FEB 01, 2024	REVISED PER CITY COMMENTS
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—	---
—	---
—	---

DATE: JULY 27, 2023
SCALE: 1:250
DRAWN BY: M.R. — PRELIMINARY
CHECKED BY: B.P. — CONSTRUCTION
APPROVED BY: ---- — RECORD

PROJECT TITLE
6TH CONCESSION DEVELOPMENT
4170 & 4190 6TH CONCESSION RD, CITY OF WINDSOR, COUNTY OF ESSEX, ONTARIO

SHEET TITLE
CONCEPT DEVELOPMENT PLAN

JOB NUMBER 21-150

SHEET NUMBER 02

DISCLAIMER
1. THIS DRAWING IS ALL TO BE SCALED.
2. THIS DRAWING, AS AN INSTRUMENT OF SERVICE, IS PRODUCED BY AND IS THE PROPERTY OF BAIRD AE ENGINEERS PLANNERS ARCHITECTS.
3. THE CONTRACTOR MUST VERIFY AND ACCEPT RESPONSIBILITY FOR ALL DIMENSIONS ON SITE AND MUST REPORT TO BAIRD AE ENGINEERS PLANNERS ARCHITECTS ANY VARIATION FROM THE SUPPLIED INFORMATION.
4. THE CONTRACTOR MUST REVIEW AND ACCEPT RESPONSIBILITY FOR SHOP DRAWINGS, ASSEMBLY DRAWINGS AND OTHER SIMILAR DOCUMENTS PRIOR TO THE COMMENCEMENT OF WORK. REFER TO THE APPROPRIATE CONSULTANT'S DRAWINGS BEFORE PROCEEDING WITH THE WORK.
5. CONSTRUCTION MUST CONFORM TO ALL APPLICABLE CODES AND REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION.
6. THE CONTRACTOR WORKING FROM DRAWINGS NOT SPECIFICALLY MARKED FOR CONSTRUCTION MUST ASSUME FULL RESPONSIBILITY AND BEAR COSTS FOR ANY CORRECTIONS OR DAMAGES RESULTING FROM THEIR WORK.

P:\2021 projects\21-150 - 6th concession development\engineering\production drawings
February 26, 2024

Sixth Concession Rd @ Holburn St

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 8:00:00
To: 9:00:00

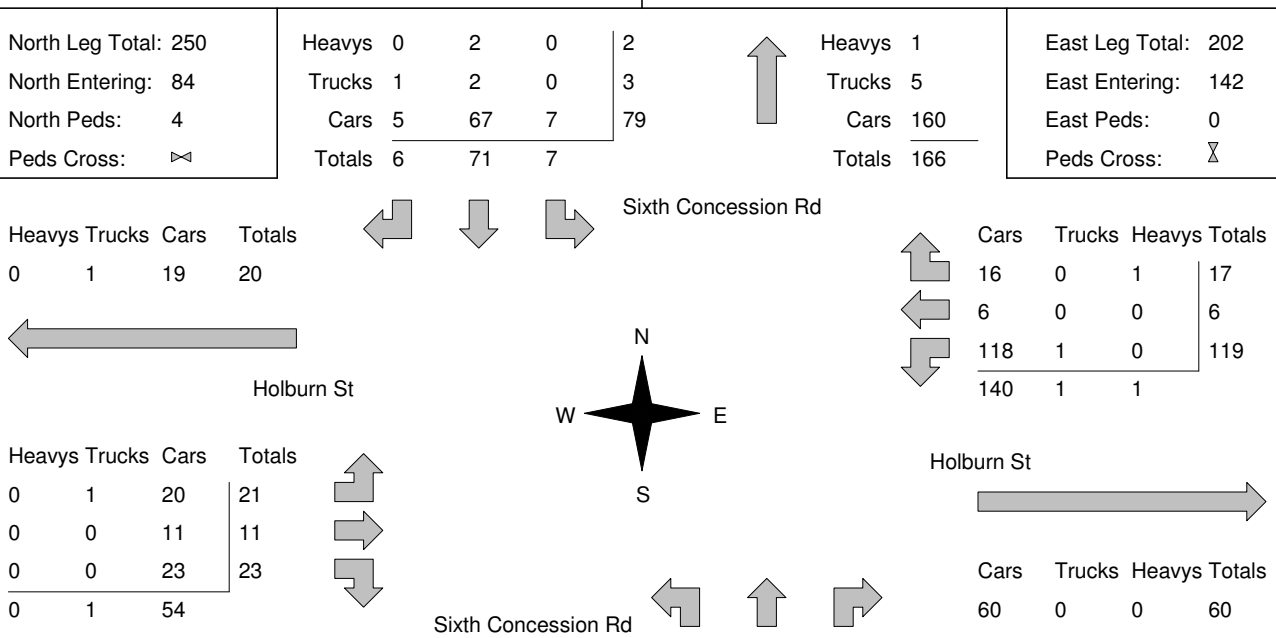
Municipality: Windsor
Site #: 0000000001
Intersection: Sixth Concession Rd & Holburn St
TFR File #: 1
Count date: 26-Jul-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Matt

**** Non-Signalized Intersection ****

Major Road: Sixth Concession Rd runs N/S



Comments

Sixth Concession Rd @ Holburn St

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 11:45:00
To: 12:45:00

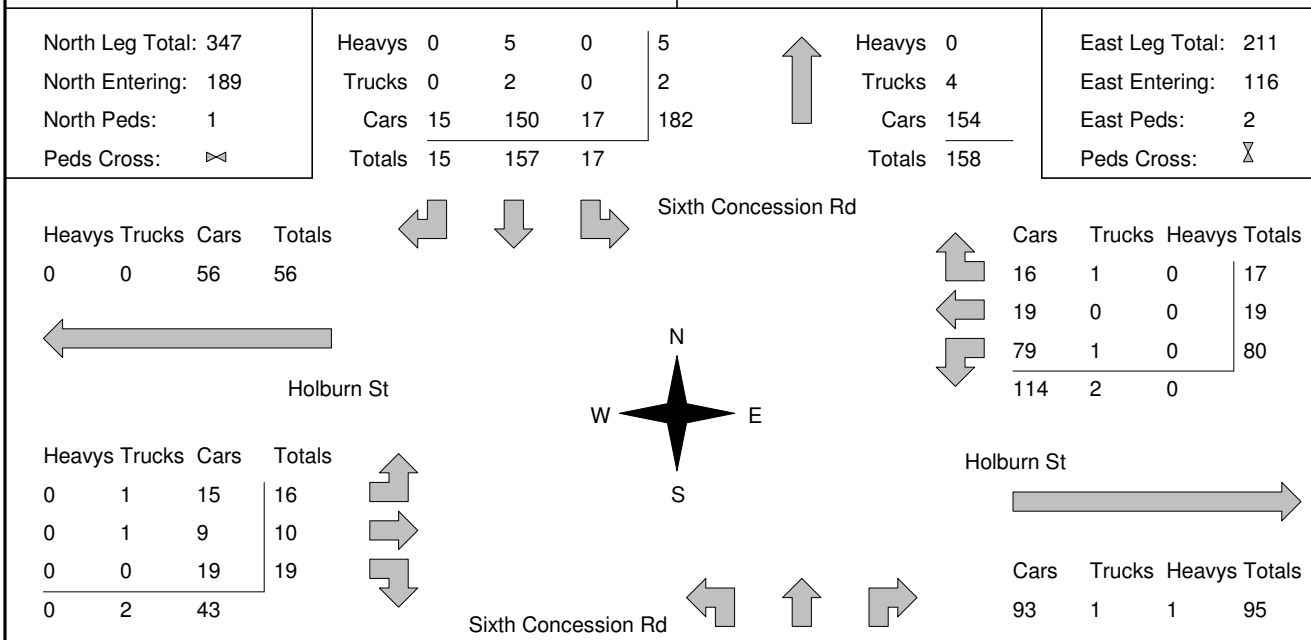
Municipality: Windsor
Site #: 0000000001
Intersection: Sixth Concession Rd & Holburn St
TFR File #: 1
Count date: 26-Jul-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Matt

**** Non-Signalized Intersection ****

Major Road: Sixth Concession Rd runs N/S



Comments

Sixth Concession Rd @ Holburn St

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 17:00:00
To: 18:00:00

Municipality: Windsor
Site #: 0000000001
Intersection: Sixth Concession Rd & Holburn St
TFR File #: 1
Count date: 26-Jul-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Matt

**** Non-Signalized Intersection ****

Major Road: Sixth Concession Rd runs N/S

North Leg Total: 440
North Entering: 246
North Peds: 5
Peds Cross: ⋈

Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	23	190	33	246
Totals	23	190	33	

Heavys	0
Trucks	1
Cars	193
Totals	194

East Leg Total: 333
East Entering: 155
East Peds: 1
Peds Cross: ⧖

Heavys	Trucks	Cars	Totals
0	0	87	87

Holburn St

Cars	Trucks	Heavys	Totals
22	0	0	22
21	0	0	21
110	2	0	112
153	2	0	

Sixth Concession Rd

N
W E
S

Heavys	Trucks	Cars	Totals
0	0	27	27
0	0	16	16
0	0	25	25
0	0	68	

Holburn St

Cars	Trucks	Heavys	Totals
177	0	1	178

Sixth Concession Rd

Peds Cross: ⧖
West Peds: 2
West Entering: 68
West Leg Total: 155

Cars	325			
Trucks	2			
Heavys	0			
Totals	327			

Cars	43	144	128	315
Trucks	0	1	0	1
Heavys	0	0	1	1
Totals	43	145	129	

Peds Cross: ⋈
South Peds: 5
South Entering: 317
South Leg Total: 644

Comments

Sixth Concession Rd @ Holburn St

Total Count Diagram

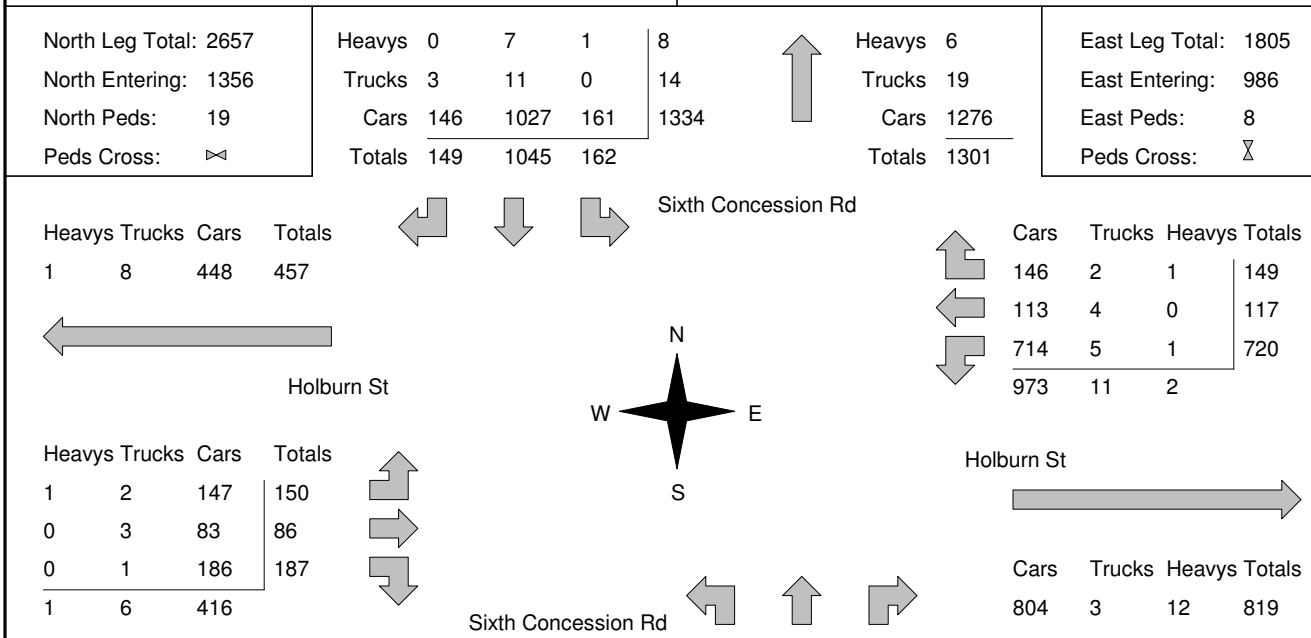
Municipality: Windsor
Site #: 0000000001
Intersection: Sixth Concession Rd & Holburn St
TFR File #: 1
Count date: 26-Jul-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Matt

**** Non-Signalized Intersection ****

Major Road: Sixth Concession Rd runs N/S

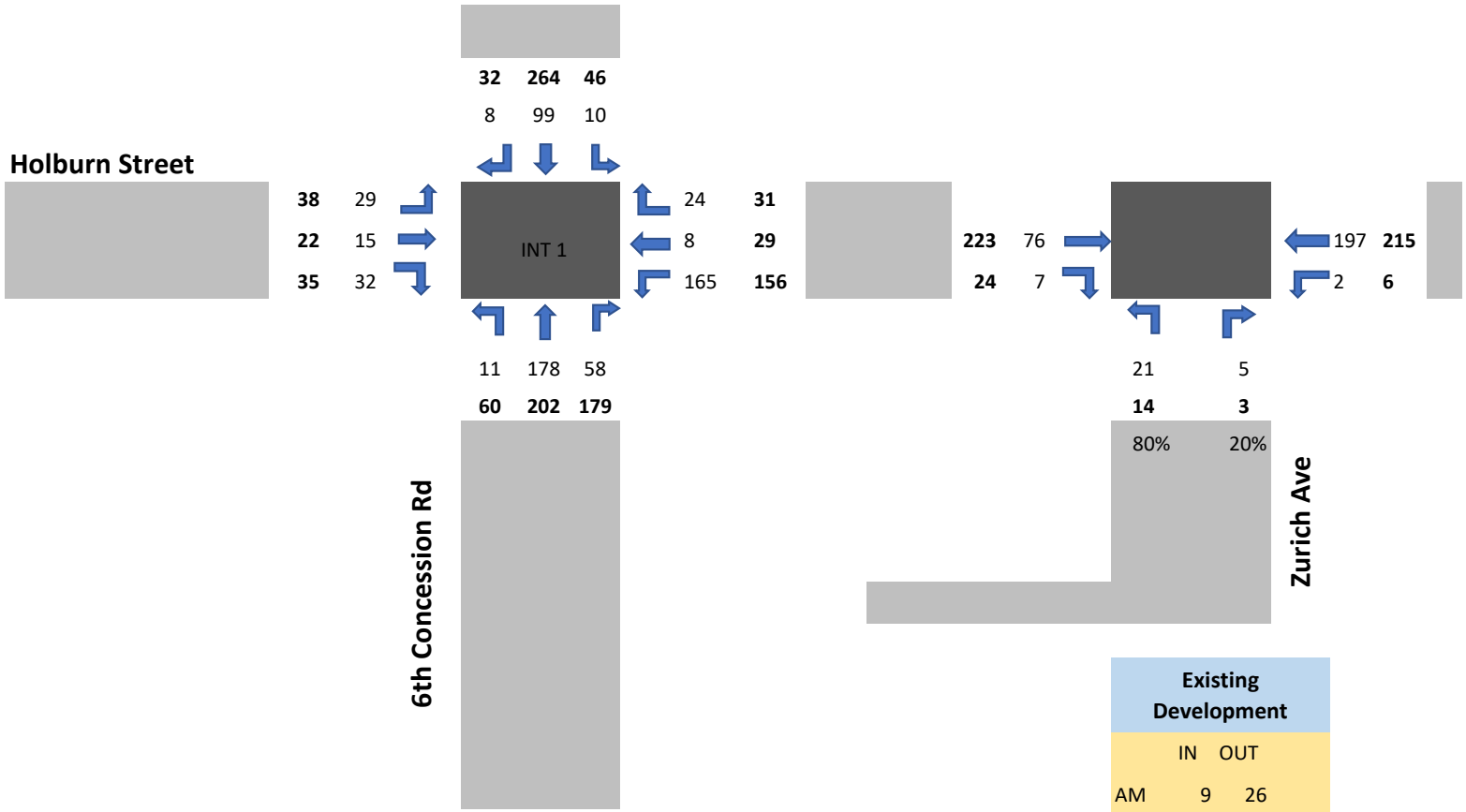


Comments

Appendix B

FUTURE TRAFFIC, DEVELOPMENT TRAFFIC AND TOTAL TRAFFIC VOLUMES

RESIDENTIAL DEVELOPMENT



Existing Development		
	IN	OUT
AM	9	26
PM	30	17

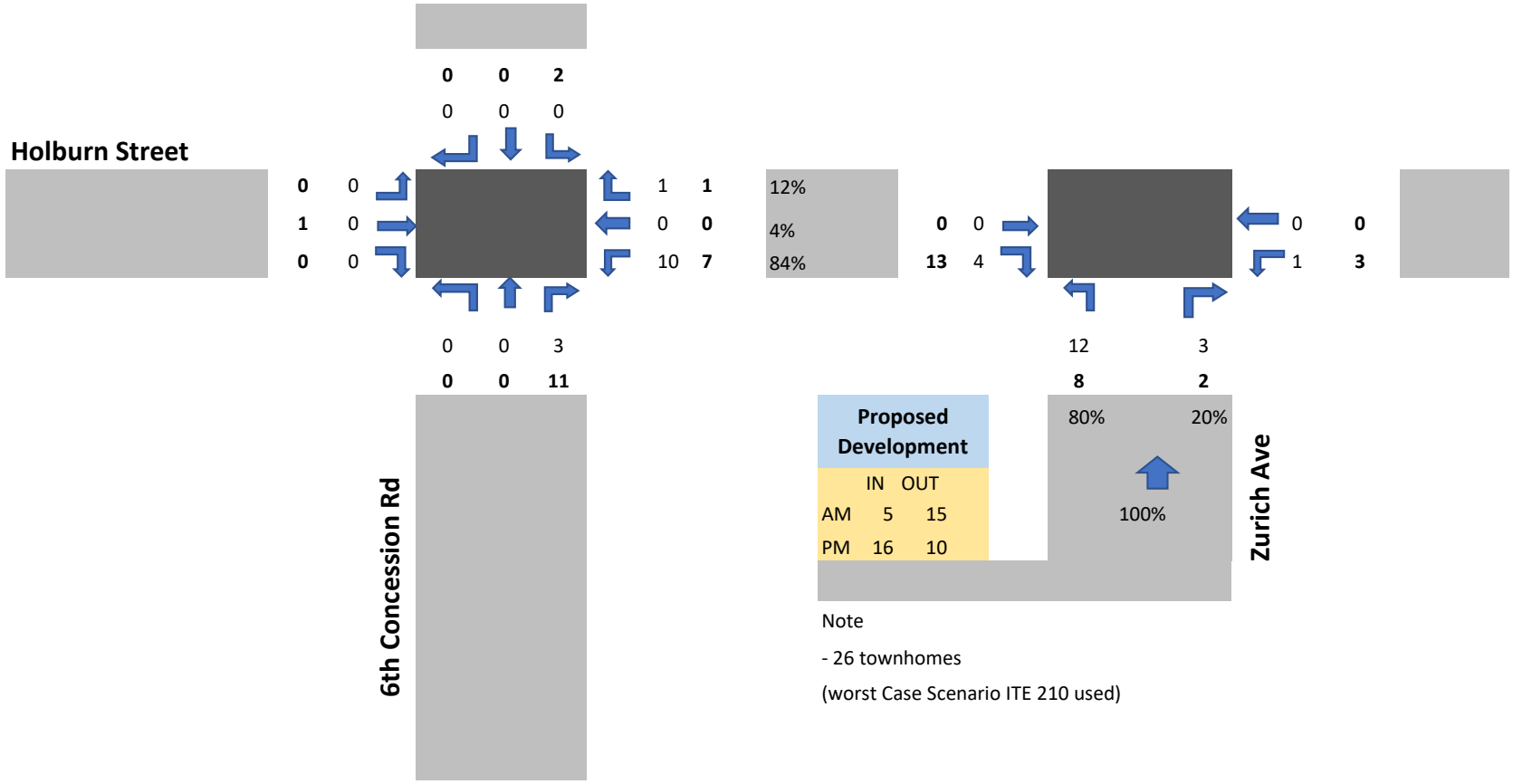
47 Single Houses

LEGEND

AM	33
PM	**33**

PROPJECT NAME	6TH Concession Development		DATE: 16-Aug-22
SHEET TITLE	2035 BACKGROUND TRAFFIC	BAIRD|AE architecture + engineering	PROJECT NO: 21-150
			FIGURE NO: Figure 3.1

RESIDENTIAL DEVELOPMENT



Note

- 26 townhomes

(worst Case Scenario ITE 210 used)

LEGEND

AM 33

PM 33

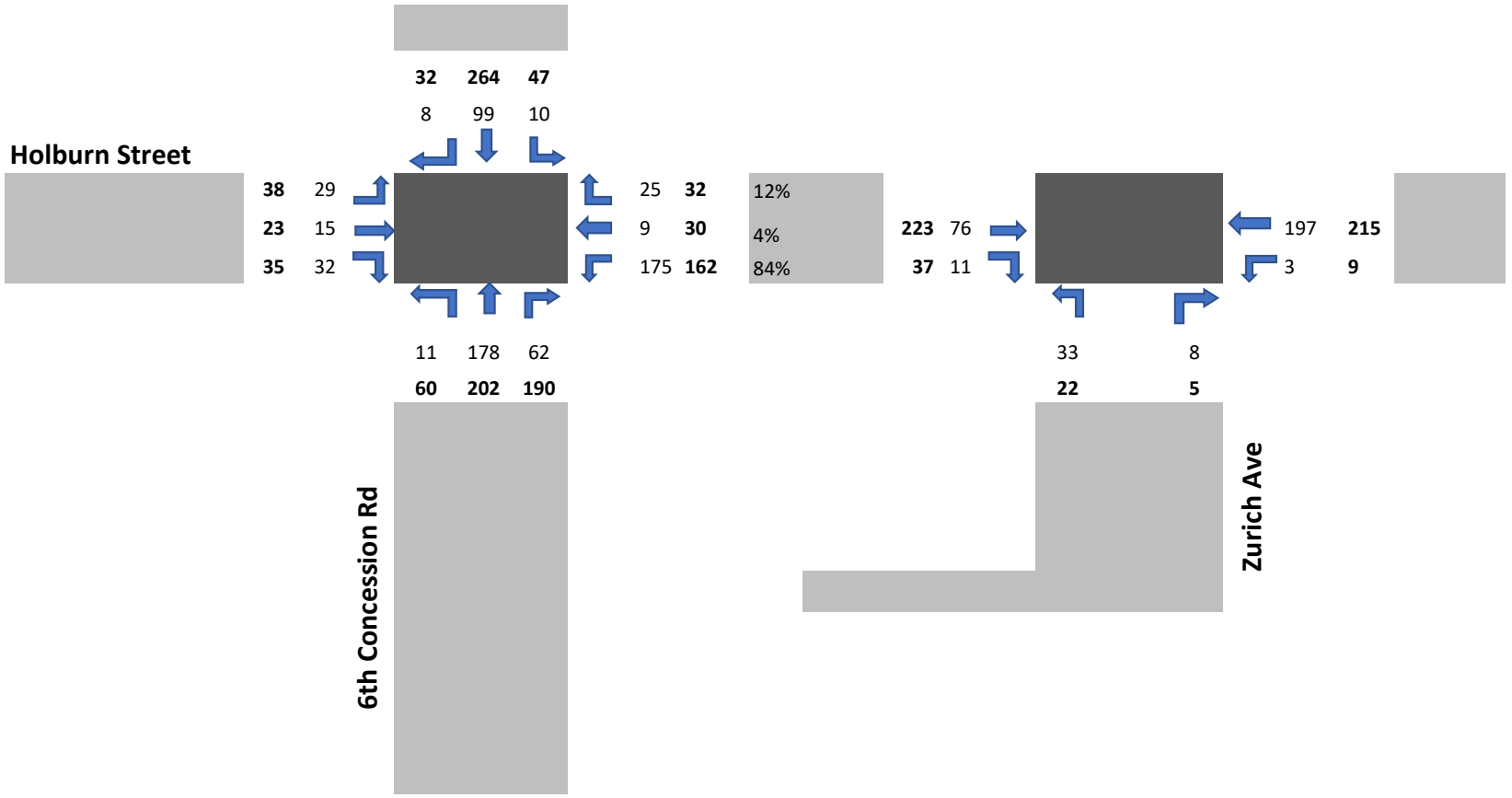
PROPJECT NAME	6TH Concession Development	DATE:	16-Aug-22
SHEET TITLE	2035 DEVELOPMENT TRAFFIC	PROJECT NO:	21-150
		FIGURE NO:	Figure 3.2

BAIRD|AE architecture + engineering

27 PRINCESS STREET, SUITE #102 LEAMINGTON, ONTARIO N8H 2X8

1000 - 267 PELISSIER STREET, WINDSOR, ONTARIO N9A 4K4

RESIDENTIAL DEVELOPMENT



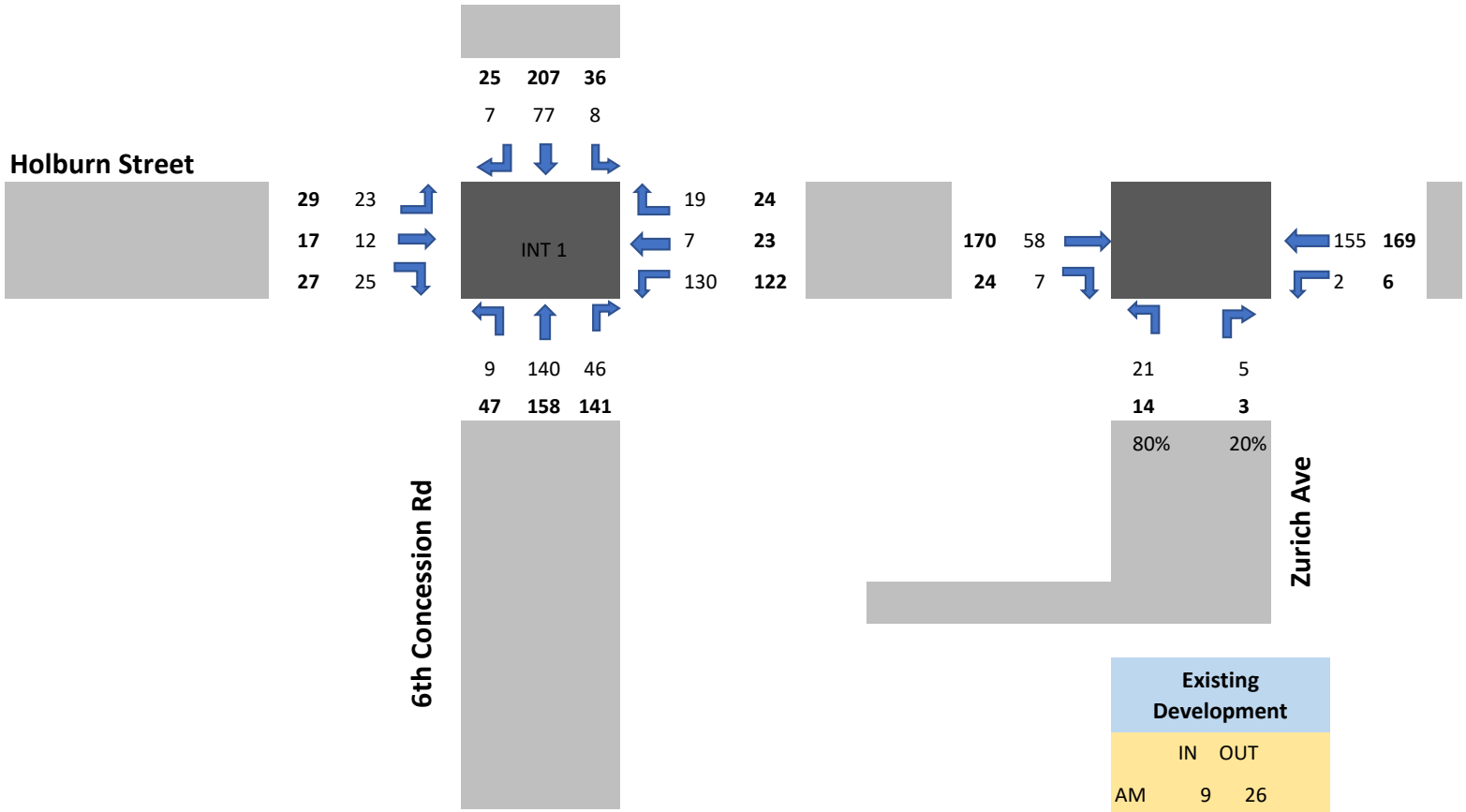
LEGEND

AM	33
PM	**33**

PROPJECT NAME	6TH Concession Development	BAIRD|AE architecture + engineering	DATE:	16-Aug-22
SHEET TITLE	2035 TOTAL TRAFFIC		PROJECT NO:	21-150
			FIGURE NO:	Figure 3.3

27 PRINCESS STREET, SUITE #102 LEAMINGTON, ONTARIO N8H 2X9
1000 - 267 PELISSIER STREET, WINDSOR, ONTARIO N9A 4K4.

RESIDENTIAL DEVELOPMENT



Existing Development		
	IN	OUT
AM	9	26
PM	30	17

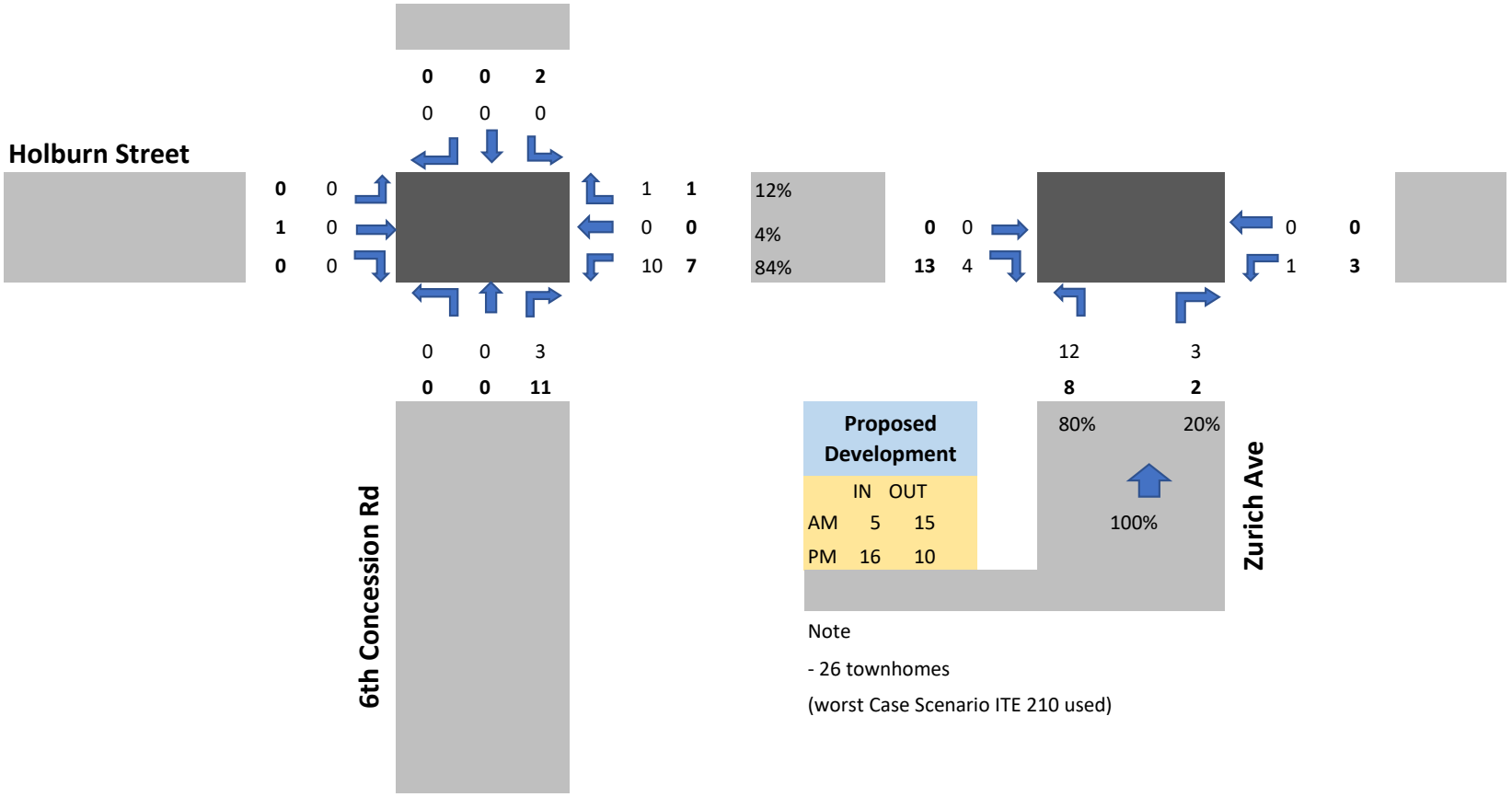
47 Single Houses

LEGEND

AM	33
PM	**33**

PROPJECT NAME	6TH Concession Development		DATE: 16-Aug-22
SHEET TITLE	2025 BACKGROUND TRAFFIC	BAIRD|AE architecture + engineering	PROJECT NO: 21-150
			FIGURE NO: Figure 1.1

RESIDENTIAL DEVELOPMENT



Note

- 26 townhomes

(worst Case Scenario ITE 210 used)

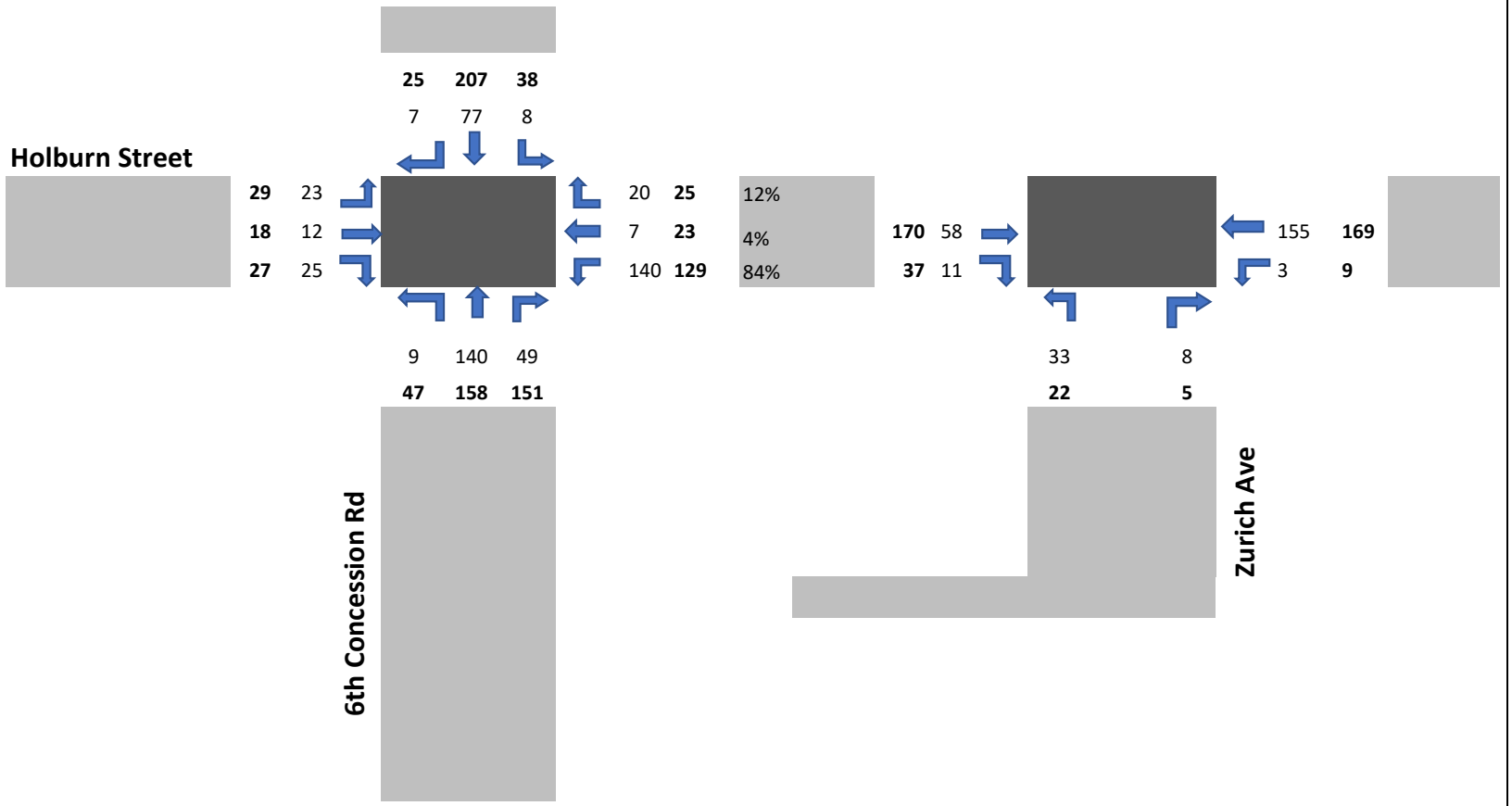
LEGEND

AM 33

PM 33

PROPJECT NAME	6TH Concession Development		DATE: 16-Aug-22
SHEET TITLE	2025 DEVELOPMENT TRAFFIC	BAIRD|AE architecture + engineering	PROJECT NO: 21-150
		27 PRINCESS STREET, SUITE #102 LEAMINGTON, ONTARIO N8H 2X8 — 1000 - 267 PELISSIER STREET, WINDSOR, ONTARIO N9A 4K4.	FIGURE NO: Figure 1.2

RESIDENTIAL DEVELOPMENT



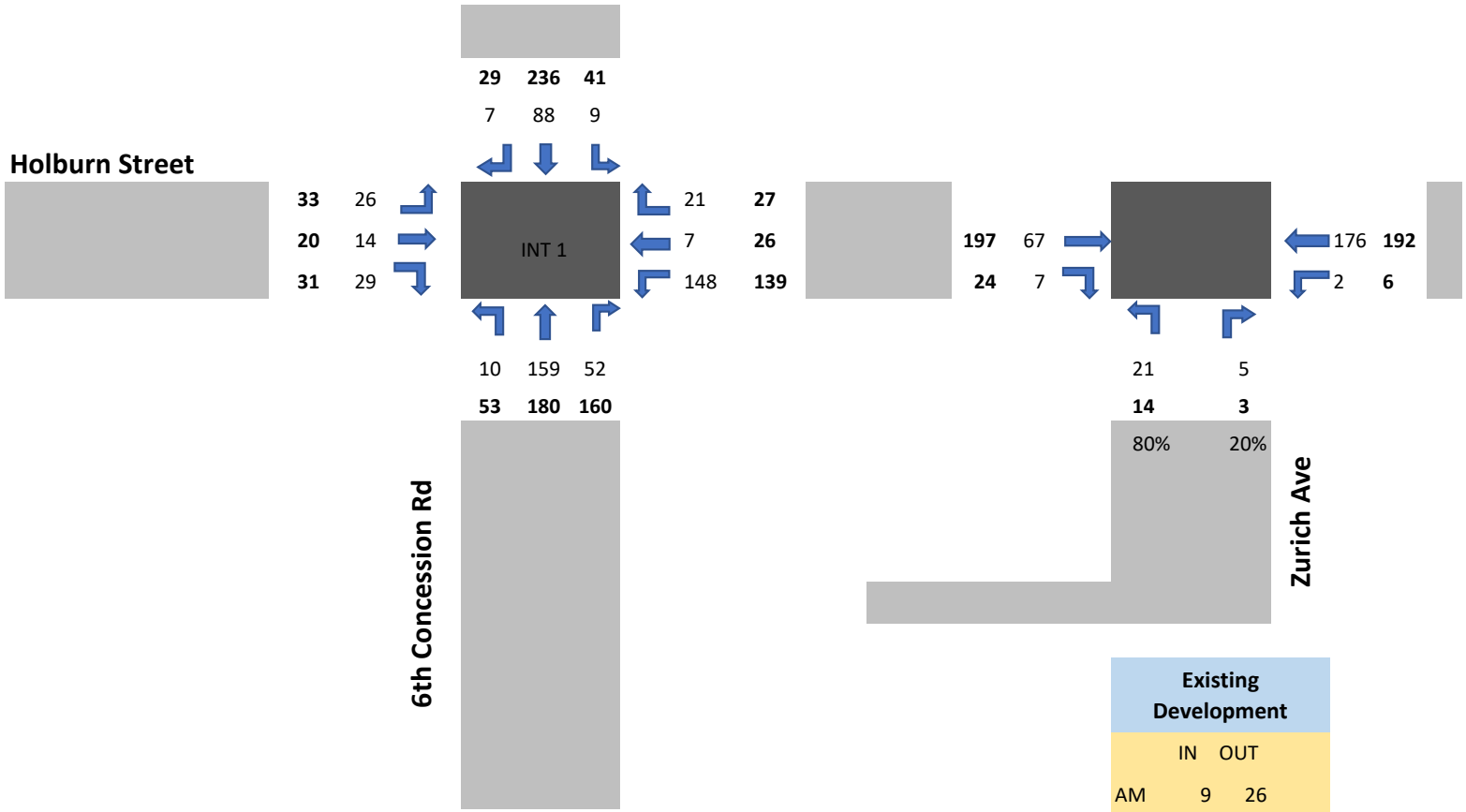
LEGEND

AM 33

PM 33

PROPJECT NAME	6TH Concession Development		DATE: 16-Aug-22
SHEET TITLE	2025 TOTAL TRAFFIC	BAIRD|AE architecture + engineering	PROJECT NO: 21-150
			FIGURE NO: Figure 1.3

RESIDENTIAL DEVELOPMENT



Existing Development		
	IN	OUT
AM	9	26
PM	30	17

47 Single Houses

LEGEND

AM 33

PM 33

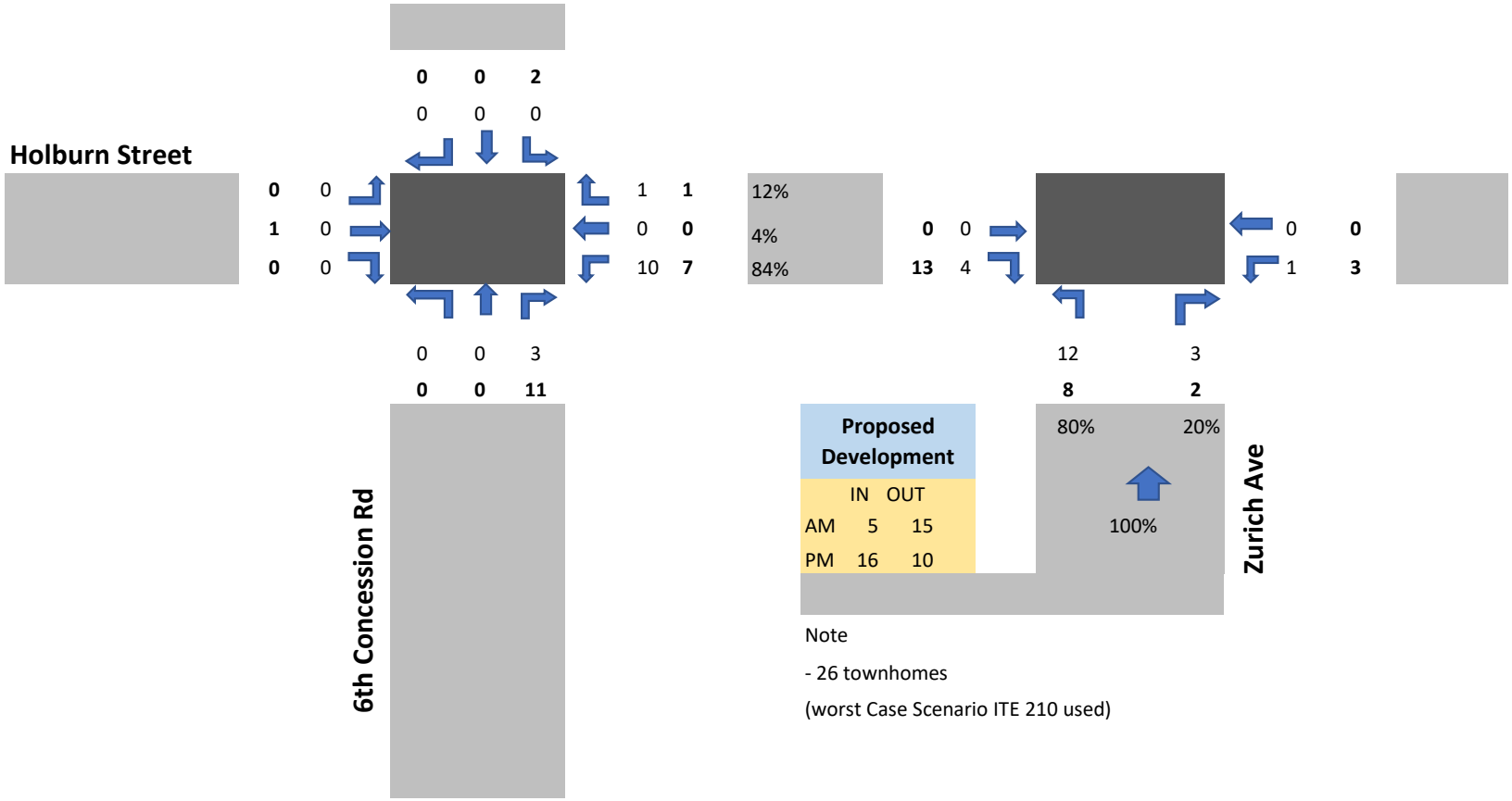
PROPJECT NAME	6TH Concession Development	DATE:	16-Aug-22
SHEET TITLE	2030 BACKGROUND TRAFFIC	PROJECT NO:	21-150
		FIGURE NO:	Figure 2.1

BAIRD | AE architecture + engineering

27 PRINCESS STREET, SUITE #102 LEAMINGTON, ONTARIO N8H 2X8

1006 - 267 PELISSIER STREET, WINDSOR, ONTARIO N9A 4K4

RESIDENTIAL DEVELOPMENT



Note

- 26 townhomes

(worst Case Scenario ITE 210 used)

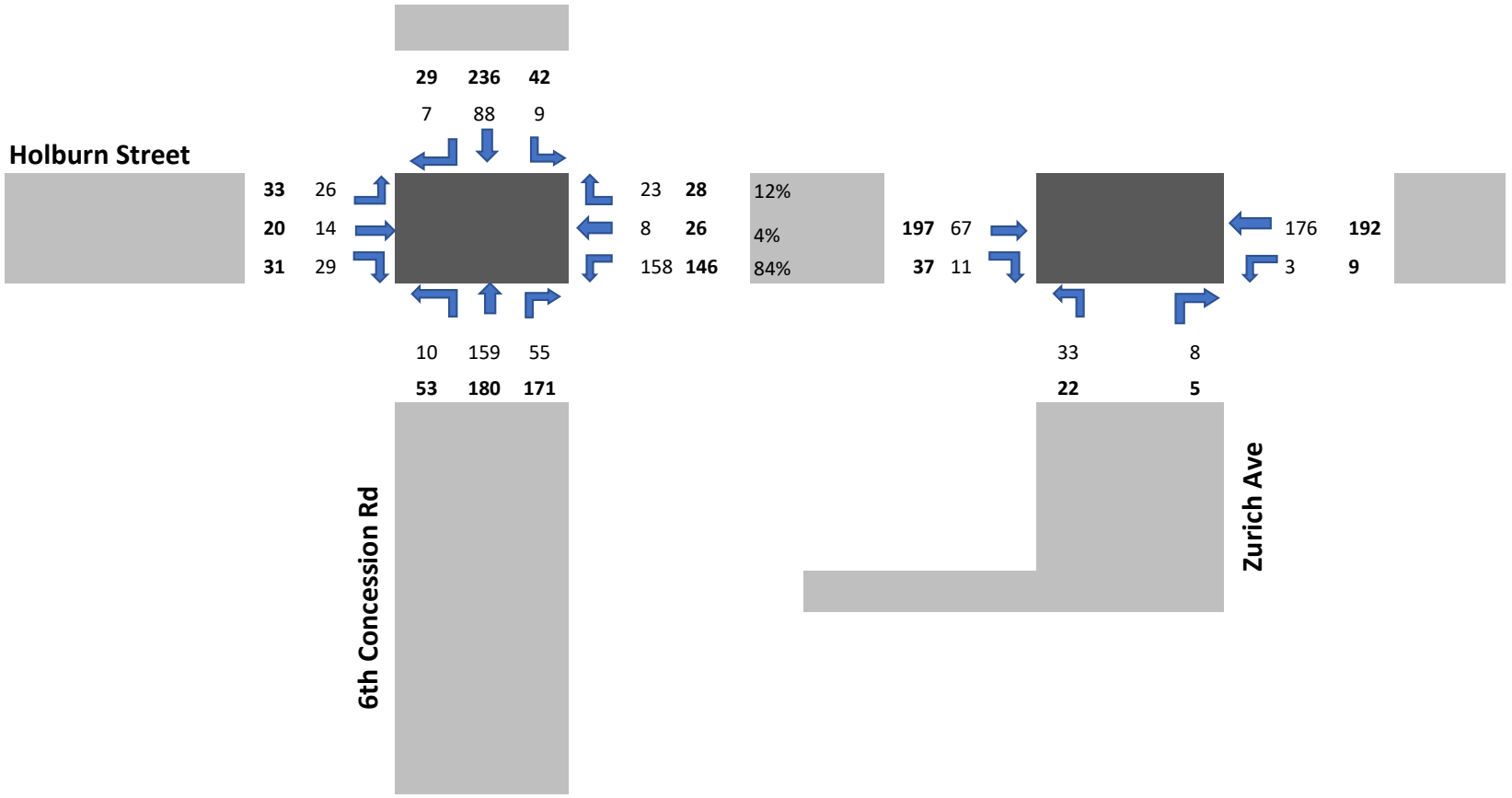
LEGEND

AM 33

PM 33

PROPJECT NAME	6TH Concession Development	BAIRD|AE architecture + engineering	DATE: 16-Aug-22
SHEET TITLE	2030 DEVELOPMENT TRAFFIC		PROJECT NO: 21-150
			FIGURE NO: Figure 2.2

RESIDENTIAL DEVELOPMENT



LEGEND

AM 33

PM 33

PROPJECT NAME	6TH Concession Development	DATE:	16-Aug-22
SHEET TITLE	2030 TOTAL TRAFFIC	PROJECT NO:	21-150
		FIGURE NO:	Figure 2.3

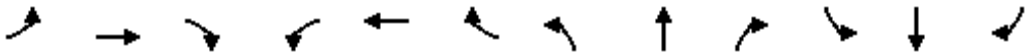
BAIRD|AE architecture + engineering

27 PRINCESS STREET, SUITE #102 LEAMINGTON, ONTARIO N8H 2X9

1000 - 267 PELISSIER STREET, WINDSOR, ONTARIO N9A 4K4.

Appendix C

CAPACITY ANALYSIS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	18	27	129	23	25	47	158	151	38	207	25
Future Volume (Veh/h)	29	18	27	129	23	25	47	158	151	38	207	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	32	20	29	140	25	27	51	172	164	41	225	27
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								321				
pX, platoon unblocked												
vC, conflicting volume	716	758	238	716	690	254	252			336		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	716	758	238	716	690	254	252			336		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	89	94	96	53	93	97	96			97		
cM capacity (veh/h)	298	312	800	300	342	785	1313			1223		

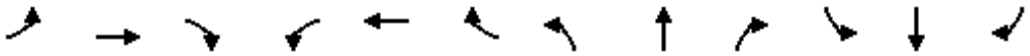
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	81	192	387	293
Volume Left	32	140	51	41
Volume Right	29	27	164	27
cSH	390	334	1313	1223
Volume to Capacity	0.21	0.57	0.04	0.03
Queue Length 95th (m)	6.2	27.2	1.0	0.8
Control Delay (s)	16.6	29.4	1.4	1.4
Lane LOS	C	D	A	A
Approach Delay (s)	16.6	29.4	1.4	1.4
Approach LOS	C	D		

Intersection Summary				
Average Delay	8.3			
Intersection Capacity Utilization	49.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	170	37	9	169	22	5
Future Volume (Veh/h)	170	37	9	169	22	5
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)	185	40	10	184	24	5
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			225		409	205
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			225		409	205
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		96	99
cM capacity (veh/h)			1344		594	836

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	225	194	29
Volume Left	0	10	24
Volume Right	40	0	5
cSH	1700	1344	625
Volume to Capacity	0.13	0.01	0.05
Queue Length 95th (m)	0.0	0.2	1.2
Control Delay (s)	0.0	0.5	11.0
Lane LOS		A	B
Approach Delay (s)	0.0	0.5	11.0
Approach LOS			B

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	26.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	14	29	158	8	23	10	159	55	9	88	7
Future Volume (Veh/h)	26	14	29	158	8	23	10	159	55	9	88	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	28	15	32	172	9	25	11	173	60	10	96	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)								321				
pX, platoon unblocked												
vC, conflicting volume	374	375	100	384	349	203	104			233		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	374	375	100	384	349	203	104			233		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	97	97	68	98	97	99			99		
cM capacity (veh/h)	552	548	956	537	566	838	1488			1335		

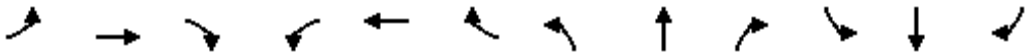
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	75	206	244	114
Volume Left	28	172	11	10
Volume Right	32	25	60	8
cSH	672	563	1488	1335
Volume to Capacity	0.11	0.37	0.01	0.01
Queue Length 95th (m)	3.0	13.4	0.2	0.2
Control Delay (s)	11.0	15.0	0.4	0.7
Lane LOS	B	C	A	A
Approach Delay (s)	11.0	15.0	0.4	0.7
Approach LOS	B	C		

Intersection Summary				
Average Delay	6.4			
Intersection Capacity Utilization	38.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	67	11	3	176	33	8
Future Volume (Veh/h)	67	11	3	176	33	8
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)	73	12	3	191	36	9
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			85		276	79
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			85		276	79
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		95	99
cM capacity (veh/h)			1512		712	981

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	85	194	45
Volume Left	0	3	36
Volume Right	12	0	9
cSH	1700	1512	754
Volume to Capacity	0.05	0.00	0.06
Queue Length 95th (m)	0.0	0.0	1.5
Control Delay (s)	0.0	0.1	10.1
Lane LOS		A	B
Approach Delay (s)	0.0	0.1	10.1
Approach LOS			B

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	21.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	20	31	146	26	28	53	180	171	42	236	29
Future Volume (Veh/h)	33	20	31	146	26	28	53	180	171	42	236	29
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	36	22	34	159	28	30	58	196	186	46	257	32
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								321				
pX, platoon unblocked												
vC, conflicting volume	814	863	273	815	786	289	289			382		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	814	863	273	815	786	289	289			382		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	85	92	96	36	91	96	95			96		
cM capacity (veh/h)	248	268	766	249	297	750	1273			1176		

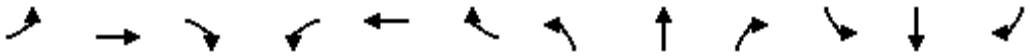
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	92	217	440	335
Volume Left	36	159	58	46
Volume Right	34	30	186	32
cSH	339	280	1273	1176
Volume to Capacity	0.27	0.77	0.05	0.04
Queue Length 95th (m)	8.7	47.1	1.1	1.0
Control Delay (s)	19.6	50.9	1.5	1.5
Lane LOS	C	F	A	A
Approach Delay (s)	19.6	50.9	1.5	1.5
Approach LOS	C	F		

Intersection Summary				
Average Delay	12.9			
Intersection Capacity Utilization	54.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	197	37	9	192	22	5
Future Volume (Veh/h)	197	37	9	192	22	5
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)	214	40	10	209	24	5
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			254		463	234
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			254		463	234
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		96	99
cM capacity (veh/h)			1311		553	805

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	254	219	29
Volume Left	0	10	24
Volume Right	40	0	5
cSH	1700	1311	584
Volume to Capacity	0.15	0.01	0.05
Queue Length 95th (m)	0.0	0.2	1.3
Control Delay (s)	0.0	0.4	11.5
Lane LOS		A	B
Approach Delay (s)	0.0	0.4	11.5
Approach LOS			B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	27.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	15	32	175	9	25	11	178	62	10	99	8
Future Volume (Veh/h)	29	15	32	175	9	25	11	178	62	10	99	8
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	32	16	35	190	10	27	12	193	67	11	108	9
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								321				
pX, platoon unblocked												
vC, conflicting volume	417	418	112	428	390	226	117			260		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	417	418	112	428	390	226	117			260		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	97	96	62	98	97	99			99		
cM capacity (veh/h)	514	517	940	499	537	813	1471			1304		

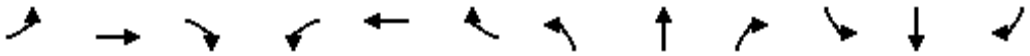
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	83	227	272	128
Volume Left	32	190	12	11
Volume Right	35	27	67	9
cSH	636	524	1471	1304
Volume to Capacity	0.13	0.43	0.01	0.01
Queue Length 95th (m)	3.6	17.3	0.2	0.2
Control Delay (s)	11.5	17.0	0.4	0.7
Lane LOS	B	C	A	A
Approach Delay (s)	11.5	17.0	0.4	0.7
Approach LOS	B	C		

Intersection Summary				
Average Delay	7.1			
Intersection Capacity Utilization	40.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	76	11	3	197	33	8
Future Volume (Veh/h)	76	11	3	197	33	8
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)	83	12	3	214	36	9
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			95		309	89
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			95		309	89
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		95	99
cM capacity (veh/h)			1499		682	969

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	95	217	45
Volume Left	0	3	36
Volume Right	12	0	9
cSH	1700	1499	725
Volume to Capacity	0.06	0.00	0.06
Queue Length 95th (m)	0.0	0.0	1.6
Control Delay (s)	0.0	0.1	10.3
Lane LOS		A	B
Approach Delay (s)	0.0	0.1	10.3
Approach LOS			B

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	22.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	23	35	162	30	32	60	202	190	47	264	32
Future Volume (Veh/h)	38	23	35	162	30	32	60	202	190	47	264	32
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	41	25	38	176	33	35	65	220	207	51	287	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)								321				
pX, platoon unblocked												
vC, conflicting volume	912	964	304	910	878	324	322			427		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	912	964	304	910	878	324	322			427		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	80	89	95	15	87	95	95			95		
cM capacity (veh/h)	203	231	735	206	259	717	1238			1132		

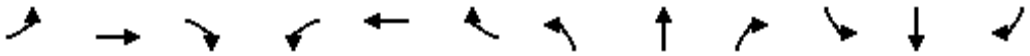
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	104	244	492	373
Volume Left	41	176	65	51
Volume Right	38	35	207	35
cSH	288	237	1238	1132
Volume to Capacity	0.36	1.03	0.05	0.05
Queue Length 95th (m)	12.7	80.2	1.3	1.1
Control Delay (s)	24.4	111.1	1.6	1.5
Lane LOS	C	F	A	A
Approach Delay (s)	24.4	111.1	1.6	1.5
Approach LOS	C	F		

Intersection Summary				
Average Delay	25.6			
Intersection Capacity Utilization	59.7%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	223	37	9	215	22	5
Future Volume (Veh/h)	223	37	9	215	22	5
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)	242	40	10	234	24	5
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			282		516	262
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			282		516	262
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		95	99
cM capacity (veh/h)			1280		515	777

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	282	244	29
Volume Left	0	10	24
Volume Right	40	0	5
cSH	1700	1280	547
Volume to Capacity	0.17	0.01	0.05
Queue Length 95th (m)	0.0	0.2	1.3
Control Delay (s)	0.0	0.4	12.0
Lane LOS		A	B
Approach Delay (s)	0.0	0.4	12.0
Approach LOS			B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	28.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	12	25	140	7	20	9	140	49	8	77	7
Future Volume (Veh/h)	23	12	25	140	7	20	9	140	49	8	77	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	13	27	152	8	22	10	152	53	9	84	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)								321				
pX, platoon unblocked												
vC, conflicting volume	330	331	88	338	308	178	92			205		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	330	331	88	338	308	178	92			205		
tC, single (s)	7.1	6.6	6.5	7.6	6.8	6.4	4.3			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.1	3.6	4.0	4.3	3.5	2.4			2.2		
p0 queue free %	96	98	97	70	99	97	99			99		
cM capacity (veh/h)	589	571	896	504	550	820	1391			1366		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	65	182	215	101
Volume Left	25	152	10	9
Volume Right	27	22	53	8
cSH	682	531	1391	1366
Volume to Capacity	0.10	0.34	0.01	0.01
Queue Length 95th (m)	2.5	12.1	0.2	0.2
Control Delay (s)	10.8	15.3	0.4	0.7
Lane LOS	B	C	A	A
Approach Delay (s)	10.8	15.3	0.4	0.7
Approach LOS	B	C		

Intersection Summary				
Average Delay	6.5			
Intersection Capacity Utilization	35.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	58	11	3	155	33	8
Future Volume (Veh/h)	58	11	3	155	33	8
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)	63	12	3	168	36	9
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			75		243	69
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			75		243	69
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		95	99
cM capacity (veh/h)			1524		744	994

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	75	171	45
Volume Left	0	3	36
Volume Right	12	0	9
cSH	1700	1524	783
Volume to Capacity	0.04	0.00	0.06
Queue Length 95th (m)	0.0	0.0	1.5
Control Delay (s)	0.0	0.1	9.9
Lane LOS		A	A
Approach Delay (s)	0.0	0.1	9.9
Approach LOS			A

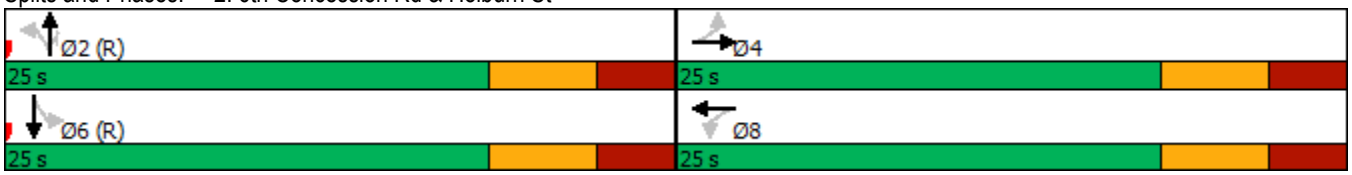
Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	20.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	20	31	146	26	28	53	180	171	42	236	29
Future Volume (vph)	33	20	31	146	26	28	53	180	171	42	236	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		30.0	0.0		0.0
Storage Lanes	0		0	0		0	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.950			0.981				0.850		0.987	
Flt Protected		0.981			0.965			0.989			0.993	
Satd. Flow (prot)	0	1755	0	0	1783	0	0	1863	1601	0	1846	0
Flt Permitted		0.819			0.725			0.856			0.915	
Satd. Flow (perm)	0	1465	0	0	1340	0	0	1612	1601	0	1701	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		34			18				186		12	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		259.0			160.0			320.5			415.9	
Travel Time (s)		18.6			11.5			23.1			29.9	
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
Adj. Flow (vph)	36	22	34	159	28	30	58	196	186	46	257	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	92	0	0	217	0	0	254	186	0	335	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Minimum Split (s)	25.0	25.0		25.0	25.0		25.0	25.0	25.0	25.0	25.0	
Total Split (s)	25.0	25.0		25.0	25.0		25.0	25.0	25.0	25.0	25.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lost Time Adjust (s)		0.0			0.0			0.0	0.0		0.0	
Total Lost Time (s)		7.0			7.0			7.0	7.0		7.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)		18.0			18.0			18.0	18.0		18.0	
Actuated g/C Ratio		0.36			0.36			0.36	0.36		0.36	
v/c Ratio		0.17			0.44			0.44	0.27		0.54	
Control Delay		8.6			14.6			15.1	3.5		16.2	
Queue Delay		0.0			0.0			0.0	0.0		0.0	
Total Delay		8.6			14.6			15.1	3.5		16.2	
LOS		A			B			B	A		B	
Approach Delay		8.6			14.6			10.2			16.2	
Approach LOS		A			B			B			B	
Queue Length 50th (m)		3.5			13.5			17.4	0.0		23.1	
Queue Length 95th (m)		11.0			29.1			33.7	9.7		43.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		235.0			136.0			296.5			391.9	
Turn Bay Length (m)									30.0			
Base Capacity (vph)		549			493			580	695		620	
Starvation Cap Reductn		0			0			0	0		0	
Spillback Cap Reductn		0			0			0	0		0	
Storage Cap Reductn		0			0			0	0		0	
Reduced v/c Ratio		0.17			0.44			0.44	0.27		0.54	

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 50			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.54			
Intersection Signal Delay: 12.8		Intersection LOS: B	
Intersection Capacity Utilization 64.2%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 2: 6th Concession Rd & Holburn St

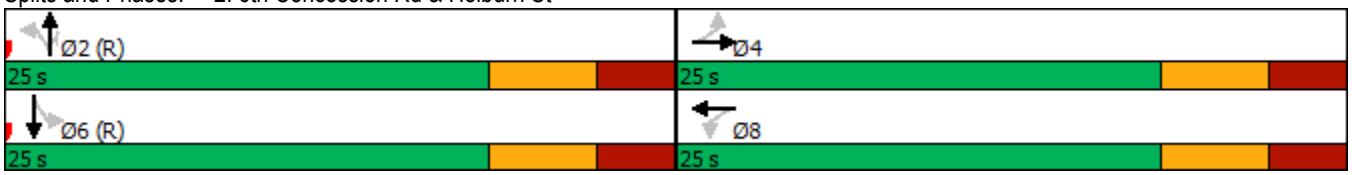


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	23	35	162	30	32	60	202	190	47	264	32
Future Volume (vph)	38	23	35	162	30	32	60	202	190	47	264	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		30.0	0.0		0.0
Storage Lanes	0		0	0		0	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.951			0.981				0.850		0.987	
Flt Protected		0.981			0.965			0.989			0.993	
Satd. Flow (prot)	0	1757	0	0	1783	0	0	1863	1601	0	1846	0
Flt Permitted		0.803			0.721			0.839			0.907	
Satd. Flow (perm)	0	1438	0	0	1332	0	0	1580	1601	0	1686	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		38			19				207		12	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		259.0			160.0			320.5			415.9	
Travel Time (s)		18.6			11.5			23.1			29.9	
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
Adj. Flow (vph)	41	25	38	176	33	35	65	220	207	51	287	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	104	0	0	244	0	0	285	207	0	373	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Minimum Split (s)	25.0	25.0		25.0	25.0		25.0	25.0	25.0	25.0	25.0	
Total Split (s)	25.0	25.0		25.0	25.0		25.0	25.0	25.0	25.0	25.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lost Time Adjust (s)		0.0			0.0			0.0	0.0		0.0	
Total Lost Time (s)		7.0			7.0			7.0	7.0		7.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)		18.0			18.0			18.0	18.0		18.0	
Actuated g/C Ratio		0.36			0.36			0.36	0.36		0.36	
v/c Ratio		0.19			0.50			0.50	0.29		0.61	
Control Delay		8.8			15.7			16.3	3.5		17.8	
Queue Delay		0.0			0.0			0.0	0.0		0.0	
Total Delay		8.8			15.7			16.3	3.5		17.8	
LOS		A			B			B	A		B	
Approach Delay		8.8			15.7			10.9			17.8	
Approach LOS		A			B			B			B	
Queue Length 50th (m)		4.0			15.7			20.1	0.0		26.5	
Queue Length 95th (m)		12.1			33.0			38.6	10.3		49.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		235.0			136.0			296.5			391.9	
Turn Bay Length (m)									30.0			
Base Capacity (vph)		542			491			568	708		614	
Starvation Cap Reductn		0			0			0	0		0	
Spillback Cap Reductn		0			0			0	0		0	
Storage Cap Reductn		0			0			0	0		0	
Reduced v/c Ratio		0.19			0.50			0.50	0.29		0.61	

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 50			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.61			
Intersection Signal Delay: 13.8		Intersection LOS: B	
Intersection Capacity Utilization 69.1%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 2: 6th Concession Rd & Holburn St



Appendix D

WARRANTS ANALYSIS

Canadian Traffic Signal Warrant Analysis

Main Street 6th Concession Road - 2030 Pre Development

Side Street Holburn Street - 2030 Pre Development

Date: August 16, 2022

City: City of Windsor

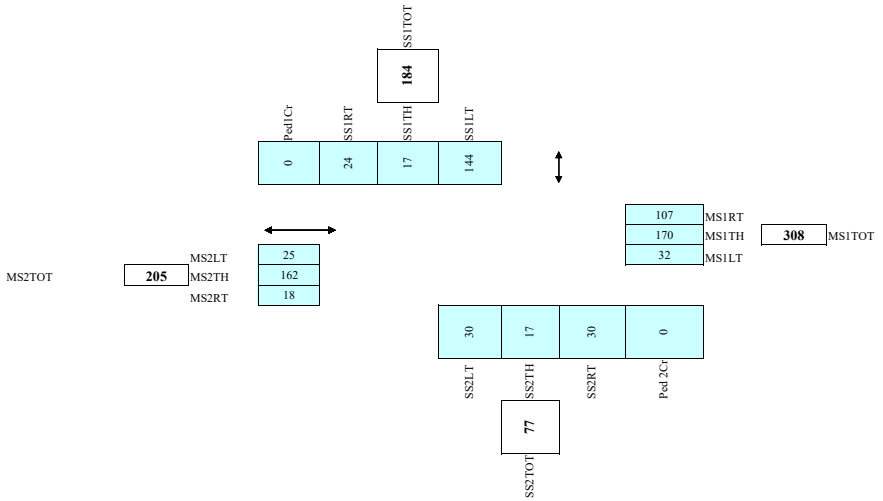
MainStreet1Lanes	(#)	1	Distance to next signal	(m)	550
MainStreet2Lanes	(#)	1	Elementary School	(y/n)	n
MainStreet LT Lanes	(#)	1	Senior's Complex	(y/n)	n
SideStreet1Lanes	(#)	1	Pathway to School	(y/n)	n
SideStreet2Lanes	(#)	1	Metro Area Population	(#)	1,000
MainStreetSpeedLimit	(km/h)	80	Side Street Bus Route	(y/n)	n
MainStreetTrucks/Buses	(%)	5.0%	Side Street Trucks	(%)	5.0%
Refuge Width on Median	(m)	0.0	T or 1-Way Intersection	(y/n)	n
			Central Business District	(y/n)	n

Vm =	**513**	(MainSt Vol Total)	Cs =	**1.005**	(Int SpacingFactor)
Vs =	**184**	(SideSt Vol Highest)	Cmt =	**1.000**	(MainStTruckFactor)
Pc =	**0**	Peds Crossing Main	Cv =	**1.100**	(SpeedFactor)
K1 =	**1,400**	veh/veh const	Cp =	**1.200**	(PopDemoFactor)
K2 =	**5,000**	veh/ped const	Csb =	**1.000**	(SideStBusFactor)
L =	**3.0**	TotalMainStLanes	Cst =	**1.000**	(SideStTruckFactor)
F =	**1.000**	(PedDemoFactor)	Vmx =	**308**	(MainStHighest)
Vm1 =	**513**	(MainStVeh-Veh#)	Vm2 =	**513**	(MainStVeh-Ped#)
Cvp =	**1.327**	(product of Cs,Cmt,Cv,Cp)	Cbt =	**1.000**	(maximum of Csb,Cst)
Ct1 =	**1.000**	T Int / one way Factor			

	MS1LT	MS1TH	MS1RT	MS2LT	MS2TH	MS2RT	SS1LT	SS1TH	SS1RT	SS2LT	SS2TH	SS2RT	PedC1	PedC2
7:00 - 8:00	10	159	52	9	88	7	148	7	21	26	14	29	0	0
8:00 - 9:00	10	159	52	9	88	7	148	7	21	26	14	29	0	0
11:00 - 12:00	10	159	52	9	88	7	148	7	21	26	14	29	0	0
12:00 - 13:00	53	180	162	41	236	29	139	26	27	33	20	31	0	0
16:00 - 17:00	53	180	162	41	236	29	139	26	27	33	20	31	0	0
17:00 - 18:00	53	180	162	41	236	29	139	26	27	33	20	31	0	0
Average	32	170	107	25	162	18	144	17	24	30	17	30	0	0

***** Enter the hourly turning movement counts averaged over the peak six hours of a typical week day**

***** Enter the peak pedestrian volume crossing the main street averaged over the same hours**



W = [Ct1xCbt(Vm1 x Vs)/K1 + (F(Vm2 x Pc)L)/K2] x Cvp

W = **89** **89** **0**

NOT Warranted ***Veh*** ***Ped***

Roadway, Vehicle and Pedestrian Factors			Range			
			Min	@	Max	@
Cs =	(Int SpacingFactor)		0.90	<200 m	1.10	isolated
Cmt =	(MainStTruckFactor)		1.00	<5%	1.15	>20%
Cv =	(SpeedFactor)		1.00	<60 km/h	1.10	>80 km/h
Cp =	(PopDemoFactor)		1.00	>250,000	1.20	<10,000
Csb =	(SideStBusFactor)		1.00	no	1.05	yes
Cst =	(SideStTruckFactor)		1.00	<10%	1.05	>10%
F =	(Ped DemoFactor)					
	(max of)	Elementary School	1.20			
		Seniors Complex	1.10			
		Path to School	1.10			

Explanation of Factors:

Cbt = 1.05 if the side street either is a bus route, or has more than 10% trucks, otherwise = 1.00.
(it is assumed that these two factors only affect the side street vehicles trying to cross the main street, not the pedestrians)

Ci = the product of the other 4 geographic factors
(Cs = intersection spacing, Cmt = main street truck, Cv = Speed, Cp = Population)

Vm1 = the main street volume - either the total of the two approaches or the highest single approach
(if the median is >=10.0 metres) (averaged over 6 peak hours)

Vm2 = the main street volume - either the total of the two approaches or the highest single approach
(if the median is >=6.0 metres) (averaged over 6 peak hours)

Vs = the highest side street approach volume (averaged over 6 peak hours)
*** note: it has been determined that Vs must be > 75 for signals to be considered ***

F = Pedestrian demographic factor - the maximum of the 3 individual pedestrian demographic factors

Pc = the total pedestrian volume crossing the mainstreet
(averaged over 6 peak hours)

L = number of lanes that the pedestrians have to cross
(only half the street if the median is >=5.0 metres)

Kv = Vehicle - Vehicle denominator constant
(Kv = 1,100 if L<=3, Kv = 1,400 if L >3)

Kp = Vehicle - Pedestrian denominator constant
(Kp = 2,000 if L<=3, Kp = 5,000 if L >3)

Canadian Traffic Signal Warrant Analysis

Main Street — **6th Concession Road - 2035 Pre Development**

Side Street — **Holburn Street - 2035 Pre Development**

Date: August 16, 2022

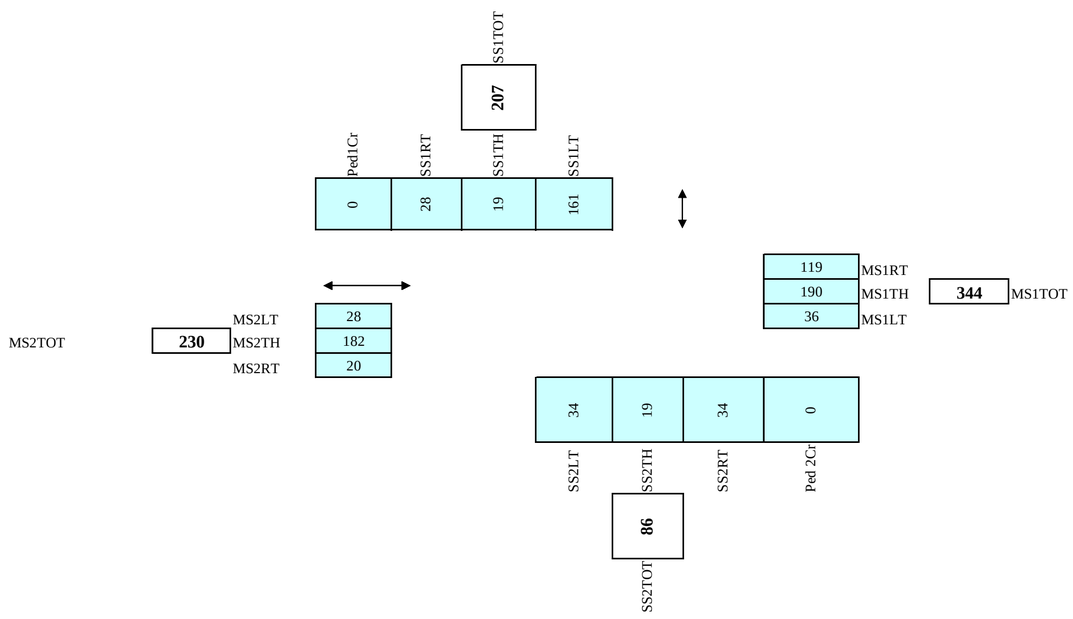
City: City of Windsor

MainStreet1Lanes	(#)	1	Distance to next signal	(m)	550
MainStreet2Lanes	(#)	1	Elementary School	(y/n)	n
MainStreet LT Lanes	(#)	1	Senior's Complex	(y/n)	n
SideStreet1Lanes	(#)	1	Pathway to School	(y/n)	n
SideStreet2Lanes	(#)	1	Metro Area Population	(#)	1,000
MainStreetSpeedLimit	(km/h)	80	Side Street Bus Route	(y/n)	n
MainStreetTrucks/Buses	(%)	5.0%	Side Street Trucks	(%)	5.0%
Refuge Width on Median	(m)	0.0	T or 1-Way Intersection	(y/n)	n
			Central Business District	(y/n)	n

	←			→			↓			↑					
	MS1LT	MS1TH	MS1RT	MS2LT	MS2TH	MS2RT	SS1LT	SS1TH	SS1RT	SS2LT	SS2TH	SS2RT	PedC1	PedC2
7:00 - 8:00	11	178	58	10	99	8	165	8	24	29	15	32	0	0
8:00 - 9:00	11	178	58	10	99	8	165	8	24	29	15	32	0	0
11:00 - 12:00	11	178	58	10	99	8	165	8	24	29	15	32	0	0
12:00 - 13:00	60	202	179	46	264	32	156	29	31	38	22	35	0	0
16:00 - 17:00	60	202	179	46	264	32	156	29	31	38	22	35	0	0
17:00 - 18:00	60	202	179	46	264	32	156	29	31	38	22	35	0	0
Average	36	190	119	28	182	20	161	19	28	34	19	34	0	0

***** Enter the hourly turning movement counts averaged over the peak six hours of a typical week day**

***** Enter the peak pedestrian volume crossing the main street averaged over the same hours**



W = [Ct1xCbt(Vm1 x Vs)/K1 + (F(Vm2 x Pc)L)/K2] x Cvp

W =	**112**	**112**	**0**
	Warranted	***Veh***	***Ped***

Vm =	**574**	(MainSt Vol Total)	Cs =	**1.005**	(Int SpacingFactor)
Vs =	**207**	(SideSt Vol Highest)	Cmt =	**1.000**	(MainStTruckFactor)
Pc =	**0**	Peds Crossing Main	Cv =	**1.100**	(SpeedFactor)
K1 =	**1,400**	veh/veh const	Cp =	**1.200**	(PopDemoFactor)
K2 =	**5,000**	veh/ped const	Csb =	**1.000**	(SideStBusFactor)
L =	**3.0**	TotalMainStLanes	Cst =	**1.000**	(SideStTruckFactor)
F =	**1.000**	(PedDemoFactor)	Vmx =	**344**	(MainStHighest)
Vm1 =	**574**	(MainStVeh-Veh#)	Vm2 =	**574**	(MainStVeh-Ped#)
Cvp =	**1.327**	(product of Cs,Cmt,Cv,Cp)	Cbt =	**1.000**	(maximum of Csb,Cst)
Ct1 =	**1.000**	T Int / one way Factor			

Roadway, Vehicle and Pedestrian Factors			**Range**			
			Min	**@**	**Max**	**@**
Cs =	(Int SpacingFactor)		0.90	<200 m	1.10	isolated
Cmt =	(MainStTruckFactor)		1.00	<5%	1.15	>20%
Cv =	(SpeedFactor)		1.00	<60 km/h	1.10	>80 km/h
Cp =	(PopDemoFactor)		1.00	>250,000	1.20	<10,000
Csb =	(SideStBusFactor)		1.00	no	1.05	yes
Cst =	(SideStTruckFactor)		1.00	<10%	1.05	>10%
F =	(Ped DemoFactor)					
	(max of)	Elementary School	1.20			
		Seniors Complex	1.10			
		Path to School	1.10			

Explanation of Factors:

Cbt = 1.05 if the side street either is a bus route, or has more than 10% trucks, otherwise = 1.00.
(it is assumed that these two factors only affect the side street vehicles trying to cross the main street, not the pedestrians)

Ci = the product of the other 4 geographic factors
(Cs = intersection spacing, Cmt = main street truck, Cv = Speed, Cp = Population)

Vm1 = the main street volume - either the total of the two approaches or the highest single approach
(if the median is >=10.0 metres) (averaged over 6 peak hours)

Vm2 = the main street volume - either the total of the two approaches or the highest single approach
(if the median is >=6.0 metres) (averaged over 6 peak hours)

Vs = the highest side street approach volume (averaged over 6 peak hours)
*** note: it has been determined that Vs must be > 75 for signals to be considered ***

F = Pedestrian demographic factor - the maximum of the 3 individual pedestrian demographic factors

Pc = the total pedestrian volume crossing the mainstreet
(averaged over 6 peak hours)

L = number of lanes that the pedestrians have to cross
(only half the street if the median is >=5.0 metres)

Kv = Vehicle - Vehicle denominator constant
(Kv = 1,100 if L<=3, Kv = 1,400 if L >3)

Kp = Vehicle - Pedestrian denominator constant
(Kp = 2,000 if L<=3, Kp = 5,000 if L >3)

Canadian Traffic Signal Warrant Analysis

Main Street 6th Concession Road - 2030 Post Development

Side Street Holburn Street - 2030 Post Development

Date: August 16, 2022

City: City of Windsor

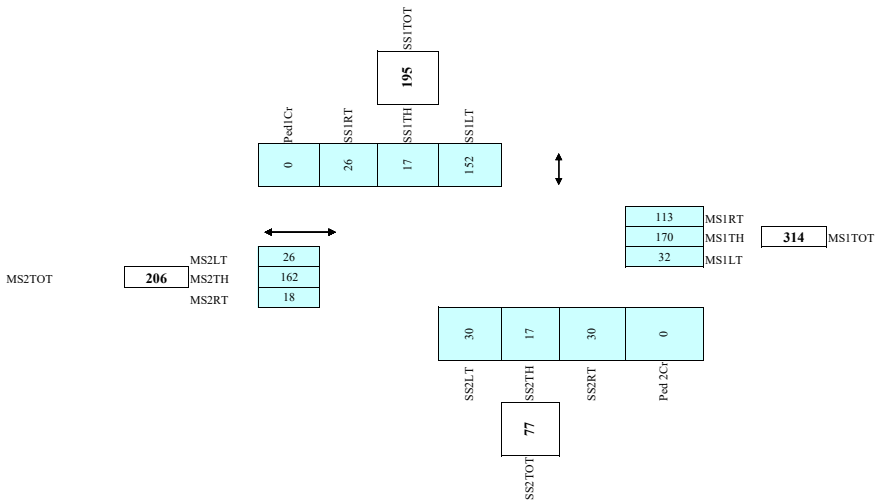
MainStreet1Lanes	(#)	1	Distance to next signal	(m)	550
MainStreet2Lanes	(#)	1	Elementary School	(y/n)	n
MainStreet LT Lanes	(#)	1	Senior's Complex	(y/n)	n
SideStreet1Lanes	(#)	1	Pathway to School	(y/n)	n
SideStreet2Lanes	(#)	1	Metro Area Population	(#)	1,000
MainStreetSpeedLimit	(km/h)	80	Side Street Bus Route	(y/n)	n
MainStreetTrucks/Buses	(%)	5.0%	Side Street Trucks	(%)	5.0%
Refuge Width on Median	(m)	0.0	T or 1-Way Intersection	(y/n)	n
			Central Business District	(y/n)	n

Vm =	**520**	(MainSt Vol Total)	Cs =	**1.005**	(Int SpacingFactor)
Vs =	**195**	(SideSt Vol Highest)	Cmt =	**1.000**	(MainStTruckFactor)
Pc =	**0**	Peds Crossing Main	Cv =	**1.100**	(SpeedFactor)
K1 =	**1,400**	veh/veh const	Cp =	**1.200**	(PopDemoFactor)
K2 =	**5,000**	veh/ped const	Csb =	**1.000**	(SideStBusFactor)
L =	**3.0**	TotalMainStLanes	Cst =	**1.000**	(SideStTruckFactor)
F =	**1.000**	(PedDemoFactor)	Vmx =	**314**	(MainStHighest)
Vm1 =	**520**	(MainStVeh-Veh#)	Vm2 =	**520**	(MainStVeh-Ped#)
Cvp =	**1.327**	(product of Cs,Cmt,Cv,Cp)	Cbt =	**1.000**	(maximum of Csb,Cst)
Ct1 =	**1.000**	T Int / one way Factor			

	MS1LT	MS1TH	MS1RT	MS2LT	MS2TH	MS2RT	SS1LT	SS1TH	SS1RT	SS2LT	SS2TH	SS2RT	PedC1	PedC2
7:00 - 8:00	10	159	55	9	88	7	158	8	23	26	14	29	0	0
8:00 - 9:00	10	159	55	9	88	7	158	8	23	26	14	29	0	0
11:00 - 12:00	10	159	55	9	88	7	158	8	23	26	14	29	0	0
12:00 - 13:00	53	180	171	42	236	29	146	26	28	33	20	31	0	0
16:00 - 17:00	53	180	171	42	236	29	146	26	28	33	20	31	0	0
17:00 - 18:00	53	180	171	42	236	29	146	26	28	33	20	31	0	0
Average	32	170	113	26	162	18	152	17	26	30	17	30	0	0

***** Enter the hourly turning movement counts averaged over the peak six hours of a typical week day**

***** Enter the peak pedestrian volume crossing the main street averaged over the same hours**



W = [Ct1xCbt(Vm1 x Vs)/K1 + (F(Vm2 x Pc)L)/K2] x Cvp

W = **96** **96** **0**

NOT Warranted ***Veh*** ***Ped***

Roadway, Vehicle and Pedestrian Factors			Range			
			Min	@	Max	@
Cs =	(Int SpacingFactor)		0.90	<200 m	1.10	isolated
Cmt =	(MainStTruckFactor)		1.00	<5%	1.15	>20%
Cv =	(SpeedFactor)		1.00	<60 km/h	1.10	>80 km/h
Cp =	(PopDemoFactor)		1.00	>250,000	1.20	<10,000
Csb =	(SideStBusFactor)		1.00	no	1.05	yes
Cst =	(SideStTruckFactor)		1.00	<10%	1.05	>10%
F =	(Ped DemoFactor)					
	(max of)	Elementary School	1.20			
		Seniors Complex	1.10			
		Path to School	1.10			

Explanation of Factors:

Cbt = 1.05 if the side street either is a bus route, or has more than 10% trucks, otherwise = 1.00.
(it is assumed that these two factors only affect the side street vehicles trying to cross the main street, not the pedestrians)

Ci = the product of the other 4 geographic factors
(Cs = intersection spacing, Cmt = main street truck, Cv = Speed, Cp = Population)

Vm1 = the main street volume - either the total of the two approaches or the highest single approach
(if the median is >=10.0 metres) (averaged over 6 peak hours)

Vm2 = the main street volume - either the total of the two approaches or the highest single approach
(if the median is >=6.0 metres) (averaged over 6 peak hours)

Vs = the highest side street approach volume (averaged over 6 peak hours)
*** note: it has been determined that Vs must be > 75 for signals to be considered ***

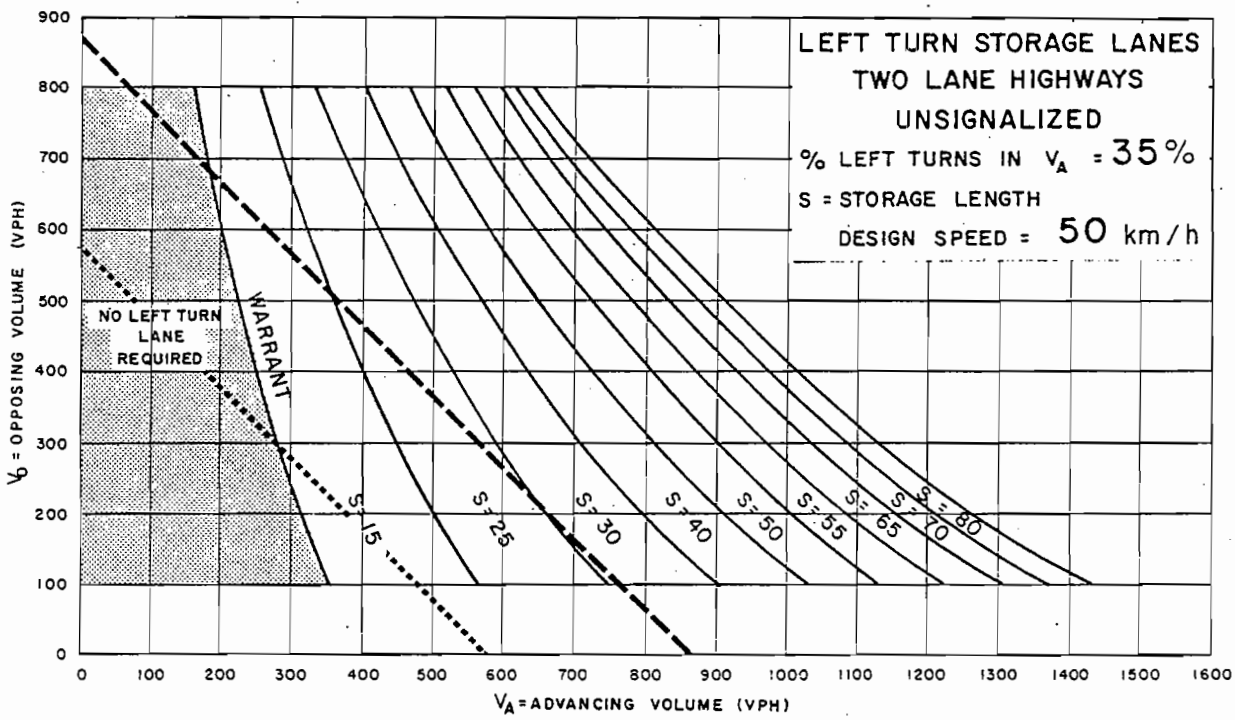
F = Pedestrian demographic factor - the maximum of the 3 individual pedestrian demographic factors

Pc = the total pedestrian volume crossing the mainstreet
(averaged over 6 peak hours)

L = number of lanes that the pedestrians have to cross
(only half the street if the median is >=5.0 metres)

Kv = Vehicle - Vehicle denominator constant
(Kv = 1,100 if L<=3, Kv = 1,400 if L >3)

Kp = Vehicle - Pedestrian denominator constant
(Kp = 2,000 if L<=3, Kp = 5,000 if L >3)



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

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

2035 AM Traffic

2035 PM Traffic

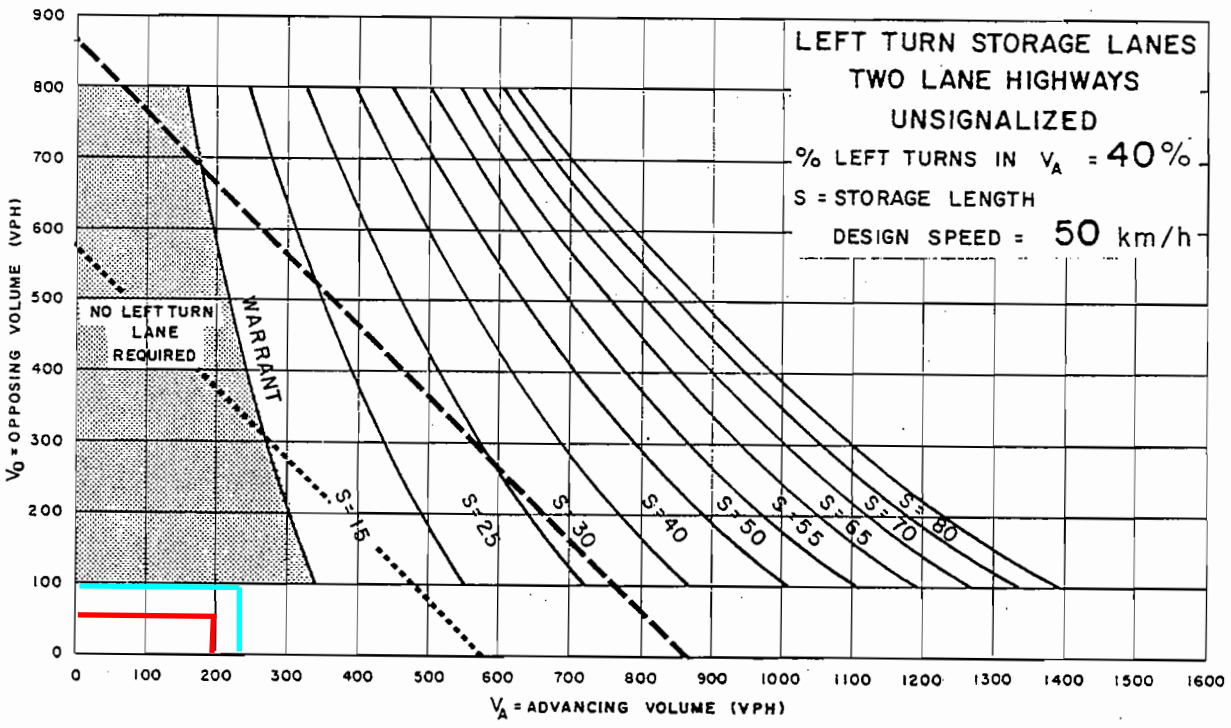


Figure EA-5

Appendix E

SITE PLANS AND PHOTOS

KEY PLAN
SCALE 1:2000

LEGEND	
	DRIVEWAY
	BUILDING ENVELOPE
	SIDEWALK

TOWNHOME DWELLING DETAILS							
LOT NO.	PROPOSED						ZONING COMPLIES
	FRONT YARD (m)	REAR YARD (m)	SIDE YARD (m)	LOT WIDTH (m)	LOT COVERAGE	FRONT YARD PAVING	
LOT 1	7.46	13.06	1.50	6.93	86.43 m² (32.11%)	47.05%	COMPLIES
LOT 2	6.30	12.70		5.50	87.43 m² (43.45%)	65.70%	COMPLIES
LOT 3	6.17	12.34		5.60	88.85 m² (43.99%)	64.05%	COMPLIES
LOT 4	7.14	11.98		5.50	87.43 m² (42.33%)	61.11%	COMPLIES
LOT 5	6.00	14.12		5.50	87.43 m² (42.39%)	64.04%	COMPLIES
LOT 6	6.00	13.76		5.50	87.43 m² (42.81%)	64.02%	COMPLIES
LOT 7	6.00	13.41	1.50	6.90	86.02 m² (33.94%)	53.29%	COMPLIES
LOT 8	6.00	12.86	1.50	7.00	87.43 m² (34.38%)	52.11%	COMPLIES
LOT 9	6.18	12.65		5.60	88.85 m² (43.76%)	63.22%	COMPLIES
LOT 10	6.49	11.69		5.60	88.85 m² (43.63%)	60.73%	COMPLIES
LOT 11	6.54	11.52		5.60	88.85 m² (44.03%)	63.87%	COMPLIES
LOT 12	7.22	10.13		5.60	88.85 m² (44.14%)	59.36%	COMPLIES
LOT 13	6.96	11.21	1.50	7.00	87.43 m² (34.43%)	51.81%	COMPLIES
LOT 14	7.76	10.45	1.50	6.38	78.66 m² (34.17%)	52.13%	COMPLIES
LOT 15	6.42	10.45		5.85	92.38 m² (46.09%)	61.55%	COMPLIES
LOT 16	6.17	10.45		5.90	93.09 m² (46.43%)	60.33%	COMPLIES
LOT 17	7.17	10.45		5.60	88.85 m² (44.25%)	59.90%	COMPLIES
LOT 18	6.00	12.92		5.60	88.85 m² (43.92%)	62.62%	COMPLIES
LOT 19	6.00	12.92	1.50	6.38	78.51 m² (34.07%)	53.59%	COMPLIES
LOT 20	6.12	12.79	1.50	6.38	78.68 m2 (34.14%)	53.36%	COMPLIES
LOT 21	6.10	12.79		5.60	88.85 m² (44.00%)	62.82%	COMPLIES
LOT 22	6.97	11.25		5.65	88.55 m² (44.39%)	60.23%	COMPLIES
LOT 23	6.45	11.24		5.75	90.97 m²(45.30%)	61.83%	COMPLIES
LOT 24	6.18	9.84	1.50	6.38	79.36 m² (36.99%)	60.00%	COMPLIES
LOT 25	6.00	7.50m	1.53	≥7.70	105.12 m² (33.94%)	18.16%	COMPLIES
LOT 26	6.00	7.50m		7.50	86.17 m² (42.94%)	44.15%	COMPLIES
LOT 27	6.00	7.50m	1.50	9.00	86.24 m² (35.78%)	35.73%	COMPLIES

SITE PLAN			
EXISTING ZONING	RESIDENTIAL DISTRICT 1.2 (RD1.2) ZONE		
PROPOSED ZONING	RESIDENTIAL DISTRICT 2.3 (RD2.3) ZONE		
PERMITTED ZONING	TOWNHOME DWELLING, AMONG OTHER USES PERMITTED WITHIN THE RESIDENTIAL DISTRICT 2.3 ZONE		
PROPOSED USE	TOWNHOME DWELLING		
DESCRIPTION	REQUIRED	PROVIDED	ZONING COMPLIANCE
MIN. FRONTAGE WIDTH	20.00m (65.62 ft)	20.00m (65.62 ft)	COMPLIES
MIN. LOT AREA	200.00m²	≥ 200.00m² (2,152.78 sq ft)	COMPLIES
MIN. FRONT YARD	6.00m	SEE ABOVE TABLE	
MIN. REAR YARD	7.50m	SEE ABOVE TABLE	
MIN. SIDE YARD	1.50m	SEE ABOVE TABLE	
MIN. LOT WIDTH	EQUAL TO THE WIDTH OF THE DWELLING UNIT PLUS ANY EXTERIOR SIDE YARD AS EXISTING AT THE TIME OF THE LOT SEVERANCE	SEE ABOVE TABLE	
MAX. LOT COVERAGE (ZBL 5.23.5)	45% OF LOT AREA; AND 50% OF LOT AREA FOR TOWNHOME DWELLING SEVERED BY A COMMON INTERIOR LOT LINE THAT SEPARATES THE DWELLING UNITS	SEE ABOVE TABLE	
MAIN BUILDING HEIGHT	MAX 9.00m	9.00m	COMPLIES
FRONT YARD PAVING	50% OF THE REQUIRED FROM YARD AREA PLUS 5% PER METER DECREASE IN LOT WIDTH BELOW 9M TO A MAXIMUM OF 70% OF THE REQUIRED FRONT YARD AREA.	SEE ABOVE TABLE	
ACCESS AREA WIDTH	MIN 3.50m TO MAX 4.50m	3.50m	COMPLIES
PARKING FOR TOWNHOME DWELLING	1 SPACE FOR EACH DWELLING OF TOTAL 27 DWELLINGS = 27 SPACE	27 SPACES PROVIDED	COMPLIES
LOT BUILDING INFO			
TOTAL LOT AREA	5,977.53 m² (64,341.59 sq. ft) 0.597 ha (1.477ac)		
TOTAL BUILDING AREA	2,366.54 m² (25,473.22 sq. ft)		
TOTAL RESIDENTIAL DWELLING UNITS	27 UNITS		
HEIGHT OF BUILDING / NO. OF STOREYS	≤9.00m / 1.0 STOREY		
BUILDING USE & OCCUPANCY	RESIDENTIAL		

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PARTNER / CONSULTANTS

REVISIONS

Date	Revision
DEC 13, 2023	REVISED LAYOUT
JAN 23, 2024	REVISED PER CITY COMMENT
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DATE:	JULY 27, 2023
SCALE:	1:250
DRAWN BY: M.R.	PRELIMINARY
CHECKED BY: B.P.	CONSTRUCTION
APPROVED BY: ----	RECORD

PROJECT TITLE
6TH CONCESSION DEVELOPMENT
4170 & 4190 6TH CONCESSION RD, CITY OF WINDSOR, COUNTY OF ESSEX, ONTARIO

SHEET TITLE
CONCEPT DEVELOPMENT PLAN

JOB NUMBER 21-150

SHEET NUMBER 02

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