URBANTRANS
Engineering Solutions Inc.

Traffic Impact Study & Parking Study

Proposed Residential Development

214 Ontario Street
City of Brighton, ON

UT-22-013

April 4, 2021

April 4, 2022

Tomba Enterprises Ltd.
P.O. Box 324
Sta A 145
The West Mall
Toronto ON M9B 5A3

URBANTRANS
Engineering Solutions Inc.

UrbanTrans Engineering Solutions Inc.
9275 Markham Road, Suite 146
Markham ON L6E 0H9
Tel: 437-236-7085
annosan@uteng.ca

RE: Traffic Impact Study & Parking Study
Proposed Residential Development
214 Ontario Street, City of Brighton
Reference No.: UT-22-013

UrbanTrans Engineering Solutions Inc. was retained by Tomba Enterprises Ltd. (the "Client") to complete this Traffic Impact Study (TIS) and Parking Study in support of an Official Plan Amendment (OPA) and Zoning By-law Amendment application(s). The proposed development is located south of Raglan Street and west of Ontario Street municipally known as 214 Ontario Street, in the City of Brighton.

The subject lands currently provide a greenhouse and garden centre located in the east half of the site while the west half of the lands are vacant. Based on the site plan provided by Bicorp Design Group Ltd. dated July 2020, we understand the project consists of the following components:

- Demolish the existing greenhouse garden centre and redevelop the subject lands with 84 residential townhouse units.
- At a minimum, two (2) car parking spaces will be provided for each unit in a garage and lead in driveway portion. In addition, a total of 26 visitor parking spaces are proposed including four (4) accessible parking spaces.
- A full movement vehicular entrance is proposed via Ontario Street. A potential for a future north-south municipal road connection to Raglan Street will be maintained and is located at the northwest corner of the subject property.

This report concludes the proposed residential development will have minimal traffic impacts to the immediate roadways and nearby intersections. It is understood that the City of Brighton is the Municipal authority to review and approve the Traffic Impact Study and Parking Study for the proposed development. It should be noted that a Terms of Reference has been submitted to the City Staff on March 1, 2022, however, no comments were received. Therefore, it was assumed that the terms of reference were accepted.

We thank you for the opportunity to undertake this study. We trust the enclosed comply with your requirements. Should you have any questions, please do not hesitate to contact the undersigned.

Kind Regards,
UrbanTrans Engineering Solutions Inc.

Signature

Engineer's Seal

Annosan Srikantha, P.Eng.
President

DISCLAIMER

This document entitled '214 Ontario Street - Traffic Impact Study (TIS) and Parking Study' or named part thereof (the "project") was prepared by UrbanTrans Engineering Solutions Inc. ("UrbanTrans") for the account of Tomba Enterprises Ltd. (the "Client"). This document is confidential and prepared solely for approval and commenting municipalities and their agencies in their review and approval of this project. The materials in this report reflect best judgement based on the information available at the time the document was issued. Any reliance on this document by any third party is strictly prohibited and UrbanTrans accepts no responsibility for damages, if any, suffered by any third party by reason of decisions made or actions based on this document.

RECORD OF REVISIONS

Revision	Date	Identification	Description
1	April 4, 2022	Final Report	Final Submission

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1.0 INTRODUCTION

1.1 Background

UrbanTrans Engineering Solutions Inc. was retained by Tomba Enterprises Ltd. (the "Client") to complete this Traffic Impact Study (TIS) and Parking Study in support of an Official Plan Amendment (OPA) and Zoning By-law Amendment application(s).

1.2 Objective

The study will assess the following components:

- Evaluate potential impacts of traffic changes prompted by the proposed development on municipal roadways and identify any infrastructure enhancements or mitigation measures warranted to ensure the road network will operate acceptably and safely upon completion of the proposed development.
- Determine whether the proposed vehicle supply conforms to the City's Zoning By-law requirements.
- Simulate vehicle swept path analysis to determine adequate space requirements are provided for passenger car, waste collection and fire/emergency vehicles.

1.3 Development Proposal

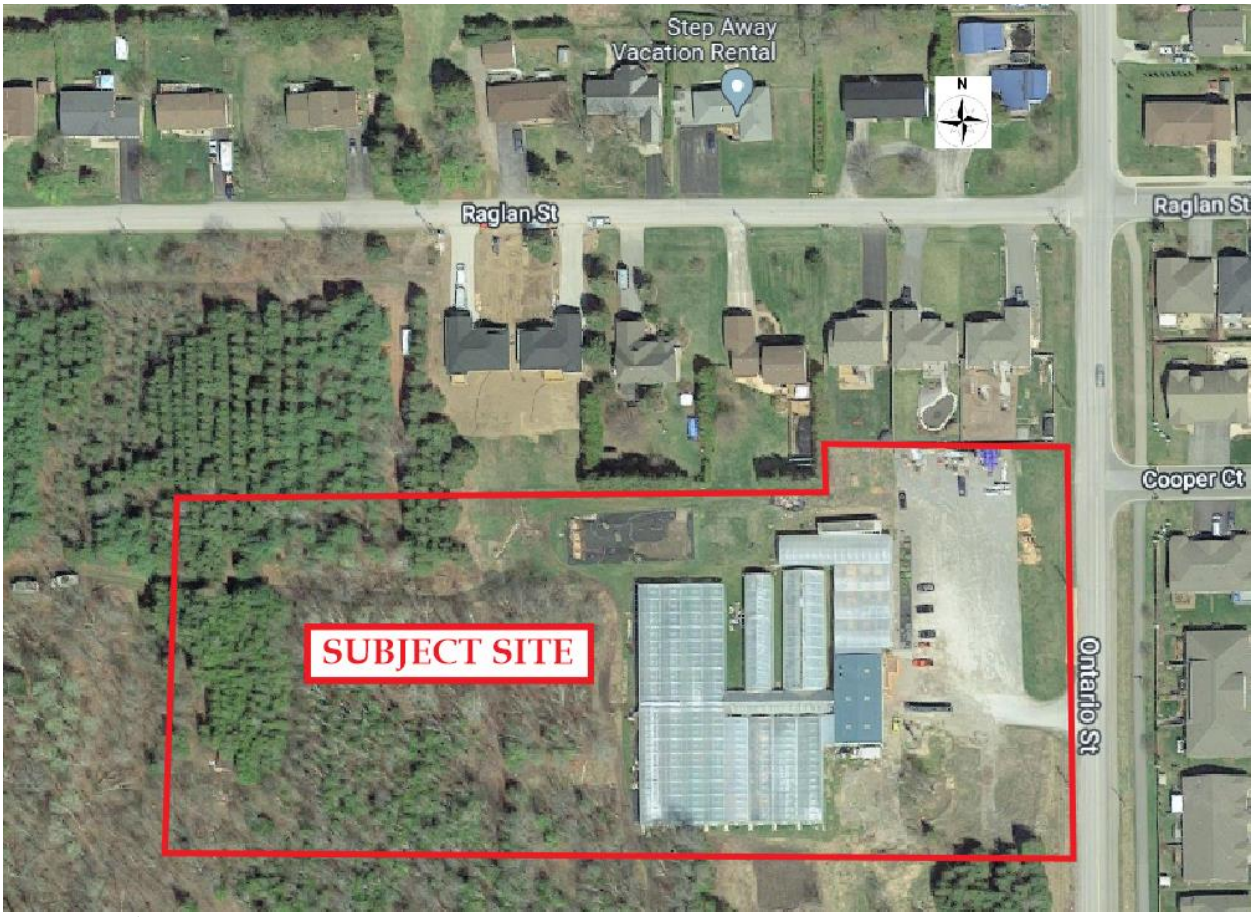
The proposed development is located south of Raglan Street and west of Ontario Street municipally known as 214 Ontario Street, in the City of Brighton.

The subject lands currently provide a greenhouse and garden centre located in the east half of the site while the west half of the lands are vacant. Based on the site plan provided by Bicorp Design Group Ltd. dated July 2020, we understand the project consists of the following components:

- Demolish the existing greenhouse garden centre and redevelop the subject lands with 84 residential townhouse units.
- At a minimum, two (2) car parking spaces will be provided for each unit in a garage and lead in driveway portion. In addition, a total of 26 visitor parking spaces are proposed including four (4) accessible parking spaces.
- A full movement vehicular entrance is proposed via Ontario Street. A potential for a future north-south municipal road connection to Raglan Street will be maintained and is located at the northwest corner of the subject property. However, for assessment purposes all site traffic will be evaluated to/from the full movement vehicular entrance via Ontario Street.

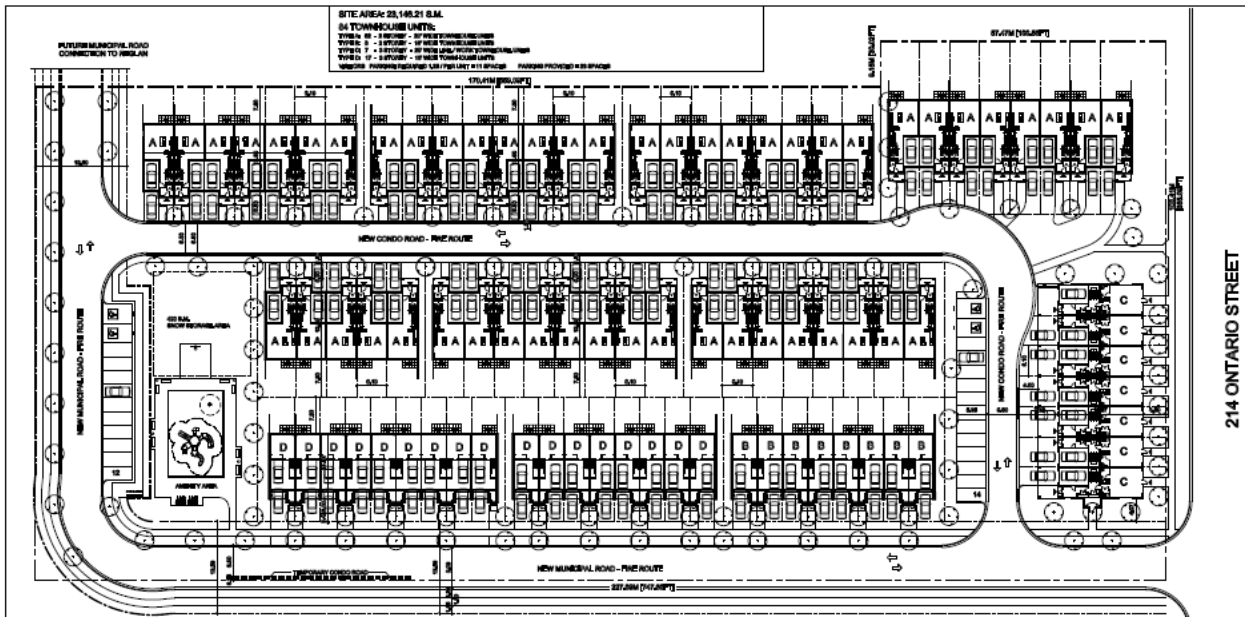
The location of the proposed development is illustrated in **Figure 1**. The proposed site plan is illustrated in **Figure 2**; **Appendix A** also provides a larger scale version of the proposed site plan.

Figure 1 - Site Location



Source: Google Map

Figure 2 – Proposed Site Plan



Source: Bicorp Design Group Ltd. Site Plan

2.0 EXISTING CONDITIONS

This section documents the transportation network in the study area in 2022, including existing roadways, transit services, active transportation network, traffic control measures, and intersection performances.

2.1 Road Network

To provide clarity throughout this report, Ontario Street has been given a north-west orientation. Therefore, Raglan Street is given an east-west orientation. On this basis, the characteristics of the roads and intersections within the vicinity of the subject site are described below:

- **Ontario Street** is a north-south arterial road under the jurisdiction of Brighton. It operates as a 2-lane cross-section at the two-way stop-controlled Raglan Street intersection. Ontario Street maintains a posted speed limit of 50 km/hr.
- **Raglan Street** is an east-west local road under the jurisdiction of Brighton. It operates as a 2-lane cross-section at the two-way stop-controlled Ontario Street intersection. Raglan Street maintains an unposted speed limit 50 km/hr.

2.2 Transit Network

The proposed subject site is situated within an area that is currently well serviced by the existing QUINTE transit network. The QUINTE transit stop is located within an easily walkable distance of less than 1km from the subject site. The transit route is provided in **Appendix B** and the route services in the vicinity of the subject site is summarized in **Table 2**. The existing QUINTE Transit System Map in the vicinity of the subject site is illustrated in **Figure 3**.

Table 2: Area Transit Context

Bus Route	Route Description	Frequency
Trenton-Brighton - Scheduled (QUINTE)	The Trenton-Brighton Route operates in a loop around the Municipality of Brighton, and then continues in an east-west direction towards the Walmart in Trenton. The stop in Trenton at Walmart provides further connections to Trenton Public Transit (included in fair). The Trenton-Brighton Route operates scheduled service Tuesday-Thursday, with one eastbound morning bus and two westbound afternoon buses. Fairs are $5.00 which includes connections to Trenton Public Transit, or $2.00 within in the Town of Brighton.	Eastbound: 9:25 Westbound: 12:05 & 14:35
Trenton-Brighton – On Demand (QUINTE)	The Trenton-Brighton Route operates in a loop around the Municipality of Brighton, and then continues in an east-west direction towards the Walmart in Trenton. On-demand bus service is provided Monday-Friday	On-Demand (18:00 latest)

Figure 3: Quinte Transit (Trenton to Brighton Route Map)

Source: Quinte Transit

2.3 Active Transportation Network

Active transportation network involves human-powered forms of travel with walking and cycling being the most dominant and can be combined with other modes such as public transit.

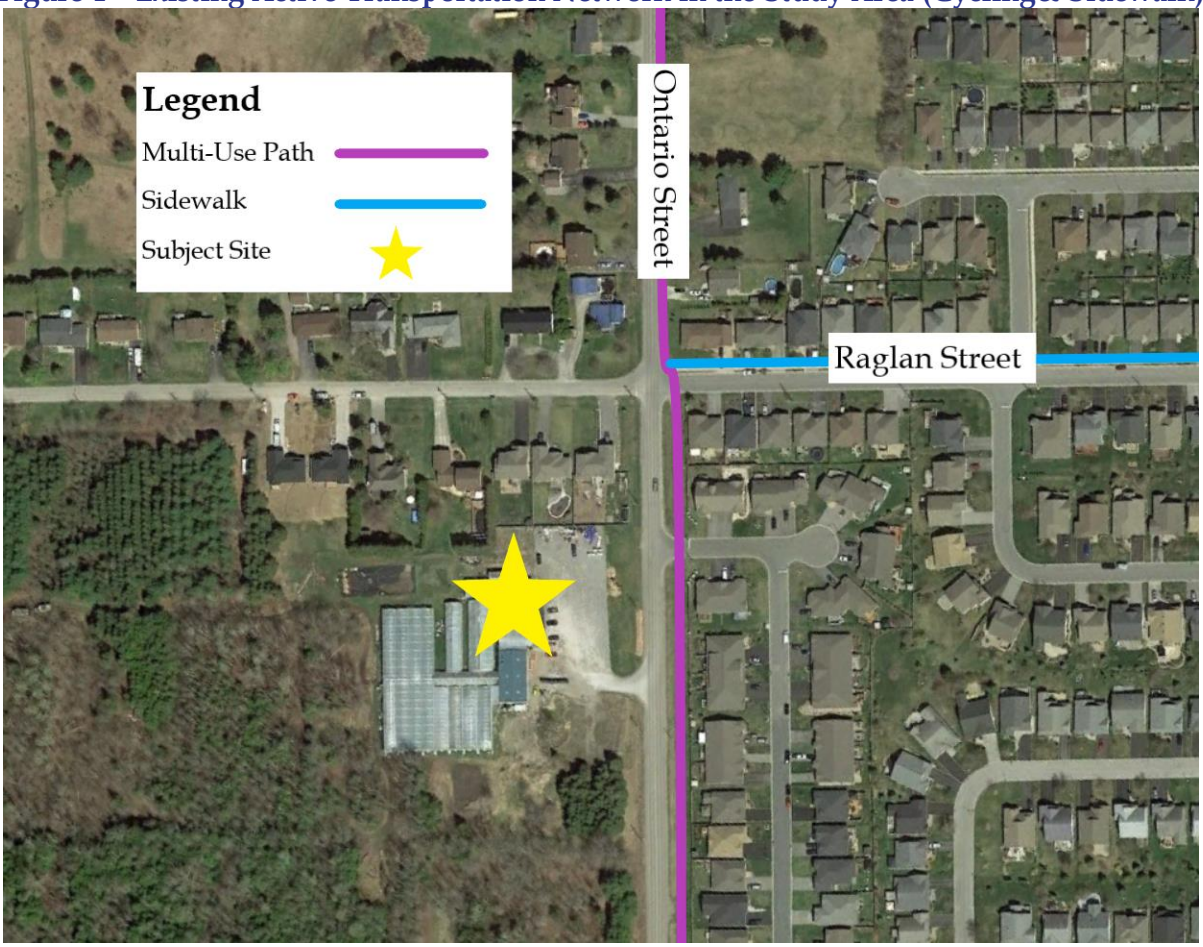
2.3.1 Sidewalk Network

Currently, there is a sidewalk/multi-use path located on the east side of Ontario Street. In addition, east of Ontario Street, there is a sidewalk on the north side of Raglan Street, in the vicinity of the subject site. The proposed development provides direct sidewalk connections to the surrounding road network. The sidewalk connections to the surrounding intersections and roadways will facilitate pedestrian movement to and from the subject site.

2.3.2 Bicycle Network

Currently, the general area of the proposed development is not well serviced by cycling routes. However, there does exist a multi-use path on the east side of Ontario Street. A cursory review of the existing cycling and sidewalk network was conducted in the study area and is illustrated in **Figure 4**.

Figure 4 – Existing Active Transportation Network in the Study Area (Cycling& Sidewalk)



Source: Google Maps

2.4 Traffic Data

The study will review and evaluate the following intersection in the vicinity of the subject site:

- Raglan Street & Ontario Street (Unsignalized)
- Ontario Street & Proposed Site Access (Unsignalized)

The existing traffic volumes at the abovementioned study area intersections were undertaken by Spectrum Traffic Data Inc. on Thursday, March 3, 2022, during the morning (7:00 AM to 10:00 AM) and afternoon (4:00 PM to 7:00 PM) peak hour periods. The detailed traffic data and signal timing plans are provided for reference in **Appendix C** and the existing 2022 lane configuration and traffic volumes are illustrated in **Figure 5**.

2.5 Base Year (2022) Traffic Operations

To assess the existing traffic conditions, UrbanTrans utilized window-based computer software Synchro Version 11 which incorporates the Highway Capacity Manual 2000 methodology (HCM 2000), to undertake capacity analysis (i.e., level of services, volume to capacity ratios, delays, queues, etc.) at the study area intersections during weekday AM and PM peak hour periods for the unsignalized intersection.

The detailed results of the analysis for existing (2022) baseline traffic conditions are provided in **Appendix D** and summarized in **Table 2**.

Table 2: Existing (2022) Traffic Peak Hour Level of Service Analysis

Intersection	Weekday AM Peak Hour					Weekday PM Peak Hour			
	Movement	Control Delay (s)	95th Queue (m)	V/C	LOS	Control Delay (s)	95th Queue (m)	V/C	LOS
Ontario St & Raglan St (Unsignalized)	EBLTR	9.7	0.9	0.04	A	10.4	0.9	0.03	B
	WBLTR	9.0	1.0	0.04	A	9.2	0.8	0.03	A
	NBLTR	-	-	<0.01	-	-	-	-	-
	SBLTR	2.7	0.3	0.01	A	2.1	0.5	0.02	A

The intersection capacity analysis indicates that under the existing conditions, the unsignalized intersection is currently operating at acceptable levels of service, v/c ratios and delay with no critical movements identified.

3.0 FUTURE BACKGROUND CONDITIONS

3.1 Horizon Years

It is anticipated that the development will be fully built-out by 2025. On this basis, a five-year horizon (2030) after the entire building process will be analyzed.

3.2 Growth Rate

As previously mentioned, a Terms of Reference has been submitted to the City Staff on March 1, 2022 (see **Appendix E**), however, no comments were received and was assumed accepted. On this basis, as a conservative approach a total of 2% growth rate per annum for all traffic volumes along Raglan Street and Ontario Street was applied under future (2030) background traffic conditions. The 2% growth rate per annum accounts for two components; background traffic growth applied to through traffic movements within the study area intersections as well as future background developments in the vicinity of the subject site.

3.3 Future Background (2030) Traffic Operations

To assess the future (2030) background traffic conditions, UrbanTrans utilized window-based computer software Synchro Version 11 which incorporates the Highway Capacity Manual 2000 methodology (HCM 2000), to undertake capacity analysis (i.e., level of services, volume to capacity ratios, delays, queues, etc.) at the study area intersections during weekday AM and PM peak hour periods for the unsignalized intersection.

The estimated future (2030) background traffic volumes are illustrated in **Figure 6**. The detailed results of the analysis are provided in **Appendix F** and summarized in **Table 3**.

Table 3: Future (2030) Background Traffic Peak Hour Level of Service Analysis

Intersection	Weekday AM Peak Hour					Weekday PM Peak Hour			
	Movement	Control Delay (s)	95th Queue (m)	V/C	LOS	Control Delay (s)	95th Queue (m)	V/C	LOS
Ontario St & Raglan St (Unsignalized)	EBLTR	10.0	1.1	0.04	A	10.8	1.2	0.05	B
	WBLTR	9.1	1.2	0.05	A	9.4	0.9	0.04	A
	NBLTR	-	-	<0.01	-	-	-	-	-
	SBLTR	2.8	0.4	0.02	A	2.1	0.5	0.02	A

The intersection capacity analysis indicates that under the future (2030) background conditions, the intersection is expected to operate at acceptable levels of service, v/c ratios and delay with no critical movements identified.

4.0 SITE GENERATED TRAFFIC VOLUMES

4.1 Proposed Development

Based on the site plan provided by Bicorp Design Group Ltd. dated July 2020, we understand the project consists of the following components:

- Demolish the existing greenhouse garden centre and redevelop the subject lands with 84 residential townhouse units. **Table 4** provides a breakdown of the townhouse units and storey.

Table 4: Proposed Townhouse Unit Classification

Type	No. of Units	No. of Storey
A	52	2
B	8	2
C	7	3
D	17	3

- At a minimum, two (2) car parking spaces will be provided for each unit in a garage and lead in driveway portion. In addition, a total of 26 visitor parking spaces are proposed including four (4) accessible parking spaces.
- A full movement vehicular entrance is proposed via Ontario Street. A potential for a future north-south municipal road connection to Raglan Street will be maintained and is located at the northwest corner of the subject property. However, for assessment purposes all site traffic will be evaluated to/from the full movement vehicular entrance via Ontario Street.

4.2 Trip Generation

The number of vehicular trips generated by the proposed development is estimated using the information contained in the ITE Trip Generation Manual (10th Edition) published by the Institute of Transportation Engineers (ITE). For the purpose of this assessment, the maximum between equations and average rates of the ITE Land Use Codes (LUC) 220 "Multifamily Housing (Low-Rise)" and (LUC) 221 "Multifamily Housing (Mid-Rise)" have been utilized for the proposed development. It is important to note, Low-rise multifamily housing includes townhouses that have one or two levels (floors) whereas High-rise multifamily housing includes townhouses that have three and 10 levels (floors).

Table 5 summarizes the trip generation volumes for the proposed development during the weekday AM and PM peak hour for full build-out. **To remain conservative, no trip reductions were applied to account for transit and other modes of transport**.

Table 5: Site Traffic Trip Generation

Land Use (Magnitude)		Weekday AM Peak Hour			Weekday PM Peak Hour		
		In	Out	Total	In	Out	Total
Multifamily Housing (Low-Rise) 60 Units	Gross Rate	0.12	0.36	0.48	0.38	0.24	0.62
	New Trip	7	22	29	23	14	37
Multifamily Housing (Mid-Rise) 24 Units	Gross Rate	0.08	0.30	0.38	0.29	0.17	0.46
	New Trip	2	7	9	7	4	11
Total Trips		**9**	**29**	**38**	**30**	**18**	**48**

Based on the trip generation calculations, the proposed residential development is estimated to generate a total 38 two-way trips (9 inbound and 29 outbound) during the weekday morning peak hour and 48 two-way trips (30 inbound and 18 outbound) during the afternoon peak hour.

4.3 Trip Distribution and Trip Assignment

Trip distribution for site traffic was reviewed and estimated based on existing traffic patterns and routes that drivers would likely take to access the subject site and engineering judgement based on ease of site access.

The distribution of site traffic trips to the study area intersections are summarized in **Table 6** and illustrated in **Figure 7**.

Table 6: Trip Distribution

Intersection	Direction	AM Peak Hour		PM Peak Hour	
		In	Out	In	Out
Raglan St & Ontario St (Unsignalized)	North	40%	50%	50%	40%
	South	35%	30%	30%	30%
	East	20%	15%	10%	20%
	West	5%	5%	10%	10%
Total		100%	100%	100%	100%

5.0 FUTURE TOTAL CONDITIONS

The future (2030) total traffic volumes are the sum of the future (2030) background traffic volumes plus the proposed site generated traffic volumes.

To assess the future (2030) total traffic conditions, UrbanTrans utilized window-based computer software Synchro Version 11 which incorporates the Highway Capacity Manual 2000 methodology (HCM 2000), to undertake capacity analysis (i.e., level of services, volume to capacity ratios, delays, queues, etc.) at the study area intersections during weekday AM and PM peak hour periods for the unsignalized intersections.

The estimated future (2030) total traffic volumes are illustrated in **Figure 8**. The detailed results of the analysis are provided in **Appendix G** and summarized in **Table 7**.

Table 7: Future (2030) Total Traffic Peak Hour Level of Service Analysis

Intersection	Weekday AM Peak Hour					Weekday PM Peak Hour			
	Movement	Control Delay (s)	95th Queue (m)	V/C	LOS	Control Delay (s)	95th Queue (m)	V/C	LOS
Ontario St & Raglan St (Unsignalized)	EBLTR	10.3	1.2	0.05	B	11.0	1.7	0.07	B
	WBLTR	9.4	1.4	0.05	A	9.7	1.1	0.05	A
	NBLTR	0.3	0.1	<0.01	A	0.6	0.1	0.01	A
	SBLTR	2.6	0.4	0.02	A	1.9	0.5	0.02	A
Site Access & Ontario St (Unsignalized)	EBLR	9.0	0.9	0.03	A	9.3	0.5	0.02	A
	NBLT	0.4	-	<0.01	A	1.0	0.2	0.01	A
	SBTR	-	-	0.03	-	-	-	0.05	-

The intersection capacity analysis indicates that under the future (2030) total conditions, the intersection is expected to operate at acceptable levels of service, v/c ratios and delay with no critical movements identified.

On this basis, it is UrbanTrans opinion no infrastructure improvements will be required to accommodate the proposed development site traffic trip generation under future 2030 total traffic conditions. Furthermore, the proposed residential development can adequately be accommodated by the existing transportation network with minimal traffic impact to the immediate roadways and nearby intersections.

6.0 TRANSPORTATION IMPACT ASSESSMENT

6.1 Site Access

Based on the site plan, a full movement vehicular entrance is proposed via Ontario Street. A potential for a future north-south municipal road connection to Raglan Street will be maintained and is located at the northwest corner of the subject property.

6.2 On-site Circulation

AutoTURN software was used to generate vehicular turning templates to confirm and demonstrate the accessibility for typical 5.6m long passenger vehicle (P TAC-2017) and a 11.5m long Waste Collection and Fire/Emergency Truck (HSU TAC-2017).

Figure 9 to **Figure 10** illustrates the turning movement templates for passenger vehicle, waste collection and fire/emergency vehicles, respectively. The analysis demonstrates that a passenger vehicle, waste collection and fire/emergency vehicles can maneuver within the designated route with no conflicts.

6.3 Signage and Pavement Marking Plan

In accordance with the Ontario Traffic Manuel (OTM) Book 5, UrbanTrans' recommend appropriate internal signages and pavement marking signs and is illustrated in **Figure 11**. Based on the recommended signages and pedestrian sidewalk within the subject site, it is our opinion the site will operate safely and efficiently for both motorists and pedestrian connectivity.

7.0 PARKING REQUIREMENT

7.1 Zoning By-law Review

The City of Brighton Zoning By-law No. 140-2002 (Section 5.1.2, Table A) is applied to the proposed development.

Based on the site plan provided by Empire dated February 2022, we understand the project consists of the following components:

- Demolish the existing greenhouse garden centre and redevelop the subject lands with 84 residential townhouse units.
- At a minimum, two (2) car parking spaces will be provided for each unit in a garage and lead in driveway portion. In addition, a total of 26 visitor parking spaces are proposed including four (4) accessible parking spaces.

The parking requirement and supply for the proposed development is detailed in **Table 8**.

Table 8: City of Brighton Zoning By-law No. 140-2002 Vehicle Parking Requirements

Type of Use	No. of Units	Parking Rates	Parking Requirement
Multiple Dwelling	84	1.5 spaces per unit	126
Total Required			**126**
Total Provided			**194**
Difference			**+68**

Based on the applicable City of Brighton Zoning By-law No. 140-2002 detailed in Table 11, the proposed development is required to provide 1.5 vehicle parking spaces per unit. The proposed development will provide a total of 2 vehicle parking spaces per unit and 26 visitor parking spaces resulting in a parking surplus of 68 vehicle parking spaces.

8.0 CONCLUSIONS

The following section provides brief overview of the study findings and our assessment of the transportation related aspects of the proposed development.

DEVELOPMENT PROPOSAL

- The proposed development is located south of Raglan Street and west of Ontario Street municipally known as 214 Ontario Street, in the City of Brighton.
- The subject lands currently provide a greenhouse and garden centre located in the east half of the site while the west half of the lands are vacant. Based on the site plan provided by Bicorp Design Group Ltd. dated July 2020, we understand the project consists of the following components:
    - Demolish the existing greenhouse garden centre and redevelop the subject lands with 84 residential townhouse units.
    - At a minimum, two (2) car parking spaces will be provided for each unit in a garage and lead in driveway portion. In addition, a total of 26 visitor parking spaces are proposed including four (4) accessible parking spaces.
    - A full movement vehicular entrance is proposed via Ontario Street. A potential for a future north-south municipal road connection to Raglan Street will be maintained and is located at the northwest corner of the subject property. However, for assessment purposes all site traffic will be evaluated to/from the full movement vehicular entrance via Ontario Street.

Base Year (2022) Traffic Operations

- The intersection capacity analysis indicates that under the existing conditions, the unsignalized intersection is currently operating at acceptable levels of service, v/c ratios and delay with no critical movements identified.

Future (2030) Background Horizon Year, Growth Rate & Developments

- It is anticipated that the development will be fully built-out by 2025. On this basis, a five-year horizon (2030) after the entire building process will be analyzed.
- A Terms of Reference has been submitted to the City Staff on March 1, 2022, however, no comments were received and was assumed accepted. On this basis, as a conservative approach a total of 2% growth rate per annum for all traffic volumes along Raglan Street and Ontario Street was applied under future (2030) background traffic conditions. The 2% growth rate per annum accounts for two components; background traffic growth applied to through traffic movements within the study area intersections as well as future background developments in the vicinity of the subject site.

Future (2030) Background Traffic Conditions

- The intersection capacity analysis indicates that under the future (2030) background conditions, the intersection is expected to operate at acceptable levels of service, v/c ratios and delay with no critical movements identified.

Trip Generation

- For the purpose of this assessment, the maximum between equations and average rates of the ITE Land Use Codes (LUC) 220 "Multifamily Housing (Low-Rise)" and (LUC) 221 "Multifamily Housing (Mid-Rise)" have been utilized for the proposed development. It is important to note, Low-rise multifamily housing includes townhouses that have one or two levels (floors) whereas High-rise multifamily housing includes townhouses that have three and 10 levels (floors).
- Based on the trip generation calculations, the proposed residential development is estimated to generate a total 38 two-way trips (9 inbound and 29 outbound) during the weekday morning peak hour and 48 two-way trips (30 inbound and 18 outbound) during the afternoon peak hour.

Future (2030) Total Traffic Conditions

- The intersection capacity analysis indicates that under the future (2030) total conditions, the intersection is expected to operate at acceptable levels of service, v/c ratios and delay with no critical movements identified.
- **On this basis, it is UrbanTrans opinion no infrastructure improvements will be required to accommodate the proposed development site traffic trip generation under future 2030 total traffic conditions. Furthermore, the proposed residential development can adequately be accommodated by the existing transportation network with minimal traffic impact to the immediate roadways and nearby intersections.**

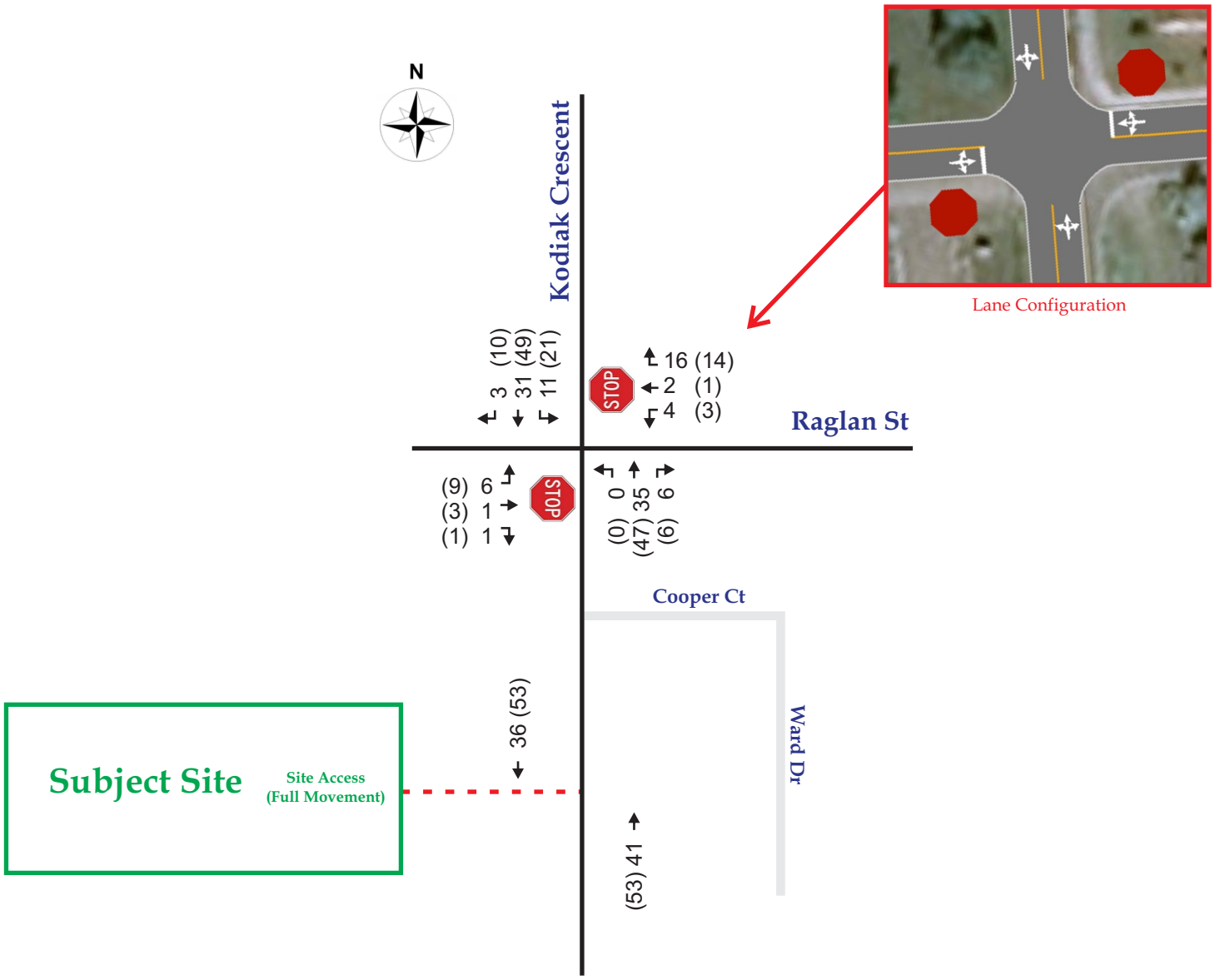
Site Access

- The analysis demonstrates that a passenger vehicle, waste collection and fire/emergency vehicles can maneuver within the designated route with no conflicts.
- In accordance with the Ontario Traffic Manuel (OTM) Book 5, UrbanTrans' recommend appropriate internal signages and pavement marking signs.
- Based on the recommended signages and pedestrian sidewalk within the subject site, it is our opinion the site will operate safely and efficiently for both motorists and pedestrian connectivity.

Parking Requirement

- Based on the applicable City of Brighton Zoning By-law No. 140-2002, the proposed development is required to provide 1.5 vehicle parking spaces per unit. The proposed development will provide a total of 2 vehicle parking spaces per unit and 26 visitor parking spaces resulting in a parking surplus of 68 vehicle parking spaces.

LEGEND	
## (##)	AM Peak Hour (PM Peak Hour)
STOP	Existing Stop Sign



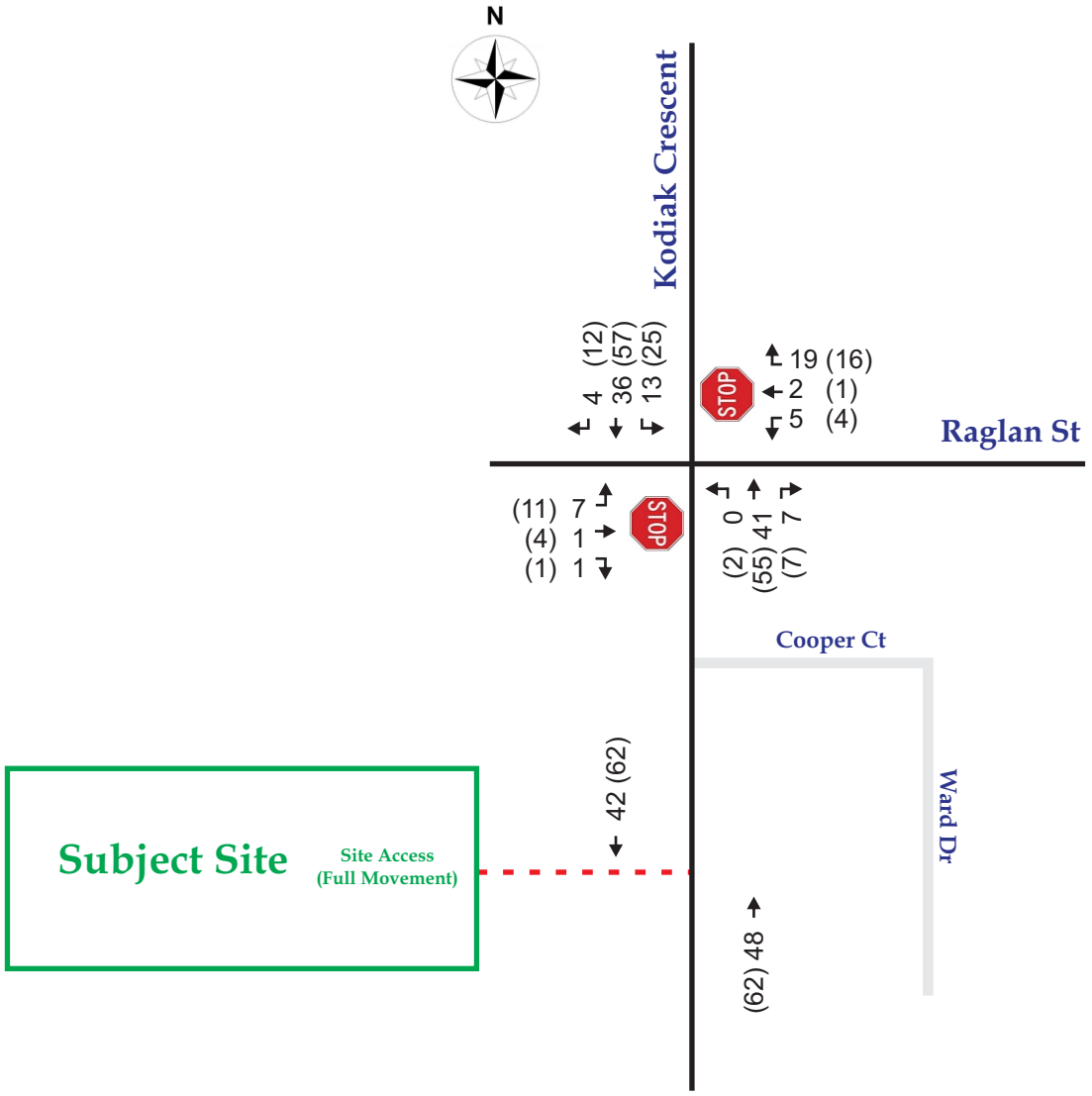
Schematic
Not To Scale

URBANTRANS Engineering Solutions Inc.

214 Ontario Street, Brighton ON
Project No. UT-21-013
April 2022

Figure 5 - Existing (2022) Traffic Volumes

LEGEND	
## (##)	AM Peak Hour (PM Peak Hour)
STOP	Existing Stop Sign



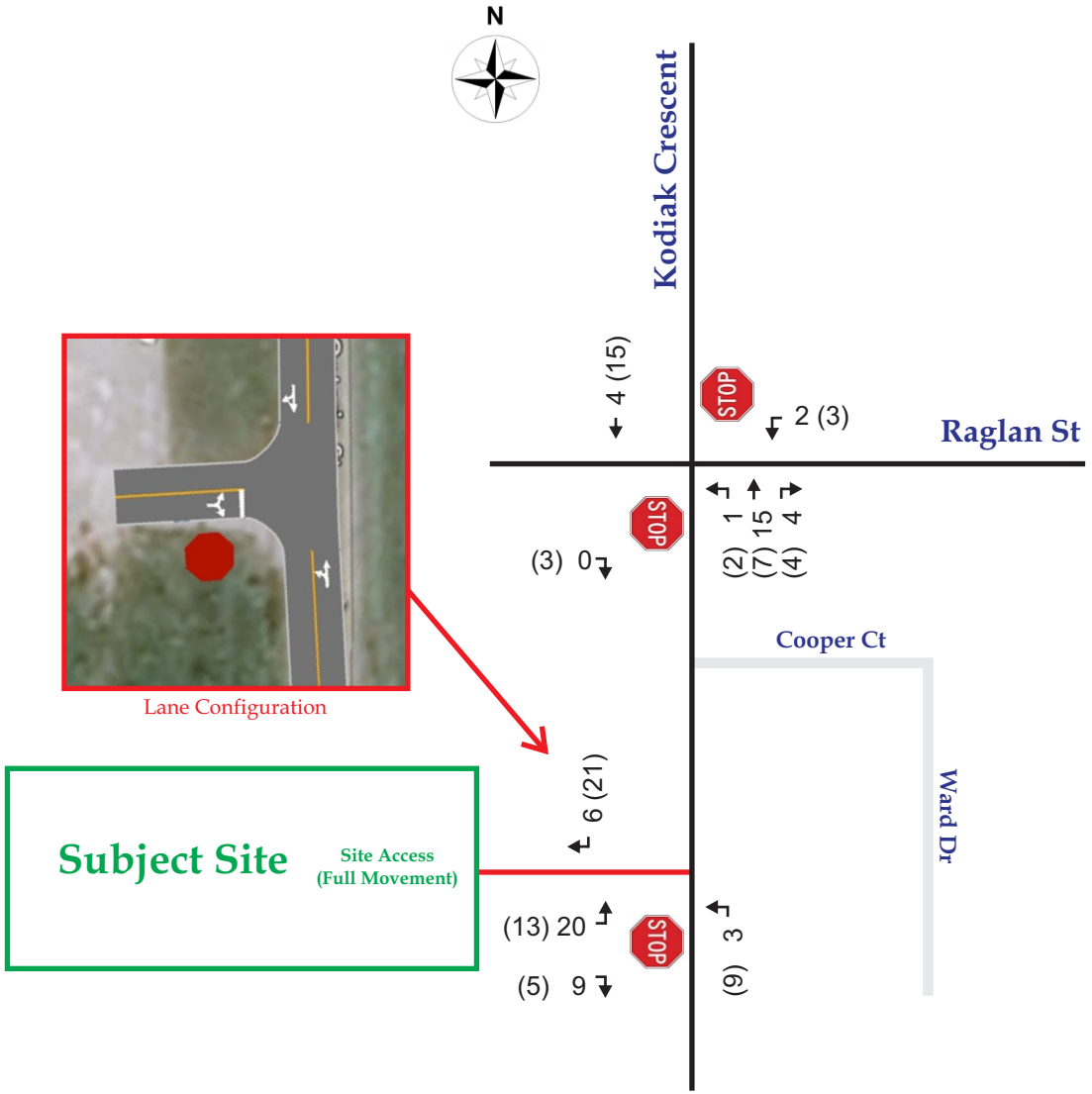
Schematic
Not To Scale

URBANTRANS Engineering Solutions Inc.

214 Ontario Street, Brighton ON
Project No. UT-21-013
April 2022

Figure 6 - Future (2030) Background Traffic Volumes

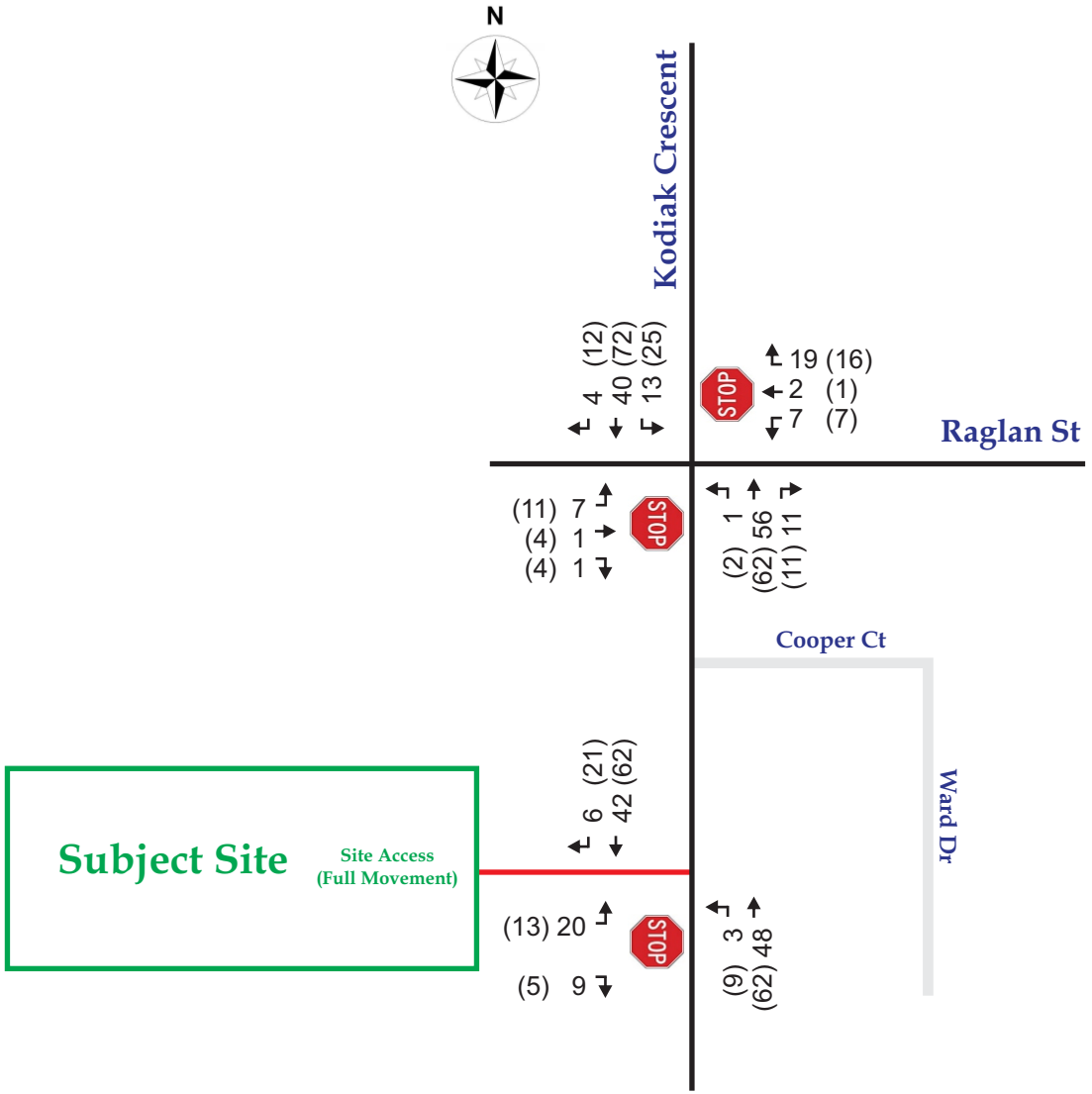
LEGEND	
## (##)	AM Peak Hour (PM Peak Hour)
STOP	Existing Stop Sign



Schematic
Not To Scale

Figure 7 - Site Traffic Volumes

LEGEND	
## (##)	AM Peak Hour (PM Peak Hour)
STOP	Existing Stop Sign



Schematic
Not To Scale

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214 Ontario Street, Brighton ON
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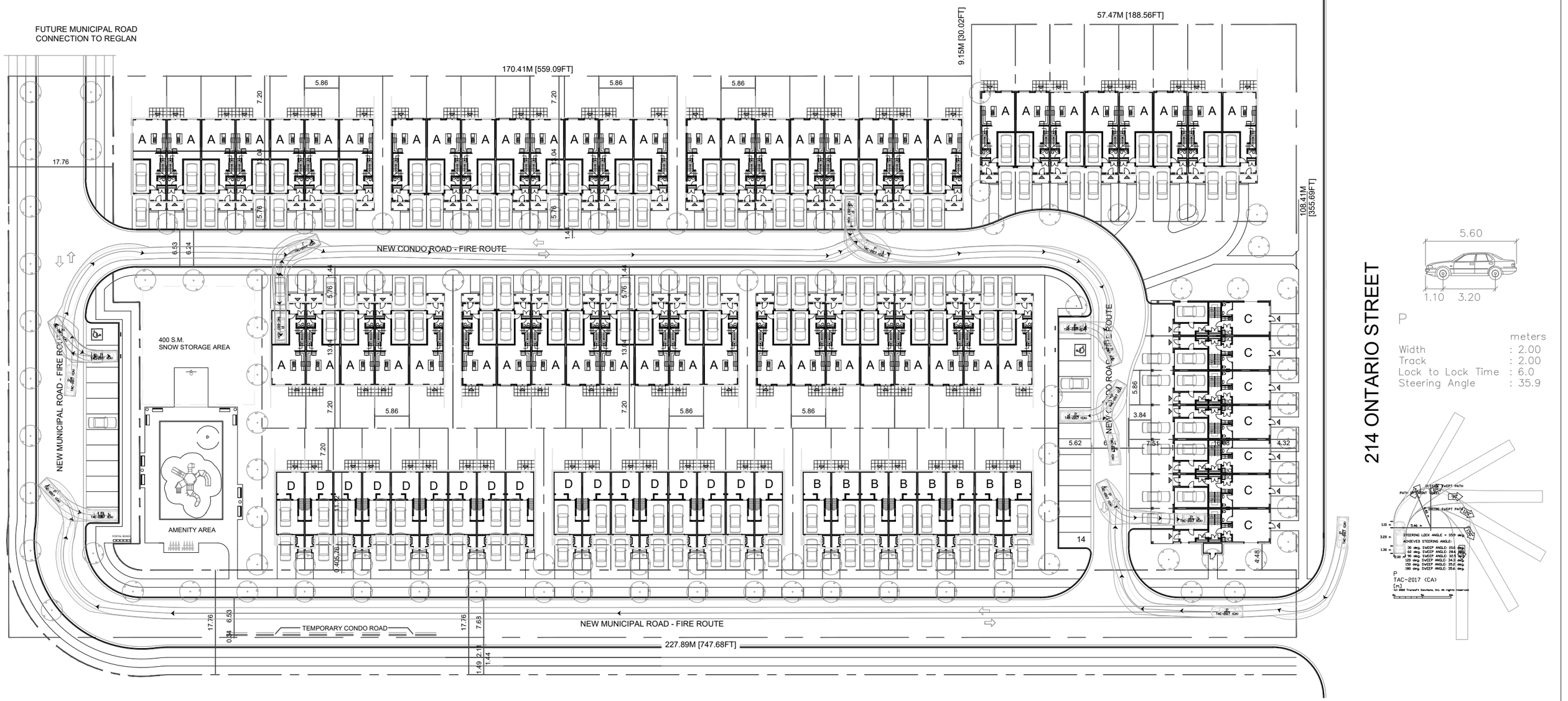
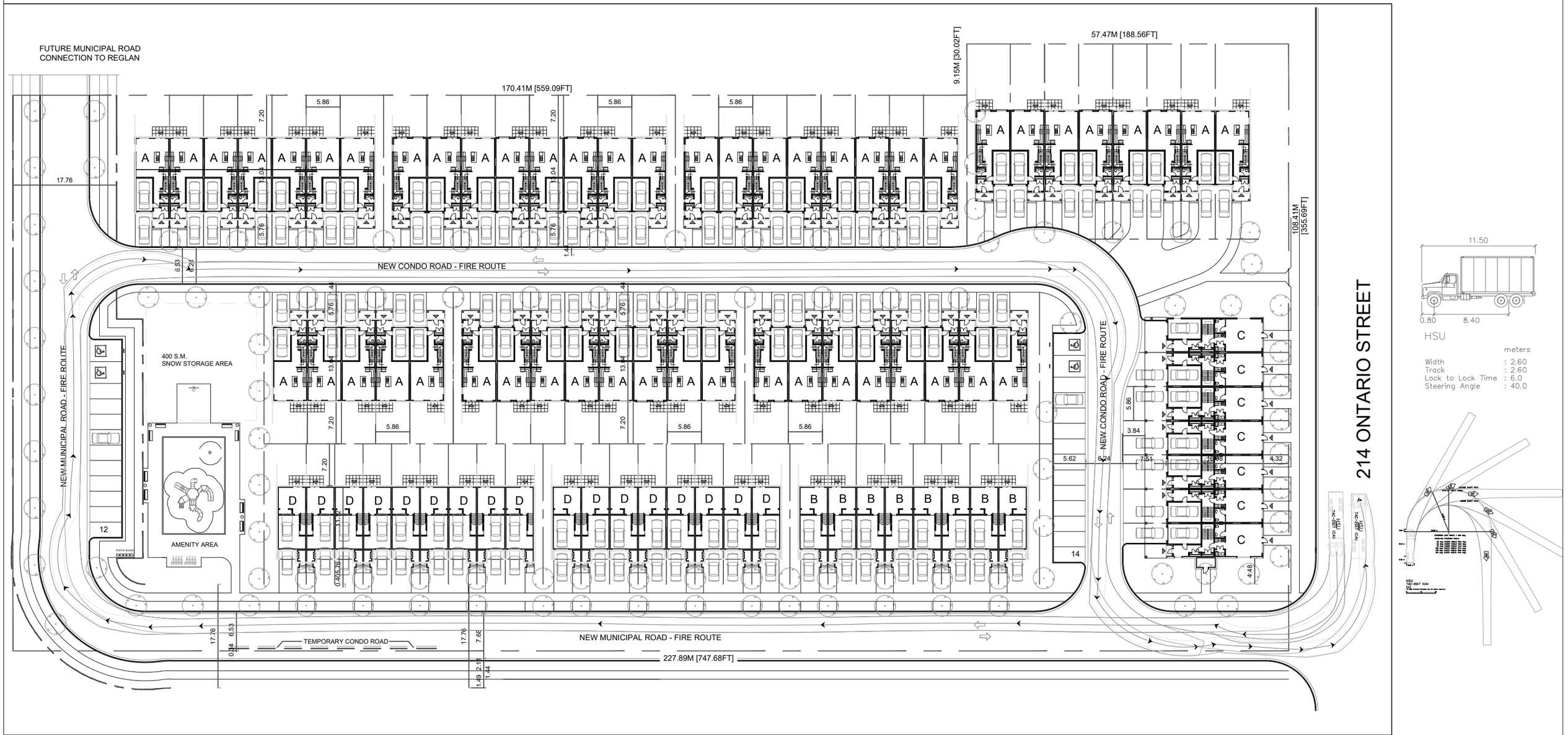
Figure 8 - Future (2030) Total Traffic Volumes



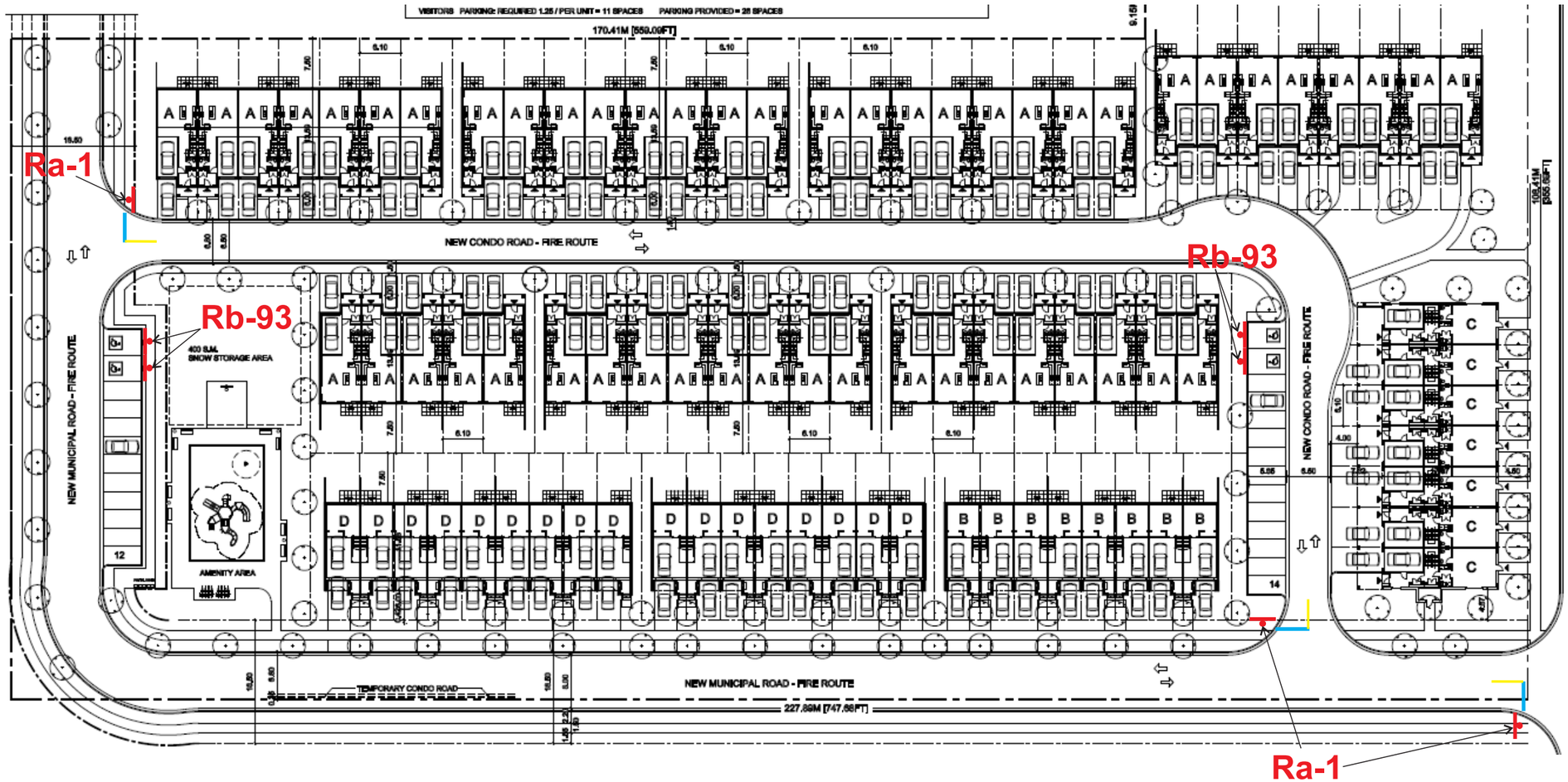
URBANTRANS Engineering Solutions Inc.	Project Name: PROPOSED RESIDENTIAL DEVELOPMENT 214 Ontario Street, City of Brighton	Drawing Title: AutoTURN Analysis Passenger Car (P TAC-2017)	
		Drawing No.: Figure 9	Date: April 4, 2022
		Project No.: UT-22-013	Drawn By: AS
		Scale: NTS	Notes:



URBANTRANS Engineering Solutions Inc.	Project Name: PROPOSED RESIDENTIAL DEVELOPMENT 214 Ontario Street, City of Brighton	Drawing Title: AutoTURN Analysis Waste Collection & Fire/Emergency (HSU TAC-2017)	
		Drawing No.: Figure 10	Date: April 4, 2022
		Project No.: UT-22-013	Drawn By: AS
		Scale: NTS	Notes:

LEGEND

SYMBOL	DESCRIPTION
	STOP Sign (Ra-1)
	DISABLED PARKING PERMIT Sign (Rb-93)
	STOP BAR (Solid White Retro-Reflective Line between 30cm and 60 cm wide)
	Solid Yellow Line Pavement Marking



URBANTRANS Engineering Solutions Inc.

Project Name:

PROPOSED RESIDENTIAL DEVELOPMENT
214 Ontario Street, City of Brighton ON

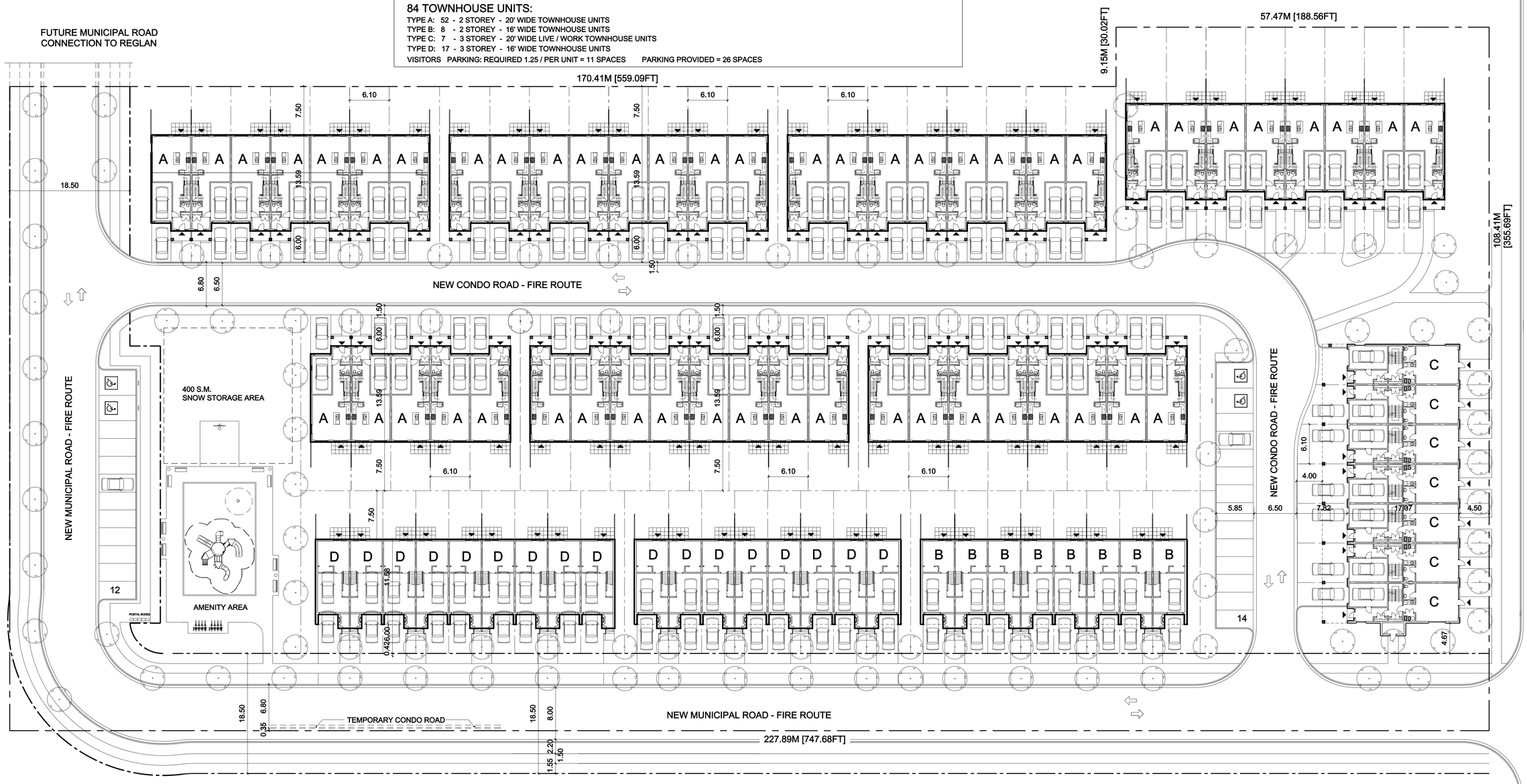
Drawing Title:	Signage and Pavement Marking Plan		
Drawing No.:	Figure 11	Date:	April 4, 2022
Project No.:	UT-22-013	Drawn By:	AS
Scale:	NTS	Notes:	

Appendix A
Proposed Site Plan

SITE AREA: 23,146.21 S.M.

84 TOWNHOUSE UNITS:

TYPE A: 52 - 2 STOREY - 20' WIDE TOWNHOUSE UNITS
TYPE B: 8 - 2 STOREY - 16' WIDE TOWNHOUSE UNITS
TYPE C: 7 - 3 STOREY - 20' WIDE LIVE / WORK TOWNHOUSE UNITS
TYPE D: 17 - 3 STOREY - 16' WIDE TOWNHOUSE UNITS
VISITORS PARKING: REQUIRED 1.25 / PER UNIT = 11 SPACES PARKING PROVIDED = 26 SPACES



7	-	-	4	07-07- 2021	PLAN UPDATE	1	07-28-2020	PRE-CONSULTATION APPLICATION
8	-	-	5	08-14- 2021	PLAN UPDATE	2	05-27-2010	PLAN UPDATE
9	-	-	6	08-16- 2021	PLAN UPDATE	3	06-04- 2021	PLAN UPDATE

REVISIONS

BICORP DESIGN GROUP LTD.
1235 FAIRVIEW STREET, SUITE 290, BURLINGTON, ONTARIO L7S 2K9
TEL: 416-705-9526
bicorpdesign@gmail.com

BRIGHTON
FREEHOLD
TOWNHOUSE DEVELOPMENT

PROJECT:
BRIGHTON FREEHOLD TOWNHOUSE DEVELOPMENT
214 ONTARIO STREET
BRIGHTON ONTARIO

TITLE:
SITE PLAN - DESIGN H5

DRAWN BY:	R.A.	CHECKED BY:	D.B.	APPROVED BY:	D.B.
SCALE:	1:250	DATE:	JULY 2020	PRINTED:	05-19-2021

BLOCK: -
AREA: -

A1-H6
2020-20

Appendix B
Quinte Transit Route Services

QUINTE TRANSIT

TRENTON-BELLEVILLE

(effective August 9, 2021)

ON-DEMAND SERVICE

- SUNNYCREEK ESTATES
- BAYVIEW ESTATES
- KENRON ESTATES

MUST BE BOOKED IN ADVANCE

TO BOOK YOUR RIDE OR FOR QUESTIONS
Contact Quinte Transit
613.392.9640 or toll free **1.855.283.9640**
info@quintetransit.ca | **quintetransit.ca**

SERVICE MONDAY-FRIDAY

$6.00 EACH WAY
INCLUDES TRANSFER FOR BELLEVILLE PUBLIC TRANSIT SYSTEM

$5.00 EACH WAY
SENIOR/STUDENT PRICE

CASH ONLY (EXACT CHANGE REQUIRED)

ON-DEMAND SERVICE

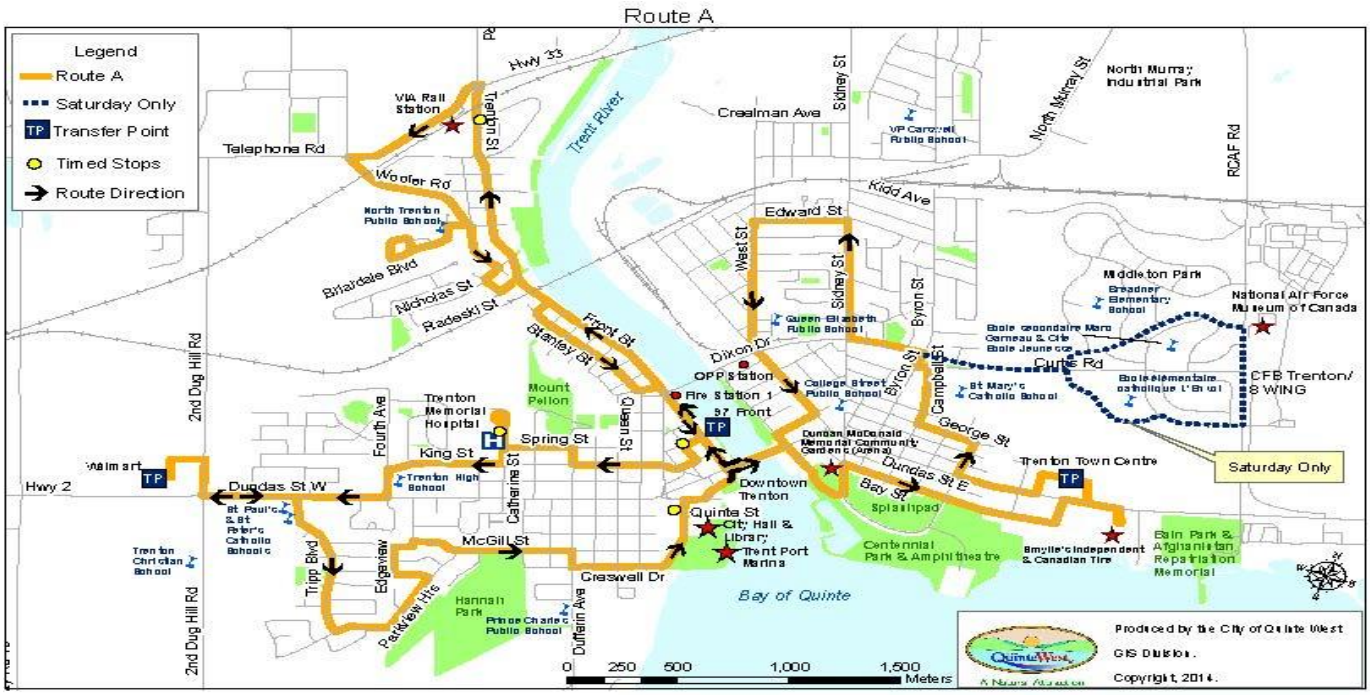
CALL TO BOOK TRIPS FROM ON-DEMAND STOPS
613.392.9640 OR **1.855.283.9640**

TRENTON TO BELLEVILLE

TOWN CENTER	BELLEVILLE TERMINAL	TOWN CENTER
5:25	5:50	6:15

TOWN CENTER	LOYALIST ARRIVE	LOYALIST DEPART	TOWN CENTER
6:25	6:43	6:50	7:12
7:25	7:43	7:53	8:15
8:25	8:43	8:53	9:15
11:25	11:43	11:53	12:15
12:25	12:43	12:53	13:15
16:25	16:43	16:53	17:15
17:25	17:43	17:53	18:15
18:25	18:43	18:53	19:15
19:25	*19:43*	*19:53*	*20:15*

Last run of the evening is ON DEMAND ONLY.
If you require service, please contact our office to book a spot.

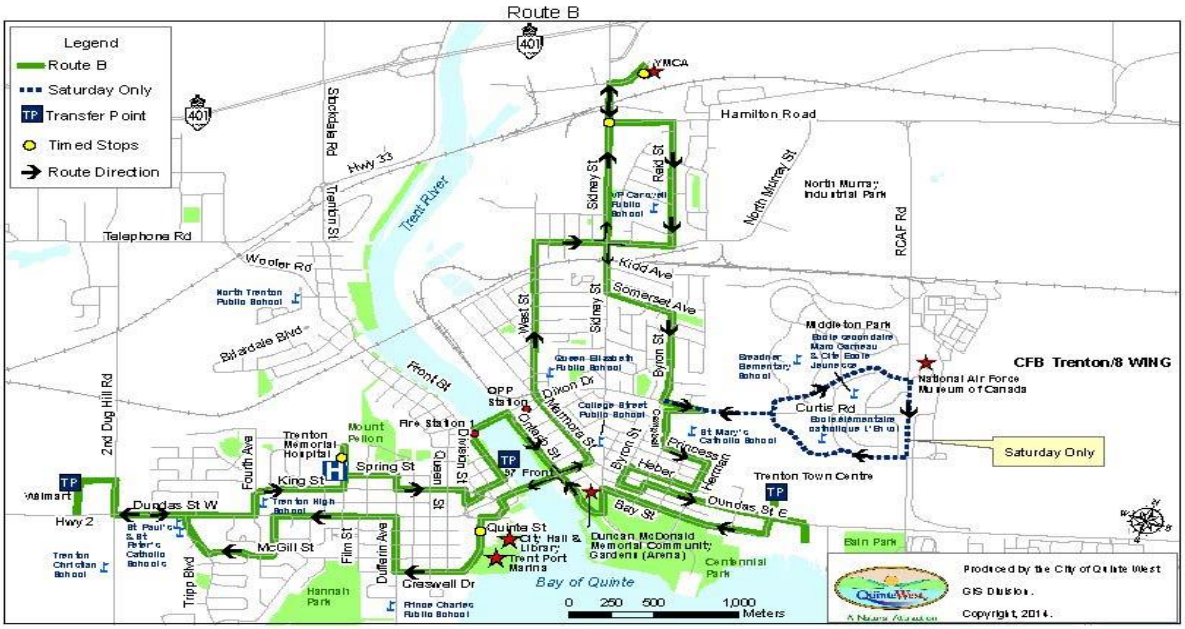


A ROUTE

Market Square Front St	Frankford Cres	Middle & Murphy	TMH	Walmart	Metro	Centennial Pk (Splashpad)	Trenton Town Centre (Giant Tiger)	Edward St. & Sidney St.
5:55	6:00	6:10	6:15	6:20	6:30	6:35	6:40	6:50
6:55	7:00	7:10	7:15	7:20	7:30	7:35	7:40	7:50
7:55	8:00	8:10	8:15	8:20	8:30	8:35	8:40	8:50
8:55	9:00	9:10	9:15	9:20	9:30	9:35	9:40	9:50
9:55	10:00	10:10	10:15	10:20	10:30	10:35	10:40	10:50
10:55	11:00	11:10	11:15	11:20	11:30	11:35	11:40	11:50
11:55	12:00	12:10	12:15	12:20	12:30	12:35	12:40	12:50
12:55	1:00	1:10	1:15	1:20	1:30	1:35	1:40	1:50
1:55	2:00	2:10	2:15	2:20	2:30	2:35	2:40	2:50
2:55	3:00	3:10	3:15	3:20	3:30	3:35	3:40	3:50
3:55	4:00	4:10	4:15	4:20	4:30	4:35	4:40	4:50
4:55	5:00	5:10	5:15	5:20	5:30	5:35	5:40	5:50
5:55	6:00	6:10	6:15	6:20	6:30	6:35	6:40	6:50
6:55	7:00	7:10	7:15	7:20	7:30	7:35	7:40	7:50

A ROUTE - SATURDAY HOURS

Market Square Front St	Frankford Cres	Middle & Murphy	TMH	Walmart	Metro	Centennial Pk (Splashpad)	Trenton Town Centre (Giant Tiger)	Rivers & RCAF Rd	Edward St. & Sidney St.
8:55	9:00	9:10	9:15	9:20	9:30	9:35	9:40	-	9:50
9:55	10:00	10:10	10:15	10:20	10:30	10:35	10:40	-	10:50
10:55	11:00	11:10	11:15	11:20	11:30	11:35	11:40	-	11:50
11:55	12:00	12:10	12:15	12:20	12:30	12:35	12:40	-	12:50
12:55	1:00	1:10	1:15	1:20	1:30	1:35	1:40	-	1:50
1:55	2:00	2:10	2:15	2:20	2:30	2:35	2:40	-	2:50
2:55	3:00	3:10	3:15	3:20	3:30	3:35	3:40	-	3:50
3:55	4:00	4:10	4:15	4:20	4:30	4:35	4:40	4:50	4:55



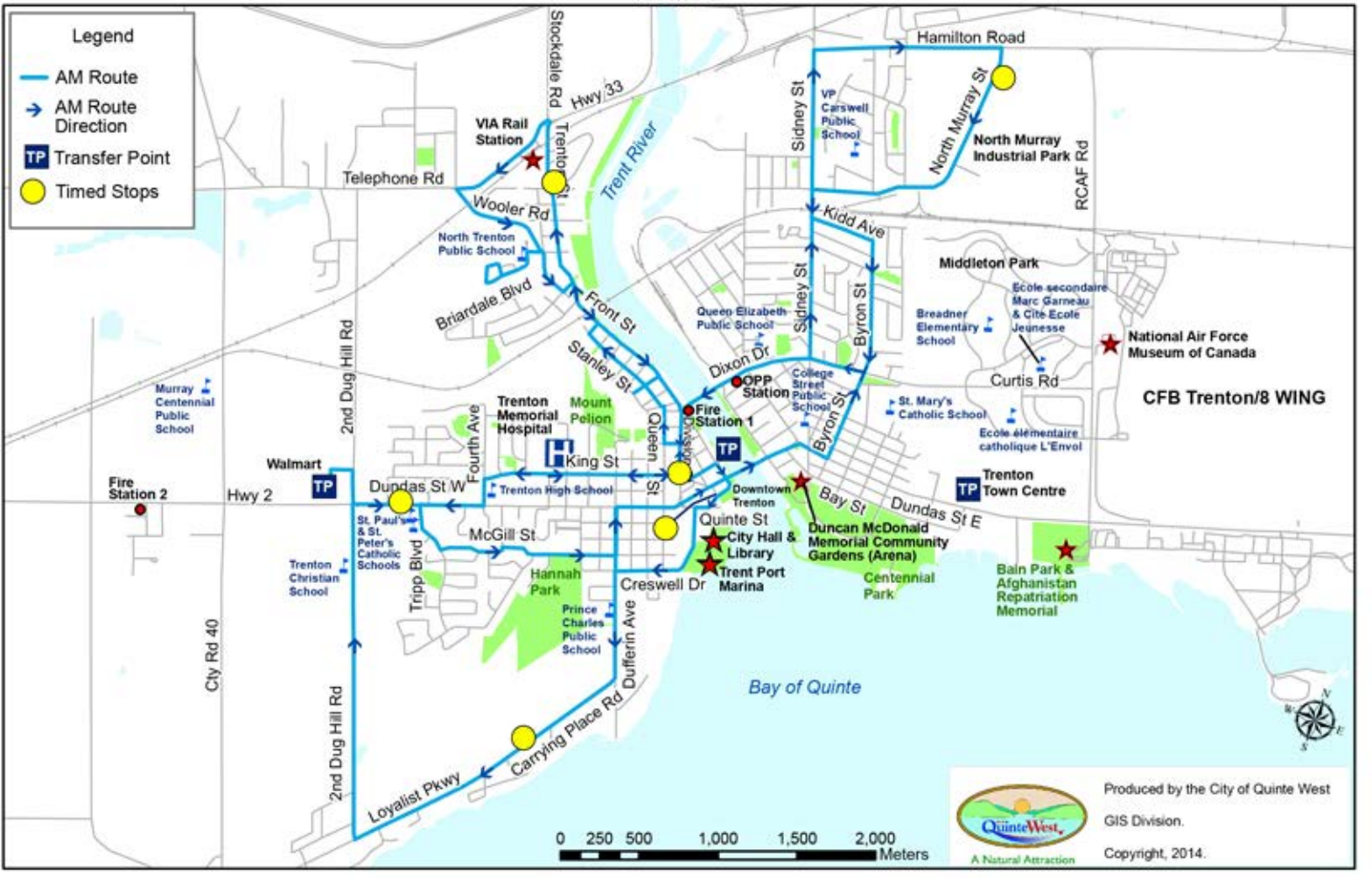
B ROUTE								
Market Square Front St	YMCA	Hamilton Rd. & Sidney St.	Trenton Town Centre (Giant Tiger)	Centennial Pk (Splashpad)	Metro	Walmart	TMH	DollarTree
5:45	5:55	6:00	6:20	6:23	6:28	6:35	6:40	6:43
6:45	6:55	7:00	7:20	7:23	7:28	7:35	7:40	7:43
7:45	7:55	8:00	8:20	8:23	8:28	8:35	8:40	8:43
8:45	8:55	9:00	9:20	9:23	9:28	9:35	9:40	9:43
9:45	9:55	10:00	10:20	10:23	10:28	10:35	10:40	10:43
10:45	10:55	11:00	11:20	11:23	11:28	11:35	11:40	11:43
11:45	11:55	12:00	12:20	12:23	12:28	12:35	12:40	12:43
12:45	12:55	1:00	1:20	1:23	1:28	1:35	1:40	1:43
1:45	1:55	2:00	2:20	2:23	2:28	2:35	2:40	2:43
2:45	2:55	3:00	3:20	3:23	3:28	3:35	3:40	3:43
3:45	3:55	4:00	4:20	4:23	4:28	4:35	4:40	4:43
4:45	4:55	5:00	5:20	5:23	5:28	5:35	5:40	5:43
5:45	5:55	6:00	6:20	6:23	6:28	6:35	6:40	6:43
6:45	6:55	7:00	7:20	7:23	7:28	7:35	7:40	7:43

B ROUTE - SATURDAY HOURS									
Market Square Front St	YMCA	Hamilton Rd. & Sidney St.	Rivers & RCAF Rd	Trenton Town Centre (Giant Tiger)	Centennial Pk (Splashpad)	Metro	Walmart	TMH	DollarTree
8:45	8:55	9:00	9:05	9:20	9:23	9:25	9:35	9:40	9:43
9:45	9:55	10:00	-	10:20	10:23	10:25	10:35	10:40	10:43
10:45	10:55	11:00	-	11:20	11:23	11:25	11:35	11:40	11:43
11:45	11:55	12:00	-	12:20	12:23	12:25	12:35	12:40	12:43
12:45	12:55	1:00	-	1:20	1:23	1:25	1:35	1:40	1:43
1:45	1:55	2:00	-	2:20	2:23	2:25	2:35	2:40	2:43
2:45	2:55	3:00	-	3:20	3:23	3:25	3:35	3:40	3:43
3:45	3:55	4:00	-	4:20	4:23	4:25	4:35	4:40	4:43

Route C

Stop Name	Walmart	Motel 6	97 Front St.	Mckessen	Rivers (Tim Hortons)	Town Centre	CB Freezers	Walmart
Stop Code	14	61	35	73	70	27	76	14
Route C Weekday Service	6:30 AM	6:35 AM	6:45 AM	6:50 AM	7:00 AM	7:05 AM		7:29 AM
	7:30 AM	7:35 AM	7:45 AM	7:50 AM	8:00 AM	8:05 AM		8:29 AM
	8:30 AM	8:35 AM	8:45 AM		9:00 AM	9:05 AM		9:29 AM
	9:30 AM	9:35 AM	9:45 AM		10:00 AM	10:05 AM		10:29 AM
	10:30 AM	10:35 AM	10:45 AM		11:00 AM	11:05 AM		11:29 AM
	11:30 AM	11:35 AM	11:45 AM		12:00 PM	12:05 PM		12:29 PM
	12:30 PM	12:35 PM	12:45 PM		1:00 PM	1:05 PM		1:29 PM
	1:30 PM	1:35 PM	1:45 PM		2:00 PM	2:05 PM		2:29 PM
	2:30 PM	2:35 PM	2:45 PM		3:00 PM	3:05 PM	3:20 PM	3:29 PM
	3:30 PM	3:35 PM	3:45 PM	3:50 PM	4:00 PM	4:05 PM		4:29 PM
	4:30 PM	4:35 PM	4:45 PM	4:50 PM	5:00 PM	5:05 PM		5:29 PM
	5:30 PM	5:35 PM	5:45 PM		6:00 PM	6:05 PM		6:29 PM
	6:30 PM	6:35 PM	6:45 PM		7:00 PM	7:05 PM		7:30 PM

Route D



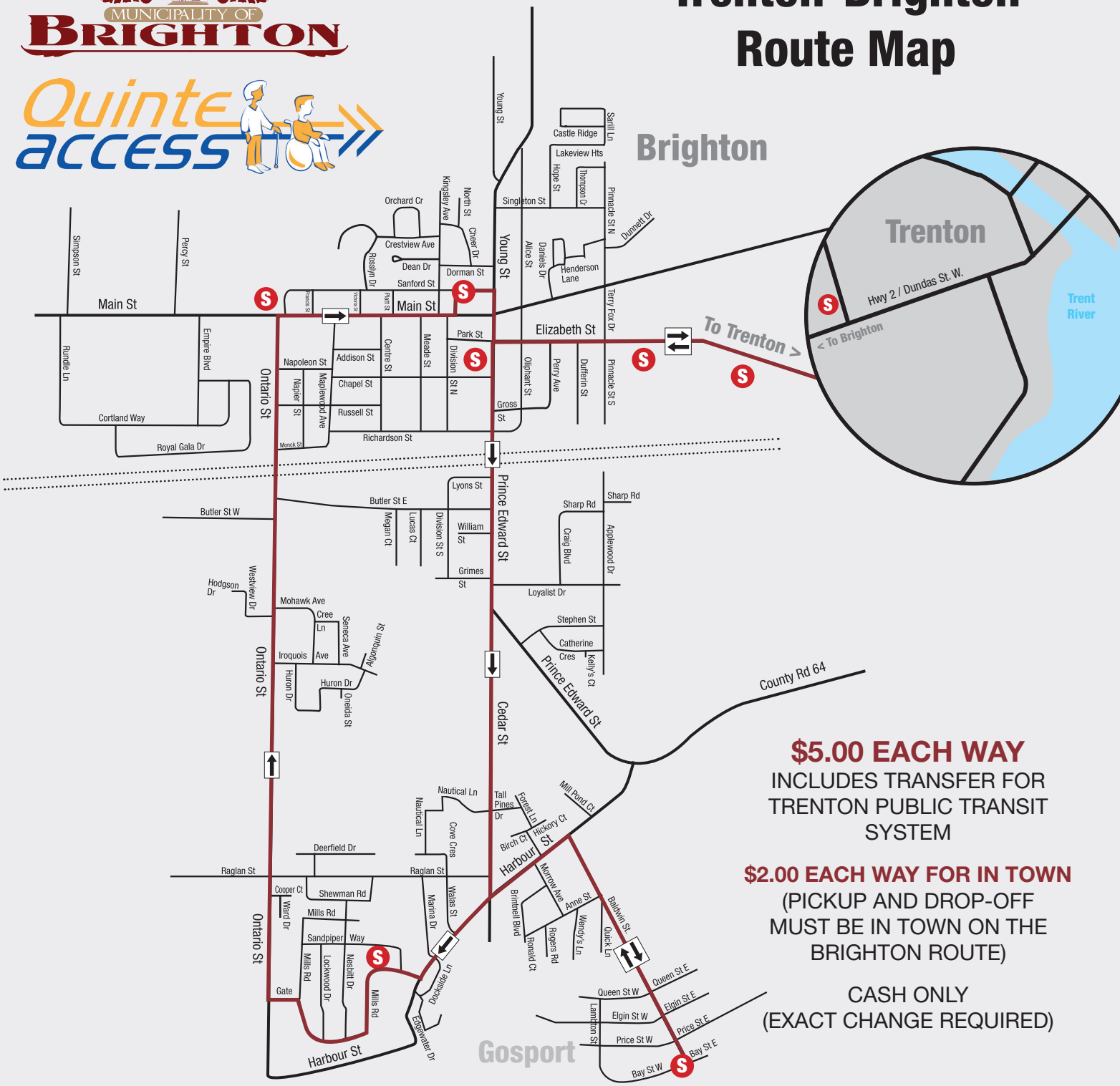
D ROUTE (AM ONLY)

Frankford Cres	Division & King St.	Tim Hortons (West End)	McGill St & Dufferin Ave	Old City Hall (Downtown)	Dundas St.E & Byron St	McKesson (N.Murray Industrial Pk)	Kidd Ave & Sidney St.	Dundas St.E & Byron St	Elgin & Front St.	45 Creswell	CB Freezer (Carrying Place Rd)	Walmart
5:15	5:20	5:30	5:35	5:40	5:45	5:55	5:58	6:00	6:05	6:08	6:15	6:20

MUNICIPALITY OF BRIGHTON

Quinte access

Trenton-Brighton Route Map



$5.00 EACH WAY

INCLUDES TRANSFER FOR TRENTON PUBLIC TRANSIT SYSTEM

$2.00 EACH WAY FOR IN TOWN

(PICKUP AND DROP-OFF MUST BE IN TOWN ON THE BRIGHTON ROUTE)

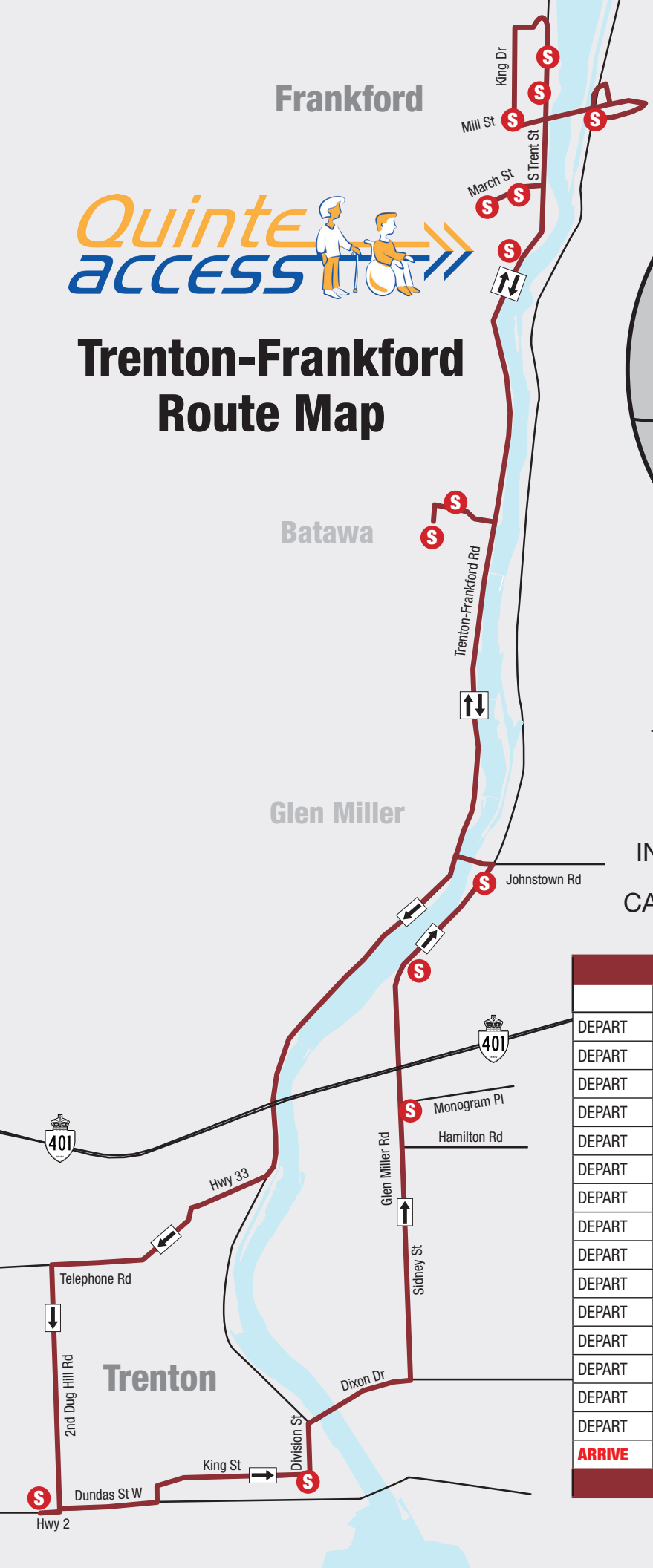
CASH ONLY
(EXACT CHANGE REQUIRED)

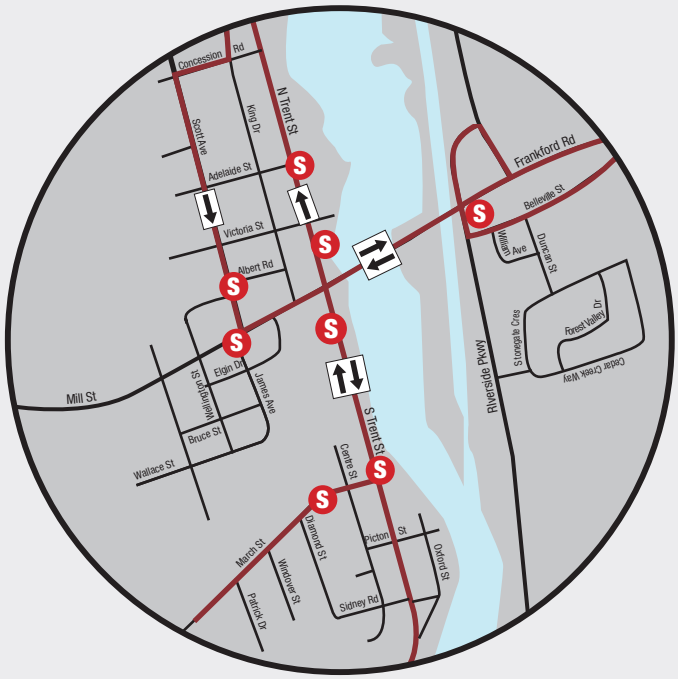
EASTBOUND	PICKUP/DROPOFF LOCATION	TUES/WED/THU
DEPART	PRINCE EDWARD SQUARE	9:15
DEPART	GOSPORT (END OF BALDWIN ST)	9:20
DEPART	BRIGHTON BY THE BAY (COMMUNITY CTR)	9:25
DEPART	BRIGHTON HEALTH SVCS CENTRE	9:35
DEPART	SOBEYS	9:38
DEPART	ARENA	9:43
DEPART	NO FRILLS	9:50
ARRIVE	TRENTON - WALMART	10:00

WESTBOUND	PICKUP/DROPOFF LOCATION	TUES/WED/THU	
DEPART	TRENTON - WALMART	11:30	14:00
DEPART	NO FRILLS	11:40	14:10
DEPART	ARENA	11:47	14:17
DEPART	SOBEYS	11:53	14:22
DEPART	BRIGHTON HEALTH SVCS CENTRE	11:56	14:25
DEPART	BRIGHTON BY THE BAY (COMMUNITY CTR)	12:05	14:35
DEPART	GOSPORT (END OF BALDWIN ST)	12:10	14:40
DEPART	PRINCE EDWARD SQUARE	12:15	14:45
ARRIVE	TRENTON - WALMART	12:25	14:55

Effective December 1, 2019

Trenton-Frankford Route Map





$4.00 EACH WAY

INCLUDES TRANSFER FOR
TRENTON PUBLIC TRANSIT SYSTEM

$2.00 EACH WAY FOR IN TOWN

(PICKUP AND DROP-OFF MUST BE
IN TOWN ON THE FRANKFORD ROUTE)

CASH ONLY (EXACT CHANGE REQUIRED)

	PICKUP/DROPOFF LOCATION	TUESDAY, WEDNESDAY, THURSDAY		
DEPART	WALMART *	10:15	12:30	15:15
DEPART	DOLLARTREE *	10:21	12:36	15:21
DEPART	SIDNEY & MONOGRAM *	10:27	12:42	15:27
DEPART	GLEN MILLER & PETERSON RD.			
DEPART	GLEN MILLER & JOHNSTOWN RD.	10:30	12:45	15:30
DEPART	BATAWA COMMUNITY CENTRE *	10:34	12:49	15:34
DEPART	MARCH ST.	10:40	12:55	15:40
DEPART	OASIS GAS BAR *	10:44	12:59	15:44
DEPART	FRANKFORD MUNICIPAL BUILDING *	10:48	13:03	15:48
DEPART	HOLY TRINITY CHURCH			
DEPART	SCOTT & ALBERT ST.			
DEPART	FARM CREDIT (FCC)	10:49	13:04	15:49
DEPART	QUINTE FIRST CREDIT UNION *	10:50	13:05	15:50
DEPART	MARCH ST.	10:54	13:09	15:54
DEPART	BATAWA COMMUNITY CENTRE *	11:00	13:15	16:00
ARRIVE	WALMART *	11:15	13:30	16:15

Effective December 1, 2019

Appendix C
Existing Traffic Data

Spectrum

Turning Movement Count
Location Name: RAGLAN ST & ONTARIO ST
Date: Thu, Mar 03, 2022 Deployment Lead: Tasos Issaaakidis

Urban Trans Engineering Solutions Inc
146 9275 MARKHAM ROAD
MARKHAM ONTARIO, L6E 0H9
CANADA

Turning Movement Count (1 . RAGLAN ST & ONTARIO ST)

Start Time	N Approach ONTARIO ST						E Approach RAGLAN ST						S Approach ONTARIO ST						W Approach RAGLAN ST						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	0	2	1	0	3	3	0	0	0	0	0	0	0	1	0	0	0	1	0	2	0	0	0	2	6	
07:15:00	0	2	2	0	1	4	4	0	0	0	0	4	1	4	0	0	1	5	0	0	1	0	0	1	14	
07:30:00	2	7	4	0	3	13	7	0	1	0	3	8	0	9	0	0	3	9	0	0	1	0	3	1	31	
07:45:00	1	8	5	0	0	14	3	0	0	0	1	3	1	12	0	0	1	13	0	0	1	0	0	1	31	82
08:00:00	1	8	3	0	0	12	2	1	2	1	0	6	1	5	0	0	0	6	0	0	2	0	0	2	26	102
08:15:00	1	8	2	0	0	11	6	0	0	0	1	6	1	9	0	0	1	10	1	0	1	0	0	2	29	117
08:30:00	0	7	1	0	0	8	5	1	2	0	0	8	3	9	0	0	0	12	0	1	2	0	1	3	31	117
08:45:00	0	8	1	0	1	9	10	0	0	0	0	10	1	8	0	0	0	9	0	0	0	0	0	0	28	114
09:00:00	0	7	1	0	0	8	4	0	0	0	1	4	1	14	0	0	0	15	0	0	1	0	0	1	28	116
09:15:00	2	5	3	0	2	10	2	0	0	0	1	2	1	8	0	0	0	9	0	0	0	0	2	0	21	108
09:30:00	1	7	1	0	1	9	7	1	0	0	3	8	1	14	0	0	0	15	0	0	2	0	1	2	34	111
09:45:00	1	6	1	0	1	8	5	0	0	0	2	5	1	9	0	0	0	10	0	0	3	0	1	3	26	109
BREAK																										
16:00:00	3	12	3	0	0	18	2	0	1	0	1	3	1	15	0	0	0	16	0	0	2	0	0	2	39	
16:15:00	5	14	6	0	0	25	2	1	1	0	0	4	3	12	0	0	0	15	1	2	1	0	0	4	48	
16:30:00	2	12	7	0	0	21	5	0	0	0	1	5	2	12	0	0	0	14	0	0	3	0	0	3	43	
16:45:00	0	11	5	0	0	16	5	0	1	0	1	6	0	8	0	0	0	8	0	1	3	0	0	4	34	164
17:00:00	2	7	5	0	0	14	3	0	1	0	0	4	0	11	0	0	0	11	0	0	0	0	0	0	29	154
17:15:00	0	10	5	0	0	15	9	1	0	0	0	10	1	7	0	0	0	8	0	0	0	0	0	0	33	139
17:30:00	0	2	2	0	0	4	2	0	1	0	1	3	0	7	0	0	0	7	0	0	1	0	0	1	15	111
17:45:00	2	6	5	0	0	13	3	0	1	0	0	4	0	5	0	0	0	5	0	0	0	0	0	0	22	99
18:00:00	0	8	1	0	0	9	3	0	1	0	0	4	0	3	0	0	0	3	0	0	1	0	0	1	17	87
18:15:00	0	4	3	0	0	7	3	1	0	0	0	4	1	5	0	0	0	6	0	0	1	0	0	1	18	72
18:30:00	0	2	3	0	0	5	2	1	1	0	0	4	0	3	0	0	0	3	0	1	0	0	0	1	13	70
18:45:00	1	7	1	0	0	9	1	1	0	0	0	2	0	2	0	0	0	2	0	0	1	0	0	1	14	62
Grand Total	24	170	71	0	12	265	95	8	13	1	16	117	20	192	0	0	6	212	2	7	27	0	8	36	**630**	-
Approach%	9.1%	64.2%	26.8%	0%		-	81.2%	6.8%	11.1%	0.9%		-	9.4%	90.6%	0%	0%		-	5.6%	19.4%	75%	0%		-	**-**	-
Totals %	3.8%	27%	11.3%	0%		42.1%	15.1%	1.3%	2.1%	0.2%		18.6%	3.2%	30.5%	0%	0%		33.7%	0.3%	1.1%	4.3%	0%		5.7%	**-**	-
Heavy	2	7	3	0		-	4	0	1	1		-	3	7	0	0		-	1	1	1	0		-	**-**	-
Heavy %	8.3%	4.1%	4.2%	0%		-	4.2%	0%	7.7%	100%		-	15%	3.6%	0%	0%		-	50%	14.3%	3.7%	0%		-	**-**	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-

Spectrum

Turning Movement Count
Location Name: RAGLAN ST & ONTARIO ST
Date: Thu, Mar 03, 2022 Deployment Lead: Tasos Issaaakidis

Urban Trans Engineering Solutions Inc
146 9275 MARKHAM ROAD
MARKHAM ONTARIO, L6E 0H9
CANADA

Peak Hour: 07:45 AM - 08:45 AM **Weather: Scattered Clouds (-10.61 °C)**

Start Time	N Approach ONTARIO ST						E Approach RAGLAN ST						S Approach ONTARIO ST						W Approach RAGLAN ST						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
07:45:00	1	8	5	0	0	14	3	0	0	0	1	3	1	12	0	0	1	13	0	0	1	0	0	1	31
08:00:00	1	8	3	0	0	12	2	1	2	1	0	6	1	5	0	0	0	6	0	0	2	0	0	2	26
08:15:00	1	8	2	0	0	11	6	0	0	0	1	6	1	9	0	0	1	10	1	0	1	0	0	2	29
08:30:00	0	7	1	0	0	8	5	1	2	0	0	8	3	9	0	0	0	12	0	1	2	0	1	3	31
Grand Total	3	31	11	0	0	45	16	2	4	1	2	23	6	35	0	0	2	41	1	1	6	0	1	8	**117**
Approach%	6.7%	68.9%	24.4%	0%		-	69.6%	8.7%	17.4%	4.3%		-	14.6%	85.4%	0%	0%		-	12.5%	12.5%	75%	0%		-	**-**
Totals %	2.6%	26.5%	9.4%	0%		38.5%	13.7%	1.7%	3.4%	0.9%		19.7%	5.1%	29.9%	0%	0%		35%	0.9%	0.9%	5.1%	0%		6.8%	**-**
PHF	0.75	0.97	0.55	0		0.8	0.67	0.5	0.5	0.25		0.72	0.5	0.73	0	0		0.79	0.25	0.25	0.75	0		0.67	**-**
Heavy	0	2	0	0		2	1	0	0	1		2	1	2	0	0		3	0	0	0	0		0	**-**
Heavy %	0%	6.5%	0%	0%		4.4%	6.3%	0%	0%	100%		8.7%	16.7%	5.7%	0%	0%		7.3%	0%	0%	0%	0%		0%	**-**
Lights	3	29	11	0		43	15	2	4	0		21	5	33	0	0		38	1	1	6	0		8	**-**
Lights %	100%	93.5%	100%	0%		95.6%	93.8%	100%	100%	0%		91.3%	83.3%	94.3%	0%	0%		92.7%	100%	100%	100%	0%		100%	**-**
Single-Unit Trucks	0	1	0	0		1	0	0	0	1		1	0	1	0	0		1	0	0	0	0		0	**-**
Single-Unit Trucks %	0%	3.2%	0%	0%		2.2%	0%	0%	0%	100%		4.3%	0%	2.9%	0%	0%		2.4%	0%	0%	0%	0%		0%	**-**
Buses	0	1	0	0		1	1	0	0	0		1	1	1	0	0		2	0	0	0	0		0	**-**
Buses %	0%	3.2%	0%	0%		2.2%	6.3%	0%	0%	0%		4.3%	16.7%	2.9%	0%	0%		4.9%	0%	0%	0%	0%		0%	**-**
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-	1	-	**-**
Pedestrians%	-	-	-	-	0%		-	-	-	-	40%		-	-	-	-	40%		-	-	-	-	20%		**-**

Spectrum

Turning Movement Count
Location Name: RAGLAN ST & ONTARIO ST
Date: Thu, Mar 03, 2022 Deployment Lead: Tasos Issaaakidis

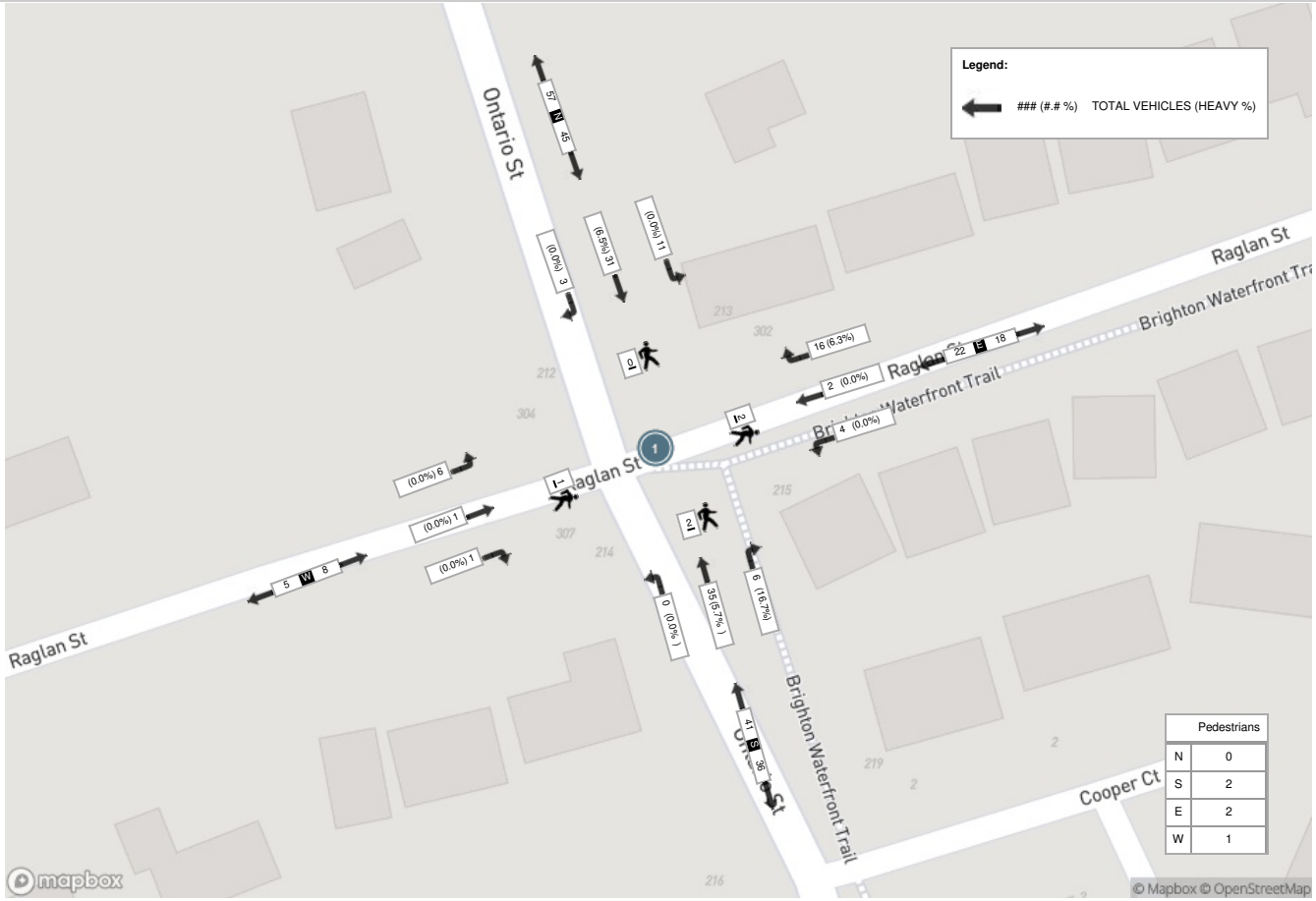
Urban Trans Engineering Solutions Inc
146 9275 MARKHAM ROAD
MARKHAM ONTARIO, L6E 0H9
CANADA

Peak Hour: 04:00 PM - 05:00 PM Weather: Scattered Clouds (-6.71 °C)

Start Time	N Approach ONTARIO ST						E Approach RAGLAN ST						S Approach ONTARIO ST						W Approach RAGLAN ST						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:00:00	3	12	3	0	0	18	2	0	1	0	1	3	1	15	0	0	0	16	0	0	2	0	0	2	39
16:15:00	5	14	6	0	0	25	2	1	1	0	0	4	3	12	0	0	0	15	1	2	1	0	0	4	48
16:30:00	2	12	7	0	0	21	5	0	0	0	1	5	2	12	0	0	0	14	0	0	3	0	0	3	43
16:45:00	0	11	5	0	0	16	5	0	1	0	1	6	0	8	0	0	0	8	0	1	3	0	0	4	34
Grand Total	10	49	21	0	0	80	14	1	3	0	3	18	6	47	0	0	0	53	1	3	9	0	0	13	**164**
Approach%	12.5%	61.3%	26.3%	0%		-	77.8%	5.6%	16.7%	0%		-	11.3%	88.7%	0%	0%		-	7.7%	23.1%	69.2%	0%		-	**-**
Totals %	6.1%	29.9%	12.8%	0%		48.8%	8.5%	0.6%	1.8%	0%		11%	3.7%	28.7%	0%	0%		32.3%	0.6%	1.8%	5.5%	0%		7.9%	**-**
PHF	0.5	0.88	0.75	0		0.8	0.7	0.25	0.75	0		0.75	0.5	0.78	0	0		0.83	0.25	0.38	0.75	0		0.81	**-**
Heavy	2	1	1	0		4	2	0	0	0		2	1	0	0	0		1	1	1	1	0		3	**-**
Heavy %	20%	2%	4.8%	0%		5%	14.3%	0%	0%	0%		11.1%	16.7%	0%	0%	0%		1.9%	100%	33.3%	11.1%	0%		23.1%	**-**
Lights	8	48	20	0		76	12	1	3	0		16	5	47	0	0		52	0	2	8	0		10	**-**
Lights %	80%	98%	95.2%	0%		95%	85.7%	100%	100%	0%		88.9%	83.3%	100%	0%	0%		98.1%	0%	66.7%	88.9%	0%		76.9%	**-**
Single-Unit Trucks	2	1	1	0		4	1	0	0	0		1	1	0	0	0		1	1	1	1	0		3	**-**
Single-Unit Trucks %	20%	2%	4.8%	0%		5%	7.1%	0%	0%	0%		5.6%	16.7%	0%	0%	0%		1.9%	100%	33.3%	11.1%	0%		23.1%	**-**
Buses	0	0	0	0		0	1	0	0	0		1	0	0	0	0		0	0	0	0	0		0	**-**
Buses %	0%	0%	0%	0%		0%	7.1%	0%	0%	0%		5.6%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	-	0%		-	-	-	-	100%		-	-	-	-	0%		-	-	-	-	0%		**-**

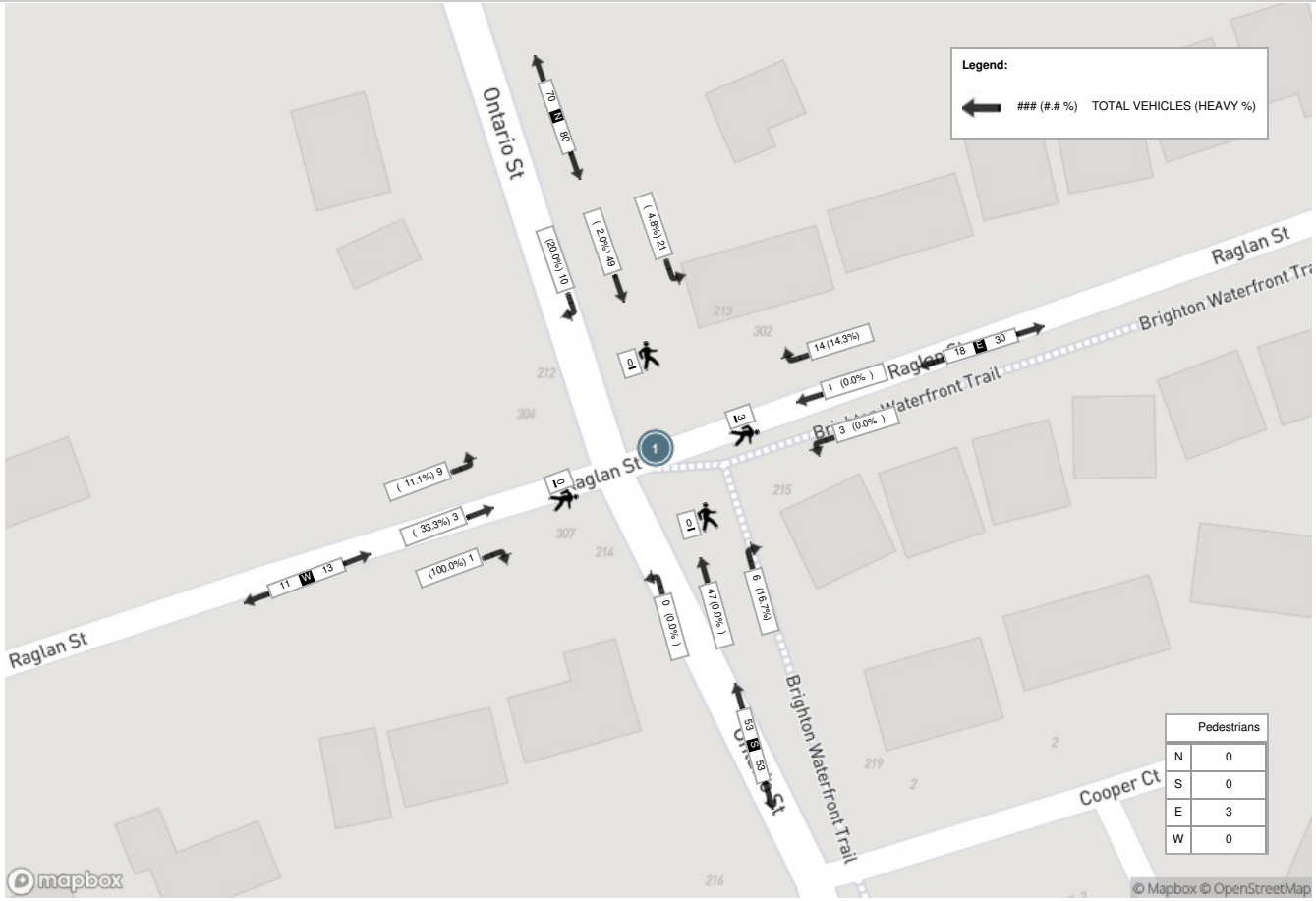
Urban Trans Engineering Solutions Inc
146 9275 MARKHAM ROAD
MARKHAM ONTARIO, L6E 0H9
CANADA

Peak Hour: 07:45 AM - 08:45 AM **Weather: Scattered Clouds (-10.61 °C)**

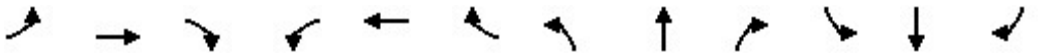


Urban Trans Engineering Solutions Inc
146 9275 MARKHAM ROAD
MARKHAM ONTARIO, L6E 0H9
CANADA

Peak Hour: 04:00 PM - 05:00 PM **Weather: Scattered Clouds (-6.71 °C)**



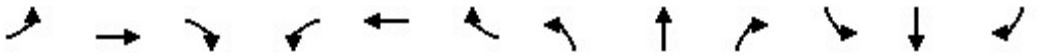
Appendix D
Existing (2022) Traffic Level of Service Calculations



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	1	1	4	2	16	0	35	6	11	31	3
Future Volume (Veh/h)	6	1	1	4	2	16	0	35	6	11	31	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.75	0.50	0.50	0.67	0.25	0.73	0.50	0.55	0.97	0.75
Hourly flow rate (vph)	24	4	1	8	4	24	0	48	12	20	32	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								140				
pX, platoon unblocked												
vC, conflicting volume	154	134	34	131	130	54	36			60		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	154	134	34	131	130	54	36			60		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.3	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.2			2.2		
p0 queue free %	97	99	100	99	99	98	100			99		
cM capacity (veh/h)	787	751	1045	834	755	1002	1588			1556		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	29	36	60	56
Volume Left	24	8	0	20
Volume Right	1	24	12	4
cSH	788	927	1588	1556
Volume to Capacity	0.04	0.04	0.00	0.01
Queue Length 95th (m)	0.9	1.0	0.0	0.3
Control Delay (s)	9.7	9.0	0.0	2.7
Lane LOS	A	A		A
Approach Delay (s)	9.7	9.0	0.0	2.7
Approach LOS	A	A		

Intersection Summary				
Average Delay	4.2			
Intersection Capacity Utilization	19.1%	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)	9	3	1	3	1	14	0	47	6	21	49	10
Future Volume (Veh/h)	9	3	1	3	1	14	0	47	6	21	49	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.38	0.25	0.75	0.25	0.70	0.25	0.78	0.50	0.75	0.88	0.50
Hourly flow rate (vph)	12	8	4	4	4	20	0	60	12	28	56	20
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								140				
pX, platoon unblocked												
vC, conflicting volume	210	194	66	196	198	66	76			72		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	210	194	66	196	198	66	76			72		
tC, single (s)	7.2	6.8	7.2	7.1	6.5	6.3	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.3	4.2	3.5	4.0	3.4	2.2			2.2		
p0 queue free %	98	99	99	99	99	98	100			98		
cM capacity (veh/h)	700	637	780	746	688	965	1536			1509		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	24	28	72	104
Volume Left	12	4	0	28
Volume Right	4	20	12	20
cSH	689	878	1536	1509
Volume to Capacity	0.03	0.03	0.00	0.02
Queue Length 95th (m)	0.9	0.8	0.0	0.5
Control Delay (s)	10.4	9.2	0.0	2.1
Lane LOS	B	A		A
Approach Delay (s)	10.4	9.2	0.0	2.1
Approach LOS	B	A		

Intersection Summary				
Average Delay	3.2			
Intersection Capacity Utilization	21.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	53	53	0
Future Volume (Veh/h)	0	0	0	53	53	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	58	58	0
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	116	58	58			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	116	58	58			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	880	1008	1546			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	58	58
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1546	1700
Volume to Capacity	0.02	0.00	0.03
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	6.7%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix E
Terms of Reference

URBANTRANS
Engineering Solutions Inc.

UrbanTrans Engineering Solutions Inc.
9275 Markham Road, Suite 146
Markham ON L6E 0H9
Tel: 437-236-7085
annosan@uteng.ca

TERMS OF REFERENCE

To: John Gooding, Manager of Capital Infrastructure, Municipality of Brighton

From: Annosan Srikantha, President, UrbanTrans Engineering Solutions Inc.

Date: March 1, 2022

Re: Terms of Reference for Traffic Impact Study – Proposed Residential Development (214 Ontario Street, Municipality of Brighton)

These Terms of Reference below are to serve as a general guideline to present the purpose, structure and scope of the work to be undertaken for the preparation of the Traffic Impact Study (TIS) and Parking Study for a residential development in support of an Official Plan Amendment (OPA) and Zoning By-law Amendment application(s). The proposed development is located south of Raglan Street and west of Ontario Street municipally known as 214 Ontario Street, in the City of Brighton.

The subject lands currently provide a greenhouse and garden centre located in the east half of the site while the west half of the lands are vacant. Based on the site plan provided by Bicorp Design Group Ltd. dated July 2020, we understand the project consists of the following components:

- Demolish the existing greenhouse garden centre and redevelop the subject lands with 84 residential townhouse units.
- At a minimum, two (2) car parking spaces will be provided for each unit in a garage and lead in driveway portion. In addition, a total of 26 visitor parking spaces are provided
- A full movement vehicular entrance is proposed via Ontario Street. A future potential north-south municipal road connection to Raglan Street will be accommodated.

Introduction

The report introduction will include full description of the proposed development, but not limited to:

- Municipal Address
- Existing and proposed land uses, access locations and operations
- Total building size and parking/loading supply
- Anticipated date of occupancy
- Development operations (i.e. hours of operation and employee/staff totals)

Existing Traffic and Active Transportation Conditions

The existing traffic analysis for the development includes the following, but not limited to:

- Review the existing conditions of the surrounding area, including road network (i.e., traffic data, lane configuration and turning restrictions), active transportation and/or transit network and assessment.
- Turning movement counts will be collected during weekday AM (7am-10am), weekday PM (4pm-7pm) peak periods at the following study area intersections:
  - Raglan Street & Ontario Street (Signalized)
  - Ontario Street & Site Access (Unsignalized)
- The traffic data obtained will utilize window-based computer software (Synchro Version 11) to undertake capacity analysis (i.e. level of services, volume to capacity ratios, delays, queues, etc.) at the study area intersections during weekday peak hour periods for signalized and unsignalized intersections.
- Document the results of all level-of-services analysis, including overall delay, control delay per vehicle, vehicle queues, and volume/capacity ratios for each intersection and critical lane group or critical movements in appendix to the TIS.

Future Background Traffic and Transit Assessment

The future background traffic analysis for the development includes the following, but not limited to:

- Review the future background traffic volumes surrounding the subject property that consist of two (2) components.
  - Background traffic growth applied to through traffic movements within the study area intersections will be confirmed with Staff at Capital Infrastructure at the study area intersections and applied to horizon study year.
  - Traffic generated by background developments in the vicinity of the subject site approved or in the approval process occurring within the horizon year of this development.
- Transportation network improvements and transit considerations will be examined.
- A five-year horizon (2027) will be carried out for assessment purposes.
- Document the results of all level-of-services analysis, including overall delay, control delay per vehicle, vehicle queues, and volume/capacity ratios for each intersection and critical lane group or critical movements in appendix to the TIS.
- Operational deficiencies due to future forecasted traffic volumes will be identified and alleviative measures will be proposed and documented in the final report.

Trip Generation and Distribution

The trip generation and distribution analysis will include:

- Apply trip generation rates from the ITE Trip Generation Manual (10th Edition) and similar development applications/first principal analysis in the area to the subject site to determine site traffic and newly added trips on the surrounding network.
- The Transportation Tomorrow Survey (TTS) data will be reviewed to forecast the person-trips generated by the proposed development as well as each transportation modal split (i.e. automobile, transit, cycling) and trip distributions.

Future Total Traffic Assessment

The future total traffic volume analysis for the development includes the following, but not limited to:

- The Future total traffic assessment comprises of future background traffic volumes plus site generated traffic volumes.
- Document the results of all level-of-services analysis, including overall delay, control delay per vehicle, vehicle queues, and volume/capacity ratios for each intersection and critical lane group or critical movements in appendix to the TIS.
- Review the proposed site accesses from a safety and operational feasibility perspective.
- Potential operational shortcomings as a result of the proposed development site traffic will be identified and alleviative measures will be proposed and documented in the report
- Identify vehicle queuing that exceeds the available storage and requirement for turn lanes as necessary.
- Access consideration and recommendations necessary to fulfill the study requirements will be detailed.

Parking Assessment

- Describe parking and loading facilities proposed in conjunction with the proposed development.
- Determine whether the proposed vehicle, bicycle and loading supply can sufficiently accommodate the peak parking demand/requirement of the proposed development and meets the City's Zoning By-law requirements.
- A recommended minimum parking rate for proposed land uses, based on best practices and shared parking rationale will be provided (if applicable).

Site Access & On-site Circulation Review

- Undertake AutoTURN Analysis as part of the functionality of the site plan by simulating vehicle swept path on the proposed site plan to confirm adequate space requirements are provided for passenger cars, waste collection, fire/emergency, and delivery trucks (where applicable).
- Appropriate signage and pavement marking plans will be recommended in accordance with the Ontario Traffic Manual (OTM).

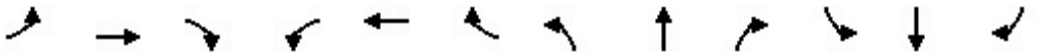
A Traffic Impact Study (TIS) and Parking Study report will be compiled and produced in final report form for submission to the Municipality summarizing the findings and recommendations with supporting documentation (i.e. summaries of data collection, assumptions related to traffic operations, computer outputs of level of service calculations, and other technical data).

We appreciate the opportunity to submit this Terms of Reference and look forward to working with you on this study application. Should you have any questions or would like to discuss any matter in greater detail, please do not hesitate to contact me at 437-236-7085. We courteously await your instructions to advance.

Kind Regards,
UrbanTrans Engineering Solutions Inc.

Annosan Srikantha, P.Eng.
President

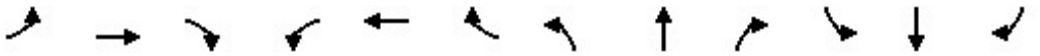
Appendix F
Future (2030) Background Traffic Level of Service Calculations



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	1	1	5	2	19	0	41	7	13	36	4
Future Volume (Veh/h)	7	1	1	5	2	19	0	41	7	13	36	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.75	0.50	0.50	0.67	0.25	0.73	0.50	0.55	0.97	0.75
Hourly flow rate (vph)	28	4	1	10	4	28	0	56	14	24	37	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)								140				
pX, platoon unblocked												
vC, conflicting volume	180	158	40	154	153	63	42			70		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	180	158	40	154	153	63	42			70		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.3	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.2			2.2		
p0 queue free %	96	99	100	99	99	97	100			98		
cM capacity (veh/h)	751	727	1038	804	731	990	1580			1544		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	33	42	70	66
Volume Left	28	10	0	24
Volume Right	1	28	14	5
cSH	754	910	1580	1544
Volume to Capacity	0.04	0.05	0.00	0.02
Queue Length 95th (m)	1.1	1.2	0.0	0.4
Control Delay (s)	10.0	9.1	0.0	2.8
Lane LOS	A	A		A
Approach Delay (s)	10.0	9.1	0.0	2.8
Approach LOS	A	A		

Intersection Summary				
Average Delay	4.2			
Intersection Capacity Utilization	19.5%	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)	11	4	1	4	1	16	0	55	7	25	57	12
Future Volume (Veh/h)	11	4	1	4	1	16	0	55	7	25	57	12
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.38	0.25	0.75	0.25	0.70	0.25	0.78	0.50	0.75	0.88	0.50
Hourly flow rate (vph)	15	11	4	5	4	23	0	71	14	33	65	24
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								140				
pX, platoon unblocked												
vC, conflicting volume	246	228	77	230	233	78	89			85		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	246	228	77	230	233	78	89			85		
tC, single (s)	7.2	6.8	7.2	7.1	6.5	6.3	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.3	4.2	3.5	4.0	3.4	2.2			2.2		
p0 queue free %	98	98	99	99	99	98	100			98		
cM capacity (veh/h)	658	607	768	703	656	950	1519			1493		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	30	32	85	122
Volume Left	15	5	0	33
Volume Right	4	23	14	24
cSH	651	855	1519	1493
Volume to Capacity	0.05	0.04	0.00	0.02
Queue Length 95th (m)	1.2	0.9	0.0	0.5
Control Delay (s)	10.8	9.4	0.0	2.1
Lane LOS	B	A		A
Approach Delay (s)	10.8	9.4	0.0	2.1
Approach LOS	B	A		

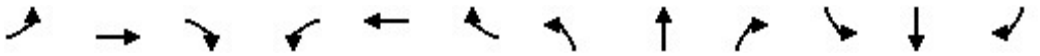
Intersection Summary				
Average Delay	3.3			
Intersection Capacity Utilization	21.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	62	62	0
Future Volume (Veh/h)	0	0	0	62	62	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	67	67	0
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	134	67	67			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	134	67	67			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	860	997	1535			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	67	67
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1535	1700
Volume to Capacity	0.02	0.00	0.04
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	6.7%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix G
Future (2030) Total Traffic Level of Service Calculations



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	1	1	7	2	19	1	56	11	13	40	4
Future Volume (Veh/h)	7	1	1	7	2	19	1	56	11	13	40	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.75	0.50	0.50	0.67	0.25	0.73	0.50	0.55	0.97	0.75
Hourly flow rate (vph)	28	4	1	14	4	28	4	77	22	24	41	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)								140				
pX, platoon unblocked												
vC, conflicting volume	218	198	44	190	190	88	46			99		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	218	198	44	190	190	88	46			99		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.3	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.2			2.2		
p0 queue free %	96	99	100	98	99	97	100			98		
cM capacity (veh/h)	708	688	1032	759	695	959	1575			1507		

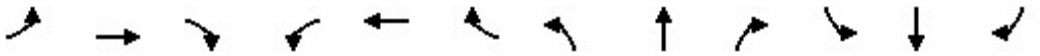
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	33	46	103	70
Volume Left	28	14	4	24
Volume Right	1	28	22	5
cSH	712	862	1575	1507
Volume to Capacity	0.05	0.05	0.00	0.02
Queue Length 95th (m)	1.2	1.4	0.1	0.4
Control Delay (s)	10.3	9.4	0.3	2.6
Lane LOS	B	A	A	A
Approach Delay (s)	10.3	9.4	0.3	2.6
Approach LOS	B	A		

Intersection Summary				
Average Delay	3.9			
Intersection Capacity Utilization	19.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	9	3	48	42	6
Future Volume (Veh/h)	20	9	3	48	42	6
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	10	3	52	46	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	108	50	53			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	108	50	53			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	100			
cM capacity (veh/h)	888	1019	1553			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	32	55	53
Volume Left	22	3	0
Volume Right	10	0	7
cSH	925	1553	1700
Volume to Capacity	0.03	0.00	0.03
Queue Length 95th (m)	0.9	0.0	0.0
Control Delay (s)	9.0	0.4	0.0
Lane LOS	A	A	
Approach Delay (s)	9.0	0.4	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	15.0%	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)	11	4	4	7	1	16	2	62	11	25	72	12
Future Volume (Veh/h)	11	4	4	7	1	16	2	62	11	25	72	12
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.38	0.25	0.75	0.25	0.70	0.25	0.78	0.50	0.75	0.88	0.50
Hourly flow rate (vph)	15	11	16	9	4	23	8	79	22	33	82	24
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								140				
pX, platoon unblocked												
vC, conflicting volume	291	277	94	288	278	90	106			101		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	291	277	94	288	278	90	106			101		
tC, single (s)	7.2	6.8	7.2	7.1	6.5	6.3	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.3	4.2	3.5	4.0	3.4	2.2			2.2		
p0 queue free %	98	98	98	99	99	98	99			98		
cM capacity (veh/h)	612	566	750	631	616	936	1498			1473		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	42	36	109	139
Volume Left	15	9	8	33
Volume Right	16	23	22	24
cSH	643	794	1498	1473
Volume to Capacity	0.07	0.05	0.01	0.02
Queue Length 95th (m)	1.7	1.1	0.1	0.5
Control Delay (s)	11.0	9.7	0.6	1.9
Lane LOS	B	A	A	A
Approach Delay (s)	11.0	9.7	0.6	1.9
Approach LOS	B	A		

Intersection Summary				
Average Delay	3.5			
Intersection Capacity Utilization	22.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	5	9	62	62	21
Future Volume (Veh/h)	13	5	9	62	62	21
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	5	10	67	67	23
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	166	78	90			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	166	78	90			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	99			
cM capacity (veh/h)	820	982	1505			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	19	77	90
Volume Left	14	10	0
Volume Right	5	0	23
cSH	857	1505	1700
Volume to Capacity	0.02	0.01	0.05
Queue Length 95th (m)	0.5	0.2	0.0
Control Delay (s)	9.3	1.0	0.0
Lane LOS	A	A	
Approach Delay (s)	9.3	1.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	20.4%	ICU Level of Service	A
Analysis Period (min)	15		