TRAFFIC IMPACT STUDY, PARKING JUSTIFICATION STUDY & TRANSPORTATION DEMAND MANAGEMENT PLAN

PROPOSED RESIDENTIAL DEVELOPMENT
1396 GUELPH LINE

CITY OF BURLINGTON
HALTON REGION

PREPARED FOR:
INFINITY DEVELOPMENT GROUP

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CFCA FILE NO. 2172-6311

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Revision Number	Date	Comments
Rev.0	March 2022	Issued for First Submission

Executive Summary

C.F. Crozier & Associates (Crozier) was retained by Infinity Development Group to complete a Traffic Impact Study (TIS), Parking Justification, and Transportation Demand Management Plan for a residential development situated at 1396 Guelph Line, City of Burlington, Halton Region.

The analysis undertaken herein was completed using the Site Plan prepared by Zedd Architecture. The development envisions the construction of an 11-storey residential tower with 236 units and 236 parking spaces, with access via a Right-in Right out from Guelph Line. Any minor changes to the Site Plan will not materially affect the conclusions set out within this report.

Under 2022 existing conditions, the intersection of Guelph Line and Palmer Drive operates with a Level of Service "A" with minimal delays, and well under capacity. It is noted that the 95th percentile queues for the westbound left-turn movement slightly exceed the storage length available during the A.M. peak, however the average queue (represented by the 50th percentile queue) is well within the available storage.

No background developments were identified in the study area, and it is noted that while widening of Guelph Line in the study area is eventually expected per the Halton Region Transportation Master Plan (2012), the timeline of roadway improvements are not anticipated by the 2027 study horizon. With the addition of background growth to the 2027 horizon year, the intersection of Guelph Line and Palmer Drive is expected to operate very similarly to that of 2022 existing conditions with minimal delays and well under capacity.

The subject development is expected to generate 71 two-way trips (24 inbound and 47 outbound) during the A.M. peak hour and 84 two-way trips (47 inbound, 37 outbound) during the P.M. peak hour.

With the addition of site-generated traffic to future background volumes, the intersection of Guelph Line and Palmer Drive is expected to continue operating with a Level of Service "A", minimal delays and no capacity concerns. The site access is forecasted to operate with a Level of Service "D" or better, with no capacity concerns in either peak hour.

Sight lines at the proposed site access were reviewed using guidelines set out in the Transportation Association of Canada Geometric Design Guidelines for Canadian Roads (TAC-GDGCR), and no visibility concerns are expected at the proposed site access.

The access location was evaluated with respect to spacing and corner clearance using the Halton Region Access Management Guidelines and the TAC GDGCR. Although the access location corner clearance to the adjacent private driveway is slightly deficient of TAC GDGCR corner clearance requirements, the access spacing meets Halton Region requirements. As such, given that visibility is sufficient and access spacing requirements are satisfied to the Region standard, the location of the proposed site access can be supported.

Transportation Demand Management (TDM) measures, including "hard" measures such as adequate cyclist and pedestrian facilities, avoiding parking oversupply, and "soft" measures such as wayfinding and educational measures and incentives were recommended at the site to reduce single-occupant vehicle trips and to promote non-motorized modes of travel and transit.

The parking justification study prepared as part of this Transportation Impact Study notes that the proposed parking supply of 1.0 spaces per unit is expected to be sufficient, despite falling deficient of the existing and "amended" City By-Law Requirements. Upon a review of peak parking rates observed in surrounding residential developments in the City of Burlington, as well as industry-standard Institute of Transportation Engineers data for residential land uses, the City's existing and "amended" parking rates would likely be an overestimation of expected parking demand at the proposed site, especially considering the development has ample opportunities for transit and active transportation. As such, the proposed development may also be supported from a parking perspective.

Additionally, it is noted that the site is also proposing parking space sizes of 2.6 m x 5.6 m, which is below the existing City of Burlington By-law requirements. Per a review of parking space dimensional requirements for municipalities within the overall GTHA, the City of Burlington has the largest vehicle stall size requirements and given the proposed parking space dimensions would meet the existing City of Toronto standards, they can be supported. The reduced parking space dimensions are expected to provide sufficient spacing for vehicles to maneuver and park within the site.

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1.0 Introduction

C.F. Crozier & Associates (Crozier) was retained by Infinity Development Group to complete a Traffic Impact Study (TIS) for a residential development situated at 1396 Guelph Line, City of Burlington, Halton Region.

The purpose of the Transportation Impact Study is to evaluate the impacts of the proposed development on the surrounding road network and recommend transportation-related mitigation measures, if required.

The following intersection(s) were reviewed in the scope of this study:

- Guelph Line and Palmer Drive
- Guelph Line at the Proposed Site Access

The following horizon timeframes were included in this study:

- Existing conditions (2022)
- Build-out year (2025) and five years post-buildout (2030)
- Weekday morning and afternoon peak hours

A scope of study encompassing the aforementioned conditions was circulated to staff at the City of Burlington (the City) and Halton Region (the Region) on March 4th, 2022. This correspondence is provided in **Appendix A**.

2.0 Development Proposal

Per the most recent Site Plan prepared by Zedd Architecture (provided in **Appendix B**), the proposed 11-storey residential building envisions the following elements:

- 236 residential units (13 bachelor, 167 1-bedroom, 56 2-bedroom)
- 236 auto parking spaces (228 underground, 8 surface)
- 85 bicycle parking spaces (80 underground, 5 surface)
- A Right-in Right-out (RIRO) access off Guelph Line

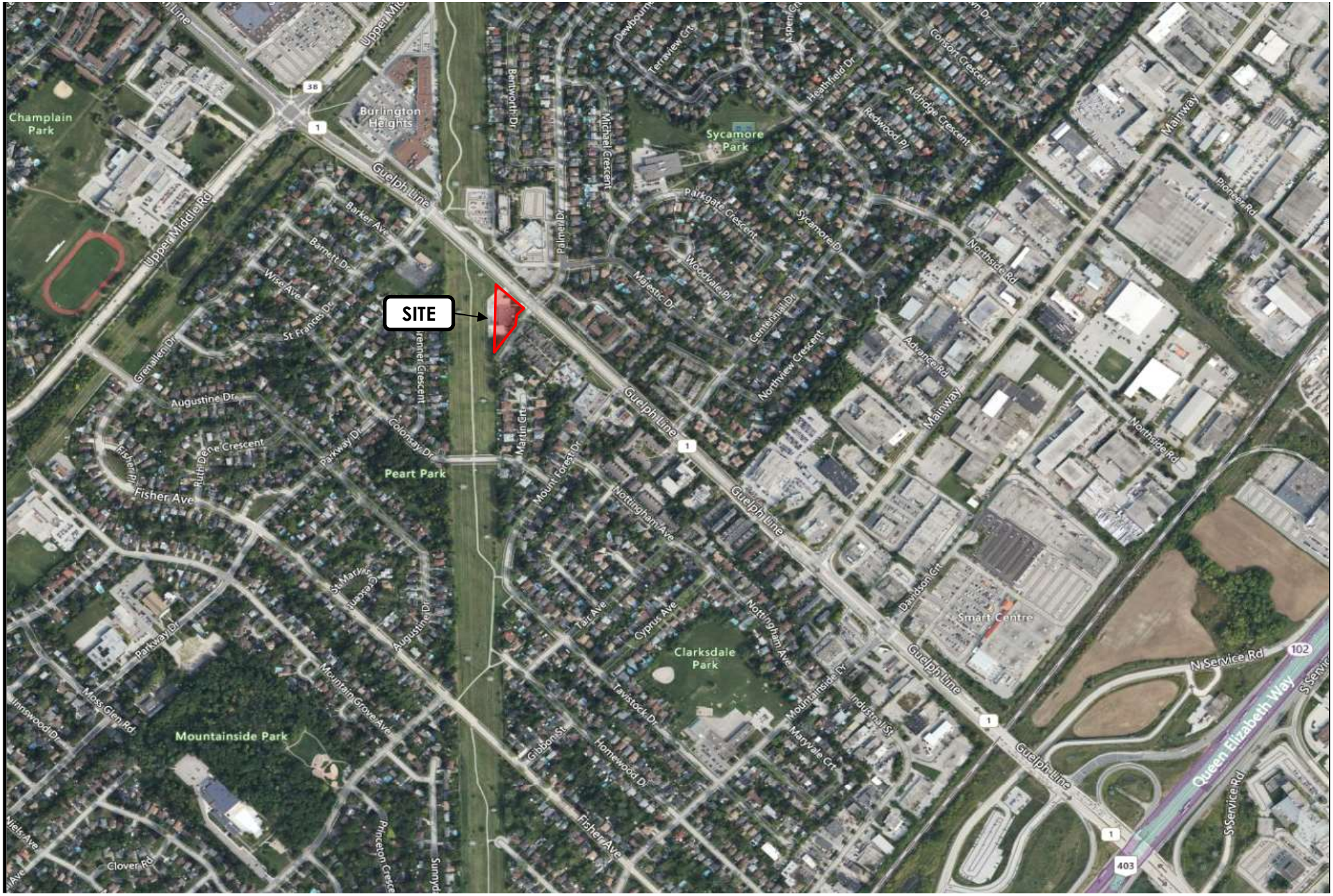
It should be noted that the details of the proposed development are subject to change and are expected to be further refined through the development application process. Any minor changes to the Site Plan are not expected to materially affect the conclusions set out within this report.

3.0 Existing Conditions

3.1 Development Lands

The subject lands, covering an area of approximately 0.46 ha, currently consists of a post office building. The study area, situated in a residential area, is bounded by Guelph Line to the east, existing residential development to the south, and the hydro corridor to the north and west. Per the City of Burlington's Interactive Zoning Map, the subject site is zoned as "S" (Utility Services).

The Site Location is included in **Figure 1** and the Site Plan is included in **Appendix B.**



Legend	1396 Guelph Line	CROZIER CONSULTING ENGINEERS	Figure 1
xx A.M. Peak Hour Traffic Volumes (xx) P.M. Peak Hour Traffic Volumes {xx} Weekend Peak Hour Traffic Volumes	Site Location		Project No. 2172-6311 Date. 2.24.2022 Analyst. Farah C

3.2 Boundary Road Network

Guelph Line (Regional Road 1) is a north/south roadway with a rural cross-section, consisting of two lanes in each direction separated by a two-way left-turn lane. Guelph Line is under the jurisdiction of Halton Region, and is classified as a Major Arterial per the City's Official Plan Schedule J. Sidewalks are available on both sides of the roadway, with a connection to the "Palmer Trail" multi-use path approximately 150 meters north of the intersection with Palmer Drive. A multi-use path is also available on the west side of Guelph Line (beside the sidewalk) north of the trail along Guelph Line. The roadway has a posted speed limit of 60 km/h in the study area.

Palmer Drive is an east-west roadway with a two-lane urban cross-section. Palmer Drive is under the jurisdiction of the City of Burlington and is classified as a Collector Road under the City's Official Plan. Sidewalks are available on both sides of the roadway with no dedicated cyclist facilities. The roadway has a posted speed limit of 40 km/h in the study area.

Appendix C contains relevant Official Plan excerpts.

3.3 Study Intersections

The intersection of **Guelph Line and Palmer Drive** is a four-legged signalized intersection. The eastbound approach consists of an existing private driveway with a single shared through/left/right-turn lane. The north and southbound approaches along Guelph Line each consist of a single through lane, a single shared through/right-turn lane, and a single left-turn lane. The westbound approach on Palmer Drive consists of a single shared through/right-turn lane and an auxiliary left-turn lane with a storage length of approximately 30 meters and taper length of approximately 50 meters. **Figure 2** illustrates the study roadway(s).

3.4 Traffic Data

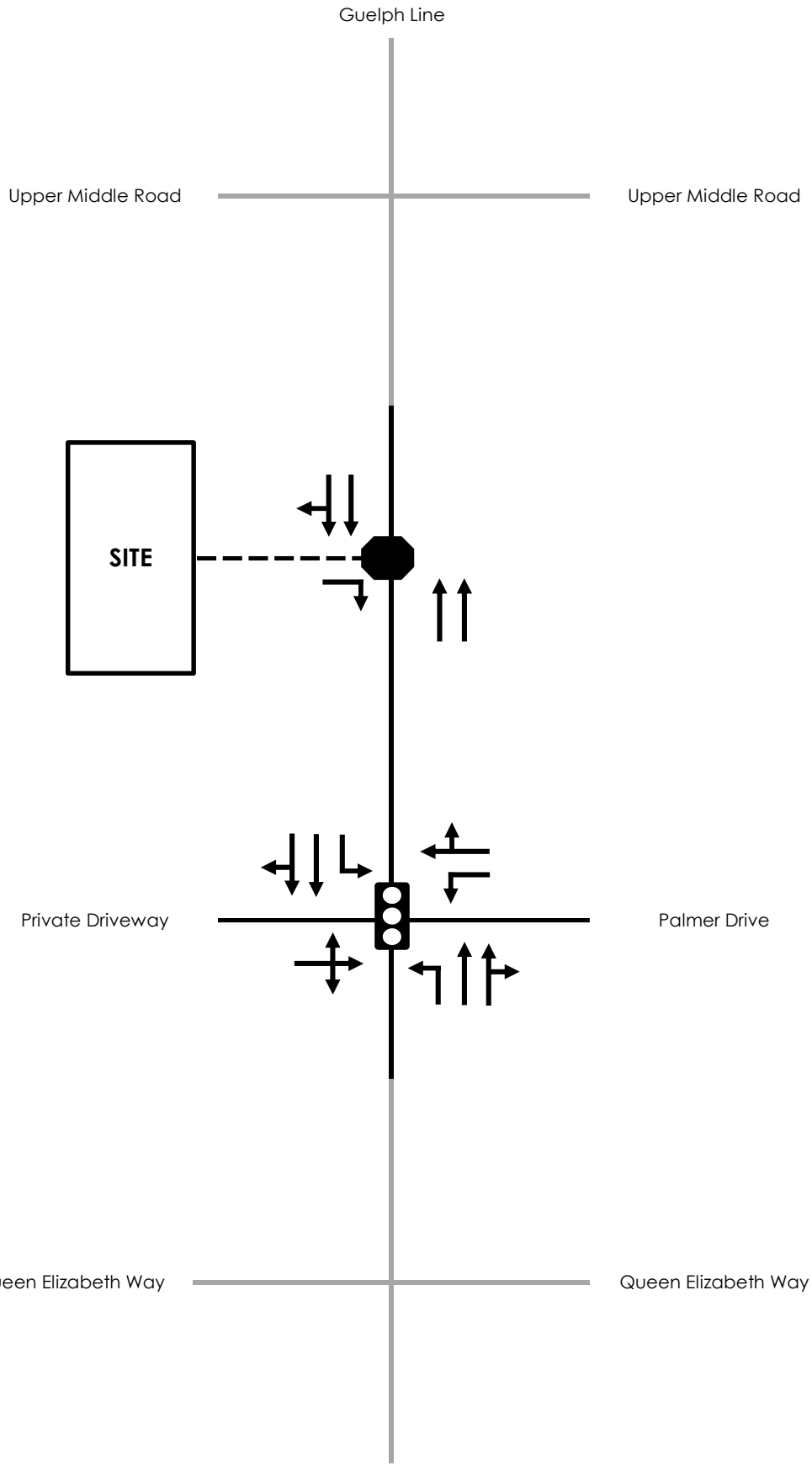
Turning movement counts at the intersection of Guelph Line and Palmer Line dated October 31, 2019, were confirmed to be the most recent traffic counts available to the Region and were used for the analysis contained herein. Signal timing plans dated March 7, 2022, were also provided by the Region, and used for the analysis contained herein. Peak hour factors used for analysis were determined based on existing traffic and are summarized in **Table 1**.

Table 1: Peak Hour Factors

Intersection	Peak Hour	Peak Hour Factor
Guelph Line and Palmer Drive	Weekday A.M.	0.98
	Weekday P.M.	0.93

3.5 Traffic Modelling

The evaluations of intersections within this report are conducted based on the methodology outlined in the Highway Capacity Manual (2010), using Synchro 11 modelling software. Intersections are assessed using a Level of Service (LOS) metric, with ranges of intersection delays assigned a letter from "A" to "F". For stop-controlled intersections, a Level of Service "A" or "B" would typically be measured during off-peak hours when lesser traffic volumes are on the roadways. Levels of Service "C" through "F" would typically be observed during commuter peak hours when significant vehicle volumes would cause lengthy travel times. The Level of Service definitions for signalized and stop-controlled intersections are included in **Appendix D**.



Legend

xx A.M. Peak Hour Traffic Volumes
(xx) P.M. Peak Hour Traffic Volumes
{xx} Weekend Peak Hour Traffic Volumes

1396 Guelph Line

Study Lane Configurations

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Figure 2

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Per the Halton Region Transportation Impact Study Guidelines, critical operations indicators (requiring mitigation measures) are as the following for signalized intersections:

- Volume to capacity (v/c) ratios exceeding 0.85 for through or shared through/turning movements and v/c ratios exceeding 0.95 for exclusive movements.
- Queues for individual movements exceeding turning lane storage

Additionally, for unsignalized intersections, mitigation measures are required when:

- Level of Service (LOS), based on average delay per vehicle, exceeds LOS "D".
- The estimated 95th percentile queue length for a movement exceeds the available queue storage.

3.6 Intersection Operations

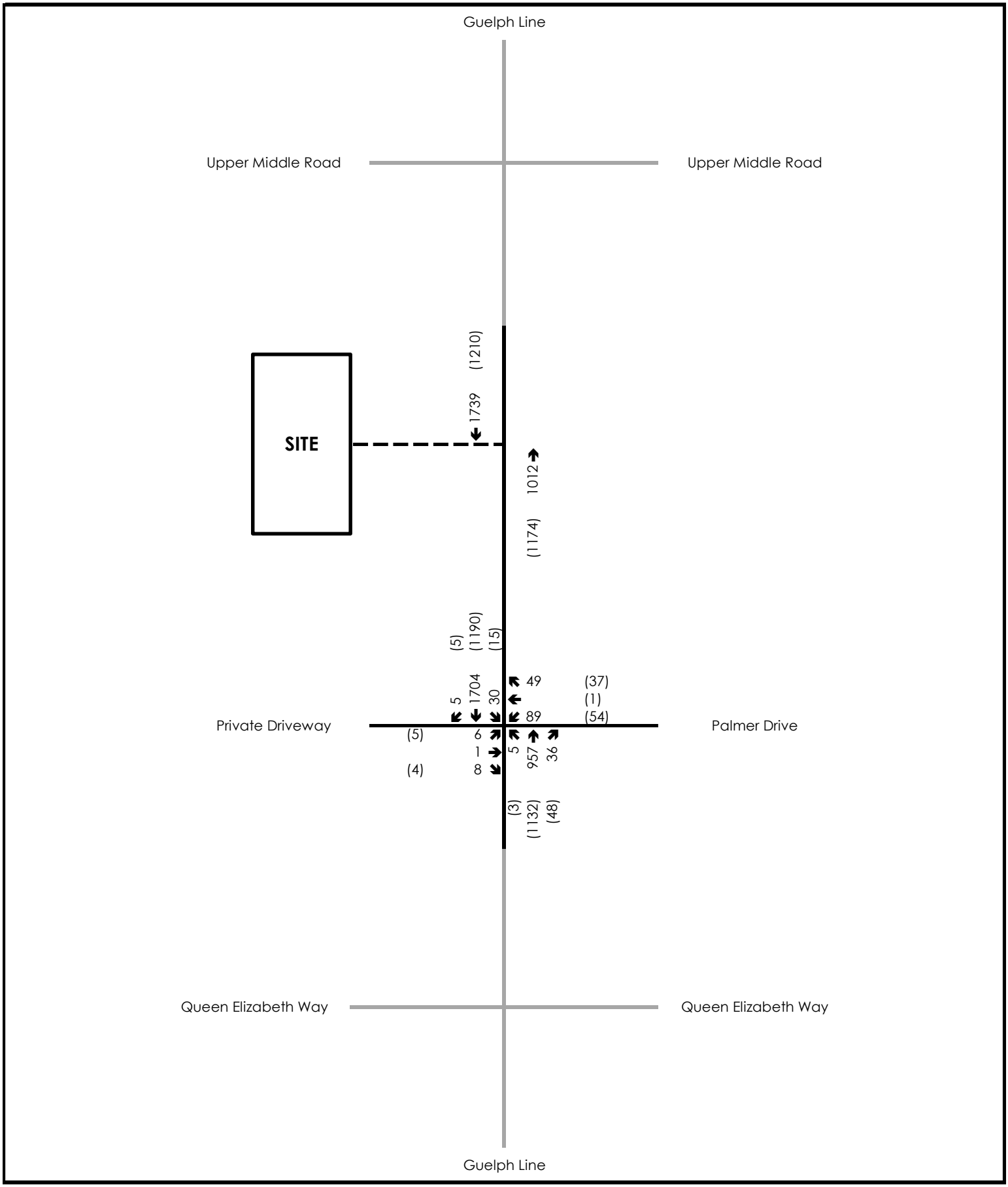
The traffic operations at the study intersections were analyzed based on grown traffic volumes to reflect 2022 existing conditions during the weekday A.M. and P.M. peak hours, as illustrated in **Figure 3**. Detailed capacity analyses are included in **Appendix E**. **Table 2** summarizes the existing traffic operations within the study area.

Table 2: 2022 Existing Levels of Service

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay	Critical V/C Ratio [2] (Approach)	95th %ile Queue Length (50th %ile Queue Length) > Storage Length
Guelph Line and Palmer Drive	Signal	A.M.	A	7.4	0.57 (SBT)	35 m (15 m) > 30 m (WBL)
		P.M.	A	5.5	0.42 (SBT)	None

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro/ICU).
Note 2: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for through or shared/through movements, and 0.95 for exclusive movements are outlined and highlighted.

As indicated in **Table 2**, the intersection of Guelph Line and Palmer Drive currently operates with a Level of Service "A" during both the weekday A.M. and P.M. peak hour. A maximum volume-to-capacity ratio of 0.57 and 0.42 was observed for the southbound through movement during the weekday A.M. and P.M. peak hours, respectively. It is noted that the 95th percentile queues for the westbound left-turn movement slightly exceed the storage length available during the A.M. peak, however the average queue (represented by the 50th percentile queue) is well within the available storage. In consideration of the low delays at the intersection and how infrequently the queues are expected to exceed the storage length, it is not recommended to extend the storage.



Legend

xx A.M. Peak Hour Traffic Volumes
(xx) P.M. Peak Hour Traffic Volumes
{xx} Weekend Peak Hour Traffic Volumes

1396 Guelph Line

2022 Existing Traffic Volumes

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Figure 3

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3.7 Active Transportation

A robust active transportation network is available in the vicinity of the development, with ample opportunities for cyclist and pedestrian traffic to safely make trips. Sidewalks are available on both sides of the roadway along Guelph Line. Additionally, a multi-use path trail (informally referred to as the "Palmer Trail") is available approximately 150 meters north of the development along the Hydro Corridor. The multi-use path also extends north of the trail connection along the west side of Guelph Line, beside the sidewalks.

3.8 Transit

Burlington Transit operates transit in the City of Burlington, and multiple routes are available in the vicinity of the study area.

Table 3 summarizes the transit opportunities in the study area. The Burlington Transit Route Map and Transit Schedules are provided in **Appendix F.** It is noted that Route 3 is the most frequent route and is located directly adjacent to the site. While Route 3 does not provide direct access to Burlington GO Station, riders can transfer at Fairview to take another bus to Burlington GO Station.

Table 3: Existing Transit near Site

Burlington Transit Route	Stop Location (Distance)	Time of Operation (Headway)	Major Destinations
Route 3 Guelph-Downtown	Guelph Line at Palmer (20 meters)	Mon-Sat 5:49 A.M. - 10:19 P.M. (20 minutes) Sun 7:19 A.M. - 7:49 P.M (30 minutes)	John Street Terminal Guelph Line/New Street Guelph Line/Fairview Guelph Line/Upper Middle Highway 407 GO Station
Route 52 Burlington Northwest (Night service)	Guelph Line at Palmer (20 meters)	Mon-Sat 10:55 P.M. - 12:55 A.M. (60 minutes)	Burlington GO Brant Street/Cavendish Dundas/Walkers Line Upper Middle/Guelph Line Fairview/Guelph Line John Street Terminal
Route 12 Upper Middle	Upper Middle Road at Guelph Line (600 meters)	Mon-Fri 5:50 A.M. – 9:50 P.M. (30 minutes) Sat 7:17 A.M. – 9:50 A.M. Sun 8:17 A.M. – 5:50 P.M (60 minutes)	Burlington GO Brant Street/Mt Forest Upper Middle/Guelph Line Upper Middle/Walkers Line Upper Middle/Appleby Line Appleby Line/Dundas St

Note: Transit information used is dated March 13, 2022 and is understood to be temporary (per the Burlington Transit Website) due to the impacts of the COVID-19 pandemic.

4.0 Future Background Conditions

4.1 Study Horizons

Per the Region's TIS Guidelines, a five-year horizon year (2027) was considered to be appropriate for the purposes of the analysis.

4.2 Background Developments

A review of the active development applications listed on the City of Burlington in the study area only included the commercial redevelopment at 2025 Guelph Line. It is noted that this commercial development had a Transportation Impact Study completed in 2015, with a 5-year horizon, and the development was approved. It is noted that the development does not appear to be constructed at the time of writing. In consideration of the unknown status of this application, this background development was not included in the analysis herein.

4.3 Transportation Improvements

Per the Region's Transportation Master Plan dated September 2011, the Region plans to widen Guelph Line between by 2031. Table 7.4 of the Region's TMP outlines that the segment of Guelph Line between Dundas Street and Fairview Street is planned to be widened. In consideration that an Environmental Assessment process has not yet publicly been initiated for the widening project, this roadway improvement was assumed to not be constructed by the 2027 horizon and was not included within the analysis herein.

It is noted that Halton Region has begun the process of undertaking an Environmental Assessment including detailed designs to improve the Guelph Line / Queen Elizabeth Way interchange in 2012. However, these improvements would fall outside of the study area.

4.4 Traffic Growth Rates

An industry standard growth rate of 2.0% per annum was applied to through movements along Guelph Line to reflect community and employment growth in the area. **Figure 4** illustrates the future background traffic volumes for the 2027 horizon year.

4.5 Intersection Operations

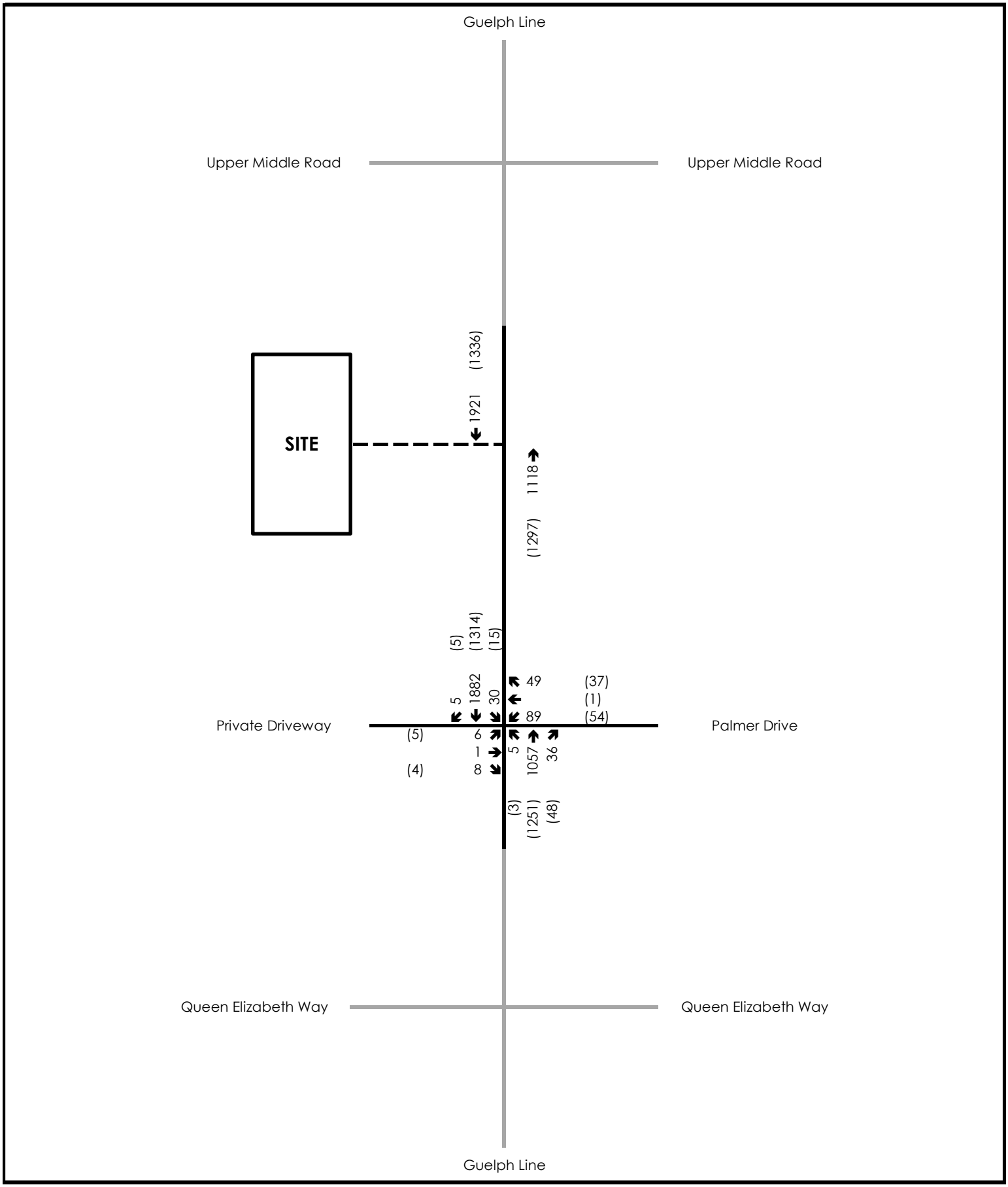
Traffic operations at the study intersections were analyzed following addition of volumes from associated growth rates. **Table 4** summarizes the 2027 future background levels of service. Detailed capacity analyses are included in **Appendix G**.

Table 4: 2027 Future Background Levels of Service

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay	Critical V/C Ratio [2] (Approach)	95th %ile Queue Length (50th %ile Queue Length) > Storage Length
Guelph Line and Palmer Drive	Signal	A.M.	A	8.3	0.67 (SBT)	35 m (15 m) > 30 m (WBL)
		P.M.	A	5.8	0.49 (SBT)	None

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro/ICU).
Note 2: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for through or shared/through movements, and 0.95 for exclusive movements are outlined and highlighted.

As indicated in **Table 4**, the intersection of Guelph Line and Palmer Drive is expected to operate very similarly to existing conditions, with minimal delays and well under capacity. As previously noted under existing conditions, while the 95th percentile queue for the westbound left-turn movement exceeds the available storage for the A.M. peak under 2027 future background conditions as well. The average queue for the westbound left-turn is also well within the existing storage length. intersection.



Legend

xx A.M. Peak Hour Traffic Volumes
(xx) P.M. Peak Hour Traffic Volumes
{xx} Weekend Peak Hour Traffic Volumes

1396 Guelph Line

2027 Future Background Traffic Volumes

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Figure 4

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Analyst. Farah C

5.0 Site Generated Traffic

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

5.1 ITE Trip Generation

The site-generated trips at the proposed development were forecasted using data from the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition.

Land Use Code 222 "Multifamily Housing (High Rise)" was used to forecast the trips generated by the proposed residential building, as tabulated in **Table 5**. Relevant excerpts from the ITE Trip Generation Manual are provided in **Appendix H**.

Table 5: ITE Trip Generation

Land Use	Units	Peak Hour	Equation	In	Out	Total
Multifamily Housing (High Rise) LUC 222	236	Weekday A.M.	T = 0.22(X) + 18.85	24	47	71
		Weekday P.M.	T = 0.26(X) + 23.12	47	37	84

Per the results summarized above, the subject development is expected to generate 71 two-way trips (24 inbound and 47 outbound) during the A.M. peak hour and 84 two-way trips (47 inbound, 37 outbound) during the P.M. peak hour.

5.2 Trip Distribution and Assignment

2016 Transportation Tomorrow Survey (TTS) data was used to derive the distribution of residential trips in the study area. Trip patterns for the subject GTA Zone 4086, as well as neighboring residential GTA zones 4085, 4083, and 4084 were considered for analysis. Trips were filtered for residential inbound and outbound trips out of the study zones during the morning (6:30 A.M. to 9:30 A.M.) and afternoon (3:30 P.M. to 6:30 P.M.).

The trip distribution percentages applied to the site trips distributed to the surrounding road network is summarized in **Table 6** below. **Appendix I** provides the detailed TTS query data.

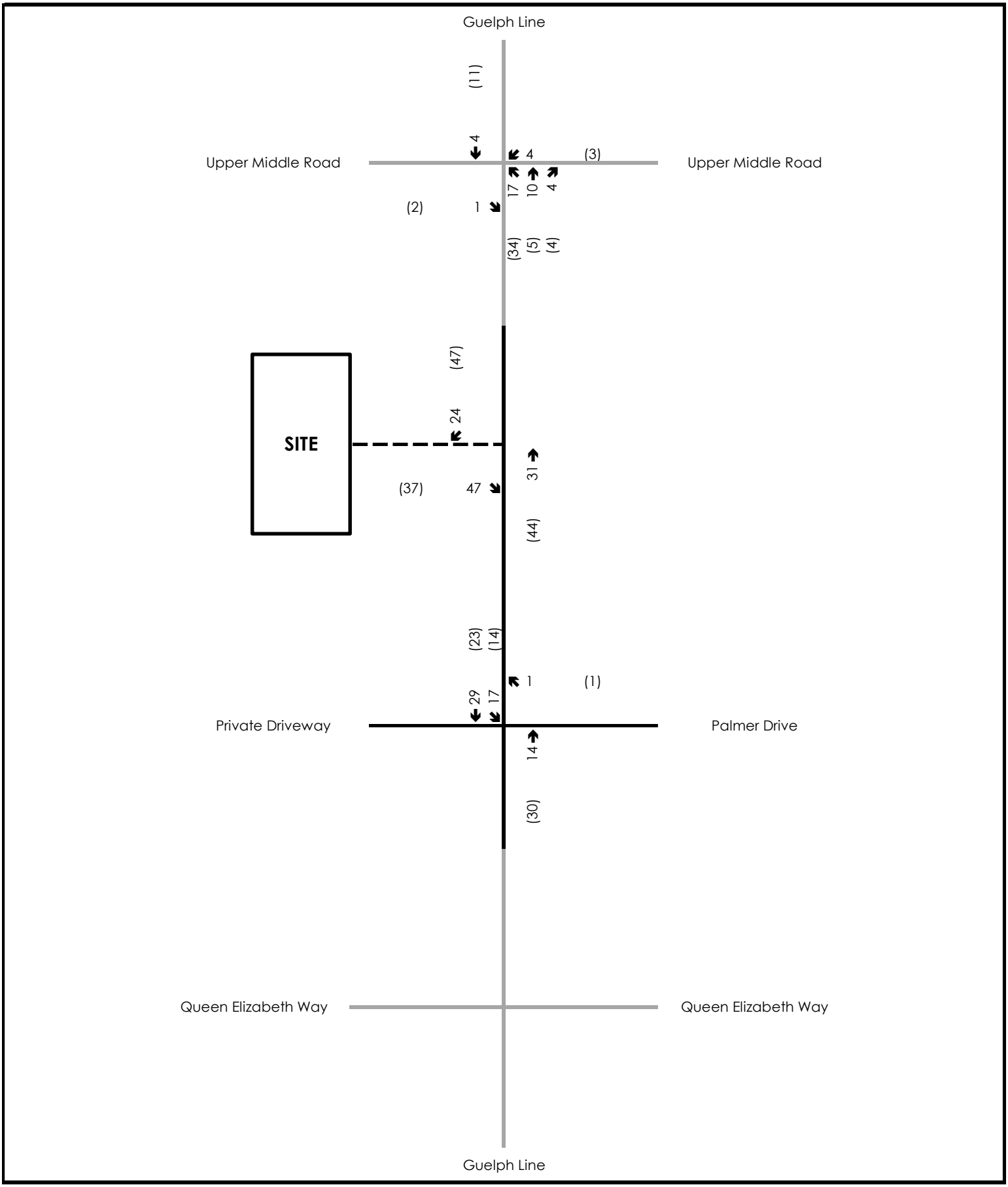
Table 6: Site Distribution

Location	AM (IN)	AM (OUT)	PM (IN)	PM (OUT)
North via Guelph Line	17%	22%	22%	14%
South via Guelph Line	58%	63%	64%	62%
East via Palmer Drive	4%	2%	2%	3%
East via Upper Middle	17%	9%	7%	12%
West via Upper Middle	4%	4%	5%	9%

It is noted that a significant amount of traffic is expected to leave the site and be destined north on Guelph Line due to the presence of the 407 interchange on Dundas Street, as well as Upper Middle Road providing access for local trips to the northeast and northwest. As a result, this traffic was assigned to the southbound left-turn movement at Guelph Line and Palmer Drive, where it would be expected to make a U-turn and head north on Guelph Line due to the Right-in, Right-out (RIRO) driveway arrangement.

Similarly, an even more significant amount of traffic is expected to enter the site from the south on Guelph Line, which is considered the dominant traffic direction due to the QEW interchange, Burlington GO and other major destinations. As a result, this traffic actually enters the site from the north on Guelph Line by making an assumed U-Turn at the intersection of Upper Middle Road and Guelph Line to the north, again due to the RIRO driveway arrangement.

Figure 5 shows the trip assignment under these assumptions along with the turning volumes at Upper Middle Road and Guelph Line outside the study area.



Legend

xx A.M. Peak Hour Traffic Volumes
(xx) P.M. Peak Hour Traffic Volumes
{xx} Weekend Peak Hour Traffic Volumes

1396 Guelph Line

Site Generated Trips

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Figure 5

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6.0 Future Total Traffic Conditions

6.1 Intersection Operations

Traffic operations at the study intersections were analyzed with the addition of the site generated traffic to the future background traffic. The total traffic volumes are illustrated in **Figure 6**.

Table 7 outlines the 2027 future total traffic Levels of Service. Detailed capacity analysis worksheets are included in **Appendix J.**

Table 7: 2027 Future Total Levels of Service

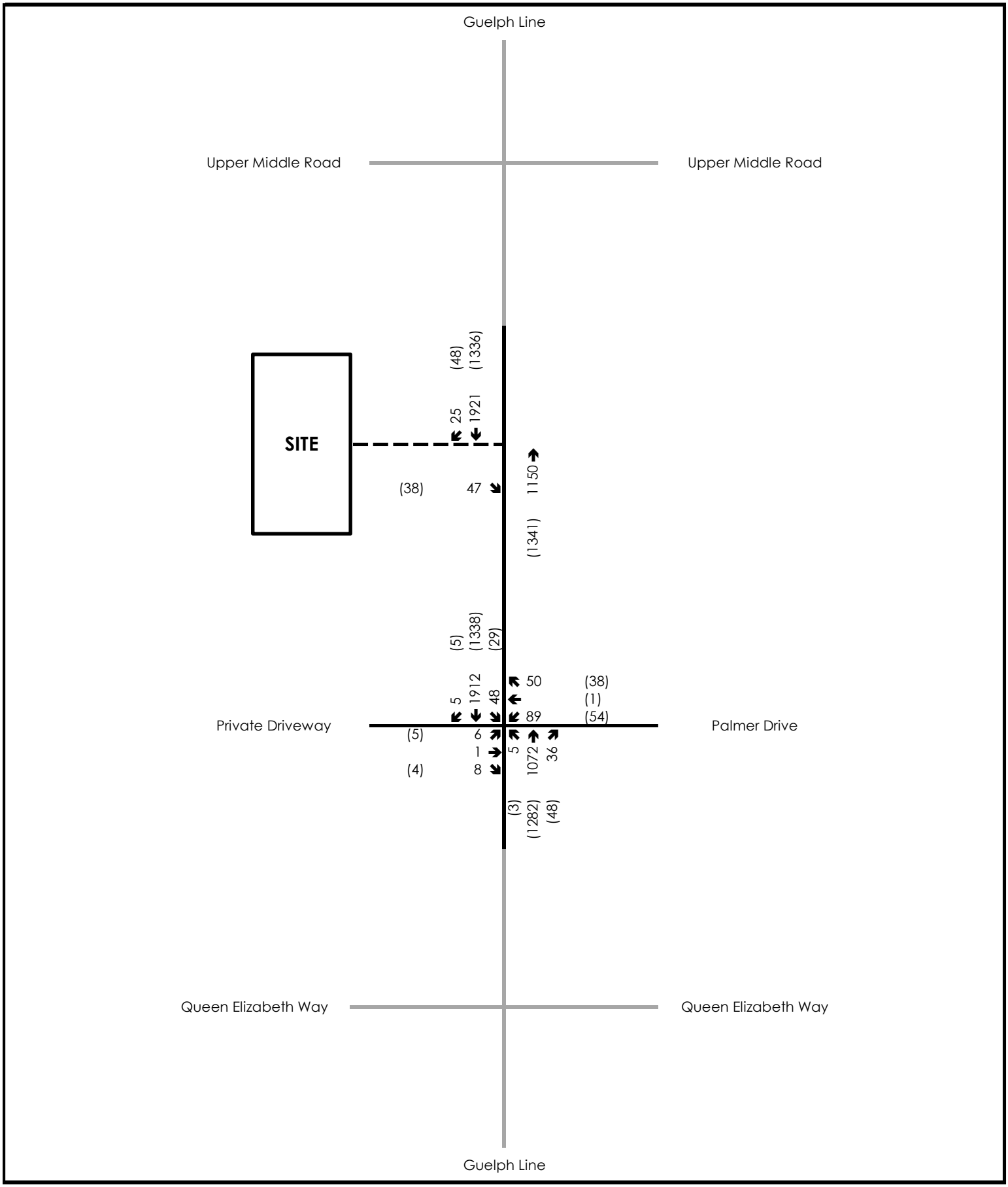
Intersection	Control	Peak Hour	Level of Service [1]	Control Delay	Critical V/C Ratio [2] (Approach)	95th %ile Queue Length (50th %ile Queue Length) > Storage Length
Guelph Line and Palmer Drive	Signal	A.M.	A	8.4	0.68 (SBT)	35 m (15 m) > 30 m (WBL)
		P.M.	A	5.8	0.49 (SBT)	None
Guelph Line at Site Access	Stop Control (Minor)	A.M.	D	26.1	0.82 (SBTR)	None
		P.M.	C	16.5	0.57 (SBTR)	None

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro/ICU).
Note 2: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for through or shared/through movements, and 0.95 for exclusive movements are outlined and highlighted.

As indicated in **Table 7**, the intersection of Guelph Line and Palmer Drive is forecasted to operate very similarly to existing and future background conditions, with a Level of Service "A" and no capacity or delay concerns.

The proposed site access is forecasted to operate with a Level of Service "D" or better, with all movements under capacity and no queueing issues identified.

As the development is not expected to materially impact the surrounding road network and the proposed site access is expected to operate with acceptable delays, the proposed development can be supported from a transportation perspective.



Legend	1396 Guelph Line	CROZIER CONSULTING ENGINEERS	Figure 6
xx A.M. Peak Hour Traffic Volumes (xx) P.M. Peak Hour Traffic Volumes {xx} Weekend Peak Hour Traffic Volumes	2027 Future Total Traffic Volumes		Project No. 2172-6311 Date. 2.24.2022 Analyst. Farah C

7.0 Site Access Review

The site is proposed to be accessed via a Right-in Right-out (RIRO) access off Guelph Line, due to the site's proximity to the existing intersection of Palmer Road at Guelph Line. The following section discusses visibility and geometric requirements pertaining to the proposed site access.

7.1 Sight Lines

The available sightlines at the proposed site access were measured and compared to the standards set out in the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GDGCR), June 2017. Sight distance was measured from the proposed site access using the following assumptions:

- A standard driver eye height of 1.08 m for a passenger car, and
- A 4.4 m setback from the approximate extension of the outer curb to represent a vehicle waiting to exit the Site.

Intersection sight distance is calculated using Equation 9.9.1 from the GDGCR as outlined below:

$$ISD = 0.278 * V\ major * tg$$

Where:
ISD = Intersection Sight Distance
V major = design speed of roadway (km/h)
tg = assumed time gap for vehicles to turn from stop onto roadway (s)

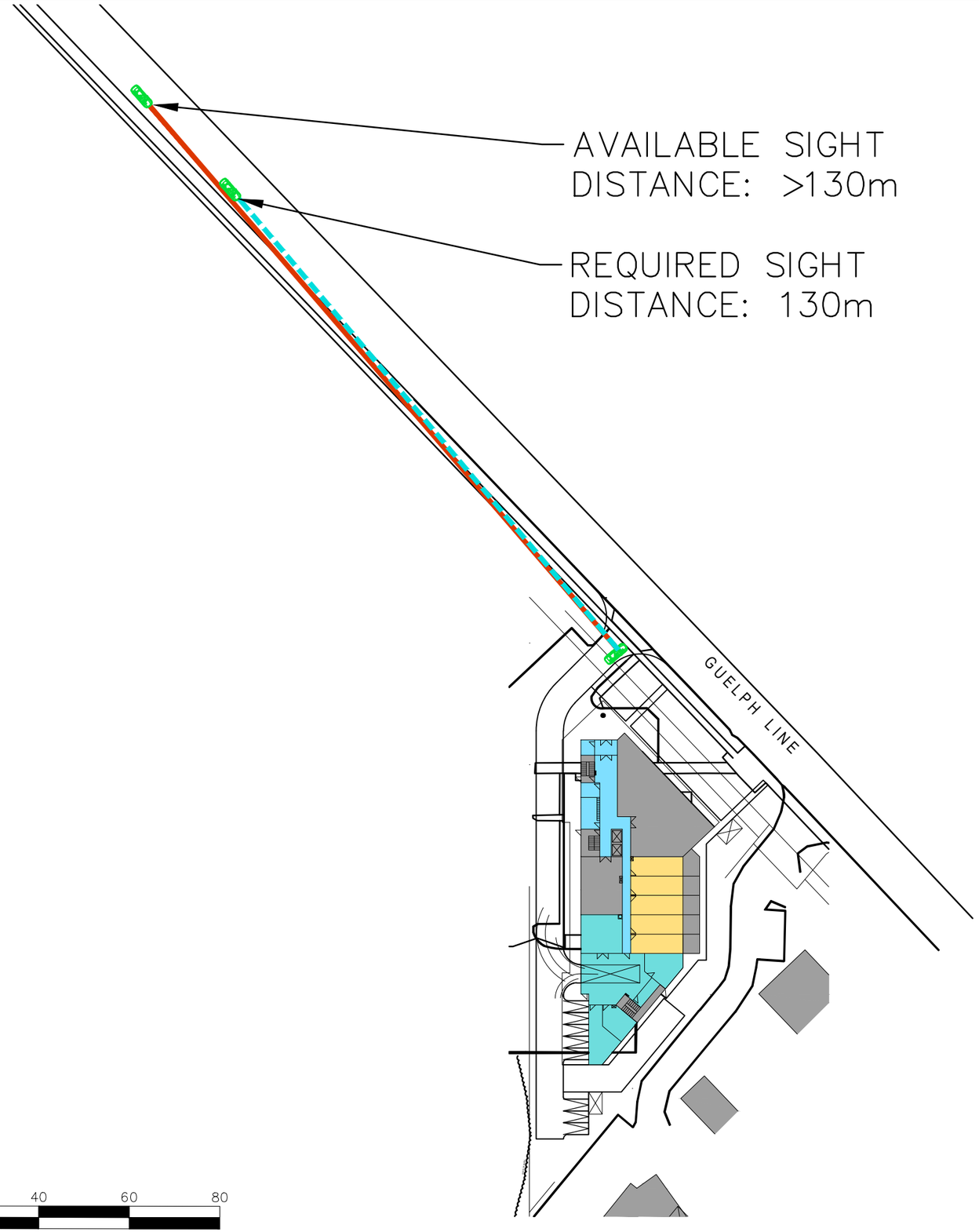
Table 7 summarizes the required and available sight lines at the proposed site access. **Figure SL-01** illustrates the sight lines at the site.

Table 8: Sight Distance Analysis

Feature	Site Access off Guelph Line
Access Type	Right-in Right-out
Assumed Speed Limit of Roadway	60 km/h
Assumed Design Speed	70 km/h
Base Time Gap [1]	6.5 s (right-turn)
Grade of Roadway	Less than 3%
Horizontal Alignment of Roadway	Straight
Required Sight Distance (right-turn) [2]	130 m
Available Sight Distance (right-turn)	>130 m
Minimum Sight Distances Satisfied?	Yes

Note 1: Time gap for right-turning vehicles from a stop onto a two-lane highway with no median and with a grade less than 3%. Value from Table 9.9.5 in the TAC-GDGCR.
Note 2: Sight distance values calculated from Intersection Sight Distance equation 9.9.1 in the GDGCR.

Per the results summarized in **Table 8**, the proposed site access off Guelph Line would meet sight distance requirements and provide sufficient visibility to drivers on the road.





LEGEND:

- AVAILABLE SIGHT DISTANCE
- REQUIRED SIGHT DISTANCE
- PASSENGER VEHICLE

Sight Distance Calculation

Feature	Site Access off Guelph Line
Access Type	Right–in Right–out
Assumed Speed Limit of Roadway	60 km/h
Assumed Design Speed	70 km/h
Base Time Gap [1]	6.5s (right–turn)
Grade of Roadway	Less than 3%
Horizontal Alignment of Roadway	Straight
Required Sight Distance (right–turn) [2]	130 m

Note 1: Time gap for right–turning vehicles from a stop onto a two–lane highway with no median and with a grade less than 3%. Value from Table 9.9.5 in the TAC–GDGCR.

Note 2: Sight Distance values calculated from equation 9.9.1 in the GDGCR.

FOR REVIEW

20 0m 20 40 60 80

SCALE: 1:1000

Project
1396 GUELPH LINE
CITY OF BURLINGTON

Drawing
SIGHT DISTANCE ANALYSIS

CROZIER CONSULTING ENGINEERS
211 YONGE STREET
SUITE 301
TORONTO, ON M5B 1M4
416-477-3392 T
WWW.CFCROZIER.CA

Drawn	R.L.	Design	F.C.	Project No.	2100–6311
Check	F.C.	Check		Check	Dwg. SL–01

7.2 Access Control

Per the Halton Region Access Management Guidelines (January 2015) Section 2.1, RIRO accesses must provide a center median with a minimum of 45 meters on either side of the curb extension to provide a continuous center median, however in the event of physical or other constraints, an alternative directional island must be constructed to control movements at the site access.

Future design submissions will detail the access design at the proposed site access per Halton Regional requirements. It has not yet been determined whether a center median or directional island will be the proposed method of restricting access.

7.3 Access Spacing

Per Section 3.2 of the Region's Access Management Guidelines, although a spacing of 115 to 140 meters is preferable between RIRO accesses, spacing between 30 to 60 meters may be considered between accesses when physical or land use conditions do not facilitate larger spacing.

It is noted that the existing private access south of the proposed site access (across Palmer Drive) is spaced approximately 50 meters south of the proposed site access, which would be acceptable per the Region's standards, given the current land uses in the study area and existing driveway location at the site.

7.4 Corner Clearance

It Is noted per Figure 8.8.2 of the TAC GDGCR, that the corner clearance required for a driveway to a signalized collector crossroad or local road is 55 meters and 15 meters, respectively. It is noted that while Palmer Drive is a collector road, the driveway adjacent to the subject site and across Palmer Drive is a local/private driveway.

The corner clearance between the subject site access and the existing driveway south of the development is approximately 50 meters. In considering the more conservative corner clearance requirement to a collector road, the provided corner clearance is slightly deficient under this conservative assumption.

However, in consideration that sight lines and access spacing requirements are met and that the access will be RIRO, the access location can be supported from a transportation perspective.

8.0 Transportation Demand Management

Transportation Demand Management (TDM) measures are recommended to promote alternative modes of transportation, such as transit, cycling or walking, and reduce single-occupant vehicle (SOV) trips entering and exiting the proposed development.

8.1 Existing Modal Split

2016 Transportation Tomorrow Survey (TTS) data for households situated in 2006 GTA Zones 4086, 4085, 4084, 4083 was analyzed, and summarized below in **Table 9**. The detailed TTS Query is provided in **Appendix K**.

Table 9: Modal Split

Mode of Travel	Modal Split (%)
Auto	89%
Transit	4%
Walking	7%
Cycling	1%

As noted above, the non-auto modal split is approximately 11%, indicating that residents of the area do use other forms of transportation to make their trips although the automobile is the dominant form of transportation in the peak hours.

8.2 Existing Transit and Active Transportation Facilities

As discussed previously, there are several transit facilities available within walking distance of the subject site. Although it is noted that the observed transit mode split (from TTS data) is low, the immediate proximity of bus stops to the site entrance would facilitate transit use for residents at the development. Incentives recommended later in this report (education, passes, welcome packages, etc.) are expected to further promote use of transit to new residents.

Additionally, there is ample opportunity for pedestrians and cyclists to use the sidewalk and "Palmer Trail" within close proximity to the development. Similarly, targeted TDM measures are expected to promote active transportation opportunities to new residents.

8.3 TDM Opportunities

8.3.1 Transit

As previously established, there are several existing transit stops in the vicinity of the subject development. It is recommended that any new construction at the site maintain the existing transit and pedestrian-friendly design currently near the site entrance (benches, transit shelters).

As discussed in the following sections, various wayfinding and education measures may be undertaken to supplement the accessibility of existing transit to promote its use as a viable mode of transportation.

8.3.2 Cyclist Facilities

The most recent Site Plan provides a total of 8 short term bicycle parking spaces (4 posts) and a total of 80 long-term bicycle parking spaces.

Per the updated City Zoning By-Law 2020, the required bicycle parking spaces are summarized in **Table 10**.

Table 10: Bicycle Parking Requirements

Land Use	Units	Type of Space	Number of Spaces Required	Spaces Required	Spaces Provided
Residential	236	Long Term	0.5 Long Term bicycle parking spaces per unit	50 Long Term	80 Long Term
		Short Term	0.05 Short Term bicycle parking spaces per unit	12 Short Term	8 Short Term

Per the requirements summarized in **Table 10**, the number of long-term bicycle parking spaces provides a surplus of 30 spaces in comparison to the City's By-Law requirements, and the short-term bicycle spaces are deficient by 4 spaces. This allocation is expected to be refined in future submissions.

The most recent Site Plan designates indoor spaces for bicycle parking, which is ideal for long-term spaces. The location of the short-term bicycle spaces is recommended to be near the entrance of the building for visitors. A well-lit path for cyclists as well as proper lighting at the bicycle parking facilities should be provided for safety and aesthetic purposes.

In consideration of the proximity of the site to the "Palmer Trail", it is recommended that the Applicant work with the City of Burlington and/or the Region of Halton to extend the existing multi-use path trail (north of the trail entrance, on the west side of Guelph Line) to connect south of the trail entrance along Guelph Line to the intersection/transit stop across Palmer Drive (on the west side of Guelph Line). This improvement would facilitate cyclist connectivity between the site and the "Palmer Trail", which would encourage new residents to cycle for some of their trips.

8.3.3 Pedestrian Facilities

Pedestrian connections on Guelph Line should connect to the proposed site and be well-lit to be safe and appealing to residents and visitors. Furthermore, pedestrian refuges, such as benches or fixtures, may be provided for additional aesthetic value as well as refuge for walking residents. Additionally, weather protection should be provided for pedestrians near the entrances and exits of the building.

8.3.4 Parking

Through parking related TDM measures, the objective is to reduce the frequency of single occupant auto trips taken to and from the site and to generally reduce vehicle ownership of residents of the future site.

The most recent Site Plan provides a deficiency of parking spaces below the By-law required rates. This reduces the number of vehicles owned by each household and encourages the use of other modes of transportation for some trips, especially during congested peak hours. Given the site's proximity to transit, the reduced parking rate is encouraged since visitors and residents have convenient access to the GO train network and local transit.

Additionally, parking may be unbundled with the purchase of a residential unit so that future residents have a clearer picture of the costs of automobile ownership and to further reduce auto ownership rates.

8.3.5 Carshare

Although there are no dedicated carshare services offered within Burlington at this time, the Applicant may consider working with various rideshare services offered within the Greater Toronto and Hamilton Area (GTHA) to provide car-share vehicles on site to also reduce overall vehicle ownership at the proposed site.

8.3.6 Wayfinding

Fixtures such as kiosks or displays may be provided in the building lobby to inform residents of transit information, such as routes, schedules, and stop locations of train or bus routes. Additionally, brochures outlining nearby transit nodes, bicycle routes, and pedestrian routes should be made available at the lobby.

Additional wayfinding signage to lead residents to nearby bus stops and the nearby "Palmer Trail" may also be provided on premises to further promote the use of transit.

8.3.7 Education and Incentives

Various educational measures and incentives may be promoted at the new residential site to overall build a robust TDM brand and promote use of alternative modes of transportation available to residents.

The residential units being sold at the subject site should be promoted with a strong TDM brand, where marketing should highlight the convenience of proximity to transit and the cycling trail and the on-site bicycle storage and lockers.

Education on available transit in the vicinity of the subject site would also be highly effective in promoting transit to new residents, who may not be aware of the variety of options available in the area. Handouts on local transit offerings and stop/schedule information, as well as nearby cyclist and pedestrian routes, may be provided to residents as part of a welcome package, and extra copies should be made available in the lobby for reference. A further step would be to include transit (PRESTO) passes to new residents as part of a welcome package to further incentivize use of transit.

9.0 Parking Review and Justification

This section discusses the parking requirements per the City of Burlington Zoning By-Laws and compares the forecasted peak parking demand based on standard analysis criteria.

A parking justification study has been prepared to support the proposed parking ratio of 1.0 parking space per unit for the proposed development. The justification includes a review of observed parking rates in the City of Burlington, as well as an estimate of parking demand using the Institute of Transportation Engineers Parking Generation Manual 5th Edition data.

9.1 Zoning By-Law Parking Requirements

The existing City of Burlington Zoning By-Law parking requirements in Section 2.2.5, Table 1.2.6 have been reviewed for the land uses proposed at the subject site and are included in **Table 11.**

It is noted that the existing By-Law has been proposed to be amended per Part 1 of the City By-Law 2020; however, the amendment to the residential parking requirements is not currently approved as of the date of this report. Therefore, both the existing "in-effect" apartment parking rate and pending "amended" parking rates were used to calculate the required parking for the proposed development, with the results for amended rates shown in **Table 12.**

Table 11: Existing Parking Requirements

Land Use	Type of Unit	Units	Parking Requirements	Parking Required	Parking Provided
Residential	1-Bedroom	180	1.25 occupant spaces per one bedroom unit	225	236
	2-Bedroom	56	1.50 occupant spaces per two-bedroom unit	84	
	Visitor	236	0.35 visitor spaces per unit	83	
Total				392	236
Surplus/Deficit				-156 spaces	

Table 12: Amended Parking Requirements (Under LPAT Review, not in-effect)

Land Use	Type of Unit	Units	Parking Requirements	Parking Required	Parking Provided
Residential	1-Bedroom	180	1.00 occupant spaces per one bedroom unit	180	236
	2-Bedroom	56	1.25 occupant spaces per two-bedroom unit	70	
	Visitor	236	0.25 visitor spaces per unit	59	
Total				309	236
Surplus/Deficit				-73 spaces	

As outlined above, the provided parking rate would provide a deficiency of 73 spaces per the "amended" parking requirements, and a deficiency of 156 parking spaces per the existing parking requirements in the City of Burlington.

9.2 Parking Demand Forecasting

To forecast the parking demand for the proposed mixed-use development, parking rates for sites with similar land use characteristics within the City of Burlington were examined along with industry standard data from the ITE Parking Generation Manual. All the surrogate parking data referenced in this section are summarized in **Table 13**.

9.2.1 ITE Parking Demand

The Institute of Transportation Engineers (ITE) Parking Generation Manual 5th Edition contains parking demand data from surveys for a variety of sites across Canada and the United States and is well recognized in the industry for parking demand data in lieu of, or in combination with data collected from local sites.

Land Use Code 222 "Multifamily Housing (High-Rise)" for sites not located near rail transit was used to estimate the site's peak parking generation, as tabulated in **Table 13**.

It is to be noted that per the ITE Parking Generation Manual, a site would be considered close to rail transit "if the walking distance between the site entrance and the closest rail transit station entrance is within a half mile (800 meters)". As the nearest GO Station (Burlington GO) is approximately 3.5 kilometres from the site, the site is not classified as being "near rail transit".

The resulting combined visitor and resident parking demand rate from the ITE Parking Generation is estimated to be 0.98 spaces/unit, which supports the proposed parking supply of 1.0 space/unit.

9.2.2 Parking Utilization Data

Parking utilization data collected for the following sites were reviewed from the background Paradigm Report for 40-70 Plains Road East in the City of Burlington:

- 551 Maple Avenue: 186 residential units contained within a 19-storey building.
- 360 Pearl Street: 75 residential units contained within a 17-storey building.
- 1284 Guelph Line: 78 residential units contained within a 4-storey building.

Observed parking ratios at these sites were collected, and the total combined visitor plus resident parking rates are summarized in **Table 13**. The overall range of maximum observed parking rates at the three sites was found to be between 0.90 – 1.06 spaces per unit, for combined resident and visitor demand.

9.2.3 Parking Demand Data Summary

Parking demand rates in the City of Burlington, as well as the ITE determined rates, are summarized in **Table 13**.

Upon review of the above data, the proposed parking supply is expected to be sufficient when considering the peak parking rates (combined visitor and resident) observed at surrounding residential buildings with similar land uses. It can also be concluded that the City's existing and "amended" parking rates would likely be an overestimation of expected parking demand at the proposed site, especially considering the development has ample opportunities for transit and active transportation users.

Table 13: Combined Resident and Visitor Parking Rates

Site Location/ Land Use Code	Development Statistics	Source	Parking Rate
551 Maple Avenue City of Burlington	19-storey, 186 units	Paradigm TIS Report	0.96 spaces per unit
360 Pearl Street City of Burlington	17-storey, 75 units	Paradigm TIS Report	0.90 spaces per unit
1284 Guelph Line City of Burlington	4-storey, 78 units	Paradigm TIS Report	1.06 spaces per unit
LUC 222 Multifamily Housing (High-Rise)	N/A	ITE Parking Generation Manual	0.98 spaces per unit
Proposed Development			**1.0 space per unit**

9.3 Parking Space Dimensional Requirements

It is noted that the site is also proposing parking space sizes (2.6 m x 5.6 m) below the existing City of Burlington By-law requirements. The By-law requirements of municipalities within the GTHA are summarized in **Table 14** below for comparison and benchmarking. It is noted that Burlington currently has the largest parking space requirements of the reviewed municipalities.

Table 14: Parking Space Dimension Review

Municipality	Width (m)	Additional Width (m)	Length (m)
Burlington	3.0	0.3	6.0
Oakville	3.0	0.3	5.7
Hamilton	2.7	None	6.0
Mississauga	2.6	None	5.2
Toronto	2.6	0.3	5.6

It is noted that the width shown above is for spaces within parking garages for municipalities that make a distinction, and that the additional width is for parking spaces is the amount of additional width required for each obstruction adjacent to the parking space.

While the proposed dimensions of the parking spaces do not meet the dimensional requirements within the existing City By-law, they do meet the existing City of Toronto standard, which ensures that the spaces would function adequately. Additionally, the parking space dimensions meet the recommended minimum width and length requirements of 2.6 and 5.5 meters (respectively), for low turnover uses included in The Dimensions of Parking (5th Edition) prepared by the Urban Land Institute and National Parking Association.

Therefore, the reduced size of the spaces can be supported given that the spaces are still expected to function adequately for vehicles parking at the site.

It is noted that parking spaces will be reviewed in detail via a maneuvering assessment as part of future site plan submissions for the site to further support the reduced parking stall sizes.

10.0 Conclusion

The findings and recommendations of our analysis are summarized as the following:

- The intersection of Guelph Line and Palmer Drive currently (2022) operates with a Level of Service "A" during the A.M. and P.M. peak periods with no capacity concerns.
- It is noted that the 95th percentile queues for the westbound left-turn movement at Guelph Line and Palmer currently and continue to exceed the storage length available during the morning peak for the 2027 horizon year. However, the 50th percentile queue is within the available storage and delays are minimal at the intersection; as such, queuing is not expected to be a significant concern at this intersection.
- Under 2027 future background and future total traffic conditions, the intersection of Guelph Line and Palmer Drive is expected to operate with minimal delays and well under capacity.
- The proposed site access is forecasted to operate with a Level of Service "D" or better in the 2027 horizon year.
- The proposed Right-in Right-out access to Guelph Line meets TAC-GDGCR sight distance requirements and would provide sufficient visibility to oncoming vehicles.
- The proposed site access location is slightly deficient of the TAC-GDGCR corner clearance requirements to the adjacent south private driveway, however the spacing meets the Halton Region spacing requirements.
- As sight lines are sufficient at the proposed site access, the location of the site access can be supported from a transportation perspective.
- Transportation Demand Management (TDM) measures, including transit, pedestrian, and cyclist infrastructure, as well as educational and financial incentives are recommended at the site to promote active transportation and transit use as opposed to single-occupant vehicle travel.
- The proposed parking at the development is deficient of 73 spaces per the City of Burlington "amended" parking requirements, and a deficiency of 156 parking spaces per the existing parking requirements.
- A review of relevant parking demand data at existing residential developments in the City of Burlington as well as industry-standard parking data concluded that the proposed parking supply of 1 space per unit is expected to be sufficient to meet the expected combined demand for residents and visitors at the site.
- Additionally, the proposed parking space dimensions do not meet the City's By-Law requirements, however, meets the existing City of Toronto standards, and can be supported on the basis that vehicles are expected to be able to maneuver in and out of the spaces.

In consideration that the proposed residential development does not materially impact the boundary road network, the proposed site access provides sufficient capacity and visibility and the parking supply at the site is expected to meet demand, the proposed development can be supported from a transportation perspective.

We trust that this letter satisfies any transportation related concerns associated with the proposed development. Should you have any questions or require any further information, please do not hesitate to contact the undersigned.

Respectfully submitted,

C.F. CROZIER & ASSOCIATES INC.

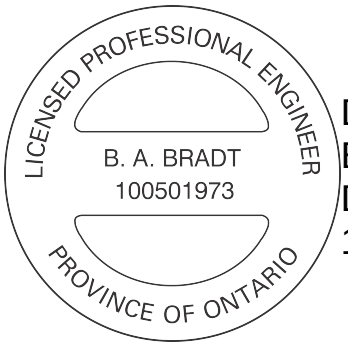
Farah Tasnim Choudhury, EIT
Engineering Intern, Transportation

C.F. CROZIER & ASSOCIATES INC.

Brandon Bradt, M. Eng.CEM, P. Eng
Project Manager, Transportation

FC/

I:\2100\2172- Infinity Development Group\6311- 1396 Guelph Line\Reports\2022.03.09 (2172-6311) 1396 Guelph Line TIS.docx



Digitally signed by Brandon Bradt
Date: 2022.03.11 12:02:12-05'00'

APPENDIX A

Agency Correspondence

Farah Choudhury

From: Farah Choudhury
Sent: Friday, March 4, 2022 1:58 PM
To: 'Kaylan.Edgcumbe@burlington.ca'; 'Adam.Huycke@halton.ca'
Cc: Brandon Bradt; 'trafficdatarequests'
Subject: 1396 Guelph Line TIS Terms of Reference (CFC#2172-6311)
Attachments: 21-027 Guelph Line Burlington - FB Rev.03.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hello,

I hope you have been doing well and staying safe. C.F. Crozier and Consulting Engineers (Crozier) has been retained to prepare a Transportation Impact Study (TIS) for a residential development located at 1396 Guelph Street in the City of Burlington, Halton Region. The Site Plans for the proposed development are attached in this email for your review.

We are kindly requesting that you review the following Terms of Reference (ToR) and provide feedback regarding our scope of work and request for data. Furthermore, should you not be the appropriate person for correspondence, it would be very appreciated to be directed to the appropriate contact.

Study Methodology for the Transportation Impact Study

We will be conducting this study using the guidelines set out in the Halton Region Transportation Impact Study Guidelines (January 2015).

The following intersection is proposed to be analyzed as part of the scope of study:

- Guelph Line at Palmer Road

We have access to counts at this intersection dated October 31, 2019. Please confirm whether use of these counts would be acceptable. Alternatively, we may consult specialty traffic counting firms we typically work with, in the event recent counts are not available to collect new data. Please confirm which data collection method is preferable.

We also kindly request signal timing plans at the above noted intersection.

Additionally, please confirm that the above noted intersection is sufficient for the analysis. In the event that analysis of additional intersections is required, please also include the most recent traffic counts and signal timing plans available at these intersection(s) or advise whether we should collect new data at these intersections as well.

Analysis Periods and Scenarios

The weekday A.M. and P.M. peak hours for the 2022 existing conditions, as well as a 5-year horizon year (2027) will be considered for future background and total traffic conditions, per the Region's TIS guidelines.

Background Developments

Please provide any background developments in the vicinity of the proposed development and the associated transportation impact studies that should be included in our analysis.

Future Background Growth Rate

An industry standard growth rate of 2.0% per annum will be applied to through movements along Guelph Line to account for background growth in the area.

Please advise whether the assumed growth rate is sufficient, or alternatively please provide an appropriate growth rate(s) to reflect expected growth along Guelph Line.

Trip Generation and Distribution

Trip Generation for the proposed development will be based on the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition, using Land Use Code 221 "Multifamily Housing (High Rise)".

The development is expected to generate 74 two-way trips (25 inbound and 49 outbound) during the A.M. peak hour and 89 two-way trips (50 inbound, 39 outbound) during the P.M. peak hour.

The site-generated trips will be distributed to the boundary road network using 2016 Transportation Tomorrow Survey (TTS) data.

Roadway and Transit Improvements

Please advise as to whether there are any roadway and transit improvements planned within the vicinity of the proposed redevelopment. We note that Guelph Line is anticipated to eventually be widened but are not proposing to include it within our analysis given the horizon years of analysis.

Analysis Procedures

Weekday A.M. and P.M. peak hours will be analyzed using Synchro 11.0 analysis software, using Highway Capacity Manual (HCM) 2000 procedures.

Site Access Review

The location of the site access will be reviewed using Halton Region's Access Management Guidelines, and sight distance from the proposed access to Guelph Line will be analyzed using the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads. It is noted that a single right-in right-out access is proposed to service the site via Guelph Line.

Transportation Demand Management (TDM) Opportunities

Analysis of existing and future Transportation Demand Management (TDM) opportunities will be conducted to reduce single-occupant vehicle (SOV) trips and promote alternative modes of transportation including transit and active transportation.

We request the following information for inclusion in the study, along with any comments that arise with regards to the above Terms of Reference.

- Please confirm the study intersections and data collection method.
- Please provide STPs for the study intersection(s).
- Please confirm the relevant growth rate(s) applicable to the roadways of study.
- Please provide any relevant background developments and the associated traffic impact studies that are to be included our analysis.
- Please provide details of any planned roadway or transit improvements in the surrounding study area within the horizon years including the widening of Guelph Line, if applicable.

I hope the contents outlined in this email are acceptable. Should you have any questions or require any further information, please feel free to call or email me.

Kind regards,

Farah Choudhury

APPENDIX B

Site Plan



Infinity Development Group

1396 Guelph Line
Burlington, Ontario

21-027

March 08, 2022

zedd
ARCHITECTURE

ARCHITECTURE | DESIGN | PLANNING
zedd architecture inc Z-627 maitland street london ontario N5Y 2V7 519 518 9333 www.zeddarchitecture.com info@zeddarchitecture.com



PROJECT STATISTICS

PROJECT#: 21-027
MARCH 04 2022

1396 GUELPH LINE
BURLINGTON

SITE

	Acre	Hectare	ft²	m²
TOTAL SITE AREA	**1.03**	**0.4168**	**44,867**	**4,168**

LOT COVERAGE (%)	33% (1,392 m²)
BUILDING HEIGHT (m)	42.37 (11 STOREYS)
VEHICLE PARKING	236 (1.00 PER UNIT)
BICYCLE PARKING	85 (0.36 PER UNIT)
DENSITY (UNITS PER HECTARE)	566
FLOOR SPACE RATIO (m²) (ABOVE GRADE GFA / SITE AREA)	4.02
OUTDOOR AMENITY	1,807 m² (7.66 m² PER UNIT)
INDOOR AMENITY	446 m² (1.89 m² PER UNIT)

BUILDING

FLOOR AREAS (m²)		**BELOW GRADE**	**ABOVE GRADE**
P.03		3,326	0
P.02		3,326	0
P.01		3,326	0
LV.01		0	1,392
LV.02-LV.06 (x5)		0	1,679 (8,395)
LV.07-.LV.10 (x4)		0	1,450 (5,800)
LV.11		0	1,160
TOTAL GFA	**26,725**	**9,978**	**16,747**

UNITS	**TOTAL**	**3 BED**	**2 BED**	**1 BED**	**BACHELOR**
LV.01	5	0	0	5 (100%)	0
LV.02-LV.06 (x5)	26 (130)	0	5 (25) (19%)	20 (100) (77%)	1 (5) (4%)
LV.07-.LV.10 (x4)	21 (84)	0	6 (24) (28%)	13 (52) (62%)	2 (8) (10%)
LV.11	17	0	7 (41%)	10 (59%)	0
TOTAL UNITS	**236**	**0**	**56 (24%)**	**167 (70%)**	**13 (6%)**

AMENITY (m²)		**BALCONIES & TERRACES**	**INTERIOR SPACE**
LV.01		60	446
LV.02-LV.06 (x5)		218 (1,090)	0
LV.07		393	0
LV.08-LV.10 (x3)		114 (342)	0
LV.11		315	0
TOTAL AMENITY	**2,253**	**1,807**	**446**

PARKING		**BICYCLE**	**BARRIER-FREE** (2.75m x 5.6m)	**STANDARD** (2.6m x 5.6m)
P.01		80	4	88
P.02		0	4	90
P.03		0	1	41
LV.01		5	0	8
TOTAL PARKING	**236V / 85B**	**85**	**(4%) 9**	**227**

NOTE:
- GROSS FLOOR AREA INCLUDES ALL BELOW AND ABOVE GRADE SPACES WITHIN EXTERIOR WALLS AND IS CALCULATED TO THE EXTERIOR FACE OF EXTERIOR WALL.
- ROOM CALCULATIONS ARE MADE TO INTERIOR FACE OF DEMISING, CORRIDOR AND EXTERIOR WALLS.
- AMENITY AREAS ARE CALCULATED TO CENTERLINE OF DEMISING WALLS, EXTERIOR FACE OF CORRIDOR AND EXTERIOR WALLS.

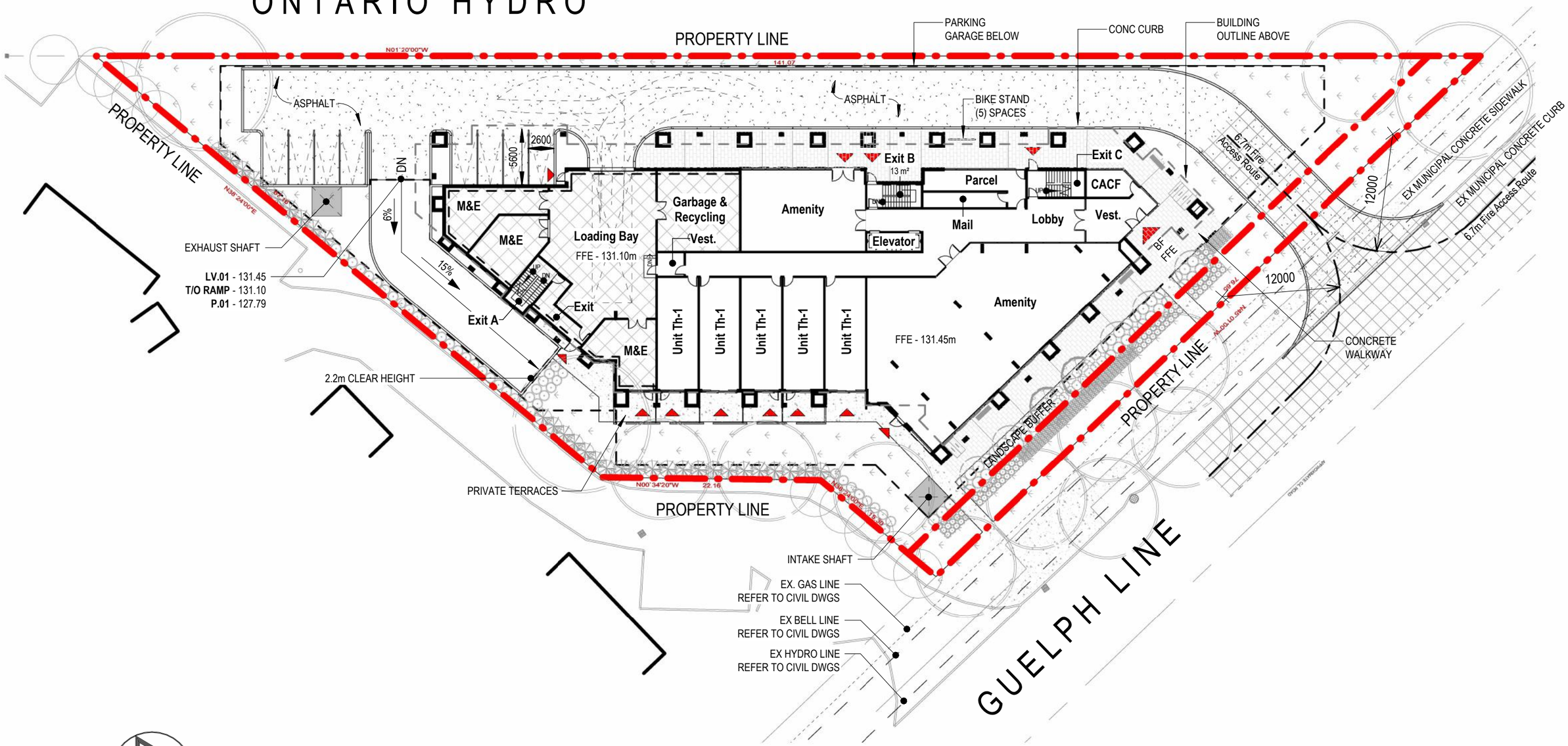
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Scale : 1 : 20

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Scale : 1 : 400

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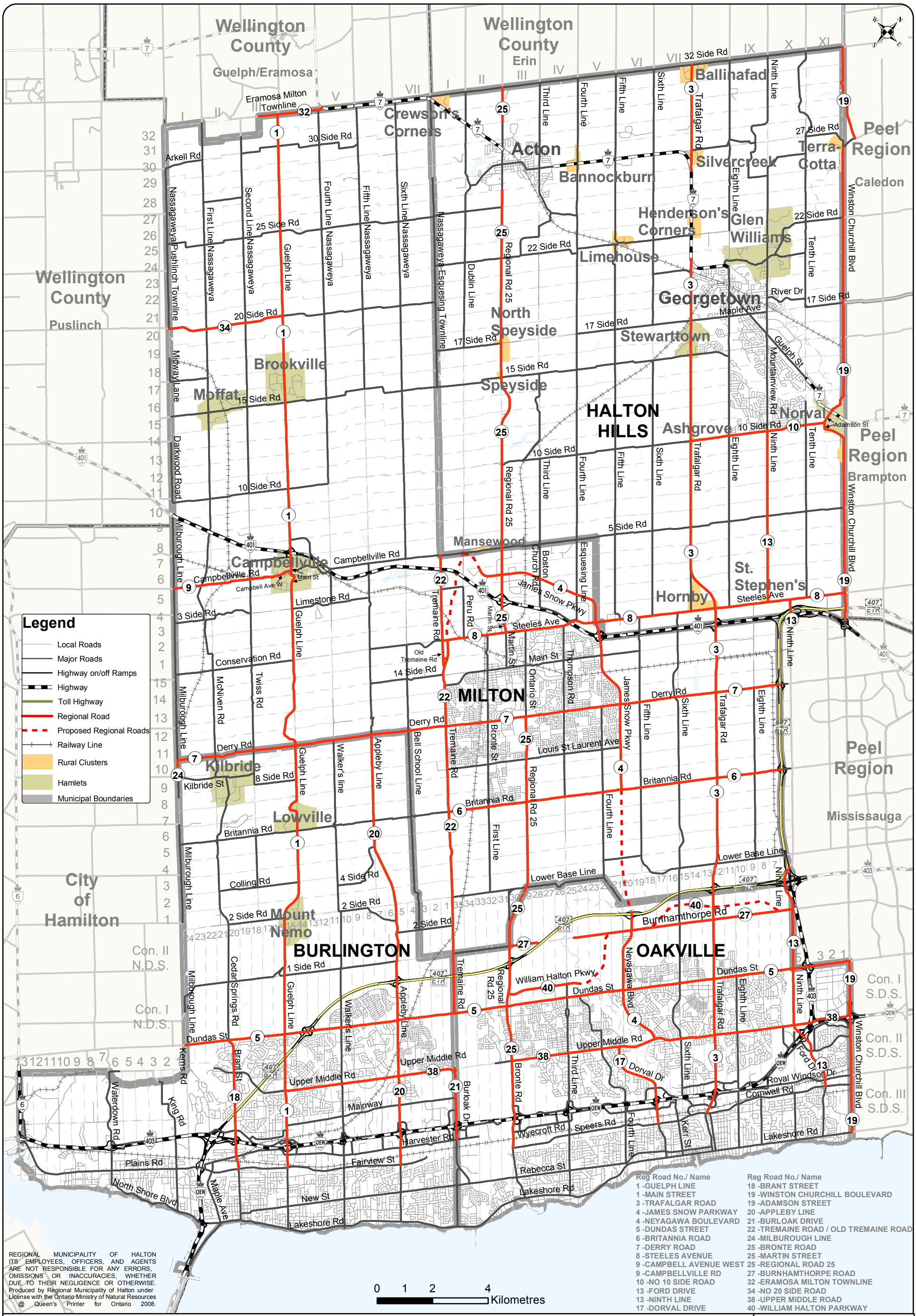
21-027	Infinity Development Group	1396 Guelph Line Burlington, Ontario	Proposed Site	March 08, 2022	SD1.2

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APPENDIX C

Official Plan Excerpts



Reg Road No./ Name	Reg Road No./ Name
1 -GUELPH LINE	18 -BRANT STREET
1 -MAIN STREET	19 -WINSTON CHURCHILL BOULEVARD
3 -TRAFALGAR ROAD	19 -ADAMSON STREET
4 -JAMES SNOW PARKWAY	20 -APPLEBY LINE
4 -NEYAGAWA BOULEVARD	21 -BURLOAK DRIVE
5 -DUNDAS STREET	22 -TREMAINE ROAD / OLD TREMAINE ROAD
6 -BRITANNIA ROAD	24 -MILBUROUGH LINE
7 -DERRY ROAD	25 -BRONTE ROAD
8 -STEELES AVENUE	25 -MARTIN STREET
9 -CAMPBELL AVENUE WEST	25 -REGIONAL ROAD 25
9 -CAMPBELLVILLE RD	27 -BURNHAMTHORPE ROAD
10 -NO 10 SIDE ROAD	32 -ERAMOSA MILTON TOWNLINE
13 -FORD DRIVE	34 -NO 20 SIDE ROAD
13 -NINTH LINE	38 -UPPER MIDDLE ROAD
17 -DORVAL DRIVE	40 -WILLIAM HALTON PARKWAY

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Regional Road Network

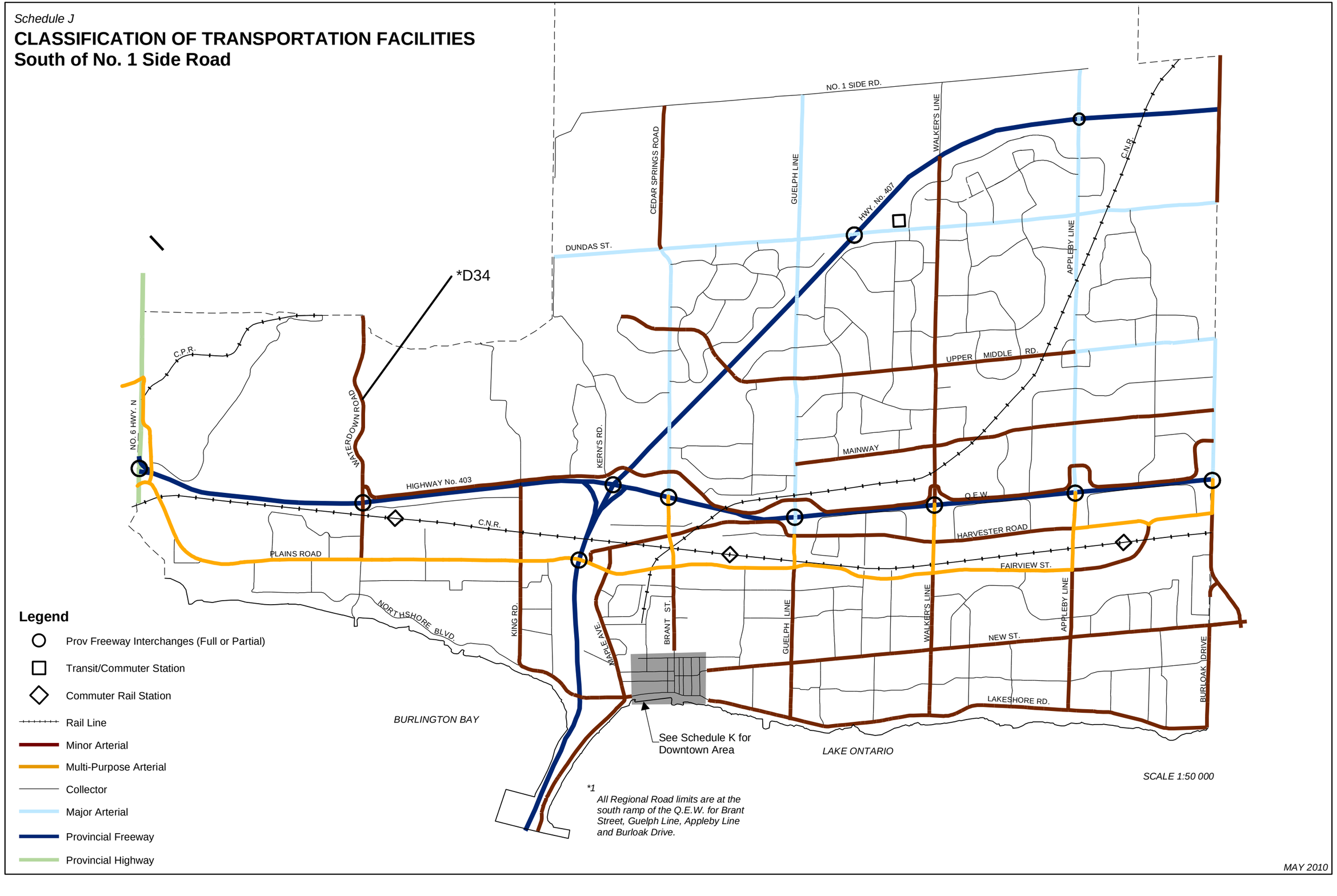
Halton Region
Public Works

June 2017

RegionalRoads_NetworkMapNew060117.mxd

Schedule J

CLASSIFICATION OF TRANSPORTATION FACILITIES
South of No. 1 Side Road



Legend

- Prov Freeway Interchanges (Full or Partial)
- Transit/Commuter Station
- Commuter Rail Station
- Rail Line
- Minor Arterial
- Multi-Purpose Arterial
- Collector
- Major Arterial
- Provincial Freeway
- Provincial Highway

*1 *All Regional Road limits are at the south ramp of the Q.E.W. for Brant Street, Guelph Line, Appleby Line and Burloak Drive.*

MAY 2010

APPENDIX D

Level of Service Definitions

Level of Service Definitions

Two-Way Stop Controlled Intersections

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

Adapted from Highway Capacity Manual 2000, Transportation Research Board

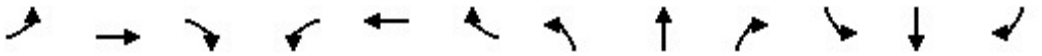
Signalized Intersections

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

Adapted from Highway Capacity Manual 2000, Transportation Research Board

APPENDIX E

2022 Existing Synchro Reports



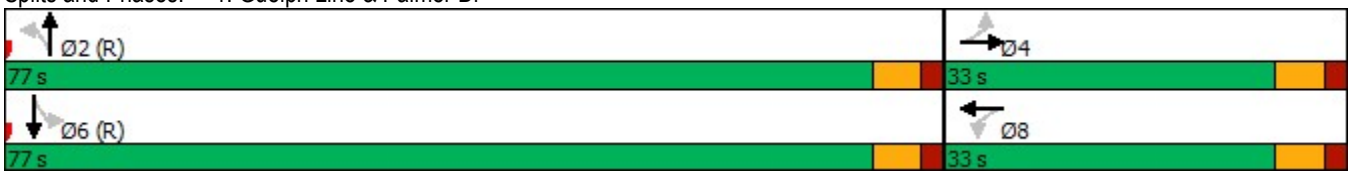
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	1	8	89	0	49	5	902	36	30	1606	5
Future Volume (vph)	6	1	8	89	0	49	5	902	36	30	1606	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	30.0		0.0	45.0		0.0	45.0		0.0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (m)	0.0			40.0			5.0			5.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.928			0.850			0.994				
Flt Protected		0.980		0.950			0.950			0.950		
Satd. Flow (prot)	0	1747	0	1825	1585	0	1825	3519	0	1825	3579	0
Flt Permitted		0.887		0.748			0.121			0.287		
Satd. Flow (perm)	0	1581	0	1437	1585	0	232	3519	0	551	3579	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			168			7			1	
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		92.2			90.2			177.0			246.8	
Travel Time (s)		8.3			8.1			10.6			14.8	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	0%	0%	2%	3%	0%	3%	6%	0%	2%	0%
Adj. Flow (vph)	6	1	8	91	0	50	5	920	37	31	1639	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	15	0	91	50	0	5	957	0	31	1644	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		5.0	5.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		45.5	45.5		45.5	45.5	
Total Split (s)	33.0	33.0		33.0	33.0		77.0	77.0		77.0	77.0	
Total Split (%)	30.0%	30.0%		30.0%	30.0%		70.0%	70.0%		70.0%	70.0%	
Maximum Green (s)	27.0	27.0		27.0	27.0		71.0	71.0		71.0	71.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	12.0	12.0		12.0	12.0		30.0	30.0		30.0	30.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		8.0	8.0		8.0	8.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		14.0		14.2	14.2		88.0	88.0		88.0	88.0	
Actuated g/C Ratio		0.13		0.13	0.13		0.80	0.80		0.80	0.80	
v/c Ratio		0.07		0.49	0.14		0.03	0.34		0.07	0.57	
Control Delay		27.9		52.8	0.9		4.6	4.6		4.6	6.7	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		27.9		52.8	0.9		4.6	4.6		4.6	6.7	
LOS		C		D	A		A	A		A	A	
Approach Delay		27.9			34.4			4.6			6.6	
Approach LOS		C			C			A			A	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.57
Intersection Signal Delay: 7.4 Intersection LOS: A
Intersection Capacity Utilization 65.1% ICU Level of Service C
Analysis Period (min) 15

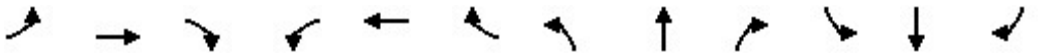
Splits and Phases: 1: Guelph Line & Palmer Dr





Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	15	91	50	5	957	31	1644
v/c Ratio	0.07	0.49	0.14	0.03	0.34	0.07	0.57
Control Delay	27.9	52.8	0.9	4.6	4.6	4.6	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.9	52.8	0.9	4.6	4.6	4.6	6.7
Queue Length 50th (m)	1.3	18.4	0.0	0.2	29.3	1.4	68.3
Queue Length 95th (m)	7.0	32.9	0.0	1.4	46.0	4.7	104.5
Internal Link Dist (m)	68.2		66.2		153.0		222.8
Turn Bay Length (m)		30.0		45.0		45.0	
Base Capacity (vph)	394	352	515	185	2817	441	2864
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.26	0.10	0.03	0.34	0.07	0.57

Intersection Summary

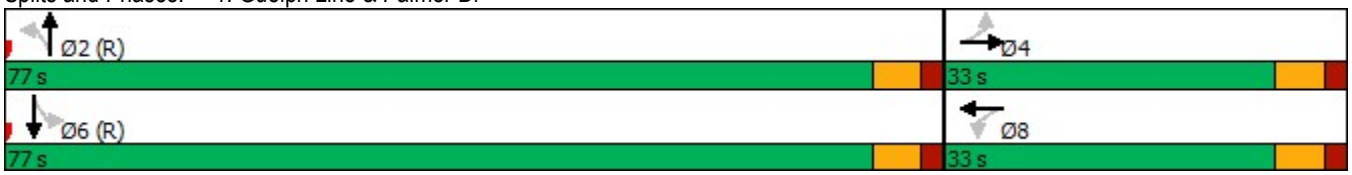


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	4	54	1	37	3	1067	48	15	1121	5
Future Volume (vph)	5	0	4	54	1	37	3	1067	48	15	1121	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	30.0		0.0	45.0		0.0	45.0		0.0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (m)	0.0			40.0			5.0			5.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.940			0.854			0.993			0.999	
Flt Protected		0.973		0.950			0.950			0.950		
Satd. Flow (prot)	0	1757	0	1825	1594	0	1825	3557	0	1706	3541	0
Flt Permitted		0.840		0.752			0.216			0.219		
Satd. Flow (perm)	0	1517	0	1445	1594	0	415	3557	0	393	3541	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			40			8			1	
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		92.2			90.2			177.0			246.8	
Travel Time (s)		8.3			8.1			10.6			14.8	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	2%	0%	0%	0%	3%	0%	2%	0%	7%	3%	0%
Adj. Flow (vph)	5	0	4	58	1	40	3	1147	52	16	1205	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	58	41	0	3	1199	0	16	1210	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		5.0	5.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		45.5	45.5		45.5	45.5	
Total Split (s)	33.0	33.0		33.0	33.0		77.0	77.0		77.0	77.0	
Total Split (%)	30.0%	30.0%		30.0%	30.0%		70.0%	70.0%		70.0%	70.0%	
Maximum Green (s)	27.0	27.0		27.0	27.0		71.0	71.0		71.0	71.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	12.0	12.0		12.0	12.0		30.0	30.0		30.0	30.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		8.0	8.0		8.0	8.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		11.8		11.7	11.7		90.2	90.2		90.2	90.2	
Actuated g/C Ratio		0.11		0.11	0.11		0.82	0.82		0.82	0.82	
v/c Ratio		0.05		0.38	0.20		0.01	0.41		0.05	0.42	
Control Delay		1.1		51.8	15.9		3.3	4.2		3.7	4.3	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		1.1		51.8	15.9		3.3	4.2		3.7	4.3	
LOS		A		D	B		A	A		A	A	
Approach Delay		1.1			37.0			4.2			4.3	
Approach LOS		A			D			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.42			
Intersection Signal Delay: 5.5		Intersection LOS: A	
Intersection Capacity Utilization 47.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Guelph Line & Palmer Dr





Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	9	58	41	3	1199	16	1210
v/c Ratio	0.05	0.38	0.20	0.01	0.41	0.05	0.42
Control Delay	1.1	51.8	15.9	3.3	4.2	3.7	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.1	51.8	15.9	3.3	4.2	3.7	4.3
Queue Length 50th (m)	0.0	11.8	0.2	0.1	35.3	0.6	36.2
Queue Length 95th (m)	0.6	23.7	9.8	0.8	53.8	2.6	55.0
Internal Link Dist (m)	68.2		66.2		153.0		222.8
Turn Bay Length (m)		30.0		45.0		45.0	
Base Capacity (vph)	394	354	421	340	2919	322	2904
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.16	0.10	0.01	0.41	0.05	0.42

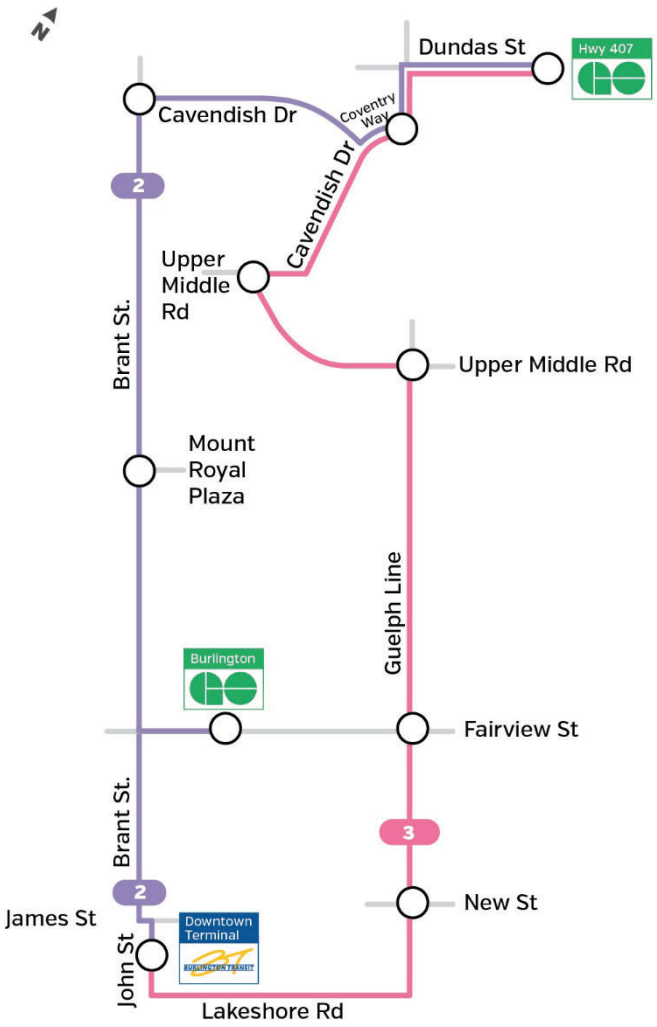
Intersection Summary

APPENDIX F

Transit Maps and Schedules

Route 2/3 Brant/ Guelph-Downtown

Temporary COVID - Jan. 9, 2022



Burlingontransit.ca
905-639-0550
contactbt@burlington.ca
#BurlONTransit

BURLINGTON TRANSIT

2 Brant

Weekdays to Cavendish / GO 407 Carpool

Downtown Terminal (John St.)	Burlington GO Station	Brant St. & Mount Forest Dr.	Cavendish Dr. & Brant St.	Coventry Way & Guelph Line	GO 407 Carpool
5:19	5:27	5:32	5:38	5:42	5:47
5:49	5:57	6:02	6:08	6:12	6:17
6:19	6:27	6:32	6:38	6:42	6:47
And every 30 minutes until					
8:19	**8:27**	**8:32**	**8:38**	**8:42**	**8:47**
8:49	**8:57**	**9:02**	**9:08**	**9:12**	**9:17**
9:19	**9:27**	**9:32**	**9:38**	**9:42**	**9:47**
9:49	**9:57**	**10:02**	**10:08**	**10:12**	**10:17**

2 Brant

Weekdays to Downtown Burlington

GO 407 Carpool	Coventry Way & Guelph Line	Cavendish Dr. & Brant St.	Brant St. & Mount Forest Dr.	Burlington GO Station	Downtown Terminal (John St.)
5:04	5:10	5:14	5:20	5:27	5:33
5:34	5:40	5:44	5:50	5:57	6:03
6:04	6:10	6:14	6:20	6:27	6:33
And every 30 minutes until					
7:04	**7:10**	**7:14**	**7:20**	**7:27**	**7:33**
7:34	**7:40**	**7:44**	**7:50**	**7:57**	**8:03**
8:04	**8:10**	**8:14**	**8:20**	**8:27**	**8:33**
8:34	**8:40**	**8:44**	**8:50**	**8:57**	**9:03**
9:04	**9:10**	**9:14**	**9:20**	**9:27**	**9:33**
9:34	**9:40**	**9:44**	**9:50**	**9:57**	**10:03**
10:04	**10:10**	**10:14**	**10:20**	**10:27**	**10:33**
10:34	**10:40**	**10:44**	**10:50**	**10:55**	

3 Guelph

Weekdays to Cavendish / GO 407 Carpool

Downtown Terminal (John St.)	Guelph Line & New St.	Guelph Line & Fairview St.	Upper Middle Rd. & Guelph Line	Upper Middle Rd. & Cavendish Dr.	Guelph Line & Coventry Way	GO 407 Carpool
5:34	5:39	5:43	5:49	5:51	5:56	6:01
6:04	6:09	6:13	6:19	6:21	6:26	6:31
6:34	6:39	6:43	6:49	6:51	6:56	7:01
And every 30 minutes until						
7:34	**7:39**	**7:43**	**7:49**	**7:51**	**7:56**	**8:01**
8:04	**8:09**	**8:13**	**8:19**	**8:21**	**8:26**	**8:31**
8:34	**8:39**	**8:43**	**8:49**	**8:51**	**8:56**	**9:01**
9:04	**9:09**	**9:13**	**9:19**	**9:21**	**9:26**	**9:31**
9:34	**9:39**	**9:43**	**9:49**	**9:51**	**9:56**	**10:01**
10:04	**10:09**	**10:13**	**10:19**	**10:21**	**10:26**	**10:31**

3 Guelph

Weekdays to Downtown Burlington

GO 407 Carpool	Guelph Line & Coventry Way	Upper Middle Rd. & Cavendish Dr.	Upper Middle Rd. & Guelph Line	Guelph Line & Fairview St.	Guelph Line & New St.	Downtown Terminal (John St.)
5:49	5:54	5:59	6:01	6:07	6:11	6:16
6:19	6:24	6:29	6:31	6:37	6:41	6:46
6:49	6:54	6:59	7:01	7:07	7:11	7:16
And every 30 minutes until						
7:49	**7:54**	**7:59**	**8:01**	**8:07**	**8:11**	**8:16**
8:19	**8:24**	**8:29**	**8:31**	**8:37**	**8:41**	**8:46**
8:49	**8:54**	**8:59**	**9:01**	**9:07**	**9:11**	**9:16**
9:19	**9:24**	**9:29**	**9:31**	**9:37**	**9:41**	**9:46**
9:49	**9:54**	**9:59**	**10:01**	**10:07**	**10:11**	**10:16**
10:19	**10:24**	**10:29**	**10:31**	**10:37**	**10:41**	**10:46**

2 Brant

Weekends to GO 407 Carpool

Downtown Terminal (John St.)	Burlington GO Station	Brant St. & Mount Forest Dr.	Cavendish Dr. & Brant St.	Coventry Way & Guelph Line	GO 407 Carpool
Saturday					
6:19	6:27	6:32	6:38	6:42	6:49
7:19	7:27	7:32	7:38	7:42	7:49
8:19	8:27	8:32	8:38	8:42	8:49
9:19	9:27	9:32	9:38	9:42	9:49
9:49	9:57	10:02	10:08	10:12	10:19
10:19	10:27	10:32	10:38	10:42	10:49
10:49	10:57	11:02	11:08	11:12	11:19
11:19	11:27	11:32	11:38	11:42	11:49
11:49	11:57	**12:02**	**12:08**	**12:12**	**12:19**
And every 30 minutes until					
7:19	**7:27**	**7:32**	**7:38**	**7:42**	**7:49**
7:49	**7:57**	**8:02**	**8:08**	**8:12**	**8:19**
8:19	**8:27**	**8:32**	**8:38**	**8:42**	**8:49**
8:49	**8:57**	**9:02**	**9:08**	**9:12**	**9:19**
9:19	**9:27**	**9:32**	**9:38**	**9:42**	**9:49**
9:49	**9:57**	**10:02**	**10:08**	**10:12**	**10:19**
Sunday / Holidays					
7:49	7:57	8:02	8:08	8:12	8:19
8:49	8:57	9:02	9:08	9:12	9:19
9:49	9:57	10:02	10:08	10:12	10:19
10:19	10:27	10:32	10:38	10:42	10:49
10:49	10:57	11:02	11:08	11:12	11:19
11:19	11:27	11:32	11:38	11:42	11:49
11:49	11:57	**12:02**	**12:08**	**12:12**	**12:19**
And every 30 minutes until					
6:19	**6:27**	**6:32**	**6:38**	**6:42**	**6:49**
6:49	**6:57**	**7:02**	**7:08**	**7:12**	**7:19**
7:19	**7:27**	**7:32**	**7:38**	**7:42**	**7:49**
7:49	**7:57**	**8:02**	**8:08**	**8:12**	**8:19**
8:19	**8:27**	**8:32**	**8:38**	**8:42**	**8:49**

2 Brant

Weekends to Burlington GO

GO 407 Carpool	Coventry Way & Guelph Line	Cavendish Dr. & Brant St.	Brant St. & Mount Forest Dr.	Burlington GO Station	Downtown Terminal (John St.)
Saturday					
6:34	6:41	6:45	6:51	6:57	7:04
7:34	7:41	7:45	7:51	7:57	8:04
8:34	8:41	8:45	8:51	8:57	9:04
9:04	9:11	9:15	9:21	9:27	9:34
9:34	9:41	9:45	9:51	9:57	10:04
10:04	10:11	10:15	10:21	10:27	10:34
10:34	10:41	10:45	10:51	10:57	11:04
11:04	11:11	11:15	11:21	11:27	11:34
11:34	11:41	11:45	11:51	11:57	**12:04**
And every 30 minutes until					
8:34	**8:41**	**8:45**	**8:51**	**8:57**	**9:04**
9:04	**9:11**	**9:15**	**9:21**	**9:27**	**9:34**
9:34	**9:41**	**9:45**	**9:51**	**9:57**	**10:04**
10:04	**10:11**	**10:15**	**10:21**	**10:27**	**10:34**
10:34	**10:41**	**10:45**	**10:51**	**10:56**	
Sunday / Holidays					
7:34	7:41	7:45	7:51	7:57	8:04
8:34	8:41	8:45	8:51	8:57	9:04
9:04	9:11	9:15	9:21	9:27	9:34
9:34	9:41	9:45	9:51	9:57	10:04
10:04	10:11	10:15	10:21	10:27	10:34
10:34	10:41	10:45	10:51	10:57	11:04
11:04	11:11	11:15	11:21	11:27	11:34
11:34	11:41	11:45	11:51	11:57	**12:04**
And every 30 minutes until					
6:04	**6:11**	**6:15**	**6:21**	**6:27**	**6:34**
6:34	**6:41**	**6:45**	**6:51**	**6:57**	**7:04**
7:04	**7:11**	**7:15**	**7:21**	**7:27**	**7:34**
7:34	**7:41**	**7:45**	**7:51**	**7:57**	**8:04**
8:04	**8:11**	**8:15**	**8:21**	**8:27**	**8:34**

3 Guelph

Weekends to Downtown

GO 407 Carpool	Guelph Line & Coventry Way	Upper Middle Rd. & Cavendish Dr.	Upper Middle Rd. & Guelph Line	Guelph Line & Fairview St.	Guelph Line & New St.	Downtown Terminal (John St.)
Saturday						
5:49	5:56	6:01	6:03	6:09	6:13	6:18
6:49	6:56	7:01	7:03	7:09	7:13	7:18
7:49	7:56	8:01	8:03	8:09	8:13	8:18
8:49	8:56	9:01	9:03	9:09	9:13	9:18
9:49	9:56	10:01	10:03	10:09	10:13	10:18
10:19	10:26	10:31	10:33	10:39	10:43	10:48
10:49	10:56	11:01	11:03	11:09	11:13	11:18
11:19	11:26	11:31	11:33	11:39	11:43	11:48
11:49	11:56	**12:01**	**12:03**	**12:09**	**12:13**	**12:18**
And every 30 minutes until						
8:19	**8:26**	**8:31**	**8:33**	**8:39**	**8:43**	**8:48**
8:49	**8:56**	**9:01**	**9:03**	**9:09**	**9:13**	**9:18**
9:19	**9:26**	**9:31**	**9:33**	**9:39**	**9:43**	**9:48**
9:49	**9:56**	**10:01**	**10:03**	**10:09**	**10:13**	**10:18**
10:19	**10:26**	**10:31**	**10:33**	**10:39**	**10:43**	**10:48**
Sunday / Holidays						
7:19	7:26	7:31	7:33	7:39	7:43	7:48
8:19	8:26	8:31	8:33	8:39	8:43	8:48
9:19	9:26	9:31	9:33	9:39	9:43	9:48
9:49	9:56	10:01	10:03	10:09	10:13	10:18
10:19	10:26	10:31	10:33	10:39	10:43	10:48
10:49	10:56	11:01	11:03	11:09	11:13	11:18
And every 30 minutes until						
6:19	**6:26**	**6:31**	**6:33**	**6:39**	**6:43**	**6:48**
6:49	**6:56**	**7:01**	**7:03**	**7:09**	**7:13**	**7:18**
7:19	**7:26**	**7:31**	**7:33**	**7:39**	**7:43**	**7:48**
7:49	**7:56**	**8:01**	**8:03**	**8:09**	**8:13**	**8:18**

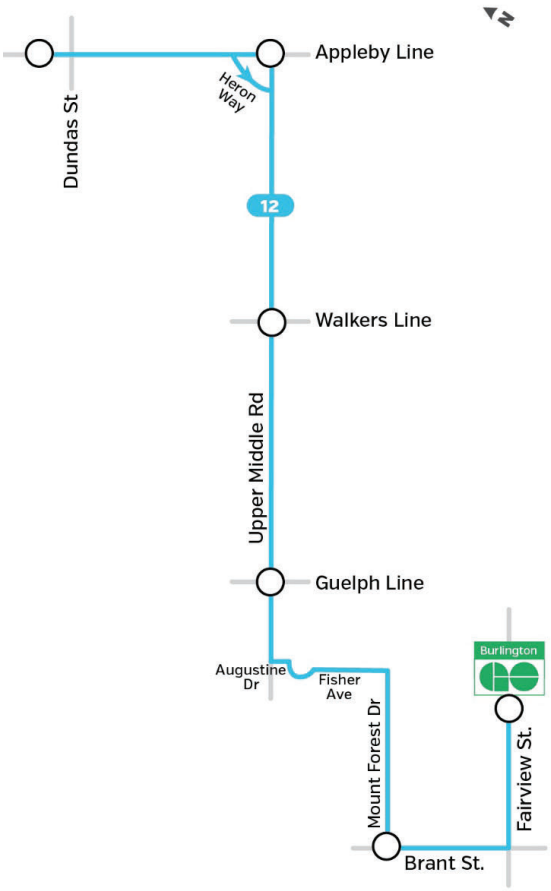
3 Guelph

Weekends to GO 407 Carpool

Downtown Terminal (John St.)	Guelph Line & New St.	Guelph Line & Fairview St.	Upper Middle Rd. & Guelph Line	Upper Middle Rd. & Cavendish Dr.	Guelph Line & Coventry Way	GO 407 Carpool
Saturday						
7:04	7:09	7:13	7:19	7:21	7:26	7:33
8:04	8:09	8:13	8:19	8:21	8:26	8:33
9:04	9:09	9:13	9:19	9:21	9:26	9:33
9:34	9:39	9:43	9:49	9:51	9:56	10:03
10:04	10:09	10:13	10:19	10:21	10:26	10:33
10:34	10:39	10:43	10:49	10:51	10:56	11:03
11:04	11:09	11:13	11:19	11:21	11:26	11:33
11:34	11:39	11:43	11:49	11:51	11:56	**12:03**
12:04	**12:09**	**12:13**	**12:19**	**12:21**	**12:26**	**12:33**
And every 30 minutes until						
8:04	**8:09**	**8:13**	**8:19**	**8:21**	**8:26**	**8:33**
8:34	**8:39**	**8:43**	**8:49**	**8:51**	**8:56**	**9:03**
9:04	**9:09**	**9:13**	**9:19**	**9:21**	**9:26**	**9:33**
9:34	**9:39**	**9:43**	**9:49**	**9:51**	**9:56**	**10:03**
10:04	**10:09**	**10:13**	**10:19**	**10:21**	**10:26**	**10:33**
Sunday / Holidays						
8:04	8:09	8:13	8:19	8:21	8:26	8:33
9:04	9:09	9:13	9:19	9:21	9:26	9:33
9:34	9:39	9:43	9:49	9:51	9:56	10:03
10:04	10:09	10:13	10:19	10:21	10:26	10:33
10:34	10:39	10:43	10:49	10:51	10:56	11:03
11:04	11:09	11:13	11:19	11:21	11:26	11:33
11:34	11:39	11:43	11:49	11:51	11:56	**12:03**
12:04	**12:09**	**12:13**	**12:19**	**12:21**	**12:26**	**12:33**
And every 30 minutes until						
7:04	**7:09**	**7:13**	**7:19**	**7:21**	**7:26**	**7:33**
7:34	**7:39**	**7:43**	**7:49**	**7:51**	**7:56**	**8:03**
8:04	**8:09**	**8:13**	**8:19**	**8:21**	**8:26**	**8:33**
8:34	**8:39**	**8:43**	**8:49**	**8:51**	**8:56**	**9:03**

Route 12 Upper Middle

Temporary COVID - Jan. 9, 2022



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#BurlONTransit

BURLINGTON TRANSIT

12 Upper Middle

Weekdays to Dundas

Burlington GO Station	Brant St. & Mount Forest Dr.	Upper Middle Rd. & Guelph Line	Upper Middle Rd. & Walkers Line	Upper Middle Rd. & Appleby Line	Burlington North SmartCentre
5:50	5:56	6:01	6:05	6:10	6:16
6:20	6:26	6:31	6:35	6:40	6:46
6:50	6:56	7:01	7:05	7:10	7:16
7:20	7:26	7:31	7:35	7:40	7:46
7:50	7:56	8:01	8:05	8:10	8:16
8:20	8:26	8:31	8:35	8:40	8:46
8:50	8:56	9:01	9:05	9:10	9:16
9:20	9:26	9:31	9:35	9:40	9:46
9:50	9:56	10:01	10:05	10:10	10:16
10:20	10:26	10:31	10:35	10:40	10:46
10:50	10:56	11:01	11:05	11:10	11:16
11:20	11:26	11:31	11:35	11:40	11:46
11:50	11:56	**12:01**	**12:05**	**12:10**	**12:16**
12:20	**12:26**	**12:31**	**12:35**	**12:40**	**12:46**
12:50	**12:56**	**1:01**	**1:05**	**1:10**	**1:16**
1:20	**1:26**	**1:31**	**1:35**	**1:40**	**1:46**
1:50	**1:56**	**2:01**	**2:05**	**2:10**	**2:16**
2:20	**2:26**	**2:31**	**2:35**	**2:40**	**2:46**
2:50	**2:56**	**3:01**	**3:05**	**3:10**	**3:16**
3:20	**3:26**	**3:31**	**3:35**	**3:40**	**3:46**
3:50	**3:56**	**4:01**	**4:05**	**4:10**	**4:16**
4:20	**4:26**	**4:31**	**4:35**	**4:40**	**4:46**
4:50	**4:56**	**5:01**	**5:05**	**5:10**	**5:16**
5:20	**5:26**	**5:31**	**5:35**	**5:40**	**5:46**
5:50	**5:56**	**6:01**	**6:05**	**6:10**	**6:16**
6:20	**6:26**	**6:31**	**6:35**	**6:40**	**6:46**
6:50	**6:56**	**7:01**	**7:05**	**7:10**	**7:16**
7:50	**7:56**	**8:01**	**8:05**	**8:10**	**8:16**
8:50	**8:56**	**9:01**	**9:05**	**9:10**	**9:16**
9:50	**9:56**	**10:01**	**10:05**	**10:10**	**10:16**

12 Upper Middle

Weekdays to Burlington GO

Burlington North SmartCentre	Upper Middle Rd. & Appleby Line	Upper Middle Rd. & Walkers Line	Upper Middle Rd. & Guelph Line	Brant St. & Mount Forest Dr.	Burlington GO Station
5:17	5:23	5:26	5:31	5:39	5:47
6:17	6:23	6:26	6:31	6:39	6:47
6:47	6:53	6:56	7:01	7:09	7:17
7:17	7:23	7:26	7:31	7:39	7:47
7:47	7:53	7:56	8:01	8:09	8:17
8:17	8:23	8:26	8:31	8:39	8:47
8:47	8:53	8:56	9:01	9:09	9:17
9:17	9:23	9:26	9:31	9:39	9:47
9:47	9:53	9:56	10:01	10:09	10:17
10:17	10:23	10:26	10:31	10:39	10:47
10:47	10:53	10:56	11:01	11:09	11:17
11:17	11:23	11:26	11:31	11:39	11:47
11:47	11:53	11:56	**12:01**	**12:09**	**12:17**
12:17	**12:23**	**12:26**	**12:31**	**12:39**	**12:47**
12:47	**12:53**	**12:56**	**1:01**	**1:09**	**1:17**
1:17	**1:23**	**1:26**	**1:31**	**1:39**	**1:47**
1:47	**1:53**	**1:56**	**2:01**	**2:09**	**2:17**
2:17	**2:23**	**2:26**	**2:31**	**2:39**	**2:47**
2:47	**2:53**	**2:56**	**3:01**	**3:09**	**3:17**
3:17	**3:23**	**3:26**	**3:31**	**3:39**	**3:47**
3:47	**3:53**	**3:56**	**4:01**	**4:09**	**4:17**
4:17	**4:23**	**4:26**	**4:31**	**4:39**	**4:47**
4:47	**4:53**	**4:56**	**5:01**	**5:09**	**5:17**
5:17	**5:23**	**5:26**	**5:31**	**5:39**	**5:47**
5:47	**5:53**	**5:56**	**6:01**	**6:09**	**6:17**
6:17	**6:23**	**6:26**	**6:31**	**6:39**	**6:47**
7:17	**7:23**	**7:26**	**7:31**	**7:39**	**7:47**
8:17	**8:23**	**8:26**	**8:31**	**8:39**	**8:47**
9:17	**9:23**	**9:26**	**9:31**	**9:39**	**9:47**

12 Upper Middle

Weekends to Dundas

Burlington GO Station	Brant St. & Mount Forest Dr.	Upper Middle Rd. & Guelph Line	Upper Middle Rd. & Walkers Line	Upper Middle Rd. & Heron Way	Dundas St. & Appleby Line
Saturday					
7:50	7:56	8:01	8:05	8:10	8:16
8:50	8:56	9:01	9:05	9:10	9:16
9:50	9:56	10:01	10:05	10:10	10:16
10:50	10:56	11:01	11:05	11:10	11:16
11:50	11:56	**12:01**	**12:05**	**12:10**	**12:16**
12:50	**12:56**	**1:01**	**1:05**	**1:10**	**1:16**
1:50	**1:56**	**2:01**	**2:05**	**2:10**	**2:16**
2:50	**2:56**	**3:01**	**3:05**	**3:10**	**3:16**
3:50	**3:56**	**4:01**	**4:05**	**4:10**	**4:16**
4:50	**4:56**	**5:01**	**5:05**	**5:10**	**5:16**
5:50	**5:56**	**6:01**	**6:05**	**6:10**	**6:16**
6:50	**6:56**	**7:01**	**7:05**	**7:10**	**7:16**
7:50	**7:56**	**8:01**	**8:05**	**8:10**	**8:16**
8:50	**8:56**	**9:01**	**9:05**	**9:10**	**9:16**
9:50	**9:56**	**10:01**	**10:05**	**10:10**	**10:16**
Sunday / Holidays					
8:50	8:56	9:01	9:05	9:10	9:16
9:50	9:56	10:01	10:05	10:10	10:16
10:50	10:56	11:01	11:05	11:10	11:16
11:50	11:56	**12:01**	**12:05**	**12:10**	**12:16**
12:50	**12:56**	**1:01**	**1:05**	**1:10**	**1:16**
1:50	**1:56**	**2:01**	**2:05**	**2:10**	**2:16**
2:50	**2:56**	**3:01**	**3:05**	**3:10**	**3:16**
3:50	**3:56**	**4:01**	**4:05**	**4:10**	**4:16**
4:50	**4:56**	**5:01**	**5:05**	**5:10**	**5:16**
5:50	**5:56**	**6:01**	**6:05**	**6:10**	**6:16**

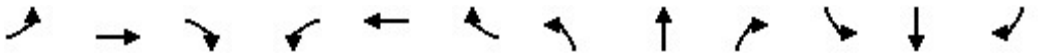
12 Upper Middle

Weekends to Burlington GO

Appleby Line & Dundas St.	Appleby Line & Heron Way	Upper Middle Rd. & Walkers Line	Upper Middle Rd. & Guelph Line	Brant St. & Mount Forest Dr.	Burlington GO Station
Saturday					
7:17	7:23	7:26	7:31	7:39	7:47
8:17	8:23	8:26	8:31	8:39	8:47
9:17	9:23	9:26	9:31	9:39	9:47
10:17	10:23	10:26	10:31	10:39	10:47
11:17	11:23	11:26	11:31	11:39	11:47
12:17	**12:23**	**12:26**	**12:31**	**12:39**	**12:47**
1:17	**1:23**	**1:26**	**1:31**	**1:39**	**1:47**
2:17	**2:23**	**2:26**	**2:31**	**2:39**	**2:47**
3:17	**3:23**	**3:26**	**3:31**	**3:39**	**3:47**
4:17	**4:23**	**4:26**	**4:31**	**4:39**	**4:47**
5:17	**5:23**	**5:26**	**5:31**	**5:39**	**5:47**
6:17	**6:23**	**6:26**	**6:31**	**6:39**	**6:47**
7:17	**7:23**	**7:26**	**7:31**	**7:39**	**7:47**
8:17	**8:23**	**8:26**	**8:31**	**8:39**	**8:47**
9:17	**9:23**	**9:26**	**9:31**	**9:39**	**9:47**
Sunday / Holidays					
8:17	8:23	8:26	8:31	8:39	8:47
9:17	9:23	9:26	9:31	9:39	9:47
10:17	10:23	10:26	10:31	10:39	10:47
11:17	11:23	11:26	11:31	11:39	11:47
12:17	**12:23**	**12:26**	**12:31**	**12:39**	**12:47**
1:17	**1:23**	**1:26**	**1:31**	**1:39**	**1:47**
2:17	**2:23**	**2:26**	**2:31**	**2:39**	**2:47**
3:17	**3:23**	**3:26**	**3:31**	**3:39**	**3:47**
4:17	**4:23**	**4:26**	**4:31**	**4:39**	**4:47**
5:17	**5:23**	**5:26**	**5:31**	**5:39**	**5:47**

APPENDIX G

2027 Future Background Synchro Reports

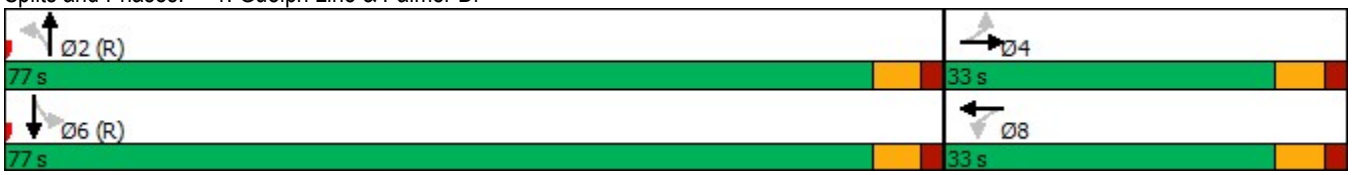


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	1	8	89	0	49	5	1057	36	30	1882	5
Future Volume (vph)	6	1	8	89	0	49	5	1057	36	30	1882	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	30.0		0.0	45.0		0.0	45.0		0.0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (m)	0.0			40.0			5.0			5.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.928			0.850			0.995				
Flt Protected		0.980		0.950			0.950			0.950		
Satd. Flow (prot)	0	1747	0	1825	1585	0	1825	3523	0	1825	3579	0
Flt Permitted		0.887		0.748			0.079			0.238		
Satd. Flow (perm)	0	1581	0	1437	1585	0	152	3523	0	457	3579	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			120			6				
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		92.2			90.2			177.0			246.8	
Travel Time (s)		8.3			8.1			10.6			14.8	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	0%	0%	2%	3%	0%	3%	6%	0%	2%	0%
Adj. Flow (vph)	6	1	8	91	0	50	5	1079	37	31	1920	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	15	0	91	50	0	5	1116	0	31	1925	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		5.0	5.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		45.5	45.5		45.5	45.5	
Total Split (s)	33.0	33.0		33.0	33.0		77.0	77.0		77.0	77.0	
Total Split (%)	30.0%	30.0%		30.0%	30.0%		70.0%	70.0%		70.0%	70.0%	
Maximum Green (s)	27.0	27.0		27.0	27.0		71.0	71.0		71.0	71.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	12.0	12.0		12.0	12.0		30.0	30.0		30.0	30.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		8.0	8.0		8.0	8.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		14.0		14.2	14.2		88.0	88.0		88.0	88.0	
Actuated g/C Ratio		0.13		0.13	0.13		0.80	0.80		0.80	0.80	
v/c Ratio		0.07		0.49	0.16		0.04	0.40		0.08	0.67	
Control Delay		27.9		52.8	1.1		5.2	4.9		4.8	8.2	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		27.9		52.8	1.1		5.2	4.9		4.8	8.2	
LOS		C		D	A		A	A		A	A	
Approach Delay		27.9			34.5			4.9			8.2	
Approach LOS		C			C			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 8.3		Intersection LOS: A	
Intersection Capacity Utilization 72.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Guelph Line & Palmer Dr





Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	15	91	50	5	1116	31	1925
v/c Ratio	0.07	0.49	0.16	0.04	0.40	0.08	0.67
Control Delay	27.9	52.8	1.1	5.2	4.9	4.8	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.9	52.8	1.1	5.2	4.9	4.8	8.2
Queue Length 50th (m)	1.3	18.4	0.0	0.2	36.4	1.4	93.5
Queue Length 95th (m)	7.0	32.9	0.0	1.5	56.7	4.8	143.8
Internal Link Dist (m)	68.2		66.2		153.0		222.8
Turn Bay Length (m)		30.0		45.0		45.0	
Base Capacity (vph)	394	352	479	121	2821	365	2864
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.26	0.10	0.04	0.40	0.08	0.67

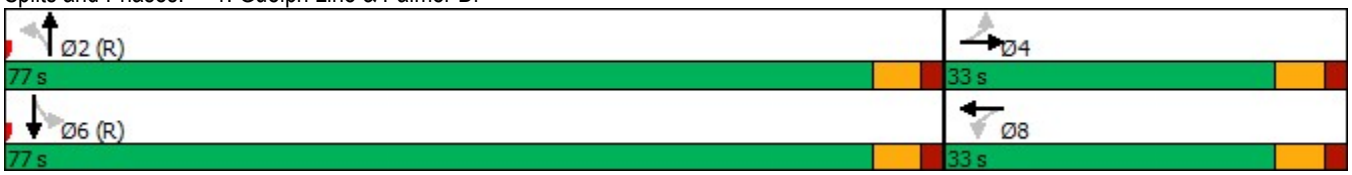
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	4	54	1	37	3	1251	48	15	1314	5
Future Volume (vph)	5	0	4	54	1	37	3	1251	48	15	1314	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	30.0		0.0	45.0		0.0	45.0		0.0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (m)	0.0			40.0			5.0			5.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.940			0.854			0.994			0.999	
Flt Protected		0.973		0.950			0.950			0.950		
Satd. Flow (prot)	0	1757	0	1825	1594	0	1825	3560	0	1706	3541	0
Flt Permitted		0.840		0.752			0.168			0.172		
Satd. Flow (perm)	0	1517	0	1445	1594	0	323	3560	0	309	3541	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			40			7			1	
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		92.2			90.2			177.0			246.8	
Travel Time (s)		8.3			8.1			10.6			14.8	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	0%	0%	3%	0%	2%	0%	7%	3%	0%
Adj. Flow (vph)	5	0	4	58	1	40	3	1345	52	16	1413	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	58	41	0	3	1397	0	16	1418	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		5.0	5.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		45.5	45.5		45.5	45.5	
Total Split (s)	33.0	33.0		33.0	33.0		77.0	77.0		77.0	77.0	
Total Split (%)	30.0%	30.0%		30.0%	30.0%		70.0%	70.0%		70.0%	70.0%	
Maximum Green (s)	27.0	27.0		27.0	27.0		71.0	71.0		71.0	71.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	12.0	12.0		12.0	12.0		30.0	30.0		30.0	30.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		8.0	8.0		8.0	8.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		11.8		11.7	11.7		90.2	90.2		90.2	90.2	
Actuated g/C Ratio		0.11		0.11	0.11		0.82	0.82		0.82	0.82	
v/c Ratio		0.05		0.38	0.20		0.01	0.48		0.06	0.49	
Control Delay		1.1		51.8	15.9		3.3	4.7		4.0	4.8	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		1.1		51.8	15.9		3.3	4.7		4.0	4.8	
LOS		A		D	B		A	A		A	A	
Approach Delay		1.1			37.0			4.7			4.8	
Approach LOS		A			D			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.49			
Intersection Signal Delay: 5.8		Intersection LOS: A	
Intersection Capacity Utilization 53.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Guelph Line & Palmer Dr





Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	9	58	41	3	1397	16	1418
v/c Ratio	0.05	0.38	0.20	0.01	0.48	0.06	0.49
Control Delay	1.1	51.8	15.9	3.3	4.7	4.0	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.1	51.8	15.9	3.3	4.7	4.0	4.8
Queue Length 50th (m)	0.0	11.8	0.2	0.1	45.0	0.7	46.5
Queue Length 95th (m)	0.6	23.7	9.8	0.8	68.1	2.7	70.4
Internal Link Dist (m)	68.2		66.2		153.0		222.8
Turn Bay Length (m)		30.0		45.0		45.0	
Base Capacity (vph)	394	354	421	265	2921	253	2904
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.16	0.10	0.01	0.48	0.06	0.49

Intersection Summary

APPENDIX H

ITE Trip Generation Manual Excerpts

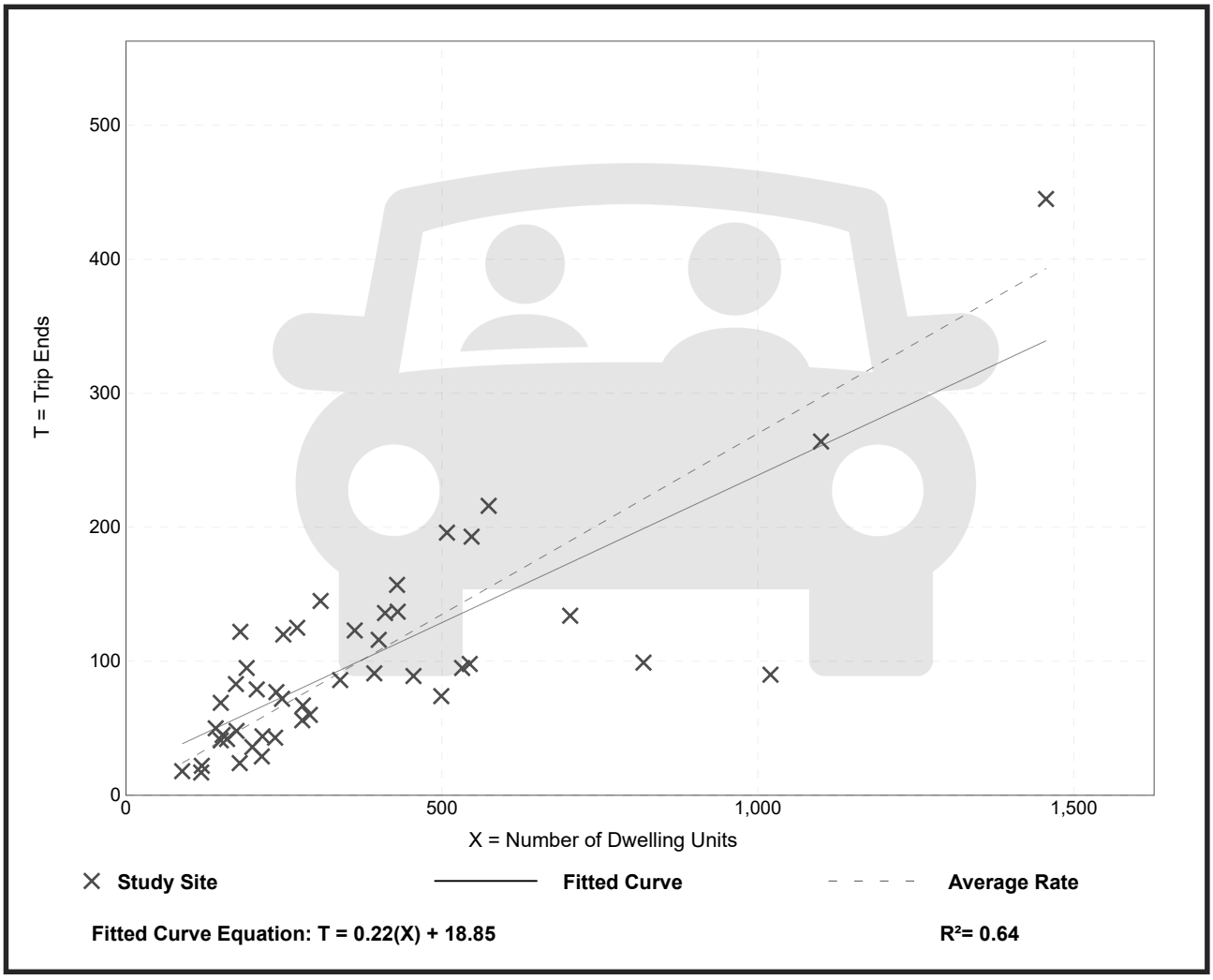
Multifamily Housing (High-Rise)
Not Close to Rail Transit (222)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 45
Avg. Num. of Dwelling Units: 372
Directional Distribution: 34% entering, 66% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.27	0.09 - 0.67	0.11

Data Plot and Equation



Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

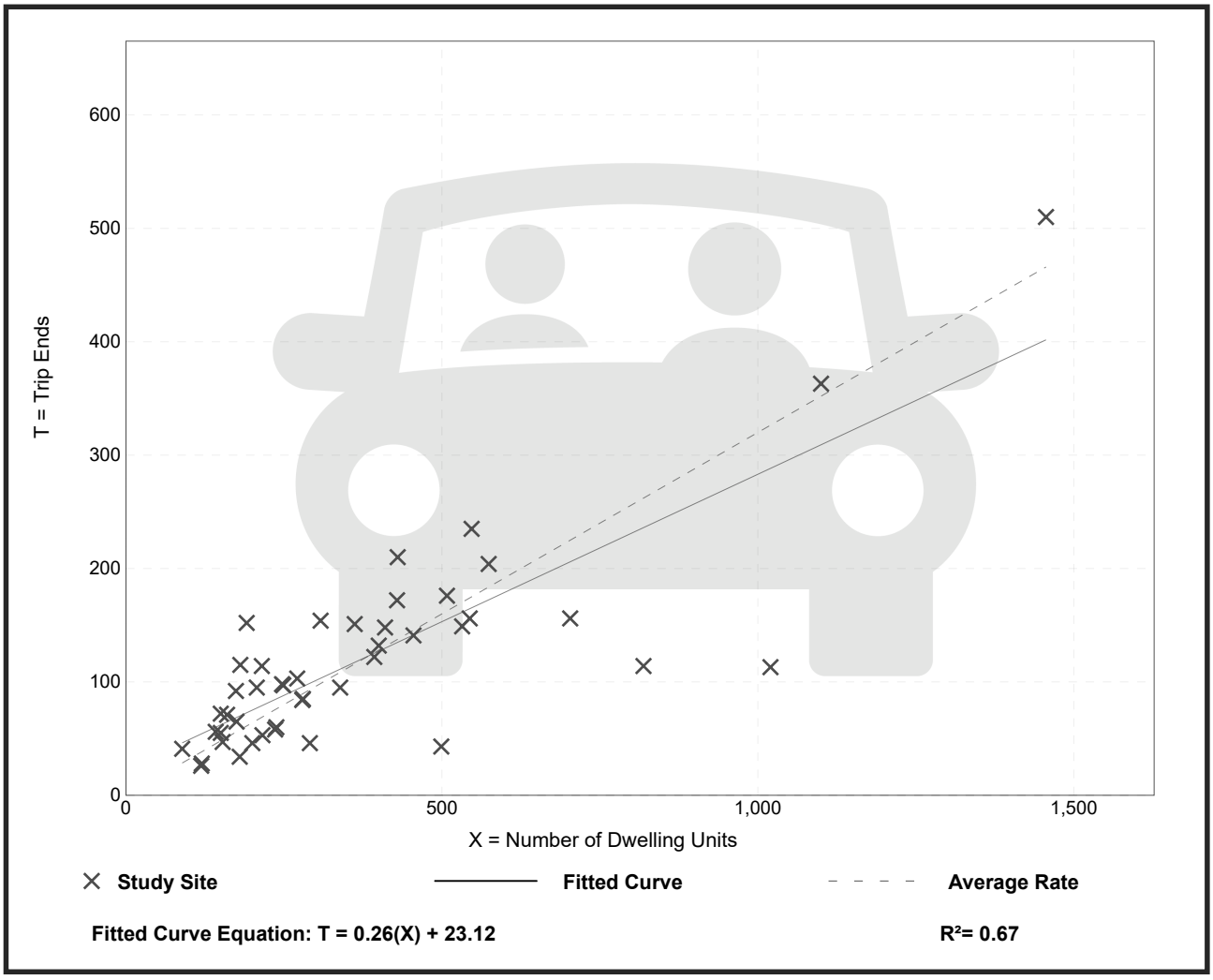
Multifamily Housing (High-Rise)
Not Close to Rail Transit (222)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 45
Avg. Num. of Dwelling Units: 372
Directional Distribution: 56% entering, 44% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.32	0.09 - 0.80	0.13

Data Plot and Equation



Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

APPENDIX I

TTS Data – Trip Distribution

Project Details

Project Name:	1396 Guelph Line
Project Number:	2172-6311
Created By:	Farah C
Date Started:	3.7.2022
Client:	Infinity Development Group

Site Information

Summary of Development	11-storey residential building with 254 residential units in the City of Burlington
Site Type	Residential
Subject Zones	4086,4085,4083,4084

TTS Query Results	
Distribution:	**AM IN**

Field	Selection	Value
Row variable:	**2006 GTA zone of origin**	**-**
Column variable:	**2006 GTA zone of destination**	**-**
Filter 1:	**2006 GTA zone of destination**	**4086,4085,4083,4084**
Filter 2:	**Start time of trip**	**0630-0930**
Filter 3:	**Trip purpose of destination**	**Home (H)**

AM IN	Internal									External								Totals
	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	External	External	External	External	External	External	External	External	
Direction	**I**	**NW**	**N**	**NE**	**E**	**SE**	**S**	**SW**	**W**	**NW**	**N**	**NE**	**E**	**SE**	**S**	**SW**	**W**	
Trips	0	22	0	30	50	12	93	0	0	0	0	0	98	0	0	0	0	305
%	0.00%	7.21%	0.00%	9.84%	16.39%	3.93%	30.49%	0.00%	0.00%	0.00%	0.00%	0.00%	32.13%	0.00%	0.00%	0.00%	0.00%	100.00%
% w/o trips in subject TAZ	0.00%	7.21%	0.00%	9.84%	16.39%	3.93%	30.49%	0.00%	0.00%	0.00%	0.00%	0.00%	32.13%	0.00%	0.00%	0.00%	0.00%	100.00%

Mon Mar 07 2022 11:10:09 GMT-0500 (Eastern Standard Time) - Run Time: 3003ms

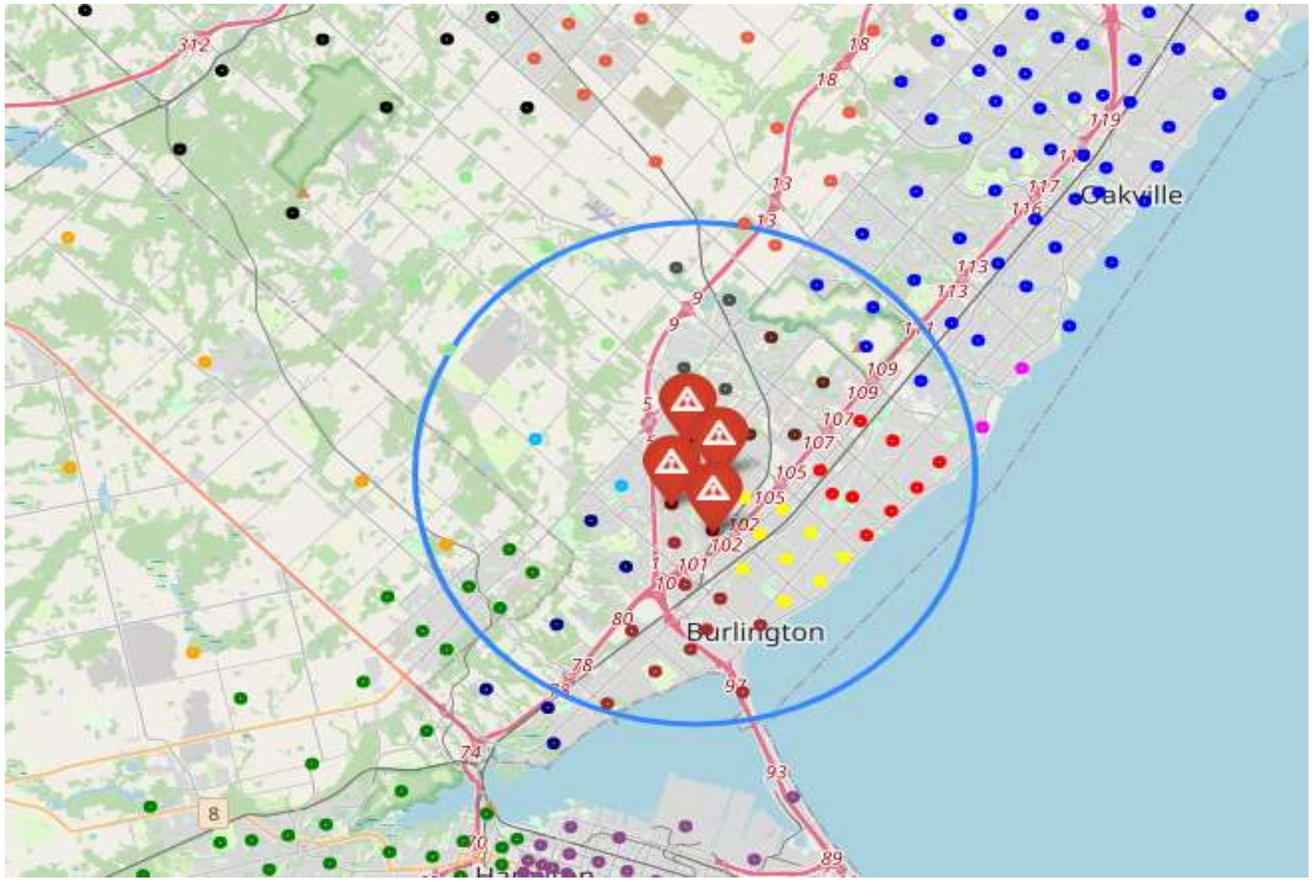
Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig
Column: 2006 GTA zone of destination - gta06_dest

Filters:
(2006 GTA zone of destination - gta06_dest In 4086,4085,4083,4084
and
Start time of trip - start_time In 630-930
and
Trip purpose of destination - purp_dest In H
and
Primary travel mode of trip - mode_prime Not In O,S,9)

Trip 2016
Table:

,4083,4084,4085,4086
3664,24,0,0,0
3699,0,34,0,0
4035,21,0,0,0
4045,0,0,19,0
4063,18,0,0,0
4068,0,0,0,45
4077,0,12,0,0
4078,30,0,0,0
4080,30,0,0,0
4081,0,0,20,0
4082,30,0,0,0
4083,57,18,0,0
4084,47,116,0,0
4085,0,32,0,0
4086,0,35,14,0
4089,0,0,22,0



4096,0,0,39,0

TTS Query Results	
Distribution:	**AM OUT**

Field	Selection	Value
Row variable:	**2006 GTA zone of destination**	**-**
Column variable:	**2006 GTA zone of origin**	**-**
Filter 1:	**2006 GTA zone of origin**	**4086,4085,4083,4084**
Filter 2:	**Start time of trip**	**1530-1830**
Filter 3:	**Trip purpose of origin**	**Home (H)**

AM OUT	Internal									External								
	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	External	External	External	External	External	External	External	External	
Direction	**I**	**NW**	**N**	**NE**	**E**	**SE**	**S**	**SW**	**W**	**NW**	**N**	**NE**	**E**	**SE**	**S**	**SW**	**W**	**Totals**
Trips	0	151	77	316	958	515	1151	541	242	114	140	738	2992	32	0	1325	361	9653
%	0.00%	1.56%	0.80%	3.27%	9.92%	5.34%	11.92%	5.60%	2.51%	1.18%	1.45%	7.65%	31.00%	0.33%	0.00%	13.73%	3.74%	100.00%
% w/o trips in subject TAZ	0.00%	1.56%	0.80%	3.27%	9.92%	5.34%	11.92%	5.60%	2.51%	1.18%	1.45%	7.65%	31.00%	0.33%	0.00%	13.73%	3.74%	100.00%

Mon Mar 07 2022 11:34:32 GMT-0500 (Eastern Standard Time) - Run Time: 2740ms

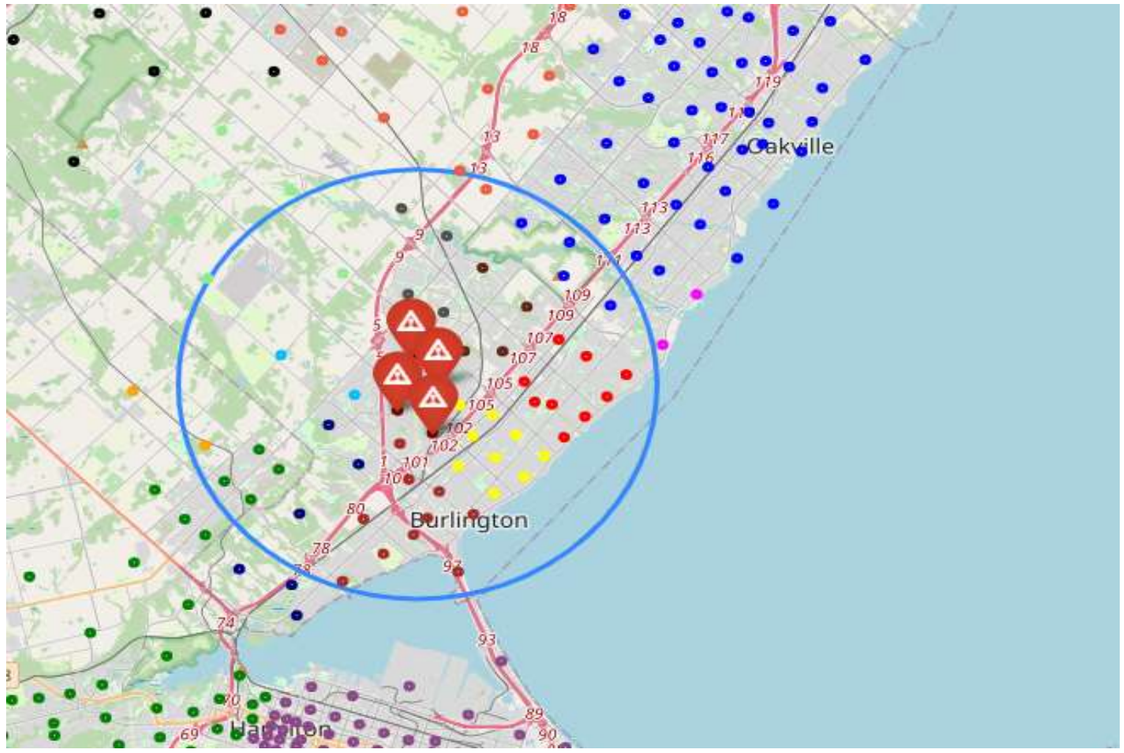
Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest
Column: 2006 GTA zone of origin - gta06_orig

Filters:
(2006 GTA zone of origin - gta06_orig In 4086,4085,4083,4084
and
Start time of trip - start_time In 630-930
and
Trip purpose of origin - purp_orig In H
and
Primary travel mode of trip - mode_prime Not In O,S,9)

Trip 2016
Table:

,4083,4084,4085,4086
25,0,11,0,0
26,0,0,15,0
38,0,36,0,0
43,34,0,0,0
47,0,0,22,0
49,0,0,27,0
52,0,12,13,0
54,0,10,0,0
55,0,19,0,21
57,17,13,0,0
58,21,0,0,0
60,0,11,0,0
63,0,49,0,0
65,12,35,0,0
67,15,0,0,0
77,0,10,0,0



89,19,0,9,0
90,0,19,0,0
211,0,23,0,0
290,0,68,0,0
313,0,16,0,0
332,0,0,0,55
334,33,0,0,0
358,0,75,0,0
371,29,0,36,0
501,37,0,0,0
2009,0,13,0,0
2096,0,0,23,0
2106,27,0,0,0
2271,0,7,0,0
3191,0,32,0,0
3331,0,11,0,0
3423,0,0,20,0
3508,15,0,0,0
3516,0,25,0,0
3605,18,0,0,0
3608,0,11,0,0
3609,35,21,0,0
3611,0,25,0,0
3612,0,4,0,0
3613,0,91,29,0
3618,0,62,0,0
3620,0,13,0,0
3631,34,48,0,0
3633,15,0,39,0
3649,24,0,0,0
3653,31,0,0,0
3654,17,0,0,0
3670,18,0,0,0
3671,0,0,34,0
3690,17,0,0,0
3699,0,11,0,0
3700,0,27,0,0
3705,0,20,0,0
3713,0,23,0,0
3715,0,34,0,0
3722,0,21,0,0
3821,0,15,0,0
3825,0,21,0,0
3834,0,11,0,0
3850,0,0,41,0
3851,0,16,0,0
3854,0,16,0,0
3864,0,18,0,0
4002,19,40,0,31
4003,0,63,0,0
4004,0,28,0,19
4005,0,32,0,0
4006,0,16,0,0
4007,0,28,0,0
4008,58,0,0,0

4009,41,21,0,0
4011,21,222,0,0
4012,27,35,0,0
4014,13,23,0,0
4022,23,0,0,0
4023,22,0,0,0
4024,0,41,0,21
4027,12,115,41,0
4029,29,26,0,0
4030,0,11,0,0
4031,0,100,0,0
4035,21,20,0,0
4039,0,32,0,0
4040,0,13,0,0
4041,59,74,14,34
4042,49,15,0,0
4045,0,0,19,0
4052,0,46,0,0
4053,0,88,20,0
4056,48,19,0,0
4057,0,83,26,25
4058,14,0,0,0
4059,43,41,15,0
4060,0,20,10,0
4061,0,122,0,0
4062,42,49,139,0
4063,17,62,291,0
4067,19,0,0,0
4068,89,0,27,45
4069,18,98,49,20
4072,0,14,0,0
4075,0,80,0,0
4076,39,0,0,0
4077,41,124,32,0
4078,46,152,119,94
4079,0,0,97,0
4080,25,55,0,0
4081,115,110,40,20
4082,82,141,26,0
4083,731,518,0,0
4084,203,1320,55,0
4.08515E+15
4086,42,35,44,83
4087,23,46,20,0
4088,31,11,20,0
4089,59,0,92,0
4090,37,0,0,0
4091,24,53,20,0
4096,0,0,77,0
4108,0,0,0,13
4119,72,0,0,0
4122,0,22,0,0
4124,54,0,0,0
4125,0,30,0,34
4127,0,74,0,0

4148,14,0,0,0
4150,0,0,19,0
4152,0,0,14,0
4166,0,0,27,0
4180,0,18,0,0
4185,0,0,27,0
4186,0,0,41,0
4188,0,11,0,0
4189,0,225,0,0
4190,111,44,10,0
5043,21,0,0,0
5047,17,0,0,0
5077,34,0,0,0
5090,0,16,0,0
5093,0,0,25,0
5104,0,4,0,0
5107,0,55,0,0
5108,0,9,17,0
5111,0,21,0,0
5119,0,0,10,0
5120,31,0,0,0
5127,31,0,0,0
5133,27,0,0,0
5135,0,56,0,0
5142,29,0,0,0
5150,25,0,0,0
5153,0,0,10,0
5159,0,24,0,0
5163,18,0,0,0
5166,0,34,0,0
5170,0,36,0,0
5171,0,11,0,0
5176,0,32,0,0
5182,0,7,0,0
5184,0,0,49,0
5186,0,122,0,0
5190,0,63,0,0
5193,30,0,0,0
5194,0,107,0,0
5197,0,21,0,0
5198,53,35,27,0
5199,0,50,0,0
5205,0,16,0,0
5210,0,20,0,0
5226,34,0,0,0
5231,0,0,13,0
5233,0,0,14,0
5236,0,0,0,19
5249,0,0,18,0
5250,23,0,0,0
5251,0,14,63,0
6024,0,88,0,0
6025,34,0,0,0
6136,0,0,14,0
6163,69,0,0,0

6191,0,21,0,0
6252,24,0,0,0
6267,33,0,0,0
6304,0,29,0,0
6329,0,12,0,0
7117,0,0,0,23
7354,0,34,0,0
8057,0,24,0,0
8144,0,20,0,0
8411,0,16,0,0
8909,0,28,0,0
9053,15,0,0,0
9998,15,0,0,0

TTS Query Results	
Distribution:	**PM IN**

Field	Selection	Value
Row variable:	**2006 GTA zone of origin**	**-**
Column variable:	**2006 GTA zone of destination**	**-**
Filter 1:	**2006 GTA zone of destination**	**4086,4085,4083,4084**
Filter 2:	**Start time of trip**	**1530-1830**
Filter 3:	**Trip purpose of destination**	**Home (H)**

PM IN	Internal									External								
	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	External	External	External	External	External	External	External	External	
Direction	**I**	**NW**	**N**	**NE**	**E**	**SE**	**S**	**SW**	**W**	**NW**	**N**	**NE**	**E**	**SE**	**S**	**SW**	**W**	**Totals**
Trips	0	248	0	335	687	398	1293	633	309	140	94	826	2756	73	0	1163	392	9347
%	0.00%	2.65%	0.00%	3.58%	7.35%	4.26%	13.83%	6.77%	3.31%	1.50%	1.01%	8.84%	29.49%	0.78%	0.00%	12.44%	4.19%	100.00%
% w/o trips in subject TAZ	0.00%	2.65%	0.00%	3.58%	7.35%	4.26%	13.83%	6.77%	3.31%	1.50%	1.01%	8.84%	29.49%	0.78%	0.00%	12.44%	4.19%	100.00%

Mon Mar 07 2022 11:22:04 GMT-0500 (Eastern Standard Time) - Run Time: 2730ms

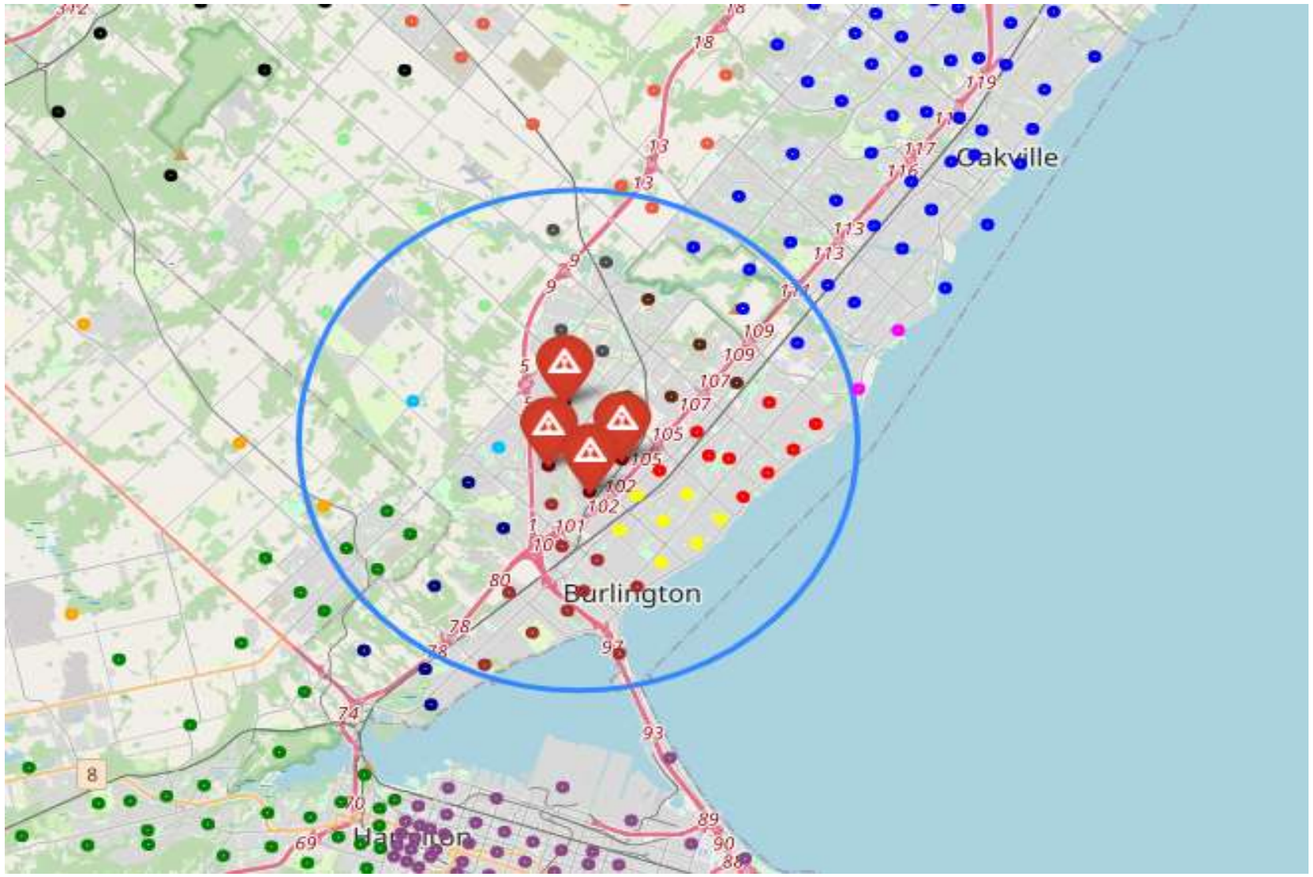
Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig
Column: 2006 GTA zone of destination - gta06_dest

Filters:
(2006 GTA zone of destination - gta06_dest In 4086,4085,4083,4084
and
Start time of trip - start_time In 1530-1830
and
Trip purpose of destination - purp_dest In H
and
Primary travel mode of trip - mode_prime Not In O,S,9)

Trip 2016
Table:

,4083,4084,4085,4086
25,0,11,0,0
38,0,0,29,0
43,34,0,0,0
47,0,0,22,0
52,0,13,13,0
54,0,10,6,0
55,0,0,0,21
57,0,13,0,0
58,21,0,0,0
60,0,11,0,0
65,12,35,0,0
67,15,0,0,0
78,0,18,0,0
89,19,0,0,0
90,0,19,0,0
211,0,23,0,0



332,0,0,0,55
355,0,0,0,72
358,0,75,0,0
371,29,0,36,0
414,0,16,0,0
484,0,27,0,0
501,37,0,0,0
1205,0,96,0,0
2009,0,13,0,0
2088,0,27,0,0
2096,13,0,23,0
2215,15,0,0,0
3191,0,32,0,0
3331,0,11,0,0
3423,0,0,20,0
3426,0,39,0,0
3516,0,25,0,0
3605,18,0,0,0
3608,0,11,0,0
3609,35,21,0,0
3611,17,25,0,0
3613,0,0,29,0
3618,0,104,0,0
3620,0,13,0,0
3631,34,48,0,0
3633,15,0,39,0
3637,0,21,0,0
3649,24,0,0,0
3670,18,0,0,0
3671,0,0,34,0
3693,0,16,0,0
3699,0,11,0,0
3700,0,27,0,0
3702,59,30,0,0
3705,0,20,0,0
3710,0,16,0,0
3713,0,23,0,0
3715,0,34,0,0
3722,0,21,0,0
3816,0,17,0,0
3821,0,15,0,0
3825,0,21,0,0
3834,0,11,0,0
3850,0,0,41,0
3851,0,16,0,0
3854,0,16,0,0
3864,0,18,0,0
4002,96,40,0,31
4003,82,63,0,0
4004,0,28,0,19
4005,0,32,41,0
4006,0,16,0,0
4008,21,122,0,0
4011,42,0,0,0
4012,27,13,0,0

4014,13,23,0,0
4016,0,53,0,0
4019,0,0,6,0
4022,23,11,0,0
4023,22,0,0,0
4024,0,41,0,21
4027,12,42,41,0
4029,0,14,0,0
4030,0,11,0,0
4031,0,100,0,0
4035,0,20,0,0
4039,0,32,0,0
4040,0,13,0,0
4041,17,81,0,34
4042,33,15,0,34
4045,35,18,0,0
4052,0,46,0,0
4053,0,96,20,72
4056,13,0,0,0
4057,0,34,0,25
4058,14,0,0,0
4059,48,34,33,0
4060,0,20,0,0
4061,59,137,0,0
4062,20,16,209,0
4063,34,84,225,0
4064,0,0,0,19
4065,0,9,0,0
4067,19,0,0,0
4068,125,74,67,0
4069,18,109,49,20
4072,0,14,0,0
4073,17,0,0,0
4075,0,80,0,0
4077,0,74,17,0
4078,46,89,17,116
4079,16,0,0,0
4080,35,42,0,0
4081,47,130,68,0
4082,16,111,49,20
4083,507,216,0,0
4084,76,812,96,0
4085,32,239,77,96
4086,55,16,53,28
4087,72,42,73,37
4088,62,9,0,24
4089,0,0,92,0
4090,37,107,0,0
4091,24,0,0,0
4093,109,16,0,31
4105,0,0,29,0
4108,0,0,0,13
4124,83,0,0,0
4127,0,74,0,0
4148,34,0,21,0

4150,0,0,19,0
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4188,0,55,0,0
4189,0,188,15,0
4190,103,55,0,0
5036,23,0,0,0
5043,21,0,0,0
5047,17,0,0,0
5049,0,21,0,0
5061,0,11,0,0
5077,34,0,0,0
5093,0,0,25,0
5104,0,4,0,0
5108,0,0,17,0
5111,0,21,0,0
5112,0,0,13,0
5120,31,0,0,0
5128,35,0,0,0
5133,27,0,0,0
5135,0,56,0,0
5142,29,0,0,0
5150,25,0,0,0
5153,0,0,10,0
5159,0,24,0,0
5166,0,34,0,0
5170,0,36,0,0
5171,0,11,0,0
5172,18,0,0,0
5176,0,32,0,0
5182,0,7,0,0
5183,0,20,0,0
5184,0,26,49,0
5186,0,122,0,0
5190,0,63,0,0
5194,0,107,0,0
5197,0,21,0,0
5198,70,19,0,0
5201,18,0,0,0
5205,0,16,108,0
5226,34,0,0,0
5231,0,4,0,0
5233,0,0,14,0
5250,23,0,0,0
5251,0,14,22,0
6024,0,88,0,0
6025,34,0,0,0
6027,0,9,0,0
6069,0,25,0,0
6163,34,0,0,0
6191,0,21,0,0
6304,0,29,0,0
6329,0,12,0,0
7115,17,0,0,0

7117,0,0,0,23
7354,0,34,0,0
8144,0,20,0,0
8317,0,9,0,0
8411,0,16,0,0
8909,0,28,0,0
9065,0,34,0,0

TTS Query Results	
Distribution:	**PM OUT**

Field	Selection	Value
Row variable:	**2006 GTA zone of destination**	**-**
Column variable:	**2006 GTA zone of origin**	**-**
Filter 1:	**2006 GTA zone of origin**	**4086,4085,4083,4084**
Filter 2:	**Start time of trip**	**1530-1830**
Filter 3:	**Trip purpose of origin**	**Home (H)**

PM OUT	Internal									External								
	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	External	External	External	External	External	External	External	External	
Direction	**I**	**NW**	**N**	**NE**	**E**	**SE**	**S**	**SW**	**W**	**NW**	**N**	**NE**	**E**	**SE**	**S**	**SW**	**W**	**Totals**
Trips	0	239	49	85	303	263	423	369	69	48	13	0	167	0	0	192	62	2282
%	0.00%	10.47%	2.15%	3.72%	13.28%	11.52%	18.54%	16.17%	3.02%	2.10%	0.57%	0.00%	7.32%	0.00%	0.00%	8.41%	2.72%	99.99%
% w/o trips in subject TAZ	0.00%	10.47%	2.15%	3.72%	13.28%	11.52%	18.54%	16.17%	3.02%	2.10%	0.57%	0.00%	7.32%	0.00%	0.00%	8.41%	2.72%	99.99%

Mon Mar 07 2022 13:12:48 GMT-0500 (Eastern Standard Time) - Run Time: 2458ms

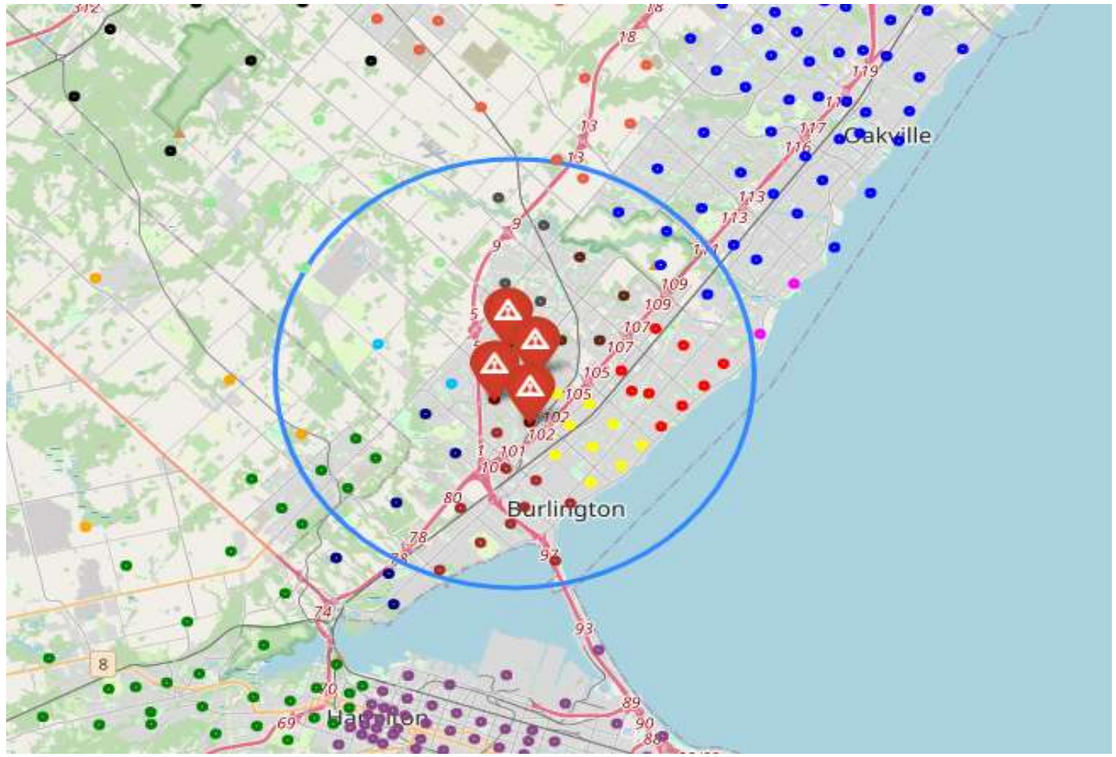
Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest
Column: 2006 GTA zone of origin - gta06_orig

Filters:
(2006 GTA zone of origin - gta06_orig In 4086,4085,4083,4084
and
Start time of trip - start_time In 1530-1830
and
Trip purpose of origin - purp_orig In H
and
Primary travel mode of trip - mode_prime Not In O,S,9)

Trip 2016
Table:

,4083,4084,4085,4086
63,0,11,0,0
64,0,40,0,0
278,0,21,0,0
3664,24,0,0,0
3690,0,0,6,0
4002,31,0,0,0
4006,15,0,0,0
4012,0,19,0,0
4057,0,0,21,0
4059,100,17,29,0
4060,0,76,0,0
4062,20,0,70,0
4063,47,22,0,31
4065,0,9,0,0
4068,0,0,80,0
4069,0,0,14,0

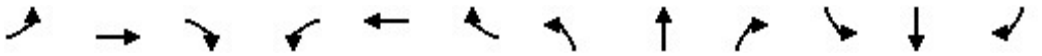


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4077,30,15,0,0
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4084,101,284,0,0
4085,0,214,0,0
4086,17,0,0,0
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4097,0,0,49,0
4188,0,22,0,0
4189,0,36,0,0
4190,34,0,67,0
5043,0,18,0,0
5045,0,50,0,0
5059,18,0,40,0
5172,0,0,14,0
5231,0,4,0,0
5250,0,0,19,0
6051,0,0,33,0
6090,29,0,0,0
6163,0,48,0,0
7319,0,0,29,0
8057,0,13,0,0
9998,0,0,39,0

Time Period	Internal								External								Total
	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	
AM (IN)	7.2%	0.0%	9.8%	16.4%	3.9%	30.5%	0.0%	0.0%	0.0%	0.0%	0.0%	32.1%	0.0%	0.0%	0.0%	0.0%	100.0%
AM (OUT)	1.6%	0.8%	3.3%	9.9%	5.3%	11.9%	5.6%	2.5%	1.2%	1.5%	7.7%	31.0%	0.3%	0.0%	13.7%	3.7%	100.0%
PM (IN)	2.7%	0.0%	3.6%	7.4%	4.3%	13.8%	6.8%	3.3%	1.5%	1.0%	8.8%	29.5%	0.8%	0.0%	12.4%	4.2%	100.0%
PM (OUT)	10.5%	2.2%	3.7%	13.3%	11.5%	18.5%	16.2%	3.0%	2.1%	0.6%	0.0%	7.3%	0.0%	0.0%	8.4%	2.7%	100.0%
SAT (IN)																	0.0%
SAT (OUT)																	0.0%

APPENDIX J

2027 Future Total Synchro Reports

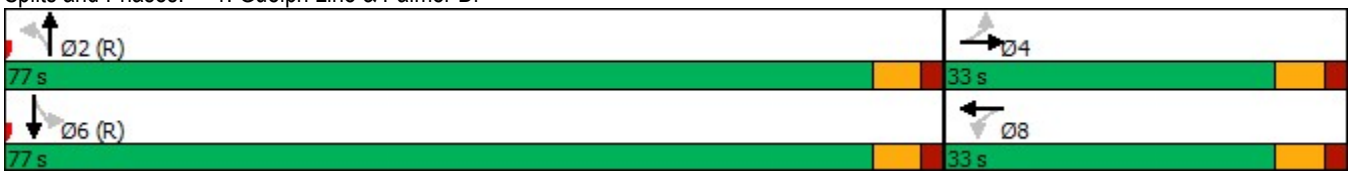


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	1	8	89	0	50	5	1072	36	48	1912	5
Future Volume (vph)	6	1	8	89	0	50	5	1072	36	48	1912	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	30.0		0.0	45.0		0.0	45.0		0.0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (m)	0.0			40.0			5.0			5.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.928			0.850			0.995				
Flt Protected		0.980		0.950			0.950			0.950		
Satd. Flow (prot)	0	1747	0	1825	1585	0	1825	3523	0	1825	3579	0
Flt Permitted		0.887		0.748			0.075			0.234		
Satd. Flow (perm)	0	1581	0	1437	1585	0	144	3523	0	450	3579	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			116			6				
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		92.2			90.2			177.0			56.9	
Travel Time (s)		8.3			8.1			10.6			3.4	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	0%	0%	2%	3%	0%	3%	6%	0%	2%	0%
Adj. Flow (vph)	6	1	8	91	0	51	5	1094	37	49	1951	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	15	0	91	51	0	5	1131	0	49	1956	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane								Yes				
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		5.0	5.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		45.5	45.5		45.5	45.5	
Total Split (s)	33.0	33.0		33.0	33.0		77.0	77.0		77.0	77.0	
Total Split (%)	30.0%	30.0%		30.0%	30.0%		70.0%	70.0%		70.0%	70.0%	
Maximum Green (s)	27.0	27.0		27.0	27.0		71.0	71.0		71.0	71.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	12.0	12.0		12.0	12.0		30.0	30.0		30.0	30.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		8.0	8.0		8.0	8.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		14.0		14.2	14.2		88.0	88.0		88.0	88.0	
Actuated g/C Ratio		0.13		0.13	0.13		0.80	0.80		0.80	0.80	
v/c Ratio		0.07		0.49	0.17		0.04	0.40		0.14	0.68	
Control Delay		27.9		52.8	1.2		5.2	5.0		5.3	8.4	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		27.9		52.8	1.2		5.2	5.0		5.3	8.4	
LOS		C		D	A		A	A		A	A	
Approach Delay		27.9			34.3			5.0			8.4	
Approach LOS		C			C			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 8.4		Intersection LOS: A	
Intersection Capacity Utilization 73.6%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Guelph Line & Palmer Dr





Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	15	91	51	5	1131	49	1956
v/c Ratio	0.07	0.49	0.17	0.04	0.40	0.14	0.68
Control Delay	27.9	52.8	1.2	5.2	5.0	5.3	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.9	52.8	1.2	5.2	5.0	5.3	8.4
Queue Length 50th (m)	1.3	18.4	0.0	0.2	37.2	2.4	97.0
Queue Length 95th (m)	7.0	32.9	0.0	1.5	57.7	7.2	148.8
Internal Link Dist (m)	68.2		66.2		153.0		32.9
Turn Bay Length (m)		30.0		45.0		45.0	
Base Capacity (vph)	394	352	476	115	2821	360	2864
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.26	0.11	0.04	0.40	0.14	0.68

Intersection Summary



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	47	0	1150	1921	25
Future Volume (vph)	0	47	0	1150	1921	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.865			0.998	
Flt Protected						
Satd. Flow (prot)	0	1629	0	3579	3571	0
Flt Permitted						
Satd. Flow (perm)	0	1629	0	3579	3571	0
Link Speed (k/h)	40			60	60	
Link Distance (m)	122.1			56.9	185.2	
Travel Time (s)	11.0			3.4	11.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	51	0	1250	2088	27
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	51	0	1250	2115	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane					Yes	
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

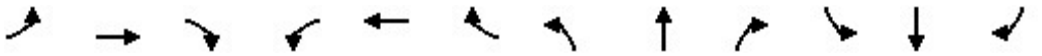
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 63.9%		ICU Level of Service B	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	47	0	1150	1921	25
Future Volume (Veh/h)	0	47	0	1150	1921	25
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	51	0	1250	2088	27
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	TWLTL	
Median storage veh)					2	
Upstream signal (m)				57		
pX, platoon unblocked	0.89					
vC, conflicting volume	2726	1058	2115			
vC1, stage 1 conf vol	2102					
vC2, stage 2 conf vol	625					
vCu, unblocked vol	2694	1058	2115			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	77	100			
cM capacity (veh/h)	77	221	255			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	51	625	625	1392	723
Volume Left	0	0	0	0	0
Volume Right	51	0	0	0	27
cSH	221	1700	1700	1700	1700
Volume to Capacity	0.23	0.37	0.37	0.82	0.43
Queue Length 95th (m)	6.6	0.0	0.0	0.0	0.0
Control Delay (s)	26.1	0.0	0.0	0.0	0.0
Lane LOS	D				
Approach Delay (s)	26.1	0.0		0.0	
Approach LOS	D				

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	63.9%	ICU Level of Service		B
Analysis Period (min)	15			

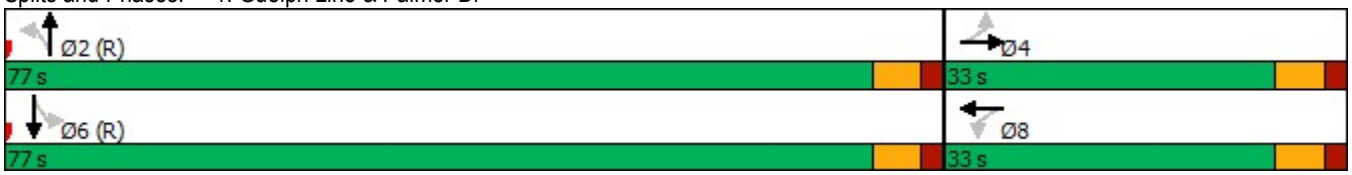


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	4	54	1	38	3	1282	48	29	1338	5
Future Volume (vph)	5	0	4	54	1	38	3	1282	48	29	1338	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	30.0		0.0	45.0		0.0	45.0		0.0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (m)	0.0			40.0			5.0			5.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.940			0.854			0.995			0.999	
Flt Protected		0.973		0.950			0.950			0.950		
Satd. Flow (prot)	0	1757	0	1825	1593	0	1825	3522	0	1825	3575	0
Flt Permitted		0.838		0.752			0.178			0.181		
Satd. Flow (perm)	0	1513	0	1445	1593	0	342	3522	0	348	3575	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			39			7			1	
Link Speed (k/h)		40			40			60			60	
Link Distance (m)		92.2			90.2			177.0			56.9	
Travel Time (s)		8.3			8.1			10.6			3.4	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	0%	0%	2%	3%	0%	3%	6%	0%	2%	0%
Adj. Flow (vph)	5	0	4	55	1	39	3	1308	49	30	1365	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	55	40	0	3	1357	0	30	1370	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane								Yes				
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		5.0	5.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		45.5	45.5		45.5	45.5	
Total Split (s)	33.0	33.0		33.0	33.0		77.0	77.0		77.0	77.0	
Total Split (%)	30.0%	30.0%		30.0%	30.0%		70.0%	70.0%		70.0%	70.0%	
Maximum Green (s)	27.0	27.0		27.0	27.0		71.0	71.0		71.0	71.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	12.0	12.0		12.0	12.0		30.0	30.0		30.0	30.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		8.0	8.0		8.0	8.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		11.6		11.5	11.5		90.4	90.4		90.4	90.4	
Actuated g/C Ratio		0.11		0.10	0.10		0.82	0.82		0.82	0.82	
v/c Ratio		0.05		0.36	0.20		0.01	0.47		0.10	0.47	
Control Delay		1.2		51.6	16.2		3.3	4.5		4.3	4.5	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		1.2		51.6	16.2		3.3	4.5		4.3	4.5	
LOS		A		D	B		A	A		A	A	
Approach Delay		1.2			36.7			4.5			4.5	
Approach LOS		A			D			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.47			
Intersection Signal Delay: 5.6		Intersection LOS: A	
Intersection Capacity Utilization 53.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Guelph Line & Palmer Dr





Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	9	55	40	3	1357	30	1370
v/c Ratio	0.05	0.36	0.20	0.01	0.47	0.10	0.47
Control Delay	1.2	51.6	16.2	3.3	4.5	4.3	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.2	51.6	16.2	3.3	4.5	4.3	4.5
Queue Length 50th (m)	0.0	11.2	0.2	0.1	42.7	1.2	43.1
Queue Length 95th (m)	0.6	22.9	9.9	0.8	64.6	4.3	65.1
Internal Link Dist (m)	68.2		66.2		153.0		32.9
Turn Bay Length (m)		30.0		45.0		45.0	
Base Capacity (vph)	394	354	420	280	2895	286	2938
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.16	0.10	0.01	0.47	0.10	0.47

Intersection Summary



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	38	0	1341	1336	48
Future Volume (vph)	0	38	0	1341	1336	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.865			0.995	
Flt Protected						
Satd. Flow (prot)	0	1629	0	3579	3561	0
Flt Permitted						
Satd. Flow (perm)	0	1629	0	3579	3561	0
Link Speed (k/h)	40			60	60	
Link Distance (m)	122.1			56.9	185.2	
Travel Time (s)	11.0			3.4	11.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	41	0	1458	1452	52
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	41	0	1458	1504	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane					Yes	
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 48.5%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	38	0	1341	1336	48
Future Volume (Veh/h)	0	38	0	1341	1336	48
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	41	0	1458	1452	52
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	TWLTL	
Median storage veh)					2	
Upstream signal (m)				57		
pX, platoon unblocked	0.87					
vC, conflicting volume	2207	752	1504			
vC1, stage 1 conf vol	1478					
vC2, stage 2 conf vol	729					
vCu, unblocked vol	2091	752	1504			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	88	100			
cM capacity (veh/h)	165	353	441			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	41	729	729	968	536
Volume Left	0	0	0	0	0
Volume Right	41	0	0	0	52
cSH	353	1700	1700	1700	1700
Volume to Capacity	0.12	0.43	0.43	0.57	0.32
Queue Length 95th (m)	3.0	0.0	0.0	0.0	0.0
Control Delay (s)	16.5	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	16.5	0.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	48.5%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX K

TTS Data – Modal Split

Thu Mar 10 2022 08:59:17 GMT-0500 (Eastern Standard Time) - Run Time: 2672ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of household - gta06_hhld
Column: Primary travel mode of trip - mode_prime

Filters:
(2006 GTA zone of household - gta06_hhld In 4005,4006,4001,4004
and
Primary travel mode of trip - mode_prime Not In O,S,9
and
Start time of trip - start_time In 630-930, 1500-1800)

Trip 2016
Table:

,Transit excluding GO rail,Cycle,Auto driver,GO rail only,Joint GO rail and local transit,Auto passenger,Paid rideshare,Walk
4001,189,0,8086,783,178,1231,0,57
4004,119,118,3096,99,64,680,0,113
4005,223,79,5501,352,44,864,12,433
4006,10,113,1745,226,0,343,0,144

Household GTA Zone	Transit excluding GO rail	Cycle	Auto driver	GO rail only	Joint GO rail and local transit	Auto passenger	Walk
4001	189	0	8086	783	178	1231	57
4004	119	118	3096	99	64	680	113
4005	223	79	5501	352	44	864	433
4006	10	113	1745	226	0	343	144
Total	541	310	18428	1460	286	3118	747
%	2%	1%	74%	6%	1%	13%	3%

Mode of Trip	Modal Split
Auto	87%
Transit	9%
Walk	3%
Cycling	1%