TRANSPORTATION IMPACT STUDY

805 DUNDAS STREET EAST

CITY OF MISSISSAUGA
REGION OF PEEL

KJC PROPERTIES INC.

PREPARED BY:
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CFCA FILE NO. 2297-6402

CROZIER
CONSULTING ENGINEERS

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

1.0 Executive Summary

C.F. Crozier & Associates Inc. (Crozier) was retained by KJC Properties Inc. (the Applicant) to conduct a Transportation Impact Study in support of a proposed mixed-use residential and non-residential development located at 805 Dundas Street in the City of Mississauga.

The analysis undertaken herein was completed using the Draft Site Plan prepared by Kirkor Architects and Planners, dated August 18, 2022. Any minor changes to the Site Plan are not expected to materially affect the conclusions set out within this report.

The proposed mixed-use development envisions the construction of three attached townhouse blocks and one 12-storey mixed-use residential tower with ground-floor non-residential space. In total, 399 residential apartment units, 20 townhouse units, and 1972 m^2 of non-residential space is proposed at the site. The site proposes a total of 513 vehicular parking spaces. Access to the site is proposed via a full-moves access to Haines Road.

Under 2022 existing conditions, all study intersections operate with a Level of Service (LOS) "C" or better for the A.M. and P.M. peak periods, with the exception of the intersection of Dundas and Tomken Road operating with a LOS "D" during the P.M. peak. The southbound left-turn movement intersection of Dundas and Haines Road currently nears capacity during the A.M. peak. The southbound through movement at Dundas and Tomken nears capacity during the A.M. peak and exceeds capacity during the P.M. peak, along with the eastbound left-turn which also exceeds capacity during the P.M. peak. As elaborated within the body of the report, it is noted that overcapacity movements are not technically possible under existing conditions, however, the aggressive growth rate applied to older counts and potential signal timing differences between the time period that the original 2014 and 2015 counts were collected, and the 2022 signal timing plans are likely causes of this result.

The study intersections operate very similarly to existing conditions under 2027 future background volumes, and most operational issues identified in the future background horizon were previously identified under existing conditions. Notably, the near capacity southbound through movement at Dundas and Tomken during the A.M. peak slightly exceeds capacity with the addition of background growth and traffic.

The proposed development is expected to generate 131 two-way (71 inbound and 60 outbound) trips during the weekday A.M. peak hour, and 178 (22 inbound and 156 outbound) trips during the weekday P.M. peak hour.

The future total operations of the study intersections are forecasted to be very similar to that of future background conditions. All operational concerns identified under future total conditions arise from existing or future background conditions. As such, the proposed development is not expected to materially impact most surrounding intersections.

Signal optimization measures were recommended at the intersection of Dundas Street East and Haines Road (during the A.M. peak only), as well as the intersection of Tomken Road and Dundas Street East during both the A.M. and P.M. peaks. The results of the signal optimization found that the southbound left-turn movement at Dundas and Haines (during the A.M. peak) would slightly improve, but still operate with a critical volume-to-capacity ratio of 0.96. The intersection of Dundas and Tomken improves to have no overcapacity movements during the A.M. peak. Additionally, the eastbound left-turn movement at Dundas/Haines during the P.M. peak does improve to operate under capacity but still with a critical volume-to-capacity of 0.94. It is recommended the City monitor both the intersections of Dundas at Haines and Dundas at Tomken for additional improvements, as required.

Notably, the proposed site access is forecasted to operate well under capacity, with no operational concerns. Additionally, sight lines at the proposed access are expected to be sufficient, with an adequate corner clearance to the downstream intersection of Dundas and Haines.

The AutoTURN assessment completed for the proposed site confirms that all expected design vehicles on-site (passenger vehicles, waste vehicles and a medium-single unit truck) are expected to maneuver the site with no encroachments or conflicts.

The proposed parking on site is slightly deficient by 10 spaces (less than 10% of total required parking spaces) of the City's By-Law requirements, however an analysis of industry standard ITE parking data indicates that the proposed parking supply would be sufficient to meet the expected demand at the site.

A variety of Transportation Demand Management (TDM) measures have been recommended at the site, including pedestrian and cyclist facilities, carshare spaces, wayfinding, and educational incentives to promote the availability of transit and active transportation. These measures would work to reduce single occupant vehicle trips at the development and promote more sustainable modes of transportation for residents and visitors. The total estimated cost to implement the recommended TDM measures would be between $22,850 - $43,700.

In consideration of the findings of this Transportation Impact Study, the development can be supported from a transportation perspective, with the addition of the recommendations outlined in this report.

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2.0 Introduction

C.F. Crozier & Associates Inc. (Crozier) was retained by KJC Properties Inc. (the Applicant) to complete a Transportation Impact Study for a proposed mixed-use residential and non-residential development at 805 Dundas Street in the City of Mississauga.

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 to support the study road network, if required.

A Terms of Reference (ToR) encompassing the scope of the Traffic Impact Study was circulated to the City of Mississauga on May 16, 2022, and comments were received on May 30, 2022. Correspondence from the City is included in Appendix A.

This study has been conducted in conformance with the City of Mississauga Traffic Impact Study Guidelines.

2.1 Development Proposal

The most recent Site Plan prepared by Kirkor Architects and Planners (provided in Appendix B) dated August 18, 2022, envisions the following elements for the proposed development:

- Building A, which is a twelve-storey building with 399 residential units and 1,972 m^2 of ground-floor non-residential space.
- Buildings B and D each consisting of six 3-storey attached townhouse units, and Building C consisting of eight 3-storey attached townhouse units.
- A total of 513 vehicular parking spaces (67 at grade and 446 underground).
- A total of 461 bicycle parking spaces (419 long-term spaces and 42 short-term spaces).

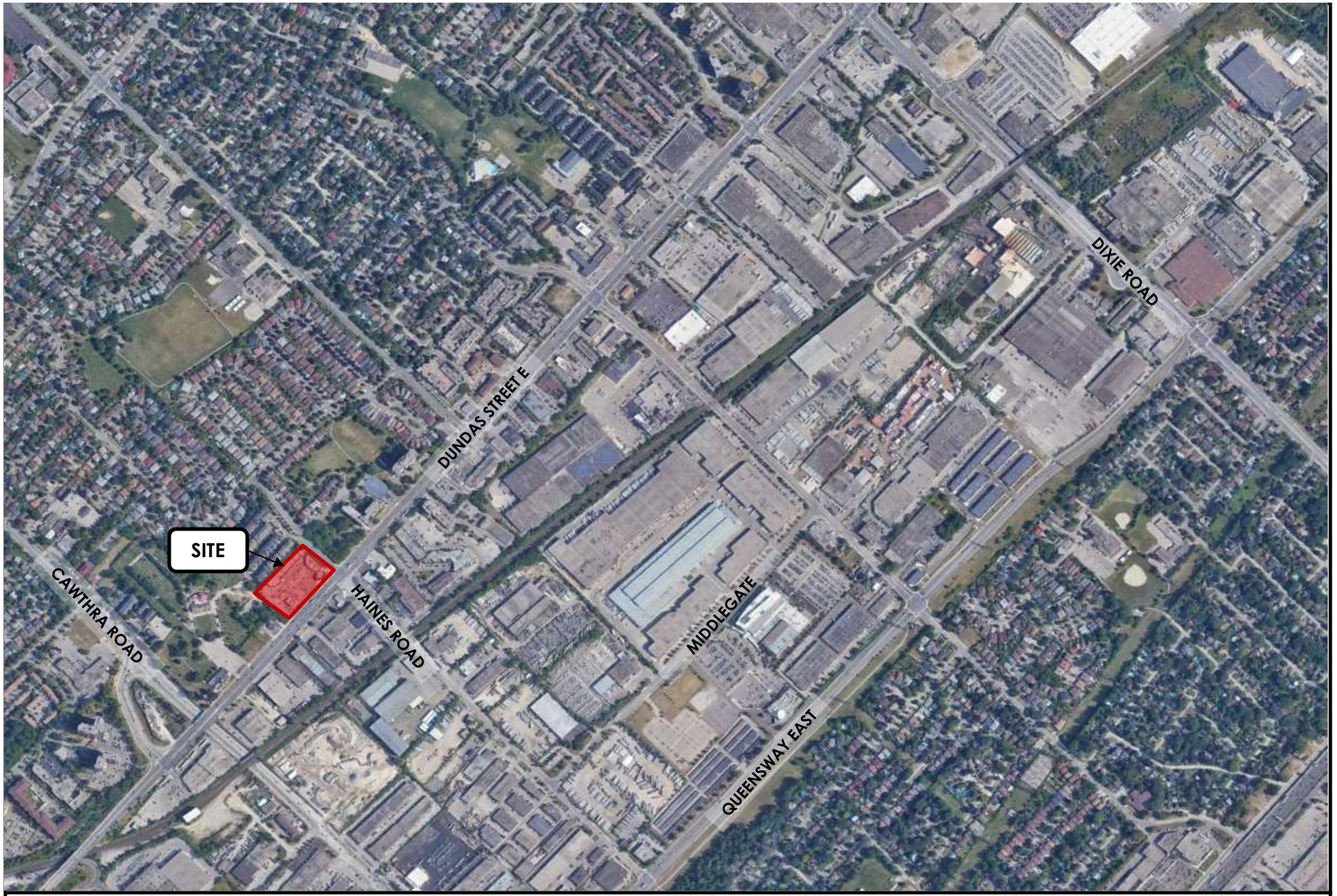
Access to the site is proposed via a full-moves access off of Haines Road.

It should be noted that the plans for the ground-floor non-residential space are still in development and are subject to change.

2.2 Development Lands

The subject lands cover an area of approximately 3.1 acres and is bound by Haines Road to the east, Dundas Street East to the south, Cedar Creek Lane to the west, and existing residential developments to the north. The subject property is currently occupied by a commercial plaza and zoned as a Commercial Zone (C2) by the City of Mississauga Zoning By-Law 0225-2007.

The Site Location is included in Figure 1.



Legend

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

805 Dundas Street E

Site Location

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Figure 1

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Date. 2022.05.16
Analyst. FC

3.0 Existing Conditions

The following intersections were reviewed as part of the study area per confirmation with City staff:

- Dundas Street East at ramp to Cawthra Road
- Dundas Street East at Haines Road
- Dundas Street East at Tomken Road

The following section provides a description of the study area from a transportation context, as well as a traffic operations analysis of the study road network.

3.1 Study Road Network

Dundas Street East is an east-west roadway with a six-lane urban cross-section east of Cawthra Road, and a four-lane cross-section west of Cawthra Road. The road is divided by a two-way left-turn median within the study area. Dundas Street is under the jurisdiction of the City of Mississauga and is classified as an Arterial Road in the City of Mississauga Official Plan Schedule 5 "Long Term Road Network", included in Appendix C. Dundas Street has sidewalks on both sides of the road in the study area and no dedicated cyclist facilities. The roadway has a posted speed limit of 60 km/h in the study area.

Cawthra Road is a north-south roadway with a four-lane urban cross-section. Cawthra Road is under the jurisdiction of Peel Region and is classified as a Regional Arterial Road per the City's Official Plan. Cawthra Road has sidewalks on both sides of the road, and a raised bicycle path adjacent to the roadway south of the ramp to Dundas Street E. The roadway has a posted speed limit of 50 km/h in the study area.

Haines Road is a north-south roadway with a two-lane urban cross-section. Haines Road is under the jurisdiction of the City and is classified as a Minor Collector under the City's Official Plan. Haines Road has sidewalks on one side of the road in the study area, with no dedicated cyclist facilities. The segment of Haines Road south of Dundas Street East has a posted speed limit of 40 km/h. The segment of Haines Road north of Dundas Street East is assumed to have a speed limit of 50 km/h.

Tomken Road is a north-south roadway with a four-lane urban cross-section. Tomken Road is under the jurisdiction of the City and is classified as a Major Collector under the City's Official Plan. Tomken Road has sidewalks on both sides of the road, and no dedicated cyclist facilities. The roadway has a posted speed limit of 50 km/h.

3.2 Study Intersections

The intersection of **Dundas Street East to Cawthra Road** is a four-legged signalized intersection. The northbound approach is a private access to a commercial property and consists of a single through/left-turn lane, and a single left-turn lane. The southbound approach ramp from Cawthra Road consists of a single left-turn lane, a shared through/left-turn lane, and a channelized right-turn lane. The eastbound approach on Dundas Street East consists of a single left-turn lane, a single through lane, and a shared through/right-turn lane. The westbound approach consists of an auxiliary left-turn lane, three through lanes and an auxiliary channelized right-turn lane.

The intersection of **Dundas Street East and Haines Road** is a four-legged signalized intersection. The northbound approach on Haines Road consists of an auxiliary left-turn lane and a shared through/right-turn lane. The southbound approach on Haines Road consists of a single through lane, and an auxiliary left-turn and channelized right-turn. The eastbound and westbound approaches on Dundas Street East each consist of a single auxiliary left-turn lane, two through lanes and a single shared through/right-turn lane.

The intersection of **Dundas Street East at Tomken Road** is a four-legged signalized intersection. The northbound approach from a private commercial access consists of a single shared through/left/right-turn lane. The southbound approach on Tomken Road consists of a right-turn lane and a shared through/right-turn lane. The westbound approach on Dundas Street East consists of a channelized right-turn, three through lanes, and an auxiliary left-turn lane. The eastbound approach on Dundas Street E consists of a single left-turn lane, two through lanes, and a single shared through/right-turn lane.

Figure 2 illustrates the study roadways.

3.3 Existing Transit

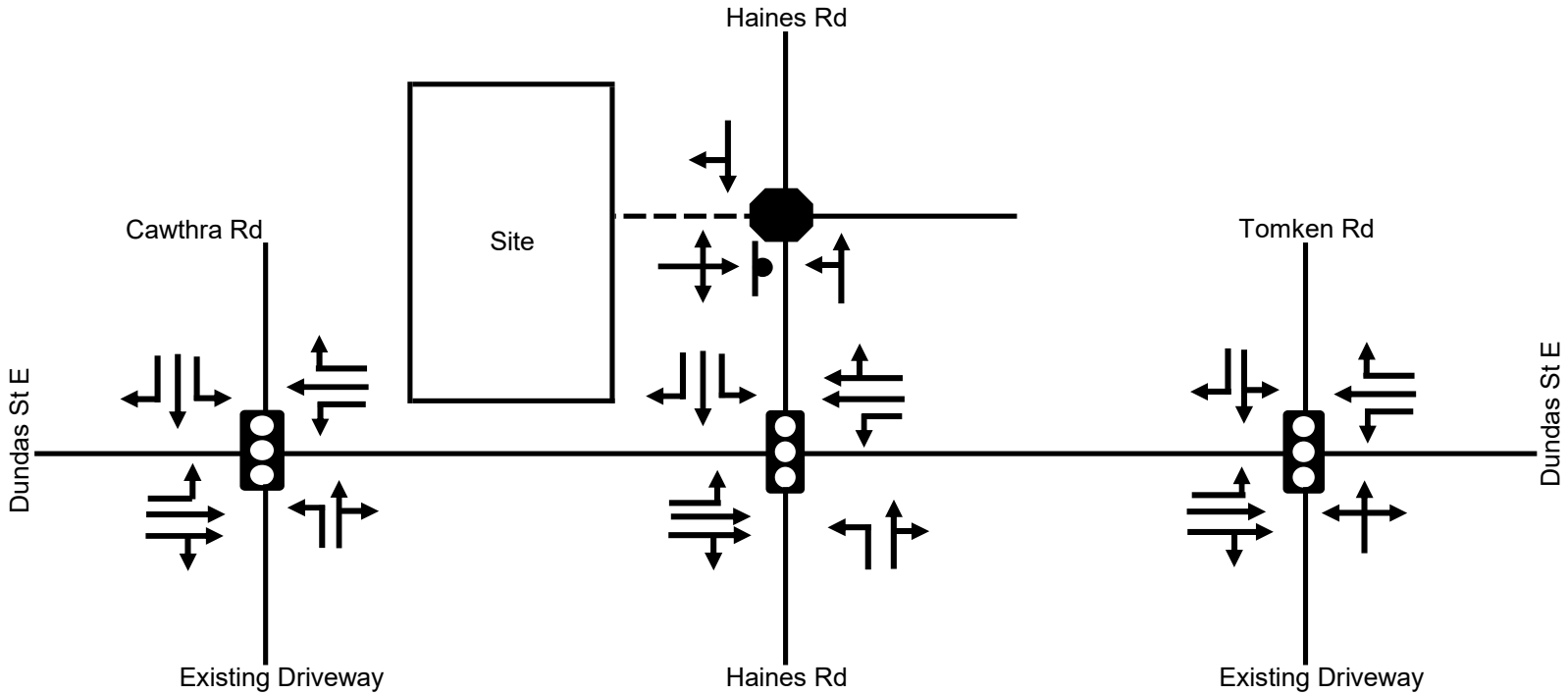
MiWay Transit operates bus routes in the immediate study area, and regional transit is offered by GO Transit within a reasonable distance (via local transit) from the site.

MiWay Route 1 "Dundas" has a stop at Dundas Street and Haines Road within 100 meters (1 minute walk) of the site. This route operates in the east-west direction along Dundas Street between TTC Kipling Station to the east and Laird Road/Ridgeway Drive to the west and operates with a regular schedule on all days of the week. This route also connects to the Dixie GO Station within a 5-minute bus ride to Dixie Road at Dundas Street East and 9-minute walk south to the station.

MiWay Route 51 "Tomken" has a stop at Dundas Street and Haines Road within 200 meters (2-minute walk) of the site. This route operates primarily north-south along Tomken Road between Cardiff Boulevard to the north and Stanfield Road to the south and operates on a regular schedule on Mondays to Saturdays.

Transit maps are provided in Appendix D.

The nearby transit stops are illustrated in Figure 3.



Legend

Stop Control
Signal Control
Stop Sign
Lane Movement
Existing Road
Future Road

805 Dundas Street E

Existing Roadway Configuration

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Figure 2

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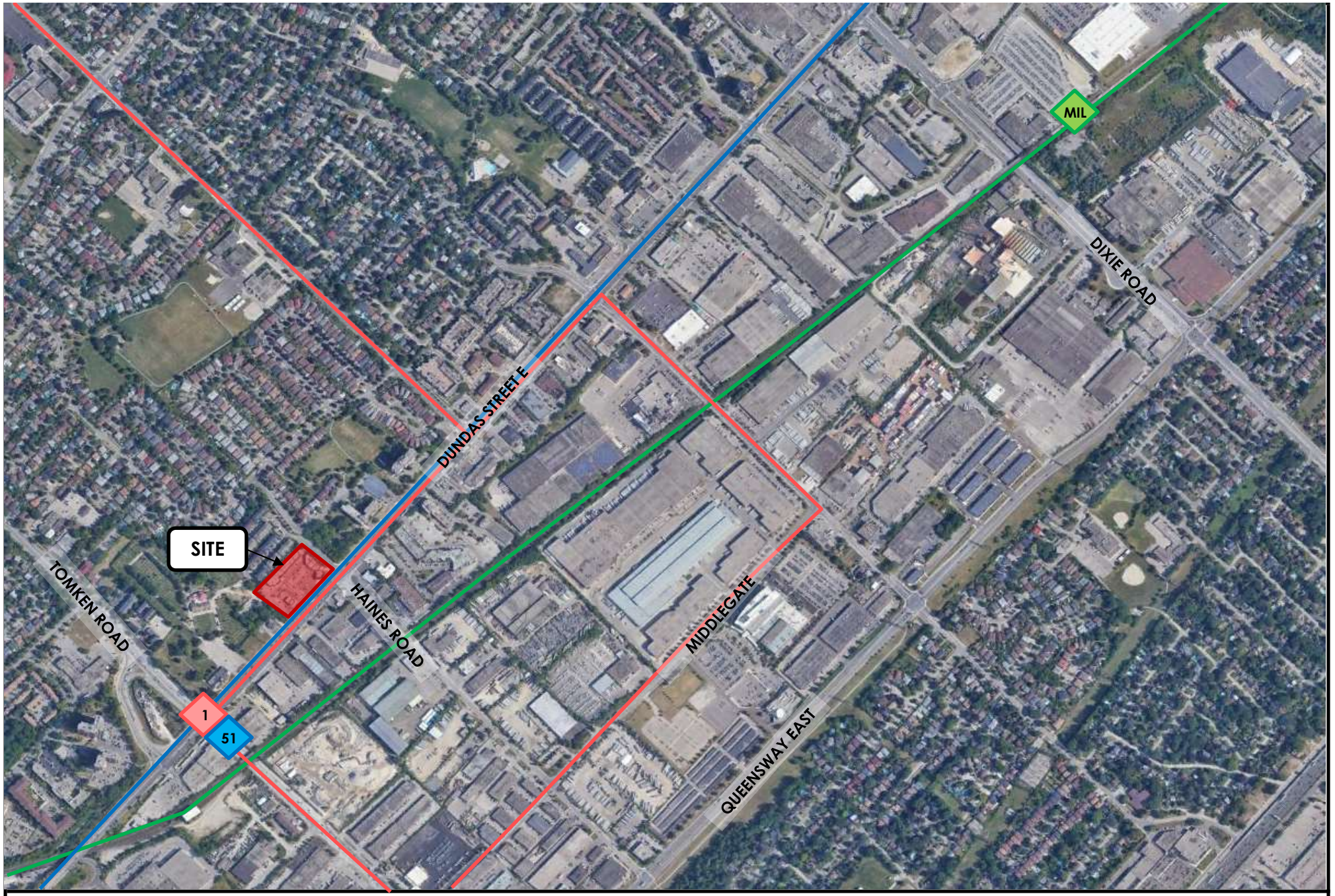
Analyst. FC



Legend

- MiWay Route 1
- MiWay Route 51
- GO Transit

805 Dundas Street E

Nearby Transit

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Figure 3

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3.4 Traffic Data

Turning movement counts and signal timing plans were provided by the City and Region for the study intersections, and the details of the counts are provided in Table 1 below.

Table 1: Traffic Data Information

Intersection	Data	Date of Collection	Source
Dundas Street at Cawthra Ramp (South)	Turning Movement Count	May 26, 2015	Peel Region (Trans-Plan)
	Signal Timing Plan	June 8, 2022	Peel Region
Dundas Street at Haines Street	Turning Movement Count	February 4, 2014	City of Mississauga
	Signal Timing Plan	June 10, 2022	
Dundas Street at Tomken Road	Turning Movement Count	February 6, 2014	
	Signal Timing Plan	June 10, 2022	

The traffic data used for analysis has been provided in Appendix E.

It should be noted that adjustments were made to the signal timing plan at Dundas Street at the ramp to Cawthra Road as the following for both the A.M. and P.M. peaks:

- Reduced the southbound walk time to 0.00 seconds and the "flash don't walk" time to 22.5 seconds, as without this adjustment, there would not be enough green time to accommodate the walk time.

- Reduced the minimum split to 15.5 seconds (minimum initial + amber + all-red). As the southbound approach has a pedestrian call button, it can be assumed this approach will not allocate the pedestrian phase as long as the pedestrian movement has been called.

3.5 Growth Rates

3.5.1 Historical Growth

Growth rates to bring historical counts to reflect 2022 existing conditions for roadways under the City of Mississauga's jurisdiction were calculated based on available historical Annual Average Daily Traffic (AADT) counts along City roadways. The AADT data is provided in Appendix E. All historical growth rates calculated (with the following caveats) have been provided in Table 2.

It is noted that no historical AADT data was available along Haines Road, and was thus assumed to be 0%, which is consistent with post 2022 growth expected for Haines Road per the City's projections also provided in Table 2.

Additionally, it is noted that a negative growth rate was observed along Dundas Street (for both the A.M. and P.M. peak) based on the limited AADT data available. As such, a conservative growth rate of 0.5% was applied to through movements along Dundas Street, which is also consistent with the City's projections for future growth.

Lastly, it is noted that growth along Tomken Road calculated for the P.M. peak was rounded to 2.0% based on a calculation of 2.2% growth. It should also be noted that the growth for the A.M. peak was calculated to be over 25%; this is attributed to likely erroneous/outlier data during the 2018 A.M. peak (8:00 A.M. to 9:00 A.M.) as this data was not consistent with the pattern of traffic observed during 2017 and the volumes observed time periods before and after the 8:00 A.M. to 9:00 A.M. time period during 2018. To provide a more realistic estimation of traffic growth expected along Tomken Road during the A.M. peak consistent with the City's future growth estimates, a growth rate of 2.0% was applied to through movements during the A.M. peak along Tomken Road for the 2014 to current horizon.

The City of Mississauga and Region of Peel provided future growth rates for the study horizons relevant to the study area, as summarized per Table 2.

Table 2: Historical and Future Growth Rates

Roadway	Direction	Peak Period	Horizon Year, Compounded Annual Growth Rate		
			2014-2021	2021-2026	2026-2027
Dundas Street	EB	A.M.	0.5%	0.5%	0.0%
		P.M.	0.5%	0.5%	0.0%
	WB	A.M.	0.5%	1.0%	0.0%
		P.M.	0.5%	0.5%	0.0%
Haines Road	NB/SB	A.M.	0.0%	0.0%	0.0%
		P.M.	0.0%	0.0%	0.0%
Tomken Road	NB	A.M.	2.0%	2.0%	0.5%
		P.M.	2.0%	2.0%	0.0%
	SB	A.M.	2.0%	2.0%	0.0%
		P.M.	2.0%	2.0%	1.0%
Roadway	**Direction**	**Peak Period**	**2016-2031**		
Cawthra Road	NB	A.M./P.M.	0.5%		

Considering the age of the traffic counts dating to 7-8 years prior to the date of the TIS, and especially bearing in mind the conservative growth rate applied to Tomken Road, it is expected that the analysis contained herein provides a very conservative estimate of roadway volumes, and likely not indicative of current travel patterns. Additionally, considering the significant difference in time between the date of the traffic counts and signal timing plans, it is expected that the difference in conditions would result in analysis results not indicative of existing operations.

3.6 Traffic Modelling

The evaluation of intersections within this report is 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 F.

Per Peel Region's TIS guidelines, a peak hour factor of 1.00 was used for all movements.

Per the Peel Region Traffic Impact Study Guidelines, the following parameters were used to identify critically operating movements and/or intersections:

- Volume/capacity (V/C) ratios for overall intersection operations, through movements or shared through/turning movements increased to 0.90 or above.
- V/C ratios for exclusive movements that will exceed 1.00.
- 95th percentile queue lengths for individual movements that exceed available lane storage.

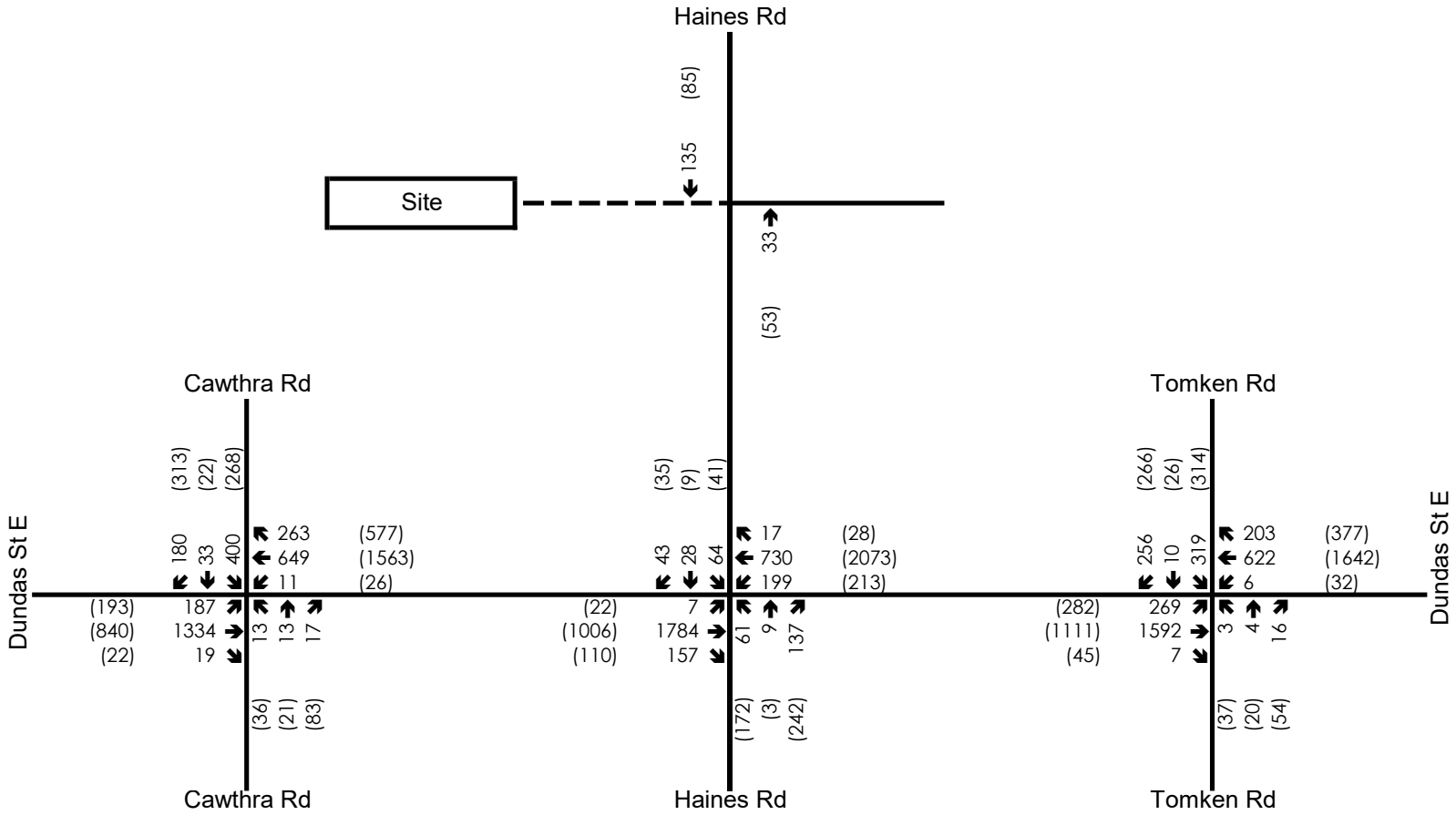
3.7 Intersection Operations

The traffic operations at the study intersections were analyzed based on observed traffic volumes during the weekday A.M. and P.M. peak hours, as illustrated in Figure 4. Detailed capacity analyses are included in Appendix G. Table 3 summarizes the existing traffic operations within the study area.

Table 3: 2022 Existing Levels of Service

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay (s)	Critical V/C Ratio [2] (Approach)	95th %ile *(50th %ile)* Queue Length > Storage Length
Dundas Street East at Ramp to Cawthra Road	Signal	A.M.	C	28.2	0.69 (SBL) 0.69 (SBT)	None
		P.M.	C	26.0	0.72 (EBL)	100m *(35m)* > 75m (EBL) 80m > 45m (WBR)
Dundas Street East at Haines Road	Signal	A.M.	C	21.2	**0.99 (SBL)**	80m > 20m (WBL) 50m *(25m)* > 25m (SBL)
		P.M.	B	14.2	0.78 (NBL)	55m > 20m (WBL) 80m *(60m)* > 75m (NBL)
Dundas Street East at Tomken Road	Signal	A.M.	C	20.5	**0.99 (SBT)**	35m *(15m)* > 15m (EBL)
		P.M.	D	40.0	**0.97 (EBL)** **1.21 (SBT)**	180m > 15m (EBL) 100m > 30m (WBR)

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro).
Note 2: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection, or any v/c ratios greater than 0.90 for through or shared through/turning movements, or greater than 1.00 for exclusive movements.



Legend		805 Dundas Street E	CROZIER CONSULTING ENGINEERS	Figure 4
xx	A.M. Peak Hour Traffic Volumes			Project No. 2297-6402
(xx)	P.M. Peak Hour Traffic Volumes	2022 Existing Traffic Volumes		Date. 2022.05.16
{xx}	Weekend Peak Hour Traffic Volumes			Analyst. FC

As indicated in Table 3, each of the study intersections operate with a Level of Service "C" or better during both the A.M. and P.M. peak hours, with the exception of the intersection of Dundas Street East at Tomken Road in the P.M. peak period operating at a Level of Service "D".

A maximum volume-to-capacity ratio of 0.69 was observed for intersection of Dundas Street East at Ramp to Cawthra Road were for both the southbound left and through movements during the weekday A.M peak hour and 0.72 for the east-bound left movement for the weekday P.M peak hour. It is noted that the 95th percentile queues for the eastbound left and westbound right movements slightly exceed the storage length available during the P.M. weekday peak hours, however the average queue length (represented by the 50th percentile queue) is within the available storage.

As indicated in Table 3, the intersection of Dundas Street East at Haines Road has an observed maximum volume-to-capacity ratio of 0.99 and 0.79 for the southbound left and northbound left movements for the weekday A.M. and P.M. peak hours, respectively. It is noted that the 95th percentile queues for the southbound left movement slightly exceed the storage length available during the A.M. weekday peak hours, however the average queue length (represented by the 50th percentile queue) is within the available storage.

As indicated in Table 3, the intersection of Dundas Street East at Tomken Road has an expected maximum volume-to-capacity ratio of 0.97 and 1.21 for the eastbound left and southbound through movements for the weekday A.M. and P.M. peak hours, respectively. It is noted that the 95th percentile queues for the eastbound left movement slightly exceed the storage length available during the A.M. weekday peak hours, however the average queue length (represented by the 50th percentile queue) is within the available storage.

4.0 Future Background Conditions

4.1 Study Horizons

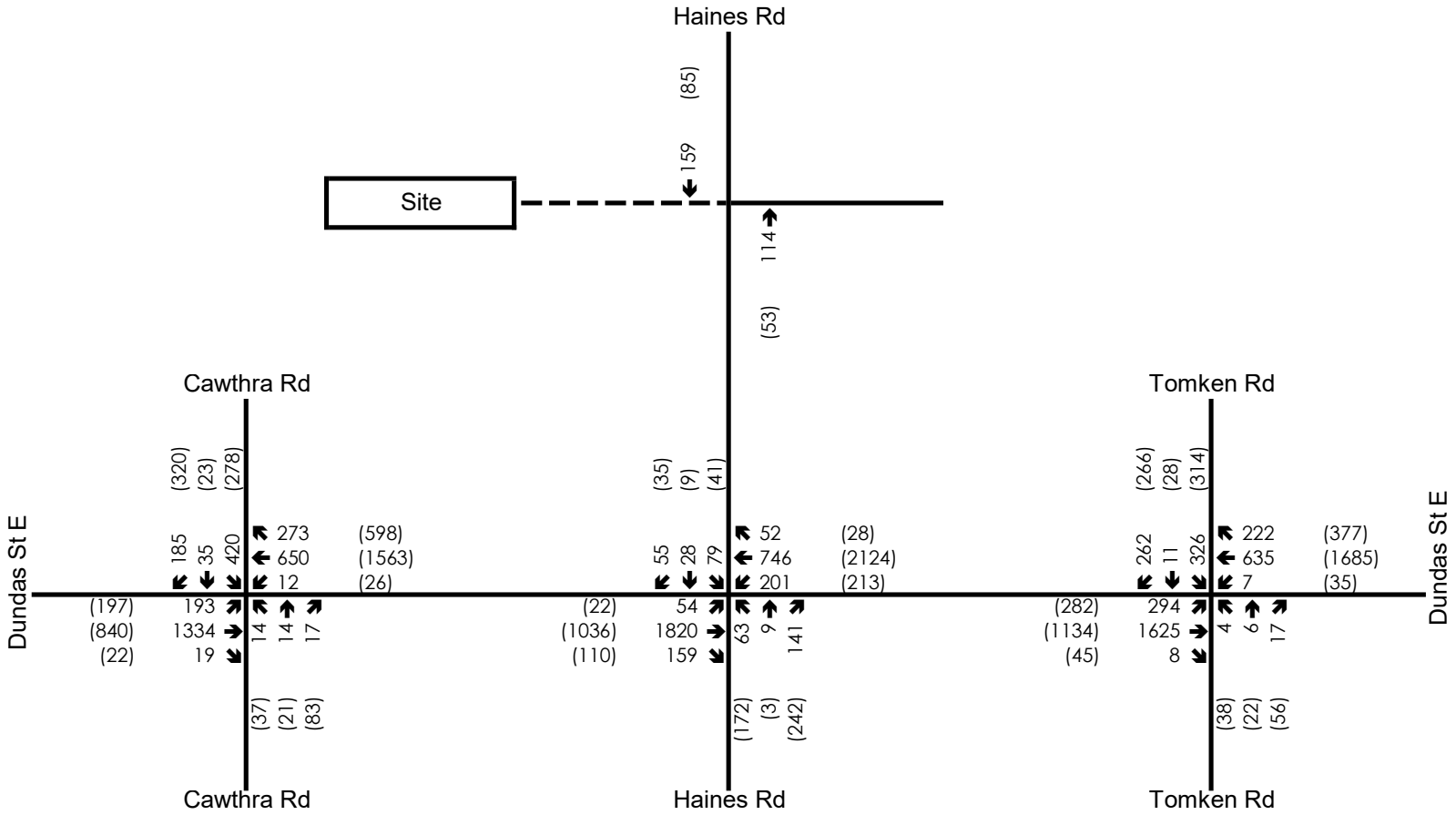
Following confirmation with City of Mississauga staff, a five-year horizon year (2027) was considered to be appropriate for analysis purposes.

4.2 Background Development

Per consultation with City staff, the following background developments were identified as part of the study area:

- 3111-3123 Cawthra Road (SP 18-133)

A Traffic Impact Study for the above noted development was completed by NexTrans in January 2016. The development proposes the construction of 42 townhouse units. The development was estimated to generate 24 two-way trips during the A.M. peak, and 27 two-way trips during the P.M. peak. The assignment of these background trips on the study road network are illustrated in Figure 5.



Legend

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

805 Dundas Street E

Future Background Traffic Volumes

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Figure 5

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4.3 Dundas Connects Master Plan

The Dundas Connects Master Plan (DCMP) was conducted in May 2018 by the City of Mississauga to identify improvements to the Dundas Street East corridor between Etobicoke Creek and Winston Churchill Boulevard. Several recommendations were made in this study, which are discussed in the following section. Relevant excerpts from the DCMP are provided in Appendix J.

4.3.1 Cawthra Focus Area

Per Figure 5-10 of the DCMP, the subject development falls within the Cawthra Focus Area; the figure also illustrates the framework plan for the Cawthra Focus Area, which envisions mixed use development, consistent with the proposed development.

4.3.2 Dundas Bus Rapid Transit (BRT)

The DCMP recommended implementing a Bus Rapid Transit (BRT) route along the Dundas Street East corridor within the City of Mississauga, which would also connect to other municipalities, eastbound to Kipling Station in Toronto, and westbound to Hamilton.

According to Metrolinx's Dundas BRT webpage at the time of writing, the subject development would be located on the Mississauga East BRT line. BRT stops are proposed at Tomken Road and Cawthra Road. The proposed stops at Tomken Road and Cawthra Road would be approximately a 6-minute walk (500 meters) from the development.

Figure 5-42 of the DCMP outlines that the segment of Dundas Street East in the study area is expected to operate with a BRT Median design. As shown in Figure 5-38 of the DCMP, the cross-sectional design of the Median design includes two 3.50-meter transit lanes in the center of the roadway in addition to the existing four vehicular lanes. The new design also envisions the addition of a 2.00-meter bike lane, tree buffer lane, and sidewalks, which would integrate with storefronts along the Dundas Street frontage.

Special discussion is provided in Section 5.2.3.5 regarding the widening of Dundas Street East at the overpass over Cawthra Road, and that given the structure of the existing bridge, that a complete replacement of the bridge is recommended to accommodate the widening for the transit lanes.

4.3.3 Roadway Improvements

The DCMP concluded with the recommendation that the Dundas Street corridor should maintain the existing four-lane general traffic lane configuration, in addition to the transit lane median and active transportation improvements.

4.4 Intersection Operations

Traffic operations at the study intersections were analyzed following addition of volumes from associated growth rates and background developments in the vicinity of the subject development. Table 4 summarizes the 2027 future background Levels of Service. Detailed capacity analyses are included in Appendix I.

Table 4: 2027 Future Background Levels of Service

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay (s)	Critical V/C Ratio [2] (Approach)	95th %ile *(50th %ile)* Queue Length > Storage Length
Dundas Street East at Ramp to Cawthra Road	Signal	A.M.	C	28.9	0.68 (SBL)	None
		P.M.	C	26.8	0.72 (EBL)	105m (*40m*) > 75m (EBL) 85m > 45m (WBR)
Dundas Street East at Haines Road	Signal	A.M.	C	22.3	**0.99 (SBL)**	80m > 20m (WBL) 50m (*25m*) > 25m (SBL)
		P.M.	B	14.4	0.78 (NBL)	55m > 20m (WBL)
Dundas Street East at Tomken Road	Signal	A.M.	C	21.6	**1.02 (SBT)**	50m > 15m (EBL)
		P.M.	D	41.3	**0.99 (EBL)** **1.23 (SBT)**	205m > 15m (EBL) 115m > 30m (WBR)

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro).
Note 2: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection, or any v/c ratios greater than 0.90 for through or shared through/turning movements, or greater than 1.00 for exclusive movements.

As indicated in Table 4, each of the study intersections operate with a Level of Service "C" or better during both the A.M. and P.M. peak hours, with the exception of the intersection of Dundas Street East at Tomken Road operating with a Level of Service "D" during the P.M. peak. It is noted the future background operations are very similar to that of the existing operations noted previously; all operational or queuing concerns identified for the future background horizon were previously identified under existing conditions.

A maximum volume-to-capacity ratio of 0.68 was observed for intersection of Dundas Street East at Ramp to Cawthra Road were for both the south-bound left and through movements during the weekday A.M peak hours and 0.72 for the east-bound left movement for the weekday P.M peak hours. It is noted that the 95th percentile queues for the eastbound left movement slightly exceed the storage length available during the P.M. weekday peak hours, however the average queue length (represented by the 50th percentile queue) is within the available storage.

As indicated in Table 4, the intersection of Dundas Street East at Haines Road has an observed maximum volume-to-capacity ratio of 0.99 and 0.78 for the southbound left and northbound left movements for the weekday A.M. and P.M. peak hours, respectively. It is noted that the 95th percentile queues for the southbound left movement slightly exceed the storage length available during the A.M. weekday peak hours, however the average queue length (represented by the 50th percentile queue) is within the available storage.

As indicated in Table 4, the intersection of Dundas Street East at Tomken Road has an expected maximum volume-to-capacity ratio of 0.99 and 1.23 for the eastbound left and southbound through movements for the weekday A.M. and P.M. peak hours, respectively.

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. The following section outlines the transportation planning impacts expected at the site, including the trip generation, trip distribution and assignment of site-generated trips.

5.1 ITE Trip Generation

The Institute of Transportation Engineers (ITE) Trip Generation Manual 11th Edition was used to forecast the number of trips generated by the proposed mixed-use development. As the development proposes a variety of land uses, the following Land Use Codes (LUC) were determined to be appropriate:

- LUC 215 "Single Family Attached Housing" for the residential units in Buildings B, C, and D
- LUC 222 "Multifamily Housing (High Rise)" for the residential units in Building A
- LUC 820 "Shopping Center" for the non-residential space in Building A

It is noted that LUC 820 was used to estimate the site-generated trips for the non-residential portion of the proposed development as this land use code encompasses a variety of commercial and retail land uses that may be planned for this space in the future.

Relevant excerpts from the ITE Trip Generation Manual 11th Edition are included in Appendix J.

Internal trips are trips that are made between the land uses internal to the overall site without making use of the road system external to the site. For example, residents of the proposed townhouses may make trips to the ground-floor non-residential space in the high-rise building. These trips would not affect the external road network, as these trips originate and terminate internally within the site. Internal trips were calculated using the NCHRP Project 8-51 "Internal Capture Methodology for Multi-Use Developments" (2011). The origin-destination matrix of the subject development with internal trip estimates are shown in Appendix K.

Additionally, it should be noted that the site is currently occupied by a retail plaza. To account for the existing site traffic being removed from the adjacent roadways (when the proposed development is constructed), the existing number of site trips from the plaza was estimated and subsequently subtracted from the future total traffic estimation.

Table 5 summarizes the number of trips forecasted to be generated by the proposed development, as well as the existing site traffic characteristics.

Per the results contained in Table 5, the proposed development is expected to generate 131 two-way (71 inbound and 60 outbound) trips during the weekday A.M. peak hour, and 176 (21 inbound and 55 outbound) trips during the weekday P.M. peak hour.

Table 5: ITE Trip Generation

Land Use	Units/GFA	Parameter	Vehicle Trips			
			Weekday A.M. Peak		Weekday P.M. Peak	
			Inbound	Outbound	Inbound	Outbound
Building A – Residential LUC 222 Multifamily Housing (High Rise)	399 Units	Equation	T = 0.26 X + 23.12		T = 0.22 X + 18.85	
		Raw Trip Generation	71	56	36	70
		Internal Trip Reduction	(1)	(1)	(10)	(4)
		Net Trip Generation	70	55	25	67
Building B – Townhouse LUC 215 Single Family Attached Housing	6 Units	Equation	0.48		0.57	
		Raw Trip Generation	1	2	2	1
		Internal Trip Reduction	-	-	(1)	-
		Net Trip Generation	1	2	1	1
Building C – Townhouses LUC 215 Single Family Attached Housing	8 Units	Equation	0.48		0.57	
		Raw Trip Generation	1	3	3	2
		Internal Trip Reduction	-	-	(1)	(0)
		Net Trip Generation	1	3	2	2
Building D – Townhouses LUC 215 Single Family Attached Housing	6 Units	Equation	0.48		0.57	
		Raw Trip Generation	1	2	2	1
		Internal Trip Reduction	-	-	(1)	(0)
		Net Trip Generation	1	2	1	1
Building A – Non-res LUC 820 Shopping Center	21,230 SF	Equation	0.84		3.40	
		Raw Trip Generation	11	7	35	37
		Internal Trip Reduction	-	-	()	(10)
		Net Trip Generation	10	6	31	28
Sub Total		**Raw Trips**	**85**	**69**	**77**	**113**
		Internal Trip Reductions	(2)	(2)	(15)	(13)
		Net Trips Generated	84	68	62	99
Existing Retail LUC 820 Shopping Center	25040 SF	Equation	0.84		3.40	
		Reductions	(13)	(8)	(41)	(44)
Total Trips Generated			**71**	**60**	**21**	**55**

5.2 Trip Distribution and Assignment

The Transportation Tomorrow Survey (TTS) is a comprehensive travel data survey conducted in the Greater Toronto and Hamilton Area. Data from the 2016 TTS was used to determine the peak hour trip distribution at the site for the residential land uses and non-residential land uses proposed at the site.

The inbound and outbound residential trip distributions were derived by filtering TTS data with a trip purpose of "Home", destined to and originating from the subject GTA Zone 3669, and neighboring GTA Zones 3668 and 3674 (with residential characteristics). The A.M. and P.M. distributions were determined by filtering for trips starting during the periods of 6:30 A.M. – 9:30 A.M. and 3:30 P.M. – 6:30 P.M., respectively. Table 6 summarizes the residential trip distribution. Figure 6 illustrates the residential trip assignment.

Table 6: Residential Trip Distribution

Direction	A.M. Inbound	A.M. Outbound	P.M. Inbound	P.M. Outbound
Northwest	5%	9%	10%	3%
North	14%	10%	11%	6%
Northeast	16%	19%	17%	19%
East	23%	15%	17%	21%
Southeast	19%	17%	20%	17%
South	4%	4%	5%	6%
Southwest	0%	4%	5%	16%
West	19%	21%	15%	11%

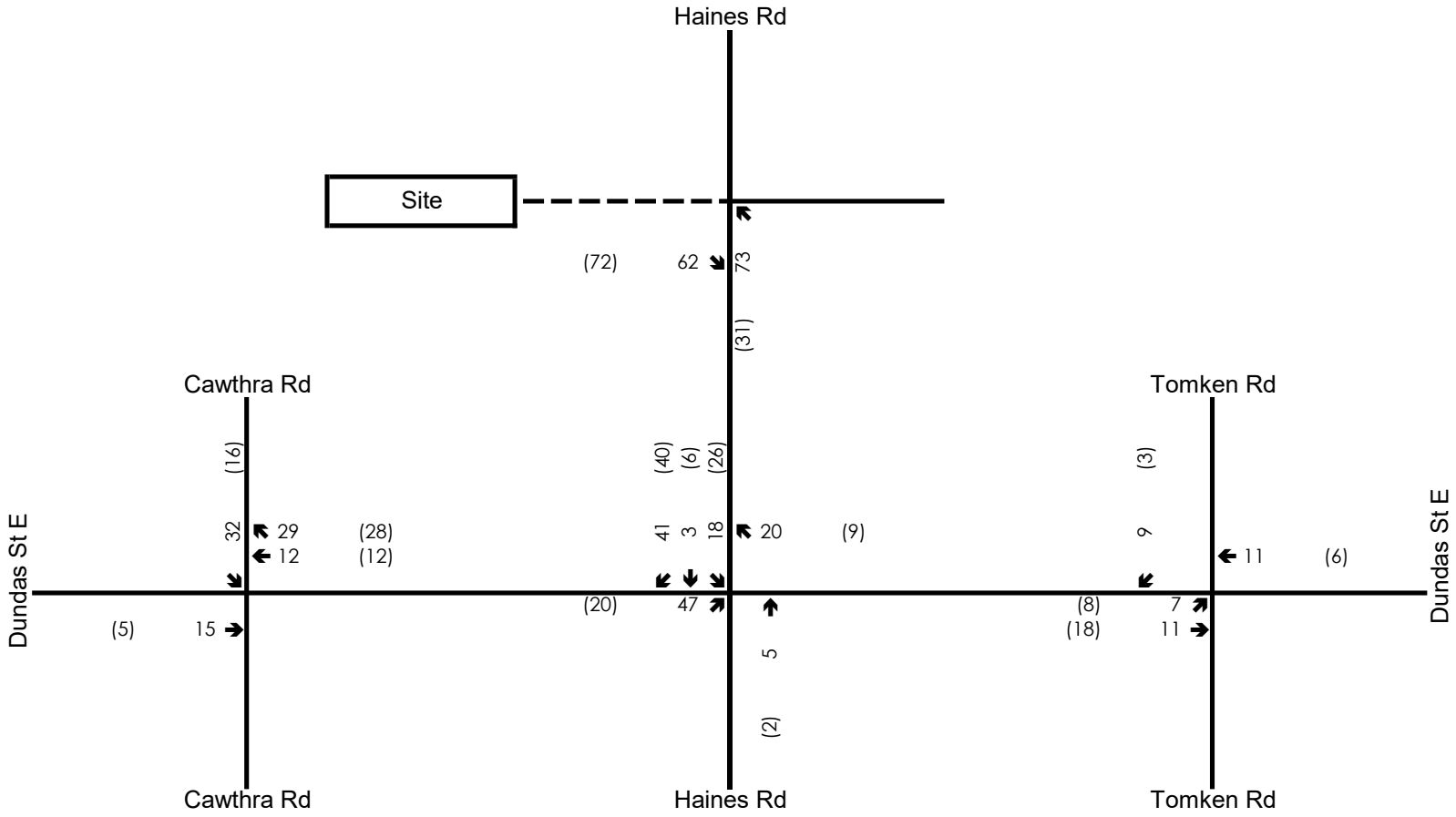
Similarly, the inbound and outbound non-residential trip distributions were filtered in a similar manner as above, with the exception that trips were filtered with the trip purpose of "Market/Shop", and the data catchment area was expanded to include the subject GTA Zone 3669, as well as GTA Zones 3668, 3659, 3660, 3667, and 3674 with mixed residential and commercial characteristics. The wider catchment area was used for the non-residential trip distribution to provide a better set of data. Figure 7 illustrates the non-residential trip assignment.

Table 7: Non-residential Trip Distribution

Direction	A.M. Inbound	A.M. Outbound	P.M. Inbound	P.M. Outbound
Northwest	7%	31%	19%	24%
North	28%	0%	1%	10%
Northeast	28%	13%	26%	18%
East	10%	17%	15%	13%
Southeast	0%	23%	15%	5%
South	0%	0%	8%	11%
Southwest	21%	17%	2%	5%
West	6%	0%	14%	12%

It should be noted that the non-residential trip distribution was also used to remove the existing retail trips estimated to be generated by the existing plaza on-site. The assigned trips subtracted from the future total traffic volumes are provided in Figure 8.

Appendix L provides the detailed TTS query results for both the residential and non-residential trip queries. The total site trip assignment is presented in Figure 9.



Legend

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

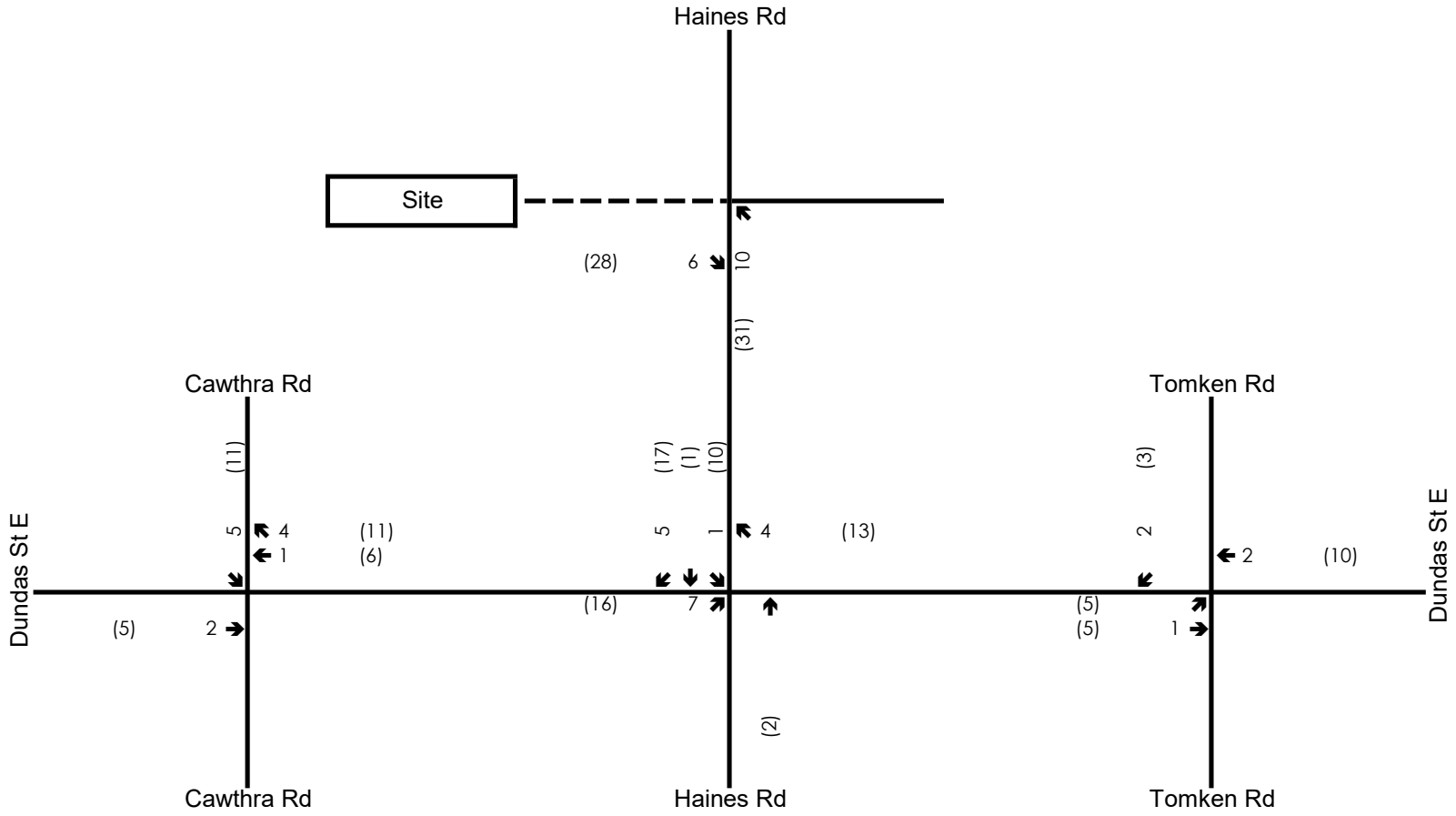
805 Dundas Street E

Residential Trip Assignment

CROZIER CONSULTING ENGINEERS

Figure 6

Project No. 2297-6402
Date. 2022.05.16
Analyst. FC



Legend

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

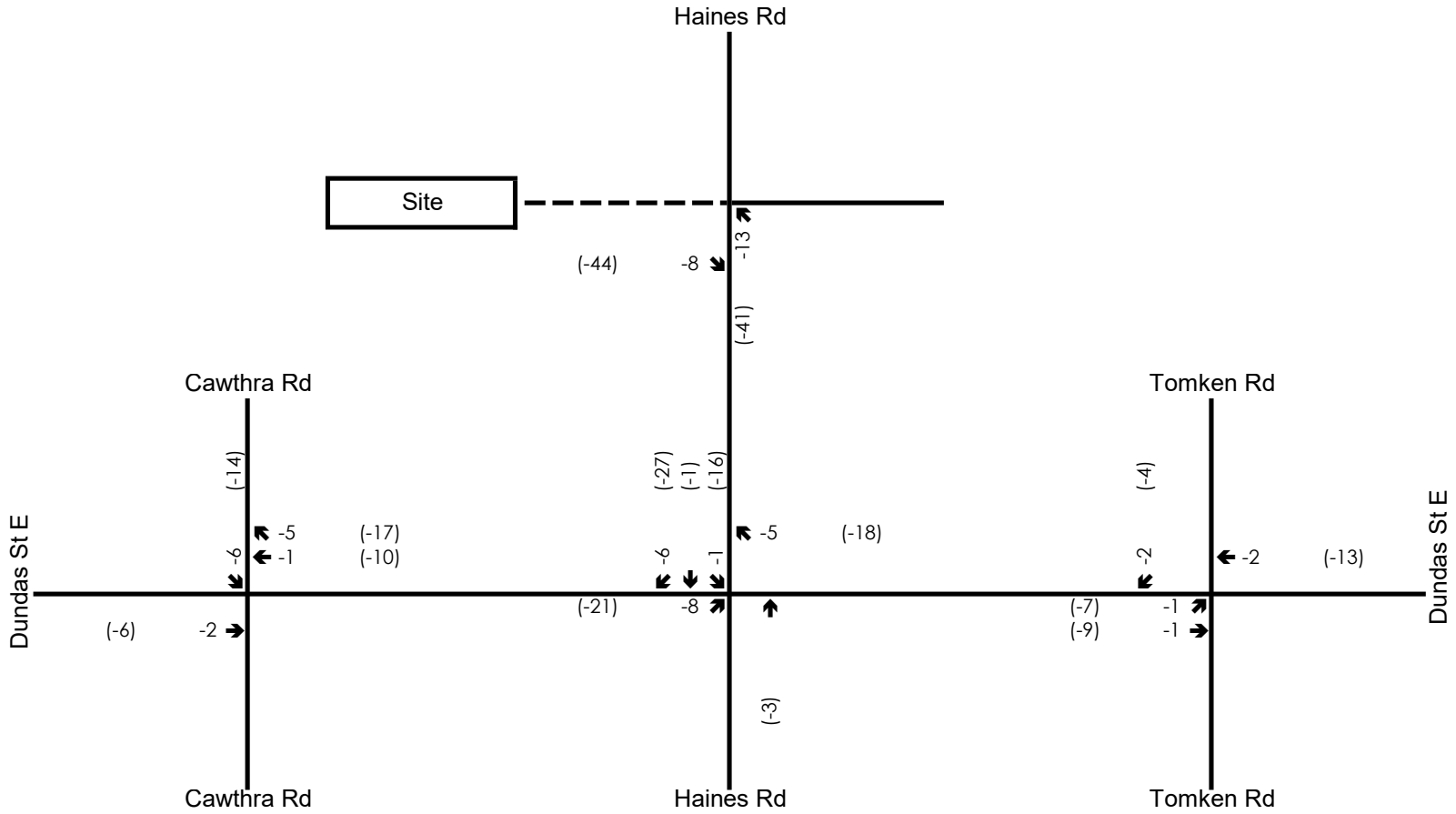
805 Dundas Street E

Non-residential Trip Assignment

CROZIER CONSULTING ENGINEERS

Figure 7

Project No. 2297-6402
Date. 2022.05.16
Analyst. FC



Legend

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

805 Dundas Street E

Existing Retail Trip Assignment (Deduction)

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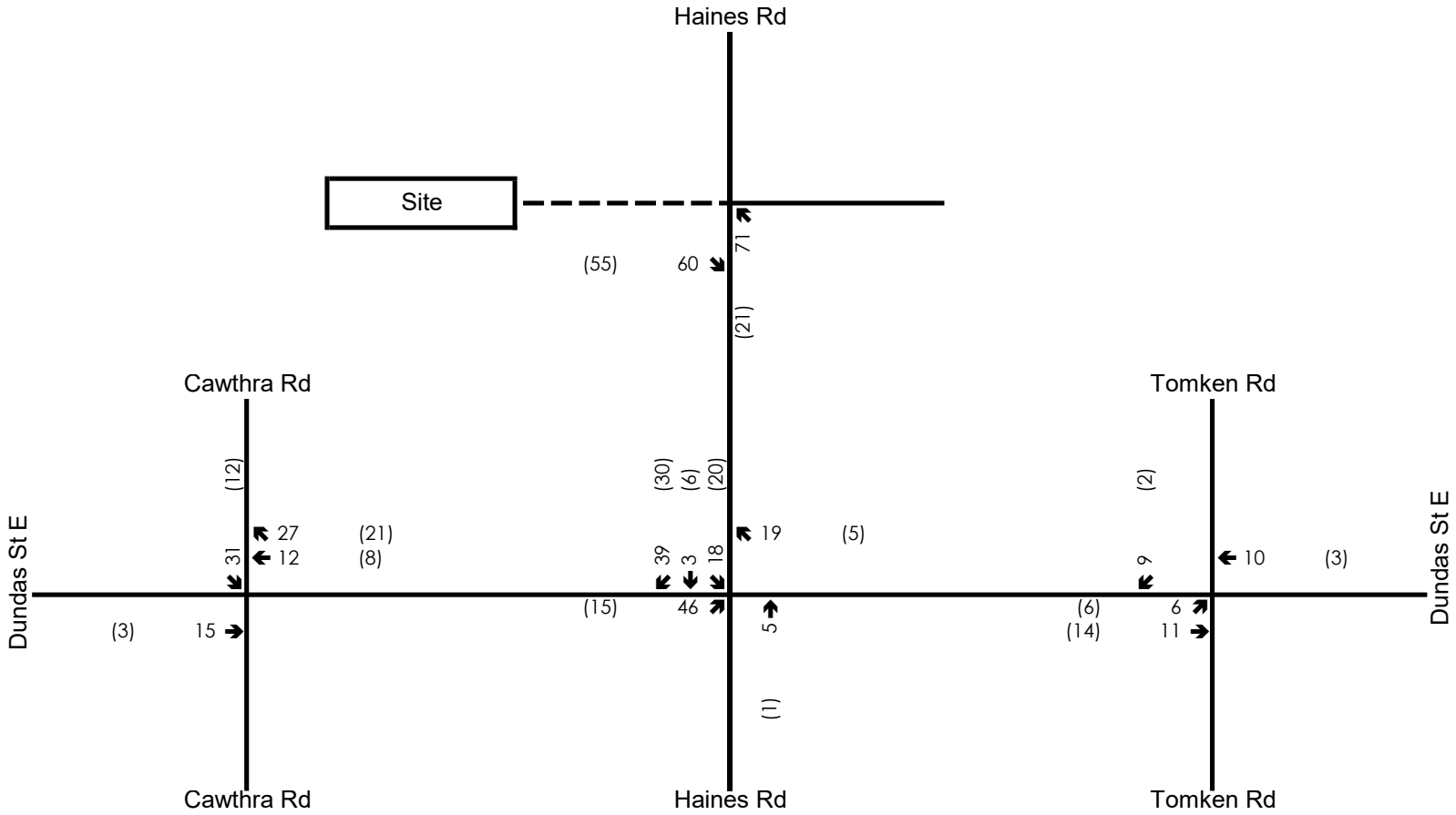
Figure 8

Project No. 2297-6402
Date. 2022.05.16
Analyst. FC



Legend

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

805 Dundas Street E

Total Site Trip Assignment

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Figure 9

Project No. 2297-6402
Date. 2022.05.16
Analyst. FC

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 10.

Table 8 outlines the 2027 future total traffic Levels of Service. Detailed capacity analysis worksheets are included in Appendix M.

Table 8: 2027 Future Total Levels of Service

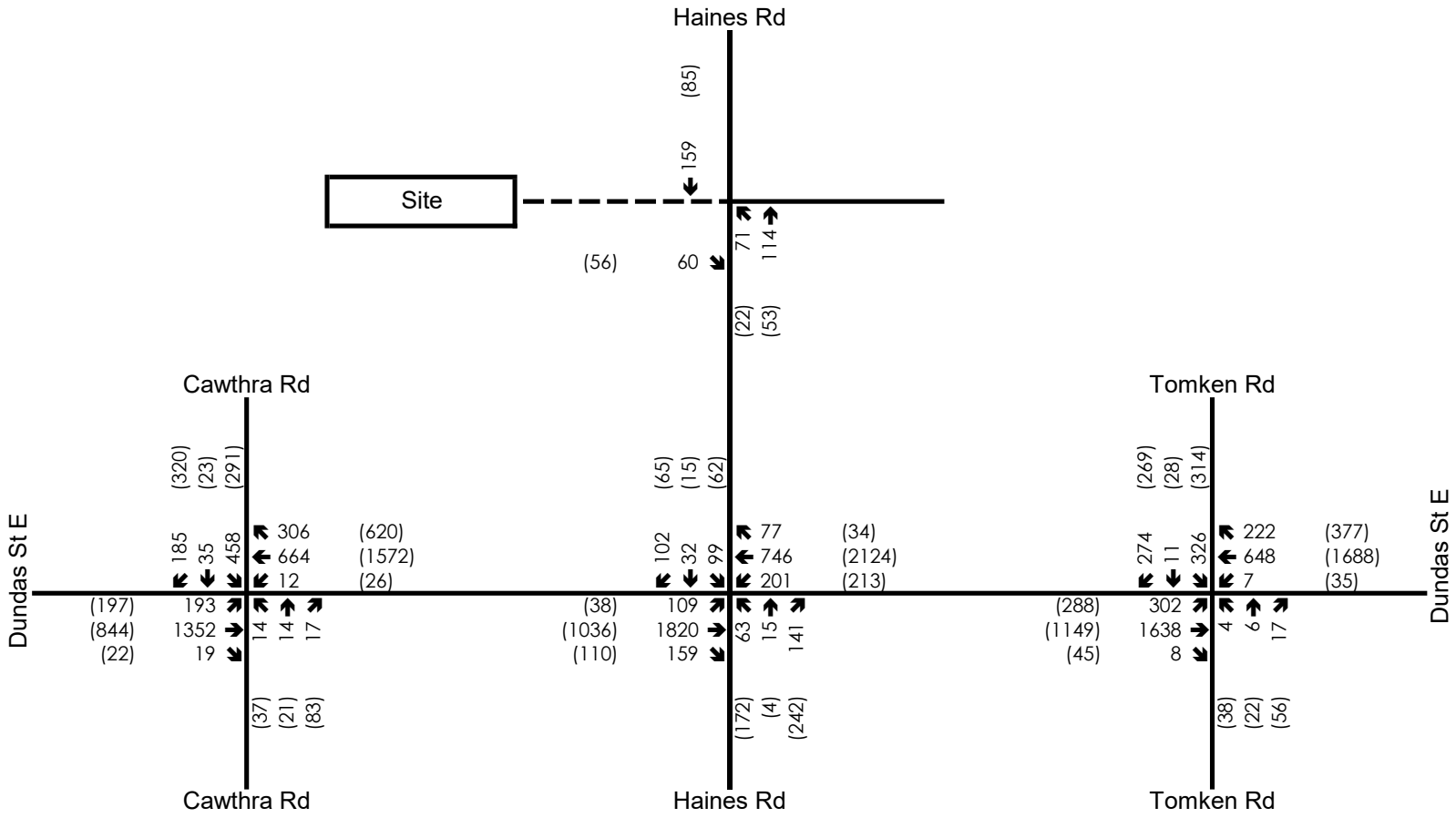
Intersection	Control	Peak Hour	Level of Service [1]	Control Delay (s)	Critical V/C Ratio [2] (Approach)	95th %ile *(50% %ile)* Queue Length > Storage Length
Dundas Street East at Ramp to Cawthra Road	Signal	A.M.	C	26.4	0.70 (EBT)	None
		P.M.	C	27.2	0.74 (EBL)	105m > 75m (EBL) 95m > 45m (WBR)
Dundas Street East at Haines Road	Signal	A.M.	C	22.9	**0.99 (SBL)**	85m > 20m (WBL) 60m > 25m (SBL)
		P.M.	B	15.8	0.80 (SBL)	35m *(3m)*> 30m (EBL) 55m > 20m (WBL) 45m *(22m)*> 25m (SBL)
Dundas Street East at Tomken Road	Signal	A.M.	C	22.0	**1.02 (SBT)**	60m > 15m (EBL)
		P.M.	E	52.5	**1.01 (EBL)** **1.23 (SBT)**	215m > 15m (EBL) 115m > 30m (WBR)
Site Access at Haines Road	Stop Control (Minor)	A.M.	A	9.5 (EB)	0.1 (SB)	None
		P.M.	A	9.0 (EB)	0.06 (EB) 0.06 (SB)	None

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro). The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note 2: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection, or any v/c ratios greater than 0.90 for through or shared through/turning movements, or greater than 1.00 for exclusive movements.

As indicated in Table 9, each of the study intersections operate with a Level of Service "C" or better during both the A.M. and P.M. peak hours, with the exception of the intersection of Dundas Street East at Tomken Road in the P.M. peak period at a Level of Service "E".

The intersection of Dundas Street East at the Ramp to Cawthra is forecasted to operate very similarly to that of future background and existing conditions with no operational issues and under capacity.



Legend

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

805 Dundas Street E

2027 Future Total Traffic Volumes

CROZIER CONSULTING ENGINEERS

Figure 10

Project No. 2297-6402
Date. 2022.05.16
Analyst. FC

The intersection of Dundas Street and Tomken Road operates very similar to future background conditions, with all capacity and queuing concerns previously identified persist into the future horizon. It is noted no additional operational concerns are identified at this intersection for the future horizon.

As indicated in Table 9, the proposed site access would operate with a Level of Service "A" with no operational or queueing concerns, and well under capacity.

7.0 Recommendations

It is noted that several operational concerns were identified under existing, future background and future total conditions, the majority of these issues beginning from existing conditions and carrying forward to future horizons. As such, the proposed development is not expected to materially impact the surrounding intersections.

However, to improve the existing issues identified at the study intersections for future horizons, it is recommended to optimize the signal timing splits to alleviate existing operational concerns:

- At the intersection of Dundas Street East and Haines Road during the A.M. peak.
- At the intersection of Tomken Road and Dundas Street East during both the A.M. and P.M. peaks.

Results demonstrating the above recommended improvements are shown below in Table 9 and detailed capacity worksheets are provided in Appendix M.

Table 9: Optimization Results

Intersection	Peak Period	2027 Future Total Pre-optimization		2027 Future Total Post-optimization	
		LOS (Delay (s))	Critical V/C Ratio(s)	LOS (Delay (s))	Critical V/C Ratio(s)
Dundas Street East at Haines Road	A.M.	C (22.9)	**0.99 (SBL)**	C (19.2)	**0.96 (SBL)**
	P.M.	C (15.8)	0.80 (SBL)	No recommendation.	
Dundas Street East at Tomken Road	A.M.	C (22.0)	**1.02 (SBT)**	C (29.1)	0.82 (SBT)
	P.M.	E (52.5)	**1.01 (EBL)** **1.23 (SBT)**	D (41.6)	**0.94 (EBL)** 0.96 (SBT)

Per these results, the existing concern of the critical southbound left-turn movement at the intersection of Dundas and Haines during the A.M. peak is slightly improved with the signal optimization, however it is noted that the movement would still be slightly critical with an expected volume-to-capacity ratio of 0.96 with the optimization. It is noted that the issues forecasted for this movement begins with existing conditions and is not resultant from site-generated traffic. It is recommended the City monitor this intersection for additional improvements.

The existing capacity concerns at the intersection of Dundas and Tomken and Dundas at Haines Road improve to operating under capacity during both the A.M. and P.M. peaks with signal optimization, however the eastbound left-turn movement would technically still operate above critical capacity during the P.M. peak. It is recommended the City also monitor this intersection for further improvements, as necessary.

8.0 Site Access Review

8.1 Sight Distance

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 Site access using the following assumptions:

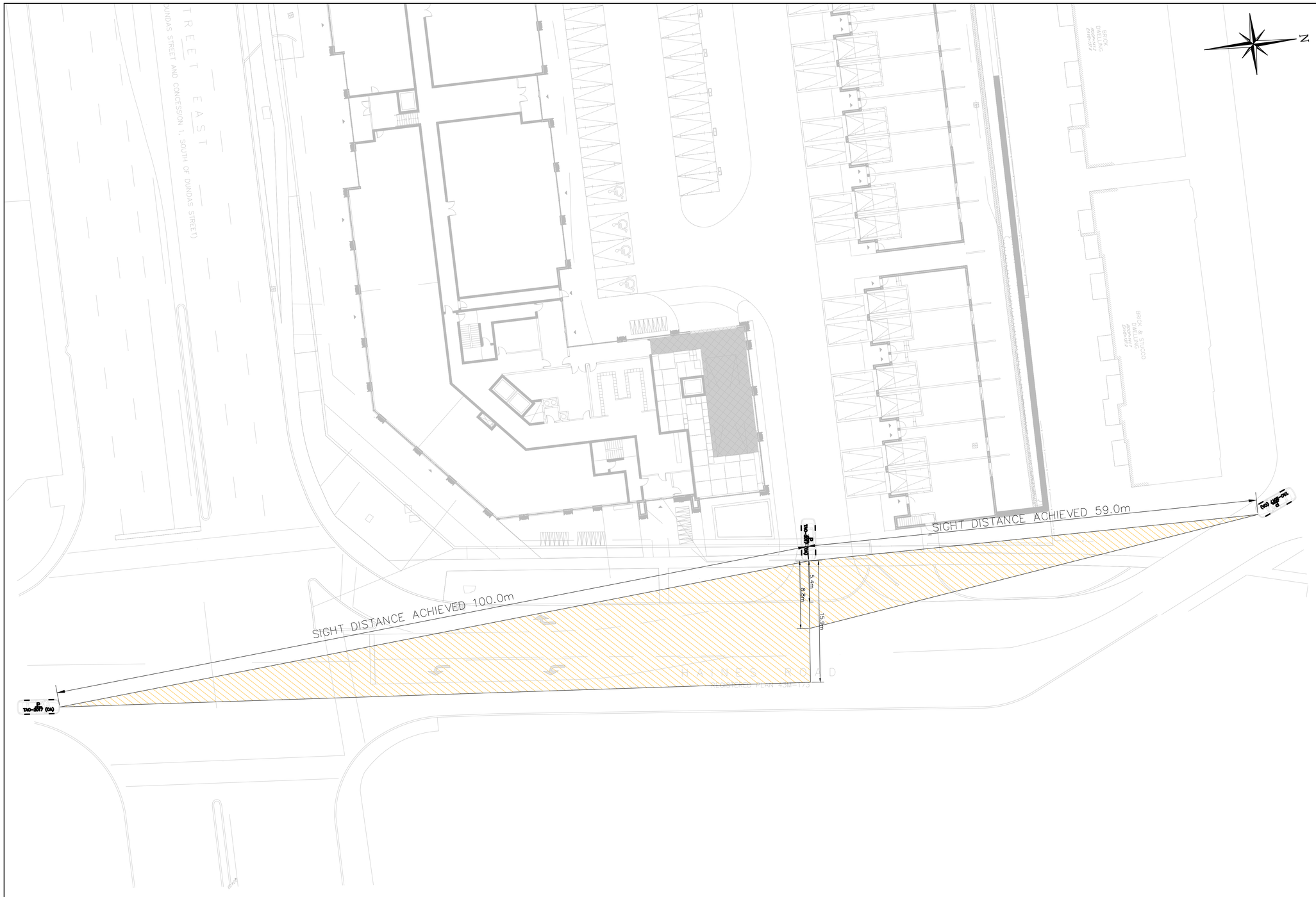
- A standard driver eye height of 1.08 m for a passenger car.
- A 4.4 m setback from the approximate extension of the outer curb to represent a vehicle waiting to exit the Site.

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



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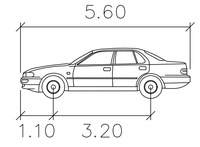

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Lock to Lock Time	: 6.0
Steering Angle	: 35.9

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1	ISSUED FOR SUBMISSION	08/24/2022

Project

805 DUNDAS STREET EAST
CITY OF MISSISSAUGA

Drawing

SIGHT DISTANCE ANALYSIS
SIGHT ACCESS ON HAINES ROAD

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L.G.			2297-6402
Check By	Check By	Scale	Drawing
F.C.	A.W.	1:200	FIG.04

Table 10: Sight Distance Analysis

Feature	Site Access off Haines Road
Access Type	Full-Movement
Assumed Speed Limit of Roadway	50 km/h
Assumed Design Speed	60 km/h
Base Time Gap [1]	6.5 s (right) 7.5 s (left)
Grade of Roadway	Less than 3%
Horizontal Alignment of Roadway	Straight
Required Sight Distance (right) [2]	110 m
Required Sight Distance (left) [2]	130 m
Available Sight Distance (right)	To stop
Available Sight Distance (left)	To intersection

Note 1: Time gap for left-turning and right-turning vehicles from a stop onto a two-lane highway with no median and with a grade less than 3%. Value from Table 9.9.3 in the TAC-GDGCR.
Note 2: Sight distance values calculated from Intersection Sight Distance equation 9.9.1 in the GDGCR.

It is noted per above, that the sight lines to the proposed accesses do not technically meet the TAC requirements, the sight lines are adequate as vehicles positioned at the site access can see vehicles positioned at the stop sign right of the access (along Haines Road) as well as at the northbound approach at the intersection of Dundas Street East and Haines Road (to the right of the site access).

It is noted that the tree canopy along Haines Road may obstruct sight lines during summer months, and as such, is recommended to be trimmed to provide better visibility. Vehicles may alternatively stop slightly beyond the stop line to have better visibility of the adjacent intersections.

Considering the above, the proposed site access provides sufficient visibility for exiting drivers.

8.2 Corner Clearance

Corner clearance is the distance between an access and the nearest upstream or downstream intersection and is measured from the near curb to near edge of the access to the up or downstream intersection. Figure 8.8.2 of the TAC GDGCR provides recommended minimum corner clearances for accesses to avoid difficult movements, blocking of the access, slow moving vehicles, and other safety or operational issues. The recommended minimum corner clearance between an access and a signalized intersection along an undivided collector road per Figure 8.8.2 is 55 meters. The proposed access provides a corner clearance of approximately 63 meters to the signalized approach at Dundas Street East at Haines Road, which sufficiently meets this minimum requirement.

9.0 Maneuvering Assessment

A maneuvering assessment was conducted to ensure the proposed site design provides adequate space for the design vehicles expected at the site. The maneuvers of these design vehicles are elaborated upon in the following section.

9.1 Passenger Vehicles

Maneuvering assessments were undertaken for passenger vehicles (P-TAC 2017) to ensure passenger vehicles can ingress and egresst critical parking spaces throughout the site. The vehicle maneuvering assessments illustrated in Figures T300, T301, and T302 illustrating the P2, P1, and ground floor passenger vehicle maneuvering, respectively, find that all parking spaces can be maneuvered with no expected conflicts or encroachments.

9.2 Medium Single Unit Trucks

A maneuvering assessment for a Medium Single Unit (MSU) truck was conducted for the site, to ensure this design vehicle can successfully enter and exit the proposed site access and enter and exit the loading space on-site. As shown in Figure T303, the MSU vehicle can circulate the site without any expected conflicts or encroachments.

9.3 Waste Vehicle

A maneuvering assessment for a Peel Region front loading garbage truck was conducted for the site, to ensure this design vehicle can successfully enter and exit the proposed site access and enter and exit the loading space on-site. As shown in Figure T304, the waste vehicle can circulate the site without any expected conflicts or encroachments.

9.4 Emergency Vehicles

A maneuvering assessment was conducted for a Peel Region Fire (emergency) vehicle to ensure that emergency services can be accessed throughout the site. As shown in Figure T305, the fire truck can enter and exit the townhouse frontage via the site access without any expected conflicts or encroachments. It is noted that fire trucks would be able to access the high-rise building via the frontage along Dundas Street and Haines Road.

Considering the maneuvering analysis contained herein, the proposed development can be supported from a maneuverability perspective.

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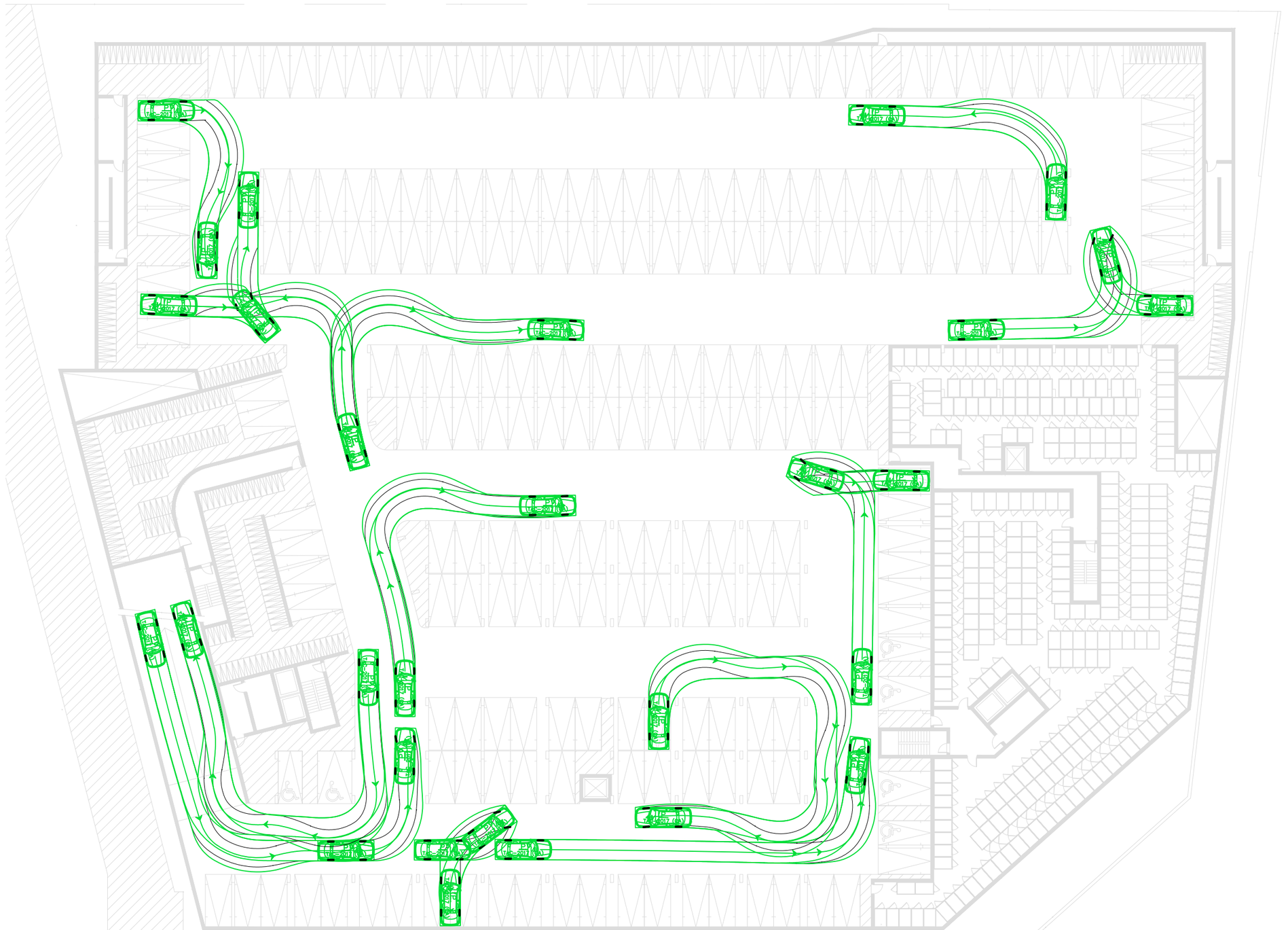

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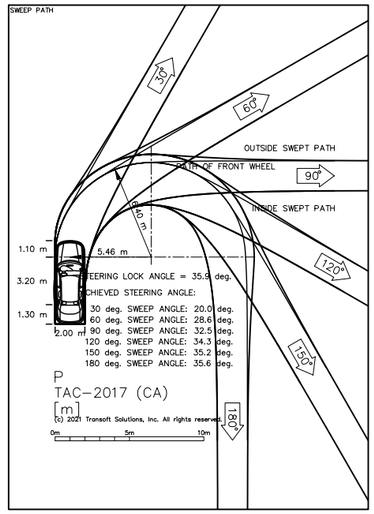
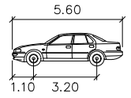


VEHICLE PROFILE



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Lock to Lock Time	: 6.0
Steering Angle	: 35.9

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1	ISSUED FOR SUBMISSION	09/15/2022

Project
805 DUNDAS STREET EAST
CITY OF MISSISSAUGA

Drawing
P2 UNDERGROUND
PASSENGER VEHICLE
VEHICLE MANEUVERING ANALYSIS

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905-875-4915 F
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T.K./A.D.			2297-6402
Check By	Check By	Scale	Drawing
F.C.	A.W.	1: 200	T300

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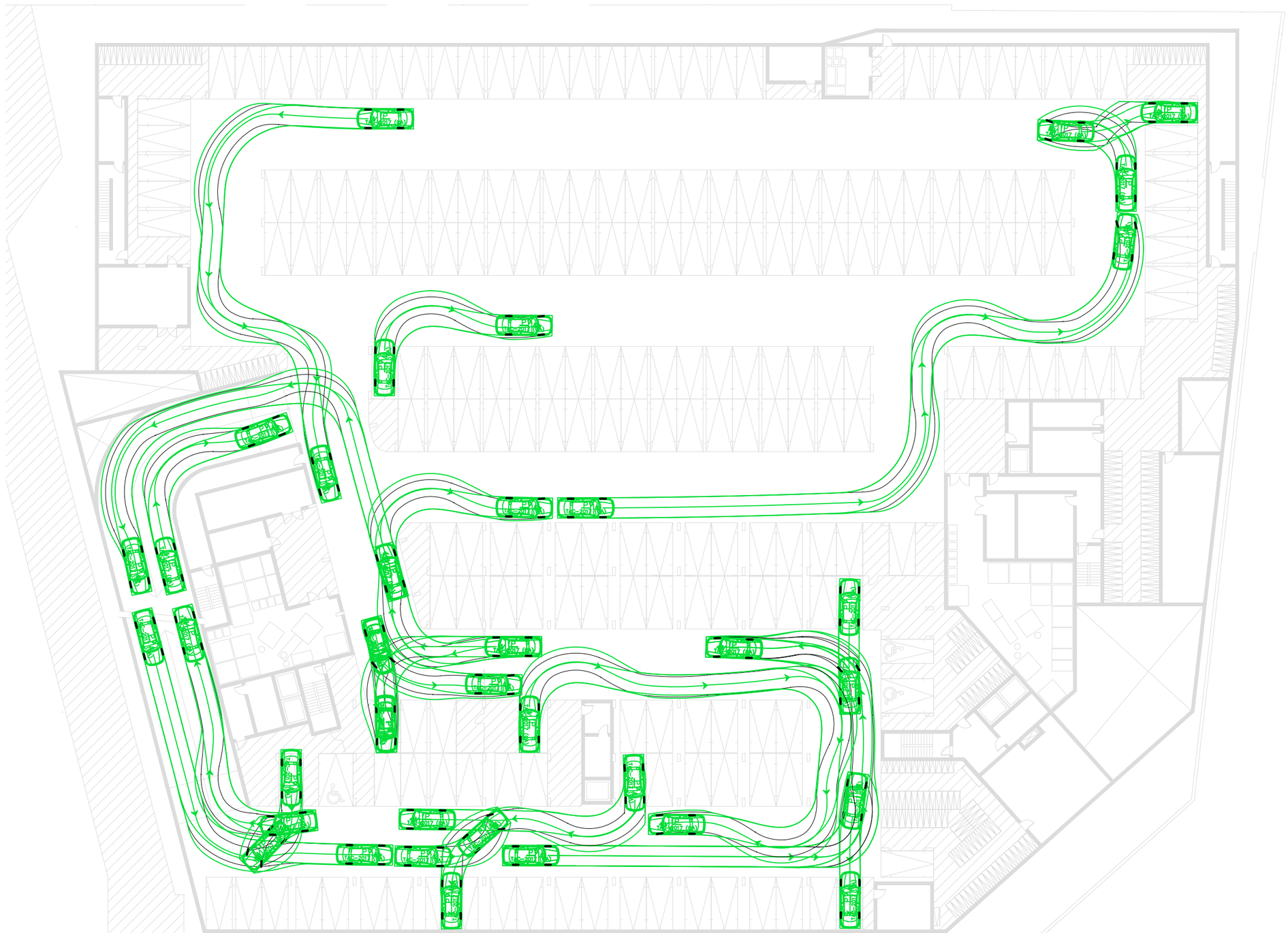

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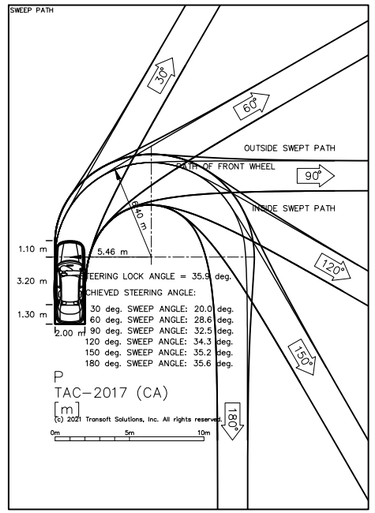
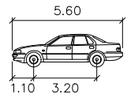


VEHICLE PROFILE



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No.	ISSUE	DATE: MM/DD/YYYY
1	ISSUED FOR SUBMISSION	09/15/2022

Project
805 DUNDAS STREET EAST
CITY OF MISSISSAUGA

Drawing
P1 UNDERGROUND
PASSENGER VEHICLE
VEHICLE MANEUVERING ANALYSIS

CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON, L9T 6P4
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T.K./A.D.		2297-6402
Check By	Check By	Scale / Drawing
F.C.	A.W.	1: 200 / T301

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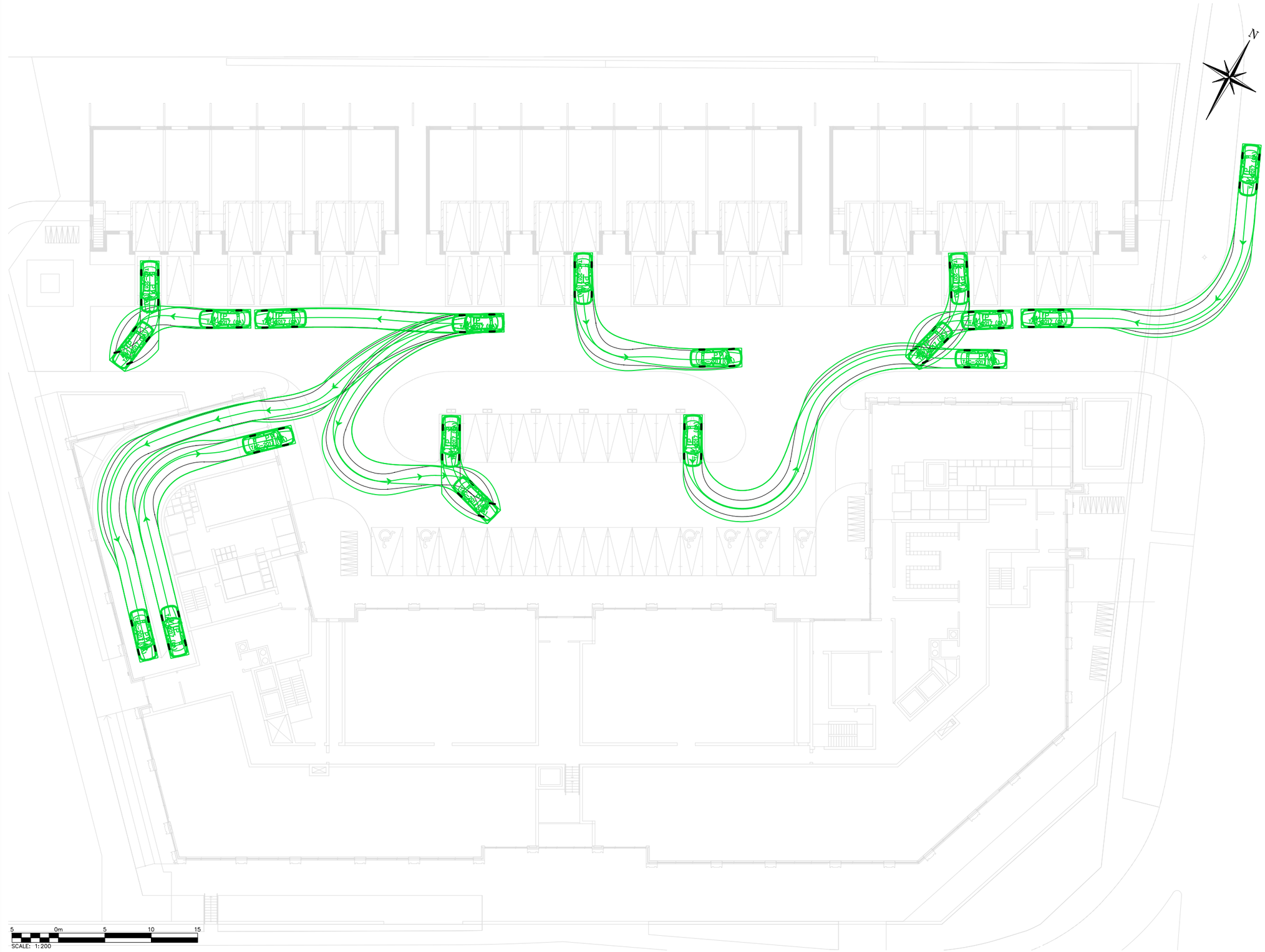
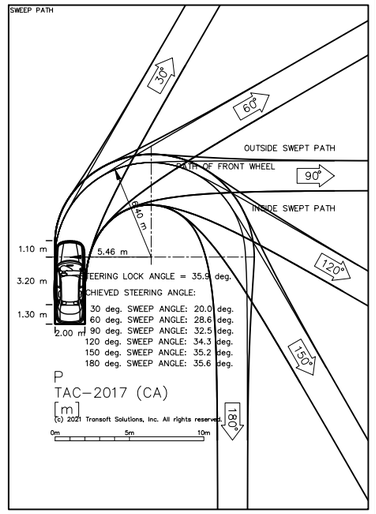
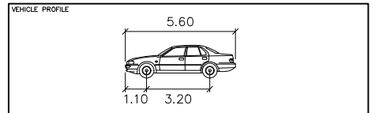
NOT TO BE USED FOR CONSTRUCTION







No.	ISSUE	DATE: MM/DD/YYYY
1	ISSUED FOR SUBMISSION	09/15/2022

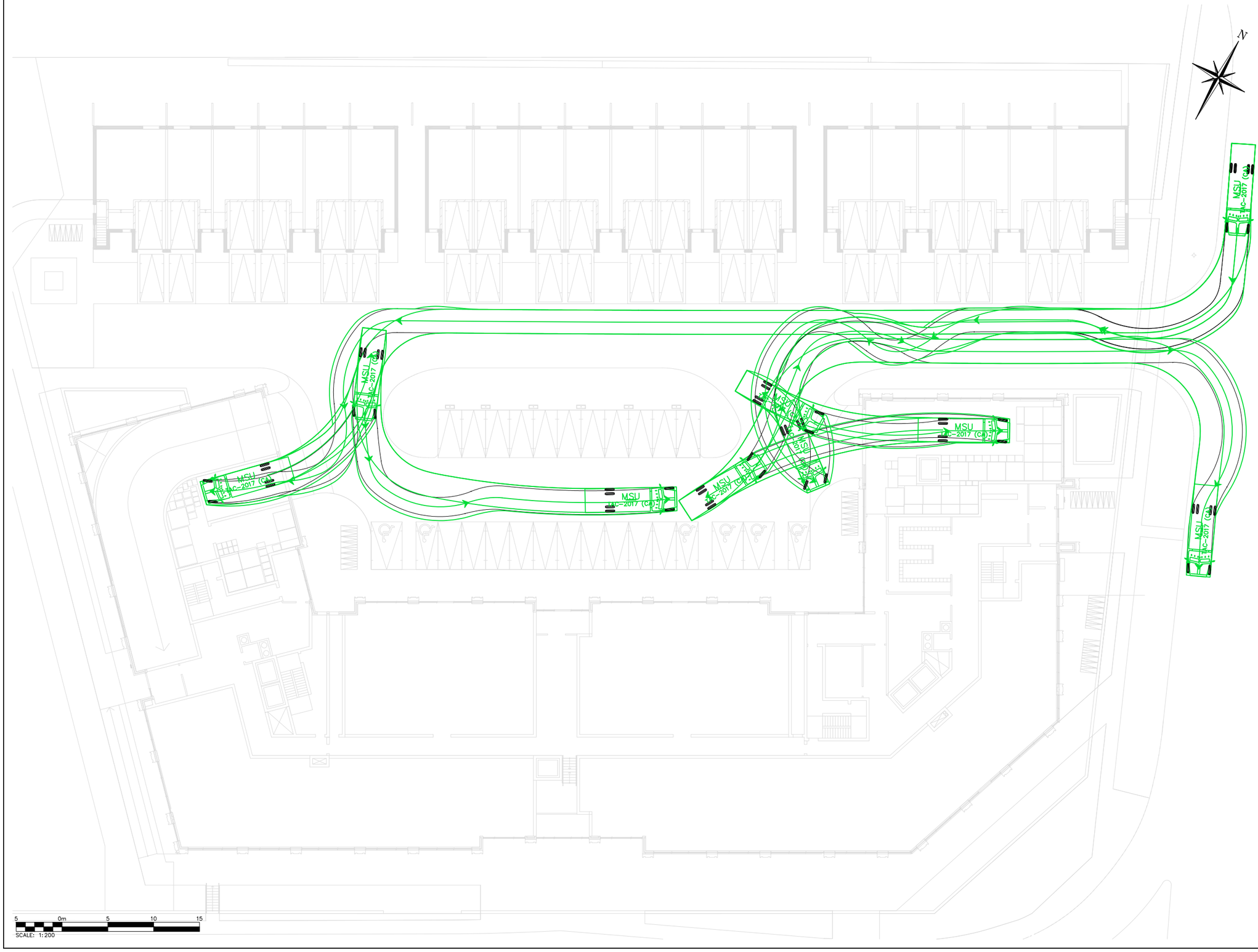
Project
805 DUNDAS STREET EAST
CITY OF MISSISSAUGA

Drawing
GROUND FLOOR
PASSENGER VEHICLE
VEHICLE MANEUVERING ANALYSIS

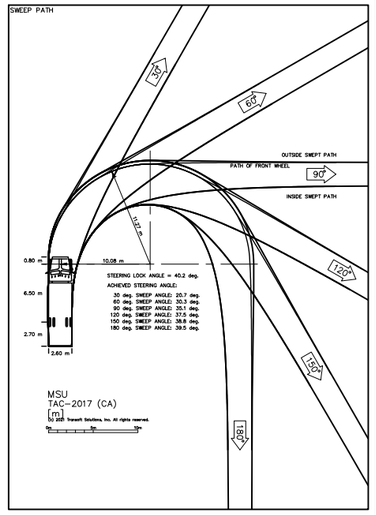
CROZIER CONSULTING ENGINEERS
2800 High Point Drive
Suite 100
Milton, ON, L9T 6P4
905-875-0026 T
905-875-4915 F
www.cfcrozier.ca
info@cfcrozier.ca

Drawn By	Design By	Project	
T.K./A.D.			2297-6402
Check By	Check By	Scale	Drawing
F.C.	A.W.	1:200	T302

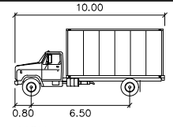
FOR REVIEW
NOT TO BE USED FOR CONSTRUCTION



SWEEP PATH



VEHICLE PROFILE



MSU

	meters
Width	: 2.60
Track	: 2.60
Lock to Lock Time	: 6.0
Steering Angle	: 40.2

No.	ISSUE	DATE: MM/DD/YYYY
1	ISSUED FOR SUBMISSION	09/15/2022

Project

805 DUNDAS STREET EAST
CITY OF MISSISSAUGA

Drawing

GROUND FLOOR
MSU
VEHICLE MANEUVERING ANALYSIS

CROZIER
CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON, L9T 6P4
905-875-0026 T
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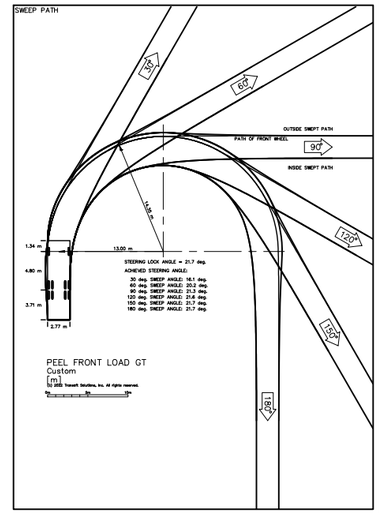
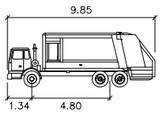
Drawn By	Design By	Project	
T.K./A.D.			2297-6402
Check By	Check By	Scale	Drawing
F.C.	A.W.	1:200	T303

FOR REVIEW
NOT TO BE USED FOR CONSTRUCTION



VEHICLE PROFILE



PEEL FRONT LOAD GT

meters

Width	: 2.77
Track	: 2.77
Lock to Lock Time	: 6.0
Steering Angle	: 21.7

No.	ISSUE	DATE: MM/DD/YYYY
1	ISSUED FOR SUBMISSION	09/15/2022

Project

805 DUNDAS STREET EAST
CITY OF MISSISSAUGA

Drawing

GROUND FLOOR
GARBAGE TRUCK
VEHICLE MANEUVERING ANALYSIS

CROZIER
CONSULTING ENGINEERS
2800 High Point Drive
Suite 100
Milton, ON, L9T 6P4
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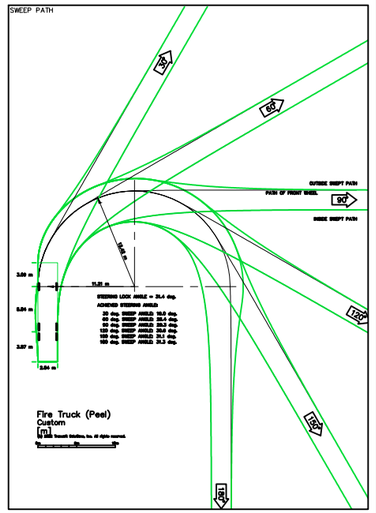
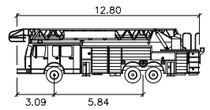
Drawn By: T.K./A.D.	Design By:	Project: 2297-6402	
Check By: F.C.	Check By: A.W.	Scale: 1:200	Drawing: T304

FOR REVIEW
NOT TO BE USED FOR CONSTRUCTION



VEHICLE PROFILE



Fire Truck (Peel)

	meters
Width	: 2.54
Track	: 2.54
Lock to Lock Time	: 6.0
Steering Angle	: 31.4

No.	ISSUE	DATE: MM/DD/YYYY
1	ISSUED FOR SUBMISSION	09/15/2022

Project

805 DUNDAS STREET EAST
CITY OF MISSISSAUGA

Drawing

GROUND FLOOR
FIRE TRUCK
VEHICLE MANEUVERING ANALYSIS

CROZIER CONSULTING ENGINEERS
2800 High Point Drive
Suite 100
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info@cfcrozier.ca

Drawn By	Design By	Project
T.K./A.D.		2297-6402
Check By	Check By	Scale / Drawing
F.C.	A.W.	1:200 / T305

10.0 Parking Review

10.1 Parking Requirements

It is noted the City of Mississauga has recently undertaken a Parking Regulations Study with amendments to the City's existing By-Law parking rates. Per discussions with City staff, parking variances are being accepted less than the existing By-Law rates but meeting the Draft (new) By-Law rates. A summary of the parking requirements at the proposed development is presented in Table 11.

Table 3.1.2.1 of the City's Draft Zoning By-Law Amendment was thus reviewed to determine the parking requirements of the proposed mixed-use development. It is noted that per Map EX 1 of the City's Parking Regulations Study, the subject site is located in Precinct 3.

It is also noted that per the Draft Zoning By-Law Section 3.1.2.1.3, a shared arrangement is permitted for residential visitor and non-residential parking, which requires the greater of the visitor parking rate for the non-residential parking rate (as applicable) be provided at the development. This calculation is summarized below under the "Mixed Use Shared Parking" row in Table 11.

Additionally, it is noted that the non-residential parking rate calculated was assumed based on the "Retail Center" rate to provide the most appropriate estimate of the parking required at the proposed non-residential space.

Table 11: Draft Zoning By-Law Parking Review for Residential Units

Land Use	Land Use Type	Unit Type (Units/GFA)	Zoning By-Law 0018-2021 Parking Rate	Proposed Parking	Required Parking
Residential Resident Parking	Apartment	399 units	1.0 spaces per unit	389	399
	Townhouse	20 units	2.0 spaces per unit	40	40
Total Resident Parking Required					**429**
Mixed Use Shared Parking	Visitor	419 units	0.2 spaces per unit	84	84
	Retail Center	1972 m^2	3.5 spaces per 100 m^2		70
Total Mixed-use Parking Required					**84**
Total Parking				**513**	**523**
Surplus/Deficit				**-10 spaces**	

As noted above, the site meets the residential townhouse and shared visitor/non-residential parking requirements, however, falls deficient of the residential apartment parking requirements by 10 spaces. It is however, noted that this deficiency is only approximately 2% of the parking required at the development. Per consultation with the City, a comprehensive parking justification study is not required for parking supplies with deficiencies less than 10%; as such, the following sections provide a brief justification to support the proposed parking rates at the site.

10.2 ITE Parking Generation Rates

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.

Rates for Land Use Code 222 "Multifamily Housing (High-Rise)" were used for the apartment building units, LUC 220 "Multifamily Housing (Low-Rise) for the proposed townhouse units, and LUC 820 "Shopping Center" for the proposed retail uses to estimate the parking demand on-site, as summarized in Table 12.

It is noted that the parking rates for the residential land uses noted below are inclusive of visitor parking spaces, and the non-residential parking demand was calculated separately from the visitor parking demand at the site; thus, the following review provides a conservative estimate of parking demands expected at the site.

Table 12: ITE Parking Generation Rates

Land Use	Units/GFA	ITE Parking Generation Rates	Calculated	Provided
Building A – Residential LUC 222 Multifamily Housing (High Rise)	399 Units	P = 1.25 X – 105.47	394	389
Building B, C, D –Townhouse LUC 220 Multifamily Housing (Low-Rise)	20 Units	Ln (P) = 0.99 ln (X) + 0.15	23	40
Building A – Retail LUC 820 Shopping Center	21,230 SF	P = 2.67 X – 11.49	45	84
Total (Surplus/Deficit)			**462**	**513 (+51)**

As noted in Table 12, the site is expected to provide a sufficient amount of parking to meet the expected demand on-site, as the proposed parking is expected to provide a surplus of 51 spaces per the ITE Parking Generation demand estimates overall at the site.

It is noted that while the residential high-rise parking appears to be deficient, the ITE rates consider combined visitor and resident parking, with no distinguishing factor between the two uses. If a visitor parking rate of 0.20 spaces per unit (per the City's Draft By-Law) is assumed to distinguish the visitor parking spaces from the residential high-rise (80 spaces), a total of 314 spaces would be estimated to be in demand for resident parking spaces for Building A. As such, the provided parking of 389 spaces for Building A is expected to be more than sufficient, along with the proposed parking for other land uses at the site.

10.3 Transportation Demand Management

As elaborated upon in the following section, various Transportation Demand Management (TDM) measures have been recommended at the site in the form of infrastructure and initiatives to promote the use of transit, active transportation, and higher occupancy passenger vehicles to access the proposed site.

Through the implementation of the TDM measures, it is expected that single-occupancy vehicle trips would be further discouraged at the development, therefore reducing overall parking demand at the development.

It is also noted that many municipalities in Ontario offer significant reductions in their By-Law parking requirements when certain TDM measures are provided.

For example, the City of Hamilton Transportation Demand Management (TDM) Guide for Development, mentions that the City may offer reduced parking requirements when developments are in proximity to transit corridors, as well as considering cash-in-lieu of parking programs, and other site-specific conditions. It should be noted, many municipalites within the Greater Toronto Area GTA also offer cash-in-lieu instead of providing parking. Relevant excerpts from the Hamilton Guide are provided in Appendix O.

Based on Table 3.D of the City of Hamilton TDM Guide outlining low- and high-priority TDM measures for mixed-use developments, a majority of the TDM measures are proposed to be included at the subject development, especially in relation to parking and active transportation facilities. As such, it would be expected that the subject development would qualify for parking reductions based on the TDM measures provided.

11.0 Transportation Demand Management (TDM)

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.

11.1 Existing TDM Opportunities

11.1.1 Modal Split

TTS data was used to determine the modal split expected at the proposed development. The modal split was determined by filtering for the mode of trips at the subject GTA Zone 3669, as well as neighboring zones 3674, 3673, 3668, and 3670 with similar residential and non-residential characteristics. A summary of the modal split analysis is provided in Table 13. The detailed TTS query is provided in Appendix N.

Note, other modes of transportation such as cycling, rideshare and taxi passengers comprised less than 1% of the modal split in the study area, and were consequently omitted in the results below.

Table 13: Modal Split

Mode of Travel	Modal Split
Auto	79%
Transit	13%
Walking	7%

As indicated above, there is a sizeable portion of commuters in the area who would be using local and regional transit. Additionally, as sidewalks are readily available in the area, the modal split of walking residents and visitors to the area indicates the study area is highly walkable.

It is expected that TDM measures at the site would be effective at the site given the existing infrustructure to support non-auto trips.

11.1.2 Transit

As outlined previously in Section 3.3, local transit routes offer connectivity in the east-west direction along Dundas Street, and in the north-south direction along Tomken Road, and regional transit is available via a short transit ride to the Dixie GO Station.

11.1.3 Active Transportation

As referenced to previously in Section 3.1, the site area is highly walkable with sidewalks available on all the surrounding roadways. Pedestrian signals are also available at the intersection of Haines Road and Dundas Street East, providing additional safety to crossing pedestrians from the site.

It is noted that there are no cyclist facilities in the immediate study network (along Dundas Street East or Haines Road). However, east-west cyclist connectivity is available via multi-use paths along Queensway East and north-west connectivity along Dixie Road for cyclists not wishing to share the road with vehicles.

11.2 TDM Opportunities and Recommendations

11.2.1 Pedestrian Facilities

Existing pedestrian connections on Haines Road will connect to the proposed site via the site access. These paths should be well-lit to be safe and appealing to residents and visitors. Furthermore, pedestrian refuges, such as benches or fixtures, may be provided for transit users, as well as refuge for walking residents.

11.2.2 Transit Facilities

The use of transit is generally supported by providing sufficient pedestrian connectivity from the site to the existing sidewalk on Haines Road/Dundas Street East as mentioned above, which provides a convenient means of accessing the existing local transit stops located within a short walking distance of the site.

The existing transit stops at Dundas Street East and Haines Road have transit shelters; thus, additional infrastructural improvements are not necessary. However, wayfinding measures and incentives (detailed further in a subsequent section) may be beneficial in promoting transit use at the site.

11.2.3 Carpool Facilities

To promote carpooling among residents, employees and visitors at the site, priority carpooling spaces may be provided on-site. These spaces would ideally be located near entrances and easily maneuverable to make carpooling a more attractive mode of transportation.

11.2.4 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 nearby bus routes. Additionally, brochures outlining nearby transit nodes, bicycle routes, and pedestrian routes should be made available in the lobby. Additional wayfinding signage to lead residents to nearby bus stops along Dundas Street East and Haines Road may also be provided on the premises to promote the use of local and regional transit options.

11.2.5 Education and Incentives

Various educational measures and incentives may be promoted at the new residential site to build an overall 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 nearby bus stops and amenities.

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.

It is also recommended to provide PRESTO cards to all new residents to encourage the use of MiWay and GO Transit. It is noted that Metrolinx has recently announced that local transit rides are also free for all GO Rail passengers, so residents using the Dixie GO Station would not have to pay to transfer to a local MiWay Transit route.

11.2.6 Smart Commute

Smart Commute is a non-profit Transportation Management Association (TMA) committed to reducing traffic congestion, improving air quality, and acting on climate change. Smart Commute Peel operates in Mississauga and the Brampton-Caledon area, including the subject site. Smart Commute works with many businesses in the City of Mississauga by providing resources and tools which allow commuters to consider transportation alternatives.

More specifically, the following Transportation Demand Strategies are provided by Smart Commute and have been historically shown to reduce single-occupant vehicle (SOV) trips to and from workplaces. Employers at the ground-floor non-residential spaces may work with Smart Commute to take advantage of the following programs:

a. Carpooling: Smart Commute promotes carpooling to employees as a viable mode choice. A new online tool called "SmartTripsON" is in the works, which will help commuters find and share carpool trips, and aid in trip planning. Employers can also set up their networks to assist their staff in finding carpool partners. Additionally, Smart Commute highlights carpooling benefits, such as cost savings, benefits to the environment, and stress reduction.

b. Cycling and Walking: Smart Commute encourages increased walking and cycling by offering an online tool where users can set goals and track active commuting habits and calories burned. Smart Commute facilitates employee engagement events, where employees can also earn rewards for walking and cycling to work.

c. Awareness and Education: Smart Commute helps employees develop an action plan to use alternative modes of transportation and offers access to various resources and studies relating to the benefits of carpooling, transit, and active transportation.

d. Emergency Ride Home: Smart Commute is aware that when employees walk, cycle, take transit or carpool on a regular basis, the need for an unexpected trip may arise in the middle of the day, outside a scheduled plan for commuting. The Emergency Ride Home program reimburses employees making an emergency trip home in unexpected circumstances if they regularly use sustainable modes of commuting.

Smart Commute also promotes initiatives such as flexible working hours and telework. However, given the proposed development's non-residential space, employees would likely be expected to work on-site. However, for office-focused roles, telework and flexible working hours may be an option.

The Smart Commute program is utilized region-wide by many employers and organizations and will reduce SOV trips generated by the proposed development.

11.3 Project Program Cost

The estimated cost to implement the TDM program components are outlined in Table 14. The estimated cost to administer the TDM plan would be $22,850 - $43,700.

Table 14: Travel Demand Management Plan Costs

TDM Measure	Unit Price	Quantity / Number of	Product Cost
PRESTO Cards	$50 - $100	419	$20,850 - $41,700
TDM Information Package	$500	1	$500
Travel Survey	$500	1	$500
TDM Event	$1,000	1	$1,000
Total Cost			$22,850 - $43,700

12.0 Conclusion

The findings and recommendations of our analysis are summarized as follows:

- Under 2022 existing traffic conditions, the study intersections operate with a Level of Service "C" or better, except for the intersection of Dundas Street East at Tomken Road which operates with an LOS "D" during the P.M. peak only.

- Some overcapacity movements were identified during existing conditions which may be attributed to the signal timing and traffic counts being mismatched due to the traffic counts' age.

- The future background operations of the study intersections are similar to existing conditions, and all capacity concerns in the future horizon are resultant from poor movements in existing conditions.

- The proposed development is expected to generate 131 two-way (71 inbound and 60 outbound) trips during the weekday A.M. peak hour, and 176 (21 inbound and 55 outbound) trips during the weekday P.M. peak hour.

- The future total operations of the study intersections are forecasted to be very similar to that of future background conditions. As such, the proposed development is not expected to materially impact the operations of the surrounding intersections.

- Signal optimization measures at Dundas and Haines during the A.M. peak improves the delay at the intersection and slightly improves the capacity for the southbound left-turn; however the southbound left-turn may operate critically even with optimization, thus it is recommended the City monitor this intersection for improvements as necessary.

- Signal optimization measures at Dundas and Tomken are recommended to mitigate existing capacity concerns, however it is noted that the eastbound left-turn movement may still operate critically during the P.M. peak. The capacity concerns at this intersection stem from existing capacity issues, therefore it is recommended the City monitor this intersection for improvements to improve operations as necessary.

- The proposed site access location can be supported as no operational concerns are expected, adequate sight lines are provided, and sufficient corner clearance is available to the adjacent major intersection.

- The maneuvering assessment conducted for the site concluded that all expected design vehicles on site (including passenger vehicles, waste vehicles, and emergency vehicles) would successfully maneuver the site with no expected conflicts.

- The proposed parking supply on site is slightly deficient by 10 spaces (approximately 2%) per the City's Draft By-Law requirements. However, based on ITE parking demand rates, it is expected the site would provide sufficient parking spaces to meet the demand of the proposed land uses.

- The Transportation Demand Management measures recommended at the site including infrastructure for pedestrians and cyclists, educational and incentive measures for transit commuters, and carpool spaces are all geared towards promoting transit, active transportation and reducing single occupant vehicle trips. The total estimated cost for the proposed TDM measures would be between $22,850 - $43,700.

In consideration that the proposed site is not expected to significantly impact the study road intersections, any site-related operational issues may be resolved with the improvements outlined within Section 7.0 of this report. Additionally, as the site maneuvering is expected to cause no conflicts and the location of the proposed site access is not expected to pose visibility or operational concerns, the proposed development may 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, EIT
Engineering Intern, Transportation

C.F. CROZIER & ASSOCIATES INC.

Aaron Wignall
Associate, Transportation

C.F. CROZIER & ASSOCIATES INC.

Ian Lindley, M.A.Sc, P.Eng
Project Engineer, Transportation

AW/ft/la

J:\2200\2297- KJC Properties Inc\6402- 802 Dundas St E\Reports\Traffic\2022.10.13 (2297-6402) 802 Dundas Street TIS_FINAL.docx

APPENDIX A

Terms of Reference Correspondence

Farah Tasnim

From: Kate Vassilyev <Kate.Vassilyev@mississauga.ca>
Sent: Monday, May 30, 2022 12:16 PM
To: Farah Choudhury
Cc: Aaron Wignall; Ian Lindley; Ryan Au
Subject: RE: 802 Dundas Street Terms of Reference and Data Request (CFC 2297-6402)

Hi Farah,

I apologize for the delay. Thank you for providing the Terms of Reference for 802 Dundas St East. Staff have reviewed it and provided the following comments in blue. Please let me know if you have any additional questions.

Regards,

Kate (Jekaterina) Vassilyev
Traffic Planning Technologist
T 905-615-3200 ext.8171
kate.vassilyev@mississauga.ca

City of Mississauga | Transportation and Works Department,
Infrustructure Planning Division

From: Farah Choudhury <fchoudhury@cfcrozier.ca>
Sent: Monday, May 16, 2022 3:57 PM
To: Bo Yu <BoYang.Yu@mississauga.ca>; Tyler Xuereb <Tyler.Xuereb@mississauga.ca>; Jim Kartsomanis <Jim.Kartsomanis@mississauga.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Ian Lindley <ilindley@cfcrozier.ca>
Subject: 802 Dundas Street Terms of Reference and Data Request (CFC 2297-6402)

Hello,

C.F. Crozier and Consulting Engineers (Crozier) has been retained to prepare a Transportation Impact Study (TIS) for a mixed-use residential/retail development located at 802 Dundas Street, City of Mississauga. The Site Plan 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 City of Mississauga TIS Guidelines.

The following intersections will be analyzed as part of the scope of study:

- Dundas Street at Haines Road
- Proposed Site Access at Haines Road
- Dundas St E & Cawthra Rd ramp

- Dundas St E & Tomken Rd

We kindly request recent traffic counts available to the City at the above noted intersections. Alternatively, we may consult specialty traffic counting firms we typically work with, in the event recent counts are not available. The historical AADT data, Growth Rate and Turning Movement Count can be obtained from Tyler Xuereb, Transportation Planning Analyst (tyler.xuereb@mississauga.ca, Ext. 4783). Please be advised that City of Mississauga still is not accepting new traffic counts. In order to grow traffic volumes to existing 2022 levels, please obtain historical traffic data counts and utilize regression analysis to determine appropriate growth rates.

Additionally, we kindly request confirmation that the above noted intersections are sufficient for analysis. In the event that analysis of additional intersections is required, please also include the most recent traffic counts available at these intersection(s). Please see above.

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 from the date of the TIS (2027) will be considered for future background and total traffic conditions, per the City'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. 3111 & 3123 Cawthra Rd (SP 18-133).

Future Background Growth Rate

We will be assuming a 2% growth rate for through movements along Dundas Street, and no growth for all other movements. Please confirm with Tyler Xuereb, Transportation Planning Analyst (tyler.xuereb@mississauga.ca, Ext. 4783).

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

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. The following Land Use Codes are proposed to be used:

- LUC 222 (Multifamily Housing High Rise) – for Building A Residential Units
- LUC 215 (Single Family Attached Housing) – For Buildings B, C, and D Residential Units
- LUC 820 (Shopping Center) – For Building A Retail Space

I have provided print-outs of the above noted land use codes from the Trip Generation Manual 11th Edition for your reference. Without any reductions, the development would be expected to generate 156 A.M. peak trips and 199 P.M. peak trips.

Additionally, we are looking to use the internal capture rates provided by NCHRP Project 8-51/ITE Journal "Improved Estimation of Internal Trip Capture for Mixed Use Developments" to reduce the site-generated trips for the mixed-uses proposed for Building A. See the attached worksheet for the calculations and rates. With the this trip reduction, we would expect a total of 153 A.M. peak hour trips and 169 P.M. peak hour trips to be generated at the development.

Please advise whether the above noted methodology to estimate the site-generated trips is acceptable. Acceptable.

Roadway and Transit Improvements

Please advise as to whether there are any roadway and transit improvements planned within the vicinity of the proposed redevelopment. Please follow the link: **http://www.mississauga.ca/portal/residents/roadresurfacing**

Dundas Connects MP **https://www.mississauga.ca/wp-content/uploads/2020/08/24113357/20180524_Dundas_Connects_Master_Plan_WEB.pdf**

Analysis Procedures

Weekday A.M. and P.M. peak hours will be analyzed using Synchro 11.0 analysis software, using Highway Capacity Manual (HCM) methodology. Please include all Synchro reports in the Appendix.

Site Access Review

The location of the site access will be reviewed using TAC and Peel Region guidelines, and sight distance from the proposed access will be analyzed using the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads. Agreed.

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 provide the most recent traffic counts available for the intersections of study. Please refer to the above for the comments.
- Please provide 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.

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

The TIS shall include a section in the report to address Community Impacts. This section shall include summary statements outlining the resulting traffic increases to the critical streets, movements and intersections. Comments or concerns from the community through future public meetings and engagements that are related to traffic shall also be addressed in this section.

Kind regards,

Farah Choudhury

Farah Choudhury, EIT | Engineering Intern
211 Yonge Street, Suite 600 | Toronto, ON M5B 1M4
T: 416.477.3392

Crozier Connections:

Read our latest news and announcements here.

APPENDIX B

Site Plan

805 DUNDAS STREET EAST, MISSISSAUGA

Proposed Mixed-Use Development

DRAWING LIST

Sheet Number	Sheet Name	Issue#1 (Add Date)	Issue#2 (Add Date)	Issue#3 (Add Date)	Issue#4 (Add Date)	Issue#5 (Add Date)
12 SITE PLAN APPROVAL						
A0						
dA0.00	Cover Sheet	■				
A1						
dA1.01	Site Survey	■				
dA1.02	Context Plan	■				
dA1.03	Site Plan	■				
dA1.04	Site Statistics	■				
A2						
dA2.01	Parking Floor Plan - Level P2	■				
dA2.02	Parking Floor Plan - Level P1	■				
dA2.03	Floor Plan - Level 1	■				
dA2.04	Floor Plan - Level 2	■				
dA2.05	Floor Plan - Level 3	■				
dA2.06	Floor Plan - Level 4 & 5	■				
dA2.07	Floor Plan - Level 6 & 7	■				
dA2.08	Floor Plan - Level 8	■				
dA2.09	Floor Plan - Level 9	■				
dA2.10	Floor Plan - Level 10	■				
dA2.11	Floor Plan - Level 11 & 12	■				
dA2.12	Floor Plan - MPH	■				
dA2.13	Roof Plan	■				
A4						
dA4.01	Elevations - Condominium	■				
dA4.02	Elevations - Condominium	■				
dA4.03	Elevations - Condominium	■				
dA4.04	Elevations - Condominium	■				
dA4.05	Elevations - Townhouses	■				
dA4.06	Elevations - Townhouses	■				
A5						
dA5.01	Building Section 'A'	■				
dA5.02	Building Section 'B'	■				
A6						
dA6.01a	Sun Shadow Study - March/September 21	■				
dA6.01b	Sun Shadow Study - March/September 21	■				
dA6.02a	Sun Shadow Study - June 21	■				
dA6.02b	Sun Shadow Study - June 21	■				
dA6.03a	Sun Shadow Study - December 21	■				
A7						
dA7.01	Perspective Views	■				
dA7.02	Perspective Views	■				
dA7.03	Perspective Views	■				
dA7.04	Perspective Views	■				

DEVELOPER

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WASTE MANAGEMENT

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AKSAN PILLER CORP. LTD.
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TORONTO, ON., M4P 2L7
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Authorities Having Jurisdiction

AUG. 18, 2022

KIRKOR
ARCHITECTS AND PLANNERS

20 De Boers Drive Suite 400
Toronto, ON M3J 0H1

Revisions:

No.:	Revision:	Date:
1	Rezoning Submission	Sept. 15, 2022

No.:	Issued For:	Date:

Client:
KJC PROPERTIES INC.

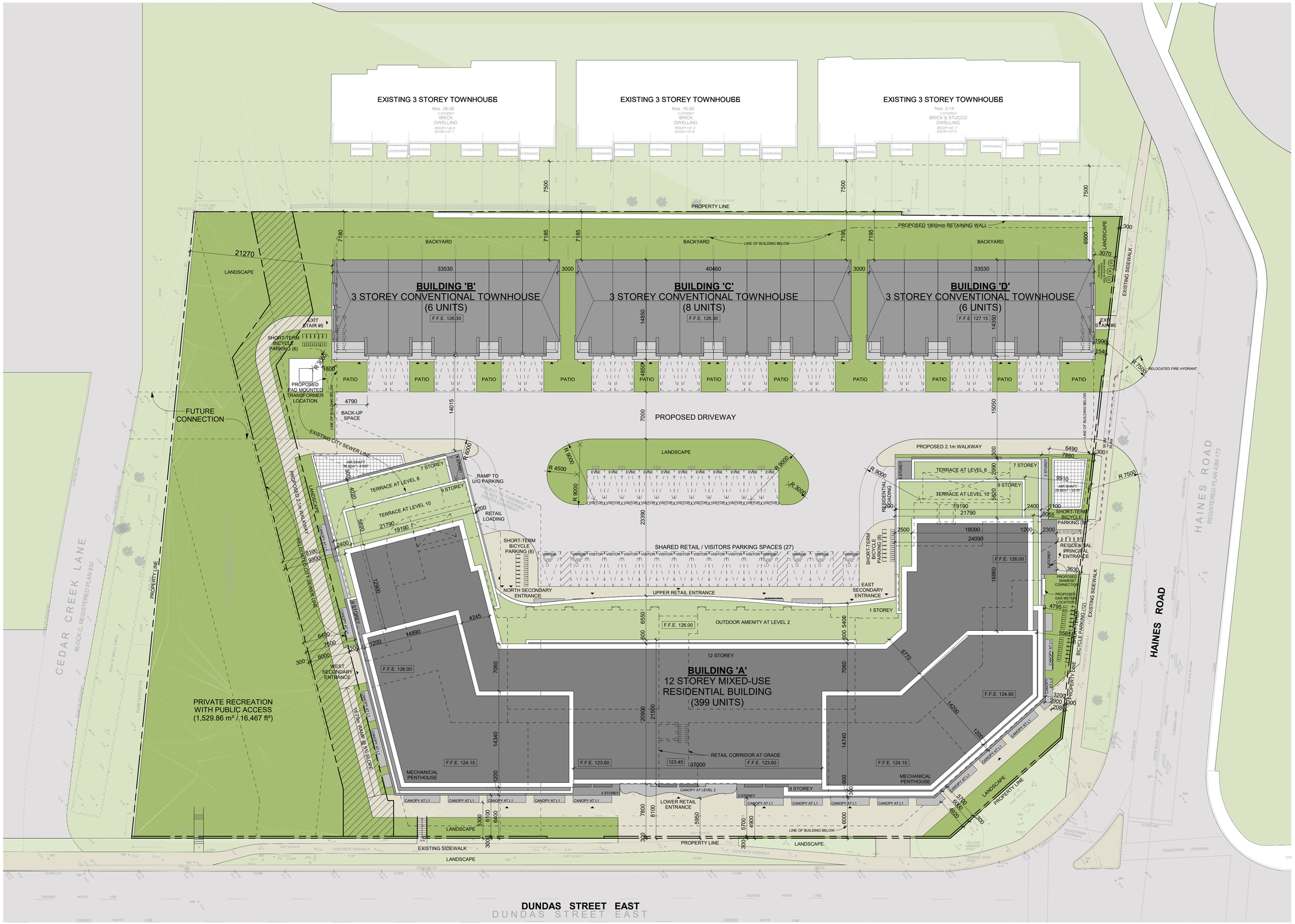
805 Dundas Street East, Mississauga, ON.
Proposed Residential Development

Drawing Title:
Cover Sheet

Scale:

Drawn by: D.S.
Checked by: G.H.
Project No.: 21-115
Date: AUG. 18, 2022
Drawing No.:
dA0.00

Plot Date: 8/18/2022 10:14:44 AM File Path: C:\Revit\2021\21115#1_805 Dundas Street East_detR2021_ghui@kirkorarchitects.com.rvt



Site Plan 1
1 : 250 dA1.03

Authorities Having Jurisdiction

AUG. 18, 2022

KIRKOR
ARCHITECTS AND PLANNERS
20 De Boers Drive Suite 400
Toronto, ON M3J 0H1

Revisions:

No.:	Revision:	Date:
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Drawing Title:
Site Plan

Scale: 1 : 250
Drawn by: G.H.
Checked by: G.H.
Project No.: 21-115
Date: AUG. 18, 2022
Drawing No.: **dA1.03**

N

Plot Date: 8/18/2022 10:15:56 AM File Path: C:\Revit\2021\21115#1_805 Dundas Street East_R21@kirkorarchitects.com.rvt

PART 1:
PLAN OF PART OF LOT 10
CONCESSION 1
NORTH OF DUNDAS STREET
CITY OF MISSISSAUGA
REGIONAL MUNICIPALITY OF PEEL

Legal Description 3 dA1.04

General Note:

i. I hereby certify that this drawing confirms in all respects to the site development plans Architect or Engineer's Signature (if applicable) and Professional seal.

ii. The City of Mississauga requires that all working drawings submitted to the Building Division as part of an application for the issue of a building permit shall be certified by the architect or engineer as being in conformity with the site development plan as approved by the City of Mississauga.

iii. All exterior lighting will be directed onto the site and will not infringe upon the adjacent properties.

iv. All rooftop mechanical units shall be screened from view by the applicant.

v. Parking spaces reserved for people with disabilities must be identified by a sign, installed at the applicant's expense, in accordance with the By-law Requirements and Building Code Requirements.

vi. The applicant will be responsible for ensuring that all plans confirm to Transport Canada's restrictions.

vii. Grades will be met with a 33% maximum slope at the property lines and within the site.

viii. All damaged areas are to be reinstated with topsoil and sod prior to the release of securities.

ix. Signage shown on the site development plans is for information purposes only. All signs will be subject to the provisions of Sign by-law 0054-2002, as amended, and a separate sign application will be required through the Building Division.

x. Any fencing adjacent to municipal lands is to be located 15 cm (6.0 in.) inside the property line.

xi. Only "shielded" lighting fixtures are permitted for all development, except for detached and semi-detached dwellings within 60m (196.8 ft.) of a residentially zoned property andmust confirm to the Engineer Certified Lighting Plan.

xii. The Engineer Certified Lighting Plan must be signed by the consulting Engineer.

xiii. The Owner covenants and agrees to construct and install "shielded" lighting fixtures on the subject lands, in conformity with the Site Plan and Engineer Certified Lighting Plan to the satisfaction of the City of Mississauga.

xiv. The applicant will be responsible for ensuring that all plans confirm to Transport Canada's restrictions.

xv. Where planting is to be located in landscaped areas on top of an underground parking structure, it is the responsibility of the applicant to arrange the coordination of the design of the underground parking structure with the Landscape Architect and the Consulting Engineering. Underground parking structures with landscaping area to be capable of supporting the following loads:
- 15 cm of drainage gravel plus 40 cm topsoil for sod
- 15 cm of drainage gravel plus 60 cm topsoil for shrubs
- 15 cm of drainage gravel plus 90 cm for trees
Or
- Prefabricated sheet drain system* with a compressive strength of 1003 Kpa plus 40 cm topsoil for sod
- Prefabricated sheet drain system* with a compressive strength of 1003 Kpa plus 60 cm topsoil for shrubs
- Prefabricated sheet drain system* with a compressive strength of 1003 Kpa plus 90 cm topsoil for trees
* Terradrain 900 or approved equal

xvi. The structural design of any retaining wall over 0.6 m in height or any retaining wall located on a property line is to be shown on the Site Grading plan for this project and is to be approved by the Consulting Engineer for the project.

xvii. Continuous 15 cm high barrier type poured concrete curbing will be provided between all asphalt and landscaped areas throughout the site.

xviii. All utility companies will be notified for locates prior to the installation of the hoarding that lies within the site and within the limited of the City boulevard area.

Additional Site Plan Notes:

1. Signage shown on the site development plans is for information purposes only. All signs will be subject to the provisions of sign by-law 0054-2002, as amended, and a separate sign application will be required through the building division.

2. The applicant is advised that they will be required to provide inspection staff 48 hours notice prior to commencement of any road construction.

3. The applicant is advised that confirmation must be received from the Development Construction Section that they have made arrangements for a preconstruction meeting.

4. Fire access route will be designed to support a load of not less than 11,363 kg. per axle and have a change in gradient of not more than 1 in 12.5 over a minimum distance of 15m.

5. If the final course of asphalt paving is delayed, install a temporary lift of asphalt at ramps or curb cuts to provide barrier-free access.

6. 1) Prior to Site Plan Approval, the Detailed Noise Report shall determine the noise impacts associated with the mechanical equipment and ventilation systems (i.e. cooling towers, garage exhaust fans, emergency generator, HVAC units etc.) for the proposed buildings and the building(s) in the immediate vicinity to ensure that all mechanical equipment will meet the Ministry of the Environment, Conservation and Parks (MECP) guidelines for stationary noise sources.
2) Prior to Site Plan Approval, sufficient securities will be required to ensure the construction of all noise mitigation features required and recommended in the Detailed Noise Report including, noise barriers, noise screens or any off-site stationary noise mitigation.
3) Prior to Site Plan Approval, the following clause is to be included on the Site Plan: "The Acoustical Consultant shall certify to the Planning and Building Department that the 'as constructed' site features for noise control including, but not limited to noise walls and berms, the as constructed buildings, mechanical equipment and ventilation systems for the buildings on-site and the off-site stationary noise sources are in compliance with the Detailed Noise Report as prepared for the particular building and in compliance with the Ministry of the Environment, Conservation and Parks (MECP) guidelines for transportation and stationary noise sources." The Acoustical Consultant shall also certify to the Planning and Building Department that the indoor noise levels and noise levels for outdoor living areas resultant from all transportation noise sources will meet Regional guideline conditions based on outside sound energy exposures outlined in the Detailed Noise Report for the subject building.
4) Prior to the release of site plan securities, the Acoustical Consultant shall certify to the Planning and Building Department that the 'as constructed' site features for noise control including, but not limited to noise walls and berms, the as constructed buildings, mechanical equipment and ventilation systems for the buildings on site and the off-site stationary noise sources are in compliance with the Detailed Noise Report as prepared for the particular building and in compliance with the Ministry of the Environment, Conservation and Parks (MOECP) guidelines for stationary noise sources. The Acoustical Consultant shall also certify to the Planning and Building Department that the indoor noise levels and noise levels for outdoor living areas resultant from all transportation noise sources will meet Regional guideline conditions based on outside sound energy exposures outlined in the Detailed Noise Study for the subject building and that no new noise impacts have been identified since the latest approved Detailed Noise Study.
5) The site plan securities required by the Planning and Building Department will include $5000 to secure for the Noise Certification to be prepared by a Professional Engineer with experience in environmental acoustics. The $5000 securities shall only be released to the applicant when the required Noise Certification has been provided to the satisfaction of the Planning and Building Department.
6) Prior to Site Plan Approval, the details of all noise screens and noise walls are to be provide to ascertain how they impact the site design, building designs and landscape design. Prior to Site Plan Approval, The Noise Consultant shall confirm that the design ad details of the noise walls/screens are in accordance with the specifications provided in the Detailed Noise Study and were these screens also provide a combined wind protection function, the Wind consultant shall also confirm that they are in accordance with the recommendations of the Quantitative Wind Study.

7. The Applicant will provide a minimum of one (1) week written notice to the Manager of Park Planning, and the Manager of Storm Water Management, City of Mississauga, prior to initiating any construction activities within the adjoining parkland, which had been approved through the development application. The Applicant accepts the responsibility for arranging all necessary repairs to and the reinstatement of, the adjoining greenbelt land / storm water pond, due to damages incurred by the construction works associated with this application. The Applicant acknowledges that securities being held by the City will be released only upon completion of all construction activities and the repairs/reinstatement works for the parkland / storm water pond, to the satisfaction of Transportation and Works in consultation with the Community Services Department.

Signature of Owner______________________

Name of Owner______________________

Date______________________

General Notes 2 dA1.04

1.0 Legal Description

SURVEYOR'S REAL PROPERTY REPORT
PART 1:
PLAN OF PART OF LOT 10
CONCESSION 1
NORTH OF DUNDAS STREET
CITY OF MISSISSAUGA
REGIONAL MUNICIPALITY OF PEEL

2.0 Site Area

Site Area	acres	sq.m.	sq.ft.
Development Area	2.7690	11,205.70	120,617
Private Recreation with Public Access	0.3780	1,529.86	16,467
Total Site Area	**3.1470**	**12,735.56**	**137,084**

3.0 Proposed Residential GFA

Gross Floor Area (GFA) **means the sum of the areas of each storey of a building, structure or part thereof, above or below established grade, excluding storage below established grade and a parking structure above or below established grade, measured from the exterior of outside walls, or from the midpoint of common walls.**

Residential means the sum of the areas of each storey of a building measured from the exterior of outside walls but shall not include any part of the building used for motor vehicle parking.

Non-Residential means the sum of the areas of each storey above or below established grade, measured from the exterior of outside walls, or from the midpoint of common walls, including the area of any floor systems or assembly located within a storey which is designed or used for access and passage by persons and including all parts of the building or structure or part thereof below established grade used for retail, office, industrial or wearhouse uses, but exclusing the following:

(1) any part of the building, structure or part thereof used for mechanical floor area;
(2) areas of stairwells, washrooms or elevators;
(3) any enclosed area used for the collection or storage of disposable or recyclable waste generated within the building or structure or part thereof;
(4) any part of the building or structure or part thereof above or below established grade used for motor vehicle parking or the provision of loading spaces;
(5) any part of the building, structure or part thereof below established grade used for storage incidental to other uses in the building, structure or part thereof or provided and reserved for the personal needs of the occupants of the building, structure or part thereof including lunch rooms, lounges or fitness rooms;
(6) accessory outdoor tank. (0379-2009)

3.10 **Proposed Residential GFA - 12 Storey Condominium - Building 'A'**

			floors	sq.m.	sq.m.	sq.ft.
Levels	1		1 x	572.41	572.41	6,161
Levels	2		1 x	2,645.78	2,645.78	28,479
Levels	3		1 x	2,833.03	2,833.03	30,494
Levels	4	to 5	2 x	2,787.04	5,574.08	59,999
Levels	6	to 7	2 x	2,777.92	5,555.84	59,803
Levels	8		1 x	2,623.96	2,623.96	28,244
Levels	9		1 x	2,604.39	2,604.39	28,033
Levels	10		1 x	2,241.41	2,241.41	24,126
Levels	11	to 12	2 x	2,212.27	4,424.54	47,625
Total Residential GFA - Building 'A'					**29,075.44**	**312,965**

3.11 **Proposed Residential GFA - 3 Storey Convential Townhouses - Building 'B' 'C' & 'D'**

	sq.m.	sq.ft.
Building 'B'	1,198.21	12,897
Building 'C'	1,463.07	15,748
Building 'D'	1,198.21	12,897
Total Residential GFA - Building 'B' 'C' & 'D'	**3,859.49**	**41,543**

3.12 **Total Residential GFA**

	sq.m.	sq.ft.
Building 'A'	29,075.44	312,965
Building 'B' 'C' & 'D'	3,859.49	41,543
Total Residential GFA	**32,934.93**	**354,509**

3.20 **Proposed GFA - Retail**

	sq.m.	sq.ft.
Retail	1,764.54	18,993
Retail - Common Area	207.80	2,237
Total Retail GFA	**1,972.34**	**21,230**

3.30 **Proposed Parking Garage GFA** (Included elevator's lobby, vestibule & lockers storage.)

	sq.m.	sq.ft.
Level P2	1,504.02	16,189
Level P1	295.10	3,176
Total Parking Garage GFA	**1,799.12**	**19,366**

3.40 **Total GFA**

	sq.m.	sq.ft.
Total Residential GFA	32,934.93	354,509
Total Retail GFA	1,972.34	21,230
Total Parking Garage GFA	1,799.12	19,366
Total GFA	**36,706.39**	**395,104**

4.0 Proposed Density - FSI

FSI	Total GFA	Total Site Area	FSI
	36,706.39	÷ 12,735.56 sq.m.	**2.88**

5.0 Unit Count

5.10 **Units - Building 'A'**

				JR. 1 BR	1 BR	2 BR	3 BR	No. of Units
Levels	1		1 x	0	0	0	0	0
Levels	2		1 x	2	17	5	2	26
Levels	3		1 x	0	29	9	2	40
Levels	4	to 5	2 x	2	29	9	1	82
Levels	6	to 7	2 x	2	29	10	0	82
Levels	8		1 x	0	28	6	3	37
Levels	9		1 x	0	26	6	4	36
Levels	10		1 x	1	21	8	2	32
Levels	11	to 12	2 x	1	21	8	2	64
Total Units - Building 'A'				**13**	**279**	**88**	**19**	**399**

5.20 **Units - Building 'B' 'C' & 'D'**

	3 BR	4 BR	No. of Units
Building 'B'	5	1	6
Building 'C'	8	0	8
Building 'D'	5	1	6
Total Units - Building 'B' 'C' & 'D'	**18**	**2**	**20**

5.30 **Total Units**

	JR. 1 BR	1 BR	2 BR	3 BR	4 BR	No. of Units
Total Units - Building 'A'	*13*	*279*	*88*	*19*	*0*	*399*
Total Units - Building 'B' 'C' & 'D'	*0*	*0*	*0*	*18*	*2*	*20*
Total Units	**13**	**279**	**88**	**37**	**2**	**419**
Percentage	*3.1%*	*66.6%*	*21.0%*	*8.8%*	*0.5%*	*100.0%*

6.0 Vehicular Parking

6.10 **Parking Ratio Proposed**

	Ratio
Residential - Townhouses	2.00 /unit
Residential - Condominium Owners	0.95 /unit
Shared Retail / Residential - Condominium Visitors	0.20 /unit
Accessible Parking Regulations	1.0 space plus 3% of the total
EVSE Parking	75%

6.20 **Parking Required**

	Units	Ratio	Parking Spaces
Residential - Townhouses	20	2.00 /unit	40
Residential - Condominium Owners	399	0.95 /unit	380
Shared Retail / Residential - Visitors	419	0.20 /unit	84
Total Parking Required			**504**

6.30 **Parking Provided**

	At Grade	Level P1	Level P2	Parking Spaces
Residential - Townhouses	40	0	0	40
Residential - Condominium Owners	0	161	228	389
Shared Retail / Residential - Visitors	27	57	0	84
Total Parking Provided	**67**	**218**	**228**	**513**

6.40 **Accessible Parking Required**

	Parking Spaces
Shared Retail / Residential - Accessible Parking Regulations	16

6.50 **Accessible Parking Provided**

	At Grade	Level P1	Level P2	Parking Spaces
Shared Retail / Residential - Accessible Parking Regulations	6	4	6	16

6.60 **EVSE Parking Required**

	Percentage	EVSE Parking Required
EVSE Parking	20%	101

6.70 **EVSE Parking Provided**

	Percentage		EVSE Parking Provided
EVSE Parking	75%		385
Level P2		*228*	
Level P1		*127*	
At Grade		*31*	

7.0 Bicycle Parking

7.10 **Bicycle Parking Ratio Proposed**

	Ratio
Residential Long-Term	1.00 /unit
Residential Short-Term	0.10 /unit

7.20 **Bicycle Parking Proposed**

	Units	Ratio	Parking Spaces
Residential Long-Term	419	1.00 /unit	419
Residential Short-Term	419	0.10 /unit	42
Total Bicycle Parking Proposed			**461**

7.30 **Bicycle Parking Required at Grade**

	Units	Percentage	Parking Spaces
	419	10%	42

7.40 **Bicycle Parking Provided**

	Level 1	Level P1	Level P2	Parking Spaces
Residential Long-Term	0	195	224	419
Residential Short-Term	42	0	0	42
Total Bicycle Parking Provided	**42**	**195**	**224**	**461**

8.0 Amenity Space

8.10 **Zoning Regulations - Indoor & Outdoor Amenity Space**

	Zoning Regulations
Minimum Amenity Area	The greater of 5.6m² per dwelling unit or 10% of the site area

8.20 **Amenity Space Required**

	Units	Ratio	sq.m.	sq.ft.
Minimum Amenity Area per dewlling unit	419	5.6m²	2,346.40	25,256

8.30 **Amenity Space Provided**

	sq.m.	sq.ft.
At Grade - Outdoor Private Recreation with Public Access	1,529.86	16,467
Level 2 - Outdoor Amenity	359.53	3,870
Level 2 - Indoor Amenity	702.56	7,562
Total Amenity Space Provided	**2,591.95**	**27,900**

9.0 Coverage

	sq.m.	sq.ft.	Coverage
Building Coverage	5,372.95	57,834	**42.2%**
Paved Areas	2,231.82	24,023	**17.5%**
Shaft Penetrations	68.48	737	**0.5%**
Landscaped Areas	5,062.31	54,490	**39.7%**
Net Site Area	**12,735.56**	**137,084**	**100.0%**

10.0 Loading

Loading Provided		No. of Loading
Condominium	Type 'G' - 13.0m X 4.0m X 6.1m	1
Retail	Type 'C' - 6.0m X 3.5m X 3.0m	1

11.0 Building Height

Building 'A' - Condominium	12 Storey
Building 'B' - Townhouses	3 Storey
Building 'C' - Townhouses	3 Storey
Building 'D' - Townhouses	3 Storey

Site Statistics 1 dA1.04

Authorities Having Jurisdiction

AUG. 18, 2022

Do not scale the drawings.

This Drawing Is Not To Be Used For Construction Until Signed ByThe Architect.

Date:

KIRKOR
ARCHITECTS AND PLANNERS
20 De Boers Drive Suite 400
Toronto, ON M3J 0H1

Revisions:

No.:	Revision:	Date:

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Client:
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Drawing Title:
Site Statistics

Scale:

Drawn by: G.H.

Checked by: G.H.

Project No.: 21-115

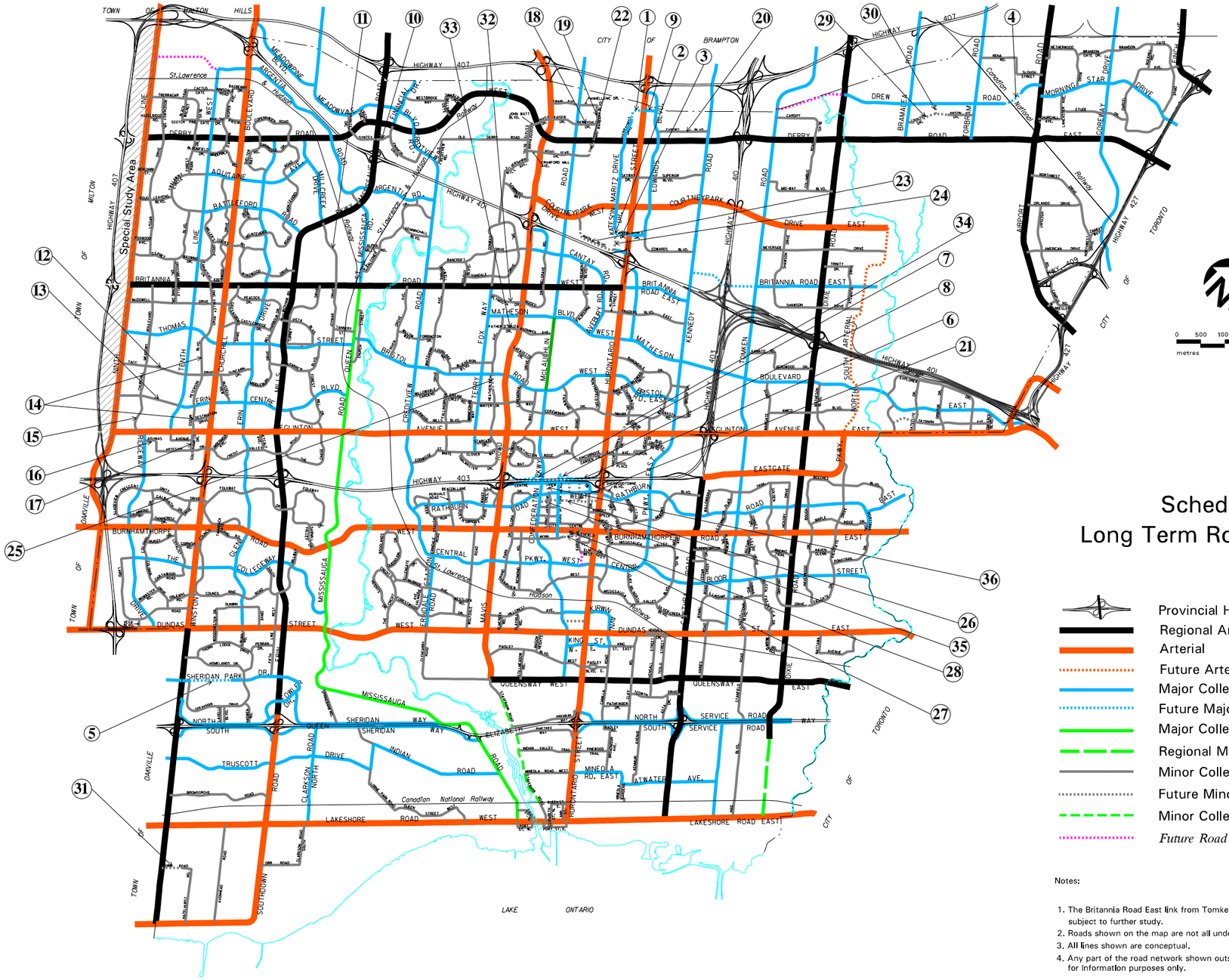
Date: AUG. 18, 2022

Drawing No.: **dA1.04**

Plot Date: 8/18/2022 11:15:44 AM File Path: C:\Revit\2021\21115P11_805 Dundas Street East_RVT2021_ghui@kirkorarchitects.com.rvt

APPENDIX C

City of Mississauga Official Plan Excerpts



Schedule 5
Long Term Road Network

- Provincial Highway and Interchange
- Regional Arterial
- Arterial
- Future Arterial (conceptual)
- Major Collector
- Future Major Collector (conceptual)
- Major Collector (Scenic Route)
- Regional Major Collector (Scenic Route)
- Minor Collector
- Future Minor Collector
- Minor Collector (Scenic Route)
- *Future Road Link to be added.*

Notes:

1. The Britannia Road East link from Tomken Road to Kennedy Road is conceptual and is subject to further study.
2. Roads shown on the map are not all under Mississauga jurisdiction.
3. All lines shown are conceptual.
4. Any part of the road network shown outside the city boundaries is shown for information purposes only.

MISSISSAUGA
Planning and Building

2011 January

The following amendments have been made:

Major Collector Roads to be shown as Future Major Collector Roads

1. Derrycrest Drive, west of Hurontario Street;
2. Kateson Drive, north of Capston Drive;
3. Capston Drive, from Kateson Drive to Hurontario Street;
4. Drew Road, just west of West Mimico Creek to south of CNR tracks;
5. Sheridan Park Drive, between the west and east leg of Speakman Drive;
6. North Service Road, from Mavis Road to Cawthra Road;
7. Confederation Parkway, North Service Road ramps;
8. Duke of York, Highway 403 flyover;

Minor Collector Roads to be shown as Major Collector Roads

9. Topflight Drive, between Hurontario Street to Edwards Boulevard (revised to complete the ring road);

Future Minor Collector Roads to be shown as Built Minor Collector Roads

10. Syntex Court, between Mississauga Road and Financial Drive;
11. Millcreek Drive, south of Southfield Road to Britannia Road West;
12. Tacc Drive, between Ninth Line and Winston Churchill Boulevard;
13. Erin Centre Boulevard, between Churchill Meadows Boulevard and Tenth Line West;
14. Oscar Peterson Boulevard, between Thomas Street and Tacc Drive, between Erin Centre Boulevard and Eglinton Avenue;
15. Churchill Meadows Boulevard, between Erin Centre Boulevard and Eglinton Avenue West;
16. Aquinas Avenue, between Ridgeway Drive and Sebastian Drive;
17. Southampton Drive, between Eglinton Avenue West and Artesian Drive;
18. Derrydale Drive, between McLaughlin Road and Saint Barbara Boulevard;
19. Saint Barbara Boulevard, between Panhellenic Drive and Derry Road West;
20. Export Boulevard, between Beckett Drive and Kennedy Road;
21. Hammerson Drive, between Rathburn Road West and the future Square One Drive;

Minor Collector Roads to be shown as Future Minor Collector Roads

22. Saint Barbara Boulevard, between Derry Road West and Longview Place;
23. Madill Boulevard, south of Courtneypark Drive to Kateson Drive;
24. Kateson Drive, between Capston Drive and Madill Boulevard;
25. Heatherleigh Avenue, between Bristol Road West and Fairford Crescent;
26. Square One Drive, between Living Arts Drive and City Centre Drive;
27. Webb Drive, east of Duke of York to Kariya Drive;
28. Proposed north/south road, between City Centre Drive and Webb Drive;
29. Logistics Drive, east of Bramalea Road to Anson Drive;
30. David Hunting Drive, between Drew Road and Logistics Drive;
31. Orr Road, west of Hazelhurst Road to Winston Churchill Boulevard;

Roads to be Added as Built Minor Collectors

32. Plymouth Drive, between Terry Fox Way to Mavis Road;
33. Father D'Souza Drive, between Heatherleigh Avenue to Mavis Road;

Roads to be Added as Future Minor Collectors

34. Sorrento Drive, between Eglinton Avenue East and Forum Drive;
35. Square One Drive, east of Confederation Parkway to Living Arts Drive; and
36. Living Arts Drive, between Rathburn Road West and Centre View Drive.

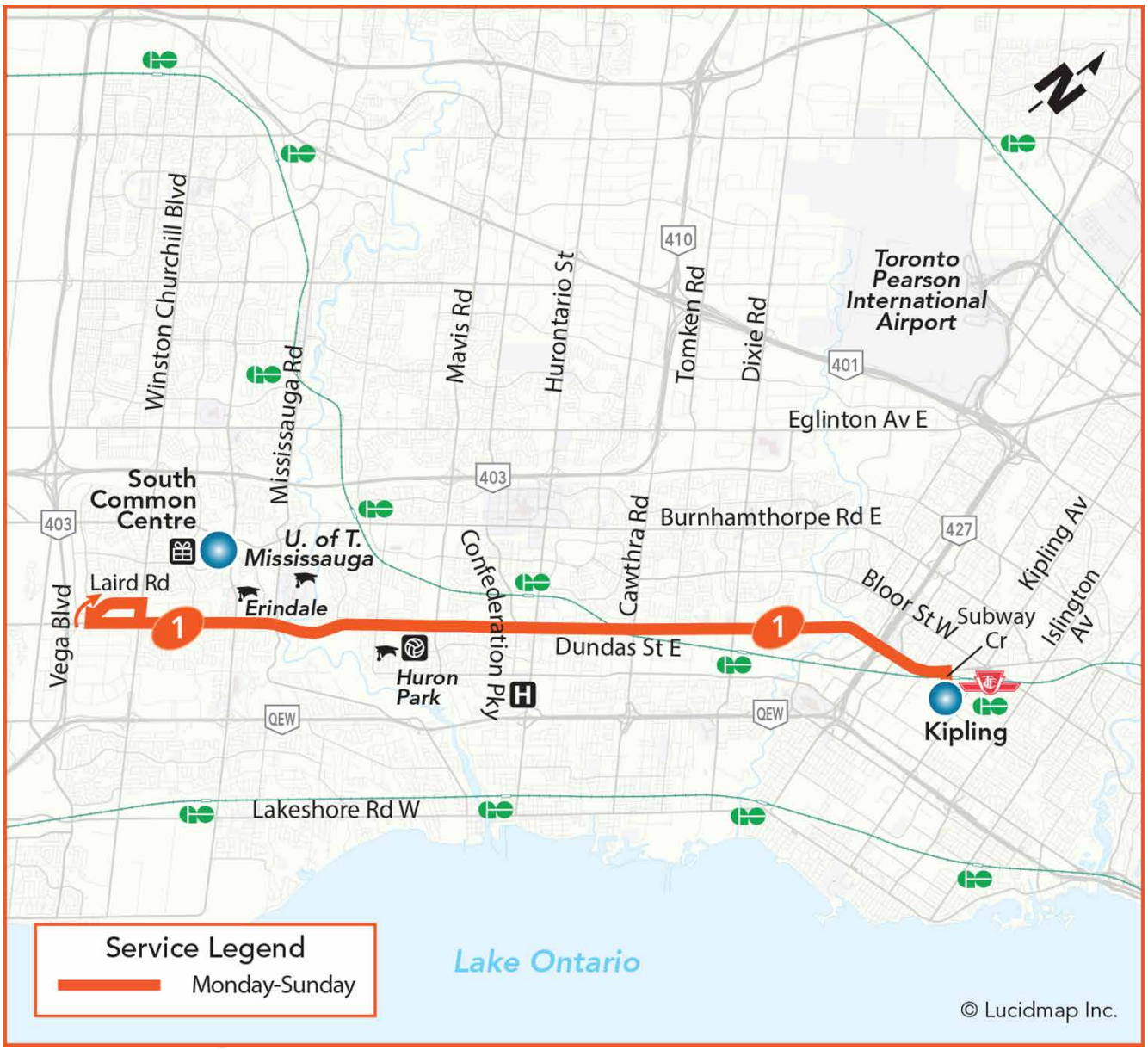
APPENDIX D

Transit Maps

1 Dundas

Local Route
Monday to Sunday

Eastbound to Kipling Bus Terminal
Westbound to Laird Rd/Ridgeway Dr



Legend

- Terminal
- Transitway Station
- High School, University or College
- TTC Subway Station
- GO Train Station
- Hospital
- Library
- Community Centre
- Shopping Centre

Effective: January 4, 2021

MiWAY MISSISSAUGA

51 Tomken

Local Route
Monday to Saturday

Northbound to Cardiff Blvd
Southbound to Stanfield Rd

Legend

- Terminal
- Transitway Station
- High School, University or College
- TTC Subway Station
- GO Train Station
- Hospital
- Library
- Community Centre
- Shopping Centre

Effective: January 04, 2016

MiWAY MISSISSAUGA

APPENDIX E

Traffic Data

Farah Tasnim

To: Tyler Xuereb
Cc: Ian Lindley; Aaron Wignall
Subject: RE: 802 Dundas Street Terms of Reference and Data Request (CFC 2297-6402)

From: Tyler Xuereb <Tyler.Xuereb@mississauga.ca>
Sent: Monday, June 13, 2022 9:23 AM
To: Farah Choudhury <fchoudhury@cfcrozier.ca>
Cc: Ian Lindley <ilindley@cfcrozier.ca>; Aaron Wignall <awignall@cfcrozier.ca>
Subject: RE: 802 Dundas Street Terms of Reference and Data Request (CFC 2297-6402)

Good Morning Farah,

Below are the recommended growth rates to be used along Dundas Street and Tomken Road for your study.

Dundas Street

	Compounded Annual Growth from Existing to 2026	
	EB	WB
AM Peak	0.5%	1.0%
PM Peak	0.5%	0.5%

	Compounded Annual Growth from 2026 to 2027	
	EB	WB
AM Peak	0.0%	0.0%
PM Peak	0.0%	0.0%

Tomken Road

	Compounded Annual Growth from Existing to 2026	
	NB	SB
AM Peak Hour	2.0%	2.0%
PM Peak Hour	2.0%	2.0%

	Compounded Annual Growth from 2026 to 2027	
	NB	SB
AM Peak Hour	0.5%	0.0%
PM Peak Hour	0.0%	1.0%

Rates from 2026 to 2027 show a 0.0% growth due to the lane reductions along Dundas Street as a result of BRT implementation.

Regards,

Tyler Xuereb
Transportation Planning Analyst
T 905-615-3200 ext.4783
Tyler.xuereb@mississauga.ca

City of Mississauga | Transportation and Works Department,
Infrastructure Planning and Engineering Services Division

From: Farah Choudhury <fchoudhury@cfcrozier.ca>
Sent: Friday, June 10, 2022 2:47 PM
To: Tyler Xuereb <Tyler.Xuereb@mississauga.ca>
Cc: Ian Lindley <ilindley@cfcrozier.ca>; Aaron Wignall <awignall@cfcrozier.ca>
Subject: RE: 802 Dundas Street Terms of Reference and Data Request (CFC 2297-6402)

Hello Tyler,

Thank you for your assistance. I was looking to follow up whether the TMC data and growth rate data previously requested for the intersections/roadways of Dundas/Haines and Dundas/Tomken was available? The payment for the TMC data was made earlier this week.

Please let me know if you had any further questions, and I hope you have a wonderful weekend!

Kind regards,

Farah Choudhury, EIT | Engineering Intern
211 Yonge Street, Suite 600 | Toronto, ON M5B 1M4
T: 416.477.3392

CROZIER
CONSULTING ENGINEERS

Crozier Connections:

Read our latest news and announcements here.

File: CA.13.SIG
Signal Timing Request
RT.07.1301
RT.07.1303

Jun. 10, 2022

Dear Farah Choudhury:

Re: Traffic Signal Timings

Please find the attached traffic signal timings for the intersections of:

Dundas Street at Haines Road
Dundas Street E at Tomken Road

The side street phases (4, 8) are actuated; meaning a vehicle or pedestrian must be present on the side street before the side street is given a green indication. Vehicle presence on the side street would result in a possible green time of between the minimum and maximum time noted, depending on demand. Pedestrian "Walk" and flashing "Don't Walk" time on the side street, as noted, would be used in the event that the pedestrian push button is activated. During the side street pedestrian indications, the side street vehicle green is concurrently displayed. Should there be no demand on the actuated phase, the signals would result in a green indication on the major street (2, 6).

Note: All times recorded in seconds, based on full demand.

The time of day plan is used for system control operation. In the event that the coordination pattern has a cycle length, offset and split value identified, the cycle length, split and offset values, as noted, would be used. However, when the time of day plan is programed using 'Action' 8, the mode is 'Free', meaning no cycle length, split and offset

values are given and the intersection operates using the phase timings provided in the report.

Should you require further information, please contact Yelena Klimenko, at 905-615-3200 ext. 3211.

Sincerely,

Yelena Klimenko
Traffic Systems Coordinator, Traffic Systems and ITS
Traffic Signals and Street Lighting
Transportation and Works Department
City of Mississauga
905-615-3200 ext. 3211
yelena.klimenko@mississauga.ca

c: Jim Kartsomanis, Supervisor, Traffic Systems and ITS

Volume Result Details by Hour Report

Location..... DUNDAS ST E btwn TOMKEN RD & UNNAMED URES

Municipality..... Mississauga

Count Station..... 1302

Direction..... Both Directions

Date	Time Period		Count	Peak Hour
Tuesday, December 05, 2017				
	12:00 AM	01:00 AM	278	☐
	01:00 AM	02:00 AM	166	☐
	02:00 AM	03:00 AM	111	☐
	03:00 AM	04:00 AM	98	☐
	04:00 AM	05:00 AM	151	☐
	05:00 AM	06:00 AM	451	☐
	06:00 AM	07:00 AM	1197	☐
	07:00 AM	08:00 AM	2278	☐
	08:00 AM	09:00 AM	2710	☐
	09:00 AM	10:00 AM	2180	☐
	10:00 AM	11:00 AM	2276	☐
	11:00 AM	12:00 PM	2441	☐
	12:00 PM	01:00 PM	2769	☐
	01:00 PM	02:00 PM	2766	☐
	02:00 PM	03:00 PM	2723	☐
	03:00 PM	04:00 PM	2928	☐
	04:00 PM	05:00 PM	3240	☐
	05:00 PM	06:00 PM	3354	☑
	06:00 PM	07:00 PM	2885	☐
	07:00 PM	08:00 PM	2138	☐
	08:00 PM	09:00 PM	1704	☐
	09:00 PM	10:00 PM	1232	☐
	10:00 PM	11:00 PM	813	☐
	11:00 PM	12:00 AM	532	☐
Total			**41,421**	

Volume Result Details by Hour Report

Location..... DUNDAS ST E btwn CEDAR CREEK LANE & HAINES RD

Municipality..... Mississauga

Count Station..... 2008

Direction..... Both Directions

Date	Time Period		Count	Peak Hour
Wednesday, March 28, 2018				
	12:00 AM	01:00 AM	244	☐
	01:00 AM	02:00 AM	141	☐
	02:00 AM	03:00 AM	94	☐
	03:00 AM	04:00 AM	73	☐
	04:00 AM	05:00 AM	168	☐
	05:00 AM	06:00 AM	369	☐
	06:00 AM	07:00 AM	1149	☐
	07:00 AM	08:00 AM	2005	☐
	08:00 AM	09:00 AM	2339	☐
	09:00 AM	10:00 AM	2071	☐
	10:00 AM	11:00 AM	2069	☐
	11:00 AM	12:00 PM	2201	☐
	12:00 PM	01:00 PM	2324	☐
	01:00 PM	02:00 PM	2289	☐
	02:00 PM	03:00 PM	2451	☐
	03:00 PM	04:00 PM	2566	☐
	04:00 PM	05:00 PM	2765	☐
	05:00 PM	06:00 PM	3000	☑
	06:00 PM	07:00 PM	2659	☐
	07:00 PM	08:00 PM	2114	☐
	08:00 PM	09:00 PM	1543	☐
	09:00 PM	10:00 PM	1133	☐
	10:00 PM	11:00 PM	724	☐
	11:00 PM	12:00 AM	416	☐
Total			**36,907**	

Volume Result Details by Hour Report

Location..... TOMKEN RD btwn FLAGSHIP DR & UNNAMED UEDU

Municipality..... Mississauga

Count Station.....

Direction..... Both Directions

Date	Time Period		Count	Peak Hour
Thursday, August 03, 2017				
	12:00 AM	01:00 AM	121	☐
	01:00 AM	02:00 AM	42	☐
	02:00 AM	03:00 AM	46	☐
	03:00 AM	04:00 AM	26	☐
	04:00 AM	05:00 AM	28	☐
	05:00 AM	06:00 AM	131	☐
	06:00 AM	07:00 AM	350	☐
	07:00 AM	08:00 AM	561	☐
	08:00 AM	09:00 AM	656	☐
	09:00 AM	10:00 AM	638	☐
	10:00 AM	11:00 AM	632	☐
	11:00 AM	12:00 PM	658	☐
	12:00 PM	01:00 PM	721	☐
	01:00 PM	02:00 PM	759	☐
	02:00 PM	03:00 PM	773	☐
	03:00 PM	04:00 PM	894	☐
	04:00 PM	05:00 PM	1053	☐
	05:00 PM	06:00 PM	1248	☑
	06:00 PM	07:00 PM	972	☐
	07:00 PM	08:00 PM	759	☐
	08:00 PM	09:00 PM	651	☐
	09:00 PM	10:00 PM	410	☐
	10:00 PM	11:00 PM	337	☐
	11:00 PM	12:00 AM	196	☐
Total			**12,662**	

Volume Result Details by Hour Report

Location..... TOMKEN RD btwn RYMAL RD & UNNAMED URES

Municipality..... Mississauga

Count Station.....

Direction..... Both Directions

Date	Time Period		Count	Peak Hour
Thursday, June 21, 2018				
	12:00 AM	01:00 AM	111	☐
	01:00 AM	02:00 AM	53	☐
	02:00 AM	03:00 AM	33	☐
	03:00 AM	04:00 AM	37	☐
	04:00 AM	05:00 AM	42	☐
	05:00 AM	06:00 AM	161	☐
	06:00 AM	07:00 AM	397	☐
	07:00 AM	08:00 AM	618	☐
	08:00 AM	09:00 AM	842	☐
	09:00 AM	10:00 AM	640	☐
	10:00 AM	11:00 AM	629	☐
	11:00 AM	12:00 PM	700	☐
	12:00 PM	01:00 PM	809	☐
	01:00 PM	02:00 PM	770	☐
	02:00 PM	03:00 PM	793	☐
	03:00 PM	04:00 PM	933	☐
	04:00 PM	05:00 PM	1041	☐
	05:00 PM	06:00 PM	1276	☑
	06:00 PM	07:00 PM	972	☐
	07:00 PM	08:00 PM	779	☐
	08:00 PM	09:00 PM	628	☐
	09:00 PM	10:00 PM	473	☐
	10:00 PM	11:00 PM	321	☐
	11:00 PM	12:00 AM	228	☐
Total			**13,286**	

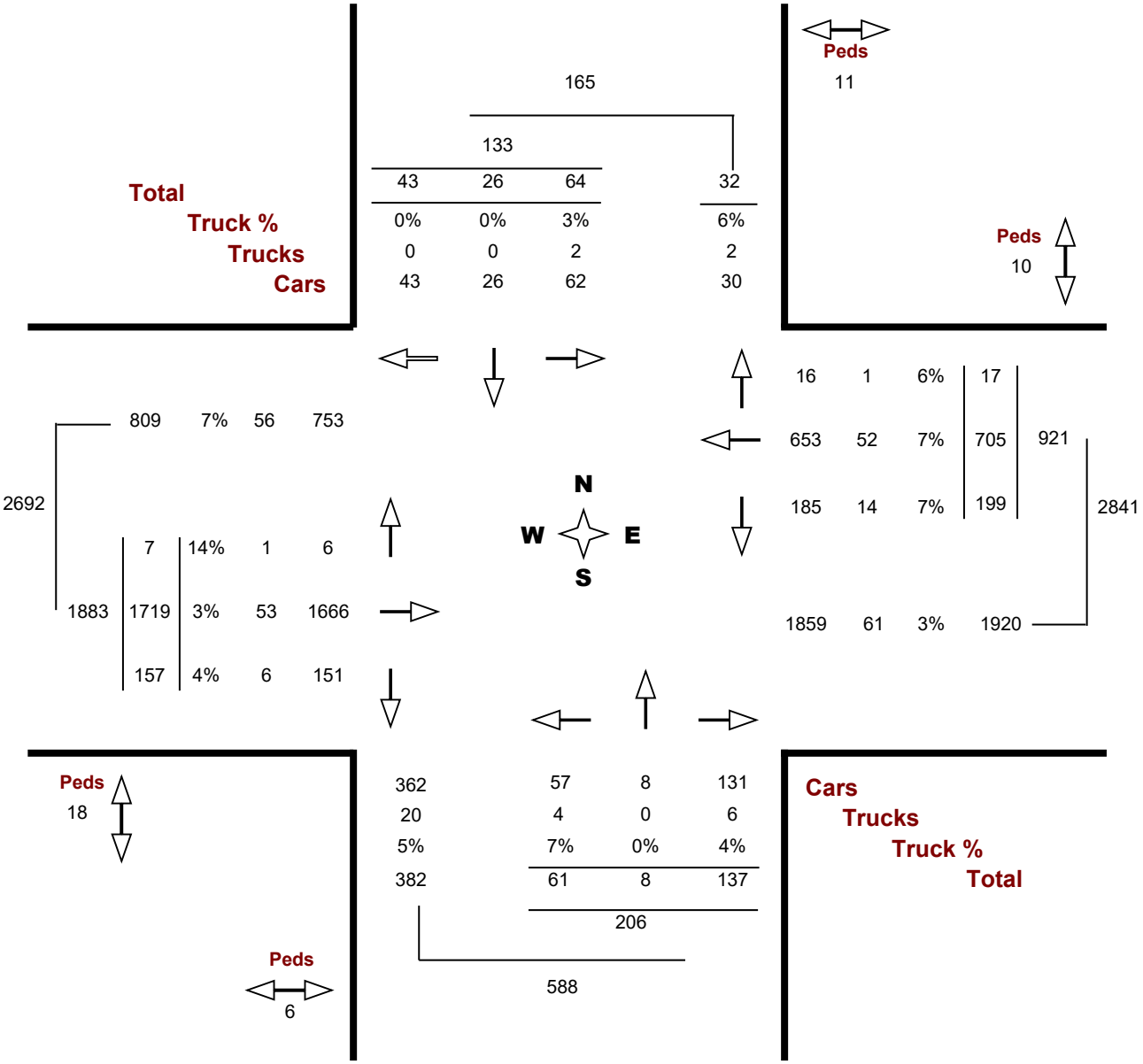
Turning Movements Report - AM Period

Location..... DUNDAS ST E @ HAINES RD

Municipality..... Mississauga **GeoID.....** 350689

Count Date..... Tuesday, 04 February, 2014 **Peak Hour.....** 08:00 AM — 09:00 AM

Road 1 HAINES RD **Road 2** DUNDAS ST E



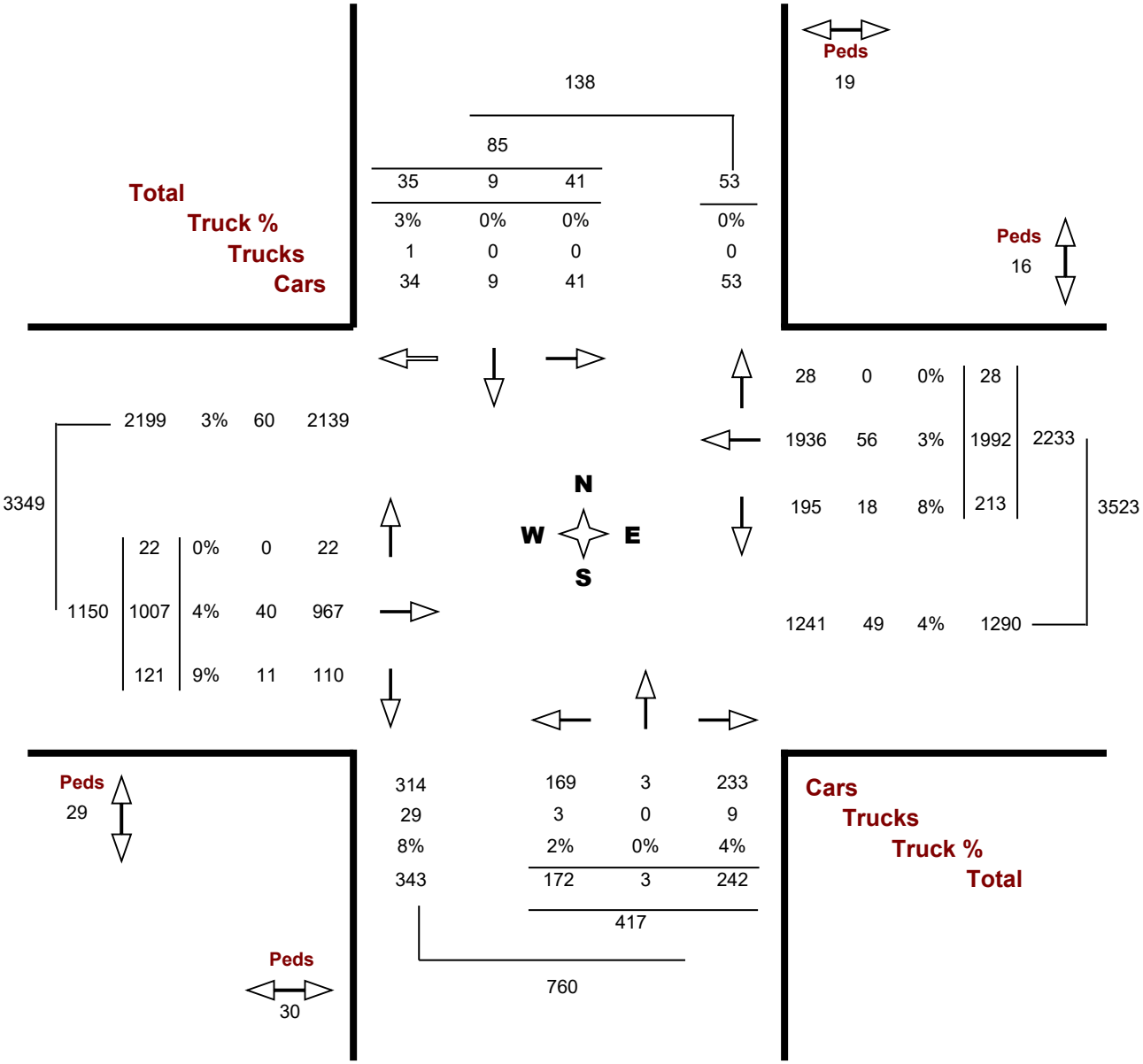
Turning Movements Report - PM Period

Location..... DUNDAS ST E @ HAINES RD

Municipality..... Mississauga **GeoID.....** 350689

Count Date..... Tuesday, 04 February, 2014 **Peak Hour.....** 04:45 PM — 05:45 PM

Road 1 HAINES RD **Road 2** DUNDAS ST E



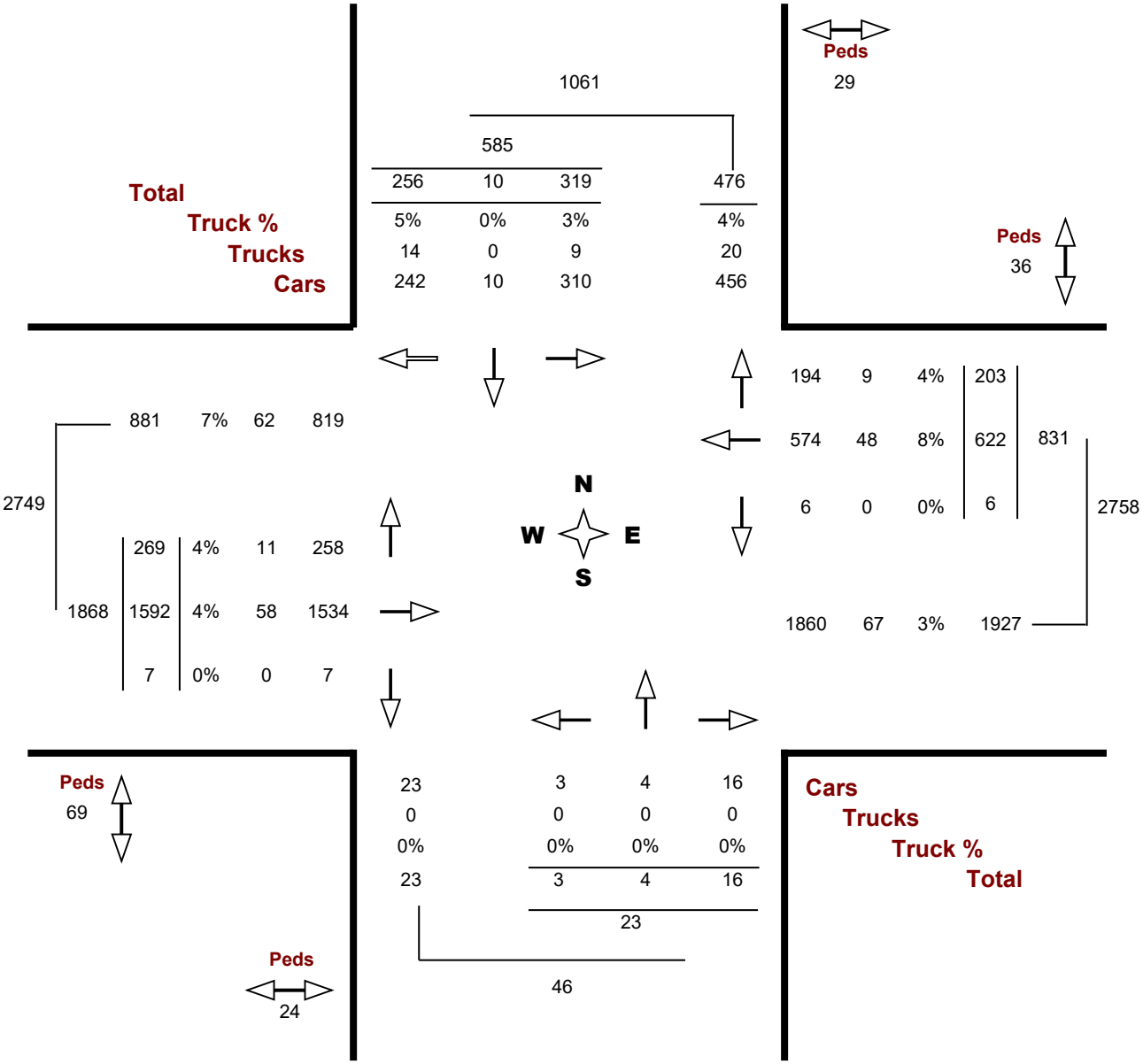
Turning Movements Report - AM Period

Location..... DUNDAS ST E @ TOMKEN RD

Municipality..... Mississauga **GeoID.....** 350812

Count Date..... Thursday, 06 February, 2014 **Peak Hour.....** 08:00 AM — 09:00 AM

Road 1 TOMKEN RD **Road 2** DUNDAS ST E



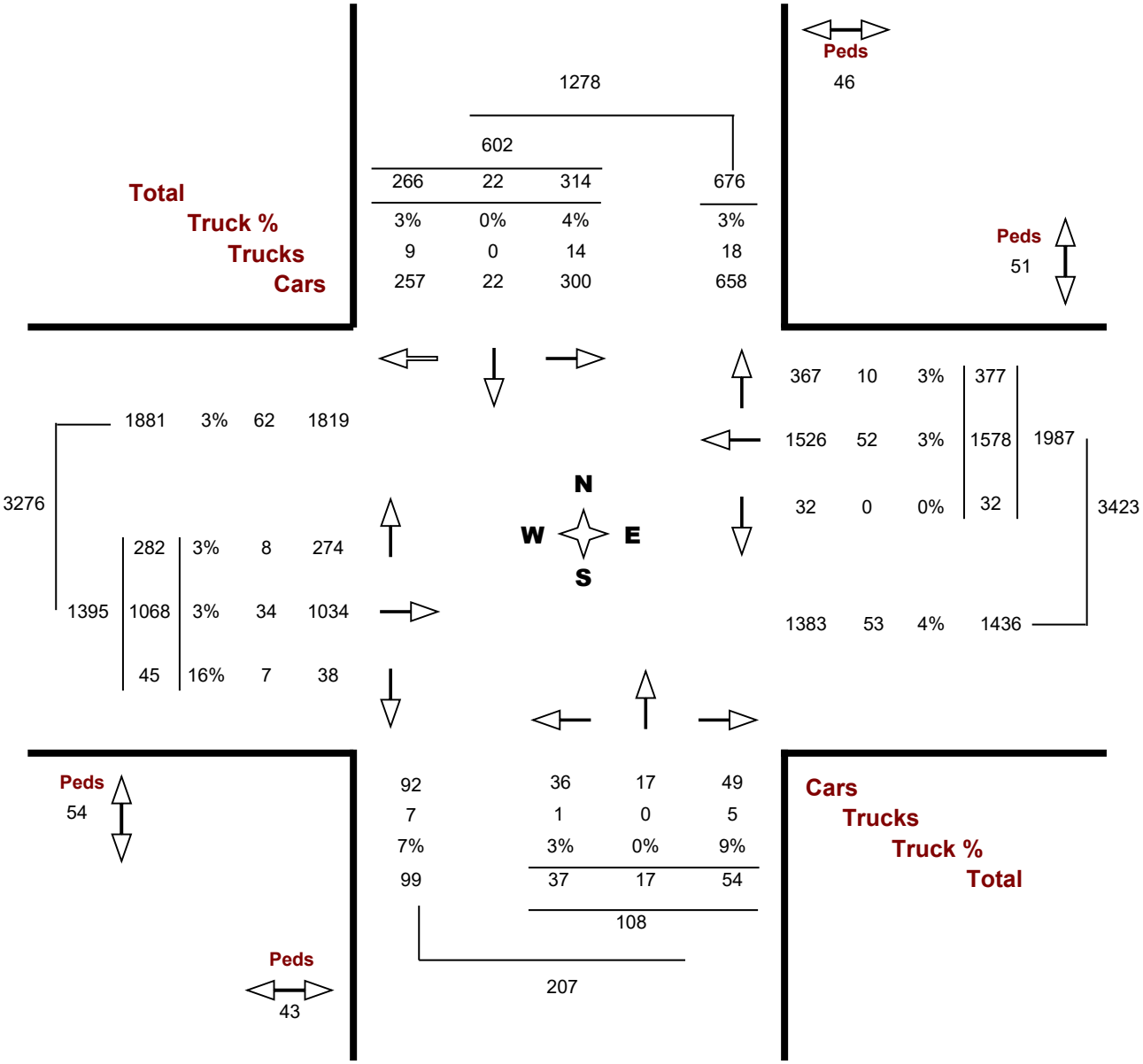
Turning Movements Report - PM Period

Location..... DUNDAS ST E @ TOMKEN RD

Municipality..... Mississauga **GeoID.....** 350812

Count Date..... Thursday, 06 February, 2014 **Peak Hour.....** 04:30 PM — 05:30 PM

Road 1 TOMKEN RD **Road 2** DUNDAS ST E



Date: June 1, 2022
From: Farah Choudhury, Crozier Consulting Engineers
Re: Growth Rates Data Request – Cawthra Road north of Dundas Street East

Farah,
Here are the estimated CAGR values for Cawthra Road north of Dundas Street East:

2016 – 2021	2021 – 2031
0.5%	0.5%

These growth rates are estimated based on multiple sources including Peel Travel Demand forecasting model, ATR and land use/forecasts data. Please note that this area may be further affected by future growth (after 2031 and beyond). An additional significant role may play future GTA West highway (particularly its timing and location). Please use your professional judgement when using these values.

If you require further assistance, please contact me at jade.huangfu@peelregion.ca.

Regards,

Jade Huangfu
Transportation Analyst, Transportation System Planning
Transportation Division, Public Works Services, Region of Peel
10 Peel Centre Drive, Suite B, 4th Floor
Brampton, ON L6T 4B9
W: (905) 791-7800 x4905
E: jade.huangfu@peelregion.ca

TMC - Intersection Count Summary

Company name: Trans-Plan Inc.
Company address: 24 Ryerson Avenue, Suite 211,Toronto, Ontario, Canada
Company phone: (647) 931-7383

Site: 1703858
Location: Ramp to Cawthra Road at Dundas Street, Mississauga
N/S Street: Ramp to Cawthra Road
E/W Street: Dundas Street
GPS Coordinates: 43.593282, -79.601023
Date: 26 May 2015
Day of week: Tuesday
Analyst(s): Kevin Lagdameo

VEHICLE TRAFFIC

Interval	SouthBound				WestBound				NorthBound				EastBound				Total
	Left	Thru	Right	B. Total	Left	Thru	Right	B. Total	Left	Thru	Right	B. Total	Left	Thru	Right	B. Total	
26/05/2015 07:00	93	4	18	115	4	72	32	108	1	1	3	5	38	239	2	279	507
26/05/2015 07:15	83	6	24	113	2	86	30	118	3	5	3	11	31	294	2	327	569
26/05/2015 07:30	94	2	28	124	1	133	51	185	1	3	1	5	35	369	2	406	720
26/05/2015 07:45	112	5	31	148	4	110	50	164	1	9	3	13	36	355	7	398	723
Hourly Total	382	17	101	500	11	401	163	575	6	18	10	34	140	1257	13	1410	2519
26/05/2015 08:00	83	5	45	133	2	132	54	188	0	2	3	5	58	339	4	401	727
26/05/2015 08:15	97	5	37	139	2	162	65	229	6	5	3	14	38	343	7	388	770
26/05/2015 08:30	99	11	39	149	2	174	70	246	5	1	6	12	37	324	0	361	768
26/05/2015 08:45	107	11	53	171	5	159	65	229	2	5	4	11	48	282	7	337	748
Hourly Total	386	32	174	592	11	627	254	892	13	13	16	42	181	1288	18	1487	3013
26/05/2015 09:00	2	0	1	3	0	0	1	1	0	0	0	0	0	0	0	0	4
26/05/2015 09:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hourly Total	2	0	1	3	0	0	1	1	0	0	0	0	0	0	0	0	4
Grand Total	770	49	276	1095	22	1028	418	1468	19	31	26	76	321	2545	31	2897	5536
Approach %	70	4	25	99	1	70	28	99	25	41	34	100	11	88	1	100	-
Total %	14	1	5	20	0	19	8	27	0	1	0	1	6	46	1	53	-

AM Peak Hour 8:00 AM - 9:00 AM

Vehicle Total	386	32	174	592	11	627	254	892	13	13	16	42	181	1288	18	1487	3013
Car	374	32	166	572	10	589	236	835	13	12	16	41	176	1252	18	1446	2894
Truck	12	0	8	20	1	38	17	56	0	1	0	1	5	35	0	40	117
Bicycle	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	1	2

Interval	SouthBound				WestBound				NorthBound				EastBound				Total
	Left	Thru	Right	B. Total	Left	Thru	Right	B. Total	Left	Thru	Right	B. Total	Left	Thru	Right	B. Total	
26/05/2015 11:00	91	15	37	143	3	164	75	242	7	10	6	23	51	206	4	261	669
26/05/2015 11:15	87	7	38	132	11	180	73	264	9	15	12	36	33	188	8	229	661
26/05/2015 11:30	73	13	45	131	5	216	101	322	4	6	4	14	49	220	5	274	741
26/05/2015 11:45	110	11	64	185	11	184	80	275	10	14	8	32	50	208	8	266	758
Hourly Total	361	46	184	591	30	744	329	1103	30	45	30	105	183	822	25	1030	2829
26/05/2015 12:00	65	9	54	128	8	235	78	321	14	8	5	27	44	222	9	275	751
26/05/2015 12:15	94	12	40	146	10	202	102	314	11	10	10	31	38	196	5	239	730
26/05/2015 12:30	85	9	64	158	8	221	94	323	5	11	7	23	55	228	3	286	790
26/05/2015 12:45	89	14	66	169	8	187	89	284	5	5	6	16	47	219	11	277	746
Hourly Total	333	44	224	601	34	845	363	1242	35	34	28	97	184	865	28	1077	3017
26/05/2015 13:00	77	14	65	156	6	208	84	298	10	11	7	28	52	265	4	321	803
26/05/2015 13:15	81	12	70	163	10	201	85	296	10	16	5	31	37	186	5	228	718
26/05/2015 13:30	63	12	52	127	7	236	81	324	6	5	7	18	42	233	9	284	753
26/05/2015 13:45	74	10	59	143	5	228	100	333	8	11	12	31	49	177	1	227	734
Hourly Total	295	48	246	589	28	873	350	1251	34	43	31	108	180	861	19	1060	3008
26/05/2015 14:00	0	0	2	2	0	28	1	29	0	0	0	0	0	22	0	22	53
26/05/2015 14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hourly Total	0	0	2	2	0	28	1	29	0	0	0	0	0	22	0	22	53
Grand Total	989	138	656	1783	92	2490	1043	3625	99	122	89	310	547	2570	72	3189	8907
Approach %	55	8	37	100	3	69	29	101	32	39	29	100	17	81	2	100	-
Total %	11	2	7	20	1	28	12	41	1	1	1	3	6	29	1	36	-

Midday Peak Hour 12:15 PM - 1:15 PM

Vehicle Total	345	49	235	629	32	818	369	1219	31	37	30	98	192	908	23	1123	3069
Car	333	47	224	604	31	783	348	1162	31	37	28	96	188	864	23	1075	2937
Truck	12	1	11	24	1	34	21	56	0	0	1	1	4	43	0	47	128
Bicycle	0	1	0	1	0	1	0	1	0	0	1	1	0	1	0	1	4

Interval	SouthBound				WestBound				NorthBound				EastBound				Total
	Left	Thru	Right	B. Total	Left	Thru	Right	B. Total	Left	Thru	Right	B. Total	Left	Thru	Right	B. Total	
26/05/2015 15:00	58	9	64	131	3	242	96	341	4	15	4	23	42	174	3	219	714
26/05/2015 15:15	65	12	67	144	5	286	106	397	7	10	6	23	56	217	11	284	848
26/05/2015 15:30	84	12	60	156	6	266	107	379	11	9	10	30	42	222	5	269	834
26/05/2015 15:45	72	11	83	166	3	287	97	387	9	13	1	23	44	201	6	251	827
Hourly Total	279	44	274	597	17	1081	406	1504	31	47	21	99	184	814	25	1023	3223
26/05/2015 16:00	71	15	74	160	10	332	144	486	2	9	7	18	49	188	5	242	906
26/05/2015 16:15	70	8	87	165	2	338	114	454	6	10	5	21	47	174	4	225	865
26/05/2015 16:30	61	7	89	157	6	370	130	506	7	4	4	15	57	207	2	266	944
26/05/2015 16:45	57	10	72	139	5	330	137	472	3	9	6	18	50	177	5	232	861
Hourly Total	259	40	322	621	23	1370	525	1918	18	32	22	72	203	746	16	965	3576
26/05/2015 17:00	54	6	83	143	7	375	147	529	16	8	5	29	55	201	4	260	961
26/05/2015 17:15	72	4	73	149	11	417	152	580	1	6	4	11	34	191	7	232	972
26/05/2015 17:30	58	6	68	132	6	360	123	489	4	13	5	22	51	210	6	267	910
26/05/2015 17:45	75	5	78	158	1	357	135	493	4	8	6	18	46	209	4	259	928
Hourly Total	259	21	302	582	25	1509	557	2091	25	35	20	80	186	811	21	1018	3771
26/05/2015 18:00	2	0	5	7	0	9	9	18	1	1	1	3	0	1	0	1	29
26/05/2015 18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hourly Total	2	0	5	7	0	9	9	18	1	1	1	3	0	1	0	1	29
Grand Total	799	105	903	1807	65	3969	1497	5531	75	115	64	254	573	2372	62	3007	10599
Approach %	44	6	50	100	1	72	27	100	30	45	25	100	19	79	2	100	-
Total %	8	1	9	18	1	37	14	52	1	1	1	3	5	22	1	28	-

PM Peak Hour 5:00 PM - 6:00 PM

Vehicle Total	259	21	302	582	25	1509	557	2091	25	35	20	80	186	811	21	1018	3771
Car	256	18	297	571	25	1486	552	2063	25	34	20	79	184	787	21	992	3705
Truck	3	1	5	9	0	23	5	28	0	0	0	0	2	22	0	24	61
Bicycle	0	2	0	2	0	0	0	0	0	1	0	1	0	2	0	2	5

PEDESTRIAN CROSSING

	North East			North West			South West			South East			Total
	Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total	
26/05/2015 07:00:00	0	0	0	3	5	8	0	0	0	0	0	0	8
26/05/2015 07:15:00	1	4	5	6	6	12	1	0	1	0	0	0	18
26/05/2015 07:30:00	0	2	2	3	6	9	1	0	1	0	0	0	12
26/05/2015 07:45:00	0	1	1	4	5	9	0	0	0	0	0	0	10
Hourly Total	1	7	8	16	22	38	2	0	2	0	0	0	48
26/05/2015 08:00:00	0	0	0	0	2	2	0	0	0	0	0	0	2
26/05/2015 08:15:00	0	1	1	1	2	3	0	0	0	0	0	0	4
26/05/2015 08:30:00	0	0	0	1	2	3	0	0	0	0	0	0	3
26/05/2015 08:45:00	0	1	1	4	5	9	1	0	1	0	0	0	11
Hourly Total	0	2	2	6	11	17	1	0	1	0	0	0	20
26/05/2015 09:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0
26/05/2015 09:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	1	9	10	22	33	55	3	0	3	0	0	0	68

AM Peak Hour 7:00 AM - 8:00 AM

Pedestrians	1	7	8	16	22	38	2	0	2	0	0	0	48

26/05/2015 11:00:00	0	0	0	1	0	1	1	0	1	0	0	0	2
26/05/2015 11:15:00	2	3	5	4	3	7	0	0	0	0	0	0	12
26/05/2015 11:30:00	0	1	1	0	1	1	1	0	1	0	0	0	3
26/05/2015 11:45:00	0	0	0	2	4	6	0	0	0	1	0	1	7
Hourly Total	2	4	6	7	8	15	2	0	2	1	0	1	24
26/05/2015 12:00:00	0	2	2	3	0	3	3	0	3	0	0	0	8
26/05/2015 12:15:00	0	0	0	7	1	8	3	0	3	1	1	2	13
26/05/2015 12:30:00	0	1	1	1	1	2	2	0	2	0	0	0	5
26/05/2015 12:45:00	0	1	1	2	4	6	1	0	1	0	0	0	8
Hourly Total	0	4	4	13	6	19	9	0	9	1	1	2	34
26/05/2015 13:00:00	0	4	4	0	2	2	5	0	5	0	0	0	11
26/05/2015 13:15:00	0	1	1	1	2	3	2	0	2	0	0	0	6
26/05/2015 13:30:00	0	2	2	5	4	9	0	0	0	0	0	0	11
26/05/2015 13:45:00	0	6	6	5	1	6	1	0	1	0	0	0	13
Hourly Total	0	13	13	11	9	20	8	0	8	0	0	0	41
26/05/2015 14:00:00	0	1	1	0	0	0	0	0	0	0	0	0	1
26/05/2015 14:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0
Hourly Total	0	1	1	0	0	0	0	0	0	0	0	0	1
Grand Total	2	22	24	31	23	54	19	0	19	2	1	3	100

Midday Peak Hour 1:00 PM - 2:00 PM

Pedestrians	0	13	13	11	9	20	8	0	8	0	0	0	41

	North East			North West			South West			South East			Total
	Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total	
26/05/2015 15:00:00	0	2	2	2	1	3	6	0	6	0	0	0	11
26/05/2015 15:15:00	0	1	1	1	1	2	3	0	3	1	0	1	7
26/05/2015 15:30:00	0	4	4	1	0	1	3	0	3	0	0	0	8
26/05/2015 15:45:00	0	2	2	8	2	10	3	0	3	0	0	0	15
Hourly Total	0	9	9	12	4	16	15	0	15	1	0	1	41
26/05/2015 16:00:00	0	3	3	3	2	5	4	0	4	0	0	0	12
26/05/2015 16:15:00	0	1	1	6	0	6	2	0	2	0	0	0	9
26/05/2015 16:30:00	0	1	1	3	1	4	6	1	7	0	0	0	12
26/05/2015 16:45:00	0	3	3	0	3	3	3	1	4	0	0	0	10
Hourly Total	0	8	8	12	6	18	15	2	17	0	0	0	43
26/05/2015 17:00:00	0	2	2	9	1	10	10	0	10	0	0	0	22

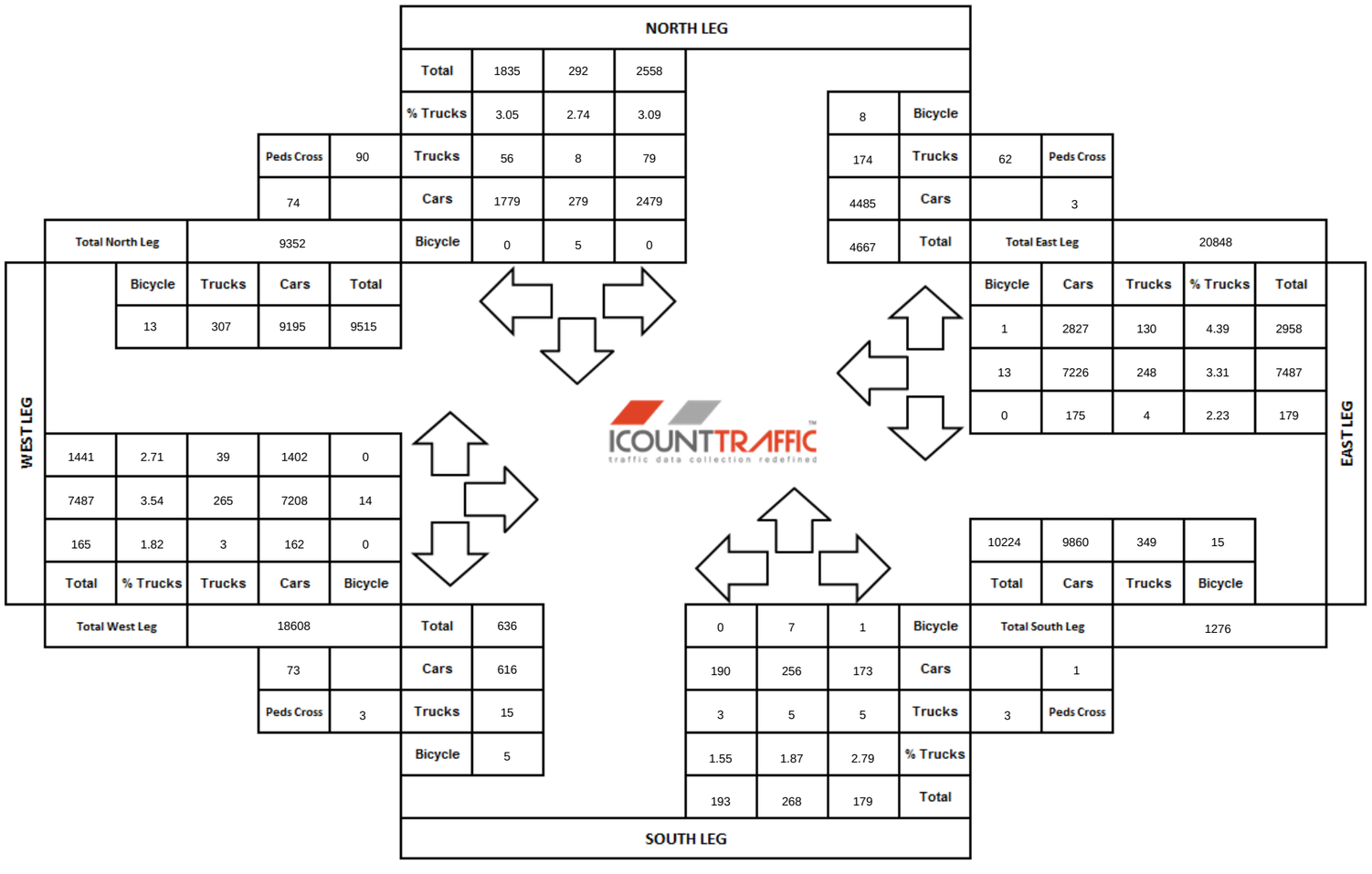
26/05/2015 17:15:00	0	1	1	0	2	2	1	1	2	0	0	0	5
26/05/2015 17:30:00	0	7	7	3	1	4	6	0	6	0	0	0	17
26/05/2015 17:45:00	0	4	4	1	4	5	4	0	4	0	0	0	13
Hourly Total	0	14	14	13	8	21	21	1	22	0	0	0	57
26/05/2015 18:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0
26/05/2015 18:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	31	31	37	18	55	51	3	54	1	0	1	141

PM Peak Hour 5:00 PM - 6:00 PM

Pedestrians	0	14	14	13	8	21	21	1	22	0	0	0	57

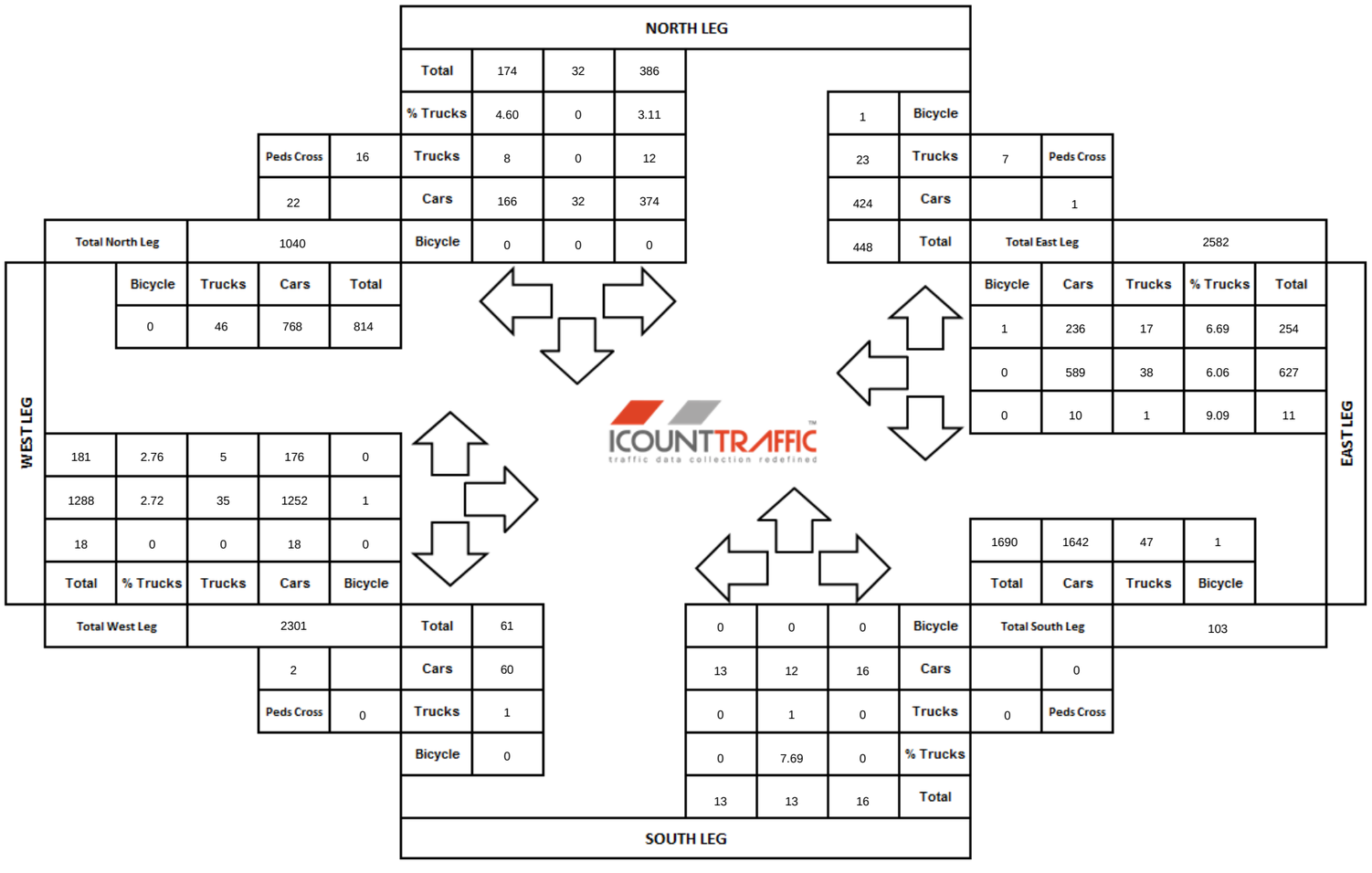
TOTAL TMC COUNT DIAGRAM

City:	**Mississauga**	**Weather:**	**Partly Cloudy**
North/South Street:	**Ramp to Cawthra Road**	**Count Date:**	**26/05/2015**
East/West Street:	**Dundas Street**	**Count Period:**	**AM, Noon, PM**
GPS Coordinates:	**43.593282, -79.601023**	**Peak Period:**	**8:00 AM - 9:00 AM, 12:15 PM - 1:15 PM, 5:00 PM - 6:00 PM**
Site Number:	**1703858**	**Major Road:**	**Ramp to Cawthra Road**
Control:	**Signalized**	**Surveyor:**	**Kevin Lagdameo**



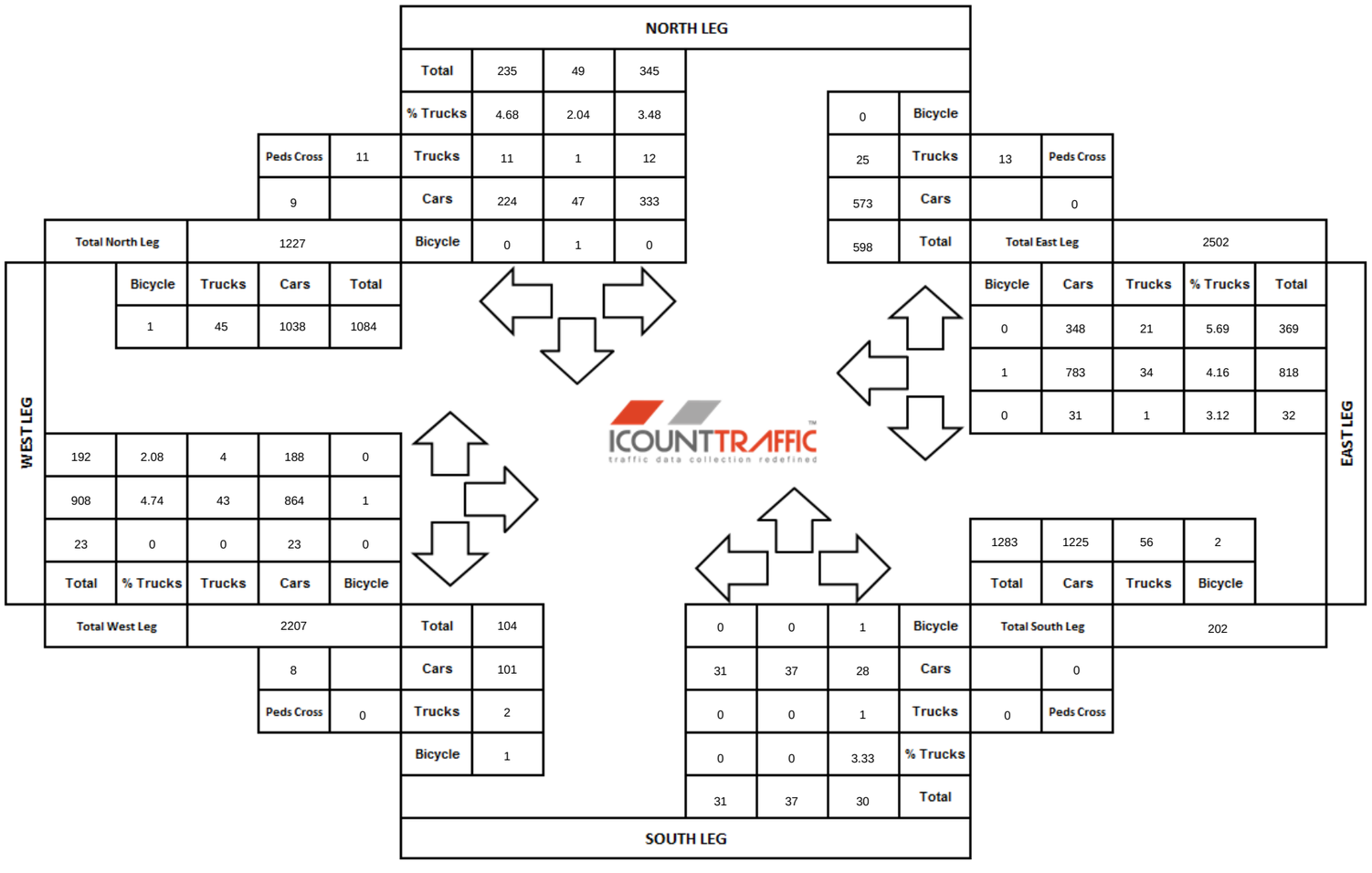
AM Peak Hour Count Diagram

City:	**Mississauga**	**Weather:**	**Partly Cloudy**
North/South Street:	**Ramp to Cawthra Road**	**Count Date:**	**26/05/2015**
East/West Street:	**Dundas Street**	**Count Period:**	**AM**
GPS Coordinates:	**43.593282, -79.601023**	**Peak Period:**	**8:00 AM - 9:00 AM**
Site Number:	**1703858**	**Major Road:**	**Ramp to Cawthra Road**
Control:	**Signalized**	**Surveyor:**	**Kevin Lagdameo**



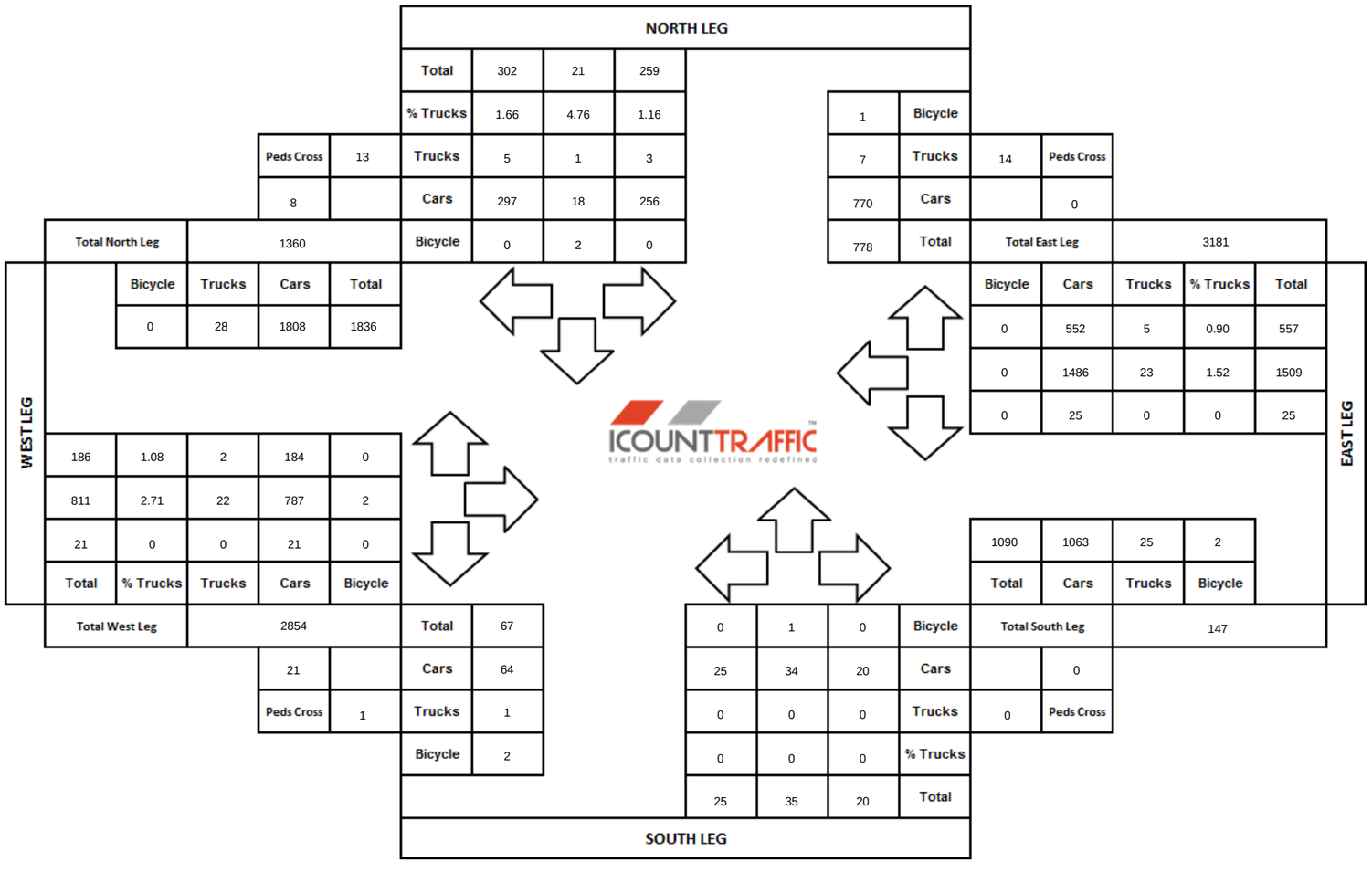
Noon Peak Hour Count Diagram

City:	**Mississauga**	**Weather:**	**Partly Cloudy**
North/South Street:	**Ramp to Cawthra Road**	**Count Date:**	**26/05/2015**
East/West Street:	**Dundas Street**	**Count Period:**	**Noon**
GPS Coordinates:	**43.593282, -79.601023**	**Peak Period:**	**12:15 PM - 1:15 PM**
Site Number:	**1703858**	**Major Road:**	**Ramp to Cawthra Road**
Control:	**Signalized**	**Surveyor:**	**Kevin Lagdameo**



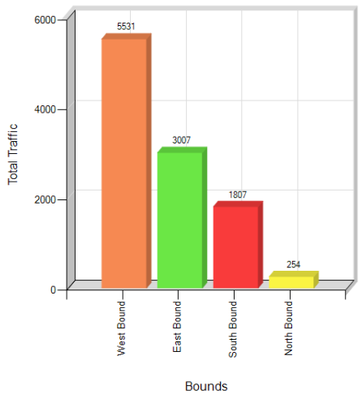
PM Peak Hour Count Diagram

City:	**Mississauga**	**Weather:**	**Partly Cloudy**
North/South Street:	**Ramp to Cawthra Road**	**Count Date:**	**26/05/2015**
East/West Street:	**Dundas Street**	**Count Period:**	**PM**
GPS Coordinates:	**43.593282, -79.601023**	**Peak Period:**	**5:00 PM - 6:00 PM**
Site Number:	**1703858**	**Major Road:**	**Ramp to Cawthra Road**
Control:	**Signalized**	**Surveyor:**	**Kevin Lagdameo**

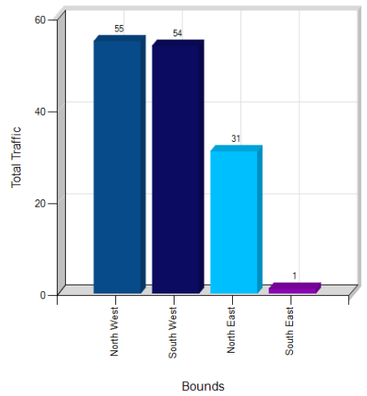


TMC chart data

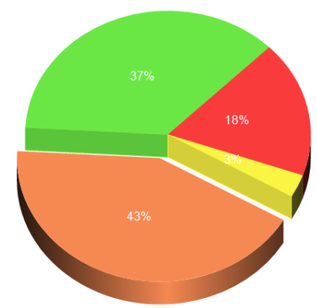
Total Traffic



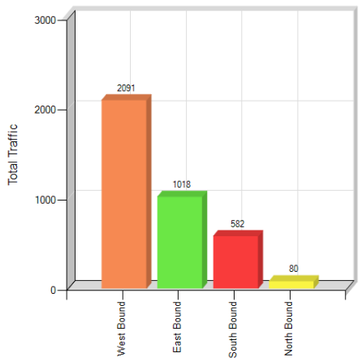
Total Pedestrians



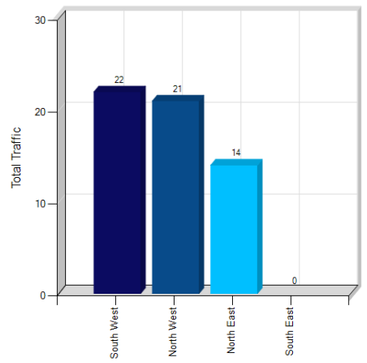
Total Approach



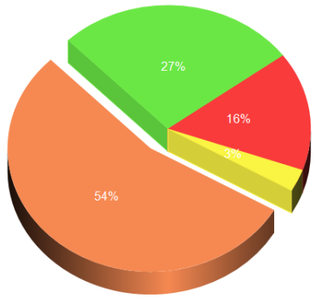
Total Traffic at Peak Hour



Total Pedestrians at Peak Hour



Total Approach at Peak Hour



	SouthBound		NorthEast
	WestBound		NorthWest
	NorthBound		SouthWest
	EastBound		SouthEast

NOTES & IMAGES

Dundas Street West Leg

Dundas Street East Leg

Ramp to Cawthra Road

Exit from Rona Plaza (South Leg)

REGIONAL MUNICIPALITY OF PEEL

Traffic Signal Timing Parameters

Database Date	**June 8, 2022**		**Prepared Date**	**June 8, 2022**
Database Rev	**iNET**		**Completed By**	**TF**
Timing Card / Field rev	**-**		**Checked By**	**RC**

Location — **Dundas Street E Ramp at Cawthra Road (South Terminal)**

Phase #	Street Name - Direction	Vehicle Minimum (s)	Pedestrian Minimum (s)		Amber (s)	All Red (s)	TIME PERIOD (s)		
			WALK	FDWALK			AM SPLITS	OFF SPLITS	PM SPLITS
1	Dundas Street - EB P.P. LT	5.0	0.0	0.0	3.0	0.0	35.0	19.0	14.0
2	Dundas Street - EB / WB	8.0	10.0	19.0	4.0	3.0	69.0	58.0	87.0
3	Cawthra Road - NB	8.0	0.0	0.0	4.0	3.0	26.0	42.0	27.0
4	Cawthra Road - SB	8.0	10.0	29.0	4.0	3.5	30.0	41.0	32.0
5	Not In Use	-	-	-	-	-	-	-	-
6	Not In Use	-	-	-	-	-	-	-	-
7	Not In Use	-	-	-	-	-	-	-	-
8	Not In Use	-	-	-	-	-	-	-	-

System Control
Yes

Semi-Actuated Mode
Yes

TIME (M-F)	PEAK	CYCLE LENGTH (s)	OFFSET (s)
06:00-09:30	AM	160	85
09:30-15:00 19:30-00:00	OFF	160	22
15:00-19:30	PM	160	14

APPENDIX F

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 G

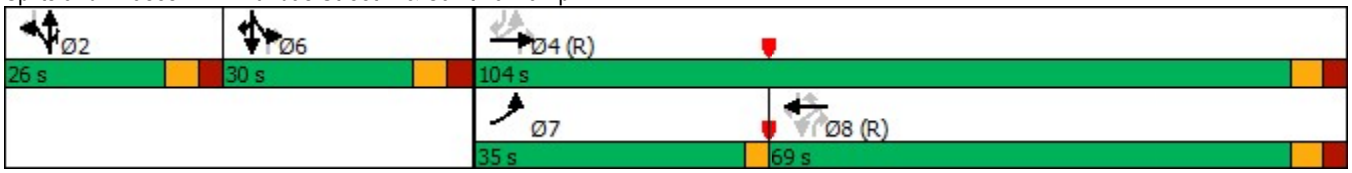
2022 Existing Synchro Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	187	1334	19	11	649	263	13	13	17	400	33	180
Future Volume (vph)	187	1334	19	11	649	263	13	13	17	400	33	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	120.0		45.0	0.0		0.0	0.0		65.0
Storage Lanes	1		0	1		1	0		1	1		1
Taper Length (m)	100.0			15.0			7.6			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.91	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.998				0.850			0.850			0.850
Flt Protected	0.950			0.950				0.976		0.950	0.959	
Satd. Flow (prot)	1789	3571	0	1789	5142	1601	0	1838	1601	1700	1716	1601
Flt Permitted	0.334			0.130				0.976		0.950	0.959	
Satd. Flow (perm)	629	3571	0	245	5142	1601	0	1838	1601	1700	1716	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				282						
Link Speed (k/h)		60			60			48			50	
Link Distance (m)		121.4			559.2			44.8			197.1	
Travel Time (s)		7.3			33.6			3.4			14.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	203	1450	21	12	705	286	14	14	18	435	36	196
Shared Lane Traffic (%)										46%		
Lane Group Flow (vph)	203	1471	0	12	705	286	0	28	18	235	236	196
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	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	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	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	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	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	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	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	pm+pt	NA		Perm	NA	Perm	Split	NA	custom	Split	NA	custom
Protected Phases	7	4			8		2	2	2	6	6	6
Permitted Phases	4			8		8			4 6 8			4 2 8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	8.0	36.0		36.0	36.0	36.0	15.0	15.0	15.0	15.5	15.5	15.5
Total Split (s)	35.0	104.0		69.0	69.0	69.0	26.0	26.0	26.0	30.0	30.0	30.0
Total Split (%)	21.9%	65.0%		43.1%	43.1%	43.1%	16.3%	16.3%	16.3%	18.8%	18.8%	18.8%
Maximum Green (s)	32.0	97.0		62.0	62.0	62.0	19.0	19.0	19.0	22.5	22.5	22.5
Yellow Time (s)	3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0		7.0	7.0	7.0		7.0	7.0	7.5	7.5	7.5
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Min		C-Min	C-Min	C-Min	None	None	None	None	None	None
Walk Time (s)		10.0		10.0	10.0	10.0				0.0	0.0	0.0
Flash Dont Walk (s)		19.0		19.0	19.0	19.0				22.5	22.5	22.5
Pedestrian Calls (#/hr)		0		0	0	0				0	0	0
Act Effct Green (s)	104.7	100.7		84.7	84.7	84.7		8.7	160.0	32.1	32.1	160.0
Actuated g/C Ratio	0.65	0.63		0.53	0.53	0.53		0.05	1.00	0.20	0.20	1.00
v/c Ratio	0.40	0.65		0.09	0.26	0.29		0.28	0.01	0.69	0.69	0.12
Control Delay	14.7	22.0		32.3	30.3	10.8		79.6	0.0	70.0	69.7	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	14.7	22.0		32.3	30.3	10.8		79.6	0.0	70.0	69.7	0.2
LOS	B	C		C	C	B		E	A	E	E	A
Approach Delay		21.1			24.8			48.4			49.4	
Approach LOS		C			C			D			D	

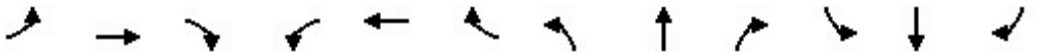
Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 16 (10%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 28.1		Intersection LOS: C	
Intersection Capacity Utilization 80.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Dundas Street E & Cawthra Ramp



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	203	1471	12	705	286	28	18	235	236	196
v/c Ratio	0.40	0.65	0.09	0.26	0.29	0.28	0.01	0.69	0.69	0.12
Control Delay	14.7	22.0	32.3	30.3	10.8	79.6	0.0	70.0	69.7	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.7	22.0	32.3	30.3	10.8	79.6	0.0	70.0	69.7	0.2
Queue Length 50th (m)	25.1	155.5	2.6	61.5	21.9	8.8	0.0	73.6	73.8	0.0
Queue Length 95th (m)	42.7	204.5	6.6	57.7	5.6	19.4	0.0	101.5	101.3	0.0
Internal Link Dist (m)		97.4		535.2		20.8			173.1	
Turn Bay Length (m)	75.0		120.0		45.0					65.0
Base Capacity (vph)	643	2287	129	2722	980	218	1601	340	343	1601
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.64	0.09	0.26	0.29	0.13	0.01	0.69	0.69	0.12

Intersection Summary

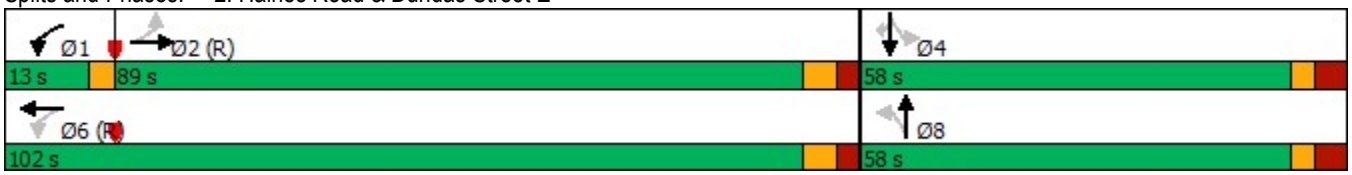


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	1784	158	200	730	52	61	9	138	77	28	53
Future Volume (vph)	53	1784	158	200	730	52	61	9	138	77	28	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	20.0		0.0	75.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	35.0			20.0			50.0			25.0		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.988			0.990			0.859				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	5080	0	1789	5090	0	1789	1618	0	1789	1883	1601
Flt Permitted	0.320			0.047			0.738			0.406		
Satd. Flow (perm)	603	5080	0	89	5090	0	1390	1618	0	765	1883	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			12			124				58
Link Speed (k/h)		60			60			50			40	
Link Distance (m)		559.2			412.2			198.5			92.1	
Travel Time (s)		33.6			24.7			14.3			8.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	58	1939	172	217	793	57	66	10	150	84	30	58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	58	2111	0	217	850	0	66	160	0	84	30	58
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)		1.6			1.6			1.6			1.6	
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	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	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		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		1	6		8	8		4	4	4
Switch Phase												
Minimum Initial (s)	8.0	8.0		5.0	8.0		8.0	8.0		8.0	8.0	8.0
Minimum Split (s)	44.0	44.0		10.0	44.0		53.0	53.0		53.0	53.0	53.0
Total Split (s)	89.0	89.0		13.0	102.0		58.0	58.0		58.0	58.0	58.0
Total Split (%)	55.6%	55.6%		8.1%	63.8%		36.3%	36.3%		36.3%	36.3%	36.3%
Maximum Green (s)	82.0	82.0		10.0	95.0		51.0	51.0		51.0	51.0	51.0
Yellow Time (s)	4.0	4.0		3.0	4.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	3.0	3.0		0.0	3.0		4.0	4.0		4.0	4.0	4.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		-1.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		3.0	7.0		7.0	7.0		6.0	7.0	7.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max		None	C-Max		None	None		None	None	None
Walk Time (s)	10.0	10.0			10.0		10.0	10.0		10.0	10.0	10.0
Flash Dont Walk (s)	27.0	27.0			27.0		36.0	36.0		36.0	36.0	36.0
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	0
Act Effct Green (s)	96.3	96.3		132.8	128.8		17.2	17.2		18.2	17.2	17.2
Actuated g/C Ratio	0.60	0.60		0.83	0.80		0.11	0.11		0.11	0.11	0.11
v/c Ratio	0.16	0.69		0.56	0.21		0.44	0.56		0.98	0.15	0.26
Control Delay	10.7	18.6		56.7	3.4		74.6	25.3		158.3	63.4	16.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	10.7	18.6		56.7	3.4		74.6	25.3		158.3	63.4	16.2
LOS	B	B		E	A		E	C		F	E	B
Approach Delay		18.4			14.3			39.7			93.8	
Approach LOS		B			B			D			F	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.98			
Intersection Signal Delay: 22.1		Intersection LOS: C	
Intersection Capacity Utilization 84.7%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 2: Haines Road & Dundas Street E



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	58	2111	217	850	66	160	84	30	58
v/c Ratio	0.16	0.69	0.56	0.21	0.44	0.56	0.98	0.15	0.26
Control Delay	10.7	18.6	56.7	3.4	74.6	25.3	158.3	63.4	16.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.7	18.6	56.7	3.4	74.6	25.3	158.3	63.4	16.2
Queue Length 50th (m)	5.6	194.7	51.1	15.8	20.0	10.6	27.1	8.8	0.0
Queue Length 95th (m)	m9.5	99.1	80.2	25.4	34.5	32.9	#51.1	18.6	13.2
Internal Link Dist (m)		535.2		388.2		174.5		68.1	
Turn Bay Length (m)	30.0		20.0		75.0		25.0		25.0
Base Capacity (vph)	362	3061	388	4101	443	600	248	600	549
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.69	0.56	0.21	0.15	0.27	0.34	0.05	0.11

Intersection Summary

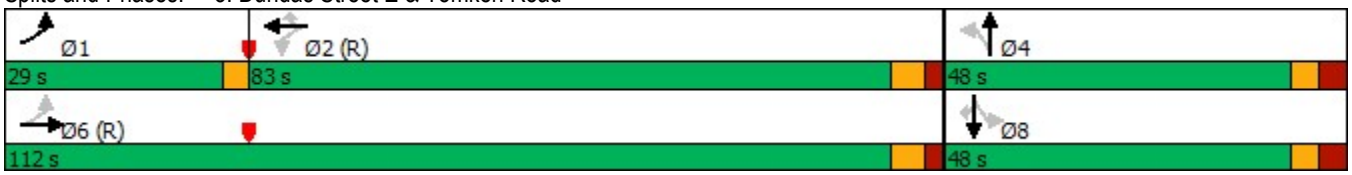
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

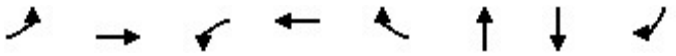
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	269	1592	7	6	622	203	3	4	16	319	10	256
Future Volume (vph)	269	1592	7	6	622	203	3	4	16	319	10	256
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	20.0		30.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		1	0		0	0		1
Taper Length (m)	35.0			40.0			2.5			2.5		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999				0.850		0.904				0.850
Flt Protected	0.950			0.950				0.994			0.954	
Satd. Flow (prot)	1789	5137	0	1789	5142	1601	0	1692	0	0	1797	1601
Flt Permitted	0.349			0.119				0.957			0.715	
Satd. Flow (perm)	657	5137	0	224	5142	1601	0	1629	0	0	1347	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				190		17				258
Link Speed (k/h)		60			60			48			50	
Link Distance (m)		412.2			702.4			80.2			421.2	
Travel Time (s)		24.7			42.1			6.0			30.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	292	1730	8	7	676	221	3	4	17	347	11	278
Shared Lane Traffic (%)												
Lane Group Flow (vph)	292	1738	0	7	676	221	0	24	0	0	358	278
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			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
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	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		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	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		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	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		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	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	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	1	6			2			4			8	
Permitted Phases	6			2		2	4			8		8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	1	6		2	2	2	4	4		8	8	8
Switch Phase												
Minimum Initial (s)	5.0	8.0		8.0	8.0	8.0	8.0	8.0		8.0	8.0	8.0
Minimum Split (s)	9.5	30.5		30.5	30.5	30.5	43.0	43.0		43.0	43.0	43.0
Total Split (s)	29.0	112.0		83.0	83.0	83.0	48.0	48.0		48.0	48.0	48.0
Total Split (%)	18.1%	70.0%		51.9%	51.9%	51.9%	30.0%	30.0%		30.0%	30.0%	30.0%
Maximum Green (s)	26.0	105.5		76.5	76.5	76.5	41.0	41.0		41.0	41.0	41.0
Yellow Time (s)	3.0	4.0		4.0	4.0	4.0	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	0.0	2.5		2.5	2.5	2.5	3.5	3.5		3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0			-2.0	0.0
Total Lost Time (s)	3.0	6.5		6.5	6.5	6.5		7.0			5.0	7.0
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		C-Max	C-Max	C-Max	None	None		None	None	None
Walk Time (s)		10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	10.0
Flash Dont Walk (s)		14.0		14.0	14.0	14.0	26.0	26.0		26.0	26.0	26.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0		0	0	0
Act Effct Green (s)	109.0	105.5		87.0	87.0	87.0		41.0			43.0	41.0
Actuated g/C Ratio	0.68	0.66		0.54	0.54	0.54		0.26			0.27	0.26
v/c Ratio	0.52	0.51		0.06	0.24	0.23		0.06			0.99	0.46
Control Delay	11.2	9.4		20.5	19.8	4.4		22.8			101.8	9.5
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Delay	11.2	9.4		20.5	19.8	4.4		22.8			101.8	9.5
LOS	B	A		C	B	A		C			F	A
Approach Delay		9.7			16.0			22.8			61.5	
Approach LOS		A			B			C			E	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 0 (0%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 20.5		Intersection LOS: C	
Intersection Capacity Utilization 77.4%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: Dundas Street E & Tomken Road





Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	292	1738	7	676	221	24	358	278
v/c Ratio	0.52	0.51	0.06	0.24	0.23	0.06	0.99	0.46
Control Delay	11.2	9.4	20.5	19.8	4.4	22.8	101.8	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.2	9.4	20.5	19.8	4.4	22.8	101.8	9.5
Queue Length 50th (m)	16.0	39.9	1.0	40.2	4.5	1.7	114.3	4.8
Queue Length 95th (m)	37.9	75.2	4.3	51.6	18.3	9.5	#180.5	29.5
Internal Link Dist (m)		388.2		678.4		56.2	397.2	
Turn Bay Length (m)	15.0		20.0		30.0			
Base Capacity (vph)	631	3387	121	2795	957	430	362	602
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.51	0.06	0.24	0.23	0.06	0.99	0.46

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1883	0	0	1883	1883	0
Flt Permitted						
Satd. Flow (perm)	1883	0	0	1883	1883	0
Link Speed (k/h)	50			50	40	
Link Distance (m)	115.2			92.1	57.7	
Travel Time (s)	8.3			6.6	5.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	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	

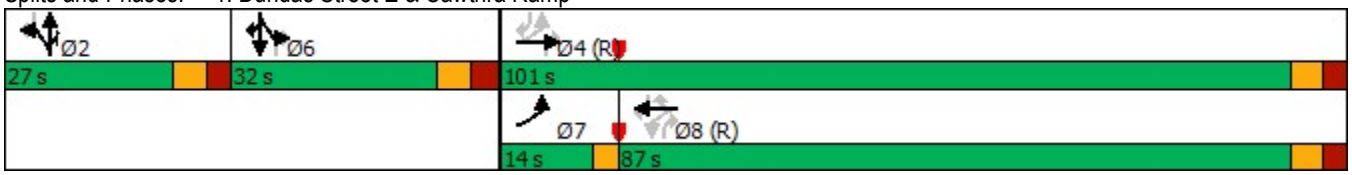
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	193	840	22	26	1563	577	36	21	83	268	22	313
Future Volume (vph)	193	840	22	26	1563	577	36	21	83	268	22	313
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	120.0		45.0	0.0		0.0	0.0		65.0
Storage Lanes	1		0	1		1	0		1	1		1
Taper Length (m)	100.0			15.0			7.6			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.91	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.996				0.850			0.850			0.850
Flt Protected	0.950			0.950				0.970		0.950	0.959	
Satd. Flow (prot)	1789	3564	0	1789	5142	1601	0	1827	1601	1700	1716	1601
Flt Permitted	0.077			0.305				0.970		0.950	0.959	
Satd. Flow (perm)	145	3564	0	574	5142	1601	0	1827	1601	1700	1716	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				314						
Link Speed (k/h)		60			60			48			50	
Link Distance (m)		121.4			559.2			44.8			197.1	
Travel Time (s)		7.3			33.6			3.4			14.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	210	913	24	28	1699	627	39	23	90	291	24	340
Shared Lane Traffic (%)										46%		
Lane Group Flow (vph)	210	937	0	28	1699	627	0	62	90	157	158	340
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	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	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	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	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	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	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	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	pm+pt	NA		Perm	NA	Perm	Split	NA	custom	Split	NA	custom
Protected Phases	7	4			8		2	2	2	6	6	6
Permitted Phases	4			8		8			4 6 8			4 2 8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	8.0	36.0		36.0	36.0	36.0	15.0	15.0	15.0	15.5	15.5	15.5
Total Split (s)	14.0	101.0		87.0	87.0	87.0	27.0	27.0	27.0	32.0	32.0	32.0
Total Split (%)	8.8%	63.1%		54.4%	54.4%	54.4%	16.9%	16.9%	16.9%	20.0%	20.0%	20.0%
Maximum Green (s)	11.0	94.0		80.0	80.0	80.0	20.0	20.0	20.0	24.5	24.5	24.5
Yellow Time (s)	3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0		7.0	7.0	7.0		7.0	7.0	7.5	7.5	7.5
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Min		C-Min	C-Min	C-Min	None	None	None	None	None	None
Walk Time (s)		10.0		10.0	10.0	10.0				0.0	0.0	0.0
Flash Dont Walk (s)		19.0		19.0	19.0	19.0				22.5	22.5	22.5
Pedestrian Calls (#/hr)		0		0	0	0				0	0	0
Act Effct Green (s)	110.0	106.0		84.1	84.1	84.1		11.1	160.0	21.4	21.4	160.0
Actuated g/C Ratio	0.69	0.66		0.53	0.53	0.53		0.07	1.00	0.13	0.13	1.00
v/c Ratio	0.72	0.40		0.09	0.63	0.63		0.49	0.06	0.69	0.69	0.21
Control Delay	42.2	13.9		20.0	28.6	15.6		84.4	0.1	81.0	80.7	0.3
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	42.2	13.9		20.0	28.6	15.6		84.4	0.1	81.0	80.7	0.3
LOS	D	B		C	C	B		F	A	F	F	A
Approach Delay		19.1			25.0			34.4			39.0	
Approach LOS		B			C			C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 16 (10%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 25.9		Intersection LOS: C	
Intersection Capacity Utilization 74.2%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Dundas Street E & Cawthra Ramp



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	210	937	28	1699	627	62	90	157	158	340
v/c Ratio	0.72	0.40	0.09	0.63	0.63	0.49	0.06	0.69	0.69	0.21
Control Delay	42.2	13.9	20.0	28.6	15.6	84.4	0.1	81.0	80.7	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.2	13.9	20.0	28.6	15.6	84.4	0.1	81.0	80.7	0.3
Queue Length 50th (m)	35.9	67.7	4.0	104.0	48.6	19.4	0.0	50.8	51.1	0.0
Queue Length 95th (m)	#99.4	100.0	m5.9	123.5	81.8	34.7	0.0	73.5	73.4	0.0
Internal Link Dist (m)		97.4		535.2		20.8			173.1	
Turn Bay Length (m)	75.0		120.0		45.0					65.0
Base Capacity (vph)	293	2362	302	2703	990	228	1597	271	273	1589
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.40	0.09	0.63	0.63	0.27	0.06	0.58	0.58	0.21

Intersection Summary

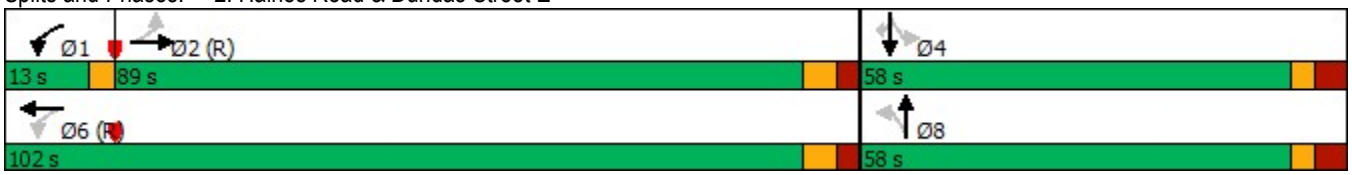
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	1006	110	213	2073	28	179	3	252	43	9	36
Future Volume (vph)	22	1006	110	213	2073	28	179	3	252	43	9	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	20.0		0.0	75.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	35.0			20.0			50.0			25.0		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.985			0.998			0.852				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	5065	0	1789	5132	0	1789	1605	0	1789	1883	1601
Flt Permitted	0.060			0.188			0.751			0.247		
Satd. Flow (perm)	113	5065	0	354	5132	0	1414	1605	0	465	1883	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			2			175				48
Link Speed (k/h)		60			60			50			40	
Link Distance (m)		559.2			412.2			198.5			92.1	
Travel Time (s)		33.6			24.7			14.3			8.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	1093	120	232	2253	30	195	3	274	47	10	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	1213	0	232	2283	0	195	277	0	47	10	39
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)		1.6			1.6			1.6			1.6	
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	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	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		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		1	6		8	8		4	4	4
Switch Phase												
Minimum Initial (s)	8.0	8.0		5.0	8.0		8.0	8.0		8.0	8.0	8.0
Minimum Split (s)	44.0	44.0		10.0	44.0		53.0	53.0		53.0	53.0	53.0
Total Split (s)	89.0	89.0		13.0	102.0		58.0	58.0		58.0	58.0	58.0
Total Split (%)	55.6%	55.6%		8.1%	63.8%		36.3%	36.3%		36.3%	36.3%	36.3%
Maximum Green (s)	82.0	82.0		10.0	95.0		51.0	51.0		51.0	51.0	51.0
Yellow Time (s)	4.0	4.0		3.0	4.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	3.0	3.0		0.0	3.0		4.0	4.0		4.0	4.0	4.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		-1.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		3.0	7.0		7.0	7.0		6.0	7.0	7.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max		None	C-Max		None	None		None	None	None
Walk Time (s)	10.0	10.0			10.0		10.0	10.0		10.0	10.0	10.0
Flash Dont Walk (s)	27.0	27.0			27.0		36.0	36.0		36.0	36.0	36.0
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	0
Act Effct Green (s)	102.3	102.3		121.8	117.8		28.2	28.2		29.2	28.2	28.2
Actuated g/C Ratio	0.64	0.64		0.76	0.74		0.18	0.18		0.18	0.18	0.18
v/c Ratio	0.33	0.37		0.61	0.60		0.79	0.65		0.56	0.03	0.12
Control Delay	24.3	9.2		27.1	7.4		83.5	28.2		82.2	50.0	9.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	24.3	9.2		27.1	7.4		83.5	28.2		82.2	50.0	9.6
LOS	C	A		C	A		F	C		F	D	A
Approach Delay		9.5			9.3			51.0			49.3	
Approach LOS		A			A			D			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 14.8		Intersection LOS: B	
Intersection Capacity Utilization 92.3%		ICU Level of Service F	
Analysis Period (min) 15			

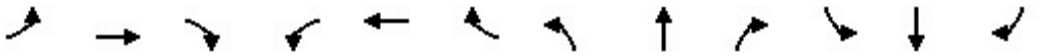
Splits and Phases: 2: Haines Road & Dundas Street E



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	24	1213	232	2283	195	277	47	10	39
v/c Ratio	0.33	0.37	0.61	0.60	0.79	0.65	0.56	0.03	0.12
Control Delay	24.3	9.2	27.1	7.4	83.5	28.2	82.2	50.0	9.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.3	9.2	27.1	7.4	83.5	28.2	82.2	50.0	9.6
Queue Length 50th (m)	1.9	33.8	24.4	58.8	60.3	30.2	13.8	2.7	0.0
Queue Length 95th (m)	m8.5	41.9	54.1	74.1	82.6	57.3	26.9	7.9	7.7
Internal Link Dist (m)		535.2		388.2		174.5		68.1	
Turn Bay Length (m)	30.0		20.0		75.0		25.0		25.0
Base Capacity (vph)	72	3243	384	3780	450	630	151	600	543
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.37	0.60	0.60	0.43	0.44	0.31	0.02	0.07

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

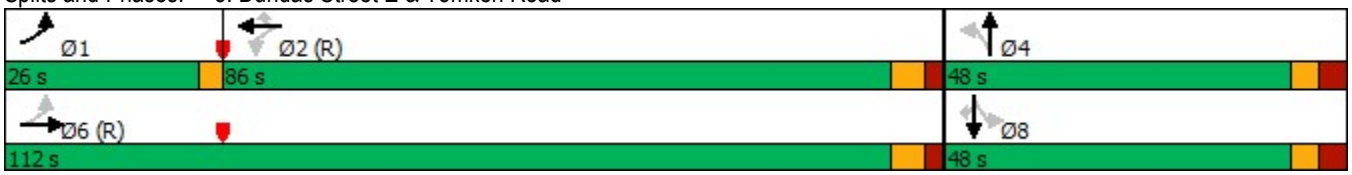


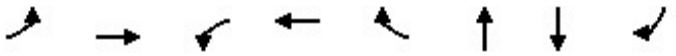
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	330	1111	53	37	1642	442	39	20	56	327	26	277
Future Volume (vph)	330	1111	53	37	1642	442	39	20	56	327	26	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	20.0		30.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		1	0		0	0		1
Taper Length (m)	35.0			40.0			2.5			2.5		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993				0.850		0.934				0.850
Flt Protected	0.950			0.950				0.983			0.956	
Satd. Flow (prot)	1789	5106	0	1789	5142	1601	0	1729	0	0	1801	1601
Flt Permitted	0.058			0.208				0.395			0.627	
Satd. Flow (perm)	109	5106	0	392	5142	1601	0	695	0	0	1181	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9				162		29				251
Link Speed (k/h)		60			60			48			50	
Link Distance (m)		412.2			702.4			80.2			421.2	
Travel Time (s)		24.7			42.1			6.0			30.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	359	1208	58	40	1785	480	42	22	61	355	28	301
Shared Lane Traffic (%)												
Lane Group Flow (vph)	359	1266	0	40	1785	480	0	125	0	0	383	301
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			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
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	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		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	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		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	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		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	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	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	1	6			2			4			8	
Permitted Phases	6			2		2	4			8		8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	1	6		2	2	2	4	4		8	8	8
Switch Phase												
Minimum Initial (s)	5.0	8.0		8.0	8.0	8.0	8.0	8.0		8.0	8.0	8.0
Minimum Split (s)	9.5	30.5		30.5	30.5	30.5	43.0	43.0		43.0	43.0	43.0
Total Split (s)	26.0	112.0		86.0	86.0	86.0	48.0	48.0		48.0	48.0	48.0
Total Split (%)	16.3%	70.0%		53.8%	53.8%	53.8%	30.0%	30.0%		30.0%	30.0%	30.0%
Maximum Green (s)	23.0	105.5		79.5	79.5	79.5	41.0	41.0		41.0	41.0	41.0
Yellow Time (s)	3.0	4.0		4.0	4.0	4.0	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	0.0	2.5		2.5	2.5	2.5	3.5	3.5		3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Lost Time (s)	3.0	6.5		6.5	6.5	6.5		7.0			7.0	7.0
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		C-Max	C-Max	C-Max	None	None		None	None	None
Walk Time (s)		10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	10.0
Flash Dont Walk (s)		14.0		14.0	14.0	14.0	26.0	26.0		26.0	26.0	26.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0		0	0	0
Act Effct Green (s)	109.0	105.5		79.5	79.5	79.5		41.0			41.0	41.0
Actuated g/C Ratio	0.68	0.66		0.50	0.50	0.50		0.26			0.26	0.26
v/c Ratio	1.14	0.38		0.21	0.70	0.55		0.63			1.27	0.51
Control Delay	148.4	9.6		26.2	32.9	20.2		55.6			191.0	12.9
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Delay	148.4	9.6		26.2	32.9	20.2		55.6			191.0	12.9
LOS	F	A		C	C	C		E			F	B
Approach Delay		40.3			30.1			55.6			112.6	
Approach LOS		D			C			E			F	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 0 (0%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.27			
Intersection Signal Delay: 46.2		Intersection LOS: D	
Intersection Capacity Utilization 90.7%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 3: Dundas Street E & Tomken Road





Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	359	1266	40	1785	480	125	383	301
v/c Ratio	1.14	0.38	0.21	0.70	0.55	0.63	1.27	0.51
Control Delay	148.4	9.6	26.2	32.9	20.2	55.6	191.0	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	148.4	9.6	26.2	32.9	20.2	55.6	191.0	12.9
Queue Length 50th (m)	~115.5	41.4	7.0	157.5	68.5	27.5	~152.7	12.3
Queue Length 95th (m)	#181.1	61.0	15.8	174.2	102.1	52.8	#217.9	40.4
Internal Link Dist (m)		388.2		678.4		56.2	397.2	
Turn Bay Length (m)	15.0		20.0		30.0			
Base Capacity (vph)	315	3369	194	2554	877	199	302	596
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.14	0.38	0.21	0.70	0.55	0.63	1.27	0.51

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1883	0	0	1883	1883	0
Flt Permitted						
Satd. Flow (perm)	1883	0	0	1883	1883	0
Link Speed (k/h)	40			40	40	
Link Distance (m)	115.2			92.1	57.7	
Travel Time (s)	10.4			8.3	5.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	97	97	97			97
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

APPENDIX H

Dundas Connects Master Plan Excerpts

DUNDASCONNECTS

Dundas Connects Master Plan

MAY 24, 2018

2.6 CORRIDOR DESIGN

The implementation of the BRT along the Dundas Street corridor represents a large investment in transit infrastructure. As a result of this investment, there will be a shift in demand for different modes of transportation, providing an opportunity to transform Dundas Street from an auto-centric roadway into a complete street suitable for all users. General corridor-wide issues and opportunities regarding corridor design are depicted in Figure 2-46.

Legend

- Transit Routes
- Hydro Underground
- Hydro Aboveground
- Potential Connections to Open Space
- Potential Connections to Transit Hubs
- Grade Separation
- Main Intersections
- Signalized Intersections
- Transit Stops
- Views
- Flood Hazard Areas
- Focus Area Boundary
- Parks and Open Space

SEGMENTS

A	B	C
FROM NINTH LINE TO WINSTON CHURCHILL BOULEVARD	FROM WINSTON CHURCHILL BOULEVARD TO MISSISSAUGA ROAD	FROM MISSISSAUGA ROAD TO ERINDALE STATION

NUMBER OF LANES

6 LANES	4 LANES

OFFICIAL PLAN DESIGNATED RIGHT-OF-WAY

42m	35m	30m

EXISTING PUBLICLY OWNED RIGHT-OF-WAY

Generally 40m	Varies 25-38m

Opportunities:
- Create new cycling infrastructure that connects with existing bike lane on Ninth Line, south of Dundas Street
- Opportunity for gateway development
- Proximity to highway

Constraints:
- Poor cycling infrastructure
- Lack of greening on streets
- Highway 403 interchange

Opportunities:
- Create new cycling infrastructure that connects with existing bike lane on Fifth Line, south and north of Dundas Street
- Create more direct connections from neighbourhoods to Dundas Street
- Regional infrastructure along Erin Mills Parkway for cycling

Constraints:
- Poor connections between neighbourhoods and open spaces
- Lack of greening on streets

Opportunities:
- Potential to connect new cycling infrastructure to existing trails on the north
- Strengthen pedestrian environment
- Provide view corridors to open space
- Strengthen connection and service to UTM
- Opportunity for new signalized access to Erindale Park off Dundas Street

Constraints:
- Traffic congestion due to lack of alternate river crossings
- Poor connections to open spaces from Dundas Street (Carriage Way)
- Space constant on bridge crossing Credit River
- Lack of greening on streets

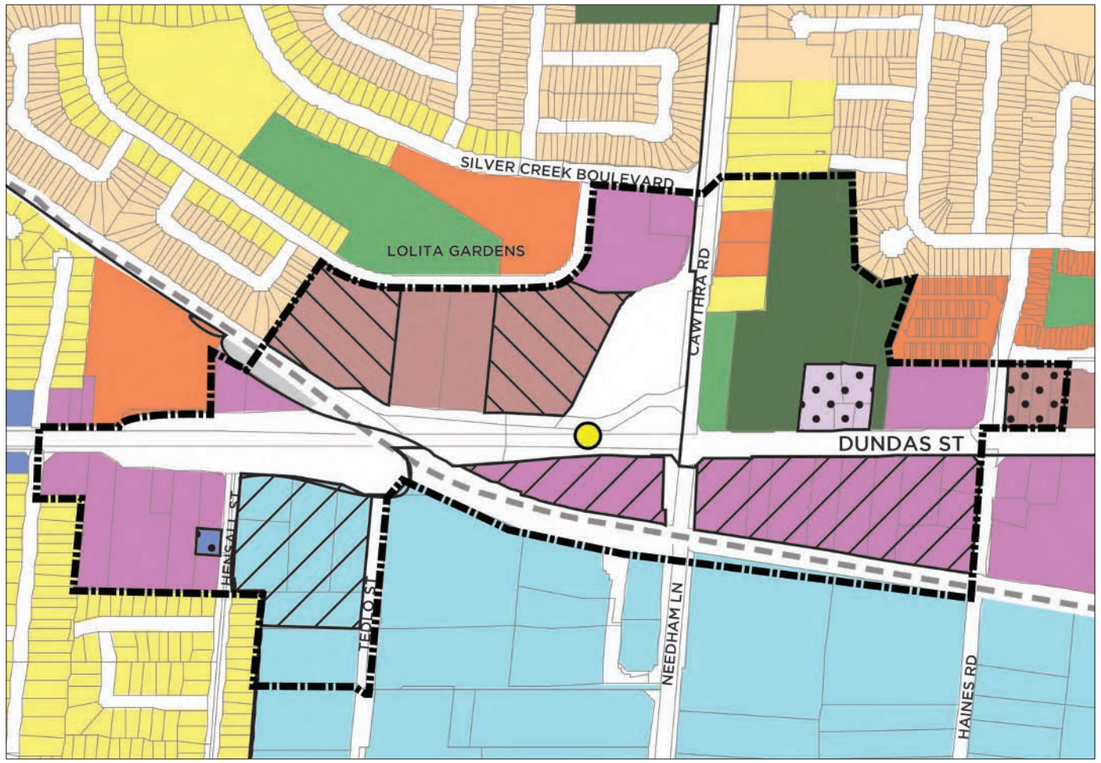


Figure 5-10. Cawthra Focus Area Proposed Uses Overlayed on Mississauga Official Plan Schedule 10 (2017 Consolidation)

Legend

Land Use Designations
- Residential Low Density I
- Residential Low Density II
- Residential Medium Density
- Residential High Density
- Mixed Use
- Convenience Commercial
- Motor Vehicle Commercial
- Office
- Business Employment
- Institutional
- Public Open Space
- Private Open Space
- Greenlands
- Parkway Belt West
- Utility
- Natural Hazard Area
- Focus Area Boundary
- Official Plan Character Area
- GO Rail
- Proposed BRT Stops

Proposed Land Uses
- Mix of Uses
- Employment Area Mixed Use
- Residential High Density Overlay

Figure 5-11. Cawthra Focus Area Framework Plan

- Focus Area Boundary
- Potential Redevelopment (Conceptual)
- Exisiting Green Space
- Natural Hazard

ACTIVE AT GRADE FRONTAGES:
- Retail Priority
- Mixed Use
- Office Priority

- GO Railway
- Main Road
- Existing Road
- Proposed Public Road
- Proposed Private Connection
- Existing Trail Network

- Proposed BRT Route and Stops
- Existing Signalized Intersection
- Potential Signalized Intersection (Conceptual)

- Potential Community Facility
- Potential Open Space
- Proposed Gateway/Connection to Trail
- Proposed Enhanced Boulevard

- Proposed BRT Stop

V. DUNDAS CONNECTS RECOMMENDATIONS

5.2.3 ACCOMMODATE BRT ON DUNDAS STREET BY RESPECTING CORRIDOR CHARACTERISTICS

Implementing BRT into an existing corridor requires context-sensitive planning and design. Given that the Dundas Street corridor is large and varied, segmenting sections of it will permit the development of a BRT solution that satisfies the unique characteristics of the corridor. The following subsections discuss the needs of each segment. The following subsections discuss the needs of each segment shown in Figure 5-42.

5.2.3.1 WEST SEGMENT – HIGHWAY 403 TO MISSISSAUGA ROAD

For much of this segment, existing infrastructure can easily be converted or reconfigured to accommodate transit infrastructure needs. The majority of the existing road consists of six general purpose lanes, and will be widened in those areas with fewer. BRT lanes in this segment will be curbside, as much of the area features stable residential development, which limits demand for median-running BRT. The planned configuration will protect sufficient space to permit reconfiguration to median BRT in the future, should that change be warranted.

5.2.3.2 ERINDALE AREA, REVERSIBLE LANE CONFIGURATION

The City of Mississauga has an interest in minimizing impacts to the natural environment of the Credit River Valley, Erindale Park, and the cultural heritage sites close to the corridor. As such, context-sensitive design is necessary. A reversible lane in the median will respect right-of-way constraints and limit environmental impacts, while satisfying the vision of the Master Plan. The reversible lane will provide for BRT movement in a dedicated median guideway in the peak direction. This solution allows for peak-direction buses within this segment to bypass traffic congestion while maintaining a high level of transit service. Off-peak direction BRT service will remain in mixed traffic, as is the case at present.

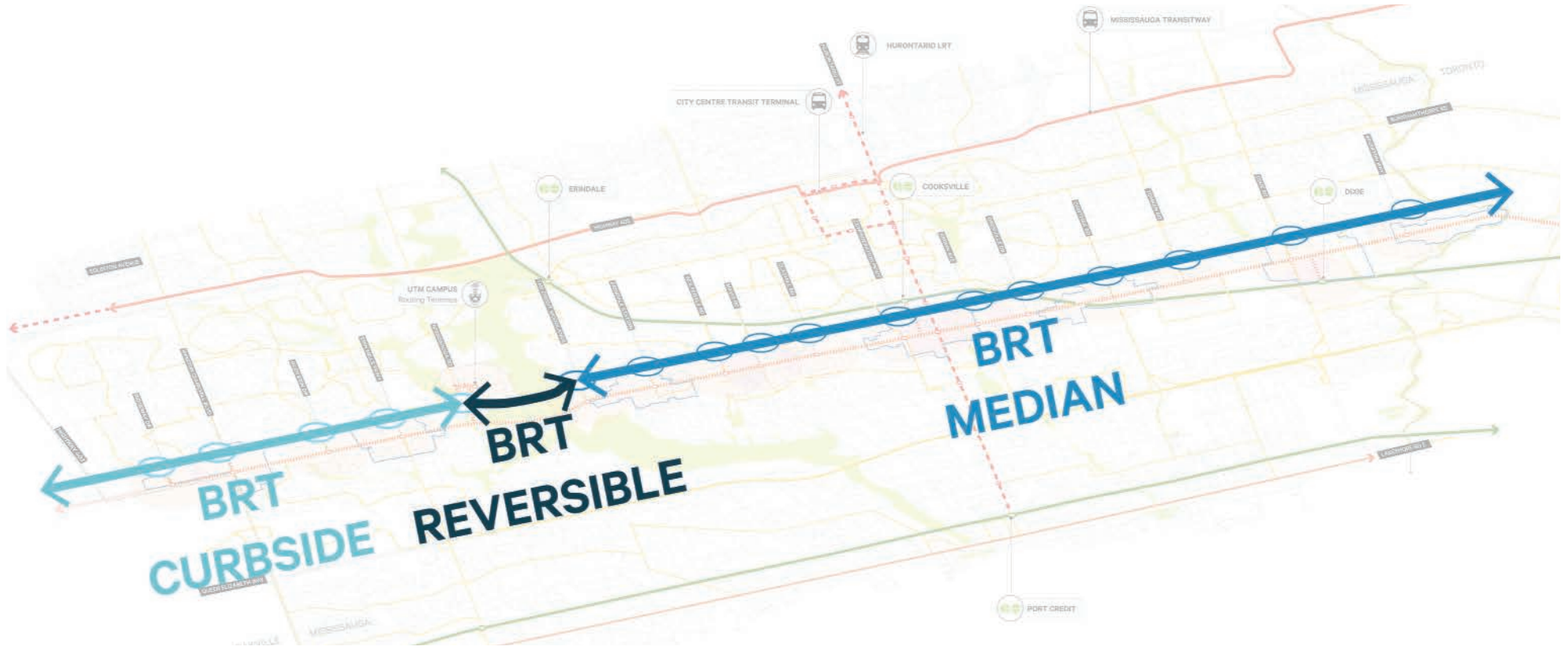


Figure 5-42. BRT Segments

The major origin/destination point in the segment is the University of Toronto at Mississauga (UTM) campus just north of the Dundas Street and Mississauga Road intersection. BRT service will be oriented to and from UTM. Because UTM is a significant trip generator, the intersection will also include a dedicated BRT southbound left-turn lane on Mississauga Road to facilitate turns into the reversible BRT lane. Movement operations are illustrated as in Figure 5-43.

Transition from the reversible lane to the two-way median BRT guideway will occur in the vicinity of The Credit Woodlands. The transition movement operations are illustrated in Figure 5-44.

Benefits of this context-sensitive solution include mitigated impacts to Erindale Park and the Erindale community, flexible bus operations, and maintaining the aesthetics of the area while providing a BRT solution.

5.2.3.3 EAST SEGMENT – THE CREDIT WOODLANDS TO ETOBICOKE CREEK

Median-running BRT is optimal in this segment due to higher built-form density, increased development opportunity, and potential connections to other transit facilities, including the Dixie and Cooksville GO Stations, and Hurontario LRT. As with the west segment, existing road infrastructure generally accommodates the six lanes required for median BRT implementation, though local widening will be required in some areas.

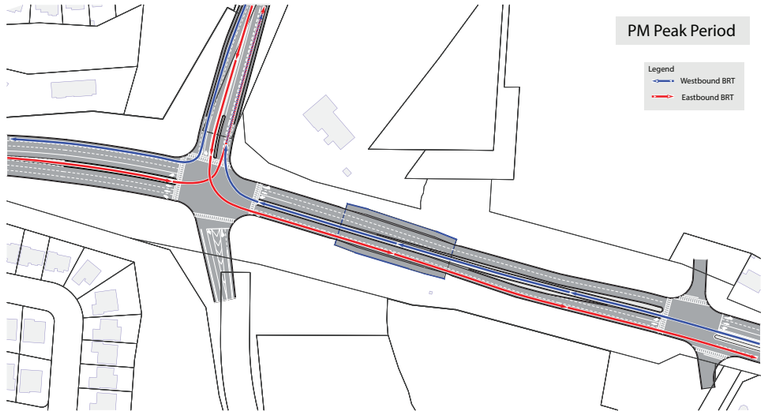


Figure 5-43. Mississauga Road reversible lane

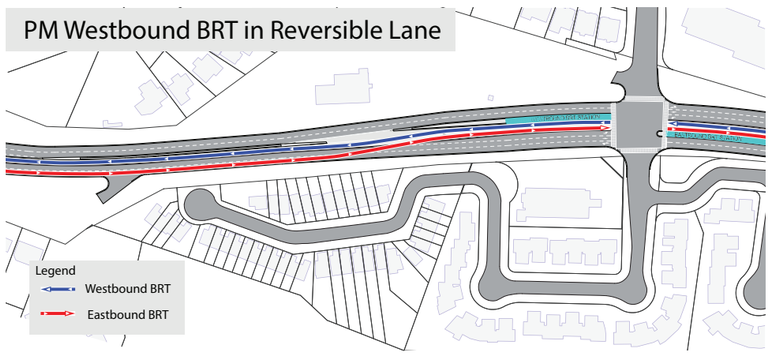


Figure 5-44. Reversible Lane Transition

5.2.3.4 COOKSVILLE

Though Cooksville is highly constrained, median BRT is nonetheless the appropriate solution for the area. Cooksville will shortly change, as Hurontario LRT and improvements to Cooksville GO Station are implemented. Widening the existing road in this segment allows for the existing general purpose lanes and access to properties along the corridor to be maintained.

Median BRT with three stations in Cooksville provides the following benefits:

- Facilitates transfers between the BRT and Hurontario LRT due to proximity of stations
- Flexible access to the BRT facility from the ring road
- Retains the existing four lanes of through traffic in the area

5.2.3.5 CAWTHRA ROAD AND DUNDAS STREET

This intersection has two features that significantly constrain any potential infrastructure improvements in the area. Those features are, firstly, the grade separation of the Canadian Pacific (CP) rail line at Cawthra Road, and secondly, the cemetery on the northeast corner. The cemetery is more significant as it limits the ability to widen the existing road platform.

Given these constraints, the recommended design maintains the existing form of grade separation at the CP rail and at Cawthra Road, since any major reconfiguration of the existing road, either in alignment or profile, would have significant impacts to the surrounding property and existing cemetery.

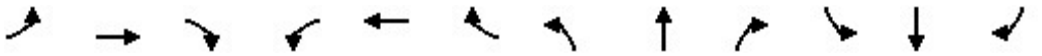
A median BRT station at the existing jug-handle intersection of Dundas Street and Cawthra Road is proposed, which will necessitate a wider Dundas Street overpass structure over Cawthra Road and the CP rail line.

Based on the City's biennial bridge inspection report,the Cawthra Road bridge is in good condition; however, since it is a solid slab bridge, widening the structure would be extremely difficult. Full replacement is recommended for the purpose of this Master Plan. The special planning and design considerations described in Section 5.2.5 include further discussion of this matter.

The CP rail bridge, in fair condition as per the City's biennial bridge-inspection report, is a slab-on-girder structure. As such, the bridge could be easily widened to accommodate the additional BRT lanes required west of the Cawthra Road and Dundas Street jug-handle intersection.

APPENDIX I

2027 Future Background Synchro Reports

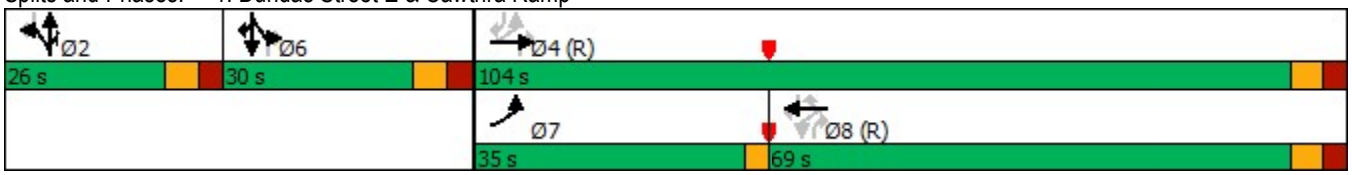


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	193	1334	19	12	650	273	14	14	17	420	35	185
Future Volume (vph)	193	1334	19	12	650	273	14	14	17	420	35	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	120.0		45.0	0.0		0.0	0.0		65.0
Storage Lanes	1		0	1		1	0		1	1		1
Taper Length (m)	100.0			15.0			7.6			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.91	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.998				0.850			0.850			0.850
Flt Protected	0.950			0.950				0.976		0.950	0.959	
Satd. Flow (prot)	1789	3571	0	1789	5142	1601	0	1838	1601	1700	1716	1601
Flt Permitted	0.330			0.125				0.976		0.950	0.959	
Satd. Flow (perm)	622	3571	0	235	5142	1601	0	1838	1601	1700	1716	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				292						
Link Speed (k/h)		60			60			48			50	
Link Distance (m)		121.4			559.2			44.8			197.1	
Travel Time (s)		7.3			33.6			3.4			14.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	210	1450	21	13	707	297	15	15	18	457	38	201
Shared Lane Traffic (%)										46%		
Lane Group Flow (vph)	210	1471	0	13	707	297	0	30	18	247	248	201
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	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	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	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	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	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	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	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	pm+pt	NA		Perm	NA	Perm	Split	NA	custom	Split	NA	custom
Protected Phases	7	4			8		2	2	2	6	6	6
Permitted Phases	4			8		8			4 6 8			4 2 8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	8.0	36.0		36.0	36.0	36.0	15.0	15.0	15.0	15.5	15.5	15.5
Total Split (s)	35.0	104.0		69.0	69.0	69.0	26.0	26.0	26.0	30.0	30.0	30.0
Total Split (%)	21.9%	65.0%		43.1%	43.1%	43.1%	16.3%	16.3%	16.3%	18.8%	18.8%	18.8%
Maximum Green (s)	32.0	97.0		62.0	62.0	62.0	19.0	19.0	19.0	22.5	22.5	22.5
Yellow Time (s)	3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0		7.0	7.0	7.0		7.0	7.0	7.5	7.5	7.5
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Min		C-Min	C-Min	C-Min	None	None	None	None	None	None
Walk Time (s)		10.0		10.0	10.0	10.0				0.0	0.0	0.0
Flash Dont Walk (s)		19.0		19.0	19.0	19.0				22.5	22.5	22.5
Pedestrian Calls (#/hr)		0		0	0	0				0	0	0
Act Effct Green (s)	102.3	98.3		81.8	81.8	81.8		8.8	160.0	34.4	34.4	160.0
Actuated g/C Ratio	0.64	0.61		0.51	0.51	0.51		0.06	1.00	0.22	0.22	1.00
v/c Ratio	0.42	0.67		0.11	0.27	0.31		0.30	0.01	0.68	0.67	0.13
Control Delay	15.7	23.3		33.2	31.8	11.0		80.0	0.0	67.7	67.4	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	15.7	23.3		33.2	31.8	11.0		80.0	0.0	67.7	67.4	0.2
LOS	B	C		C	C	B		F	A	E	E	A
Approach Delay		22.3			25.7			50.0			48.1	
Approach LOS		C			C			D			D	

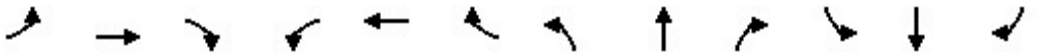
Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 16 (10%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 28.9		Intersection LOS: C	
Intersection Capacity Utilization 81.3%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Dundas Street E & Cawthra Ramp



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	210	1471	13	707	297	30	18	247	248	201
v/c Ratio	0.42	0.67	0.11	0.27	0.31	0.30	0.01	0.68	0.67	0.13
Control Delay	15.7	23.3	33.2	31.8	11.0	80.0	0.0	67.7	67.4	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.7	23.3	33.2	31.8	11.0	80.0	0.0	67.7	67.4	0.2
Queue Length 50th (m)	27.1	160.7	2.9	62.2	23.6	9.4	0.0	76.8	77.0	0.0
Queue Length 95th (m)	43.5	202.0	7.0	57.3	16.9	20.7	0.0	107.6	107.8	0.0
Internal Link Dist (m)		97.4		535.2		20.8			173.1	
Turn Bay Length (m)	75.0		120.0		45.0					65.0
Base Capacity (vph)	631	2245	120	2629	961	218	1601	365	368	1601
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.66	0.11	0.27	0.31	0.14	0.01	0.68	0.67	0.13

Intersection Summary

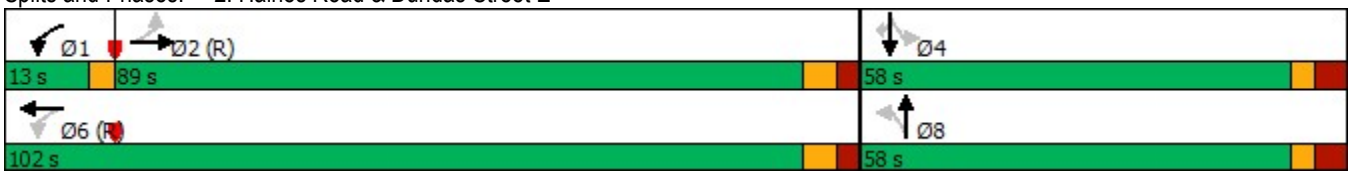


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	1820	159	201	746	52	63	9	141	79	28	55
Future Volume (vph)	54	1820	159	201	746	52	63	9	141	79	28	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	20.0		0.0	75.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	35.0			20.0			50.0			25.0		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.988			0.990			0.859				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	5080	0	1789	5090	0	1789	1618	0	1789	1883	1601
Flt Permitted	0.315			0.043			0.738			0.401		
Satd. Flow (perm)	593	5080	0	81	5090	0	1390	1618	0	755	1883	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			12			123				60
Link Speed (k/h)		60			60			50			40	
Link Distance (m)		559.2			412.2			198.5			92.1	
Travel Time (s)		33.6			24.7			14.3			8.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	59	1978	173	218	811	57	68	10	153	86	30	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	59	2151	0	218	868	0	68	163	0	86	30	60
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)		1.6			1.6			1.6			1.6	
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	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	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		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		1	6		8	8		4	4	4
Switch Phase												
Minimum Initial (s)	8.0	8.0		5.0	8.0		8.0	8.0		8.0	8.0	8.0
Minimum Split (s)	44.0	44.0		10.0	44.0		53.0	53.0		53.0	53.0	53.0
Total Split (s)	89.0	89.0		13.0	102.0		58.0	58.0		58.0	58.0	58.0
Total Split (%)	55.6%	55.6%		8.1%	63.8%		36.3%	36.3%		36.3%	36.3%	36.3%
Maximum Green (s)	82.0	82.0		10.0	95.0		51.0	51.0		51.0	51.0	51.0
Yellow Time (s)	4.0	4.0		3.0	4.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	3.0	3.0		0.0	3.0		4.0	4.0		4.0	4.0	4.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		-1.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		3.0	7.0		7.0	7.0		6.0	7.0	7.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max		None	C-Max		None	None		None	None	None
Walk Time (s)	10.0	10.0			10.0		10.0	10.0		10.0	10.0	10.0
Flash Dont Walk (s)	27.0	27.0			27.0		36.0	36.0		36.0	36.0	36.0
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	0
Act Effct Green (s)	95.7	95.7		132.4	128.4		17.6	17.6		18.6	17.6	17.6
Actuated g/C Ratio	0.60	0.60		0.83	0.80		0.11	0.11		0.12	0.11	0.11
v/c Ratio	0.17	0.71		0.57	0.21		0.45	0.57		0.99	0.15	0.26
Control Delay	10.9	18.6		58.2	3.5		74.2	26.3		161.4	63.0	15.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	10.9	18.6		58.2	3.5		74.2	26.3		161.4	63.0	15.8
LOS	B	B		E	A		E	C		F	E	B
Approach Delay		18.4			14.5			40.4			95.0	
Approach LOS		B			B			D			F	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 22.3		Intersection LOS: C	
Intersection Capacity Utilization 85.7%		ICU Level of Service E	
Analysis Period (min) 15			

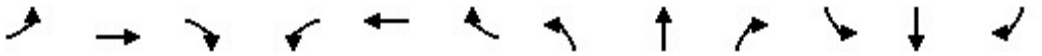
Splits and Phases: 2: Haines Road & Dundas Street E



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	59	2151	218	868	68	163	86	30	60
v/c Ratio	0.17	0.71	0.57	0.21	0.45	0.57	0.99	0.15	0.26
Control Delay	10.9	18.6	58.2	3.5	74.2	26.3	161.4	63.0	15.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.9	18.6	58.2	3.5	74.2	26.3	161.4	63.0	15.8
Queue Length 50th (m)	5.2	199.3	52.7	16.7	20.6	11.8	27.8	8.8	0.0
Queue Length 95th (m)	m9.6	105.8	82.7	26.4	35.3	34.4	#52.2	18.5	13.4
Internal Link Dist (m)		535.2		388.2		174.5		68.1	
Turn Bay Length (m)	30.0		20.0		75.0		25.0		25.0
Base Capacity (vph)	354	3043	384	4088	443	599	245	600	551
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.71	0.57	0.21	0.15	0.27	0.35	0.05	0.11

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

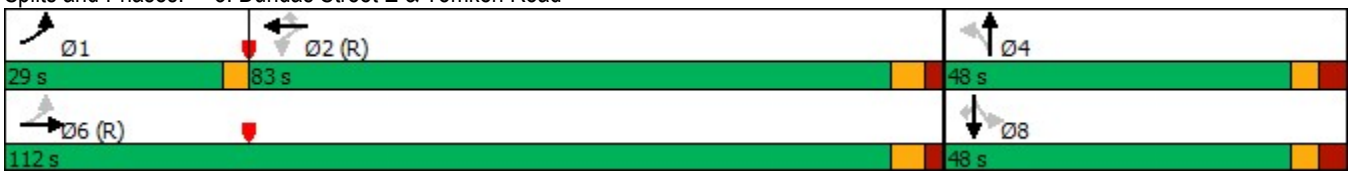


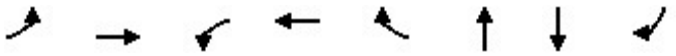
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	294	1625	8	7	635	222	4	6	17	326	11	262
Future Volume (vph)	294	1625	8	7	635	222	4	6	17	326	11	262
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	20.0		30.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		1	0		0	0		1
Taper Length (m)	35.0			40.0			2.5			2.5		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999				0.850		0.916				0.850
Flt Protected	0.950			0.950				0.993			0.954	
Satd. Flow (prot)	1789	5137	0	1789	5142	1601	0	1713	0	0	1797	1601
Flt Permitted	0.341			0.114				0.923			0.712	
Satd. Flow (perm)	642	5137	0	215	5142	1601	0	1592	0	0	1341	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				203		18				259
Link Speed (k/h)		60			60			48			50	
Link Distance (m)		412.2			702.4			80.2			421.2	
Travel Time (s)		24.7			42.1			6.0			30.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	320	1766	9	8	690	241	4	7	18	354	12	285
Shared Lane Traffic (%)												
Lane Group Flow (vph)	320	1775	0	8	690	241	0	29	0	0	366	285
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			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
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	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		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	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		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	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		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	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	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	1	6			2			4			8	
Permitted Phases	6			2		2	4			8		8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	1	6		2	2	2	4	4		8	8	8
Switch Phase												
Minimum Initial (s)	5.0	8.0		8.0	8.0	8.0	8.0	8.0		8.0	8.0	8.0
Minimum Split (s)	9.5	30.5		30.5	30.5	30.5	43.0	43.0		43.0	43.0	43.0
Total Split (s)	29.0	112.0		83.0	83.0	83.0	48.0	48.0		48.0	48.0	48.0
Total Split (%)	18.1%	70.0%		51.9%	51.9%	51.9%	30.0%	30.0%		30.0%	30.0%	30.0%
Maximum Green (s)	26.0	105.5		76.5	76.5	76.5	41.0	41.0		41.0	41.0	41.0
Yellow Time (s)	3.0	4.0		4.0	4.0	4.0	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	0.0	2.5		2.5	2.5	2.5	3.5	3.5		3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0			-2.0	0.0
Total Lost Time (s)	3.0	6.5		6.5	6.5	6.5		7.0			5.0	7.0
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		C-Max	C-Max	C-Max	None	None		None	None	None
Walk Time (s)		10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	10.0
Flash Dont Walk (s)		14.0		14.0	14.0	14.0	26.0	26.0		26.0	26.0	26.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0		0	0	0
Act Effct Green (s)	109.0	105.5		85.8	85.8	85.8		41.0			43.0	41.0
Actuated g/C Ratio	0.68	0.66		0.54	0.54	0.54		0.26			0.27	0.26
v/c Ratio	0.57	0.52		0.07	0.25	0.25		0.07			1.02	0.47
Control Delay	14.7	9.4		21.6	20.5	4.8		24.3			108.2	10.1
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Delay	14.7	9.4		21.6	20.5	4.8		24.3			108.2	10.1
LOS	B	A		C	C	A		C			F	B
Approach Delay		10.2			16.5			24.3			65.3	
Approach LOS		B			B			C			E	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 0 (0%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.02			
Intersection Signal Delay: 21.6		Intersection LOS: C	
Intersection Capacity Utilization 78.5%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: Dundas Street E & Tomken Road





Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	320	1775	8	690	241	29	366	285
v/c Ratio	0.57	0.52	0.07	0.25	0.25	0.07	1.02	0.47
Control Delay	14.7	9.4	21.6	20.5	4.8	24.3	108.2	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.7	9.4	21.6	20.5	4.8	24.3	108.2	10.1
Queue Length 50th (m)	18.3	42.2	1.2	41.9	5.6	2.7	~122.4	6.3
Queue Length 95th (m)	52.1	76.4	4.8	53.9	20.6	11.3	#187.0	31.9
Internal Link Dist (m)		388.2		678.4		56.2	397.2	
Turn Bay Length (m)	15.0		20.0		30.0			
Base Capacity (vph)	623	3387	115	2756	952	421	360	602
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.52	0.07	0.25	0.25	0.07	1.02	0.47

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1883	0	0	1883	1883	0
Flt Permitted						
Satd. Flow (perm)	1883	0	0	1883	1883	0
Link Speed (k/h)	50			50	40	
Link Distance (m)	115.2			92.1	57.7	
Travel Time (s)	8.3			6.6	5.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	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	

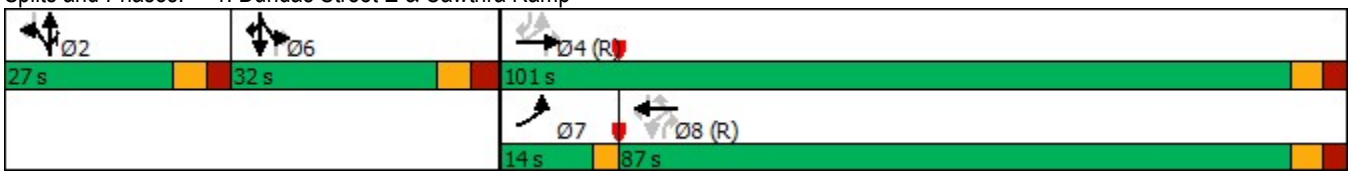
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	197	840	22	26	1563	598	37	21	83	278	23	320
Future Volume (vph)	197	840	22	26	1563	598	37	21	83	278	23	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	120.0		45.0	0.0		0.0	0.0		65.0
Storage Lanes	1		0	1		1	0		1	1		1
Taper Length (m)	100.0			15.0			7.6			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.91	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.996				0.850			0.850			0.850
Flt Protected	0.950			0.950				0.969		0.950	0.959	
Satd. Flow (prot)	1789	3564	0	1789	5142	1601	0	1825	1601	1700	1716	1601
Flt Permitted	0.075			0.305				0.969		0.950	0.959	
Satd. Flow (perm)	141	3564	0	574	5142	1601	0	1825	1601	1700	1716	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				325						
Link Speed (k/h)		60			60			48			50	
Link Distance (m)		121.4			559.2			44.8			197.1	
Travel Time (s)		7.3			33.6			3.4			14.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	214	913	24	28	1699	650	40	23	90	302	25	348
Shared Lane Traffic (%)										46%		
Lane Group Flow (vph)	214	937	0	28	1699	650	0	63	90	163	164	348
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	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	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	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	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	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	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	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	pm+pt	NA		Perm	NA	Perm	Split	NA	custom	Split	NA	custom
Protected Phases	7	4			8		2	2	2	6	6	6
Permitted Phases	4			8		8			4 6 8			4 2 8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	8.0	36.0		36.0	36.0	36.0	15.0	15.0	15.0	15.5	15.5	15.5
Total Split (s)	14.0	101.0		87.0	87.0	87.0	27.0	27.0	27.0	32.0	32.0	32.0
Total Split (%)	8.8%	63.1%		54.4%	54.4%	54.4%	16.9%	16.9%	16.9%	20.0%	20.0%	20.0%
Maximum Green (s)	11.0	94.0		80.0	80.0	80.0	20.0	20.0	20.0	24.5	24.5	24.5
Yellow Time (s)	3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0		7.0	7.0	7.0		7.0	7.0	7.5	7.5	7.5
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Min		C-Min	C-Min	C-Min	None	None	None	None	None	None
Walk Time (s)		10.0		10.0	10.0	10.0				0.0	0.0	0.0
Flash Dont Walk (s)		19.0		19.0	19.0	19.0				22.5	22.5	22.5
Pedestrian Calls (#/hr)		0		0	0	0				0	0	0
Act Effct Green (s)	109.6	105.6		83.1	83.1	83.1		11.1	160.0	21.8	21.8	160.0
Actuated g/C Ratio	0.68	0.66		0.52	0.52	0.52		0.07	1.00	0.14	0.14	1.00
v/c Ratio	0.72	0.40		0.09	0.64	0.66		0.50	0.06	0.71	0.70	0.22
Control Delay	44.0	14.1		20.6	29.2	16.4		84.5	0.1	81.7	81.3	0.3
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	44.0	14.1		20.6	29.2	16.4		84.5	0.1	81.7	81.3	0.3
LOS	D	B		C	C	B		F	A	F	F	A
Approach Delay		19.6			25.6			34.8			39.6	
Approach LOS		B			C			C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 16 (10%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 26.5		Intersection LOS: C	
Intersection Capacity Utilization 74.6%		ICU Level of Service D	
Analysis Period (min) 15			

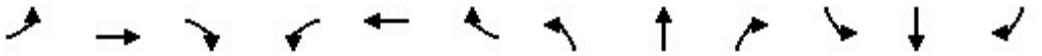
Splits and Phases: 1: Dundas Street E & Cawthra Ramp



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	214	937	28	1699	650	63	90	163	164	348
v/c Ratio	0.72	0.40	0.09	0.64	0.66	0.50	0.06	0.71	0.70	0.22
Control Delay	44.0	14.1	20.6	29.2	16.4	84.5	0.1	81.7	81.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.0	14.1	20.6	29.2	16.4	84.5	0.1	81.7	81.3	0.3
Queue Length 50th (m)	38.2	68.5	4.1	103.8	50.0	19.7	0.0	52.8	53.0	0.0
Queue Length 95th (m)	#103.5	100.0	m5.8	126.0	87.5	35.4	0.0	76.2	76.4	0.0
Internal Link Dist (m)		97.4		535.2		20.8			173.1	
Turn Bay Length (m)	75.0		120.0		45.0					65.0
Base Capacity (vph)	296	2352	298	2671	988	228	1597	272	274	1587
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.40	0.09	0.64	0.66	0.28	0.06	0.60	0.60	0.22

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

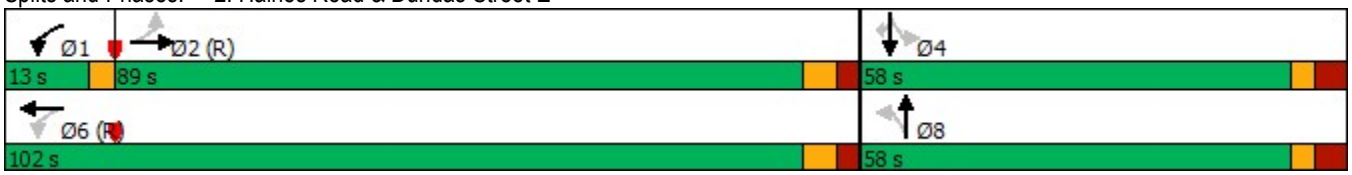


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	1036	110	213	2124	28	183	3	257	44	9	38
Future Volume (vph)	22	1036	110	213	2124	28	183	3	257	44	9	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	20.0		0.0	75.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	35.0			20.0			50.0			25.0		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.986			0.998			0.852				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	5070	0	1789	5132	0	1789	1605	0	1789	1883	1601
Flt Permitted	0.055			0.179			0.751			0.245		
Satd. Flow (perm)	104	5070	0	337	5132	0	1414	1605	0	461	1883	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			2			170				48
Link Speed (k/h)		60			60			50			40	
Link Distance (m)		559.2			412.2			198.5			92.1	
Travel Time (s)		33.6			24.7			14.3			8.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	1126	120	232	2309	30	199	3	279	48	10	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	1246	0	232	2339	0	199	282	0	48	10	41
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)		1.6			1.6			1.6			1.6	
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	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	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		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		1	6		8	8		4	4	4
Switch Phase												
Minimum Initial (s)	8.0	8.0		5.0	8.0		8.0	8.0		8.0	8.0	8.0
Minimum Split (s)	44.0	44.0		10.0	44.0		53.0	53.0		53.0	53.0	53.0
Total Split (s)	89.0	89.0		13.0	102.0		58.0	58.0		58.0	58.0	58.0
Total Split (%)	55.6%	55.6%		8.1%	63.8%		36.3%	36.3%		36.3%	36.3%	36.3%
Maximum Green (s)	82.0	82.0		10.0	95.0		51.0	51.0		51.0	51.0	51.0
Yellow Time (s)	4.0	4.0		3.0	4.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	3.0	3.0		0.0	3.0		4.0	4.0		4.0	4.0	4.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		-1.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		3.0	7.0		7.0	7.0		6.0	7.0	7.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max		None	C-Max		None	None		None	None	None
Walk Time (s)	10.0	10.0			10.0		10.0	10.0		10.0	10.0	10.0
Flash Dont Walk (s)	27.0	27.0			27.0		36.0	36.0		36.0	36.0	36.0
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	0
Act Effct Green (s)	101.0	101.0		121.2	117.2		28.8	28.8		29.8	28.8	28.8
Actuated g/C Ratio	0.63	0.63		0.76	0.73		0.18	0.18		0.19	0.18	0.18
v/c Ratio	0.37	0.39		0.62	0.62		0.78	0.66		0.56	0.03	0.13
Control Delay	28.7	9.6		29.3	7.7		82.6	30.1		81.9	49.4	10.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	28.7	9.6		29.3	7.7		82.6	30.1		81.9	49.4	10.2
LOS	C	A		C	A		F	C		F	D	B
Approach Delay		9.9			9.7			51.8			48.9	
Approach LOS		A			A			D			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 15.2		Intersection LOS: B	
Intersection Capacity Utilization 93.6%		ICU Level of Service F	
Analysis Period (min) 15			

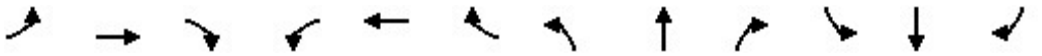
Splits and Phases: 2: Haines Road & Dundas Street E



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	24	1246	232	2339	199	282	48	10	41
v/c Ratio	0.37	0.39	0.62	0.62	0.78	0.66	0.56	0.03	0.13
Control Delay	28.7	9.6	29.3	7.7	82.6	30.1	81.9	49.4	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.7	9.6	29.3	7.7	82.6	30.1	81.9	49.4	10.2
Queue Length 50th (m)	2.0	35.5	27.1	61.7	61.1	33.2	14.0	2.7	0.0
Queue Length 95th (m)	m8.6	48.6	56.7	76.4	83.7	60.8	27.5	7.9	8.4
Internal Link Dist (m)		535.2		388.2		174.5		68.1	
Turn Bay Length (m)	30.0		20.0		75.0		25.0		25.0
Base Capacity (vph)	65	3207	376	3760	450	627	149	600	543
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.39	0.62	0.62	0.44	0.45	0.32	0.02	0.08

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

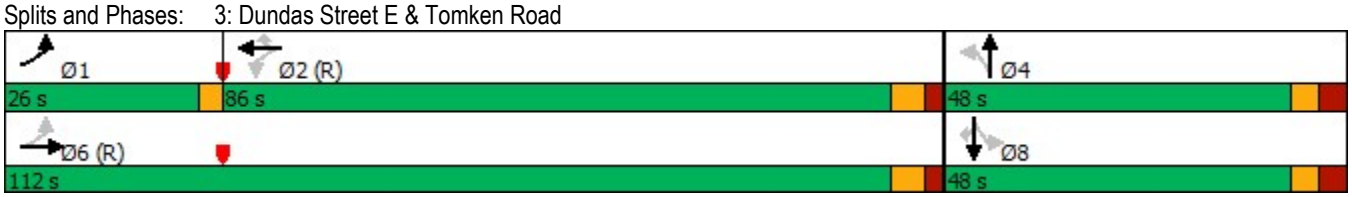


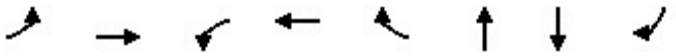
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	358	1134	58	41	1685	479	40	22	58	334	28	283
Future Volume (vph)	358	1134	58	41	1685	479	40	22	58	334	28	283
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	20.0		30.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		1	0		0	0		1
Taper Length (m)	35.0			40.0			2.5			2.5		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993				0.850		0.935				0.850
Flt Protected	0.950			0.950				0.984			0.956	
Satd. Flow (prot)	1789	5106	0	1789	5142	1601	0	1733	0	0	1801	1601
Flt Permitted	0.053			0.201				0.370			0.621	
Satd. Flow (perm)	100	5106	0	379	5142	1601	0	652	0	0	1170	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10				172		28				250
Link Speed (k/h)		60			60			48			50	
Link Distance (m)		412.2			702.4			80.2			421.2	
Travel Time (s)		24.7			42.1			6.0			30.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	389	1233	63	45	1832	521	43	24	63	363	30	308
Shared Lane Traffic (%)												
Lane Group Flow (vph)	389	1296	0	45	1832	521	0	130	0	0	393	308
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			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
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	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		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	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		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	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		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	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	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	1	6			2			4			8	
Permitted Phases	6			2		2	4			8		8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	1	6		2	2	2	4	4		8	8	8
Switch Phase												
Minimum Initial (s)	5.0	8.0		8.0	8.0	8.0	8.0	8.0		8.0	8.0	8.0
Minimum Split (s)	9.5	30.5		30.5	30.5	30.5	43.0	43.0		43.0	43.0	43.0
Total Split (s)	26.0	112.0		86.0	86.0	86.0	48.0	48.0		48.0	48.0	48.0
Total Split (%)	16.3%	70.0%		53.8%	53.8%	53.8%	30.0%	30.0%		30.0%	30.0%	30.0%
Maximum Green (s)	23.0	105.5		79.5	79.5	79.5	41.0	41.0		41.0	41.0	41.0
Yellow Time (s)	3.0	4.0		4.0	4.0	4.0	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	0.0	2.5		2.5	2.5	2.5	3.5	3.5		3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Lost Time (s)	3.0	6.5		6.5	6.5	6.5		7.0			7.0	7.0
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		C-Max	C-Max	C-Max	None	None		None	None	None
Walk Time (s)		10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	10.0
Flash Dont Walk (s)		14.0		14.0	14.0	14.0	26.0	26.0		26.0	26.0	26.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0		0	0	0
Act Effct Green (s)	109.0	105.5		79.5	79.5	79.5		41.0			41.0	41.0
Actuated g/C Ratio	0.68	0.66		0.50	0.50	0.50		0.26			0.26	0.26
v/c Ratio	1.25	0.38		0.24	0.72	0.59		0.70			1.31	0.52
Control Delay	188.5	9.7		27.3	33.5	21.4		62.4			208.4	13.9
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Delay	188.5	9.7		27.3	33.5	21.4		62.4			208.4	13.9
LOS	F	A		C	C	C		E			F	B
Approach Delay		50.9			30.7			62.4			122.9	
Approach LOS		D			C			E			F	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 0 (0%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green			
Natural Cycle: 125			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.31			
Intersection Signal Delay: 51.7		Intersection LOS: D	
Intersection Capacity Utilization 93.6%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 3: Dundas Street E & Tomken Road





Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	389	1296	45	1832	521	130	393	308
v/c Ratio	1.25	0.38	0.24	0.72	0.59	0.70	1.31	0.52
Control Delay	188.5	9.7	27.3	33.5	21.4	62.4	208.4	13.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	188.5	9.7	27.3	33.5	21.4	62.4	208.4	13.9
Queue Length 50th (m)	~139.3	42.7	8.0	163.9	78.2	30.0	~160.2	14.4
Queue Length 95th (m)	#206.3	62.3	17.8	180.8	114.9	#61.0	#226.1	43.8
Internal Link Dist (m)		388.2		678.4		56.2	397.2	
Turn Bay Length (m)	15.0		20.0		30.0			
Base Capacity (vph)	310	3370	188	2554	882	187	299	596
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.25	0.38	0.24	0.72	0.59	0.70	1.31	0.52

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1883	0	0	1883	1883	0
Flt Permitted						
Satd. Flow (perm)	1883	0	0	1883	1883	0
Link Speed (k/h)	40			40	40	
Link Distance (m)	115.2			92.1	57.7	
Travel Time (s)	10.4			8.3	5.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	97	97	97			97
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

APPENDIX J

ITE Trip Generation Manual Excerpts

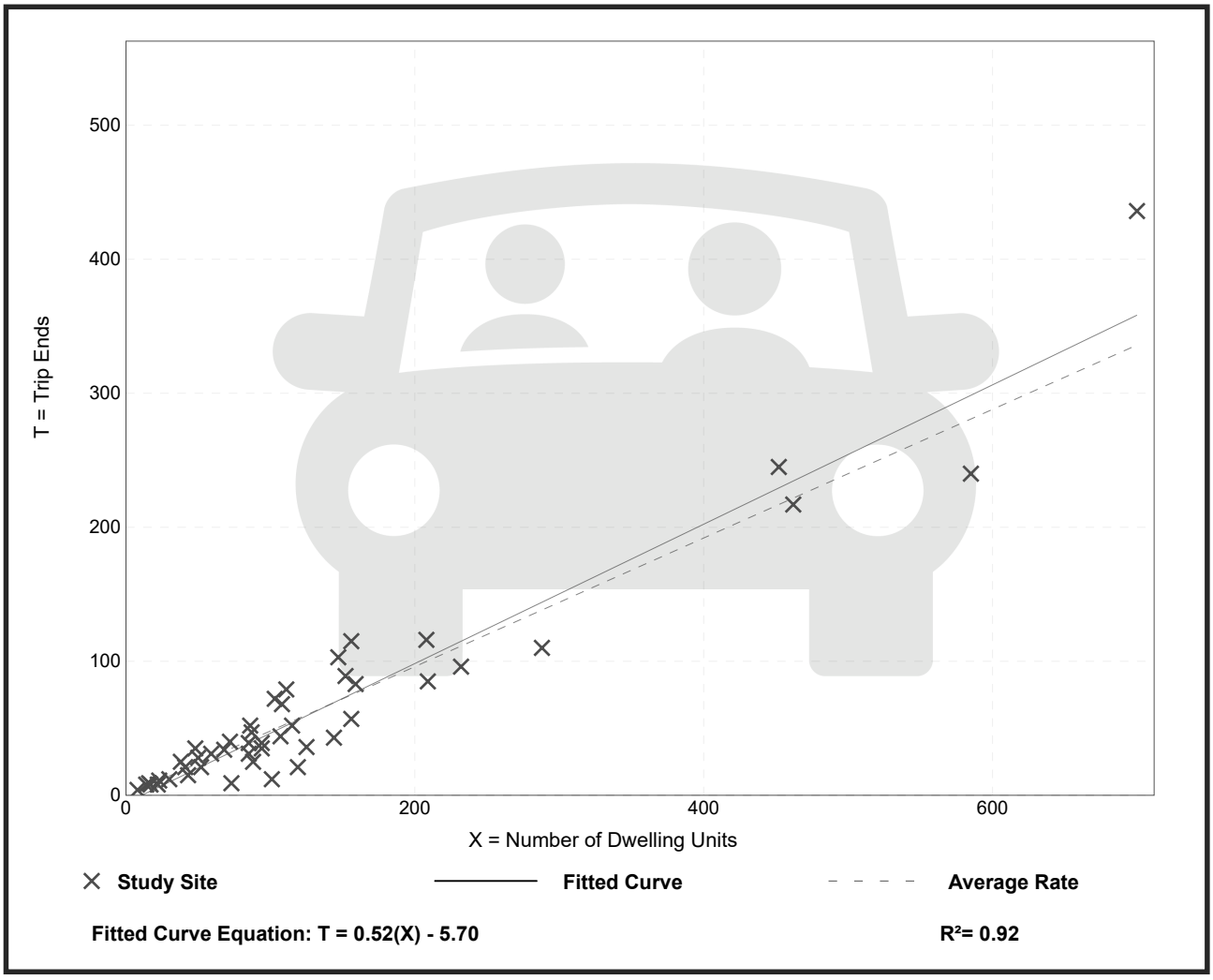
Single-Family Attached Housing
(215)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 46
Avg. Num. of Dwelling Units: 135
Directional Distribution: 31% entering, 69% exiting

Vehicle Trip Generation per Dwelling Unit

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

Data Plot and Equation



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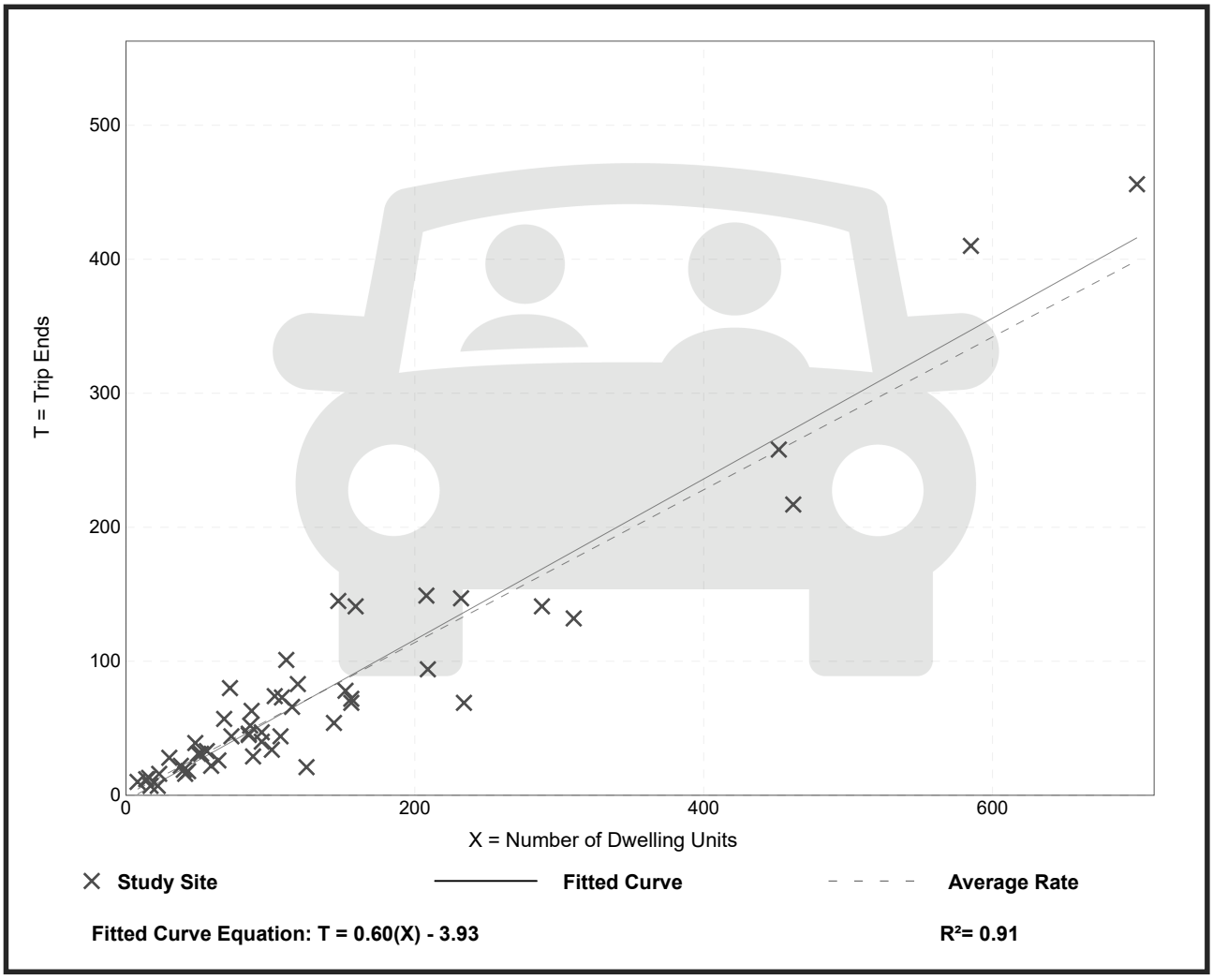
Single-Family Attached Housing
(215)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 51
Avg. Num. of Dwelling Units: 136
Directional Distribution: 57% entering, 43% exiting

Vehicle Trip Generation per Dwelling Unit

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

Data Plot and Equation



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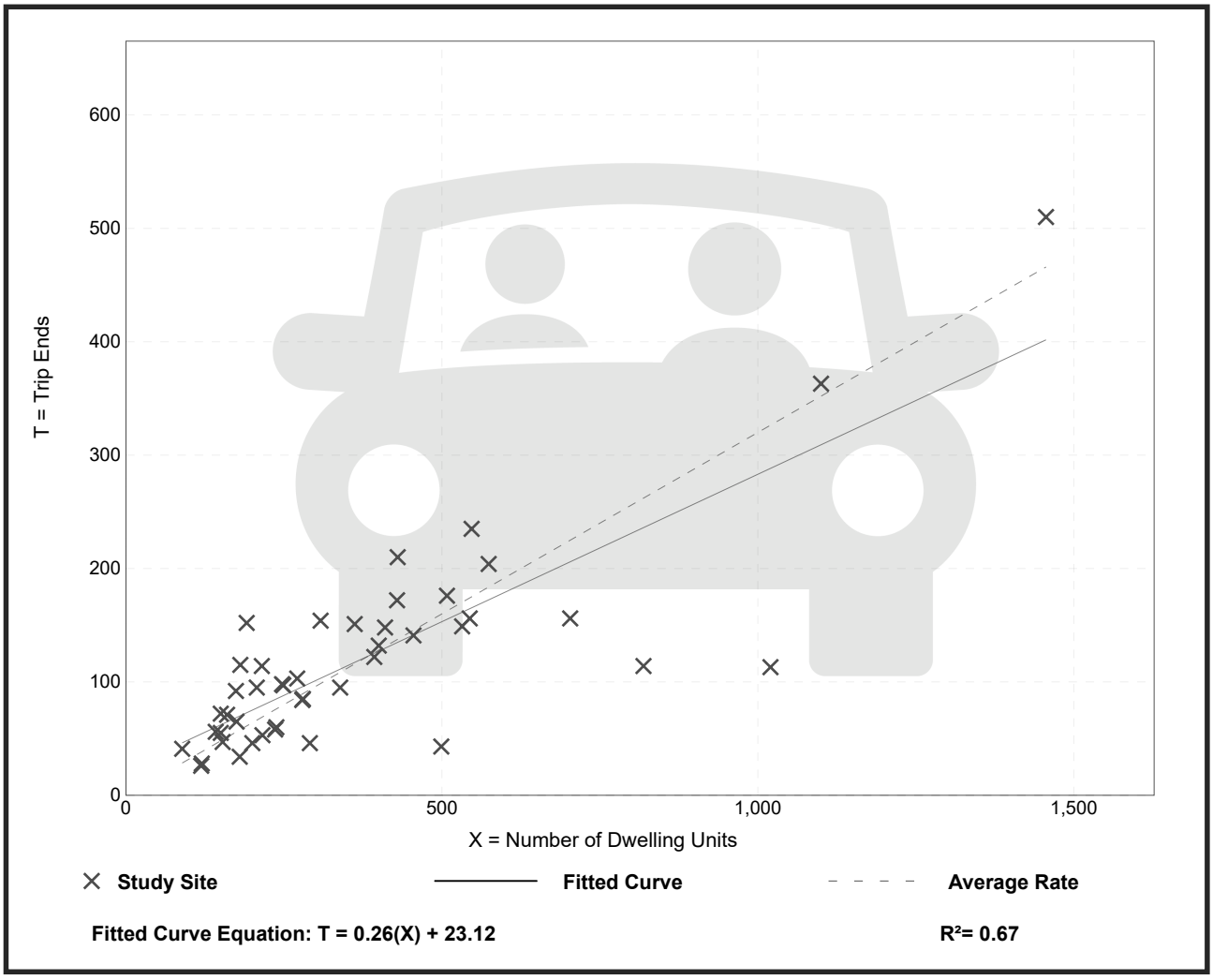
Multifamily Housing (High-Rise)
Not Close to Rail Transit (222)

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

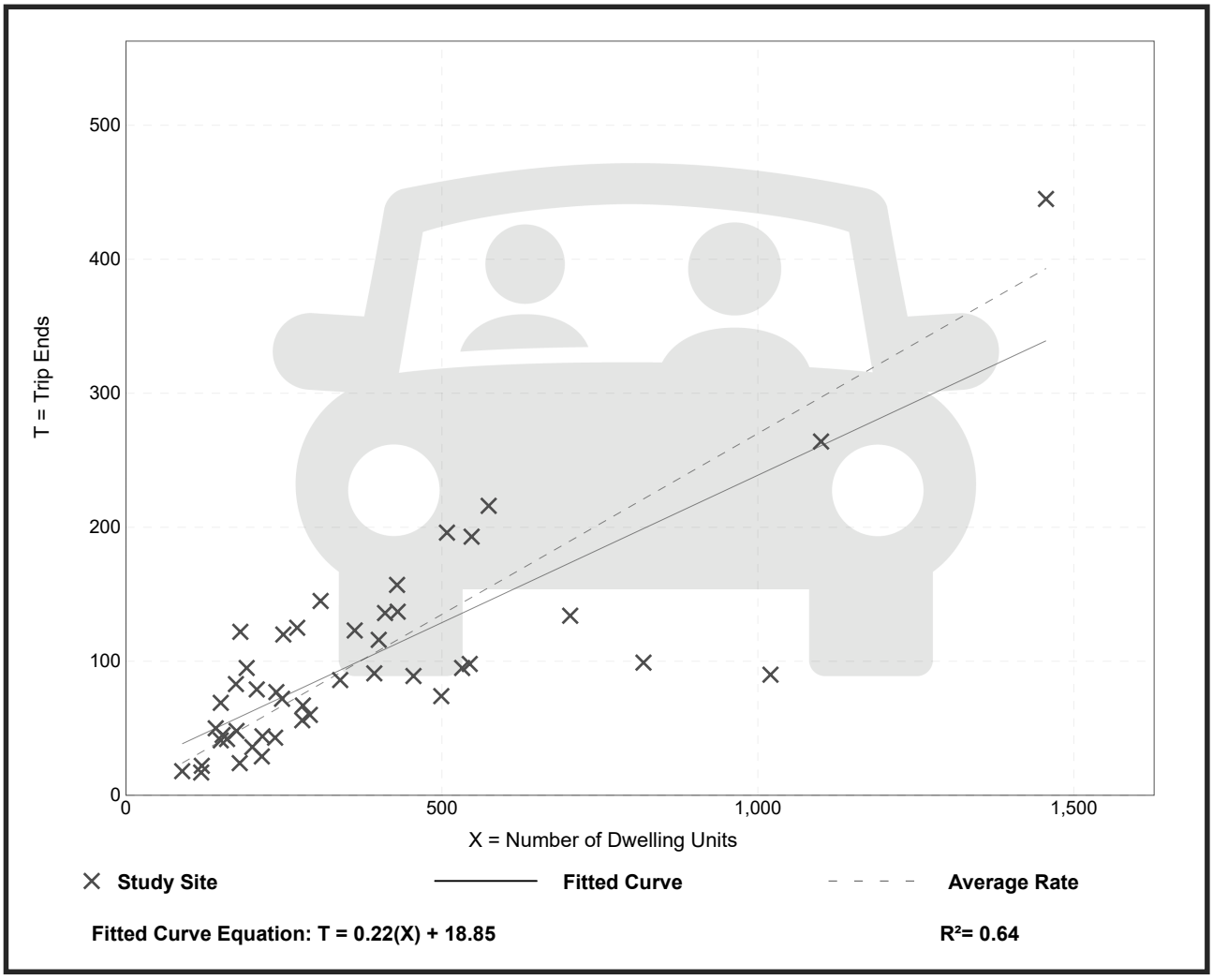
Multifamily Housing (High-Rise)
Not Close to Rail Transit (222)

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

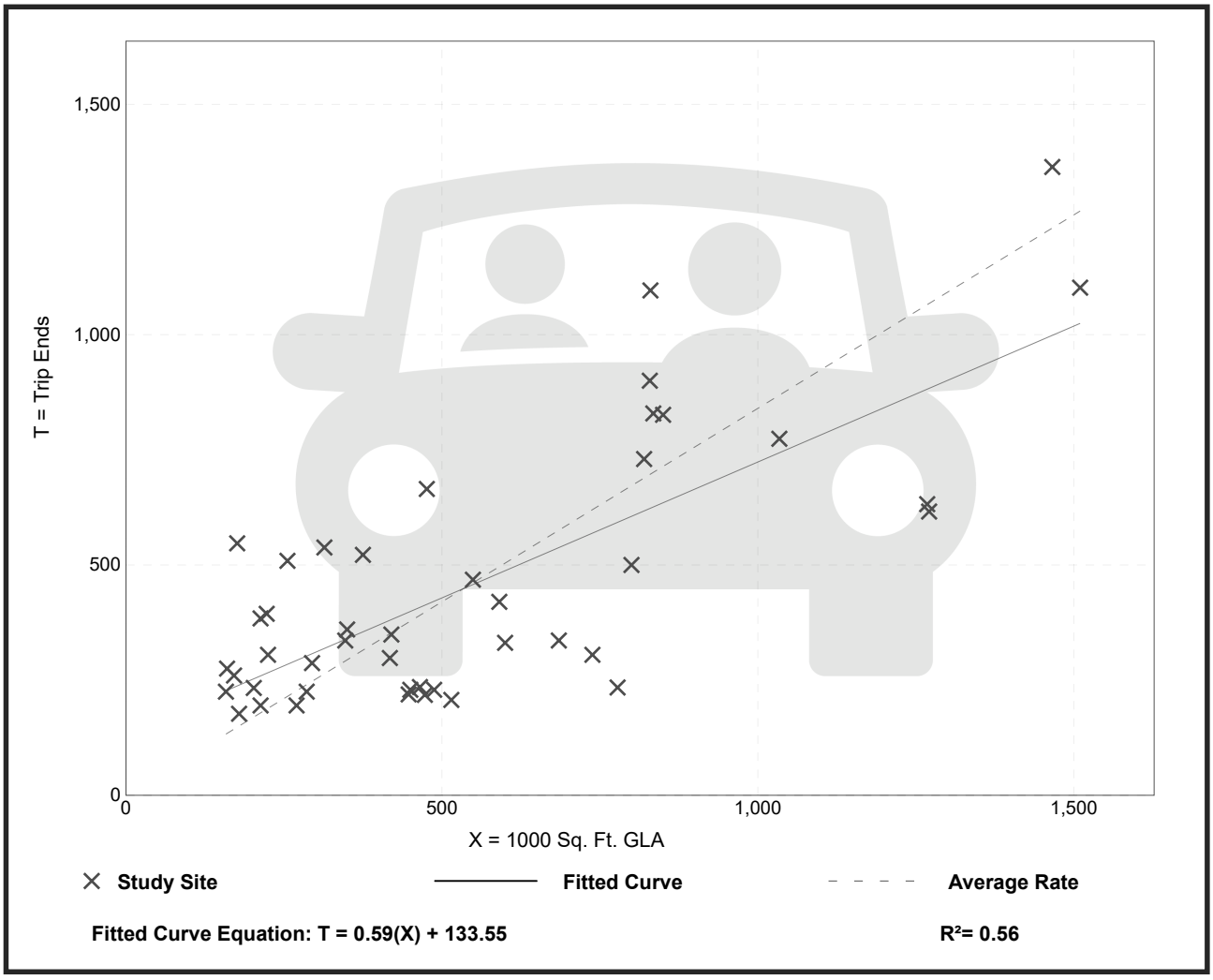
Shopping Center (>150k)
(820)

Vehicle Trip Ends vs: **1000 Sq. Ft. GLA**
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: 44
Avg. 1000 Sq. Ft. GLA: 546
Directional Distribution: 62% entering, 38% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
0.84	0.30 - 3.11	0.42

Data Plot and Equation



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

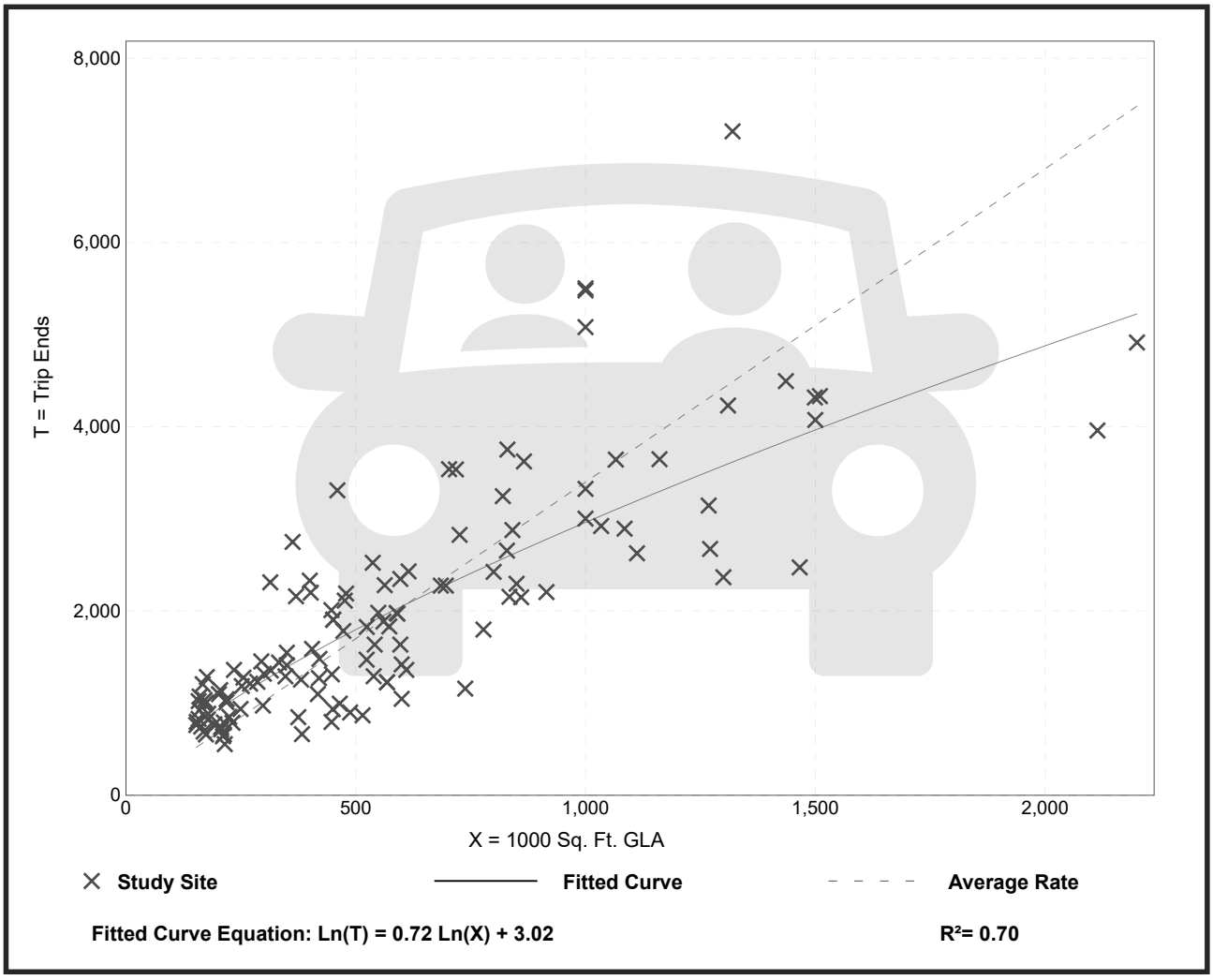
Shopping Center (>150k)
(820)

Vehicle Trip Ends vs: **1000 Sq. Ft. GLA**
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: 126
Avg. 1000 Sq. Ft. GLA: 581
Directional Distribution: 48% entering, 52% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
3.40	1.57 - 7.58	1.26

Data Plot and Equation



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

APPENDIX K

Internal Capture Worksheet

New Internal Trip Capture Methodology for Multi-Use Developments

Based on NCHRP Project 8-51

Note: Saturday is assumed to be the same as PM Peak Hour for Multi-Use Reductions, if Saturday Multi-Use is assumed, this must be disclosed

Do not modify values in Grey Cells

INPUTS

Volumes

Use	AM Volumes		PM Volumes		Saturday Volumes	
	Entering	Exiting	Entering	Exiting	Entering	Exiting
Office						
Retail	13	8	40	43		
Restaurant						
Cinema/ Entertainment						
Residential	71	56	36	70		
Hotel						

Proximity of Uses

Use	Separation Distance (**In Feet**)					
	Office	Retail	Restaurant	Cinema/ Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail			0	0	0	0
Restaurant				0	0	0
Cinema/ Entertainment					0	0
Residential						0
Hotel						

OUTPUTS

AM Peak Hour Multi-Use Reduction Summary

	Office	Retail	Restaurant	Cinema/ Entertainment	Residential	Hotel	In	In%
Office	0	0	0	0	0	0	**0**	**0%**
Retail	0	0	0	0	1	0	**1**	**4%**
Restaurant	0	0	0	0	0	0	**0**	**0%**
Cinema/ Entertainment	0	0	0	0	0	0	**0**	**0%**
Residential	0	1	0	0	0	0	**1**	**2%**
Hotel	0	0	0	0	0	0	**0**	**0%**
Out	**0**	**1**	**0**	**0**	**1**	**0**		
Out %	**0%**	**14%**	**0%**	**0%**	**1%**	**0%**		

PM Peak Hour Multi-Use Reduction Summary (Contains Proximity Factors)

	Office	Retail	Restaurant	Cinema/ Entertainment	Residential	Hotel	In	In%
Office	0	0	0	0	0	0	**0**	**0%**
Retail	0	0	0	0	4	0	**4**	**10%**
Restaurant	0	0	0	0	0	0	**0**	**0%**
Cinema/ Entertainment	0	0	0	0	0	0	**0**	**0%**
Residential	0	11	0	0	0	0	**11**	**31%**
Hotel	0	0	0	0	0	0	**0**	**0%**
Out	**0**	**11**	**0**	**0**	**4**	**0**		
Out %	**0%**	**26%**	**0%**	**0%**	**6%**	**0%**		

Saturday Peak Hour Multi-Use Reduction Summary (Contains Proximity Factors)

	Office	Retail	Restaurant	Cinema/ Entertainment	Residential	Hotel	In	In%
Office	0	0	0	0	0	0	**0**	**0%**
Retail	0	0	0	0	0	0	**0**	**0%**
Restaurant	0	0	0	0	0	0	**0**	**0%**
Cinema/ Entertainment	0	0	0	0	0	0	**0**	**0%**
Residential	0	0	0	0	0	0	**0**	**0%**
Hotel	0	0	0	0	0	0	**0**	**0%**
Out	**0**	**0**	**0**	**0**	**0**	**0**		
Out %	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**		

Supporting Data

Percentages from ITE Journal August 2010: "Improved Estimation of Internal Trip Capture for Mixed-Use Developments"

AM From-To Percentages Matrix

To	From					
	Office	Retail	Restaurant	Cinema/ Entertainment	Residential	Hotel
Office		29%	31%		2%	75%
Retail	28%		14%		1%	14%
Restaurant	63%	13%			20%	9%
Cinema/ Entertainment						
Residential	1%	14%	4%			0%
Hotel	0%	0%	3%		0%	

AM To-From Percentages Matrix

To	From					
	Office	Retail	Restaurant	Cinema/ Entertainment	Residential	Hotel
Office		4%	14%		3%	3%
Retail	32%		8%		17%	4%
Restaurant	23%	50%			20%	6%
Cinema/ Entertainment						
Residential	0%	2%	5%			0%
Hotel	0%	0%	4%		0%	

PM (Saturday) From-To Percentages Matrix

To	From					
	Office	Retail	Restaurant	Cinema/ Entertainment	Residential	Hotel
Office		2%	3%	2%	4%	0%
Retail	20%		41%	21%	42%	16%
Restaurant	4%	29%		31%	21%	68%
Cinema/ Entertainment	0%	4%	8%		0%	68%
Residential	2%	26%	18%	8%		0%
Hotel	0%	5%	7%	2%	3%	2%

PM (Saturday) To-From Percentages Matrix

To	From					
	Office	Retail	Restaurant	Cinema/ Entertainment	Residential	Hotel
Office		31%	30%	6%	57%	0%
Retail	8%		50%	4%	10%	2%
Restaurant	2%	29%		3%	14%	5%
Cinema/ Entertainment	1%	26%	32%		0%	0%
Residential	4%	46%	16%	4%		0%
Hotel	0%	17%	71%	1%	12%	

PM (Saturday) Only From-To Proximity Factors Matrix

To	From					
	Office	Retail	Restaurant	Cinema/ Entertainment	Residential	Hotel
Office	1.00	1.00	1.00	1.00	1.00	1.00
Retail	1.00	1.00	1.00	1.00	1.00	1.00
Restaurant	1.00	1.00	1.00	1.00	1.00	1.00
Cinema/ Entertainment	1.00	1.00	1.00	1.00	1.00	1.00
Residential	1.00	1.00	1.00	1.00	1.00	1.00
Hotel	1.00	1.00	1.00	1.00	1.00	1.00

PM (Saturday) Only To-From Proximity Factors Matrix

To	From					
	Office	Retail	Restaurant	Cinema/ Entertainment	Residential	Hotel
Office	1.00	1.00	1.00	1.00	1.00	1.00
Retail	1.00	1.00	1.00	1.00	1.00	1.00
Restaurant	1.00	1.00	1.00	1.00	1.00	1.00
Cinema/ Entertainment	1.00	1.00	1.00	1.00	1.00	1.00
Residential	1.00	1.00	1.00	1.00	1.00	1.00
Hotel	1.00	1.00	1.00	1.00	1.00	1.00

Red numbers for those land use pairs with proximity factors

APPENDIX L

TTS Query Results – Trip Distribution

Project Details

Project Name:	802 Dundas Street E
Project Number:	2297-6402
Created By:	FC
Date Started:	2022.05.16
Client:	KJC Properties Inc.

Site Information

Summary of Development	Mixed-use Residential and Retail; 12-storey building with ground floor retail and 3 townhouse blocks with 20 units
Site Type	Residential
Subject Zones	3669,3668,3674

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	3669,3668,3674
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	476	40	68	102	6	45	30	0	147	0	43	21	170	102	0	0	0	1250
%	38.08%	3.20%	5.44%	8.16%	0.48%	3.60%	2.40%	0.00%	11.76%	0.00%	3.44%	1.68%	13.60%	8.16%	0.00%	0.00%	0.00%	100.00%
% w/o trips in subject TAZ	0.00%	5.17%	8.79%	13.18%	0.78%	5.81%	3.88%	0.00%	18.99%	0.00%	5.56%	2.71%	21.96%	13.18%	0.00%	0.00%	0.00%	100.01%

Tue May 17 2022 16:29:22 GMT-0400 (Eastern Daylight Time) - Run Time: 2458ms

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 3669,3668,3674

and

Start time of trip - start_time In 630-930

and

Trip purpose of destination - purp_dest In H)

Trip 2016

Table:

,3668,3669,3674

68,0,8,0

147,0,14,0

289,0,0,57

292,13,0,0

308,13,47,20

309,0,0,24

312,0,4,0

324,0,36,0

336,0,10,0

439,0,19,0

537,17,0,0

3330,11,0,0

3419,43,0,0

3601,14,0,0

3610,0,0,24
3649,10,0,0
3658,0,4,0
3660,0,20,0
3665,23,0,0
3668,57,0,11
3669,28,151,22
3671,25,0,0
3674,25,96,86
3675,0,6,0
3696,23,0,0
3698,0,0,21
3709,0,12,0
3724,43,0,0
3815,0,0,21
3844,0,19,0
3847,14,0,0
3851,13,0,0
3859,0,90,0
3861,0,0,6
3863,0,11,0
3874,0,16,23
3877,29,0,0

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	3669,3668,3674
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	2038	751	699	884	208	201	401	336	1376	97	182	852	1158	1288	0	32	541	11044
%	18.45%	6.80%	6.33%	8.00%	1.88%	1.82%	3.63%	3.04%	12.46%	0.88%	1.65%	7.71%	10.49%	11.66%	0.00%	0.29%	4.90%	99.99%
% w/o trips in subject TAZ	0.00%	8.34%	7.76%	9.82%	2.31%	2.23%	4.45%	3.73%	15.28%	1.08%	2.02%	9.46%	12.86%	14.30%	0.00%	0.36%	6.01%	100.01%

Tue May 17 2022 16:47:56 GMT-0400 (Eastern Daylight Time) - Run Time: 2664ms

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 3669,3668,3674

and

Start time of trip - start_time In 630-930

and

Trip purpose of origin - purp_orig In H)

Trip 2016

Table:

,3668,3669,3674

11,0,0,57

21,26,4,0

25,0,0,57

32,0,0,20

36,0,20,9

37,0,0,20

38,25,17,22

41,0,25,0

43,13,15,0

48,0,17,0

50,60,19,0

51,44,40,0

52,0,97,0

53,0,20,0

54,0,18,0
55,24,28,30
56,0,33,0
57,0,72,39
59,0,19,0
63,51,0,46
65,14,13,6
67,0,6,0
68,0,8,9
93,0,16,0
113,16,0,0
116,12,0,0
146,0,0,21
147,0,14,0
175,0,0,4
176,10,0,0
201,31,0,0
210,0,0,8
211,0,20,0
221,22,0,0
231,0,0,7
246,10,0,0
254,0,0,12
258,0,19,0
269,0,9,0
290,0,13,0
292,32,7,13
293,16,0,0
296,0,34,0
299,31,0,12
301,41,0,0
306,0,0,23
307,50,0,0
308,13,47,0
309,0,43,0
311,0,33,0
312,0,20,0
313,16,50,0
315,0,14,0
317,32,0,0
321,0,64,0
322,0,33,0
323,0,17,15
325,0,6,0
326,0,10,0
327,0,7,0
328,0,10,0
330,0,0,35
332,0,42,0
336,0,47,70
355,0,0,11

358,0,36,0
359,0,14,0
361,0,19,0
371,50,51,21
373,0,15,0
378,0,0,24
383,42,0,0
386,0,14,0
387,0,19,0
390,0,0,35
391,0,85,0
406,0,0,15
439,0,19,0
443,31,0,29
450,0,8,0
461,16,0,0
484,0,0,40
532,38,0,0
554,0,0,24
1044,0,0,9
2004,0,0,23
2085,16,0,0
2091,0,0,22
2096,106,0,0
2236,0,46,0
2366,0,17,0
2369,0,0,33
2372,0,0,32
2395,8,0,0
2400,0,34,0
2401,9,0,31
2562,0,10,0
2656,0,22,0
2702,0,28,0
2763,0,12,0
3105,0,0,25
3323,0,18,0
3328,15,0,0
3343,0,0,78
3361,0,6,0
3364,0,18,0
3366,0,0,14
3385,0,12,0
3420,0,0,14
3601,28,8,15
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3609,17,0,21
3610,0,21,45
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3612,0,5,17
3620,0,0,39
3621,0,0,28
3626,0,35,8
3627,0,28,0
3631,16,106,78
3632,93,22,0
3634,50,0,11
3635,0,63,0
3639,0,15,0
3640,0,0,17
3643,32,0,66
3645,0,44,0
3649,67,40,102
3653,0,18,0
3654,14,0,51
3655,25,0,0
3658,71,4,0
3659,64,11,0
3660,51,34,9
3661,0,33,0
3662,0,11,46
3663,0,11,0
3664,46,0,0
3665,46,0,0
3666,0,5,0
3667,15,0,0
3668,236,0,48
3669,98,591,176
3670,0,16,11
3671,264,0,37
3672,0,4,0
3673,10,0,0

3,674,127,458,304

3675,57,41,35
3680,0,84,0
3681,0,13,0
3682,0,13,59
3684,14,0,0
3688,0,13,0
3690,32,0,0
3692,0,64,0
3693,0,21,0
3696,20,0,0
3697,12,0,0
3698,16,209,83
3699,0,19,23
3700,0,0,33
3701,49,27,37
3702,0,90,20
3703,0,29,0

3704,8,33,0
3705,0,23,26
3707,14,0,0
3709,14,8,0
3710,0,87,0
3711,0,10,0
3715,0,22,11
3719,0,19,0
3720,0,16,0
3721,0,108,19
3809,23,0,0
3811,13,0,0
3815,0,0,41
3816,0,22,0
3821,23,0,0
3823,20,0,0
3825,0,0,12
3828,0,0,9
3831,0,10,0
3836,8,0,0
3838,0,9,0
3841,0,19,0
3842,26,0,11
3844,0,19,0
3846,0,69,0
3847,9,13,0
3848,0,55,0
3851,54,10,31
3853,17,0,0
3857,0,10,20
3858,79,0,15
3859,0,203,0
3860,0,15,0
3861,15,11,6
3862,60,11,7
3863,40,11,0
3867,8,13,0
3872,37,0,0
3874,23,40,41
4009,0,0,17
4016,15,0,0
4024,0,33,68
4029,13,0,24
4030,28,0,18
4035,0,46,0
4040,0,4,0
4041,13,46,0
4069,0,0,32
4082,16,0,0
4087,13,0,0
4126,0,22,0

4147,37,0,0
4185,0,30,0
5142,0,28,0
5198,0,30,0
6129,0,14,0
6258,0,46,0
7302,0,14,0
8057,22,0,0
8145,0,0,6
8614,14,0,0
8910,0,0,17

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	3669,3668,3674
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	951	650	676	725	299	274	405	354	812	117	209	651	1041	1349	0	69	438	9020
%	10.54%	7.21%	7.49%	8.04%	3.31%	3.04%	4.49%	3.92%	9.00%	1.30%	2.32%	7.22%	11.54%	14.96%	0.00%	0.76%	4.86%	100.00%
% w/o trips in subject TAZ	0.00%	8.06%	8.38%	8.99%	3.71%	3.40%	5.02%	4.39%	10.06%	1.45%	2.59%	8.07%	12.90%	16.72%	0.00%	0.86%	5.43%	100.03%

Tue May 17 2022 16:28:52 GMT-0400 (Eastern Daylight Time) - Run Time: 2432ms

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 3669,3668,3674

and

Start time of trip - start_time In 1530-1830

and

Trip purpose of destination - purp_dest In H)

Trip 2016

Table:

,3668,3669,3674

11,0,0,57

25,0,0,88

32,0,0,20

34,0,0,11

35,41,0,0

37,0,0,20

38,25,17,38

41,0,25,0

43,13,25,0

45,0,14,0

50,10,19,0

51,44,65,0

52,0,104,20

53,17,20,0

54,0,18,0
55,53,28,6
56,0,26,0
57,0,55,39
59,0,19,0
63,51,0,46
65,0,20,6
67,0,0,18
89,0,10,0
98,0,12,0
110,0,41,0
130,56,0,0
146,0,0,21
147,0,14,0
176,10,0,0
201,31,0,0
204,0,20,0
210,0,0,8
211,0,18,0
222,0,11,0
231,0,0,7
246,10,0,0
254,0,0,12
258,0,19,0
286,0,0,19
290,0,13,9
292,0,7,13
295,0,11,0
296,0,34,0
299,60,12,19
307,50,0,0
308,0,0,18
309,0,25,32
311,0,33,0
312,0,0,22
313,0,40,0
315,0,14,0
317,32,0,0
321,0,64,0
323,0,23,0
326,0,10,0
327,0,7,0
332,0,42,0
355,0,0,11
357,0,0,14
358,0,36,0
359,0,14,0
361,0,19,0
371,93,12,0
378,0,0,24
386,0,14,0

387,0,19,0
388,0,25,0
391,0,37,0
403,0,25,0
415,0,0,9
439,0,19,0
443,31,0,29
450,0,8,0
460,13,0,0
465,0,16,0
484,0,0,72
532,38,0,0
2004,0,0,23
2070,30,0,0
2091,0,0,22
2096,106,0,0
2236,0,46,0
2366,0,17,0
2369,0,0,33
2372,0,0,32
2395,8,0,0
2400,0,34,0
2401,9,0,31
2422,0,4,0
2562,0,10,0
2656,0,22,0
2702,0,28,0
3105,0,0,25
3323,0,18,0
3328,0,0,12
3339,0,24,0
3343,0,0,78
3364,0,18,0
3366,0,0,14
3438,24,0,0
3466,0,0,14
3518,0,0,21
3601,35,0,0
3604,0,0,15
3605,14,24,0
3608,0,17,0
3609,59,0,21
3610,0,54,55
3612,0,5,17
3613,0,11,0
3614,16,0,0
3620,0,0,39
3621,0,17,19
3626,0,35,8
3627,0,28,0
3631,16,0,15

3632,89,0,0
3634,35,0,11
3635,0,72,0
3639,0,15,0
3641,0,0,35
3643,32,0,66
3645,0,22,0
3649,57,66,106
3653,0,15,0
3654,0,35,51
3655,0,52,0
3658,26,4,0
3659,32,0,0
3660,33,45,0
3661,0,33,0
3662,0,0,46
3664,46,13,0
3666,0,5,0
3667,15,0,0
3668,68,0,25
3669,110,302,41
3671,90,21,0
3674,36,183,186
3675,0,30,79
3680,39,28,0
3681,0,13,0
3682,0,32,102
3686,0,69,0
3688,0,7,0
3692,0,64,0
3693,0,57,0
3696,20,17,0
3698,0,41,0
3699,16,0,23
3700,0,0,52
3701,49,69,17
3702,0,0,20
3703,0,45,0
3704,8,33,0
3705,0,35,26
3707,14,0,29
3709,14,50,13
3710,0,87,0
3713,0,22,0
3715,0,22,0
3719,42,0,0
3721,0,66,19
3811,13,0,0
3815,0,0,21
3816,0,44,0
3821,23,0,0

3823,20,0,0
3825,0,0,12
3828,0,0,9
3831,0,10,0
3835,0,0,24
3841,0,35,0
3843,20,0,0
3844,0,19,0
3847,9,0,0
3848,0,55,0
3851,30,40,95
3853,17,0,0
3857,0,56,15
3858,0,10,23
3859,0,0,6
3860,0,57,100
3861,15,48,0
3862,0,11,7
3863,12,0,10
3868,0,0,32
3871,54,0,0
3872,37,0,0
3874,42,41,42
3877,24,0,0
4009,0,0,17
4016,28,0,0
4021,0,0,13
4024,0,45,101
4027,0,11,0
4029,0,0,15
4030,0,0,18
4041,13,46,0
4069,0,11,32
4087,13,0,0
4126,0,22,0
4147,37,0,0
4196,0,20,0
5112,0,12,0
5142,0,28,0
5198,0,19,0
6258,0,46,0
7302,0,14,0
8057,22,0,0
8145,0,0,6
8910,0,0,17

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	3669,3668,3674
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	236	45	85	319	155	247	132	329	162	19	48	71	285	111	0	0	71	2315
%	10.19%	1.94%	3.67%	13.78%	6.70%	10.67%	5.70%	14.21%	7.00%	0.82%	2.07%	3.07%	12.31%	4.79%	0.00%	0.00%	3.07%	99.99%
% w/o trips in subject TAZ	0.00%	2.16%	4.09%	15.34%	7.46%	11.88%	6.35%	15.82%	7.79%	0.91%	2.31%	3.42%	13.71%	5.34%	0.00%	0.00%	3.42%	100.00%

Tue May 17 2022 16:57:13 GMT-0400 (Eastern Daylight Time) - Run Time: 2872ms

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 3669,3668,3674

and

Start time of trip - start_time In 1530-1830

and

Trip purpose of origin - purp_orig In H)

Trip 2016

Table:

,3668,3669,3674

36,0,0,21

50,10,0,0

54,0,10,0

127,13,0,0

147,0,14,0

157,0,0,23

211,0,56,0

259,68,0,0

286,0,0,29

308,13,0,18

309,0,17,24

312,0,0,11

323,0,36,0

328,14,0,0

335,0,0,21
391,50,0,0
439,0,19,0
3325,0,24,0
3339,0,24,0
3479,0,19,0
3610,0,11,0
3632,0,18,0
3635,0,29,0
3639,0,0,6
3641,0,0,35
3649,0,42,0
3653,41,15,0
3654,0,18,0
3659,0,11,24
3660,41,25,24
3661,0,81,0
3665,0,6,0
3667,116,0,0
3668,25,0,25
3669,23,27,0
3670,0,0,11
3671,0,21,0
3674,0,35,101
3675,0,0,25
3676,0,0,12
3680,13,13,0
3682,0,0,72
3693,25,0,0
3698,0,14,0
3699,0,19,0
3700,0,0,19
3701,0,27,0
3703,0,16,0
3709,0,42,0
3844,0,19,0
3847,0,0,14
3848,0,18,0
3851,16,9,12
3857,0,17,41
3858,0,56,0
3859,0,45,0
3860,0,0,38
3861,0,42,0
3862,0,0,15
3863,0,0,10
3871,30,0,0
3872,33,0,0
3874,82,83,22
4103,0,0,28
5164,43,0,0

Time Period	Internal								External								Total
	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	
AM (IN)	5.2%	8.8%	13.2%	0.8%	5.8%	3.9%	0.0%	19.0%	0.0%	5.6%	2.7%	22.0%	13.2%	0.0%	0.0%	0.0%	100.0%
AM (OUT)	8.3%	7.8%	9.8%	2.3%	2.2%	4.5%	3.7%	15.3%	1.1%	2.0%	9.5%	12.9%	14.3%	0.0%	0.4%	6.0%	100.0%
PM (IN)	8.1%	8.4%	9.0%	3.7%	3.4%	5.0%	4.4%	10.1%	1.5%	2.6%	8.1%	12.9%	16.7%	0.0%	0.9%	5.4%	100.0%
PM (OUT)	2.2%	4.1%	15.3%	7.5%	11.9%	6.4%	15.8%	7.8%	0.9%	2.3%	3.4%	13.7%	5.3%	0.0%	0.0%	3.4%	100.0%

Project Details

Project Name:	802 Dundas Street E
Project Number:	2297-6402
Created By:	FC
Date Started:	2022.05.16
Client:	KJC Properties Inc.

Site Information

Summary of Development	Mixed-use Residential and Retail; 12-storey building with ground floor retail and 3 townhouse blocks with 20 units
Site Type	Retail
Subject Zones	3669,3668,3659,3660,3667,3674

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	,3668,3659,3660,3667,
Filter 2:	Start time of trip	0630-0930
Filter 3:	Trip purpose of destination	Market/Shop (M)

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	93	14	26	35	0	0	0	41	11	0	28	19	19	0	0	0	0	286
%	32.52%	4.90%	9.09%	12.24%	0.00%	0.00%	0.00%	14.34%	3.85%	0.00%	9.79%	6.64%	6.64%	0.00%	0.00%	0.00%	0.00%	100.01%
% w/o trips in subject TAZ	0.00%	7.25%	13.47%	18.13%	0.00%	0.00%	0.00%	21.24%	5.70%	0.00%	14.51%	9.84%	9.84%	0.00%	0.00%	0.00%	0.00%	99.98%

Wed May 18 2022 08:45:49 GMT-0400 (Eastern Daylight Time) - Run Time: 2601ms

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 3669,3668,3659,3660,3667,3674

and

Start time of trip - start_time In 630-930

and

Trip purpose of destination - purp_dest In M)

Trip 2016

Table:

,3659,3660,3668,3674

314,0,19,0,0

333,0,19,0,0

3464,0,28,0,0

3610,0,10,0,0

3647,0,23,0,0

3653,0,18,0,0

3655,0,11,0,0

3668,0,0,25,0

3669,0,20,18,10

3674,0,9,11,0

3675,0,22,0,0

3680,0,0,0,14

3682,0,0,0,13

3687,16,0,0,0

3852,0,0,0,25

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	,3668,3659,3660,3667,
Filter 2:	Start time of trip	1530-1830
Filter 3:	Trip purpose of origin	Market/Shop (M)

AM OUT	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	31	33	0	14	0	0	0	18	0	0	0	0	18	25	0	0	0	139
%	22.30%	23.74%	0.00%	10.07%	0.00%	0.00%	0.00%	12.95%	0.00%	0.00%	0.00%	0.00%	12.95%	17.99%	0.00%	0.00%	0.00%	100.00%
% w/o trips in subject TAZ	0.00%	30.56%	0.00%	12.96%	0.00%	0.00%	0.00%	16.67%	0.00%	0.00%	0.00%	0.00%	16.67%	23.15%	0.00%	0.00%	0.00%	100.01%

Wed May 18 2022 08:44:08 GMT-0400 (Eastern Daylight Time) - Run Time: 2331ms

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 3669,3668,3659,3660,3667,3674

and

Start time of trip - start_time In 630-930

and

Trip purpose of origin - purp_orig In M)

Trip 2016

Table:

,3660,3668,3674

26,0,0,25

309,0,18,0

3652,18,0,0

3669,20,0,0

3674,0,11,0

3702,0,0,14

3719,33,0,0

3874,9,0,0

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**	**,3668,3659,3660,3667,**
Filter 2:	**Start time of trip**	**1530-1830**
Filter 3:	**Trip purpose of destination**	**Market/Shop (M)**

PM 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	134	137	11	100	68	88	60	16	62	0	0	91	43	23	0	0	39	872
%	15.37%	15.71%	1.26%	11.47%	7.80%	10.09%	6.88%	1.83%	7.11%	0.00%	0.00%	10.44%	4.93%	2.64%	0.00%	0.00%	4.47%	100.00%
% w/o trips in subject TAZ	0.00%	18.56%	1.49%	13.55%	9.21%	11.92%	8.13%	2.17%	8.40%	0.00%	0.00%	12.33%	5.83%	3.12%	0.00%	0.00%	5.28%	99.99%

Wed May 18 2022 08:45:27 GMT-0400 (Eastern Daylight Time) - Run Time: 3362ms

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 3669,3668,3659,3660,3667,3674

and

Start time of trip - start_time In 1530-1830

and

Trip purpose of destination - purp_dest In M)

Trip 2016

Table:

,3659,3660,3668,3669,3674

67,0,0,0,0,16

295,0,0,7,0,0

307,0,27,0,0,0

313,0,0,16,0,0

351,0,0,0,10,0

2085,0,0,0,0,16

3336,0,65,0,0,0

3632,0,0,0,0,16

3634,0,0,0,0,15

3635,0,0,0,0,20

3642,0,9,0,0,0

3643,0,13,0,0,0

3648,38,0,0,0,0

3654,0,75,13,0,0

3655,0,23,0,0,0
3658,0,0,0,0,33
3660,0,6,0,0,0
3668,0,20,13,23,0
3669,0,25,0,0,35
3670,0,34,0,0,13
3671,0,0,0,0,4
3673,0,0,0,0,24
3674,0,0,0,0,12
3693,0,0,0,0,11
3709,0,0,14,0,0
3715,0,0,7,0,0
3851,0,0,0,0,62
3857,0,25,0,61,0
3861,0,5,0,0,0
3863,0,0,0,0,11
3874,0,0,0,0,16
4004,0,24,0,0,0
4024,0,0,15,0,0

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	,3668,3659,3660,3667,
Filter 2:	Start time of trip	1530-1830
Filter 3:	Trip purpose of origin	Market/Shop (M)

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	251	166	71	125	60	37	74	37	81	0	0	0	28	0	0	0	0	930
%	26.99%	17.85%	7.63%	13.44%	6.45%	3.98%	7.96%	3.98%	8.71%	0.00%	0.00%	0.00%	3.01%	0.00%	0.00%	0.00%	0.00%	100.00%
% w/o trips in subject TAZ	0.00%	24.45%	10.46%	18.41%	8.84%	5.45%	10.90%	5.45%	11.93%	0.00%	0.00%	0.00%	4.12%	0.00%	0.00%	0.00%	0.00%	100.01%

Wed May 18 2022 08:44:51 GMT-0400 (Eastern Daylight Time) - Run Time: 2512ms

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 3669,3668,3659,3660,3667,3674

and

Start time of trip - start_time In 1530-1830

and

Trip purpose of origin - purp_orig In M)

Trip 2016

Table:

,3659,3660,3667,3668,3669,3674

312,0,0,21,0,0,0

323,0,0,0,7,0,0

3604,0,0,7,0,0,0

3608,0,17,0,0,0,0

3610,0,0,0,0,0,48

3622,19,0,0,0,0,0

3643,0,13,0,0,0,0

3648,38,16,0,0,0,0

3651,0,0,0,0,10,0

3653,0,20,0,17,0,0

3654,0,37,0,0,0,0

3659,0,15,0,13,0,0

3660,0,6,0,0,0,0

3663,0,0,0,0,0,62

3668,0,0,0,15,23,31
3669,0,31,0,0,0,89
3670,0,12,0,0,0,25
3672,0,9,0,0,0,0
3673,0,0,0,15,0,24
3674,0,0,0,0,0,28
3681,0,45,0,0,0,0
3686,0,0,0,0,0,4
3690,0,23,0,0,0,0
3694,0,0,0,0,0,35
3851,0,25,0,0,0,0
3855,0,25,0,0,0,0
3857,0,0,0,0,61,0
3863,0,0,0,14,0,0
3874,0,23,0,0,0,0
3876,0,0,0,7,0,0

Time Period	Internal								External								Total
	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	
AM (IN)	7.3%	13.5%	18.1%	0.0%	0.0%	0.0%	21.2%	5.7%	0.0%	14.5%	9.8%	9.8%	0.0%	0.0%	0.0%	0.0%	100.0%
AM (OUT)	30.6%	0.0%	13.0%	0.0%	0.0%	0.0%	16.7%	0.0%	0.0%	0.0%	0.0%	16.7%	23.2%	0.0%	0.0%	0.0%	100.0%
PM (IN)	18.6%	1.5%	13.6%	9.2%	11.9%	8.1%	2.2%	8.4%	0.0%	0.0%	12.3%	5.8%	3.1%	0.0%	0.0%	5.3%	100.0%
PM (OUT)	24.5%	10.5%	18.4%	8.8%	5.5%	10.9%	5.5%	11.9%	0.0%	0.0%	0.0%	4.1%	0.0%	0.0%	0.0%	0.0%	100.0%
SAT (IN)																	0.0%
SAT (OUT)																	0.0%

APPENDIX M

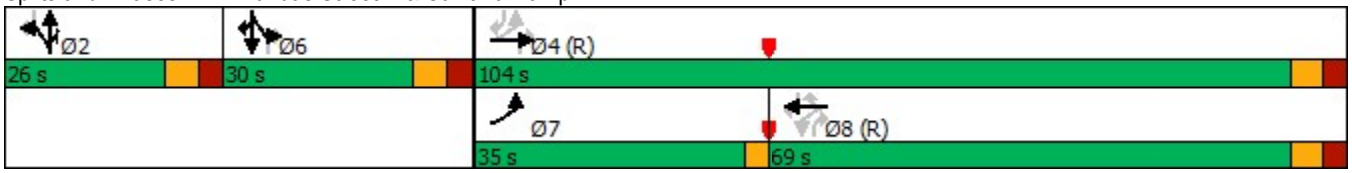
2027 Future Total Synchro Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	193	1352	19	12	664	306	14	14	17	458	35	185
Future Volume (vph)	193	1352	19	12	664	306	14	14	17	458	35	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	120.0		45.0	0.0		0.0	0.0		65.0
Storage Lanes	1		0	1		1	0		1	1		1
Taper Length (m)	100.0			15.0			7.6			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.91	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.998				0.850			0.850			0.850
Flt Protected	0.950			0.950				0.976		0.950	0.959	
Satd. Flow (prot)	1789	3571	0	1789	5142	1601	0	1838	1601	1700	1716	1601
Flt Permitted	0.318			0.113				0.976		0.950	0.959	
Satd. Flow (perm)	599	3571	0	213	5142	1601	0	1838	1601	1700	1716	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				321						
Link Speed (k/h)		60			60			48			50	
Link Distance (m)		121.4			559.2			44.8			197.1	
Travel Time (s)		7.3			33.6			3.4			14.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	210	1470	21	13	722	333	15	15	18	498	38	201
Shared Lane Traffic (%)										46%		
Lane Group Flow (vph)	210	1491	0	13	722	333	0	30	18	269	267	201
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	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	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	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	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	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	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	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	pm+pt	NA		Perm	NA	Perm	Split	NA	custom	Split	NA	custom
Protected Phases	7	4			8		2	2	2	6	6	6
Permitted Phases	4			8		8			4 6 8			4 2 8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	8.0	36.0		36.0	36.0	36.0	15.0	15.0	15.0	15.5	15.5	15.5
Total Split (s)	35.0	104.0		69.0	69.0	69.0	26.0	26.0	26.0	30.0	30.0	30.0
Total Split (%)	21.9%	65.0%		43.1%	43.1%	43.1%	16.3%	16.3%	16.3%	18.8%	18.8%	18.8%
Maximum Green (s)	32.0	97.0		62.0	62.0	62.0	19.0	19.0	19.0	22.5	22.5	22.5
Yellow Time (s)	3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0		7.0	7.0	7.0		7.0	7.0	7.5	7.5	7.5
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Min		C-Min	C-Min	C-Min	None	None	None	None	None	None
Walk Time (s)		10.0		10.0	10.0	10.0				0.0	0.0	0.0
Flash Dont Walk (s)		19.0		19.0	19.0	19.0				22.5	22.5	22.5
Pedestrian Calls (#/hr)		0		0	0	0				0	0	0
Act Effct Green (s)	99.1	95.1		78.4	78.4	78.4		8.8	160.0	37.6	37.6	160.0
Actuated g/C Ratio	0.62	0.59		0.49	0.49	0.49		0.06	1.00	0.24	0.24	1.00
v/c Ratio	0.44	0.70		0.12	0.29	0.35		0.30	0.01	0.68	0.66	0.13
Control Delay	16.7	25.2		31.8	32.4	9.8		80.0	0.0	65.6	65.0	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	16.7	25.2		31.8	32.4	9.8		80.0	0.0	65.6	65.0	0.2
LOS	B	C		C	C	A		F	A	E	E	A
Approach Delay		24.2			25.4			50.0			47.5	
Approach LOS		C			C			D			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 16 (10%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 29.7		Intersection LOS: C	
Intersection Capacity Utilization 82.8%		ICU Level of Service E	
Analysis Period (min) 15			

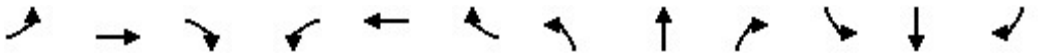
Splits and Phases: 1: Dundas Street E & Cawthra Ramp



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	210	1491	13	722	333	30	18	269	267	201
v/c Ratio	0.44	0.70	0.12	0.29	0.35	0.30	0.01	0.68	0.66	0.13
Control Delay	16.7	25.2	31.8	32.4	9.8	80.0	0.0	65.6	65.0	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.7	25.2	31.8	32.4	9.8	80.0	0.0	65.6	65.0	0.2
Queue Length 50th (m)	28.8	173.8	3.0	63.0	26.0	9.4	0.0	82.6	81.6	0.0
Queue Length 95th (m)	39.8	190.1	6.8	56.2	5.8	20.7	0.0	#130.1	#128.3	0.0
Internal Link Dist (m)		97.4		535.2		20.8			173.1	
Turn Bay Length (m)	75.0		120.0		45.0					65.0
Base Capacity (vph)	609	2196	104	2518	947	218	1601	398	403	1601
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.68	0.13	0.29	0.35	0.14	0.01	0.68	0.66	0.13

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

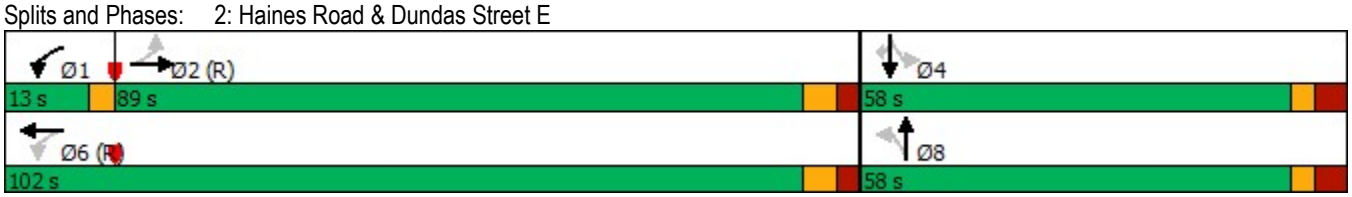


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	109	1820	159	201	746	77	63	15	141	99	32	102
Future Volume (vph)	109	1820	159	201	746	77	63	15	141	99	32	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	20.0		0.0	75.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	35.0			20.0			50.0			25.0		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.988			0.986			0.864				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	5080	0	1789	5070	0	1789	1627	0	1789	1883	1601
Flt Permitted	0.306			0.042			0.734			0.430		
Satd. Flow (perm)	576	5080	0	79	5070	0	1382	1627	0	810	1883	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			19			123				111
Link Speed (k/h)		60			60			50			40	
Link Distance (m)		559.2			412.2			198.5			92.1	
Travel Time (s)		33.6			24.7			14.3			8.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	118	1978	173	218	811	84	68	16	153	108	35	111
Shared Lane Traffic (%)												
Lane Group Flow (vph)	118	2151	0	218	895	0	68	169	0	108	35	111
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)		1.6			1.6			1.6			1.6	
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	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	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		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		1	6		8	8		4	4	4
Switch Phase												
Minimum Initial (s)	8.0	8.0		5.0	8.0		8.0	8.0		8.0	8.0	8.0
Minimum Split (s)	44.0	44.0		10.0	44.0		53.0	53.0		53.0	53.0	53.0
Total Split (s)	89.0	89.0		13.0	102.0		58.0	58.0		58.0	58.0	58.0
Total Split (%)	55.6%	55.6%		8.1%	63.8%		36.3%	36.3%		36.3%	36.3%	36.3%
Maximum Green (s)	82.0	82.0		10.0	95.0		51.0	51.0		51.0	51.0	51.0
Yellow Time (s)	4.0	4.0		3.0	4.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	3.0	3.0		0.0	3.0		4.0	4.0		4.0	4.0	4.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		-1.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		3.0	7.0		7.0	7.0		6.0	7.0	7.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max		None	C-Max		None	None		None	None	None
Walk Time (s)	10.0	10.0			10.0		10.0	10.0		10.0	10.0	10.0
Flash Dont Walk (s)	27.0	27.0			27.0		36.0	36.0		36.0	36.0	36.0
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	0
Act Effct Green (s)	92.3	92.3		129.1	125.1		20.9	20.9		21.9	20.9	20.9
Actuated g/C Ratio	0.58	0.58		0.81	0.78		0.13	0.13		0.14	0.13	0.13
v/c Ratio	0.36	0.73		0.57	0.23		0.38	0.53		0.98	0.14	0.36
Control Delay	14.7	19.3		61.1	4.2		67.5	24.7		147.7	59.6	12.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	14.7	19.3		61.1	4.2		67.5	24.7		147.7	59.6	12.4
LOS	B	B		E	A		E	C		F	E	B
Approach Delay		19.1			15.3			37.0			76.4	
Approach LOS		B			B			D			E	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.98			
Intersection Signal Delay: 22.9		Intersection LOS: C	
Intersection Capacity Utilization 86.0%		ICU Level of Service E	
Analysis Period (min) 15			

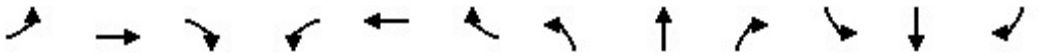
Splits and Phases: 2: Haines Road & Dundas Street E



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	118	2151	218	895	68	169	108	35	111
v/c Ratio	0.36	0.73	0.57	0.23	0.38	0.53	0.98	0.14	0.36
Control Delay	14.7	19.3	61.1	4.2	67.5	24.7	147.7	59.6	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.7	19.3	61.1	4.2	67.5	24.7	147.7	59.6	12.4
Queue Length 50th (m)	11.6	172.8	53.8	17.9	20.1	13.3	34.8	10.0	0.0
Queue Length 95th (m)	m24.2	151.6	83.6	28.4	34.1	35.1	#60.3	19.9	17.2
Internal Link Dist (m)		535.2		388.2		174.5		68.1	
Turn Bay Length (m)	30.0		20.0		75.0		25.0		25.0
Base Capacity (vph)	332	2934	382	3968	440	602	263	600	585
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.73	0.57	0.23	0.15	0.28	0.41	0.06	0.19

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

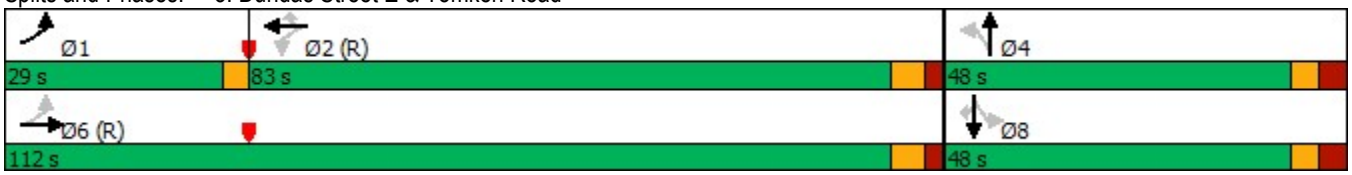


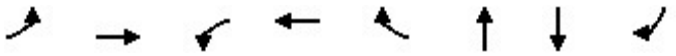
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	302	1638	8	7	648	222	4	6	17	326	11	274
Future Volume (vph)	302	1638	8	7	648	222	4	6	17	326	11	274
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	20.0		30.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		1	0		0	0		1
Taper Length (m)	35.0			40.0			2.5			2.5		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999				0.850		0.916				0.850
Flt Protected	0.950			0.950				0.993			0.954	
Satd. Flow (prot)	1789	5137	0	1789	5142	1601	0	1713	0	0	1797	1601
Flt Permitted	0.335			0.113				0.923			0.712	
Satd. Flow (perm)	631	5137	0	213	5142	1601	0	1592	0	0	1341	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				199		18				271
Link Speed (k/h)		60			60			48			50	
Link Distance (m)		412.2			702.4			80.2			421.2	
Travel Time (s)		24.7			42.1			6.0			30.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	328	1780	9	8	704	241	4	7	18	354	12	298
Shared Lane Traffic (%)												
Lane Group Flow (vph)	328	1789	0	8	704	241	0	29	0	0	366	298
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			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
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	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		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	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		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	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		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	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	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	1	6			2			4			8	
Permitted Phases	6			2		2	4			8		8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	1	6		2	2	2	4	4		8	8	8
Switch Phase												
Minimum Initial (s)	5.0	8.0		8.0	8.0	8.0	8.0	8.0		8.0	8.0	8.0
Minimum Split (s)	9.5	30.5		30.5	30.5	30.5	43.0	43.0		43.0	43.0	43.0
Total Split (s)	29.0	112.0		83.0	83.0	83.0	48.0	48.0		48.0	48.0	48.0
Total Split (%)	18.1%	70.0%		51.9%	51.9%	51.9%	30.0%	30.0%		30.0%	30.0%	30.0%
Maximum Green (s)	26.0	105.5		76.5	76.5	76.5	41.0	41.0		41.0	41.0	41.0
Yellow Time (s)	3.0	4.0		4.0	4.0	4.0	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	0.0	2.5		2.5	2.5	2.5	3.5	3.5		3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0			-2.0	0.0
Total Lost Time (s)	3.0	6.5		6.5	6.5	6.5		7.0			5.0	7.0
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		C-Max	C-Max	C-Max	None	None		None	None	None
Walk Time (s)		10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	10.0
Flash Dont Walk (s)		14.0		14.0	14.0	14.0	26.0	26.0		26.0	26.0	26.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0		0	0	0
Act Effct Green (s)	109.0	105.5		85.4	85.4	85.4		41.0			43.0	41.0
Actuated g/C Ratio	0.68	0.66		0.53	0.53	0.53		0.26			0.27	0.26
v/c Ratio	0.59	0.53		0.07	0.26	0.25		0.07			1.02	0.49
Control Delay	17.3	10.0		21.9	20.8	5.1		24.3			108.2	10.1
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Delay	17.3	10.0		21.9	20.8	5.1		24.3			108.2	10.1
LOS	B	A		C	C	A		C			F	B
Approach Delay		11.1			16.8			24.3			64.2	
Approach LOS		B			B			C			E	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 0 (0%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.02			
Intersection Signal Delay: 22.0		Intersection LOS: C	
Intersection Capacity Utilization 78.8%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: Dundas Street E & Tomken Road





Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	328	1789	8	704	241	29	366	298
v/c Ratio	0.59	0.53	0.07	0.26	0.25	0.07	1.02	0.49
Control Delay	17.3	10.0	21.9	20.8	5.1	24.3	108.2	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.3	10.0	21.9	20.8	5.1	24.3	108.2	10.1
Queue Length 50th (m)	20.6	47.6	1.2	43.1	6.2	2.7	~122.4	6.6
Queue Length 95th (m)	61.8	80.2	4.8	55.4	21.6	11.3	#187.0	33.0
Internal Link Dist (m)		388.2		678.4		56.2	397.2	
Turn Bay Length (m)	15.0		20.0		30.0			
Base Capacity (vph)	618	3387	113	2745	947	421	360	611
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.53	0.07	0.26	0.25	0.07	1.02	0.49

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

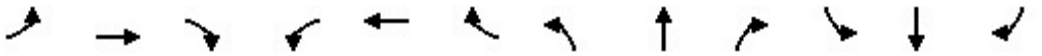
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	60	71	114	159	0
Future Volume (vph)	0	60	71	114	159	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected				0.981		
Satd. Flow (prot)	1629	0	0	1848	1883	0
Flt Permitted				0.981		
Satd. Flow (perm)	1629	0	0	1848	1883	0
Link Speed (k/h)	50			50	40	
Link Distance (m)	115.2			92.1	57.7	
Travel Time (s)	8.3			6.6	5.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	65	77	124	173	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	65	0	0	201	173	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	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 32.0%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	60	71	114	159	0
Future Volume (Veh/h)	0	60	71	114	159	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	65	77	124	173	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				92		
pX, platoon unblocked	0.98					
vC, conflicting volume	451	173	173			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	427	173	173			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	93	95			
cM capacity (veh/h)	540	871	1404			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	65	201	173
Volume Left	0	77	0
Volume Right	65	0	0
cSH	871	1404	1700
Volume to Capacity	0.07	0.05	0.10
Queue Length 95th (m)	1.8	1.3	0.0
Control Delay (s)	9.5	3.2	0.0
Lane LOS	A	A	
Approach Delay (s)	9.5	3.2	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	32.0%	ICU Level of Service	A
Analysis Period (min)	15		

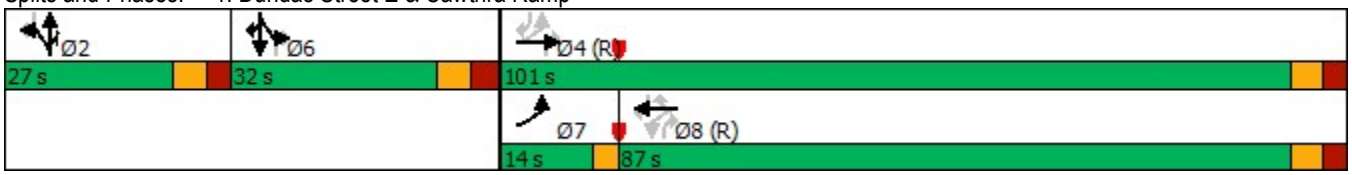


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	197	844	22	26	1572	620	37	21	83	291	23	320
Future Volume (vph)	197	844	22	26	1572	620	37	21	83	291	23	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	120.0		45.0	0.0		0.0	0.0		65.0
Storage Lanes	1		0	1		1	0		1	1		1
Taper Length (m)	100.0			15.0			7.6			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.91	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.996				0.850			0.850			0.850
Flt Protected	0.950			0.950				0.969		0.950	0.959	
Satd. Flow (prot)	1789	3564	0	1789	5142	1601	0	1825	1601	1700	1716	1601
Flt Permitted	0.073			0.304				0.969		0.950	0.959	
Satd. Flow (perm)	137	3564	0	573	5142	1601	0	1825	1601	1700	1716	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				335						
Link Speed (k/h)		60			60			48			50	
Link Distance (m)		121.4			559.2			44.8			197.1	
Travel Time (s)		7.3			33.6			3.4			14.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	214	917	24	28	1709	674	40	23	90	316	25	348
Shared Lane Traffic (%)										46%		
Lane Group Flow (vph)	214	941	0	28	1709	674	0	63	90	171	170	348
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	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	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	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	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	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	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	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	pm+pt	NA		Perm	NA	Perm	Split	NA	custom	Split	NA	custom
Protected Phases	7	4			8		2	2	2	6	6	6
Permitted Phases	4			8		8			4 6 8			4 2 8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	8.0	36.0		36.0	36.0	36.0	15.0	15.0	15.0	15.5	15.5	15.5
Total Split (s)	14.0	101.0		87.0	87.0	87.0	27.0	27.0	27.0	32.0	32.0	32.0
Total Split (%)	8.8%	63.1%		54.4%	54.4%	54.4%	16.9%	16.9%	16.9%	20.0%	20.0%	20.0%
Maximum Green (s)	11.0	94.0		80.0	80.0	80.0	20.0	20.0	20.0	24.5	24.5	24.5
Yellow Time (s)	3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0		7.0	7.0	7.0		7.0	7.0	7.5	7.5	7.5
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Min		C-Min	C-Min	C-Min	None	None	None	None	None	None
Walk Time (s)		10.0		10.0	10.0	10.0				0.0	0.0	0.0
Flash Dont Walk (s)		19.0		19.0	19.0	19.0				22.5	22.5	22.5
Pedestrian Calls (#/hr)		0		0	0	0				0	0	0
Act Effct Green (s)	108.8	104.8		82.6	82.6	82.6		11.1	160.0	22.5	22.5	160.0
Actuated g/C Ratio	0.68	0.66		0.52	0.52	0.52		0.07	1.00	0.14	0.14	1.00
v/c Ratio	0.74	0.40		0.09	0.64	0.68		0.50	0.06	0.72	0.71	0.22
Control Delay	46.3	14.4		21.3	29.8	17.4		84.5	0.1	81.5	80.6	0.3
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	46.3	14.4		21.3	29.8	17.4		84.5	0.1	81.5	80.6	0.3
LOS	D	B		C	C	B		F	A	F	F	A
Approach Delay		20.3			26.3			34.8			40.3	
Approach LOS		C			C			C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 16 (10%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 27.2		Intersection LOS: C	
Intersection Capacity Utilization 74.8%		ICU Level of Service D	
Analysis Period (min) 15			

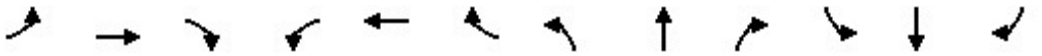
Splits and Phases: 1: Dundas Street E & Cawthra Ramp



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	214	941	28	1709	674	63	90	171	170	348
v/c Ratio	0.74	0.40	0.09	0.64	0.68	0.50	0.06	0.72	0.71	0.22
Control Delay	46.3	14.4	21.3	29.8	17.4	84.5	0.1	81.5	80.6	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.3	14.4	21.3	29.8	17.4	84.5	0.1	81.5	80.6	0.3
Queue Length 50th (m)	39.4	70.1	4.4	105.2	54.2	19.7	0.0	55.3	54.8	0.0
Queue Length 95th (m)	#105.0	100.6	m6.6	127.5	91.9	35.4	0.0	79.5	79.0	0.0
Internal Link Dist (m)		97.4		535.2		20.8			173.1	
Turn Bay Length (m)	75.0		120.0		45.0					65.0
Base Capacity (vph)	291	2336	295	2655	989	228	1597	276	278	1584
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.40	0.09	0.64	0.68	0.28	0.06	0.62	0.61	0.22

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

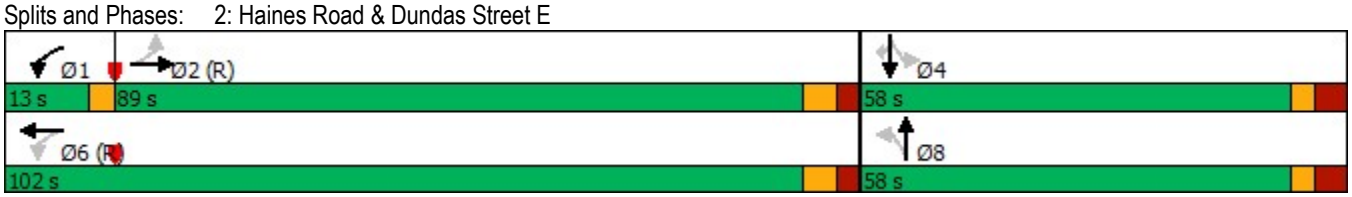


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	1036	110	213	2124	34	172	4	242	62	15	65
Future Volume (vph)	38	1036	110	213	2124	34	172	4	242	62	15	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	20.0		0.0	75.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	35.0			20.0			50.0			25.0		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.986			0.998			0.852				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	5070	0	1789	5132	0	1789	1605	0	1789	1883	1601
Flt Permitted	0.056			0.181			0.747			0.255		
Satd. Flow (perm)	105	5070	0	341	5132	0	1407	1605	0	480	1883	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			2			170				48
Link Speed (k/h)		60			60			50			40	
Link Distance (m)		559.2			412.2			198.5			92.1	
Travel Time (s)		33.6			24.7			14.3			8.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	1126	120	232	2309	37	187	4	263	67	16	71
Shared Lane Traffic (%)												
Lane Group Flow (vph)	41	1246	0	232	2346	0	187	267	0	67	16	71
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)		1.6			1.6			1.6			1.6	
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	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	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		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		1	6		8	8		4	4	4
Switch Phase												
Minimum Initial (s)	8.0	8.0		5.0	8.0		8.0	8.0		8.0	8.0	8.0
Minimum Split (s)	44.0	44.0		10.0	44.0		53.0	53.0		53.0	53.0	53.0
Total Split (s)	89.0	89.0		13.0	102.0		58.0	58.0		58.0	58.0	58.0
Total Split (%)	55.6%	55.6%		8.1%	63.8%		36.3%	36.3%		36.3%	36.3%	36.3%
Maximum Green (s)	82.0	82.0		10.0	95.0		51.0	51.0		51.0	51.0	51.0
Yellow Time (s)	4.0	4.0		3.0	4.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	3.0	3.0		0.0	3.0		4.0	4.0		4.0	4.0	4.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		-1.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		3.0	7.0		7.0	7.0		6.0	7.0	7.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max		None	C-Max		None	None		None	None	None
Walk Time (s)	10.0	10.0			10.0		10.0	10.0		10.0	10.0	10.0
Flash Dont Walk (s)	27.0	27.0			27.0		36.0	36.0		36.0	36.0	36.0
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	0
Act Effct Green (s)	102.8	102.8		122.8	118.8		27.2	27.2		28.2	27.2	27.2
Actuated g/C Ratio	0.64	0.64		0.77	0.74		0.17	0.17		0.18	0.17	0.17
v/c Ratio	0.61	0.38		0.61	0.62		0.78	0.64		0.80	0.05	0.23
Control Delay	52.6	8.9		28.0	7.4		84.6	28.3		115.5	51.7	22.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	52.6	8.9		28.0	7.4		84.6	28.3		115.5	51.7	22.5
LOS	D	A		C	A		F	C		F	D	C
Approach Delay		10.3			9.2			51.5			66.0	
Approach LOS		B			A			D			E	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 15.8		Intersection LOS: B	
Intersection Capacity Utilization 92.8%		ICU Level of Service F	
Analysis Period (min) 15			

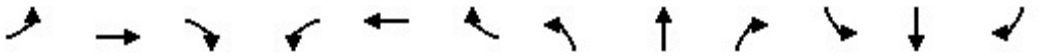
Splits and Phases: 2: Haines Road & Dundas Street E



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	41	1246	232	2346	187	267	67	16	71
v/c Ratio	0.61	0.38	0.61	0.62	0.78	0.64	0.80	0.05	0.23
Control Delay	52.6	8.9	28.0	7.4	84.6	28.3	115.5	51.7	22.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.6	8.9	28.0	7.4	84.6	28.3	115.5	51.7	22.5
Queue Length 50th (m)	3.2	35.0	26.0	59.4	57.9	28.7	20.7	4.3	6.3
Queue Length 95th (m)	m#33.2	39.6	55.5	74.3	80.5	56.2	#40.0	10.6	19.4
Internal Link Dist (m)		535.2		388.2		174.5		68.1	
Turn Bay Length (m)	30.0		20.0		75.0		25.0		25.0
Base Capacity (vph)	67	3263	380	3810	448	627	156	600	543
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.38	0.61	0.62	0.42	0.43	0.43	0.03	0.13

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

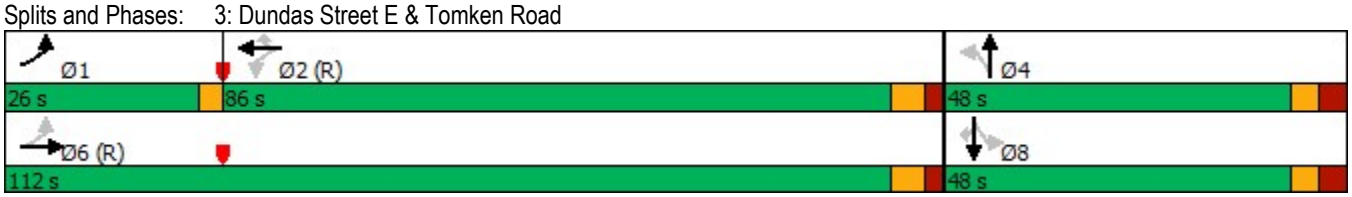


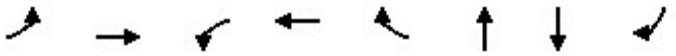
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	288	1149	45	35	1688	377	38	22	56	314	28	269
Future Volume (vph)	288	1149	45	35	1688	377	38	22	56	314	28	269
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	20.0		30.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		1	0		0	0		1
Taper Length (m)	35.0			40.0			2.5			2.5		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994				0.850		0.935				0.850
Flt Protected	0.950			0.950				0.984			0.956	
Satd. Flow (prot)	1789	5111	0	1789	5142	1601	0	1733	0	0	1801	1601
Flt Permitted	0.052			0.201				0.428			0.627	
Satd. Flow (perm)	98	5111	0	379	5142	1601	0	754	0	0	1181	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8				135		28				250
Link Speed (k/h)		60			60			48			50	
Link Distance (m)		412.2			702.4			80.2			421.2	
Travel Time (s)		24.7			42.1			6.0			30.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	313	1249	49	38	1835	410	41	24	61	341	30	292
Shared Lane Traffic (%)												
Lane Group Flow (vph)	313	1298	0	38	1835	410	0	126	0	0	371	292
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			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
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	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		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	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		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	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		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	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	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	1	6			2			4			8	
Permitted Phases	6			2		2	4			8		8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	1	6		2	2	2	4	4		8	8	8
Switch Phase												
Minimum Initial (s)	5.0	8.0		8.0	8.0	8.0	8.0	8.0		8.0	8.0	8.0
Minimum Split (s)	9.5	30.5		30.5	30.5	30.5	43.0	43.0		43.0	43.0	43.0
Total Split (s)	26.0	112.0		86.0	86.0	86.0	48.0	48.0		48.0	48.0	48.0
Total Split (%)	16.3%	70.0%		53.8%	53.8%	53.8%	30.0%	30.0%		30.0%	30.0%	30.0%
Maximum Green (s)	23.0	105.5		79.5	79.5	79.5	41.0	41.0		41.0	41.0	41.0
Yellow Time (s)	3.0	4.0		4.0	4.0	4.0	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	0.0	2.5		2.5	2.5	2.5	3.5	3.5		3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Lost Time (s)	3.0	6.5		6.5	6.5	6.5		7.0			7.0	7.0
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		C-Max	C-Max	C-Max	None	None		None	None	None
Walk Time (s)		10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	10.0
Flash Dont Walk (s)		14.0		14.0	14.0	14.0	26.0	26.0		26.0	26.0	26.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0		0	0	0
Act Effct Green (s)	109.0	105.5		79.5	79.5	79.5		41.0			41.0	41.0
Actuated g/C Ratio	0.68	0.66		0.50	0.50	0.50		0.26			0.26	0.26
v/c Ratio	1.01	0.38		0.20	0.72	0.48		0.59			1.23	0.49
Control Delay	116.1	9.5		26.1	33.5	19.0		52.8			176.6	11.9
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Delay	116.1	9.5		26.1	33.5	19.0		52.8			176.6	11.9
LOS	F	A		C	C	B		D			F	B
Approach Delay		30.2			30.8			52.8			104.1	
Approach LOS		C			C			D			F	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 0 (0%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.23			
Intersection Signal Delay: 41.5		Intersection LOS: D	
Intersection Capacity Utilization 88.7%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 3: Dundas Street E & Tomken Road





Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	313	1298	38	1835	410	126	371	292
v/c Ratio	1.01	0.38	0.20	0.72	0.48	0.59	1.23	0.49
Control Delay	116.1	9.5	26.1	33.5	19.0	52.8	176.6	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	116.1	9.5	26.1	33.5	19.0	52.8	176.6	11.9
Queue Length 50th (m)	~88.9	42.5	6.6	164.3	55.8	27.6	~144.8	10.3
Queue Length 95th (m)	#151.4	61.3	15.2	181.2	84.3	52.4	#209.3	37.5
Internal Link Dist (m)		388.2		678.4		56.2	397.2	
Turn Bay Length (m)	15.0		20.0		30.0			
Base Capacity (vph)	309	3372	188	2554	863	214	302	596
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.01	0.38	0.20	0.72	0.48	0.59	1.23	0.49

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	56	22	53	85	0
Future Volume (vph)	0	56	22	53	85	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected				0.986		
Satd. Flow (prot)	1629	0	0	1857	1883	0
Flt Permitted				0.986		
Satd. Flow (perm)	1629	0	0	1857	1883	0
Link Speed (k/h)	40			40	40	
Link Distance (m)	115.2			92.1	57.7	
Travel Time (s)	10.4			8.3	5.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	61	24	58	92	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	61	0	0	82	92	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	97	97	97			97
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 20.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	56	22	53	85	0
Future Volume (Veh/h)	0	56	22	53	85	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	61	24	58	92	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				92		
pX, platoon unblocked						
vC, conflicting volume	198	92	92			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	198	92	92			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	94	98			
cM capacity (veh/h)	778	965	1503			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	61	82	92
Volume Left	0	24	0
Volume Right	61	0	0
cSH	965	1503	1700
Volume to Capacity	0.06	0.02	0.05
Queue Length 95th (m)	1.5	0.4	0.0
Control Delay (s)	9.0	2.3	0.0
Lane LOS	A	A	
Approach Delay (s)	9.0	2.3	0.0
Approach LOS	A		

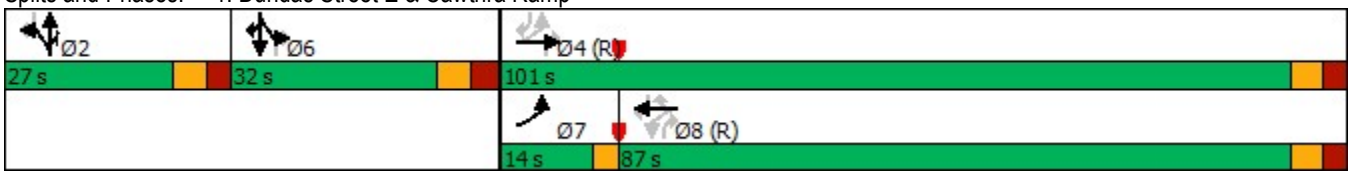
Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	20.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	197	844	22	26	1572	620	37	21	83	291	23	320
Future Volume (vph)	197	844	22	26	1572	620	37	21	83	291	23	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	120.0		45.0	0.0		0.0	0.0		65.0
Storage Lanes	1		0	1		1	0		1	1		1
Taper Length (m)	100.0			15.0			7.6			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.91	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.996				0.850			0.850			0.850
Flt Protected	0.950			0.950				0.969		0.950	0.959	
Satd. Flow (prot)	1789	3564	0	1789	5142	1601	0	1825	1601	1700	1716	1601
Flt Permitted	0.073			0.304				0.969		0.950	0.959	
Satd. Flow (perm)	137	3564	0	573	5142	1601	0	1825	1601	1700	1716	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				335						
Link Speed (k/h)		60			60			48			50	
Link Distance (m)		121.4			559.2			44.8			197.1	
Travel Time (s)		7.3			33.6			3.4			14.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	214	917	24	28	1709	674	40	23	90	316	25	348
Shared Lane Traffic (%)										46%		
Lane Group Flow (vph)	214	941	0	28	1709	674	0	63	90	171	170	348
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	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	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	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	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	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	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	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	pm+pt	NA		Perm	NA	Perm	Split	NA	custom	Split	NA	custom
Protected Phases	7	4			8		2	2	2	6	6	6
Permitted Phases	4			8		8			4 6 8			4 2 8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	8.0	36.0		36.0	36.0	36.0	15.0	15.0	15.0	15.5	15.5	15.5
Total Split (s)	14.0	101.0		87.0	87.0	87.0	27.0	27.0	27.0	32.0	32.0	32.0
Total Split (%)	8.8%	63.1%		54.4%	54.4%	54.4%	16.9%	16.9%	16.9%	20.0%	20.0%	20.0%
Maximum Green (s)	11.0	94.0		80.0	80.0	80.0	20.0	20.0	20.0	24.5	24.5	24.5
Yellow Time (s)	3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0		7.0	7.0	7.0		7.0	7.0	7.5	7.5	7.5
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Min		C-Min	C-Min	C-Min	None	None	None	None	None	None
Walk Time (s)		10.0		10.0	10.0	10.0				0.0	0.0	0.0
Flash Dont Walk (s)		19.0		19.0	19.0	19.0				22.5	22.5	22.5
Pedestrian Calls (#/hr)		0		0	0	0				0	0	0
Act Effct Green (s)	108.8	104.8		82.6	82.6	82.6		11.1	160.0	22.5	22.5	160.0
Actuated g/C Ratio	0.68	0.66		0.52	0.52	0.52		0.07	1.00	0.14	0.14	1.00
v/c Ratio	0.74	0.40		0.09	0.64	0.68		0.50	0.06	0.72	0.71	0.22
Control Delay	46.3	14.4		23.2	29.6	17.8		84.5	0.1	81.5	80.6	0.3
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	46.3	14.4		23.2	29.6	17.8		84.5	0.1	81.5	80.6	0.3
LOS	D	B		C	C	B		F	A	F	F	A
Approach Delay		20.3			26.3			34.8			40.3	
Approach LOS		C			C			C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 16 (10%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 27.2		Intersection LOS: C	
Intersection Capacity Utilization 74.8%		ICU Level of Service D	
Analysis Period (min) 15			

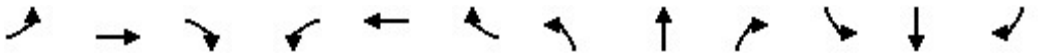
Splits and Phases: 1: Dundas Street E & Cawthra Ramp



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	214	941	28	1709	674	63	90	171	170	348
v/c Ratio	0.74	0.40	0.09	0.64	0.68	0.50	0.06	0.72	0.71	0.22
Control Delay	46.3	14.4	23.2	29.6	17.8	84.5	0.1	81.5	80.6	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.3	14.4	23.2	29.6	17.8	84.5	0.1	81.5	80.6	0.3
Queue Length 50th (m)	39.4	70.1	4.4	104.7	55.9	19.7	0.0	55.3	54.8	0.0
Queue Length 95th (m)	#105.0	100.6	m6.6	127.2	91.4	35.4	0.0	79.5	79.0	0.0
Internal Link Dist (m)		97.4		535.2		20.8			173.1	
Turn Bay Length (m)	75.0		120.0		45.0					65.0
Base Capacity (vph)	291	2336	295	2655	989	228	1597	276	278	1584
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.40	0.09	0.64	0.68	0.28	0.06	0.62	0.61	0.22

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

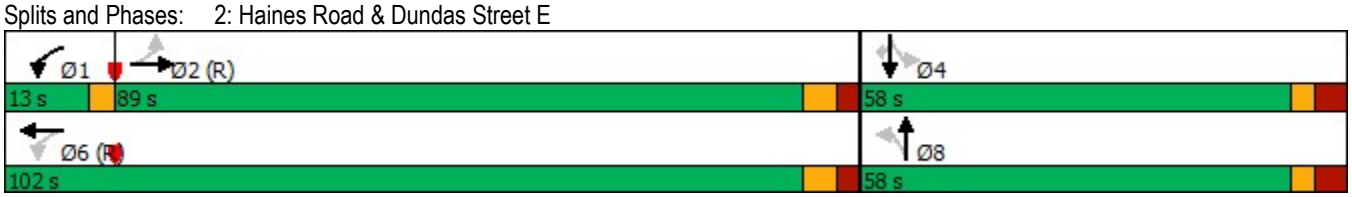


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	1036	110	213	2124	34	172	4	242	62	15	65
Future Volume (vph)	38	1036	110	213	2124	34	172	4	242	62	15	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	20.0		0.0	75.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	35.0			20.0			50.0			25.0		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.986			0.998			0.852				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	5070	0	1789	5132	0	1789	1605	0	1789	1883	1601
Flt Permitted	0.056			0.181			0.747			0.255		
Satd. Flow (perm)	105	5070	0	341	5132	0	1407	1605	0	480	1883	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			2			170				48
Link Speed (k/h)		60			60			50			40	
Link Distance (m)		559.2			412.2			198.5			92.1	
Travel Time (s)		33.6			24.7			14.3			8.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	1126	120	232	2309	37	187	4	263	67	16	71
Shared Lane Traffic (%)												
Lane Group Flow (vph)	41	1246	0	232	2346	0	187	267	0	67	16	71
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)		1.6			1.6			1.6			1.6	
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	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	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		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		1	6		8	8		4	4	4
Switch Phase												
Minimum Initial (s)	8.0	8.0		5.0	8.0		8.0	8.0		8.0	8.0	8.0
Minimum Split (s)	44.0	44.0		10.0	44.0		53.0	53.0		53.0	53.0	53.0
Total Split (s)	89.0	89.0		13.0	102.0		58.0	58.0		58.0	58.0	58.0
Total Split (%)	55.6%	55.6%		8.1%	63.8%		36.3%	36.3%		36.3%	36.3%	36.3%
Maximum Green (s)	82.0	82.0		10.0	95.0		51.0	51.0		51.0	51.0	51.0
Yellow Time (s)	4.0	4.0		3.0	4.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	3.0	3.0		0.0	3.0		4.0	4.0		4.0	4.0	4.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		-1.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		3.0	7.0		7.0	7.0		6.0	7.0	7.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max		None	C-Max		None	None		None	None	None
Walk Time (s)	10.0	10.0			10.0		10.0	10.0		10.0	10.0	10.0
Flash Dont Walk (s)	27.0	27.0			27.0		36.0	36.0		36.0	36.0	36.0
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	0
Act Effct Green (s)	102.8	102.8		122.8	118.8		27.2	27.2		28.2	27.2	27.2
Actuated g/C Ratio	0.64	0.64		0.77	0.74		0.17	0.17		0.18	0.17	0.17
v/c Ratio	0.61	0.38		0.61	0.62		0.78	0.64		0.80	0.05	0.23
Control Delay	52.6	8.9		29.2	6.5		84.6	28.3		115.5	51.7	22.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	52.6	8.9		29.2	6.5		84.6	28.3		115.5	51.7	22.5
LOS	D	A		C	A		F	C		F	D	C
Approach Delay		10.3			8.5			51.5			66.0	
Approach LOS		B			A			D			E	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 15.4		Intersection LOS: B	
Intersection Capacity Utilization 92.8%		ICU Level of Service F	
Analysis Period (min) 15			

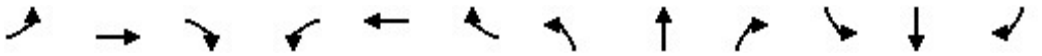
Splits and Phases: 2: Haines Road & Dundas Street E



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	41	1246	232	2346	187	267	67	16	71
v/c Ratio	0.61	0.38	0.61	0.62	0.78	0.64	0.80	0.05	0.23
Control Delay	52.6	8.9	29.2	6.5	84.6	28.3	115.5	51.7	22.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.6	8.9	29.2	6.5	84.6	28.3	115.5	51.7	22.5
Queue Length 50th (m)	3.2	35.0	25.8	32.6	57.9	28.7	20.7	4.3	6.3
Queue Length 95th (m)	m#33.2	39.6	m45.0	62.0	80.5	56.2	#40.0	10.6	19.4
Internal Link Dist (m)		535.2		388.2		174.5		68.1	
Turn Bay Length (m)	30.0		20.0		75.0		25.0		25.0
Base Capacity (vph)	67	3263	380	3810	448	627	156	600	543
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.38	0.61	0.62	0.42	0.43	0.43	0.03	0.13

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

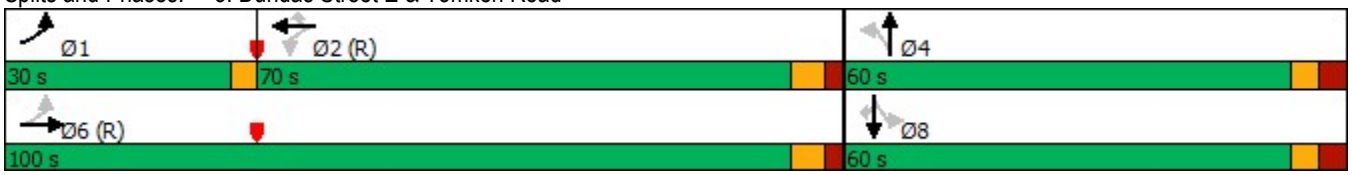


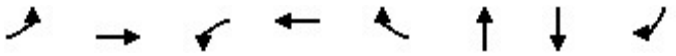
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	288	1149	45	35	1688	377	38	22	56	314	28	269
Future Volume (vph)	288	1149	45	35	1688	377	38	22	56	314	28	269
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	20.0		30.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		1	0		0	0		1
Taper Length (m)	35.0			40.0			2.5			2.5		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994				0.850		0.935				0.850
Flt Protected	0.950			0.950				0.984			0.956	
Satd. Flow (prot)	1789	5111	0	1789	5142	1601	0	1733	0	0	1801	1601
Flt Permitted	0.057			0.201				0.586			0.642	
Satd. Flow (perm)	107	5111	0	379	5142	1601	0	1032	0	0	1209	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				113		32				291
Link Speed (k/h)		60			60			48			50	
Link Distance (m)		412.2			702.4			80.2			421.2	
Travel Time (s)		24.7			42.1			6.0			30.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	313	1249	49	38	1835	410	41	24	61	341	30	292
Shared Lane Traffic (%)												
Lane Group Flow (vph)	313	1298	0	38	1835	410	0	126	0	0	371	292
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			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
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	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		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	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		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	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		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	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	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	1	6			2			4			8	
Permitted Phases	6			2		2	4			8		8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	1	6		2	2	2	4	4		8	8	8
Switch Phase												
Minimum Initial (s)	5.0	8.0		8.0	8.0	8.0	8.0	8.0		8.0	8.0	8.0
Minimum Split (s)	9.5	30.5		30.5	30.5	30.5	43.0	43.0		43.0	43.0	43.0
Total Split (s)	30.0	100.0		70.0	70.0	70.0	60.0	60.0		60.0	60.0	60.0
Total Split (%)	18.8%	62.5%		43.8%	43.8%	43.8%	37.5%	37.5%		37.5%	37.5%	37.5%
Maximum Green (s)	27.0	93.5		63.5	63.5	63.5	53.0	53.0		53.0	53.0	53.0
Yellow Time (s)	3.0	4.0		4.0	4.0	4.0	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	0.0	2.5		2.5	2.5	2.5	3.5	3.5		3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Lost Time (s)	3.0	6.5		6.5	6.5	6.5		7.0			7.0	7.0
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		C-Max	C-Max	C-Max	None	None		None	None	None
Walk Time (s)		10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	10.0
Flash Dont Walk (s)		14.0		14.0	14.0	14.0	26.0	26.0		26.0	26.0	26.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0		0	0	0
Act Effct Green (s)	98.9	95.4		66.9	66.9	66.9		51.1			51.1	51.1
Actuated g/C Ratio	0.62	0.60		0.42	0.42	0.42		0.32			0.32	0.32
v/c Ratio	0.94	0.43		0.24	0.85	0.56		0.36			0.96	0.41
Control Delay	99.3	18.0		37.6	47.7	29.1		33.4			89.9	5.7
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Delay	99.3	18.0		37.6	47.7	29.1		33.4			89.9	5.7
LOS	F	B		D	D	C		C			F	A
Approach Delay		33.8			44.2			33.4			52.8	
Approach LOS		C			D			C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 0 (0%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.96			
Intersection Signal Delay: 41.6		Intersection LOS: D	
Intersection Capacity Utilization 88.7%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 3: Dundas Street E & Tomken Road





Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	313	1298	38	1835	410	126	371	292
v/c Ratio	0.94	0.43	0.24	0.85	0.56	0.36	0.96	0.41
Control Delay	99.3	18.0	37.6	47.7	29.1	33.4	89.9	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	99.3	18.0	37.6	47.7	29.1	33.4	89.9	5.7
Queue Length 50th (m)	89.4	62.9	8.1	199.7	74.3	22.4	114.2	0.2
Queue Length 95th (m)	#140.2	94.2	18.5	220.1	109.6	41.7	#177.1	20.9
Internal Link Dist (m)		388.2		678.4		56.2	397.2	
Turn Bay Length (m)	15.0		20.0		30.0			
Base Capacity (vph)	349	3050	158	2148	734	363	400	724
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.43	0.24	0.85	0.56	0.35	0.93	0.40

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

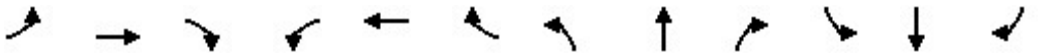
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	56	22	53	85	0
Future Volume (vph)	0	56	22	53	85	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected				0.986		
Satd. Flow (prot)	1629	0	0	1857	1883	0
Flt Permitted				0.986		
Satd. Flow (perm)	1629	0	0	1857	1883	0
Link Speed (k/h)	40			40	40	
Link Distance (m)	115.2			92.1	57.7	
Travel Time (s)	10.4			8.3	5.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	61	24	58	92	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	61	0	0	82	92	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	97	97	97			97
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 20.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	56	22	53	85	0
Future Volume (Veh/h)	0	56	22	53	85	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	61	24	58	92	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				92		
pX, platoon unblocked						
vC, conflicting volume	198	92	92			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	198	92	92			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	94	98			
cM capacity (veh/h)	778	965	1503			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	61	82	92
Volume Left	0	24	0
Volume Right	61	0	0
cSH	965	1503	1700
Volume to Capacity	0.06	0.02	0.05
Queue Length 95th (m)	1.5	0.4	0.0
Control Delay (s)	9.0	2.3	0.0
Lane LOS	A	A	
Approach Delay (s)	9.0	2.3	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	20.8%	ICU Level of Service	A
Analysis Period (min)	15		

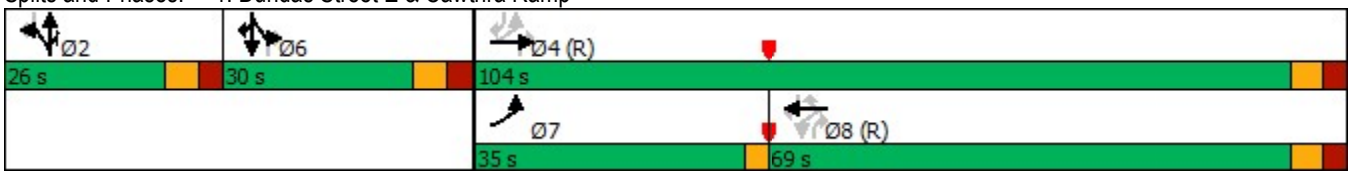


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	193	1352	19	12	664	306	14	14	17	458	35	185
Future Volume (vph)	193	1352	19	12	664	306	14	14	17	458	35	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	120.0		45.0	0.0		0.0	0.0		65.0
Storage Lanes	1		0	1		1	0		1	1		1
Taper Length (m)	100.0			15.0			7.6			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.91	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.998				0.850			0.850			0.850
Flt Protected	0.950			0.950				0.976		0.950	0.959	
Satd. Flow (prot)	1789	3571	0	1789	5142	1601	0	1838	1601	1700	1716	1601
Flt Permitted	0.318			0.113				0.976		0.950	0.959	
Satd. Flow (perm)	599	3571	0	213	5142	1601	0	1838	1601	1700	1716	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				321						
Link Speed (k/h)		60			60			48			50	
Link Distance (m)		121.4			559.2			44.8			197.1	
Travel Time (s)		7.3			33.6			3.4			14.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	210	1470	21	13	722	333	15	15	18	498	38	201
Shared Lane Traffic (%)										46%		
Lane Group Flow (vph)	210	1491	0	13	722	333	0	30	18	269	267	201
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	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	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	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	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	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	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	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	pm+pt	NA		Perm	NA	Perm	Split	NA	custom	Split	NA	custom
Protected Phases	7	4			8		2	2	2	6	6	6
Permitted Phases	4			8		8			4 6 8			4 2 8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	8.0	36.0		36.0	36.0	36.0	15.0	15.0	15.0	15.5	15.5	15.5
Total Split (s)	35.0	104.0		69.0	69.0	69.0	26.0	26.0	26.0	30.0	30.0	30.0
Total Split (%)	21.9%	65.0%		43.1%	43.1%	43.1%	16.3%	16.3%	16.3%	18.8%	18.8%	18.8%
Maximum Green (s)	32.0	97.0		62.0	62.0	62.0	19.0	19.0	19.0	22.5	22.5	22.5
Yellow Time (s)	3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0		7.0	7.0	7.0		7.0	7.0	7.5	7.5	7.5
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Min		C-Min	C-Min	C-Min	None	None	None	None	None	None
Walk Time (s)		10.0		10.0	10.0	10.0				0.0	0.0	0.0
Flash Dont Walk (s)		19.0		19.0	19.0	19.0				22.5	22.5	22.5
Pedestrian Calls (#/hr)		0		0	0	0				0	0	0
Act Effct Green (s)	99.1	95.1		78.4	78.4	78.4		8.8	160.0	37.6	37.6	160.0
Actuated g/C Ratio	0.62	0.59		0.49	0.49	0.49		0.06	1.00	0.24	0.24	1.00
v/c Ratio	0.44	0.70		0.12	0.29	0.35		0.30	0.01	0.68	0.66	0.13
Control Delay	16.7	25.2		22.9	20.2	1.6		80.0	0.0	65.6	65.0	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	16.7	25.2		22.9	20.2	1.6		80.0	0.0	65.6	65.0	0.2
LOS	B	C		C	C	A		F	A	E	E	A
Approach Delay		24.2			14.5			50.0			47.5	
Approach LOS		C			B			D			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 16 (10%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 26.4		Intersection LOS: C	
Intersection Capacity Utilization 82.8%		ICU Level of Service E	
Analysis Period (min) 15			

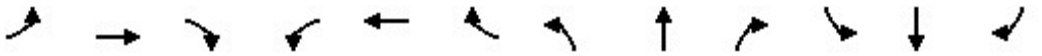
Splits and Phases: 1: Dundas Street E & Cawthra Ramp



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	210	1491	13	722	333	30	18	269	267	201
v/c Ratio	0.44	0.70	0.12	0.29	0.35	0.30	0.01	0.68	0.66	0.13
Control Delay	16.7	25.2	22.9	20.2	1.6	80.0	0.0	65.6	65.0	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.7	25.2	22.9	20.2	1.6	80.0	0.0	65.6	65.0	0.2
Queue Length 50th (m)	28.8	173.8	1.8	37.3	0.5	9.4	0.0	82.6	81.6	0.0
Queue Length 95th (m)	39.8	190.1	5.3	43.4	5.8	20.7	0.0	#130.1	#128.3	0.0
Internal Link Dist (m)		97.4		535.2		20.8			173.1	
Turn Bay Length (m)	75.0		120.0		45.0					65.0
Base Capacity (vph)	609	2196	104	2518	947	218	1601	398	403	1601
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.68	0.13	0.29	0.35	0.14	0.01	0.68	0.66	0.13

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

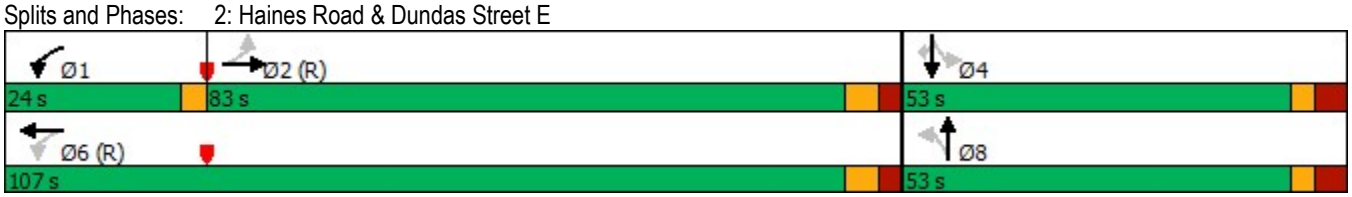


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	109	1820	159	201	746	77	63	15	141	99	32	102
Future Volume (vph)	109	1820	159	201	746	77	63	15	141	99	32	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	20.0		0.0	75.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	35.0			20.0			50.0			25.0		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.988			0.986			0.864				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	5080	0	1789	5070	0	1789	1627	0	1789	1883	1601
Flt Permitted	0.306			0.049			0.734			0.434		
Satd. Flow (perm)	576	5080	0	92	5070	0	1382	1627	0	817	1883	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			21			153				111
Link Speed (k/h)		60			60			50			40	
Link Distance (m)		559.2			412.2			198.5			92.1	
Travel Time (s)		33.6			24.7			14.3			8.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	118	1978	173	218	811	84	68	16	153	108	35	111
Shared Lane Traffic (%)												
Lane Group Flow (vph)	118	2151	0	218	895	0	68	169	0	108	35	111
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)		1.6			1.6			1.6			1.6	
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	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	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		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		1	6		8	8		4	4	4
Switch Phase												
Minimum Initial (s)	8.0	8.0		5.0	8.0		8.0	8.0		8.0	8.0	8.0
Minimum Split (s)	44.0	44.0		10.0	44.0		53.0	53.0		53.0	53.0	53.0
Total Split (s)	83.0	83.0		24.0	107.0		53.0	53.0		53.0	53.0	53.0
Total Split (%)	51.9%	51.9%		15.0%	66.9%		33.1%	33.1%		33.1%	33.1%	33.1%
Maximum Green (s)	76.0	76.0		21.0	100.0		46.0	46.0		46.0	46.0	46.0
Yellow Time (s)	4.0	4.0		3.0	4.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	3.0	3.0		0.0	3.0		4.0	4.0		4.0	4.0	4.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		-1.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		3.0	7.0		7.0	7.0		6.0	7.0	7.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max		None	C-Max		None	None		None	None	None
Walk Time (s)	10.0	10.0			10.0		10.0	10.0		10.0	10.0	10.0
Flash Dont Walk (s)	27.0	27.0			27.0		36.0	36.0		36.0	36.0	36.0
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	0
Act Effct Green (s)	102.3	102.3		128.8	124.8		21.2	21.2		22.2	21.2	21.2
Actuated g/C Ratio	0.64	0.64		0.80	0.78		0.13	0.13		0.14	0.13	0.13
v/c Ratio	0.32	0.66		0.78	0.23		0.37	0.49		0.96	0.14	0.36
Control Delay	12.1	12.6		83.7	1.8		67.0	15.6		141.4	59.3	12.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	12.1	12.6		83.7	1.8		67.0	15.6		141.4	59.3	12.3
LOS	B	B		F	A		E	B		F	E	B
Approach Delay		12.6			17.8			30.4			73.7	
Approach LOS		B			B			C			E	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.96			
Intersection Signal Delay: 19.2		Intersection LOS: B	
Intersection Capacity Utilization 86.0%		ICU Level of Service E	
Analysis Period (min) 15			

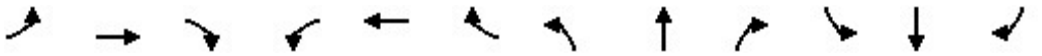
Splits and Phases: 2: Haines Road & Dundas Street E



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	118	2151	218	895	68	169	108	35	111
v/c Ratio	0.32	0.66	0.78	0.23	0.37	0.49	0.96	0.14	0.36
Control Delay	12.1	12.6	83.7	1.8	67.0	15.6	141.4	59.3	12.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.1	12.6	83.7	1.8	67.0	15.6	141.4	59.3	12.3
Queue Length 50th (m)	11.6	79.8	45.8	7.3	20.1	4.5	34.6	10.0	0.0
Queue Length 95th (m)	m24.9	133.5	81.5	12.6	34.0	25.4	#59.2	19.8	17.1
Internal Link Dist (m)		535.2		388.2		174.5		68.1	
Turn Bay Length (m)	30.0		20.0		75.0		25.0		25.0
Base Capacity (vph)	368	3252	313	3960	397	576	239	541	539
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.66	0.70	0.23	0.17	0.29	0.45	0.06	0.21

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

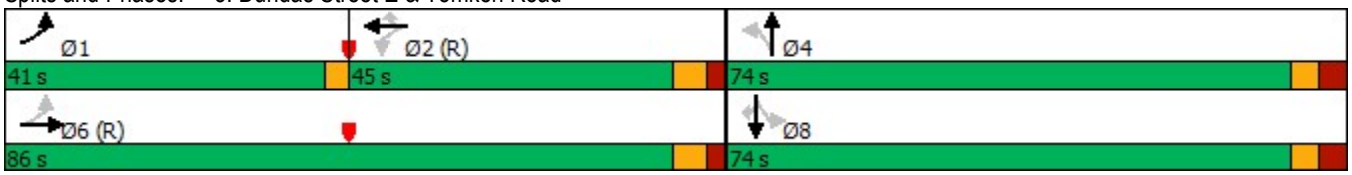


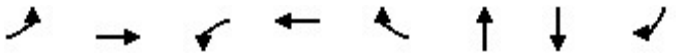
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	302	1638	8	7	648	222	4	6	17	326	11	274
Future Volume (vph)	302	1638	8	7	648	222	4	6	17	326	11	274
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0		0.0	20.0		30.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		1	0		0	0		1
Taper Length (m)	35.0			40.0			2.5			2.5		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999				0.850		0.916				0.850
Flt Protected	0.950			0.950				0.993			0.954	
Satd. Flow (prot)	1789	5137	0	1789	5142	1601	0	1713	0	0	1797	1601
Flt Permitted	0.317			0.107				0.952			0.712	
Satd. Flow (perm)	597	5137	0	202	5142	1601	0	1642	0	0	1341	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				137		8				298
Link Speed (k/h)		60			60			48			50	
Link Distance (m)		412.2			702.4			80.2			421.2	
Travel Time (s)		24.7			42.1			6.0			30.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	328	1780	9	8	704	241	4	7	18	354	12	298
Shared Lane Traffic (%)												
Lane Group Flow (vph)	328	1789	0	8	704	241	0	29	0	0	366	298
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			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
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	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		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	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		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	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		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	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	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	1	6			2			4			8	
Permitted Phases	6			2		2	4			8		8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	1	6		2	2	2	4	4		8	8	8
Switch Phase												
Minimum Initial (s)	5.0	8.0		8.0	8.0	8.0	8.0	8.0		8.0	8.0	8.0
Minimum Split (s)	9.5	30.5		30.5	30.5	30.5	43.0	43.0		43.0	43.0	43.0
Total Split (s)	41.0	86.0		45.0	45.0	45.0	74.0	74.0		74.0	74.0	74.0
Total Split (%)	25.6%	53.8%		28.1%	28.1%	28.1%	46.3%	46.3%		46.3%	46.3%	46.3%
Maximum Green (s)	38.0	79.5		38.5	38.5	38.5	67.0	67.0		67.0	67.0	67.0
Yellow Time (s)	3.0	4.0		4.0	4.0	4.0	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	0.0	2.5		2.5	2.5	2.5	3.5	3.5		3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0			-2.0	0.0
Total Lost Time (s)	3.0	6.5		6.5	6.5	6.5		7.0			5.0	7.0
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		C-Max	C-Max	C-Max	None	None		None	None	None
Walk Time (s)		10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	10.0
Flash Dont Walk (s)		14.0		14.0	14.0	14.0	26.0	26.0		26.0	26.0	26.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0		0	0	0
Act Effct Green (s)	98.7	95.2		71.9	71.9	71.9		51.3			53.3	51.3
Actuated g/C Ratio	0.62	0.60		0.45	0.45	0.45		0.32			0.33	0.32
v/c Ratio	0.63	0.59		0.09	0.30	0.30		0.05			0.82	0.42
Control Delay	31.8	26.5		39.0	31.3	15.8		25.8			63.2	4.9
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Delay	31.8	26.5		39.0	31.3	15.8		25.8			63.2	4.9
LOS	C	C		D	C	B		C			E	A
Approach Delay		27.4			27.5			25.8			37.1	
Approach LOS		C			C			C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 0 (0%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 29.1		Intersection LOS: C	
Intersection Capacity Utilization 78.8%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: Dundas Street E & Tomken Road





Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	328	1789	8	704	241	29	366	298
v/c Ratio	0.63	0.59	0.09	0.30	0.30	0.05	0.82	0.42
Control Delay	31.8	26.5	39.0	31.3	15.8	25.8	63.2	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.8	26.5	39.0	31.3	15.8	25.8	63.2	4.9
Queue Length 50th (m)	49.2	101.7	1.5	51.7	19.3	4.6	106.1	0.0
Queue Length 95th (m)	107.7	170.2	7.0	79.9	50.9	10.9	130.7	18.4
Internal Link Dist (m)		388.2		678.4		56.2	397.2	
Turn Bay Length (m)	15.0		20.0		30.0			
Base Capacity (vph)	651	3055	90	2311	795	692	578	843
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.59	0.09	0.30	0.30	0.04	0.63	0.35

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	60	71	114	159	0
Future Volume (vph)	0	60	71	114	159	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected				0.981		
Satd. Flow (prot)	1629	0	0	1848	1883	0
Flt Permitted				0.981		
Satd. Flow (perm)	1629	0	0	1848	1883	0
Link Speed (k/h)	50			50	40	
Link Distance (m)	115.2			92.1	57.7	
Travel Time (s)	8.3			6.6	5.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	65	77	124	173	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	65	0	0	201	173	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	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 32.0%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	60	71	114	159	0
Future Volume (Veh/h)	0	60	71	114	159	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	65	77	124	173	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				92		
pX, platoon unblocked	0.98					
vC, conflicting volume	451	173	173			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	433	173	173			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	93	95			
cM capacity (veh/h)	539	871	1404			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	65	201	173
Volume Left	0	77	0
Volume Right	65	0	0
cSH	871	1404	1700
Volume to Capacity	0.07	0.05	0.10
Queue Length 95th (m)	1.8	1.3	0.0
Control Delay (s)	9.5	3.2	0.0
Lane LOS	A	A	
Approach Delay (s)	9.5	3.2	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	32.0%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX N

TTS Query Results – Modal Split

Mon May 16 2022 13:03:33 GMT-0400 (Eastern Daylight Time) - Run Time: 3118ms

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 3669,3674,3673,3668,3670
and
Primary travel mode of trip - mode_prime Not In O,S,9,M)

Trip 2016
Table:

,Transit excluding GO rail,Cycle,Auto driver,GO rail only,Joint GO rail and local transit,Auto passenger,Taxi passenger,Paid rideshare,Walk
3668,1620,164,9069,144,29,1852,0,52,696
3669,2915,0,13963,449,139,2980,57,39,1130
3670,1740,53,8072,101,0,1459,113,48,1843
3673,378,0,3307,38,0,698,0,0,0
3674,1172,24,9865,190,126,2103,119,0,920

GTA Zone	Transit excluding GO rail	Cycle	Auto driver	GO rail only	Joint GO rail and local transit	Auto passenger	Taxi passenger	Paid rideshare	Walk
3668	1620	164	9069	144	29	1852	0	52	696
3669	2915	0	13963	449	139	2980	57	39	1130
3670	1740	53	8072	101	0	1459	113	48	1843
3674	1172	24	9865	190	126	2103	119	0	920
Total	7447	241	40969	884	294	8394	289	139	4589
%	12%	0%	65%	1%	0%	13%	0%	0%	7%

Non-auto modal split 35%

APPENDIX O

City of Hamilton TDM Guidelines Excerpts

Final

TDM for Development

Prepared for City of Hamilton
by IBI Group

June 2015

3.A Residential

Category	TDM Initiative	Single family home development	Multiple family (low-medium density)	Multiple family (high density)
Cycling	Visible, well-lit, short-term bicycle parking for visitors (above minimum provisions or recommendations)	●	●	●
	Secure, indoor bicycle parking storage spaces for tenants/residents	-	●	●
	Ensure development connects to bicycle network	●	-	-
Walking	Safe, attractive and direct walkways for pedestrians linking building entrances with public sidewalks and with key destinations such as schools	●	●	●
	Enhanced pedestrian amenities on-site (benches, landscaping, lighting)	●	●	●
Transit	Enhance walking routes between main building entrance(s) and transit stops/stations	-	●	●
	Provide weather-protected waiting areas	○	●	●
	Bicycle parking located at or near transit stops	○	●	●
	Provision of transit information on-site and adjacent to stops/stations	●	●	●
	Implement transit priority measures (queue jump lanes, traffic signal priority, bus only lanes)	●	-	-
Parking	Provide no more than the minimum number of required spaces for residents and visitors	●	●	●
	Reduced minimum parking requirements based on proximity to transit	-	●	●
	Cash-in-lieu of parking to fund public parking or fund sustainable transportation	-	○	●
	Shared parking with nearby developments or on-street spaces	-	○	●
	Reduced minimum parking requirements based on provision of dedicated carshare vehicle parking spaces	-	●	●
	Unbundle parking costs from unit costs	-	○	●
Carshare/ Bikeshare	On-site carshare vehicle(s)	○	●	●
	On-site bikeshare facility	○	●	●
Wayfinding and Travel Planning	Travel planning resources for residents (individualized marketing, active transportation maps, community resources)	●	●	●
	Wayfinding signage to major destinations such as schools, public amenities, and commercial areas	●	○	○
Education/ Promotion, Incentives	Contribute to building a strong TDM brand	-	●	●
	Include transit and active transportation maps, annual transit passes, carshare memberships, and/or bikeshare memberships with new home/condo purchase	●	●	●

Legend: ○ Low Priority ● High Priority

3.A Residential

Why it's important/relevant?

- Reduce auto ownership levels, therefore reducing private vehicle trips and congestion.
- Create safe and attractive environments that encourage travel by walking, cycling and transit over auto.
- Support the development of healthy communities

Guidelines and Best Practices

Cycling

Focus: Encourage cycling as a mode choice for visitors and residents/tenants

- Convenient, secure location(s) for bicycle parking [1, 2 (p12)]:
  - » Near building entrance for visitors
  - » Near elevator/stairs for tenants/residents
  - » Generally on ground floor or first floor in below grade vehicle parking
  - » At established grade (avoid access with steps or steep incline)
- Consult with City staff to determine appropriate bicycle parking requirements; draft standards are available at this time. Typical number of bicycle parking spaces:
  - » Long-term range: 0.5 - 1.25 spaces/unit [3, 4 (p12)]
  - » Short-term range: 0.05 - 0.2 spaces/unit [3, 4 (p12)]
- Potential to negotiate a reduction in number of vehicle parking spaces in exchange for additional bicycle parking spaces

Walking

Focus: Encourage walking by providing safe and attractive environments for all pedestrians.

- Support pedestrian mobility through routine accommodation and design solutions [6 (p12)]
- Adopt pedestrian-friendly site design standards [1, 2 (p12)]:
  - » Well-lit sidewalks and walkways throughout building(s) (e.g. avoid dark alleys, hallways, stairwells)
  - » Direct connections to/from streets and main entrances
  - » Weather protection by main entrances and on adjacent sidewalks
- Accommodate pedestrians in residential subdivisions by providing:
  - » interconnected streets and blocks (also encourages more efficient transit service);
  - » sidewalks on both sides of the street; and,
  - » safety features at intersections and crossings (e.g. refuge islands, curb extensions) [2 (p12)].

Pedestrian-friendly environment with direct access to townhouses (credit: Dylan Passmore)

Transit

Focus: Prioritize connections and access to transit. Encourage transit as a desirable mode choice.

- Design direct and convenient connections to transit stations/stops:
  - » Well-lit walkways
  - » Weather protected waiting area (e.g. overhang, awning)
  - » Barrier free access including connecting sidewalks to bus stops
  - » Bike parking near stops

3.A Residential (continued)

- Consult with HSR to enhance nearby bus stops (e.g. provide for benches, shelters)
- Incorporate displays or kiosks into design of common areas (e.g. lobby) or near entrances to display transit information, such as schedules of nearby routes
- Allow for efficient transit service and for transit priority measures at key intersections:
  - » Interconnected network and block pattern to maximize routing (e.g. avoid cul-de-sacs and dead ends)
  - » Reserve enough curb space for current or future implementation (e.g. queue jump lanes, bus stop).

Parking

Focus: Reduce auto ownership, oversupply of parking, and private vehicle trips.

- Supply only the minimum number of required parking spaces as outlined in the zoning bylaw [7 (p12)]
  - » Reducing parking spaces should not exacerbate any current parking issues
- Explore potential to reduce parking requirements due to proximity to transit corridors with increased service levels (e.g. 0.75-1.2 spaces per unit) [13, 14 (p12)]
  - » Development Planning staff will work with development community to determine if reductions are feasible based on site context
  - » Benefits: lower automobile ownership rates; more residents and visitors take transit
- Explore opportunities to apply for cash-in-lieu of parking provisions [9]
  - » Typical range: $5,000–$7,000 per space
- Explore potential to meet parking requirements through shared parking, depending on context and proximity to developments with complimentary uses [10 (p12)]
  - » Residential land uses have lower occupancy rates during daytime weekdays, while offices have higher occupancy rates during this same time and lower occupancy rates on evening periods and the weekends).
- Carshare parking can encourage lower automobile ownership rates, and therefore parking requirements:

Dedicated carshare spaces as part of residential complex (credit: Dylan Passmore)

  - » Requires coordination with providers (see “Carshare/Bikeshare”)
  - » Typical range: 1 carshare space = 1–4 parking spaces [11]
- Unbundling the purchase of parking spaces from the rental/sale cost of residential units:
  - » Generally for buildings with multiple units (> 10 units) [12 (p12)]
  - » Benefits: more efficient use of parking, and lower auto ownership rates (resident does not feel need to own a car because of unused space)
  - » Requires parking management of excess parking spaces (sell or lease) and measures to prevent sale of multiple spaces to single buyer (avoid monopoly)

Carshare/Bikeshare

Focus: Encouraging more sustainable travel by residents/tenants and community members by providing alternatives to car ownership.

- Consult/discuss with carshare providers to provide vehicle(s) and dedicated parking stall(s) on-site
- Consult/discuss with bikeshare providers to provide a docking station and bikes on-site where appropriate
- Benefits residents as well as nearby residents and businesses (community at large) where suitable

3.A Residential (continued)

Wayfinding and Travel Planning

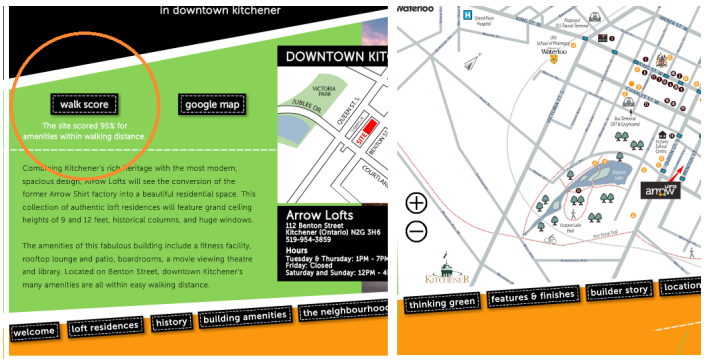
Focus: Increase awareness of sustainable transportation opportunities for residents/tenants, visitors, and community members.

- Install kiosks with information on nearby transit routes and schedules, where applicable
- Install wayfinding signage directing residents and visitors to active transportation facilities (pedestrian pathways, bike network, trails), where applicable
- Work with building owner/management company to support travel planning resources for residents/tenants
  - » Provide transit and active transportation maps to new residents as part of “welcome package”
- Support the development of an individualized marketing program for residential developments to address resident concerns about available travel options.

Education/Promotion and Incentives

Focus: Promote early adoption of sustainable transportation modes by residents/tenants.

- Brand or highlight TDM elements in sale and rental marketing materials: proximity to transit, cycling facilities, carshare/bikeshare facilities, inclusion of annual passes or memberships to transit/carsharing/bikesharing, etc.
- Purchase annual transit passes or carshare/bikeshare membership with new home/condo purchase. Benefits:
  - » Encourage sustainable mode of travel;
  - » Reduce automobile ownership and parking requirements; and,
  - » Great marketing tool for developer/builder.



Promoting WalkScore™ and rail connections for new development in Downtown Kitchener, ON (Photo credit: ArrowLofts.com)

Resources

1. City of Hamilton. 2003. Site Plan Guidelines. Site Context (s 2.2, 2.5, 2.6), Site Design (s 3.2).
2. Institute for Transportation Engineers (ITE). 2010. Promoting sustainable transportation through site design.
3. City of Richmond Zoning Bylaw 8500 (Section 7, Parking and Loading).
4. Association of Pedestrian and Bicycle Professionals (APBP). 2010. Bicycle Parking Guidelines, 2nd Ed.
5. City of Toronto. 2013. Zoning By-Law 569-2013. Parking Rates (200.5.10).
6. City of Hamilton. 2013. Pedestrian Mobility Plan.
7. City of Hamilton. 2005. Zoning By-Law 05-200. Parking Regulations (s 5.6).
8. City of Edmonton. Zoning By-Law 12800. Parking, Loading and Passenger Drop-off (s 54.2).
9. City of Hamilton Cash-in-lieu of Parking Program and Application.
10. Smith, M.S. 2005. Shared parking 2nd Ed. Washington, DC. ULI - the Urban Land Institute and the International Council of Shopping Centres.
11. IBI Group. 2009. Parking standards review: Examination of potential options and impacts of car share programs on parking standards.
12. Nelson-Nygaard. 2011. Getting more with less: Managing residential parking in urban developments with carsharing and unbundling.
13. City of Hamilton. 2012. B-Line Background Information Report.
14. City of Hamilton 2010. Transit-Oriented Development Guidelines