Ontario Line

Transit Oriented Communities

Gerrard-Carlaw South

Transportation Impact Assessment Study

Issued for Rezoning

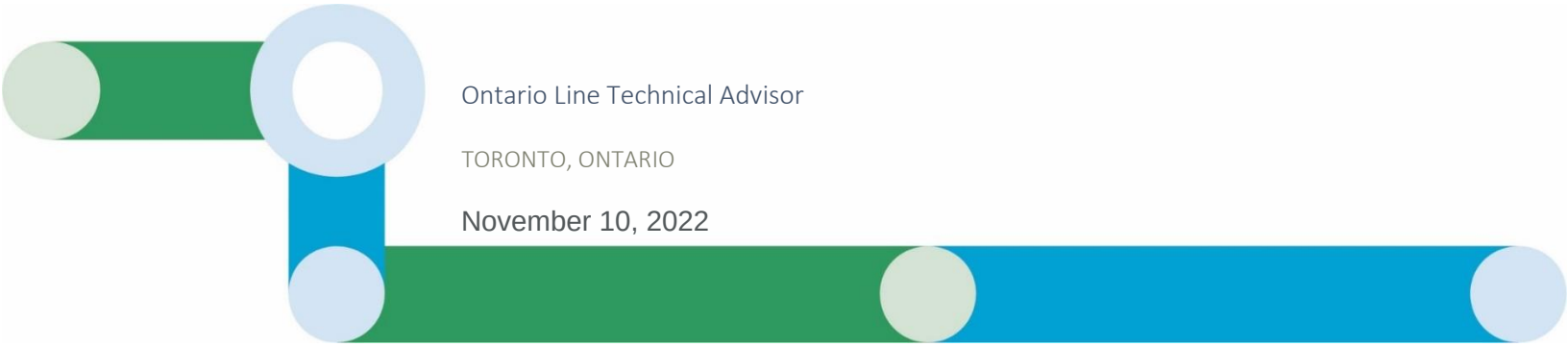
West Site: 10 Dickens Street,
Toronto, Canada

East Site: 388 Carlaw Ave,
Toronto, Canada

Contract RFS-2019-NAFC-110

PO 214244

HDR Project 10206938



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November 10, 2022

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This report was prepared using the previous version of the Site Plan (September 23rd, 2022), including the Site statistics. The revised Site Plan as part of this package has 4 dwelling units less and 20 sq. ft more retail space on the 10 Dickens and 1 dwelling unit more, 100 sq. ft more retail space and 2000 sq. ft less office space than the previous site plans (September 23rd, 2022). The report, including the analysis and recommendations, has not been updated because the changes to the Gerrard Rezoning Resubmission Package since this report are minimal and will not materially affect the outcomes and recommendations provided in this report.

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1 Introduction

HDR Corporation was retained by Metrolinx to undertake a Transportation Impact Study and Parking Assessment for a proposed mixed-use development to be located south of the future Ontario Line Gerrard Station site.

The subject properties currently contain retail / commercial buildings and a parking lot. The proposed redevelopment consists of two separate sites:

- **West Site**: 10 Dickens Street
  - Consisting of 744 residential units, 417 m^2 of retail space, and south of the Joint Rail Corridor.
- **East Site**: 388 Carlaw Ave
  - Consisting of 569 residential units, 5,806 m^2 of office, and 7,205 m^2 of General Commerce.

The location of the proposed development is shown in **Figure 1**.

The traffic impact study report includes documentation of the following components:

- Existing Conditions
- Background Traffic Conditions
- Proposed TOC Trip Generation
- Future Total Traffic Conditions with the TOC
- Parking Assessment
- Loading Assessment
- Transportation Demand Management
- Preliminary Findings and Next Steps

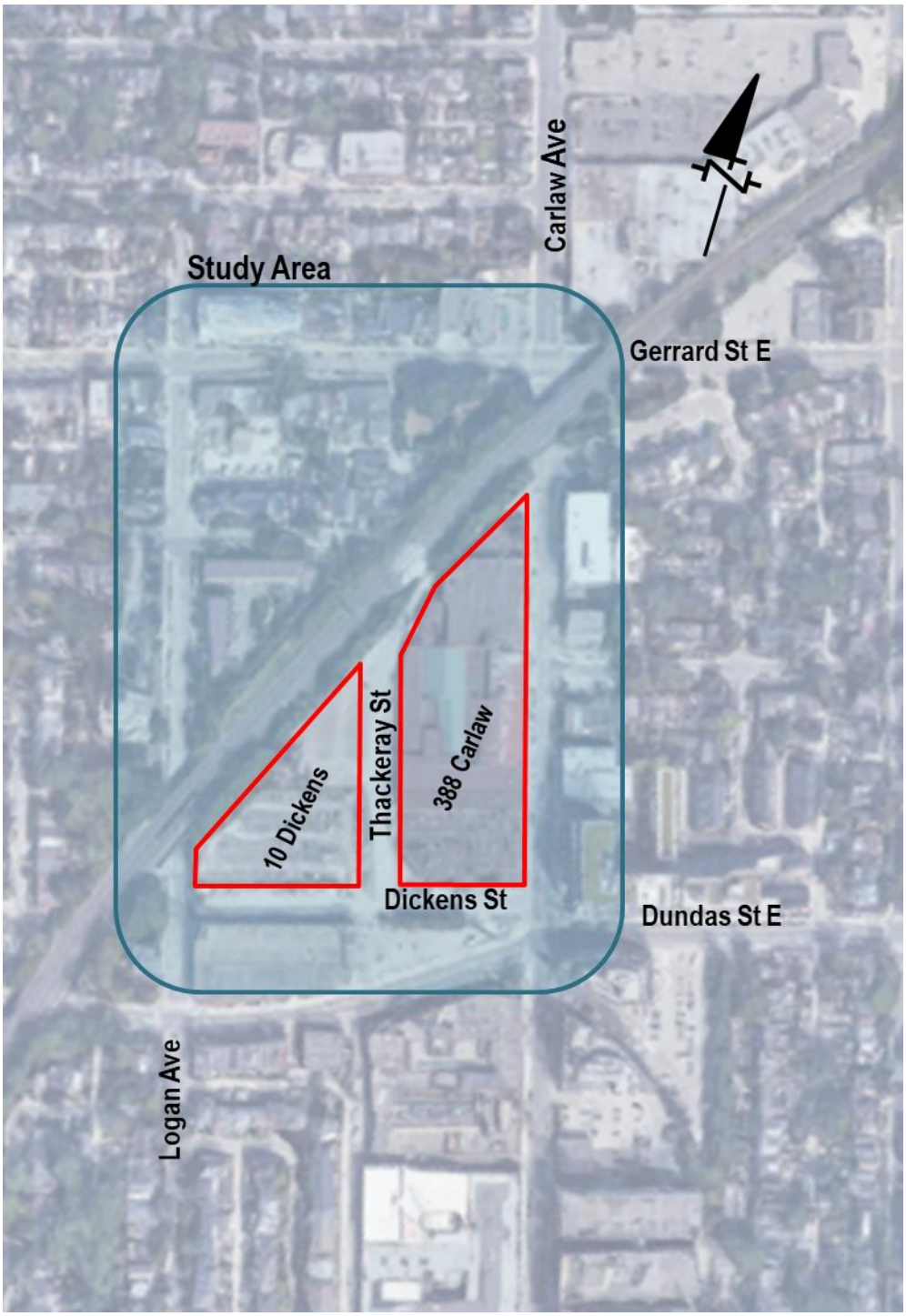


Figure 1: Study Area and Site Context

1.1 Scope of Work

The scope of work has been prepared in accordance with the **City of Toronto Guidelines for the Preparation of Transportation Impact Studies** (2003), and is as follows:

Study Area	• The block bounded by Gerrard St E, Dundas St E, Logan Ave and Carlaw Ave
Analysis Scenarios	• Existing 2020 Traffic Conditions • Future 2032 Background Traffic Conditions (8-year horizon) *Includes 0.5% annual general background traffic growth, the future Gerrard Station plus other new development traffic in the vicinity of the site* • Future 2032 Total Traffic Conditions (8-year horizon) *Includes future background traffic volumes plus traffic resulting from the proposed development, minus traffic from the existing site land uses.*
Analysis Time Periods	The following time periods were analyzed as they represent peak trip generation times for residential developments: • Weekday AM peak hour between 7:00am and 9:00am • Weekday PM peak hour between 3:00pm and 6:00pm
Study Area Intersections for Analysis	The following intersections were analyzed for capacity, level of service, and delays: 1) Gerrard St E & Logan Ave 2) Gerrard St & Carlaw Ave 3) Dundas St E & Logan Ave 4) Dundas St E & Carlaw Ave 5) Site Access (Thackeray St Extension & Carlaw Ave)
Parking and Loading Study	A parking and loading assessment was undertaken for the proposed development using the City of Toronto Zoning By-law 569-2013 and 89-2022 as the basis of the assessment. A Transportation Demand Management (TDM) Plan has been developed to further support the proposed parking supply and to ensure a wholesome approach to transportation management that addresses the needs of all modes and achieves planning goals of encouraging multi-modal decision making through the provision of alternative and sustainable modes of travel, and reduce single-occupant vehicle use.

1.2 Intersection Operations and Analysis Methodology

Intersection operations were assessed for the study area intersections and future site driveways using the software program Synchro Traffic Signal Coordination Software Version 9, which employs methodology from the **Highway Capacity Manual** (HCM 2000) published by the Transportation Research Board National Research Council. Synchro can analyze both signalized and unsignalized intersections in a road corridor or network, considering the spacing, interaction, queues, and operations between intersections.

The signalized and unsignalized intersection analysis considers three separate measures of performance:

- The capacity of all intersection movements, represented by the volume to capacity (v/c) ratio.
- the level of service (LOS) for all intersection turning movements as well as for the overall intersection. The overall intersection LOS is based on the average control delay per vehicle (weighted) for the various movements through the intersection; and
- the forecasted queue lengths (95th percentile queue length) and storage requirements.

LOS is an indicator of how long a vehicle must wait to complete a movement and is represented by a letter between 'A' and 'F', with 'F' being the longest delay. The volume to capacity (v/c) ratio is a measure of the degree of capacity utilized at an intersection. HCM definitions are summarized in **Table 1**.

Table 1: Highway Capacity Manual Level of Service Definitions

Level of Service (LOS)	Signalized Control Delay per Vehicle (s)	Unsignalized Control Delay per Vehicle (s)	Description
A	≤ 10	≤ 10	Ideal
B	> 10 and ≤ 20	> 10 and ≤ 15	Acceptable
C	> 20 and ≤ 35	> 15 and ≤ 25	Acceptable
D	> 35 and ≤ 55	> 25 and ≤ 35	Somewhat undesirable
E	> 55 and ≤ 80	> 35 and ≤ 50	Undesirable
F	> 80	> 50	Unacceptable

The analysis undertaken in this study also follows the City of Toronto Guidelines for Using Synchro 11 (Including SimTraffic 11[1]) (March 18th, 2016), City of Toronto 'Guidelines for the Preparation of Transportation Impact Studies[2]' (July 2003), and City of Toronto 'Traffic Signal Operations Policies and Strategies' (May 2015)[3].

[1] https://www.toronto.ca/wp-content/uploads/2021/01/964c-TSSignal-OptimizationSynchro-11-Guidelines.pdf
[2] http://arris.ca/~arris2/ARCHIVE/traffic-impact-study-guidelines.pdf
[3] https://www.toronto.ca/wp-content/uploads/2017/11/91d6-0_2015-11-13_Traffic-Signal-Operations-Policies-and-Strategies_Final-a.pdf

2 Existing Conditions

2.1 Site Context

As shown in **Figure 1**, the study sites are bounded by Gerrard Street East to the North, Logan Avenue to the West, Carlaw Avenue to the East, and Dundas Street East to the south, with Dickens Street running east-west between the two sites and Thackery St running north-south adjacent to the sites. The north edge of the development will accommodate the Joint Rail Corridor.

The site is situated in an area with good surface transit service on Gerrard St E. The closest existing subway station is College Station, approximately 3.5 kilometers to the west, and the future Gerrard Station will be located on the northeast corner of the site. The sites are currently occupied by an auto center, and various fitness and art studios. Vehicular access is currently provided to the sites via Carlaw Ave onto Dickens St.

2.2 Existing Road Network

The existing road network is shown in **Figure 2,** including existing traffic controls and lane configurations. All study roadways are under the jurisdiction of the City of Toronto.

The sites are well-served by the surrounding road network with direct access to all bounding streets. The existing road network is described below:

Gerrard Street E	Gerrard Street is a two-way east-west minor arterial road with a speed limit of 40 km/h. It has a four-lane cross section, with sidewalks on both sides of the street. Within the study area, Gerrard Street also comprises of streetcar transit facility that shares the right-of-way (ROW) with vehicular traffic.
Dundas Street E	Dundas Street E is a two-way east west minor arterial road with a posted speed limit of 40 km/h. It has a two-lane cross-section with sidewalks and dedicated bike lanes on both sides of the street in this study area.
Logan Ave	Logan Avenue is a two-way north-south collector road with a speed limit of 40 km/h. It has a two-lane cross section, with sidewalks and dedicated bike lanes on both sides of the street in the study area.
Carlaw Avenue	Carlaw Avenue is a two-way north-south minor arterial road with a speed limit of 40 km/h. It has a four-lane cross section, with sidewalks on both sides of the street.

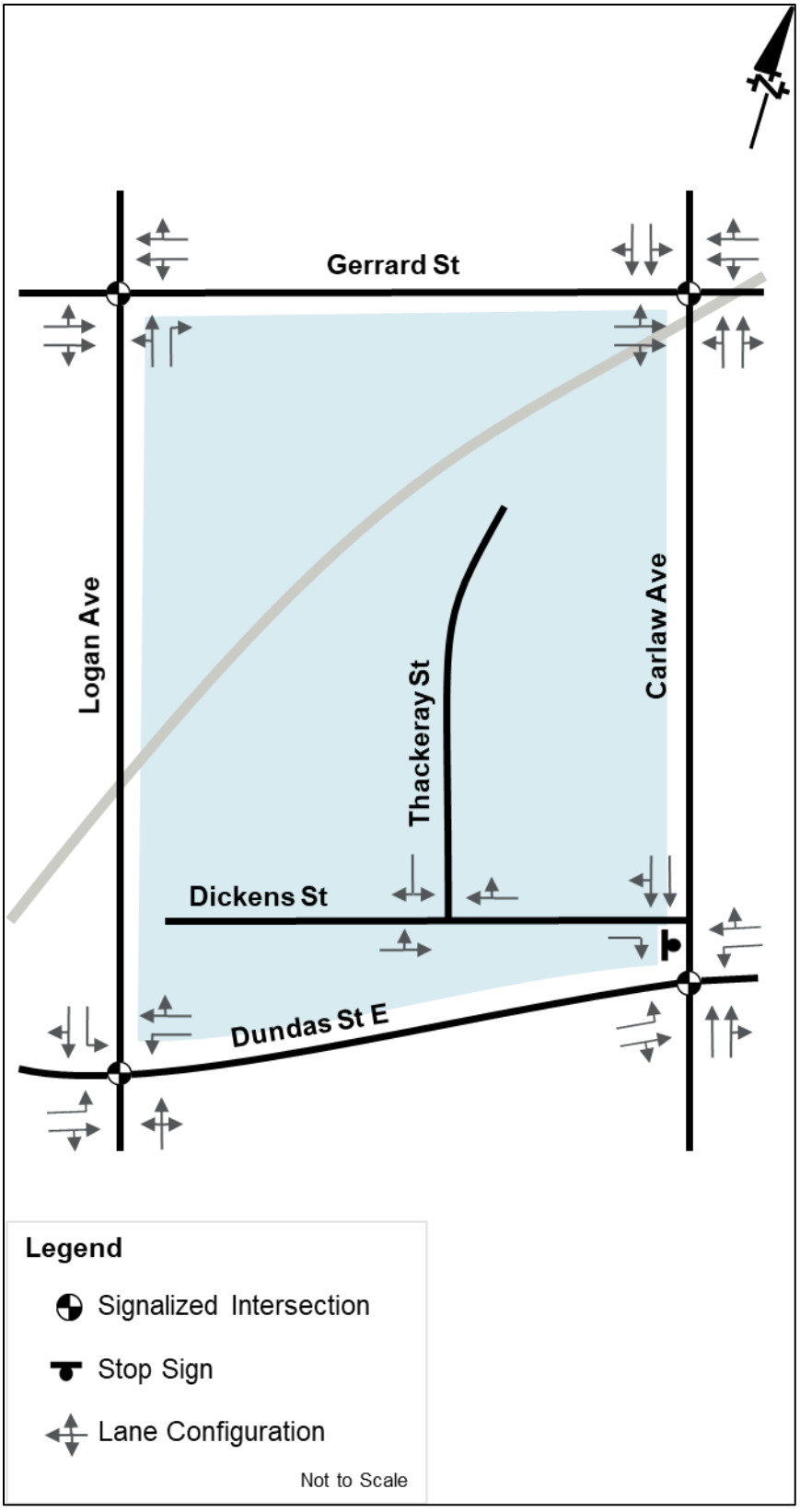


Figure 2: Existing Lane Configuration and Traffic Control

2.3 Existing Transit Services

The TTC operates streetcar and bus services along Gerrard St E. The surface transit routes provide connections to downtown and are summarized in **Table 2**, and an excerpt from the TTC system map[4] is also shown in **Figure 3**. Route 506 operates along Gerrard St E and provides access to subway Line 1 through College station.

Table 2: Transit Service Summary

Route #	Route Name	Route Description
506	Carlton St to High Park	North-south route between Castle Frank Station and The Esplanade
306	Carlton St to High Park	Operates between Exhibition Place, Fort York, and the Distillery neighborhoods
72A	Pape to Eastern	North-south route between Pape Ave to Eastern Ave
72B	Pape to Union Station	Operates between Pape Station to Union St via Commissioners and Queens Quay
72C	Pape to Commissioners	Operates between Pape station to Commissioners Street to the east

[4] TTC System Map for August 2022, https://ttc-cdn.azureedge.net/-/media/Project/TTC/DevProto/Images/Home/Routes-and-Schedules/Landing-page-pdfs/TTC_SystemMap_2021-11.pdf?rev=aea09f163c9c4fac8e484af54a1c202b

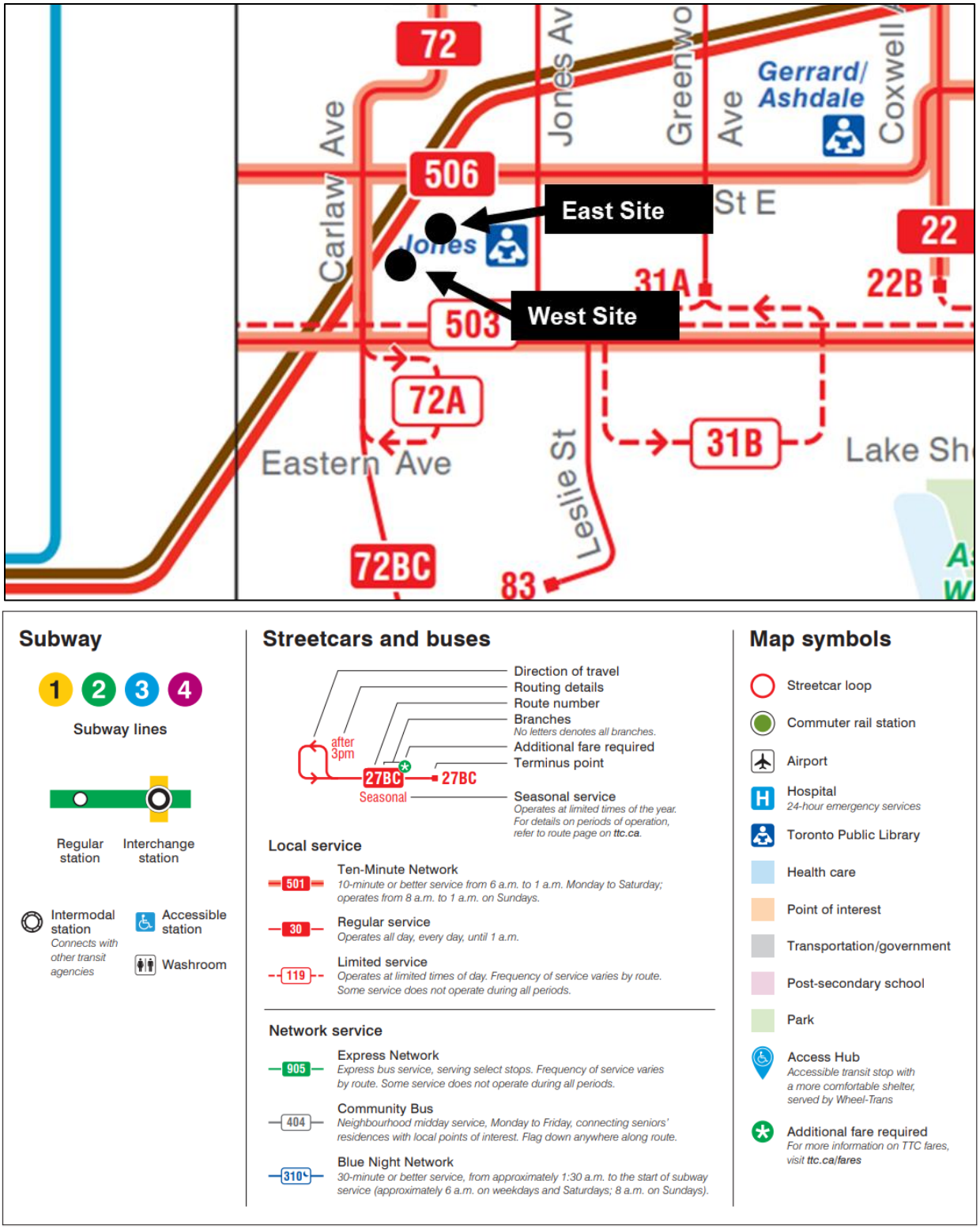


Figure 3: Existing Transit Service

2.4 Existing Cycling and Pedestrian Facilities

Pedestrian connectivity within the study area is good in terms of sidewalks, paths, and pedestrian crossings. All major streets (have sidewalks on both sides. Ladder crosswalks are typically located on all legs of the signalized intersections within the study area.

There are dedicated bike lanes in both directions on Logan Ave and Dundas St, with a protected bike lane on west bound Dundas St. The existing active transportation network is depicted in **Figure 5**. Generally, the sidewalks in the study area are 1.8m wide or wider, but due to objects such as power poles, traffic signals, waste bins and street trees, the clear pedestrian zone may be narrower in many locations, as illustrated in **Figure 4**.

The highest pedestrian activity area is generally at the intersection of Gerrard St E/Carlaw Ave Due to streetcar and bus service in the east west direction adjacent to Gerrard St E and bus service in the north south direction adjacent to Carlaw Ave.

Figure 4: Left - Sidewalk on Carlaw Ave (Intersection of Gerrard and Carlaw, looking at sidewalk adjacent to southbound Carlaw Ave). Sidewalk on Gerrard St (Intersection of Gerrard and Carlaw, looking at sidewalk adjacent to Eastbound Gerrard St E)

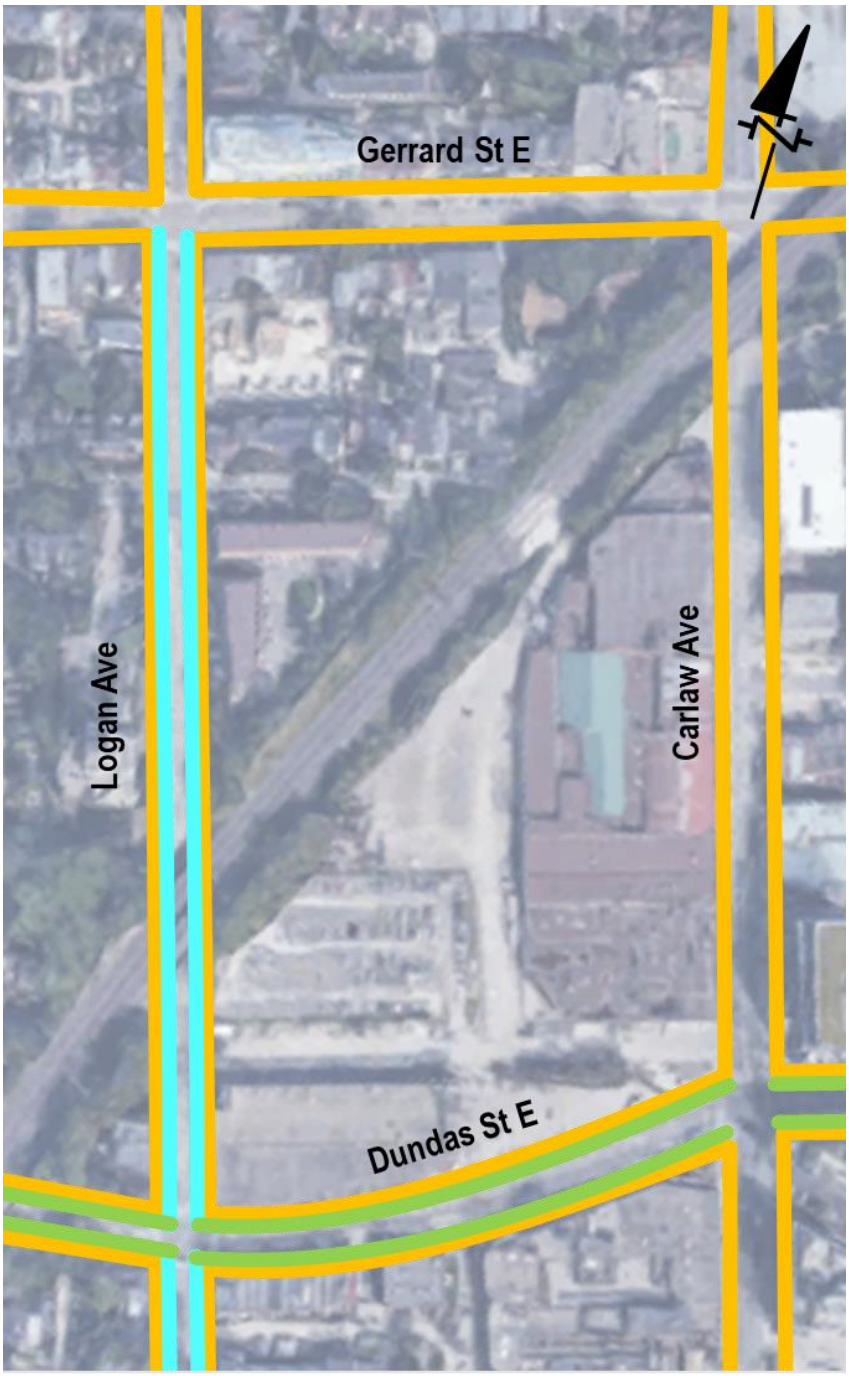


Figure 5: Active Transportation Network

2.5 Existing Traffic Volumes

A summary of the intersections and their sources are provided in **Table 3** below. HDR used counts from the Ontario Line Project, Draft Environmental Conditions Report - Traffic and Transportation Report, Appendix B7 to maintain consistency with this study where possible and supplemented these counts with additional counts from the City's database.

Table 3: Traffic Count Source

Intersection	Count Source / Date
Gerrard St & Logan Ave	City of Toronto Traffic Count Database - 2015
Gerrard St & Carlaw Ave	City of Toronto Traffic Count Database - 2018
Dundas St & Logan Ave	City of Toronto Traffic Count Database - 2022
Dundas St & Carlaw Ave	City of Toronto Traffic Count Database - 2022

Individual intersection peak hour traffic volumes are shown and were used in the study analysis, which is more conservative than calculating a global peak hour. Volume balancing between intersections was also reviewed. All links and intersection volumes were relatively balanced, and any imbalances are likely due to adjacent driveways and were adjusted accordingly.

Figure 6 shows the existing traffic volumes at the study area intersections.

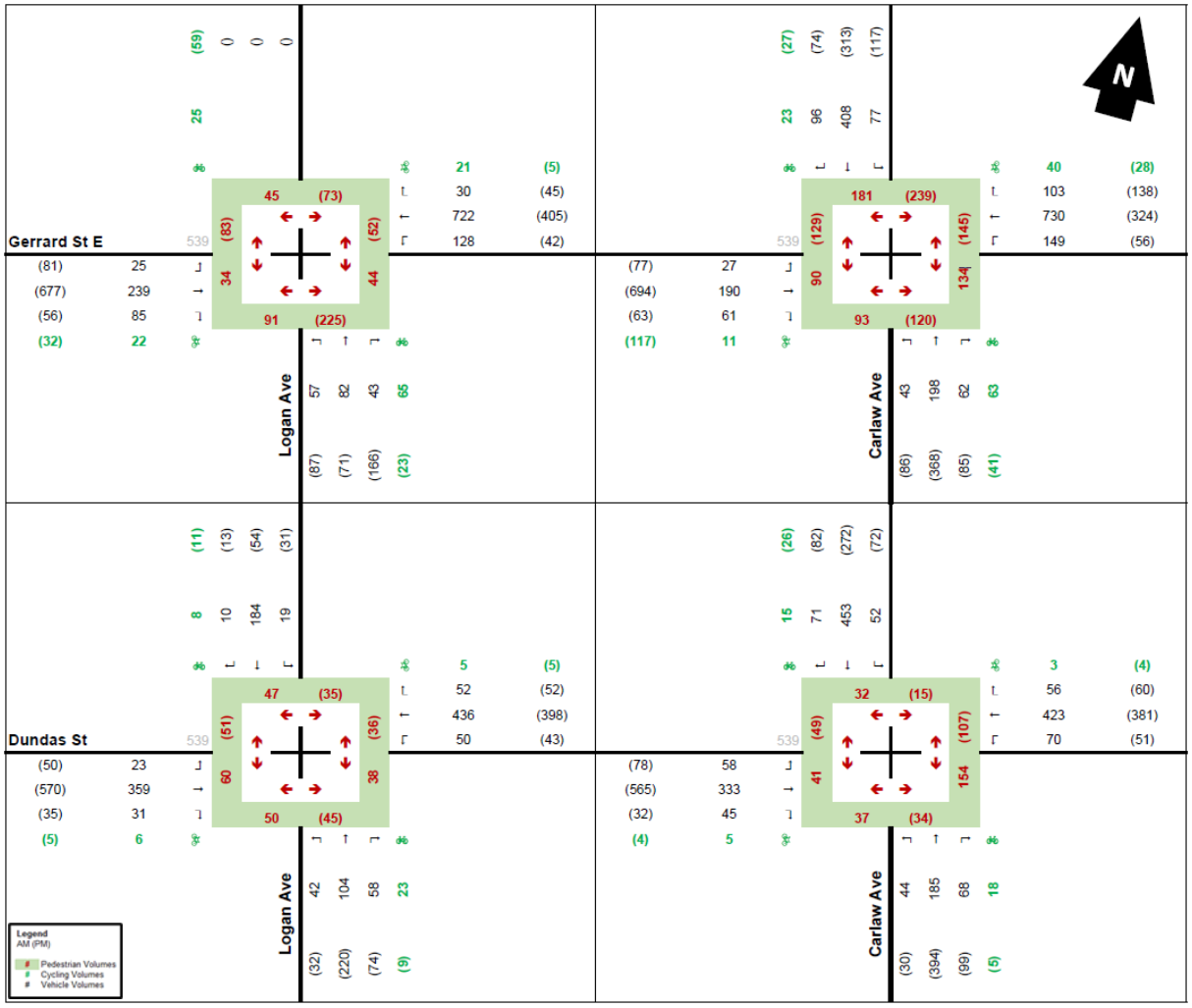


Figure 6: Existing Traffic Volumes

2.6 Existing Operations

Based on the existing traffic volumes and road network, intersection operations were assessed using Synchro 11 traffic analysis software. Existing signal timings used in the analysis are provided in Appendix A.

Table 4 summarizes the level-of-service (LOS) and volume/capacity ratio (v/c ratio) for each movement under existing conditions. Detailed Synchro results and reports for all study area intersections are provided in Appendix B.

Under existing traffic conditions, all study intersections are operating at a LOS of C or better other than:

- PM eastbound and AM westbound movements at the intersection of Gerrard St E & Carlaw Ave.

The impact of streetcars was incorporated into the analysis by reducing the Gerrard Street East ideal saturated flow rates from the default 1,900 vehicles per hour (vpd) to 1,250, based on the impact that streetcars were found to have on existing capacity/operations near the proposed Gerrard/Carlaw Ontario Line Station. This effectively reduces the capacity of the Gerrard Street East lanes by 33% and is considered a conservative estimate of the actual traffic capacity loss associated with the streetcar. While synchro results show the westbound movements of Gerrard St E & Carlaw Ave to be failing, the results underestimate the intersection performance because of conservative estimates of the streetcar impacts, and the actual performance is likely better than what is shown in the result summary.

Table 4: Existing Conditions – Summary

Intersection and Movement		Lanes	Storage (m)	AM Peak Hour			PM Peak Hour		
				LOS	v/c	95th Q	LOS	v/c	95th Q
Gerrard St E & Logan Ave		**-**	**-**	**B**	**0.64**	**-**	**B**	**0.73**	**-**
Eastbound	Left-Through-Right	2	-	A	0.24	J15.8	B	0.56	53
Westbound	Left-Through-Right	2	-	B	0.64	63.4	A	0.34	28
Northbound	Left-Through-Right	1	-	C	0.4	38.2	C	0.73	75
Gerrard St E & Carlaw Ave		**-**	**-**	**E**	**1.24**	**-**	**D**	**1.07**	**-**
Eastbound	Left-Through-Right	2	-	B	0.36	17.6	E	1.07	105
Westbound	Left-Through-Right	2	-	F	1.24	130	B	0.71	43
Northbound	Left-Through-Right	2	-	B	0.32	22	B	0.61	45
Southbound	Left-Through-Right	2	-	B	0.57	46	C	0.63	44
Dundas St E & Carlaw Ave		**-**	**-**	**B**	**0.69**	**-**	**B**	**0.86**	**-**
Eastbound	Left	1	45	B	0.29	10	B	0.35	13
	Through-Right	1	-	B	0.55	41	C	0.86	97
Westbound	Left	1	45	B	0.26	11	B	0.35	11
	Through-Right	1	-	B	0.69	59	B	0.64	51
Northbound	Left-Through-Right	2	-	A	0.28	12	A	0.44	23
Southbound	Left-Through-Right	2	-	B	0.49	27	A	0.40	19
Dundas St E & Logan Ave		**-**	**-**	**B**	**0.63**	**-**	**B**	**0.78**	**-**
Eastbound	Left	1	30	B	0.10	6	B	0.19	11
	Through-Right	1	-	B	0.50	59	C	0.78	117
Westbound	Left	1	30	B	0.17	10	B	0.28	11
	Through-Right	1	-	B	0.63	80	B	0.58	71
Northbound	Left-Through-Right	1	-	B	0.37	33	B	0.54	57
Southbound	Left	1	30	B	0.05	6	B	0.11	8
	Through-Right	1	-	B	0.30	33	B	0.11	12

Note: LOS E & F and V/C greater than 0.90 have been highlighted in yellow

3 Background Traffic Conditions

3.1 Planned Roadway Improvements

Based on the City of Toronto's Ongoing Infrastructure & Construction Projects[5] , the City is planning on installing cycling infrastructure on Gerrard St E. The final recommended plans for these improvements have not yet been confirmed. Additionally, any improvements are not anticipated to significantly affect the intersection laning and/or operations at the study area intersections, and therefore no changes were made to the future model based on this project.

3.2 Background Traffic Volumes

Background traffic volumes are comprised of existing traffic volumes plus general background traffic growth, plus traffic associated with nearby developments, and each component is summarized below.

3.2.1 Background Developments

Nearby background developments were reviewed, as shown in **Figure 7**. In a 500m radius there are 5 development applications were found, with 1 currently under review or being appealed, and 4 approved / closed. No documentation was available for the closed projects. In addition to the projects, there are 2 additional known developments at 449 Carlaw and 794 Gerrard St.

794 Gerrard St E is a mid-rise mixed-use development with 58 units of multifamily housing in addition to a 7,298 sq ft retail space. The development at 449 Carlaw has submitted to the City for a high density mixed use development comprised of three tall buildings with 1,080 residential units.

[5] https://www.toronto.ca/community-people/get-involved/public-consultations/infrastructure-projects/

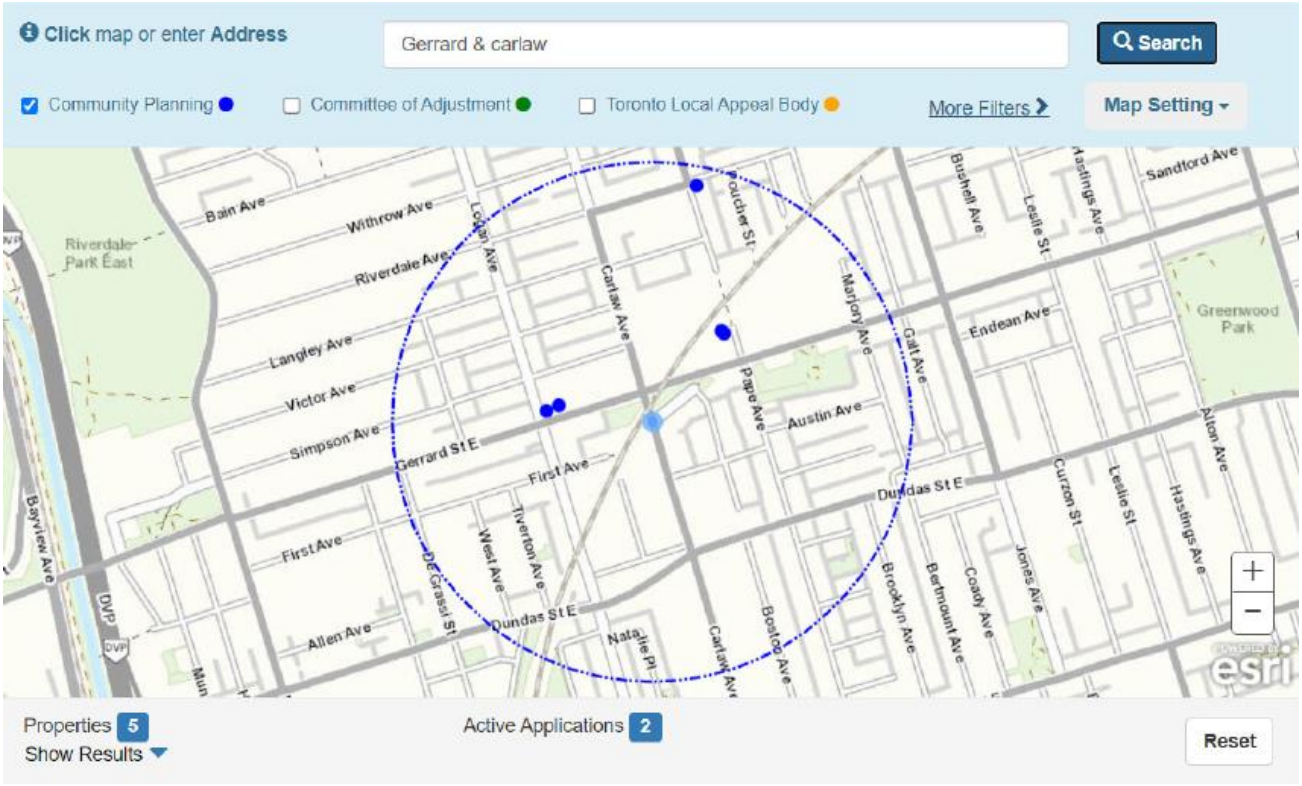


Figure 7: Adjacent Background Developments for Consideration

3.2.2 General Background Growth

Based on experience and a review of general traffic patterns and magnitude of volumes within the study area, traffic demand has remained relatively stable, despite variations in traffic patterns. To assess worst-case growth conditions, a base background vehicular growth rate of 0.5% was applied to the study intersections, which is considered a conservative assumption. A 1% growth rate was applied to all pedestrian and bicycle volumes. Existing Conditions volumes, used in Section 2, were elevated to the future horizon year 2030.

3.2.3 Ontario Line – Gerrard Station

The Gerrard Station has been included as a layer of background growth and walking and transit trips to/from the station were generated. The generated walking and transit trips were for the 2041 horizon and are therefore conservative. These trips were distributed and assigned to the study area network, and details can be found in the next section. As the station was considered constructed in this scenario, the existing site traffic on both sites was removed.

Figure 8 summarizes the combined background volumes from nearby developments, general background growth and the Ontario Line-Gerrard Station expected in 2030.

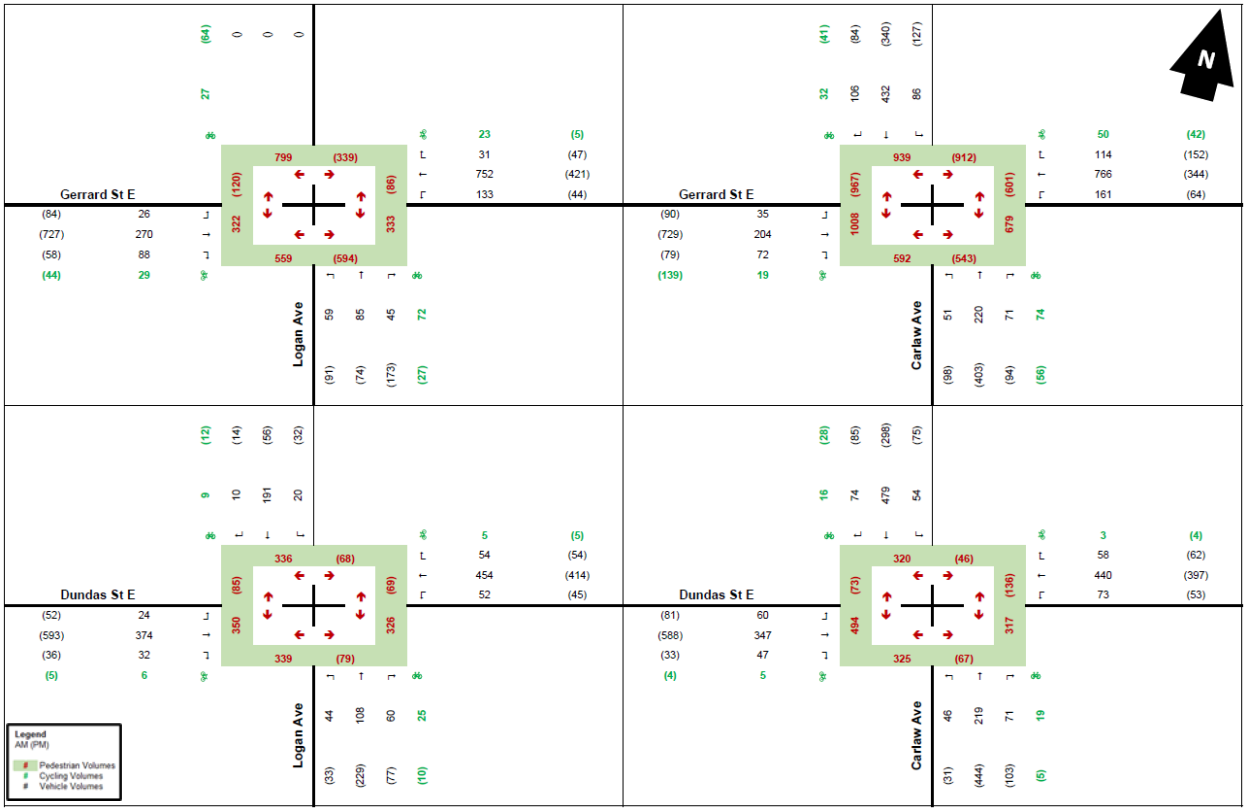


Figure 8: Future 2030 Background Traffic Volumes

3.3 Background Traffic Operations

Table 5 summarizes the LOS and v/c ratio for movements under future background conditions based on the forecast traffic volumes. Signal timing split optimization was incorporated, if needed, into both the AM and PM Synchro models. Detailed Synchro results and reports for all study area intersections are provided in **Appendix B**. Under future background conditions, all movements will still be operating with residual capacity and with LOS 'E' or better, except for:

- Gerrard St E & Carlaw Ave
  - The westbound Left-Through-Right capacity in the AM and PM peak periods will exceed capacity.
  - The eastbound Left-Through-Right capacity in the PM peak period exceeds capacity.

Table 5: Future Background Conditions – Summary

Intersection and Movement		Lanes	Storage (m)	AM Peak Hour			PM Peak Hour		
				LOS	v/c	95th Q	LOS	v/c	95th Q
Gerrard St E & Logan Ave		**-**	**-**	**B**	**0.72**	**-**	**B**	**0.85**	**-**
Eastbound	Left-Through-Right	2	-	A	0.3	19	B	0.62	60
Westbound	Left-Through-Right	2	-	B	0.72	73	A	0.37	29
Northbound	Left-Through-Right	1	-	C	0.48	42	D	0.85	95
Gerrard St E & Carlaw Ave		**-**	**-**	**F**	**1.43**	**-**	**F**	**1.77**	**-**
Eastbound	Left-Through-Right	2	-	B	0.46	20	F	1.77	140
Westbound	Left-Through-Right	2	-	F	1.43	144	F	1.38	88
Northbound	Left-Through-Right	2	-	B	0.41	38	B	0.56	43
Southbound	Left-Through-Right	2	-	C	0.69	93	B	0.57	42
Dundas St E & Carlaw Ave		**-**	**-**	**B**	**0.73**	**-**	**B**	**0.86**	**-**
Eastbound	Left	1	45	B	0.36	11	B	0.35	13
	Through-Right	1	-	B	0.59	45	C	0.86	97
Westbound	Left	1	45	B	0.31	12	B	0.35	11
	Through-Right	1	-	B	0.73	74	B	0.64	51
Northbound	Left-Through-Right	2	-	A	0.34	16	A	0.44	23
Southbound	Left-Through-Right	2	-	B	0.55	30	A	0.4	19
Dundas St E & Logan Ave		**-**	**-**	**B**	**0.69**	**-**	**B**	**0.78**	**-**
Eastbound	Left	1	30	B	0.13	6	B	0.2	11
	Through-Right	1	-	B	0.55	64	C	0.78	117
Westbound	Left	1	30	B	0.22	11	B	0.29	11
	Through-Right	1	-	B	0.69	88	B	0.59	71
Northbound	Left-Through-Right	1	-	B	0.47	37	B	0.56	57
Southbound	Left	1	30	B	0.08	6	B	0.11	8
	Through-Right	1	-	B	0.32	34	B	0.11	12

Note: LOS E & F and V/C greater than 0.90 have been highlighted in yellow

Similar to the existing conditions assessment, the eastbound movements, and westbound movements at the intersection of Gerrard Street and Carlaw Avenue will continue to operate over capacity, and hence, no recommendations are provided.

4 Proposed TOC Trip Generation

4.1 Conceptual Site Plan

The proposed development is comprised of two separate sites. 10 Dickens is bordered by Logan Ave and Dundas St E, and 388 Carlaw is bordered by Carlaw Ave and Dundas St E. **Figure 9** shows two site plans, and **Table 6** shows the site statistics for both sites, which were received on September 23rd, 2022.

Table 6: Site Plan Statistics

Site	Residential Units	Retail & General Commercial Size	Office Size
10 Dickens	**744 units**	**417m² GFA**	**-**
388 Carlaw	**569 units**	**7205 m² GFA**	**5806m² GFA**

Vehicular access to both 388 Carlaw and 10 Dickens will be provided through and extension of Thackeray St to the east onto Carlaw Ave, across from Badgerow Ave. This extension of Thackeray St onto Carlaw Ave will be signalized. The existing access to the site using Dickens St will be closed to vehicular access and will provide access for pedestrians and cyclists. There are six entrances to 388 Carlaw and three accesses to 10 Dickens.

Figure 9: Site Plans

4.2 Site Trip Generation

4.2.1 Mode Splits

The 2016 Transportation Tomorrow Survey (TTS) was used to inform the future mode split assumptions for the proposed development using existing information. The TTS is a survey of households within the Greater Golden Horseshoe, including the Greater Toronto Area, that summarizes travel patterns and other related transportation information that can be used to aid in planning, such as mode splits. The 2016 TTS divides geographical areas into 'zones' for the purposes of determining trip patterns from one zone to another.

The existing mode splits for the area were obtained through a review of TTS (2006) Zones 272, 271, 270, 273, and 269, which are the zones including and surrounding the subject site. The TTS data and the proposed mode splits are summarized in **Table 7**.

The proposed mode splits are considered conservative as they are based on existing mode splits, when in fact, auto trips are anticipated to continue to shift to transit and active transportation as the study area continues to develop and densify, and this change will be further spurred with the addition of the future Ontario Line and stations near the development.

Table 7: Mode Splits

Mode	Existing (TTS)			
	AM (In)	AM (Out)	PM (In)	PM (Out)
Transit	10%	43%	42%	18%
Walking	57%	16%	16%	35%
Cycling	5%	9%	9%	5%
Auto Passenger	6%	8%	8%	13%
Auto Driver / Taxi	22%	24%	26%	29%
Total	100%	100%	100%	100%

4.2.2 Trip Generation

Trips were generated for the proposed development using the information provided in the Institute of Transportation Engineers (ITE) Trip Generation Informational Report (11th edition). Trip generation rates for Land Use 222 (Multifamily Housing – High-Rise), Land Use 814 (Variety Store) and Land Use 712 (Small Office Building) were used.

Table 8 shows the ITE trip generation rates used for each site land use, and it includes estimated person trips per vehicle trip. The purpose of generating person trips rather than vehicle trips was to be able to assign pedestrian, cycling and transit trips to the study network.

Table 9 and **Table 10** show the resulting trip generation for each site by mode. Due to the density of compatible land uses in close proximity on Sites B and F, an assumed 5% internal capture rate was applied to all trip types, and this is also considered a conservative assumption. Future Ontario Line Gerrard Station trips (walk and transit to/from the station) were developed and are also shown in the tables.

Table 8: ITE Trip Generation Rates

ITE LUC	Peak Hour	ITE Average Vehicle Trip Rate	Equation	Entering	Exiting
222 Multifamily High Rise	AM	0.65	T=0.67(X) - 3.32	24%	76%
	PM	0.57	T=0.62(X) - 6.41	59%	41%
814 Variety Store	AM	6.24	-	56%	44%
	PM	16.75	-	51%	49%
712 Small Office Building	AM	3.33	-	56%	44%
	PM	1.52	-	51%	49%

Note: The trip generation equation was only used for Residential Land Use, for all other land uses, the total person trips were calculated by multiplying the ITE vehicle trip rate by the person trips per vehicle value to get total person trips.

Table 9: 10 Dickens Site - Trip Generation by Mode

Land Use	AM Peak Hour			PM Peak Hour		
	Total	In	Out	Total	In	Out
LUC 222 Multifamily High Rise						
Total	**497**	**119**	**378**	**457**	**269**	**187**
Transit	175	12	163	145	112	33
Walking	129	68	61	110	44	66
Cycling	39	6	33	34	24	10
Auto Passenger	38	7	32	44	20	24
Auto Driver	116	27	89	123	69	54
LUC 814 Variety Store						
Total	**27**	**15**	**12**	**73**	**37**	**36**
Transit	7	2	5	22	16	6
Walking	11	9	2	19	6	13
Cycling	2	1	1	5	3	2
Auto Passenger	2	1	1	7	3	5
Auto Driver	6	3	3	20	10	10
Site Total (excluding Station) – Including 5% Internal Capture						
Total	**498**	**128**	**370**	**503**	**291**	**212**
Transit	**173**	**13**	**160**	**159**	**121**	**38**
Walking	**132**	**73**	**59**	**122**	**47**	**75**
Cycling	**39**	**6**	**33**	**38**	**26**	**11**
Auto Passenger	**38**	**7**	**31**	**49**	**22**	**27**
Auto Driver	**116**	**29**	**87**	**136**	**75**	**61**

Table 10: 388 Carlaw - Trip Generation by Mode

Land Use	AM Peak Hour			PM Peak Hour		
	Total	In	Out	Total	In	Out
LUC 222 Multifamily High Rise						
Total	**377**	**91**	**287**	**346**	**204**	**142**
Transit	175	12	163	145	112	33
Walking	128	68	61	109	44	66
Cycling	39	6	33	34	24	10
Auto Passenger	38	7	32	44	20	24
Auto Driver	116	27	89	123	69	54
LUC 814 Variety Store						
Total	**484**	**271**	**213**	**1299**	**662**	**636**
Transit	7	2	5	22	16	6
Walking	11	9	2	19	6	13
Cycling	2	1	1	5	3	2
Auto Passenger	2	1	1	7	3	5
Auto Driver	6	3	3	20	10	10
LUC 712 Variety Store						
Total	**204**	**114**	**90**	**93**	**47**	**46**
Transit	**50**	**12**	**39**	**28**	**20**	**8**
Walking	**79**	**65**	**14**	**24**	**8**	**16**
Cycling	**13**	**6**	**8**	**7**	**4**	**2**
Auto Passenger	**14**	**6**	**7**	**9**	**4**	**6**
Auto Driver	**47**	**25**	**21**	**25**	**12**	**13**
Site Total (excluding Station) – Including 5% Internal Capture						
Total	**1012**	**452**	**560**	**1651**	**868**	**783**
Transit	220	24	196	185	140	45
Walking	208	135	73	144	54	90
Cycling	52	11	40	44	30	14
Auto Passenger	51	13	38	57	25	32
Auto Driver	160	53	107	160	86	74

4.2.3 Existing Vehicle Site Trips

As there is an existing development on the east site of the proposed development, existing vehicle trip generation was conducted for these land uses and subtracted from existing traffic volumes. It was assumed that the complex is made of small offices and business and the approximate area was estimated using Google Earth. **Table 11** shows the trips generated / subtracted from the site.

Table 11: 388 Carlaw - Existing Vehicle Trip Generation

Land Use	AM Peak Hour			PM Peak Hour		
	Total	In	Out	Total	In	Out
Total	42	23	18	19	10	9
Transit	10	2	8	6	4	2
Walking	16	13	3	5	2	3
Cycling	3	1	2	1	1	1
Auto Passenger	3	1	2	2	1	1
Auto Driver	10	5	4	5	2	3

4.3 Site Traffic Distribution and Assignment

Future trip distribution was estimated using the information from the 2016 TTS. The trip distribution for the site was based on the existing distribution to TTS zones (272, 271, 270, 273, 269). Trips were distributed based on each mode of transportation, and Google directions were also used to understand the fastest routes, by time of day, which was used to inform trip assignment. The assumed trip distribution is summarized in **Table 12** below. The total trips, including the trips generated from the proposed site and background volumes are shown in **Figure 10**.

Table 12: Assumed Trip Distribution – North and South Sites

	Auto				Cycle				Pedestrian				Transit			
	N	E	S	W	N	E	S	W	N	E	S	W	N	E	S	W
AM IN	6%	8%	84%	2%	0%	0%	100%	0%	0%	1%	99%	0%	10%	22%	78%	0%
AM OUT	23%	11%	52%	14%	7%	0%	91%	2%	0%	0%	100%	0%	23%	8%	73%	5%
PM IN	18%	12%	57%	14%	0%	0%	100%	0%	0%	3%	97%	0%	26%	7%	71%	7%
PM OUT	7%	6%	83%	3%	0%	3%	97%	0%	0%	0%	100%	0%	15%	4%	87%	4%

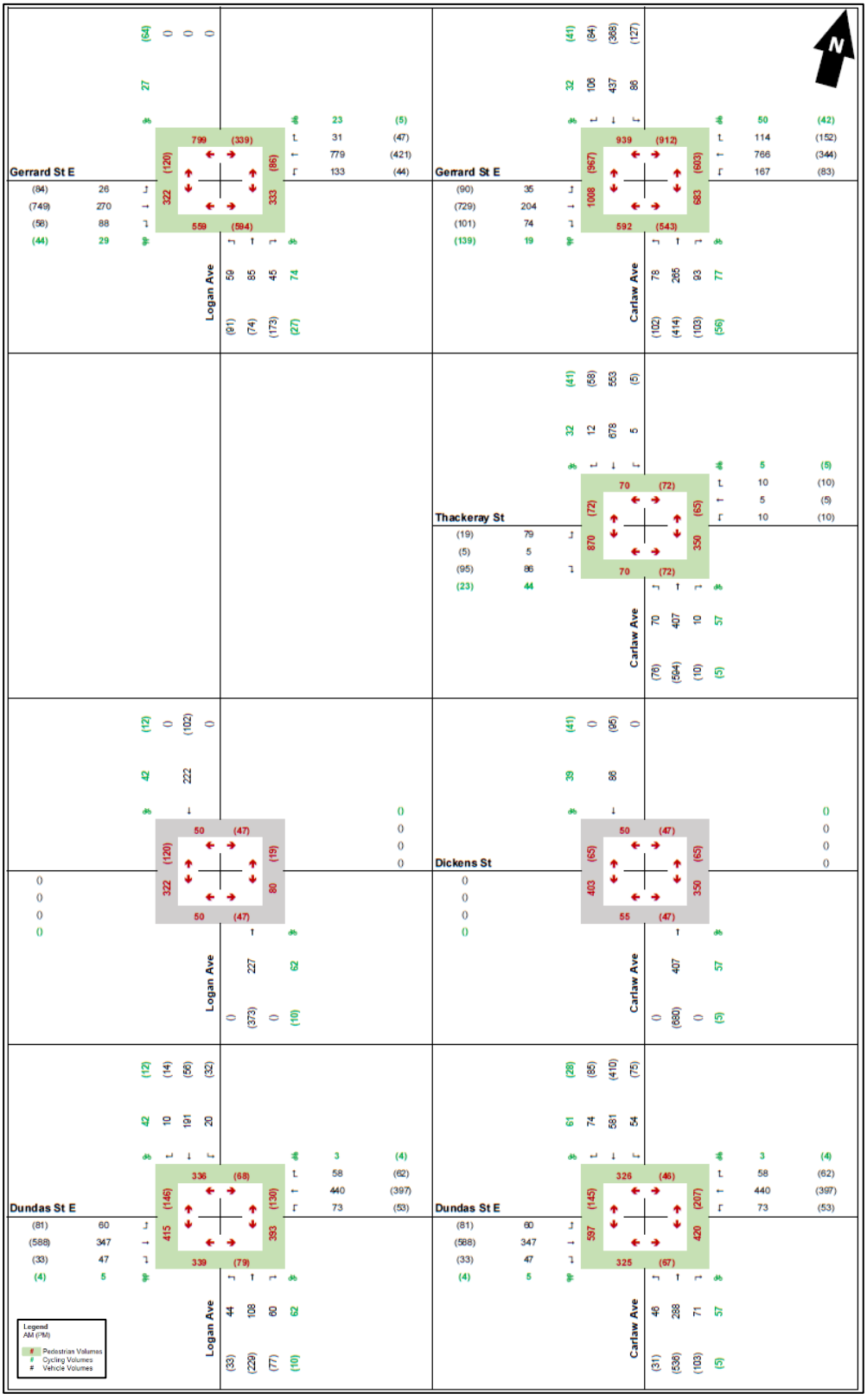


Figure 10: 2030 Total Traffic Volumes

5 Future Total Traffic Conditions with TOC

Table 13 summarizes the future total traffic operations at the study area intersections. There were no assumed geometric improvements. Detailed results and reports for all study area intersections are provided in **Appendix B**.

Under future total conditions, all movements will still be operating with LOS 'E' or better, and with residual capacity, except for:

- Gerrard St E & Carlaw Ave
    - The westbound left-through-right movement in the AM and PM peak period will exceed available capacity
    - The eastbound left-through-right movement in the AM and PM peak period will exceed available capacity
- Badgerow Ave / Thackeray St E & Carlaw Ave
    - The eastbound left-through-right movement in the AM delays will exceed acceptable values
    - The westbound left-through-right movement in the AM and PM delays will exceed acceptable values
    - The northbound left-through-right movement in the AM delays will exceed acceptable values

Table 13: Future 2030 Total Conditions – Summary

Intersection and Movement		Lanes	Storage (m)	AM Peak Hour			PM Peak Hour		
				LOS	v/c	95th Q	LOS	v/c	95th Q
Gerrard St E & Logan Ave		**-**	**-**	**B**	**0.73**	**-**	**B**	**0.85**	**-**
Eastbound	Left-Through-Right	2	-	A	0.30	19	B	0.63	62.3
Westbound	Left-Through-Right	2	-	B	0.73	75	A	0.39	30
Northbound	Left-Through-Right	1	-	C	0.48	42	D	0.85	95
Gerrard St E & Carlaw Ave		**-**	**-**	**F**	**1.45**	**-**	**E**	**1.23**	**-**
Eastbound	Left-Through-Right	2	-	B	0.46	25	F	1.23	121
Westbound	Left-Through-Right	2	-	F	1.45	148	E	1.04	78
Northbound	Left-Through-Right	2	-	B	0.55	36	C	0.82	69
Southbound	Left-Through-Right	2	-	C	0.70	57	C	0.82	66
Dundas St E & Carlaw Ave		**-**	**-**	**B**	**0.74**	**-**	**B**	**0.89**	**-**
Eastbound	Left	1	45	B	0.36	11	B	0.38	14
	Through-Right	1	-	B	0.59	46	C	0.89	102
Westbound	Left	1	45	B	0.31	12	B	0.36	11
	Through-Right	1	-	B	0.74	75	B	0.66	54
Northbound	Left-Through-Right	2	-	A	0.41	19	B	0.56	31
Southbound	Left-Through-Right	2	-	B	0.62	36	B	0.53	27
Dundas St E & Logan Ave		**-**	**-**	**B**	**0.68**	**-**	**C**	**0.80**	**-**
Eastbound	Left	1	30	B	0.31	14	B	0.32	17
	Through-Right	1	-	B	0.58	67	C	0.80	131
Westbound	Left	1	30	B	0.32	16	C	0.37	15
	Through-Right	1	-	B	0.68	85	B	0.60	73
Northbound	Left-Through-Right	1	-	B	0.47	38	C	0.60	62.1
Southbound	Left	1	30	B	0.08	6	B	0.08	6
	Through-Right	1	-	B	0.32	34	B	0.32	34
Badgerow Ave / Thackeray St E & Carlaw Ave – Unsignalized		**-**	**-**	**F**	**Error**	**-**	**A**	**0.51**	**-**
Eastbound	Left-Through-Right	1	-	F	Error	Error	D	0.51	21
Westbound	Left-Through-Right	1	-	F	Error	Error	F	0.27	8
Northbound	Left-Through-Right	2	-	F	0.82	34	A	0.2	3
Southbound	Left-Through-Right	2	-	A	0.23	1	A	0.22	1

Note: LOS E & F and V/C greater than 0.90 have been highlighted in yellow

Both eastbound and westbound operations along Gerrard Street at Carlaw Avenue were identified as not performing within acceptable levels of service in existing conditions, which will continue to be reflected in the Future Post Development scenario. However, it should also be noted that the results underestimate the intersection performance because of conservative estimates of the growth rates and streetcar impacts, and the actual performance will likely be better than what is shown in the result summary.

The intersection of Badgerow Ave / Thackeray St E & Carlaw Ave as a stop-controlled intersection does not perform at an acceptable standard. The north and southbound volumes on Carlaw ave do not allow enough gaps for volumes from Thackeray St and Badgerow Ave to complete left, through and right movements. Synchro displays errors due to the extensive control delays for the east and westbound movements. With a stop controlled intersection not performing to an acceptable standard, it is recommended to signalize the intersection of Badgerow Ave / Thackeray St E & Carlaw Ave. The results of signalizing the intersection of Badgerow Ave / Thackeray St E & Carlaw Ave is summarized below in **Table 14**.

Table 14: Future 2030 Total Conditions Badgerow Ave / Thackeray St E & Carlaw Ave Signalized – Summary

Intersection and Movement		Lanes	Storage (m)	AM Peak Hour			PM Peak Hour		
				LOS	v/c	95th Q	LOS	v/c	95th Q
Thackeray St E & Carlaw Ave - Signalized		**-**	**-**	**A**	**0.47**	**-**	**A**	**0.38**	**-**
Eastbound	Left-Through-Right	1	-	B	0.47	20	A	0.31	8
Westbound	Left-Through-Right	1	-	A	0.07	4	A	0.08	4
Northbound	Left-Through-Right	2	-	A	0.28	21	A	0.38	35
Southbound	Left-Through-Right	2	-	A	0.39	35	A	0.31	28

Note: LOS E & F and V/C greater than 0.90 have been highlighted in yellow

6 Parking and Loading Assessment

The proposed parking supply was originally reviewed based on the parking requirements of the City-wide Zoning By-law 569-2013, as amended (Office Consolidation) Version Date: May 1st, 2020. The by-law includes specific requirements for parking (bicycle and vehicle) as well as loading. However, the City enacted and passed Zoning By-law 89-2022 on February 3, 2022, which amends By-law 569-2013 and officially shifts the City's approach to one of a maximum limit on supplied parking at new developments instead of a minimum supply requirement. Although By-law 569-2013 does not apply to the site, the City is in the practice of updating site's zoned under the previous zoning by-law (438-86) to the current by-law, 569-2013, through the development process. Therefore, the parking requirements under 569-2013, as amended by 89-2022, is used to assess parking requirements for the site. Our assessment has review of both by-laws but only the applicable by-law has been documented below.

Both parking and loading assessments were conducted per site plans which were received on November 10th, 2022.

6.1 Policy Area Designations and Parking Requirements

The current city-wide Zoning By-law 89-2022, an amendment to By-law 569-2013 includes multiple sets of vehicle parking rates with diminishing requirements for some areas that have better transit accessibility.

As shown in **Figure 11**, the 388 Carlaw site is included in policy zone B, whereas the 10 Dickens site does not fall within policy zone A or B. Due to similarity in development location to 388 Carlaw and proximity to the Joint Rail Corridor, it will be assumed that the 10 Dickens site will follow vehicle and bicycle parking requirements outlined in By-law 89-2022 Policy Zone B.

Figure 11: City of Toronto Policy Areas
Source: https://www.toronto.ca/legdocs/bylaws/2022/law0089-diagram-1-pz-l-map.pdf

6.2 Vehicular Parking Supply

10 Dickens

The total proposed vehicular parking supply for 10 Dickens is 223 spaces. The development proposes 2 car-share spaces, 39 residential visitor spaces, and 182 residential parking. As a result, the blended visitor and residential parking rates are between 0.05 and 0.24 per dwelling units, respectively. Visitor parking and publicly accessible areas below grade will be separated from residential parking areas. There is no surface parking.

388 Carlaw

The total proposed vehicular parking supply for 388 Carlaw is 283 spaces. The development proposes 2 car-share spaces, 37 office spaces, 35 retail/commercial, 30 residential visitor spaces, and 179 residential parking. As a result, the blended visitor and residential parking rates are 0.05 and 0.31 per dwelling units, respectively. Parking will be provided by a two level below-grade parking garage. There is no surface parking. The parking supply for both sites are summarized in **Table 15.**

Table 15: Vehicle Parking Supply

Site	Vehicle Parking Space Type					
	Residential	Residential Visitor	Office	Retail and Commercial	Car share	Total
10 Dickens	182	39	0	0	2	223
388 Carlaw	179	30	37	35	2	283

6.3 Vehicle Parking Requirements

Vehicle parking requirements based on using By-law 569-2013 By-law 89-2022 policy zone B are shown in **Table 16** and **Table 17.** City Council has adopted lower standards for approval for new developments, and more recently to eliminate parking minimums for residential multi-family dwellings. These actions have been bolstered by Ontario's New Five-Year Climate Change Action Plan and other initiatives by the City of Toronto. There has also been a decline in residential parking demand and vehicle ownership in the areas surrounding downtown Toronto.

This area is well served by transit, with access to the Ontario Line Gerrard Station and will also be well served by a number of bus routes and streetcar. Also, a very high transit-dependency is the fundamental characteristic of Transit Oriented Developments/Communities, as they promote reduced auto-dependency.

Toronto Green Standard Version 4 states that "all residential parking spaces provided for dwelling units located in an apartment building, mixed use building, multiple dwelling unit building, excluding visitor parking spaces, must include an energized outlet capable of providing

level 2 charging or higher to the parking space:"[6]. All residential parking spaces will include an energized outlet capable of providing a minimum of Level 2 charging.

Table 16: Vehicle Parking Zoning By-law Requirements – 10 Dickens

Building	Land Use	Size (Unit or sqm)	By-law No. 89-2022 Policy Zone B			
			Minimum Rate	Maximum Rate	Minimum # of Spaces	Maximum # of Spaces
10 Dickens	Bachelor	0	-	0.7/unit	-	0
	1-bed	509	-	0.8/unit	-	407
	2-bed	151	-	0.9/unit	-	135
	3-bed	84	-	1.1/unit	-	92
	Visitors	744	2+(0.05/unit)	5+(0.1/unit)	39	79
	Retail & General Commerce	417	-	4/100sqm	-	16
	Office	0	-	1/100sqm	-	-
Total Residential					**39**	**713**
Total Non-Residential					**-**	**16**

Table 17: Vehicle Parking Zoning By-law Requirements – 388 Carlaw

Building	Land Use	Size (Unit or sqm)	By-law No. 89-2022 Policy Zone B			
			Minimum Rate	Maximum Rate	Minimum # of Spaces	Maximum # of Spaces
388 Carlaw	Bachelor	0	-	0.7/unit	-	0
	1-bed	386	-	0.8/unit	-	308
	2-bed	120	-	0.9/unit	-	108
	3-bed	63	-	1.1/unit	-	69
	Visitors	569	2+(0.05/unit)	5+(0.1/unit)	30	61
	Retail & General Commerce	7205	-	4/100sqm	-	288
	Office	5806	-	1/100sqm	-	58
Total Residential					**30**	**546**
Total Non-Residential					**-**	**346**

Table 18 below shows the comparison to parking requirements under Zoning By-law 89-2022, all parking requirements have been met.

[6] https://www.toronto.ca/city-government/planning-development/official-plan-guidelines/toronto-green-standard/toronto-green-standard-version-4/mid-to-high-rise-residential-non-residential-version-4/air-quality/

Table 18: Parking Requirements Summary

10 Dickens				
Site	**Minimum # of Spaces**	**Maximum # of Spaces**	**Proposed Spaces**	**Supplied Parking Rate**
Residential	0	713	182	0.24
Visitor	39	79	39	0.05
Retail	0	16	0	0.00
388 Carlaw				
Site	**Minimum # of Spaces**	**Maximum # of Spaces**	**Proposed Spaces**	**Supplied Parking Rate**
Residential	0	546	255	0.31
Visitor	30	61	39	0.07
Retail	0	346	35	0.49 (per 100sqm)
Office	0	54	37	0.64 (per 100sqm)

Accessible parking requirements were reviewed based on the new by-laws. **Table 19** and **Table 20** show the calculation of effective parking and required accessible parking for the 10 Dickens and 388 Carlaw respectively.

For both sites, the number of effective parking spaces have been calculated. 10 Dickens requires 17 accessible parking spaces and 388 Carlaw requires 18 accessible spaces. 10 Dickens and 388 Carlaw will be deficient by 12 and 11 spaces, respectively. However, this is appropriate considering the limited parking supply provided throughout the site.

Table 19: 10 Dickens - Accessible Parking Requirements

Type	**Units**	**By-law No. 89-2022**	
		Effective Rate	**Effective Spaces**
Dwelling units - Bachelor	0	0.7	0
Dwelling units - One Bed	509	0.8	407
Dwelling units - Two Bed	151	0.9	135
Dwelling units - Three or more	84	1.1	92
Residential Visitor	744	0.1	74
Retail Store (sqm)	406	2/100 sqm GFA	8
Office (sqm)	0	1/100 sqm GFA	0
		Total Effective	716
		Total Accessible Parking Provided	39
		Greater of the above (Actual effective)	716
		Required Accessible Parking (if the number of effective parking spaces is more than 100, a minimum of 5 accessible parking spaces plus 1 accessible parking space for every 50 effective parking spaces or part thereof in excess of 100 parking spaces)	17
		Accessible parking Provided	5
		Surplus/Deficit	-12

Table 20: 388 Carlaw - Accessible Parking Requirements

Type	Units	By-law No. 89-2022	
		Effective Rate	Effective Spaces
Dwelling units - Bachelor	0	0.7	0
Dwelling units - One Bed	386	0.8	308
Dwelling units - Two Bed	120	0.9	108
Dwelling units - Three or more	63	1.1	69
Residential Visitor	569	0.1	56
Retail Store (sqm)	7385	2/100 sqm GFA	147
Office (sqm)	5774	1/100 sqm GFA	57
		Total Effective	745
		Total Accessible Parking Provided	30
		Greater of the above (Actual effective)	745
		Required Accessible Parking (if the number of effective parking spaces is more than 100, a minimum of 5 accessible parking spaces plus 1 accessible parking space for every 50 effective parking spaces or part thereof in excess of 100 parking spaces)	17
		Accessible parking Provided	7
		Surplus/Deficit	-10

6.4 Bicycle Parking Supply

Bicycle parking for the site will be provided in the form of short-term and long-term bicycle parking spaces. Short-term bicycle parking will be provided at-grade as well as underground, and will serve residential visitors, commercial patrons, and potentially residents who are making short stops at home. Long-term bicycle parking will be within each building. The bicycle parking supply is summarized in **Table 21.** As per requirements of Toronto Green Standard Version 4, at least a 15% long-term bicycle parking spaces of long-term bicycle parking spaces will be adjacent to an Energized Outlet (120 V). Thus, meeting the requirement that 15% long-term bicycle parking spaces shall include an Energized Outlet (120 V).

Table 21: Bicycle Parking Supply

Building	Bicycle Parking Space Type				
	Residential Long Term	Residential Short Term	Non-residential Long Term	Non-residential Short Term	Total
10 Dickens	671	85	1	6	**763**
388 Carlaw	541	64	72	48	**725**

6.5 Bicycle Parking Requirements

Bicycle parking requirements were also assessed based on By-law 569-2013. Overall, the proposed bicycle parking supply is anticipated to serve the development well, there is a surplus of bicycle parking for the proposed development, which is aimed at encouraging the utilization of cycling as an active mode of transportation. There are no bicycle parking requirements for transit as per the By-law 569-2013; however, 10 of 10 Dicken's bicycle parking spots have been assigned for transit to serve and promote active modes.

Table 22: Bicycle Parking Zoning By-law Requirements – 10 Dickens

Land Use		Unit or per 100 sqm	By-law No. 569-2013			
			Long Term		Short Term	
			Rate	# required	Rate	# required
10 Dickens	Residential	744	0.9	670	0.1	75
	Retail	417	0.2	1	3+(0.3/unit)	5
	Office	0	0.2	0	3+(0.2/unit)	0
	Transit	-	-	-	-	-
Total Required			-	671	-	80
Proposed			-	672	-	91
Surplus / Deficit			-	+1	-	+11

Table 23: Bicycle Parking Zoning By-law Requirements – 388 Carlaw

Land Use		Unit or per 100 sqm	By-law No. 569-2013			
			Long Term		Short Term	
			Rate	# required	Rate	# required
388 Carlaw	Residential	569	0.9	513	0.1	57
	Retail	7,205	0.2	15	3+(0.3/unit)	25
	Office	5,806	0.2	12	3+(0.2/unit)	15
	Transit	-	-	-	-	-
Total Required			-	540	-	97
Proposed			-	613	-	112
Surplus / Deficit			-	+73	-	+15

6.6 Loading Space Requirements

Loading space requirements of Zoning By-law 569-2013 were also reviewed for the proposed site. The loading space requirements as per the By-law, and loading spaces provided, are shown in **Table 24.**

Table 24: Loading Spaces Required Based on By-Law Rates

Building	Land Use Type	Unit or sqm	Loading space required	Loading space provided
10 Dickens St	Residential	747	1 Type "G" and 1 - Type "C"	1 Type "G" and 1 - Type "C"
	Retail Store	406	None Required	None Provided
	Total (Shared)	**-**	1 Type "G" and 1 - Type "C"	1 Type "G" and 1 - Type "C"
388 Carlaw Ave	Dwelling units	568	1 Type "G" and 1 - Type "C"	1 Type "G" and 2 - Type "C"
	Retail Store	7451	3 Type "B"	4 Type "B" and 2 Type "C"
	Office	6833	2 Type "B" and 2 Type "C"	
	Total (Shared)	-	1 Type "G" and 2 Type "C" and 3 Type "B"	1 Type "G" and 2 - Type "C" and 4 Type "B"

The dimensions of the proposed loadings spaces meet the By-law requirements, with the dimensions of each type listed below.

Type “G”

- Minimum Length: 13.0 meters
- Minimum Width: 4.0 meters
- Minimum Clearance: 6.1 meters

Type “B”

- Minimum Length: 11.0 meters
- Minimum Width: 3.5 meters
- Minimum Clearance: 4.0 meters

Type “C”

- Minimum Length: 6.0 meters
- Minimum Width: 3.5 meters
- Minimum Clearance: 3.0 meters

6.6.1 Loading Swept Path Analysis

The loading areas were tested using AutoTurn software (within AutoCAD) to check the loading space accessibility for the anticipated design vehicles entering the site, and for each of the building loading areas. The largest vehicle anticipated to enter the site is a Medium Single-Unit Truck ('MSU') style delivery or moving vehicle. A front-end load garbage was also tested. In the case of overlap, the largest vehicle was tested, and it is assumed that schedules will not overlap. The design vehicles are shown in **Figure 12**.

There are Type "G" / "C" loading spaces at 10 Dickens. The Type "G" loading space accessibility is the most constrained movement for 10 Dickens and both MSU and Front-End Loader vehicles were tested. The swept path analysis is shown in **Figure 13** and **Figure 14**.

There are Type "C" loading spaces on the north portion of 388 Carlaw. The Type "C" loading space accessibility is the most constrained movement for 10 Dickens and both MSU and Front-End Loader vehicles were tested. The swept path analysis is shown in **Figure 15**.

There are two Type "B", two Type "C" and one Type "G" loading space on the south portion of 388 Carlaw. The Type "B" and The Type "G loading space accessibility are the most constrained movements in which the MSU and Wayne Titan vehicles were tested. The swept path analysis is shown in **Figure 16**.

A 0.2m buffer was placed around the paths of each vehicle to account for any turning movement imperfections. All loading spaces are accessible with the design vehicles.

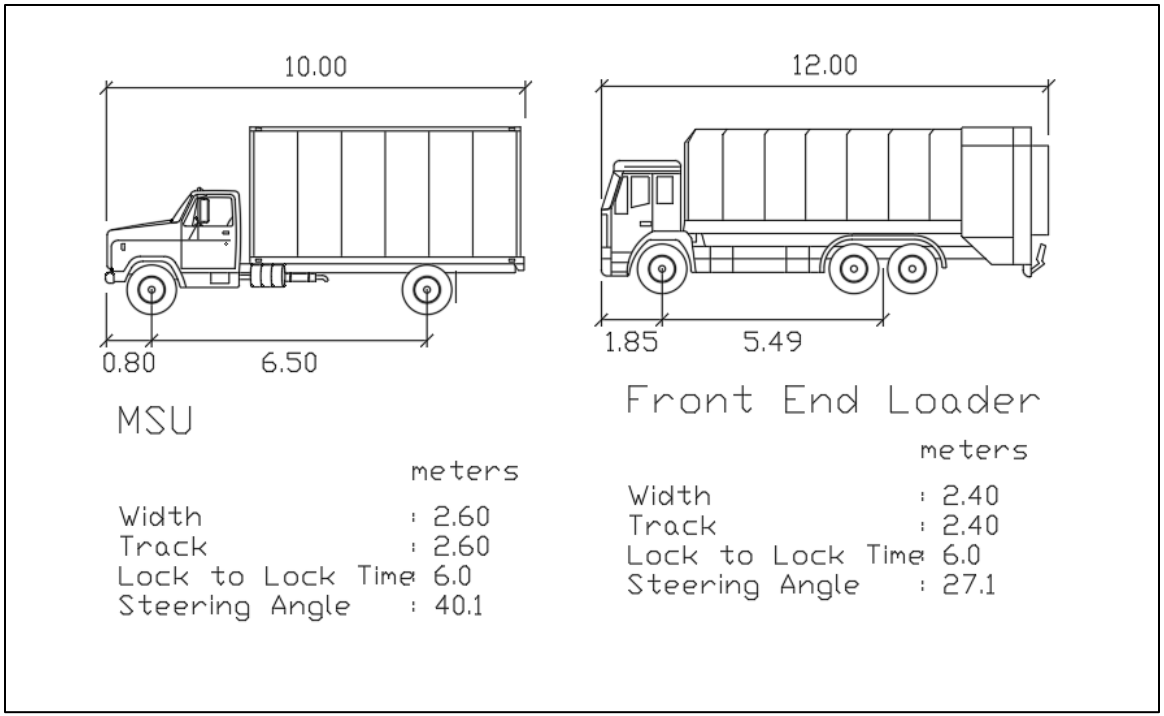


Figure 12: Design Vehicles

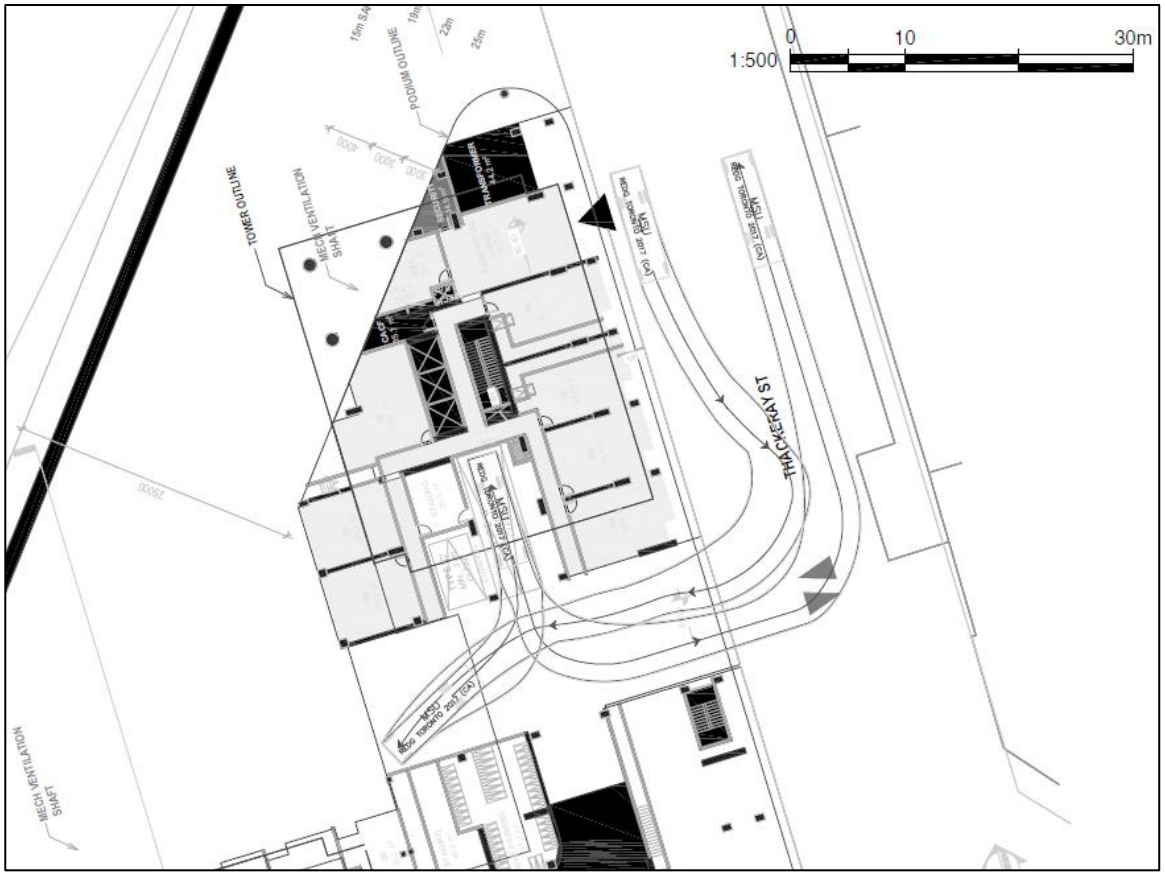


Figure 13: 10 Dickens – MSU

Figure 14: 10 Dickens – Front End Loader

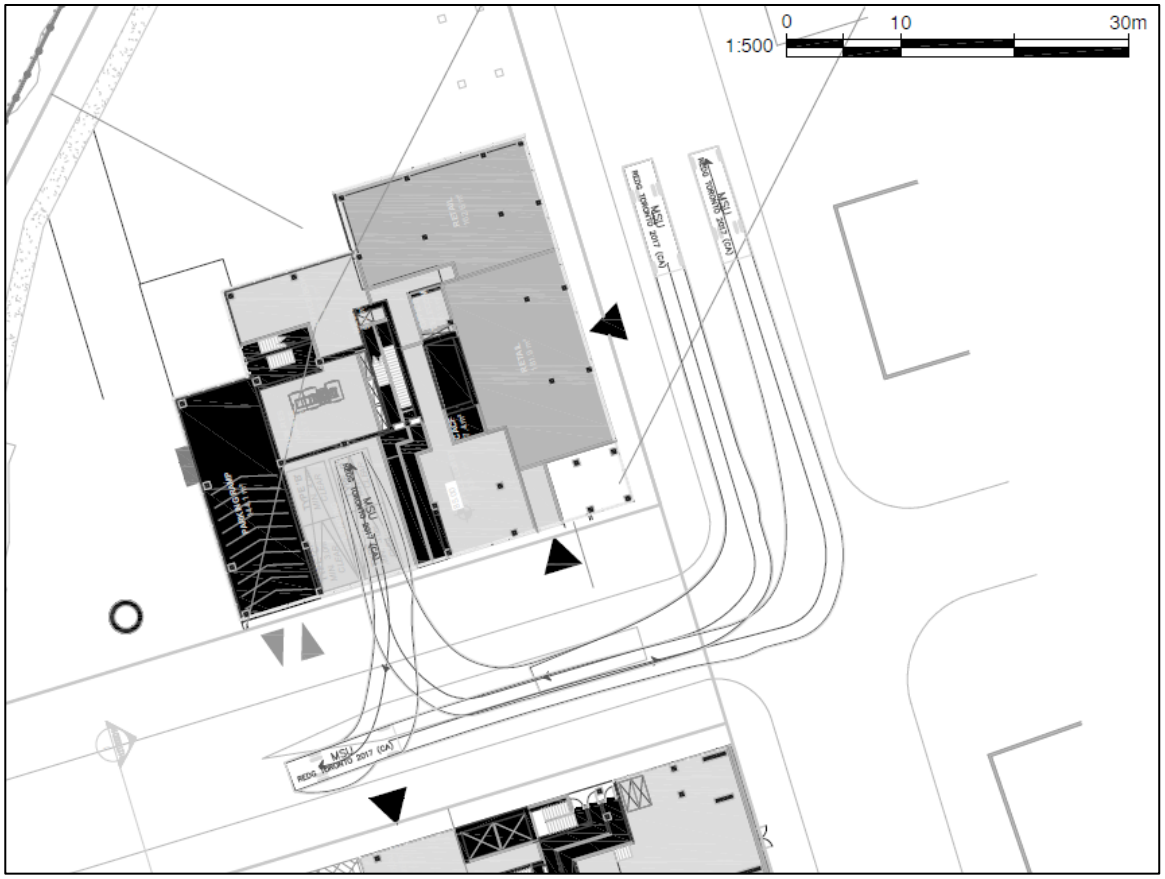


Figure 15: 388 Carlaw – MSU-North Loading Space

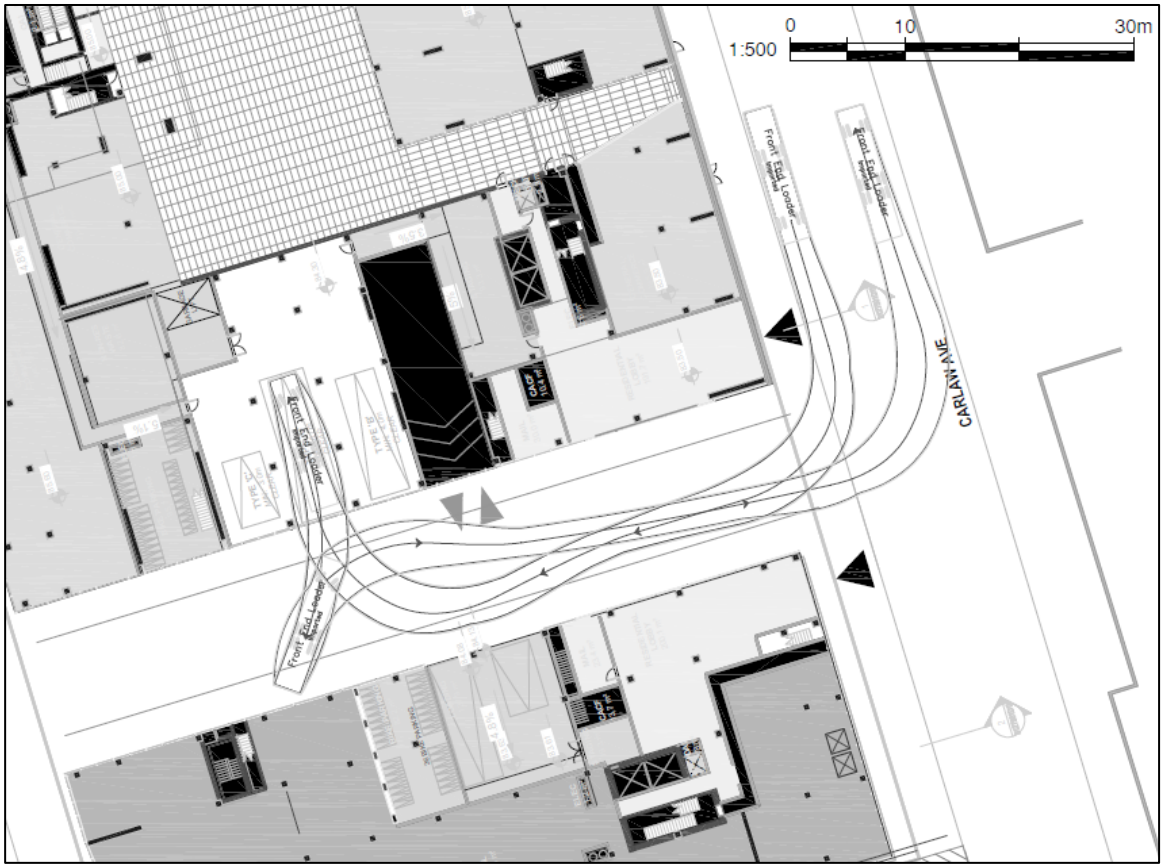


Figure 16: 388 Carlaw – Front End Loader–South Loading Space

7 Transportation Demand Management ('TDM')

Transportation Demand Management (TDM) measures are methods employed to reduce the traffic impacts of development through the reduction of Single-Occupant Vehicle (SOV) trips as well as the encouragement of more sustainable forms of travel and more efficient use of the transportation network for all modes of travel. TDM measures can be 'hard measures', such as infrastructure like bicycle parking, or can be 'soft measures' such as policies that allow for working-from-home or flex hours. TDM measures must also be tied to the surrounding transportation network context of the development. For example, bicycle parking will be ineffective if there is no surrounding bicycle infrastructure like bicycle lanes, multi-use paths, or a lack of bicycle parking at the ultimate destination. For this reason, successful TDM implementation requires a united effort and coordination between the City and developers.

Hard measures are physical infrastructure improvements that encourage alternative modes of travel and mode shifts away from single-occupant vehicles. This can include the provision of bicycle parking or enhanced pedestrian and cyclist facilities on-site including shower and change facilities for employment uses. Soft measures are programs or policies, such as unbundling or condo units to parking spaces, work-from-home policies, transit subsidies, carpooling assistance etc. In many cases, hard and soft measures work together and provide mutual benefit. For instance, transit pass subsidies are soft measures, but when paired with hard measures like improved waiting areas, they can have a greater impact on mode choice.

The Toronto Green Standard (Version 4) requires measures that will support a 15% or greater reduction in single occupancy vehicle (SOV) trips.

For the subject site, the general context of the area as a downtown city center-core, mixed-use environment with excellent transit access and future direct transit access to the Ontario Line, will have an impact on the potential TDM measures. In fact, the inherent nature of the area and the presence of the Ontario Line and streetcar surface transit routes along both roadways adjacent to the development will make this location an excellent candidate to benefit from TDM initiatives.

The mixed-use nature of surrounding areas allows for synergy and mixed-use interactions between the proposed residential towers, offices, as well as the ancillary retail at the ground floor, and the surrounding retail-commercial and services that are in the area. Additionally, due to the location near the City's central business district, there is an expectation that many of the residents will work within the general area and will not rely on transit to make their daily trips. Rather, these residents will walk or cycle. The mixed-use, and walkable nature of the area will in itself help to reduce vehicle trips by encouraging walking and linked trips.

Regardless of the ability for the development to leverage TDM initiatives, the strongest TDM measure will be the fact that residential towers will be able to provide limited vehicular parking. A significant number of trips generated by the development will be pick-up/drop-off or taxi/rideshare trips. The occupancy of the buildings will be market-driven, meaning that a lot of residents who decide to purchase units in this building will want to be car-free and many will live and work in close proximity, thus relying on transit, walking, and cycling to get around.

Since the ancillary commercial will primarily serve the surrounding area and the residential condos above, the TDM plan will be geared towards adapting the residential component.

7.1.1 Local and Regional Transit Accessibility

As already discussed, there is good transit coverage within the vicinity of the site even without the construction of the Ontario Line. TTC surface transit is provided in the form of streetcars along Gerrard Street E and Carlaw Ave. Additionally, the streetcar and bus routes provides direct access to the Toronto subway system to College Station, approximately 3.5 kilometers to the west. Bus and transit stops are eastbound and westbound on Gerrard St and north and southbound on Carlaw Ave.

7.1.2 Pedestrian and Cycling Connections

The West building will be directly fronting Logan Ave which has dedicated north and southbound bicycle lanes. On the south side of the building, there is also a protected westbound bike line to further encourage residents to utilize bicycles as a vehicle alternative.

Bicycles are also allowed on the TTC subway system outside of peak periods. Residents will be able to bring their bicycles on the subway and use them to complete the last leg of their trips if it is conducive to their needs.

7.1.3 Bicycle Parking

The building will be equipped with long-term bicycle parking that will be available to all residents. Long-term bicycle parking ensures that residents are encouraged to own bicycles in the first place by providing them with easily accessible, secure, and sheltered bicycle parking. Short-term bicycle parking will be provided for visitors. The short-term bicycle parking will be placed in safe, well lit, accessible areas at ground level. This will encourage visitors to feel cycling is a viable option.

Toronto Bike Share is also available within the general area. There are 70 bikeshare docks within 500 meters walking distance. These will also be available for use by residents and visitors if they use the bikeshare services. Bikeshare spaces are considered usable if they are occupied or empty, as they can be used by residents or visitors when leaving the site (bicycle is available) or when returning (there is a free "dock").

Bicycle repair stations are recommended to be installed on site. Bicycle repair stations further encourages residents and visitors to travel by bicycle by providing tools needed to do routine and basic maintenance on bicycles.

7.1.4 Car-Share Services

Car-share services are an effective way to reduce auto dependency and parking needs for both residential and non-residential developments, by providing vehicles that can be used by residents on an as-needed basis. The result is that the development will attract those who do not own vehicles and typically rely on alternative forms of transportation, thus reducing the number of parking spaces required on site and attracting residents that will generally produce fewer vehicle trips, but will still occasionally require a vehicle.

For some development proposals, the City of Toronto has accepted proposals that suggest that for each car-share parking space provided on site, the development will be able to reduce the parking supply by 4 parking spaces. This is another example of the City accepting TDM measures to reduce the parking supply.

7.1.5 Unbundled Resident Parking

Bundling parking spaces with unit sales, whether intended or not intended, results in the building being marketed to drivers and vehicles owners. For those who do not own vehicles and do not wish to own a parking space, these hidden costs are forced on them and at the very least result in unwanted effort required to rent out and seek a renter for the parking space in an effort to recuperate lost money.

Therefore, unbundling further benefits the developer as well as the community because the building will automatically be marketed to and attract those who do not drive as a primary form of transportation. This theoretically reduces parking requirements for the building, reduces the amount of congestion on the surrounding road network, and allows for more efficient site design and use of the transportation network.

Unbundled resident parking will be offered as an option for some units. This will open the market up to those who do not want or cannot own vehicles, thus reducing the effect of single occupant vehicle activity generated by the development. Unbundled parking could lead to a potential 10% to the residential parking rates.[7]

7.1.6 Summary of Transportation Demand Management

The following summarizes the measures that will support a 15% or greater reduction in single occupancy vehicle (SOV) trips as required by the Toronto Green Standard (Version 3):

- Convenient access to Ontario Line
- Proximity to surface transit routes along Gerrard St E and Carlaw Ave
- Unbundled Resident Parking; and
- Carshare services.

[7] https://www.vtpi.org/park_man.pdf

7.2 Toronto Green Standard

The TDM plan presented in **Section 7.1** supports the Tier 1 standard of the updated Toronto Green Standards (Version 4) for mid and high-rise residential buildings requiring that all development proposals have a 25% or greater reduction occupancy vehicle SOV trips.

Conservative estimates of the expected SOV trip reductions for the TDM measures are summarized in **Table 25**.

Table 25: Estimated Decrease in SOV

TDM Measure	Estimated % decrease in SOV	Details
Reduced Vehicle Parking Supply in combination with car share services, increased bike parking spaces, and bicycle repair station	≤ 20%	Overprovision of parking is known to encourage and reinforce the use of single occupant vehicles, even when transit is a viable option. Therefore, reduced parking supplies are expected to result in reduced parking demand and vehicle trips under some circumstances such as when there is a mixed-use environment, supporting nearby amenities, good transit services. The subject development meets this criterion. The proposed parking supply is 80% lower than the require parking supply based on the current in-force zoning By-law 89-2022. There, the vehicle trips are also likely to be reduced.
Pedestrian Connections	≤ 1%	The site is located directly adjacent to Carlaw Avenue and Dundas Street and will have direct access to sidewalks and crosswalks.
Supporting Amenities	≤ 5%	The location of the development is approximately 300 meters from mixed-used developments with supporting amenities such as banks and grocery stores will increase interaction trips.
Total:	≤ 26%	Expected to exceed the minimum 25% reduction of SOV Trips

The above measures are expected to meet and likely to exceed the required 25% reduction to single occupant vehicle trips. Additionally, there are other measure that will also contribute to the marketing of this development as transit oriented and will encourage a market interest by those who do not rely on single-occupant vehicles even if those measures may not directly impact mode choice.

Toronto Green Standard Requirement	Proposed Development
AQ 1.1 Single-Occupant Vehicle Trips Reduce single occupancy auto vehicle trips generated by the proposed development by 25% through a variety of multimodal infrastructure strategies and Transportation Demand Management (TDM) measures	As discussed in **Section 7.1**, the TDM measures proposed are expected to meet and likely exceed the required 25% reduction to single-occupant vehicle trips.
AQ 1.2 Electric Vehicle Infrastructure Parking spaces must be equipped with an energized outlet, which is clearly marked and identified for electric vehicle charging, in accordance with Zoning By-law 569-2013, as amended: 2,3,4,5,6,7,8 1. all residential parking spaces provided for dwelling units located in an apartment building, mixed use building, multiple dwelling unit building, excluding visitor parking spaces, must include an energized outlet capable of providing Level 2 charging or higher to the parking space; and, 2. in cases other than those set out in (A) above, 25 percent of the residential and non-residential parking spaces in a building must include an energized outlet capable of providing Level 2 charging or higher.	All resident parking spaces will be electrified.
AQ 2.1 Bicycle Parking Rates Provide bicycle parking spaces in accordance with Chapter 230 of Zoning By-law 569-2013.	The bicycle parking supply meets the requirements outlined in the City-wide Zoning by-law
AQ 2.2 Long-term Bicycle Parking Location Long-term bicycle parking must be provided in a secure controlled-access bicycle parking facility or purpose-built bicycle locker on the first or second story of the building or on levels below ground commencing with the first level below ground	Long-term bicycle parking spaces are provided in basement parking.
AQ 2.3 Short-term Bicycle Parking Location Locate short-term bicycle parking in a highly visible and publicly accessible location at-grade or on the first parking level of the building below grade	As discussed in **Section 7.1**, all short-term bicycle parking spaces are located at-grade in publicly accessible locations.
AQ 2.4 Electric Bicycle Infrastructure Residential: At least 15% of the required long-term bicycle parking spaces, or one parking space, whichever is greater, shall include an Energized Outlet (120 V) adjacent to the bicycle rack or parking space.	Long-term parking spaces for residents will be electrified.
AQ 2.5 Shower and Change Facilities Provide shower and change facilities consistent with the rate identified in Chapter 230 of the City-wide Zoning By-law.	N/A
AQ 2.6 Publicly Accessible Bicycle Parking For all uses within 500m of transit station entrance, provide at least 10 additional publicly accessible, short-term bicycle parking spaces, at-grade on the site or within the public boulevard in addition to bicycle parking required under **AQ 2.1.**	Gerrard Street has transit connectivity. Future Gerrard Carlaw Ontario Line station will be constructed adjacent to the site. More than 10 publicly accessible bicycle parking spaces have been provided.
AQ 3.1 Connectivity Provide safe, direct, universally accessible pedestrian routes, including crosswalks and midblock crossings that connect the buildings on-site to the off-site pedestrian network and priority destinations.	Main entrances have pedestrian connections directly to the neighborhood sidewalk network.
AQ 3.2 Sidewalk Space Provide a context-sensitive pedestrian clearway that is a minimum of 2.1m wide, to accommodate pedestrian flow safely and comfortably.	Pedestrian areas surrounding the building will be designed to meet this criterion.
AQ 3.3 Weather Protection Provide covered outdoor waiting areas for pedestrian comfort and protection from inclement weather.	Canopies are provided above the main entrances of the building.
AQ 3.4 Pedestrian Specific Lighting Provide pedestrian scale lighting that is evenly spaced, continuous and directed onto sidewalks, pathways, entrances, outdoor waiting areas and public spaces.	Pedestrian-scale lighting will be provided throughout the site.

8 Conclusions and Recommendations

8.1 Traffic Capacity and Operations

The study network currently operates within standard performance thresholds, apart from the intersection of Gerrard St E and Carlaw Ave, which will continue to operate below acceptable levels of service similar to existing conditions. However, the conservative growth rates and post-Covid scenario may result in a better level of service than reported here.

Despite some congestion and some movements operating near-capacity under existing conditions, there is generally residual capacity in the road network to accommodate the projected vehicle auto volumes.

The existing intersection of Badgerow Ave and Carlaw will require signalization to accommodate the background growth and the extension of Thackeray St.

8.2 Parking

The vehicular parking requirements based on By-law 569-2013 rates are a maximum of 729 and minimum of 39 for 10 Dickens additionally a maximum of 892 and minimum of 30 for 388 Carlaw

The proposed parking on both sites will satisfy the residential tenant parking rates, and the City of Toronto by-law requirement for shared spaces between residential visitor and office uses. For accessible parking, although 10 Dickens and 388 Carlaw will be deficient by 12 and 10 accessible parking spaces, respectively, considering the limited overall parking supply, the provided accessible parking space is appropriate.

As per the Toronto Green Standard Version 4 requirements, all residential parking spaces will include an energized outlet capable of providing a minimum of Level 2 charging.

The bicycle parking requirements based on By-law 569-2013 rates are 754 for 10 Dickens and 637 for 388 Carlaw without any reductions applied. The development supplies the required bicycle parking requirements with a surplus of 12 at 10 Dickens and 88 at 388 Carlaw.

8.3 Loading

Application of Zoning By-laws 569-2013 and 438-86 requires various Type ‘G’, Type ‘B’, and two Type ‘C’ loading spaces on all sites. Loading sites provided satisfy all the requirements. The proposed development also accommodates the required maneuvering of all truck types, coming in and going out.

Appendix A: Signal Timing

LOCATION:	**Gerrard St E & Carlaw Ave**	*DISTRICT:*	**Toronto & East York**
MODE/COMMENT:	**FXT with Firehall Pre-emption (EBLA), TSP* & 2-Wire Porala APS**	*COMPUTER SYSTEM:*	**TransSuite**
TCS:	**372**	*CONTROLLER/CABINET TYPE:*	**Peek ATC 1000 / TS2 T1**
PREPARED BY/ DATE:	**Akshay Salwan / April 15, 2020**	*CONFLICT FLASH:*	**Red & Red**
CHECKED BY/DATE:	**Ranajamil Iftikhar / Masoud Ramezani / May 6, 2020**	*DESIGN WALK SPEED:*	**1.0 m/s (FDW based on full crossing at 1.2 m/s)**
IMPLEMENTATION DATE:	**February 9, 2021**	*CHANNEL/DROP:*	**4022/16**
		CONTROLLER FIRMWARE:	**3.018.1.2976**

N

NEMA Phase		OFF All Other Times	AM 06:30-09:30 M-F	PM 15:00-19:00 M-F	NGHT 23:00-06:30 Daily	WKND 09:00-21:00 Sat & Sun	Phase Mode (Fixed/Demanded/Callable)	Remarks
	Local Plan	Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5		
	Split Table	Split 1	Split 2	Split 3	Split 4	Split 5		
1 NOT USED	WLK FDW MIN MAX1 AMB ALR SPLIT							Pedestrian Minimums: EWWK = 7 secs; EWFD = 14 secs NSWK = 7 secs; NSFD = 14 secs Firehall Preemption Instructions: • If preemption is received in phase 2/6: Time to Preemption Sequence = 0 - 28 secs • If preemption is received in phase 4/7/8: Time to Preemption Sequence = 0 - 28 secs • Signals go to All Red display before going into preemption sequence Preemption Sequence: Serve 60.0 seconds EBLA/EBG/EWDW Serve 3.0 seconds EBY/EWDW Serve 2.8 second of ALLR Return to normal operation in EWG/EWWK. Polara APS to emit voice message during FH Pre-emption calls "Emergency vehicle approaching,clear intersection immediately." APS on during 7 seconds of NSWK and EWWK when activated by APS pushbuttons and no arrows displayed. Extended Push activation = 3 sec *See back for TSP Instructions. TSP disabled - TSP activation pending new firmware testing & field validation.
2 Gerrard St E	WLK 7 FDW 14 MIN 21 MAX1 27 AMB 3.0 ALR 2.8 SPLIT	33	38	30	33	35	Fixed POZ activated by Request Loop (max extension of 30 secs in Green/Walk)	
3 NOT USED	WLK FDW MIN MAX1 AMB ALR SPLIT							
4 Carlaw Ave	WLK 7 FDW 14 MIN 21 MAX1 21 AMB 3.0 ALR 2.7 SPLIT	27	32	40	27	35	Fixed (truncations allowable to pedestrian minimum)	
5	WLK FDW MIN MAX1 AMB ALR SPLIT						Only Displayed during Firehall Preemption	
6 Gerrard St E	WLK 7 FDW 14 MIN 21 MAX1 27 AMB 3.0 ALR 2.8 SPLIT	33	38	30	33	35	Fixed POZ activated by Request Loop (max extension of 30 secs in Green/Walk)	
7	WLK FDW MIN 6 MAX1 6 AMB 3 ALR 1 SPLIT			11			Demanded	
8 Carlaw Ave	WLK 7 FDW 14 MIN 21 MAX1 21 AMB 3.0 ALR 2.7 SPLIT	27	32	29	27	35	Fixed (truncations allowable to pedestrian minimum)	
	CL OF	60 18	70 43	70 7	60 36	70 60		

NOTES:

LOC: Gerrard St E & Carlaw Ave
MODE: FXT with Firehall Pre-emption (EBLA) & TSP
TCS: 372 **PREPARATION DATE (TIMING CARD):** April 17, 2020

OFFSET CORRECTION PARAMETERS

2.3.4 O.C. Extend / Reduce

(Max. time added & subtracted in sec.)

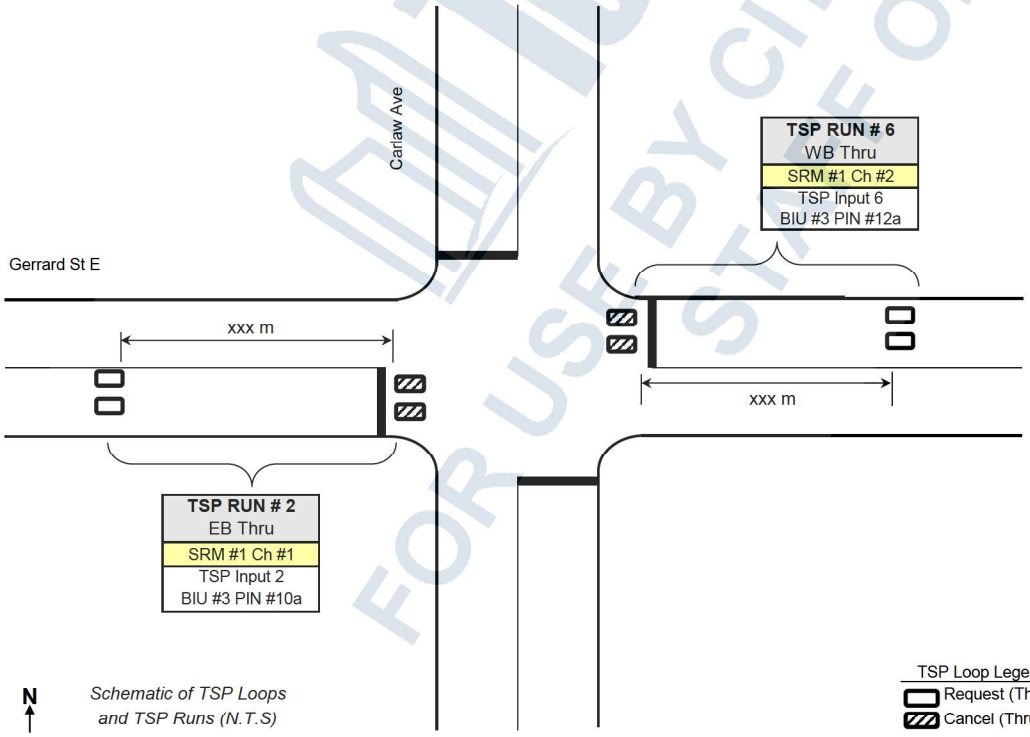
		Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8	From page 1 [Cycle]	[Slop]	2.3.2.x O.C. Thres.
OFF												Pattern 1
Split 1	Ext.	--	11	--	11	--	11	--	11	60	6	15 s [25 %]
	Rdc.	--	6	--	--	--	6	--	--			
AM												Pattern 2
Split 2	Ext.	--	13	--	13	--	13	--	13	70	16	18 s [25 %]
	Rdc.	--	11	--	5	--	11	--	5			
PM												Pattern 3
Split 3	Ext.	--	13	--	13	--	13	--	13	70	16	18 s [25 %]
	Rdc.	--	3	--	13	--	3	--	13			
NGHT												Pattern 4
Split 4	Ext.	--	11	--	11	--	11	--	11	60	6	15 s [25 %]
	Rdc.	--	6	--	--	--	6	--	--			
WKEND												Pattern 5
Split 5	Ext.	--	13	--	13	--	13	--	13	70	16	18 s [25 %]
	Rdc.	--	8	--	8	--	8	--	8			

T.S.P. PARAMETERS

PREPARED: Akshay Salwan

	TSP RUN # 2 EB Thru	TSP RUN # 6 WB Thru
2.8.2 Transit Run Parameters		
ATC Green Extend Mode (Equivalent TTC Algorithm)	Mode 2 A	Mode 2 A
2.8.3 Transit Action Plan 1 (Used for all Patterns)		
Run Enable (X = Yes)	X	X
Run Config = **1**	Recovery = 2 (O.C. with delay)	
2.8.4 Transit Run Configuration 1		
Delay / Extend / Fail	-- / -- / 235	-- / -- / 235
CALLS (and Extends)	**Ø 2/6**	**Ø 2/6**
Skips	--	--
Reduces (Truncates)	**Ø 4/8**	**Ø 4/8**

	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
2.8.6 TSP Split Tables: 1 & 4								
GRN EXT (SDW Extension)	--	--	--	--	--	--	--	--
GRN RDC (Reduction)	--	6	--	--	--	6	--	--
WLK EXT (Walk Extension)	--	30	--	--	--	30	--	--
2.8.6 TSP Split Tables: 2								
GRN EXT (SDW Extension)	--	--	--	--	--	--	--	--
GRN RDC (Reduction)	--	11	--	5	--	11	--	5
WLK EXT (Walk Extension)	--	30	--	--	--	30	--	--
2.8.6 TSP Split Tables: 3								
GRN EXT (SDW Extension)	--	--	--	--	--	--	--	--
GRN RDC (Reduction)	--	3	--	13	--	3	--	13
WLK EXT (Walk Extension)	--	30	--	--	--	30	--	--
2.8.6 TSP Split Tables: 5								
GRN EXT (SDW Extension)	--	--	--	--	--	--	--	--
GRN RDC (Reduction)	--	8	--	8	--	8	--	8
WLK EXT (Walk Extension)	--	30	--	--	--	30	--	--



Notes:

ATC Mode	0	2	3	4
TTC Algor'm	**B-2**	**A**	**C**	**D**
Extensions	SDW	Walk	W/SDW	W/SDW

TSP SUMMARY

EW: 30 secs EWG/EWWK Max Extensions
NS: Truncate to pedestrian minimum

LOCATION:	Gerrard St E & Logan Ave	*DISTRICT:*	Scarborough
MODE/COMMENT:	SAP with PR & TSP*	*COMPUTER SYSTEM:*	TransSuite
TCS:	373	*CONTROLLER/CABINET TYPE:*	Peek ATC 1000 / TS2 T1
PREPARED BY / DATE:	*Ameneh Dialameh / February 6, 2019*	*CONFLICT FLASH:*	Red & Red
CHECKED BY / DATE:	Carmen Lam / February 6, 2019	*DESIGN WALK SPEED:*	1.0 m/s (FDW based on full crossing at 1.2 m/s)
IMPLEMENTATION DATE:	February 7, 2019	*CHANNEL/DROP:*	4022/ 20
		CONTROLLER FIRMWARE:	3.018.1.2976

N

NEMA Phase		OFF	AM	PM	NGHT	WKND	Phase Mode	Remarks
		All Other Times	06:30-09:30 M-F	15:45-18:30 M-F	23:00-06:30 Daily	10:00-19:00 Sat & Sun	(Fixed/Demanded or Callable)	
	Local Plan	Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5		
	Split Table	Split 1	Split 2	Split 3	Split 4	Split 5		
1 NOT USED	WLK							Pedestrian Minimums: EWWK = 7 sec, EWFD = 14 sec NSWK = 7 sec, NSFD = 13 sec NS phase is callable by vehicle or pedestrian actuation. If a vehicle call and/or a pedestrian call is received, the pedestrian minimum will be served. The NSWK and NSFD are only display on the pedestrian signal heads if a vehicle and/or pedestrian call is received. *See back for TSP Instructions. EB & WB TSP enabled on September 12, 2018.
	FDW							
	MIN							
	MAX1							
	AMB							
	ALR							
	SPLIT							
2 Gerrard St E	WLK	7					Fixed POZ activated by Request Loop (max extension of 30 secs in Green/Walk)	
	FDW	14						
	MIN	21						
	MAX1	28						
	AMB	3						
	ALR	3						
	SPLIT	33	43	43	33	43		
3 NOT USED	WLK							
	FDW							
	MIN							
	MAX1							
	AMB							
	ALR							
	SPLIT							
4 Logan Ave	WLK	7					Callable by Wavetronix and/or Pushbutton;	
	FDW	13						
	MIN	20						
	MAX1	20						
	AMB	4						
	ALR	2						
	SPLIT	27	27	27	27	27		
5 NOT USED	WLK							
	FDW							
	MIN							
	MAX1							
	AMB							
	ALR							
	SPLIT							
6 Gerrard St E	WLK	7					Fixed POZ activated by Request Loop (max extension of 30 secs in Green/Walk)	
	FDW	14						
	MIN	21						
	MAX1	28						
	AMB	3						
	ALR	3						
	SPLIT	33	43	43	33	43		
7 NOT USED	WLK							
	FDW							
	MIN							
	MAX1							
	AMB							
	ALR							
	SPLIT							
8 Logan Ave	WLK	7					Callable by Pushbutton	
	FDW	13						
	MIN	20						
	MAX1	20						
	AMB	4						
	ALR	2						
	SPLIT	27	27	27	27	27		
	CL	60	70	70	60	70		
	OF	2	60	59	1	8		

Notes: North leg is One-Way Northbound

LOC: Gerrard St E & Logan Ave

MODE: SAP with PR & TSP*

TCS: 373 **PREPARATION DATE (TIMING CARD):** February 6, 2019

OFFSET CORRECTION PARAMETERS

2.3.4 O.C. Extend / Reduce *(Max. time added & subtracted in sec.)* From page 1

		Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8	[Cycle]	[Slop]
OFF											
Split 1	Ext.	--	23	--	--	--	23	--		60	7
	Rdc.	--	6	--	1	--	6	--	1		
AM											
Split 2	Ext.	--	26	--	--	--	26	--	--	70	17
	Rdc.	--	16	--	1	--	16	--	1		
PM											
Split 3	Ext.	--	26	--	--	--	26	--	--	70	17
	Rdc.	--	16	--	1	--	16	--	1		
NGHT											
Split 4	Ext.	--	26	--	--	--	26	--	--	60	17
	Rdc.	--	16	--	1	--	16	--	1		
WKND											
Split 5	Ext.	--	26	--	--	--	26	--	--	70	17
	Rdc.	--	16	--	1	--	16	--	1		

2.3.2.x O.C. Thres.

Pattern 1: **15** s [25 %]

Pattern 2: **18** s [26 %]

Pattern 3: **18** s [26 %]

Pattern 4: **15** s [25 %]

Pattern 5: **18** s [26 %]

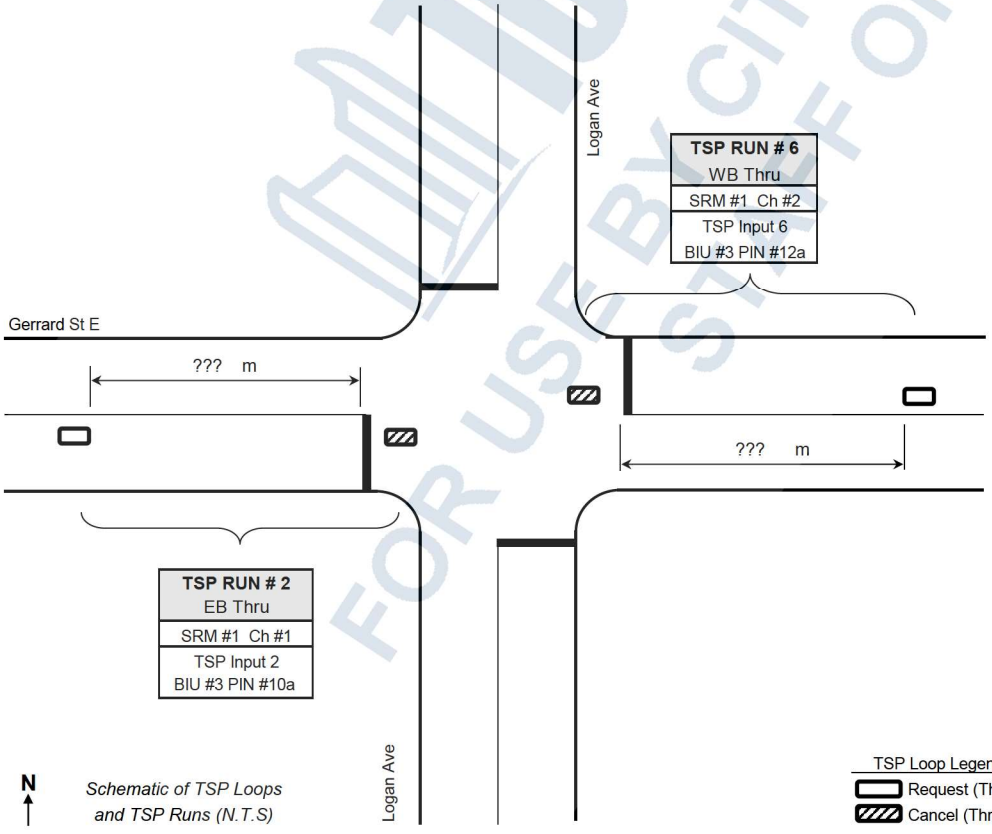
T.S.P. PARAMETERS

PREPARED: AD / CL

	TSP RUN # 2 EB Thru	TSP RUN # 6 WB Thru
2.8.2 Transit Run Parameters		
ATC Green Extend Mode (Equivalent TTC Algorithm)	Mode 2 A	Mode 2 A
2.8.3 Transit Action Plan 1 (Used for all Patterns)		
Run Enable (X = Yes)	X	X
Run Config = **1**	Recovery = 2 (O.C. with delay)	
2.8.4 Transit Run Configuration 1		
Delay / Extend / Fail	-- / -- / 235	-- / -- / 235
CALLS (and Extends)	**Ø 2/6**	**Ø 2/6**
Skips	--	--
Reduces (Truncates)	**Ø 4/8**	**Ø 4/8**

2.8.6 TSP Split Tables: 1, 2, 3, 4 & 5

	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
GRN EXT (SDW Extension)	--	--	--	--	--	--	--	--
GRN RDC (Reduction)	--	--	--	-1	--	--	--	-1
WLK EXT (Walk Extension)	--	30	--	--	--	30	--	--



Schematic of TSP Loops and TSP Runs (N.T.S)

Notes:

Screen 2.1.9.2 Script #2 TSP Filter A used to block TSP calls during PH 4/8 AMB and ALR, and during PH 2/6 in unused time late in the cycle. The script is a workaround with firmware 3.18.2976. TSP calls can be checked on screen 1.2.4 at all times.

ATC Mode	0	2	3	4
TTC Algor'm	**B-2**	**A**	**C**	**D**
Extensions	SDW	Walk	W/SDW	W/SDW

TSP SUMMARY

Maximum Green Extensions:

EWG/EWWK: 30 s Green/Walk

Truncation of phase 4 and 8

LOCATION:	**Gerrard St E & Pape Ave**	*DISTRICT:*	**Toronto & East York**
MODE/COMMENT:	**FXT with TSP***	*COMPUTER SYSTEM:*	**TransSuite**
TCS:	**371**	*CONTROLLER/CABINET TYPE:*	**Peek ATC 1000 / TS2 T1**
PREPARED BY / DATE:	***Alvin Luk / December 17, 2019***	*CONFLICT FLASH:*	**Red & Red**
CHECKED BY / DATE:	**Ameneh Dialameh / January 21, 2020**	*DESIGN WALK SPEED:*	**0.9 m/s (FDW based on full crossing at 1.1 m/s)**
IMPLEMENTATION DATE:	**February 19, 2020**	*CHANNEL/DROP:*	**4022/15**
		CONTROLLER FIRMWARE:	**3.018.1.2976**

N

NEMA Phase		OFF	AM	PM	NGHT	WKND	Phase Mode	Remarks
		All Other Times	06:30-09:30 M-F	15:45-18:30 M-F	23:00-06:30 Daily	10:00-19:00 Sat & Sun	(Fixed/Demanded or Callable)	
	Local Plan	Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5		
	Split Table	Split 1	Split 2	Split 3	Split 4	Split 5		
1 NOT USED	WLK							Pedestrian Minimums: EWWK = 8 sec, EWFD = 13 sec NSWK = 8 sec, NSFD = 15 sec
	FDW							*See back for TSP Instructions.
	MIN							EB & WB TSP enabled on September 12, 2018.
	MAX1							
	AMB							
	ALR							
	SPLIT							
2 Gerrard St E	WLK 8						Fixed POZ activated by Request Loop (max extension of 30 secs in Green/Walk)	
	FDW 13							
	MIN 21							
	MAX1 24							
	AMB 3.0							
	ALR 2.5							
	SPLIT	30	40	40	30	40		
3 NOT USED	WLK							
	FDW							
	MIN							
	MAX1							
	AMB							
	ALR							
	SPLIT							
4 Pape Ave	WLK 8						Fixed	
	FDW 15							
	MIN 23							
	MAX1 23							
	AMB 3.0							
	ALR 3.9							
	SPLIT	30	30	30	30	30		
5 NOT USED	WLK							
	FDW							
	MIN							
	MAX1							
	AMB							
	ALR							
	SPLIT							
6 Gerrard St E	WLK 8						Fixed POZ activated by Request Loop (max extension of 30 secs in Green/Walk)	
	FDW 13							
	MIN 21							
	MAX1 24							
	AMB 3.0							
	ALR 2.5							
	SPLIT	30	40	40	30	40		
7 NOT USED	WLK							
	FDW							
	MIN							
	MAX1							
	AMB							
	ALR							
	SPLIT							
8 Pape Ave	WLK 8						Fixed	
	FDW 15							
	MIN 23							
	MAX1 23							
	AMB 3.0							
	ALR 3.9							
	SPLIT	30	30	30	30	30		
	CL	60	70	70	60	70		
	OF	38	25	25	18	42		

Notes:

LOC: Gerrard St & Pape Ave
MODE: FXT with TSP
TCS: 371 **PREPARATION DATE (TIMING CARD):** December 17, 2019

OFFSET CORRECTION PARAMETERS

2.3.4 O.C. Extend / Reduce *(Max. time added & subtracted in sec.)*

From page 1

		Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8	[Cycle]	[Slop]	2.3.2.x O.C. Thres.
OFF												Pattern 1
Split 1	Ext.	--	12	--	11	--	12	--	11	60	3	12 s [20 %]
	Rdc.	--	3	--	--	--	3	--	--			
AM												Pattern 2
Split 2	Ext.	--	13	--	13	--	13	--	13	70	9	18 s [26 %]
	Rdc.	--	9	--	--	--	9	--	--			
PM												Pattern 3
Split 3	Ext.	--	13	--	13	--	13	--	13	70	9	18 s [26 %]
	Rdc.	--	9	--	--	--	9	--	--			
NIGHT												Pattern 1
Split 4	Ext.	--	12	--	11	--	12	--	11	60	3	12 s [20 %]
	Rdc.	--	3	--	--	--	3	--	--			
WKND												Pattern 5
Split 5	Ext.	--	13	--	13	--	13	--	13	70	9	18 s [26 %]
	Rdc.	--	9	--	--	--	9	--	--			

Pattern 1 and 4 OC Thres set to 3x OC Rdc due to limited slop. Controller could take up to 3 cycles to get back in sync from -TSP Recovery.

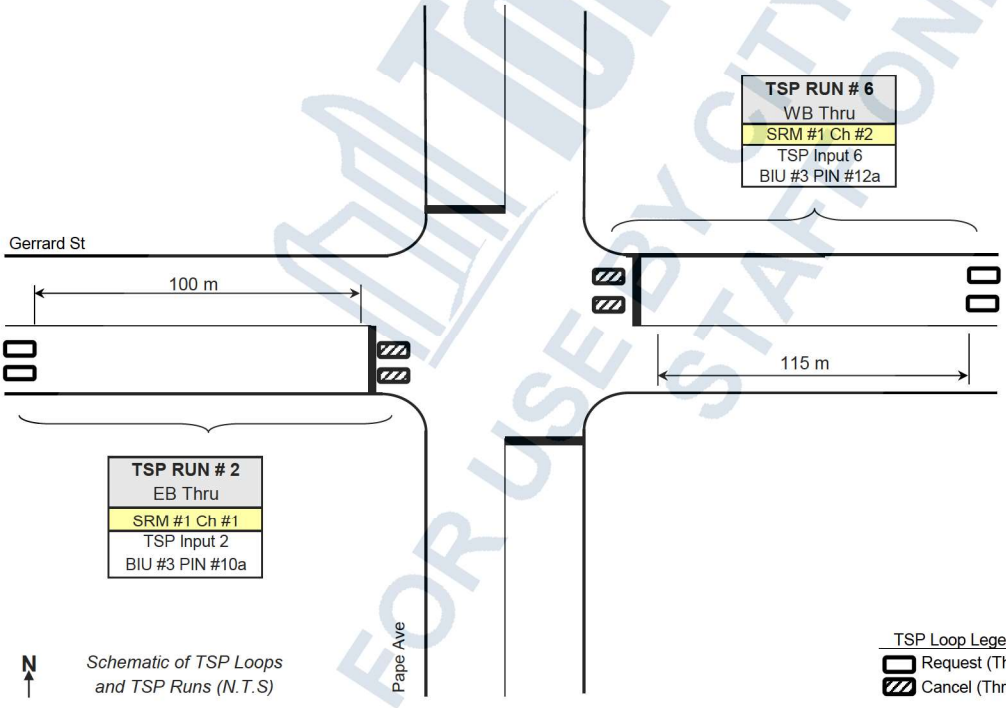
OC Parameters modified to emulate MTSS with FXT operation.

T.S.P. PARAMETERS

PREPARED: AL / AD

	TSP RUN # 2 EB Thru	TSP RUN # 6 WB Thru
2.8.2 Transit Run Parameters		
ATC Green Extend Mode (Equivalent TTC Algorithm)	Mode 2 A	Mode 2 A
2.8.3 Transit Action Plan 1 (Used for all Patterns)		
Run Enable (X = Yes)	X	X
Run Config = **1**	Recovery = 2 (O.C. with delay)	
2.8.4 Transit Run Configuration 1		
Delay / Extend / Fail	-- / -- / 235	-- / -- / 235
CALLS (and Extends)	**Ø 2/6**	**Ø 2/6**
Skips	--	--
Reduces (Truncates)	--	--

2.8.6 TSP Split Tables: 1,2,3,4 & 5	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
GRN EXT (SDW Extension)	--	--	--	--	--	--	--	--
GRN RDC (Reduction)	--	--	--	--	--	--	--	--
WLK EXT (Walk Extension)	--	30	--	--	--	30	--	--



Notes:
Truncation of Phases 4 and 8 permitted to the pedestrian minimum, but there is currently no slop available.

ATC Mode	0	2	3	4
TTC Algor'm	**B-2**	**A**	**C**	**D**
Extensions	SDW	Walk	W/SDW	W/SDW

TSP SUMMARY

Maximum Green Extensions:
EWG: 30 s Green/Walk
Truncation of phases 4 and 8

Appendix B: Detailed Synchro Results

HCM Signalized Intersection Capacity Analysis
1: Logan Ave & Dundas St E

08/31/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	359	31	50	436	52	42	104	58	19	184	10
Future Volume (vph)	23	359	31	50	436	52	42	104	58	19	184	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.8	4.8		4.8	4.8			4.7		4.7	4.7	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99			0.97		1.00	0.99	
Flpb, ped/bikes	0.97	1.00		0.96	1.00			0.98		0.95	1.00	
Frt	1.00	0.99		1.00	0.98			0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1698	1804		1674	1791			1678		1667	1815	
Flt Permitted	0.31	1.00		0.41	1.00			0.90		0.60	1.00	
Satd. Flow (perm)	551	1804		714	1791			1531		1055	1815	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	26	399	34	56	484	58	47	116	64	21	204	11
RTOR Reduction (vph)	0	4	0	0	6	0	0	20	0	0	3	0
Lane Group Flow (vph)	26	429	0	56	536	0	0	207	0	21	212	0
Confl. Peds. (#/hr)	47		50	50		47	60		38	38		60
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	32.2	32.2		32.2	32.2			26.3		26.3	26.3	
Effective Green, g (s)	33.2	33.2		33.2	33.2			27.3		27.3	27.3	
Actuated g/C Ratio	0.47	0.47		0.47	0.47			0.39		0.39	0.39	
Clearance Time (s)	5.8	5.8		5.8	5.8			5.7		5.7	5.7	
Lane Grp Cap (vph)	261	855		338	849			597		411	707	
v/s Ratio Prot		0.24			c0.30						0.12	
v/s Ratio Perm	0.05			0.08				c0.14		0.02		
v/c Ratio	0.10	0.50		0.17	0.63			0.35		0.05	0.30	
Uniform Delay, d1	10.2	12.7		10.5	13.8			15.1		13.3	14.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.8	2.1		1.1	3.5			1.6		0.2	1.1	
Delay (s)	10.9	14.8		11.6	17.4			16.6		13.5	15.8	
Level of Service	B	B		B	B			B		B	B	
Approach Delay (s)		14.6			16.8			16.6			15.6	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.50			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.5	
Intersection Capacity Utilization	88.4%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Logan Ave & Gerrard Street

08/31/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	239	85	128	722	30	57	82	43	0	0	0
Future Volume (vph)	25	239	85	128	722	30	57	82	43	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.95			0.95			1.00				
Frpb, ped/bikes		0.95			1.00			0.97				
Flpb, ped/bikes		1.00			0.98			0.99				
Frt		0.96			0.99			0.97				
Flt Protected		1.00			0.99			0.98				
Satd. Flow (prot)		3177			3217			1686				
Flt Permitted		0.86			0.81			0.98				
Satd. Flow (perm)		2733			2619			1686				
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	28	266	94	142	802	33	63	91	48	0	0	0
RTOR Reduction (vph)	0	40	0	0	3	0	0	15	0	0	0	0
Lane Group Flow (vph)	0	348	0	0	974	0	0	187	0	0	0	0
Confl. Peds. (#/hr)	45		91	91		45	34		44	44		34
Confl. Bikes (#/hr)			22			21			65			25
Parking (#/hr)					0							
Turn Type	Perm	NA		Perm	NA		Perm	NA				
Protected Phases		4			8			2				
Permitted Phases	4			8			2					
Actuated Green, G (s)		43.0			43.0			21.0				
Effective Green, g (s)		44.0			44.0			22.0				
Actuated g/C Ratio		0.58			0.58			0.29				
Clearance Time (s)		6.0			6.0			6.0				
Lane Grp Cap (vph)		1582			1516			488				
v/s Ratio Prot												
v/s Ratio Perm		0.13			c0.37			0.11				
v/c Ratio		0.22			0.64			0.38				
Uniform Delay, d1		7.7			10.7			21.6				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		0.3			2.1			2.3				
Delay (s)		8.0			12.8			23.9				
Level of Service		A			B			C				
Approach Delay (s)		8.0			12.8			23.9			0.0	
Approach LOS		A			B			C			A	

Intersection Summary				
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.56			
Actuated Cycle Length (s)	76.0	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	83.4%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Carlaw Avenue & Dundas St E

08/31/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	333	45	70	423	56	44	185	68	52	453	71
Future Volume (vph)	58	333	45	70	423	56	44	185	68	52	453	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5			3.5			3.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.95			0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00			1.00			0.99	
Frt	1.00	0.98		1.00	0.98			0.97			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99			1.00	
Satd. Flow (prot)	1734	1800		1726	1802			3178			3361	
Flt Permitted	0.28	1.00		0.40	1.00			0.83			0.90	
Satd. Flow (perm)	519	1800		721	1802			2663			3032	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	64	370	50	78	470	62	49	206	76	58	503	79
RTOR Reduction (vph)	0	11	0	0	10	0	0	44	0	0	24	0
Lane Group Flow (vph)	64	409	0	78	522	0	0	287	0	0	616	0
Confl. Peds. (#/hr)	32		37	37		32	41		154	154		41
Confl. Bikes (#/hr)			5			3			18			15
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.0	18.0		18.0	18.0			18.0			18.0	
Effective Green, g (s)	19.0	19.0		19.0	19.0			19.0			19.0	
Actuated g/C Ratio	0.42	0.42		0.42	0.42			0.42			0.42	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Grp Cap (vph)	219	760		304	760			1124			1280	
v/s Ratio Prot		0.23			c0.29							
v/s Ratio Perm	0.12			0.11				0.11			c0.20	
v/c Ratio	0.29	0.54		0.26	0.69			0.26			0.48	
Uniform Delay, d1	8.6	9.7		8.4	10.6			8.4			9.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	3.4	2.7		2.0	5.0			0.5			1.3	
Delay (s)	11.9	12.4		10.5	15.6			9.0			10.7	
Level of Service	B	B		B	B			A			B	
Approach Delay (s)		12.4			14.9			9.0			10.7	
Approach LOS		B			B			A			B	

Intersection Summary				
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.58			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	75.2%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
372: Carlaw Avenue & Gerrard Street /Gerrard Street

08/31/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	190	61	149	730	103	43	198	62	77	408	96
Future Volume (vph)	27	190	61	149	730	103	43	198	62	77	408	96
Ideal Flow (vphpl)	1250	1250	1250	1250	1250	1250	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.8			4.8			4.7			4.7	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frpb, ped/bikes		0.98			0.98			0.97			0.98	
Flpb, ped/bikes		1.00			0.99			1.00			0.99	
Frt		0.97			0.98			0.97			0.98	
Flt Protected		1.00			0.99			0.99			0.99	
Satd. Flow (prot)		2052			2147			3103			3272	
Flt Permitted		0.82			0.82			0.81			0.85	
Satd. Flow (perm)		1699			1784			2545			2795	
Peak-hour factor, PHF	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)	29	207	66	162	793	112	47	215	67	84	443	104
RTOR Reduction (vph)	0	35	0	0	13	0	0	32	0	0	23	0
Lane Group Flow (vph)	0	267	0	0	1054	0	0	297	0	0	608	0
Confl. Peds. (#/hr)	181		93	93		181	90		134	134		90
Confl. Bikes (#/hr)			11			40			63			23
Heavy Vehicles (%)	0%	9%	5%	2%	4%	3%	7%	7%	4%	0%	3%	3%
Bus Blockages (#/hr)	0	0	8	0	0	15	0	0	0	0	0	7
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		32.2			32.2			26.3			26.3	
Effective Green, g (s)		33.2			33.2			27.3			27.3	
Actuated g/C Ratio		0.47			0.47			0.39			0.39	
Clearance Time (s)		5.8			5.8			5.7			5.7	
Lane Grp Cap (vph)		805			846			992			1090	
v/s Ratio Prot												
v/s Ratio Perm		0.16			c0.59			0.12			c0.22	
v/c Ratio		0.33			1.25			0.30			0.56	
Uniform Delay, d1		11.5			18.4			14.7			16.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.1			120.7			0.8			2.1	
Delay (s)		12.6			139.1			15.5			18.7	
Level of Service		B			F			B			B	
Approach Delay (s)		12.6			139.1			15.5			18.7	
Approach LOS		B			F			B			B	

Intersection Summary				
HCM 2000 Control Delay	72.6	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	0.94			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.5	
Intersection Capacity Utilization	111.4%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
1: Logan Ave & Dundas St E

08/31/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	570	35	43	398	52	32	220	74	31	54	13
Future Volume (vph)	50	570	35	43	398	52	32	220	74	31	54	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.8	4.8		4.8	4.8			4.7		4.7	4.7	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99			0.98		1.00	0.98	
Flpb, ped/bikes	0.97	1.00		0.98	1.00			0.99		0.97	1.00	
Frt	1.00	0.99		1.00	0.98			0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1706	1814		1718	1791			1723		1693	1747	
Flt Permitted	0.34	1.00		0.20	1.00			0.97		0.47	1.00	
Satd. Flow (perm)	619	1814		359	1791			1676		831	1747	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	56	633	39	48	442	58	36	244	82	34	60	14
RTOR Reduction (vph)	0	3	0	0	7	0	0	15	0	0	9	0
Lane Group Flow (vph)	56	669	0	48	493	0	0	347	0	34	65	0
Confl. Peds. (#/hr)	35		45	45		35	51		36	36		51
Confl. Bikes (#/hr)			5			5			9			11
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	32.2	32.2		32.2	32.2			26.3		26.3	26.3	
Effective Green, g (s)	33.2	33.2		33.2	33.2			27.3		27.3	27.3	
Actuated g/C Ratio	0.47	0.47		0.47	0.47			0.39		0.39	0.39	
Clearance Time (s)	5.8	5.8		5.8	5.8			5.7		5.7	5.7	
Lane Grp Cap (vph)	293	860		170	849			653		324	681	
v/s Ratio Prot		c0.37			0.28						0.04	
v/s Ratio Perm	0.09			0.13				c0.21		0.04		
v/c Ratio	0.19	0.78		0.28	0.58			0.53		0.10	0.10	
Uniform Delay, d1	10.6	15.3		11.2	13.4			16.4		13.6	13.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	1.4	6.9		4.1	2.9			3.1		0.7	0.3	
Delay (s)	12.1	22.2		15.3	16.2			19.5		14.2	13.8	
Level of Service	B	C		B	B			B		B	B	
Approach Delay (s)		21.4			16.2			19.5			13.9	
Approach LOS		C			B			B			B	

Intersection Summary				
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.67			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.5	
Intersection Capacity Utilization	74.7%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
3: Logan Ave & Gerrard Street

08/31/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	677	56	42	405	45	87	71	166	0	0	0
Future Volume (vph)	81	677	56	42	405	45	87	71	166	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.95			0.95			1.00				
Frpb, ped/bikes		0.97			0.98			0.94				
Flpb, ped/bikes		0.99			0.99			0.97				
Frt		0.99			0.99			0.93				
Flt Protected		1.00			1.00			0.99				
Satd. Flow (prot)		3307			3348			1543				
Flt Permitted		0.83			0.82			0.99				
Satd. Flow (perm)		2758			2767			1543				
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	90	752	62	47	450	50	97	79	184	0	0	0
RTOR Reduction (vph)	0	7	0	0	10	0	0	48	0	0	0	0
Lane Group Flow (vph)	0	897	0	0	537	0	0	312	0	0	0	0
Confl. Peds. (#/hr)	73		225	225		73	83		52	52		83
Confl. Bikes (#/hr)			22			21			65			25
Turn Type	Perm	NA		Perm	NA		Perm	NA				
Protected Phases		4			8			2				
Permitted Phases	4			8			2					
Actuated Green, G (s)		43.0			43.0			21.0				
Effective Green, g (s)		44.0			44.0			22.0				
Actuated g/C Ratio		0.58			0.58			0.29				
Clearance Time (s)		6.0			6.0			6.0				
Lane Grp Cap (vph)		1596			1601			446				
v/s Ratio Prot												
v/s Ratio Perm		c0.33			0.19			0.20				
v/c Ratio		0.56			0.34			0.70				
Uniform Delay, d1		10.0			8.4			24.1				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		1.4			0.6			8.9				
Delay (s)		11.4			8.9			32.9				
Level of Service		B			A			C				
Approach Delay (s)		11.4			8.9			32.9			0.0	
Approach LOS		B			A			C			A	

Intersection Summary				
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	76.0	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	99.2%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
5: Carlaw Avenue & Dundas St E

08/31/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	78	565	32	51	381	60	30	394	99	72	272	82
Future Volume (vph)	78	565	32	51	381	60	30	394	99	72	272	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5			3.5			3.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.97			0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00			1.00			0.99	
Frt	1.00	0.99		1.00	0.98			0.97			0.97	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1742	1823		1738	1798			3288			3303	
Flt Permitted	0.33	1.00		0.21	1.00			0.92			0.80	
Satd. Flow (perm)	597	1823		385	1798			3017			2675	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	87	628	36	57	423	67	33	438	110	80	302	91
RTOR Reduction (vph)	0	5	0	0	13	0	0	45	0	0	46	0
Lane Group Flow (vph)	87	659	0	57	477	0	0	536	0	0	427	0
Confl. Peds. (#/hr)	15		34	34		15	49		107	107		40
Confl. Bikes (#/hr)			4			4			5			26
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.0	18.0		18.0	18.0			18.0			18.0	
Effective Green, g (s)	19.0	19.0		19.0	19.0			19.0			19.0	
Actuated g/C Ratio	0.42	0.42		0.42	0.42			0.42			0.42	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Grp Cap (vph)	252	769		162	759			1273			1129	
v/s Ratio Prot		c0.36			0.27							
v/s Ratio Perm	0.15			0.15				c0.18			0.16	
v/c Ratio	0.35	0.86		0.35	0.63			0.42			0.38	
Uniform Delay, d1	8.8	11.8		8.8	10.2			9.1			8.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	3.7	11.9		5.9	3.9			1.0			1.0	
Delay (s)	12.5	23.7		14.7	14.2			10.2			9.9	
Level of Service	B	C		B	B			B			A	
Approach Delay (s)		22.4			14.2			10.2			9.9	
Approach LOS		C			B			B			A	

Intersection Summary				
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.64			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	80.4%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
372: Carlaw Avenue & Gerrard Street /Gerrard Street

08/31/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	694	63	56	324	138	86	368	85	117	313	74
Future Volume (vph)	77	694	63	56	324	138	86	368	85	117	313	74
Ideal Flow (vphpl)	1250	1250	1250	1250	1250	1250	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.8			4.8			4.7			4.7	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frpb, ped/bikes		0.99			0.93			0.97			0.98	
Flpb, ped/bikes		0.99			1.00			0.99			0.99	
Frt		0.99			0.96			0.98			0.98	
Flt Protected		1.00			0.99			0.99			0.99	
Satd. Flow (prot)		2095			2014			3126			3255	
Flt Permitted		0.84			0.77			0.76			0.66	
Satd. Flow (perm)		1761			1560			2398			2171	
Peak-hour factor, PHF	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)	84	754	68	61	352	150	93	400	92	127	340	80
RTOR Reduction (vph)	0	8	0	0	53	0	0	22	0	0	20	0
Lane Group Flow (vph)	0	898	0	0	510	0	0	563	0	0	527	0
Confl. Peds. (#/hr)	239		120	120		239	129		145	145		129
Confl. Bikes (#/hr)			117			28			63			27
Heavy Vehicles (%)	0%	9%	5%	2%	4%	3%	7%	7%	4%	0%	3%	3%
Bus Blockages (#/hr)	0	0	8	0	0	15	0	0	0	0	0	7
Parking (#/hr)										0		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		32.2			32.2			26.3			26.3	
Effective Green, g (s)		33.2			33.2			27.3			27.3	
Actuated g/C Ratio		0.47			0.47			0.39			0.39	
Clearance Time (s)		5.8			5.8			5.7			5.7	
Lane Grp Cap (vph)		835			739			935			846	
v/s Ratio Prot												
v/s Ratio Perm		c0.51			0.33			0.23			c0.24	
v/c Ratio		1.07			0.69			0.60			0.62	
Uniform Delay, d1		18.4			14.4			17.0			17.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		53.3			5.2			2.9			3.5	
Delay (s)		71.7			19.6			19.9			20.7	
Level of Service		E			B			B			C	
Approach Delay (s)		71.7			19.6			19.9			20.7	
Approach LOS		E			B			B			C	

Intersection Summary				
HCM 2000 Control Delay	38.0	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.87			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.5	
Intersection Capacity Utilization	111.9%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
1: Logan Ave & Dundas St E

08/31/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	374	32	52	454	54	44	108	60	20	191	10
Future Volume (vph)	24	374	32	52	454	54	44	108	60	20	191	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.8	4.8		4.8	4.8			4.7		4.7	4.7	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.96		1.00	0.94			0.85		1.00	0.97	
Flpb, ped/bikes	0.84	1.00		0.78	1.00			0.92		0.67	1.00	
Frt	1.00	0.99		1.00	0.98			0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1467	1742		1357	1709			1369		1171	1779	
Flt Permitted	0.29	1.00		0.39	1.00			0.90		0.59	1.00	
Satd. Flow (perm)	446	1742		554	1709			1245		730	1779	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	27	416	36	58	504	60	49	120	67	22	212	11
RTOR Reduction (vph)	0	4	0	0	6	0	0	20	0	0	2	0
Lane Group Flow (vph)	27	448	0	58	558	0	0	216	0	22	221	0
Confl. Peds. (#/hr)	336		339	339		336	350		326	326		350
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	32.2	32.2		32.2	32.2			26.3		26.3	26.3	
Effective Green, g (s)	33.2	33.2		33.2	33.2			27.3		27.3	27.3	
Actuated g/C Ratio	0.47	0.47		0.47	0.47			0.39		0.39	0.39	
Clearance Time (s)	5.8	5.8		5.8	5.8			5.7		5.7	5.7	
Lane Grp Cap (vph)	211	826		262	810			485		284	693	
v/s Ratio Prot		0.26			c0.33						0.12	
v/s Ratio Perm	0.06			0.10				c0.17		0.03		
v/c Ratio	0.13	0.54		0.22	0.69			0.45		0.08	0.32	
Uniform Delay, d1	10.3	13.0		10.8	14.4			15.8		13.4	14.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	1.2	2.5		1.9	4.8			2.9		0.5	1.2	
Delay (s)	11.5	15.6		12.8	19.1			18.7		14.0	16.1	
Level of Service	B	B		B	B			B		B	B	
Approach Delay (s)		15.3			18.5			18.7			15.9	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.58			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.5	
Intersection Capacity Utilization	90.0%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Logan Ave & Gerrard Street

08/31/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	270	88	133	752	31	59	85	45	0	0	0
Future Volume (vph)	26	270	88	133	752	31	59	85	45	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.95			0.95			1.00				
Frpb, ped/bikes		0.85			0.98			0.92				
Flpb, ped/bikes		0.99			0.95			0.90				
Frt		0.97			0.99			0.97				
Flt Protected		1.00			0.99			0.98				
Satd. Flow (prot)		2839			3039			1444				
Flt Permitted		0.86			0.80			0.98				
Satd. Flow (perm)		2436			2437			1444				
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	29	300	98	148	836	34	66	94	50	0	0	0
RTOR Reduction (vph)	0	37	0	0	3	0	0	15	0	0	0	0
Lane Group Flow (vph)	0	390	0	0	1015	0	0	195	0	0	0	0
Confl. Peds. (#/hr)	799		559	559		799	322		333	333		322
Confl. Bikes (#/hr)			29			23			72			27
Parking (#/hr)					0							
Turn Type	Perm	NA		Perm	NA		Perm	NA				
Protected Phases		4			8			2				
Permitted Phases	4			8			2					
Actuated Green, G (s)		43.0			43.0			21.0				
Effective Green, g (s)		44.0			44.0			22.0				
Actuated g/C Ratio		0.58			0.58			0.29				
Clearance Time (s)		6.0			6.0			6.0				
Lane Grp Cap (vph)		1410			1410			418				
v/s Ratio Prot												
v/s Ratio Perm		0.16			c0.42			0.14				
v/c Ratio		0.28			0.72			0.47				
Uniform Delay, d1		8.0			11.5			22.2				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		0.5			3.2			3.7				
Delay (s)		8.5			14.7			25.9				
Level of Service		A			B			C				
Approach Delay (s)		8.5			14.7			25.9			0.0	
Approach LOS		A			B			C			A	

Intersection Summary				
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.63			
Actuated Cycle Length (s)	76.0	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	85.1%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Carlaw Avenue & Dundas St E

08/31/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	347	47	73	440	58	46	219	71	54	479	74
Future Volume (vph)	60	347	47	73	440	58	46	219	71	54	479	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5			3.5			3.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.97			0.91			0.96	
Flpb, ped/bikes	0.91	1.00		0.89	1.00			0.98			0.98	
Frt	1.00	0.98		1.00	0.98			0.97			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99			1.00	
Satd. Flow (prot)	1599	1755		1549	1758			3020			3217	
Flt Permitted	0.26	1.00		0.38	1.00			0.83			0.89	
Satd. Flow (perm)	444	1755		617	1758			2527			2886	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	67	386	52	81	489	64	51	243	79	60	532	82
RTOR Reduction (vph)	0	3	0	0	10	0	0	20	0	0	15	0
Lane Group Flow (vph)	67	435	0	81	543	0	0	353	0	0	659	0
Confl. Peds. (#/hr)	320		325	325		320	494		317	317		494
Confl. Bikes (#/hr)			5			3			18			15
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.0	18.0		18.0	18.0			18.0			18.0	
Effective Green, g (s)	19.0	19.0		19.0	19.0			19.0			19.0	
Actuated g/C Ratio	0.42	0.42		0.42	0.42			0.42			0.42	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Grp Cap (vph)	187	741		260	742			1066			1218	
v/s Ratio Prot		0.25			c0.31							
v/s Ratio Perm	0.15			0.13				0.14			c0.23	
v/c Ratio	0.36	0.59		0.31	0.73			0.33			0.54	
Uniform Delay, d1	8.8	10.0		8.6	10.9			8.7			9.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	5.3	3.4		3.1	6.3			0.8			1.7	
Delay (s)	14.1	13.4		11.8	17.1			9.6			11.5	
Level of Service	B	B		B	B			A			B	
Approach Delay (s)		13.5			16.5			9.6			11.5	
Approach LOS		B			B			A			B	

Intersection Summary				
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.64			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	78.6%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
372: Carlaw Avenue & Gerrard Street /Gerrard Street

08/31/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	204	72	161	766	114	51	220	71	86	432	106
Future Volume (vph)	35	204	72	161	766	114	51	220	71	86	432	106
Ideal Flow (vphpl)	1250	1250	1250	1250	1250	1250	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.8			4.8			4.7			4.7	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frpb, ped/bikes		0.92			0.95			0.92			0.92	
Flpb, ped/bikes		0.99			0.97			0.98			0.97	
Frt		0.97			0.98			0.97			0.97	
Flt Protected		0.99			0.99			0.99			0.99	
Satd. Flow (prot)		1915			2034			2897			3017	
Flt Permitted		0.79			0.81			0.79			0.83	
Satd. Flow (perm)		1519			1663			2310			2530	
Peak-hour factor, PHF	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)	38	222	78	175	833	124	55	239	77	93	470	115
RTOR Reduction (vph)	0	0	0	0	2	0	0	12	0	0	0	0
Lane Group Flow (vph)	0	338	0	0	1130	0	0	359	0	0	678	0
Confl. Peds. (#/hr)	939		592	592		939	1008		679	679		1008
Confl. Bikes (#/hr)			19			50			74			32
Heavy Vehicles (%)	0%	9%	5%	2%	4%	3%	7%	7%	4%	0%	3%	3%
Bus Blockages (#/hr)	0	0	8	0	0	15	0	0	0	0	0	7
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		33.2			32.2			26.3			26.3	
Effective Green, g (s)		34.2			33.2			27.3			27.3	
Actuated g/C Ratio		0.49			0.47			0.39			0.39	
Clearance Time (s)		4.8			5.8			5.7			5.7	
Lane Grp Cap (vph)		742			788			900			986	
v/s Ratio Prot												
v/s Ratio Perm		0.22			c0.68			0.16			c0.27	
v/c Ratio		0.46			1.43			0.40			0.69	
Uniform Delay, d1		11.8			18.4			15.4			17.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.0			202.8			1.3			3.9	
Delay (s)		13.8			221.2			16.7			21.7	
Level of Service		B			F			B			C	
Approach Delay (s)		13.8			221.2			16.7			21.7	
Approach LOS		B			F			B			C	

Intersection Summary				
HCM 2000 Control Delay	109.6	HCM 2000 Level of Service	F	
HCM 2000 Volume to Capacity ratio	1.10			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.5	
Intersection Capacity Utilization	116.2%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
1: Logan Ave & Dundas St E

08/31/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	593	36	45	414	54	33	229	77	32	56	14
Future Volume (vph)	52	593	36	45	414	54	33	229	77	32	56	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.8	4.8		4.8	4.8			4.7		4.7	4.7	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.98			0.96		1.00	0.96	
Flpb, ped/bikes	0.95	1.00		1.00	1.00			0.99		0.94	1.00	
Frt	1.00	0.99		1.00	0.98			0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1669	1808		1750	1778			1687		1644	1715	
Flt Permitted	0.33	1.00		0.18	1.00			0.97		0.45	1.00	
Satd. Flow (perm)	575	1808		324	1778			1641		785	1715	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	58	659	40	50	460	60	37	254	86	36	62	16
RTOR Reduction (vph)	0	3	0	0	7	0	0	15	0	0	10	0
Lane Group Flow (vph)	58	696	0	50	513	0	0	362	0	36	68	0
Confl. Peds. (#/hr)	68		79	79		68	85		69	69		85
Confl. Bikes (#/hr)			5			5			10			12
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	32.2	32.2		32.2	32.2			26.3		26.3	26.3	
Effective Green, g (s)	33.2	33.2		33.2	33.2			27.3		27.3	27.3	
Actuated g/C Ratio	0.47	0.47		0.47	0.47			0.39		0.39	0.39	
Clearance Time (s)	5.8	5.8		5.8	5.8			5.7		5.7	5.7	
Lane Grp Cap (vph)	272	857		153	843			639		306	668	
v/s Ratio Prot		c0.38			0.29						0.04	
v/s Ratio Perm	0.10			0.15				c0.22		0.05		
v/c Ratio	0.21	0.81		0.33	0.61			0.57		0.12	0.10	
Uniform Delay, d1	10.8	15.7		11.4	13.6			16.7		13.6	13.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	1.8	8.3		5.6	3.3			3.6		0.8	0.3	
Delay (s)	12.5	24.0		17.1	16.9			20.3		14.4	13.9	
Level of Service	B	C		B	B			C		B	B	
Approach Delay (s)		23.1			16.9			20.3			14.0	
Approach LOS		C			B			C			B	

Intersection Summary				
HCM 2000 Control Delay	20.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.5	
Intersection Capacity Utilization	77.5%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
3: Logan Ave & Gerrard Street

08/31/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	727	58	44	421	47	91	74	173	0	0	0
Future Volume (vph)	84	727	58	44	421	47	91	74	173	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.95			0.95			1.00				
Frpb, ped/bikes		0.96			0.95			0.93				
Flpb, ped/bikes		0.98			0.99			0.96				
Frt		0.99			0.99			0.93				
Flt Protected		1.00			1.00			0.99				
Satd. Flow (prot)		3221			3225			1510				
Flt Permitted		0.83			0.81			0.99				
Satd. Flow (perm)		2676			2630			1510				
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	93	808	64	49	468	52	101	82	192	0	0	0
RTOR Reduction (vph)	0	7	0	0	10	0	0	6	0	0	0	0
Lane Group Flow (vph)	0	958	0	0	559	0	0	369	0	0	0	0
Confl. Peds. (#/hr)	339		594	594		339	120		86	86		120
Confl. Bikes (#/hr)			44			5			27			54
Turn Type	Perm	NA		Perm	NA		Perm	NA				
Protected Phases		4			8			2				
Permitted Phases	4			8			2					
Actuated Green, G (s)		43.0			43.0			21.0				
Effective Green, g (s)		44.0			44.0			22.0				
Actuated g/C Ratio		0.58			0.58			0.29				
Clearance Time (s)		6.0			6.0			6.0				
Lane Grp Cap (vph)		1549			1522			437				
v/s Ratio Prot												
v/s Ratio Perm		c0.36			0.21			0.24				
v/c Ratio		0.62			0.37			0.84				
Uniform Delay, d1		10.5			8.6			25.4				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		1.9			0.7			17.7				
Delay (s)		12.4			9.2			43.1				
Level of Service		B			A			D				
Approach Delay (s)		12.4			9.2			43.1			0.0	
Approach LOS		B			A			D			A	

Intersection Summary				
HCM 2000 Control Delay	17.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.69			
Actuated Cycle Length (s)	76.0	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	102.4%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
5: Carlaw Avenue & Dundas St E

08/31/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	586	33	53	397	62	31	444	103	75	298	85
Future Volume (vph)	81	586	33	53	397	62	31	444	103	75	298	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5			3.5			3.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.97			0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00			1.00			0.99	
Frt	1.00	0.99		1.00	0.98			0.97			0.97	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1726	1821		1728	1793			3280			3291	
Flt Permitted	0.31	1.00		0.21	1.00			0.91			0.79	
Satd. Flow (perm)	556	1821		383	1793			3008			2631	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	90	651	37	59	441	69	34	493	114	83	331	94
RTOR Reduction (vph)	0	5	0	0	13	0	0	41	0	0	43	0
Lane Group Flow (vph)	90	683	0	59	497	0	0	600	0	0	465	0
Confl. Peds. (#/hr)	46		67	67		46	73		136	136		73
Confl. Bikes (#/hr)			4			4						28
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.0	18.0		18.0	18.0			18.0			18.0	
Effective Green, g (s)	19.0	19.0		19.0	19.0			19.0			19.0	
Actuated g/C Ratio	0.42	0.42		0.42	0.42			0.42			0.42	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Grp Cap (vph)	234	768		161	757			1270			1110	
v/s Ratio Prot		c0.38			0.28							
v/s Ratio Perm	0.16			0.15				c0.20			0.18	
v/c Ratio	0.38	0.89		0.37	0.66			0.47			0.42	
Uniform Delay, d1	9.0	12.0		8.9	10.4			9.4			9.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	4.7	14.6		6.3	4.4			1.3			1.2	
Delay (s)	13.7	26.6		15.2	14.8			10.6			10.3	
Level of Service	B	C		B	B			B			B	
Approach Delay (s)		25.2			14.9			10.6			10.3	
Approach LOS		C			B			B			B	

Intersection Summary				
HCM 2000 Control Delay	16.1	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	83.3%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
372: Carlaw Avenue & Gerrard Street /Gerrard Street

08/31/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	729	79	64	344	152	96	403	94	127	340	84
Future Volume (vph)	90	729	79	64	344	152	96	403	94	127	340	84
Ideal Flow (vphpl)	1250	1250	1250	1250	1250	1250	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.8			4.8			4.7			4.7	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frpb, ped/bikes		0.97			0.88			0.94			0.93	
Flpb, ped/bikes		0.98			0.99			0.97			0.97	
Frt		0.99			0.96			0.98			0.98	
Flt Protected		1.00			0.99			0.99			0.99	
Satd. Flow (prot)		2034			1897			2966			3047	
Flt Permitted		0.75			0.63			0.76			0.67	
Satd. Flow (perm)		1532			1210			2284			2071	
Peak-hour factor, PHF	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)	98	792	86	70	374	165	104	438	102	138	370	91
RTOR Reduction (vph)	0	1	0	0	7	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	975	0	0	602	0	0	644	0	0	599	0
Confl. Peds. (#/hr)	912		543	543		912	967		601	601		967
Confl. Bikes (#/hr)			139			42			56			41
Heavy Vehicles (%)	0%	9%	5%	2%	4%	3%	7%	7%	4%	0%	3%	3%
Bus Blockages (#/hr)	0	0	8	0	0	15	0	0	0	0	0	7
Parking (#/hr)										0		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		24.2			24.2			34.3			34.3	
Effective Green, g (s)		25.2			25.2			35.3			35.3	
Actuated g/C Ratio		0.36			0.36			0.50			0.50	
Clearance Time (s)		5.8			5.8			5.7			5.7	
Lane Grp Cap (vph)		551			435			1151			1044	
v/s Ratio Prot												
v/s Ratio Perm		c0.64			0.50			0.28			c0.29	
v/c Ratio		1.77			1.38			0.56			0.57	
Uniform Delay, d1		22.4			22.4			12.0			12.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		353.9			186.5			2.0			2.3	
Delay (s)		376.3			208.9			13.9			14.4	
Level of Service		F			F			B			B	
Approach Delay (s)		376.3			208.9			13.9			14.4	
Approach LOS		F			F			B			B	

Intersection Summary				
HCM 2000 Control Delay	181.1	HCM 2000 Level of Service	F	
HCM 2000 Volume to Capacity ratio	1.07			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.5	
Intersection Capacity Utilization	119.3%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
1: Logan Ave & Dundas St E

08/31/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	374	47	73	440	58	44	108	60	20	191	10
Future Volume (vph)	60	374	47	73	440	58	44	108	60	20	191	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.8	4.8		4.8	4.8			4.7		4.7	4.7	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.94		1.00	0.94			0.84		1.00	0.97	
Flpb, ped/bikes	0.83	1.00		0.79	1.00			0.92		0.66	1.00	
Frt	1.00	0.98		1.00	0.98			0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1457	1702		1374	1697			1346		1150	1776	
Flt Permitted	0.30	1.00		0.37	1.00			0.90		0.59	1.00	
Satd. Flow (perm)	458	1702		540	1697			1223		717	1776	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	67	416	52	81	489	64	49	120	67	22	212	11
RTOR Reduction (vph)	0	6	0	0	7	0	0	20	0	0	2	0
Lane Group Flow (vph)	67	462	0	81	546	0	0	216	0	22	221	0
Confl. Peds. (#/hr)	336		339	339		336	400		377	377		400
Confl. Bikes (#/hr)			5			3			55			36
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	32.2	32.2		32.2	32.2			26.3		26.3	26.3	
Effective Green, g (s)	33.2	33.2		33.2	33.2			27.3		27.3	27.3	
Actuated g/C Ratio	0.47	0.47		0.47	0.47			0.39		0.39	0.39	
Clearance Time (s)	5.8	5.8		5.8	5.8			5.7		5.7	5.7	
Lane Grp Cap (vph)	217	807		256	804			476		279	692	
v/s Ratio Prot		0.27			c0.32						0.12	
v/s Ratio Perm	0.15			0.15				c0.18		0.03		
v/c Ratio	0.31	0.57		0.32	0.68			0.45		0.08	0.32	
Uniform Delay, d1	11.3	13.3		11.4	14.3			15.8		13.4	14.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	3.7	2.9		3.2	4.6			3.1		0.6	1.2	
Delay (s)	15.0	16.2		14.6	18.9			18.9		14.0	16.1	
Level of Service	B	B		B	B			B		B	B	
Approach Delay (s)		16.1			18.3			18.9			15.9	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM 2000 Control Delay	17.3	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.58			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.5	
Intersection Capacity Utilization	96.0%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
3: Logan Ave & Gerrard Street

08/31/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	270	88	133	774	31	59	85	45	0	0	0
Future Volume (vph)	26	270	88	133	774	31	59	85	45	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.95			0.95			1.00				
Frpb, ped/bikes		0.85			0.98			0.92				
Flpb, ped/bikes		0.99			0.95			0.90				
Frt		0.97			1.00			0.97				
Flt Protected		1.00			0.99			0.98				
Satd. Flow (prot)		2840			3045			1444				
Flt Permitted		0.85			0.80			0.98				
Satd. Flow (perm)		2431			2450			1444				
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	29	300	98	148	860	34	66	94	50	0	0	0
RTOR Reduction (vph)	0	37	0	0	3	0	0	15	0	0	0	0
Lane Group Flow (vph)	0	390	0	0	1039	0	0	195	0	0	0	0
Confl. Peds. (#/hr)	799		559	559		799	322		333	333		322
Confl. Bikes (#/hr)			29			23			74			27
Parking (#/hr)					0							
Turn Type	Perm	NA		Perm	NA		Perm	NA				
Protected Phases		4			8			2				
Permitted Phases	4			8			2					
Actuated Green, G (s)		43.0			43.0			21.0				
Effective Green, g (s)		44.0			44.0			22.0				
Actuated g/C Ratio		0.58			0.58			0.29				
Clearance Time (s)		6.0			6.0			6.0				
Lane Grp Cap (vph)		1407			1418			418				
v/s Ratio Prot												
v/s Ratio Perm		0.16			c0.42			0.14				
v/c Ratio		0.28			0.73			0.47				
Uniform Delay, d1		8.0			11.7			22.2				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		0.5			3.4			3.7				
Delay (s)		8.5			15.1			25.9				
Level of Service		A			B			C				
Approach Delay (s)		8.5			15.1			25.9			0.0	
Approach LOS		A			B			C			A	

Intersection Summary				
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.64			
Actuated Cycle Length (s)	76.0	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	85.1%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
5: Carlaw Avenue & Dundas St E

08/31/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	347	47	73	440	58	46	281	71	54	561	74
Future Volume (vph)	60	347	47	73	440	58	46	281	71	54	561	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5			3.5			3.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.97			0.90			0.96	
Flpb, ped/bikes	0.91	1.00		0.89	1.00			0.99			0.98	
Frt	1.00	0.98		1.00	0.98			0.97			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99			1.00	
Satd. Flow (prot)	1596	1755		1549	1757			3027			3233	
Flt Permitted	0.26	1.00		0.38	1.00			0.83			0.89	
Satd. Flow (perm)	443	1755		617	1757			2534			2895	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	67	386	52	81	489	64	51	312	79	60	623	82
RTOR Reduction (vph)	0	1	0	0	10	0	0	20	0	0	14	0
Lane Group Flow (vph)	67	437	0	81	543	0	0	422	0	0	751	0
Confl. Peds. (#/hr)	326		325	325		326	589		411	411		589
Confl. Bikes (#/hr)			5			3			50			53
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.0	18.0		18.0	18.0			18.0			18.0	
Effective Green, g (s)	19.0	19.0		19.0	19.0			19.0			19.0	
Actuated g/C Ratio	0.42	0.42		0.42	0.42			0.42			0.42	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Grp Cap (vph)	187	741		260	741			1069			1222	
v/s Ratio Prot		0.25			c0.31							
v/s Ratio Perm	0.15			0.13				0.17			c0.26	
v/c Ratio	0.36	0.59		0.31	0.73			0.39			0.61	
Uniform Delay, d1	8.8	10.0		8.6	10.9			9.0			10.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	5.3	3.4		3.1	6.3			1.1			2.3	
Delay (s)	14.1	13.4		11.8	17.2			10.1			12.5	
Level of Service	B	B		B	B			B			B	
Approach Delay (s)		13.5			16.5			10.1			12.5	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: Carlaw Avenue & Thackeray St/Badgerow Ave

08/31/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	5	86	10	5	10	70	330	5	5	676	12
Future Volume (vph)	79	5	86	10	5	10	70	330	5	5	676	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			3.5			3.5	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.97			0.98			0.99			0.99	
Flpb, ped/bikes		0.98			0.99			0.97			1.00	
Frt		0.93			0.95			1.00			1.00	
Flt Protected		0.98			0.98			0.99			1.00	
Satd. Flow (prot)		1600			1654			3327			3448	
Flt Permitted		0.85			0.87			0.78			0.95	
Satd. Flow (perm)		1385			1468			2631			3284	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	88	6	96	11	6	11	78	367	6	6	751	13
RTOR Reduction (vph)	0	0	0	0	0	0	0	2	0	0	2	0
Lane Group Flow (vph)	0	190	0	0	28	0	0	449	0	0	768	0
Confl. Peds. (#/hr)	63		63	63		63	863		350	350		863
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.6			9.6			22.7			22.7	
Effective Green, g (s)		10.6			10.6			23.7			23.7	
Actuated g/C Ratio		0.26			0.26			0.57			0.57	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		355			376			1509			1884	
v/s Ratio Prot												
v/s Ratio Perm		c0.14			0.02			0.17			c0.23	
v/c Ratio		0.54			0.07			0.30			0.41	
Uniform Delay, d1		13.2			11.6			4.5			4.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.6			0.1			0.5			0.7	
Delay (s)		14.8			11.7			5.0			5.6	
Level of Service		B			B			A			A	
Approach Delay (s)		14.8			11.7			5.0			5.6	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	41.3	Sum of lost time (s)	7.0
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
372: Carlaw Avenue & Gerrard Street /Gerrard Street 08/31/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	204	73	167	766	114	73	256	88	86	436	106
Future Volume (vph)	35	204	73	167	766	114	73	256	88	86	436	106
Ideal Flow (vphpl)	1250	1250	1250	1250	1250	1250	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.8			4.8			4.7			4.7	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frpb, ped/bikes		0.91			0.95			0.92			0.92	
Flpb, ped/bikes		0.99			0.96			0.97			0.97	
Frt		0.97			0.98			0.97			0.97	
Flt Protected		0.99			0.99			0.99			0.99	
Satd. Flow (prot)		1913			2032			2875			3032	
Flt Permitted		0.79			0.81			0.72			0.82	
Satd. Flow (perm)		1514			1655			2085			2489	
Peak-hour factor, PHF	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)	38	222	79	182	833	124	79	278	96	93	474	115
RTOR Reduction (vph)	0	0	0	0	1	0	0	12	0	0	0	0
Lane Group Flow (vph)	0	339	0	0	1138	0	0	441	0	0	682	0
Confl. Peds. (#/hr)	939		592	592		939	1008		683	683		1008
Confl. Bikes (#/hr)			19			50			77			32
Heavy Vehicles (%)	0%	9%	5%	2%	4%	3%	7%	7%	4%	0%	3%	3%
Bus Blockages (#/hr)	0	0	8	0	0	15	0	0	0	0	0	7
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		33.2			32.2			26.3			26.3	
Effective Green, g (s)		34.2			33.2			27.3			27.3	
Actuated g/C Ratio		0.49			0.47			0.39			0.39	
Clearance Time (s)		4.8			5.8			5.7			5.7	
Lane Grp Cap (vph)		739			784			813			970	
v/s Ratio Prot												
v/s Ratio Perm		0.22			c0.69			0.21			c0.27	
v/c Ratio		0.46			1.45			0.54			0.70	
Uniform Delay, d1		11.8			18.4			16.5			17.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.0			210.3			2.6			4.3	
Delay (s)		13.8			228.7			19.1			22.2	
Level of Service		B			F			B			C	
Approach Delay (s)		13.8			228.7			19.1			22.2	
Approach LOS		B			F			B			C	

Intersection Summary			
HCM 2000 Control Delay	110.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	116.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1: Logan Ave & Dundas St E

08/31/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	588	33	53	397	62	33	229	77	20	191	10
Future Volume (vph)	81	588	33	53	397	62	33	229	77	20	191	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.8	4.8		4.8	4.8			4.7		4.7	4.7	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.98			0.94		1.00	0.99	
Flpb, ped/bikes	0.95	1.00		1.00	1.00			0.98		0.90	1.00	
Frt	1.00	0.99		1.00	0.98			0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1667	1810		1750	1767			1646		1572	1803	
Flt Permitted	0.34	1.00		0.18	1.00			0.95		0.45	1.00	
Satd. Flow (perm)	590	1810		338	1767			1577		751	1803	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	90	653	37	59	441	69	37	254	86	22	212	11
RTOR Reduction (vph)	0	3	0	0	8	0	0	15	0	0	2	0
Lane Group Flow (vph)	90	687	0	59	502	0	0	362	0	22	221	0
Confl. Peds. (#/hr)	68		79	79		68	132		116	116		132
Confl. Bikes (#/hr)			4			4			10			12
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	32.2	32.2		32.2	32.2			26.3		26.3	26.3	
Effective Green, g (s)	33.2	33.2		33.2	33.2			27.3		27.3	27.3	
Actuated g/C Ratio	0.47	0.47		0.47	0.47			0.39		0.39	0.39	
Clearance Time (s)	5.8	5.8		5.8	5.8			5.7		5.7	5.7	
Lane Grp Cap (vph)	279	858		160	838			615		292	703	
v/s Ratio Prot		c0.38			0.28						0.12	
v/s Ratio Perm	0.15			0.17				c0.23		0.03		
v/c Ratio	0.32	0.80		0.37	0.60			0.59		0.08	0.31	
Uniform Delay, d1	11.4	15.6		11.7	13.5			16.9		13.4	14.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	3.0	7.7		6.4	3.2			4.1		0.5	1.2	
Delay (s)	14.5	23.3		18.1	16.7			21.0		13.9	16.0	
Level of Service	B	C		B	B			C		B	B	
Approach Delay (s)		22.3			16.8			21.0			15.8	
Approach LOS		C			B			C			B	

Intersection Summary				
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.5	
Intersection Capacity Utilization	104.1%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
3: Logan Ave & Gerrard Street

08/31/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	745	58	44	421	47	91	74	173	0	0	0
Future Volume (vph)	84	745	58	44	421	47	91	74	173	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.95			0.95			1.00				
Frpb, ped/bikes		0.96			0.95			0.93				
Flpb, ped/bikes		0.98			0.99			0.96				
Frt		0.99			0.99			0.93				
Flt Protected		1.00			1.00			0.99				
Satd. Flow (prot)		3226			3066			1510				
Flt Permitted		0.83			0.81			0.99				
Satd. Flow (perm)		2687			2491			1510				
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	93	828	64	49	468	52	101	82	192	0	0	0
RTOR Reduction (vph)	0	7	0	0	10	0	0	6	0	0	0	0
Lane Group Flow (vph)	0	978	0	0	559	0	0	369	0	0	0	0
Confl. Peds. (#/hr)	339		594	594		339	120		86	86		120
Confl. Bikes (#/hr)			44			5			27			64
Parking (#/hr)					0							
Turn Type	Perm	NA		Perm	NA		Perm	NA				
Protected Phases		4			8			2				
Permitted Phases	4			8			2					
Actuated Green, G (s)		43.0			43.0			21.0				
Effective Green, g (s)		44.0			44.0			22.0				
Actuated g/C Ratio		0.58			0.58			0.29				
Clearance Time (s)		6.0			6.0			6.0				
Lane Grp Cap (vph)		1555			1442			437				
v/s Ratio Prot												
v/s Ratio Perm		c0.36			0.22			0.24				
v/c Ratio		0.63			0.39			0.85				
Uniform Delay, d1		10.6			8.7			25.4				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		1.9			0.8			17.9				
Delay (s)		12.5			9.5			43.3				
Level of Service		B			A			D				
Approach Delay (s)		12.5			9.5			43.3			0.0	
Approach LOS		B			A			D			A	

Intersection Summary				
HCM 2000 Control Delay	17.6	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	76.0	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	102.9%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
5: Carlaw Avenue & Dundas St E

08/31/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	588	33	53	397	62	31	518	103	75	389	85
Future Volume (vph)	81	588	33	53	397	62	31	518	103	75	389	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5			3.5			3.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.96			0.98	
Flpb, ped/bikes	0.99	1.00		0.99	1.00			1.00			0.99	
Frt	1.00	0.99		1.00	0.98			0.98			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1726	1821		1728	1793			3262			3295	
Flt Permitted	0.31	1.00		0.21	1.00			0.91			0.80	
Satd. Flow (perm)	556	1821		383	1793			2982			2641	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	90	653	37	59	441	69	34	576	114	83	432	94
RTOR Reduction (vph)	0	5	0	0	13	0	0	34	0	0	33	0
Lane Group Flow (vph)	90	685	0	59	497	0	0	690	0	0	576	0
Confl. Peds. (#/hr)	46		67	67		46	133		196	196		133
Confl. Bikes (#/hr)			4			4			5			28
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.0	18.0		18.0	18.0			18.0			18.0	
Effective Green, g (s)	19.0	19.0		19.0	19.0			19.0			19.0	
Actuated g/C Ratio	0.42	0.42		0.42	0.42			0.42			0.42	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Grp Cap (vph)	234	768		161	757			1259			1115	
v/s Ratio Prot		c0.38			0.28							
v/s Ratio Perm	0.16			0.15				c0.23			0.22	
v/c Ratio	0.38	0.89		0.37	0.66			0.55			0.52	
Uniform Delay, d1	9.0	12.1		8.9	10.4			9.8			9.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	4.7	14.9		6.3	4.4			1.7			1.7	
Delay (s)	13.7	26.9		15.2	14.8			11.5			11.3	
Level of Service	B	C		B	B			B			B	
Approach Delay (s)		25.4			14.9			11.5			11.3	
Approach LOS		C			B			B			B	

Intersection Summary				
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.72			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	87.1%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

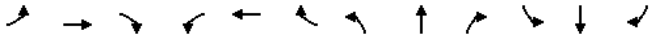
HCM Signalized Intersection Capacity Analysis
8: Carlaw Avenue & Thackeray St/Badgerow Ave

08/31/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	5	95	10	5	10	76	576	10	5	540	58
Future Volume (vph)	19	5	95	10	5	10	76	576	10	5	540	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			3.5			3.5	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.94			0.98			1.00			0.99	
Flpb, ped/bikes		0.99			0.99			1.00			1.00	
Frt		0.89			0.95			1.00			0.99	
Flt Protected		0.99			0.98			0.99			1.00	
Satd. Flow (prot)		1523			1651			3457			3411	
Flt Permitted		0.95			0.86			0.83			0.95	
Satd. Flow (perm)		1458			1454			2897			3242	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	21	6	106	11	6	11	84	640	11	6	600	64
RTOR Reduction (vph)	0	85	0	0	0	0	0	1	0	0	12	0
Lane Group Flow (vph)	0	48	0	0	28	0	0	734	0	0	658	0
Confl. Peds. (#/hr)	60		60	60		60	60		65	65		60
Confl. Bikes (#/hr)			23			5			5			41
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.2			7.2			24.7			24.7	
Effective Green, g (s)		8.2			8.2			25.7			25.7	
Actuated g/C Ratio		0.20			0.20			0.63			0.63	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		292			291			1820			2037	
v/s Ratio Prot												
v/s Ratio Perm		c0.03			0.02			c0.25			0.20	
v/c Ratio		0.17			0.10			0.40			0.32	
Uniform Delay, d1		13.5			13.3			3.8			3.5	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.3			0.1			0.7			0.4	
Delay (s)		13.8			13.5			4.4			4.0	
Level of Service		B			B			A			A	
Approach Delay (s)		13.8			13.5			4.4			4.0	
Approach LOS		B			B			A			A	

Intersection Summary				
HCM 2000 Control Delay	5.2	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.35			
Actuated Cycle Length (s)	40.9	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	60.4%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
372: Carlaw Avenue & Gerrard Street /Gerrard Street 08/31/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	729	97	79	344	152	101	412	101	127	363	84
Future Volume (vph)	90	729	97	79	344	152	101	412	101	127	363	84
Ideal Flow (vphpl)	1250	1250	1250	1250	1250	1250	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.8			4.8			4.7			4.7	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frpb, ped/bikes		0.96			0.89			0.94			0.94	
Flpb, ped/bikes		0.98			0.99			0.97			0.97	
Frt		0.98			0.96			0.98			0.98	
Flt Protected		1.00			0.99			0.99			0.99	
Satd. Flow (prot)		2017			1901			2960			3071	
Flt Permitted		0.82			0.66			0.70			0.63	
Satd. Flow (perm)		1660			1267			2086			1945	
Peak-hour factor, PHF	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)	98	792	105	86	374	165	110	448	110	138	395	91
RTOR Reduction (vph)	0	0	0	0	1	0	0	3	0	0	1	0
Lane Group Flow (vph)	0	995	0	0	624	0	0	665	0	0	623	0
Confl. Peds. (#/hr)	912		543	543		912	967		602	602		967
Confl. Bikes (#/hr)			139			42			56			41
Heavy Vehicles (%)	0%	9%	5%	2%	4%	3%	7%	7%	4%	0%	3%	3%
Bus Blockages (#/hr)	0	0	8	0	0	15	0	0	0	0	0	7
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		33.2			32.2			26.3			26.3	
Effective Green, g (s)		34.2			33.2			27.3			27.3	
Actuated g/C Ratio		0.49			0.47			0.39			0.39	
Clearance Time (s)		4.8			5.8			5.7			5.7	
Lane Grp Cap (vph)		811			600			813			758	
v/s Ratio Prot												
v/s Ratio Perm		c0.60			0.49			0.32			c0.32	
v/c Ratio		1.23			1.04			0.82			0.82	
Uniform Delay, d1		17.9			18.4			19.1			19.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		112.9			47.5			9.0			9.8	
Delay (s)		130.8			65.9			28.1			29.0	
Level of Service		F			E			C			C	
Approach Delay (s)		130.8			65.9			28.1			29.0	
Approach LOS		F			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	71.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	121.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			