36-48 Steeles Avenue East and 37-49 Highland Park Boulevard
Proposed Residential Development
City of Markham

Transportation Mobility Plan Update

Prepared For: Zonix Homes Inc.

April 23, 2021

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1.0 INTRODUCTION

BA Group is retained by Zonix Homes Inc. to provide transportation consulting services related to a proposed residential development to be located on a site municipally known as 36-48 Steeles Avenue East and 37-49 Highland Park Boulevard, in the City of Markham (herein referred to as "the site"). The site is located in the northeast quadrant of Steeles Avenue East / Dudley Avenue / Dumont Street. It is bounded by Steeles Avenue East to the south, Dudley Avenue to the west, Highland Park Boulevard to the north and adjacent private properties to the east.

The site is well-served by numerous high-frequency bus services on Steeles Avenue and Yonge Street operated by three transit agencies, including York Region Transit (YRT), Toronto Transit Commission (TTS) and GO Transit / Metrolinx. It is located approximately 250 metres from the intersection of Yonge Street / Steeles Avenue, which has been identified as a Mobility Hub (*Gateway Hub*) by Metrolinx's *The Big Move*[1], the regional transportation plan for the Greater Toronto Area and Hamilton (GTAH). The Yonge Street / Steeles Avenue intersection will be a major transit station on the future Yonge Subway Extension and will connect bus service as well as planned higher-order transit service on Steeles Avenue.

The site location and site context are illustrated in **Figure 1** and **Figure 2**, respectively.

1.1 EXISTING SITE

The site is currently occupied by single-family residential buildings with driveway connections to Steeles Avenue East, Highland Park Boulevard and Dudley Avenue.

1.2 PROPOSED DEVELOPMENT

The current development concept plan illustrates two residential buildings including one 27-storey residential building (Building A) consisting of 407 units with frontage onto Steeles Avenue East, and one 6-storey residential building (Building B) consisting of 126 units with frontage onto Highland Park Boulevard. A total of 533 residential units are proposed on site.

An east-west private driveway is proposed between Building A and Building B, extending from Dudley Avenue to a turn around circle at the east end of the site. The driveway provides access to an underground parking garage, a consolidated and enclosed loading facility located in Building A and pick-up/drop-off areas which are provided adjacent to the buildings lobbies. The driveway also allows for an extension to the east, connecting to Willowdale Boulevard, if other properties are redeveloped in the future, but does not rely on this extension.

The development statistics are summarized in **Table 1**. The site concept plan is illustrated in **Figure 3**. Reduced-scale architectural plans are provided for reference in **APPENDIX B**.

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[1] "Draft 2041 Regional Transportation Plan for the Greater Toronto and Hamilton Area". September 14, 2017. Metrolinx.

TABLE 1 DEVELOPMENT PROPOSAL SUMMARY

Use		Development Proposal		
		Building A	Building B	Total
	Residential Units	407 units	126 units	533 units
	Vehicular Parking	331 resident spaces 64 visitor spaces 395 total spaces	100 resident spaces 18 visitor spaces 118 total spaces	431 resident spaces 82 visitor spaces 513 total spaces
	Bicycle Parking	211 long-term spaces 93 short-term spaces 304 total spaces	63 long-term spaces 30 short-term spaces 93 total spaces	274 long-term spaces 123 short-term spaces 397 total spaces
	Loading	1 Type 'G' space		
	Access	East-west private driveway connection to Dudley Avenue		

Notes:
1. Based on architectural plans prepared by Kirkor Architects and Planners dated April 20, 2021.

As part of this development, a traffic signal is proposed at the existing (unsignalized) intersection of Steeles Avenue East / Dudley Avenue / Dumont Street in order to better provide vehicular, pedestrian and cyclist connectivity on both Steeles Avenue and Dudley Avenue / Dumont Street. Signalization of this intersection will also support the implementation of the City of Toronto's Transportation Master Plan for the North Yonge area (discussed in **Sections 2.4** and **3.1.2** of this report), which recommends the conversion of Dumont Street (opposite Dudley Street on the south side of Steeles Avenue) from a *local* road to a *collector* road classification in the future.

1.3 BACKGROUND

The Official Plan Amendment (OPA) and Zoning By-Law Amendment (ZBA) application for the site was submitted to the City of Markham, City of Toronto and York Region in February 2019. As part of this application, BA Group prepared a report titled *36-48 Steeles Avenue East & 37-63 Highland Park Boulevard, Proposed Residential Development, City of Markham – Transportation Mobility Plan* dated February 26, 2019 (herein referred to as the "*February 2019 Transportation Study*").

The February 2019 application envisioned a phased development of the entire block bounded by Steeles Avenue East to the south, Dudley Avenue to the west, Highland Park Boulevard to the north and Willowdale Boulevard to the east, as follows:

- Phase 1 – Southwest block (36-48 Steeles Avenue East) – Zoning Bylaw Amendment (ZBA) and Official Plan (OPA) applications were submitted for the southwest quadrant of the block to permit a residential condominium building with grade-level retail. The southwest block was bounded by Steeles Avenue East to the south, Dudley Avenue to the west, and low-rise residential buildings to the east and north.

- Phase 2 – North and east blocks (50-60 Steeles Avenue East & 37-63 Highland Park Boulevard) – OPA applications were submitted to permit residential apartment uses on the remainder of the larger block, on the north and east portions of the block.

The February 2019 Transportation Study assessed the multi-modal transportation impact of both the Phase 1 and Phase 2 developments and was submitted as part of the ZBA/OPA package for Phase 1 as well as the OPA package for Phase 2, as it assessed the cumulative transportation aspects of the two phases.

This update report focuses on a revised development concept plan which includes the southwest and north blocks and addresses comments received from reviewing agencies. **Table 1** summarizes a comparison of the development concept plans submitted in February 2019 and the current development concept plan which is the subject of this update report.

TABLE 2 DEVELOPMENT CONCEPT PLAN COMPARISON (FEBRUARY 2019 TO CURRENT)

Land Use	February 2019	Current Development Concept	Difference
Residential Units	877 units	533 units	-344 units
Retail GFA	668 m^2 GFA	-	-668 m^2 GFA

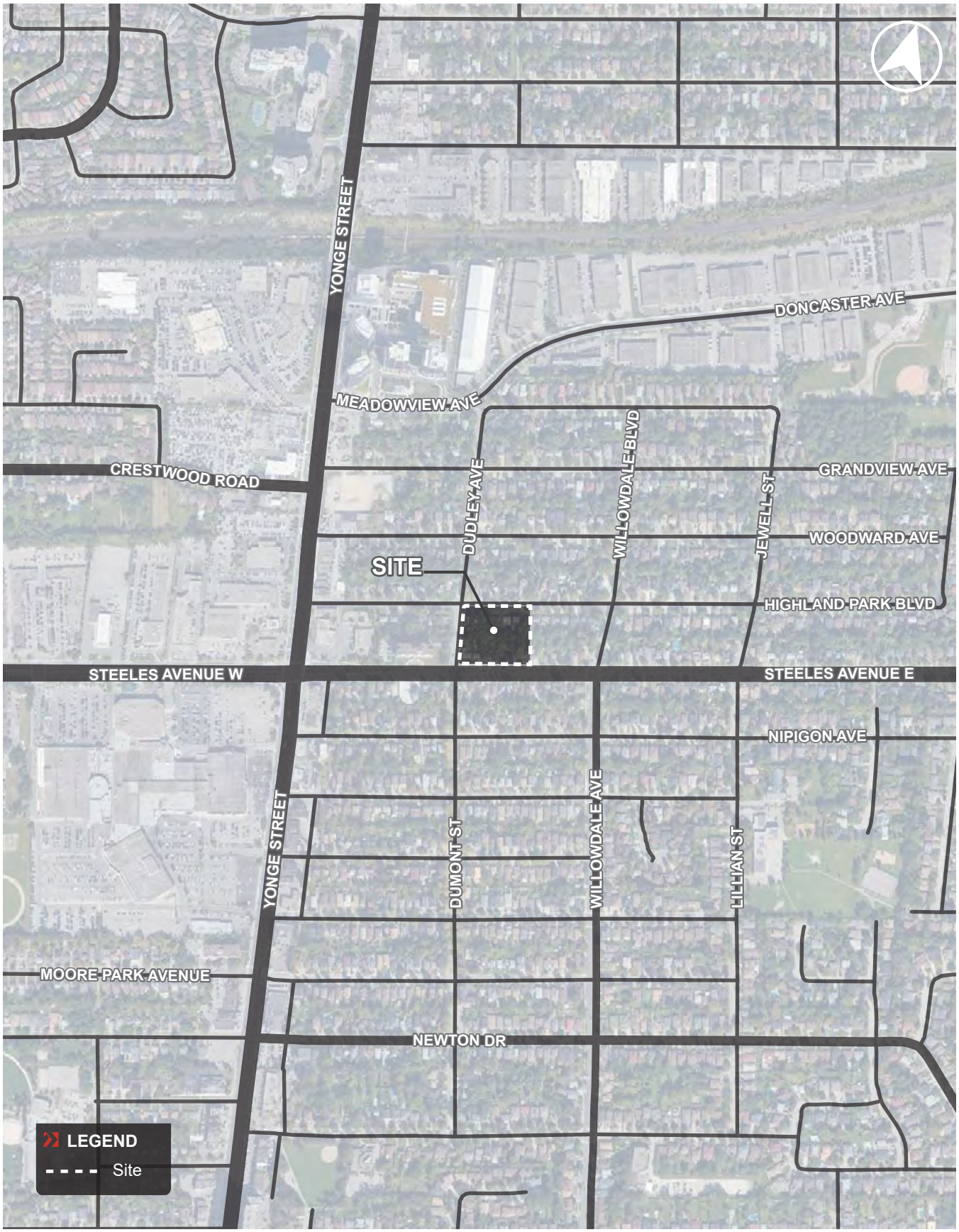

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FIGURE 1 SITE LOCATION

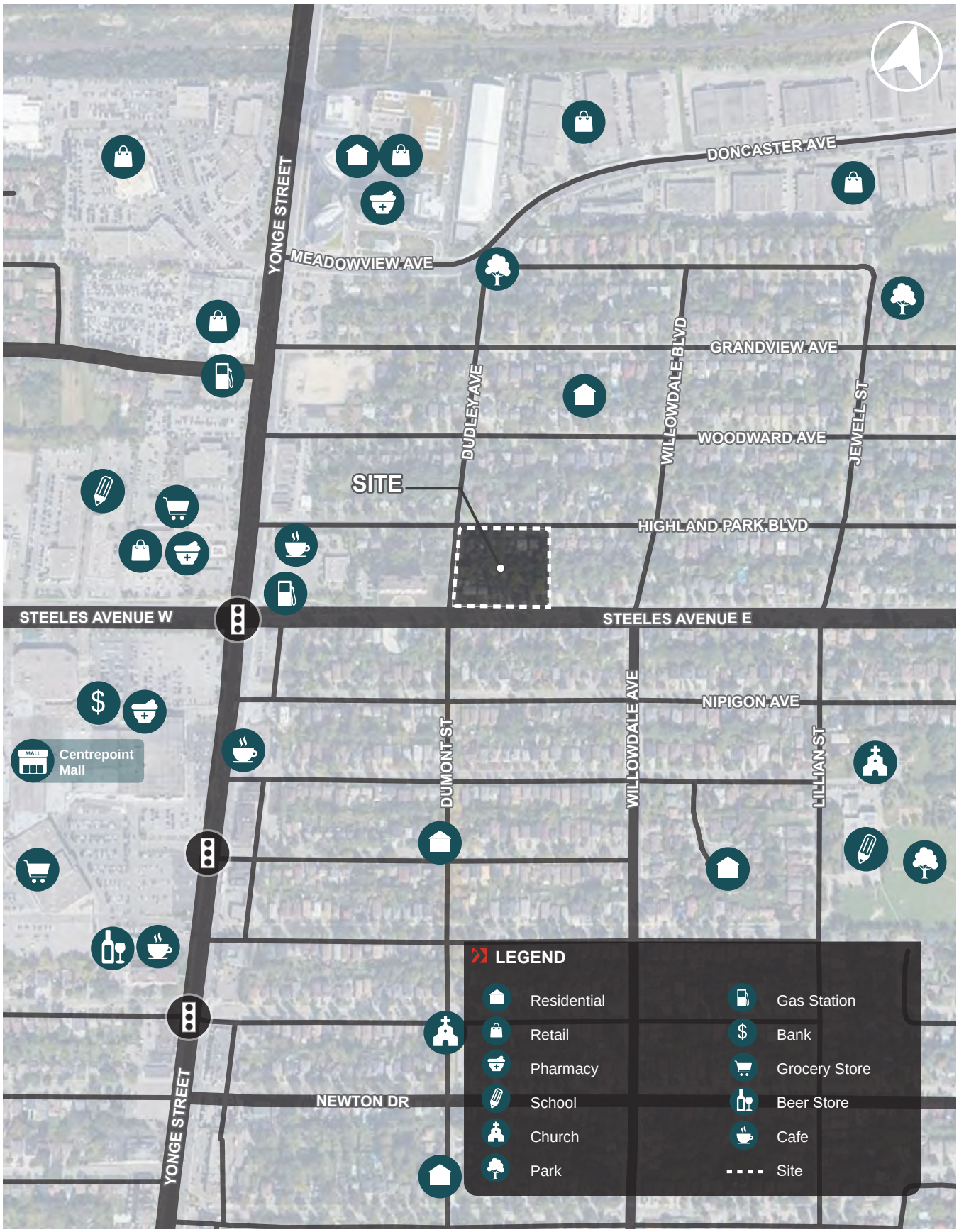

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FIGURE 2 SITE CONTEXT

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FIGURE 3 SITE CONCEPT PLAN

1.4 SCOPE OF TRANSPORTATION REVIEW

Key aspects reviewed as part of this study include the following:

- A review of the proposed development programme and site plan;
- A review of the Yonge-Steeles area planning context;
- A review of the area transportation context in the site vicinity;
- A review of existing and planned transit service in the site vicinity;
- A review of existing traffic activity levels and patterns in the study area;
- A review of general corridor growth and background development activity in the study area;
- Development of new site-related multi-modal traffic forecasts and assignments reflecting the current site development plan;
- An outline of travel characteristics and travel demand projections for the proposed development plan for pedestrians, cyclists and transit users;
- An assessment of the operation of current and future transit, pedestrian and bicycle facilities in the site vicinity;
- An assessment of new site traffic-related volume changes on the area street network;
- An assessment of traffic operations at the area intersections today and in the future including the proposed site driveway;
- A discussion related to the parking, loading and bicycle parking supply provisions proposed for the site; and
- A discussion related to the comprehensive Transportation Demand Management (TDM) plan that is proposed for the site to reduce auto trips to and from the site.

Based on discussion with review agency staff, traffic operations analyses have been undertaken during the weekday morning and afternoon street peak hours for the existing, future background and future total traffic scenarios at the following locations in the site vicinity:

Signalized Intersections:

- Steeles Avenue East / Yonge Street
- Steeles Avenue East / Willowdale Boulevard / Willowdale Avenue

Unsignalized Intersections:

- Steeles Avenue East / Dudley Avenue / Dumont Street
- Highland Park Boulevard / Yonge Street
- Highland Park Boulevard / Dudley Avenue
- Highland Park Boulevard / Willowdale Boulevard

Site Access:

- Dudley Avenue / Private Driveway

Both 5-year and 10-year study horizons have been adopted in the assessment of site-related traffic impacts on the area road network.

2.0 AREA PLANNING CONTEXT

The Yonge-Steeles area has been the subject of numerous planning studies conducted by each of the various municipal and regional governmental stakeholders, including York Region and the cities of Vaughan, Markham and Toronto. The key findings of these studies are briefly summarized in the following.

2.1 YONGE-STEELES AREA REGIONAL TRANSPORTATION STUDY (YORK REGION, 2015)

The ***Yonge-Steeles Area Regional Transportation Study***[2] was undertaken by York Region to amalgamate information contained in multiple prior studies for the Yonge-Steeles area and develop definitive land use forecasts for the Yonge-Steeles area and its environs in consultation with the cities of Vaughan, Markham and Toronto. The final report was issued in September 2015. Two working papers were prepared that also formed part of the study, and were published in 2014: *Working Paper #1 – Review of Existing Studies*[3], and *Working Paper #2 – Network Needs and Opportunities*[4].

2.1.1 Study Area

The *Yonge-Steeles Area Regional Transportation Study* (September 2015), herein referred to as the "*2015 Regional Transportation Study*", encompasses a large study area that includes all the study areas adopted by various other studies undertaken for the Yonge-Steeles area. The study area is bounded by Bathurst Street to the west, Bayview Avenue to the east, Highway 407 to the north and Finch Avenue to the south. The study area is illustrated in Exhibit 1.1 of the *2015 Regional Transportation Study*.

2.1.2 Study Scope

The study builds on 11 prior planning studies for the Yonge-Steeles area that were completed by the various municipal and regional authorities responsible for parts of the study area. It reviews and assesses those different studies and delivers guidance on managing growth and transportation demand within the study area.

The study reviews the existing challenges in the Yonge-Steeles area, proposes development thresholds and outlines recommendations that will inform planning policy.

2.1.3 Methodology

The study was led by York Region with input from the Cities of Vaughan, Markham and Toronto and Metrolinx. Representatives from the various stakeholders provided input on population forecasts and made suggestions for management and improvement of the transportation context which were then assessed by the Region to determine recommendations for the study area as a whole.

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[2] *Yonge-Steeles Area Regional Transportation Study Final Report*. September 2015. Prepared for York Region by IBI Group.

[3] *Yonge-Steeles Area Regional Transportation Study Working Paper #1 – Review of Existing Studies*. January 24, 2014. Prepared for York Region by IBI Group.

[4] *Yonge-Steeles Area Regional Transportation Study Working Paper #2 – Network Needs and Opportunities*. June 2014. Prepared for York Region by IBI Group.

Population forecasts adopted for the Yonge-Steels study area were based on growth forecasts made by the York Region and Cities of Toronto, Vaughan and Markham. Two scenarios were considered:

- Low Growth Scenario – Population and employment forecasts based on data from York Region's Official Plan (2010) and the City of Toronto draft plans.

- High Growth Scenario – Population and employment forecasts based on the Yonge-Steeles draft plans issued by the Cities of Toronto, Markham and Vaughan.

The adopted population and employment forecasts for each scenario were used as the basis of the traffic impact analysis completed as a part of the *Yonge-Steeles Area Regional Transportation Study* and included in the final report as the proposed phased development thresholds.

2.1.4 Recommendations and Discussion

Existing challenges in the study area include the existing road network operating near capacity today, a lack of pedestrian and cycling infrastructure in the area, and limited opportunities for improvements to the transit network beyond the planned Yonge subway extension and Steeles rapid transit. The Yonge subway extension is assumed to be completed by 2031[5], while the timing for the Steeles rapid transit is still uncertain.

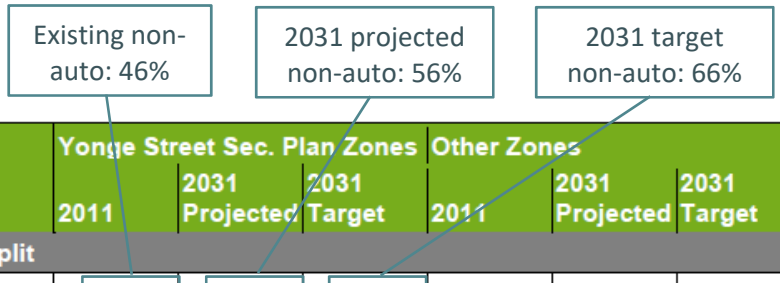
In light of these conditions, the study recommends that new developments incorporate substantive transportation demand management (TDM) measures that will improve the existing multi-modal transportation context and reduce the number of new peak-hour vehicular trips.

The study outlines targets for peak-hour travel mode shares that new developments should aim to meet through TDM measures, even after the Yonge Street subway extension is completed. These targets are included in Exhibit 3.9 of the study and reproduced below in **Exhibit 1**. Targets are provided separately for the "Yonge Street Secondary Plan Zones", which are zones along the Yonge Street corridor that are expected to accommodate the majority of population and employment growth, and the rest of the zones in the study area. Non-driver mode share targets for the "Yonge Street Secondary Plan Zones" are higher than other zones, given that the Yonge Street subway extension will significantly improve transit service in those areas.

Note that the subject site, immediately adjacent to the Yonge Street / Steeles Avenue intersection, would seek to meet the non-driver mode share targets for the "Yonge Street Secondary Plan Zones". Thus, the rest of this report will focus on analysis relating to this zone group only.

[5] As noted on page 40 (Section 3.2 Transportation Implications) of the 2015 *Yonge-Steeles Area Regional Transportation Study*, the "TTC's Line 1 subway is assumed to be extended through the study area by 2031", and "Much of the projected increases in population and employment are forecast to occur close to future subway stations".

EXHIBIT 1 2015 *YONGE-STEELES AREA REGIONAL TRANSPORTATION STUDY* – MODE SHARE TARGETS BY STUDY AREA (EXHIBIT 3.9)



Mode	Yonge Street Sec. Plan Zones			Other Zones			Entire Study Area		
	2011	2031 Projected	2031 Target	2011	2031 Projected	2031 Target	2011	2031 Projected	2031 Target
Mode Split									
Auto Driver	54%	44%	34%	63%	59%	56%	61%	53%	48%
Auto Pass.	12%	10%	13%	14%	13%	13%	13%	11%	13%
Transit	29%	35%	38%	18%	23%	24%	21%	28%	30%
Walk	5%	10%	10%	5%	5%	6%	5%	7%	7%
Cycle	0%	1%	5%	0%	0%	1%	0%	1%	2%
TOTAL	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Trip Origins									
Auto Driver	3,500	9,400	7,100	18,300	21,600	20,500	21,700	31,000	27,600
Auto Pass.	800	2,200	2,700	4,100	4,600	4,700	4,900	6,700	7,400
Transit	1,900	7,300	8,000	5,300	8,700	9,200	7,300	16,000	17,200
Walk	300	2,100	2,200	1,500	1,800	2,100	1,800	3,900	4,300
Cycle	50	200	1,100	100	200	300	200	400	1,400
TOTAL	**6,550**	**21,200**	**21,200**	**29,300**	**36,800**	**36,800**	**35,900**	**58,000**	**58,000**

Notes:
1. Exhibit 3.9. *Yonge-Steeles Area Regional Transportation Study Final Report*. September 2015. Prepared for York Region by IBI Group.

As summarized above, the existing (2011) non-driver mode share in the "Yonge Street Secondary Plan Zones" is in the order of 46%. In 2031, with the completion of the subway extension, the projected non-driver mode share is in the order of 56%. Thus, an even higher mode share target has been set, at 66%, to encourage the use of TDM measures to further reduce auto trips[6].

The study provides a framework for achieving these mode share targets which includes building new local streets (as per current Secondary Plans) to create a tighter grid network more conducive to pedestrian and cycling trips, incorporating employment uses into development programs to create live-work opportunities within the study area, reducing parking supplies and providing other incentives to promote non-vehicular travel.

A key conclusion of the study is that the capacity for increased density in the study area is dependent on the completion of major transit improvements, including the Yonge subway extension and Steeles rapid transit. The study concludes that development should be phased based on the completion of the Yonge subway extension. The proposed development levels before and after the construction of the subway extension are

[6] Note that there is a minor discrepancy in the study report regarding the exact target non-driver mode share. The table shown in **Exhibit 1** above (reproduced from Exhibit 3.9 of the study) shows a 2031 target of 66% (i.e. all non-driver mode shares combined). Elsewhere in the study text, however, reference is made to a 2031 target of 65% (including on the graph shown in Exhibit 3.8 of the study, and in discussion on pages 80 and 87). For the purpose of this study, the more conservative target of 66% is assumed, consistent with the table shown in **Exhibit 1** above.

included in Exhibit 7.3 of the study and reproduced in **Exhibit 2** below. For the City of Markham, a net new population of 3,562 is proposed before the subway extension and 5,660 after. No limits are recommended for employment and institutional development in any of the areas.

EXHIBIT 2: YONGE-STEELES AREA REGIONAL TRANSPORTATION STUDY – PROPOSED DEVELOPMENT PHASING (NET NEW POPULATION) (EXHIBIT 7.3)

	Net New Population		
	Pre-Subway	Post-Subway	Total
Vaughan	2,963	7,457	10,420
Markham	3,562	5,660	9,222
Sub-total York Region	**6,525**	**13,117**	**19,642**
Toronto - North of Cummer	4,780	9,375	14,155
Toronto - South of Cummer	2,560	4,755	7,315
Sub-total Toronto	**7,340**	**14,130**	**21,470**

Notes:
1. Exhibit 7.3. *Yonge-Steeles Area Regional Transportation Study Final Report*. September 2015. Prepared for York Region by IBI Group.

It is our understanding, based on discussions with staff from the City of Markham and York Region, that the pre-subway development phasing 'limit' is close to being reached, following the recent completion of new developments in the northeast quadrant of Yonge Street / Steeles Avenue (including, most notably, the World on Yonge mixed-use development). A total of 238 residential units (representing a population of 476, assuming 2 people/unit[7]) remains available under this pre-subway development phasing 'limit'. If this 'limit' is reached, a further detailed transportation study is required to assess the ability of the transportation network to accommodate growth prior to the completion of the Yonge subway extension. **Notwithstanding the background information presented above, a detailed analysis of recent Transportation Tomorrow Survey (TTS) data for high-density residential dwelling types in the Yonge-Steeles area, similar to the proposed development, demonstrates that the existing non-driver mode share is in fact already near, or at, the 2031 post-subway target of 66%, and thus new developments exceeding the 'pre-subway' limit are appropriate if they are able to achieve at, or near, the desired post-subway target mode share.**

2.2 YONGE-STEELES CORRIDOR SECONDARY PLAN (CITY OF VAUGHAN, 2015)

The ***Yonge-Steeles Corridor Secondary Plan***[8] was released by the City of Vaughan in September 2010 and revised in December 2015. The Secondary Plan area encompasses a northerly portion located along Yonge Street between Royal Orchard Boulevard and Highway 407, and a southerly portion located at the northwest quadrant of Yonge Street / Steeles Avenue.

[7] A unit occupancy of 2 people/unit is used by City of Markham and York Region staff for new developments in the area.
[8] *Yonge-Steeles Corridor Secondary Plan*. December 11, 2015. Prepared for City of Vaughan by Young + Wright / IBI Group Architect, GHK International (Canada) Ltd., Dillon Consulting Ltd.

Key transportation-related recommendations of this Secondary Plan include the construction of a new local road network in the northwest quadrant of Yonge Street / Steeles Avenue that creates a grid pattern and allows for more permeability and creates additional access points to developments along Yonge Street and Steeles Avenue. Design guidelines for the new local streets include sidewalks, street trees and on-street parking in order to improve the pedestrian and cycling facilities.

The proposed local road network in the northwest quadrant of Yonge Street / Steeles Avenue, as illustrated in Exhibit 2.1 of the *2015 Regional Transportation Study*, is illustrated in **Figure 4** of this report.

2.3 YONGE-STEELES CORRIDOR STUDY (CITY OF MARKHAM, 2008)

The ***Yonge-Steeles Corridor Study***[9] was undertaken by the City of Markham and was completed in 2008. The corridor study area generally includes the north-east quadrant of the Yonge Street / Steeles Avenue intersection and extends east to Bayview Avenue and north to John Street.

The corridor study recommends the use of Complete Streets principles to create an environment that is more accessible to pedestrians and cyclists. The study further recommends high-density mixed-use development along Yonge Street.

2.4 YONGE STREET NORTH PLANNING STUDY (CITY OF TORONTO, 2013)

The City of Toronto is in the process of undertaking the ***Yonge Street North Planning Study***[10] for the northern segment of the Yonge Street corridor between Finch Avenue and Steeles Avenue. The study, commenced in 2011, will develop a framework for the further development and intensification of the northern section of the Yonge Street corridor in the City of Toronto, particularly in light of the anticipated future Yonge Subway Extension.

The study highlights the need for additional pedestrian and cycling infrastructure and recommends mixed-use development along Yonge Street, widened sidewalks, bicycle lanes and subway stations at Cummer Avenue and Steeles Avenue. Key reports completed to date as part of this study are summarized in the following:

2.4.1.1 "*Yonge Street North Planning Study – Existing Transportation Study*". March 2012. LEA Consulting.

This background report reviewed the existing transportation context within the Yonge Street corridor between Finch Avenue and Steeles Avenue to identify current opportunities and constraints. The study reviewed current and planned road, transit, cycling and pedestrian environment within the study area, as well as existing lane use and travel patterns. The study area is bounded by Hilda Avenue / Talbot Road to the west, Steeles Avenue to the north, Willowdale Avenue to the east and Finch Avenue to the south.

[9] *Yonge-Steeles Corridor Study*. 2008. City of Markham.
[10] *Yonge Street North Planning Study*. 2013. City of Toronto.

The study undertook cordon traffic analysis for key corridors (i.e. 'screenlines') within the study area, in conjunction with individual intersection analyses. The study found that existing weekday peak period traffic volumes are sufficiently accommodated on the network of roads within the study area, with certain sections operating under busy conditions.

2.4.1.2 "*Background Report for the Yonge Street North Planning Study*". May 2012. McCaulay Shiomi Howson *Ltd.*, in association with BrookMcIlroy & LEA Consulting.

This background report, completed in conjunction with the *"Yonge Street North Planning Study - Existing Transportation Study"* (March 2012), reviewed the current planning context within the study area and summarized public consultations conducted to date. Key aspects reviewed included existing land use, built form and proposed development, policy and regulatory framework, public framework, community facilities, transportation infrastructure, and servicing infrastructure.

2.4.1.3 "*Preferred Urban Structure Option Report – Yonge Street North Planning Study*". May 2013. MSH, in association with BrookMcIlroy & LEA Consulting.

This study developed / identified priority directions and a preliminary vision statement for the study area, as well as a common framework for the evaluation of future development alternatives. As well, this study developed and evaluated a range of conceptual urban structures and transportation alternatives to support varying levels of development. These are summarized in the following.

Urban Structure Alternatives:

- **Do Nothing** – Build-out of existing Centre and Avenue designations and related zoning, totalling approximately 13,100 residential units and 8,900 jobs.
- **Centre Extended** – Designate the entire Yonge Street North Corridor as a Centre with transition areas, with a build-out total of approximately 21,000 residential units and 25,000 jobs.
- **Nodes and Avenue** – Designate lands adjacent to the proposed subway stations at Cummer Avenue / Drewry Avenue and Steeles Avenue as "Nodes", with a build-out total of approximately 16,900 residential units and 9,500 jobs.
- **Notes and Wider Avenue** – Builds on the "Nodes and Avenues" option by designating a wider area as "Avenue", with a build-out total of approximately 17,500 residential units and 15,800 jobs.

Transportation Alternatives:

- **Do Nothing** – This option includes several improvements already planned by the City, including:
  - Extension of Beecroft Avenue and completion of the North Service Road;
  - Installation of bicycle lanes on Willowdale Avenue;
  - Installation of bicycle trail along the Finch Hydro corridor; and
  - Yonge Street streetscape improvements.
- **Nodal Improvements** – This option improves accessibility around proposed subway station nodes through the introduction of new road connections.
- **Network Improvements** – This option builds on the "Nodal Improvements" option through the introduction of additional road connections between the nodes.

The preferred urban structure identified through the study was the **Nodes and Wider Avenue** option with some modifications, supported by a transportation alternative that is similar to the **Network Improvements**

option with some modifications. A preferred road network plan was created that illustrated the creation of new public roads in the study area.

The 'Transportation Networks and Connections' priority directions identified by the study are summarized in the following:

- "Extend the Yonge Subway north to Steeles Avenue"
- "Enhance pedestrian access and linkages to Yonge Street and surrounding neighbourhoods"
- "Improve the public road network and connectivity in the area"
- "Provide a bicycle network and facilities for cyclists"
- "Integrated pedestrian connections to subway stations from adjacent development"
- "Provide a Yonge Street Centre Median"

2.4.1.4 "*Yonge Street North Planning Study – Transportation Master Plan*". June 2013. LEA Consulting.

This study, completed in conjunction with the *"Preferred Urban Structure Option Report – Yonge Street North Planning Study"* (May 2013), developed a Transportation Master Plan to identify transportation infrastructure required to support the urban structure alternatives identified through the Preferred Urban Structure Option Report.

This study evaluated the three transportation alternatives outlined in the *Preferred Urban Structure Option Report* (summarized above). The recommended transportation network plan illustrated new infrastructure for the study area.

The recommended transportation master plan included pedestrian and cyclist infrastructure, including (in the vicinity of the subject site) a Yonge Street Promenade through the entire study area, major pedestrian routes on Steeles Avenue and Willowdale Avenue, on-street bicycle routes on Willowdale Avenue, and the conversion of Dumont Street from a local to a collector road. Elements of the Yonge Street promenade were not detailed, however, the street was imagined to become a complete street space (which typically includes a bicycle facility).

2.4.1.5 "*Yonge Street North Planning Study Draft Implementation Plan*". May 21, 2014 – DRAFT FOR PUBLIC CONSULTATION. City of Toronto.

This report contains a plan for the implementation of amendments to the City of Toronto Official Plan and North York Centre Secondary Plan to amend existing zoning permissions and planning policies for the North Yonge study area.

2.5 YONGE SUBWAY EXTENSION

The ***Yonge Subway Extension*** is a transit project discussed in the regional transportation plan prepared by Metrolinx (The Big Move[11]) and summarized in the *Yonge and Steeles Area Regional Transportation Study Working Paper #1*[3]. The plan currently identifies four stations in York Region between Finch Station and Richmond Hill Centre. A proposed station at Steeles Avenue would provide connection to York Region Transit (YRT) bus routes and a proposed rapid transit route along Steeles Avenue.

The Yonge subway extension has been approved; however, a timeline for construction has not been set as additional studies are being conducted to review the capacity of the Yonge subway line prior to the construction of a downtown relief line.

2.6 SOUTH YONGE STREET CORRIDOR STREETSCAPE MASTER PLAN (YORK REGION, 2010)

The ***South Yonge Street Corridor Streetscape Master Plan***[12] was completed in 2010 by York Region. The plan considers the entire length of the Yonge Street corridor, between Steeles Avenue and Highway 407.

The plan focuses on establishing design guidelines for Yonge Street that will better support non-vehicular travel along the corridor. The plan's recommendations include widening sidewalks along Yonge Street, a central median, creating additional pedestrian crossing opportunities, increasing accessibility and providing protected bike lanes.

2.7 STEELES RAPID TRANSIT PROJECT

The ***Steeles Rapid Transit Project*** has been considered by York Region and is identified as a recommendation of the 2015 *Yonge-Steeles Area Regional Transportation Study*. Steeles Avenue is included as a planned rapid transit route in the *2041 Regional Transportation Plan* published by Metrolinx in March 2018[13]. The plan indicates a BRT or LRT along Steeles Avenue between Jane Street and McCowan Road with a below-grade transfer at the planned Yonge Street / Steeles Avenue mobility hub; however, no further details or timelines are provided for the planning or implementation of the project.

[11] *The Big Move*. September 2013. Metrolinx.
[12] *South Yonge Street Corridor Streetscape Master Plan*. 2010. York Region.
[13] *2041 Regional Transportation Plan*. March 2018. Metrolinx.

3.0 AREA TRANSPORTATION CONTEXT

An overview of the transportation context in the vicinity of the site is provided in the following.

3.1 ROAD NETWORK

3.1.1 Existing Area Road Network

Steeles Avenue is an east-west major arterial road under the jurisdiction of the City of Toronto. It connects east-west across the GTA, from Appleby Line (Halton Region) in the west to the Scarborough-Pickering Townline in the east, where it becomes Taunton Road and continues to the east of Highway 115 in Clarington (Durham Region).

In the site vicinity, it has a 4-lane cross-section, having 2 lanes in each direction and widening to 3 lanes (westbound through) at Yonge Street. Additional left-turn lanes are located at the signalized intersections with Yonge Street and Willowdale Boulevard / Willowdale Avenue. In the site vicinity, bus bays (with a short queue jump lane) are located on the westbound approach at Dudley Avenue / Dumont Street and the eastbound approach at Willowdale Boulevard / Willowdale Avenue. The posted speed limit is 60 km/h.

Yonge Street is a north-south major arterial road that extends from Lake Ontario in the south, through the City of Toronto and York Region, to just south of Lake Simcoe in the north. South of Steeles Avenue, Yonge Street is under the jurisdiction of the City of Toronto, while north of Steeles Avenue it is under the jurisdiction of the York Region.

Within the study area, Yonge Street has a 7-lane cross-section, including 3 lanes in each direction and 1 median left-turn lane. The curb lane is an HOV lane from 7 am-10 am and 3 pm-7 pm on weekdays (Monday-Friday). The posted speed limit is 50 km/h.

Dudley Avenue is a north-south local road under the jurisdiction of the City of Markham. It connects Highland Park Avenue in the north to Steeles Avenue East in the south. It has a 2-lane unmarked cross-section and a posted speed limit of 40 km/h. At its southern end, on the south side of Steeles Avenue East, Dudley connects to Dumont Street.

Dumont Street is a north-south local road under the jurisdiction of the City of Toronto. It extends from Centre Avenue in the south to Steeles Avenue East in the north. It has a 2-lane unmarked cross-section and a posted speed limit of 40 km/h. At its northern end, on the north side of Steeles Avenue East, Dumont Street connects to Dudley Street.

Willowdale Boulevard is a north-south local road under the jurisdiction of the City of Markham. It connects Highland Park Avenue in the north to Steeles Avenue East in the south. It has a 3-lane cross-section, with one lane providing a designated left-turn lane at the signalized intersection of Steeles Avenue East. It has a posted speed limit of 40 km/h.

Willowdale Avenue is a north-south collector road under the jurisdiction of the City of Toronto. It extends from just north of Highway 401 in the south to Steeles Avenue East in the north. It has a 4-lane cross-section

with an exclusive northbound right-turn lane at the signalized intersection at Steeles Avenue East. No speed limit is posted; the default limit in the City of Toronto is 50 km/h.

Highland Park Boulevard is a primarily east-west local road connecting from Yonge Street in the west to east of Jewell Street, where it becomes a north-south road and connects to Grandview Avenue. Highland Park Boulevard is under the jurisdiction of the City of Markham. It has a 2-lane cross-section with 1-lane in each direction. It has a posted speed limit of 40 km/h.

The existing area road network is illustrated in **Figure 4**. The existing area road network lane configuration and intersection control measures are illustrated in **Figure 5**.

3.1.2 Future Area Road Network

The City of Vaughan's *2010 Yonge-Steeles Corridor Secondary Plan (revised in 2015)*, discussed in **Section 2.2** of this report, sets out a plan for the creation of a new local road network in the northwest quadrant of Yonge Street / Steeles Avenue that improves permeability in that portion of the network and improves access to Yonge Street and Steeles Avenue for new and existing developments.

As well, the City of Toronto's *2013 Yonge Street North Planning Study*, discussed in **Section 2.4** of this report, includes a Transportation Master Plan for the portion of Yonge Street and its immediate surroundings between Steeles Avenue and Finch Avenue that includes the creation of a new local and collector road network.

The future local road network based on the above studies is illustrated in Exhibit 2.1 of the 2015 *Yonge-Steeles Area Regional Transportation Study* and is reproduced in **Figure 4** of this report. The creation of the new local road network around the busy Yonge Street / Steeles Avenue intersection (in particular the northwest and southwest quadrants) will improve the permeability around this busy intersection, and provide alternate routing options for vehicular, pedestrian and cyclist traffic to access the rest of the road network, particularly Yonge Street and Steeles Avenue, without needing to pass through the congested Yonge Street / Steeles Avenue intersection.

Notably, for the purpose of the subject development, the creation of a new local and collector road network will relieve pressure on the Yonge Street / Steeles Avenue intersection and provide additional routing options for traffic to/from the subject site, particularly:

- **Woodward Avenue extension (City of Vaughan)** – the westward extension of Woodward Avenue, which currently terminates at an unsignalized T-intersection at Yonge Street (2 blocks north of Steeles Avenue), to Hilda Avenue in the west. As part of this extension, the intersection of Yonge Street / Woodward Avenue will become signalized. The Woodward Avenue extension will be a local road under the jurisdiction of the City of Vaughan.

- **3 new north-south local roads connecting between the Woodward Avenue extension and Steeles Avenue (City of Vaughan)** – 3 new north-south local roads are proposed between the Woodward Avenue extension and Steeles Avenue, in between Yonge Street and Hilda Avenue. The new local roads will be under the jurisdiction of the City of Vaughan.

- **Conversion of Dumont Street from local to collector road (City of Toronto)** – Dumont Street, an existing north-south local road in the City of Toronto that connects to Dudley Avenue north of Steeles Avenue, will be converted to a collector road south of Steeles Avenue, from Steeles Avenue to Newton Drive in the south. The conversion signifies the elevation of Dumont Street to a higher-order road that is of greater importance for carrying vehicular, pedestrian and cyclist traffic in parallel to Yonge Street. The intersection of Yonge Street / Dudley Avenue / Dumont Street is currently unsignalized.

Furthermore, the proposed development is located in proximity to potential Light Rail Transit (LRT) and Bus Rapid Transit (BRT) alignments along Steeles Avenue. Restrictions may be added to the intersection Steeles Avenue East / Dudley Avenue / Dumont Street in the future as a result of the potential portal on Steeles Avenue East.

Figure 6 and **Figure 7** illustrate the future area road network lane configuration and traffic control measures without and with restrictions at Steeles Avenue East / Dudley Avenue / Dumont Street, respectively.

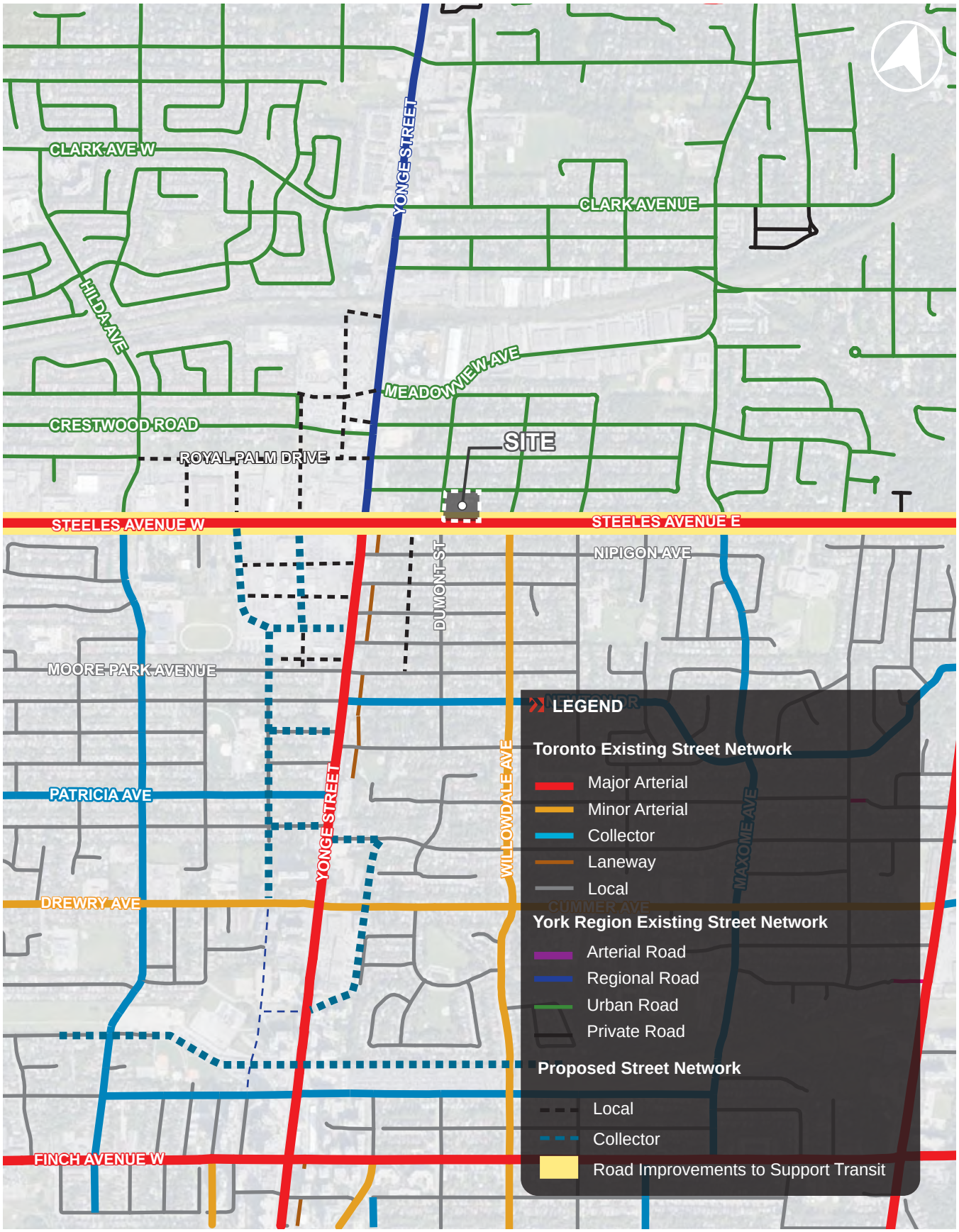


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FIGURE 4 EXISTING AND FUTURE STREET NETWORK

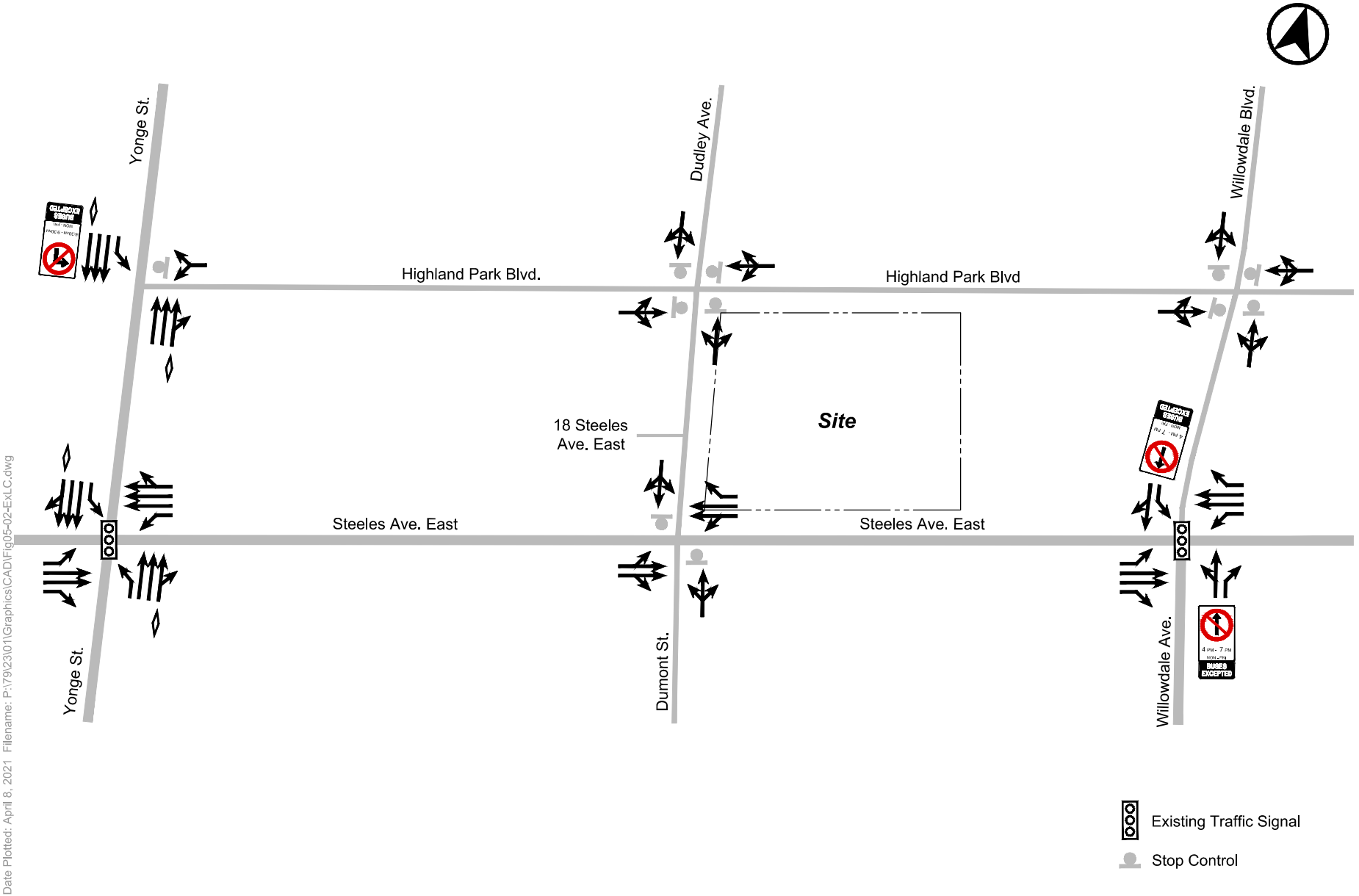

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FIGURE 5 EXISTING AREA ROAD LANE CONFIGURATION AND TRAFFIC CONTROL

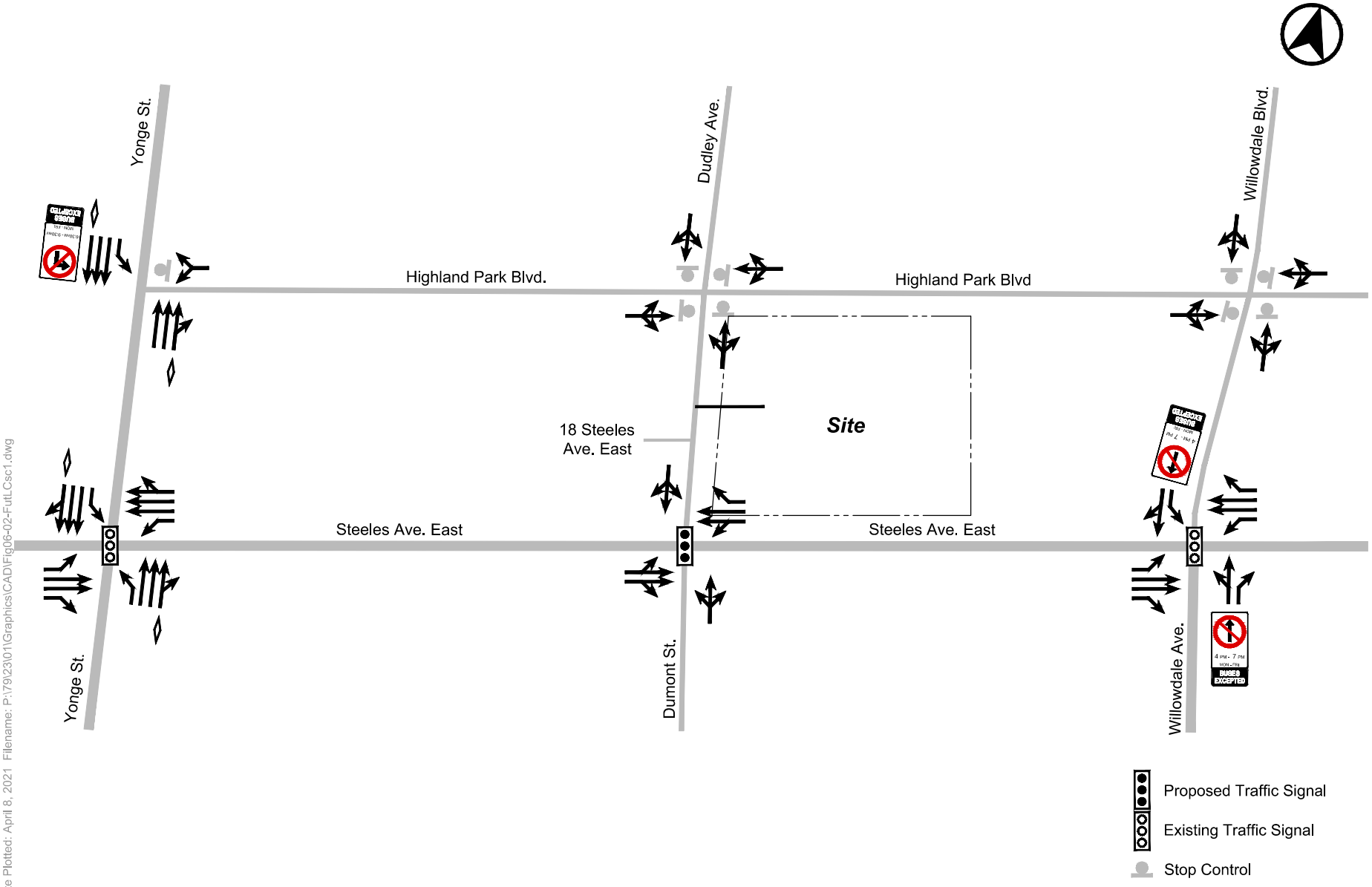

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FIGURE 6 FUTURE AREA ROAD LANE CONFIGURATION AND TRAFFIC CONTROL (BASE CASE)

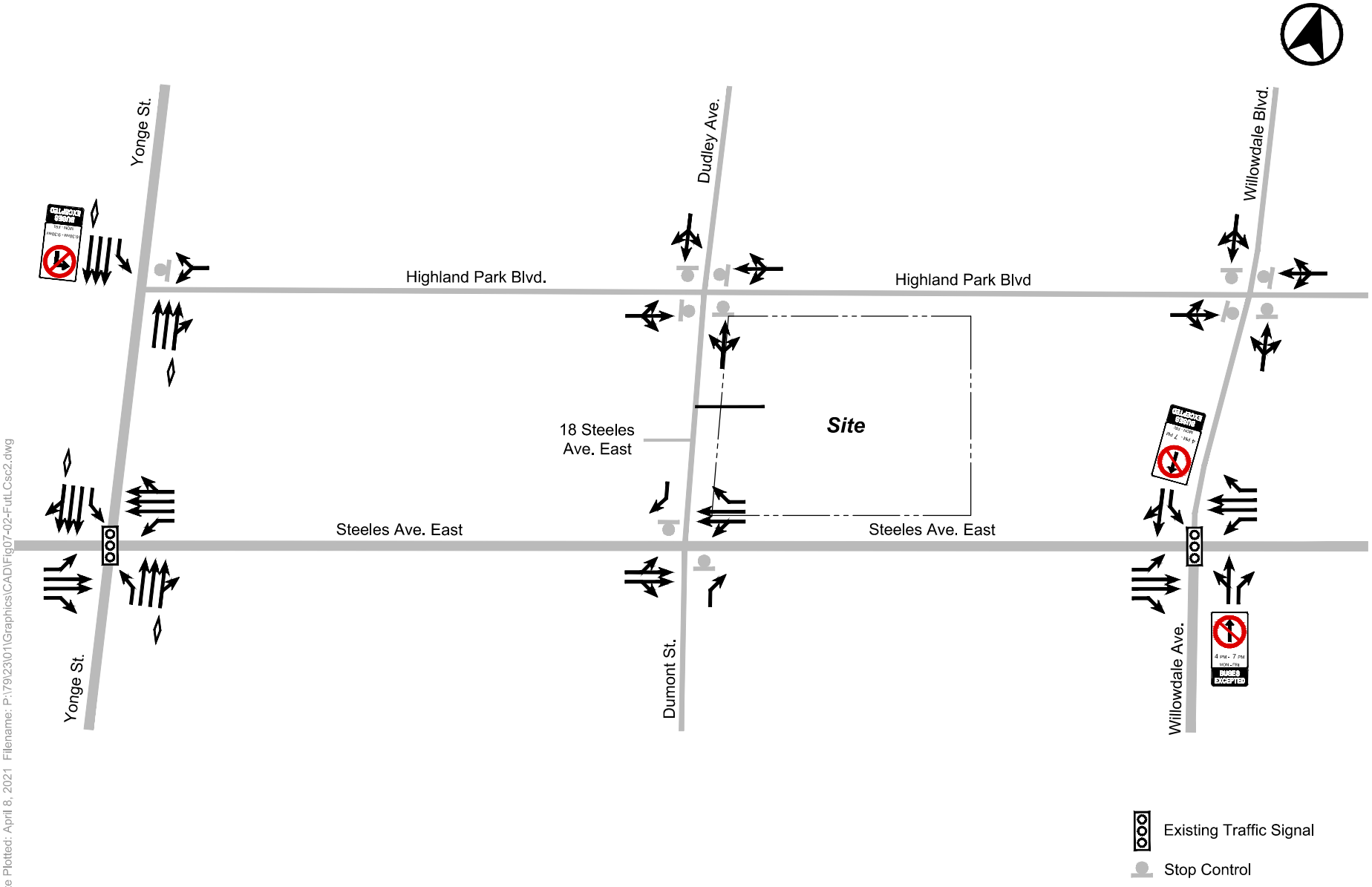

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FIGURE 7 FUTURE AREA ROAD LANE CONFIGURATION AND TRAFFIC CONTROL (SENSITIVITY)

3.2 TRANSIT NETWORK

3.2.1 Existing Transit Service

The site is well-served by numerous high-frequency bus services on Steeles Avenue and Yonge Street operated by three transit agencies, including York Region Transit (YRT), Toronto Transit Commission (TTS) and GO Transit / Metrolinx. It is located approximately 250 metres from the intersection of Yonge Street / Steeles Avenue, which will be a major transit station on the future Yonge Subway Extension, and a Mobility Hub connecting planned higher-order transit service on Steeles Avenue.

The nearest bus stops to the site on Steeles Avenue East are located immediately adjacent to the site, at Dudley Avenue / Dumont Street to the west and Willowdale Boulevard / Willowdale Avenue to the east. The nearest bus stops on Yonge Street are located approximately 250 metres (4 minutes' walk) at Yonge Street / Steeles Avenue to the west.

3.2.1.1 York Region Transit / VIVA

Bus route 2 (Milliken)
This bus service operates between the Finch GO Bus Terminal (located adjacent to the Finch subway station) in the City of Toronto in the south to the area of Markham Road / Denison Street in the York Region in the northeast. Within the study area, the route operates along Yonge Street to Meadowview Avenue in the north, then via Meadowview Avenue to/from the northeast. This service operates with 20-25 minute headways during AM peak (7 am-9:30 am) and 25-30 minute headways during PM peak (4 pm-6 pm) from Monday to Friday.

The nearest stop to the site is located at Yonge Street / Steeles Avenue.

Bus route 5 (Clark)
This bus service operates between the Finch GO Bus Terminal (located adjacent to the Finch subway station) in the City of Toronto in the south to the area of Dufferin Street and Glen Shields Avenue in the York Region in the northwest. Within the study area, the route operates along Yonge Street to Clark Avenue West in the north, then via Clark Avenue West to/from the west. This service operates with 16-19 minute headways during the AM peak and the PM peak from Monday to Friday.

The nearest stop to the site is located at Yonge Street / Steeles Avenue.

Bus route 23 (Thornhill Woods)
This bus service operates between the Finch GO Bus Terminal (located adjacent to the Finch subway station) in the City of Toronto in the south to Promenade Terminal (located adjacent to Promenade Mall) in York Region, then to the area of Teston Road / Via Romano Boulevard in York Region in the northwest. Within the study area, the route operates along Yonge Street to Steeles Avenue where it connects to Hilda Avenue and the northern part of the route. This service operates with 33-34 minute headways during the AM peak and the PM peak, Monday to Friday.

The nearest stop to the site is located just west of Yonge Street on Steeles Avenue.

Bus route 77 / 77A (Highway 7)
This bus service operates between the Finch GO Bus Terminal (located adjacent to the Finch subway station) in the City of Toronto in the south to the area of Highway 7 and Vaughan Valley Road in the York Region in the west. There are 2 bus services provided along this route. Bus route 77A is an express route that operates on the 407 for a segment of the route during the AM peak and PM peak. Bus route 77 operates with a regular schedule. Within the study area, both routes operate along Yonge Street to Centre Street, where route 77A travels along Highway 407 to / from the west, and route 77 continues along Centre Street to/from the west. Route 77 operates with 15-16 minute headways during the AM peak and 17-minute headways during the PM peak from Monday to Friday. Route 77A operates with 41-48 minute headways during the AM peak and 46-47 minute headways during the PM peak, Monday to Friday.

The nearest stop to the site is located at Yonge Street / Steeles Avenue.

Bus route 88 (Bathurst)
This bus service operates between the Finch GO Bus Terminal (located adjacent to the Finch subway station) in the City of Toronto in the south to Seneca College King Campus in York Region in the north. Within the study area, the route operates along Yonge Street to Steeles Avenue, where it travels east-west to connect to/from the north via Bathurst Street. This route operates with 16-17 minute headways during the AM peak and PM Peak, Monday to Friday.

The nearest stop to the site is located just west of Yonge Street on Steeles Avenue.

Bus route 91 / 91A / 91E (Bayview / Bayview Limited Express)
This bus service has 3 routes that operate within the vicinity of the site. All 3 routes operate between the Finch GO Bus Terminal (located adjacent to the Finch subway station) in the City of Toronto in the south to the area of Bayview Plaza (located at Bayview Avenue and Taylor Mills Drive South) in York Region in the north. Route 91 loops around using Taylor Mills Drive, while Route 91A continues north towards the area of Bayview Avenue and Subrisco Avenue. Route 91E is an express service that only operates southbound towards the Finch GO Bus Terminal from the area of Bayview Avenue and Subrisco Avenue and only during AM peak period. Within the study area, all 3 routes operate along Yonge Street to Steeles Avenue, then continue to / from Bayview via Steeles Avenue East. Route 91 and Route 91A operate with 24-minute headways during the AM peak and 28-minute headways during the PM peak, Monday to Friday. Route 91E operates with 20-27 minute (3 buses, 20 min & 27 min between) headways during the AM peak.

The nearest stops to the site for Route 91 and Route 91A are located at Steeles Avenue at the intersections with Willowdale Boulevard / Willowdale Avenue, Dudley Avenue and Dumont Street, and Yonge Street. Route 91E does not stop within the site area.

Bus route 98E / 99 (Yonge Limited Express / Yonge)
This bus service operates between the Finch GO Bus Terminal (located adjacent to the Finch subway station) in the City of Toronto in the south to the area of Yonge Street and Green Lane in the York Region in the north. Route 98E is an express service that only operates northbound and only during the PM peak. (Only one bus) Route 99 operates along Yonge Street with 32-34 minute headways during the AM peak and 28-32 minute headways during the PM peak, Monday to Friday.

Route 98E does not stop within the study area. The nearest stop to the site for Route 99 is located at Yonge Street / Steeles Avenue.

Bus route 300 / 301 / 302 / 303 / 304 (Business Express / Markham Express / Unionville Express / Bur Oak Express / Mount Joy Express)
These bus services operate between the Finch GO Bus Terminal (located adjacent to the Finch subway station) in the City of Toronto in the south to various locations northeast in Markham in York Region. Within the study area Route 300 travels northbound along Yonge Street from the Finch GO Bus Terminal to Highway 407 without any stops in the AM peak with 15-minute headways, and southbound along Yonge Street from Highway 407 to the Finch GO Bus Terminal without any stops in the PM peak with 21-34 minute headways. Route 301, Route 302, Route 303, and Route 304 travels southbound along Yonge Street from Highway 407 to the Finch GO Bus Terminal without any stops in the AM peak with 8-30 minute headways Monday to Friday, and northbound along Yonge Street from the Finch GO Bus Terminal to Highway 407 without any stops in the PM peak with 10-45 minute headways, Monday to Friday.

All routes pass through the site area without stopping.

VIVA Blue / VIVA Blue A
This bus service operates between the Finch GO Bus Terminal (located adjacent to the Finch subway station) in the City of Toronto in the south to the Newmarket GO Bus Terminal (located at Davis Drive West and Eagle Street West) in the City of Newmarket. Both routes operate along Yonge Street within the study area. Route Blue A is an express route that does not stop at intermediate terminals. The VIVA Blue and VIVA Blue A both operate southbound only along Yonge Street during the AM Peak and northbound only during the PM Peak. The VIVA Blue has 2 routes servicing different end terminals. Both VIVA Blue routes operate with 15-minute headways during the AM peak and PM Peak, Monday to Friday. The VIVA Blue A route operates with 15-minute headways during the AM peak and PM peak, Monday to Friday.

The nearest stop to the site is located at Yonge Street / Steeles Avenue.

VIVA Pink
This bus service operates between the Finch GO Bus Terminal (located adjacent to the Finch subway station) in the City of Toronto in the south to the Unionville GO Bus Terminal (located near YMCA Boulevard and Rivis Rd) in the City of Markham. Within the study area, the route operates along Yonge Street to Highway 7 in the north, then to/from the Unionville GO Bus Terminal via Highway 7. This service operates at 15-minute headways during the AM peak and PM peak, Monday to Friday.

The nearest stop to the site is located at Yonge Street / Steeles Avenue.

3.2.1.2 Toronto Transit Commission (TTC)

Bus Route 53 / 53A / 53B / 953A / 953B (Steeles East / Steeles East Express)
This bus service operates between the Finch subway station in the City of Toronto to the area of Markham Road and Steeles Avenue (53B and 953B), and the area of Morningside Avenue and Staines Road (53A and 953A) in the east. Route 953 is the express route of Route 53. The routes operate north-south along Yonge Street to Steeles Avenue and east-west along Steeles Avenue East within the site area. Route 53A operates with 25-minute headways during AM peak and PM peak. Route 53B operates with 5-minute headways during the AM peak and the PM peak. Westbound operations towards Finch Station all have a headway of 5 minutes. Route 953A and Route 953B operate with 13-14 minute headways **eastbound** in the AM peak, and 15-16 minute headways **eastbound** in the PM peak. Route 953A and Route 953B operate with 13-14 minute headways **westbound** in the AM peak only. The express routes 953A and 953B do not operate westbound in the PM peak.

Within the study area, these routes are serviced at Yonge Street at Steeles Avenue, Steeles Avenue at Dudley Avenue / Dumont Street, and Steeles Avenue at Willowdale Boulevard and Willowdale Avenue. The nearest stop to the site for Route 953A and Route 953B is located at Yonge Street and Steeles Avenue.

Bus Route 60 / 60A / 60B / 60D 960 (Steeles West)
This bus service operates between the Finch subway station (located at Yonge Street and Finch Avenue) to the area of Steeles Avenue West and Highway 27 in the west and Pioneer Village Station (located across York University, near Steeles Avenue West / Jane Street) in the City of Toronto. Route 960 is the express route of Route 60. This service operates north-south on Yonge Street to Steeles Avenue and connects to the west via Steeles Avenue West in the vicinity of the site. Route 60A operates between Finch Station and Pioneer Village Station with 7-8 minute headways during the AM Peak and PM Peak. Route 60B operates between Finch Station and the area of Steeles Avenue West / Martin Grove Road with 7-8 minute headways during the PM peak only. Route 60D operates between Finch Station and the area of Steeles Avenue West and Highway 27 with 7-8 minute headways during the AM Peak and PM peak. Route 960 is an express route, which operates between Finch Station and Pioneer Village Station with 8-minute headways during the AM peak and 12-minute headways during the PM peak.

Within the vicinity of the site, the routes are serviced at Yonge Street / Steeles Avenue.

Bus Route 97F (Yonge)
This bus service operates between Davisville subway station (located at Davisville Avenue / Chaplin Crescent and Yonge Street) to the area of Steeles Avenue West and Hilda Avenue. Within the vicinity of the site, the service operates north on Yonge Street to Hilda Avenue from Finch Station, then loops to returns to Finch Station via east along Steeles Avenue West and south along Yonge Street. It operates with 30-minute headways during the AM peak and PM peak.

The nearest stop to the site is located at Yonge Street / Steeles Avenue.

Bus Route 98 (Willowdale-Senlac)
This bus service operates between the Steeles / Yonge Loop (located on Steeles Avenue East, west of Dudley Avenue / Dumont Street) to Sheppard-Yonge subway station (located at Yonge Street and Sheppard Avenue) and the area of Peckham Avenue and Cactus Avenue in the City of Toronto in the west. Within the

vicinity of the study area, this bus service operates north-south along Willowdale Avenue and east-west along Steeles Avenue East with 30-minute headways.

The nearest stops to the site are located at the Steeles/Yonge Loop, Steeles Avenue East at Dudley Avenue / Dumont Street, and Willowdale Avenue at Steeles Avenue East.

3.2.1.3 GO Transit / Metrolinx

GO Bus Route 32 / 32A / 32B (Brampton Trinity Common / North York)
This bus service has 3 routes, which operates between the York Mills GO Bus Terminal (located at the York Mills subway station) in the City of Toronto and Bramalea GO Train station (located at Steeles Avenue East / Bramalea Road), Bramalea Bus Terminal (located at Kensington Road / Central Park Drive), and Trinity Common Mall (located adjacent to Highway 410 on Bovaird Drive East) in the City of Brampton. This service operates southbound only on Yonge Street during the AM peak and northbound only on Yonge Street during the PM peak within the vicinity of the site. Route 32 operates at 15-30 minute headways during the AM peak and 21-30 minute headways during the PM peak. Route 32A operates with 25-45 minute headways during the AM Peak. It has 1 bus operating during the PM Peak. Route 32B operates with 25-minute headways during the AM peak and 26-30 minute headways during the PM peak.

The nearest stop to the site is located at Yonge Street / Steeles Avenue.

3.2.2 Future Transit Improvements

3.2.2.1 Yonge Subway Extension

An Environmental Assessment (EA) was completed in 2009 for the extension of the Yonge subway line, north to an emerging centre in Richmond Hill just north of Highway 407. A new station is planned at Steeles Avenue. While the EA was approved, the City of Toronto placed a number of pre-conditions prior to implementation. These requirements were aimed at providing additional capacity on the Yonge subway line and included: (1) use of new larger and integrated subway cars, (2) improvements to the signalling system, and (3) improvements at the Bloor-Yonge interchange or alternative capacity relief south of Bloor Street. New subway cars have been phased into active service, and signal improvements are currently being made. Studies related to the third requirement are ongoing.

Metrolinx has responsibility for the prioritization of major new regional transit initiatives across the Greater Toronto (and beyond) area. The Yonge Subway Extension remains one of several unfunded projects still identified within the Metrolinx 15-year time frame. A preliminary Benefit Case Analysis (BCA) was completed for the extension in 2009; a subsequent more detailed BCA based on supplemental concept design work undertaken by the TTC was completed in 2013. As well, City of Toronto / TTC staff are currently undertaking a study of alternatives to improve the transit accessibility of Downtown Toronto; i.e., south of Bloor Street.

For the purpose of this assessment, implementation of the Yonge Subway Extension is assumed to be beyond the scope of the 5-year time frame considered herein.

3.2.2.2 Steeles Rapid Transit

The Steeles Rapid Transit Project has been considered by York Region and is identified as a recommendation of the 2015 *Yonge-Steeles Area Regional Transportation Study*. Steeles Avenue is included as a planned rapid transit route in the *2041 Regional Transportation Plan* published by Metrolinx in March 2018[14]. The plan indicates a BRT or LRT along Steeles Avenue between Jane Street and McCowan Road with a below-grade transfer at the planned Yonge Street / Steeles Avenue mobility hub; however, no further details or timelines are provided for the planning or implementation of the project.

Figure 8 illustrates the existing and future transit network in the site vicinity.

3.3 PEDESTRIAN NETWORK

The subject site is located approximately 250 metres from Yonge Street / Steeles Avenue intersection, which will be a major transit station on the future Yonge Subway Extension, and a Mobility Hub (Gateway Hub) connecting planned higher-order transit service on Steeles Avenue.

Continuous sidewalks are provided on both sides of Steeles Avenue East and Yonge Street in the site vicinity, connecting the site to the Yonge Street / Steeles Avenue intersection and all the transit stops on Yonge Street and Steeles Avenue.

No sidewalks are currently provided on Dudley Avenue, Willowdale Boulevard or Highland Park Boulevard in the site vicinity.

Figure 9 illustrates the existing and future pedestrian network, facilities, and destinations in the surrounding area.

3.4 BICYCLE NETWORK

The *City of Toronto Near-Term Cycling Implementation Program (2019-2021)* illustrates existing and proposed cycling facilities in the City of Toronto. In the vicinity of the site (south of Steeles Avenue), there are no existing cycling facilities, however, future facilities are planned:

- **Willowdale Avenue** – Bicycle lanes or cycle tracks are proposed on Willowdale Avenue from Steeles Avenue to its southern terminus at Avondale Avenue (south of Sheppard Avenue).

- **Yonge Street** – As part of the 2013 *Yonge Street North Planning Study* (discussed in **Section 2.4**), a Yonge Street Promenade was recommended on Yonge Street south of Steeles Avenue (to Finch Avenue). Elements of the Yonge Street promenade were not detailed, however, the street was imagined to become a complete street space (which typically includes a bicycle facility).

[14] *2041 Regional Transportation Plan*. March 2018. Metrolinx.

The York Region Cycling Map illustrates existing and proposed cycling facilities in York Region. In the vicinity of the site (north of Steeles Avenue), there are no existing cycling facilities, however, future facilities are planned:

- **Willowdale Boulevard** – Protected bicycle lanes are proposed on Willowdale Boulevard from Steeles Avenue to its northern terminus at Meadowview Avenue. These bicycle lanes would connect to the bicycle facilities on Willowdale Avenue south of Steeles Avenue (in the City of Toronto, as noted above).

Figure 10 illustrates the existing and proposed area bicycle context.

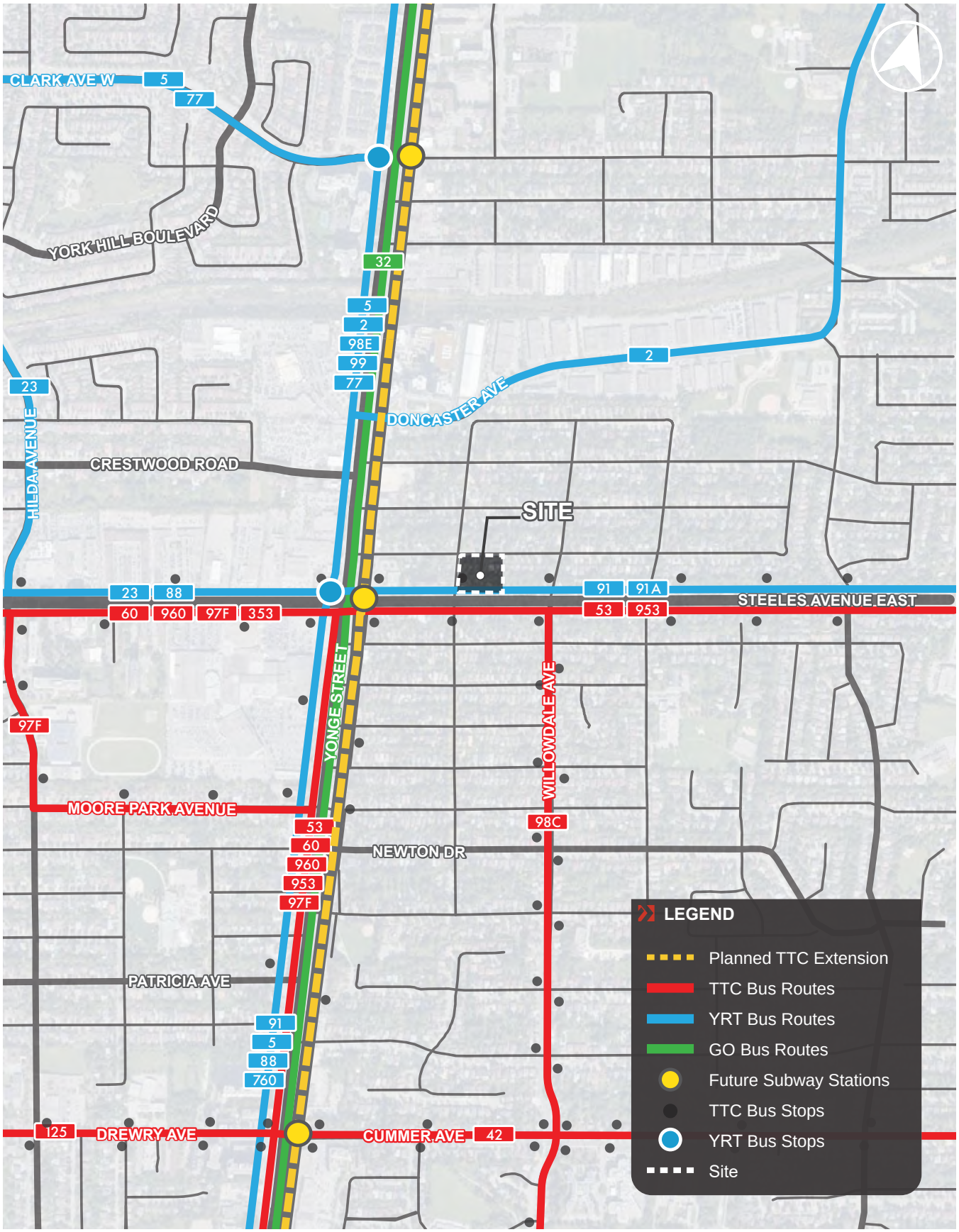

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FIGURE 8 EXISTING AND FUTURE TRANSIT NETWORK

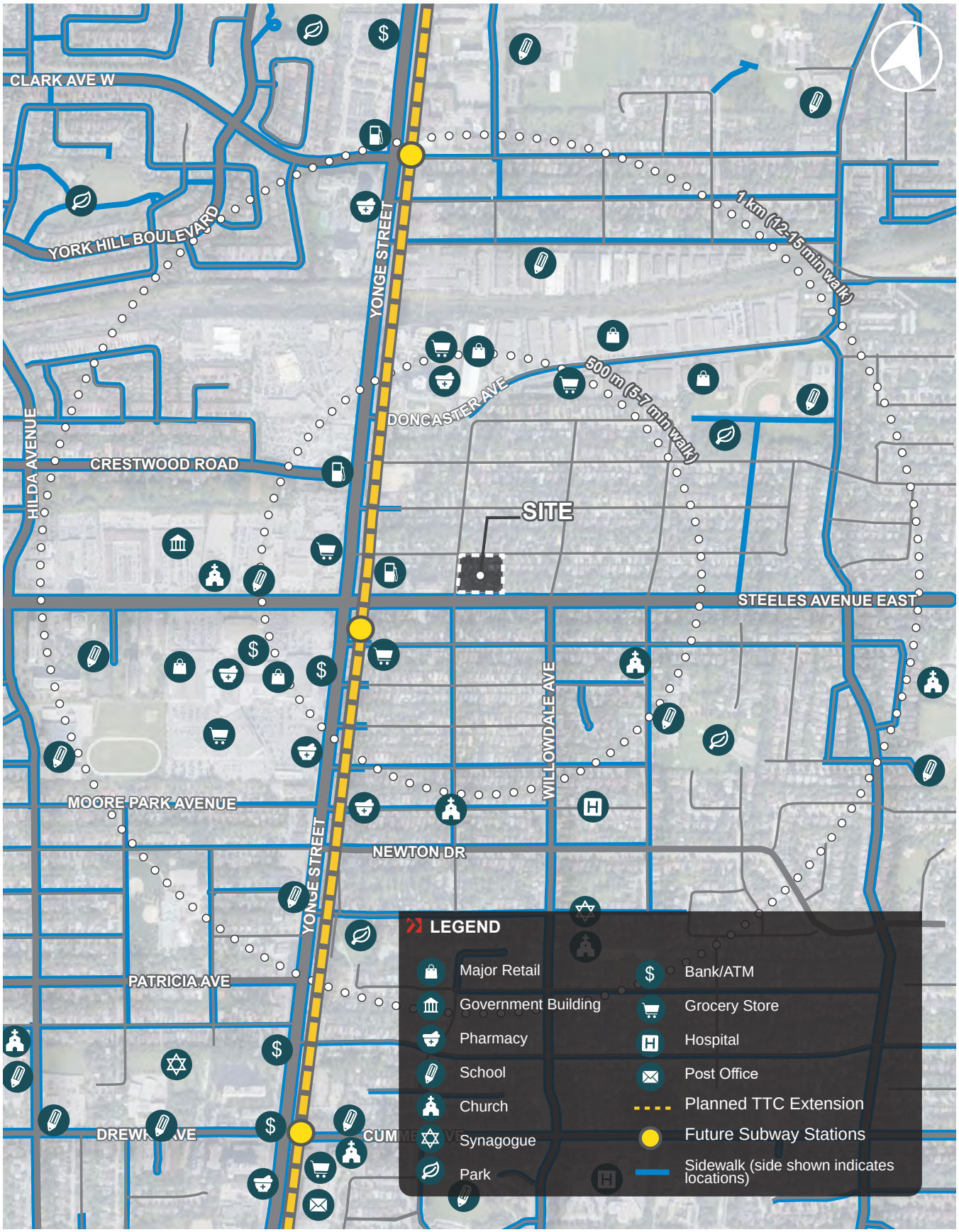

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FIGURE 9 EXISTING AND FUTURE PEDESTRIAN NETWORK

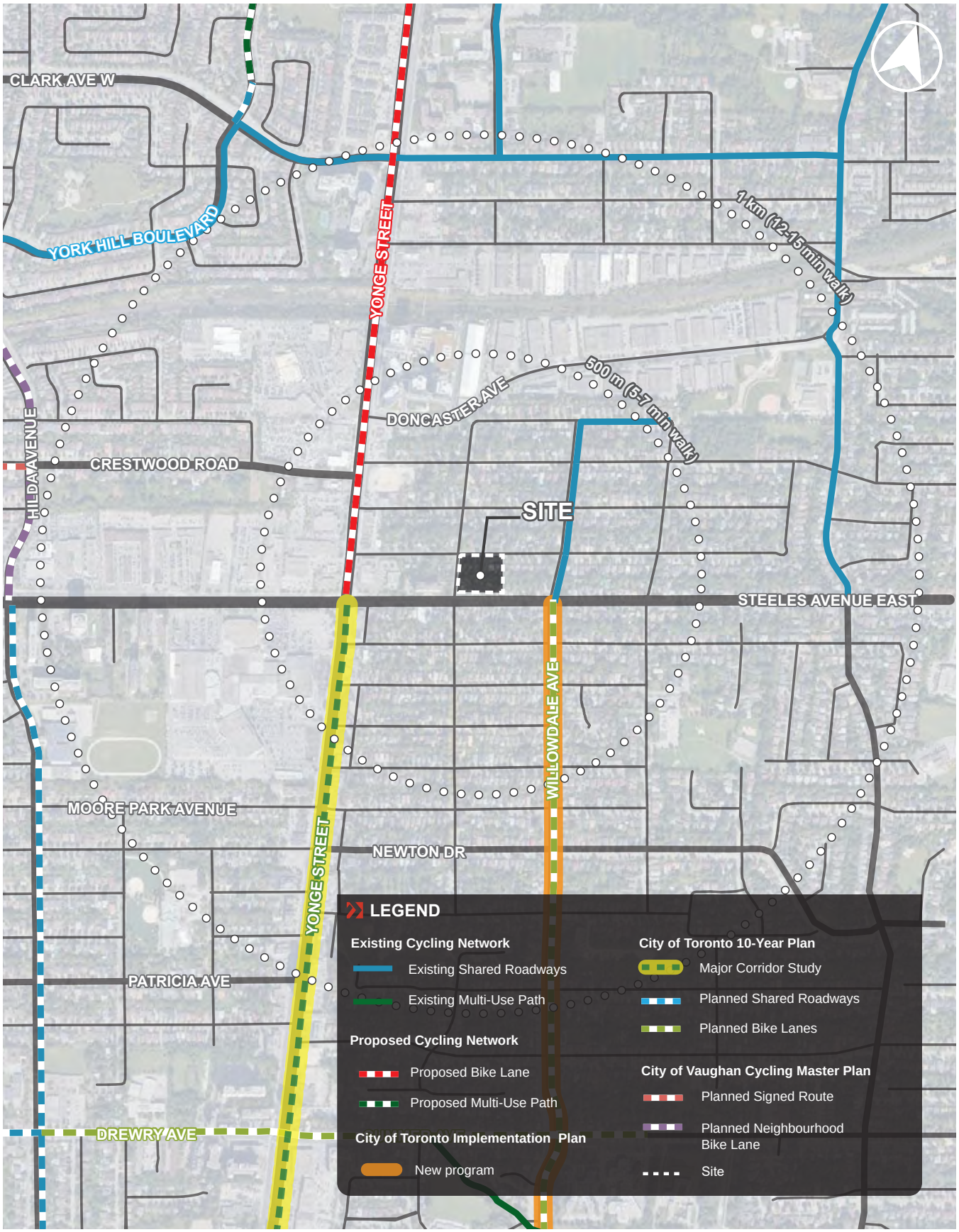

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FIGURE 10 EXISTING AND FUTURE CYCLING NETWORK

4.0 BICYCLE PARKING

4.1 BICYCLE PARKING REQUIREMENTS

The City of Markham does not currently have minimum bicycle parking standards in its zoning bylaw. Thus, it is proposed to adopt the bicycle parking rates applied by the City of Markham at other recent developments in the City including at 8200 Warden Avenue and 28 Main Street. These rates are, notably, higher than the potential rates noted in the City of Markham's *Comprehensive Zoning By-Law Project*[15] (i.e. 0.25 spaces per unit for residents and 0.06 spaces per unit for residential visitors in medium and high-density residential developments).

The application of the proposed rates to the Site is summarized in **Table 3**.

TABLE 3 PROPOSED BICYCLE PARKING RATES

Units[1]	Type	Rate	Requirement
Building A			
407 units	Long-term (Resident)	0.5 spaces per unit	204 spaces
	Short-term (Visitor)	0.2 spaces per unit	81 spaces
	Subtotal	**--**	**285 spaces**
Building B			
126 units	Long-term (Resident)	0.5 spaces per unit	63 spaces
	Short-term (Visitor)	0.2 spaces per unit	25 spaces
	Subtotal	**--**	**88 spaces**
Total Site			
533 units	Long-term (Resident)	0.5 spaces per unit	267 spaces
	Short-term (Visitor)	0.2 spaces per unit	106 spaces
	Subtotal	**--**	**373 spaces**

Notes:
1. Based on architectural plans prepared by Kirkor Architects and Planners dated April 20, 2021.

Based on the foregoing, the application of the above bicycle parking rates to the proposed development results in 374 bicycle parking spaces in total, including 267 resident spaces and 106 visitor spaces.

4.2 PROPOSED BICYCLE PARKING SUPPLY

The current architectural site statistics indicate the provision of 304 bicycle parking spaces for Building A, including 211 long-term and 93 short-term spaces, and 93 spaces for Building B, including 63 long-term spaces and 30 short-term spaces. In total, 397 bicycle parking spaces are provided on the site, including 274 long-term spaces and 123 short-term spaces, which meets the proposed minimum bicycle parking supply.

[15] "*Comprehensive Zoning By-Law Project – Task 9: Review and Assessment of Parking and Loading Standards*". Markham Zoning By-Law Consultant Team. August 17, 2015.

5.0 VEHICULAR PARKING

5.1 ZONING BY-LAW REQUIREMENTS

The application of the in-force City of Markham Zoning By-Law 28-97 to the subject site is summarized in **Table 4**.

TABLE 4 CITY OF MARKHAM ZONING BY-LAW 28-97 PARKING REQUIREMENTS

Units	Type	By-Law	Required
533 units	Resident	1.25 spaces per unit	666
	Visitor	0.25 spaces per unit	133
TOTAL	--	--	**799**

Notes:
1. Rounding per City of Markham Zoning By-Law 28-97, Section 3.1 – "Where the application of the parking standards in the above Parking Standards tables results in a numeric fraction, fractions of less than 0.5 shall be rounded down to the nearest whole number. Fractions equal to or greater than 0.5 shall be rounded up to the nearest whole number."

Resident parking standards outlined in Zoning By-Law 28-87 are considered to significantly overstate the parking needs of a residential apartment in this area of the City in light of the highly transit-accessible location, the extremely high volume and frequency of bus services operating in the site vicinity (operated by York Region Transit / VIVA, TTC and GO Transit / Metrolinx) and the high level of existing non-auto based travel for residential apartment dwellers in the site vicinity.

The parking requirements of Zoning By-Law 28-87 are currently uniformly applied across the City, with no recognition of the transit, walking and cycling context of the area (with the exception of the City's By-Law 2004-196 for the Markham Centre, the City's major growth node). It also does not set maximum standards for parking provision (again with the exception of By-Law 2004-196 for the Markham Centre, which sets limits on maximum parking in order to encourage greater transit use and assist in the creation of a high-density urban area).

However, the City of Markham's *Comprehensive Zoning By-Law Project* (2015) recommends the application of reduced parking requirements that recognizes the non-auto transit-supportive context of different areas of the City, including Regional Corridors & Key Development Areas (which includes the Yonge-Steeles area). It also notes that this would be "*consistent with current Provincial and Regional planning policies and directives… The York Region Official Plan states in Policy 5.2.10(a) that "… secondary plans and zoning by-laws… shall include… (a) reduced minimum parking requirements that reflect the walking distance to transit and complementary uses".*" The document does not recommend specific standards for such areas. The following provides a review of zoning bylaws and policies in other jurisdictions for areas comparable to the subject site.

To the south of the site, the City of Toronto Zoning By-Law 569-2013 recognizes sites' proximity to subway and surface transit via the provision of reduced rates for certain Policy Areas, while to the west of the site, at the northwest corner of Yonge Street / Steeles Avenue, the City of Vaughan's *Draft Parking Standards*

Review (2010)[16] recommends reduced rates for key intensification areas including 'Higher-Order Transit Hubs' that would be applicable to this area given the existing and planned transit / urban form / intensification context.

For purposes of comparison, the application of City of Toronto Zoning By-Law 569-2013 Policy Area 3 (for avenues served by higher-order transit) and Policy Area 4 (for avenues served by surface transit) as well as the standards contained in the City of Vaughan's 2010 *Draft Parking Standards Review* for 'Higher-Order Transit Hubs'[17] are summarized in **Table 5**.

TABLE 5 CITY OF TORONTO ZONING BY-LAW 569-2013 (PA3 AND PA4) AND CITY OF VAUGHAN *DRAFT PARKING STANDARDS REVIEW* PARKING REQUIREMENTS

Unit Type	City of Toronto By-Law 569-2013 [1]				City of Vaughan 2010 *Draft Parking Standards Review* [2]	
	Policy Area 3		Policy Area 4		Higher-Order Transit Hubs	
	By-Law	Required	By-Law	Required	By-Law	Required
Bachelor *0 units*	0.6 spaces / unit	0	0.7 spaces / unit	0	0.7 spaces / unit	0
1-bedroom *287 units*	0.7 spaces / unit	200	0.8 spaces / unit	229	0.7 spaces / unit	201
2-bedroom *188 units*	0.9 spaces / unit	169	0.9 spaces / unit	169	0.9 spaces / unit	169
3-bedroom *28 units*	1.0 spaces / unit	28	1.1 spaces / unit	30	1.0 spaces / unit	28
Townhouse *30 units*	1.0 spaces / unit	30	1.0 spaces / unit	30	1.0 spaces / unit	30
Resident Subtotal	effective rate 0.80 spaces / unit	**427**	effective rate 0.86 spaces / unit	**458**	effective rate 0.80 spaces / unit	**428**
Residential Visitor 533 units	0.10 spaces / unit	**53**	0.15 spaces / unit	**79**	0.15 spaces / unit	**80**
TOTAL	--	**480**	--	**537**	--	**508**

Notes:
1. Rounding per City of Toronto Zoning By-Law 569-2013 – Vehicular parking calculations that result in a fraction must be rounded DOWN to the nearest whole number.
2. The City of Vaughan Zoning By-Law 1-88 does not specify requirements for rounding. For the purpose of this analysis, and consistent with the City of Vaughan's 2010 *Draft Parking Standards Review*, parking space calculations have been rounded to the nearest whole number.

[16] "*Review of Parking Standards Contained Within the City of Vaughan's Comprehensive Zoning By-Law*". IBI Group. March 2010.
[17] Note that the recommended rates contained in the City of Vaughan's 2010 *Draft Parking Standards Review* for 'Higher-Order Transit Hubs' are the same as the rates contained in the City of Vaughan Zoning By-Law 1-88 for the Vaughan Metropolitan Centre (VMC).

5.2 PROPOSED ZONING BY-LAW STANDARD AND SUPPLY

The proposed parking supply consists of 395 parking spaces for residents (effective ratio of 0.74 spaces/ unit) and 118 parking spaces for visitors (effective ratio of 0.22 spaces/ unit), for a total of 513 parking spaces.

5.3 ADEQUACY OF PROPOSED PARKING STANDARD

5.3.1 Resident Parking Supply

The following provides an overview of the contextual factors influencing parking demands at residential buildings in this area of the City and the adequacy of the proposed (reduced) resident parking supply for the project, including:

- Observed demand at comparable sites;
- Area transportation context;
- Mobility as a Service (Maas);
- Transportation planning context; and
- Transportation Demand Management (TDM) plan.

5.3.1.1 Observed Demand at Comparable Sites

BA Group has undertaken resident parking demand at proxy sites in the City of Markham and City of Vaughan that are similar in context to the proposed development. Resident parking demand studies are undertaken between 2:00am-4:00am on weekday mornings (overnight), when resident vehicles are most likely to be parked. Studies are undertaken on multiple days at the same location. Proxy demand studies are summarized in **Table 6**.

TABLE 6 PROXY RESIDENT PARKING DEMAND STUDIES

Location	Date	# Units	Resident Parking Supply	Resident Parking Demand
Condominiums: World on Yonge, 7161-7171 Yonge Street, Markham (Yonge Street / Meadowview Avenue)	Tuesday December 4, 2018 (2:00am)	1,250 units	1,396 spaces (1.1 spaces / unit)	995 spaces **(0.80 spaces / unit)**
	Thursday December 6, 2018 (2:00am)			1,046 spaces **(0.84 spaces / unit)**
Condominiums: Legacy at Heron's Hill, 30 Heron's Hill Way & 2035 Sheppard Avenue East (Sheppard Avenue / Consumers Road)	Wednesday May 17, 2017 (3:00am)	330 units	344 spaces (1.04 spaces / unit)	275 spaces **(0.80 spaces / unit)**
	Tuesday May 23, 2017 (3:00am)			269 spaces **(0.78 spaces / unit)**
Rental apartments: 135 Fenelon Drive, Toronto (York Mills Road / Don Mills Road)	Tuesday March 20, 2018 (3:00am)	218 units	228 spaces (1.05 spaces / unit)	163 spaces **(0.75 spaces / unit)**
	Thursday March 22, 2018 (3:00am)			165 spaces **(0.76 spaces / unit)**
5 Fisherville Road and 6040 Bathurst Street (Bathurst Street / Steeles Avenue West)	Wednesday, October 7, 2015 (4:00 a.m.)	396	-	219 **(0.55 spaces / unit)**
	Thursday, October 15, 2015 (4:00 a.m.)		-	228 **(0.58 spaces / unit)**

Notes:
1. Number of occupied units as of October 2015, provided by property management staff.

Observed resident parking demand at condominium and rental apartment buildings in comparable locations (and, in fact, in locations with less transit accessibility than the subject site) range from 0.55 to 0.84 spaces / unit. Notably, the observed demand at these buildings are all significantly lower than the zoning bylaw standards that apply for these sites, and also significantly lower than the in-force City of Markham Zoning By-Law 28-87 that applies to the subject site. The proposed resident parking rate of 0.74 spaces / unit falls within this range.

5.3.1.2 Area Transportation Context

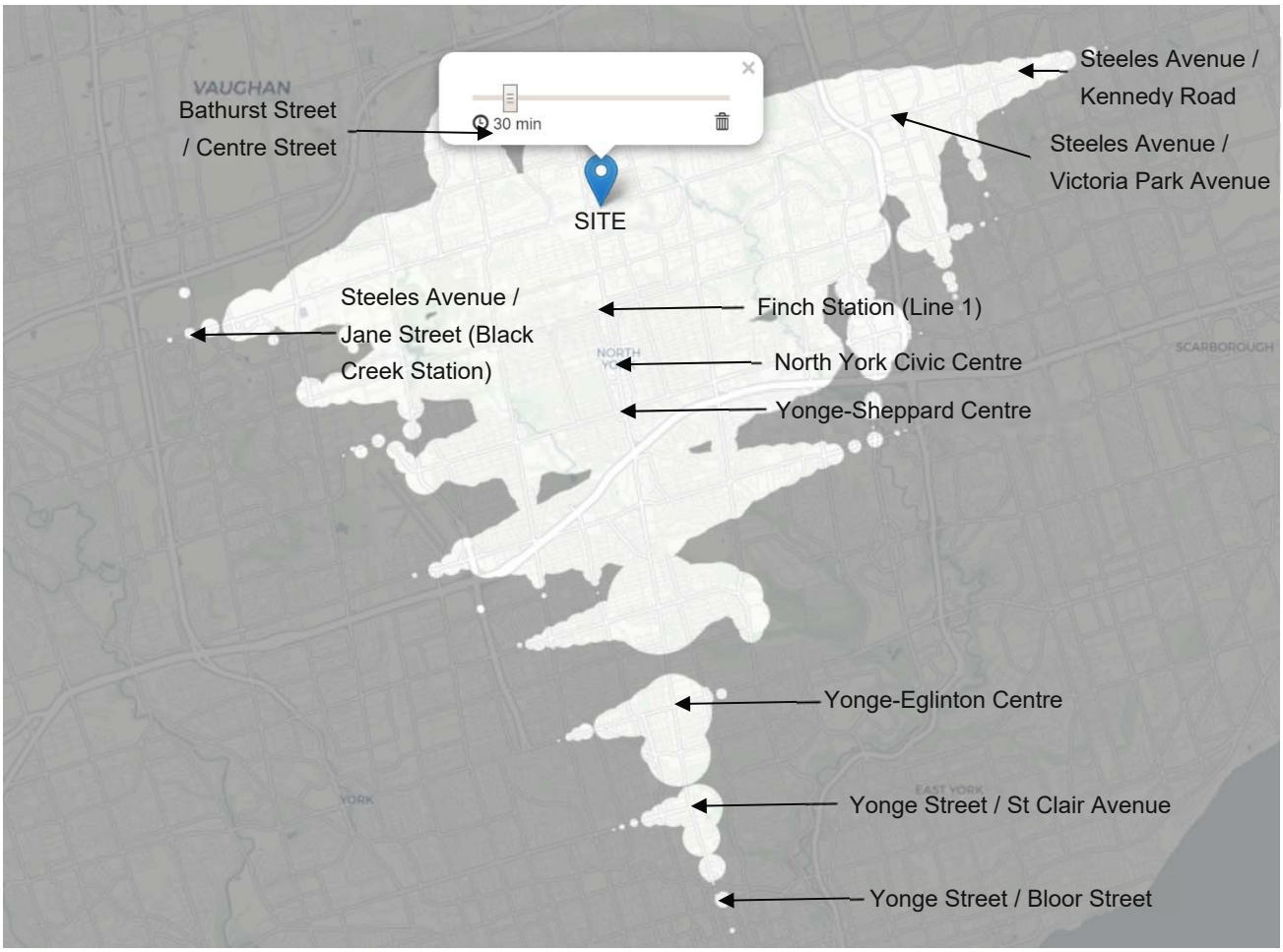
The site is well-served by numerous high-frequency bus services on Steeles Avenue East and Yonge Street operated by three transit agencies, including York Region Transit (YRT), Toronto Transit Commission (TTS) and GO Transit / Metrolinx. The existing non-auto travel usage is extremely high in the site vicinity today – approaching, in fact, the levels experienced near Finch Station, which serves the Line 1 subway as well as surface transit operated by TTC, YRT / VIVA and GO Transit / Metrolinx.

The Yonge Street / Steeles Avenue intersection will be a major transit station on the future Yonge Subway Extension and will connect bus service as well as planned higher-order transit service on Steeles Avenue.

The Walk Score® ranking website assigns the site a Walk Score of 86 ("Very Walkable" – most errands can be accomplished on foot), a Transit Score of 79 ("Excellent Transit" – transit is convenient for most trips), and a Bike Score of 50 ("Bikeable"), which underscores the accessibility of the site by non-auto means.

As well, based on a review of the Mapnificant (www.mapnificant.net) data service, the existing 30-minute transit reach to / from the site is significant and encompasses a large portion of uptown, midtown, northwest and northeast Toronto as well as parts of southern Vaughan and Markham. The existing 30-minute transit area is illustrated in **Exhibit 3**. The map illustrates the travel area from the site to the first point of exiting the transit vehicle. Note that transit service travel times are variable and are reflective of passenger dwell times (time waiting for a transit vehicle), and that the travel reach cited herein is representative of typical travel times.

EXHIBIT 3 30-MINUTE TRANSIT TRAVEL RADIUS TO / FROM THE SITE



Based on the foregoing, the existing transit network in the site vicinity allows for a wide transit reach. Within a typical 30-minute transit ride one can access an area as far north as Yonge Street / Centre Street, as far west as Steeles Avenue West / Jane Street, as far south as Yonge Street / Bloor Street and as far east as Steeles Avenue East / Kennedy Road.

With the numerous transit improvements planned across the GTA, transit reach to / from the site is expected to further improve.

The range of employment, retail, entertainment, cultural, amenity and institutional destinations located across the central GTA that can be readily reached by transit, foot and bicycle serves to reduce the need for residents of the site to travel on a day-to-day basis using a car, and in fact to own a vehicle.

5.3.1.3 Mobility as a Service (Maas)

Mobility as a Service (Maas) is a disruptive innovation that is playing an increasingly important role in reducing private car ownership. MaaS is a concept that represents a shift away from personally-owned modes of transportation towards transportation solutions that are consumed as a service. MaaS aims to seamlessly combine multi-modal transport options to handle everything from travel planning to payment via a single platform.

The growth of MaaS is supported by a number of innovative service providers such as ride-sharing services (e.g. Uber and Lyft), bike-sharing programs (e.g. Bike Share) and car-sharing services. The MaaS concept also anticipates the future introduction of self-driving cars, which will further decrease the need for personal car ownership in favour of on-demand car services, which are expected to become more affordable with self-driving cars. MaaS aims to seamlessly integrate transit services into the trip chain, with benefits for both transit ridership and overall travel efficiency.

The increasing role played by MaaS providers today, as well as significant growth in the MaaS market that is anticipated in the future, will further reduce the need for private car ownership and parking.

5.3.1.4 Transportation Planning Context

From a transportation planning perspective, three key aspects are key:

Residents can and do live in the highly transit-accessible areas of the GTA without owning a private vehicle. A myriad of traditional transportation choices are available to residents, including public transit, taxis, walking, and cycling in addition to the more recent options including car share and ride share services. A number of zoning bylaws in the GTA recognize this, by setting minimum parking standards for most unit types at less than one space per unit. A reduction from the bylaw simply increases the numbers of residents who will not have a private parking space.

Providing less parking helps encourage sustainable transportation and reduces peak period automobile travel. Providing parking encourages travel by private automobile. Put simply, residents who have a choice between sustainable travel modes and a private automobile may choose to drive whereas residents without parking will travel by other modes.

No risk to the City of Markham or the surrounding neighbourhood. A sometimes-cited rationale for providing more resident parking is the need to ensure residents will not park on area public streets. However the City controls the ability for residents of any given property to be given permission to park on street. Should the City wish to do so the proposed building could be specifically excluded from permit parking.

5.3.1.5 Transportation Demand Management (TDM)

A comprehensive TDM plan is being planned for the site that will work to reduce single-occupancy vehicular trips to / from the site and encourage alternative modes including transit, cycling and walking. These TDM measures will reduce auto usage and the need for residents to own a vehicle. The TDM strategy is discussed in **Section 6.0**.

5.3.2 Non-Resident Parking Supply

The proposed non-resident parking ratio of 0.22 spaces / unit exceeds the requirements based on comparison to the City of Toronto Zoning By-Law 569-2013 Policy Area 3 (for avenues served by higher-order transit) and Policy Area 4 (for avenues served by surface transit) as well as the standards contained in the City of Vaughan's 2010 Draft Parking Standards Review for 'Higher-Order Transit Hubs', and is appropriate for the site given the local area context.

6.0 TRANSPORTATION DEMAND MANAGEMENT (TDM)

6.1 MOBILITY CHOICE TRAVEL PLAN

The location of the site and its surrounding uses greatly influence the success of a mobility plan. The purpose of the Mobility Choice Travel Plan is to guide the provision of viable alternative personal transportation options beyond the single-occupant, private automobile. This plan intends to support the proposed development by outlining TDM measures and the suite of strategies under consideration to promote the use of more active and sustainable transportation modes; respond to the mobility needs of residents, employees and visitors of the site; and reduce the overall dependence on the private automobile.

The existing and future site context provides for frequent public transit services, cyclist and pedestrian connectivity. While strong opportunities exist in the area infrastructure to accommodate sustainable transportation practices, the ability to fully leverage these opportunities is granted by the success of the implementation of the Mobility Plan.

A detailed Mobility Choice Travel Plan will be developed and secured through the approvals process in consultation with the City of Markham.

6.2 ORGANIZATIONAL FRAMEWORK

The key objectives of the plan can be organized within the following categories:

- Encourage transit use;
- Encourage and facilitate bicycle use;
- Enhance pedestrian access and walkability;
- Facilitation of reduced car ownership and usage;
- Vehicular parking supply and management;
- Land use and building infrastructure; and
- Coordination, communication, and promotion.

Measures from the Mobility Choice Travel Plan will be incorporated into the proposed development to minimize the need to own a personal vehicle or use an automobile when travelling to and from the site. It is important to encourage and facilitate the use of non-automobile travel modes on a daily basis.

Table 7 summarizes the potential Mobility Choice Travel Plan Strategies for the proposed development.

TABLE 7 POTENTIAL MOBILITY CHOICE TRAVEL PLAN STRATEGIES

TRANSIT USE		**Intent:** Support for and the promotion of the use of area transit services for both short and long-distance travel by residents, visitors, and employees will reduce the overall use of a vehicle and the need to own one.	**Implementation:** • The site is located immediately adjacent to the Yonge Street / Steeles Avenue intersection which is defined as a Gateway Hub in Metrolinx's *The Big Move*. Under existing conditions, it serves a large number of high-frequency bus services operated by YRT / VIVA, TTC and GO Transit / Metrolinx. • With the planned implementation of the Yonge Subway Extension as well as high-order transit on Steeles Avenue, this Gateway Hub will integrate an even larger number of higher-order and bus services. • Consideration will be given to providing each dwelling with a one-time, pre-loaded PRESTO card.
BICYCLE FACILITIES		**Intent:** Provide cycling infrastructure that supports and promotes cycling as a convenient and viable travel alternative to the personal automobile.	**Implementation:** • A total of 397 bicycle parking spaces are proposed on the ground floor and P1 level of the parking garage. • To facilitate safe/convenient access to the resident bicycle parking facilities on the P1 level, a separate outbound bicycle lane (1.5 metres wide) will be provided on the garage ramp connecting the ground floor to the P1 level. Cyclists entering the garage will travel in the vehicular traffic lane, as they are generally able to travel (downhill) at the speed of traffic, while cyclists exiting the garage (uphill) will travel in the bicycle lane, as they generally travel slower than vehicular traffic. • The site is located adjacent to future on-street bicycle lanes Willowdale Boulevard and Willowdale Avenue, Hilda Avenue and (potentially) the northern portion of Yonge Street in North York. • Bicycle repair stands will be provided in the bicycle rooms to enable residents to do light maintenance and pump tires on their bicycles without owning/carrying equipment of their own.
PEDESTRIAN CONNECTIVITY		**Intent:** A high-quality, safe, connection between the site and transit stations/stops, cycling network, and public street system encourages residents, employees and visitors to travel around the site area without a vehicle.	**Implementation:** • The site will provide widened sidewalks along the entirety of its frontages on Steeles Avenue and Dudley Avenue. Notably, Dudley Avenue does not have sidewalks today. • The site will also remove 7 existing driveway accesses onto Steeles Avenue and Dudley Avenue, and consolidate these into a single laneway connection at Dudley Avenue.
PARKING MANAGEMENT		**Intent:** Reduced parking standards within the proposed development encourages residents, visitors and employees to re-consider the use or ownership of a vehicle.	**Implementation:** • Residential parking is proposed to be supplied at a reduced rate relative to the in-force City of Markham Zoning By-Law 28-87, which is considered to overstate the parking needs of a residential building in this location. The proposed resident parking standard will adequately meet the parking needs of site residents without oversupplying parking.

CAR-SHARE		**Intent:** Car-share programs provide "on-demand" access to a fleet of vehicles located on the site. The convenience and easy access reduces the need to own a personal vehicle and also encourages the use of other non-automobile commuting methods.	**Implementation:** • 2 car-share spaces are proposed on the site to enable residents to access a vehicle on an as-needed basis without the need to own one. • Consideration will be given to providing each dwelling with 1-year car share membership.

The effectiveness of TDMs is discussed in **Section 9.3** of the February 2019 report.

7.0 LOADING

City of Markham By-law 177-96 has no requirement for residential loading spaces.

City of Toronto Zoning By-law 569-2013 minimum loading dimensional requirements was referenced to determine appropriate loading facilities for the proposed development. The dimensions of the City of Toronto standard Type G loading space are approximately 13.0m x 4.0m x 7.5m and are coupled with a bin storage area that will facilitate waste bin pickup.

On this basis, on Type ‘G’ loading space is provided at-grade and will provide a consolidated refusing loading area for both buildngs.

Vehicle Maneuvering Diagrams (VMD’s) illustrating the ingress and egress of a City of Markham (Turtle Island) garbage collection vehicle to/from the loading facility are attached in **APPENDIX C**. The manoeuvres are functional and therefore, the loading facility is appropriate.

8.0 TRAFFIC VOLUMES

8.1 ANALYSIS SCENARIOS AND HORIZONS

Traffic analyses have been completed for the following weekday morning and afternoon peak hour scenarios:

- **Existing Traffic** – volumes on the road network under existing conditions.
- **Future Background Traffic** – volumes in the future prior to build-out of the Site which considers area growth.
- **Future Total Traffic** – volumes in the future after build-out of the Site, inclusive of area background growth.

The introduction of local roads proposed in the *Yonge-Steeles Regional Transportation Study* (September 2015) will significantly transform the local travel characteristics in the Yonge-Steeles area. Several new collector and local roads are identified in the *2015 Regional Transportation Study*, which will improve the connectivity and accessibility of the Yonge-Steeles area and provide opportunities for traffic to reroute from the currently congested intersections in the study area.

Considering the introduction of the finer-grained road network identified in the 2015 Regional Transportation Study, the following two planning horizons have been analyzed in this study:

- **Future 2026 (5-year horizon)** – prior to the completion of locals roads identified in the *Yonge-Steeles Regional Transportation Study* (September 2015).

- **Future 2031 (10-year horizon)** – after the completion of all locals roads identified in the *Yonge-Steeles Regional Transportation Study* (September 2015).

Furthermore, the proposed development is located in proximity to potential Light Rail Transit (LRT) and Bus Rapid Transit (BRT) alignments along Steeles Avenue. Considering restrictions may be added to the intersection Steeles Avenue East / Dudley Avenue / Dumont Street at the 2031 horizon as a result of the potential portal on Steeles Avenue East, the following two scenarios have been analyzed in this study:

- **2031 Base case** – assume existing lane configuration and full movements are allowed at the intersection Steeles Avenue East / Dudley Avenue / Dumont Street.

- **2031 Sensitivity** – assume the intersection Steeles Avenue East / Dudley Avenue / Dumont Street become restricted to right-in/right-out only.

8.2 EXISTING TRAFFIC VOLUMES

Note: Undertaking new traffic field studies is not possible at the time of completing this analysis, given the unprecedented circumstances surrounding the COVID-19 pandemic from March 2020 onwards. Existing traffic volume data, as described below, is used to develop existing baseline conditions for analysis herein.

Base existing traffic volumes were established for the weekday morning and afternoon peak hours (the busiest hour of traffic between 7:30-9:30 am and 4:00-6:00 pm, respectively) for intersections within the study area, based on recent traffic count information collected by Spectrum Traffic Inc. on behalf of BA Group.

Traffic count information adopted as the basis for the traffic operations analysis undertaken to assess operational impacts of the proposed development is summarized in **Table 8**.

TABLE 8 EXISTING TRAFFIC COUNTS

Intersections	Date of Counts	Source
Yonge Street / Steeles Avenue	Thu, Mar 21, 2019	City of Toronto
Yonge Street / Highland Park Boulevard	Thu, Feb 28, 2019	Region of York
Dudley Avenue / Dumont Street / Steeles Avenue East	Thu, Jul 05, 2018	Spectrum Traffic Data Inc.
Dudley Avenue / Highland Park Boulevard		
Willowdale Avenue / Dumont Street / Steeles Avenue East		
Willowdale Avenue / Highland Park Boulevard		
Dudley Avenue / 18 Steeles Avenue East Driveway		

The above-listed traffic counts were used as base volumes, with all **through volumes** balanced up or down to meet the observed volumes at **Yonge Street / Steeles Avenue** (March 2019 counts). Turning volumes were not altered during balancing.

Weekday morning and afternoon peak hour traffic volumes in the study area adopted for this analysis are illustrated in **Figure 11**. Turning movement counts are attached in **APPENDIX I**.

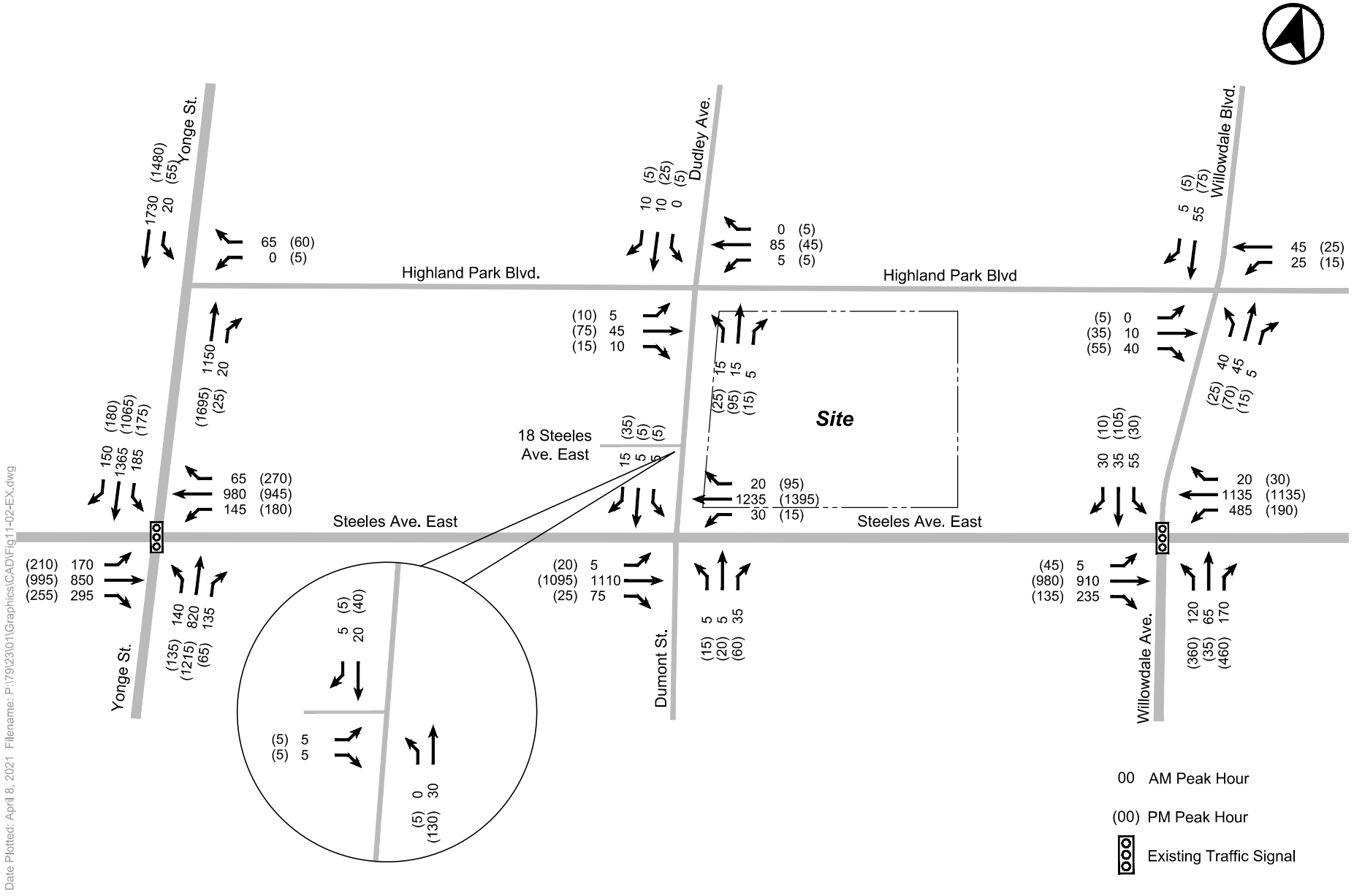


FIGURE 11 EXISTING TRAFFIC VOLUMES

8.3 BACKGROUND TRAFFIC VOLUMES

8.3.1 Corridor Growth

Historical weekday traffic volume counts at the Yonge Street / Steeles Avenue intersection were reviewed to determine:

- How traffic volumes along these corridors have changed on a sustained basis over recent years during the weekday street peak periods; and
- Appropriate allowances for future general corridor growth along these corridors.

The observed trends indicate that, generally, there has been no growth in corridor traffic volumes on the area road network. Therefore, no 'general' corridor growth allowances have been made along Yonge Street or Steeles Avenue over and above the series of specific allowances made for other area development proposals for either horizon of consideration. Observed trends in traffic volumes are summarized in **APPENDIX E**.

8.3.2 Background Developments

Allowances were made to account for new traffic generated by other development proposals in the area that are either under construction, approved, being reviewed or for which an application is expected to be submitted to the City in the near future. A total of 15 development proposals have been considered, representing in the order of 14,121 residential units, 26,441 m^2 retail GFA, 23,002 m^2 office GFA, 2,275 m^2 community centre GFA, 1,697 m^2 daycare GFA, and 228 hotel rooms. Background developments included in this analysis are summarized in **Table 9** and illustrated in **Figure 12**.

Trip generation rates and traffic assignments adopted for each background development are based upon the information documented in the traffic impact studies (TIS) prepared for each project. Where no traffic volumes and distributions were available for a specific background development, trip generation rates and traffic distribution assumptions have been adopted consistent with this development application.

TABLE 9 BACKGROUND DEVELOPMENTS SUMMARY

Developments	Development Statistics	Sources	Date	Status	Horizon
City of Toronto Developments					
5799-5915 Yonge St (Newtonbrook Plaza - Block 1)	808 condominium units 3,968 m^2 office GFA 3,332 m^2 retail GFA	BA Group	Mar 2018	NOAC Issued	2026
5799-5915 Yonge St (Newtonbrook Plaza - Block 2)	856 condominium units 3,628 m^2 office GFA 2,350 m^2 retail GFA 4,318 m^2 community centre GFA 1,032 m^2 daycare GFA	BA Group	Oct 2020	SPA Under Review	2026
5799-5915 Yonge St (Newtonbrook Plaza Total)	1,628 condominium units 6,955 m^2 retail GFA 10,000 m^2 office GFA 2,275 m^2 community centre GFA 915 m^2 daycare GFA	BA Group	Sep 2015	LPAT Approved	2031

Developments	Development Statistics	Sources	Date	Status	Horizon
5800 Yonge St	1,496 residential units 1,256 m^2 retail GFA 4,602 m^2 office GFA 782 m^2 daycare GFA	BA Group	Jan 2020	OPA/ZBA/SUB Under Review	2026
5840-5870 Yonge St	407 residential units	WSP	Apr 2020	Condominium Approval Under Review	2026
5959 Yonge St (Phase 1)	939 condominium units 1,438 m^2 retail GFA	GHD	Jul 2017	OPA/ZBA LPAT Appeal	2026
5959 Yonge St (Phase 2)	603 condominium units 242 m^2 retail GFA	GHD	Jul 2017	OPA/ZBA LPAT Appeal	2031
5995 Yonge St	443 condominium units	BA Group	Nov 2019	ZBA/SPA LPAT Appeal	2026
6080 Yonge St 11 Homewood Ave	262 condominium units 808 m^2 retail GFA	Trans-Plan	Jun 2020	OPA/ZBA LPAT Appeal	2026
6150 Yonge St	521 condominium units 798 m^2 retail GFA	BA Group	Nov 2020	ZBA Under Review	2026
33-43 Centre Ave	83 condominium units	BA Group	Dec 2020	OPA Under Review	2026
City of Vaughan Developments					
100 Steeles Ave W	1,765 condominium units 1,203 m^2 auto dealership GFA	BA Group	Dec 2019	OPA/ZBA Under Review	2026
180 Steeles Ave W (Phase 1)	2,080 condominium units 3,271 m^2 retail GFA	BA Group	Feb 2020	OPA/ZBA Under Review	2026
434 Steeles Ave W	3,349 m^2 auto dealership GFA	NexTrans	Nov 2019	SPA Under Review	2026
7028 Yonge St (Phase 1)	1,330 condominium units 228 hotel rooms 1,546 m^2 office GFA	Cole Engineering Group	Jun 2019	OPA/ZBA Under Review	2026
7028 Yonge St (Phase 2)	572 condominium units	Cole Engineering Group	Jun 2019	OPA/ZBA Under Review	2031
7080 Yonge St	652 condominium units 673 m^2 retail GFA 1,122 m^2 office GFA	BA Group	Sep 2020	OPA/ZBA Under Review	2026
City of Markham Developments					
7089 Yonge St	221 residential units 1,161 m^2 retail GFA 1,764 m^2 office GFA	RJ Burnside	Jun 2016	Unknown	2026
Langstaff Gateway (Phase 1)	1,083 residential units 1,955 m^2 retail GFA	WSP	Unknown	Unknown	2026
Total	**14,121 residential units, 26,441 m^2 retail GFA, 23,002 m^2 office GFA, 2,275 m^2 community centre GFA, 1,697 m^2 daycare GFA, and 228 hotel rooms**				

The background development located on the site municipally known as 7028 Yonge Street, located in the northwest quadrant of the Yonge Street / Steeles Avenue intersection in the City of Vaughan, is currently proposed to include approximately 1,900 residential units, 228 hotel rooms and 1,546 m^2 of commercial GFA. Phase 1 of this development was considered in the 2026 horizon and Phase 2 was considered in the 2031 horizon.

Background development traffic allowances considered for the 2026 and 2031 horizons are illustrated in **Figure 13** and **Figure 14**, respectively.

8.3.3 Future Traffic Volumes Rerouting

With the completion of the fine-grain street network identified in the *Yonge-Steele Regional Transportation Study* (September 2015), traffic volumes will have the opportunity to rerouting to the new collectors and local roads.

Unadjusted future background traffic volumes are the sum of existing traffic volumes, corridor growth volumes and background development traffic volumes. A reduction of 15% was applied to all movements of the intersection Yonge Street / Steeles Avenue with respect to the unadjusted 2031 future background traffic volumes to account for existing and background traffic volumes rerouting away from this intersection to the new collectors and local roads, and is in keeping with other studies in the area.

Further reduction is anticipated as a result of the mode shift towards more sustainable and efficient modes of transport after the completion of the Line 1 Subway Extension. This reduction is not considered in this analysis as Line 1 Subway Extension is not expected to be completed by either planning horizon considered in this study.

8.3.4 Future Background Traffic Volumes

Adjusted future background traffic volumes are the sum of existing traffic volumes, corridor growth volumes, background development traffic volumes, and traffic volumes displacement under the 2031 horizon.

Future background traffic volumes for the 2026 horizon is illustrated in **Figure 15**. Future background traffic volumes for the 2031 (adjusted) horizon are illustrated in **Figure 16** for the base and **Figure 17** for the sensitivity.

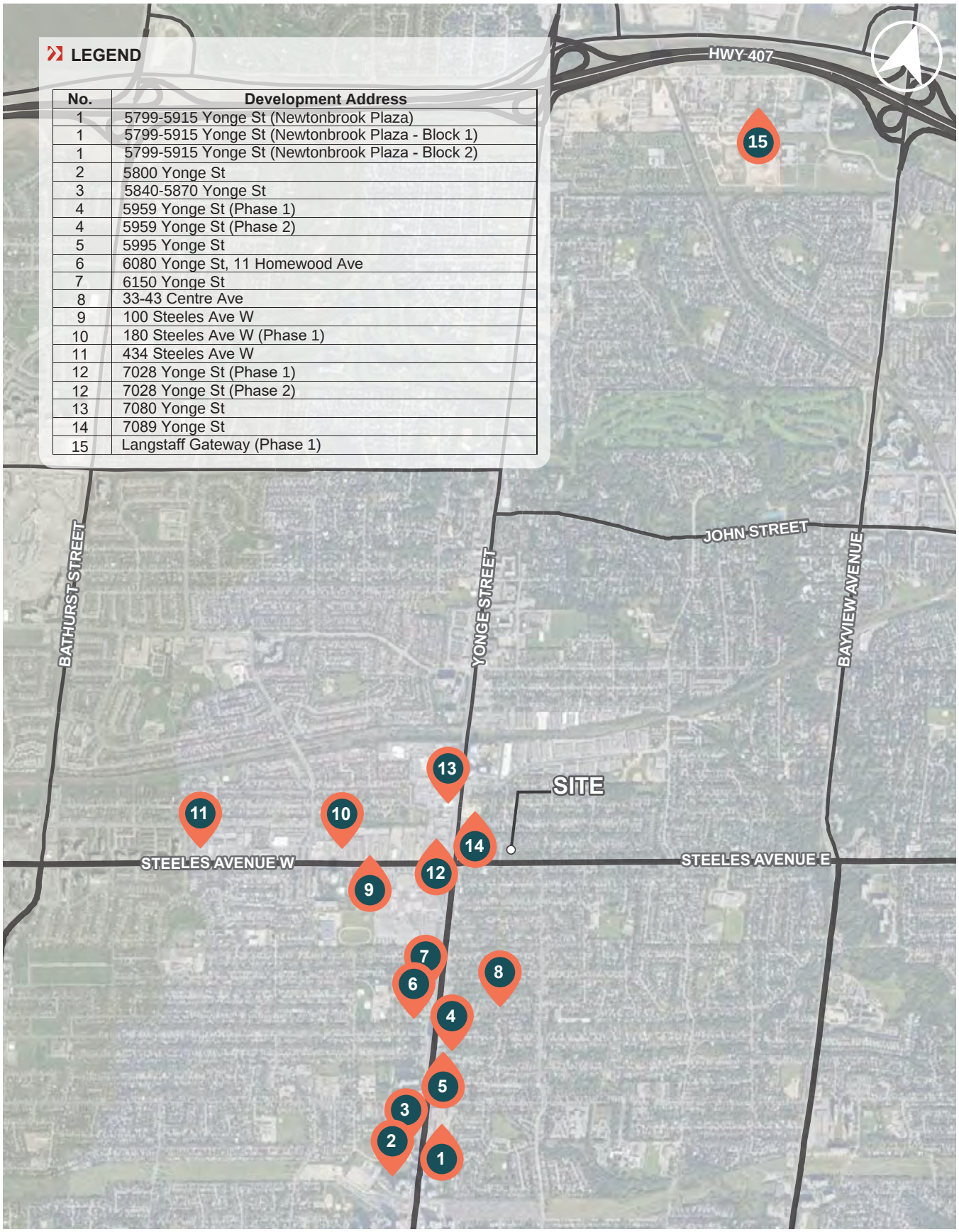


FIGURE 12 BACKGROUND DEVELOPMENTS LOCATION

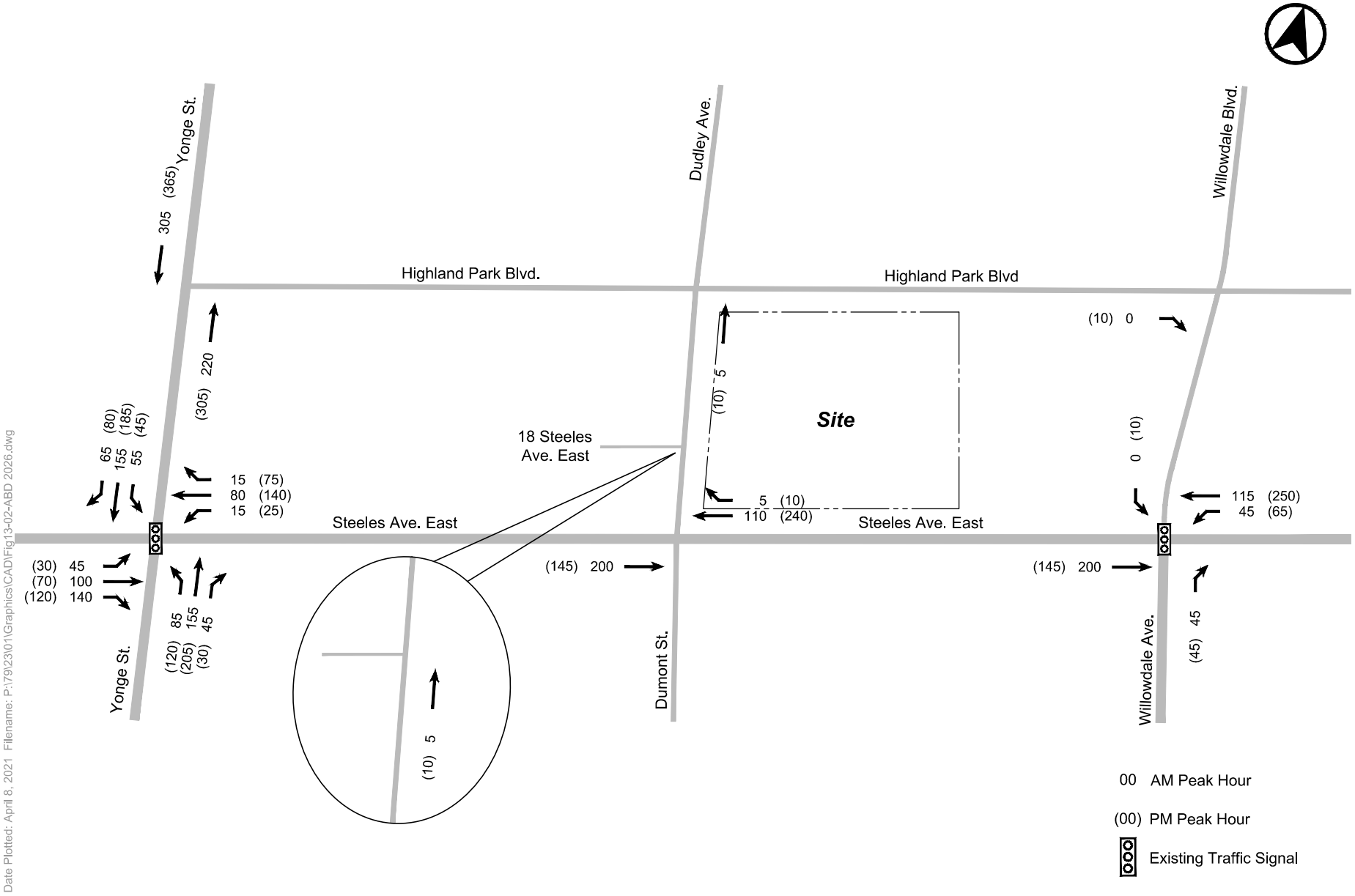


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FIGURE 13 AREA BACKGROUND DEVELOPMENT TRAFFIC VOLUMES (2026)

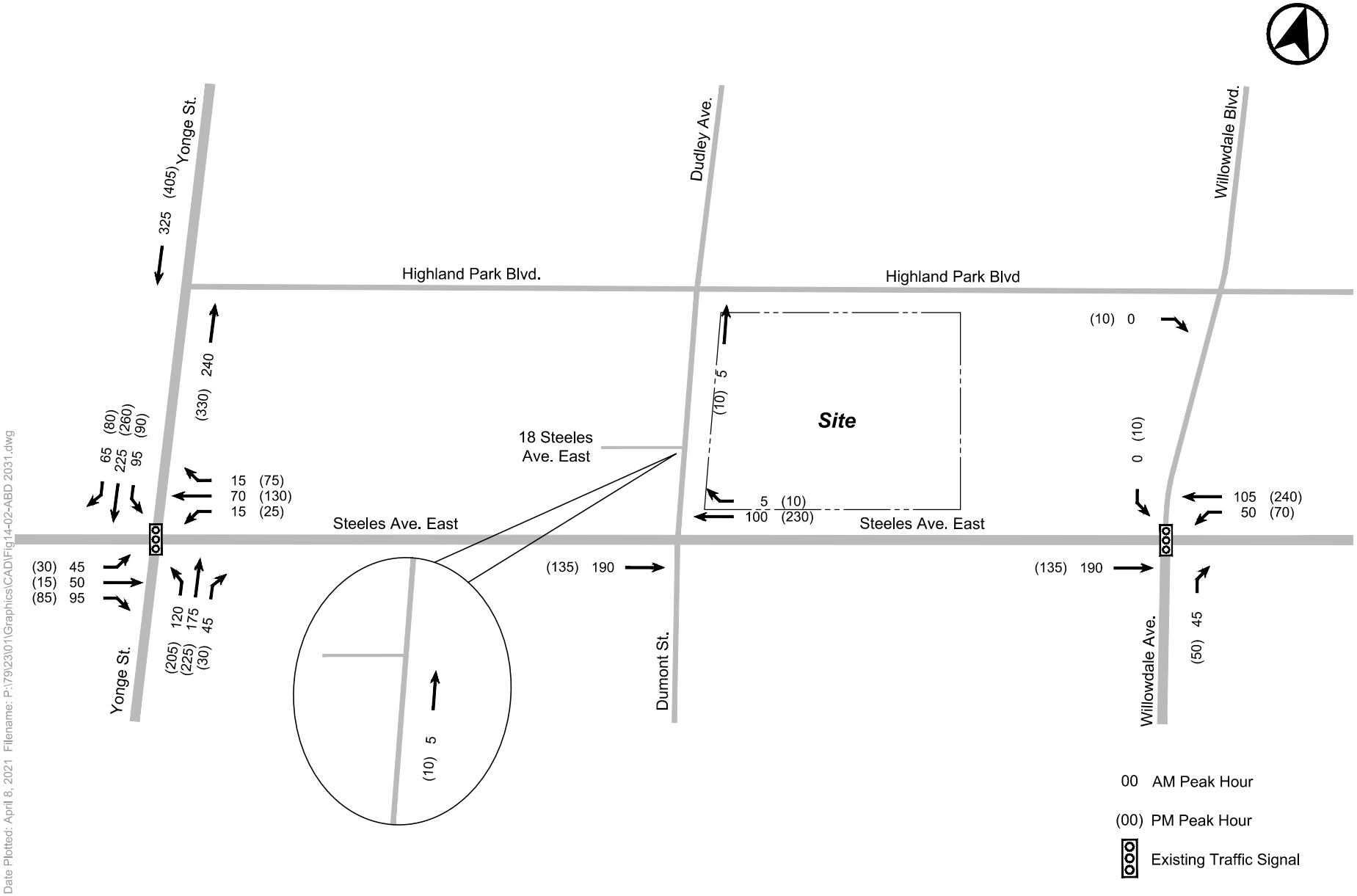

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FIGURE 14 AREA BACKGROUND DEVELOPMENT TRAFFIC VOLUMES (2031)

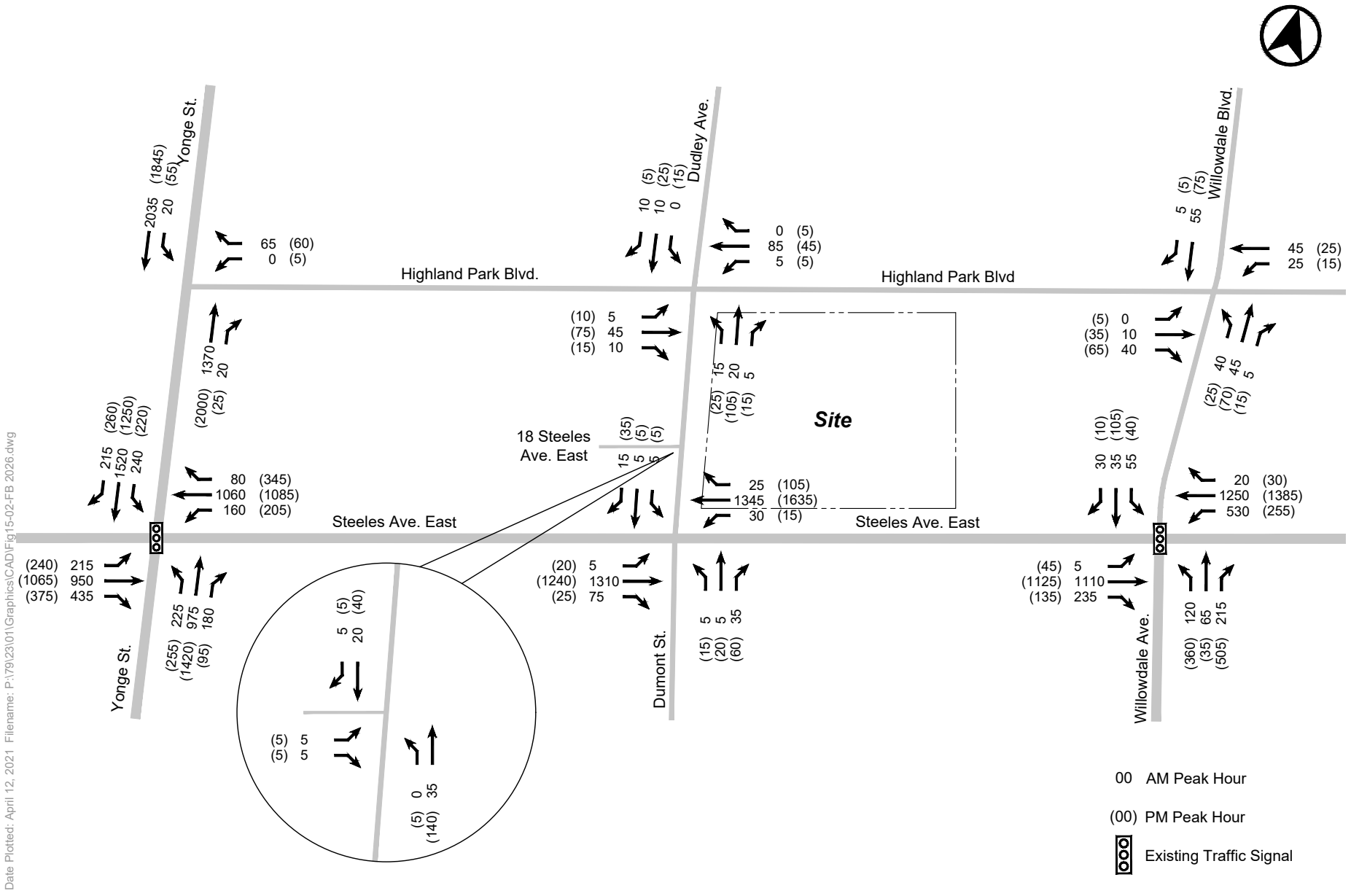

FIGURE 15 FUTURE BACKGROUND TRAFFIC VOLUMES (2026)

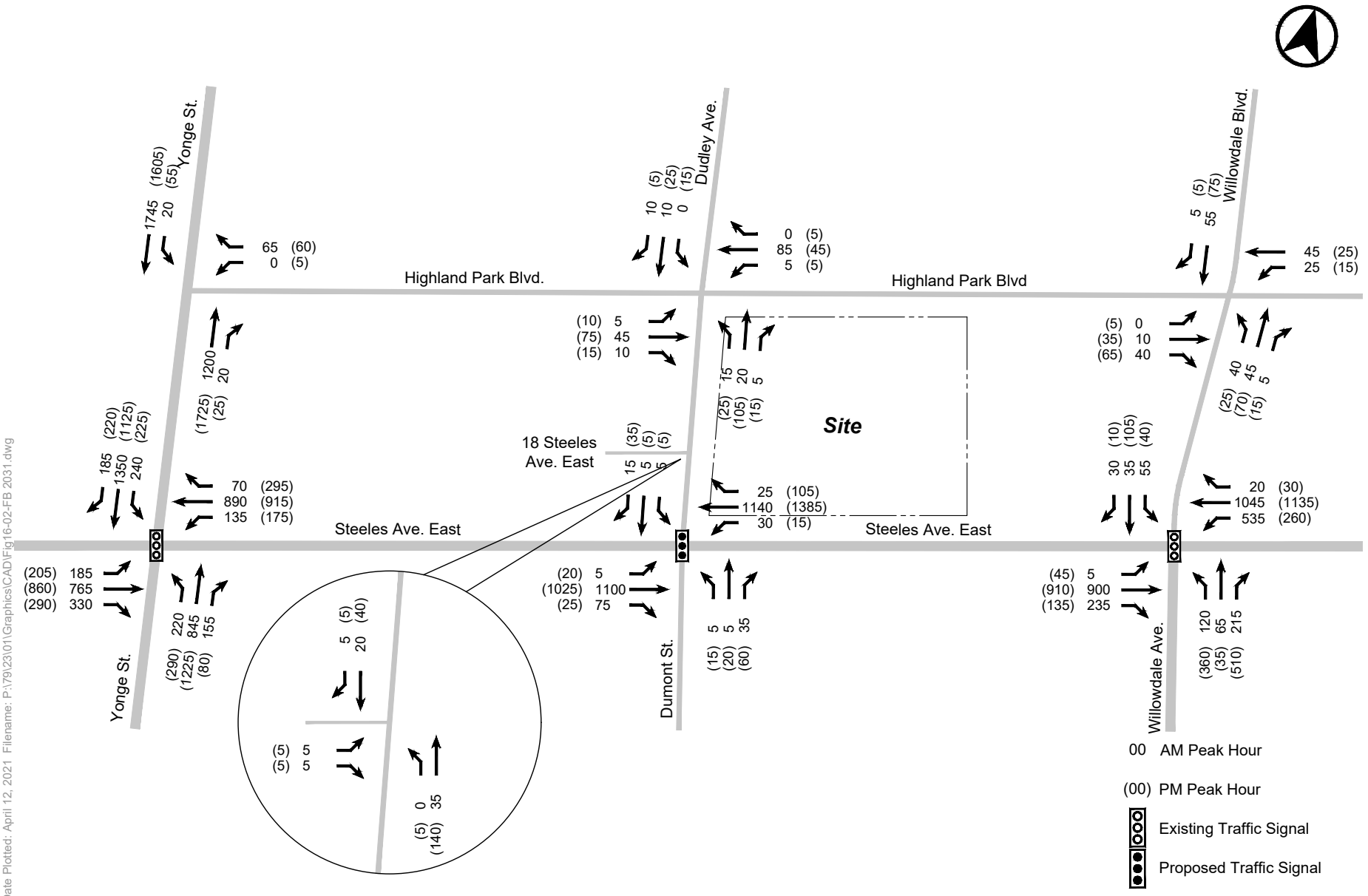

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FIGURE 16 FUTURE BACKGROUND TRAFFIC VOLUMES (2031 - BASE CASE)

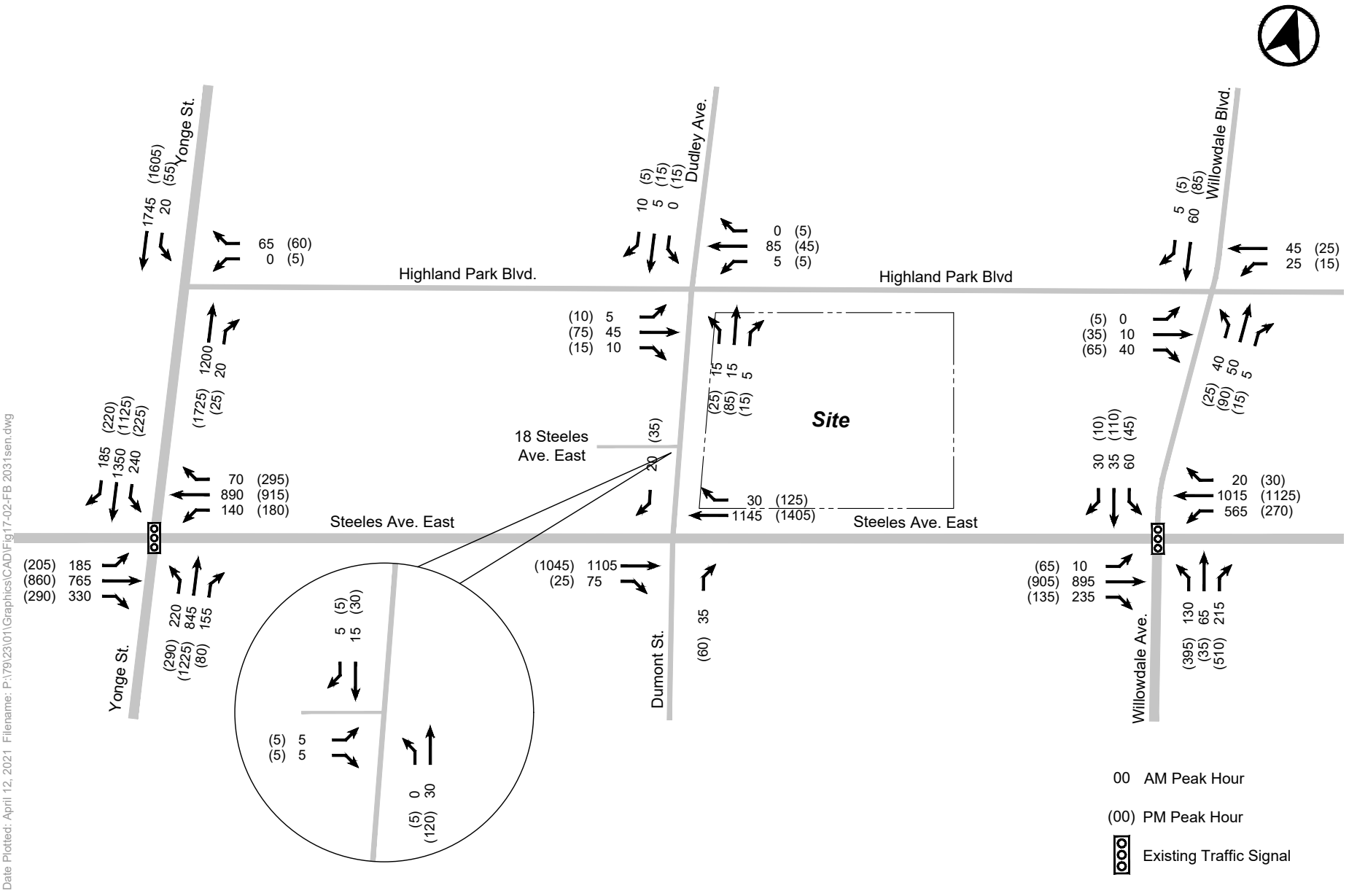

FIGURE 17 FUTURE BACKGROUND TRAFFIC VOLUMES (2031 - SENSITIVITY)

8.4 FORECAST SITE TRAVEL DEMAND

8.4.1 Residential Traffic Generation

Forecast residential vehicular traffic generation for the proposed development is based on proxy site traffic surveys undertaken by BA Group at similar developments in North York and the City of Markham and reflects existing trip generation characteristics. Adopted residential site trip generation parameters and resulting site traffic generation are summarized in **Table 10**.

The residential trip rate adopted in this update report is consistent with the *February 2019 Transportation Study*. Detailed proxy trip generation data are provided in **APPENDIX D**.

TABLE 10 RESIDENTIAL SITE TRAFFIC GENERATION

Proxy Site Location	Survey Date	AM Peak Hour			PM Peak Hour		
		In	Out	2-Way	In	Out	2-Way
World on Yonge **7161-7171 Yonge St** (1,250 units)	Tue, Dec 4, 2018	0.03	0.15	**0.18**	0.14	0.05	**0.19**
5795 Yonge St (179 units)	Fri, Nov 2, 2007	0.03	0.13	**0.17**	0.16	0.09	**0.26**
	Thu, Jun 4, 2015	0.03	0.15	**0.18**	0.11	0.11	**0.22**
	Tue, Nov 6, 2018	0.06	0.21	**0.27**	0.12	0.11	**0.23**
5791 & 5793 Yonge St (396 units)	Thu, Jun 4, 2015	0.05	0.14	**0.19**	0.08	0.07	**0.15**
	Tue, Nov 6, 2018	0.03	0.15	**0.17**	0.12	0.06	**0.19**
Average Rate		**0.04**	**0.15**	**0.19**	**0.12**	**0.08**	**0.21**
Residential Site Trips (533 units)		**20**	**80**	**100**	**65**	**45**	**110**

Notes:
1. Vehicle trips have been rounded to the nearest 5.
2. Proxy site data collected by BA Group at the mentioned sites.
3. Existing site traffic is assumed to be negligible.

The proposed development is forecast to generate in the order of 100 and 110 two-way trips during the weekday morning and afternoon peak hours, respectively.

8.4.2 Trip Distribution and Assignment

Site traffic has been assigned to the area road network based on a review of travel information provided by the 2016 Transportation for Tomorrow Survey (TTS) and existing road network turn restrictions, traffic patterns and connectivity. The site traffic distribution is summarized in **Table 11**. Detailed output TTS data and distribution assumptions are included in **APPENDIX F**.

TABLE 11 SITE TRAFFIC DISTRIBUTION

Directions	Base Case [3]		Sensitivity [4]	
	Outbound [1]	Inbound [2]	Outbound [1]	Inbound [2]
To / From the North on Yonge Street	9%	14%	9%	20%
To / From the South on Yonge Street	6%	5%	39%	10%
To / From the East on Steeles Avenue East	33%	39%	33%	39%
To / From the West on Steeles Avenue West	19%	16%	19%	10%
To / From the South on Dumont Street	30%	15%	0%	0%
To / From the South on Willowdale Avenue	3%	11%	0%	21%
Total	**100%**	**100%**	**100%**	**100%**

Notes:
1. Based upon morning peak period residential outbound trips.
2. Based upon afternoon peak period residential inbound trips.
3. Base case: Steeles Avenue East / Dudley Avenue / Dumont Street is signalized.
4. Sensitivity: Steeles Avenue East / Dudley Avenue / Dumont Street is unsignalized and Right-in/Right-out.
5. No southbound through movement at the Steeles Avenue East / Willowdale Avenue / Willowdale Boulevard permitted during the weekday morning peak period.
6. No northbound through movement at the Steeles Avenue East / Willowdale Avenue / Willowdale Boulevard permitted during the weekday afternoon peak period.
7. No southbound left turns from Yonge Street to Highland Park Boulevard permitted during the weekday morning peak periods.
8. TTS zones 446, 447, 459, 2140, 2351, 2352, and 2353.

New site traffic was assigned onto the area road network based on the directional distribution summarized in **Table 11**, with consideration given to local and collector street routing opportunities in the area as well as to existing and projected capacity constraints associated with specific turning movements. Site traffic volumes for the weekday morning and afternoon peak hours are illustrated in **Figure 18** for the base case condition and **Figure 19** for the sensitivity analysis.

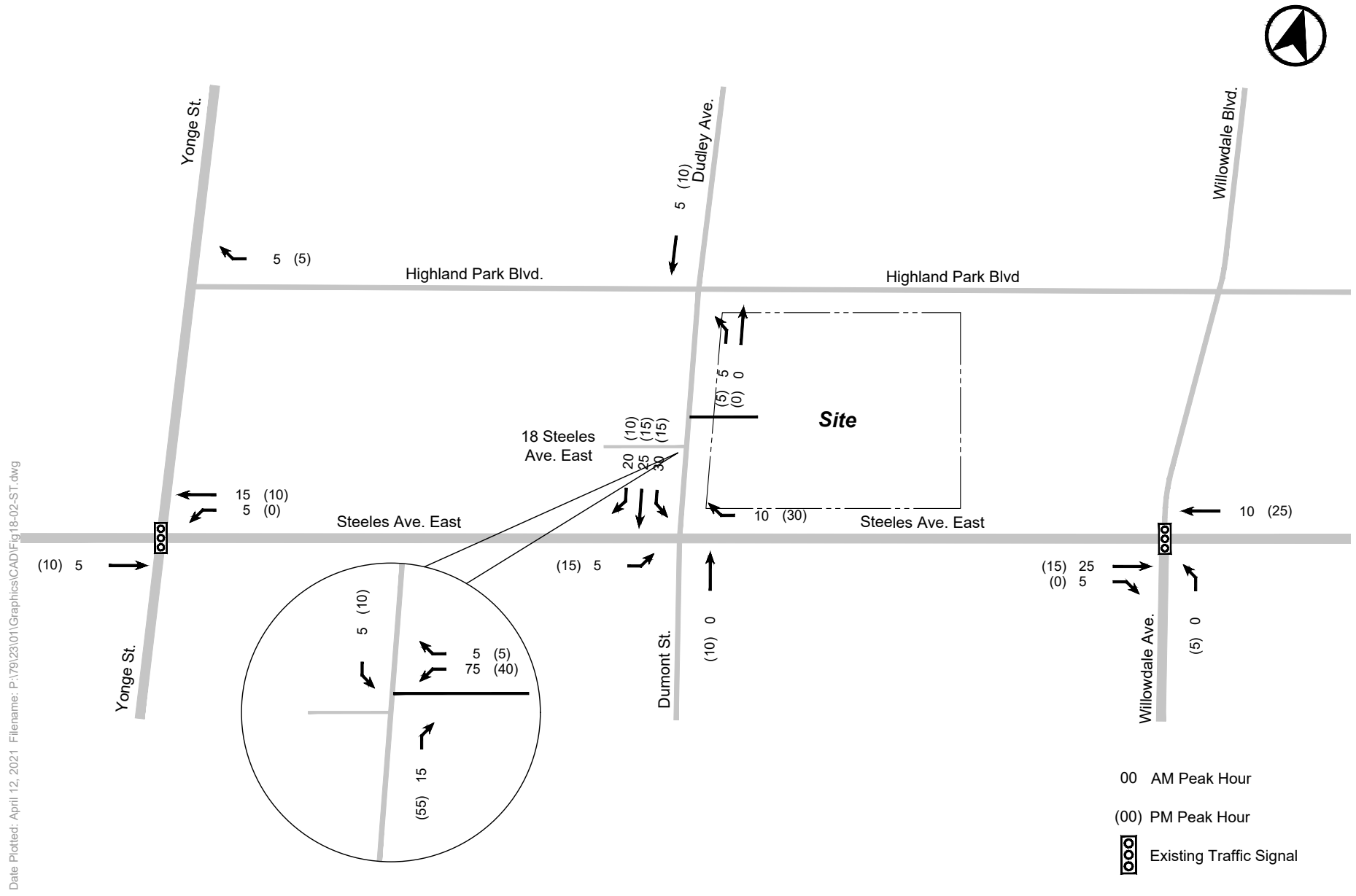

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FIGURE 18 NEW SITE TRAFFIC VOLUMES (BASE CASE)

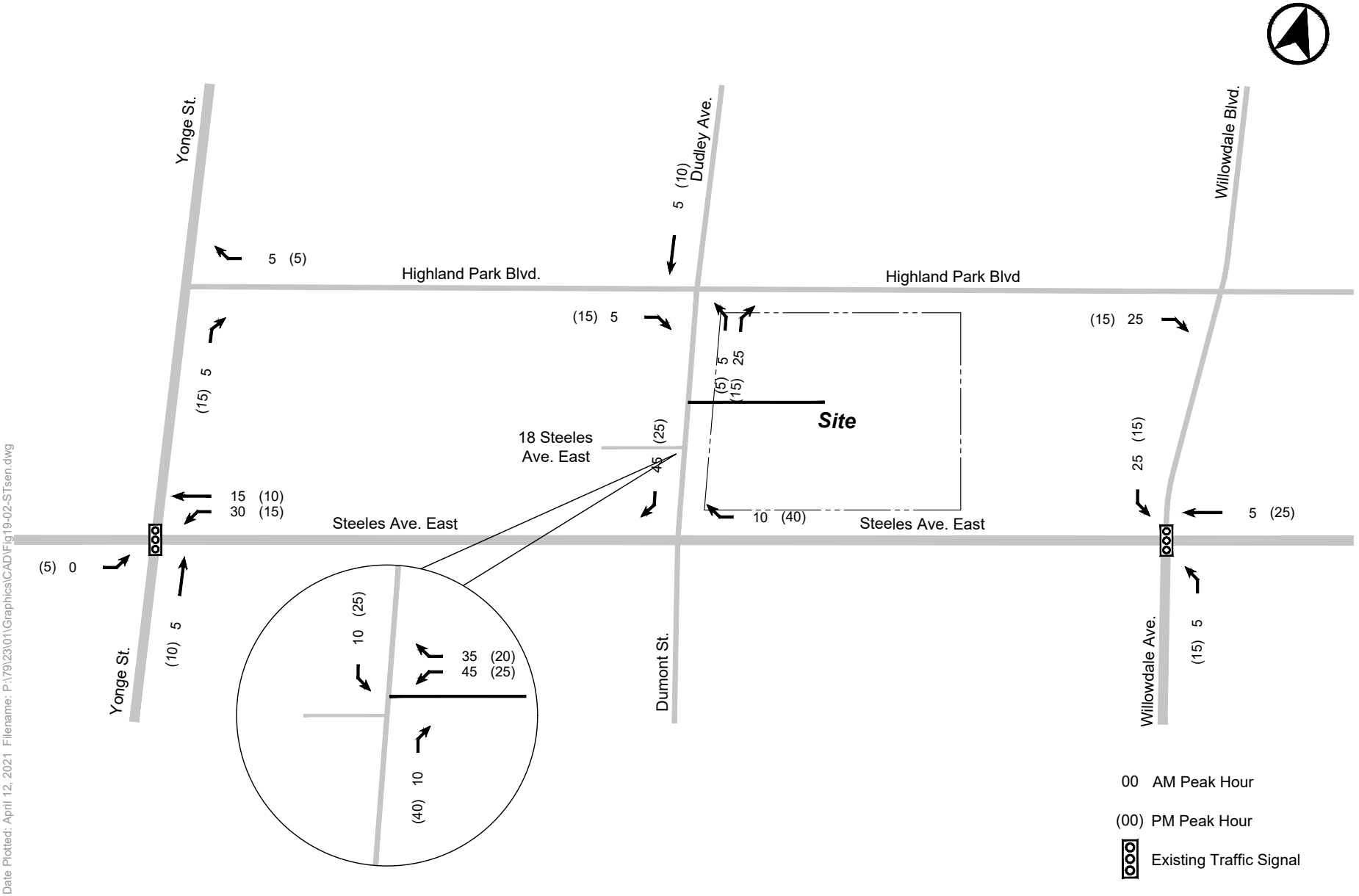

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FIGURE 19 NEW SITE TRAFFIC VOLUMES (SENSITIVITY)

8.4.3 Multi-Modal Trip Generation

BA Group has forecast the multi-modal travel demand for the proposed development based on the vehicle trip generation provided in **Section 8.4.1** and back-calculated the non-auto travel demand using the targeted 2031 mode split from *Yonge-Steeles Area Regional Transportation Study* (September 2015), as summarized in **Table 12**. The mode split adopted for this report is consistent with the *February 2019 Transportation Study*.

TABLE 12 MULTI-MODAL NEW SITE TRIP GENERATION

Mode	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Area Mode Split						
Driver	34%	34%		34%	34%	
Passenger	13%	13%		13%	13%	
Transit	38%	38%		38%	38%	
Walk	10%	10%	-	10%	10%	-
Cycle	5%	5%		5%	5%	
Total	**100%**	**100%**	**-**	**100%**	**100%**	**-**
Multi-Modal Trip Generation						
Driver	14	58	72	47	33	80
Passenger	6	22	28	18	12	30
Transit	16	65	81	53	36	89
Walk	4	17	21	14	10	24
Cycle	2	9	11	7	5	12
Total	**42**	**171**	**213**	**139**	**96**	**235**

Based on the foregoing, the proposed development is forecast to generate in the order of 213 and 235 two-way person trips during the weekday morning and afternoon peak hours, respectively.

8.5 FUTURE TOTAL TRAFFIC VOLUMES

Future total traffic volumes represent the sum of future background traffic volumes and new site traffic volumes are illustrated in **Figure 20**, **Figure 21**, and **Figure 22** for the 2026 horizon, 2031 horizon base case condition, and 2031 sensitivity condition, respectively.

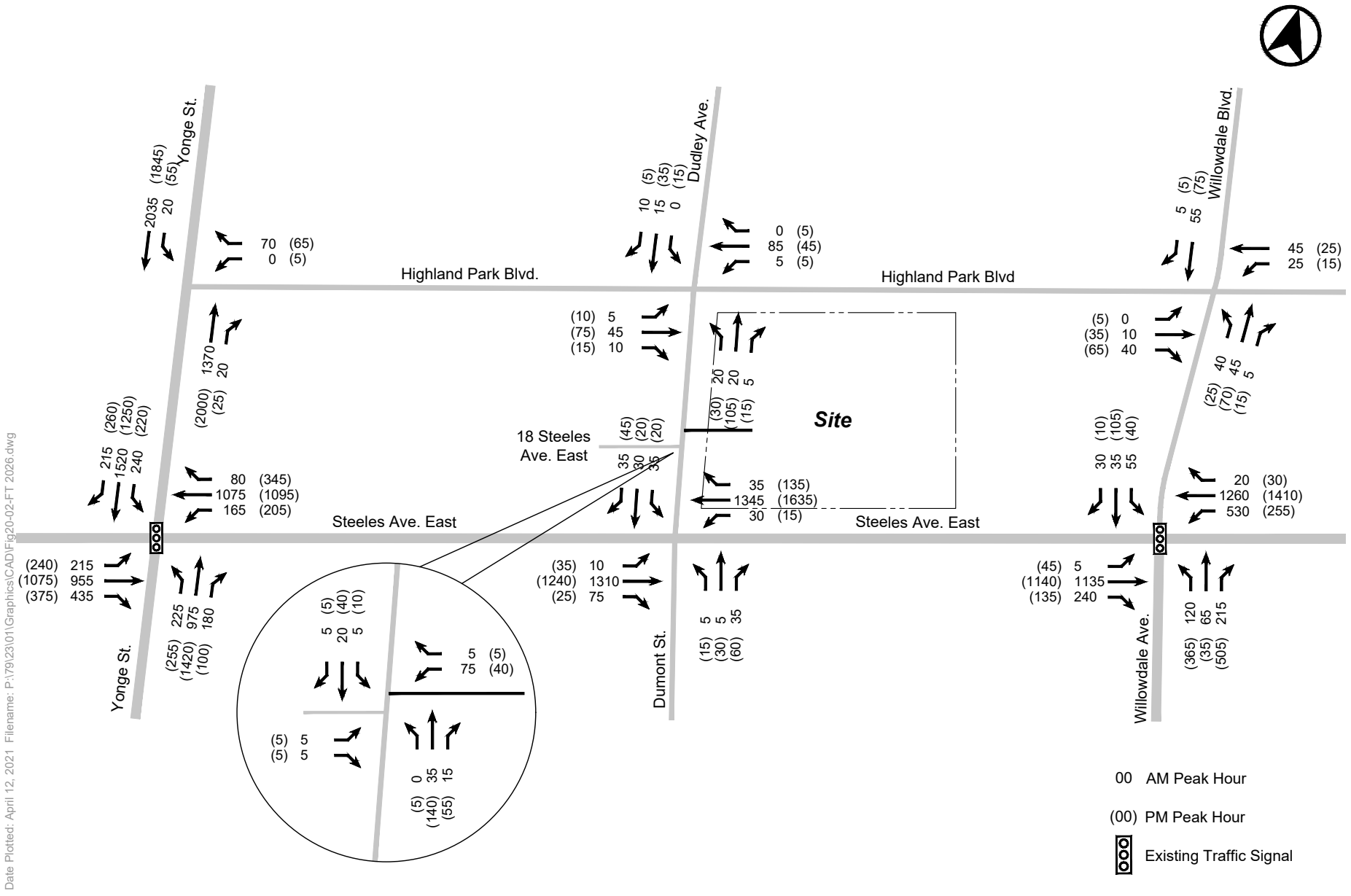

FIGURE 20 FUTURE TOTAL TRAFFIC VOLUMES (2026)

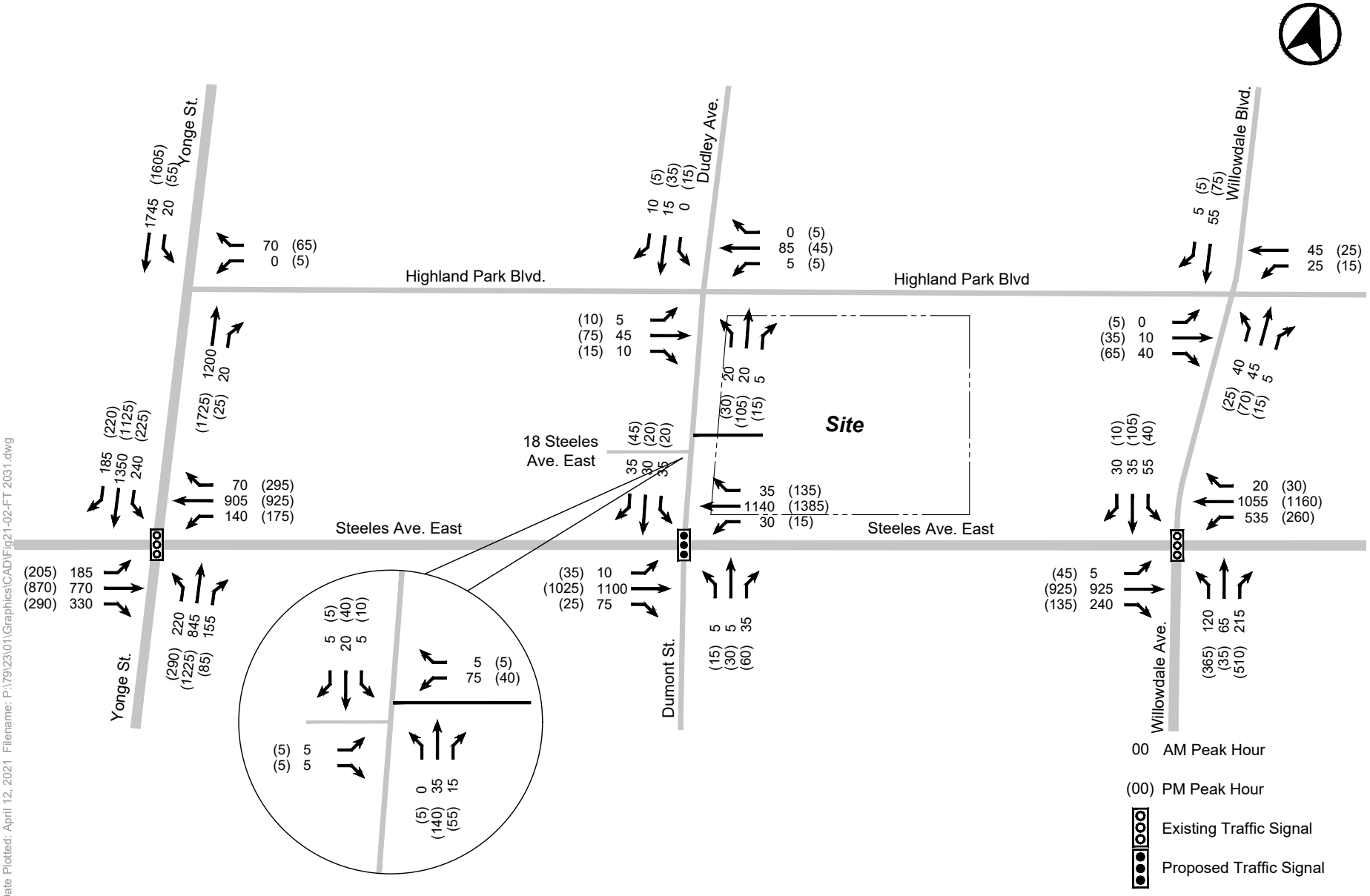

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FIGURE 21 FUTURE TOTAL TRAFFIC VOLUMES (2031 - BASE CASE)

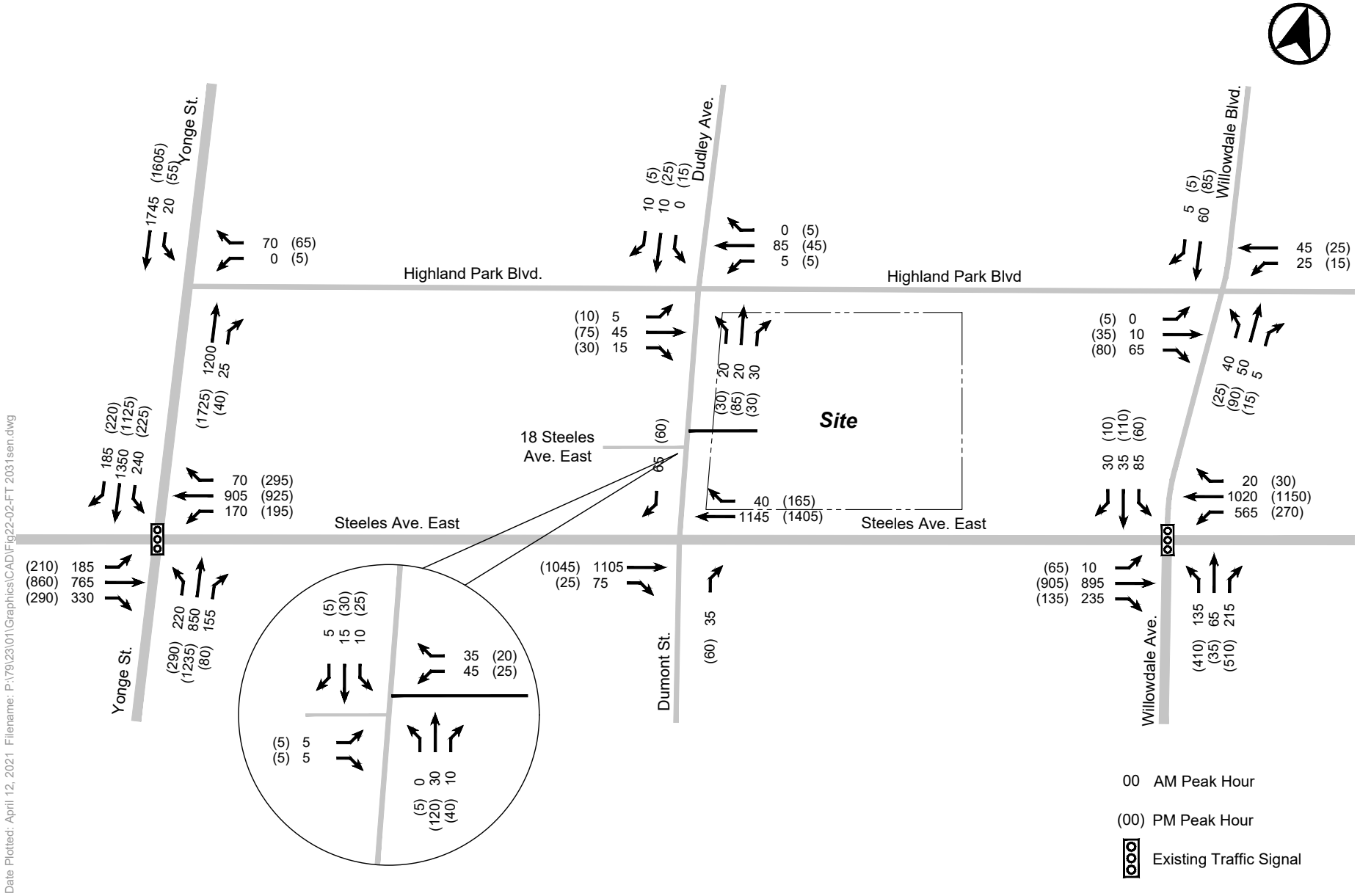


FIGURE 22 FUTURE TOTAL TRAFFIC VOLUMES (2031 - SENSITIVITY)

9.0 TRAFFIC OPERATIONS ANALYSIS

9.1 CAPACITY ANALYSIS METHODOLOGY

Traffic operations analyses have been undertaken at the area intersections using standard capacity analysis procedures as follows.

Signalized Intersections:

Analyses undertaken at intersections operating under traffic signal control have been completed using the methodologies and procedures outlined in the Highway Capacity Manual (HCM) 2000, and in accordance with the City of Toronto's guidelines for analyses undertaken using Synchro 9.0 software. The product of the signalized intersection evaluation is an intersection performance index (volume to capacity ratio or V/C), where a V/C index of 1.00 indicates 'at or near capacity' conditions.

Unsignalized Intersections:

Unsignalized intersection analyses have been carried out using standard capacity procedures for intersections operating under "Two-way" and "All-Way" STOP control and in accordance with the methodologies outlined in the Highway Capacity Manual 2000 (HCM, 2000).

The product of these analyses is a level of service (LOS) designation, ranging from LOS of A to F; which provides a relative indication of the level of delay experienced by motorists completing a turning manoeuvre at an intersection. LOS A represents conditions under which motorists would experience little delay and LOS F reflects conditions where more extended delays can be expected.

HCM level of service (LOS) criteria for unsignalized intersections is as follow:

- LOS A: Control Delay ≤ 10s
- LOS B: 10s < Control Delay ≤ 15s
- LOS C: 15s < Control Delay ≤ 25s
- LOS D: 25s < Control Delay ≤ 35s
- LOS E: 35s < Control Delay ≤ 50s
- LOS F: Control Delay > 50s

9.2 NETWORK-WIDE PARAMETERS

Key analysis parameters were assumed based on requirements contained in the City of Toronto's *Guidelines for Using Synchro 9 (Including SimTraffic 9)* (March 2016) and York Region's *Transportation Mobility Plan Guidelines* (November 2016), summarized as follows:

Network Assumptions and Area Turn Restrictions

The existing area road network lane configuration and traffic control are illustrated in **Figure 5**. The future area road network lane configuration and traffic control are illustrated in **Figure 6** for the base case condition and **Figure 7** for the sensitivity analysis.

The base case assumes the introduction of a new traffic signal at the intersection Steeles Avenue East / Dudley Avenue / Dumont Street as part of this development.

The sensitivity analysis assumes the intersection Steeles Avenue East / Dudley Avenue / Dumont Street may be restricted to right-in/right-out only (the eastbound left, westbound left, northbound left, northbound through, southbound left and southbound through movements are prohibited) as a result of the potential LRT alignment along Steeles Avenue East.

Therefore, the intersection Steeles Avenue East / Dudley Avenue / Dumont Street was analyzed under the following assumptions:

TABLE 13 STEELES AVENUE EAST / DUDLEY AVENUE / DUMONT STREET ASSUMPTIONS

Scenario	Horizon	Analysis Scenario	Control	Turn Restriction
Existing	2021	--	Two-way stop	None
Future Background	2026	--	Two-way stop	None
	2031	Base	Two-way stop	None
	2031	Sensitivity	Two-way stop	Right-in/Right-out [1]
Future Total	2026	--	Signal	None
	2031	Base	Signal	None
	2031	Sensitivity	Two-way stop	Right-in/Right-out [1]

Notes:
1. Right-in/Right-out: NBL, NBT, SBL, SBT, EBL and WBL movements are restricted.

Under existing conditions, southbound through movement is prohibited at the intersection Steeles Avenue East / Willowdale Avenue / Willowdale Boulevard from 7:00 am to 9:00 am Monday to Friday, and northbound through movement is prohibited from 4:00 pm to 7:00 pm Monday to Friday. Furthermore, southbound left movement is prohibited at the intersection Yonge Street / Highland Park Boulevard from 6:30 am to 9:00 am Monday to Friday. These turning restrictions were assumed to be maintained under all future conditions.

In addition, under existing conditions, southbound left movement is prohibited at the intersection Yonge Street / Woodward Avenue from 6:30 am to 9:00 am Monday to Friday. With the introduction of a new traffic signal at this intersection in the future, this turn restriction was assumed to be removed.

Existing Signal Timing

Existing signal timings, phasing plans, and cycle lengths were obtained from the City of Toronto. Existing signal timings adopted as the basis for the traffic operations analyses are provided in **APPENDIX J**.

The signal operates on SCOOT signal timings at intersections Yonge Street / Steeles Avenue and Steeles Avenue East / Willowdale Avenue / Willowdale Boulevard, allowing cycle times and phasing split to optimize in synchronization with real-time traffic conditions.

Future Signal Timing

Existing signal timings were maintained during the analysis of future conditions whenever possible. When necessary, signal timings were optimized under future background and future total conditions, including the following:

- A new traffic signal is proposed at the intersection Steeles Avenue East / Dudley Avenue / Dumont Street as part of this development. The phasing and cycle length of this traffic signal was assumed based on existing signal timings at adjacent intersections.

- Total splits for all phases are optimized within the existing Split, Cycle and Offset Optimization Technique (SCOOT) parameters at the intersection Yonge Street / Steeles Avenue during the weekday morning and afternoon peak hours.

Base Saturation Flow Rates

The City of Toronto *Guidelines for Using Synchro 9 (Including SimTraffic 9)* (March 2016), specifies a base saturation flow rate of 1,900 passenger cars per hour of green time per lane (pcphgpl) for signalized and unsignalized intersections. These default rates were adopted in the analysis for the proposed development, even though York Region's *Transportation Mobility Plan Guidelines* (November 2016) stipulate a base saturation flow rate of 2,000 pcphgpl.

Heavy Vehicle Assumptions

Heavy and medium truck percentages incorporated into the analysis were based upon information provided as part of intersection turning movement counts.

Lost Time Adjustments

The City of Toronto *Guidelines for Using Synchro 9 (Including SimTraffic 9)* (March 2016), specify a base lost time adjustment factor of -1.0 seconds (i.e. a total loss time per phase equal to the amber plus all-red time minus 1 second). York Region's *Transportation Mobility Plan Guidelines* (November 2016) specify a base lost time adjustment factor of 0.0 seconds.

The default lost time adjustment value of -1.0 seconds was applied to all movements for all intersections along Steeles Avenue East in accordance with the City of Toronto's guidelines. The default lost time adjustment value of 0.0 seconds was used for all York Region intersections. Further lost time adjustments were made to left-turn movements of the intersection Yonge Street / Steeles Avenue based on results of intergreen studies, as discussed in **Section 9.3.2**.

Peak Hour Factors

The peak hour factors of the area intersections were calculated based on the existing traffic volume data extracted from traffic counts utilized in the study for the operations analysis.

Lane Utilization Factors

The lane utilization factor (LUF) takes into consideration the distribution of individual lane usage within each movement group. Yonge Street contains curbside designated transit/HOV lanes in both the northbound and

southbound directions. A reduced lane utilization factor was calculated and applied to the northbound and southbound through movements on Yonge Street in the study area under all analysis scenarios, as discussed in **Section 9.3.1**. Default Synchro lane utilization factors were adopted for all other movements in the study area.

9.3 MODEL CALIBRATIONS

9.3.1 HOV Lanes – Yonge Street

In the vicinity of the site, the northbound and southbound curb lanes on Yonge Street are designated as High Occupancy Vehicle (HOV 3+) lanes from 7-10 am and 3-7 pm from Monday to Friday. Only buses, taxis, motorcycles, cyclists and vehicles with 3 or more occupants are permitted to use this lane during these times.

As such, in order to more accurately model traffic operations at intersections along Yonge Street within the study area, a traffic lane distribution study was undertaken at the Yonge Street / Steeles Avenue intersection to determine a suitable northbound and southbound lane utilization factor that would account for the skewed lane volume balance due to the HOV lane.

Based on the lane distribution study (summarized data sheets included in **APPENDIX G**) a decreased lane utilization factor was calculated and applied to the northbound and southbound through movements on Yonge Street within the study area under all analysis scenarios. The lane utilization factor formula is shown below.

$$f_{LU} = \frac{Total\ Lane\ Group\ Volume}{(Highest\ Lane\ Volume) \times (\#\ of\ Lanes\ in\ Group)}$$

The lane utilization factors assumed in this analysis based on the foregoing were 0.93 and 0.88 for the northbound through and 0.77 and 0.85 for the southbound through movements on Yonge Street in the weekday morning and afternoon peak periods, respectively. These factors were applied to all signalized intersections along Yonge Street.

9.3.2 Intergreen Calibration

Intergreen studies were conducted at the intersection Yonge Street / Steeles Avenue for the left-turning movements based on the Spectrum video recording associated with the intersection traffic count. This was done in order to record the number of vehicles that perform a left-turn during the amber and all-red phases of the signal cycle. Intergreen study results and adopted changes to the Synchro Lost Time Adjustment values are summarized in **Table 14**.

All detailed intergreen studies used for the intersection calibrations are attached in **APPENDIX G**.

TABLE 14 INTERGREEN CALIBRATION – YONGE STREET / STEELES AVENUE

Movement	Observed Number of Vehicles Turning on Intergreen per Cycle	Calibrated Synchro Lost Time Adjustment Value
NBL	1.9 (1.9)	2.0 (2.0)
SBL	1.7 (1.6)	1.5 (1.5)
EBL	1.5 (1.6)	1.5 (1.5)
WBL	1.8 (1.9)	1.5 (2.0)

Notes:
1. 00 (00): Weekday morning peak hour (Weekday afternoon peak hour)

9.3.3 Delay Calibration

Delay studies were undertaken at the unsignalized intersections of Steeles Avenue East / Dudley Avenue / Dumont Street for the weekday morning and afternoon peak hours on Thursday, July 5, 2018 (on the same day, and during the same periods, as the turning movement counts undertaken at these intersections). The results of these studies were used to calibrate the Synchro analysis for these intersections to better reflect existing conditions.

The results of the delay studies are included in **APPENDIX G**. Synchro calibration parameters are summarized in **Table 15**.

TABLE 15 DELAY STUDY SYNCHRO CALIBRATION

Movement	Observed Delay [1, 2]	Target Synchro Control Delay [2]	Default Values				Calibrated Values			
			Critical Gap	Follow up time	Control Delay [3]	LOS	Critical Gap	Follow up time	Control Delay [3]	LOS
SBL	24 (27)	29 (32)	7.5 (7.5)	3.5 (3.5)	22.9 (16.8)	C (C)	7.9 (9.1)	3.6 (4.5)	28.9 (32.0)	(D) D
SBT	24 (27)	29 (32)	6.5 (6.5)	4.0 (4.0)	22.9 (16.8)	C (C)	7.3 (9.0)	4.5 (5.6)	28.9 (32.0)	D (D)

Notes:
1. Average observed delay in the morning and afternoon 2-hour peak periods.
2. Control Delay = Observed Stopped Delay + 5 seconds/vehicle. The additional 5 seconds/vehicle is used to reflect delay during deceleration to and acceleration from a stop.
3. Synchro control delay (HCM 2000 methodology).
4. 00 (00): Weekday morning peak hour (Weekday afternoon peak hour).

9.4 SIGNALIZED INTERSECTION ANALYSIS

Traffic operations analysis results and discussion for the area signalized intersections for the existing, future background and future total conditions are summarized in the following sections. Detailed capacity analysis reports are provided in **APPENDIX H**.

9.4.1 Yonge Street / Steeles Avenue

The results of the signalized intersection traffic operations analyses undertaken for the Yonge Street / Steeles Avenue intersection are summarized in **Table 16**.

TABLE 16 YONGE STREET / STEELES AVENUE CAPACITY ANALYSIS

Lane Group	Existing		Future Background						Future Total					
	2021		2026		2031 (Base)		2031 (Sensitivity)		2026		2031 (Base)		2031 (Sensitivity)	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	0.86 (0.96)	E (F)	1.07 (1.09)	F (F)	0.95 (0.93)	E (E)	0.95 (0.93)	E (E)	1.07 (1.09)	F (F)	0.96 (0.93)	F (E)	0.96 (0.95)	F (F)
EBT	0.87 (0.96)	D (E)	0.94 (1.04)	E (F)	0.81 (0.90)	D (E)	0.81 (0.90)	D (E)	0.94 (1.05)	E (F)	0.82 (0.92)	D (E)	0.82 (0.90)	D (E)
EBR	0.62 (0.51)	C (C)	0.83 (0.74)	D (C)	0.61 (0.52)	C (C)	0.61 (0.52)	C (C)	0.83 (0.74)	D (C)	0.61 (0.52)	C (C)	0.61 (0.52)	C (C)
WBL	0.77 (0.90)	D (E)	0.89 (1.07)	F (F)	0.70 (0.86)	D (D)	0.72 (0.88)	D (D)	0.92 (1.07)	F (F)	0.72 (0.86)	D (E)	0.87 (0.96)	E (E)
WBTR	0.78 (0.89)	D (D)	0.85 (1.08)	D (F)	0.73 (0.96)	C (E)	0.73 (0.96)	C (E)	0.85 (1.09)	D (F)	0.74 (0.97)	C (E)	0.74 (0.97)	D (E)
NBL	0.86 (0.67)	E (C)	1.03 (0.99)	F (F)	0.91 (0.99)	E (F)	0.91 (0.99)	E (F)	1.04 (0.99)	F (F)	0.92 (0.99)	E (F)	0.91 (0.99)	E (F)
NBTR	0.51 (0.92)	C (D)	0.76 (1.08)	D (F)	0.61 (0.91)	D (D)	0.61 (0.91)	D (D)	0.76 (1.09)	D (F)	0.62 (0.91)	D (D)	0.62 (0.92)	D (D)
SBL	0.72 (0.81)	C (D)	0.85 (1.01)	D (F)	0.74 (0.98)	C (F)	0.74 (0.98)	C (F)	0.85 (1.01)	D (F)	0.74 (0.98)	C (F)	0.74 (0.98)	C (F)
SBTR	0.85 (0.82)	D (D)	1.11 (1.09)	F (F)	0.96 (0.99)	D (E)	0.96 (0.99)	D (E)	1.11 (1.09)	F (F)	0.96 (0.99)	D (E)	0.96 (0.99)	D (E)
Overall	**0.88 (0.94)**	**D (D)**	**1.12 (1.10)**	**E (F)**	**0.97 (1.00)**	**D (E)**	**0.97 (1.00)**	**D (E)**	**1.12 (1.10)**	**E (F)**	**0.97 (1.00)**	**D (E)**	**0.97 (1.00)**	**D (E)**

Notes:
1. 00 (00): Weekday morning peak hour (Weekday afternoon peak hour).

The intersection of Yonge Street / Steeles Avenue is a busy critical link between the City of Toronto, City of Markham and City of Vaughan. It operates under constrained conditions today, in particular the eastbound left, eastbound through, westbound left, and northbound through-right movements during the peak hours. Contributing factors to these constrained operations include the fact that the northwest and southwest quadrants of this intersection are not served by a finer-grained network of local roads that might permit local traffic to route away from the intersection and onto alternate roads. Thus, the future redevelopment of these quadrants will require the development of a local road network (as planned through Secondary Plans for these areas) that would serve local traffic and permit more flexible routing options that better disperse traffic

through the area. It is noted that the northeast and southeast quadrants of the intersection – including the subject site – are better served in this regard by a local road network that permits better routing options for local traffic away from the intersection.

Existing

Under existing conditions, the intersection operates under busy but acceptable conditions for an urban area with an overall volume-to-capacity (V/C) ratio of 0.88 during the weekday morning peak hour and 0.94 during the afternoon peak hour.

2026 Horizon

Under the 2026 future background conditions, *prior to the development of local roads identified in the Yonge-Steeles Area Regional Transportation Study (September 2015)*, with the addition of background traffic, the intersection will operate above its theoretical capacity with overall V/C ratios of 1.12 and 1.10 during the weekday morning and weekday afternoon peak hours, respectively. Several lane groups will operate with a v/c ratio greater than 1.0 including eastbound left, eastbound through, westbound left, westbound through-right, northbound left, northbound through-right, southbound left and southbound through-right movements.

Under the 2026 future total conditions, with the addition of site traffic, the intersection will operate above its theoretical capacity with overall V/C ratios of 1.12 and 1.10 during the weekday morning and weekday afternoon peak hours, respectively. Several lane groups will operate with a v/c ratio greater than 1.0 including eastbound left, eastbound through, westbound left, westbound through-right, northbound left, northbound through-right, southbound left and southbound through-right movements.

It should be noted that the impact of site-related traffic on the overall operation of this intersection is negligible during the peak periods, as there is no increase in the overall V/C ratios from the future background condition to the future total condition. Furthermore, site traffic contributes no more than 0.01 to the V/C ratio of any individual movement with the exception of the non-critical westbound left movement during the weekday morning peak hour. This is anticipated given the relatively modest amount of new traffic associated with the proposed development that is expected to use this intersection.

2031 Horizon (Base Case)

Under the 2031 future background base case conditions, *after the development of local roads identified in the Yonge-Steeles Area Regional Transportation Study (September 2015)*, with the addition of 2031 background traffic, the intersection will operate at capacity with overall V/C ratios of 0.97 and 1.00 during the weekday morning and weekday afternoon peak hours, respectively. All movements will operate within their theoretical capacities with V/C ratios less than 1.0.

Under the 2031 future total base case conditions, with the addition of site traffic, the intersection will operate at capacity with overall V/C ratios of 0.97 and 1.00 during the weekday morning and weekday afternoon peak hours, respectively. All movements will operate within their theoretical capacities with V/C ratios less than 1.0.

2031 Horizon (Sensitivity)

Under the 2031 future background sensitivity conditions, *after the development of local roads identified in the Yonge-Steeles Area Regional Transportation Study (September 2015)*, with the addition of 2031 background

traffic, the intersection will operate at capacity with overall V/C ratios of 0.97 and 1.00 during the weekday morning and weekday afternoon peak hours, respectively. All movements will operate within their theoretical capacities with V/C ratios less than 1.0.

Under the 2031 future total sensitivity conditions, with the addition of site traffic, the intersection will operate at capacity with overall V/C ratios of 0.97 and 1.00 during the weekday morning and weekday afternoon peak hours, respectively. All movements will operate within their theoretical capacities with V/C ratios less than 1.0.

Overall

The addition of site traffic will have a negligible impact on the overall intersection operations. Recognizing the City of Toronto and York Region have planned improvements to the Yonge-Steeles area that will improve the operation of this intersection, new site traffic can be appropriately accommodated at this intersection.

9.4.2 Steeles Avenue East / Willowdale Avenue / Willowdale Boulevard

The results of the signalized intersection traffic operations analyses undertaken for the Steeles Avenue East Willowdale Avenue / Willowdale Boulevard intersection are summarized in **Table 17**. Under existing conditions, no southbound through movement is permitted at this intersection during the weekday morning peak hour (7:00 am – 9:00 am Monday to Friday), and no northbound through movement is permitted at this intersection during the weekday afternoon peak hour (4:00 pm – 7:00 pm Monday to Friday).

TABLE 17 STEELES AVENUE EAST / WILLOWDALE AVENUE CAPACITY ANALYSIS

Lane Group	Existing		Future Background						Future Total					
	2021		2026		2031 (Base)		2031 (Sensitivity)		2026		2031 (Base)		2031 (Sensitivity)	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	0.04 (0.41)	E (C)	0.04 (0.84)	C (E)	0.04 (0.41)	D (C)	0.07 (0.69)	D (D)	0.04 (0.84)	C (F)	0.04 (0.45)	D (C)	0.07 (0.78)	D (D)
EBT	0.91 (0.85)	E (C)	0.94 (1.13)	D (F)	0.95 (0.94)	E (D)	0.95 (0.91)	E (C)	0.95 (1.14)	D (F)	0.98 (0.95)	E (D)	0.95 (0.91)	E (C)
EBR	0.43 (0.17)	E (A)	0.38 (0.18)	D (B)	0.46 (0.19)	D (B)	0.46 (0.18)	D (B)	0.39 (0.18)	D (B)	0.47 (0.19)	D (B)	0.46 (0.18)	D (B)
WBL	0.75 (0.76)	C (D)	0.95 (0.78)	E (D)	0.79 (0.77)	C (D)	0.84 (0.95)	D (E)	0.95 (0.80)	E (D)	0.79 (0.79)	C (D)	0.85 (1.00)	D (F)
WBT	0.49 (0.69)	A (C)	0.54 (0.84)	B (C)	0.45 (0.69)	A (C)	0.44 (0.72)	A (C)	0.55 (0.86)	B (D)	0.46 (0.71)	A (C)	0.45 (0.75)	A (C)
WBR	0.02 (0.02)	A (B)	0.02 (0.02)	A (B)	0.02 (0.02)	A (B)	0.02 (0.02)	A (B)	0.02 (0.02)	A (B)	0.02 (0.02)	A (B)	0.02 (0.02)	A (B)
NBLT	0.61 (0.77)	D (D)	0.61 (0.77)	D (D)	0.61 (0.77)	D (D)	0.63 (0.80)	D (D)	0.61 (0.77)	D (D)	0.61 (0.77)	D (D)	0.64 (0.81)	D (D)
NBR	0.12 (0.53)	D (C)	0.15 (0.61)	D (C)	0.15 (0.61)	D (C)	0.15 (0.59)	D (C)	0.15 (0.61)	D (C)	0.15 (0.61)	D (C)	0.15 (0.58)	D (C)
SBL	0.32 (0.11)	D (C)	0.32 (0.15)	D (C)	0.32 (0.15)	D (C)	0.35 (0.16)	D (C)	0.32 (0.15)	D (C)	0.32 (0.15)	D (C)	0.50 (0.22)	D (C)
SBTR	0.11 (0.14)	D (C)	0.11 (0.14)	D (C)	0.11 (0.14)	D (C)	0.11 (0.14)	D (C)	0.11 (0.14)	D (C)	0.11 (0.14)	D (C)	0.11 (0.14)	D (B)
Overall	**0.80 (0.83)**	**D (C)**	**0.92 (0.94)**	**C (D)**	**0.83 (0.85)**	**D (C)**	**0.85 (0.92)**	**D (C)**	**0.92 (0.95)**	**D (D)**	**0.84 (0.86)**	**D (C)**	**0.86 (0.95)**	**D (D)**

Notes:
1. 00 (00): Weekday morning peak hour (Weekday afternoon peak hour).

Existing

Under existing conditions, the intersection operates under busy but acceptable conditions for an urban area with an overall volume-to-capacity (V/C) ratio of 0.80 during the weekday morning peak hour and 0.83 during the afternoon peak hour.

2026 Horizon

Under the 2026 future background conditions, *prior to the development of local roads identified in the Yonge-Steeles Area Regional Transportation Study (September 2015)*, with the addition of background traffic, the intersection will operate above its theoretical capacity with overall V/C ratios of 0.92 and 0.94 during the weekday morning and weekday afternoon peak hours, respectively. The eastbound through movement will operate with a V/C ratio of 1.13 during the weekday afternoon peak hour.

Under the 2026 future total conditions, with the addition of site traffic, the intersection will operate above its theoretical capacity with overall V/C ratios of 0.92 and 0.95 during the weekday morning and weekday afternoon peak hours, respectively. The eastbound through movement will operate with a V/C ratio of 1.14 during the weekday afternoon peak hour.

It should be noted that the impact of site-related traffic on the operation of this intersection is minor during the peak periods, as the increase in the overall V/C ratios from the future background condition to the future total condition is minimal (only 0.01 to the critical eastbound through movement and 0.01 to the overall intersection during the weekday afternoon peak hour). This is anticipated given the relatively modest amount of new traffic associated with the proposed development that is expected to use this intersection.

2031 Horizon (Base Case)

Under the 2031 future background base case conditions, *after the development of local roads identified in the Yonge-Steeles Area Regional Transportation Study (September 2015)*, with the addition of 2031 background traffic, the intersection will operate under busy but acceptable conditions with overall V/C ratios of 0.83 and 0.85 during the weekday morning and weekday afternoon peak hours, respectively. All movements will operate within their theoretical capacities with V/C ratios less than 1.0.

Under the 2031 future total base case conditions, with the addition of site traffic, the intersection will operate under busy but acceptable conditions with overall V/C ratios of 0.84 and 0.86 during the weekday morning and weekday afternoon peak hours, respectively. All movements will operate within their theoretical capacities with V/C ratios less than 1.0.

2031 Horizon (Sensitivity)

Under the 2031 future background sensitivity conditions, *after the development of local roads identified in the Yonge-Steeles Area Regional Transportation Study (September 2015)*, with the addition of 2031 background traffic, the intersection will operate under busy but acceptable conditions with overall V/C ratios of 0.85 and 0.92 during the weekday morning and weekday afternoon peak hours, respectively. All movements will operate within their theoretical capacities with V/C ratios less than 1.0.

Under the 2031 future total sensitivity conditions, with the addition of site traffic, the intersection will operate under busy but acceptable conditions with overall V/C ratios of 0.86 and 0.95 during the weekday morning and weekday afternoon peak hours, respectively. All movements will operate within their theoretical capacities with V/C ratios less than or equal to 1.0.

Overall

The addition of site traffic will have a negligible impact on the overall intersection operations. Recognizing the City of Toronto and York Region have planned improvements to the Yonge-Steeles area that will improve the operation of this intersection, new site traffic can be appropriately accommodated at this intersection.

9.5 UNSIGNALIZED INTERSECTION ANALYSIS

9.5.1 Steeles Avenue East / Dudley Avenue / Dumont Street

The results of the intersection traffic operations analyses undertaken for the Steeles Avenue East / Dudley Avenue / Dumont Street intersection are summarized in **Table 18**.

The base case assumes the introduction of a new traffic signal at the intersection as part of this development under future total conditions. A preliminary functional design drawing illustrating lane configuration and pavement marking with signalization is provided in **APPENDIX K**.

The sensitivity analysis assumes the intersection may be restricted to right-in/right-out only (the eastbound left, westbound left, northbound left, northbound through, southbound left and southbound through movements are prohibited) as a result of the potential LRT alignment along Steeles Avenue East.

TABLE 18 STEELES AVENUE EAST / DUDLEY AVENUE / DUMONT STREET CAPACITY ANALYSIS

Lane Group	Existing		Future Background						Future Total					
	2021 Unsignalized		2026 Unsignalized		2031 Unsignalized (Base)		2031 Unsignalized (Sensitivity)		2026 Unsignalized		2031 Signalized (Base)		2031 Unsignalized (Sensitivity)	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	V/C	LOS	V/C	LOS	Delay	LOS
EBLTR	0.2 (1.3)	A (A)	0.3 (1.9)	A (A)	0.2 (1.3)	A (A)	-- (--)	-- (--)	0.54 (0.58)	A (A)	0.46 (0.47)	A (A)	-- (--)	-- (--)
WBLT	1.2 (0.6)	A (A)	1.4 (0.7)	A (A)	1.3 (0.6)	A (A)	-- (--)	-- (--)	0.57 (0.64)	A (A)	0.48 (0.54)	A (A)	-- (--)	-- (--)
WBR	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	0.03 (0.13)	A (A)	0.03 (0.13)	A (A)	-- (--)	-- (--)
NBLTR	16.8 (23.3)	C (C)	20.2 (31.4)	C (D)	17.2 (24.0)	C (C)	9.4 (9.8)	A (A)	0.08 (0.49)	D (E)	0.08 (0.49)	D (E)	9.4 (9.8)	A (A)
SBLTR	30.1 (25.5)	D (D)	38.8 (36.0)	E (E)	30.7 (27.1)	D (D)	-- (--)	-- (--)	0.53 (0.46)	E (E)	0.53 (0.46)	E (E)	-- (--)	-- (--)
Overall	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	**0.57 (0.62)**	**A (A)**	**0.49 (0.53)**	**A (A)**	-- (--)	-- (--)

Notes:
1. 00 (00): Weekday morning peak hour (Weekday afternoon peak hour).
2. Control delays calculated in seconds

Based on the foregoing, this intersection will operate under acceptable conditions under all scenarios. New site traffic can be appropriately accommodated at this intersection.

9.5.2 Other Unsignalized Intersections

The results of the traffic operations analyses undertaken for other unsignalized intersections, including the site driveway, are summarized in **Table 19**. Synchro analysis worksheets are attached in **APPENDIX H**.

Vehicular access to the site will be provided via a driveway onto Dudley Avenue. The access to the site is anticipated to operate acceptably (**LOS B** or better) under the future total scenario.

TABLE 19 OTHER UNSIGNALIZED INTERSECTIONS CAPACITY ANALYSIS SUMMARY

Lane Group	Existing		Future Background						Future Total					
	2021		2026		2031 (Base)		2031 (Sensitivity)		2026		2031 (Base)		2031 (Sensitivity)	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Yonge Street / Highland Park Boulevard														
WBLR	9.7 (12.2)	A (B)	10.1 (13.3)	B (B)	9.8 (12.3)	A (B)	9.8 (12.3)	A (B)	10.2 (13.3)	B (B)	9.9 (12.3)	A (B)	9.9 (12.3)	A (B)
SBL	11.2 (13.7)	B (B)	11.5 (16.6)	B (C)	11.1 (13.9)	B (B)	11.1 (13.9)	B (B)	11.5 (16.6)	B (C)	11.1 (13.9)	B (B)	11.1 (14.0)	B (B)
Dudley Avenue / Highland Park Boulevard														
EBLTR	7.5 (8.1)	A (A)	7.5 (8.2)	A (A)	7.5 (8.2)	A (A)	7.5 (8.1)	A (A)	7.6 (8.2)	A (A)	7.6 (8.2)	A (A)	7.6 (8.2)	A (A)
WBLTR	7.7 (7.8)	A (A)	7.7 (7.9)	A (A)	7.7 (7.9)	A (A)	7.7 (7.8)	A (A)	7.8 (8.0)	A (A)	7.8 (8.0)	A (A)	7.9 (7.9)	A (A)
NBLTR	7.5 (8.4)	A (A)	7.6 (8.5)	A (A)	7.6 (8.5)	A (A)	7.5 (8.3)	A (A)	7.7 (8.6)	A (A)	7.7 (8.6)	A (A)	7.6 (8.5)	A (A)
SBLTR	7.2 (7.7)	A (A)	7.2 (7.8)	A (A)	7.2 (7.8)	A (A)	7.0 (7.7)	A (A)	7.3 (7.9)	A (A)	7.3 (7.9)	A (A)	7.2 (7.9)	A (A)
Willowdale Boulevard / Highland Park Boulevard														
EBLTR	7.1 (7.7)	A (A)	7.1 (7.8)	A (A)	7.1 (7.8)	A (A)	7.2 (7.9)	A (A)	7.1 (7.8)	A (A)	7.1 (7.8)	A (A)	7.3 (8.0)	A (A)
WBLTR	7.9 (7.9)	A (A)	7.9 (7.9)	A (A)	7.9 (7.9)	A (A)	7.9 (8.0)	A (A)	7.9 (7.9)	A (A)	7.9 (7.9)	A (A)	8.0 (8.0)	A (A)
NBLTR	8.0 (8.1)	A (A)	8.0 (8.1)	A (A)	8.0 (8.1)	A (A)	8.0 (8.4)	A (A)	8.0 (8.1)	A (A)	8.0 (8.1)	A (A)	8.1 (8.4)	A (A)
SBLTR	7.6 (7.9)	A (A)	7.6 (7.9)	A (A)	7.6 (7.9)	A (A)	7.7 (8.1)	A (A)	7.6 (7.9)	A (A)	7.6 (7.9)	A (A)	7.7 (8.1)	A (A)
Dudley Avenue / Site Driveway / 18 Steeles Avenue East Driveway														
EBLTR	8.7 (9.2)	A (A)	8.7 (9.2)	A (A)	8.7 (9.2)	A (A)	8.6 (9.1)	A (A)	8.8 (9.5)	A (A)	8.8 (9.5)	A (A)	8.9 (9.6)	A (A)
WBLTR	0.0 (0.0)	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)	A (A)	9.4 (10.6)	A (B)	9.4 (10.6)	A (B)	9.2 (10.0)	A (B)
NBLTR	0.0 (0.3)	A (A)	0.0 (0.3)	A (A)	0.0 (0.3)	A (A)	0.0 (0.3)	A (A)	0.0 (0.2)	A (A)	0.0 (0.2)	A (A)	0.0 (0.2)	A (A)
SBLTR	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	1.2 (1.5)	A (A)	1.2 (1.5)	A (A)	2.5 (3.3)	A (A)

Notes:
1. 00 (00): Weekday morning peak hour (Weekday afternoon peak hour).
2. Control delays calculated in seconds

Traffic operations at all unsignalized intersections within the study area are acceptable under all scenarios without any need for road improvements or mitigation measures. All movements will function at **LOS C** or better in all scenarios.

Based on the foregoing, new site traffic volumes can be appropriately accommodated at all unsignalized intersections in the study area.

9.6 INTERSECTION QUEUE ANALYSIS

Queue analysis results for all signalized intersections in the study are summarized in **Table 20**. 50th and 95th percentile queues and available lane storage for key turning movements are identified. Synchro queue results are provided in **APPENDIX H**.

TABLE 20 QUEUE ANALYSIS RESULTS SUMMARY

Movement [Storage]	Existing		Future Background						Future Total					
	2021		2026		2031 (Base)		2031 (Sensitivity)		2026		2031 (Base)		2031 (Sensitivity)	
	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
Yonge Street / Steeles Avenue														
EBL [115]	30.2 (43.5)	75.7 (97.9)	49.8 (57.8)	103.5 (113.8)	33.0 (41.2)	78.4 (90.5)	33.0 (41.2)	78.2 (90.5)	50.0 (57.8)	103.7 (113.8)	32.7 (41.2)	79.5 (90.5)	33.0 (42.7)	79.5 (93.9)
EBT [--]	117.5 (143.9)	152.7 (189.8)	134.0 (168.1)	176.0 (211.9)	103.0 (121.7)	127.4 (159.3)	103.0 (121.7)	127.4 (159.3)	134.9 (171.3)	177.5 (215.1)	103.1 (123.7)	128.3 (162.7)	103.0 (121.7)	127.4 (159.3)
EBR [--]	53.7 (39.0)	91.6 (68.9)	88.6 (74.1)	159.6 (134.3)	51.8 (39.0)	90.9 (71.2)	51.8 (39.0)	90.9 (71.2)	88.6 (74.1)	159.6 (134.3)	51.8 (39.0)	90.9 (71.2)	51.8 (39.0)	90.9 (71.2)
WBL [160]	21.7 (39.5)	57.0 (77.4)	32.4 (49.8)	74.1 (73.0)	16.3 (38.1)	44.9 (70.9)	17.1 (39.7)	48.6 (68.0)	32.8 (46.8)	77.1 (96.5)	15.9 (28.9)	49.1 (76.4)	24.0 (43.5)	69.6 (74.7)
WBTR [--]	98.1 (119.1)	109.0 (140.1)	109.4 (161.0)	99.7 (193.7)	88.8 (121.1)	65.2 (152.6)	89.1 (121.3)	67.9 (153.0)	111.6 (94.9)	110.6 (189.7)	90.4 (122.7)	52.9 (105.5)	90.7 (122.7)	72.1 (154.7)
NBL [--]	23.0 (19.7)	64.1 (42.7)	50.8 (55.0)	104.6 (112.8)	45.5 (64.7)	101.4 (124.7)	45.5 (64.7)	101.4 (124.7)	50.8 (55.0)	104.6 (112.8)	46.0 (64.7)	101.4 (124.7)	45.5 (64.7)	101.4 (124.7)
NBTR [--]	66.8 (145.6)	80.2 (175.1)	101.2 (204.3)	119.4 (241.6)	80.7 (148.1)	100.8 (177.8)	80.7 (148.1)	100.8 (177.8)	101.2 (205.7)	119.4 (243.0)	81.3 (149.0)	100.8 (185.2)	81.3 (149.9)	101.4 (186.4)
SBL [--]	26.4 (31.8)	45.3 (70.2)	44.7 (46.1)	88.2 (101.5)	35.1 (47.5)	62.6 (101.4)	35.1 (47.5)	62.6 (101.4)	44.8 (46.1)	88.5 (101.5)	35.5 (47.5)	62.6 (101.4)	35.1 (47.5)	62.8 (101.4)
SBTR [--]	139.0 (120.9)	161.0 (143.0)	206.8 (183.3)	239.3 (217.2)	154.5 (143.6)	191.3 (182.4)	154.5 (143.6)	191.3 (182.4)	206.8 (183.3)	239.3 (217.2)	154.5 (143.6)	191.3 (182.4)	154.5 (143.6)	191.3 (182.4)
Steeles Avenue East / Dudley Avenue / Dumont Street														
EBLTR [--]	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	24.1 (24.0)	29.2 (17.7)	21.5 (9.7)	29.1 (10.9)	-- (--)	-- (--)
WBLT [--]	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	21.6 (89.6)	11.4 (63.4)	19.7 (73.4)	11.7 (82.0)	-- (--)	-- (--)
WBR [--]	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	0.1 (7.2)	0.1 (0.5)	0.1 (6.0)	0.2 (9.9)	-- (--)	-- (--)
NBLTR [--]	-- (--)	3.5 (11.5)	-- (--)	4.5 (15.8)	-- (--)	3.6 (11.9)	-- (--)	1.0 (2.0)	2.4 (16.6)	14.0 (35.1)	2.4 (16.4)	14.0 (34.9)	-- (--)	1.0 (2.0)
SBLTR [--]	-- (--)	4.1 (6.1)	-- (--)	5.4 (8.9)	-- (--)	4.2 (6.5)	-- (--)	0.8 (1.2)	20.9 (13.3)	38.3 (30.3)	20.7 (13.0)	38.1 (30.0)	-- (--)	2.8 (2.1)

Movement [Storage]	Existing		Future Background						Future Total					
	2021		2026		2031 (Base)		2031 (Sensitivity)		2026		2031 (Base)		2031 (Sensitivity)	
	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
Steeles Avenue East / Willowdale Avenue / Willowdale Boulevard														
EBL [40]	1.2 (8.9)	1.7 (10.1)	0.7 (11.4)	1.1 (12.2)	0.9 (10.2)	1.3 (10.9)	2.0 (16.3)	3.1 (18.8)	0.8 (11.3)	1.5 (28.6)	0.9 (9.5)	2.2 (24.7)	2.0 (16.5)	3.1 (19.9)
EBT [--]	137.4 (142.8)	174.1 (163.2)	100.3 (191.0)	117.2 (183.3)	98.0 (129.6)	165.6 (149.3)	97.2 (128.6)	163.7 (147.2)	108.4 (195.9)	199.2 (233.5)	104.4 (134.7)	173.4 (175.5)	97.2 (128.6)	163.6 (147.2)
EBR [15]	47.5 (11.1)	62.5 (12.6)	22.7 (11.9)	31.0 (11.9)	28.9 (14.7)	49.9 (15.1)	28.9 (14.9)	49.7 (15.1)	26.1 (8.6)	49.7 (14.6)	32.0 (11.8)	57.1 (18.4)	28.9 (14.9)	49.7 (15.1)
WBL [65]	93.8 (34.4)	178.8 (91.0)	118.3 (51.7)	241.5 (130.3)	102.4 (53.0)	207.9 (133.0)	115.4 (66.9)	225.9 (139.8)	118.7 (52.2)	241.9 (130.3)	102.4 (53.4)	207.9 (133.0)	116.6 (71.7)	225.9 (139.8)
WBT [--]	60.8 (126.6)	111.1 (175.0)	70.7 (175.2)	128.9 (254.7)	53.5 (127.4)	98.7 (175.0)	54.3 (134.3)	94.8 (172.7)	71.6 (182.5)	130.5 (262.3)	54.5 (133.1)	100.2 (180.5)	55.9 (141.6)	95.8 (178.3)
WBR [20]	0.0 (0.0)	0.0 (1.9)	0.0 (0.0)	0.0 (1.9)	0.0 (0.0)	0.0 (1.9)	0.0 (0.0)	0.0 (1.9)	0.0 (0.0)	0.0 (1.9)	0.0 (0.0)	0.0 (1.9)	0.0 (0.0)	0.0 (1.9)
NBLT [--]	47.7 (87.8)	64.0 (114.6)	47.7 (87.2)	64.0 (114.6)	47.7 (87.2)	64.0 (114.6)	49.8 (93.3)	67.6 (131.3)	47.7 (88.0)	64.0 (116.6)	47.7 (88.0)	64.0 (116.6)	50.9 (96.4)	69.2 (138.7)
NBR [--]	0.0 (45.3)	16.7 (70.0)	0.0 (58.5)	18.5 (86.5)	0.0 (58.2)	18.5 (86.3)	0.0 (54.2)	18.5 (86.3)	0.0 (57.9)	18.5 (86.5)	0.0 (57.9)	18.5 (86.6)	0.0 (52.9)	18.5 (86.3)
SBL [20]	13.2 (4.7)	23.5 (10.1)	13.2 (6.3)	23.5 (12.5)	13.2 (6.3)	23.5 (12.5)	14.3 (6.6)	25.3 (14.0)	13.2 (6.2)	23.5 (12.5)	13.2 (6.2)	23.5 (12.5)	20.9 (9.0)	34.8 (18.3)
SBTR [--]	7.9 (17.5)	17.9 (26.1)	7.9 (17.4)	17.9 (26.1)	7.9 (17.4)	17.9 (26.1)	7.8 (17.0)	17.9 (27.0)	7.9 (17.2)	17.9 (26.1)	7.9 (17.2)	17.9 (26.1)	7.8 (16.6)	17.9 (27.0)

Notes:
1. 00 (00): Weekday morning peak hour (Weekday afternoon peak hour).
2. Queue and storage lengths measured in metres.

Yonge Street / Steeles Avenue

The current storage length for the eastbound left and southbound left movements is 115 metres and 160 metres, respectively. The 50th and 95th percentile queue for these two movements at this intersection can be appropriately accommodated within the available storage capacity under all scenarios.

There is a two-way left-turn lane along Yonge Street that currently extends from Steeles Avenue to Athabaska Avenue to the south and Grandview Avenue to the north. The 50th and 95th percentile queue for the southbound left and northbound left movements at this intersection can be appropriately accommodated by the two-way left-turn lane.

Steeles Avenue East / Dudley Avenue / Dumont Street

The estimated 50th and 95th percentile queue of the southbound shared left-through-right movement under future total conditions during the weekday morning peak hour are approximately 21 metres and 38 metres, respectively.

The distance between the southbound stop bar and the driveway serving the property at 18 Steeles Avenue East is approximately 30 metres. The 50th percentile queue lengths will be well accommodated in this storage

length. The 95th percentile queue length may block the driveway for parts of the signal cycle (at the end of the red interval) but will clear on every cycle.

Steeles Avenue East / Willowdale Avenue / Willowdale Boulevard

Under existing, future background and future total conditions, the 50th and 95th percentile queue for several movements at this intersection exceed the existing storage length, including the eastbound right, westbound left, and southbound left movements.

It is important to note that these queues are primarily a result of existing and background traffic making the movement (rather than site-generated traffic). The proposed development is not anticipated to generate any additional traffic volumes to the critical westbound left movement and will generate minimal traffic volumes to the non-critical eastbound right and southbound left movements.

Based on the foregoing, site-related impact to the queue at this intersection is minimal.

10.0 TRANSIT TRAVEL ASSESSMENT

10.1 CONTEXT

The site is well situated near the intersection Yonge Street and Steeles Avenue (approximately 250 m or 3-minute walk), bordering the City of Toronto and the City of Markham in the York Region. There are ample easily accessible transit options provided by the Toronto Transit Commission (TTC), York Region Transit (YRT) and GO Transit.

Bus routes that travel in the vicinity of the site provide access to higher-order transit (i.e. subways and regional transit) with connections to the Finch Station Transit Terminal.

10.2 SITE TRANSIT TRIP GENERATION

Forecast transit trips for the proposed development were established in **Section 8.4.3**. Transit trips to and from the site during the weekday morning and afternoon peak hours are summarized in **Table 21.**

TABLE 21 SITE GENERATED TRANSIT TRIPS

	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Total Site Transit Trips	16	65	**81**	53	36	**89**

The proposed development is anticipated to generate in the order of approximately 81 and 89 two-way transit trips during the weekday morning and afternoon peak hours, respectively.

10.3 SITE TRANSIT TRIP DISTRIBUTION

In order to estimate the future catchment for transit trips to/from the site, a 2016 TTS analysis has been undertaken for existing home-based transit trips in the area. The resultant estimated transit catchments of the proposal are summarized in **Table 22**.

TABLE 22 ESTIMATED TRANSIT CATCHMENTS

Location	Inbound [1]	Outbound [2]
City of Toronto	90%	85%
South of Site	85%	80%
East of Site	0%	0%
West of Site	5%	5%
Region of York	10%	15%
Total	**100%**	**100%**

Notes:
1. Based on afternoon peak period residential inbound trips.
2. Based on morning peak period residential outbound trips.
3. Based on TTS analysis for home-based transit trips within TTS zones 446,447,459,2140,2351,2352, and 2353.

A summary of the potential transit options to/from the site from each of these catchments is provided in **Section 3.0**. The adopted site transit distribution is summarized in **Table 23**.

TABLE 23 SITE TRANSIT DISTRIBUTION

Route	Branch	Inbound	Outbound
Toronto Transit Commission (TTC)			
53 / 953 Steeles East	EB to Markham Road	80%	0%
	WB to Finch Station	0%	75%
60 / 960 Steeles West	EB to Finch Station	5%	0%
	WB to Pioneer Village Station	0%	5%
98 Willowdale-Senlac	NB to Steeles Ave	5%	0%
	SB to Sheppard-Yonge Station	0%	5%
TTC Total		**90%**	**85%**
York Region Transit (YRT)			
91 Bayview	NB to Elgin Mills Road	0%	5%
	SB to Finch Station	5%	0%
77 Highway 7	EB to Finch Station	2.5%	0%
	West to Highway 50	0%	5%
VIVA Blue / Blue A	NB to Davis Drive	0%	5%
	SB to Finch Station	2.5%	0%
YRT Total		**10%**	**15%**
Transit Total		**100%**	**100%**

The forecasted transit trips were assigned based on the above distribution. Site transit trips are anticipated to be predominately oriented south of the site, as resident-based transit riders tend to route to/from the major employment areas in Downtown Toronto via Finch Station.

10.4 FORECAST SITE TRANSIT TRIPS

The resulting transit trips, based on the preceding distribution and forecast transit rider volumes, are summarized in **Table 24**. Forecast transit rider volumes are summarized based on their respective transit routes.

TABLE 24 PEAK HOUR SITE-GENERATED TRANSIT TRIPS

Route	Branch	Trips per Hour		Trips per Transit Vehicle	
		Inbound	Outbound	Inbound	Outbound
Toronto Transit Commission (TTC)					
53 / 953 Steeles East	EB to Markham Road	13 (42)	0 (0)	1 (4)	0 (0)
	WB to Finch Station	0 (0)	49 (27)	0 (0)	4 (2)
60 / 960 Steeles West	EB to Finch Station	1 (3)	0 (0)	0 (0)	0 (0)
	WB to Pioneer Village Station	0 (0)	3 (2)	0 (0)	0 (0)
98 Willowdale-Senlac	NB to Steeles Ave	1 (3)	0 (0)	0 (1)	0 (0)
	SB to Sheppard-Yonge Station	0 (0)	3 (2)	0 (0)	1 (1)
TTC Total		**15 (48)**	**55 (31)**	**--**	**--**
York Region Transit (YRT)					
91 Bayview	NB to Elgin Mills Road	0 (0)	4 (2)	0 (0)	1 (1)
	SB to Finch Station	1 (3)	0 (0)	1 (1)	0 (0)
77 Highway 7	EB to Finch Station	0 (1)	0 (0)	0 (1)	0 (0)
	West to Highway 50	0 (0)	3 (2)	0 (0)	1 (1)
VIVA Blue / Blue A	NB to Davis Drive	0 (0)	3 (1)	0 (0)	1 (0)
	SB to Finch Station	0 (1)	0 (0)	0 (0)	0 (0)
YRT Total		**1 (5)**	**10 (5)**	**--**	**--**
Transit Total		**16 (53)**	**65 (36)**	**--**	**--**

Notes:
1. 00 (00): Weekday morning peak hour (Weekday afternoon peak hour)

The site is forecast to add in the order of 49 transit trips at maximum to an individual bus route (53 Steeles East) during both weekday peak periods. Given the headway of the 53 Steeles East (including 953 Steeles East Express) bus is approximately 4-5 minutes during the peak hours, the site is forecast to add in the order 3-4 bus riders on a particular vehicle during peak hours. The impacts of the proposed development on the area bus network are minimal.

10.5 TRANSIT TRAVEL PERFORMANCE REVIEW

The following transit travel review for the study area is based on requirements outlined in **Section 1.10.3** of York Region's *Transportation Mobility Plan Guidelines* (November 2016). A 'Level-of-Service' (LOS) based approach was undertaken to evaluate nearby transit options, to determine the effectiveness of public transportation services available in the study area. An evaluation of transit stops in a close and convenient walking distance of the subject site was undertaken, including TTC and YRT bus stops at:

- Yonge Street @ Steeles Avenue (NB, far-side stop), 300 metres
- Yonge Street @ Steeles Avenue (SB, near-side stop), 350 metres
- Yonge Street @ Steeles Avenue (NB/EB, near-side stop), 250 metres
- Yonge Street @ Steeles Avenue (SB, far-side stop), 350 metres
- Steeles Avenue West @ Yonge Street (WB, far-side stop), 350 metres
- Steeles Avenue East @ Dudley Avenue (WB, near-side stop), 30 metres
- Steeles Avenue East @ Dumont Street (EB, near-side stop), 30 metres
- Steeles Avenue East @ Willowdale Boulevard (WB, near-side stop), 200 metres
- Steeles Avenue East @ Willowdale Avenue (EB, near-side stop), 190 metres

Buses are currently the primary mode of transit available in the vicinity of the Site. Accordingly, assignment of LOS ratings for each of the above-listed stops, as summarized in **Table 25**, was undertaken based on: (1) access to transit stop; (2) transit service frequency; and (3) transit vehicle performance at the intersection.

TABLE 25 TRANSIT LEVEL-OF-SERVICE ANALYSIS SUMMARY (2031 HORIZON)

Transit Stop Location	Direction	Level of Service (LOS)		
		Access to Transit Stops	Transit Headways	Intersection Approach
Yonge Street @ Steeles Avenue (NB, far-side stop)	Northbound	B	A	B (E)
Yonge Street @ Steeles Avenue (SB, near-side stop)	Southbound	B	A	E (E)
Yonge Street @ Steeles Avenue (NB/EB, near-side stop)	Northbound / Eastbound	B	B	B (E)
Yonge Street @ Steeles Avenue (SB, far-side stop)	Southbound	B	A	E (E)
Steeles Avenue West @ Yonge Street (WB, far-side stop)	Westbound	B	A	C (E)
Steeles Avenue East @ Dudley Avenue (WB, near-side stop)	Westbound	A	B	A (A)
Steeles Avenue East @ Dumont Street (EB, near-side stop)	Eastbound	A	B	A (A)
Steeles Avenue East @ Willowdale Boulevard (WB, near-side stop)	Westbound	A	B	A (C)
Steeles Avenue East @ Willowdale Avenue (EB, near-side stop)	Eastbound	A	B	E (E)

Notes:
1. A (A): Weekday morning peak hour (Weekday afternoon peak hour)

11.0 PEDESTRIAN TRAVEL ASSESSMENT

11.1 FORECAST SITE PEDESTRIAN TRIPS

Site generated pedestrian trips include the following:

1. **Direct Pedestrians –** walking trips to/from the site (the primary mode of travel is walk), developed by applying the TTS walking trip mode share to the new site trips.

2. **Transit Pedestrians –** walking trips between transit stops and the site (the primary mode of travel is transit), reflective of transit trips generated by the site, developed by applying the TTS transit mode share to the new site trips.

Site pedestrian trip generation is summarized in **Table 26**.

TABLE 26 SITE PEDESTRIAN TRIPS

	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Direct Pedestrians	4	17	21	14	10	24
Transit-Based Pedestrians	16	65	81	53	36	89
Total Site Pedestrian Trips	20	82	**102**	67	46	**113**

The proposed development will generate in the order of 21 and 24 direct pedestrian trips during weekday morning and afternoon peak hour periods, respectively, and will generate in the order of 81 and 89 transit-based pedestrian trips during the weekday morning and afternoon peak hour, respectively. In total, the proposed development will generate in the order of 102 and 113 pedestrian trips during the weekday morning and afternoon peak hours, respectively.

The site is located approximately 300 metres to the Centerpoint Mall and is in proximity to a variety of educational, recreational and retail uses in the area. Transit-related pedestrian trips will predominately access or egress the transit services provided on Steeles Avenue or Yonge Street.

11.2 PEDESTRIAN TRAVEL PERFORMANCE REVIEW

The following pedestrian travel review for the study area is based on requirements outlined in **Section 1.10.4** of York Region's *Transportation Mobility Plan Guidelines* (November 2016). A 'Level-of-Service' (LOS) based approach was undertaken to evaluate pedestrian facilities in the study area. Accordingly, each intersection in the study area was evaluated based on (1) sidewalk width, (2) buffer zone width, (3) presence of pedestrian signal head, and (4) cross-walk delineation to determine the pedestrian mode level of service performance, as summarized in **Table 27**.

TABLE 27 TRANSIT LEVEL-OF-SERVICE ANALYSIS SUMMARY (2031 HORIZON)

Intersection	Description (Orientation)	Side of Road	Level of Service (LOS)	
			Segment	Intersection
Yonge Street / Steeles Avenue	Yonge St (North-South)	East side	C	C
		West side	C	C
	Steeles Ave (East-West)	North side	B	C
		South side	B	C
Yonge Street / Highland Park Boulevard	Yonge St (North-South)	East side	B	E
		West side	C	--
	Highland Park Blvd (East-West)	North side	E	F
		South side	F	F
Dudley Avenue / Dumont Street / Steeles Avenue East	Dudley Ave – Dumont St (North-South)	East side	B	B
		West side	F	B
	Steeles Ave East (East-West)	North side	B	B
		South side	B	B
Dudley Avenue / Highland Park Boulevard	Dudley Ave (North-South)	East side	C	D
		West side	F	F
	Highland Park Blvd (East-West)	North side	F	F
		South side	C	D
Willowdale Avenue / Willowdale Boulevard / Steeles Avenue East	Willowdale Ave – Willowdale Blvd (North-South)	East side	C	C
		West side	C	C
	Steeles Ave East (East-West)	North side	B	B
		South side	B	B
Willowdale Boulevard / Highland Park Boulevard	Willowdale Blvd (North-South)	East side	F	F
		West side	F	F
	Highland Park Blvd (East-West)	North side	F	F
		South side	F	F

Notes:
1. A (A): Weekday morning peak hour (Weekday afternoon peak hour)

The pedestrian network in the study area is generally well connected along major and minor corridors (Yonge Street, Steeles Avenue, and Willowdale Avenue). A key missing link in the context of the site, however, is along local roads (Dudley Avenue, Dumont Street, Willowdale Boulevard and Highland Park Boulevard), where pedestrian infrastructure is not provided.

As part of this development, high-quality sidewalks will be added along the entire site frontages on Dudley Avenue and Highland Park Boulevard. In addition, with the proposed introduction of a traffic signal at Steeles Avenue East / Dudley Avenue / Dumont Street, formal pedestrian cross-walks will be introduced. Thus, the proposed development will improve the pedestrian environment in the site vicinity.

12.0 CYCLING TRAVEL ASSESSMENT

12.1 FORECAST SITE CYCLING TRIPS

Forecast cycling trips for the proposed development were established in **Section 8.4.3**. Cycling trips to and from the Site during the weekday morning and afternoon peak hours are summarized in **Table 21**.

TABLE 28 SITE GENERATED TRANSIT TRIPS

	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Total Site Cycling Trips	2	9	**11**	7	5	**12**

The proposed development is anticipated to generate in the order of approximately 11 and 12 two-way cycling trips during the weekday morning and afternoon peak hours, respectively.

12.2 CYCLING TRAVEL PERFORMANCE REVIEW

The following cycling travel review for the study area is based on requirements outlined in **Section 1.10.5** of York Region's *Transportation Mobility Plan Guidelines* (November 2016). A 'Level-of-Service' (LOS) based approach was undertaken to evaluate cycling facilities in the study area.

A technical assessment of cycling facilities along Steeles Avenue East was carried out for the purpose of this report, as summarized in **Table 27**, to highlight the existing shortcomings of cycling infrastructure that will be potentially mitigated by the implementation of the future Yonge-Steeles Corridor Secondary Plan.

TABLE 29 TRANSIT LEVEL-OF-SERVICE ANALYSIS SUMMARY

Intersection	Description (Orientation)	Side of Road	Level of Service (LOS)	
			Segment	Intersection
Yonge Street / Steeles Avenue	Yonge St (North-South)	East side	F	F
		West side	F	F
	Steeles Ave (East-West)	North side	F	F
		South side	F	F
Dudley Avenue / Dumont Street / Steeles Avenue East	Dudley Ave – Dumont St (North-South)	East side	F	F
		West side	F	F
	Steeles Ave East (East-West)	North side	F	F
		South side	F	F
Willowdale Avenue / Willowdale Boulevard / Steeles Avenue East	Willowdale Ave – Willowdale Blvd (North-South)	East side	F	F
		West side	F	F
	Steeles Ave East (East-West)	North side	F	F
		South side	F	F

Notes:
1. A (A): Weekday morning peak hour (Weekday afternoon peak hour)

Under existing conditions, there is no dedicated cycling infrastructure provided on the arterial, collectors or local roads in the vicinity of the site (LOS F). The future provision of a more comprehensive cycling network is outlined in the City of Toronto's *Near-Term Implementation Program*, *York Region Cycling Map*, and *Yonge-Steeles Area Regional Transportation Study* (summarized in **Section 3.4** of this report).

Future bicycle facilities are being contemplated on Yonge Street south of Steeles Avenue. Protected bicycle lanes are also proposed on Willowdale Avenue and Willowdale Boulevard (adjacent to the site) from Avondale Avenue (south of Sheppard Avenue) to Meadowview Avenue (north of the site).

Based on the foregoing, the proposed development is appropriate from a transportation perspective and can be accommodated on the area transportation network.

13.0 SUMMARY AND CONCLUSIONS

BA Group is retained by Zonix Homes Inc. to provide transportation consulting services in relation to proposed residential development on a site municipally known as 36-48 Steeles Avenue East and 37-49 Highland Park Boulevard in the City of Markham.

Key findings are summarized as follows:

Proposed Development

1. The current development features two residential buildings: one 27-storey residential building (Building A) consisting of 407 units with frontage onto Steeles Avenue East, and one 6-storey residential building (Building B) consisting of 126 units with frontage onto Highland Park Boulevard. A total of 533 residential units are proposed on site.

2. As part of this development, it is proposed to introduce a traffic signal at the existing (unsignalized) intersection of Steeles Avenue East / Dudley Avenue / Dumont Street in order to provide connectivity for vehicular, pedestrian and cyclist activity on both Steeles Avenue and Dudley Avenue / Dumont Street.

Area Planning Context

3. The Yonge-Steeles area has been the subject of numerous planning studies conducted by each of the various municipal and regional governmental stakeholders, including the York Region and the cities of Vaughan, Markham and Toronto.

4. Key findings of these studies are summarized in this report, notably York Region's 2015 *Yonge-Steeles Area Regional Transportation Study*.

Area Travel Characteristics

5. The site is well-served by high-frequency bus service on Steeles Avenue and Yonge Street operated by York Region Transit (YRT), the Toronto Transit Commission (TTS) and GO Transit / Metrolinx. It is located approximately 250 metres from the intersection of Yonge Street / Steeles Avenue, which has been identified as a Mobility Hub (*Gateway Hub*) by Metrolinx's *The Big Move*. The Yonge Street / Steeles Avenue intersection will be a major transit station on the future Yonge Subway Extension and will connect bus service as well as planned higher-order transit service on Steeles Avenue.

Bicycle Parking

6. The City of Markham does not currently have minimum bicycle parking standards in its zoning bylaw. Thus, it is proposed to adopt the bicycle parking rates applied by the City of Markham at other recent developments in the City including at 8200 Warden Avenue and 28 Main Street. These rates are, notably, higher than the potential rates noted in the City of Markham's *Comprehensive Zoning By-Law Project*.

7. Application of the above bicycle parking rates to the proposed development results in 373 bicycle parking spaces in total, including 267 long-term spaces and 106 short-term spaces.

8. The current architectural site statistics indicate the provision of a total of 397 bicycle parking spaces, including 274 long-term spaces and 123 short-term spaces.

Vehicular Parking

9. Resident parking standards outlined in Zoning By-Law 28-87 are considered to significantly overstate the parking needs of a residential apartment in this area of the City in light of the highly transit-accessible location, the extremely high volume and frequency of bus services operating in the site vicinity (operated by York Region Transit / VIVA, TTC and GO Transit / Metrolinx) and the high level of existing non-auto based travel for residential apartment dwellers in the site vicinity.

10. The proposed parking supply consists of 395 parking spaces for residents (effective ratio of 0.74 spaces/ unit) and 118 parking spaces for visitors (effective ratio of 0.22 spaces/ unit), for a total of 513 parking spaces. These rates are developed with consideration for the following, and are appropriate for the site given the area context:

    - Observed demand at comparable sites;
    - Area transportation context;
    - Mobility as a Service (Maas);
    - Transportation planning context; and
    - Transportation Demand Management (TDM) plan

Loading

11. City of Markham By-law 177-96 has no requirement for residential loading spaces.

12. The current architectural plans illustrate the provision of one Type ‘G’ loading space (with 13.0m x 4.0m x 7.5m) based on comparision to City of Toronto Zoning By-law 569-2013 at-grade for the building, with access from the private driveway.

Transportation Demand Management (TDM)

13. A detailed Mobility Choice Travel Plan will be developed and secured through the approvals process in consultation with the City of Markham.

14. The key objectives of the plan can be organized within the following categories:

    - Encourage transit use;
    - Encourage and facilitate bicycle use;
    - Enhance pedestrian access and walkability;
    - Facilitation of reduced car ownership and usage;
    - Vehicular parking supply and management;
    - Land use and building infrastructure; and
    - Coordination, communication, and promotion.

15. Measures from the Mobility Choice Travel Plan will be incorporated into the proposed development to minimize the need to own a personal vehicle or use an automobile when travelling to and from the

site. It is important to encourage and facilitate the use of non-automobile travel modes on a daily basis.

Traffic Volumes

16. Considering the introduction of the finer-grained road network identified in the *2015 Regional Transportation Study*, the following two planning horizons have been analyzed in this study:

    - **Future 2026 (5-year horizon)** – prior to the completion of local roads identified in the *Yonge-Steeles Regional Transportation Study* (September 2015).

    - **Future 2031 (10-year horizon)** – after the completion of all local roads identified in the *Yonge-Steeles Regional Transportation Study* (September 2015).

17. The proposed development is located in proximity to potential Light Rail Transit (LRT) and Bus Rapid Transit (BRT) alignments along Steeles Avenue. Considering restrictions may be added to the intersection Steeles Avenue East / Dudley Avenue / Dumont Street at the 2031 horizon as a result of the potential portal on Steeles Avenue East, the following two scenarios have been analyzed in this study:

    - **2031 Base case** – assume existing lane configuration and full movements are permitted at the intersection Steeles Avenue East / Dudley Avenue / Dumont Street.

    - **2031 Sensitivity** – assume the intersection Steeles Avenue East / Dudley Avenue / Dumont Street become restricted to right-in/right-out only.

18. The proposed development is expected to generate in the order of 100 and 110 two-way trips during the weekday morning and afternoon peak hours, respectively.

19. The proposed development is expected to generate in the order of 213 and 235 two-way person trips during the weekday morning and afternoon peak hours, respectively.

Operations Analysis

20. Traffic operations analyses conducted at signalized and unsignalized intersections were based on the methodologies outlined in the *Highway Capacity Manual 2000* using *Synchro 9* software.

Yonge Street / Steeles Avenue

21. The intersection of Yonge Street / Steeles Avenue is a busy critical link between the City of Toronto, City of Markham and City of Vaughan. It operates under constrained conditions today, in particular the eastbound left, eastbound through, westbound left, and northbound through-right movements during the peak hours. Contributing factors to these constrained operations include the fact that the northwest and southwest quadrants of this intersection are not served by a finer-grained network of local roads that might permit local traffic to route away from the intersection and onto alternate roads. Thus, the future redevelopment of these quadrants will require the development of a local road network (as planned through Secondary Plans for these areas) that would serve local traffic and permit more flexible routing options that better disperse traffic through the area. It is noted that the

northeast and southeast quadrants of the intersection – including the subject site – are better served in this regard by a local road network that permits better routing options for local traffic away from the intersection.

22. The addition of site traffic will have a negligible impact on the overall intersection operations. Recognizing the City of Toronto and York Region have planned improvements to the Yonge-Steeles area that will improve the operation of this intersection, new site traffic can be appropriately accommodated at this intersection.

Steeles Avenue East / Willowdale Avenue / Willowdale Boulevard

23. The addition of site traffic will have a negligible impact on the overall intersection operations. Recognizing the City of Toronto and York Region have planned improvements to the Yonge-Steeles area that will improve the operation of this intersection, new site traffic can be appropriately accommodated at this intersection.

Steeles Avenue East / Dudley Avenue / Dumont Street

24. This intersection was analyzed under STOP control for existing, all future background, and future total 2031 sensitivity conditions. Under future total 2026 and 2031 base case conditions, with the proposed introduction of a new traffic signal, this intersection was analyzed under signal control.

25. This intersection will operate under acceptable conditions under all scenarios. New site traffic can be appropriately accommodated at this intersection.

Unsignalized Intersections

26. Traffic operations at all unsignalized intersections within the study area are acceptable under all scenarios without any need for road improvements or mitigation measures. All movements will function at LOS C or better in all scenarios.

Queue Analysis

27. Site-related impact to the queue at study area intersections is minimal.

Transit Travel Assessment

28. The proposed development is anticipated to generate in the order of approximately 81 and 89 two-way transit trips during the weekday morning and afternoon peak hours, respectively.

29. The site is forecast to add in the order of 49 transit trips at maximum to an individual bus route (53 Steeles East) during both weekday peak periods. Given the headway of the 53 Steeles East (including 953 Steeles East Express) bus is approximately 4-5 minutes during the peak hours, the Site is forecast to add in the order 3-4 bus riders on a particular vehicle during peak hours. The impacts of the proposed development on the area bus network are minimal.

Pedestrian Travel Assessment

30. The proposed development will generate in the order of 21 and 24 direct pedestrian trips during weekday morning and afternoon peak hour periods, respectively, and will generate in the order of 81

and 89 transit-based pedestrian trips during the weekday morning and afternoon peak hour, respectively. In total, the proposed development will generate in the order of 102 and 113 pedestrian trips during the weekday morning and afternoon peak hours, respectively.

31. The pedestrian network in the study area is generally well connected along major and minor corridors (Yonge Street, Steeles Avenue, and Willowdale Avenue). A key missing link in the context of the site, however, is along local roads (Dudley Avenue, Dumont Street, Willowdale Boulevard and Highland Park Boulevard), where pedestrian infrastructure is not provided.

32. As part of this development, high-quality sidewalks will be added along the entire site frontages on Dudley Avenue and Highland Park Boulevard. In addition, with the proposed introduction of a traffic signal at Steeles Avenue East / Dudley Avenue / Dumont Street, formal pedestrian cross-walks will be introduced. Thus, the proposed development will improve the pedestrian environment in the site vicinity.

Cycling Travel Assessment

33. There are no dedicated cycling facilities in the site vicinity today, but improvements are planned, particularly on Willowdale Avenue and Willowdale Boulevard, that will connect the site to the wider cycling network and significantly enhance the cyclist environment.

34. Significant bicycle accommodations are being made on-site to take advantage of future cycling infrastructure including bicycle parking, bicycle ramp and bicycle repair stations on the site.

Based on the foregoing, the proposed development is appropriate from a transportation perspective and can be accommodated on the area transportation network.

APPENDIX A:
Response to Comments

April 23, 2021

Sean Esfahani
Zonix Group
44 Steeles Avenue East
Thornhill, ON L3T 1A2

RE: Response to Agency Comments
36-48 Steeles Avenue East and 37-49 Highland Park Boulevard, City of Markham

Dear Mr.Esfahani:

BA Group is retained by Zonix Homes Inc. to provide transportation consulting services related to a proposed residential development to be located on a site municipally known as 36-48 Steeles Avenue East and 37-49 Highland Park Boulevard, in the City of Markham (herein referred to as "the site").

The Official Plan Amendment (OPA) and Zoning By-Law Amendment (ZBA) application for the site and was submitted to the City of Markham, City of Toronto and York Region in February 2019. As part of this application, BA Group prepared a Transportation Mobility Plan report titled *36-48 Steeles Avenue East & 37-63 Highland Park Boulevard, Proposed Residential Development, City of Markham – Transportation Mobility Plan,* dated February 26, 2019.

Since the original submission, comments have been received from reviewing agencies and the development concept plan has been revised. An update report has been prepared, titled *36-48 Steeles Avenue East and 37-49 Highland Park Boulevard, Proposed Residential Development, City of Markham, dated April 23 2021* (referred to herein as the "April 2021 update report").

This letter summarizes detailed responses to agency comments, with references to relevant analysis documented in the April 2021 update report.

RESPONSE TO COMMENTS

CITY OF MARKHAM

Operations

1. Proposed sidewalk on Dudley Ave should end at the south limit of the driveway entrance. On Dudley, sidewalk width should be 1.5m.

Response:

The revised development concept plan illustrates a 2.1m sidewalk on Dudley Avenue on the site frontage.

2. We would also have concerns about the number of bike racks they are proposing on City lands. Unless these are all controlled by Toronto. They can put them on private lands.

Response:

The revised development concept plan illustrates bicycle rooms at-grade and on the P1 parking level.

Waste Management Operations

3. Access/Egress requirements – these elements must all be shown on submitted plans along with roadway dimensions:
    - minimum 6.0m pavement width maintained throughout site
    - minimum 12.0m centreline turning radius maintained throughout site
    - minimum 4.4m vertical clearance maintained throughout site
    - minimum 6.1m vertical clearance for servicing required under obstructions (ceiling, balconies, wires, ducts, sprinkler heads, lighting, trees)
    - maximum reverse distance permitted is 18.0m – any further distance requires a turning feature

Response:

The revised development concept plan incorporates the access/egress requirements.

Development Engineering

4. Delineate and identify on the site plan drawings the following lands as being conveyed to the City for a nominal sum:
    - A 4.90m wide strip of land along the Steeles Avenue East frontage being conveyed to the City. Eliminate any encroachments that are located within the lands that are to be conveyed to the City;
    - A 6.0m corner rounding on the northeast corner of Steeles Avenue East and Dudley Avenue to be free of encumbrances and conveyed to the City for a nominal sum;
    - Please clearly indicate existing and future property line on the site plan;

Response:

The revised development concept plan incorporates the conveyance requirements.

5. Please submit a traffic signal drawing illustrating the proposed new signalized intersection at Steeles Avenue East/Dudley Avenue/Dumont Street. The signal installation will be required as part of the Phase 1 development;

Response:
The April 2021 update report includes a functional design drawing of the Steeles Avenue East/Dudley Avenue/Dumont Street intersection, illustrating proposed pavement marking with signal installation.

6. Please submit a detailed functional plan with the proposed pavement marking and signage changes around the site. Include any curb bump outs and pedestrian crossings for the modifications to the intersection design;

Response:
The April 2021 update report includes a functional design drawing of the Steeles Avenue East/Dudley Avenue/Dumont Street intersection, illustrating proposed pavement marking with signal installation.

7. Provide a Transportation Demand Management (TDM) Plan;

Response:
The April 2021 update report includes the Transportation Demand Management (TDM) Plan.

8. As per Toronto Green Standard, a sidewalk of at least 2.1m wide must be provided along the site frontage of Steeles Avenue East. Be advised that the hydro poles and street furniture within the sidewalk will need to be relocated, or the sidewalk will need to be wider to maintain the required 2.1m clearance;

Response:
The revised development concept plan illustrates a 2.1m sidewalk on the site frontage of Steeles Avenue East.

9. Please show the sidewalk transitions, within the site frontage at a 5:1 slope, for the new 2.1 m sidewalk and the existing adjacent sidewalk on Steeles Avenue;

Response:
To be provided under separate cover.

10. Provide and depict on the site plan tactile walking surface indicators (TWSI) at the Steeles Avenue East/Dudley Avenue intersection and the Steeles Avenue East/Dumont Street; and

Response:
The April 2021 update report includes a functional design drawing of the Steeles Avenue East/Dudley Avenue/Dumont Street intersection, illustrating proposed pavement marking with signal installation (including TWSI).

11. Depict the TTC bus stop locations on the site plan. Any changes to the intersection design and relocation of any bus pads must be of the approval and satisfaction of the Toronto Transit Commission.

Response:
The April 2021 update report includes a functional design drawing of the Steeles Avenue East/Dudley Avenue/Dumont Street intersection, illustrating proposed TTC bus stop location.

Engineering and Construction Services

12. All engineering drawings are to be revised to ensure that a municipal 2.1 m wide concrete sidewalk is shown along the Steeles Avenue frontage with 1.0 offset from the property line. This sidewalk will have to be constructed to City of Toronto standards. A tactile walking surface indicator needs to be installed at the intersection of Steeles Avenue and Dudley Avenue to City of Toronto standards. The applicant will have to secure these works with the City of Toronto and City of Toronto Community Panning will ensure this requirement is secured in the Site Planning agreement between the applicant and the City of Markham in favour of the City of Toronto.

Response:
The revised development concept plan illustrates a 2.1m sidewalk on the site frontage of Steeles Avenue East. The April 2021 update report includes a functional design drawing of the Steeles Avenue East/Dudley Avenue/Dumont Street intersection, illustrating proposed pavement marking with signal installation (including TWSI).

Transportation Engineering

13. The study did not provide any existing queuing observation and queuing analysis at the signalized and unsignalized intersections considered in the study. Queuing analysis should be provided and mitigation measures should be recommended where required.

Response:
The April 2021 update report includes queue analysis of all intersections in the study area.

14. It was noted that existing traffic counts were conducted in July 2018. Seasonal counts may not be reflective of normal conditions since school related traffic is not captured in the summer counts. Please provide a comparison of non-summer count with the summer counts to verify the counts used in the study.

Response:
The April 2021 update report includes review traffic counts from various years and dates, as part of the development of existing base volumes. Through volumes were balanced up or down to meet the observed volumes at Yonge Street / Steeles Avenue (March 2019 counts).

15. The study should include background developments within Markham, specifically along the Yonge Street corridor. Development at 7089 Yonge Street and the proposed Langstaff Gateway Phase 1A should be included as part of background traffic. The City of Toronto and the City of Vaughan should be consulted to verify any background developments within their respective jurisdiction.

Response:
The April 2021 update report includes background traffic allowances for 7089 Yonge Street and Langstaff Gateway Phase 1A.

16. An overall parking rate for the purpose of comparison to other growth centres within Markham should be provided. For example, Markham Centre has a maximum residential rate of 1 parking space per unit. Please note that the City of Markham currently does not accept bedroom-based parking rate requirements. Also, the proposed parking rates should be supported by proxy surveys within the area.

Response:
The April 2021 update report includes supporting documentation for the proposed overall parking rate of 0.74 space / unit for residents, and is supported by proxy surveys for sites located in a similar transportation context.

17. It was indicated in the study that 2 car share spaces are to be provided for Phase 1. Car share is part of the TDM program in support of the proposed parking rates. Note that the City currently does not have any policy on parking reduction based on car-share supply and therefore should not be applied. It is unclear if these car-share spaces are counted towards the parking requirement. Please provide clarification.

Response:
The revised development concept plan illustrates 2 car share spaces.

18. The residential trip generation was based on proxy surveys conducted at three nearby condominium buildings. The City supports the use of proxy surveys to determine trip generation. The study should include the data and confirm that all accesses and on-street related activities are captured.

Response:
The April 2021 update report includes proxy trip generation data.

19. Turn restrictions have already been implemented at several study area intersections to mitigate existing traffic infiltration through the surrounding neighbourhood. The study must address the impacts the proposed development will have on the local road network and provide mitigation measures if required.

Response:
The April 2021 update report considers all existing turn restrictions.

20. As it relates to trip generation and distribution, the following comments are provided:
    - It was assumed in the study that no additional vehicular trips will be generated for the retail component of the development in the morning peak hour. However other retail related ITE trip rates assume some trip generation in the morning. Although the retail trip generation may be minimal it should still be accounted for.
    - As it relates to trip distribution, it is unclear as to why the trip distribution percentage differ significantly between Block 1 and Block 2 for the direction to/from south on Yonge Street (Table 17, Phase 1 - 33%/29% vs Phase 2 - 6%/6%).

Response:
The revised development concept plan does not include a retail component. The April 2021 update report documents revised trip distribution and assignment based on the current development concept plan.

21. The study should consider the changes anticipated by the Yonge Subway Extension project implementation. The proposed development is located in close proximity of the future Steeles Avenue TTC subway station which is part of the Yong Subway Extension. As a result of the portal along Steeles Avenue, the Steeles Avenue/Dudley Avenue-Dumont Street will be restricted to right-in/right-out. The study must fully assess the resulting impacts of prohibiting movements at this intersection and identify opportunities to minimize such impacts.

Response:
The April 2021 update report documents a sensitivity analysis considering the intersection Steeles Avenue/Dudley Avenue/Dumont Street may be restricted to right-in/right-out in the future.

22. There is currently no sidewalks on Dudley Avenue, Willowdale Boulevard or Highland Park Boulevard. It was also noted that the proposed plan does not include any cycling facilities. The study should include a detailed pedestrian and cycling plan to demonstrate how the development will connect with existing and proposed facilities. The proposed plan must include 2.0m sidewalks along Dudley Avenue, Willowdale Boulevard, and Highland Park Boulevard, as well as 3.0m sidewalks along Steeles Avenue, to enhance walkability and ensure direct connection to pedestrian facilities along Steeles Avenue. It is also recommended to provide cycling facilities along Dudley Avenue and signed bike routes on Highland Park Avenue. Please provide a revised site plan illustrating proposed sidewalk and bike lane locations, as well as functional transportation design study for all roads abutting the subject site. The study must include road cross section elements, functional plan, the need for turning lanes at study intersections, and daylight triangles at the intersection of Dudley Avenue and Steeles Avenue.

Response:
The revised development concept plan illustrates minimum 2.1m sidewalks on the Dudley Avenue, Highland Park Boulevard and Steeles Avenue East site frontages. Cycling facilities have not been proposed at this time because they would not provide connectivity beyond the site frontage. Should the application advance, a detailed pedestrian connectivity and cycling facility plan will be provided at the Site Plan Application stage of the process.

The April 2021 update report includes a functional design drawing of the Steeles Avenue East/Dudley Avenue/Dumont Street intersection, illustrating proposed pavement marking with signal installation (including TWSI).

23. The traffic volumes at the driveway opposite of the proposed site access on Dudley Avenue should be documented. The location of the proposed site access on Dudley Avenue with respective to its spacing and alignment with the opposite driveway on the west of Dudley Avenue should also be reviewed in the study to confirm that the spacing requirements are in keeping with the operational requirements.

Response:

The April 2021 update report documents existing traffic volumes at the driveway providing access to the property at 18 Steeles Avenue East relying on review of video recorded on Thursday, July 5, 2018. Based on the relatively low volume of existing traffic volumes at both the existing driveway and the proposed site driveway, as well as maintenance of adequate sight lines, no mitigating measures are warranted. As a matter of fact, a minor misalignment may be preferable in the long term, to mitigate cut-through traffic, if the site driveway is extended to Willowdale Boulevard, should the adjacent site to the east develop in the future.

For Phase 1 – Southwest Block

1.0 Active Transportation Network

24. The City requests a 3.0m wide sidewalk along Steeles Ave within the proposed development. The widen sidewalk will better accommodate and is recommended as pedestrian LOS A is anticipated for the proposed development.

Response:

The revised development concept plan illustrates a 2.1m sidewalk on the site frontage of Steeles Avenue East.

2.0 Bicycle Parking (Long-term & Short-term) and Bike Repair Station

25. The City requests the Applicant to confirm the number of long-term and short-term bicycle parking spaces for Phase 1 as inconsistency is found within the TMP (pg 2, 7, 39).

Response:

The revised development concept plan illustrates a total of 397 bicycle parking spaces, including 274 long-term spaces and 123 short-term spaces.

26. Some of the short-term bicycle parking shall be relocated outside and be placed near the entrances (residential/ retail) of the building. They should be visible and easily accessible with racks that provide a secure point for locking up.

Response:

The revised development concept plan illustrates short-term bicycle parking spaces at-grade.

27. As the long-term bicycle parking are distributed in various area, appropriate signage should be provided to direct residents and visitors. At a minimum, at least one bike parking sign shall be installed at each bike parking area.

Response:

The revised development concept plan illustrates long-term bicycle parking spaces at-grade and on the P1 parking level. A signage plan will be provided at the Site Plan Application stage.

28. Also, the Applicant shall provide at least one bicycle repair station in close proximity to the long-term bicycle parking area. Location of the bicycle repair station should be clearly indicated on site plan for City's review and approval.

Response:

The revised development concept plan illustrates bicycle repair stations in the following locations:

- Three (3) stations are provided in Building 'A' short term bicycle parking room on the ground floor
- One(1) station is provided in Building 'B' long term bicycle parking room on the ground floor
- Two (2) stations are provided in Building 'B' long term bicycle parking room on the P1 level; and
- One (1) sation is provided in Building 'B' short temr bicycle parking room on the ground floor.

3.0 Car-Share Service

29. The City requests further details on the 2 proposed car-share spaces. In order to reduce the demand of vehicle parking and ownership, the City requests the Applicant to provide an on-site car-sharing service to all residents. As part of a comprehensive car-share program, the Applicant shall:
    - Contact a car-share company and securing a letter of intent to obtain on-site vehicles and service for 2 years;
    - Reserve a dedicated car-share vehicle parking spot at grade level so that it is accessible to all users. It shall be also be properly signed to increase visibility;
    - Fully subsidized car-share membership for all residential units for minimum of 2 year;
    - Fully subsidizing unmet minimum revenue to sustain the car-share program for a minimum of 2 years.

Response:

The revised development concept plan illustrates 2 car share spaces. Other comments have been noted for further review.

30. The location of the two designated car-share vehicle parking spot shall be clearly identified on site plan. The letter of credit amount required is to be provided by the Applicant for City's review and approval.

Response:

The revised development concept plan illustrates 2 car share spaces on the P1 level adjacent to the Building B elevator lobby.

4.0 New Resident Information Package & Transit Incentive Program (York Region Development Charge)

31. Under the current York Region Development Charge rate, a part of the fee already includes the transit incentive program and transportation information to new residents upon occupancy. Pre-loaded transit passes and transportation information will be prepared by York Region and York Region Transit.

Response:

Acknowledged.

32. The City requests the Applicant to coordinate and reserve a venue (i.e. meeting room) to host at least two information sessions and assist YR/YRT to promote and deliver these TDM programs to residents upon occupancy.

Response:

Acknowledged.

5.0 Residential Travel Surveys

33. A travel survey, provided by the City, shall be distributed to all residential units at the time of closing by the Applicant. The Applicant shall contact the City of obtain the travel surveys at least 30 days prior to closing date, and collect the surveys from residents upon completion. A follow-up travel survey shall be conducted after two years of full occupancy.

Response:

Acknowledged.

6.0 Unbundled Parking

34. The practice of unbundled parking is an important and standard TDM strategy for medium and high density residential developments in Markham. The City supports this TDM strategy as it allows the option to purchase the residential unit separately from the parking space. This encourages residents to explore alternative transportation options aside from single occupancy driving. As such, the City believes that the implementation of unbundled parking is appropriate and shall be implemented for the proposed development.

Response:

Acknowledged.

7.0 Cost Summary

35. The Owner shall provide the City with a complete list of TDM measures to be implemented for proposed development. The list will become conditions in the site plan agreement, along with a TDM-Letter of Credit (LC) contribution. An appropriate TDM-LC amount should reflect the costs required to develop and implement all the proposed measures.

Response:

The April 2021 update report includes a TDM plan, to be refined further at the Site Plan Application stage.

For Phase 2 – North and East Blocks

36. Detailed and comprehensive TDM Plan for City staff review and approval. The TDM Plan should clearly demonstrate how to reduce the transportation impact of single-occupant vehicles from this proposed development.

Response:

The April 2021 update report includes a TDM plan, to be refined further at the Site Plan Application stage.

CITY OF TORONTO

City Planning

37. A widening of 4.9 metres is required along the Steeles Avenue East frontage of the property to satisfy the requirement of a 36 metre right-of-way.

Response:
The revised development plan illustrates the required conveyance.

38. The sidewalk along Steeles Avenue East should be a minimum of 2.1 m wide and constructed to City of Toronto standards.

Response:
The revised development concept plan illustrates a 2.1m sidewalk on the site frontage of Steeles Avenue East.

YORK REGION

Transportation

39. Transportation Planning in co-ordination with Traffic Signal Operations, Development Engineering and YRT/Viva, have reviewed the OPA application and supporting Transportation Mobility Plan, dated February 26, 2019, prepared by BA Group, and have indicated no objection to the proposed OPA regarding the land use. However, it should be noted that the Region will require that the following policy to be included in the OPA:

    "The proposed development plan will be required to protect and demonstrate that a future vehicular and pedestrian interconnection will be provided to the east. This road will be required to connect as a condition of Site Plan Approval."

    The purpose of this policy is to ensure there is a future vehicular interconnection with lands to the east, and existing access on Steeles Avenue is consolidated and restricted to local roads. This is consistent with ROP policy 7.2.53. Further, the applicant is required to provide a conceptual site plan demonstrating that the proposed development will connect to the lands to the east.

Response:
The revised development concept plan does not include the lands to the east.

40. The TTS analysis was completed with traffic zones surrounding the Finch GO Bus Terminal (Yonge subway). The site is located approximately 1.9 km from the current terminus of the Yonge subway. This assumption does not accurately reflect the Yonge/Steeles area existing conditions, as noted in the report. Traffic zones should be selected outside the walking distance to the subway station.

Response:
The April 2021 update report documents TTS analysis which was completed for traffic zones 446, 447, 459, 2140, 2351, 2352 and 2353. All TTS zones used are located north of Cummer Avenue / Drewry Avenue. The centroid of each TTS zone used in this analysis is located at least 1.0 kilometres north of the nearest entrance to the Finch Station. Therefore, this assumption reflects the existing conditions in the Yonge/Steeles area.

41. A consolidated TDM checklist that summarizes all the programs and measures, estimated costs and responsibility of the applicant to implement TDM recommendations. The checklist based on Table 13 in the Region's Transportation Mobility Guidelines shall include a cost for a physical location to deliver information packages and pre-loaded PRESTO cards to residents (note: this shall not occur at the sales office).

Response:
The April 2021 update report includes a TDM plan, to be refined further at the Site Plan Application stage.

42. Sensitivity analysis Intersection of Steeles Avenue East /Dumont Street - Dudley Avenue. It should be noted that there is an access to the bus terminal planned for the future Steeles subway station along Steeles Avenue, as a result the intersection of Steeles Avenue East/Dumont Street-Dudley Avenue may be restricted to right-in/right-out operation. The transportation study shall be updated to include sensitivity analysis to determine the effects if this intersection is restricted in the future. The sensitivity analysis shall analyze the proposed development with the intersection of Steeles Avenue East/Dumont Street-Dudley Avenue restricted to right-in/right-out movements.

Response:
The April 2021 update report documents the sensitivity analysis.

43. The planning and preliminary engineering program of the Yonge Subway Extension (YSE) is currently underway and is expected to be completed in 2020. Until its completion, the planning and preliminary engineering program is continuously evolving. In addition, the subject site is located within 60m of a TTC structure/ right-of-way. Accordingly, the review of this development proposal is within the TTC purview. For additional information, the applicant should refer to the TTC's Developer's Guide.

    Further, YRRTC's comments must be considered in conjunction with the TTC's development review comments. While the TTC's development review process is independent of YRRTC's process, the applicant must work in consultation with both the TTC and YRRTC to ensure all requirements related to the YSE project are satisfactorily addressed. For general information regarding the YSE project, refer to the following links:

Response:
Acknowledged.

YORK REGION RAPID TRANSIT

A. Yonge Subway Extension (YSE) Stakeholder Coordination

44. The subject site is located within 60m of a TTC structure/ right-of-way. Accordingly, the review of this development proposal is within the Toronto Transit Commission (TTC) purview. For additional information, the applicant should refer to the TTC's Developer's Guide. Further, YRRTC's comments must be considered in conjunction with the TTC's development review comments. While the TTC's development review process is independent of YRRTC's process, the applicant must work in consultation with both the TTC and YRRTC to ensure all requirements related to the YSE project are satisfactorily addressed.

Response:
Acknowledged.

B. Transportation Planning and Urban Design

45. The applicant is proposing a signalized intersection at Yonge Street and Dudley Avenue/ Dumont Street. Median access to the below grade bus terminal will impede a full traffic movement access, and impact the ability for north-south roads to connect across Steeles Avenue East. The applicant is advised to consult with the YSE Project team, York Region, the City of Markham, and the City of Toronto on access and intersection configuration.

Response:
Acknowledged. The April 2021 update report documents analysis with full moves and with a right-in/right-out restriction at the Steeles Avenue East/Dudley Avenue/Dumont Street intersection.

46. The applicant's Traffic Study must address the larger context of the proposed street network, the connection to the future bus terminal on Steeles Avenue, and site traffic movements/volumes; including vehicular and active transportation.

Response:
The connection to the future bus terminal on Steeles Avenue is undefined by Metrolinx at this time and is outside the scope of this study.

47. The applicant is required to revise their Transportation Mobility Plan to include a timeline on the phasing of the proposed development, if any.

Response:
The revised development concept plan does not contemplate phasing.

C. Land Conveyance and Protection

48. As identified in the Council and Ministry of the Environment approved 2009 Environmental Project Report, the applicant must convey, free and clear of all encumbrances, all lands required to construct, operate and maintain the future YSE and bus terminal, including but not limited to road widenings along both the Yonge Street and Steeles Avenue East frontages

Response:
Not applicable.

We trust that this summarizes an appropriate response to the comments at this time.

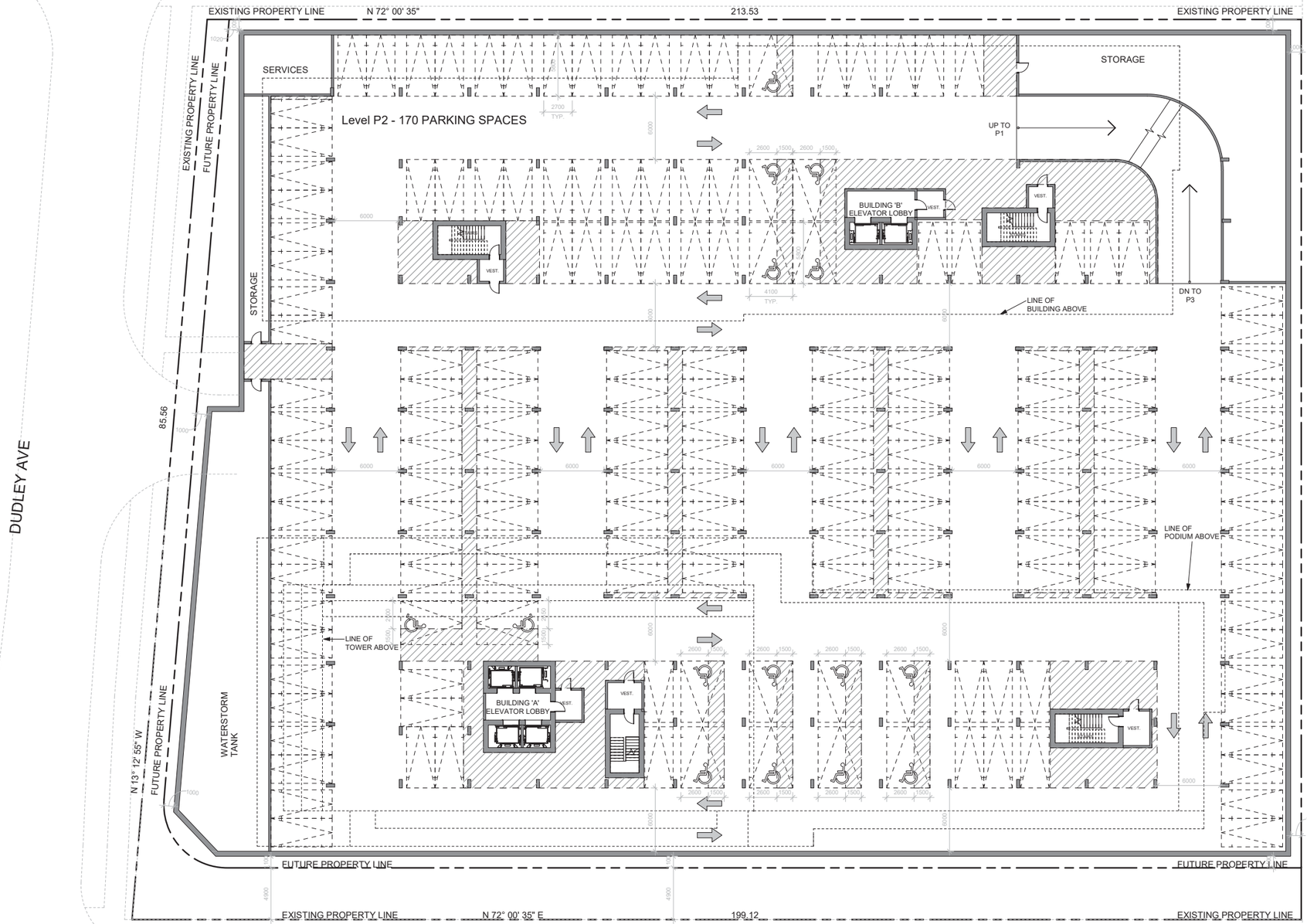
Sincerely,
BA Consulting Group Ltd.

Margaret Briegmann. P.Eng.
Associate

Cc: Ethan Sun, BA Group

APPENDIX B:
Reduced-Scale Architectural Plans

HIGHLAND PARK BLVD



STEELES AVE EAST

Floor Plan - Level P2
1 : 200

2
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Date:

ONTARIO ASSOCIATION OF ARCHITECTS
MARTIN KIRKMAN
LICENCE
3240
SEAL MUST BE SIGNED TO BE VALID

KIRKOR ARCHITECTS AND PLANNERS
20 De Boers Dr. # 400 Toronto ON M3J 0H1
TEL 416 665 6060 kirkorarchitects.com

Revisions:

No.:	Revision:	Date:

No.:	Issued For:	Date:

Drawing Title:

Parking Level - P2, P3

Client:

Zonix Group

Project:

36-48 Steeles Avenue East

36-48 Steeles Avenue East

Scale: 1 : 200

Drawn by: Author

Checked by: Checker

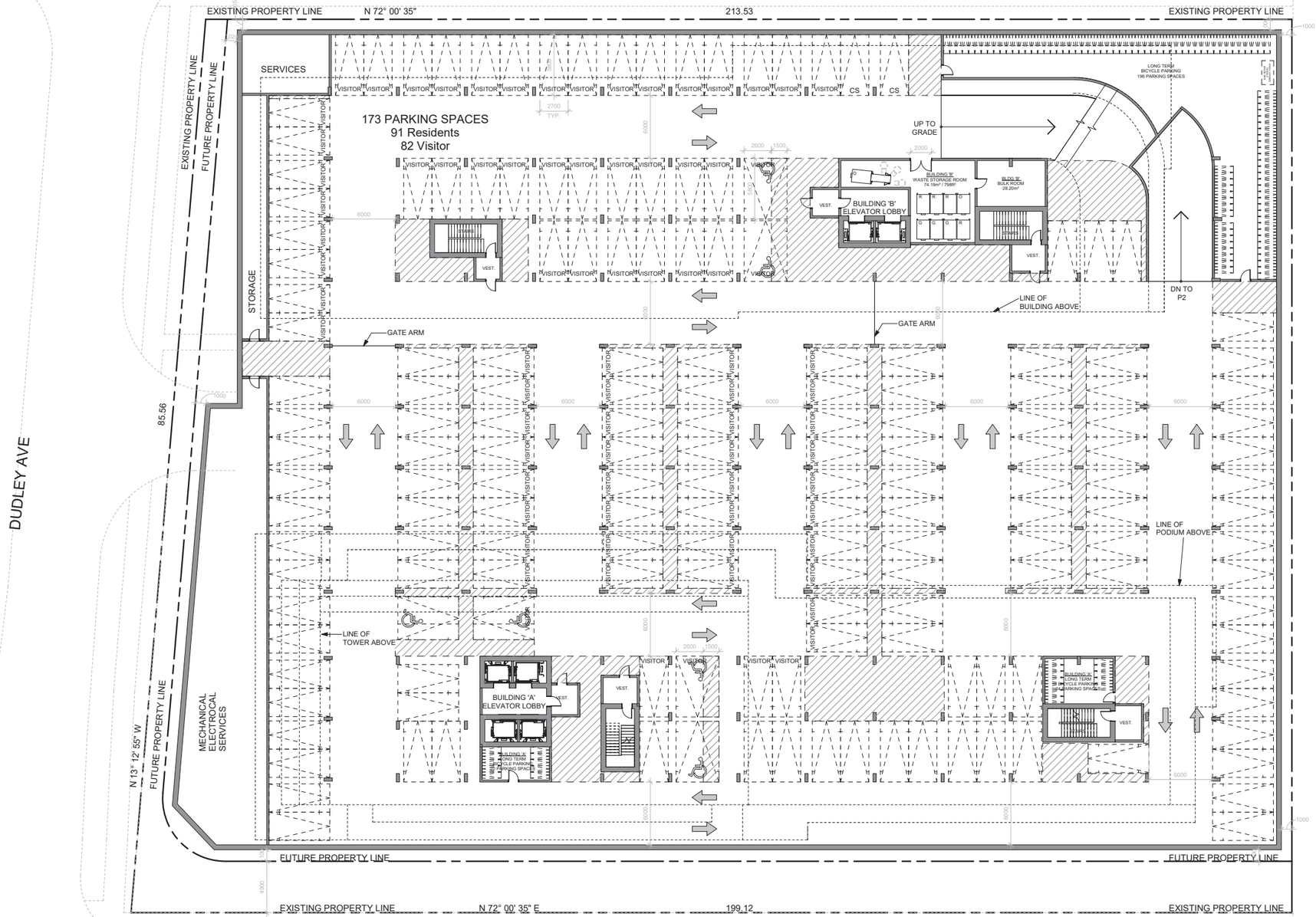
Project No.: 18038

Date: 04/23/21

Drawing No.:

dA2.1

HIGHLAND PARK BLVD



STEELES AVE EAST

Floor Plan - Level P1
1 : 200

1
dA2.2

KIRKOR ARCHITECTS AND PLANNERS
20 De Boers Dr. # 400 Toronto ON M3J 0H1
TEL 416 665 6060 kirkorarchitects.com

Revisions:

No.:	Revision:	Date:

No.:	Issued For:	Date:

Drawing Title:

Parking Level - P1

Client:

Zonix Group

Project:

36-48 Steeles Avenue East

36-48 Steeles Avenue East

Scale: 1 : 200

Drawn by: Author

Checked by: Checker

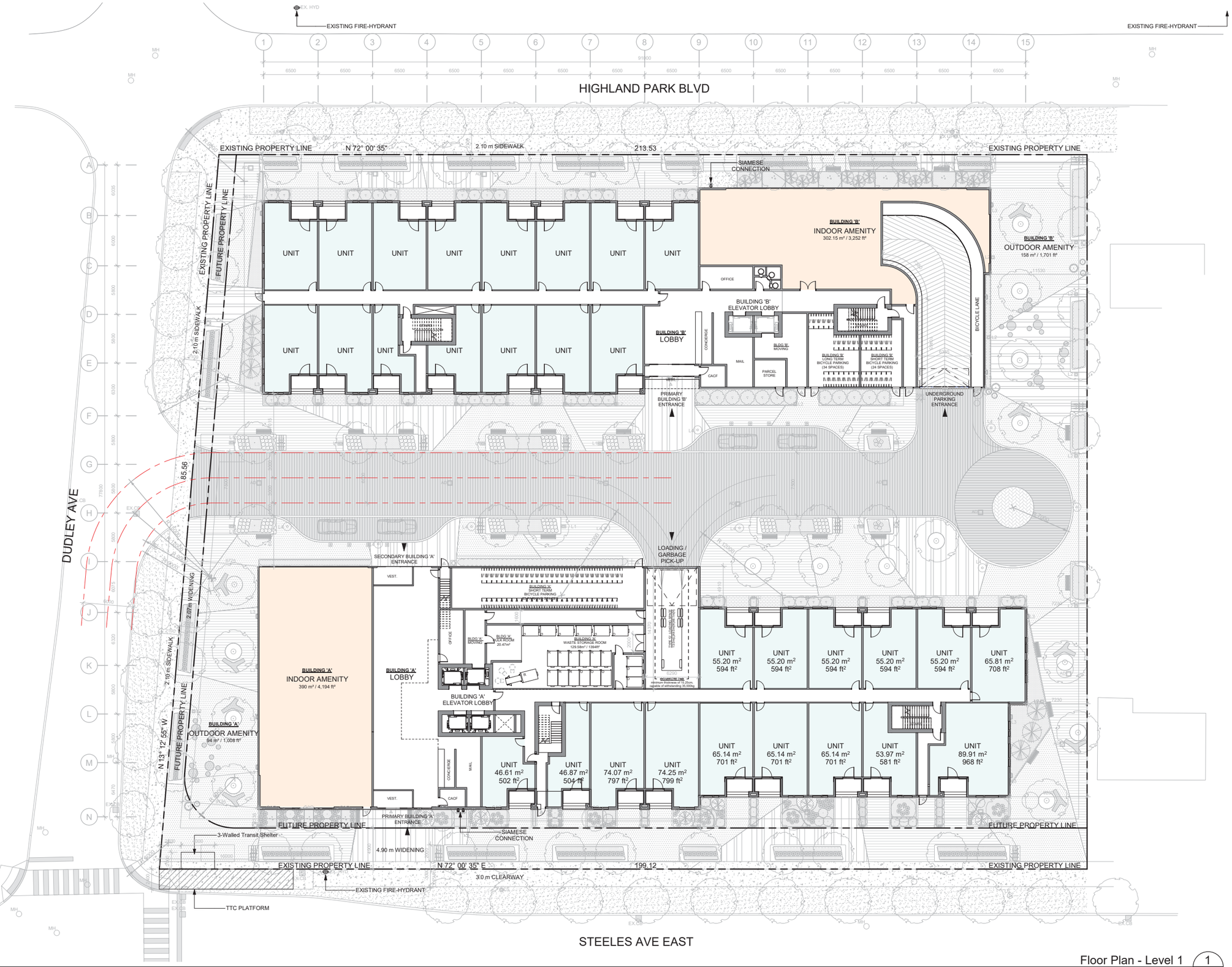
Project No.: 18038

Date: 04/23/21

Drawing No.:

dA2.2

Plot Date: 4/23/2021 9:49:48 AM File Path: C:\Revit\2019\18038-Model-36-48 Steeles Ave E_Rezoning, 26 Storey, 875sqm - April 15, 2021_TToofanian.rvt



Floor Plan - Level 1

1 : 200

1
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Plot Date: 4/23/2021 9:50:21 AM File Path: C:\Revit\2019\18038-Model-36-48 Steeles Ave E_Rezoning, 26 Storey, 875sqm - April 15, 2021_TTaofarian.rvt

Date:

ONTARIO ASSOCIATION OF ARCHITECTS
KIRSTEN KIRKMAN
LICENCE
3240
SEAL MUST BE SIGNED TO BE VALID

KIRKOR ARCHITECTS AND PLANNERS
20 De Boers Dr. # 400 Toronto ON M3J 0H1
TEL 416 665 6060 kirkorarchitects.com

Revisions:

No.:	Revision:	Date:

No.:	Issued For:	Date:

Drawing Title:

Floor Plans - Level 1

Client:

Zonix Group

Project:

36-48 Steeles Avenue East

36-48 Steeles Avenue East

Scale: 1 : 200

Drawn by: Author

Checked by: Checker

Project No.: 18038

Date: 04/23/21

Drawing No.:

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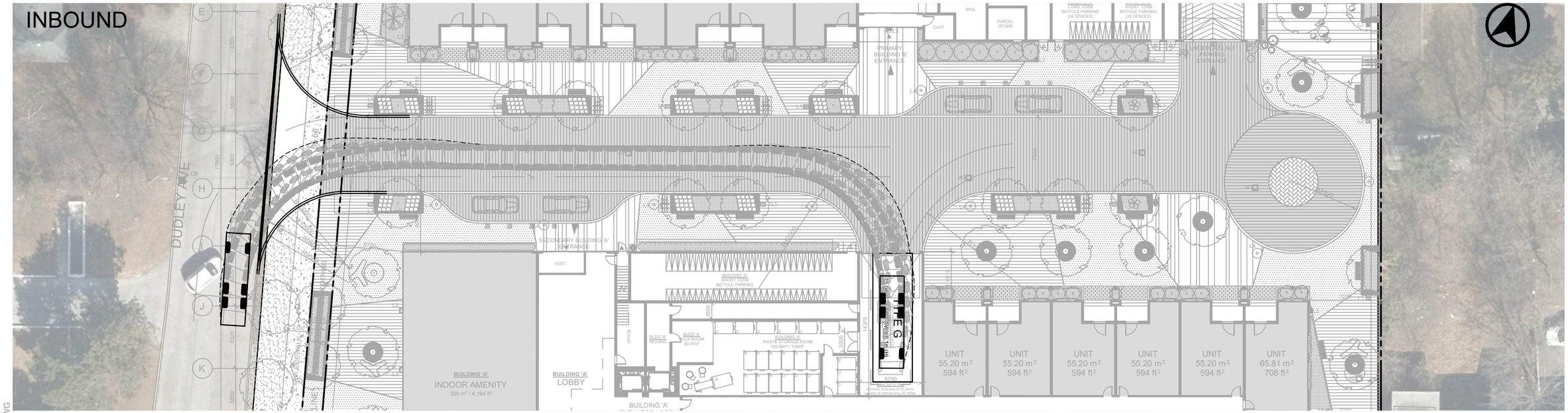
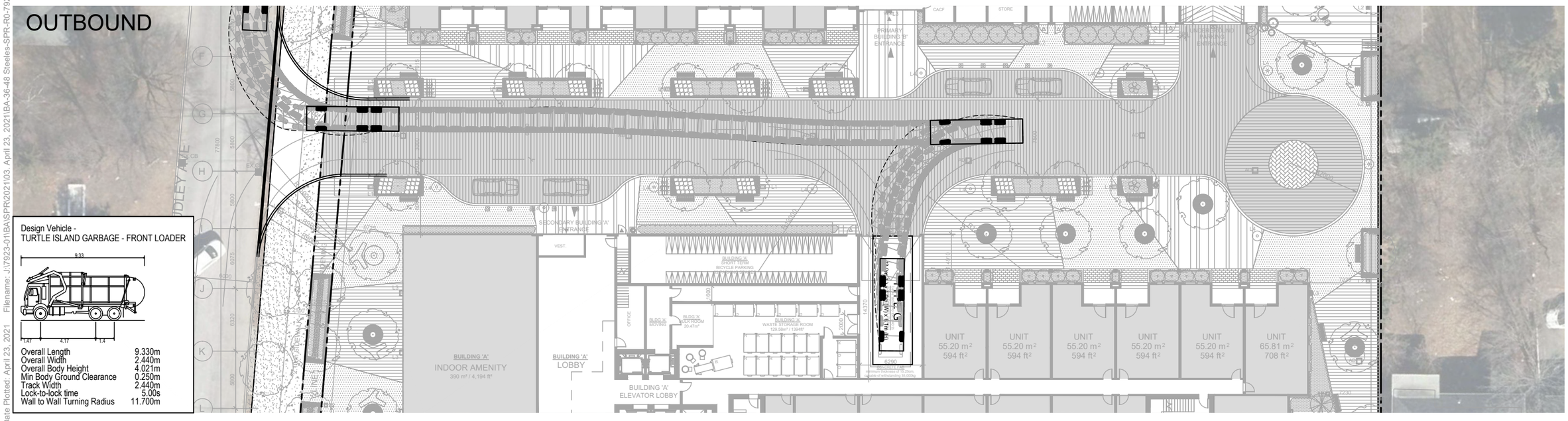
APPENDIX C:
Vehicle Manoeuvring Diagrams

INBOUND



OUTBOUND



Design Vehicle -
TURTLE ISLAND GARBAGE - FRONT LOADER

Overall Length	9.330m
Overall Width	2.440m
Overall Body Height	4.021m
Min Body Ground Clearance	0.250m
Track Width	2.440m
Lock-to-lock time	5.00s
Wall to Wall Turning Radius	11.700m

BA Group

36 - 48 STEELES AVENUE
VEHICLE MANOEUVRING DIAGRAM
TURTLE ISLAND GARBAGE

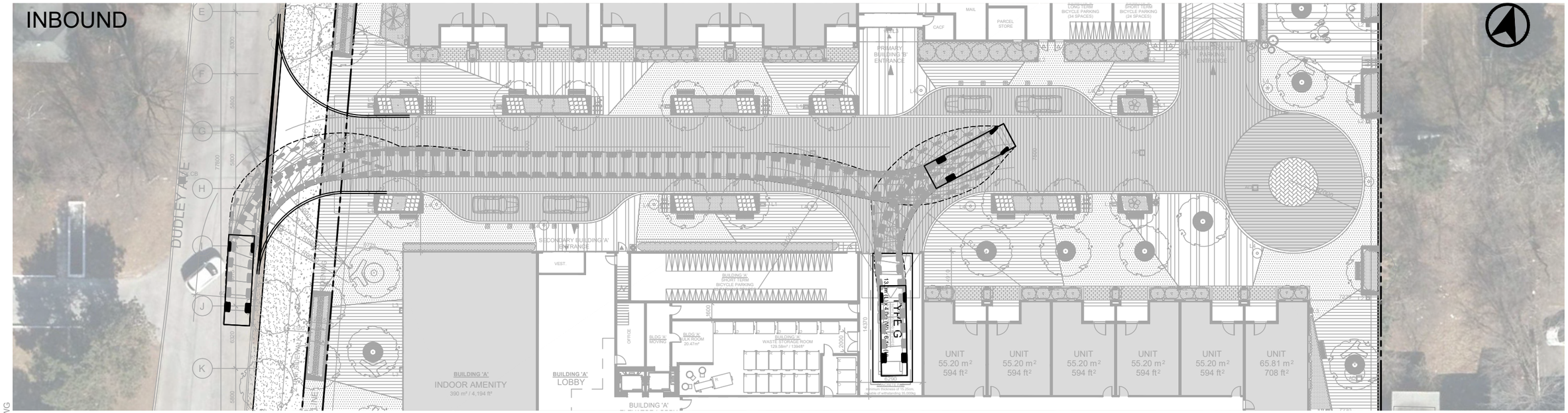
Project:	36-48 STEELES AVE
Project No.	7923-01
Date:	APRIL 23, 2021
Revised:	--

Scale 1:400 — 0 2 4 6 8 10 20m

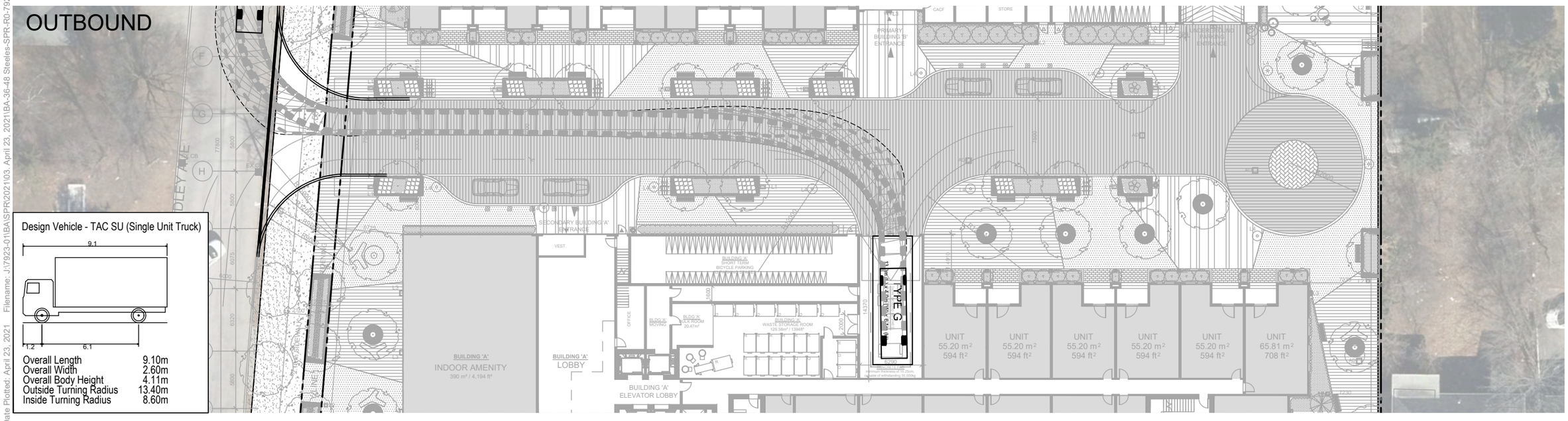
Drawing No. VMD-01

Date Plotted: April 23, 2021 Filename: J:\7923-01\BA\SPR\2021\03_April 23, 2021\BA-36-48 Steeles-SPR-R0-79-23-01.DWG

INBOUND



OUTBOUND



Design Vehicle - TAC SU (Single Unit Truck)

Overall Length	9.10m
Overall Width	2.60m
Overall Body Height	4.11m
Outside Turning Radius	13.40m
Inside Turning Radius	8.60m

BA Group

36 - 48 STEELES AVENUE

VEHICLE MANOEUVRING DIAGRAM
TAC SINGLE UNIT TRUCK

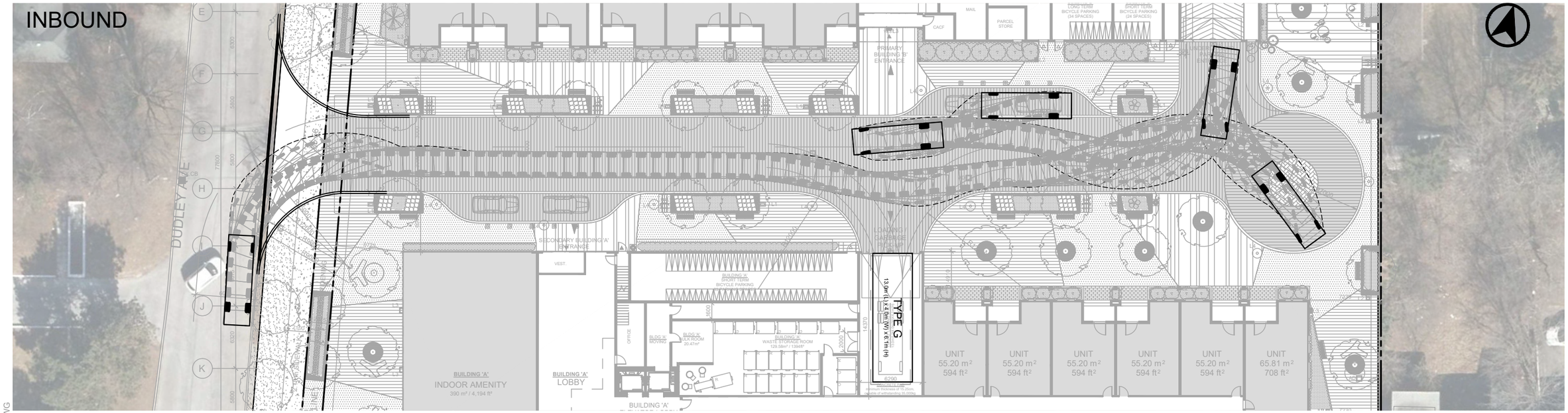
Project:	36-48 STEELES AVE
Project No.	7923-01
Date:	APRIL 23, 2021
Revised:	--

Scale 1:400 (0 2 4 6 8 10 20m)

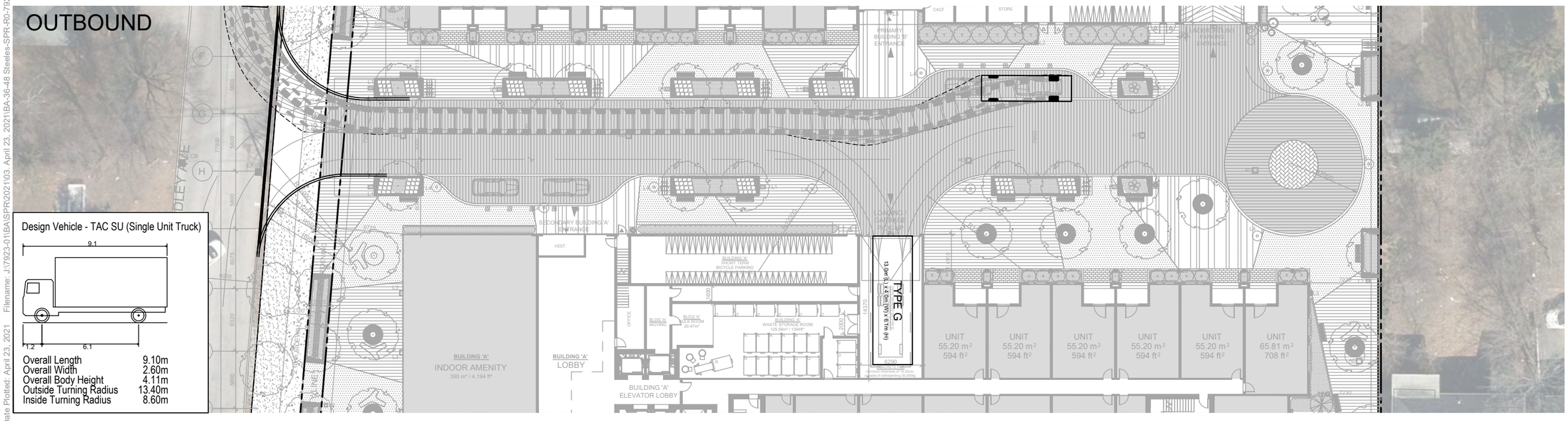
Drawing No. VMD-02A

Date Plotted: April 23, 2021 Filename: J:\7923-01\BA\SPR\2021\03_April 23, 2021\BA-36-48 Steeles-SPR-R0-79-23-01.DWG

INBOUND



OUTBOUND



Design Vehicle - TAC SU (Single Unit Truck)

Overall Length	9.10m
Overall Width	2.60m
Overall Body Height	4.11m
Outside Turning Radius	13.40m
Inside Turning Radius	8.60m

BA Group

36 - 48 STEELES AVENUE

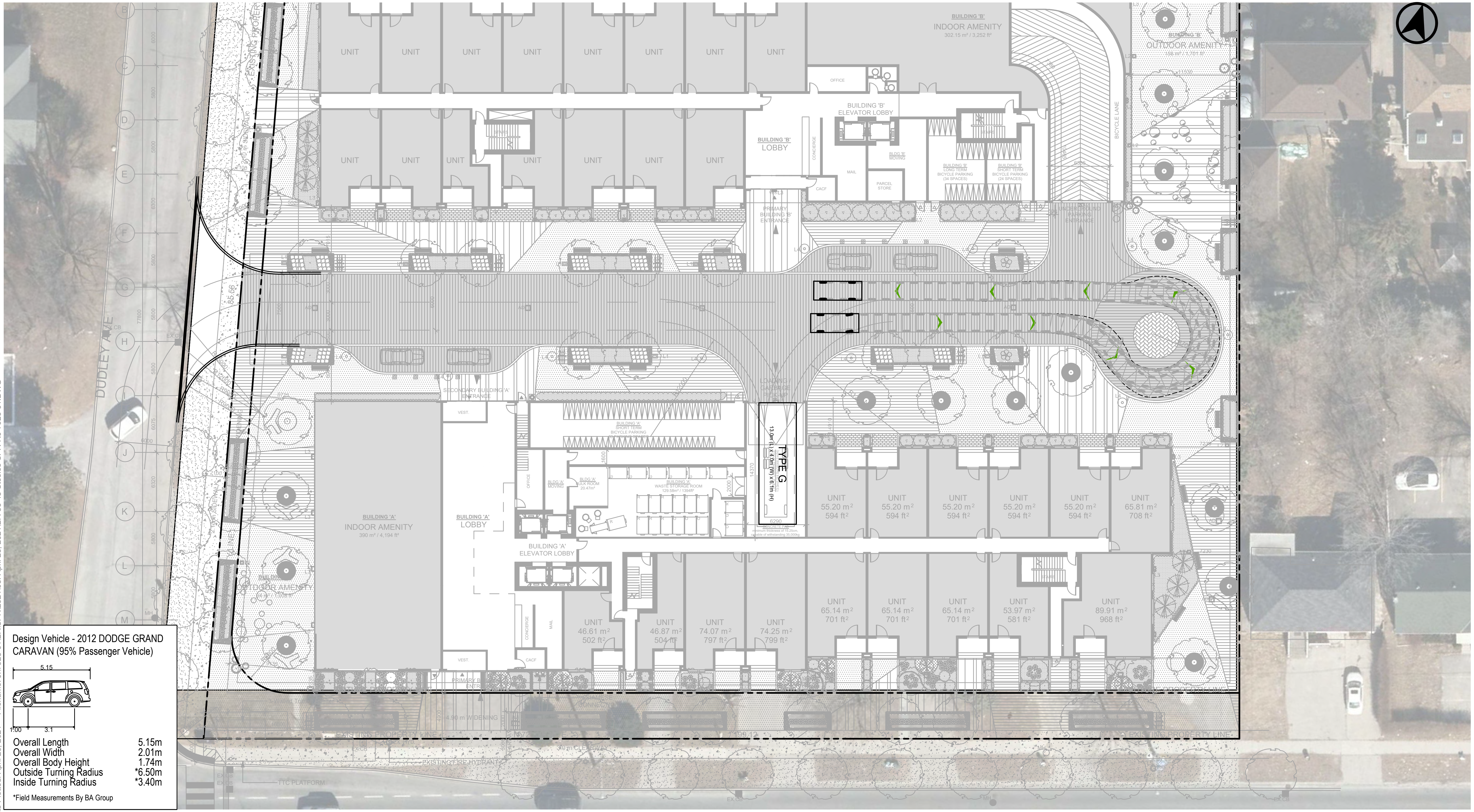
VEHICLE MANOEUVRING DIAGRAM
TAC SINGLE UNIT TRUCK

Project:	36-48 STEELES AVE
Project No.	7923-01
Date:	APRIL 23, 2021
Revised:	--

Scale 1:400 — 0 2 4 6 8 10 20m

Drawing No. VMD-02B

Date Plotted: April 23, 2021 Filename: J:\7923-01\BA\SPR\2021\03_April 23, 2021\BA-36-48 Steeles-SPR-R0-79-23-01.DWG



Date Plotted: April 23, 2021 Filename: J:\7923-01\BA\SPR\2021\03. April 23, 2021\BA-36-48 Steeles-SPR-R0-7923-01.DWG

BA Group

36 - 48 STEELES AVENUE

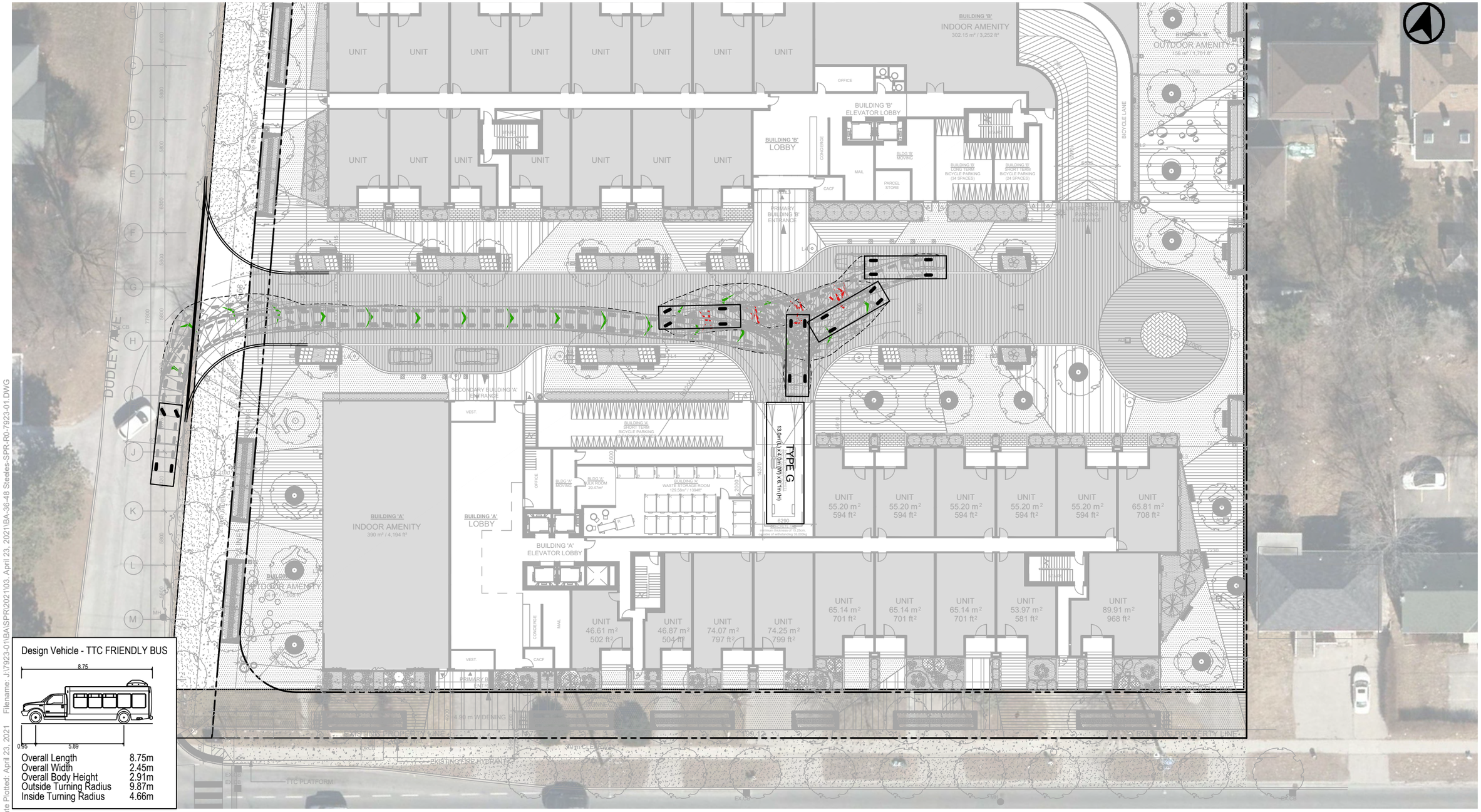
VEHICLE MANOEUVRING DIAGRAM

DODGE GRAND CARAVAN

Project:	36-48 STEELES AVE
Project No.	7923-01
Date:	APRIL 23, 2021
Revised:	--

Scale 1:400 (0 2 4 6 8 10 20m)

Drawing No. VMD-03



Design Vehicle - TTC FRIENDLY BUS

Overall Length	8.75m
Overall Width	2.45m
Overall Body Height	2.91m
Outside Turning Radius	9.87m
Inside Turning Radius	4.66m

Date Plotted: April 23, 2021 Filename: J:\7923-01\BA\SPR2021\03. April 23, 2021\BA-36-48 Steeles-SPR-R0-7923-01.DWG

BA Group

36 - 48 STEELES AVENUE

VEHICLE MANOEUVRING DIAGRAM
TTC FRIENDLY BUS

Project:	36-48 STEELES AVE
Project No.	7923-01
Date:	APRIL 23, 2021
Revised:	--

Scale 1:400 (0 2 4 6 8 10 20m)

Drawing No. VMD-04

APPENDIX D:
Trip Generation Data

Project: Newtonbrook Plaza
Location: Turnberry Condominium
5795 Yonge St, Toronto
Study Date: Friday, November 2, 2007
Study Time: 7:30-9:30 AM, 4-6 PM

Traffic

Period Ending	Right In	Left In	Total In	Right Out	Left Out	Total Out	2-Way	Hourly
7:45	0	0	0	2	2	4	4	
8:00	0	1	1	6	1	7	8	
8:15	3	0	3	3	1	4	7	
8:30	1	0	1	5	1	6	7	26
8:45	1	0	1	5	2	7	8	30
9:00	1	1	2	6	0	6	8	30
9:15	0	2	2	2	0	2	4	27
9:30	0	0	0	8	1	9	9	29
Total	6	4	10	37	8	45	55	
Peak Hour 7:45-8:45	5	1	6	19	5	24	30	
Trip Gen			**0.03**			**0.13**	**0.17**	
16:15	1	0	1	2	1	3	4	
16:30	3	1	4	2	0	2	6	
16:45	4	1	5	1	0	1	6	
17:00	6	5	11	2	1	3	14	30
17:15	3	0	3	7	1	8	11	37
17:30	1	1	2	1	0	1	3	34
17:45	7	6	13	5	0	5	18	46
18:00	5	2	7	2	1	3	10	42
Total	30	16	46	22	4	26	72	
Peak Hour 16:45-17:45	17	12	29	15	2	17	46	
Trip Gen			**0.16**			**0.09**	**0.26**	

Trip Generation based on 179 units.

Project No.: 7923-01
Project Name: Newtonbrook Plaza
Study Location: 5791-5793 Yonge St, Luxe Condo
Municipality: Toronto
Study Date: Thursday June 4 & Saturday June 6, 2015
Study Time: 7:00-9:00am
Study Type: Trip Generation

Thursday June 4, 7:30-9:30 am

END TIME	INBOUND LAYBY PUDO	INBOUND PARKING	INBOUND GARAGE	INBOUND Total	OUTBOUND LAYBY PICKUP	OUTBOUND LAYBY DROPOFF	OUTBOUND GARAGE	OUTBOUND PARKING	OUTBOUND Total	Two Way Total	Hourly
7:15	2	0	0	2	2	0	5	0	7	9	
7:30	0	0	1	1	1	0	6	0	7	8	
7:45	1	1	1	3	1	0	6	0	7	10	
8:00	0	1	3	4	1	0	8	0	8	12	40
8:15	0	2	2	5	0	0	7	1	8	13	44
8:30	3	2	0	5	0	0	14	1	15	20	55
8:45	3	2	0	5	1	0	17	1	21	25	70
9:00	0	1	3	4	3	0	8	2	12	19	77
TOTAL	10	8	14	32	10	0	71	4	85	117	
Peak Hour 8:00-9:00	6	5	10	21	6	0	46	4	56	77	
Trip Generation		**0.05**							**0.14**	**0.20**	

Note: Includes 1 Medium Landscaping Truck arrived between 7:45-8:00 near visitors plus 1 small school bus in PUDO arrived 8:30-8:45 departed 8:45-9:00

Thursday June 4, 4 - 6 pm

END TIME	INBOUND LAYBY PUDO	INBOUND PARKING	INBOUND GARAGE	INBOUND Total	OUTBOUND LAYBY PICKUP	OUTBOUND LAYBY DROPOFF	OUTBOUND GARAGE	OUTBOUND PARKING	OUTBOUND Total	Two Way Total	Hourly
16:15	1	4	2	7	0	0	1	3	4	11	
16:30	0	2	5	7	0	0	3	1	4	11	
16:45	1	2	3	6	2	0	7	1	10	16	
17:00	0	2	6	9	0	0	4	1	5	14	52
17:15	1	1	4	6	1	0	3	0	4	10	51
17:30	3	0	7	10	3	0	5	0	8	18	58
17:45	1	2	1	4	0	0	6	1	7	11	53
18:00	3	0	8	11	0	0	4	0	8	19	58
TOTAL	10	11	39	60	10	0	33	7	50	110	
Peak Hour 17:00-18:00	8	3	20	31	8	0	18	1	27	58	
Trip Generation		**0.08**							**0.07**	**0.15**	

Note: Includes 1 Heavy Truck arrived in PUDO between 4 - 4:15, departed between 4:30-4:45

Saturday June 6, 12 - 3 pm

END TIME	INBOUND LAYBY PUDO	INBOUND PARKING	INBOUND GARAGE	INBOUND Total	OUTBOUND LAYBY PICKUP	OUTBOUND LAYBY DROPOFF	OUTBOUND GARAGE	OUTBOUND PARKING	OUTBOUND Total	Two Way Total	Hourly
12:00	1	3	1	5	0	0	3	0	3	8	
12:15	2	3	3	10	5	0	5	1	11	21	
12:30	0	2	3	5	0	0	7	2	9	14	55
12:45	1	0	4	5	1	0	10	3	14	19	73
13:00	3	3	4	10	3	0	10	3	16	26	76
13:15	1	1	3	5	1	0	5	0	6	11	70
13:30	2	1	5	8	1	0	7	0	8	16	70
13:45	9	0	8	17	11	0	4	0	15	32	88
14:00	2	2	6	10	2	0	7	3	12	22	84
14:15	2	1	4	7	1	0	1	1	4	11	81
14:30	1	1	7	9	1	0	7	1	9	18	83
14:45	1	1	2	4	1	0	2	1	4	8	59
TOTAL	28	20	46	94	28	0	63	17	108	202	
Peak Hour 12:45-13:45	15	7	18	40	16	0	26	6	48	88	
Trip Generation		**0.00**							**0.12**	**0.23**	

Note: Includes 1 Medium Truck arrived before noon

Trip Generation based on 388 Total Units Per ADJ
5791 Yonge - 138 units (http://condos.ca/toronto/luxe-5791-yonge-st)
5793 Yonge - 190 units (http://condos.ca/toronto/luxe-2-5793-yonge-st)

Project No.: 7923-01
Project Name: Newtonbrook Plaza
Study Location: Turnberry Court Condo, 5795 Yonge St
Study Date: Thursday June 4; & Saturday June 6, 2015
Study Time: 7:30-9:30 & 4 - 6 weekday; 12 - 3 pm weekend
Study Type: Trip Generation

Thurs June 4: AM 7:30-9:30

END	INBOUND				OUTBOUND				Two Way	Hourly
	LAYBY		BACK AREA/	Total	LAYBY		BACK AREA/	Total		
TIME	PICKUP	DROPOFF	GARAGE		PICKUP	DROPOFF	GARAGE			
7:15	0	0	0	0	0	0	0	0	0	
7:30	0	0	2	2	0	0	1	1	3	
7:45	0	0	0	0	0	0	8	8	8	
8:00	0	0	2	2	0	0	5	5	7	18
8:15	1	0	0	1	1	0	3	4	5	23
8:30	0	0	1	1	0	0	6	6	7	27
8:45	0	0	2	2	0	0	8	8	10	29
9:00	1	0	1	2	1	0	7	8	10	32
TOTAL	2	0	8	10	2	0	38	40	50	
Peak Hour 8:00-9:00	2	0	4	6	2	0	24	26	32	
Trip Generation				**0.03**				**0.15**	**0.18**	

Thurs June 4: PM 4 - 6

END	INBOUND				OUTBOUND				Two Way	Hourly
	LAYBY		BACK AREA/	Total	LAYBY		BACK AREA/	Total		
TIME	PICKUP	DROPOFF	GARAGE		PICKUP	DROPOFF	GARAGE			
16:15	0	1	5	6	0	1	1	2	8	
16:30	0	1	2	3	0	0	4	4	7	
16:45	0	1	4	5	0	2	7	9	14	
17:00	0	3	3	6	0	3	1	4	10	39
17:15	0	0	3	3	0	0	4	4	7	38
17:30	0	0	3	3	0	0	4	4	7	38
17:45	0	0	3	3	0	0	2	2	5	29
18:00	0	0	1	1	0	0	3	3	4	23
TOTAL	0	6	24	30	0	6	26	32	62	
Peak Hour 16:00-17:00	0	6	14	20	0	6	13	19	39	
Trip Generation				**0.12**				**0.11**	**0.23**	

Sat June 6: 12 - 3 pm

END	INBOUND				OUTBOUND				Two Way	Hourly
	LAYBY		BACK AREA/	Total	LAYBY		BACK AREA/	Total		
TIME	PICKUP	DROPOFF	GARAGE		PICKUP	DROPOFF	GARAGE			
12:15	0	1	1	2	0	1	2	3	5	
12:30	1	0	5	6	0	0	2	2	8	
12:45	2	0	2	4	2	0	3	5	9	
13:00	1	0	2	3	1	0	4	5	8	30
13:15	1	2	3	6	1	2	1	4	10	35
13:30	1	0	1	2	1	0	2	3	5	32
13:45	1	0	2	3	0	0	6	6	9	32
14:00	1	0	6	7	1	0	6	7	14	38
14:15	0	0	2	2	1	0	1	2	4	32
14:30	1	0	1	2	1	0	2	3	5	32
14:45	1	0	3	4	1	0	0	1	5	28
15:00	2	0	0	2	0	0	0	0	2	16
TOTAL	12	3	28	43	9	3	29	41	84	
Peak Hour 13:00-14:00	4	2	12	18	3	2	15	20	38	
Trip Generation				**0.10**				**0.12**	**0.22**	

Trip Generation based on 173 Total Units per Website

Project No.: 7923-01
Project Name: Atlantis
Location: World on Yonge
Municipality: Markham
Study Date: Tuesday, December 4, 2018
Study Time: 7:00-10:00 am, 3:30 -6:30 pm

Residential Traffic Only

Period Ending	In	Out	2-Way Total	Hourly Total
7:15	1	25	26	
7:30	0	30	30	
7:45	6	48	54	
8:00	5	32	37	147
8:15	3	34	37	158
8:30	0	55	55	183
8:45	10	55	65	194
9:00	13	40	53	210
9:15	15	39	54	227
9:30	7	36	43	215
9:45	8	44	52	202
10:00	5	22	27	176
Total	73	460	533	
Peak Hour 8:15-9:15	38	189	227	
Trip Gen	0.03	0.15	0.18	
15:45	6	5	11	
16:00	15	15	30	
16:15	16	11	27	
16:30	30	15	45	113
16:45	28	12	40	142
17:00	27	12	39	151
17:15	25	6	31	155
17:30	24	15	39	149
17:45	57	21	78	187
18:00	42	19	61	209
18:15	43	13	56	234
18:30	38	7	45	240
Total	351	151	502	
Peak Hour 17:30-18:30	180	60	240	
Trip Gen	0.14	0.05	0.19	

Total Units 1250

Project No.: 7923-01
Project Name: Atlantis (Steeles)
Location: Luxe Condominiums I & II, 5791 & 5793 Yonge Street
Municipality: Toronto
Study Date: Tuesday, November 6, 2018
Study Time: 7:30 -9:30 am, 4-6 pm

Residential Traffic

Rear Parking Lot Access

Period	Inbound			Outbound			2-Way	Hourly	Bicycles			Loading Vehicles		
Ending	Residents	PUDO	Total	Residents	PUDO	Total	Total	Total	In	Out	2-Way	In	Out	2-Way
7:45	2	2	4	14	0	14	18		0	0	0	0	0	0
8:00	2	2	4	18	0	18	22		0	0	0	0	0	0
8:15	1	0	1	12	0	12	13		0	1	1	0	0	0
8:30	0	1	1	15	0	15	16	69	0	0	0	0	0	0
8:45	2	1	3	5	0	5	8	59	0	0	0	0	0	0
9:00	2	1	3	8	0	8	11	48	0	0	0	0	0	0
9:15	3	1	4	8	0	8	12	47	0	0	0	0	0	0
9:30	2	1	3	8	0	8	11	42	0	1	1	0	0	0
Total	14	9	23	88	0	88	111		0	2	2	0	0	0
Peak Hour 7:30-8:30	5	5	10	59	0	59	69		0	1	1	0	0	0
Trip Gen	0.01	0.01	0.03	0.15	0.00	0.15	0.17							
16:15	6	1	7	1	0	1	8		0	0	0	1	0	1
16:30	5	3	8	4	0	4	12		0	0	0	0	0	0
16:45	6	1	7	4	0	4	11		0	0	0	0	0	0
17:00	11	4	15	6	0	6	21	52	0	0	0	0	0	0
17:15	10	1	11	9	0	9	20	64	0	0	0	0	0	0
17:30	8	2	10	3	0	3	13	65	0	0	0	0	0	0
17:45	11	2	13	7	0	7	20	74	0	0	0	0	0	0
18:00	9	1	10	4	0	4	14	67	0	0	0	0	0	0
Total	66	15	81	38	0	38	119		0	0	0	1	0	1
Peak Hour 16:45-17:45	40	9	49	25	0	25	74		0	0	0	0	0	0
Trip Gen	0.10	0.02	0.12	0.06	0.00	0.06	0.19							

Luxe Condominiums:
5791 Yonge St 198
5793 Yonge St 198
Total Units 396

Project No.: 7923-01
Project Name: Atlantis (Steeles)
Location: Luxe Condominiums I & II, 5791 & 5793 Yonge Street
Municipality: Toronto
Study Date: Tuesday, November 6, 2018
Time: 7:30 -9:30 am, 4-6 pm

Pedestrians - Yonge St Access

Period	Inbound					Outbound					2-Way	Hourly
Ending	TTC	Walk	PUDO	Cyclists	Total	TTC	Walk	PUDO	Cyclists	Total	Total	Total
7:45	0	2	0	0	2	0	11	0	0	11	13	
8:00	0	1	0	0	1	0	20	0	0	20	21	
8:15	0	1	0	0	1	0	32	0	0	32	33	
8:30	0	4	0	0	4	0	24	0	0	24	28	95
8:45	0	4	0	0	4	0	30	0	0	30	34	116
9:00	0	2	0	0	2	0	15	0	1	16	18	113
9:15	0	1	0	0	1	0	10	0	0	10	11	91
9:30	0	2	0	0	2	0	13	0	0	13	15	78
Total	0	17	0	0	17	0	155	0	1	156	173	
Peak Hour 7:45-8:45	0	10	0	0	10	0	106	0	0	106	116	
16:15	0	15	0	0	15	0	10	0	0	10	25	
16:30	0	7	0	0	7	0	4	0	0	4	11	
16:45	0	16	0	0	16	0	1	0	0	1	17	
17:00	0	12	0	0	12	0	3	0	0	3	15	68
17:15	0	11	0	0	11	0	7	0	0	7	18	61
17:30	0	14	0	0	14	0	6	0	0	6	20	70
17:45	0	17	0	0	17	0	5	0	0	5	22	75
18:00	0	14	0	0	14	0	9	0	0	9	23	83
Total	0	106	0	0	106	0	45	0	0	45	151	
Peak Hour 17:00-18:00	0	56	0	0	56	0	27	0	0	27	83	

Luxe Condominiums:
5791 Yonge St 198
5793 Yonge St 198
Total Units 396

Project No.: 7923-01
Project Name: Atlantis (Steeles)
Location: Turnberry Court Condominiums, 5795 Yonge St
Municipality: Toronto
Study Date: Tuesday, November 6, 2018
Study Time: 7:30 -9:30 am, 4:00-5:15 pm

Traffic

	Inbound				Outbound				2-Way	Hourly	Bicycles			Loading Vehicles		
Period Ending	Residents	Visitors	PUDO	Total	Residents	Visitors	PUDO	Total	Total	Total	In	Out	2-Way	In	Out	2-Way
7:45	0	0	2	2	2	0	3	5	7		0	0	0	0	0	0
8:00	1	0	0	1	5	1	1	7	8		0	0	0	0	0	0
8:15	1	0	1	2	9	0	1	10	12		0	0	0	0	0	0
8:30	0	0	1	1	9	0	1	10	11	38	0	0	0	0	0	0
8:45	2	0	1	3	6	0	1	7	10	41	0	0	0	0	0	0
9:00	1	3	1	5	9	0	1	10	15	48	0	0	0	0	0	0
9:15	4	0	0	4	2	0	0	2	6	42	0	0	0	0	0	0
9:30	2	0	1	3	4	0	1	5	8	39	0	0	0	0	0	0
Total	11	3	7	21	46	1	9	56	77		0	0	0	0	0	0
Peak Hour 8:00-9:00	4	3	4	11	33	0	4	37	48		0	0	0	0	0	0
Trip Gen	0.02	0.02	0.02	0.06	0.19	0.00	0.02	0.22	0.28							
16:15	1	0	0	1	3	1	0	4	5		0	0	0	0	0	0
16:30	2	3	1	6	1	1	1	3	9		0	0	0	0	0	0
16:45	1	1	0	2	1	1	0	2	4		0	0	0	1	1	2
17:00	1	0	1	2	2	1	1	4	6	24	0	0	0	0	0	0
17:15	2	0	2	4	0	1	2	3	7	26	0	0	0	0	0	0
Total	7	4	4	15	7	5	4	16	31		0	0	0	1	1	2
Peak Hour 16:15-17:15	6	4	4	14	4	4	4	12	26		0	0	0	1	1	2
Trip Gen	0.04	0.02	0.02	0.08	0.02	0.02	0.02	0.07	0.15							

Total Units 170

Project No.: 7923-01
Project Name: Atlantis (Steeles)
Location: Turnberry Court Condominiums, 5795 Yonge St
Municipality: Toronto
Study Date: Tuesday, November 6, 2018
Time: 7:30 -9:30 am, 4:00-5:15 pm

Pedestrians

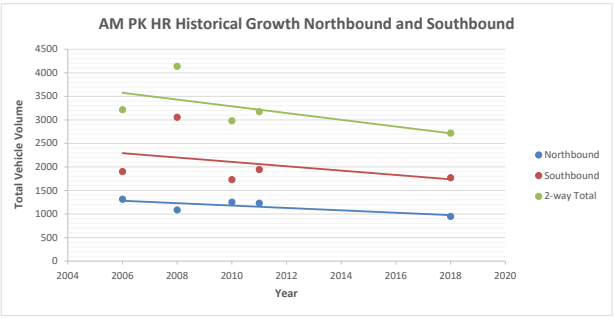
	Inbound			Outbound			2-Way	Hourly
Period Ending	Front Doors	Rear Doors	Total	Front Doors	Rear Doors	Total	Total	Total
7:45	0	0	0	0	0	0	0	
8:00	0	0	0	0	0	0	0	
8:15	0	0	0	4	1	5	5	
8:30	3	0	3	6	0	6	9	14
8:45	1	0	1	4	0	4	5	19
9:00	0	0	0	1	0	1	1	20
9:15	0	0	0	1	0	1	1	16
9:30	1	0	1	0	0	0	1	8
Total	5	0	5	16	1	17	22	
Peak Hour 8:00-9:00	4	0	4	15	1	16	20	
16:15	3	0	3	3	0	3	6	
16:30	1	0	1	0	0	0	1	
16:45	3	0	3	3	0	3	6	
17:00	3	0	3	3	0	3	6	19
17:15	6	0	6	2	0	2	8	21
Total	16	0	16	11	0	11	27	
Peak Hour 16:15-17:15	13	0	13	8	0	8	21	

Total Units 170

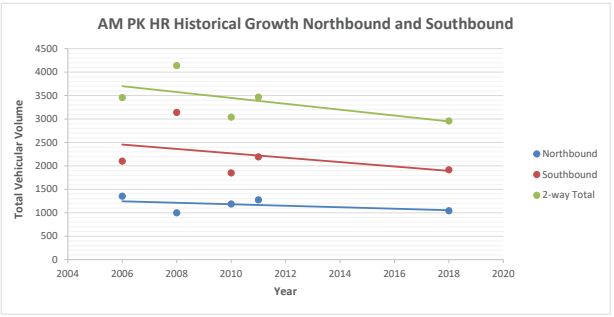
APPENDIX E:
Corridor Growth Analysis

Project: 36-48 Steeles Ave
Project ID: 7923-01
Intersection: Yonge / Steeles
Peak Hour: AM

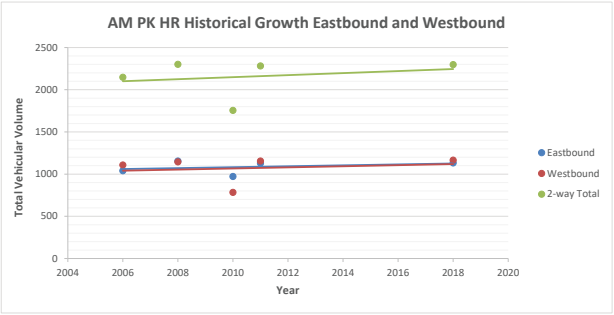
Count Information		North of Yonge / Steeles		
Date	Year	Northbound	Southbound	2-way
Tue, Dec 6	2011	1230	1944	3174
Fri, Oct 1	2010	1250	1730	2980
Thu, Jun 26	2008	1084	3054	4138
Thu, Jul 5	2018	947	1770	2717
Thu, Dec 21	2006	1314	1901	3215
Trend Point		1154.84	2061.30	3216.14
Slope		-25.40	-46.24	-71.64
Growth		**-2.20%**	**-2.24%**	**-2.23%**



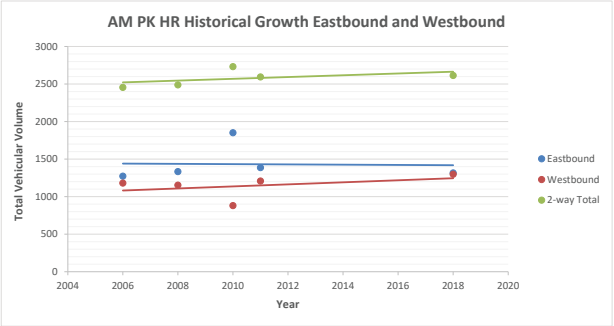
Count Information		South of Yonge / Steeles		
Date	Year	Northbound	Southbound	2-way
Tue, Dec 6	2011	1274	2193	3467
Fri, Oct 1	2010	1189	1851	3040
Thu, Jun 26	2008	1000	3140	4140
Thu, Jul 5	2018	1043	1915	2958
Thu, Dec 21	2006	1355	2101	3456
Trend Point		1165.86	2221.29	3387.15
Slope		-15.85	-46.77	-62.62
Growth		**-1.36%**	**-2.11%**	**-1.85%**



Count Information		East of Yonge / Steeles		
Date	Year	Eastbound	Westbound	2-way
Tue, Dec 6	2011	1128	1154	2282
Fri, Oct 1	2010	972	783	1755
Thu, Jun 26	2008	1155	1145	2300
Thu, Jul 5	2018	1132	1165	2297
Thu, Dec 21	2006	1040	1107	2147
Trend Point		1087.60	1073.41	2161.01
Slope		5.50	6.53	12.04
Growth		**0.51%**	**0.61%**	**0.56%**

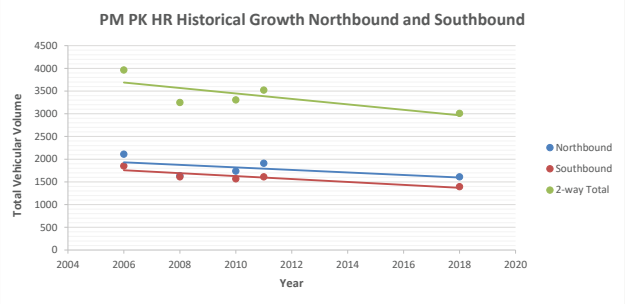


Count Information		West of Yonge / Steeles		
Date	Year	Eastbound	Westbound	2-way
Tue, Dec 6	2011	1387	1208	2595
Fri, Oct 1	2010	1851	880	2731
Thu, Jun 26	2008	1334	1154	2488
Thu, Jul 5	2018	1315	1299	2614
Thu, Dec 21	2006	1273	1181	2454
Trend Point		1431.28	1149.86	2581.14
Slope		-1.79	13.64	11.85
Growth		**-0.13%**	**1.19%**	**0.46%**

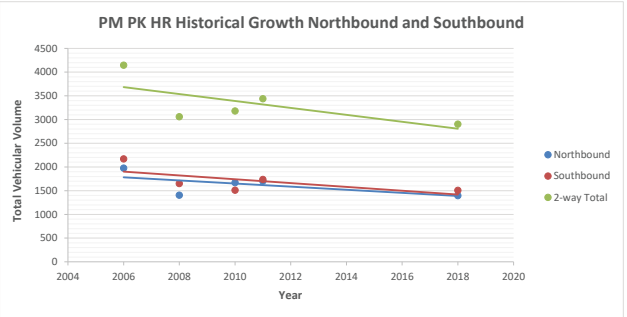


Project: 36-48 Steeles Ave
Project ID: 7923-01
Intersection: Yonge / Steeles
Peak Hour: PM

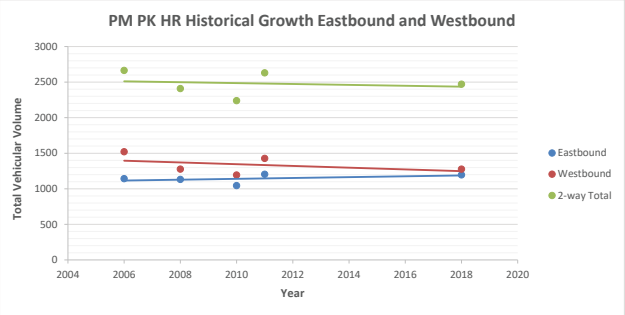
Count Information		North of Yonge / Steeles		
Date	Year	Northbound	Southbound	2-way
Tue, Dec 6	2011	1912	1612	3524
Fri, Oct 1	2010	1738	1570	3308
Thu, Jun 26	2008	1638	1612	3250
Thu, Jul 5	2018	1613	1396	3009
Thu, Dec 21	2006	2113	1853	3966
Trend Point		1791.64	1595.71	3387.35
Slope		-27.89	-32.23	-60.12
Growth		**-1.56%**	**-2.02%**	**-1.77%**



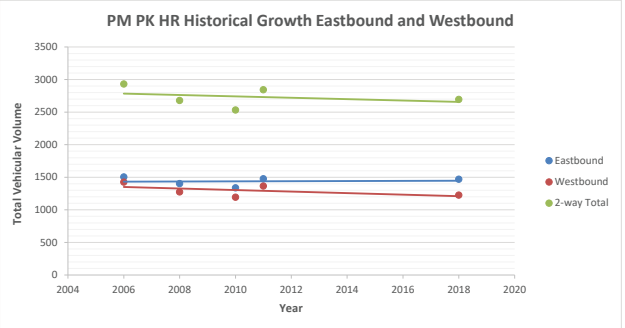
Count Information		South of Yonge / Steeles		
Date	Year	Northbound	Southbound	2-way
Tue, Dec 6	2011	1703	1737	3440
Fri, Oct 1	2010	1670	1513	3183
Thu, Jun 26	2008	1408	1653	3061
Thu, Jul 5	2018	1398	1507	2905
Thu, Dec 21	2006	1976	2173	4149
Trend Point		1617.89	1700.47	3318.37
Slope		-32.76	-40.32	-73.09
Growth		**-2.03%**	**-2.37%**	**-2.20%**



Count Information		East of Yonge / Steeles		
Date	Year	Eastbound	Westbound	2-way
Tue, Dec 6	2011	1204	1426	2630
Fri, Oct 1	2010	1044	1194	2238
Thu, Jun 26	2008	1132	1276	2408
Thu, Jul 5	2018	1195	1276	2471
Thu, Dec 21	2006	1143	1521	2664
Trend Point		1145.99	1333.71	2479.70
Slope		5.98	-12.23	-6.26
Growth		**0.52%**	**-0.92%**	**-0.25%**

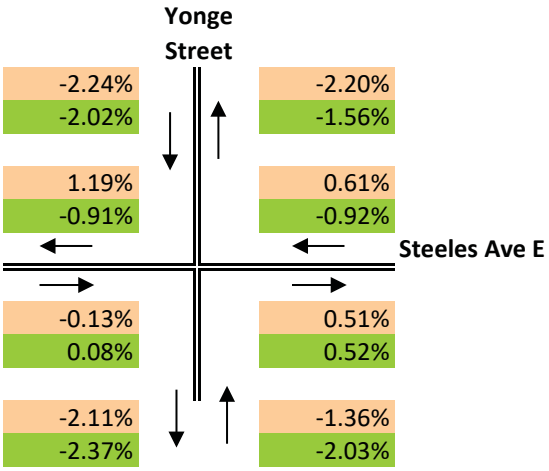


Count Information		West of Yonge / Steeles		
Date	Year	Eastbound	Westbound	2-way
Tue, Dec 6	2011	1477	1365	2842
Fri, Oct 1	2010	1337	1194	2531
Thu, Jun 26	2008	1402	1275	2677
Thu, Jul 5	2018	1470	1225	2695
Thu, Dec 21	2006	1505	1426	2931
Trend Point		1438.67	1292.29	2730.96
Slope		1.18	-11.78	-10.60
Growth		**0.08%**	**-0.91%**	**-0.39%**



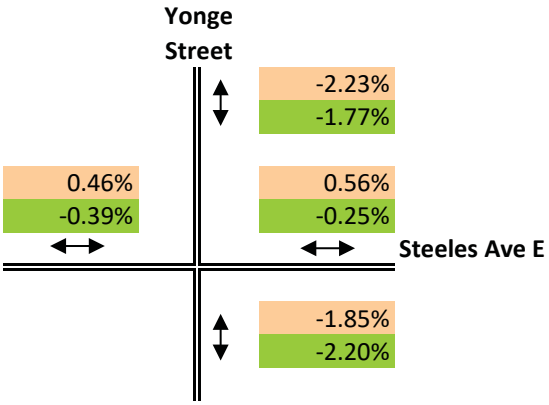
Background Traffic Growth Rates

AM
PM



Background Traffic Growth Rates (2-way)

AM
PM



APPENDIX F:
Transportation Tomorrow Survey Data

Wed Nov 07 2018 17:07:20 GMT-0500 (Eastern Standard Time) - Run Time: 2603ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of destination - pd_dest
Column: 2006 GTA zone of origin - gta06_orig

Filters:
(Start time of trip - start_time In 600-859
and
Trip purpose of origin - purp_orig In H,
and
Primary travel mode of trip - mode_prime In D, M, P, T, U,
and
2006 GTA zone of origin - gta06_orig In 446,447,459,2140,2351,2352,2353,)

Trip 2016
Table:

	446	447	459	2140	2351	2352	2353	Total
PD 1 of Toronto	0	86	14	0	39	16	140	295
PD 2 of Toronto	0	0	0	0	0	0	16	16
PD 3 of Toronto	0	38	38	0	0	61	7	144
PD 4 of Toronto	12	71	74	0	19	0	0	176
PD 5 of Toronto	21	0	94	0	69	0	27	211
PD 6 of Toronto	0	36	11	0	0	0	0	47
PD 8 of Toronto	0	0	0	0	19	0	0	19
PD 9 of Toronto	34	36	0	0	39	0	0	109
PD 10 of Toronto	16	0	32	0	15	197	48	308
PD 11 of Toronto	348	118	379	45	158	102	72	1222
423	0	0	20	0	0	0	0	20
427	90	0	0	0	0	0	0	90
430	0	0	11	0	0	0	19	30
433	32	0	0	0	0	0	0	32
434	174	0	0	0	0	0	0	174
436	0	0	0	0	0	0	15	15
440	0	0	0	0	19	0	0	19
443	0	25	33	14	11	25	0	108
446	0	0	0	0	96	0	0	96
447	0	0	38	0	0	0	0	38
448	0	0	58	0	0	0	0	58
452	52	0	45	31	0	0	0	128
453	0	56	88	0	33	0	0	177
454	0	0	0	0	0	0	19	19
456	0	11	0	0	0	0	0	11
459	0	0	0	0	0	62	0	62
461	0	27	73	0	0	0	0	100
463	0	0	14	0	0	15	0	29
465	0	0	0	0	0	0	21	21
PD 12 of Toronto	74	0	128	0	0	0	10	212
PD 13 of Toronto	0	0	22	0	0	0	0	22
PD 14 of Toronto	0	0	38	0	0	0	19	57
PD 15 of Toronto	16	0	33	0	0	0	0	49
PD 16 of Toronto	0	77	0	0	18	17	0	112
Newmarket	0	0	0	0	39	0	0	39
Aurora	17	0	23	0	0	0	0	40
Richmond Hill	36	14	44	0	46	0	49	189
Markham	77	203	46	20	37	206	200	789
Vaughan	16	0	24	40	45	64	19	208
2026	0	0	24	0	0	0	0	24
2069	16	0	0	0	0	0	0	16
2119	0	0	0	0	45	0	0	45
2122	0	0	0	0	0	25	0	25
2126	0	0	0	0	0	0	19	19
2128	0	0	0	0	0	17	0	17
2141	0	0	0	40	0	0	0	40
2142	0	0	0	0	0	22	0	22
2351	0	0	0	0	21	22	47	90
2353	0	0	23	0	0	0	45	68
2357	0	0	0	0	16	0	0	16
2363	0	0	0	0	0	0	12	12
2364	43	0	24	0	0	0	37	104
2365	0	38	0	0	0	0	0	38
2367	0	0	0	20	0	62	0	82
2370	0	21	0	0	0	61	0	82
2374	0	0	0	0	0	0	35	35
2386	0	20	0	0	0	0	0	20
2393	0	77	0	0	0	0	0	77
2405	0	0	0	0	0	61	0	61
2407	0	0	0	0	0	0	23	23
2431	0	47	0	0	0	0	0	47
2449	34	0	0	0	0	0	0	34
Caledon	0	0	27	0	0	0	0	27
Brampton	0	0	0	0	16	0	0	16
Mississauga	0	0	27	0	58	22	107	214
Hamilton	0	0	0	0	0	19	0	19
Innisfil	0	0	34	0	0	61	0	95

Wed Nov 07 2018 17:06:20 GMT-0500 (Eastern Standard Time) - Run Time: 2518ms

Cross Tabulation Query Form - Trip - 2016 v1.1

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

Filters:
(Start time of trip - start_time In 600-859
and
Trip purpose of origin - purp_orig In H,
and
Primary travel mode of trip - mode_prime In D, M, P, T, U,
and
2006 GTA zone of origin - gta06_orig In 446,447,459,2140,2351,2352,2353,
and
Planning district of destination - pd_dest In 11, 31, 33,)

Trip 2016
Table:

	446	447	459	2140	2351	2352	2353
423	0	0	20	0	0	0	0
427	90	0	0	0	0	0	0
430	0	0	11	0	0	0	19
433	32	0	0	0	0	0	0
434	174	0	0	0	0	0	0
436	0	0	0	0	0	0	15
440	0	0	0	0	19	0	0
443	0	25	33	14	11	25	0
446	0	0	0	0	96	0	0
447	0	0	38	0	0	0	0
448	0	0	58	0	0	0	0
452	52	0	45	31	0	0	0
453	0	56	88	0	33	0	0
454	0	0	0	0	0	0	19
456	0	11	0	0	0	0	0
459	0	0	0	0	0	62	0
461	0	27	73	0	0	0	0
463	0	0	14	0	0	15	0
465	0	0	0	0	0	0	21
2026	0	0	24	0	0	0	0
2069	16	0	0	0	0	0	0
2119	0	0	0	0	45	0	0
2122	0	0	0	0	0	25	0
2126	0	0	0	0	0	0	19
2128	0	0	0	0	0	17	0
2141	0	0	0	40	0	0	0
2142	0	0	0	0	0	22	0
2351	0	0	0	0	21	22	47
2353	0	0	23	0	0	0	45
2357	0	0	0	0	0	16	0
2363	0	0	0	0	0	0	12
2364	43	0	24	0	0	0	37
2365	0	38	0	0	0	0	0
2367	0	0	0	20	0	62	0
2370	0	21	0	0	0	61	0
2374	0	0	0	0	0	0	35
2386	0	20	0	0	0	0	0
2393	0	77	0	0	0	0	0
2405	0	0	0	0	0	61	0
2407	0	0	0	0	0	0	23
2431	0	47	0	0	0	0	0
2449	34	0	0	0	0	0	0

Wed Nov 07 2018 17:19:54 GMT-0500 (Eastern Standard Time) - Run Time: 2364ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of origin - pd_orig
Column: 2006 GTA zone of destination - gta06_dest

Filters:
(Start time of trip - start_time In 1500-1759
and
Trip purpose of destination - purp_dest In H,
and
Primary travel mode of trip - mode_prime In D, M, P, T, U,
and
2006 GTA zone of destination - gta06_dest In 446,447,459,2140,2351,2352,2353,)

Trip 2016
Table:

		446	447	459	2140	2351	2352	2353	Total
PD 1 of Toronto		0	53	10	0	39	16	144	262
PD 3 of Toronto		0	0	81	22	0	31	12	146
PD 4 of Toronto		0	11	19	0	49	0	0	79
PD 5 of Toronto		21	0	84	0	122	0	27	254
PD 6 of Toronto		0	36	0	0	0	0	0	36
PD 9 of Toronto		0	36	0	0	0	0	0	36
PD 10 of Toronto		16	20	32	0	0	121	33	222
PD 11 of Toronto		297	87	366	31	11	0	100	892
	427	60	0	0	0	0	0	0	60
	430	0	0	11	0	0	0	19	30
	434	116	0	0	0	0	0	0	116
	438	0	0	27	0	0	0	0	27
	443	0	0	0	0	11	0	0	11
	444	17	0	0	0	0	0	0	17
	445	0	0	22	0	0	0	0	22
	446	17	12	64	0	0	0	31	124
	448	0	0	0	0	0	0	30	30
	452	0	0	30	31	0	0	0	61
	453	0	56	88	0	0	0	0	144
	456	0	11	0	0	0	0	0	11
	458	18	0	0	0	0	0	0	18
	459	0	0	10	0	0	0	0	10
	461	0	9	77	0	0	0	0	86
	463	0	0	38	0	0	0	0	38
	464	68	0	0	0	0	0	0	68
	465	0	0	0	0	0	0	21	21
PD 12 of Toronto		74	0	76	0	30	0	10	190
PD 13 of Toronto		32	0	22	0	54	0	0	108
PD 14 of Toronto		0	0	38	0	0	0	0	38
PD 15 of Toronto		16	0	10	0	0	0	0	26
PD 16 of Toronto		0	77	17	0	0	17	0	111
Newmarket		16	0	0	0	39	0	15	70
Aurora		0	0	0	0	16	0	14	30
Richmond Hill		27	51	46	0	46	69	53	292
Markham		104	77	52	20	21	297	46	617
Vaughan		30	0	29	18	65	220	48	410
	2080	0	0	0	0	0	23	0	23
	2081	0	0	0	0	0	0	10	10
	2084	30	0	0	0	0	0	0	30
	2119	0	0	0	0	45	0	0	45
	2122	0	0	0	0	0	76	0	76
	2124	0	0	0	0	19	82	30	131
	2128	0	0	0	0	0	17	0	17
	2133	0	0	0	0	0	0	8	8
	2141	0	0	0	18	0	0	0	18
	2142	0	0	0	0	0	22	0	22
	2145	0	0	29	0	0	0	0	29
	2351	0	0	0	0	21	22	0	43
	2353	0	0	0	0	0	0	19	19
	2357	0	9	0	0	0	0	0	9
	2358	27	0	0	0	0	0	0	27
	2362	0	0	0	0	0	19	0	19
	2363	0	0	0	0	0	37	6	43
	2364	43	0	10	0	0	0	12	65
	2365	0	38	0	0	0	0	0	38
	2366	0	0	0	0	0	0	8	8
	2367	0	0	0	20	0	62	0	82
	2370	0	21	0	0	0	0	0	21
	2371	0	0	10	0	0	0	0	10
	2372	0	0	32	0	0	0	0	32
	2389	0	9	0	0	0	97	0	106
	2405	0	0	0	0	0	61	0	61
	2449	34	0	0	0	0	0	0	34
Caledon		0	0	27	0	0	0	0	27
Brampton		32	0	0	0	0	0	0	32
Mississauga		0	0	52	0	38	0	0	90
Welland		0	0	0	0	0	0	19	19

Wed Nov 07 2018 17:23:49 GMT-0500 (Eastern Standard Time) - Run Time: 2331ms

Cross Tabulation Query Form - Trip - 2016 v1.1

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

Filters:
(Start time of trip - start_time In 1500-1759
and
Trip purpose of destination - purp_dest In H,
and
Primary travel mode of trip - mode_prime In D, M, P, T, U,
and
2006 GTA zone of destination - gta06_dest In 446,447,459,2140,2351,2352,2353,
and
Planning district of origin - pd_orig In 11, 31, 33,)

Trip 2016
Table:

	446	447	459	2140	2351	2352	2353
427	60	0	0	0	0	0	0
430	0	0	11	0	0	0	19
434	116	0	0	0	0	0	0
438	0	0	27	0	0	0	0
443	0	0	0	0	11	0	0
444	17	0	0	0	0	0	0
445	0	0	22	0	0	0	0
446	17	12	64	0	0	0	31
448	0	0	0	0	0	0	30
452	0	0	30	31	0	0	0
453	0	56	88	0	0	0	0
456	0	11	0	0	0	0	0
458	18	0	0	0	0	0	0
459	0	0	10	0	0	0	0
461	0	9	77	0	0	0	0
463	0	0	38	0	0	0	0
464	68	0	0	0	0	0	0
465	0	0	0	0	0	0	21
2080	0	0	0	0	0	23	0
2081	0	0	0	0	0	0	10
2084	30	0	0	0	0	0	0
2119	0	0	0	0	45	0	0
2122	0	0	0	0	0	76	0
2124	0	0	0	0	19	82	30
2128	0	0	0	0	0	17	0
2133	0	0	0	0	0	0	8
2141	0	0	0	18	0	0	0
2142	0	0	0	0	0	22	0
2145	0	0	29	0	0	0	0
2351	0	0	0	0	21	22	0
2353	0	0	0	0	0	0	19
2357	0	9	0	0	0	0	0
2358	27	0	0	0	0	0	0
2362	0	0	0	0	0	19	0
2363	0	0	0	0	0	37	6
2364	43	0	10	0	0	0	12
2365	0	38	0	0	0	0	0
2366	0	0	0	0	0	0	8
2367	0	0	0	20	0	62	0
2370	0	21	0	0	0	0	0
2371	0	0	10	0	0	0	0
2372	0	0	32	0	0	0	0
2389	0	9	0	0	0	97	0
2405	0	0	0	0	0	61	0
2449	34	0	0	0	0	0	0

AM Peak Hour
Outbound
2021-04-23

Traffic Volume Allocation

	Zone	Trips	%	NORTH Yonge St	SOUTH Yonge St	EAST Steeles Ave E	WEST Steeles Ave E	SOUTH Dudley Ave	SOUTH Willowdale Ave	WEST Woodward Ave	TOTAL
	PD 1 of Toronto	295	6%			40%		60%			100.00%
	PD 2 of Toronto	16	0%		30%		50%		20%		100.00%
	PD 3 of Toronto	144	3%				50%	50%			100.00%
	PD 4 of Toronto	176	4%			10%		60%	30%		100.00%
	PD 5 of Toronto	211	5%		10%	60%			30%		100.00%
	PD 6 of Toronto	47	1%		10%	60%			30%		100.00%
	PD 8 of Toronto	19	0%		50%		20%		30%		100.00%
	PD 9 of Toronto	109	2%		30%		70%				100.00%
	PD 10 of Toronto	308	7%		10%		90%				100.00%
	423	20	0%		20%		60%		20%		100.00%
	427	90	2%		20%		50%		30%		100.00%
	430	30	1%				100%				100.00%
	433	32	1%		15%		20%	30%	35%		100.00%
	434	174	4%		25%		25%	25%	25%		100.00%
	436	15	0%		35%		35%		30%		100.00%
	440	19	0%		30%		40%		30%		100.00%
	443	108	2%					100%			100.00%
	446	96	2%		25%		25%	25%	25%		100.00%
PD 11 of Toronto	447	38	1%		35%			25%	40%		100.00%
	448	58	1%					70%	30%		100.00%
	452	128	3%					65%	35%		100.00%
	453	177	4%					60%	40%		100.00%
	454	19	0%		70%			10%	20%		100.00%
	456	11	0%			35%		35%	30%		100.00%
	459	62	1%			40%		30%	30%		100.00%
	461	100	2%			35%		35%	30%		100.00%
	463	29	1%			40%		30%	30%		100.00%
	465	21	0%			50%		20%	30%		100.00%
	PD 12 of Toronto	212	5%			60%			40%		100.00%
	PD 13 of Toronto	22	0%			60%			40%		100.00%
	PD 14 of Toronto	57	1%			50%			50%		100.00%
	PD 15 of Toronto	49	1%			100%					100.00%
	PD 16 of Toronto	112	2%			100%					100.00%
	Newmarket	39	1%			100%					100.00%
	Aurora	40	1%			100%					100.00%
	Richmond Hill	189	4%	50%		50%					100.00%
	2026	24	1%	10%			45%			45%	100.00%
	2069	16	0%	10%			45%			45%	100.00%
	2119	45	1%				100%				100.00%
Vaughan	2122	25	1%	10%			60%			30%	100.00%
	2126	19	0%	10%			45%			45%	100.00%
	2128	17	0%	10%			45%			45%	100.00%
	2141	40	1%	20%			20%			60%	100.00%
	2142	22	0%	90%						10%	100.00%
	2351	90	2%	70%		30%					100.00%
	2353	68	1%	80%		20%					100.00%
	2357	16	0%	100%							100.00%
	2363	12	0%			100%					100.00%
	2364	104	2%			100%					100.00%
	2365	38	1%			100%					100.00%
	2367	82	2%			100%					100.00%
Markham	2370	82	2%			100%					100.00%
	2374	35	1%			100%					100.00%
	2386	20	0%			100%					100.00%
	2393	77	2%			100%					100.00%
	2405	61	1%			100%					100.00%
	2407	23	0%			100%					100.00%
	2431	47	1%			100%					100.00%
	2449	34	1%			100%					100.00%
	Caledon	27	1%	10%	30%		40%		20%		100.00%
	Brampton	16	0%	10%	30%		40%		20%		100.00%
	Mississauga	214	5%	10%			40%	30%	20%		100.00%
	Hamilton	19	0%	10%	30%		40%		20%		100.00%
	Innisfil	95	2%	10%	30%		40%		20%		100.00%
	TOTAL TRIPS	4640	100%								

Route Split Totals

NORTH Yonge St	SOUTH Yonge St	EAST Steeles Ave E	WEST Steeles Ave E	SOUTH Dudley Ave	SOUTH Willowdale Ave	WEST Woodward Ave	TOTAL
0.00%	0.00%	2.54%	0.00%	3.81%	0.00%	0.00%	6.4%
0.00%	0.10%	0.00%	0.17%	0.00%	0.07%	0.00%	0.3%
0.00%	0.00%	0.00%	1.55%	1.55%	0.00%	0.00%	3.1%
0.00%	0.00%	0.38%	0.00%	2.28%	1.14%	0.00%	3.8%
0.00%	0.45%	2.73%	0.00%	0.00%	1.36%	0.00%	4.5%
0.00%	0.10%	0.61%	0.00%	0.00%	0.30%	0.00%	1.0%
0.00%	0.20%	0.00%	0.08%	0.00%	0.12%	0.00%	0.4%
0.00%	0.70%	0.00%	1.64%	0.00%	0.00%	0.00%	2.3%
0.00%	0.66%	0.00%	5.97%	0.00%	0.00%	0.00%	6.6%
0.00%	0.09%	0.00%	0.26%	0.00%	0.09%	0.00%	0.4%
0.00%	0.39%	0.00%	0.97%	0.00%	0.58%	0.00%	1.9%
0.00%	0.00%	0.00%	0.65%	0.00%	0.00%	0.00%	0.6%
0.00%	0.10%	0.00%	0.14%	0.21%	0.24%	0.00%	0.7%
0.00%	0.94%	0.00%	0.94%	0.94%	0.94%	0.00%	3.8%
0.00%	0.11%	0.00%	0.11%	0.00%	0.10%	0.00%	0.3%
0.00%	0.12%	0.00%	0.16%	0.00%	0.12%	0.00%	0.4%
0.00%	0.00%	0.00%	0.00%	2.33%	0.00%	0.00%	2.3%
0.00%	0.52%	0.00%	0.52%	0.52%	0.52%	0.00%	2.1%
0.00%	0.29%	0.00%	0.00%	0.20%	0.33%	0.00%	0.8%
0.00%	0.00%	0.00%	0.00%	0.88%	0.38%	0.00%	1.3%
0.00%	0.00%	0.00%	0.00%	1.79%	0.97%	0.00%	2.8%
0.00%	0.00%	0.00%	0.00%	2.29%	1.53%	0.00%	3.8%
0.00%	0.29%	0.00%	0.00%	0.04%	0.08%	0.00%	0.4%
0.00%	0.00%	0.08%	0.00%	0.08%	0.07%	0.00%	0.2%
0.00%	0.00%	0.53%	0.00%	0.40%	0.40%	0.00%	1.3%
0.00%	0.00%	0.75%	0.00%	0.75%	0.65%	0.00%	2.2%
0.00%	0.00%	0.25%	0.00%	0.19%	0.19%	0.00%	0.6%
0.00%	0.00%	0.23%	0.00%	0.09%	0.14%	0.00%	0.5%
0.00%	0.00%	2.74%	0.00%	0.00%	1.83%	0.00%	4.6%
0.00%	0.00%	0.28%	0.00%	0.00%	0.19%	0.00%	0.5%
0.00%	0.00%	0.61%	0.00%	0.00%	0.61%	0.00%	1.2%
0.00%	0.00%	1.06%	0.00%	0.00%	0.00%	0.00%	1.1%
0.00%	0.00%	2.41%	0.00%	0.00%	0.00%	0.00%	2.4%
0.00%	0.00%	0.84%	0.00%	0.00%	0.00%	0.00%	0.8%
0.00%	0.00%	0.86%	0.00%	0.00%	0.00%	0.00%	0.9%
2.04%	0.00%	2.04%	0.00%	0.00%	0.00%	0.00%	4.1%
0.05%	0.00%	0.00%	0.23%	0.00%	0.00%	0.23%	0.5%
0.03%	0.00%	0.00%	0.16%	0.00%	0.00%	0.16%	0.3%
0.00%	0.00%	0.00%	0.97%	0.00%	0.00%	0.00%	1.0%
0.05%	0.00%	0.00%	0.32%	0.00%	0.00%	0.16%	0.5%
0.04%	0.00%	0.00%	0.18%	0.00%	0.00%	0.18%	0.4%
0.04%	0.00%	0.00%	0.16%	0.00%	0.00%	0.16%	0.4%
0.17%	0.00%	0.00%	0.17%	0.00%	0.00%	0.52%	0.9%
0.43%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.5%
1.36%	0.00%	0.58%	0.00%	0.00%	0.00%	0.00%	1.9%
1.17%	0.00%	0.29%	0.00%	0.00%	0.00%	0.00%	1.5%
0.34%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.3%
0.00%	0.00%	0.26%	0.00%	0.00%	0.00%	0.00%	0.3%
0.00%	0.00%	2.24%	0.00%	0.00%	0.00%	0.00%	2.2%
0.00%	0.00%	0.82%	0.00%	0.00%	0.00%	0.00%	0.8%
0.00%	0.00%	1.77%	0.00%	0.00%	0.00%	0.00%	1.8%
0.00%	0.00%	1.77%	0.00%	0.00%	0.00%	0.00%	1.8%
0.00%	0.00%	0.75%	0.00%	0.00%	0.00%	0.00%	0.8%
0.00%	0.00%	0.43%	0.00%	0.00%	0.00%	0.00%	0.4%
0.00%	0.00%	1.66%	0.00%	0.00%	0.00%	0.00%	1.7%
0.00%	0.00%	1.31%	0.00%	0.00%	0.00%	0.00%	1.3%
0.00%	0.00%	0.50%	0.00%	0.00%	0.00%	0.00%	0.5%
0.00%	0.00%	1.01%	0.00%	0.00%	0.00%	0.00%	1.0%
0.00%	0.00%	0.73%	0.00%	0.00%	0.00%	0.00%	0.7%
0.06%	0.17%	0.00%	0.23%	0.00%	0.12%	0.00%	0.6%
0.03%	0.10%	0.00%	0.14%	0.00%	0.07%	0.00%	0.3%
0.46%	0.00%	0.00%	1.84%	1.38%	0.92%	0.00%	4.6%
0.04%	0.12%	0.00%	0.16%	0.00%	0.08%	0.00%	0.4%
0.20%	0.61%	0.00%	0.82%	0.00%	0.41%	0.00%	2.0%
6.5%	**6.1%**	**33.1%**	**18.6%**	**19.7%**	**14.5%**	**1.5%**	100.0%

SC1 - Steeles & Dudley Signalized	**7%**	**6%**	**33%**	**19%**	**30%**	**3%**	**2%**	100%
SC2 - Steeles & Dudley RT Only	**7%**	**39%**	**33%**	**19%**	**0%**	**0%**	**2%**	100%

PM Peak Hour
Inbound
2021-04-23

Traffic Volume Allocation

	Zone	Trips	%	NORTH Yonge St	SOUTH Yonge St	EAST Steeles Ave E	WEST Steeles Ave E	SOUTH Dudley Ave	SOUTH Willowdale Ave	WEST Woodward Ave	TOTAL
	PD 1 of Toronto	262	7%		10%	40%			50%		100.00%
	PD 3 of Toronto	146	4%		20%		50%		30%		100.00%
	PD 4 of Toronto	79	2%				30%	50%	20%		100.00%
	PD 5 of Toronto	254	6%			40%		30%	30%		100.00%
	PD 6 of Toronto	36	1%			90%			10%		100.00%
	PD 9 of Toronto	36	1%		30%		50%		20%		100.00%
	PD 10 of Toronto	222	6%				60%	20%	20%		100.00%
	427	60	2%		10%		80%	10%			100.00%
	430	30	1%			100%					100.00%
	434	116	3%		30%		20%	50%			100.00%
	438	27	1%		40%			10%	50%		100.00%
	443	11	0%		20%			30%	50%		100.00%
	444	17	0%		10%			40%	50%		100.00%
	445	22	1%		50%			30%	20%		100.00%
	446	124	3%		25%		25%	25%	25%		100.00%
PD 11 of Toronto	448	30	1%		10%			40%	50%		100.00%
	452	61	2%		20%				80%		100.00%
	453	144	4%						100%		100.00%
	456	11	0%			30%			70%		100.00%
	458	18	0%			30%			70%		100.00%
	459	10	0%			30%			70%		100.00%
	461	86	2%			80%			20%		100.00%
	463	38	1%			50%			50%		100.00%
	464	68	2%			50%			50%		100.00%
	465	21	1%			70%			30%		100.00%
	PD 12 of Toronto	190	5%		10%	60%			30%		100.00%
	PD 13 of Toronto	108	3%		20%	60%			20%		100.00%
	PD 14 of Toronto	38	1%			100%					100.00%
	PD 15 of Toronto	26	1%			100%					100.00%
	PD 16 of Toronto	111	3%			100%					100.00%
	Newmarket	70	2%			100%					100.00%
	Aurora	30	1%			100%					100.00%
	Richmond Hill	292	7%	50%		50%					100.00%
	2080	23	1%	25%			25%			50%	100.00%
	2081	10	0%	25%			25%			50%	100.00%
	2084	30	1%	35%			30%			35%	100.00%
	2119	45	1%				100%				100.00%
	2122	76	2%	30%			30%			40%	100.00%
Vaughan	2124	131	3%	30%			30%			40%	100.00%
	2128	17	0%	30%			30%			40%	100.00%
	2133	8	0%	30%			30%			40%	100.00%
	2141	18	0%	30%			30%			40%	100.00%
	2142	22	1%	70%						30%	100.00%
	2145	29	1%	100%							100.00%
	2351	43	1%	60%		40%					100.00%
	2353	19	0%	75%		25%					100.00%
	2357	9	0%	30%		70%					100.00%
	2358	27	1%	100%							100.00%
	2362	19	0%	30%		70%					100.00%
	2363	43	1%	10%		90%					100.00%
	2364	65	2%			100%					100.00%
Markham	2365	38	1%			100%					100.00%
	2366	8	0%			100%					100.00%
	2367	82	2%	20%		80%					100.00%
	2370	21	1%			100%					100.00%
	2371	10	0%			100%					100.00%
	2372	32	1%			100%					100.00%
	2389	106	3%			100%					100.00%
	2405	61	2%			100%					100.00%
	2449	34	1%			100%					100.00%
	Caledon	27	1%	10%		10%	80%				100.00%
	Brampton	32	1%	10%		10%	80%				100.00%
	Mississauga	90	2%	10%		10%	80%				100.00%
	Welland	19	0%	10%		10%	80%				100.00%
	TOTAL TRIPS	3988	100%								

Route Split Totals

NORTH Yonge St	SOUTH Yonge St	EAST Steeles Ave E	WEST Steeles Ave E	SOUTH Dudley Ave	SOUTH Willowdale Ave	WEST Woodward Ave	TOTAL
0.00%	0.66%	2.63%	0.00%	0.00%	3.28%	0.00%	6.6%
0.00%	0.73%	0.00%	1.83%	0.00%	1.10%	0.00%	3.7%
0.00%	0.00%	0.00%	0.59%	0.99%	0.40%	0.00%	2.0%
0.00%	0.00%	2.55%	0.00%	1.91%	1.91%	0.00%	6.4%
0.00%	0.00%	0.81%	0.00%	0.00%	0.09%	0.00%	0.9%
0.00%	0.27%	0.00%	0.45%	0.00%	0.18%	0.00%	0.9%
0.00%	0.00%	0.00%	3.34%	1.11%	1.11%	0.00%	5.6%
0.00%	0.15%	0.00%	1.20%	0.15%	0.00%	0.00%	1.5%
0.00%	0.00%	0.75%	0.00%	0.00%	0.00%	0.00%	0.8%
0.00%	0.87%	0.00%	0.58%	1.45%	0.00%	0.00%	2.9%
0.00%	0.27%	0.00%	0.00%	0.07%	0.34%	0.00%	0.7%
0.00%	0.06%	0.00%	0.00%	0.08%	0.14%	0.00%	0.3%
0.00%	0.04%	0.00%	0.00%	0.17%	0.21%	0.00%	0.4%
0.00%	0.28%	0.00%	0.00%	0.17%	0.11%	0.00%	0.6%
0.00%	0.78%	0.00%	0.78%	0.78%	0.78%	0.00%	3.1%
0.00%	0.08%	0.00%	0.00%	0.30%	0.38%	0.00%	0.8%
0.00%	0.31%	0.00%	0.00%	0.00%	1.22%	0.00%	1.5%
0.00%	0.00%	0.00%	0.00%	0.00%	3.61%	0.00%	3.6%
0.00%	0.00%	0.08%	0.00%	0.00%	0.19%	0.00%	0.3%
0.00%	0.00%	0.14%	0.00%	0.00%	0.32%	0.00%	0.5%
0.00%	0.00%	0.08%	0.00%	0.00%	0.18%	0.00%	0.3%
0.00%	0.00%	1.73%	0.00%	0.00%	0.43%	0.00%	2.2%
0.00%	0.00%	0.48%	0.00%	0.00%	0.48%	0.00%	1.0%
0.00%	0.00%	0.85%	0.00%	0.00%	0.85%	0.00%	1.7%
0.00%	0.00%	0.37%	0.00%	0.00%	0.16%	0.00%	0.5%
0.00%	0.48%	2.86%	0.00%	0.00%	1.43%	0.00%	4.8%
0.00%	0.54%	1.62%	0.00%	0.00%	0.54%	0.00%	2.7%
0.00%	0.00%	0.95%	0.00%	0.00%	0.00%	0.00%	1.0%
0.00%	0.00%	0.65%	0.00%	0.00%	0.00%	0.00%	0.7%
0.00%	0.00%	2.78%	0.00%	0.00%	0.00%	0.00%	2.8%
0.00%	0.00%	1.76%	0.00%	0.00%	0.00%	0.00%	1.8%
0.00%	0.00%	0.75%	0.00%	0.00%	0.00%	0.00%	0.8%
3.66%	0.00%	3.66%	0.00%	0.00%	0.00%	0.00%	7.3%
0.14%	0.00%	0.00%	0.14%	0.00%	0.00%	0.29%	0.6%
0.06%	0.00%	0.00%	0.06%	0.00%	0.00%	0.13%	0.3%
0.26%	0.00%	0.00%	0.23%	0.00%	0.00%	0.26%	0.8%
0.00%	0.00%	0.00%	1.13%	0.00%	0.00%	0.00%	1.1%
0.57%	0.00%	0.00%	0.57%	0.00%	0.00%	0.76%	1.9%
0.99%	0.00%	0.00%	0.99%	0.00%	0.00%	1.31%	3.3%
0.13%	0.00%	0.00%	0.13%	0.00%	0.00%	0.17%	0.4%
0.06%	0.00%	0.00%	0.06%	0.00%	0.00%	0.08%	0.2%
0.14%	0.00%	0.00%	0.14%	0.00%	0.00%	0.18%	0.5%
0.39%	0.00%	0.00%	0.00%	0.00%	0.00%	0.17%	0.6%
0.73%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.7%
0.65%	0.00%	0.43%	0.00%	0.00%	0.00%	0.00%	1.1%
0.36%	0.00%	0.12%	0.00%	0.00%	0.00%	0.00%	0.5%
0.07%	0.00%	0.16%	0.00%	0.00%	0.00%	0.00%	0.2%
0.68%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.7%
0.14%	0.00%	0.33%	0.00%	0.00%	0.00%	0.00%	0.5%
0.11%	0.00%	0.97%	0.00%	0.00%	0.00%	0.00%	1.1%
0.00%	0.00%	1.63%	0.00%	0.00%	0.00%	0.00%	1.6%
0.00%	0.00%	0.95%	0.00%	0.00%	0.00%	0.00%	1.0%
0.00%	0.00%	0.20%	0.00%	0.00%	0.00%	0.00%	0.2%
0.41%	0.00%	1.64%	0.00%	0.00%	0.00%	0.00%	2.1%
0.00%	0.00%	0.53%	0.00%	0.00%	0.00%	0.00%	0.5%
0.00%	0.00%	0.25%	0.00%	0.00%	0.00%	0.00%	0.3%
0.00%	0.00%	0.80%	0.00%	0.00%	0.00%	0.00%	0.8%
0.00%	0.00%	2.66%	0.00%	0.00%	0.00%	0.00%	2.7%
0.00%	0.00%	1.53%	0.00%	0.00%	0.00%	0.00%	1.5%
0.00%	0.00%	0.85%	0.00%	0.00%	0.00%	0.00%	0.9%
0.07%	0.00%	0.07%	0.54%	0.00%	0.00%	0.00%	0.7%
0.08%	0.00%	0.08%	0.64%	0.00%	0.00%	0.00%	0.8%
0.23%	0.00%	0.23%	1.81%	0.00%	0.00%	0.00%	2.3%
0.05%	0.00%	0.05%	0.38%	0.00%	0.00%	0.00%	0.5%
10.0%	**5.5%**	**39.0%**	**15.6%**	**7.2%**	**19.4%**	**3.4%**	100.0%

SC1 - Steeles & Dudley Signalized	**10%**	**5%**	**39%**	**16%**	**15%**	**11%**	**4%**	100%
SC2 - Steeles & Dudley RT Only	**10%**	**10%**	**39%**	**10%**	**0%**	**21%**	**10%**	100%

APPENDIX G:
Synchro Calibration Studies

Project No: 7923-01
Project: 36 Steeles
Study Location: Dudley Avenue & Steeles Avenue East SB
Municipality: Toronto
Study Date: 43286
Study Time: 8:30-9:30 & 17:00-18:00

Delay Study

	Overall Delay (sec)	Left Turn Delay (sec)	Through Delay (sec)	Right Turn Delay (sec)
2-HR Period 07:30-09:30				
Minimum Delay	1	4	13	1
Average Delay	24	22	39	23
85th Percentile	46	32	60	43
95th Percentile	74	51	87	73
Maximum Delay	100	64	100	80
Total Vehicles Measured	55	10	6	39
Total from Traffic Count	54	10	7	37
Sample	102%	100%	86%	105%
AM Peak Hour 7:30-8:30				
Minimum Delay	1	10	21	1
Average Delay	26	15	44	22
85th Percentile	39	20	68	36
95th Percentile	49	23	89	43
Maximum Delay	100	24	100	50
Total Vehicles Measured	24	3	5	16
Total from Traffic Count	23	3	5	15
Sample	104%	100%	100%	107%
2-HR Period 16:00-18:00				
Minimum Delay	2	7	11	2
Average Delay	27	31	49	23
85th Percentile	45	40	115	43
95th Percentile	60	88	124	54
Maximum Delay	134	134	128	76
Total Vehicles Measured	76	12	7	57
Total from Traffic Count	77	12	6	59
Sample	99%	100%	117%	97%
PM Peak Hour 16:45-17:45				
Minimum Delay	2	16	11	2
Average Delay	25	50	21	22
85th Percentile	41	86	30	42
95th Percentile	50	118	35	48
Maximum Delay	134	134	38	55
Total Vehicles Measured	43	4	4	35
Total from Traffic Count	44	4	5	35
Sample	98%	100%	80%	100%

Project: 36-48 Steeles Ave E
Project No: 7923-01
Location: Yonge St & Steeles Ave
Date: Tuesday December 4, 2018
Time: 8:00 - 9:00

AM Peak Hour Intergreen - All Approaches

Time	North Approach					South Approach					East Approach					West Approach				
	Advance	Green	Amber	Red	Total	Advance	Green	Amber	Red	Total	Advance	Green	Amber	Red	Total	Advance	Green	Amber	Red	Total
7:59	6	0	0	2	8	5	0	0	2	7	4	0	1	0	5	6	0	0	1	7
8:01	8	0	0	1	9	-	0	0	1	1	4	0	0	0	4	6	0	0	2	8
8:03	7	0	0	2	9	3	0	0	2	5	3	0	0	1	4	5	0	1	2	8
8:05	7	0	1	1	9	5	0	0	2	7	4	0	0	1	5	5	0	0	1	6
8:07	7	1	0	2	10	3	0	0	1	4	-	0	0	2	2	3	0	0	1	4
8:09	6	1	0	3	10	3	0	0	1	4	2	0	1	1	4	4	0	0	2	6
8:12	7	0	0	2	9	-	0	0	1	1	-	0	0	1	1	6	0	0	2	8
8:14	6	1	0	2	9	5	0	0	1	6	2	0	0	1	3	3	0	0	1	4
8:16	6	1	1	1	9	4	0	0	1	5	4	0	0	2	6	7	0	0	2	9
8:18	6	3	0	0	9	6	0	0	1	7	5	0	0	0	5	3	0	0	2	5
8:20	6	0	1	0	7	5	0	0	2	7	5	0	0	2	7	5	0	0	2	7
8:22	2	1	1	0	4	5	0	0	1	6	4	0	0	0	4	7	0	0	1	8
8:24	5	0	0	3	8	2	0	0	2	4	3	0	0	2	5	4	0	0	3	7
8:27	3	1	0	2	6	2	0	0	1	3	1	0	0	2	3	4	0	0	2	6
8:29	6	0	1	1	8	4	0	0	2	6	3	0	0	2	5	-	0	0	2	2
8:31	5	0	0	2	7	5	0	0	3	8	3	0	0	1	4	4	0	0	2	6
8:33	4	0	0	2	6	2	0	0	1	3	5	0	0	2	7	6	0	0	2	8
8:35	5	1	1	0	7	4	0	1	3	8	3	0	0	1	4	6	0	0	1	7
8:37	3	2	0	2	7	2	0	0	2	4	3	0	0	2	5	4	0	0	2	6
8:39	2	0	0	2	4	2	0	0	2	4	6	0	0	1	7	7	0	0	2	9
8:42	4	4	0	2	10	3	0	0	2	5	1	0	0	2	3	4	0	0	2	6
8:44	3	0	0	1	4	4	0	0	3	7	4	0	0	2	6	4	0	0	2	6
8:46	4	0	1	3	8	3	0	0	2	5	4	0	0	1	5	6	0	0	1	7
8:48	3	3	0	1	7	2	0	0	1	3	3	0	0	2	5	4	0	0	2	6
8:50	5	0	0	3	8	2	0	0	2	4	2	0	0	2	4	3	0	0	2	5
8:52	4	2	0	2	8	6	0	0	2	8	4	0	0	1	5	4	0	0	2	6
8:55	6	4	1	1	12	3	0	0	2	5	3	0	0	2	5	5	0	0	2	7
8:57	3	0	0	2	5	6	0	0	1	7	4	2	1	2	9	4	0	0	2	6
Total	**139**	**25**	**8**	**45**	**217**	**96**	**0**	**1**	**47**	**144**	**89**	**2**	**3**	**38**	**132**	**129**	**0**	**1**	**50**	**180**
Average	**5.0**	**0.9**	**0.3**	**1.6**	**7.8**	**3.69**	**0.0**	**0.0**	**1.7**	**5.1**	**3.4**	**0.1**	**0.1**	**1.4**	**4.7**	**4.8**	**0.0**	**0.0**	**1.8**	**6.4**
Percentage	**0.64**	**0.12**	**0.04**	**0.21**		**0.67**	**0.00**	**0.01**	**0.33**		**0.67**	**0.02**	**0.02**	**0.29**		**0.72**	**0.00**	**0.01**	**0.28**	

Amber + All Red	NBL	1.9	SBL	1.7	EBL	1.5	WBL	1.8

Project: 36-48 Steeles Ave E
Project No: 7923-01
Location: Yonge St & Steeles Ave
Date: Tuesday December 4, 2018
Time: 17:00 - 18:00

PM Peak Hour Intergreen - All Approaches

Time	North Approach					South Approach					East Approach					West Approach				
	Advance	Green	Amber	Red	Total	Advance	Green	Amber	Red	Total	Advance	Green	Amber	Red	Total	Advance	Green	Amber	Red	Total
17:00	4	0	0	3	7	4	0	0	2	6	0	0	0	2	2	5	0	0	2	7
17:02	3	0	0	1	4	4	0	0	1	5	4	0	0	1	5	4	0	0	2	6
17:05	6	0	0	3	9	5	0	0	2	7	6	0	0	2	8	7	0	0	1	8
17:07	4	0	0	1	5	5	0	0	2	7	2	0	0	1	3	3	0	0	2	5
17:09	3	0	0	2	5	2	0	0	1	3	6	0	0	1	7	6	0	0	1	7
17:11	6	0	0	2	8	4	0	0	1	5	7	0	0	1	8	5	0	0	2	7
17:13	3	0	0	2	5	2	0	0	2	4	-	0	0	2	2	5	0	0	2	7
17:15	6	0	0	2	8	6	0	0	2	8	6	0	0	0	6	6	0	0	2	8
17:17	6	0	0	2	8	6	0	0	2	8	4	0	0	2	6	5	0	0	2	7
17:19	6	0	0	3	9	3	0	0	2	5	2	0	0	2	4	5	0	0	2	7
17:22	6	0	0	2	8	3	0	0	1	4	3	0	0	1	4	5	0	0	2	7
17:24	4	0	0	2	6	5	0	0	3	8	3	0	0	2	5	5	0	0	2	7
17:26	5	0	0	2	7	4	0	0	1	5	4	0	0	2	6	3	0	0	2	5
17:28	6	0	0	2	8	2	0	0	2	4	4	0	0	2	6	5	0	0	1	6
17:30	5	0	0	2	7	6	0	0	1	7	5	0	0	1	6	5	0	0	3	8
17:32	5	0	0	2	7	2	0	0	2	4	6	0	0	2	8	6	0	0	2	8
17:34	5	0	0	2	7	5	0	0	2	7	6	0	0	2	8	4	0	0	2	6
17:36	6	0	0	2	8	6	0	0	1	7	3	0	0	1	4	2	0	0	2	4
17:39	4	0	0	1	5	4	0	0	2	6	2	0	0	2	4	4	0	0	1	5
17:41	6	0	0	2	8	5	0	0	2	7	4	0	0	1	5	2	0	0	1	3
17:43	5	0	0	1	6	3	0	0	2	5	5	0	0	2	7	7	0	0	2	9
17:45	5	0	0	2	7	5	0	0	2	7	5	0	0	2	7	5	0	0	1	6
17:47	2	0	0	1	3	3	0	0	1	4	4	0	0	3	7	4	0	0	2	6
17:49	4	0	0	2	6	5	0	0	1	6	5	0	0	3	8	4	1	0	2	7
17:52	3	0	0	2	5	1	0	0	2	3	2	0	0	1	3	3	0	0	3	6
17:54	5	0	0	2	7	3	0	0	1	4	7	0	0	2	9	8	0	0	2	10
17:56	3	0	0	2	5	4	0	0	1	5	5	0	0	1	6	5	0	0	2	7
17:58	1	0	0	1	2	4	0	0	1	5	8	0	0	2	10	7	0	0	2	9
Total	**127**	**0**	**0**	**53**	**180**	**111**	**0**	**0**	**45**	**156**	**118**	**0**	**0**	**46**	**164**	**135**	**1**	**0**	**52**	**188**
Average	**4.5**	**0.0**	**0.0**	**1.9**	**6.4**	**3.96**	**0.0**	**0.0**	**1.6**	**5.6**	**4.4**	**0.0**	**0.0**	**1.6**	**5.9**	**4.8**	**0.0**	**0.0**	**1.9**	**6.7**
Percentage	**0.71**	**0.00**	**0.00**	**0.29**		**0.71**	**0.00**	**0.00**	**0.29**		**0.72**	**0.00**	**0.00**	**0.28**		**0.72**	**0.01**	**0.00**	**0.28**	

Amber + All Red	NBL	2.0	SBL	1.5	EBL	1.5	WBL	1.5	<< AM
Amber + All Red	NBL	2.0	SBL	1.5	EBL	1.5	WBL	2.0	<< PM

Project No: 7923-01
Project: 36-48 Steeles Ave E
Study Location: Yonge St and Steeles Ave.
Study Date: Wednesday July 24, 2019
Study Time: 8:00-9:00, 16:00-17:00

Northbound Lane Utilization

Period Ending	Left Turn Lane					Thru Lane					Thru Lane					Right Turn Lane					Total				Total Vehicles
	Cars	Medium	Heavy	Buses	Total Vehicles	Cars	Medium	Heavy	Buses	Total Vehicles	Cars	Medium	Heavy	Buses	Total Vehicles	Cars	Medium	Heavy	Buses	Total Vehicles	Cars	Medium	Heavy	Buses	
8:15	43	0	0	0	43	90	4	1	0	95	111	0	1	1	113	91	2	0	8	101	335	6	2	9	352
8:30	34	0	1	0	35	121	1	1	0	123	106	0	1	0	107	77	2	0	4	83	338	3	3	4	348
8:45	44	0	3	0	47	114	0	1	0	115	98	0	1	0	99	69	1	0	10	80	325	1	5	10	341
9:00	41	0	0	0	41	77	9	3	0	89	107	2	1	0	110	68	1	1	8	78	293	12	5	8	318
Total	162	0	4	0	166	402	14	6	0	422	422	2	4	1	429	305	6	1	30	342	1291	22	15	31	1359
16:15	51	1	0	0	52	103	3	0	0	106	105	1	1	0	107	76	0	0	5	81	335	5	1	5	346
16:30	43	1	1	0	45	127	0	1	0	128	128	0	0	0	128	63	1	2	3	69	361	2	4	3	370
16:45	44	1	0	0	45	138	0	0	0	138	134	1	3	0	138	56	0	0	7	63	372	2	3	7	384
17:00	49	0	0	0	49	122	4	1	0	127	121	0	1	1	123	99	0	0	6	105	391	4	2	7	404
Total	187	3	1	0	191	490	7	2	0	499	488	2	5	1	496	294	1	2	21	318	1459	13	10	22	1504

Southbound Lane Utilization

Period Ending	Left Turn Lane					Thru Lane					Thru Lane					Shared Thru/Right Turn Lane					Total				Total Vehicles
	Cars	Medium	Heavy	Buses	Total Vehicles	Cars	Medium	Heavy	Buses	Total Vehicles	Cars	Medium	Heavy	Buses	Total Vehicles	Cars	Medium	Heavy	Buses	Total Vehicles	Cars	Medium	Heavy	Buses	
8:15	23	0	0	4	27	106	3	1	0	110	101	0	0	0	101	42	2	0	0	44	272	5	1	4	282
8:30	16	0	0	4	20	108	1	2	0	111	86	3	3	0	92	37	0	0	0	37	247	4	5	4	260
8:45	26	0	0	7	33	103	1	3	0	107	99	0	2	0	101	47	0	1	0	48	275	1	6	7	289
9:00	24	0	0	6	30	106	1	0	0	107	98	2	3	0	103	37	1	1	0	39	265	4	4	6	279
Total	89	0	0	21	110	423	6	6	0	435	384	5	8	0	397	163	3	2	0	168	1059	14	16	21	1110
16:15	23	0	0	7	30	99	1	1	0	101	72	1	2	0	75	64	1	1	0	66	258	3	4	7	272
16:30	24	0	0	4	28	96	1	3	0	100	76	1	0	0	77	76	1	0	0	77	272	3	3	4	282
16:45	40	0	1	5	46	129	0	1	0	130	93	1	2	0	96	93	1	2	0	96	355	2	6	5	368
17:00	79	0	0	3	82	123	0	2	0	125	109	0	0	1	110	108	0	0	1	109	419	0	2	5	426
Total	166	0	1	19	186	447	2	7	0	456	350	3	4	1	358	341	3	3	1	348	1304	8	15	21	1348

LUF

NB	AM	0.927
	PM	0.877
SB	AM	0.766
	PM	0.849

APPENDIX H:
Synchro Analysis Output Sheets

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	170	850	295	145	980	140	820	185	1365
Future Volume (vph)	170	850	295	145	980	140	820	185	1365
Turn Type	pm+pt	NA	custom	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4 5	8		2		6	
Detector Phase	7	4	4 5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	34.0		6.0	34.0	6.0	32.0	6.0	32.0
Minimum Split (s)	14.0	44.0		14.0	44.0	10.0	39.0	11.0	39.0
Total Split (s)	14.0	44.0		14.0	44.0	11.0	59.0	11.0	59.0
Total Split (%)	10.9%	34.4%		10.9%	34.4%	8.6%	46.1%	8.6%	46.1%
Maximum Green (s)	10.0	37.0		10.0	37.0	7.0	52.0	7.0	52.0
Yellow Time (s)	3.0	4.0		3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	3.0		1.0	3.0	1.0	3.0	1.0	3.0
Lost Time Adjust (s)	-1.5	-1.0		-1.5	-1.0	-1.5	-1.0	-2.0	-1.0
Total Lost Time (s)	2.5	6.0		2.5	6.0	2.5	6.0	2.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Min		None	Min	None	C-Min	None	C-Min
Walk Time (s)		7.0			7.0		8.0		8.0
Flash Dont Walk (s)		27.0			27.0		24.0		24.0
Pedestrian Calls (#/hr)		85			85		95		95

Intersection Summary

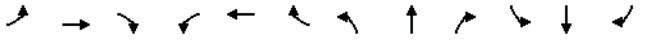
Cycle Length: 128
Actuated Cycle Length: 128
Offset: 57 (45%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated

Splits and Phases: 1: Yonge St & Steeles Ave W/Steeles Ave E

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	177	885	307	151	1089	146	995	193	1578
v/c Ratio	0.85	0.88	0.69	0.76	0.78	0.85	0.51	0.71	0.86
Control Delay	61.8	53.8	34.6	56.6	38.0	66.1	28.5	32.8	39.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.8	53.8	34.6	56.6	38.0	66.1	28.5	32.8	39.9
Queue Length 50th (m)	30.2	117.5	53.7	21.7	98.1	23.0	66.8	26.4	139.0
Queue Length 95th (m)	#75.7	#152.7	91.6	#57.0	109.0	#64.1	80.2	#45.3	161.0
Internal Link Dist (m)		174.7			226.8		81.6		84.7
Turn Bay Length (m)	110.0			160.0		50.0		40.0	
Base Capacity (vph)	209	1010	438	199	1418	171	1990	273	1890
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.88	0.70	0.76	0.77	0.85	0.50	0.71	0.83

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	170	850	295	145	980	65	140	820	135	185	1365	150
Future Volume (vph)	170	850	295	145	980	65	140	820	135	185	1365	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	2.5	6.0	6.0	2.5	6.0		2.5	6.0		2.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		1.00	*0.93		1.00	*0.88	
Frpb, ped/bikes	1.00	1.00	0.71	1.00	0.99		1.00	0.97		1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1515	3400	1043	1526	4758		1620	4763		1609	4541	
Flt Permitted	0.12	1.00	1.00	0.11	1.00		0.08	1.00		0.21	1.00	
Satd. Flow (perm)	187	3400	1043	180	4758		130	4763		362	4541	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	177	885	307	151	1021	68	146	854	141	193	1422	156
RTOR Reduction (vph)	0	0	40	0	6	0	0	18	0	0	10	0
Lane Group Flow (vph)	177	885	267	151	1083	0	146	977	0	193	1568	0
Confl. Peds. (#/hr)	165		255	255		165	270		165	165		270
Heavy Vehicles (%)	11%	5%	2%	10%	5%	13%	4%	5%	2%	4%	4%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	32	0	0	31
Turn Type	pm+pt	NA	custom	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4 5	8			2			6		
Actuated Green, G (s)	48.3	37.1	51.8	46.9	36.4		58.5	50.8		58.3	50.7	
Effective Green, g (s)	51.3	38.1	52.8	49.9	37.4		61.5	51.8		62.3	51.7	
Actuated g/C Ratio	0.40	0.30	0.41	0.39	0.29		0.48	0.40		0.49	0.40	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	206	1012	430	196	1390		169	1927		269	1834	
v/s Ratio Prot	c0.08	c0.26		0.07	0.23		c0.06	0.21		0.05	0.35	
v/s Ratio Perm	0.26		0.26	0.23			c0.35			0.29		
v/c Ratio	0.86	0.87	0.62	0.77	0.78		0.86	0.51		0.72	0.85	
Uniform Delay, d1	29.0	42.7	29.7	29.8	41.5		29.2	28.5		20.2	34.7	
Progression Factor	1.00	1.00	1.00	1.31	0.82		1.00	1.00		1.00	1.00	
Incremental Delay, d2	28.1	8.5	2.8	15.4	2.6		33.8	1.0		8.8	5.3	
Delay (s)	57.1	51.2	32.5	54.4	36.7		63.0	29.5		29.0	40.1	
Level of Service	E	D	C	D	D		E	C		C	D	
Approach Delay (s)		47.8			38.9			33.8			38.9	
Approach LOS		D			D			C			D	

Intersection Summary				
HCM 2000 Control Delay	40.0	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.88			
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	17.0	
Intersection Capacity Utilization	92.7%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	65	1150	20	20	1730
Future Volume (Veh/h)	0	65	1150	20	20	1730
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	68	1198	21	21	1802
Pedestrians	125					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	10					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			109			
pX, platoon unblocked	0.86	0.86			0.86	
vC, conflicting volume	1976	535			1344	
vC1, stage 1 conf vol	1334					
vC2, stage 2 conf vol	643					
vCu, unblocked vol	1567	0			833	
tC, single (s)	6.8	6.9			4.2	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	92			97	
cM capacity (veh/h)	260	836			604	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	68	479	479	261	21	601	601	601
Volume Left	0	0	0	0	21	0	0	0
Volume Right	68	0	0	21	0	0	0	0
cSH	836	1700	1700	1700	604	1700	1700	1700
Volume to Capacity	0.08	0.28	0.28	0.15	0.03	0.35	0.35	0.35
Queue Length 95th (m)	2.1	0.0	0.0	0.0	0.9	0.0	0.0	0.0
Control Delay (s)	9.7	0.0	0.0	0.0	11.2	0.0	0.0	0.0
Lane LOS	A				B			
Approach Delay (s)	9.7	0.0			0.1			
Approach LOS	A							

Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	44.1%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	1110	75	30	1235	20	5	5	35	5	5	15
Future Volume (Veh/h)	5	1110	75	30	1235	20	5	5	35	5	5	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	5	1121	76	30	1247	20	5	5	35	5	5	15
Pedestrians								10			20	
Lane Width (m)								3.5			3.5	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								1			2	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		251			224							
pX, platoon unblocked	0.84			0.76			0.84	0.84	0.76	0.84	0.84	0.84
vC, conflicting volume	1287			1207			1880	2526	608	1935	2544	644
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	972			634			823	1597	0	889	1618	211
tC, single (s)	4.1			4.1			7.5	6.5	6.9	*7.9	*7.3	7.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	*3.6	*4.5	3.4
p0 queue free %	99			96			97	94	96	97	91	98
cM capacity (veh/h)	596			721			191	83	820	152	54	633

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	566	636	446	831	20	45	25
Volume Left	5	0	30	0	0	5	5
Volume Right	0	76	0	0	20	35	15
cSH	596	1700	721	1700	1700	349	168
Volume to Capacity	0.01	0.37	0.04	0.49	0.01	0.13	0.15
Queue Length 95th (m)	0.2	0.0	1.0	0.0	0.0	3.5	4.1
Control Delay (s)	0.2	0.0	1.2	0.0	0.0	16.8	30.1
Lane LOS	A		A			C	D
Approach Delay (s)	0.1		0.4			16.8	30.1
Approach LOS						C	D

Intersection Summary					
Average Delay	0.8				
Intersection Capacity Utilization	65.6%	ICU Level of Service		C	
Analysis Period (min)	15				

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	45	10	5	85	0	15	15	5	0	10	10
Future Volume (vph)	5	45	10	5	85	0	15	15	5	0	10	10
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	6	55	12	6	104	0	18	18	6	0	12	12

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	73	110	42	24
Volume Left (vph)	6	6	18	0
Volume Right (vph)	12	0	6	12
Hadj (s)	-0.01	0.01	0.00	-0.30
Departure Headway (s)	4.1	4.1	4.3	4.0
Degree Utilization, x	0.08	0.13	0.05	0.03
Capacity (veh/h)	845	853	790	845
Control Delay (s)	7.5	7.7	7.5	7.2
Approach Delay (s)	7.5	7.7	7.5	7.2
Approach LOS	A	A	A	A

Intersection Summary					
Delay	7.6				
Level of Service	A				
Intersection Capacity Utilization	22.8%	ICU Level of Service		A	
Analysis Period (min)	15				

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	45	10	5	85	0	15	15	5	0	10	10
Future Vol, veh/h	5	45	10	5	85	0	15	15	5	0	10	10
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles, %	0	6	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	6	55	12	6	104	0	18	18	6	0	12	12
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

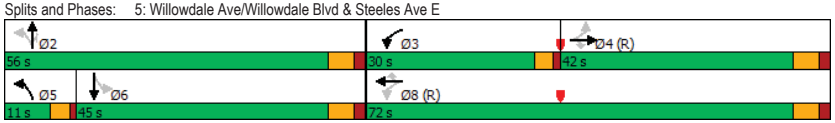
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.4	7.7	7.6	7.2
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	43%	8%	6%	0%
Vol Thru, %	43%	75%	94%	50%
Vol Right, %	14%	17%	0%	50%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	35	60	90	20
LT Vol	15	5	5	0
Through Vol	15	45	85	10
RT Vol	5	10	0	10
Lane Flow Rate	43	73	110	24
Geometry Grp	1	1	1	1
Degree of Util (X)	0.05	0.082	0.125	0.027
Departure Headway (Hd)	4.235	4.018	4.084	3.949
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	833	885	873	890
Service Time	2.324	2.075	2.132	2.044
HCM Lane V/C Ratio	0.052	0.082	0.126	0.027
HCM Control Delay	7.6	7.4	7.7	7.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.3	0.4	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	5	910	235	485	1135	20	120	65	170	55	35
Future Volume (vph)	5	910	235	485	1135	20	120	65	170	55	35
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA
Protected Phases		4		3	8		5	2			6
Permitted Phases	4		4	8		8	2		2	6	
Detector Phase	4	4	4	3	8	8	5	2	2	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	7.0	7.0	7.0	7.0
Minimum Split (s)	42.0	42.0	42.0	10.0	42.0	42.0	11.0	45.0	45.0	45.0	45.0
Total Split (s)	42.0	42.0	42.0	30.0	72.0	72.0	11.0	56.0	56.0	45.0	45.0
Total Split (%)	32.8%	32.8%	32.8%	23.4%	56.3%	56.3%	8.6%	43.8%	43.8%	35.2%	35.2%
Maximum Green (s)	36.0	36.0	36.0	26.0	66.0	66.0	7.0	50.0	50.0	39.0	39.0
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None
Walk Time (s)	23.0	23.0	23.0		23.0	23.0		23.0	23.0	23.0	23.0
Flash Dont Walk (s)	13.0	13.0	13.0		13.0	13.0		16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)	20	20	20		20	20		20	20	20	20

Intersection Summary
Cycle Length: 128
Actuated Cycle Length: 128
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 5: Willowdale Ave/Willowdale Blvd & Steeles Ave E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	5	938	242	500	1170	21	191	175	57	67
v/c Ratio	0.04	0.91	0.51	0.74	0.49	0.02	0.61	0.38	0.32	0.17
Control Delay	62.0	76.4	50.8	36.3	11.1	0.1	51.7	7.1	42.9	21.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.0	76.4	50.8	36.3	11.1	0.1	51.7	7.1	42.9	21.5
Queue Length 50th (m)	1.2	137.4	47.5	93.8	60.8	0.0	47.7	0.0	13.2	7.9
Queue Length 95th (m)	m1.7	m#174.1	m62.5	#178.8	111.1	0.0	64.0	16.7	23.5	17.9
Internal Link Dist (m)		199.6			142.4		80.1			87.7
Turn Bay Length (m)	35.0		20.0	65.0		20.0			15.0	
Base Capacity (vph)	131	1032	471	674	2378	959	558	684	250	552
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.91	0.51	0.74	0.49	0.02	0.34	0.26	0.23	0.12

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	910	235	485	1135	20	120	65	170	55	35	30
Future Volume (vph)	5	910	235	485	1135	20	120	65	170	55	35	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96		1.00	0.97	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1679	3368	1326	1668	3400	1346		1780	1453	1573	1698	
Flt Permitted	0.24	1.00	1.00	0.09	1.00	1.00		0.76	1.00	0.48	1.00	
Satd. Flow (perm)	427	3368	1326	166	3400	1346		1403	1453	802	1698	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	5	938	242	500	1170	21	124	67	175	57	36	31
RTOR Reduction (vph)	0	0	65	0	0	6	0	0	136	0	24	0
Lane Group Flow (vph)	5	938	177	500	1170	15	0	191	39	57	43	0
Confl. Peds. (#/hr)	10		20	20		10	5		15	15		5
Heavy Vehicles (%)	0%	6%	2%	1%	5%	0%	3%	0%	1%	6%	4%	0%
Bus Blockages (#/hr)	0	0	18	0	0	18	0	0	0	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	38.3	38.3	38.3	88.6	88.6	88.6		27.4	27.4	27.4	27.4	
Effective Green, g (s)	39.3	39.3	39.3	89.6	89.6	89.6		28.4	28.4	28.4	28.4	
Actuated g/C Ratio	0.31	0.31	0.31	0.70	0.70	0.70		0.22	0.22	0.22	0.22	
Clearance Time (s)	6.0	6.0	6.0	4.0	6.0	6.0		6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	131	1034	407	671	2380	942		311	322	177	376	
v/s Ratio Prot		c0.28		c0.28	0.34						0.03	
v/s Ratio Perm	0.01		0.13	0.25		0.01		c0.14	0.03	0.07		
v/c Ratio	0.04	0.91	0.43	0.75	0.49	0.02		0.61	0.12	0.32	0.11	
Uniform Delay, d1	31.1	42.6	35.5	28.1	8.8	5.8		44.9	39.8	41.7	39.8	
Progression Factor	1.87	1.61	2.15	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	8.8	2.1	4.5	0.7	0.0		3.6	0.2	1.1	0.1	
Delay (s)	58.5	77.3	78.5	32.6	9.5	5.9		48.4	40.0	42.8	39.9	
Level of Service	E	E	E	C	A	A		D	D	D	D	
Approach Delay (s)		77.5			16.3			44.4			41.2	
Approach LOS		E			B			D			D	

Intersection Summary

HCM 2000 Control Delay	41.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	10	40	25	45	0	40	45	5	0	55	5
Future Volume (vph)	0	10	40	25	45	0	40	45	5	0	55	5
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	11	45	28	51	0	45	51	6	0	62	6

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	56	79	102	68
Volume Left (vph)	0	28	45	0
Volume Right (vph)	45	0	6	6
Hadj (s)	-0.48	0.07	0.07	-0.05
Departure Headway (s)	3.9	4.4	4.3	4.3
Degree Utilization, x	0.06	0.10	0.12	0.08
Capacity (veh/h)	878	771	796	812
Control Delay (s)	7.1	7.9	8.0	7.6
Approach Delay (s)	7.1	7.9	8.0	7.6
Approach LOS	A	A	A	A

Intersection Summary				
Delay			7.7	
Level of Service			A	
Intersection Capacity Utilization			29.4%	ICU Level of Service
Analysis Period (min)			15	

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	10	40	25	45	0	40	45	5	0	55	5
Future Vol, veh/h	0	10	40	25	45	0	40	45	5	0	55	5
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	0	0	0	0	0	0	0	2	0	0	0	0
Mvmt Flow	0	11	45	28	51	0	45	51	6	0	62	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.1	7.9	7.9	7.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	44%	0%	36%	0%
Vol Thru, %	50%	20%	64%	92%
Vol Right, %	6%	80%	0%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	90	50	70	60
LT Vol	40	0	25	0
Through Vol	45	10	45	55
RT Vol	5	40	0	5
Lane Flow Rate	101	56	79	67
Geometry Grp	1	1	1	1
Degree of Util (X)	0.119	0.061	0.096	0.078
Departure Headway (Hd)	4.242	3.885	4.408	4.163
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	833	927	818	846
Service Time	2.33	1.887	2.408	2.261
HCM Lane V/C Ratio	0.121	0.06	0.097	0.079
HCM Control Delay	7.9	7.1	7.9	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.2	0.3	0.3

HCM Unsignalized Intersection Capacity Analysis
7: Dudley Ave & 18 Steeles Ave E Driveway/Site Driveway

Existing AM
36-48 Steeles Ave E (7923-01)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	0	0	0	0	30	0	0	20	5
Future Volume (Veh/h)	5	0	5	0	0	0	0	30	0	0	20	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	5	0	0	0	0	33	0	0	22	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	58	58	24	62	60	33	27			33		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	58	58	24	62	60	33	27			33		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	100	100	100	100			100		
cM capacity (veh/h)	939	834	1052	928	831	1041	1587			1579		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	10	0	33	27
Volume Left	5	0	0	0
Volume Right	5	0	0	5
cSH	992	1700	1587	1579
Volume to Capacity	0.01	0.00	0.00	0.00
Queue Length 95th (m)	0.2	0.0	0.0	0.0
Control Delay (s)	8.7	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	8.7	0.0	0.0	0.0
Approach LOS	A	A		

Intersection Summary					
Average Delay			1.2		
Intersection Capacity Utilization			13.3%	ICU Level of Service	A
Analysis Period (min)			15		

Timings
1: Yonge St & Steeles Ave W/Steeles Ave E

Existing PM
36-48 Steeles Ave E (7923-01)

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	210	995	255	180	945	135	1215	175	1065
Future Volume (vph)	210	995	255	180	945	135	1215	175	1065
Turn Type	pm+pt	NA	custom	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4 5	8		2		6	
Detector Phase	7	4	4 5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	34.0		6.0	34.0	6.0	32.0	6.0	32.0
Minimum Split (s)	14.0	41.0		14.0	41.0	16.0	39.0	16.0	39.0
Total Split (s)	15.0	46.0		14.0	45.0	16.0	52.0	16.0	52.0
Total Split (%)	11.7%	35.9%		10.9%	35.2%	12.5%	40.6%	12.5%	40.6%
Maximum Green (s)	11.0	39.0		10.0	38.0	12.0	45.0	12.0	45.0
Yellow Time (s)	3.0	4.0		3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	3.0		1.0	3.0	1.0	3.0	1.0	3.0
Lost Time Adjust (s)	-2.0	-1.0		-1.5	-1.0	-1.5	-1.0	-2.0	-1.0
Total Lost Time (s)	2.0	6.0		2.5	6.0	2.5	6.0	2.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Min		None	Min	None	C-Min	None	C-Min
Walk Time (s)		7.0			7.0		8.0		8.0
Flash Dont Walk (s)		27.0			27.0		24.0		24.0
Pedestrian Calls (#/hr)		85			85		90		90

Intersection Summary
Cycle Length: 128
Actuated Cycle Length: 128
Offset: 48 (38%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated

Splits and Phases: 1: Yonge St & Steeles Ave W/Steeles Ave E

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	221	1047	268	189	1279	142	1347	184	1310
v/c Ratio	0.95	0.96	0.57	0.89	0.89	0.66	0.92	0.80	0.82
Control Delay	80.2	62.7	25.6	60.5	52.1	38.9	50.2	54.6	41.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.2	62.7	25.6	60.5	52.1	38.9	50.2	54.6	41.4
Queue Length 50th (m)	43.5	143.9	39.0	39.5	119.1	19.7	145.6	31.8	120.9
Queue Length 95th (m)	#97.9	#189.8	68.9	m#77.4	140.1	42.7	#175.1	#70.2	143.0
Internal Link Dist (m)		182.5			226.8		81.6		84.7
Turn Bay Length (m)	110.0			160.0		50.0		40.0	
Base Capacity (vph)	233	1089	477	212	1433	232	1483	233	1600
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.96	0.56	0.89	0.89	0.61	0.91	0.79	0.82

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	995	255	180	945	270	135	1215	65	175	1065	180
Future Volume (vph)	210	995	255	180	945	270	135	1215	65	175	1065	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	2.0	6.0	6.0	2.5	6.0		2.5	6.0		2.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		1.00	*0.77		1.00	*0.85	
Frpb, ped/bikes	1.00	1.00	0.69	1.00	0.95		1.00	0.98		1.00	0.95	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1634	3466	1000	1648	4573		1666	4119		1620	4361	
Flt Permitted	0.10	1.00	1.00	0.10	1.00		0.09	1.00		0.08	1.00	
Satd. Flow (perm)	167	3466	1000	176	4573		153	4119		144	4361	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	221	1047	268	189	995	284	142	1279	68	184	1121	189
RTOR Reduction (vph)	0	0	37	0	40	0	0	4	0	0	17	0
Lane Group Flow (vph)	221	1047	231	189	1239	0	142	1343	0	184	1293	0
Confl. Peds. (#/hr)	185		285	285		185	295		245	245		295
Heavy Vehicles (%)	3%	3%	4%	2%	3%	4%	1%	3%	3%	4%	2%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	31	0	0	26
Turn Type	pm+pt	NA	custom	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4 5	8			2			6		
Actuated Green, G (s)	51.2	39.3	57.0	48.6	38.0		55.1	44.4		57.1	45.4	
Effective Green, g (s)	55.2	40.3	58.0	51.6	39.0		58.1	45.4		61.1	46.4	
Actuated g/C Ratio	0.43	0.31	0.45	0.40	0.30		0.45	0.35		0.48	0.36	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	231	1091	453	210	1393		213	1460		226	1580	
v/s Ratio Prot	c0.10	c0.30		0.09	0.27		0.06	c0.33		c0.09	0.30	
v/s Ratio Perm	0.31		0.23	0.28			0.24			0.30		
v/c Ratio	0.96	0.96	0.51	0.90	0.89		0.67	0.92		0.81	0.82	
Uniform Delay, d1	35.6	43.1	24.9	32.6	42.4		25.2	39.6		32.8	37.0	
Progression Factor	1.00	1.00	1.00	0.89	1.11		1.00	1.00		1.00	1.00	
Incremental Delay, d2	46.7	18.1	0.9	29.7	5.7		7.7	10.9		19.7	4.9	
Delay (s)	82.2	61.1	25.8	58.8	52.8		32.9	50.4		52.5	41.8	
Level of Service	F	E	C	E	D		C	D		D	D	
Approach Delay (s)		58.0			53.6			48.8			43.1	
Approach LOS		E			D			D			D	

Intersection Summary

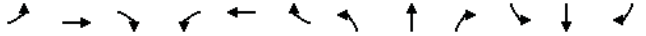
HCM 2000 Control Delay	50.9	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	0.94				
Actuated Cycle Length (s)	128.0	Sum of lost time (s)		17.0	
Intersection Capacity Utilization	93.0%	ICU Level of Service		F	
Analysis Period (min)	15				

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	60	1695	25	55	1480
Future Volume (Veh/h)	5	60	1695	25	55	1480
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	5	61	1730	26	56	1510
Pedestrians	170					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	14					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			109			
pX, platoon unblocked	0.71	0.71			0.71	
vC, conflicting volume	2528	760			1926	
vC1, stage 1 conf vol	1913					
vC2, stage 2 conf vol	615					
vCu, unblocked vol	1715	0			864	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	91			88	
cM capacity (veh/h)	205	663			471	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	66	692	692	372	56	503	503	503
Volume Left	5	0	0	0	56	0	0	0
Volume Right	61	0	0	26	0	0	0	0
cSH	567	1700	1700	1700	471	1700	1700	1700
Volume to Capacity	0.12	0.41	0.41	0.22	0.12	0.30	0.30	0.30
Queue Length 95th (m)	3.1	0.0	0.0	0.0	3.2	0.0	0.0	0.0
Control Delay (s)	12.2	0.0	0.0	0.0	13.7	0.0	0.0	0.0
Lane LOS	B				B			
Approach Delay (s)	12.2	0.0			0.5			
Approach LOS	B							

Intersection Summary					
Average Delay	0.5				
Intersection Capacity Utilization	50.7%	ICU Level of Service			A
Analysis Period (min)	15				

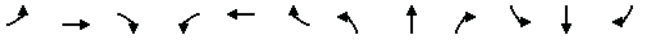


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	1095	25	15	1395	95	15	20	60	5	5	35
Future Volume (Veh/h)	20	1095	25	15	1395	95	15	20	60	5	5	35
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	21	1141	26	16	1453	99	16	21	62	5	5	36
Pedestrians		5						15			35	
Lane Width (m)		3.5						3.5			3.5	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						1			3	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		251			224							
pX, platoon unblocked	0.74			0.72			0.85	0.85	0.72	0.85	0.85	0.74
vC, conflicting volume	1587			1182			2013	2830	598	2205	2744	766
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1098			470			470	1434	0	696	1333	0
tC, single (s)	4.1			4.1			7.7	6.5	6.9	*9.1	*9.0	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	*4.5	*5.6	3.3
p0 queue free %	95			98			95	80	92	96	88	95
cM capacity (veh/h)	464			782			309	103	770	122	41	784

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	592	596	500	969	99	99	46
Volume Left	21	0	16	0	0	16	5
Volume Right	0	26	0	0	99	62	36
cSH	464	1700	782	1700	1700	294	221
Volume to Capacity	0.05	0.35	0.02	0.57	0.06	0.34	0.21
Queue Length 95th (m)	1.1	0.0	0.5	0.0	0.0	11.5	6.1
Control Delay (s)	1.3	0.0	0.6	0.0	0.0	23.3	25.5
Lane LOS	A		A			C	D
Approach Delay (s)	0.7		0.2			23.3	25.5
Approach LOS						C	D

Intersection Summary					
Average Delay	1.6				
Intersection Capacity Utilization	64.1%	ICU Level of Service			C
Analysis Period (min)	15				

* User Entered Value



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	10	75	15	5	45	5	25	95	15	5	25	5
Future Volume (vph)	10	75	15	5	45	5	25	95	15	5	25	5
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	12	88	18	6	53	6	29	112	18	6	29	6

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	118	65	159	41
Volume Left (vph)	12	6	29	6
Volume Right (vph)	18	6	18	6
Hadj (s)	-0.07	-0.04	-0.03	-0.06
Departure Headway (s)	4.4	4.5	4.3	4.4
Degree Utilization, x	0.14	0.08	0.19	0.05
Capacity (veh/h)	786	756	793	758
Control Delay (s)	8.1	7.8	8.4	7.7
Approach Delay (s)	8.1	7.8	8.4	7.7
Approach LOS	A	A	A	A

Intersection Summary				
Delay			8.1	
Level of Service			A	
Intersection Capacity Utilization			26.1%	ICU Level of Service
Analysis Period (min)			15	

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	10	75	15	5	45	5	25	95	15	5	25	5
Future Vol, veh/h	10	75	15	5	45	5	25	95	15	5	25	5
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	12	88	18	6	53	6	29	112	18	6	29	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.1	7.9	8.4	7.7
HCM LOS	A	A	A	A

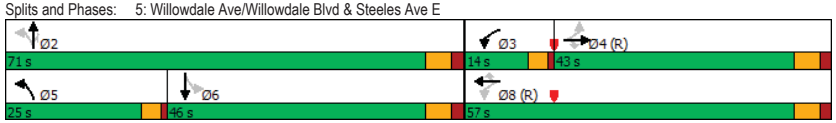
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	19%	10%	9%	14%
Vol Thru, %	70%	75%	82%	71%
Vol Right, %	11%	15%	9%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	135	100	55	35
LT Vol	25	10	5	5
Through Vol	95	75	45	25
RT Vol	15	15	5	5
Lane Flow Rate	159	118	65	41
Geometry Grp	1	1	1	1
Degree of Util (X)	0.191	0.142	0.08	0.051
Departure Headway (Hd)	4.33	4.357	4.448	4.431
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	831	825	807	810
Service Time	2.345	2.373	2.466	2.449
HCM Lane V/C Ratio	0.191	0.143	0.081	0.051
HCM Control Delay	8.4	8.1	7.9	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	0.5	0.3	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	45	980	135	190	1135	30	360	35	460	30	105
Future Volume (vph)	45	980	135	190	1135	30	360	35	460	30	105
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA
Protected Phases		4		3	8		5	2			6
Permitted Phases	4		4	8		8	2		2	6	
Detector Phase	4	4	4	3	8	8	5	2	2	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	7.0	7.0	7.0	7.0
Minimum Split (s)	43.0	43.0	43.0	14.0	43.0	43.0	25.0	46.0	46.0	46.0	46.0
Total Split (s)	43.0	43.0	43.0	14.0	57.0	57.0	25.0	71.0	71.0	46.0	46.0
Total Split (%)	33.6%	33.6%	33.6%	10.9%	44.5%	44.5%	19.5%	55.5%	55.5%	35.9%	35.9%
Maximum Green (s)	37.0	37.0	37.0	10.0	51.0	51.0	21.0	65.0	65.0	40.0	40.0
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None
Walk Time (s)	24.0	24.0	24.0		24.0	24.0		24.0	24.0	24.0	24.0
Flash Dont Walk (s)	13.0	13.0	13.0		13.0	13.0		16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)	15	15	15		15	15		15	15	15	15

Intersection Summary

Cycle Length: 128
Actuated Cycle Length: 128
Offset: 41.5 (32%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 5: Willowdale Ave/Willowdale Blvd & Steeles Ave E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	46	1010	139	196	1170	31	407	474	31	118
v/c Ratio	0.41	0.85	0.27	0.75	0.69	0.04	0.77	0.62	0.11	0.15
Control Delay	24.0	25.5	4.6	48.2	29.8	1.4	40.4	15.5	19.2	19.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	25.5	4.6	48.2	29.8	1.4	40.4	15.5	19.2	19.7
Queue Length 50th (m)	8.9	142.8	11.1	34.4	126.6	0.0	87.8	45.3	4.7	17.5
Queue Length 95th (m)	m10.1	m#163.2	m12.6	#91.0	175.0	1.9	114.6	70.0	10.1	26.1
Internal Link Dist (m)		199.6			142.4		80.1			87.5
Turn Bay Length (m)	35.0		20.0	65.0		20.0			15.0	
Base Capacity (vph)	112	1192	524	260	1696	695	630	872	282	806
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.85	0.27	0.75	0.69	0.04	0.65	0.54	0.11	0.15

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	980	135	190	1135	30	360	35	460	30	105	10
Future Volume (vph)	45	980	135	190	1135	30	360	35	460	30	105	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96		1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		0.99	1.00	0.99	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1680	3466	1345	1668	3466	1359		1768	1468	1674	1852	
Flt Permitted	0.18	1.00	1.00	0.09	1.00	1.00		0.66	1.00	0.37	1.00	
Satd. Flow (perm)	327	3466	1345	149	3466	1359		1222	1468	652	1852	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	46	1010	139	196	1170	31	371	36	474	31	108	10
RTOR Reduction (vph)	0	0	62	0	0	16	0	0	136	0	2	0
Lane Group Flow (vph)	46	1010	77	196	1170	15	0	407	338	31	116	0
Confl. Peds. (#/hr)	10		15	15		10	10		15	15		10
Heavy Vehicles (%)	0%	3%	2%	1%	3%	0%	1%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	16	0	0	16	0	0	0	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	43.0	43.0	43.0	61.6	61.6	61.6		54.4	54.4	54.4	54.4	
Effective Green, g (s)	44.0	44.0	44.0	62.6	62.6	62.6		55.4	55.4	55.4	55.4	
Actuated g/C Ratio	0.34	0.34	0.34	0.49	0.49	0.49		0.43	0.43	0.43	0.43	
Clearance Time (s)	6.0	6.0	6.0	4.0	6.0	6.0		6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	112	1191	462	257	1695	664		528	635	282	801	
v/s Ratio Prot		c0.29		c0.09	0.34						0.06	
v/s Ratio Perm	0.14		0.06	0.28		0.01		c0.33	0.23	0.05		
v/c Ratio	0.41	0.85	0.17	0.76	0.69	0.02		0.77	0.53	0.11	0.14	
Uniform Delay, d1	32.1	38.9	29.2	32.2	25.2	16.9		30.9	26.8	21.6	22.0	
Progression Factor	0.49	0.50	0.32	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.9	3.6	0.3	12.6	2.3	0.1		6.9	0.9	0.2	0.1	
Delay (s)	20.5	23.1	9.7	44.7	27.6	17.0		37.8	27.6	21.8	22.0	
Level of Service	C	C	A	D	C	B		D	C	C	C	
Approach Delay (s)		21.4			29.7			32.3			22.0	
Approach LOS		C			C			C			C	

Intersection Summary				
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.83			
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	17.0	
Intersection Capacity Utilization	88.5%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	35	55	15	25	0	25	70	15	0	75	5
Future Volume (vph)	5	35	55	15	25	0	25	70	15	0	75	5
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	6	41	64	17	29	0	29	81	17	0	87	6

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	111	46	127	93
Volume Left (vph)	6	17	29	0
Volume Right (vph)	64	0	17	6
Hadj (s)	-0.34	0.07	-0.03	-0.04
Departure Headway (s)	4.1	4.6	4.3	4.4
Degree Utilization, x	0.13	0.06	0.15	0.11
Capacity (veh/h)	827	731	796	782
Control Delay (s)	7.7	7.9	8.1	7.9
Approach Delay (s)	7.7	7.9	8.1	7.9
Approach LOS	A	A	A	A

Intersection Summary				
Delay	7.9			
Level of Service	A			
Intersection Capacity Utilization	26.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection	
Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	5	35	55	15	25	0	25	70	15	0	75	5
Future Vol, veh/h	5	35	55	15	25	0	25	70	15	0	75	5
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	6	41	64	17	29	0	29	81	17	0	87	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.7	7.9	8.1	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	23%	5%	38%	0%
Vol Thru, %	64%	37%	62%	94%
Vol Right, %	14%	58%	0%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	110	95	40	80
LT Vol	25	5	15	0
Through Vol	70	35	25	75
RT Vol	15	55	0	5
Lane Flow Rate	128	110	47	93
Geometry Grp	1	1	1	1
Degree of Util (X)	0.153	0.126	0.059	0.112
Departure Headway (Hd)	4.309	4.113	4.589	4.346
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	834	874	782	827
Service Time	2.324	2.126	2.605	2.361
HCM Lane V/C Ratio	0.153	0.126	0.06	0.112
HCM Control Delay	8.1	7.7	7.9	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.4	0.2	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (veh/h)	5	0	5	0	0	0	5	130	0	0	40	5
Future Volume (Veh/h)	5	0	5	0	0	0	5	130	0	0	40	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	5	0	0	0	5	141	0	0	43	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	196	196	46	202	199	141	48			141		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	196	196	46	202	199	141	48			141		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	100	100	100	100			100		
cM capacity (veh/h)	761	697	1024	751	695	907	1559			1442		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	10	0	146	48
Volume Left	5	0	5	0
Volume Right	5	0	0	5
cSH	873	1700	1559	1442
Volume to Capacity	0.01	0.00	0.00	0.00
Queue Length 95th (m)	0.3	0.0	0.1	0.0
Control Delay (s)	9.2	0.0	0.3	0.0
Lane LOS	A	A	A	
Approach Delay (s)	9.2	0.0	0.3	0.0
Approach LOS	A	A		

Intersection Summary				
Average Delay		0.6		
Intersection Capacity Utilization		20.9%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	215	950	435	160	1060	225	975	240	1520
Future Volume (vph)	215	950	435	160	1060	225	975	240	1520
Turn Type	pm+pt	NA	custom	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4 5	8		2		6	
Detector Phase	7	4	4 5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	34.0		6.0	34.0	6.0	32.0	6.0	32.0
Minimum Split (s)	14.0	44.0		14.0	44.0	10.0	39.0	11.0	39.0
Total Split (s)	16.0	46.0		14.0	44.0	16.0	47.0	21.0	52.0
Total Split (%)	12.5%	35.9%		10.9%	34.4%	12.5%	36.7%	16.4%	40.6%
Maximum Green (s)	12.0	39.0		10.0	37.0	12.0	40.0	17.0	45.0
Yellow Time (s)	3.0	4.0		3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	3.0		1.0	3.0	1.0	3.0	1.0	3.0
Lost Time Adjust (s)	-1.5	-1.0		-1.5	-1.0	-1.5	-1.0	-2.0	-1.0
Total Lost Time (s)	2.5	6.0		2.5	6.0	2.5	6.0	2.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Min		None	Min	None	C-Min	None	C-Min
Walk Time (s)		7.0			7.0		8.0		8.0
Flash Dont Walk (s)		27.0			27.0		24.0		24.0
Pedestrian Calls (#/hr)		85			85		95		95

Intersection Summary

Cycle Length: 128
Actuated Cycle Length: 128
Offset: 57 (45%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 1: Yonge St & Steeles Ave W/Steeles Ave E

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	224	990	453	167	1187	234	1204	250	1807
v/c Ratio	1.05	0.94	0.88	0.88	0.84	1.01	0.76	0.84	1.11
Control Delay	109.7	59.5	45.8	81.4	43.9	97.6	41.4	52.6	98.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	109.7	59.5	45.8	81.4	43.9	97.6	41.4	52.6	98.1
Queue Length 50th (m)	~49.8	134.0	88.6	32.4	109.4	~50.8	101.2	44.7	~206.8
Queue Length 95th (m)	#103.5	#176.0	#159.6	#74.1	99.7	#104.6	119.4	#88.2	#239.3
Internal Link Dist (m)		174.7			226.8		81.6		84.7
Turn Bay Length (m)	110.0			160.0		50.0		40.0	
Base Capacity (vph)	213	1062	506	190	1415	231	1583	308	1624
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.05	0.93	0.90	0.88	0.84	1.01	0.76	0.81	1.11

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	215	950	435	160	1060	80	225	975	180	240	1520	215
Future Volume (vph)	215	950	435	160	1060	80	225	975	180	240	1520	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	2.5	6.0	6.0	2.5	6.0		2.5	6.0		2.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		1.00	*0.93		1.00	*0.88	
Frpb, ped/bikes	1.00	1.00	0.71	1.00	0.99		1.00	0.97		1.00	0.96	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1516	3400	1043	1528	4743		1620	4740		1617	4484	
Flt Permitted	0.10	1.00	1.00	0.10	1.00		0.09	1.00		0.11	1.00	
Satd. Flow (perm)	159	3400	1043	168	4743		160	4740		190	4484	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	224	990	453	167	1104	83	234	1016	188	250	1583	224
RTOR Reduction (vph)	0	0	55	0	6	0	0	21	0	0	13	0
Lane Group Flow (vph)	224	990	398	167	1181	0	234	1183	0	250	1794	0
Confl. Peds. (#/hr)	165		255	255		165	270		165	165		270
Heavy Vehicles (%)	11%	5%	2%	10%	5%	13%	4%	5%	2%	4%	4%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	32	0	0	31
Turn Type	pm+pt	NA	custom	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4 5	8			2			6		
Actuated Green, G (s)	50.7	38.7	58.0	46.7	36.7		53.5	41.2		61.1	45.0	
Effective Green, g (s)	53.7	39.7	59.0	49.7	37.7		56.5	42.2		63.3	46.0	
Actuated g/C Ratio	0.42	0.31	0.46	0.39	0.29		0.44	0.33		0.49	0.36	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	209	1054	480	187	1396		228	1562		295	1611	
v/s Ratio Prot	c0.11	0.29		0.08	0.25		c0.11	0.25		c0.12	c0.40	
v/s Ratio Perm	c0.34		0.38	0.27			0.34			0.30		
v/c Ratio	1.07	0.94	0.83	0.89	0.85		1.03	0.76		0.85	1.11	
Uniform Delay, d1	36.0	43.0	30.1	31.0	42.4		38.3	38.3		30.9	41.0	
Progression Factor	1.00	1.00	1.00	1.57	0.90		1.00	1.00		1.00	1.00	
Incremental Delay, d2	82.6	15.1	11.3	33.9	4.3		66.6	3.5		19.6	60.3	
Delay (s)	118.6	58.1	41.4	82.6	42.7		104.9	41.8		50.5	101.3	
Level of Service	F	E	D	F	D		F	D		D	F	
Approach Delay (s)		61.7			47.6			52.1			95.1	
Approach LOS		E			D			D			F	

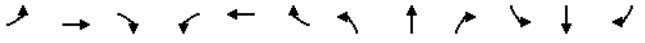
Intersection Summary				
HCM 2000 Control Delay	67.2	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	1.12			
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	17.0	
Intersection Capacity Utilization	104.6%	ICU Level of Service	G	
Analysis Period (min)	15			

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	65	1370	20	20	2035
Future Volume (Veh/h)	0	65	1370	20	20	2035
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	68	1427	21	21	2120
Pedestrians	125					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	10					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			109			
pX, platoon unblocked	0.79	0.79			0.79	
vC, conflicting volume	2311	611			1573	
vC1, stage 1 conf vol	1562					
vC2, stage 2 conf vol	749					
vCu, unblocked vol	1732	0			799	
tC, single (s)	6.8	6.9			4.2	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	91			96	
cM capacity (veh/h)	239	768			571	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	68	571	571	306	21	707	707	707
Volume Left	0	0	0	0	21	0	0	0
Volume Right	68	0	0	21	0	0	0	0
cSH	768	1700	1700	1700	571	1700	1700	1700
Volume to Capacity	0.09	0.34	0.34	0.18	0.04	0.42	0.42	0.42
Queue Length 95th (m)	2.3	0.0	0.0	0.0	0.9	0.0	0.0	0.0
Control Delay (s)	10.1	0.0	0.0	0.0	11.5	0.0	0.0	0.0
Lane LOS	B				B			
Approach Delay (s)	10.1	0.0			0.1			
Approach LOS	B							

Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	50.0%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	1310	75	30	1345	25	5	5	35	5	5	15
Future Volume (Veh/h)	5	1310	75	30	1345	25	5	5	35	5	5	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	5	1323	76	30	1359	25	5	5	35	5	5	15
Pedestrians								10			20	
Lane Width (m)								3.5			3.5	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								1			2	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		251			224							
pX, platoon unblocked	0.82			0.72			0.82	0.82	0.72	0.82	0.82	0.82
vC, conflicting volume	1404			1409			2138	2845	710	2148	2858	700
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1044			799			926	1793	0	938	1809	180
tC, single (s)	4.1			4.1			7.5	6.5	6.9	*7.9	*7.3	7.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	*3.6	*4.5	3.4
p0 queue free %	99			95			97	92	96	96	87	98
cM capacity (veh/h)	541			597			151	61	782	133	39	641

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	666	738	483	906	25	45	25
Volume Left	5	0	30	0	0	5	5
Volume Right	0	76	0	0	25	35	15
cSH	541	1700	597	1700	1700	282	131
Volume to Capacity	0.01	0.43	0.05	0.53	0.01	0.16	0.19
Queue Length 95th (m)	0.2	0.0	1.3	0.0	0.0	4.5	5.4
Control Delay (s)	0.3	0.0	1.4	0.0	0.0	20.2	38.8
Lane LOS	A		A			C	E
Approach Delay (s)	0.1		0.5			20.2	38.8
Approach LOS						C	E

Intersection Summary					
Average Delay	1.0				
Intersection Capacity Utilization	68.6%	ICU Level of Service		C	
Analysis Period (min)	15				

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	45	10	5	85	0	15	20	5	0	10	10
Future Volume (vph)	5	45	10	5	85	0	15	20	5	0	10	10
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	6	55	12	6	104	0	18	24	6	0	12	12

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	73	110	48	24
Volume Left (vph)	6	6	18	0
Volume Right (vph)	12	0	6	12
Hadj (s)	-0.01	0.01	0.00	-0.30
Departure Headway (s)	4.2	4.1	4.3	4.0
Degree Utilization, x	0.08	0.13	0.06	0.03
Capacity (veh/h)	841	849	790	843
Control Delay (s)	7.5	7.7	7.6	7.2
Approach Delay (s)	7.5	7.7	7.6	7.2
Approach LOS	A	A	A	A

Intersection Summary					
Delay	7.6				
Level of Service	A				
Intersection Capacity Utilization	22.9%	ICU Level of Service		A	
Analysis Period (min)	15				

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	45	10	5	85	0	15	20	5	0	10	10
Future Vol, veh/h	5	45	10	5	85	0	15	20	5	0	10	10
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles, %	0	6	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	6	55	12	6	104	0	18	24	6	0	12	12
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

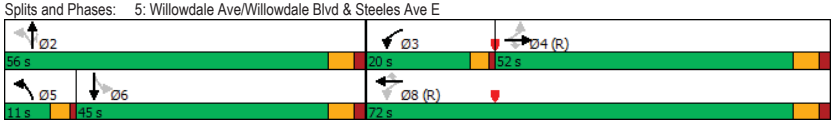
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.5	7.7	7.6	7.2
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	38%	8%	6%	0%
Vol Thru, %	50%	75%	94%	50%
Vol Right, %	12%	17%	0%	50%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	40	60	90	20
LT Vol	15	5	5	0
Through Vol	20	45	85	10
RT Vol	5	10	0	10
Lane Flow Rate	49	73	110	24
Geometry Grp	1	1	1	1
Degree of Util (X)	0.057	0.082	0.125	0.027
Departure Headway (Hd)	4.235	4.028	4.094	3.953
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	833	882	870	889
Service Time	2.324	2.089	2.146	2.051
HCM Lane V/C Ratio	0.059	0.083	0.126	0.027
HCM Control Delay	7.6	7.5	7.7	7.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.3	0.4	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	5	1110	235	530	1250	20	120	65	215	55	35
Future Volume (vph)	5	1110	235	530	1250	20	120	65	215	55	35
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA
Protected Phases		4		3	8		5	2			6
Permitted Phases	4		4	8		8	2		2	6	
Detector Phase	4	4	4	3	8	8	5	2	2	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	7.0	7.0	7.0	7.0
Minimum Split (s)	42.0	42.0	42.0	10.0	42.0	42.0	11.0	45.0	45.0	45.0	45.0
Total Split (s)	52.0	52.0	52.0	20.0	72.0	72.0	11.0	56.0	56.0	45.0	45.0
Total Split (%)	40.6%	40.6%	40.6%	15.6%	56.3%	56.3%	8.6%	43.8%	43.8%	35.2%	35.2%
Maximum Green (s)	46.0	46.0	46.0	16.0	66.0	66.0	7.0	50.0	50.0	39.0	39.0
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None
Walk Time (s)	23.0	23.0	23.0		23.0	23.0		23.0	23.0	23.0	23.0
Flash Dont Walk (s)	13.0	13.0	13.0		13.0	13.0		16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)	20	20	20		20	20		20	20	20	20

Intersection Summary
Cycle Length: 128
Actuated Cycle Length: 128
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated

Splits and Phases: 5: Willowdale Ave/Willowdale Blvd & Steeles Ave E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	5	1144	242	546	1289	21	191	222	57	67
v/c Ratio	0.04	0.94	0.45	0.94	0.54	0.02	0.61	0.45	0.32	0.17
Control Delay	33.6	46.2	22.7	61.0	11.9	0.1	51.7	7.1	42.9	21.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.6	46.2	22.7	61.0	11.9	0.1	51.7	7.1	42.9	21.5
Queue Length 50th (m)	0.7	100.3	22.7	118.3	70.7	0.0	47.7	0.0	13.2	7.9
Queue Length 95th (m)	m1.1	m#117.2	m31.0	#241.5	128.9	0.0	64.0	18.5	23.5	17.9
Internal Link Dist (m)		199.6			142.4		80.1			87.7
Turn Bay Length (m)	35.0		20.0	65.0		20.0			15.0	
Base Capacity (vph)	139	1236	546	580	2378	959	558	712	250	552
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.93	0.44	0.94	0.54	0.02	0.34	0.31	0.23	0.12

Intersection Summary

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

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	1110	235	530	1250	20	120	65	215	55	35	30
Future Volume (vph)	5	1110	235	530	1250	20	120	65	215	55	35	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96		1.00	0.97	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1680	3368	1326	1668	3400	1346		1780	1453	1573	1698	
Flt Permitted	0.21	1.00	1.00	0.08	1.00	1.00		0.76	1.00	0.48	1.00	
Satd. Flow (perm)	379	3368	1326	142	3400	1346		1403	1453	802	1698	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	5	1144	242	546	1289	21	124	67	222	57	36	31
RTOR Reduction (vph)	0	0	60	0	0	6	0	0	173	0	24	0
Lane Group Flow (vph)	5	1144	182	546	1289	15	0	191	49	57	43	0
Confl. Peds. (#/hr)	10		20	20		10	5		15	15		5
Heavy Vehicles (%)	0%	6%	2%	1%	5%	0%	3%	0%	1%	6%	4%	0%
Bus Blockages (#/hr)	0	0	18	0	0	18	0	0	0	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	45.5	45.5	45.5	88.6	88.6	88.6		27.4	27.4	27.4	27.4	
Effective Green, g (s)	46.5	46.5	46.5	89.6	89.6	89.6		28.4	28.4	28.4	28.4	
Actuated g/C Ratio	0.36	0.36	0.36	0.70	0.70	0.70		0.22	0.22	0.22	0.22	
Clearance Time (s)	6.0	6.0	6.0	4.0	6.0	6.0		6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	137	1223	481	577	2380	942		311	322	177	376	
v/s Ratio Prot		0.34		c0.30	0.38						0.03	
v/s Ratio Perm	0.01		0.14	c0.37		0.01		c0.14	0.03	0.07		
v/c Ratio	0.04	0.94	0.38	0.95	0.54	0.02		0.61	0.15	0.32	0.11	
Uniform Delay, d1	26.3	39.3	30.1	36.5	9.3	5.8		44.9	40.1	41.7	39.8	
Progression Factor	1.25	0.95	1.15	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	8.4	1.1	24.6	0.9	0.0		3.6	0.2	1.1	0.1	
Delay (s)	33.1	45.7	35.8	61.1	10.2	5.9		48.4	40.3	42.8	39.9	
Level of Service	C	D	D	E	B	A		D	D	D	D	
Approach Delay (s)		43.9			25.1			44.1			41.2	
Approach LOS		D			C			D			D	

Intersection Summary

HCM 2000 Control Delay	34.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	94.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	10	40	25	45	0	40	45	5	0	55	5
Future Volume (vph)	0	10	40	25	45	0	40	45	5	0	55	5
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	11	45	28	51	0	45	51	6	0	62	6

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	56	79	102	68
Volume Left (vph)	0	28	45	0
Volume Right (vph)	45	0	6	6
Hadj (s)	-0.48	0.07	0.07	-0.05
Departure Headway (s)	3.9	4.4	4.3	4.3
Degree Utilization, x	0.06	0.10	0.12	0.08
Capacity (veh/h)	878	771	796	812
Control Delay (s)	7.1	7.9	8.0	7.6
Approach Delay (s)	7.1	7.9	8.0	7.6
Approach LOS	A	A	A	A

Intersection Summary				
Delay			7.7	
Level of Service			A	
Intersection Capacity Utilization			29.4%	ICU Level of Service
Analysis Period (min)			15	

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	10	40	25	45	0	40	45	5	0	55	5
Future Vol, veh/h	0	10	40	25	45	0	40	45	5	0	55	5
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	0	0	0	0	0	0	0	2	0	0	0	0
Mvmt Flow	0	11	45	28	51	0	45	51	6	0	62	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.1	7.9	7.9	7.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	44%	0%	36%	0%
Vol Thru, %	50%	20%	64%	92%
Vol Right, %	6%	80%	0%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	90	50	70	60
LT Vol	40	0	25	0
Through Vol	45	10	45	55
RT Vol	5	40	0	5
Lane Flow Rate	101	56	79	67
Geometry Grp	1	1	1	1
Degree of Util (X)	0.119	0.061	0.096	0.078
Departure Headway (Hd)	4.242	3.885	4.408	4.163
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	833	927	818	846
Service Time	2.33	1.887	2.408	2.261
HCM Lane V/C Ratio	0.121	0.06	0.097	0.079
HCM Control Delay	7.9	7.1	7.9	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.2	0.3	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	0	0	0	0	35	0	0	20	5
Future Volume (Veh/h)	5	0	5	0	0	0	0	35	0	0	20	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	5	0	0	0	0	38	0	0	22	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	62	62	24	68	65	38	27			38		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	62	62	24	68	65	38	27			38		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	100	100	100	100			100		
cM capacity (veh/h)	932	828	1052	921	826	1034	1587			1572		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	10	0	38	27
Volume Left	5	0	0	0
Volume Right	5	0	0	5
cSH	988	1700	1587	1572
Volume to Capacity	0.01	0.00	0.00	0.00
Queue Length 95th (m)	0.2	0.0	0.0	0.0
Control Delay (s)	8.7	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	8.7	0.0	0.0	0.0
Approach LOS	A	A		

Intersection Summary					
Average Delay			1.2		
Intersection Capacity Utilization			13.3%	ICU Level of Service	A
Analysis Period (min)			15		

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	240	1065	375	205	1085	255	1420	220	1250
Future Volume (vph)	240	1065	375	205	1085	255	1420	220	1250
Turn Type	pm+pt	NA	custom	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4 5	8		2		6	
Detector Phase	7	4	4 5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	34.0		6.0	34.0	6.0	32.0	6.0	32.0
Minimum Split (s)	14.0	41.0		14.0	41.0	16.0	39.0	16.0	39.0
Total Split (s)	16.0	46.0		14.0	44.0	19.0	52.0	16.0	49.0
Total Split (%)	12.5%	35.9%		10.9%	34.4%	14.8%	40.6%	12.5%	38.3%
Maximum Green (s)	12.0	39.0		10.0	37.0	15.0	45.0	12.0	42.0
Yellow Time (s)	3.0	4.0		3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	3.0		1.0	3.0	1.0	3.0	1.0	3.0
Lost Time Adjust (s)	-2.0	-1.0		-1.5	-1.0	-1.5	-1.0	-2.0	-1.0
Total Lost Time (s)	2.0	6.0		2.5	6.0	2.5	6.0	2.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Min		None	Min	None	C-Min	None	C-Min
Walk Time (s)		7.0			7.0		8.0		8.0
Flash Dont Walk (s)		27.0			27.0		24.0		24.0
Pedestrian Calls (#/hr)		85			85		90		90

Intersection Summary
Cycle Length: 128
Actuated Cycle Length: 128
Offset: 48 (38%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated

Splits and Phases: 1: Yonge St & Steeles Ave W/Steeles Ave E

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	253	1121	395	216	1505	268	1595	232	1590
v/c Ratio	1.07	1.04	0.79	1.04	1.08	0.98	1.08	0.99	1.09
Control Delay	110.3	79.8	37.6	88.9	87.6	84.8	87.6	91.3	89.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	110.3	79.8	37.6	88.9	87.6	84.8	87.6	91.3	89.9
Queue Length 50th (m)	~57.8	~168.1	74.1	~49.8	~161.0	55.0	~204.3	46.1	~183.3
Queue Length 95th (m)	#113.8	#211.9	#134.3	m#73.0	#193.7	#112.8	#241.6	#101.5	#217.2
Internal Link Dist (m)		182.5			226.8		81.6		84.7
Turn Bay Length (m)	110.0			160.0		50.0		40.0	
Base Capacity (vph)	237	1083	497	207	1392	273	1476	234	1465
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.07	1.04	0.79	1.04	1.08	0.98	1.08	0.99	1.09

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	240	1065	375	205	1085	345	255	1420	95	220	1250	260
Future Volume (vph)	240	1065	375	205	1085	345	255	1420	95	220	1250	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	2.0	6.0	6.0	2.5	6.0		2.5	6.0		2.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		1.00	*0.77		1.00	*0.85	
Frpb, ped/bikes	1.00	1.00	0.69	1.00	0.95		1.00	0.98		1.00	0.95	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1636	3466	1000	1652	4538		1668	4096		1620	4297	
Flt Permitted	0.10	1.00	1.00	0.10	1.00		0.09	1.00		0.09	1.00	
Satd. Flow (perm)	168	3466	1000	181	4538		153	4096		155	4297	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	253	1121	395	216	1142	363	268	1495	100	232	1316	274
RTOR Reduction (vph)	0	0	35	0	45	0	0	4	0	0	22	0
Lane Group Flow (vph)	253	1121	360	216	1460	0	268	1591	0	232	1568	0
Confl. Peds. (#/hr)	185		285	285		185	295		245	245		295
Heavy Vehicles (%)	3%	3%	4%	2%	3%	4%	1%	3%	3%	4%	2%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	31	0	0	26
Turn Type	pm+pt	NA	custom	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4 5	8			2			6		
Actuated Green, G (s)	51.0	39.0	61.0	47.0	37.0		60.0	45.0		54.0	42.0	
Effective Green, g (s)	55.0	40.0	62.0	50.0	38.0		62.5	46.0		58.0	43.0	
Actuated g/C Ratio	0.43	0.31	0.48	0.39	0.30		0.49	0.36		0.45	0.34	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	232	1083	484	202	1347		270	1472		230	1443	
v/s Ratio Prot	c0.12	c0.32		0.10	0.32		c0.13	c0.39		c0.11	0.36	
v/s Ratio Perm	0.35		0.36	0.32			0.36			0.35		
v/c Ratio	1.09	1.04	0.74	1.07	1.08		0.99	1.08		1.01	1.09	
Uniform Delay, d1	37.8	44.0	26.6	35.2	45.0		40.1	41.0		38.7	42.5	
Progression Factor	1.00	1.00	1.00	0.82	1.05		1.00	1.00		1.00	1.00	
Incremental Delay, d2	85.3	36.8	6.1	69.4	46.4		52.5	48.5		61.6	51.0	
Delay (s)	123.2	80.8	32.7	98.4	93.5		92.6	89.5		100.3	93.5	
Level of Service	F	F	C	F	F		F	F		F	F	
Approach Delay (s)		76.1			94.1			89.9			94.3	
Approach LOS		E			F			F			F	

Intersection Summary

HCM 2000 Control Delay	88.7	HCM 2000 Level of Service		F	
HCM 2000 Volume to Capacity ratio	1.10				
Actuated Cycle Length (s)	128.0	Sum of lost time (s)		17.0	
Intersection Capacity Utilization	106.0%	ICU Level of Service		G	
Analysis Period (min)	15				

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	60	2000	25	55	1845
Future Volume (Veh/h)	5	60	2000	25	55	1845
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	5	61	2041	26	56	1883
Pedestrians	170					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	14					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			109			
pX, platoon unblocked	0.66	0.66			0.66	
vC, conflicting volume	2964	863			2237	
vC1, stage 1 conf vol	2224					
vC2, stage 2 conf vol	740					
vCu, unblocked vol	2174	0			1074	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	90			85	
cM capacity (veh/h)	150	619			366	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	66	816	816	434	56	628	628	628
Volume Left	5	0	0	0	56	0	0	0
Volume Right	61	0	0	26	0	0	0	0
cSH	500	1700	1700	1700	366	1700	1700	1700
Volume to Capacity	0.13	0.48	0.48	0.26	0.15	0.37	0.37	0.37
Queue Length 95th (m)	3.6	0.0	0.0	0.0	4.3	0.0	0.0	0.0
Control Delay (s)	13.3	0.0	0.0	0.0	16.6	0.0	0.0	0.0
Lane LOS	B				C			
Approach Delay (s)	13.3	0.0			0.5			
Approach LOS	B							

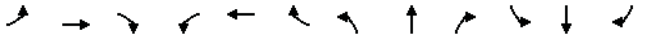
Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	56.4%	ICU Level of Service		B
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	1240	25	15	1635	105	15	20	60	5	5	35
Future Volume (Veh/h)	20	1240	25	15	1635	105	15	20	60	5	5	35
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	21	1292	26	16	1703	109	16	21	62	5	5	36
Pedestrians		5						15			35	
Lane Width (m)		3.5						3.5			3.5	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						1			3	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		251			224							
pX, platoon unblocked	0.64			0.70			0.79	0.79	0.70	0.79	0.79	0.64
vC, conflicting volume	1847			1333			2289	3241	674	2530	3145	892
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1192			635			403	1615	0	710	1493	0
tC, single (s)	4.1			4.1			7.7	6.5	6.9	*9.1	*9.0	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	*4.5	*5.6	3.3
p0 queue free %	94			98			95	71	92	95	82	95
cM capacity (veh/h)	367			667			298	73	755	100	27	673

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	667	672	584	1135	109	99	46
Volume Left	21	0	16	0	0	16	5
Volume Right	0	26	0	0	109	62	36
cSH	367	1700	667	1700	1700	233	161
Volume to Capacity	0.06	0.40	0.02	0.67	0.06	0.42	0.29
Queue Length 95th (m)	1.4	0.0	0.6	0.0	0.0	15.8	8.9
Control Delay (s)	1.9	0.0	0.7	0.0	0.0	31.4	36.0
Lane LOS	A		A			D	E
Approach Delay (s)	0.9		0.2			31.4	36.0
Approach LOS						D	E

Intersection Summary				
Average Delay	1.9			
Intersection Capacity Utilization	70.7%	ICU Level of Service		C
Analysis Period (min)	15			

* User Entered Value



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	10	75	15	5	45	5	25	105	15	15	25	5
Future Volume (vph)	10	75	15	5	45	5	25	105	15	15	25	5
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	12	88	18	6	53	6	29	124	18	18	29	6

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	118	65	171	53
Volume Left (vph)	12	6	29	18
Volume Right (vph)	18	6	18	6
Hadj (s)	-0.07	-0.04	-0.03	0.00
Departure Headway (s)	4.4	4.5	4.4	4.5
Degree Utilization, x	0.15	0.08	0.21	0.07
Capacity (veh/h)	772	743	789	746
Control Delay (s)	8.2	7.9	8.5	7.8
Approach Delay (s)	8.2	7.9	8.5	7.8
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.2		
Level of Service	A		
Intersection Capacity Utilization	24.5%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	75	15	5	45	5	25	105	15	15	25	5
Future Vol, veh/h	10	75	15	5	45	5	25	105	15	15	25	5
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	12	88	18	6	53	6	29	124	18	18	29	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.2	7.9	8.5	7.8
HCM LOS	A	A	A	A

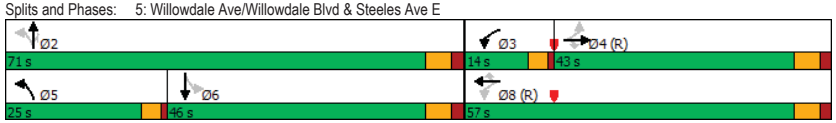
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	17%	10%	9%	33%
Vol Thru, %	72%	75%	82%	56%
Vol Right, %	10%	15%	9%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	145	100	55	45
LT Vol	25	10	5	15
Through Vol	105	75	45	25
RT Vol	15	15	5	5
Lane Flow Rate	171	118	65	53
Geometry Grp	1	1	1	1
Degree of Util (X)	0.206	0.144	0.081	0.066
Departure Headway (Hd)	4.352	4.413	4.506	4.507
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	827	814	797	796
Service Time	2.367	2.431	2.526	2.527
HCM Lane V/C Ratio	0.207	0.145	0.082	0.067
HCM Control Delay	8.5	8.2	7.9	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.8	0.5	0.3	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	45	1125	135	255	1385	30	360	35	505	40	105
Future Volume (vph)	45	1125	135	255	1385	30	360	35	505	40	105
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA
Protected Phases		4		3	8		5	2			6
Permitted Phases	4		4	8		8	2		2	6	
Detector Phase	4	4	4	3	8	8	5	2	2	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	7.0	7.0	7.0	7.0
Minimum Split (s)	43.0	43.0	43.0	14.0	43.0	43.0	25.0	46.0	46.0	46.0	46.0
Total Split (s)	43.0	43.0	43.0	14.0	57.0	57.0	25.0	71.0	71.0	46.0	46.0
Total Split (%)	33.6%	33.6%	33.6%	10.9%	44.5%	44.5%	19.5%	55.5%	55.5%	35.9%	35.9%
Maximum Green (s)	37.0	37.0	37.0	10.0	51.0	51.0	21.0	65.0	65.0	40.0	40.0
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None
Walk Time (s)	24.0	24.0	24.0		24.0	24.0		24.0	24.0	24.0	24.0
Flash Dont Walk (s)	13.0	13.0	13.0		13.0	13.0		16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)	15	15	15		15	15		15	15	15	15

Intersection Summary

Cycle Length: 128
Actuated Cycle Length: 128
Offset: 41.5 (32%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated

Splits and Phases: 5: Willowdale Ave/Willowdale Blvd & Steeles Ave E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	46	1160	139	263	1428	31	407	521	41	118
v/c Ratio	0.84	1.13	0.30	0.78	0.84	0.04	0.77	0.68	0.15	0.15
Control Delay	63.6	90.0	6.0	48.6	35.9	1.4	40.3	18.7	20.0	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.6	90.0	6.0	48.6	35.9	1.4	40.3	18.7	20.0	19.6
Queue Length 50th (m)	11.4	~191.0	11.9	51.7	175.2	0.0	87.2	58.5	6.3	17.4
Queue Length 95th (m)	m12.2	m#183.3	m11.9	#130.3	#254.7	1.9	114.6	86.5	12.5	26.1
Internal Link Dist (m)		199.6			142.4		80.1			87.5
Turn Bay Length (m)	35.0		20.0	65.0		20.0			15.0	
Base Capacity (vph)	55	1028	465	338	1694	694	630	870	283	807
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	1.13	0.30	0.78	0.84	0.04	0.65	0.60	0.14	0.15

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	1125	135	255	1385	30	360	35	505	40	105	10
Future Volume (vph)	45	1125	135	255	1385	30	360	35	505	40	105	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96		1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		0.99	1.00	0.99	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1682	3466	1345	1668	3466	1359		1768	1468	1674	1852	
Flt Permitted	0.11	1.00	1.00	0.10	1.00	1.00		0.66	1.00	0.37	1.00	
Satd. Flow (perm)	186	3466	1345	171	3466	1359		1222	1468	652	1852	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	46	1160	139	263	1428	31	371	36	521	41	108	10
RTOR Reduction (vph)	0	0	66	0	0	16	0	0	133	0	2	0
Lane Group Flow (vph)	46	1160	73	263	1428	15	0	407	388	41	116	0
Confl. Peds. (#/hr)	10		15	15		10	10		15	15		10
Heavy Vehicles (%)	0%	3%	2%	1%	3%	0%	1%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	16	0	0	16	0	0	0	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	37.0	37.0	37.0	61.6	61.6	61.6		54.4	54.4	54.4	54.4	
Effective Green, g (s)	38.0	38.0	38.0	62.6	62.6	62.6		55.4	55.4	55.4	55.4	
Actuated g/C Ratio	0.30	0.30	0.30	0.49	0.49	0.49		0.43	0.43	0.43	0.43	
Clearance Time (s)	6.0	6.0	6.0	4.0	6.0	6.0		6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	55	1028	399	336	1695	664		528	635	282	801	
v/s Ratio Prot		c0.33		0.13	c0.41						0.06	
v/s Ratio Perm	0.25		0.05	0.25		0.01		c0.33	0.26	0.06		
v/c Ratio	0.84	1.13	0.18	0.78	0.84	0.02		0.77	0.61	0.15	0.14	
Uniform Delay, d1	42.1	45.0	33.5	34.8	28.4	16.9		30.9	28.0	22.0	22.0	
Progression Factor	0.59	0.62	0.43	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	31.0	61.6	0.3	11.3	5.3	0.1		6.9	1.7	0.2	0.1	
Delay (s)	55.9	89.7	14.8	46.1	33.7	17.0		37.8	29.7	22.2	22.0	
Level of Service	E	F	B	D	C	B		D	C	C	C	
Approach Delay (s)		80.8			35.3			33.2			22.1	
Approach LOS		F			D			C			C	

Intersection Summary				
HCM 2000 Control Delay	49.1	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.94			
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	17.0	
Intersection Capacity Utilization	90.5%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	35	65	15	25	0	25	70	15	0	75	5
Future Volume (vph)	5	35	65	15	25	0	25	70	15	0	75	5
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	6	41	76	17	29	0	29	81	17	0	87	6

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	123	46	127	93
Volume Left (vph)	6	17	29	0
Volume Right (vph)	76	0	17	6
Hadj (s)	-0.36	0.07	-0.03	-0.04
Departure Headway (s)	4.1	4.6	4.3	4.4
Degree Utilization, x	0.14	0.06	0.15	0.11
Capacity (veh/h)	832	728	789	776
Control Delay (s)	7.8	7.9	8.1	7.9
Approach Delay (s)	7.8	7.9	8.1	7.9
Approach LOS	A	A	A	A

Intersection Summary				
Delay	7.9			
Level of Service	A			
Intersection Capacity Utilization	27.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection	
Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	35	65	15	25	0	25	70	15	0	75	5
Future Vol, veh/h	5	35	65	15	25	0	25	70	15	0	75	5
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	6	41	76	17	29	0	29	81	17	0	87	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.8	7.9	8.1	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	23%	5%	38%	0%
Vol Thru, %	64%	33%	62%	94%
Vol Right, %	14%	62%	0%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	110	105	40	80
LT Vol	25	5	15	0
Through Vol	70	35	25	75
RT Vol	15	65	0	5
Lane Flow Rate	128	122	47	93
Geometry Grp	1	1	1	1
Degree of Util (X)	0.154	0.139	0.059	0.113
Departure Headway (Hd)	4.336	4.09	4.603	4.372
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	829	879	780	822
Service Time	2.351	2.104	2.621	2.387
HCM Lane V/C Ratio	0.154	0.139	0.06	0.113
HCM Control Delay	8.1	7.8	7.9	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.5	0.2	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	0	0	0	5	140	0	0	40	5
Future Volume (Veh/h)	5	0	5	0	0	0	5	140	0	0	40	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	5	0	0	0	5	152	0	0	43	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	208	208	46	212	210	152	48			152		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	208	208	46	212	210	152	48			152		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	100	100	100	100			100		
cM capacity (veh/h)	748	687	1024	739	685	894	1559			1429		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	10	0	157	48
Volume Left	5	0	5	0
Volume Right	5	0	0	5
cSH	865	1700	1559	1429
Volume to Capacity	0.01	0.00	0.00	0.00
Queue Length 95th (m)	0.3	0.0	0.1	0.0
Control Delay (s)	9.2	0.0	0.3	0.0
Lane LOS	A	A	A	
Approach Delay (s)	9.2	0.0	0.3	0.0
Approach LOS	A	A		

Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	21.4%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	185	765	330	135	890	220	845	240	1350
Future Volume (vph)	185	765	330	135	890	220	845	240	1350
Turn Type	pm+pt	NA	custom	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4 5	8		2		6	
Detector Phase	7	4	4 5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	34.0		6.0	34.0	6.0	32.0	6.0	32.0
Minimum Split (s)	14.0	44.0		14.0	44.0	10.0	39.0	11.0	39.0
Total Split (s)	14.0	44.0		14.0	44.0	17.0	46.0	24.0	53.0
Total Split (%)	10.9%	34.4%		10.9%	34.4%	13.3%	35.9%	18.8%	41.4%
Maximum Green (s)	10.0	37.0		10.0	37.0	13.0	39.0	20.0	46.0
Yellow Time (s)	3.0	4.0		3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	3.0		1.0	3.0	1.0	3.0	1.0	3.0
Lost Time Adjust (s)	-1.5	-1.0		-1.5	-1.0	-1.5	-1.0	-2.0	-1.0
Total Lost Time (s)	2.5	6.0		2.5	6.0	2.5	6.0	2.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Min		None	Min	None	C-Min	None	C-Min
Walk Time (s)		7.0			7.0		8.0		8.0
Flash Dont Walk (s)		27.0			27.0		24.0		24.0
Pedestrian Calls (#/hr)		85			85		95		95

Intersection Summary

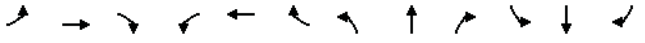
Cycle Length: 128
Actuated Cycle Length: 128
Offset: 57 (45%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated

Splits and Phases: 1: Yonge St & Steeles Ave W/Steeles Ave E

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	193	797	344	141	1000	229	1041	250	1599
v/c Ratio	0.93	0.81	0.68	0.69	0.73	0.90	0.62	0.74	0.96
Control Delay	75.3	49.9	28.0	50.1	36.1	70.4	36.0	32.7	53.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.3	49.9	28.0	50.1	36.1	70.4	36.0	32.7	53.8
Queue Length 50th (m)	33.0	103.0	51.8	16.3	88.8	45.5	80.7	35.1	154.5
Queue Length 95th (m)	#78.4	127.4	90.9	#44.9	65.2	#101.4	100.8	62.6	#191.3
Internal Link Dist (m)		174.7			226.8		81.6		84.7
Turn Bay Length (m)	110.0			160.0		50.0		40.0	
Base Capacity (vph)	207	1009	489	208	1413	254	1685	381	1664
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.79	0.70	0.68	0.71	0.90	0.62	0.66	0.96

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	765	330	135	890	70	220	845	155	240	1350	185
Future Volume (vph)	185	765	330	135	890	70	220	845	155	240	1350	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	2.5	6.0	6.0	2.5	6.0		2.5	6.0		2.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		1.00	*0.93		1.00	*0.88	
Frpb, ped/bikes	1.00	1.00	0.71	1.00	0.99		1.00	0.97		1.00	0.96	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1512	3400	1043	1521	4737		1620	4742		1613	4492	
Flt Permitted	0.15	1.00	1.00	0.15	1.00		0.09	1.00		0.17	1.00	
Satd. Flow (perm)	231	3400	1043	239	4737		150	4742		288	4492	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	193	797	344	141	927	73	229	880	161	250	1406	193
RTOR Reduction (vph)	0	0	56	0	7	0	0	20	0	0	13	0
Lane Group Flow (vph)	193	797	288	141	993	0	229	1021	0	250	1586	0
Confl. Peds. (#/hr)	165		255	255		165	270		165	165		270
Heavy Vehicles (%)	11%	5%	2%	10%	5%	13%	4%	5%	2%	4%	4%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	32	0	0	31
Turn Type	pm+pt	NA	custom	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4 5	8			2			6		
Actuated Green, G (s)	46.0	36.0	57.3	45.4	35.7		58.2	43.9		62.4	46.0	
Effective Green, g (s)	49.0	37.0	58.3	48.4	36.7		61.2	44.9		66.3	47.0	
Actuated g/C Ratio	0.38	0.29	0.46	0.38	0.29		0.48	0.35		0.52	0.37	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	203	982	475	202	1358		253	1663		339	1649	
v/s Ratio Prot	c0.09	0.23		0.06	0.21		c0.11	0.22		c0.11	c0.35	
v/s Ratio Perm	c0.28		0.28	0.20			0.32			0.28		
v/c Ratio	0.95	0.81	0.61	0.70	0.73		0.91	0.61		0.74	0.96	
Uniform Delay, d1	30.2	42.3	26.2	29.7	41.2		36.6	34.4		20.3	39.6	
Progression Factor	1.00	1.00	1.00	1.42	0.80		1.00	1.00		1.00	1.00	
Incremental Delay, d2	49.0	5.2	2.2	9.3	1.9		32.4	1.7		8.1	14.8	
Delay (s)	79.2	47.4	28.4	51.5	35.0		69.0	36.1		28.4	54.4	
Level of Service	E	D	C	D	C		E	D		C	D	
Approach Delay (s)		47.1			37.0			42.0			50.9	
Approach LOS		D			D			D			D	

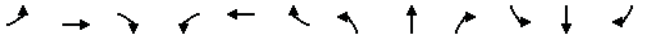
Intersection Summary				
HCM 2000 Control Delay	45.1	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.97			
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	17.0	
Intersection Capacity Utilization	98.7%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	65	1200	20	20	1745
Future Volume (Veh/h)	0	65	1200	20	20	1745
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	68	1250	21	21	1818
Pedestrians	125					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	10					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			109			
pX, platoon unblocked	0.84	0.84			0.84	
vC, conflicting volume	2034	552			1396	
vC1, stage 1 conf vol	1386					
vC2, stage 2 conf vol	648					
vCu, unblocked vol	1552	0			790	
tC, single (s)	6.8	6.9			4.2	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	92			97	
cM capacity (veh/h)	264	813			609	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	68	500	500	271	21	606	606	606
Volume Left	0	0	0	0	21	0	0	0
Volume Right	68	0	0	21	0	0	0	0
cSH	813	1700	1700	1700	609	1700	1700	1700
Volume to Capacity	0.08	0.29	0.29	0.16	0.03	0.36	0.36	0.36
Queue Length 95th (m)	2.2	0.0	0.0	0.0	0.9	0.0	0.0	0.0
Control Delay (s)	9.8	0.0	0.0	0.0	11.1	0.0	0.0	0.0
Lane LOS	A				B			
Approach Delay (s)	9.8	0.0			0.1			
Approach LOS	A							

Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	44.4%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	1100	75	30	1140	25	5	5	35	5	5	15
Future Volume (Veh/h)	5	1100	75	30	1140	25	5	5	35	5	5	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	5	1111	76	30	1152	25	5	5	35	5	5	15
Pedestrians								10			20	
Lane Width (m)								3.5			3.5	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								1			2	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		251			224							
pX, platoon unblocked	0.87			0.79			0.86	0.86	0.79	0.86	0.86	0.87
vC, conflicting volume	1197			1197			1822	2426	604	1835	2439	596
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	919			715			921	1626	0	935	1641	225
tC, single (s)	4.1			4.1			7.5	6.5	6.9	*7.9	*7.3	7.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	*3.6	*4.5	3.4
p0 queue free %	99			96			97	94	96	97	91	98
cM capacity (veh/h)	640			700			166	82	854	144	54	635

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	560	632	414	768	25	45	25
Volume Left	5	0	30	0	0	5	5
Volume Right	0	76	0	0	25	35	15
cSH	640	1700	700	1700	1700	341	165
Volume to Capacity	0.01	0.37	0.04	0.45	0.01	0.13	0.15
Queue Length 95th (m)	0.2	0.0	1.1	0.0	0.0	3.6	4.2
Control Delay (s)	0.2	0.0	1.3	0.0	0.0	17.2	30.7
Lane LOS	A		A			C	D
Approach Delay (s)	0.1		0.4			17.2	30.7
Approach LOS						C	D

Intersection Summary					
Average Delay	0.9				
Intersection Capacity Utilization	63.1%	ICU Level of Service		B	
Analysis Period (min)	15				

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	45	10	5	85	0	15	20	5	0	10	10
Future Volume (vph)	5	45	10	5	85	0	15	20	5	0	10	10
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	6	55	12	6	104	0	18	24	6	0	12	12

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	73	110	48	24
Volume Left (vph)	6	6	18	0
Volume Right (vph)	12	0	6	12
Hadj (s)	-0.01	0.01	0.00	-0.30
Departure Headway (s)	4.2	4.1	4.3	4.0
Degree Utilization, x	0.08	0.13	0.06	0.03
Capacity (veh/h)	841	849	790	843
Control Delay (s)	7.5	7.7	7.6	7.2
Approach Delay (s)	7.5	7.7	7.6	7.2
Approach LOS	A	A	A	A

Intersection Summary					
Delay	7.6				
Level of Service	A				
Intersection Capacity Utilization	22.9%	ICU Level of Service		A	
Analysis Period (min)	15				

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	45	10	5	85	0	15	20	5	0	10	10
Future Vol, veh/h	5	45	10	5	85	0	15	20	5	0	10	10
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles, %	0	6	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	6	55	12	6	104	0	18	24	6	0	12	12
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

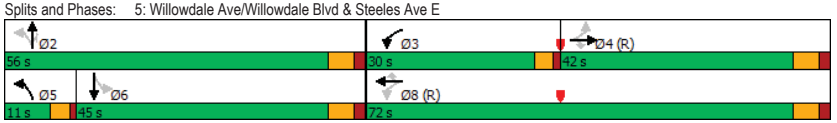
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.5	7.7	7.6	7.2
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	38%	8%	6%	0%
Vol Thru, %	50%	75%	94%	50%
Vol Right, %	12%	17%	0%	50%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	40	60	90	20
LT Vol	15	5	5	0
Through Vol	20	45	85	10
RT Vol	5	10	0	10
Lane Flow Rate	49	73	110	24
Geometry Grp	1	1	1	1
Degree of Util (X)	0.057	0.082	0.125	0.027
Departure Headway (Hd)	4.235	4.028	4.094	3.953
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	833	882	870	889
Service Time	2.324	2.089	2.146	2.051
HCM Lane V/C Ratio	0.059	0.083	0.126	0.027
HCM Control Delay	7.6	7.5	7.7	7.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.3	0.4	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	5	900	235	535	1045	20	120	65	215	55	35
Future Volume (vph)	5	900	235	535	1045	20	120	65	215	55	35
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA
Protected Phases		4		3	8		5	2			6
Permitted Phases	4		4	8		8	2		2	6	
Detector Phase	4	4	4	3	8	8	5	2	2	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	7.0	7.0	7.0	7.0
Minimum Split (s)	42.0	42.0	42.0	10.0	42.0	42.0	11.0	45.0	45.0	45.0	45.0
Total Split (s)	42.0	42.0	42.0	30.0	72.0	72.0	11.0	56.0	56.0	45.0	45.0
Total Split (%)	32.8%	32.8%	32.8%	23.4%	56.3%	56.3%	8.6%	43.8%	43.8%	35.2%	35.2%
Maximum Green (s)	36.0	36.0	36.0	26.0	66.0	66.0	7.0	50.0	50.0	39.0	39.0
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None
Walk Time (s)	23.0	23.0	23.0		23.0	23.0		23.0	23.0	23.0	23.0
Flash Dont Walk (s)	13.0	13.0	13.0		13.0	13.0		16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)	20	20	20		20	20		20	20	20	20

Intersection Summary
Cycle Length: 128
Actuated Cycle Length: 128
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated

Splits and Phases: 5: Willowdale Ave/Willowdale Blvd & Steeles Ave E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	5	928	242	552	1077	21	191	222	57	67
v/c Ratio	0.04	0.95	0.54	0.79	0.45	0.02	0.61	0.45	0.32	0.17
Control Delay	45.4	64.5	34.2	37.8	10.6	0.1	51.7	7.1	42.9	21.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.4	64.5	34.2	37.8	10.6	0.1	51.7	7.1	42.9	21.5
Queue Length 50th (m)	0.9	98.0	28.9	102.4	53.5	0.0	47.7	0.0	13.2	7.9
Queue Length 95th (m)	m1.3	#165.6	m49.9	#207.9	98.7	0.0	64.0	18.5	23.5	17.9
Internal Link Dist (m)		199.6			142.4		80.1			87.7
Turn Bay Length (m)	35.0		20.0	65.0		20.0			15.0	
Base Capacity (vph)	135	973	450	703	2378	959	558	712	250	552
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.95	0.54	0.79	0.45	0.02	0.34	0.31	0.23	0.12

Intersection Summary

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

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	900	235	535	1045	20	120	65	215	55	35	30
Future Volume (vph)	5	900	235	535	1045	20	120	65	215	55	35	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96		1.00	0.97	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1678	3368	1326	1668	3400	1346		1780	1453	1573	1698	
Flt Permitted	0.27	1.00	1.00	0.10	1.00	1.00		0.76	1.00	0.48	1.00	
Satd. Flow (perm)	469	3368	1326	176	3400	1346		1403	1453	802	1698	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	5	928	242	552	1077	21	124	67	222	57	36	31
RTOR Reduction (vph)	0	0	67	0	0	6	0	0	173	0	24	0
Lane Group Flow (vph)	5	928	175	552	1077	15	0	191	49	57	43	0
Confl. Peds. (#/hr)	10		20	20		10	5		15	15		5
Heavy Vehicles (%)	0%	6%	2%	1%	5%	0%	3%	0%	1%	6%	4%	0%
Bus Blockages (#/hr)	0	0	18	0	0	18	0	0	0	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	36.0	36.0	36.0	88.6	88.6	88.6		27.4	27.4	27.4	27.4	
Effective Green, g (s)	37.0	37.0	37.0	89.6	89.6	89.6		28.4	28.4	28.4	28.4	
Actuated g/C Ratio	0.29	0.29	0.29	0.70	0.70	0.70		0.22	0.22	0.22	0.22	
Clearance Time (s)	6.0	6.0	6.0	4.0	6.0	6.0		6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	135	973	383	701	2380	942		311	322	177	376	
v/s Ratio Prot		c0.28		c0.31	0.32						0.03	
v/s Ratio Perm	0.01		0.13	0.25		0.01		c0.14	0.03	0.07		
v/c Ratio	0.04	0.95	0.46	0.79	0.45	0.02		0.61	0.15	0.32	0.11	
Uniform Delay, d1	32.7	44.7	37.3	28.1	8.4	5.8		44.9	40.1	41.7	39.8	
Progression Factor	1.35	1.10	1.33	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	15.4	2.8	5.8	0.6	0.0		3.6	0.2	1.1	0.1	
Delay (s)	44.5	64.5	52.2	34.0	9.1	5.9		48.4	40.3	42.8	39.9	
Level of Service	D	E	D	C	A	A		D	D	D	D	
Approach Delay (s)		61.9			17.3			44.1			41.2	
Approach LOS		E			B			D			D	

Intersection Summary

HCM 2000 Control Delay	37.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	94.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	10	40	25	45	0	40	45	5	0	55	5
Future Volume (vph)	0	10	40	25	45	0	40	45	5	0	55	5
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	11	45	28	51	0	45	51	6	0	62	6

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	56	79	102	68
Volume Left (vph)	0	28	45	0
Volume Right (vph)	45	0	6	6
Hadj (s)	-0.48	0.07	0.07	-0.05
Departure Headway (s)	3.9	4.4	4.3	4.3
Degree Utilization, x	0.06	0.10	0.12	0.08
Capacity (veh/h)	878	771	796	812
Control Delay (s)	7.1	7.9	8.0	7.6
Approach Delay (s)	7.1	7.9	8.0	7.6
Approach LOS	A	A	A	A

Intersection Summary				
Delay			7.7	
Level of Service			A	
Intersection Capacity Utilization			29.4%	ICU Level of Service
Analysis Period (min)			15	

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	10	40	25	45	0	40	45	5	0	55	5
Future Vol, veh/h	0	10	40	25	45	0	40	45	5	0	55	5
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	0	0	0	0	0	0	0	2	0	0	0	0
Mvmt Flow	0	11	45	28	51	0	45	51	6	0	62	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.1	7.9	7.9	7.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	44%	0%	36%	0%
Vol Thru, %	50%	20%	64%	92%
Vol Right, %	6%	80%	0%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	90	50	70	60
LT Vol	40	0	25	0
Through Vol	45	10	45	55
RT Vol	5	40	0	5
Lane Flow Rate	101	56	79	67
Geometry Grp	1	1	1	1
Degree of Util (X)	0.119	0.061	0.096	0.078
Departure Headway (Hd)	4.242	3.885	4.408	4.163
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	833	927	818	846
Service Time	2.33	1.887	2.408	2.261
HCM Lane V/C Ratio	0.121	0.06	0.097	0.079
HCM Control Delay	7.9	7.1	7.9	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.2	0.3	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	0	0	0	0	35	0	0	20	5
Future Volume (Veh/h)	5	0	5	0	0	0	0	35	0	0	20	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	5	0	0	0	0	38	0	0	22	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	62	62	24	68	65	38	27			38		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	62	62	24	68	65	38	27			38		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	100	100	100	100			100		
cM capacity (veh/h)	932	828	1052	921	826	1034	1587			1572		

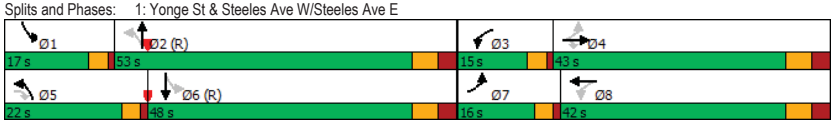
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	10	0	38	27
Volume Left	5	0	0	0
Volume Right	5	0	0	5
cSH	988	1700	1587	1572
Volume to Capacity	0.01	0.00	0.00	0.00
Queue Length 95th (m)	0.2	0.0	0.0	0.0
Control Delay (s)	8.7	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	8.7	0.0	0.0	0.0
Approach LOS	A	A		

Intersection Summary					
Average Delay			1.2		
Intersection Capacity Utilization			13.3%	ICU Level of Service	A
Analysis Period (min)			15		

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	205	860	290	175	915	290	1225	225	1125
Future Volume (vph)	205	860	290	175	915	290	1225	225	1125
Turn Type	pm+pt	NA	custom	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4 5	8		2		6	
Detector Phase	7	4	4 5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	34.0		6.0	34.0	6.0	32.0	6.0	32.0
Minimum Split (s)	14.0	41.0		14.0	41.0	16.0	39.0	16.0	39.0
Total Split (s)	16.0	43.0		15.0	42.0	22.0	53.0	17.0	48.0
Total Split (%)	12.5%	33.6%		11.7%	32.8%	17.2%	41.4%	13.3%	37.5%
Maximum Green (s)	12.0	36.0		11.0	35.0	18.0	46.0	13.0	41.0
Yellow Time (s)	3.0	4.0		3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	3.0		1.0	3.0	1.0	3.0	1.0	3.0
Lost Time Adjust (s)	-2.0	-1.0		-1.5	-1.0	-1.5	-1.0	-2.0	-1.0
Total Lost Time (s)	2.0	6.0		2.5	6.0	2.5	6.0	2.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Min		None	Min	None	C-Min	None	C-Min
Walk Time (s)		7.0			7.0		8.0		8.0
Flash Dont Walk (s)		27.0			27.0		24.0		24.0
Pedestrian Calls (#/hr)		85			85		90		90

Intersection Summary
Cycle Length: 128
Actuated Cycle Length: 128
Offset: 48 (38%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated

Splits and Phases: 1: Yonge St & Steeles Ave W/Steeles Ave E



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	216	905	305	184	1274	305	1373	237	1416
v/c Ratio	0.92	0.90	0.59	0.85	0.97	0.98	0.91	0.97	0.99
Control Delay	73.2	57.1	21.9	51.7	59.7	81.6	48.3	84.8	62.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.2	57.1	21.9	51.7	59.7	81.6	48.3	84.8	62.5
Queue Length 50th (m)	41.2	121.7	39.0	38.1	121.1	64.7	148.1	47.5	143.6
Queue Length 95th (m)	#90.5	#159.3	71.2	m#70.9	#152.6	#124.7	#177.8	#101.4	#182.4
Internal Link Dist (m)		182.5			226.8		81.6		84.7
Turn Bay Length (m)	110.0			160.0		50.0		40.0	
Base Capacity (vph)	235	1001	515	217	1319	312	1509	245	1436
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.90	0.59	0.85	0.97	0.98	0.91	0.97	0.99

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	205	860	290	175	915	295	290	1225	80	225	1125	220
Future Volume (vph)	205	860	290	175	915	295	290	1225	80	225	1125	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	2.0	6.0	6.0	2.5	6.0		2.5	6.0		2.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		1.00	*0.77		1.00	*0.85	
Frpb, ped/bikes	1.00	1.00	0.69	1.00	0.95		1.00	0.98		1.00	0.95	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1634	3466	1000	1646	4533		1668	4098		1618	4316	
Flt Permitted	0.11	1.00	1.00	0.11	1.00		0.09	1.00		0.09	1.00	
Satd. Flow (perm)	181	3466	1000	190	4533		156	4098		158	4316	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	216	905	305	184	963	311	305	1289	84	237	1184	232
RTOR Reduction (vph)	0	0	53	0	45	0	0	4	0	0	20	0
Lane Group Flow (vph)	216	905	252	184	1229	0	305	1369	0	237	1396	0
Confl. Peds. (#/hr)	185		285	285		185	295		245	245		295
Heavy Vehicles (%)	3%	3%	4%	2%	3%	4%	1%	3%	3%	4%	2%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	31	0	0	26
Turn Type	pm+pt	NA	custom	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4 5	8			2			6		
Actuated Green, G (s)	48.0	36.0	61.0	46.0	35.0		63.0	46.0		54.0	41.0	
Effective Green, g (s)	52.0	37.0	62.0	49.0	36.0		64.5	47.0		58.0	42.0	
Actuated g/C Ratio	0.41	0.29	0.48	0.38	0.28		0.50	0.37		0.45	0.33	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	232	1001	484	214	1274		308	1504		242	1416	
v/s Ratio Prot	c0.10	0.26		0.08	c0.27		c0.15	0.33		0.11	0.32	
v/s Ratio Perm	0.28		0.25	0.24			c0.35			0.33		
v/c Ratio	0.93	0.90	0.52	0.86	0.96		0.99	0.91		0.98	0.99	
Uniform Delay, d1	34.5	43.8	22.8	31.1	45.4		40.0	38.5		37.3	42.7	
Progression Factor	1.00	1.00	1.00	0.83	1.04		1.00	1.00		1.00	1.00	
Incremental Delay, d2	40.4	11.3	1.0	22.1	14.4		48.5	9.7		51.4	20.8	
Delay (s)	74.9	55.1	23.8	47.9	61.5		88.5	48.2		88.7	63.5	
Level of Service	E	E	C	D	E		F	D		F	E	
Approach Delay (s)		51.4			59.8			55.6			67.1	
Approach LOS		D			E			E			E	

Intersection Summary

HCM 2000 Control Delay	58.7	HCM 2000 Level of Service		E	
HCM 2000 Volume to Capacity ratio	1.00				
Actuated Cycle Length (s)	128.0	Sum of lost time (s)		17.0	
Intersection Capacity Utilization	100.5%	ICU Level of Service		G	
Analysis Period (min)	15				

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	60	1725	25	55	1605
Future Volume (Veh/h)	5	60	1725	25	55	1605
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	5	61	1760	26	56	1638
Pedestrians	170					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	14					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			109			
pX, platoon unblocked	0.70	0.70			0.70	
vC, conflicting volume	2601	770			1956	
vC1, stage 1 conf vol	1943					
vC2, stage 2 conf vol	658					
vCu, unblocked vol	1805	0			889	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	91			88	
cM capacity (veh/h)	196	660			458	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	66	704	704	378	56	546	546	546
Volume Left	5	0	0	0	56	0	0	0
Volume Right	61	0	0	26	0	0	0	0
cSH	559	1700	1700	1700	458	1700	1700	1700
Volume to Capacity	0.12	0.41	0.41	0.22	0.12	0.32	0.32	0.32
Queue Length 95th (m)	3.2	0.0	0.0	0.0	3.3	0.0	0.0	0.0
Control Delay (s)	12.3	0.0	0.0	0.0	13.9	0.0	0.0	0.0
Lane LOS	B				B			
Approach Delay (s)	12.3	0.0			0.5			
Approach LOS	B							

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	51.3%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	1025	25	15	1385	105	15	20	60	5	5	35
Future Volume (Veh/h)	20	1025	25	15	1385	105	15	20	60	5	5	35
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	21	1068	26	16	1443	109	16	21	62	5	5	36
Pedestrians		5						15			35	
Lane Width (m)		3.5						3.5			3.5	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						1			3	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		251			224							
pX, platoon unblocked	0.74			0.76			0.86	0.86	0.76	0.86	0.86	0.74
vC, conflicting volume	1587			1109			1935	2757	562	2158	2661	762
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1101			518			525	1477	0	784	1366	0
tC, single (s)	4.1			4.1			7.7	6.5	6.9	*9.1	*9.0	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	*4.5	*5.6	3.3
p0 queue free %	95			98			94	79	92	95	87	95
cM capacity (veh/h)	464			796			286	99	816	104	40	785

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	555	560	497	962	109	99	46
Volume Left	21	0	16	0	0	16	5
Volume Right	0	26	0	0	109	62	36
cSH	464	1700	796	1700	1700	287	209
Volume to Capacity	0.05	0.33	0.02	0.57	0.06	0.34	0.22
Queue Length 95th (m)	1.1	0.0	0.5	0.0	0.0	11.9	6.5
Control Delay (s)	1.3	0.0	0.6	0.0	0.0	24.0	27.1
Lane LOS	A		A			C	D
Approach Delay (s)	0.7		0.2			24.0	27.1
Approach LOS						C	D

Intersection Summary				
Average Delay	1.6			
Intersection Capacity Utilization	63.8%	ICU Level of Service		B
Analysis Period (min)	15			

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	10	75	15	5	45	5	25	105	15	15	25	5
Future Volume (vph)	10	75	15	5	45	5	25	105	15	15	25	5
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	12	88	18	6	53	6	29	124	18	18	29	6

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	118	65	171	53
Volume Left (vph)	12	6	29	18
Volume Right (vph)	18	6	18	6
Hadj (s)	-0.07	-0.04	-0.03	0.00
Departure Headway (s)	4.4	4.5	4.4	4.5
Degree Utilization, x	0.15	0.08	0.21	0.07
Capacity (veh/h)	772	743	789	746
Control Delay (s)	8.2	7.9	8.5	7.8
Approach Delay (s)	8.2	7.9	8.5	7.8
Approach LOS	A	A	A	A

Intersection Summary				
Delay			8.2	
Level of Service			A	
Intersection Capacity Utilization			24.5%	ICU Level of Service
Analysis Period (min)			15	

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	75	15	5	45	5	25	105	15	15	25	5
Future Vol, veh/h	10	75	15	5	45	5	25	105	15	15	25	5
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	12	88	18	6	53	6	29	124	18	18	29	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.2	7.9	8.5	7.8
HCM LOS	A	A	A	A

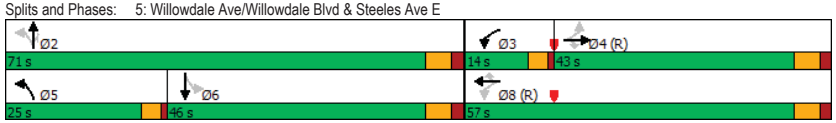
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	17%	10%	9%	33%
Vol Thru, %	72%	75%	82%	56%
Vol Right, %	10%	15%	9%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	145	100	55	45
LT Vol	25	10	5	15
Through Vol	105	75	45	25
RT Vol	15	15	5	5
Lane Flow Rate	171	118	65	53
Geometry Grp	1	1	1	1
Degree of Util (X)	0.206	0.144	0.081	0.066
Departure Headway (Hd)	4.352	4.413	4.506	4.507
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	827	814	797	796
Service Time	2.367	2.431	2.526	2.527
HCM Lane V/C Ratio	0.207	0.145	0.082	0.067
HCM Control Delay	8.5	8.2	7.9	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.8	0.5	0.3	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	45	910	135	260	1135	30	360	35	510	40	105
Future Volume (vph)	45	910	135	260	1135	30	360	35	510	40	105
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA
Protected Phases		4		3	8		5	2			6
Permitted Phases	4		4	8		8	2		2	6	
Detector Phase	4	4	4	3	8	8	5	2	2	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	7.0	7.0	7.0	7.0
Minimum Split (s)	43.0	43.0	43.0	14.0	43.0	43.0	25.0	46.0	46.0	46.0	46.0
Total Split (s)	43.0	43.0	43.0	14.0	57.0	57.0	25.0	71.0	71.0	46.0	46.0
Total Split (%)	33.6%	33.6%	33.6%	10.9%	44.5%	44.5%	19.5%	55.5%	55.5%	35.9%	35.9%
Maximum Green (s)	37.0	37.0	37.0	10.0	51.0	51.0	21.0	65.0	65.0	40.0	40.0
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None
Walk Time (s)	24.0	24.0	24.0		24.0	24.0		24.0	24.0	24.0	24.0
Flash Dont Walk (s)	13.0	13.0	13.0		13.0	13.0		16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)	15	15	15		15	15		15	15	15	15

Intersection Summary

Cycle Length: 128
Actuated Cycle Length: 128
Offset: 41.5 (32%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 5: Willowdale Ave/Willowdale Blvd & Steeles Ave E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	46	938	139	268	1170	31	407	526	41	118
v/c Ratio	0.41	0.94	0.31	0.76	0.69	0.04	0.77	0.68	0.15	0.15
Control Delay	26.9	38.5	7.2	47.1	29.9	1.4	40.3	18.5	20.0	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.9	38.5	7.2	47.1	29.9	1.4	40.3	18.5	20.0	19.6
Queue Length 50th (m)	10.2	129.6	14.7	53.0	127.4	0.0	87.2	58.2	6.3	17.4
Queue Length 95th (m)	m10.9	m#149.3	m15.1	#133.0	175.0	1.9	114.6	86.3	12.5	26.1
Internal Link Dist (m)		199.6			142.4		80.1			87.5
Turn Bay Length (m)	35.0		20.0	65.0		20.0			15.0	
Base Capacity (vph)	115	1028	465	351	1694	694	630	874	283	807
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.91	0.30	0.76	0.69	0.04	0.65	0.60	0.14	0.15

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	910	135	260	1135	30	360	35	510	40	105	10
Future Volume (vph)	45	910	135	260	1135	30	360	35	510	40	105	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96		1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		0.99	1.00	0.99	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1679	3466	1345	1668	3466	1359		1768	1468	1674	1852	
Flt Permitted	0.22	1.00	1.00	0.10	1.00	1.00		0.66	1.00	0.37	1.00	
Satd. Flow (perm)	388	3466	1345	176	3466	1359		1222	1468	652	1852	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	46	938	139	268	1170	31	371	36	526	41	108	10
RTOR Reduction (vph)	0	0	67	0	0	16	0	0	137	0	2	0
Lane Group Flow (vph)	46	938	72	268	1170	15	0	407	389	41	116	0
Confl. Peds. (#/hr)	10		15	15		10	10		15	15		10
Heavy Vehicles (%)	0%	3%	2%	1%	3%	0%	1%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	16	0	0	16	0	0	0	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	36.0	36.0	36.0	61.6	61.6	61.6		54.4	54.4	54.4	54.4	
Effective Green, g (s)	37.0	37.0	37.0	62.6	62.6	62.6		55.4	55.4	55.4	55.4	
Actuated g/C Ratio	0.29	0.29	0.29	0.49	0.49	0.49		0.43	0.43	0.43	0.43	
Clearance Time (s)	6.0	6.0	6.0	4.0	6.0	6.0		6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	112	1001	388	349	1695	664		528	635	282	801	
v/s Ratio Prot		c0.27		c0.14	0.34						0.06	
v/s Ratio Perm	0.12		0.05	0.24		0.01		c0.33	0.26	0.06		
v/c Ratio	0.41	0.94	0.19	0.77	0.69	0.02		0.77	0.61	0.15	0.14	
Uniform Delay, d1	36.7	44.4	34.2	33.9	25.2	16.9		30.9	28.0	22.0	22.0	
Progression Factor	0.56	0.64	0.50	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.3	9.6	0.5	9.7	2.3	0.1		6.9	1.8	0.2	0.1	
Delay (s)	25.9	37.9	17.5	43.7	27.6	17.0		37.8	29.8	22.2	22.0	
Level of Service	C	D	B	D	C	B		D	C	C	C	
Approach Delay (s)		34.8			30.3			33.3			22.1	
Approach LOS		C			C			C			C	

Intersection Summary				
HCM 2000 Control Delay	32.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.85			
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	17.0	
Intersection Capacity Utilization	90.4%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	35	65	15	25	0	25	70	15	0	75	5
Future Volume (vph)	5	35	65	15	25	0	25	70	15	0	75	5
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	6	41	76	17	29	0	29	81	17	0	87	6

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	123	46	127	93
Volume Left (vph)	6	17	29	0
Volume Right (vph)	76	0	17	6
Hadj (s)	-0.36	0.07	-0.03	-0.04
Departure Headway (s)	4.1	4.6	4.3	4.4
Degree Utilization, x	0.14	0.06	0.15	0.11
Capacity (veh/h)	832	728	789	776
Control Delay (s)	7.8	7.9	8.1	7.9
Approach Delay (s)	7.8	7.9	8.1	7.9
Approach LOS	A	A	A	A

Intersection Summary				
Delay	7.9			
Level of Service	A			
Intersection Capacity Utilization	27.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection	
Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	35	65	15	25	0	25	70	15	0	75	5
Future Vol, veh/h	5	35	65	15	25	0	25	70	15	0	75	5
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	6	41	76	17	29	0	29	81	17	0	87	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.8	7.9	8.1	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	23%	5%	38%	0%
Vol Thru, %	64%	33%	62%	94%
Vol Right, %	14%	62%	0%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	110	105	40	80
LT Vol	25	5	15	0
Through Vol	70	35	25	75
RT Vol	15	65	0	5
Lane Flow Rate	128	122	47	93
Geometry Grp	1	1	1	1
Degree of Util (X)	0.154	0.139	0.059	0.113
Departure Headway (Hd)	4.336	4.09	4.603	4.372
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	829	879	780	822
Service Time	2.351	2.104	2.621	2.387
HCM Lane V/C Ratio	0.154	0.139	0.06	0.113
HCM Control Delay	8.1	7.8	7.9	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.5	0.2	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	0	0	0	5	140	0	0	40	5
Future Volume (Veh/h)	5	0	5	0	0	0	5	140	0	0	40	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	5	0	0	0	5	152	0	0	43	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	208	208	46	212	210	152	48			152		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	208	208	46	212	210	152	48			152		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	100	100	100	100			100		
cM capacity (veh/h)	748	687	1024	739	685	894	1559			1429		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	10	0	157	48
Volume Left	5	0	5	0
Volume Right	5	0	0	5
cSH	865	1700	1559	1429
Volume to Capacity	0.01	0.00	0.00	0.00
Queue Length 95th (m)	0.3	0.0	0.1	0.0
Control Delay (s)	9.2	0.0	0.3	0.0
Lane LOS	A	A	A	
Approach Delay (s)	9.2	0.0	0.3	0.0
Approach LOS	A	A		

Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	21.4%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	185	765	330	140	890	220	845	240	1350
Future Volume (vph)	185	765	330	140	890	220	845	240	1350
Turn Type	pm+pt	NA	custom	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4 5	8		2		6	
Detector Phase	7	4	4 5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	34.0		6.0	34.0	6.0	32.0	6.0	32.0
Minimum Split (s)	14.0	44.0		14.0	44.0	10.0	39.0	11.0	39.0
Total Split (s)	14.0	44.0		14.0	44.0	17.0	46.0	24.0	53.0
Total Split (%)	10.9%	34.4%		10.9%	34.4%	13.3%	35.9%	18.8%	41.4%
Maximum Green (s)	10.0	37.0		10.0	37.0	13.0	39.0	20.0	46.0
Yellow Time (s)	3.0	4.0		3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	3.0		1.0	3.0	1.0	3.0	1.0	3.0
Lost Time Adjust (s)	-1.5	-1.0		-1.5	-1.0	-1.5	-1.0	-2.0	-1.0
Total Lost Time (s)	2.5	6.0		2.5	6.0	2.5	6.0	2.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Min		None	Min	None	C-Min	None	C-Min
Walk Time (s)		7.0			7.0		8.0		8.0
Flash Dont Walk (s)		27.0			27.0		24.0		24.0
Pedestrian Calls (#/hr)		85			85		95		95

Intersection Summary

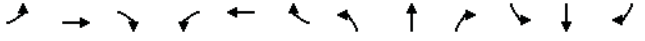
Cycle Length: 128
Actuated Cycle Length: 128
Offset: 57 (45%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated

Splits and Phases: 1: Yonge St & Steeles Ave W/Steeles Ave E

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	193	797	344	146	1000	229	1041	250	1599
v/c Ratio	0.93	0.81	0.68	0.71	0.73	0.90	0.62	0.74	0.96
Control Delay	75.1	50.1	28.0	52.1	36.0	70.4	36.0	32.7	53.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.1	50.1	28.0	52.1	36.0	70.4	36.0	32.7	53.8
Queue Length 50th (m)	33.0	103.0	51.8	17.1	89.1	45.5	80.7	35.1	154.5
Queue Length 95th (m)	#78.2	127.4	90.9	#48.6	67.9	#101.4	100.8	62.6	#191.3
Internal Link Dist (m)		174.7			226.8		81.6		84.7
Turn Bay Length (m)	110.0			160.0		50.0		40.0	
Base Capacity (vph)	207	1009	489	207	1413	254	1685	381	1664
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.79	0.70	0.71	0.71	0.90	0.62	0.66	0.96

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	765	330	140	890	70	220	845	155	240	1350	185
Future Volume (vph)	185	765	330	140	890	70	220	845	155	240	1350	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	2.5	6.0	6.0	2.5	6.0		2.5	6.0		2.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		1.00	*0.93		1.00	*0.88	
Frpb, ped/bikes	1.00	1.00	0.71	1.00	0.99		1.00	0.97		1.00	0.96	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1512	3400	1043	1521	4737		1620	4742		1613	4492	
Flt Permitted	0.15	1.00	1.00	0.15	1.00		0.09	1.00		0.17	1.00	
Satd. Flow (perm)	232	3400	1043	237	4737		150	4742		288	4492	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	193	797	344	146	927	73	229	880	161	250	1406	193
RTOR Reduction (vph)	0	0	56	0	7	0	0	20	0	0	13	0
Lane Group Flow (vph)	193	797	288	146	993	0	229	1021	0	250	1586	0
Confl. Peds. (#/hr)	165		255	255		165	270		165	165		270
Heavy Vehicles (%)	11%	5%	2%	10%	5%	13%	4%	5%	2%	4%	4%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	32	0	0	31
Turn Type	pm+pt	NA	custom	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4 5	8			2			6		
Actuated Green, G (s)	45.9	35.9	57.2	45.5	35.7		58.2	43.9		62.4	46.0	
Effective Green, g (s)	48.9	36.9	58.2	48.5	36.7		61.2	44.9		66.3	47.0	
Actuated g/C Ratio	0.38	0.29	0.45	0.38	0.29		0.48	0.35		0.52	0.37	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	203	980	474	203	1358		253	1663		339	1649	
v/s Ratio Prot	c0.09	0.23		0.06	0.21		c0.11	0.22		c0.11	c0.35	
v/s Ratio Perm	c0.28		0.28	0.21			0.32			0.28		
v/c Ratio	0.95	0.81	0.61	0.72	0.73		0.91	0.61		0.74	0.96	
Uniform Delay, d1	30.3	42.3	26.3	29.7	41.2		36.6	34.4		20.3	39.6	
Progression Factor	1.00	1.00	1.00	1.42	0.80		1.00	1.00		1.00	1.00	
Incremental Delay, d2	49.0	5.2	2.2	10.7	1.9		32.4	1.7		8.1	14.8	
Delay (s)	79.3	47.6	28.5	53.0	34.9		69.0	36.1		28.4	54.4	
Level of Service	E	D	C	D	C		E	D		C	D	
Approach Delay (s)		47.3			37.2			42.0			50.9	
Approach LOS		D			D			D			D	

Intersection Summary				
HCM 2000 Control Delay	45.2	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.97			
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	17.0	
Intersection Capacity Utilization	98.7%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	65	1200	20	20	1745
Future Volume (Veh/h)	0	65	1200	20	20	1745
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	68	1250	21	21	1818
Pedestrians	125					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	10					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			109			
pX, platoon unblocked	0.84	0.84			0.84	
vC, conflicting volume	2034	552			1396	
vC1, stage 1 conf vol	1386					
vC2, stage 2 conf vol	648					
vCu, unblocked vol	1552	0			790	
tC, single (s)	6.8	6.9			4.2	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	92			97	
cM capacity (veh/h)	264	813			609	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	68	500	500	271	21	606	606	606
Volume Left	0	0	0	0	21	0	0	0
Volume Right	68	0	0	21	0	0	0	0
cSH	813	1700	1700	1700	609	1700	1700	1700
Volume to Capacity	0.08	0.29	0.29	0.16	0.03	0.36	0.36	0.36
Queue Length 95th (m)	2.2	0.0	0.0	0.0	0.9	0.0	0.0	0.0
Control Delay (s)	9.8	0.0	0.0	0.0	11.1	0.0	0.0	0.0
Lane LOS	A				B			
Approach Delay (s)	9.8	0.0			0.1			
Approach LOS	A							

Intersection Summary					
Average Delay	0.3				
Intersection Capacity Utilization	44.4%	ICU Level of Service			A
Analysis Period (min)	15				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1105	75	0	1145	30	0	0	35	0	0	20
Future Volume (Veh/h)	0	1105	75	0	1145	30	0	0	35	0	0	20
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	0	1116	76	0	1157	30	0	0	35	0	0	20
Pedestrians								10			20	
Lane Width (m)								3.0			3.0	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		251			224							
pX, platoon unblocked	0.87			0.79			0.85	0.85	0.79	0.85	0.85	0.87
vC, conflicting volume	1207			1202			1762	2371	606	1770	2379	598
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	940			720			867	1580	0	876	1590	241
tC, single (s)	4.1			4.1			7.5	6.5	6.9	*7.9	*7.3	7.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	*3.6	*4.5	3.4
p0 queue free %	100			100			100	100	96	100	100	97
cM capacity (veh/h)	633			698			202	92	854	174	61	624

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	744	448	578	578	30	35	20
Volume Left	0	0	0	0	0	0	0
Volume Right	0	76	0	0	30	35	20
cSH	1700	1700	1700	1700	1700	854	624
Volume to Capacity	0.44	0.26	0.34	0.34	0.02	0.04	0.03
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	1.0	0.8
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	9.4	11.0
Lane LOS						A	B
Approach Delay (s)	0.0		0.0			9.4	11.0
Approach LOS						A	B

Intersection Summary							
Average Delay	0.2						
Intersection Capacity Utilization	43.0%	ICU Level of Service			A		
Analysis Period (min)	15						

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	45	10	5	85	0	15	15	5	0	5	10
Future Volume (vph)	5	45	10	5	85	0	15	15	5	0	5	10
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	6	55	12	6	104	0	18	18	6	0	6	12

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	73	110	42	18
Volume Left (vph)	6	6	18	0
Volume Right (vph)	12	0	6	12
Hadj (s)	-0.01	0.01	0.00	-0.40
Departure Headway (s)	4.1	4.1	4.3	3.9
Degree Utilization, x	0.08	0.13	0.05	0.02
Capacity (veh/h)	849	857	792	865
Control Delay (s)	7.5	7.7	7.5	7.0
Approach Delay (s)	7.5	7.7	7.5	7.0
Approach LOS	A	A	A	A

Intersection Summary							
Delay	7.6						
Level of Service	A						
Intersection Capacity Utilization	22.8%	ICU Level of Service			A		
Analysis Period (min)	15						

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	45	10	5	85	0	15	15	5	0	5	10
Future Vol, veh/h	5	45	10	5	85	0	15	15	5	0	5	10
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles, %	0	6	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	6	55	12	6	104	0	18	18	6	0	6	12
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

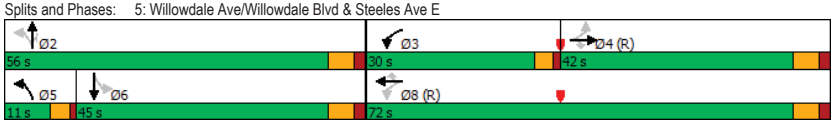
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.4	7.7	7.5	7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	43%	8%	6%	0%
Vol Thru, %	43%	75%	94%	33%
Vol Right, %	14%	17%	0%	67%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	35	60	90	15
LT Vol	15	5	5	0
Through Vol	15	45	85	5
RT Vol	5	10	0	10
Lane Flow Rate	43	73	110	18
Geometry Grp	1	1	1	1
Degree of Util (X)	0.05	0.081	0.124	0.02
Departure Headway (Hd)	4.23	4.006	4.072	3.848
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	835	888	876	914
Service Time	2.313	2.06	2.118	1.94
HCM Lane V/C Ratio	0.051	0.082	0.126	0.02
HCM Control Delay	7.5	7.4	7.7	7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.3	0.4	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	10	895	235	565	1015	20	130	65	215	60	35
Future Volume (vph)	10	895	235	565	1015	20	130	65	215	60	35
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA
Protected Phases		4		3	8		5	2			6
Permitted Phases	4		4	8		8	2		2	6	
Detector Phase	4	4	4	3	8	8	5	2	2	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	7.0	7.0	7.0	7.0
Minimum Split (s)	42.0	42.0	42.0	10.0	42.0	42.0	11.0	45.0	45.0	45.0	45.0
Total Split (s)	42.0	42.0	42.0	30.0	72.0	72.0	11.0	56.0	56.0	45.0	45.0
Total Split (%)	32.8%	32.8%	32.8%	23.4%	56.3%	56.3%	8.6%	43.8%	43.8%	35.2%	35.2%
Maximum Green (s)	36.0	36.0	36.0	26.0	66.0	66.0	7.0	50.0	50.0	39.0	39.0
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None
Walk Time (s)	23.0	23.0	23.0		23.0	23.0		23.0	23.0	23.0	23.0
Flash Dont Walk (s)	13.0	13.0	13.0		13.0	13.0		16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)	20	20	20		20	20		20	20	20	20

Intersection Summary
Cycle Length: 128
Actuated Cycle Length: 128
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated

Splits and Phases: 5: Willowdale Ave/Willowdale Blvd & Steeles Ave E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	10	923	242	582	1046	21	201	222	62	67
v/c Ratio	0.07	0.95	0.54	0.84	0.44	0.02	0.63	0.44	0.35	0.16
Control Delay	46.3	64.3	34.4	42.2	10.7	0.1	52.0	7.0	43.7	21.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.3	64.3	34.4	42.2	10.7	0.1	52.0	7.0	43.7	21.2
Queue Length 50th (m)	2.0	97.2	28.9	115.4	54.3	0.0	49.8	0.0	14.3	7.8
Queue Length 95th (m)	m3.1	#163.7	m49.7	#225.9	94.8	0.0	67.6	18.5	25.3	17.9
Internal Link Dist (m)		199.6			142.4		80.1			87.7
Turn Bay Length (m)	35.0		20.0	65.0		20.0			15.0	
Base Capacity (vph)	139	973	450	693	2357	951	555	712	243	552
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.95	0.54	0.84	0.44	0.02	0.36	0.31	0.26	0.12

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	895	235	565	1015	20	130	65	215	60	35	30
Future Volume (vph)	10	895	235	565	1015	20	130	65	215	60	35	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96		1.00	0.97	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1678	3368	1326	1668	3400	1346		1777	1453	1573	1698	
Flt Permitted	0.27	1.00	1.00	0.10	1.00	1.00		0.76	1.00	0.47	1.00	
Satd. Flow (perm)	483	3368	1326	176	3400	1346		1393	1453	780	1698	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	923	242	582	1046	21	134	67	222	62	36	31
RTOR Reduction (vph)	0	0	67	0	0	6	0	0	171	0	24	0
Lane Group Flow (vph)	10	923	175	582	1046	15	0	201	51	62	43	0
Confl. Peds. (#/hr)	10		20	20		10	5		15	15		5
Heavy Vehicles (%)	0%	6%	2%	1%	5%	0%	3%	0%	1%	6%	4%	0%
Bus Blockages (#/hr)	0	0	18	0	0	18	0	0	0	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	36.0	36.0	36.0	87.8	87.8	87.8		28.2	28.2	28.2	28.2	
Effective Green, g (s)	37.0	37.0	37.0	88.8	88.8	88.8		29.2	29.2	29.2	29.2	
Actuated g/C Ratio	0.29	0.29	0.29	0.69	0.69	0.69		0.23	0.23	0.23	0.23	
Clearance Time (s)	6.0	6.0	6.0	4.0	6.0	6.0		6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	139	973	383	690	2358	933		317	331	177	387	
v/s Ratio Prot		c0.27		c0.32	0.31						0.03	
v/s Ratio Perm	0.02		0.13	0.26		0.01		c0.14	0.03	0.08		
v/c Ratio	0.07	0.95	0.46	0.84	0.44	0.02		0.63	0.15	0.35	0.11	
Uniform Delay, d1	33.0	44.6	37.3	29.9	8.7	6.1		44.6	39.5	41.4	39.1	
Progression Factor	1.34	1.11	1.34	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	14.6	2.7	9.2	0.6	0.0		4.1	0.2	1.2	0.1	
Delay (s)	45.1	64.0	52.6	39.1	9.3	6.1		48.7	39.7	42.6	39.3	
Level of Service	D	E	D	D	A	A		D	D	D	D	
Approach Delay (s)		61.5			19.8			44.0			40.9	
Approach LOS		E			B			D			D	

Intersection Summary

HCM 2000 Control Delay	38.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	96.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	10	40	25	45	0	40	50	5	0	60	5
Future Volume (vph)	0	10	40	25	45	0	40	50	5	0	60	5
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	11	45	28	51	0	45	56	6	0	67	6

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	56	79	107	73
Volume Left (vph)	0	28	45	0
Volume Right (vph)	45	0	6	6
Hadj (s)	-0.48	0.07	0.07	-0.05
Departure Headway (s)	3.9	4.4	4.3	4.3
Degree Utilization, x	0.06	0.10	0.13	0.09
Capacity (veh/h)	871	766	795	810
Control Delay (s)	7.2	7.9	8.0	7.7
Approach Delay (s)	7.2	7.9	8.0	7.7
Approach LOS	A	A	A	A

Intersection Summary				
Delay			7.8	
Level of Service			A	
Intersection Capacity Utilization			29.6%	ICU Level of Service
Analysis Period (min)			15	

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	0	10	40	25	45	0	40	50	5	0	60	5
Future Vol, veh/h	0	10	40	25	45	0	40	50	5	0	60	5
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	0	0	0	0	0	0	0	2	0	0	0	0
Mvmt Flow	0	11	45	28	51	0	45	56	6	0	67	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.2	7.9	8	7.7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	42%	0%	36%	0%
Vol Thru, %	53%	20%	64%	92%
Vol Right, %	5%	80%	0%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	95	50	70	65
LT Vol	40	0	25	0
Through Vol	50	10	45	60
RT Vol	5	40	0	5
Lane Flow Rate	107	56	79	73
Geometry Grp	1	1	1	1
Degree of Util (X)	0.126	0.061	0.097	0.087
Departure Headway (Hd)	4.243	3.913	4.433	4.274
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	832	920	812	844
Service Time	2.337	1.918	2.439	2.274
HCM Lane V/C Ratio	0.129	0.061	0.097	0.086
HCM Control Delay	8	7.2	7.9	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.2	0.3	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	0	0	0	0	30	0	0	15	5
Future Volume (Veh/h)	5	0	5	0	0	0	0	30	0	0	15	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	5	0	0	0	0	33	0	0	16	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	52	52	18	56	54	33	21			33		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	52	52	18	56	54	33	21			33		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	100	100	100	100			100		
cM capacity (veh/h)	948	840	1060	936	837	1041	1595			1579		

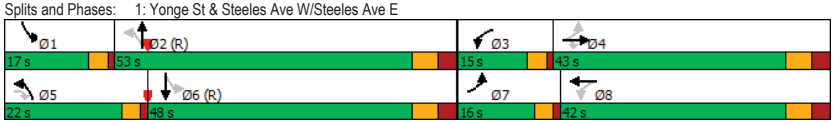
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	10	0	33	21
Volume Left	5	0	0	0
Volume Right	5	0	0	5
cSH	1001	1700	1595	1579
Volume to Capacity	0.01	0.09	0.00	0.00
Queue Length 95th (m)	0.2	0.0	0.0	0.0
Control Delay (s)	8.6	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	8.6	0.0	0.0	0.0
Approach LOS	A	A		

Intersection Summary					
Average Delay			1.3		
Intersection Capacity Utilization			13.3%	ICU Level of Service	A
Analysis Period (min)			15		

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	205	860	290	180	915	290	1225	225	1125
Future Volume (vph)	205	860	290	180	915	290	1225	225	1125
Turn Type	pm+pt	NA	custom	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4 5	8		2		6	
Detector Phase	7	4	4 5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	34.0		6.0	34.0	6.0	32.0	6.0	32.0
Minimum Split (s)	14.0	41.0		14.0	41.0	16.0	39.0	16.0	39.0
Total Split (s)	16.0	43.0		15.0	42.0	22.0	53.0	17.0	48.0
Total Split (%)	12.5%	33.6%		11.7%	32.8%	17.2%	41.4%	13.3%	37.5%
Maximum Green (s)	12.0	36.0		11.0	35.0	18.0	46.0	13.0	41.0
Yellow Time (s)	3.0	4.0		3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	3.0		1.0	3.0	1.0	3.0	1.0	3.0
Lost Time Adjust (s)	-2.0	-1.0		-1.5	-1.0	-1.5	-1.0	-2.0	-1.0
Total Lost Time (s)	2.0	6.0		2.5	6.0	2.5	6.0	2.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Min		None	Min	None	C-Min	None	C-Min
Walk Time (s)		7.0			7.0		8.0		8.0
Flash Dont Walk (s)		27.0			27.0		24.0		24.0
Pedestrian Calls (#/hr)		85			85		90		90

Intersection Summary
Cycle Length: 128
Actuated Cycle Length: 128
Offset: 48 (38%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated

Splits and Phases: 1: Yonge St & Steeles Ave W/Steeles Ave E



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	216	905	305	189	1274	305	1373	237	1416
v/c Ratio	0.92	0.90	0.59	0.87	0.97	0.98	0.91	0.97	0.99
Control Delay	73.2	57.1	21.9	52.8	57.8	81.6	48.3	84.8	62.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.2	57.1	21.9	52.8	57.8	81.6	48.3	84.8	62.5
Queue Length 50th (m)	41.2	121.7	39.0	39.7	121.3	64.7	148.1	47.5	143.6
Queue Length 95th (m)	#90.5	#159.3	71.2	m#68.0	#153.0	#124.7	#177.8	#101.4	#182.4
Internal Link Dist (m)		182.5			226.8		81.6		84.7
Turn Bay Length (m)	110.0			160.0		50.0		40.0	
Base Capacity (vph)	235	1001	515	217	1319	312	1509	245	1436
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.90	0.59	0.87	0.97	0.98	0.91	0.97	0.99

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	205	860	290	180	915	295	290	1225	80	225	1125	220
Future Volume (vph)	205	860	290	180	915	295	290	1225	80	225	1125	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	2.0	6.0	6.0	2.5	6.0		2.5	6.0		2.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		1.00	*0.77		1.00	*0.85	
Frpb, ped/bikes	1.00	1.00	0.69	1.00	0.95		1.00	0.98		1.00	0.95	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1634	3466	1000	1646	4533		1668	4098		1618	4316	
Flt Permitted	0.11	1.00	1.00	0.11	1.00		0.09	1.00		0.09	1.00	
Satd. Flow (perm)	181	3466	1000	190	4533		156	4098		158	4316	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	216	905	305	189	963	311	305	1289	84	237	1184	232
RTOR Reduction (vph)	0	0	53	0	45	0	0	4	0	0	20	0
Lane Group Flow (vph)	216	905	252	189	1229	0	305	1369	0	237	1396	0
Confl. Peds. (#/hr)	185		285	285		185	295		245	245		295
Heavy Vehicles (%)	3%	3%	4%	2%	3%	4%	1%	3%	3%	4%	2%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	31	0	0	26
Turn Type	pm+pt	NA	custom	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4 5	8			2			6		
Actuated Green, G (s)	48.0	36.0	61.0	46.0	35.0		63.0	46.0		54.0	41.0	
Effective Green, g (s)	52.0	37.0	62.0	49.0	36.0		64.5	47.0		58.0	42.0	
Actuated g/C Ratio	0.41	0.29	0.48	0.38	0.28		0.50	0.37		0.45	0.33	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	232	1001	484	214	1274		308	1504		242	1416	
v/s Ratio Prot	c0.10	0.26		0.09	c0.27		c0.15	0.33		0.11	0.32	
v/s Ratio Perm	0.28		0.25	0.25			c0.35			0.33		
v/c Ratio	0.93	0.90	0.52	0.88	0.96		0.99	0.91		0.98	0.99	
Uniform Delay, d1	34.5	43.8	22.8	31.2	45.4		40.0	38.5		37.3	42.7	
Progression Factor	1.00	1.00	1.00	0.79	1.01		1.00	1.00		1.00	1.00	
Incremental Delay, d2	40.4	11.3	1.0	24.9	13.8		48.5	9.7		51.4	20.8	
Delay (s)	74.9	55.1	23.8	49.7	59.4		88.5	48.2		88.7	63.5	
Level of Service	E	E	C	D	E		F	D		F	E	
Approach Delay (s)		51.4			58.2			55.6			67.1	
Approach LOS		D			E			E			E	

Intersection Summary

HCM 2000 Control Delay	58.3	HCM 2000 Level of Service		E	
HCM 2000 Volume to Capacity ratio	1.00				
Actuated Cycle Length (s)	128.0	Sum of lost time (s)		17.0	
Intersection Capacity Utilization	100.5%	ICU Level of Service		G	
Analysis Period (min)	15				

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	60	1725	25	55	1605
Future Volume (Veh/h)	5	60	1725	25	55	1605
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	5	61	1760	26	56	1638
Pedestrians	170					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	14					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			109			
pX, platoon unblocked	0.70	0.70			0.70	
vC, conflicting volume	2601	770			1956	
vC1, stage 1 conf vol	1943					
vC2, stage 2 conf vol	658					
vCu, unblocked vol	1805	0			889	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	91			88	
cM capacity (veh/h)	196	660			458	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	66	704	704	378	56	546	546	546
Volume Left	5	0	0	0	56	0	0	0
Volume Right	61	0	0	26	0	0	0	0
cSH	559	1700	1700	1700	458	1700	1700	1700
Volume to Capacity	0.12	0.41	0.41	0.22	0.12	0.32	0.32	0.32
Queue Length 95th (m)	3.2	0.0	0.0	0.0	3.3	0.0	0.0	0.0
Control Delay (s)	12.3	0.0	0.0	0.0	13.9	0.0	0.0	0.0
Lane LOS	B				B			
Approach Delay (s)	12.3	0.0			0.5			
Approach LOS	B							

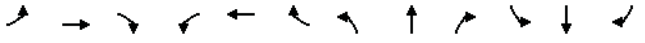
Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	51.3%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1045	25	0	1405	125	0	0	60	0	0	35
Future Volume (Veh/h)	0	1045	25	0	1405	125	0	0	60	0	0	35
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	1089	26	0	1464	130	0	0	62	0	0	36
Pedestrians		5						15			35	
Lane Width (m)		3.5						3.0			3.0	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						1			2	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		251			224							
pX, platoon unblocked	0.74			0.76			0.86	0.86	0.76	0.86	0.86	0.74
vC, conflicting volume	1629			1130			1890	2746	572	2106	2629	772
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1138			546			450	1451	0	702	1314	0
tC, single (s)	4.1			4.1			7.7	6.5	6.9	*9.1	*9.0	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	*4.5	*5.6	3.3
p0 queue free %	100			100			100	100	92	100	100	95
cM capacity (veh/h)	446			779			375	109	818	153	47	781

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	726	389	732	732	130	62	36
Volume Left	0	0	0	0	0	0	0
Volume Right	0	26	0	0	130	62	36
cSH	1700	1700	1700	1700	1700	818	781
Volume to Capacity	0.43	0.23	0.43	0.43	0.08	0.08	0.05
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	2.0	1.2
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	9.8	9.8
Lane LOS						A	A
Approach Delay (s)	0.0		0.0			9.8	9.8
Approach LOS						A	A

Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	50.4%	ICU Level of Service		A
Analysis Period (min)	15			

* User Entered Value



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	10	75	15	5	45	5	25	85	15	15	15	5
Future Volume (vph)	10	75	15	5	45	5	25	85	15	15	15	5
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	12	88	18	6	53	6	29	100	18	18	18	6

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	118	65	147	42
Volume Left (vph)	12	6	29	18
Volume Right (vph)	18	6	18	6
Hadj (s)	-0.07	-0.04	-0.03	0.00
Departure Headway (s)	4.3	4.4	4.3	4.5
Degree Utilization, x	0.14	0.08	0.18	0.05
Capacity (veh/h)	792	762	793	752
Control Delay (s)	8.1	7.8	8.3	7.7
Approach Delay (s)	8.1	7.8	8.3	7.7
Approach LOS	A	A	A	A

Intersection Summary				
Delay			8.1	
Level of Service			A	
Intersection Capacity Utilization			23.2%	ICU Level of Service
Analysis Period (min)			15	

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	75	15	5	45	5	25	85	15	15	15	5
Future Vol, veh/h	10	75	15	5	45	5	25	85	15	15	15	5
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	12	88	18	6	53	6	29	100	18	18	18	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.1	7.8	8.3	7.7
HCM LOS	A	A	A	A

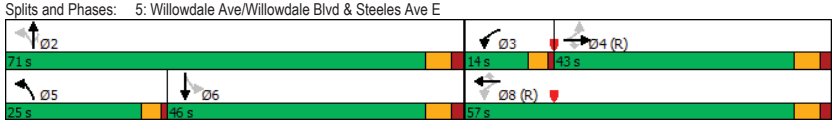
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	20%	10%	9%	43%
Vol Thru, %	68%	75%	82%	43%
Vol Right, %	12%	15%	9%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	125	100	55	35
LT Vol	25	10	5	15
Through Vol	85	75	45	15
RT Vol	15	15	5	5
Lane Flow Rate	147	118	65	41
Geometry Grp	1	1	1	1
Degree of Util (X)	0.177	0.142	0.079	0.051
Departure Headway (Hd)	4.329	4.331	4.422	4.475
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	831	831	812	802
Service Time	2.341	2.345	2.438	2.492
HCM Lane V/C Ratio	0.177	0.142	0.08	0.051
HCM Control Delay	8.3	8.1	7.8	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.6	0.5	0.3	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	65	905	135	270	1125	30	395	35	510	45	110
Future Volume (vph)	65	905	135	270	1125	30	395	35	510	45	110
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA
Protected Phases		4		3	8		5	2			6
Permitted Phases	4		4	8		8	2		2	6	
Detector Phase	4	4	4	3	8	8	5	2	2	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	7.0	7.0	7.0	7.0
Minimum Split (s)	43.0	43.0	43.0	14.0	43.0	43.0	25.0	46.0	46.0	46.0	46.0
Total Split (s)	43.0	43.0	43.0	14.0	57.0	57.0	25.0	71.0	71.0	46.0	46.0
Total Split (%)	33.6%	33.6%	33.6%	10.9%	44.5%	44.5%	19.5%	55.5%	55.5%	35.9%	35.9%
Maximum Green (s)	37.0	37.0	37.0	10.0	51.0	51.0	21.0	65.0	65.0	40.0	40.0
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None
Walk Time (s)	24.0	24.0	24.0		24.0	24.0		24.0	24.0	24.0	24.0
Flash Dont Walk (s)	13.0	13.0	13.0		13.0	13.0		16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)	15	15	15		15	15		15	15	15	15

Intersection Summary

Cycle Length: 128
Actuated Cycle Length: 128
Offset: 41.5 (32%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 5: Willowdale Ave/Willowdale Blvd & Steeles Ave E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	67	933	139	278	1160	31	443	526	46	123
v/c Ratio	0.68	0.91	0.30	0.94	0.72	0.05	0.80	0.66	0.16	0.14
Control Delay	44.6	35.5	7.2	73.6	32.5	1.4	40.4	16.8	19.2	18.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.6	35.5	7.2	73.6	32.5	1.4	40.4	16.8	19.2	18.3
Queue Length 50th (m)	16.3	128.6	14.9	~66.9	134.3	0.0	93.3	54.2	6.6	17.0
Queue Length 95th (m)	m18.8	m147.2	m15.1	#139.8	172.7	1.9	131.3	86.3	14.0	27.0
Internal Link Dist (m)		199.6			142.4		80.1			87.5
Turn Bay Length (m)	35.0		20.0	65.0		20.0			15.0	
Base Capacity (vph)	98	1028	465	296	1607	662	625	874	285	851
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.91	0.30	0.94	0.72	0.05	0.71	0.60	0.16	0.14

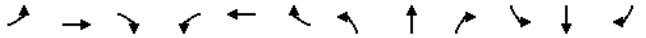
Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	905	135	270	1125	30	395	35	510	45	110	10
Future Volume (vph)	65	905	135	270	1125	30	395	35	510	45	110	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96		1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		0.99	1.00	0.99	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1680	3466	1345	1668	3466	1359		1767	1468	1674	1853	
Flt Permitted	0.19	1.00	1.00	0.10	1.00	1.00		0.66	1.00	0.35	1.00	
Satd. Flow (perm)	330	3466	1345	171	3466	1359		1213	1468	624	1853	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	67	933	139	278	1160	31	407	36	526	46	113	10
RTOR Reduction (vph)	0	0	66	0	0	17	0	0	131	0	2	0
Lane Group Flow (vph)	67	933	73	278	1160	14	0	443	395	46	121	0
Confl. Peds. (#/hr)	10		15	15		10	10		15	15		10
Heavy Vehicles (%)	0%	3%	2%	1%	3%	0%	1%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	16	0	0	16	0	0	0	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	37.0	37.0	37.0	58.3	58.3	58.3		57.7	57.7	57.7	57.7	
Effective Green, g (s)	38.0	38.0	38.0	59.3	59.3	59.3		58.7	58.7	58.7	58.7	
Actuated g/C Ratio	0.30	0.30	0.30	0.46	0.46	0.46		0.46	0.46	0.46	0.46	
Clearance Time (s)	6.0	6.0	6.0	4.0	6.0	6.0		6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	97	1028	399	293	1605	629		556	673	286	849	
v/s Ratio Prot		0.27		c0.14	0.33						0.07	
v/s Ratio Perm	0.20		0.05	c0.30		0.01		c0.37	0.27	0.07		
v/c Ratio	0.69	0.91	0.18	0.95	0.72	0.02		0.80	0.59	0.16	0.14	
Uniform Delay, d1	39.8	43.3	33.5	38.1	27.7	18.6		29.6	25.7	20.3	20.1	
Progression Factor	0.60	0.64	0.50	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	17.4	7.0	0.5	38.5	2.9	0.1		7.8	1.3	0.3	0.1	
Delay (s)	41.4	34.8	17.2	76.6	30.6	18.7		37.4	27.0	20.5	20.1	
Level of Service	D	C	B	E	C	B		D	C	C	C	
Approach Delay (s)		33.0			39.0			31.7			20.2	
Approach LOS		C			D			C			C	

Intersection Summary				
HCM 2000 Control Delay	34.5	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.92			
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	17.0	
Intersection Capacity Utilization	90.6%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	35	65	15	25	0	25	90	15	0	85	5
Future Volume (vph)	5	35	65	15	25	0	25	90	15	0	85	5
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	6	41	76	17	29	0	29	105	17	0	99	6

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	123	46	151	105
Volume Left (vph)	6	17	29	0
Volume Right (vph)	76	0	17	6
Hadj (s)	-0.36	0.07	-0.03	-0.03
Departure Headway (s)	4.2	4.7	4.4	4.4
Degree Utilization, x	0.14	0.06	0.18	0.13
Capacity (veh/h)	800	709	785	768
Control Delay (s)	7.9	8.0	8.4	8.1
Approach Delay (s)	7.9	8.0	8.4	8.1
Approach LOS	A	A	A	A

Intersection Summary				
Delay	8.1			
Level of Service	A			
Intersection Capacity Utilization	28.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	35	65	15	25	0	25	90	15	0	85	5
Future Vol, veh/h	5	35	65	15	25	0	25	90	15	0	85	5
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	6	41	76	17	29	0	29	105	17	0	99	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.9	8	8.4	8.1
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	19%	5%	38%	0%
Vol Thru, %	69%	33%	62%	94%
Vol Right, %	12%	62%	0%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	130	105	40	90
LT Vol	25	5	15	0
Through Vol	90	35	25	85
RT Vol	15	65	0	5
Lane Flow Rate	151	122	47	105
Geometry Grp	1	1	1	1
Degree of Util (X)	0.183	0.141	0.061	0.128
Departure Headway (Hd)	4.359	4.17	4.686	4.406
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	824	861	765	815
Service Time	2.378	2.19	2.709	2.426
HCM Lane V/C Ratio	0.183	0.142	0.061	0.129
HCM Control Delay	8.4	7.9	8	8.1
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	0.5	0.2	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	0	0	0	5	120	0	0	30	5
Future Volume (Veh/h)	5	0	5	0	0	0	5	120	0	0	30	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	5	0	0	0	5	130	0	0	33	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	176	176	36	180	178	130	38			130		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	176	176	36	180	178	130	38			130		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	100	100	100	100			100		
cM capacity (veh/h)	785	716	1037	775	713	920	1572			1455		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	10	0	135	38
Volume Left	5	0	5	0
Volume Right	5	0	0	5
cSH	894	1700	1572	1455
Volume to Capacity	0.01	0.00	0.00	0.00
Queue Length 95th (m)	0.3	0.0	0.1	0.0
Control Delay (s)	9.1	0.0	0.3	0.0
Lane LOS	A	A	A	
Approach Delay (s)	9.1	0.0	0.3	0.0
Approach LOS	A	A		

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	20.4%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	215	955	435	165	1075	225	975	240	1520
Future Volume (vph)	215	955	435	165	1075	225	975	240	1520
Turn Type	pm+pt	NA	custom	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4 5	8		2		6	
Detector Phase	7	4	4 5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	34.0		6.0	34.0	6.0	32.0	6.0	32.0
Minimum Split (s)	14.0	44.0		14.0	44.0	10.0	39.0	11.0	39.0
Total Split (s)	16.0	46.0		14.0	44.0	16.0	47.0	21.0	52.0
Total Split (%)	12.5%	35.9%		10.9%	34.4%	12.5%	36.7%	16.4%	40.6%
Maximum Green (s)	12.0	39.0		10.0	37.0	12.0	40.0	17.0	45.0
Yellow Time (s)	3.0	4.0		3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	3.0		1.0	3.0	1.0	3.0	1.0	3.0
Lost Time Adjust (s)	-1.5	-1.0		-1.5	-1.0	-1.5	-1.0	-2.0	-1.0
Total Lost Time (s)	2.5	6.0		2.5	6.0	2.5	6.0	2.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Min		None	Min	None	C-Min	None	C-Min
Walk Time (s)		7.0			7.0		8.0		8.0
Flash Dont Walk (s)		27.0			27.0		24.0		24.0
Pedestrian Calls (#/hr)		85			85		95		95

Intersection Summary

Cycle Length: 128
Actuated Cycle Length: 128
Offset: 57 (45%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 1: Yonge St & Steeles Ave W/Steeles Ave E

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	224	995	453	172	1203	234	1204	250	1807
v/c Ratio	1.06	0.94	0.88	0.91	0.86	1.02	0.76	0.84	1.11
Control Delay	111.0	60.0	45.8	84.0	44.3	98.6	41.4	52.8	98.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	111.0	60.0	45.8	84.0	44.3	98.6	41.4	52.8	98.1
Queue Length 50th (m)	~50.0	134.9	88.6	32.8	111.6	~50.8	101.2	44.8	~206.8
Queue Length 95th (m)	#103.7	#177.5	#159.6	#77.1	110.6	#104.6	119.4	#88.5	#239.3
Internal Link Dist (m)		174.7			226.8		81.6		84.7
Turn Bay Length (m)	110.0			160.0		50.0		40.0	
Base Capacity (vph)	212	1062	506	189	1415	230	1581	308	1624
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.06	0.94	0.90	0.91	0.85	1.02	0.76	0.81	1.11

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	215	955	435	165	1075	80	225	975	180	240	1520	215
Future Volume (vph)	215	955	435	165	1075	80	225	975	180	240	1520	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	2.5	6.0	6.0	2.5	6.0		2.5	6.0		2.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		1.00	*0.93		1.00	*0.88	
Frpb, ped/bikes	1.00	1.00	0.71	1.00	0.99		1.00	0.97		1.00	0.96	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1516	3400	1043	1528	4745		1620	4740		1617	4484	
Flt Permitted	0.10	1.00	1.00	0.10	1.00		0.09	1.00		0.11	1.00	
Satd. Flow (perm)	158	3400	1043	168	4745		160	4740		189	4484	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	224	995	453	172	1120	83	234	1016	188	250	1583	224
RTOR Reduction (vph)	0	0	55	0	6	0	0	21	0	0	13	0
Lane Group Flow (vph)	224	995	398	172	1197	0	234	1183	0	250	1794	0
Confl. Peds. (#/hr)	165		255	255		165	270		165	165		270
Heavy Vehicles (%)	11%	5%	2%	10%	5%	13%	4%	5%	2%	4%	4%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	32	0	0	31
Turn Type	pm+pt	NA	custom	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4 5	8			2			6		
Actuated Green, G (s)	50.8	38.8	58.0	46.8	36.8		53.3	41.1		61.1	45.0	
Effective Green, g (s)	53.8	39.8	59.0	49.8	37.8		56.3	42.1		63.2	46.0	
Actuated g/C Ratio	0.42	0.31	0.46	0.39	0.30		0.44	0.33		0.49	0.36	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	209	1057	480	187	1401		226	1559		295	1611	
v/s Ratio Prot	c0.11	0.29		0.08	0.25		c0.11	0.25		c0.12	c0.40	
v/s Ratio Perm	c0.34		0.38	0.27			0.34			0.30		
v/c Ratio	1.07	0.94	0.83	0.92	0.85		1.04	0.76		0.85	1.11	
Uniform Delay, d1	36.1	43.0	30.1	31.8	42.5		38.1	38.4		31.1	41.0	
Progression Factor	1.00	1.00	1.00	1.49	0.91		1.00	1.00		1.00	1.00	
Incremental Delay, d2	82.6	15.5	11.3	38.3	4.5		69.4	3.5		19.6	60.3	
Delay (s)	118.7	58.5	41.4	85.6	43.0		107.5	41.9		50.7	101.3	
Level of Service	F	E	D	F	D		F	D		D	F	
Approach Delay (s)		61.9			48.3			52.6			95.1	
Approach LOS		E			D			D			F	

Intersection Summary				
HCM 2000 Control Delay	67.5	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	1.12			
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	17.0	
Intersection Capacity Utilization	104.6%	ICU Level of Service	G	
Analysis Period (min)	15			

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	70	1370	20	20	2035
Future Volume (Veh/h)	0	70	1370	20	20	2035
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	73	1427	21	21	2120
Pedestrians	125					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	10					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			109			
pX, platoon unblocked	0.79	0.79			0.79	
vC, conflicting volume	2311	611			1573	
vC1, stage 1 conf vol	1562					
vC2, stage 2 conf vol	749					
vCu, unblocked vol	1731	0			798	
tC, single (s)	6.8	6.9			4.2	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	90			96	
cM capacity (veh/h)	239	768			572	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	73	571	571	306	21	707	707	707
Volume Left	0	0	0	0	21	0	0	0
Volume Right	73	0	0	21	0	0	0	0
cSH	768	1700	1700	1700	572	1700	1700	1700
Volume to Capacity	0.10	0.34	0.34	0.18	0.04	0.42	0.42	0.42
Queue Length 95th (m)	2.5	0.0	0.0	0.0	0.9	0.0	0.0	0.0
Control Delay (s)	10.2	0.0	0.0	0.0	11.5	0.0	0.0	0.0
Lane LOS	B				B			
Approach Delay (s)	10.2	0.0			0.1			
Approach LOS	B							

Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	50.3%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	10	1310	30	1345	35	5	5	35	30
Future Volume (vph)	10	1310	30	1345	35	5	5	35	30
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		4		8			2		6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	2	2	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	101.0	101.0	101.0	101.0	101.0	27.0	27.0	27.0	27.0
Total Split (%)	78.9%	78.9%	78.9%	78.9%	78.9%	21.1%	21.1%	21.1%	21.1%
Maximum Green (s)	95.0	95.0	95.0	95.0	95.0	21.0	21.0	21.0	21.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		-1.0		-1.0	-1.0		-1.0		-1.0
Total Lost Time (s)		5.0		5.0	5.0		5.0		5.0
Lead/Lag									
Lead-Lag Optimize?									
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0

Intersection Summary

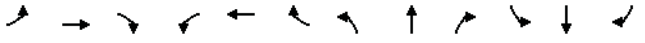
Cycle Length: 128
Actuated Cycle Length: 128
Offset: 28 (22%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 3: Dudley Ave & Steeles Ave E

Lane Group	EBT	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	1409	1389	35	45	100
v/c Ratio	0.54	0.57	0.03	0.23	0.57
Control Delay	3.5	3.0	0.1	23.2	56.6
Queue Delay	0.2	0.0	0.0	0.0	0.0
Total Delay	3.7	3.0	0.1	23.2	56.6
Queue Length 50th (m)	24.1	21.6	0.1	2.4	20.9
Queue Length 95th (m)	m29.2	11.4	m0.1	14.0	38.3
Internal Link Dist (m)	226.8	199.6		65.0	35.4
Turn Bay Length (m)			25.0		
Base Capacity (vph)	2594	2437	1036	308	277
Starvation Cap Reductn	344	108	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.63	0.60	0.03	0.15	0.36

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	1310	75	30	1345	35	5	5	35	35	30	35
Future Volume (vph)	10	1310	75	30	1345	35	5	5	35	35	30	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)		5.0			5.0	5.0		5.0			5.0	
Lane Util. Factor		0.95			0.95	1.00		1.00			1.00	
Frpb, ped/bikes		1.00			1.00	0.91		1.00			1.00	
Flpb, ped/bikes		1.00			1.00	1.00		1.00			1.00	
Frt		0.99			1.00	0.85		0.90			0.95	
Flt Protected		1.00			1.00	1.00		0.99			0.98	
Satd. Flow (prot)		3371			3399	1262		1672			1683	
Flt Permitted		0.94			0.88	1.00		0.97			0.89	
Satd. Flow (perm)		3170			2981	1262		1630			1527	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	10	1323	76	30	1359	35	5	5	35	35	30	35
RTOR Reduction (vph)	0	2	0	0	0	5	0	31	0	0	16	0
Lane Group Flow (vph)	0	1407	0	0	1389	30	0	14	0	0	84	0
Confl. Peds. (#/hr)	20		10	10		20						
Heavy Vehicles (%)	0%	5%	0%	0%	5%	0%	0%	0%	0%	0%	0%	13%
Bus Blockages (#/hr)	0	0	18	0	0	20	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		103.7			103.7	103.7		12.3			12.3	
Effective Green, g (s)		104.7			104.7	104.7		13.3			13.3	
Actuated g/C Ratio		0.82			0.82	0.82		0.10			0.10	
Clearance Time (s)		6.0			6.0	6.0		6.0			6.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)		2592			2438	1032		169			158	
v/s Ratio Prot												
v/s Ratio Perm		0.44			c0.47	0.02		0.01			c0.05	
v/c Ratio		0.54			0.57	0.03		0.08			0.53	
Uniform Delay, d1		3.8			4.0	2.2		51.8			54.4	
Progression Factor		0.74			0.48	0.07		1.00			1.00	
Incremental Delay, d2		0.4			0.8	0.0		0.2			3.4	
Delay (s)		3.2			2.7	0.2		52.0			57.8	
Level of Service		A			A	A		D			E	
Approach Delay (s)		3.2			2.7			52.0			57.8	
Approach LOS		A			A			D			E	

Intersection Summary				
HCM 2000 Control Delay	5.5	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.57			
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	79.3%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	45	10	5	85	0	20	20	5	0	15	10
Future Volume (vph)	5	45	10	5	85	0	20	20	5	0	15	10
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	6	55	12	6	104	0	24	24	6	0	18	12

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	73	110	54	30
Volume Left (vph)	6	6	24	0
Volume Right (vph)	12	0	6	12
Hadj (s)	-0.01	0.01	0.02	-0.24
Departure Headway (s)	4.2	4.2	4.4	4.1
Degree Utilization, x	0.09	0.13	0.07	0.03
Capacity (veh/h)	833	841	785	829
Control Delay (s)	7.6	7.8	7.7	7.3
Approach Delay (s)	7.6	7.8	7.7	7.3
Approach LOS	A	A	A	A

Intersection Summary					
Delay	7.6				
Level of Service	A				
Intersection Capacity Utilization	23.1%	ICU Level of Service		A	
Analysis Period (min)	15				

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	45	10	5	85	0	20	20	5	0	15	10
Future Vol, veh/h	5	45	10	5	85	0	20	20	5	0	15	10
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles, %	0	6	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	6	55	12	6	104	0	24	24	6	0	18	12
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

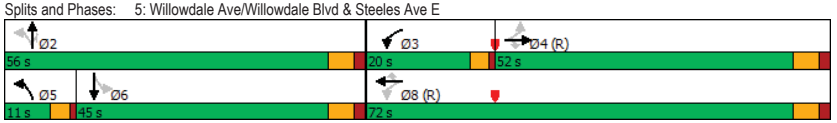
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.5	7.8	7.7	7.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	44%	8%	6%	0%
Vol Thru, %	44%	75%	94%	60%
Vol Right, %	11%	17%	0%	40%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	45	60	90	25
LT Vol	20	5	5	0
Through Vol	20	45	85	15
RT Vol	5	10	0	10
Lane Flow Rate	55	73	110	30
Geometry Grp	1	1	1	1
Degree of Util (X)	0.065	0.082	0.125	0.034
Departure Headway (Hd)	4.262	4.049	4.116	4.019
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	828	875	864	875
Service Time	2.353	2.119	2.176	2.118
HCM Lane V/C Ratio	0.066	0.083	0.127	0.034
HCM Control Delay	7.7	7.5	7.8	7.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.3	0.4	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	5	1135	240	530	1260	20	120	65	215	55	35
Future Volume (vph)	5	1135	240	530	1260	20	120	65	215	55	35
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA
Protected Phases		4		3	8		5	2			6
Permitted Phases	4		4	8		8	2		2	6	
Detector Phase	4	4	4	3	8	8	5	2	2	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	7.0	7.0	7.0	7.0
Minimum Split (s)	42.0	42.0	42.0	10.0	42.0	42.0	11.0	45.0	45.0	45.0	45.0
Total Split (s)	52.0	52.0	52.0	20.0	72.0	72.0	11.0	56.0	56.0	45.0	45.0
Total Split (%)	40.6%	40.6%	40.6%	15.6%	56.3%	56.3%	8.6%	43.8%	43.8%	35.2%	35.2%
Maximum Green (s)	46.0	46.0	46.0	16.0	66.0	66.0	7.0	50.0	50.0	39.0	39.0
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None
Walk Time (s)	23.0	23.0	23.0		23.0	23.0		23.0	23.0	23.0	23.0
Flash Dont Walk (s)	13.0	13.0	13.0		13.0	13.0		16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)	20	20	20		20	20		20	20	20	20

Intersection Summary
Cycle Length: 128
Actuated Cycle Length: 128
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated

Splits and Phases: 5: Willowdale Ave/Willowdale Blvd & Steeles Ave E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	5	1170	247	546	1299	21	191	222	57	67
v/c Ratio	0.04	0.95	0.45	0.95	0.55	0.02	0.61	0.45	0.32	0.17
Control Delay	33.4	54.3	24.6	62.5	12.0	0.1	51.7	7.1	42.9	21.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.4	54.3	24.6	62.5	12.0	0.1	51.7	7.1	42.9	21.5
Queue Length 50th (m)	0.8	108.4	26.1	118.7	71.6	0.0	47.7	0.0	13.2	7.9
Queue Length 95th (m)	m1.5	#199.2	49.7	#241.9	130.5	0.0	64.0	18.5	23.5	17.9
Internal Link Dist (m)		199.6			142.4		80.1			87.7
Turn Bay Length (m)	35.0		20.0	65.0		20.0			15.0	
Base Capacity (vph)	137	1236	546	576	2378	959	558	712	250	552
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.95	0.45	0.95	0.55	0.02	0.34	0.31	0.23	0.12

Intersection Summary

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

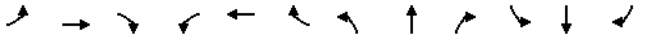
m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	1135	240	530	1260	20	120	65	215	55	35	30
Future Volume (vph)	5	1135	240	530	1260	20	120	65	215	55	35	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96		1.00	0.97	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1680	3368	1326	1668	3400	1346		1780	1453	1573	1698	
Flt Permitted	0.21	1.00	1.00	0.08	1.00	1.00		0.76	1.00	0.48	1.00	
Satd. Flow (perm)	376	3368	1326	141	3400	1346		1403	1453	802	1698	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	5	1170	247	546	1299	21	124	67	222	57	36	31
RTOR Reduction (vph)	0	0	60	0	0	6	0	0	173	0	24	0
Lane Group Flow (vph)	5	1170	187	546	1299	15	0	191	49	57	43	0
Confl. Peds. (#/hr)	10		20	20		10	5		15	15		5
Heavy Vehicles (%)	0%	6%	2%	1%	5%	0%	3%	0%	1%	6%	4%	0%
Bus Blockages (#/hr)	0	0	18	0	0	18	0	0	0	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	45.7	45.7	45.7	88.6	88.6	88.6		27.4	27.4	27.4	27.4	
Effective Green, g (s)	46.7	46.7	46.7	89.6	89.6	89.6		28.4	28.4	28.4	28.4	
Actuated g/C Ratio	0.36	0.36	0.36	0.70	0.70	0.70		0.22	0.22	0.22	0.22	
Clearance Time (s)	6.0	6.0	6.0	4.0	6.0	6.0		6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	137	1228	483	574	2380	942		311	322	177	376	
v/s Ratio Prot		0.35		c0.30	0.38						0.03	
v/s Ratio Perm	0.01		0.14	c0.37		0.01		c0.14	0.03	0.07		
v/c Ratio	0.04	0.95	0.39	0.95	0.55	0.02		0.61	0.15	0.32	0.11	
Uniform Delay, d1	26.2	39.6	30.1	36.7	9.3	5.8		44.9	40.1	41.7	39.8	
Progression Factor	1.24	0.98	1.18	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	15.0	2.0	25.8	0.9	0.0		3.6	0.2	1.1	0.1	
Delay (s)	32.8	54.0	37.6	62.6	10.2	5.9		48.4	40.3	42.8	39.9	
Level of Service	C	D	D	E	B	A		D	D	D	D	
Approach Delay (s)		51.1			25.5			44.1			41.2	
Approach LOS		D			C			D			D	

Intersection Summary

HCM 2000 Control Delay	37.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	95.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	10	40	25	45	0	40	45	5	0	55	5
Future Volume (vph)	0	10	40	25	45	0	40	45	5	0	55	5
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	11	45	28	51	0	45	51	6	0	62	6

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	56	79	102	68
Volume Left (vph)	0	28	45	0
Volume Right (vph)	45	0	6	6
Hadj (s)	-0.48	0.07	0.07	-0.05
Departure Headway (s)	3.9	4.4	4.3	4.3
Degree Utilization, x	0.06	0.10	0.12	0.08
Capacity (veh/h)	878	771	796	812
Control Delay (s)	7.1	7.9	8.0	7.6
Approach Delay (s)	7.1	7.9	8.0	7.6
Approach LOS	A	A	A	A

Intersection Summary				
Delay			7.7	
Level of Service			A	
Intersection Capacity Utilization			29.4%	ICU Level of Service
Analysis Period (min)			15	

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	10	40	25	45	0	40	45	5	0	55	5
Future Vol, veh/h	0	10	40	25	45	0	40	45	5	0	55	5
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	0	0	0	0	0	0	0	2	0	0	0	0
Mvmt Flow	0	11	45	28	51	0	45	51	6	0	62	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.1	7.9	7.9	7.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	44%	0%	36%	0%
Vol Thru, %	50%	20%	64%	92%
Vol Right, %	6%	80%	0%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	90	50	70	60
LT Vol	40	0	25	0
Through Vol	45	10	45	55
RT Vol	5	40	0	5
Lane Flow Rate	101	56	79	67
Geometry Grp	1	1	1	1
Degree of Util (X)	0.119	0.061	0.096	0.078
Departure Headway (Hd)	4.242	3.885	4.408	4.163
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	833	927	818	846
Service Time	2.33	1.887	2.408	2.261
HCM Lane V/C Ratio	0.121	0.06	0.097	0.079
HCM Control Delay	7.9	7.1	7.9	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.2	0.3	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	75	0	5	0	35	15	5	20	5
Future Volume (Veh/h)	5	0	5	75	0	5	0	35	15	5	20	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	5	82	0	5	0	38	16	5	22	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								59				
pX, platoon unblocked												
vC, conflicting volume	86	88	24	86	83	46	27			54		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	86	88	24	86	83	46	27			54		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	91	100	100	100			100		
cM capacity (veh/h)	894	799	1052	894	805	1023	1587			1551		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	10	87	54	32
Volume Left	5	82	0	5
Volume Right	5	5	16	5
cSH	967	901	1587	1551
Volume to Capacity	0.01	0.10	0.00	0.00
Queue Length 95th (m)	0.3	2.6	0.0	0.1
Control Delay (s)	8.8	9.4	0.0	1.2
Lane LOS	A	A		A
Approach Delay (s)	8.8	9.4	0.0	1.2
Approach LOS	A	A		

Intersection Summary					
Average Delay			5.2		
Intersection Capacity Utilization			20.0%	ICU Level of Service	A
Analysis Period (min)			15		

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	240	1075	375	205	1095	255	1420	220	1250
Future Volume (vph)	240	1075	375	205	1095	255	1420	220	1250
Turn Type	pm+pt	NA	custom	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4 5	8		2		6	
Detector Phase	7	4	4 5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	34.0		6.0	34.0	6.0	32.0	6.0	32.0
Minimum Split (s)	14.0	41.0		14.0	41.0	16.0	39.0	16.0	39.0
Total Split (s)	16.0	46.0		14.0	44.0	19.0	52.0	16.0	49.0
Total Split (%)	12.5%	35.9%		10.9%	34.4%	14.8%	40.6%	12.5%	38.3%
Maximum Green (s)	12.0	39.0		10.0	37.0	15.0	45.0	12.0	42.0
Yellow Time (s)	3.0	4.0		3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	3.0		1.0	3.0	1.0	3.0	1.0	3.0
Lost Time Adjust (s)	-2.0	-1.0		-1.5	-1.0	-1.5	-1.0	-2.0	-1.0
Total Lost Time (s)	2.0	6.0		2.5	6.0	2.5	6.0	2.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Min		None	Min	None	C-Min	None	C-Min
Walk Time (s)		7.0			7.0		8.0		8.0
Flash Dont Walk (s)		27.0			27.0		24.0		24.0
Pedestrian Calls (#/hr)		85			85		90		90

Intersection Summary
Cycle Length: 128
Actuated Cycle Length: 128
Offset: 48 (38%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated

Splits and Phases: 1: Yonge St & Steeles Ave W/Steeles Ave E

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	253	1132	395	216	1516	268	1600	232	1590
v/c Ratio	1.07	1.05	0.79	1.04	1.09	0.98	1.09	0.99	1.09
Control Delay	110.3	82.7	37.6	102.2	89.0	84.8	89.2	91.3	89.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	110.3	82.7	37.6	102.2	89.0	84.8	89.2	91.3	89.9
Queue Length 50th (m)	~57.8	~171.3	74.1	~46.8	~94.9	55.0	~205.7	46.1	~183.3
Queue Length 95th (m)	#113.8	#215.1	#134.3	#96.5	#189.7	#112.8	#243.0	#101.5	#217.2
Internal Link Dist (m)		182.5			226.8		81.6		84.7
Turn Bay Length (m)	110.0			160.0		50.0		40.0	
Base Capacity (vph)	237	1083	497	207	1392	273	1474	234	1465
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.07	1.05	0.79	1.04	1.09	0.98	1.09	0.99	1.09

Intersection Summary

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

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	240	1075	375	205	1095	345	255	1420	100	220	1250	260
Future Volume (vph)	240	1075	375	205	1095	345	255	1420	100	220	1250	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	2.0	6.0	6.0	2.5	6.0		2.5	6.0		2.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		1.00	*0.77		1.00	*0.85	
Frpb, ped/bikes	1.00	1.00	0.69	1.00	0.95		1.00	0.98		1.00	0.95	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1636	3466	1000	1652	4541		1668	4090		1620	4297	
Flt Permitted	0.10	1.00	1.00	0.10	1.00		0.09	1.00		0.09	1.00	
Satd. Flow (perm)	168	3466	1000	181	4541		153	4090		155	4297	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	253	1132	395	216	1153	363	268	1495	105	232	1316	274
RTOR Reduction (vph)	0	0	35	0	44	0	0	5	0	0	22	0
Lane Group Flow (vph)	253	1132	360	216	1472	0	268	1595	0	232	1568	0
Confl. Peds. (#/hr)	185		285	285		185	295		245	245		295
Heavy Vehicles (%)	3%	3%	4%	2%	3%	4%	1%	3%	3%	4%	2%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	31	0	0	26
Turn Type	pm+pt	NA	custom	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4 5	8			2			6		
Actuated Green, G (s)	51.0	39.0	61.0	47.0	37.0		60.0	45.0		54.0	42.0	
Effective Green, g (s)	55.0	40.0	62.0	50.0	38.0		62.5	46.0		58.0	43.0	
Actuated g/C Ratio	0.43	0.31	0.48	0.39	0.30		0.49	0.36		0.45	0.34	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	232	1083	484	202	1348		270	1469		230	1443	
v/s Ratio Prot	c0.12	c0.33		0.10	0.32		c0.13	c0.39		c0.11	0.36	
v/s Ratio Perm	0.35		0.36	0.32			0.36			0.35		
v/c Ratio	1.09	1.05	0.74	1.07	1.09		0.99	1.09		1.01	1.09	
Uniform Delay, d1	37.9	44.0	26.6	35.2	45.0		40.1	41.0		38.7	42.5	
Progression Factor	1.00	1.00	1.00	1.14	0.95		1.00	1.00		1.00	1.00	
Incremental Delay, d2	85.3	39.9	6.1	75.5	51.3		52.5	50.4		61.6	51.0	
Delay (s)	123.2	83.9	32.7	115.6	94.2		92.6	91.4		100.3	93.5	
Level of Service	F	F	C	F	F		F	F		F	F	
Approach Delay (s)		78.1			96.9			91.6			94.3	
Approach LOS		E			F			F			F	

Intersection Summary

HCM 2000 Control Delay	90.2	HCM 2000 Level of Service		F	
HCM 2000 Volume to Capacity ratio	1.10				
Actuated Cycle Length (s)	128.0	Sum of lost time (s)		17.0	
Intersection Capacity Utilization	106.2%	ICU Level of Service		G	
Analysis Period (min)	15				

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	65	2000	25	55	1845
Future Volume (Veh/h)	5	65	2000	25	55	1845
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	5	66	2041	26	56	1883
Pedestrians	170					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	14					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			109			
pX, platoon unblocked	0.66	0.66			0.66	
vC, conflicting volume	2964	863			2237	
vC1, stage 1 conf vol	2224					
vC2, stage 2 conf vol	740					
vCu, unblocked vol	2174	0			1074	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	89			85	
cM capacity (veh/h)	150	619			366	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	71	816	816	434	56	628	628	628
Volume Left	5	0	0	0	56	0	0	0
Volume Right	66	0	0	26	0	0	0	0
cSH	507	1700	1700	1700	366	1700	1700	1700
Volume to Capacity	0.14	0.48	0.48	0.26	0.15	0.37	0.37	0.37
Queue Length 95th (m)	3.9	0.0	0.0	0.0	4.3	0.0	0.0	0.0
Control Delay (s)	13.3	0.0	0.0	0.0	16.6	0.0	0.0	0.0
Lane LOS	B				C			
Approach Delay (s)	13.3	0.0			0.5			
Approach LOS	B							

Intersection Summary				
Average Delay		0.5		
Intersection Capacity Utilization		56.7%	ICU Level of Service	B
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	35	1240	15	1635	135	15	30	20	20
Future Volume (vph)	35	1240	15	1635	135	15	30	20	20
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		4		8			2		6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	2	2	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	103.0	103.0	103.0	103.0	103.0	25.0	25.0	25.0	25.0
Total Split (%)	80.5%	80.5%	80.5%	80.5%	80.5%	19.5%	19.5%	19.5%	19.5%
Maximum Green (s)	97.0	97.0	97.0	97.0	97.0	19.0	19.0	19.0	19.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		-1.0		-1.0	-1.0		-1.0		-1.0
Total Lost Time (s)		5.0		5.0	5.0		5.0		5.0
Lead/Lag									
Lead-Lag Optimize?									
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0

Intersection Summary
Cycle Length: 128
Actuated Cycle Length: 128
Offset: 26 (20%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 3: Dumont St/Dudley Ave & Steeles Ave E

Lane Group	EBT	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	1354	1719	141	110	89
v/c Ratio	0.58	0.64	0.14	0.60	0.58
Control Delay	4.5	7.7	1.9	46.4	47.8
Queue Delay	0.4	0.2	0.0	0.0	0.0
Total Delay	4.9	7.9	1.9	46.4	47.8
Queue Length 50th (m)	24.0	89.6	7.2	16.6	13.3
Queue Length 95th (m)	m17.7	63.4	m0.5	35.1	30.3
Internal Link Dist (m)	226.8	199.6		65.0	37.6
Turn Bay Length (m)			25.0		
Base Capacity (vph)	2351	2701	1008	278	236
Starvation Cap Reductn	472	277	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.72	0.71	0.14	0.40	0.38

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	1240	25	15	1635	135	15	30	60	20	20	45
Future Volume (vph)	35	1240	25	15	1635	135	15	30	60	20	20	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)		5.0			5.0	5.0		5.0			5.0	
Lane Util. Factor		0.95			0.95	1.00		1.00			1.00	
Frpb, ped/bikes		1.00			1.00	0.86		1.00			0.99	
Flpb, ped/bikes		1.00			1.00	1.00		1.00			1.00	
Frt		1.00			1.00	0.85		0.92			0.93	
Flt Protected		1.00			1.00	1.00		0.99			0.99	
Satd. Flow (prot)		3451			3499	1200		1680			1704	
Flt Permitted		0.82			0.93	1.00		0.91			0.76	
Satd. Flow (perm)		2833			3256	1200		1543			1310	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	36	1292	26	16	1703	141	16	31	62	21	21	47
RTOR Reduction (vph)	0	1	0	0	0	13	0	41	0	0	34	0
Lane Group Flow (vph)	0	1353	0	0	1719	128	0	69	0	0	55	0
Confl. Peds. (#/hr)	35		15	15		35	5					5
Heavy Vehicles (%)	0%	3%	0%	0%	2%	0%	8%	0%	2%	0%	0%	0%
Bus Blockages (#/hr)	0	0	18	0	0	18	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		105.2			105.2	105.2		10.8			10.8	
Effective Green, g (s)		106.2			106.2	106.2		11.8			11.8	
Actuated g/C Ratio		0.83			0.83	0.83		0.09			0.09	
Clearance Time (s)		6.0			6.0	6.0		6.0			6.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)		2350			2701	995		142			120	
v/s Ratio Prot												
v/s Ratio Perm		0.48			c0.53	0.11		c0.04			0.04	
v/c Ratio		0.58			0.64	0.13		0.49			0.46	
Uniform Delay, d1		3.6			3.9	2.1		55.2			55.1	
Progression Factor		1.09			1.56	1.39		1.00			1.00	
Incremental Delay, d2		0.1			0.7	0.1		2.6			2.8	
Delay (s)		4.0			6.8	3.0		57.8			57.9	
Level of Service		A			A	A		E			E	
Approach Delay (s)		4.0			6.5			57.8			57.9	
Approach LOS		A			A			E			E	

Intersection Summary

HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	10	75	15	5	45	5	30	105	15	15	35	5
Future Volume (vph)	10	75	15	5	45	5	30	105	15	15	35	5
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	12	88	18	6	53	6	35	124	18	18	41	6

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	118	65	177	65
Volume Left (vph)	12	6	35	18
Volume Right (vph)	18	6	18	6
Hadj (s)	-0.07	-0.04	-0.02	0.00
Departure Headway (s)	4.5	4.6	4.4	4.5
Degree Utilization, x	0.15	0.08	0.22	0.08
Capacity (veh/h)	752	733	784	744
Control Delay (s)	8.2	8.0	8.6	7.9
Approach Delay (s)	8.2	8.0	8.6	7.9
Approach LOS	A	A	A	A

Intersection Summary				
Delay			8.3	
Level of Service			A	
Intersection Capacity Utilization			25.4%	ICU Level of Service
Analysis Period (min)			15	

Intersection	
Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	75	15	5	45	5	30	105	15	15	35	5
Future Vol, veh/h	10	75	15	5	45	5	30	105	15	15	35	5
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	12	88	18	6	53	6	35	124	18	18	41	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.2	8	8.6	7.9
HCM LOS	A	A	A	A

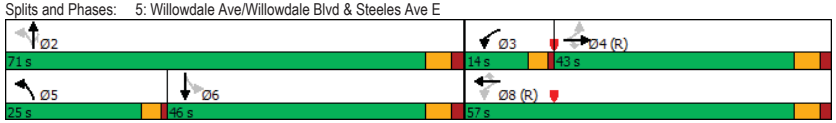
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	20%	10%	9%	27%
Vol Thru, %	70%	75%	82%	64%
Vol Right, %	10%	15%	9%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	150	100	55	55
LT Vol	30	10	5	15
Through Vol	105	75	45	35
RT Vol	15	15	5	5
Lane Flow Rate	176	118	65	65
Geometry Grp	1	1	1	1
Degree of Util (X)	0.214	0.146	0.082	0.081
Departure Headway (Hd)	4.375	4.456	4.549	4.517
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	822	806	788	794
Service Time	2.395	2.476	2.572	2.541
HCM Lane V/C Ratio	0.214	0.146	0.082	0.082
HCM Control Delay	8.6	8.2	8	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.8	0.5	0.3	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	45	1140	135	255	1410	30	365	35	505	40	105
Future Volume (vph)	45	1140	135	255	1410	30	365	35	505	40	105
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA
Protected Phases		4		3	8		5	2			6
Permitted Phases	4		4	8		8	2		2	6	
Detector Phase	4	4	4	3	8	8	5	2	2	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	7.0	7.0	7.0	7.0
Minimum Split (s)	43.0	43.0	43.0	14.0	43.0	43.0	25.0	46.0	46.0	46.0	46.0
Total Split (s)	43.0	43.0	43.0	14.0	57.0	57.0	25.0	71.0	71.0	46.0	46.0
Total Split (%)	33.6%	33.6%	33.6%	10.9%	44.5%	44.5%	19.5%	55.5%	55.5%	35.9%	35.9%
Maximum Green (s)	37.0	37.0	37.0	10.0	51.0	51.0	21.0	65.0	65.0	40.0	40.0
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None
Walk Time (s)	24.0	24.0	24.0		24.0	24.0		24.0	24.0	24.0	24.0
Flash Dont Walk (s)	13.0	13.0	13.0		13.0	13.0		16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)	15	15	15		15	15		15	15	15	15

Intersection Summary

Cycle Length: 128
Actuated Cycle Length: 128
Offset: 41.5 (32%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated

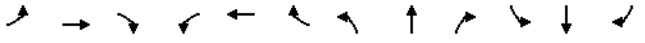
Splits and Phases: 5: Willowdale Ave/Willowdale Blvd & Steeles Ave E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	46	1175	139	263	1454	31	412	521	41	118
v/c Ratio	0.84	1.14	0.30	0.79	0.86	0.04	0.77	0.67	0.15	0.15
Control Delay	101.6	101.7	5.3	50.2	37.5	1.4	40.1	18.5	19.9	19.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	101.6	101.7	5.3	50.2	37.5	1.4	40.1	18.5	19.9	19.4
Queue Length 50th (m)	11.3	~195.9	8.6	52.2	182.5	0.0	88.0	57.9	6.2	17.2
Queue Length 95th (m)	m#28.6	#233.5	14.6	#130.3	#262.3	1.9	116.6	86.5	12.5	26.1
Internal Link Dist (m)		199.6			142.4		80.1			87.5
Turn Bay Length (m)	35.0		20.0	65.0		20.0			15.0	
Base Capacity (vph)	55	1028	465	332	1681	690	630	870	283	812
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	1.14	0.30	0.79	0.86	0.04	0.65	0.60	0.14	0.15

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	1140	135	255	1410	30	365	35	505	40	105	10
Future Volume (vph)	45	1140	135	255	1410	30	365	35	505	40	105	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96		1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		0.99	1.00	0.99	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1682	3466	1345	1668	3466	1359		1767	1468	1674	1852	
Flt Permitted	0.11	1.00	1.00	0.10	1.00	1.00		0.66	1.00	0.37	1.00	
Satd. Flow (perm)	186	3466	1345	171	3466	1359		1222	1468	648	1852	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	46	1175	139	263	1454	31	376	36	521	41	108	10
RTOR Reduction (vph)	0	0	66	0	0	16	0	0	132	0	2	0
Lane Group Flow (vph)	46	1175	73	263	1454	15	0	412	389	41	116	0
Confl. Peds. (#/hr)	10		15	15		10	10		15	15		10
Heavy Vehicles (%)	0%	3%	2%	1%	3%	0%	1%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	16	0	0	16	0	0	0	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	37.0	37.0	37.0	61.1	61.1	61.1		54.9	54.9	54.9	54.9	
Effective Green, g (s)	38.0	38.0	38.0	62.1	62.1	62.1		55.9	55.9	55.9	55.9	
Actuated g/C Ratio	0.30	0.30	0.30	0.49	0.49	0.49		0.44	0.44	0.44	0.44	
Clearance Time (s)	6.0	6.0	6.0	4.0	6.0	6.0		6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	55	1028	399	329	1681	659		533	641	282	808	
v/s Ratio Prot		c0.34		0.13	c0.42						0.06	
v/s Ratio Perm	0.25		0.05	0.26		0.01		c0.34	0.26	0.06		
v/c Ratio	0.84	1.14	0.18	0.80	0.86	0.02		0.77	0.61	0.15	0.14	
Uniform Delay, d1	42.1	45.0	33.5	35.2	29.2	17.2		30.7	27.6	21.7	21.7	
Progression Factor	0.55	0.59	0.31	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	70.9	74.4	0.8	12.7	6.2	0.1		6.9	1.6	0.2	0.1	
Delay (s)	93.9	101.1	11.2	47.9	35.5	17.2		37.5	29.2	21.9	21.7	
Level of Service	F	F	B	D	D	B		D	C	C	C	
Approach Delay (s)		91.7			37.0			32.9			21.8	
Approach LOS		F			D			C			C	

Intersection Summary				
HCM 2000 Control Delay	53.2	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.95			
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	17.0	
Intersection Capacity Utilization	90.9%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	35	65	15	25	0	25	70	15	0	75	5
Future Volume (vph)	5	35	65	15	25	0	25	70	15	0	75	5
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	6	41	76	17	29	0	29	81	17	0	87	6

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	123	46	127	93
Volume Left (vph)	6	17	29	0
Volume Right (vph)	76	0	17	6
Hadj (s)	-0.36	0.07	-0.03	-0.04
Departure Headway (s)	4.1	4.6	4.3	4.4
Degree Utilization, x	0.14	0.06	0.15	0.11
Capacity (veh/h)	832	728	789	776
Control Delay (s)	7.8	7.9	8.1	7.9
Approach Delay (s)	7.8	7.9	8.1	7.9
Approach LOS	A	A	A	A

Intersection Summary				
Delay	7.9			
Level of Service	A			
Intersection Capacity Utilization	27.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection	
Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	35	65	15	25	0	25	70	15	0	75	5
Future Vol, veh/h	5	35	65	15	25	0	25	70	15	0	75	5
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	6	41	76	17	29	0	29	81	17	0	87	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.8	7.9	8.1	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	23%	5%	38%	0%
Vol Thru, %	64%	33%	62%	94%
Vol Right, %	14%	62%	0%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	110	105	40	80
LT Vol	25	5	15	0
Through Vol	70	35	25	75
RT Vol	15	65	0	5
Lane Flow Rate	128	122	47	93
Geometry Grp	1	1	1	1
Degree of Util (X)	0.154	0.139	0.059	0.113
Departure Headway (Hd)	4.336	4.09	4.603	4.372
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	829	879	780	822
Service Time	2.351	2.104	2.621	2.387
HCM Lane V/C Ratio	0.154	0.139	0.06	0.113
HCM Control Delay	8.1	7.8	7.9	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.5	0.2	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	40	0	5	5	140	55	10	40	5
Future Volume (Veh/h)	5	0	5	40	0	5	5	140	55	10	40	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	5	43	0	5	5	152	60	11	43	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								62				
pX, platoon unblocked												
vC, conflicting volume	264	290	46	264	262	182	48			212		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	264	290	46	264	262	182	48			212		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	94	100	99	100			99		
cM capacity (veh/h)	678	614	1024	679	636	861	1559			1358		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	10	48	217	59
Volume Left	5	43	5	11
Volume Right	5	5	60	5
cSH	816	694	1559	1358
Volume to Capacity	0.01	0.07	0.00	0.01
Queue Length 95th (m)	0.3	1.8	0.1	0.2
Control Delay (s)	9.5	10.6	0.2	1.5
Lane LOS	A	B	A	A
Approach Delay (s)	9.5	10.6	0.2	1.5
Approach LOS	A	B		

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	22.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	185	770	330	140	905	220	845	240	1350
Future Volume (vph)	185	770	330	140	905	220	845	240	1350
Turn Type	pm+pt	NA	custom	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4 5	8		2		6	
Detector Phase	7	4	4 5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	34.0		6.0	34.0	6.0	32.0	6.0	32.0
Minimum Split (s)	14.0	44.0		14.0	44.0	10.0	39.0	11.0	39.0
Total Split (s)	14.0	44.0		14.0	44.0	17.0	46.0	24.0	53.0
Total Split (%)	10.9%	34.4%		10.9%	34.4%	13.3%	35.9%	18.8%	41.4%
Maximum Green (s)	10.0	37.0		10.0	37.0	13.0	39.0	20.0	46.0
Yellow Time (s)	3.0	4.0		3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	3.0		1.0	3.0	1.0	3.0	1.0	3.0
Lost Time Adjust (s)	-1.5	-1.0		-1.5	-1.0	-1.5	-1.0	-2.0	-1.0
Total Lost Time (s)	2.5	6.0		2.5	6.0	2.5	6.0	2.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Min		None	Min	None	C-Min	None	C-Min
Walk Time (s)		7.0			7.0		8.0		8.0
Flash Dont Walk (s)		27.0			27.0		24.0		24.0
Pedestrian Calls (#/hr)		85			85		95		95

Intersection Summary

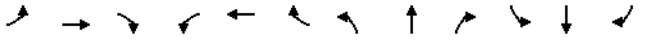
Cycle Length: 128
Actuated Cycle Length: 128
Offset: 57 (45%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated

Splits and Phases: 1: Yonge St & Steeles Ave W/Steeles Ave E

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	193	802	344	146	1016	229	1041	250	1599
v/c Ratio	0.94	0.82	0.68	0.72	0.74	0.91	0.62	0.74	0.96
Control Delay	77.4	50.1	28.0	50.9	35.1	71.8	36.1	32.8	53.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.4	50.1	28.0	50.9	35.1	71.8	36.1	32.8	53.8
Queue Length 50th (m)	32.7	103.1	51.8	15.9	90.4	46.0	81.3	35.5	154.5
Queue Length 95th (m)	#79.5	128.3	90.9	#49.1	52.9	#101.4	100.8	62.6	#191.3
Internal Link Dist (m)		174.7			226.8		81.6		84.7
Turn Bay Length (m)	110.0			160.0		50.0		40.0	
Base Capacity (vph)	205	1009	497	206	1413	252	1681	381	1664
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.79	0.69	0.71	0.72	0.91	0.62	0.66	0.96

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	770	330	140	905	70	220	845	155	240	1350	185
Future Volume (vph)	185	770	330	140	905	70	220	845	155	240	1350	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	2.5	6.0	6.0	2.5	6.0		2.5	6.0		2.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		1.00	*0.93		1.00	*0.88	
Frpb, ped/bikes	1.00	1.00	0.71	1.00	0.99		1.00	0.97		1.00	0.96	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1513	3400	1043	1522	4739		1620	4742		1613	4492	
Flt Permitted	0.14	1.00	1.00	0.15	1.00		0.09	1.00		0.17	1.00	
Satd. Flow (perm)	224	3400	1043	234	4739		151	4742		287	4492	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	193	802	344	146	943	73	229	880	161	250	1406	193
RTOR Reduction (vph)	0	0	56	0	7	0	0	20	0	0	13	0
Lane Group Flow (vph)	193	802	288	146	1009	0	229	1021	0	250	1586	0
Confl. Peds. (#/hr)	165		255	255		165	270		165	165		270
Heavy Vehicles (%)	11%	5%	2%	10%	5%	13%	4%	5%	2%	4%	4%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	32	0	0	31
Turn Type	pm+pt	NA	custom	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4 5	8			2			6		
Actuated Green, G (s)	46.0	36.0	57.1	45.6	35.8		57.9	43.8		62.5	46.1	
Effective Green, g (s)	49.0	37.0	58.1	48.6	36.8		60.9	44.8		66.2	47.1	
Actuated g/C Ratio	0.38	0.29	0.45	0.38	0.29		0.48	0.35		0.52	0.37	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	201	982	473	202	1362		250	1659		339	1652	
v/s Ratio Prot	c0.09	0.24		0.06	0.21		c0.11	0.22		c0.11	c0.35	
v/s Ratio Perm	c0.28		0.28	0.21			0.32			0.28		
v/c Ratio	0.96	0.82	0.61	0.72	0.74		0.92	0.62		0.74	0.96	
Uniform Delay, d1	30.3	42.3	26.4	29.7	41.3		36.7	34.5		20.4	39.5	
Progression Factor	1.00	1.00	1.00	1.38	0.78		1.00	1.00		1.00	1.00	
Incremental Delay, d2	51.9	5.3	2.2	10.9	2.0		34.9	1.7		8.1	14.5	
Delay (s)	82.2	47.7	28.6	51.9	34.0		71.6	36.2		28.5	54.0	
Level of Service	F	D	C	D	C		E	D		C	D	
Approach Delay (s)		47.8			36.3			42.6			50.5	
Approach LOS		D			D			D			D	

Intersection Summary				
HCM 2000 Control Delay	45.1	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.97			
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	17.0	
Intersection Capacity Utilization	98.7%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	70	1200	20	20	1745
Future Volume (Veh/h)	0	70	1200	20	20	1745
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	73	1250	21	21	1818
Pedestrians	125					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	10					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			109			
pX, platoon unblocked	0.84	0.84			0.84	
vC, conflicting volume	2034	552			1396	
vC1, stage 1 conf vol	1386					
vC2, stage 2 conf vol	648					
vCu, unblocked vol	1551	0			789	
tC, single (s)	6.8	6.9			4.2	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	91			97	
cM capacity (veh/h)	264	813			610	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	73	500	500	271	21	606	606	606
Volume Left	0	0	0	0	21	0	0	0
Volume Right	73	0	0	21	0	0	0	0
cSH	813	1700	1700	1700	610	1700	1700	1700
Volume to Capacity	0.09	0.29	0.29	0.16	0.03	0.36	0.36	0.36
Queue Length 95th (m)	2.4	0.0	0.0	0.0	0.9	0.0	0.0	0.0
Control Delay (s)	9.9	0.0	0.0	0.0	11.1	0.0	0.0	0.0
Lane LOS	A				B			
Approach Delay (s)	9.9	0.0			0.1			
Approach LOS	A							

Intersection Summary					
Average Delay	0.3				
Intersection Capacity Utilization	44.7%	ICU Level of Service			A
Analysis Period (min)	15				

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	10	1100	30	1140	35	5	5	35	30
Future Volume (vph)	10	1100	30	1140	35	5	5	35	30
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		4		8			2		6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	2	2	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	98.0	98.0	98.0	98.0	98.0	30.0	30.0	30.0	30.0
Total Split (%)	76.6%	76.6%	76.6%	76.6%	76.6%	23.4%	23.4%	23.4%	23.4%
Maximum Green (s)	92.0	92.0	92.0	92.0	92.0	24.0	24.0	24.0	24.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		-1.0		-1.0	-1.0		-1.0		-1.0
Total Lost Time (s)		5.0		5.0	5.0		5.0		5.0
Lead/Lag									
Lead-Lag Optimize?									
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0

Intersection Summary

Cycle Length: 128
Actuated Cycle Length: 128
Offset: 30 (23%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

Splits and Phases: 3: Dudley Ave & Steeles Ave E

Lane Group	EBT	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	1197	1182	35	45	100
v/c Ratio	0.46	0.48	0.03	0.23	0.57
Control Delay	3.0	2.4	0.2	23.3	56.2
Queue Delay	0.0	0.1	0.0	0.0	0.0
Total Delay	3.0	2.5	0.2	23.3	56.2
Queue Length 50th (m)	21.5	19.7	0.1	2.4	20.7
Queue Length 95th (m)	29.1	11.7	m0.2	14.0	38.1
Internal Link Dist (m)	226.8	199.6		65.0	35.4
Turn Bay Length (m)			25.0		
Base Capacity (vph)	2595	2463	1037	346	313
Starvation Cap Reductn	0	193	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.46	0.52	0.03	0.13	0.32

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	1100	75	30	1140	35	5	5	35	35	30	35
Future Volume (vph)	10	1100	75	30	1140	35	5	5	35	35	30	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)		5.0			5.0	5.0		5.0			5.0	
Lane Util. Factor		0.95			0.95	1.00		1.00			1.00	
Frpb, ped/bikes		1.00			1.00	0.91		1.00			1.00	
Flpb, ped/bikes		1.00			1.00	1.00		1.00			1.00	
Frt		0.99			1.00	0.85		0.90			0.95	
Flt Protected		1.00			1.00	1.00		0.99			0.98	
Satd. Flow (prot)		3366			3399	1262		1672			1683	
Flt Permitted		0.94			0.88	1.00		0.97			0.89	
Satd. Flow (perm)		3170			3007	1262		1629			1527	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	10	1111	76	30	1152	35	5	5	35	35	30	35
RTOR Reduction (vph)	0	3	0	0	0	5	0	31	0	0	17	0
Lane Group Flow (vph)	0	1194	0	0	1182	30	0	14	0	0	83	0
Confl. Peds. (#/hr)	20		10	10		20						
Heavy Vehicles (%)	0%	5%	0%	0%	5%	0%	0%	0%	0%	0%	0%	13%
Bus Blockages (#/hr)	0	0	18	0	0	20	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		103.8			103.8	103.8		12.2			12.2	
Effective Green, g (s)		104.8			104.8	104.8		13.2			13.2	
Actuated g/C Ratio		0.82			0.82	0.82		0.10			0.10	
Clearance Time (s)		6.0			6.0	6.0		6.0			6.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)		2595			2461	1033		167			157	
v/s Ratio Prot												
v/s Ratio Perm		0.38			c0.39	0.02		0.01			c0.05	
v/c Ratio		0.46			0.48	0.03		0.08			0.53	
Uniform Delay, d1		3.4			3.5	2.2		51.9			54.4	
Progression Factor		0.70			0.47	0.10		1.00			1.00	
Incremental Delay, d2		0.4			0.6	0.0		0.2			3.2	
Delay (s)		2.7			2.2	0.3		52.1			57.6	
Level of Service		A			A	A		D			E	
Approach Delay (s)		2.7			2.2			52.1			57.6	
Approach LOS		A			A			D			E	

Intersection Summary				
HCM 2000 Control Delay	5.5	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.49			
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	73.7%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	45	10	5	85	0	20	20	5	0	15	10
Future Volume (vph)	5	45	10	5	85	0	20	20	5	0	15	10
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	6	55	12	6	104	0	24	24	6	0	18	12

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	73	110	54	30
Volume Left (vph)	6	6	24	0
Volume Right (vph)	12	0	6	12
Hadj (s)	-0.01	0.01	0.02	-0.24
Departure Headway (s)	4.2	4.2	4.4	4.1
Degree Utilization, x	0.09	0.13	0.07	0.03
Capacity (veh/h)	833	841	785	829
Control Delay (s)	7.6	7.8	7.7	7.3
Approach Delay (s)	7.6	7.8	7.7	7.3
Approach LOS	A	A	A	A

Intersection Summary					
Delay	7.6				
Level of Service	A				
Intersection Capacity Utilization	23.1%	ICU Level of Service		A	
Analysis Period (min)	15				

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	45	10	5	85	0	20	20	5	0	15	10
Future Vol, veh/h	5	45	10	5	85	0	20	20	5	0	15	10
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles, %	0	6	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	6	55	12	6	104	0	24	24	6	0	18	12
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

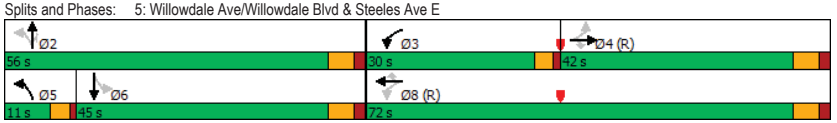
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.5	7.8	7.7	7.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	44%	8%	6%	0%
Vol Thru, %	44%	75%	94%	60%
Vol Right, %	11%	17%	0%	40%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	45	60	90	25
LT Vol	20	5	5	0
Through Vol	20	45	85	15
RT Vol	5	10	0	10
Lane Flow Rate	55	73	110	30
Geometry Grp	1	1	1	1
Degree of Util (X)	0.065	0.082	0.125	0.034
Departure Headway (Hd)	4.262	4.049	4.116	4.019
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	828	875	864	875
Service Time	2.353	2.119	2.176	2.118
HCM Lane V/C Ratio	0.066	0.083	0.127	0.034
HCM Control Delay	7.7	7.5	7.8	7.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.3	0.4	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	5	925	240	535	1055	20	120	65	215	55	35
Future Volume (vph)	5	925	240	535	1055	20	120	65	215	55	35
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA
Protected Phases		4		3	8		5	2			6
Permitted Phases	4		4	8		8	2		2	6	
Detector Phase	4	4	4	3	8	8	5	2	2	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	7.0	7.0	7.0	7.0
Minimum Split (s)	42.0	42.0	42.0	10.0	42.0	42.0	11.0	45.0	45.0	45.0	45.0
Total Split (s)	42.0	42.0	42.0	30.0	72.0	72.0	11.0	56.0	56.0	45.0	45.0
Total Split (%)	32.8%	32.8%	32.8%	23.4%	56.3%	56.3%	8.6%	43.8%	43.8%	35.2%	35.2%
Maximum Green (s)	36.0	36.0	36.0	26.0	66.0	66.0	7.0	50.0	50.0	39.0	39.0
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None
Walk Time (s)	23.0	23.0	23.0		23.0	23.0		23.0	23.0	23.0	23.0
Flash Dont Walk (s)	13.0	13.0	13.0		13.0	13.0		16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)	20	20	20		20	20		20	20	20	20

Intersection Summary
Cycle Length: 128
Actuated Cycle Length: 128
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated

Splits and Phases: 5: Willowdale Ave/Willowdale Blvd & Steeles Ave E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	5	954	247	552	1088	21	191	222	57	67
v/c Ratio	0.04	0.98	0.55	0.79	0.46	0.02	0.61	0.45	0.32	0.17
Control Delay	45.0	73.0	35.4	37.8	10.7	0.1	51.7	7.1	42.9	21.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.0	73.0	35.4	37.8	10.7	0.1	51.7	7.1	42.9	21.5
Queue Length 50th (m)	0.9	104.4	32.0	102.4	54.5	0.0	47.7	0.0	13.2	7.9
Queue Length 95th (m)	m2.2	#173.4	57.1	#207.9	100.2	0.0	64.0	18.5	23.5	17.9
Internal Link Dist (m)		199.6			142.4		80.1			87.7
Turn Bay Length (m)	35.0		20.0	65.0		20.0			15.0	
Base Capacity (vph)	134	973	450	703	2378	959	558	712	250	552
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.98	0.55	0.79	0.46	0.02	0.34	0.31	0.23	0.12

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	925	240	535	1055	20	120	65	215	55	35	30
Future Volume (vph)	5	925	240	535	1055	20	120	65	215	55	35	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96		1.00	0.97	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1678	3368	1326	1668	3400	1346		1780	1453	1573	1698	
Flt Permitted	0.26	1.00	1.00	0.10	1.00	1.00		0.76	1.00	0.48	1.00	
Satd. Flow (perm)	464	3368	1326	176	3400	1346		1403	1453	802	1698	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	5	954	247	552	1088	21	124	67	222	57	36	31
RTOR Reduction (vph)	0	0	67	0	0	6	0	0	173	0	24	0
Lane Group Flow (vph)	5	954	180	552	1088	15	0	191	49	57	43	0
Confl. Peds. (#/hr)	10		20	20		10	5		15	15		5
Heavy Vehicles (%)	0%	6%	2%	1%	5%	0%	3%	0%	1%	6%	4%	0%
Bus Blockages (#/hr)	0	0	18	0	0	18	0	0	0	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	36.0	36.0	36.0	88.6	88.6	88.6		27.4	27.4	27.4	27.4	
Effective Green, g (s)	37.0	37.0	37.0	89.6	89.6	89.6		28.4	28.4	28.4	28.4	
Actuated g/C Ratio	0.29	0.29	0.29	0.70	0.70	0.70		0.22	0.22	0.22	0.22	
Clearance Time (s)	6.0	6.0	6.0	4.0	6.0	6.0		6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	134	973	383	701	2380	942		311	322	177	376	
v/s Ratio Prot		c0.28		c0.31	0.32						0.03	
v/s Ratio Perm	0.01		0.14	0.25		0.01		c0.14	0.03	0.07		
v/c Ratio	0.04	0.98	0.47	0.79	0.46	0.02		0.61	0.15	0.32	0.11	
Uniform Delay, d1	32.7	45.1	37.4	28.2	8.5	5.8		44.9	40.1	41.7	39.8	
Progression Factor	1.33	1.11	1.31	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	23.3	3.8	5.8	0.6	0.0		3.6	0.2	1.1	0.1	
Delay (s)	44.1	73.3	52.7	34.0	9.1	5.9		48.4	40.3	42.8	39.9	
Level of Service	D	E	D	C	A	A		D	D	D	D	
Approach Delay (s)		69.0			17.4			44.1			41.2	
Approach LOS		E			B			D			D	

Intersection Summary

HCM 2000 Control Delay	39.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	94.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	10	40	25	45	0	40	45	5	0	55	5
Future Volume (vph)	0	10	40	25	45	0	40	45	5	0	55	5
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	11	45	28	51	0	45	51	6	0	62	6

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	56	79	102	68
Volume Left (vph)	0	28	45	0
Volume Right (vph)	45	0	6	6
Hadj (s)	-0.48	0.07	0.07	-0.05
Departure Headway (s)	3.9	4.4	4.3	4.3
Degree Utilization, x	0.06	0.10	0.12	0.08
Capacity (veh/h)	878	771	796	812
Control Delay (s)	7.1	7.9	8.0	7.6
Approach Delay (s)	7.1	7.9	8.0	7.6
Approach LOS	A	A	A	A

Intersection Summary				
Delay			7.7	
Level of Service			A	
Intersection Capacity Utilization			29.4%	ICU Level of Service
Analysis Period (min)			15	

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	10	40	25	45	0	40	45	5	0	55	5
Future Vol, veh/h	0	10	40	25	45	0	40	45	5	0	55	5
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	0	0	0	0	0	0	0	2	0	0	0	0
Mvmt Flow	0	11	45	28	51	0	45	51	6	0	62	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.1	7.9	7.9	7.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	44%	0%	36%	0%
Vol Thru, %	50%	20%	64%	92%
Vol Right, %	6%	80%	0%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	90	50	70	60
LT Vol	40	0	25	0
Through Vol	45	10	45	55
RT Vol	5	40	0	5
Lane Flow Rate	101	56	79	67
Geometry Grp	1	1	1	1
Degree of Util (X)	0.119	0.061	0.096	0.078
Departure Headway (Hd)	4.242	3.885	4.408	4.163
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	833	927	818	846
Service Time	2.33	1.887	2.408	2.261
HCM Lane V/C Ratio	0.121	0.06	0.097	0.079
HCM Control Delay	7.9	7.1	7.9	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.2	0.3	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	75	0	5	0	35	15	5	20	5
Future Volume (Veh/h)	5	0	5	75	0	5	0	35	15	5	20	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	5	82	0	5	0	38	16	5	22	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								59				
pX, platoon unblocked												
vC, conflicting volume	86	88	24	86	83	46	27			54		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	86	88	24	86	83	46	27			54		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	91	100	100	100			100		
cM capacity (veh/h)	894	799	1052	894	805	1023	1587			1551		

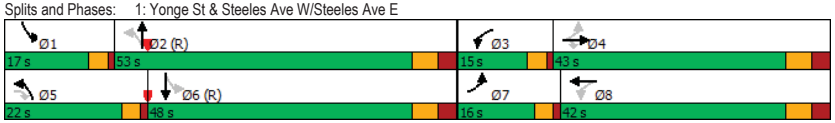
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	10	87	54	32
Volume Left	5	82	0	5
Volume Right	5	5	16	5
cSH	967	901	1587	1551
Volume to Capacity	0.01	0.10	0.00	0.00
Queue Length 95th (m)	0.3	2.6	0.0	0.1
Control Delay (s)	8.8	9.4	0.0	1.2
Lane LOS	A	A		A
Approach Delay (s)	8.8	9.4	0.0	1.2
Approach LOS	A	A		

Intersection Summary				
Average Delay			5.2	
Intersection Capacity Utilization			20.0%	ICU Level of Service
Analysis Period (min)			15	

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	205	870	290	175	925	290	1225	225	1125
Future Volume (vph)	205	870	290	175	925	290	1225	225	1125
Turn Type	pm+pt	NA	custom	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4 5	8		2		6	
Detector Phase	7	4	4 5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	34.0		6.0	34.0	6.0	32.0	6.0	32.0
Minimum Split (s)	14.0	41.0		14.0	41.0	16.0	39.0	16.0	39.0
Total Split (s)	16.0	43.0		15.0	42.0	22.0	53.0	17.0	48.0
Total Split (%)	12.5%	33.6%		11.7%	32.8%	17.2%	41.4%	13.3%	37.5%
Maximum Green (s)	12.0	36.0		11.0	35.0	18.0	46.0	13.0	41.0
Yellow Time (s)	3.0	4.0		3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	3.0		1.0	3.0	1.0	3.0	1.0	3.0
Lost Time Adjust (s)	-2.0	-1.0		-1.5	-1.0	-1.5	-1.0	-2.0	-1.0
Total Lost Time (s)	2.0	6.0		2.5	6.0	2.5	6.0	2.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Min		None	Min	None	C-Min	None	C-Min
Walk Time (s)		7.0			7.0		8.0		8.0
Flash Dont Walk (s)		27.0			27.0		24.0		24.0
Pedestrian Calls (#/hr)		85			85		90		90

Intersection Summary
Cycle Length: 128
Actuated Cycle Length: 128
Offset: 48 (38%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated

Splits and Phases: 1: Yonge St & Steeles Ave W/Steeles Ave E



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	216	916	305	184	1285	305	1378	237	1416
v/c Ratio	0.92	0.92	0.59	0.85	0.97	0.98	0.91	0.97	0.99
Control Delay	73.2	58.4	21.9	63.3	57.0	81.6	48.8	84.8	62.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.2	58.4	21.9	63.3	57.0	81.6	48.8	84.8	62.5
Queue Length 50th (m)	41.2	123.7	39.0	28.9	122.7	64.7	149.0	47.5	143.6
Queue Length 95th (m)	#90.5	#162.7	71.2	#76.4	#105.5	#124.7	#185.2	#101.4	#182.4
Internal Link Dist (m)		182.5			226.8		81.6		84.7
Turn Bay Length (m)	110.0			160.0		50.0		40.0	
Base Capacity (vph)	235	1001	515	217	1321	312	1507	245	1436
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.92	0.59	0.85	0.97	0.98	0.91	0.97	0.99

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	205	870	290	175	925	295	290	1225	85	225	1125	220
Future Volume (vph)	205	870	290	175	925	295	290	1225	85	225	1125	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	2.0	6.0	6.0	2.5	6.0		2.5	6.0		2.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		1.00	*0.77		1.00	*0.85	
Frpb, ped/bikes	1.00	1.00	0.69	1.00	0.95		1.00	0.98		1.00	0.95	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1634	3466	1000	1646	4537		1668	4092		1618	4316	
Flt Permitted	0.11	1.00	1.00	0.11	1.00		0.09	1.00		0.09	1.00	
Satd. Flow (perm)	181	3466	1000	190	4537		156	4092		158	4316	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	216	916	305	184	974	311	305	1289	89	237	1184	232
RTOR Reduction (vph)	0	0	53	0	45	0	0	5	0	0	20	0
Lane Group Flow (vph)	216	916	252	184	1240	0	305	1373	0	237	1396	0
Confl. Peds. (#/hr)	185		285	285		185	295		245	245		295
Heavy Vehicles (%)	3%	3%	4%	2%	3%	4%	1%	3%	3%	4%	2%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	31	0	0	26
Turn Type	pm+pt	NA	custom	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4 5	8			2			6		
Actuated Green, G (s)	48.0	36.0	61.0	46.0	35.0		63.0	46.0		54.0	41.0	
Effective Green, g (s)	52.0	37.0	62.0	49.0	36.0		64.5	47.0		58.0	42.0	
Actuated g/C Ratio	0.41	0.29	0.48	0.38	0.28		0.50	0.37		0.45	0.33	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	232	1001	484	214	1276		308	1502		242	1416	
v/s Ratio Prot	c0.10	0.26		0.08	c0.27		c0.15	0.34		0.11	0.32	
v/s Ratio Perm	0.28		0.25	0.24			c0.35			0.33		
v/c Ratio	0.93	0.92	0.52	0.86	0.97		0.99	0.91		0.98	0.99	
Uniform Delay, d1	34.6	44.0	22.8	31.2	45.5		40.0	38.6		37.4	42.7	
Progression Factor	1.00	1.00	1.00	1.17	0.91		1.00	1.00		1.00	1.00	
Incremental Delay, d2	40.4	12.5	1.0	24.3	16.9		48.5	10.1		51.4	20.8	
Delay (s)	75.0	56.5	23.8	60.8	58.4		88.5	48.7		88.8	63.5	
Level of Service	E	E	C	E	E		F	D		F	E	
Approach Delay (s)		52.3			58.7			55.9			67.1	
Approach LOS		D			E			E			E	

Intersection Summary

HCM 2000 Control Delay	58.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	100.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	65	1725	25	55	1605
Future Volume (Veh/h)	5	65	1725	25	55	1605
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	5	66	1760	26	56	1638
Pedestrians	170					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	14					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			109			
pX, platoon unblocked	0.70	0.70			0.70	
vC, conflicting volume	2601	770			1956	
vC1, stage 1 conf vol	1943					
vC2, stage 2 conf vol	658					
vCu, unblocked vol	1797	0			879	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	90			88	
cM capacity (veh/h)	197	658			461	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	71	704	704	378	56	546	546	546
Volume Left	5	0	0	0	56	0	0	0
Volume Right	66	0	0	26	0	0	0	0
cSH	565	1700	1700	1700	461	1700	1700	1700
Volume to Capacity	0.13	0.41	0.41	0.22	0.12	0.32	0.32	0.32
Queue Length 95th (m)	3.4	0.0	0.0	0.0	3.3	0.0	0.0	0.0
Control Delay (s)	12.3	0.0	0.0	0.0	13.9	0.0	0.0	0.0
Lane LOS	B				B			
Approach Delay (s)	12.3	0.0			0.5			
Approach LOS	B							

Intersection Summary				
Average Delay		0.5		
Intersection Capacity Utilization		51.6%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	35	1025	15	1385	135	15	30	20	20
Future Volume (vph)	35	1025	15	1385	135	15	30	20	20
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		4		8			2		6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	2	2	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	101.0	101.0	101.0	101.0	101.0	27.0	27.0	27.0	27.0
Total Split (%)	78.9%	78.9%	78.9%	78.9%	78.9%	21.1%	21.1%	21.1%	21.1%
Maximum Green (s)	95.0	95.0	95.0	95.0	95.0	21.0	21.0	21.0	21.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		-1.0		-1.0	-1.0		-1.0		-1.0
Total Lost Time (s)		5.0		5.0	5.0		5.0		5.0
Lead/Lag									
Lead-Lag Optimize?									
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0

Intersection Summary
Cycle Length: 128
Actuated Cycle Length: 128
Offset: 29 (23%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 3: Dumont St/Dudley Ave & Steeles Ave E

Lane Group	EBT	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	1130	1459	141	110	89
v/c Ratio	0.47	0.54	0.14	0.60	0.58
Control Delay	2.4	6.1	3.0	46.0	47.5
Queue Delay	0.0	0.2	0.0	0.0	0.0
Total Delay	2.4	6.4	3.0	46.0	47.5
Queue Length 50th (m)	9.7	73.4	6.0	16.4	13.0
Queue Length 95th (m)	m10.9	82.0	m9.9	34.9	30.0
Internal Link Dist (m)	226.8	199.6		65.0	37.6
Turn Bay Length (m)			25.0		
Base Capacity (vph)	2390	2711	1010	302	255
Starvation Cap Reductn	0	477	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.47	0.65	0.14	0.36	0.35

Intersection Summary

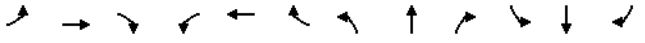
m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	1025	25	15	1385	135	15	30	60	20	20	45
Future Volume (vph)	35	1025	25	15	1385	135	15	30	60	20	20	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)		5.0			5.0	5.0		5.0			5.0	
Lane Util. Factor		0.95			0.95	1.00		1.00			1.00	
Frpb, ped/bikes		1.00			1.00	0.86		1.00			0.99	
Flpb, ped/bikes		1.00			1.00	1.00		1.00			1.00	
Frt		1.00			1.00	0.85		0.92			0.93	
Flt Protected		1.00			1.00	1.00		0.99			0.99	
Satd. Flow (prot)		3447			3498	1200		1680			1704	
Flt Permitted		0.83			0.93	1.00		0.91			0.76	
Satd. Flow (perm)		2877			3266	1200		1540			1303	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	36	1068	26	16	1443	141	16	31	62	21	21	47
RTOR Reduction (vph)	0	1	0	0	0	14	0	42	0	0	35	0
Lane Group Flow (vph)	0	1129	0	0	1459	127	0	68	0	0	54	0
Confl. Peds. (#/hr)	35		15	15		35	5					5
Heavy Vehicles (%)	0%	3%	0%	0%	2%	0%	8%	0%	2%	0%	0%	0%
Bus Blockages (#/hr)	0	0	18	0	0	18	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		105.3			105.3	105.3		10.7			10.7	
Effective Green, g (s)		106.3			106.3	106.3		11.7			11.7	
Actuated g/C Ratio		0.83			0.83	0.83		0.09			0.09	
Clearance Time (s)		6.0			6.0	6.0		6.0			6.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)		2389			2712	996		140			119	
v/s Ratio Prot												
v/s Ratio Perm		0.39			c0.45	0.11		c0.04			0.04	
v/c Ratio		0.47			0.54	0.13		0.49			0.46	
Uniform Delay, d1		3.0			3.3	2.1		55.3			55.1	
Progression Factor		0.64			1.49	2.44		1.00			1.00	
Incremental Delay, d2		0.3			0.6	0.2		2.7			2.8	
Delay (s)		2.2			5.5	5.2		58.0			57.9	
Level of Service		A			A	A		E			E	
Approach Delay (s)		2.2			5.5			58.0			57.9	
Approach LOS		A			A			E			E	

Intersection Summary

HCM 2000 Control Delay	7.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	10	75	15	5	45	5	30	105	15	15	35	5
Future Volume (vph)	10	75	15	5	45	5	30	105	15	15	35	5
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	12	88	18	6	53	6	35	124	18	18	41	6

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	118	65	177	65
Volume Left (vph)	12	6	35	18
Volume Right (vph)	18	6	18	6
Hadj (s)	-0.07	-0.04	-0.02	0.00
Departure Headway (s)	4.5	4.6	4.4	4.5
Degree Utilization, x	0.15	0.08	0.22	0.08
Capacity (veh/h)	752	733	784	744
Control Delay (s)	8.2	8.0	8.6	7.9
Approach Delay (s)	8.2	8.0	8.6	7.9
Approach LOS	A	A	A	A

Intersection Summary				
Delay			8.3	
Level of Service			A	
Intersection Capacity Utilization			25.4%	ICU Level of Service
Analysis Period (min)			15	

Intersection	
Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	10	75	15	5	45	5	30	105	15	15	35	5
Future Vol, veh/h	10	75	15	5	45	5	30	105	15	15	35	5
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	12	88	18	6	53	6	35	124	18	18	41	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.2	8	8.6	7.9
HCM LOS	A	A	A	A

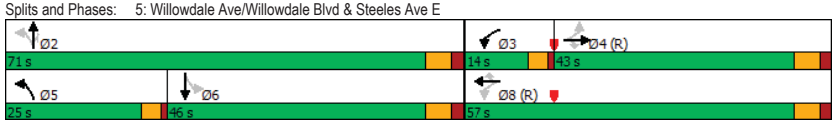
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	20%	10%	9%	27%
Vol Thru, %	70%	75%	82%	64%
Vol Right, %	10%	15%	9%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	150	100	55	55
LT Vol	30	10	5	15
Through Vol	105	75	45	35
RT Vol	15	15	5	5
Lane Flow Rate	176	118	65	65
Geometry Grp	1	1	1	1
Degree of Util (X)	0.214	0.146	0.082	0.081
Departure Headway (Hd)	4.375	4.456	4.549	4.517
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	822	806	788	794
Service Time	2.395	2.476	2.572	2.541
HCM Lane V/C Ratio	0.214	0.146	0.082	0.082
HCM Control Delay	8.6	8.2	8	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.8	0.5	0.3	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	45	925	135	260	1160	30	365	35	510	40	105
Future Volume (vph)	45	925	135	260	1160	30	365	35	510	40	105
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA
Protected Phases		4		3	8		5	2			6
Permitted Phases	4		4	8		8	2		2	6	
Detector Phase	4	4	4	3	8	8	5	2	2	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	7.0	7.0	7.0	7.0
Minimum Split (s)	43.0	43.0	43.0	14.0	43.0	43.0	25.0	46.0	46.0	46.0	46.0
Total Split (s)	43.0	43.0	43.0	14.0	57.0	57.0	25.0	71.0	71.0	46.0	46.0
Total Split (%)	33.6%	33.6%	33.6%	10.9%	44.5%	44.5%	19.5%	55.5%	55.5%	35.9%	35.9%
Maximum Green (s)	37.0	37.0	37.0	10.0	51.0	51.0	21.0	65.0	65.0	40.0	40.0
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None
Walk Time (s)	24.0	24.0	24.0		24.0	24.0		24.0	24.0	24.0	24.0
Flash Dont Walk (s)	13.0	13.0	13.0		13.0	13.0		16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)	15	15	15		15	15		15	15	15	15

Intersection Summary

Cycle Length: 128
Actuated Cycle Length: 128
Offset: 41.5 (32%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 5: Willowdale Ave/Willowdale Blvd & Steeles Ave E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	46	954	139	268	1196	31	412	526	41	118
v/c Ratio	0.45	0.95	0.30	0.78	0.71	0.04	0.77	0.68	0.15	0.15
Control Delay	34.4	46.1	6.9	49.1	30.7	1.4	40.1	18.3	19.9	19.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.4	46.1	6.9	49.1	30.7	1.4	40.1	18.3	19.9	19.4
Queue Length 50th (m)	9.5	134.7	11.8	53.4	133.1	0.0	88.0	57.9	6.2	17.2
Queue Length 95th (m)	24.7	#175.5	18.4	#133.0	180.5	1.9	116.6	86.6	12.5	26.1
Internal Link Dist (m)		199.6			142.4		80.1			87.5
Turn Bay Length (m)	35.0		20.0	65.0		20.0			15.0	
Base Capacity (vph)	105	1028	465	342	1681	690	630	873	283	812
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.93	0.30	0.78	0.71	0.04	0.65	0.60	0.14	0.15

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	925	135	260	1160	30	365	35	510	40	105	10
Future Volume (vph)	45	925	135	260	1160	30	365	35	510	40	105	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96		1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		0.99	1.00	0.99	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1680	3466	1345	1668	3466	1359		1767	1468	1674	1852	
Flt Permitted	0.20	1.00	1.00	0.10	1.00	1.00		0.66	1.00	0.37	1.00	
Satd. Flow (perm)	355	3466	1345	175	3466	1359		1222	1468	648	1852	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	46	954	139	268	1196	31	376	36	526	41	108	10
RTOR Reduction (vph)	0	0	67	0	0	16	0	0	136	0	2	0
Lane Group Flow (vph)	46	954	72	268	1196	15	0	412	390	41	116	0
Confl. Peds. (#/hr)	10		15	15		10	10		15	15		10
Heavy Vehicles (%)	0%	3%	2%	1%	3%	0%	1%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	16	0	0	16	0	0	0	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	36.2	36.2	36.2	61.1	61.1	61.1		54.9	54.9	54.9	54.9	
Effective Green, g (s)	37.2	37.2	37.2	62.1	62.1	62.1		55.9	55.9	55.9	55.9	
Actuated g/C Ratio	0.29	0.29	0.29	0.49	0.49	0.49		0.44	0.44	0.44	0.44	
Clearance Time (s)	6.0	6.0	6.0	4.0	6.0	6.0		6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	103	1007	390	340	1681	659		533	641	282	808	
v/s Ratio Prot		c0.28		c0.13	0.35						0.06	
v/s Ratio Perm	0.13		0.05	0.25		0.01		c0.34	0.27	0.06		
v/c Ratio	0.45	0.95	0.19	0.79	0.71	0.02		0.77	0.61	0.15	0.14	
Uniform Delay, d1	37.0	44.4	34.0	34.5	25.9	17.2		30.7	27.7	21.7	21.7	
Progression Factor	0.57	0.64	0.42	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	12.1	16.9	0.9	11.5	2.6	0.1		6.9	1.6	0.2	0.1	
Delay (s)	33.1	45.5	15.1	46.0	28.5	17.2		37.5	29.3	21.9	21.7	
Level of Service	C	D	B	D	C	B		D	C	C	C	
Approach Delay (s)		41.3			31.4			32.9			21.8	
Approach LOS		D			C			C			C	

Intersection Summary				
HCM 2000 Control Delay	34.4	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.86			
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	17.0	
Intersection Capacity Utilization	90.4%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	35	65	15	25	0	25	70	15	0	75	5
Future Volume (vph)	5	35	65	15	25	0	25	70	15	0	75	5
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	6	41	76	17	29	0	29	81	17	0	87	6

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	123	46	127	93
Volume Left (vph)	6	17	29	0
Volume Right (vph)	76	0	17	6
Hadj (s)	-0.36	0.07	-0.03	-0.04
Departure Headway (s)	4.1	4.6	4.3	4.4
Degree Utilization, x	0.14	0.06	0.15	0.11
Capacity (veh/h)	832	728	789	776
Control Delay (s)	7.8	7.9	8.1	7.9
Approach Delay (s)	7.8	7.9	8.1	7.9
Approach LOS	A	A	A	A

Intersection Summary				
Delay	7.9			
Level of Service	A			
Intersection Capacity Utilization	27.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection	
Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	35	65	15	25	0	25	70	15	0	75	5
Future Vol, veh/h	5	35	65	15	25	0	25	70	15	0	75	5
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	6	41	76	17	29	0	29	81	17	0	87	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.8	7.9	8.1	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	23%	5%	38%	0%
Vol Thru, %	64%	33%	62%	94%
Vol Right, %	14%	62%	0%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	110	105	40	80
LT Vol	25	5	15	0
Through Vol	70	35	25	75
RT Vol	15	65	0	5
Lane Flow Rate	128	122	47	93
Geometry Grp	1	1	1	1
Degree of Util (X)	0.154	0.139	0.059	0.113
Departure Headway (Hd)	4.336	4.09	4.603	4.372
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	829	879	780	822
Service Time	2.351	2.104	2.621	2.387
HCM Lane V/C Ratio	0.154	0.139	0.06	0.113
HCM Control Delay	8.1	7.8	7.9	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.5	0.2	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	40	0	5	5	140	55	10	40	5
Future Volume (Veh/h)	5	0	5	40	0	5	5	140	55	10	40	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	5	43	0	5	5	152	60	11	43	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								62				
pX, platoon unblocked												
vC, conflicting volume	264	290	46	264	262	182	48			212		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	264	290	46	264	262	182	48			212		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	94	100	99	100			99		
cM capacity (veh/h)	678	614	1024	679	636	861	1559			1358		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	10	48	217	59
Volume Left	5	43	5	11
Volume Right	5	5	60	5
cSH	816	694	1559	1358
Volume to Capacity	0.01	0.07	0.00	0.01
Queue Length 95th (m)	0.3	1.8	0.1	0.2
Control Delay (s)	9.5	10.6	0.2	1.5
Lane LOS	A	B	A	A
Approach Delay (s)	9.5	10.6	0.2	1.5
Approach LOS	A	B		

Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	22.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	185	765	330	170	905	220	850	240	1350
Future Volume (vph)	185	765	330	170	905	220	850	240	1350
Turn Type	pm+pt	NA	custom	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4 5	8		2		6	
Detector Phase	7	4	4 5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	34.0		6.0	34.0	6.0	32.0	6.0	32.0
Minimum Split (s)	14.0	44.0		14.0	44.0	10.0	39.0	11.0	39.0
Total Split (s)	14.0	44.0		14.0	44.0	17.0	46.0	24.0	53.0
Total Split (%)	10.9%	34.4%		10.9%	34.4%	13.3%	35.9%	18.8%	41.4%
Maximum Green (s)	10.0	37.0		10.0	37.0	13.0	39.0	20.0	46.0
Yellow Time (s)	3.0	4.0		3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	3.0		1.0	3.0	1.0	3.0	1.0	3.0
Lost Time Adjust (s)	-1.5	-1.0		-1.5	-1.0	-1.5	-1.0	-2.0	-1.0
Total Lost Time (s)	2.5	6.0		2.5	6.0	2.5	6.0	2.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Min		None	Min	None	C-Min	None	C-Min
Walk Time (s)		7.0			7.0		8.0		8.0
Flash Dont Walk (s)		27.0			27.0		24.0		24.0
Pedestrian Calls (#/hr)		85			85		95		95

Intersection Summary

Cycle Length: 128
Actuated Cycle Length: 128
Offset: 57 (45%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated

Splits and Phases: 1: Yonge St & Steeles Ave W/Steeles Ave E

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	193	797	344	177	1016	229	1046	250	1599
v/c Ratio	0.95	0.82	0.68	0.86	0.74	0.90	0.62	0.74	0.96
Control Delay	78.1	50.4	28.1	69.8	36.7	70.5	36.1	32.9	53.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.1	50.4	28.1	69.8	36.7	70.5	36.1	32.9	53.8
Queue Length 50th (m)	33.0	103.0	51.8	24.0	90.7	45.5	81.3	35.1	154.5
Queue Length 95th (m)	#79.5	127.4	90.9	#69.6	72.1	#101.4	101.4	62.8	#191.3
Internal Link Dist (m)		174.7			226.8		81.6		84.7
Turn Bay Length (m)	110.0			160.0		50.0		40.0	
Base Capacity (vph)	204	1009	489	206	1413	254	1684	380	1664
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.79	0.70	0.86	0.72	0.90	0.62	0.66	0.96

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	765	330	170	905	70	220	850	155	240	1350	185
Future Volume (vph)	185	765	330	170	905	70	220	850	155	240	1350	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	2.5	6.0	6.0	2.5	6.0		2.5	6.0		2.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		1.00	*0.93		1.00	*0.88	
Frpb, ped/bikes	1.00	1.00	0.71	1.00	0.99		1.00	0.97		1.00	0.96	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1513	3400	1043	1522	4739		1620	4743		1613	4492	
Flt Permitted	0.14	1.00	1.00	0.15	1.00		0.09	1.00		0.17	1.00	
Satd. Flow (perm)	224	3400	1043	233	4739		150	4743		285	4492	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	193	797	344	177	943	73	229	885	161	250	1406	193
RTOR Reduction (vph)	0	0	56	0	7	0	0	20	0	0	13	0
Lane Group Flow (vph)	193	797	288	177	1009	0	229	1026	0	250	1586	0
Confl. Peds. (#/hr)	165		255	255		165	270		165	165		270
Heavy Vehicles (%)	11%	5%	2%	10%	5%	13%	4%	5%	2%	4%	4%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	32	0	0	31
Turn Type	pm+pt	NA	custom	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4 5	8			2			6		
Actuated Green, G (s)	45.7	35.7	57.0	45.7	35.7		58.2	43.9		62.4	46.0	
Effective Green, g (s)	48.7	36.7	58.0	48.7	36.7		61.2	44.9		66.3	47.0	
Actuated g/C Ratio	0.38	0.29	0.45	0.38	0.29		0.48	0.35		0.52	0.37	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	201	974	472	204	1358		253	1663		338	1649	
v/s Ratio Prot	c0.09	0.23		0.08	0.21		c0.11	0.22		c0.11	c0.35	
v/s Ratio Perm	c0.28		0.28	0.25			0.32			0.28		
v/c Ratio	0.96	0.82	0.61	0.87	0.74		0.91	0.62		0.74	0.96	
Uniform Delay, d1	30.6	42.5	26.5	30.5	41.4		36.6	34.4		20.4	39.6	
Progression Factor	1.00	1.00	1.00	1.46	0.81		1.00	1.00		1.00	1.00	
Incremental Delay, d2	51.9	5.4	2.3	28.3	2.1		32.4	1.7		8.2	14.8	
Delay (s)	82.5	48.0	28.8	72.7	35.5		69.0	36.1		28.6	54.4	
Level of Service	F	D	C	E	D		E	D		C	D	
Approach Delay (s)		48.0			41.0			42.0			50.9	
Approach LOS		D			D			D			D	

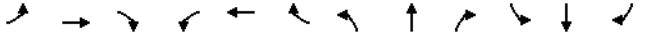
Intersection Summary				
HCM 2000 Control Delay	46.1	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.97			
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	17.0	
Intersection Capacity Utilization	98.7%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	70	1200	25	20	1745
Future Volume (Veh/h)	0	70	1200	25	20	1745
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	73	1250	26	21	1818
Pedestrians	125					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	10					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			109			
pX, platoon unblocked	0.84	0.84			0.84	
vC, conflicting volume	2036	555			1401	
vC1, stage 1 conf vol	1388					
vC2, stage 2 conf vol	648					
vCu, unblocked vol	1551	0			791	
tC, single (s)	6.8	6.9			4.2	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	91			97	
cM capacity (veh/h)	264	812			608	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	73	500	500	276	21	606	606	606
Volume Left	0	0	0	0	21	0	0	0
Volume Right	73	0	0	26	0	0	0	0
cSH	812	1700	1700	1700	608	1700	1700	1700
Volume to Capacity	0.09	0.29	0.29	0.16	0.03	0.36	0.36	0.36
Queue Length 95th (m)	2.4	0.0	0.0	0.0	0.9	0.0	0.0	0.0
Control Delay (s)	9.9	0.0	0.0	0.0	11.1	0.0	0.0	0.0
Lane LOS	A				B			
Approach Delay (s)	9.9	0.0			0.1			
Approach LOS	A							

Intersection Summary					
Average Delay	0.3				
Intersection Capacity Utilization	44.7%	ICU Level of Service			A
Analysis Period (min)	15				



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1105	75	0	1145	40	0	0	35	0	0	65
Future Volume (Veh/h)	0	1105	75	0	1145	40	0	0	35	0	0	65
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	0	1116	76	0	1157	40	0	0	35	0	0	66
Pedestrians								10			20	
Lane Width (m)								3.0			3.0	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		251			224							
pX, platoon unblocked	0.87			0.79			0.85	0.85	0.79	0.85	0.85	0.87
vC, conflicting volume	1217			1202			1808	2381	606	1770	2379	598
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	949			719			915	1586	0	870	1584	238
tC, single (s)	4.1			4.1			7.5	6.5	6.9	*7.9	*7.3	7.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	*3.6	*4.5	3.4
p0 queue free %	100			100			100	100	96	100	100	89
cM capacity (veh/h)	627			698			172	91	854	176	62	627

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	744	448	578	578	40	35	66
Volume Left	0	0	0	0	0	0	0
Volume Right	0	76	0	0	40	35	66
cSH	1700	1700	1700	1700	1700	854	627
Volume to Capacity	0.44	0.26	0.34	0.34	0.02	0.04	0.11
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	1.0	2.8
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	9.4	11.4
Lane LOS						A	B
Approach Delay (s)	0.0		0.0			9.4	11.4
Approach LOS						A	B

Intersection Summary					
Average Delay	0.4				
Intersection Capacity Utilization	43.0%	ICU Level of Service		A	
Analysis Period (min)	15				

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	45	15	5	85	0	20	20	30	0	10	10
Future Volume (vph)	5	45	15	5	85	0	20	20	30	0	10	10
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	6	55	18	6	104	0	24	24	37	0	12	12

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	79	110	85	24
Volume Left (vph)	6	6	24	0
Volume Right (vph)	18	0	37	12
Hadj (s)	-0.05	0.01	-0.20	-0.30
Departure Headway (s)	4.2	4.2	4.1	4.1
Degree Utilization, x	0.09	0.13	0.10	0.03
Capacity (veh/h)	827	826	825	828
Control Delay (s)	7.6	7.9	7.6	7.2
Approach Delay (s)	7.6	7.9	7.6	7.2
Approach LOS	A	A	A	A

Intersection Summary					
Delay	7.7				
Level of Service	A				
Intersection Capacity Utilization	24.8%	ICU Level of Service		A	
Analysis Period (min)	15				

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	45	15	5	85	0	20	20	30	0	10	10
Future Vol, veh/h	5	45	15	5	85	0	20	20	30	0	10	10
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles, %	0	6	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	6	55	18	6	104	0	24	24	37	0	12	12
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

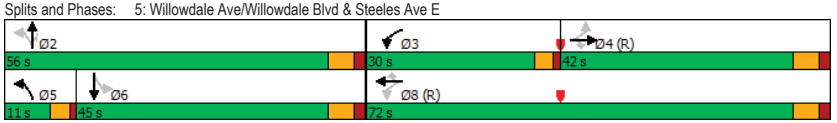
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.5	7.8	7.6	7.2
HCM LOS	A	A	A	A

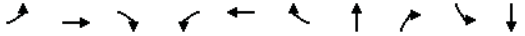
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	29%	8%	6%	0%
Vol Thru, %	29%	69%	94%	50%
Vol Right, %	43%	23%	0%	50%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	70	65	90	20
LT Vol	20	5	5	0
Through Vol	20	45	85	10
RT Vol	30	15	0	10
Lane Flow Rate	85	79	110	24
Geometry Grp	1	1	1	1
Degree of Util (X)	0.096	0.089	0.127	0.028
Departure Headway (Hd)	4.044	4.053	4.163	4.104
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	871	873	853	878
Service Time	2.141	2.131	2.231	2.104
HCM Lane V/C Ratio	0.098	0.09	0.129	0.027
HCM Control Delay	7.6	7.5	7.8	7.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.3	0.4	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	10	895	235	565	1020	20	135	65	215	85	35
Future Volume (vph)	10	895	235	565	1020	20	135	65	215	85	35
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA
Protected Phases		4		3	8		5	2			6
Permitted Phases	4		4	8		8	2		2	6	
Detector Phase	4	4	4	3	8	8	5	2	2	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	7.0	7.0	7.0	7.0
Minimum Split (s)	42.0	42.0	42.0	10.0	42.0	42.0	11.0	45.0	45.0	45.0	45.0
Total Split (s)	42.0	42.0	42.0	30.0	72.0	72.0	11.0	56.0	56.0	45.0	45.0
Total Split (%)	32.8%	32.8%	32.8%	23.4%	56.3%	56.3%	8.6%	43.8%	43.8%	35.2%	35.2%
Maximum Green (s)	36.0	36.0	36.0	26.0	66.0	66.0	7.0	50.0	50.0	39.0	39.0
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None
Walk Time (s)	23.0	23.0	23.0		23.0	23.0		23.0	23.0	23.0	23.0
Flash Dont Walk (s)	13.0	13.0	13.0		13.0	13.0		16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)	20	20	20		20	20		20	20	20	20

Intersection Summary
Cycle Length: 128
Actuated Cycle Length: 128
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated

Splits and Phases: 5: Willowdale Ave/Willowdale Blvd & Steeles Ave E

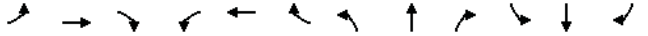




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	10	923	242	582	1052	21	206	222	88	67
v/c Ratio	0.07	0.95	0.54	0.84	0.45	0.02	0.64	0.44	0.50	0.16
Control Delay	46.4	64.7	34.6	42.7	10.9	0.1	52.5	6.9	50.1	21.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.4	64.7	34.6	42.7	10.9	0.1	52.5	6.9	50.1	21.2
Queue Length 50th (m)	2.0	97.2	28.9	116.6	55.9	0.0	50.9	0.0	20.9	7.8
Queue Length 95th (m)	m3.1	#163.6	m49.7	#225.9	95.8	0.0	69.2	18.5	34.8	17.9
Internal Link Dist (m)		199.6			142.4		80.1			87.7
Turn Bay Length (m)	35.0		20.0	65.0		20.0			15.0	
Base Capacity (vph)	138	973	450	690	2350	948	553	712	240	552
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.95	0.54	0.84	0.45	0.02	0.37	0.31	0.37	0.12

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	895	235	565	1020	20	135	65	215	85	35	30
Future Volume (vph)	10	895	235	565	1020	20	135	65	215	85	35	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96		1.00	0.97	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1678	3368	1326	1668	3400	1346		1776	1453	1573	1698	
Flt Permitted	0.27	1.00	1.00	0.10	1.00	1.00		0.76	1.00	0.46	1.00	
Satd. Flow (perm)	481	3368	1326	176	3400	1346		1389	1453	768	1698	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	923	242	582	1052	21	139	67	222	88	36	31
RTOR Reduction (vph)	0	0	67	0	0	6	0	0	171	0	24	0
Lane Group Flow (vph)	10	923	175	582	1052	15	0	206	51	88	43	0
Confl. Peds. (#/hr)	10		20	20		10	5		15	15		5
Heavy Vehicles (%)	0%	6%	2%	1%	5%	0%	3%	0%	1%	6%	4%	0%
Bus Blockages (#/hr)	0	0	18	0	0	18	0	0	0	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	35.9	35.9	35.9	87.5	87.5	87.5		28.5	28.5	28.5	28.5	
Effective Green, g (s)	36.9	36.9	36.9	88.5	88.5	88.5		29.5	29.5	29.5	29.5	
Actuated g/C Ratio	0.29	0.29	0.29	0.69	0.69	0.69		0.23	0.23	0.23	0.23	
Clearance Time (s)	6.0	6.0	6.0	4.0	6.0	6.0		6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	138	970	382	688	2350	930		320	334	177	391	
v/s Ratio Prot		c0.27		c0.32	0.31						0.03	
v/s Ratio Perm	0.02		0.13	0.26		0.01		c0.15	0.04	0.11		
v/c Ratio	0.07	0.95	0.46	0.85	0.45	0.02		0.64	0.15	0.50	0.11	
Uniform Delay, d1	33.1	44.7	37.4	30.0	8.8	6.2		44.5	39.3	42.8	38.9	
Progression Factor	1.34	1.12	1.35	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	15.1	2.8	9.4	0.6	0.0		4.4	0.2	2.2	0.1	
Delay (s)	45.2	65.0	53.1	39.4	9.4	6.2		48.9	39.5	45.0	39.0	
Level of Service	D	E	D	D	A	A		D	D	D	D	
Approach Delay (s)		62.3			19.9			44.0			42.4	
Approach LOS		E			B			D			D	

Intersection Summary

HCM 2000 Control Delay	38.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	96.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	10	65	25	45	0	40	50	5	0	60	5
Future Volume (vph)	0	10	65	25	45	0	40	50	5	0	60	5
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	11	73	28	51	0	45	56	6	0	67	6

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	84	79	107	73
Volume Left (vph)	0	28	45	0
Volume Right (vph)	73	0	6	6
Hadj (s)	-0.52	0.07	0.07	-0.05
Departure Headway (s)	3.9	4.5	4.4	4.3
Degree Utilization, x	0.09	0.10	0.13	0.09
Capacity (veh/h)	879	760	780	785
Control Delay (s)	7.3	8.0	8.1	7.7
Approach Delay (s)	7.3	8.0	8.1	7.7
Approach LOS	A	A	A	A

Intersection Summary				
Delay			7.8	
Level of Service			A	
Intersection Capacity Utilization			29.6%	ICU Level of Service
Analysis Period (min)			15	

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	0	10	65	25	45	0	40	50	5	0	60	5
Future Vol, veh/h	0	10	65	25	45	0	40	50	5	0	60	5
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	0	0	0	0	0	0	0	2	0	0	0	0
Mvmt Flow	0	11	73	28	51	0	45	56	6	0	67	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.3	8	8.1	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	42%	0%	36%	0%
Vol Thru, %	53%	13%	64%	92%
Vol Right, %	5%	87%	0%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	95	75	70	65
LT Vol	40	0	25	0
Through Vol	50	10	45	60
RT Vol	5	65	0	5
Lane Flow Rate	107	84	79	73
Geometry Grp	1	1	1	1
Degree of Util (X)	0.13	0.091	0.098	0.088
Departure Headway (Hd)	4.398	3.876	4.464	4.323
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	820	927	805	831
Service Time	2.398	1.889	2.477	2.338
HCM Lane V/C Ratio	0.13	0.091	0.098	0.088
HCM Control Delay	8.1	7.3	8	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.3	0.3	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	45	0	35	0	30	10	10	15	5
Future Volume (Veh/h)	5	0	5	45	0	35	0	30	10	10	15	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	5	49	0	38	0	33	11	11	16	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	117	84	18	84	82	38	21			44		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	117	84	18	84	82	38	21			44		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	95	100	96	100			99		
cM capacity (veh/h)	823	800	1060	894	803	1033	1595			1564		

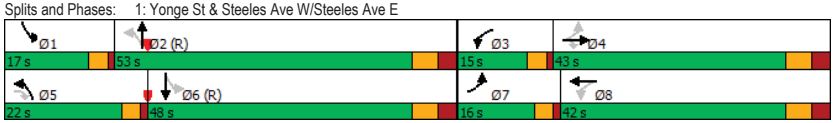
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	10	87	44	32
Volume Left	5	49	0	11
Volume Right	5	38	11	5
cSH	927	950	1595	1564
Volume to Capacity	0.01	0.09	0.00	0.01
Queue Length 95th (m)	0.3	2.4	0.0	0.2
Control Delay (s)	8.9	9.2	0.0	2.5
Lane LOS	A	A		A
Approach Delay (s)	8.9	9.2	0.0	2.5
Approach LOS	A	A		

Intersection Summary				
Average Delay			5.6	
Intersection Capacity Utilization			21.0%	ICU Level of Service
Analysis Period (min)			15	

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	210	860	290	195	925	290	1235	225	1125
Future Volume (vph)	210	860	290	195	925	290	1235	225	1125
Turn Type	pm+pt	NA	custom	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4 5	8		2		6	
Detector Phase	7	4	4 5	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	34.0		6.0	34.0	6.0	32.0	6.0	32.0
Minimum Split (s)	14.0	41.0		14.0	41.0	16.0	39.0	16.0	39.0
Total Split (s)	16.0	43.0		15.0	42.0	22.0	53.0	17.0	48.0
Total Split (%)	12.5%	33.6%		11.7%	32.8%	17.2%	41.4%	13.3%	37.5%
Maximum Green (s)	12.0	36.0		11.0	35.0	18.0	46.0	13.0	41.0
Yellow Time (s)	3.0	4.0		3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	3.0		1.0	3.0	1.0	3.0	1.0	3.0
Lost Time Adjust (s)	-2.0	-1.0		-1.5	-1.0	-1.5	-1.0	-2.0	-1.0
Total Lost Time (s)	2.0	6.0		2.5	6.0	2.5	6.0	2.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Min		None	Min	None	C-Min	None	C-Min
Walk Time (s)		7.0			7.0		8.0		8.0
Flash Dont Walk (s)		27.0			27.0		24.0		24.0
Pedestrian Calls (#/hr)		85			85		90		90

Intersection Summary
Cycle Length: 128
Actuated Cycle Length: 128
Offset: 48 (38%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated

Splits and Phases: 1: Yonge St & Steeles Ave W/Steeles Ave E



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	221	905	305	205	1285	305	1384	237	1416
v/c Ratio	0.94	0.90	0.59	0.94	0.97	0.98	0.92	0.97	0.99
Control Delay	77.8	57.1	21.9	65.3	58.3	81.6	49.1	84.8	62.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.8	57.1	21.9	65.3	58.3	81.6	49.1	84.8	62.5
Queue Length 50th (m)	42.7	121.7	39.0	43.5	122.7	64.7	149.9	47.5	143.6
Queue Length 95th (m)	#93.9	#159.3	71.2	m#74.7	#154.7	#124.7	#186.4	#101.4	#182.4
Internal Link Dist (m)		182.5			226.8		81.6		84.7
Turn Bay Length (m)	110.0			160.0		50.0		40.0	
Base Capacity (vph)	235	1001	515	217	1321	312	1509	245	1436
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.90	0.59	0.94	0.97	0.98	0.92	0.97	0.99

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	860	290	195	925	295	290	1235	80	225	1125	220
Future Volume (vph)	210	860	290	195	925	295	290	1235	80	225	1125	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	2.0	6.0	6.0	2.5	6.0		2.5	6.0		2.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		1.00	*0.77		1.00	*0.85	
Frpb, ped/bikes	1.00	1.00	0.69	1.00	0.95		1.00	0.98		1.00	0.95	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1634	3466	1000	1646	4537		1668	4099		1618	4316	
Flt Permitted	0.11	1.00	1.00	0.11	1.00		0.09	1.00		0.09	1.00	
Satd. Flow (perm)	181	3466	1000	190	4537		156	4099		158	4316	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	221	905	305	205	974	311	305	1300	84	237	1184	232
RTOR Reduction (vph)	0	0	53	0	45	0	0	4	0	0	20	0
Lane Group Flow (vph)	221	905	252	205	1240	0	305	1380	0	237	1396	0
Confl. Peds. (#/hr)	185		285	285		185	295		245	245		295
Heavy Vehicles (%)	3%	3%	4%	2%	3%	4%	1%	3%	3%	4%	2%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	31	0	0	26
Turn Type	pm+pt	NA	custom	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4 5	8			2			6		
Actuated Green, G (s)	48.0	36.0	61.0	46.0	35.0		63.0	46.0		54.0	41.0	
Effective Green, g (s)	52.0	37.0	62.0	49.0	36.0		64.5	47.0		58.0	42.0	
Actuated g/C Ratio	0.41	0.29	0.48	0.38	0.28		0.50	0.37		0.45	0.33	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	232	1001	484	214	1276		308	1505		242	1416	
v/s Ratio Prot	c0.10	0.26		c0.09	c0.27		c0.15	0.34		0.11	0.32	
v/s Ratio Perm	0.28		0.25	0.27			c0.35			0.33		
v/c Ratio	0.95	0.90	0.52	0.96	0.97		0.99	0.92		0.98	0.99	
Uniform Delay, d1	35.2	43.8	22.8	33.5	45.5		40.0	38.6		37.4	42.7	
Progression Factor	1.00	1.00	1.00	0.77	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	45.7	11.3	1.0	39.6	14.8		48.5	10.3		51.4	20.8	
Delay (s)	80.9	55.1	23.8	65.6	60.2		88.5	48.9		88.8	63.5	
Level of Service	F	E	C	E	E		F	D		F	E	
Approach Delay (s)		52.4			60.9			56.1			67.1	
Approach LOS		D			E			E			E	

Intersection Summary

HCM 2000 Control Delay	59.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	100.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	65	1725	40	55	1605
Future Volume (Veh/h)	5	65	1725	40	55	1605
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	5	66	1760	41	56	1638
Pedestrians	170					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	14					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			109			
pX, platoon unblocked	0.70	0.70			0.70	
vC, conflicting volume	2608	777			1971	
vC1, stage 1 conf vol	1950					
vC2, stage 2 conf vol	658					
vCu, unblocked vol	1801	0			891	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	90			88	
cM capacity (veh/h)	197	656			455	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	71	704	704	393	56	546	546	546
Volume Left	5	0	0	0	56	0	0	0
Volume Right	66	0	0	41	0	0	0	0
cSH	563	1700	1700	1700	455	1700	1700	1700
Volume to Capacity	0.13	0.41	0.41	0.23	0.12	0.32	0.32	0.32
Queue Length 95th (m)	3.4	0.0	0.0	0.0	3.3	0.0	0.0	0.0
Control Delay (s)	12.3	0.0	0.0	0.0	14.0	0.0	0.0	0.0
Lane LOS	B				B			
Approach Delay (s)	12.3	0.0			0.5			
Approach LOS	B							

Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	52.0%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1045	25	0	1405	165	0	0	60	0	0	60
Future Volume (Veh/h)	0	1045	25	0	1405	165	0	0	60	0	0	60
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	1089	26	0	1464	172	0	0	62	0	0	62
Pedestrians		5						15			35	
Lane Width (m)		3.5						3.0			3.0	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						1			2	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		251			224							
pX, platoon unblocked	0.73			0.76			0.84	0.84	0.76	0.84	0.84	0.73
vC, conflicting volume	1671			1130			1916	2788	572	2106	2629	772
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1169			546			449	1481	0	673	1293	0
tC, single (s)	4.1			4.1			7.7	6.5	6.9	*9.1	*9.0	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	*4.5	*5.6	3.3
p0 queue free %	100			100			100	100	92	100	100	92
cM capacity (veh/h)	428			779			357	103	818	160	48	769

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	726	389	732	732	172	62	62
Volume Left	0	0	0	0	0	0	0
Volume Right	0	26	0	0	172	62	62
cSH	1700	1700	1700	1700	1700	818	769
Volume to Capacity	0.43	0.23	0.43	0.43	0.10	0.08	0.08
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	2.0	2.1
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	9.8	10.1
Lane LOS						A	B
Approach Delay (s)	0.0		0.0			9.8	10.1
Approach LOS						A	B

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	51.1%	ICU Level of Service		A
Analysis Period (min)	15			

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	10	75	30	5	45	5	30	85	30	15	25	5
Future Volume (vph)	10	75	30	5	45	5	30	85	30	15	25	5
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	12	88	35	6	53	6	35	100	35	18	29	6

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	135	65	170	53
Volume Left (vph)	12	6	35	18
Volume Right (vph)	35	6	35	6
Hadj (s)	-0.14	-0.04	-0.08	0.00
Departure Headway (s)	4.4	4.5	4.3	4.6
Degree Utilization, x	0.16	0.08	0.21	0.07
Capacity (veh/h)	785	740	789	738
Control Delay (s)	8.2	7.9	8.5	7.9
Approach Delay (s)	8.2	7.9	8.5	7.9
Approach LOS	A	A	A	A

Intersection Summary				
Delay			8.2	
Level of Service			A	
Intersection Capacity Utilization			25.7%	ICU Level of Service
Analysis Period (min)			15	

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	75	30	5	45	5	30	85	30	15	25	5
Future Vol, veh/h	10	75	30	5	45	5	30	85	30	15	25	5
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	12	88	35	6	53	6	35	100	35	18	29	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.2	7.9	8.5	7.9
HCM LOS	A	A	A	A

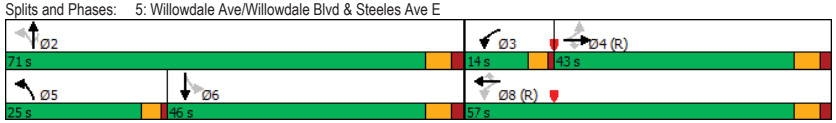
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	21%	9%	9%	33%
Vol Thru, %	59%	65%	82%	56%
Vol Right, %	21%	26%	9%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	145	115	55	45
LT Vol	30	10	5	15
Through Vol	85	75	45	25
RT Vol	30	30	5	5
Lane Flow Rate	171	135	65	53
Geometry Grp	1	1	1	1
Degree of Util (X)	0.205	0.163	0.081	0.067
Departure Headway (Hd)	4.332	4.342	4.522	4.543
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	831	828	793	789
Service Time	2.35	2.362	2.544	2.564
HCM Lane V/C Ratio	0.206	0.163	0.082	0.067
HCM Control Delay	8.5	8.2	7.9	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.8	0.6	0.3	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	65	905	135	270	1150	30	410	35	510	60	110
Future Volume (vph)	65	905	135	270	1150	30	410	35	510	60	110
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA
Protected Phases		4		3	8		5	2			6
Permitted Phases	4		4	8		8	2		2	6	
Detector Phase	4	4	4	3	8	8	5	2	2	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	7.0	7.0	7.0	7.0
Minimum Split (s)	43.0	43.0	43.0	14.0	43.0	43.0	25.0	46.0	46.0	46.0	46.0
Total Split (s)	43.0	43.0	43.0	14.0	57.0	57.0	25.0	71.0	71.0	46.0	46.0
Total Split (%)	33.6%	33.6%	33.6%	10.9%	44.5%	44.5%	19.5%	55.5%	55.5%	35.9%	35.9%
Maximum Green (s)	37.0	37.0	37.0	10.0	51.0	51.0	21.0	65.0	65.0	40.0	40.0
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None
Walk Time (s)	24.0	24.0	24.0		24.0	24.0		24.0	24.0	24.0	24.0
Flash Dont Walk (s)	13.0	13.0	13.0		13.0	13.0		16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)	15	15	15		15	15		15	15	15	15

Intersection Summary

Cycle Length: 128
Actuated Cycle Length: 128
Offset: 41.5 (32%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 5: Willowdale Ave/Willowdale Blvd & Steeles Ave E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	67	933	139	278	1186	31	459	526	62	123
v/c Ratio	0.78	0.91	0.30	0.99	0.75	0.05	0.81	0.65	0.22	0.14
Control Delay	57.6	35.5	7.2	86.0	34.1	1.4	40.7	16.3	20.4	17.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	35.5	7.2	86.0	34.1	1.4	40.7	16.3	20.4	17.8
Queue Length 50th (m)	16.5	128.6	14.9	~71.7	141.6	0.0	96.4	52.9	9.0	16.6
Queue Length 95th (m)	m19.9	m147.2	m15.1	#139.8	178.3	1.9	138.7	86.3	18.3	27.0
Internal Link Dist (m)		199.6			142.4		80.1			87.5
Turn Bay Length (m)	35.0		20.0	65.0		20.0			15.0	
Base Capacity (vph)	86	1028	465	282	1576	650	626	874	284	867
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.91	0.30	0.99	0.75	0.05	0.73	0.60	0.22	0.14

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	905	135	270	1150	30	410	35	510	60	110	10
Future Volume (vph)	65	905	135	270	1150	30	410	35	510	60	110	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96		1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		0.99	1.00	0.99	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1680	3466	1345	1668	3466	1359		1766	1468	1675	1853	
Flt Permitted	0.16	1.00	1.00	0.10	1.00	1.00		0.66	1.00	0.35	1.00	
Satd. Flow (perm)	290	3466	1345	171	3466	1359		1213	1468	609	1853	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	67	933	139	278	1186	31	423	36	526	62	113	10
RTOR Reduction (vph)	0	0	66	0	0	17	0	0	129	0	2	0
Lane Group Flow (vph)	67	933	73	278	1186	14	0	459	397	62	121	0
Confl. Peds. (#/hr)	10		15	15		10	10		15	15		10
Heavy Vehicles (%)	0%	3%	2%	1%	3%	0%	1%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	16	0	0	16	0	0	0	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	37.0	37.0	37.0	57.2	57.2	57.2		58.8	58.8	58.8	58.8	
Effective Green, g (s)	38.0	38.0	38.0	58.2	58.2	58.2		59.8	59.8	59.8	59.8	
Actuated g/C Ratio	0.30	0.30	0.30	0.45	0.45	0.45		0.47	0.47	0.47	0.47	
Clearance Time (s)	6.0	6.0	6.0	4.0	6.0	6.0		6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	86	1028	399	278	1575	617		566	685	284	865	
v/s Ratio Prot		0.27		c0.13	0.34						0.07	
v/s Ratio Perm	0.23		0.05	c0.32		0.01		c0.38	0.27	0.10		
v/c Ratio	0.78	0.91	0.18	1.00	0.75	0.02		0.81	0.58	0.22	0.14	
Uniform Delay, d1	41.2	43.3	33.5	39.0	28.9	19.2		29.3	24.9	20.2	19.4	
Progression Factor	0.62	0.64	0.50	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	27.3	6.9	0.5	54.0	3.4	0.1		8.6	1.2	0.4	0.1	
Delay (s)	52.7	34.8	17.2	93.0	32.3	19.3		37.9	26.1	20.6	19.5	
Level of Service	D	C	B	F	C	B		D	C	C	B	
Approach Delay (s)		33.7			43.3			31.6			19.9	
Approach LOS		C			D			C			B	

Intersection Summary				
HCM 2000 Control Delay	36.3	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.95			
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	17.0	
Intersection Capacity Utilization	90.6%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	35	80	15	25	0	25	90	15	0	85	5
Future Volume (vph)	5	35	80	15	25	0	25	90	15	0	85	5
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	6	41	93	17	29	0	29	105	17	0	99	6

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	140	46	151	105
Volume Left (vph)	6	17	29	0
Volume Right (vph)	93	0	17	6
Hadj (s)	-0.39	0.07	-0.03	-0.03
Departure Headway (s)	4.2	4.7	4.4	4.5
Degree Utilization, x	0.16	0.06	0.19	0.13
Capacity (veh/h)	806	705	776	759
Control Delay (s)	8.0	8.0	8.4	8.1
Approach Delay (s)	8.0	8.0	8.4	8.1
Approach LOS	A	A	A	A

Intersection Summary				
Delay	8.2			
Level of Service	A			
Intersection Capacity Utilization	28.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	35	80	15	25	0	25	90	15	0	85	5
Future Vol, veh/h	5	35	80	15	25	0	25	90	15	0	85	5
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	6	41	93	17	29	0	29	105	17	0	99	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8	8	8.4	8.1
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	19%	4%	38%	0%
Vol Thru, %	69%	29%	62%	94%
Vol Right, %	12%	67%	0%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	130	120	40	90
LT Vol	25	5	15	0
Through Vol	90	35	25	85
RT Vol	15	80	0	5
Lane Flow Rate	151	140	47	105
Geometry Grp	1	1	1	1
Degree of Util (X)	0.185	0.161	0.061	0.129
Departure Headway (Hd)	4.397	4.145	4.708	4.445
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	816	867	761	807
Service Time	2.419	2.165	2.734	2.468
HCM Lane V/C Ratio	0.185	0.161	0.062	0.13
HCM Control Delay	8.4	8	8	8.1
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	0.6	0.2	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	25	0	20	5	120	40	25	30	5
Future Volume (Veh/h)	5	0	5	25	0	20	5	120	40	25	30	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	5	27	0	22	5	130	43	27	33	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	273	272	36	256	254	152	38			173		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	273	272	36	256	254	152	38			173		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	96	100	98	100			98		
cM capacity (veh/h)	651	620	1037	682	635	895	1572			1404		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	10	49	178	65
Volume Left	5	27	5	27
Volume Right	5	22	43	5
cSH	800	763	1572	1404
Volume to Capacity	0.01	0.06	0.00	0.02
Queue Length 95th (m)	0.3	1.6	0.1	0.5
Control Delay (s)	9.6	10.0	0.2	3.3
Lane LOS	A	B	A	A
Approach Delay (s)	9.6	10.0	0.2	3.3
Approach LOS	A	B		

Intersection Summary				
Average Delay	2.8			
Intersection Capacity Utilization	25.7%	ICU Level of Service	A	
Analysis Period (min)	15			

APPENDIX I:
Turning Movement Counts

City of Toronto - Traffic Safety Unit

Turning Movement Count Summary Report

STEELES AVE AT YONGE ST (PX 131)

Survey Date: 2019-Mar-21 (Thursday)

Survey Type: Pedestrian Hours

Time Period	Vehicle Type	NORTHBOUND Exits	Left	Thru	Right	Total	EASTBOUND Exits	Left	Thru	Right	Total	SOUTHBOUND Exits	Left	Thru	Right	Total	WESTBOUND Exits	Left	Thru	Right	Total		Peds	Bike	Other
08:15-09:15	CAR	940	110	734	107	951	1,093	151	806	257	1,214	1,637	180	1,276	140	1,596	1,175	104	925	55	1,084	N	164	0	0
	TRK	67	5	41	3	49	51	18	41	7	66	69	7	48	11	66	69	14	53	8	75	S	256	1	0
AM PEAK	BUS	46	27	45	26	98	29	0	3	30	33	98	0	43	0	43	30	25	3	1	29	E	166	0	0
																						W	269	0	0
	TOTAL:	**1,053**	**142**	**820**	**136**	**1,098**	**1,173**	**169**	**850**	**294**	**1,313**	**1,804**	**187**	**1,367**	**151**	**1,705**	**1,274**	**143**	**981**	**64**	**1,188**				
17:00-18:00	CAR	1,598	107	1,133	40	1,280	1,178	203	968	212	1,383	1,373	170	1,004	168	1,342	1,190	157	915	262	1,334	N	185	1	0
	TRK	53	1	37	2	40	37	6	28	11	45	40	7	25	11	43	41	4	29	10	43	S	286	1	0
PM PEAK	BUS	45	26	45	24	95	24	0	0	34	34	88	0	36	0	36	26	18	0	0	18	E	244	1	0
																						W	297	0	0
	TOTAL:	**1,696**	**134**	**1,215**	**66**	**1,415**	**1,239**	**209**	**996**	**257**	**1,462**	**1,501**	**177**	**1,065**	**179**	**1,421**	**1,257**	**179**	**944**	**272**	**1,395**				
OFF HR AVG	CAR	1,172	140	788	82	1,010	853	222	635	235	1,092	1,140	136	770	193	1,099	1,014	135	681	162	978	N	131	1	0
	TRK	70	6	44	5	55	52	15	39	8	62	53	8	38	14	60	60	7	40	11	58	S	131	1	0
	BUS	18	17	18	15	50	17	0	2	19	21	54	0	19	1	20	20	16	2	0	18	E	116	0	0
																						W	223	0	0
	TOTAL:	**1,260**	**163**	**850**	**102**	**1,115**	**922**	**237**	**676**	**262**	**1,175**	**1,247**	**144**	**827**	**208**	**1,179**	**1,094**	**158**	**723**	**173**	**1,054**				
07:30-09:30	CAR	1,732	219	1,336	180	1,735	2,134	280	1,609	510	2,399	3,259	345	2,551	245	3,141	2,341	198	1,877	116	2,191	N	326	0	0
	TRK	127	11	80	11	102	93	33	69	18	120	124	13	85	24	122	122	21	87	14	122	S	480	2	0
2 HR AM	BUS	92	54	91	48	193	55	0	7	59	66	204	0	94	2	96	61	51	5	1	57	E	301	0	0
																						W	505	0	0
	TOTAL:	**1,951**	**284**	**1,507**	**239**	**2,030**	**2,282**	**313**	**1,685**	**587**	**2,585**	**3,587**	**358**	**2,730**	**271**	**3,359**	**2,524**	**270**	**1,969**	**131**	**2,370**				
16:00-18:00	CAR	3,109	228	2,147	78	2,453	2,438	447	2,038	399	2,884	2,578	322	1,875	311	2,508	2,354	304	1,815	515	2,634	N	392	1	0
	TRK	113	5	82	5	92	83	10	59	17	86	95	19	71	18	108	81	7	58	21	86	S	545	2	0
2 HR PM	BUS	92	52	92	50	194	51	0	0	60	60	172	1	80	0	81	53	32	1	0	33	E	441	1	0
																						W	641	0	0
	TOTAL:	**3,314**	**285**	**2,321**	**133**	**2,739**	**2,572**	**457**	**2,097**	**476**	**3,030**	**2,845**	**342**	**2,026**	**329**	**2,697**	**2,488**	**343**	**1,874**	**536**	**2,753**				
07:30-18:00	CAR	9,880	1,034	6,886	599	8,519	8,280	1,669	6,427	1,913	10,009	10,730	1,254	7,731	1,372	10,357	9,030	1,086	6,624	1,325	9,035	N	1,297	3	0
	TRK	531	41	348	35	424	388	103	289	68	460	433	64	310	102	476	459	55	316	80	451	S	1,608	7	0
8 HR SUM	BUS	265	178	263	165	606	181	0	15	201	216	611	1	262	5	268	196	148	13	2	163	E	1,275	1	0
																						W	2,128	1	0
	TOTAL:	**10,676**	**1,253**	**7,497**	**799**	**9,549**	**8,849**	**1,772**	**6,731**	**2,182**	**10,685**	**11,774**	**1,319**	**8,303**	**1,479**	**11,101**	**9,685**	**1,289**	**6,953**	**1,407**	**9,649**				

Total 8 Hour Vehicle Volume: 40,984

Total 8 Hour Bicycle Volume: 12

Total 8 Hour Intersection Volume: 40,996

Comment:

Printed On: 29 Jun, 2020 2:14:36PM

City of Toronto - Traffic Safety Unit

Intersection Detailed 15 Minutes Movement Report

STEELES AVE AT YONGE ST (PX 131)

Survey Type: Pedestrian Hours

Survey Date: Mar-21-2019 (Thursday)

Time Period		NORTH BOUND Thru	Right	Left	EAST BOUND Thru	Right	Left	SOUTH BOUND Thru	Right	Left	WEST BOUND Thru	Right	Left	
07:45	CARS	125	19	26	203	68	24	354	22	38	238	9	19	
	DUALS	7	3	0	9	4	5	6	4	1	7	0	1	
	BUSES	8	7	8	1	9	0	13	2	0	0	0	7	
	BIKE (OTHER)		0	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	North Side		30	East Side		30	South Side		53	West Side		47	
08:00	CARS	138	17	25	234	65	34	340	22	43	254	15	25	
	DUALS	12	2	3	6	4	3	12	3	1	11	2	3	
	BUSES	10	5	7	0	8	0	16	0	0	0	0	5	
	BIKE (OTHER)		1	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	North Side		49	East Side		35	South Side		67	West Side		58	
08:15	CARS	166	19	27	197	72	29	318	25	51	244	14	24	
	DUALS	10	2	3	8	1	4	10	0	3	5	3	2	
	BUSES	16	6	5	1	7	0	12	0	0	1	0	7	
	BIKE (OTHER)		0	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	North Side		52	East Side		43	South Side		83	West Side		74	
08:30	CARS	171	22	20	212	70	28	332	36	51	233	14	20	
	DUALS	10	1	1	5	2	4	9	3	4	5	1	3	
	BUSES	11	5	10	0	8	0	15	0	0	0	0	5	
	BIKE (OTHER)		0	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	North Side		41	East Side		37	South Side		80	West Side		81	
08:45	CARS	181	25	32	210	55	33	316	31	48	228	13	25	
	DUALS	9	1	3	11	0	6	13	4	0	16	4	3	
	BUSES	12	11	7	0	6	0	10	0	0	2	0	5	
	BIKE (OTHER)		0	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	North Side		54	East Side		53	South Side		87	West Side		76	
09:00	CARS	198	27	24	195	80	40	334	37	45	229	17	29	
	DUALS	11	0	0	15	3	4	14	3	0	16	0	6	
	BUSES	13	5	6	1	7	0	7	0	0	0	0	9	
	BIKE (OTHER)		1	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	North Side		30	East Side		40	South Side		48	West Side		62	
09:15	CARS	184	33	34	189	52	50	294	36	36	235	11	30	
	DUALS	11	1	1	10	2	4	12	1	3	16	3	2	
	BUSES	9	5	4	2	9	0	11	0	0	1	1	6	
	BIKE (OTHER)		0	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	North Side		39	East Side		36	South Side		41	West Side		50	

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City of Toronto - Traffic Safety Unit

Intersection Detailed 15 Minutes Movement Report

STEELES AVE AT YONGE ST (PX 131) **Survey Date:** Mar-21-2019 (Thursday)

Survey Type: Pedestrian Hours

Time Period		NORTH BOUND Thru	Right	Left	EAST BOUND Thru	Right	Left	SOUTH BOUND Thru	Right	Left	WEST BOUND Thru	Right	Left	
12:45	CARS	257	19	39	163	70	68	205	63	38	190	48	49	
	DUALS	16	2	1	10	0	2	13	7	4	12	5	2	
	BUSES	3	5	4	0	4	0	5	1	0	0	0	3	
	BIKE (OTHER)		0	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	**North Side**		45	**East Side**		23	**South Side**		30	**West Side**			51
13:00	CARS	216	26	43	171	60	68	227	63	38	160	43	36	
	DUALS	11	2	4	8	3	6	8	7	1	10	3	3	
	BUSES	3	3	5	0	3	0	4	0	0	0	0	3	
	BIKE (OTHER)		0	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	**North Side**		27	**East Side**		18	**South Side**		32	**West Side**			59
13:15	CARS	230	24	50	157	65	69	217	50	44	168	47	34	
	DUALS	9	2	1	15	1	1	12	2	5	10	3	1	
	BUSES	4	3	3	0	5	0	3	0	0	0	0	4	
	BIKE (OTHER)		1	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	**North Side**		23	**East Side**		29	**South Side**		35	**West Side**			43
13:30	CARS	179	23	36	170	71	73	186	55	44	143	37	33	
	DUALS	12	2	3	14	3	7	12	4	0	7	5	0	
	BUSES	4	3	4	1	5	0	5	0	0	0	0	3	
	BIKE (OTHER)		0	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	**North Side**		43	**East Side**		43	**South Side**		53	**West Side**			47
14:30	CARS	244	20	44	223	61	69	197	62	39	179	40	36	
	DUALS	7	0	0	12	3	4	6	1	3	10	3	2	
	BUSES	4	4	3	0	5	0	6	0	0	1	0	4	
	BIKE (OTHER)		0	(0)		1	(0)		0	(0)	0	(0)		
	PEDS	**North Side**		45	**East Side**		36	**South Side**		31	**West Side**			64
14:45	CARS	227	32	46	162	56	55	220	54	46	184	37	30	
	DUALS	15	2	1	12	2	4	10	3	2	11	3	3	
	BUSES	6	5	4	5	3	0	7	1	0	1	0	5	
	BIKE (OTHER)		0	(0)		0	(0)		1	(0)	0	(0)		
	PEDS	**North Side**		30	**East Side**		44	**South Side**		42	**West Side**			48
15:00	CARS	205	19	34	154	66	66	210	39	41	201	50	28	
	DUALS	9	1	2	12	3	3	7	2	0	14	3	1	
	BUSES	4	4	4	1	6	0	8	0	0	2	0	6	
	BIKE (OTHER)		1	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	**North Side**		46	**East Side**		34	**South Side**		51	**West Side**			79

City of Toronto - Traffic Safety Unit

Intersection Detailed 15 Minutes Movement Report

STEELES AVE AT YONGE ST (PX 131) **Survey Date:** Mar-21-2019 (Thursday)

Survey Type: Pedestrian Hours

Time Period		NORTH BOUND Thru	Right	Left	EAST BOUND Thru	Right	Left	SOUTH BOUND Thru	Right	Left	WEST BOUND Thru	Right	Left	
09:30	CARS	173	18	31	169	48	42	263	36	33	216	23	26	
	DUALS	10	1	0	5	2	3	9	6	1	11	1	1	
	BUSES	12	4	7	2	5	0	10	0	0	1	0	7	
	BIKE (OTHER)		0	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	**North Side**		31	**East Side**		27	**South Side**		21	**West Side**			57
10:15	CARS	166	16	28	135	60	54	198	42	27	185	34	38	
	DUALS	8	0	3	7	1	2	14	0	1	8	4	1	
	BUSES	9	4	7	0	7	0	8	0	0	0	0	3	
	BIKE (OTHER)		0	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	**North Side**		28	**East Side**		25	**South Side**		19	**West Side**			33
10:30	CARS	164	13	35	168	60	45	186	44	24	159	33	32	
	DUALS	9	0	3	7	1	4	9	5	3	6	4	2	
	BUSES	7	3	5	0	3	0	4	0	0	1	0	7	
	BIKE (OTHER)		0	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	**North Side**		21	**East Side**		17	**South Side**		20	**West Side**			46
10:45	CARS	164	23	30	147	59	51	182	45	33	187	35	27	
	DUALS	7	2	2	9	3	5	7	5	2	12	2	2	
	BUSES	5	8	4	0	6	0	6	0	0	0	0	4	
	BIKE (OTHER)		0	(0)		0	(0)		1	(0)	0	(0)		
	PEDS	**North Side**		28	**East Side**		27	**South Side**		31	**West Side**			48
11:00	CARS	199	18	40	134	45	43	199	40	30	200	31	35	
	DUALS	12	1	2	4	4	2	8	2	3	10	3	1	
	BUSES	4	3	4	0	5	0	4	0	0	0	0	3	
	BIKE (OTHER)		1	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	**North Side**		31	**East Side**		31	**South Side**		22	**West Side**			44
12:15	CARS	240	30	41	139	72	55	222	68	36	155	54	47	
	DUALS	21	2	1	11	0	3	13	6	1	10	2	2	
	BUSES	3	4	4	0	5	0	4	0	0	0	0	3	
	BIKE (OTHER)		0	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	**North Side**		30	**East Side**		26	**South Side**		20	**West Side**			55
12:30	CARS	207	23	39	184	58	66	221	53	30	190	46	45	
	DUALS	9	2	2	19	4	8	10	6	3	16	1	1	
	BUSES	5	2	4	0	4	0	2	0	0	0	0	3	
	BIKE (OTHER)		0	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	**North Side**		39	**East Side**		24	**South Side**		30	**West Side**			67

Printed On: 29 Jun, 2020 2:15:57PM

City of Toronto - Traffic Safety Unit

Intersection Detailed 15 Minutes Movement Report

STEELES AVE AT YONGE ST (PX 131) **Survey Date:** Mar-21-2019 (Thursday)

Survey Type: Pedestrian Hours

Time Period		NORTH BOUND Thru	Right	Left	EAST BOUND Thru	Right	Left	SOUTH BOUND Thru	Right	Left	WEST BOUND Thru	Right	Left	
17:15	CARS	280	8	19	251	58	53	254	42	39	219	70	42	
	DUALS	6	1	0	9	1	1	7	1	2	10	5	1	
	BUSES	11	5	7	0	7	0	9	0	0	0	0	4	
	BIKE (OTHER)		0	(0)		0	(0)		1	(0)	1	(0)		
	PEDS	**North Side**		47	**East Side**		42	**South Side**		79	**West Side**			102
17:30	CARS	290	12	27	224	41	45	228	38	44	227	63	37	
	DUALS	10	1	0	4	2	3	3	2	3	9	0	0	
	BUSES	11	5	7	0	9	0	9	0	0	0	0	5	
	BIKE (OTHER)		0	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	**North Side**		52	**East Side**		77	**South Side**		70	**West Side**			55
17:45	CARS	270	11	31	254	41	43	251	41	43	234	57	40	
	DUALS	11	0	0	8	5	0	7	4	0	2	2	1	
	BUSES	9	6	5	0	13	0	13	0	0	0	0	6	
	BIKE (OTHER)		1	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	**North Side**		52	**East Side**		69	**South Side**		81	**West Side**			60
18:00	CARS	293	9	30	239	72	62	271	47	44	235	72	38	
	DUALS	10	0	1	7	3	2	8	4	2	8	3	2	
	BUSES	14	8	7	0	5	0	5	0	0	0	0	3	
	BIKE (OTHER)		0	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	**North Side**		34	**East Side**		56	**South Side**		56	**West Side**			80

City of Toronto - Traffic Safety Unit

Intersection Detailed 15 Minutes Movement Report

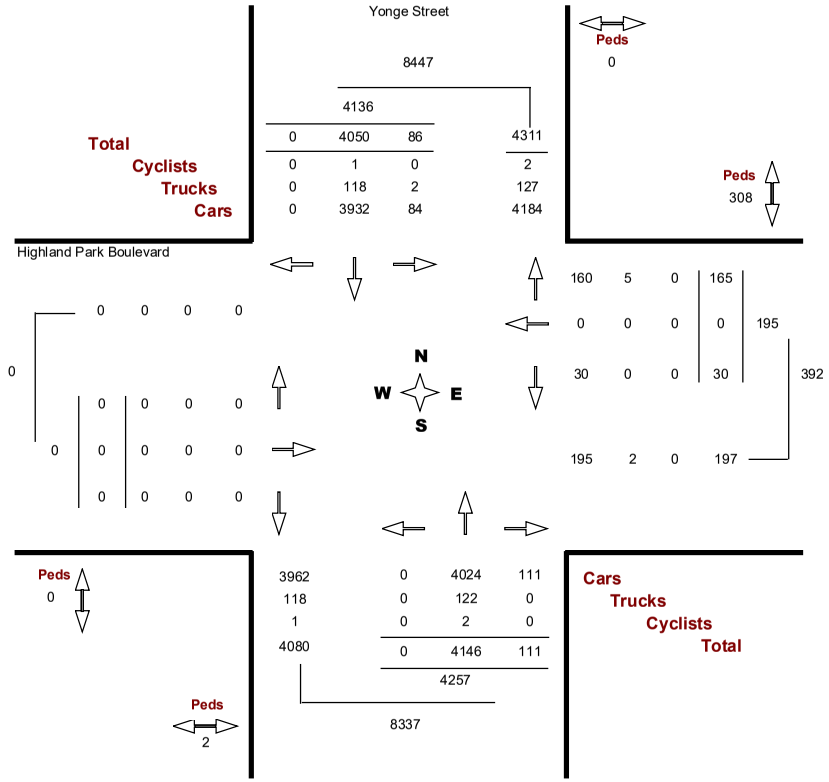
STEELES AVE AT YONGE ST (PX 131) **Survey Date:** Mar-21-2019 (Thursday)

Survey Type: Pedestrian Hours

Time Period		NORTH BOUND Thru	Right	Left	EAST BOUND Thru	Right	Left	SOUTH BOUND Thru	Right	Left	WEST BOUND Thru	Right	Left	
15:15	CARS	197	23	20	198	70	59	198	42	33	193	66	39	
	DUALS	15	0	0	7	2	3	11	4	2	9	2	2	
	BUSES	4	5	4	0	8	0	4	0	0	0	1	6	
	BIKE (OTHER)		0	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	**North Side**		39	**East Side**		34	**South Side**		48	**West Side**			110
15:30	CARS	257	20	33	235	68	45	210	51	42	231	45	32	
	DUALS	14	1	0	8	2	4	11	1	2	14	2	4	
	BUSES	5	5	7	0	5	0	5	0	0	2	0	5	
	BIKE (OTHER)		0	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	**North Side**		50	**East Side**		52	**South Side**		58	**West Side**			98
15:45	CARS	251	12	29	240	63	56	227	45	42	207	48	43	
	DUALS	12	0	0	6	1	2	3	5	0	12	0	0	
	BUSES	10	6	6	1	8	0	13	1	0	0	0	3	
	BIKE (OTHER)		0	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	**North Side**		54	**East Side**		70	**South Side**		61	**West Side**			90
16:15	CARS	241	10	29	277	37	62	201	44	38	221	60	40	
	DUALS	16	0	1	9	3	2	7	1	4	6	1	1	
	BUSES	11	7	7	0	9	0	7	0	0	0	0	6	
	BIKE (OTHER)		0	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	**North Side**		61	**East Side**		61	**South Side**		78	**West Side**			96
16:30	CARS	245	10	32	258	48	51	217	31	38	216	61	35	
	DUALS	16	3	1	14	2	2	19	3	2	6	3	1	
	BUSES	11	5	6	0	2	0	14	0	1	0	0	3	
	BIKE (OTHER)		0	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	**North Side**		50	**East Side**		43	**South Side**		43	**West Side**			76
16:45	CARS	280	6	32	253	55	68	241	33	41	217	68	39	
	DUALS	7	0	1	3	1	0	7	2	2	9	7	0	
	BUSES	9	7	7	0	9	0	8	0	0	1	0	0	
	BIKE (OTHER)		1	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	**North Side**		56	**East Side**		51	**South Side**		68	**West Side**			90
17:00	CARS	248	12	28	282	47	63	212	35	35	246	64	33	
	DUALS	6	0	1	5	0	0	13	1	4	8	0	1	
	BUSES	16	7	6	0	6	0	15	0	0	0	0	5	
	BIKE (OTHER)		0	(0)		0	(0)		0	(0)	0	(0)		
	PEDS	**North Side**		40	**East Side**		42	**South Side**		70	**West Side**			82

Turning Movements Diagram
Period Report: MD Period

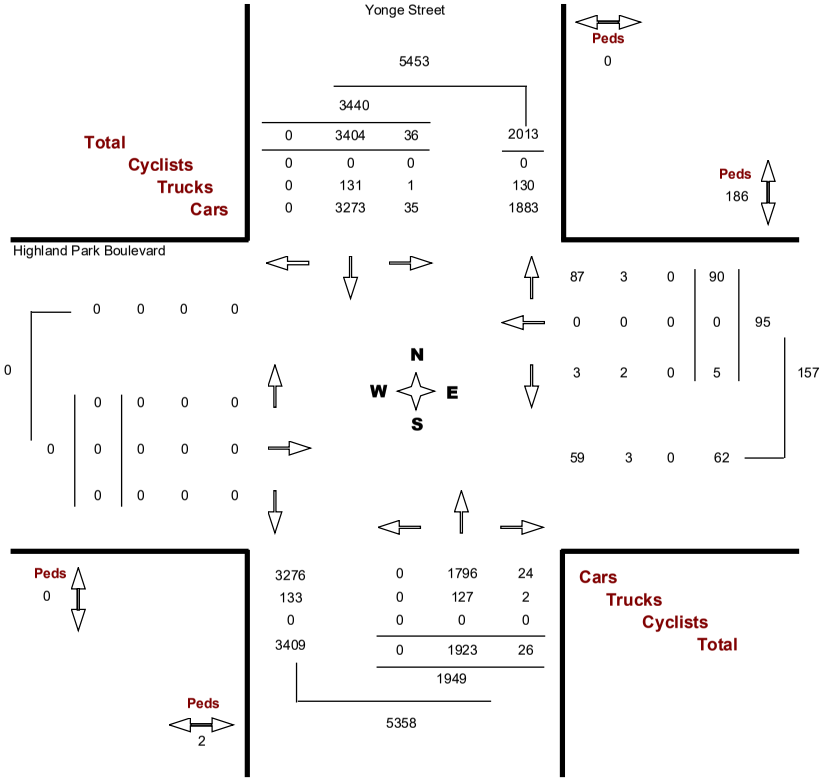
Location Yonge Street & Highland Park Boulevard
Municipality Markham
GeoID 460AB00E
Count Date Thursday, 28 February, 2019 **Count Period.** 11:00 AM — 02:00 PM



Notes:

Turning Movements Diagram
Period Report: AM Period

Location Yonge Street & Highland Park Boulevard
Municipality Markham
GeoID 460AB00E
Count Date Thursday, 28 February, 2019 **Count Period.** 07:00 AM — 09:00 AM

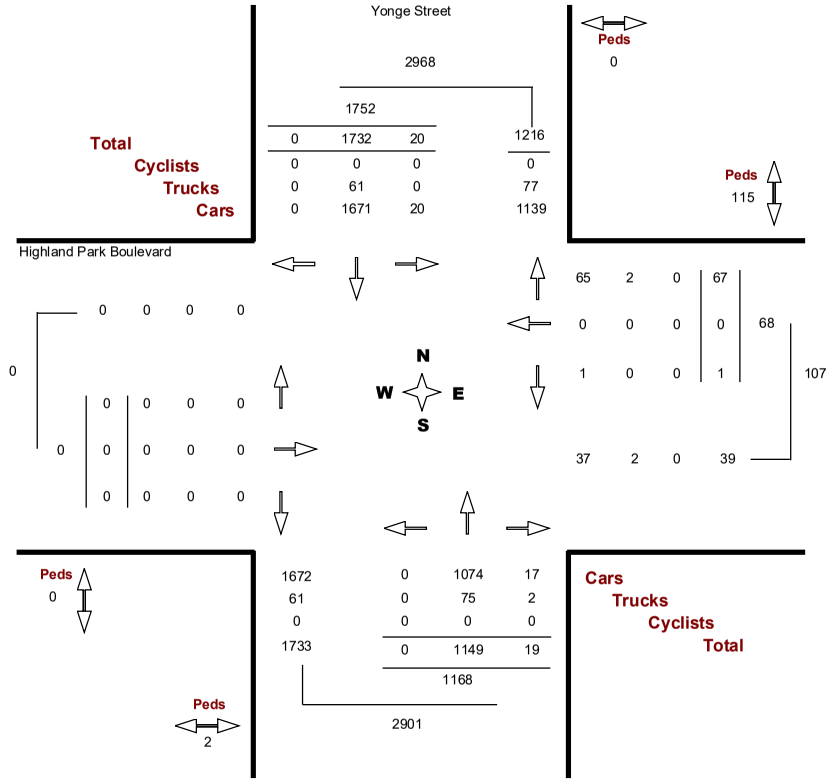


Notes:

Turning Movements Diagram
Peak Hour Report: AM Period

Location..... Yonge Street & Highland Park Boulevard
Municipality. Markham
Traffic Cont. Stop sign
Major Dir..... None

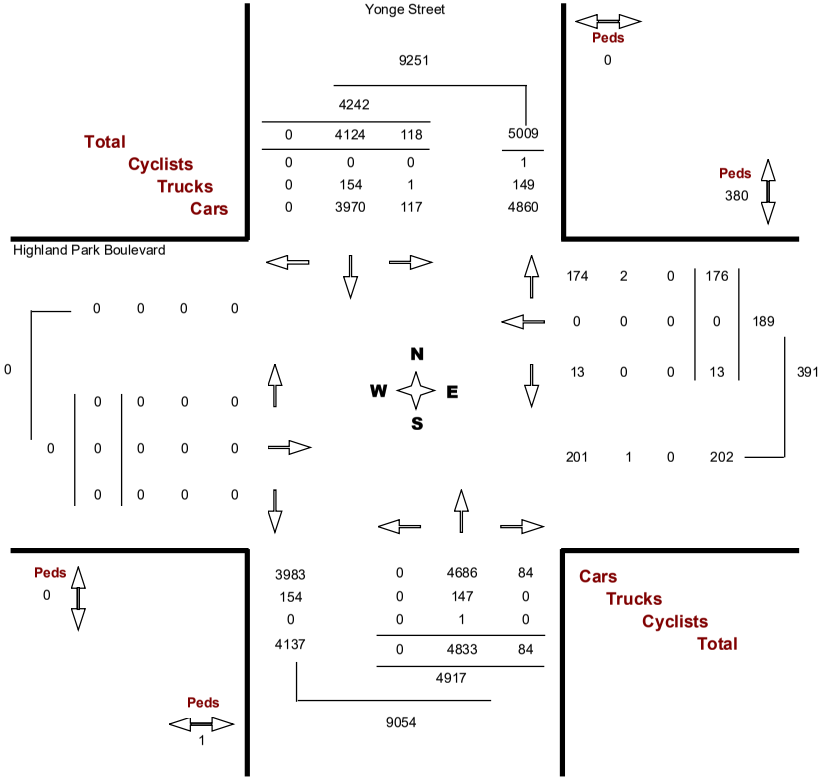
GeoID..... 460AB00E
Count Date. Thursday, 28 February, 2019
Count Period. 07:00 AM — 09:00 AM
Peak Hour.... 08:00 AM — 09:00 AM



Notes:

Turning Movements Diagram
Period Report: PM Period

Location Yonge Street & Highland Park Boulevard
Municipality Markham
GeoID 460AB00E
Count Date Thursday, 28 February, 2019
Count Period. 03:00 PM — 06:00 PM

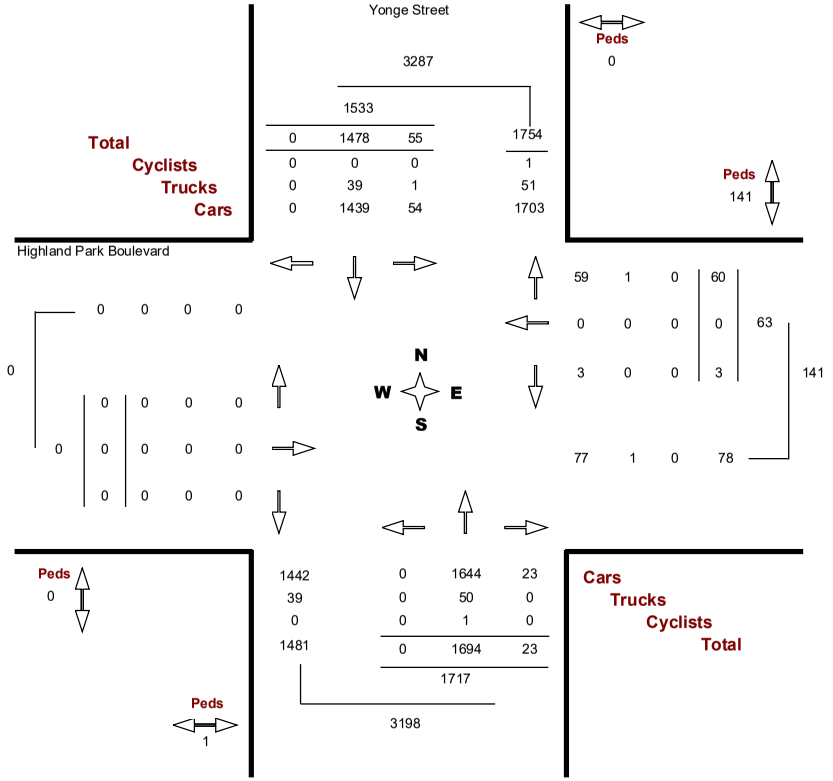


Notes:

Turning Movements Diagram
Peak Hour Report: PM Period

Location..... Yonge Street & Highland Park Boulevard
Municipality. Markham
Traffic Cont. Stop sign
Major Dir..... None

GeoID..... 460AB00E
Count Date. Thursday, 28 February, 2019
Count Period. 03:00 PM — 06:00 PM
Peak Hour.... 05:00 PM — 06:00 PM

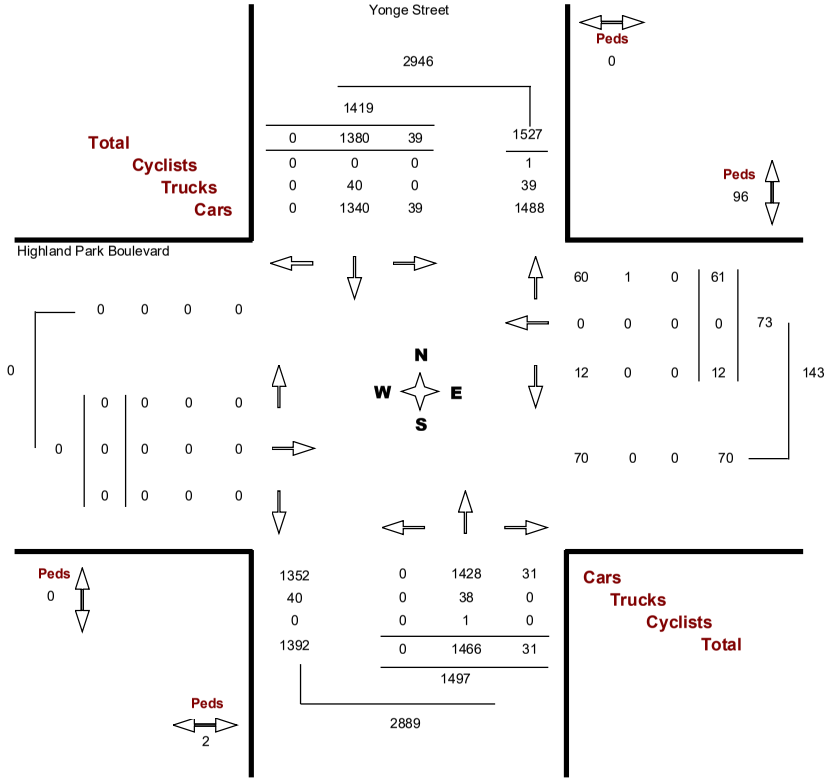


Notes:

Turning Movements Diagram
Peak Hour Report: MD Period

Location..... Yonge Street & Highland Park Boulevard
Municipality. Markham
Traffic Cont. Stop sign
Major Dir..... None

GeoID..... 460AB00E
Count Date. Thursday, 28 February, 2019
Count Period. 11:00 AM — 02:00 PM
Peak Hour.... 12:45 PM — 01:45 PM



Notes:

Turning Movement Count (2 . STEELES AVE E & DUDLEY AVE / DUMONT ST)

Start Time	N Approach DUDLEY AVE						E Approach STEELES AVE E						S Approach DUMONT ST						W Approach STEELES AVE E						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:30:00	4	1	0	0	2	5	1	326	2	0	0	329	9	1	1	0	2	11	20	256	0	0	0	276	621	
07:45:00	4	2	2	0	5	8	0	317	10	0	0	327	7	2	1	0	2	10	12	262	1	0	0	275	620	
08:00:00	3	0	0	0	11	3	7	290	5	0	0	302	7	0	1	0	2	8	20	274	1	0	0	295	608	
08:15:00	4	2	1	0	2	7	4	284	11	0	0	299	14	0	1	0	3	15	22	279	1	0	0	302	623	2472
08:30:00	3	1	2	0	3	6	9	290	3	0	0	302	8	0	0	0	2	8	28	256	0	0	1	284	600	2451
08:45:00	6	1	0	1	3	8	8	289	4	0	0	301	10	1	0	0	1	11	12	263	0	0	1	275	595	2426
09:00:00	4	0	5	0	4	9	2	222	2	0	0	226	6	0	0	0	6	6	11	229	2	0	0	242	483	2301
09:15:00	9	0	0	0	2	9	1	297	4	0	1	302	5	0	0	0	0	5	6	223	1	0	0	230	546	2224
BREAK																										
16:00:00	5	0	0	0	2	5	11	306	3	0	0	320	18	0	0	0	2	18	11	293	2	0	0	306	649	
16:15:00	6	1	2	0	9	9	14	307	3	0	0	324	14	2	0	0	4	16	4	279	4	0	2	287	636	
16:30:00	4	0	2	0	4	6	13	305	6	0	0	324	16	4	5	0	3	25	4	291	5	0	0	300	655	
16:45:00	7	1	0	0	5	8	29	322	1	0	1	352	14	5	2	0	3	21	8	311	2	0	0	321	702	2642
17:00:00	7	1	0	0	5	8	18	303	5	0	1	326	11	7	3	0	7	21	6	284	6	0	3	296	651	2644
17:15:00	12	3	2	0	11	17	25	314	5	0	0	344	17	3	4	0	3	24	3	268	8	0	0	279	664	2672
17:30:00	9	0	2	0	12	11	22	330	6	0	0	358	17	5	4	0	2	26	7	272	3	0	0	282	677	2694
17:45:00	9	0	4	0	12	13	9	319	3	0	0	331	11	2	7	0	0	20	5	278	6	1	0	290	654	2646
Grand Total	96	13	22	1	92	132	173	4821	73	0	3	5067	184	32	29	0	42	245	179	4318	42	1	7	4540	**9984**	-
Approach%	72.7%	9.8%	16.7%	0.8%		-	3.4%	95.1%	1.4%	0%		-	75.1%	13.1%	11.8%	0%		-	3.9%	95.1%	0.9%	0%		-	-	-
Totals %	1%	0.1%	0.2%	0%		1.3%	1.7%	48.3%	0.7%	0%		50.8%	1.8%	0.3%	0.3%	0%		2.5%	1.8%	43.2%	0.4%	0%		45.5%	-	-
Heavy	3	0	2	0		-	1	179	0	0		-	3	0	1	0		-	1	184	1	0		-	-	-
Heavy %	3.1%	0%	9.1%	0%		-	0.6%	3.7%	0%	0%		-	1.6%	0%	3.4%	0%		-	0.6%	4.3%	2.4%	0%		-	-	-
Bicycles	0	0	0	0		-	0	1	0	0		-	0	1	0	0		-	0	0	1	0		-	-	-
Bicycle %	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	3.1%	0%	0%		-	0%	0%	2.4%	0%		-	-	-

Spectrum

Turning Movement Count
Location Name: STEELES AVE E & DUDLEY AVE / DUMONT ST
Date: Thu, Jul 05, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

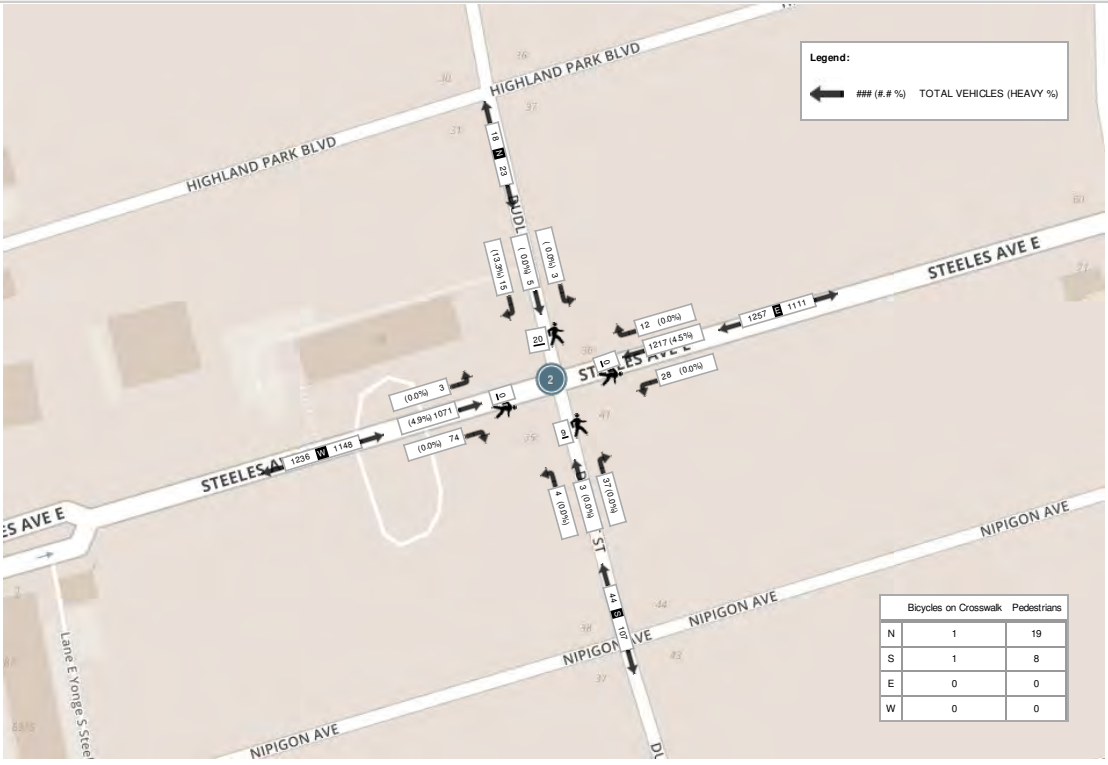
Peak Hour: 07:30 AM - 08:30 AM Weather: Partly Cloudy (26.2 °C)

Start Time	N Approach DUDLEY AVE						E Approach STEELES AVE E						S Approach DUMONT ST						W Approach STEELES AVE E						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
07:30:00	4	1	0	0	2	5	1	326	2	0	0	329	9	1	1	0	2	11	20	256	0	0	0	276	621
07:45:00	4	2	2	0	5	8	0	317	10	0	0	327	7	2	1	0	2	10	12	262	1	0	0	275	620
08:00:00	3	0	0	0	11	3	7	290	5	0	0	302	7	0	1	0	2	8	20	274	1	0	0	295	608
08:15:00	4	2	1	0	2	7	4	284	11	0	0	299	14	0	1	0	3	15	22	279	1	0	0	302	623
Grand Total	15	5	3	0	20	23	12	1217	28	0	0	1257	37	3	4	0	9	44	74	1071	3	0	0	1148	**2472**
Approach%	65.2%	21.7%	13%	0%		-	1%	96.8%	2.2%	0%		-	84.1%	6.8%	9.1%	0%		-	6.4%	93.3%	0.3%	0%		-	-
Totals %	0.6%	0.2%	0.1%	0%		0.9%	0.5%	49.2%	1.1%	0%		50.8%	1.5%	0.1%	0.2%	0%		1.8%	3%	43.3%	0.1%	0%		46.4%	-
PHF	0.94	0.63	0.38	0		0.72	0.43	0.93	0.64	0		0.96	0.66	0.38	1	0		0.73	0.84	0.96	0.75	0		0.95	-
Heavy	2	0	0	0		2	0	55	0	0		55	0	0	0	0		0	0	53	0	0		53	-
Heavy %	13.3%	0%	0%	0%		8.7%	0%	4.5%	0%	0%		4.4%	0%	0%	0%	0%		0%	0%	4.9%	0%	0%		4.6%	-
Lights	13	5	3	0		21	12	1162	28	0		1202	37	3	4	0		44	74	1018	3	0		1095	-
Lights %	86.7%	100%	100%	0%		91.3%	100%	95.5%	100%	0%		95.6%	100%	100%	100%	0%		100%	100%	95.1%	100%	0%		95.4%	-
Single-Unit Trucks	2	0	0	0		2	0	27	0	0		27	0	0	0	0		0	0	16	0	0		16	-
Single-Unit Trucks %	13.3%	0%	0%	0%		8.7%	0%	2.2%	0%	0%		2.1%	0%	0%	0%	0%		0%	0%	1.5%	0%	0%		1.4%	-
Buses	0	0	0	0		0	0	24	0	0		24	0	0	0	0		0	0	34	0	0		34	-
Buses %	0%	0%	0%	0%		0%	0%	2%	0%	0%		1.9%	0%	0%	0%	0%		0%	0%	3.2%	0%	0%		3%	-
Articulated Trucks	0	0	0	0		0	0	4	0	0		4	0	0	0	0		0	0	3	0	0		3	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.3%	-
Pedestrians	-	-	-	-	19	-	-	-	-	-	0	-	-	-	-	-	8	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	65.5%		-	-	-	-	0%		-	-	-	-	27.6%		-	-	-	-	0%		-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	3.4%		-	-	-	-	0%		-	-	-	-	3.4%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	1	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 04:45 PM - 05:45 PM Weather: Partly Cloudy (35 °C)

Start Time	N Approach DUDLEY AVE						E Approach STEELES AVE E						S Approach DUMONT ST						W Approach STEELES AVE E						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:45:00	7	1	0	0	5	8	29	322	1	0	1	352	14	5	2	0	3	21	8	311	2	0	0	321	702
17:00:00	7	1	0	0	5	8	18	303	5	0	1	326	11	7	3	0	7	21	6	284	6	0	3	296	651
17:15:00	12	3	2	0	11	17	25	314	5	0	0	344	17	3	4	0	3	24	3	268	8	0	0	279	664
17:30:00	9	0	2	0	12	11	22	330	6	0	0	358	17	5	4	0	2	26	7	272	3	0	0	282	677
Grand Total	35	5	4	0	33	44	94	1269	17	0	2	1380	59	20	13	0	15	92	24	1135	19	0	3	1178	**2694**
Approach%	79.5%	11.4%	9.1%	0%		-	6.8%	92%	1.2%	0%		-	64.1%	21.7%	14.1%	0%		-	2%	96.3%	1.6%	0%		-	-
Totals %	1.3%	0.2%	0.1%	0%		1.6%	3.5%	47.1%	0.6%	0%		51.2%	2.2%	0.7%	0.5%	0%		3.4%	0.9%	42.1%	0.7%	0%		43.7%	-
PHF	0.73	0.42	0.5	0		0.65	0.81	0.96	0.71	0		0.96	0.87	0.71	0.81	0		0.88	0.75	0.91	0.59	0		0.92	-
Heavy	0	0	0	0		0	0	27	0	0		27	1	0	1	0		2	0	33	0	0		33	-
Heavy %	0%	0%	0%	0%		0%	0%	2.1%	0%	0%		2%	1.7%	0%	7.7%	0%		2.2%	0%	2.9%	0%	0%		2.8%	-
Lights	35	5	4	0		44	94	1242	17	0		1353	58	20	12	0		90	24	1102	19	0		1145	-
Lights %	100%	100%	100%	0%		100%	100%	97.9%	100%	0%		98%	98.3%	100%	92.3%	0%		97.8%	100%	97.1%	100%	0%		97.2%	-
Single-Unit Trucks	0	0	0	0		0	0	12	0	0		12	1	0	1	0		2	0	9	0	0		9	-
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0.9%	0%	0%		0.9%	1.7%	0%	7.7%	0%		2.2%	0%	0.8%	0%	0%		0.8%	-
Buses	0	0	0	0		0	0	13	0	0		13	0	0	0	0		0	0	24	0	0		24	-
Buses %	0%	0%	0%	0%		0%	0%	1%	0%	0%		0.9%	0%	0%	0%	0%		0%	0%	2.1%	0%	0%		2%	-
Articulated Trucks	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	33	-	-	-	-	-	2	-	-	-	-	-	13	-	-	-	-	-	3	-	-
Pedestrians%	-	-	-	-	62.3%		-	-	-	-	3.8%		-	-	-	-	24.5%		-	-	-	-	5.7%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	3.8%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 07:30 AM - 08:30 AM Weather: Partly Cloudy (26.2 °C)



BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 04:45 PM - 05:45 PM Weather: Partly Cloudy (35 °C)

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Turning Movement Count (5 . DUDLEY AVE & HIGHLAND PARK BLVD)

Start Time	N Approach DUDLEY AVE						E Approach HIGHLAND PARK BLVD						S Approach DUDLEY AVE						W Approach HIGHLAND PARK BLVD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:30:00	2	4	1	0	1	7	0	5	0	0	0	5	3	0	1	0	0	4	0	7	1	0	0	8	24	
07:45:00	3	3	0	0	0	6	0	12	2	0	6	14	0	3	1	0	1	4	2	2	1	0	0	5	29	
08:00:00	3	1	1	0	0	5	0	22	2	0	3	24	0	3	5	0	2	8	0	6	2	0	0	8	45	
08:15:00	1	3	1	0	0	5	0	6	2	0	4	8	0	3	3	0	1	6	3	13	1	0	0	17	36	134
08:30:00	1	1	0	0	0	2	0	18	2	0	0	20	0	6	4	0	1	10	3	11	3	0	1	17	49	159
08:45:00	4	6	0	0	1	10	0	25	1	0	1	26	3	4	5	0	0	12	3	6	0	0	1	9	57	187
09:00:00	0	3	0	0	0	3	0	13	2	0	0	15	1	1	4	0	0	6	5	13	1	0	1	19	43	185
09:15:00	1	7	0	0	0	8	1	9	1	0	0	11	0	1	0	0	1	1	3	14	0	0	1	17	37	186
BREAK																										
16:00:00	6	2	0	0	0	8	2	8	1	0	0	11	0	11	2	0	3	13	3	11	4	0	1	18	50	
16:15:00	3	5	3	0	0	11	0	5	1	0	0	6	1	14	5	0	1	20	3	11	4	0	2	18	55	
16:30:00	3	2	2	0	1	7	1	9	1	0	0	11	0	18	2	0	3	20	3	13	1	0	0	17	55	
16:45:00	1	1	1	0	0	3	1	9	3	1	0	14	7	21	7	0	1	35	4	16	2	0	0	22	74	234
17:00:00	1	5	0	0	1	6	1	4	0	0	3	5	5	20	6	0	1	31	3	16	5	0	3	24	66	250
17:15:00	3	11	5	0	0	19	1	6	2	0	0	9	2	27	5	0	0	34	4	21	2	0	1	27	89	284
17:30:00	1	9	1	0	0	11	0	12	1	0	0	13	3	23	5	0	2	31	4	13	2	0	2	19	74	303
17:45:00	3	7	3	0	0	13	0	5	2	0	2	7	2	12	2	0	0	16	5	14	4	0	3	23	59	288
Grand Total	36	70	18	0	4	124	7	168	23	1	19	199	27	167	57	0	17	251	48	187	33	0	16	268	**842**	-
Approach%	29%	56.5%	14.5%	0%		-	3.5%	84.4%	11.6%	0.5%		-	10.8%	66.5%	22.7%	0%		-	17.9%	69.8%	12.3%	0%		-	-	-
Totals %	4.3%	8.3%	2.1%	0%		14.7%	0.8%	20%	2.7%	0.1%		23.6%	3.2%	19.8%	6.8%	0%		29.8%	5.7%	22.2%	3.9%	0%		31.8%	-	-
Heavy	0	2	0	0		-	0	0	0	0		-	1	1	0	0		-	3	2	0	0		-	-	-
Heavy %	0%	2.9%	0%	0%		-	0%	0%	0%	0%		-	3.7%	0.6%	0%	0%		-	6.3%	1.1%	0%	0%		-	-	-
Bicycles	1	2	1	0		-	0	1	1	0		-	1	2	0	0		-	1	5	1	0		-	-	-
Bicycle %	2.8%	2.9%	5.6%	0%		-	0%	0.6%	4.3%	0%		-	3.7%	1.2%	0%	0%		-	2.1%	2.7%	3%	0%		-	-	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Partly Cloudy (26.2 °C)

Start Time	N Approach DUDLEY AVE						E Approach HIGHLAND PARK BLVD						S Approach DUDLEY AVE						W Approach HIGHLAND PARK BLVD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:00:00	3	1	1	0	0	5	0	22	2	0	3	24	0	3	5	0	2	8	0	6	2	0	0	8	45
08:15:00	1	3	1	0	0	5	0	6	2	0	4	8	0	3	3	0	1	6	3	13	1	0	0	17	36
08:30:00	1	1	0	0	0	2	0	18	2	0	0	20	0	6	4	0	1	10	3	11	3	0	1	17	49
08:45:00	4	6	0	0	1	10	0	25	1	0	1	26	3	4	5	0	0	12	3	6	0	0	1	9	57
Grand Total	9	11	2	0	1	22	0	71	7	0	8	78	3	16	17	0	4	36	9	36	6	0	2	51	**187**
Approach%	40.9%	50%	9.1%	0%		-	0%	91%	9%	0%		-	8.3%	44.4%	47.2%	0%		-	17.6%	70.6%	11.8%	0%		-	-
Totals %	4.8%	5.9%	1.1%	0%		11.8%	0%	38%	3.7%	0%		41.7%	1.6%	8.6%	9.1%	0%		19.3%	4.8%	19.3%	3.2%	0%		27.3%	-
PHF	0.56	0.46	0.5	0		0.55	0	0.71	0.88	0		0.75	0.25	0.67	0.85	0		0.75	0.75	0.69	0.5	0		0.75	-
Heavy	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	2	0	0		2	-
Heavy %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	5.6%	0%	0%		3.9%	-
Lights	9	11	2	0		22	0	71	7	0		78	3	16	17	0		36	9	34	6	0		49	-
Lights %	100%	100%	100%	0%		100%	0%	100%	100%	0%		100%	100%	100%	100%	0%		100%	100%	94.4%	100%	0%		96.1%	-
Single-Unit Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	2	0	0		2	-
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	5.6%	0%	0%		3.9%	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	8	-	-	-	-	-	4	-	-	-	-	-	2	-	-
Pedestrians%	-	-	-	-	6.7%		-	-	-	-	53.3%		-	-	-	-	26.7%		-	-	-	-	13.3%		-
Bicycles on Road	0	0	1	0	0	-	0	0	1	0	0	-	0	1	0	0	0	-	0	0	1	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

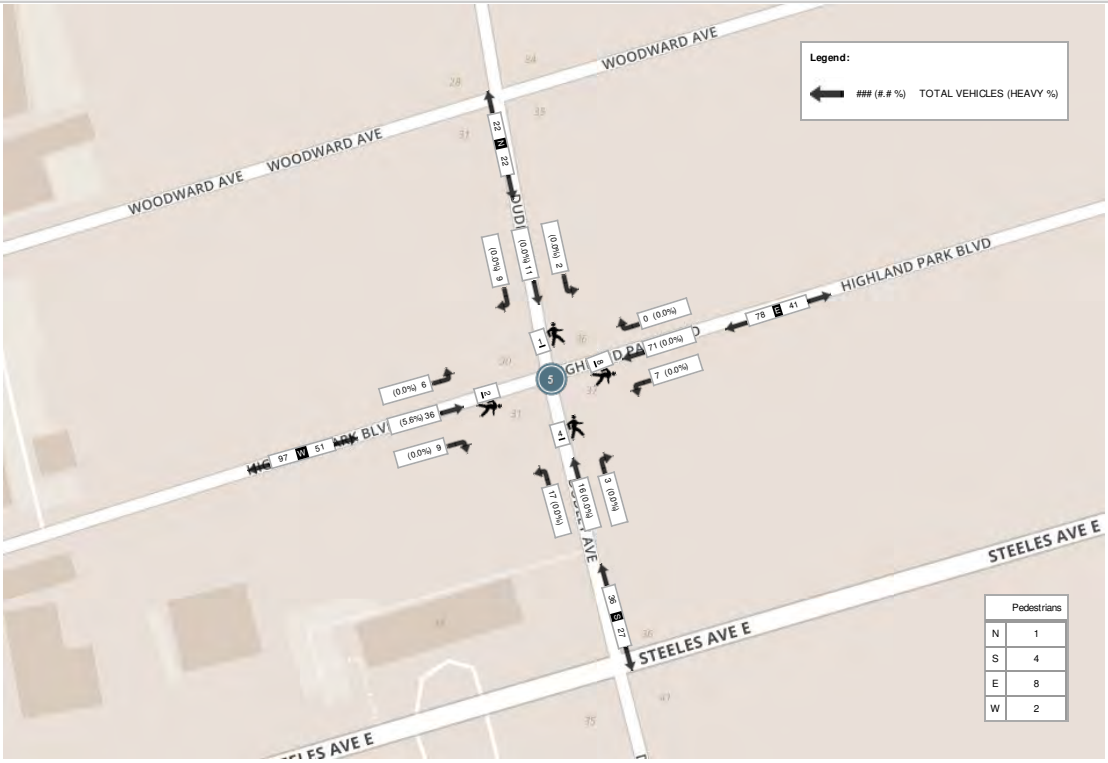
Turning Movement Count
Location Name: DUDLEY AVE & HIGHLAND PARK BLVD
Date: Thu, Jul 05, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

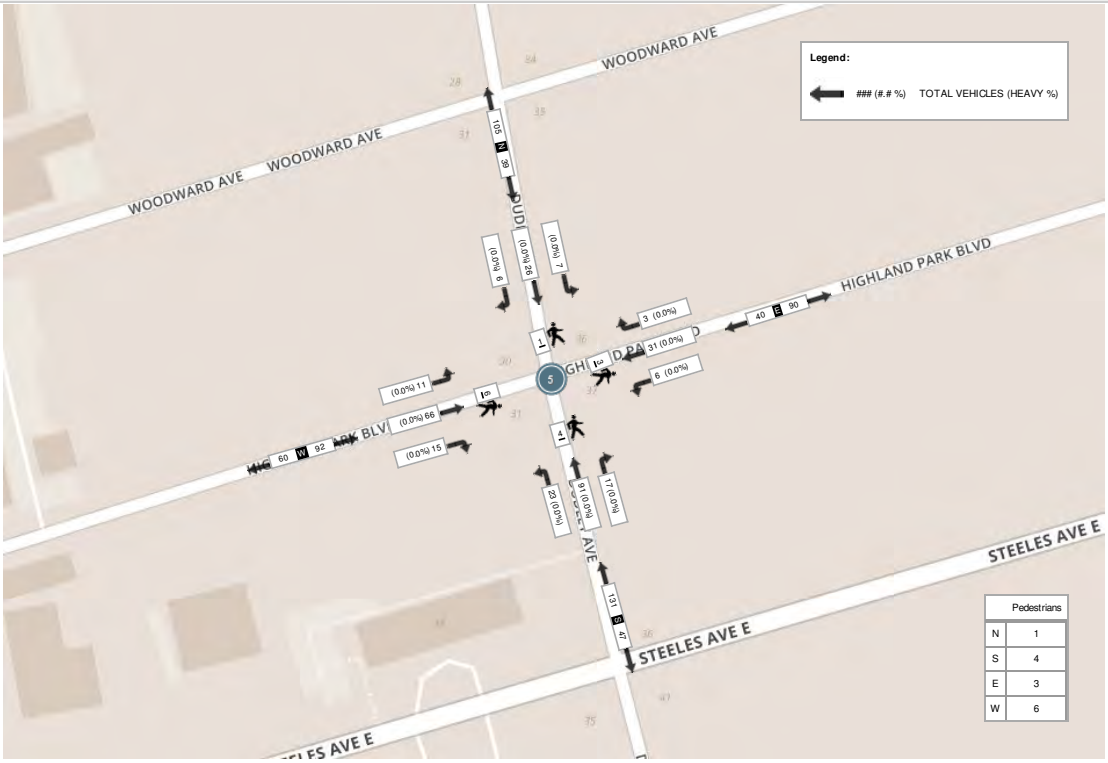
Peak Hour: 04:45 PM - 05:45 PM Weather: Partly Cloudy (35 °C)

Start Time	N Approach DUDLEY AVE						E Approach HIGHLAND PARK BLVD						S Approach DUDLEY AVE						W Approach HIGHLAND PARK BLVD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:45:00	1	1	1	0	0	3	1	9	3	1	0	14	7	21	7	0	1	35	4	16	2	0	0	22	74
17:00:00	1	5	0	0	1	6	1	4	0	0	3	5	5	20	6	0	1	31	3	16	5	0	3	24	66
17:15:00	3	11	5	0	0	19	1	6	2	0	0	9	2	27	5	0	0	34	4	21	2	0	1	27	89
17:30:00	1	9	1	0	0	11	0	12	1	0	0	13	3	23	5	0	2	31	4	13	2	0	2	19	74
Grand Total	6	26	7	0	1	39	3	31	6	1	3	41	17	91	23	0	4	131	15	66	11	0	6	92	**303**
Approach%	15.4%	66.7%	17.9%	0%		-	7.3%	75.6%	14.6%	2.4%		-	13%	69.5%	17.6%	0%		-	16.3%	71.7%	12%	0%		-	-
Totals %	2%	8.6%	2.3%	0%		12.9%	1%	10.2%	2%	0.3%		13.5%	5.6%	30%	7.6%	0%		43.2%	5%	21.8%	3.6%	0%		30.4%	-
PHF	0.5	0.59	0.35	0		0.51	0.75	0.65	0.5	0.25		0.73	0.61	0.84	0.82	0		0.94	0.94	0.79	0.55	0		0.85	-
Heavy	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Heavy %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Lights	6	26	7	0		39	3	31	6	1		41	17	91	23	0		131	15	66	11	0		92	-
Lights %	100%	100%	100%	0%		100%	100%	100%	100%	100%		100%	100%	100%	100%	0%		100%	100%	100%	100%	0%		100%	-
Single-Unit Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	3	-	-	-	-	-	4	-	-	-	-	-	6	-	-
Pedestrians%	-	-	-	-	7.1%		-	-	-	-	21.4%		-	-	-	-	28.6%		-	-	-	-	42.9%		-
Bicycles on Road	0	2	0	0	0	-	0	1	0	0	0	-	0	1	0	0	0	-	0	1	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 08:00 AM - 09:00 AM Weather: Partly Cloudy (26.2 °C)



Peak Hour: 04:45 PM - 05:45 PM Weather: Partly Cloudy (35 °C)



Turning Movement Count (3 . STEELES AVE E & WILLOWDALE AVE)

Start Time	N Approach WILLOWDALE AVE						E Approach STEELES AVE E						S Approach WILLOWDALE AVE						W Approach STEELES AVE E						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:30:00	0	2	10	0	2	12	0	295	111	0	4	406	21	8	28	0	4	57	65	192	0	0	4	257	732	
07:45:00	7	3	2	0	0	12	5	299	134	0	5	438	25	7	24	0	4	56	67	197	1	0	2	265	771	
08:00:00	7	5	9	0	8	21	3	250	117	0	4	370	35	14	31	0	4	80	59	215	1	0	3	275	746	
08:15:00	5	9	13	0	0	27	4	252	130	0	3	386	60	10	32	1	8	103	51	225	2	0	2	278	794	3043
08:30:00	3	9	9	0	1	21	10	276	105	0	5	391	50	19	31	0	2	100	56	216	0	0	0	272	784	3095
08:45:00	4	20	5	0	0	29	10	241	66	0	3	317	40	17	42	0	4	99	54	228	2	0	3	284	729	3053
09:00:00	3	26	10	0	1	39	3	194	81	0	0	278	30	13	32	0	4	75	59	178	1	0	1	238	630	2937
09:15:00	0	21	8	0	1	29	4	247	54	0	6	305	38	9	47	0	0	94	36	199	2	0	0	237	665	2808
BREAK																										
16:00:00	2	12	8	0	1	22	8	246	45	0	4	299	89	5	95	0	1	189	42	256	6	0	7	304	814	
16:15:00	3	24	3	0	1	30	6	255	43	0	13	304	94	8	73	0	3	175	37	242	7	0	3	286	795	
16:30:00	2	24	10	0	0	36	14	230	39	0	4	283	102	3	86	0	3	191	28	268	10	0	1	306	816	
16:45:00	0	24	8	0	2	32	11	235	38	0	1	284	120	10	99	0	3	229	35	273	7	0	2	315	860	3285
17:00:00	6	20	6	0	4	32	2	218	64	0	9	284	114	11	87	0	9	212	36	247	14	0	4	297	825	3296
17:15:00	1	39	8	0	4	48	4	270	48	0	0	322	122	9	87	0	2	218	38	231	12	0	2	281	869	3370
17:30:00	2	25	6	0	2	33	8	251	35	0	5	294	91	7	102	0	4	200	24	252	9	0	3	285	812	3366
17:45:00	2	32	8	0	2	42	4	221	47	0	3	272	102	9	89	0	2	200	31	251	5	0	3	287	801	3307
Grand Total	47	295	123	0	29	465	96	3980	1157	0	69	5233	1133	159	985	1	57	2278	718	3670	79	0	40	4467	**12443**	-
Approach%	10.1%	63.4%	26.5%	0%		-	1.8%	76.1%	22.1%	0%		-	49.7%	7%	43.2%	0%		-	16.1%	82.2%	1.8%	0%		-	-	-
Totals %	0.4%	2.4%	1%	0%		3.7%	0.8%	32%	9.3%	0%		42.1%	9.1%	1.3%	7.9%	0%		18.3%	5.8%	29.5%	0.6%	0%		35.9%	-	-
Heavy	0	1	2	0		-	1	163	11	0		-	1	0	13	0		-	16	175	0	0		-	-	-
Heavy %	0%	0.3%	1.6%	0%		-	1%	4.1%	1%	0%		-	0.1%	0%	1.3%	0%		-	2.2%	4.8%	0%	0%		-	-	-
Bicycles	0	2	0	0		-	0	0	0	0		-	1	4	0	0		-	0	0	0	0		-	-	-
Bicycle %	0%	0.7%	0%	0%		-	0%	0%	0%	0%		-	0.1%	2.5%	0%	0%		-	0%	0%	0%	0%		-	-	-

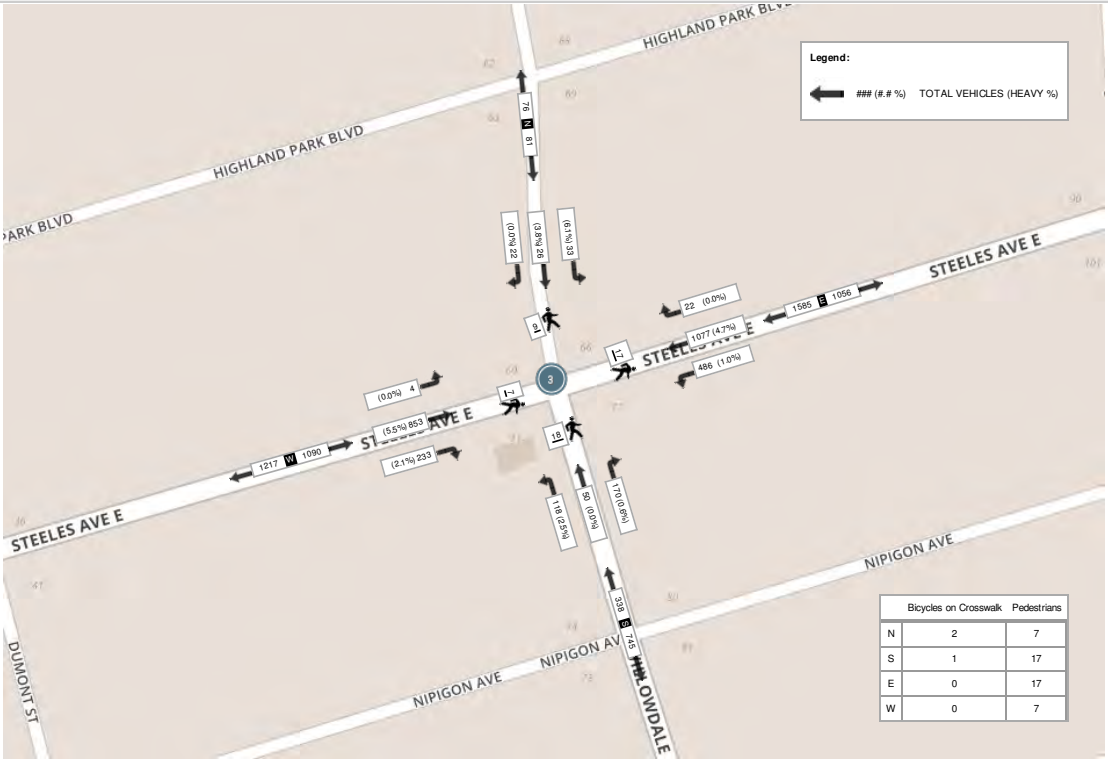
Peak Hour: 07:45 AM - 08:45 AM Weather: Partly Cloudy (26.2 °C)

Start Time	N Approach WILLOWDALE AVE						E Approach STEELES AVE E						S Approach WILLOWDALE AVE						W Approach STEELES AVE E						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
07:45:00	7	3	2	0	0	12	5	299	134	0	5	438	25	7	24	0	4	56	67	197	1	0	2	265	771
08:00:00	7	5	9	0	8	21	3	250	117	0	4	370	35	14	31	0	4	80	59	215	1	0	3	275	746
08:15:00	5	9	13	0	0	27	4	252	130	0	3	386	60	10	32	1	8	103	51	225	2	0	2	278	794
08:30:00	3	9	9	0	1	21	10	276	105	0	5	391	50	19	31	0	2	100	56	216	0	0	0	272	784
Grand Total	22	26	33	0	9	81	22	1077	486	0	17	1585	170	50	118	1	18	339	233	853	4	0	7	1090	**3095**
Approach%	27.2%	32.1%	40.7%	0%		-	1.4%	67.9%	30.7%	0%		-	50.1%	14.7%	34.8%	0.3%		-	21.4%	78.3%	0.4%	0%		-	-
Totals %	0.7%	0.8%	1.1%	0%		2.6%	0.7%	34.8%	15.7%	0%		51.2%	5.5%	1.6%	3.8%	0%		11%	7.5%	27.6%	0.1%	0%		35.2%	-
PHF	0.79	0.72	0.63	0		0.75	0.55	0.9	0.91	0		0.9	0.71	0.66	0.92	0.25		0.82	0.87	0.95	0.5	0		0.98	-
Heavy	0	1	2	0		3	0	51	5	0		56	1	0	3	0		4	5	47	0	0		52	-
Heavy %	0%	3.8%	6.1%	0%		3.7%	0%	4.7%	1%	0%		3.5%	0.6%	0%	2.5%	0%		1.2%	2.1%	5.5%	0%	0%		4.8%	-
Lights	22	25	31	0		78	22	1026	481	0		1529	169	50	115	1		335	228	806	4	0		1038	-
Lights %	100%	96.2%	93.9%	0%		96.3%	100%	95.3%	99%	0%		96.5%	99.4%	100%	97.5%	100%		98.8%	97.9%	94.5%	100%	0%		95.2%	-
Single-Unit Trucks	0	1	2	0		3	0	21	3	0		24	0	0	1	0		1	1	15	0	0		16	-
Single-Unit Trucks %	0%	3.8%	6.1%	0%		3.7%	0%	1.9%	0.6%	0%		1.5%	0%	0%	0.8%	0%		0.3%	0.4%	1.8%	0%	0%		1.5%	-
Buses	0	0	0	0		0	0	25	0	0		25	1	0	2	0		3	4	29	0	0		33	-
Buses %	0%	0%	0%	0%		0%	0%	2.3%	0%	0%		1.6%	0.6%	0%	1.7%	0%		0.9%	1.7%	3.4%	0%	0%		3%	-
Articulated Trucks	0	0	0	0		0	0	5	2	0		7	0	0	0	0		0	0	3	0	0		3	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.5%	0.4%	0%		0.4%	0%	0%	0%	0%		0%	0%	0.4%	0%	0%		0.3%	-
Pedestrians	-	-	-	-	7	-	-	-	-	-	17	-	-	-	-	-	17	-	-	-	-	-	7	-	-
Pedestrians%	-	-	-	-	13.7%		-	-	-	-	33.3%		-	-	-	-	33.3%		-	-	-	-	13.7%		-
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	3.9%		-	-	-	-	0%		-	-	-	-	2%		-	-	-	-	0%		-
Bicycles on Road	0	1	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 04:30 PM - 05:30 PM Weather: Partly Cloudy (35 °C)

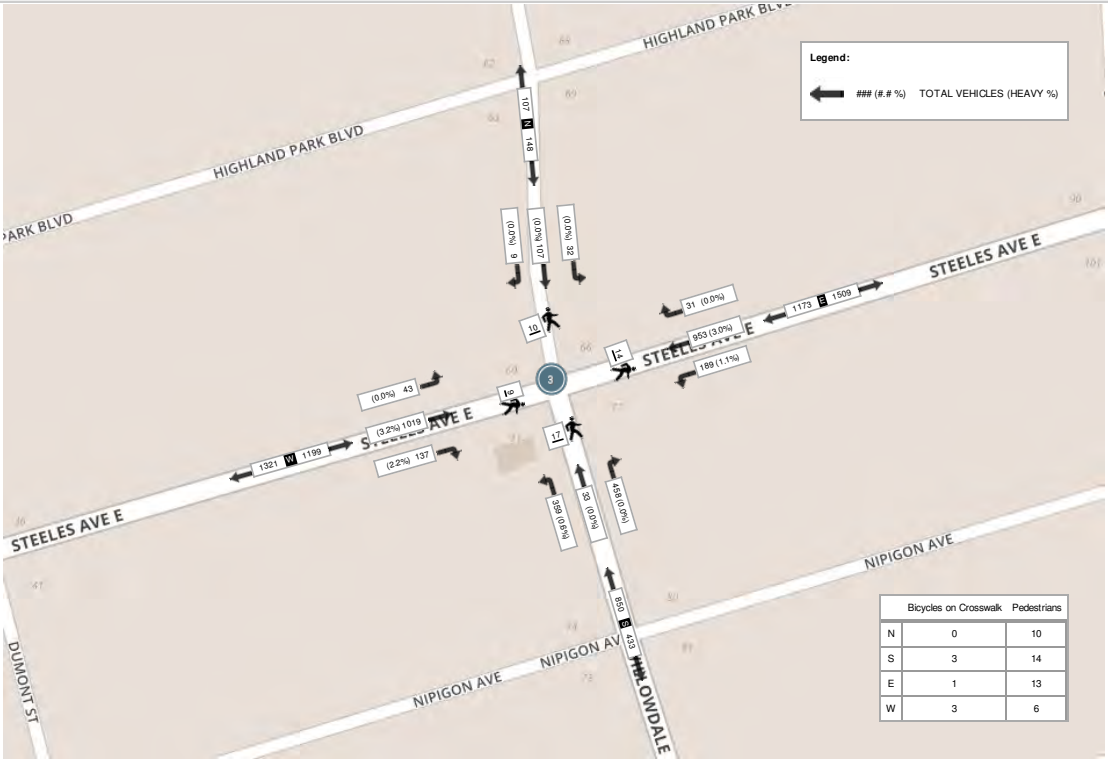
Start Time	N Approach WILLOWDALE AVE						E Approach STEELES AVE E						S Approach WILLOWDALE AVE						W Approach STEELES AVE E						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:30:00	2	24	10	0	0	36	14	230	39	0	4	283	102	3	86	0	3	191	28	268	10	0	1	306	816
16:45:00	0	24	8	0	2	32	11	235	38	0	1	284	120	10	99	0	3	229	35	273	7	0	2	315	860
17:00:00	6	20	6	0	4	32	2	218	64	0	9	284	114	11	87	0	9	212	36	247	14	0	4	297	825
17:15:00	1	39	8	0	4	48	4	270	48	0	0	322	122	9	87	0	2	218	38	231	12	0	2	281	869
Grand Total	9	107	32	0	10	148	31	953	189	0	14	1173	458	33	359	0	17	850	137	1019	43	0	9	1199	**3370**
Approach%	6.1%	72.3%	21.6%	0%		-	2.6%	81.2%	16.1%	0%		-	53.9%	3.9%	42.2%	0%		-	11.4%	85%	3.6%	0%		-	**-**
Totals %	0.3%	3.2%	0.9%	0%		4.4%	0.9%	28.3%	5.6%	0%		34.8%	13.6%	1%	10.7%	0%		25.2%	4.1%	30.2%	1.3%	0%		35.6%	**-**
PHF	0.38	0.69	0.8	0		0.77	0.55	0.88	0.74	0		0.91	0.94	0.75	0.91	0		0.93	0.9	0.93	0.77	0		0.95	**-**
Heavy	0	0	0	0		0	0	29	2	0		31	0	0	2	0		2	3	33	0	0		36	**-**
Heavy %	0%	0%	0%	0%		0%	0%	3%	1.1%	0%		2.6%	0%	0%	0.6%	0%		0.2%	2.2%	3.2%	0%	0%		3%	**-**
Lights	9	107	32	0		148	31	924	187	0		1142	458	33	357	0		848	134	986	43	0		1163	**-**
Lights %	100%	100%	100%	0%		100%	100%	97%	98.9%	0%		97.4%	100%	100%	99.4%	0%		99.8%	97.8%	96.8%	100%	0%		97%	**-**
Single-Unit Trucks	0	0	0	0		0	0	14	2	0		16	0	0	1	0		1	1	9	0	0		10	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	1.5%	1.1%	0%		1.4%	0%	0%	0.3%	0%		0.1%	0.7%	0.9%	0%	0%		0.8%	**-**
Buses	0	0	0	0		0	0	13	0	0		13	0	0	1	0		1	2	24	0	0		26	**-**
Buses %	0%	0%	0%	0%		0%	0%	1.4%	0%	0%		1.1%	0%	0%	0.3%	0%		0.1%	1.5%	2.4%	0%	0%		2.2%	**-**
Articulated Trucks	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	0	0	0	0		0	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	10	-	-	-	-	-	13	-	-	-	-	-	14	-	-	-	-	-	6	-	**-**
Pedestrians%	-	-	-	-	20%		-	-	-	-	26%		-	-	-	-	28%		-	-	-	-	12%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	3	-	-	-	-	-	3	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	2%		-	-	-	-	6%		-	-	-	-	6%		**-**
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	0	0	0	0	0	-	**-**
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Peak Hour: 07:45 AM - 08:45 AM Weather: Partly Cloudy (26.2 °C)



BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 04:30 PM - 05:30 PM Weather: Partly Cloudy (35 °C)



BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Turning Movement Count (4 . WILLOWDALE AVE & HIGHLAND PARK BLVD)

Start Time	N Approach WILLOWDALE AVE						E Approach HIGHLAND PARK BLVD						S Approach WILLOWDALE AVE						W Approach HIGHLAND PARK BLVD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:30:00	3	5	0	0	0	8	0	2	1	0	4	3	1	7	0	0	0	8	8	3	0	0	0	11	30	
07:45:00	3	10	0	0	0	13	0	7	1	0	0	8	2	6	4	0	0	12	2	0	0	0	2	2	35	
08:00:00	1	16	0	0	0	17	1	9	1	0	2	11	2	5	12	0	1	19	8	1	0	0	1	9	56	
08:15:00	0	12	0	0	0	12	0	5	2	0	3	7	2	10	5	0	3	17	15	1	0	0	0	16	52	173
08:30:00	2	9	0	0	0	11	1	5	4	0	2	10	0	17	12	0	1	29	9	3	0	0	0	12	62	205
08:45:00	2	13	0	0	0	15	0	11	4	0	0	15	2	11	16	0	0	29	8	2	1	0	3	11	70	240
09:00:00	2	15	0	0	0	17	0	4	11	0	1	15	0	11	6	0	1	17	12	2	0	0	0	14	63	247
09:15:00	0	16	0	0	0	16	0	3	5	0	0	8	4	6	5	0	3	15	10	4	0	0	0	14	53	248
BREAK																										
16:00:00	1	12	0	0	0	13	1	2	2	0	0	5	2	10	7	0	0	19	8	3	0	0	2	11	48	
16:15:00	0	21	0	0	0	21	0	2	5	0	0	7	1	15	4	0	0	20	6	6	1	0	0	13	61	
16:30:00	0	22	2	0	0	24	0	1	5	0	0	6	2	17	9	1	0	29	7	5	1	0	1	13	72	
16:45:00	3	17	0	0	0	20	0	4	3	0	0	7	2	19	7	1	0	29	12	9	1	0	0	22	78	259
17:00:00	0	12	0	0	1	12	0	2	4	0	2	6	3	20	3	0	2	26	10	7	2	0	0	19	63	274
17:15:00	3	24	0	0	1	27	1	0	5	0	0	6	6	13	6	0	0	25	22	4	3	0	1	29	87	300
17:30:00	0	18	0	0	0	18	0	7	1	0	3	8	2	18	6	0	0	26	9	7	1	0	1	17	69	297
17:45:00	1	34	0	0	0	35	0	4	1	0	0	5	3	13	3	0	0	19	12	4	1	0	3	17	76	295
Grand Total	21	256	2	0	2	279	4	68	55	0	17	127	34	198	105	2	11	339	158	61	11	0	14	230	**975**	-
Approach%	7.5%	91.8%	0.7%	0%		-	3.1%	53.5%	43.3%	0%		-	10%	58.4%	31%	0.6%		-	68.7%	26.5%	4.8%	0%		-	-	-
Totals %	2.2%	26.3%	0.2%	0%		28.6%	0.4%	7%	5.6%	0%		13%	3.5%	20.3%	10.8%	0.2%		34.8%	16.2%	6.3%	1.1%	0%		23.6%	-	-
Heavy	0	1	0	0		-	0	0	0	0		-	0	1	0	0		-	2	1	0	0		-	-	-
Heavy %	0%	0.4%	0%	0%		-	0%	0%	0%	0%		-	0%	0.5%	0%	0%		-	1.3%	1.6%	0%	0%		-	-	-
Bicycles	0	2	0	0		-	0	2	0	0		-	1	5	0	0		-	1	2	1	0		-	-	-
Bicycle %	0%	0.8%	0%	0%		-	0%	2.9%	0%	0%		-	2.9%	2.5%	0%	0%		-	0.6%	3.3%	9.1%	0%		-	-	-

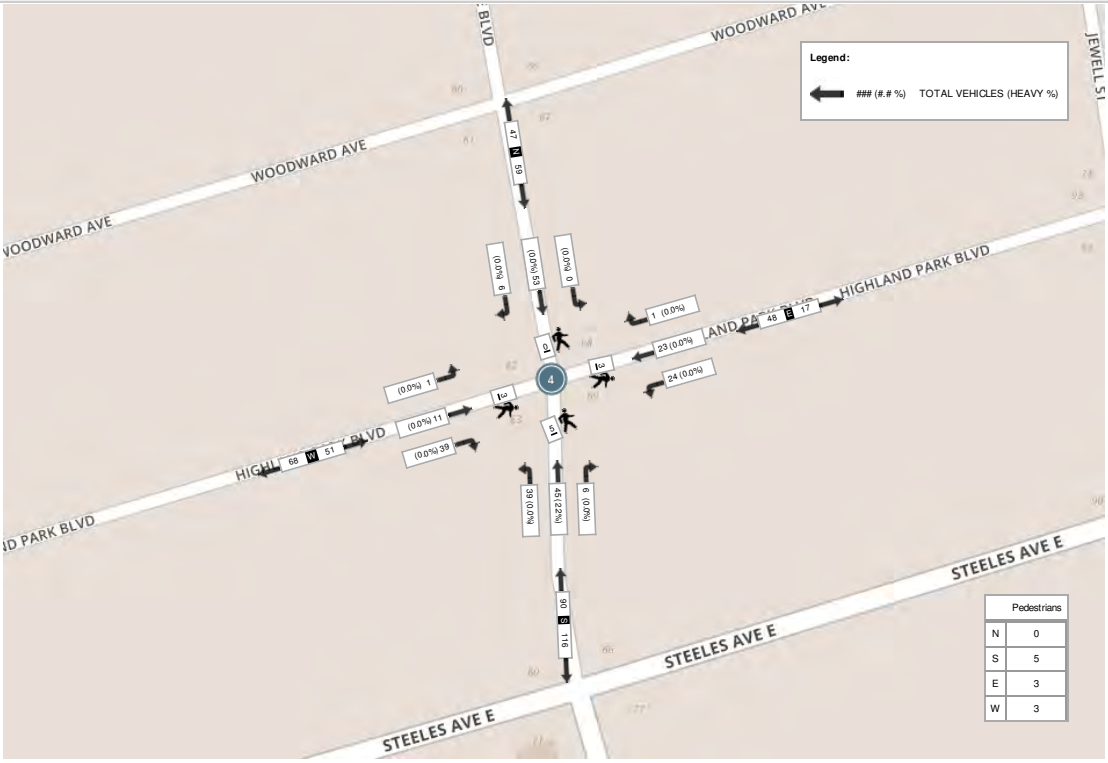
Peak Hour: 08:30 AM - 09:30 AM Weather: Partly Cloudy (26.2 °C)

Start Time	N Approach WILLOWDALE AVE						E Approach HIGHLAND PARK BLVD						S Approach WILLOWDALE AVE						W Approach HIGHLAND PARK BLVD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:30:00	2	9	0	0	0	11	1	5	4	0	2	10	0	17	12	0	1	29	9	3	0	0	0	12	62
08:45:00	2	13	0	0	0	15	0	11	4	0	0	15	2	11	16	0	0	29	8	2	1	0	3	11	70
09:00:00	2	15	0	0	0	17	0	4	11	0	1	15	0	11	6	0	1	17	12	2	0	0	0	14	63
09:15:00	0	16	0	0	0	16	0	3	5	0	0	8	4	6	5	0	3	15	10	4	0	0	0	14	53
Grand Total	6	53	0	0	0	59	1	23	24	0	3	48	6	45	39	0	5	90	39	11	1	0	3	51	**248**
Approach%	10.2%	89.8%	0%	0%		-	2.1%	47.9%	50%	0%		-	6.7%	50%	43.3%	0%		-	76.5%	21.6%	2%	0%		-	-
Totals %	2.4%	21.4%	0%	0%		23.8%	0.4%	9.3%	9.7%	0%		19.4%	2.4%	18.1%	15.7%	0%		36.3%	15.7%	4.4%	0.4%	0%		20.6%	-
PHF	0.75	0.83	0	0		0.87	0.25	0.52	0.55	0		0.8	0.38	0.66	0.61	0		0.78	0.81	0.69	0.25	0		0.91	-
Heavy	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	-
Heavy %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	2.2%	0%	0%		1.1%	0%	0%	0%	0%		0%	-
Lights	6	53	0	0		59	1	23	24	0		48	6	44	39	0		89	39	11	1	0		51	-
Lights %	100%	100%	0%	0%		100%	100%	100%	100%	0%		100%	100%	97.8%	100%	0%		98.9%	100%	100%	100%	0%		100%	-
Single-Unit Trucks	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	-
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	2.2%	0%	0%		1.1%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	5	-	-	-	-	-	3	-	-
Pedestrians%	-	-	-	-	0%		-	-	-	-	27.3%		-	-	-	-	45.5%		-	-	-	-	27.3%		-
Bicycles on Road	0	0	0	0	0	-	0	1	0	0	0	-	0	0	0	0	0	-	0	1	1	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

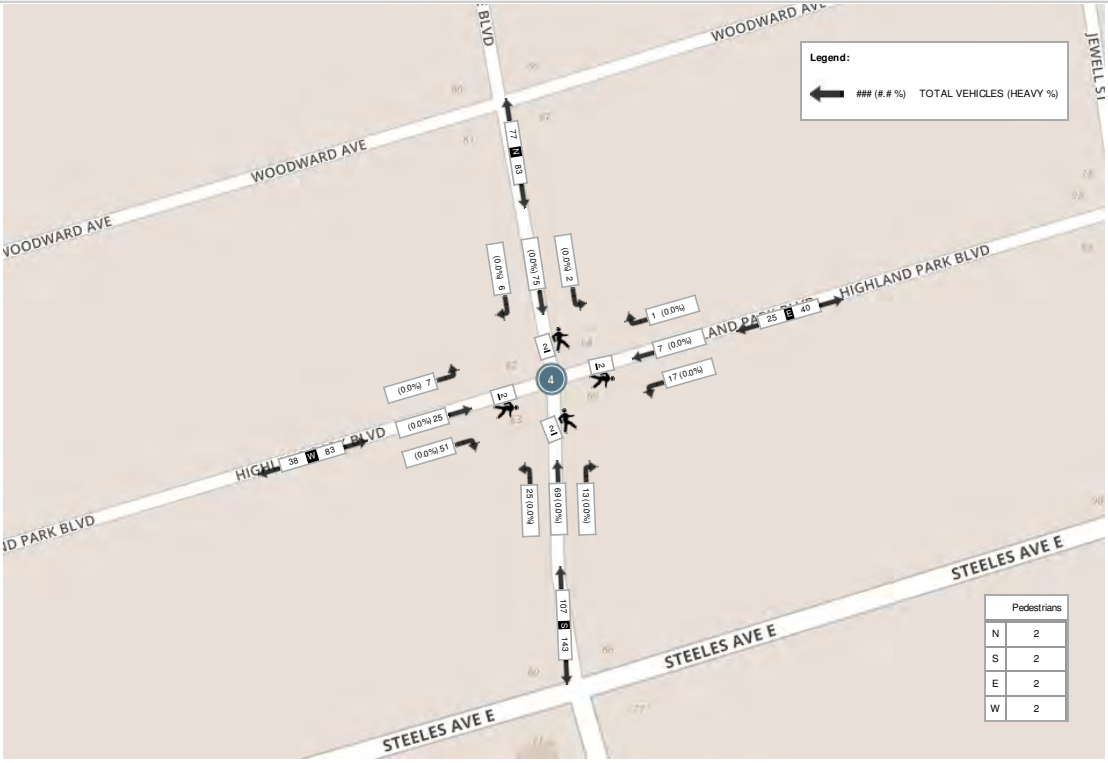
Peak Hour: 04:30 PM - 05:30 PM Weather: Partly Cloudy (35 °C)

Start Time	N Approach WILLOWDALE AVE						E Approach HIGHLAND PARK BLVD						S Approach WILLOWDALE AVE						W Approach HIGHLAND PARK BLVD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:30:00	0	22	2	0	0	24	0	1	5	0	0	6	2	17	9	1	0	29	7	5	1	0	1	13	72
16:45:00	3	17	0	0	0	20	0	4	3	0	0	7	2	19	7	1	0	29	12	9	1	0	0	22	78
17:00:00	0	12	0	0	1	12	0	2	4	0	2	6	3	20	3	0	2	26	10	7	2	0	0	19	63
17:15:00	3	24	0	0	1	27	1	0	5	0	0	6	6	13	6	0	0	25	22	4	3	0	1	29	87
Grand Total	6	75	2	0	2	83	1	7	17	0	2	25	13	69	25	2	2	109	51	25	7	0	2	83	**300**
Approach%	7.2%	90.4%	2.4%	0%		-	4%	28%	68%	0%		-	11.9%	63.3%	22.9%	1.8%		-	61.4%	30.1%	8.4%	0%		-	-
Totals %	2%	25%	0.7%	0%		27.7%	0.3%	2.3%	5.7%	0%		8.3%	4.3%	23%	8.3%	0.7%		36.3%	17%	8.3%	2.3%	0%		27.7%	-
PHF	0.5	0.78	0.25	0		0.77	0.25	0.44	0.85	0		0.89	0.54	0.86	0.69	0.5		0.94	0.58	0.69	0.58	0		0.72	-
Heavy	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Heavy %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Lights	6	75	2	0		83	1	7	17	0		25	13	69	25	2		109	51	25	7	0		83	-
Lights %	100%	100%	100%	0%		100%	100%	100%	100%	0%		100%	100%	100%	100%	100%		100%	100%	100%	100%	0%		100%	-
Single-Unit Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-	2	-	-
Pedestrians%	-	-	-	-	25%		-	-	-	-	25%		-	-	-	-	25%		-	-	-	-	25%		-
Bicycles on Road	0	0	0	0	0	-	0	1	0	0	0	-	0	2	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 08:30 AM - 09:30 AM Weather: Partly Cloudy (26.2 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Partly Cloudy (35 °C)



Project No: 7923-01 **Peak Hour: 8:30-9:30**
Project Name: 36 Steeles
Study Location: Dudley Avenue & 18 Steeles Ave E Driveway
Municipality: Toronto
Study Date: 2018-07-05
Study Time: 7:30-9:30

	Turning Movement						
	Enter		Exit				
Time Period Start	NBL	SBR	EBL	EBR	15 Min Total	60 Min Total	PHF
7:30 AM			1	1	2	6	
7:45 AM			1	1	2	8	
8:00 AM			1		1	11	
8:15 AM			1		1	14	
8:30 AM		1	2	1	4	17	0.85
8:45 AM		2	1	2	5	0	
9:00 AM		2	1	1	4	0	
9:15 AM	1	2		1	4	0	

Project No: 7923-01 **Peak Hour: 4:30-5:30**
Project Name: 36 Steeles
Study Location: Dudley Avenue & 18 Steeles Ave E Driveway
Municipality: Toronto
Study Date: 2018-07-05
Study Time: 4:00-6:00

	Turning Movement						
	Enter		Exit				
Time Period Start	NBL	SBR	EBL	EBR	15 Min Total	60 Min Total	PHF
4:00 PM					0	9	
4:15 PM			2		2	14	
4:30 PM	2	1	1		4	15	0.9375
4:45 PM	1		2		3	14	
5:00 PM	1	2		2	5	14	
5:15 PM	1	1		1	3	0	
5:30 PM		2		1	3	0	
5:45 PM	1	1	1		3	0	

APPENDIX J:
Signal Timing Plans

CITY OF TORONTO – TRANSPORTATION SERVICES
ITS OPERATIONS – TRAFFIC SIGNALS
703 Don Mills Rd, Fifth Floor, Toronto ON M3C 3N3
Phone: 416-397-5770 Fax: 416-397-5777

CURRENT SIGNAL TIMING INFORMATION

Location: Yonge St & Steeles Ave West
TCS/SCN: 131 / 10811
Our Ref.: 2018_0190
Staff: EN/TZ
Date: July 4, 2018
Controller Type: Peek ATC-1000 / TS2T1
Mode of Control: FXT with RLC(NB)
Design Walk Speed: 1.0 m/s (FDW based on full crossing @ 1.2 m/s)
N/S FDW Duration: 24 seconds
E/W FDW Duration: 27 seconds
Issued to: BA Consulting Group Ltd. (Marie Y. Wong)

Control Level	TYPICAL				SCOOT			
Plan	OFF PEAK	AM PEAK	PM PEAK	NIGHT	OFF PEAK	AM PEAK	PM PEAK	NIGHT
Time of Operation	All Other Times	06:30-10:00, M-F	15:00-20:00, M-F	00:15-05:45, Daily	All Other Times	06:30-10:00, M-F	15:00-20:00, M-F	00:15-05:45, Daily
Signal Aspect								
North-South Phase								
*NBLA/NBG/NSWK(E. Side) or **SBLA/SBG/NSWK(W.Side) or NSLA/NSDW	9	7	12	-	6-26	6-34	6-34	-
*NBYA/NBG/NSWK(E. Side) or **SBYA/SBG/NSWK(W.Side) or NSYA/NSDW	3	3	3	-	3	3	3	-
*NBG/NSWK(E.Side) or **SBG/NSWK(W.Side) or ALLR	1	1	1	-	1	1	1	-
NSG/NSWK	18	28	21	24	8-28	8-36	8-36	8-48
NSG/NSFD	24	24	24	24	24	24	24	24
NSY/NSDW	4	4	4	4	4	4	4	4
ALLR	3	3	3	3	3	3	3	3
East-West Phase								
***EBLA/EBG/EWWK(S.Side) or ****WBLA/WBG/EWWK(N.Side) or EWLA/EWDW	10	10	10	-	6-26	6-34	6-34	-
***EBYA/EBG/EWWK(S.Side) or ****WBYA/WBG/EWWK(N.Side) or EWYA/EWDW	3	3	3	-	3	3	3	-
***EBG/EWWK(S.Side) or ****WBG/EWWK(N.Side) or ALLR	1	1	1	-	1	1	1	-
EWG/EWWK	10	10	12	15	7-27	7-35	7-35	7-47
EWG/EWFD	27	27	27	27	27	27	27	27
EWY/EWDW	4	4	4	4	4	4	4	4
ALLR	3	3	3	3	3	3	3	3
Cycle Length/Range	120	128	128	104	104-120	104-128	120-128	80-120

NOTES:
*NBLA callable all times except 00:15 - 05:45 daily. Unused time allocated to NSG.
**SBLA callable all times except 00:15 - 05:45 daily. Unused time allocated to NSG.
***EBLA callable all times except 00:15 - 05:45 daily. Unused time allocated to EWG.
****WBLA callable all times except 00:15 - 05:45 daily. Unused time allocated to EWG.
SCOOT cycle lengths between 32 - 64 may change by 4 second increments, between 64 - 128 by 8 second increments and above 128 by 16 second increments. SCOOT may change the cycle length by one increment at a time every 150 seconds.

CITY OF TORONTO – TRANSPORTATION SERVICES
ITS OPERATIONS – TRAFFIC SIGNALS
703 Don Mills Rd, Fifth Floor, Toronto ON M3C 3N3
Phone: 416-397-5770 Fax: 416-397-5777

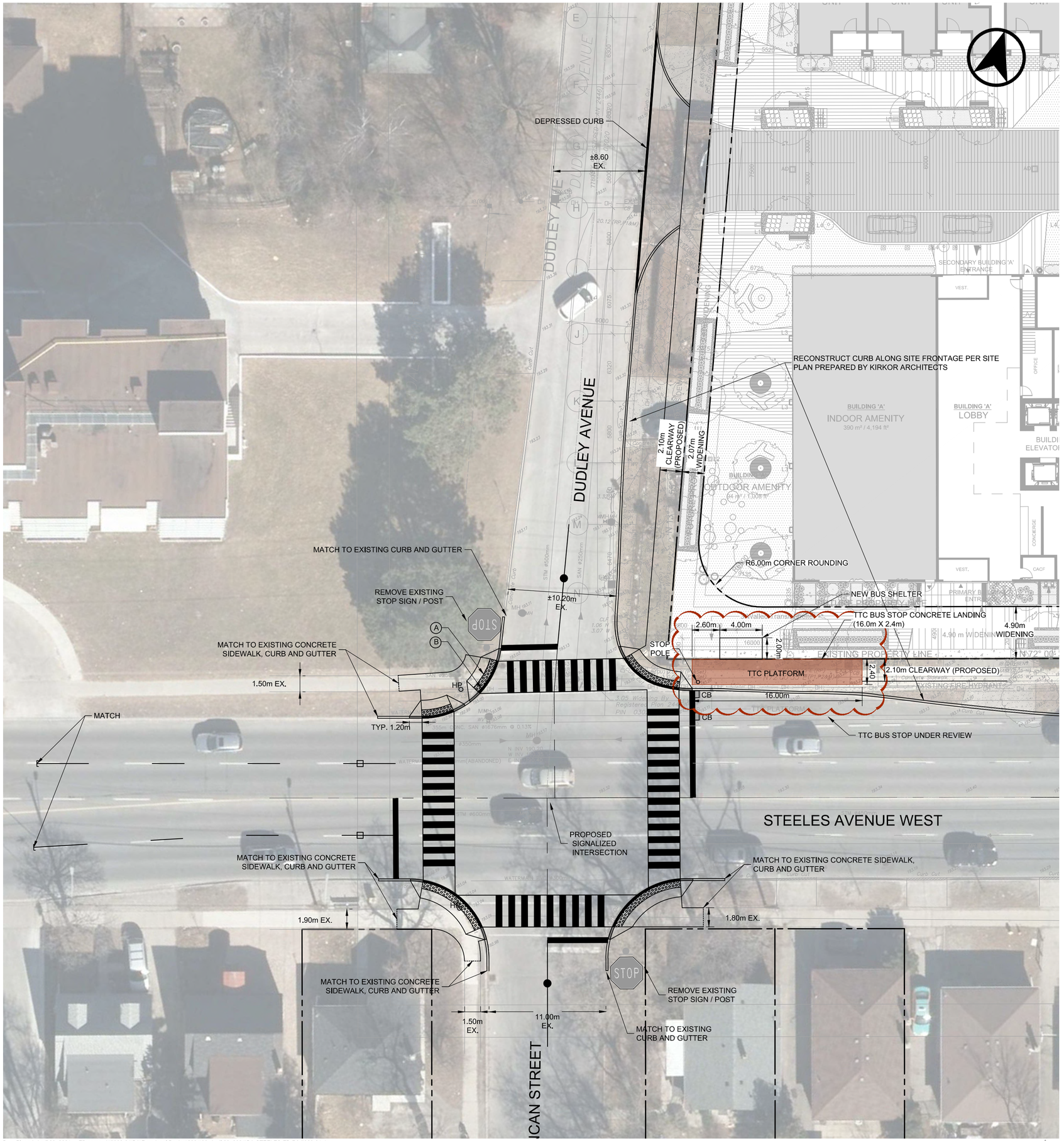
CURRENT SIGNAL TIMING INFORMATION

Location: Steeles Avenue East & Willowdale Avenue
TCS/SCN: 986/60431
Our Ref: 2018_0190
Staff: EN/TZ
Date: July 4, 2018
Controller Type: PEEK ATC-1000 / TS2 T1
Mode of Control: SA2-VMG with PR
Design Walk Speed: 1.0 m/s (FDW based on full crossing @ 1.2 m/s)
N/S FDW Duration: 16 seconds
E/W FDW Duration: 13 seconds
Issued to: BA Consulting Group Ltd. (Marie Y. Wong)

Control Level	TYPICAL			SCOOT		
Plan	OFF	AM	PM	OFF PEAK	AM PEAK	PM PEAK
Time of Operation	ALL OTHER TIMES	06:30 - 10:00, M-F.	15:00 - 19:00, M-F.	ALL OTHER TIMES	06:30-10:00, M-F	15:00-19:00, M-F
Signal Aspect						
East-West Phase						
*WBLA/WBG/EWWK (North Side Only)	-	26	10	-	7-58	7-43
*WBYA/WBG/EWWK (North Side Only)	-	3	3	-	3	3
*WBG/EWWK (North Side Only)	-	1	1	-	1	1
EWG/EWWK or EWG/EWDW	40	23	24	8-72	8-59	8-44
EWG/EWFD or EWG/EWDW	13	13	13	13	13	13
EWY/EWDW	4	4	4	4	4	4
ALLR	2	2	2	2	2	2
North-South Phase						
**NBLA/NBG/NSWK (East Side Only)	-	7	21	-	6-57	21-57
**NBYA/NBG/NSWK (East Side Only)	-	3	3	-	3	3
**NBG/NSWK (East Side Only)	-	1	1	-	1	1
***NSG/NSWK or NSG/NSDW	23	23	24	7-71	7-58	7-43
***NSG/NSFD or NSG/NSDW	16	16	16	16	16	16
***NSY/NSDW	4	4	4	4	4	4
ALLR	2	2	2	2	2	2
Cycle Length/Range	104	128	128	104-120	104-128	120-128

NOTES:
*WBLA callable 06:30-10:00 & 15:00-19:00, Mon-Fri by setback loop
**NBLA callable 06:30-10:00 & 15:00-19:00, Mon-Fri by setback loop
***NS phase is callable by vehicle or pedestrian actuation. If a vehicle call is received, the minimum NSG is 7 seconds. If ongoing vehicle demand exists on the stopbar loop, the NSG is capable of providing vehicle extensions up to the maximum. If a pedestrian call is received, the pedestrian minimums will be served. The NSWK & NSFD are only displayed on the pedestrian signal heads if a pedestrian call is received. Extension time is based on vehicle demand. Unused extension time is given to the EWG.
SCOOT cycle lengths between 32 - 64 may change by 4 second increments, between 64 - 128 by 8 second increments and above 128 by 16 second increments. SCOOT may change the cycle length by one increment at a time every 150 seconds.

APPENDIX K:
Functional Design Drawings



Date Plotted: April 23, 2021 Filename: J:\7923-01\BA\Functional Design\2021\02. April 23, 2021\BA-STEELES-FD-R0-7923-01.dwg

LEGEND:

CB CATCH BASIN (EXISTING)
HP HYDRO POLE (EXISTING)
--- SIDEWALK - MATCH TO EXISTING

SIGNAGE LEGEND

Ex. Ra-1
(600 x 600)mm

SIGN MOUNT LEGEND

ALL SIGNS ARE SHOWN IN APPROXIMATE LOCATIONS AND TO BE DETERMINED ON SITE. SIGNS MUST BE VISIBLE TO DRIVER AND NOT OBSTRUCTED BY LANDSCAPE.

EXISTING POST

PAVEMENT MARKING:

(NOTE-ALL MARKINGS MUST CONFORM TO THE ONTARIO TRAFFIC MANUAL (OTM) BOOK 11

10cm (4 in.) WHITE SOLID

10cm (4 in.) YELLOW SOLID

10cm (4 in.) WHITE (3m (10 ft.) LINE, 3m (10 ft.) GAP))

DENOTES LIMIT OF SYMBOLS

ALL STOP BARS TO BE 60cm (2 ft.) WHITE SOLID

PEDESTRIAN CROSSING
- COLD PLASTIC "POLYMERIC"
- WIDTH AS SHOWN
- PATTERN: 60cm PAINTED, 60cm GAP
- TRAFFIC WHITE

NOTES:

A. TACTILE WALKING SURFACE INDICATOR AND CURB RAMP DETAIL DESIGNED AS PER CITY OF TORONTO STANDARD T.310.030-10

B. CONCRETE DROPPED CURB AND GUTTER DETAIL ACCORDING TO T-310.030-10

C. SIGNALIZED INTERSECTION CONFIGURATION DESIGNED AS PER CITY OF TORONTO STANDARD T.310.030-7

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MOVEMENT IN URBAN ENVIRONMENTS
BAGROUP.COM

36-48 STEELES AVENUE

STEELES AVE WEST / DUDLEY AVENUE PROPOSED SIGNALIZED INTERSECTION

Date: APRIL 23, 2021

Project No.: 7923-01

Scale: 1:250

0 5 10m

FD-01